

# **HP60 - HP65 HP72 - HP73A**

***Progressive  
and fully-modulating  
gas - light oil burners***

**MANUAL OF INSTALLATION - USE - MAINTENANCE**

***CIB UNIGAS***

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

## DANGERS, WARNINGS AND NOTES OF CAUTION

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

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

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

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

### 1) GENERAL INTRODUCTION

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

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

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

Contact qualified personnel only.

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

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

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

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

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

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

### 2) SPECIAL INSTRUCTIONS FOR BURNERS

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

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

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

### Special warnings

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

### 3) GENERAL INSTRUCTIONS DEPENDING ON FUEL USED

#### 3a) ELECTRICAL CONNECTION

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

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

#### GENERAL

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

#### SPECIAL INSTRUCTIONS FOR USING GAS

Have qualified personnel inspect the installation to ensure that:

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

#### Precautions if you can smell gas

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

### DIRECTIVES AND STANDARDS

#### *Gas burners*

##### European directives

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

##### Harmonized standards

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

#### *Light oil burners*

##### European directives

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

##### Harmonized standards

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

##### National Standard

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

#### *Heavy oil burners*

##### European Directives

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

##### Harmonized standards

- UNI EN 267 (Automatic forced draught burners for liquid fuels)
- EN 55014-1 (Electromagnetic compatibility- Requirements for 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);

##### Norme nazionali / National Standard

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

### Gas - Light oil burners

#### European Directives

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

#### Harmonized standards

- UNI EN 676 (Automatic forced draught burners for gaseous fuels)
- UNI EN 267 (Automatic forced draught burners for liquid fuels)
- EN 55014-1 (Electromagnetic compatibility- Requirements for 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);

#### Norme nazionali / National Standard

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

### Gas - Heavy oil burners

#### European directives:

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

#### Harmonized standards

- UNI EN 676 (Automatic forced draught burners for gaseous fuels)
- EN 55014-1 (Electromagnetic compatibility- Requirements for 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);

#### National Standard

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

### Industrial burners

#### European directives

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

#### Harmonized standards

- EN 55014-1 (Electromagnetic compatibility- Requirements for 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.

## GENERAL FEATURES

This series represents monobloc gas burners made in die-cast aluminium housing, that can burn either gas or light oil, thanks to the adjustable combustion head which allows a good performance with both fuels. They can be provided in progressive or fully-modulating version.

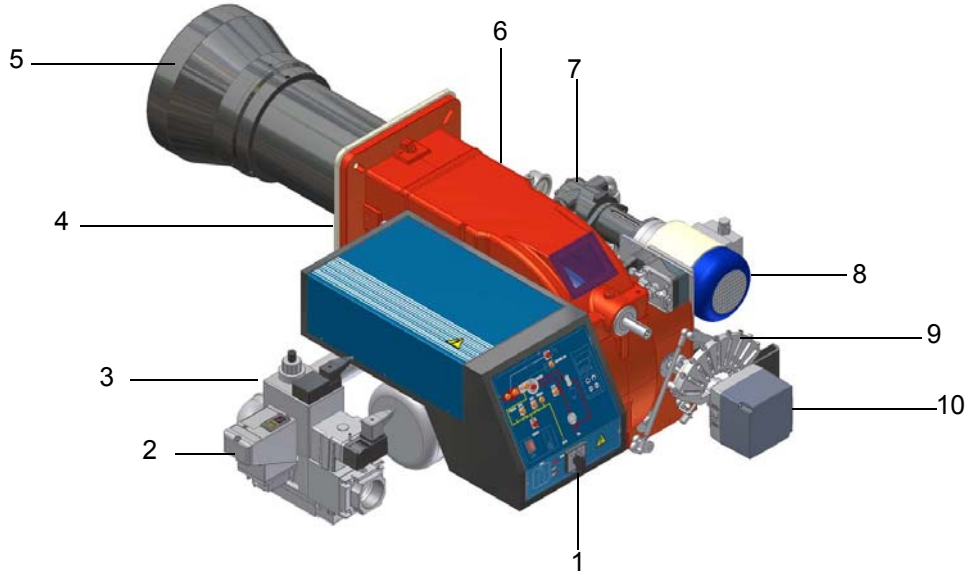


Fig. 1

- 1 Mimic panel with startup switch
- 2 Gas proving system
- 3 Gas valve group
- 4 Burner flange
- 5 Blast tube-Combustion head ass.y
- 6 Cover
- 7 Light oil pump
- 8 Pump motor
- 9 Gas adjusting cam
- 10 Actuator

**Gas operation:** the gas coming from the supply line, passes through the valves group provided with filter and stabiliser. This one forces the pressure in the utilisation limits. The actuator (10) moves proportionally the air damper and the gas butterfly valve. It drives an adjusting cam (13) with variable shape. This one allows the optimisation of the gas flue values, as to get an efficient combustion.

**Light oil operation:** the fuel coming from the supply line, is pushed by the pump (8) to the nozzle and then into the combustion chamber, where the mixture between fuel and air takes place and consequently the flame.

In the burners, the mixture between fuel and air, to perform clean and efficient combustion, is activated by atomisation of oil into very small particles. This process is achieved making pressurised oil passing through the nozzle.

The pump (8) main function is to transfer oil from the tank to the nozzle in the desired quantity and pressure. To adjust this pressure, pumps are provided with a pressure regulator (except for some models for which a separate regulating valve is provided). Other pumps are provided with two pressure regulators: one for the high and one for low pressure (in double-stage systems with one nozzle).

The adjustable combustion head can improve the burner performance. The combustion head (5) 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 (1), placed on the burner front side, shows each operating stage.

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

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

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

Example:

Furnace input: 600kW

Backpressure: 4mbar

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

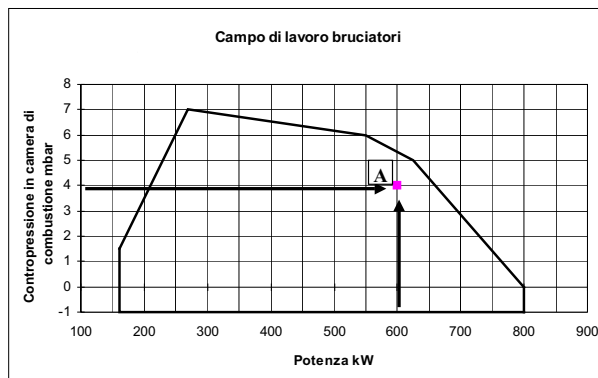


Fig. 2

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

### Checking the proper gas train size

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

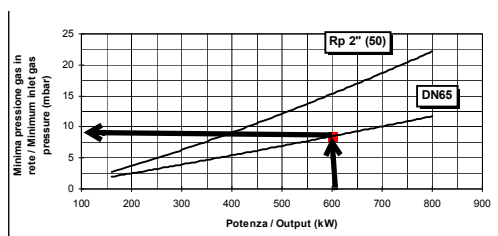


Fig. 3

### Matching the burner to the boiler

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

- Cast-iron boilers, three pass flue boilers (with the first pass in the rear part): the blast tube must protrude no more than 100 mm into the combustion chamber.
- Pressurised boilers with flame reversal: in this case the blast tube must penetrate at least 50 - 100 mm into combustion chamber in respect to the tube bundle plate.
- The length of the blast tubes does not always allow this requirement to be met, and thus it may be necessary to use a suitably-sized spacer to move the burner backwards or to design a blast tube that suits the utilisation (please, contact the manufacturer).

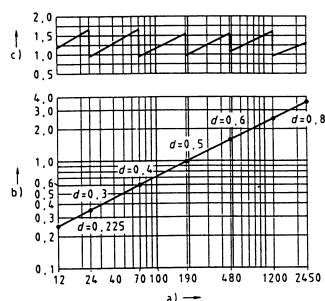


Fig. 4

#### Key

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

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



## Burner model identification

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

Type	HP60	Model	MG.	PR.	S.	*	A.	1.	50
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		
(1) BURNER TYPE	HP60								
(2) FUEL	M - Natural gas      G - Light oil B - Biogas								
(3) OPERATION (Available versions)	PR - Progressive      MD - Fully modulating								
(4) BLAST TUBE	S - Standard      L - Extended								
(5) DESTINATION COUNTRY	* - see data plate								
(6) BURNER VERSION	A - Standard Y - Speciale								
(7) EQUIPMENT	0 = 2 gas valves 1 = 2 gas valves + gas proving system 7 = 2 gas valves + maximum gas pressure switch 8 = 2 gas valves + gas proving system + maximum gas pressure switch								
(8) GAS CONNECTION see Specifications	32 = Rp1 <sub>1/4</sub> 40 = Rp1 <sub>1/2</sub> 50 = Rp2 65 = DN65      80 = DN80								

## Specifications

BURNER TYPE		HP60
Output	min. - max. kW	170 - 880
Fuel		Natural gas - Light oil
Gas category		(see next paragraph)
Gas rate	min. - max. (Stm <sup>3</sup> /h)	18 - 93
Gas pressure	min. - max. mbar	(see Note 2)
Light oil train inlet pressure	max. bar	2
Light oil rate	min. - max. kg/h	14 - 74
Viscosity		2 - 7.4 cSt @ 40°C
Oil density		840 kg/m <sup>3</sup>
Power supply		230V 3~ / 400V 3N ~ 50Hz
Total power consumption	kW	2.15
Fan motor	kW	1.1
Pump motor	kW	0.55
Protection		IP40
Approx. weight	kg	70
Operation		Progressive - Fully modulating
Gas Train - 32	Valves size / Gas connection	1" <sub>1/4</sub> / Rp1 <sub>1/4</sub>
Gas Train - 40	Valves size / Gas connection	1" <sub>1/2</sub> / Rp1 <sub>1/2</sub>
Gas Train - 50	Valves size / Gas connection	2" / Rp2
Gas Train - 65	Valves size / Gas connection	2" <sub>1/2</sub> / Rp2 <sub>1/2</sub>
Operating temperature	°C	-10 ÷ +50
Storage Temperature	°C	-20 ÷ +60
Working service*		Intermittent

<b>Note1:</b>	All gas flow rates are referred to Stm <sup>3</sup> /h (1013 mbar absolute pressure, 15 °C temperature) and are valid for G20 gas (net calorific value H <sub>i</sub> = 34.02 MJ/Stm <sup>3</sup> ).
<b>Note2:</b>	Maximum gas pressure = 360mbar (with Dungs MBDLE/MBC valves) = 500mbar (with Dungs MBC and Siemens VGD gas valves). Minimum gas pressure = see gas curves.

**NOTE ON THE BURNER WORKING SERVICE:** for safety reasons, one controlled shutdown must be performed every 24 hours of continuous operation.

BURNER TYPE		HP65
Output	min. - max. kW	270 - 970
Fuel		Nat. gas - Light oil
Gas category		(see next paragraph)
Gas rate	min. - max. (Stm <sup>3</sup> /h)	29 - 103
Gas pressure	min. - max. mbar	(see Note 2)
Light oil train inlet pressure	max. bar	2
Oil viscosity	min.- max.kg/h	23 - 82
Oil density		2 - 7.4 cSt @40°C
Oil density		840 kg/m <sup>3</sup>
Power supply		230V 3~ / 400V 3N ~ 50Hz
Total power consumption	kW	2.6
Fa motor	kW	1.5
Pump motor	kW	0.55
Protection		IP40
Approx. weight	kg	105
Operation		Progressive - Fully modulating
Gas Train - 32	Valves size / Gas connection	1" <sup>1</sup> / <sub>4</sub> / Rp1 <sup>1</sup> / <sub>4</sub>
Gas Train - 40	Valves size / Gas connection	1" <sup>1</sup> / <sub>2</sub> / Rp1 <sup>1</sup> / <sub>2</sub>
Gas Train - 50	Valves size / Gas connection	2" / Rp2
Gas Train - 65	Valves size / Gas connection	2" <sup>1</sup> / <sub>2</sub> / Rp2 <sup>1</sup> / <sub>2</sub>
Operating temperature	°C	-10 ÷ +50
Storage Temperature	°C	-20 ÷ +60
Working service*		Intermittent

BURNER TYPE		HP72...0.40	HP72...0.50	HP72...0.65	HP72...0.80
Output	min. - max. kW	330 - 1200			
Fuel		Nat. gas - Light oil			
Gas category		(see next paragraph)			
Gas rate	min.- max. (Stm <sup>3</sup> /h)	35 - 127			
Gas pressure	min. - max. mbar	(see Note 2)			
Light oil train inlet pressure	max. bar	2			
Oil viscosity	min.- max. kg/h	28 - 101			
Oil density		2 - 7.4 cSt @40°C			
Oil density		0.84 kg/m <sup>3</sup>			
Power supply		230V 3~ / 400V 3N ~ 50Hz			
Total power consumption	kW	3.25			
Fan motor	kW	2.2			
Pump motor	kW	0.55			
Protection		IP40			
Approx. weight	kg	105	110	120	130
Operation		Progressive - Fully modulating			
Gas Train		40	50	65	80
Valves size / Gas connection		1" <sup>1</sup> / <sub>2</sub> / Rp1 <sup>1</sup> / <sub>2</sub>	2" / DN50	2" <sup>1</sup> / <sub>2</sub> / DN65	3" / DN80
Operating temperature	°C	-10 ÷ +50			
Storage Temperature	°C	-20 ÷ +60			
Working service*		Intermittent			

<b>Note1:</b>	All gas flow rates are referred to Stm <sup>3</sup> /h (1013 mbar absolute pressure, 15 °C temperature) and are valid for G20 gas (net calorific value H <sub>i</sub> = 34.02 MJ/Stm <sup>3</sup> ).
<b>Note2:</b>	Maximum gas pressure = 360mbar (with Dungs MBDLE/MBC valves) = 500mbar (with Dungs MBC and Siemens VGD gas valves). Minimum gas pressure = see gas curves.

**\* NOTE ON THE BURNER WORKING SERVICE:** for safety reasons, one controlled shutdown must be performed every 24 hours of continuous operation.



BURNER TYPE		HP72...1.40	HP72...1.50	HP72...1.65	HP72...1.80
Output	min. - max. kW	330 - 1550			
Fuel		Nat. gas - Light oil			
Gas category		(see next paragraph)			
Gas rate	min. - max. (Stm <sup>3</sup> /h)	35 - 164			
Gas pressure	min.- max. mbar	(see Note 2)			
Light oil train inlet pressure	max. bar	2			
Oil viscosity	min.- max. kg/h	28 - 131			
Oil density		2 - 7.4 cSt @40°C			
Oil density		840 kg/m <sup>3</sup>			
Power supply		230V 3~ / 400V 3N ~ 50Hz			
Total power consumption	kW	3.25			
Fan motor	kW	2.2			
Pump motor	kW	0.55			
Protection		IP40			
Approx. weight	kg	105	110	120	130
Operation		Progressive - Fully modulating			
Gas Train		40	50	65	80
Valves size / Gas connection		1" <sub>1/2</sub> / Rp1 <sub>1/2</sub>	2" / Rp2	2" <sub>1/2</sub> / DN65	3" / DN80
Operating temperature	°C	-10 ÷ +50			
Storage Temperature	°C	-20 ÷ +60			
Working service*		Intermittent			

BURNER TYPE		HP73A MG..x.50	HP73A MG..x.65	HP73A MG..x.80
Output	min. - max. kW	320 - 2300		
Fuel		Nat. gas - Light oil		
Gas category		(see next paragraph)		
Gas rate	min.- max. (Stm <sup>3</sup> /h)	34 - 243	34 - 243	34 - 243
Gas pressure	min.- max. mbar	(see Note 2)		
Light oil train inlet pressure	max. bar	2		
Oil viscosity	min.-max. kg/h	27 - 194	27 - 194	27 - 194
Oil density		2 - 7.4 cSt @40°C		
Oil density		840 kg/m <sup>3</sup>		
Power supply		230V 3~ / 400V 3N ~ 50Hz		
Total power consumption	kW	4.05		
Fan motor	kW	3		
Pump motor	kW	0.55		
Index of Protection		IP40		
Approx. weight	kg	115	125	135
Operation		Progressive - Fully modulating		
Gas train		50	65	80
Valves size/Gas connection		2" / Rp2	2" <sub>1/2</sub> / DN65	3" / DN80
Storage Temperature	°C	-10 ÷ +50		
Working service*	°C	-20 ÷ +60		
Operating temperature		Intermittent		

<b>Note1:</b>	All gas flow rates are referred to Stm <sup>3</sup> /h (1013 mbar absolute pressure, 15 °C temperature) and are valid for G20 gas (net calorific value H <sub>i</sub> = 34.02 MJ/Stm <sup>3</sup> ).
<b>Note2:</b>	Maximum gas pressure = 360mbar (with Dungs MBDLE/MBC valves) = 500mbar (with Dungs MBC and Siemens VGD gas valves). Minimum gas pressure = see gas curves.

**\* NOTE ON THE BURNER WORKING SERVICE:** for safety reasons, one controlled shutdown must be performed every 24 hours of continuous operation.

## Country and usefulness gas categories

GAS CATEGORY	COUNTRY																								
	AT	ES	GR	SE	FI	IE	HU	IS	NO	CZ	DK	GB	IT	PT	CY	EE	LV	SI	MT	SK	BG	LT	RO	TR	CH
I <sub>2H</sub>																									
I <sub>2E</sub>	LU	PL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I <sub>2E( R ) B</sub>	BE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(*) I <sub>2EK</sub>	NL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I <sub>2ELL</sub>	DE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I <sub>2Er</sub>	FR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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

## 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> )	$f_Q$	$f_p$
LPG	26.79	2.151	0.353	0.4
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:

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

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

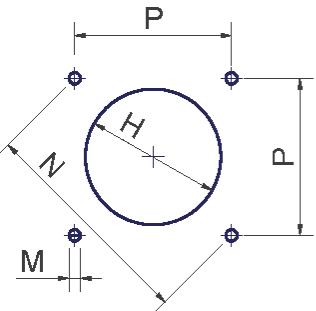
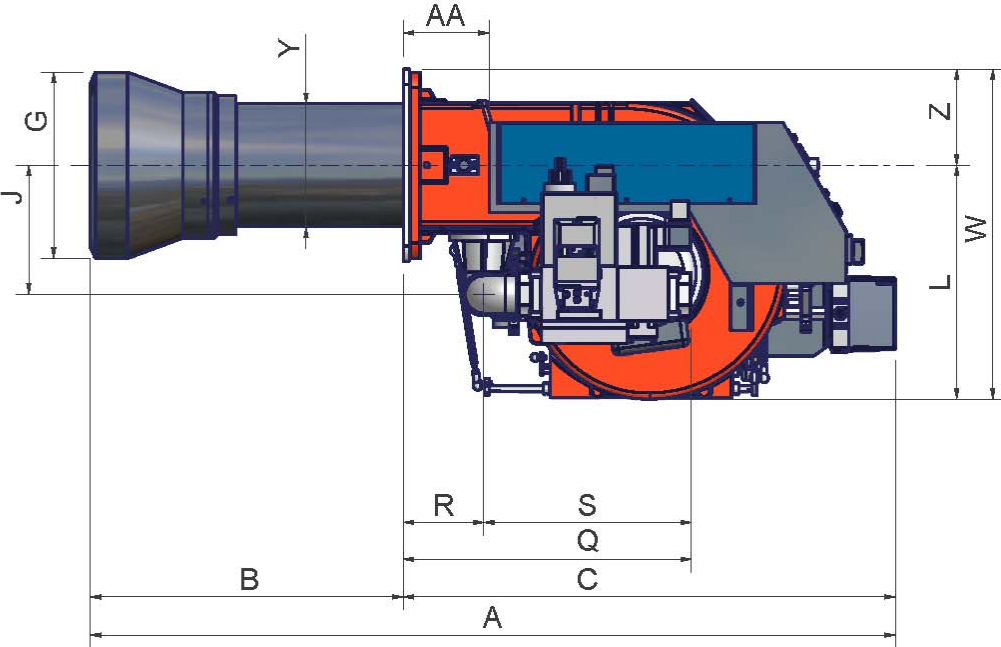
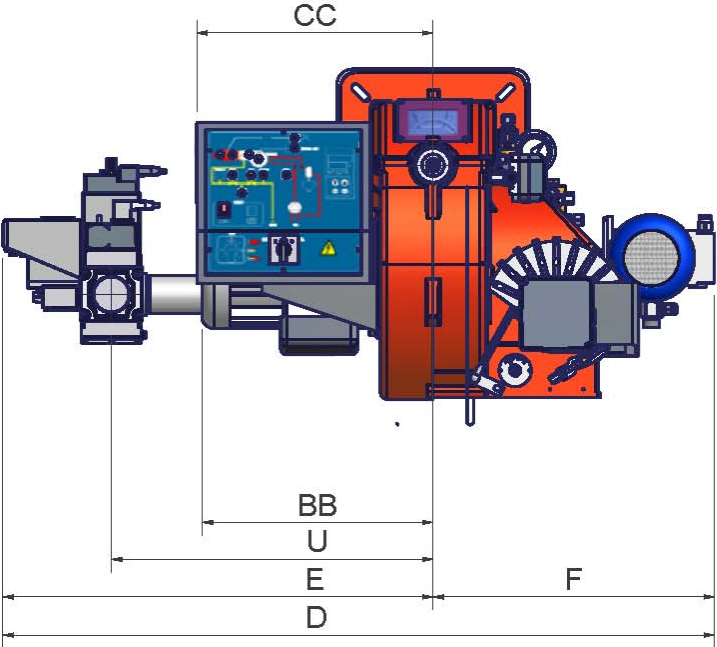


**ATTENTION!** The combustion head type and the settings depend on the fuel. The burner must be used only for its intended purpose specified in the burner data plate.

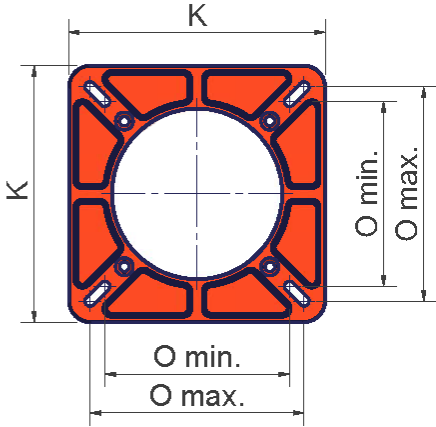


**ATTENTION!** The corrective factors in the above table depend on the gas composition, so on the calorific value and the density of the gas. The above value can be taken only as reference.

Overall dimensions (mm)



Boiler recommended drilling template



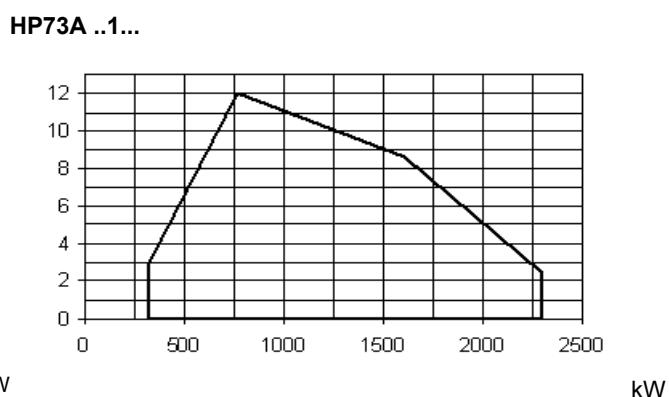
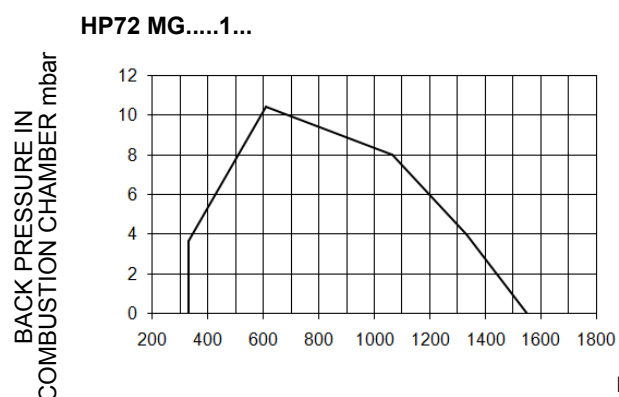
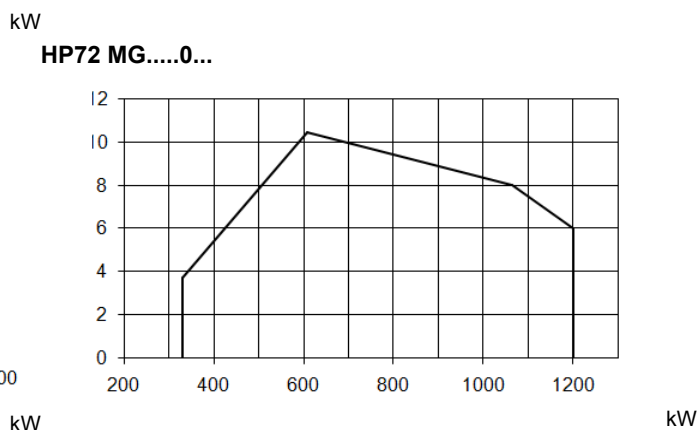
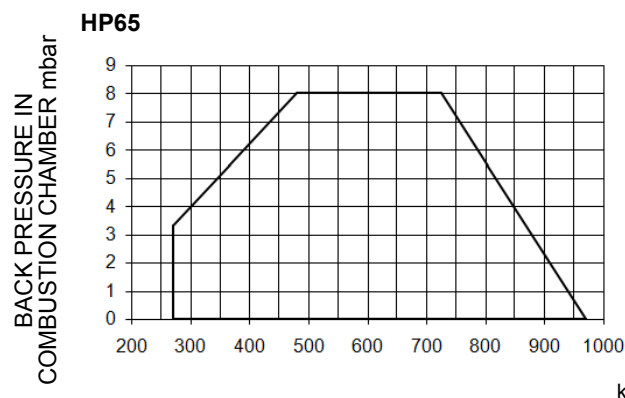
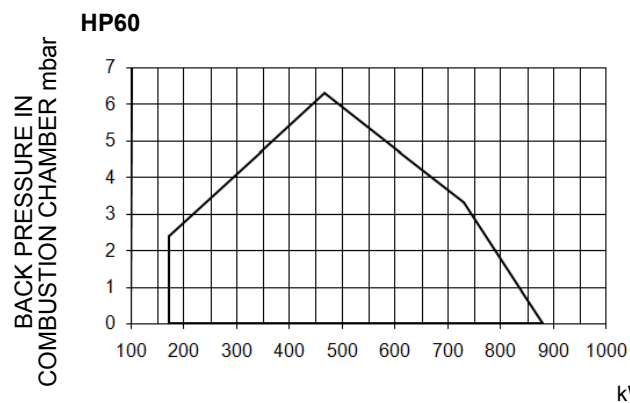
	DN	A	AA	B	BB	C	CC	D	E	F	G	H	J	K	L	M	N	O - min	O - max	P	Q	R	S	U	V	W	Y	Z
HP60 MG..0.32	32	1119	99	383	314	736	362	930	595	430	240	280	210	240	344	M10	269	190	190	190	463	112	256	444	x	464	162	120
HP60 MG..0.40	40	1153	99	383	314	770	362	1044	500	415	240	280	202	240	344	M10	269	190	190	190	439	112	327	444	x	464	162	120
HP60 MG.. 0.50	50	1153	99	383	314	770	362	930	500	430	240	280	210	240	344	M10	269	190	190	190	445	112	335	519	x	464	162	120
HP60 MG.. 0.65	65	1153	99	383	314	770	362	1115	685	430	240	280	250	240	420	M10	269	190	190	190	845	112	403	540	313	540	162	120
HP65 MG.. 0.32	32	1156	139	362	347	794	382	1022	588	454	240	280	208	300	376	M10	330	216	250	233	463	130	256	539	x	531	162	155
HP65 MG.. 1.32	32	1156	139	362	347	794	382	1148	714	454	240	280	208	300	376	M10	330	216	250	233	463	130	256	539	x	531	162	155
HP65 MG.. 0.40	40	1156	139	362	347	794	382	1022	579	454	240	280	208	300	376	M10	330	216	250	233	457	130	327	535	x	531	162	155
HP65 MG.. 1.40	40	1156	139	362	347	794	382	1148	710	454	240	280	208	300	376	M10	330	216	250	233	457	130	327	535	x	531	162	155
HP65 MG.. 0.50	50	1156	139	362	347	794	382	1022	568	454	240	280	208	300	376	M10	330	216	250	233	465	130	335	519	x	531	162	155
HP65 MG.. 1.50	50	1156	139	362	347	794	382	1148	694	454	240	280	208	300	376	M10	330	216	250	233	465	130	335	519	x	531	162	155
HP65 MG..0.65	65	1156	139	362	347	794	382	1120	666	454	240	280	275	300	393	M10	330	216	250	233	533	130	403	565	313	548	162	155
HP65 MG..1.65	65	1156	139	362	347	794	382	1226	772	454	240	280	275	300	393	M10	330	216	250	233	533	130	403	565	313	548	162	155
HP72 MG.. 0.40	40	1299	139	505	373	794	382	1022	584	454	300	340	208	300	376	M10	330	216	250	233	457	130	327	519	x	531	198	155
HP72 MG..1.40	40	1299	139	505	373	794	382	1148	710	454	300	340	208	300	376	M10	330	216	250	233	457	130	327	519	x	531	198	155
HP72 MG.. 0.50	50	1299	139	505	373	794	382	1022	568	454	300	340	208	300	376	M10	330	216	250	233	465	130	335	519	x	531	198	155
HP72 MG..1.50	50	1299	139	505	373	794	382	1148	694	454	300	340	208	300	376	M10	330	216	250	233	465	130	335	519	x	531	198	155
HP72 MG..0.65	65	1299	139	505	373	794	382	1120	666	454	300	340	275	300	393	M10	330	216	250	233	533	130	403	565	313	548	198	155
HP72 MG..1.65	65	1299	139	505	373	794	382	1226	772	454	300	340	275	300	393	M10	330	216	250	233	533	130	403	565	313	548	198	155
HP72 MG.. 0.80	80	1299	139	505	373	794	382	1120	666	454	300	340	275	300	407	M10	330	216	250	233	574	130	444	565	344	562	198	155
HP72 MG..1.80	80	1299	139	505	373	794	382	1228	774	454	300	340	275	300	407	M10	330	216	250	233	574	130	444	565	344	562	198	155
HP72 MG..0.100	100	1299	139	505	373	794	382	1395	941	454	300	340	434	300	579	M10	330	216	250	233	653	130	523	824	405	734	198	155
HP72 MG..1.100	100	1299	139	505	373	794	382	1503	1049	454	300	340	434	300	579	M10	330	216	250	233	653	130	523	824	405	734	198	155
HP73A MG..1.50	50	1294	139	500	373	794	382	1148	694	454	234	264	208	300	376	M10	330	216	250	233	465	130	335	519	x	531	198	155
HP73A MG..1.65	65	1294	139	500	373	794	382	1226	772	454	234	264	275	300	393	M10	330	216	250	233	533	130	403	565	313	548	198	155
HP73A MG..1.80	80	1294	139	500	373	794	382	1228	774	454	234	264	275	300	407	M10	330	216	250	233	574	130	444	565	344	562	198	155
HP73A MG..1.100	100	1294	139	500	373	794	382	1503	1049	454	234	264	434	300	579	M10	330	216	250	233	653	130	523	824	405	734	198	155

\*DN = gas valves size

#### HP60 - HP72:

it is recommended to fit a counterflange between burner and boiler. As an alternative, make a smaller hole H, but greather than Y and fit the blast tube from the internal side of boiler.

