

HP20 - HP30

Progressive, Fully-modulating Gas - light oil dual fuel burners

MANUAL OF INSTALLATION - USE - MAINTENANCE

CIB UNIGAS

BURNERS - BRUCIATORI - BRULERS - BRENNER - QUEMADORES - ГОРЕЛКИ

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APENDIX

WARNINGS

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

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

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

CAREFULLY KEEP THIS MANUAL FOR FUTURE REFERENCE.

1) GENERAL INTRODUCTION

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

In case of any doubt, do not use the unit - contact the supplier.

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

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

Contact qualified personnel only.

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

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

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

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

The manufacturer shall not be held liable, by agreement or otherwise, for damages resulting from improper installation, use and failure to comply with the instructions supplied by the manufacturer.

2) SPECIAL INSTRUCTIONS FOR BURNERS

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

When the decision is made to discontinue the use of the burner, the user

shall have qualified personnel carry out the following operations:

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

Special warnings

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

3) GENERAL INSTRUCTIONS DEPENDING ON FUEL USED

3a) ELECTRICAL CONNECTION

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

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

GENERAL

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

SPECIAL INSTRUCTIONS FOR USING GAS

Have qualified personnel inspect the installation to ensure that:

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

Precautions if you can smell gas

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

DIRECTIVES AND STANDARDS

Gas burners

European directives:

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

Harmonised standards :

- UNI EN 676 (Gas Burners);
- CEI EN 60335-1(Household and similar electrical appliances - Safety. Part 1: General requirements;
- EN 50165 (Electrical equipment of non-electric appliances for household and similar purposes. Safety requirements.

Light oil burners

European directives:

- Directive 2006/95/EC on low voltage;
- Directive 2004/108/CEE on electromagnetic compatibility

Harmonised standards :

- CEI EN 60335-1(Household and similar electrical appliances - Safety. Part 1: General requirements;
- EN 50165 (Electrical equipment of non-electric appliances for household and similar purposes. Safety requirements.

National standards :

- UNI 7824: Monobloc nebulizer burners for liquid fuels. Characteristics and test methods

Heavy oil burners

European directives:

- Directive 2006/95/EC on low voltage;
- Directive 2004/108/CEE on electromagnetic compatibility

Harmonised standards :

- CEI EN 60335-1 Household and similar electrical appliances - SafetyPart 1: General requirements;
- EN 50165 Electrical equipment of non-electric appliances for household and similar purposes. Safety requirements.

National standards :

- UNI 7824: Monobloc nebulizer burners for liquid fuels. Characteristics and test methods

Gas - Light oil burners

European directives:

- Directive 90/396/CEE Gas Appliances;
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- UNI EN 676 Gas Burners
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- EN 50165 Electrical equipment of non-electric appliances for household and similar purposes. Safety requirements.

National standards :

- UNI 7824: Monobloc nebulizer burners for liquid fuels. Characteristics and test methods

Gas - Heavy oil burners

European directives:

- Directive 90/396/CEE - Gas Appliances;
- Directive 2006/95/EC on low voltage;
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National standards :

- UNI 7824: Monobloc nebulizer burners for liquid fuels. Characteristics and test methods

PART I: INSTALLATION

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.

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 moves proportionally the air damper and the gas butterfly valve. It drives an adjusting cam 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 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 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 determines the energetic quality and the geometry of the flame. Fuel and comburent are routed into separated ways as far as the zone of flame generation (combustion chamber). The control panel, placed on the burner 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. 1), 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.

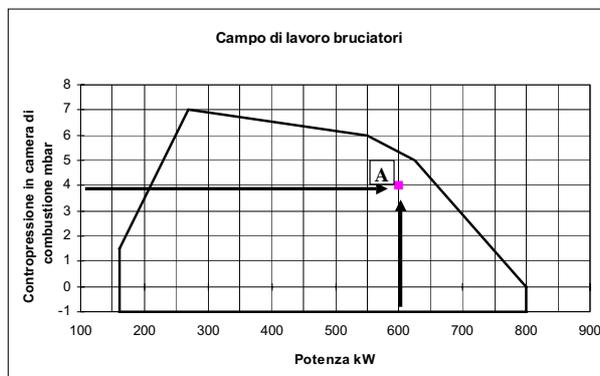


Fig. 1

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.

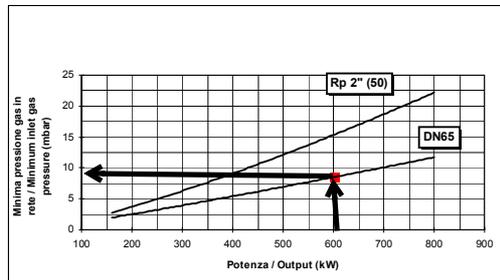


Fig. 2

Matching the burner to the boiler

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

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

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

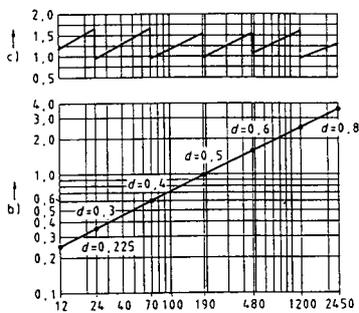


Fig. 3

Key

- a) Heat output in kW
- b) Length of the flame tube in meters
- c) Flame tube firing intensity in MW/m³
- d) Combustion chamber diameter (m)

Fig. 3 - 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	HP20	Model	MG.	PR.	S.	*	A.	O.	25
	(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) BURNER TYPE	HP20 - HP30								
(2) FUEL	M - Natural gas		G - Light oil						
(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								
(7) EQUIPMENT	0 = 2 gas valves 1 = 2 gas valves + gas proving system 7 = 2 gas valves + max. pressure switch 8 = 2 gas valves + gas proving system + max. pressure switch								
(8) GAS CONNECTION	25 = Rp1		32 = Rp1 _{1/4}						

Specifications

BURNER TYPE		HP20	HP30
Output	min. - max. kW	85 - 230	65 - 350
Fuel		Natural gas - Light oil	
Gas category		(see next paragraph)	
Gas rate	min.-max. min. - max. Stm ³ /h)	9 - 24.3	7 - 37
Gas pressure	min.- max. mbar	(see Note 2)	
Light oil rate	min.- max. kg/h	7.2 - 19.4	5.5 - 29.5
Oil viscosity		2 - 7.4 cSt @ 40°C	
Oil density		840 kg/m ³	
Power supply		230V 1N ~ 50Hz	
Total power consumption	kW	0.75	
Electric motor	kW	0.37	
Pump motor	kW	0.10	
Protection		IP40	
Approx. weight	kg	60	60
Operation		Progressive - Fully modulating	
Gas Train Rp1	Valves size / Gas connection	1" / Rp1	1" _{1/4} / Rp1 _{1/4}
Gas Train Rp1 _{1/4}	Valves size / Gas connection	1" / Rp1	1" _{1/4} / Rp1 _{1/4}
Operating temperature	°C	-10 ÷ +50	
Storage Temperature	°C	-20 ÷ +60	
Working service**		Intermittent	

*** NOTE ON THE BURNER WORKING SERVICE**

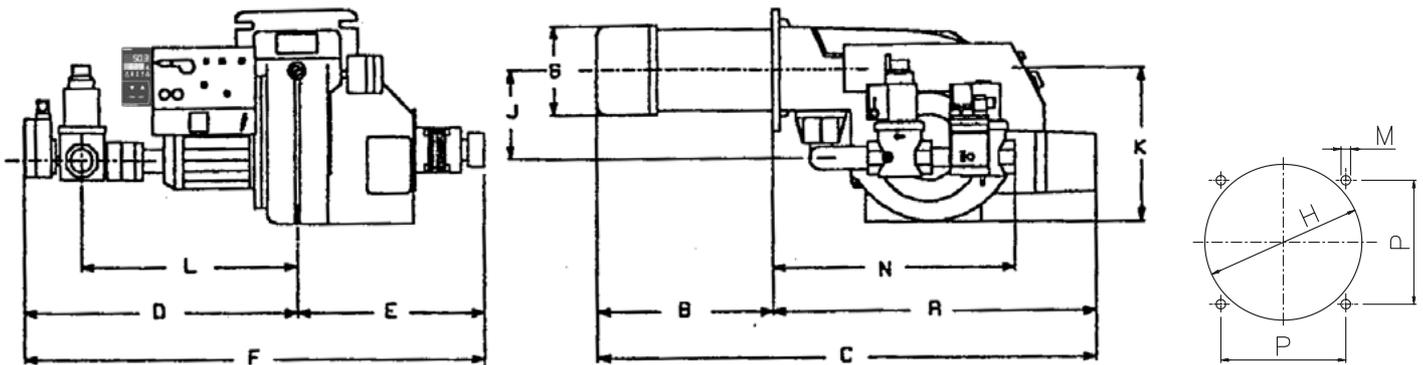
- **Siemens LGB..:** for safety reasons, one controlled shutdown must be performed every 24 hours of continuous operation.
- **Siemens LME..:** the control box automatically stops after 24h of continuous working. The control box immediately starts up, automatically.

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

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 _{2H}																									
I _{2E}	LU	PL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I _{2E(R)B}	BE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I _{2L}	NL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I _{2ELL}	DE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I _{2Er}	FR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Overall dimensions (mm)

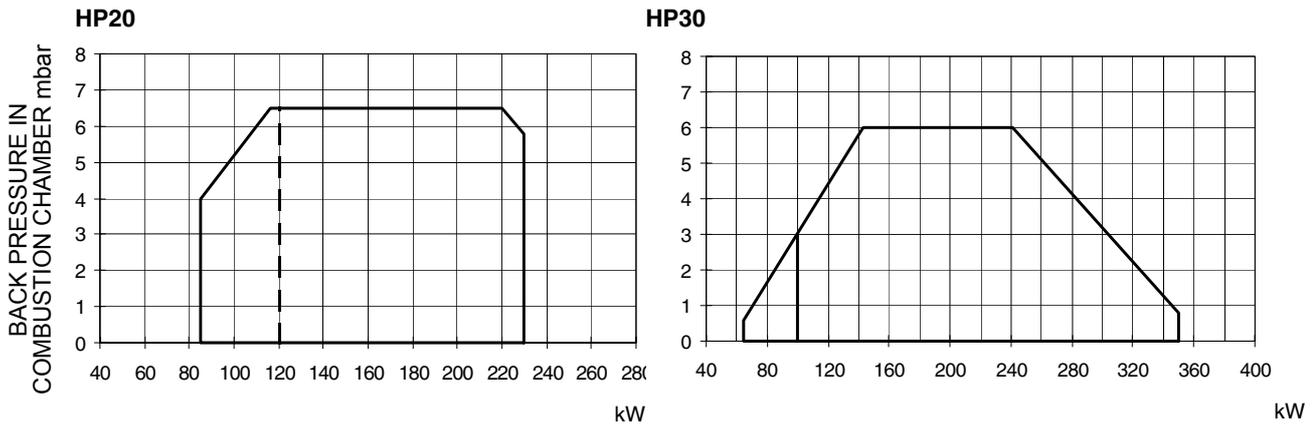


	A	B(*S)	B(*L)	C(*S)	C(*L)	D	E	F	G	H	J	K	L	M	N	P
HP20	555	173	258	728	813	510	320	830	126	151	178	290	360	M10	370	155
HP30	555	300	-	855	-	510	320	830	150	162	178	290	360	M10	490	155

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

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

Performance Curves

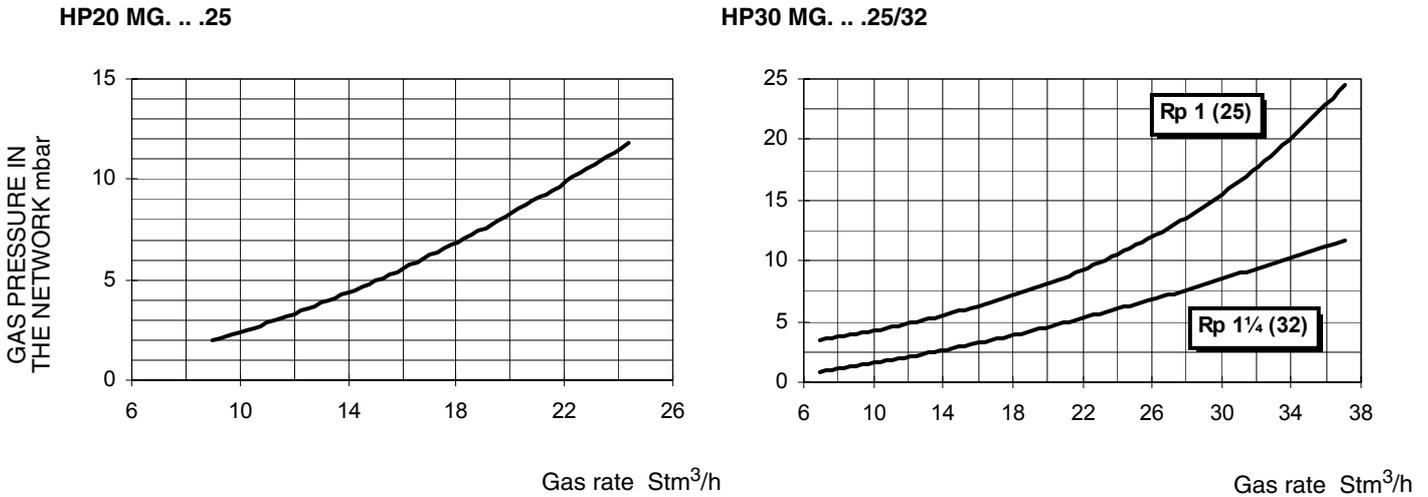


To get the input in kcal/h, multiply value in kW by 860.

