C70N US

Gas burners Premix

Microprocessor controlled

LMV 2x/3x

MANUAL OF INSTALLATION - USE - MAINTENANCE

CIB UNIGAS

BURNERS - BRUCIATORI - BRULERS - BRENNER - QUEMADORES - ГОРЕЛКИ

M039682WA 0.0 01/2023

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 supplied with the burner:

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

.

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 harmless.

- 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 (i.e. pumps, burner, etc.) 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.

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.	--

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.

SYMBOLS USED

WARNING	Failure to observe the warning may result in irreparable damage to the unit or damage to the environment
DANGER!	Failure to observe the warning may result in serious injuries or death.
WARNING	Failure to observe the warning may result in electric shock with lethal consequences.

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.

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.

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

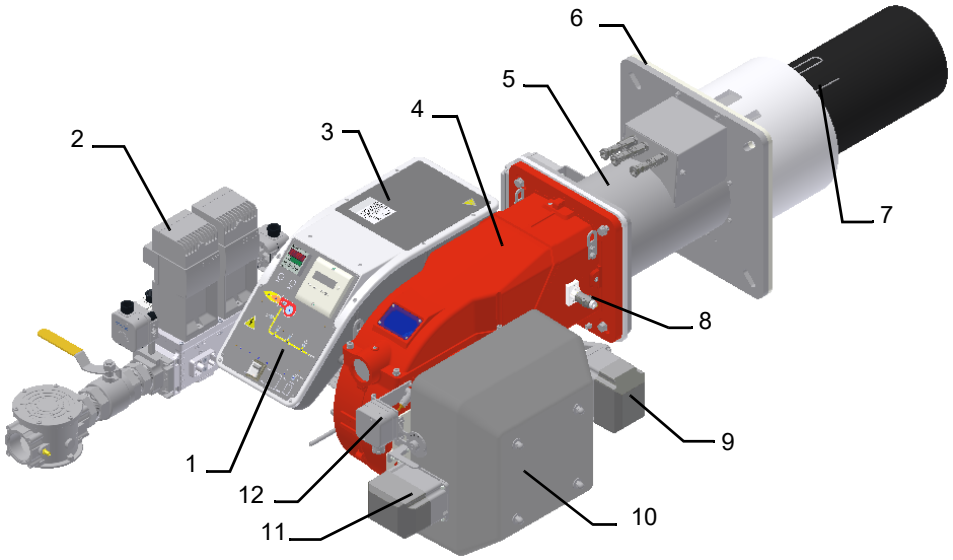
UNI EN 676 (Automatic forced draught burners for gaseous fuels)
EN 55014-1 (Electromagnetic compatibility- Requirements for house hold appliances, electric tools and similar apparatus)
EN 60204-1:2006 (Safety of machinery – Electrical equipment of machines.)
CEI EN 60335-1 (Specification for safety of 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);

PART I: SPECIFICATIONS

BURNERS FEATURES

Note: the figure is indicative only

1 Control panel with startup switch
2 Gas train
3 Electrical panel
4 Cover
5 Spacer
6 Burner flange
7 Electrodes
8 Photocell
9 Actuator
10 Silencer
11 Actuator
12 Air pressure switch



Gas operation: From the supply line the gas fuel passes through the gas train (filter, safety valves, gas pressure regulator and butterfly valve). The pressure regulator sets the gas pressure within the combustion head utilization limits. Air is supplied by a fan, which may be onboard or separated depending on burner configuration, and is channeled through an air damper.

The air damper and the gas butterfly valve are actuated by servomotors according to load curves, in order to achieve the correct proportion between fuel and air flows, and to optimize flue gas parameters.

The adjustable combustion head can improve the burner performance by controlling the flame geometry and combustion efficiency.

Fuel and air are routed through separated channels inside the combustion head, then mixed to ignite the flame inside the combustion chamber. The ignition spark is provided by electrodes and a high voltage transformer (a pilot flame may also be employed, depending on burner configuration).

Pre-ventilation of the combustion chamber is usually implemented according to gas directives.
The control panel, onboard or separated, allows the operator to monitor each operating phase.

Gas categories and countries of application

Countries
AL, AT, BE, BG, CH, CY, 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

Group	
H	L (*)
E	2R (*)
EK (*)	Er (*)
LL (*)	E (R)

(*) Premix type ...N burners are not enabled to work with these gas categories.
The above gas groups can be combined according to the standard EN437:2021 and national situation of countries.

Fuel

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.	--

Burner model identification

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

Type	**C70N US**	Model	**M-.**	**MD.**	**SR.**	***.**	**A.**	**1.**	**80.**	**EA**
	(1)		**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**

1	BURNER TYPE	**C70N US**
2	FUEL	M - Natural gas
3	OPERATION (Available versions)	PR - Progressive MD - Fully modulating
4	BLAST TUBE AND AIR INLET CONFIGURATION	SR = Standard blast tube + ABS polymer (silenced) air intake LR = Extended blast tube + ABS polymer (silenced) air intake
5	DESTINATION COUNTRY	* - see data plate
6	BURNER VERSION	A - Standard Y - Special
7	EQUIPMENT	0 = 2 gas valves 1 = 2 gas valves + gas proving system 8 = 2 gas valves + gas proving system + maximum gas pressure switch
8	GAS CONNECTION	**32** = 1" $_{1/4}$ NPT, **40** = 1" $_{1/2}$ NPT, **50** = 2" NPT, **65** = 2" $_{1/2}$ NPT,
9	MICRO-PROCESSOR CONTROL	EA = micro-processor control, without inverter EB = micro-processor control, with inverter

Technical Specifications

BURNER TYPE		**C70N US**
Output	min. - max.MBH	400 - 2,625
Fuel		Natural gas
Category		(see next paragraph)
Gas rate- LPG (M-)	min.- max. Stm^3/h	7,4 - 77
Gas pressure	min.- max. psi	min: see note #1 - max: 7.25 psi
Power supply (3ph)		380V 3A.C. 60Hz
Power supply (1ph)		120V 3A.C. 60Hz
Total power consumption	HP	2,5
Fan motor power consumption	HP	1,8
Protection		IP40
Operation		Progressive - Fully modulating
Operating temperature	°C	14 °F to 120 °F (- 10 °C to 50 °C)
Storage Temperature	°C	'-4 °F to 140 °F (-20 °C to 60 °C) /max 80% relative humidity
Working service (4)		Intermittent

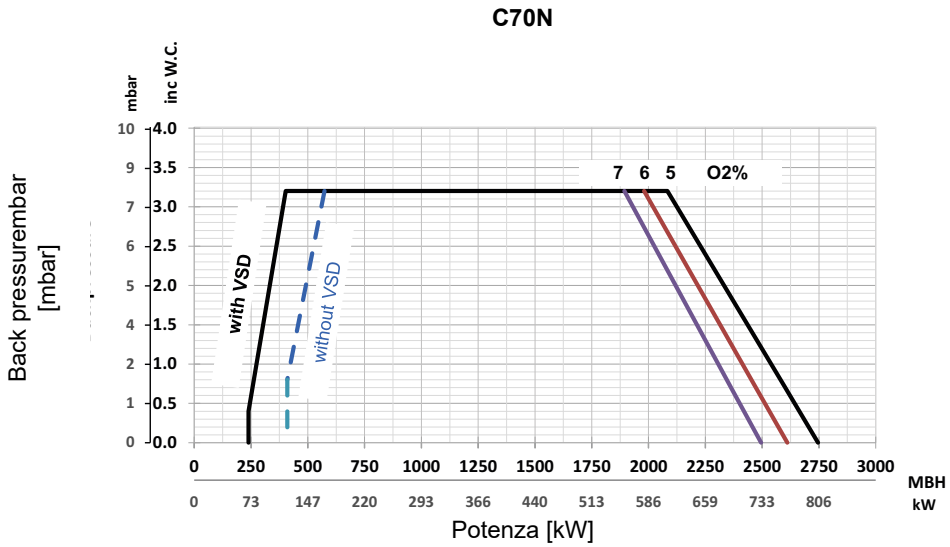
ATTENTION! The combustion head type and the settings depend on the fuel. The burner must be used only for its intended purpose specified in the burner data plate .

(*) NOTE ON THE WORKING SERVICE: the control box automatically stops after 24h of continuous working. The control box immediately starts up, automatically.

(**) The distance between the measurement surface and the burner body is 1 meter (UNI EN ISO 3744)

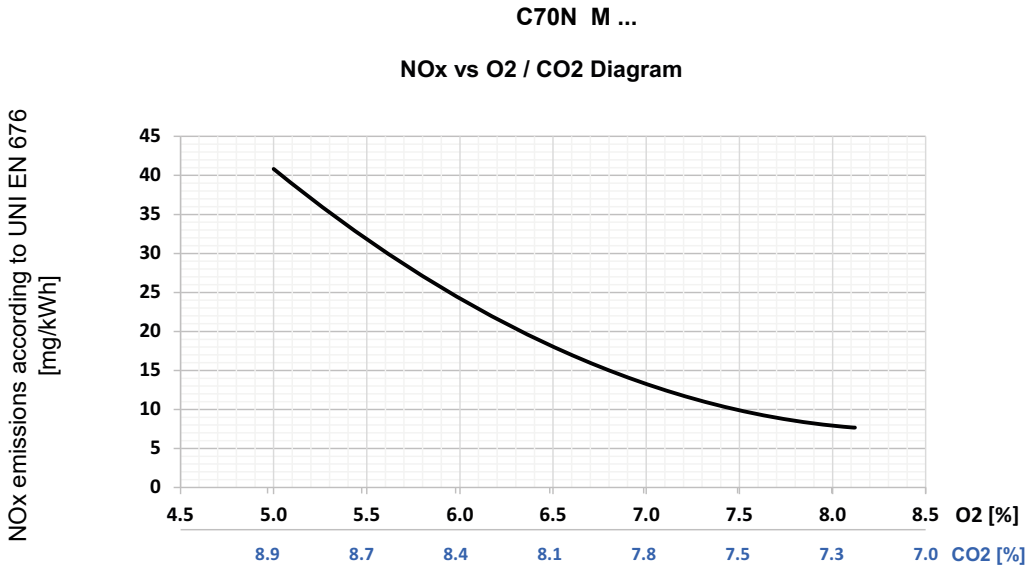
NOTE 1: Minimu required natural gas pressure according to burner working diagrams

Performance Curves



Confronto degli NOx con l' O_2 e CO_2

Il seguente diagramma mostra le variazioni di emissioni di NOx in funzione dei valori di O_2 o CO_2 nei fumi, ottenuti da test di laboratorio bruciando gas naturale.



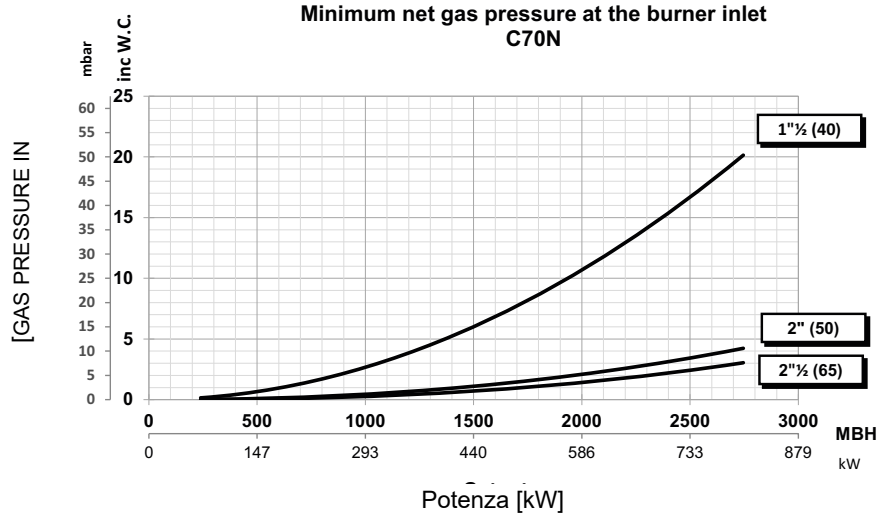
NOTE: The performance curve is a diagram that represents the burner performance in the type approval phase or in the laboratory tests, but does not represent the regulation range of the machine..

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

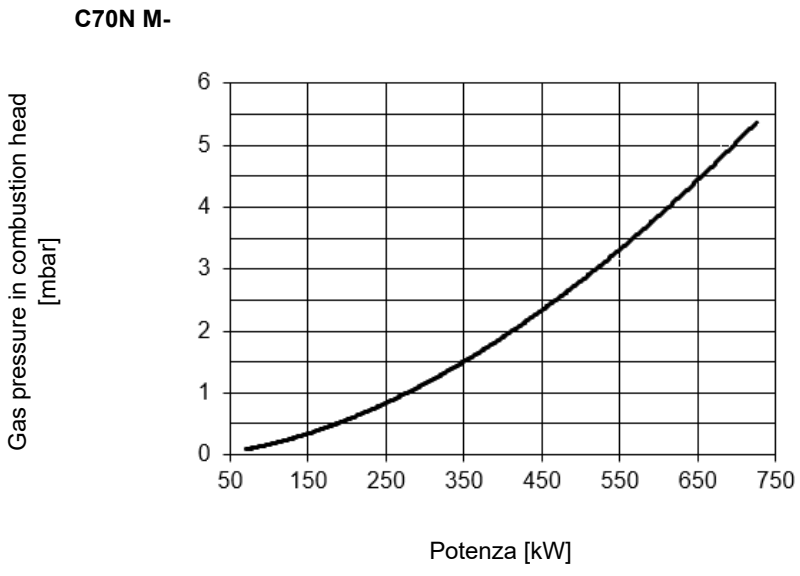
Pressure in the Network / gas flow rate curves(natural gas)Pressure in the Network / gas flow rate curves

WARNING: the diagrams refers to natural gas. For different type of fuel please refer to the paragraph "Fuel" at the beginning of this chapter.

