TP205A

Gas burners

MANUAL OF INSTALLATION - USE - MAINTENANCE

BURNERS - BRUCIATORI - BRULERS - BRENNER - QUEMADORES - ГОРЕЛКИ

M039705CA 0.1 10/2023

DANGERS, WARNINGS AND NOTES OF CAUTION

This manual is supplied as an integral and essential part of the product and must be delivered to the user.

Information included in this section are dedicated both to the user and to personnel following product installation and maintenance.

The user will find further information about operating and use restrictions, in the second section of this manual. we highly recommend to read it.

Carefully keep this manual for future reference.

The following:

- Entails the customer's acknowledgement and acceptance of the company's general terms and conditions of sale, in force at the date of order confirmation and available in the appendix to the current price lists.
- Is intended exclusively for specialised, experienced and trained users able to operate in conditions that are safe for people, the device and the environment, and in full compliance with the requirements set out on the following pages and with current health and safety regulations.

Information regarding assembly/installation, maintenance, replacement and repair is always and exclusively intended for (and therefore only to be carried out by) specialised personnel and/or directly by the Authorised Technical Service

IMPORTANT :

The supply has been made at the best conditions on the basis of the customer's order and technical indications concerning the state of the places and the installation systems, as well as the need to prepare certain certifications and / or additional adaptations with respect to the standard observed and transmitted for each product. In this respect, the manufacturer declines any responsibility for complaints, malfunctions, criticalities, damages and/or anything else consequent to incomplete, inaccurate and/or missing information, as well as failure to comply with the technical requirements and installation regulations, initial start-up, operational management and maintenance.

For proper operation of the device, it is necessary to ensure the readability and conservation of the manual, also for future reference. In case of deterioration or more simply for reasons of technical and operational insight, contact the manufacturer directly. Text, descriptions, images, examples and anything else contained in this document are the exclusive property of the manufacturer. Any reproduction is prohibited.

RISK ANALYSIS

Instruction manual delivered with the device:

This is an integral and essential part of the product and must not be separated from it. It must therefore be kept carefully for any necessary consultation and must accompany the burner even if it is transferred to another owner or user, or to another system. In the event of damage or loss, another copy must be requested from the local customer service centre;

Delivery of the system and instruction manual

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The supplier of the system is obliged to accurately inform the user about:– Use of the system;

– any further testing that may be necessary before activating the system;

– maintenance and the requirement to have the system checked at least once a year by a contractor or other specialised technician.

To ensure periodic monitoring, the manufacturer recommends drawing up a Maintenance Agreement.

WARRANTY AND LIABILITY

In particular, warranty and liability claims will no longer be valid in the event of damage to persons and/or property if such damage is due to any of the following causes:

- Incorrect installation, start-up, use and maintenance of the burner;
- Improper, incorrect or unreasonable use of the burner;
- Operation by unqualified personnel;
- Carrying out of unauthorised changes to the device;
- Use of the burner with safety devices that are faulty, incorrectly applied and/or not working;
- Installation of untested supplementary components on the burner;
- Powering of the burner with unsuitable fuels;
- Faults in the fuel supply system;
- Use of the burner even after an error and/or fault has occurred;
- Repairs and/or overhauls incorrectly carried out;
- Modification of the combustion chamber with inserts that prevent the regular development of the structurally established flame;
- Insufficient and inappropriate supervision and care of the burner components most subject to wear and tear;
- Use of non-original components, whether spare parts, kits, accessories and optionals;
- Force majeure.

Furthermore, the manufacturer declines all responsibility for non-compliance with this manual.



WARNING! Failure to comply with this manual, operational negligence, incorrect installation and unauthorised modifications will result in the manufacturer's warranty for the burner being voided.

Personnel training

The user is the person, organisation or company that has acquired the appliance and intends to use it for the specific purpose. The user is responsible for the appliance and for training the personnel that operate it.

The user:

- Undertakes to entrust the machine to suitably trained and qualified personnel;
- Must take all measures necessary to prevent unauthorised people gaining access to the appliance;
- Undertakes to adequately inform personnel about application and observance of the safety requirements, and therefore ensure that they are familiar with the operating instructions and safety requirements;
- Must inform the manufacturer if any faults or malfunctions of the accident prevention systems occur, and if there is any suspected danger;
- Personnel must always use the personal protective equipment required by law and follow the instructions provided in this manual;
- Personnel must observe all danger and caution notices on the appliance;
- Personnel must not carry out, on their own initiative, operations or interventions outside their area of expertise;
- Personnel must inform their superiors of any problem and danger that may arise;
- The assembly of parts of other makes, or any modifications made, may alter the characteristics of the appliance and may therefore compromise operational safety. The manufacturer therefore declines all responsibility for damages arising from the use of non-original parts.

GENERAL INTRODUCTION

- The equipment must be installed in compliance with the regulations in force, following the manufacturer's instructions, by qualified personnel.
- Qualified personnel means those having technical knowledge in the field of components for civil or industrial heating systems, sanitary hot water generation and particularly service centres authorised by the manufacturer.
- Improper installation may cause injury to people and animals, or damage to property, for which the manufacturer cannot be held liable.
- Remove all packaging material and inspect the equipment for integrity.

In case of any doubt, do not use the unit - contact the supplier.

The packaging materials (wooden crate, nails, fastening devices, plastic bags, foamed polystyrene, etc), should not be left within the reach of children, as they may prove harmful.

- Before any cleaning or servicing operation, disconnect the unit from the mains by turning the master switch OFF, and/or through the cutout devices that are provided.
- Make sure that inlet or exhaust grilles are unobstructed.
- In case of breakdown and/or defective unit operation, disconnect the unit. Make no attempt to repair the unit or take any direct action.

Contact qualified personnel only.

Units shall be repaired exclusively by a servicing centre, duly authorised by the manufacturer, with original spare parts and accessories.

Failure to comply with the above instructions is likely to impair the unit's safety.

To ensure equipment efficiency and proper operation, it is essential that maintenance operations are performed by qualified personnel at regular intervals, following the manufacturer's instructions.

- When a decision is made to discontinue the use of the equipment, those parts likely to constitute sources of danger shall be made harm-

less.

- In case the equipment is to be sold or transferred to another user, or in case the original user should move and leave the unit behind, make sure that these instructions accompany the equipment at all times so that they can be consulted by the new owner and/or the installer.
- This unit shall be employed exclusively for the use for which it is meant. Any other use shall be considered as improper and, therefore, dangerous.

The manufacturer shall not be held liable, by agreement or otherwise, for WARNING! Failure to observe the information given in this manual, operating negligence, incorrect installation and carrying out of non authorised modifications will result in the annulment by the manufacturer of the guarantee that it supplies with the burner.

The damages resulting from improper installation, use and failure to comply with the instructions supplied by the manufacturer.The occurrence of any of the following circustances may cause explosions, polluting unburnt gases (example: carbon monoxide CO), burns, serious harm to people, animals and things:

- Failure to comply with one of the WARNINGS in this chapter
- Incorrect handling, installation, adjustment or maintenance of the burner
- Incorrect use of the burner or incorrect use of its parts or optional supply

SPECIAL INSTRUCTIONS FOR BURNERS

a Make the following checks:

- • the burner should be installed in a suitable room, with ventilation openings complying with the requirements of the regulations in force, and sufficient for good combustion;
- • only burners designed according to the regulations in force should be used;
- • this burner should be employed exclusively for the use for which it was designed;
- • before connecting the burner, make sure that the unit rating is the same as delivery mains (electricity, gas oil, or other fuel);
- • observe caution with hot burner components. These are, usually, near to the flame and the fuel pre-heating system, they become hot during the unit operation and will remain hot for some time after the burner has stopped.

When the decision is made to discontinue the use of the burner, the user shall have qualified personnel carry out the following operations:

a • remove the power supply by disconnecting the power cord from the mains;

b • disconnect the fuel supply by means of the hand-operated shutoff valve and remove the control handwheels from their spindles.

Special warnings

- Make sure that the burner has, on installation, been firmly secured to the appliance, so that the flame is generated inside the appliance firebox.
- Before the burner is started and, thereafter, at least once a year, have qualified personnel perform the following operations:
  - a set the burner fuel flow rate depending on the heat input of the appliance;
  - b set the flow rate of the combustion-supporting air to obtain a combustion efficiency level at least equal to the lower level required by the regulations in force;
  - c check the unit operation for proper combustion, to avoid any harmful or polluting unburnt gases in excess of the limits permitted by the regulations in force;
  - d make sure that control and safety devices are operating properly;
  - e make sure that exhaust ducts intended to discharge the products of combustion are operating properly;
  - f on completion of setting and adjustment operations, make sure that all mechanical locking devices of controls have been duly tightened;
  - g make sure that a copy of the burner use and maintenance instructions is available in the boiler room.
- In case of a burner shut-down, reser the control box by means of the RESET pushbutton. If a second shut-down takes place, call the Technical Service, without trying to RESET further.
- The unit shall be operated and serviced by qualified personnel only, in compliance with the regulations in force.

GENERAL INSTRUCTIONS DEPENDING ON FUEL USED

ELECTRICAL CONNECTION

- For safety reasons the unit must be efficiently earthed and installed as required by current safety regulations.
- It is vital that all saftey requirements are met. In case of any doubt, ask for an accurate inspection of electrics by qualified personnel, since the manufacturer cannot be held liable for damages that may be caused by failure to correctly earth the equipment.
- Qualified personnel must inspect the system to make sure that it is adequate to take the maximum power used by the equipment shown on the equipment rating plate. In particular, make sure that the system cable cross section is adequate for the power absorbed by the unit.
- No adaptors, multiple outlet sockets and/or extension cables are permitted to connect the unit to the electric mains.
- An omnipolar switch shall be provided for connection to mains, as required by the current safety regulations.
- The use of any power-operated component implies observance of a few basic rules, for example:
  - do not touch the unit with wet or damp parts of the body and/or with bare feet;
  - do not pull electric cables;
  - do not leave the equipment exposed to weather (rain, sun, etc.) unless expressly required to do so;
  - do not allow children or inexperienced persons to use equipment;
- The unit input cable shall not be replaced by the user. In case of damage to the cable, switch off the unit and contact qualified personnel to replace.

When the unit is out of use for some time the electric switch supplying all the power-driven components in the system
should be switched off.

FIRING WITH GAS, LIGHT OIL OR OTHER FUELS GENERAL

General Warnings

- The burner shall be installed by qualified personnel and in compliance with regulations and provisions in force; wrong installation can cause injuries to people and animals, or damage to property, for which the manufacturer cannot be held liable.
- Before installation, it is recommended that all the fuel supply system pipes be carefully cleaned inside, to remove foreign matter that might impair the burner operation.
- Before the burner is commissioned, qualified personnel should inspect the following:
  - a the fuel supply system, for proper sealing;
  - b the fuel flow rate, to make sure that it has been set based on the firing rate required of the burner;
  - c the burner firing system, to make sure that it is supplied for the designed fuel type;
  - d the fuel supply pressure, to make sure that it is included in the range shown on the rating plate;
  - e the fuel supply system, to make sure that the system dimensions are adequate to the burner firing rate, and that the system is equipped with all the safety and control devices required by the regulations in force.
- When the burner is to remain idle for some time, the fuel supply tap or taps should be closed.

Special instructions for using gas

Have qualified personnel inspect the installation to ensure that:

- a the gas delivery line and train are in compliance with the regulations and provisions in force;
- b all gas connections are tight;
- c the boiler room ventilation openings are such that they ensure the air supply flow required by the current regulations, and in any case are sufficient for proper combustion.
- Do not use gas pipes to earth electrical equipment.
- Never leave the burner connected when not in use. Always shut the gas valve off.
- In case of prolonged absence of the user, the main gas delivery valve to the burner should be shut off.

Precautions if you can smell gas

a do not operate electric switches, the telephone, or any other item likely to generate sparks;

b immediately open doors and windows to create an air flow to purge the room;

c close the gas valves;
d contact qualified personnel.

- Do not obstruct the ventilation openings of the room where gas appliances are installed, to avoid dangerous conditions such as the development of toxic or explosive mixtures.

Using oil pressure gauges

Generally, pressure gauges are equipped with a manual valve. Open the valve only to take the reading and close it immediately afterwards.

Safety and prevention

- Opening or tampering with the burner components is not allowed, apart from the parts requiring maintenance.
- Only those parts envisaged by the manufacturer can be replaced.

SYMBOLS USED

	***WARNING***	Failure to observe the warning may result in irreparable damage (electrical or meccanichal source respectively) to the unit or damage to the environment
	***DANGER!***	Failure to observe the warning may result in serious injuries or death (electrical or meccanichal source respectively).
	***NOTE***	This symbol distinguishes warnings of an annotative, reminder, general nature

BURNER SAFETY

The burners- and the configurations described below - comply with the regulations in force regarding health, safety and the environment. For more in-depth information, refer to the declarations of conformity that are an integral part of this Manual.

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DANGER! Incorrect motor rotation can seriously damage property and injure people.



.Do not touch any mechanical moving parts with your hands or any other part of your body. Injury hazard

Do not touch any parts containing fuel (i.e. tank and pipes). Scalding hazard

Do not use the burner in situations other than the ones provided for in the data plate.

Do not use fuels other than the ones stated.

Do not use the burner in potentially explosive environments.

Do not remove or by-pass any machine safety devices.

Do not remove any protection devices or open the burner or any other component while the burner is running.

Do not disconnect any part of the burner or its components while the burner is running.

Untrained staff must not modify any linkages.



- After any maintenance, it is important to restore the protection devices before restarting the machine.
- All safety devices must be kept in perfect working order.
- Personnel authorized to maintain the machine must always be provided with suitable protections.



ATTENTION: while running, the parts of the burner near the generator (coupling flange) are subject to overheating. Where necessary, avoid any contact risks by wearing suitable PPE.

DIRECTIVES AND STANDARDS

Gas burners

European directives

2016/426/UE (appliances burning gaseous fuels)
2014/35/UE (Low Tension Directive)
2014/30/UE (Electromagnetic compatibility Directive)
2006/42/CE (Machinery Directive)

Harmonized standards

UNI EN 676 (Automatic forced draught burners for gaseous fuels)
EN 55014-1 (Electromagnetic compatibility- Requirements for house hold appliances, electric tools and similar apparatus)
EN 60204-1:2006 (Safety of machinery – Electrical equipment of machines.)
CEI EN 60335-1 (Specification for safety of household and similar electrical appliances);
CEI EN 60335-2-102 (Household and similar electrical appliances. Safety. Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections).
UNI EN ISO 12100:2010 (Safety of machinery - General principles for design - Risk assessment and risk reduction);

Industrial burners

European directives

2006/42/CE (Machinery Directive)
2014/35/UE (Low Tension Directive)
2014/30/UE (Electromagnetic compatibility Directive)
2006/42/CE (Machinery Directive)

Harmonized standards

EN 746-2 (Industrial thermoprocessing equipment - Part 2: Safety requirements for combustion and fuel handling systems)
EN 55014-1 (Electromagnetic compatibility- Requirements for house hold appliances, electric tools and similar apparatus)
EN 60204-1:2006 (Safety of machinery – Electrical equipment of machines.)
CEI EN 60335-1 (Specification for safety of household and similar electrical appliances);
UNI EN ISO 12100:2010 (Safety of machinery - General principles for design - Risk assessment and risk reduction);

BURER DATA PLATE

For the following information, please refer to the data plate:

- Burner type and burner model: must be reported in any communication with the supplier
- Burner ID (serial number): must be reported in any communication with the supplier
- Date of production (year and month)
- Information about fuel type and network pressure

	Consump
Type	--
Model	--
Year	--
S.Number	--
Output	--
Oil Flow	--
Fuel	--
Category	--
Gas Pressure	--
Viscosity	--
El.Supply	--
El.Consump.	--
Fan Motor	--
Protection	--
Drwaing n°	--
P.I.N.	--

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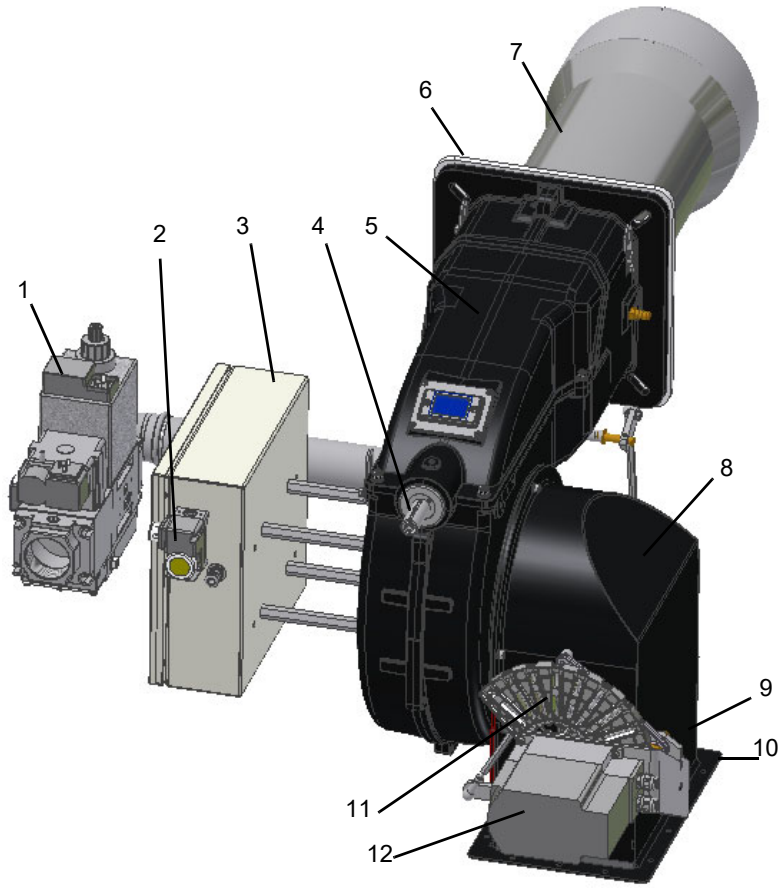
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PART I: INSTALLATION MANUAL



Note: the figure is indicative only

1 Gas train
2 Air pressure switch
3 Junction box
4 Combustion head adjusting screw
5 Cover
6 Burner flange
7 Blast tube + Combustion head
8 Silencer
9 Bellows
10 Air inlet flange
11 Actuator
12 Adjusting cam

Gas operation: the gas coming from the supply line passes through filter, gas valves and pressure regulator. This one forces the pressure in the utilisation limits. The electric actuator , that moves proportionally the air damper and the gas butterfly valve, uses an adjusting cam with variable shape. This one allows the optimisation of the gas flue values, as to get an efficient combustion. The combustion head positioning determines the burner's output. The combustion head determines the energetic quality and the geometry of the flame. Fuel and comburent are routed into separated ways as far as the zone of flame generation (combustion chamber).

The control panel , placed on the burner's front side, shows each operating stage.

Gas categories and countries of application

Countries					
AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MK, MT, NO, NL, PL, PT, RO, SE, SI, SK, TR					
***Models:* "...M-...", "...MG...", "...MN...", "...ME...", "...MD..."**			***Models:* "...L-...", "...LG...", "...LN..."**		
Group			**Group**		
E	LL	Er	B/P	B	P
H	L	E (R)	3R		
EK	2R				

The above gas groups can be combined according to the standard EN437:2021 and national situation of countries.

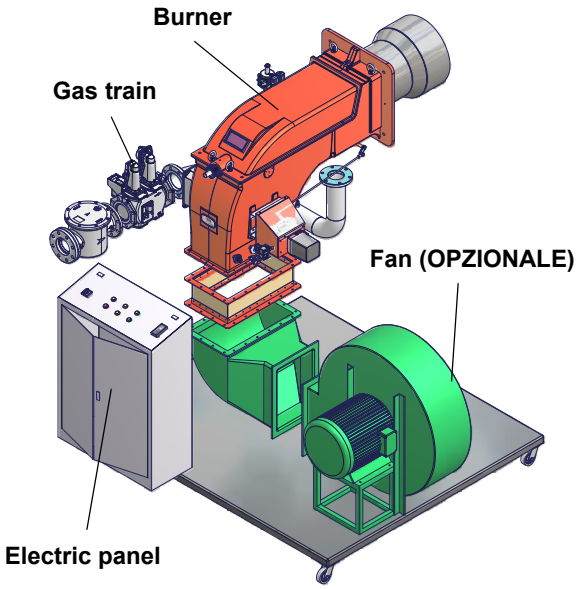
Type of fuel used

DANGER! The burner must be used only with the fuel specified in the burner data plate.

Type	--
Model	--
Year	--
S.Number	--
Output	--
Oil Flow	--
Fuel	--
Category	--
Gas Pressure	--
Viscosity	--
El.Supply	--
El.Consump.	--

GENERAL FEATURES

This series of industrial burners is designed for all those applications that require big-sized air fans or air-flue heat exchangers to be installed in sound-proof areas to reduce noise. They can be provided with built-in or separate-mounted control panel (console or wall-mounted).



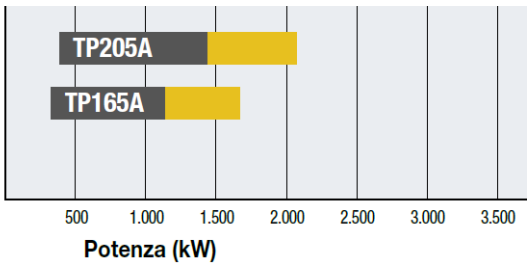
Note: the picture shows one of the possible installations. Fan and electrical panel can be placed according to the customer needs.

How to select the burner

To check if the burner is suitable for the boiler to which it must be installled, the following parameters are needed:

- fuel
- furnace input, in kW or kcal/h (kW = kcal/h / 860);
- boiler type;
- combustion chamber type (3-smoke pass, reverse flame, other)
- temperature or pressure of the thermal carrier fluid
- Comburent air temperature
- Air duct positioning
- Pressure in the combustion chamber
- Elevation (altitude) of burner installation
- Gas train (only for gas burners)
- Pumping unit (only for light-oil or heavy-oil burners)
- Air fan
- Bilt-in or separated control panel
- backpressure (data are available on the boiler's ID plate or in the user's manual).

Burners provided with built-in control panel are designed for IP40 index of protection. For other values of IP, please contact the manufacturer Technical Dpt.



