# LG / NG140
# LG / NG200
# LGX / NGX120
# LGX / NGX200

## Idea Series
## Gas burners Progressive
## Fully-modulating

**MANUAL OF INSTALLATION - USE - MAINTENANCE**

CIB UNIGAS

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

M039280CB Rel. 0.1 06/2023

## DANGERS, WARNINGS AND NOTES OF CAUTION

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

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

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

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

### 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 circustances may cause explosions, polluting unburnt gases (example: carbon monoxide CO), burns, serious harm to people, animals and things:

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

### 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, reser the control box by means of the RESET pushbutton. If a second shut-down takes place, call the Technical Service, **without trying to RESET further**.
- The unit shall be operated and serviced by qualified personnel only, in compliance with the regulations in force.

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

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

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

**National Standard**

-UNI 7824 (Atomizing burners of the monobloc type. Characteristics and test methods)

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

**Norme nazionali / National Standard**

-UNI 7824 (Atomizing burners of the monobloc type. Characteristics and test methods.

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

**Norme nazionali / National Standard**

-UNI 7824 (Atomizing burners of the monobloc type. Characteristics and test methods.

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

**National Standard**

- UNI 7824 (Atomizing burners of the monobloc type. Characteristics and test methods.

### *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 house hold 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.



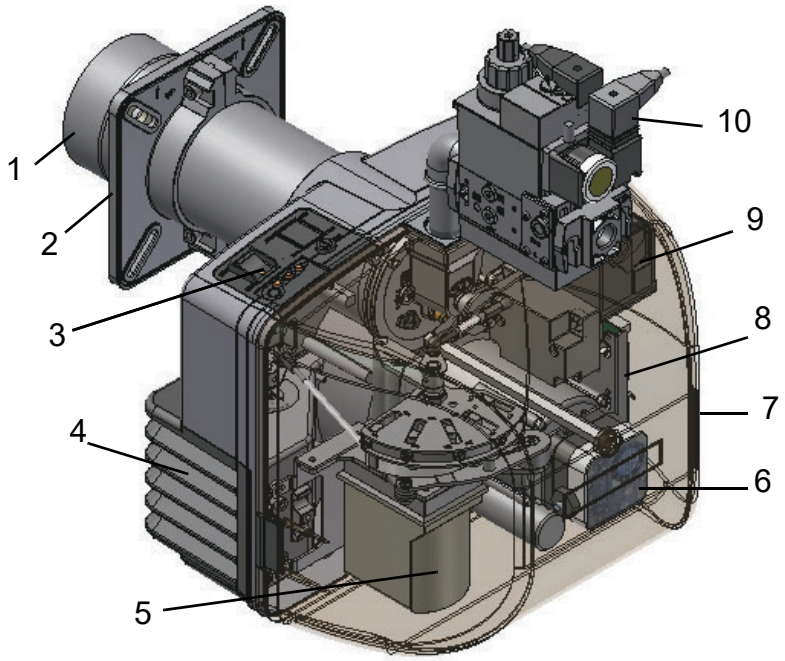
***WARNING!*** Failure to observe the warning may result in electric shock with lethal consequences

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

## GENERAL FEATURES

Burners of this series are provided with a removable cover made of ABS, a heat and crash proof plastic material. The design of the shi-fitng flange assures an efficient tightness and room saving. All the mechanical components are mounted on a removable plate that makes routine maintenance operation easier. The combustion head position can be easily adjusted by means of a indexed screw and the peculiar air intake lower the noise levels.

1 Blast tube-combustion head assembly
2 Burner flange
3 Control panel with startup switch
4 Air intake
5 Actuator
6 Air pressure switch
7 Cover
8 Printed board circuit
9 Control box
10 Gas valves group




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 servocontrol (5) moves proportionally the air damper: it uses an adjusting cam with variable shape. This one allows the optimisation of the gas flue values, as to get an efficient combustion. The combustion head positioning determines the burner 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.

### *Fuel*

The burner technical specifications, described in this manual, refer to natural gas (calorific net value Hi = 9.45 kWh/Stm$^3$, density ρ = 0.717 Kg/Stm$^3$) and LPG (calorific net value Hi = 26.79 kWh/Stm$^3$, density ρ = 2.151 Kg/Stm$^3$). For different fuel such as town gas and biogas, multiply the values of flow and pressure by th corrective factors shown in the table below.

| **Fuel** | **Hi** (KWh/Stm$^3$) | **ρ** (kg/Stm$^3$) | $f_Q$ | $f_p$ |
|---|---|---|---|---|
| Town gas | 4,88 | 0,6023 | 1,936 | 3,3 |
| Biogas | 6,395 | 1,1472 | 1,478 | 3,5 |
| LPG | 26,79 | 2,151 | 0,353 | 0,4 |

For example, to obtain the flow and pressure values for the biogas:

$$Q_{biogas} = Q_{naturalGas} \cdot 1,478$$

$$p_{biogas} = p_{naturalGas} \cdot 3,5$$

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

***ATTENTION: the corrective factors in the above table depend on the gas composition, so on the calorifc value and the density of the gas. The above value can be taken only as reference.***

### *Burner model identification*

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

| Type **NG200** Model **M-. PR. S. .* A 0. 15** | |
|---|---|
| (1) (2) (3) (4) (5) (6) (7) (8) | |
| (1) BURNER TYPE | NG - Natural gas burner<br>LG - L.P.G. burner<br>NGX - Low NOx burners |
| (2) FUEL | M - Natural gas L - LPG C - Town-gas |
| (3) OPERATION(Available versions) | PR - Progressive MD - Fully modulating |
| (4) BLAST TUBE | S - standard L - Extended |
| (5) DESTINATION COUNTRY | * see data plate |
| (6) BURNER VERSION | A - Standard<br>Y - special |
| (7) EQUIPMENT | 0 = 2 gas valves<br>1= 2 Gas valves + gas proving system<br>7 = 2 gas valves + high gas pressure switch<br>8= 2 Gas valves + gas proving system + high gas pressure switch |
| (8) GAS CONNECTION | 15 = Rp1/2 20 = Rp 3/4 25 = Rp1 |

## *Specifications*

| **BURNERS** | | **NG140..xx..15** | **NG140..xx.20** | **NG140..xx.25** |
|---|---|---|---|---|
| Output | min.- max. kW | 35 - 170 | | |
| Fuel | | Natural gas | | |
| Category | | (see next paragraph) | | |
| Gas rate | min.-max.($Stm^3/h$) | 3.7 - 18 | | |
| Gas pressure | min.-max.mbar | (Note2) | | |
| Power supply | | 230V - 50 Hz | | |
| Total power | kW | 0.48 | | |
| Electric motor | kW | 0.18 | | |
| Protection | | IP40 | | |
| Approx. weight | kg | 18 | | |
| Valves size - Gas connection | | 1/2" - Rp 1/2 | 3/4" - Rp 3/4 | 1" - Rp 1 |
| Operation | | Progressive - Fully modulating | | |
| Operating temperature | °C | -10 ÷ +50 | | |
| Storage Temperature | °C | -20 ÷ +60 | | |
| Working service * | | Intermittent | | |

| **BURNERS** | | **LG140..xx..15** | **LG140..xx.20** | **LG140..xx.25** |
|---|---|---|---|---|
| Output | min.- max. kW | 40 - 170 | | |
| Fuel | | L.P.G. | | |
| Category | | $I_{3B/P}$ | | |
| Gas rate | min.-max.($Stm^3/h$) | 1.5 - 6.5 | | |
| Gas pressure | min.-max.mbar | (Note2) | | |
| Power supply | | 230V - 50 Hz | | |
| Total power | kW | 0.48 | | |
| Electric motor | kW | 0.18 | | |
| Protection | | IP40 | | |
| Approx. weight | kg | 18 | | |
| Valves size - Gas connection | | 1/2" - Rp 1/2 | 3/4" - Rp 3/4 | 1" - Rp 1 |
| Operation | | Progressive - Fully modulating | | |
| Operating temperature | °C | -10 ÷ +50 | | |
| Storage Temperature | °C | -20 ÷ +60 | | |
| Working service * | | Intermittent | | |

| BURNERS | | NG200..xx..20 | NG200..xx..25 | LG200..xx..20 | LG200..xx..25 |
|---|---|---|---|---|---|
| Output | min.- max. kW | 42 - 200 | | | |
| Fuel | | Natural gas | | L.P.G. | |
| Category | | (see next paragraph) | | | |
| Gas rate | min.-max.(Stm$^3$/h) | 4.4 - 21 | | 1.5 - 7.7 | |
| Gas pressure | min.-max.mbar | (Note2) | | | |
| Power supply | | 230V - 50 Hz | | | |
| Total power | kW | 0.48 | | | |
| Electric motor | kW | 0.18 | | | |
| Protection | | IP40 | | | |
| Approx. weight | kg | 20 | | | |
| Valves size - Gas connection | | 3/4" - Rp 3/4 | 1" - Rp 1 | 3/4" - Rp 3/4 | 1" - Rp 1 |
| Operation | | Progressive - Fully modulating | | | |
| Operating temperature | °C | -10 ÷ +50 | | | |
| Storage Temperature | °C | -20 ÷ +60 | | | |
| Working service * | | Intermittent | | | |

| BURNERS | | NGX120..xx..20 | NGX120..xx..25 | LGX120..xx..20 | LGX120..xx..25 |
|---|---|---|---|---|---|
| Output | min.- max. kW | 35 - 120 | | | |
| Fuel | | Natural gas | | | |
| Category | | (see next paragraph) | | | |
| Gas rate | min.-max.(Stm$^3$/h) | 3,7 - 12,7 | | | |
| Gas pressure | min.-max.mbar | (Note2 | | | |
| Power supply | | 230V - 50 Hz | | | |
| Total power | kW | 0.48 | | | |
| Electric motor | kW | 0.18 | | | |
| Protection | | IP40 | | | |
| Approx. weight | kg | 20 | | | |
| Valves size - Gas connection | | 3/4" - Rp 3/4 | 1" - Rp 1 | 3/4" - Rp 3/4 | 1" - Rp 1 |
| Operation | | Progressive - Fully modulating | | | |
| Storage Temperature | °C | -20 ÷ +60 | | | |
| Working service * | | Intermittent | | | |

| BURNERS | | NGX200..xx..20 | NGX200..xx..25 | LGX200..xx..20 | LGX200..xx..25 |
|---|---|---|---|---|---|
| Output | min.- max. kW | 40 - 150 | | | |
| Fuel | | Natural gas | | | |
| Category | | (see next paragraph) | | | |
| Gas rate | min.-max.(Stm$^3$/h) | 4,2 - 15,9 | | | |
| Gas pressure | min.-max.mbar | (Note2 | | | |
| Power supply | | 230V - 50 Hz | | | |
| Total power | kW | 0.48 | | | |
| Electric motor | kW | 0.18 | | | |
| Protection | | IP40 | | | |
| Approx. weight | kg | 20 | | | |
| Valves size - Gas connection | | 3/4" - Rp 3/4 | 1" - Rp 1 | 3/4" - Rp 3/4 | 1" - Rp 1 |
| Operation | | Progressive - Fully modulating | | | |
| Storage Temperature | °C | -20 ÷ +60 | | | |
| Working service * | | Intermittent | | | |

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

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

## *Country and usefulness gas categories*

| GAS CATEGORY | COUNTRY | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $I_{2H}$ | 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 |
| $I_{2E}$ | LU | PL | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| $I_{2E(R)B}$ | BE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| (*) $I_{2EK}$ | NL | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| $I_{2ELL}$ | DE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| $I_{2Er}$ | FR | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**(*) Only for $I_{2EK}$** : the appliance was configured for the appliance category K (I2K) 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 (I2E). 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 (kW = kcal/h/860);
- backpressure (data are available on the boiler ID plate or in the user's manual).

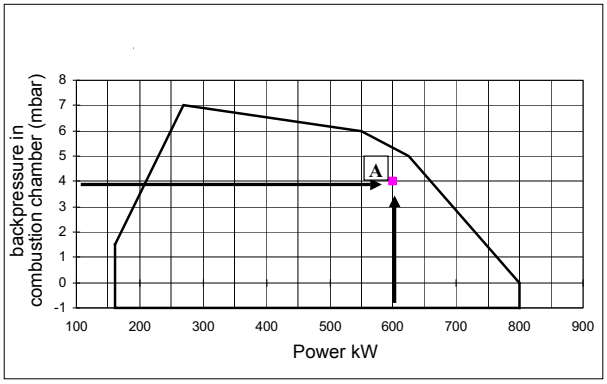
Example:

Furnace input: 600kW

Backpressure: 4 mbar

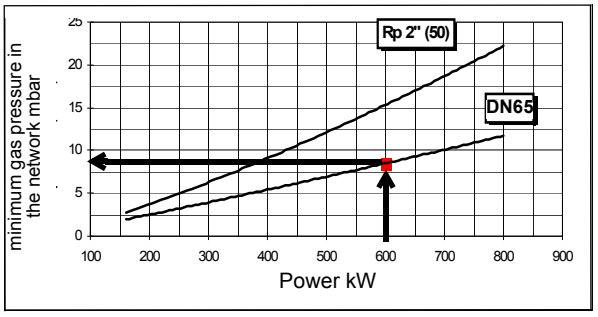
In the "Performance curve" diagram, draw a vertical line matching the furnace input value and an horizontal line matching the backpressure value. The burner is suitable if the intersection point A is inside the performance curve.

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

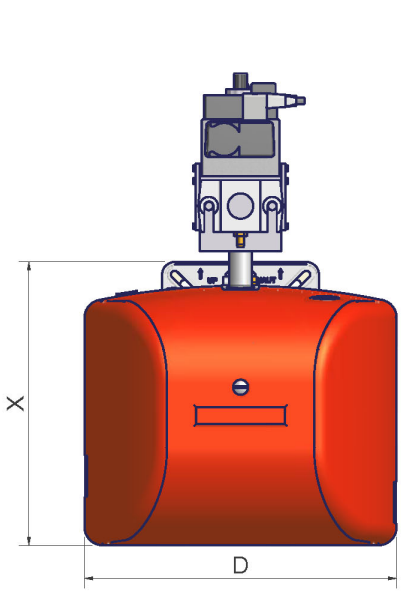


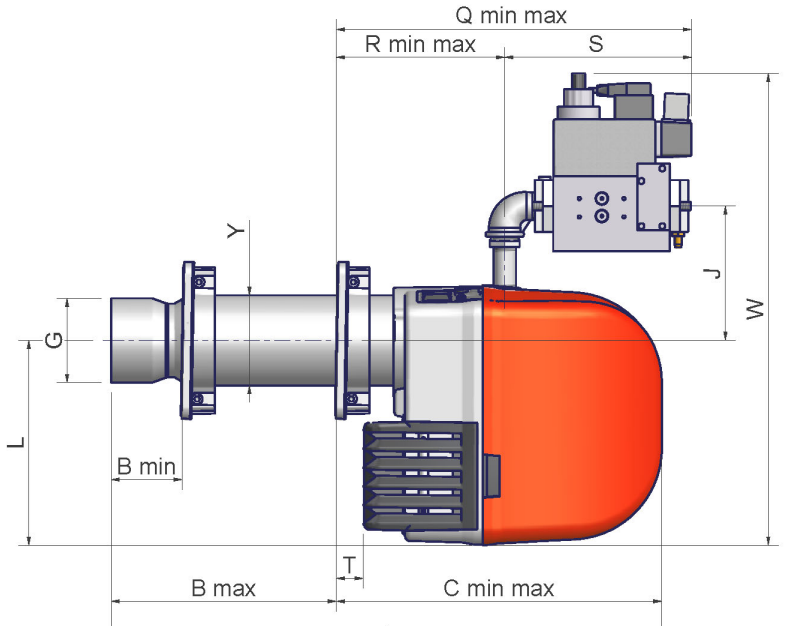

## *Checking the proper gas train size*

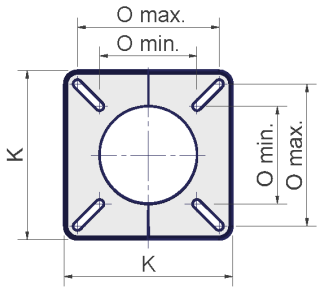
To check the proper gas train size, it is necessary to the available gas pressure value upstream the burner's gas valve. Then subtract the backpressure. The result is called **pgas.** Draw a vertical line matching the furnace input value (600kW, in the example), quoted on the x-axis, as far as intercepitng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