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.

MOUNTINGS AND CONNECTIONS

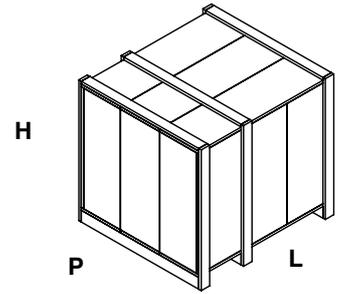
Packing

Burners are despatched in cardboard packages whose dimensions are: **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

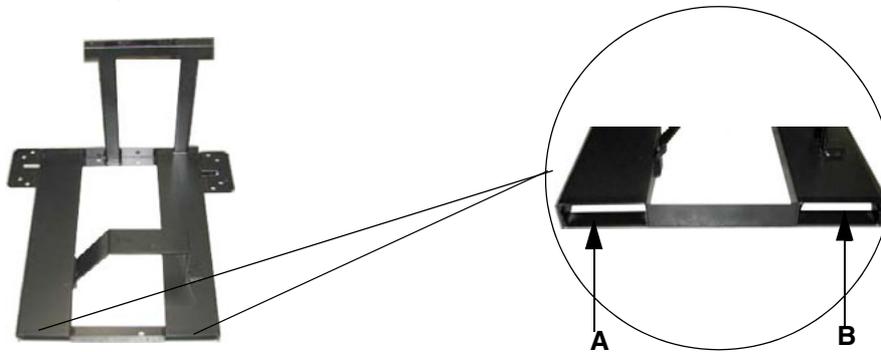
To get rid of the burner's packing, follow the procedures laid down by current laws on disposal of materials



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.

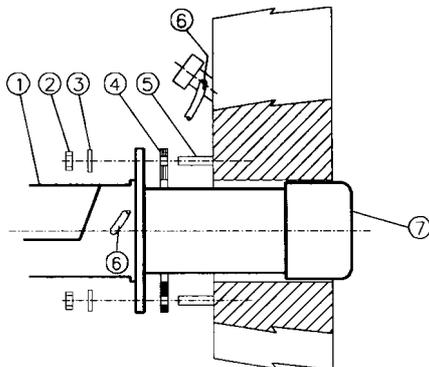
The burner is mounted on a stirrup provided for handling the burner by means of a fork lift truck: the forks must be inserted into the A and B ways. Remove the stirrup only once the burner is installed to the boiler.



Fitting the burner to the boiler

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

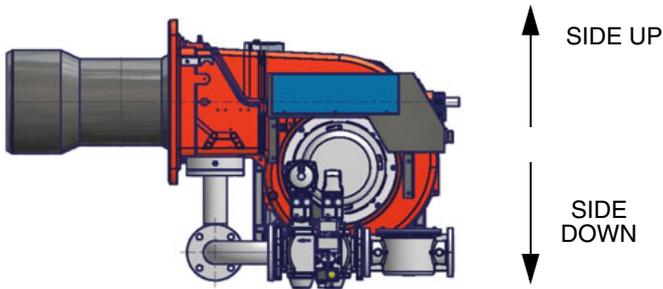
- 1 make a hole on the closing door of the combustion chamber as described on paragraph "Overall dimensions";
- 2 place the burner to the boiler: lift it up and handle it according to the procedure described on paragraph "Handling the burner";
- 3 place the 4 stud bolts (5) on the hole of the boiler's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



Keys

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

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

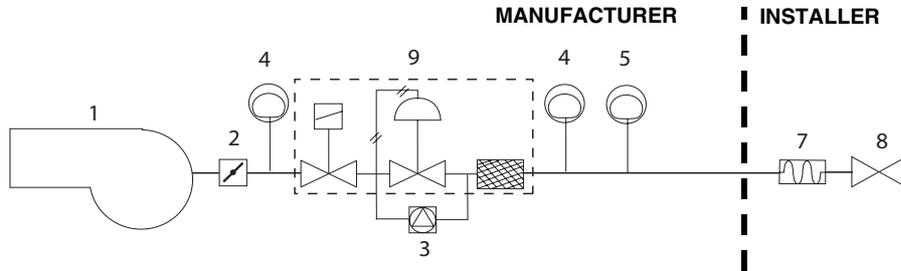


Gas train connections

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.

	<p>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.</p>
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Gas train with valves group MB-DLE with built-in gas pressure governor+ VPS504 gas proving system



Key

- 1 Burner
- 2 Butterfly valve
- 3 Gas proving system (option)
- 4 Maximum gas pressure switch (optional*)
- 5 Minimum gas pressure switch
- 6 Gas filter
- 7 Bellow joint
- 8 Manual cutoff valve
- 9 MB-DLE Valves group

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

Assembling the gas grain

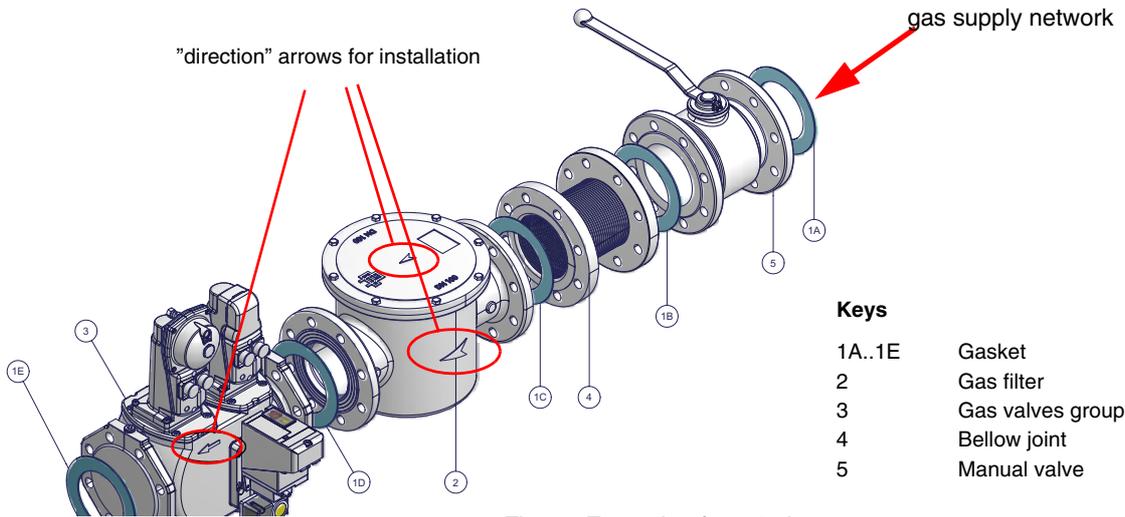


Fig. 4 - Example of gas train

To mount the gas train, proceed as follows:

- 1) in case of threaded joints: use proper seals according to the gas used;
- 2) fasten all the elements by means of screws, according to the schemes shown, observing the mounting directions for each element.

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

	ATTENTION: once the gas train is mounted according to the diagram on Fig. 4, 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

MULTIBLOC DUNGS MB-DLE 405..412

Mounting

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

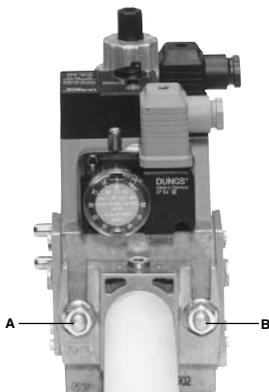


Fig. 5

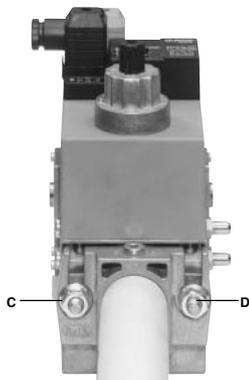


Fig. 6



Fig. 7

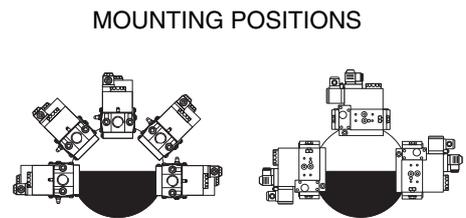


Fig. 8

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. 4, the gas proving test must be performed, according to the procedure set by the laws in force.
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Hydraulic diagrams for light oil supplying circuits

Fig. 9 - Gravity circuit

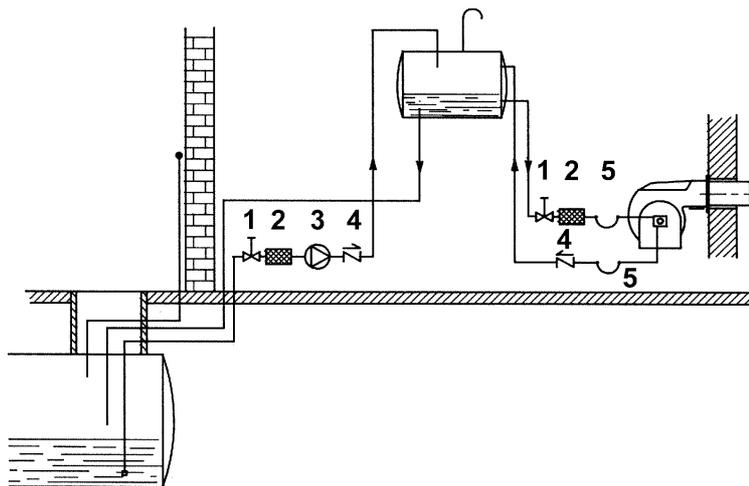


Fig. 10 - Ring circuit

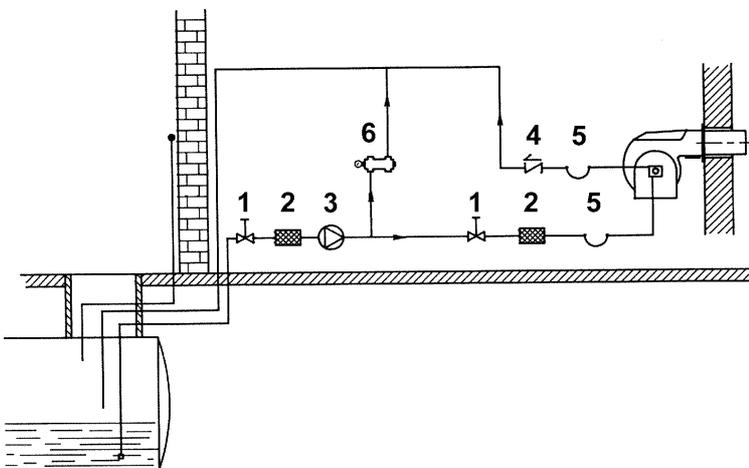
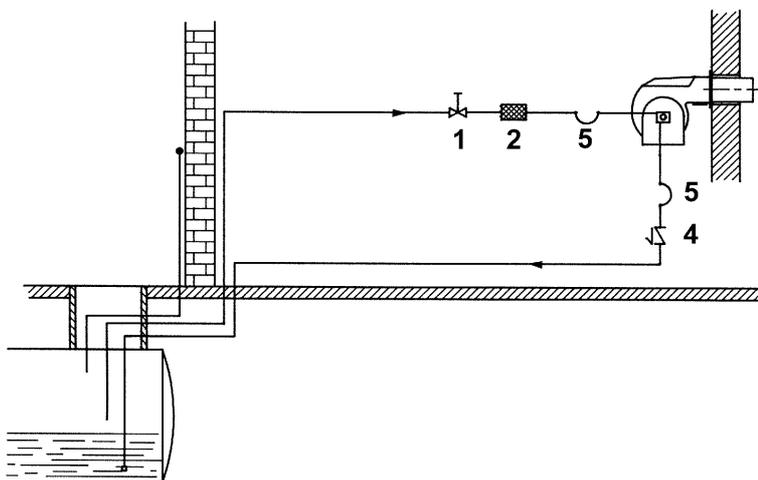


Fig. 11 - Suction circuit



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. 12).