Burner performance range

Data requested:

- furnace input;
- air temperature
- altitude
- generator pressure or temperature

Example:

- furnace input: 9600kW
- air temperature: 15°C
- altitude: 0m

See the diagram in , as to find the burners that better suite the power range requested in the exmple (9600kW). Once the models are founded out, the choice regards technical and economical features. Technical features can be summarised in a higher modulation ratio (fewer start-ups, less consumption, fewer swigings in the generator temperature and pressure values.

Burner model identification

Burners are identified by burner type and model. Burner model identification is described as follows.

Type	**TP205A**	Model	**M-.**	**PR.**	**S-.**	***.**	**E.**	**1.**	**50.**
	(1)		**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**

1	Burner type	**TP205A**
2	Fuel	M - Natural gas, L - LPG
3	Operation	PR - Progressive, MD - Fully modulating, AB - Double stage
4	Blast tube and air inlet configuration	S - Standard L - Extended
5	Destination country	* - see data plate
6	Burner version	A - Standard, E- Junction box, Y - Special
7	Equipment	0 = 2 gas valves 1 = 2 gas valves + gas proving system 7 = 2 gas valves + maximum gas pressure switch 8 = 2 gas valves + gas proving system + maximum gas pressure switch
8	Gas connection	40 = $Rp1_{1/2}$, 50 = Rp2, 65 = DN65 , 80 = DN80

Burner performance

		TP205A M-..	**TP205A L-..**
Output	min. - max. kW	340 - 2050	340 - 2050
Fuel		M - Natural gas	L - LPG
Category		(see next paragraph)	$I_{3B/P}$
Protection		IP40	
Operation		Progressive - Fully modulating	
Operating temperature	°C	-10 ÷ +50	
Storage Temperature	°C	-20 ÷ +60	
Working service		(5)	

Electrical data 50 Hz

Possible voltages, check the actual three-phase and single-phase supply voltage on the burner nameplate.

Power supply	V	220 V / 230 V 3~ - 380 V / 400 V 3N ~ 50 Hz	
	Hz	**50**	
Total power consumption	kW	0,5	0,5

Electrical data 60 Hz

Possible voltages, check the actual three-phase and single-phase supply voltage on the burner nameplate.

Power supply	V	110 / 120 / 230 2 a.c.	
	Hz	**60**	
Total power consumption	kW	0,5	0,5

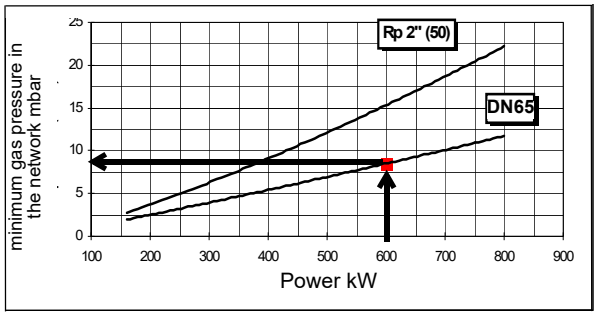
Fuel data

gas rate- Natural gas (1)	min.- max. (Stm^3/h)	36 - 217	-
gas rate-		-	12,7 - 77
Gas pressure (2)	mbar	(see Note 2)	

Note 1:	All gas flow rates are referred to Stm^3 / h (1.013 mbar absolute pressure, 15 °C temperature) and are valid for G20 gas (net calorific value H_i = 34,02 MJ / Stm^3); for L.P.G. (net calorific value H_i = 93,5 MJ / Stm^3).	
Note 2:	Maximum gas pressure	360 mbar (with Dungs MBDLE).
		500 mbar (with Siemens VGD or Dungs MultiBloc MBE).
	Minimum gas pressure	see gas curves
Note 3:	Burners are suitable only for indoor operation with a maximum relative humidity of 80 %.	
Note 4:	With electrode: for safety reasons the burner must stop automatically every 24 hours.	
Note 5:	The type of service can be continuous (flame signal presence for more than 24 h without any stop) or intermittent (at least once every 24 h there is a work stoppage and the flame is extinguished) depending on the configuration ordered. Operation can be continuous in the presence of flame detection via ION ionisation or Siemens QRI..., QRA5..., QRA7... or Lamtec FSS... with Siemens LMV37x or LMV5x flame control equipment (BMS) and Lamtec BT3...	

Checking the proper gas train size

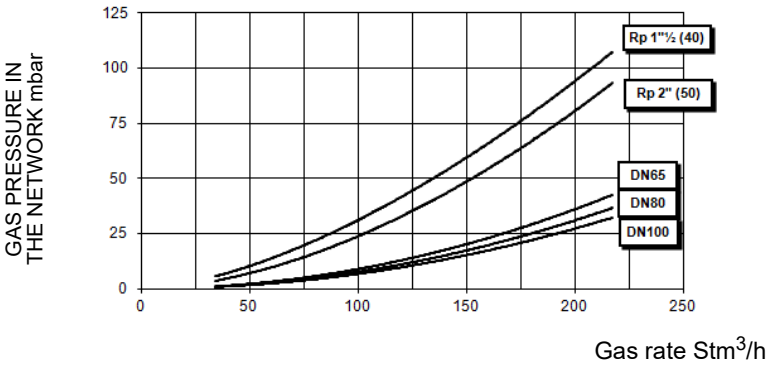
To check the proper gas train size, it is necessary to the available gas pressure value upstream the burner's gas valve. Then subtract the backpressure. The result is called **pgas.** Draw a vertical line matching the furnace input value (600kW, in the example), quoted on the x-axis, as far as intercepitng the network pressure curve, according to the installed gas train (DN65, in the example). From the interception point, draw an horizontal line as far as matching, on the y-axis, the value of pressure necessary to get the requested furnace input. This value must be lower or equal to the **pgas** value, calculated before.



Pressure in the Network / gas flow rate curves (natural gas)

Caution: the gas rate value is quoted on the x-axis, the related network pressure is quoted on the y-axis (pressure value in the combustion chamber is not included). To know the minimum pressure at the gas train inlet, necessary to get the requested gas rate, add the pressure value in the combustion chamber to the value read on the y-axis.

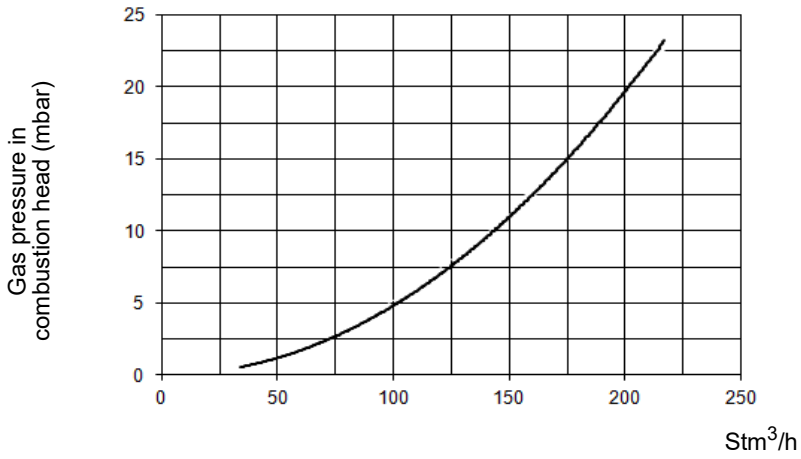
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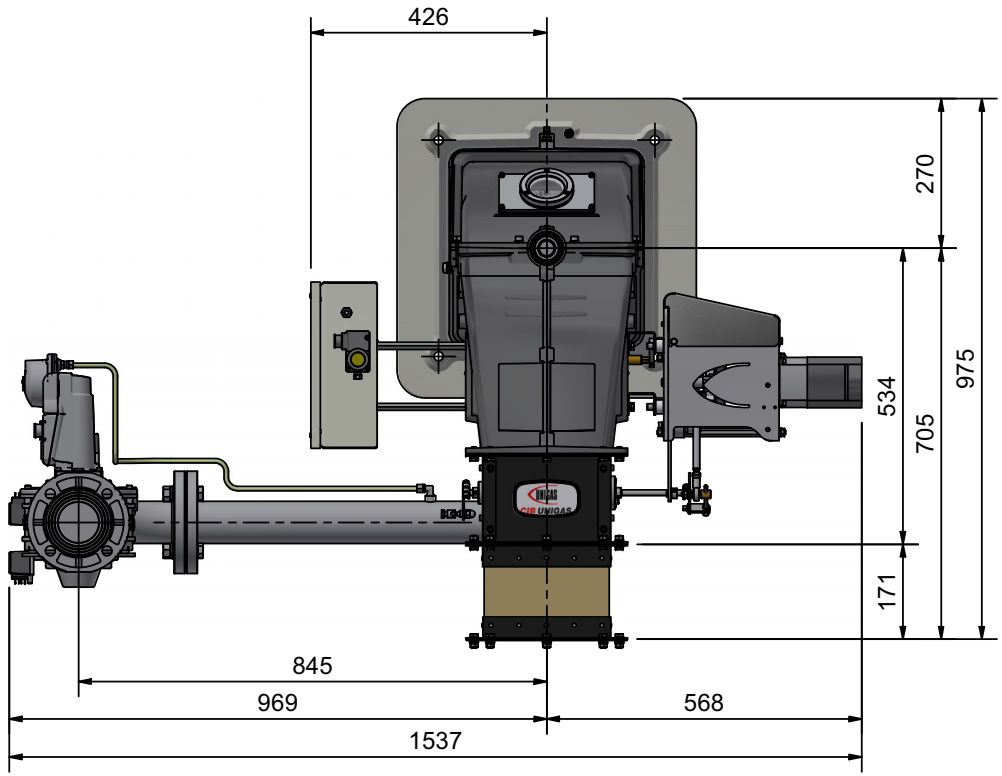
Gas pressure burner head vs natural gas flow rate

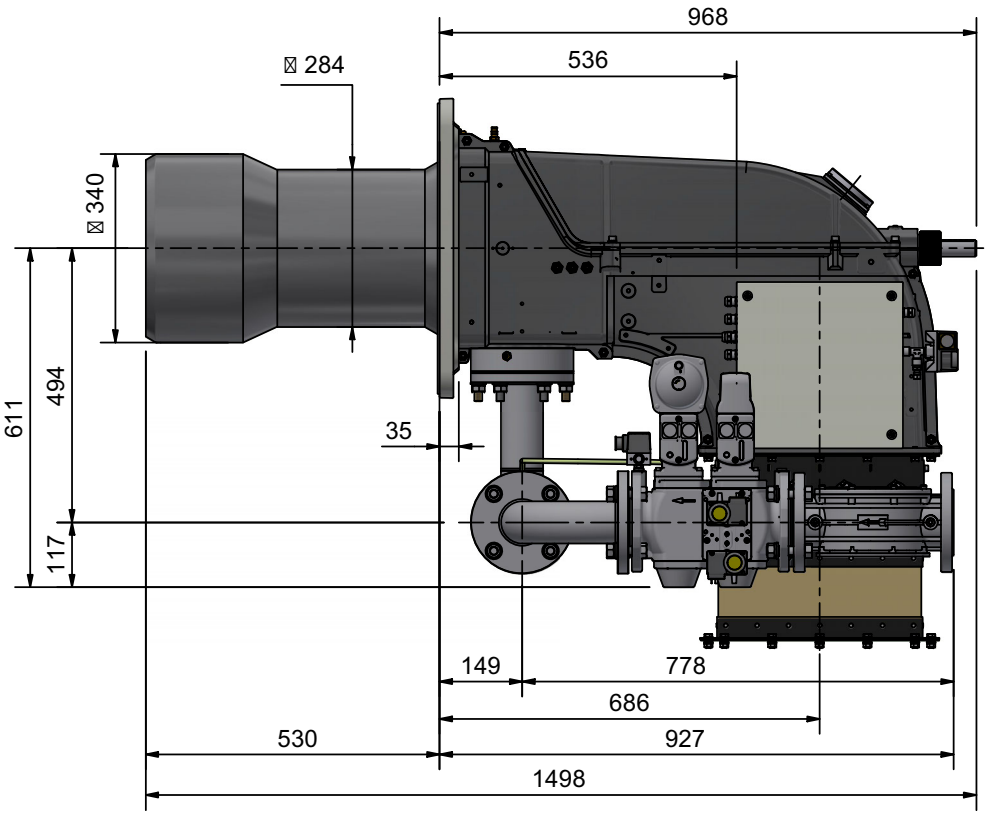
Curves are referred to pressure = 0 mbar in the combustion chamber!

TP205A M-..

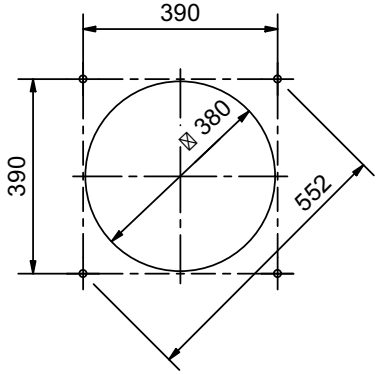


Overall dimensions (mm)

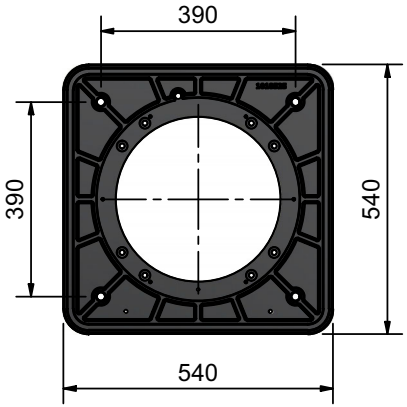


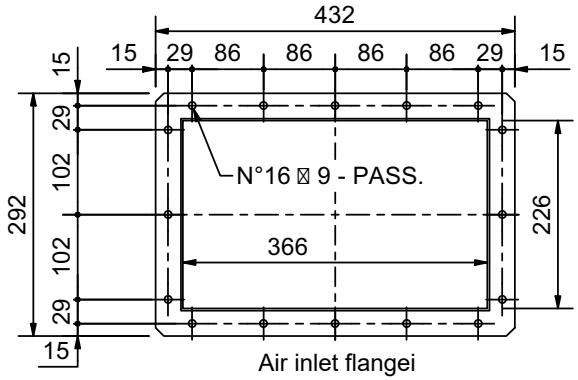


Boiler recommended drilling template

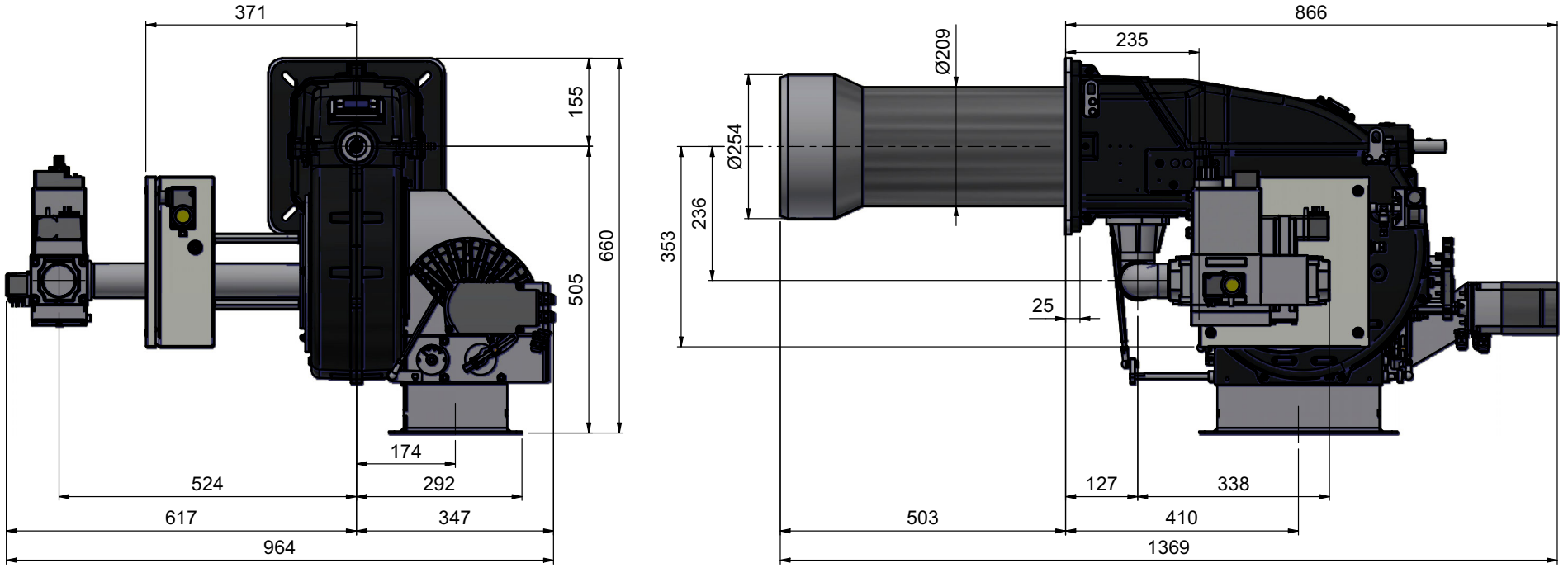


Burner flange

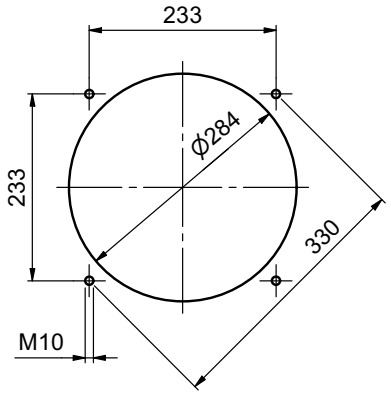




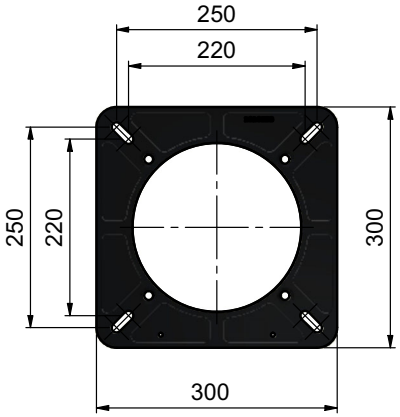
Air inlet flangei



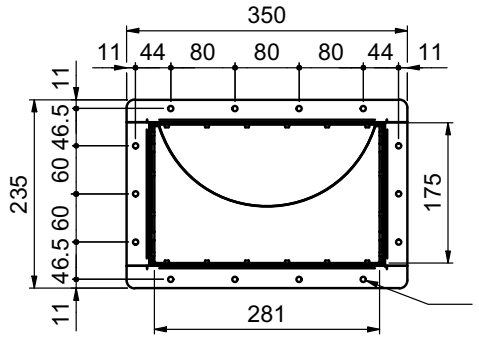
Boiler recommended drilling template



Burner flange



Air inlet flangei



GAS TRAIN HYDRAULIC DIAGRAMS

ATTENTION: Before executing the connections to the gas pipe network, be sure that the manual cutoff valves are closed.

The following diagrams show some examples of possible gas trains with the components supplied with the burner and those fitted by the installer. The gas trains and the connection of the burner to the fuel supply line must be done in accordance with current local regulations.

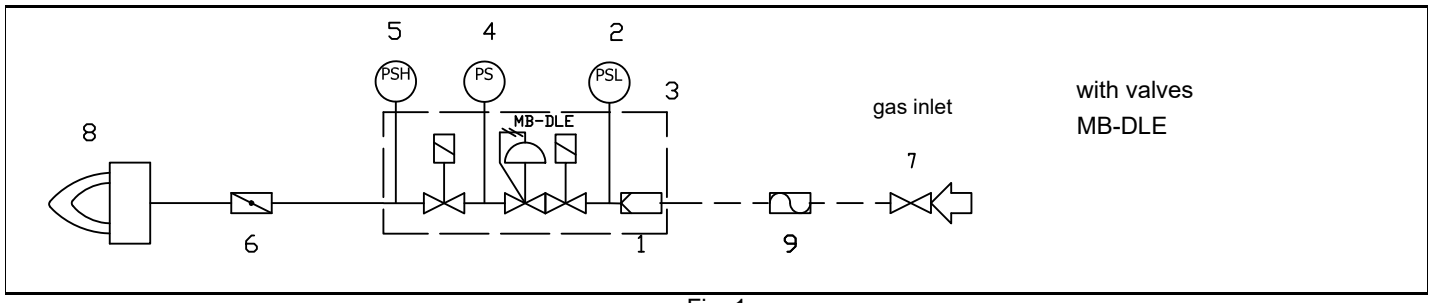


Fig. 1

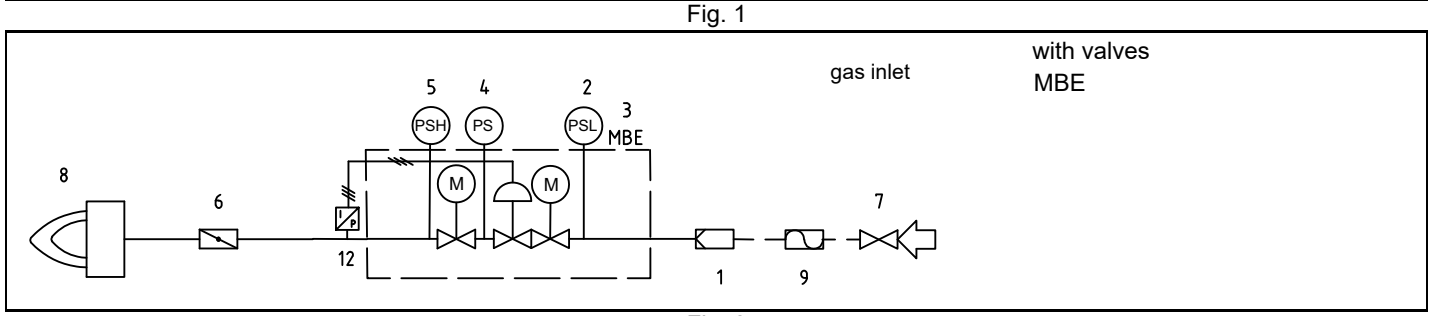


Fig. 2

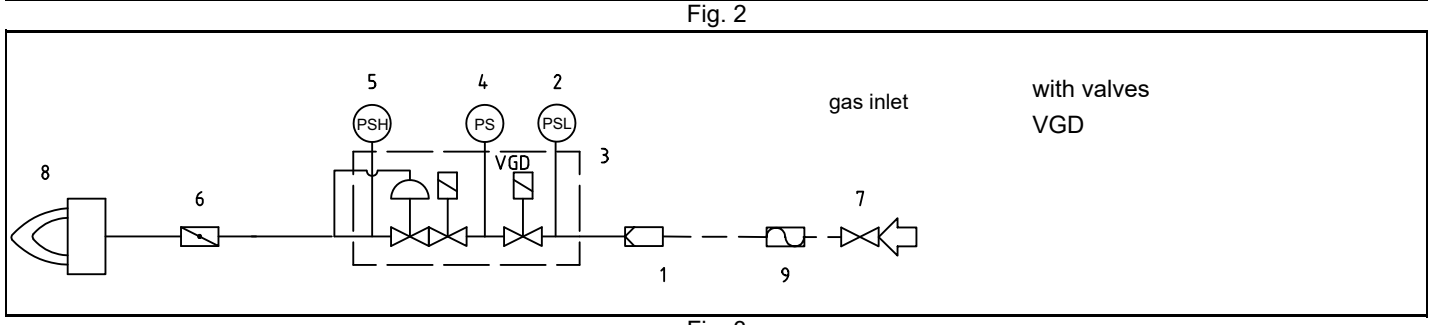
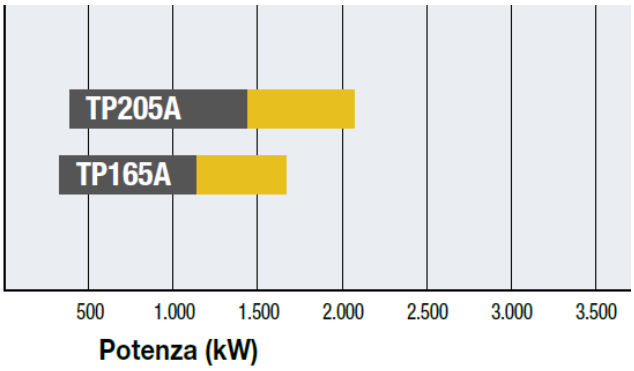


Fig. 3

Legend:
1 Filter
2 Low pressure switch - PGMIN
3 Safety valve
4 Proving system pressure switch - PGCP (*optional)
5 High pressure switch PGMAX: mandatory for MBE, optional for VGD and DMV-DLE
6 Butterfly valve
7 Upstream manual valve
8 Main burner
9 Antivibration joint (*optional)
12 MBE pressure sensor

Performance Curves

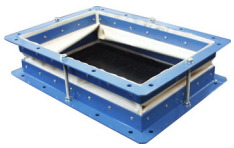
Output diagram (air temperature = 15°C)



Burner performance range

To get the input in kcal/h, multiply value in kW by 860.
Data are referred to standard conditions: atmospheric pressure at 1013mbar, ambient temperature at 15°C

Fan installation



Connect the air duct to the burner by means of the bellows unit provided together with the burner (see the picture below).Install the bellows units provided as explained on pages 13-14.