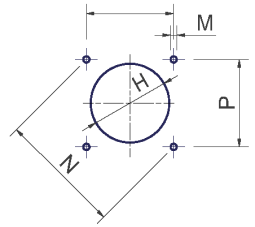


## *Overall dimensions (mm)*




**Burner flange and boiler recommended drilling template**

B*: SPECIAL blast tube lengths must be agreed with **Cib Unigas**

| | DN | A | Bmin. | Bmax. | Cmin. | Cmax. | D | G | H | J | K | L | M | N | Omin | Omax | P | Q | | R | | S | Tmin | W | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NG140 - (S) | 20 | 560 | 85 | 170 | 390 | 475 | 374 | Ø101 | Ø128 | 161 | 188 | 245 | M8 | 188 | 109 | 158 | 133 | 382 | 467 | 202 | 287 | 180 | 32 | 537 | 340 | Ø108 |
| NG140- (L) | 20 | 660 | 85 | 270 | 390 | 575 | 374 | Ø101 | Ø128 | 161 | 188 | 245 | M8 | 188 | 109 | 158 | 133 | 382 | 567 | 202 | 387 | 180 | 32 | 537 | 340 | Ø108 |
| NG140- (S) | 25 | 560 | 85 | 170 | 390 | 475 | 374 | Ø101 | Ø128 | 161 | 188 | 245 | M8 | 188 | 109 | 158 | 133 | 426 | 511 | 202 | 287 | 224 | 32 | 565 | 340 | Ø108 |
| NG140- (L) | 25 | 660 | 85 | 270 | 390 | 575 | 374 | Ø101 | Ø128 | 161 | 188 | 245 | M8 | 188 | 109 | 158 | 133 | 426 | 611 | 202 | 387 | 224 | 32 | 565 | 340 | Ø108 |
| NG200- (S) | 20 | 560 | 85 | 170 | 390 | 475 | 374 | Ø117 | Ø137 | 161 | 188 | 245 | M8 | 188 | 109 | 158 | 133 | 382 | 467 | 202 | 287 | 180 | 32 | 537 | 340 | Ø108 |
| NG200- (L) | 20 | 660 | 85 | 270 | 390 | 575 | 374 | Ø117 | Ø137 | 161 | 188 | 245 | M8 | 188 | 109 | 158 | 133 | 382 | 567 | 202 | 387 | 180 | 32 | 537 | 340 | Ø108 |
| NG200- (S) | 25 | 560 | 85 | 170 | 390 | 475 | 374 | Ø117 | Ø137 | 161 | 188 | 245 | M8 | 188 | 109 | 158 | 133 | 426 | 511 | 202 | 287 | 224 | 32 | 565 | 340 | Ø108 |
| NG200- (L) | 25 | 660 | 85 | 270 | 390 | 575 | 374 | Ø117 | Ø137 | 161 | 188 | 245 | M8 | 188 | 109 | 158 | 133 | 426 | 611 | 202 | 387 | 224 | 32 | 565 | 340 | Ø108 |

| | DN | A | Bmin | Bmax | Cmin | Cmax | D | G | H | J | K | L | M | N | Omin | Omax | P | Q | | R | | S | Tmin | W | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NGX120- (S) | 15 | 560 | 85 | 170 | 390 | 475 | 374 | Ø108 | Ø128 | 161 | 188 | 245 | M8 | 188 | 109 | 158 | 133 | 382 | 467 | 202 | 287 | 180 | 32 | 537 | 340 | Ø108 |
| NGX120- (L) | 15 | 660 | 85 | 270 | 390 | 575 | 374 | Ø108 | Ø128 | 161 | 188 | 245 | M8 | 188 | 109 | 158 | 133 | 382 | 567 | 202 | 387 | 180 | 32 | 537 | 340 | Ø108 |
| NGX120- (S) | 25 | 560 | 85 | 170 | 390 | 475 | 374 | Ø108 | Ø128 | 161 | 188 | 245 | M8 | 188 | 109 | 158 | 133 | 382 | 467 | 202 | 287 | 180 | 32 | 537 | 340 | Ø108 |
| NGX120- (L) | 25 | 660 | 85 | 270 | 390 | 575 | 374 | Ø108 | Ø128 | 161 | 188 | 245 | M8 | 188 | 109 | 158 | 133 | 382 | 567 | 202 | 387 | 180 | 32 | 537 | 340 | Ø108 |
| NGX200- (S) | 25 | 560 | 85 | 170 | 390 | 475 | 374 | Ø114 | Ø134 | 161 | 188 | 245 | M8 | 188 | 109 | 158 | 133 | 382 | 467 | 202 | 287 | 180 | 32 | 537 | 340 | Ø108 |
| NGX200- (L) | 25 | 660 | 85 | 270 | 390 | 575 | 374 | Ø114 | Ø134 | 161 | 188 | 245 | M8 | 188 | 109 | 158 | 133 | 382 | 567 | 202 | 387 | 180 | 32 | 537 | 340 | Ø108 |
| NGX200- (S) | 25 | 560 | 85 | 170 | 390 | 475 | 374 | Ø114 | Ø134 | 161 | 188 | 245 | M8 | 188 | 109 | 158 | 133 | 382 | 467 | 202 | 287 | 180 | 32 | 537 | 340 | Ø108 |
| NGX200- (L) | 25 | 660 | 85 | 270 | 390 | 575 | 374 | Ø114 | Ø134 | 161 | 188 | 245 | M8 | 188 | 109 | 158 | 133 | 382 | 567 | 202 | 387 | 180 | 32 | 537 | 340 | Ø108 |

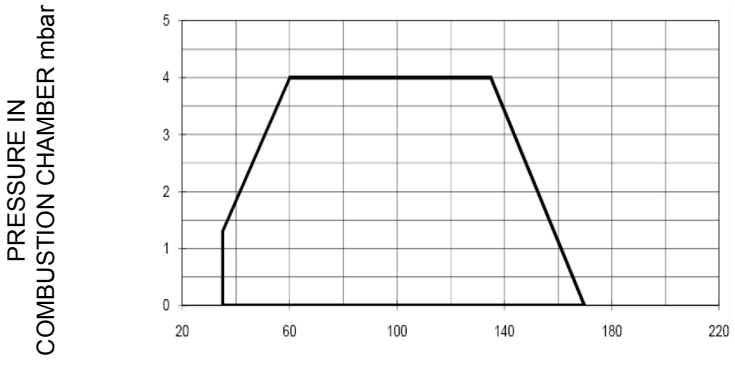
*S = measure referred to burner fitted with standard blast tube*L = measure referred to burner fitted with extended blast tube

⚠ NG200: **NG200** a counterflange is suggested.

## *Performance curves*

- **Natural gas burners**

**NG140 M-.xx...**

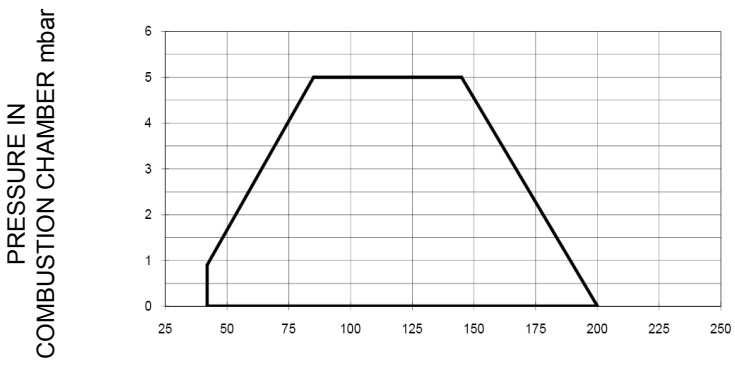



- **LPG burners**

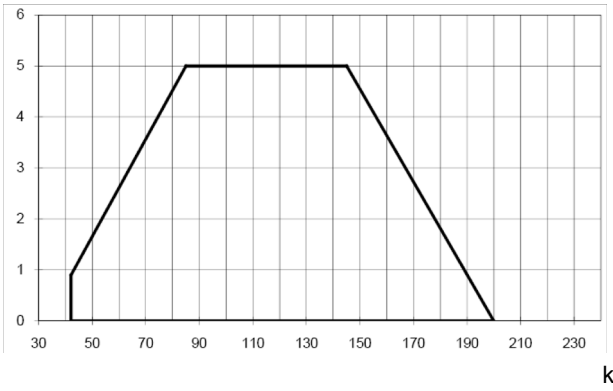
**LG140 L-.xx...**




**NG200 M-.xx...**




**LG200 L-.xx...**




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

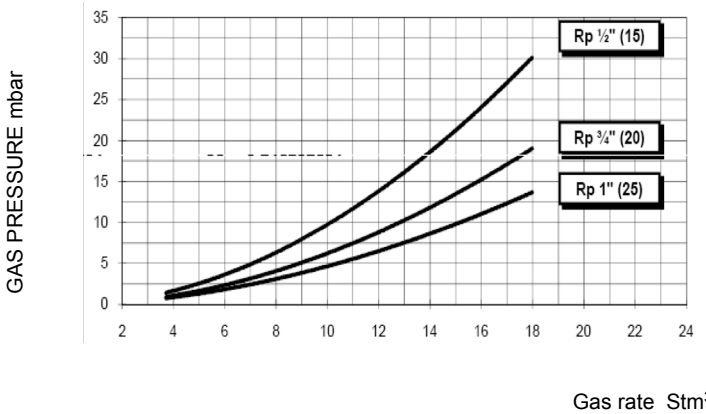
Data are referred to standard conditions: atmospheric pressure at 1013mbar, ambient temperature at 15°C.

**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 adjsuting 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/rate in the network curves*

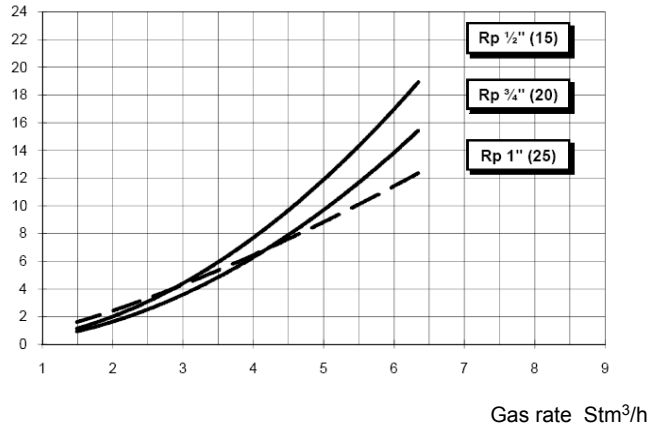
- **Natural gas Burners**

**NG140 M-.xx...**

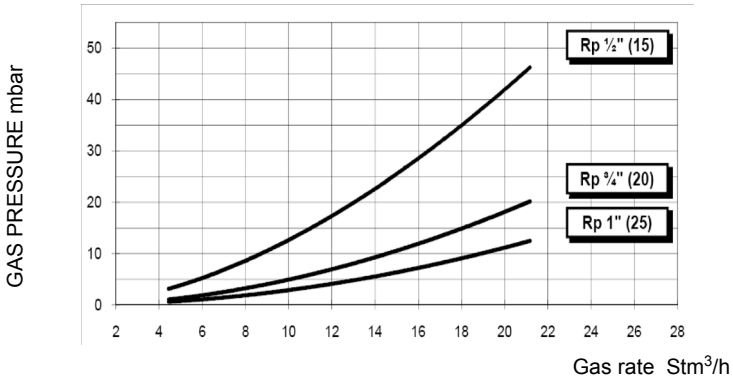



- **Natural gas BurnersLPG burners**

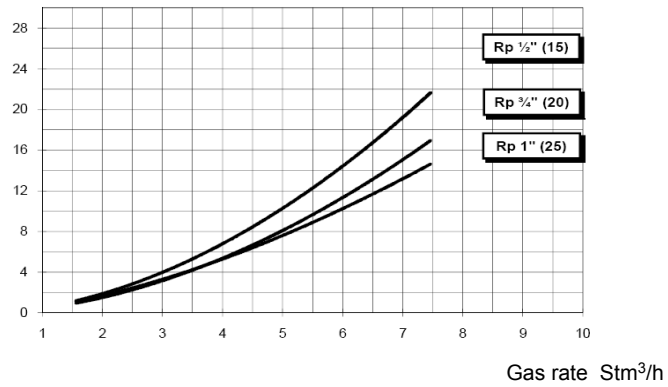
**LG140 L-.xx...**




**NG200 M-.xx...**




**LG200 L-.xx...**




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

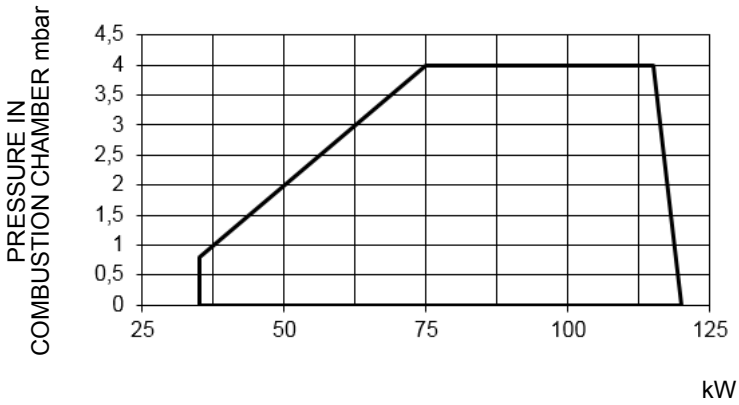
Data are referred to standard conditions: atmospheric pressure at 1013mbar, ambient temperature at 15°C.

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

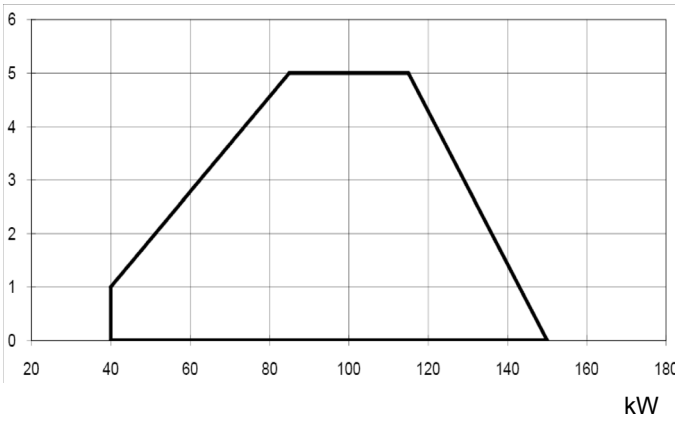
## *Low NOx gas burners*

- **Performance curves**

**NGX120 M-.xx...**




**NGX200 M-.xx...**

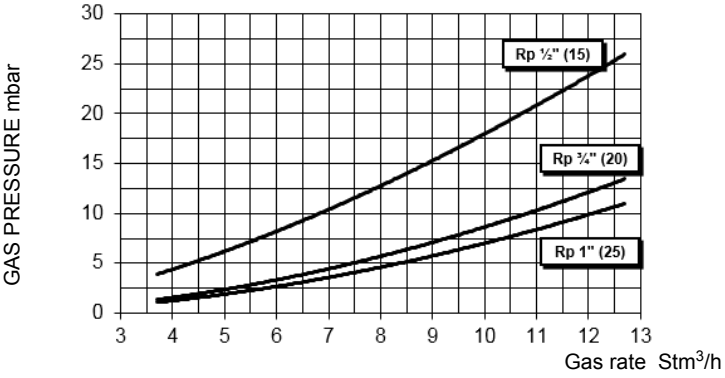



To get the input in kcal/h, multiply value in kW by 860.

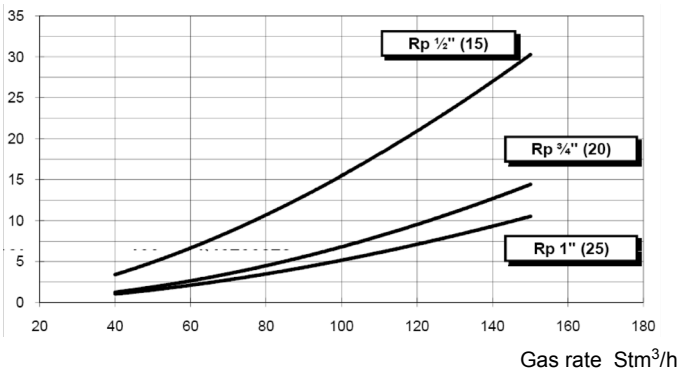
Data are referred to standard conditions: atmospheric pressure at 1013mbar, ambient temperature at 15°C.

- **Pressure in the network - gas flow rate curves"**

**NGX120 M-.xx...**




**NGX200 M-.xx...**




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

## *MOUNTINGS AND CONNECTIONS*

**Packing**

The burners are dispatched in cardboard packages whose dimensions are:

- Standard Blast tube: 600mm x 370mm x 400mm (L x P x H)
- Extended Blast tube: 750mm x 370mm x 400mm (L x P x H)

Packing cases of this kind are affected by humidity and are not suitable for stacking. The following are placed in each packing case.

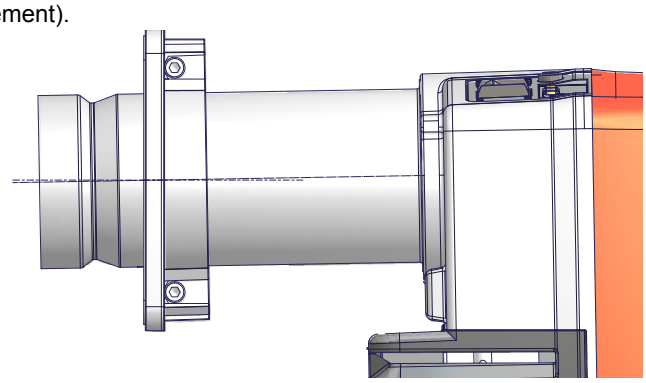
- burner with detached gas train;
- gasket to be inserted between the burner and the boiler;
- envelope containing this manual.

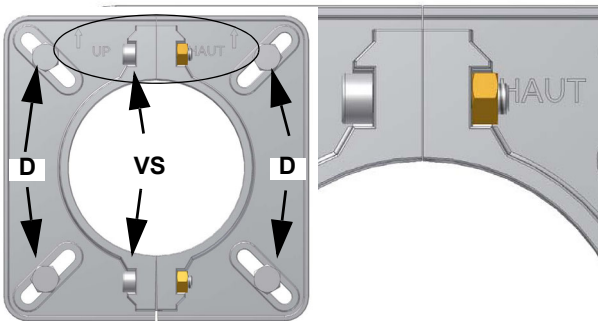
To get rid of the burner's packing, follow the procedures laid down by current laws on disposal of materials.

