

**NG280 - NG350 - NG400**  
**NGX280 - NGX350 - NGX400**  
**LG280 - LG350 - LG400**

***Microprocessor-controlled  
gas burners***

**MANUAL OF INSTALLATION - USE - MAINTENANCE**

***CIB UNIGAS***

**BURNERS - BRUCIATORI - BRULERS - BRENNER - QUEMADORES - ГОРЕЛКИ**

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## WARNINGS

**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.**

### 1) 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 cut-out 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.

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.
- For all the units that have been modified or have options fitted then original accessory equipment only shall be used.
- 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 damages resulting from improper installation, use and failure to comply with the instructions supplied by the manufacturer.

### 2) SPECIAL INSTRUCTIONS FOR BURNERS

- 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 shut-off 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, reset 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.

### 3) GENERAL INSTRUCTIONS DEPENDING ON FUEL USED

#### 3a) ELECTRICAL CONNECTION

- For safety reasons the unit must be efficiently earthed and installed as required by current safety regulations.
  - It is vital that all safety requirements are met. In case of any doubt, ask for an accurate inspection of electricians 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.

### 3b) FIRING WITH GAS, LIGHT OIL OR OTHER FUELS

#### GENERAL

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

#### SPECIAL INSTRUCTIONS FOR USING GAS

Have qualified personnel inspect the installation to ensure that:

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

#### Precautions if you can smell gas

- a do not operate electric switches, the telephone, or any other item likely to generate sparks;
  - b immediately open doors and windows to create an air flow to purge the room;
  - c close the gas valves;
  - d contact qualified personnel.
- Do not obstruct the ventilation openings of the room where gas appliances are installed, to avoid dangerous conditions such as the development of toxic or explosive mixtures.

### DIRECTIVES AND STANDARDS

#### *Gas burners*

##### European directives:

- Directive 2009/142/EC - Gas Appliances;
- Directive 2006/95/EC on low voltage;
- Directive 2004/108/EC on electromagnetic compatibility

##### Harmonised standards :

- UNI EN 676 (Gas Burners);
- CEI EN 60335-1(Household and similar electrical appliances - Safety. Part 1: General requirements;
- EN 50165 (Electrical equipment of non-electric appliances for household and similar purposes. Safety requirements.

#### *Light oil burners*

##### European directives:

- Directive 2006/95/EC on low voltage;
- Directive 2004/108/EC on electromagnetic compatibility

##### Harmonised standards :

- CEI EN 60335-1(Household and similar electrical appliances - Safety. Part 1: General requirements;
- EN 50165 (Electrical equipment of non-electric appliances for household and similar purposes. Safety requirements.

##### National standards :

- UNI 7824: Monobloc nebulizer burners for liquid fuels. Characteristics and test methods

#### *Heavy oil burners*

##### European directives:

- Directive 2006/95/EC on low voltage;
- Directive 2004/108/EC on electromagnetic compatibility

##### Harmonised standards :

- CEI EN 60335-1 Household and similar electrical appliances - SafetyPart 1: General requirements;
- EN 50165 Electrical equipment of non-electric appliances for household and similar purposes. Safety requirements.

##### National standards :

- UNI 7824: Monobloc nebulizer burners for liquid fuels. Characteristics and test methods

#### *Gas - Light oil burners*

##### European directives:

- Directive 2009/142/EC - Gas Appliances;
- Directive 2006/95/EC on low voltage;
- Directive 2004/108/EC on electromagnetic compatibility

##### Harmonised standards :

- UNI EN 676 Gas Burners
- CEI EN 60335-1(Household and similar electrical appliances - Safety. Part 1: General requirements;
- EN 50165 Electrical equipment of non-electric appliances for household and similar purposes. Safety requirements.

##### National standards :

- UNI 7824: Monobloc nebulizer burners for liquid fuels. Characteristics and test methods

#### *Gas - Heavy oil burners*

##### European directives:

- Directive 2009/142/EC - Gas Appliances;
- Directive 2006/95/EC on low voltage;
- Directive 2004/108/EC on electromagnetic compatibility

##### Harmonised standards :

- UNI EN 676 (Gas Burners);
- CEI EN 60335-1(Household and similar electrical appliances - Safety. Part 1: General requirements;
- EN 50165 Electrical equipment of non-electric appliances for household and similar purposes. Safety requirements.

##### National standards :

- UNI 7824: Monobloc nebulizer burners for liquid fuels. Characteristics and test methods

## GENERAL FEATURES

The control system is made of the Siemens LMV central unit that performs all the burner control functions and of the Siemens AZL local programming unit that interfaces the system with the user.

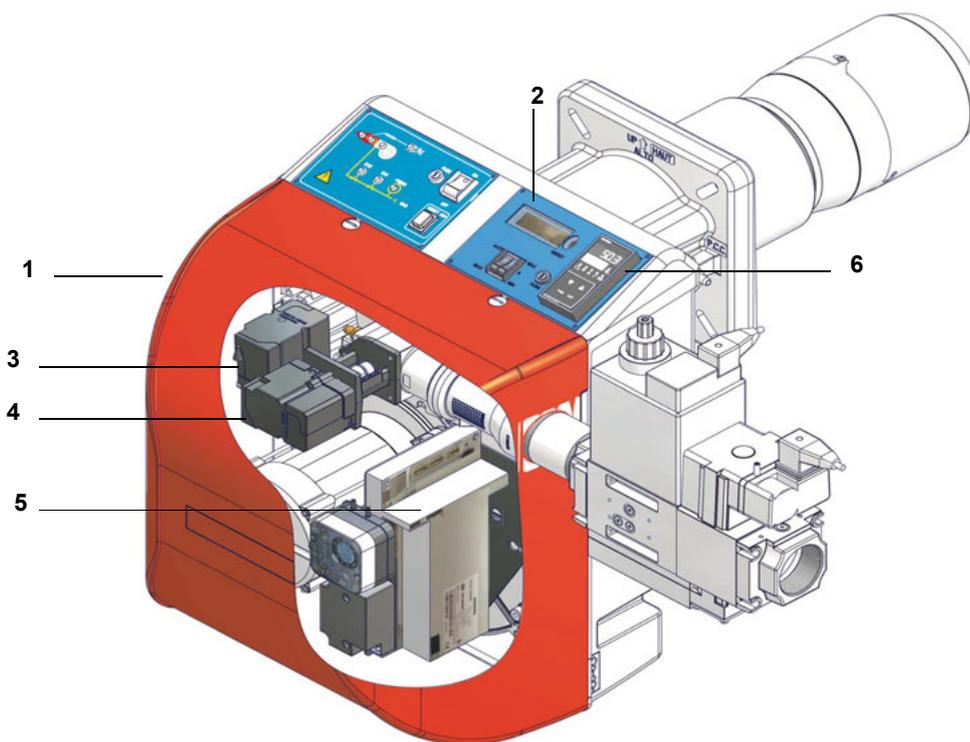


Fig. 1

### Keys

- 1 Burner
- 2 AZL2..
- 3 Air actuator
- 4 Fuel actuator
- 5 LMV2..
- 6 Output modulatore (only for fully-modulating models)

The burner shown is indicative.

The gas coming from the supply line, passes through the valves group provided with filter and governor. This one forces the pressure in the utilisation limits. In the double-stage , progressive and fully- modulating burners, the electric actuator, that moves proportionally the air damper and the gas butterfly valve, is controlled by the LMV2 Burner Management System (BMS). This one allows the optimisation of the gas flue values, as to get an efficient combustion. The combustion head positioning determines the burner's output. Fuel and comburent are routed into separated ways as far as the zone of flame generation (combustion chamber). The air (comburent) and fuel (gas, gas oil, heavy oil) are forced into the combustion chamber. The control panel, placed on the burner's front side, shows each operating stage.

## How to interpret the burner's "Performance curve"

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

- furnace input, in kW or kcal/h ( $\text{kW} = \text{kcal/h} / 860$ );
- backpressure (data are available on the boiler's ID plate or in the user's manual).

Example:

Furnace input: kW 600

Backpressure: mbar 4

In the "Performance curve" diagram (Fig. 2), draw a vertical line matching the furnace input value and an horizontal line matching the backpressure value. The burner is suitable if the intersection point A is inside the performance curve.

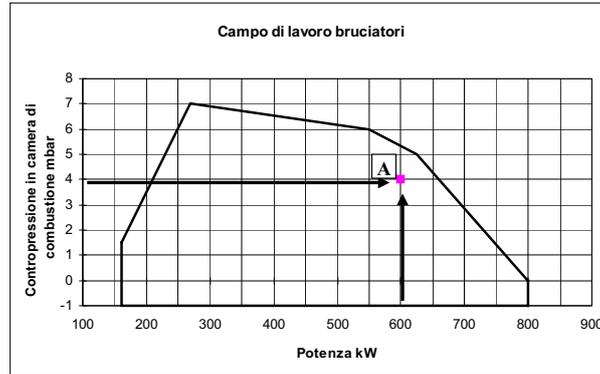


Fig. 2

Data are referred to standard conditions: atmospheric pressure at 1013mbar, ambient temperature at 15°C.

### Checking the proper gas train size

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

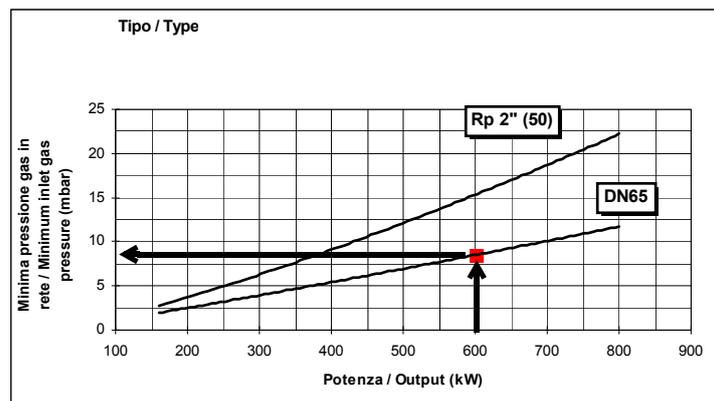


Fig. 3

## BURNER FEATURES

### Burner model identification

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

Type	NG400	Model	M-	PR.	S.	*	A.	0.	50.	EA
	(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) BURNER TYPE	NG - Natural gas burners LG - L.P.G. burners NGX - Low NOx burners									
(2) FUEL	M - Natural gas      L - LPG									
(3)	PR - Progressive      MD - Fully modulating									
(4) BLAST TUBE	S - standard      L - extended      M - modular									
(5) DESTINATION COUNTRY	* see data plate									
(6) BURNER VERSION	A - Standard									
(7) EQUIPMENT	0 = 2 gas valves 1 = 2 Gas valves + gas proving system)									
(8) GAS CONNECTION	15 = Rp1/2    20 = Rp3/4    25 = Rp1    32 = Rp1 ¼    40 = Rp1 ½    50 = Rp2									
(9) GAS CONNECTION	EA = micro-processor controlled burner (LMV2x) EB = micro-processor controlled burner (LMV3x)									

### Technical specifications

BURNER TYPE		NG280	NG280	NG280	LG280	LG280	LG280
		M-xx...x.25	M-xx...x.32	M-xx...x.40	L-xx...x.20	L-xx...x.25	L-xx...x.32
Output	min.- max. kW	65 - 300					
Fuel		Natural gas			L.P.G.		
Category		(see next paragraph)			I <sub>3B/P</sub>		
Gas rate	min.- max. (Stm <sup>3</sup> /h)	7 - 32			2,5 - 11,5		
Gas Pressure	min.- max. mbar	(Note2)					
Power supply		230V - 50Hz					
Total power consumption	kW	0,55					
Electric motor	kW	0,25					
Protection		IP40					
Valves size / Gas connection		1" / Rp 1	1" ¼ / Rp 1 ¼	1" ½ / Rp 1 ½	1" / Rp1	1" / Rp1	1" ¼ / Rp 1 ¼
Operation		Progressive - Fully modulating					
Operating temperature	°C	-10 ÷ +50					
Storage Temperature	°C	-20 ÷ +60					
Working service*		Intermittent					

BURNER TYPE		NG350	NG350	NG350	LG350	LG350	LG350
		M-xx...x.25	M-xx...x.32	M-xx...x.40	L-xx...x.25	L-xx...x.32	L-xx...x.40
Output	min.- max. kW	80 - 330			85 - 330		
Fuel		Natural gas			L.P.G.		
Category		(see next paragraphsee next paragraph)			I <sub>3B/P</sub>	I <sub>3B/P</sub>	I <sub>3B/P</sub>
Gas rate	min.- max. (Stm <sup>3</sup> /h)	8.5 - 35	8.5 - 35	8.5 - 35	3 - 13	3 - 13	3 - 13
Gas pressure	min.- max. mbar	(Note2)					
Power supply		230V - 50Hz					
Total power consumption	kW	0,67					
Electric motor	kW	0,37					
Protection		IP40					
Valves size / Gas connection		1" / Rp 1	1" ¼ / Rp 1 ¼	1" ½ / Rp 1 ½	1" / Rp1	1" ¼ / Rp 1 ¼	1" ½ / Rp 1 ½
Operation		Progressive - Fully modulating					
Operating temperature	°C	-10 ÷ +50					
Storage Temperature	°C	-20 ÷ +60					
Working service *		Intermittent					

BURNER TYPE		NG400 M-xx...x.25	NG400 M-xx...x.32	NG400 M-xx...x.40	NG400 M-xx...x.50
Output	min.- max. kW	115 - 420			
Fuel		Natural gas			
Category		(see next paragraph)			
Gas rate	min.- max. (Stm <sup>3</sup> /h)	12 - 44.5			
Gas pressure	min.- max. mbar	(Note2)			
Power supply		230V - 50Hz			
Total power consumption	kW	0,67/0,75			
Electric motor	kW	0,37/0,45			
Protection		IP40			
Valves size / Gas connection		1" / Rp 1	1" ¼ / Rp 1 ¼	1" ½ / Rp 1" ½	2" / Rp 2
Operation		Progressive - Fully modulating			
Operating temperature	°C	-10 ÷ +50			
Storage Temperature	°C	-20 ÷ +60			
Working service *		Intermittent			

BURNER TYPE		LG400 L-xx...x.25	LG400 L-xx...x.32	LG400 L-xx...x.40	LG400 L-xx...x.50
Output	min.- max. kW	105 - 420			
Fuel		L.P.G.			
Category		I <sub>3B/P</sub>			
Gas rate	min.- max. (Stm <sup>3</sup> /h)	4 - 16			
Gas pressure	min.- max. mbar	(Note2)			
Power supply		230V - 50Hz			
Total power consumption	kW	0,67/0,75			
Electric motor	kW	0,37/0,45			
Protection		IP40			
Valves size / Gas connection		1" / Rp 1	1" ¼ / Rp 1 ¼	1" ½ / Rp 1" ½	2" / Rp 2
Operation		Progressive - Fully modulating			
Operating temperature	°C	-10 ÷ +50			
Storage Temperature	°C	-20 ÷ +60			
Working service *		Intermittent			

<b>Note1:</b>	All gas flow rates are referred to Stm <sup>3</sup> /h (1013 mbar absolute pressure, 15 °C temperature) and are valid for G20 gas (nett calorific value H <sub>i</sub> = 34.02 MJ/Stm <sup>3</sup> ); for L.P.G. (net calorific value H <sub>i</sub> = 93.5 MJ/Stm <sup>3</sup> )
<b>Note2:</b>	Maximum gas pressure = 360mbar (with Dungs MBDLE/MBC valves) Minimum gas pressure = see gas curves.

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

## Low NOx burners Technical specifications

BURNER TYPE		NGX280 M-.xx...x.25	NGX280 M-.xx...x.32	NGX280 M-.xx...x.40
Output	min.- max. kW	60 - 190		
Fuel		Natural gas		
Category		(see next paragraph)		
Gas rate	min.- max. (Stm <sup>3</sup> /h)	6,4 - 20		
Gas pressure	min.- max. mbar	(Note2)		
Power supply		230V - 50Hz		
Total power consumption	kW	0,55		
Electric motor	kW	0,25		
Protection		IP40		
Valves size / Gas connection		1" / Rp1	1" <sub>1/4</sub> / Rp 1 <sub>1/4</sub>	1" <sub>1/2</sub> / Rp 1 <sub>1/2</sub>
Operation		Progressive - Fully modulating		
NOx emissions		Class 3 - EN676/2008		
Operating temperature	°C	-10 ÷ +50		
Storage Temperature	°C	-20 ÷ +60		
Working service *		Intermitent		

BURNER TYPE		NGX350 M-.xx...x.25	NGX350 M-.xx...x.32	NGX350 M-.xx...x.40
Output	min.- max. kW	65 - 260		
Fuel		Natural gas		
Category		(see next paragraph)		
Gas rate	min.- max. min.- max.(Stm <sup>3</sup> /h)	7 - 27,5		
Gas pressure	min.- max. mbar	(Note2)		
Power supply		230V - 50Hz		
Total power consumption	kW	0,67		
Electric motor	kW	0,37		
Protection		IP40		
Valves size / Gas connection		1" / Rp1	1" <sub>1/4</sub> / Rp 1 <sub>1/4</sub>	1" <sub>1/2</sub> / Rp 1 <sub>1/2</sub>
Operation		Progressive - Fully modulating		
NOx emissions		Class 3 - EN676/2008		
Operating temperature	°C	-10 ÷ +50		
Storage Temperature	°C	-20 ÷ +60		
Working service *		Intermitent		

<b>Note1:</b>	All gas flow rates are referred to Stm <sup>3</sup> /h (1013 mbar absolute pressure, 15 °C temperature) and are valid for G20 gas (net calorific value H <sub>i</sub> = 34.02 MJ/Stm <sup>3</sup> ); for L.P.G. (net calorific value H <sub>i</sub> = 93.5 MJ/Stm <sup>3</sup> )
<b>Note2:</b>	Maximum gas pressure = 360mbar (with Dungs MBDLE/MBC valves) Minimum gas pressure = see gas curves.

