

**R91A - R92A - R93A  
R512A - R515A  
R520A - R525A**

***Gas burners  
Progressive / Fully modulating***

**MANUAL OF INSTALLATION - USE - MAINTENANCE**

***CIB UNIGAS***

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

## DANGERS, WARNINGS AND NOTES OF CAUTION

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

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

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

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

### 1) GENERAL INTRODUCTION

- The equipment must be installed in compliance with the regulations in force, following the manufacturer's instructions, by qualified personnel.
- Qualified personnel means those having technical knowledge in the field of components for civil or industrial heating systems, sanitary hot water generation and particularly service centres authorised by the manufacturer.
- Improper installation may cause injury to people and animals, or damage to property, for which the manufacturer cannot be held liable.
- Remove all packaging material and inspect the equipment for integrity. In case of any doubt, do not use the unit - contact the supplier.

The packaging materials (wooden crate, nails, fastening devices, plastic bags, foamed polystyrene, etc), should not be left within the reach of children, as they may prove harmful.

- Before any cleaning or servicing operation, disconnect the unit from the mains by turning the master switch OFF, and/or through the cut-out devices that are provided.
- Make sure that inlet or exhaust grilles are unobstructed.
- In case of breakdown and/or defective unit operation, disconnect the unit. Make no attempt to repair the unit or take any direct action.

Contact qualified personnel only.

Units shall be repaired exclusively by a servicing centre, duly authorised by the manufacturer, with original spare parts and accessories.

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

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

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

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

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

### 2) SPECIAL INSTRUCTIONS FOR BURNERS

- The burner should be installed in a suitable room, with ventilation openings complying with the requirements of the regulations in force, and sufficient for good combustion.
- Only burners designed according to the regulations in force should be used.
- This burner should be employed exclusively for the use for which it was designed.
- Before connecting the burner, make sure that the unit rating is the same as delivery mains (electricity, gas oil, or other fuel).
- Observe caution with hot burner components. These are, usually, near to the flame and the fuel pre-heating system, they become hot during the unit operation and will remain hot for some time after the burner has stopped.

When the decision is made to discontinue the use of the burner, the user shall have qualified personnel carry out the following operations:

- a Remove the power supply by disconnecting the power cord from the mains.
- b Disconnect the fuel supply by means of the hand-operated shut-off valve and remove the control handwheels from their spindles.

### Special warnings

- Make sure that the burner has, on installation, been firmly secured to the appliance, so that the flame is generated inside the appliance fire-box.
- Before the burner is started and, thereafter, at least once a year, have qualified personnel perform the following operations:
  - a set the burner fuel flow rate depending on the heat input of the appliance;
  - b set the flow rate of the combustion-supporting air to obtain a combustion efficiency level at least equal to the lower level required by the regulations in force;
  - c check the unit operation for proper combustion, to avoid any harmful or polluting unburnt gases in excess of the limits permitted by the regulations in force;
  - d make sure that control and safety devices are operating properly;
  - e make sure that exhaust ducts intended to discharge the products of combustion are operating properly;
  - f on completion of setting and adjustment operations, make sure that all mechanical locking devices of controls have been duly tightened;
  - g make sure that a copy of the burner use and maintenance instructions is available in the boiler room.
- In case of a burner shut-down, reset the control box by means of the RESET pushbutton. If a second shut-down takes place, call the Technical Service, **without trying to RESET further**.
- The unit shall be operated and serviced by qualified personnel only, in compliance with the regulations in force.

### 3) GENERAL INSTRUCTIONS DEPENDING ON FUEL USED

#### 3a) ELECTRICAL CONNECTION

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

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

#### GENERAL

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

#### SPECIAL INSTRUCTIONS FOR USING GAS

Have qualified personnel inspect the installation to ensure that:

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

#### Precautions if you can smell gas

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

### DIRECTIVES AND STANDARDS

#### *Gas burners*

##### European directives

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

##### Harmonized standards

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

#### *Light oil burners*

##### European directives

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

##### Harmonized standards

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

#### *Heavy oil burners*

##### European Directives

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

##### Harmonized standards

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

### Gas - Light oil burners

#### European Directives

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

#### Harmonized standards

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

### Gas - Heavy oil burners

#### European directives:

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

#### Harmonized standards

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

### Industrial burners

#### European directives

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

#### Harmonized standards

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

### Burner data plate

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

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

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

### SYMBOLS USED



#### WARNING!

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



#### DANGER!

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



#### WARNING!

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

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

### BURNER SAFETY

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



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

### Residual risks deriving from misuse and prohibitions

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



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



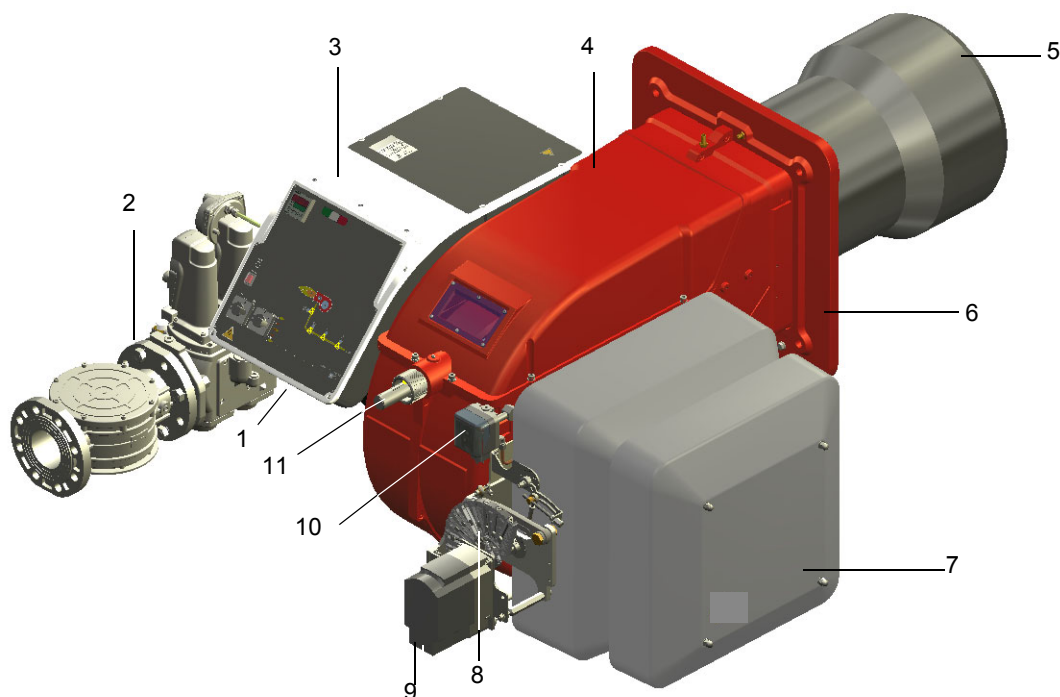
After any maintenance, it is important to restore the protection devices before restarting the machine.  
All safety devices must be kept in perfect working order.  
Personnel authorized to maintain the machine must always be provided with suitable protections.



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

## PART I: SPECIFICATIONS

## GENERAL FEATURES



- 1 Control panel with startup switch
- 2 Gas valve group
- 3 Electrical panel
- 4 Cover
- 5 Blast tube + Combustion head
- 6 Flange
- 7 Silencer
- 8 Adjusting cam
- 9 Actuator
- 10 Air pressure switch
- 11 Head adjusting ring

**Gas operation:** the gas coming from the supply line passes through filter, gas valves and pressure regulator. This one forces the pressure in the utilisation limits. The electric actuator , that moves proportionally the air damper and the gas butterfly valve, uses an adjusting cam with variable shape. This one allows the optimisation of the gas flue values, as to get an efficient combustion. The combustion head positioning determines the burner's output. The combustion head determines the energetic quality and the geometry of the flame. Fuel and comburent are routed into separated ways as far as the zone of flame generation (combustion chamber). The control panel , placed on the burner's front side, shows each operating stage.

## Burner model identification

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

|      |             |       |                                    |
|------|-------------|-------|------------------------------------|
| Type | <b>R91A</b> | Model | <b>M-. MD. S. *. A. 1. 80.</b>     |
|      | <b>(1)</b>  |       | <b>(2) (3) (4) (5) (6) (7) (8)</b> |

|   |                                |                                                                                                              |
|---|--------------------------------|--------------------------------------------------------------------------------------------------------------|
| 1 | BURNER TYPE                    | <b>R91A, R92A, R93A, R512A, R515A, R520A, R525A</b>                                                          |
| 2 | FUEL                           | C - Town-gas<br>M - Natural gas<br>L - LPG                                                                   |
| 3 | OPERATION (Available versions) | PR - Progressive<br>MD - Fully modulating                                                                    |
| 4 | BLAST TUBE                     | S - Standard L - ExtendedExtended blast tube                                                                 |
| 5 | DESTINATION COUNTRY            | * - see data plate                                                                                           |
| 6 | BURNER VERSION                 | A - Standard<br>Y - Special                                                                                  |
| 7 | EQUIPMENT                      | 1 = 2 gas valves + gas proving system<br>8 = 2 gas valves + gas proving system + maximum gas pressure switch |
| 8 | GAS CONNECTION                 | 50 = Rp2 65 = DN65<br>80 = DN80 100 = DN100                                                                  |

## Fuel

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

| Fuel     | $H_i$ (KWh/Stm <sup>3</sup> ) | $\rho$ (kg/Stm <sup>3</sup> ) | $f_Q$ | $f_p$ |
|----------|-------------------------------|-------------------------------|-------|-------|
| Town gas | 4.88                          | 0.6023                        | 1.936 | 3.3   |
| Biogas   | 6.395                         | 1.1472                        | 1.478 | 3.5   |

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 calorific value and the density of the gas. The above value can be taken only as reference.

**Burner performance**

| BURNER TYPE           |                | R91A                           | R92A       | R93A       | R512A      | R515A      | R520A       | R525A ....50 | R525A ....xx |
|-----------------------|----------------|--------------------------------|------------|------------|------------|------------|-------------|--------------|--------------|
| Output                | min. - max. kW | 480 - 2670                     | 480 - 3050 | 550 - 4100 | 600 - 4500 | 770 - 5200 | 1000 - 6400 | 2000 - 6700  | 2000 - 8000  |
| Protection            |                | IP40                           |            |            |            |            |             |              |              |
| Operation             |                | Progressive - Fully modulating |            |            |            |            |             |              |              |
| Operating temperature | °C             | -10 ÷ +50                      |            |            |            |            |             |              |              |
| Storage Temperature   | °C             | -20 ÷ +60                      |            |            |            |            |             |              |              |
| Working service*      |                | Intermittent Continuous        |            |            |            |            |             |              |              |

**Electrical data 50 Hz**

Possible voltages, check the actual three-phase and single-phase supply voltage on the burner nameplate.

| BURNER TYPE             |    | R91A                               | R92A | R93A | R512A | R515A | R520A | R525A ....50 | R525A ....xx |
|-------------------------|----|------------------------------------|------|------|-------|-------|-------|--------------|--------------|
| Power supply triphase   |    | 220/230V 3~ / 380/400V 3N ~ 50Hz   |      |      |       |       |       |              |              |
| Auxiliary Power supply  |    | 220V/230V 2~ / 220V/230V 1N ~ 50Hz |      |      |       |       |       |              |              |
| Total power consumption | kW | 4.5                                | 6.0  | 8.0  | 9.7   | 11.5  | 15.5  | 19           | 19           |
| Electric motor          | kW | 4                                  | 5.5  | 7.5  | 9.2   | 11    | 15    | 18.5         | 18.5         |

**Electrical data 60 Hz**

Possible voltages, check the actual three-phase and single-phase supply voltage on the burner nameplate.

| BURNER TYPE             |    | R91A                               | R92A | R93A | R512A | R515A | R520A | R525A ....50 | R525A ....xx |
|-------------------------|----|------------------------------------|------|------|-------|-------|-------|--------------|--------------|
| Power supply triphase   |    | 220/230V 3~ / 380/400V 3N ~60Hz    |      |      |       |       |       |              |              |
| Auxiliary Power supply  |    | 220V/230V 2~ / 220V/230V 1N ~ 60Hz |      |      |       |       |       |              |              |
| Total power consumption | kW | 5,3                                | 7,1  | 9,5  | 11,54 | 13,7  | 18,5  | 22,7         | 22,7         |
| Electric motor          | kW | 4,8                                | 6,6  | 9    | 11,04 | 13,2  | 18    | 22,2         | 22,2         |

**Fuel data**

| BURNER TYPE           |                                  | R91A ...L         | R92A ...L  | R93A ...L | R512A ...L | R515A ...L | R520A ...L | R525A ...L<br>....50 | R525A ...L<br>....xx |
|-----------------------|----------------------------------|-------------------|------------|-----------|------------|------------|------------|----------------------|----------------------|
| Fuel                  |                                  | L - LPG           |            |           |            |            |            |                      |                      |
| Category              |                                  | I <sub>3B/P</sub> |            |           |            |            |            |                      |                      |
| Gas rate- LPG         | min.- max. (Stm <sup>3</sup> /h) | 17.9 - 100        | 17.9 - 114 | 20 - 153  | 22 - 167   | 28 - 194   | 37 - 238   | 74 - 250             | 74 - 300             |
| Pressure Gas pressure | mbar                             | (see Note 2)      |            |           |            |            |            |                      |                      |

| BURNER TYPE           |                                  | R91A ...M            | R92A ...M | R93A ...M | R512A ...M | R515A ...M | R520A ...M | R525A ...M<br>....50 | R525A ...M<br>....xx |
|-----------------------|----------------------------------|----------------------|-----------|-----------|------------|------------|------------|----------------------|----------------------|
| Fuel                  |                                  | M - Natural gas      |           |           |            |            |            |                      |                      |
| Category              |                                  | (see next paragraph) |           |           |            |            |            |                      |                      |
| Natural Gas rate      | min.- max. (Stm <sup>3</sup> /h) | 51 - 283             | 51 - 323  | 58 - 434  | 63 - 476   | 81 - 550   | 106 - 677  | 212 - 709            | 212 - 847            |
| Pressure Gas pressure | mbar                             | (see Note 2)         |           |           |            |            |            |                      |                      |

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                     |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| <b>Note 1:</b> | All gas flow rates are referred to Stm <sup>3</sup> / h (1.013 mbar absolute pressure, 15 °C temperature) and are valid for G20 gas (net calorific value H <sub>i</sub> = 34,02 MJ / Stm <sup>3</sup> ); for L.P.G. (net calorific value H <sub>i</sub> = 93,5 MJ / Stm <sup>3</sup> ).                                                                                                                                                                            |                                                     |
| <b>Note 2:</b> | Maximum gas pressure                                                                                                                                                                                                                                                                                                                                                                                                                                               | 360 mbar (with Dungs MBDLE).                        |
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 500 mbar (with Siemens VGD or Dungs MultiBloc MBE). |
|                | Minimum gas pressure                                                                                                                                                                                                                                                                                                                                                                                                                                               | see gas curves                                      |
| <b>Note 3:</b> | Burners are suitable only for indoor operation with a maximum relative humidity of 80 %.                                                                                                                                                                                                                                                                                                                                                                           |                                                     |
| <b>Note 4:</b> | With electrode: for safety reasons the burner must stop automatically every 24 hours.                                                                                                                                                                                                                                                                                                                                                                              |                                                     |
| <b>Note 5:</b> | The type of service can be continuous (flame signal presence for more than 24 h without any stop) or intermittent (at least once every 24 h there is a work stoppage and the flame is extinguished) depending on the configuration ordered.<br>Operation can be continuous in the presence of flame detection via ION ionisation or Siemens QRI..., QRA5..., QRA7... or Lamtec FSS... with Siemens LMV37x or LMV5x flame control equipment (BMS) and Lamtec BT3... |                                                     |

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

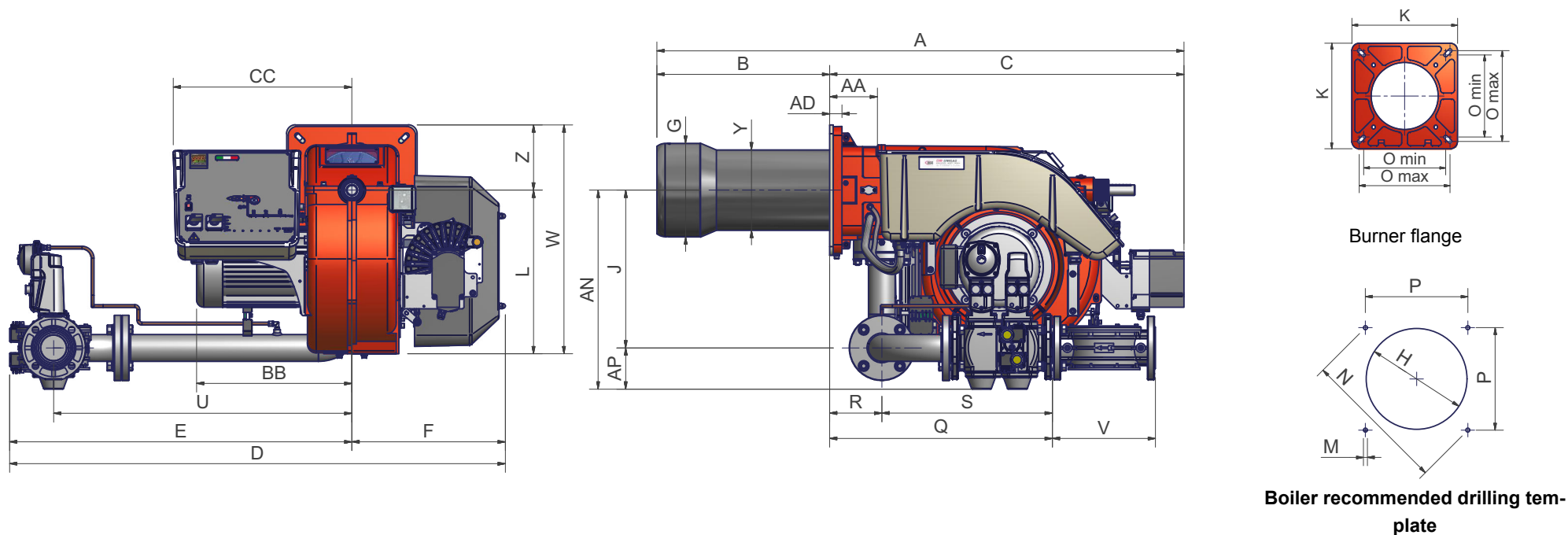
Type of fuel used



**DANGER!** The burner must be used only with the fuel specified in the burner data plate.

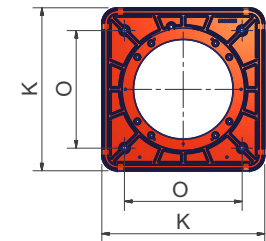
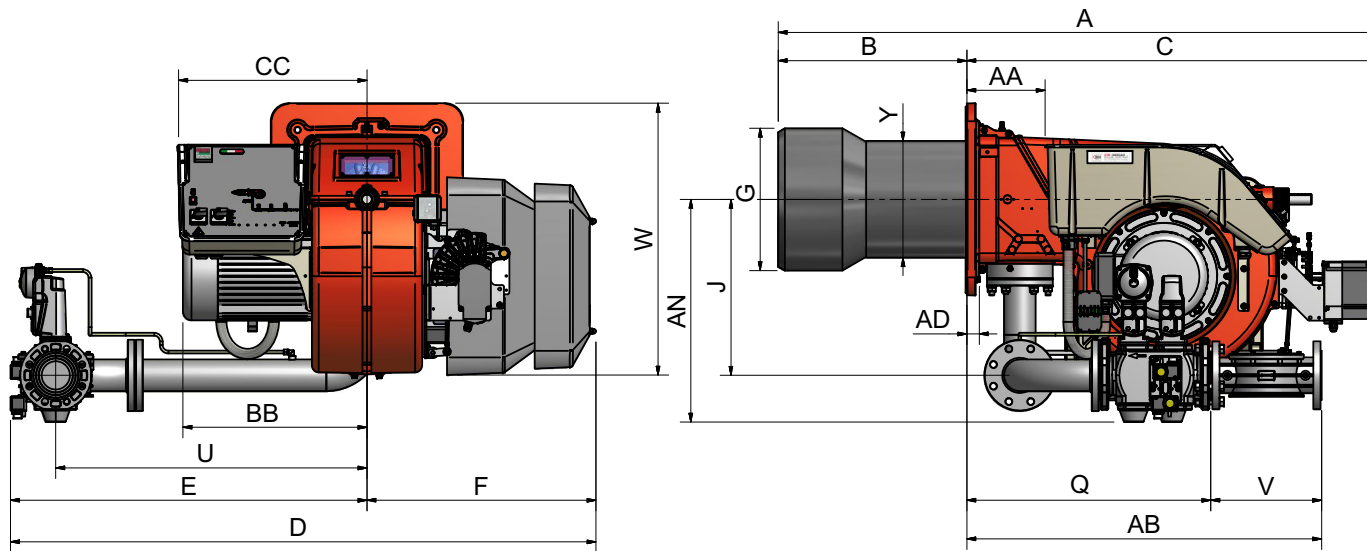
|              |    |
|--------------|----|
| Type         | -- |
| Model        | -- |
| Year         | -- |
| S.Number     | -- |
| Output       | -- |
| Oil Flow     | -- |
| Fuel         | -- |
| Category     | -- |
| Gas Pressure | -- |
| Viscosity    | -- |
| El.Supply    | -- |
| El.Consump.  | -- |

## Overall dimensions (mm)

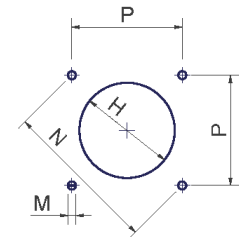


|             | DN* | A    | AA  | AD | AN  | AP  | B   | BB  | C    | CC  | D    | E    | F   | G   | H   | I   | J   | K   | L   | M   | N   | Omin | Omax | P   | Q   | R   | S   | U   | V   | W   | Y   | Z   |
|-------------|-----|------|-----|----|-----|-----|-----|-----|------|-----|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>R91A</b> | 50  | 1495 | 136 | 35 | 550 | 100 | 490 | 441 | 1005 | 506 | 1160 | 725  | 435 | 265 | 295 | 228 | 450 | 360 | 464 | M12 | 424 | 280  | 310  | 300 | 532 | 148 | 384 | 624 | 190 | 649 | 228 | 185 |
| <b>R91A</b> | 65  | 1495 | 136 | 35 | 564 | 117 | 490 | 441 | 1005 | 506 | 1406 | 971  | 435 | 265 | 295 | 228 | 447 | 360 | 464 | M12 | 424 | 280  | 310  | 300 | 632 | 148 | 484 | 846 | 292 | 649 | 228 | 185 |
| <b>R91A</b> | 80  | 1495 | 136 | 35 | 579 | 132 | 490 | 441 | 1005 | 506 | 1437 | 1002 | 435 | 265 | 295 | 228 | 447 | 360 | 464 | M12 | 424 | 280  | 310  | 300 | 683 | 148 | 535 | 875 | 313 | 649 | 228 | 185 |
| <b>R91A</b> | 100 | 1495 | 136 | 35 | 592 | 145 | 490 | 441 | 1005 | 506 | 1520 | 1085 | 435 | 265 | 295 | 228 | 447 | 360 | 464 | M12 | 424 | 280  | 310  | 300 | 790 | 148 | 642 | 942 | 353 | 649 | 228 | 185 |
| <b>R92A</b> | 50  | 1495 | 136 | 35 | 550 | 100 | 490 | 441 | 1005 | 506 | 1160 | 725  | 435 | 269 | 299 | 228 | 450 | 360 | 464 | M12 | 424 | 280  | 310  | 300 | 532 | 148 | 384 | 624 | 190 | 649 | 228 | 185 |
| <b>R92A</b> | 65  | 1495 | 136 | 35 | 564 | 117 | 490 | 441 | 1005 | 506 | 1406 | 971  | 435 | 269 | 299 | 228 | 447 | 360 | 464 | M12 | 424 | 280  | 310  | 300 | 632 | 148 | 484 | 846 | 292 | 649 | 228 | 185 |
| <b>R92A</b> | 80  | 1495 | 136 | 35 | 579 | 132 | 490 | 441 | 1005 | 506 | 1437 | 1002 | 435 | 269 | 299 | 228 | 447 | 360 | 464 | M12 | 424 | 280  | 310  | 300 | 683 | 148 | 535 | 875 | 313 | 649 | 228 | 185 |
| <b>R92A</b> | 100 | 1495 | 136 | 35 | 592 | 145 | 490 | 441 | 1005 | 506 | 1520 | 1085 | 435 | 269 | 299 | 228 | 447 | 360 | 464 | M12 | 424 | 280  | 310  | 300 | 790 | 148 | 642 | 942 | 353 | 649 | 228 | 185 |
| <b>R93A</b> | 50  | 1500 | 136 | 35 | 550 | 100 | 495 | 460 | 1005 | 506 | 1160 | 725  | 435 | 304 | 344 | 228 | 450 | 360 | 464 | M12 | 424 | 280  | 310  | 300 | 532 | 148 | 384 | 624 | 190 | 649 | 228 | 185 |
| <b>R93A</b> | 65  | 1500 | 136 | 35 | 564 | 117 | 495 | 460 | 1005 | 506 | 1406 | 971  | 435 | 304 | 344 | 228 | 447 | 360 | 464 | M12 | 424 | 280  | 310  | 300 | 632 | 148 | 484 | 846 | 292 | 649 | 228 | 185 |
| <b>R93A</b> | 80  | 1500 | 136 | 35 | 579 | 132 | 495 | 460 | 1005 | 506 | 1437 | 1002 | 435 | 304 | 344 | 228 | 447 | 360 | 464 | M12 | 424 | 280  | 310  | 300 | 683 | 148 | 535 | 875 | 313 | 649 | 228 | 185 |
| <b>R93A</b> | 100 | 1500 | 136 | 35 | 592 | 145 | 495 | 460 | 1005 | 506 | 1520 | 1085 | 435 | 304 | 344 | 228 | 447 | 360 | 464 | M12 | 424 | 280  | 310  | 300 | 790 | 148 | 642 | 942 | 353 | 649 | 228 | 185 |

\*DN = gas valves size



Burner flange



Boiler recommended drilling template

|       | DN* | A    | AA  | AD | AN  | AP  | B   | BB  | C    | CC  | D    | E    | F   | G   | H   | J   | K   | L   | M   | N   | O   | P   | Q   | R   | S   | U   | V   | W   | Y   | Z   |
|-------|-----|------|-----|----|-----|-----|-----|-----|------|-----|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| R512A | 50  | 1683 | 220 | 35 | 595 | 100 | 530 | 517 | 1153 | 532 | 1590 | 946  | 644 | 340 | 380 | 494 | 540 | 494 | M14 | 552 | 390 | 390 | 763 | 149 | 614 | 845 | 190 | 764 | 311 | 270 |
|       | 65  | 1683 | 220 | 35 | 611 | 117 | 530 | 517 | 1153 | 532 | 1613 | 969  | 644 | 340 | 380 | 494 | 540 | 494 | M14 | 552 | 390 | 390 | 636 | 149 | 487 | 845 | 292 | 764 | 311 | 270 |
|       | 80  | 1683 | 220 | 35 | 626 | 132 | 530 | 517 | 1153 | 532 | 1646 | 1002 | 644 | 340 | 380 | 494 | 540 | 494 | M14 | 552 | 390 | 390 | 687 | 149 | 538 | 875 | 310 | 764 | 311 | 270 |
|       | 100 | 1683 | 220 | 35 | 639 | 145 | 530 | 517 | 1153 | 532 | 1726 | 1082 | 644 | 340 | 380 | 494 | 540 | 494 | M14 | 552 | 390 | 390 | 791 | 149 | 642 | 942 | 353 | 764 | 311 | 270 |
| R515A | 50  | 1683 | 220 | 35 | 595 | 100 | 530 | 517 | 1153 | 532 | 1590 | 946  | 644 | 380 | 420 | 494 | 540 | 494 | M14 | 552 | 390 | 390 | 763 | 149 | 614 | 845 | 190 | 764 | 316 | 270 |
|       | 65  | 1683 | 220 | 35 | 611 | 117 | 530 | 517 | 1153 | 532 | 1613 | 969  | 644 | 380 | 420 | 494 | 540 | 494 | M14 | 552 | 390 | 390 | 636 | 149 | 487 | 845 | 292 | 764 | 316 | 270 |
|       | 80  | 1683 | 220 | 35 | 626 | 132 | 530 | 517 | 1153 | 532 | 1646 | 1002 | 644 | 380 | 420 | 494 | 540 | 494 | M14 | 552 | 390 | 390 | 687 | 149 | 538 | 875 | 310 | 764 | 316 | 270 |
|       | 100 | 1683 | 220 | 35 | 639 | 145 | 530 | 517 | 1153 | 532 | 1726 | 1082 | 644 | 380 | 420 | 494 | 540 | 494 | M14 | 552 | 390 | 390 | 791 | 149 | 642 | 942 | 353 | 764 | 316 | 270 |
| R520A | 50  | 1683 | 220 | 35 | 595 | 100 | 530 | 517 | 1153 | 532 | 1590 | 946  | 644 | 400 | 440 | 494 | 540 | 604 | M14 | 552 | 390 | 390 | 763 | 149 | 614 | 845 | 190 | 874 | 328 | 270 |
|       | 65  | 1683 | 220 | 35 | 611 | 117 | 530 | 517 | 1153 | 532 | 1613 | 969  | 644 | 400 | 440 | 494 | 540 | 604 | M14 | 552 | 390 | 390 | 636 | 149 | 487 | 845 | 292 | 874 | 328 | 270 |
|       | 80  | 1683 | 220 | 35 | 626 | 132 | 530 | 517 | 1153 | 532 | 1646 | 1002 | 644 | 400 | 440 | 494 | 540 | 604 | M14 | 552 | 390 | 390 | 687 | 149 | 538 | 875 | 310 | 874 | 328 | 270 |
|       | 100 | 1683 | 220 | 35 | 639 | 145 | 530 | 517 | 1153 | 532 | 1726 | 1082 | 644 | 400 | 440 | 494 | 540 | 604 | M14 | 552 | 390 | 390 | 791 | 149 | 642 | 942 | 353 | 874 | 328 | 270 |
| R525A | 50  | 1683 | 220 | 35 | 595 | 100 | 530 | 650 | 1153 | 532 | 1590 | 946  | 644 | 434 | 484 | 494 | 540 | 604 | M14 | 552 | 390 | 390 | 763 | 149 | 614 | 845 | 190 | 874 | 328 | 270 |
|       | 65  | 1683 | 220 | 35 | 611 | 117 | 530 | 650 | 1153 | 532 | 1613 | 969  | 644 | 434 | 484 | 494 | 540 | 604 | M14 | 552 | 390 | 390 | 636 | 149 | 487 | 845 | 292 | 874 | 328 | 270 |
|       | 80  | 1683 | 220 | 35 | 626 | 132 | 530 | 650 | 1153 | 532 | 1646 | 1002 | 644 | 434 | 484 | 494 | 540 | 604 | M14 | 552 | 390 | 390 | 687 | 149 | 538 | 875 | 310 | 874 | 328 | 270 |
|       | 100 | 1683 | 220 | 35 | 639 | 145 | 530 | 650 | 1153 | 532 | 1726 | 1082 | 644 | 434 | 484 | 494 | 540 | 604 | M14 | 552 | 390 | 390 | 791 | 149 | 642 | 942 | 353 | 874 | 328 | 270 |

\*DN = gas valves size

### How to read the burner “Performance curve”

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

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

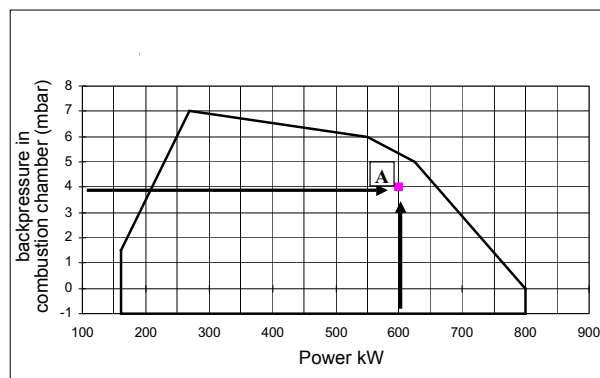
Example:

Furnace input: 600kW

Backpressure: 4 mbar

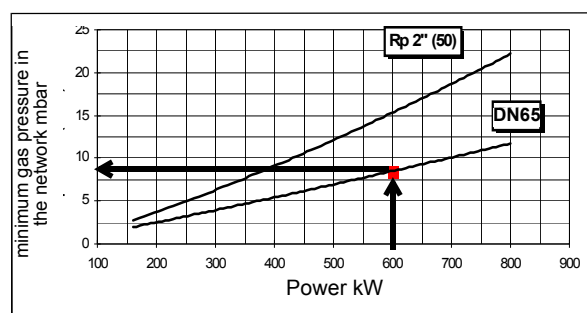
In the “Performance curve” diagram, draw a vertical line matching the furnace input value and an horizontal line matching the backpressure value. The burner is suitable if the intersection point A is inside the performance curve.