### *Fitting the burner to the boiler*

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

1 on the boiler's door hole, fix the 4 stud bolts according to the drilling template showed on paragraph "Overall dimensions"
2 fix the flange of the burner to the boiler;
3 install the burner into the boiler;
4 according to the reference showed on Fig. 3, fix the flange to the boiler's stud bolts **D**, without completely fastening;
5 loosen the **VS** screws in order to let the blast tube move back and forth;
6 install the burner making the blast tube move into the flange as to reach the right position according to the boiler/utilisation
7 fasten the **VS** screws:
8 tighten the 4 stud blolts **D** completely;
9 seal the space between the blast tube and the refractory lining with appropriate insulating material (ceramic fibre cord or refractory cement).





## *Matching the burner to the boiler*

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

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

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

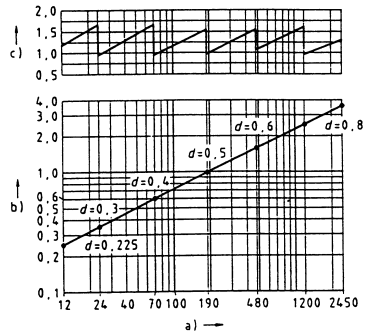



Fig. 2

**Key**

a) Heat output in kW

b) Length of the flame tube in meters

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

d) Combustion chamber diameter (m)

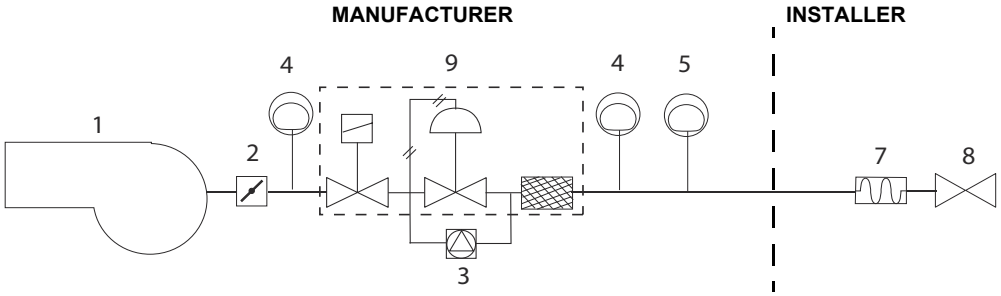
Fig. 2 - Firing intensity, diameter and lenght of the test flame tube as a function of the heat input in kW.

## *Installing the gas train*

| | |
|---|---|
| ⚠ | **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. |

The following diagram 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.

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 Maximum gas pressure switch (option*)
5 Minimum gas pressure switch
7 Bellows unit
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).

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

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 fo the gas valves are showed in the next paragraph.

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

**MULTIBLOC DUNGS MB-DLE 405..412**

**Mounting**

1. Mount flange onto tube lines: use appropriate sealing agent (see Fig. 5);
2. insert MB-DLE: note position of O rings (see Fig. 5);
3. tighten screws A, B, C and D (Fig. 3 - Fig. 4), accordind to the mounting positions (Fig. 6);
4. after installation, perform leakage and functional test;
5. disassembly in reverse order.

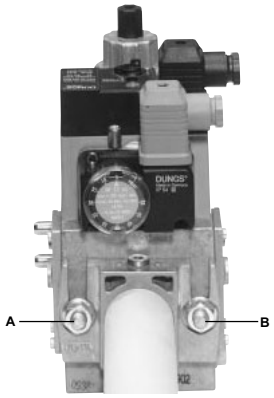



Fig. 3

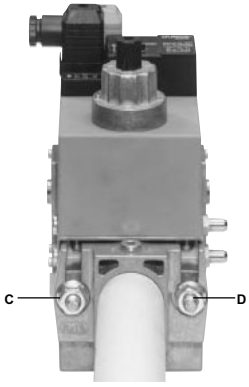



Fig. 4

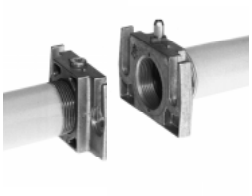


Fig. 5

MOUNTING POSITIONS

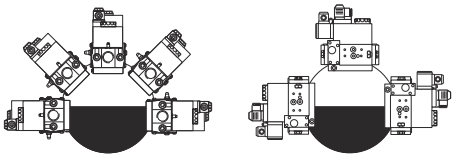


Fig. 6

***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. 7-A);
4 iInsert sealing rings (10,5 x 2,25) into VPS 504 (Fig. 8-B, Fig. 7-B)
5 Torque screws 3, 4, 5, 6 (M4 x16) Fig. 7-C

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

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

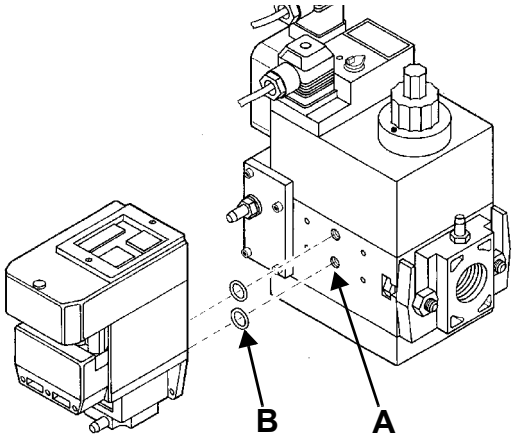



Fig. 7

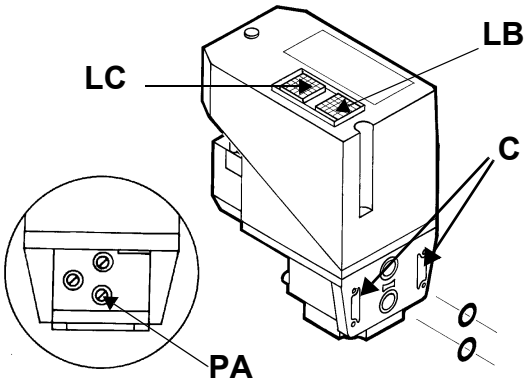



Fig. 8

When wishing to monitor the test, install a pressure gauge ranged to that of the pressure supply point **PA** (Fig. 8). 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**.

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

Once the train is installed, connect the gas valves group plug and the gas pressure switch one (on the valve group as well). Pay attention not to exchange them.

## *Electrical connections*

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

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

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

To execute the electrical connections, proceed as follows:

1 find the pulg or the plugs, according to the model, that comes out from the burnrer:
- 7 pins plug for power supply (all models)
- 4 pins plug;
- 7 pins plug (for MD - fully modulating burners);

2 execute the electrical connections to the plugs, according to hte burner model (see next paragraph);

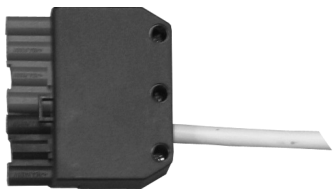
3 now the burner is ready to start up.

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

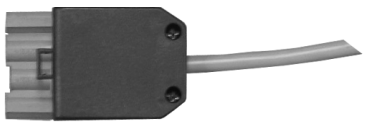
**IMPORTANT: before operating the burner, be sure all connectors are linked as indicated in the diagrams.**

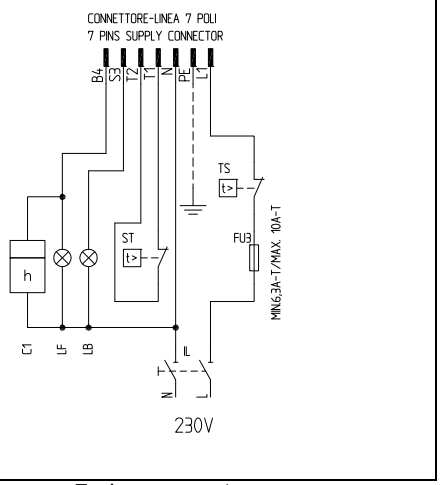
***Connectors identification***

Burner power supply connector

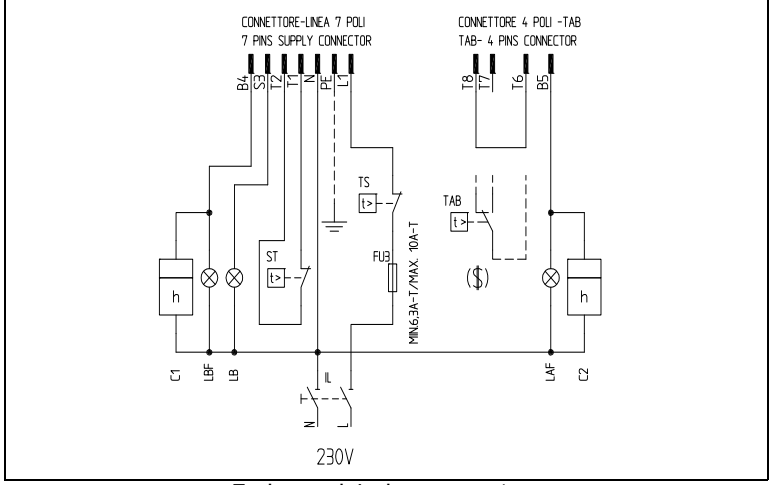


HIGH/LOW flame connector






7-pins connector




7-pins and 4-pins connectors

**Key**

| | |
|---|---|
| C1 | LOW FLAME TIME METER |
| C2 | HIGH FLAME TIME METER |
| FU1 | FAN MOTOR LINE FUSE |
| FU3 | LINE FUSE |
| IL | BURNER LINE SWITCH |
| IM | FAN MOTOR LINE SWITCH |
| KM1 | FAN MOTOR CONTACTOR |
| LAF | BURNER IN HIGH FLAME INDICATOR LIGHT |
| LB | INDICATOR LIGHT FOR BURNER LOCK-OUT |
| LBF | BURNER IN LOW FLAME SIGNALLING LAMP |
| MV | FAN MOTOR |
| ST | THERMOSTATS O PRESSURE SWITCHES SERIE |
| TAB | HIGH LOW FLAME THERMOSTAT/PRESSURE SWITCH |
| TS | SAFETY THERMOSTAT/PRESSURE SWITCH |

CONN-MOTORE FAN MOTOR CONNECTOR

CONN-LINEA BURNER POWER SUPPLY CONNNECTOR

CONN-TAB HIGH-LOW FLAME CONNECTOR

($) IF "TAB" USED REMOVE THE BRIDGE BETWEEN TERMINALS T6-T8

- ***Fully-modulating burners connectors:***

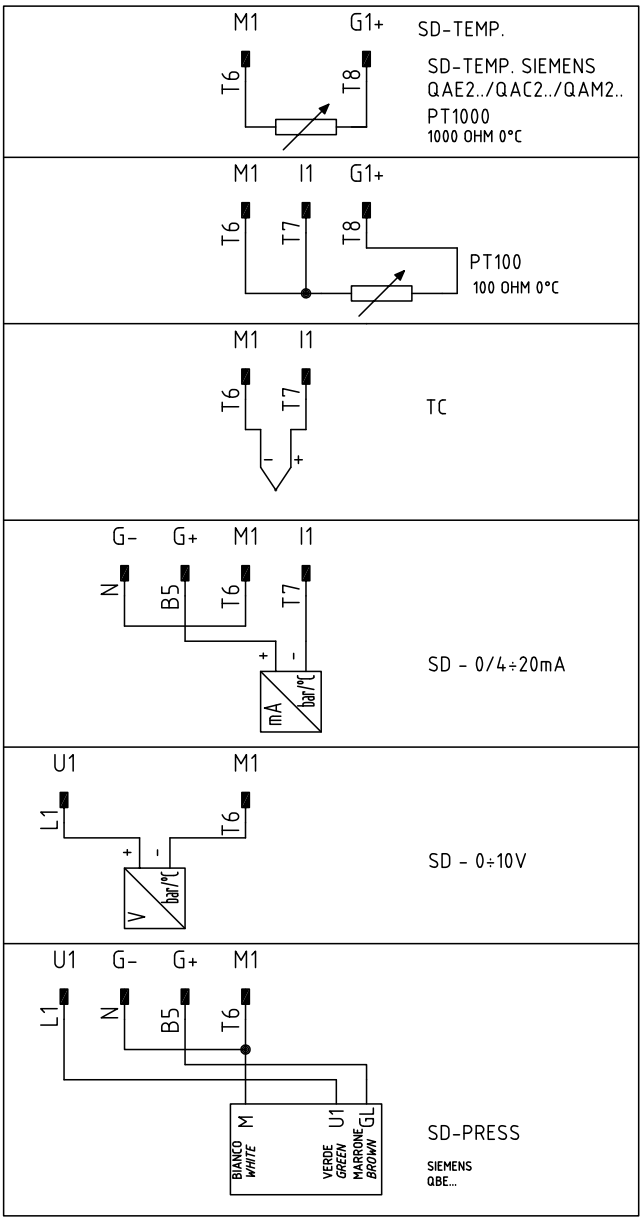



Fig. 9 - Probes connection by 7-pins connector

**Key**

| | |
|---|---|
| C1 | LOW FLAME TIME METER |
| FU1 | LINE FUSE FOR FAN MOTOR |
| FU3 | LINE FUSE |
| FU4 | AUXILIARY FUSE |
| IL | BURNER LINE SWITCH |
| IM | FAN MOTOR LINE SWITCH |
| KM1 | FAN MOTOR REMOTE CONTACTOR |
| SIEMENS RWF40 | MODULATION REGULATOR |
| LB | BURNER LOCKOUT SIGNALLING LAMP |
| LBF | BURNER IN LOW FLAME SIGNALLING LAMP |
| MV | FAN MOTOR |
| SD-0÷10V | VOLTAGE SIGNAL |
| SD-0/4÷20mA | CURENT SIGNAL |
| SD-PRESS | PRESSURE PROBE |
| SMA | MAN/AUTO SELECTOR |
| 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, 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)

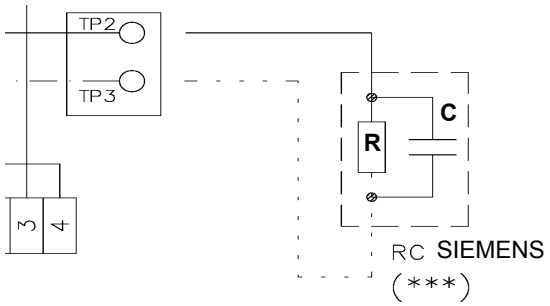
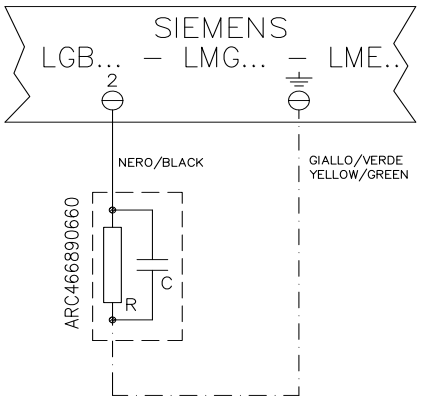



Fig. 10

As far as burners with no PCB provided, the RC Siemens circuit must be inserted between terminal 2 and the earth terminal of the Simens LME.. control box.



# ADJUSTING THE AIR AND GAS FLOW RATES

## *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. 11, 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.

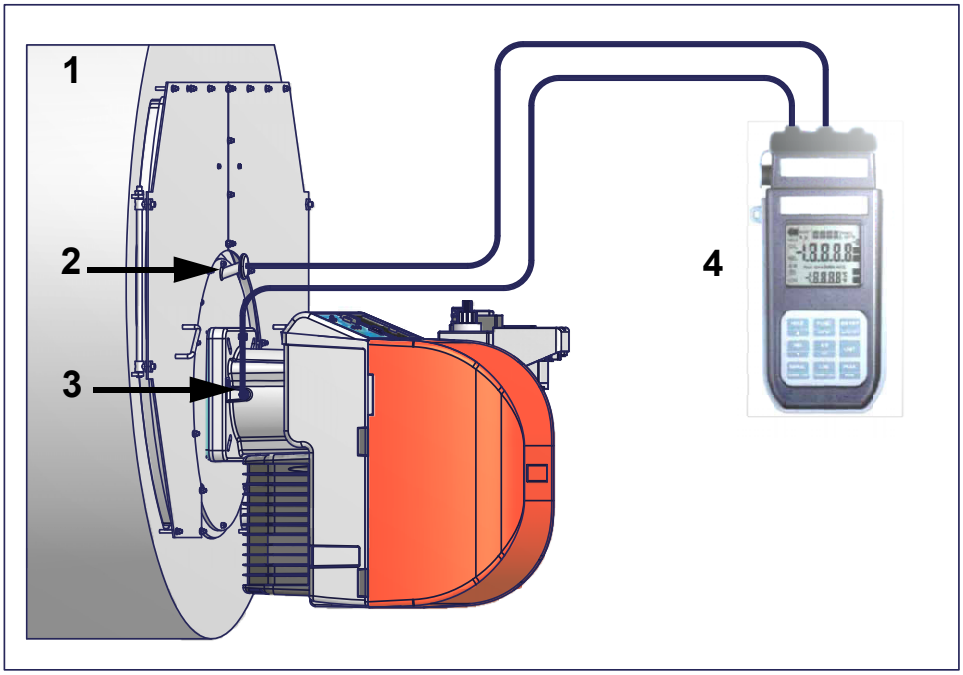



Fig. 11

**Key**

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

## *Measuring the gas pressure in the combustion head*

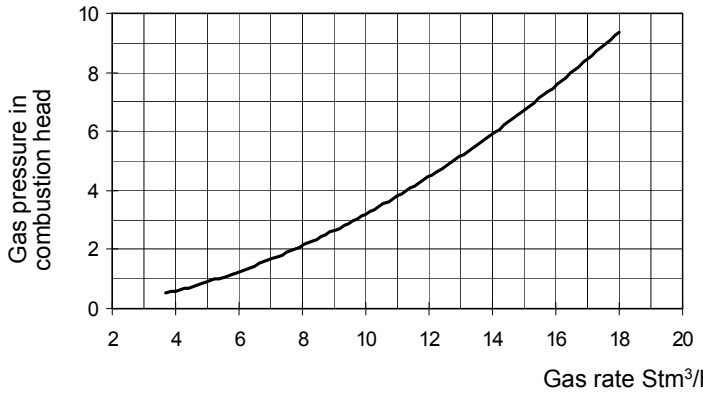
In order to measure the pressure in the combustion head, insert the pressure gauge probes: one into the generator's pressure outlet (Fig. 11-2) to get the pressure in the combustion chamber and the other one into the butterfly valve's pressure outlet of the burner (Fig. 11-3). On the basis of the measured 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 Stm3/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.**

