

***LG550***  
***NG550***  
***NGX550***  
***LGX550***



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

**MANUAL OF INSTALLATION - USE - MAINTENANCE**

***CIB UNIGAS***

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

## DANGERS, WARNINGS AND NOTES OF CAUTION

**THIS MANUAL IS SUPPLIED AS AN INTEGRAL AND ESSENTIAL PART OF THE PRODUCT AND MUST BE DELIVERED TO THE USER.**

**INFORMATION INCLUDED IN THIS SECTION ARE DEDICATED BOTH TO THE USER AND TO PERSONNEL FOLLOWING PRODUCT INSTALLATION AND MAINTENANCE.**

**THE USER WILL FIND FURTHER INFORMATION ABOUT OPERATING AND USE RESTRICTIONS, IN THE SECOND SECTION OF THIS MANUAL. WE HIGHLY RECOMMEND TO READ IT.**

**CAREFULLY KEEP THIS MANUAL FOR FUTURE REFERENCE.**

### 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 and accessories.

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

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

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

The manufacturer shall not be held liable, by agreement or otherwise, for damages resulting from improper installation, use and failure to comply with the instructions supplied by the manufacturer. The occurrence of any of the following circumstances may cause explosions, polluting unburnt gases (example: carbon monoxide CO), burns, serious harm to people, animals and things:

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

### 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 fire-box.
- 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 electrics by qualified personnel, since the manufacturer cannot be held liable for damages that may be caused by failure to correctly earth the equipment.
- Qualified personnel must inspect the system to make sure that it is adequate to take the maximum power used by the equipment shown on the equipment rating plate. In particular, make sure that the system cable cross section is adequate for the power absorbed by the unit.
- No adaptors, multiple outlet sockets and/or extension cables are permitted to connect the unit to the electric mains.
- An omnipolar switch shall be provided for connection to mains, as required by the current safety regulations.
- The use of any power-operated component implies observance of a few basic rules, for example:
  - do not touch the unit with wet or damp parts of the body and/or with bare feet;
  - do not pull electric cables;
  - do not leave the equipment exposed to weather (rain, sun, etc.) unless expressly required to do so;
  - do not allow children or inexperienced persons to use equipment;
- The unit input cable shall not be replaced by the user. In case of damage to the cable, switch off the unit and contact qualified personnel to replace. When the unit is out of use for some time the electric switch supplying all the power-driven components in the system (i.e. pumps, burner, etc.) should be switched off.

### 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

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

##### Harmonized standards

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

#### *Light oil burners*

##### European directives

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

##### Harmonized standards

- UNI EN 267:2011 (Automatic forced draught burners for liquid fuels)
- EN 55014-1 (Electromagnetic compatibility- Requirements for household appliances, electric tools and similar apparatus)
- EN 60204-1:2006 (Safety of machinery – Electrical equipment of machines.)
- CEI EN 60335-1 (Specification for safety of household and similar electrical appliances);
- CEI EN 60335-2-102 (Household and similar electrical appliances. Safety. Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections).
- UNI EN ISO 12100:2010 (Safety of machinery - General principles for design - Risk assessment and risk reduction);

#### *Heavy oil burners*

##### European Directives

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

##### Harmonized standards

- UNI EN 267 (Automatic forced draught burners for liquid fuels)
- EN 55014-1 (Electromagnetic compatibility- Requirements for household appliances, electric tools and similar apparatus)
- EN 60204-1:2006 (Safety of machinery – Electrical equipment of machines.)
- CEI EN 60335-1 (Specification for safety of household and similar electrical appliances);
- CEI EN 60335-2-102 (Household and similar electrical appliances. Safety. Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections).
- UNI EN ISO 12100:2010 (Safety of machinery - General principles for design - Risk assessment and risk reduction);

### Gas - Light oil burners

#### European Directives

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

#### Harmonized standards

- UNI EN 676 (Automatic forced draught burners for gaseous fuels)
- UNI EN 267 (Automatic forced draught burners for liquid fuels)
- EN 55014-1 (Electromagnetic compatibility- Requirements for household appliances, electric tools and similar apparatus)
- EN 60204-1:2006 (Safety of machinery – Electrical equipment of machines.)
- CEI EN 60335-1 (Specification for safety of household and similar electrical appliances);
- CEI EN 60335-2-102 (Household and similar electrical appliances. Safety. Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections).
- UNI EN ISO 12100:2010 (Safety of machinery - General principles for design - Risk assessment and risk reduction);

### Gas - Heavy oil burners

#### European directives:

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

#### Harmonized standards

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

### Industrial burners

#### European directives

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

#### Harmonized standards

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

### Burner data plate

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

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

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

### SYMBOLS USED



**WARNING!**

Failure to observe the warning may result in irreparable damage to the unit or damage to the environment



**DANGER!**

Failure to observe the warning may result in serious injuries or death.



**WARNING!**

Failure to observe the warning may result in electric shock with lethal consequences

Figures, illustrations and images used in this manual may differ in appearance from the actual product.

### BURNER SAFETY

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



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

### Residual risks deriving from misuse and prohibitions

The burner has been built in order to make its operation safe; there are, however, residual risks.



Do not touch any mechanical moving parts with your hands or any other part of your body. Injury hazard  
Do not touch any parts containing fuel (i.e. tank and pipes). Scalding hazard  
Do not use the burner in situations other than the ones provided for in the data plate.  
Do not use fuels other than the ones stated.  
Do not use the burner in potentially explosive environments.  
Do not remove or by-pass any machine safety devices.  
Do not remove any protection devices or open the burner or any other component while the burner is running.  
Do not disconnect any part of the burner or its components while the burner is running.  
Untrained staff must not modify any linkages.



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



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

## 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.

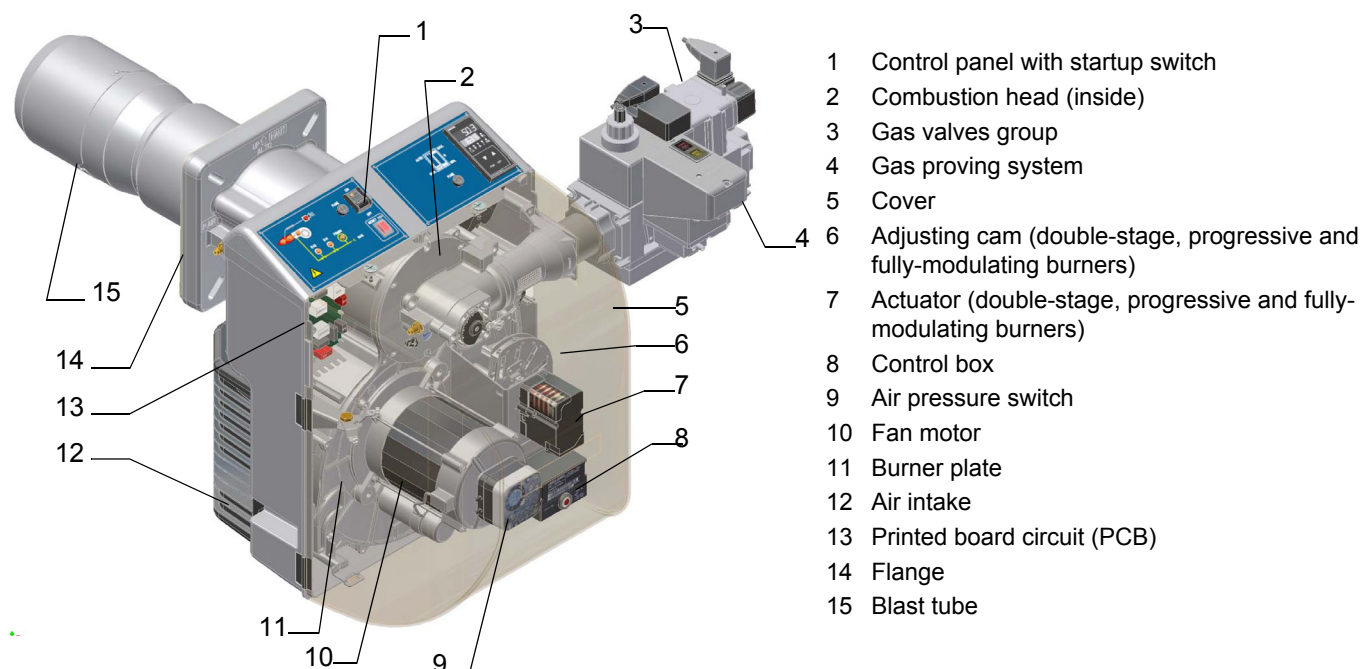


Fig. 1

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.



## BURNERS SPECIFICATIONS

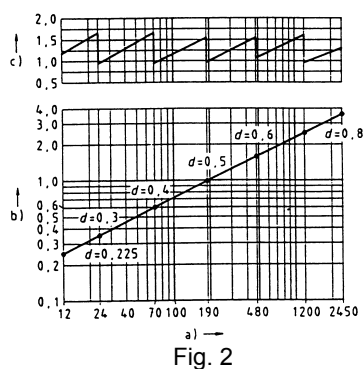
Type NG550 (1)	Model (2)	M- (3)	PR. (4)	S. (5)	A. (6)	O. (7)	50 (8)
(1) BURNER TYPE	NG - Natural gas burner LG - L.P.G. burner NGX - Low NOx burners LGX - Natural gas Low NOx burners						
(2) FUEL	M - Natural gas L - LPG						
(3) OPERATION	TN - Single stage      AB - Double stage PR - Progressive      MD - Fully modulating						
(4) BLAST TUBE	S - standard      L - extended						
(5) DESTINATION COUNTRY	see data plate						
(6) BURNER VERSION	A - Standard, Y - Special						
(7) EQUIPMENT	0 = 2 gas valves 1 = 2 Gas valves + gas proving system (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>1/4</sup> 40 = Rp1 <sup>1/2</sup> 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 length follow the instructions of the boiler manufacturer. In absence of these consider the following:

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

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



#### Key

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

Fig. 2 - Firing intensity, diameter and length of the test flame tube as a function of the heat input in kW.

## Specifications

BURNERS M-.TN...		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		110V / 120V / 220 / 230V - 50 / 60 Hz 2 a.c.							
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>1/4</sup> / Rp 1 <sub>1/4</sub>	1" <sup>1/2</sup> / Rp 1 <sub>1/2</sub>	2" / Rp 2	1" / Rp 1	1" <sup>1/4</sup> / Rp 1 <sub>1/4</sub>	1" <sup>1/2</sup> / 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		110V /120V / 220 / 230V - 50 / 60 Hz 2 a.c.							
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>1/4</sup> / Rp 1 <sub>1/4</sub>	1" <sup>1/2</sup> / Rp 1 <sub>1/2</sub>	2" / Rp 2	1" / Rp 1	1" <sup>1/4</sup> / Rp 1 <sub>1/4</sub>	1" <sup>1/2</sup> / 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 (net calorific value H <sub>i</sub> = 34.02 MJ/Stm <sup>3</sup> ); for L.P.G. (net calorific value H <sub>i</sub> = 93.5 MJ/Stm <sup>3</sup> )
<b>Note2:</b>	Maximum gas pressure = 360mbar (with Dungs MBDLE/MBC valves) Minimum gas pressure = see gas curves for network gas pressure.

**\* 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	LGX550 L-.xx... 0.25	LGX550 L-.xx... 0.32	LGX550 L-.xx... 0.40	LGX550 L-.xx... 0.50
Output	min-max kW	132 - 490							
Fuel		Natural gas				I <sub>3B/P</sub>			
Gas category		(see next paragraph)							
Gas rate	min-max Stm <sup>3</sup> /h	14 - 52				4,9 - 18,3			
Gas pressure	min-max mbar	(see Note 2)							
Power supply		110V / 120V / 220 / 230V - 50 / 60 Hz 2 a.c.							
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>1/4</sup> / Rp 1 <sub>1/4</sub>	1 <sup>1/2</sup> / Rp 1 <sub>1/2</sub>	2" / Rp 2	1" / Rp 1	1 <sup>1/4</sup> / Rp 1 <sub>1/4</sub>	1 <sup>1/2</sup> / 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 (net calorific value H <sub>i</sub> = 34.02 MJ/Stm <sup>3</sup> ); for L.P.G. (net calorific value H <sub>i</sub> = 93.5 MJ/Stm <sup>3</sup> )
<b>Note2:</b>	Maximum gas pressure = 360mbar (with Dungs MBDLE/MBC valves) Minimum gas pressure = see gas curves for network gas pressure.

\* 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 CAT	COUNTRY																								
I <sub>2H</sub>	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>2E</sub>	LU	PL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I <sub>2E(R)</sub>	BE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(*)	NL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I <sub>2ELL</sub>	DE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I <sub>2Er</sub>	FR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

(\*) Only for I<sub>2EK</sub>: the appliance was configured for the appliance category K (I<sub>2K</sub>) and is suitable for the use of G and G+ distribution gases according to the specifications as included in the NTA 8837:2012 Annex D with a Wobbe index of 43.46 – 45.3 MJ/m3 (dry, 0 °C, upper value) or 41.23 – 42.98 (dry, 15 °C, upper value). This appliance can moreover be converted and/or be calibrated for the appliance category E (I<sub>2E</sub>). This therefore implies that the appliance “is suitable for G+ gas and H gas or is demonstrably suitable for G+ gas and can demonstrably be made suitable for H gas” within the meaning of the “Dutch Decree of 10 May 2016 regarding amendment of the Dutch Gas Appliances Decree and the Dutch Commodities (Administrative Fines) Act in connection with the changing composition of gas in the Netherlands as well as technical amendment of some other decrees.



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

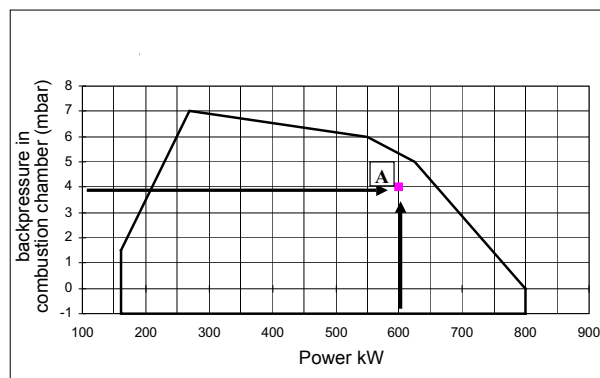
Example:

Furnace input: 600kW

Backpressure: 4 mbar

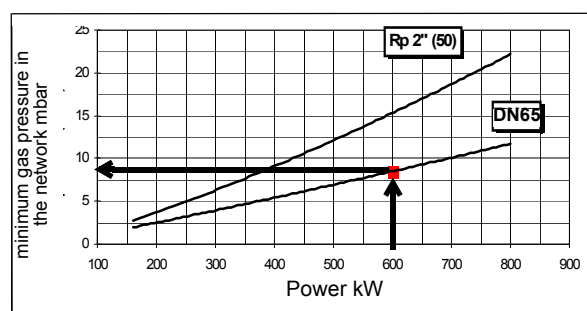
In the "Performance curve" diagram, draw a vertical line matching the furnace input value and an horizontal line matching the backpressure value. The burner is suitable if the intersection point A is inside the performance curve.

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



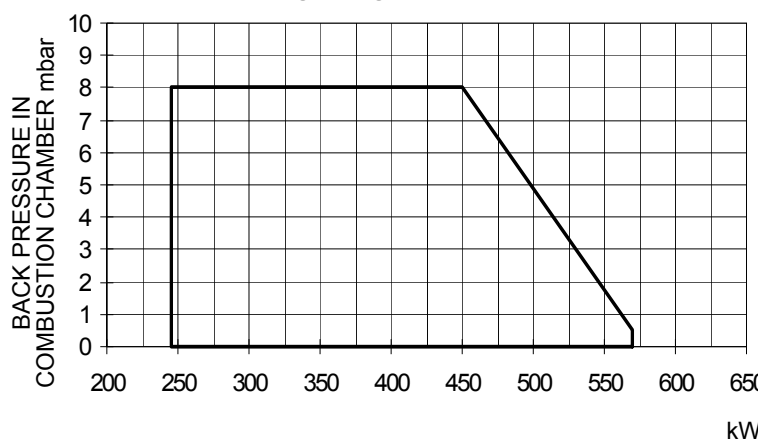
### Checking the proper gas train size

To check the proper gas train size, it is necessary to the available gas pressure value upstream the burner's gas valve. Then subtract the backpressure. The result is called **pgas**. 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 **pgas** value, calculated before.



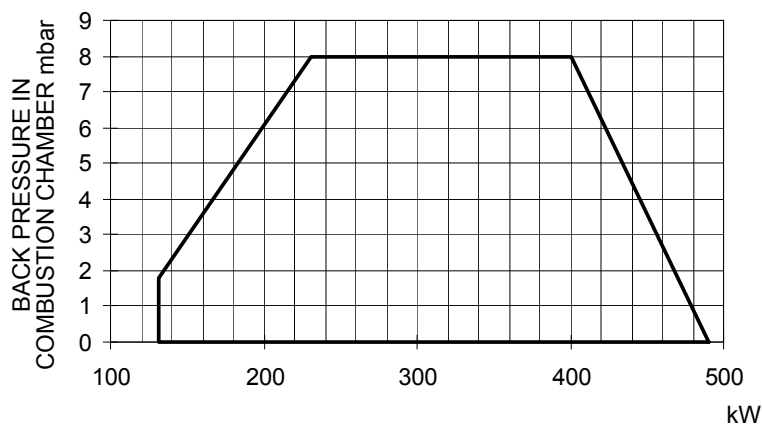
### Performance curves

NG550 - LG550 Single stage



NG550 - LG550 Double-stage/Progressive



**NGX550 Low NOx burner**

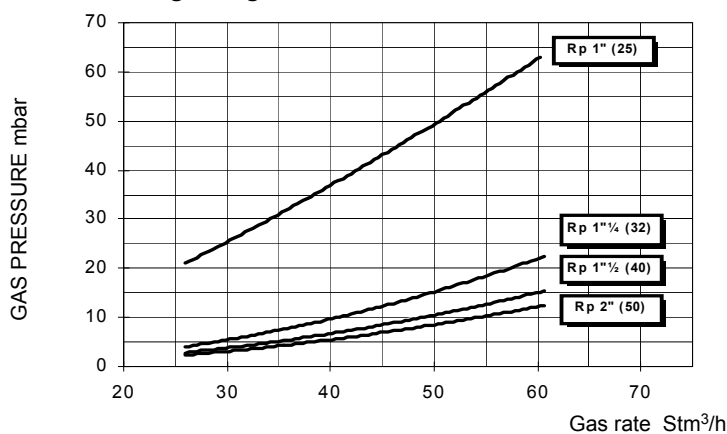
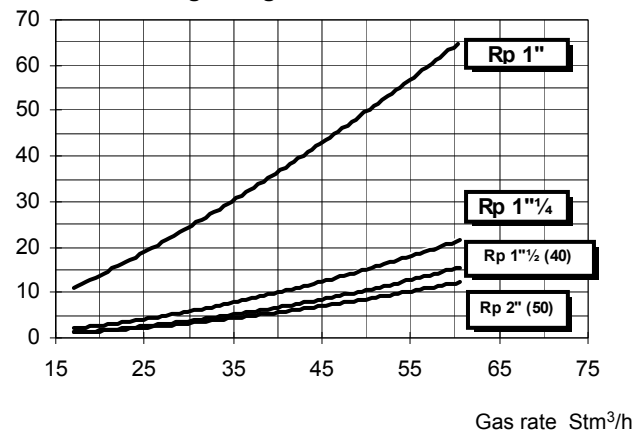
To get the input in kcal/h, multiply value in kW by 860.