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

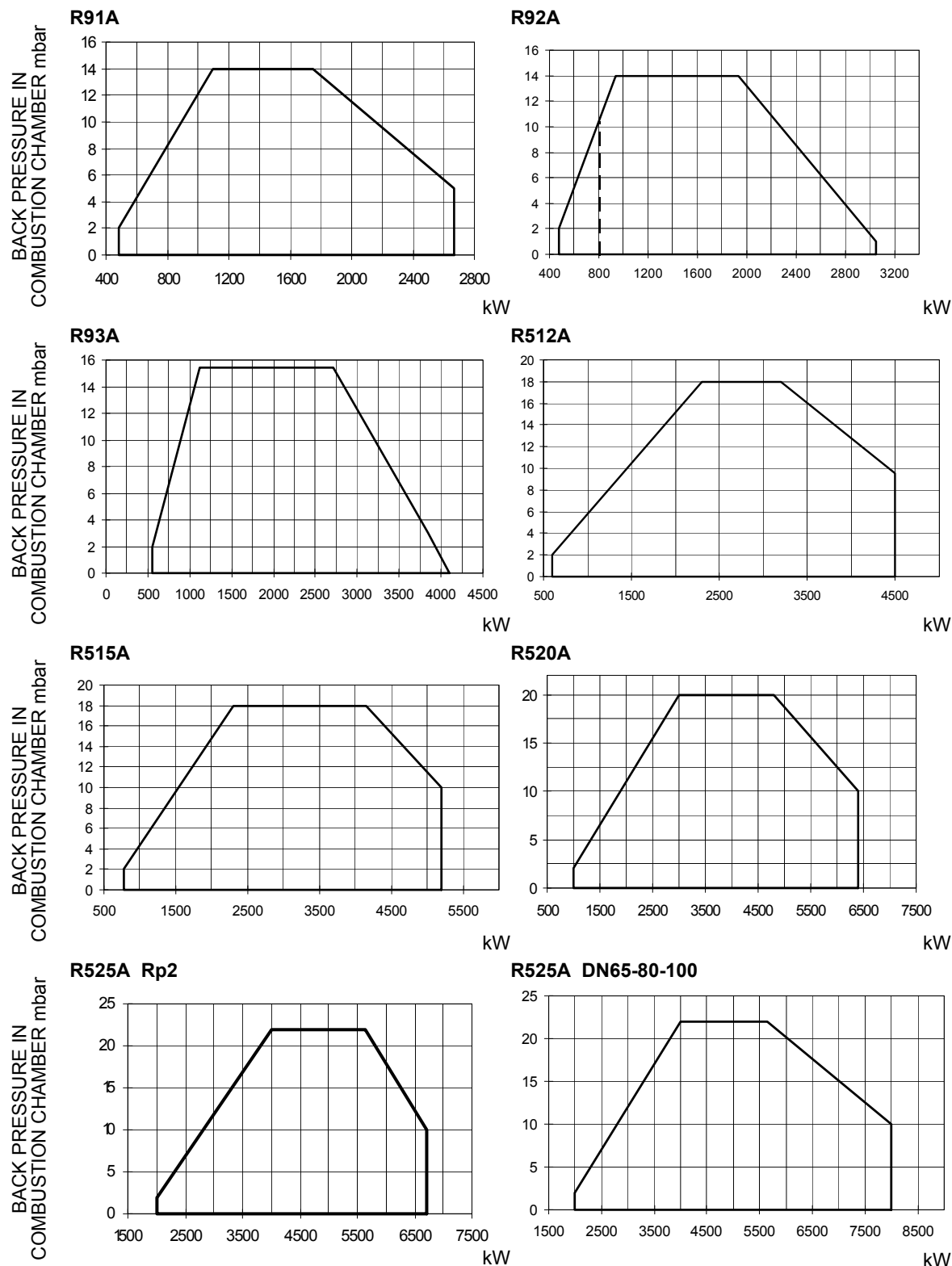


### Checking the proper gas train size

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



## Performance Curves



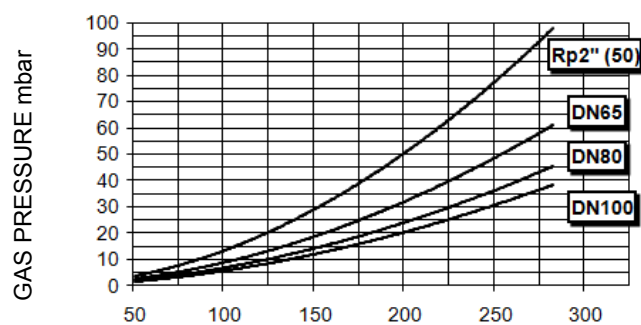
To get the input in kcal/h, multiply value in kW by 860.

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

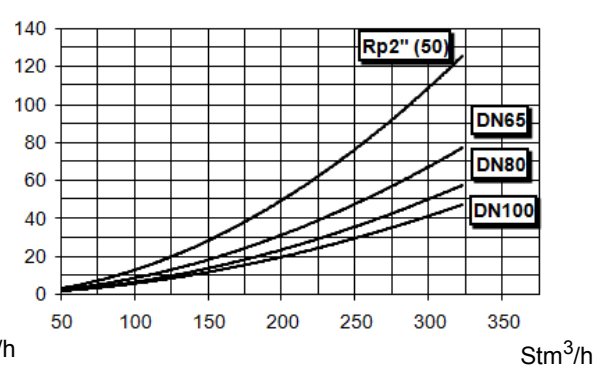
**NOTE:** The performance curve is a diagram that represents the burner performance in the type approval phase or in the laboratory tests, but does not represent the regulation range of the machine. On this diagram the maximum output point is usually reached by adjusting the combustion head to its "MAX"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

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

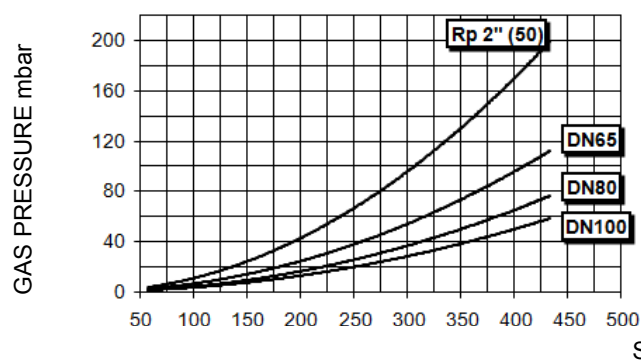
R91A M-..



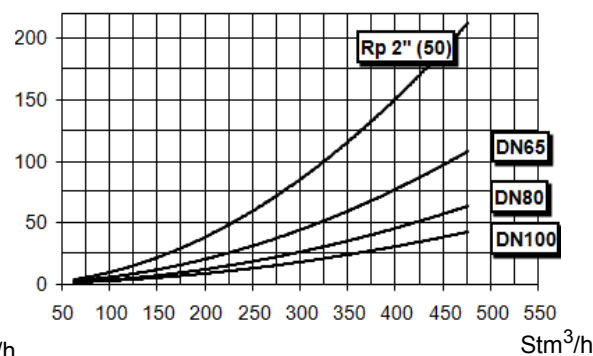
R92A M-..



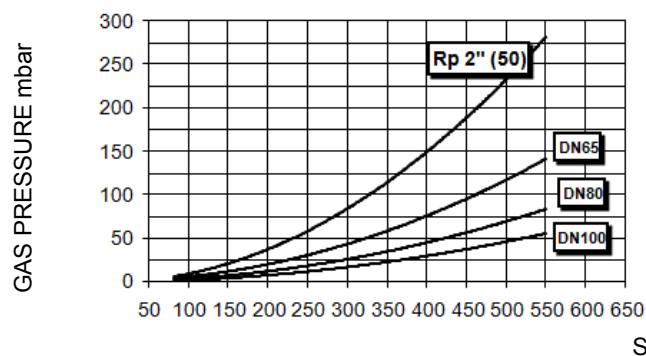
R93A M-..



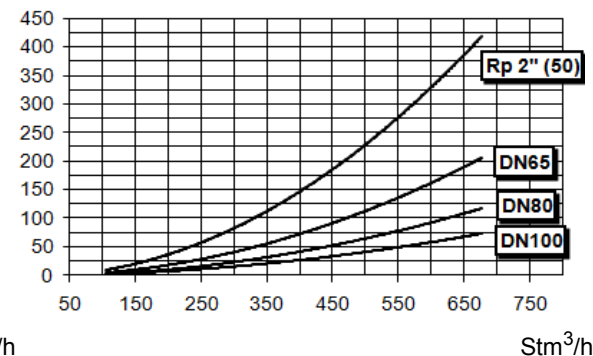
R512A M-..



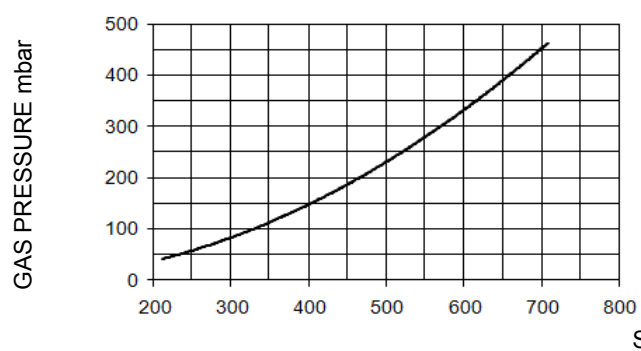
R515A M-..



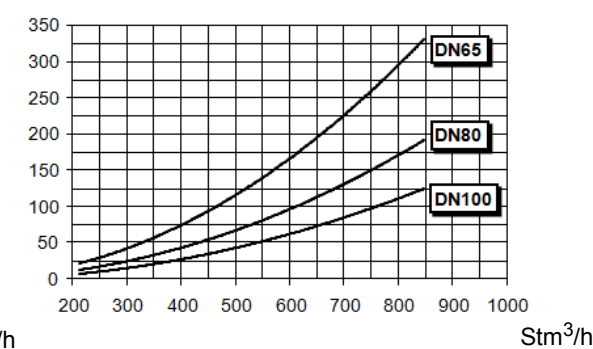
R520A M-..



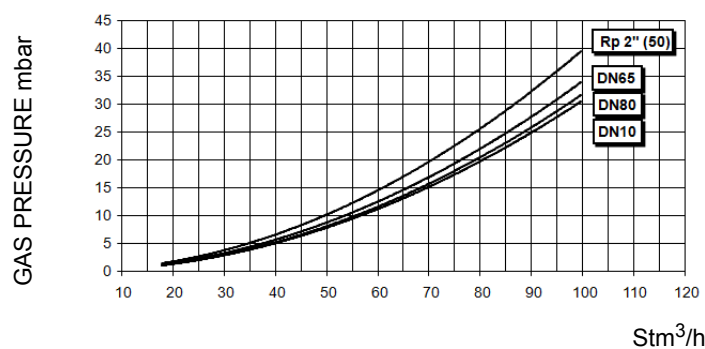
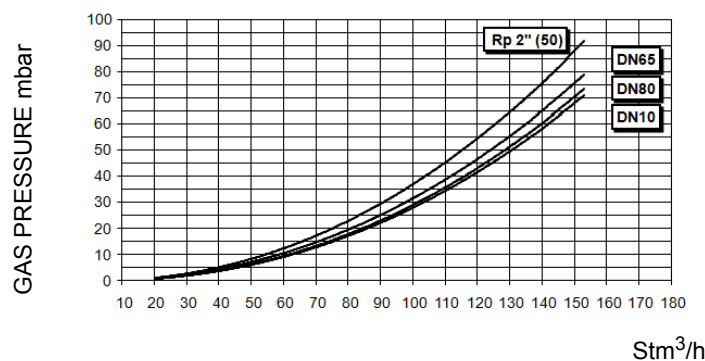
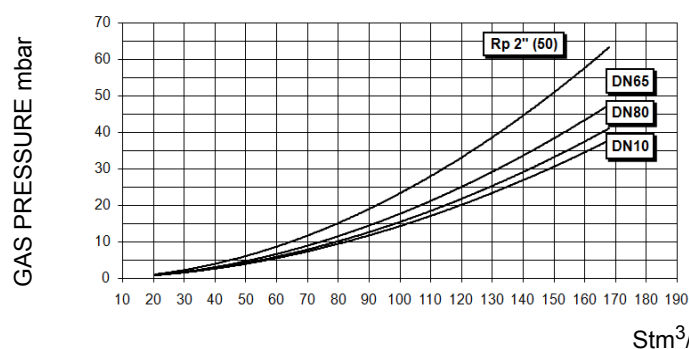
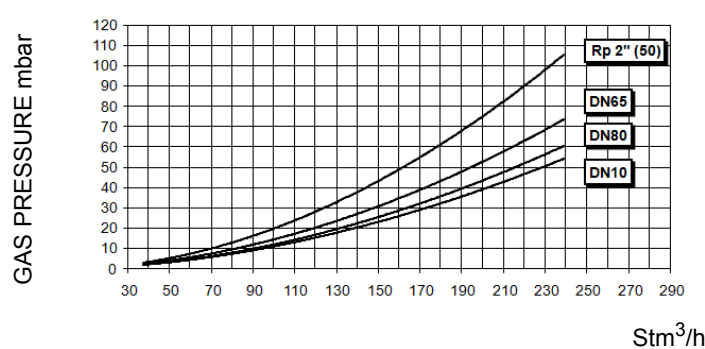
R525A M-.. Rp2



R525A M-.. DN65-80-100



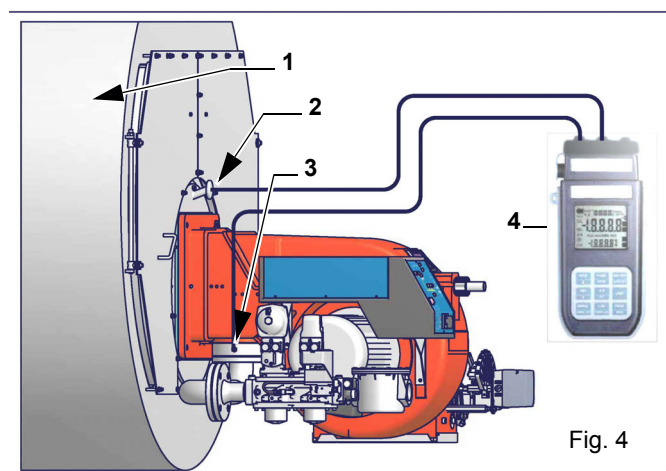
**ATTENTION:** the gas rate value is quoted on the x-axis, the related network pressure is quoted on the y-axis (pressure value in the combustion chamber is not included). To know the minimum pressure at the gas train inlet, necessary to get the requested gas rate, add the pressure value in the combustion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

**Pressure in the Network / gas flow rate curves(LPG)****R91A L-..****R93A L-..****R512A L-..****R520AL-..**

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

### Combustion head gas pressure curves

Combustion head gas pressure depends on gas flow and combustion chamber backpressure. When backpressure is subtracted, it depends only on gas flow, provided combustion is properly adjusted, flue gases residual O<sub>2</sub> percentage complies with "Recommended combustion values" table and CO in the standard limits). During this stage, the combustion head, the gas butterfly valve and the actuator are at the maximum opening. Refer to , showing the correct way to measure the gas pressure, considering the values of pressure in combustion chamber, surveyed by means of the pressure gauge or taken from the boiler's Technical specifications.



Note: the figure is indicative only. Key

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



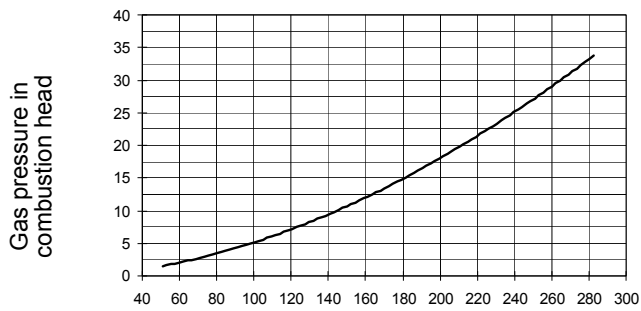
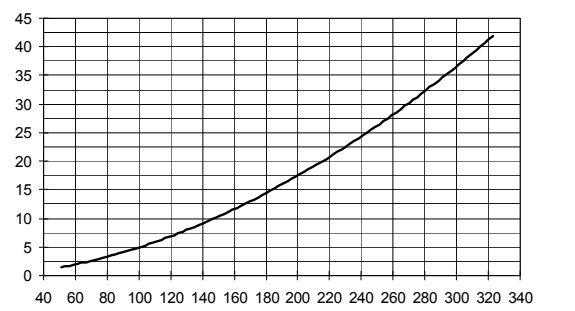
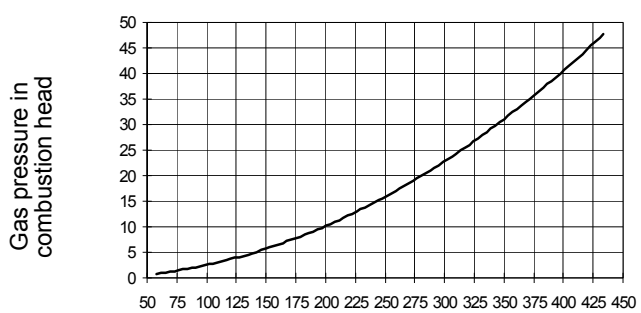
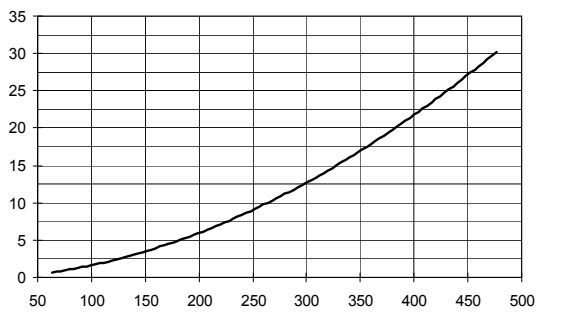
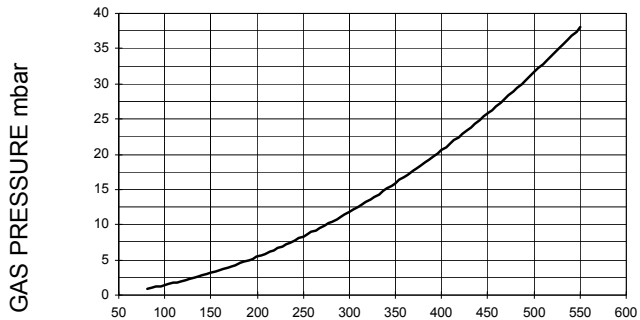
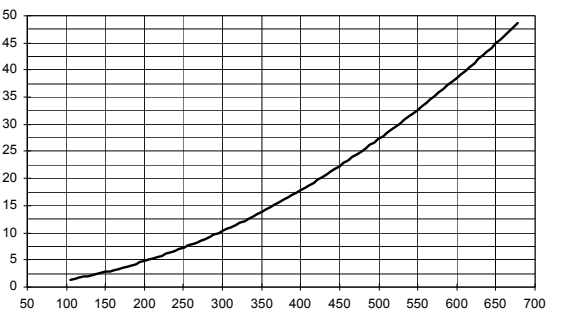
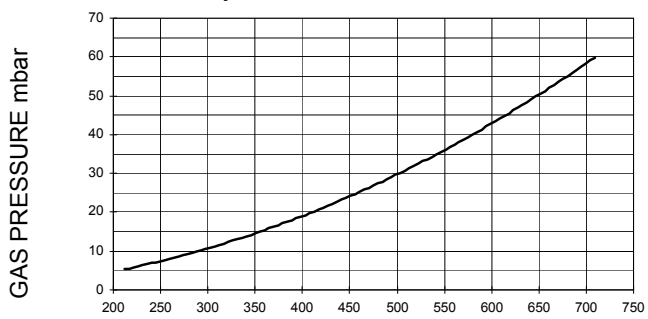
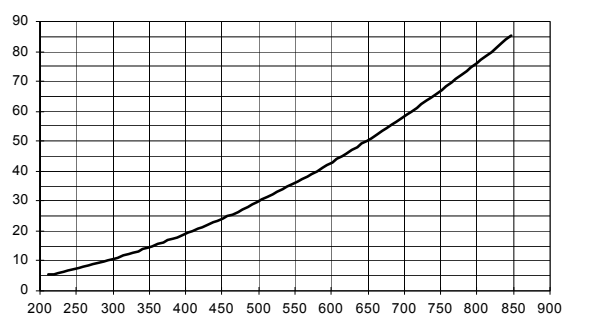
**ATTENTION: THE BURNED GAS RATE MUST BE READ AT THE GAS FLOW METER. WHEN IT IS NOT POSSIBLE, THE USER CAN REFERS TO THE PRESSURE-RATE CURVES AS GENERAL INFORMATION ONLY.**

### Measuring gas pressure in the combustion head

In order to measure the pressure in the combustion head, insert the pressure gauge probes: one into the combustion chamber's pressure outlet to get the pressure in the combustion chamber and the other one into the butterfly valve's pressure outlet of the burner. Or 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 find out the burner's output in Stm<sup>3</sup>/h (quoted on the x axis) from the pressure measured in the combustion head (quoted on the y axis). The data obtained must be considered when adjusting the gas flow rate.

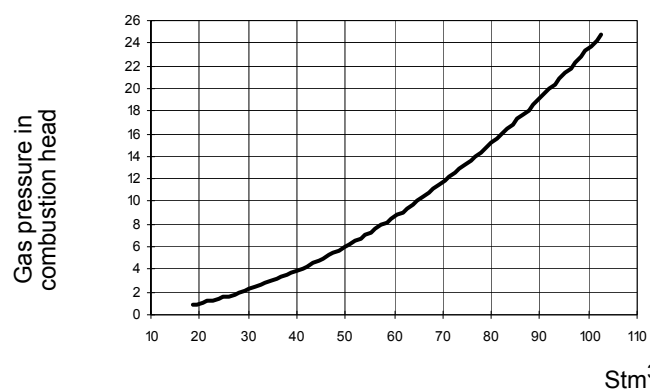
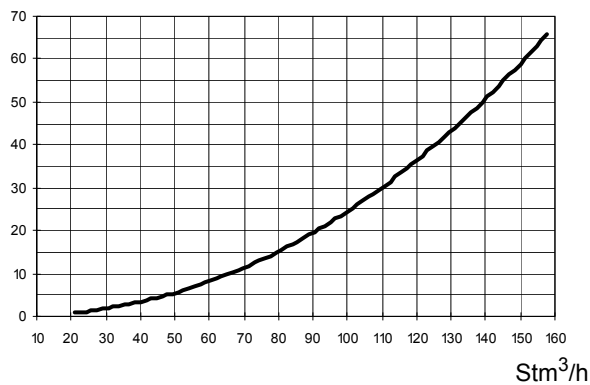
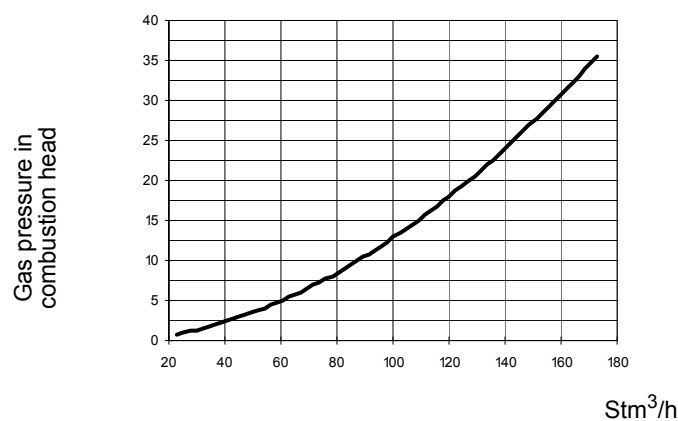
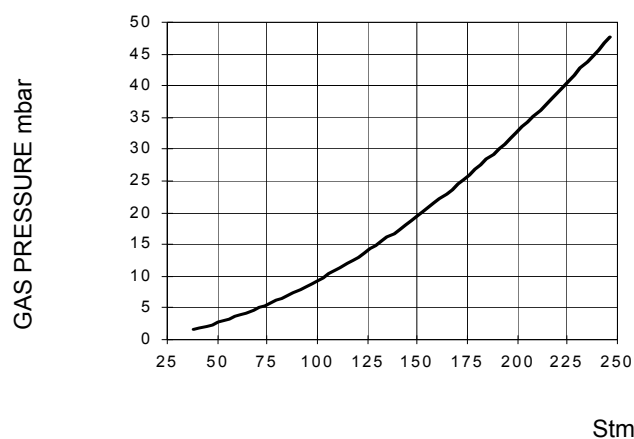
**Pressure - rate in combustion head curves (natural gas)**

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

**R91A M-..****R92A M-..****R93A M-..****R512A M-..****R515A M-..****R520A M-..****R525A M-.. Rp2****R525A M-.. DN65-80-100**

**Pressure - rate in combustion head curves (LPG)**

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

**R91A L-..****R93A L-..****R512A L-..****R520A L-..**

## PART II: INSTALLATION

## MOUNTING AND CONNECTING THE BURNER

## Transport and storage



**ATTENTION!** The equipment must be installed in compliance with the regulations in force, following the manufacturer's instructions, by qualified personnel. All handling operations must be carried out with appropriate resources and qualified personnel



**ATTENTION:** Use intact and correctly dimensioned hoisting equipment, conforms to the local regulations and health and safety regulations. Do not stand under lifted loads.

If the product must be stored, avoid humid and corrosive places. Observe the temperatures stated in the burner data table at the beginning of this manual. The packages containing the burners must be locked inside the means of transport in such a way as to guarantee the absence of dangerous movements and avoid any possible damage.

In case of storage, the burners must be stored inside their packaging, in storerooms protected from the weather. Avoid humid or corrosive places and respect the temperatures indicated in the burner data table at the beginning of this manual.

## Packing

The burners are despatched in wooden crates whose dimensions are:

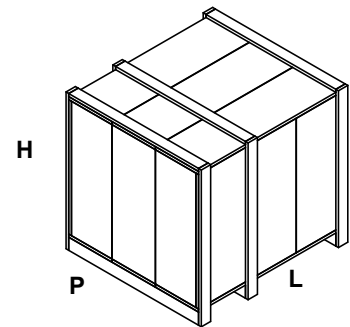
- **9xA series:** 1672mm x 1072mm x 1016mm (L x P x H)
- **5xxA series:** 1886mm x 1456mm x 1120mm (L x P x H)

Packing cases of this type are affected by humidity and are not suitable for stacking.

The following are placed in each packing case:

- burner with detached gas train;
- gasket or ceramic fibre plait (according to burner type) to be inserted between the burner and the boiler;
- envelope containing this manual and other documents.

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



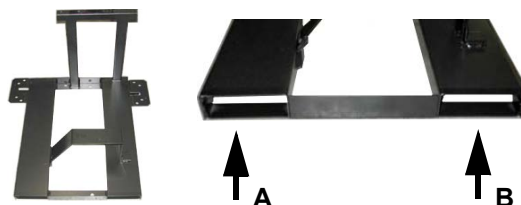
## Handling the burner



**WARNING!** The handling operations must be carried out by specialised and trained personnel. If these operations are not carried out correctly, the residual risk for the burner to overturn and fall down still persists. To move the burner, use means suitable to support its weight (see paragraph "Technical specifications").