## Performance Curves

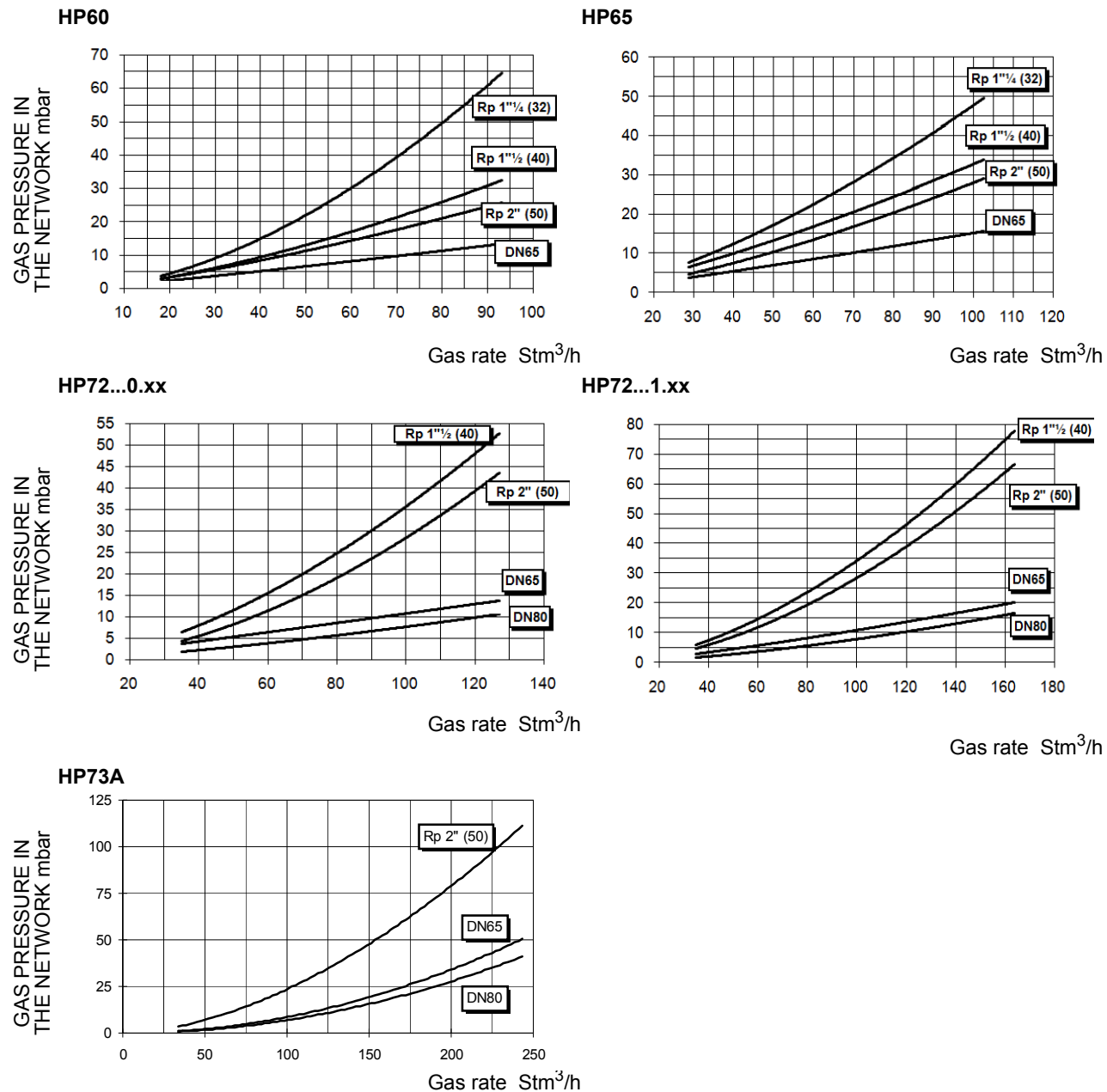


To get the input in kcal/h, multiply value in kW by 860.

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 rate curves



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



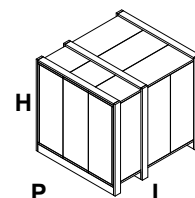
**WARNING:** the diagrams refers to natural gas. For different type of fuel please refer to the paragraph "Fuel" at the beginning of this chapter.

## MOUNTINGS AND CONNECTIONS

### Packing

Burners are despatched in cardboard packages and whose dimensions: **1280mm x 850mm x 760mm (L x P x H)**  
Packing cases of this kind are affected by humidity and are not suitable for stacking. The following are placed in each packing case:

- burner with gas train detached;
- gasket to be inserted between the burner and the boiler;
- flexible oil pipes;
- oil filter;
- envelope containing this manual



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

### Handling the burner

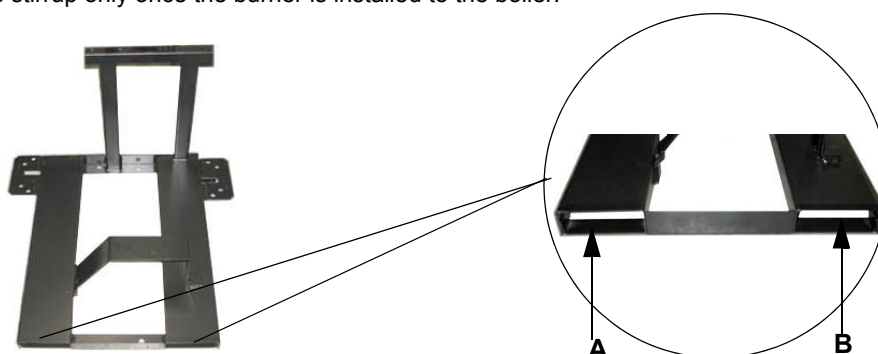


**ATTENTION! The handling operations must be carried out by specialised and trained personnel. If these operations are not carried out correctly, the residual risk for the burner to overturn and fall down still persists.**

**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.**

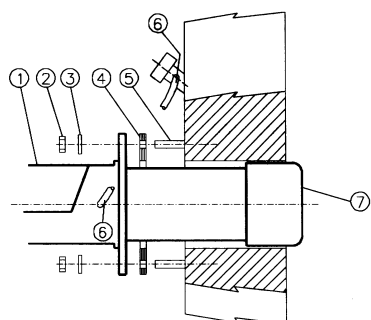
The burner is mounted on a stirrup provided for handling the burner by means of a fork lift truck: the forks must be inserted into the A and B ways. Remove the stirrup only once the burner is installed to the boiler.



### Fitting the burner to the boiler

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

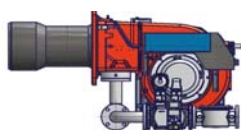
- 1 make a hole on the closing door of the combustion chamber as described on paragraph "Overall dimensions"
- 2 place the burner to the boiler: lift it up and handle it according to the procedure described on paragraph "Handling the burner";
- 3 place the stud bolts (5) on boiler's door, according to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



#### Keys

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

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



↑ SIDE UP  
↓ SIDE DOWN



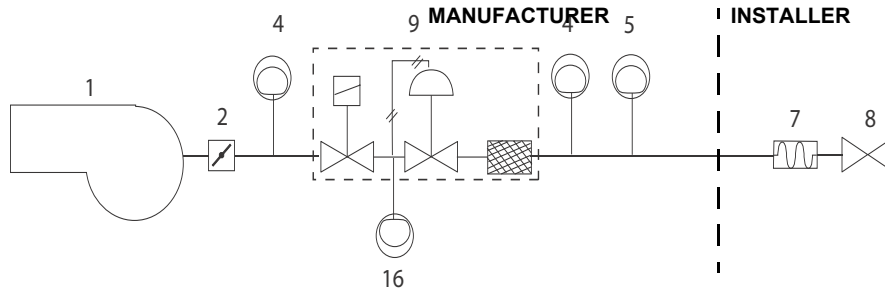
## Gas train connections

The next 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.

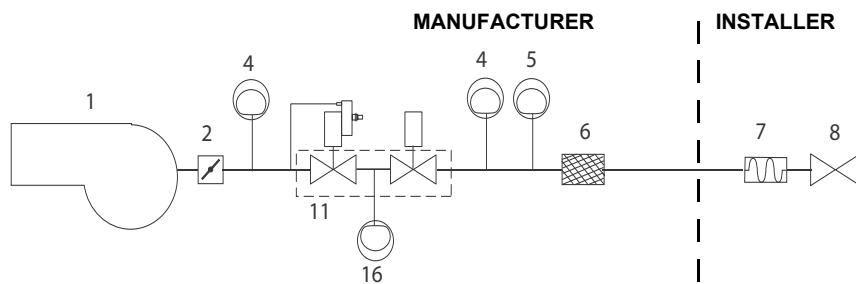


**ATTENTION:** BEFORE EXECUTING THE CONNECTIONS TO THE GAS PIPE NETWORK, BE SURE THAT THE MANUAL CUTOFF VALVES ARE CLOSED. READ CAREFULLY THE “WARNINGS” CHAPTER AT THE BEGINNING OF THIS MANUAL.

Gas train with valves group MB-DLE (2 valves + gas filter + pressure governor + pressure switch) + gas leakage pressure switch (PGCP)



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



### Key

- |   |                                       |
|---|---------------------------------------|
| 1 Burner                                | 7 Bellow joint                        |
| 2 Butterfly valve                       | 8 Manual valve                        |
| 4 Maximum gas pressure switch (option*) | 9 MB-DLE Valves group                 |
| 5 Minimum gas pressure switch           | 11 VGD Valves group                   |
| 6 Gas filter                            | 16 Gas leakage pressure switch (PGCP) |

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

## Assembling the gas grain

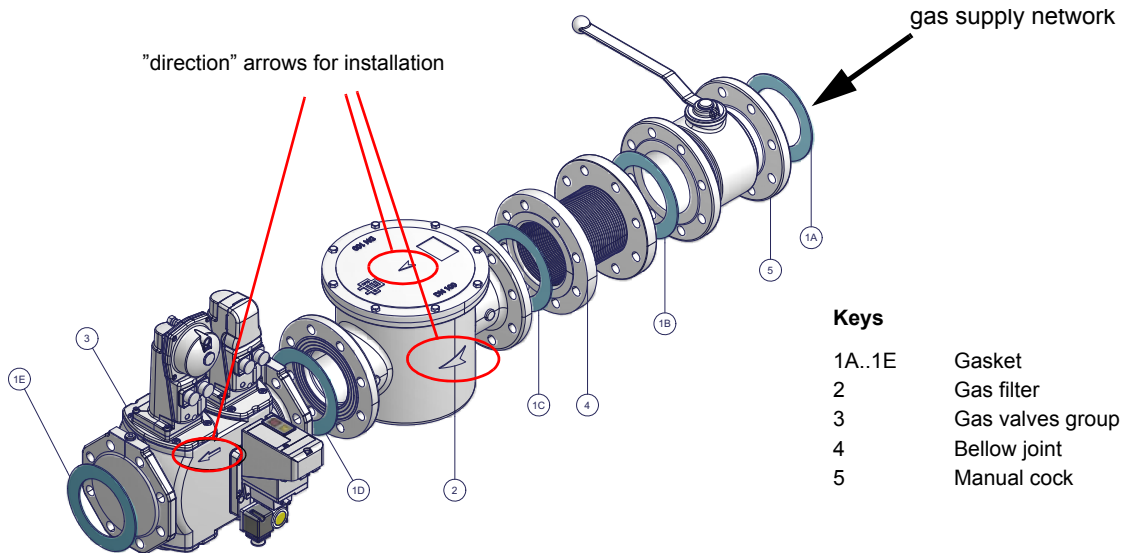


Fig. 5 - Example of gas train

To mount the gas train, proceed as follows:

1-a) in case of threaded joints: use proper seals according to the gas used;

1-b) in case of flanged joints: place a gasket (no. 1A..1E - Fig. 5) between the elements

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



**ATTENTION:** once the gas train is mounted according to the diagram on Fig. 5, 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).

The procedures of installation for the gas valves are shown in the next paragraphs, according to the gas train used:

- threaded gas trains with Multibloc Dungs MB-DLE or Siemens VGD20..
- flanged gas trains with Multibloc Dungs MB-DLE or Siemens VGD40..

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

#### Mounting

1. Mount flange onto tube lines: use appropriate sealing agent (see Fig. 8);
2. insert MB-DLE: note position of O rings (see Fig. 8);
3. tighten screws A, B, C and D (Fig. 6 - Fig. 7), according to the mounting positions (Fig. 9);
4. after installation, perform leakage and functional test;
5. disassembly in reverse order.

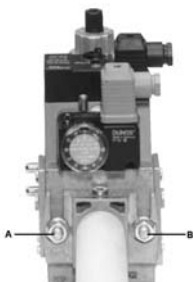


Fig. 6

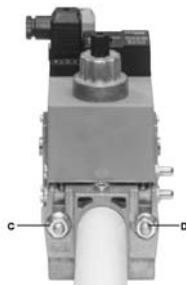


Fig. 7



Fig. 8

#### MOUNTING POSITIONS

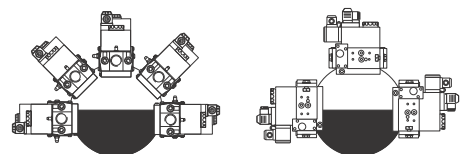


Fig. 9

## MULTIBLOC DUNGS MB-DLE 415..420

### Mounting

1. Loosen screws A and B **do not** unscrew (Fig. 10 - Fig. 11).
2. unscrew screws C and D (Fig. 10 - Fig. 11).
3. Remove MultiBloc between the threaded flanges (Fig. 11).
4. After mounting, perform leakage and functional tests.

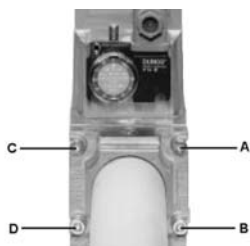


Fig. 10

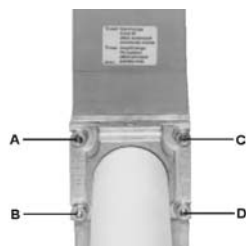


Fig. 11



Fig. 12

### MOUNTING POSITIONS

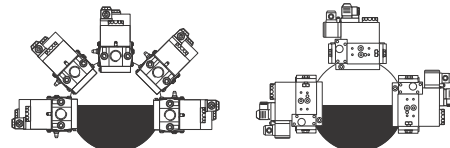


Fig. 13

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

### Mounting

- When mounting the VGD.. double gas valve, two flanges are required (as for VGD20.. model, the flanges are threaded); to prevent cuttings from falling inside the valve, first fit the flanges to the piping and then clean the associated parts;
- install the valve;
- the direction of gas flow must be in accordance with the direction of the arrow on the valve body;
- ensure that the bolts on the flanges are properly tightened;
- ensure that the connections with all components are tight;
- make certain that the O-rings and gaskets between the flanges and the double gas valve are fitted.
- 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 (see Fig. 17).



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

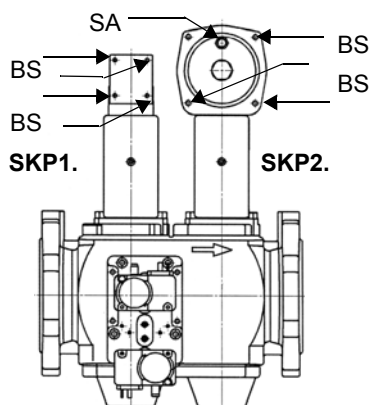


Fig. 14

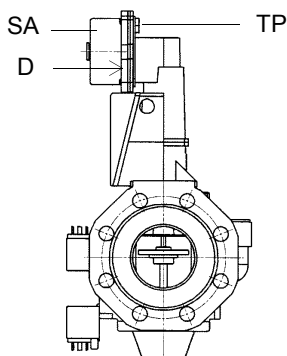
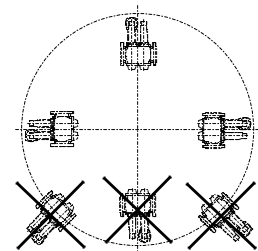


Fig. 15



SIEMENS VGD..MOUNTING POSITIONS

Fig. 16

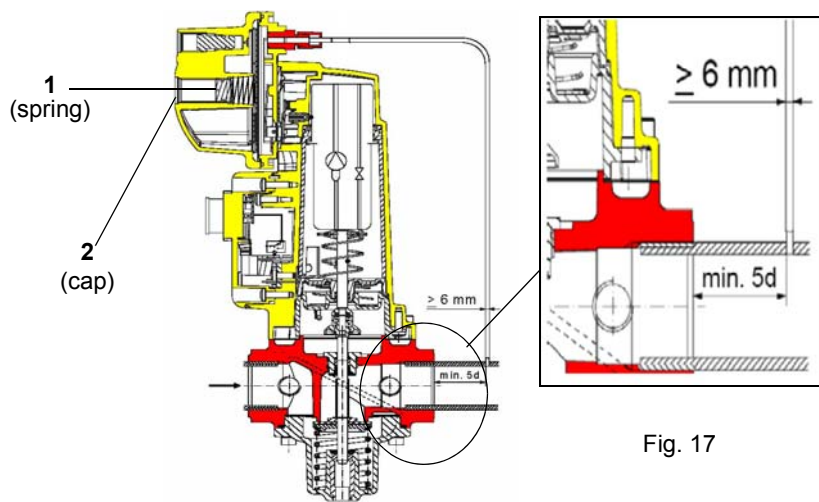


Fig. 17

#### 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.

<b>Performance range (mbar)</b>	0 - 22	15 - 120	100 - 250
<b>Spring colour</b>	neutral	yellow	red

Once the train is installed, connect electrically all its elements: gas valves group, pressure switches, gas proving system.



**ATTENTION:** once the gas train is mounted according to the diagram on Fig. 5, the gas proving test must be performed, according to the procedure set by the laws in force.

Fig. 18 - Gravity circuit

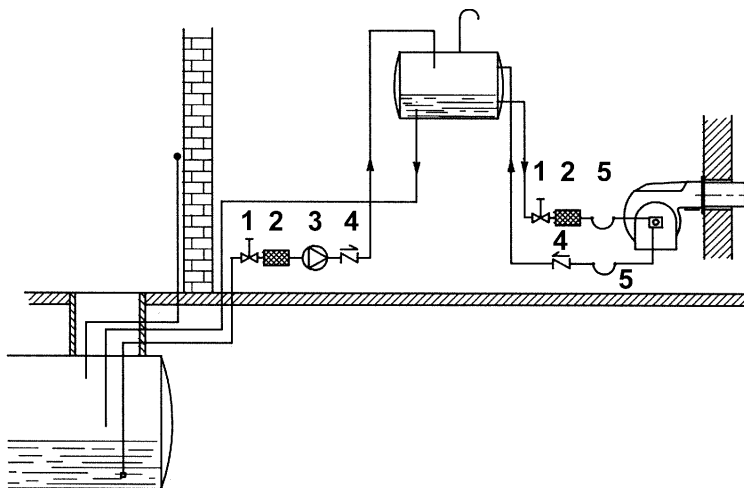


Fig. 19 - Ring circuit

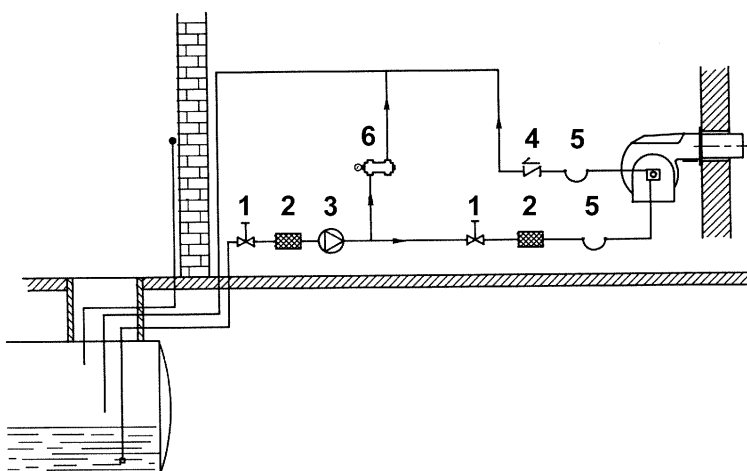
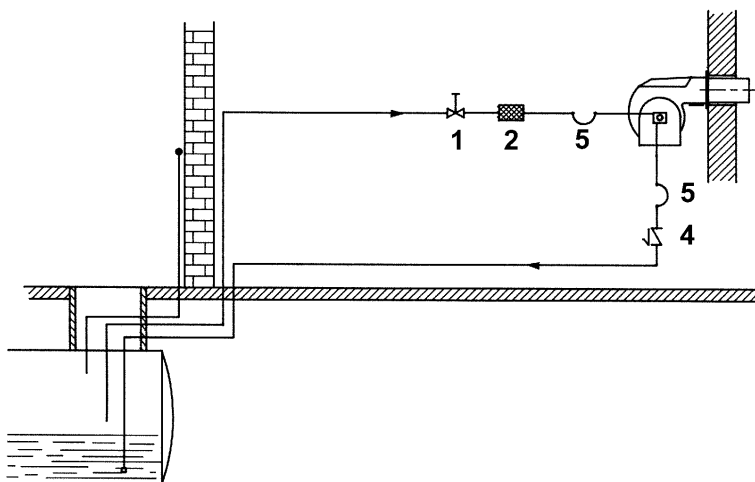


Fig. 20 - Suction circuit

**Key**

- 1 Manual valve
- 2 Light oil filter
- 3 Light oil feeding pump
- 4 One way valve
- 5 Flexible hoses
- 6 Relief valve



**NOTE:** in plants where gravity or ring feed systems are provided, install an automatic interception device (see n. 4 - Fig. 21).

## Light oil piping installation diagram

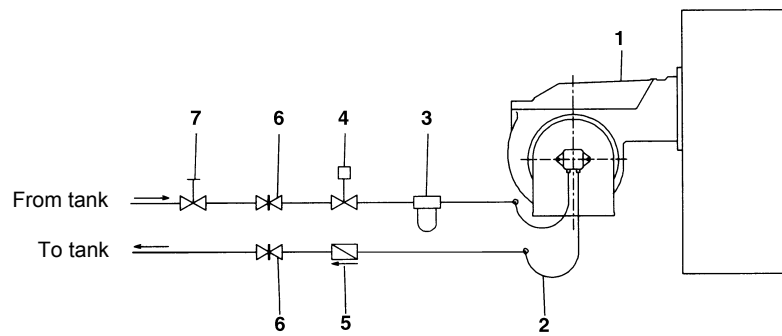


Fig. 21

### Key

- 1 Burner
- 2 Flexible hoses (fitted)
- 3 Light oil filter (fitted)
- 4 Automatic interceptor (\*)
- 5 One-way valve (\*)
- 6 Gate valve
- 7 Quick-closing gate-valve (not in vicinity of tank or boiler)

(\*) Only for installations with gravity, siphon or forced circulation feed systems. If the device installed is a solenoid valve, a timer must be installed to delay the valve closing. The direct connection of the device without a timer may cause pump breaks.

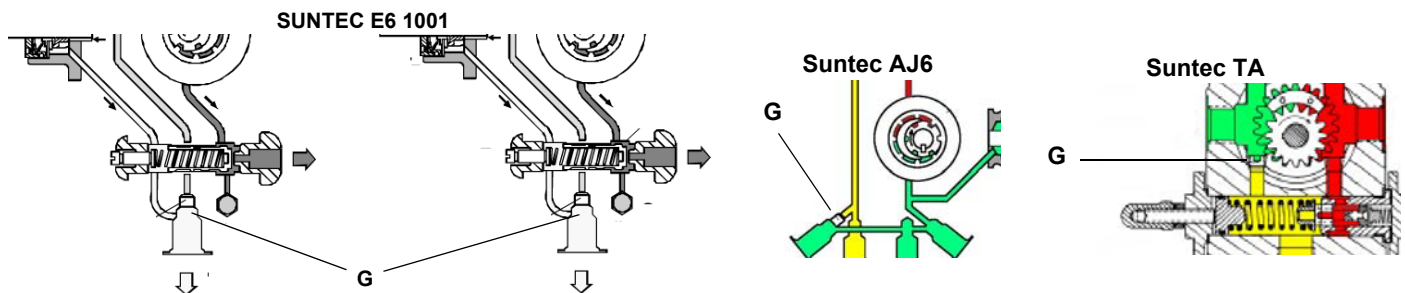
The pumps that are used can be installed both into single-pipe and double-pipe systems.

**Single-pipe system:** a single pipe drives the oil from the tank to the pump's inlet. Then, from the pump, the pressurised oil is driven to the nozzle: a part comes out from the nozzle while the other part goes back to the pump. In this system, the by-pass plug, if provided, must be removed and the optional return port, on the pump's body, must be sealed by steel plug and washer.

**Double-pipe system:** as for the single pipe system, a pipe that connects the tank to the pump's inlet is used besides another pipe that connects the pump's return port to the tank, as well. The excess of oil goes back to the tank: this installation can be considered self-bleeding. If provided, the inside by-pass plug must be installed to avoid air and fuel passing through the pump.

Burners come out from the factory provided for double-stage systems. They can be suited for single-pipe system (recommended in the case of gravity feed) as described before. To change from a 1-pipe system to a 2-pipe-system, insert the by-pass plug **G** (as for ccw-rotation- referring to the pump shaft).