ATTENTION! The bellows unit provided is made of canvas and is provided with blocking spacers to avoid breaking it during installation: first place the bellows unit between flanges, then remove the spacers. Canvas has to be stretched after the installation, but not stressed.

ATTENTION! the air duct dimensioning must be perforformed according to the flow rate, the temperature, the distance between the fan and the burner and according to the fan features as well..

ATTENTION! It is suggested to install the fan on vibration-damping supports in order to reduce vibration propagation.

PART II: INSTALLATION

MOUNTING AND CONNECTING THE BURNER

Transport and storage

If the product must be stored, avoid humid and corrosive places. Observe the temperatures stated in the burner data table at the beginning of this manual. The packages containing the burners must be locked inside the means of transport in such a way as to guarantee the absence of dangerous movements and avoid any possible damage.

In case of storage, the burners must be stored inside their packaging, in storerooms protected from the weather. Avoid humid or corrosive places and respect the temperatures indicated in the burner data table at the beginning of this manual.

Packing

The burners are despatched in wooden crates whose dimensions are:

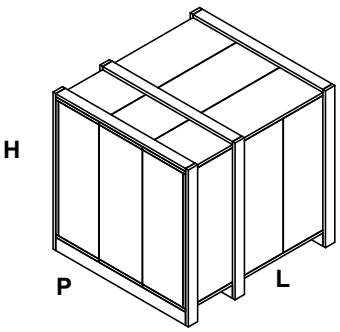
- 1636mm x 1036mm x 1016mm (L x P x H).

Such packages fear moisture and are not suitable for stacking.Packing cases of this type are affected by humidity and are not suitable for stacking.

The following are placed in each packing case:These packagings are damaged by moisture and the maximum number of overlapping packagings indicated on the outside of the packaging may not be exceeded.

- burner with detached gas train;
- gasket or ceramic fibre plait (according to burner type) to be inserted between the burner and the boiler;
- envelope containing this manual and other documents.

To get rid of the burner's packing, follow the procedures laid down by current laws on disposal of materials.

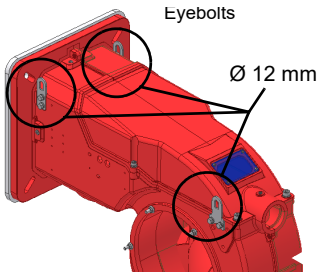


Handling the burner

WARNING! The handling operations must be carried out by specialised and trained personnel. If these operations are not carried out correctly, the residual risk for the burner to overturn and fall down still persists.

The burner is provided with eyebolts, for handling operations and it can be lifted with a hydraulic lift or a small manual crane. (A)





Fitting the burner to the boiler

To install the burner into the boiler, proceed as follows:

1 make a hole on the closing door of the combustion chamber as described on paragraph “Overall dimensions”)
2 place the burner to the boiler: lift it up and handle it according to the procedure described on paragraph “Handling the burner”;
3 place the 4 stud bolts (5), according to the burner’s drilling plate described on paragraph “Overall dimensions”;
4 fasten the 4 stud bolts;
5 place the ceramic fibre plait on the burner flange;
6 install the burner into the boiler;
7 fix the burner to the stud bolts, by means of the fixing nuts, according to the next picture.

WARNING!After fitting the burner to the boiler, ensure that the gap between the blast tube and the refractory lining is sealed with appropriate insulating material (ceramic fibre cord or refractory cement).

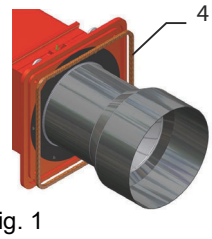
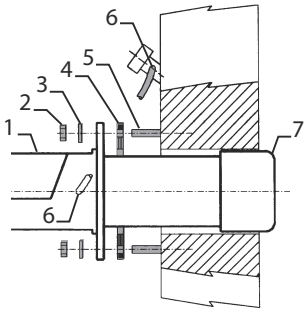


Fig. 1



Keys

1 Burner
2 Fixing nut
3 Washer
4 Ceramic fibre plait
5 Stud bolt
7 Blast tube

Matching the burner to the boiler

The burners described in this manual have been tested with combustion chambers that comply with EN676 regulation and whose dimensions are described in the diagram . In case the burner must be coupled with boilers with a combustion chamber smaller in diameter or shorter than those described in the diagram, please contact the supplier, to verify that a correct matching is possible, with respect of the application involved. To correctly match the burner to the boiler verify the type of the blast tube . Verify the necessary input and the pressure in combustion chamber are included in the burner performance curve; otherwise the choice of the burner must be revised consulting the burner manufacturer. To choose the blast tube lenght follow the instructions of the boiler manufacturer. In absence of these consider the following:

- Cast-iron boilers, three pass flue boilers (with the first pass in the rear part): the blast tube must protrude no more than **Dist** = 100 mm into the combustion chamber. (please see the picture below)
- Pressurised boilers with flame reversal: in this case the blast tube must penetrate **Dm** 50 ÷ 100 mm into combustion chamber in respect to the tube bundle plate.(please see the picture below)

A: ceramic fibre
B: refractory wall

Dist. = 100 mm
DM = 50 ÷ 100 mm

Dist. = 3,93 in
DM = 1,96 ÷ 3,93 in

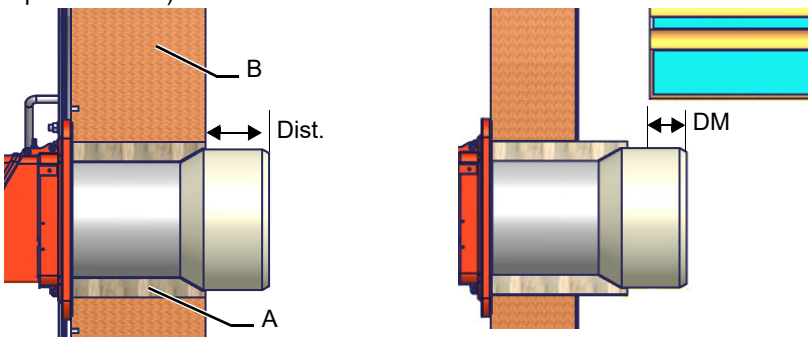


Fig. 2

WARNING! Carefully seal the free space between blast tube and the refractory lining with ceramic fibre rope or other suitable means.

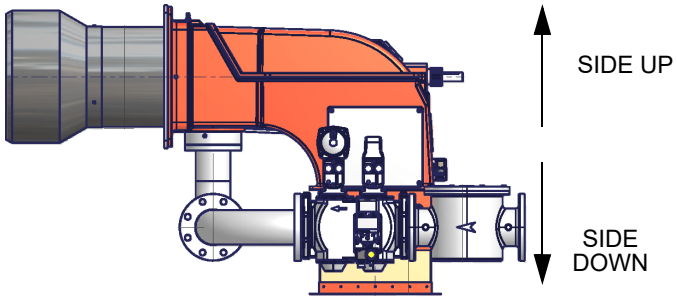
The length of the blast tubes does not always allow this requirement to be met, and thus it may be necessary to use a suitably-sized spacer to move the burner backwards or to design a blast tube tha suites the utilisation (please, contact the manifacturer).

Fan installation

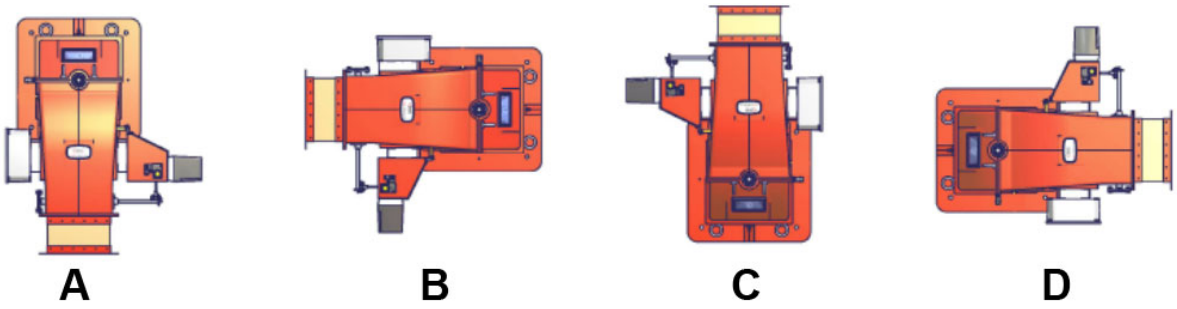
Pay attention when designing the air duct: dimensioning must be performed according to the flow rate, the temperature, the distance between the fan and the burner and according to the fan features as well.

⚠	**ATTENTION!** The bellows unit provided is made of canvas and is provided with blocking spacers to avoid breaking it during installation: **first** place the bellows unit between flanges, **then** remove the spacers. Canvas has to be stretched after the installation, but not stressed.

The burner is designed to work mounted as shown in the picture below. For different installations, please contact the Technical Department.



Duo-block burner orientation.



Duo-block burner orientation to be specified at the order.

Matching the burner to the boiler

The burners described in this manual have been tested with combustion chambers that comply with EN676 regulation and whose dimensions are described in the diagram . In case the burner must be coupled with boilers with a combustion chamber smaller in diameter or shorter than those described in the diagram, please contact the supplier, to verify that a correct matching is possible, with respect of the application involved. To correctly match the burner to the boiler verify the necessary input and the pressure in combustion chamber are included in the burner performance curve; otherwise the choice of the burner must be revised consulting the burner manufacturer. To choose the blast tube lenght follow the instructions of the boiler manufacturer. In absence of these consider the following:

- Cast-iron boilers, three pass flue boilers (with the first pass in the rear part): the blast tube must protrude no more than 100 mm into the combustion chamber.
- Pressurised boilers with flame reversal: in this case the blast tube must penetrate at least 50 - 100 mm into combustion chamber in respect to the tube bundle plate.

The length of the blast tubes does not always allow this requirement to be met, and thus it may be necessary to use a suitably-sized spacer to move the burner backwards or to design a blast tube tha suites the utilisation (please, contact the manifacturer).

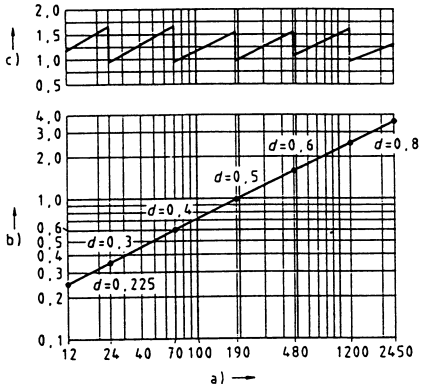


Fig. 3

Key

a) Heat output in kW

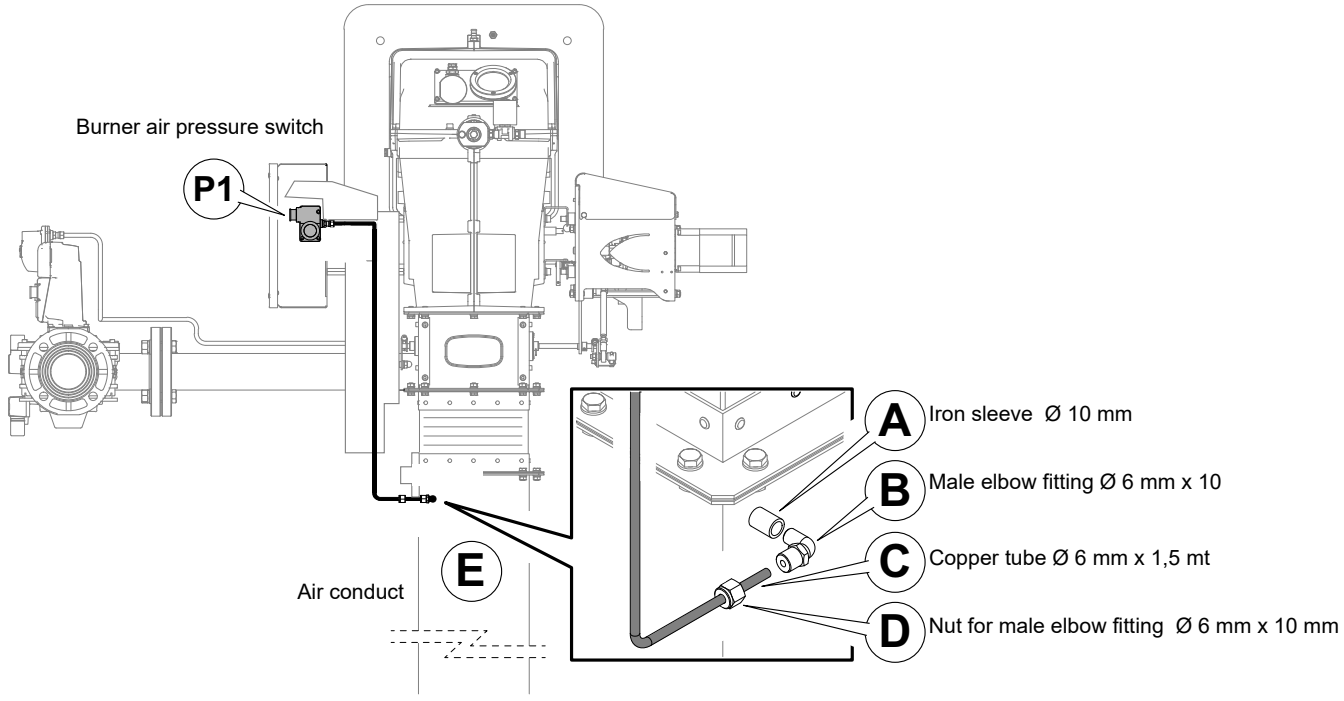
b) Lenght of the flame tube in meters

c) Flame tube firing intensity in MW/m^3

d) Combustion chamber diameter (m)

Fig. 6 - Firing intensity, diameter and lenght of the test flame tube as a function of the heat input in kW.

Connection diagram of the air pressure switch to the burner air conduct



Copper tube connection Ø 6 mm:

- Drill the air duct (with hole from Ø 10 mm);
- Fit sleeve **A** (Ø 10 mm) and weld it on channel **E**;
- Assemble in sequence the **B-D** details on the tube (Ø 6 mm) **C** appropriately shaped up to the connection on the air pressure switch (**P1**).

GAS TRAIN CONNECTIONS

WARNING: before executing the connections to the gas pipe network, be sure that the manual cutoff valves are closed.

ATTENTION: it is recommended to mount filter and gas valves to avoid that extraneous material drops inside the valves, during maintenance and cleaning operation of the filters (both the filters outside the valves group and the ones built-in the gas valves).

ATTENTION: once the gas train is mounted, the gas proving test must be performed, according to the procedure set by laws in force.

CAUTION: The direction of gas flow must follow the arrow on the body of the components mounted on the gas ramp (valves, filters, gaskets...).

CAUTION:Remove caps and covers from units before installation.

NOTE: *the bellows unit, the manual cutoff valve and the gaskets are not part of the standard supply*

Following the "Hydraulic Schematics" section, the figure shows the components fitted by the installer.

Keys

1	Gas filter
3	Gas valves group
9	Bellows unit
10	Manual valve
11	Gasket(a, b, c, d)

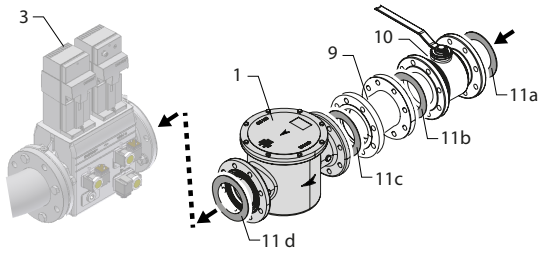


Fig. 4

Procedure to install the double gas valve unit: 2 flanges are required to mount the gas valve assemblies.

- Valves up to 2" are supplied with special threaded flanges.
- Valves of DN65 and above are supplied with PN16 flanges.

Gas Filter (if provided)

The gas filters remove the dust particles that are present in the gas, and prevent the elements at risk (e.g.: burner valves, counters and regulators) from becoming rapidly blocked. The filter is normally installed upstream from all the control and on-off devices.

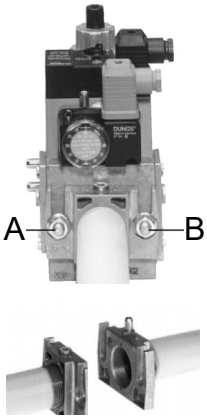
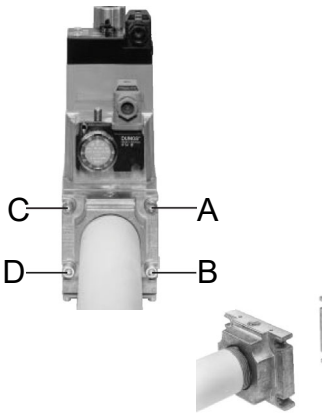
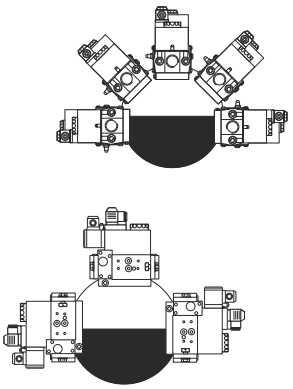
ATTENTION: it is reccomended to install the filter with gas flow parallel to the floor in order to prevent dust fall on the safety valve during maintenance operation.

Once the train is installed, connect the gas valves group and pressure switches plugs.