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

BURNER TYPE		NGX400 M-.xx...x.25	NGX400 M-.xx...x.32	NGX400 M-.xx...x.40	NGX400 M-.xx...x.50
Output	min.- max. kW	90 - 350			
Fuel		Natural gas			
Category		(see next paragraph)			
Gas rate	min.- max. (Stm <sup>3</sup> /h)	9.5 - 37			
Gas pressure	min.- max. mbar	(Note2)			
Power supply		230V - 50Hz			
Total power consumption	kW	0,67/0,75			
Electric motor	kW	0,37/0,45			
Protection		IP40			
Valves size / Gas connection		1" / Rp 1	1" ¼ / Rp 1 ¼	1" ½ / Rp 1 ½	2" / Rp 2
Operation		Progressive - Fully modulating			
NOx emissions		Class 3 - EN676/2008			
Operating temperature	°C	-10 ÷ +50			
Storage Temperature	°C	-20 ÷ +60			
Working service *		Intermittent			

<b>Note1:</b>	All gas flow rates are referred to Stm <sup>3</sup> /h (1013 mbar absolute pressure, 15 °C temperature) and are valid for G20 gas (net calorific value H <sub>i</sub> = 34.02 MJ/Stm <sup>3</sup> ); for L.P.G. (net calorific value H <sub>i</sub> = 93.5 MJ/Stm <sup>3</sup> )
<b>Note2:</b>	Maximum gas pressure = 360mbar (with Dungs MBDLE/MBC valves) Minimum gas pressure = see gas curves.

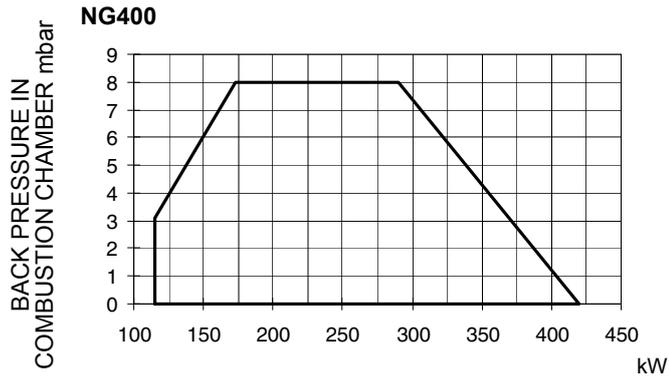
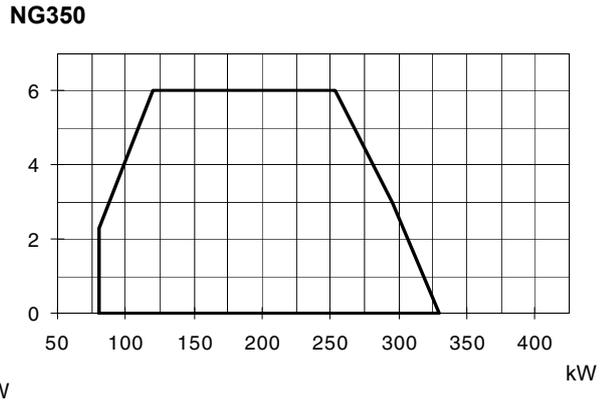
\* NOTE ON THE WORKING SERVICE: the control box automatically stops after 24h of continuous working. The control box immediately starts up, automatically.

#### Country and usefulness gas categories

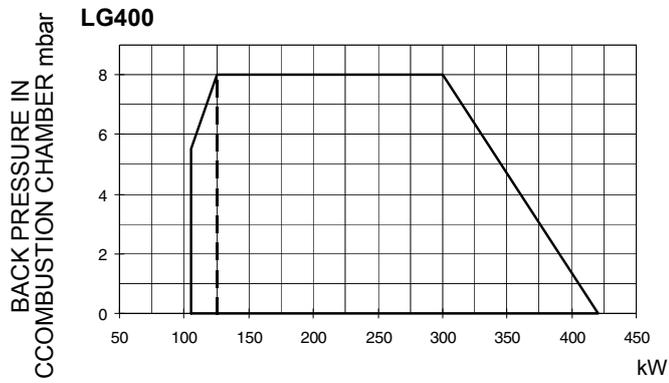
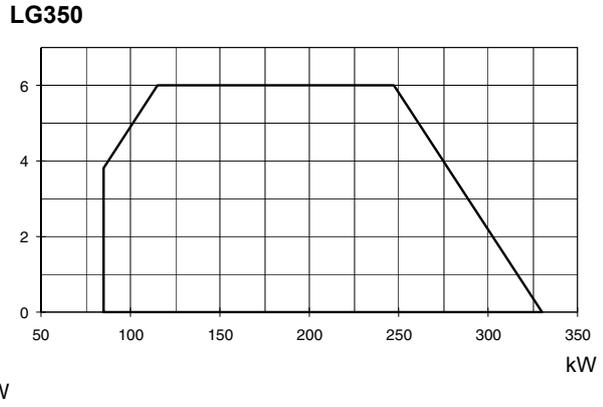
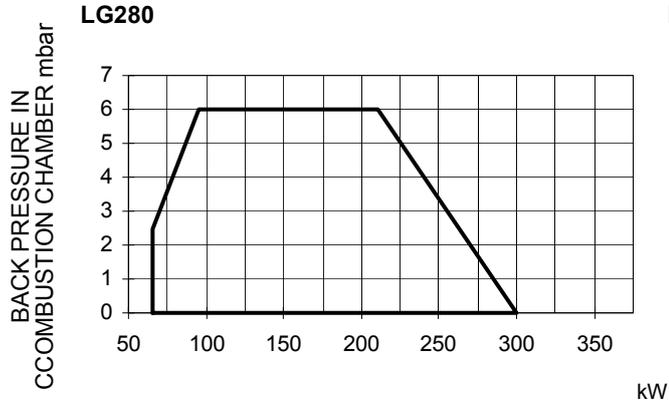
GAS CATEGORY	COUNTRY																								
	AT	ES	G	SE	FI	IE	HU	IS	N	CZ	DK	GB	IT	PT	CY	EE	LV	SI	MT	SK	BG	LT	R	TR	CH
I <sub>2H</sub>																									
I <sub>2E</sub>	LU	PL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I <sub>2E(R)B</sub>	BE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I <sub>2L</sub>	NL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I <sub>2ELL</sub>	DE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I <sub>2Er</sub>	FR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Performance Curves

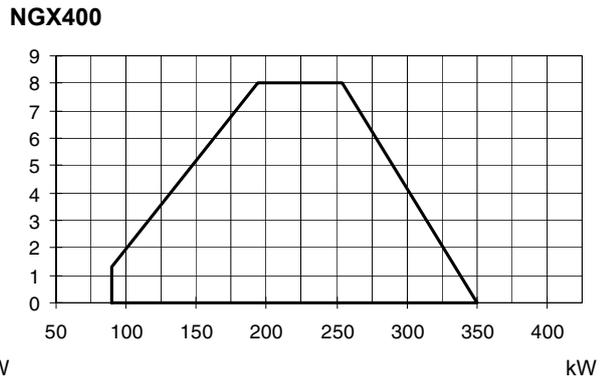
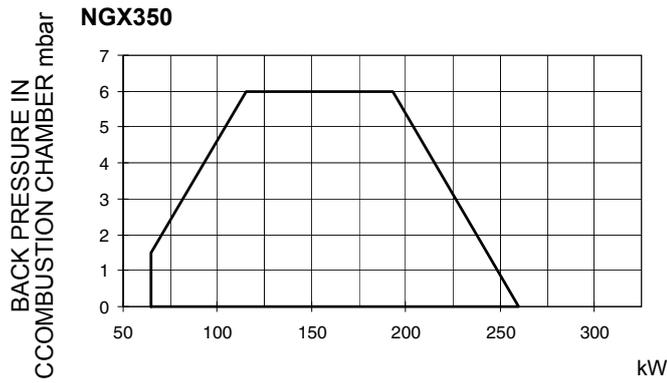
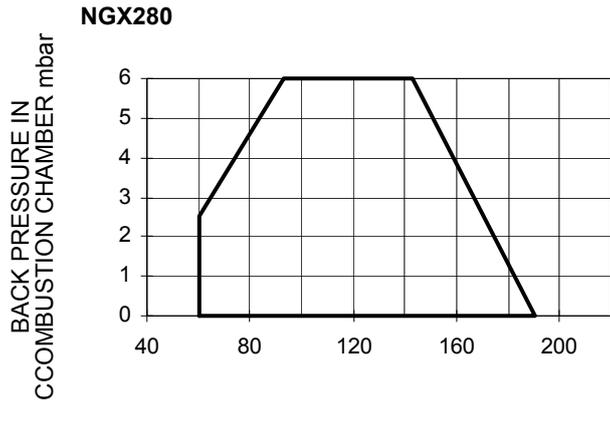
- Gas burners



- L.P.G. Burners



● **Low NOx burners**

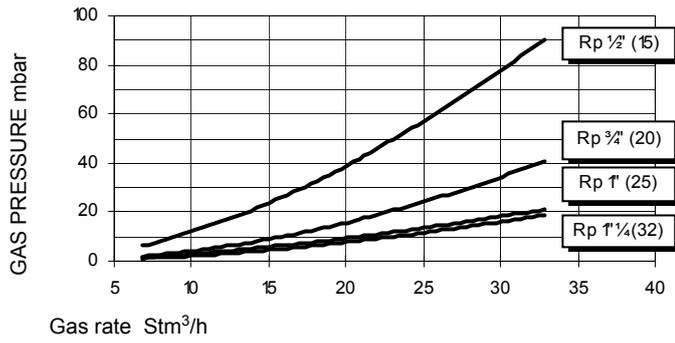


**NOTE:** The performance curve is a diagram that represents the burner performance in the type approval phase or in the laboratory tests, but does not represent the regulation range of the machine. On this diagram the maximum output point is usually reached by adjusting the combustion head to its “MAX” position (see paragraph “Adjusting the combustion head”); the minimum output point is reached setting the combustion head to its “MIN” position. During the first ignition, the combustion head is set in order to find a compromise between the burner output and the generator specifications, that is why the minimum output may be different from the Performance curve minimum.

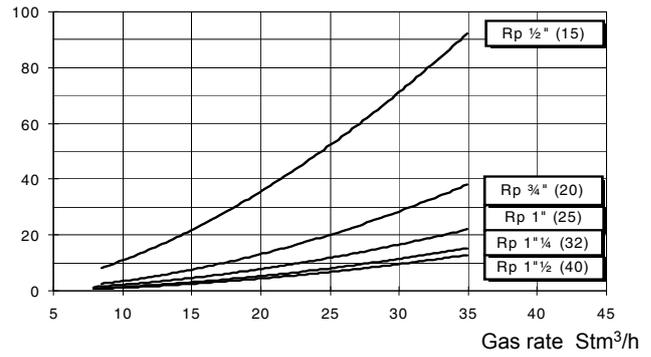
## Pressure in the network - gas flow rate curves

### ● Gas burners

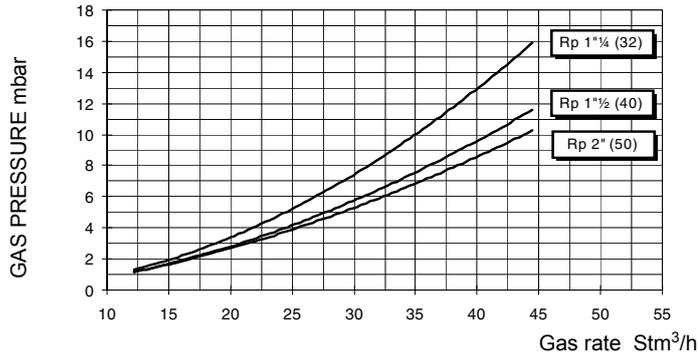
**NG280 M-.AB...**



**NG350 M-.PR/MD...**

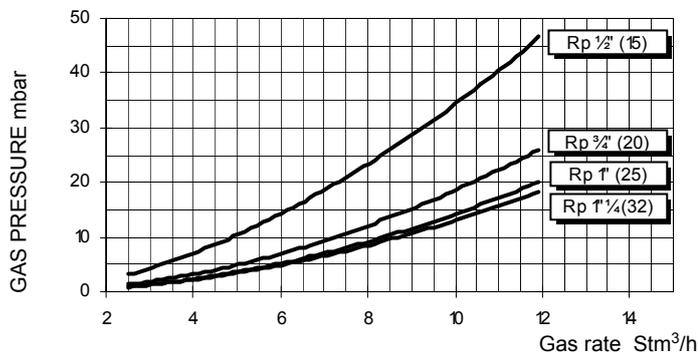


**NG400 M-.PR/MD...32-40-50**

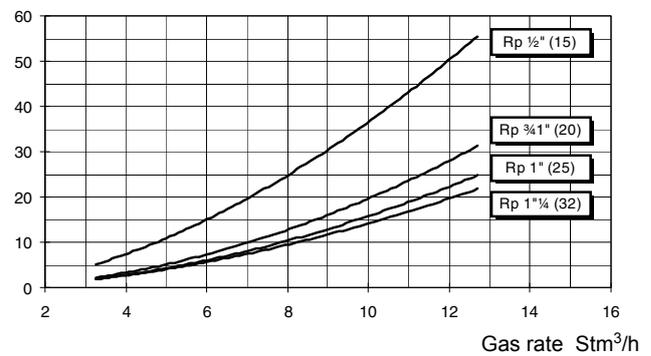


### ● L.P.G. Burners

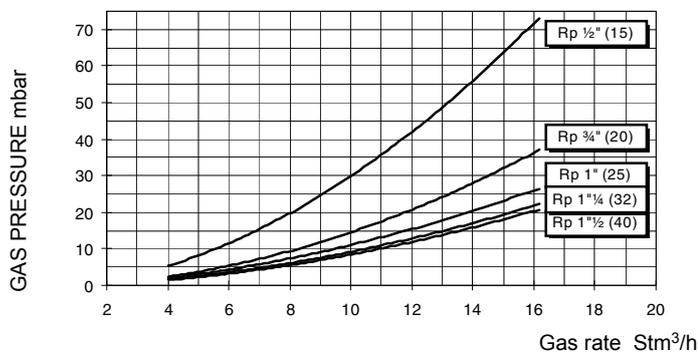
**LG280 L-.AB...**



**LG350 L-.PR....**



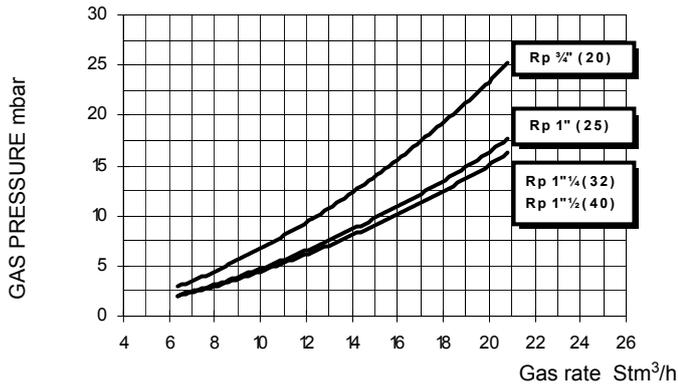
**LG400 L-.PR/MD....**



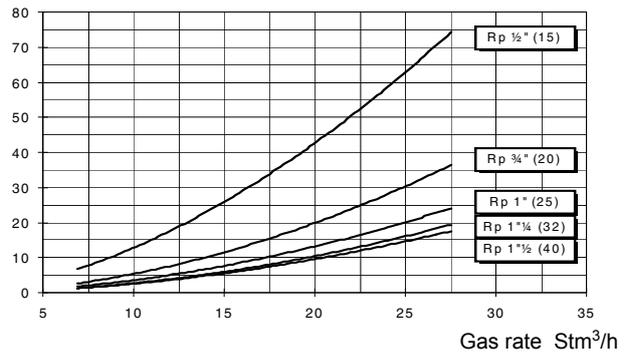
Caution: the gas rate value is quoted on the x-axis, the related network pressure is quoted on the y-axis (pressure value in the combustion chamber is not included). To know the minimum pressure at the gas train inlet, necessary to get the requested gas rate, add the pressure value in the combustion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

● **Low NOx burners**

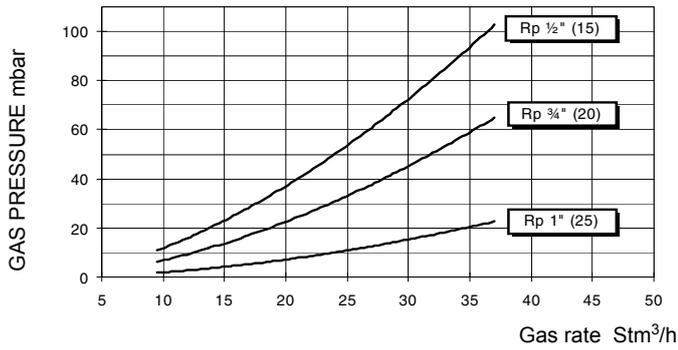
**NGX280**



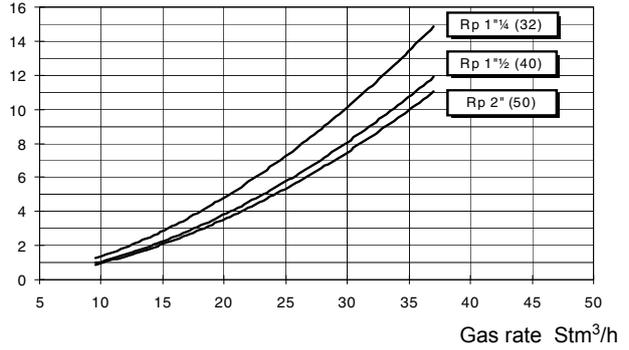
**NGX350**



**NGX400 M-...15-20-25**



**NGX400 M-...32-40-50**



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

## Combustion head pressure curves vs. the gas flow rate

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

The curves referred to the gas pressure in the combustion head, depending on the gas flow rate, are referred to the burner in the combustion stage (percentage of residual O<sub>2</sub> in the flues as shown in the “Recommended combustion values” table and CO in the standard limits). During this stage, the combustion head, the gas butterfly valve and the servocontrol are at the maximum opening. Refer to Fig. 4, 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.