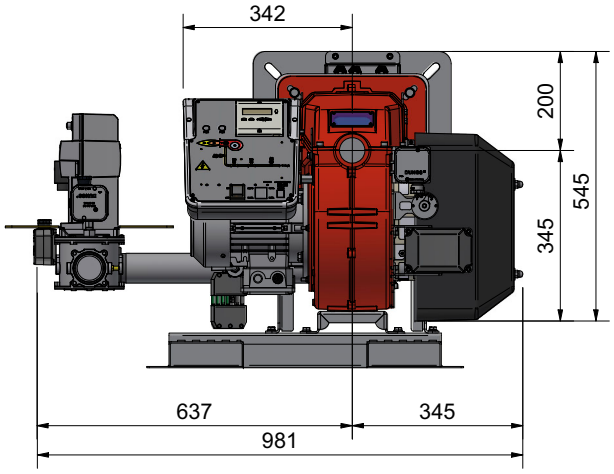


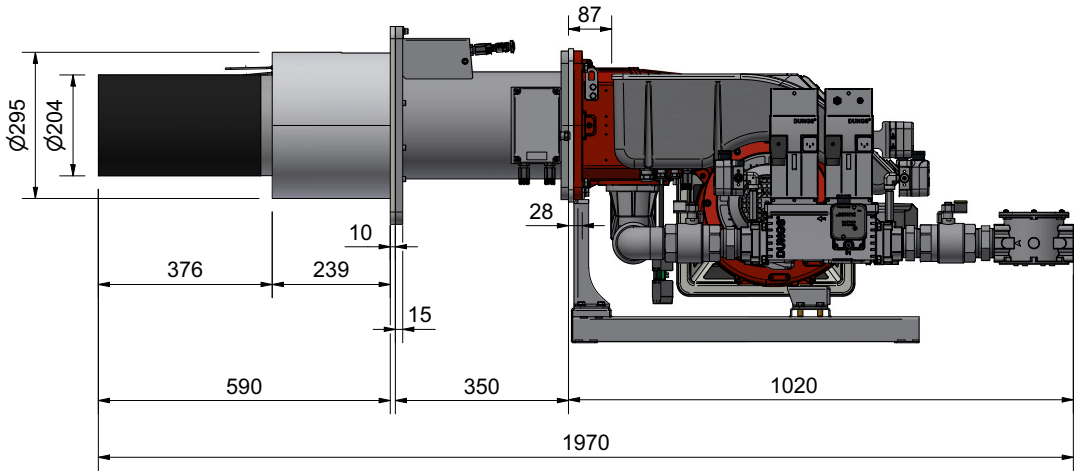
Gas pressure burner head vs natural gas flow rate

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

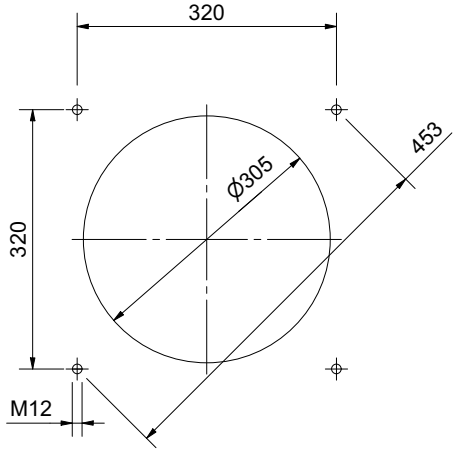


Overall dimensions (mm) - C70N

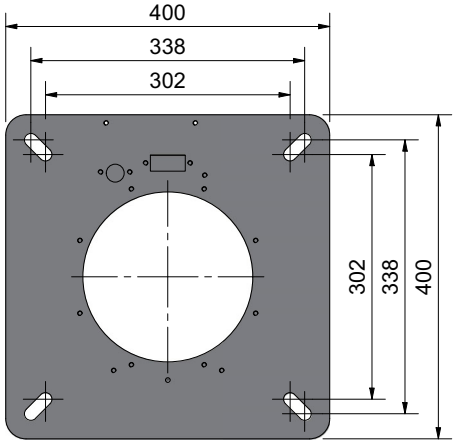




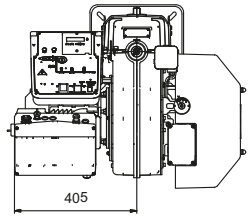
Boiler recommended drilling template

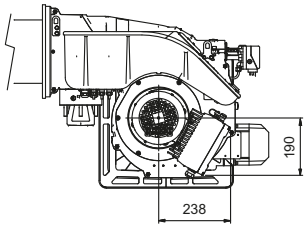


burner flange



Dimensions with Inverter

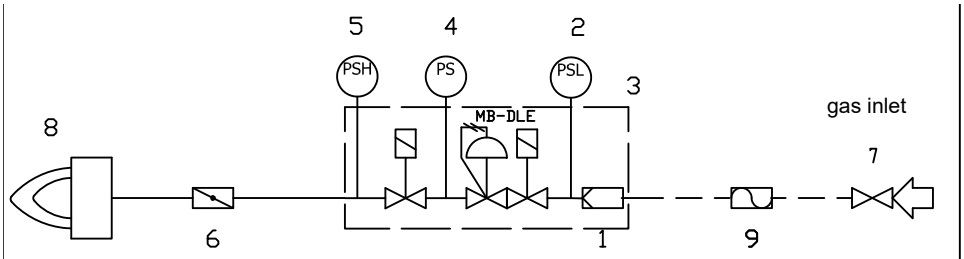




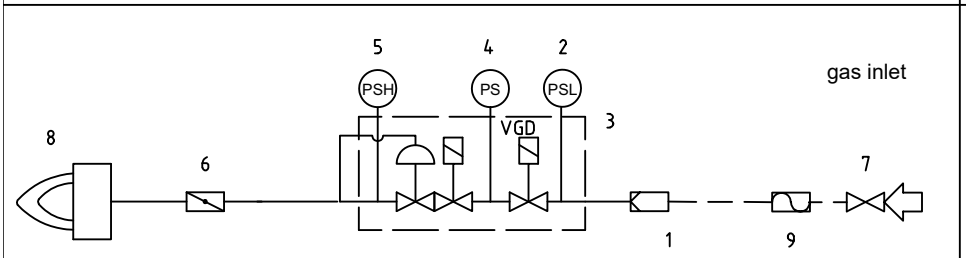
GAS TRAIN CONNECTION

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

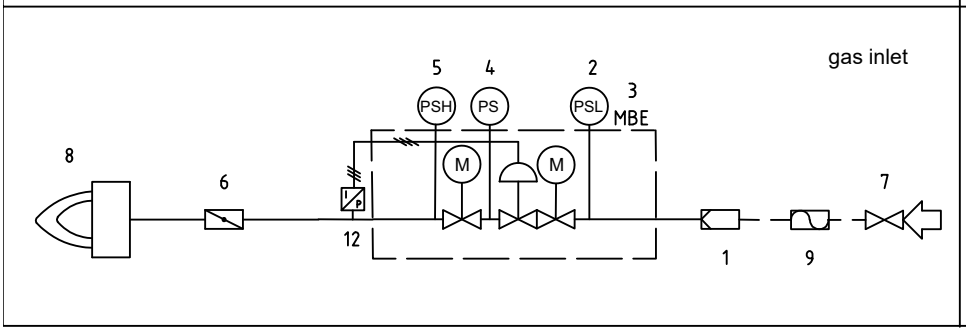
The following diagrams show some examples of possible gas trains with the components supplied with the burner and those fitted by the installer. The gas trains and the connection of the burner to the fuel supply line must be done in accordance with current local regulations.



with valves
MB-DLE



with valves
VGD



with valves
MBE

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

PART II: NOTES FOR THE INSTALLER

How to read the burner "Performance curve"

The procedure for matching a burner and evaluating the achievable emissions from a thermal unit can be broken down into a few simple steps.The first step is the approximate choice of burner, considering the operating point with reference to burner performance.Then, with reference to the desired NOx emissions, the O_2 concentration in the flue gas is determined.Finally, the correct choice of burner is verified by considering the right curve among the three noted in the diagram.

To choose the proper burner, the following data are necessarily required:

- Boiler type(inversion/passing, hot water/ steam...)
- Burner input
- Backpressure in the combustion chamber
- Dimensions of the combustion chamber included the reverse smoke chamber
- NOx emissions requested

Choosing the burner

- To clearly explain the procedure about choosing a suitable burner, please follow the example:
- Boiler type 3 pass
- Furnace input 1300 kW
- Backpressure in the combustion chamber 10 mbar
- NOx target 15 ppm @ 3% O_2 (about 30 mg/ kWh)

Each performance curve is identified by the O_2 content in the smokes 5% 6% 7%.

Increasing he O_2 content, the burner output decreases, so the performance curves.

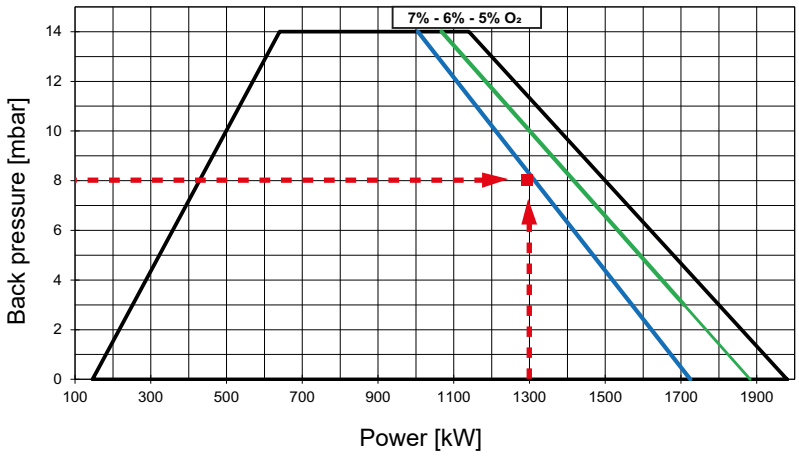
A rough choice suggests a **G200N** burner could be a right choice.

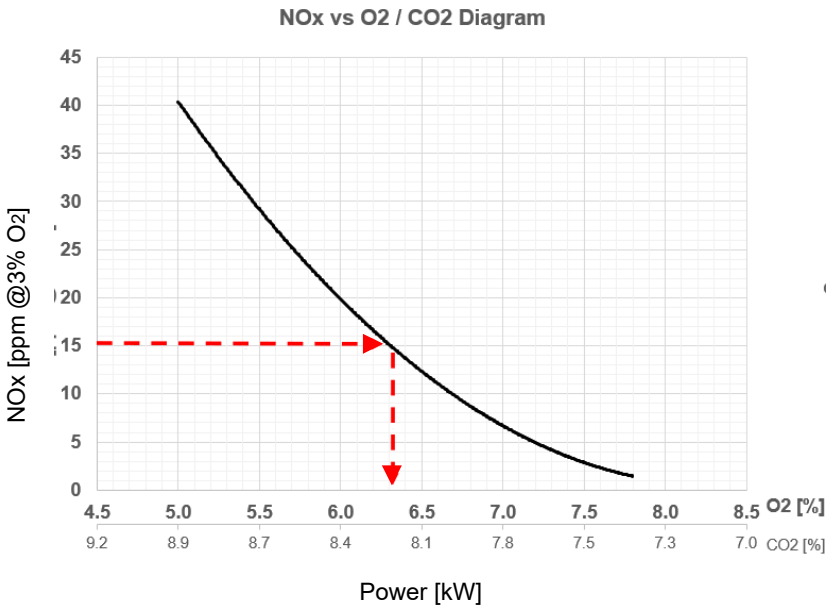
From the O_2 / NOX diagram determinate the O_2 content in the smokes, so the O_2 curve of reference of the performance curve. In our example, to have NOx = 15 ppm @3% O_2, we expect 6,4 % O_2 at the stack.

We will consider the curve (7) in the G200N performance curve diagram.

The required operating point (1300 kW at 10 mbar) is inside of G200N performance curve when O_2 is 7% at the stack.

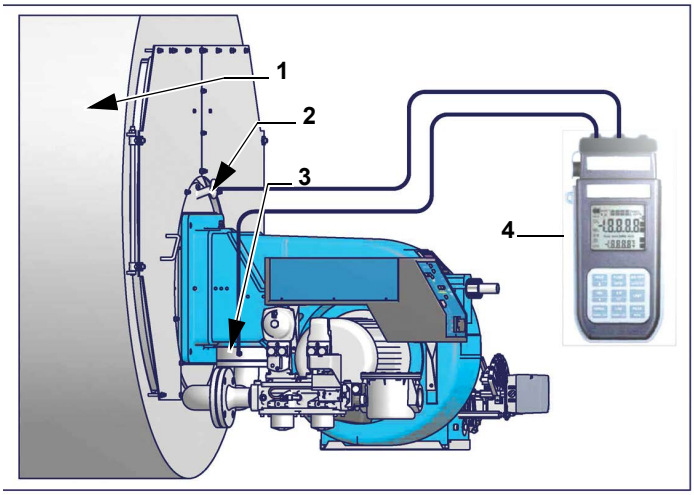
G200N is the right choice.





