

***LG550***  
***NG550***  
***NGX550***



***IDEA Series***  
***Gas burners***

**MANUAL OF INSTALLATION - USE - MAINTENANCE**

***CIB UNIGAS***

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

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## TABLE OF CONTENTS

<b>WARNINGS</b> .....	<b>5</b>
<b>PART I: INSTALLATION</b> .....	<b>5</b>
GENERAL FEATURES .....	5
<i>How to interpret the burner "Performance curve"</i> .....	6
<i>Checking the proper gas train size</i> .....	6
BURNERS SPECIFICATIONS .....	7
<i>Matching the burner to the boiler</i> .....	7
<i>Specifications</i> .....	8
<i>Country and usefulness gas categories</i> .....	9
<i>Performance curves</i> .....	10
<i>Overall dimensions</i> .....	12
MOUNTINGS AND CONNECTIONS .....	14
<i>Packing</i> .....	14
<i>Fitting the burner to the boiler</i> .....	14
GAS TRAIN CONNECTIONS .....	15
<i>Gas Proving System VPS504 (Option)</i> .....	16
ELECTRICAL CONNECTIONS .....	17
<i>Power supply without neutral</i> .....	19
<i>Combustion head pressure curves vs. the gas flow rate</i> .....	20
<i>Measuring the gas pressure in the combustion head</i> .....	20
<i>Plugs for pressure measurement</i> .....	20
<i>Gas pressure in combustion head vs. gas flow rate curves</i> .....	21
<i>Startup Output</i> .....	22
<i>Adjustments - brief description</i> .....	22
<i>Adjustment procedure</i> .....	22
<i>Fully modulating burners</i> .....	24
<i>Calibration of air and gas pressure switches</i> .....	24
<i>Calibration of air pressure switch (only for single stage burners)</i> .....	24
<i>Calibration of air pressure switch (double-stage, progressive and fully-modulating)</i> .....	24
<i>Calibration of minimum gas pressure switch</i> .....	25
<i>Adjusting the high gas pressure switch (when provided)</i> .....	25
<b>PART II: OPERATION</b> .....	<b>26</b>
<i>Burner control panel</i> .....	27
OPERATION .....	28
<b>PART III: MAINTENANCE</b> .....	<b>29</b>
ROUTINE OPERATIONS .....	29
<i>Removing the filter in the MULTIBLOC DUNGS MB-DLE 405..412</i> .....	29
<i>Removing the filter in theMULTIBLOC DUNGS MB-DLE 415 - 420</i> .....	30
<i>Removing and cleaning the combustion head</i> .....	30
<i>Replacing the electrodes</i> .....	32
<i>Electrodes position setting</i> .....	32
<i>Checking the ionisation current</i> .....	33
<i>Seasonal stop</i> .....	33
TROUBLESHOOTING .....	34
SPARE PARTS .....	35
BURNER EXPLODED VIEW .....	36
ELECTRICAL WIRING DIAGRAMS .....	38
<b>APPENDIX</b>	

## 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 90/396/CEE - Gas Appliances;
- Directive 2006/95/EC on low voltage;
- Directive 2004/108/CEE 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/CEE 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/CEE 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 90/396/CEE Gas Appliances;
- Directive 2006/95/EC on low voltage;
- Directive 2004/108/CEE 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 90/396/CEE - Gas Appliances;
- Directive 2006/95/EC on low voltage;
- Directive 2004/108/CEE 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

## PART I: INSTALLATION

## GENERAL FEATURES

This series burners are characterised by high performances and width in the performance curves, when the pressure in the combustion chamber is high. They are also provided with other important functional features: there are plugs which can be easily connected to the boiler and to the detecting probes, a pressure plug in the combustion chamber, all mechanical components are mounted on a plate which can be quickly taken off for maintenance. The head is adjustable by means of a graduated screw. The gas train can be mounted either on the right side or on the left side.

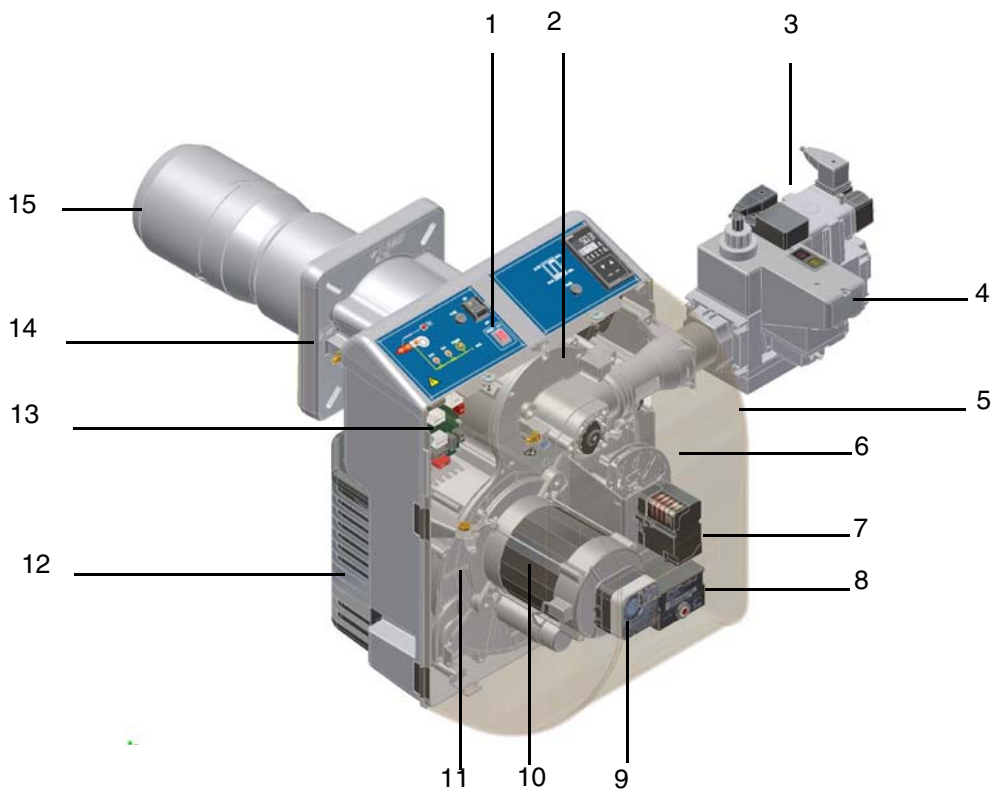


Fig. 1

- 1 Control panel with startup switch
- 2 Combustion head (inside)
- 3 Gas valves group
- 4 Gas proving system
- 5 Cover
- 6 Adjusting cam (double-stage, progressive and fully-modulating burners)
- 7 Actuator (double-stage, progressive and fully-modulating burners)
- 8 Control box
- 9 Air pressure switch
- 10 Fan motor
- 11 Burner plate
- 12 Air intake
- 13 Printed board circuit (PCB)
- 14 Flange
- 15 Blast tube

The gas coming from the supply line, passes through the valves group provided with filter and stabiliser. This one forces the pressure in the utilisation limits. In the double-stage , progressive and fully- modulating burners, the electric actuator (7), that moves proportionally the air damper and the gas butterfly valve, uses an adjusting cam with variable shape. This one allows the optimisation of the gas flue values, as to get an efficient combustion. The combustion head (2) positioning determines the burner 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 “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 (kW = kcal/h / 860);
- backpressure (data are available on the boiler ID plate or in the user’s manual).

Example:

Furnace input: 600kW

Backpressure: 4mbar

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.

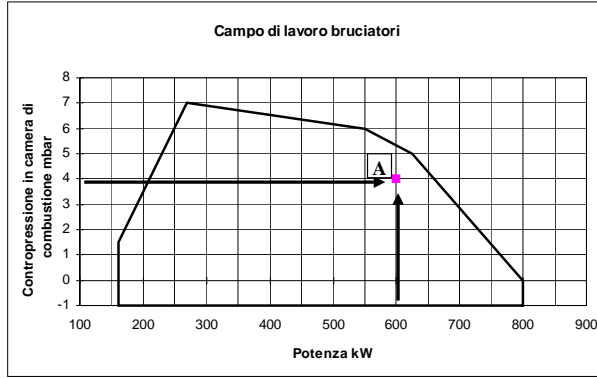


Fig. 2

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 know the available gas pressure value upstream the burner’s gas valve. Then subtract the backpressure. The result is called **p<sub>gas</sub>**. 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<sub>gas</sub>** value, calculated before.

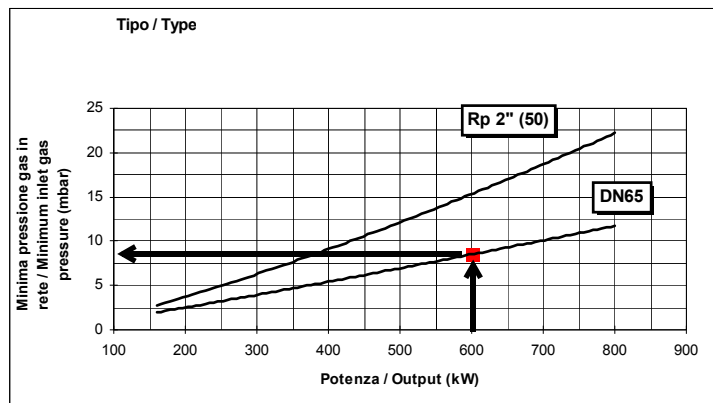


Fig. 3

**BURNERS SPECIFICATIONS**

**Burner model identification**

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

Type NG550 (1)	Model	M- (2)	PR. (3)	S. (4)	* (5)	A. (6)	0. (7)	50 (8)
(1) BURNER TYPE	NG - Natural gas burner LG - L.P.G. burner NGX - Low NOx burners							
(2) FUEL	M - Natural gas L - LPG							
(3) OPERATION	TN - Single stage PR - Progressive				AB - Double stage MD - Fully modulating			
(4) BLAST TUBE	S - standard				L - extended			
(5) DESTINATION COUNTRY	see data plate							
(6) BURNER VERSION	A - Standard							
(7) EQUIPMENT	0 = 2 gas valves 1= 2 Gas valves + gas proving system (option) 7 = 2 gas valves + maximum gas pressure switch 8= 2 Gas valves + gas proving system (option) + maximum gas pressure switch							
(8) GAS CONNECTION	25 = Rp1		32 = Rp1 <sup>1</sup> / <sub>4</sub>		40 = Rp1 <sup>1</sup> / <sub>2</sub>		50 = Rp2	

**Matching the burner to the boiler**

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

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

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

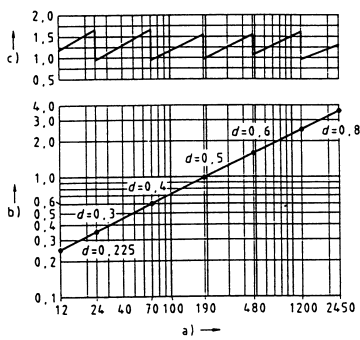


Fig. 4

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

## Specifications

BURNERS		NG550 M-.TN..0.25	NG550 M-.TN..0.32	NG550 M-.TN..0.40	NG550 M-.TN..0.50	LG550 L-.TN..0.25	LG550 L-.TN..0.32	LG550 L-.TN..0.40	LG550 L-.TN...0.50
Output	min. - max kW	245 - 570							
Fuel		Natural gas				L.P.G.			
Gas category		(see next paragraph)				I <sub>3B/P</sub>			
Gas rate	min.- max Stm <sup>3</sup> /h	26 - 60				9.4 - 22			
Gas pressure	min. - max. mbar	(see Note 2)							
Power supply		230V - 50Hz							
Total power consumption	kW	0.92							
Electric motor	kW	0.62							
Protection		IP40							
Approx. weight	kg	55							
Valves size / Gas connection		1" / Rp 1	1 <sup>1</sup> / <sub>4</sub> /Rp 1 <sub>1/4</sub>	1 <sup>1</sup> / <sub>2</sub> /Rp 1 <sub>1/2</sub>	2" / Rp 2	1" / Rp 1	1 <sup>1</sup> / <sub>4</sub> /Rp 1 <sub>1/4</sub>	1 <sup>1</sup> / <sub>2</sub> /Rp 1 <sub>1/2</sub>	2" / Rp 2
Operation		Single stage							
Operating temperature	°C	-10 ÷ +50							
Storage Temperature	°C	-20 ÷ +60							
Working service*		Intermittent							

BURNERS		NG550 M-.xx..0.25	NG550 M-.xx...0.32	NG550 M-.xx...0.40	NG550 M-.xx...0.50	LG550 L-.xx..0.25	LG550 L-.xx...0.32	LG550 L-.xx...0.40	LG550 L-.xx...0.50
Output	min. - max kW	160 - 570							
Fuel		Natural gas				L.P.G.			
Gas category		(see next paragraph)				I <sub>3B/P</sub>			
Gas rate	min.- max Stm <sup>3</sup> /h	17 - 60				6.2 - 22			
Gas pressure	min. - max. mbar	(see Note 2)							
Power supply		230V - 50Hz							
Total power consumption	kW	0.92							
Electric motor	kW	0.62							
Protection		IP40							
Approx. weight	kg	55							
Valves size / Gas connection		1" / Rp 1	1 <sup>1</sup> / <sub>4</sub> /Rp 1 <sub>1/4</sub>	1 <sup>1</sup> / <sub>2</sub> /Rp 1 <sub>1/2</sub>	2" / Rp 2	1" / Rp 1	1 <sup>1</sup> / <sub>4</sub> /Rp 1 <sub>1/4</sub>	1 <sup>1</sup> / <sub>2</sub> /Rp 1 <sub>1/2</sub>	2" / Rp 2
Operation		Double stage - 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. (nett calorific value H <sub>i</sub> = 93.5 MJ/Stm <sup>3</sup> )
<b>Note2:</b>	Maximum gas pressure = 360mbar (with Dungs MBDLE 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

BURNERS		NGX550 M-.xx...0.25	NGX550 M-.xx...0.32	NGX550 M-.xx...0.40	NGX550 M-.xx...0.50
Output	min. - max kW	132 - 490			
Fuel		Natural gas			
Gas category		(see next paragraph)			
Gas rate	min.- max Stm <sup>3</sup> /h	14 - 52			
Gas pressure	min. - max. mbar	(see Note 2)			
Power supply		230V - 50Hz			
Total power consumption	kW	0.92			
Electric motor	kW	0.62			
Protection		IP40			
Approx. weight	kg	55			
Valves size / Gas connection		1" / Rp 1	1" <sub>1/4</sub> / Rp 1 <sub>1/4</sub>	1" <sub>1/2</sub> / Rp 1 <sub>1/2</sub>	2" / Rp 2
Operation		Double stage - 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. (nett calorific value H <sub>i</sub> = 93.5 MJ/Stm <sup>3</sup> )
<b>Note2:</b>	Maximum gas pressure = 360mbar (with Dungs MBDLE valves) Minimum gas pressure = see gas curves.

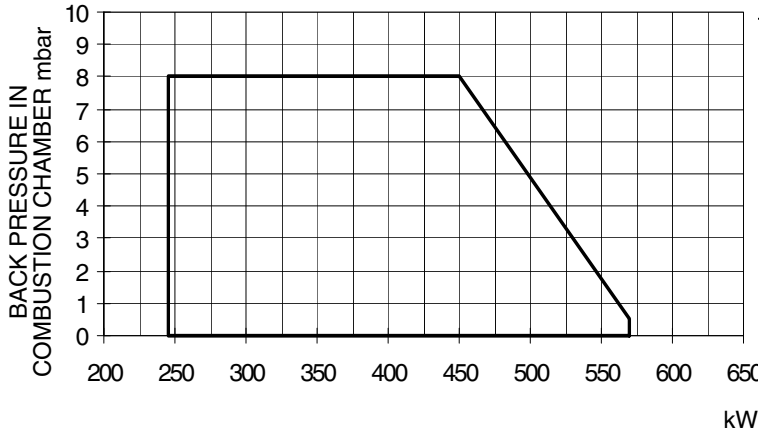
\* NOTE ON THE WORKING SERVICE: the control box automatically stops after 24h of continuous working. The control box immediately starts up, automatically.

## Country and usefulness gas categories

GAS CATEGORY	COUNTRY																								
	AT	ES	GR	SE	FI	IE	HU	IS	NO	CZ	DK	GB	IT	PT	CY	EE	LV	SI	MT	SK	BG	LT	RO	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**

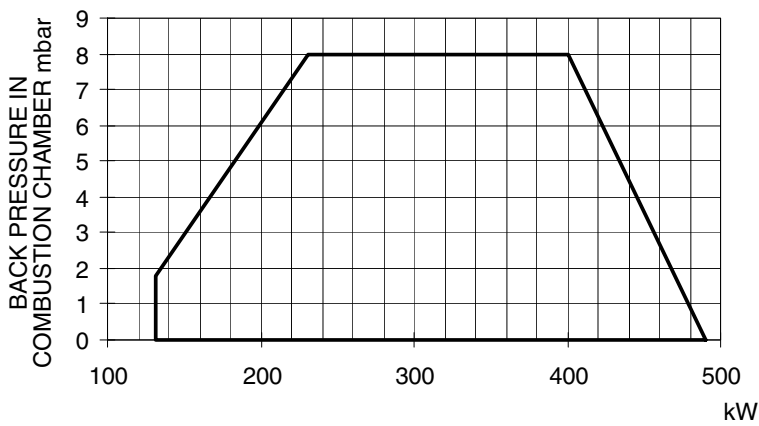
**NG550 - LG550 Single stage**



**NG550 - LG550 Double-stage/Progressive**



**NGX550 Low NOx burner**



To get the input in kcal/h, multiply value in kW by 860.

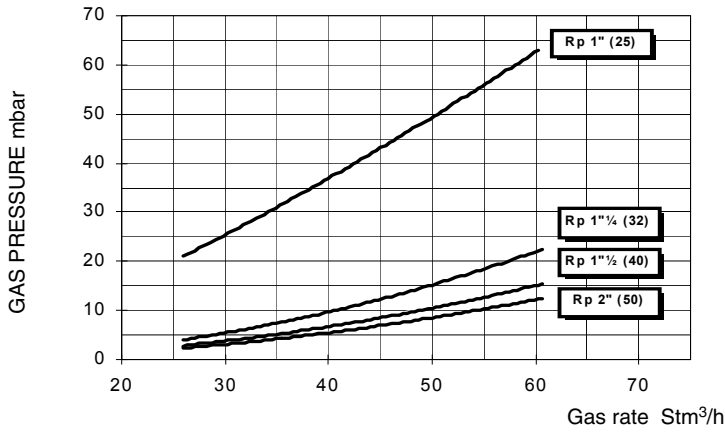
Data are referred to standard conditions: atmospheric pressure at 1013mbar, ambient temperature at 15°C.