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

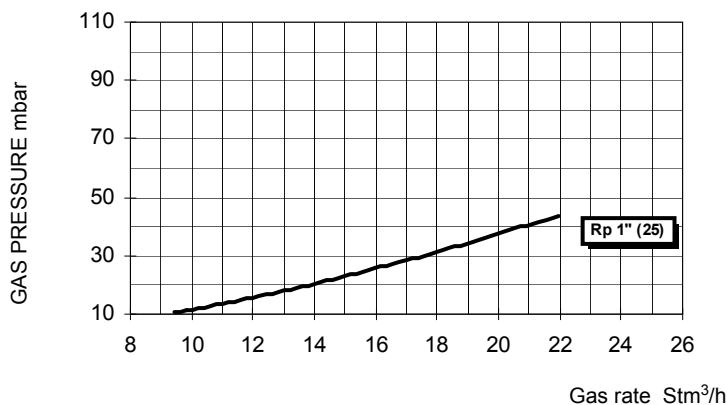
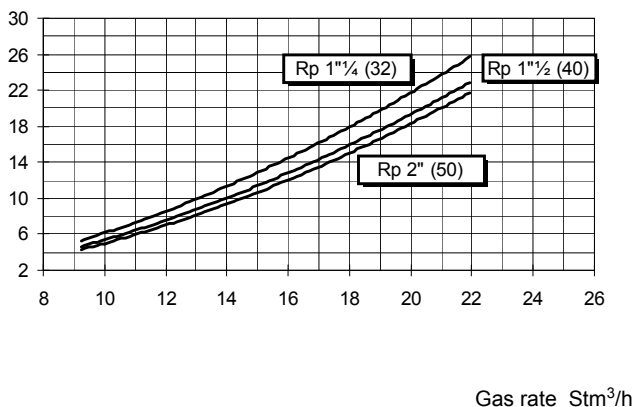
**NOTE:** The performance curve is a diagram that represents the burner performance in the type approval phase or in the laboratory tests, but does not represent the regulation range of the machine. On this diagram the maximum output point is usually reached by adjusting the combustion head to its "MAX" 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**

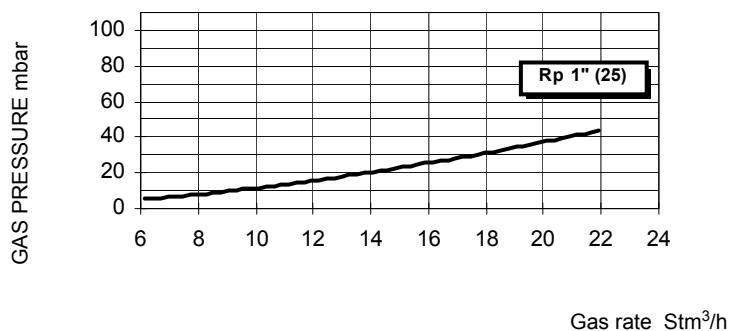
- Natural gas burners**

**NG550 Single stage****NG550 Double-stage/Progressive**

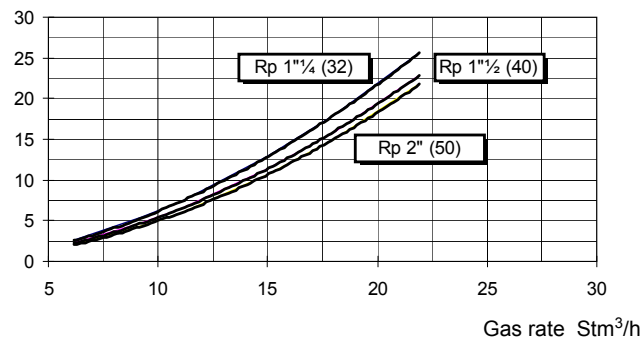
- L.P.G. Burners**

**LG550 L-TN..25 Single stage****LG550 L-TN..32/40/50 Single stage**

LG550 L-PR.. Double-stage/Progressive

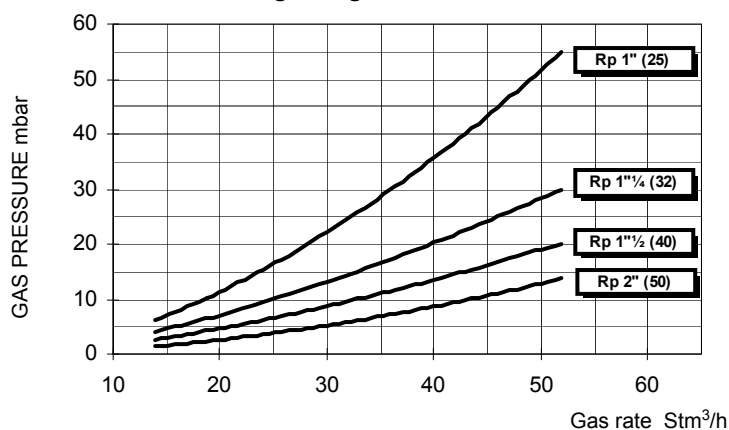


LG550 L-PR.. Double-stage/Progressive



- Low NOx burners

NGX550 Double-stage/Progressive



The values in the diagrams refer to **natural gas** with a calorific value of 8125 kcal/Stm³ (15°C, 1013 mbar) and a density of 0.714 kg/Stm³.



The values in the diagrams refer to **GPL** with a calorific value of 22300 kcal/Stm³ (15°C, 1013 mbar) and a density of 2.14 kg/Stm³. When the calorific value and the density change, the pressure values should be adjusted accordingly.

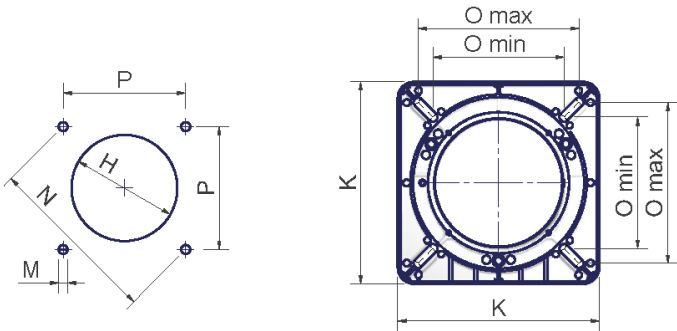
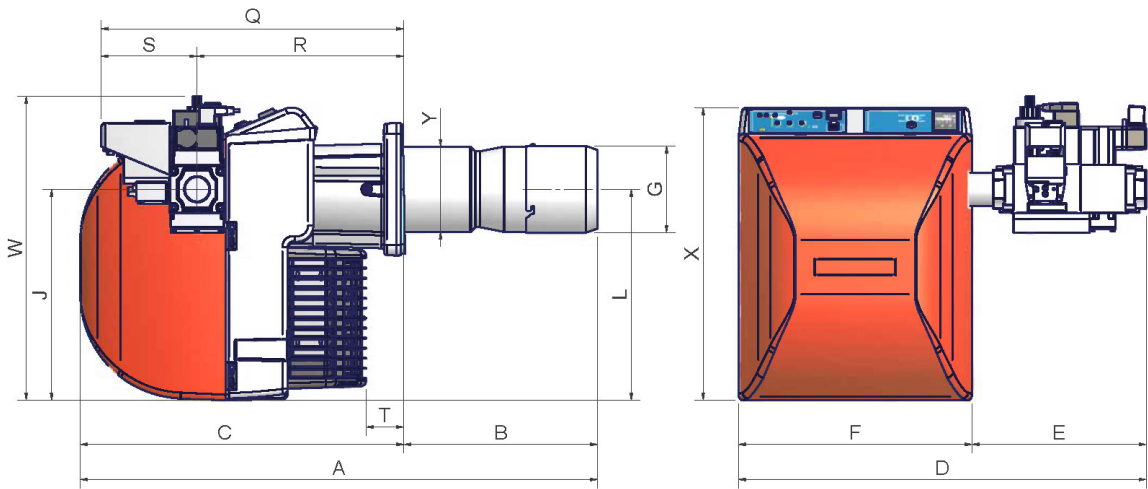
Where:

$$\Delta p_2 = \Delta p_1 * \left( \frac{Q_2}{Q_1} \right)^2 * \left( \frac{\rho_2}{\rho_1} \right)$$

- $p_1$  Natural gas pressure shown in diagram
- $p_2$  Real gas pressure
- $Q_1$  Natural gas flow rate shown in diagram
- $Q_2$  Real gas flow rate
- $\rho_1$  Natural gas density shown in diagram
- $\rho_2$  Real gas density

Overall dimensions (mm)

- Standard burners

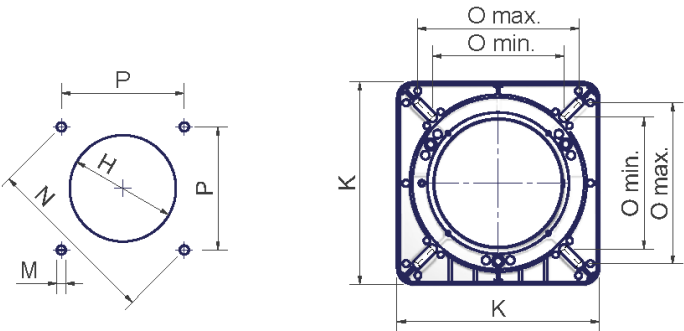
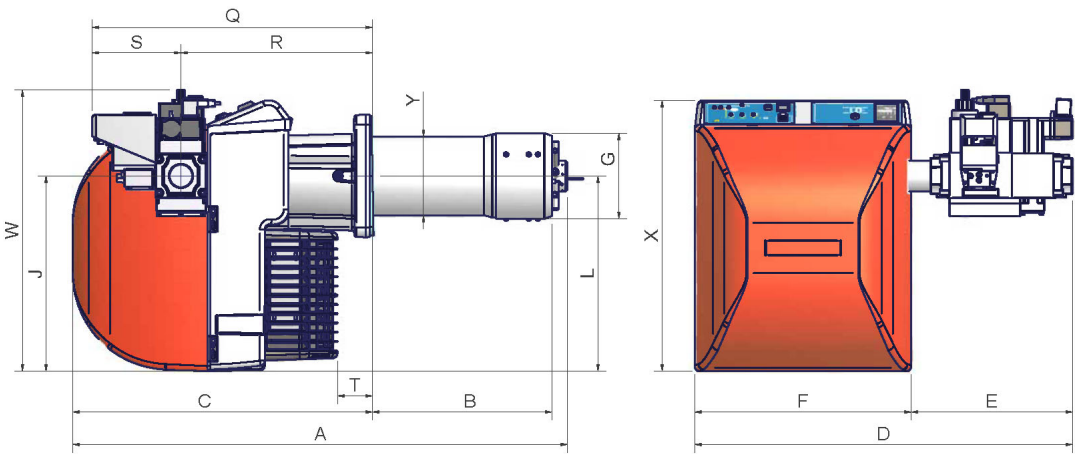


Recommended boiler drilling jig and burner flange

	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
NG/LG550	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
	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
	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 tubeOMU

Low NOx Burner



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 x	P	Q	R	S	T	W	X	Y
NGX550 - LGX550	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
	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
	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.

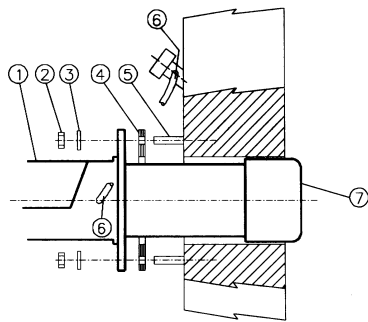
- 1 Burner with gas train;
- 1 gasket to be inserted between the burner and the boiler;
- 1 envelope containing this manual

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:

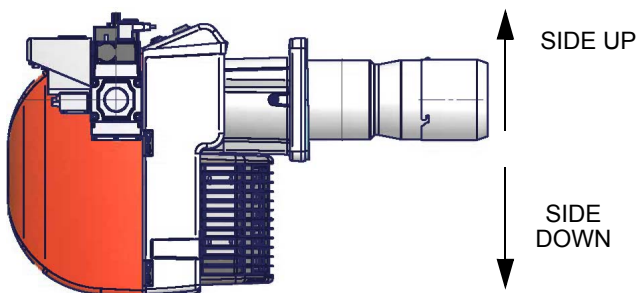
- 1 make a hole on the closing door of the combustion chamber as described on paragraph "Overall dimensions")
- 2 place the burner to the boiler: lift it up and handle it according to the procedure described on paragraph "Handling the burner";
- 3 place the stud bolts (5) on boiler's door, according to the burner drilling template described on paragraph "Overall dimensions";
- 4 fasten the 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.





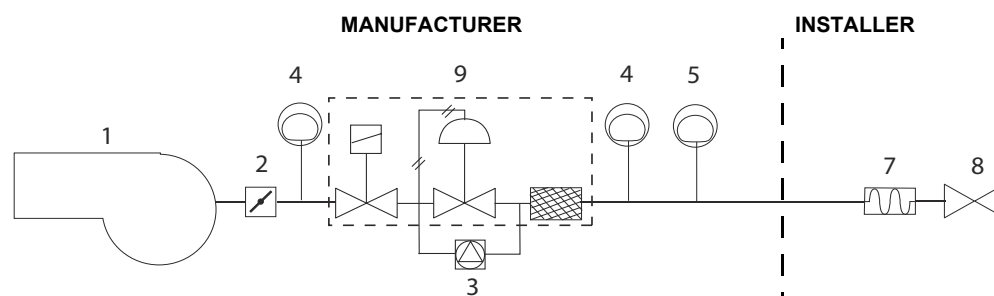
## GAS TRAIN CONNECTIONS

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



**DANGER! Incorrect motor rotation can seriously damage property and injure people. ATTENTION:** BEFORE EXECUTING THE CONNECTIONS TO THE GAS PIPE NETWORK, BE SURE THAT THE MANUAL CUTOFF VALVES ARE CLOSED. READ CAREFULLY THE “WARNINGS” CHAPTER AT THE BEGINNING OF THIS MANUAL.

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



### Key

- 1 Burner
- 2 Butterfly valve
- 3 Gas proving system (option)
- 4 Low gas pressure switch
- 5 High gas pressure switch (option)
- 7 Bellow joint
- 8 Manual cutoff valve
- 9 MB-DLE valve group

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

To mount the gas train, proceed as follows:

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

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

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



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



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

## MULTIBLOC DUNGS MB-DLE 405..412

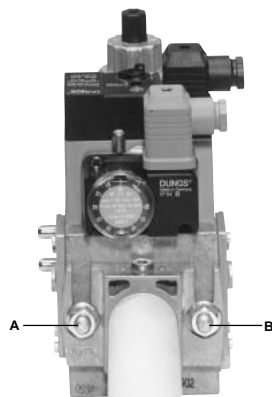


Fig. 3

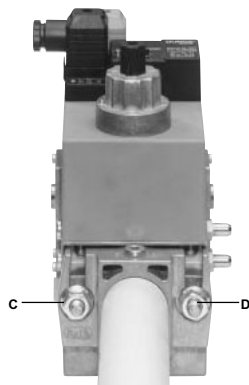


Fig. 4

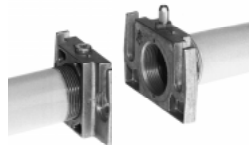


Fig. 5

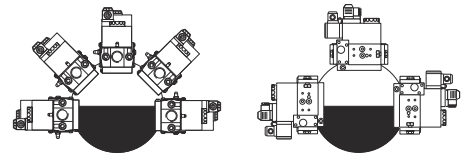


Fig. 6

## MULTIBLOC DUNGS MB-DLE 415..420

### Mounting

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

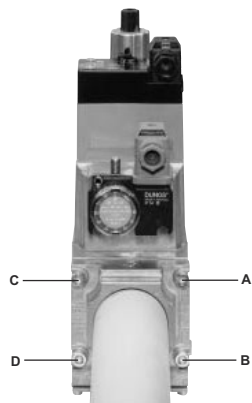


Fig. 7

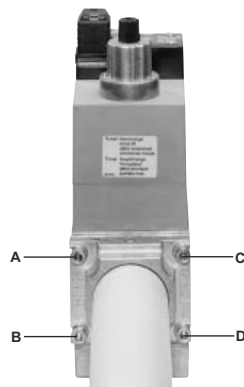


Fig. 8

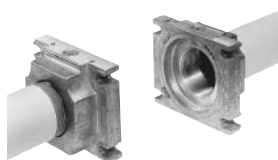


Fig. 9

### MOUNTING POSITIONS

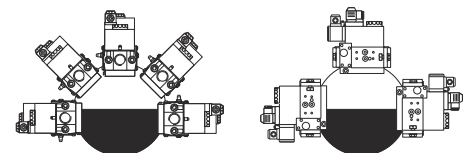


Fig. 10

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



**DANGER! Incorrect motor rotation can seriously damage property and injure people. 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. 11-A);
- 4 insert sealing rings (10,5 x 2,25) into VPS 504 (Fig. 12-B, Fig. 11-B)
- 5 Torque screws 3, 4, 5, 6 (M4 x16) Fig. 11-C

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

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

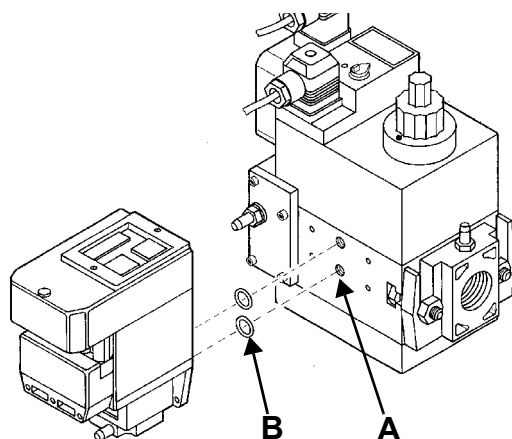


Fig. 11

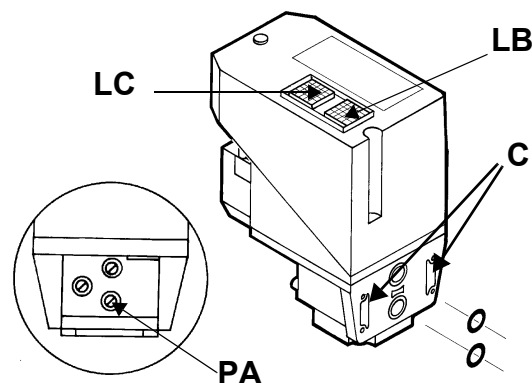


Fig. 12

When wishing to monitor the test, install a pressure gauge ranged to that of the pressure supply point **PA** (Fig. 12). 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**.

### Gas Train Reversal

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

- 1 Remove the plastic hook **G** to release the rod **T** (Fig. 13) .
- 2 Take the screws **V1**, **V2**, **V3**, **V4**, **V5**, **VT1** and **VT2** off (Fig. 13).
- 3 Take the ignition cable **CA** off of the transformer .
- 4 Disconnect the connector **CR** from the printed circuit (Fig. 14).
- 5 Take off the flange and the combustion head together (Fig. 16).

- 6 Take the gas pipe **TR** off and put it in the new position fixing the screws **VT1** and **VT2** (Fig. 15).

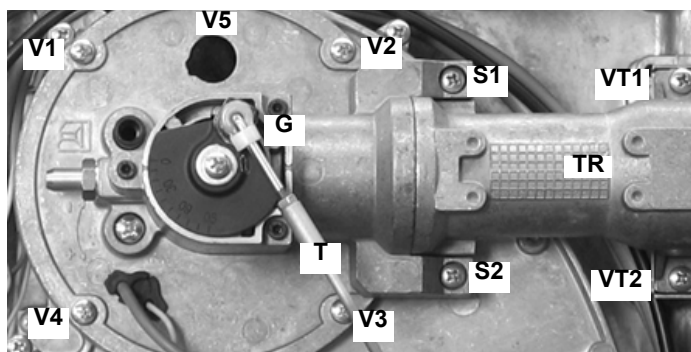


Fig. 13

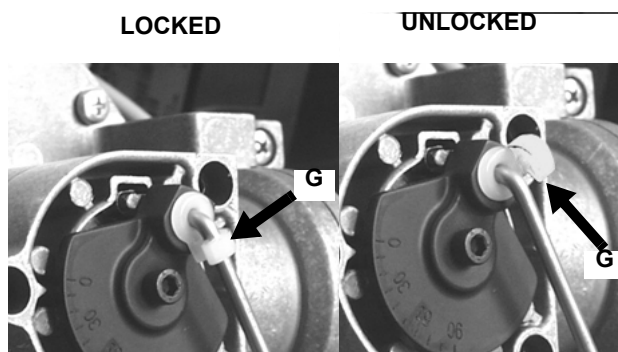


Fig. 15

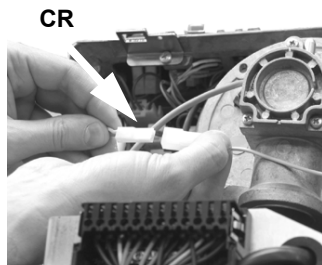
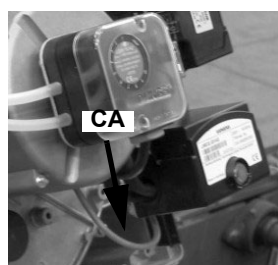


Fig. 14

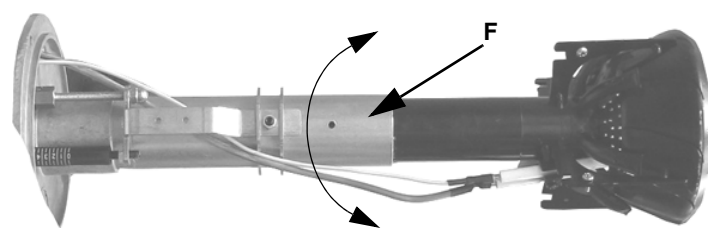
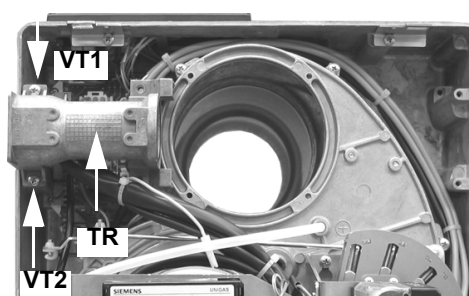


Fig. 16

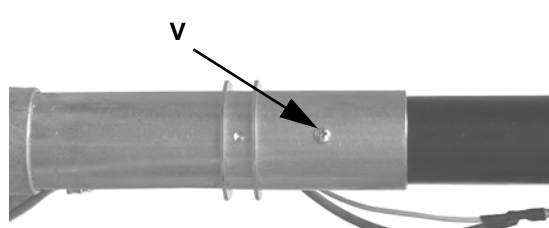


Fig. 17

- 7 Unscrew the **V**, rotate the head of 180 ° along its axis as shown in( Fig. 16), until the hole **F** is found. Fit the screw again(Fig. 16 - Fig. 17).
- 8 (Fig. 18)Insert again the flange and the combustion head together
- 9 (Fig. 18)Rotate the disc **D** following the instructions below.
- 10 Take off the screw **VF**.(Fig. 18)
- 11 Rotate the disc **D** for 180 ° and then fit the screw **VF** (Fig. 19).