**The unpacked burner must be lifted and moved only by means of a fork lift truck.**

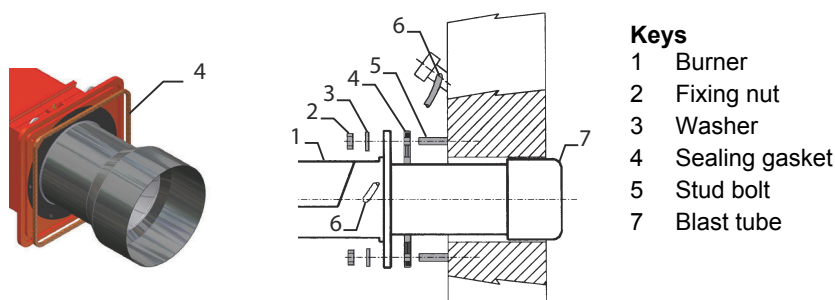
The burner is mounted on a support provided for handling the burner by means of a fork lift truck: the forks must be inserted into the A and B ways. Remove the stirrup only once the burner is installed to the boiler.



## Fitting the burner to the boiler

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

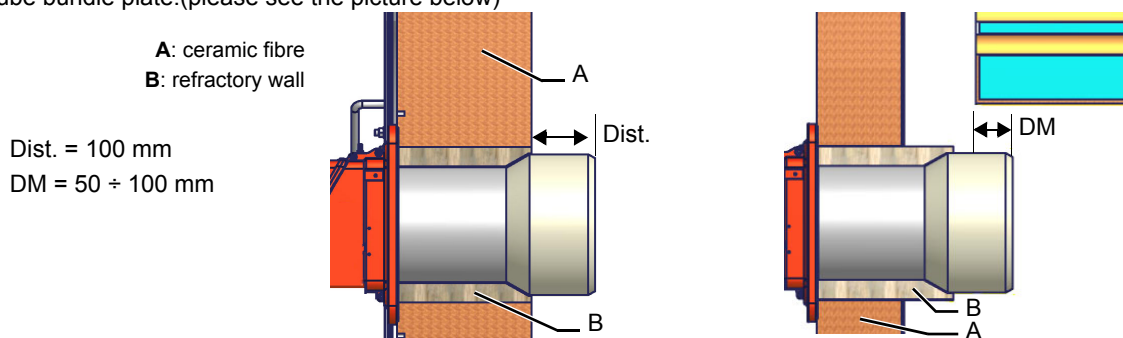
- 1 make a hole on the closing door of the combustion chamber as described on paragraph "Overall dimensions")
- 2 place the burner to the boiler: lift it up and handle it according to the procedure described on paragraph "Handling the burner";
- 3 place the 4 stud bolts (5) on boiler's door, according to the burner drilling template described on paragraph "Overall dimensions";
- 4 fasten the 4 stud bolts;
- 5 place the gasket on the burner flange;
- 6 install the burner into the boiler;
- 7 fix the burner to the stud bolts, by means of the fixing nuts, according to the next picture.
- 8 After fitting the burner to the boiler, ensure that the gap between the blast tube and the refractory lining is sealed with appropriate insulating material (ceramic fibre cord or refractory cement).



## 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 type of the blast tube. Verify the necessary input and the pressure in combustion chamber are included in the burner performance curve; otherwise the choice of the burner must be revised consulting the burner manufacturer. To choose the blast tube length follow the instructions of the boiler manufacturer. In absence of these consider the following:

- Cast-iron boilers, three pass flue boilers (with the first pass in the rear part): the blast tube must protrude no more than **Dist** = 100 mm into the combustion chamber. (please see the picture below)
- Pressurised boilers with flame reversal: in this case the blast tube must penetrate **DM** 50 ÷ 100 mm into combustion chamber in respect to the tube bundle plate. (please see the picture below)



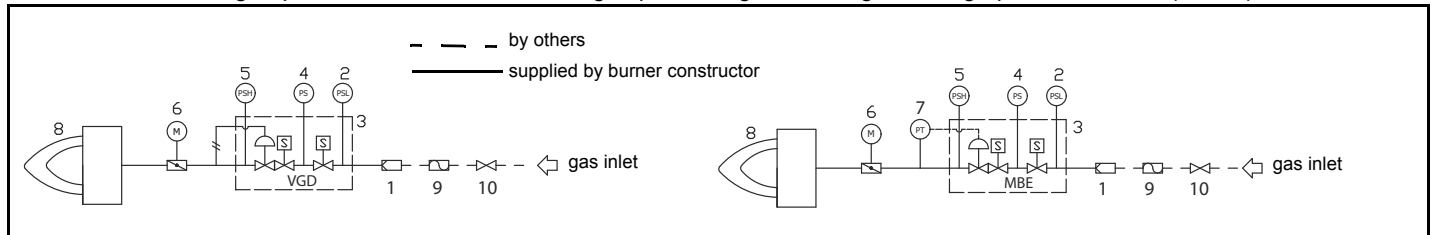
**WARNING! Carefully seal the free space between blast tube and the refractory lining with ceramic fibre rope or other suitable means.**

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

## GAS TRAIN CONNECTIONS

The diagrams show the components of the gas train included in the delivery and which must be fitted by the installer. The diagrams are in compliance with the current laws.

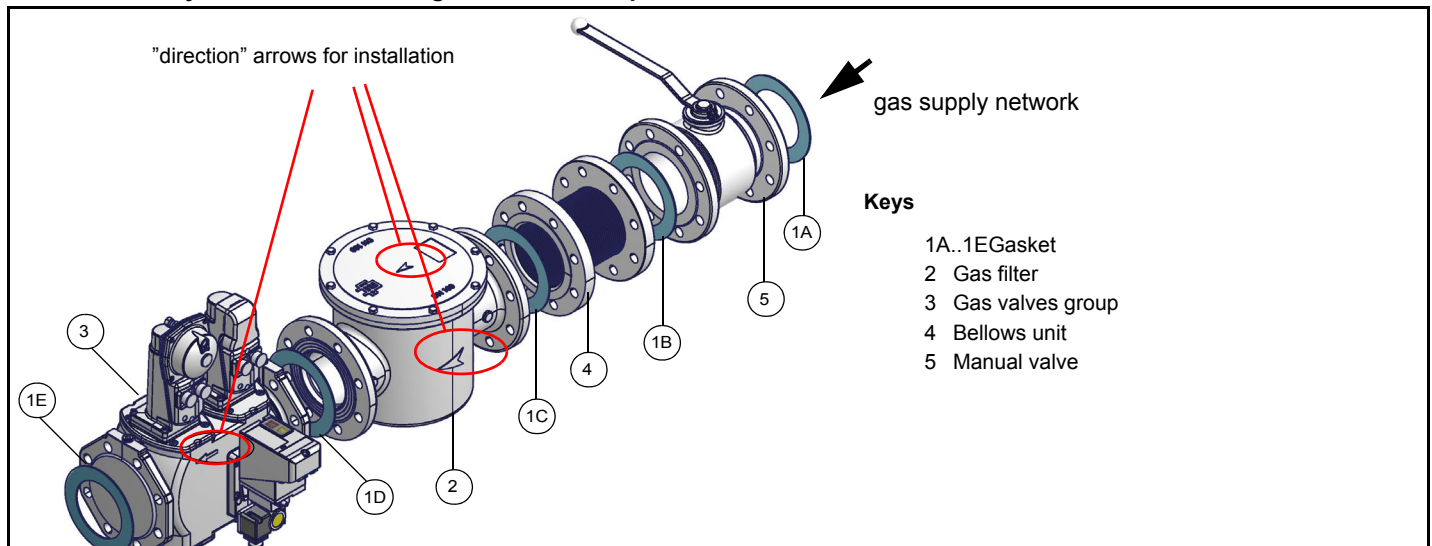
Gas train with valves group VGD and MBE with built-in gas pressure governor + gas leakage pressure switch (PGCP)



### Legend

|   |                                                                       |    |                                 |
|---|-----------------------------------------------------------------------|----|---------------------------------|
| 1 | Filter                                                                | 6  | Butterfly valve                 |
| 2 | Pressure switch - PGMIN                                               | 7  | Pressure transducer             |
| 3 | Safety valve with built in gas governor                               | 8  | Main burner                     |
| 4 | Proving system pressure switch - PGCP                                 | 9  | Antivibration joint (*optional) |
| 5 | Pressure switch PGMAX: mandatory for MBE, optional for VGD and MB-DLE | 10 | Manual valve(*optional)         |

**GAS TRAIN CONNECTIONS** The diagrams show the components of the gas train included in the delivery and which must be fitted by the installer. The diagrams are in compliance with the current laws.



Procedure to install the double gas valve unit:

- two (2) gas flanges are required; they may be threaded or flanged depending on size
- first step: install the flanges to prevent entry of foreign bodies in the gas line
- on the gas pipe, clean the already assembled parts and then install the valve unit
- check gas flow direction: it must follow the arrow on the valve body
- VGD20: make sure the O-rings are correctly positioned between the flanges and the valve
- VGD40 and MBE: make sure the gaskets are correctly positioned between the flange
- fasten all the components with screws, according to the following diagrams
- make sure bolts on the flanges are properly tightened



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



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



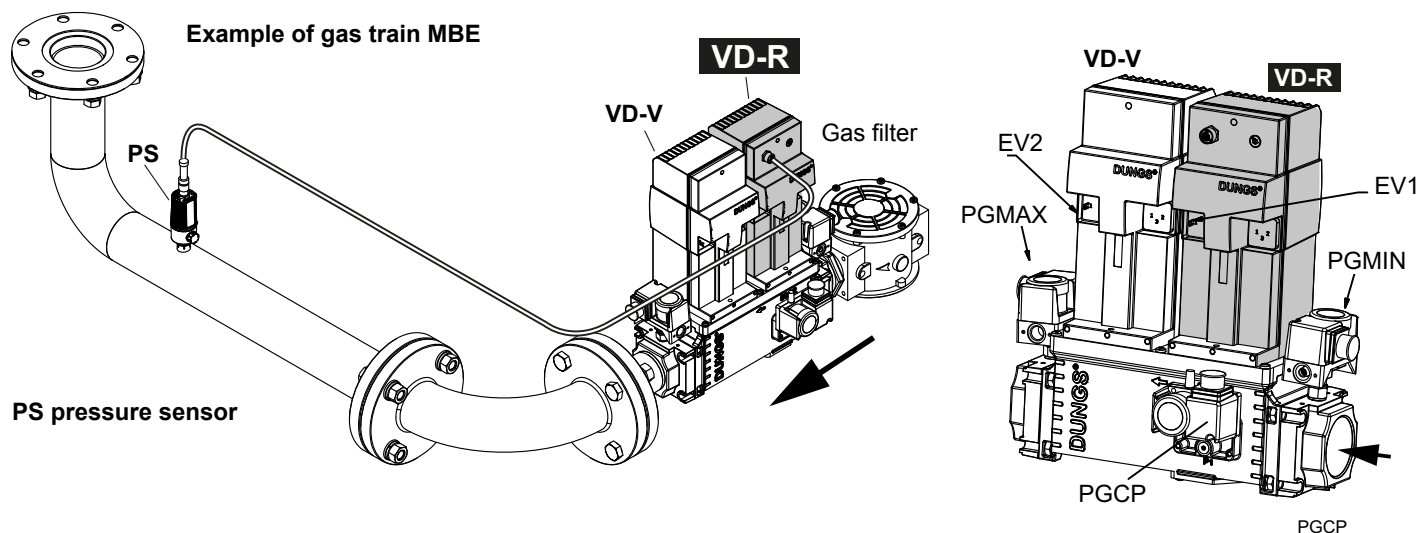
**ATTENTION:** once the gas train is mounted, the gas proving test must be performed, according to the procedure set by laws in force.

To mount the gas train, proceed as follows:

- 1 In case of threaded joints: use proper seals according to the gas used- in case of flanged joints: place a gasket between the elements
- 2 Fasten all the items by means of screws, according to the diagrams showed, observing the mounting direction for each item

**NOTE:** the bellows unit, the manual cutoff valve and the gaskets are not part of the standard supply

### MultiBloc MBE



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

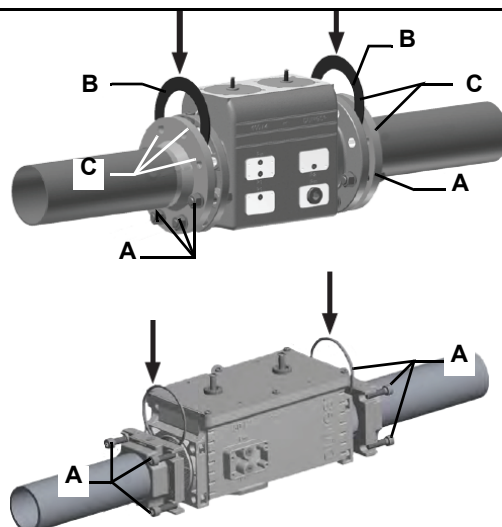


**ATTENTION:** it is recommended to mount filter and gas valves to avoid that extraneous material drops inside the valves, during maintenance and cleaning operation of the filters (both the filters outside the valves group and the ones built-in the gas valves).



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

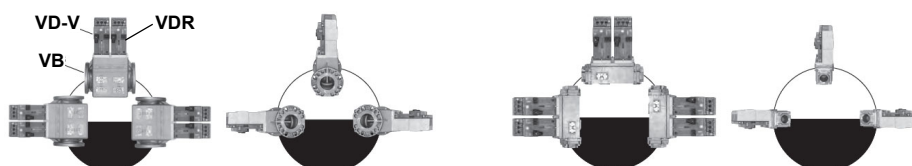
### Threaded train with MultiBloc MBE - Mounting

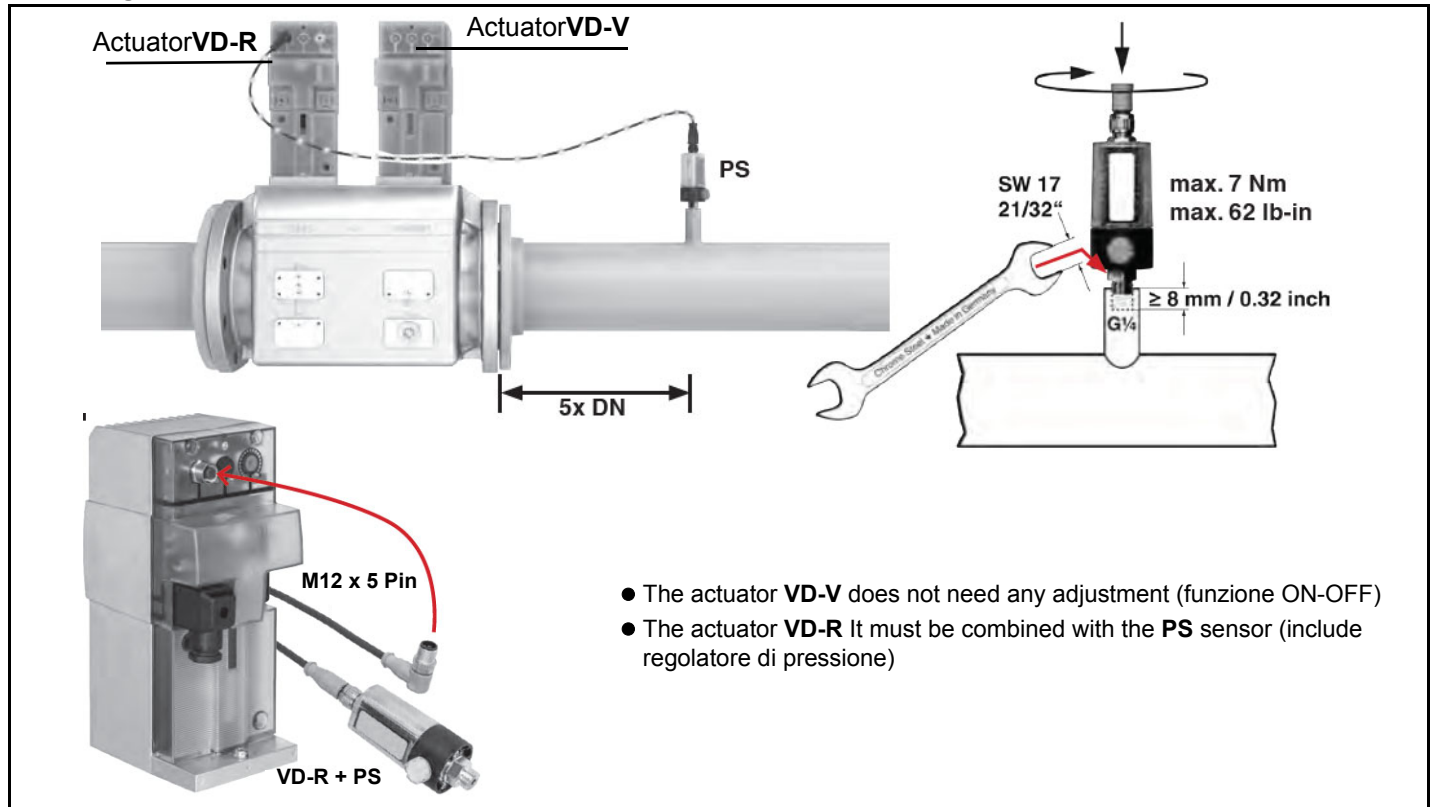


1. Insert studs A.
  2. Insert seals B.
  3. Insert studs C.
  4. Tighten studs in accordance with section 8.
- Ensure correct position of the seal!**
5. Perform leak and functional tests after mounting.
  6. Screws (4xM5x20) for VD assembly are supplied.

1. Mount flange into pipe systems. Use appropriate sealing agent.
  2. Insert VB together with supplied O-rings.
- Check current position of O-rings.
3. Tighten supplied screws (8xM8x30) in accordance with section 8.
  4. Screws (4xM5x25) for VD assembly are supplied.
  5. After installation, perform leakage and functional test.
  6. Disassembly in reverse order.

### Mounting position MBE / VB / VD



**Mounting VD-R & PS-...**

1. Gas pressure regulation is possible with VD-R and PS pressure sensor only.

**WARNING! For US/CN installation, the output pressure must be monitored by min. and max. pressure switches set to +/- 20% of the setpoint.**

2. Mounting on pipe. Sensor position: 5x DN according to MBE. Pipe fitting with female thread size 1/4, mount sensor with seal, observe torque.
3. The pressure sensor includes a vent limiter according to UL 353 and ANSI Z21.18/CSA 6.3. No venting required in locations where vent limiters are accepted by the jurisdiction.
4. Only PS pressure sensors specified by DUNGS are authorised to be connected to the VD-R's M12 interface.
5. Only PS cables specified by DUNGS are authorised to be used to connect the PS to the VD-R. Max. cable length 3 m.

**Siemens VGD20.. e VGD40..**

**Siemens VGD20.. and VGD40.. gas valves - with SKP2.. (pressure governor)**

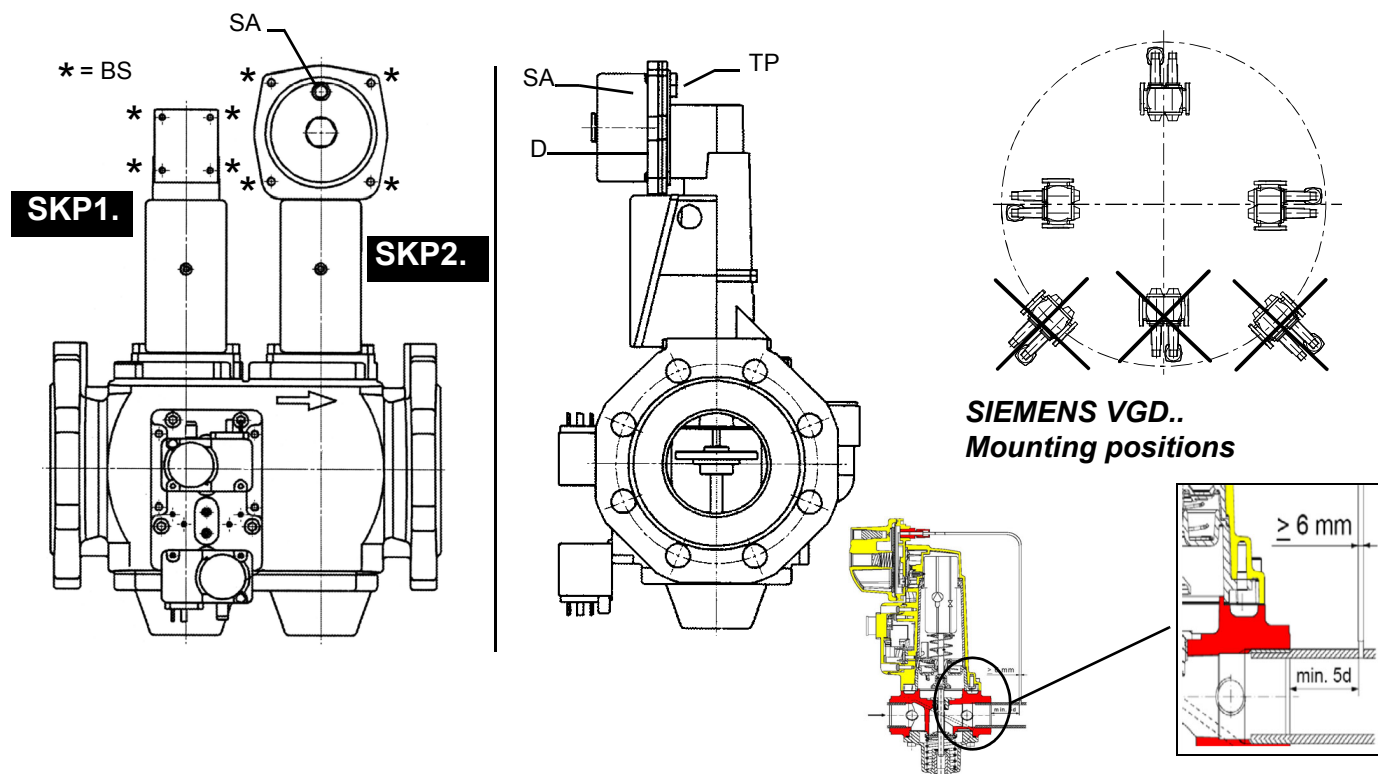
- Connect the reference gas pipe (**TP** in figure; 8mm-external size pipe supplied loose), to the gas pressure nipples placed on the gas pipe, downstream the gas valves: gas pressure must be measured at a distance that must be at least 5 times the pipe size.
- Leave the blowhole free (**SA** in figure). Should the spring fitted not permit satisfactory regulation, ask one of our service centres for a suitable replacement.



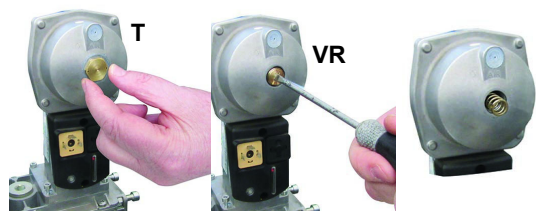
**Caution: the SKP2 diaphragm D must be vertical**



**WARNING: removing the four screws BS causes the device to be unserviceable!**



### version with SKP2 (built-in pressure stabilizer)



### Siemens VGD valves with SKP actuator:

The pressure adjusting range, upstream the gas valves group, changes according to the spring provided with the valve group.

To replace the spring supplied with the valve group, proceed as follows:

- Remove the cap (T)
- Unscrew the adjusting screw (VR) with a screwdriver
- Replace the spring

Stick the adhesive label for spring identification on the type plate.

| Performance range (mbar) |         |          |            |
|--------------------------|---------|----------|------------|
|                          | neutral | yellow   | red        |
| Spring colour SKP 25.0   | 0 ÷ 22  | 15 ÷ 120 | 100 ÷ 250  |
| Spring colour SKP 25.4   |         | 7 ÷ 700  | 150 ÷ 1500 |

### Gas valveGas Filter (if provided)

The gas filters remove the dust particles that are present in the gas, and prevent the elements at risk (e.g.: burner valves, counters and regulators) from becoming rapidly blocked. The filter is normally installed upstream from all the control and on-off devices.



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

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

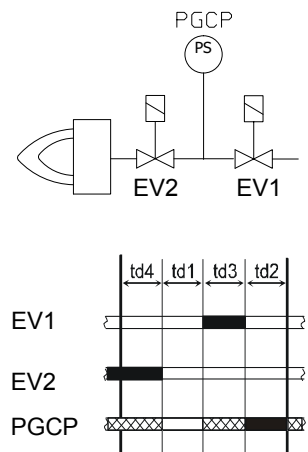
**Integrated proving system (burners equipped with LME7x, LMV, LDU)**

This paragraph describes the integrated proving system operation sequence:

- At the beginning both the valves (EV1 and EV2) must be closed.
- Test space evacuating: EV2 valve (burner side) opens and keep this position for a preset time (td4), in order to bring the test space to ambient pressure. Test atmospheric pressure: EV2 closes and keep this position for a preset time (test time td1). The pressure switch PGCP has not to detect a rise of pressure.
- Test space filling: EV1 opens and keep this position for a preset time (td3), in order to fill the test space.
- Test gas pressure: EV1 closes and keep this position for a preset time (td2). The pressure switch PGCP has not to detect a pressure drop down.

If all of the test phases are passed the proving system test is successful, if not a burner lockout happens.

On LMV5x and LMV2x/3x and LME73 (except LME73.831BC), the valve proving can be parameterized to take place on startup, shutdown, or both. On LME73.831BC the valve proving is parameterized to take place on startup only.



## PART III: OPERATION

## ELECTRICAL CONNECTIONS



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

**ATTENTION:** Connecting electrical supply wires to the burner terminal block MA, be sure that the ground wire is longer than phase and neutral ones.

To execute the electrical connections, proceed as follows:

- 1 remove the cover from the electrical board, unscrewing the fixing screws;
- 2 execute the electrical connections to the supply terminal board as shown in the attached wiring diagrams;
- 3 check the direction of the fan motor (see next paragraph);
- 1 refit the panel cover.



**WARNING:** (only for double stage and progressive burners) The burner is provided with an electrical bridge between terminals 6 and 7; when connecting the high/low flame thermostat, remove this bridge before connecting the thermostat.

## Rotation of electric motor

Once the electrical connection of the burner is executed, remember to check the rotation of the electric motor. The motor should rotate according to the "arrow" symbol on the body. In the event of wrong rotation, reverse the three-phase supply and check again the rotation of the motor.



**CAUTION:** check the motor thermal cut-out adjustment

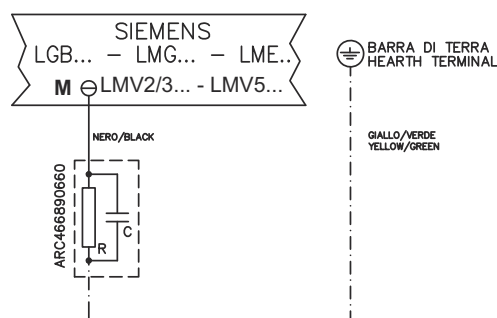
**NOTE:** the burners are supplied for three-phase 380/400/415/480 V supply, and in the case of three-phase 220/230/240 V supply it is necessary to modify the electrical connections into the terminal box of the electric motor and replace the overload tripped relay.

## Note on electrical supply

In the case where the power supply of the AUXILIARIES of the phase-phase burner (without a neutral), for the flame detection it is necessary to connect the RC circuit Siemens between the terminal 2 (terminal X3-04-4 in case of LMV2x, LMV3x, LMV5x, LME7x) of the base and the earth terminal, RC466890660. For LMV5 control box, please refer to the labeling recommendations available on the Siemens CD attached to the burner

## Key

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



## LIMITATIONS OF USE

**THE BURNER IS AN APPLIANCE DESIGNED AND CONSTRUCTED TO OPERATE ONLY AFTER BEING CORRECTLY CONNECTED TO A HEAT GENERATOR (E.G. BOILER, HOT AIR GENERATOR, FURNACE, ETC.), ANY OTHER USE IS TO BE CONSIDERED IMPROPER AND THEREFORE DANGEROUS.**

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

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

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

NEVER OPEN OR DISMANTLE ANY COMPONENT OF THE MACHINE EXCEPT FOR ITS MAINTENANCE.

TO SECURE THE MACHINE, ACT ON THE ISOLATOR SWITCH. IN CASE OF ANOMALIES THAT REQUIRED A SHUT DOWN OF THE BURNER, IT'S POSSIBLE TO ACT ON THE AUXILIARY LINE SWITCH, LOCATED ON THE BURNER FRONT PANEL.

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.

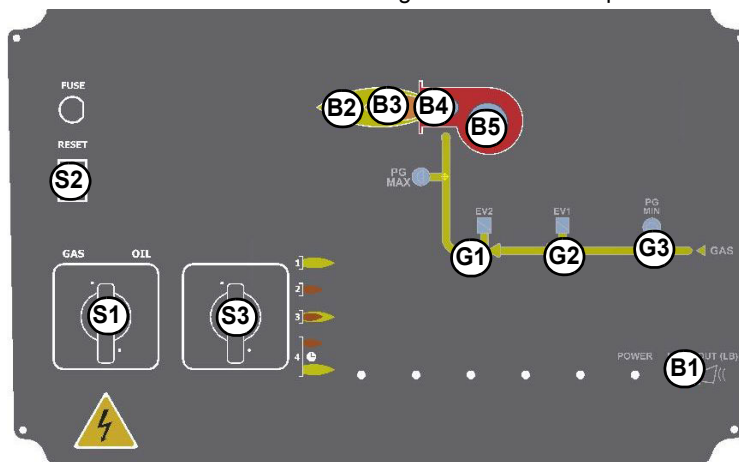
**WARNING:** DURING NORMAL OPERATION THE PARTS OF THE BURNER NEAREST TO THE GENERATOR (COUPLING FLANGE) CAN BECOME VERY HOT, AVOID TOUCHING THEM SO AS NOT TO GET BURNT.



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

**DANGER:** During commissioning operations, do not let the burner operate with insufficient air flow (danger of formation of carbon monoxide); if this should happen, make the gas decrease slowly until the normal combustion values are achieved. **WARNING:** never loose the sealed screws! otherwise, the device warranty will be immediately invalidate!