Combustion head gas pressure curves

Combustion head gas pressure depends on gas flow and combustion chamber backpressure. When backpressure is subtracted, it depends only on gas flow, provided combustion is properly adjusted, flue gases residual O2 percentage complies with “Recommended combustion values” table and CO in the standard limits). During this stage, the combustion head, the gas butterfly valve and the actuator are at the maximum opening. Refer to , showing the correct way to measure the gas pressure, considering the values of pressure in combustion chamber, surveyed by means of the pressure gauge or taken from the boiler’s Technical specifications.
.



Note: the figure is indicative only.Key

1 Generator
2 Pressure outlet on the combustion chamber
3 Gas pressure outlet on the butterfly valve
4 Differential pressure gauge

ATTENTION: THE BURNED GAS RATE MUST BE READ AT THE GAS FLOW METER. WHEN IT IS NOT POSSIBLE, THE USER CAN REFERS TO THE PRESSURE-RATE CURVES AS GENERAL INFORMATION ONLY.

Matching the burner to the boiler (low NOx burners)

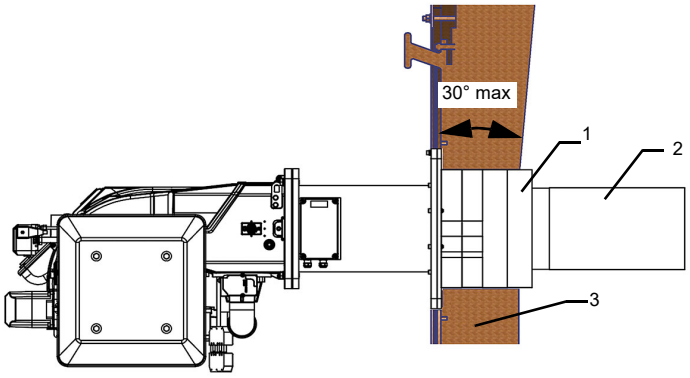
The burners described in this manual have been tested in combustion chambers complying with standard EN676. If the burner is to be matched to boilers with combustion chambers of a smaller diameter or shorter length than those indicated in the Standard, contact the Manufacturer to check that it is suitable for the application for which it is intended.

To correctly match the burner to the boiler:

- Check that the required power and the pressure in the combustion chamber are within the working range.
- Also check that the length of the combustion chamber is greater than the combustion head.
- Verify that the neutral section of the head exceeds the refractory. The application does not always meet this requirement, so it may be necessary to use a spacer of a suitable size, which serves to retract the burner to meet the above measurements.

The neutral section of the combustion head must be protected against high temperatures. A specially shaped panel for applications with operating temperatures up to 1200° C is supplied.

If the above requirements cannot be met, the choice of burner must be reviewed in consultation with the manufacturer.



1 - Burner insulation
2 - Burner head
3 - Boiler door

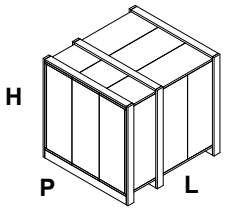
PART III: INSTALLATION

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

Packing

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 body
- Head
- Train
- Gaskets

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

Burners are despatched in cardboard packages whose dimensions are:

- 1600mm x 1000mm x 920mm (L x P x H).

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.

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.

Transport and handling

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. to move the burner, use means suitable to support its weight (see paragraph "technical specifications").

Warning! If the mass to be moved does not allow sufficient visibility for the shunter, arrange for a signalman to assist on the ground. In any case, proceed in accordance with current accident prevention regulations.

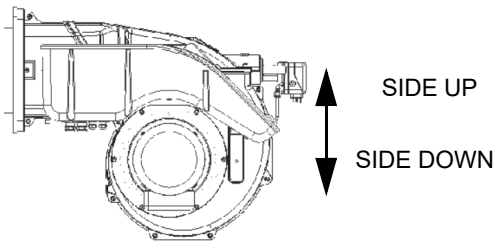
Lifting and handling must be carried out with a fork-lift truck of adequate capacity for the mass of the burner, its accessories and packaging, taking care to always check in advance that the spaces necessary for manoeuvring have been prepared. Lift the load after ascertaining its stability and proceed to the area where the packaging will be freed, avoiding abrupt manoeuvres and dangerous gradients.

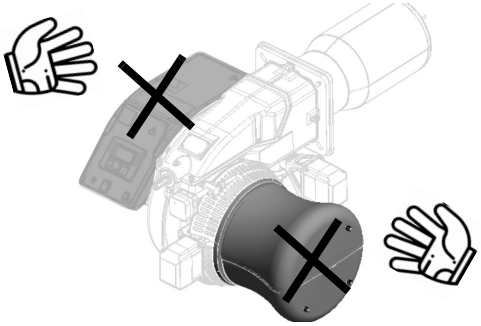
The packages containing the burners must be locked inside the means of transport in such a way as to guarantee the absence of dangerous movements and avoid any possible damage.

Handling the burner

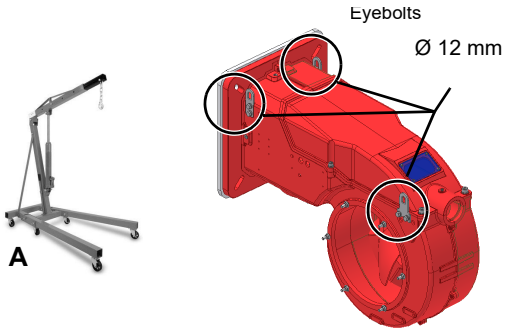
The burner is designed to work positioned according to the picture below. For different installations, please contact the Manufacture.

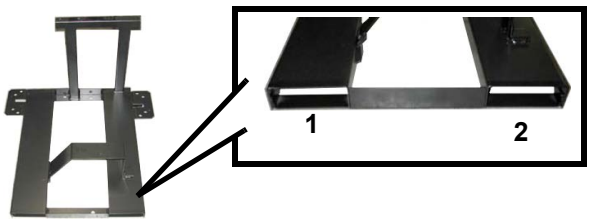
Warning! Don't lift the burner by the air intake silencer!





The burner is provided with eyebolts, for handling operations and it can be lifted with a hydraulic lift or a small manual crane. (A)
The burner is mounted on a stirrup provided for handling the burner by means of a fork lift truck: the forks must be inserted into the A anb B ways. Remove the stirrup only once the burner is installed to the boiler.

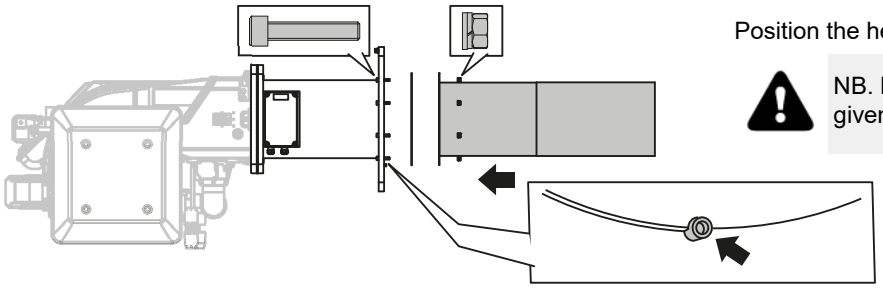




Fitting the burner to the boiler

The burner is shipped with the head included to avoid damage during transport. Please follow the following assembly steps/sequences:

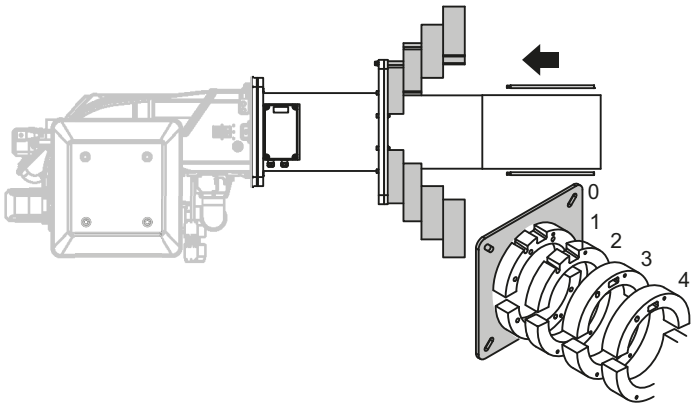
ATTENTION: The burner must not be ignited without the combustion head, gas ramp and all necessary connections and checks having been made.



PHASE 1

Position the head and secure it with the nuts.

NB. Position the head according to the reference given by the pin on the flange.

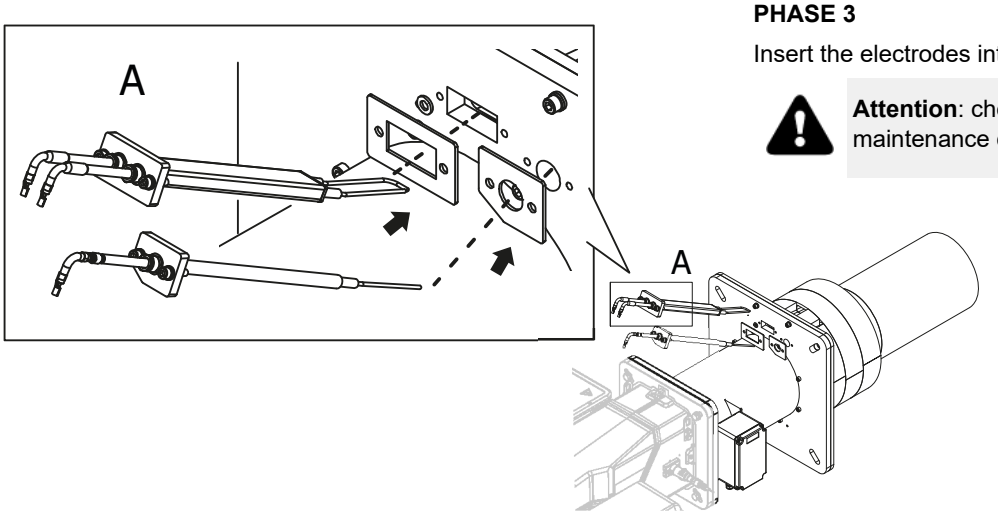


PHASE 2

Insert the refractories into the pin and screw in

Attention: respecter la séquence/ordre des isolateurs.

Attention: handle with care and do not crush the refractory.



PHASE 3

Insert the electrodes into the appropriate slots

Attention: check electrode positioning as per maintenance chapter.

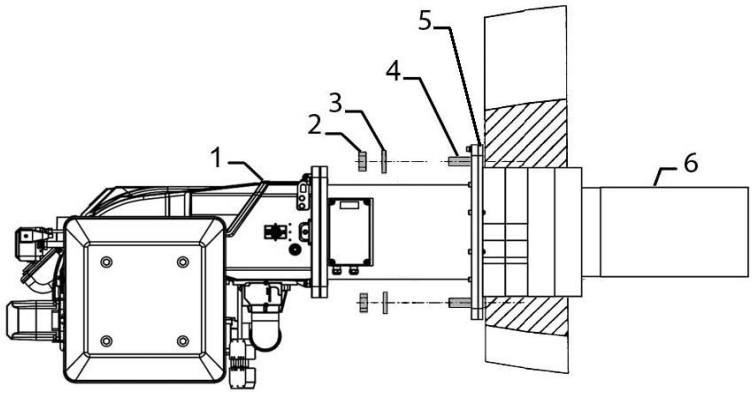
Fitting the burner to the boiler

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

1 make a hole on the generator flange according to the drilling template at the paragraph “Overall dimensions” and screw in the studs (4)
2 place the gasket (5) on the generator flange;
3 pull together the burner to the boiler flange by moving the burner according to the 'Lifting and Handling' section;
4 fix the burner flange with nuts (2 - 3) to the studs (4) of the boiler according to the picture.

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.

Attention: The boiler bore must comply with the dimensions in the table in chapter "Overall dimensions". If this is not possible, please contact the manufacturer.
Do not wall and use soft refractory mat to fill the gap between the boiler hole and the burner refractory.



Keys
1 Burner
2 Fixing nut
3 Washer
4 Sealing gasket
5 Gasket
7 Blast tube

m

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.

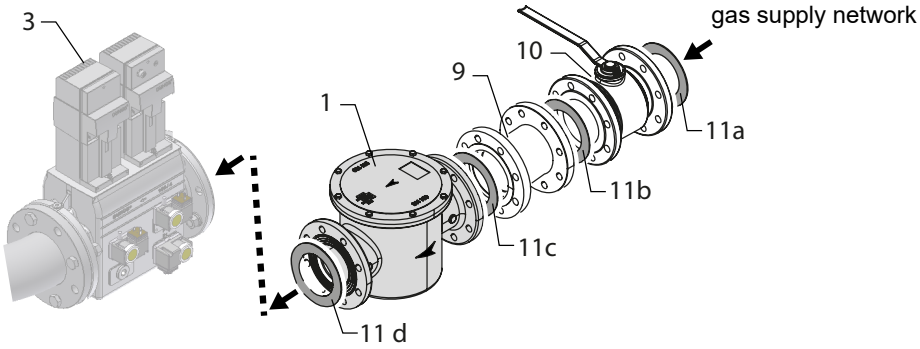
CAUTION: The direction of gas flow must follow the arrow on the body of the components mounted on the gas ramp (valves, filters, gaskets...).