**Caution:** Changing the direction of rotation, all connections on top and side are reversed.



### Bleed

Bleeding in two-pipe operation is automatic : it is assured by a bleed flat on the piston. In one-pipe operation, the plug of a pressure gauge port must be loosened until the air is evacuated from the system.

## About the use of fuel pumps

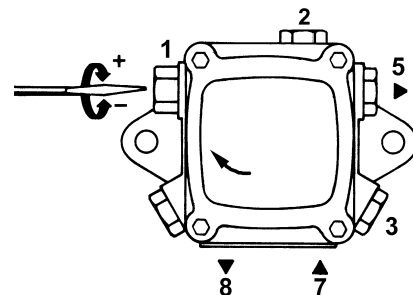
- Make sure that the by-pass plug is not used in a single pipe installation, because the fuel unit will not function properly and damage to the pump and burner motor could result.
- Do not use fuel with additives to avoid the possible formation over time of compounds which may deposit between the gear teeth, thus obstructing them.
- After filling the tank, wait before starting the burner. This will give any suspended impurities time to deposit on the bottom of the tank, thus avoiding the possibility that they might be sucked into the pump.
- On initial commissioning a "dry" operation is foreseen for a considerable length of time (for example, when there is a long suction line to bleed). To avoid damages inject some lubrication oil into the vacuum inlet.
- Care must be taken when installing the pump not to force the pump shaft along its axis or laterally to avoid excessive wear on the joint, noise and overloading the gears.
- Pipes should not contain air pockets. Rapid attachment joint should therefore be avoided and threaded or mechanical seal junctions preferred. Junction threads, elbow joints and couplings should be sealed with removable seal component. The number of junctions should be kept to a minimum as they are a possible source of leakage.
- Do not use PTFE tape on the suction and return line pipes to avoid the possibility that particles enter circulation. These could deposit on the pump filter or the nozzle, reducing efficiency. Always use O-Rings or mechanical seal (copper or aluminium gaskets) junctions if possible.
- An external filter should always be installed in the suction line upstream of the fuel unit.

## Light oil pumps

The pumps provided with these burners can be:

- HP60 - HP65: Suntec AJ6
- HP72: Suntec E7
- HP73A : Suntec TA2

Suntec AJ6	
Viscosity	2 - 75 cSt
Oil temperature	60°C max
Inlet maximum pressure	2 bar
Inlet minimum pressure	- 0.45 bar to avoid gasing
Rated speed	3600 rpm max.



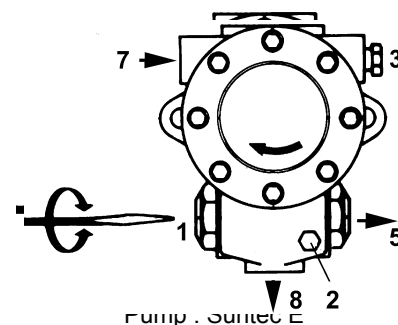
### Key SUNTEC AJ6

- 1 Pressure governor
- 2 Pressure gauge
- 3 Vacuum gauge
- 5 To the Nozzle
- 7 Inlet
- 8 Return

Suntec E6 - E7 1001	
Oil viscosity	3 - 75 cSt
Oil temperature	90°C max
Inlet maximum pressure	3,5 bar
Maximum return pressure	3,5 bar
Minimum inlet pressure	- 0,45 to avoid gasing
Rotation speed	3600 rpm max.

### Key

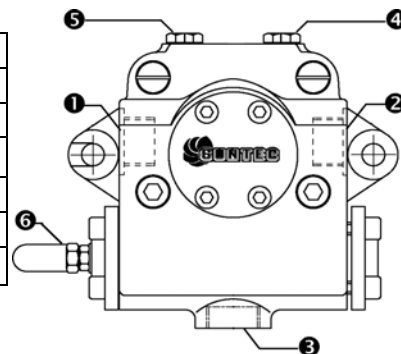
- 1 Pressure governor
- 2 Pump pressure gauge
- 3 Inlet
- 4 To the nozzle
- 5 Return
- Pressure governor
- 5 Pump pressure gauge
- 6 Inlet
- 7 To the nozzle
- 5 Return





Suntec TA..	
Oil viscosity	3 ÷ 75 cSt
Oil temperature	0 ÷ 150°C
Min. suction pressure	- 0.45 bar to avoid gasing
Max. suction pressure	5 bar
Max. return pressure	5 bar
Rotation speed	3600 rpm max.




- 1 Inlet G1/2
- 2 To the nozzle G1/2
- 3 Return G1/2
- 4 Pressure gauge port G1/4
- 5 Vacuum gauge port G1/4
- 6 Pressure governor



### Connecting the light oil flexible hoses

To connect the flexible light oil hoses to the pump, proceed as follows, according to the pump provided:

- 1 remove the closing nuts **A** and **R** on the inlet and return connections of the pump;
- 2 screw the rotating nut of the two flexible hoses on the pump **being careful to avoid exchanging the inlet and return lines**: see the arrows marked on the pump that show the inlet and the return (see previous paragraph).

Suntec AJ6	Suntec E..	Suntec TA
		

## 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.



**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.

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);
- 4 refit the panel cover.

### Rotation of fan motor and pump motor

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

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



**CAUTION:** adjust the thermal cut-out according to the motor rated current value.

## ADJUSTMENTS

### *Combustion head gas pressure curves depending on the flow rate*

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

The curves referred to the gas pressure in the combustion head, depending on the gas flow rate, are referred to the burner properly adjusted (percentage of residual  $O_2$  in the flues as shown in the "Recommended combustion values" table and CO in the standard limits). During this stage, the combustion head, the gas butterfly valve and the actuator are at the maximum opening. Refer to Fig. 22, showing the correct way to measure the gas pressure, considering the values of pressure in combustion chamber, surveyed by means of the pressure gauge or taken from the boiler's Technical specifications.

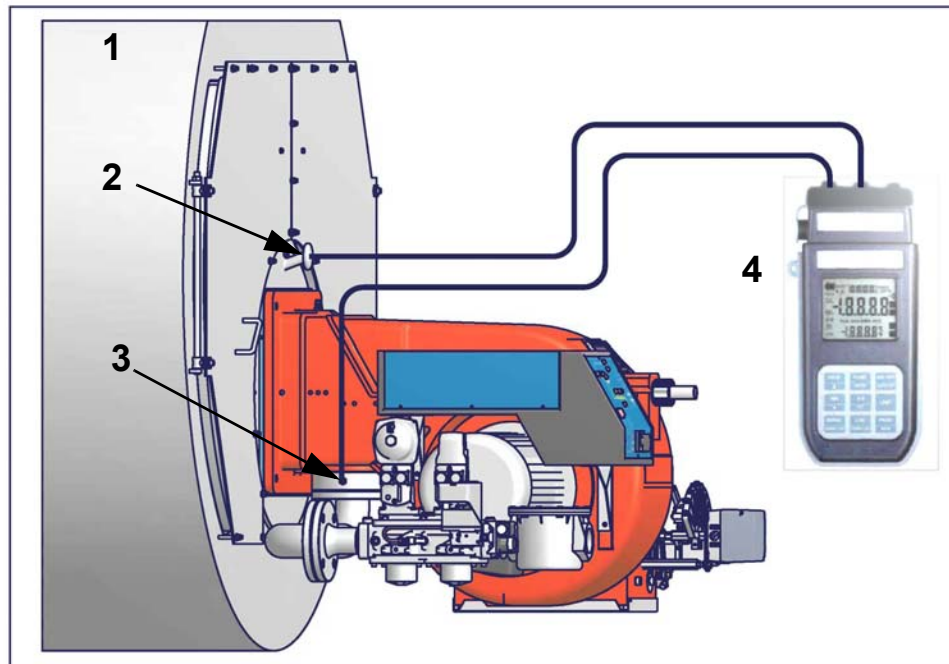


Fig. 22

#### **Key**

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

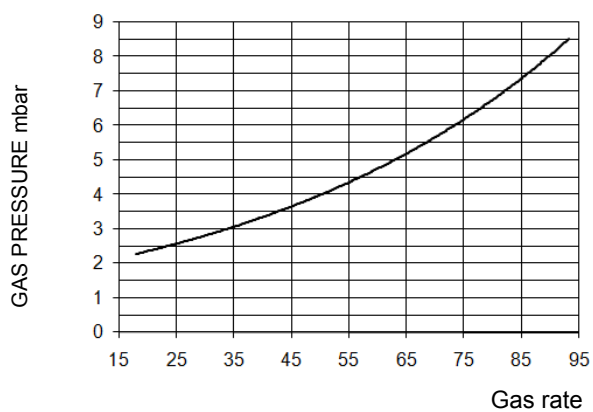
### ***Measuring the gas pressure in the combustion head***

In order to measure the pressure in the combustion head, insert the pressure gauge probes: one into the combustion chamber's pressure outlet (Fig. 22-2) to get the pressure in the combustion chamber and the other one into the butterfly valve's pressure outlet of the burner (Fig. 22-3). On the basis of the measured differential pressure, it is possible to get the maximum flow rate: in the pressure - rate curves (showed on the next paragraph), it is easy to find out the burner's output in  $Stm^3/h$  (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.

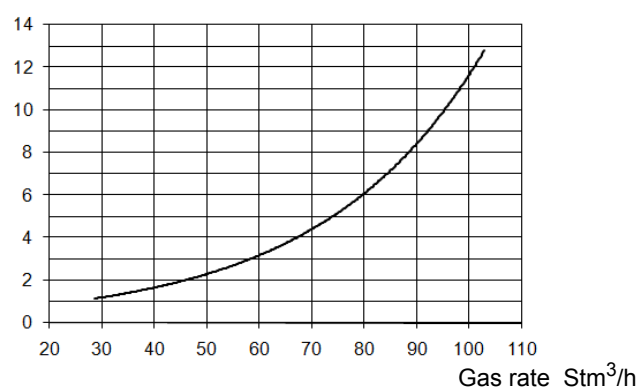
**NOTE: THE PRESSURE-RATE CURVES ARE GIVEN AS INFORMATION ONLY; FOR A PROPER SETTING OF THE GAS RATE, PLEASE REFER TO THE GAS METER READING.**

## Pressure in combustion head - gas rate curves

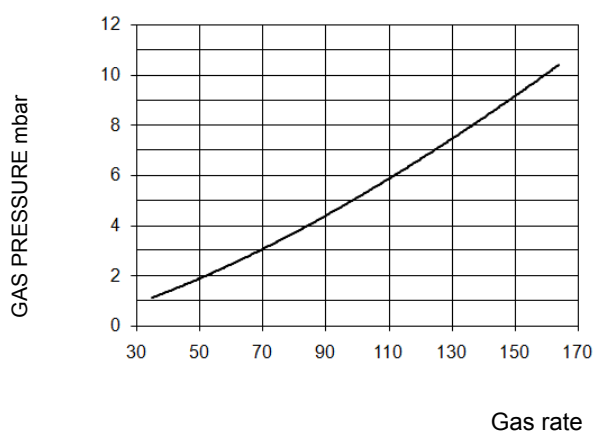
HP60



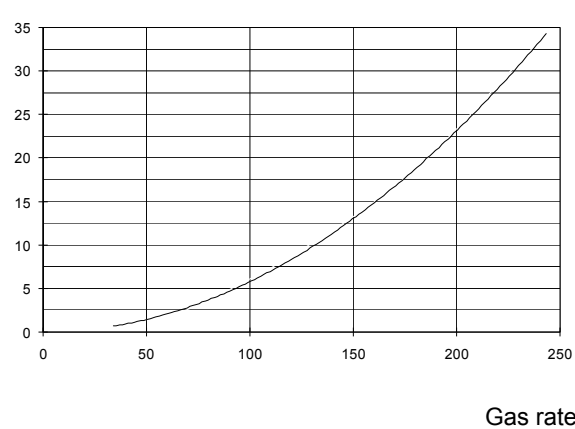
HP65




HP72



HP73A



**WARNING:** the diagrams refers to natural gas. For different type of fuel please refer to the paragraph "Fuel" at the beginning of this chapter.

	<b>ATTENTION:</b> 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.
	<b>ATTENTION:</b> 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.
	<b>WARNING: NEVER LOOSE THE SEALED SCREWS! OTHERWISE, THE DEVICE WARRANTY WILL BE IMMEDIATELY INVALIDATE!</b>

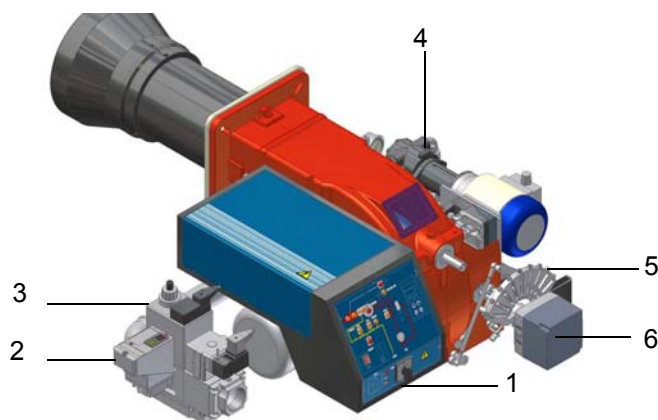


Fig. 23

#### Keys

- 1 Gas filter
- 2 Gas proving system
- 3 Gas valves
- 4 Fuel pump
- 5 Gas Adjusting cam
- 6 Actuator

### Gas Filter

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

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

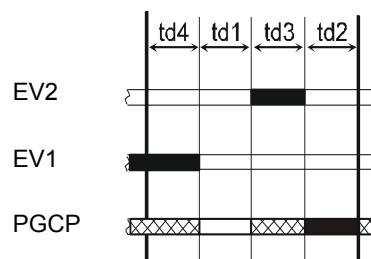
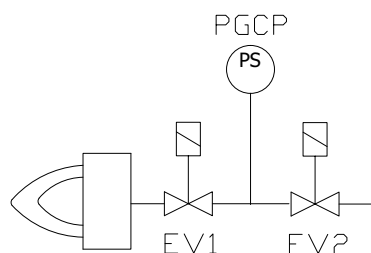
This paragraph describes the integrated proving system operation sequence:

- At the beginning both the valves (EV1 and EV2) must be closed.
- Test space evacuating: EV1 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: EV1 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: EV2 opens and keep this position for a preset time (td3), in order to fill the test space.
- Test gas pressure: EV2 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, shut-down, or both.

On LME73.831BC the valve proving is parameterized to take place on startup only.



## Actuator

The actuator provided can be either berger STM30../Siemens SQM40.. (see page 29) or Siemens SQL33.. .



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

Recommended combustion parameters		
Fuel	Recommended (%) CO <sub>2</sub>	Recommended (%) O <sub>2</sub>
Natural gas	9 ÷ 10	3 ÷ 4.8
Light oil	11.5 ÷ 13	2.9 ÷ 4.9

### 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.

### HP73A only

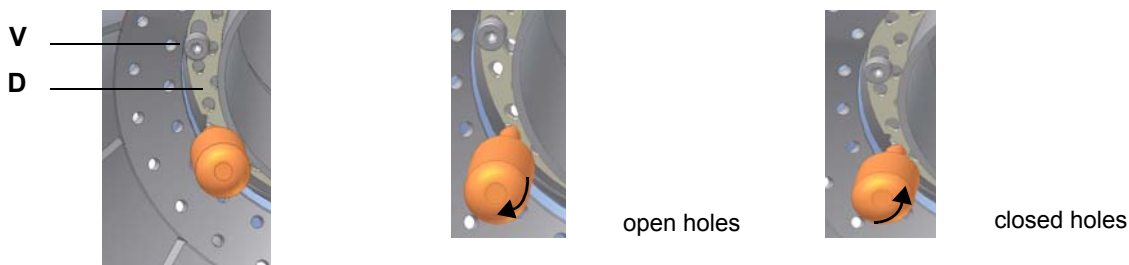


**CAUTION:** perform these adjustments once the burner is turned off and cooled.

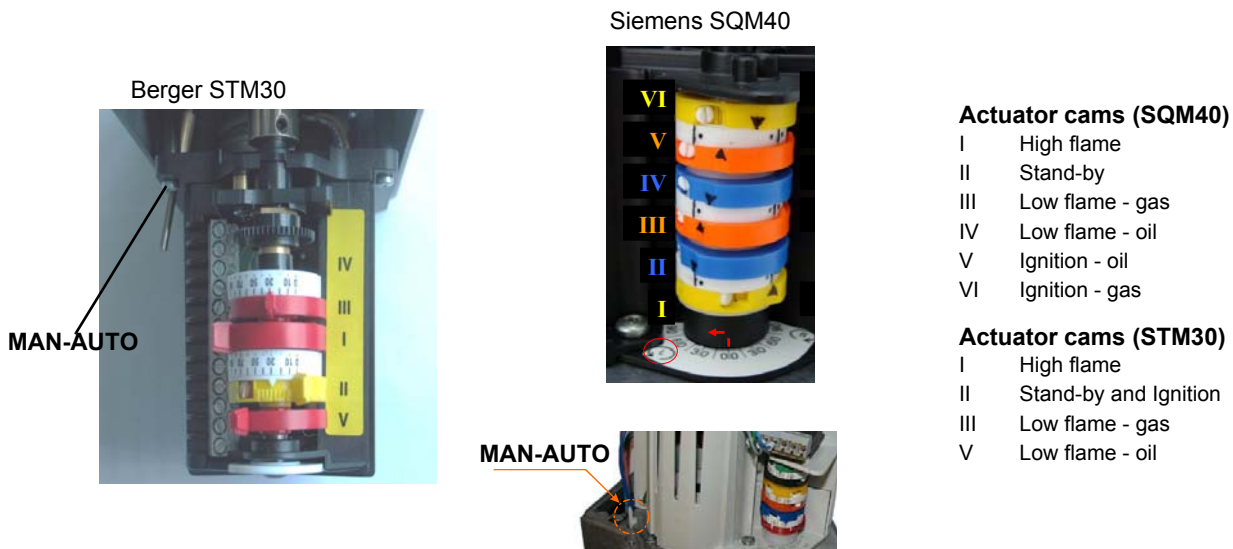
The burner is factory-set with the adjusting plate holes fully open, and the combustion head at its MAX position, so it is fit to work at the maximum output.

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 adjustmet is performed, fasten the **V** screws.



Now, adjust the burner according to the actuator model provided.



- 1 ;set GAS fuel by means of the burner **CM** switch (it is placed on the burner control panel - see page 45)
- 2 open the electrical panel to check the fan motor rotation
- 3 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 **VS** must be removed only in case of replacement of the coil.

- 4 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.
- 5 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;
- 6 drive the burner to high flame stage, by means fo the thermostat **TAB** (high/low flame thermostat - see Wiring diagrams), as far as fully-modulating burners, see related paragraph.drive the burner to high flame stage, by means fo the thermostat **TAB**; as far as Fully-modulating burners, see next paragraphs.
- 7 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.
- 8 go on adjusting air and gas flow rates: check, continuously, the flue gas analysys, as to avoid combustion with little air; dose the air according to the gas flow rate change following the steps quoted below;
- 9 acting on the pressure stabiliser of the valves group, adjust the **gas flow rate in the high flame stage** as to meet the values requested by the boiler/utilisation:

-**Multibloc MB-DLE**:The pressure governor is adjusted by operating the screw **VS** located under the cover **C**. By screwing down the pressure is increased and by unscrewing it is reduced. The valve is adjusted by means of the **RP** regulator after slackening the locking screw **VB** by a number of turns. By unscrewing the regulator **RP** the valve opens, screwing the valve closes.

- **Siemens VGD valves group**: remove cap **T** and act on the **VR** adjusting screw to increase or decrease the pressure and consequently the gas rate; screwind **VR** the rate increases, unscrewing it decreases (see next figure).

- **Dungs MBC..SE valves group**: act on its pressure governor to increase or decrease the pressure and consequently the gas rate.

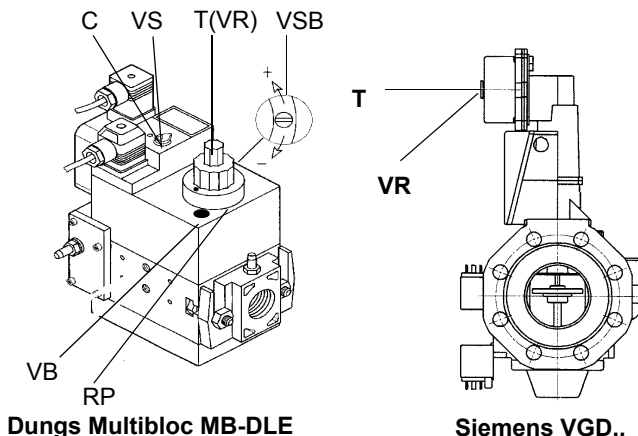
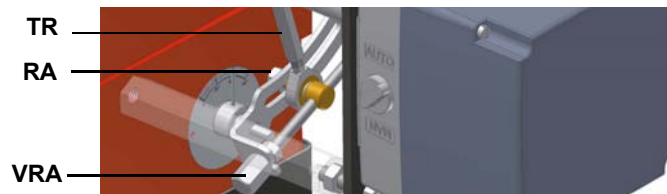


Fig. 24

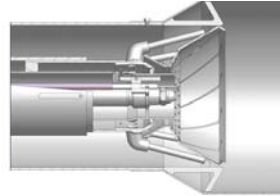
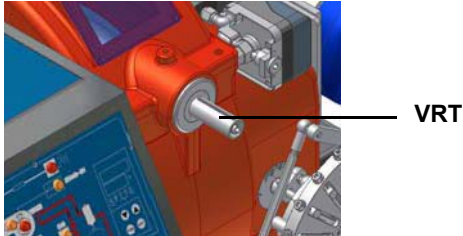
- 10 To adjust the **air flow rate in the high flame stage**, loose the **RA** nut and screw **VRA** as to get the desired air flow rate: moving the rod **TR** towards the air damper shaft, the air damper opens and consequently the air flow rate increases, moving it far from the shaft the air damper closes and the air flow rate decreases.



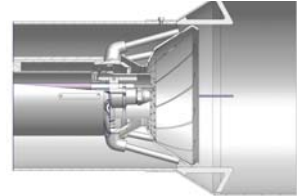
**Note:** once the procedure is performed, be sure that the blocking nut **RA** is fasten. Do not change the position of the air damper rods.



- 11 The burner is factory-set with the head in its MAX position (maximum output). To let the burner operate at a lower output, turn clockwise the **VRT** screw and move progressively the combustion head back towards the MIN position.

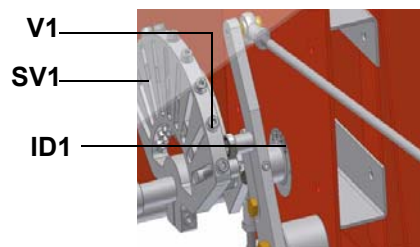
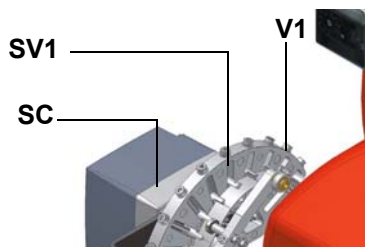


"MAX" head position

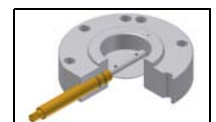


"MIN" head position

- 12 **Attention!** if it is necessary to change the head position, repeat the air and gas adjustments described above. 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.
- 13 as for the point-to-point regulation, move the gas low flame microswitch (cam III) a little lower than the maximum position (90°);
- 14 set the **TAB** thermostat to the minimum (as far as Fully-modulating burners, see next paragraphs) in order that the actuator moves progressively towards the low flame position;
- 15 move cam III 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

- 16 Move again cam III 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.

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

---

### **Calibration of air and gas pressure switches**

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

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



### **Calibration of air pressure switch**

To calibrate the air pressure switch, proceed as follows:

- Remove the transparent plastic cap.
- Once air and 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.

### **PGCP Gas leakage pressure switch (withn Siemens LDU/LME7x burner control/Siemens LMV Burner Management System)**

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

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

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

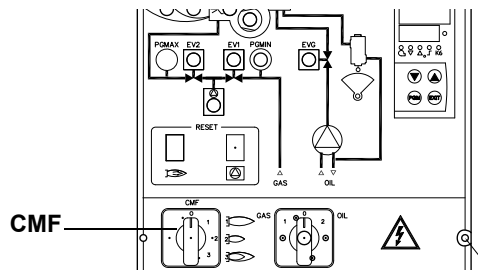
- 1 remove the pressure switch plastic cover;
- 2 if the maximum pressure switch is mounted upstream the gas valves: measure the gas pressure in the network, when flame is off; by means of the adjusting ring nut **VR**, set the value read, increased by the 30%.
- 3 if the maximum pressure switch is mounted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

## Fully modulating burners

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

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

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



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

### Adjustment procedure for light oil operation

The light oil flow rate can be adjusted choosing a by-pass nozzle that suits the boiler/utilisation output and setting the delivery and return pressure values according to the ones quoted on the table below and the diagram on Fig. 25 (as far as reading the pressure values, see next paragraphs).

NOZZLE	NOZZLE SUPPLY PRESSURE bar	HIGH FLAME RETURN PRESSURE bar	LOW FLAME RETURN PRESSURE bar
MONARCH BPS	20	See table below	See table below
BERGONZO A3	20	11 ÷ 13	6 (recommended)

RETURN PRESSURE bar														
Nozzle sizeNozzl e size (GPH)	0	1,4	2,8	4,1	5,5	6,9	8,3	9,6	11	12,4	13,8	15,2	Flow rate in kg/h with close return	Pressure with close return to use in the nozzle choice)
0,75	1,3	1,6	2,1	2,5									3,2	5,5
1,0	2,1	2,1	2,4	3,0	3,7	4,6	5,2						5,4	8,6
1,5	2,9	3,0	3,3	4,1	4,9	6,0	7,0						7,9	9,3
2,0	4,6	5,1	5,4	6,4	7,5	8,7	9,9						10,5	9,3
2,5	3,5	4,1	4,9	5,9	7,5	9,1	10,8	12,4					13,5	10,7
3,0	5,6	5,9	6,2	7,2	8,7	10,0	11,9	13,8					15,3	11,0
3,5	7,0	7,2	7,8	8,7	9,9	11,3	12,4	13,7	18,4				19,7	12,1
4,0	7,8	7,9	8,3	8,6	10,3	11,6	13,0	14,1	17,3	20,2			21,0	12,8
4,5	9,2	9,4	10,0	11,0	11,9	12,9	14,3	15,3	17,2	24,5			24,8	14,1
5,0	10,8	11,0	11,3	11,6	13,0	14,3	15,6	17,0	18,6	24,3			26,2	13,4
5,5	9,7	10,0	10,2	11,1	12,1	13,4	14,8	16,4	18,1				29,7	12,4
6,0	9,2	9,5	9,9	10,0	10,8	12,4	14,1	15,7	17,5	18,9	29,3		33,1	14,8
6,5	10,5	10,8	11,1	11,4	12,1	13,8	15,3	16,5	18,4	20,0	22,4	36,2	36,7	15,5
7,0	8,7	9,4	10,0	11,4	13,2	14,9	17,2	19,6	23,1	25,1	33,2		33,7	15,2
7,5	11,3	11,8	10,3	13,0	14,3	15,3	17,2	19,2	21,8	24,2	30,4		39,3	14,1
8,0	9,9	9,9	10,2	11,3	12,6	14,3	16,1	18,4	21,1	24,3			39,7	13,8
9,0	10,8	11,0	11,1	12,6	14,5	16,1	18,8	21,8	25,1	28,9			45,9	13,8
9,5	11,4	11,6	12,2	13,7	15,3	17,3	19,7	23,2	26,5	30,0	33,5		49,1	14,5
10,5	11,6	11,6	12,2	13,7	15,4	17,6	20,7	24,0	27,3	31,2	35,5		50,9	15,2
12,0	13,7	14,0	14,3	15,6	18,1	21,9	25,8	30,2	34,7	39,7	44,5		61,7	14,5
13,8	13,4	13,4	13,7	15,6	18,1	23,2	28,3	34,7	41,0	47,7	54,7		71,2	15,2
15,3	16,5	16,9	17,2	18,4	20,7	23,8	28,3	33,1	36,9	44,5	51,8		76,0	15,2
17,5	21,6	21,9	21,9	23,2	25,8	29,6	34,7	40,7	46,4	54,0	62,3	71,2	89,7	15,5
19,5	19,7	20,0	20,3	21,3	23,8	28,0	32,7	39,7	47,1	55,3	66,4	75,0	97,3	16,2
21,5	24,8	24,8	25,1	26,1	28,3	33,4	37,8	45,1	53,1	61,7	73,8	83,9	106,5	16,6
24,0	26,7	27,0	27,7	29,3	31,8	36,6	45,8	55,0	65,5	77,3	90,9	106,2	111,6	15,9
28,0	28,6	28,9	30,5	35,3	43,6	42,1	67,1	85,5	107,1	127,8	151,7		154,8	14,8
30,0	25,8	25,8	28,6	35,9	43,2	56,3	73,8	90,6	102,4	120,8	144,0	160,9	164,1	15,5
35,0	34,3	35,0	40,7	49,9	63,6	82,7	103,6	122,1	145,9	120,8			186,0	13,8
40,0	52,8	53,1	60,4	70,6	86,8	106,5	128,8	149,7	179,6	172,6			217,2	13,1
45,0	73,4	73,4	83,0	93,5	112,2	134,5	157,7	185,0	225,7	209,8			242,3	12,4
50,0	92,5	94,4	104,6	118,9	139,9	167,2	196,8	231,8	263,3				266,8	11,4

Tab. 1- Monarch nozzle

N.B. Specific gravity of the light oil: 0.840kg/dm<sup>3</sup>

**Example:** If the nozzle provided is mod. MONARCH 10.5 GPH, when the return pressure is 13.8 bar, the flow rate will be 35.5kg/h (see the chart above). If the return pressure is 13.80bar (with the same nozzle), the flow rate value will be 15.4kg/h. The flow rate in the High-flame operation is related to the nozzle provided with close return.