Fig. 4 - Burner front panel



(A1)

#### Keys

- B1 Lock-out LED
- B2 Hi-flame operation LED
- B3 Lo-flame operation LED
- B4 "Ignition transformer operation" LED
- B5 "Fan motor overload tripped" LED
- G1 "EV2 opening" LED
- G2 "EV1 opening" LED
- G3 "Gas pressure switch signal" LED

- S1 Main switch
- S2 Reset pushbutton for control box
- S3 Operation selector MAN - AUTO (operation in manual or automatic mode):
  - MIN = operation with min output
  - MAX = operation at the max output
- A1 Burner Modulator (only on fully modulating burners)

Fig. 5 **Gas operation**

- Check the gas feeding pressure is sufficient (signalling lamp **G3** on).
- **Burners fitted with gas proving system:** the gas proving system test begins; when the test is performed the proving system LED turns on. At the end of the test, the burner starting cycle begins: in case of leakage in a valve, the gas proving system stops the burner and the lamp **B1** turns on.

**NOTE:** if the burner is fitted with Dungs VPS504, the pre-purge phase starts once the gas proving system is successfully performed. Since the pre-purge phase must be carried out with the maximum air rate, the control box drives the actuator opening and when the maximum opening position is achieved, the pre-purge time counting starts.

- At the end of the pre-purge time, the actuator drives the complete closing (ignition with gas position) and, as this is achieved the ignition transformer is energised (LED **B4** is on); the gas valves open.
- Few seconds after the valves opening, the transformer is de-energised and lamp **B4** turns off.
- The burner is now operating, meanwhile the actuator goes to the high flame position and, after some seconds, the two-stage operation begins; the burner is driven automatically to high flame or low flame, according to the plant requirements.

Operation in high or low flame is signalled by lamp **B2** on the frontal panel.

## AIR FLOW AND FUEL ADJUSTMENT



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

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

| Recommended combustion parameters |                                 |                                |
|-----------------------------------|---------------------------------|--------------------------------|
|                                   | CO <sub>2</sub> (%)             | O <sub>2</sub> (%)             |
| Fuel                              | Recommended (%) CO <sub>2</sub> | Recommended (%) O <sub>2</sub> |
| Natural gas                       | 9 ÷ 10                          | 4,8 ÷ 3                        |
| LPG                               | 11 ÷ 12                         | 4,3 ÷ 2,8                      |

### 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.
- Then, adjust the combustion values corresponding to the points between maximum and minimum: set the shape of the adjusting cam foil. The adjusting cam sets the air/gas ratio in those points, regulating the opening-closing of the throttle gas valve.
- Set, now, the low flame output, acting on the low flame microswitch of the actuator in order to avoid the low flame output increasing too much or that the flues temperature gets too low to cause condensation in the chimney.

### Air and Gas Flow Rate Settings by means of Berger STM30../Siemens SQM40.. actuator

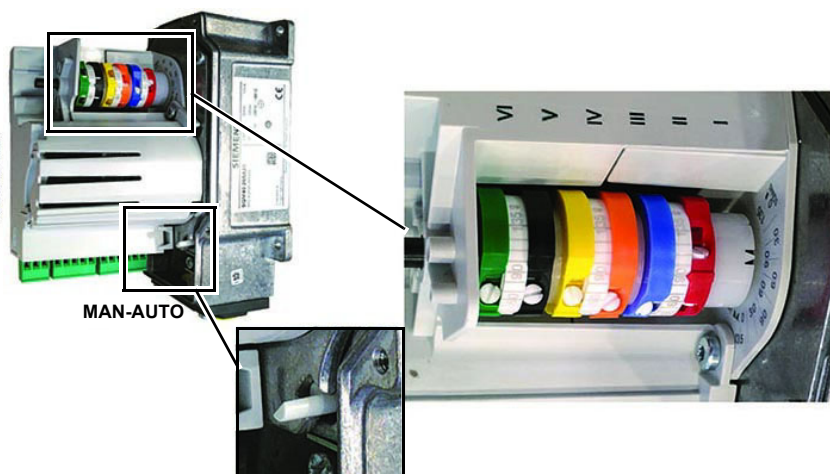
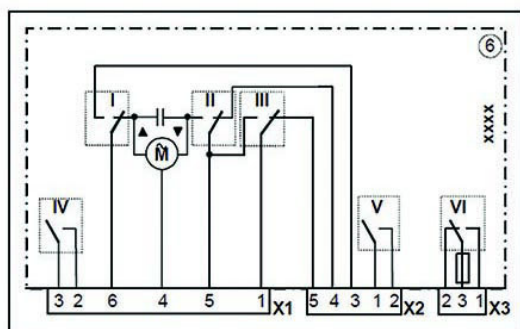
- 1 check the fan motor rotation.
- 2 Only for burners provided with **Multibloc MB-DLE gas valves**: before starting the burner up, set the slow opening. To set the slow opening, remove cover **T**, reverse it upside down and use it as a tool to rotate screw **VR**. Clockwise rotation reduces start flow rate, anticlockwise rotation increases it. Do not use a screwdriver on the screw **VR**!

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

- 3 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.
- 4 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;
- 5 drive the burner to high flame stage, by means of the thermostat **TAB**.
- 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.
- 7 go on adjusting air and gas flow rates: check, continuously, the flue gas analysis, as to avoid combustion with little air; dose the air according to the gas flow rate change following the steps quoted below;

### SQM40.265 Actuator cams

- (RD) I High flame  
(BU) II Stand-by  
(OG) III Low flame  
(YE) IV -  
(BK) V-  
(GN) VI Ignition



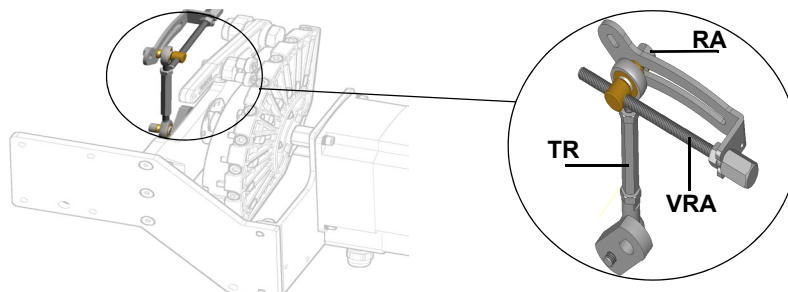
- 8 Drive the burner to high flame stage (please refer to the LMVx documentation attached to this manual).
- 9 To adjust the **air flow rate in the high flame stage**, loose the **RA** nut and screw **VRA** as to get the desired air flow rate: moving the rod **TR** towards the air damper shaft, the air damper opens and consequently the air flow rate increases, moving it far from the

shaft the air damper closes and the air flow rate decreases.



**Note:** once the procedure is performed, be sure that the blocking nut **RA** is fasten. Do not change the position of the air damper rods.

- 10 If necessary, adjust the combustion head position (see the dedicated paragraph).
- 11 The air and gas rate are now adjusted at the maximum power stage, go on with the point to point adjustment on the **SV1** (FGR side) adjusting cam as to reach the minimum output point.
- 12 Procedere, ora, alla regolazione dei pressostati. Now adjust the pressure switches.

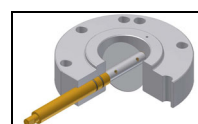
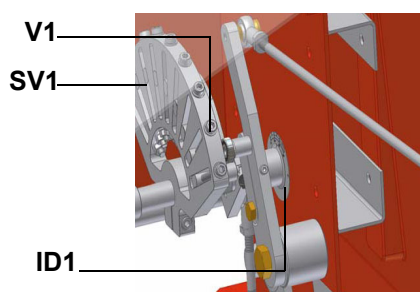
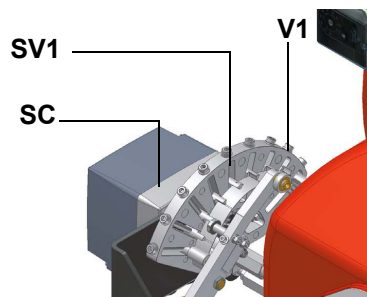


- 13 If necessary, adjust the combustion head position (see the dedicated paragraph)..

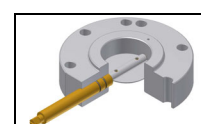


**Attention!** if it is necessary to change the head position, repeat the air and gas adjustments described above.

- 14 The air and gas rate are now adjusted at the maximum power stage, go on with the point to point adjustment on the **SV1** (gas side) adjusting cam as to reach the minimum output point.
- 15 as for the point-to-point regulation, move the gas low flame microswitch a little lower than the maximum position (90°);
- 16 set the **TAB** thermostat to the minimum in order that the actuator moves progressively towards the low flame position;
- 17 move the gas low flame microswitch to the minimum to move the actuator towards the low flame until the two bearings find the adjusting screw that refers to the lower position: screw **V1** to increase the rate, unscrew to decrease.



Gas throttle valve open



Gas throttle valve closed

- 18 Move again the gas low flame microswitch towards the minimum to meet the next screw on the adjusting cam and repeat the previous step; go on this way as to reach the desired low flame point.
- 19 Now adjust the pressure switches.

20

### Fully-modulating burners

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

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



**CMF**

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

## MultiBloc MBE Regulation VD-R with PS

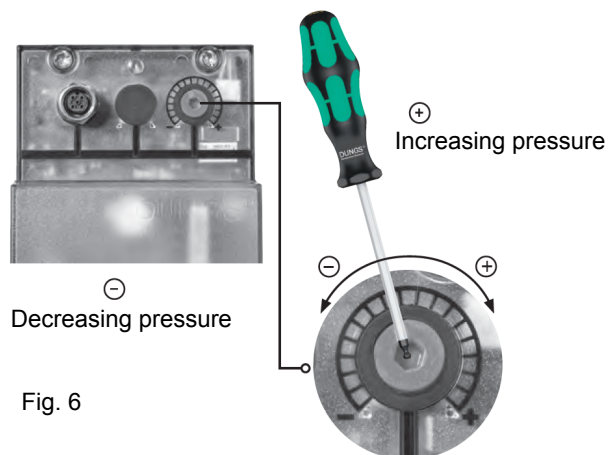


Fig. 6



**Setting scale is „Not“ linear! Various sensors available. Output pressure according to sensor's measuring range.**



**Adjust the outlet pressure to the value specified by the burner or equipment manufacturer!**



**While making outlet pressure adjustments, do not exceed a value that creates a hazardous condition to the burner!**

**ATTENTION:** To set the outlet pressure of the VD-R regulator, act on the adjustment ring nut (Fig. 10)

The position of the indicator in the dial indicates the value of the outlet pressure calculated as a percentage of the full scale of the PS sensor (Fig. 11)

| Outlet pressure  | MIN                           | 10%                            | 25%                              | 50%                               | 75%                               | MAX                               |
|------------------|-------------------------------|--------------------------------|----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| <b>PS-10/40</b>  | 4 mbar<br>0,4 kPa<br>2 "w.c.  | 10 mbar<br>1,0 kPa<br>4 "w.c.  | 25 mbar<br>2,5 kPa<br>10 "w.c.   | 50 mbar<br>5,0 kPa<br>20 "w.c.    | 75 mbar<br>7,5 kPa<br>30 "w.c.    | 100 mbar<br>10,0 kPa<br>40 "w.c.  |
| <b>PS-50/200</b> | 20 mbar<br>2,0 kPa<br>8 "w.c. | 50 mbar<br>5,0 kPa<br>20 "w.c. | 125 mbar<br>12,5 kPa<br>50 "w.c. | 250 mbar<br>25,0 kPa<br>100 "w.c. | 375 mbar<br>37,5 kPa<br>150 "w.c. | 500 mbar<br>50,0 kPa<br>200 "w.c. |

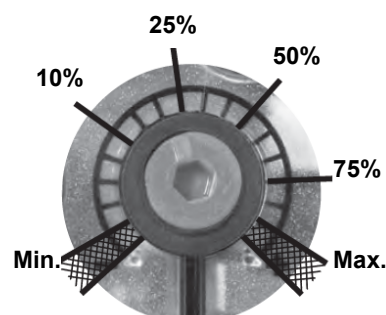


Fig. 7

Adjusting output pressure for positive pressure systems (requires PS-10/40 or PS-50/200):

## Pressure taps MultiBloc MBE

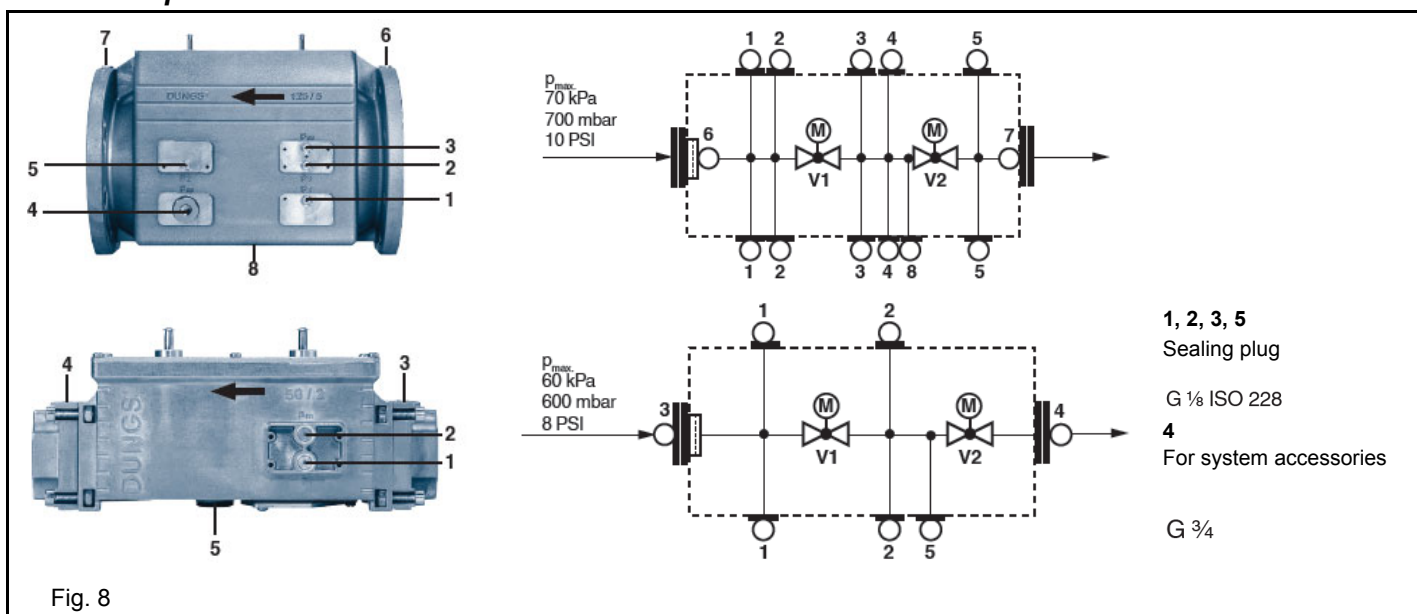
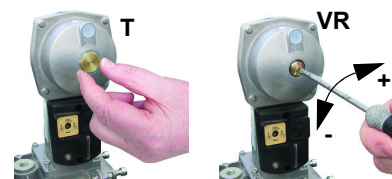


Fig. 8

## Gas valveversion with SKP2 (built-in pressure stabilizer)

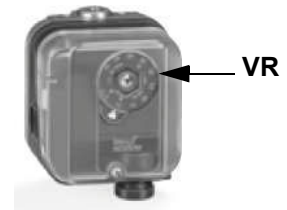
To increase or decrease gas pressure, and therefore gas flow rate, remove the cap **T** and use a screwdriver to adjust the regulating screw **VR**. Turn clockwise to increase the flow rate, counterclockwise to reduce it.



### Calibration air and gas pressure switches

The **air pressure switch** locks the control box if the air pressure is not the one requested. If it happens, unlock the burner by means of the control box unlock pushbutton, placed on the burner control panel.

The **gas pressure switches** check the pressure to avoid the burner operate when the pressure value is not in the requested pressure range.



### Calibration of low gas pressure switch

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

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

### Calibration the maximum gas pressure switch (when provided)

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

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

### Calibration of air pressure switch

To calibrate the air pressure switch, proceed as follows:

- Remove the transparent plastic cap.
- Once air and fuel setting have been accomplished, startup the burner.
- During the pre-purge phase of the operation, turn slowly the adjusting ring nut **VR** in the clockwise direction (to increase the adjusting pressure) until the burner lockout, then read the value on the pressure switch scale and set it to a value reduced by 15%.
- Repeat the ignition cycle of the burner and check it runs properly.
- Refit the transparent plastic cover on the pressure switch.

### Calibration gas leakage pressure switch (PGCP)

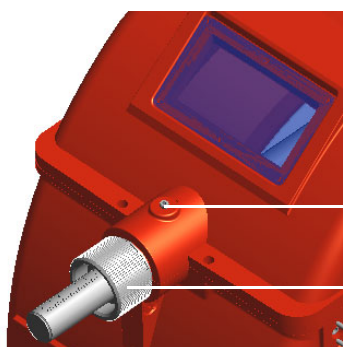
- remove the pressure switch plastic cover;
- adjust the PGCP pressure switch to the same value set for the minimum gas pressure switch;
- replace the plastic cover.

## Adjusting the combustion head



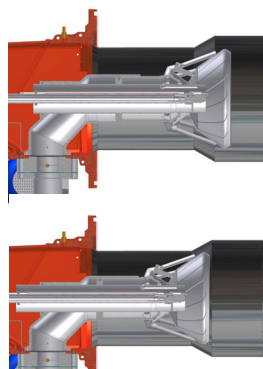
**Attention!** if it is necessary to change the head position, repeat the air and fuel adjustments described above.

Only if necessary, change the combustion head position: to let the burner operate at a lower output, loose the **VB** screw and move progressively back the combustion head towards the MIN position, by turning clockwise the **VRT** ring nut. Fasten **VB** screw when the adjustment is accomplished.



**VB**

**VRT**



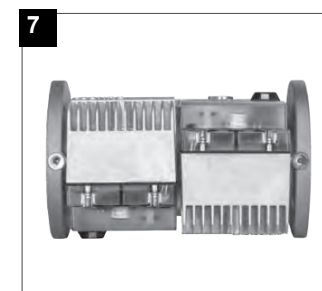
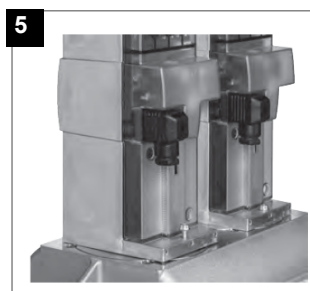
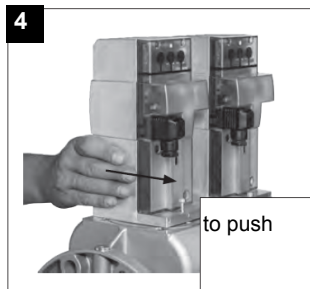
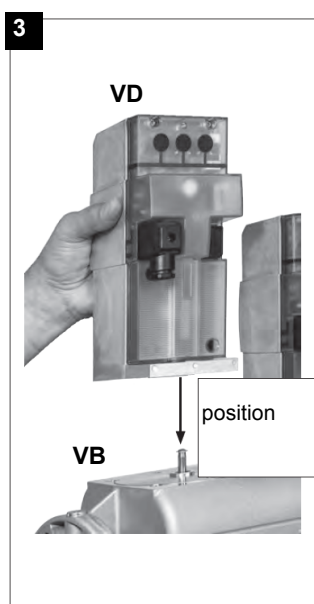
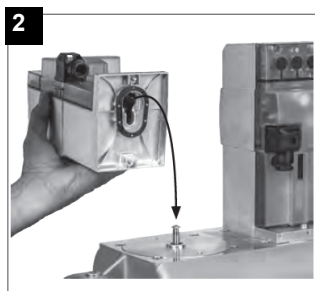
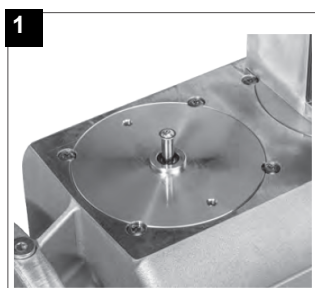
"MAX" head position

"MIN" head position



**CAUTION:** perform these adjustments once the burner is turned off and cooled.

## MultiBloc VD Mounting



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

## Center head holes gas flow regulation (natural gas burners)

To adjust the gas flow, partially close the holes, as follows:

- 1 loosen the three **V** screws that fix the adjusting plate **D**;
- 2 insert a screwdriver on the adjusting plate notches and let it move CW/CCW as to open/close the holes;
- 3 once the adjustment is performed, fasten the **V** screws.



The adjusting plate correct position must be regulated in the plant during the commissioning.

The factory setting depends on the type of fuel for which the burner is designed:

- For natural gas burners, plate holes are fully opened

### **Center head holes gas flow regulation (LPG burners)**

To adjust the gas flow, partially close the holes, as follows:

- 1 loosen the three **V** screws that fix the adjusting plate **D**;
- 2 insert a screwdriver on the adjusting plate notches and let it move CW/CCW as to open/close the holes;
- 3 once the adjustment is performed, fasten the **V** screws.



The adjusting plate correct position must be regulated in the plant during the commissioning.

- 9xA series: 1,5 mm      5xxA series: 1,3 mm

## PART IV: MAINTENANCE

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



**WARNING: ALL OPERATIONS ON THE BURNER MUST BE CARRIED OUT WITH THE MAINS DISCONNECTED AND THE FUEL MANUAL CUTOFF VALVES CLOSED!**  
**ATTENTION: READ CAREFULLY THE "WARNINGS" CHAPTER AT THE BEGINNING OF THIS MANUAL.**

### ROUTINE MAINTENANCE

- Clean and examine the gas filter cartridge and replace it if necessary;
- Remove and clean the combustion head;
- Examine and clean the ignition electrodes, adjust and replace them if necessary;
- Examine and clean the detection electrode/photoelement (according to the burner models), replace it if necessary, in case of doubt, check the detection circuit, after the burner start-up;
- Clean and grease leverages and rotating parts.

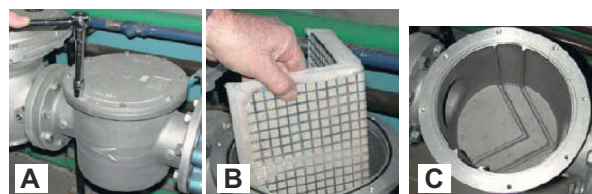


**DANGER! Incorrect motor rotation can seriously damage property and injure people.**  
**ATTENTION: when servicing, if it was necessary to disassemble the gas train parts, remember to execute the gas proving test, once the gas train is reassembled, according to the procedure imposed by the law in force.**

### Gas filter maintenance

To clean or remove the filter, proceed as follows:

- 1 remove the cap unscrewing the fixing screws (A);
- 2 remove the filtering cartridge (B), clean it using water and soap, blow it with compressed air (or replace it, if necessary)
- 3 replace the cartridge in its proper position taking care to place it inbetween the guides as not to hamper the cap replacement;
- 4 be sure to replace the "O" ring into its place (C) and replace the cover fastening by the proper screws (A).

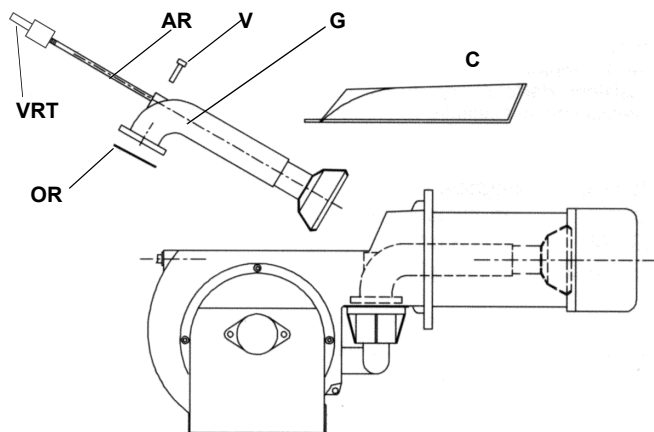


**WARNING: Before opening the filter, close the manual cutoff valve downstream the filter and bleed the gas; check that inside the filter there is no pressurised gas.**

### Removing the combustion head

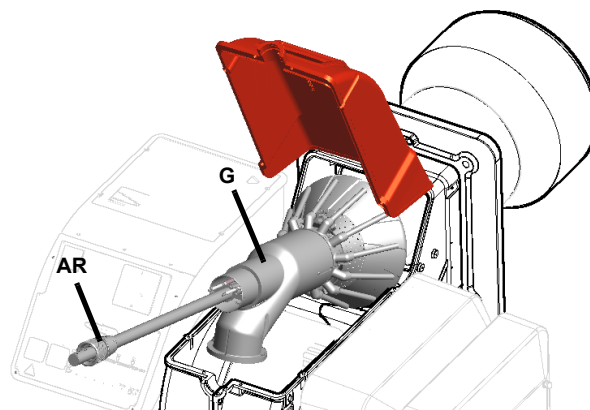
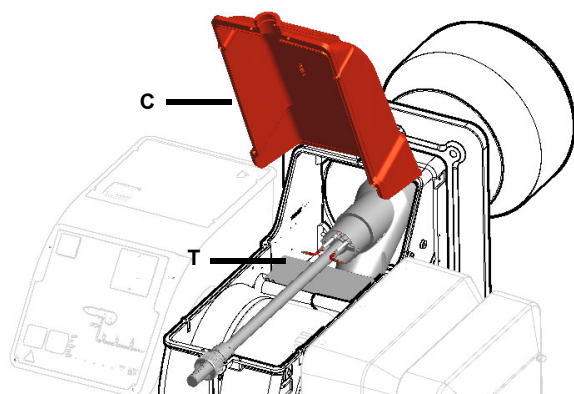
- Remove the cover C.
- Remove the electrodes cables;
- Unscrew the 3 screws V which hold in position the gas manifold G.
- Some models are provided with the T baffle. Move the gas manifold ahead and remove the baffle.
- Pull out the complete group as shown in the picture below.
- Clean the combustion head by a compressed air blow or, in case of scale, scrape it off by a scratchbrush.

**Note:** to replace the combustion head reverse the procedure described above having care to place correctly the O ring (OR) between burner and gas manifold.



**Key**

|     |                      |
|-----|----------------------|
| VRT | Head adjusting screw |
| AR  | Threaded rod         |
| V   | Fixing screw         |
| G   | Gas manifold         |
| OR  | "O" ring             |
| C   | Cover                |
| T   | Baffle               |



## Electrodes Adjustment

**Important Note:** Check the ignition and detection electrodes after removing/adjusting the combustion head.



**ATTENTION:** avoid the ignition and detection electrodes to contact metallic parts (blast tube, head, etc.), otherwise the boiler's operation would be compromised. Check the electrodes position after any intervention on the combustion head.

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

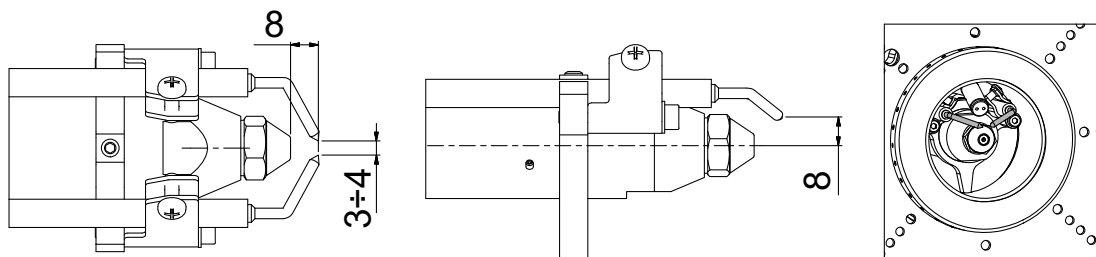


Fig. 9

## Replacing the ignition electrodes



**ATTENTION:** avoid the ignition and detection electrodes to contact metallic parts (blast tube, head, etc.), otherwise the boiler's operation would be compromised. Check the electrodes position after any intervention on the combustion head.

To replace the ignition electrodes, proceed as follows:

- 1 remove the burner cover
- 2 loose the nuts that fasten the electrodes group to the combustion head (A);
- 3 disconnect the electrodes cables (B);
- 4 loose the security dowes of the adjusting ring nut (C);
- 5 shift the electrodes group back to the outside and remove the combustion head (D),
- 6 loose the screw of th eignition electrodes support (E);
- 7 remove the electrodes and replace them paying attention to the measures showed in figure (F-G).
- 8 reassemble the burner by following the procedure in the reversed order.
- 9

A



B



C



D



E



F

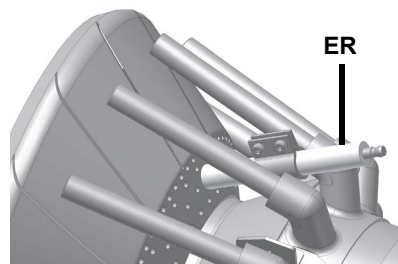
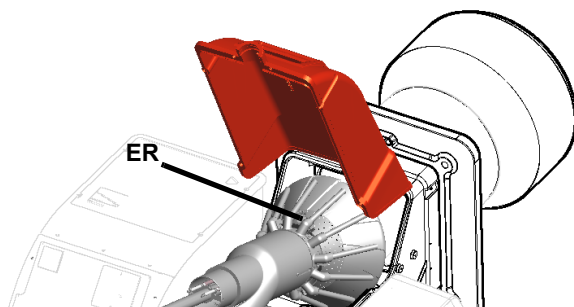


## Replacing the detection electrode (natural gas burners)

To replace the detection electrode, proceed as follows:

- 1 remove the combustion head according to the procedure on paragraph "Removing the combustion head";
- 2 by means of an allen key, loose the fixing screws of the detection electrode **ER** and replace it;

- 3 replace the combustion head.



**ATTENTION:** avoid the electrode to get in touch with metallic parts (blast tube, head, etc.), otherwise the boiler operation would be compromised. Check the electrode position after any intervention on the combustion head.