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)

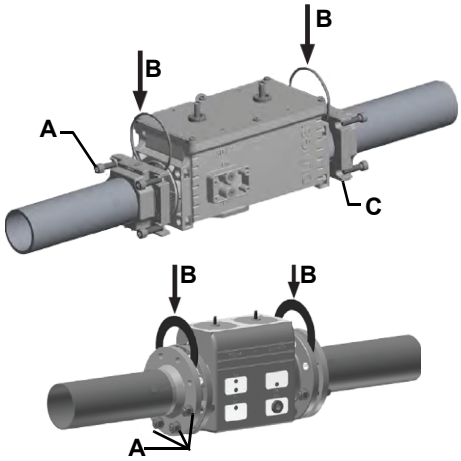


Procedure to install the double gas valve unit: **two (2) gas flanges are required; they may be threaded or flanged depending on size**

- **first step: install the flanges to prevent entry of foreign bodies in the gas line**
- **on the gas pipe, clean the already assembled parts and then install the valve unit check gas flow direction: it must follow the arrow on the valve body**
- **VGD20: make sure the O-rings are correctly positioned between the flanges and the valve**

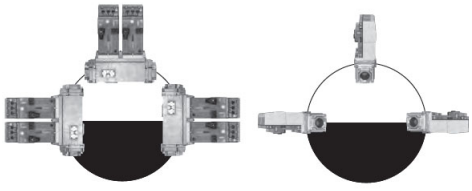
In all cases:

- ensure that the gaskets are correctly positioned between the flanges;
- fasten all the components with screws, according to the following diagrams:
- make sure bolts on the flanges are properly tightened
- check that the connections of all components are leak .



CAUTION: Use seals suitable for the gas used.

WARNING: Slowly open the fuel cock to avoid breaking the pressure regulator.



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.

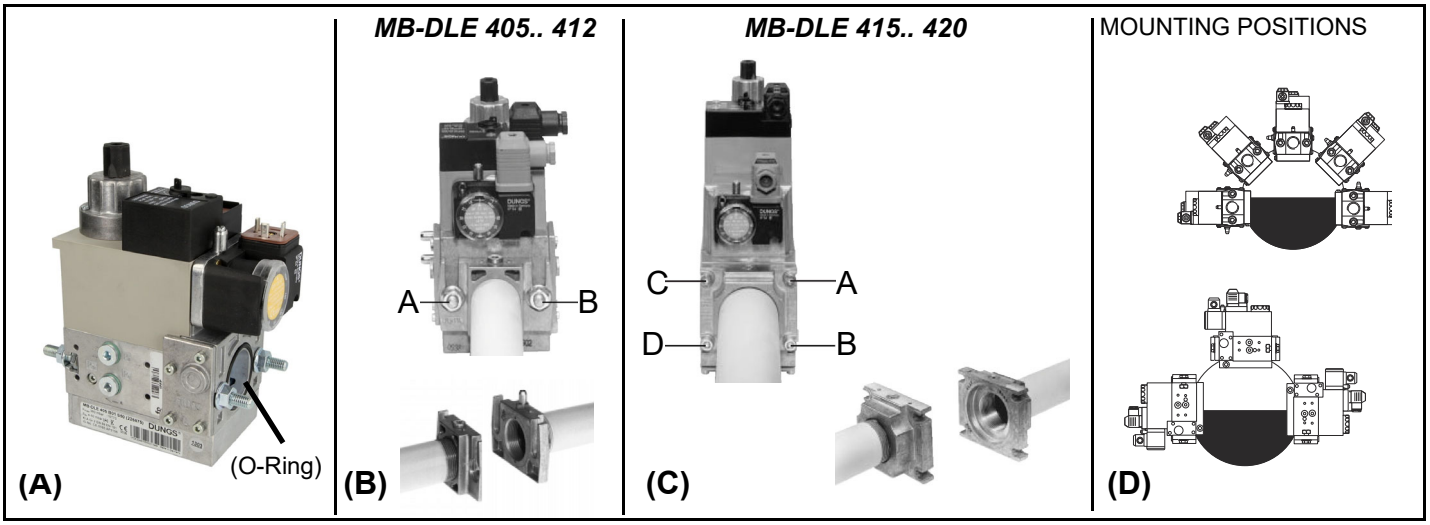
ATTENTION: it is reccomended to install the filter with gas flow parallel to the floor in order to prevent dust fall on the safety valve during maintenance operation.

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

MultiBloc MB-DLE - *Assembling the gas train*

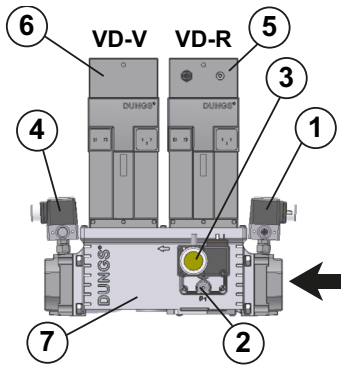
Mounting

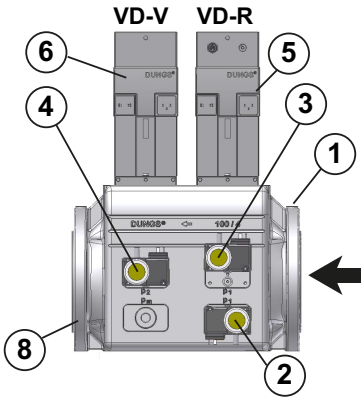
1 Mount flange onto tube lines: use appropriate sealing agent
2 Insert MB-DLE: note position of O rings
3 Remove MultiBloc between the threaded flanges
4 After installation, perform leakage and functional test
5 Disassembly in reverse order



DUNGS MBE

Components and position of pressure switches

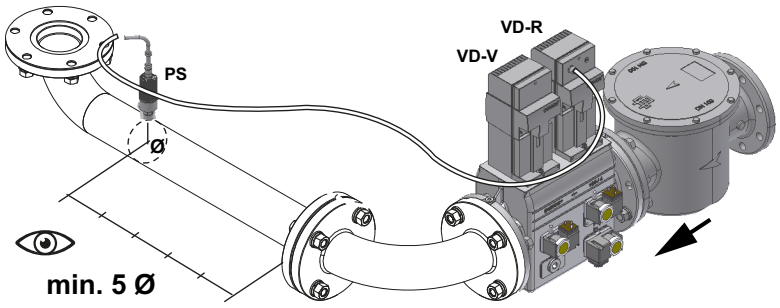


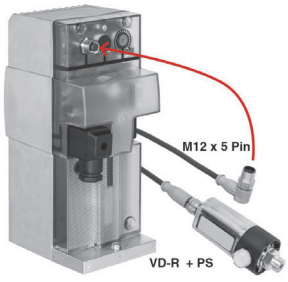


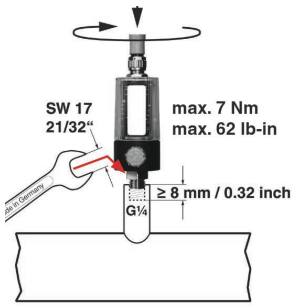
1 PGMIN minimum gas pressure switch
2 PGMIN minimum gas pressure switch (alternative to 1)
3 PGCP leakage control gas pressure switch
4 PGMAX maximum gas pressure switch
5 Actuator with integrated pressure stabiliser
6 On-Off actuator
7 Valve body (Threaded)
8 Valve body (Flange)

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

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

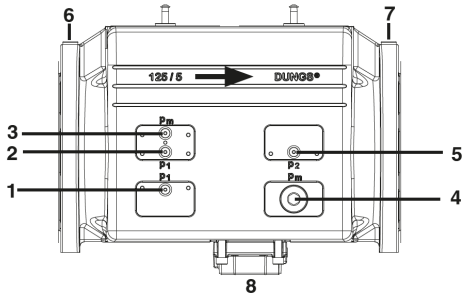


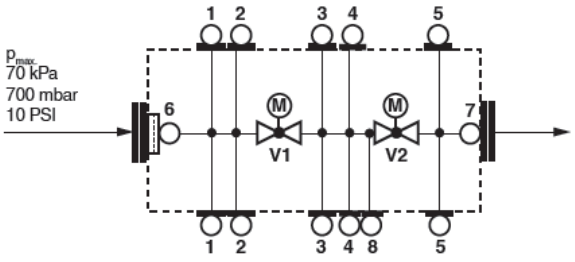




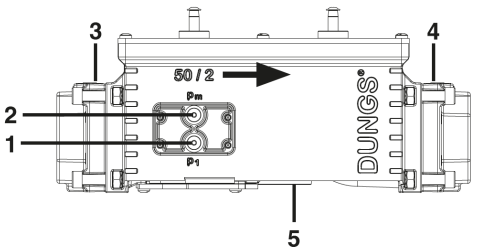
Attention: In the case of the MBE... valve, a pressure limit switch downstream of the safety valve is mandatory.

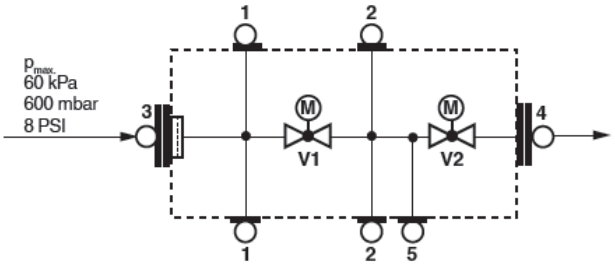
Pressure taps MultiBloc MBE





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

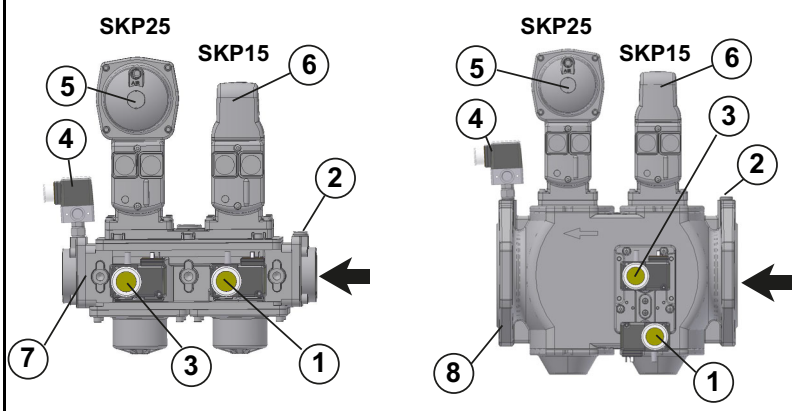




1, 2, 3, 4 Sealing plug G1/8 ISO 228
5 Locking screw
For version VB-2L only: connection for vent line **NPT 1**

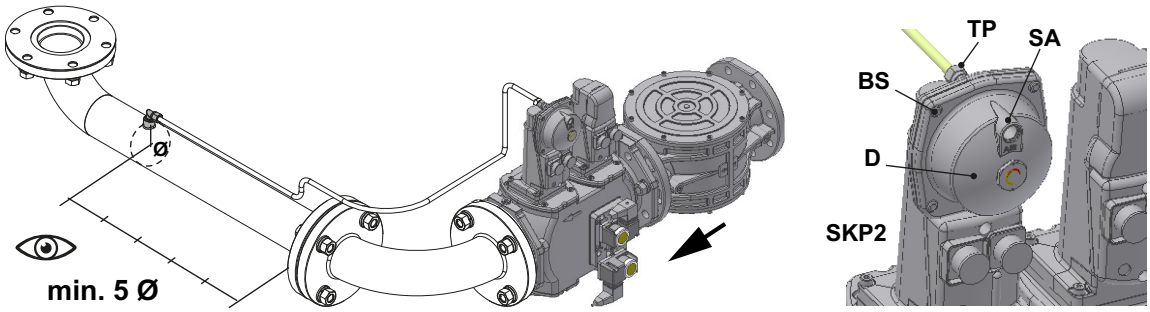
Siemens VGD20.. e VGD40..

Components and position of pressure switches



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)

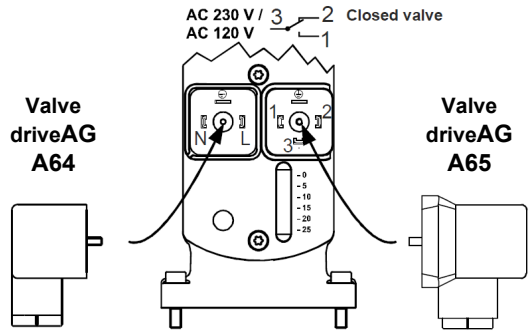
- Connect the reference gas pipe (**TP** in figure; 8mm-external size pipe supplied loose), to the gas pressure nipples placed on the gas pipe, downstream the gas valves: gas pressure must be measured at a distance that must be at least 5 times the pipe size.
- Leave the blowhole free (**SA** in figure). 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!

version with SKP2 (built-in pressure stabilizer)Siemens VGD../VRD.. SKPx5 (Auxiliary-optional micro switch)Gas valve

If the auxiliary microswitch (POC) is required, a dedicated actuator, different from the one usually supplied, must be ordered. The connection is shown in the figure.