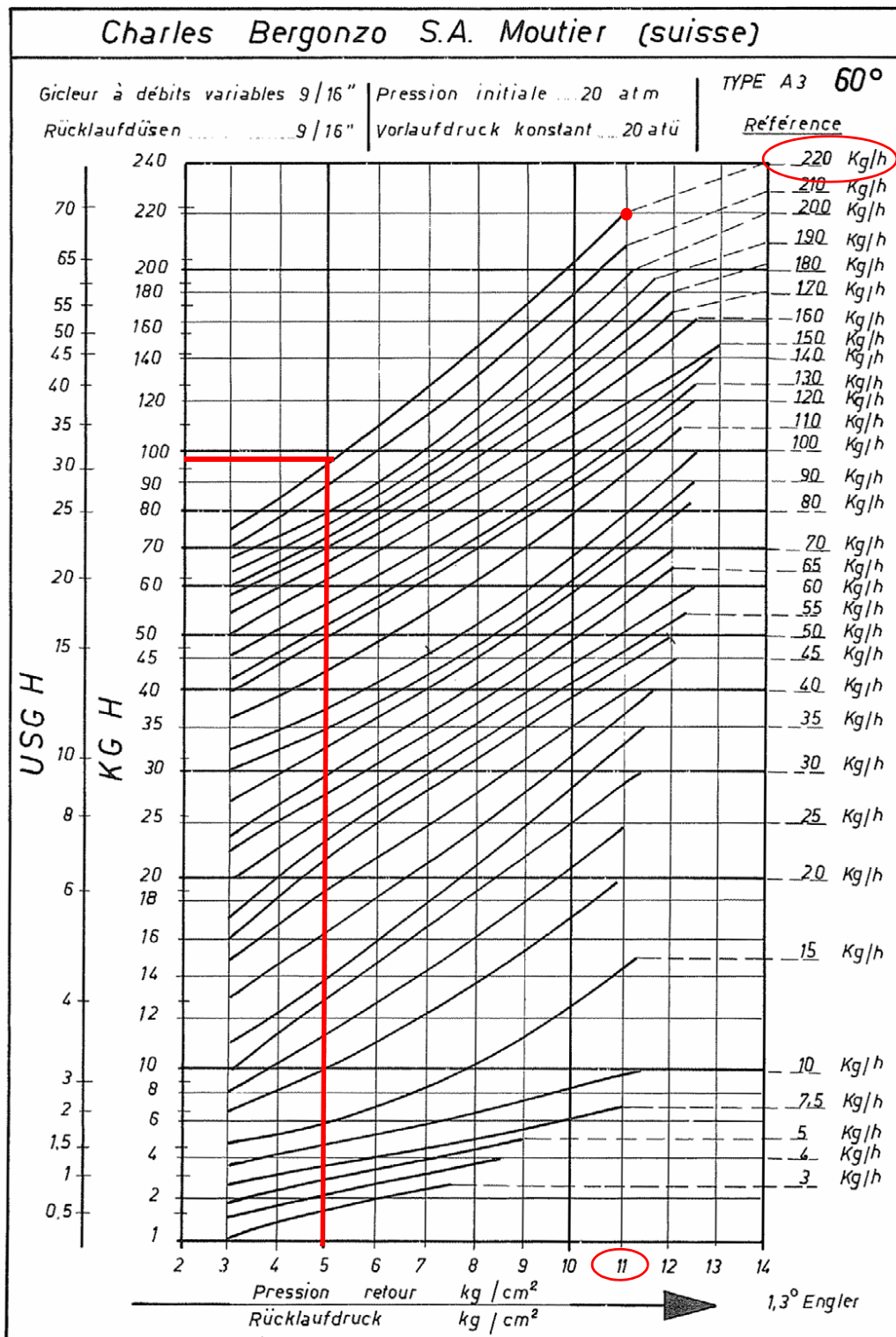


Fig. 25

**Example (Bergonzo):** if a 220kg/h flow rate BERGONZO nozzle is provided, set the return pressure at 11bar, supply at 20bar on the delivery to get a 220kg/h flow rate. If the return pressure needed is 5bar, instead, act on the V adjusting screw on the pressure governor (see chapter on page 33). The flow rate will then be about 95kg/h (see the example showed on the Bergonzo diagram).



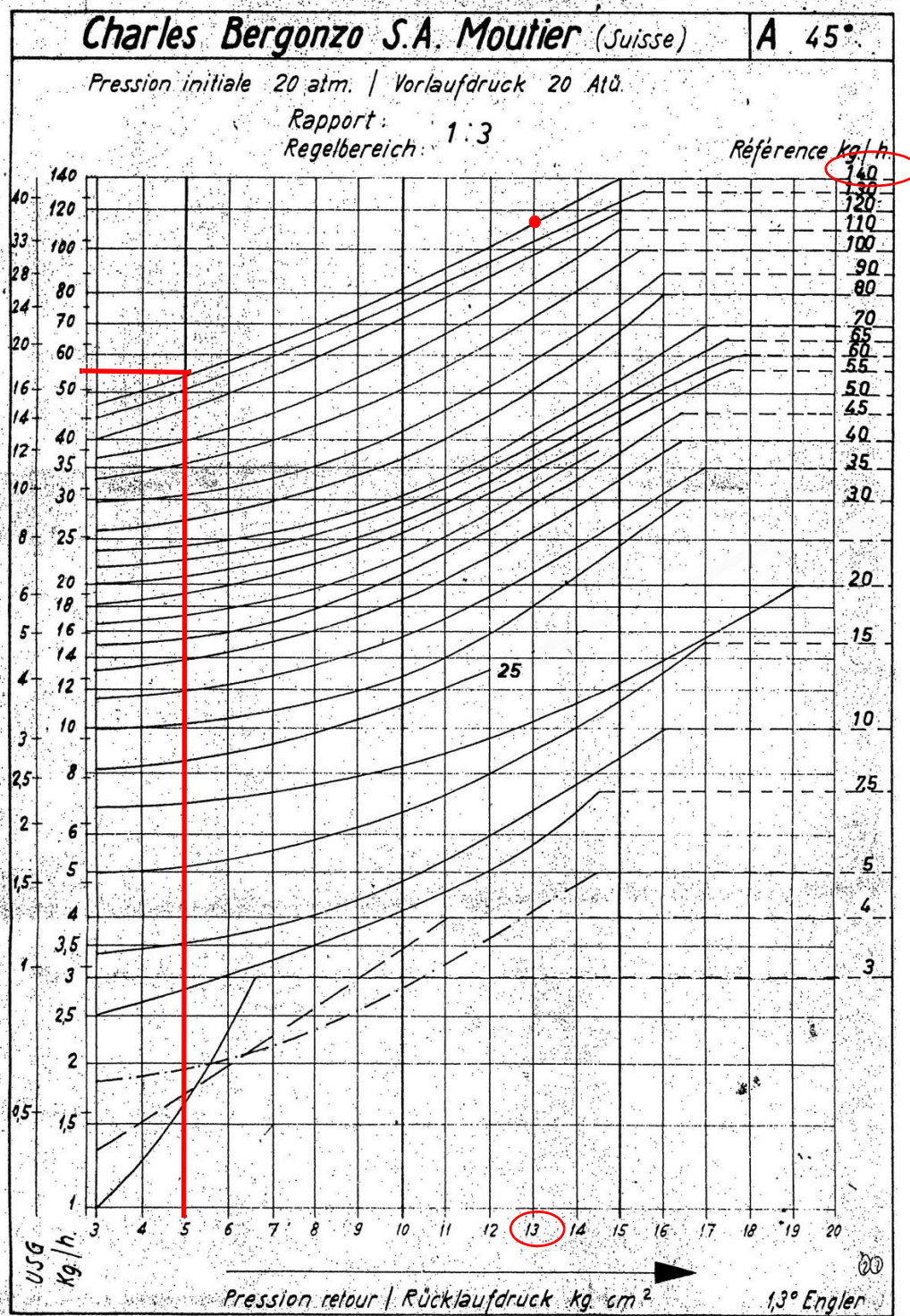


Fig. 26

**Example (Bergonzo):** if a 140kg/h flow rate BERGONZO 45° nozzle is provided, set the return pressure at 13bar, supply at 20bar on the delivery to get a 110kg/h flow rate. If the return pressure needed is 5bar, instead, act on the adjusting screw on the pressure governor. The flow rate will then be about 55kg/h (see the example showed on the Bergonzo diagram).

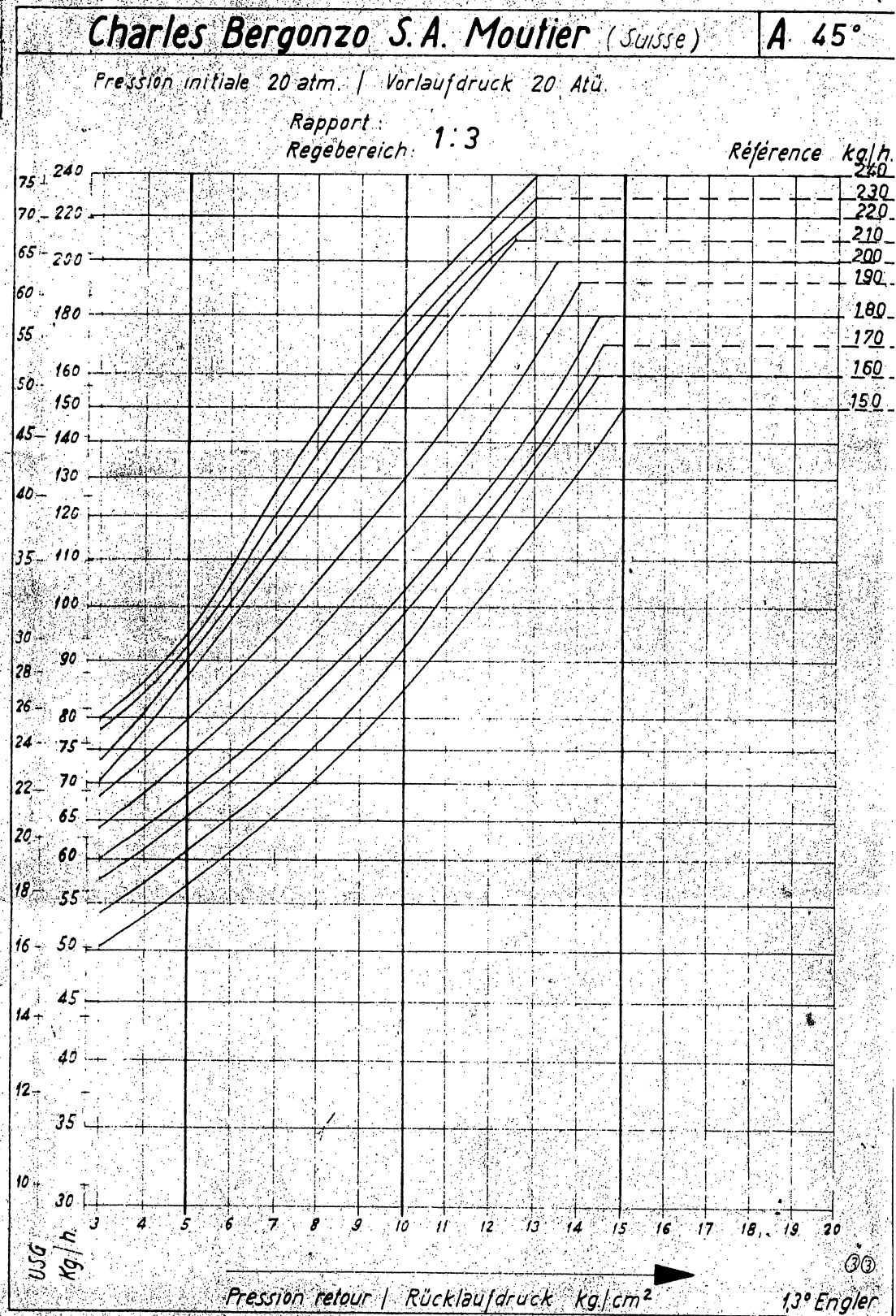
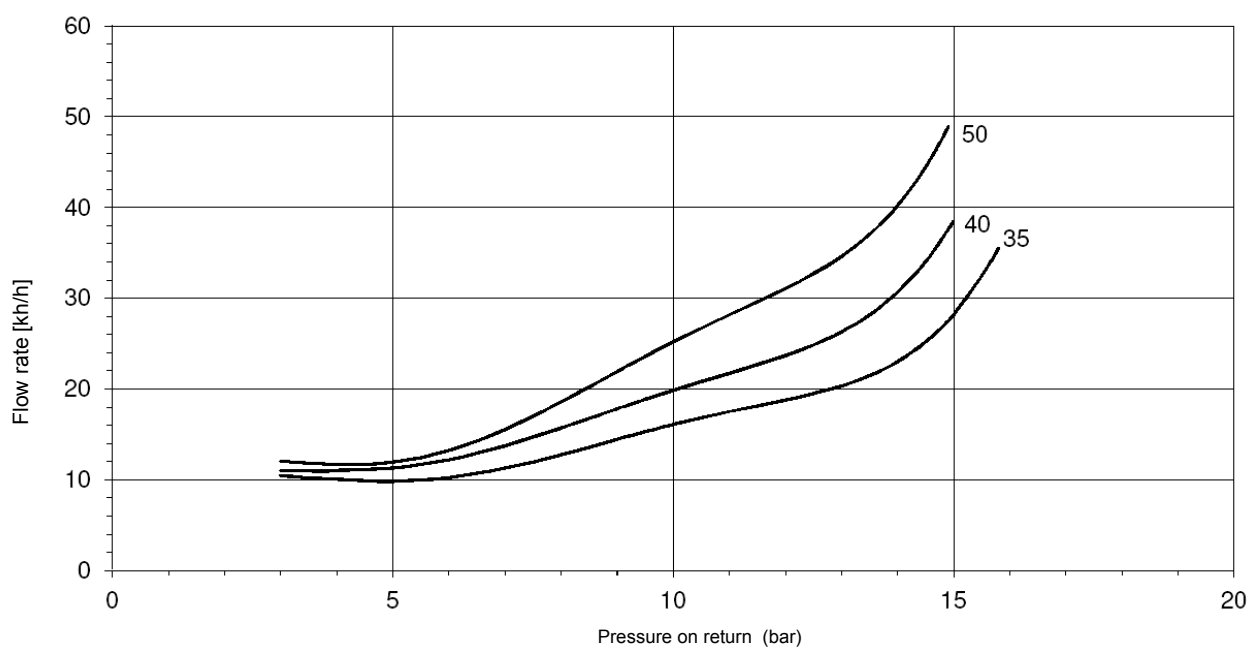
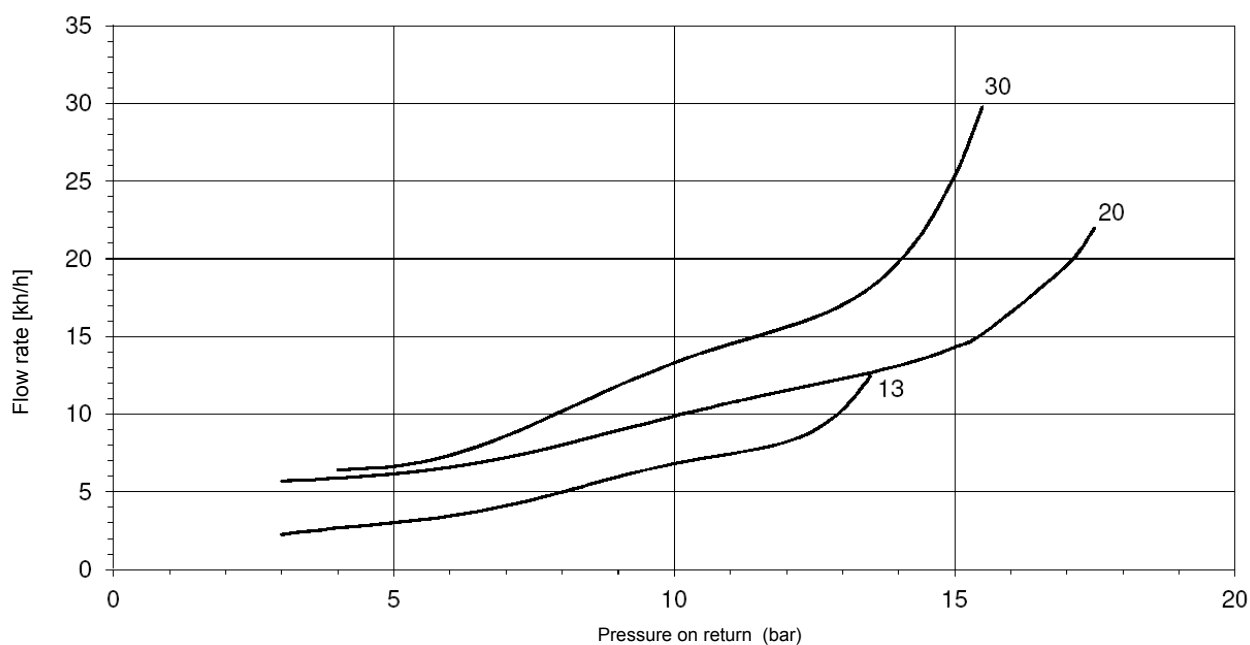
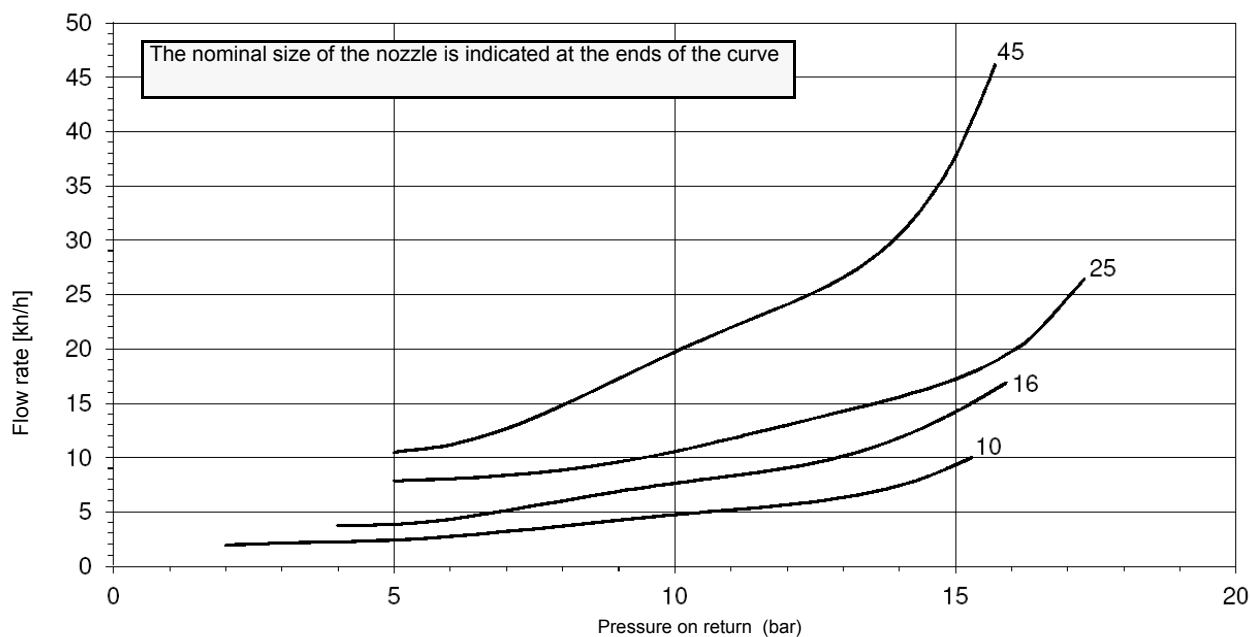


Fig. 27



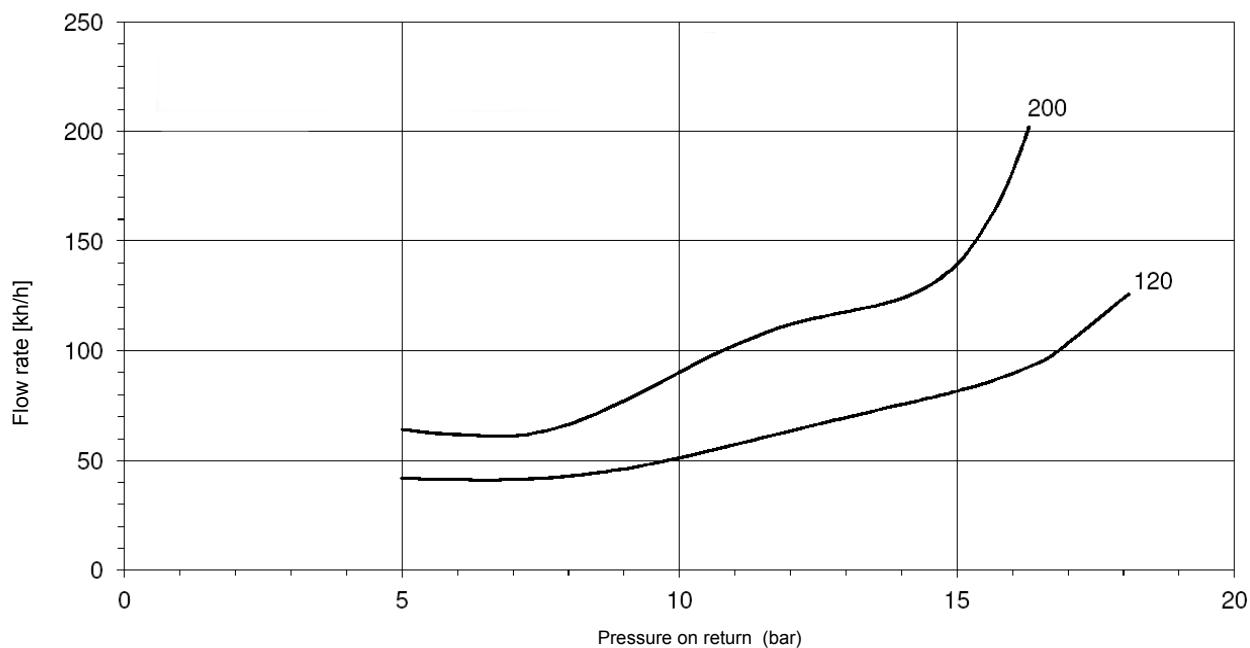
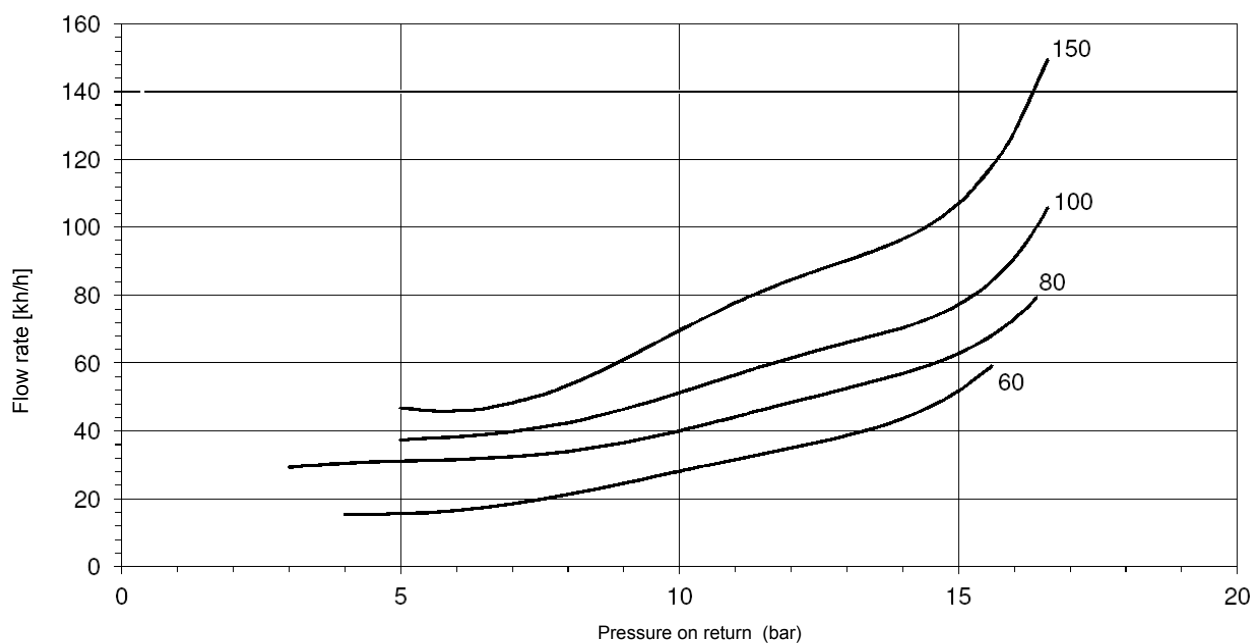
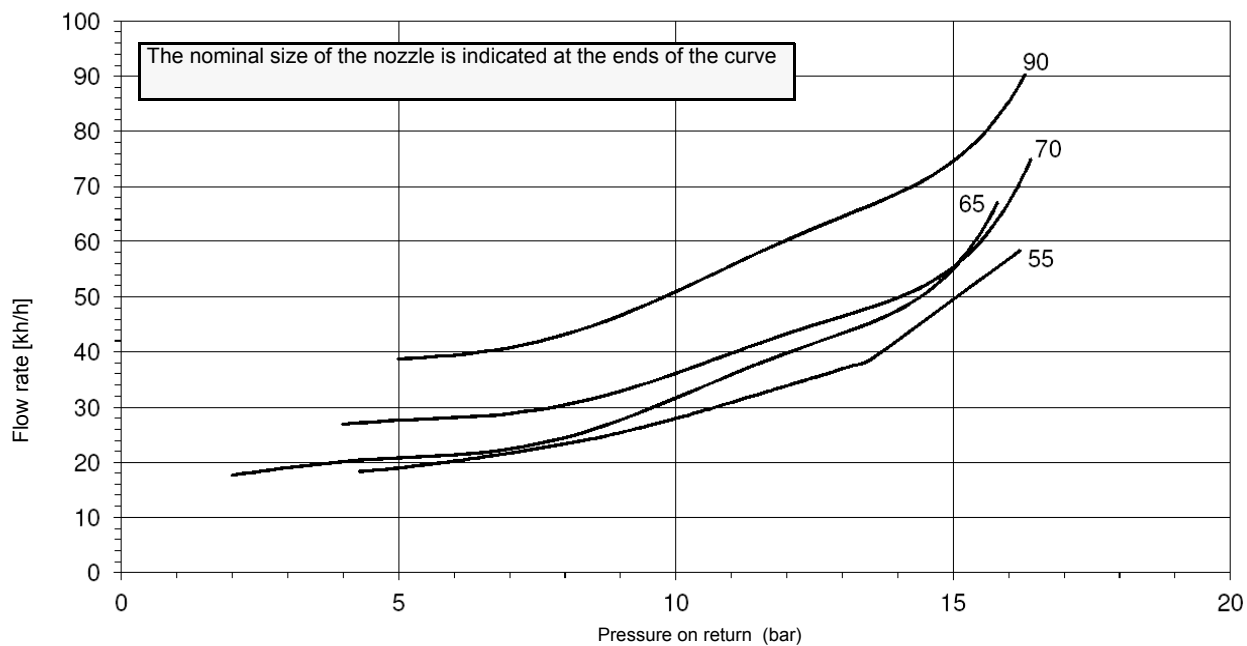
**FLUIDICS KW3...45°**