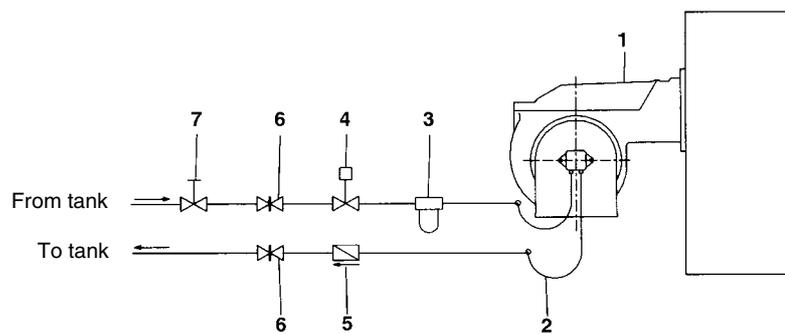
Light oil piping installation diagram

Fig. 12

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.

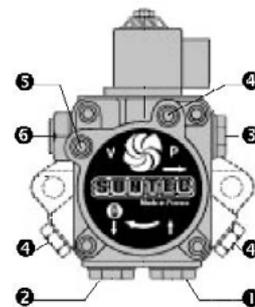
About the use of fuel pumps

- 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 sg 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

Pump Suntec AL65

Viscosity range	2 ÷ 12 (cSt) mm ² /s
Oil temperature	0 ÷ 60 °C
Inlet pressure	2 bar
Minimum inlet pressure	- 0,45 bar to avoid gasing
Maximum return pressure	2 bar
Rated speed	3600 rpm



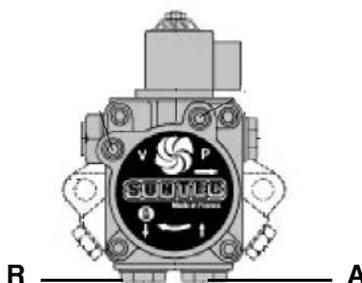
Keys

- 1 inlet (suction) G1/4
- 2 return and internal by-pass plug G1/4
- 3 outlet to the nozzle G1/8
- 4 pressure gauge port G1/8
- 5 vacuum gauge port G1/8
- 6 pressure adjusting screw

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).



Electrical connections

	<p>Respect the basic safety rules. make sure of the connection to the earthing system. do not reverse the phase and neutral connections. fit a differential thermal magnet switch adequate for connection to the mains.</p>
	<p>ATTENTION: before executing the electrical connections, pay attention to turn the plant's switch to OFF and be sure that the burner's main switch is in 0 position (OFF) too. Read carefully the chapter "WARNINGS", and the "Electrical connections" section.</p>

	<p>WARNING: The burner is provided with a jumper between terminals 6 and 7; in the event of connecting the high/low flame thermostat remove this jumper before connecting the thermostat.</p>
	<p>IMPORTANT: while connecting electric supply wires to burner's terminal block be sure that ground wire should be longer than phase and neutral ones.</p>

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

To execute the electrical connections, proceed as follows:

- 1 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 following diagrams,
- 3 check the direction of the motor;
- 4 refit the panel cover

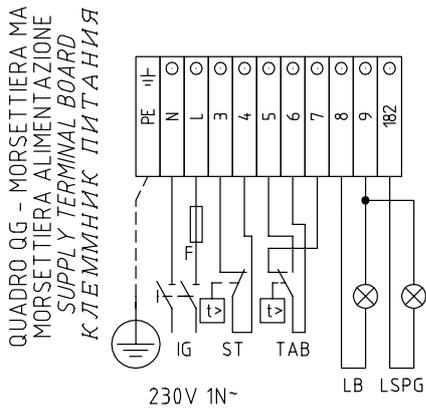


Fig. 13 Progressive burners

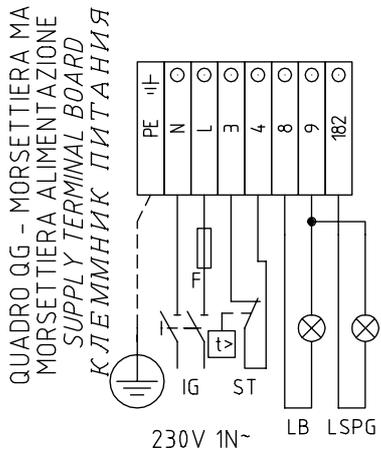


Fig. 14 Fully modulating burners

Probes connection by means of the 7-pins plug (Fig. 16) - see Fig. 15 and the Electric wiring diagrams for connections.

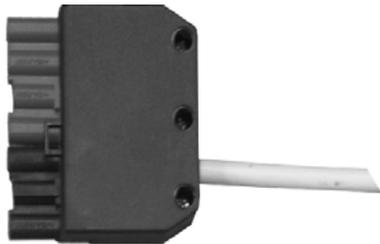


Fig. 16 Probe connector:

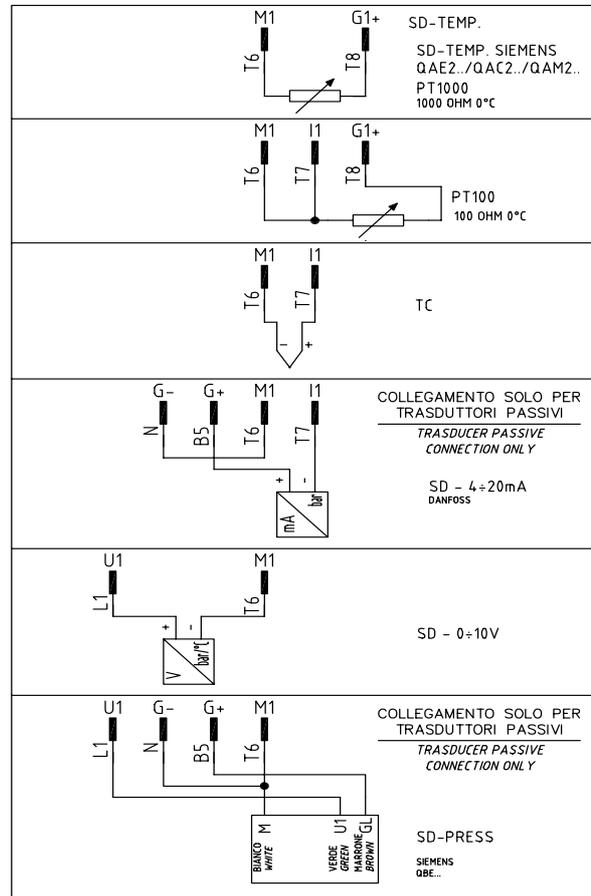


Fig. 15 Probes connection

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 servocontrol are at the maximum opening. Refer to Fig. 17, 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.

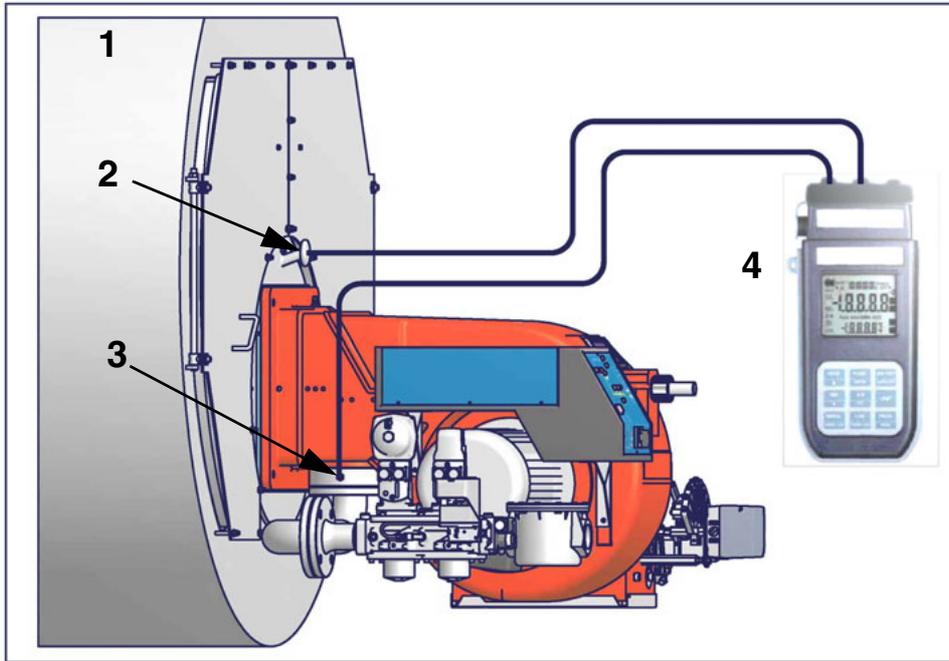


Fig. 17

Key

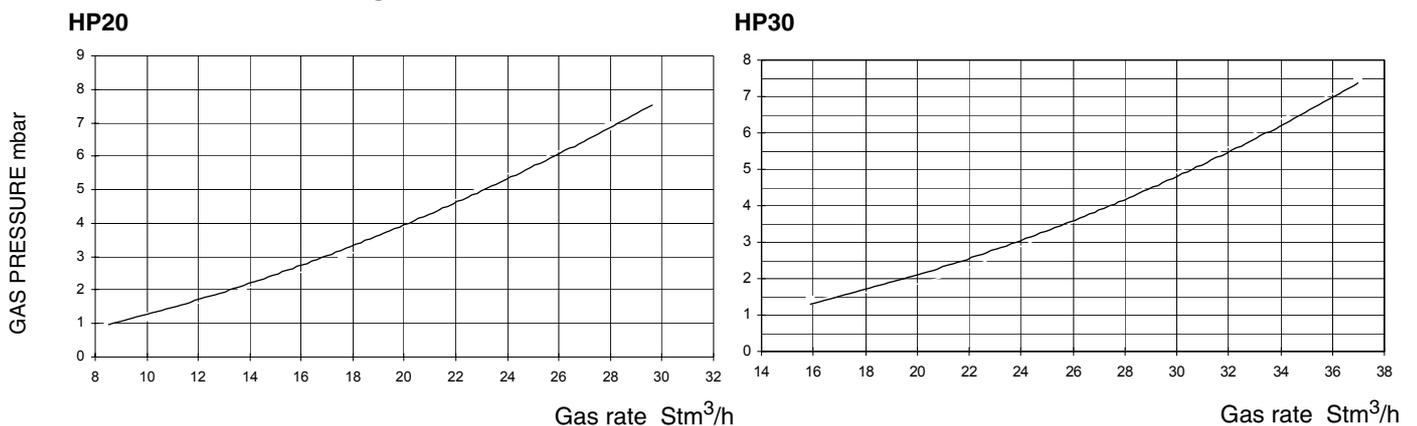
- 1 Generator
- 2 Pressure outlet on the combustion chamber
- 3 Gas pressure outlet on the butterfly valve
- 4 Differential pressure gauge

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. 17-2) to get the pressure in the combustion chamber and the other one into the butterfly valve's pressure outlet of the burner (Fig. 17-3). 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



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

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.

VPS504 Gas proving system

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

When wishing to monitor the test, install a pressure gauge ranged to that of the pressure supply point PA.

If the test cycle is satisfactory, after a few seconds the consent light LC (yellow) comes on. In the opposite case the lockout light LB (red) comes on.

To restart it is necessary to reset the appliance by pressing the illuminated pushbutton LB.

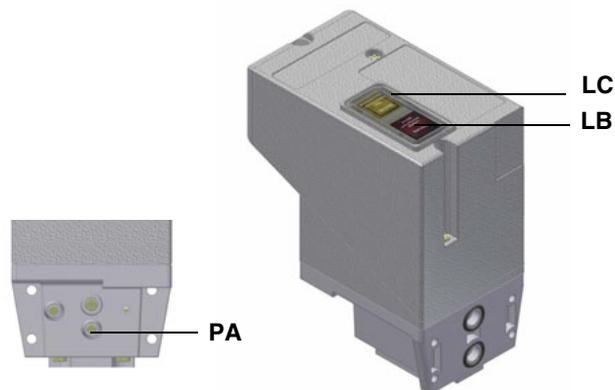


Fig. 18

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

Recommended combustion parameters		
Fuel	Recommended (%) CO ₂	Recommended (%) O ₂
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, as described on par. see "Measuring the gas pressure in the combustion head" on page 17.
- Then, adjust the combustion values corresponding to the points between maximum and minimum: set the shape of the adjusting cam foil. The adjusting cam sets the air/gas ratio in those points, regulating the opening-closing of the throttle gas valve.
- Set, now, the low flame output, acting on the low flame microswitch of the actuator in order to avoid the low flame output increasing too much or that the flues temperature gets too low to cause condensation in the chimney.