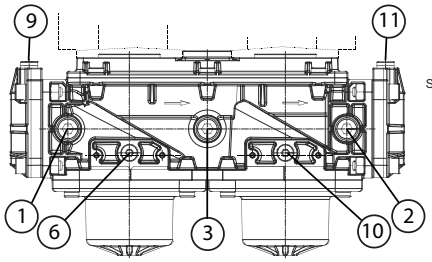


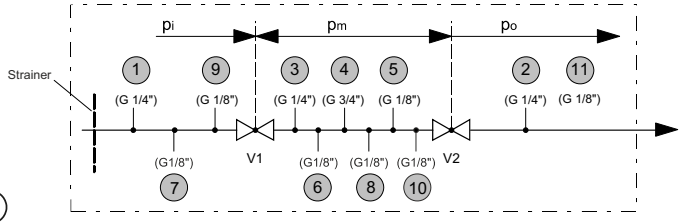
AGA64 - Valve drivePlug connection ON-OFF
AGA65 - End of strokePlug connection POC

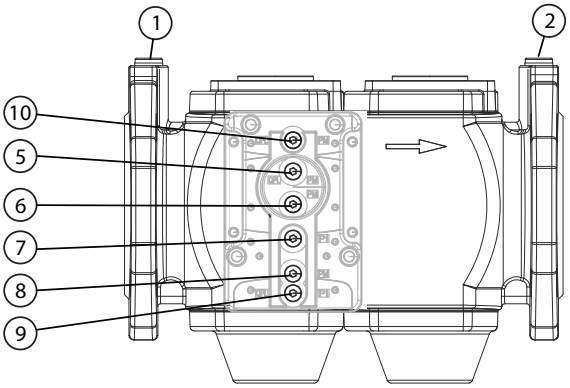
End of stroke (POC)

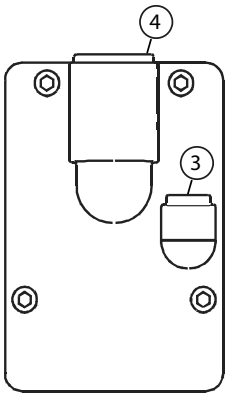
The connection plug of the POC is different from that of the ON-OFF drive

Siemens VGD *Pressure taps*









Legend
pi Inlet pressure
pm Pressure between valves
po Outlet pressure

ELECTRICAL CONNECTIONS

Any cable connection or hook-up to the grid must be carried out by qualified, informed and trained personnel, directly coordinated and authorized by Technical Service. Always check in advance that the system electrical interlock is fitted with a safety circuit breaker.The installation must be built in accordance with the regulations in force and comply with basic safety rules.

See the wiring diagram for more information.

WARNING: It is possible that some components are still live despite being disconnected from the mains and can cause electric shocks.

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.

Note on electrical supply

WARNING:

The implant must have / in the implant there must be:

- Have earthing connected to the burner; always check the connection, functionality and health and safety compliance of the earthing cable beforehand. If in doubt, request a thorough check by qualified technical personnel.
- Do not use foreign masses (e.g. fuel lines, metal structures...) to connect the burner to earth.
- When connecting the power wires to the burner's MA terminal block, ensure that the earth wire is longer than the phase and neutral wires.
- Do not reverse the phase and neutral connections.
- Provide an omnipolar switch-disconnector and a residual current circuit breaker, circuit breaker or fuses on the electrical supply line to the burner.
- Always check the protection of the mains system against overcurrents and electromagnetic interference as a preventive measure.
- Check that the voltage for which the system and the burner motors are designed corresponds to the mains voltage (+/- 10%).
- Before carrying out any work on the machine's electrical panel, open the system's omnipolar switch disconnector and turn the switch on the burner's electrical panel OFF.

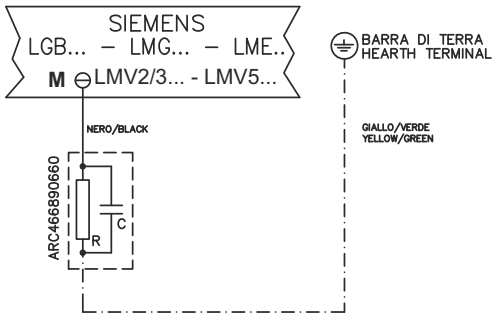
In any case:

- Provide adequately protected and safe mains supply and mains/burner tracing cables, with flame-proof electric cable of a cross-section suitable for the installed power;
- Absolutely avoid the use of extension cords, adapters or power strips;

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

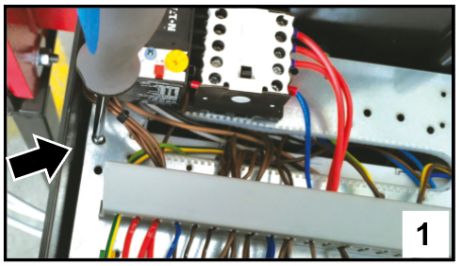
Key

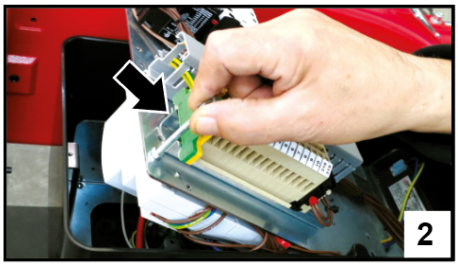
C - Capacitor (22 nF , 250 V)
LME / LMV - Siemens control box
R - Resistor (1 MΩ)
M: Terminal 2 (LGB, LME), Terminal X3-04-4 (LMV2x, LMV3x, LMV5, LME7x)
RC466890660 - RC Siemens filter

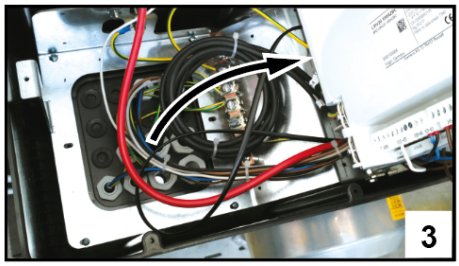


Procedure for accessing the equipment and making electrical connections

1 Unscrew the screw as shown in Fig. 1
2 Lift the plate using the screws as shown in Fig. 2
3 Make the electrical connections

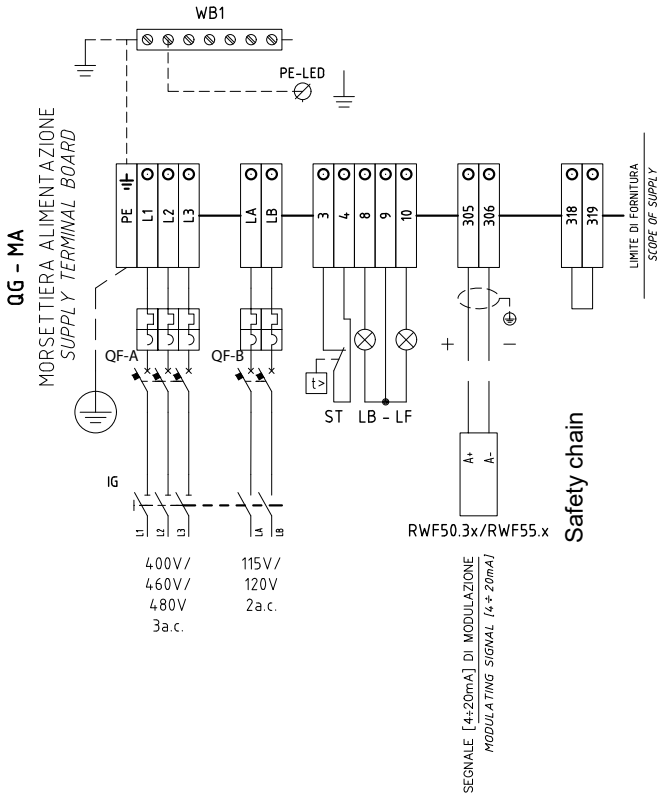






Follow the electrical diagrams attached to the manual for the connections to the terminal strip MA.
The electrical panel is supplied complete with a terminal strip for the connection to the system electrical line and, in case of on board control panel, a plug for the connection to the modulation probe (if any).

PRINTED CIRCUIT
[6100561]



BURNER SUPPLY TERMINAL BOARD MA

ST series of thermostats or pressure switches
TAB high low flame thermostat
LB indicator light for burner lock-out (remote)
LF indicator light burner operation (remote)
IG mains switch
F fuses
WB1 earth terminal
QF-A fan ano pump motor protection magnetothermic
OF-B auxiliary suppl y circuit breaker protection

NOTE: In the case of standard burners, see the connection of probes / modulation signals on the following page. In any case, the wiring diagram attached to this manual always applies.

Rotation of electric motor

ATTENTION: 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.

ATTENTION: check the calibration of the thermal relay sensor (+5% ÷ +10% rated value).

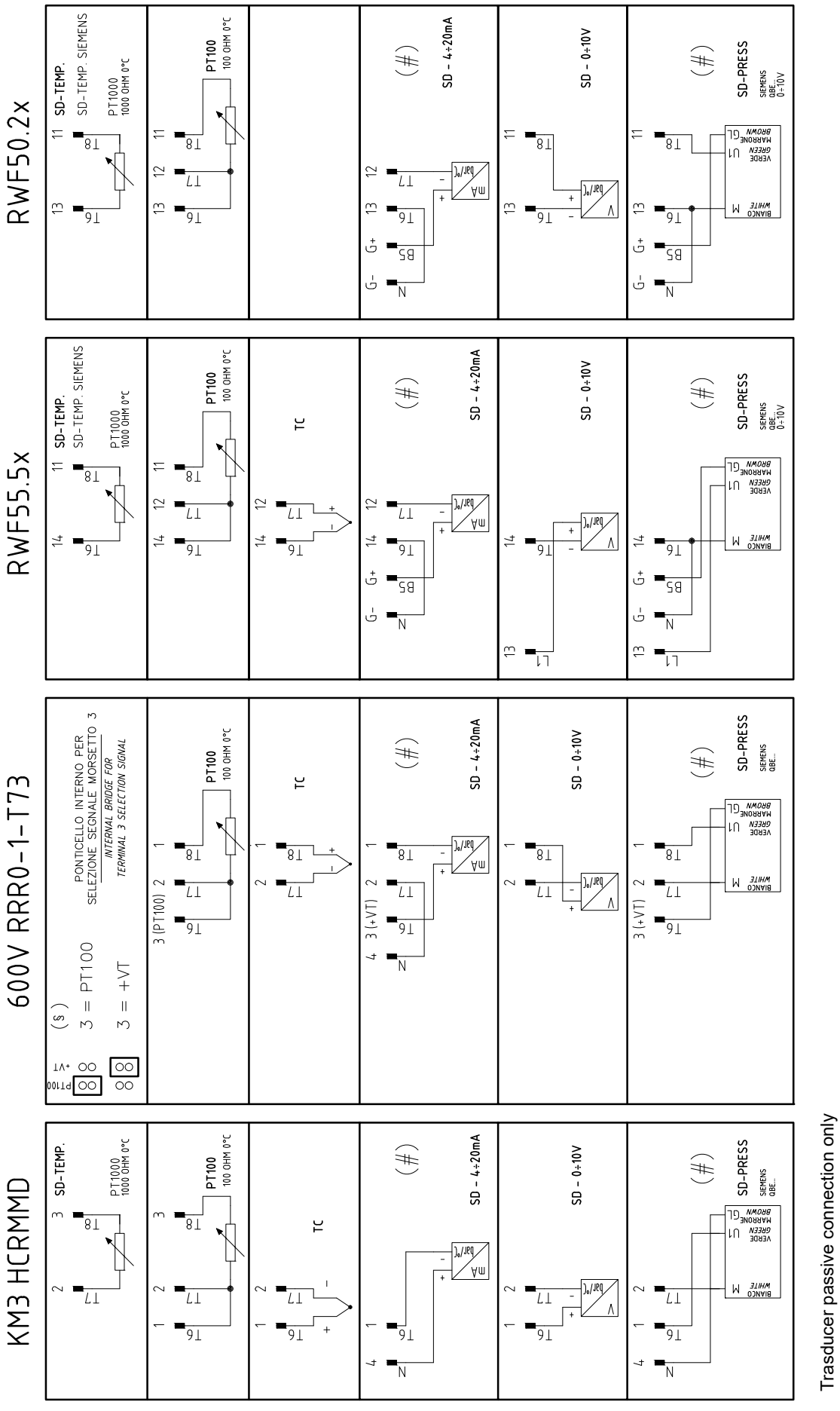
DANGER! Incorrect motor rotation can seriously damage property and injure people.

Once the electrical connection of the burner is executed, remember to check the rotation of the electrical motor (pump motor if any, and fan motor) . The motor should rotate according to the “arrow” symbol on the body. In the event of wrong rotation, change 2 of the 3 phases of the three-phase power cable and check again the rotation of the motor.

After completing the electrical connection of the burner, remember to check the rotation of the electric motor of both the pump (if present) and the fan. The motor must rotate in the direction indicated on the housing. In case of incorrect rotation, reverse the connection of 2 of the 3 phases of the 3-phase power supply cable and re-check the motor rotation.



Probe connection with 7 pins connector



BURNERS WITH INVERTER VARIANT (if provided)



INVEOR M



DANFOSS FC102



DANFOSS FC101

The manufacturer provides:

KOSTAL: on-board or wall-mounted (in the latter case the kit is required)

DANFOSS: wall-mounted

Both can be equipped with a braking resistor.