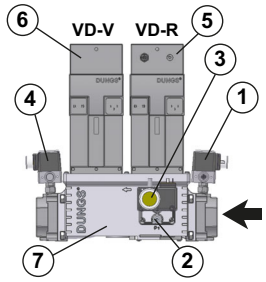
MultiBloc MB-DLE - Assembling the gas train

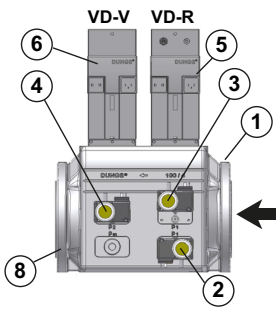
Mounting

1 Mount flange onto tube lines: use appropriate sealing agent
2 Insert MB-DLE: note position of O rings
3 Remove MultiBloc between the threaded flanges
4 After installation, perform leakage and functional test
5 Disassembly in reverse order

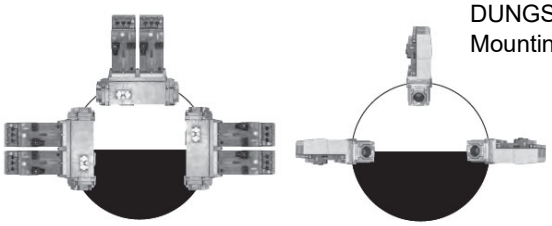
	MB-DLE 405.. 412	***MB-DLE 415.. 420***	MOUNTING POSITIONS
			
Fig. 5	Fig. 6	Fig. 7	Fig. 8

DUNGS MBE - Components and position of pressure switches





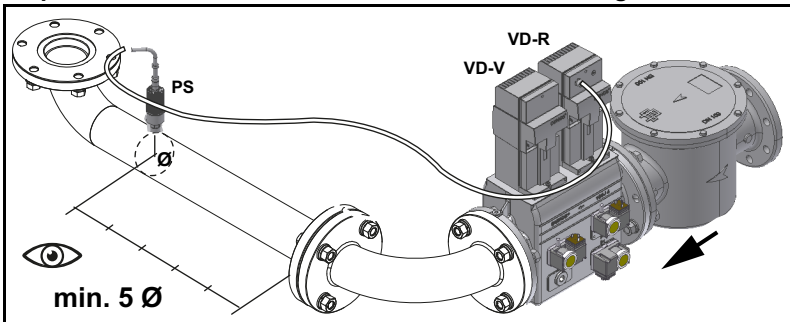
DUNGS MBE..
Mounting positions

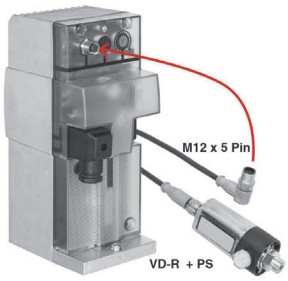


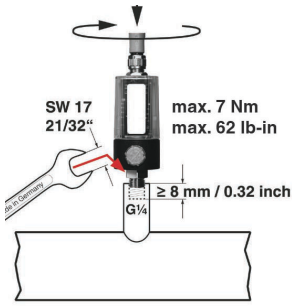
On equipment versions Facile VD-R must be installed upstream valve

1 PGMIN minimum gas pressure switch
2 PGMIN minimum gas pressure switch (alternative to 1)
3 PGCP leakage control gas pressure switch
4 PGMAX maximum gas pressure switch
5 Actuator with integrated pressure stabiliser
6 On-Off actuator
7 Valve body (Threaded)
8 Valve body (Flange)

PS pressure sensor connection to VD-R actuator and gas train

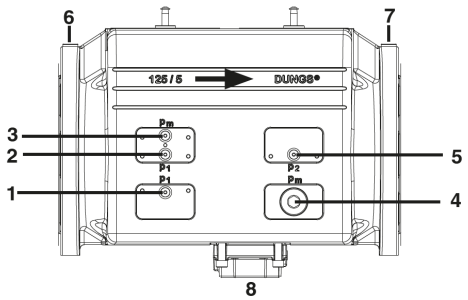


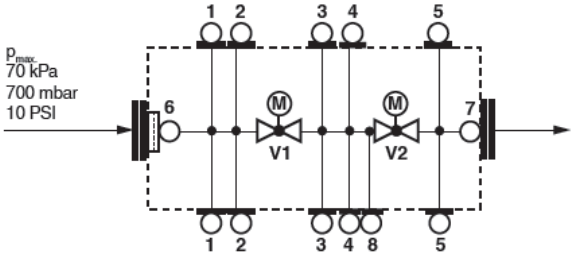




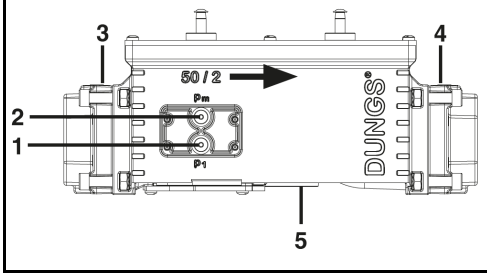
Attention: In the case of the MBE... valve, a pressure limit switch downstream of the safety valve is mandatory.

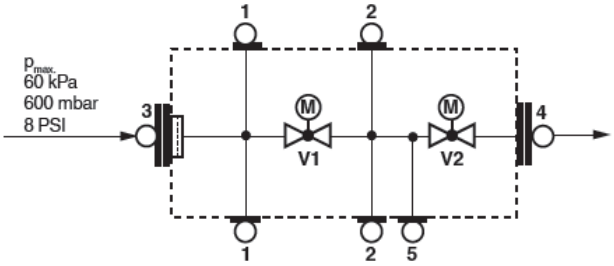
Pressure taps MultiBloc MBE





1, 2, 3, 5 Sealing plug G1/8 ISO 228
4 G3/4 for system accessories
6, 7 Sealing plug G1/4 ISO 228
8 For version VB…L only: connection for vent line
VB-2½L=1¼"NPT
VB-3L=1½"NPT
VB-4L=2"NPT
VB-5L=2"NPT

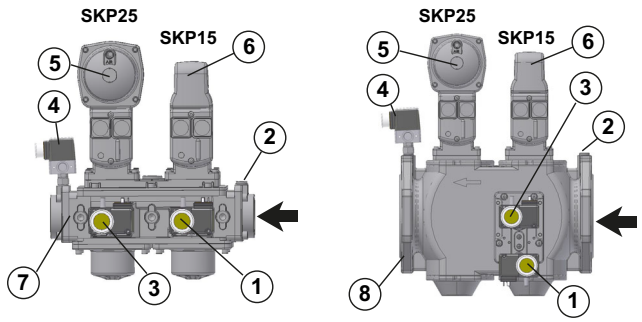


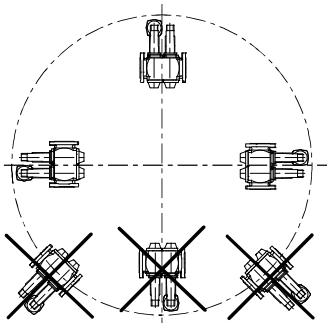


1, 2, 3, 4 Sealing plug G1/8 ISO 228
5 Locking screw
For version VB-2L only: connection for vent line **NPT 1**

Siemens VGD20.. e VGD40..

Components and position of pressure switches

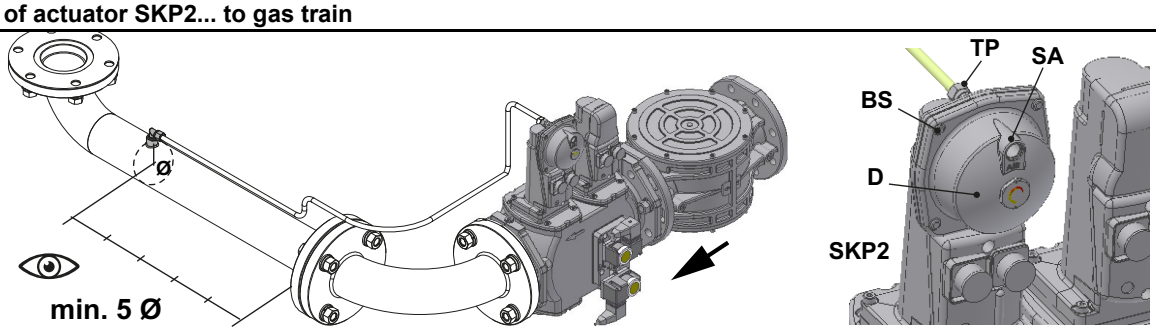




SIEMENS VGD..
Mounting positions

1 PGMIN minimum gas pressure switch
2 PGMIN minimum gas pressure switch (alternative to 1)
3 PGCP leakage control gas pressure switch
4 PGMAX maximum gas pressure switch
5 Actuator with integrated pressure stabiliser
6 On-Off actuator
7 Valve body (Threaded)
8 Valve body (Flange)

Connection of actuator SKP2... to gas train



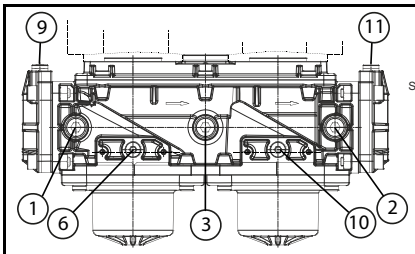
Siemens SKP2.. (pressure governor)

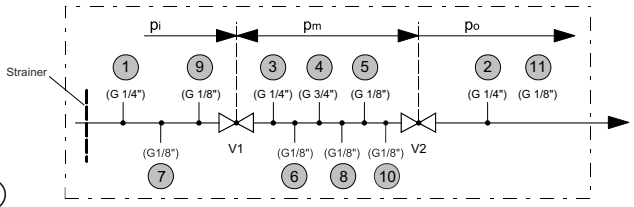
- Connect the reference gas pipe (**TP** in figure; 8mm-external size pipe supplied loose), to the gas pressure nipples placed on the gas pipe, downstream the gas valves: gas pressure must be measured at a distance that must be at least 5 times the pipe size.
- Leave the blowhole free (**SA** in figure). Should the spring fitted not permit satisfactory regulation, ask one of our service centres for a suitable replacement.

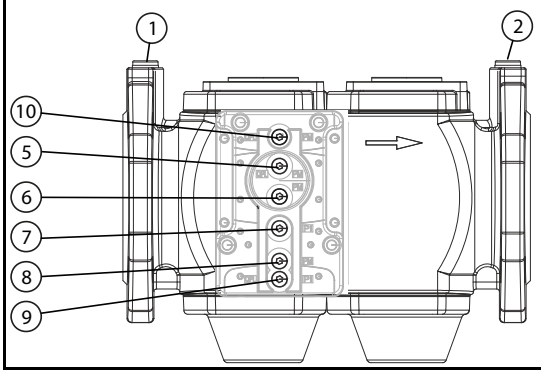
- D: pressure adjustment spring seat

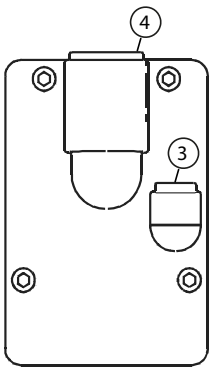
WARNING: removing the four screws BS causes the device to be unserviceable!

Siemens VGD *Pressure taps*



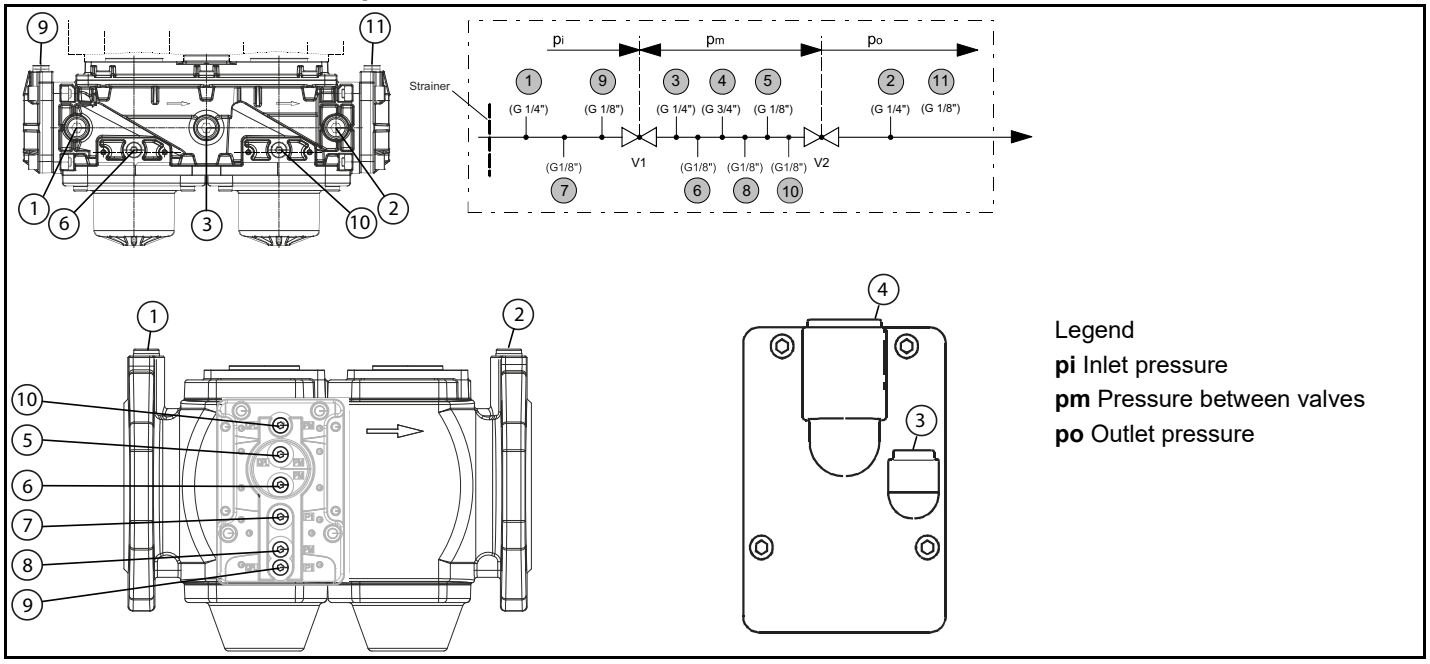






Legend
pi Inlet pressure
pm Pressure between valves
po Outlet pressure

Siemens VGD *Pressure taps*



The procedures of installation fo the gas valves are showed in the next paragraphs, according to the gas train used:

- threaded gas trains with Multibloc Dungs MBC..SE 1200 or Siemens VGD20..
- flanged gas trains with Multibloc Dungs MBC..SE 1900-3100-5000 or Siemens VGD40..

Once the train is installed, connect electrically all its elements: gas valves group, pressure switches, gas proving system.

ELECTRICAL CONNECTIONS

WARNING! Respect the basic safety rules. make sure of the connection to the earthing system. do not reverse the phase and neutral connections. fit a differential thermal magnet switch adequate for connection to the mains.

WARNING! before executing the electrical connections, pay attention to turn the plant's switch to OFF and be sure that the burner's main switch is in 0 position (OFF) too. Read carefully the chapter "WARNINGS", and the "Electrical connections" section.

ATTENTION: Connecting electrical supply wires to the burner teminal block MA, be sure that the ground wire is longer than phase and neutral ones.

1 To execute the electrical connections, proceed as follows:remove the cover from the electrical board, unscrewing the fixing screws;
2 execute the electrical connections to the supply terminal board as shown in the attached wiring diagrams;
3 check the direction of the fan motor (see next paragraph);
4 refit the panel cover.

WARNING: (only for double stage and progressive burners) The burner is provided with an electrical bridge between terminals 6 and 7; when connecting the high/low flame thermostat, remove this bridge before connecting the thermostat.

CAUTION: check the motor thermal cut-out adjustment

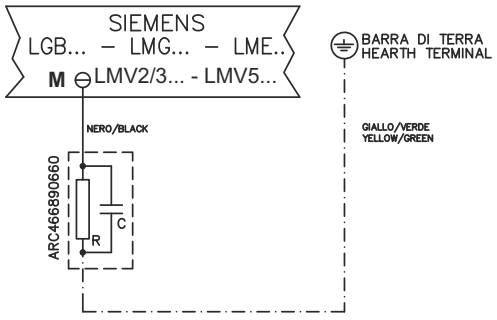
NOTE: the burners are supplied for three-phase 380/400/415/480 V supply, and in the case of three-phase 220/230/240 V supply it is necessary to modify the electrical connections into the terminal box of the electric motor and replace the overload tripped relay.

Note on electrical supply

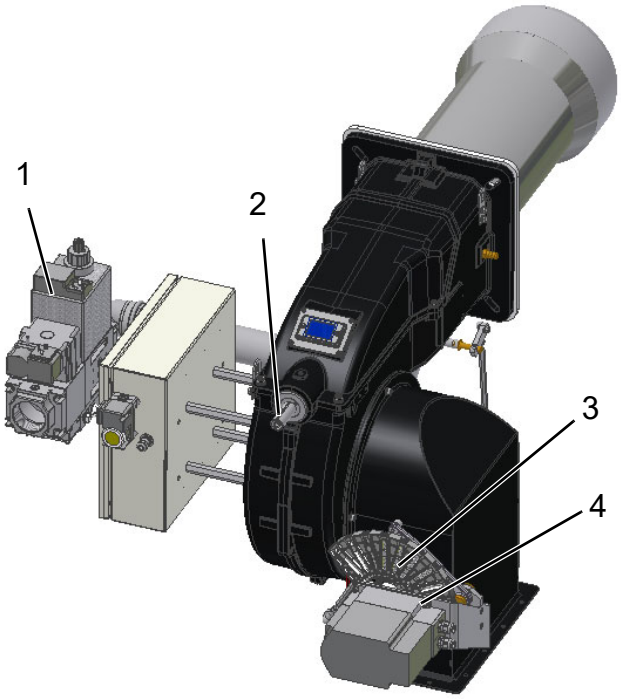
In the case where the power supply of the AUXILIARIES of the phase-phase burner (without a neutral), for the flame detection it is necessary to connect the RC circuit Siemens between the terminal 2 (terminal X3-04-4 in case of LMV2x, LMV3x, LMV5x, LME7x) of the base and the earth terminal, RC466890660. For LMV5 control box, please refer to the clabeling recommendations avaible on the Siemens CD attached to the burner

Key

C - Capacitor (22 nF , 250 V)
LME / LMV - Siemens control box
R - Resistor (1 MΩ)
M: Terminal 2 (LGB, LME), Terminal X3-04-4 (LMV2x, LMV3x, LMV5, LME7x)
RC466890660 - RC Siemens filter



ADJUSTING AIR AND GAS FLOW RATES



Keys

1 Gas valves
2 Combustion head adjusting screw
3 Adjusting cam
4 Actuatori

Gas Filter

The gas filters remove the dust particles that are present in the gas, and prevent the elements at risk (e.g.: burners, counters and regulators) from becoming rapidly blocked. The filter is normally installed upstream from all the control and on-off devices.

Integrated proving system (burners equipped with LME7x, LMV, LDU)

This paragraph describes the integrated proving system operation sequence:

- At the beginning both the valves (EV1 and EV2) must be closed.
- Test space evacuating: EV2 valve (burner side) opens and keep this position for a preset time (td4), in order the bring the test space to ambient pressure.Test atmospheric pressure: EV2 closes and keep this position for a preset time (test time td1). The pressure switch PGCP has not to detect a rise of pressure.
- Test space filling: EV1 opens and keep this position for a preset time (td3), in order to fill the test space.
- Test gas pressure: EV1 closes and keep this position for a preset time (td2). The pressure switch PGCP has not to detect a pressure drop down.

If all of the test phases are passed the proving system test is successful, if not a burner lockout happens.

On LMV5x and LMV2x/3x and LME73 (except LME73.831BC), the valve proving can be parameterized to take place on startup, shutdown, or both. On LME73.831BC the valve proving is parameterized to take place on startup only.

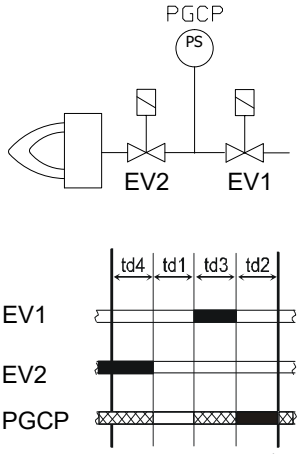


Fig. 1

Adjusting air and gas flow rates

	***ATTENTION:* before starting the burner up, be sure that the manual cutoff valves are open and check that the pressure upstream the gas train complies the value quoted on paragraph "Technical specifications". Be sure that the mains switch is closed.**
	ATTENTION: During commissioning operations, do not let the burner operate with insufficient air flow (danger of formation of carbon monoxide); if this should happen, make the fuel decrease slowly until the normal combustion values are achieved.
	WARNING: NEVER LOOSE THE SEALED SCREWS! OTHERWISE, THE DEVICE WARRANTY WILL BE INVALIDATE!

	IMPORTANT! the combustion air excess must be adjusted according to the in the following chart:

Recommended combustion parameters		
Fuel	Recommended (%) CO_2	Recommended (%) O_2
Natural gas	9 ÷ 10	3 ÷ 4.8
LPG	11 ÷ 12	2.8 ÷ 4.3

.During the factory test, the gas butterfly valve, air damper in low flame and actuator are set to average values.

Adjustments - brief description

- Adjust the air and gas flow rates at the maximum output ("high flame") first, by means of the air damper and the valves group pressure stabiliser respectively.
- Check that the combustion parameters are in the suggested limits.
- Check the flow rate measuring it on the counter or, if it was not possible, verifying the combustion head pressure by means of a differential pressure gauge, as described on par. "Measuring the gas pressure in the combustion head".
- Then, adjust the combustion values corresponding to the points between maximum and minimum (progressive -fully modulating burners only): set the shape of the adjusting cam foil. The adjusting cam sets the air/gas ratio in those points, regulating the opening-closing of the air damper.
- Set, now, the low flame output, acting on the low flame microswitch of the actuator in order to avoid the low flame output increasing too much or that the flues temperature gets too low to cause condensation in the chimney.

To change the burner setting during the testing in the plant, follows the next procedure, according to the model provided.

ADJUSTING THE GAS VALVES GROUP

Multibloc MB-DLE

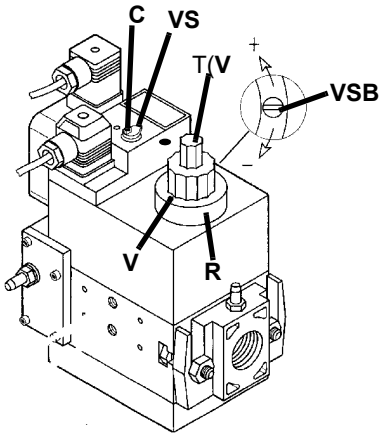
The multibloc unit is a compact unit consisting of two valves, gas pressure switch, pressure stabilizer and gas filter.

The valve is adjusted by means of the **RP** regulator after slackening the locking screw **VB** by a number of turns. By unscrewing the regulator **RP** the valve opens, screwing the valve closes. To set the fast opening remove cover **T**, reverse it upside down and use it as a tool to rotate screw **VR**. Clockwise rotation reduces start flow rate, anticlockwise rotation increases it.

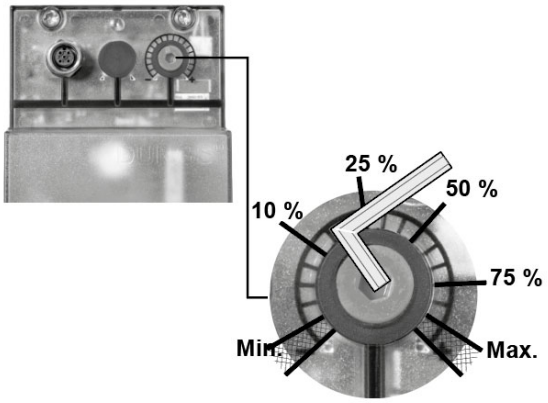
Do not use a screwdriver on the screw **VR**!

The pressure stabilizer is adjusted by operating the screw **VS** located under the cover **C**. By screwing down the pressure is increased and by unscrewing it is reduced.

Note: the screw **VSB** must be removed only in case of replacemente of the coil.