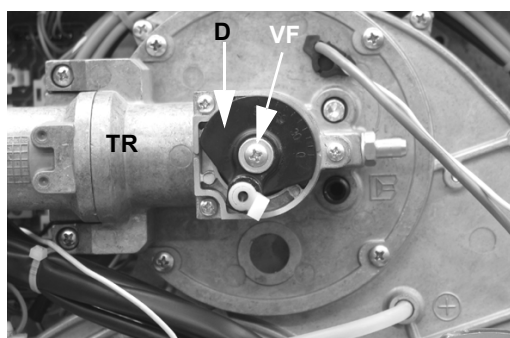


Fig. 18: Old position

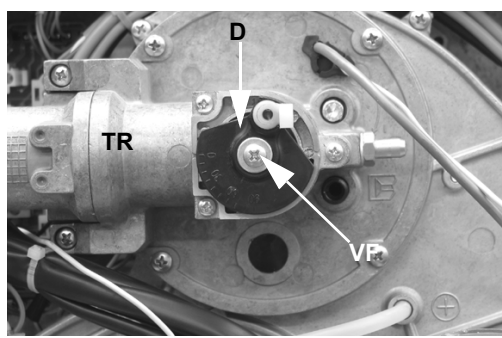


Fig. 19: New position

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

## ELECTRICAL CONNECTIONS



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

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



**WARNING:** 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.



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

To execute the electrical connections, proceed as follows:

- 1 find the plug or the plugs, according to the model:
  - 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

#### Burner supply connector

(Fig. 23, Fig. 25)

#### Probe connection connector

(fully modulating burners, Fig. 27)

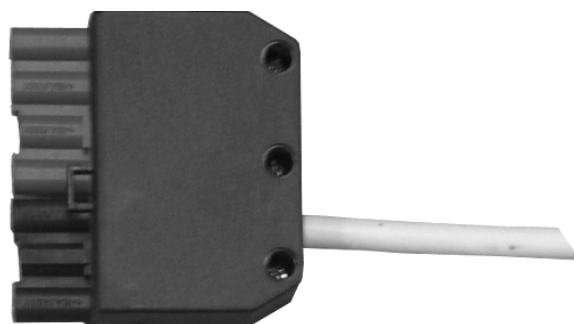


Fig. 20

#### HIGH/LOW flame connector

(progressive burners , Fig. 25)

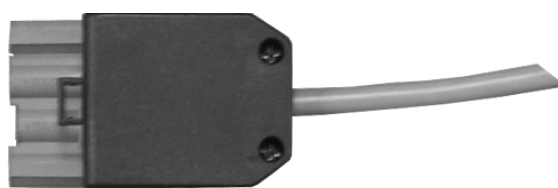


Fig. 21

#### Fan motor connector

(Fig. 24 - Fig. 26)

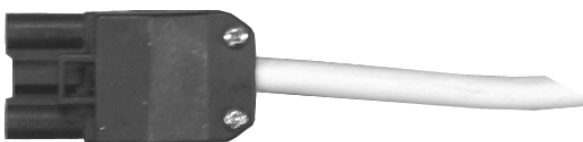


Fig. 22



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

● **Single stage burner connectors:**

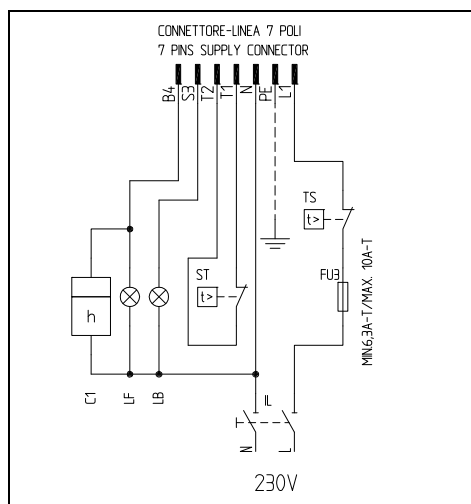


Fig. 23 - 7-poles connector

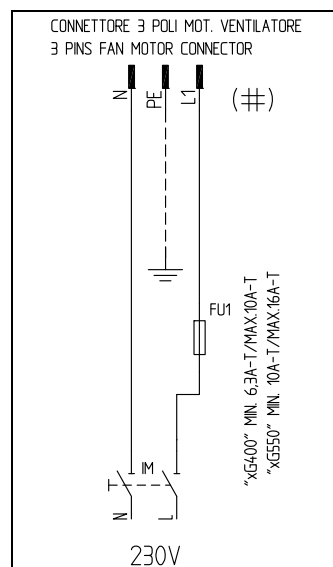


Fig. 24 - Electric motor 3-pole connector

● **Progressive burner connectors**

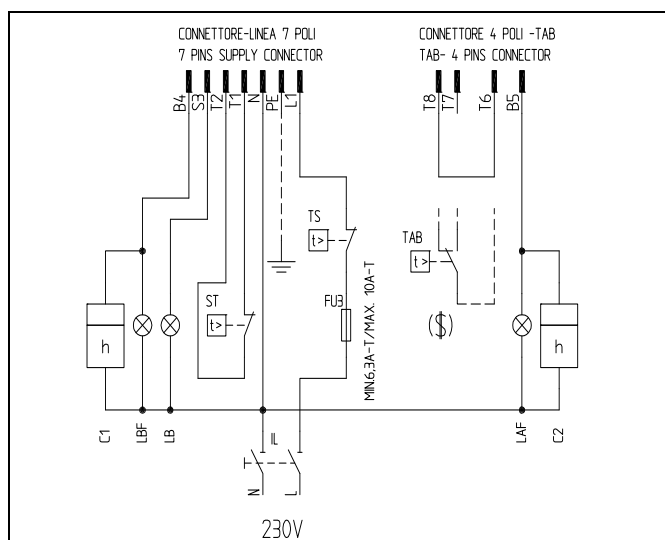


Fig. 25 - 7-poles and 4-poles connectors

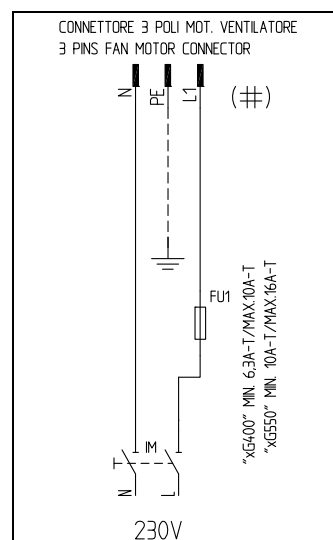


Fig. 26 - Electric motor 3-poles connector

**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



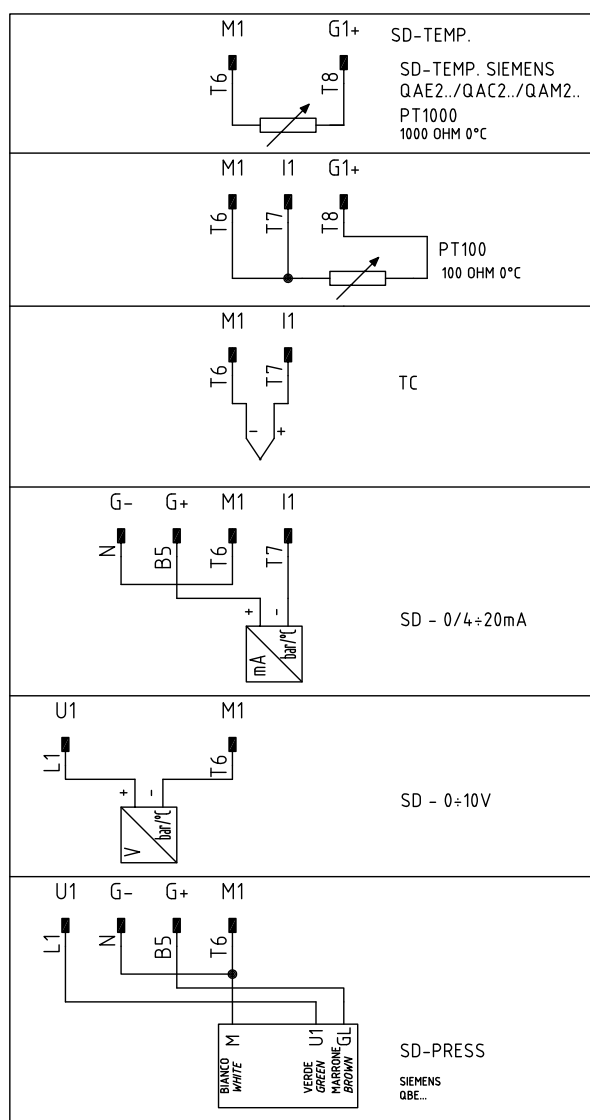


Fig. 27 - Probes connection

**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	CURRENT SIGNAL
SD-PRESS	PRESSURE PROBE
SMA	MAN/AUTO SELECTOR
SMF	OPERATION SELECTOR MIN-0-MAX
ST	PRESSURE SWITCHES OR THERMOSTATS SERIE
TS	SAFETY THERMOSTAT/PRESSURE SWITCH

**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)

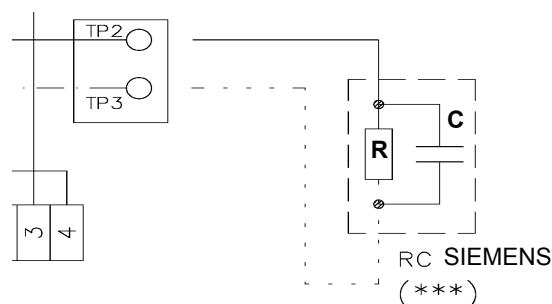


Fig. 28

### 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  $O_2$  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. 29, 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.

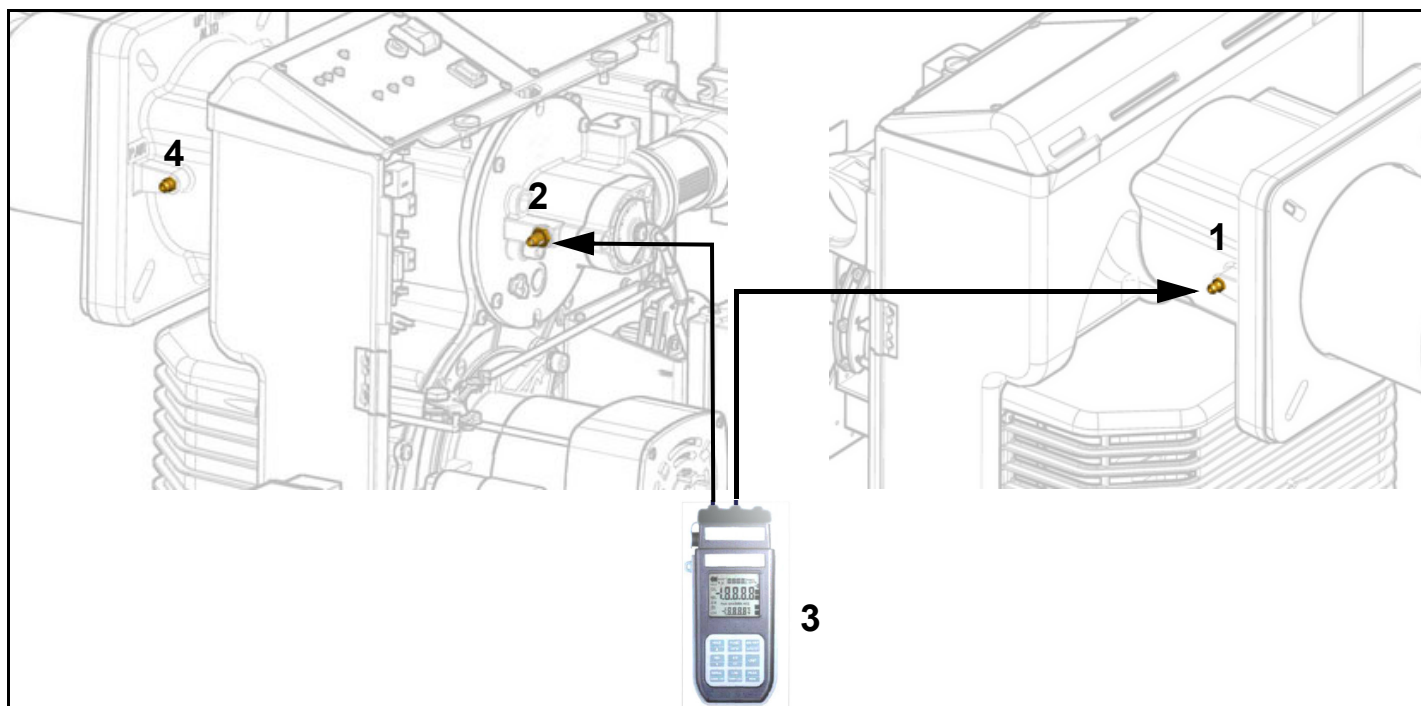


Fig. 29

#### Key

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

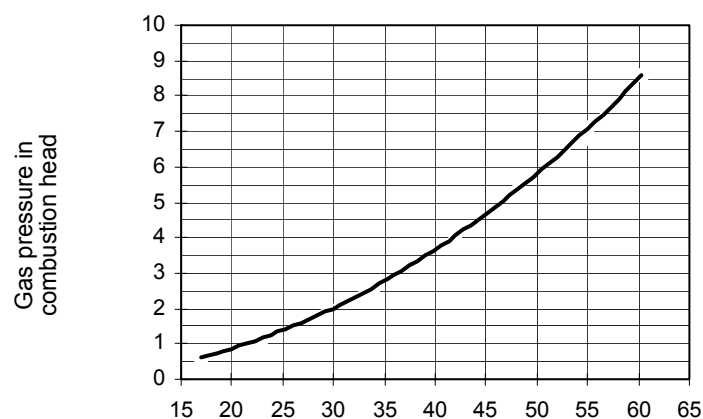
### Measuring the gas pressure in the combustion head

In order to measure the pressure in the combustion head, insert the pressure gauge probes: one into the generator's pressure outlet to get the pressure in the combustion chamber and the other one into the butterfly valve's pressure outlet of the burner (Fig. 29-3). 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  $Stm^3/h$  (quoted on the x axis) from the pressure measured in the combustion head (quoted on the y axis).

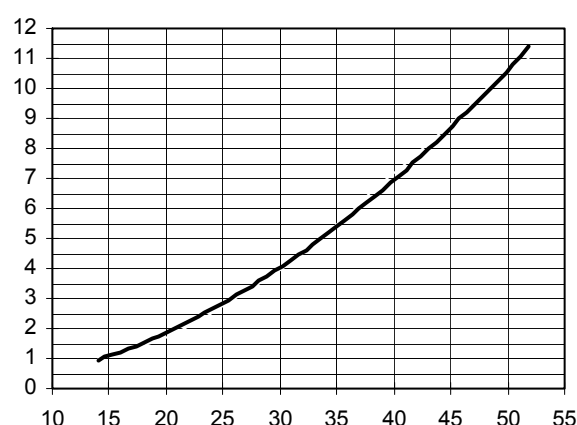
**NOTE: THE PRESSURE-RATE CURVES ARE APPROXIMATE; FOR A PROPER SETTING OF THE GAS RATE, PLEASE REFER TO THE GAS METER READING.**

## Gas pressure in combustion head vs. gas flow rate curves

NG550

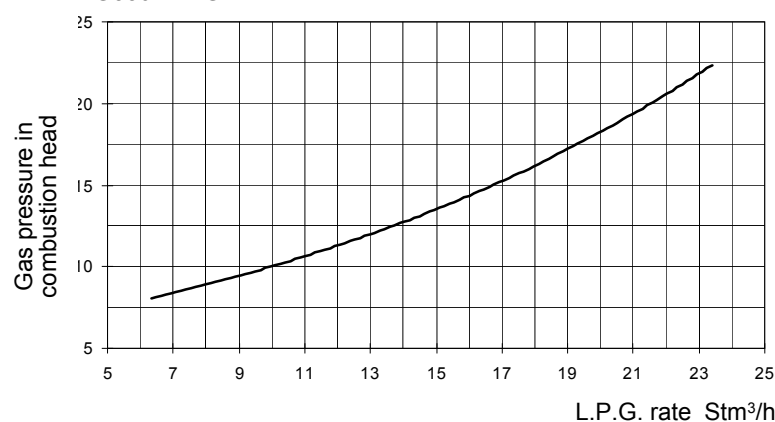


NGX550



Gas rate Stm³/h

LG550 L.P.G.



L.P.G. rate Stm³/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 fuel decrease slowly until the normal combustion values are achieved.



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



The values in the diagrams refer to **natural gas** with a calorific value of 8125 kcal/Stm³ (15°C, 1013 mbar) and a density of 0.714 kg/Stm³.

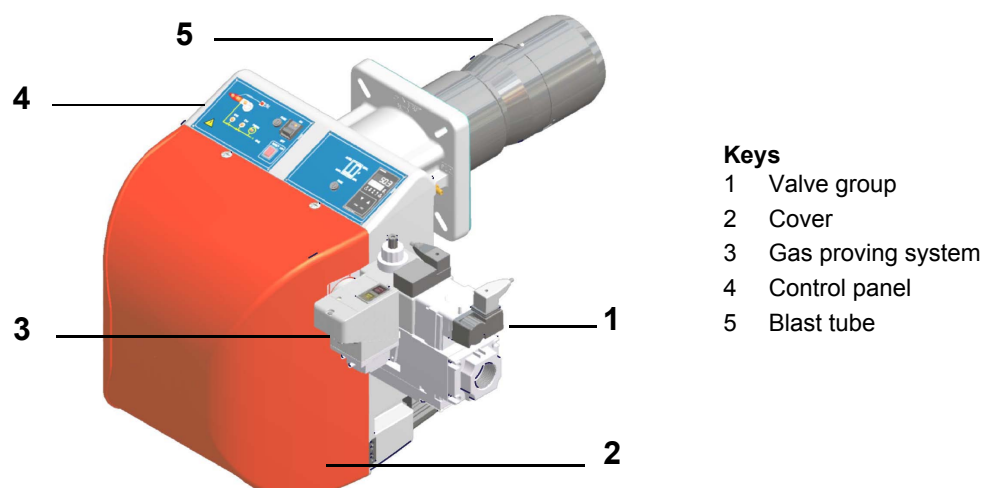


The values in the diagrams refer to **GPL** with a calorific value of 22300 kcal/Stm³ (15°C, 1013 mbar) and a density of 2.14 kg/Stm³. When the calorific value and the density change, the pressure values should be adjusted accordingly.

Where:

$$\Delta p_2 = \Delta p_1 * \left( \frac{Q_2}{Q_1} \right)^2 * \left( \frac{\rho_2}{\rho_1} \right)$$

- $p_1$  Natural gas pressure shown in diagram
- $p_2$  Real gas pressure
- $Q_1$  Natural gas flow rate shown in diagram
- $Q_2$  Real gas flow rate
- $\rho_1$  Natural gas density shown in diagram
- $\rho_2$  Real gas density



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 23).