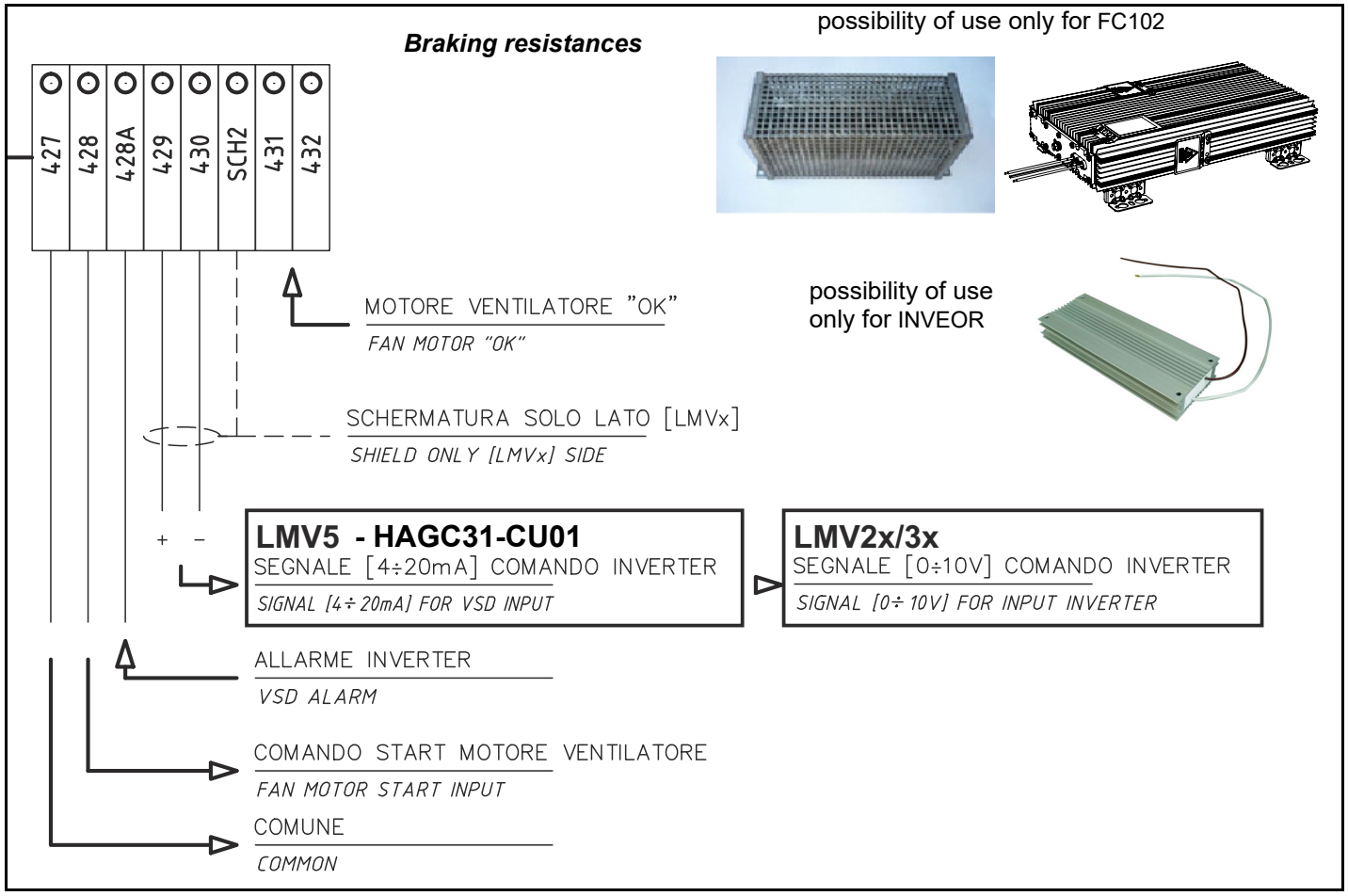
The burner terminal box is prepared to receive certain signals (for connection to the inverter, see the dedicated connection diagram).

Input signals for the inverter depending on the equipment:	
LMV51.300 / LMV52.xxx	4÷20mA
HAGC31-CU01	4÷20mA
LMV37.400 / LMV26.300	0÷10V

The **LMV51.300 / LMV52.xxx, HAGC31-CU01 e LMV37.400/LMV26.300** electronic cam burners with fan motor driven by inverter in addition to the air and fuel adjustment curves also have a fan motor speed adjustment curve.

Generally the curve of the inverter goes from 50% to 100% of the engine revolutions. This, in addition to improving the setting of the burner also allows a saving on the consumption of the fan engine.

Terminal interface with Inverter



PART IV: OPERATION

DANGER

- Incorrect motor rotation can seriously damage property and injure people.
- All burner adjustment operations must be carried out by checking combustion using a previously correctly calibrated fume analyser.
- Always check that the chimney is free from obstructions, never obstructed, and that the passage of fumes is always free.
- 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 gas decrease slowly until the normal combustion values are achieved.

WARNING

- Before executing the connections to the gas pipe network, be sure that the manual cutoff valves are closed.
- During normal operation, the parts of the burner closest to the generator (coupling flange) are subject to heating. avoid touching them to avoid burns.
- 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.

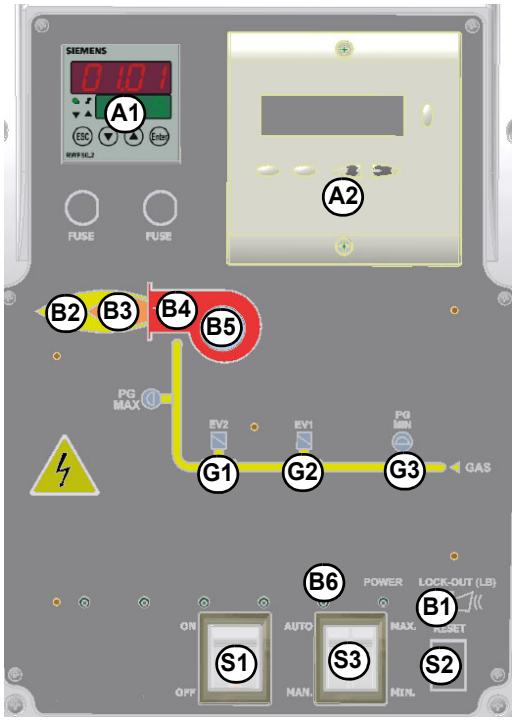
LIMITATIONS OF USE

- The burner is an appliance designed and constructed to operate only after being correctly connected to a heat generator (e.g. boiler, hot air generator, furnace, etc.), any other use is to be considered improper and therefore dangerous.
- The burner is an appliance designed and built to operate in accordance with the information on its nameplate and specifications in this manual, any other use is considered improper and therefore dangerous.
- The user must guarantee the correct assembly of the appliance by entrusting its installation to qualified personnel, and having the first ignition carried out by an assistance center authorized by the burner manufacturer. In this regard, the electrical connection to the regulation and safety devices of the generator is essential (operating, safety, etc. thermostats) which guarantees correct and safe burner operation.
- Therefore, any operation of the appliance which is independent of the installation operations or which takes place after total or partial tampering with these (e.g. disconnection, even partial, of electrical conductors, opening of the generator door, disassembly of parts of the burner) must be excluded.
- Never open or disassemble any component of the machine.
- To make the machine safe, operate the main disconnect switch.

BURNER RELEASE OPERATIONS

- In the event of anomalies that require the burner to be switched off, it is possible to act on the auxiliary line switch on the front of the panel, which due to its easy accessibility and speed of operation also acts as an emergency switch, and possibly on the release button.
- In the event of a lockout, the cause must be evaluated. if the flame back warning light is on, before unlocking the control box it is mandatory to check the integrity and good condition of the combustion head as described in the maintenance paragraph.
- In the event of lockout due to flashback, after appropriate checks of the reasons for the lockout and after having implemented the appropriate solutions, to restart the burner it is necessary to cut and re-apply power using the main switch, before pressing the reset button.
- In the event of a lockout, unlock the equipment by pressing the reset button. in the event of a new lockout, contact technical support, without making further attempts.

Burner front panel



Keys

B1 Lock-out LED
B2 Hi-flame operation LED
B3 Lo-flame operation LED
B4 “Ignition transformer operation” LED
B5 “Fan motor overload tripped” LED
G1 “EV2 opening” LED
G2 “EV1 opening” LED
G3 “Gas pressure switch signal ” LED
S1 Main switch
S2 Reset pushbutton for control box
S3 Operation selector MAN - AUTO (operation in manual or automatic mode):
MIN = operation with minimum output
MAX = operation at the maximum output
A1 Burner Modulator (only on fully modulating burners)
A2 AZL..

Gas operation

DANGER!Do not restart the burner without first inspecting the good condition of the combustion head according to the maintenance chapter.

- Check that the flame control is not in lockout position (signalling on LMV) and unlock it if necessary by pressing the dedicated button (for further information on the LMV.., see the relevant manual).
- In the event of a burner blockage, always check that the pilot light (B6) for flame return blockage is off. If the light is on, it means that the photocell has detected a flame inside the combustion head mesh.
- In order to unlock the burner after a flame backfire warning lockout, it is necessary to switch off the power to the control panel (necessary before inspecting the combustion head), wait a few seconds and then switch the power back on.
- Finally, press the burner unlock button (S2).
- Check that the gas pressure is sufficient (indicated by an error code on the AZL..display and PGMIN light on).
- Verify that the set of pressure switches or thermostats gives operating consent to the burner.
- **Burners fitted with gas proving system:** the gas proving system test begins; when the test is performed the proving system LED turns on. At the end of the test, the burner staring cycle begins: in case of leakage in a valve, the gas proving system stops the burner and the lamp **B1** turns on.
- At the beginning of the start-up cycle, the actuator drives the air damper to the maximum opening position, then the fan motor starts up: the pre-purge phase begins. During the pre-purge phase, the air damper complete opening is signalled by the light **B2** on (see front panel).
- At the end of the pre-purge, the air damper is driven to the ignition position, the ignition transformer is energised (signalled by the light **B4** on the front panel) then, few seconds later, the EV1 and EV2 gas valves are energised (light G1 and G2 on the front panel).
- Few seconds after the gas valves opening, the ignition transformer is de-energised and light **B4** turns to off.
- .The burner operates in the low flame stage; few seconds later the two-stages operation begins and the burner output increases or decreases, driven by the external thermostats (progressive burners) or by the modulator (fully-modulating burners).

ADJUSTING AIR AND GAS FLOW RATES

WARNING! During commissioning operations, do not let the burner operate with insufficient air flow (danger of formation of carbon monoxide).
WARNING! the combustion air excess must be adjusted according to the values in the following chart.

Recommended combustion parameters		
Fuel	Recommended (%) CO_2	Recommended (%) O_2Empfohlener O_2 (%)
Natural gas	9 ÷ 7,8	5 ÷ 7

(First) Start-up preliminary operations - gas supply

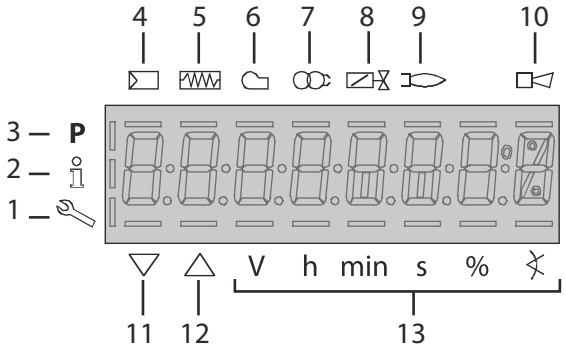
Recommended actions to be carried out in sequence:

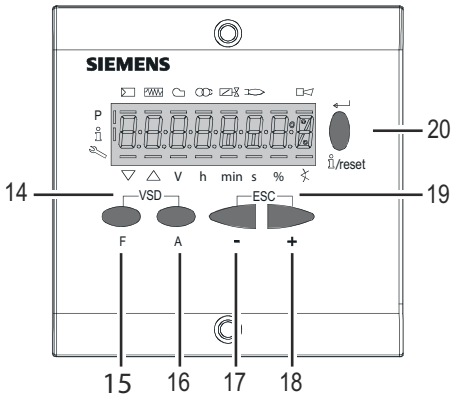
1 Check the burner and all its components are installed correctly
2 Check that all electrical and mechanical parts are connected correctly
3 Check that there is water or other vector fluids in the generator
4 Check that the ventilation gates/dampers in the plant are open and the stack is free
5 Connect the gauges used to adjust and check pressures on the incoming line and on the head, air and fuel side.
6 Open the thermostatic series and the safety chain
7 Turn the main switch on the panel front with the "ON/OFF" selector to position "ON".
8 Check the phase and neutral position is correct
9 Open the manual shut-off valves slowly, in order to prevent any water hammers that might seriously damage valves and pressure regulator
10 Check the sense of rotation of the electrical motors
11 Bleed the line, getting rid of all the air in the pipe as far as the main gas valve
12 Ensure the pressure entering the main valves is not excessive due to damage to or wrong adjustment of the line pressure regulator
13 Ensure the gas supply minimum pressure is at least equal to the pressure required by the pressure curves - burnt gas flow

DANGER! Venting the air from the piping must take place in safe conditions, avoiding dangerous concentrations of fuel in the rooms. You must therefore ventilate the rooms and wait long enough for the gases to dissipate outside before switching on.