MultiBloc MBE *Regulation VD-R whith PS*

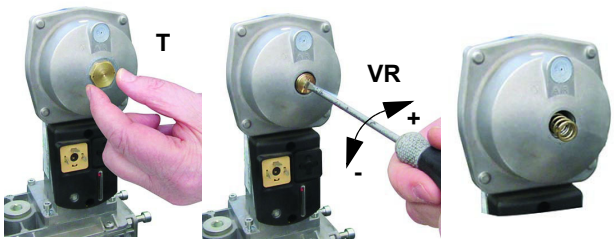


Outlet pressure	MIN	10%	25%	50%	75%	MAX
PS-10/40	4 mbar 0,4 kPa 2 "w.c.	10 mbar 1,0 kPa 4 "w.c.	25 mbar 2,5 kPa 10 "w.c.	50 mbar 5,0 kPa 20 "w.c.	75 mbar 7,5 kPa 30 "w.c.	100 mbar 10,0 kPa 40 "w.c.
PS-50/200	20 mbar 2,0 kPa 8 "w.c.	50 mbar 5,0 kPa 20 "w.c.	125 mbar 12,5 kPa 50 "w.c.	250 mbar 25,0 kPa 100 "w.c.	375 mbar 37,5 kPa 150 "w.c.	500 mbar 50,0 kPa 200 "w.c.

Caution: check that the range of the installed spring is compatible with the gas pressure at the burner head (see appropriate diagram) to which must be added the back pressure and approx. 5 /10 mbar for various leaks and gas line.

While making outlet pressure adjustments, do not exceed a value that creates a hazardous condition to the burner!

Siemens VGD../VRD.. version with SKP2



Performance range (mbar)			
	neutral	**yellow**	**red**
Spring colour SKP 25.0	0 ÷ 22	15 ÷ 120	100 ÷ 250
Spring colour SKP 25.4		7 ÷ 700	150 ÷ 1500

The pressure adjusting range, upstream the gas valves group, changes according to the spring provided with the valve group.
To replace the spring supplied with the valve group, proceed as follows:i

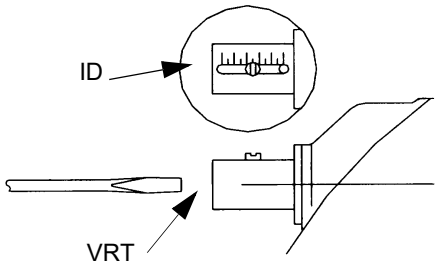
To increase or decrease gas pressure, and therefore gas flow rate, remove the cap **T** and use a screwdriver to adjust the regulating screw **VR**. Turn clockwise to increase the flow rate, counterclockwise to reduce it.

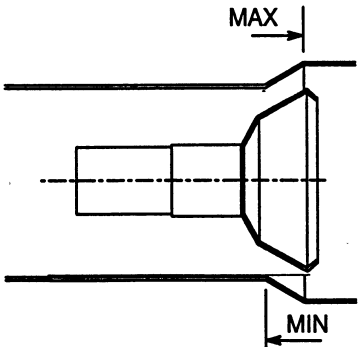
Adjusting the combustion head

CAUTION: perform these adjustments once the burner is turned off and cooled.

Regulating the combustion head

The burner is factory-adjusted with the combustion head in the "MAX" position, accordingly to the maximum power. To operate the burner at a lower power, progressively shift back the combustion head, towards the "MIN" position, screwing the screw **VRT**. The ID index shows how much the combustion head moved.





Attention! if it is necessary to change the head position, repeat the air and fuel adjustments described above.

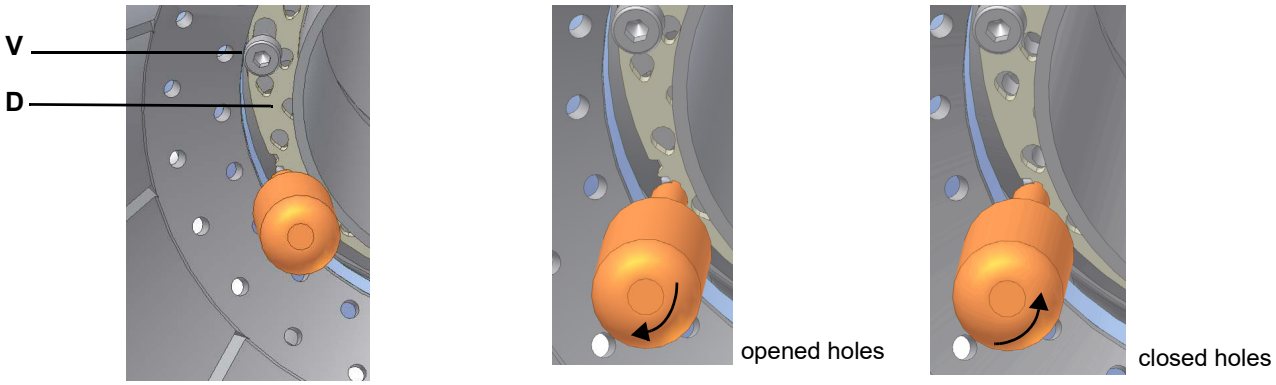
Center head holes gas flow regulation

To adjust the gas flow, partially close the holes, as follows:

1 loosen the three **V** screws that fix the adjusting plate **D**;

2 insert a screwdriver on the adjusting plate notches and let it move CW/CCW as to open/close the holes;

3 once the adjustmet is performed, fasten the **V** screws.



The adjusting plate correct position must be regulated in the plant during the commissioning.

The factory setting depends on the type of fuel for which the burner is designed:

- For natural gas burners, plate holes are fully opened

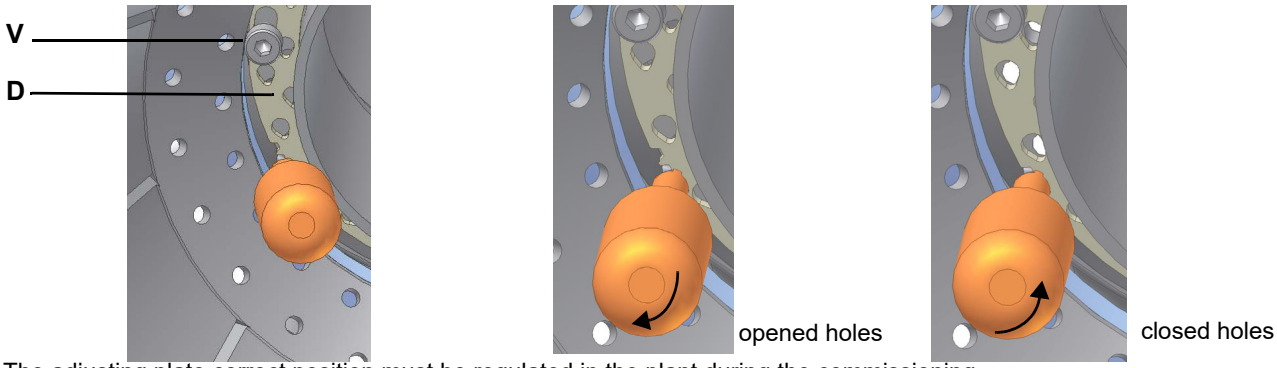
(E205A L-) Center head holes gas flow regulation

To adjust the gas flow, partially close the holes, as follows:

1 loosen the three **V** screws that fix the adjusting plate **D**;

2 insert a screwdriver on the adjusting plate notches and let it move CW/CCW as to open/close the holes;

3 once the adjustmet is performed, fasten the **V** screws.



The adjusting plate correct position must be regulated in the plant during the commissioning.

The factory setting depends on the type of fuel for which the burner is designed:

- For LPG burners, plate holes are opened about 1.7mm

Adjustment procedure

1 Turn the burner on by means of its main switch **S1**: if the burner locks (LED **B1** on in the control panel) press the RESET button (**S2**) on the control panel. See chapter “Operation” for further details.

2 check the fan motor rotation

3 Start the burner up by means of the thermostat series and wait unitl the pre-purge phase comes to end and that burner starts up;

4 the burner starts up in the low flame stage: drive the burner to high flame stage, by means of the “high/low flame” thermostat **TAB**.

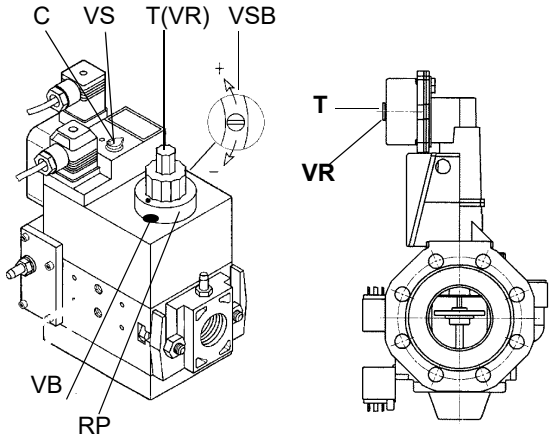
5 adjust the burner combustion values in the high flame stage as described in the following steps.

6 go on adjusting air and gas flow rates: check, continuosly, the flue gas analisys, as to avoid combustion with little air; dose the air according to the gas flow rate change following the steps quoted below;

7 acting on the pressure governor of the valves group, adjust the **gas flow rate in the high flame stage** as to meet the values requested by the boiler/utilisation:

- **Multibloc MB-DLE:** the valve is adjusted by means of the **RP** regulator after slackening the locking screw **VB** by a number of turns. By unscrewing the regulator **RP** the valve opens, screwing the valve closes. The pressure stabilizer is adjusted by operating the screw **VS** located under the cover **C**. By screwing down the pressure is increased and by unscrewing it is reduced. **Note:** the screw **VSB** must be removed only in case of replacemente of the coil.

- Siemens VGD valves group: remove cap **T** and act on the **VR** adjusting screw to increase or decrease the pressure and consequently the gas rate; screwind **VR** the rate increases, unscrewing it decreases (see next figure).

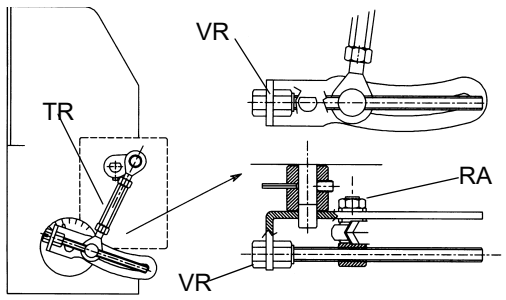


Dungs Multibloc MB-DLE **Siemens VGD..**

⚠ Pressure governor is factory-set. The setting values must be locally adapted to machine conditions. Important! Follow the instructions carefully!

8 To adjust the **air flow rate in the high flame stage**, loose the **RA** nut and screw **VRA** as to get the desired air flow rate: moving the rod **T** towards the air damper shaft, the air damper opens and consequently the air flow rate increases, moving it far from the shaft the air damper closes and the air flow rate decreases.

Note: once the procedure is perfomed, be sure that the blocking nut **RA** is fasten.



Go on adjusting the burner according to the model (double-stage, progressive, fully-modulating).

Go on adjusting the burner according to the model (double-stage, progressive, fully-modulating).

Double-stage burners

- drive the burner to the low flame stage by means of the **TAB** thermostat;
- To change the gas flow rate in order to get an efficient combustion, slacken the nut **DB** and adjust the opening angle of the gas butterfly valve by rotating the screw **TG** (clockwise rotation increases gas flow, anticlockwise rotation decreases it). The slot on the butterfly valve shaft shows the opening degree of the valve regardingthe horizontal axis. **Don't act on DE nuts.**

NOTE: At the end of settings, make sure the locking screws **RA** and **DB** are fully tightened.

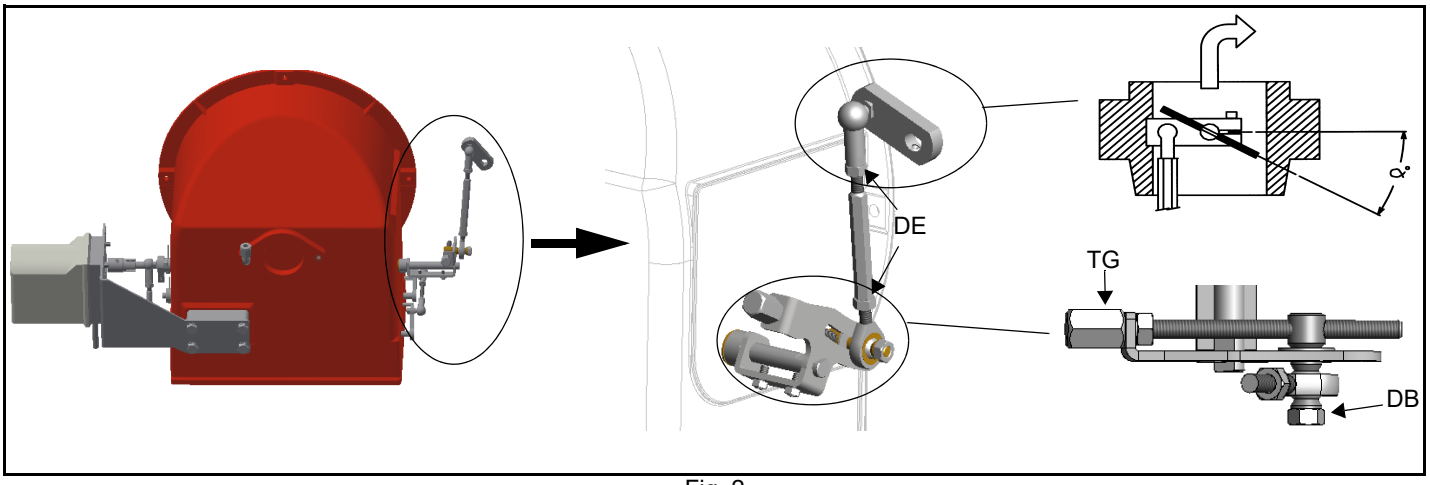
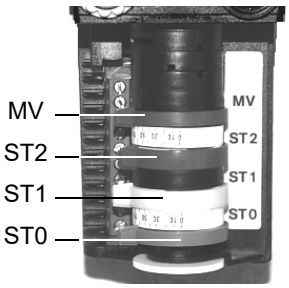


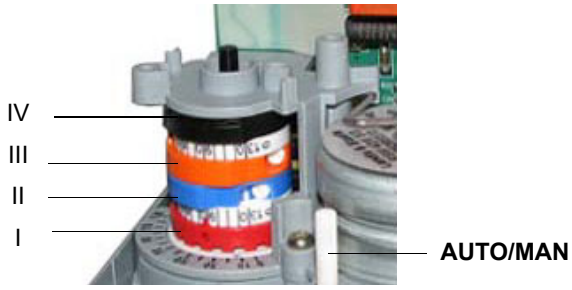
Fig. 2

- Now adjust the pressure switches.
- If it is necessary to change the burner output in the low flame stage, move the low flame cam: the low flame position matches the ignition position. As far as burners fitted with Dungs MBC gas valves, the low flame cam does not match the ignition cam position, that is why it must be set at about 30° more than the ignition cam.
- Turn the burner off and then start it up again. If the adjustment is not correct, repeat the previous steps.

Berger STA6 B 3.41 (high-low flame burners)



Siemens SQN72.2A4Axx (high-low flame burners)



For DUNGS MB-DLE / Siemens VGD gas valves	Actuator camsBerger STA	Siemens SQN72
High flame position (set to 90°)	ST2	I (red)
Low flame and ignition position	ST1	III (orange)
Stand-by position (set to 0°)	ST0	II (blue)
Not used	MV	IV (black)

Berger STA12: a key is provided to move the cams.

Siemens SQN72: a key is provided to move cams I and IV, the other cams can be moved by means of screws.

On the BERGER STA12B3.41 actuator, the manual air damper control is not provided. On the Siemens actuator the AUTO/MAN mode is provided (see picture).

Progressive burners

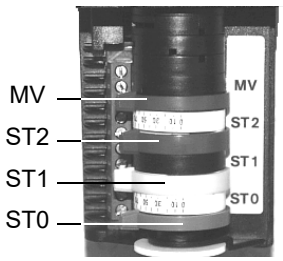
Once the procedure till step 8 described on paragraph “” on page 30, is accomplished, go on as follows:

9 set the low flame cam matching the high flame cam;

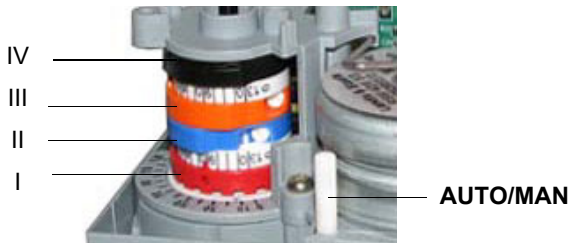
10 set the **TAB** thermostat to the minimum in order that the actuator moves progressively towards the low flame position;

The manual air damper control is not provided on these actuators. The adjustments must be carried out acting manually on the cams.

Berger STA12B3.41 (progressive and fully modulating burners)



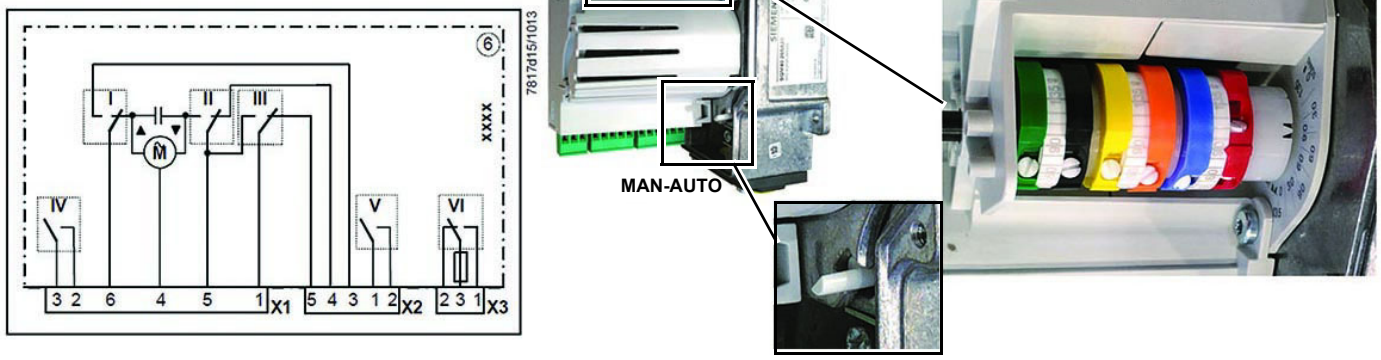
Siemens SQN72.6A4Axx (progressive and fully modulating burners)



For DUNGS MB-DLE / Siemens VGD gas valves	Actuator camsBerger STA	Siemens SQN72
High flame position (set to 90°)	ST2	I (red)
Low flame and ignition position	ST1	III (orange)
Stand-by position (set to 0°)	ST0	II (blue)
Not used	MV	IV (black)

SQM40.265 Actuator cams

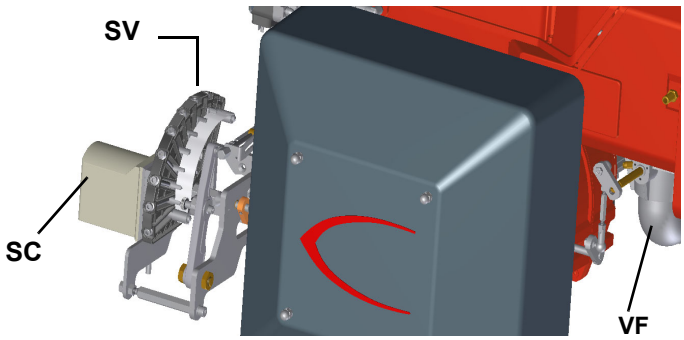
(RD) I High flame
(BU) II Stand-by
(OG) III Low flame
(YE) IV -
(BK) V-
(GN) VI Ignition

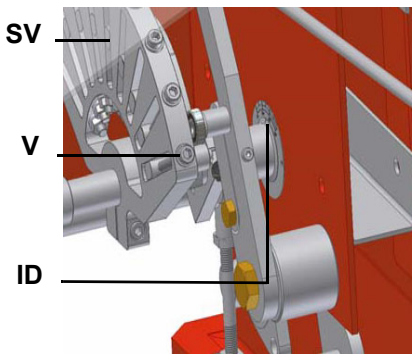


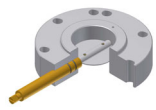
11 move the low flame cam to the minimum to move the actuator towards the low flame until the two bearings find the adjusting screw that refers to the lower position: screw **V** to increase the rate, unscrew to decrease.

12 Move again the low flame cam towards the minimum to meet the next screw on the adjusting cam and repeat the previous step; go on this way as to reach the desired low flame point.

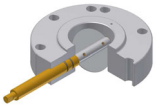
13 Now adjust the pressure switches (see page 34).







Gas butterfly valve closed



Gas butterfly valve open

14 If it is necessary to change the burner output in the low flame stage, move the low flame cam: the low flame position matches the ignition position. As far as burners fitted with Dungs MBC gas valves, the low flame cam does not match the ignition cam position,

that is why it must be set at about 30° more than the ignition cam.

15 Turn the burner off and then start it up again. If the adjustment is not correct, repeat the previous steps.

ADJUSTING THE GAS VALVES GROUP *Calibration air and gas pressure switches*



The **air pressure switch** locks the control box if the air pressure is not the one requested. If it happens, unlock the burner by means of the control box unlock pushbutton, placed on the burner control panel.

The **gas pressure switches** check the pressure to avoid the burner operate when the pressure value is not in the requested pressure range.

Calibration of air pressure switch

To calibrate the air pressure switch, proceed as follows:

- Remove the transparent plastic cap.
- Once air and fuel setting have been accomplished, startup the burner.
- During the pre-purge phase o the operation, turn slowly the adjusting ring nut **VR** in the clockwise direction (to increase the adjusting pressure) until the burner lockout, then read the value on the pressure switch scale and set it to a value reduced by 15%.
- Repeat the ignition cycle of the burner and check it runs properly.
- Refit the transparent plastic cover on the pressure switch.

Calibration of low gas pressure switch

With the burner operating at maximum power, increase the regulation pressure by slowly turning the control knob clockwise until the burner stops, taking care it does not go into lockout and the display shows the error "**Err c20 d0**".
As for the gas pressure switch calibration, proceed as follows:

- Be sure that the filter is clean.
- Remove the transparent plastic cap.
- While the burner is operating at the maximum output, test the gas pressure on the pressure port of the minimum gas pressure switch.
- Slowly close the manual cutoff valve (placed upstream the pressure switch, see gas train installation diagram), until the detected pressure is reduced by 50%. Pay attention that the CO value in the flue gas does not increase: if the CO values are higher than the limits laid down by law, slowly open the cutoff valve as to get values lower than these limits.
- Check that the burner is operating correctly.
- Clockwise turn the pressure switch adjusting ring nut (as to increase the pressure value) until the burner stops.
- Slowly fully open the manual cutoff valve.
- Refit the transparent plastic cover on the pressure switch.