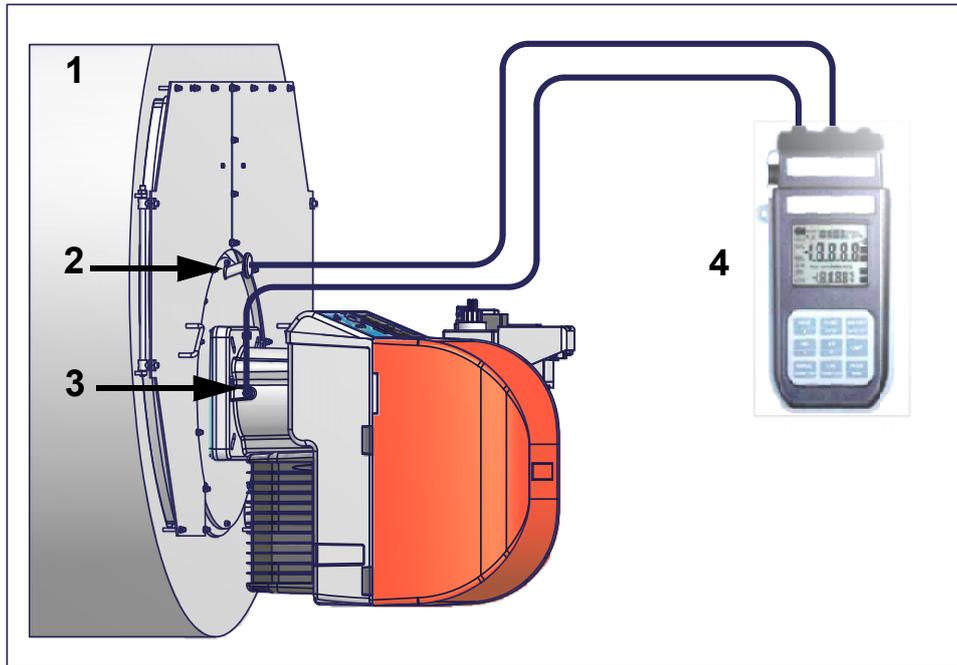


Fig. 4

### Key

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

### Measuring the gas pressure in the combustion head

In order to measure the pressure in the combustion head, insert the pressure gauge probes: one into the generator’s pressure outlet (Fig. 4-2) to get the pressure in the combustion chamber and the other one into the butterfly valve’s pressure outlet of the burner (Fig. 4-3). On the basis of the measured differential pressure, it is possible to get the maximum flow rate: in the pressure - rate curves (shown on the next paragraph), it is easy to get the burner output in kW or Stm<sup>3</sup>/h (quoted on the x axis) from the pressure measured in the combustion head (quoted on the y axis).

**NOTE: THE PRESSURE-RATE CURVES ARE APPROXIMATE; FOR A PROPER SETTING OF THE GAS RATE, PLEASE REFER TO THE GAS METER READING.**

To measure the pressure in the combustion chamber, as far as the IDEA series, a pressure plug is provided upstream the burner’s blast tube.

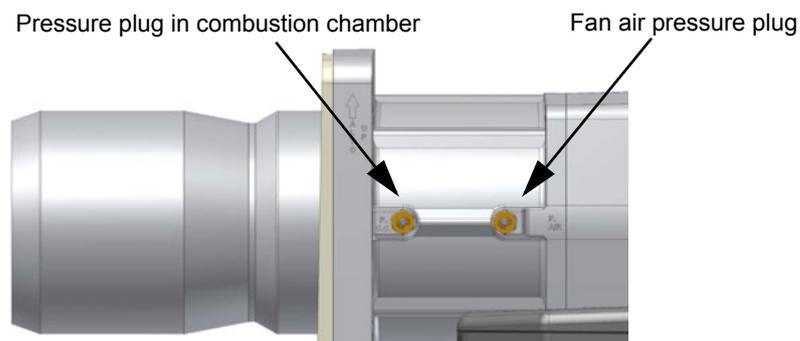
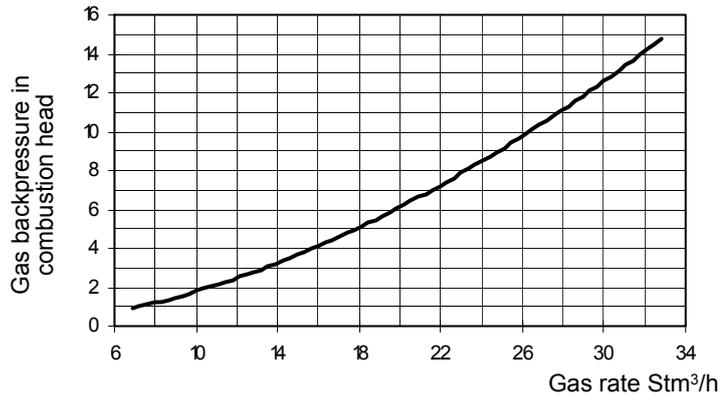


Fig. 5

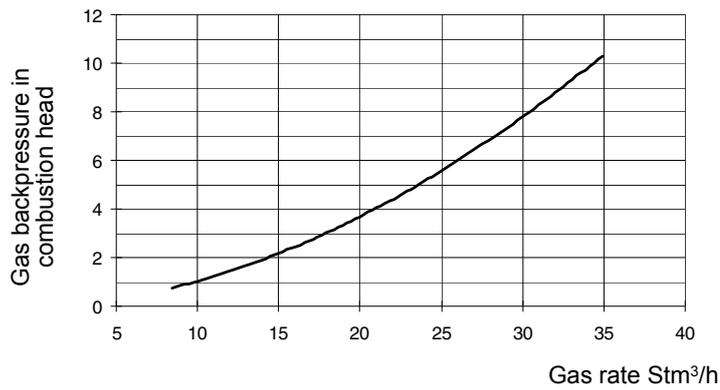
## Pressure in the combustion head vs. gas flow rate curves

### ● Natural gas burners

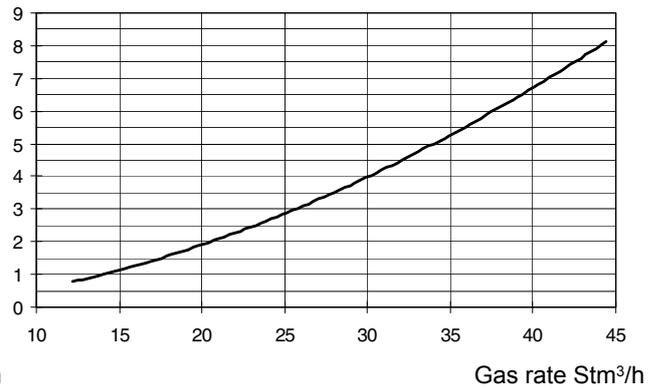
#### NG280



#### NG350

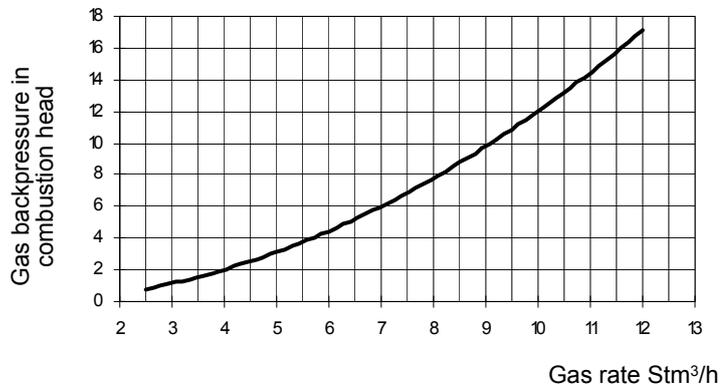


#### NG400

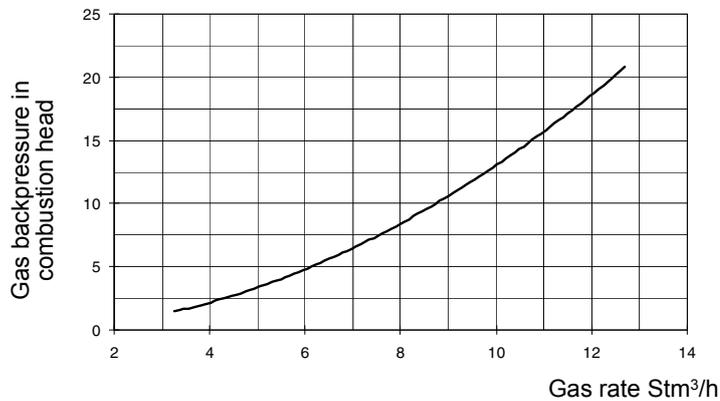


### ● L.P.G. Burners

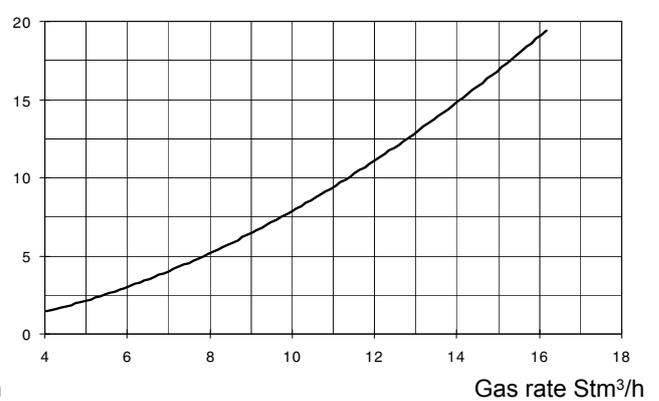
#### LG280



#### LG350

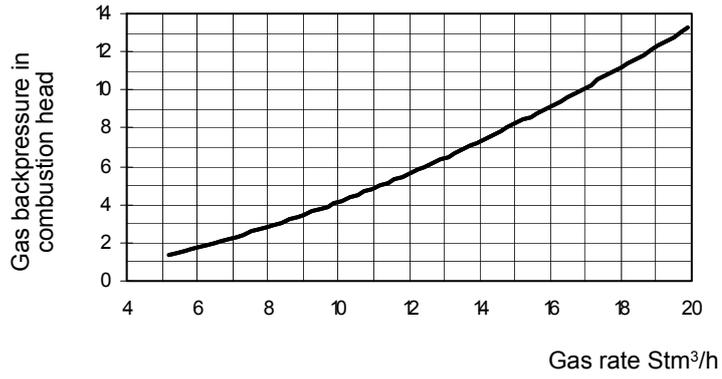


#### LG400

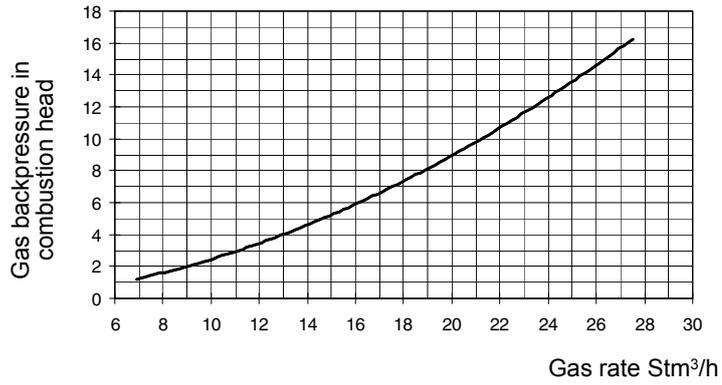


● Low NOx burners

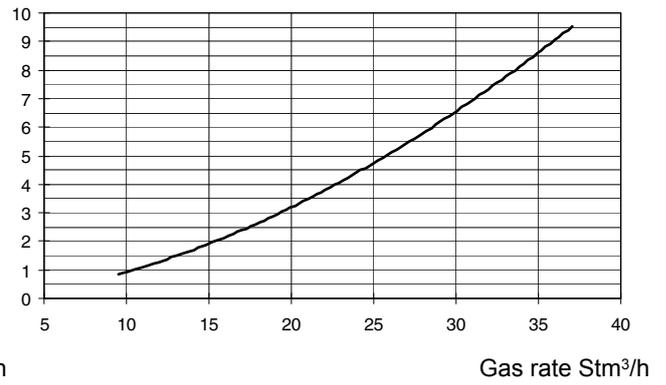
**NGX280**



**NGX350**

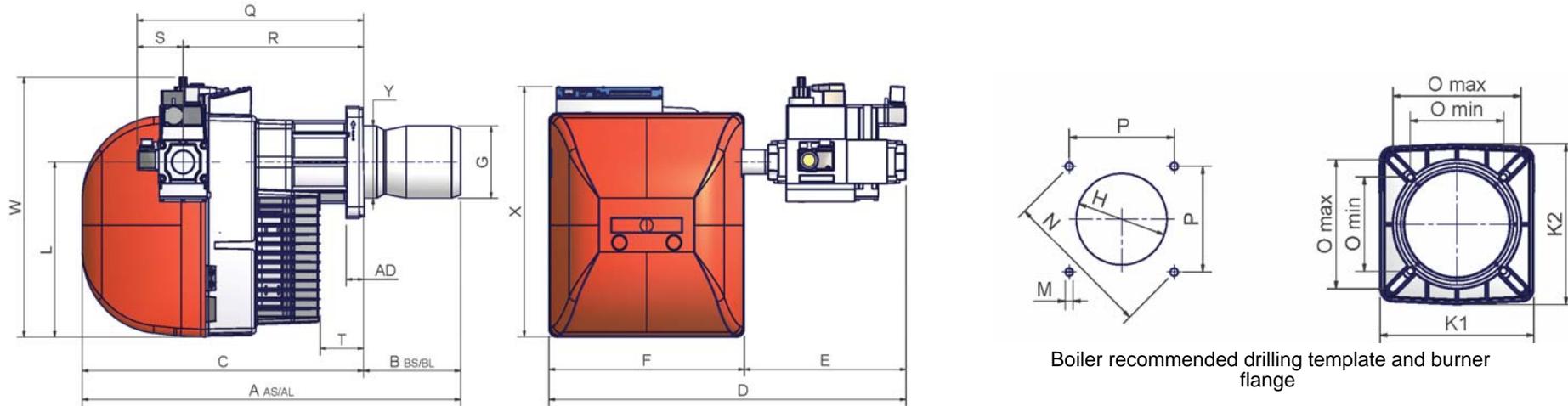


**NGX400**



## Overall dimensions (mm)

- Standard burners



Boiler recommended drilling template and burner flange

	DN	A(S*)	A(L*)	B(S*)	B(L*)	C	D ±5mm	E ±5mm	F	G	H	Y	K1	K2	L	M	N	Omin	Omax	P	Q	R	S	T	W	X
NG280 M-..PR..Ex	0.25 (1")	733	878	163	308	570	596	200	396	113	164	108	215	223	348	M10	219	131	179	155	459	366	93	128	508	491
NG280 M-..PR..Ex	0.32 (1"1/4)	733	878	163	308	570	596	200	396	113	164	108	215	223	348	M10	219	131	179	155	459	366	93	128	508	491
NG280 M-..PR..Ex	0.40 (1"1/2)	733	878	163	308	570	726	330	396	113	164	108	215	223	348	M10	219	131	179	155	459	366	93	128	517	491
NG280 M-..PR..Ex	0.50 (2")	733	878	163	308	570	726	330	396	113	164	108	215	223	348	M10	219	131	179	155	459	366	93	128	567	491
NG280 M-..MD..Ex	0.25 (1")	733	878	163	308	570	668	200	468	113	164	108	215	223	348	M10	219	131	179	155	459	366	93	128	508	491
NG280 M-..MD..Ex	0.32 (1"1/4)	733	878	163	308	570	668	200	468	113	164	108	215	223	348	M10	219	131	179	155	459	366	93	128	508	491
NG280 M-..MD..Ex	0.40 (1"1/2)	733	878	163	308	570	798	330	468	113	164	108	215	223	348	M10	219	131	179	155	459	366	93	128	517	491
NG280 M-..MD..Ex	0.50 (2")	733	878	163	308	570	798	330	468	113	164	108	215	223	348	M10	219	131	179	155	459	366	93	128	567	491