### Checking the detection current with electrode (natural gas)

To check the detection signal follow the scheme in the picture below. If the signal is less than the value indicated, check the position of the detection electrode or detector, the electrical contacts and, if necessary, replace the electrode or the detector.

| Control box    | Minimum detection signal   |
|----------------|----------------------------|
| Siemens LME7.. | 2 $\mu$ A (with electrode) |

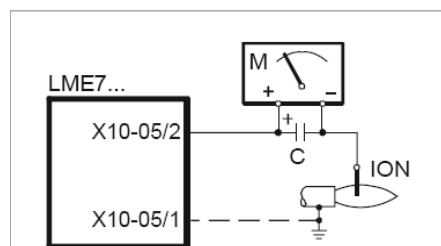


Fig. 10: Detection by electrode

### Checking the detection current with photocell (LME) (L.P.G.)

To check the detection signal follow the scheme in the picture below. If the signal is less than the value indicated, check the position of the detection electrode or detector, the electrical contacts and, if necessary, replace the electrode or the detector.

| Control box     | Minimum detection signal      |
|-----------------|-------------------------------|
| Siemens LME7... | 70 $\mu$ A (with UV detector) |

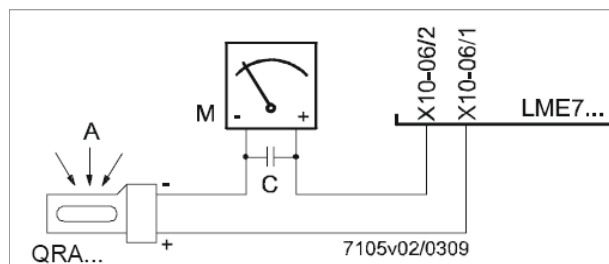


Fig. 11: Detection by photocell QRA..

### Burner service term

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

### Seasonal stop

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

- 1 turn the burner main switch to 0 (Off position)

- 2 disconnect the power mains
- 3 close the fuel valve of the supply line

***Burner disposal***

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

**WIRING DIAGRAMS**

Refer to the attached wiring diagrams.

**WARNING**

- 1 - Electrical supply 230V / 400V 50Hz 3N a.c.
- 2 - Do not reverse phase with neutral
- 3 - Ensure burner is properly earthed

**TROUBLESHOOTING GUIDE Gas operation**

|                                                                                                       |                                                                                          |                                                                                                                                                        |
|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>BURNER DOESN'T LIGHT</b>                                                                           | * No electric power supply                                                               | * Restore power supply                                                                                                                                 |
|                                                                                                       | * Main switch open                                                                       | * Close switch                                                                                                                                         |
|                                                                                                       | * Thermostats open                                                                       | * Check set points and thermostat connections                                                                                                          |
|                                                                                                       | * Bad thermostat set point or broken thermostat                                          | * Reset or replace the thermostat                                                                                                                      |
|                                                                                                       | * No gas pressure                                                                        | * Restore gas pressure                                                                                                                                 |
|                                                                                                       | * Safety devices (manually operated safety thermostat, pressure switches and so on) open | * Restore safety devices; wait till boiler reaches operating temperature then check safety device functionality.                                       |
|                                                                                                       | * Broken fuses                                                                           | * Replace fuses. Check current absorption                                                                                                              |
|                                                                                                       | * Fan thermal contacts open (three phases motors only)                                   | * Reset contacts and check current absorption                                                                                                          |
|                                                                                                       | * Burner control lock out                                                                | * Reset and check its functionality                                                                                                                    |
| <b>GAS LEAKAGE: BURNER LOCKS OUT (NO FLAME)</b>                                                       | * Burner control damaged                                                                 | * Replace burner control                                                                                                                               |
|                                                                                                       | * Gas flow is too low                                                                    | * Increase the gas flow<br>* Check gas filter cleanness<br>* Check butterfly valve opening when burner is starting (only Hi-Low flame and progressive) |
|                                                                                                       | * Ignition electrodes discharge to ground because dirty or broken                        | * Clean or replace electrodes                                                                                                                          |
|                                                                                                       | * Bad electrodes setting                                                                 | * Check electrodes position referring to instruction manual                                                                                            |
|                                                                                                       | * Electrical ignition cables damaged                                                     | * Replace cables                                                                                                                                       |
|                                                                                                       | * Bad position of cables in the ignition transformer or into the electrodes              | * Improve the installation                                                                                                                             |
| <b>BURNER LOCKS OUT WITH FLAME PRESENCE</b>                                                           | * Ignition transformer damaged                                                           | * Replace the transformer                                                                                                                              |
|                                                                                                       | * Wrong setting of flame detector                                                        | * Adjust flame detector                                                                                                                                |
|                                                                                                       | * Flame detector damaged                                                                 | * Replace flame detector                                                                                                                               |
|                                                                                                       | * Bad cables of flame detector                                                           | * Check cables                                                                                                                                         |
|                                                                                                       | * Burner control damaged                                                                 | * Replace burner control                                                                                                                               |
|                                                                                                       | * Phase and neutral inverted                                                             | * Adjust connections                                                                                                                                   |
|                                                                                                       | * Ground missing or damaged                                                              | * Check ground continuity                                                                                                                              |
|                                                                                                       | * Voltage on neutral                                                                     | * Take off tension on neutral                                                                                                                          |
|                                                                                                       | * Too small flame (due to not much gas)                                                  | * Adjust gas flow<br>* Check gas filter cleanness                                                                                                      |
| <b>only FOR LME22: BURNER CONTINUES TO PERFORM ALL ITS FEATURES WITHOUT IGNITING THE BURNER</b>       | * Too much combustion air                                                                | * Adjust air flow rate                                                                                                                                 |
|                                                                                                       | * Air pressure switch damaged or bad links                                               | * Check air pressure switch functions and links                                                                                                        |
| <b>BURNER LOCKS OUT WITHOUT ANY GAS FLOW</b>                                                          | * Burner control damaged                                                                 | * Replace burner control                                                                                                                               |
|                                                                                                       | * Gas valves don't open                                                                  | * Check voltage on valves; if necessary replace valve or the burner control<br>* Check if the gas pressure is so high that the valve cannot open       |
|                                                                                                       | * Gas valves completely closed                                                           | * Open valves                                                                                                                                          |
|                                                                                                       | * Pressure governor too closed                                                           | * Adjust the pressure governor                                                                                                                         |
|                                                                                                       | * Butterfly valve closed                                                                 | * Open the butterfly valve                                                                                                                             |
|                                                                                                       | * Maximum pressure switch open.                                                          | * Check connection and functionality                                                                                                                   |
| <b>THE BURNER IS BLOCKED AND THE EQUIPMENT PROVIDES A LOCK CODE "CAUSE AIR PRESSURE SWITCH FAULT"</b> | * Air pressure switch doesn't close the NO contact                                       | * Check connections<br>* Check pressure switch functionality                                                                                           |
|                                                                                                       | * Air pressure switch damaged (it keeps the stand-by position or badly set)              | * Check air pressure switch functionality<br>* Reset air pressure switch                                                                               |
|                                                                                                       | * Air pressure switch connections wrong                                                  | * Check connections                                                                                                                                    |
|                                                                                                       | * Air fan damaged                                                                        | * Replace motor                                                                                                                                        |
|                                                                                                       | * No power supply                                                                        | * Reset power supply                                                                                                                                   |
| <b>BURNER LOCKS OUT DURING NORMAL RUNNING</b>                                                         | * Air damper too closed                                                                  | * Adjust air damper position                                                                                                                           |
|                                                                                                       | * Flame detector circuit interrupted                                                     | * Check wiring<br>* Check photocell                                                                                                                    |
|                                                                                                       | * Burner control damaged                                                                 | * Replace burner control                                                                                                                               |
| <b>THE BURNER STARTS AND AFTER A WHILE IT REPEATS THE STARTING CYCLE.</b>                             | * Maximum gas pressure switch damaged or badly set                                       | * Reset pressure switch or replace it                                                                                                                  |
|                                                                                                       | * Gas pressure switch badly set                                                          | * Reset the pressure switch                                                                                                                            |
|                                                                                                       | * Gas filter dirty                                                                       | * Clean gas filter                                                                                                                                     |
| <b>BURNER STANDS WHILE RUNNING WITHOUT ANY SWITCHING OF THERMOSTATS</b>                               | * Gas governor too low or damaged                                                        | * Reset or replace the governor                                                                                                                        |
|                                                                                                       | * Thermal contacts of fan motor open                                                     | * Reset contacts and check values<br>* Check current absorption                                                                                        |
| <b>FAN MOTOR DOESN'T START</b>                                                                        | * Internal motor wiring broken                                                           | * Replace wiring or complete motor                                                                                                                     |
|                                                                                                       | * Fan motor starter broken                                                               | * Replace starter                                                                                                                                      |
|                                                                                                       | * Fuses broken (three phases only)                                                       | * Replace fuses and check current absorption                                                                                                           |
| <b>BURNER DOESN'T SWITCH TO HIGH FLAME</b>                                                            | * Hi-low flame thermostat badly set or damaged                                           | * Reset or replace thermostat                                                                                                                          |
|                                                                                                       | * Servomotor cam badly set                                                               | * Reset servomotor cam                                                                                                                                 |
| <b>mechanical only: SOMETIMES THE SERVOMOTOR RUNS IN THE WRONG WAY</b>                                | * Servomotor capacitor damaged                                                           | * Replace capacitor                                                                                                                                    |
| <b>PHASE-TO-PHASE SUPPLY OR PRESENCE OF VOLTAGE ON NEUTRAL*</b>                                       | * Lights up and freezes                                                                  | * In such cases, insert an RC circuit (our code 2531003).                                                                                              |





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

# LME73.000Ax + PME73.831AxBC LME73.831AxBC



***Service instruction manual***

M12921CB Rel.1.2 02/2016

## GENERAL FEATURES

LME/ is suitable for gas, light and heavy oil burners

LME7 series has two devices: LME73.000 (hardware) and PME73.831AxBC (programmable unit). The LME73.831AxBC is also available: it has a built in software and it is not programmable.

LME7 is inside the control panel. If supplied, PME73.831BC is inside the LME7;

The display AZL23.. or AZL21.. is available for Service and hardware setup.

LME7... are used for the startup and supervision of 2-stage/progressive, modulating forced draft gas burners in intermittent operation.

The flame is supervised with an ionization probe, optionally with UV flame detector QRA2..., QRA4.U or QRA10....

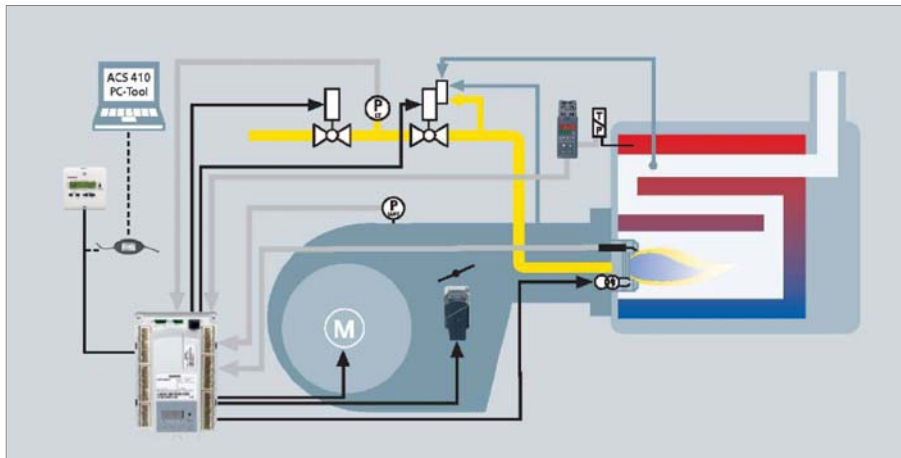
Integrated in the LME7... basic unit are:

- Burner control
- BCI
- Control for one actuator
- Lockout reset button (info button)
- 3 multicolor signal lamp LED for operations and fault notifications
- 3 x 7-segment display for service, fault and operating state information
- Interface for program module (no function)

Passwords protect the different parameter levels against unauthorized access. Basic settings that the plant operator can make on site require no password.

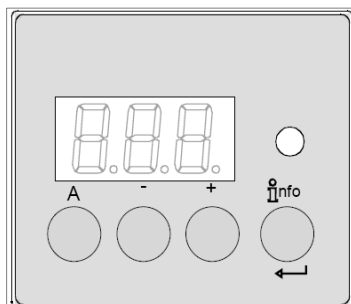
Functions:

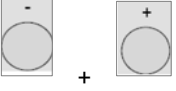
- Undervoltage detection
- Electrical remote reset facility
- Accurate control times thanks to digital signal handling
- Multicolor indication of fault status and operating state messages
- Air pressure supervision with function check of air pressure switch during start and operation (gas)
- Repetition limitation
- Controlled intermittent operation after 24 hours of continuous operation\*
- BCI
- Indication of program sequence



\* after no more than 24 hours of continuous operation, the burner control initiates automatic controlled shutdown followed by a restart.

## User interface :



|                                                                                     |                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <b>Button A</b> <ul style="list-style-type: none"> <li>- Display preset output</li> <li>- In lockout position: Power value to the time of fault</li> </ul>                                                                                             |
|    | <b>Info and Enter button</b> <ul style="list-style-type: none"> <li>- Reset in the event of fault, changeover visual diagnostic of the cause of fault (refer to chapter Diagnostics of cause of fault )</li> </ul>                                     |
|    | <b>- button</b> <ul style="list-style-type: none"> <li>- Display flame signal current 2 or phases display</li> <li>- In lockout position: MMI phase to the time of fault</li> </ul>                                                                    |
|    | <b>+ button</b> <ul style="list-style-type: none"> <li>- Display flame signal current 1 or phases display</li> <li>- In lockout position: MMI phase to the time of fault</li> </ul>                                                                    |
|  | <b>3 multicolor signal lamp</b> <ul style="list-style-type: none"> <li>- Refer to chapter "Blink code table"</li> </ul>                                                                                                                                |
|  | <b>+ and - button: Escape function</b><br>(press + and - simultaneously) <ul style="list-style-type: none"> <li>- No adoption of value</li> <li>- One menu level up</li> <li>- Keep depressed for &gt;1second for backup / restore function</li> </ul> |

## First startup when PME is supplied or PME replacement:

### First startup:

- 1) insert a new PME
- 2) turn the power on; The display shows "rst" and "PrC" one after the other.
- 3) keep pushing the INFO  button more than 3 seconds; "run" appears; PME parameters will be transferred to LME
- 4) at the end, "End" and "rst" appears one after the other; Later (2'), the control box locks out "Loc 138"
- 5) reset the control box by pressing the INFO  button (for less than 3 seconds)  
Now the display shows "OFF"; the burner is ready to be started.

### Replacement:

- 1) Turn off the burner, replace the existing PME with a new one
- 2) For the first startup, repeat the above procedure, from step 2.

**List of phase display on board LME :**

| Phase number of 7-segment display        | LED                   | Function                                                                                                               |
|------------------------------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------|
| Standby                                  |                       |                                                                                                                        |
| OFF                                      | Off                   | Standby, waiting for heat demand                                                                                       |
| P08                                      | Off                   | Mains ON / test phase (e.g. detector test)                                                                             |
| <b>Startup</b>                           |                       |                                                                                                                        |
| P21                                      | Yellow                | Safety valve ON, air pressure switch test / POC test (timeout / locking                                                |
| P22                                      | Yellow                | Fan motor ON / air pressure switch test / settling time                                                                |
| P24                                      | Yellow                | Actuator opens in prepurging position                                                                                  |
| P30                                      | Yellow                | Prepurging                                                                                                             |
| P36                                      | Yellow                | Actuator closes in ignition load / low-fire position                                                                   |
| P38                                      | Yellow blinking       | Preignition time                                                                                                       |
| P40                                      | Yellow blinking       | 1st safety time (TSA1) / ignition transformer ON                                                                       |
| P42                                      | Green                 | Safety time (ignition transformer OFF), flame check                                                                    |
| P44                                      | Green                 | Interval: End of safety time and fuel valve 1 (V1) ON<br>Interval: End of safety time and load controller (LR) release |
| P50 Green                                | P50 Green             | 2nd safety time (TSA2)                                                                                                 |
| P54 Green                                | P54 Green             | P259.01: Actuator opens in > low-fire                                                                                  |
| P54 Green                                | P54 Green             | P260: Actuator closes in low-fire                                                                                      |
| oP1 Green                                | oP1 Green             | Interval until release of load controller target (analog or 3-position step input)                                     |
| <b>Operation</b>                         |                       |                                                                                                                        |
| oP                                       | Green                 | Operation, modulating operation                                                                                        |
| <b>Shutdown</b>                          |                       |                                                                                                                        |
| P10                                      | Yellow                | Shutdown, actuator opens in CLOSE position (home run)                                                                  |
| P72                                      | Yellow                | Actuator opens in high-fire position / end of operation                                                                |
| P74                                      | Yellow                | Postpurging                                                                                                            |
| <b>Valve proving</b>                     |                       |                                                                                                                        |
| P80                                      | Yellow                | Test space evacuating                                                                                                  |
| P81                                      | Yellow                | Checking time fuel valve 1                                                                                             |
| P82                                      | Yellow                | Test space filling                                                                                                     |
| P83                                      | Yellow                | Checking time fuel valve 2                                                                                             |
| <b>Waiting phases (start prevention)</b> |                       |                                                                                                                        |
| P01                                      | Red / yellow blinking | Undervoltage                                                                                                           |
| P02                                      | Yellow                | Safety loop open                                                                                                       |
| P04                                      | Red / green blinking  | Extraneous light on burner startup (timeout / locking after 30 s)                                                      |
| P90                                      | Yellow                | Pressure switch-min open                                                                                               |
| <b>Lockout</b>                           |                       |                                                                                                                        |
| LOC                                      | Red                   | Lockout phase                                                                                                          |

## Operation :

|                                                                                   |                                                                                                                                                                        |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | The lockout reset button (info button) (EK) is the key operating element for resetting the burner control and for activating / deactivating the diagnostics functions. |
|  | The multicolor signal lamp (LED) is the key indicating element for visual diagnostics.                                                                                 |

Both lockout reset button (EK) and signal lamp (LED) are located in the control panel.

There are 2 diagnostics choices:

1. Visual diagnostics: Indication of operating state or diagnostics of cause of fault
2. Diagnostics: Via internal display or to AZL2.. display and operating unit

Visual diagnostics:

In normal operation, the different operating states are indicated in the form of color codes according to the color code table given below.

### Color code table for multicolor signal lamp (LED) :

| State                                           | Color code                    | Color             |
|-------------------------------------------------|-------------------------------|-------------------|
| Waiting time (tw), other waiting states         | ○ .....                       | OFF               |
| Ignition phase, ignition controlled             | ● ○ ● ○ ● ○ ● ○ ● ○ ● ○       | Blinking yellow   |
| Operation, flame o.k.                           | □ .....                       | Green             |
| Operation, flame not o.k.                       | □ ○ □ ○ □ ○ □ ○ □ ○ □ ○       | Blinking green    |
| Extraneous light on burner startup              | □ ▲ □ ▲ □ ▲ □ ▲ □ ▲ □ ▲       | Green-red         |
| Undervoltage                                    | ● ▲ ● ▲ ● ▲ ● ▲ ● ▲ ● ▲       | Yellow-red        |
| Fault, alarm                                    | ▲ .....                       | Red               |
| Error code output (refer to «Error code table») | ▲ ○ ▲ ○ ▲ ○ ▲ ○ ▲ ○ ▲ ○       | Blinking red      |
| Interface diagnostics                           | ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲       | Red flicker light |
| Heating request                                 | ● .....                       | Yellow            |
| Heating request                                 | ● ● ▲ ● ● ▲ ● ● ▲ ● ● ▲ ● ● ▲ | Yellow            |

### Key

|       |            |
|-------|------------|
| ..... | Steady on  |
| ○     | Led off    |
| ▲     | Led red    |
| ●     | Led yellow |
| □     | Led green  |

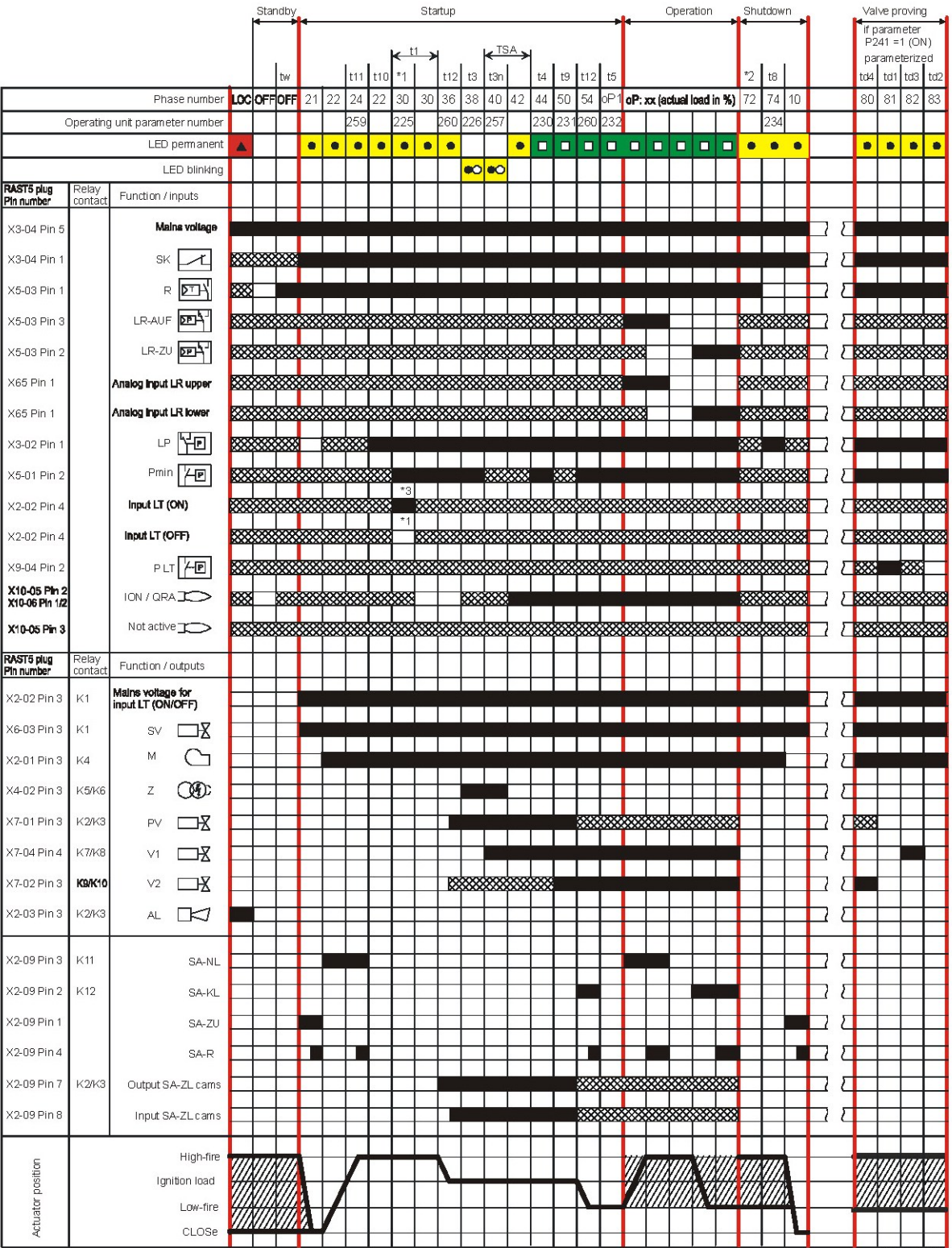
Version 1:

- |                                 |               | Standby                                                                      |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  | Startup                             |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  | Operation                                                                                                              |  |  |  |  |  |  |  |                    |  | Shutdown |  |                                          |  | Valve proving |  |  |  |
|---------------------------------|---------------|------------------------------------------------------------------------------|--|--|--|--|--|--|--|-----------------------------------------|--|--|--|--|--|--|--|-------------------------------------|--|--|--|--|--|--|--|-----------------------------------------------------|--|--|--|-------------|--|--|--|------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--------------------|--|----------|--|------------------------------------------|--|---------------|--|--|--|
|                                 |               | LOG OFF OFF                                                                  |  |  |  |  |  |  |  | t <sub>w</sub>                          |  |  |  |  |  |  |  | t <sub>t1</sub> t <sub>t10</sub> *1 |  |  |  |  |  |  |  | t <sub>t2</sub> t <sub>t3</sub> t <sub>tn</sub> TSA |  |  |  |             |  |  |  | t <sub>t4</sub> t <sub>t9</sub> t <sub>t12</sub> t <sub>t5</sub> oP <sub>1</sub> oP <sub>2</sub> xx (actual load in %) |  |  |  |  |  |  |  | *2 t <sub>t8</sub> |  |          |  | if parameter P241 = 1 (ON) parameterized |  |               |  |  |  |
|                                 |               | 21 22 24 22 30 30 36 38 40 42 44 50 54 54 oP <sub>1</sub> oP <sub>2</sub> xx |  |  |  |  |  |  |  | 259 225 260 226 257 230 231 230 260 232 |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  | 72 74 10                                            |  |  |  | 80 81 82 83 |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| Phase number                    |               |                                                                              |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| Operating unit parameter number |               |                                                                              |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| LED permanent                   |               |                                                                              |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| LED blinking                    |               |                                                                              |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| RAS15 plug Pin number           | Relay contact | Function / inputs                                                            |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X3-04 Pin 5                     |               | Main voltage                                                                 |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X3-04 Pin 1                     | SK            |                                                                              |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X5-03 Pin 1                     | R             |                                                                              |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X5-03 Pin 3                     | LR-AUF        |                                                                              |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X5-03 Pin 2                     | LR-ZU         |                                                                              |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X65 Pin 1                       |               | Analog input LR upper                                                        |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X65 Pin 1                       |               | Analog input LR lower                                                        |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X3-02 Pin 1                     | LP            |                                                                              |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X6-01 Pin 2                     | Pmin          |                                                                              |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X2-02 Pin 4                     |               | Input LT (ON)                                                                |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X2-02 Pin 4                     |               | Input LT (OFF)                                                               |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X9-04 Pin 2                     | P.LT          |                                                                              |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X10-05 Pin 2<br>X10-06 Pin 1/2  |               | ION / QRA                                                                    |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X10-06 Pin 3                    |               | Not active                                                                   |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| RAS15 plug Pin number           | Relay contact | Function / outputs                                                           |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X2-02 Pin 3                     | K1            | Main voltage for Input LT (ON/OFF)                                           |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X6-03 Pin 3                     | K1            | SV                                                                           |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X2-01 Pin 3                     | K4            | M                                                                            |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X4-02 Pin 3                     | K5/K6         | Z                                                                            |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X7-01 Pin 3                     | K2/K3         | PV                                                                           |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X7-04 Pin 4                     | K7/K8         | V1                                                                           |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X7-02 Pin 3                     | K9/K10        | V2                                                                           |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X2-03 Pin 3                     | K2/K3         | AL                                                                           |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X2-09 Pin 3                     | K11           | SA-NL                                                                        |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X2-09 Pin 2                     | K12           | SA-KL                                                                        |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X2-09 Pin 1                     |               | SA-ZU                                                                        |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X2-09 Pin 4                     |               | SA-R                                                                         |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X2-09 Pin 7                     | K2/K3         | Output SA-ZL cams                                                            |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| X2-09 Pin 8                     |               | Input SA-ZL cams                                                             |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
| Actuator position               |               | High-fire                                                                    |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
|                                 |               | Low-fire                                                                     |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
|                                 |               | Ignition load                                                                |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |
|                                 |               | CLOSE                                                                        |  |  |  |  |  |  |  |                                         |  |  |  |  |  |  |  |                                     |  |  |  |  |  |  |  |                                                     |  |  |  |             |  |  |  |                                                                                                                        |  |  |  |  |  |  |  |                    |  |          |  |                                          |  |               |  |  |  |

Program sequence :

Version 2:

- Ignition load > low-fire
- Prepurging in high-fire
- Parameter 515 = 1 (condition parameter 259.01 = 0 seconds)



7114d04e/0112

| Phase number | Function                                                                           |
|--------------|------------------------------------------------------------------------------------|
| LOC          | Lockout phase                                                                      |
| OFF          | Standby, waiting for heat demand                                                   |
| oP           | Operation, modulating operation                                                    |
| oP1          | Interval until release of load controller target (analog or 3-position step input) |
| 01           | Under voltage                                                                      |
| 02           | Safety loop open                                                                   |
| 04           | Extraneous light on burner startup (timeout/locking after 30 seconds)              |
| 08           | Mains ON/test phase (e.g. detector test)                                           |
| 10           | Shutdown, actuator opens in CLOSE position (homerun)                               |
| 21           | Safety valve ON, air pressure switch OFF, actuator opens in CLOSE position         |
| 22           | Part 1: Fan motor ON                                                               |
|              | Part 2: Specified time (t10) air pressure switch (LP)                              |
|              | Message (timeout) stabilization air pressure switch                                |
| 24           | Actuator opens in prepurge position                                                |
| 30           | Part 1: Prepurge time (t1) without extraneous light test                           |
|              | Valve proving after mains ON, lockout                                              |
|              | Part 2: Prepurge time (t1) with extraneous light test                              |
| 36           | Actuator closes in ignition load                                                   |
| 38           | Preignition (t3)                                                                   |
| 40           | Postignition time (t3n), parameter 257 + 0.3 seconds                               |
| 42           | Flame detection                                                                    |
| 44           | Interval (t4): End of safety time (TSA) and burner valve 2 ON                      |
| 50           | 2nd safety time (t9)                                                               |
| 54           | Parameter 259.01: Actuator opens in > low-fire                                     |
|              | Parameter 260: Actuator closes in low-fire                                         |
| 72           | End of operation, checking if valve proving (LT) shall be performed                |
| 74           | Postpurging (t8)                                                                   |
| 80           | Test space evacuation (td4)                                                        |
| 81           | Test time (td1) fuel valve 1 (V1)                                                  |
| 82           | Test space filling (td3)                                                           |
| 83           | Test time (td2) fuel valve 2 (V2)                                                  |
| 90           | Pressure switch-min open □ safety shutdown                                         |
| *1           | Valve proving is conducted when...                                                 |
|              | - parameter 241.00 = 1 and parameter 241.02 = 1, or                                |
|              | - parameter 241.00 = 1 and parameter 241.01 = 0                                    |
| *2           | Valve proving is conducted when...                                                 |
|              | - parameter 241.00 = 1 and parameter 241.02 = 1, or                                |
|              | - parameter 241.00 = 1 and parameter 241.01 = 1                                    |
| *3           | Valve proving (LT) will not be performed                                           |

# **Error code table :**

| <b>Red blink code of fault signal lamp (LED)</b> | <b>Possible cause</b>                                                                                                                                                                                                                  |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 x blinks                                       | No establishment of flame at the end of the safety time (TSA)                                                                                                                                                                          |
|                                                  | <ul style="list-style-type: none"> <li>- Faulty or soiled flame detector</li> <li>- Faulty or soiled fuel valves</li> <li>- Poor adjustment of burner, no fuel</li> <li>- Faulty ignition equipment</li> </ul>                         |
| 3 x blinks                                       | Air pressure switch (LP) faulty <ul style="list-style-type: none"> <li>- Loss of air pressure after specified time (t10)</li> <li>- Air pressure switch (LP) welded in no-load position</li> </ul>                                     |
| 4 x blinks                                       | Extraneous light on burner startup                                                                                                                                                                                                     |
| 5 x blinks                                       | Time supervision air pressure switch (LP) <ul style="list-style-type: none"> <li>- Air pressure switch (LP) welded in working position</li> </ul>                                                                                      |
| 6 x blinks                                       | Actuator position not reached <ul style="list-style-type: none"> <li>- Actuator faulty</li> <li>- Wrong adjustment of cam</li> <li>- Actuator defective or blocked</li> <li>- False connection</li> <li>- Misadjustment</li> </ul>     |
| 7 x blinks                                       | Too many losses of flame during operation (limitation of repetitions) <ul style="list-style-type: none"> <li>- Faulty or soiled flame detector</li> <li>- Faulty or soiled fuel valves</li> <li>- Poor adjustment of burner</li> </ul> |
| 8 x blinks                                       | Free                                                                                                                                                                                                                                   |
| 9 x blinks                                       | Free                                                                                                                                                                                                                                   |
| 10 x blinks                                      | Wiring error or internal error, output contacts, other faults                                                                                                                                                                          |
| 12 x blinks                                      | Valve proving (LT) <ul style="list-style-type: none"> <li>- Fuel valve 1 (V1) leaking</li> </ul>                                                                                                                                       |
| 13 x blinks                                      | Valve proving (LT) <ul style="list-style-type: none"> <li>- Fuel valve 2 (V2) leaking</li> </ul>                                                                                                                                       |
| 14 x blinks                                      | Error in connection with valve closure control POC                                                                                                                                                                                     |
| 15 x blinks                                      | Error code $\geq 15$                                                                                                                                                                                                                   |
|                                                  | Error code 22: Error of safety loop (SL)                                                                                                                                                                                               |

During the time the cause of fault is diagnosed, the control outputs are deactivated:

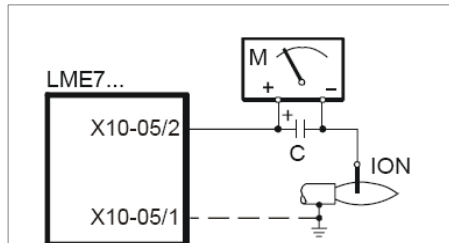
- Burner remains shut down
- External fault indication (AL) at terminal X2-03, pin 3 steady on

Diagnostics of cause of fault is quit and the burner switched on again by resetting the burner control. Press the lockout reset button (info button) for about 1 second (<3 seconds).