Calibration the maximum gas pressure switch (when provided)

To calibrate the maximum pressure switch, proceed as follows according to its mounting position:

- remove the pressure switch plastic cover;
- if the maximum pressure switch is mounted upstreaam the gas valves: measure the gas pressure in the network, when flame is off; by means of the adjusting ring nut **VR**, set the value read, increased by the 30%.
- if the maximum pressure switch is mounted downstream the “gas governor-gas valves” group and upstream the butterfly valve: light the burner, adjust it according to the procedure in the previous paragrph. Then, measure the gas pressure at the operating flow rate, downstream the “gas governor-gas valves” group and upstream the butterfly valve; by means of the adjusting ring nut **VR**, set the value read on step 2, increased by the 30%;
- replace the plastic cover.

PGCP Gas leakage pressure switch

- remove the pressure switch plastic cover;
- adjust the PGCP pressure switch to the same value set for the minimum gas pressure switch;
- replace the plastic cover.

WARNING: ALL OPERATIONS ON THE BURNER MUST BE CARRIED OUT WITH THE MAINS DISCONNECTED AND THE FUEL MANAUL CUTOFF VALVES CLOSED!

ATTENTION: READ CAREFULLY THE “WARNINGS” CHAPTER AT THE BEGINNIG OF THIS MANUAL.

PART III: MAINTENANCE

At least once a year carry out the maintenance operations listed below. In the case of seasonal servicing, it is recommended to carry out the maintenance at the end of each heating season; in the case of continuous operation the maintenance is carried out every 6 months.

WARNING: ALL OPERATIONS ON THE BURNER MUST BE CARRIED OUT WITH THE MAINS DISCONNECTED AND THE FUEL MANAUL CUTOFF VALVES CLOSED!
ATTENTION: READ CAREFULLY THE "WARNINGS" CHAPTER AT THE BEGINNIG OF THIS MANUAL.

ROUTINE MAINTENANCE

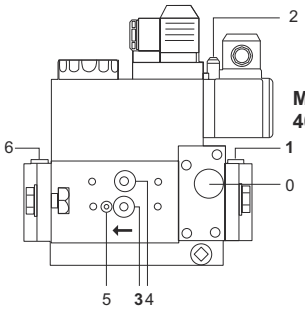
- Clean and examining the gas filter cartdrige, if necessary replace it (see next paragraphs).
- Removal, examination and cleaning of the combustion head (Fig. 4 and the following).
- Check the ignition and detection electrodes, clean and adjust if necessary (see Fig. 6). In case of doubt, check the detection current according to the schemes in Fig. 30-Fig. 31.
- Cleaning and greasing of sliding and rotating parts.

ATTENTIONwhen servicing, if it was necessary to disassemble the gas train parts, remember to execute the gas proving test, once the gas train is reassembled, according to the procedure imposed by the law in force.

Gas filter maintenance

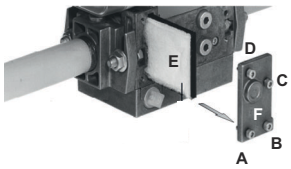
WARNING: Before opening the filter, close the manual cutoff valve downstream the filter and bleed the gas; check that inside the filter there is no pressurised gas.

Per pulire o sostituire il filtro gas procedere nel modo seguente:

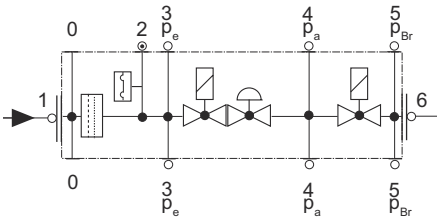


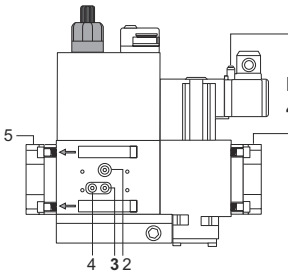
MB-DLE 405..412

0 Filter cover
1, 3,4 , 6 Screw plug G 1/8
2 Meter connection
5 Screw plug M14



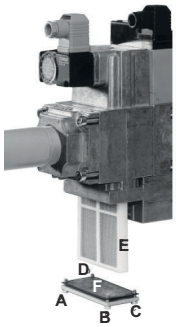
Pressure taps



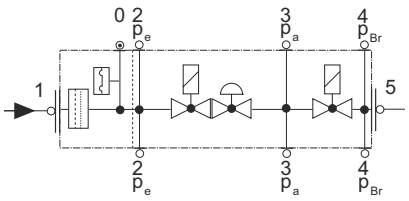


MB-DLE 415 - 420 B01

0, 1, 2, 3, 4, 5
Bouchon à vis G 1/8



Pressure taps



- Check the filter at least once a year!
- Change the filter if the pressure difference between pressure connection 1 and 3 (Fig. 1-Fig. 3)is $\Delta p > 10$ mbar.
- Change the filter if the pressure difference between pressure connection 1 and 3 (Fig. 1-Fig. 3) is twice as high compared to the last check.

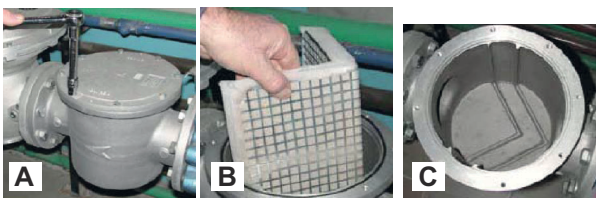
You can change the filter without removing the fitting.

1 Interrupt the gas supply closing the on-off valve.
2 Remove screws 1 ÷ 4 using the Allen key n. 3 and remove filter cover 5 in Fig. 5.
3 Remove the filter 6 and replace with a new one.
4 Replace filter cover 5 and tighten screws 1 ÷ 4 without using any force and fasten.
5 Perform leakage and functional test, $p_{max.}$ = 360 mbar.

To clean or remove the filter, proceed as follows:

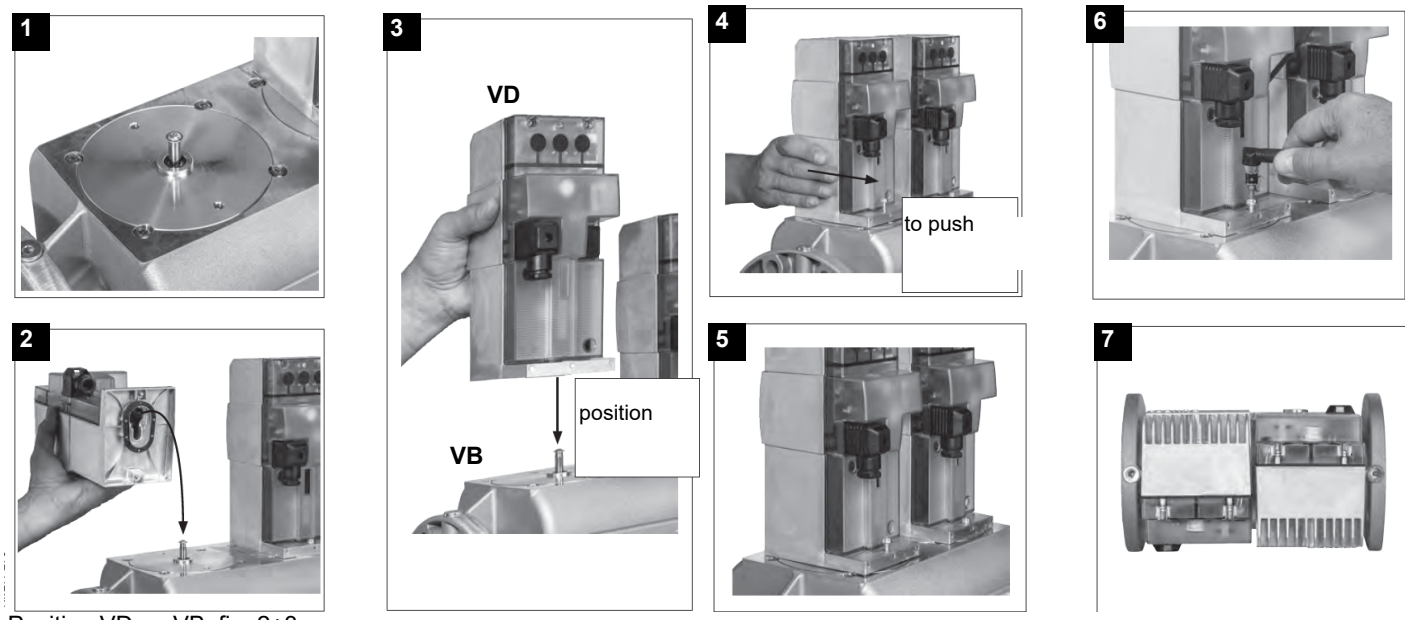
1 remove the cap unscrewing the fixing screws (A);
2 remove the filtering cartridge (B), clean it using water and soap, blow it with compressed air(or replace it, if necessary)
3 replace the cartridge in its proper position taking care to place it inbetween the guides as not to hamper the cap replacement;

be sure to replace the “O” ring into its place (C) and replace the cover fastening by the proper screws (A).



MultiBloc VD-V VD-R Mounting

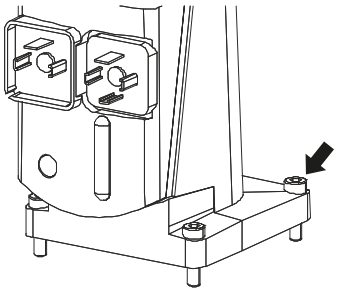
Fig. 1

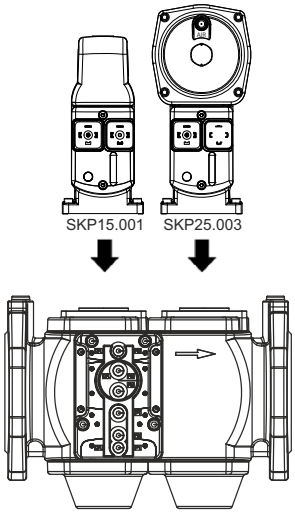


1. Position VD on VB, fig. 2+3.
2. Slide VD forward up to the stop, fig. 4.
3. Screw VD on with 2 M5 screws for each, max. 5 Nm/44 in.-lb., fig. 5/6.
4. VD can be mounted rotated by 180°, fig. 7.

Siemens SKP15 e SKP25 Mounting

Fig. 2



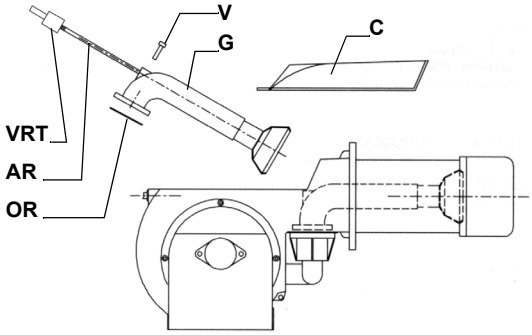


To replace the actuators, turn the screws as shown in the drawing.

Removing the combustion head

- Remove the lid C.
- Unscrew the screws V holding in position the manifold G and pull out the complete group as shown in figure.

Note: for the subsequent assembly carry out the above described operations



To remove the combustion head, pull it out. Once removed, check that the air and gas holes are not obstructed. Clean the combustion head by means of compressed air or scrape off the scale using a metallic brush

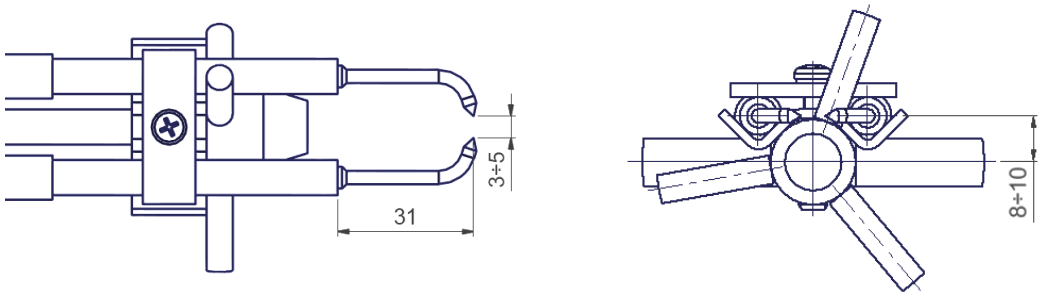
Adjusting the electrodes

Important Note: Check the ignition and detection electrodes after removing/adjusting the combustion head.

ATTENTION: avoid the ignition and detection electrodes to contact metallic parts (blast tube, head, etc.), otherwise the boiler operation would be compromised. Check the electrodes position after any intervention on the combustion head.

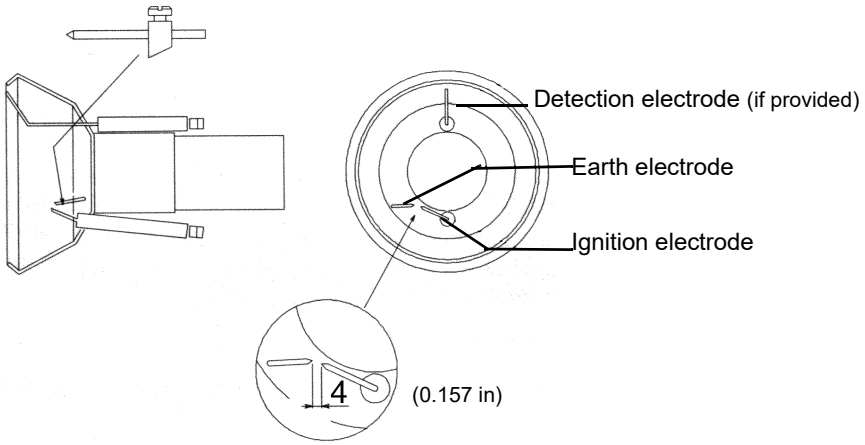
Electrodes position settings

E205A



Adjusting the electrodes

Important Note: Check the ignition and detection electrodes after removing/adjusting the combustion head.

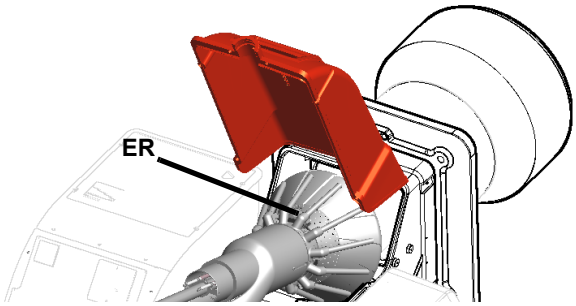


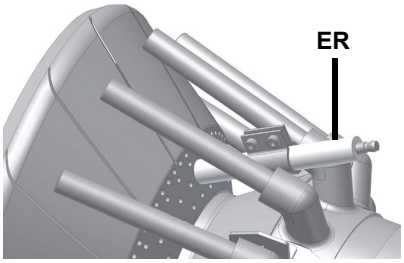
ATTENTION: avoid the ignition and detection electrodes to contact metallic parts (blast tube, head, etc.), otherwise the boiler's operation would be compromised. Check the electrodes position after any intervention on the combustion head.

Replacing the detection electrode (natural gas burners)

To replace the detection electrode, proceed as follows:

1 remove the combustion head according to the procedure on paragraph “Removing the combustion head”;
2 by means of an allen key, loose the fixing screws of the detection electrode **ER** and replace it;
3 replace the combustion head.



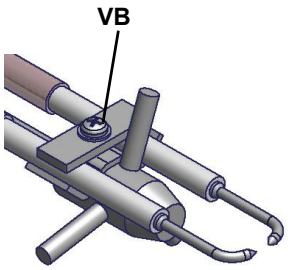


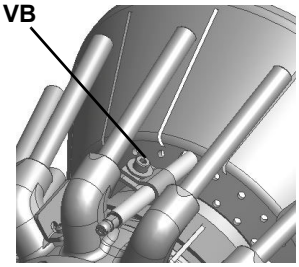
ATTENTION: avoid the electrode to get in touch with metallic parts (blast tube, head, etc.), otherwise the boiler operation would be compromised. Check the electrode position after any intervention on the combustion head.

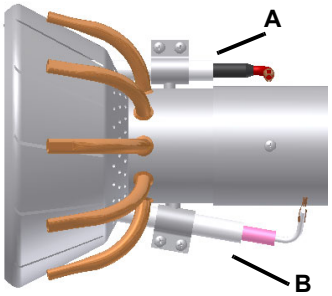
Replacing the electrodes

ATTENTION: avoid the ignition and detection electrodes to contact metallic parts (blast tube, head, etc.), otherwise the boiler’s operation would be compromised. Check the electrodes position after any intervention on the combustion head.

4
5 To replace the ignition electrodes, proceed as follows:
1 remove the burner cover
2 disconnect the electrodes cables;
3 loose the screw **VB** that fasten the electrodes group to the combustion head;
4 remove the electrodes and replace them paying attention to the measures showed in previous paragraph.
5 Reassemble the burner by fllowing the procedure in the reversed order.

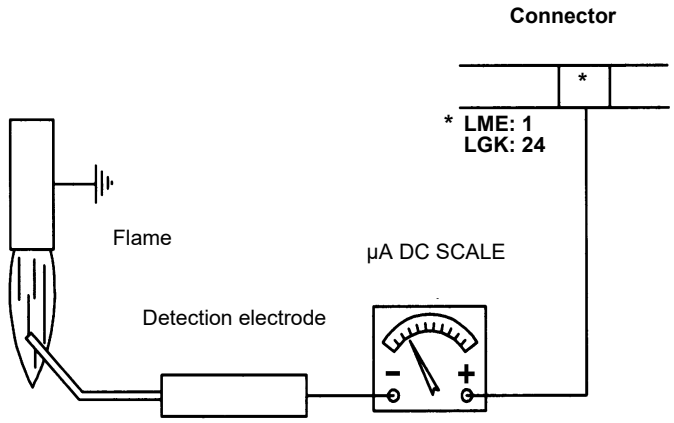






Checking the detection current with electrode (natural gas)

To check the detection signal follow the scheme in the picture below. If the signal is less than the value indicated, check the position of the detection electrode or detector, the electrical contacts and, if necessary, replace the electrode or the detector.



Control box	Minimum detection signal
Siemens LME21-22	3 µA
LGK	12 µA

Checking the detection current with electrode (natural gas)

To check the detection signal follow the scheme in the picture below. If the signal is less than the value indicated, check the position of the detection electrode or detector, the electrical contacts and, if necessary, replace the electrode or the detector.

Control box	Minimum detection signal
Siemens LME7..	2µA (with electrode)

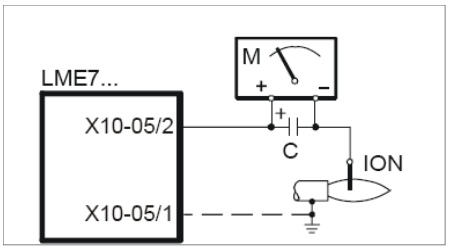


Fig. 4: Detection by electrode

Seasonal stop

To stop the burner in the seasonal stop, proceed as follows:

1 turn the burner's main switch to 0 (Off position)
2 disconnect the power mains
3 close the fuel cock of the supply line

Burner disposal

In case of disposal, follow the instructions according to the laws in force in your country about the "Disposal of materials".

WIRING DIAGRAMS

Refer to the attached wiring diagrams.

WARNING

1 - Electrical supply 230V / 400V 50Hz 3N a.c.
2 - Do not reverse phase with neutral
3 - Ensure burner is properly earthed

TROUBLESHOOTING GUIDE Gas operation

BURNER DOESN'T LIGHT	* No electric power supply	* Restore power supply
	* Main switch open	* Close switch
	* Thermostats open	* Check set points and thermostat connections
	* Bad thermostat set point or broken thermostat	* Reset or replace the thermostat
	* No gas pressure	* Restore gas pressure
	* Safety devices (manually operated safety thermostat, pressure switches and so on) open	* Restore safety devices; wait till boiler reaches operating temperature then check safety device functionality.
	* Broken fuses	* Replace fuses. Check current absorption
	* Fan thermal contacts open (three phases motors only)	* Reset contacts and check current absorption
	* Burner control lock out	* Reset and check its functionality
	* Burner control damaged	* Replace burner control
GAS LEAKAGE: BURNER LOCKS OUT (NO FLAME)	* Gas flow is too low	* Increase the gas flow * Check gas filter cleanness * Check butterfly valve opening when burner is starting (only Hi-Low flame and progressive)
	* Ignition electrodes discharge to ground because dirty or broken	* Clean or replace electrodes
	* Bad electrodes setting	* Check electrodes position referring to instruction manual
	* Electrical ignition cables damaged	* Replace cables
	* Bad position of cables in the ignition transformer or into the electrodes	* Improve the installation
	* Ignition transformer damaged	* Replace the transformer
BURNER LOCKS OUT WITH FLAME PRESENCE	* Wrong setting of flame detector	* Adjust flame detector
	* Flame detector damaged	* Replace flame detector
	* Bad cables of flame detector	* Check cables
	* Burner control damaged	* Replace burner control
	* Phase and neutral inverted	* Adjust connections
	* Ground missing or damaged	* Check ground continuity
	* Voltage on neutral	* Take off tension on neutral
	* Too small flame (due to not much gas)	* Adjust gas flow * Check gas filter cleanness
	* Too much combustion air	* Adjust air flow rate
only FOR LME22: BURNER CONTINUES TO PERFORM ALL ITS FEATURES WITHOUT IGNITING THE BURNER	* Air pressure switch damaged or bad links	* Check air pressure switch functions and links
	* Burner control damaged	* Replace burner control
BURNER LOCKS OUT WITHOUT ANY GAS FLOW	* Gas valves don't open	* Check voltage on valves; if necessary replace valve or the burner control * Check if the gas pressure is so high that the valve cannot open
	* Gas valves completely closed	* Open valves
	* Pressure governor too closed	* Adjust the pressure governor
	* Butterfly valve closed	* Open the butterfly valve
	* Maximum pressure switch open.	* Check connection and functionality
	* Air pressure switch doesn't close the NO contact	* Check connections * Check pressure switch functionality
THE BURNER IS BLOCKED AND THE EQUIPMENT PROVIDES A LOCK CODE "CAUSE AIR PRESSURE SWITCH FAULT"	* Air pressure switch damaged (it keeps the stand-by position or badly set)	* Check air pressure switch functionality * Reset air pressure switch
	* Air pressure switch connections wrong	* Check connections
	* Air fan damaged	* Replace motor
	* No power supply	* Reset power supply
	* Air damper too closed	* Adjust air damper position
BURNER LOCKS OUT DURING NORMAL RUNNING	* Flame detector circuit interrupted	* Check wiring * Check photocell
	* Burner control damaged	* Replace burner control
	* Maximum gas pressure switch damaged or badly set	* Reset pressure switch or replace it
THE BURNER STARTS AND AFTER A WHILE IT REPEATS THE STARTING CYCLE.	* Gas pressure switch badly set	* Reset the pressure switch
	* Gas filter dirty	* Clean gas filter
	* Gas governor too low or damaged	* Reset or replace the governor
BURNER STANDS WHILE RUNNING WITHOUT ANY SWITCHING OF THERMOSTATS	* Thermal contacts of fan motor open	* Reset contacts and check values * Check current absorption
FAN MOTOR DOESN'T START	* Internal motor wiring broken	* Replace wiring or complete motor
	* Fan motor starter broken	* Replace starter
	* Fuses broken (three phases only)	* Replace fuses and check current absorption
BURNER DOESN'T SWITCH TO HIGH FLAME	* Hi-low flame thermostat badly set or damaged	* Reset or replace thermostat
	* Servomotor cam badly set	* Reset servomotor cam
***mechanical only*: SOMETIMES THE SERVOMOTOR RUNS IN THE WRONG WAY**	* Servomotor capacitor damaged	* Replace capacitor
PHASE-TO-PHASE SUPPLY OR PRESENCE OF VOLTAGE ON NEUTRAL*	* Lights up and freezes	* In such cases, insert an RC circuit (our code 2531003).