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

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

### Adjustments - brief description

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.

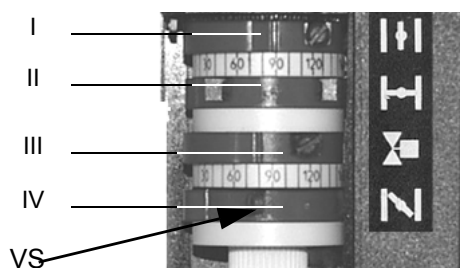
Before starting the burner up, adjust the valves group slow opening: to set the slow opening remove cover **T**, reverse it upside down and use it as a tool to twist screw **VR**. Decrease the ignition flow rate by screwing, increase it by unscrewing. Do not use a screwdriver on the screw **VR**!

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 STA: 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.

- 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.

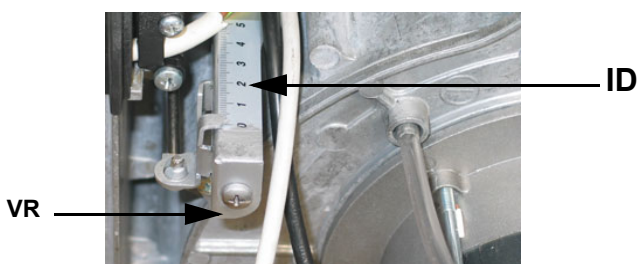


Fig. 31

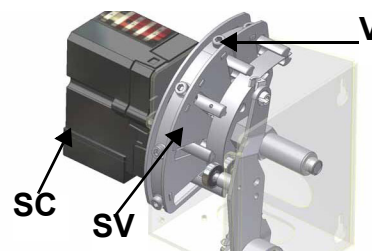


Fig. 32

#### ● **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. 34), and to "fully-backward" position for low NOx burners (Fig. 35). 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. 33). The **ID** index shows how much the combustion head moved.

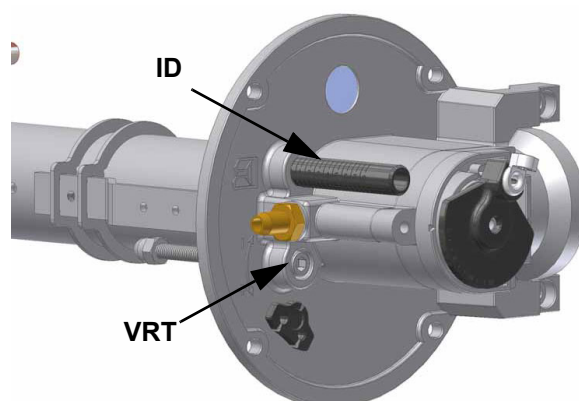


Fig. 33

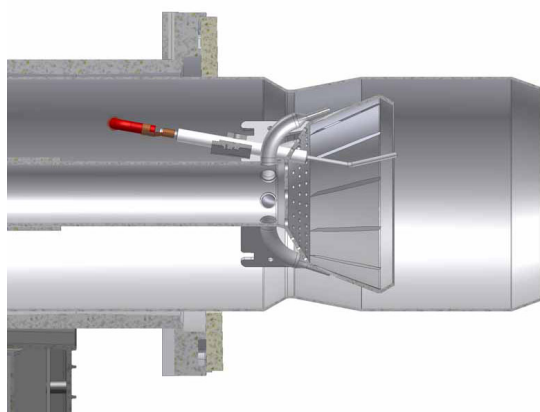


Fig. 34 - Head in “fully-ahead position”

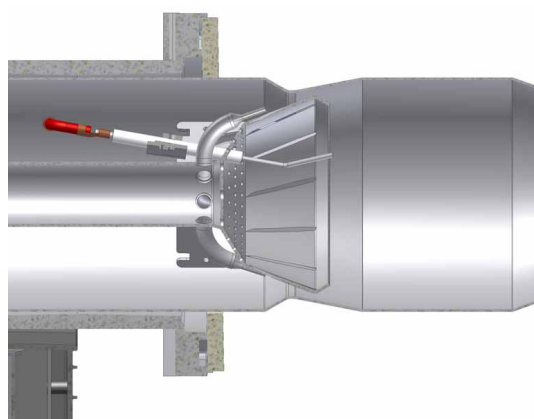


Fig. 35 - Head in “fully-backward position”

### **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.

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

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

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



## 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*

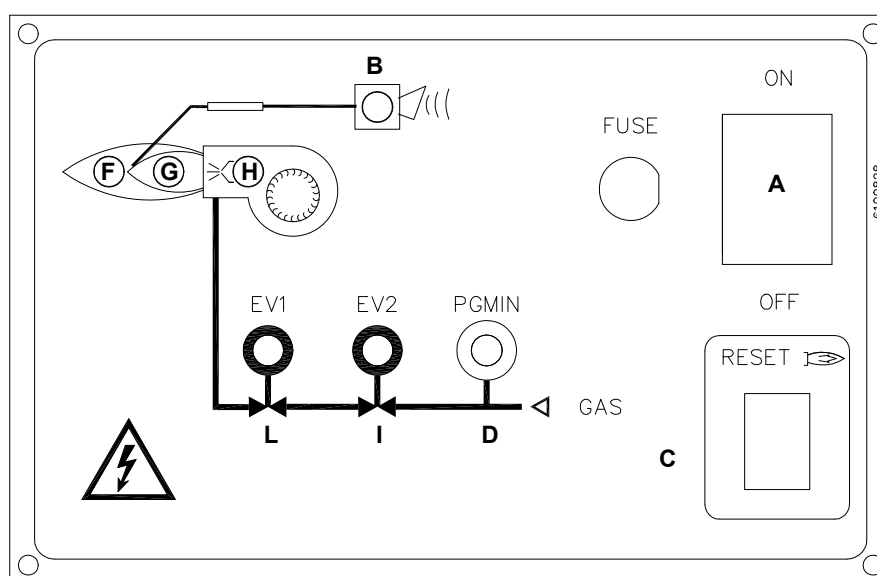


Fig. 36 -

Single-stage and double-stage burners

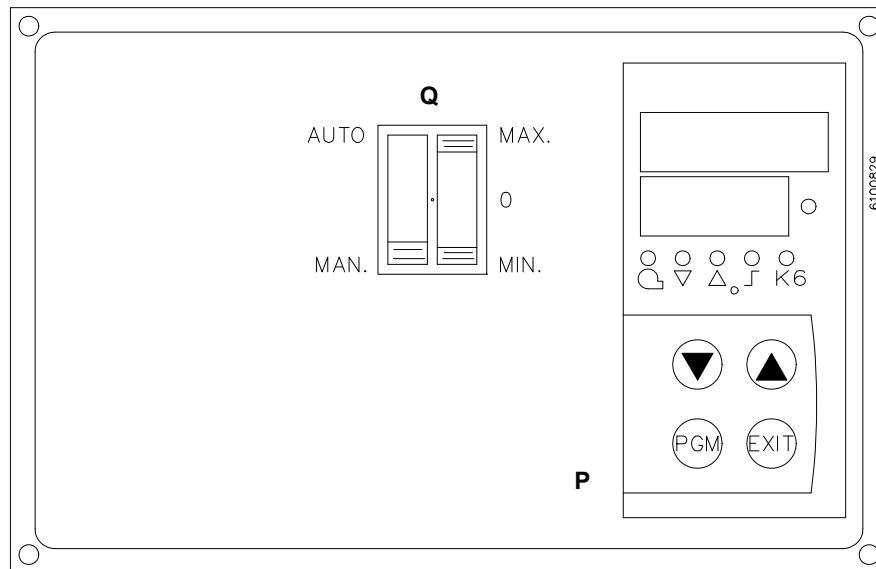


Fig. 37 - Progressive burners only

### 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

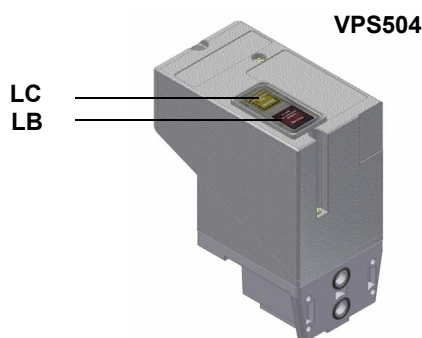


BEFORE STARTING UP THE BURNER, BE SURE THAT THE MAIN SWITCH IS ON AND THE MANUAL SHUTOFF VALVES ARE OPEN. READ CAREFULLY THE "WARNINGS" NOTES ON THIS MANUAL.

- 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 17.)



### 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. 38 on).
- Remove, check and clean the combustion head (Fig. 44 on).
- Check the ignition and detection electrodes, clean and adjust if necessary (see Fig. 50). In case of doubt, check the detection current according to the schemes in Fig. 51.
- 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. 38-Fig. 39) is  $\Delta p > 10$  mbar.
- Change the filter if the pressure difference between pressure connection 1 and 3 (Fig. 38-Fig. 39) 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. 40.
- 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.

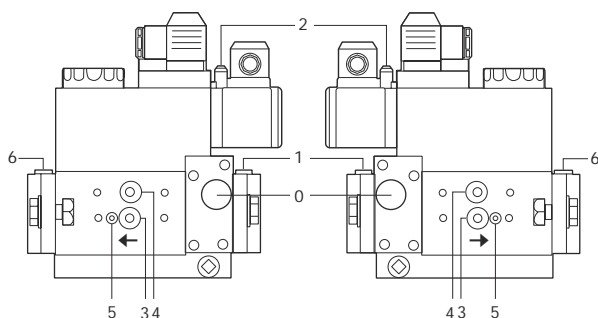


Fig. 38

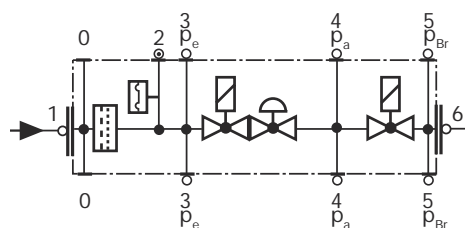


Fig. 39

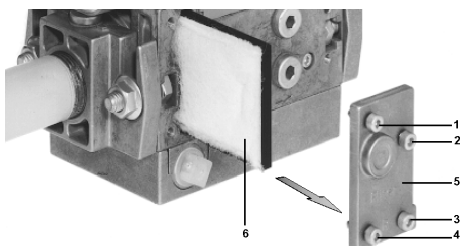


Fig. 40



## 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. 41-Fig. 42)  $\Delta p > 10$  mbar.
- Change the filter if the pressure difference between pressure connection 1 and 2 (Fig. 41-Fig. 42) 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. 43).
- 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.

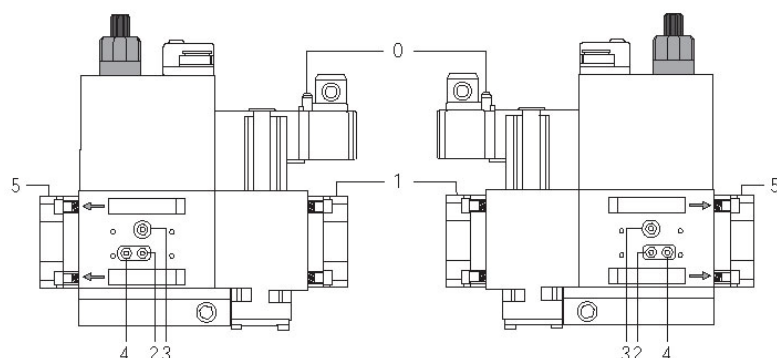


Fig. 41

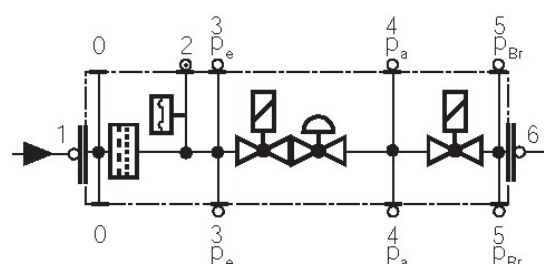


Fig. 42

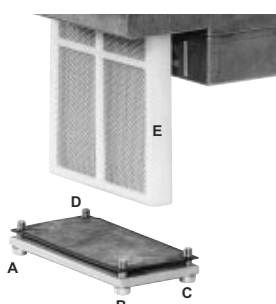


Fig. 43

## Removing and cleaning the combustion head

- 1 Remove the 4 screws V1, V2, V3, V4 and the couple of screws S1 and S2 (Fig. 44).



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

- 2 Slacken the butterfly valve adjusting rod (Fig. 45) and take it out pulling outside.
- 3 Remove the connector CR of the ionization electrode (Fig. 46).
- 4 Unplug cable CA of the ignition electrode EA (Fig. 46) and extract it from the flange by removing the rubber G (Fig. 46).
- 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.

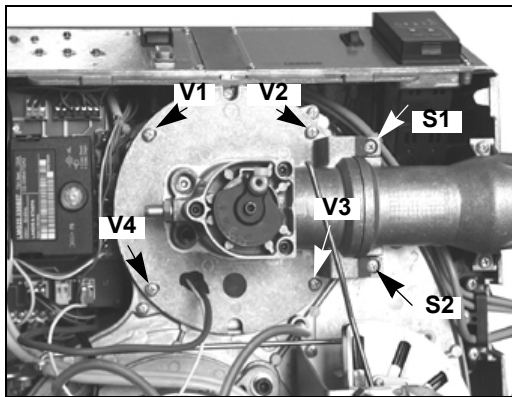


Fig. 44

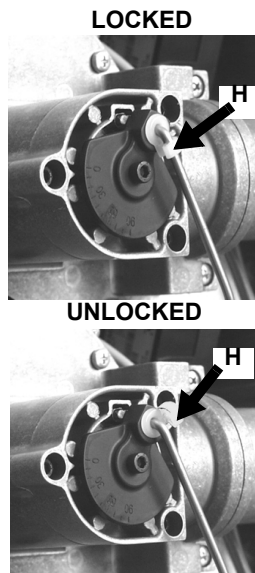


Fig. 45

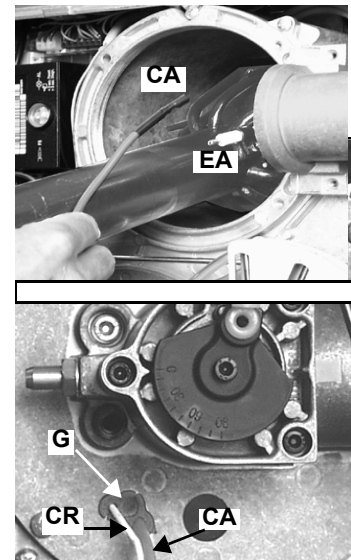


Fig. 46

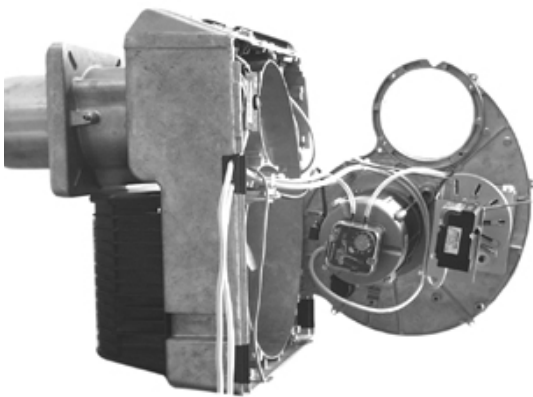


Fig. 47

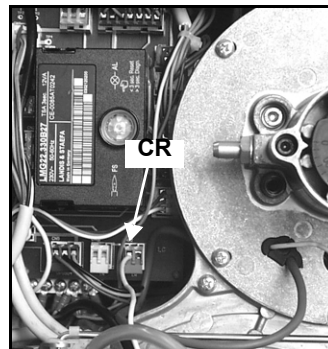


Fig. 48

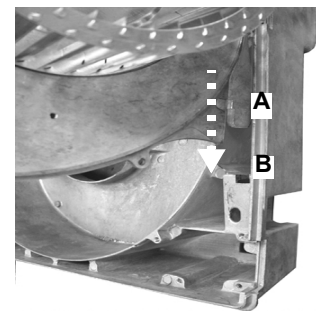
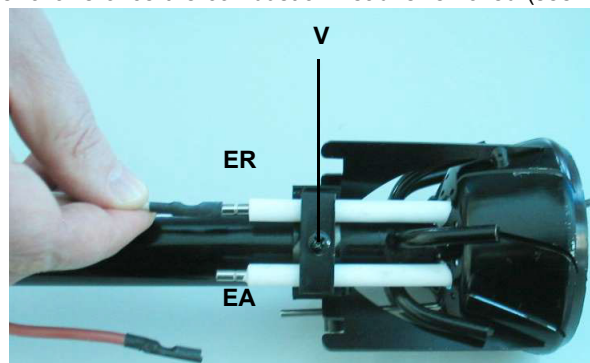


Fig. 49

### 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 33):

- 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  $4 \pm 5$  mm (see Fig. 50).

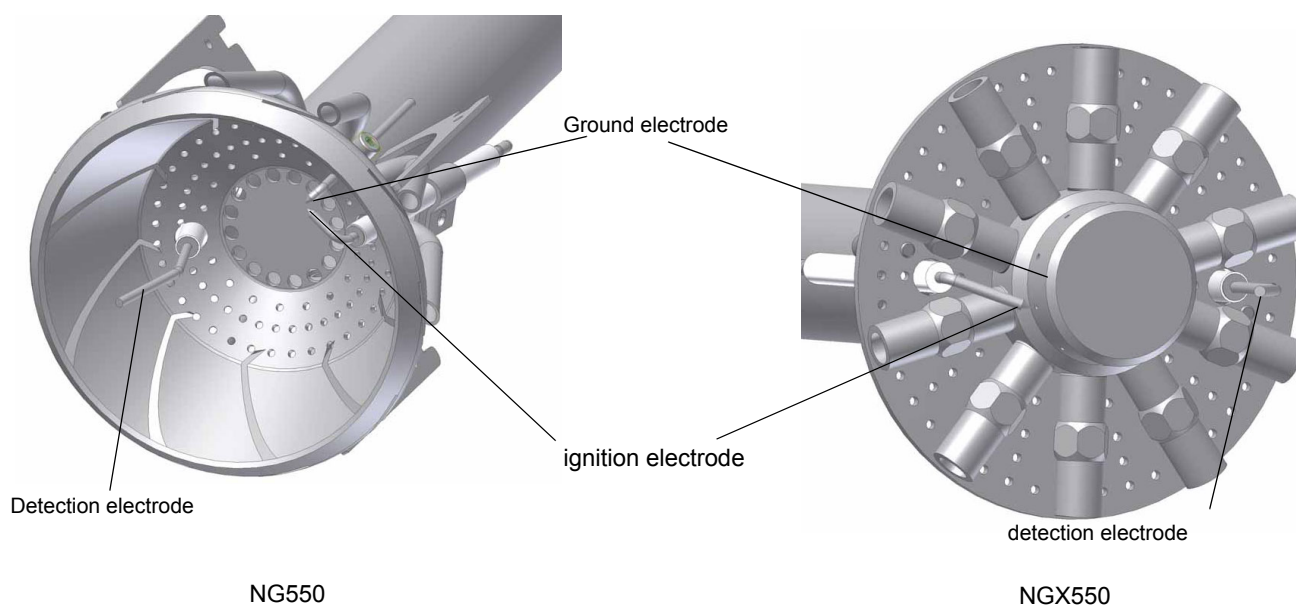


Fig. 50

## Checking the ionisation current

If the burner locks out, execute the following inspections. To measure the detection signals refer to the diagrams in Fig. 51. 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 35).