Adjustment procedure for gas operation

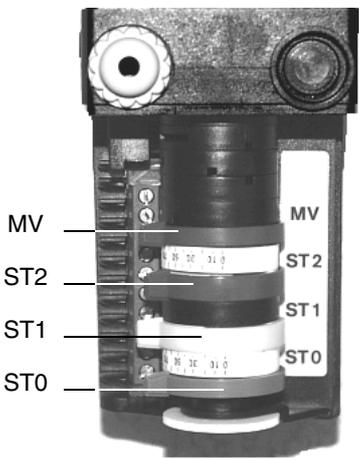
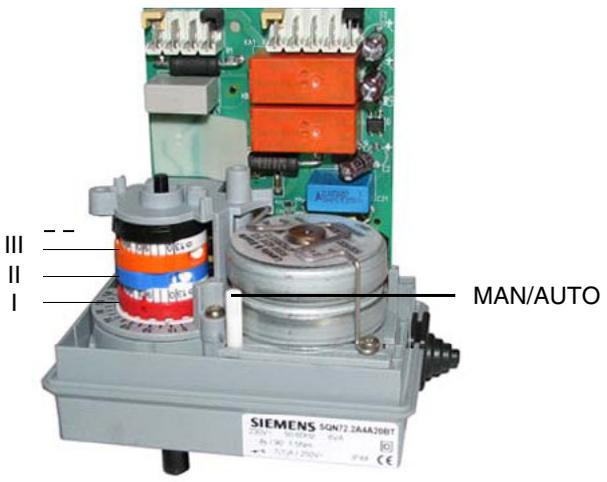
- 1 Set GAS fuel by means of the burner **CM** switch (it is placed on the burner control panel - see page 26)
- 2 Only for burners provided with **Multibloc MB-DLE gas valves**: before starting the burner up, set the slow opening. To set the slow opening, remove cover **T**, reverse it upside down and use it as a tool to rotate screw **VR**. Clockwise rotation reduces start flow rate, anticlockwise rotation increases it. Do not use a screwdriver on the screw **VR**!

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

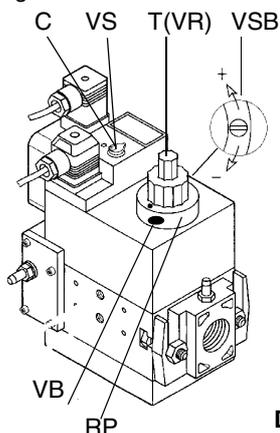
Attention:

- **Beger actuator:** cams can be moved manually
- **Siemens actuator:** set the MAN/AUTO lever to MAN to move the cams, remember to set it to AUTO once the adjustment is accomplished.

- 3 Before starting the burner up, drive the high flame actuator microswitch matching the low flame one (in order to let the burner operates at the lowest output) to safely achieve the high flame stage.
- 4 Start the burner up by means of the thermostat series and wait until the pre-purge time comes to an end and that the burner starts up;
- 5 drive the burner to high flame stage, by means of the thermostat **TAB** (high/low flame thermostat - see Wiring diagrams), as far as fully-modulating burners, see related paragraph.
- 6 Then move progressively the microswitch to higher values until it reaches the high flame position; always check the combustion values and eventually adjusting the gas by means of the valves group governor.

Berger STA12 B 3.41	Siemens SQN72
	
ST2 = High flame cam ST0 = Ignition position ST1 = Low flame	I = High flame cam II = Ignition position III = Low flame

- 7 go on adjusting air and gas flow rates: check, continuously, the flue gas analysis, as to avoid combustion with little air; dose the air according to the gas flow rate change following the steps quoted below;
- 8 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: **Dungs MBC..SE valves group**: act on its pressure governor to increase or decrease the pressure and consequently the gas rate.:

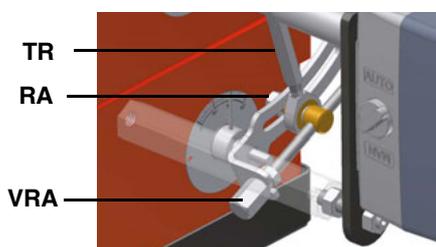


Dungs Multibloc MB-DLE

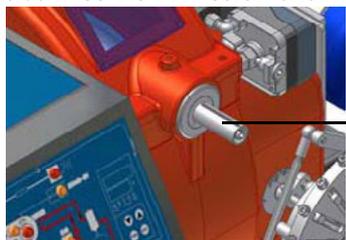
Fig. 19

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

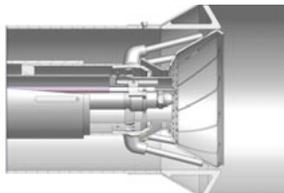
Note: once the procedure is performed, be sure that the blocking nut **RA** is fasten. Do not change the position of the air damper rods.



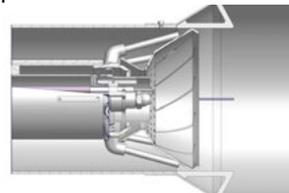
- 10 The burner is factory-set with the head in its MAX position (maximum output). To let the burner operate at a lower output, turn clockwise the **VRT** screw and move progressively the combustion head back towards the MIN position.



VRT



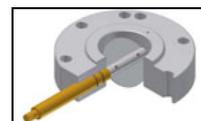
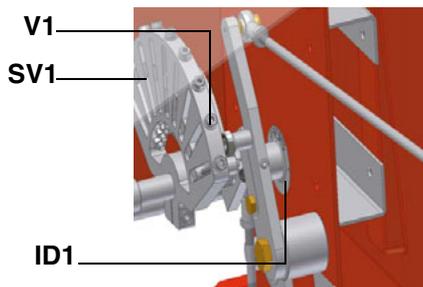
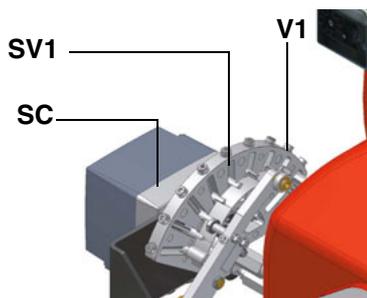
"MAX" head position



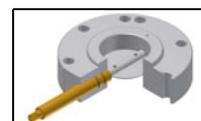
"MIN" head position

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

- 11 the air and gas rate are now adjusted at the maximum power stage, go on with the point to point adjustment on the **SV1** (gas side) adjusting cam as to reach the minimum output point.
- 12 as for the point-to-point regulation, move the low flame microswitch a little lower than the maximum position (90°);
- 13 set the **TAB** thermostat to the minimum in order that the actuator moves progressively towards the low flame position (as far as fully-modulating burners, see the related paragraph);
- 14 move the low flame cam 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

- 15 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.

Calibration of low gas pressure switch

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

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

Adjusting the high gas pressure switch (when provided)

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

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

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 (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

RETURN PRESSURE bar														
Nozzle 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

N.B. Specific gravity of the light oil: 0.840kg/dm³

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 table above). If the return pressure is 13.80bar (with the same nozzle), the flow rate value will be about 15.4kg/h. The flow rate in the High-flame operation is related to the nozzle provided with close return.

Oil Flow Rate Settings

- 1 record the high flame value set during the gas operation adjustments (see previous paragraphs).
- 2 Once the air and gas flow rates are adjusted, turn the burner off, switch the **CM** switch to the oil operation (OIL, on the burner control panel (see page 26).
- 3 bleed the air from the **M** pressure gauge port (Fig. 20) by loosening the cap without removing it, then release the contactor.

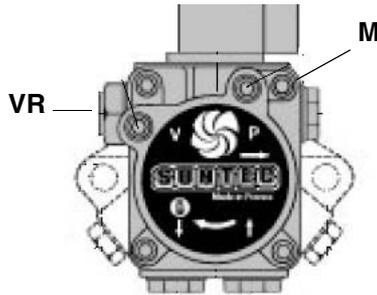


Fig. 20

- 4 Start the burner up by means of the thermostat series and wait until the pre-purge time comes to an end and that the burner starts up;
- 5 drive the burner to high flame stage, by means of the thermostat **TAB** (as far as fully-modulating burners, see the related paragraph).

Attention:

- **Berger actuator:** cams can be moved manually
- **Siemens actuator:** set the MAN/AUTO lever to MAN to move the cams, remember to set it to AUTO once the adjustment is accomplished.

Berger STA12 B 3.41	Siemens SQN72
<p>A photograph of a Berger STA12 B 3.41 actuator. It shows a vertical assembly with several adjustment points. Labels on the left side point to 'MV', 'ST2', 'ST1', and 'ST0'. Labels on the right side point to 'MV', 'ST2', 'ST1', and 'ST0'. The actuator has a black and silver finish.</p>	<p>A photograph of a Siemens SQN72 actuator. It shows a vertical assembly with a grey base and a white top section. Labels on the left side point to 'I', 'II', and 'III'. A label on the right side points to 'AUTO-MAN'. The actuator has a grey and white finish.</p>
<p>ST2 = High flame cam ST0 = Ignition position ST1 = Low flame</p>	<p>I = High flame cam II = Ignition position III = Low flame</p>

- 6 the nozzle supply pressure is 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. 21 and act on on the pump adjusting screw **VR** (see Fig. 22) as to get the nozzle pressure at 20bar (see table on page 22).

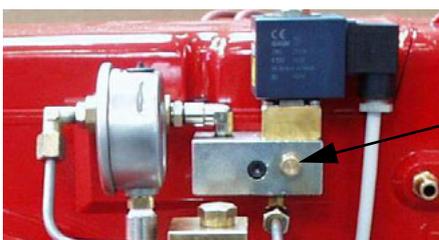


Fig. 21

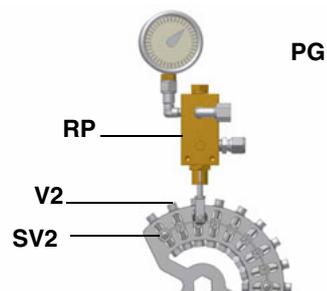


Fig. 22

- 7 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.

- 8 once the oil rate is adjusted at the maximum output (the air rate was adjusted in the gas regulation), go on with the point to point adjustment on the **SV2** (light oil side) adjusting cam as to reach the minimum output point, as described on the next steps.
- 9 as for the point-to-point regulation, move the gas low flame microswitch (cam III) a little lower than the maximum position (90°);
- 10 set the **TAB** thermostat to the minimum in order that the actuator moves progressively towards the low flame position (as far as fully-modulating burners, see the related paragraph);
- 11 move the low flame cam 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 **V2** to increase the rate, unscrew to decrease.
- 12 The low flame position must never match the ignition position that is why the 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.

As far as fully-modulating burners see paragraph on page 21.

Light 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 set the fuel immission into the combustion chamber. The part of fuel that is not burnt goes back to the tank through the return circuit. The fuel amount to be burnt is adjusted by means of the burner actuator according to the adjustments set (see previous paragraph).

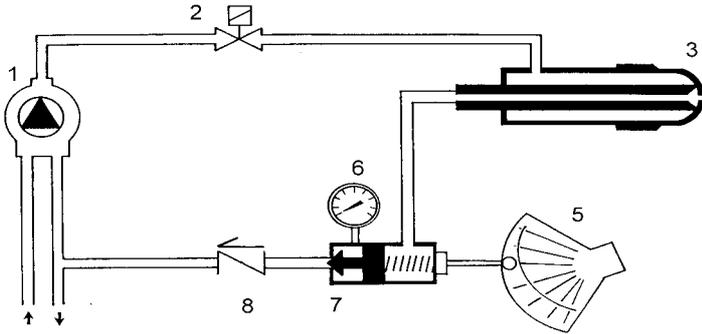


Fig. 23 - Stand-by

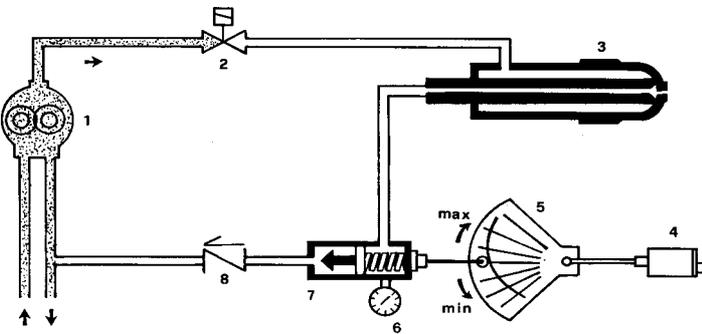


Fig. 24 - Pre-purge

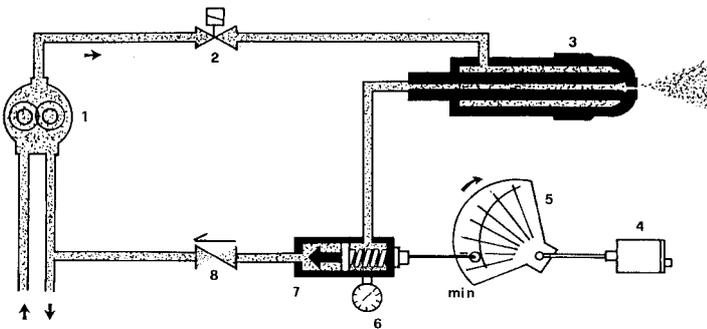


Fig. 25 - Low flame

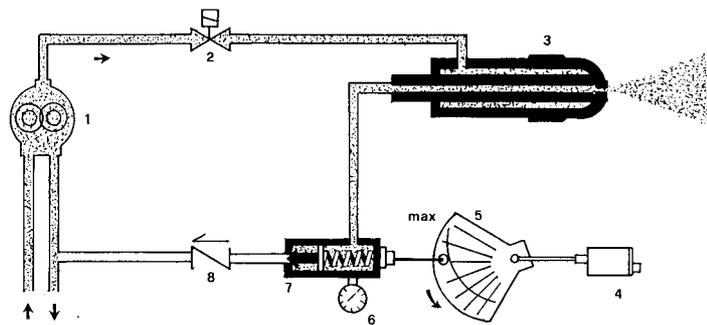


Fig. 26 - High flame

Key

- 1 Light oil pump
- 2 Light oil solenoid valve
- 3 Nozzle
- 4 Actuator
- 5 Adjusting cam
- 6 pressure gauge
- 7 Pressure regulator
- 8 One-way valve

PART II: OPERATION

LIMITATIONS OF USE

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

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

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

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

NEVER OPEN OR DISMANTLE ANY COMPONENT OF THE MACHINE.