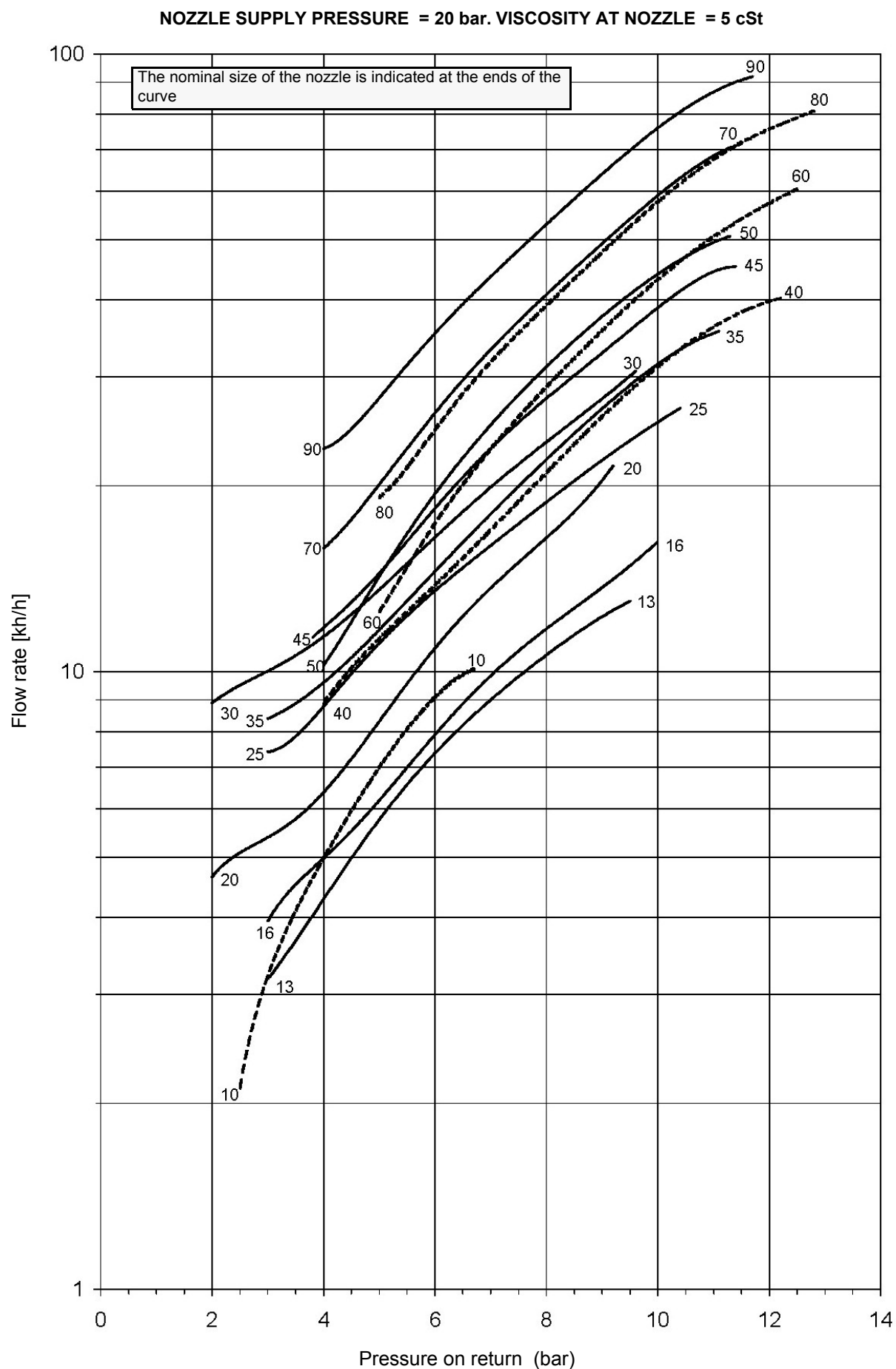
**NOZZLE SUPPLY PRESSURE = 20 bar. VISCOSITY AT NOZZLE = 5 cSt**



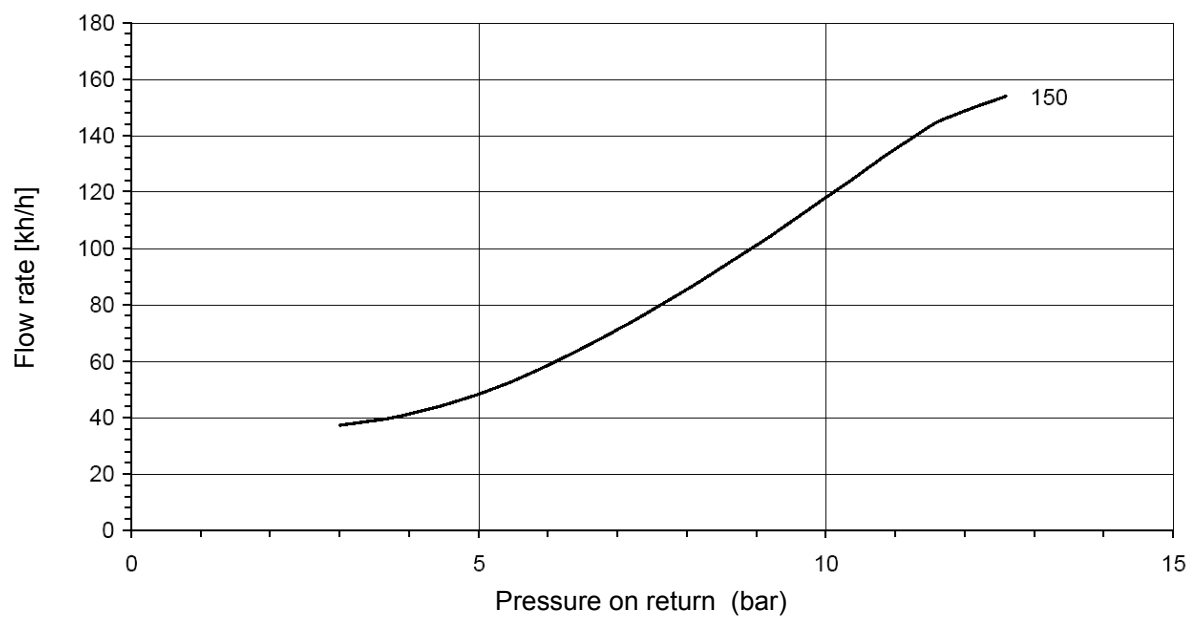
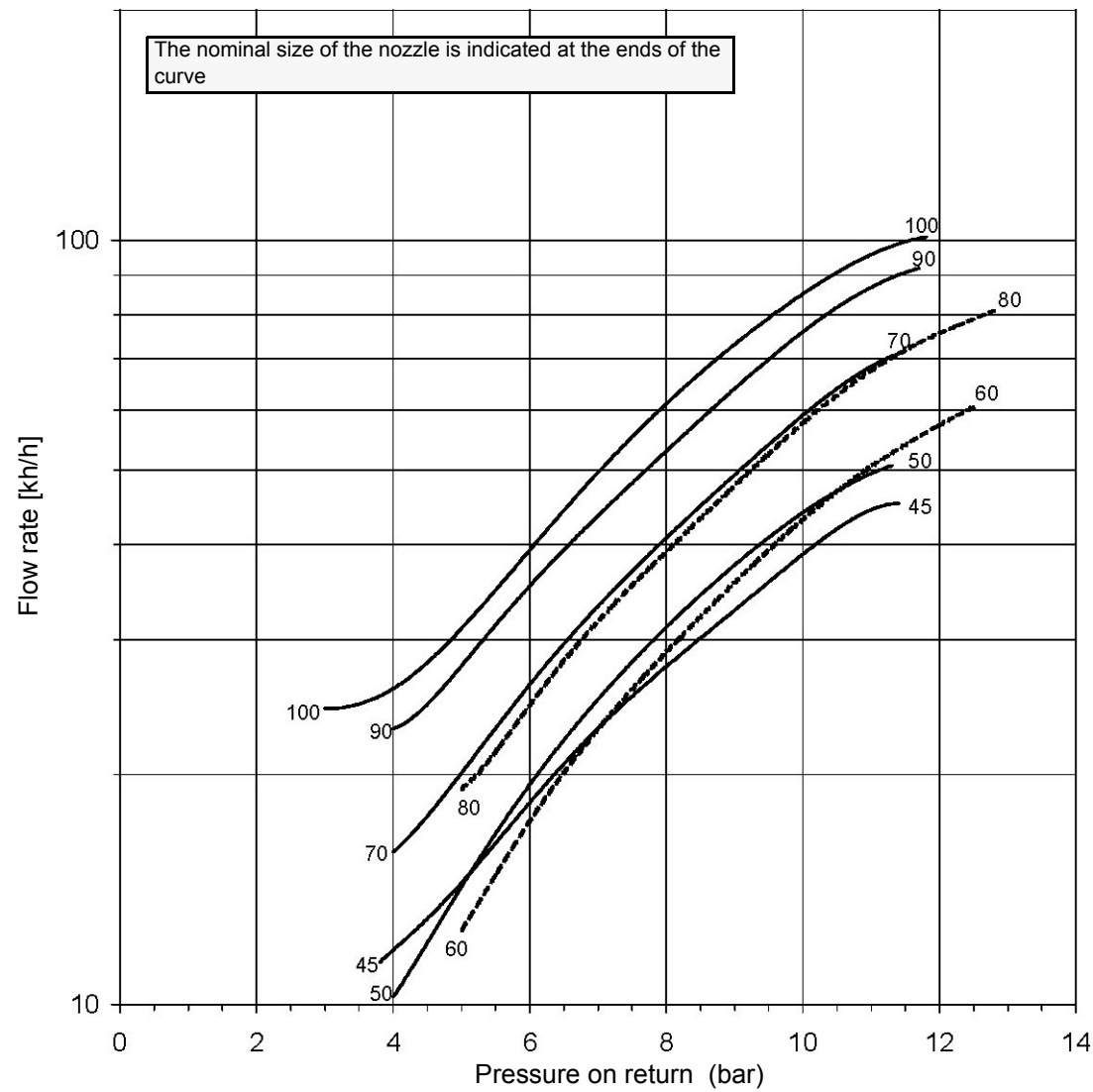
**FLUIDICS KW3...45°**

**NOZZLE SUPPLY PRESSURE = 20 bar. VISCOSITY AT NOZZLE = 5 cSt**



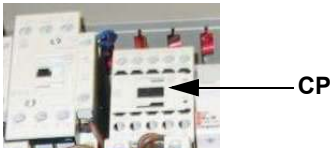


NOZZLE SUPPLY PRESSURE = 20 bar. VISCOSITY AT NOZZLE = 5 cSt



**Oil Flow Rate Settings by means of Berger STM30../Siemens SQM40.. actuator**

- 1 Once the air and gas flow rates are adjusted, turn the burner off, switch the **CM** switch to the heavy oil operation (OIL, on the burner control panel (see page 45).
- 2 with the electrical panel open, prime the oil pump acting directly on the related **CP** contactor (see next picture): check the pump motor rotation and keep pressing for some seconds until the oil circuit is charged;



- 3 bleed the air from the **M** pressure gauge port (Fig. 28) by loosening the cap without removing it, then release the contactor.

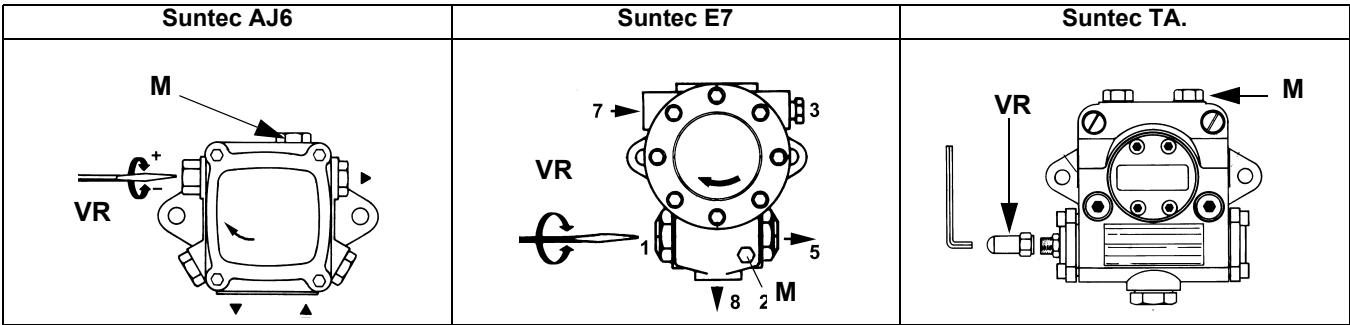


Fig. 28

- 4 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 achieve safely the high flame stage .
- 5 record the high flame value set during the gas operation adjustments (see previous paragraphs);
- 6 start the burner up by means of the thermostat series and wait until the pre-purge time comes to an end and that the bruner starts up;
- 7 drive the burner to high flame stage, by means fo the thermostat **TAB** (high/low flame thermostat - see Wiring diagrams), as far as fully-modulating burners, see related paragraph.drive the burner to high flame stage, by means fo the thermostat **TAB**, as for fully-modulating burners, see next paragraphs.
- 8 Then move progressively the microswitch to higher values until it reaches the high flame position; always check the combustion values and eventually adjusting the oil pressure (see next step).

Siemens SQM40

A photograph of the Siemens SQM40 actuator. It shows a vertical stack of six colored cam rings labeled I through VI. Below the stack is a dial with a red arrow pointing to a value.

**Actuator cams (SQM40)**

- I High flame
- II Stand-by
- III Low flame - gas
- IV Low flame - oil
- V Ignition - oil
- VI Ignition - gas

Berger STM30

A photograph of the Berger STM30 actuator. It shows a vertical stack of five colored cam rings labeled I through V. To the left of the stack is a label 'MAN-AUTO' with an arrow pointing to a switch.

**Actuator cams (STM30)**

- I High flame
- II Stand-by and Ignition
- III Low flame - gas
- V Low flame - oil

- 9 the nozzle supply pressureis already factory-set and must not be changed. Only if necessary, adjust the supply pressure as follows (see related paragraph); insert a pressure gauge into the port shown on Fig. 29 and act on on the pump adjusting screw **VR** (see

Fig. 28) as to get the nozzle pressure at 20bar (Monarch or Fluidics nozzles - see page 33-34).

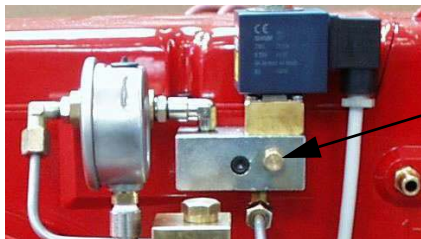


Fig. 29

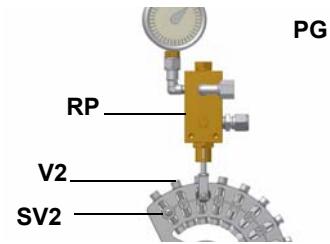


Fig. 30

- 10 in order to get the maximum oil flow rate, adjust the pressure (reading its value on the **PG** pressure gauge) without changing the air flow rate set during the gas operation adjustments (see previous paragraph): checking always the combustion parameters, the adjustment is to be performed by means of the **SV2** adjusting cam screw (see picture) when the cam has reached the high flame position.
- 11 as for the point-to-point regulation in order to set the cam foil shape, move the oil low flame microswitch a little lower than the maximum position (90°);
- 12 set the **TAB** thermostat (as for fully-modulating burners, see next paragraphs) to the minimum in order that the actuator moves progressively towards the low flame position;
- 13 move the oil low flame cam towards the minimum to move the actuator towards the low flame until the two bearings find the adjusting screw that refers to a lower position: screw **V2** to increase the rate, unscrew to decrease, in order to get the pressure as showed on chart/diagram on "Adjustment procedure for light oil operation" on page 33, according to the requested rate.
- 14 Move again the oil low flame cam 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.
- 15 The low flame position must never match the ignition position that is why the related cam must be set 20°- 30° more than the ignition position.

Turn the burner off; then start it up again. If the adjustment is not correct, repeat the previous steps.

### Maximum oil pressure switch

The oil pressure switch on the return line, checks that the pressure does not exceed a default value. This value must not be higher than the maximum acceptable pressure on the return line (this value is reported on the specification table). A pressure change on the return line could affect the combustion parameters: for this reason, the pressure switch must be set, say, at 20% over the pressure recorded during the combustion adjustment. The factory setting is 4 bar.

It is recommended to verify that the combustion parameters are within the range of acceptable values even against a pressure variation that gets close to the limit of the pressure switch

This check should be carried out along the whole range of the burner output.

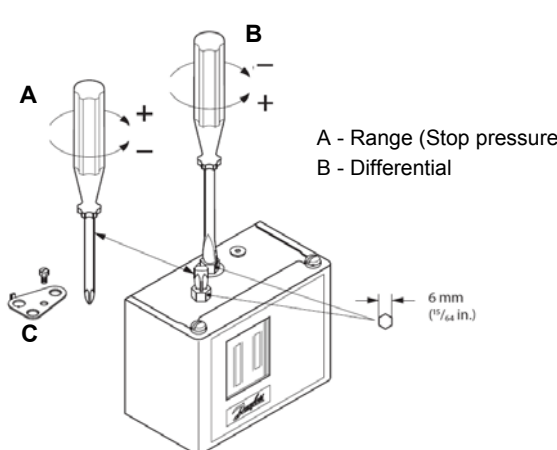
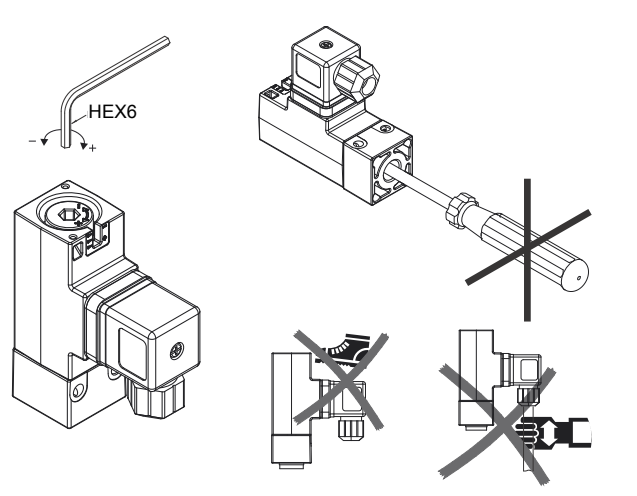
In case of unacceptable values, reduce from 20% to 15% the overpressure; later on, repeat the adjustments described above.

### Minimum oil pressure switch (when provided)

The minimum oil pressure switch on the inlet line, checks that the pressure does not drop below a default value. The pressure switch must be set, say, at 10% under the pressure at the nozzle.

### Oil pressure switch adjustment

Follow the below instruction, according to the pressure switch installed.

 <p>A - Range (Stop pressure) B - Differential</p> <p>NB: Remove lockplate (C) before adjustment</p>	
<b>Danfoss KP..</b>	<b>Trafag Picostat 9B4..</b>

### Oil circuit

The fuel is pushed into the pump 1 to the nozzle 3 at the delivery pressure set by the pressure governor. The solenoid valve 2 stops the fuel immission into the combustion chamber. The fuel flow rate that is not burnt goes back to the tank through the return circuit. The spill-back nozzle is fed at constant pressure, while the return line pressure is adjusted by means of the pressure governor controlled by an actuator coupled to an adjusting cam. The fuel amount to be burnt is adjusted by means of the burner actuator according to the adjustments set (see previous paragraph).

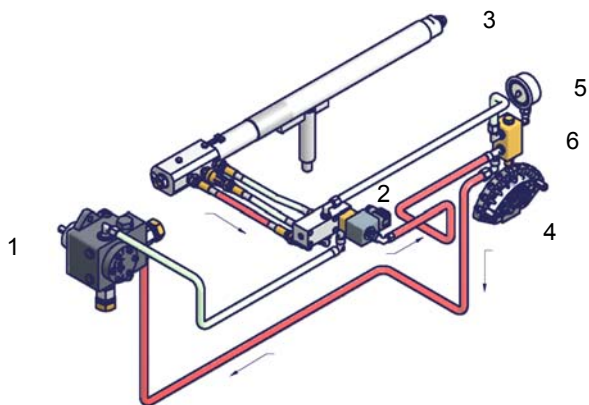


Fig. 31 - Stand-by

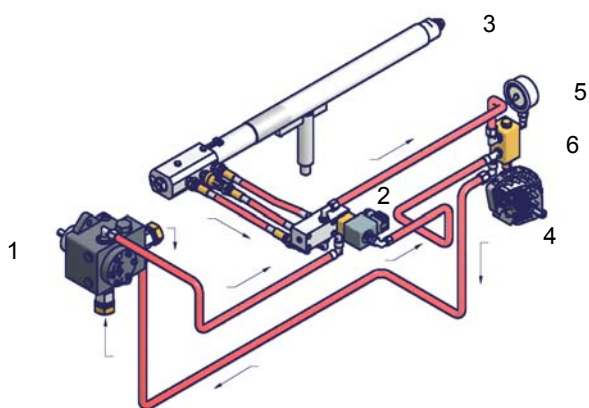


Fig. 32 - Prepurge

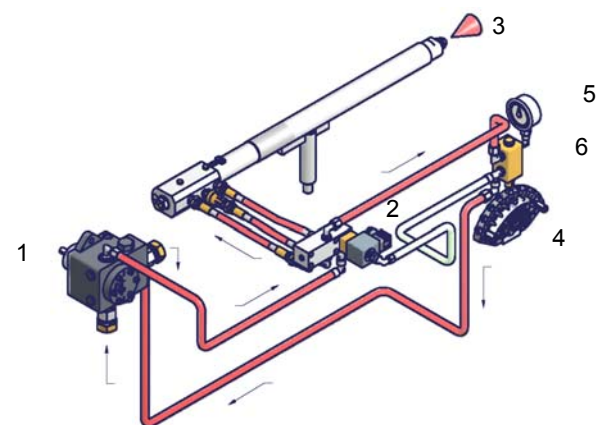


Fig. 33 - Low flame

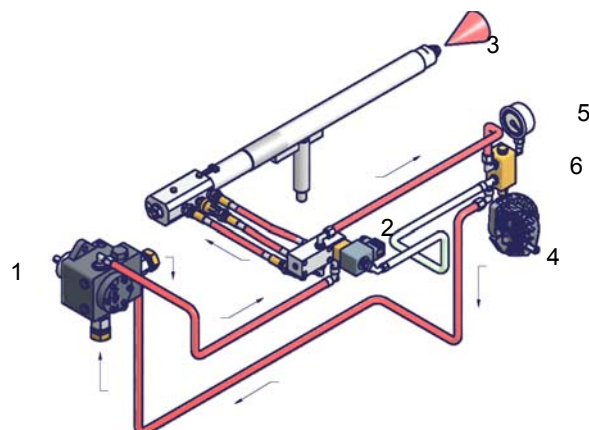


Fig. 34 - High flame

#### Key

- 1 Oil pump
- 2 Oil solenoid valve
- 3 Nozzle
- 4 Adjusting cam
- 5 Pressure gauge
- 6 Pressure governor



## LIMITATIONS OF USE

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

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

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

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

NEVER OPEN OR DISMANTLE ANY COMPONENT OF THE MACHINE.

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

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

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

## OPERATION



BEFORE STARTING UP THE BURNER, BE SURE THAT THE MAIN SWITCH IS ON AND THE MANUAL SHUTOFF VALVES ARE OPEN.

### Fuel selection:

- In order to start the burner with gas or light oil, the operator must commute the selector on the burner control panel on (1) = gas, or (2) = light oil.

If the selector is set on (1) the gas cock must be open, while the light oil cock must be closed. Viceversa if the selector is set on (2).

**CAUTION:** if the fuel chosen is oil, be sure the cutoff valves on the feed and return pipes are open.

- Check the control box is not locked (signalling light **O**, on); if so, reset it by means of the pushbutton **C**.
- Check the series of thermostats and pressure switches turn the burner to on.

### Gas operation

- Check the gas feeding pressure is sufficient (signalling lamp **G** on).

**Burners provided 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 **E** turns on. Reset it, by means of the reset pushbutton on the device.

- Check the gas feeding pressure is sufficient (signalling lamp **G** on).

**Burners provided 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 **E** turns on.

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 **L** is on).

- Few seconds after the gas valves opening, the transformer is de-energised and lamp **L** 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 **N** on the frontal panel.

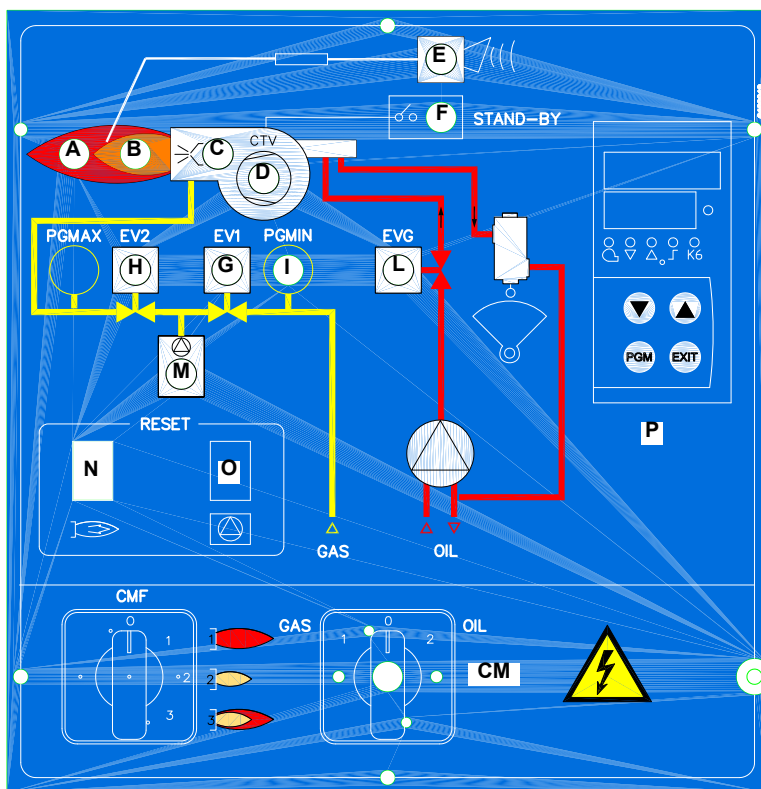
### Light oil operation

- The fan motor starts and the pre-purge phase as well. Since the pre-purge phase must be carried out at the maximum air rate, the control box drives the actuator opening and when the maximum opening position is reached, the pre-purge time counting starts.
- At the end of the pre-purge time, the actuator is in the light oil ignition position: the ignition transformer is energised (lamp **L** on). Few seconds after the light oil valves opening, the transformer is de-energised and lamp **L** turns off.
- The burner is now operating, meanwhile the actuator goes to the high flame position; 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 LED **N** on the burner control panel.

**Modulating burners:** they are provided with the Siemens RWF40 modulator (**P**-see next picture). As for the modulator operation see the related manual.