## *Pressure in combustion head - gas flow rate curves*

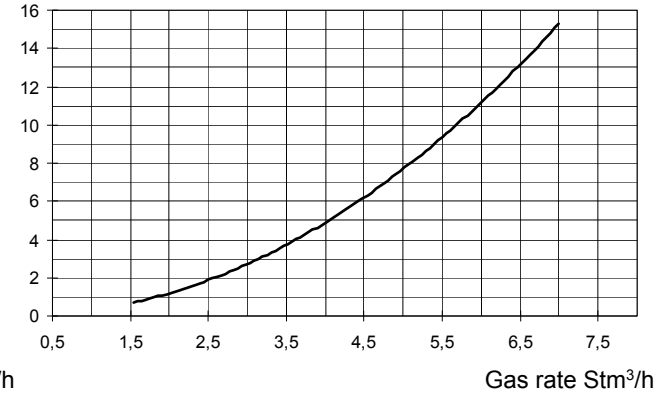
**Natural gas Burners**

**NG140**

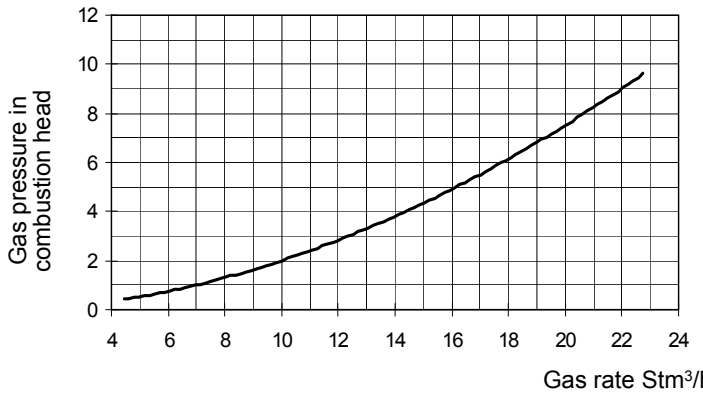



**L.P.G. Burners**

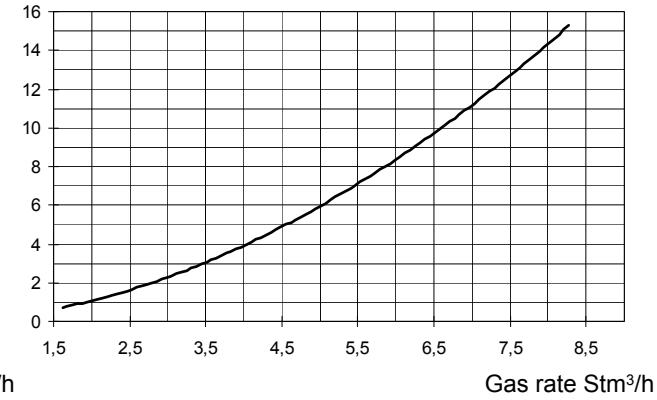
**LG140**




**NG200**

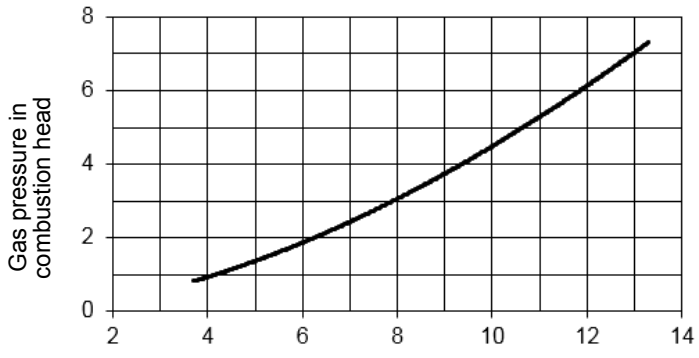



**LG200**

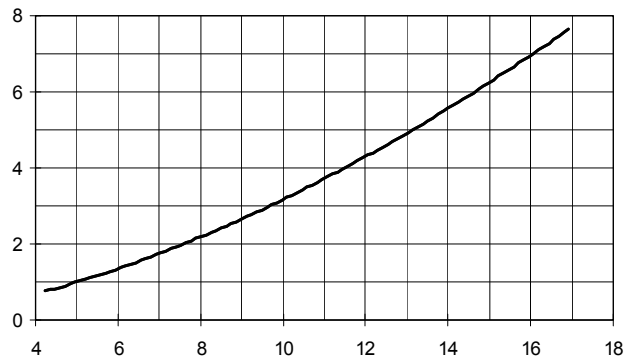



**Low NOx burners**

**NGX120**




**NGX200**



### *Setting gas and air flow rate*

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

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

### *Startup Output*

The start-up heat output shall not exceed 120 kW (single stage burners) or 1/3 of nominal output (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 progressive or modulating burners, the low flame ouptut must be higher than the minimum ouptut quoted in the performance curve (page 10).

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

**Table 1:**

| **Recommended combustion parameters** | | |
|---|---|---|
| Fuel | Recommended (%) $CO_2$ | Recommended (%) $O_2$ |
| 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. see “Measuring the gas pressure in the combustion head” on page 19.
- Set the low flame output, acting on the low flame microswitch of the actuator in order to avoid the low flame output increasing too much or that the flues temperature gets too low to cause condensation in the chimney.

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

## *Adjustment procedure*

1 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.

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 burner cover.

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

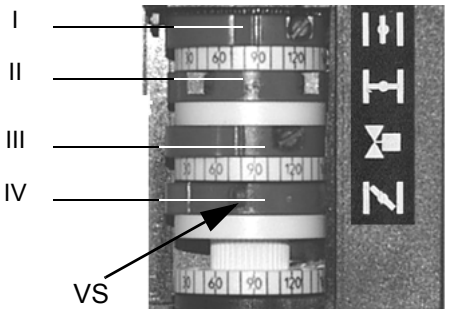
4 drive the burner to high flame stage, by means of the thermostat **TAB** (high-low flame thermostat - see wiring diagrams).

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

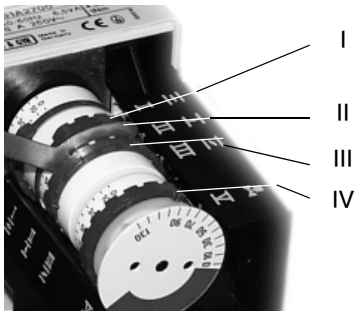
6 Then move progressively the microswitch to higher values until it reaches the high flame position; always check the combustion values and eventually adjusting the gas by means of the valves group stabiliser.

As for the setting, refer to the following chart. On this actuator, the manual control of the air damper is not provided; the setting of the cams is carried out working by a screwdriver on the **VS** screw placed internally to the cam.

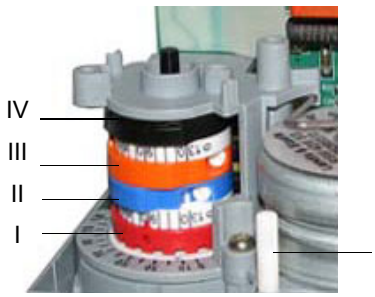
Berger STA




Siemens SQN30




Siemens SQN72




| | Siemens SQN30 | BERGER STA | Siemens SQN72 |
|---|---|---|---|
| High flame position (set to 90°) | I | I | I (red) |
| Low flame and ignition position | ||| | IV | III (orange) |
| Stand-by position (set to 0°) | II | II | II (blue) |
| Not used | V | III | IV (black) |

Note: to move the cams, use

- 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.
- Siemens SQN72: a key is provided to move cams I and IV, the other cams can be moved by means of screws. On the Siemens actuator the AUTO/MAN mode is provided (see picture).

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

⚠ **Pressure controller is provisionally factory-set. The setting values must be locally adjusted to machine conditions.**

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 (Fig. 13). As for “fully-ahead” position, it means that the head is placed inside the boiler, “fully-backward” position means that the head is towards the operator. As far as the reduced output operation, progressively move the combusiton head towards the “MIN” position, rotating clockwise the **VRT** screw (Fig. 12). The **ID** index shows how much the com-

bustion head moved.

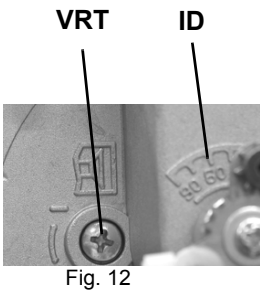


Fig. 12

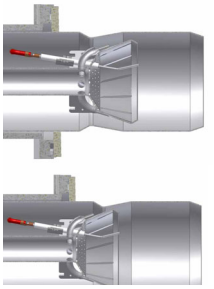

Fig. 13 - Head in “fully-ahead position”


Fig. 14 - Head in “fully-backward position”

8 nce the combustion head is adjusted, remove the actuator cover (except single-stage models) and set it to the ignition position, (ignition position= 0° on the air damper index **ID**);

9 The comburent air adjustment must be performed by means of the actuator. 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.

10 unscrew the **V** srew to increase the air flow rate, unscrew to decrease it

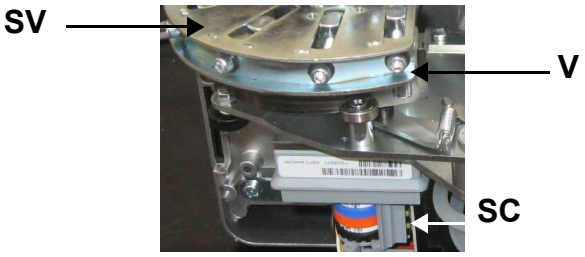
11 once the maximum flow rate is fixed, shortcircuit for a while, the thermostat **TAB** T6 and T7 terminals (see wiring diagrams). As far as the fully-modulating models, see next paragraph. The actuator will move towards the low flame position; then remove the bridge;

12 Adjust the screw **V** related to that position;

13 Shortcircuit, again for a while, the **TAB** T6 and T7 terminals and repeat from point 11;

14 repeat all these instructions for all the actuator stroke, in order to define the cam foil shape.

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




15 Drive the burner to the low flame operation, by the **TAB** boiler thermostat.

16 To change, if needed, the gas flow rate, slacken the screw **V1** (Fig. 15) and set the opening angle of the buttefly valve rotating the round plate **C** by means of the screw **V3** (turn clockwise to decrease the gas rate or counterclockwise to increase it). The index **S** shows the opening angle.

.

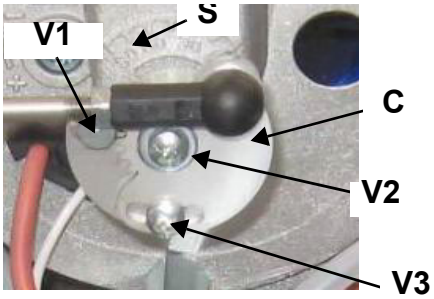


Fig. 15
Рис. 16

### *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 (page 26); when the LED with the hand symbol lights up, push 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.

**Multibloc MB-DLE**

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

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

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

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

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

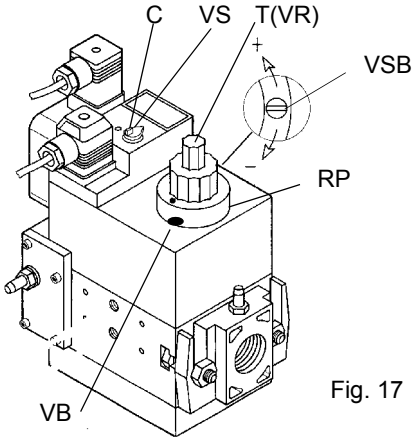



Fig. 17

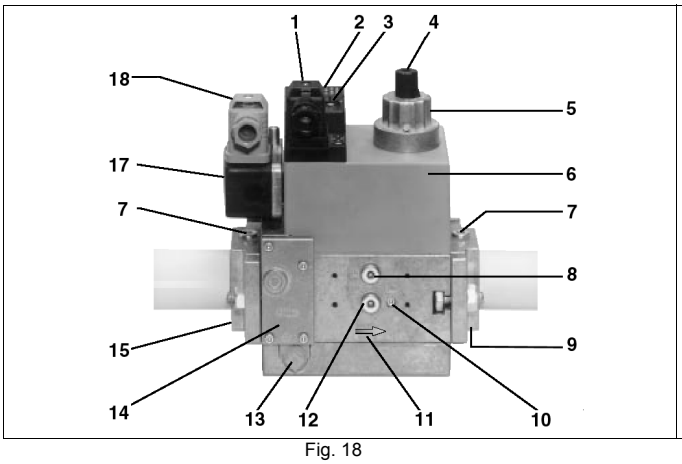



Fig. 18

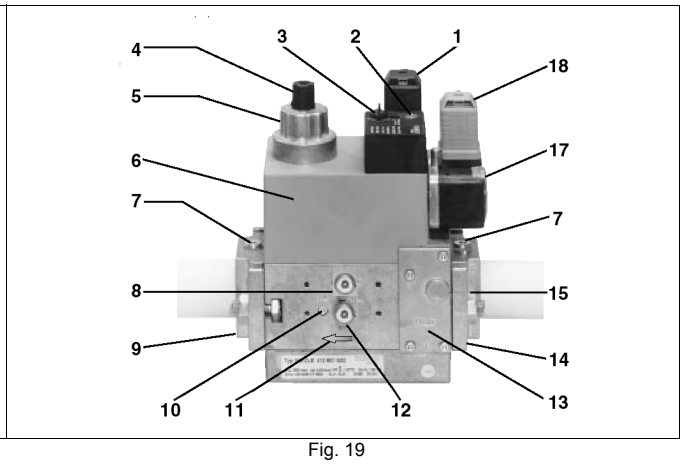



Fig. 19

**Key**

1 Electrical connection for valves
2 Operation display (optional)
3 Pressure governor closing tap
4 Start setting cap
5 Hydraulic brake and rate regulator
6 Coil
7 Test point connection G 1/8
8 Test point connection G 1/8 downstream of valve 1, on both sides
9 Output flange
10 Test point connection M4 downstream of valve 2
11 Gas flow direction
12 Test connection G 1/8 downstream of valve 1, on both sides
13 Vent nozzle pressure regulator
14 Filter (below cover)
15 Input flange
17 Pressure switch
18 Pressure switch electric connection

***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. 20-A);

4 iInsert sealing rings (10,5 x 2,25) into VPS 504 (Fig. 21-B, Fig. 20-B)

5 Torque screws 3, 4, 5, 6 (M4 x16) Fig. 20-C

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

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

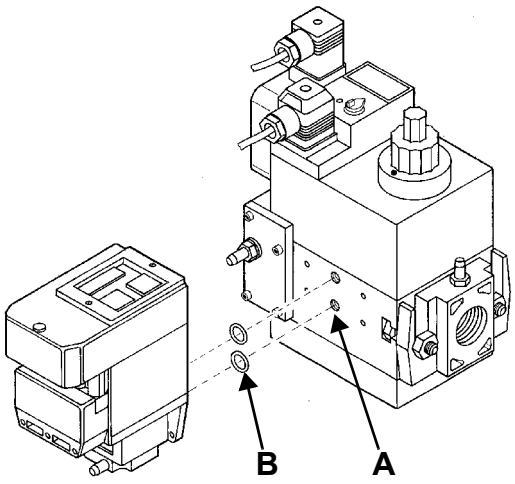


Fig. 20

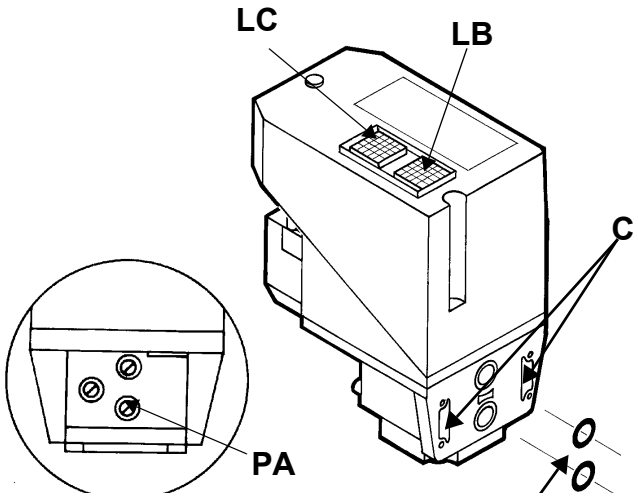


Fig. 21

When wishing to monitor the test, install a pressure gauge ranged to that of the pressure supply point **PA** (Fig. 21). 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**.

## *Adjusting the 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.

## *Adjusting the air pressure switch*

To calibrate the air pressure switch, proceed as follows:

- Remove the transparent plastic cap.
- Once air and gas setting have been accomplished, startup the burner.
- During the pre-purge phase o 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 upstreaam the gas valves: measure the gas pressure in the network, when flame is off; by means of the adjusting ring nut **VR**, set the value read, increased by the 30%.