**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.

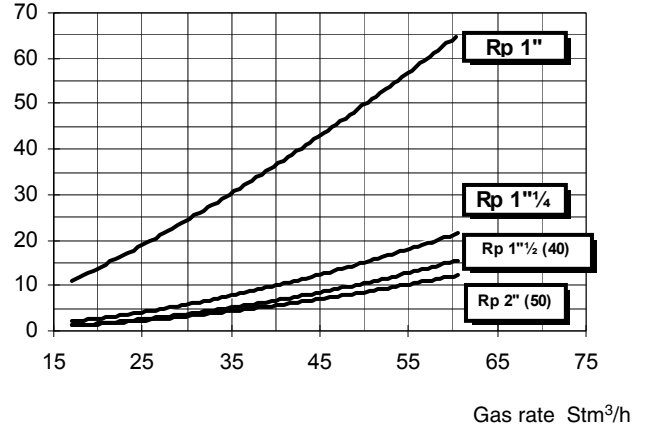
**Pressure in the network/gas rate curves**

● **Natural gas burners**

**NG550 Single stage**

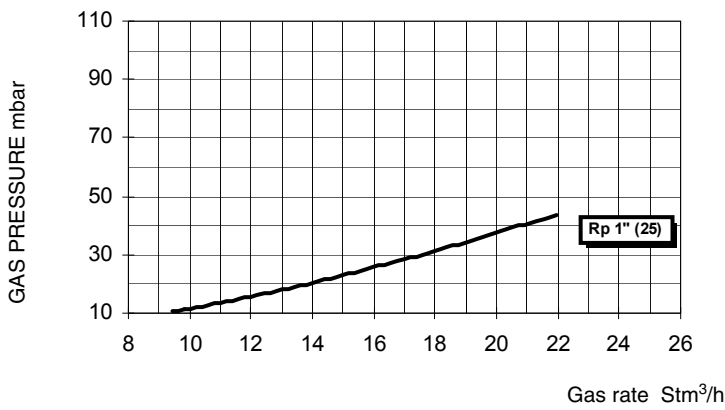


**NG550 Double-stage/Progressive**

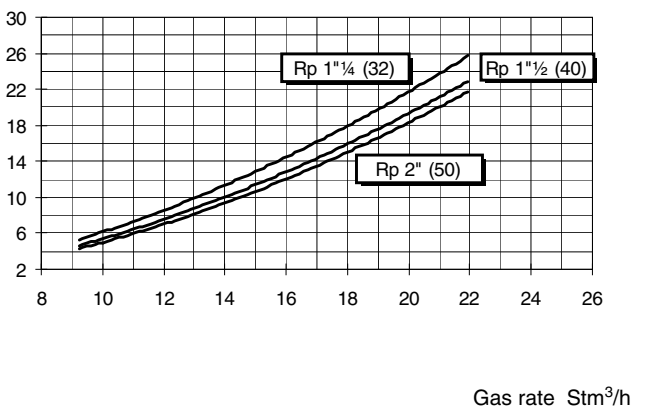


● **L.P.G. Burners**

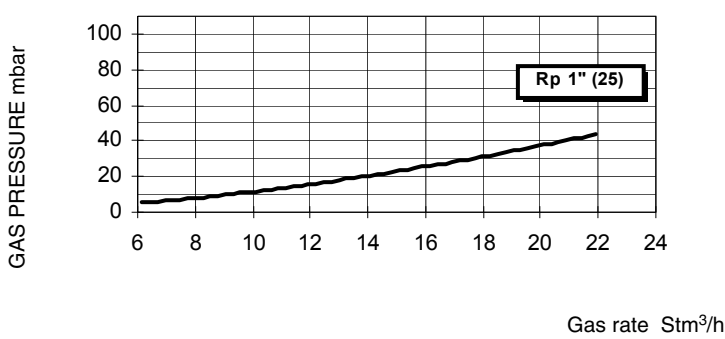
**LG550 L-TN..25 Single stage**



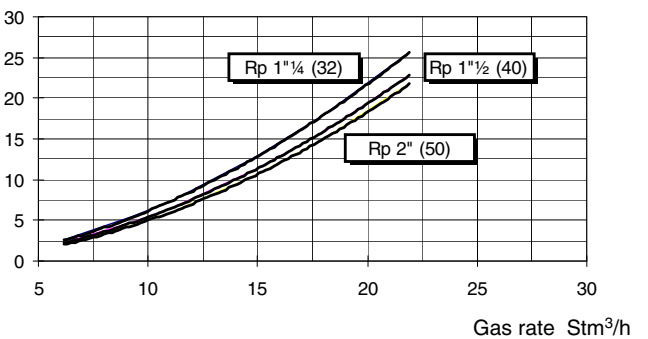
**LG550 L-TN..32/40/50 Single stage**



**LG550 L-PR.. Double-stage/Progressive**

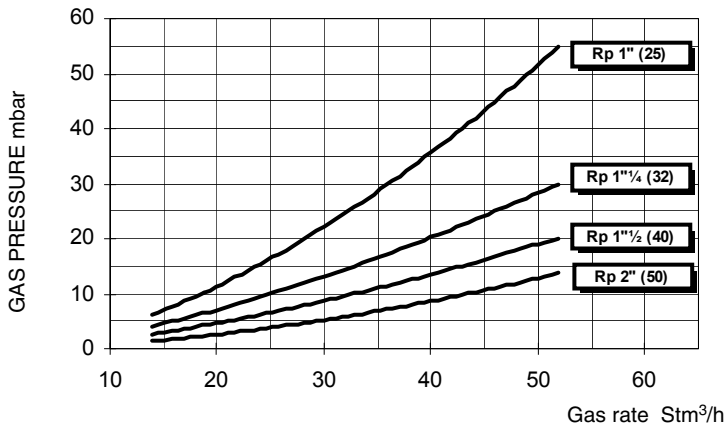


**LG550 L-PR.. Double-stage/Progressive**



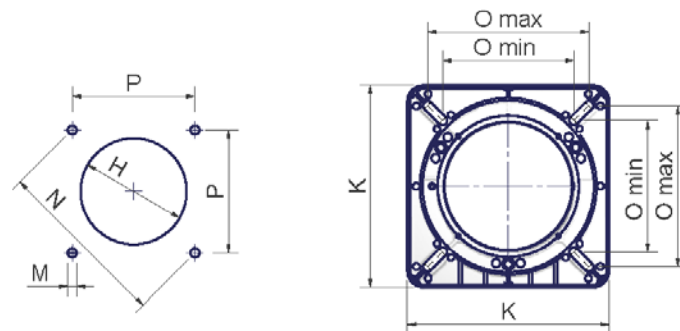
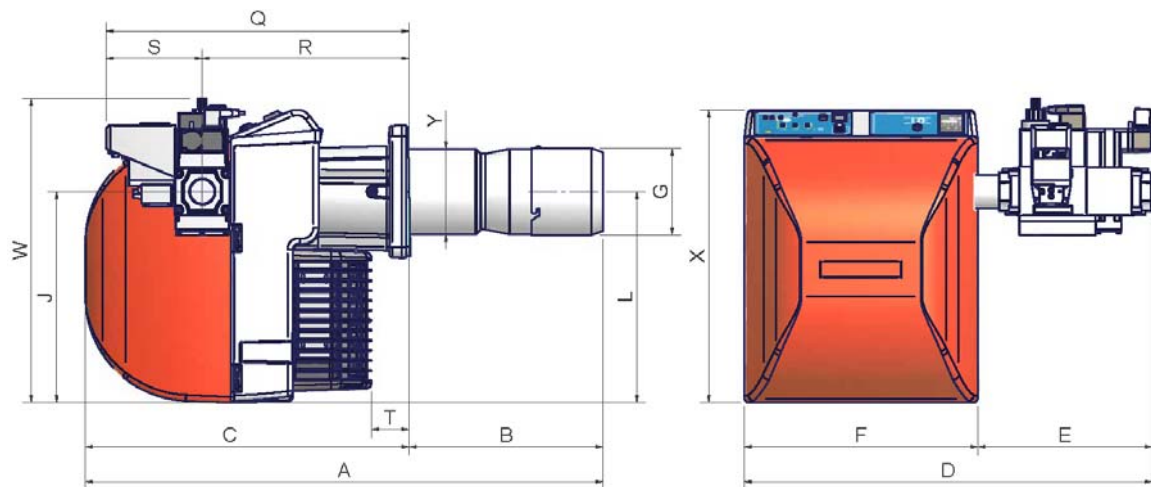
● **Low NOx burners**

**NGX550 Double-stage/Progressive**



**Overall dimensions (mm)**

● **Standard burners**



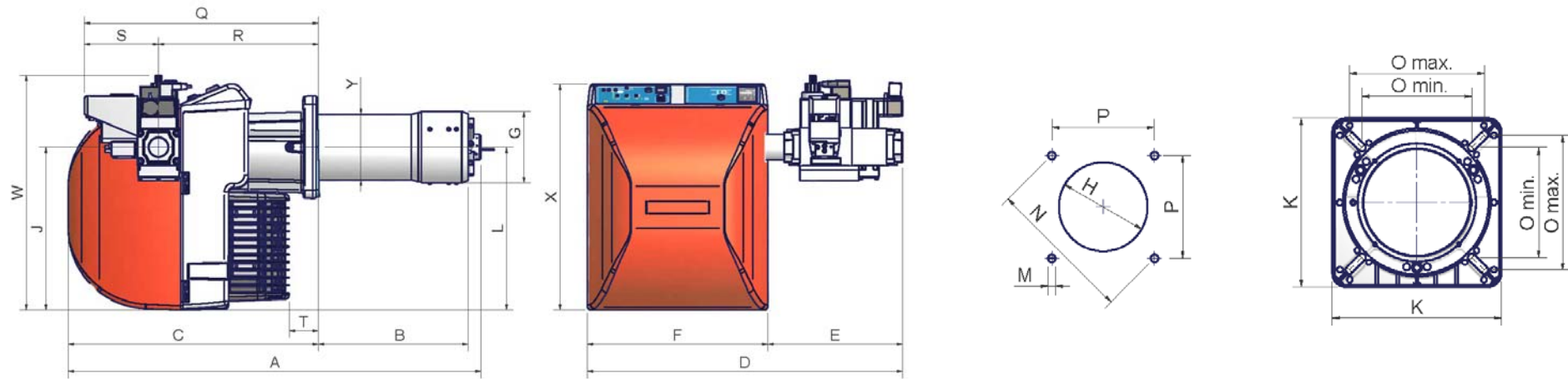
Recommended boiler drilling jig and burner flange

	DN	A(S*)	A(L*)	B(S*)	B(L*)	C	D ±5mm	E ±5mm	F	G	H	J	K	L	M	N	Omin	Omax	P	Q	R	S	T	W	X	Y
<b>NG/LG550</b>	25/32	843	943	253	353	590	671	245	426	165	178	384	241	384	M10	247	157	192	174	552	377	175	69	543	533	155
<b>NG/LG550</b>	40	843	943	253	353	590	744	318	426	165	178	384	241	384	M10	247	157	192	174	552	377	175	69	553	533	155
<b>NG/LG550</b>	50	843	943	253	353	590	744	318	426	165	178	384	241	384	M10	247	157	192	174	552	377	175	69	603	533	155

\* S = measure referred to burners fitted with standard blast tube

L = measure referred to burners fitted with extended blast tube

**Low NOx Burner** Low NOx burners



Recommended boiler drilling jig and burner flange Recommended boiler drilling jig and burner flange

	DN	A(S*)	A(L*)	B(S*)	B(L*)	C	D ±5mm	E ±5mm	F	G	H	J	K	L	M	N	Omin	Omax	P	Q	R	S	T	W	X	Y
<b>NGX550</b>	25/32	874	974	253	353	590	671	245	426	176	198	384	241	384	M10	247	157	192	174	552	377	175	69	543	533	168
<b>NGX550</b>	40	874	974	253	353	590	744	318	426	176	198	384	241	384	M10	247	157	192	174	552	377	175	69	553	533	168
<b>NGX550</b>	50	874	974	253	353	590	744	318	426	176	198	384	241	384	M10	247	157	192	174	552	377	175	69	603	533	168

\* S = measure referred to burners fitted with standard blast tube  
L = measure referred to burners fitted with extended blast tube

## MOUNTINGS AND CONNECTIONS

### Packing

urners are despatched in cardboard packages whose dimensions are: 1030mm x 530mm x 570mm (L x P x H)

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

The following are placed in each packing case.

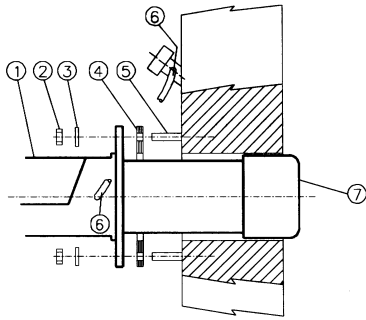
- 1 Burner with gas train;
- 1 gasket to be inserted between the burner and the boiler;
- 1 envelope containing this manual

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 install the burner into the boiler, proceed as follows:

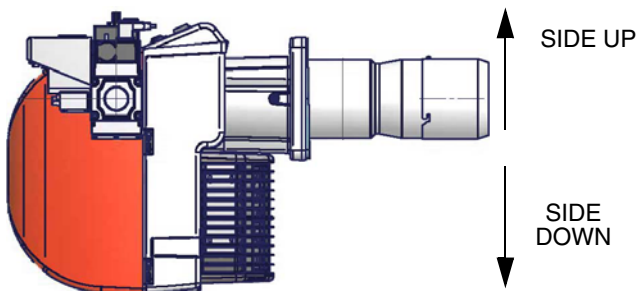
- 1 make a hole on the closing door of the combustion chamber as described on paragraph "Overall dimensions")
- 2 place the burner to the boiler: lift it up and handle it according to the procedure described on paragraph "Handling the burner";
- 3 place the 4 stud bolts (5) on boiler's door, according to the burner's drilling template described on paragraph "Overall dimensions";
- 4 fasten the 4 stud bolts;
- 5 place the gasket on the burner flange;
- 6 install the burner into the boiler;
- 7 fix the burner to the stud bolts, by means of the fixing nuts, according to the next picture.
- 8 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).



#### Keys

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

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

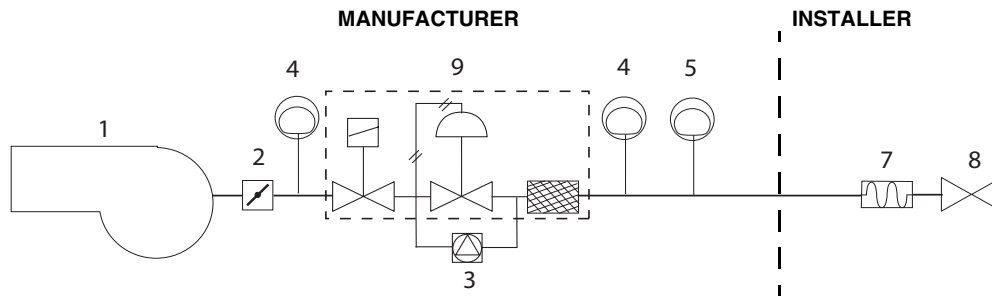


## GAS TRAIN CONNECTIONS

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

	<b>ATTENTION:</b> 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
- 3 Gas proving system (option)
- 4 High gas pressure switch (option)
- 5 Low gas pressure switch
- 7 Bellow joint
- 8 Manual cutoff valve
- 9 MB-DLE valve group

\*Note: the high gas pressure switch can be mounted either upstream the gas valve or downstream the gas valves but upstream the butterfly gas valve.

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 valve and the gaskets are not part of the standard supply.

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

	<b>ATTENTION:</b> 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.
--	--

	<b>ATTENTION:</b> 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. 7);
2. insert MB-DLE: note position of O rings (see Fig. 7);
3. tighten screws A, B, C and D (Fig. 5 - Fig. 6), according to the mounting positions (Fig. 8);
4. after installation, perform leakage and functional test;
5. disassembly in reverse order.

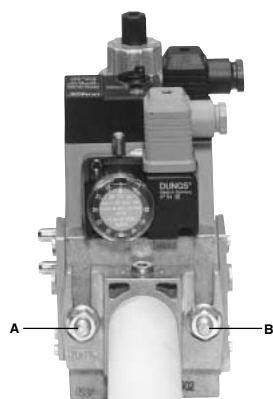


Fig. 5

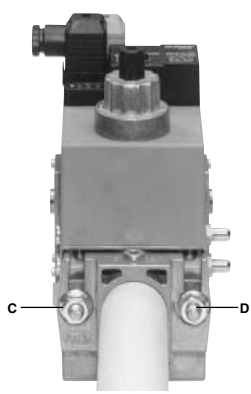


Fig. 6



Fig. 7

## MOUNTING POSITIONS

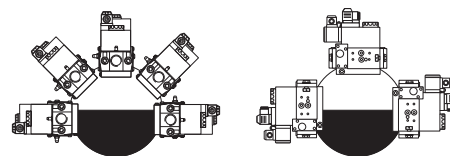


Fig. 8

**MULTIBLOC DUNGS MB-DLE 415..420****Mounting**

1. Loosen screws A and B **do not** unscrew (Fig. 5 - Fig. 6).
2. unscrew screws C and D (Fig. 5 - Fig. 6).
3. Remove MultiBloc between the threaded flanges (Fig. 6).
4. After mounting, perform leakage and functional tests.

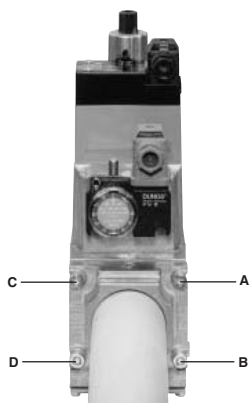


Fig. 9

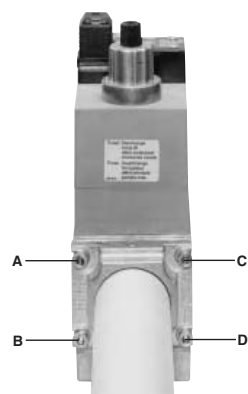


Fig. 10

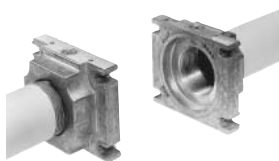


Fig. 11

## MOUNTING POSITIONS

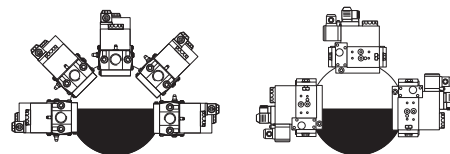


Fig. 12

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



**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.

**Gas Proving System VPS504 (Option)**

The VPS504 check the operation of the seal of the gas shut off valves. This check, carried out as soon as the boiler thermostat gives a start signal to the burner, creates, by means of the diaphragm pump inside it, a pressure in the test space of 20 mbar higher than the supply pressure.

To install the DUNGS VPS504 gas proving system on the MD-DLE valves group, proceed as follows:

- 1 turn off gas supply.;
- 2 Switch off power supply.
- 3 remove the MultiBloc's screw plugs (Fig. 13-A);
- 4 insert sealing rings (10,5 x 2,25) into VPS 504 (Fig. 14-B, Fig. 13-B)
- 5 Torque screws 3, 4, 5, 6 (M4 x16) Fig. 13-C

**Only use screws with metric thread on reassembly (modification, repair).**

- 6 On completion of work, perform a leak and functional test.



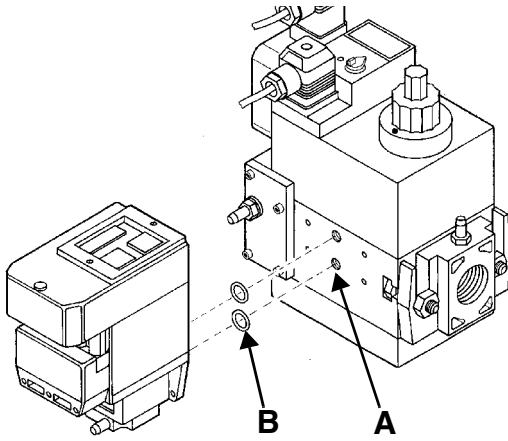


Fig. 13

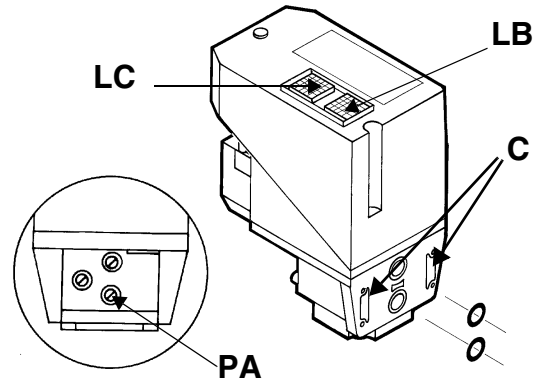




Fig. 14

When wishing to monitor the test, install a pressure gauge ranged to that of the pressure supply point **PA** (Fig. 14). If the test cycle is satisfactory, after a few seconds the consent light **LC** (yellow) comes on. In the opposite case the lockout light **LB** (red) comes on. To restart it is necessary to reset the appliance by pressing the illuminated pushbutton **LB**.