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website:www.cibunigas.it-e-mail:cibunigas@cibunigas.it

Note: specifications and data subject to change. Errors and omissions excepted.

LME73.000Ax + PME73.831AxBC
LME73.831AxBC



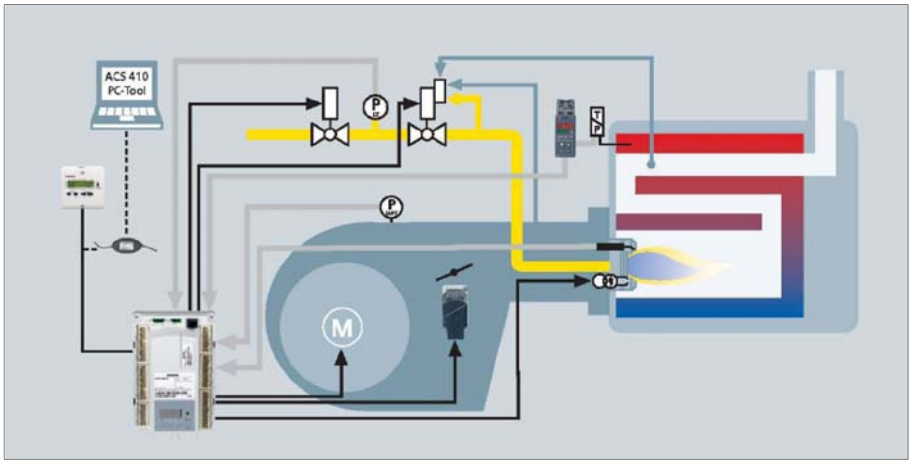
Service instruction manual

M12921CB Rel.1.2 02/2016

GENERAL FEATURES

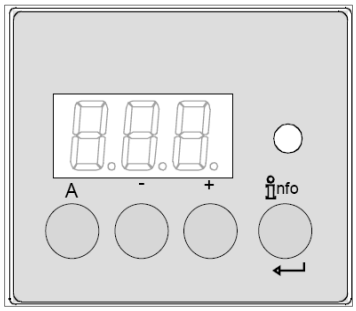
LME/ is suitable for gas, light and heavy oil burners
LME7 series has two devices: LME73.000 (hardware) and PME73.831AxBC (programmable unit). The LME73.831AxBC is also available: it has a built in software and it isa not programmable.
LME7 is inside the control panel. If supplied, PME73.831BC is inside the LME7;
The display AZL23.. or AZL21.. is available for Service and hardware setup.

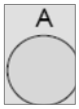
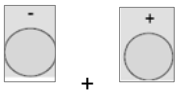
LME7… are used for the startup and supervision of 2-stage/progressive, modulating forced draft gas burners in intermittent operation.
The flame is supervised with an ionization probe, optionally with UV flame detector QRA2..., QRA4.U or QRA10....
Integrated in the LME7... basic unit are:
• Burner control
• BCI
• Control for one actuator
• Lockout reset button (info button)
• 3 multicolor signal lamp LED for operations and fault notifications
• 3 x 7-segment display for service, fault and operating state information
• Interface for program module (no function)
Passwords protect the different parameter levels against unauthorized access. Basic settings that the plant operator can make on site require no password.
Functions:
- Undervoltage detection
- Electrical remote reset facility
- Accurate control times thanks to digital signal handling
- Multicolor indication of fault status and operating state messages
- Air pressure supervision with function check of air pressure switch during start and operation (gas)
- Repetition limitation
- Controlled intermittent operation after 24 hours of continuous operation*
- BCI
- Indication of program sequence



* after no more than 24 hours of continuous operation, the burner control initiates automatic controlled shutdown followed by a restart.

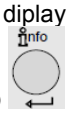
User interface :



	***Button A*** - Display preset output - In lockout position: Power value to the time of fault
	I***nfo and Enter button*** - Reset in the event of fault, changeover visual diagnostic of the cause of fault (refer to chapter Diagnostics of cause of fault)
	***- button*** - Display flame signal current 2 or phases display - In lockout position: MMI phase to the time of fault
	***+ button*** - Display flame signal current 1 or phases display - In lockout position: MMI phase to the time of fault
	***3 multicolor signal lamp*** - Refer to chapter “Blink code table”
	**+ and - button: Escape function** (press + and - simultaneously) - No adoption of value - One menu level up - Keep depressed for >1second for backup / restore function

First startup when PME is supplied or PME replacement:

First startup:

1) insert a new PME
2) turn the power on; The diplay shows "rst" and "PrC" one after the other.
3) keep pushing the INFO  button more than 3 seconds; "run" appears; PME parameters will be transferred to LME
4) at the end, "End" and "rst" appears one after the other; Later (2'), the control box locks out "Loc 138"
5) reset the control box by pressing the INFO  button (for less than 3 seconds)

Now the display shows "OFF"; the burner is ready to be started.

Replacement:

1) Turn off the burner, replace the existing PME with a new one
2) For the first startup, repeat the above procedure, from step 2.

List of phase display on board LME :

Phase number of 7-segment display	**LED**	**Function**
Standby		
OFF	Off	Standby, waiting for heat demand
P08	Off	Mains ON / test phase (e.g. detector test)
Startup		
P21	Yellow	Safety valve ON, air pressure switch test / POC test (timeout / locking
P22	Yellow	Fan motor ON / air pressure switch test / settling time
P24	Yellow	Actuator opens in prepurging position
P30	Yellow	Prepurging
P36	Yellow	Actuator closes in ignition load / low-fire position
P38	Yellow blinking	Preignition time
P40	Yellow blinking	1st safety time (TSA1) / ignition transformer ON
P42	Green	Safety time (ignition transformer OFF), flame check
P44	Green	Interval: End of safety time and fuel valve 1 (V1) ON Interval: End of safety time and load controller (LR) release
P50 Green	P50 Green	2nd safety time (TSA2)
P54 Green	P54 Green	P259.01: Actuator opens in > low-fire
P54 Green	P54 Green	P260: Actuator closes in low-fire
oP1 Green	oP1 Green	Interval until release of load controller target (analog or 3-position step input)
Operation		
oP	Green	Operation, modulating operation
Shutdown		
P10	Yellow	Shutdown, actuator opens in CLOSE position (home run)
P72	Yellow	Actuator opens in high-fire position / end of operation
P74	Yellow	Postpurging
Valve proving		
P80	Yellow	Test space evacuating
P81	Yellow	Checking time fuel valve 1
P82	Yellow	Test space filling
P83	Yellow	Checking time fuel valve 2
Waiting phases (start prevention)		
P01	Red / yellow blinking	Undervoltage
P02	Yellow	Safety loop open
P04	Red / green blinking	Extraneous light on burner startup (timeout / locking after 30 s)
P90	Yellow	Pressure switch-min open
Lockout		
LOC	Red	Lockout phase

Operation :

	The lockout reset button (info button) (EK) is the key operating element for resetting the burner control and for activating / deactivating the diagnostics functions.
	The multicolor signal lamp (LED) is the key indicating element for visual diagnostics.

Both lockout reset button (EK) and signal lamp (LED) are located in the control panel.
There are 2 diagnostics choices:
1. Visual diagnostics: Indication of operating state or diagnostics of cause of fault
2. Diagnostics: Via internal display or to AZL2.. display and operating unit
Visual diagnostics:
In normal operation, the different operating states are indicated in the form of color codes according to the color code table given below.

Color code table for multicolor signal lamp (LED) **:**

State	Color code	Color
Waiting time (tw), other waiting states	❍.....	OFF
Ignition phase, ignition controlled	●❍●❍●❍●❍●❍●	Blinking yellow
Operation, flame o.k.	□.....	Green
Operation, flame not o.k.	□❍□❍□❍□❍□❍	Blinking green
Extraneous light on burner startup	□▲□▲□▲□▲□▲	Green-red
Undervoltage	●▲●▲●▲●▲●▲	Yellow-red
Fault, alarm	▲.....	Red
Error code output (refer to «Error code table»)	▲❍ ▲❍ ▲❍ ▲❍	Blinking red
Interface diagnostics	▲▲▲▲▲▲▲▲	Red flicker light
Heating request	●.....	Yellow
Heating request	●●▲●●▲●●▲●●	Yellow

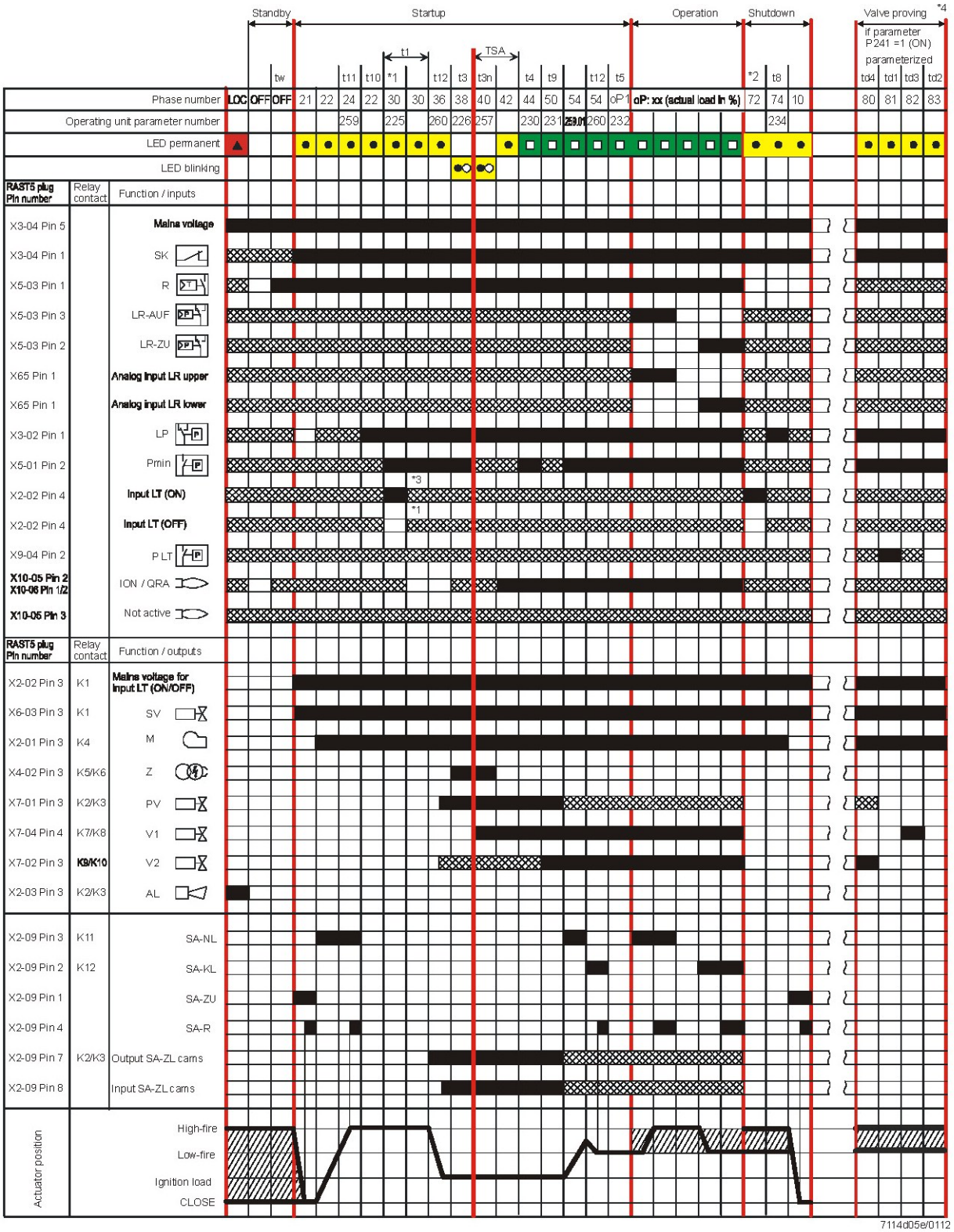
Key

.....	Steady on
❍	Led off
▲	Led red
●	Led yellow
□	Led green

Program sequence :

Version 1:

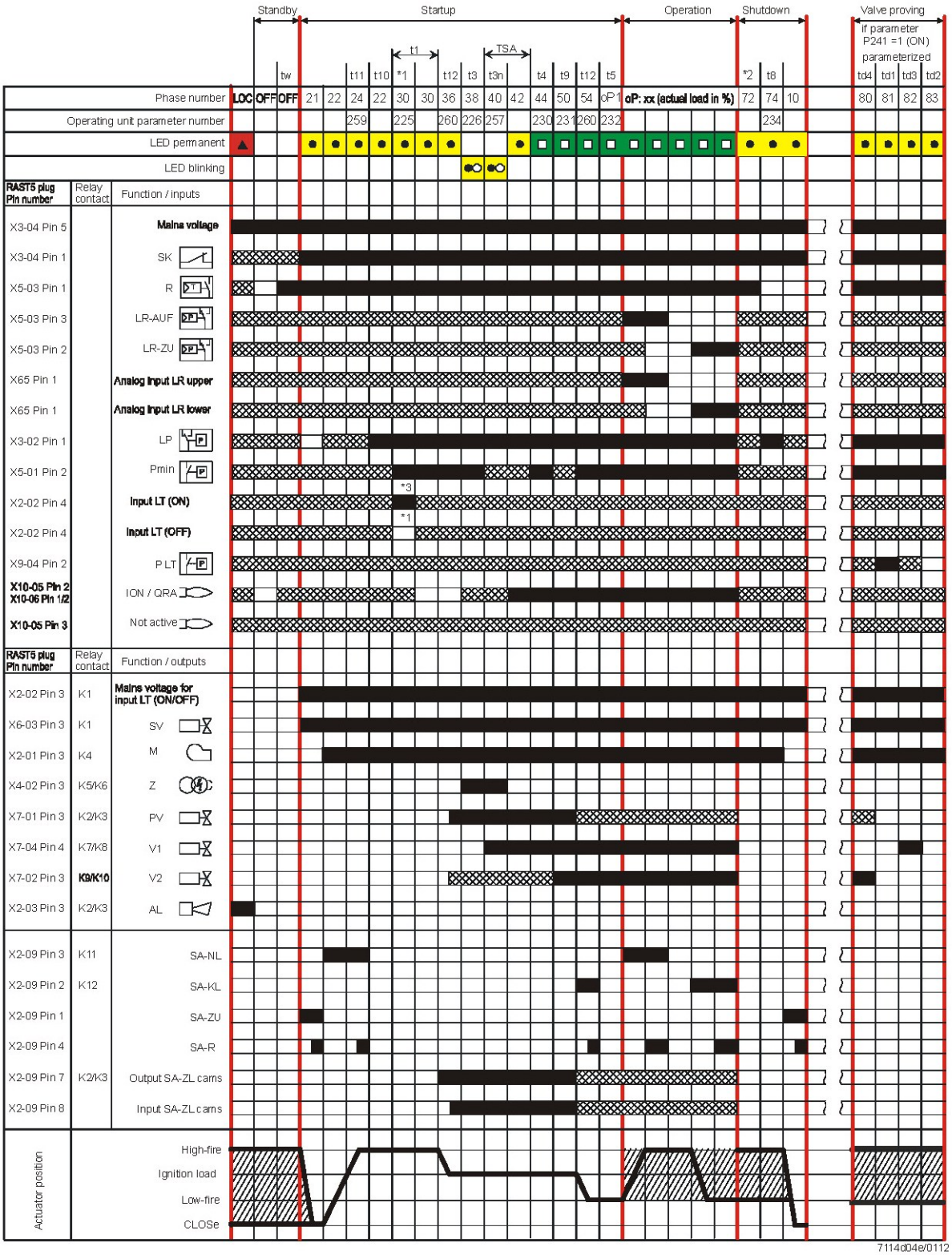
- Ignition load < low-fire
- Prepurging in high-fire
- Parameter 515 = 1 (condition parameter 259.01 > 0 seconds)



Program sequence :

Version 2:

- Ignition load > low-fire
- Prepurging in high-fire
- Parameter 515 = 1 (condition parameter 259.01 = 0 seconds)



Phase number	Function
LOC	Lockout phase
OFF	Standby, waiting for heat demand
oP	Operation, modulating operation
oP1	Interval until release of load controller target (analog or 3-position step input)
01	Under voltage
02	Safety loop open
04	Extraneous light on burner startup (timeout/locking after 30 seconds)
08	Mains ON/test phase (e.g. detector test)
10	Shutdown, actuator opens in CLOSE position (homerun)
21	Safety valve ON, air pressure switch OFF, actuator opens in CLOSE position
22	Part 1: Fan motor ON
	Part 2: Specified time (t10) air pressure switch (LP)
	Message (timeout) stabilization air pressure switch
24	Actuator opens in prepurge position
30	Part 1: Prepurge time (t1) without extraneous light test
	Valve proving after mains ON, lockout
	Part 2: Prepurge time (t1) with extraneous light test
36	Actuator closes in ignition load
38	Preignition (t3)
40	Postignition time (t3n), parameter 257 + 0.3 seconds
42	Flame detection
44	Interval (t4): End of safety time (TSA) and burner valve 2 ON
50	2nd safety time (t9)
54	Parameter 259.01: Actuator opens in > low-fire
	Parameter 260: Actuator closes in low-fire
72	End of operation, checking if valve proving (LT) shall be performed
74	Postpurging (t8)
80	Test space evacuation (td4)
81	Test time (td1) fuel valve 1 (V1)
82	Test space filling (td3)
83	Test time (td2) fuel valve 2 (V2)
90	Pressure switch-min open safety shutdown
*1	Valve proving is conducted when…
	- parameter 241.00 = 1 and parameter 241.02 = 1, or
	- parameter 241.00 = 1 and parameter 241.01 = 0
*2	Valve proving is conducted when…
	- parameter 241.00 = 1 and parameter 241.02 = 1, or
	- parameter 241.00 = 1 and parameter 241.01 = 1
*3	Valve proving (LT) will not be performed

Error code table :

Red blink code of fault signal lamp (LED)	Possible cause
2 x blinks	No establishment of flame at the end of the safety time (TSA)
	- Faulty or soiled flame detector - Faulty or soiled fuel valves - Poor adjustment of burner, no fuel - Faulty ignition equipment
3 x blinks	Air pressure switch (LP) faulty - Loss of air pressure after specified time (t10) - - Air pressure switch (LP) welded in no-load position
4 x blinks	Extraneous light on burner startup
5 x blinks	Time supervision air pressure switch (LP) - Air pressure switch (LP) welded in working position
6 x blinks	Actuator position not reached - Actuator faulty - Wrong adjustment of cam - Actuator defective or blocked - False connection - Misadjustment
7 x blinks	Too many losses of flame during operation (limitation of repetitions) - Faulty or soiled flame detector - Faulty or soiled fuel valves - Poor adjustment of burner
8 x blinks	Free
9 x blinks	Free
10 x blinks	Wiring error or internal error, output contacts, other faults
12 x blinks	Valve proving (LT) - Fuel valve 1 (V1) leaking
13 x blinks	Valve proving (LT) - Fuel valve 2 (V2) leaking
14 x blinks	Error in connection with valve closure control POC
15 x blinks	Error code ≥15 Error code 22: Error of safety loop (SL)

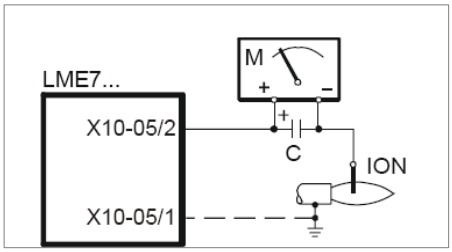
During the time the cause of fault is diagnosed, the control outputs are deactivated:
- Burner remains shut down
- External fault indication (AL) at terminal X2-03, pin 3 steady on

Diagnostics of cause of fault is quit and the burner switched on again by resetting the burner control. Press the lockout reset button (info button) for about 1 second (<3 seconds).

Flame detection – detection electrode :

Short-circuit current	Max. AC 1 mA
Required detector current	Min. DC 2 µA, display approx. 45 %
Possible detector current	Max. DC 3 µA, display approx. 100 %
Permissible length of detector cable (laid separately)	30 m (core-earth 100 pF/m)

Measuring circuit



Keys

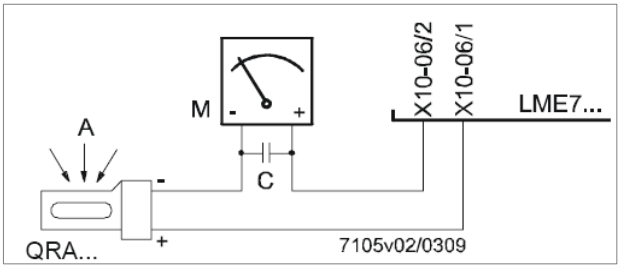
C	-	Electrolytic condenser 100...470 µF; DC 10...25 V
ION	-	Ionization probe
M	-	Microammeter Ri max. 5,000 Ω

Flame detection – UV probe :

Threshold values when flame is supervised by QRA...