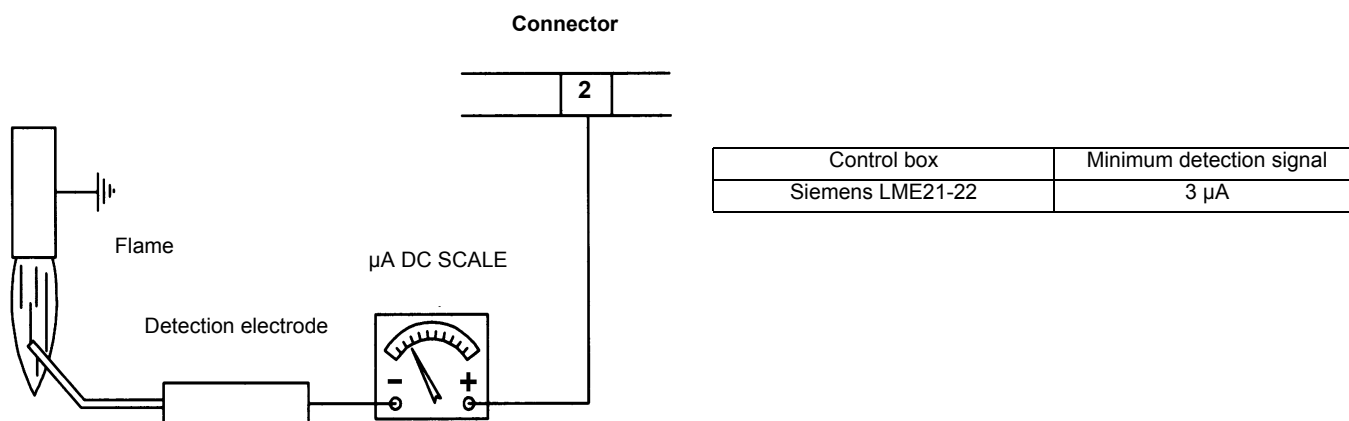


Fig. 51

## Seasonal stop

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

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

## Burner disposal

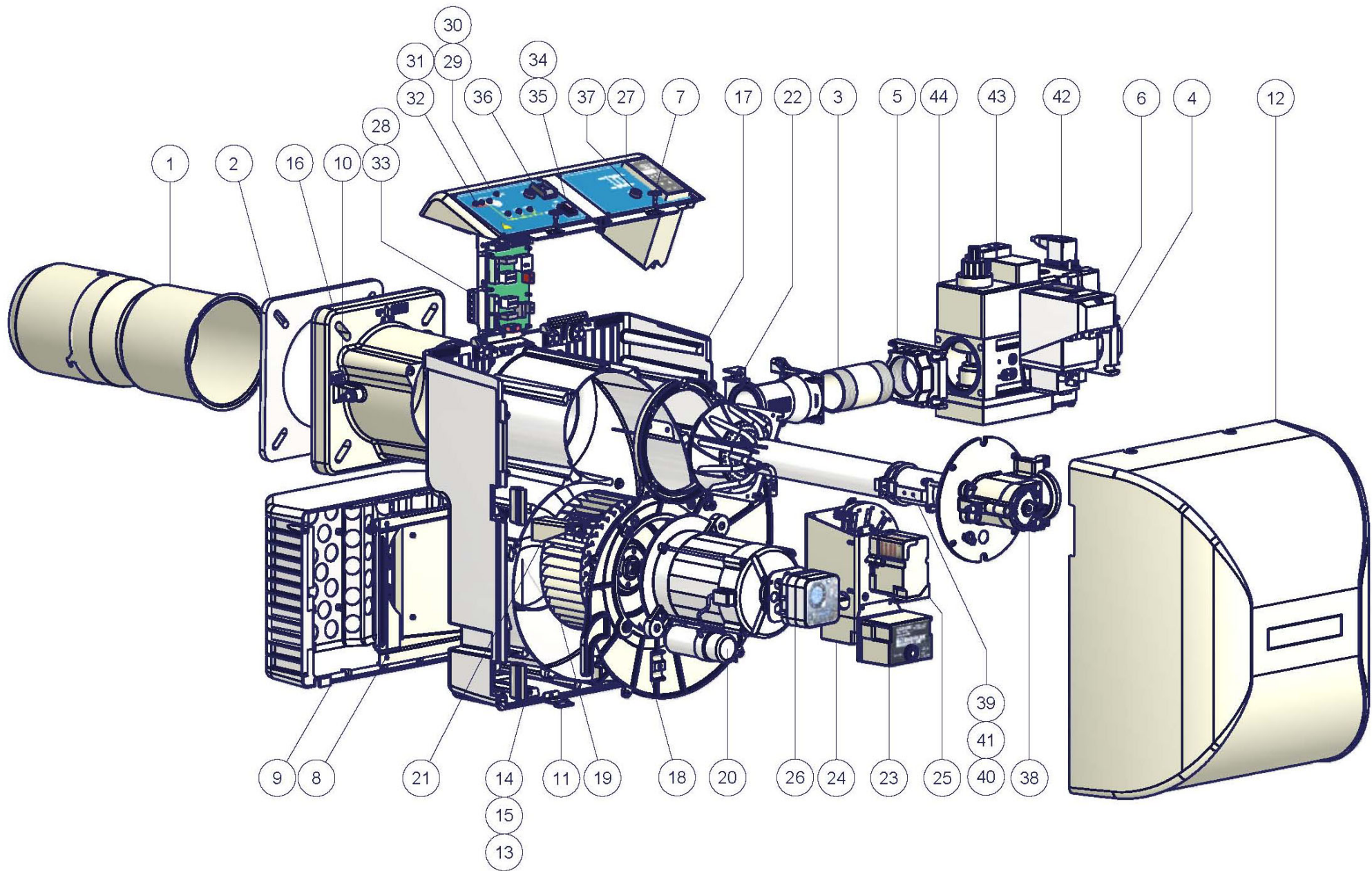
In case of disposal, follow the instructions according to the laws in force in your country about the "Disposal of materials".

## BURNER EXPLODED VIEW

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

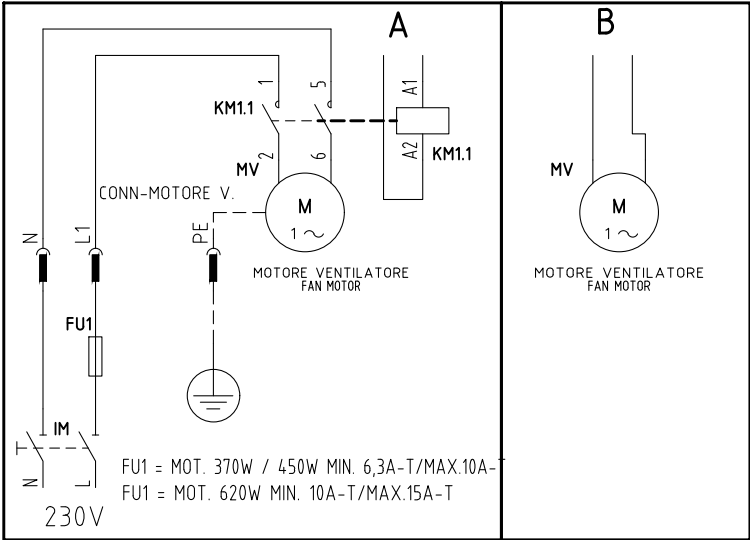
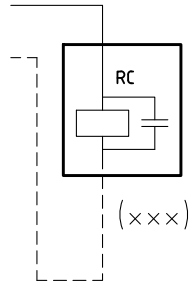
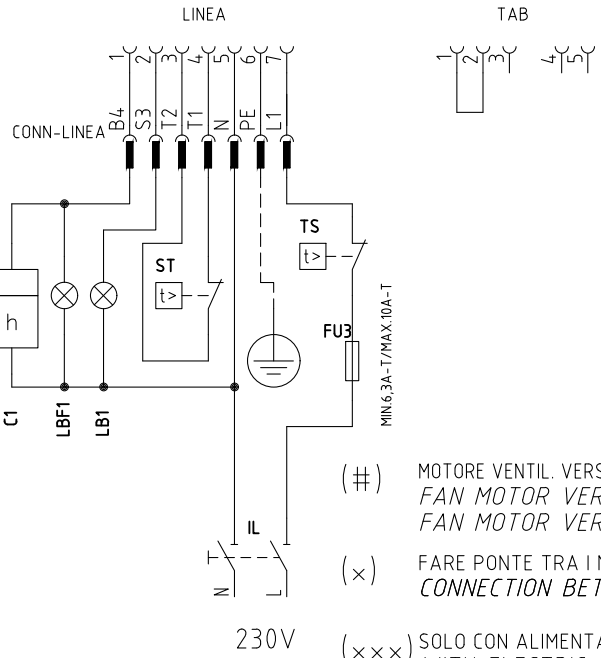
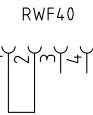
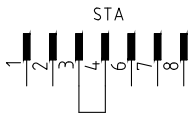
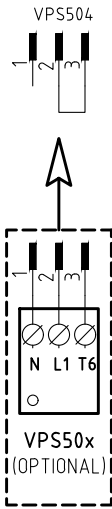
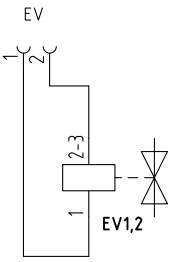
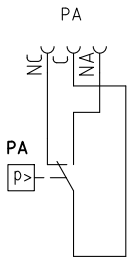
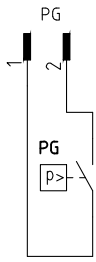
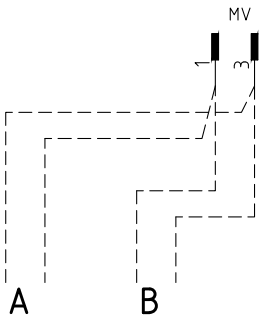
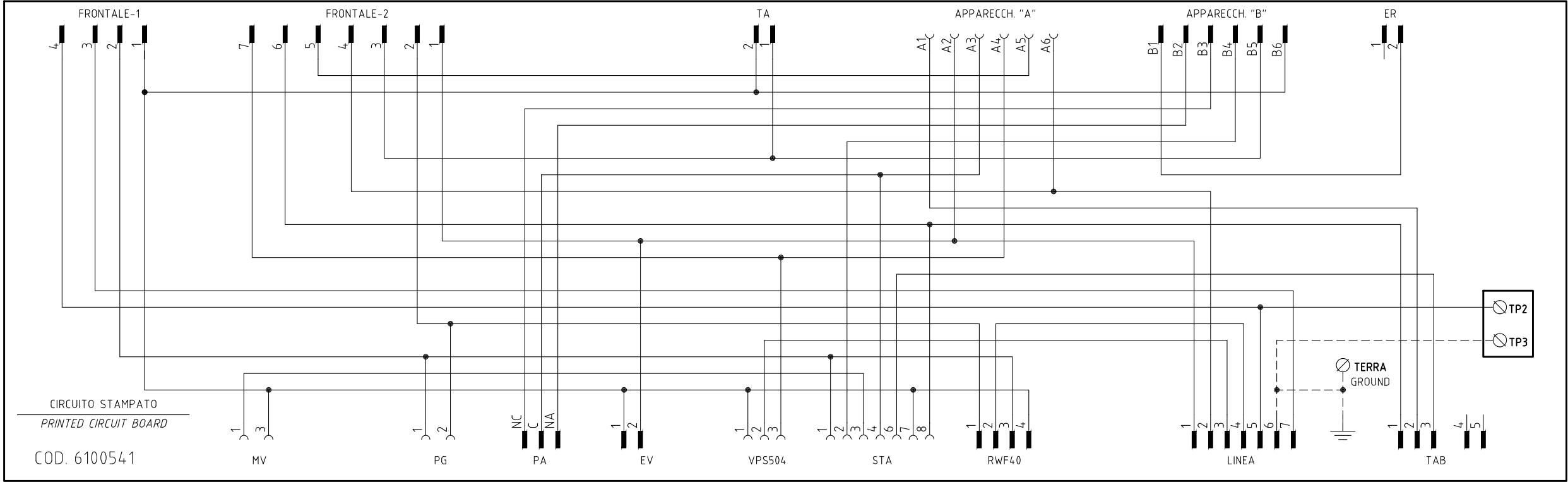
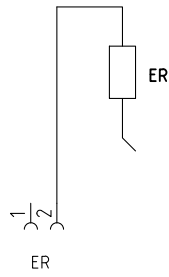
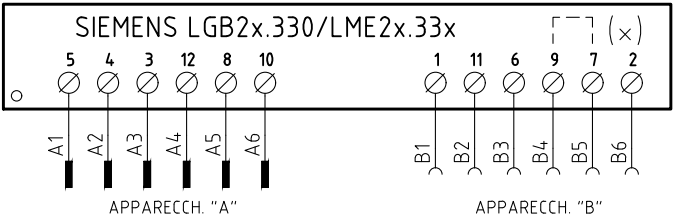
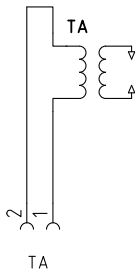
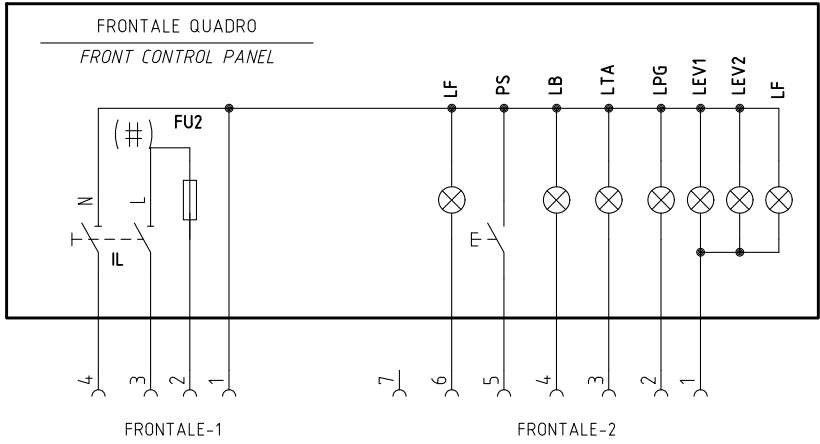
**ACTUATOR CAMS BERGER STA13B0.36/83N23L**

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

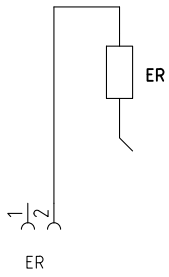
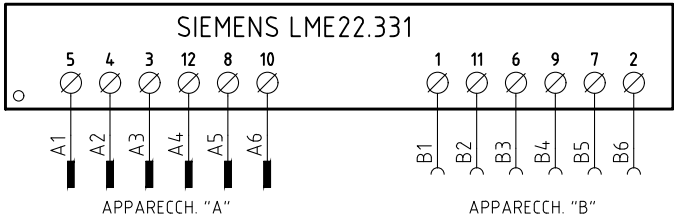
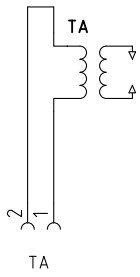
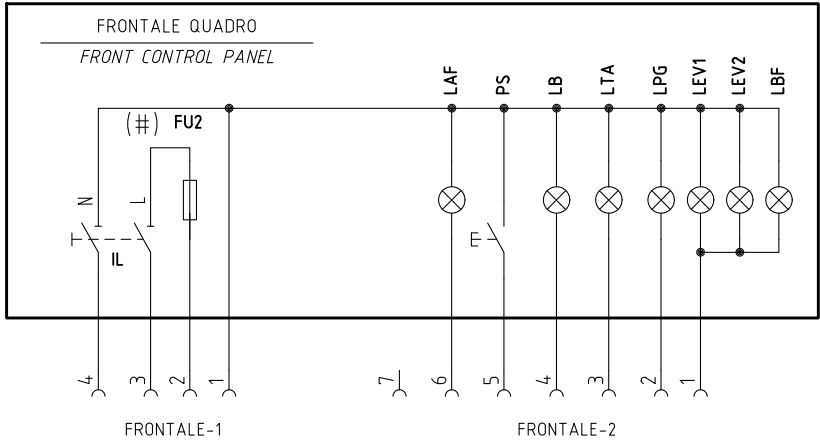
(xxx) SOLO CON ALIMENTAZIONE ELETTRICA SENZA NEUTRO  
WITH ELECTRIC SUPPLY WITHOUT NEUTRAL VERSION ONLY

	Impianto <i>TIPI/TYPES NG(X)350/400/550 – LG(X)350/400/550</i> <i>MODELLI/MODELS x-.TN(PR)(MD).x.xx.A.x.xx</i>	Ordine		Data 19/10/2010	PREC. /	FOGLIO 1
	Descrizione <i>VERSIONE CON CIRCUITO STAMPATO</i> <i>WITH PRINTED CIRCUIT VERSION</i>	Commessa	Data Controllato 03/08/2017	Revisione 06		
		Esecutore U. PINTON	Controllato T. BARALDO	Dis. N. 18 – 0163	SEGUE 2	TOTALE 5

05	AGGIUNTO7ADDED "KM3" ASCON	07/08/14	U. PINTON
04	AGGIUNTO/ADDED "600V"	19/06/12	U. PINTON
03	AGGIUNTO/ADDED "RwF50.2x"	20/01/12	U. PINTON
02	MOTOR MODIFY	19/10/10	U. PINTON
06	AGGIUNTO / ADDED RWF40.0x0	03/08/17	U. PINTON
REV.	MODIFICA	DATA	FIRME



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

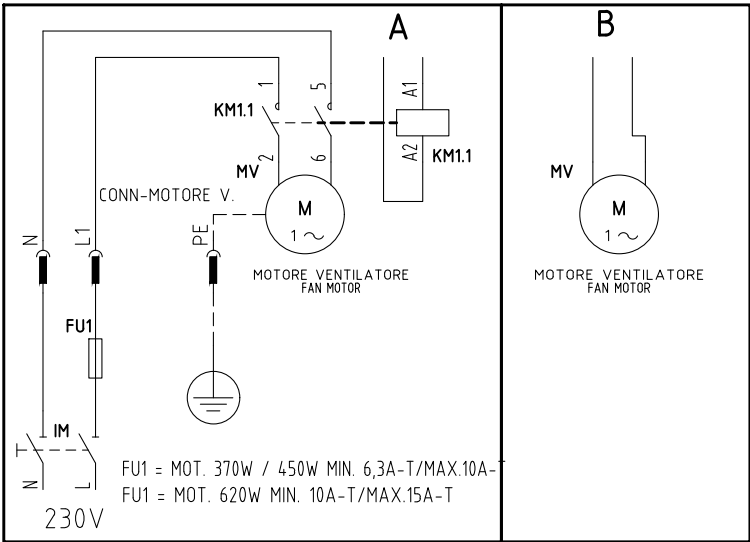
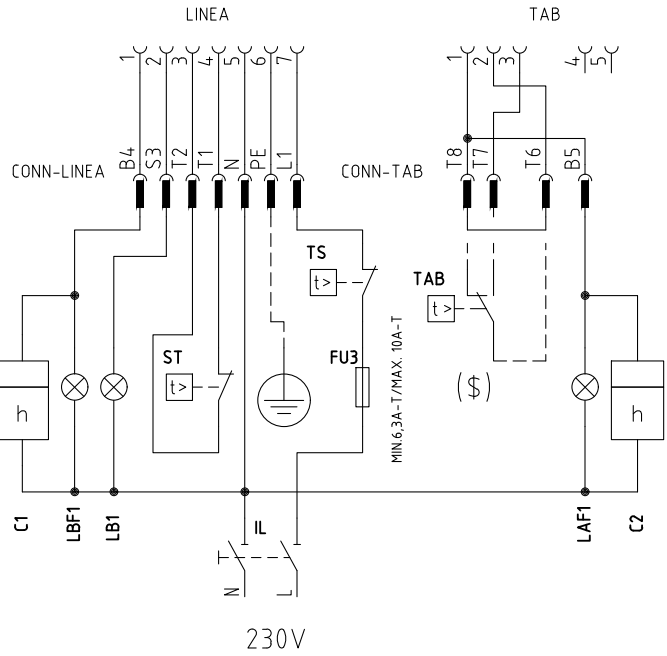
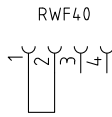
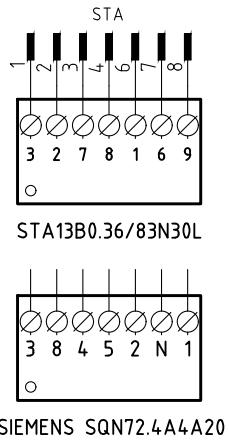
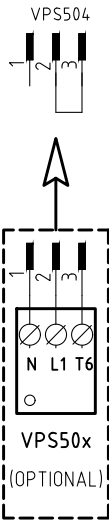
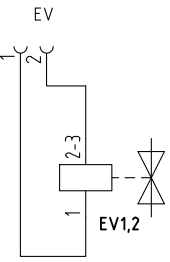
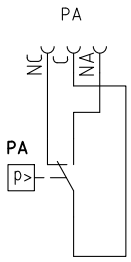
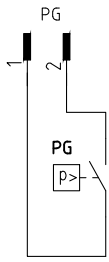
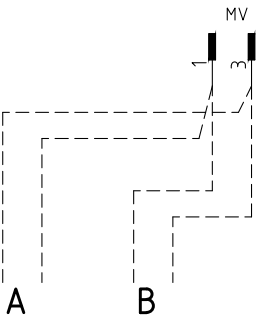
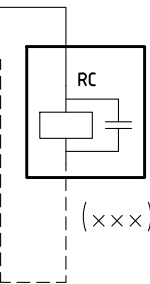
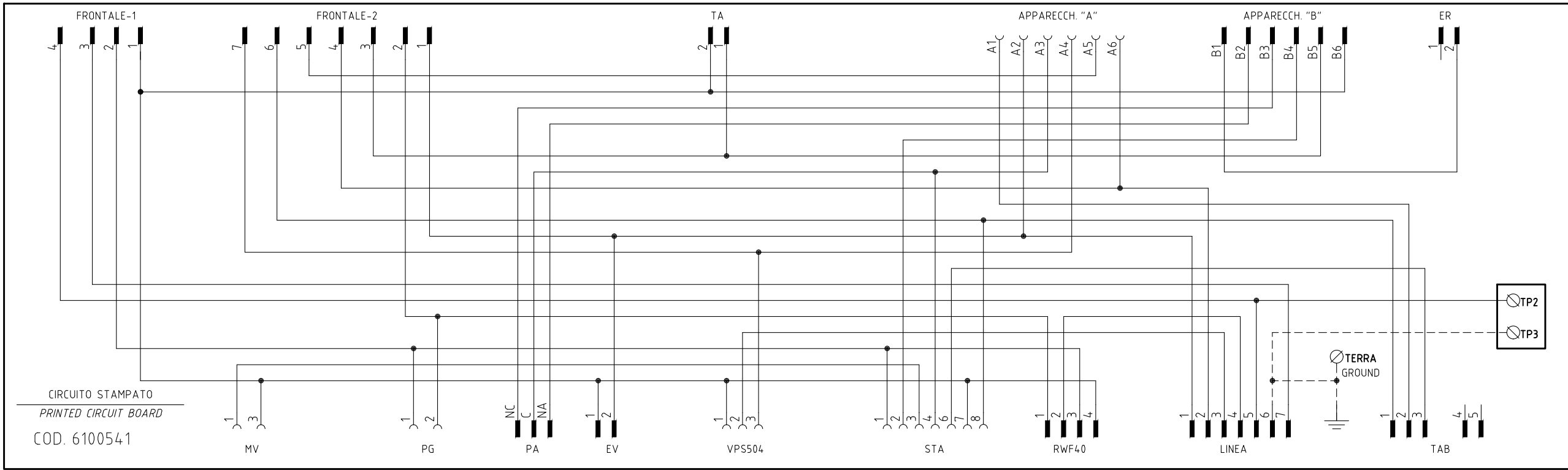