## Flame detection – detection electrode :

|                                                        |                                          |
|--------------------------------------------------------|------------------------------------------|
| Short-circuit current                                  | Max. AC 1 mA                             |
| Required detector current                              | Min. DC 2 $\mu$ A, display approx. 45 %  |
| Possible detector current                              | Max. DC 3 $\mu$ A, display approx. 100 % |
| Permissible length of detector cable (laid separately) | 30 m (core-earth 100 pF/m)               |

### Measuring circuit



### Keys

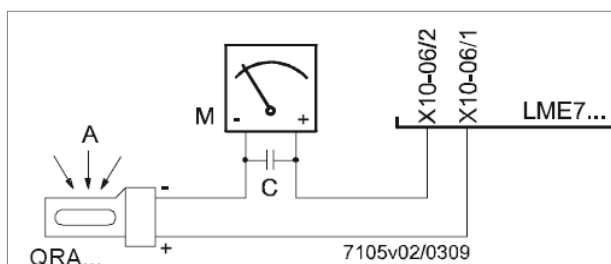
- C - Electrolytic condenser 100...470  $\mu$ F; DC 10...25 V
- ION - Ionization probe
- M - Microammeter Ri max. 5,000  $\Omega$

## Flame detection – UV probe :

Threshold values when flame is supervised by QRA...

|                                               |                                        |
|-----------------------------------------------|----------------------------------------|
| - Start prevention (extraneous light)         | Intensity (parameter 954) approx. 12 % |
| - Operation                                   | Intensity (Parameter 954) approx. 13 % |
| Operating voltage                             | AC 280 V $\pm$ 15 %                    |
| Mains frequency                               | 50...60 Hz $\pm$ 6 %                   |
| Required detector current                     | Min. 70 $\mu$ A                        |
| Possible detector current                     |                                        |
| - Operation                                   | Max. 700 $\mu$ A                       |
| Perm. length of detector cable                |                                        |
| - Normal cable, laid separately <sup>1)</sup> | Max. 100 m                             |

<sup>1)</sup> Multicore cable not permitted



### Keys

- A - Exposure to light
- C - Electrolytic condenser 100...470  $\mu$ F; DC 10...25 V
- M - Microammeter Ri max. 5,000  $\Omega$

### Warning!

Input QRA... is not short-circuit-proof!

Short-circuits of X10-06/2 against earth can destroy the QRA... input

Simultaneous operation of flame detector QRA... and detection electrode is not permitted

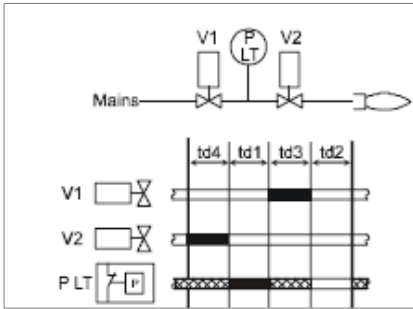
To make certain the age of the UV tube can be determined, the LME7... basic unit must always be connected to mains supply.

Gas proving system :

Valve proving is dependent on input valve proving ON / OFF (X2-02). When a leak is detected, the gas valve proving function ensures that the gas valves will not be opened and that ignition will not be switched on. Lockout will be initiated.

Valve proving with separate pressure switch (P LT)

- Step 1: td4 – Evacuation of test space  
Gas valve on the burner side is opened to bring the test space to atmospheric pressure.
- Step 2: td1 – Test atmospheric pressure  
When the gas has closed, the gas pressure in the test space must not exceed a certain level.
- Step 3: td3 Filling of test space  
Gas valve on the mains side opens to fill the test space.
- Step 4: td2 – Test gas pressure  
When the gas valve has closed, the gas pressure in the test space must not drop below a certain level.



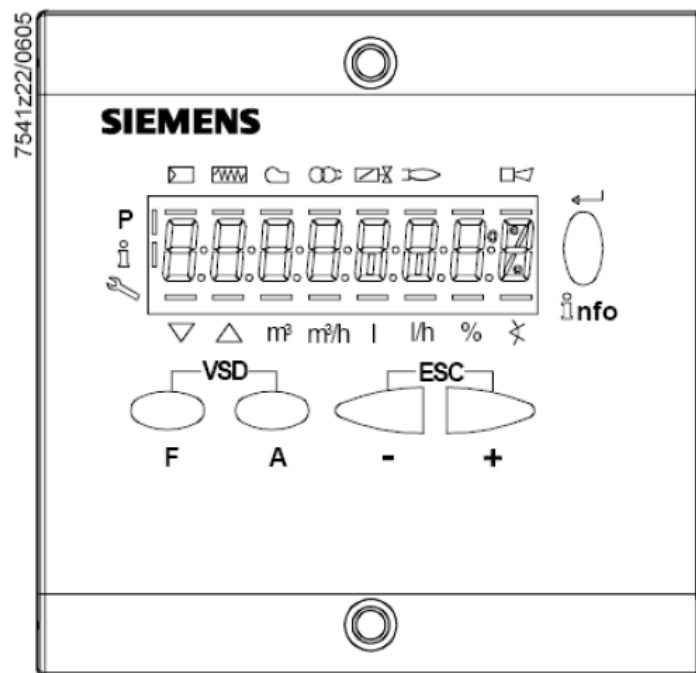
Controllo tenuta con pressostati separati

- Keys
- td1 Test atmospheric pressure
  - td2 Test gas pressure
  - td3 Filling of test space
  - td4 Evacuation of test space
  - V... Fuel valve
  - PLT Pressure switch valve proving
  - Input / output signal 1 (ON)
  - Input / output signal 0 (OFF)
  - Input permissible signal 1 (ON) or 0 (OFF)

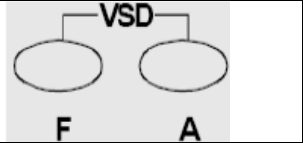
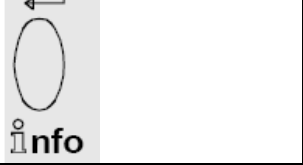
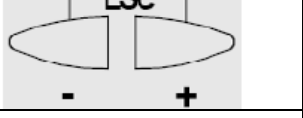
| No. | Parameter                                    |
|-----|----------------------------------------------|
| 242 | Valve proving evacuation of test space       |
| 243 | Valve proving time test atmospheric pressure |
| 244 | Valve proving filling of test space          |
| 245 | Valve proving time test gas pressure         |

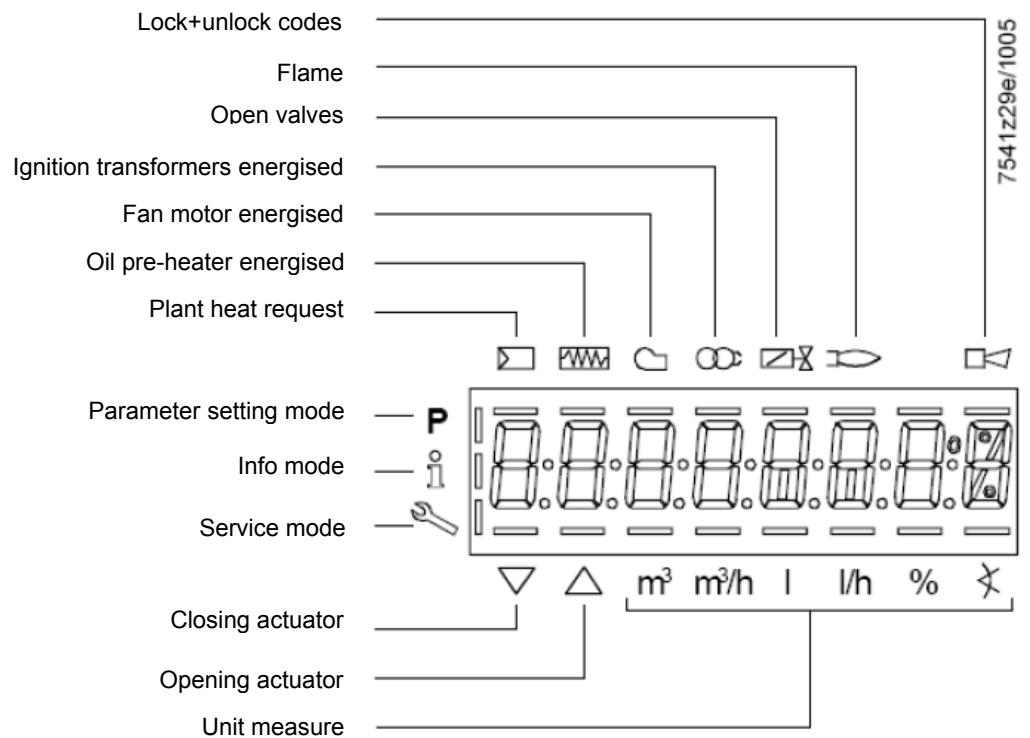
## Instruction, control and modify via AZL2x :

The AZL2x.. display/programming unit is shown below:

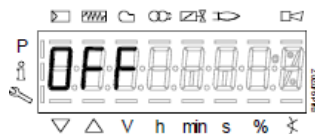


The keys functions are the following:

|                                                                                    |                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>Key F + A<br/>While pressing the two keys contemporarily, the code message will appear: by entering the proper password it is possible to access the Service mode.</p>                          |
|  | <p>Info and Enter keys<br/>Used for Info and Service menues<br/>Used as Enter key in the setting modes<br/>Used as Reset key in the burner operation mode<br/>Used to enter a lower level menu</p> |
|  | <p>Key -<br/>Used for one menu level down<br/>Used to decrease a value</p>                                                                                                                         |
|  | <p>Key +<br/>Used for one menu level up<br/>Used to increase a value</p>                                                                                                                           |
|  | <p>Keys (+ &amp; -) = ESC<br/>By pressing + and - at the same time, the ESCAPE function is performed<br/>No adoption of value<br/>One menu level down</p>                                          |
|                                                                                    |                                                                                                                                                                                                    |



While pushing the  button together with whatever else button, LME73 locks out; the display shows



On stand-by position,  appears



On operation, all the phases appears with their number.

List of phase with display AZL2x :

| Phase number                                 | Function                                                                                                                                       |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Standby                                      |                                                                                                                                                |
| OFF                                          | Standby, waiting for heat request                                                                                                              |
| Ph08                                         | Power ON / test phase (e.g. detector test)                                                                                                     |
| <b>Startup</b>                               |                                                                                                                                                |
| Ph21                                         | Safety valve ON, air pressure switch test / POC test (timeout / locking after 5 seconds), actuator opens in low-fire position / CLOSE position |
| Ph22                                         | Fan motor ON or air pressure switch test / settling time                                                                                       |
| Ph24                                         | Actuator travels to the prepurge position                                                                                                      |
| Ph30                                         | Prepurging                                                                                                                                     |
| Ph36                                         | Actuator closes until ignition load / low-fire is reached, and parameter 259.02: Actuator opens to a position > ignition load                  |
| Ph38                                         | Preignition                                                                                                                                    |
| Ph40                                         | 1st safety time (TSA1) / ignition transformer ON                                                                                               |
| Ph42                                         | Safety time (ignition transformer OFF), flame check                                                                                            |
| Ph44                                         | Interval: End of safety time and fuel valve 1 (V1) ON                                                                                          |
| Ph50                                         | 2nd safety time (TSA2)                                                                                                                         |
| Ph54                                         | P259.01: Actuator opens in > low-fire                                                                                                          |
| Ph54                                         | P260: Actuator closes in low-fire                                                                                                              |
| oP1                                          | Interval until release of load controller target (analog or 3-position step input)                                                             |
| <b>Operation</b>                             |                                                                                                                                                |
| oP                                           | Operation, modulating operation                                                                                                                |
| <b>Shutdown</b>                              |                                                                                                                                                |
| Ph10                                         | Shutdown, actuator opens in CLOSE position (home run)                                                                                          |
| Ph72                                         | Actuator opens in high-fire position / end of operation                                                                                        |
| Ph74                                         | Postpurging                                                                                                                                    |
| <b>Valve proving</b>                         |                                                                                                                                                |
| Ph80                                         | Test space evacuating                                                                                                                          |
| Ph81                                         | Checking time fuel valve 1                                                                                                                     |
| Ph82                                         | Test space filling                                                                                                                             |
| Ph83                                         | Checking time fuel valve 2                                                                                                                     |
| <b>Waiting phases<br/>(start prevention)</b> |                                                                                                                                                |
| Ph01                                         | Undervoltage                                                                                                                                   |
| Ph02                                         | Safety loop open                                                                                                                               |
| Ph04                                         | Extraneous light at burner startup (timeout / locking after 30 seconds)                                                                        |
| Ph90                                         | Pressure switch-min open → safety shutdown                                                                                                     |
| <b>Lockout</b>                               |                                                                                                                                                |
| LOC                                          | Lockout phase                                                                                                                                  |

**Error code list with operation via internal AZL :**

| <b>Error code</b> | <b>Clear text</b>                                                                                                                                   | <b>Possible cause</b>                                                                                                                                                                                                                     |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Loc 2             | No establishment of flame at the end of the safety time (TSA)                                                                                       | <ul style="list-style-type: none"> <li>- Faulty or soiled fuel valves</li> <li>- Faulty or soiled flame detector</li> <li>- Poor adjustment of burner, no fuel</li> <li>- Faulty ignition equipment</li> </ul>                            |
| Loc 3             | Air pressure faulty (air pressure switch (LP) welded in no-load position, decrease to specified time (t10) (air pressure switch (LP) response time) | Air pressure switch (LP) faulty<br><ul style="list-style-type: none"> <li>- Loss of air pressure signal after specified time (t10)</li> <li>- Air pressure switch (LP) is welded in no-load position</li> </ul>                           |
| Loc 4             | Extraneous light                                                                                                                                    | Extraneous light when burner startup                                                                                                                                                                                                      |
| Loc 5             | Air pressure faulty, air pressure switch welded in working position                                                                                 | Time out air pressure switch (LP)<br><ul style="list-style-type: none"> <li>- Air pressure switch (LP) is welded in working position</li> </ul>                                                                                           |
| Loc 6             | Fault of actuator                                                                                                                                   | <ul style="list-style-type: none"> <li>- Actuator faulty or blocked</li> <li>- Faulty connection</li> <li>- Wrong adjustment</li> </ul>                                                                                                   |
| Loc 7             | Loss of flame                                                                                                                                       | Too many losses of flame during operation (limitation of repetitions)<br><ul style="list-style-type: none"> <li>- Faulty or soiled fuel valves</li> <li>- Faulty or soiled flame detector</li> <li>- Poor adjustment of burner</li> </ul> |
| Loc 8             | ---                                                                                                                                                 | Free                                                                                                                                                                                                                                      |
| Loc 9             | ---                                                                                                                                                 | Free                                                                                                                                                                                                                                      |
| Loc 10            | Error not relatable (application), internal error                                                                                                   | Wiring error or internal error, output contacts, other faults                                                                                                                                                                             |
| Loc 12            | Valve proving                                                                                                                                       | Fuel valve 1 (V1) leak                                                                                                                                                                                                                    |
| Loc 13            | Valve proving                                                                                                                                       | Fuel valve 2 (V2) leak                                                                                                                                                                                                                    |
| Loc 22            | Safety loop open                                                                                                                                    | <ul style="list-style-type: none"> <li>- Gas pressure switch-max open</li> <li>- Safety limit thermostat cut out</li> </ul>                                                                                                               |
| Loc 138           | Restore process successful                                                                                                                          | Restore process successful                                                                                                                                                                                                                |
| Loc 167           | Manual locking                                                                                                                                      | Manual locking                                                                                                                                                                                                                            |
| Loc: 206          | AZL2... incompatible                                                                                                                                | Use the latest version                                                                                                                                                                                                                    |

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



## Info level :



Keep pushing the **info** button until



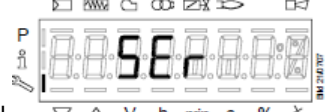
appears. Use + or - for scrolling the parameter list. If on the right side a dash-dot appears, it means the display doesn't show the

full description. Push **info** again for 1 to 3 s in order to show the full description.

Below the visible **Info** parameters:

| Parameter number | Parameter list<br>PME73.000Ax + PME73.831AxBC<br>LME73.831AxBC | Edit       | Value range |         | Resolution | Factory setting | Password level reading from level | Password level writing from level |
|------------------|----------------------------------------------------------------|------------|-------------|---------|------------|-----------------|-----------------------------------|-----------------------------------|
|                  |                                                                |            | Min.        | Max.    |            |                 |                                   |                                   |
| <b>100</b>       | <b>General</b>                                                 |            |             |         |            |                 |                                   |                                   |
| 102              | Identification date                                            | Read only  | ---         | ---     | ---        |                 | Info                              | ---                               |
| 103              | Identification number                                          | Read only  | 0           | 9999    | 1          |                 | Info                              | ---                               |
| 113              | Burner identification                                          | Read only  | x           | xxxxxxx | 1          |                 | Info                              | ---                               |
| 164              | Numbers of startups resettable                                 | Resettable | 0           | 999999  | 1          |                 | Info                              | Info                              |
| 166              | Total number of startups                                       | Read only  | 0           | 999999  | 1          |                 | Info                              | ---                               |
| 170.00           | Switching cycles actuator relay K12                            | Read only  | 0           | 999999  | 1          |                 | Info                              | ---                               |
| 170.01           | Switching cycles actuator relay K11                            | Read only  | 0           | 999999  | 1          |                 | Info                              | ---                               |
| 170.02           | Switching cycles actuator relay K2                             | Read only  | 0           | 999999  | 1          |                 | Info                              | ---                               |
| 170.03           | Switching cycles actuator relay K1                             | Read only  | 0           | 999999  | 1          |                 | Info                              | ---                               |
| 171              | Max. switching cycles actuator relay                           | Read only  | 0           | 999999  | 1          |                 | Info                              | ---                               |

## Service level :

Keep pushing the  button until  appears. Use + or - for scrolling the parameter list. . If on the right side a dash-dot appears, it means the display doesn't show the full description. Push  again for 1 to 3 s in order to show the full description.

Below the visible **Info** parameters:

| Parameter number | Parameter list<br>PME73.000Ax + PME73.831AxBC<br>LME73.831AxBC                                              | Edit      | Value range         |                              | Resolution         | Factory setting | Password level reading from level | Password level writing from level |
|------------------|-------------------------------------------------------------------------------------------------------------|-----------|---------------------|------------------------------|--------------------|-----------------|-----------------------------------|-----------------------------------|
|                  |                                                                                                             |           | Min.                | Max.                         |                    |                 |                                   |                                   |
| 700              | <b>Error history</b>                                                                                        |           |                     |                              |                    |                 |                                   |                                   |
| 701              | Current error:<br>00: Error code<br>01: Startup meter reading<br>02: MMI phase<br>03: Power value           | Read only | 2<br>0<br>---<br>0% | 255<br>999999<br>---<br>100% | 1<br>1<br>---<br>1 |                 | Service                           | ---                               |
| 702              | Error history former 1:<br>00: Error code<br>01: Startup meter reading<br>02: MMI phase<br>03: Power value  | Read only | 2<br>0<br>---<br>0% | 255<br>999999<br>---<br>100% | 1<br>1<br>---<br>1 |                 | Service                           | ---                               |
| •                |                                                                                                             |           |                     |                              |                    |                 |                                   |                                   |
| •                |                                                                                                             |           |                     |                              |                    |                 |                                   |                                   |
| •                |                                                                                                             |           |                     |                              |                    |                 |                                   |                                   |
| 711              | Error history former 10:<br>00: Error code<br>01: Startup meter reading<br>02: MMI phase<br>03: Power value | Read only | 2<br>0<br>---<br>0% | 255<br>999999<br>---<br>100% | 1<br>1<br>---<br>1 |                 | Service                           | ---                               |
|                  |                                                                                                             |           |                     |                              |                    |                 |                                   |                                   |

|     |                  |           |     |                                                |        |  |         |     |
|-----|------------------|-----------|-----|------------------------------------------------|--------|--|---------|-----|
| 900 | Process data     |           |     |                                                |        |  |         |     |
| 936 | Normalized speed | Read only | 0%  | 100%                                           | 0.01 % |  | Service | --- |
| 951 | Mains voltage    | Read only | 0 V | LME73.000A1:<br>175 V<br>LME73.000A2:<br>350 V | 1 V    |  | Service | --- |
| 954 | Flame intensity  | Read only | 0%  | 100%                                           | 1%     |  | Service | --- |

## Parameter level (Heating engineering) :

This level lets the engineer to modify some burner parameters. It is protect with a 4 digit password (SO level) and a 5 digit password (OEM level)

Password input : push **F** and **A** buttons together until the display shows "**code**" and 7 underlines. The left one flashes. By **+** or **-** move the flashing underline until it is on the desired position and push "enter". The underline becomes a dash. By means of **+** or **-**, choose the right character and push "enter". Input the whole password and the **PArA** appears and later on **000 Int**.

Scroll the parameters using **+** or **-**: **000Int, 100, 200, 500, 600 are on the display**. Choose the proper parameter group with the **enter** button and scroll the options with **+** e poi **-** (below the full par set: the two columns on the right give the level access). Choose the parameter to be modified with "enter" is writing is allowed. The parameter now flashes: **+** or **-** modifies the parameter and **enter** confirms. **+** and **-** pushed together move the menu one step back. Push **+** and **-** several times in order to get the home position..

| Parameter number | Parameter list<br>PME73.000Ax + PME73.831AxBC<br>LME73.831AxBC                                                                                                                      | Edit | Value range |          | Resolution | Factory setting | Password level<br>reading from level | Password level<br>writing from level |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|----------|------------|-----------------|--------------------------------------|--------------------------------------|
|                  |                                                                                                                                                                                     |      | Min.        | Max.     |            |                 |                                      |                                      |
| <b>0</b>         | <b>Internal parameter</b>                                                                                                                                                           |      |             |          |            |                 |                                      |                                      |
| 41               | Heating engineers password (4 characters)                                                                                                                                           | Edit | xxxx        | xxxx     | ---        |                 | ---                                  | OEM                                  |
| 42               | OEM's password (5 characters)                                                                                                                                                       | Edit | xxxxx       | xxxxx    | ---        |                 | ---                                  | OEM                                  |
| 60               | Backup / restore                                                                                                                                                                    | Edit | Restore     | Backup   | ---        |                 | ---                                  | SO                                   |
| <b>100</b>       | <b>General</b>                                                                                                                                                                      |      |             |          |            |                 |                                      |                                      |
| 123              | Min. power control step                                                                                                                                                             | Edit | 1%          | 10%      | 0.1        |                 | SO                                   | SO                                   |
| 140              | Mode display of Display and operating unit AZL2...<br>1 = Standard (program phase)<br>2 = Flame 1 (QRA... / ION)<br>3 = Flame 2 (QRB... / QRC...)<br>4 = Active power (power value) | Edit | 1           | 4        | 4          |                 | SO                                   | SO                                   |
| <b>200</b>       | <b>Burner control</b>                                                                                                                                                               |      |             |          |            |                 |                                      |                                      |
| 224              | Specified time (t10) air pressure switch (LP)                                                                                                                                       | Edit | 0 s         | 13.818 s | 0.294 s    | 12,054          | SO                                   | OEM                                  |
| 225              | Gas: Prepurge time (t1)                                                                                                                                                             | Edit | 0 s         | 1237 s   | 4.851 s    | 29,106          | SO                                   | OEM                                  |
| 226              | Gas: Preignition time (t3)                                                                                                                                                          | Edit | 1.029 s     | 37.485 s | 0.147 s    | 2,058           | SO                                   | OEM                                  |
| 230              | Interval (t4): End of safety time (TSA) - fuel valve 1 (V1) ON                                                                                                                      | Edit | 3.234 s     | 74.97 s  | 0.294 s    | 3,234           | SO                                   | OEM                                  |
| 231              | Interval (t9): Fuel valve 1 (V1) ON - pilot valve (PV) OFF                                                                                                                          | Edit | 0 s         | 74.97 s  | 0.294 s    | 2,940           | SO                                   | OEM                                  |
| 232              | Interval (t5): Pilot valve (PV) OFF - load controller (LR) release                                                                                                                  | Edit | 2.058 s     | 74.97 s  | 0.294 s    | 8.820           | SO                                   | OEM                                  |
| 234              | Gas: Postpurge time (t8)                                                                                                                                                            | Edit | 0 s         | 1237 s   | 4.851 s    | 0               | SO                                   | OEM                                  |
| 239              | Gas: Intermittent operation after 24 hours of continuous operation<br>0=OFF<br>1=ON                                                                                                 | Edit | 0           | 1        | 1          | 1               | SO                                   | OEM                                  |