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 paragrph. Then, measure the gas pressure at the operating flow rate, downstream the “gas governor-gas valves” group and upstream the butterfly valve; by means of the adjusting ring nut **VR**, set the value read on step 2, increased by the 30%;

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 AUTHORISED BY THE COMPANY MANUFACTURING THE BURNER.**

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

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

**NEVER OPEN OR DISMANTLE ANY COMPONENT OF THE MACHINE.**

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

**IN CASE OF A BURNER SHUT-DOWN, RESET THE CONTROL BOX BY MEANS OF THE RESET PUSHBUTTON. IF A SECOND SHUT-DOWN TAKES PLACE, CALL THE TECHNICAL SERVICE, WITHOUT TRYING TO RESET FURTHER.**

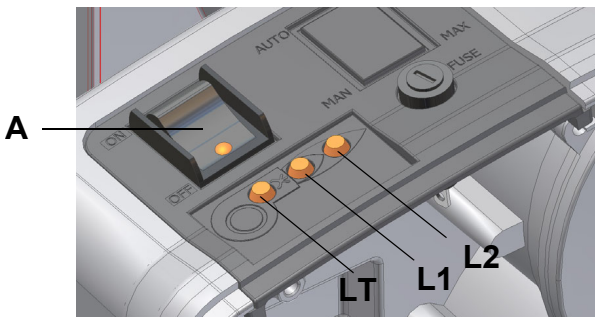
**WARNING: DURING NORMAL OPERATION THE PARTS OF THE BURNER NEAREST TO THE GENERATOR (COUPLING FLANGE) CAN BECOME VERY HOT, AVOID TOUCHING THEM SO AS NOT TO GET BURNT.**

## OPERATION

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

- Startup the burner by the boiler master power switch;
- as for double-stage models, turn the burner main switch **A** to On;
- make sure that the control box has not shut down and reset if necessary by means of the reset button **R** by pressing the clear rubber seal on the burner cover;
- make sure that the set of thermostats (or pressure-switches) triggers burner operation (in double-stage models **L1** LED lights on)
- the burner starting cycle begins: the control box switches on the burner fan;
- at the end of the pre-purge time, the ignition transformer switches (in double-stage models **LT** LED lights on); few seconds later the solenoid valve is powered and the burner starts up;
- the ignition transformer stays on for a few seconds after the ignition of the flame (post-ignition time) and at the end of this time it is switched off.

.



# PART III: MAINTENANCE

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

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

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

## ROUTINE MAINTENANCE

- Clean and examining the gas filter cartdrige, if necessary replace it (Fig. 22 on).
- Removal, examination and cleaning of the combustion head (see Fig. 28 on).
- Check the ignition and detection electrodes, clean and adjust if necessary (see page 31). In case of doubr, check the detection current according to the schemes in page 32.
- Cleaning and greasing of sliding and rotating parts.

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

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

- Check the filter at least once a year!
- Change the filter if the pressure difference between pressure connection 1 and 3 (Fig. 22-Fig. 23)is $\Delta p > 10$ mbar.
- Change the filter if the pressure difference between pressure connection 1 and 3 (Fig. 22-Fig. 23) 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. 24.
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.

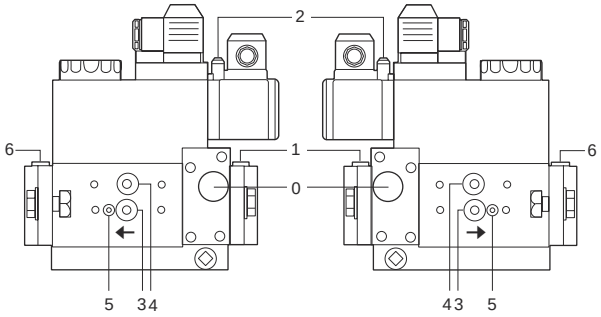



Fig. 22

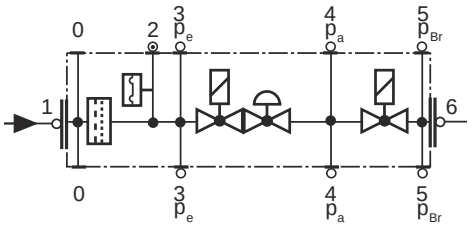



Fig. 23

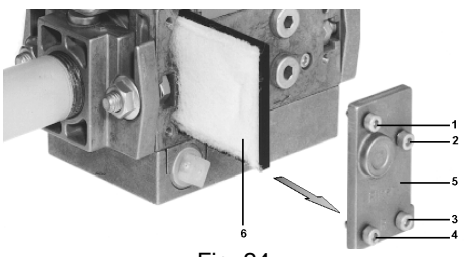



Fig. 24

## *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. 25-Fig. 26) Δp> 10 mbar.
- Change the filter if the pressure difference between pressure connection 1 and 2 (Fig. 25-Fig. 26) 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. 27).
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.

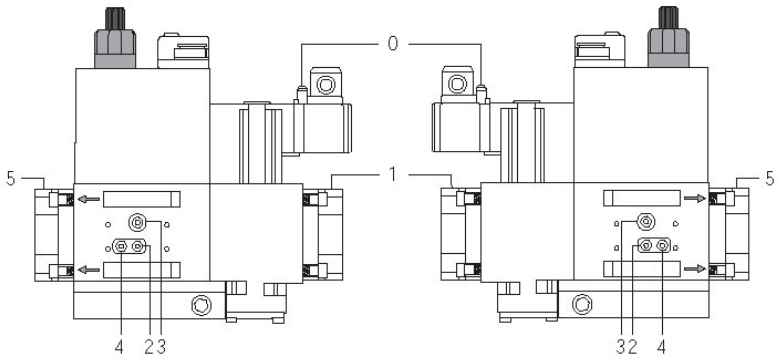



Fig. 25

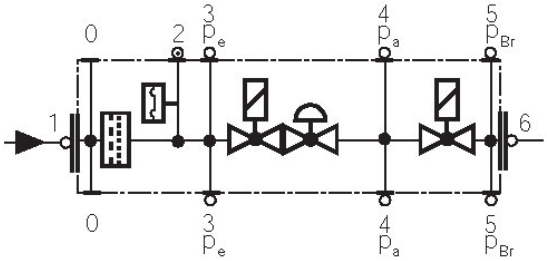



Fig. 26

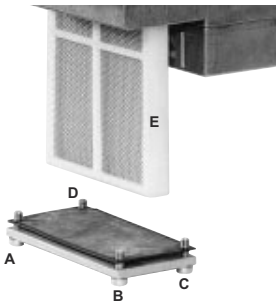



Fig. 27

## *Disassembling the burner plate to service the burner fan*

Before proceeding to maintenance/replacing operations, follow the next procedure:

1 remove the component plate "C" by unscrewing the V1, V2, V3, V4 screws and the "F" securing pin (Fig. 28);
2 remove the rubber cable holder by unscrewing **V5** and **V6** in Fig. 29;
3 free rod **T** (see Fig. 30);
4 disconnect the connector **CV**, Fig. 32;
5 place the plate in one of the ways showed in order to facilitate maintenance operations.

⚠ **NOTE: When re-assembling the component plate, make sure that the pin for the air damper "P" enters its housing "B" (see picture below).**

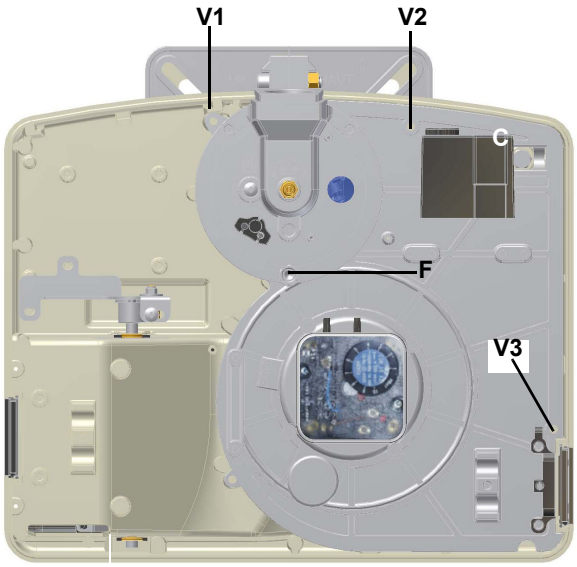



Fig. 28

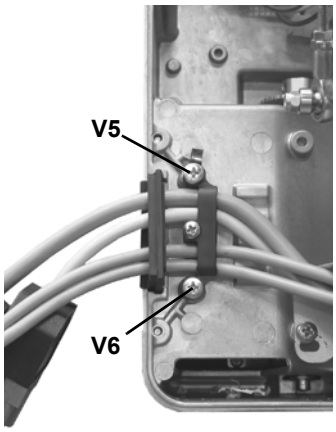



Fig. 29

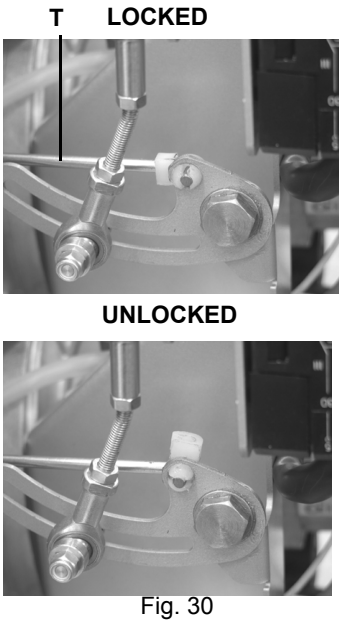



Fig. 30

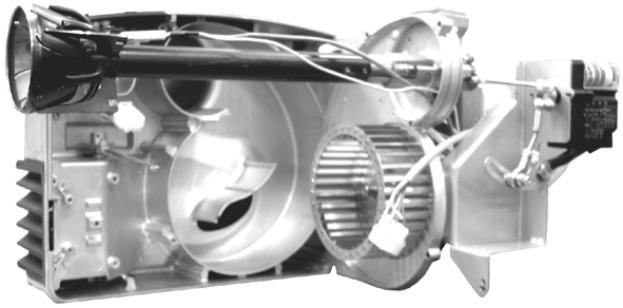


Fig. 31

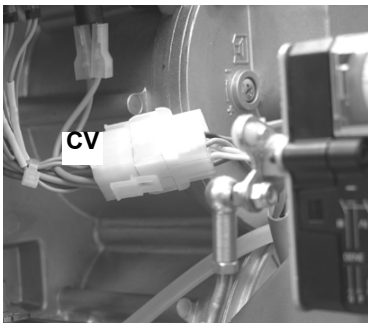



Fig. 32

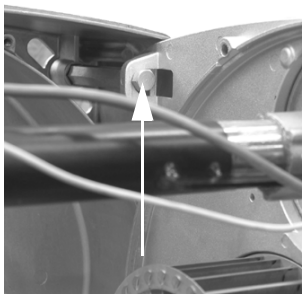


Fig. 33

## *Removing the combustion head*

**ATTENTION:** avoid the ignition and detection electrodes to get in touch with metallic parts (blast tube, head, etc.), otherwise the boiler's operation would be compromised. Check the electrodes position after any intervention on the combustion head. The gap between the ignition electrode and the ground is **4÷5 mm**.

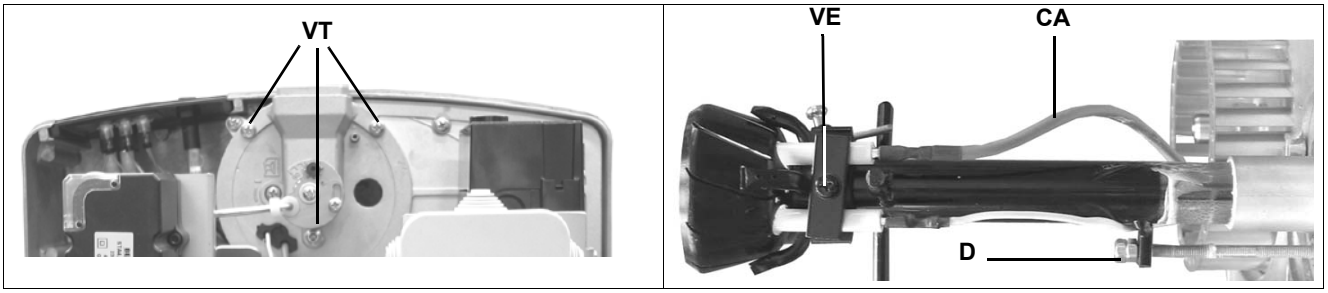
To remove the combustion head, proceed as follows:

1 remove the burner cover;
2 unscrew the **VT** fixing screws;
3 disconnect the ignition cable **CA**; unscrew the fixing nuts **D** and shift the combustion head off its housing;
4 adjust the electrodes: to replace them, if necessary, disconnect the cables and unscrew **VE**;
5 remove the electrodes and replace them;
6 to clean the combustion head, use a vacuum cleaner; to scrape off the scale use a metallic brush;
7 replace all the items reversing the procedure.

**CAUTION: during the assembling phase, before tightening screws V1, V2, V3, mount and tighten screws S1 and S2.** After the disassembling the burner plate, the combustion head can be removed as follows:

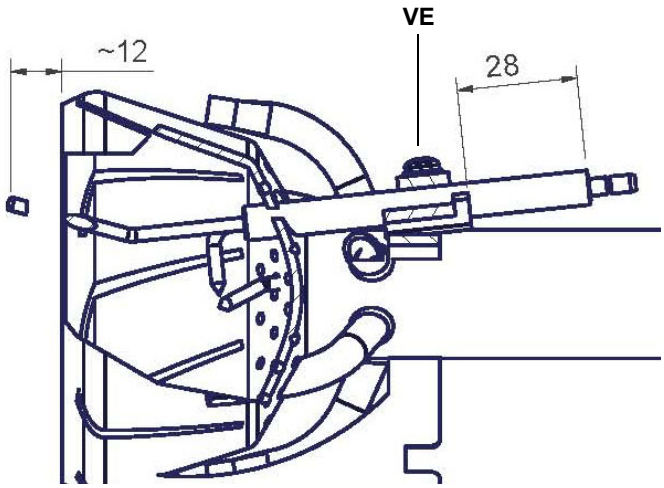
1 unscrew the fixing screwa **VT**;
2 disconnect the ignition cable **CA**; unscrew the fixing nuts **D** and remove the combustion head from its housing;
3 adjust the electrodes; to replace them, if necessary, disconnect the cables and unscrew **VE**;
4 remove the electrodes and replace them
5 clean the combustion head by means of a vacuum cleaner; use a metallic brush to scrape off the scale;

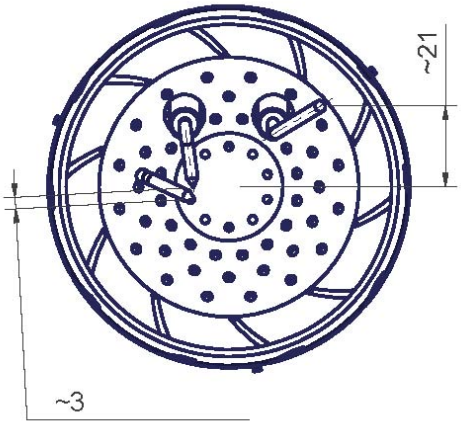
reassemble all the items in the reversed order, observing the electrodes position (see next paragraph)

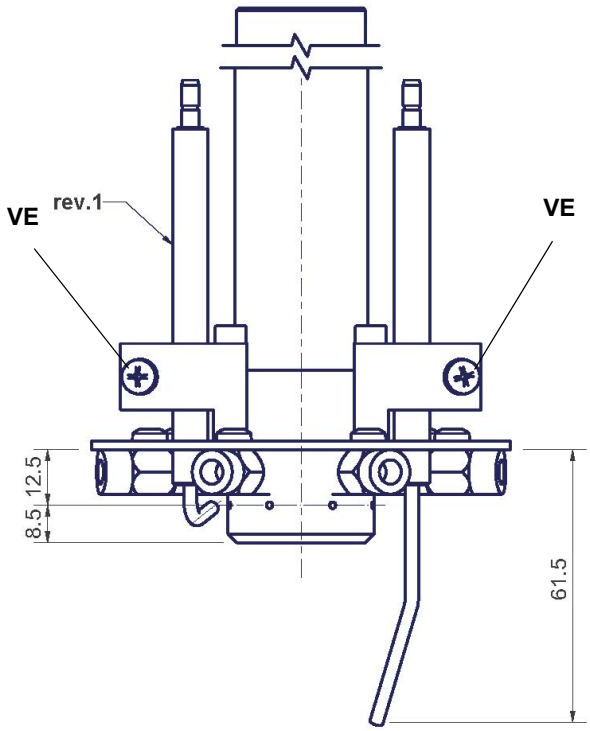


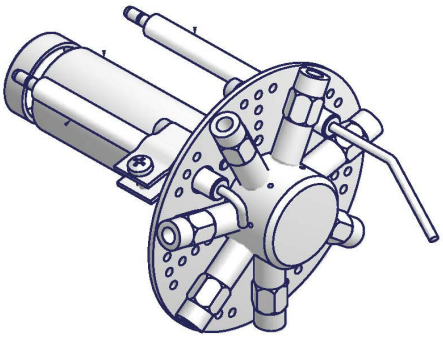

### *Correct electrodes positioning*

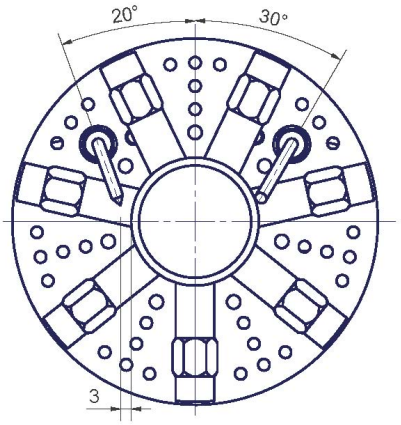
To get a good ignition, it is necessary to observe the measures shown in the next pictures. Be sure to fasten the electrodes fixing screw **VE**, before reassembling the burner.