### Burner control panel



#### Key

A	High flame mode indicating light
B	Low flame mode indicating light
C	Ignition transformer operation
CM	Main switch/operation mode Gas / Oil
D	Fan motor therma cutout intervention
E	Burner lockout indicating light
F	Stand-by mode indicating light
G	Gas valve EV1 operation
H	Gas valve EV2 operation
I	Gas pressure switch enabling signal
L	Oil solenoid valve operation
M	Gas proving system intervention
N	Control box reset pushbutton
O	Gas proving system reset pushbutton
P	Modulator


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

- Check and clean the gas filter cartridge, if necessary replace it (see next paragraphs);
- Check and clean the fuel filter cartridge, replace if necessary.
- Check and clean the filter inside the light oil pump: filter must be thoroughly cleaned at least once in a season to ensure correct working of the fuel unit. To remove the filter, unscrew the four screws on the cover. When reassemble, make sure that the filter is mounted with the feet toward the pump body. If the gasket between cover and pump housing should be damaged, it must be replaced. An external filter should always be installed in the suction line upstream of the fuel unit.
- Check the fuel hoses for possible leaks.
- Remove, check and clean the combustion head (see page 50);
- Check ignition electrodes, clean, adjust and, if necessary, replace them (see page 50);
- Check and carefully clean the **UV** detector, replace it if necessary; if in doubt, check the detection current, once the burner starts up.
- Remove and clean the fuel nozzle  (**Important: cleaning must be performed using solvent, not metal tools!**). At the end of maintenance operations after the burner reassembly, light the flame and check its shape, replacing the nozzle whenever a questionable flame shape appears. Whenever the burner is used intensely, we recommend preventively replacing the nozzle at the start of each heating season.
- Clean and grease sliding and rotating parts.



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

## Light oil filter maintenance

For correct and proper servicing, proceed as follows:

- 1 cutoff the required pipe section;
- 2 unscrew the filter cup;
- 3 remove the filtering cartridge, wash it with gasoline; if necessary, replace it; check the tightening O-rings and replace them if necessary;
- 4 replace the cup and restore the pipe line.



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

- Check the filter at least once a year!
- Change the filter if the pressure difference between pressure connection 1 and 3 (Fig. 35-Fig. 36) is  $\Delta p > 10$  mbar.
- Change the filter if the pressure difference between pressure connection 1 and 3 (Fig. 35-Fig. 36) is twice as high compared to the last check.

You can change the filter without removing the fitting.

- 1 Interrupt the gas supply closing the on-off valve.
- 2 Remove screws 1 ÷ 4 using the Allen key n. 3 and remove filter cover 5 in Fig. 37.
- 3 Remove the filter 6 and replace with a new one.
- 4 Replace filter cover 5 and tighten screws 1 ÷ 4 without using any force and fasten.
- 5 Perform leakage and functional test,  $p_{max.} = 360$  mbar.
- 6 Pay attention that dirt does not fall inside the valve.

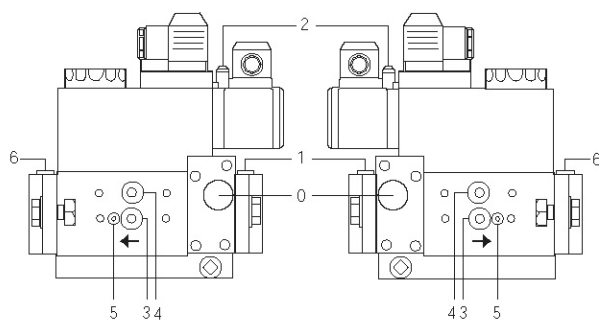


Fig. 35

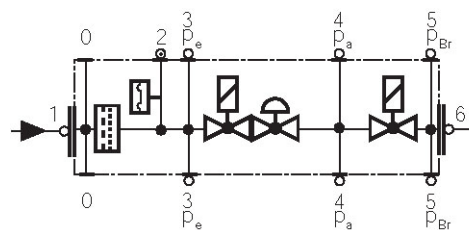


Fig. 36

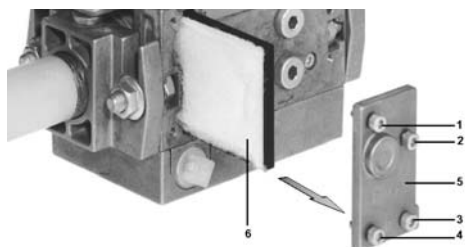


Fig. 37

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

- Check the filter at least once a year!
- Change the filter if the pressure difference between pressure connection 1 and 2 (Fig. 38-Fig. 39)  $\Delta p > 10$  mbar.
- Change the filter if the pressure difference between pressure connection 1 and 2 (Fig. 38-Fig. 39) is twice as high compared to the last check.

You can change the filter without removing the fitting.

- 1 Interrupt the gas supply closing the on-off valve.
- 2 Remove screws 1 ÷ 6 (Fig. 40).
- 3 Change filter insert.
- 4 Re-insert filter housing, screw in screws 1 ÷ 6 without using any force and fasten.
- 5 Perform leakage and functional test,  $p_{max.} = 360$  mbar.
- 6 Pay attention that dirt does not fall inside the valve.

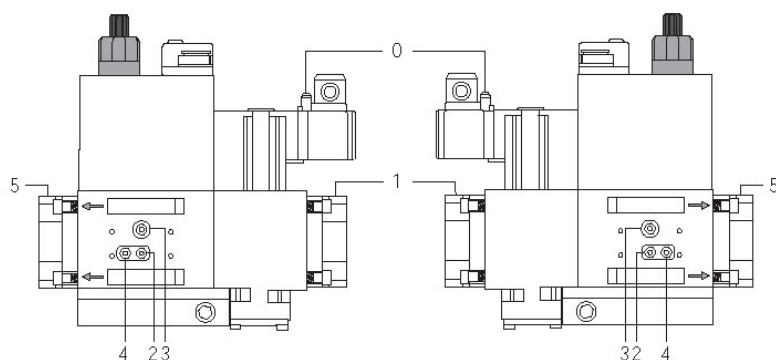


Fig. 38

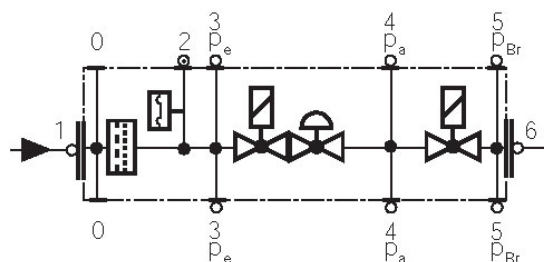


Fig. 39

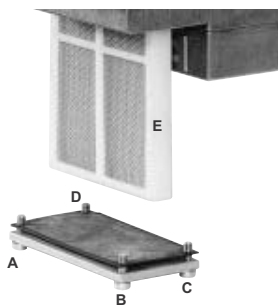


Fig. 40

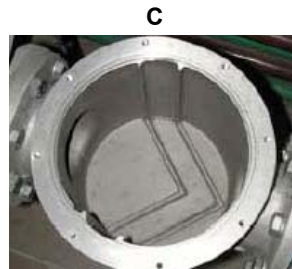
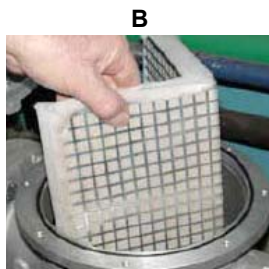
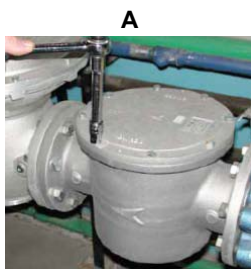
### Gas filter maintenance



**ATTENTION:** 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.

To clean or remove the filter, proceed as follows:

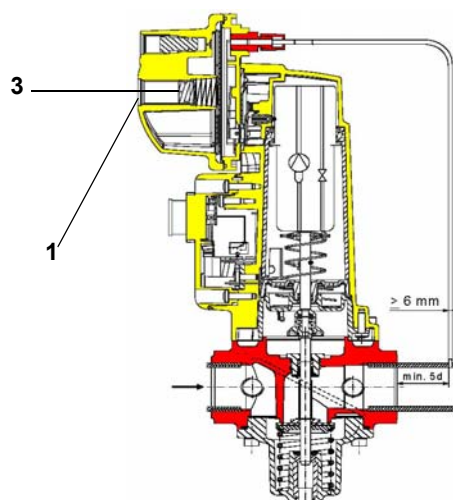
- 1 remove the cap unscrewing the fixing screws (A);
- 2 remove the filtering cartridge (B), clean it using water and soap, blow it with compressed air (or replace it, if necessary)
- 3 replace the cartridge in its proper position taking care to place it inbetween the guides as not to hamper the cap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



### Replacing the spring in the gas valve group

To replace the spring in the gas valve group, proceed as follows:

- 1 Carefully twist the protection cap 1 and the O-ring 2.
- 2 remove the "set value" spring 3 from housing 4.
- 3 Replace spring 3.
- 4 Carefully insert the new "set value" spring. Pay attention to mount properly. First insert the spring part with smaller diameter in the housing.
- 5 Place O-ring 2 in protective cap 1. Screw in the protective cap with the O-ring in it.
- 6 Stick the adhesive label for spring identification on the type plate.

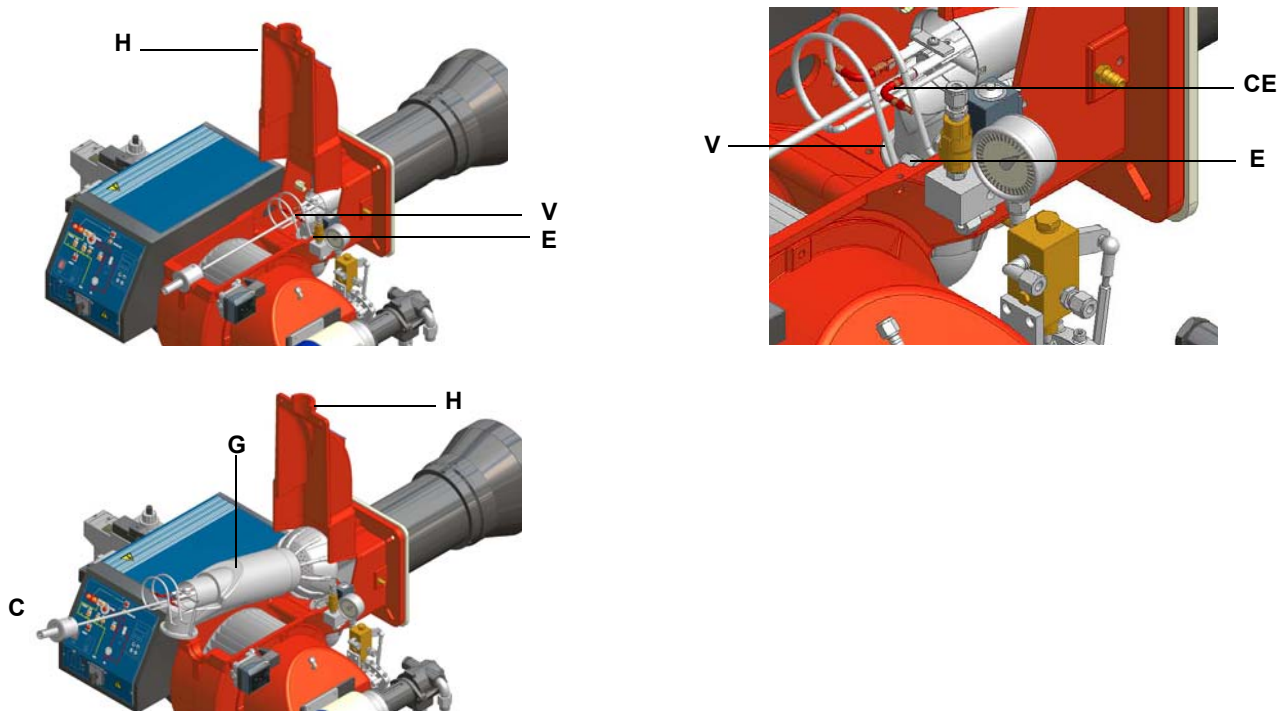


SKP Siemens actuator

## Removing the combustion head

- 1 Remove the top **H**.
- 2 Disconnect the electrode cables **CE**.
- 3 Remove the **UV** detector out of its housing: disconnect electrode cables and the light oil flexible hoses.
- 4 Loosen the screws **S** holding the **VR** group: screw the VR screw in order to loose the threaded rod **C**.
- 5 Loosen the screws **V** holding the gas manifold **G**, loosen the two connectors **E** and remove the assembly as shown.
- 6 Clean the combustion head by means of a vacuum cleaner; scrape off the scale by means of a metallic brush.

**Note:** to replace the combustion head, reverse the operations described above.



## Adjusting the electrodes position

Adjust the electrodes position, according to the quotes (in mm) shown on the next picture.

**HP60-65-72**

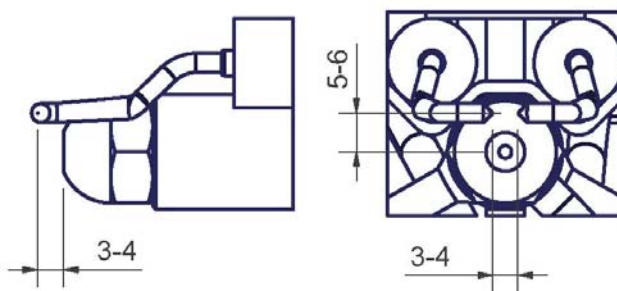


Fig. 41

**HP73A**

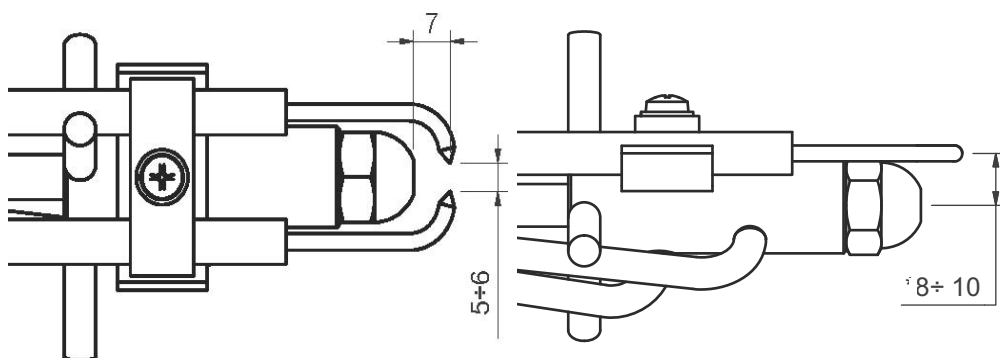


Fig. 42



## Cleaning/replacing the electrodes

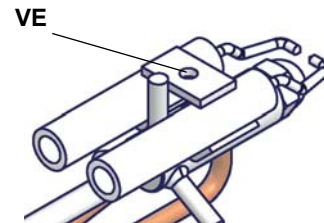


**ATTENTION:** avoid the electrodes to get in touch with metallic parts (blast tube, head, etc.), otherwise the boiler operation would be compromised. Check the electrodes position after any intervention on the combustion head.

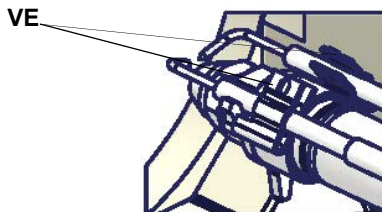
To clean/replace the electrodes, proceed as follows:

- 1 remove the combustion head as described in the previous paragraph;
  - 2 remove the electrodes ass.y and clean them;
- in order to replace the electrodes, unscrew the **VE** fixing screws and remove them: place the new electrodes being careful to observe the measures in the previous paragraph; reassemble the electrodes and the combustion head following the reversed procedure.

### HP60-65-72



### HP73A



## Cleaning and replacing the detection photocell

To clean/replace the detection photocell, proceed as follows:

- 1 Disconnect the system from the electrical power supply.
- 2 Shut off the fuel supply;
- 3 remove the photocell from its slot (see next figure);
- 4 clean the bulbe if dirty, taking care not to touch it with bare hands;
- 5 if necessary, replace the bulb;
- 6 replace the photocell into its slot.



## Checking the detection current

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...	70μA with UV detector)

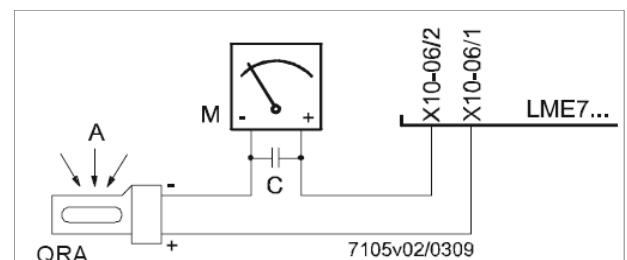


Fig. 43: Detection by photocell QRA..

To clean/replace the detection photocell, proceed as follows:

- 1 Disconnect the system from the electrical power supply.
- 2 Shut off the fuel supply
- 3 remove the photocell from its slot (see next picture);
- 4 clean the bulbe if dirty, taking care not to touch it with bare hands;
- 5 if necessary, replace the bulb;
- 6 replace the photocell into its slot.

---

### ***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".



## 53

[illegible]

**BURNER EXPLODED VIEW**

ITEM	DESCRIPTION
1	FRONT CONTROL PANEL
2	LIGHT
3	LIGHT
4	LOCK-OUT RESET BUTTON
5	PROTECTION
6	SWITCH
7	BOARD
8	COVER
9	IGNITION ELECTRODE
10	NOZZLE
11	IGNITION CABLE
12	NOZZLE HOLDER
13	GAS MANIFOLD
14	STANDARD COMBUSTION HEAD
15	RING NUT
16	NET
17	MOTOR
18	PLATE
19	COUPLING
20	PUMP
21	BRACKET
22	FAN WHEEL
23	MOTOR
24	PRESSURE GAUGE
25	PRESSURE GOVERNOR
26	BRACKET
27	GAS VALVES GROUP WITH GOVERNOR
28	THREADED GAS PIPE
29	ELBOW
30	FLANGE
31	GAS PROVING SYSTEM
32	AIR INLET CONE
33	BURNER HOUSING
34	COVER
35	COVER EXTENSION
36	GENERATOR GASKET
37	O RING
38	INSPECTION GLASS

ITEM	DESCRIPTION
39	PRESSURE PLUG
40	ELBOW
41	THROTTLE SHAFT
42	BUTTERFLY GAS VALVE
43	PHOTOCELL
44	STANDARD BLAST TUBE
45	AIR PRESSURE SWITCH
46	SCREW
47	CAM
48	LEVERAGE
49	ROD
50	JOINT
51	JOINT
52	BUSH
53	LEVERAGE
54	ADJUSTING CAM
55	ACTUATOR
56	ACTUATOR SHAFT
57	BRACKET
58	AIR INTAKE DAMPER
59	AIR INTAKE DAMPER
60	AIR INTAKE
61	LOUVER SHAFT
62	LOUVER SHAFT
63	THROTTLE SHAFT
64	ADJUSTING CAM SHAFT
65	ADJUSTING CAM
66	LEVERAGE
67	ROD
68	ROD
69	JOINT
70	JOINT
71	OIL SOLENOID VALVE
72	ONE-WAY VALVE
73	OIL MANIFOLD
74	CONNECTOR
75	CONNECTOR
76	CONNECTOR



---

## **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









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



# **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:






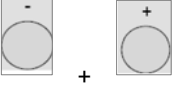
- Undervoltage detection
- Electrical remote reset facility
- Accurate control times thanks to digital signal handling
- Multicolor indication of fault status and operating state messages
- Air pressure supervision with function check of air pressure switch during start and operation (gas)
- Repetition 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> (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 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

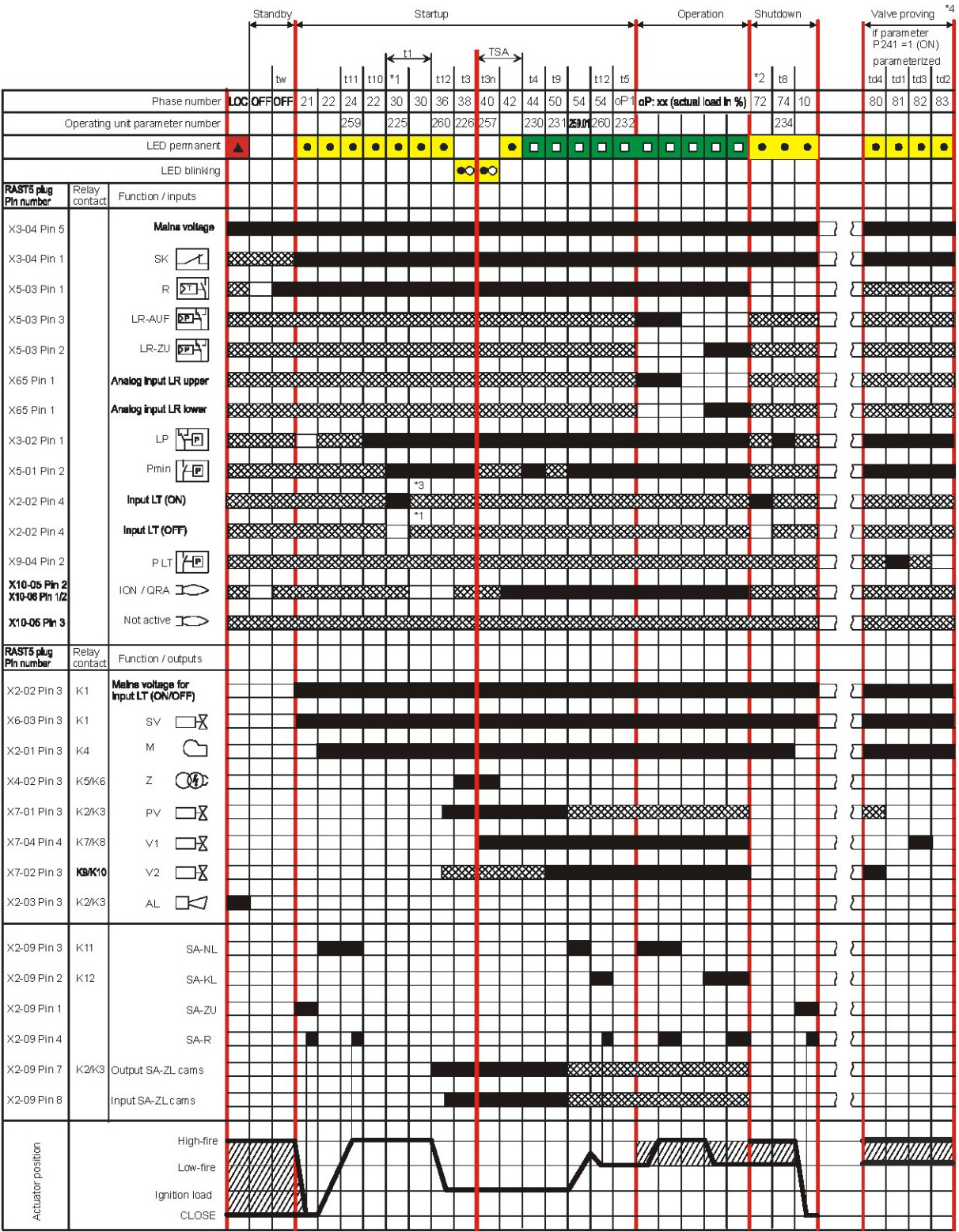
### Key

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

**Program sequence :**

Version 1:

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



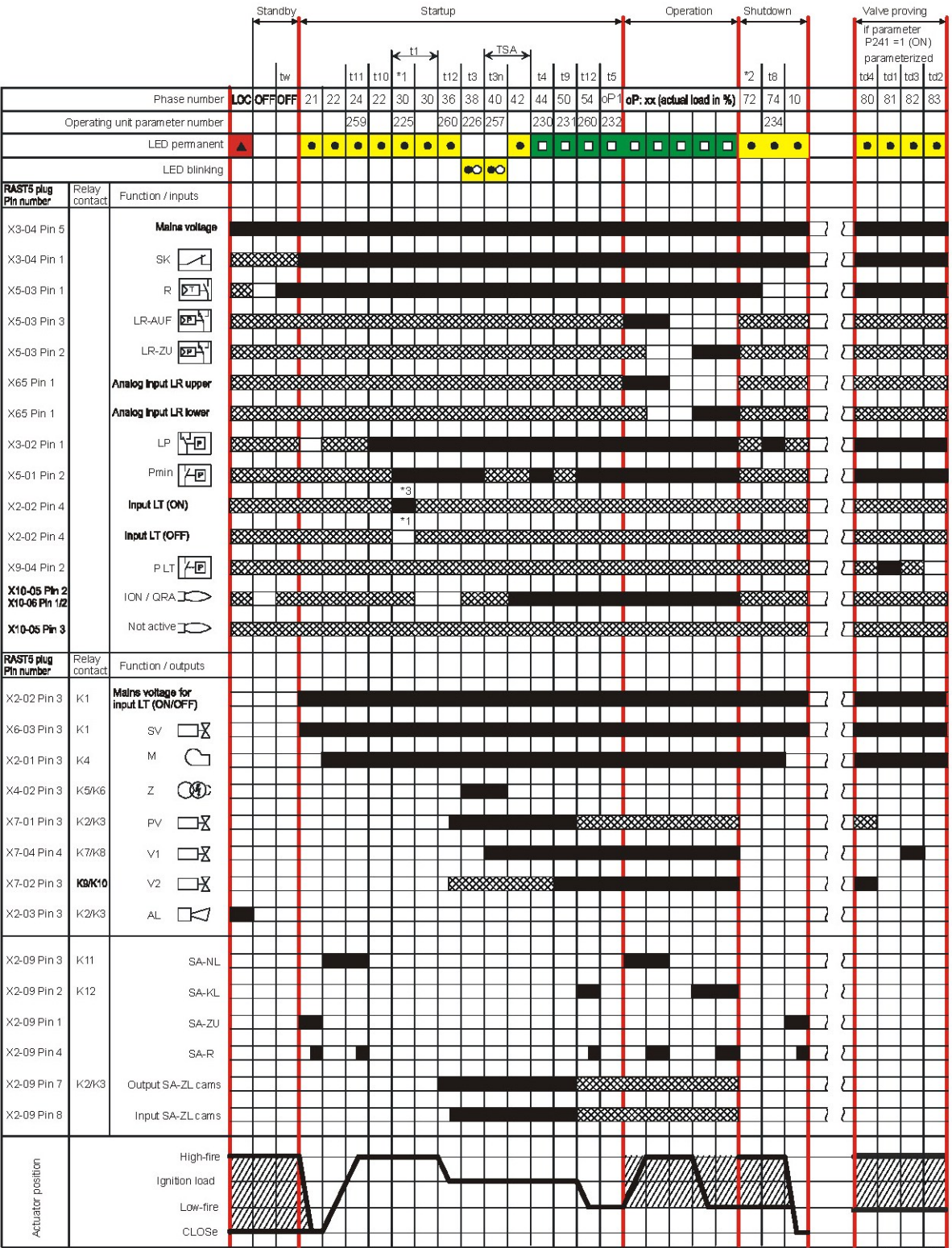
7114d05e0112



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 :**

Red blink code of fault signal lamp (LED)	Possible cause
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

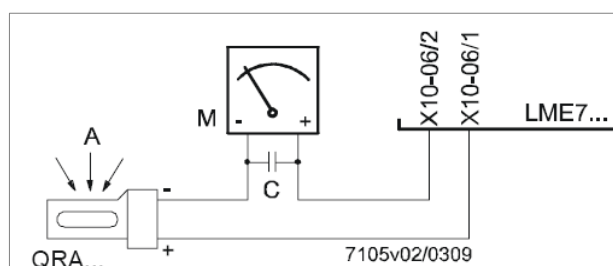
- C - Electrolytic condenser 100...470  $\mu$ F; DC 10...25 V
- ION - Ionization probe
- M - Microammeter Ri max. 5,000  $\Omega$

## 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

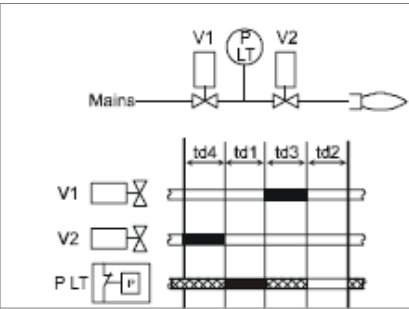
To make certain the age of the UV tube can be determined, the LME7... basic unit must always be connected to mains supply.

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.