User interface

The AZL2x.. display is shown below:
The keys functions are the following:





1 Service mode
2 Info mode
3 Parametere setting mode
4 Plant heat request
5 Oil pre-heater energised
6 Fan motor energised
7 Ignition transformers energised
8 Open valves
9 Flame
10 Lock+unlock codes
11 Closing actuator
12 Opening actuator
13 Unit measure
14 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.
15 Key **F**Used to adjust the “fuel” actuator position (**F**uel):
While pressing the **F** key, the “fuel” actuator position can be changed by means of the **+** and **-** keys.
16 Key **A** (**A**ir):
Used to adjust the “air” actuator position
While pressing the **A** key, the “air” actuator position can be changed by means of the **+** and **-** keys.
17 Key **-**Key -
Used to decrease a a value
Used to enter Info and Serivce during the curve adjustments
18 Key **+**Key +
Used to increase a a value
Used to enter Info and Serivce during the curve adjustments
19 Keys (+ & -)= ESC
By pressing + and - at the same time, the ESCAPE function is perfo-med: to enter a lower level menu
20 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

The display will show these data:The display will show these data:

Setting menu

The setting menu is divided into different blocks:

Bloc.	Descrizione	Description	Password
100	Informazioni generali	General	OEM / Service / Info
200	Controllo bruciatore	Burner control	OEM / Service
400	Curve rapporto	Ratio curves	OEM / Service
500	Controllo rapporto	Ratio control	OEM / Service
600	Servocomandi	Actuators	OEM / Service
700	Storico errori	Error history	OEM / Service / Info
900	Dati di processo	Process data	OEM / Service / Info

The accesses to the various blocks are allowed by passwords. Passwords are divided into three levels:

- User level (info): no password needed
- Service level (Service)

- Manifacturer level (OEM)

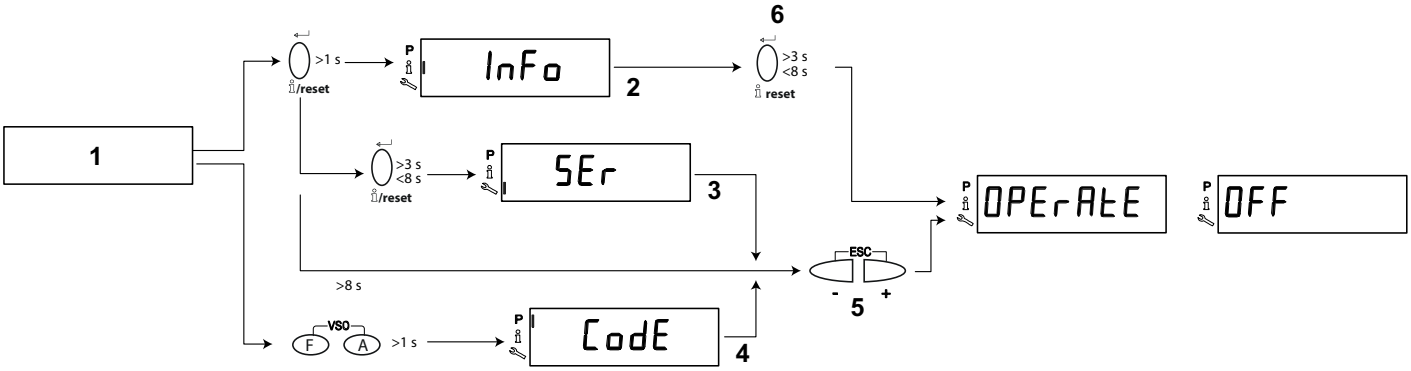
PHASES LIST

During operation, the following program phases are shown. The meaning for each phase is quoted in the table below

Fase /	Funzione	Function
Ph00	Fase blocco	Lockout phase
Ph01	Fase di sicurezza	Safety phase
Ph10	t10 = tempo raggiungimento posizione riposo	t10 = home run
Ph12	Pausa	Standby (stationary)
Ph22	t22 = tempo di salita ventilatore (motore ventilatore = ON, valvola intercetta-zione di sicurezza = ON)	t22 = fan ramp up time (fan motor = ON, safety shutoff valve = ON)
Ph24	Verso posizione preventilazione	Traveling to the prepurge position
Ph30	t1 = tempo preventilazione	t1 = prepurge time
Ph36	Verso posizione accensione	Traveling to the ignition position
Ph38	t3 = tempo preaccensione	t3 = preignition time
Ph40	TSA1 = primo tempo sicurezza (trasformatore accensione ON)TSA1 = primo tempo sicurezza (trasformatore accensione ON)	TSA1= 1st safety time (ignition transformer ON)
Ph42	TSA1 = primo tempo sicurezza (trasformatore accensione OFF)	TSA1 = 1st safety time (ignition transformer OFF) t42 = preignition time OFF
Ph44	t44 = intervallo 1	t44 = interval 1
Ph50	TSA2 = secondo tempo sicurezza	TSA2 = 2nd safety time
Ph52	t52 = intervallo 2	t52 = interval 2
Ph60	Funzionamento 1 (stazionario)	Operation 1 (stationary)
Ph62	t62 = massimo tempo bassa fiamma (funzionamento 2, in preparazione per spegnimento, verso bassa fiamma)	t62 = max. time low-fire (operation 2, prepa-ring for shutdown, traveling to low-fire)
Ph70	t13 = tempo postcombustione	t13 = afterburn time
Ph72	Verso posizione postcombustione	Traveling to the postpurge position
Ph74	t8 = tempo postventilazione	t8 = postpurge time
Ph80	t80 = tempo evacuazione controllo tenuta valvole	t80 = valve proving test evacuation time
Ph81	t81 = tempo perdita pressione atmosferica, prova atmosferica	t81 = leakage time test time atmospheric pressure, atmospheric test
Ph82	t82 = test perdita, test riempimento	t82 = leakage test filling test, filling
Ph83	t83 = tempo perdita pressione gas, test pressione	t83 = leakage test time gas pressure, pres sure test
Ph90	Tempo attesa “mancanza gas”	Gas shortage waiting time

Entering the Parameter levels

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



1
2
3

4
5
6

The burner and consequently the LMV2x.. are factory set; the air and fuel curves as set as well.

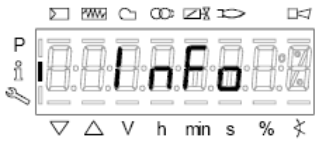
Info level

To enter the **Info** level, proceed as follows:

1 in any menu position, press keys **+** and **-** at the same time, then the program will start again: the display will show **OFF**.



2 until the display will show **InFo**, Press the **enter (InFo)** key



3 then il will show the first code (167) flashing, on the right side it will show the data entered. By pressing **+** or **-** it is possible to scroll (up or down) the parameter list.

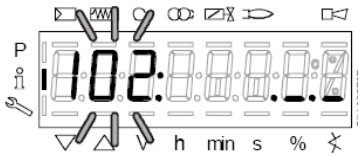
4 If a dot-line is shown on the right, there is no enough room for complete visualisation: press **enter** again the data will be completely shown for 1 to 3 seconds. By pressing **enter** or **+** and**-** at the same time, the system will exit the parameter visualisation and go back to the flashing number.

The **Info** level shows some basic parameters as:

Para-meter	***Description***
167	Cubic meters of fule (resettable)
162	Operating hours (resettable)
163	Device operating hours
164	Burners start-ups (resettable)
166	Total number of start-ups
113	Burner number (i.e. serial number)

Para-meter	***Description***
107	Software version
102	Software date
103	Device serial number
104	Customer code
105	Version
143	Free

5 Example: choose parameter 102 to show the date



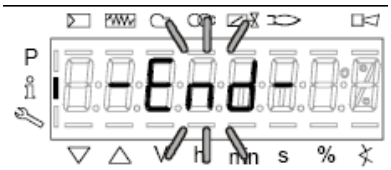
the display shows parameter **102** flashing on the left and characters **._._** on the right.

6 press InFo for 1-3 seconds: the date will appear

7 press InFo to go back to parameter “102”

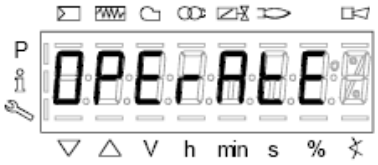
8 by pressing + / -, it is possible to scroll up/down the parameter list (see table above), or, by pressing ESC or InFo for more seconds, the display will show

9 Once the last parameter is accessed (143) by pressing **+** , the **End** message will flash.



10 Press **InFo** 

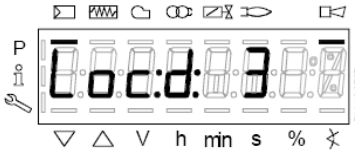
for more than three seconds or for more than three seconds orto return to the normal display.



If a message like the one below is shown during operation,



it means that the burner is locked out and the Errore code is shown (in the example “error code:4”); this message is alternating with another message



Diagnostic code (in the example “diagnostic code:3”). Record the codes and find out the fault in the Error table.
To perform the reset, press InFo for one second:



The unit displays an event which does not lead to shutdown.
The display shows current error code **c:** alternating with diagnostic code **d**:



.
Press **InFo** to return to the display of phases.
Example: Error code **111** / diagnostic code 0



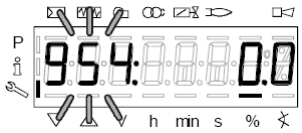
To reset, press InFo for a second. Record the codes and check the Error List to find the type of faults.

Service level
To enter the Service mode, press InFo until the display will show:



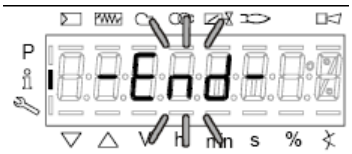
The service level shows all the information about flame intensity, actuators position, number and lock codes:

Parameter	***Description***
954	Flame intensity
121	% output, if set = automatic operation
922	Actuators position, 00=combustibile; 01= aria
161	Lock-outs number
701..725	Lock-outs History (see chapter 23 in the LMV2x manual)



1 .the first parameter will be “954”: the percentage of flame is shown on the right. By pressinf + or - it is possible to scroll up/down the parameter list.

2 Once the last parameter is accessed (143) by pressing **+** , the **End** message will blink.



3 PressPress **InFo** for more than three seconds or for more than three seconds orto return to the normal display.



For further nformation, see tha LMV2 related manual.

ADJUSTING THE GAS VALVES GROUP

Multibloc MB-DLE

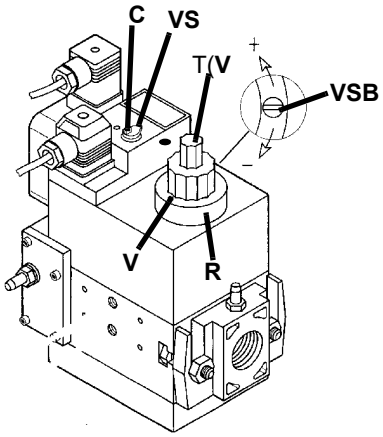
The multibloc unit is a compact unit consisting of two valves, gas pressure switch, pressure stabilizer and gas filter.

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.

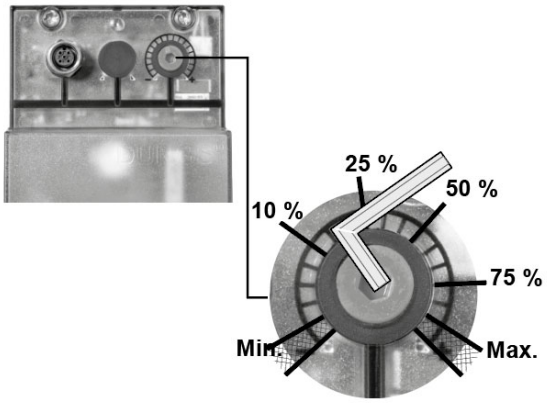
Do not use a screwdriver on the screw **VR**!

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*

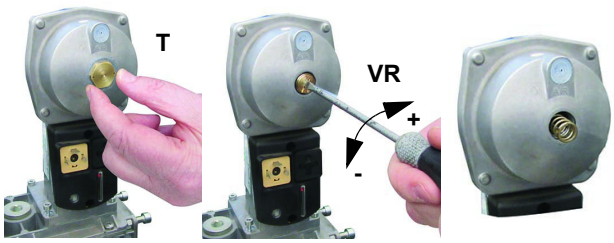


Outlet pressure	MIN	10%	25%	50%	75%	MAX
PS-10/40	4 mbar 0,4 kPa 2 "w.c.	10 mbar 1,0 kPa 4 "w.c.	25 mbar 2,5 kPa 10 "w.c.	50 mbar 5,0 kPa 20 "w.c.	75 mbar 7,5 kPa 30 "w.c.	100 mbar 10,0 kPa 40 "w.c.
PS-50/200	20 mbar 2,0 kPa 8 "w.c.	50 mbar 5,0 kPa 20 "w.c.	125 mbar 12,5 kPa 50 "w.c.	250 mbar 25,0 kPa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

PART V: 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.

Attention:

- Read carefully the “warnings” chapter at the beginnig of this manual
- All operations on the burner must be carried out with the mains disconnected and the fuel manaul cutoff valves closed!
- Any maintenance, cleaning or check intervals are a mere indication: the functionality of the burner - and its components - depends, among other things, from capacity utilisation rate, environment, nature and quality of the fuels used
- never loose the sealed screws! otherwise, the device warranty will be immediately invalidate!

ROUTINE MAINTENANCE

Check that the gas meter is not moving when the burner is off. In case it is rotating, look for possible leaks.

- Check the cleaning condition of the vent. Clean the vent by using exclusively a dry brush. If needed, disassemble it from the motor’s shaft and wash it by using non corrosive detergents. Prior to disassemble the vent, take the measurements in relation to the motor's shaft, so as to reassemble it in the same position.
- Check that all parts in contact with combustive air (air box, protection mesh and Archimedean screw) are clean and free from any obstruction that might impede free afflux. Clean it with compressed air if available and/or a dry brush or cloths. Eventually wash it with non corrosive detergents.
- Check the blast tube; it must be substituted in case of obvious cracks or anomalous holes. Slight deformations that do not affect combustion may be tolerated
- Check the condition of the burner-boiler gasket. Eventually substitute it.
- Check the fan’s motor: no specific maintenance is needed. In case of anomalous noises when running, check the condition of the bearings and eventually substitute them or completely substitute the motor.
- Clean and examine the gas filter cartridge and replace it if necesssary;
- Remove and clean the combustion head;
- Examine and clean the ignition electrodes, adjust and replace them if necessary;
- Examine and clean the detection electrode/photoelement (according to the burner models), replace it if necessary, in case of doubt, check the detection circuit, after the burner start-up;
- Clean and grease leverages and rotating parts.