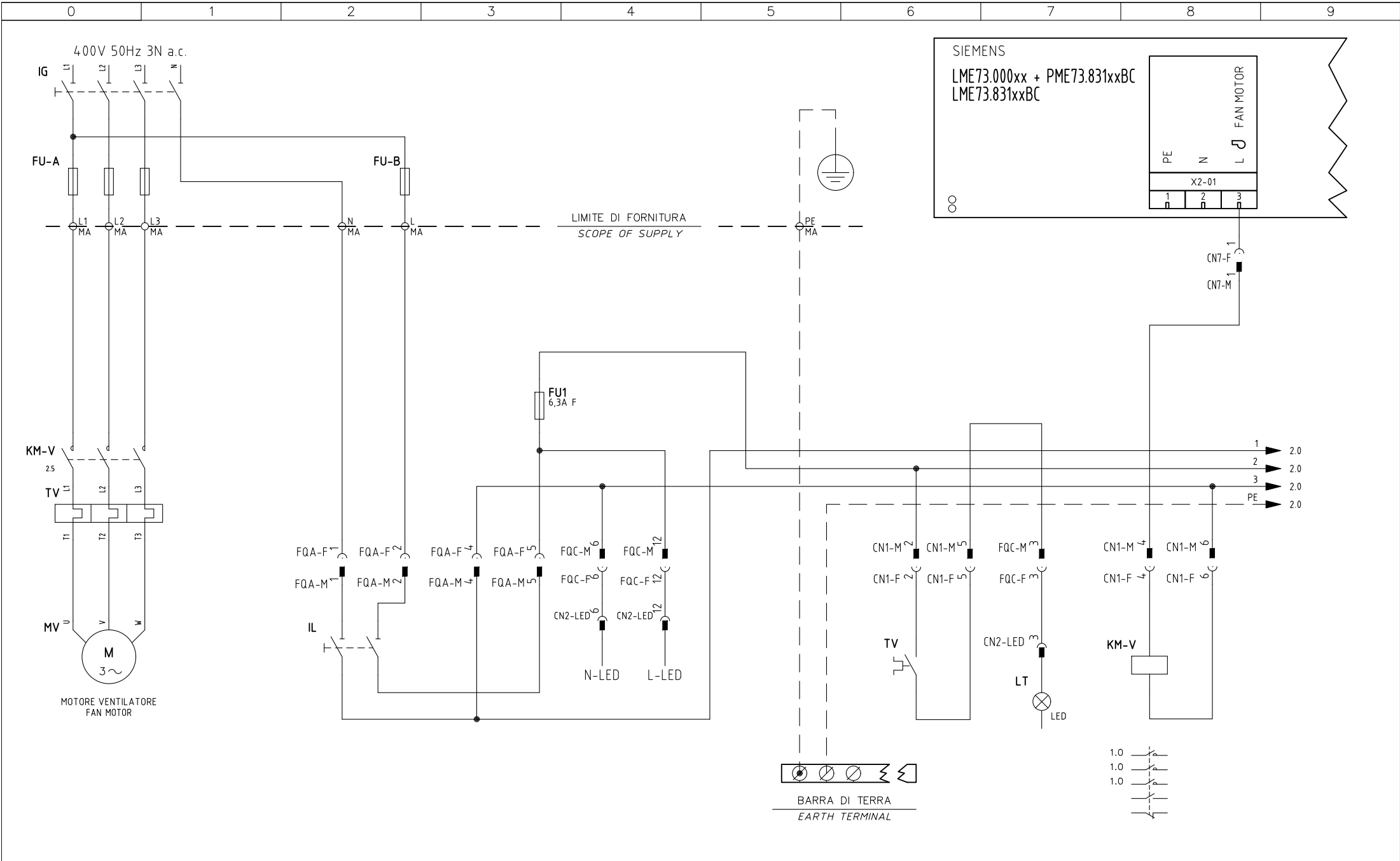
|        |                                                                                                                                                                                 |      |         |          |         |        |    |     |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------|----------|---------|--------|----|-----|
| 240    | Repetition in the event of loss of flame during operation<br>0 = None<br>1 = None<br>2 = 1 x Repetition                                                                         | Edit | 0       | 2        | 1       | 0      | SO | OEM |
| 241.00 | Valve proving<br>0 = Off<br>1 = On                                                                                                                                              | Edit | 0       | 1        | 1       | 1      | SO | OEM |
| 241.01 | Valve proving<br>0 = During prepurge time (t1)<br>1 = During postpurge time (t8)                                                                                                | Edit | 0       | 1        | 1       | 0      | SO | OEM |
| 241.02 | Valve proving<br>0 = According to P241.01<br>1 = During prepurge time (t1) and postpurge time (t8)                                                                              | Edit | 0       | 1        | 1       | 0      | SO | OEM |
| 242    | Valve proving test space evacuating                                                                                                                                             | Edit | 0 s     | 2.648 s  | 0.147 s | 2,646  | SO | OEM |
| 243    | Valve proving time test atmospheric pressure                                                                                                                                    | Edit | 1.029 s | 37.485 s | 0.147 s | 10,290 | SO | OEM |
| 244    | Valve proving test space filling                                                                                                                                                | Edit | 0 s     | 2.648 s  | 0.147 s | 2,646  | SO | OEM |
| 245    | Valve proving time test gas pressure                                                                                                                                            | Edit | 1.029 s | 37.485 s | 0.147 s | 10,290 | SO | OEM |
| 254    | Response time detector error<br>0 = 1 s<br>1 = 3 s                                                                                                                              | Edit | 0       | 1        | 1       | 0      | SO | OEM |
| 257    | Gas: Postignition time (t3n – 0.3 seconds)                                                                                                                                      | Edit | 0 s     | 13.23 s  | 0.147 s | 2,205  | SO | OEM |
| 259.00 | Opening time of actuator (t11) (timeout for lockout)                                                                                                                            | Edit | 0 s     | 1237 s   | 4.851 s | 67,914 | SO | OEM |
| 259.01 | Opening time of actuator from ignition load to low-fire position                                                                                                                | Edit | 0 s     | 37.485 s | 0.147 s | 14,994 | SO | OEM |
| 259.02 | Opening time of actuator from low-fire to ignition load position                                                                                                                | Edit | 0 s     | 37.485 s | 0.147 s | 14,994 |    |     |
| 260    | Closing time of actuator (t12) (timeout for lockout)                                                                                                                            | Edit | 0 s     | 1237 s   | 4.851 s | 67,914 | SO | OEM |
| 500    | <b>Ratio control</b>                                                                                                                                                            |      |         |          |         |        |    |     |
| 515    | Actuator position during prepurge time (t1) and postpurge time (t8)<br>0: Purging in low-fire<br>1: Purging in high-fire                                                        | Edit | 0       | 1        | 1       | 1      | SO | OEM |
| 560    | Pneumatic combustion control<br>0 = off / 3-step modulation<br>1 = PWM fan / analog modulation<br>2 = air damper / analog modulation (feedback potentiometer ASZxx.3x required) | Edit | 0       | 2        | 1       | 1      | SO | SO  |
|        |                                                                                                                                                                                 |      |         |          |         |        |    |     |
|        |                                                                                                                                                                                 |      |         |          |         |        |    |     |

| 600 | Power setting                                                                                                                                                                                            |      |   |   |   |   |    |    |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---|---|---|---|----|----|
| 654 | Analog input (feedback potentiometer ASZxx.3x required)<br>0 = 3-position step input<br>1 = 0...10 V<br>2 = 0...135 $\Omega$<br>3 = 0...20 mA<br>4 = 4...20 mA with lockout at I < 4 mA<br>5 = 4...20 mA | Edit | 0 | 5 | 1 | 0 | SO | SO |

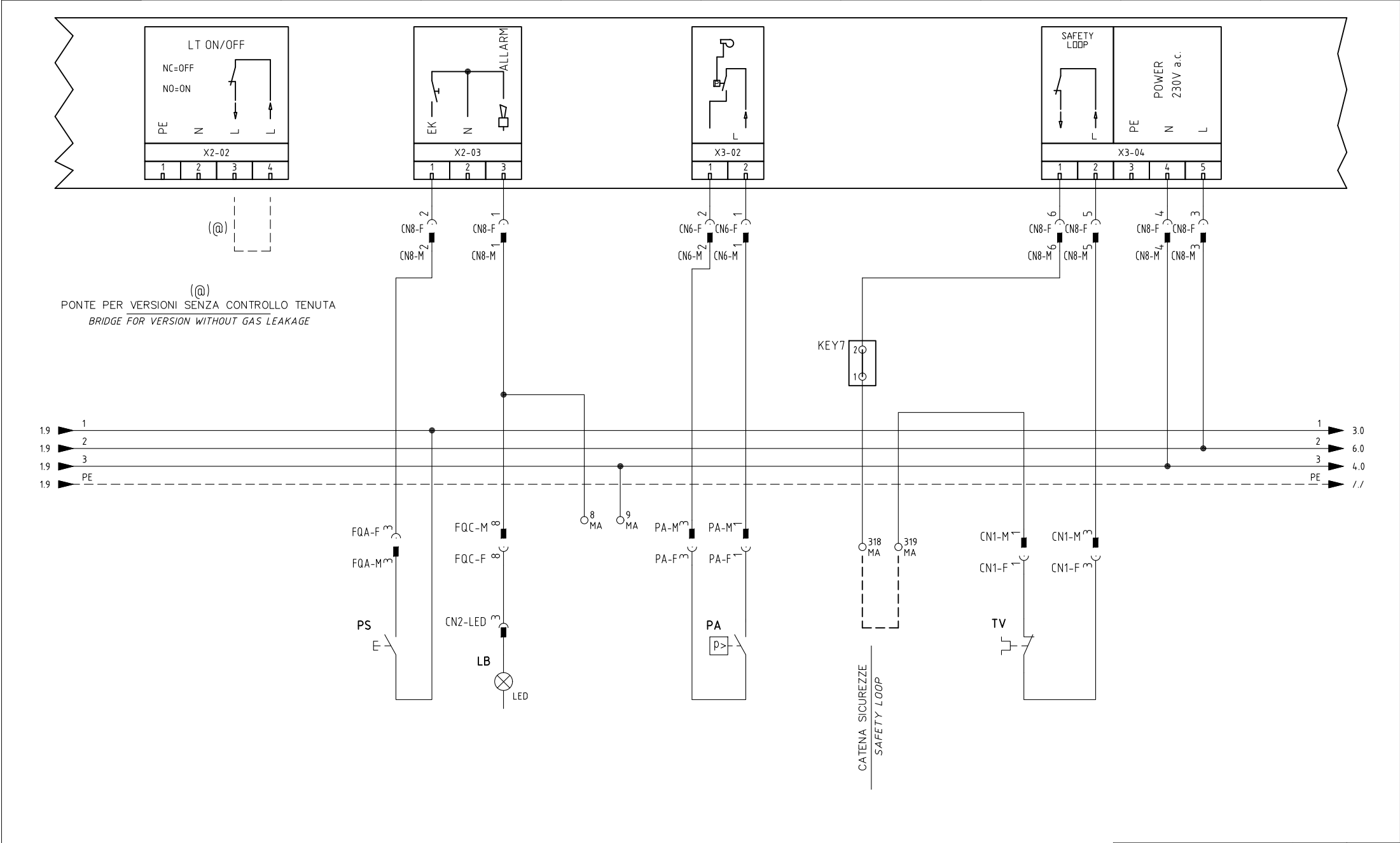
| WARNING                                                                                |                                                                  |
|----------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Parameter Num. :<br>41<br>42<br>60<br>123<br>140<br>242<br>243<br>244<br>245<br>259.01 | Adjustable parameters from SO or OEM levels for<br>LME73.831AxBC |



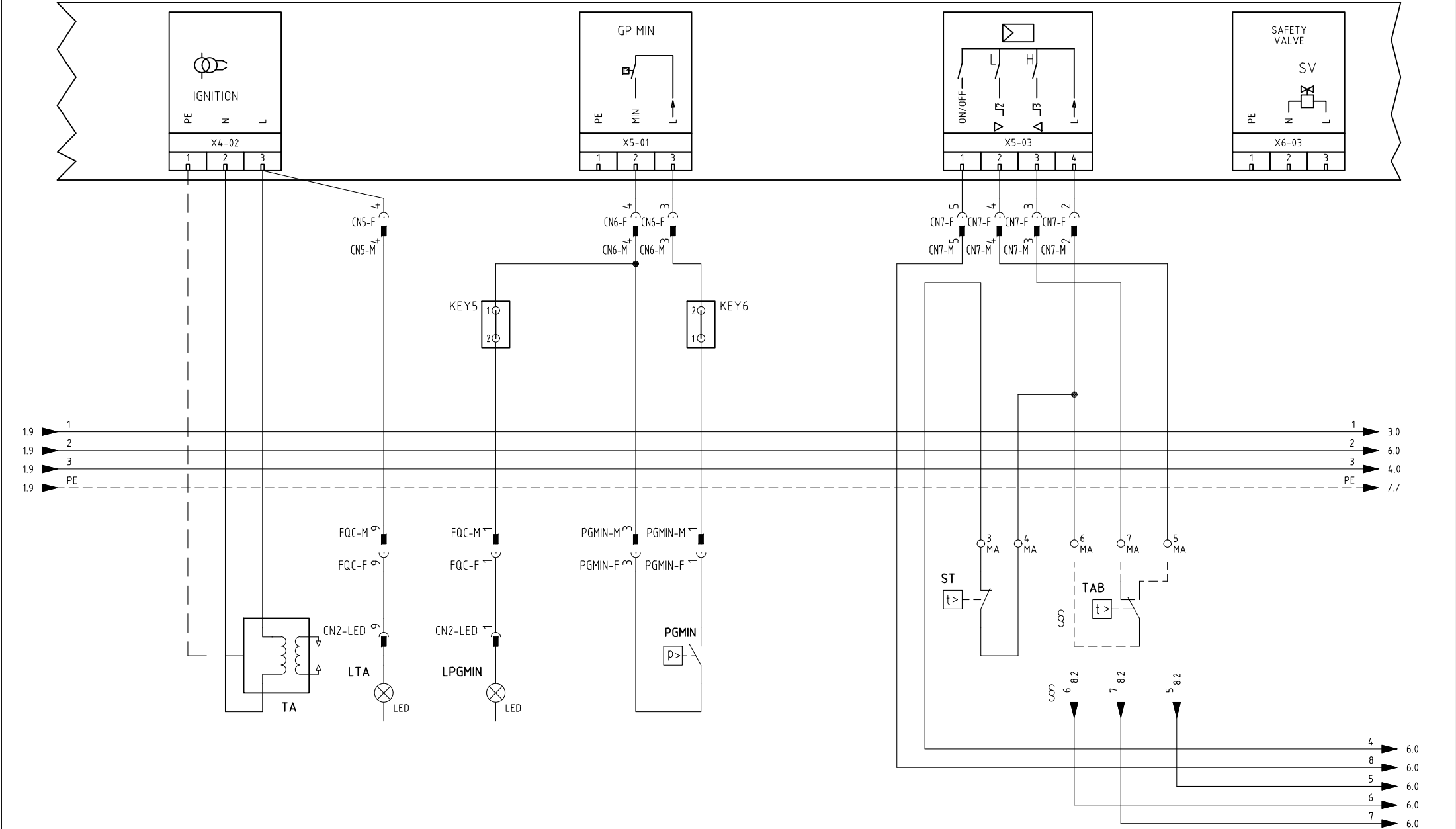
Note: Specifications and data subject to change. Errors and omissions excepted.



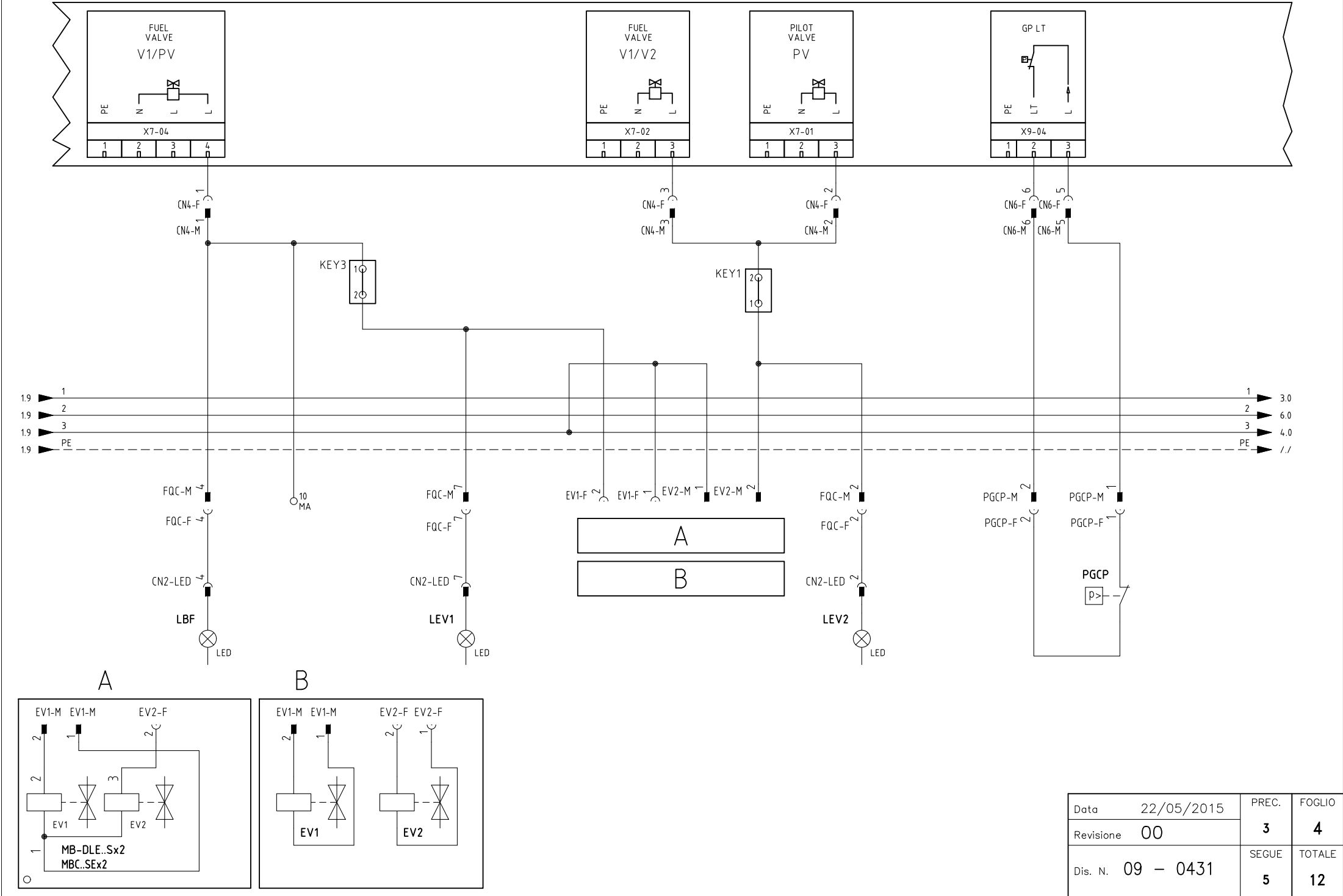
|  |             |                                        |  |           |  |                  |                   |       |        |
|--|-------------|----------------------------------------|--|-----------|--|------------------|-------------------|-------|--------|
|  | Impianto    | TIPI/TYPES R91A ÷ R520A / TP91A÷TP520A |  | Ordine    |  | Data             | 22/05/2015        | PREC. | FOGLIO |
|  |             | MODELLO/MODEL x-.PR(MD).S.xx.A.1.xx    |  | Commessa  |  | Data Controllato | 00                | /     | 1      |
|  | Descrizione | LME73.xx + COD. 6100573 + COD. 6100566 |  | Esecutore |  | Controllato      |                   | SEQUE | TOTALE |
|  |             |                                        |  | U. PINTON |  | G. SCATTOLIN     | Dis. N. 09 - 0431 | 2     | 12     |

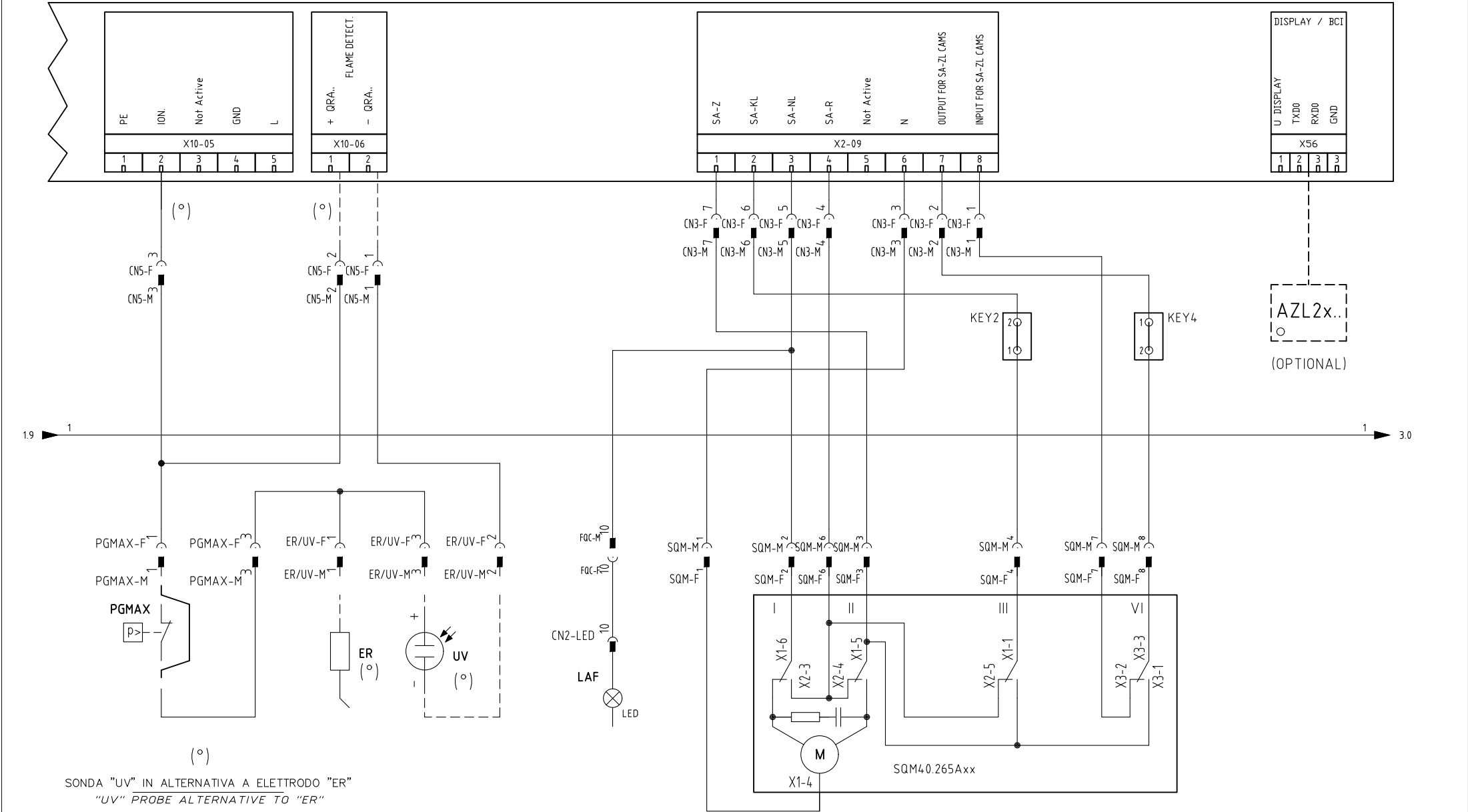


|           |            |         |           |
|-----------|------------|---------|-----------|
| Data      | 22/05/2015 | PREC.   | FOGLIO    |
| Revisione | 00         | 1       | 2         |
| Dis. N.   | 09 - 0431  | SEGUE 3 | TOTALE 12 |



|           |            |       |        |
|-----------|------------|-------|--------|
| Data      | 22/05/2015 | PREC. | FOGLIO |
| Revisione | 00         | 2     | 3      |
| Dis. N.   | 09 - 0431  | SEGUE | TOTALE |
|           |            | 4     | 12     |



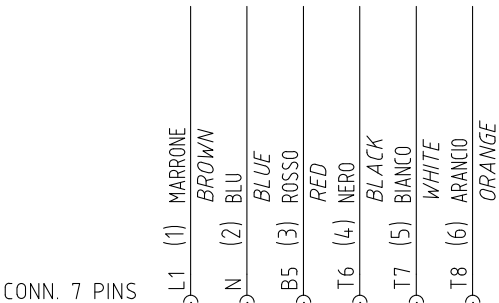
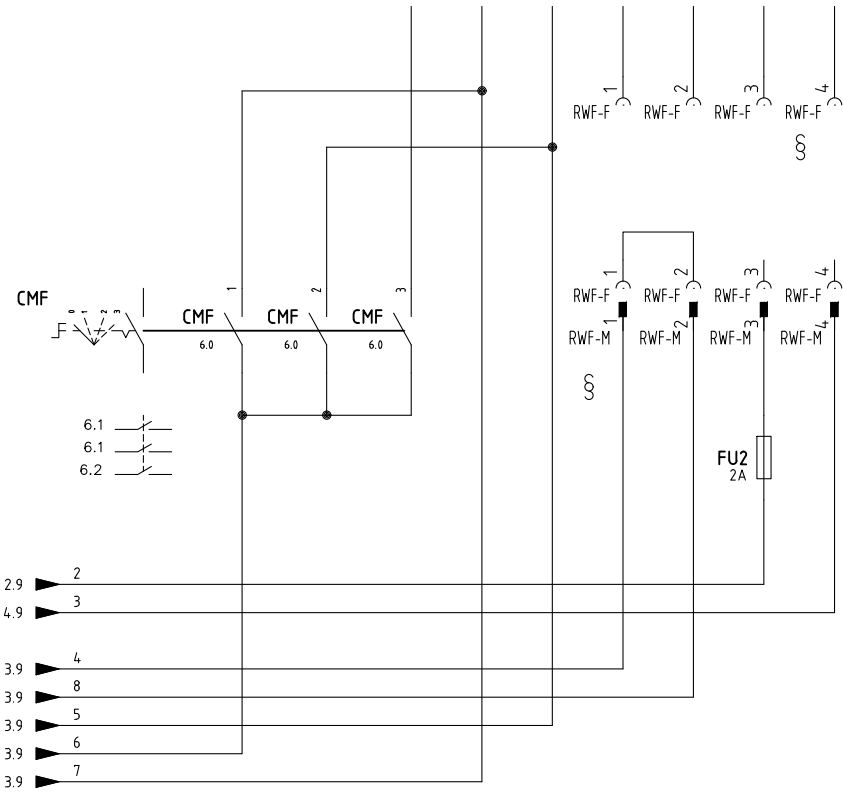
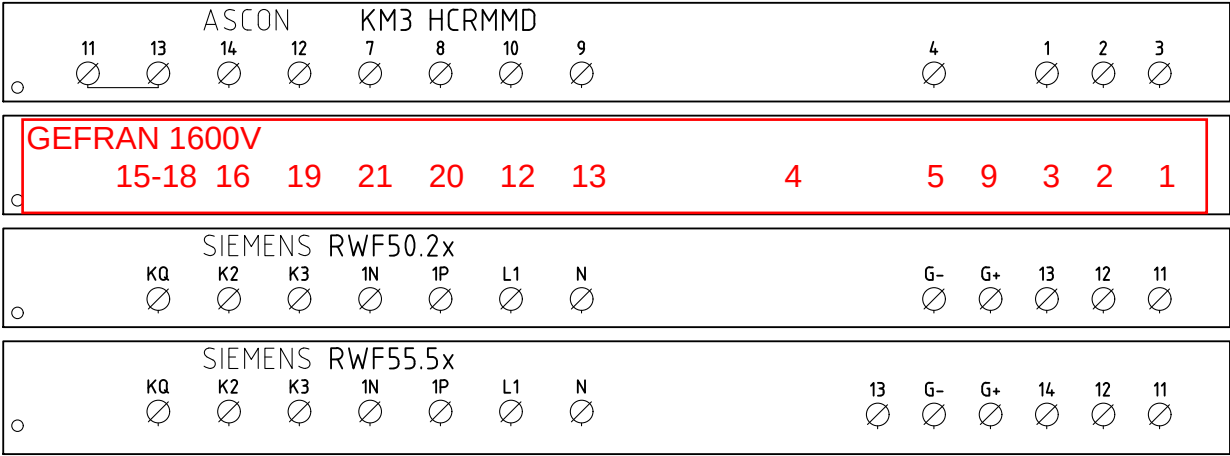


SONDA "UV" IN ALTERNATIVA A ELETTRODO "ER"  
"UV" PROBE ALTERNATIVE TO "ER"

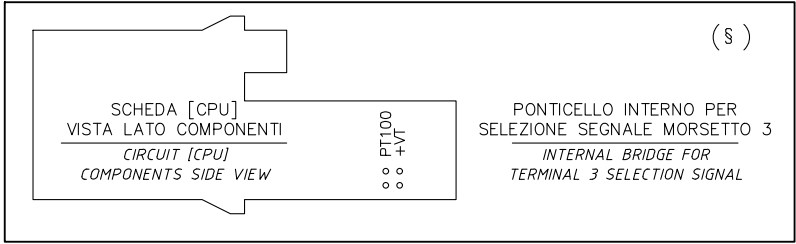
SERVOCOMANDO SERRANDA ARIA  
AIR DAMPER ACTUATOR  
SQM40.265Axx

- I ALTA FIAMMA  
HIGH FLAME
- II SOSTA  
STAND-BY
- III BASSA FIAMMA  
LOW FLAME
- VI ACCENSIONE  
IGNITION

|           |            |       |        |
|-----------|------------|-------|--------|
| Data      | 22/05/2015 | PREC. | FOGLIO |
| Revisione | 00         | 4     | 5      |
| Dis. N.   | 09 - 0431  | SEGUE | TOTALE |
|           |            | 6     | 12     |