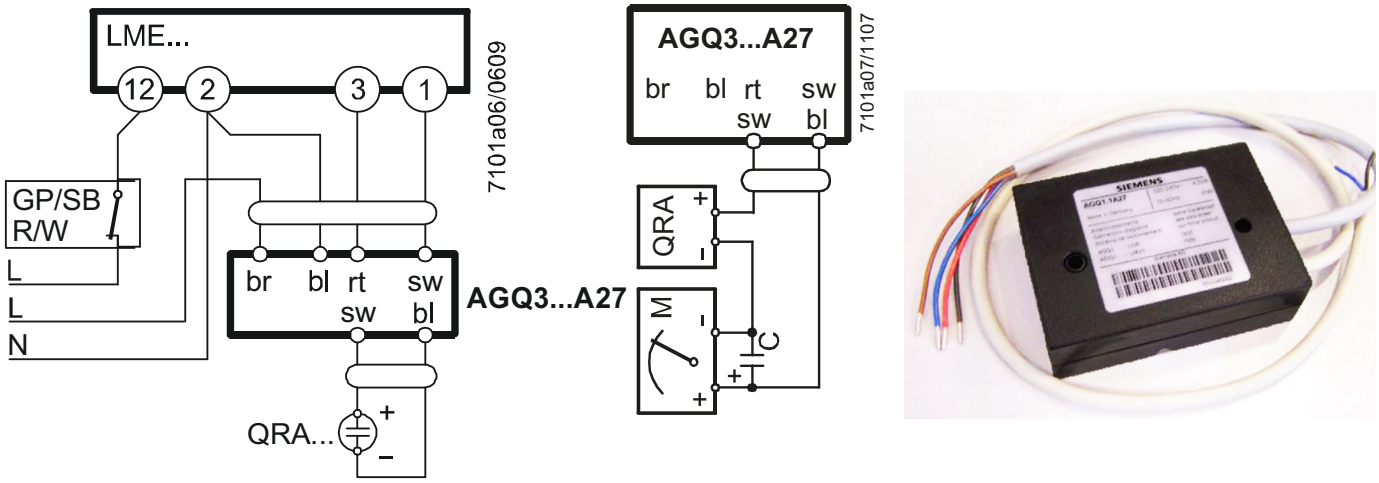





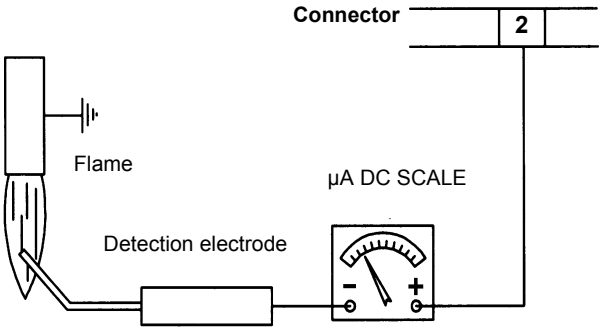
### *Flame supervision with QRA2 + ACQ3.1A27.. (just for LME2x …)*

| Device | Flame detector | Measure at the detector UV QRA… |
|---|---|---|
| Siemens LME2x | QRA2 | 200 µA |




### *Checking the detection current*

If the burner locks, execute the following inpesctions. To measure the detection signals refer to the diagrams in the following picture. 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.




| Control box | Minimum detection signal |
|---|---|
| Siemens LME21-22 | 3 µA |

Fig. 34

### *Seasonal stop*

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

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

### *Burner disposal*

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

## WIRING DIAGRAMS

Refer to the attached wiring diagrams.

**WARNING**

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

**Wiring diagram - Progressive burners:: SE18-069**
**Wiring diagram - Fully-modulating burners: SE18-166;**

# TROUBLESHOOTING

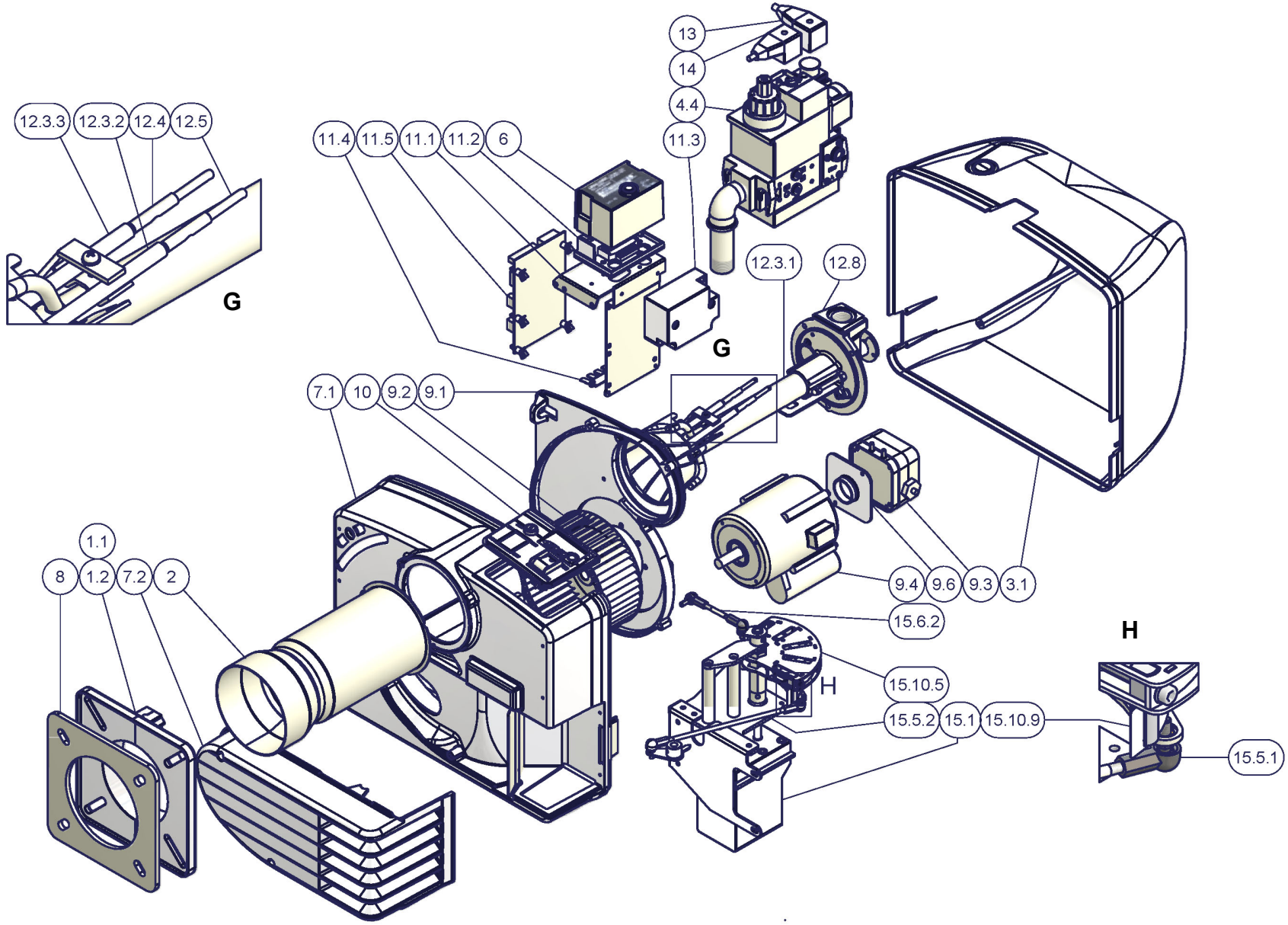
| CAUSE | TROUBLE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | THE BURNER DOESN'TSTART | CONTINUE WITH PRE-PURGE | DOESN'T START AND LOCK-OUT | DOESN'T START AND REPEATS THE CYCLE | STARTS AND REPEATS THE CYCLE | STARTS AND LOCK-OUTB | THE FLAME MONITOR DEVICE DOESN'T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

l = with any control box;

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

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

## BURNER EXPLODED VIEW



| POS. | DESCRIPTION |
|---|---|
| 1.1 | FLANGE |
| 1.2 | FLANGE |
| 2 | STANDARD BLAST TUBE |
| 3.1 | COVER |
| 4.4 | GAS VALVE GROUP |
| 6 | CONTROL BOX |
| 7.1 | BURNER HOUSING |
| 7.2 | AIR INTAKE |
| 7.3 | PIN |
| 8 | GENERATOR GASKET |
| 9.1 | MOTOR SUPPORT PLATE |
| 9.2 | FAN WHEEL |
| 9.3 | AIR PRESSURE SWITCH |
| 9.4 | MOTOR |
| 9.6 | BRACKET |
| 10 | FRONT CONTROL PANEL |
| 11.1 | BRACKET |
| 11.2 | CONTROL BOX SOCKET |

| POS. | DESCRIPTION |
|---|---|
| 11.3 | IGNITION TRANSFORMER |
| 11.4 | PLATE |
| 11.5 | PRINTED CIRCUIT BOARD |
| 12.1 | FAIRLEAD |
| 12.3.1 | STANDARD COMBUSTION HEAD |
| 12.3.2 | DETECTION ELECTRODE |
| 12.3.3 | IGNITION ELECTRODE |
| 12.4 | IGNITION CABLE |
| 12.5 | DETECTION CABLE |
| 12.8 | FLANGE |
| 13 | CONNECTOR |
| 14 | CONNECTOR |
| 15.1 | ACTUATOR |
| 15.10.5 | ADJUSTING CAM |
| 15.10.9 | ADJUSTING CAM FOIL |
| 15.5.1 | JOINT |
| 15.5.2 | ROD |
| 15.6.2 | ROD |

# APPENDIXAPPENDIX

## SIEMENS LME11/21/22 CONTROL BOX

The series of equipment LME.. is used for the starup and supervisione of 1- or 2- stage gas burners. The series LME..is interchangeable with the series LGB.. and LMG.., all diagrams and accessories are interchangeable, the main features are:

- Indications of error codes by a signalling multicolor LED in the lockout reset button;
- Programmer fix times for the digital management of signals.

### 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) aremixed 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:

| | |
|---|---|
| **red LED**<br>**yellow LED**<br>**green LED**<br>LED | ..... Steady on<br>❍... Off |

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

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

### START-UP PROGRAM

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

**A Start command (switching on)**

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

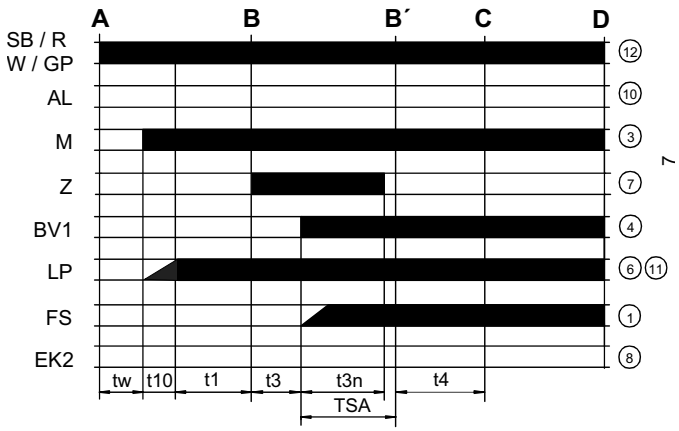
**C** Burner operation position

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

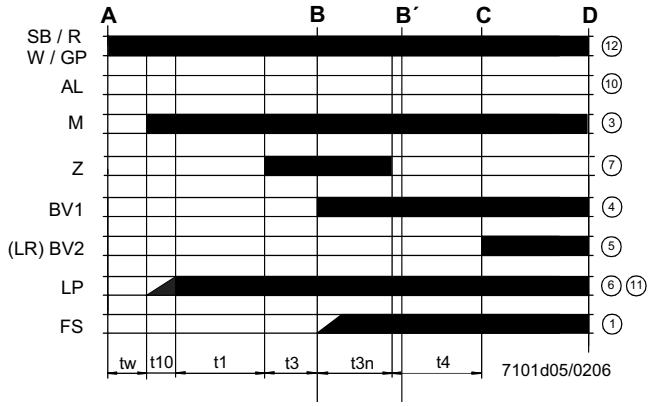
**D** Controlled by "R" shutdown

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

**LME11 control sequence**

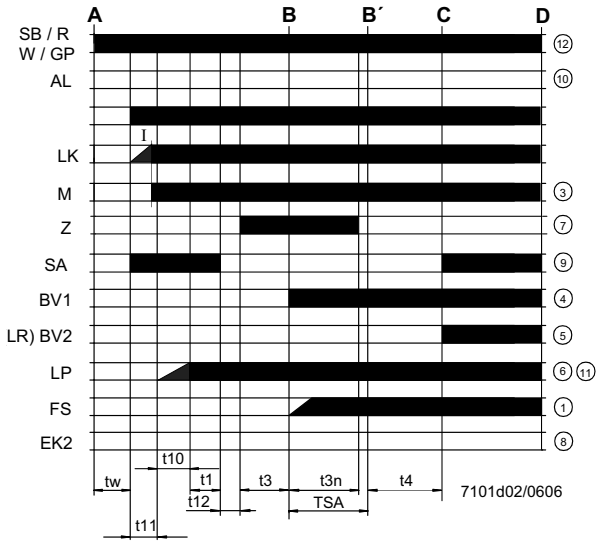



**LME21 control sequence**




**LME22 control sequence**

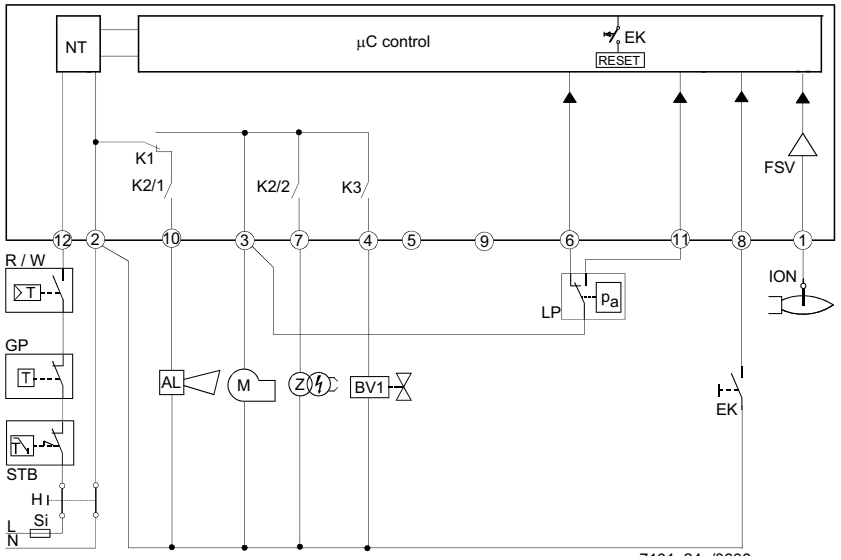
.



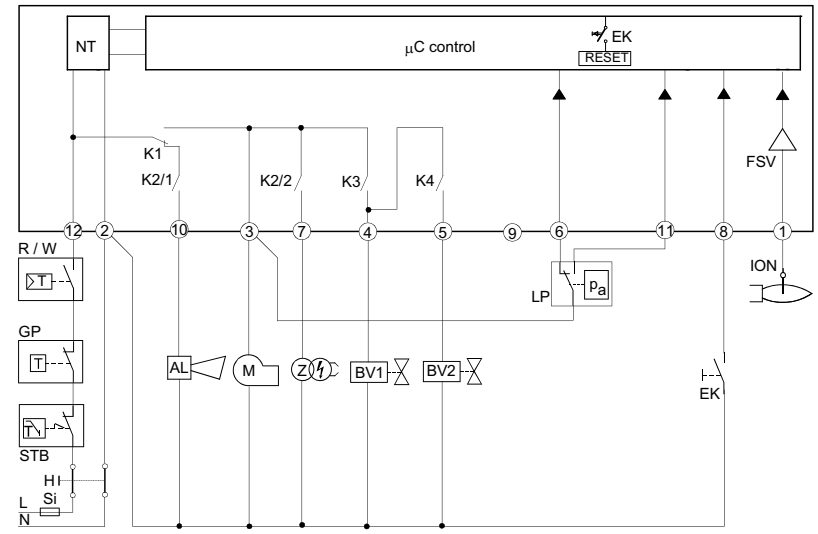

**Control sequence**

| | |
|---|---|
| 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 |

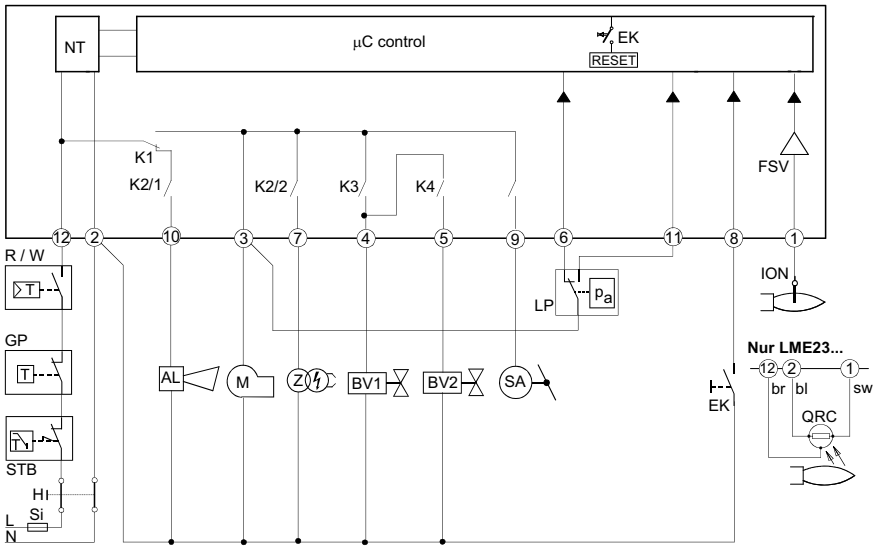
### LME11 connection diagram




### LME21 connection diagram




### LME22 connection diagram



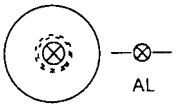

### Connection diagram

| | |
|---|---|
| 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 |

## 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 thresold, a safety shutdown is performed.
- If the operating voltage exceeds the undervoltage thresold, 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.
- IIf 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.