	DN	A(S*)	A(L*)	B(S*)	B(L*)	C	D ±5mm	E ±5mm	F	G	H	Y	K1	K2	L	M	N	Omin	Omax	P	Q	R	S	T	W	X
NG350 M-..PR..Ex	0.25 (1")	748	878	178	308	570	596	200	396	125	164	144	215	223	348	M10	219	131	179	155	459	366	93	128	508	491
NG350 M-..PR..Ex	0.32 (1"1/4)	748	878	178	308	570	596	200	396	125	164	144	215	223	348	M10	219	131	179	155	459	366	93	128	508	491
NG350 M-..PR..Ex	0.40 (1"1/2)	748	878	178	308	570	726	330	396	125	164	144	215	223	348	M10	219	131	179	155	459	366	93	128	517	491
NG350 M-..PR..Ex	0.50 (2")	748	878	178	308	570	726	330	396	125	164	144	215	223	348	M10	219	131	179	155	459	366	93	128	567	491
NG350 M-..MD..Ex	0.25 (1")	748	878	178	308	570	668	200	468	125	164	144	215	223	348	M10	219	131	179	155	459	366	93	128	508	491
NG350 M-..MD..Ex	0.32 (1"1/4)	748	878	178	308	570	668	200	468	125	164	144	215	223	348	M10	219	131	179	155	459	366	93	128	508	491
NG350 M-..MD..Ex	0.40 (1"1/2)	748	878	178	308	570	798	330	468	125	164	144	215	223	348	M10	219	131	179	155	459	366	93	128	517	491
NG350 M-..MD..Ex	0.50 (2")	748	878	178	308	570	798	330	468	125	164	144	215	223	348	M10	219	131	179	155	459	366	93	128	567	491

When PGMAX (maximum pressure switch) is supplied, add 60mm to "D" and "E"

	DN	A(S*)	A(L*)	B(S*)	B(L*)	C	D	±5mm	E	±5mm	F	G	H	Y	K1	K2	L	M	N	Omin	Omax	P	Q	R	S	T	W	X
NG400 M-..PR..Ex	0.25 (1")	768	898	198	328	570	596	200	396	144	164	144	215	223	348	M10	219	131	179	155	459	366	93	89	508	496		
NG400 M-..PR..Ex	0.32 (1"1/4)	768	898	198	328	570	596	200	396	144	164	144	215	223	348	M10	219	131	179	155	459	366	93	89	508	496		
NG400 M-..PR..Ex	0.40 (1"1/2)	768	898	198	328	570	726	330	396	144	164	144	215	223	348	M10	219	131	179	155	459	366	93	89	517	496		
NG400 M-..PR..Ex	0.50 (2")	768	898	198	328	570	726	330	396	144	164	144	215	223	348	M10	219	131	179	155	459	366	93	89	567	496		
NG400 M-..MD..Ex	0.25 (1")	768	898	198	328	570	668	200	468	144	164	144	215	223	348	M10	219	131	179	155	459	366	93	89	508	496		
NG400 M-..MD..Ex	0.32 (1"1/4)	768	898	198	328	570	668	200	468	144	164	144	215	223	348	M10	219	131	179	155	459	366	93	89	508	496		
NG400 M-..MD..Ex	0.40 (1"1/2)	768	898	198	328	570	798	330	468	144	164	144	215	223	348	M10	219	131	179	155	459	366	93	89	517	496		
NG400 M-..MD..Ex	0.50 (2")	768	898	198	328	570	798	330	468	144	164	144	215	223	348	M10	219	131	179	155	459	366	93	89	567	496		

	DN	A(S*)	A(L*)	B(S*)	B(L*)	C	D	±5mm	E	±5mm	F	G	H	Y	K1	K2	L	M	N	Omin	Omax	P	Q	R	S	T	W	X
NGX280 M-..PR..Ex	0.25 (1")	733	878	163	308	570	596	200	396	117	137	108	215	223	348	M10	219	131	179	155	459	366	93	128	508	491		
NGX280 M-..PR..Ex	0.32 (1"1/4)	733	878	163	308	570	596	200	396	117	137	108	215	223	348	M10	219	131	179	155	459	366	93	128	508	491		
NGX280 M-..PR..Ex	0.40 (1"1/2)	733	878	163	308	570	726	330	396	117	137	108	215	223	348	M10	219	131	179	155	459	366	93	128	517	491		
NGX280 M-..PR..Ex	0.50 (2")	733	878	163	308	570	726	330	396	117	137	108	215	223	348	M10	219	131	179	155	459	366	93	128	567	491		
NGX280 M-..MD..Ex	0.25 (1")	733	878	163	308	570	668	200	468	117	137	108	215	223	348	M10	219	131	179	155	459	366	93	128	508	491		
NGX280 M-..MD..Ex	0.32 (1"1/4)	733	878	163	308	570	668	200	468	117	137	108	215	223	348	M10	219	131	179	155	459	366	93	128	508	491		
NGX280 M-..MD..Ex	0.40 (1"1/2)	733	878	163	308	570	798	330	468	117	137	108	215	223	348	M10	219	131	179	155	459	366	93	128	517	491		
NGX280 M-..MD..Ex	0.50 (2")	733	878	163	308	570	798	330	468	117	137	108	215	223	348	M10	219	131	179	155	459	366	93	128	567	491		

	DN	A(S*)	A(L*)	B(S*)	B(L*)	C	D	±5mm	E	±5mm	F	G	H	Y	K1	K2	L	M	N	Omin	Omax	P	Q	R	S	T	W	X
NGX350 M-..PR..Ex	0.25 (1")	748	878	178	308	570	596	200	396	131	164	144	215	223	348	M10	219	131	179	155	459	366	93	89	508	491		
NGX350 M-..PR..Ex	0.32 (1"1/4)	748	878	178	308	570	596	200	396	131	164	144	215	223	348	M10	219	131	179	155	459	366	93	89	508	491		
NGX350 M-..PR..Ex	0.40 (1"1/2)	748	878	178	308	570	726	330	396	131	164	144	215	223	348	M10	219	131	179	155	459	366	93	89	517	491		
NGX350 M-..PR..Ex	0.50 (2")	748	878	178	308	570	726	330	396	131	164	144	215	223	348	M10	219	131	179	155	459	366	93	89	567	491		
NGX350 M-..MD..Ex	0.25 (1")	748	878	178	308	570	668	200	468	131	164	144	215	223	348	M10	219	131	179	155	459	366	93	89	508	491		
NGX350 M-..MD..Ex	0.32 (1"1/4)	748	878	178	308	570	668	200	468	131	164	144	215	223	348	M10	219	131	179	155	459	366	93	89	508	491		
NGX350 M-..MD..Ex	0.40 (1"1/2)	748	878	178	308	570	798	330	468	131	164	144	215	223	348	M10	219	131	179	155	459	366	93	89	517	491		
NGX350 M-..MD..Ex	0.50 (2")	748	878	178	308	570	798	330	468	131	164	144	215	223	348	M10	219	131	179	155	459	366	93	89	567	491		

	DN	A(S*)	A(L*)	B(S*)	B(L*)	C	D	±5mm	E	±5mm	F	G	H	Y	K1	K2	L	M	N	Omin	Omax	P	Q	R	S	T	W	X
NGX400 M-..PR..Ex	0.25 (1")	768	898	198	328	570	596	200	396	156	176	156	215	223	348	M10	219	131	179	155	459	366	93	89	508	496		
NGX400 M-..PR..Ex	0.32 (1"1/4)	768	898	198	328	570	596	200	396	156	176	156	215	223	348	M10	219	131	179	155	459	366	93	89	508	496		
NGX400 M-..PR..Ex	0.40 (1"1/2)	768	898	198	328	570	726	330	396	156	176	156	215	223	348	M10	219	131	179	155	459	366	93	89	517	496		
NGX400 M-..PR..Ex	0.50 (2")	768	898	198	328	570	726	330	396	156	176	156	215	223	348	M10	219	131	179	155	459	366	93	89	567	496		
NGX400 M-..MD..Ex	0.25 (1")	768	898	198	328	570	668	200	468	156	176	156	215	223	348	M10	219	131	179	155	459	366	93	89	508	496		
NGX400 M-..MD..Ex	0.32 (1"1/4)	768	898	198	328	570	668	200	468	156	176	156	215	223	348	M10	219	131	179	155	459	366	93	89	508	496		
NGX400 M-..MD..Ex	0.40 (1"1/2)	768	898	198	328	570	798	330	468	156	176	156	215	223	348	M10	219	131	179	155	459	366	93	89	517	496		
NGX400 M-..MD..Ex	0.50 (2")	768	898	198	328	570	798	330	468	156	176	156	215	223	348	M10	219	131	179	155	459	366	93	89	567	496		

\* S = standard blast tube

L = long blast tube

**When PGMAX (maximum pressure switch) is supplied, add 60mm to "D" and "E"**

## MOUNTINGS AND CONNECTIONS

### Packing

The burners are despatched in cardboard packages whose dimensions are: 795mm x 490mm x 550mm (L x P x H)

Packing cases of this type are affected by humidity; the maximum number of cases to be stacked is indicated outside the packing.

The following are placed in each packing case.

- Burner with gas train;
- gasket to be inserted between the burner and the boiler;
- envelope containing tis manual

When disposing of the burner packing and if the packing is scrapped follow the procedures laid down in the current legislation regarding the disposal of materials.

### Fitting the burner to the boiler

To perform the installation, proceed as follows:

- 1 place the 4 stud bolts on the hole of the boiler's door, according to the burner's drilling plate described on paragraph "Overall dimensions";
- 2 place the gasket on the burner's flange;
- 3 install the burner into the boiler;
- 4 fix the burner to the stud bolts, by means of the fixing nuts, according to Fig. 6.
- 5 After fitting the burner to the boiler, ensure that the gap between the blast tube and the refractory lining is sealed with appropriate insulating material (ceramic fibre cord or refractory cement).

#### Key

- 1 Burner
- 2 Fixing nut
- 3 Washer
- 4 Sealing gasket
- 5 Stud bolt
- 7 Blast tube

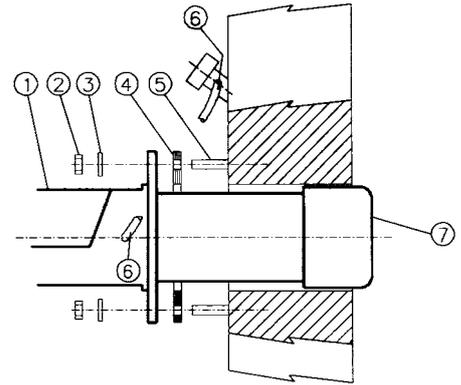


Fig. 6

### Matching the burner to the boiler

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

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

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

#### Key

- a) Heat output in kW
- b) Length of the flame tube in meters
- c) Flame tube firing intensity in MW/m<sup>3</sup>
- d) Combustion chamber diameter (m)

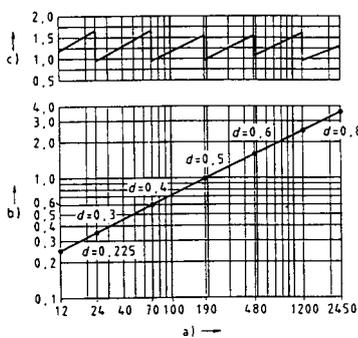


Fig. 7

Fig. 7 - Firing intensity, diameter and length of the test flame tube as a function of the heat input in kW.

## How to modify the blast tube length (NG/LG350-NG/LG400)

To modify blast tube length please read the following instructions.

- 1 Remove combustion head (See "Removing the combustion head" - Part III of this user's guide).
- 2 Remove the flanged piece **T** by removing the 4 socket head screws **VTF** (Fig. 8).
- 3 Remove the 4 screws which hold the blast tube to the flanged piece (Fig. 9).
- 4 Extract the blast tube from the flanged piece and assemble it in the other way round as shown in pictures Fig. 10 and Fig. 11. Now fasten the two pieces using the same screws.
- 5 Assemble the whole piece to the burner by caring attention to the indication in picture Fig. 13.

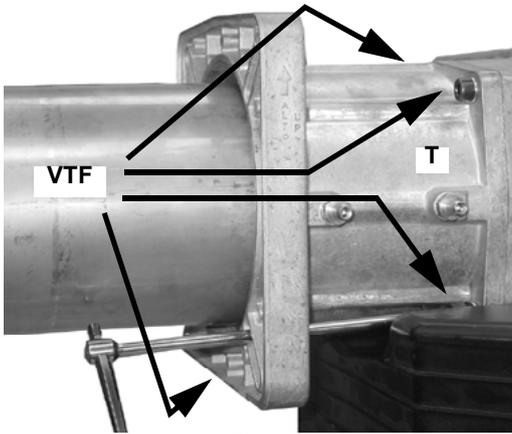


Fig. 8

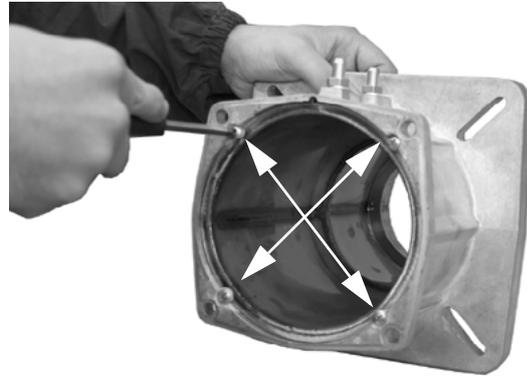


Fig. 9

Fig. 10 - Short blast tube

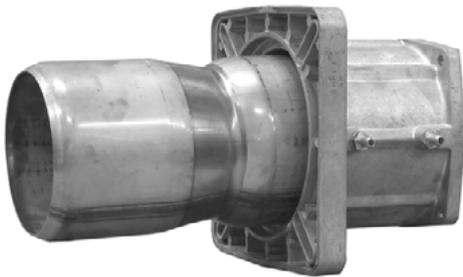


Fig. 11 - Long blast tube



Fig. 12

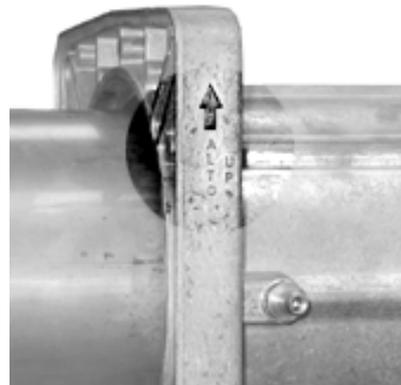


Fig. 13

If you modify the blast tube length you have to modify also the combustion head length by reading the following instructions.

- 1 Remove the screws **V1** and **V2** as shown in Fig. 14.
- 2 Lower the terminal part of the combustion head, by moving it with a slight circular movement, until the holes will match (Fig. 15) and tight the screw shown in Fig. 16.
- 3 Adjust cables length by pulling them very slightly paying particular attention not to disconnect the ionisation cable to the electrode.
- 4 Fix the combustion head again (See "Removing the combustion head").

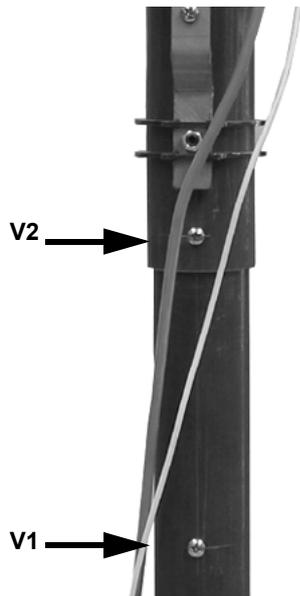


Fig. 14

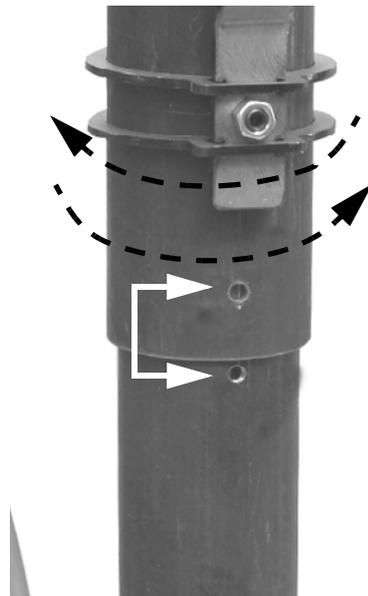


Fig. 15

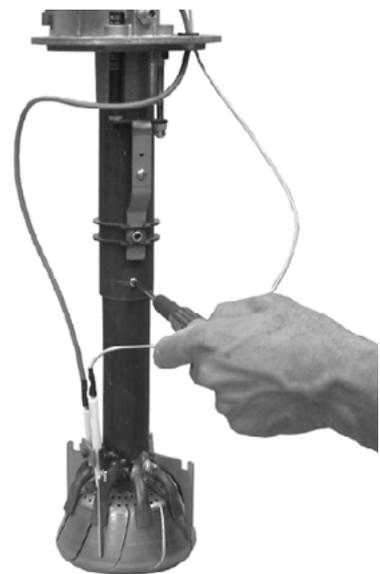


Fig. 16

### Gas Train Reversal

The gas train can be fit either on the left and on the right. Follow these instruction..

- 1 Remove the plastic hook **G** to release the rod **T** (Fig. 17) .
- 2 Take the screws **V1**, **V2**, **V3**, **V4**, **VT1** and **VT2** off (Fig. 17).
- 3 Take the ignition cable **CA** off of the transformer .
- 4 Disconnect the connector **CR** from the printed circuit (Fig. 18).
- 5 Take off the flange and the combustion head together (Fig. 20).
- 6 Take the gas pipe **TR** off and put it in the new position fixing the screws **VT1** and **VT2** (Fig. 19).