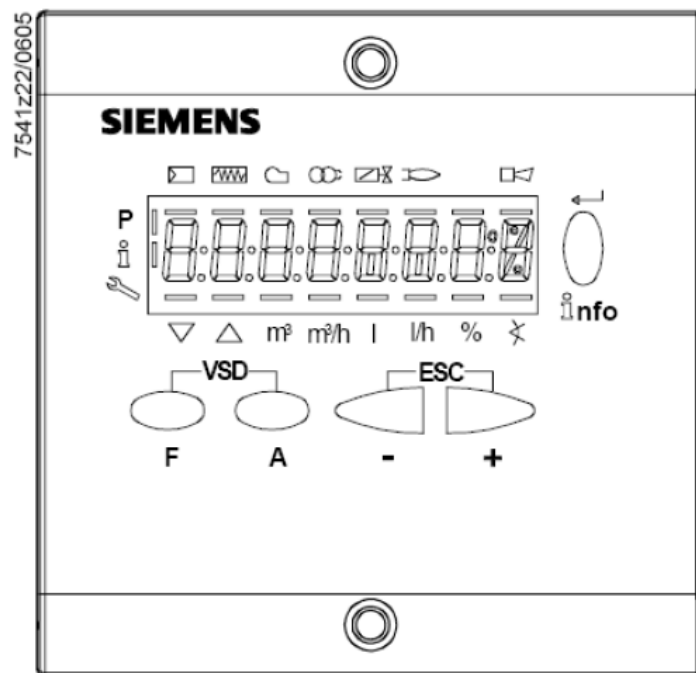
Controllo tenuta con pressostati separati

- 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 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 Used for Info and Service menues Used as Enter key in the setting modes Used as Reset key in the burner operation mode Used to enter a lower level menu</p>
	<p>Key - Used for one menu level down Used to decrease a value</p>
	<p>Key + Used for one menu level up Used to increase a a value</p>
	<p>Keys (+ &amp; -) = ESC By pressing + and - at the same time, the ESCAPE function is performed No adoption of value One menu level down</p>

The display will show these data:



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 :**

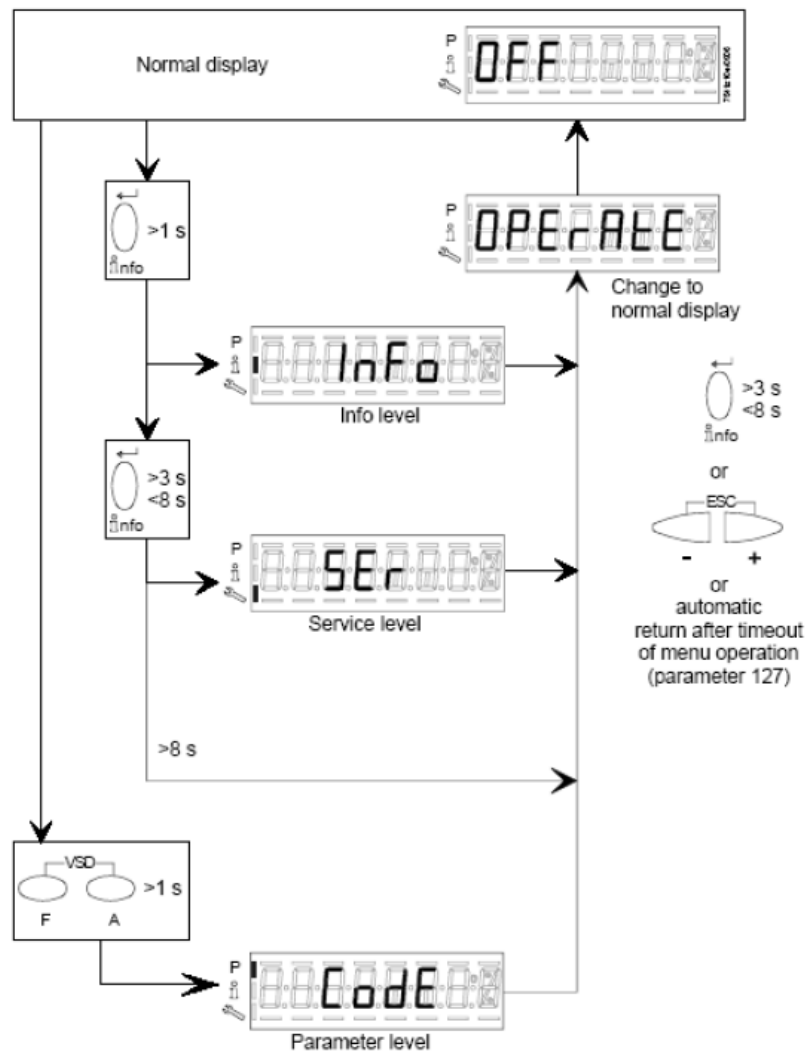
<b>Phase number</b>	<b>Function</b>
Standby	
OFF	Standby, waiting for heat request
Ph08	Power ON / test phase (e.g. detector test)
<b>Startup</b>	
Ph21	Safety valve ON, air pressure switch test / POC test (timeout / locking after 5 seconds), actuator opens in low-fire position / CLOSE position
Ph22	Fan 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 (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 <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) <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) <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

### Entering the Parameter levels:

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 :





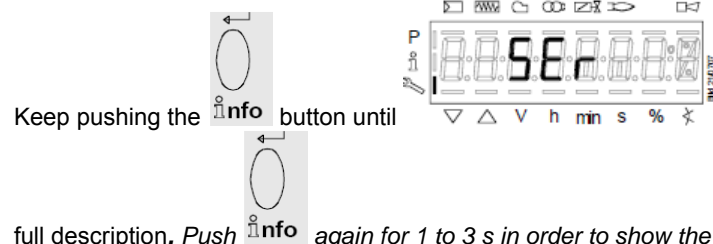
## Info level :

Keep pushing the  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 PME73.000Ax + PME73.831AxBC 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 **info** button until **58.7** 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 PME73.000Ax + PME73.831AxBC LME73.831AxBC	Edit	Value range		Resolution	Factory setting	Password level reading from level	Password level writing from level
			Min.	Max.				
<b>700</b>	<b>Error history</b>							
701	Current error: 00: Error code 01: Startup meter reading 02: MMI phase 03: Power value	Read only	2 0 --- 0%	255 999999 --- 100%	1 1 --- 1		Service	---
702	Error history former 1: 00: Error code 01: Startup meter reading 02: MMI phase 03: Power value	Read only	2 0 --- 0%	255 999999 --- 100%	1 1 --- 1		Service	---
•								
•								
•								
711	Error history former 10: 00: Error code 01: Startup meter reading 02: MMI phase 03: Power value	Read only	2 0 --- 0%	255 999999 --- 100%	1 1 --- 1		Service	---

900	Process data							
936	Normalized speed	Read only	0%	100%	0.01 %		Service	---
951	Mains voltage	Read only	0 V	LME73.000A1: 175 V LME73.000A2: 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 PME73.000Ax + PME73.831AxBC LME73.831AxBC	Edit	Value range		Resolution	Factory setting	Password level reading from level	Password level 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... 1 = Standard (program phase) 2 = Flame 1 (QRA... / ION) 3 = Flame 2 (QRB... / QRC...) 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 0=OFF 1=ON	Edit	0	1	1	1	SO	OEM

240	Repetition in the event of loss of flame during operation 0 = None 1 = None 2 = 1 x Repetition	Edit	0	2	1	0	SO	OEM
241.00	Valve proving 0 = Off 1 = On	Edit	0	1	1	1	SO	OEM
241.01	Valve proving 0 = During prepurge time (t1) 1 = During postpurge time (t8)	Edit	0	1	1	0	SO	OEM
241.02	Valve proving 0 = According to P241.01 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 0 = 1 s 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
<b>500</b>	<b>Ratio control</b>							
515	Actuator position during prepurge time (t1) and postpurge time (t8) 0: Purging in low-fire 1: Purging in high-fire	Edit	0	1	1	1	SO	OEM
560	Pneumatic combustion control 0 = off / 3-step modulation 1 = PWM fan / analog modulation 2 = air damper / analog modulation (feedback potentiometer ASZxx.3x required)	Edit	0	2	1	1	SO	SO

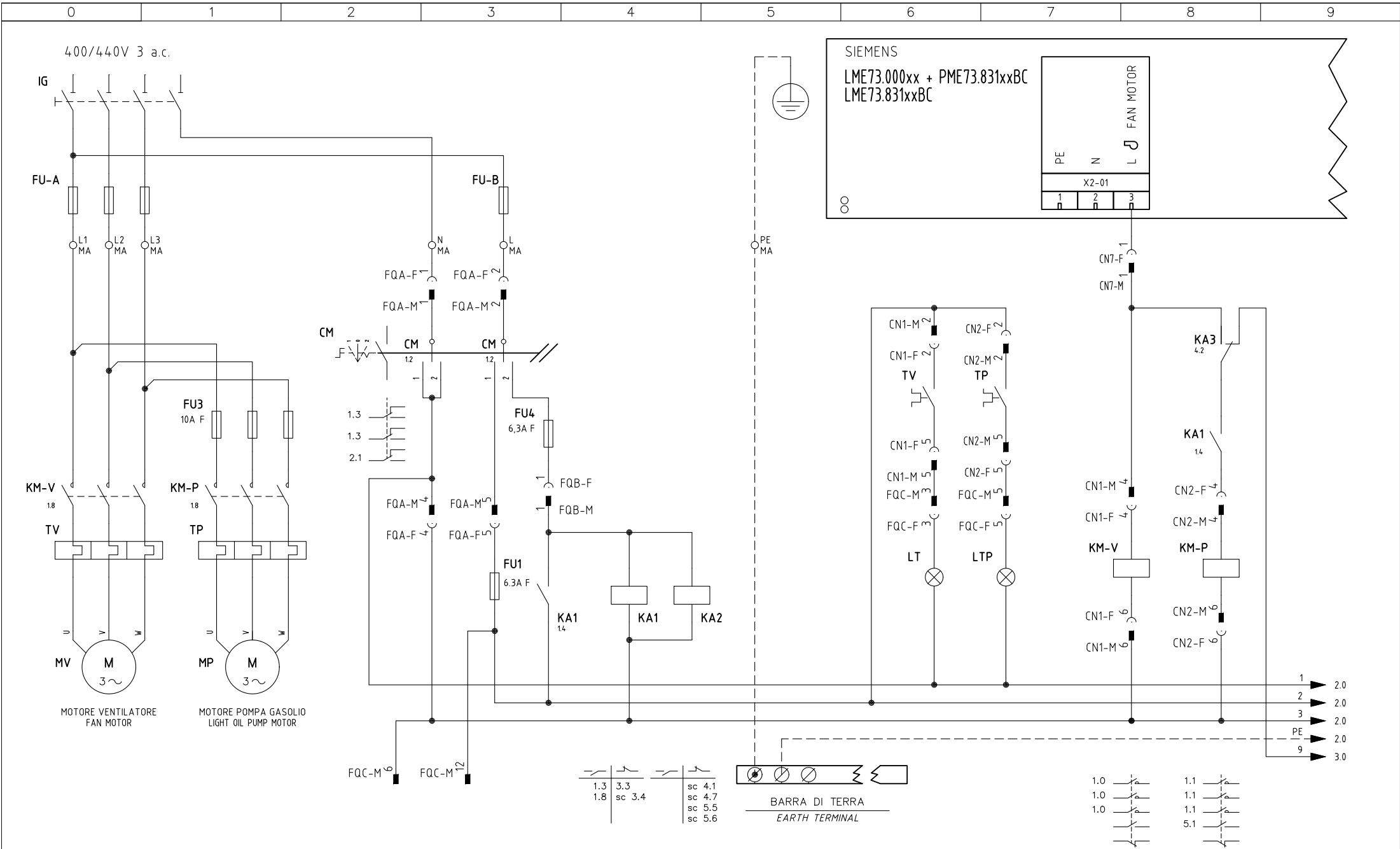
600	Power setting							
654	Analog input (feedback potentiometer ASZxx.3x required) 0 = 3-position step input 1 = 0...10 V 2 = 0...135 $\Omega$ 3 = 0...20 mA 4 = 4...20 mA with lockout at I < 4 mA 5 = 4...20 mA	Edit	0	5	1	0	SO	SO

WARNING	
Parameter Num. : 41 42 60 123 140 242 243 244 245 259.01	Adjustable parameters from SO or OEM levels for LME73.831AxB



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





Impianto  
TIPI/TYPES HP60÷HP73A / HR91A ÷ HR520A / HTP91A÷HTP520A  
MODELLO/MODEL xG-.PR(MD).S.xx.A.1.xx

Descrizione  
WITH LME73.xx + CIRCUIT 6100574  
(AND MODULATOR RWF55.x / RWF50.2x / 600V / KM3)

Ordine

Commissa

Esecutore  
U. PINTON

Data Controllato  
30/09/2014

Controllato  
E. CAVALLI

Data  
30/09/2014

Revisione  
00

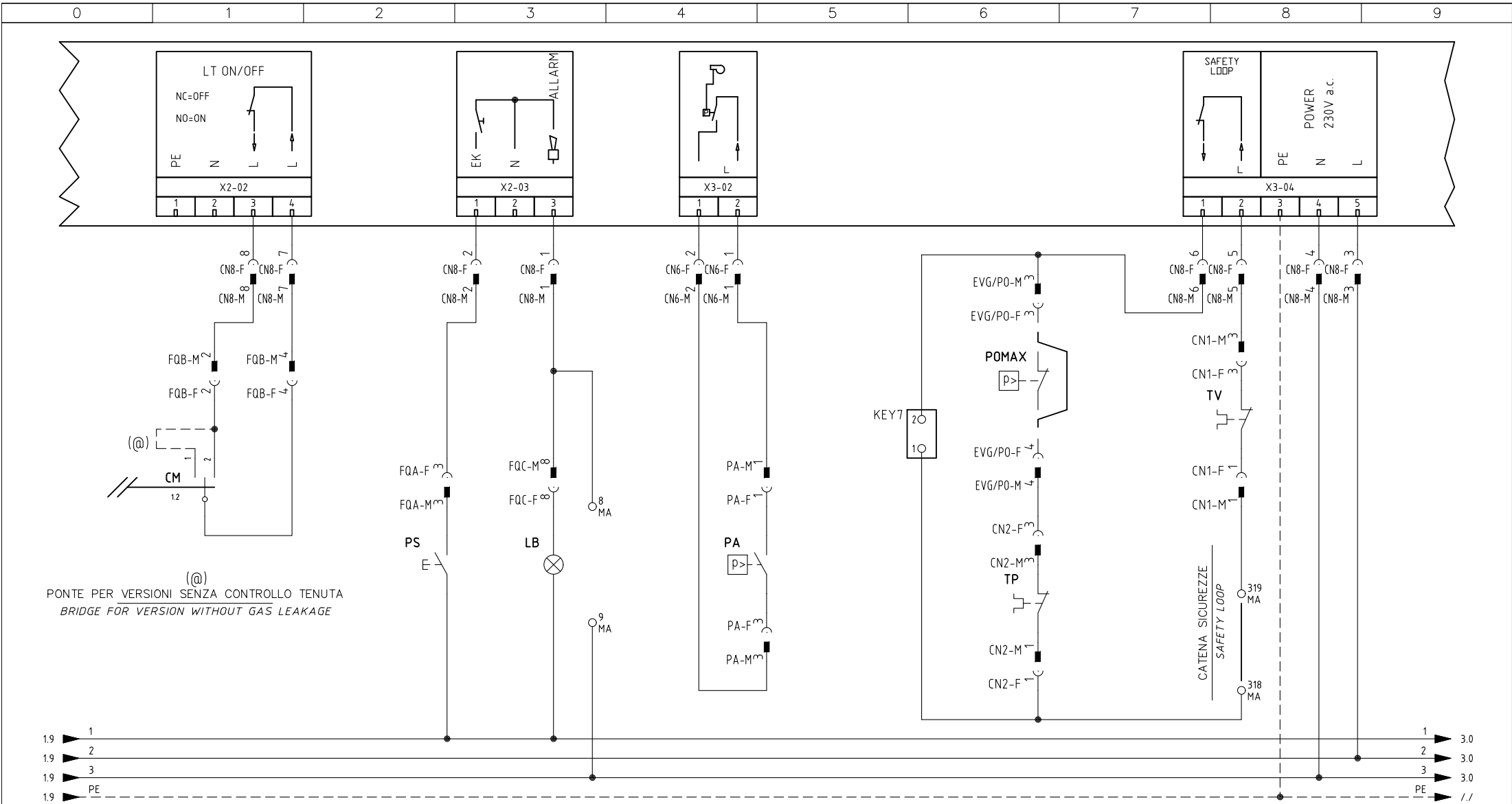
Dis. N.  
05 - 1062

PREC.  
/

FOGLIO  
1

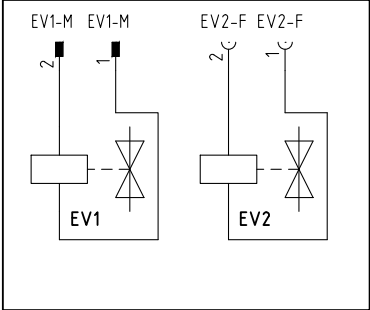
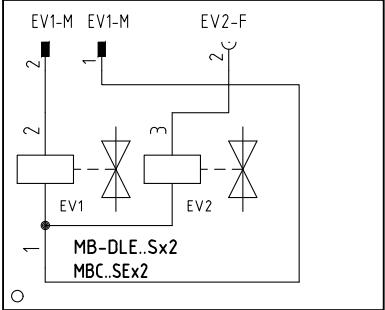
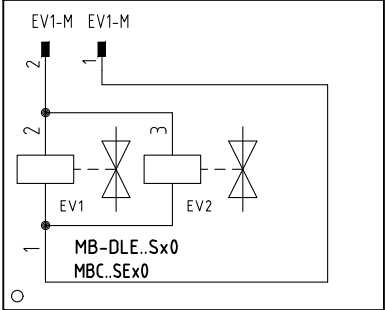
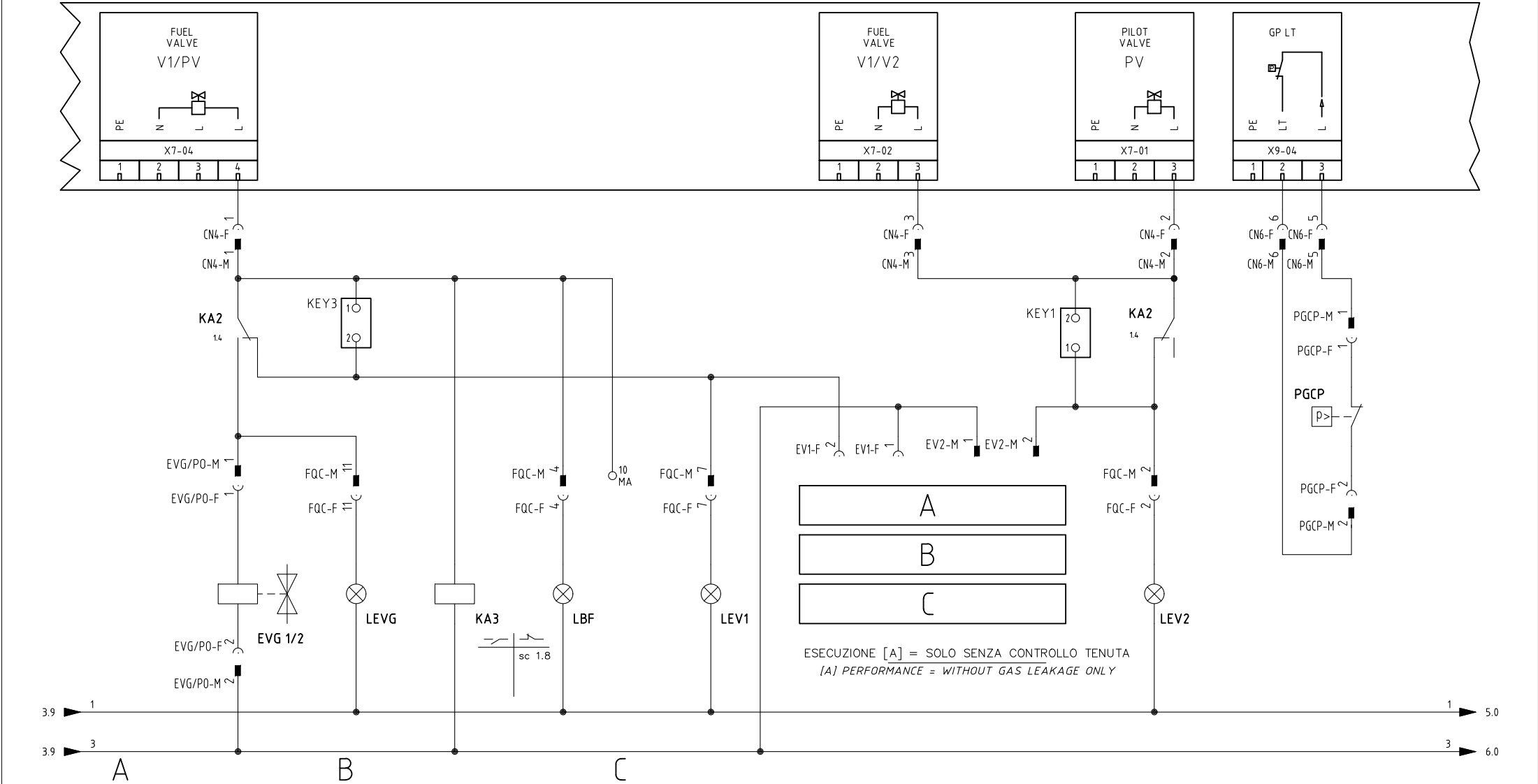
SEQUE  
2

TOTALE  
12

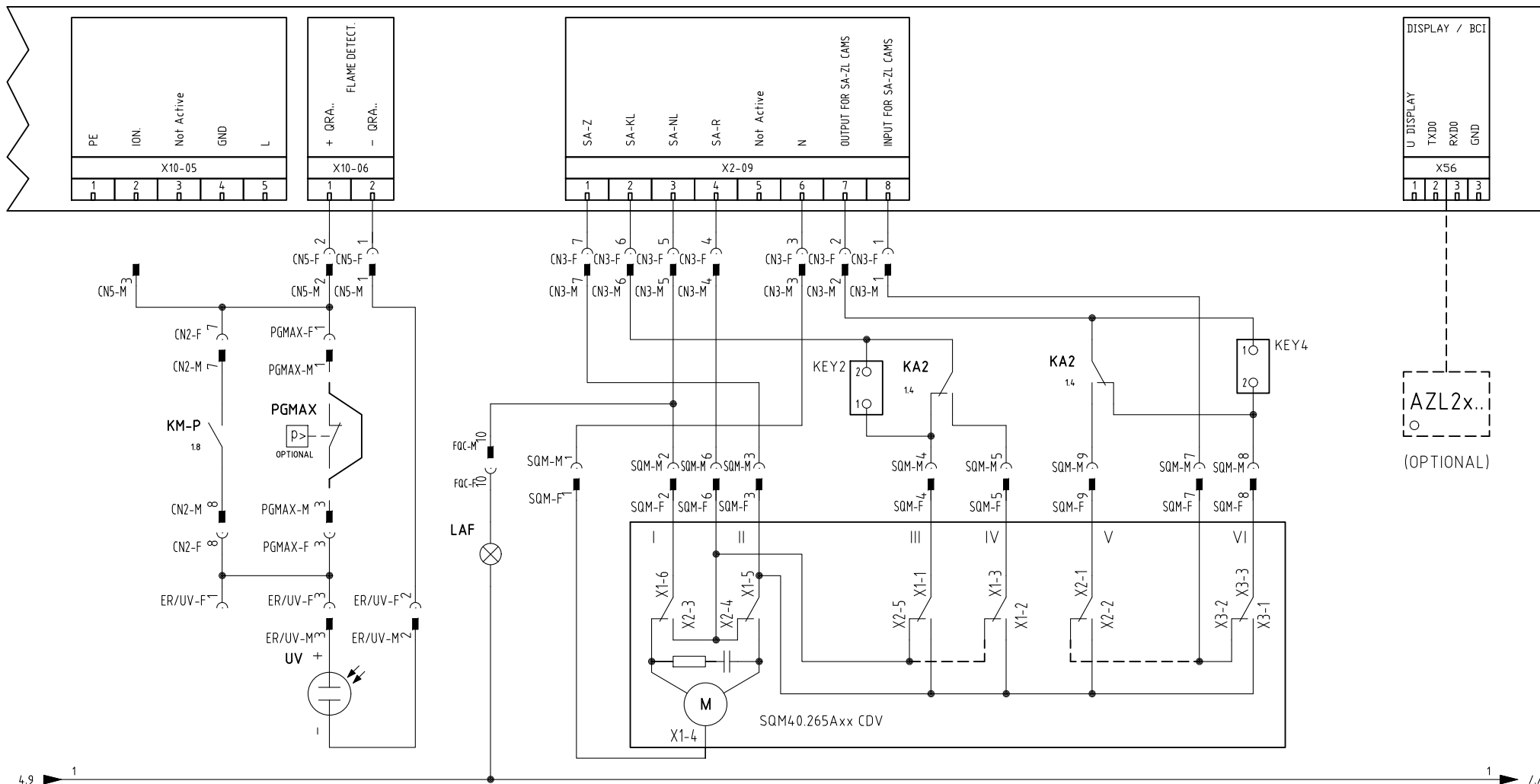


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Revisione	00	1	2
Dis. N.	05 - 1062	SEGUE	TOTALE
		3	12





Data	30/09/2014	PREC.	FOGLIO
Revisione	00	3	4
Dis. N.	05 - 1062	SEQUE	TOTALE
		5	12



SERVOCOMANDO SERRANDA ARIA  
AIR DAMPER ACTUATOR  
SQM40.265Axx CDV

- I ALTA FIAMMA  
HIGH FLAME
- II SOSTA  
STAND-BY
- III BASSA FIAMMA GAS  
GAS LOW FLAME
- IV BASSA FIAMMA GASOLIO  
LIGHT OIL LOW FLAME
- V ACCENSIONE GASOLIO  
LIGHT OIL IGNITION
- VI ACCENSIONE GAS  
GAS IGNITION

Data	30/09/2014	PREC.	FOGLIO
Revisione	00	4	5
Dis. N.	05 - 1062	SEGUE	TOTALE
		6	12

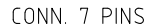


Diagram showing the components side view of the circuit board. The board is labeled with the following text:

SCHEDA [CPU]  
VISTA LATO COMPONENTI

CIRCUIT [CPU]  
COMPONENTS SIDE VIEW

PT100  
+V

PONTICELLO INTERNO PER  
SELEZIONE SEGNALE MORSETTO 3

INTERNAL BRIDGE FOR  
TERMINAL 3 SELECTION SIGNAL

Data	30/09/2014	PREC.	FOGLIO
Revisione	00	5	6
Dis. N.	05 - 1062	SEGUE	TOTALE
		7	12

(xx)