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

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

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

OPERATION



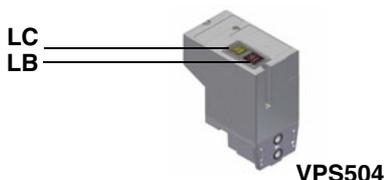
ATTENTION: before starting the burner up, be sure that the manual cutoff valves are open and check that the pressure upstream the gas train complies the value quoted on paragraph "Technical specifications".

- Choose the typer of fuel by turning the **A** switch, on the burner control panel.
CAUTION: if the fuel chosen is light 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, in burners with VPS504 (pushbutton **LB** in picture), or by the **D** pushbutton on the burner panel if this one is fitted with LDU11 proving system.



NOTE: if the burner is fitted with Dungs VPS504, the pre-purgue phase starts once the gas proving system is successfully performed. Since the pre-purgue 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.

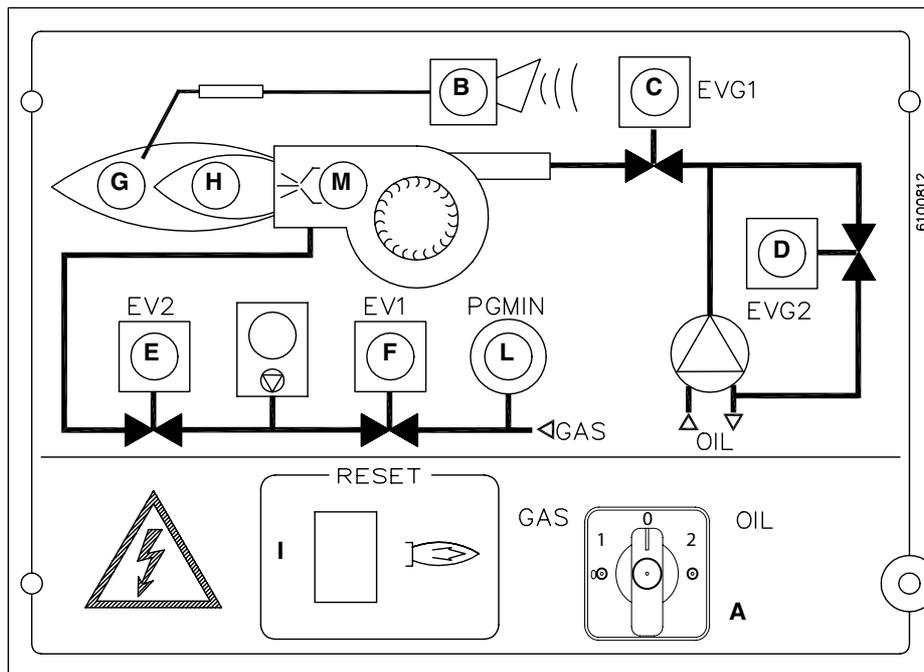


Fig. 27 - Burner control panel

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 thermal 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

PART III: MAINTENANCE

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



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

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

ROUTINE 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 29);
- Check ignition electrodes, clean, adjust and, if necessary, replace them (see page 30);
- Check and carefully clean the **UV** detector, replace it if necessary; if in doubt, check the detection current, once the burner starts up (see on page 30).
- 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. 28-Fig. 29) is $\Delta p > 10$ mbar.
- Change the filter if the pressure difference between pressure connection 1 and 3 (Fig. 28-Fig. 29) 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. 30.
- 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.

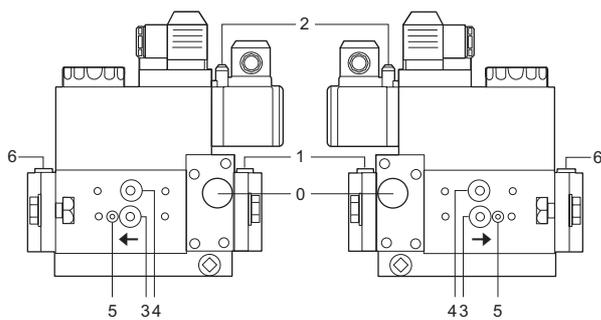


Fig. 28

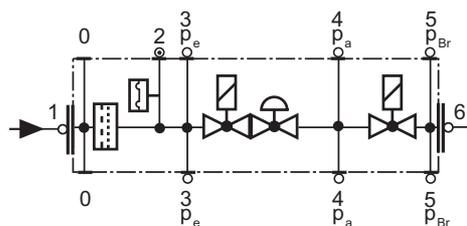


Fig. 29

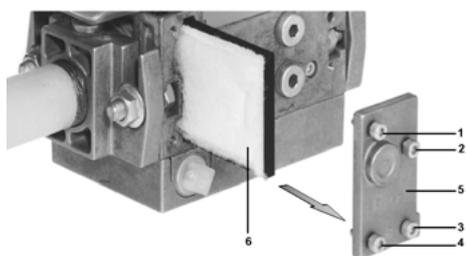


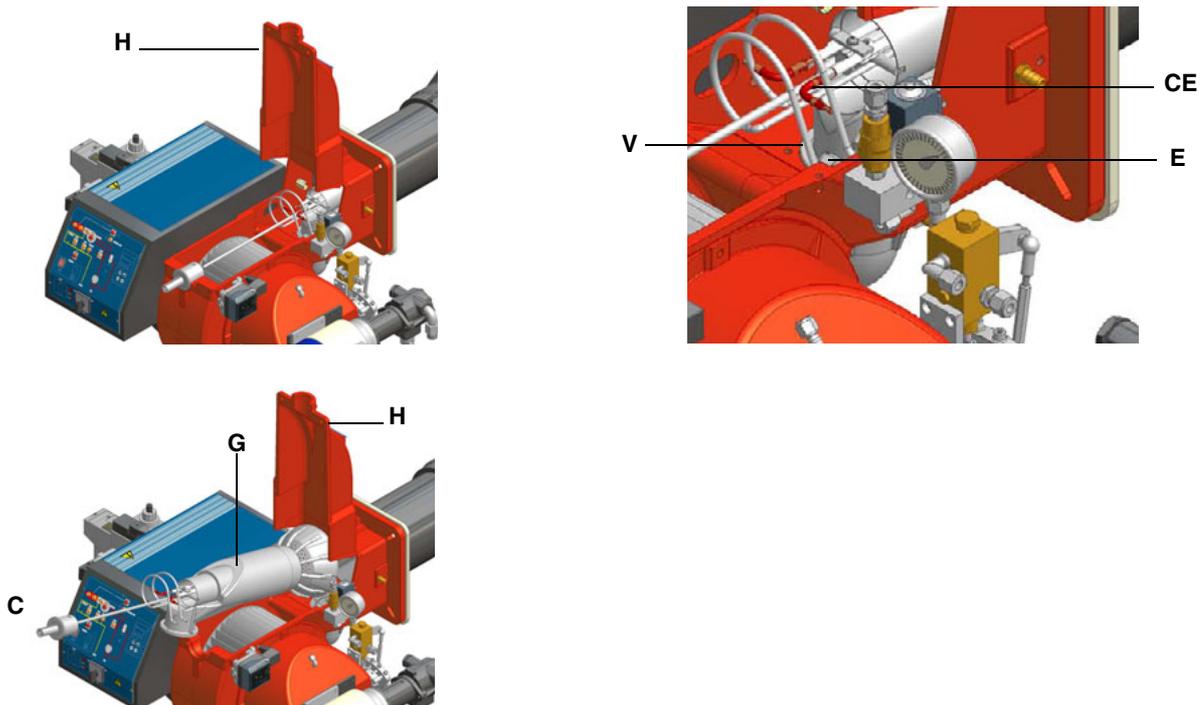
Fig. 30

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 **V** holding the gas manifold **G**, loosen the two connectors **E** and remove the assembly as shown.

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

- 5 Clean the combustion head by means of a vacuum cleaner; scrape off the scale by means of a metallic brush.



Adjusting the electrodes position

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

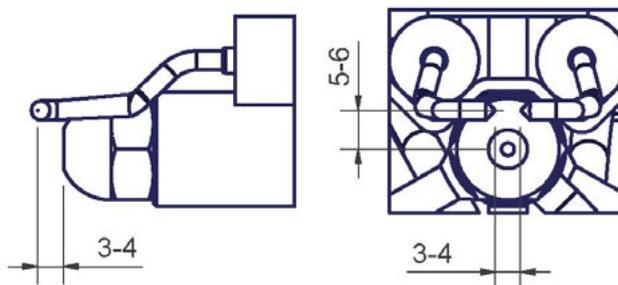


Fig. 31

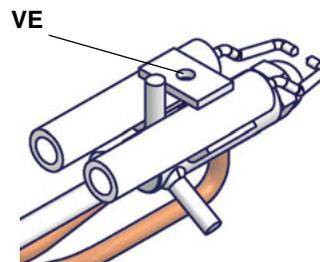
Cleaning/replacing the electrodes



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;
- 3 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.



Cleaning and replacing the detection photocell

The photocell working life is about 10000 working hours (about 1 year), at max 50°C after which it must be replaced.

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.

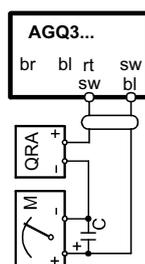


Checking the detection current

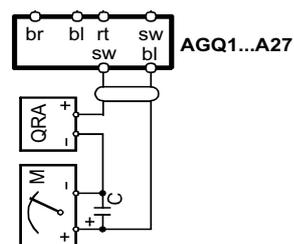
To check the detection current follow the diagram on pictures below. If the signal is less than the value indicated, check the position of the detector, the electrical contacts and, if necessary, replace the detector.

Control box	Minimum detection signal
Siemens LGB../LME..	200 μ A (with UV detector)

LME..



LGB..



Keys

C Electrolytic capacitor 100...470 μ F; DC 10...25 V

M Microammeter

Ri max. 5000 ohm

QRA. UV detector

rt Red

sw Black

br Brown

gr Grey

bl Blue

Seasonal stop

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

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

Burner disposal

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

TROUBLESHOOTING

CAUSE / FAULT	BURNER DOESN'T START	CONTINUE PRE-PURGUE	BURNER DOESN'T START AND LOCKS	BURNER DOESN'T START AND REPEATS THE CYCLE	BURNER STARTS AND REPEATS THE CYCLE	BURNER DOESN'T SWITCH TO HIGH FLAME	BURNER'S LOCKOUT DURING OPERATION	BURNER STOPS AND REPEATS CYCLE DURING OPERATION	BURNER'S LOCKOUT AFTER START	THE FLAME CONTROL DEV. REPEATS THE CYCLE WITHOUT GIVE CONSENT
MAIN SWITCH OPEN	●									
ABSENCE OF GAS	●									
MINIMUM GAS PRESSURE SWITCH FAULT OR BAD SETTING	●			●	●			●		
BOILER THERMOSTATS OPEN	●									
OVERLOAD TRIPPED INTERVENTION	●									
FUSES INTERVENTION	●									
AIR PRESSURE SWITCH FAULT OR BAD SETTING	●		●				●			●
DEFECTIVE CONTROL BOX	●	●	●				●			
DEFECTIVE AIR DAMPER ACTUATOR		●								
DEFECTIVE IGNITION TRANSFORMER			●							
IGNITION ELECTRODE WRONG POSITION			●							
THROTTLE VALVE BAD SETTING			●							
DEFECTIVE GAS GOVERNOR				●	●			●		
DEFECTIVE HI-LO FLAME THERMOSTAT						●				
ACTUATOR CAM BAD SETTING						●				
DETECTION PROBE BAD POSITION OR DEFECTIVE DETECTION CIRCUIT							●		●	
REVERSED PHASE AND NEUTRAL CONNECTION									●	