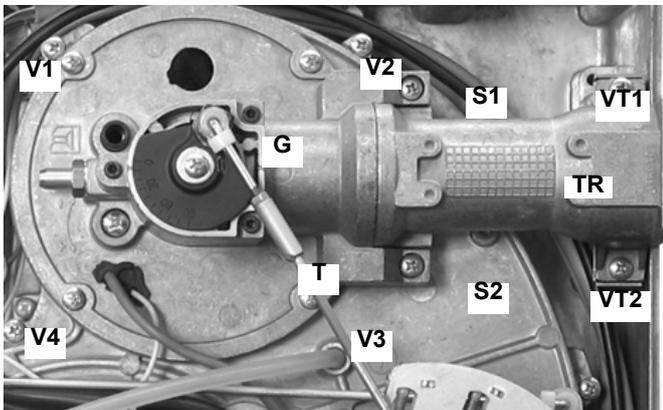


Fig. 17

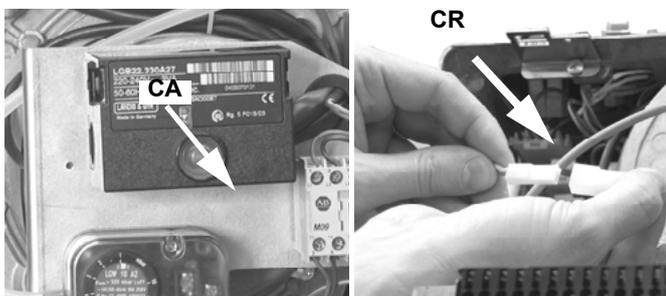
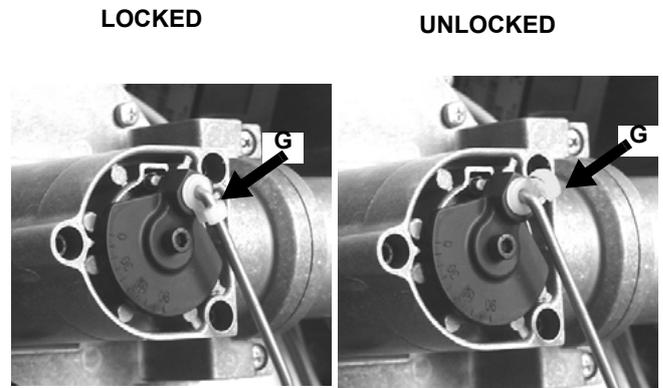


Fig. 18

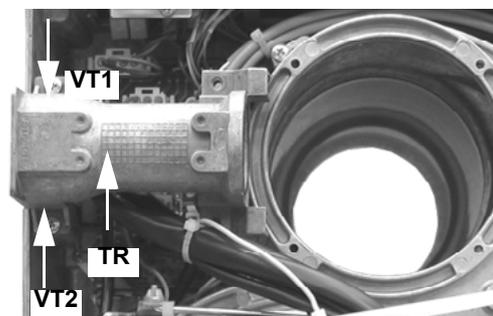


Fig. 19

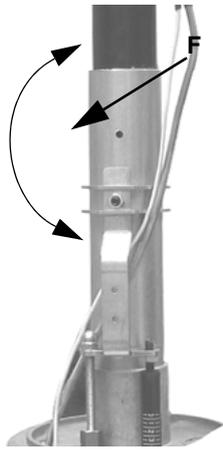


Fig. 20

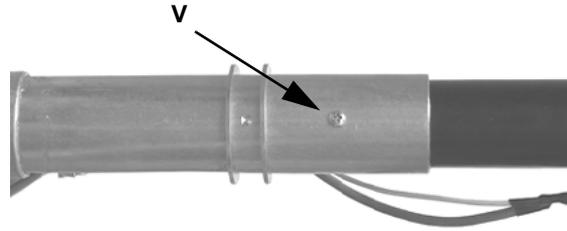


Fig. 21

- 7 Unscrew the **V**, rotate the head of 180 ° along its axis as shown in Fig. 20), until the hole **F** is found. Fit the screw again (Fig. 20 - Fig. 21).
- 8 Insert again the flange and the combustion head together
- 9 Rotate the disc **D** following the instructions below.
- 10 Take off the screw **VF**.
- 11 Rotate the disc **D** for 180 ° and then fit the screw **VF** (Fig. 22).

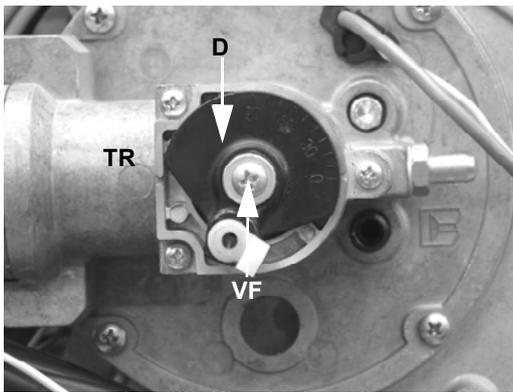


Fig. 22: Standard position

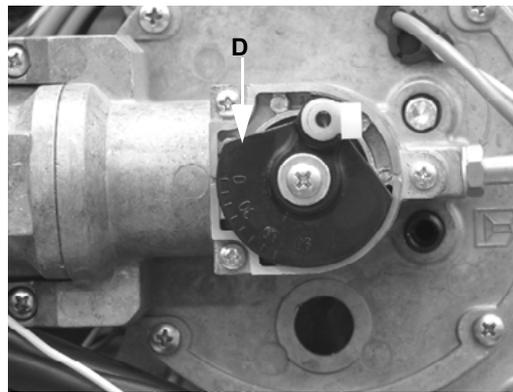


Fig. 23: New position

- 12 Reconnect **CR** and **CA**.
- 13 Retighten the screws **V1**, **V2**, **V3**, **V4**, **VT1** e **VT2**.
- 14 Place again the rod **T** into its own position and fasten it by the plastic hook **G**.

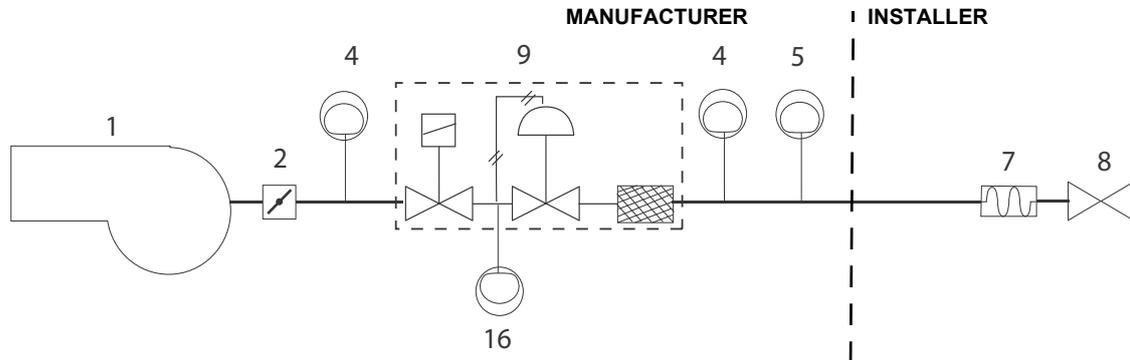
## GAS TRAIN CONNECTIONS

This paragraph shows the gas train components which are included in the delivery and those which must be fitted by the customer. The diagram complies with regulations in force



**ATTENTION:** BEFORE EXECUTING THE CONNECTIONS TO THE GAS PIPE NETWORK, BE SURE THAT THE MANUAL CUTOFF VALVES ARE CLOSED. READ CAREFULLY THE "WARNINGS" CHAPTER AT THE BEGINNING OF THIS MANUAL.

Gas train with valves group MB-DLE (2 valves + gas filter + pressure governor) + VPS504 gas proving system



### Key

- 1 Burner
- 2 Butterfly valve
- 4 High gas pressure switch (option\*)
- 5 Low gas pressure switch
- 7 Bellows unit
- 8 Manual cutoff valve
- 9 Dungs MB-DLE valves group
- 16 Gas leakage pressure switch

\* Note: the maximum gas pressure switch can be mounted either upstream or downstream the gas valve but upstream the butterfly gas valve (see item no.4 in the scheme above).

To mount the gas train, proceed as follows:

- 1) in case of threaded joints: use proper seals according to the gas used;
- 2) fasten all the items by means of screws, according to the next diagrams, observing the mounting direction for each item.

**NOTE:** the bellow joint, the manual cock and the gaskets are not part of the standard supply.

The procedures of installation for the gas valves are showed in the next paragraph.



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



**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).

## MULTIBLOC DUNGS MB-DLE 405..412

### Mounting

1. Mount flange onto tube lines: use appropriate sealing agent (see Fig. 30);
2. insert MB-DLE: note position of O rings (see Fig. 30);
3. tighten screws A, B, C and D (Fig. 28 - Fig. 29), according to the mounting positions (Fig. 31);
4. after installation, perform leakage and functional test;
5. disassembly in reverse order.

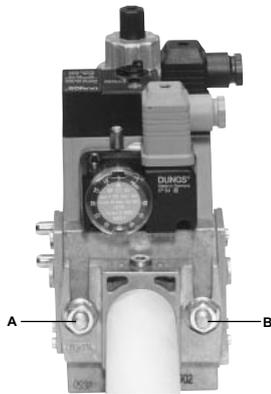


Fig. 24

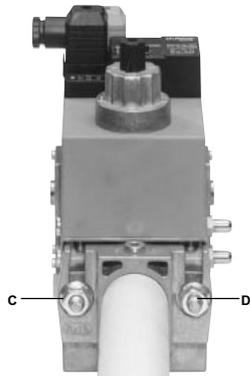


Fig. 25

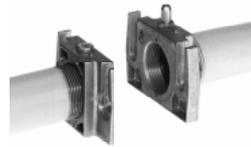


Fig. 26

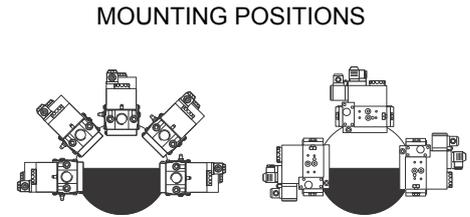


Fig. 27

## MULTIBLOC DUNGS MB-DLE 415..420

### Mounting

1. Loosen screws A and B **do not** unscrew (Fig. 28 - Fig. 29).
2. unscrew screws C and D (Fig. 28 - Fig. 29).
3. Remove MultiBloc between the threaded flanges (Fig. 29).
4. After mounting, perform leakage and functional tests.

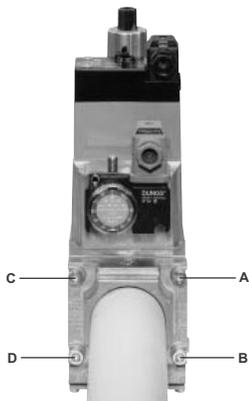


Fig. 28

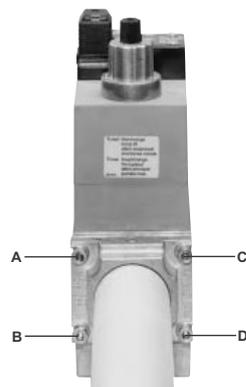


Fig. 29

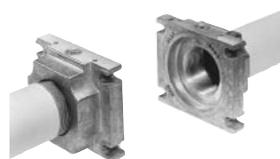


Fig. 30

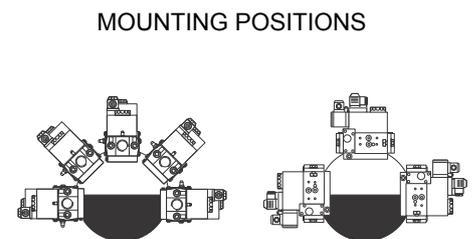


Fig. 31

Once the train is installed, connect the gas valves group plug.

## ELECTRICAL CONNECTIONS



RESPECT THE BASIC SAFETY RULES. MAKE SURE OF THE CONNECTION TO THE EARTHING SYSTEM. DO NOT REVERSE THE PHASE AND NEUTRAL CONNECTIONS. FIT A DIFFERENTIAL THERMAL MAGNET SWITCH ADEQUATE FOR CONNECTION TO THE MAINS.



**ATTENTION:** 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.



**WARNING:** if the cable that connects the thermostats and the control box should be longer than 3 meters, insert a sectioning relay following the attached electrical wiring diagram.

To execute the electrical connections, proceed as follows:

- 1 find the plug or the plugs, according to the model, that comes out from the burner:
  - 7 pins plug for the power supply (for all models);
  - 4 pins plug;
  - 3-pins plug (only for NG/NGX400);
- 2 execute the electrical connections to the plugs, according to the burner model (see next paragraph);
- 3 once all the connections are accomplished, check the fan motor direction (see next paragraphs);
- 4 now the burner is ready to start up.

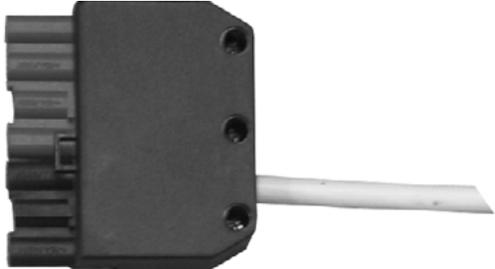
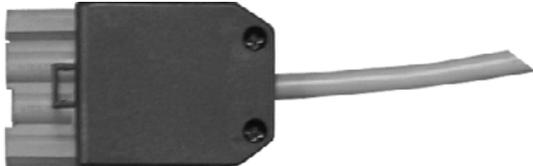


The burner is fitted with a bridge between terminals T6 and T8 on the 4-poles plug-TAB (external side link, male connector); if the TAB high/low flame thermostat must be connected, remove the bridge between terminals, before connecting the thermostat.



**IMPORTANT:** before operating the burner, be sure all connectors are linked as shown in the diagrams.

### Connectors identification

<p><b>Burner power supply connector</b> (Fig. 35 - Fig. 37 - Fig. 39) <b>Probe connection connector</b> (fully modulating burners, Fig. 41)</p>	 <p style="text-align: right;">Fig. 32</p>
<p><b>HIGH/LOW flame connector</b>(Fig. 37)</p>	 <p style="text-align: right;">Fig. 33</p>
<p><b>Fan motor connector (NG/NGX400 only)</b> (Fig. 36 - Fig. 38 - Fig. 40)</p>	 <p style="text-align: right;">Fig. 34</p>

## Connectors wiring diagrams

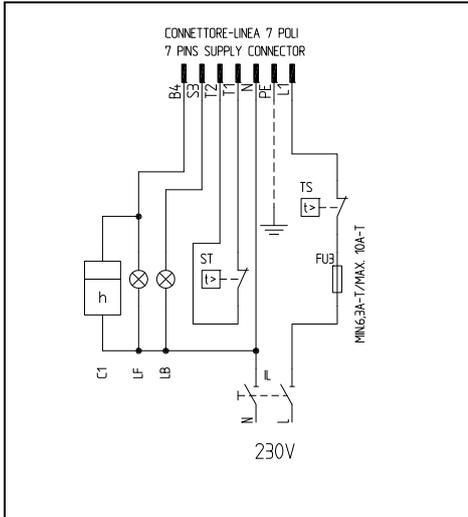


Fig. 35 - 7-pins connector

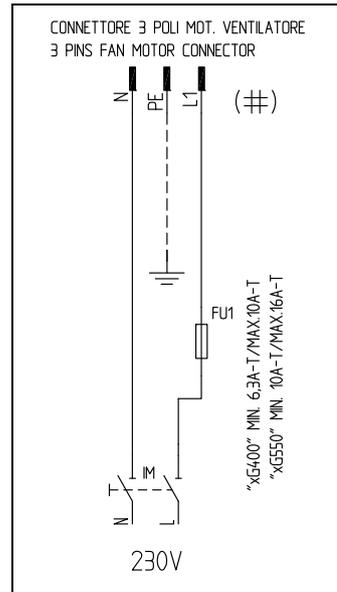


Fig. 36 - Electric motor's 3-pins connector  
NG/LG/NGX400

### ● Progressive burners' connectors:

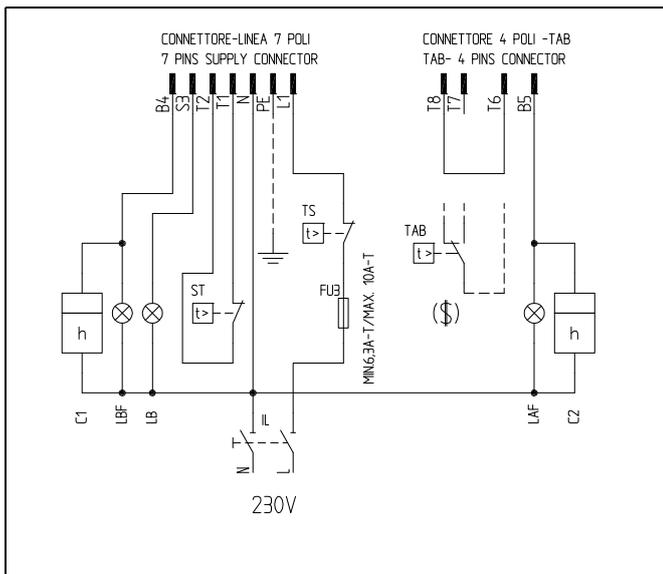


Fig. 37 - 7-pin and 4-pin connectors

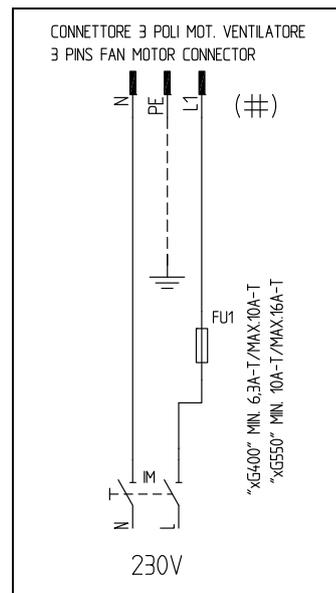


Fig. 38 Electric motor's 3-pin connector for  
NG/LG/NGX400

### Key

C1	LOW FLAME TIME METER
C2	HIGH FLAME TIME METER
FU1	FAN MOTOR LINE FUSE
FU3	LINE FUSE
IL	BURNER LINE SWITCH
IM	FAN MOTOR LINE SWITCH
KM1	FAN MOTOR CONTACTOR
LAF	BURNER IN HIGH FLAME INDICATOR LIGHT
LB	INDICATOR LIGHT FOR BURNER LOCK-OUT