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 mantained in the case fo mains failure.




## DIAGNOSITICS OF THE CASUE 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 signsl 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 buttonaccording to the “Error code table”:

## CONTROL BOX LOCKED

| ERROR CODE TABLE | |
|---|---|
| **2 blinks **** | **No establishment of flame at the end of TSA**<br>- Faulty or soiled fuel valves<br>- Faulty or soiled flame detector<br>- Inadequate adjustement of burner, no fuel<br>- Faulty ignition equipment |
| **3 blinks ***** | **The air pressure switch does not switch or remains in idle position:**<br>- LP is faulty<br>- Loss of air pressure signal after t10<br>- LPis welded in normal position. |
| **4 blinks ****** | - Extraneous light when burner starts up. |
| **5 blinks ******* | - LP is working position. |
| **6 blinks ******* | Free. |
| **7 blinks ********* | **Loss of flame during operation**<br>- Faulty or soiled fuel valves<br>- Faulty or soiled flame detector<br>- Inadequate adjustement of burner |
| **8 ÷ 9 blinks** | Free |
| **10 blinks ************ | **Faulty output contacts**<br>- Wiring error<br>- Anomalous voltage on ouput terminals<br>- Other faults |
| **14 blinks **************** | - CPI contact 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.

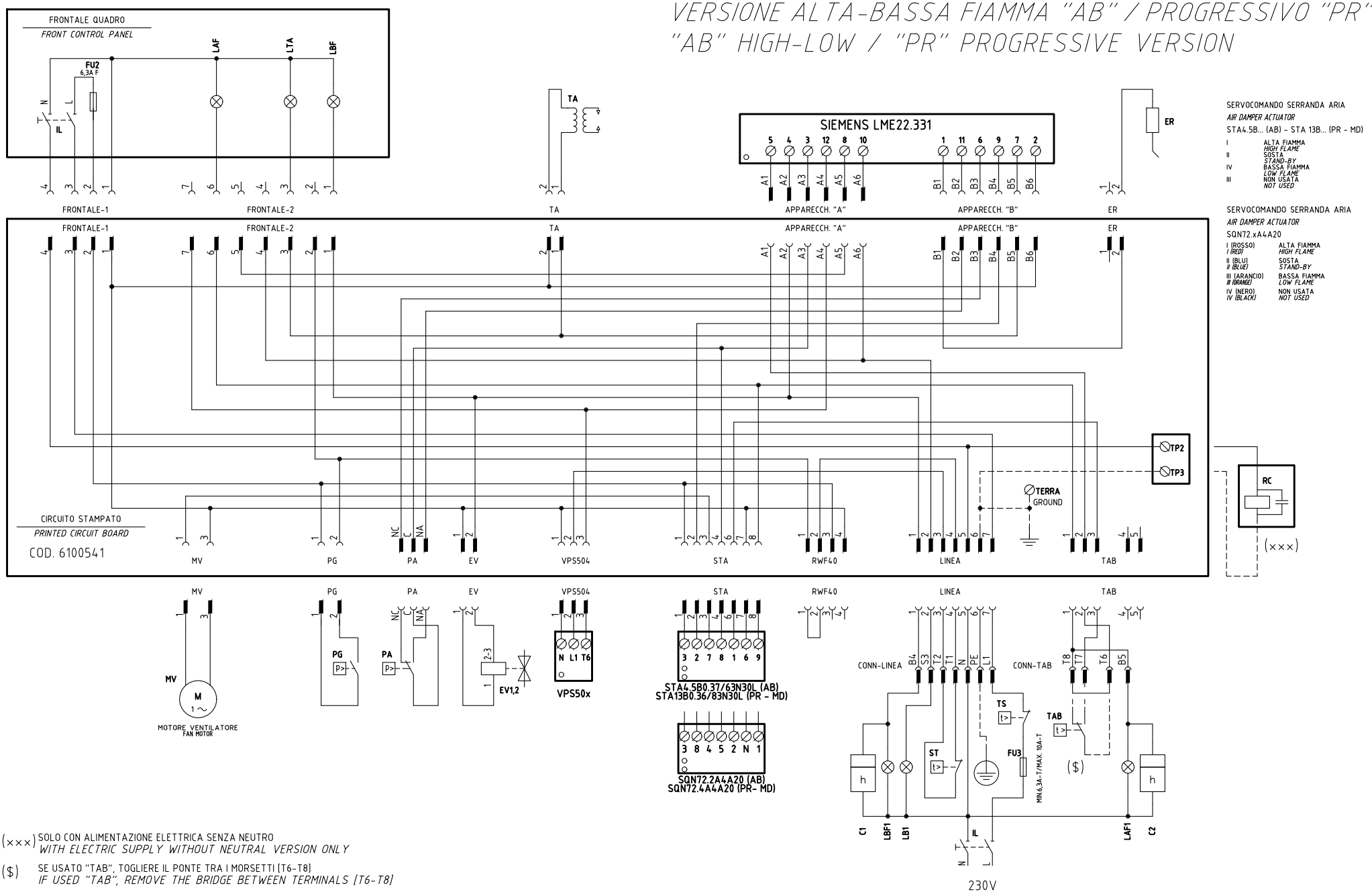
## TECHNICAL CHARACTERISTICS

| | |
|---|---|
| Mains voltage | 120V AC +10% / -15%<br>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 |
| Thermostats cable length | max. 3 m |
| 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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Tel. +39 049 9200944 - Fax +39 049 9200945/9201269
web site: www.cibunigas.it - e-mail: cibunigas@cibunigas.it

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

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

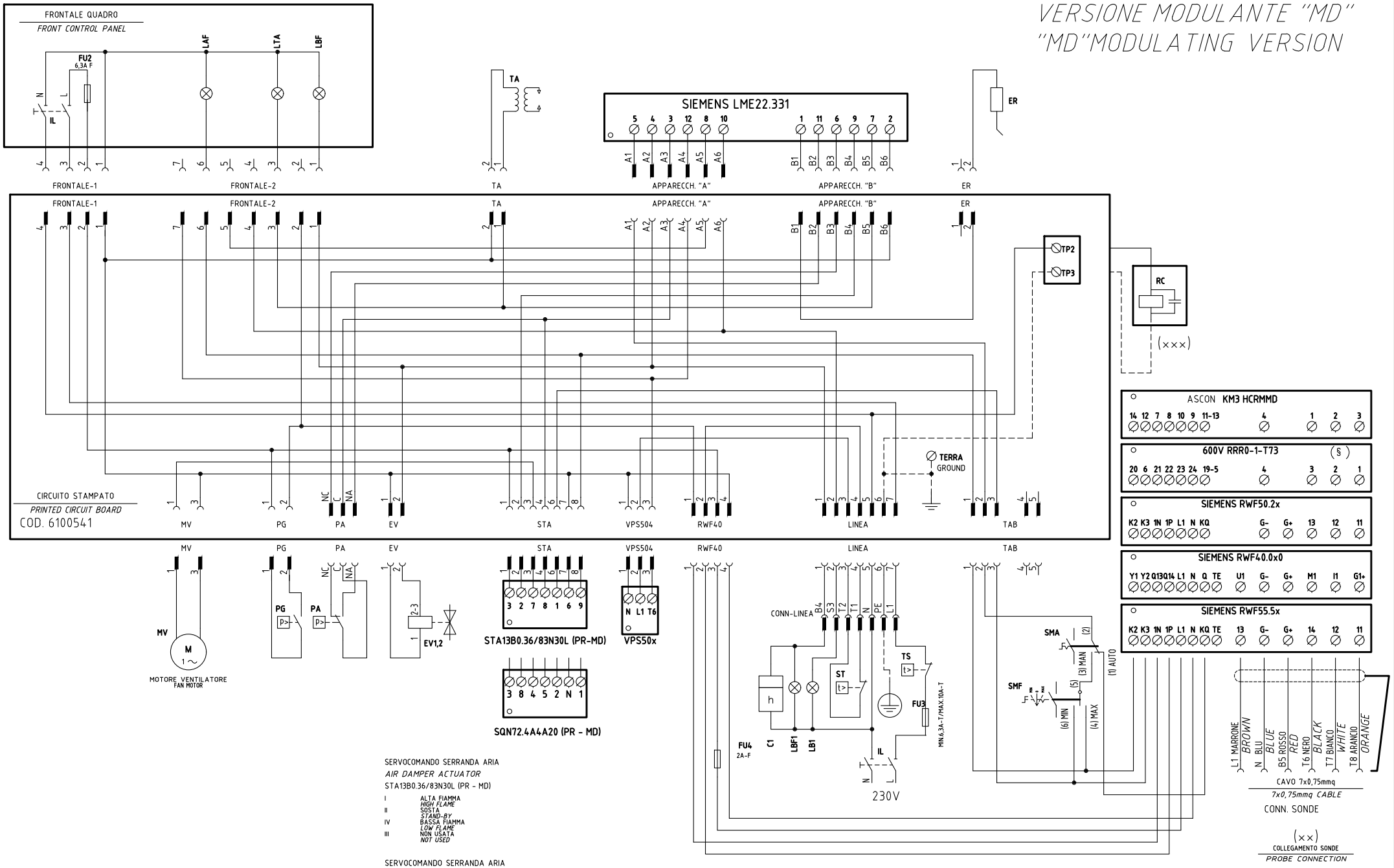



(×××) SOLO CON ALIMENTAZIONE ELETTRICA SENZA NEUTRO
*WITH ELECTRIC SUPPLY WITHOUT NEUTRAL VERSION ONLY*

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

| | | | | | | |
|---|---|---|---|---|---|---|
| UNIGAS | Impianto: *TIPI/TYPES NG/LG 140 – 200 / NGX120 – 200 MODELLO/MODEL x–.AB(PR)(MD).x.xx.A.1.xx* | Ordine | | Data 22/10/2018 | PREC. / | FOGLIO 1 |
| | Descrizione: *VERSIONE CON CIRCUITO STAMPATO WITH PRINTED CIRCUIT VERSION* | Commessa | Data Controllato 22/10/2018 | Revisione 00 | SEGUE 2 | TOTALE 4 |
| | | Esecutore U. PINTON | Controllato M. MASCHIO | Dis. N. 18 – 0323 | | |

# VERSIONE MODULANTE "MD"
# "MD" MODULATING VERSION




SERVOCOMANDO SERRANDA ARIA
*AIR DAMPER ACTUATOR*
STA13B0.36/83N30L (PR - MD)

| | |
|---|---|
| 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*
SQN72.4A4A20 (PR - MD)

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

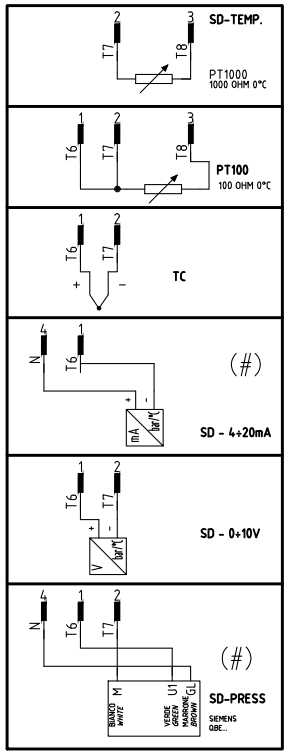
(×××) SOLO CON ALIMENTAZIONE ELETTRICA SENZA NEUTRO
*WITH ELECTRIC SUPPLY WITHOUT NEUTRAL VERSION ONLY*

| | | | |
|---|---|---|---|
| Data | 22/10/2018 | PREC. 1 | FOGLIO 2 |
| Revisione | 00 | | |
| Dis. N. | 18 – 0323 | SEGUE 3 | TOTALE 4 |