SERVOCOMANDO SERRANDA ARIA  
AIR DAMPER ACTUATOR  
STA13B0.36/83N30L

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

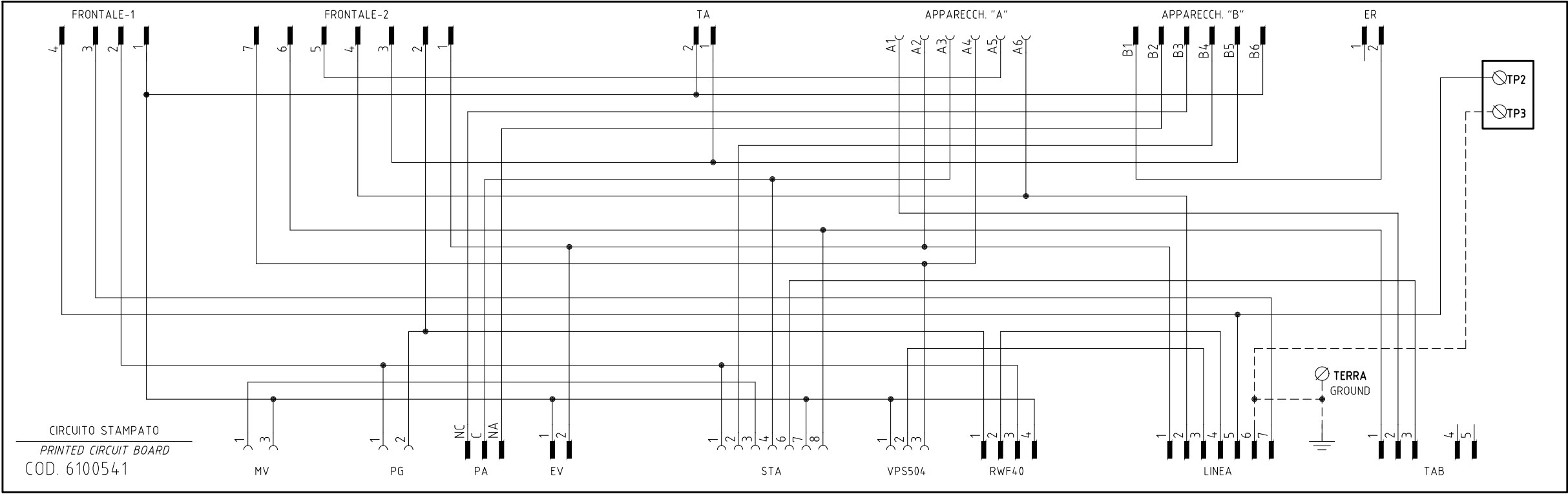
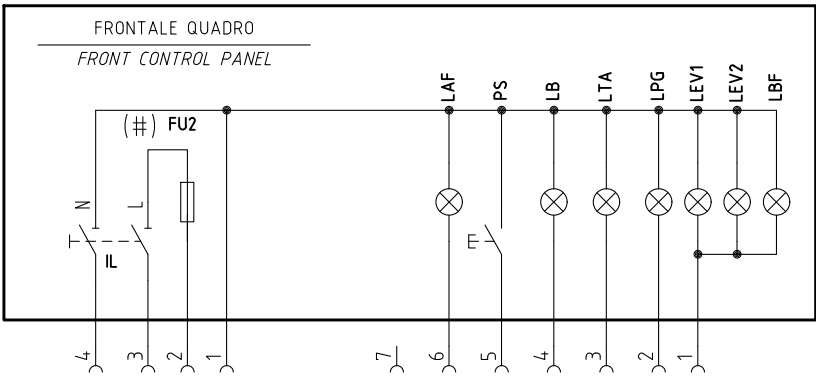
SERVOCOMANDO SERRANDA ARIA  
AIR DAMPER ACTUATOR  
SIEMENS SQN72.xA4A20

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

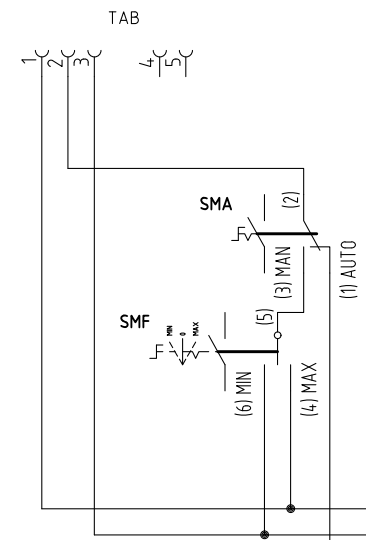
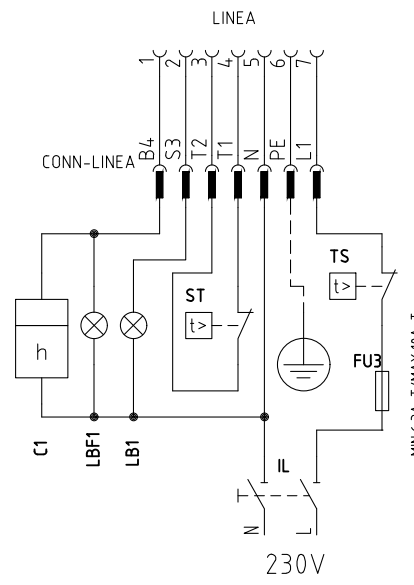
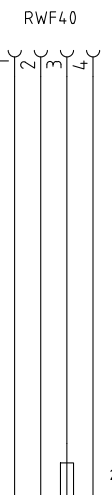
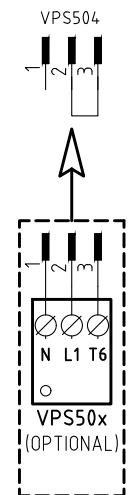
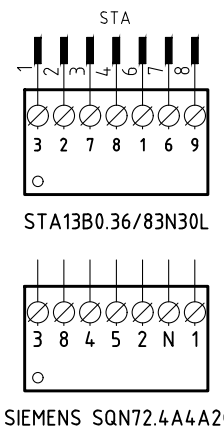
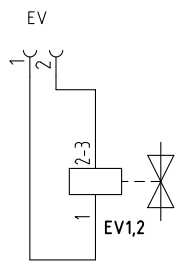
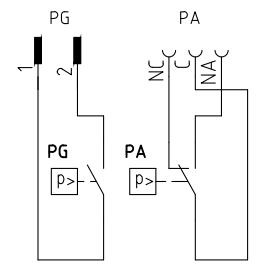
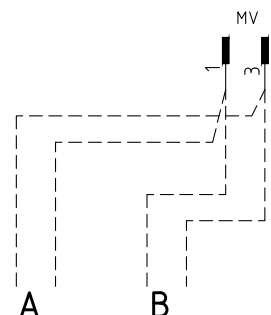


- (#) MOTORE VENTIL. VERSIONE [A], FU2 = 6,3A F; MOTORE VENTIL. VERSIONE [B], FU2 = 10A F  
FAN MOTOR VERSION [A], FU2= 6,3 A F;  
FAN MOTOR VERSION [B], FU2= 10 A F
- (×××) SOLO CON ALIMENTAZIONE ELETTRICA SENZA NEUTRO  
WITH ELECTRIC SUPPLY WITHOUT NEUTRAL VERSION ONLY
- (\$ ) SE USATO "TAB", TOGLIERE IL PONTE TRA I MORSETTI T6-T8  
IF USED "TAB", REMOVE THE BRIDGE BETWEEN TERMINALS T6-T8

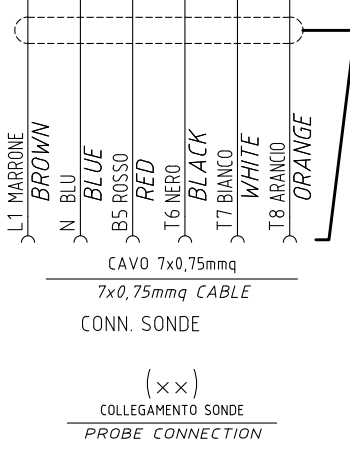
Data	19/10/2010	PREC.	FOGLIO
Revisione	06	1	2
Dis. N.	18 - 0163	SEGUE	TOTALE
		3	5



CIRCUITO STAMPATO  
PRINTED CIRCUIT BOARD  
COD. 6100541



ASCONE 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	1N	1P	L1	N	KQ	G-	G+	13	12	11
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
SIEMENS RWF40.0x0											
Y1	Y2	Q13	Q14	L1	N	Q	TE	U1	G-	G+	M1
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
SIEMENS RWF55.5x											
K2	K3	1N	1P	L1	N	KQ	TE	13	G-	G+	14
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗



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

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

SERVOCOMANDO SERRANDA ARIA  
AIR DAMPER ACTUATOR  
SIEMENS SQN72.4A4A20

I (ROSSO) ALTA FIAMMA  
I (RED) HIGH FLAME  
II (BLU) SOSTA  
II (BLUE) STAND-BY  
III (ARANCIO) BASSA FIAMMA  
III (ORANGE) LOW FLAME  
IV (NERO) NON USATA  
IV (BLACK) 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

VERSIONE MODULANTE "MD"  
"MD"MODULATING VERSION

Data	19/10/2010	PREC.	FOGLIO
Revisione	06	2	3
Dis. N.	18 - 0163	SEGUE	TOTALE
		4	5

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

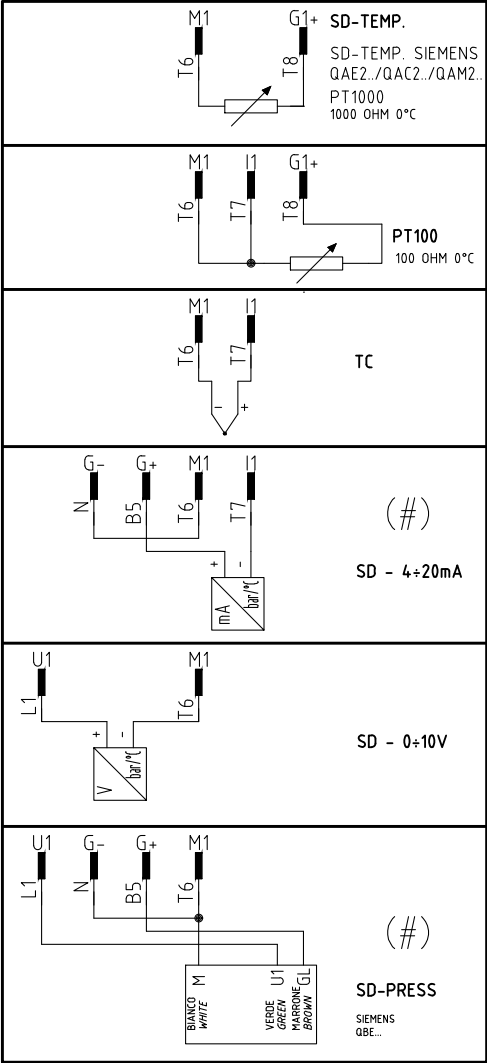
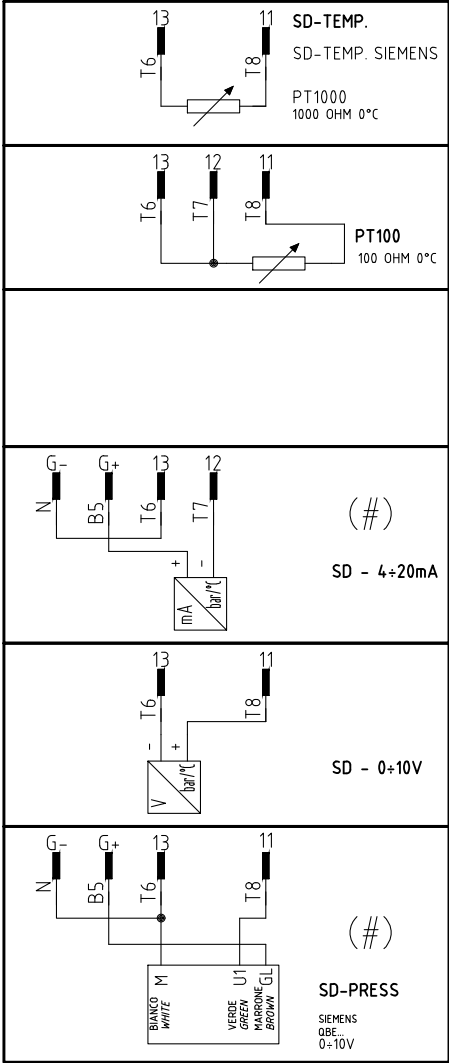
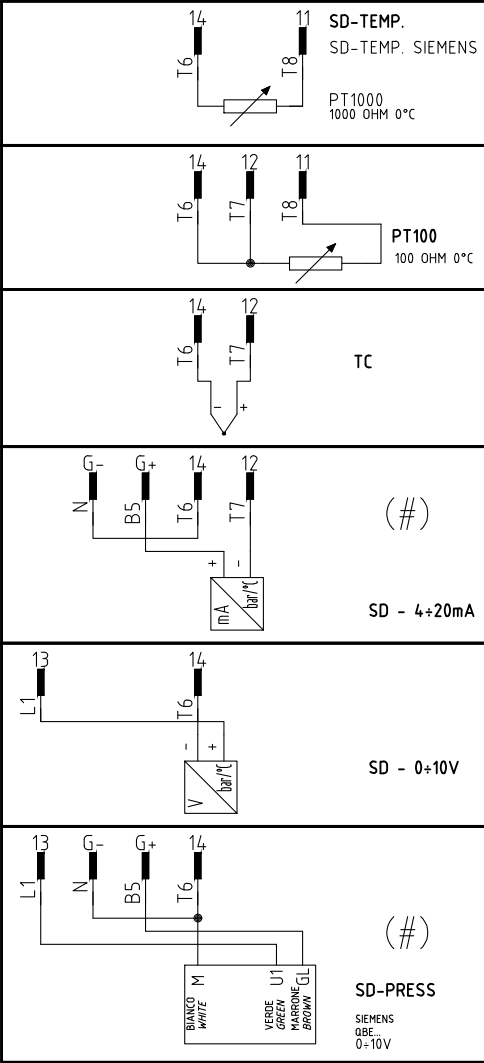
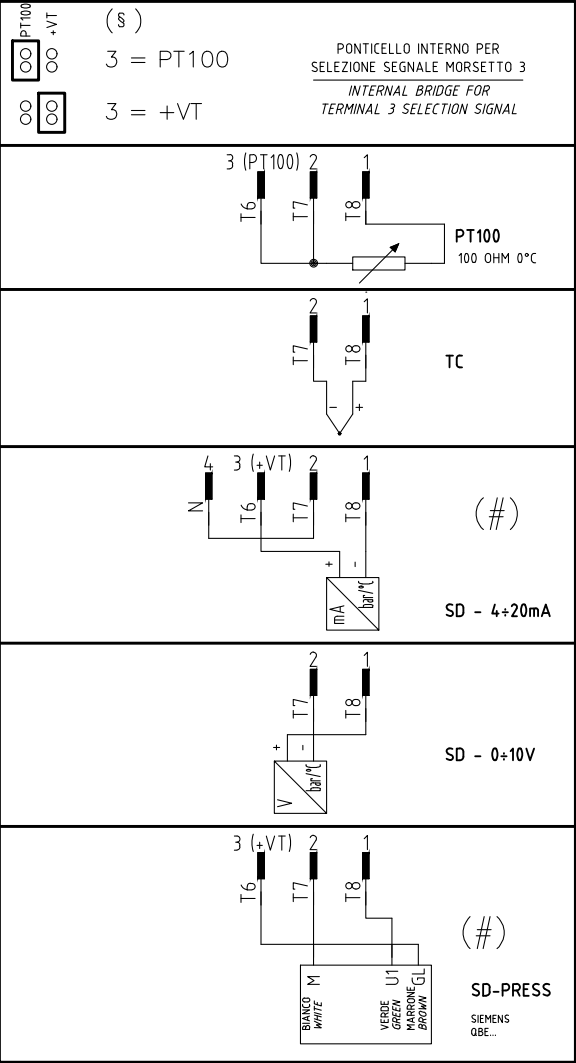
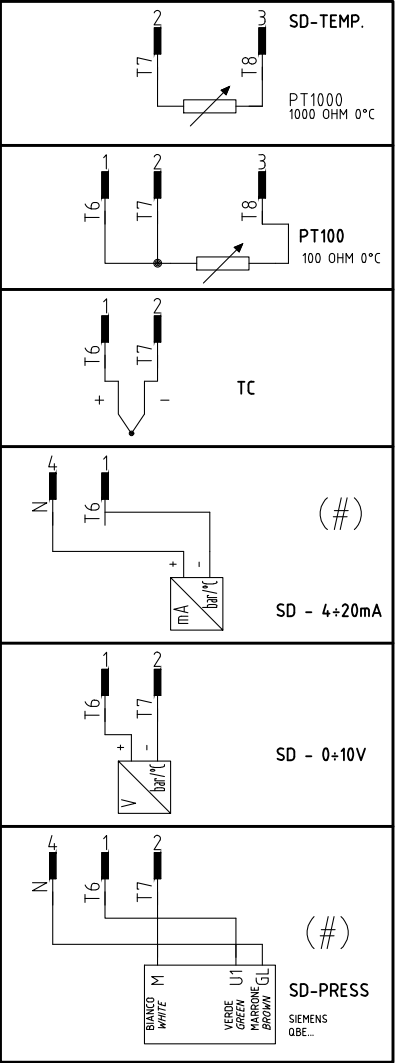
KM3 HCRMMD