LBF	BURNER IN LOW FLAME SIGNALLING LAMP
MV	FAN MOTOR
ST	THERMOSTATS O PRESSURE SWITCHES SERIE
TAB	HIGH LOW FLAME THERMOSTAT/PRESSURE SWITCH
TS	SAFETY THERMOSTAT/PRESSURE SWITCH
CONN-MOTORE	FAN MOTOR CONNECTOR
CONN-LINEA	BURNER POWER SUPPLY CONNNECTOR
CONN-TAB	HIGH-LOW FLAME CONNECTOR
(\$)	IF "TAB" USED REMOVE THE BRIDGE BETWEEN TERMINALS T6-T8

● Fully-modulating burners' connectors:

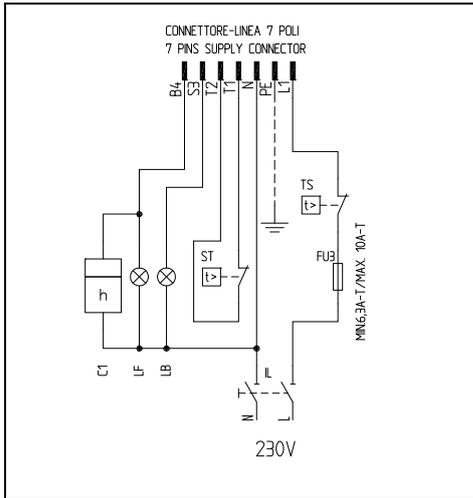


Fig. 39 - 7-pin connector

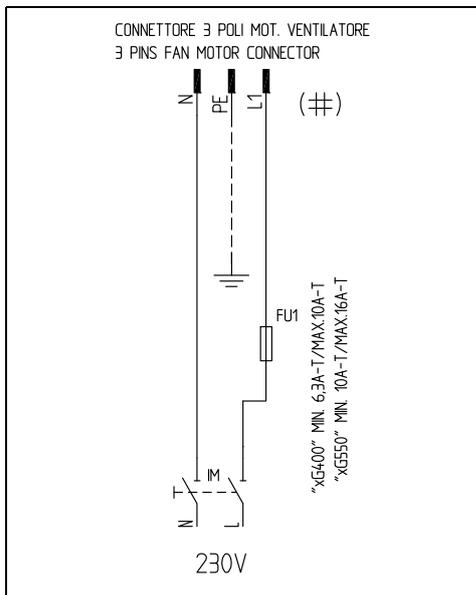


Fig. 40 - Electric motor's 3-pin connector for NG/LG/NGXG400

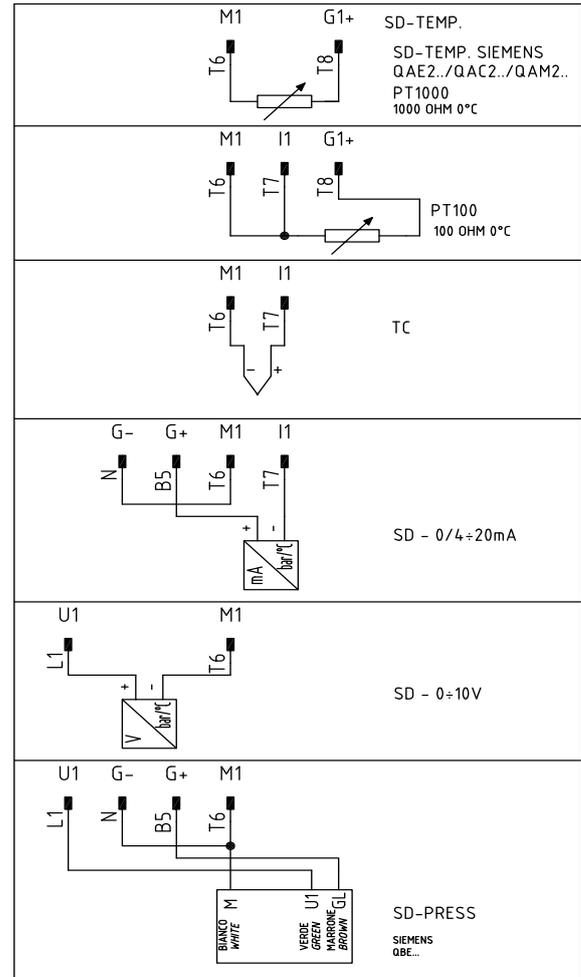


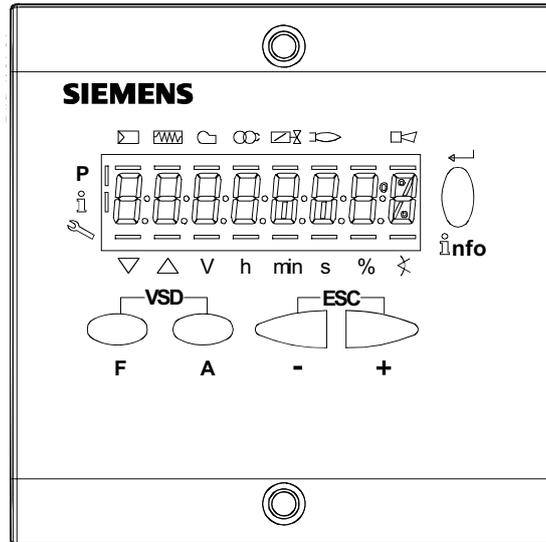
Fig. 41 - Probes connection

- |              |                            |             |  |
|--------------|----------------------------|-------------|--|
| <b>Key</b>   |                            | LB          | BURNER LOCKOUT SIGNALLING LAMP         |
| C1           | LOW FLAME TIME METER       | LBF         | BURNER IN LOW FLAME SIGNALLING LAMP    |
| FU1          | LINE FUSE FOR FAN MOTOR    | MV          | FAN MOTOR                              |
| FU3          | LINE FUSE                  | SD-0÷10V    | VOLTAGE SIGNAL                         |
| FU4          | AUXILIARY FUSE             | SD-0/4÷20mA | CURRENT SIGNAL                         |
| IL           | BURNER LINE SWITCH         | SD-PRESS    | PRESSURE PROBE                         |
| IM           | FAN MOTOR LINE SWITCH      | SMA         | MAN/AUTO SELECTOR                      |
| KM1          | FAN MOTOR REMOTE CONTACTOR | SMF         | OPERATION SELECTOR MIN-0-MAX           |
| LANDIS RWF40 | MODULATION REGULATOR       | ST          | PRESSURE SWITCHES OR THERMOSTATS SERIE |
|              |                            | TS          | SAFETY THERMOSTAT/PRESSURE SWITCH      |

## User interface

The AZL2x.. display is shown below:

The keys functions are the following:



### Key F

Used to adjust the “fuel” actuator position (**Fuel**): :

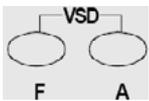
While pressing the **F** key, the “fuel” actuator position can be changed by means of the **+** and **-** keys.



### Key A

Used to adjust the “air” actuator position (**Air**):

While pressing the **A** key, the “air” actuator position can be changed by means of the **+** and **-** keys.



### Key F + A

While pressing the two keys contemporarily, the **code** message will appear: by entering the proper password it is possible to access the **Service** mode.



### Info and Enter keys

Used for **Info** and **Service** menus

Used as **Enter** key in the setting modes

Used as **Reset** key in the burner operation mode

Used to enter a lower level menu



### -Key -

Used to decrease a a value

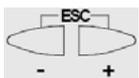
Used to enter Info and Service during the curve adjustments



### +Key +

Used to increase a a value

Used to enter Info and Service during the curve adjustments



### Keys (+ & -) = ESC

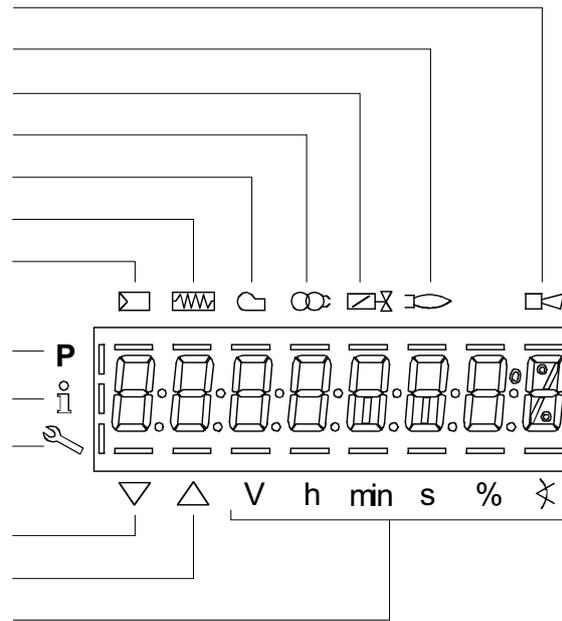
By pressing **+** and **-** at the same time, the **ESCAPE** function is performed:

to erase a entered value

to enter a lower level menu

The display will show these data:

- Lock+unlock codes
- Flame
- Open valves
- Ignition transformers energised
- Fan motor energised
- Oil pre-heater energised
- Plant heat request
- Parameter setting mode
- Info mode
- Service mode
- Closing actuator
- Opening actuator
- Unit measure



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)
- Manufacturer level (OEM)

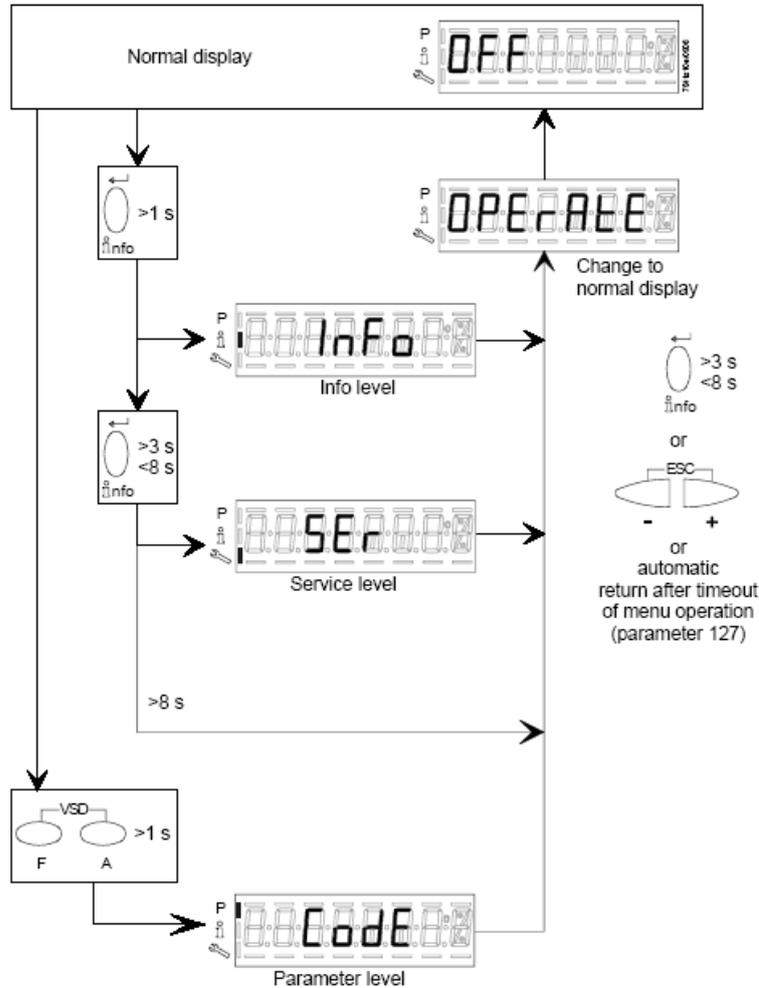
## PHASES LIST

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

Phase	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 intercettazione 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= 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 = intervallo2	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, preparing 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	t80 = 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	t80 = tempo perdita pressione gas, test pressione	t83 = leakage test time gas pressure, pressure 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:

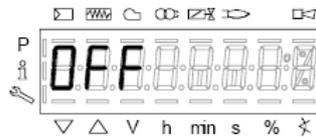


The burner and consequently the LMV2x.. are factory set; the air and fuel curves as set as well.

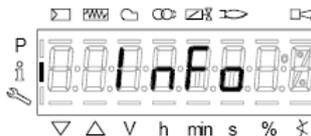
### Info level

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

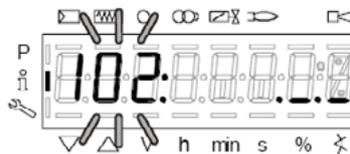


- 3 then it will show the first code (167) flashing, on the right side it will show the data entered. By pressing + or - it is possible to scroll (up or down) the parameter list.
- 4 If a dot-line is shown on the right, there is no enough room for complete visualisation: press **enter** again the data 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:

Parameter	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)
107	Software version
102	Software date
103	Device serial number
104	Parameter set preassignment: Customer code
105	Parameter set preassignment: Version
143	Free

5 Example: choose parameter 102 to show the date



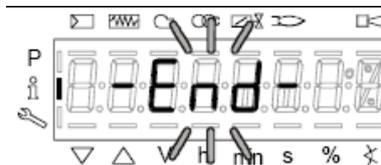
the display shows parameter **102** flashing on the left and characters **. \_ . \_** on the right.

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

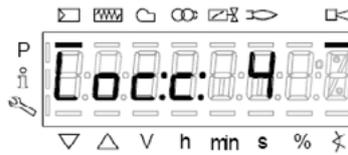
9 Once the last parameter is accessed (143) by pressing **+**, the **End** message will flash.



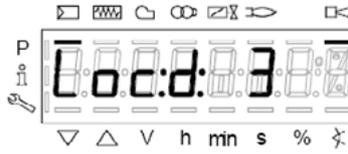
10 Press **InFo**  for more than three seconds or  for more than three seconds orto return to the normal display.



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



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

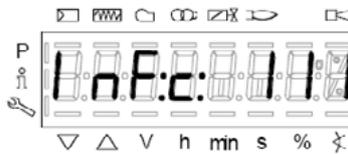


Diagnostic code (in the example “diagnostic code:3”). Record the codes and find out the fault in the Error table.  
To perform the reset, press InFo for one second:



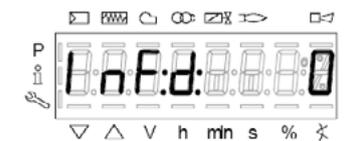
The unit displays an event which does not lead to shutdown.

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.

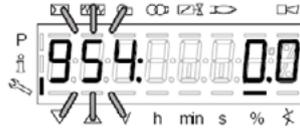
### **Service level**

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

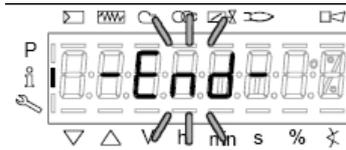


The service level shows all the information about flame intensity, actuators position, number and lock codes:

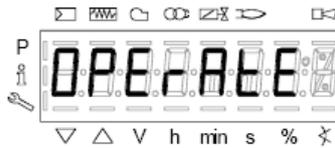
Parameter	Description
954	Flame intensity
121	% output, if set = automatic operation
922	Actuators position, 00=combustibile; 01= aria
161	Lock-outs number
701..725	Lock-outs History (see chapter 23 in the LMV2x manual)



- 1 the first parameter will be "954": the percentage of flame is shown on the right. By pressing + 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 Press **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.

## SETTING GAS AND AIR FLOW RATE



**ATTENTION:** before starting the burner up, be sure that the manual cutoff valves are open and check that the pressure upstream the gas train complies the value quoted on paragraph "Technical specifications". Be sure that the mains switch is closed.

**ATTENTION:** During commissioning operations, do not let the burner operate with insufficient air flow (danger of formation of carbon monoxide); if this should happen, make the gas decrease slowly until the normal combustion values are achieved.