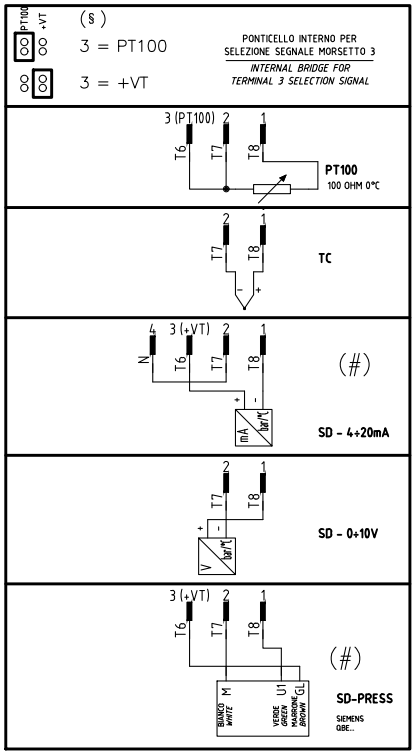
(××) ATTENZIONE COLLEGAMENTO SONDE CON CONNETTORE 7 POLI

*WARNING PROBE CONNECTION WITH 7 PINS CONNECTOR*

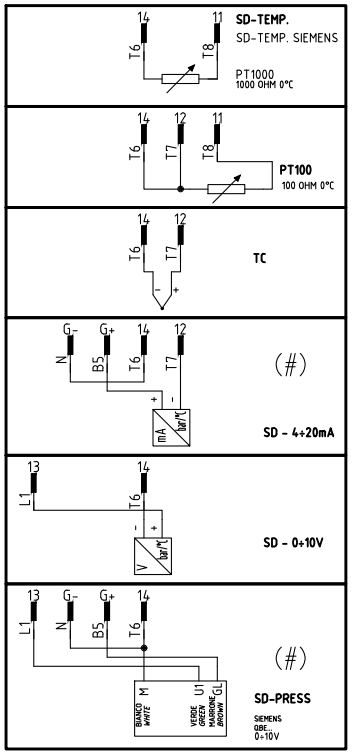
## KM3 HCRMMD



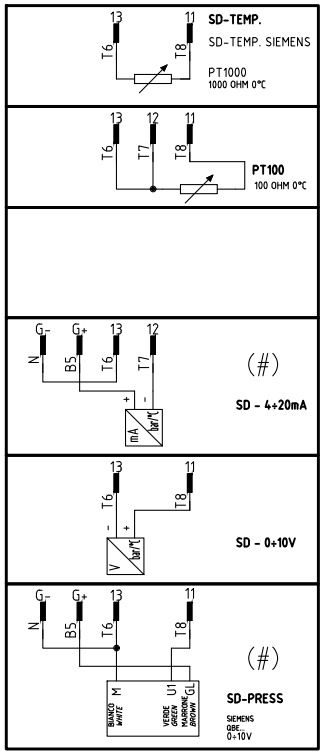

## 600V RRR0-1-T73



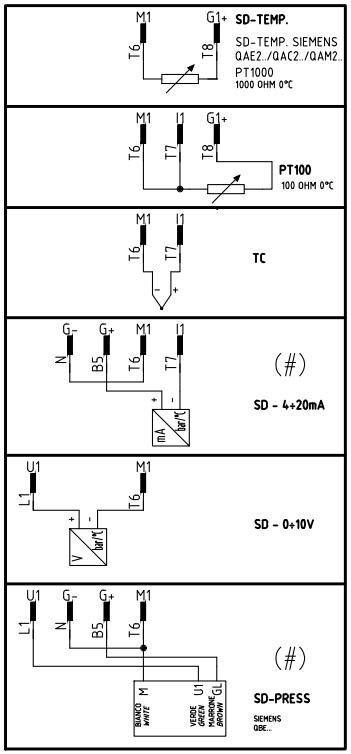

## RWF55.5x




## RWF50.2x

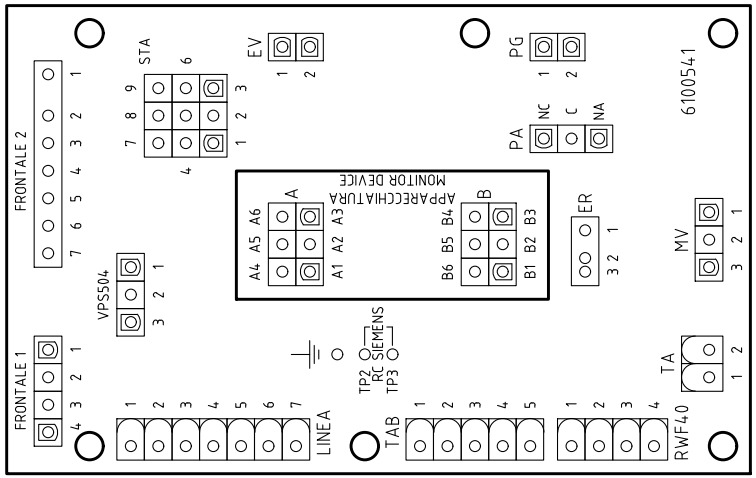


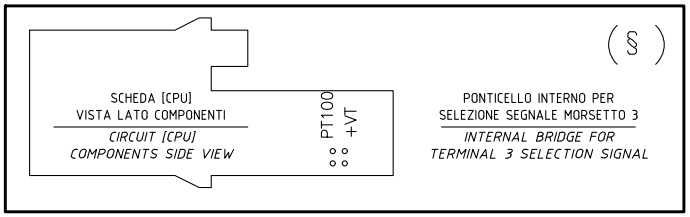

## RWF40.0xx




(#) COLLEGAMENTO SOLO PER TRASDUTTORI PASSIVI

*TRASDUCER PASSIVE CONNECTION ONLY*



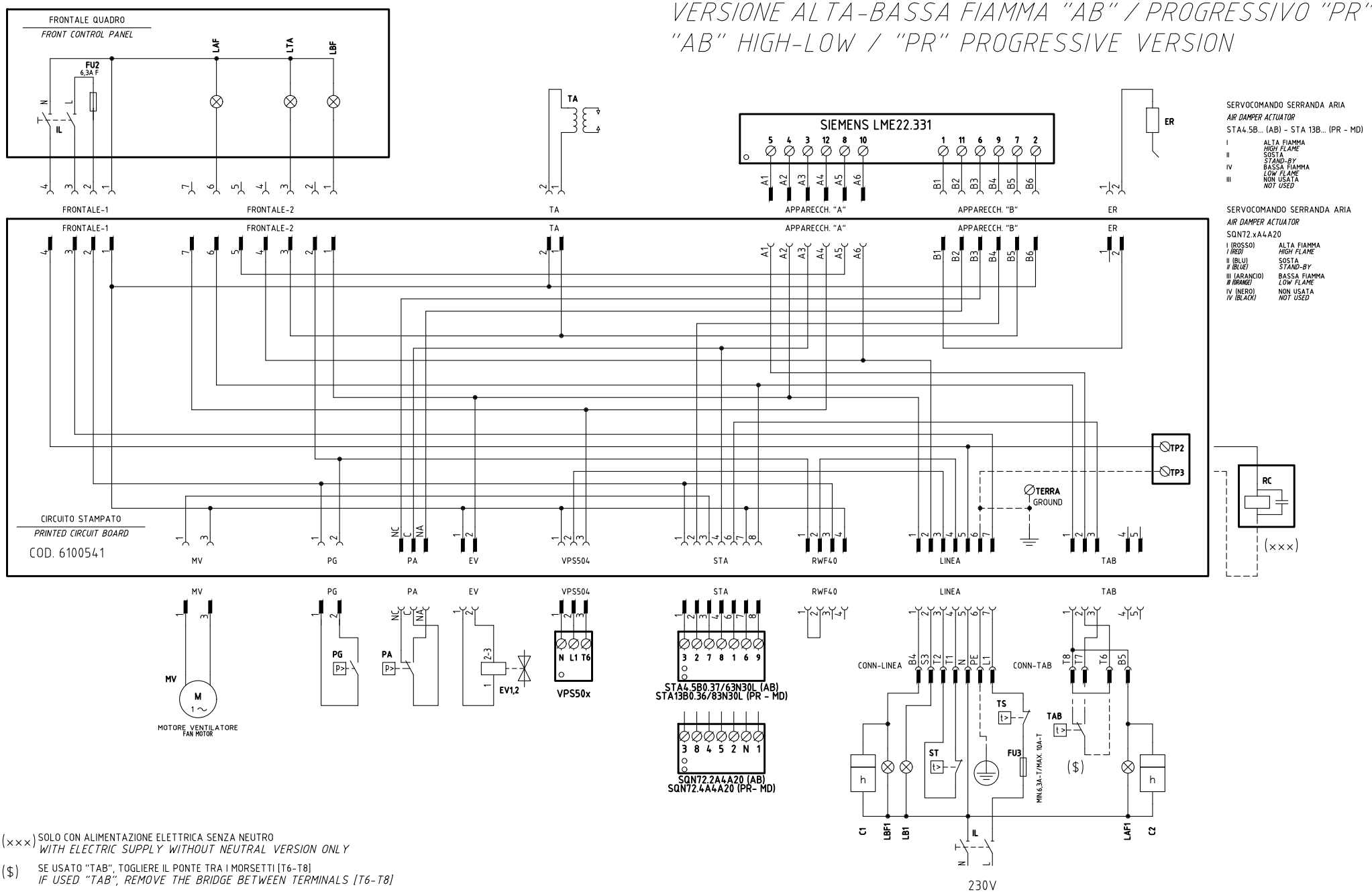




| | | | |
|---|---|---|---|
| Data 22/10/2018 | | PREC. 2 | FOGLIO 3 |
| Revisione 00 | | | |
| Dis. N. 18 – 0323 | | SEGUE 4 | TOTALE 4 |

| 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) |
| FU2 | FUSIBILE DI LINEA | LINE FUSE |
| FU3 | FUSIBILE DI LINEA | LINE FUSE |
| FU4 | FUSIBILE AUSILIARIO | AUXILIARY FUSE |
| IL | INTERRUTTORE LINEA BRUCIATORE | BURNER LINE SWITCH |
| 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 |
| 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 |
| 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 |
| 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 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.xA4A20 | 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 |
| STA4.5B... / STA13B... | 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 | GAS PROVING SYSTEM |

| | | | |
|---|---|---|---|
| Data 22/10/2018 | | PREC. 3 | FOGLIO 4 |
| Revisione 00 | | | |
| Dis. N. 18 – 0323 | | SEGUE / | TOTALE 4 |

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

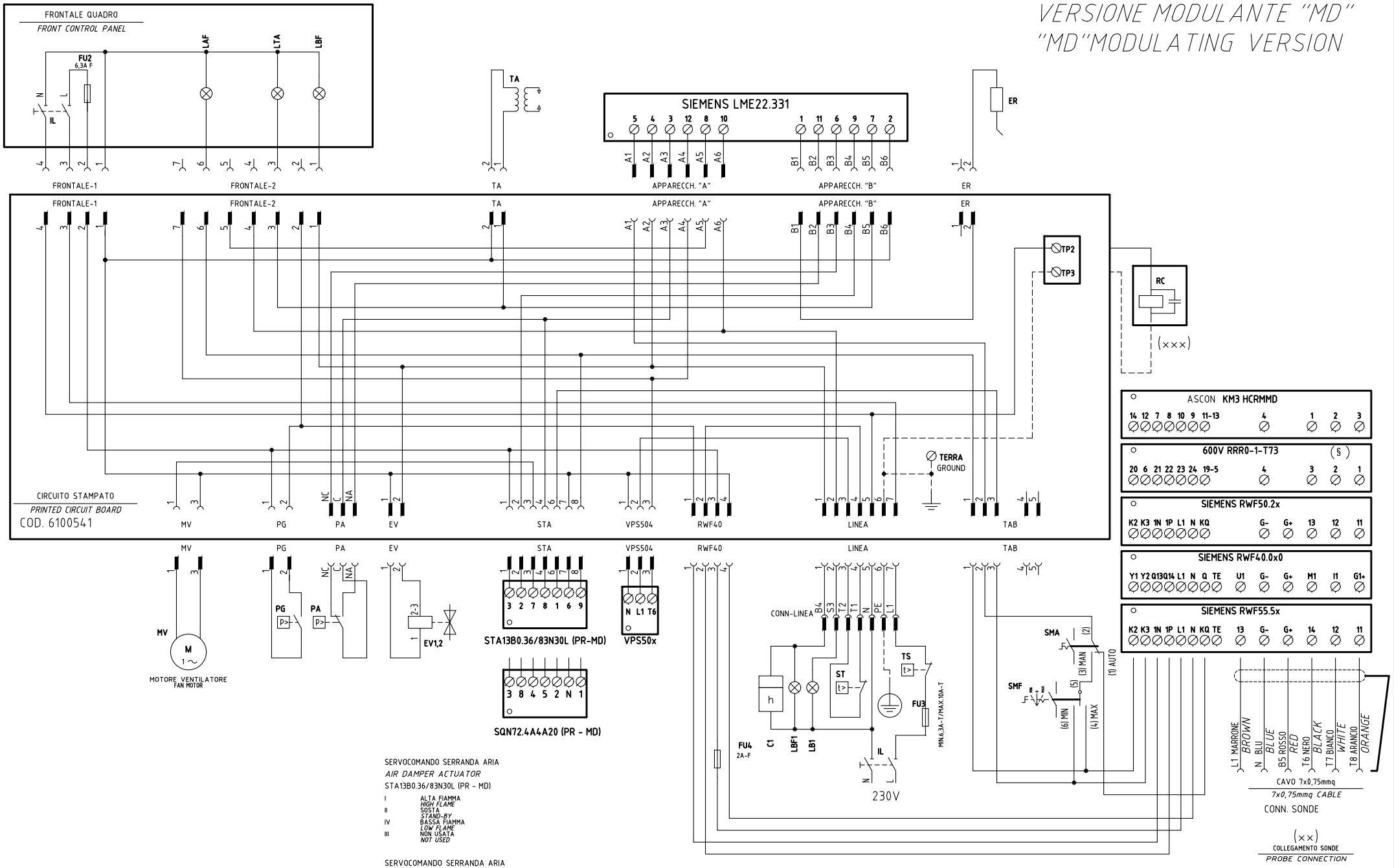



(×××) SOLO CON ALIMENTAZIONE ELETTRICA SENZA NEUTRO
*WITH ELECTRIC SUPPLY WITHOUT NEUTRAL VERSION ONLY*

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

| | | | | | | |
|---|---|---|---|---|---|---|
| UNIGAS | Impianto: *TIPI/TYPES NG/LG 140 – 200 / NGX120 – 200 MODELLO/MODEL x–.AB(PR)(MD).x.xx.A.1.xx* | Ordine | | Data 22/10/2018 | PREC. / | FOGLIO 1 |
| | Descrizione: *VERSIONE CON CIRCUITO STAMPATO WITH PRINTED CIRCUIT VERSION* | Commessa | Data Controllato 22/10/2018 | Revisione 00 | SEGUE 2 | TOTALE 4 |
| | | Esecutore U. PINTON | Controllato M. MASCHIO | Dis. N. 18 – 0323 | | |

# VERSIONE MODULANTE "MD"
# "MD" MODULATING VERSION




SERVOCOMANDO SERRANDA ARIA
*AIR DAMPER ACTUATOR*
STA13B0.36/83N30L (PR - MD)

| | |
|---|---|
| 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*
SQN72.4A4A20 (PR - MD)

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

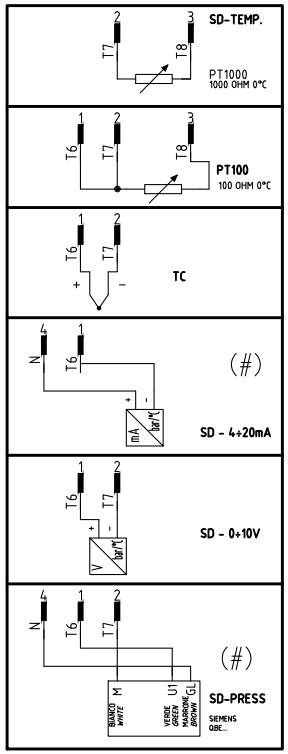
(×××) SOLO CON ALIMENTAZIONE ELETTRICA SENZA NEUTRO
*WITH ELECTRIC SUPPLY WITHOUT NEUTRAL VERSION ONLY*

| | | | |
|---|---|---|---|
| Data | 22/10/2018 | PREC. 1 | FOGLIO 2 |
| Revisione | 00 | | |
| Dis. N. | 18 – 0323 | SEGUE 3 | TOTALE 4 |

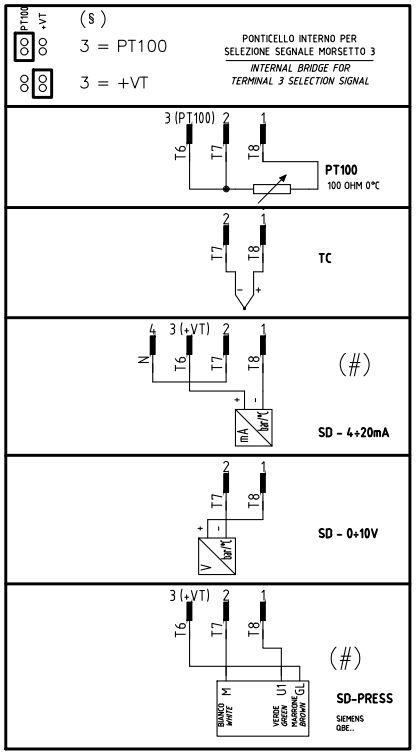
(××) ATTENZIONE COLLEGAMENTO SONDE CON CONNETTORE 7 POLI

*WARNING PROBE CONNECTION WITH 7 PINS CONNECTOR*

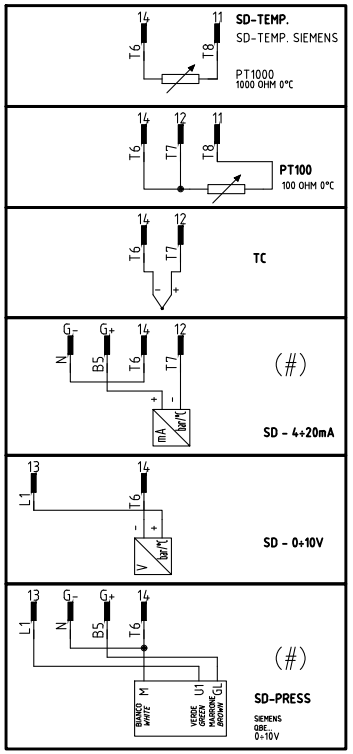
## KM3 HCRMMD



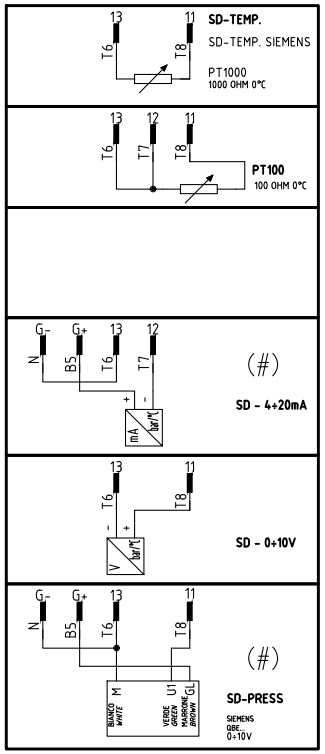

## 600V RRR0-1-T73



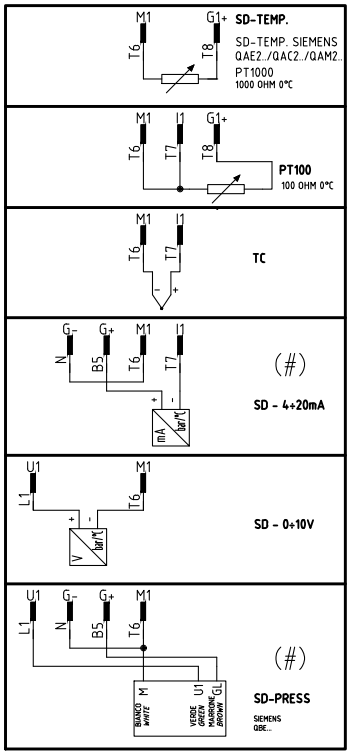

## RWF55.5x




## RWF50.2x

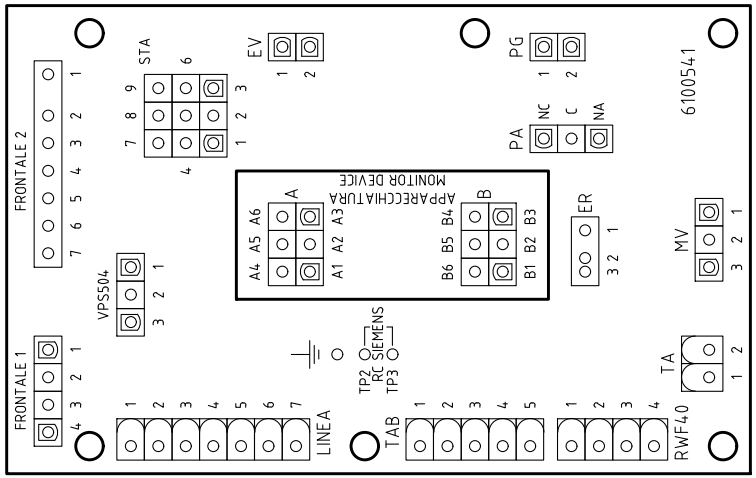


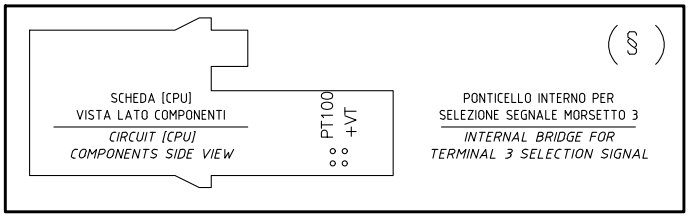

## RWF40.0xx




(#) COLLEGAMENTO SOLO PER TRASDUTTORI PASSIVI

*TRASDUCER PASSIVE CONNECTION ONLY*




| | | | |
|---|---|---|---|
| Data 22/10/2018 | | PREC. 2 | FOGLIO 3 |
| Revisione 00 | | | |
| Dis. N. 18 – 0323 | | SEGUE 4 | TOTALE 4 |

| 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) |
| FU2 | FUSIBILE DI LINEA | LINE FUSE |
| FU3 | FUSIBILE DI LINEA | LINE FUSE |
| FU4 | FUSIBILE AUSILIARIO | AUXILIARY FUSE |
| IL | INTERRUTTORE LINEA BRUCIATORE | BURNER LINE SWITCH |
| 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 |
| 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 |
| 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 |
| 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 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.xA4A20 | 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 |
| STA4.5B... / STA13B... | 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 | GAS PROVING SYSTEM |

| | | | |
|---|---|---|---|
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