SPARE PARTS

Description	Code	
	HP20	HP30
CONTROL BOX - Siemens LGB..	2020430	2020430
CONTROL BOX- Siemens LME..	2020468	2020468
IGNITION ELECTRODE	2080212	2080219
OIL FILTER	2090025	2090025
GASKET	2110004	2110004
FAN WHEEL	2150006	2150006
AIR PRESSURE SWITCH	2160065	2160065
MINIMUM GAS PRESSURE SWITCH	2160077	2160077
IGNITION TRANSFORMER	2170106	2170140
PUMP MOTOR - SIMEL	2180099	2180715
PUMP MOTOR - AEG	2180715	2180715
FAN MOTOR	2180704	2180704
GAS VALVE GROUP - Rp1 - Dungs MB-DLE410	2190341	2190341
GAS VALVE GROUP - Rp1 1/4 - Dungs MB-DLE412	2190342	2190342
GAS PROVING SYSTEM	2190420	2190420
GAS PROVING SYSTEM	2191604	2191604
FLEXIBLE HOSE	2340002	2340001
SMALL ADJUSTING CAM FOIL	2440013	2440013
BIG ADJUSTING CAM FOIL	2440014	2440014
ACTUATOR BERGER STA12	2480053	2480053
ACTUATOR SIEMENS SQN72	24800A4	24800A4
UV PROBE	2510001	2510001
UV PROBE ADAPTOR - Siemens AGQ1.1A27	2510101	2510101
UV PROBE ADAPTOR - Siemens AGQ3.1A27	2510114	2510114
MOTOR-PUMP COUPLING (SIMEL)	2540016	2540016
MOTOR-PUMP COUPLING (AEG)	2540055	2540055
LIGHT OIL GOVERNOR	2570054	2570054
BURNER MODULATOR (only for fully-modulating burners)	2570112	2570112
PUMP SUNTEC AL65	2590180	2590180
NOZZLE	2610101	2610101
COMBUSTION HEAD	3060265	3060204
BLAST TUBE	3090040	3091004
BLAST TUBE	3090041	-
IGNITION CABLE	6050109	6050109

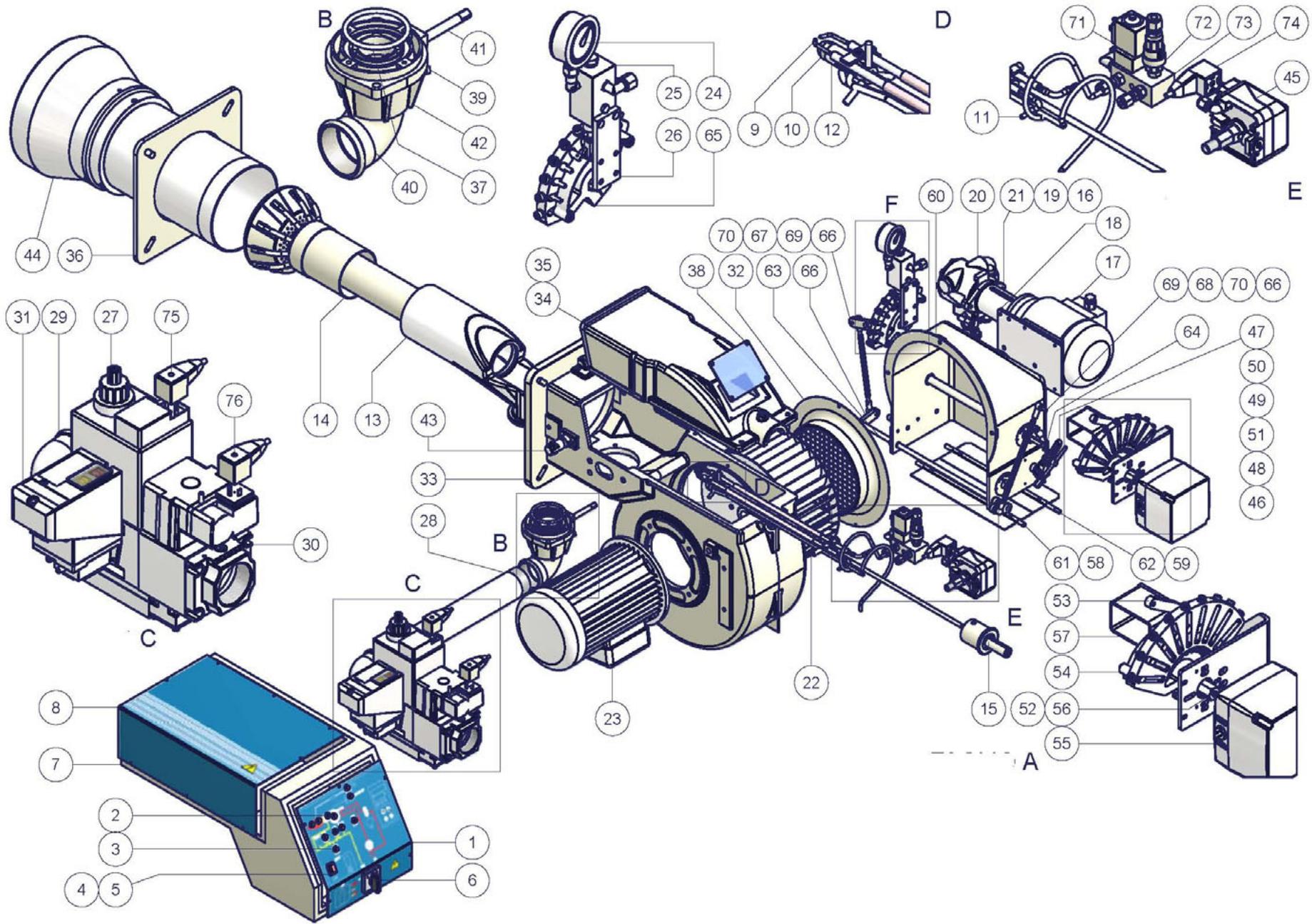
NOTE: it is recommended to mention the burner ID number on the spare parts request form.

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

Generic drawing: some parts could differ from the ones provided.

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



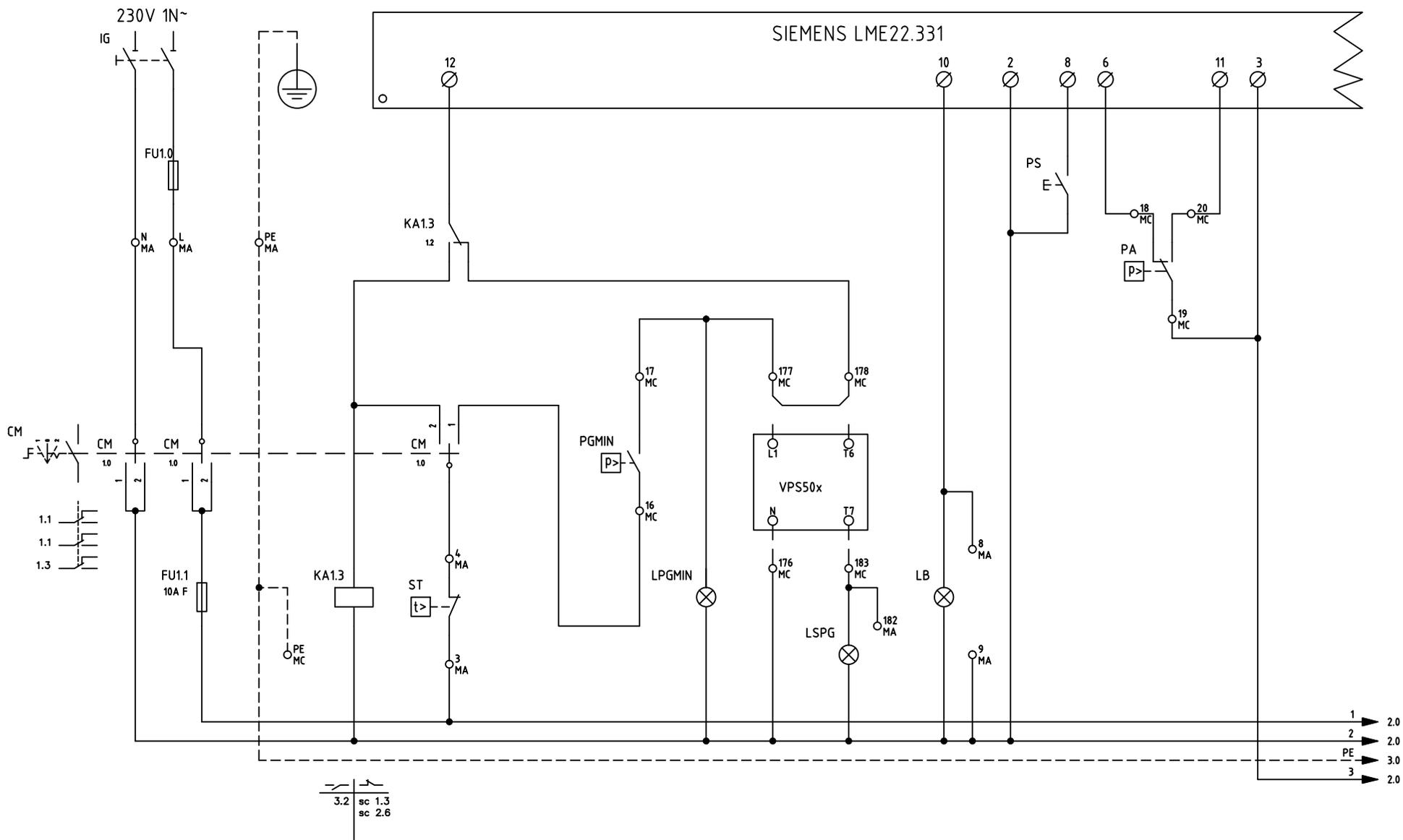
WIRING DIAGRAMS

ATTENTION:

- 1 - Electrical supply 230V 50Hz 1N a.c.
- 2 - Don't reverse phase with neutral
- 3 - Ensure to the burner a proper hearthing

Progressive burners: SE04-639.

Fully-modulating burners: SE04-626.

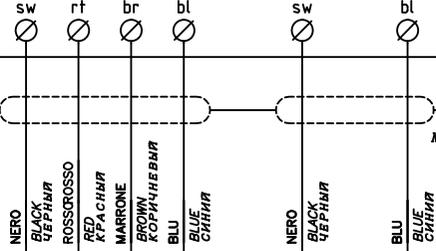


Data	25/09/2000	PREC.	FOGLIO
Revisione	04	/	1
Dis. N.	04 - 639	SEGUE	TOTALE
		2	6

SIEMENS LME22.331

SIEMENS AGQ3.1A27

CAVIERA
MULTIPLEX CABLE
МНОГОПОЛЮСНЫЙ КАБЕЛЬ



NERO
BLACK
ЧЕРНАЯ

ROSSOSSO
RED
КРАСНАЯ

MARRONE
BROWN
КОРИЧНЕВАЯ

BLU
BLUE
СИНИЯ

NERO
BLACK
ЧЕРНАЯ

BLU
BLUE
СИНИЯ



34 MC

36 MC

37 MC

KA1.3
12

145 MC

146 MC

EVG1/2

37 MC

POMAX

PGMAX

156 MC

158 MC

25 MC

26 MC

EV1

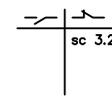
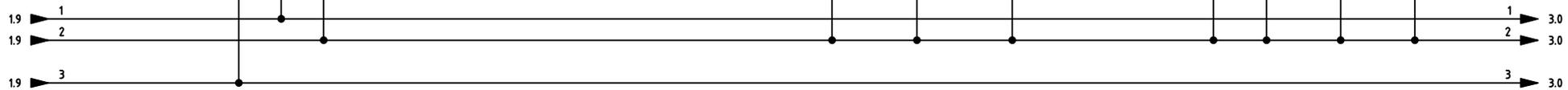
EV2