600V RRR0-1-T73

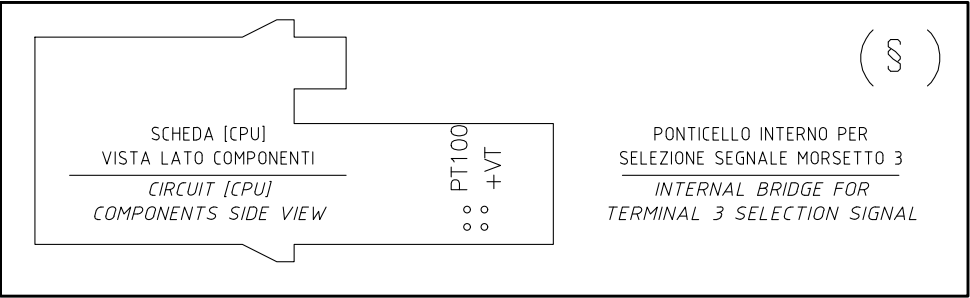
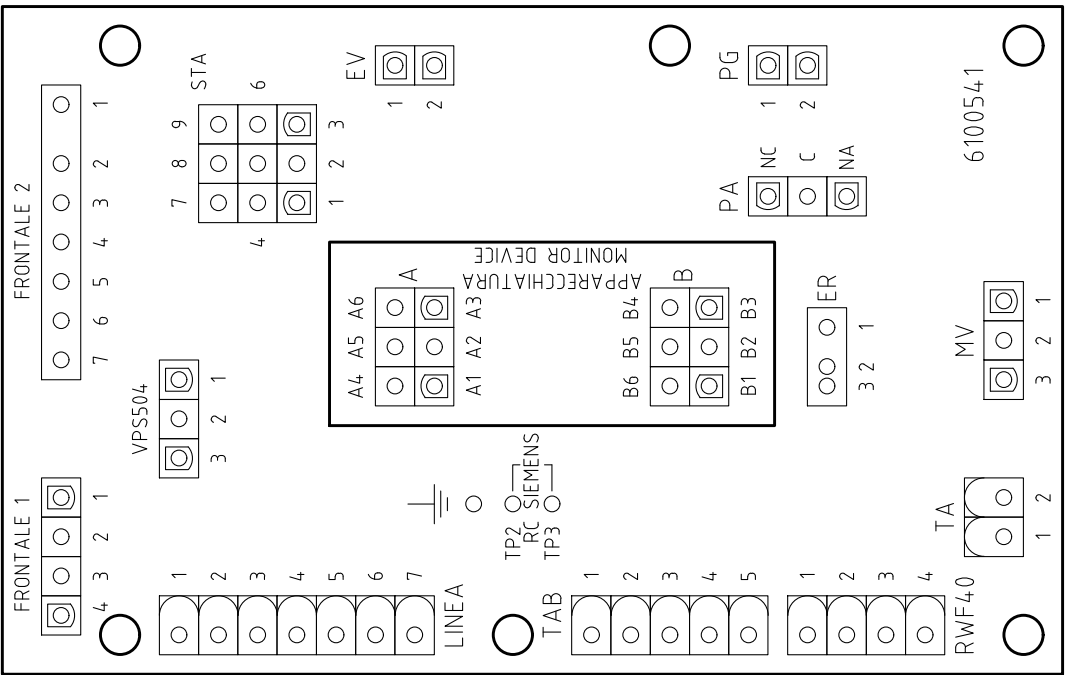
RWF55.5x

RWF50.2x

RWF40.0xx



(#)  
COLLEGAMENTO SOLO PER  
TRASDUTTORI PASSIVI  
TRANSDUCER PASSIVE  
CONNECTION ONLY



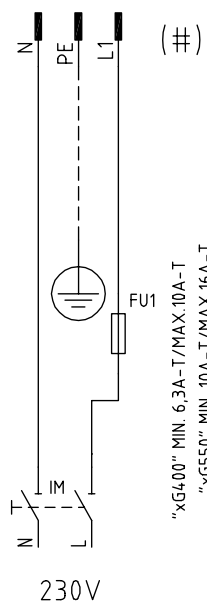
Data	19/10/2010	PREC.	FOGLIO
Revisione	06	3	4
Dis. N.	18 - 0163	SEGUE	TOTALE
		5	5

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
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 LINEA BRUCIATORE					BURNER LINE FUSE									
FU4	FUSIBILE AUSILIARIO					AUXILIARY FUSE									
IL	INTERRUTTORE LINEA AUSILIARI					AUXILIARY 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 LME22.331	APPARECCHIATURA CONTROLLO FIAMMA					CONTROL BOX									
SIEMENS RWF40.0x0	REGOLATORE MODULANTE					BURNER MODULATOR									
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)									

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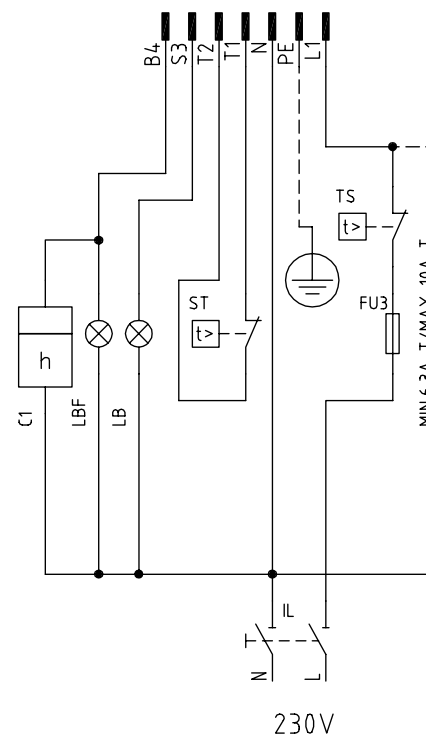
VERSIONE ALTA-BASSA FIAMMA / PROGRESSIVO CON RELE' "KAB" DI SEZIONAMENTO  
 HIGH-LOW / PROGRESSIVE VERSION WITH "KAB" SECTIONING RELAY  
 ИСПОЛНЕНИЕ ДВУХСТУПЕНЧАТОЕ / ПРОГРЕССИВНОЕ С РАЗДЕЛИТЕЛЬНЫМ РЕЛЕ «КАВ»

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

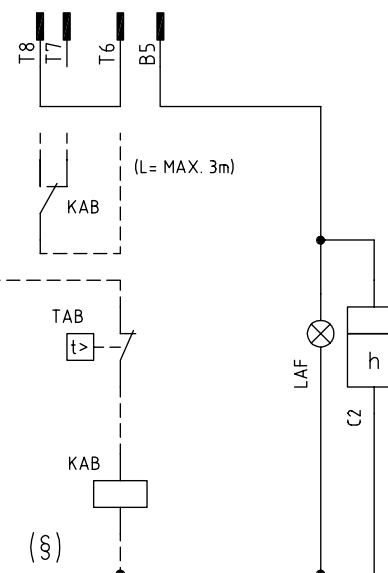


(#) ESCLUSO TIPO [xG350]  
 EXCLUDED TYPE [xG350]  
 ЗА ИСКЛЮЧЕНИЕМ ТИПА [xG350]

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 1
Revisione	00		
Dis. N.	TAB_1	SEGUE 2	TOTALE 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' AUSILARIO	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

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

## 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>LED</p>	<p>red LED</p> <p>yellow LED</p> <p>green LED</p>	<p>..... Steady on</p> <p>○... Off</p>
--	---	--

During startup, status indication takes place according to the table:

Status	Color code	Color
Waiting time $t_{w2}$ , other waiting states	○.....	Off
Ignition phase, ignition controlled	● ○ ○ ○ ● ○ ○ ○ ● ○ ●	Flashing yellow
Operation, flame ok	<u>□.....</u>	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 «t11») 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

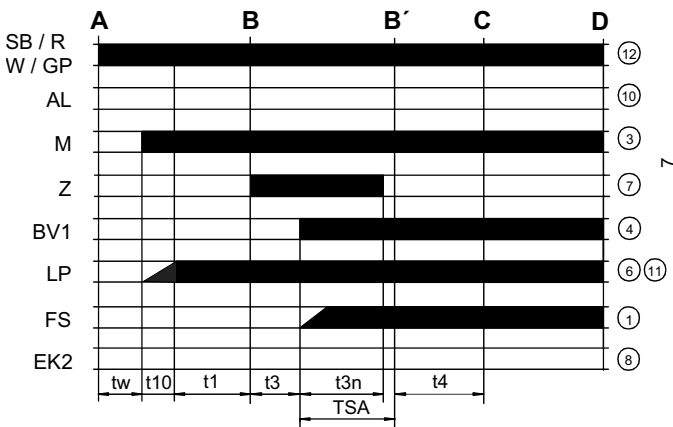
**C - D** Burner operation (heat production)

**D** Controlled by "R" shutdown

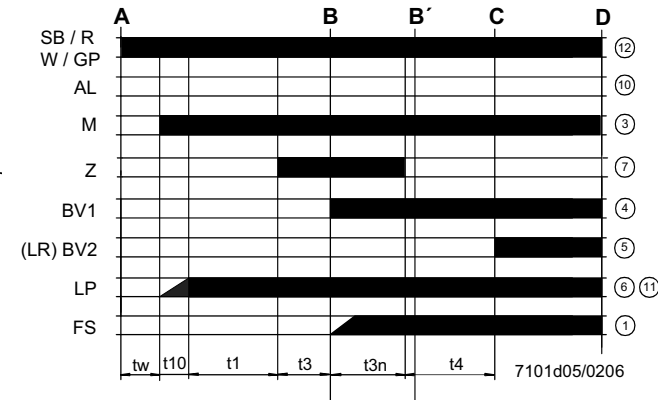
The burner stops and the control device is ready for a new startup.



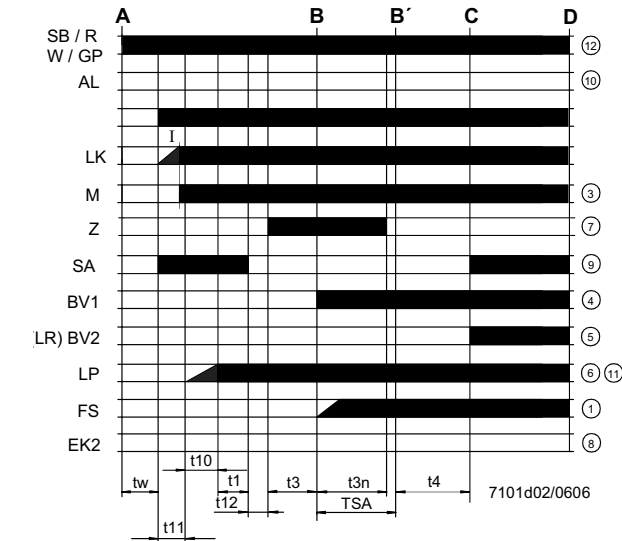
LME11 control sequence



LME21 control sequence



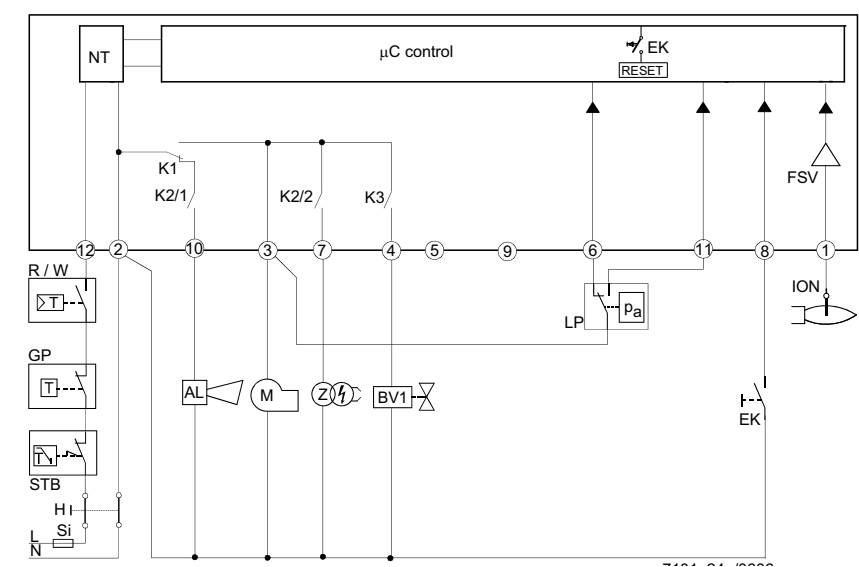
LME22 control sequence



Control sequence

- tw Waiting time
- t1 Purge time
- TSA Ignition safety time
- t3 Preignition time
- t3n Postignition time
- t4 Interval between BV1 and BV2/LR
- t10 Specified time for air pressure signal
- t11 Programmed opening time for actuator SA
- t12 Programmed closing time for actuator SA

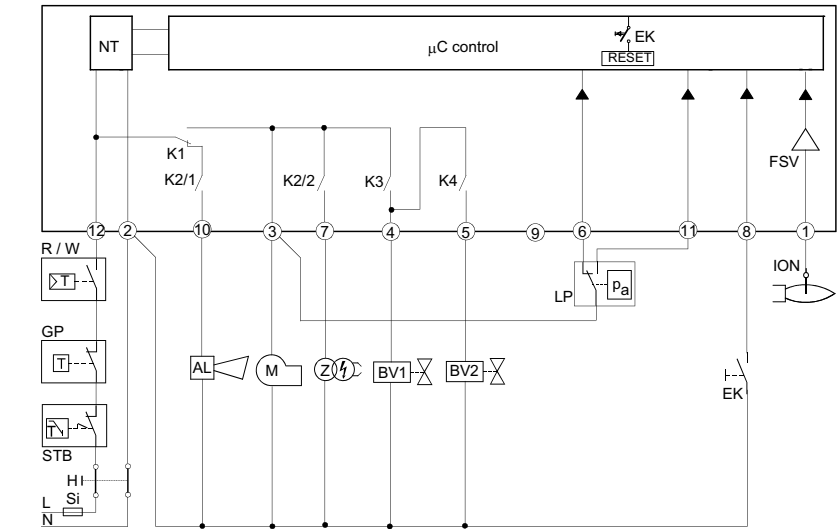
LME11 connection diagram



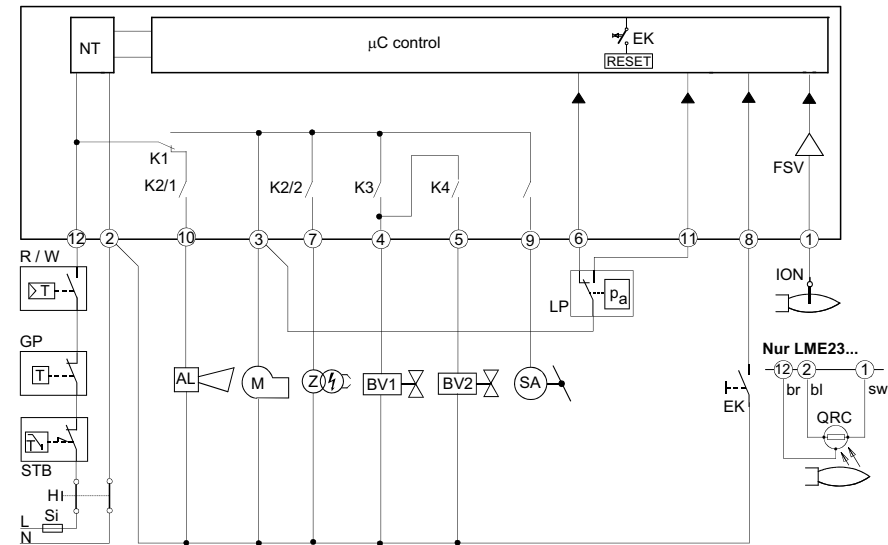
Connection diagram

- 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 CAUSE 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> <ul style="list-style-type: none"><li>- Faulty or soiled fuel valves</li><li>- Faulty or soiled flame detector</li><li>- Inadequate adjustment of burner, no fuel</li><li>- Faulty ignition equipment</li></ul>
3 blinks ***	<b>The air pressure switch does not switch or remains in idle position:</b> <ul style="list-style-type: none"><li>- LP is faulty</li><li>- Loss of air pressure signal after t10</li><li>- LP is welded in normal position.</li></ul>
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> <ul style="list-style-type: none"><li>- Faulty or soiled fuel valves</li><li>- Faulty or soiled flame detector</li><li>- Inadequate adjustment of burner</li></ul>
8 ÷ 9 blinks	Free
10 blinks *****	<b>Faulty output contacts</b> <b>Attention: "lockout" remote signal (terminal no. 10) not enabled</b> <ul style="list-style-type: none"><li>- Wiring error</li><li>- Anomalous voltage on output terminals</li><li>- Other faults</li></ul>
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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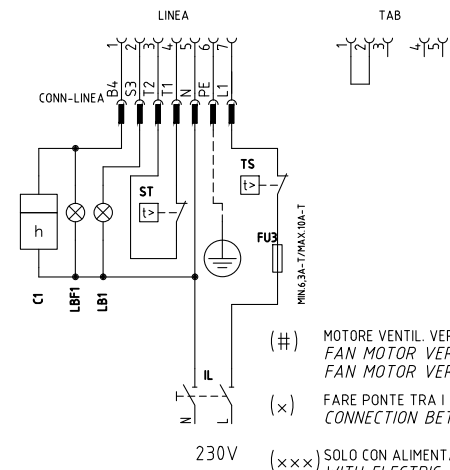
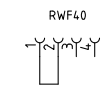
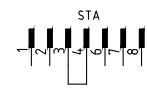
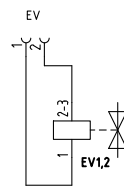
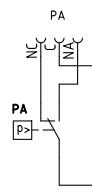
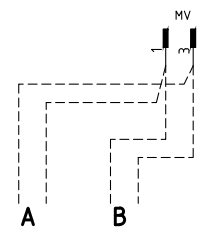
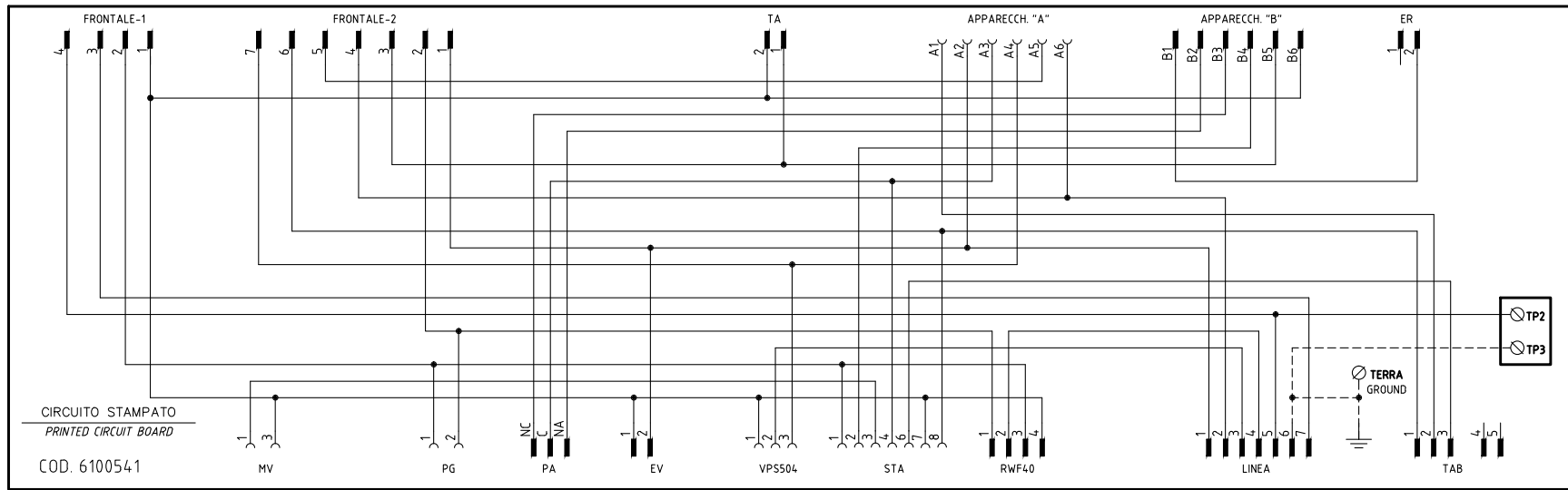
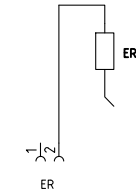
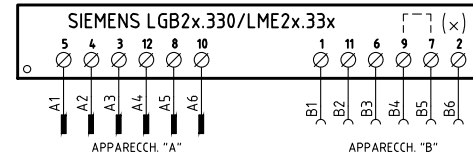
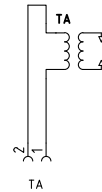
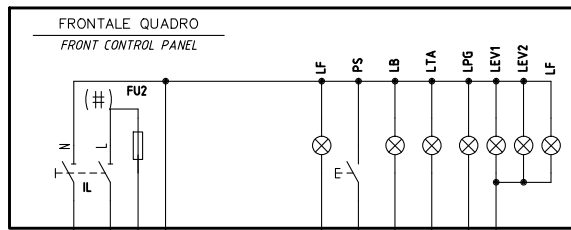