**WARNING: NEVER LOOSE THE SEALED SCREWS! OTHERWISE, THE DEVICE WARRANTY WILL BE IMMEDIATELY INVALIDATE!**

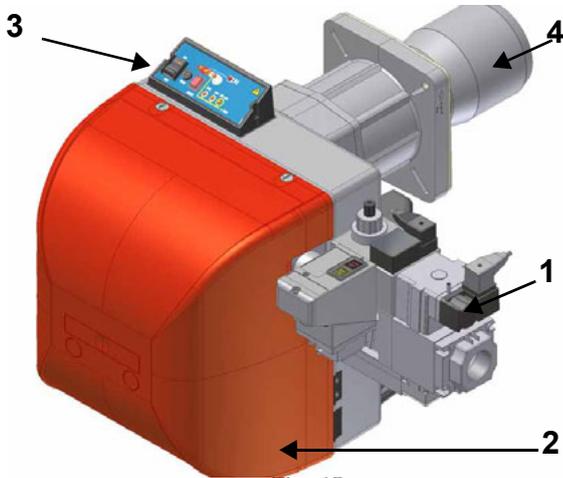


Fig. 42

### Keys

- 1 Valve group
- 2 Cover
- 3 Control panel
- 4 Blast tube

To perform the adjustments, unscrew the fixing screws and remove the burner's cover (see Fig. 42-2)

### Startup Output

The start-up heat output shall not exceed 120 kW (single stage burners) or 1/3 of nominal output (double-stage, progressive or fully modulating burners). In order to comply with these requirements, burners are provided with butterfly valve and/or slow-opening safety valve. On double-stage, progressive or modulating burners, the low flame output must be higher than the minimum output quoted in the performance curve (page 11).



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

Recommended combustion parameters		
Fuel	Recommended (%) CO <sub>2</sub>	Recommended (%) O <sub>2</sub>
Natural gas	9 ÷ 10	3 ÷ 4.8
LPG	11 ÷ 12	2.8 ÷ 4.3

### Adjustments - brief description

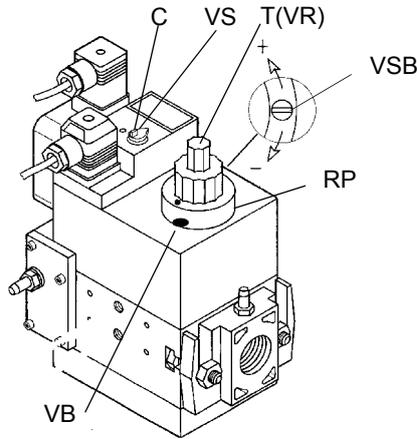
- Check that the combustion parameters are in the suggested limits.
- Check the flow rate measuring it on the counter or, if it was not possible, verifying the combustion head pressure by means of a differential pressure gauge, as described on par. "Measuring the gas pressure in the combustion head" on page 15.
- Then, adjust the combustion by setting the "air/gas ratio" curvepoints (see the LMV2x attached manual).
- Set, now, the low flame output, in order to avoid the low flame output increasing too much or that the flues temperature gets too low to cause condensation in the chimney.

### Adjusting procedure

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

**DUNGS MB-DLE gas valves group:** Before starting the burner up, adjust the valves group slow opening: to set the slow opening remove cover **T**, reverse it upside down and use it as a tool to rotate screw **VR**. Decrease the ignition flow rate by screwing, increase it by unscrewing. Do not use a screwdriver on the screw **VR**!

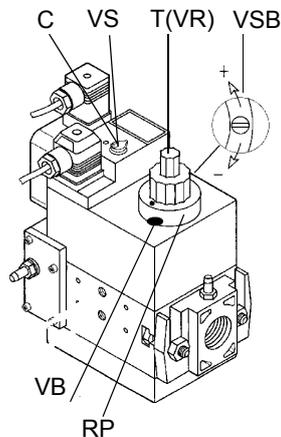
Note: the screw **VSB** must be removed only in case of replacement of the coil (see picture).



Go on adjusting air and gas flow rates: check, continuously, the flue gas analysis, as to avoid combustion with little air; dose the air according to the gas flow rate change following the steps quoted below;

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

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



**Dungs Multibloc MB-DLE**

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

Now adjust the pressure switches (see next par.).

## Adjusting the combustion head

The burner is adjusted in the factory with the combustion head in the position that refers to the "MAX" output. The maximum output setting refers to the "fully-ahead" position of the combustion head, as far as standard models (Fig. 44), and to "fully-backward" position for low NOx burners (Fig. 45). As for "fully-ahead" position, it means that the head is placed inside the boiler, "fully-backward" position means that the head is towards the operator. As far as the reduced output operation, progressively move the combustion head towards the "MIN" position, rotating clockwise the **VRT** screw (Fig. 43). The **ID** index shows how much the combustion head moved.

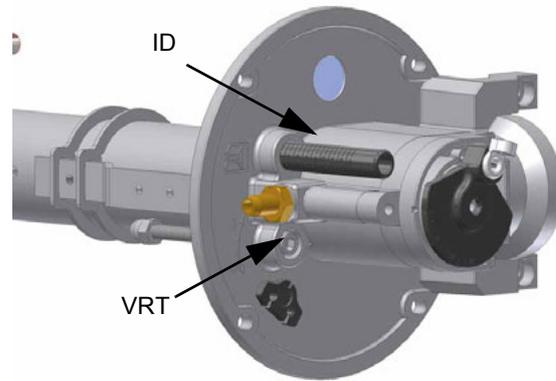


Fig. 43

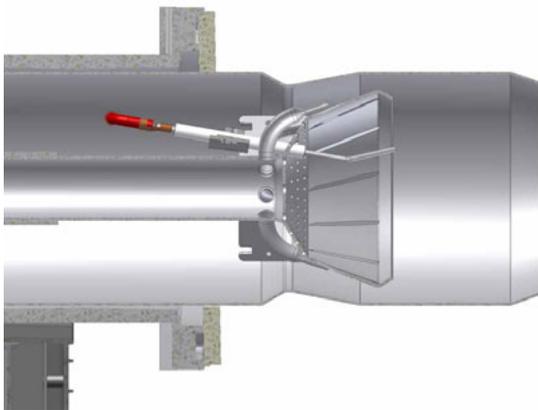


Fig. 44 - Head in "fully-ahead position"

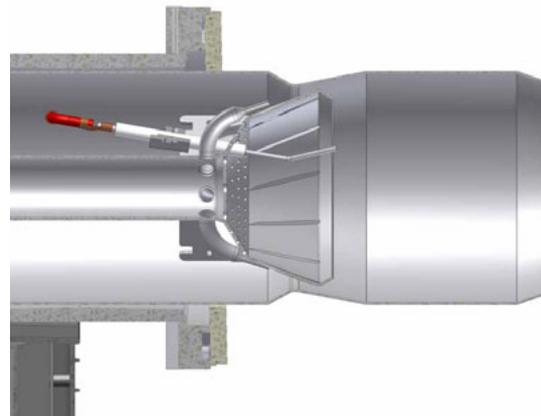


Fig. 45 - Head in "fully-backward position"

## Fully modulating burners

To adjust the fully-modulating burners, use the **CMF** switch on the burner control panel (see next picture), instead of the **TAB** thermostat as described on the previous paragraphs about the progressive burners. Go on adjusting the burner as described before, paying attention to use the **CMF** switch instead of **TAB**.

The **CMF** position sets the operating stages: to drive the burner to the high-flame stage, set **CMF=1**; to drive it to the low-flame stage, set **CMF=2**.

To move the adjusting cam set **CMF=1** or **2** and then **CMF=0**.

- CMF = 0 stop at the current position
- CMF = 1 high flame operation
- CMF = 2 low flame operation
- CMF = 3 automatic operation

As for the **RWF** setting, please refer to the related documentation.

---

### **Calibration of 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 gas setting have been accomplished, startup the burner.
- During the pre-purge phase of the operation, turn slowly the adjusting ring nut **VR** in the clockwise direction 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**

As for the gas pressure switch calibration, proceed as follows:

- Remove the transparent plastic cap.
- While the burner is operating at the maximum output, test the gas pressure on the low gas pressure switch port.
- Slowly close the manual shut-off valve (placed upstream the pressure switch, see gas train installation diagram), until the measured pressure is reduced by 50%. Pay attention that the CO value in the flue gas does not increase.
- Check that the burner is operating correctly.
- Screw down the pressure switch adjusting ring nut until the burner lockout.
- Fully open the manual shut-off valve.
- Refit the transparent plastic cover on the pressure switch.

### **Adjusting the maximum gas pressure switch (when provided)**

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

- 1 remove the pressure switch plastic cover;
- 2 if the maximum pressure switch is mounted upstream 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%.
- 3 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 paragraph. 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%;
- 4 replace the plastic cover.

### **PGCP Gas leakage pressure switch (with Siemens LDU burner control/Siemens LMV Burner Management System)**

- 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.

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 USER MUST GUARANTEE THE CORRECT FITTING OF THE APPLIANCE, ENTRUSTING THE INSTALLATION OF IT TO QUALIFIED PERSONNEL AND HAVING THE FIRST COMMISSIONING OF IT CARRIED OUT BY A SERVICE CENTRE AUTHORIZED BY THE COMPANY MANUFACTURING THE BURNER.

A FUNDAMENTAL FACTOR IN THIS RESPECT IS THE ELECTRICAL CONNECTION TO THE GENERATOR'S CONTROL AND SAFETY UNITS (CONTROL THERMOSTAT, SAFETY, ETC.) WHICH GUARANTEES CORRECT AND SAFE FUNCTIONING OF THE BURNER.

THEREFORE, ANY OPERATION OF THE APPLIANCE MUST BE PREVENTED WHICH DEPARTS FROM THE INSTALLATION OPERATIONS OR WHICH HAPPENS AFTER TOTAL OR PARTIAL TAMPERING WITH THESE (E.G. DISCONNECTION, EVEN PARTIAL, OF THE ELECTRICAL LEADS, OPENING THE GENERATOR DOOR, DISMANTLING OF PART OF THE BURNER).

NEVER OPEN OR DISMANTLE ANY COMPONENT OF THE MACHINE.

OPERATE ONLY THE MAIN SWITCH, WHICH THROUGH ITS EASY ACCESSIBILITY AND RAPIDITY OF OPERATION ALSO FUNCTIONS AS AN EMERGENCY SWITCH, AND ON THE RESET BUTTON.

IN CASE OF A BURNER SHUT-DOWN, RESET 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.

WARNING: DURING NORMAL OPERATION THE PARTS OF THE BURNER NEAREST TO THE GENERATOR (COUPLING FLANGE) CAN BECOME VERY HOT, AVOID TOUCHING THEM SO AS NOT TO GET BURNT.

OPERATION

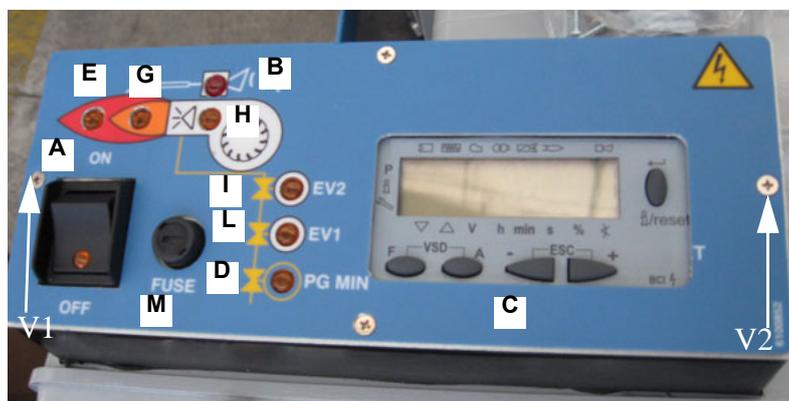


Fig. 46 - Burner's control panel



Fig. 47 - Burner modulator

Key - Fig. 46

- A Mains switch ON - OFF
- B Lockout signaling lamp
- C AZL user interface
- D Minimum gas pressure switch consent signaling lamp
- E High flame operation signaling lamp (or air damper opening during pre-purge stage)
- G Low flame operation signaling lamp
- H Ignition transformer in operation signaling light
- I EV2 opening signaling lamp
- L EV1 opening signaling lamp
- M Fuse

---

## OPERATION



ATTENTION: BEFORE STARTING THE BURNER UP, BE SURE THAT THE MANUAL CUTOFF VALVES ARE OPEN AND CHECK THAT THE PRESSURE VALUE UPSTREAM THE GAS TRAIN MATCHES THE VALUE ON PARAGRAPH "TECHNICAL SPECIFICATIONS"). CHECK THAT THE MAINS SWITCH IS CLOSED. CAREFULLY READ THE "WARNINGS" CHAPTER.

- Set to On the A main switch on the burner front panel.
- Check that the control box is not in lockout position (lamp B On), eventually unlock it by pressing the Enter/Info key on the AZL display (for further information on LMV2/AZL, please refer to the related manual).
- Check the thermostat/pressure switches series enables the burner to operate.
- Check that the gas pressure is sufficient (if not the display AZL2.. will show a warning message).
- At the beginning of startup cycle, the actuator drives the air damper to its maximum opening position, then the fan motor starts up: the pre-purging phase starts. During pre-purging, the air damper complete opening is signalled by the lamp F on the front panel.
- At the end of pre-purging, the air damper is driven to ignition position, the ignition transformer is energised (signalled by lamp H on the front panel) and, few seconds later, the EV1 and EV2 gas valves are open (lamp L and I on the front panel).

Few seconds later, after the gas valve opening, then the ignition transformer is de-energised (lamp H turns to off). The burner is now operating in low flame, later on the two-stage operation begins and the burner increases or decreases the output directly controlled by the external thermostat (in the progressive version) or by the output controller (P in the next picture, only for fully-modulating burners).

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.

	<b>WARNING: ALL OPERATIONS ON THE BURNER MUST BE CARRIED OUT WITH THE MAINS DISCONNECTED AND THE FUEL MANUAL CUTOFF VALVES CLOSED!</b>
	<b>ATTENTION: READ CAREFULLY THE “WARNINGS” CHAPTER AT THE BEGINNING OF THIS MANUAL.</b>

**ROUTINE MAINTENANCE**

- Clean and examining the gas filter cartridge, if necessary replace it (Fig. 48 on).
- Removal, examination and cleaning of the combustion head.
- Check the ignition and detection electrodes, clean and adjust if necessary (see Fig. 55). In case of doubt, check the detection current according to the schemes in Fig. 59.
- Cleaning and greasing of sliding and rotating parts.

**⚠ ATTENTION** 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.

**Removing the filter in the MULTIBLOC DUNGS MB-DLE 405..412**

- Check the filter at least once a year!
- Change the filter if the pressure difference between pressure connection 1 and 3 (Fig. 48-Fig. 49) is  $Dp > 10$  mbar.
- Change the filter if the pressure difference between pressure connection 1 and 3 (Fig. 48-Fig. 49) 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. 50.
- 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.
- 6 Pay attention that dirt does not fall inside the valve.

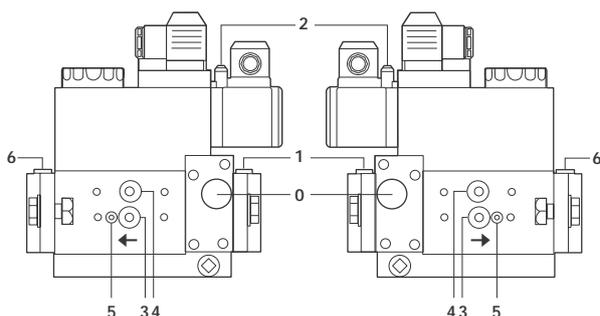


Fig. 48

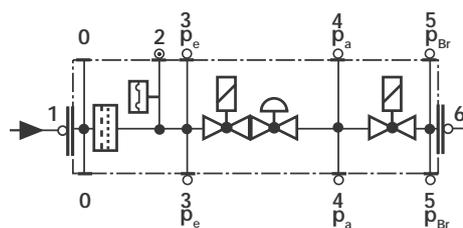


Fig. 49

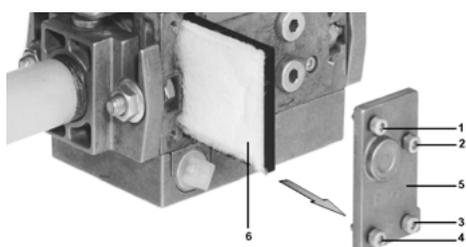


Fig. 50

## Removing the filter in the MULTIBLOC DUNGS MB-DLE 415 - 420 B01 1" 1/2 - 2"

- Check the filter at least once a year!
- Change the filter if the pressure difference between pressure connection 1 and 2 (Fig. 51-Fig. 52)  $Dp > 10$  mbar.
- Change the filter if the pressure difference between pressure connection 1 and 2 (Fig. 51-Fig. 52) 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 ÷ 6 (Fig. 53).
- 3 Change filter insert.
- 4 Re-insert filter housing, screw in screws 1 ÷ 6 without using any force and fasten.
- 5 Perform leakage and functional test,  $p_{max.} = 360$  mbar.
- 6 Pay attention that dirt does not fall inside the valve.