LEV1

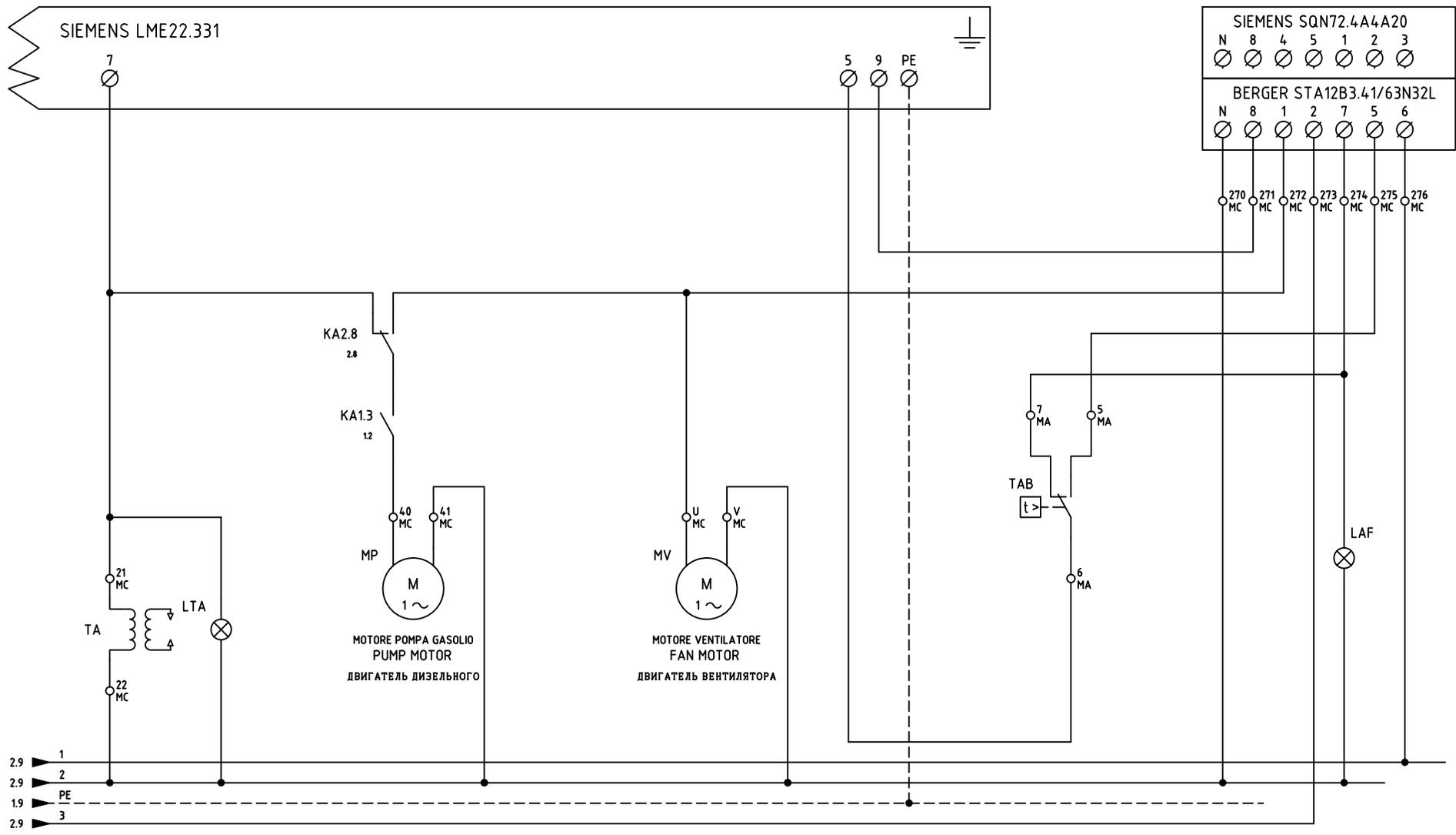
LEV2

KA2.8

LBF



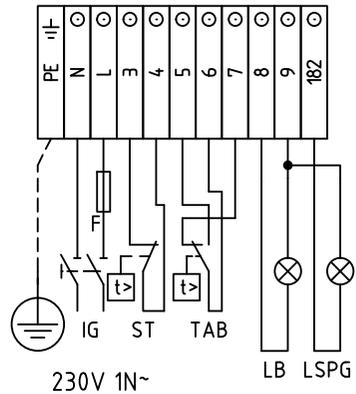
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Revisione	04	1	2
Dis. N.	04 - 639	SEGUE	TOTALE
		3	6



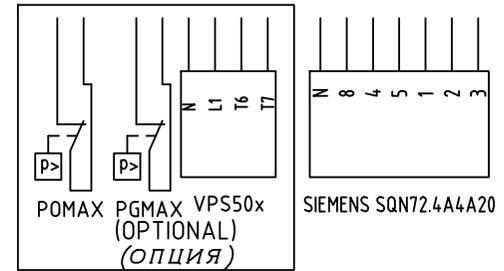
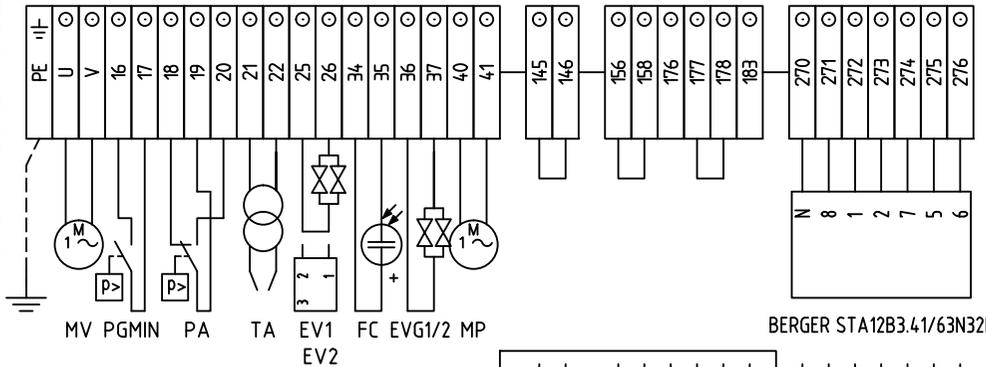
2.9 1
 2.9 2
 1.9 PE
 2.9 3

Data	25/09/2000	PREC.	FOGLIO
Revisione	04	2	3
Dis. N.	04 - 639	SEGUE	TOTALE
		4	6

QUADRO QG - MORSETTIERA MA
 MORSETTIERA ALIMENTAZIONE
 SUPPLY TERMINAL BOARD
 КЛЕММНИК ПИТАНИЯ



QUADRO QG - MORSETTIERA MC
 MORSETTIERA COMPONENTI BRUCIATORE
 BURNER COMPONENT TERMINAL BOARD
 КЛЕММНИК КОМПОНЕНТОВ ГОРЕЛКИ



SERVOCOMANDO SERRANDA ARIA
 AIR DAMPER ACTUATOR
 BERGER STA12B3.41/63N32L

ST2 ALTA FIAMMA
 HIGH FLAME
 ST0 SOSTA
 STAND-BY
 ST1 BASSA FIAMMA
 LOW FLAME

SERVOCOMANDO SERRANDA ARIA
 СЕРВОПРИВОД ВОЗДУШНОЙ ЗАСЛОНКИ
 BERGER STA12B3.41/63N32L

ST2 ALTA FIAMMA
 БОЛЬШОЕ ПЛАМЯ
 ST0 СОСТА
 РЕЖИМ ВЫЖИДАНИЯ
 ST1 БАССА ФИАММА
 МАЛОЕ ПЛАМЯ

SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)
 AIR DAMPER ACTUATOR (ALTERNATIVE)
 SIEMENS SQN72.4A4A20

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

SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)
 СЕРВОПРИВОД ВОЗДУШНОЙ ЗАСЛОНКИ (АЛЬТЕРНАТИВНЫЙ)
 SIEMENS SQN72.4A4A20

I (ROSSO) ALTA FIAMMA
 I (КРАСНЫЙ) БОЛЬШОЕ ПЛАМЯ
 II (BLU) СОСТА
 II (СИНИЙ) РЕЖИМ ВЫЖИДАНИЯ
 III (ARANCIO) БАССА ФИАММА
 III (ОРАНЖЕВЫЙ) МАЛОЕ ПЛАМЯ

Data	25/09/2000	PREC.	FOGLIO
Revisione	04	3	4
Dis. N.	04 - 639	SEGUE	TOTALE
		5	6

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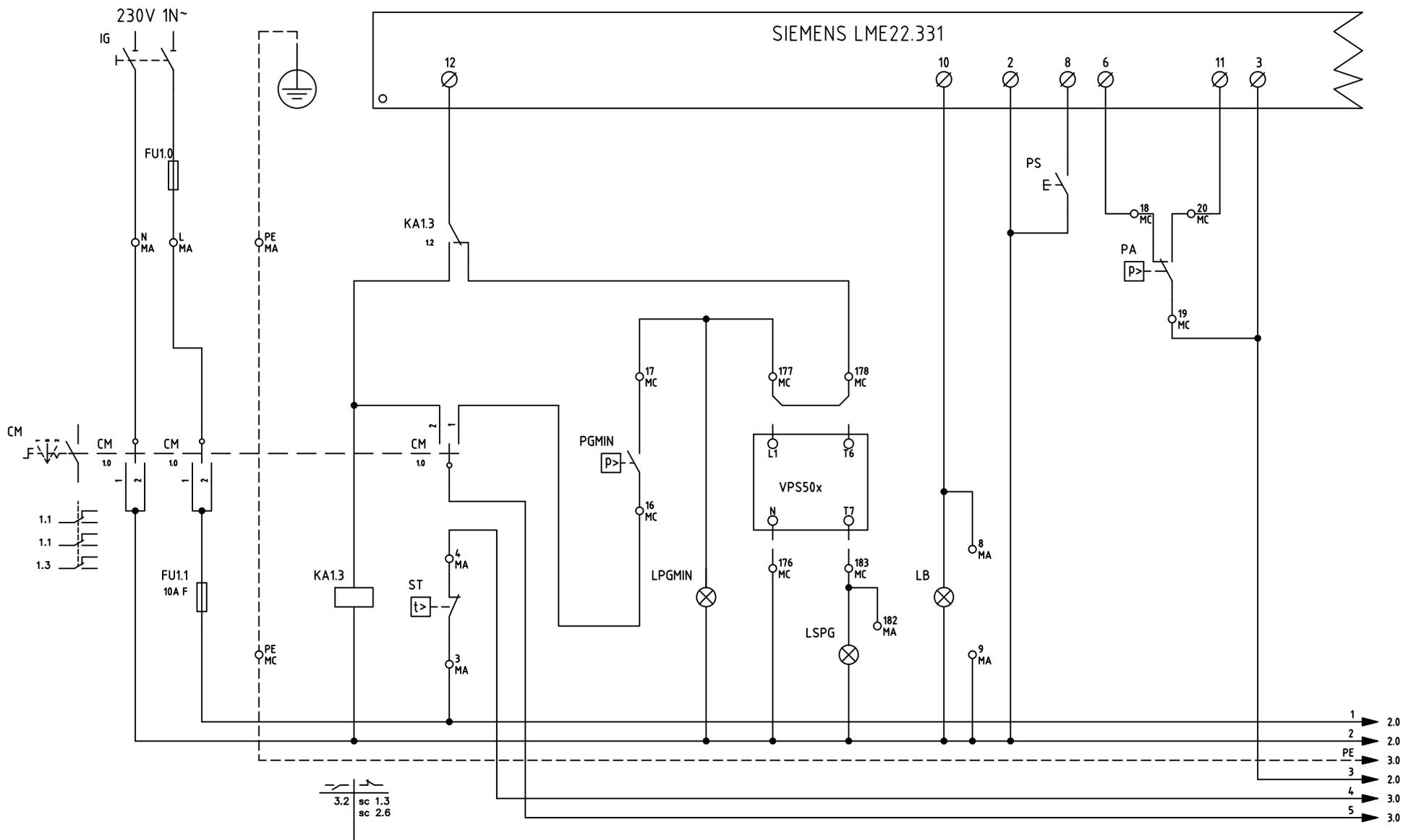
SIGLA/ITEM	FOGLIO/SHEET	FUNZIONE	FUNCTION
BERGER STA12B3.41/63N32L	3	SERVOCOMANDO SERRANDA ARIA	AIR DAMPER ACTUATOR
CM	1	SELETTORE MANUALE COMBUSTIBILE 1) GAS 0) OFF 2) GASOLIO	COMBUSTIBLE SELECTOR 1)GAS 0)OFF 2)LIGHT OIL
EV1	2	ELETTROVALVOLA GAS LATO RETE (O GRUPPO VALVOLE)	UPSTREAM GAS SOLENOID VALVE (OR VALVES GROUP)
EV2	2	ELETTROVALVOLA GAS LATO BRUCIATORE (O GRUPPO VALVOLE)	DOWNSTREAM GAS SOLENOID VALVE (OR VALVES GROUP)
EVG1/2	2	ELETTROVALVOLE GASOLIO	LIGHT OIL SOLENOID VALVE
FC	2	SONDA UV RILEVAZIONE FIAMMA	UV FLAME DETECTOR
FU1.0	1	FUSIBILE DI LINEA	LINE FUSE
FU1.1	1	FUSIBILE LINEA AUSILIARI	AUXILIARY LINE FUSE
IG	1	INTERRUTTORE GENERALE	MAINS SWITCH
KA1.3	1	RELE' AUSILIARIO	AUXILIARY RELAY
KA2.8	2	RELE' AUSILIARIO	AUXILIARY RELAY
LAF	3	LAMPADA SEGNALAZIONE ALTA FIAMMA BRUCIATORE	BURNER IN HIGH FLAME INDICATOR LIGHT
LB	1	LAMPADA SEGNALAZIONE BLOCCO BRUCIATORE	INDICATOR LIGHT FOR BURNER LOCK-OUT
LBF	2	LAMPADA SEGNALAZIONE BASSA FIAMMA BRUCIATORE	BURNER IN LOW FLAME INDICATOR LIGHT
LEV1	2	LAMPADA SEGNALAZIONE APERTURA [EV1]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV1]
LEV2	2	LAMPADA SEGNALAZIONE APERTURA [EV2]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV2]
LEVG	2	LAMPADA SEGNALAZIONE APERTURA [EVG]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EVG]
LPGMIN	1	LAMPADA SEGNALAZIONE PRESENZA GAS IN RETE	INDICATOR LIGHT FOR PRESENCE OF GAS IN THE NETWORK
LSPG	1	LAMPADA SEGNALAZIONE BLOCCO CONTROLLO TENUTA VALVOLE	INDICATOR LIGHT FOR LEAKAGE OF VALVES
LTA	3	LAMPADA SEGNALAZIONE TRASFORMATORE DI ACCENSIONE	IGNITION TRANSFORMER INDICATOR LIGHT
MP	3	MOTORE POMPA GASOLIO	PUMP MOTOR
MV	3	MOTORE VENTILATORE	FAN MOTOR
PA	1	PRESSOSTATO ARIA	AIR PRESSURE SWITCH
PGMAX	2	PRESSOSTATO GAS DI MASSIMA PRESSIONE (OPTIONAL)	MAXIMUM GAS PRESSURE SWITCH (OPTIONAL)
PGMIN	1	PRESSOSTATO GAS DI MINIMA PRESSIONE	MINIMUM GAS PRESSURE SWITCH
POMAX	2	PRESSOSTATO DI MASSIMA PRESSIONE OLIO (OPTIONAL)	MAXIMUM OIL PRESSURE SWITCH (OPTIONAL)
PS	1	PULSANTE SBLOCCO FIAMMA	LOCK-OUT RESET BUTTON
SIEMENS AGQ3.1A27	2	ADATTATORE PER Sonda UV RILEVAZIONE FIAMMA	ADAPTER FOR UV FLAME DETECTOR
SIEMENS LME22.331	1	APPARECCHIATURA CONTROLLO FIAMMA	CONTROL BOX
SIEMENS SQN72.4A4A20	3	SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)	AIR DAMPER ACTUATOR (ALTERNATIVE)
ST	1	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
VPS50x	1	CONTROLLO DI TENUTA VALVOLE GAS (OPTIONAL)	GAS PROVING SYSTEM (OPTIONAL)