**ELECTRICAL CONNECTIONS**

	<p>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.</p>
	<p><b>ATTENTION:</b> 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.</p>

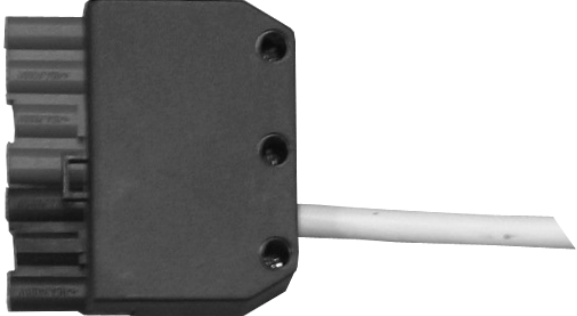
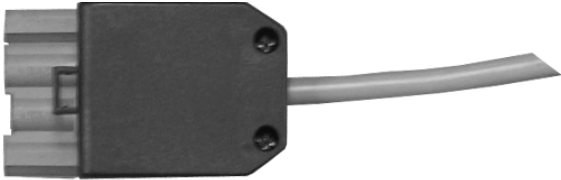
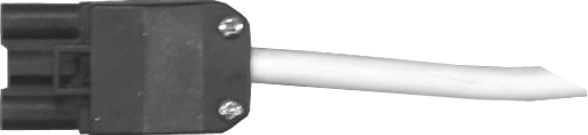
	<p><b>WARNING:</b> the burner is fitted with a bridge between terminals T6 and T8 on CN2-TAB connector (external side link, male connector); remove this bridge before thermostat connection.</p>
---	---


	<p><b>WARNING:</b> 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..</p>
---	--

To execute the electrical connections, proceed as follows:

- 1 find the plug or the plugs, according to the model:
  - 7 poles plug for the power supply (for all models);
  - 4 poles plug (progressive burners);
  - 3-poles plug;
- 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 (sse next paragraphs);
- 4 now the burner is ready to start up.

**Identification of linking connectors**

<p><b>Burner supply connector</b> (Fig. 18, Fig. 20)</p> <p><b>Probe connection connector</b> (fully modulating burners, Fig. 22)</p>	 <p>Fig. 15</p>
<p><b>HIGH/LOW flame connector</b> (progressive burners , Fig. 20)</p>	 <p>Fig. 16</p>
<p><b>Fan motor connector</b> (Fig. 19 - Fig. 21)</p>	 <p>Fig. 17</p>

	<p><b>IMPORTANT:</b> before operating the burner, be sure all connectors are linked as shown in the diagrams.</p>
--	---

● **Single stage burner connectors:**

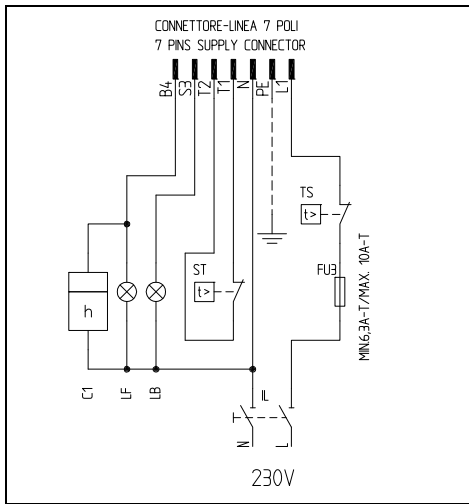


Fig. 18 - 7-poles connector

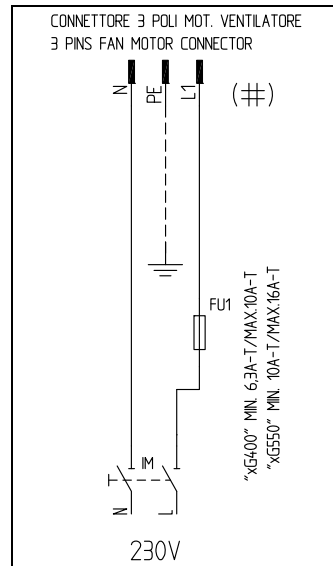


Fig. 19 - Electric motor 3-pole connector

● **Progressive burner connectors**

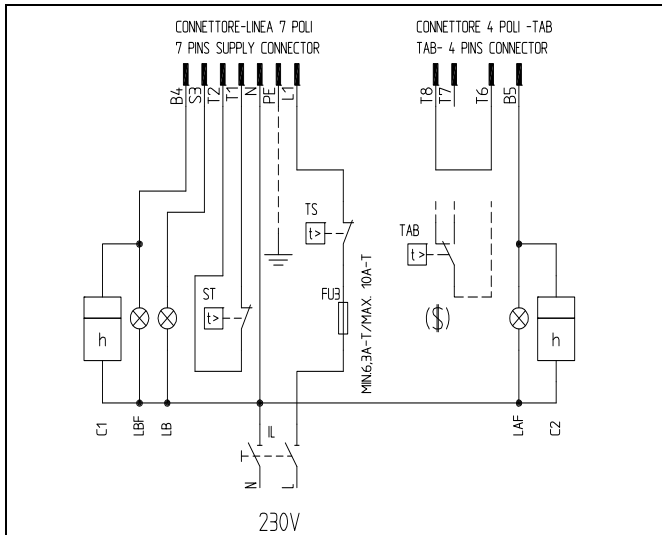


Fig. 20 - 7-poles and 4-poles connectors

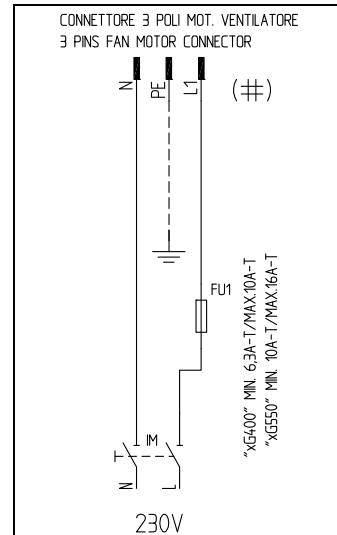


Fig. 21 - Electric motor 3-poles connector

**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

**Key**

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

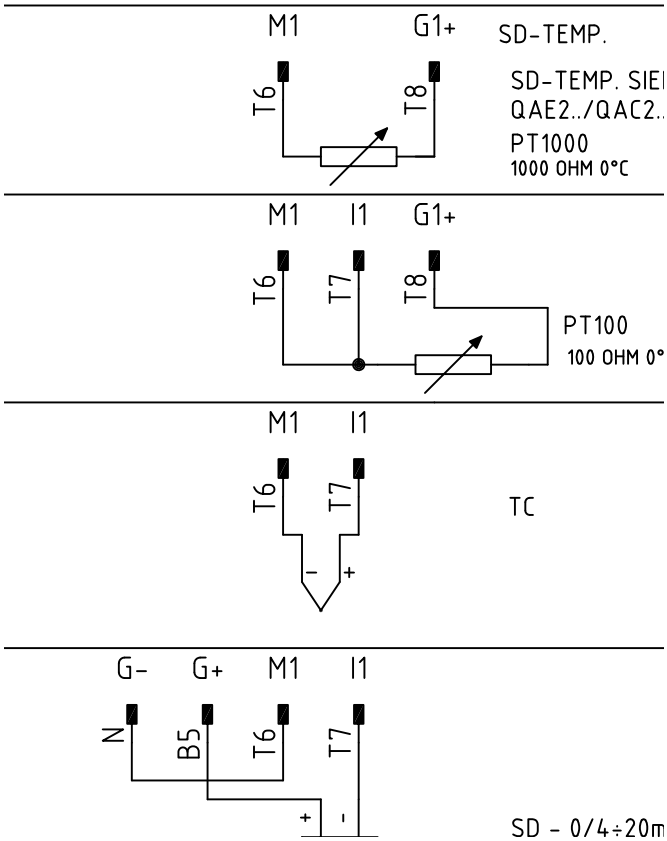


Fig. 22 - Probes connection

**Power supply without neutral**

If the power supply to the burner is 230V phase-phase (without the neutral wire), with the Siemens LME.. control box (see Appendix), between the terminal 2 on the board and the earth terminal, an RC Siemens RC466890660 filter must be inserted.

**Key**

- C - Capacitor (22nF/250V)
- R - Resistor (1Mohm)
- (\*\*\*) RC466890660 - RC Siemens filter
- (Code: 2531003)

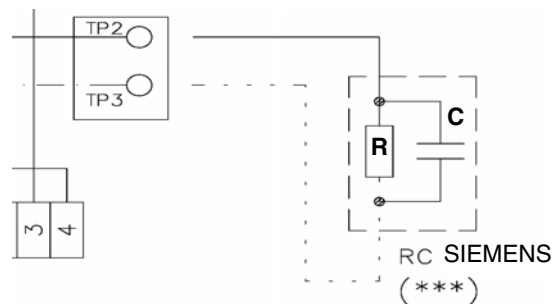


Fig. 23

### 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. 24, 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.

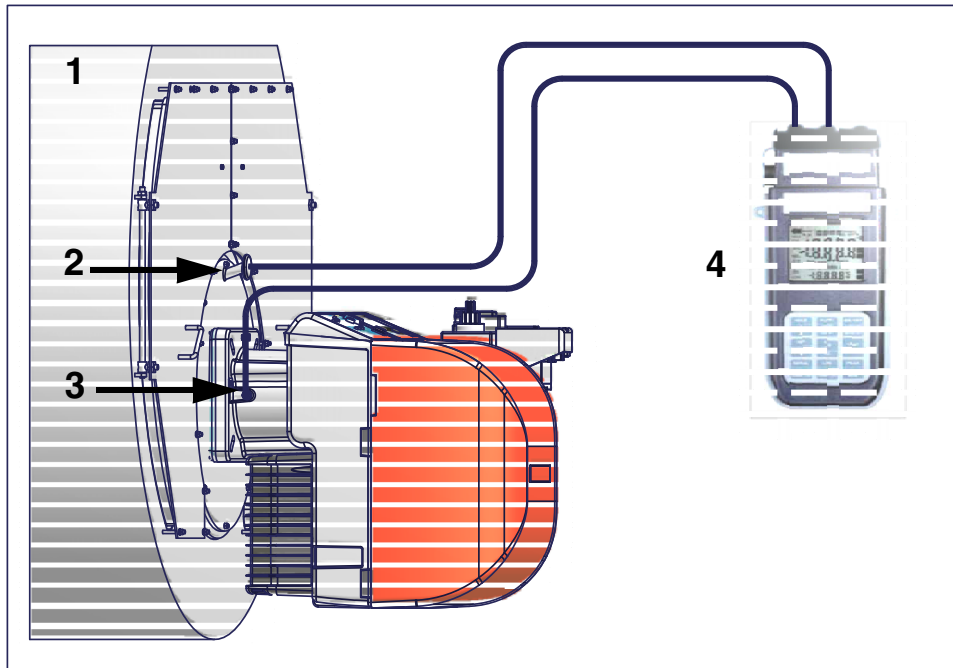


Fig. 24

#### 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. 24-2) to get the pressure in the combustion chamber and the other one into the butterfly valve's pressure outlet of the burner (Fig. 24-3). On the basis of the measured differential pressure, it is possible to get the maximum flow rate: in the pressure - rate curves (showed 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.**

#### Plugs for pressure measurement

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



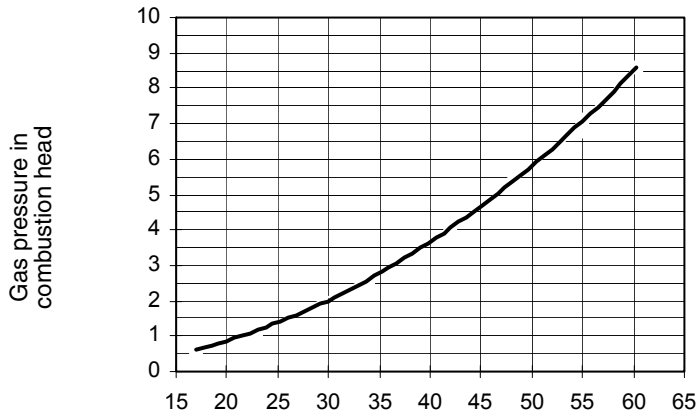
Fan air pressure plug



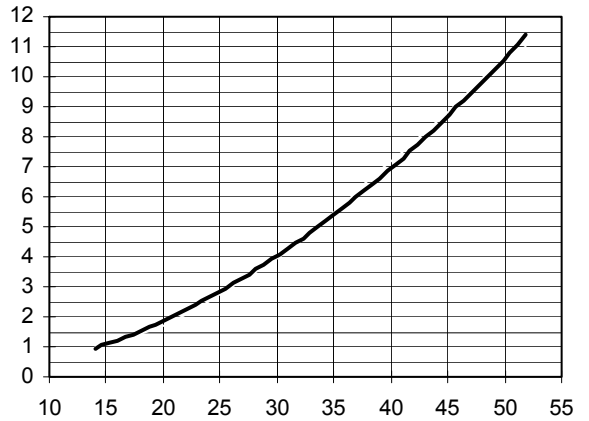
Pressure in combustion chamber plug

Gas pressure in combustion head vs. gas flow rate curves

NG550

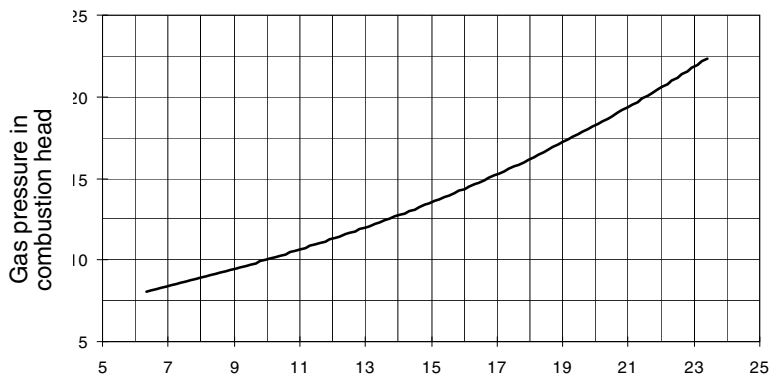


NGX550



Gas rate Stm<sup>3</sup>/h

LG550 L.P.G.

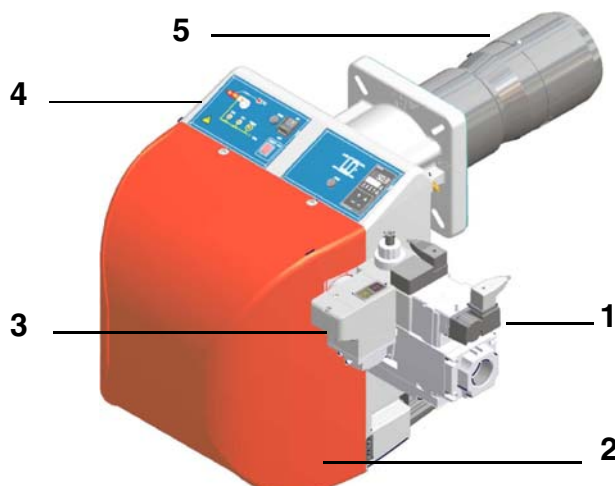


L.P.G. rate Stm<sup>3</sup>/h

**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 INVALIDATE!**




**Keys**

- 1 Valve group
- 2 Cover
- 3 Gas proving system
- 4 Control panel
- 5 Blast tube

To perform the adjustments, unscrew the fixing screws and remove the burner cover.

### 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 (see "Gas pressure in combustion head vs. gas flow rate curves" on page 22).

	<b>IMPORTANT! the combustion air excess must be adjusted according to the in the following chart.</b>
---	---

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

Adjust the air and gas flow rates at the maximum output ("high flame") first, by means of the air damper and the adjusting cam respectively.

- Check that the combustion parameters are in the suggested limits.
- Check the flow rate measuring it on the counter or, if it was not possible, verifying the combustion head pressure by means of a differential pressure gauge, as described on par. "Measuring the gas pressure in the combustion head" on page 20.
- Then, adjust the combustion values corresponding to the points between maximum and minimum: set the shape of the adjusting cam foil. The adjusting cam sets the air/gas ratio in those points, regulating the opening-closing of the throttle gas valve.
- Set, now, the low flame output, acting on the low flame microswitch of the actuator in order to avoid the low flame output increasing too much or that the flues temperature gets too low to cause condensation in the chimney.

### Adjustment procedure

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

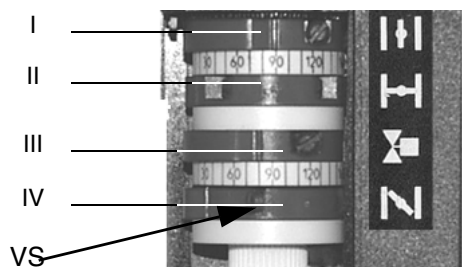
Before starting the burner up, adjust the valves group slow opening: to set the slow opening remove cover **T**, reverse it upside down and use it as a tool to twist screw **VR**. Decrease the ignition flow rate by screwing, increase it by unscrewing. Do not use a screwdriver on the screw **VR**!

Note: the screw **VS** must be removed only in case of replacement of the coil.

- 1 remove the burner cover
- 2 startup the burner by turning its main switch **A** to on: if the burner locks (LED **B** on in the control panel) press the RESET button (**C**) on the control panel ( ).
- 3 remove the actuator cover: set it to the ignition position (ignition position= 0° on the air damper index **ID** - see figure on pag.23);
- 4 (Progressive/Fully-modulating burners) Before starting the burner up, drive the high flame actuator microswitch matching the low flame one (in order to let the burner operates at the lowest output) to safely achieve the high flame stage.

As for the setting, refer to this correspondence table.

#### Berger STA



#### Siemens SQN72



	BERGER STA	Siemens SQN72
High flame position (set to 90°)	I	I (red)
Low flame and ignition position	IV	III (orange)
Stand-by position (set to 0°)	II	II (blue)
Not used	III	IV (black)

- Berger STA12: On this actuator, the manual control of the air damper is not provided; the setting of the cams is carried out working with a screwdriver on the **VS** screw placed on the cam.
- Siemens SQN72: a key is provided to move cams I and IV, the other cams can be moved by means of screws. On the Siemens actuator the AUTO/MAN mode is provided (see picture).

- 5 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;
- 6 drive the burner to high flame stage, by means of the thermostat **TAB** (except single-stage models).
- 7 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 by the boiler/utilisation:
  - **Multibloc MB-DLE**: The pressure governor 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. 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.

**⚠ Pressure stabiliser is factory-set. The setting values must be locally adapted to machine conditions. Important! Follow the instructions of the burner manufacturer!**

To adjust the air flow rate, proceed as follows, according to the burner operation (single-stage, double-stage, progressive or fully-modulating).

#### ● Adjustements for single-stage burners

- 8 loosen **VR** screw (see picture below)
- 9 move the **ID** index towards + or -, in order to increase or decrease the air flow-rate, according to the required combustion values;
- 10 fasten the **VR** screw again.



Fig. 26

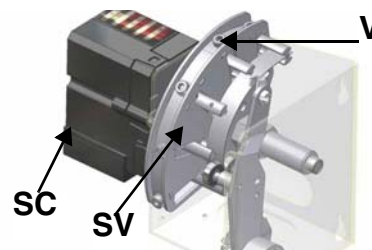


Fig. 27

#### ● Double-stage, progressive or fully-modulating burners

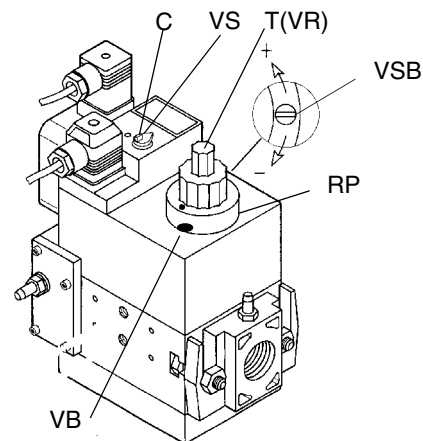
- 11 still in the high flame operation and with the actuator on its 90° position, find the **V** screw on the adjusting cam **SV** (see next picture), matching with the bearings that move along the foil and related to the actuator position.
- 12 unscrew the **V** screw to increase the air flow rate, unscrew to decrease it
- 13 once the maximum flow rate is fixed, shortcircuit for a while, the thermostat **TAB** T6 and T7 terminals (see pag. 35), as far as the fully-modulating burners, see next paragraph. The actuator will move towards the low flame position as to meet the next screw **V**; then remove the bridge;
- 14 then adjust the screw **V** related to that position;
- 15 shortcircuit, again for a while, the **TAB** T6 and T7 terminals and repeat from point 11;
- 16 repeat all these instructions for all the actuator stroke, in order to define the foil shape.