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Via L.Galvani, 9 - 35011 Campodarsego (PD) - ITALY  
Tel. +39 049 9200944 - Fax +39 049 9200945/9201269  
web site: [www.cibunigas.it](http://www.cibunigas.it) - e-mail: [cibunigas@cibunigas.it](mailto:cibunigas@cibunigas.it)

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

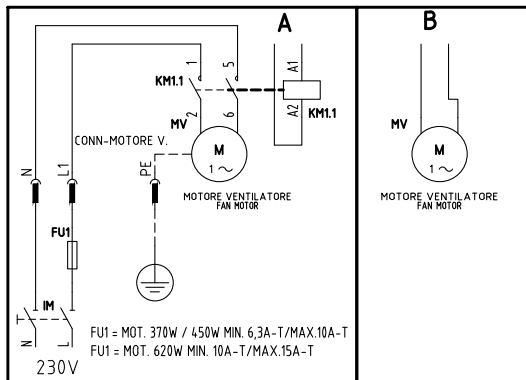
# VERSIONE MONOSTADIO "TN" "TN" SINGLE-STAGE VERSION



(#) 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

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

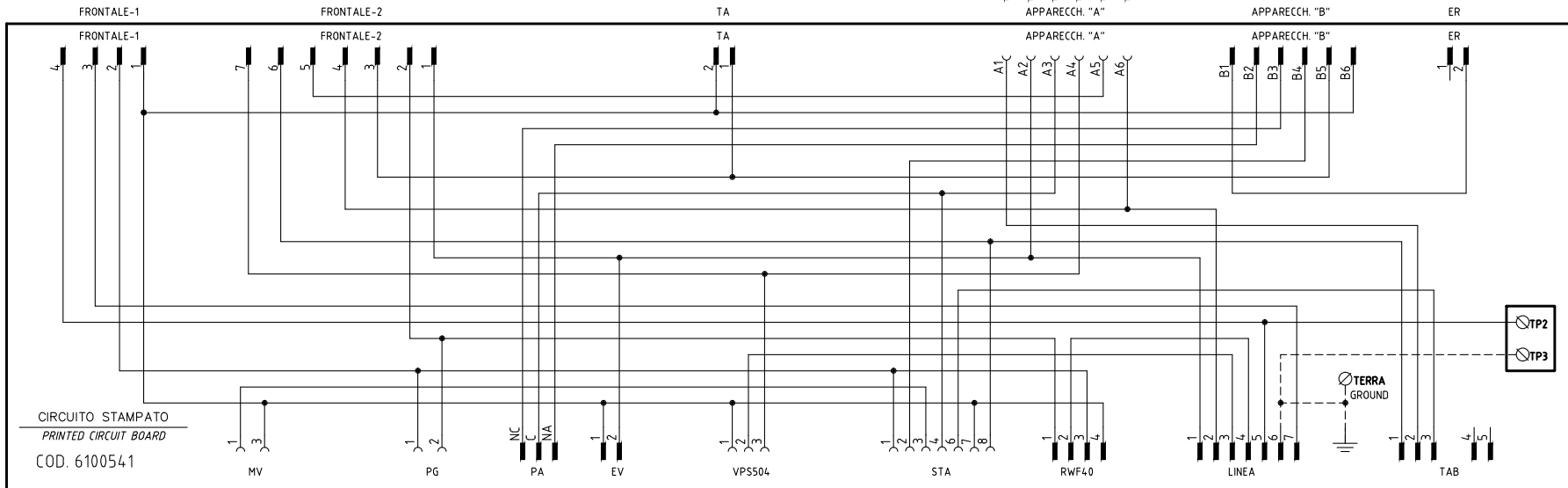
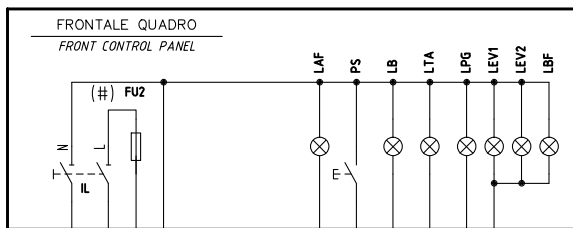


	Impianto	Ordine	Data 19/10/2010		PREC.	FOGLIO
	TIPI/TYPES NG(X)350/400/550 - LG(X)350/400/550	Commissa	Revisione 05		/	1
	Descrizione	Esecutore	Dis. N. 18 - 0163		SEQUE	TOTALE
	VERSIONE CON CIRCUITO STAMPATO WITH PRINTED CIRCUIT VERSION	U. PINTON	E. CAVALLI		2	5

REV.	MODIFICA	DATA	FIRME
05	AGGIUNTO/ADDED "KVB" ASCON	07/08/14	U. PINTON
04	AGGIUNTO/ADDED "600V"	19/06/12	U. PINTON
03	AGGIUNTO/ADDED "RWF50.2x"	20/01/12	U. PINTON
02	MOTOR MODIFY	19/10/10	U. PINTON
01	AGGIUNTO / ADDED SGM72..	22/05/09	U. PINTON



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

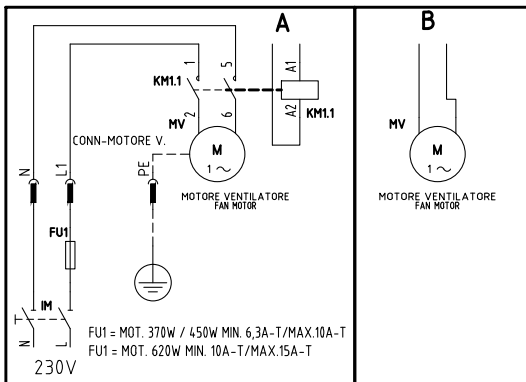
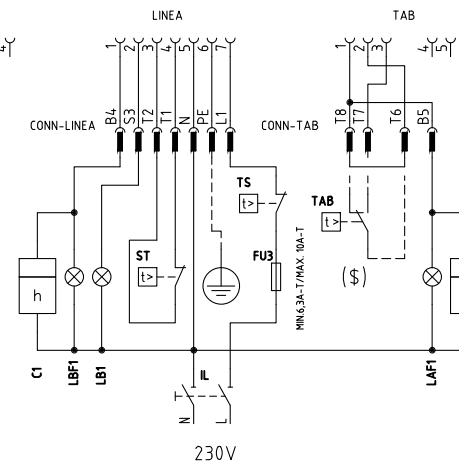
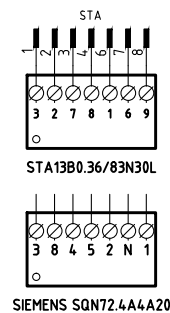
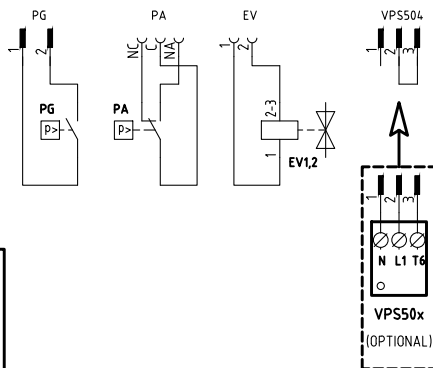
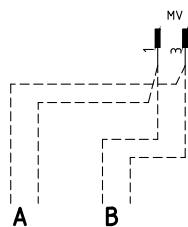


SERVOCOMANDO SERRANDA ARIA  
AIR DAMPER ACTUATOR  
STA13B0.36/83N30L

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

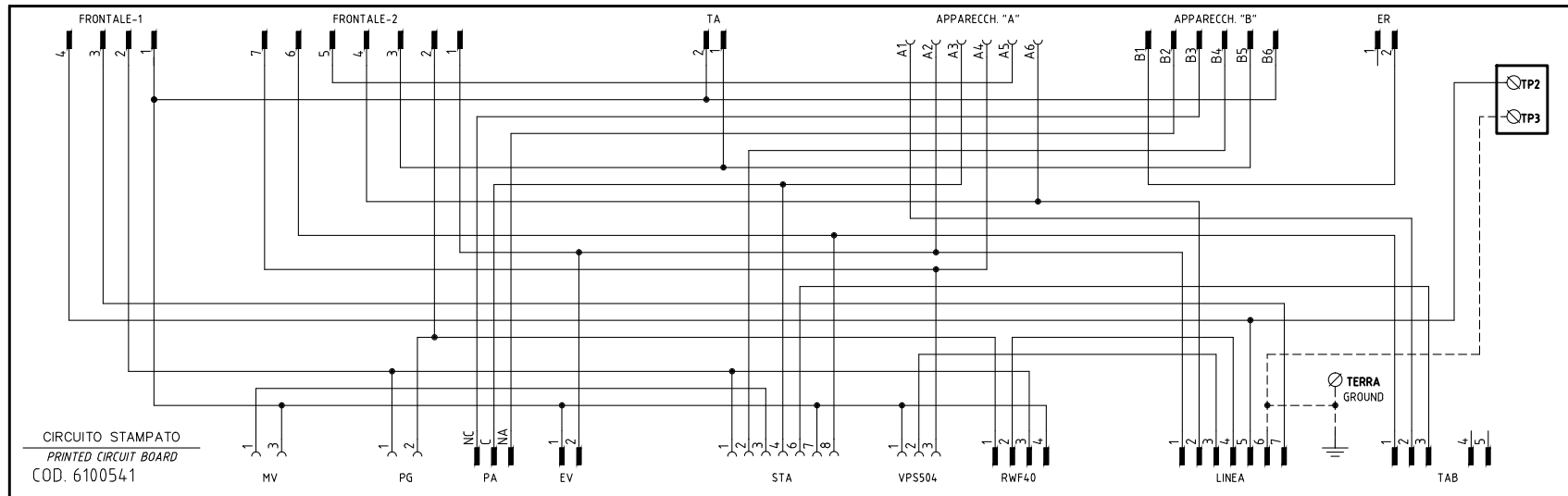
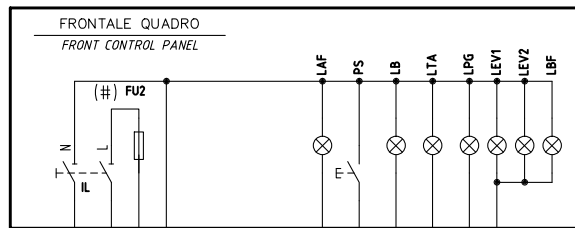
SERVOCOMANDO SERRANDA ARIA  
AIR DAMPER ACTUATOR  
SIEMENS SQNT2.xA4.A20

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

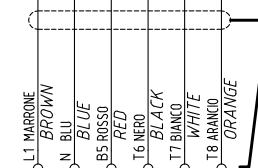
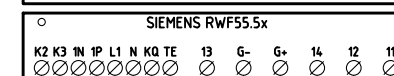
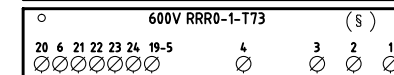
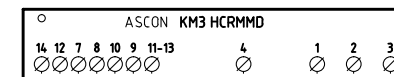
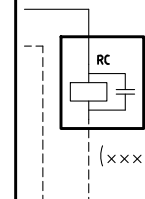


- (#) MOTORE VENTIL. VERSIONE [A], FU2 = 6,3A F; MOTORE VENTIL. VERSIONE [B], FU2 = 10A F  
 FAN MOTOR VERSION [A], FU2 = 6,3 A F;  
 FAN MOTOR VERSION [B], FU2 = 10 A F
- (x x x) SOLO CON ALIMENTAZIONE ELETTRICA SENZA NEUTRO  
 WITH ELECTRIC SUPPLY WITHOUT NEUTRAL VERSION ONLY
- (\$) SE USATO "TAB", 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

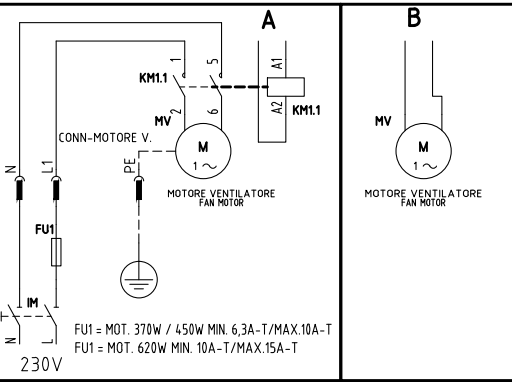
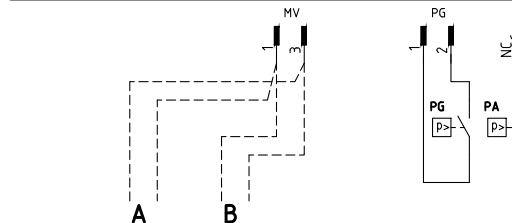


CAVO 7x0,75mmq

7x0,75mmq CABLE

CONN. SONDE

(x x)  
COLLEGAMENTO SONDE  
PROBE CONNECTION



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

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

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

I (ROSSO) ALTA FIAMMA  
I (RED) HIGH FLAME  
II (BLU) SOSTA  
II (BLUE) STAND-BY  
III (ARANCIO) BASSA FIAMMA  
III (ORANGE) LOW FLAME  
IV (NERO) NON USATA  
IV (BLACK) 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

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

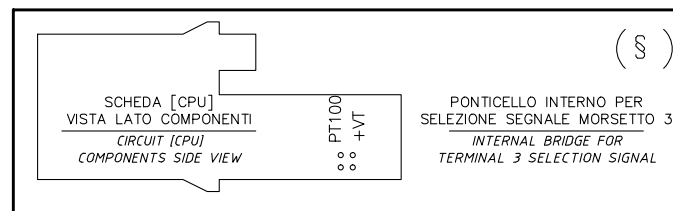
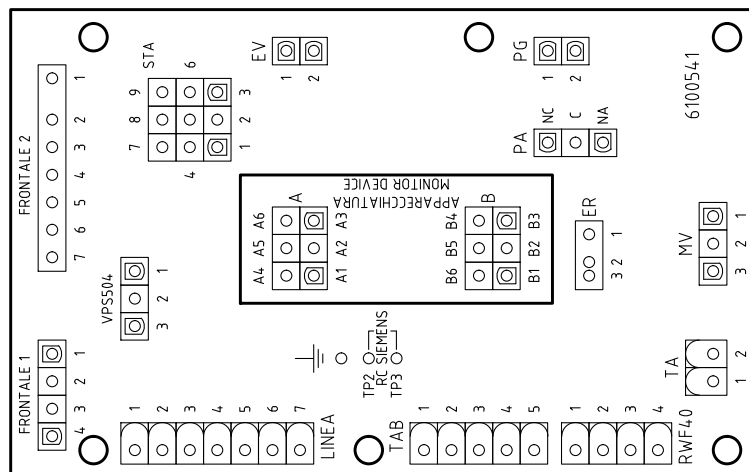
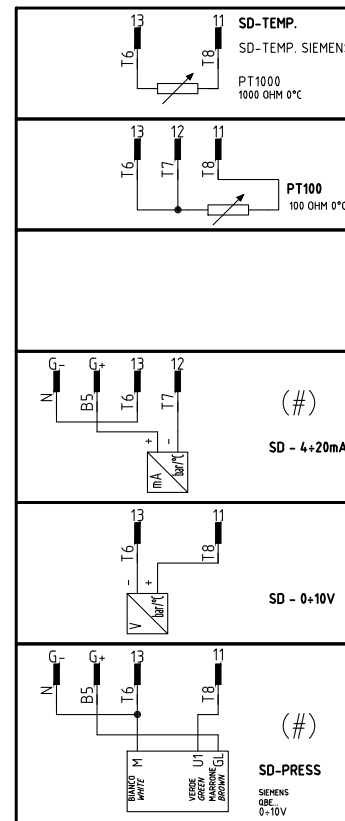
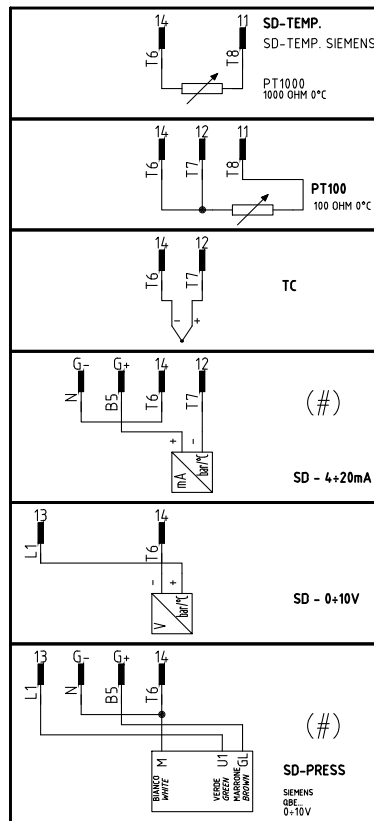
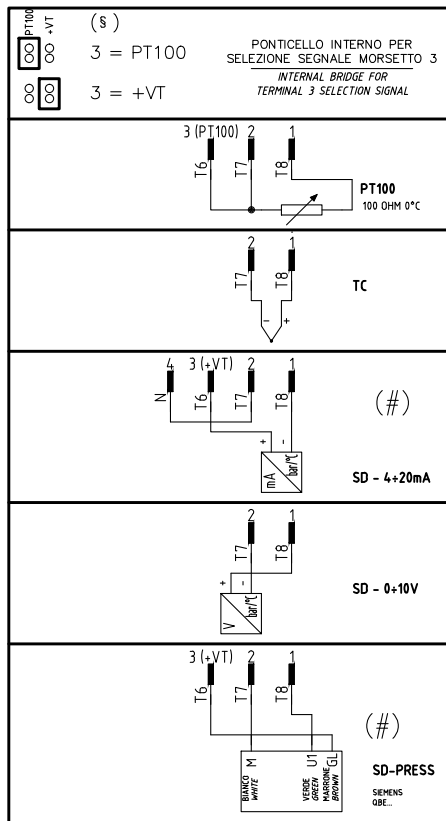
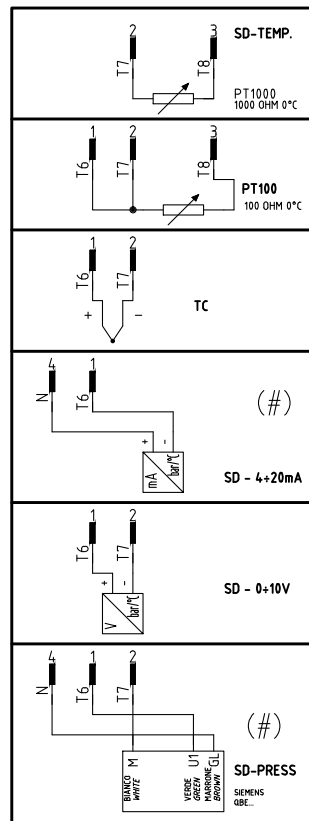
(xx)  
ATTENZIONE COLLEGAMENTO SONDE CON CONNETTORE 7 POLI  
WARNING PROBE CONNECTION WITH 7 PINS CONNECTOR

## KM3 HCRMMD

## 600V RRR0-1-T73

## RWF55.5x

## RWF50.2x



Data	19/10/2010	PREC.	FOGLIO
Revisione	05	3	4
Dis. N.	18 - 0163	SEQUE	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 SEGNALE ALTA FIAMMA BRUCIATORE	BURNER IN HIGH FLAME INDICATOR LIGHT
LAF1	LAMPADA SEGNALE ALTA FIAMMA BRUCIATORE	BURNER IN HIGH FLAME INDICATOR LIGHT
LB	LAMPADA SEGNALE BLOCCO BRUCIATORE	INDICATOR LIGHT FOR BURNER LOCK-OUT
LB1	LAMPADA SEGNALE BLOCCO BRUCIATORE	INDICATOR LIGHT FOR BURNER LOCK-OUT
LBF	LAMPADA SEGNALE BASSA FIAMMA BRUCIATORE	BURNER IN LOW FLAME INDICATOR LIGHT
LBF1	LAMPADA SEGNALE BASSA FIAMMA BRUCIATORE	BURNER IN LOW FLAME INDICATOR LIGHT
LEV1	LAMPADA SEGNALE APERTURA [EV1]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV1]
LEV2	LAMPADA SEGNALE APERTURA [EV2]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV2]
LF	LAMPADA SEGNALE FUNZIONAMENTO BRUCIATORE	INDICATOR LIGHT BURNER OPERATION
LPG	LAMPADA SEGNALE PRESENZA GAS IN RETE	INDICATOR LIGHT FOR PRESENCE OF GAS IN THE NETWORK
LTA	LAMPADA SEGNALE 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)