- Start prevention (extraneous light)	Intensity (parameter 954) approx. 12 %
- Operation	Intensity (Parameter 954) approx. 13 %
Operating voltage	AC 280 V ±15 %
Mains frequency	50...60 Hz ±6 %
Required detector current	Min. 70 µA
Possible detector current	
- Operation	Max. 700 µA
Perm. length of detector cable	
- Normal cable, laid separately [1])	Max. 100 m

[1]) Multicore cable not permitted



Keys

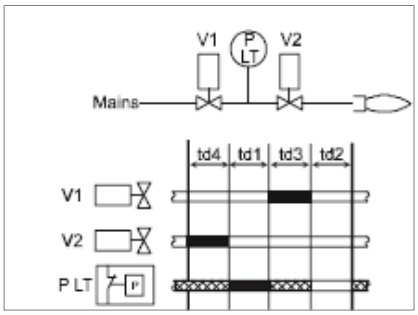
A	-	Exposure to light
C	-	Electrolytic condenser 100...470 µF; DC 10...25 V
M	-	Microammeter Ri max. 5,000 Ω

Warning!
Input QRA... is not short-circuit-proof!
Short-circuits of X10-06/2 against earth can destroy the QRA... input
Simultaneous operation of flame detector QRA... and detection electrode is not permitted
To make certain the age of the UV tube can be determined, the LME7... basic unit must always be connected to mains supply.

Gas proving system :

Valve proving is dependent on input valve proving ON / OFF (X2-02). When a leak is detected, the gas valve proving function ensures that the gas valves will not be opened and that ignition will not be switched on. Lockout will be initiated.
.

Valve proving with separate pressure switch (P LT)
Step 1: td4 – Evacuation of test space
Gas valve on the burner side is opened to bring the test space to atmospheric pressure.
Step 2: td1 – Test atmospheric pressure
When the gas has closed, the gas pressure in the test space must not exceed a certain level.
Step 3: td3 Filling of test space
Gas valve on the mains side opens to fill the test space.
Step 4: td2 – Test gas pressure
When the gas valve has closed, the gas pressure in the test space must not drop below a certain level.



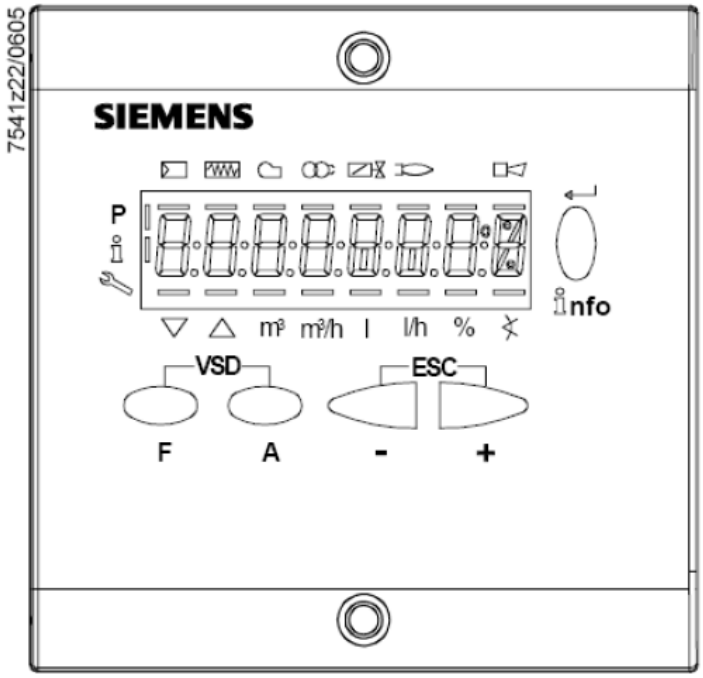
Controllo tenuta con pressostati separati

Keys
td1 Test atmospheric pressure
td2 Test gas pressure
td3 Filling of test space
td4 Evacuation of test space
V… Fuel valve
PLT Pressure switch valve proving
Input / output signal 1 (ON)
Input / output signal 0 (OFF)
Input permissible signal 1 (ON) or 0 (OFF)

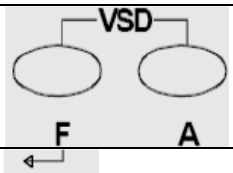
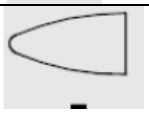
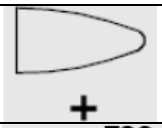
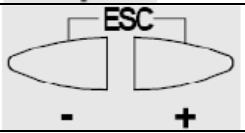
No.	***Parameter***
242	Valve proving evacuation of test space
243	Valve proving time test atmospheric pressure
244	Valve proving filling of test space
245	Valve proving time test gas pressure

Instruction, control and modify via AZL2x :

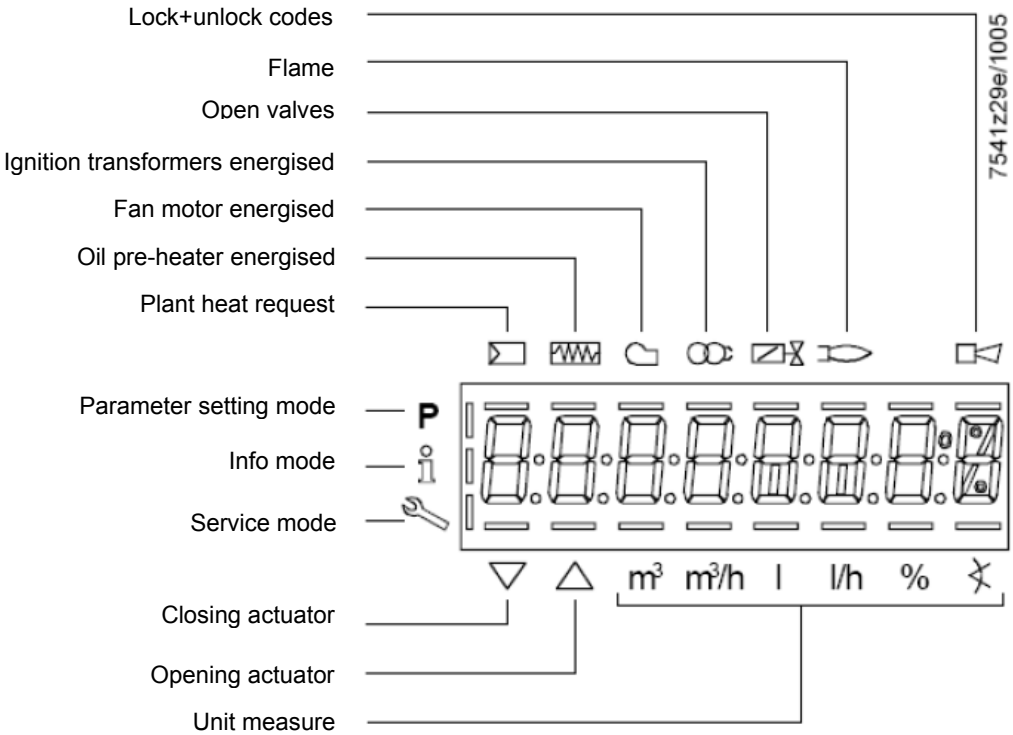
The AZL2x.. display/programming unit is shown below:



The keys functions are the following:

	Key F + A While pressing the two keys contemporarly, the code message will appear: by entering the proper password it is possible to access the Service mode.
	Info and Enter keys Used for Info and Service menues Used as Enter key in the setting modes Used as Reset key in the burner operation mode Used to enter a lower level menu
	Key - Used for one menu level down Used to decrease a value
	Key + Used for one menu level up Used to increase a a value
	Keys (+ & -)= ESC By pressing + and - at the same time, the ESCAPE function is performed No adoption of value One menu level down

The display will show these data:



While pushing the 

button together with whatever else button, LME73 locks out; the display shows



On stand-by position, 

appears

On operation, all the phases appears with their number. 

List of phase with display AZL2x :

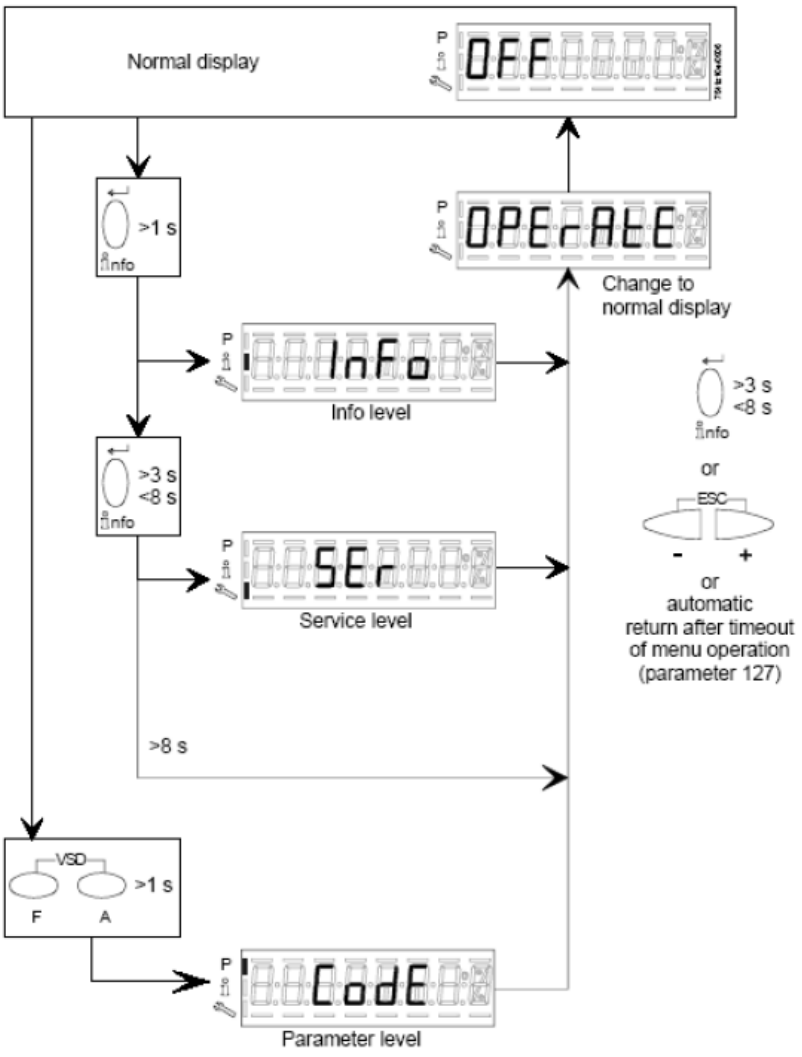
Phase number	**Function**
Standby	
OFF	Standby, waiting for heat request
Ph08	Power ON / test phase (e.g. detector test)
Startup	
Ph21	Safety valve ON, air pressure switch test / POC test (timeout / locking after 5 seconds), actuator opens in low-fire position / CLOSE position
Ph22	Fan motor ON or air pressure switch test / settling time
Ph24	Actuator travels to the prepurge position
Ph30	Prepurging
Ph36	Actuator closes until ignition load / low-fire is reached, and parameter 259.02: Actuator opens to a position > ignition load
Ph38	Preignition
Ph40	1st safety time (TSA1) / ignition transformer ON
Ph42	Safety time (ignition transformer OFF), flame check
Ph44	Interval: End of safety time and fuel valve 1 (V1) ON
Ph50	2nd safety time (TSA2)
Ph54	P259.01: Actuator opens in > low-fire
Ph54	P260: Actuator closes in low-fire
oP1	Interval until release of load controller target (analog or 3-position step input)
Operation	
oP	Operation, modulating operation
Shutdown	
Ph10	Shutdown, actuator opens in CLOSE position (home run)
Ph72	Actuator opens in high-fire position / end of operation
Ph74	Postpurging
Valve proving	
Ph80	Test space evacuating
Ph81	Checking time fuel valve 1
Ph82	Test space filling
Ph83	Checking time fuel valve 2
Waiting phases (start prevention)	
Ph01	Undervoltage
Ph02	Safety loop open
Ph04	Extraneous light at burner startup (timeout / locking after 30 seconds)
Ph90	Pressure switch-min open → safety shutdown
Lockout	
LOC	Lockout phase

Error code list with operation via internal AZL :

Error code	*Clear text*	*Possible cause*
Loc 2	No establishment of flame at the end of the safety time (TSA)	- Faulty or soiled fuel valves - Faulty or soiled flame detector - Poor adjustment of burner, no fuel - Faulty ignition equipment
Loc 3	Air pressure faulty (air pressure switch (LP) welded in no-load position, decrease to spe-cified time (t10) (air pressure switch (LP) re-sponse time)	Air pressure switch (LP) faulty - Loss of air pressure signal after specified time (t10) - Air pressure switch (LP) is welded in no-load position
Loc 4	Extraneous light	Extraneous light when burner startup
Loc 5	Air pressure faulty, air pressure switch wel-ded in working position	Time out air pressure switch (LP) - Air pressure switch (LP) is welded in working position
Loc 6	Fault of actuator	- Actuator faulty or blocked - Faulty connection - Wrong adjustment
Loc 7	Loss of flame	Too many losses of flame during operation (limitation of repetitions) - Faulty or soiled fuel valves - Faulty or soiled flame detector - Poor adjustment of burner
Loc 8	---	Free
Loc 9	---	Free
Loc 10	Error not relatable (application), internal error	Wiring error or internal error, output contacts, other faults
Loc 12	Valve proving	Fuel valve 1 (V1) leak
Loc 13	Valve proving	Fuel valve 2 (V2) leak
Loc 22	Safety loop open	- Gas pressure switch-max open - Safety limit thermostat cut out
Loc 138	Restore process successful	Restore process successful
Loc 167	Manual locking	Manual locking
Loc: 206	AZL2... incompatible	Use the latest version

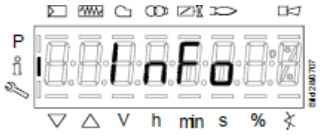
Entering the Parameter levels:

y means of a proper use of the keys, it is possible to enter the various level parameters, as shown in the following flow chart :



Info level :

Keep pushing the 

button until 

appears. Use + or - for scrolling the parameter list. If on the right side a dash-dot appears, it means the display doesn't show the full description. *Push* 

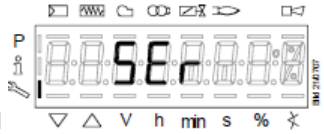
again for 1 to 3 s in order to show the full description.

Below the visible **Info** parameters:

Parameter number	Parameter list PME73.000Ax + PME73.831AxBC LME73.831AxBC	Edit	Value range Min.	Value range Max.	Resolution	Factory setting	Password level reading from level	Password level writing from level
100	**General**							
102	Identification date	Read only	---	---	---		Info	---
103	Identification number	Read only	0	9999	1		Info	---
113	Burner identification	Read only	x	xxxxxxxx	1		Info	---
164	Numbers of startups resettable	Resettable	0	999999	1		Info	Info
166	Total number of startups	Read only	0	999999	1		Info	---
170.00	Switching cycles actuator relay K12	Read only	0	999999	1		Info	---
170.01	Switching cycles actuator relay K11	Read only	0	999999	1		Info	---
170.02	Switching cycles actuator relay K2	Read only	0	999999	1		Info	---
170.03	Switching cycles actuator relay K1	Read only	0	999999	1		Info	---
171	Max. switching cycles actuator relay	Read only	0	999999	1		Info	---

Service level :

Keep pushing the 

button until 

appears. Use + or - for scrolling the parameter list. . If on the right side a dash-dot appears, it means the display doesn't show the full description. *Push* 

again for 1 to 3 s in order to show the full description.

Below the visible **Info** parameters:

Parameter number	Parameter list PME73.000Ax + PME73.831AxBC LME73.831AxBC	Edit	Value range Min.	Value range Max.	Resolution	Factory setting	Password level reading from level	Password level writing from level
700	**Error history**							
701	Current error:	Read only					Service	---
	00: Error code		2	255	1			
	01: Startup meter reading		0	999999	1			
	02: MMI phase		---	---	---			
	03: Power value		0%	100%	1			
702	Error history former 1:	Read only					Service	---
	00: Error code		2	255	1			
	01: Startup meter reading		0	999999	1			
	02: MMI phase		---	---	---			
	03: Power value		0%	100%	1			
•								
•								
•								
711	Error history former 10:	Read only					Service	---
	00: Error code		2	255	1			
	01: Startup meter reading		0	999999	1			
	02: MMI phase		---	---	---			
	03: Power value		0%	100%	1			

900	**Process data**							
936	Normalized speed	Read only	0%	100%	0.01 %		Service	---
951	Mains voltage	Read only	0 V	LME73.000A1: 175 V LME73.000A2: 350 V	1 V		Service	---
954	Flame intensity	Read only	0%	100%	1%		Service	---

Parameter level (Heating engeneering) :

This level lets the engineer to modify some burner parameters. It is protect with a 4 digit password (SO level) and a 5 digit password (OEM level)
Password input : push **F** and **A** buttons together until the display shows "**code"** and 7 underlines. The left one flashes. By **+** or **-** move the flashing underline until it is on the desired position and push "enter". The underline becomes a dash. By means of **+** or **-,** choose the right character and push "enter". Input the whole password and the **PArA** appears and later on **000 Int** .
Scroll the parameters using **+** or **-: 000Int**, **100**, **200**, **500**, **600 are on the display**. Choose the proper parameter group with the **enter** button and scroll the options with **+** e poi **-** (below the full par set: the two columns on the right give the level access). Choose the parameter to be modified with "enter" is writing is allowed. The parameter now flashes: **+** or **–** modifies the parameter and **enter** confirms. **+** and **-** pushed togther movbe the menu one step back. Push **+** and **-** several times in order to get the home position..

Parameter number	Parameter list PME73.000Ax + PME73.831AxBC LME73.831AxBC	Edit	Value range		Resolution	Factory setting	Password level reading from level	Password level writing from level
			Min.	Max.				
0	**Internal parameter**							
41	Heating engineers password (4 characters)	Edit	xxxx	xxxx	---		---	OEM
42	OEM's password (5 characters)	Edit	xxxxx	xxxxx	---		---	OEM
60	Backup / restore	Edit	Restore	Backup	---		---	SO
100	**General**							
123	Min. power control step	Edit	1%	10%	0.1		SO	SO
140	Mode display of Display and operating unit AZL2... 1 = Standard (program phase) 2 = Flame 1 (QRA... / ION) 3 = Flame 2 (QRB... / QRC...) 4 = Active power (power value)	Edit	1	4	4		SO	SO
200	**Burner control**							
224	Specified time (t10) air pressure switch (LP)	Edit	0 s	13.818 s	0.294 s	12,054	SO	OEM
225	Gas: Prepurge time (t1)	Edit	0 s	1237 s	4.851 s	29,106	SO	OEM
226	Gas: Preignition time (t3)	Edit	1.029 s	37.485 s	0.147 s	2,058	SO	OEM
230	Interval (t4): End of safety time (TSA) - fuel valve 1 (V1) ON	Edit	3.234 s	74.97 s	0.294 s	3,234	SO	OEM
231	Interval (t9): Fuel valve 1 (V1) ON - pilot valve (PV) OFF	Edit	0 s	74.97 s	0.294 s	2,940	SO	OEM
232	Interval (t5): Pilot valve (PV) OFF - load controller (LR) release	Edit	2.058 s	74.97 s	0.294 s	8.820	SO	OEM
234	Gas: Postpurge time (t8)	Edit	0 s	1237 s	4.851 s	0	SO	OEM
239	Gas: Intermittent operation after 24 hours of continuous operation 0=OFF 1=ON	Edit	0	1	1	1	SO	OEM

240	Repetition in the event of loss of flame during operation 0 = None 1 = None 2 = 1 x Repetition	Edit	0	2	1	0	SO	OEM
241.00	Valve proving 0 = Off 1 = On	Edit	0	1	1	1	SO	OEM
241.01	Valve proving 0 = During prepurge time (t1) 1 = During postpurge time (t8)	Edit	0	1	1	0	SO	OEM
241.02	Valve proving 0 = According to P241.01 1 = During prepurge time (t1) and postpurge time (t8)	Edit	0	1	1	0	SO	OEM
242	Valve proving test space evacuating	Edit	0 s	2.648 s	0.147 s	2,646	SO	OEM
243	Valve proving time test atmospheric pressure	Edit	1.029 s	37.485 s	0.147 s	10,290	SO	OEM
244	Valve proving test space filling	Edit	0 s	2.648 s	0.147 s	2,646	SO	OEM
245	Valve proving time test gas pressure	Edit	1.029 s	37.485 s	0.147 s	10,290	SO	OEM
254	Response time detector error 0 = 1 s 1 = 3 s	Edit	0	1	1	0	SO	OEM
257	Gas: Postignition time (t3n – 0.3 seconds)	Edit	0 s	13.23 s	0.147 s	2,205	SO	OEM
259.00	Opening time of actuator (t11) (timeout for lockout)	Edit	0 s	1237 s	4.851 s	67,914	SO	OEM
259.01	Opening time of actuator from ignition load to low-fire position	Edit	0 s	37.485 s	0.147 s	14,994	SO	OEM
259.02	Opening time of actuator from low-fire to ignition load position	Edit	0 s	37.485 s	0.147 s	14,994		
260	Closing time of actuator (t12) (timeout for lockout)	Edit	0 s	1237 s	4.851 s	67,914	SO	OEM
500	**Ratio control**							
515	Actuator position during prepurge time (t1) and postpurge time (t8) 0: Purging in low-fire 1: Purging in high-fire	Edit	0	1	1	1	SO	OEM
560	Pneumatic combustion control 0 = off / 3-step modulation 1 = PWM fan / analog modulation ~~2 = air damper / analog modulation (feedback potentiometer ASZxx.3x required)~~	Edit	0	2	1	1	SO	SO

600	Power setting							
654	Analog input (feedback potentiometer ASZxx.3x required) 0 = 3-position step input 1 = 0...10 V 2 = 0...135 Ω 3 = 0...20 mA 4 = 4...20 mA with lockout at I <4 mA 5 = 4...20 mA	Edit	0	5	1	0	SO	SO

WARNING	
Parameter Num. : **41** **42** **60** **123** **140** **242** **243** **244** **245** **259.01**	**Adjustable parameters from SO or OEM levels for LME73.831AxBC**

Note: Specifications and data subject to change. Errors and omissions excepted.