**Note:** If it should be necessary to adjust the rating of the burner in low flame, work on the related actuator cam. After this operation, check the gas rate and verify the combustion values. In case of lack or excess of air, work on the screws **V** of the adjusting cam (see pictures) matching the setting point of the air rate in low flame; unscrew to increase the air rate or screw to decrease it.

#### Fully modulating burners

To adjust the air rate in low flame and in the intermediate points, proceed as follow.

- 1 Keep pushed for 5 seconds the EXIT button on the modulator (); when the LED with the hand symbol lights up, press the arrow button, driving the actuator to the maximum opening position progressively;
- 2 stop its stroke when it meets each screw **V**: adjust the air rate by adjusting the **V** screw that matches each bearing.
- 3 Push the EXIT button to quit the manual mode.





### Adjusting the combustion head

The burner is factory-set with the combustion head at 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. 29), and to "fully-backward" position for low NO<sub>x</sub> burners (Fig. 30). As for "fully-ahead" position, it means that the head is towards 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. 28). The **ID** index shows how much the combustion head moved.

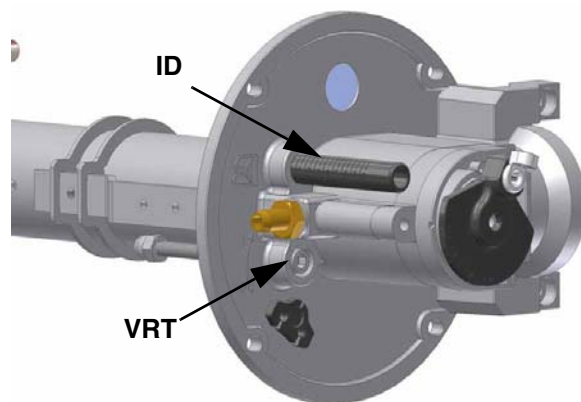


Fig. 28

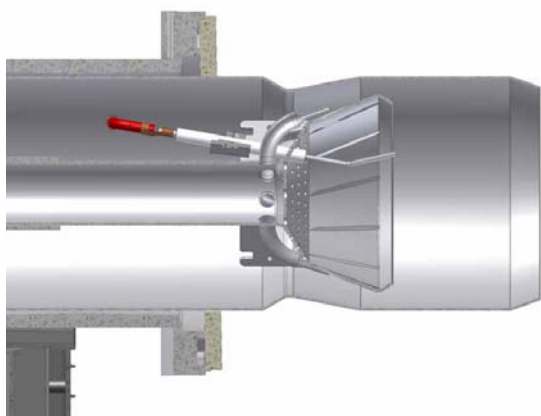


Fig. 29 - Head in "fully-ahead position"

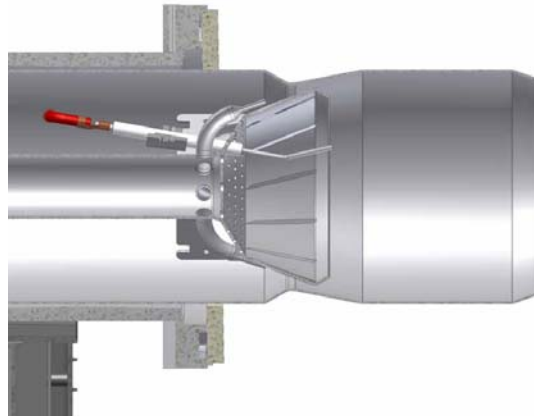


Fig. 30 - Head in "fully-backward position"

### 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 (only for single stage burners)

Calibration is carried out as follows:

- Remove the transparent plastic cap.
- Once air and gas setting have been accomplished, startup the burner.
- While the burner is operating, rotate slowly and clockwise the adjusting ring nut **VR**, until the burner locks; read the pressure value on the scale of the pressure switch and set it again to a value reduced by the 15%.
- Repeat the start-up cycle and check the burner runs properly.
- Refit the transparent plastic cover on the pressure switch.

**Calibration of air pressure switch (double-stage, progressive and fully-modulating)**

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:

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

Calibration is carried out as follows:

- Remove the transparent plastic cap.
- With the burner in operation at the maximum power, test the pressure on the pressure port of the pressure switch;
- Slowly close the manual shut-off valve upstream the pressure switch (see gas train installation diagram) until the detected pressure is reduced by 50%.
- Check that the burner works properly.
- Then screw down the 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 high gas pressure switch (when provided)**

To calibrate the high 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.



Fig. 31

## PART II: OPERATION

## 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.

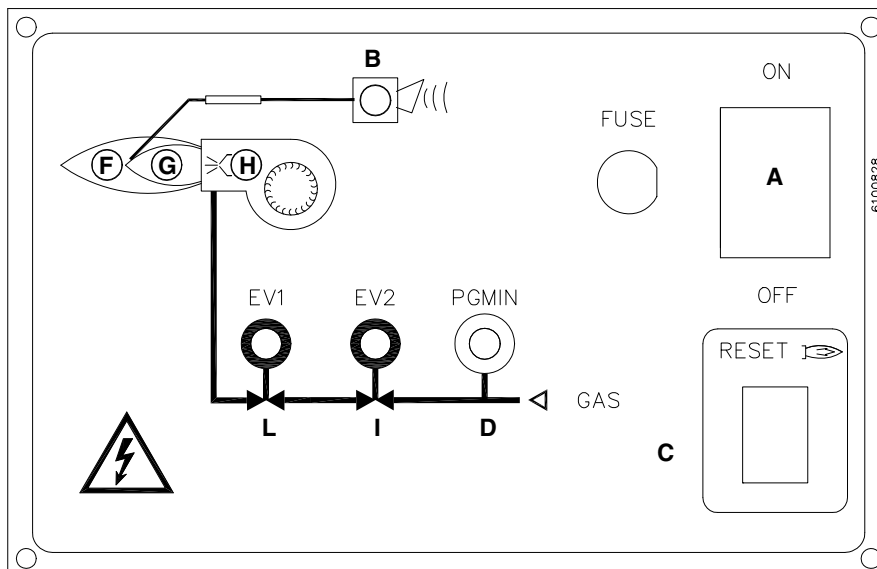
*Burner control panel*

Fig. 32 -

Single-stage and double-stage burners

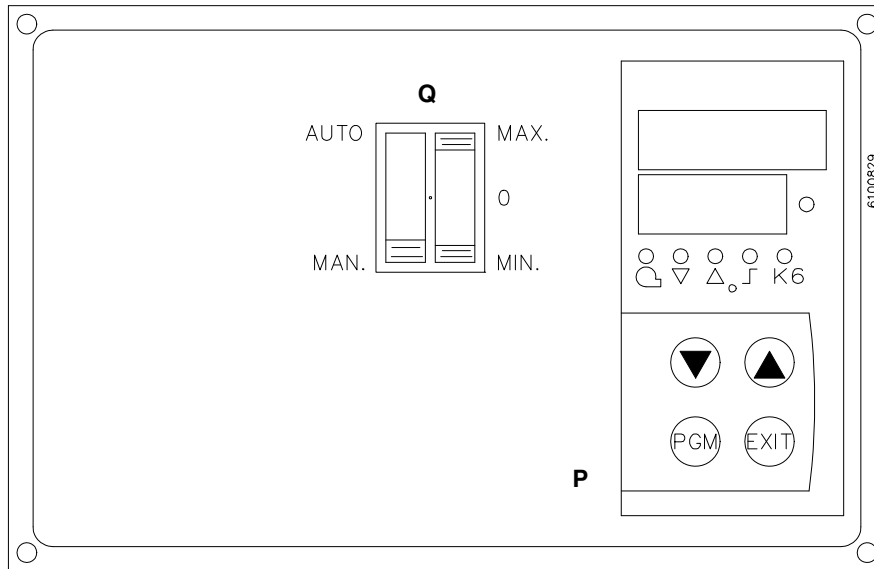


Fig. 33 - Progressive burners only

**Keys**

- A Mains switch ON - OFF
- B Lockout signalling lamp
- C Reset button for control box
- D Gas pressure switch consent signalling lamp
- F High flame operation signalling lamp (or air damper opening during pre-purge stage)
- G Low flame operation signalling lamp
- H Ignition transformer in operation signalling light
- I EV2 opening signalling lamp
- L EV1 opening signalling lamp
- P Modulator (on fully modulating burners only)
- Q Operation selector MAN - AUTO (operation in manual or automatic mode):  
 MIN = operation with minimum output  
 0 = Stop  
 MAX = operation at the maximum output

## OPERATION

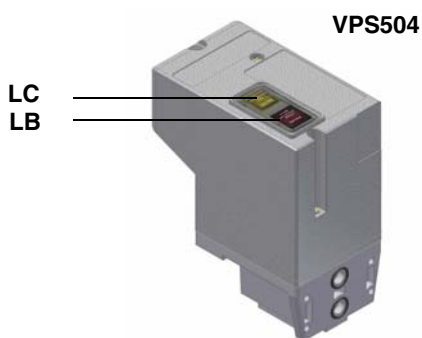


BEFORE STARTING UP THE BURNER, BE SURE THAT THE MAIN SWITCH IS ON AND THE MANUAL SHUTOFF VALVES ARE OPEN. READ CAREFULLY THE "WARNINGS" NOTES ON THIS MANUAL.

- Set to ON position the mains switch **A** on the burner electrical board front panel.
- Check the control box (see *Appendix*) is not in the lockout position (LED **B** on), if necessary reset it by means of the pushbutton **C** (reset), pushing for less than 3 seconds (otherwise the control box will switch to the "Diagnostics" mode).
- Check that the control thermostats or pressure switches start the burner up.
- Check the gas supply pressure is sufficient (LED **D** on).

**Only burners provided with gas proving system:** the gas proving system check cycle starts; when the check is accomplished it is signalled by the light of the **LC** LED on the device. When the valves check is finished, the start up cycle of the burner begins. In the case of a leak in a valve, the gas proving system locks and its red **LB** LED lights.

To reset the device press its reset pushbutton (See "Gas Proving System VPS504 (Option)" on page 16.)



### All burners

- When the startup cycle begins, the actuator drives the air damper to the maximum opening position, the fan motor starts and the pre-purge phase begins.
- During the pre-purge phase, the complete opening of the air damper is signalled by the LED **E** on the frontal panel of the electrical board.
- At the end of the pre-purge phase, the air damper goes to the ignition position, the ignition transformer comes on (signalled by the LED **H**) and few seconds later the solenoid valves **EV1** and **EV2** are energized (LEDs **L** and **I** on the front panel).
- The flame must light up in the safety time (few seconds after the gas valve opening), totherwise the gas proving system locks out. Few seconds after the opening of the valves, the ignition transformer and the lamp **H** turn off. The burner is now on.
- Some seconds after the gas valve opening, the burner starts the automatic operation: it drives to the high flame or low flame stage according to the plant request (only for progressive burners - PR) or drives to the position required from the modulator (only fullt-modulating burners - MD).

**Single stage burners:** the burner is on at the maximum power; the LEDs **E** and **G** are on;

- **High-low flame burners:** the burner is on in low flame (LED **G** is on); some seconds later the high flame operation begins and the burner switches automatically to high flame (LED **E** is on) or remains in low flame operation, depending on the plant needs.
- **Modulating burners:** they are provided with the Siemens RWF40 modulator , placed on the burner side. As for the modulator operation see the related manual.

## PART III: MAINTENANCE

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



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

**ATTENTION: READ CAREFULLY THE "WARNINGS" CHAPTER AT THE BEGINNING OF THIS MANUAL..**

## ROUTINE OPERATIONS

- Clean and check the gas filter cartridge, if necessary replace it (Fig. 34 on).
- Remove, check and clean the combustion head (Fig. 40 on).
- Check the ignition and detection electrodes, clean and adjust if necessary (see Fig. 46). In case of doubt, check the detection current according to the schemes in Fig. 47.
- Check and grease 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. 34-Fig. 35) is  $\Delta p > 10$  mbar.
- Change the filter if the pressure difference between pressure connection 1 and 3 (Fig. 34-Fig. 35) 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. 36.
- 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.

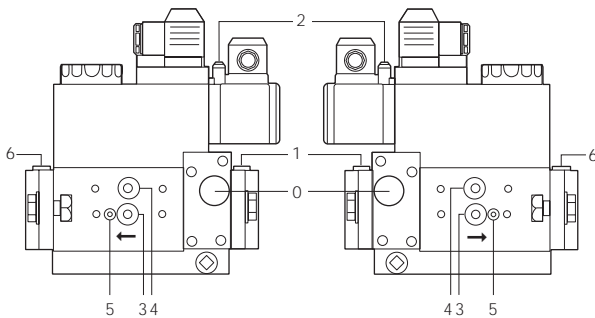


Fig. 34

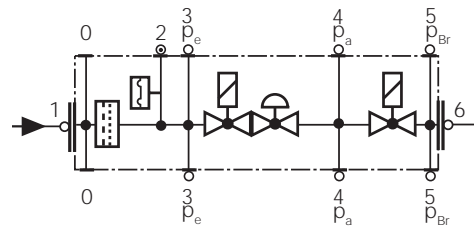


Fig. 35

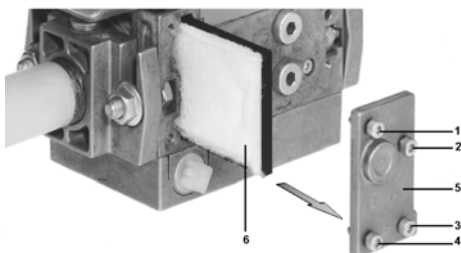


Fig. 36

### 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. 37-Fig. 38)  $\Delta p > 10$  mbar.
- Change the filter if the pressure difference between pressure connection 1 and 2 (Fig. 37-Fig. 38) 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. 39).
- 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.

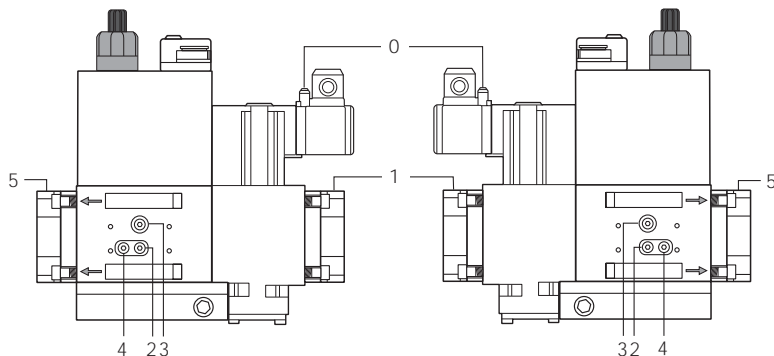


Fig. 37

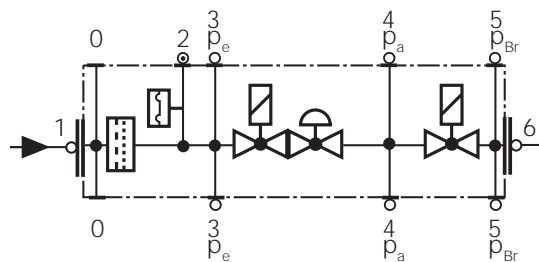


Fig. 38

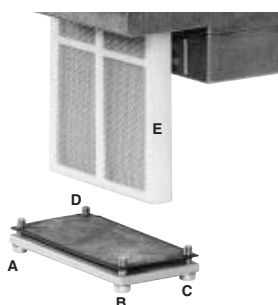


Fig. 39

### Removing and cleaning the combustion head

- 1 Remove the 4 screws V1, V2, V3, V4 and the couple of screws S1 and S2 (Fig. 40).

**⚠ ATTENTION: the screw V1 is longer than the other and must be replaced in its seat.**

- 2 Slacken the butterfly valve adjusting rod (Fig. 41) and take it out pulling outside.
- 3 Remove the connector **CR** of the ionization electrode (Fig. 42).
- 4 Unplug cable **CA** of the ignition electrode **EA** (Fig. 42) and extract it from the flange by removing the rubber **G** (Fig. 42).
- 5 To remove the head, the operator must pull it towards himself.
- 6 Once the combustion head is removed, check that the air and gas holes are not obstructed.
- 7 Clean the combustion head by means of a vacuum cleaner or, in case of scale, scrape it off by means of a scratchbrush.
- 8 To reassemble the plate, follow the procedure in reversed order.

**CAUTION:** while assembling, before tightening screws V1, V2, V3, V4, tighten screws S1 and S2, then fasten V1, V2, V3, V4. 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. 122 - H). Clean the combustion head by a compressed air blow or, in case of scale, scrape it off by a

scratchbrush.

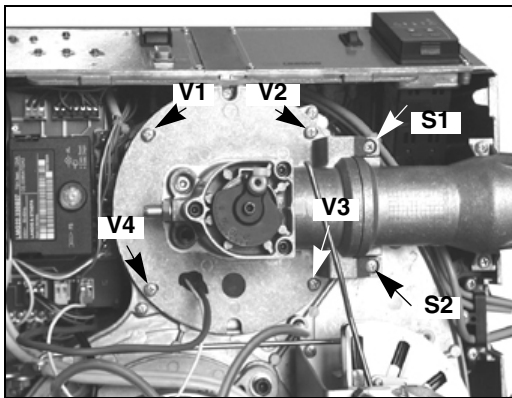


Fig. 40

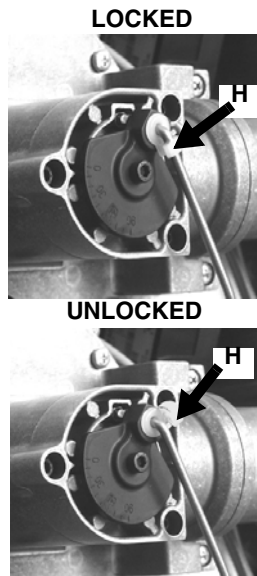


Fig. 41

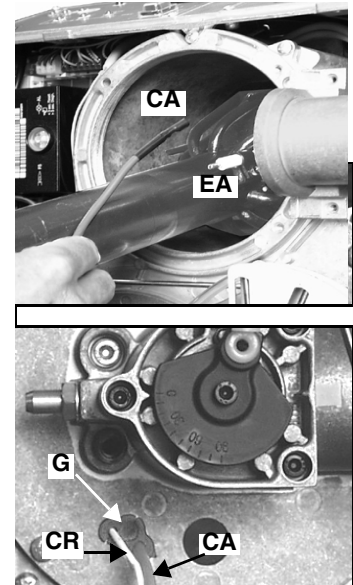


Fig. 42

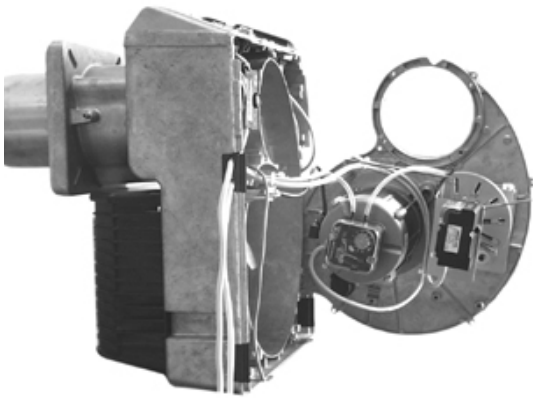


Fig. 43

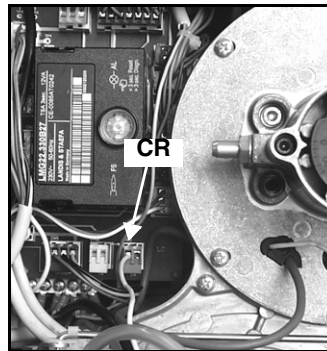


Fig. 44

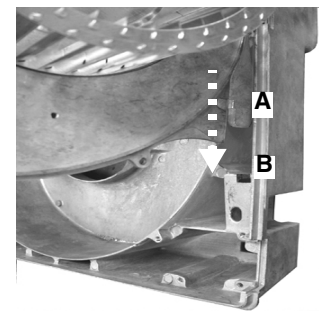
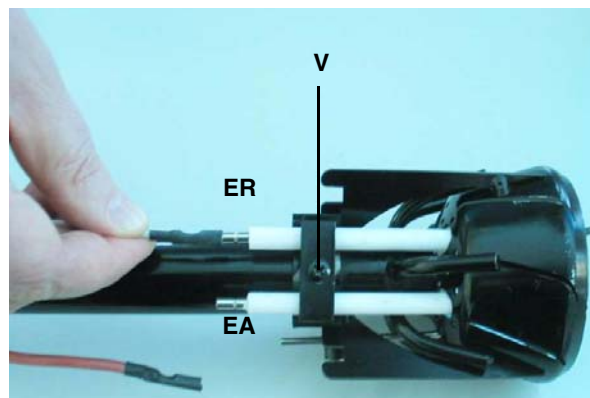


Fig. 45

### Replacing the electrodes

.To remove the electrodes, proceed as follows once the combustion head is removed (see "Removing and cleaning the combustion head" on page 31):

- 1 disconnect the cables from the electrodes (**ER** = detection electrode; **EA** = ignition electrode);
- 2 loosen the fixing screw (**V**);
- 3 remove the electrodes and replace them, observing the measures quoted on next paragraph;
- 4 re-connect the cables and re-assemble the combustion head (see next picture).