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



§  
VERSIONE (PR) / VERSIONE (MD) CON RWF.. / 600V / KM3  
(PR) VERSION / (MD) VERSION WITH RWF.. / 600V / KM3

|           |            |       |        |
|-----------|------------|-------|--------|
| Data      | 22/05/2015 | PREC. | FOGLIO |
| Revisione | 00         | 5     | 6      |
| Dis. N.   | 09 - 0431  | SEGUE | TOTALE |
|           |            | 7     | 12     |

$$\left( \begin{array}{cc} \times & \times \end{array} \right)$$

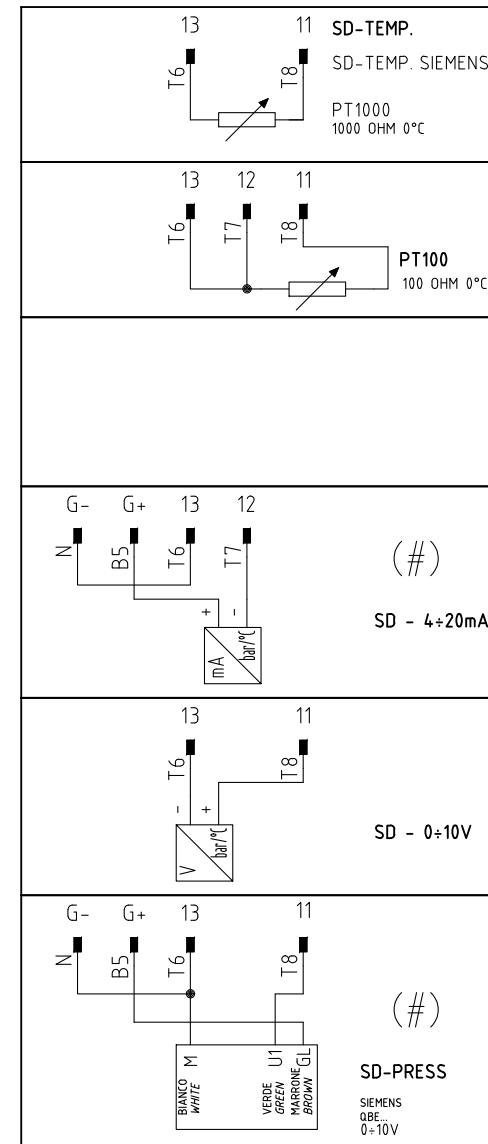
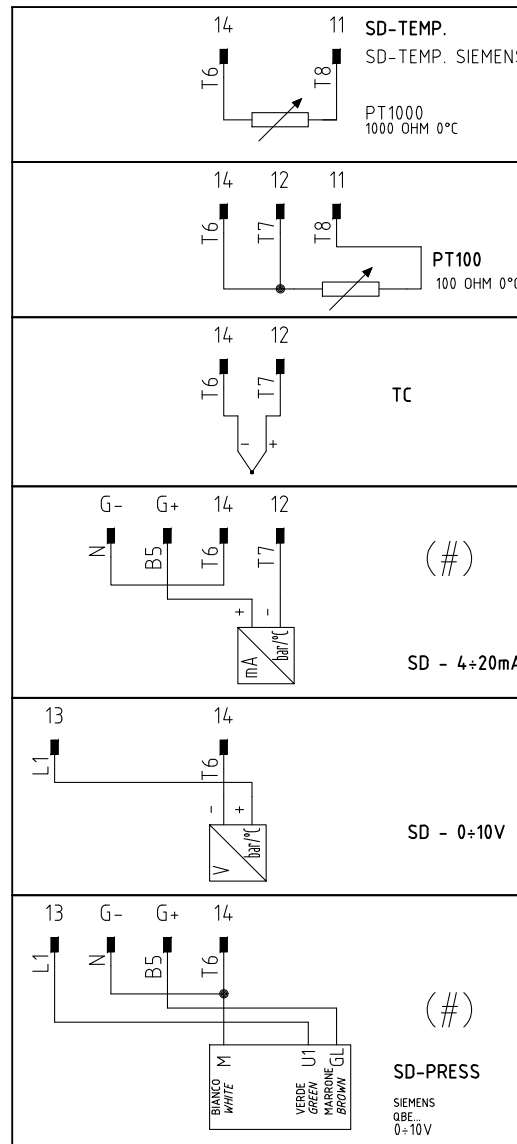
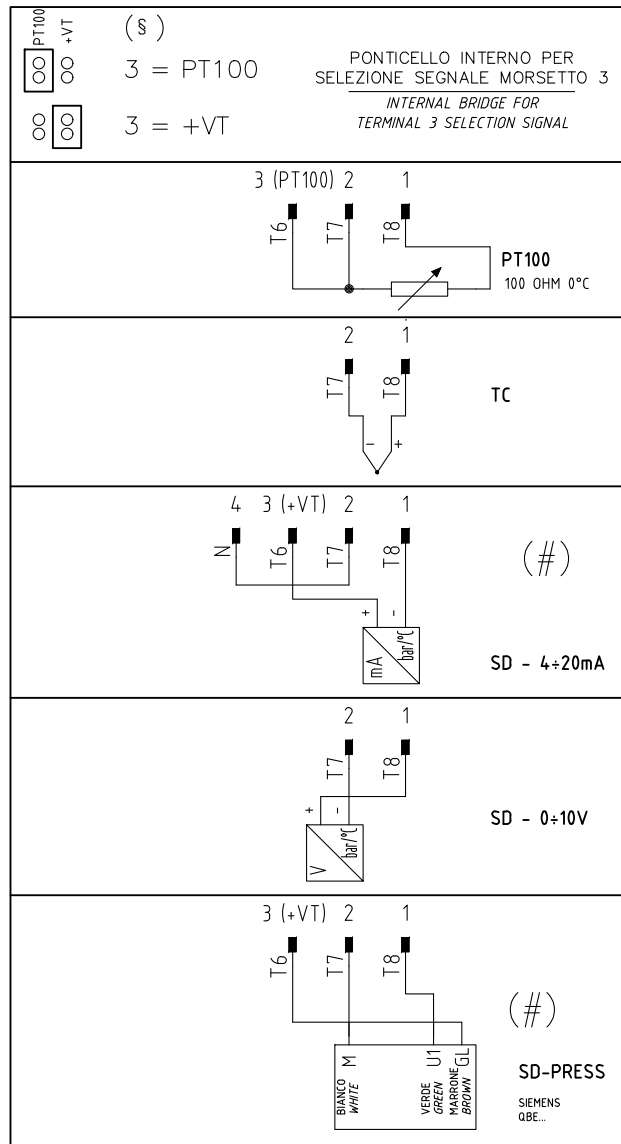
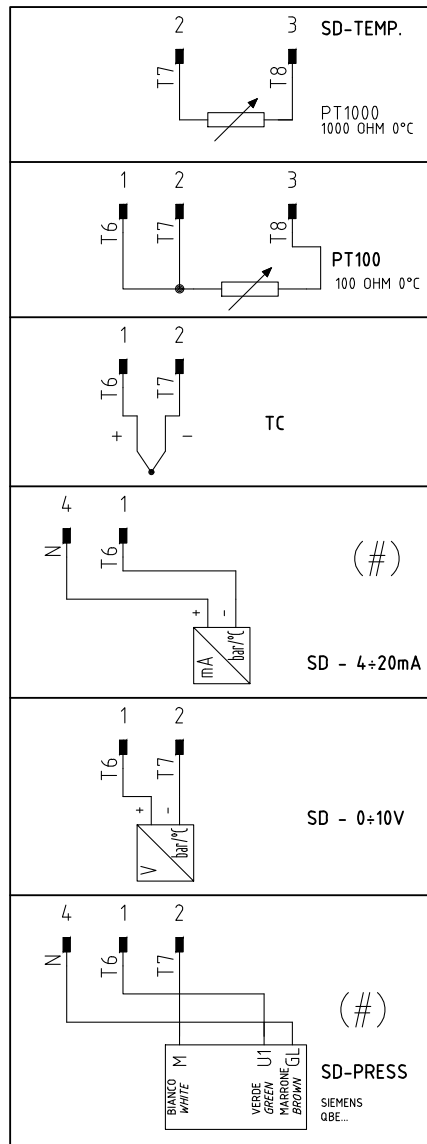
ATTENZIONE COLLEGAMENTO SONDE CON CONNETTORE 7 POLI  
WARNING PROBE CONNECTION WITH 7 PINS CONNECTOR

## KM3 HCRMMD

600V RRR0-1-T73

## RW F55.5x

## RWF50.2x

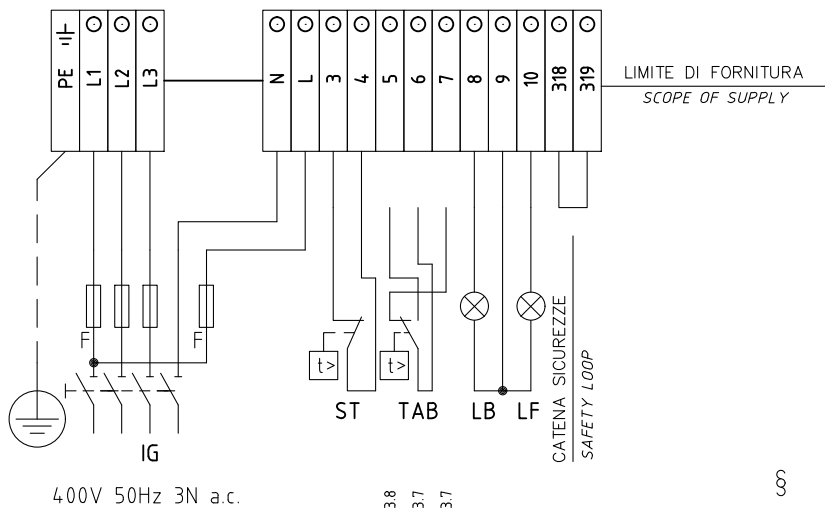
 $(\#)$ 

COLLEGAMENTO SOLO PER  
TRASDUTTORI PASSIVI

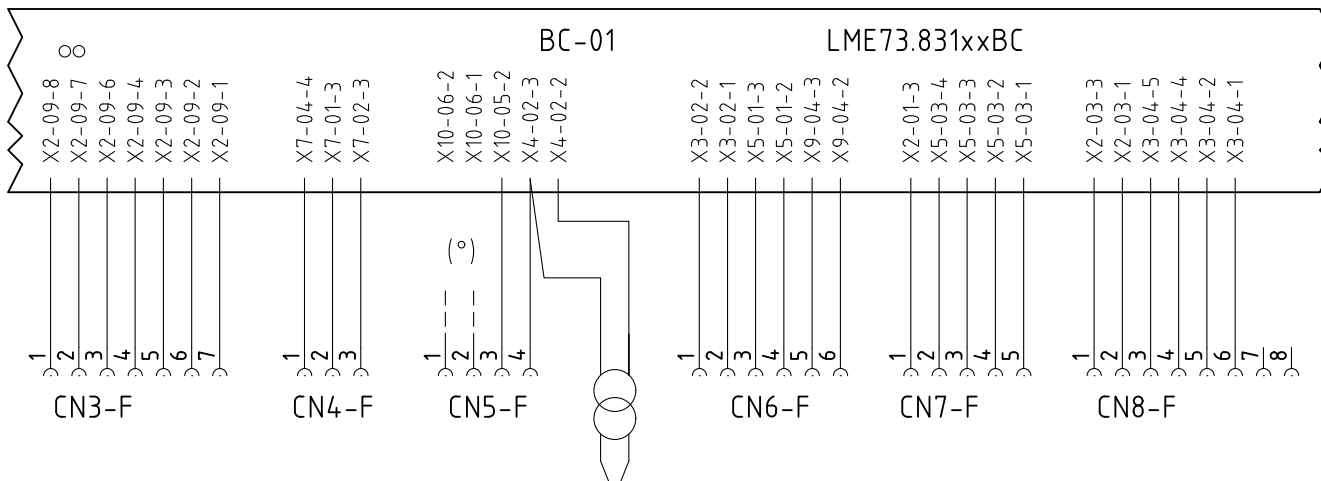
TRASDUCER PASSIVE  
CONNECTION ONLY

|           |            |          |           |
|-----------|------------|----------|-----------|
| Data      | 22/05/2015 | PREC.    | FOGLIO    |
| Revisione | 00         | <b>6</b> | <b>7</b>  |
| Dis. N.   | 09 – 0431  | SEQUE    | TOTALE    |
|           |            | <b>8</b> | <b>12</b> |

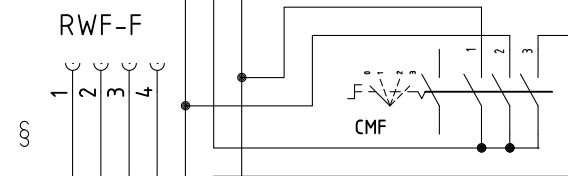
QUADRO QG - MORSETTIERA MA  
MORSETTIERA ALIMENTAZIONE BRUCIATORE  
BURNER SUPPLY TERMINAL BOARD



VERSIONE (PR) / VERSIONE (MD) CON RWF.. / 600V / KM3  
(PR) VERSION / (MD) VERSION WITH RWF.. / 600V / KM3



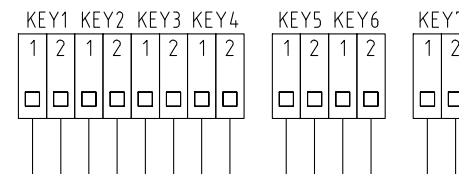
SONDA "UV" IN ALTERNATIVA A ELETTRODO "ER"  
"UV" PROBE ALTERNATIVE TO "ER"



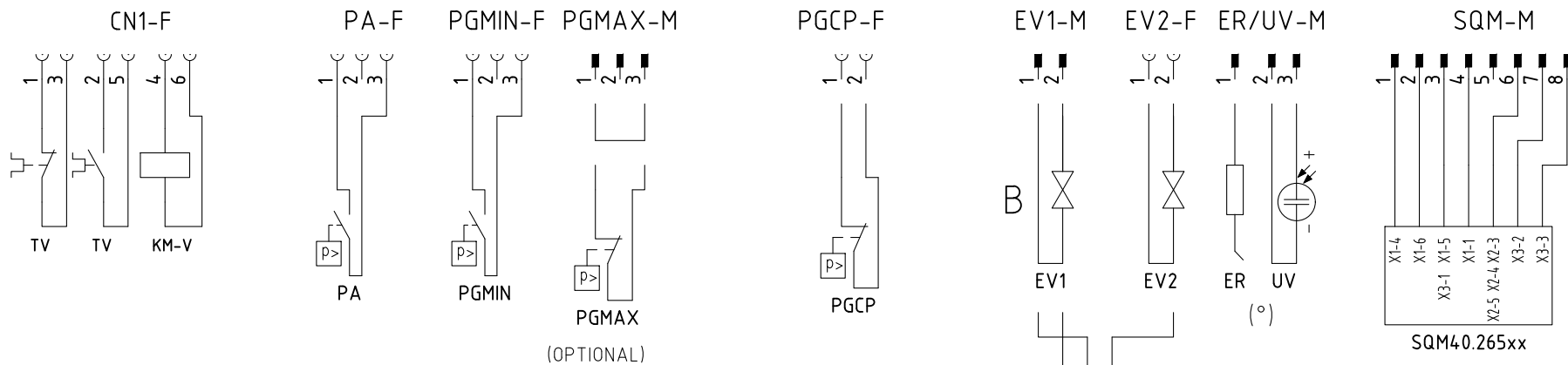
RWF50.2x - RWF55.5x

600V RRR0-1-T73

KM3 HCRMMD

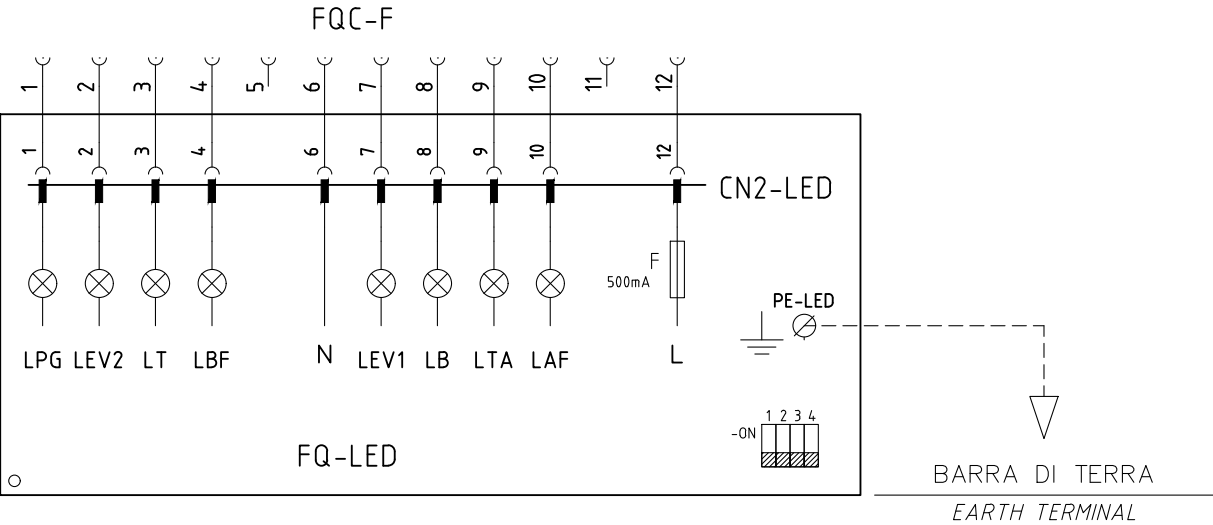
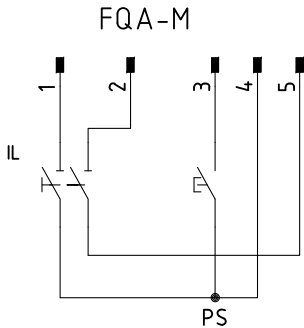
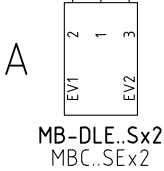


|           |            |       |        |
|-----------|------------|-------|--------|
| Data      | 22/05/2015 | PREC. | FOGLIO |
| Revisione | 00         | 7     | 8      |
| Dis. N.   | 09 - 0431  | SEGUE | TOTALE |
|           |            | 9     | 12     |



SERVOCOMANDO SERRANDA ARIA  
AIR DAMPER ACTUATOR  
SQM40.265Axx

- I ALTA FIAMMA  
HIGH FLAME
- II SOSTA  
STAND-BY
- III BASSA FIAMMA  
LOW FLAME
- VI ACCENSIONE  
IGNITION

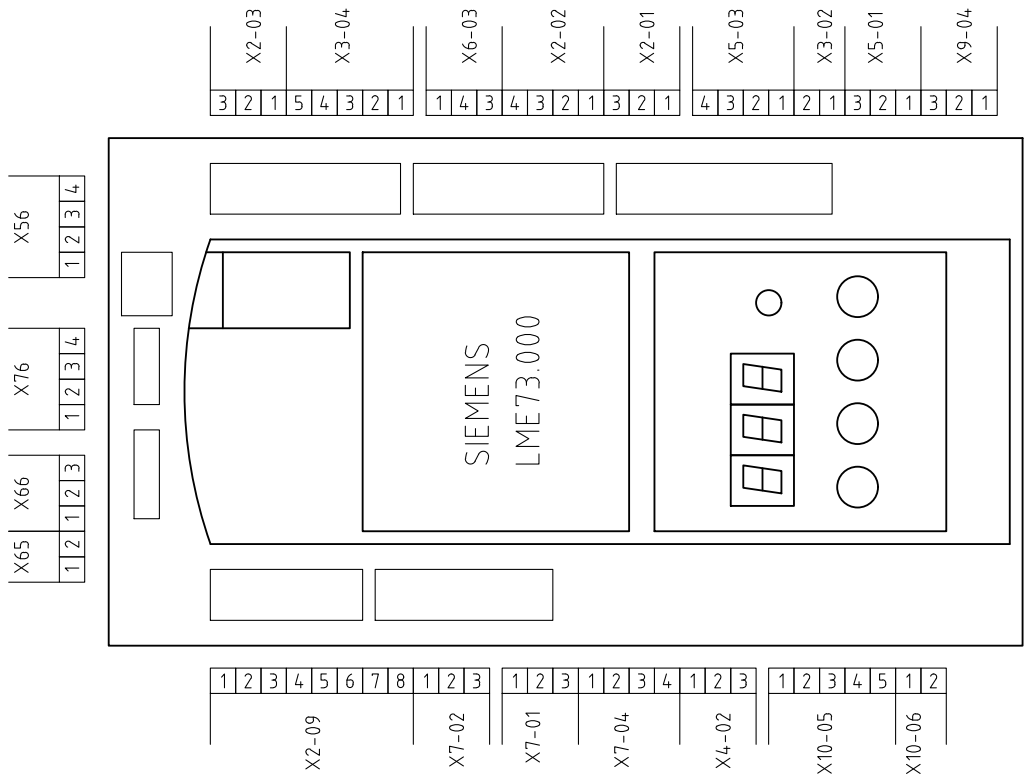


(°)  
SONDA "UV" IN ALTERNATIVA A ELETTRODO "ER"  
"UV" PROBE ALTERNATIVE TO "ER"

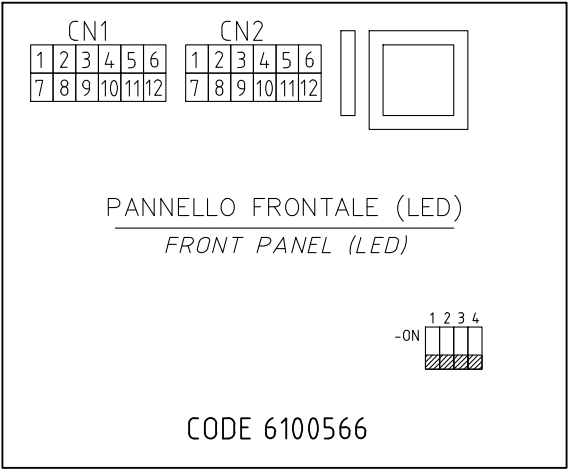
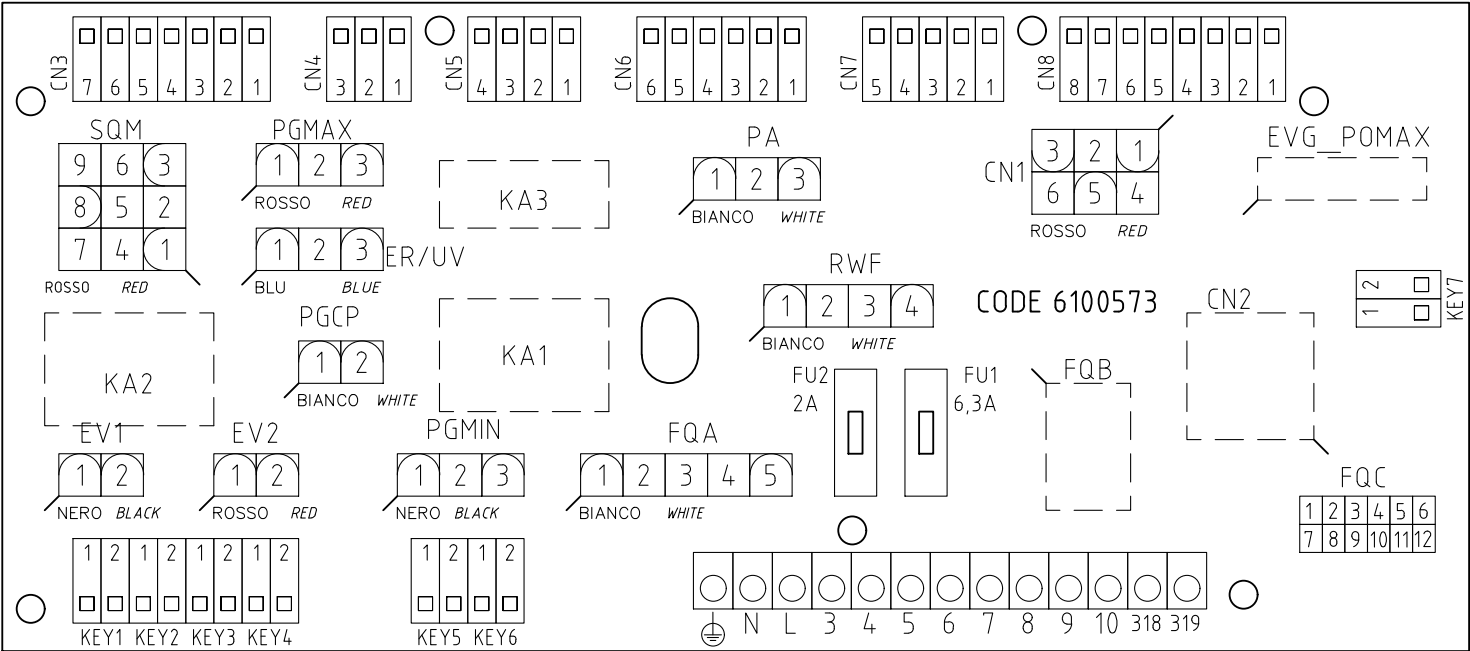
|           |            |       |        |
|-----------|------------|-------|--------|
| Data      | 22/05/2015 | PREC. | FOGLIO |
| Revisione | 00         | 8     | 9      |
| Dis. N.   | 09 - 0431  | SEGUE | TOTALE |
|           |            | 10    | 12     |

| Sigla/Item                  | Foglio/Sheet | Funzione                                                                | Function                                                 |
|-----------------------------|--------------|-------------------------------------------------------------------------|----------------------------------------------------------|
| 600V RRR0-1-T73             | 6            | REGOLATORE MODULANTE (ALTERNATIVO)                                      | BURNER MODULATOR (ALTERNATIVE)                           |
| AZL2x..                     | 5            | INTERFACCIA UTENTE                                                      | USER INTERFACE                                           |
| CMF                         | 6            | COMMUT. MANUALE FUNZ. 0)FERMO 1)ALTA FIAMMA 2)BASSA FIAMMA 3)AUTOMATICO | MANUAL SWITCH 0)OFF 1)HIGH FLAME 2)LOW FLAME 3)AUTOMATIC |
| ER                          | 5            | ELETTRODO RILEVAZIONE FIAMMA                                            | FLAME DETECTION ELECTRODE                                |
| EV1                         | 4            | ELETTROVALVOLA GAS LATO RETE                                            | UPSTREAM GAS SOLENOID VALVE                              |
| EV2                         | 4            | ELETTROVALVOLA GAS LATO BRUCIATORE                                      | DOWNSTREAM GAS SOLENOID VALVE                            |
| FQ-LED                      | 9            | PANNELLO FRONTALE (LED)                                                 | FRONT PANEL (LED)                                        |
| FQ-LED                      | 8            | PANNELLO FRONTALE (LED)                                                 | FRONT PANEL (LED)                                        |
| FU1                         | 1            | FUSIBILE AUSILIARIO                                                     | AUXILIARY FUSE                                           |
| FU2                         | 6            | FUSIBILE                                                                | FUSE                                                     |
| FU-A                        | 1            | FUSIBILI DI LINEA                                                       | LINE FUSES                                               |
| FU-B                        | 1            | FUSIBILE DI LINEA                                                       | LINE FUSE                                                |
| IG                          | 1            | INTERRUTTORE GENERALE                                                   | MAINS SWITCH                                             |
| IL                          | 1            | INTERRUTTORE LINEA AUSILIARI                                            | AUXILIARY LINE SWITCH                                    |
| KM3 HCRMMD                  | 6            | REGOLATORE MODULANTE (ALTERNATIVO)                                      | BURNER MODULATOR (ALTERNATIVE)                           |
| KM-V                        | 1            | CONTATTORE MOTORE VENTILATORE                                           | FAN MOTOR CONTACTOR                                      |
| LAF                         | 5            | LAMPADA SEGNALE ALTA FIAMMA BRUCIATORE                                  | BURNER IN HIGH FLAME INDICATOR LIGHT                     |
| LB                          | 2            | LAMPADA SEGNALE BLOCCO BRUCIATORE                                       | INDICATOR LIGHT FOR BURNER LOCK-OUT                      |
| LBF                         | 4            | LAMPADA SEGNALE BASSA FIAMMA BRUCIATORE                                 | BURNER IN LOW FLAME INDICATOR LIGHT                      |
| LEV1                        | 4            | LAMPADA SEGNALE APERTURA [EV1]                                          | INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV1]       |
| LEV2                        | 4            | LAMPADA SEGNALE APERTURA [EV2]                                          | INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV2]       |
| LME73.000xx + PME73.831xxBC | 1            | APPARECCHIATURA DI COMANDO                                              | CONTROL SCHEME                                           |
| LME73.831xxBC               | 1            | APPARECCHIATURA DI COMANDO                                              | CONTROL SCHEME                                           |
| LPGMIN                      | 3            | LAMPADA SEGNALE PRESENZA GAS IN RETE                                    | INDICATOR LIGHT FOR PRESENCE OF GAS IN THE NETWORK       |
| LT                          | 1            | LAMPADA SEGNALE BLOCCO TERMICO MOTORE VENTILATORE                       | INDICATOR LIGHT FOR FAN MOTOR OVERLOAD THERMAL CUTOUT    |
| LTA                         | 3            | LAMPADA SEGNALE TRASFORMATORE DI ACCENSIONE                             | IGNITION TRANSFORMER INDICATOR LIGHT                     |
| MB-DLE..Sx2                 | 4            | GRUPPO VALVOLE GAS                                                      | GAS VALVES GROUP                                         |
| MBC..SEx2                   | 4            | GRUPPO VALVOLE GAS (ALTERNATIVO)                                        | GAS VALVES GROUP (ALTERNATIVE)                           |
| MV                          | 1            | MOTORE VENTILATORE                                                      | FAN MOTOR                                                |
| PA                          | 2            | PRESSOSTATO ARIA                                                        | AIR PRESSURE SWITCH                                      |
| PGCP                        | 4            | PRESSOSTATO GAS CONTROLLO PERDITE                                       | GAS LEAKAGE PRESSURE SWITCH                              |
| PGMAX                       | 5            | PRESSOSTATO GAS DI MASSIMA PRESSIONE (OPTIONAL)                         | MAXIMUM PRESSURE GAS SWITCH (OPTIONAL)                   |

| Sigla/Item   | Foglio/Sheet | Funzione                                 | Function                                   |
|--------------|--------------|------------------------------------------|--------------------------------------------|
| PGBIN        | 3            | PRESSOSTATO GAS DI MINIMA PRESSIONE      | MINIMUM GAS PRESSURE SWITCH                |
| PS           | 2            | PULSANTE SBLOCCO FIAMMA                  | FLAME UNLOCK BUTTON                        |
| PT100        | 7            | SONDA DI TEMPERATURA                     | TEMPERATURE PROBE                          |
| RWF50.2x     | 6            | REGOLATORE MODULANTE                     | BURNER MODULATOR                           |
| RWF55.5x     | 6            | REGOLATORE MODULANTE (ALTERNATIVO)       | BURNER MODULATOR (ALTERNATIVE)             |
| SD-PRESS     | 7            | SONDA DI PRESSIONE                       | PRESSURE PROBE                             |
| SD-TEMP.     | 7            | SONDA DI TEMPERATURA                     | TEMPERATURE PROBE                          |
| SD - 0÷10V   | 7            | TRASDUTTORE USCITA IN TENSIONE           | TRANSDUCER VOLTAGE OUTPUT                  |
| SD - 4÷20mA  | 7            | TRASDUTTORE USCITA IN CORRENTE           | TRANSDUCER CURRENT OUTPUT                  |
| SQM40.265Axx | 5            | SERVOCOMANDO SERRANDA ARIA               | AIR DAMPER ACTUATOR                        |
| ST           | 3            | SERIE TERMOSTATI/PRESSOSTATI             | SERIES OF THERMOSTATS OR PRESSURE SWITCHES |
| TA           | 3            | TRASFORMATORE DI ACCENSIONE              | IGNITION TRANSFORMER                       |
| TAB          | 3            | TERMOSTATO/PRESSOSTATO ALTA-BASSA FIAMMA | HIGH-LOW THERMOSTAT/PRESSURE SWITCHES      |
| TC           | 7            | TERMOCOPPIA                              | THERMOCOUPLE                               |
| TV           | 1            | TERMICO MOTORE VENTILATORE               | FAN MOTOR THERMAL                          |
| UV           | 5            | SONDA UV RILEVAZIONE FIAMMA              | UV FLAME DETECTOR                          |



VISTA LATO COMPONENTI  
COMPONENTS SIDE VIEW



|           |            |       |        |
|-----------|------------|-------|--------|
| Data      | 22/05/2015 | PREC. | FOGLIO |
| Revisione | 00         | 11    | 12     |
| Dis. N.   | 09 - 0431  | SEGUE | TOTALE |
|           | /          |       | 12     |