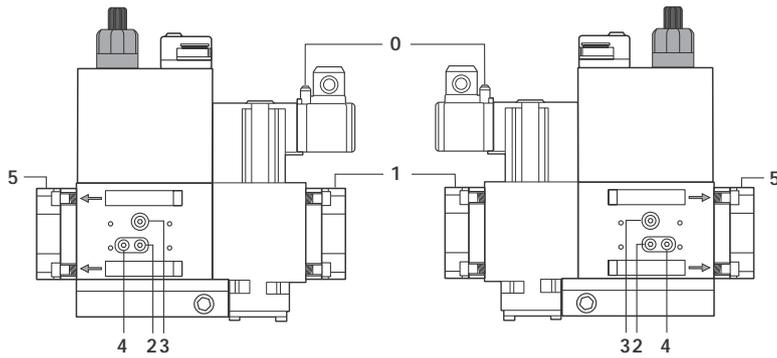


Fig. 51

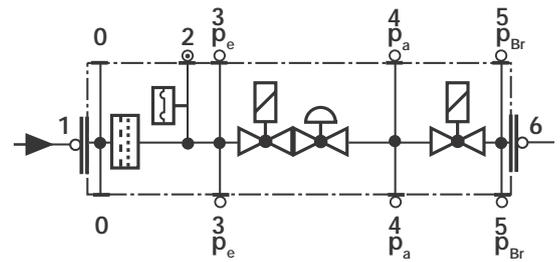


Fig. 52

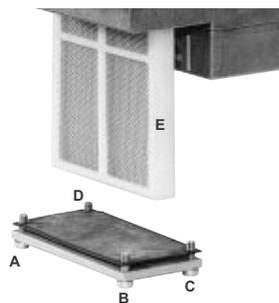


Fig. 53

### Removing and cleaning the combustion head

- 1 By means of the plastic hook **G**, unlock the rod **T** (Fig. 54) which drives the butterfly valve (Fig. 54 and Fig. 55), to disconnect it from its seat.
- 2 Remove the screws **V1**, **V2**, **V3**, **V4** and the screws **S1** and **S2** (Fig. 54).
- 3 Disconnect the ignition cable **CA** from the ignition transformer (Fig. 56).
- 4 Disconnect the connector **CR** (Fig. 57).

**CAUTION: during the assembling phase, before tightening screws V1, V2, V3, V4, mount and tighten screws S1 and S2.**

To remove the head, the operator must pull it towards himself. Once the combustion head is removed, check that the air and gas holes are not obstructed (Fig. 57 - **H**). Clean the combustion head by a compressed air blow or, in case of scale, scrape it off by a scratchbrush.

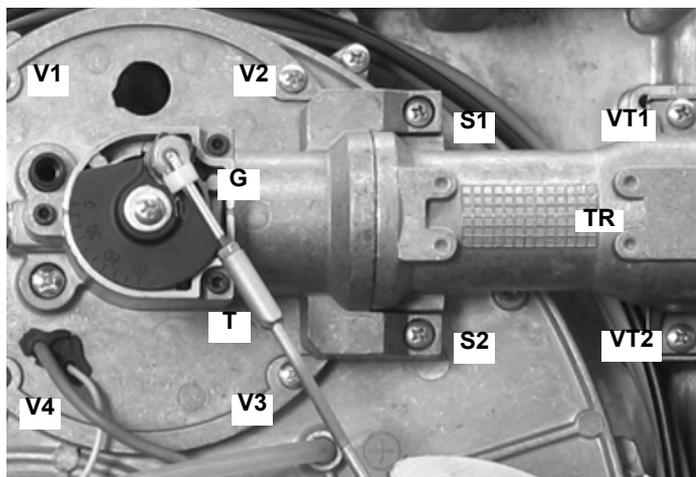


Fig. 54

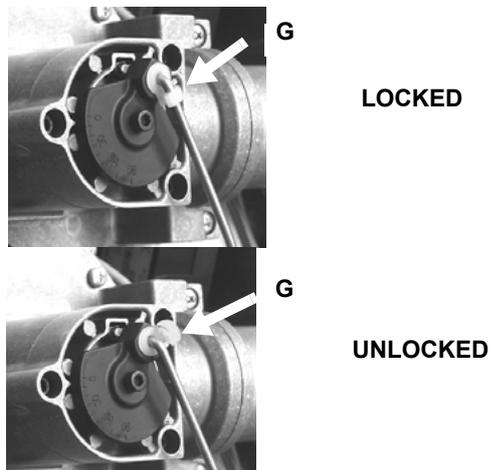


Fig. 55

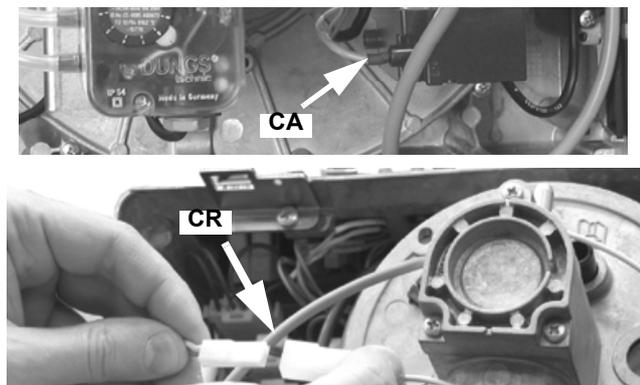


Fig. 56

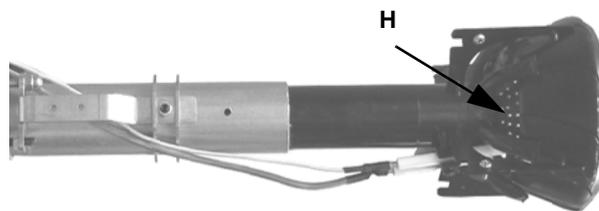


Fig. 57

## Adjusting the electrodes position

**ATTENTION:** avoid the ignition and detection electrodes to get in touch with 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. The gap between the ignition electrode and the ground is **4±5 mm**.

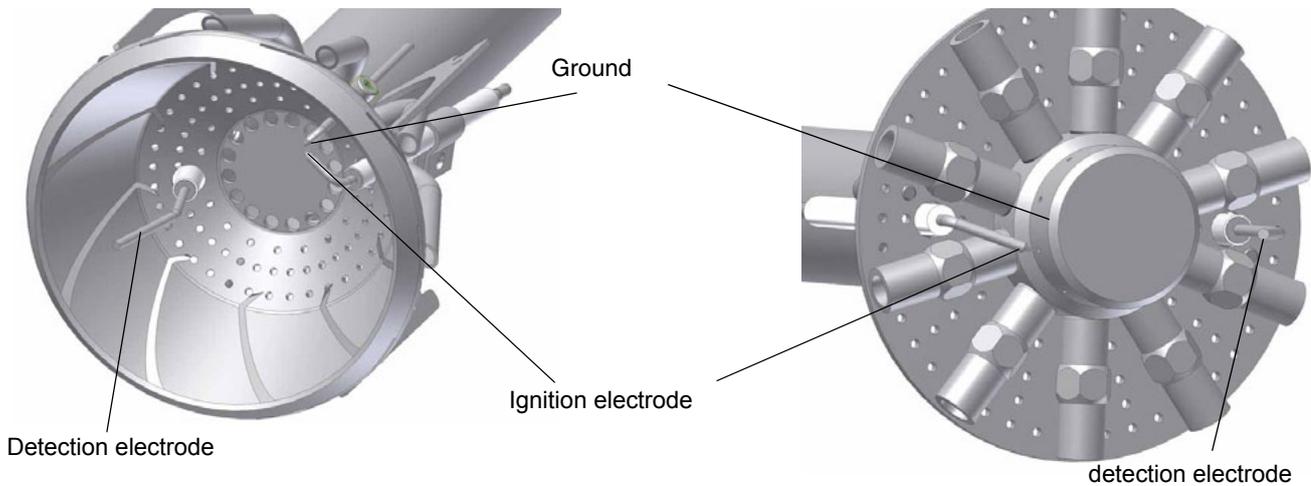


Fig. 58

## Checking the detection current

To measure the detection signals refer to the diagrams in the picture below. If the signal is less than the indicated value, check the position of the detection electrode, the electrical contacts and if necessary replace the detection electrode.

Control box	Minimum detection signal
Siemens LMV2	4 $\mu$ A (value on display:30%)

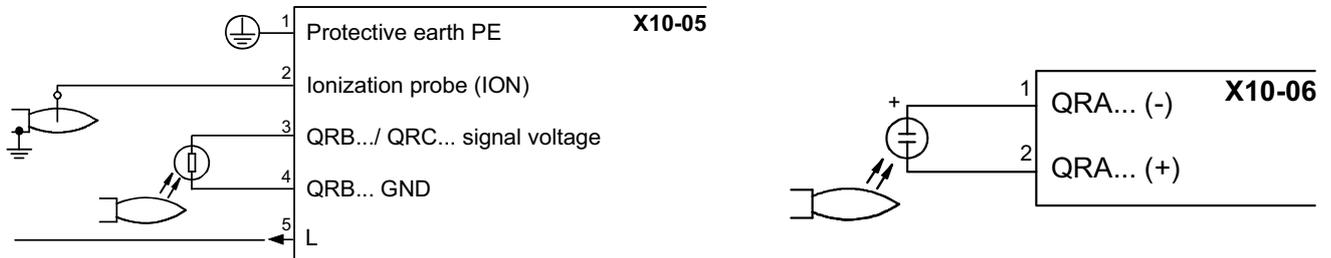


Fig. 59

Error code	Diagnostic code	Cause
93	3	Sensore short-circuit

Permissible length of flame detector cable (laid separately): 3 m (core-earth 100 pF / m).

## Extraneous light

Extraneous light during standby (phase 12) leads to start prevention, followed by a restart.

Extraneous light during the prepurge phase leads to immediate lockout.

If extraneous light occurs during the shutdown phase, the system switches to the safety phase.

One repetition is permitted. This means that if the error occurs again the next time the system is shut down, the unit initiates lockout.

## Seasonal stop

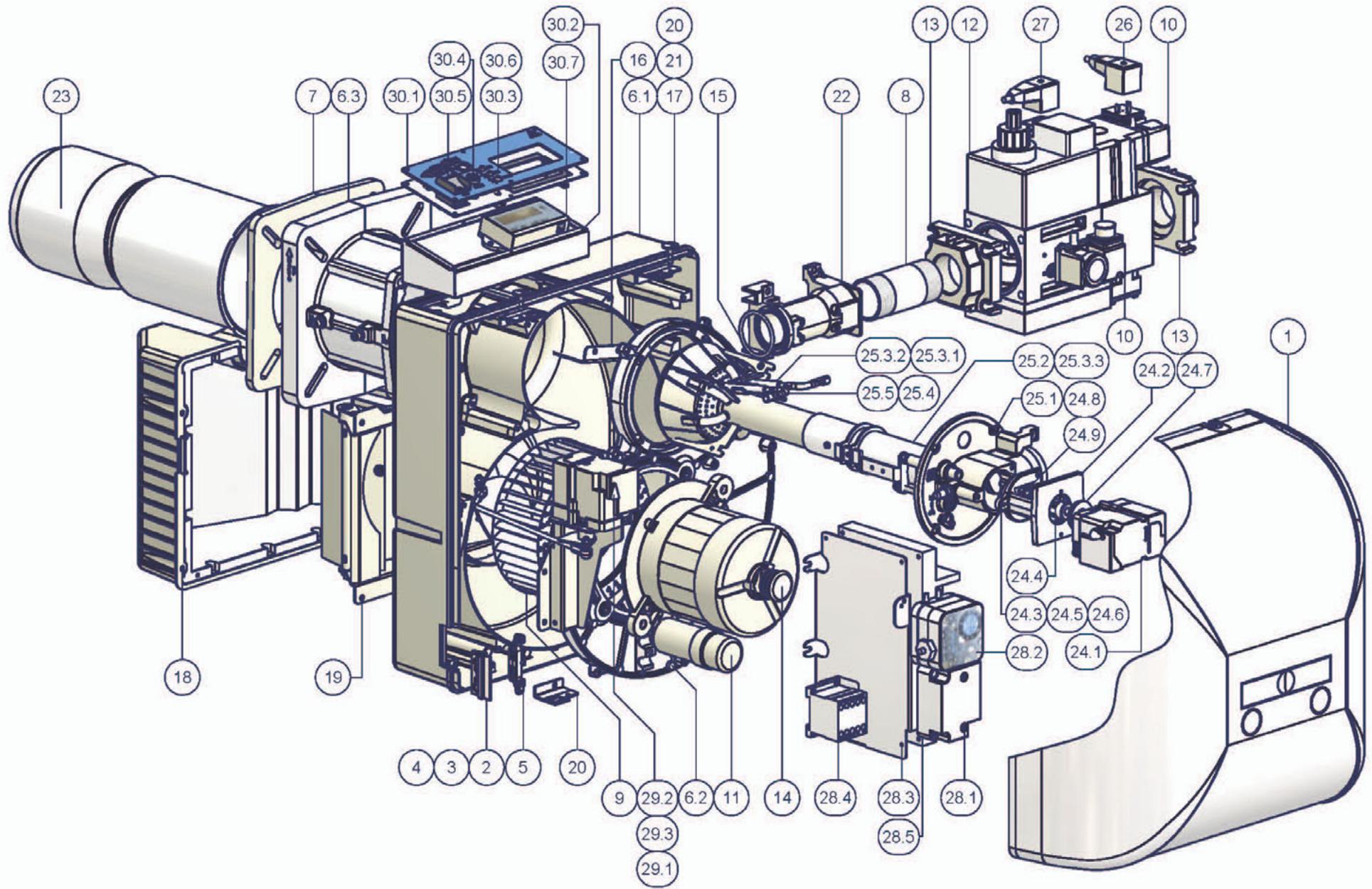
To stop the burner in the seasonal stop, proceed as follows:

- 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".

BURNER EXPLODED VIEW



POS.	DESCRIPTION
1	COVER
2	FAIRLEAD
3	FAIRLEAD
4	FAIRLEAD
5	FAIRLEAD
6.1	BURNER HOUSING
6.2	MOTOR SUPPORT PLATE
6.3	FLANGED PIPE
7	GENERATOR GASKET
8	THREADED GAS PIPE
9	FAN WHEEL
10	GAS PRESSURE
11	MOTOR
12	GAS VALVES GROUP WITH GOVERNOR
13	FLANGE
14	PLUG
15	O RING
16	AIR FLAP
17	COVER FIXING SCREW
18	AIR INTAKE
19	AIR INTAKE
20	BRACKET
21	BRACKET
22	GAS MANIFOLD
23	BLAST TUBE
24.1	ACTUATOR
24.2	FLANGE
24.3	BUTTERFLY GAS VALVE
24.4	COUPLING

POS.	DESCRIPTION
24.5	O RING
24.6	PIN
24.7	BUSH
24.8	INDEX LABEL
24.9	INDEX
25.1	GAS MANIFOLD
25.2	HEAD EXTENSION
25.3.1	DETECTION ELECTRODE
25.3.2	IGNITION ELECTRODE
25.3.3	COMBUSTION HEAD
25.4	IGNITION CABLE
25.5	DETECTION CABLE
26	CONNECTOR
27	CONNECTOR
28.1	IGNITION TRANSFORMER
28.2	AIR PRESSURE SWITCH
28.3	BRACKET
28.4	CONTACTOR
28.5	CONTROL BOX
29.1	ACTUATOR BRACKET
29.2	ACTUATOR
29.3	ADJUSTING BUSH
30.1	FRONT CONTROL PANEL
30.2	BOARD
30.3	LIGHT
30.4	FUSE
30.5	SWITCH
30.6	LIGHT
30.7	CONTROL PANEL

## SPARE PARTS

Description	Code		
	LG/NG280	LG/NG350	LG/NG400
COVER	1011803	1011803	1011803
BURNER MANAGEMENT SYSTEM - SIEMENS LMV2..	2020474	2020474	2020474
BURNER MANAGEMENT SYSTEM - SIEMENS LMV3..	2020477	2020477	2020477
USER INTERFACE/DISPLAY - SIEMENS AZL2..	2022115	2022115	2022115
DETECTION ELECTRODE	2080108	2080108	2080108
IGNITION ELECTRODE	2080218	2080218	2080218
GASKET	2110059	2110059	2110059
AIR PRESSURE SWITCH	2160053	2160053	2160053
GAS PRESSURE SWITCH	2160077	2160077	2160077
IGNITION TRANSFORMER MOD. COFI	2170138	2170138	2170138
IGNITION TRANSFORMER MOD. DANFOSS	2170232	2170232	2170232
MOTOR	2180717	2180714	2180712
VALVE GROUP Rp1	2190341	2190341	2190341
VALVE GROUP Rp1 1/4	2190342	2190342	2190342
VALVE GROUP Rp1 1/2	21903L3	21903L3	21903L3
ACTUATOR - SIEMENS SQN14	2480096	2480096	2480096
ACTUATOR - SIEMENS RWF	2570112	2570112	2570112
COMBUSTION HEAD (GAS) mod. NG	30600P9	30600H3	30600H2
COMBUSTION HEAD (L.P.G.) mod. LG	30600Q3	30600H7	30600H6
BLAST TUBE S*	30900L0	30900G3	30900F9
BLAST TUBE L*	30900L1	30900G3**	30900F9**
COMBUSTION HEAD (GAS) mod. NG	3501842	3501841	3501842
COMBUSTION HEAD (L.P.G.) mod. LG	-	3501844	3501843
IGNITION CABLE	6050153	6050153	6050153
DETECTION CABLE	6050214	6050214	6050214

### Spare parts for Low NOx Burners only

Description	Code		
	NGX280	NGX350	NGX400
COMBUSTION HEAD (NOx)	30600Q7	30600H9	30600H8
BLAST TUBE S*	30910P5	30910L6	30910L7

\*S: standard  
L: long

\*\* To modify the blast tube's length, see chapter "How to modify blast tube length".

**NOTE:** it is recommended to mention the burner ID number on the spare parts request form.

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## **ELECTRICAL WIRING DIAGRAMS**

See the attached wiring diagrams.

**Wiring diagram SE04-755 - Progressive burners**

**Wiring diagram SE04-753 - Fully-modulating burners**







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