**Electrodes position setting**

**ATTENTION:** avoid the ignition and detection electrodes to contact metallic parts (blast tube, head, etc.), otherwise the boiler's operation would be compromised. Check the electrodes position after any intervention on the combustion head. The gap between the ignition electrode and the ground is  $4 \div 5 \text{ mm}$  (see Fig. 46).

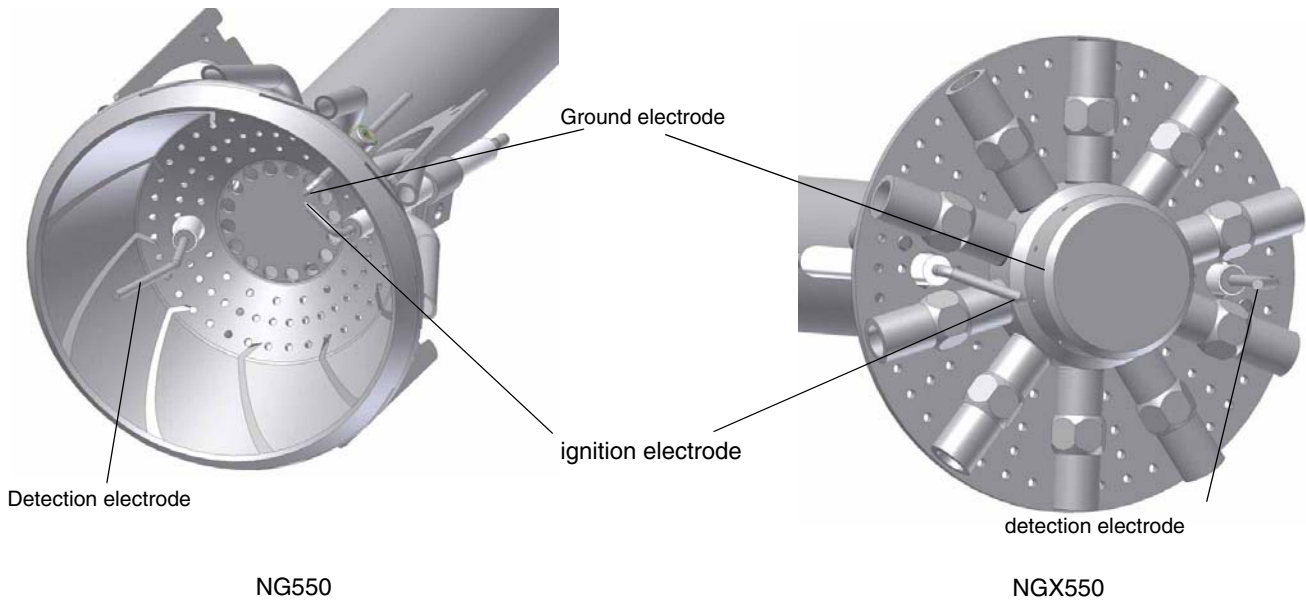


Fig. 46

**Checking the ionisation current**

If the burner locks out, execute the following inspections. To measure the detection signals refer to the diagrams in Fig. 47 . If the signal is less than the value shown, check the position of the detection electrode, the electrical contacts and if necessary replace the detection electrode (see “Electrodes position setting” on page 33).

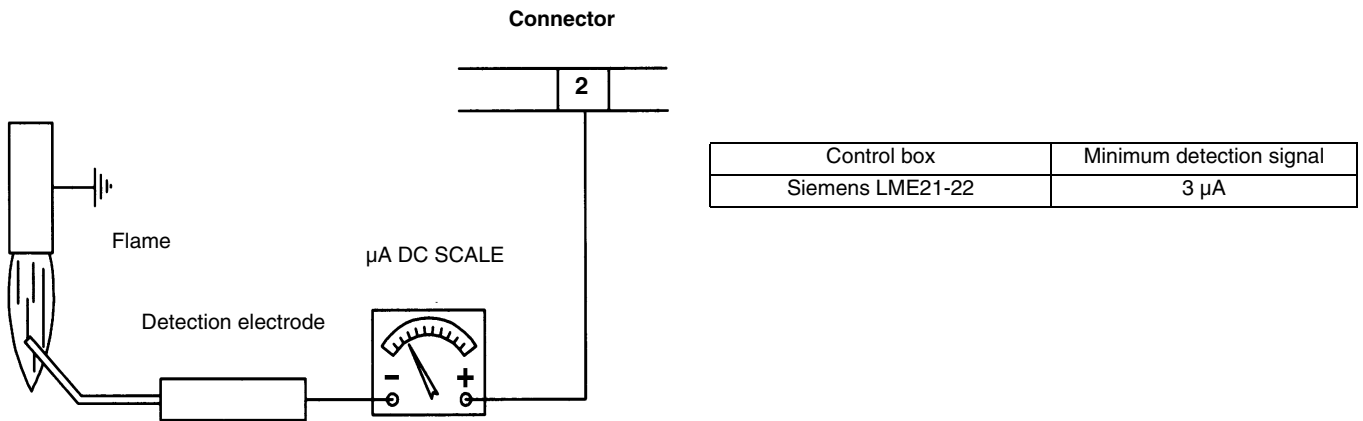


Fig. 47

**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”.

# TROUBLESHOOTING

CAUSE	TROUBLE											
	THE BURNER DOESN'T START	CONTINUE WITH PRE-PURGE	DOESN'T START AND LOCK-OUT	DOESN'T START AND REPEATS THE CYCLE	STARTS AND REPEATS THE CYCLE	STARTS AND LOCK-OUT	THE FLAME MONITOR DEVICE DOESN'T GIVE CONSENT TO START	DOESN'T SWITCH TO HIGH FLAME	DOESN'T RETURN IN LOW FLAME	THE SERVO CONTROL IS LOCK AND VIBRATE	LOCK-OUT DURING OPERATION	TURNS OF AND REPEATS CYCLE DURING OPERATION
MAIN SWITCH OPEN	●											
LACK OF GAS	●			●								
MAXIMUM GAS PRESSURE SWITCH DEFECTIVE (IF PROVIDED)	●		●									
THERMOSTATS/PRESSURE SWITCHES DEFECTIVE	●			●								●
OVERLOAD TRIPPED INTERVENTION	●											
AUXILIARIES FUSE INTERRUPTED	●											
CONTROL BOX FAULTY	●	●	●			●					●	
DEFECTIVE SERVOCONTROL (IF PROVIDED)	●	●	●				♦					
AIR PRESSURE SWITCH FAULT OR BAD SETTING	●					●	●				●	
MINIMUM GAS PRESSURE SWITCH DEFECTIVE OR GAS FILTER DIRTY	●			●	●		●					●
IGNITION TRANSFORMER FAULT			●									
IGNITION ELECTRODES BAD POSITION			●									
DETECTION ELECTRODE BAD POSITION						●					●	
BUTTERFLY VALVE BAD SETTING			●			●						
DEFECTIVE GAS GOVERNOR			●	●	●							●
GAS VALVE DEFECTIVE			●									
BAD CONNECTION OR DEFECTIVE HIGH/LOW FLAME THERMOSTAT OR PRESSURE SWITCH (IF PROVIDED)							♦	●	●	♦		
WRONG SETTING SERVO CONTROL CAM							1	1	1			
UV PROBE DIRTY OR DEFECTIVE (IF PROVIDED)			1			1					1	
PHASE-NEUTRAL INVERTED						s						
PHASE-PHASE SUPPLY OR PRESENCE OF VOLTAGE ON THE NEUTRAL CONDUCTOR(*)						s						

1 = with any control box;

s = with only LGB2../LMG2../LME11/LME2..

(\*) In such cases, insert the circuit SIEMENS "RC466890660" (See chapter "Electrical connections")

## SPARE PARTS

Description	Code		
	NG550	LG550	NGX550
COVER	1011801	1011801	1011801
CONTROL BOX	2020468	2020468	2020468
DETECTION ELECTRODE	2080108	2080108	2080108
IGNITION ELECTRODE	2080218	2080218	2080270
IGNITION ELECTRODE	2080234	2080234	-
GASKET	2110056	2110056	2110056
FAN WHEEL	2150049	2150049	2150049
GAS PRESSURE SWITCH	2160077	2160077	2160077
AIR PRESSURE SWITCH	2160053	2160053	2160053
IGNITION TRANSFORMER MOD. COFI	2170138	2170138	2170138
IGNITION TRANSFORMER MOD. DANFOSS	2170233	2170233	2170233
MOTOR	2180711	2180711	2180711
VALVE GROUP Rp1	2190341	2190341	2190341
VALVE GROUP Rp1 1/4	2190342	2190342	2190342
VALVE GROUP Rp1 1/2	21903L3	21903L3	21903L3
VALVE GROUP Rp2	21903L4	21903L4	21903L4
GAS PROVING SYSTEM (option)	2191604	2191604	2191604
ADJUSTING CAM FOIL	2440236	2440236	2440236
ACTUATOR (double stage, progressive and fully-modulating) - Berger STA13	2480074	2480074	2480074
ACTUATOR (double stage, progressive and fully-modulating) - Siemens SQN72	24800A4	24800A4	24800A4
COMBUSTION HEAD	30600F2	30600F9	30600G0
BLAST TUBE (*S)	30900F4	30900F4	30910K7
BLAST TUBE (*L)	30900H9	30900H9	30910K6
COMBUSTION HEAD WITH ELECTRODES (standard blast tube)	3501835	3501834	3501838
COMBUSTION HEAD WITH ELECTRODES (extended blast tube)	3501835	3501834	3501839
IGNITION CABLE	6050153	6050153	6050153
DETECTION CABLE	6050214	6050214	6050214
ELECTRONIC BOARD	6100541	6100541	6100541

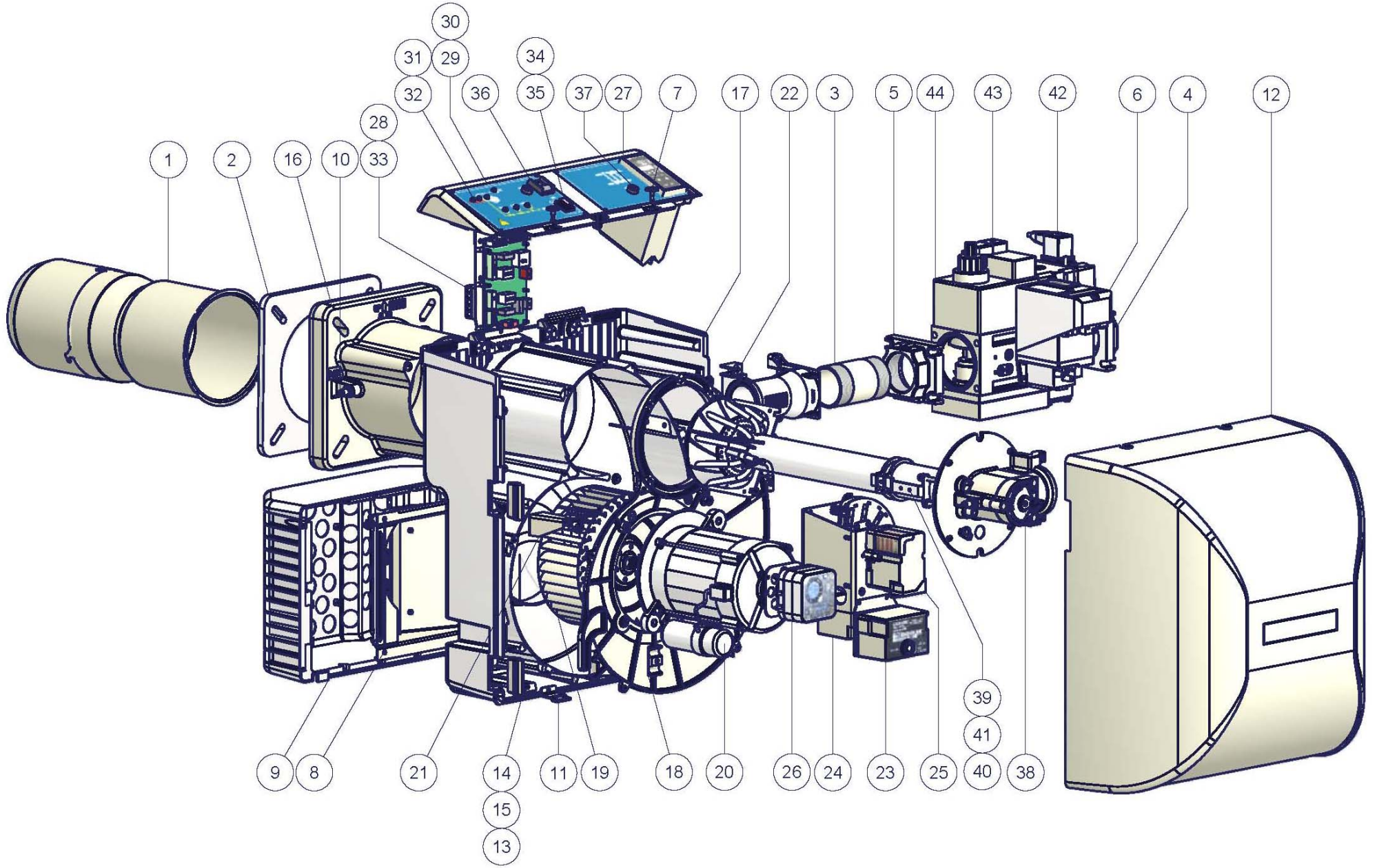
\*S:standard blast tube

L: extended blast tube

**BURNER EXPLODED VIEW**

POSITION	DESCRIPTION
1	EXTENDED BLAST TUBE
2	GENERATOR GASKET
3	THREADED GAS PIPE
4	FLANGE
5	FLANGE
6	GAS PROVING SYSTEM
7	COVER FIXING SCREW
8	AIR INTAKE
9	AIR INTAKE
10	PRESSURE PLUG
11	BRACKET
12	COVER
13	FAIRLEAD
14	FAIRLEAD
15	FAIRLEAD
16	FLANGED PIPE
17	BURNER HOUSING
18	MOTOR SUPPORT PLATE
19	FAN WHEEL
20	MOTOR
21	TRANSMISSION
22	GAS MANIFOLD

POSITION	DESCRIPTION
23	CONTROL BOX
24	IGNITION TRANSFORMER
25	ACTUATOR
26	AIR PRESSURE SWITCH
27	OUTPUT CONTROLLER
28	PRINTED CIRCUIT BOARD
29	FRONT CONTROL PANEL
30	FRONT CONTROL PANEL
31	LIGHT
32	LIGHT
33	CONTACTOR
34	LOCK-OUT RESET BUTTON
35	PROTECTION
36	SWITCH
37	FUSE
38	GAS MANIFOLD
39	EXTENDED COMBUSTION HEAD (ASSY)
40	IGNITION CABLE
41	DETECTION CABLE
42	CONNECTOR
43	CONNECTOR
44	GAS VALVES GROUP WITH GOVERNOR



**ELECTRICAL WIRING DIAGRAMS****Wiring diagram 18-163 - Complete key**

C1	LOW FLAME TIME METER
C2	HIGH FLAME TIME METER
ER	FLAME DETECTION ELECTRODE
EV1,2	GAS ELECTRO-VALVES (OR VALVES GROUP)
FU1	FAN MOTOR LINE FUSE
FU2	LINE FUSE
FU3	LINE FUSE
FU4	AUXILIARY FUSE
IL	BURNER LINE SWITCH
IM	FAN MOTOR LINE SWITCH
KM1	FAN MOTOR CONTACTOR
LAF	BURNER IN HIGH FLAME INDICATOR LIGHT
LME2x330	CONTROL BOX
LME22.330	CONTROL BOX
LB	INDICATOR LIGHT FOR BURNER LOCK-OUT
LBF	BURNER IN LOW FLAME INDICATOR LIGHT
LEV1	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE EV2
LEV2	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE EV2
LF	INDICATOR LIGHT BRUNER FUNCTIONING
LPG	INDICATOR LIGHT FOR PRESENCE OF GAS IN THE NETWORK
LTA	IGNITION TRANSFORMER INDICATOR LIGHT
MV	FAN MOTOR
PA	COMBUSTION AIR PRESSURE SWITCH
PG	MINIMUM GAS PRESSURE SWITCH
PS	LOCK-OUT RESET BUTTON
PT100	TEMPERATURE PROBE
PT1000	TEMPERATURE PROBE
RC	RC CIRCUIT
SATRONIC DLG976	CONTROL BOX
SATRONIC DMG972	CONTROL BOX
SD-0÷10V	VOLTAGE SIGNAL
SD-0/4÷20mA	CURRENT SIGNAL
SD-PRESS	PRESSURE PROBE
SD-TEMP	TEMPERATURE PROBE
SIEMENS RWF40	MODULATOR
SMA	MANUAL/AUTOMATIC SELECTOR
SMF	MIN-0-MAX FUNCTIONING MANUAL SELECTOR
ST	SERIES OF THERMOSTATS OR PRESSURE SWITCHES
STA13B0.36/83N23L	AIR DAMPER SERVO CONTROL
TA	IGNITION TRANSFORMER
TAB (\$)	HIGH-LOW THERMOSTAT/PRESSURE SWITCHES
TC	THERMOCOUPLE
TS	SAFETY THERMOSTAT OR PRESSURE SWITCH
VPS504	GAS PROVING SYSTEM (OPTIONAL)
(*)	CN11 LGB21.330 - SINGLE STAGE VERSION ONLY
(**)	PROBE CONNECTION (SEE SHEET 4)
(***)	WITH ELECTRIC SUPPLY WITHOUT NEUTRAL VERSION ONLY
(\$)	IF "TAB" USED REMOVE THE BRIDGE BETWEEN TERMINALS T6-T8