ATTENTION:

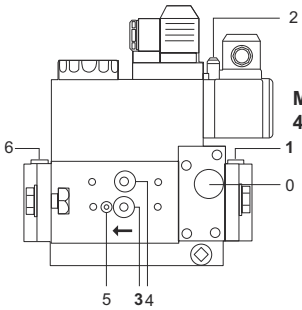
- At least every 2 months, or more frequently depending on the case, clean the burner installation room.
- At least every 2 months, or more often if needed, clean the room where the burner is installed.Avoid leaving installations, papers, nylon bags, etc., inside the room. They could be sucked by the burner and cause malfunctioning.
- Check that the room’s vents are free from obstructions.
- when 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.

ATTENTION: During the filter maintenance procedure, the gas flow sensor must remain clean. Avoid contact with dust or other debris

Gas filter maintenance Gas filter included in the valve body

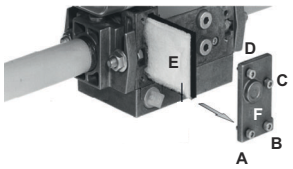
WARNING: Before opening the filter, close the manual cutoff valve downstream the filter and bleed the gas; check that inside the filter there is no pressurised gas.

To clean or replace the gas filter, proceed as follows:

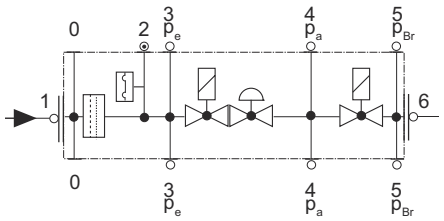


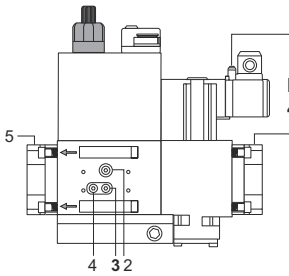
MB-DLE 405..412

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



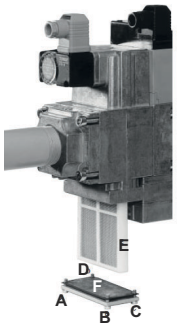
Pressure taps



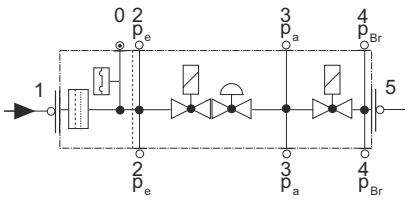


MB-DLE 415 - 420 B01

0, 1, 2, 3, 4, 5
Screw plug 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.

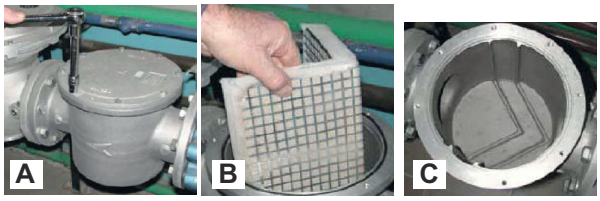
1 Interrupt the gas supply closing the on-off valve.
2 Remove screws 1 ÷ 4 using the Allen key n. 3 and remove filter cover 5 in Fig. 5.
3 Remove the filter 6 and replace with a new one.
4 Replace filter cover 5 and tighten screws 1 ÷ 4 without using any force and fasten.
5 Perform leakage and functional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

In-line gas filter

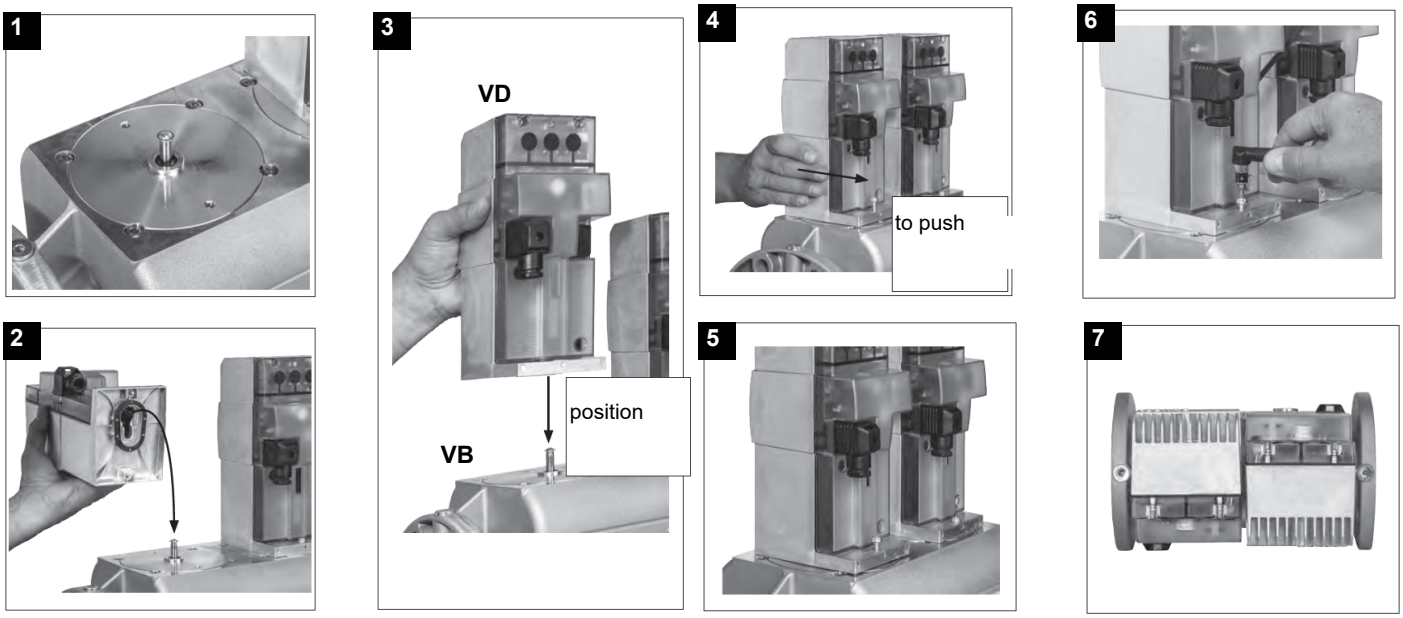
To clean or remove the filter, proceed as follows:

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).

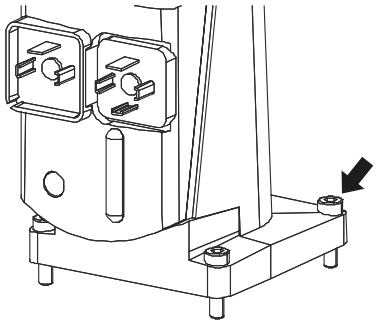


MultiBloc VD-V VD-R Mounting

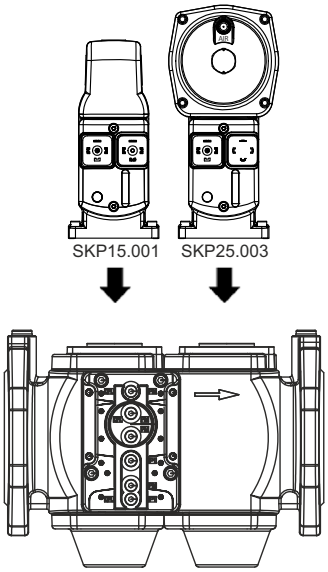


1. Position VD on VB, fig. 2+3.
2. Slide VD forward up to the stop, fig. 4.
3. Screw VD on with 2 M5 screws for each, max. 5 Nm/44 in.-lb., fig. 5/6.
4. VD can be mounted rotated by 180°, fig. 7.

Siemens SKP15 e SKP25 Mounting



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

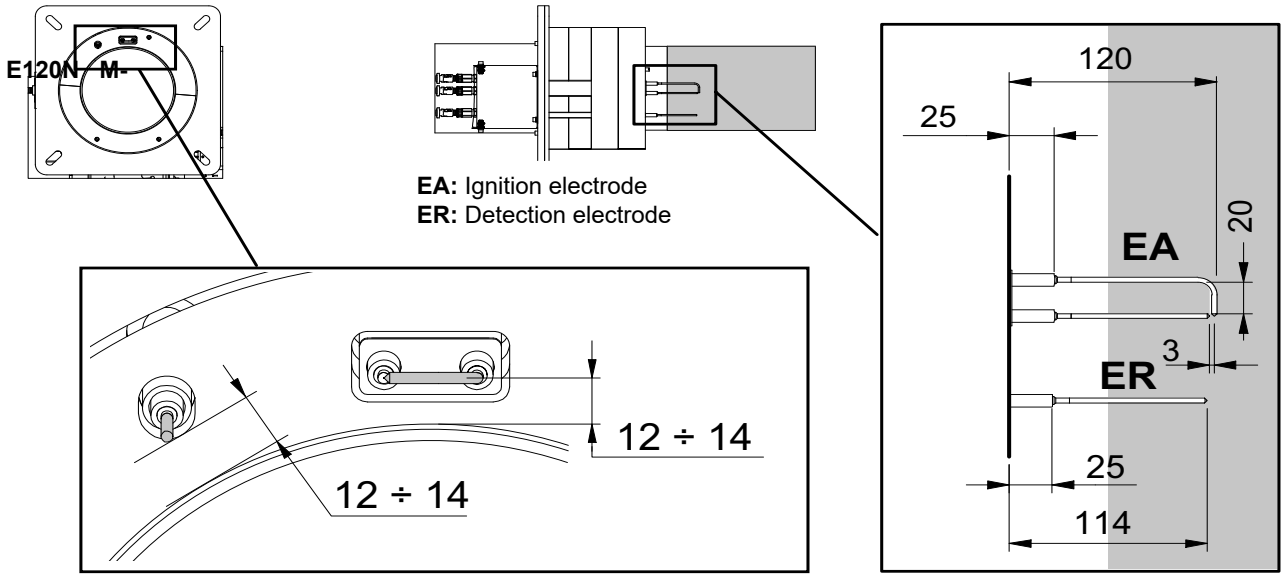


Electrodes Adjustment

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.

Adjust the electrodes position, according to the quotes shown othe next picture



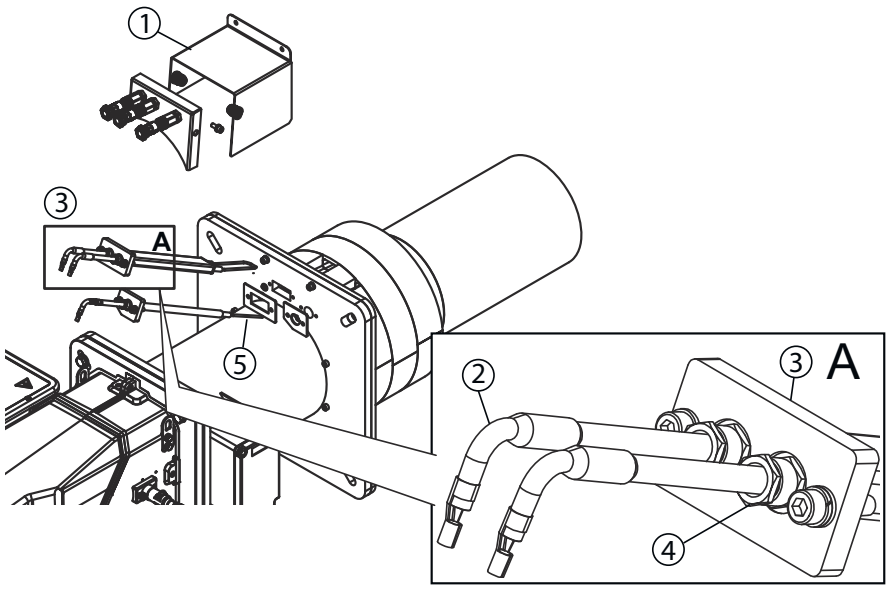
Replacing the electrodes

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.

Cleaning of detection and ignition electrodes:

1 Remove protective cover (1)
2 Disconnect the electrical cables (2) from the electrodes (it is not necessary to remove the cable glands, however, at the operator's discretion)
3 Remove the entire electrode assembly with holder after unscrewing the screws securing the flange (3)
4 Only if necessary adjust the position of the electrode. Loosen the threaded connection securing the electrode to the holder (4)
5 Clean the electrode sensing element
6 Reinsert the entire electrode assembly following previous steps in reverse.

CAUTION: Ensure correct positioning of the electrodes before reinserting them on the burner (see section on electrode adjustment for dimensions).



.Burner service term

- In optimal operating conditions, and with preventive maintenance, the burner can last up to 20 years.
- Upon expiry of the burner service term, it is necessary to carry out a technical diagnosis and, if necessary, an overall repair.
- The burner status is considered to be at its limit if it is technically impossible to continue using it due to non-compliance with safety requirements or a decrease in performance.
- The owner makes the decision whether to finish using the burner, or replacing and disposing of it based on the actual state of the appliance and any repair costs.
- The use of the burner for other purposes after the expiry of the terms of use is strictly prohibited.

Seasonal stop

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

1 turn the burner main switch to 0 (Off position)
2 disconnect the power mains
3 close the fuel valve 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.

4 Power supply (3ph) 440 V 3 A.C. 60 Hz
5 Auxiliary Power supply (1ph) 120 V 2 A.C. 60 Hz
This burner is fitted with a three phase/single-phase transformer inside the control panel, It is necessary to connect the burner only to 3ph power supply, the auxiliary power supply will be guaranteed by the included transformer. Please pay attention to the wiring diagrams to make the proper power supply connections.
3-ph/1-ph transformer tecnical data: 500VA, input voltage 230V/output voltage 115V
6 Do not reverse phase with neutral
7 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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Note: specifications and data subject to change. Errors and omissions excepted.