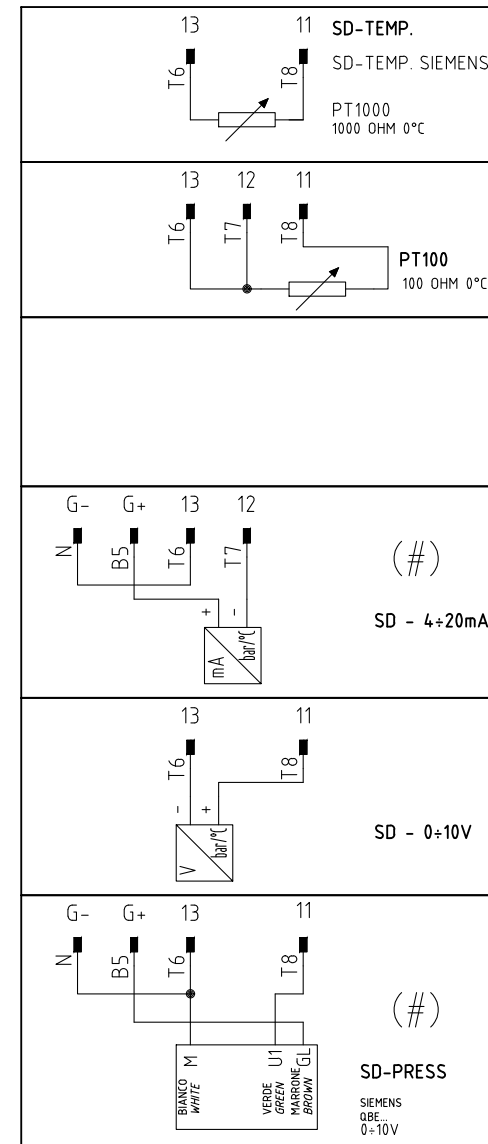
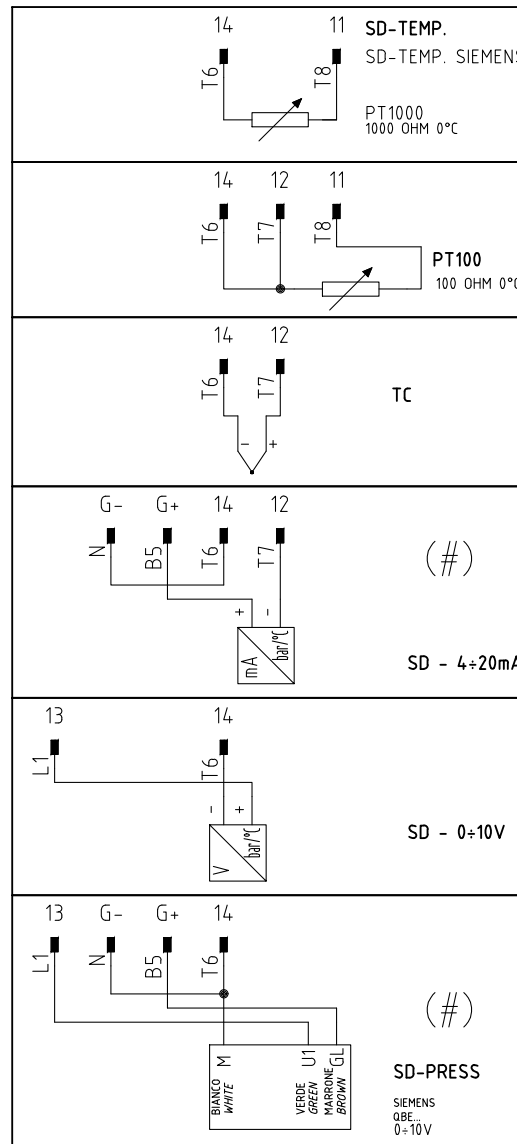
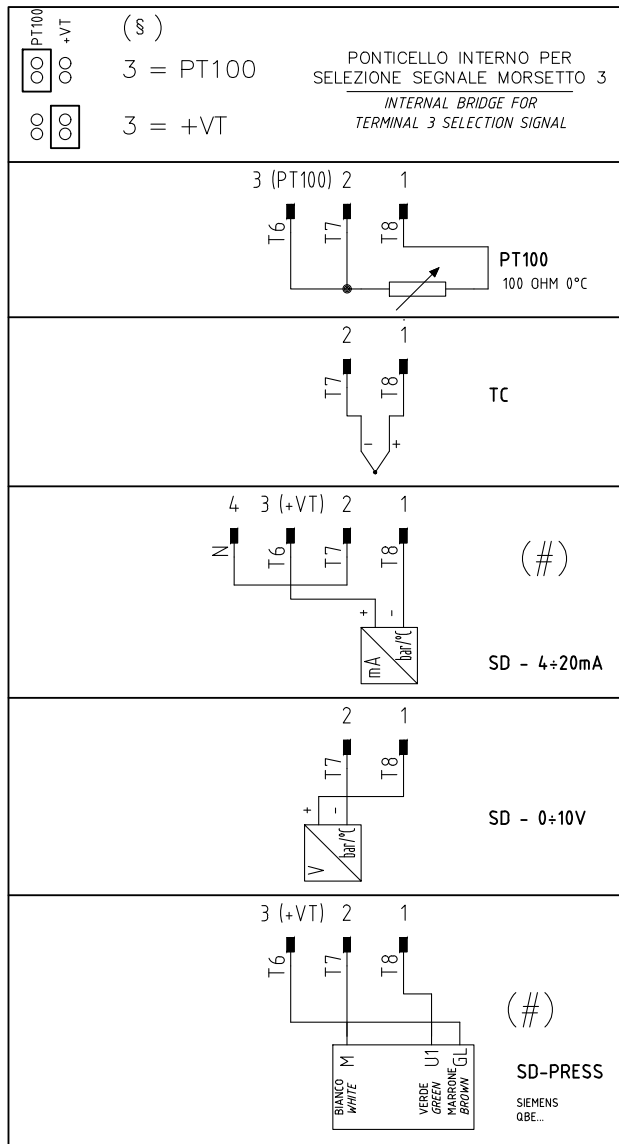
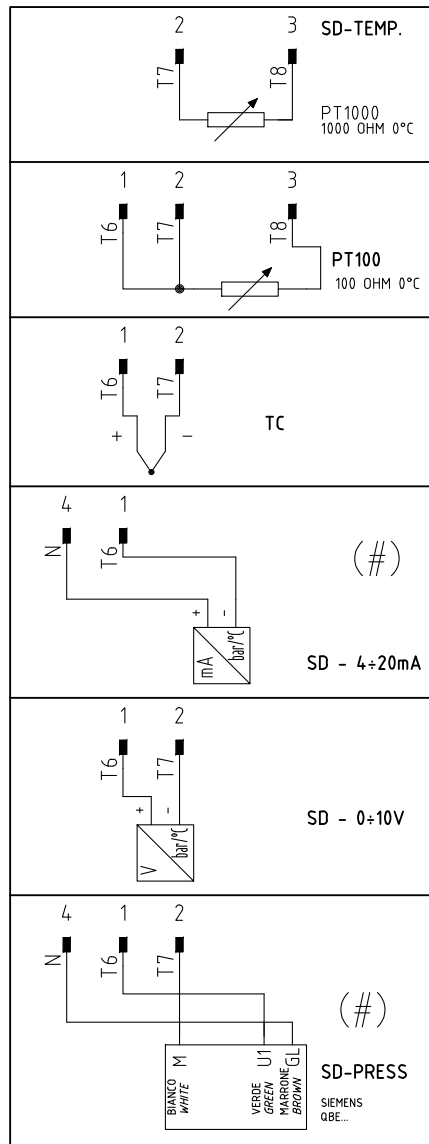
ATTENZIONE COLLEGAMENTO SONDE CON CONNETTORE 7 POLI  
WARNING PROBE CONNECTION WITH 7 PINS CONNECTOR

## KM3 HCRMMD

## 600V RRR0-1-T73

## RWF55.5x

## RWF50.2x



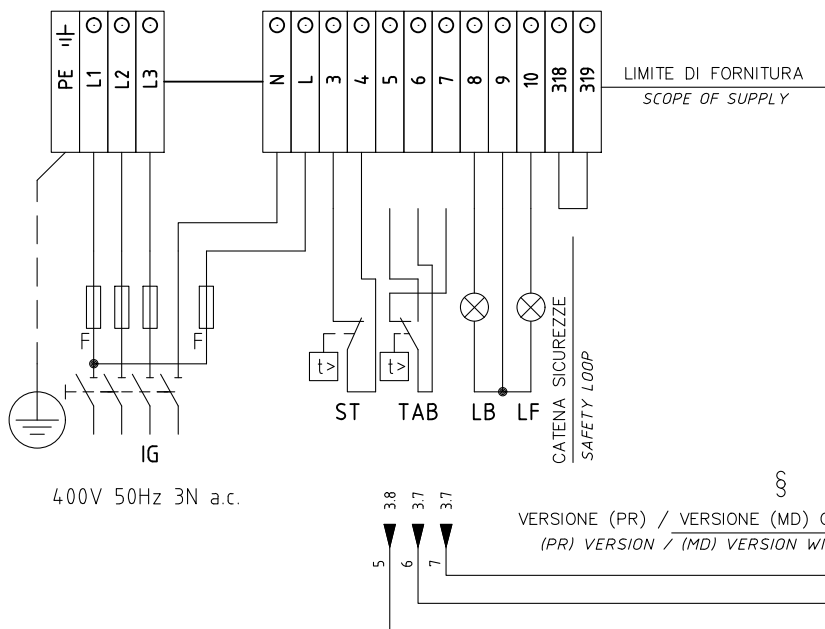
(#)

COLLEGAMENTO SOLO PER  
TRASDUTTORI PASSIVI

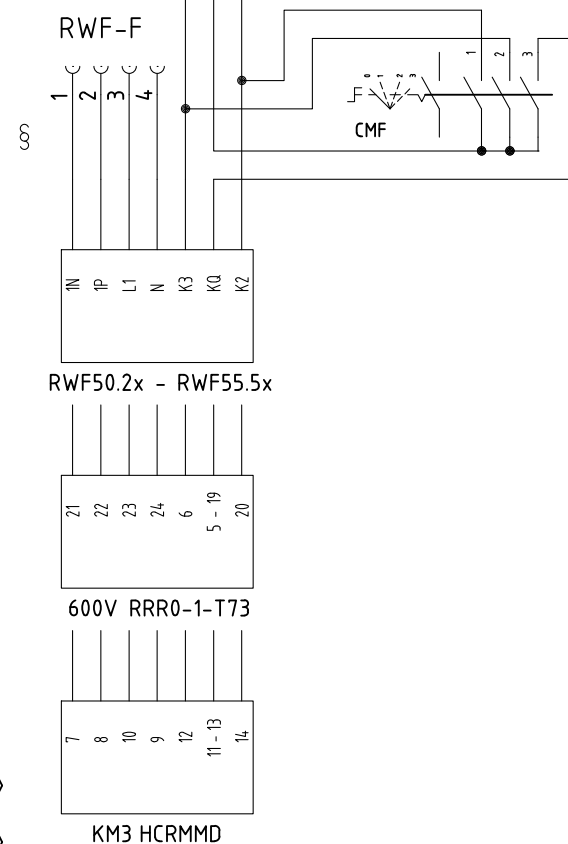
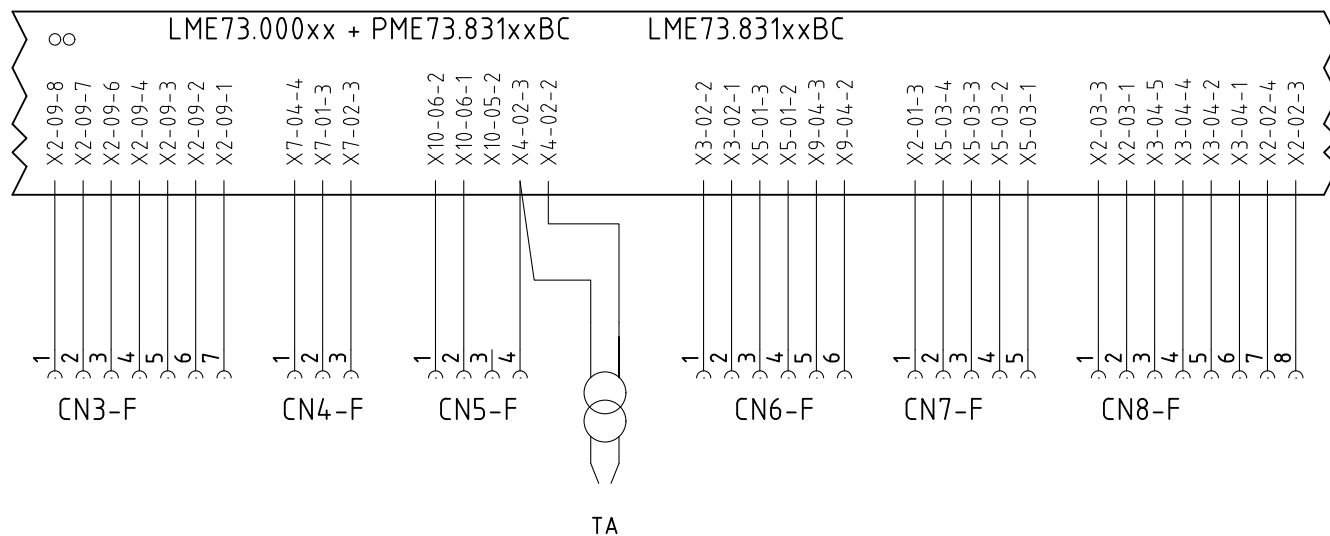
TRASDUCER PASSIVE  
CONNECTION ONLY

Data	30/09/2014	PREC.	FOGLIO
Revisione	00	6	7
Dis. N.	05 - 1062	SEGUE	TOTALE
		8	12

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



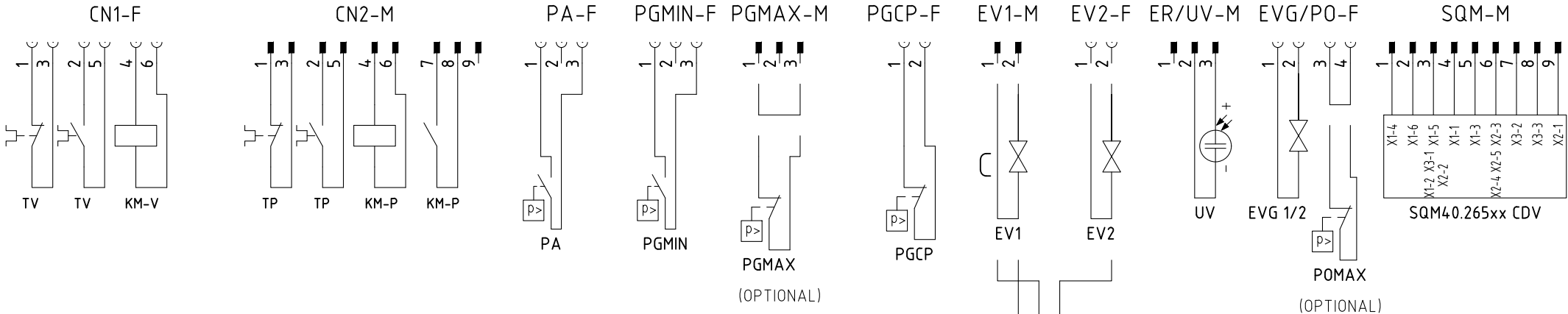
VERSIONE (PR) / VERSIONE (MD) CON RWF.. / 600V / KM3  
(PR) VERSION / (MD) VERSION WITH RWF.. / 600V / KM3



KEY1	KEY2	KEY3	KEY4	KEY5	KEY6	KEY7
1	2	1	2	1	2	1
2	1	2	1	2	1	2
3	2	1	2	3	2	3
4	3	2	3	4	3	4
5	4	3	4	5	4	5
6	5	4	5	6	5	6
7	6	5	6	7	6	7
8	7	6	7	8	7	8
9	8	7	8	9	8	9
10	9	8	9	10	9	10
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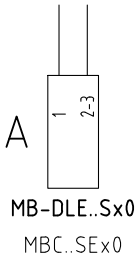
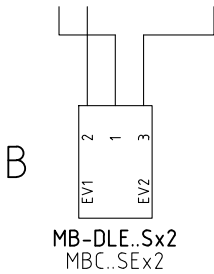
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Revisione	00	7	8
Dis. N.	05 - 1062	SEGUE	TOTALE
		9	12



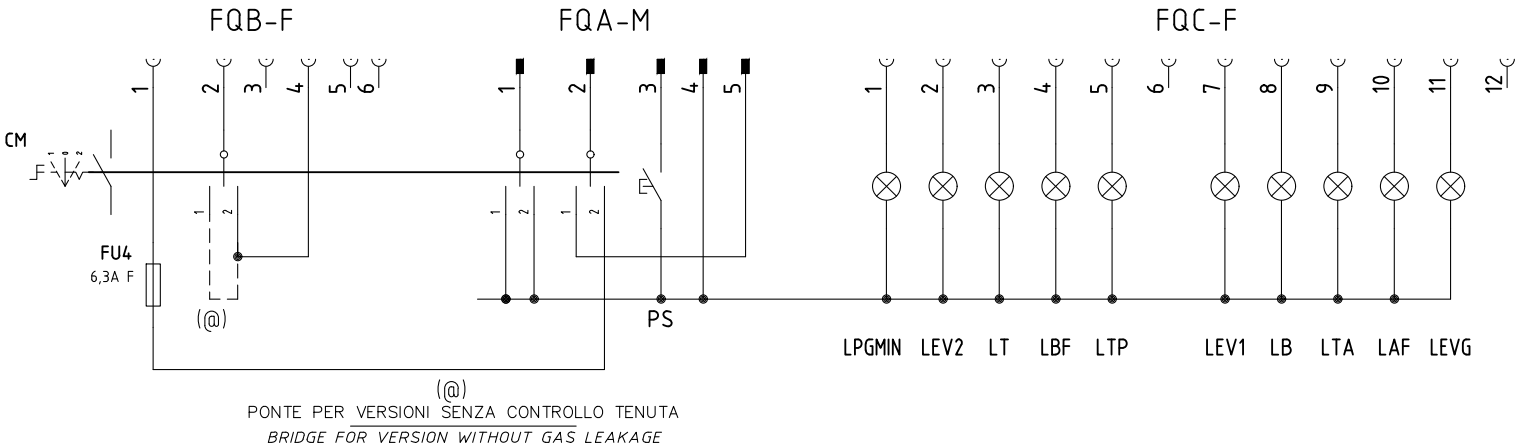


SERVOCOMANDO SERRANDA ARIA  
AIR DAMPER ACTUATOR  
SQM40.265Axx CDV

- I
- ALTA FIAMMA
- HIGH FLAME
- II
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- III
- BASSA FIAMMA GAS
- GAS LOW FLAME
- IV
- BASSA FIAMMA GASOLIO
- LIGHT OIL LOW FLAME
- V
- ACCENSIONE GASOLIO
- LIGHT OIL IGNITION
- VI
- ACCENSIONE GAS
- GAS IGNITION



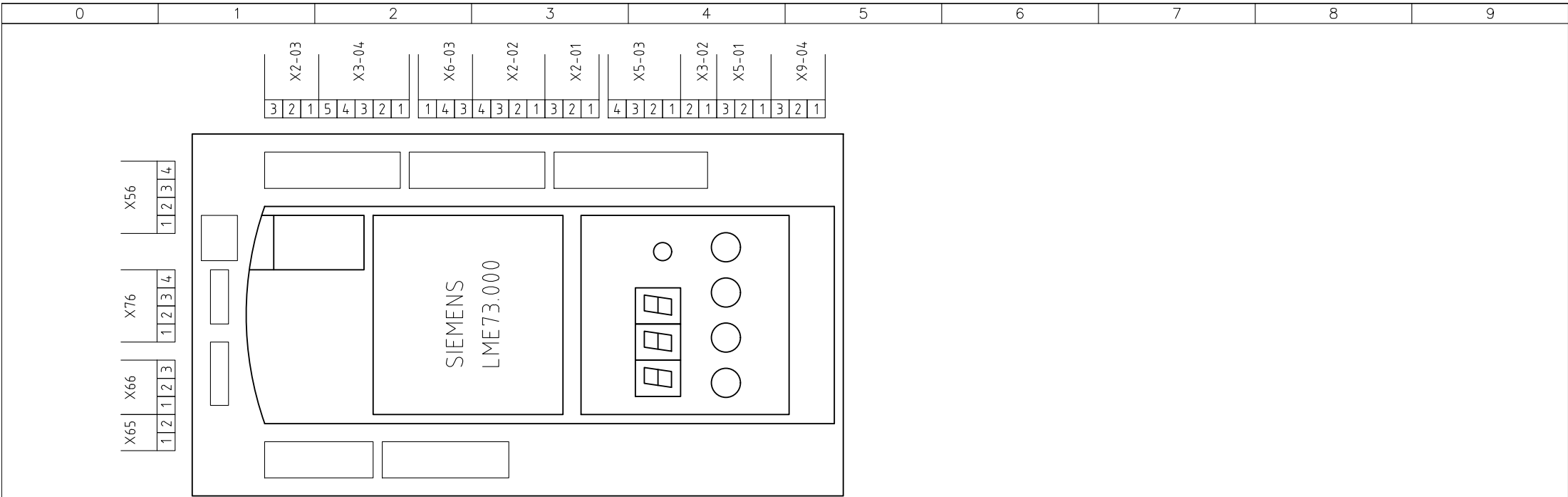
ESECUZIONE [A] = SOLO SENZA CONTROLLO TENUTA  
[A] PERFORMANCE = WITHOUT GAS LEAKAGE ONLY



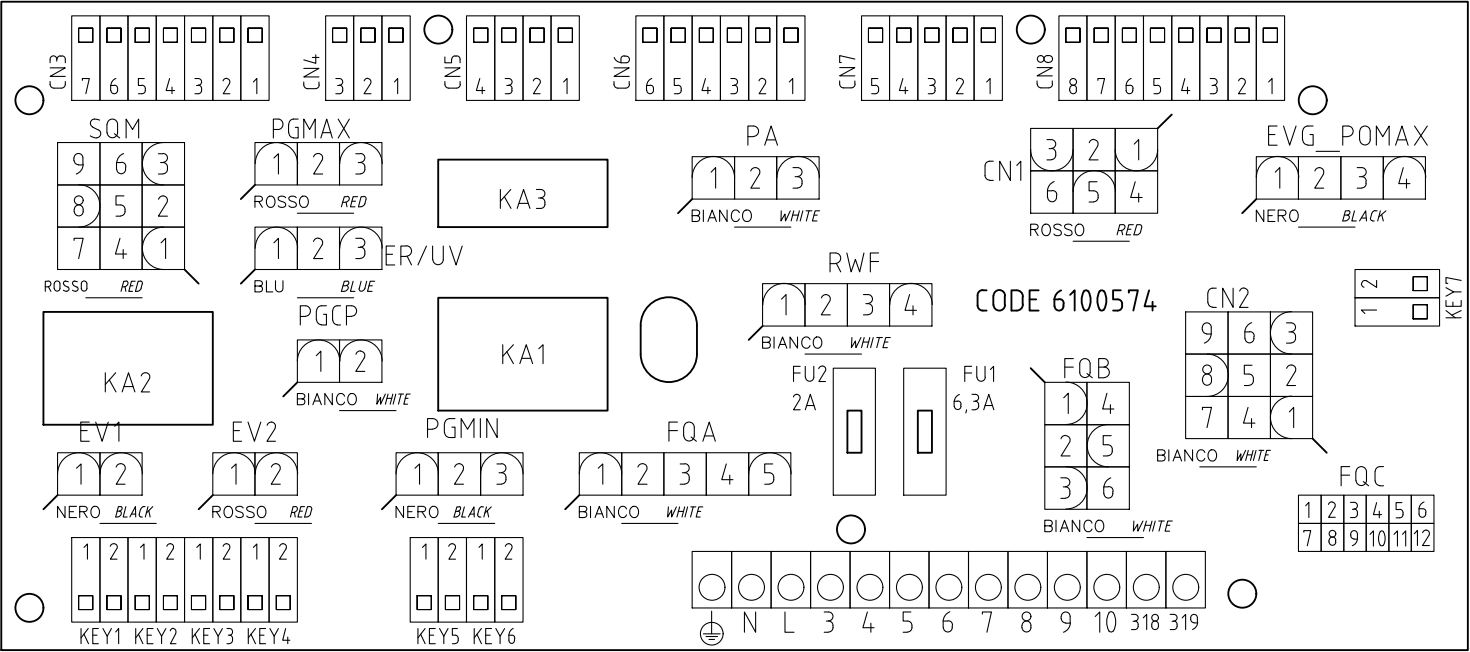
Data	30/09/2014	PREC.	FOGLIO
Revisione	00	8	9
Dis. N.	05 - 1062	SEGUE	TOTALE
		10	12

Sigla/Item	Foglio/Sheet	Funzione	Function
600V RRR0-1-T73	6	REGOLATORE MODULANTE (ALTERNATIVO)	BURNER MODULATOR (ALTERNATIVE)
AZL2x..	5	INTERFACCIA UTENTE	USER INTERFACE
CM	1	COMMUTATORE FUNZIONAMENTO 1)GAS 0)SPENTO 2)GASOLIO	MANUAL OPERATION SWITCH 1)GAS 0)OFF 2)LIGHT OIL
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
EV1	4	ELETTROVALVOLA GAS LATO RETE	UPSTREAM GAS SOLENOID VALVE
EV2	4	ELETTROVALVOLA GAS LATO BRUCIATORE	DOWNSTREAM GAS SOLENOID VALVE
EVG 1/2	4	ELETTROVALVOLE GASOLIO	LIGHT OIL ELECTRO VALVE
FU1	1	FUSIBILE LINEA AUSILIARI	AUXILIARY LINE FUSE
FU2	6	FUSIBILE	FUSE
FU3	1	FUSIBILI LINEA POMPA	PUMP LINE FUSES
FU4	1	FUSIBILE AUSILIARIO	AUXILIARY FUSE
FU-A	1	FUSIBILI DI LINEA	LINE FUSES
FU-B	1	FUSIBILE DI LINEA	LINE FUSE
IG	1	INTERRUTTORE GENERALE	MAINS SWITCH
KA1	1	RELE' AUSILIARIO	AUXILIARY RELAY
KA2	1	RELE' AUSILIARIO	AUXILIARY RELAY
KA3	4	RELE' AUSILIARIO	AUXILIARY RELAY
KM3 HCRMMD	6	REGOLATORE MODULANTE (ALTERNATIVO)	BURNER MODULATOR (ALTERNATIVE)
KM-P	1	CONTATTORE MOTORE POMPA GASOLIO	LIGHT OIL PUMP MOTOR CONTACTOR
KM-V	1	CONTATTORE MOTORE VENTILATORE	FAN MOTOR CONTACTOR
LAF	5	LAMPADA SEGNAZIONE ALTA FIAMMA BRUCIATORE	BURNER IN HIGH FLAME INDICATOR LIGHT
LB	2	LAMPADA SEGNAZIONE BLOCCO BRUCIATORE	INDICATOR LIGHT FOR BURNER LOCK-OUT
LBF	4	LAMPADA SEGNAZIONE BASSA FIAMMA BRUCIATORE	BURNER IN LOW FLAME INDICATOR LIGHT
LEV1	4	LAMPADA SEGNAZIONE APERTURA [EV1]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV1]
LEV2	4	LAMPADA SEGNAZIONE APERTURA [EV2]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV2]
LEVg	4	LAMPADA SEGNAZIONE APERTURA [EVg]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EVg]
LME73.000xx + PME73.831xxBC	1	APPARECCHIATURA DI COMANDO	CONTROL SCHEME
LME73.831xxBC	1	APPARECCHIATURA DI COMANDO	CONTROL SCHEME
LPGMIN	3	LAMPADA SEGNAZIONE PRESENZA GAS IN RETE	INDICATOR LIGHT FOR PRESENCE OF GAS IN THE NETWORK
LT	1	LAMPADA SEGNAZIONE BLOCCO TERMICO MOTORE VENTILATORE	INDICATOR LIGHT FOR FAN MOTOR OVERLOAD THERMAL CUTOUT
LTA	3	LAMPADA SEGNAZIONE TRASFORMATORE DI ACCENSIONE	IGNITION TRANSFORMER INDICATOR LIGHT
LTP	1	LAMPADA SEGNAZIONE BLOCCO TERMICO MOTORE VENTILATORE	INDICATOR LIGHT FOR FAN MOTOR OVERLOAD THERMAL CUTOUT

Sigla/Item	Foglio/Sheet	Funzione	Function
MB-DLE..Sx0	4	GRUPPO VALVOLE GAS	GAS VALVES GROUP
MB-DLE..Sx2	4	GRUPPO VALVOLE GAS	GAS VALVES GROUP
MBC..SEx0	4	GRUPPO VALVOLE GAS (ALTERNATIVO)	GAS VALVES GROUP (ALTERNATIVE)
MBC..SEx2	4	GRUPPO VALVOLE GAS (ALTERNATIVO)	GAS VALVES GROUP (ALTERNATIVE)
MP	1	MOTORE POMPA GASOLIO	LIGHT OIL PUMP MOTOR
MV	1	MOTORE VENTILATORE	FAN MOTOR
PA	2	PRESSOSTATO ARIA	AIR PRESSURE SWITCH
PGCP	4	PRESSOSTATO GAS CONTROLLO PERDITE (OPTIONAL)	GAS LEAKAGE PRESSURE SWITCH (OPTIONAL)
PGMAX	5	PRESSOSTATO GAS DI MASSIMA PRESSIONE (OPTIONAL)	MAXIMUM PRESSURE GAS SWITCH (OPTIONAL)
PGMIN	3	PRESSOSTATO GAS DI MINIMA PRESSIONE	MINIMUM GAS PRESSURE SWITCH
POMAX	2	PRESSOSTATO DI MASSIMA PRESSIONE OLIO (OPTIONAL)	MAXIMUM OIL PRESSURE SWITCH (OPTIONAL)
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 CDV	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
TP	1	TERMICO MOTORE POMPA	PUMP MOTOR THERMAL
TV	1	TERMICO MOTORE VENTILATORE	FAN MOTOR THERMAL
UV	5	SONDA UV RILEVAZIONE FIAMMA	UV FLAME DETECTOR



VISTA LATO COMPONENTI  
COMPONENTS SIDE VIEW



Data	30/09/2014	PREC.	FOGLIO
Revisione	00	11	12
Dis. N.	05 - 1062	SEGUE	TOTALE
		/	12