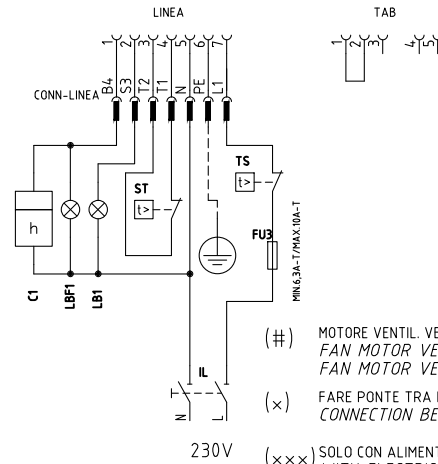
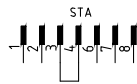
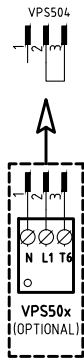
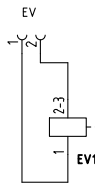
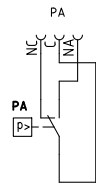
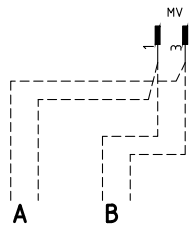
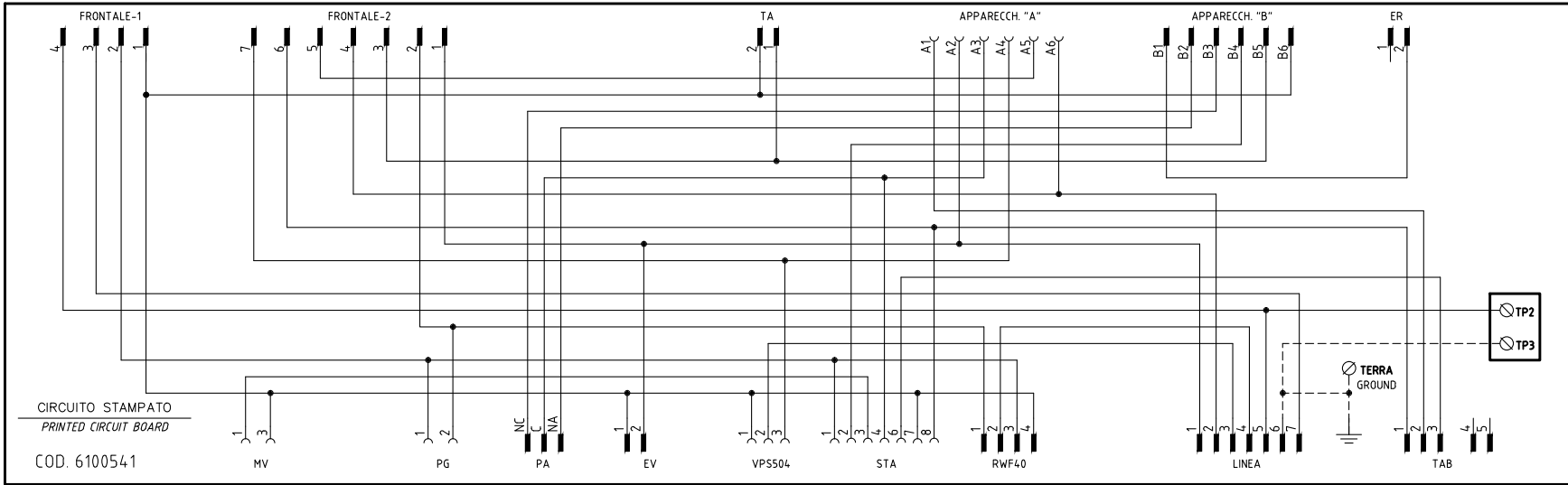
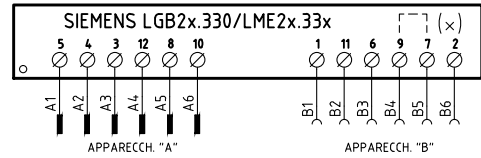
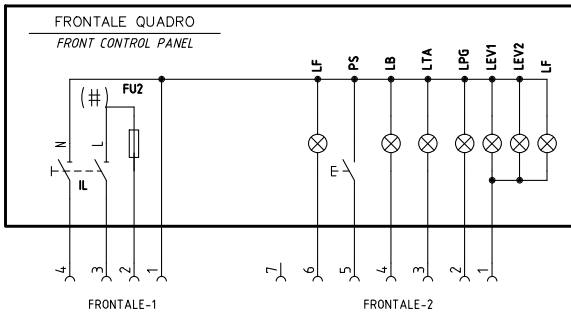
**ACTUATOR CAMS BERGER STA13B0.36/83N23L**

I	High flame
II	Stand-by
IV	Low flame
III	Not used

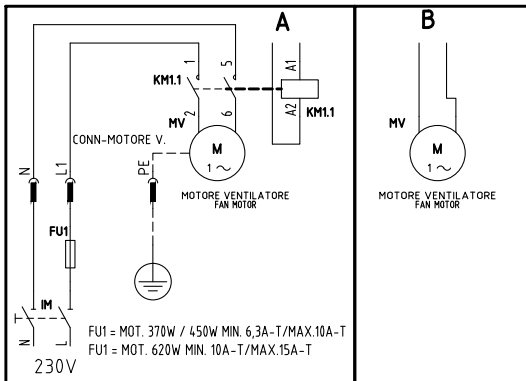
**WARNING:**

- 1 - Electrical supply 230V 50/60Hz 1N a.c.
- 2 - Do not reverse phase with neutral
- 3 - Ensure burner is properly earthed

# VERSIONE MONOSTADIO "TN" "TN" SINGLE-STAGE VERSION

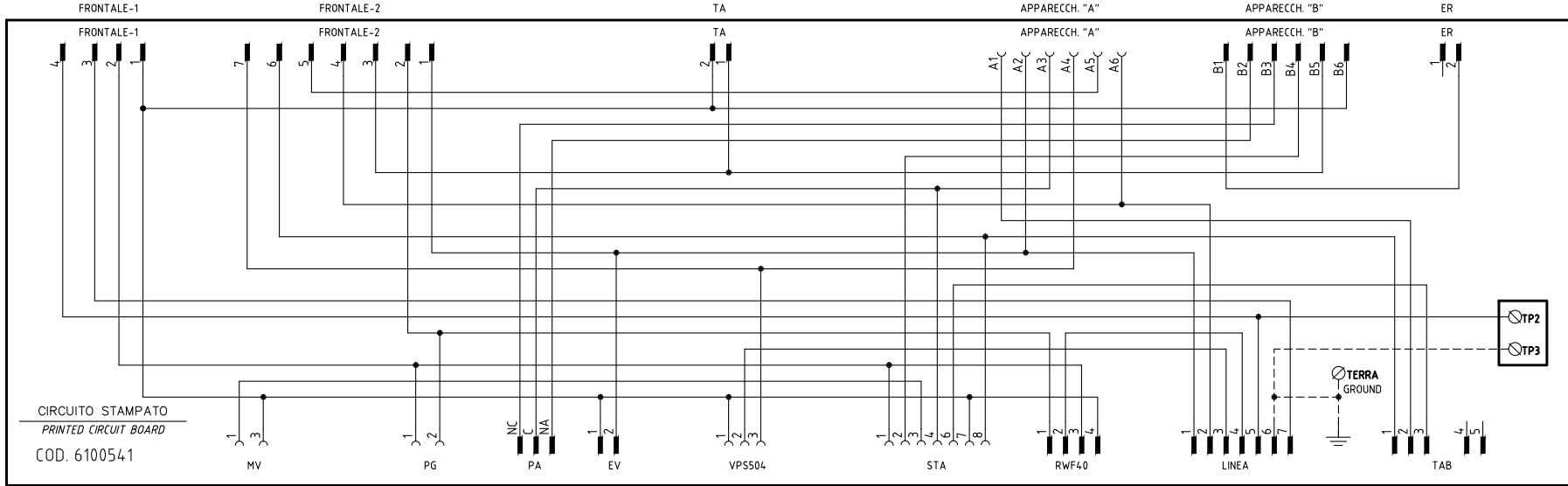
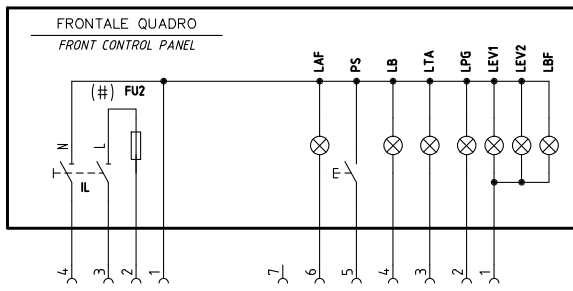


- (#) MOTORE VENTIL. VERSIONE [A], FU2 = 6,3A F; MOTORE VENTIL. VERSIONE [B], FU2 = 10A F  
FAN MOTOR VERSION [A], FU2 = 6,3 A F;  
FAN MOTOR VERSION [B], FU2 = 10 A F
- (x) FARE PONTE TRA I MORSETTI 7 E 9 SOLO CON LGB21.330  
CONNECTION BETWEEN TERMINALS 7 AND 9 WITH LGB21.330 ONLY
- (x x x) SOLO CON ALIMENTAZIONE ELETTRICA SENZA NEUTRO  
WITH ELECTRIC SUPPLY WITHOUT NEUTRAL VERSION ONLY



Data	19/10/2010	PREC.	FOGLIO
Revisione	05	/	1
Dis. N.	18 - 0163	SEGUE	TOTALE
		2	5

VERSIONE ALTA-BASSA FIAMMA "AB" / PROGRESSIVO "PR"  
 "AB" HIGH-LOW / "PR" PROGRESSIVE VERSION

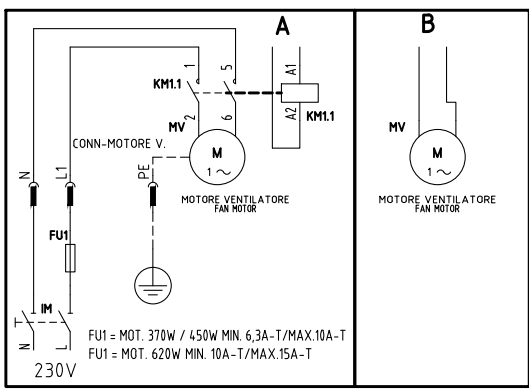
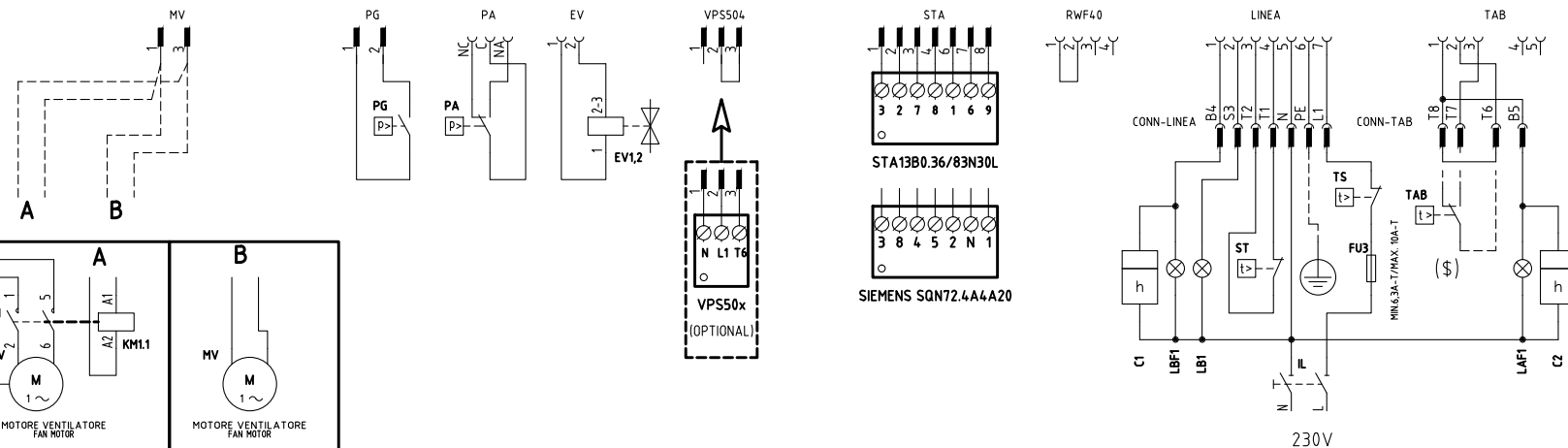


SERVOCOMANDO SERRANDA ARIA  
 AIR DAMPER ACTUATOR  
 STA13B0.36/83N30L

I ALTA FIAMMA  
 HIGH FLAME  
 SOSTA  
 STAND-BY  
 II BASSA FIAMMA  
 LOW FLAME  
 III NON USATA  
 NOT USED

SERVOCOMANDO SERRANDA ARIA  
 AIR DAMPER ACTUATOR  
 SIEMENS SQNT2.xA4.A20

I (ROSSO) ALTA FIAMMA  
 HIGH FLAME  
 II (BLU) SOSTA  
 STAND-BY  
 III (ARANCIO) BASSA FIAMMA  
 LOW FLAME  
 IV (NERO) NON USATA  
 NOT USED



(#) MOTORE VENTIL. VERSIONE [A], FU2 = 6,3A F; MOTORE VENTIL. VERSIONE [B], FU2 = 10A F  
 FAN MOTOR VERSION [A], FU2 = 6,3 A F;  
 FAN MOTOR VERSION [B], FU2 = 10 A F

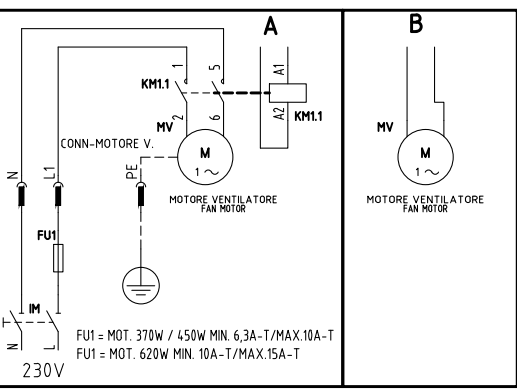
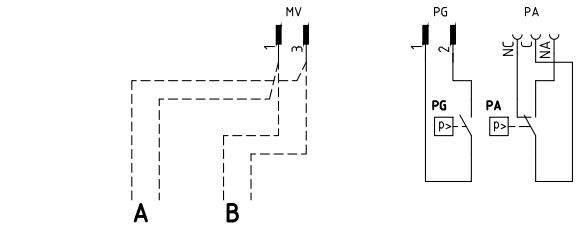
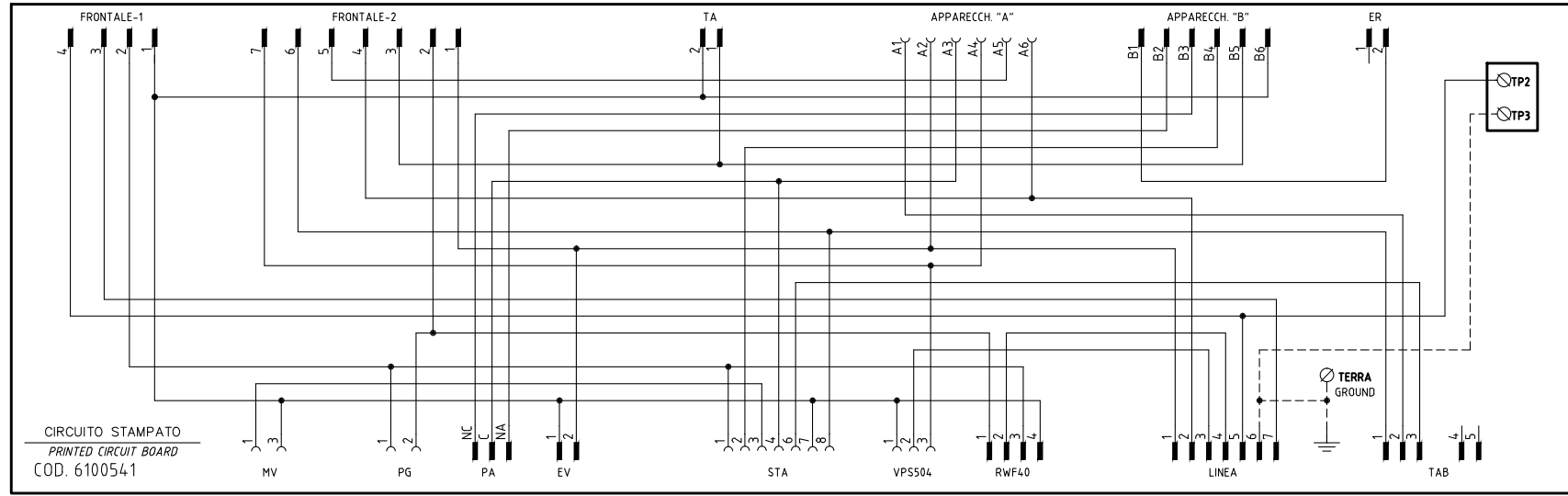
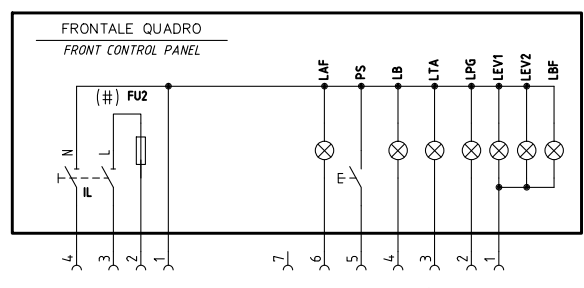
(x x x) SOLO CON ALIMENTAZIONE ELETTRICA SENZA NEUTRO  
 WITH ELECTRIC SUPPLY WITHOUT NEUTRAL VERSION ONLY

(\$) SE USATO "TAB", TOGLIERE IL PONTE TRA I MORSETTI T6-T8  
 IF USED "TAB", REMOVE THE BRIDGE BETWEEN TERMINALS T6-T8

Data	19/10/2010	PREC.	FOGLIO
Revisione	05	1	2
Dis. N.	18 - 0163	SEGUE	TOTALE
		3	5



VERSIONE MODULANTE "MD"  
"MD" MODULATING VERSION

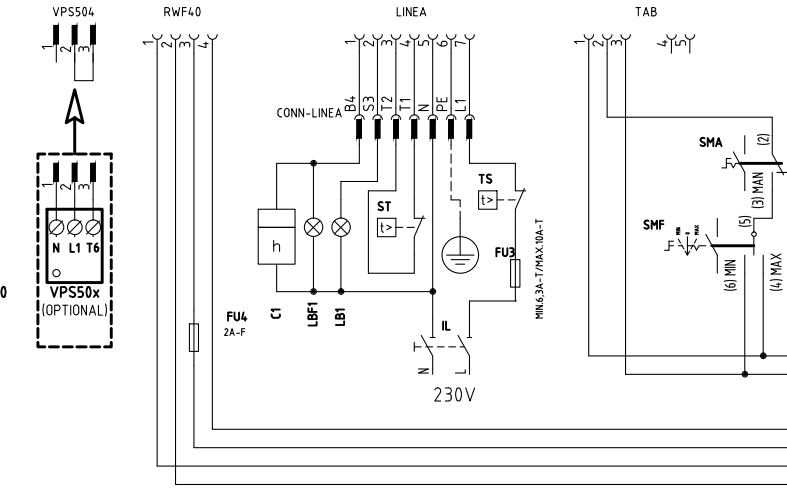
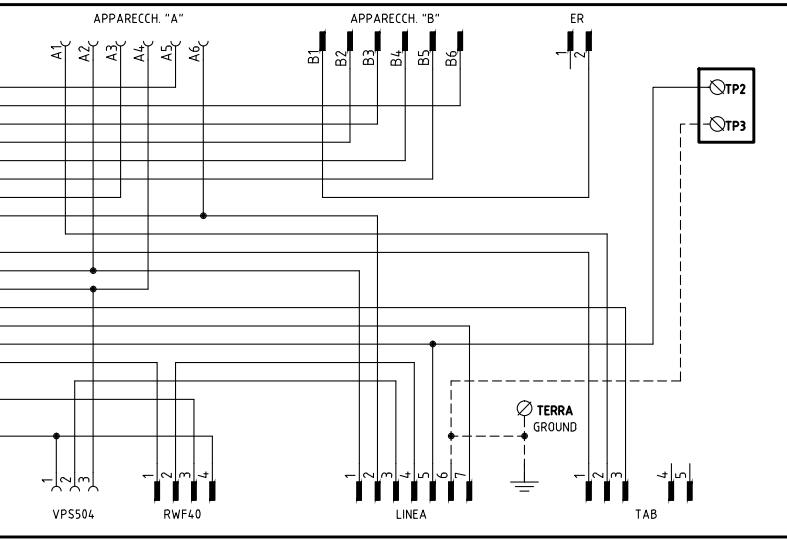
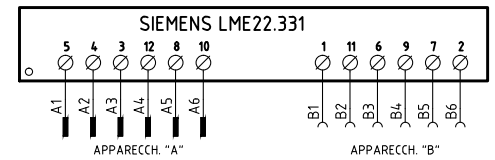


SERVOCOMANDO SERRANDA ARIA  
AIR DAMPER ACTUATOR  
STA13B0.36/83N30L

I ALTA FIAMMA HIGH FLAME  
II SOSTA STAND-BY  
III BASSA FIAMMA LOW FLAME  
IV NON USATA NOT USED

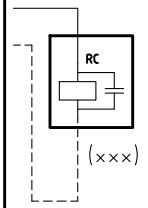
SERVOCOMANDO SERRANDA ARIA  
AIR DAMPER ACTUATOR  
SIEMENS SQN72.xA4.A20

I (ROSSO) ALTA FIAMMA HIGH FLAME  
II (BLU) SOSTA STAND-BY  
III (ARANCIO) BASSA FIAMMA LOW FLAME  
IV (NERO) NON USATA NOT USED



(#) MOTORE VENTIL. VERSIONE [A], FU2 = 6,3A F; MOTORE VENTIL. VERSIONE [B], FU2 = 10A F  
FAN MOTOR VERSION [A], FU2= 6,3 A F;  
FAN MOTOR VERSION [B], FU2= 10 A F

(x x x) SOLO CON ALIMENTAZIONE ELETTRICA SENZA NEUTRO  
WITH ELECTRIC SUPPLY WITHOUT NEUTRAL VERSION ONLY

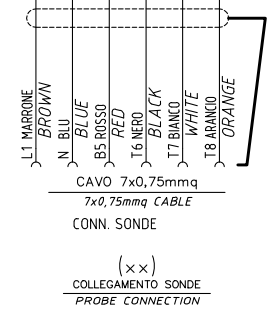


ASCON KM3 HCRMMD										
14	12	7	8	10	9	11-13	4	1	2	3
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗

600V RRR0-1-T73 (S)										
20	6	21	22	23	24	19-5	4	3	2	1
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗

SIEMENS RWF50.2x											
K2	K3	IN	1P	L1	N	KQ	G-	G+	13	12	11
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗

SIEMENS RWF55.5x													
K2	K3	IN	1P	L1	N	KQ	TE	13	G-	G+	14	12	11
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗



Data	19/10/2010	PREC.	FOGLIO
Revisione	05	2	3
Dis. N.	18 - 0163	SEQUE	TOTALE
		4	5

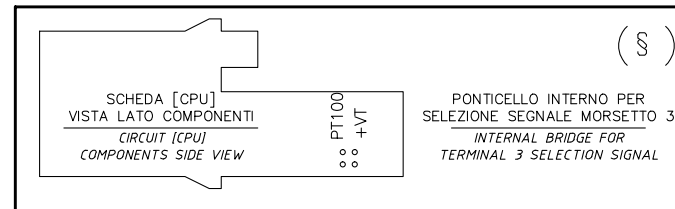
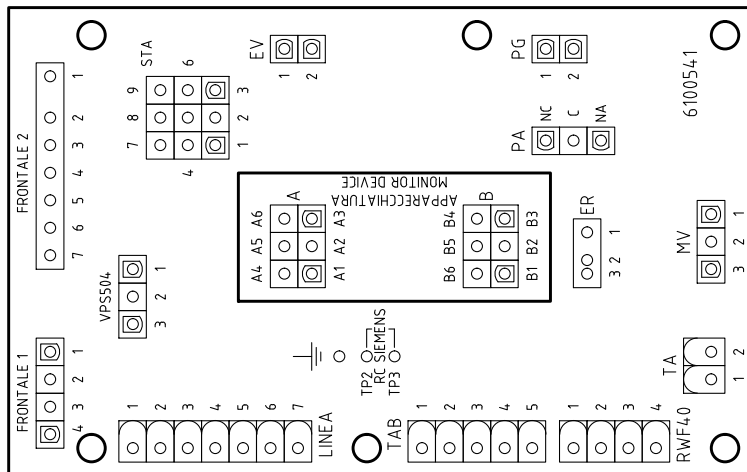
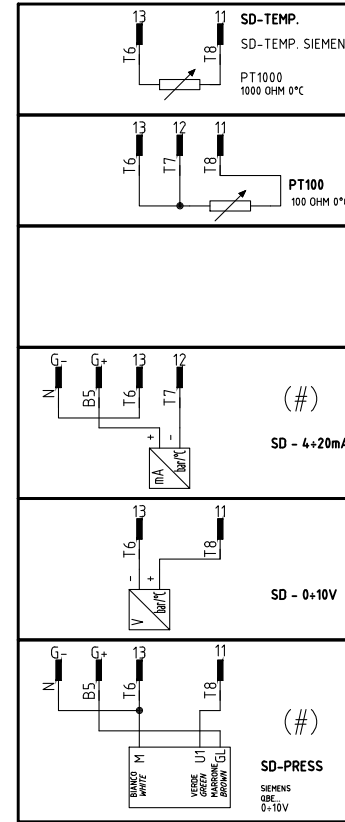
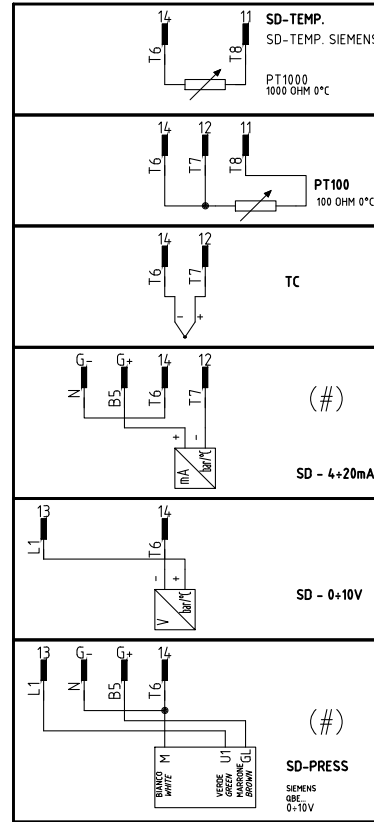
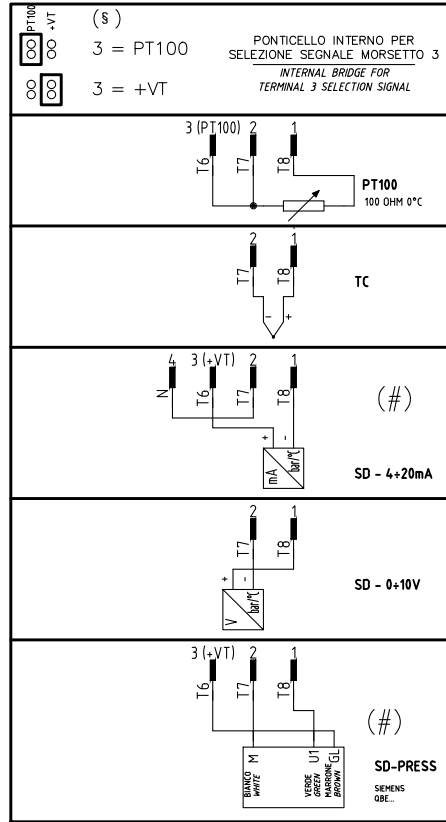
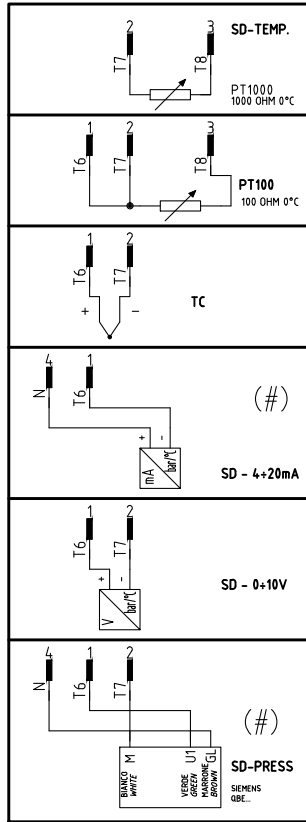
(xx)  
 ATTENZIONE COLLEGAMENTO SONDE CON CONNETTORE 7 POLI  
 WARNING PROBE CONNECTION WITH 7 PINS CONNECTOR

### KM3 HCRMMD

### 600V RRR0-1-T73

### RWF55.5x

### RWF50.2x



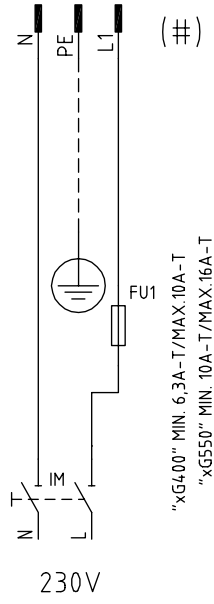
Data	19/10/2010	PREC.	FOGLIO
Revisione	05	3	4
Dis. N.	18 - 0163	SEGUE	TOTALE
		5	5

Sigla/Item	Funzione	Function
600V RRR0-1-T73	REGOLATORE MODULANTE (ALTERNATIVO)	BURNER MODULATOR (ALTERNATIVE)
C1	CONTAORE BASSA FIAMMA	LOW FLAME TIME COUNTER
C2	CONTAORE ALTA FIAMMA	HIGH FLAME TIME COUNTER
ER	ELETTRODO RILEVAZIONE FIAMMA	FLAME DETECTION ELECTRODE
EV1,2	ELETTROVALVOLE GAS (O GRUPPO VALVOLE)	GAS ELECTRO-VALVES (OR VALVES GROUP)
FU1	FUSIBILE LINEA MOTORE VENTILATORE	FAN MOTOR LINE FUSE
FU2	FUSIBILE DI LINEA	LINE FUSE
FU3	FUSIBILE DI LINEA	LINE FUSE
FU4	FUSIBILE AUSILIARIO	AUXILIARY FUSE
IL	INTERRUTTORE LINEA BRUCIATORE	BURNER LINE SWITCH
IM	INTERRUTTORE LINEA MOTORE VENTILATORE	FAN MOTOR LINE SWITCH
KM1.1	CONTATTORE MOTORE VENTILATORE	FAN MOTOR CONTACTOR
KM3 HCRMMD	REGOLATORE MODULANTE (ALTERNATIVO)	BURNER MODULATOR (ALTERNATIVE)
LAF	LAMPADA SEGNALAZIONE ALTA FIAMMA BRUCIATORE	BURNER IN HIGH FLAME INDICATOR LIGHT
LAF1	LAMPADA SEGNALAZIONE ALTA FIAMMA BRUCIATORE	BURNER IN HIGH FLAME INDICATOR LIGHT
LB	LAMPADA SEGNALAZIONE BLOCCO BRUCIATORE	INDICATOR LIGHT FOR BURNER LOCK-OUT
LB1	LAMPADA SEGNALAZIONE BLOCCO BRUCIATORE	INDICATOR LIGHT FOR BURNER LOCK-OUT
LBF	LAMPADA SEGNALAZIONE BASSA FIAMMA BRUCIATORE	BURNER IN LOW FLAME INDICATOR LIGHT
LBF1	LAMPADA SEGNALAZIONE BASSA FIAMMA BRUCIATORE	BURNER IN LOW FLAME INDICATOR LIGHT
LEV1	LAMPADA SEGNALAZIONE APERTURA [EV1]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV1]
LEV2	LAMPADA SEGNALAZIONE APERTURA [EV2]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV2]
LF	LAMPADA SEGNALAZIONE FUNZIONAMENTO BRUCIATORE	INDICATOR LIGHT BURNER OPERATION
LPG	LAMPADA SEGNALAZIONE PRESENZA GAS IN RETE	INDICATOR LIGHT FOR PRESENCE OF GAS IN THE NETWORK
LTA	LAMPADA SEGNALAZIONE TRASFORMATORE DI ACCENSIONE	IGNITION TRANSFORMER INDICATOR LIGHT
MV	MOTORE VENTILATORE	FAN MOTOR
PA	PRESSOSTATO ARIA	AIR PRESSURE SWITCH
PG	PRESSOSTATO GAS DI MINIMA PRESSIONE	MINIMUM GAS PRESSURE SWITCH
PS	PULSANTE SBLOCCO FIAMMA	FLAME UNLOCK BUTTON
PT100	SONDA DI TEMPERATURA	TEMPERATURE PROBE
RC	CIRCUITO RC	RC CIRCUIT
SD-PRESS	SONDA DI PRESSIONE	PRESSURE PROBE
SD-TEMP.	SONDA DI TEMPERATURA	TEMPERATURE PROBE
SD - 0÷10V	TRASDUTTORE USCITA IN TENSIONE	TRANSDUCER VOLTAGE OUTPUT
SD - 4÷20mA	TRASDUTTORE USCITA IN CORRENTE	TRANSDUCER CURRENT OUTPUT
SIEMENS LGB2x.330/LME2x.33x	APPARECCHIATURA CONTROLLO FIAMMA	CONTROL BOX
SIEMENS LME22.331	APPARECCHIATURA CONTROLLO FIAMMA	CONTROL BOX
SIEMENS RWF50.2x	REGOLATORE MODULANTE	BURNER MODULATOR
SIEMENS RWF55.5x	REGOLATORE MODULANTE (ALTERNATIVO)	BURNER MODULATOR (ALTERNATIVE)
SIEMENS SQN72.4A4A20	SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)	AIR DAMPER ACTUATOR (ALTERNATIVE)
SMA	SELETTORE MANUALE/AUTOMATICO	MANUAL/AUTOMATIC SWITCH
SMF	SELETTORE MANUALE FUNZIONAMENTO MIN-0-MAX	MIN-0-MAX MANUAL OPERATION SWITCH
ST	SERIE TERMOSTATI/PRESSOSTATI	SERIES OF THERMOSTATS OR PRESSURE SWITCHES
STA13B0.36/83N30L	SERVOCOMANDO SERRANDA ARIA	AIR DAMPER ACTUATOR
TA	TRASFORMATORE DI ACCENSIONE	IGNITION TRANSFORMER
TAB	TERMOSTATO/PRESSOSTATO ALTA-BASSA FIAMMA	HIGH-LOW THERMOSTAT/PRESSURE SWITCHES
TC	TERMOCOPPIA	THERMOCOUPLE
TS	TERMOSTATO/PRESSOSTATO DI SICUREZZA	SAFETY THERMOSTAT OR PRESSURE SWITCH
VPS50x	CONTROLLO DI TENUTA VALVOLE GAS (OPTIONAL)	GAS PROVING SYSTEM (OPTIONAL)

Data	19/10/2010	PREC.	FOGLIO
Revisione	05	4	5
Dis. N.	18 - 0163	SEGUE	TOTALE
		/	5

VERSIONE ALTA-BASSA FIAMMA / PROGRESSIVO CON RELE' "KAB" DI SEZIONAMENTO  
 HIGH-LOW / PROGRESSIVE VERSION WITH "KAB" SECTIONING RELAY  
 ИСПОЛНЕНИЕ ДВУХСТУПЕНЧАТОЕ / ПРОГРЕССИВНОЕ С РАЗДЕЛИТЕЛЬНЫМ РЕЛЕ «КАВ»

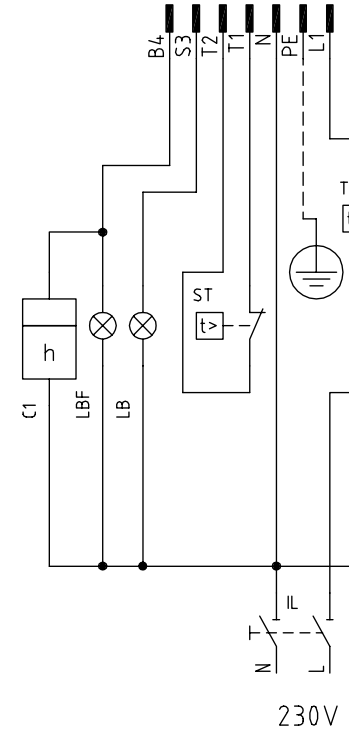
CONNETTORE [3] POLI  
 [3] PINS CONNECTOR  
 [3]-ТИ ПОЛЮСНЫЙ СОЕДИНИТЕЛЬНЫЙ РАЗЪЕМ



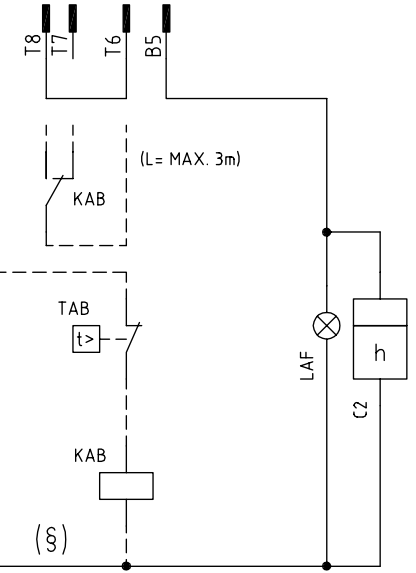
"xG400" MIN. 6,3A-T/MAX. 10A-T  
 "xG550" MIN. 10A-T/MAX. 16A-T

(#) ESCLUSO TIPO [xG350]  
 EXCLUDED TYPE [xG350]  
 ЗА ИСКЛЮЧЕНИЕМ ТИПА [xG350]

CONNETTORE [7] POLI  
 [7] PINS CONNECTOR  
 [7]-ТИ ПОЛЮСНЫЙ СОЕДИНИТЕЛЬНЫЙ РАЗЪЕМ



CONNETTORE [4] POLI  
 [4] PINS CONNECTOR  
 [4]-ТИ ПОЛЮСНЫЙ СОЕДИНИТЕЛЬНЫЙ РАЗЪЕМ



(§) SE USATO, TOGLIERE IL PONTE TRA I MORSETTI T6-T8  
 IF USED, REMOVE THE BRIDGE BETWEEN TERMINALS T6-T8  
 ЕСЛИ ИСПОЛЬЗУЕТСЯ, СНЯТЬ ПЕРЕМЫЧКУ МЕЖДУ КЛЕММАМИ T6 - T8

Data	26/06/2008	PREC.	FOGLIO
Revisione	00	/	1
Dis. N.	TAB_1	SEGUE	TOTALE
		2	1

SIGLA/ITEM	FUNZIONE	FUNCTION
C1	CONTAORE BASSA FIAMMA	LOW FLAME TIME COUNTER
C2	CONTAORE ALTA FIAMMA	HIGH FLAME TIME COUNTER
FU1	FUSIBILE LINEA MOTORE VENTILATORE	FAN MOTOR LINE FUSE
FU3	FUSIBILE LINEA BRUCIATORE	BURNER LINE FUSE
IL	INTERRUTTORE LINEA BRUCIATORE	BURNER LINE SWITCH
IM	INTERRUTTORE LINEA MOTORE VENTILATORE	FAN MOTOR LINE SWITCH
KAB	RELE' AUSILIARIO	AUXILIARY RELAY
LAF	LAMPADA SEGNALAZIONE ALTA FIAMMA BRUCIATORE	BURNER IN HIGH FLAME INDICATOR LIGHT
LB	LAMPADA SEGNALAZIONE BLOCCO BRUCIATORE	INDICATOR LIGHT FOR BURNER LOCK-OUT
LBF	LAMPADA SEGNALAZIONE BASSA FIAMMA BRUCIATORE	BURNER IN LOW FLAME INDICATOR LIGHT
ST	SERIE TERMOSTATI/PRESSOSTATI	SERIES OF THERMOSTATS OR PRESSURE SWITCHES
TAB	TERMOSTATO/PRESSOSTATO ALTA-BASSA FIAMMA	HIGH-LOW THERMOSTAT/PRESSURE SWITCHES
TS	TERMOSTATO/PRESSOSTATO DI SICUREZZA	SAFETY THERMOSTAT OR PRESSURE SWITCH

SIGLA/ITEM	FUNZIONE	FUNCTION
C1	CONTAORE BASSA FIAMMA	СЧЕТЧИК ЧАСОВ РАБОТЫ НА МАЛОМ ПЛАМЕНИ
C2	CONTAORE ALTA FIAMMA	СЧЕТЧИК ЧАСОВ РАБОТЫ НА БОЛЬШОМ ПЛАМЕНИ
FU1	FUSIBILE LINEA MOTORE VENTILATORE	ПЛАВКИЙ ПРЕДОХРАНИТЕЛЬ ЛИНИИ ДВИГАТЕЛЯ ВЕНТИЛЯТОРА
FU3	FUSIBILE LINEA BRUCIATORE	ПЛАВКИЙ ПРЕДОХРАНИТЕЛЬ ЛИНИИ ГОРЕЛКИ
IL	INTERRUTTORE LINEA BRUCIATORE	ВЫКЛЮЧАТЕЛЬ ЛИНИИ ГОРЕЛКИ
IM	INTERRUTTORE LINEA MOTORE VENTILATORE	ВЫКЛЮЧАТЕЛЬ ЛИНИИ ДВИГАТЕЛЯ ВЕНТИЛЯТОРА
KAB	RELE' AUSILIARIO	ВСПОМОГАТЕЛЬНОЕ РЕЛЕ
LAF	LAMPADA SEGNALAZIONE ALTA FIAMMA BRUCIATORE	СИГНАЛЬНАЯ ЛАМПОЧКА БОЛЬШОГО ПЛАМЕНИ ГОРЕЛКИ
LB	LAMPADA SEGNALAZIONE BLOCCO BRUCIATORE	СИГНАЛЬНАЯ ЛАМПОЧКА БЛОКИРОВКИ ГОРЕЛКИ
LBF	LAMPADA SEGNALAZIONE BASSA FIAMMA BRUCIATORE	СИГНАЛЬНАЯ ЛАМПОЧКА МАЛОГО ПЛАМЕНИ ГОРЕЛКИ
ST	SERIE TERMOSTATI/PRESSOSTATI	РЯД ТЕРМОСТАТОВ/РЕЛЕ ДАВЛЕНИЯ
TAB	TERMOSTATO/PRESSOSTATO ALTA-BASSA FIAMMA	ТЕРМОСТАТ/РЕЛЕ ДАВЛЕНИЯ БОЛЬШОГО/МАЛОГО ПЛАМЕНИ
TS	TERMOSTATO/PRESSOSTATO DI SICUREZZA	ПРЕДОХРАНИТЕЛЬНЫЙ ТЕРМОСТАТ/ РЕЛЕ ДАВЛЕНИЯ

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**SIEMENS LME11/21/22 CONTROL BOX**

The series of equipment LME.. is used for the startup and supervision of 1- or 2- stage gas burners. The series LME.. is interchangeable with the series LGB.. and LMG..., all diagrams and accessories are interchangeable.

**Comparative table**

LGB Series	LMG Series	LME Series
---	LMG 25.33	LME 11.33
LGB 21.33	LMG 21.33	LME 21.33
LGB 22.33	LMG 22.33	LME 22.33

**Preconditions for burner startup**

- Burner control must be reset
- All contacts in the line are closed, request for heat
- No undervoltage
- Air pressure switch LP must be in its "no-load" position
- Fan motor or AGK25 is closed
- Flame detector is darkened and there is no extraneous light

**Undervoltage**

Safety shutdown from the operating position takes place should mains voltage drop below about AC 175 V (at UN = AC 230 V)

Restart is initiated when mains voltage exceeds about AC 185 V (at UN = AC 230 V).

**Controlled intermittent operation**

After no more than 24 hours of continuous operation, the burner control will initiate automatic controlled shutdown followed by a restart.

**Reversed polarity protection with ionization**

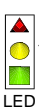
If the connections of live conductor (terminal 12) and neutral conductor (terminal 2) are mixed up, the burner control will initiate lockout at the end of the safety time "TSA".

**Control sequence in the event of fault**

If lockout occurs, the outputs for the fuel valves, the burner motor and the ignition equipment will immediately be deactivated (< 1 second).

**Operational status indication**

In normal operation, the different operating states are showed by means of the multicolor LED, inside the lockout reset button:

	<p><b>red LED</b></p> <p><b>yellow LED</b></p> <p><b>green LED</b></p> <p>LED</p>	<p>Steady on</p> <p>.....</p> <p>Off</p> <p>○...</p>
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During startup, status indication takes place according to the table:

Status	Color code	Color
Waiting time tw, other waiting states	○.....	Off
Ignition phase, ignition controlled	●○●○●○●○●○●○	Flashing yellow
Operation, flame ok	□.....	Green
Operation, flame not ok	□○□○□○□○□○□○	Flashing green
Extraneous light on burner startup	□▲□▲□▲□▲□▲□▲	Green - red
Undervoltage	●▲●▲●▲●▲●▲●▲	Yellow - red
Fault, alarm	▲.....	Red
Error code output (refer to "Error code table")	▲○ ▲○ ▲○ ▲○	Flashing red

**START-UP PROGRAM**

As far as the startup program, see its time diagram:

**A Start command (switching on)**

This command is triggered by control thermostat / pressure controller «R». Terminal 12 receives voltage and the programming mechanism starts running. On completion of waiting time «tw» with the LME21..., or after air damper «SA» has reached the nominal load position (on completion of «t1 1») with the LME22..., fan motor «M» will be started.

**tw Waiting time**

During the waiting time, air pressure monitor «LP» and flame relay «FR» are tested for correct contact positions.

**t11 Programmed opening time for actuator «SA»**

(Only with LME22...) The air damper opens until the nominal load position is reached. Only then will fan motor «M» be switched on.

**t10 Specified time for air pressure signal**

On completion of this period of time, the set air pressure must have built up, or else lockout will occur.

**t1 Prepurge time**

Purging the combustion chamber and the secondary heating surfaces: required with low-fire air volumes when using the LME21... and with nominal load air volumes when using the LME22.... The diagrams show the so-called prepurge time «t1» during which air pressure monitor «LP» must indicate that the required air pressure is available. The effective prepurge time «t1» comprises interval end «tw» through «t3».

**t12 Programmed closing time for actuator «SA»**

(Only with LME22...) During «t12», the air damper travels to the low-fire position.

**t3 Preignition time**

During «t3» and up to the end of «TSA», flame relay «FR» is forced to close. On completion of «t3», the release of fuel is triggered at terminal 4.

**TSA Ignition safety time**

On completion of «TSA», a flame signal must be present at terminal 1. That flame signal must be continuously available until shutdown occurs, or else flame relay «FR» will be deenergized, resulting in lockout.

**t4 Interval BV1 and BV2-LR**

Time between the end of TSA and the signal to the second fuel valve BV2 or to the load controller LR

**B - B' Interval for flame establishment**

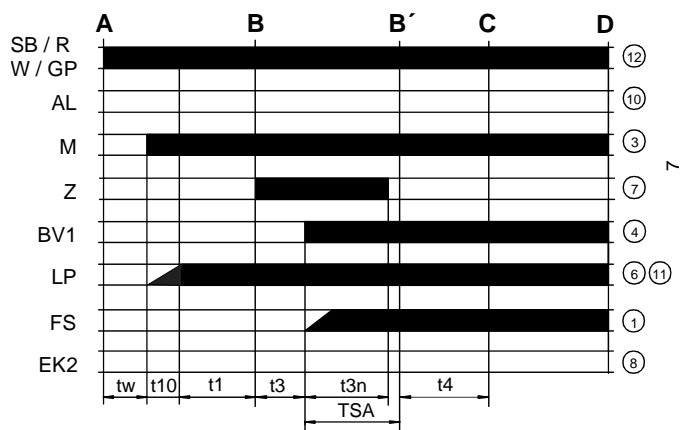
**C Burner operation position**

**C - D Burner operation (heat production)**

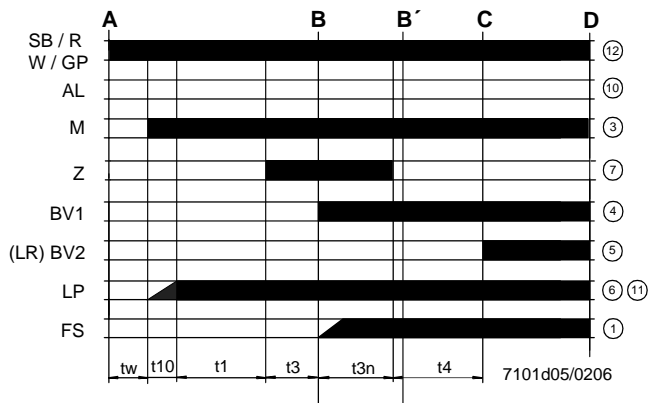
**D Controlled by "R" shutdown**

The burner stops and the control device is ready for a new startup.

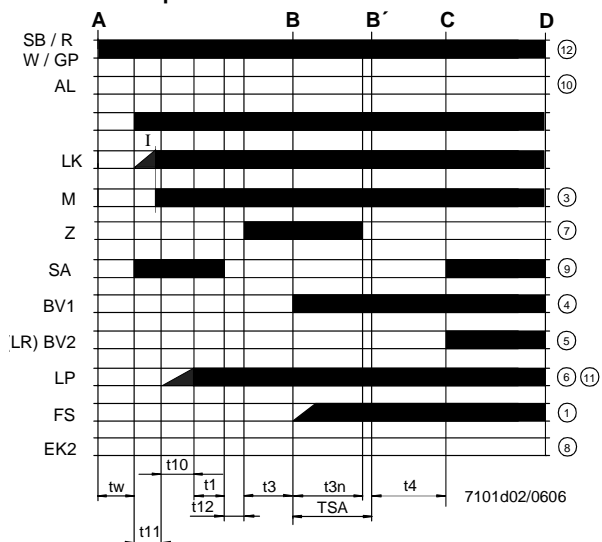
**LME11 control sequence**



**LME21 control sequence**



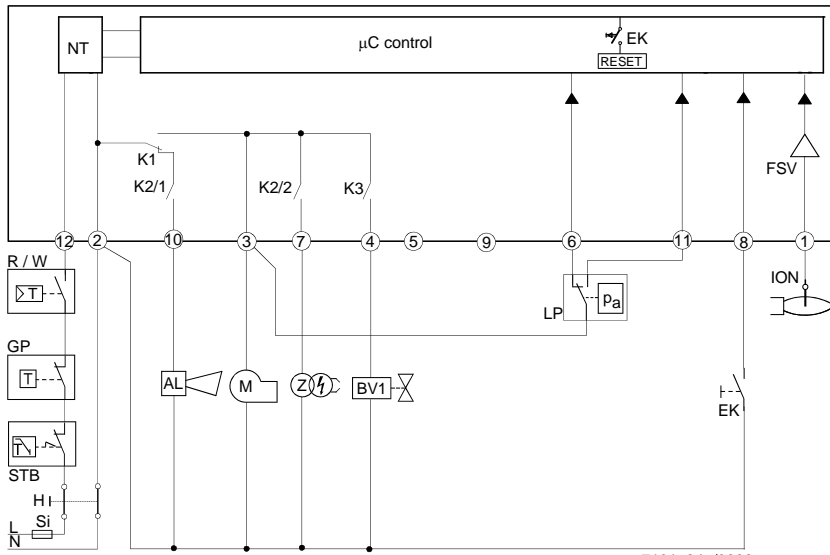
**LME22 control sequence**



**Control sequence**

- $t_w$  Waiting time
- $t_1$  Purge time
- TSA Ignition safety time
- $t_3$  Preignition time
- $t_{3n}$  Postignition time
- $t_4$  Interval between BV1 and BV2/LR
- $t_{10}$  Specified time for air pressure signal
- $t_{11}$  Programmed opening time for actuator SA
- $t_{12}$  Programmed closing time for actuator SA

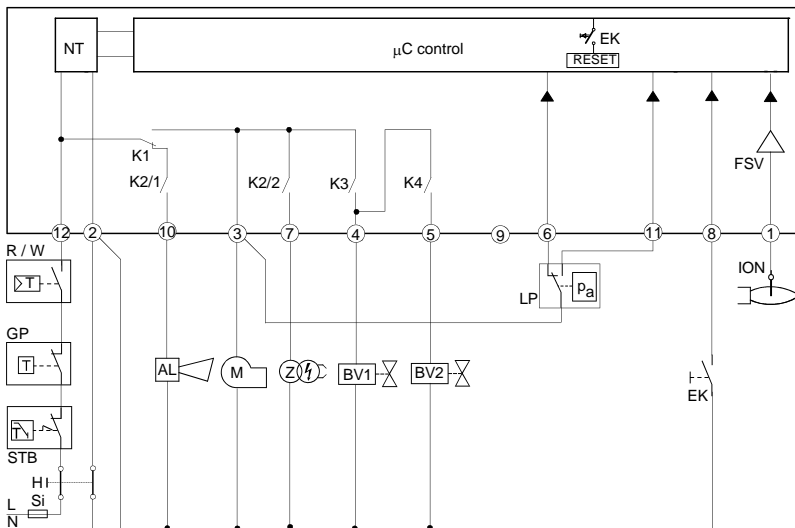
### LME11 connection diagram



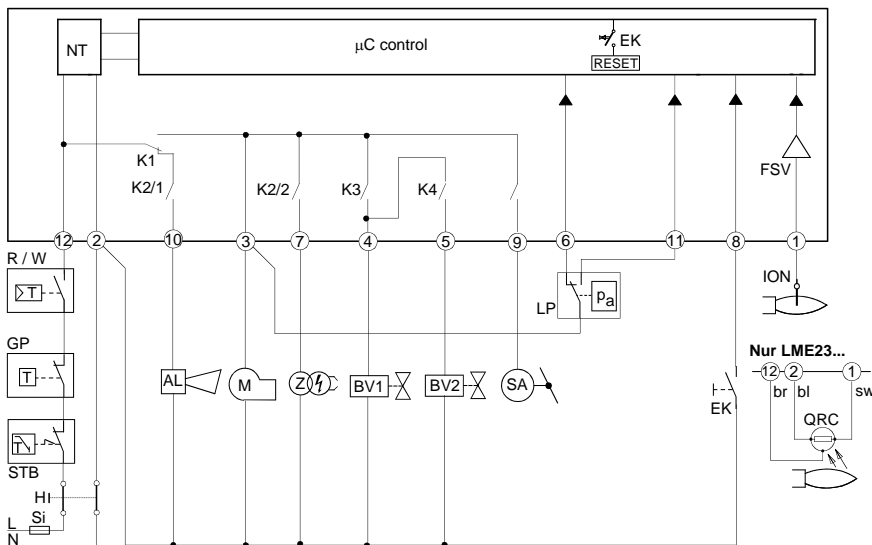
### Connection diagram

- AL Error message (alarm)
- BV Fuel valve
- EK2 Remote lockout reset button
- FS Flame signal
- GP Gas pressure switch
- LP Air pressure switch
- LR Load controller
- M Fan motor
- R Control thermostat/pressurestat
- SB Safety limit thermostat
- W Limit thermostat /pressure switch
- Z Ignition transformer

### LME21 connection diagram



### LME22 connection diagram





## CONTROL PROGRAM IN THE EVENT OF FAULT

- If a fault occurs, all outputs will immediately be deactivated (in less than 1s).
- After an interruption of power, a restart will be made with the full program sequence.
- If the operating voltage drops below the undervoltage threshold, a safety shutdown is performed.
- If the operating voltage exceeds the undervoltage threshold, a restart will be performed.
- In case of extraneous light during "t1", a lockout occurs.
- In case of extraneous light during "tw", there is a prevention of startup and a lockout after 30 seconds.
- In case of no flame at the end of TSA, there will be max. 3 repetitions of the startup cycle, followed by a lockout at the end of TSA, for mod. LME11..; directly a lockout at the end of TSA for LME21-22 models.
- For LME11 model: if a loss of flame occurs during operation, in case of an establishment of flame at the end of TSA, there will be max. 3 repetitions, otherwise a lockout will occur.
- For LME21-22 models: if a loss of flame occurs during operation, there will be a lockout.
- If the contact of air pressure monitor LP is in working position, a prevention of startup and lockout after 65 seconds will occur.
- If the contact of air pressure monitor LP is in normal position, a lockout occurs at the end of t10.
- If no air pressure signal is present after completion of t1, a lockout will occur.

## CONTROL BOX LOCKED

In the event of lockout, the LME.. remains locked and the red signal lamp (LED) will light up. The burner control can immediately be reset. This state is also maintained in the case of mains failure.

## DIAGNOSTICS OF THE CASE OF FAULT

- Press the lockout reset button for more than 3 seconds to activate the visual diagnostics.
- Count the number of blinks of the red signal lamp and check the fault condition on the "Error code table" (the device repeats the blinks for regular intervals).

During diagnostics, the control outputs are deactivated:

- the burner remains shut down;
- external fault indication is deactivated;
- fault status is showed by the red LED, inside the LME's lockout reset button according to the "Error code table":

ERROR CODE TABLE	
2 blinks **	<b>No establishment of flame at the end of TSA</b> - Faulty or soiled fuel valves - Faulty or soiled flame detector - Inadequate adjustment of burner, no fuel - Faulty ignition equipment
3 blinks ***	<b>The air pressure switch does not switch or remains in idle position:</b> - LP is faulty - Loss of air pressure signal after t10 - LP is welded in normal position.
4 blinks ****	- Extraneous light when burner starts up.
5 blinks *****	- LP is working position.
6 blinks *****	Free.
7 blinks *****	<b>Loss of flame during operation</b> - Faulty or soiled fuel valves - Faulty or soiled flame detector - Inadequate adjustment of burner
8 ÷ 9 blinks	Free
10 blinks *****	<b>Faulty output contacts</b> <b>Attention: "lockout" remote signal (terminal no. 10) not enabled</b> - Wiring error - Anomalous voltage on output terminals - Other faults
14 blinks ***** (only for LME4x)	- CPI contact (gas valve microswitch) not closed.

## RESETTING THE BURNER CONTROL

When lockout occurs, the burner control can immediately be reset, by pressing the lockout reset button for about 1..3 seconds. The LME.. can only be reset when all contacts in the line are closed and when there is no undervoltage.

## LIMITATION OF REPETITIONS (only for LME11.. model)

If no flame is established at the end of TSA, or if the flame is lost during operation, a maximum of 3 repetitions per controller startup can be performed via "R", otherwise lockout will be initiated. Counting of repetitions is restarted each time a controlled startup via "R" takes place.

**⚠ Condensation, formation of ice and ingress of water are not permitted!**

## TECHNICAL CHARACTERISTICS

Mains voltage	120V AC +10% / -15% 230V AC +10% / -15%
Frequency	50 ... 60 Hz +/- 6%
Power consumption	12VA
External primary fuse	max. 10 A (slow)
input current at terminal 12	max. 5 A
Detection cable length	max. 3m (for electrode)
Detection cable length	max. 20 m (laid separately, for QRA probe)
Reset cable length	max. 20 m (posato separatamente)
Term. 8 & 10 cable length	max. 20 m
Thermostat cable length and other terminals	max. 3 m
Safety class	I
Index of protection	IP40 (to be ensured during mounting)
Operating conditions	-20... +60 °C, < 95% UR
Storage conditions	-20... +60 °C, < 95% UR
Weight	approx. 160 g

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