Data	25/09/2000	PREC.	FOGLIO
Revisione	04	4	5
Dis. N.	04 - 639	SEGUE	TOTALE
		6	6

0	1	2	3	4	5	6	7	8	9
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SIGLA/ITEM	FOGLIO/SHEET	FUNZIONE	FUNCTION
BERGER STA12B3.41/63N32L	3	SERVOCOMANDO SERRANDA ARIA	СЕРВОПРИВОД ВОЗДУШНОЙ ЗАСЛОНКИ
CM	1	SELETTORE MANUALE COMBUSTIBILE 1) GAS 0) OFF 2) GASOLIO	РУЧНОЙ ПЕРЕКЛЮЧАТЕЛЬ ТОПЛИВА 1)ГАЗ 0)ВЫКЛ 2)ДИЗТОПЛИВО
EV1	2	ELETTROVALVOLA GAS LATO RETE (O GRUPPO VALVOLE)	ГАЗОВЫЙ ЭЛЕКТРОКЛАПАН СО СТОРОНЫ СЕТИ (ИЛИ ГРУППЫ КЛАПАНОВ)
EV2	2	ELETTROVALVOLA GAS LATO BRUCIATORE (O GRUPPO VALVOLE)	ГАЗОВЫЙ ЭЛЕКТРОКЛАПАН СО СТОРОНЫ ГОРЕЛКИ (ИЛИ ГРУППЫ КЛАПАНОВ)
EVG1/2	2	ELETTROVALVOLA GASOLIO	ДИЗЕЛЬНЫЕ ЭЛЕКТРОКЛАПАНЫ
FC	2	SONDA UV RILEVAZIONE FIAMMA	УФ ДАТЧИК КОНТРОЛЯ ПЛАМЕНИ
FU1.0	1	FUSIBILE DI LINEA	ПЛАВКИЙ ПРЕДОХРАНИТЕЛЬ ЛИНИИ
FU1.1	1	FUSIBILE LINEA AUSILIARI	ПЛАВКИЙ ПРЕДОХРАНИТЕЛЬ ЛИНИИ ВСПОМОГАТЕЛЬНОГО ОБОРУДОВАНИЯ
IG	1	INTERRUTTORE GENERALE	ОБЩИЙ ВЫКЛЮЧАТЕЛЬ
KA1.3	1	RELE' AUSILIARIO	ВСПОМОГАТЕЛЬНОЕ РЕЛЕ
KA2.8	2	RELE' AUSILIARIO	ВСПОМОГАТЕЛЬНОЕ РЕЛЕ
LAF	3	LAMPADA SEGNALAZIONE ALTA FIAMMA BRUCIATORE	СИГНАЛЬНАЯ ЛАМПОЧКА БОЛЬШОГО ПЛАМЕНИ ГОРЕЛКИ
LB	1	LAMPADA SEGNALAZIONE BLOCCO BRUCIATORE	СИГНАЛЬНАЯ ЛАМПОЧКА БЛОКИРОВКИ ГОРЕЛКИ
LBF	2	LAMPADA SEGNALAZIONE BASSA FIAMMA BRUCIATORE	СИГНАЛЬНАЯ ЛАМПОЧКА МАЛОГО ПЛАМЕНИ ГОРЕЛКИ
LEV1	2	LAMPADA SEGNALAZIONE APERTURA [EV1]	СИГНАЛЬНАЯ ЛАМПОЧКА ОТКРЫТИЯ [EV1]
LEV2	2	LAMPADA SEGNALAZIONE APERTURA [EV2]	СИГНАЛЬНАЯ ЛАМПОЧКА ОТКРЫТИЯ [EV2]
LEV3	2	LAMPADA SEGNALAZIONE APERTURA [EVG]	СИГНАЛЬНАЯ ЛАМПОЧКА ОТКРЫТИЯ [EVG]
LPGMIN	1	LAMPADA SEGNALAZIONE PRESENZA GAS IN RETE	СИГНАЛЬНАЯ ЛАМПОЧКА НАЛИЧИЯ ГАЗА В СЕТИ
LSPG	1	LAMPADA SEGNALAZIONE BLOCCO CONTROLLO TENUTA VALVOLE	СИГНАЛЬНАЯ ЛАМПОЧКА БЛОКИРОВКИ БЛОКА КОНТРОЛЯ ГЕРМЕТИЧНОСТИ КЛАПАНОВ
LTA	3	LAMPADA SEGNALAZIONE TRASFORMATORE DI ACCENSIONE	СИГНАЛЬНАЯ ЛАМПОЧКА ЗАПАЛЬНОГО ТРАНСФОРМАТОРА
MP	3	MOTORE POMPA GASOLIO	ДВИГАТЕЛЬ ДИЗЕЛЬНОГО
MV	3	MOTORE VENTILATORE	ДВИГАТЕЛЬ ВЕНТИЛЯТОРА
PA	1	PRESSOSTATO ARIA	РЕЛЕ ДАВЛЕНИЯ ВОЗДУХА
PGMAX	2	PRESSOSTATO GAS DI MASSIMA PRESSIONE (OPTIONAL)	РЕЛЕ МАКСИМАЛЬНОГО ДАВЛЕНИЯ ГАЗА (ОПЦИЯ)
PGMIN	1	PRESSOSTATO GAS DI MINIMA PRESSIONE	РЕЛЕ МИНИМАЛЬНОГО ДАВЛЕНИЯ ГАЗА
POMAX	2	PRESSOSTATO DI MASSIMA PRESSIONE OLIO (OPTIONAL)	РЕЛЕ МАКСИМАЛЬНОГО ДАВЛЕНИЯ ЖИДКОГО ТОПЛИВА (ОПЦИЯ)
PS	1	PULSANTE SBLOCCO FIAMMA	КНОПКА СБРОСА БЛОКИРОВКИ ПЛАМЕНИ
SIEMENS AGQ3.1A27	2	ADATTATORE PER SONDA UV RILEVAZIONE FIAMMA	АДАПТЕР ДЛЯ УФ ДАТЧИКА КОНТРОЛЯ ПЛАМЕНИ
SIEMENS LME22.331	1	APPARECCHIATURA CONTROLLO FIAMMA	ЭЛЕКТРОННЫЙ БЛОК КОНТРОЛЯ ПЛАМЕНИ
SIEMENS SQN72.4A4A20	3	SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)	СЕРВОПРИВОД ВОЗДУШНОЙ ЗАСЛОНКИ (АЛЬТЕРНАТИВНЫЙ)
ST	1	SERIE TERMOSTATI/PRESSOSTATI	РЯД ТЕРМОСТАТОВ/РЕЛЕ ДАВЛЕНИЯ
TA	3	TRASFORMATORE DI ACCENSIONE	ЗАПАЛЬНЫЙ ТРАНСФОРМАТОР
TAB	3	TERMOSTATO/PRESSOSTATO ALTA-BASSA FIAMMA	ТЕРМОСТАТ/РЕЛЕ ДАВЛЕНИЯ БОЛЬШОГО/МАЛОГО ПЛАМЕНИ
VPS50x	1	CONTROLLO DI TENUTA VALVOLE GAS (OPTIONAL)	БЛОК КОНТРОЛЯ ГЕРМЕТИЧНОСТИ ГАЗОВЫХ КЛАПАНОВ (ОПЦИЯ)

Data	25/09/2000	PREC.	FOGLIO
Revisione	04	5	6
Dis. N.	04 - 639	SEGUE	TOTALE
		/	6

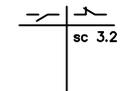
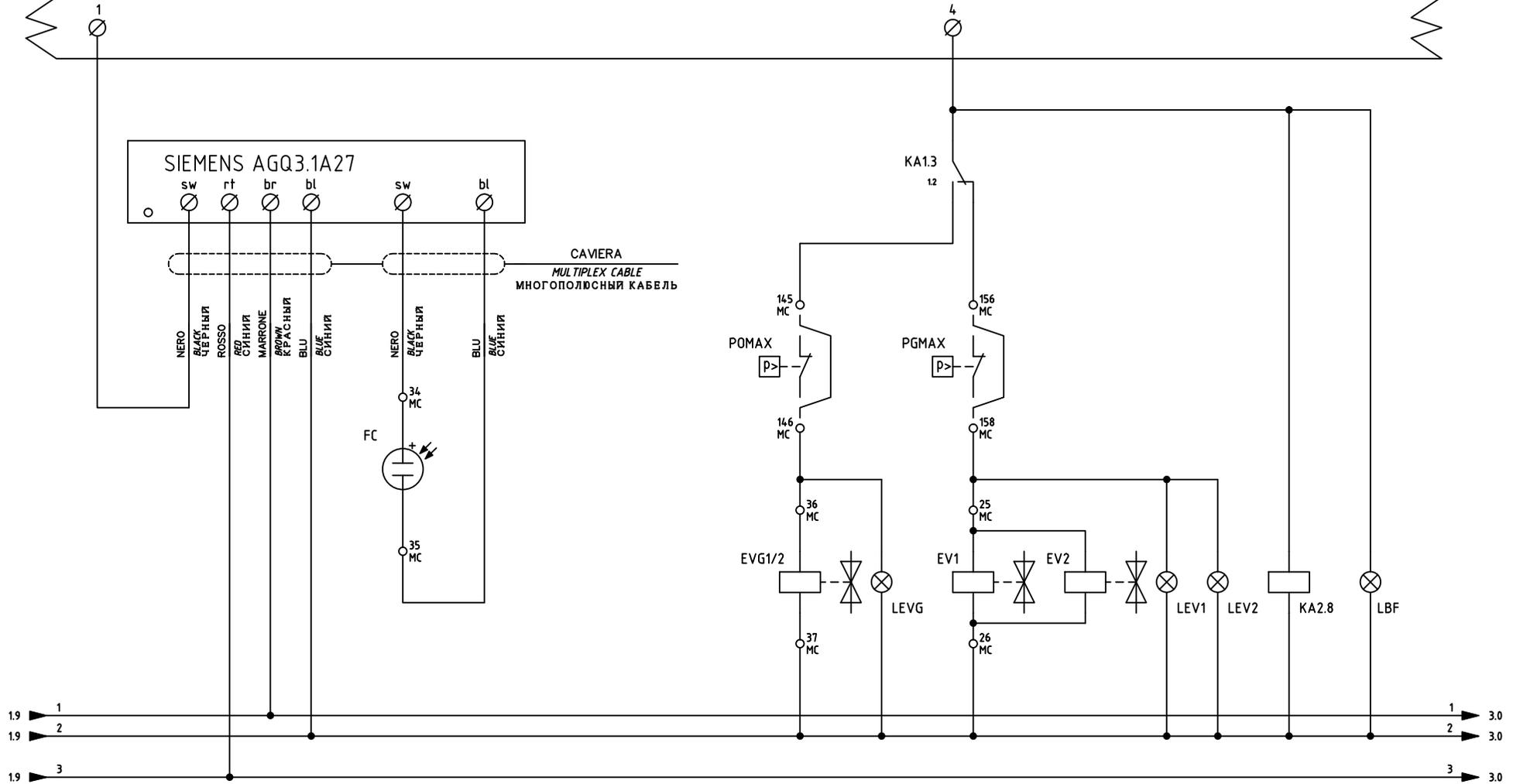


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Revisione	05	/	1
Dis. N.	04 - 626	SEGUE	TOTALE
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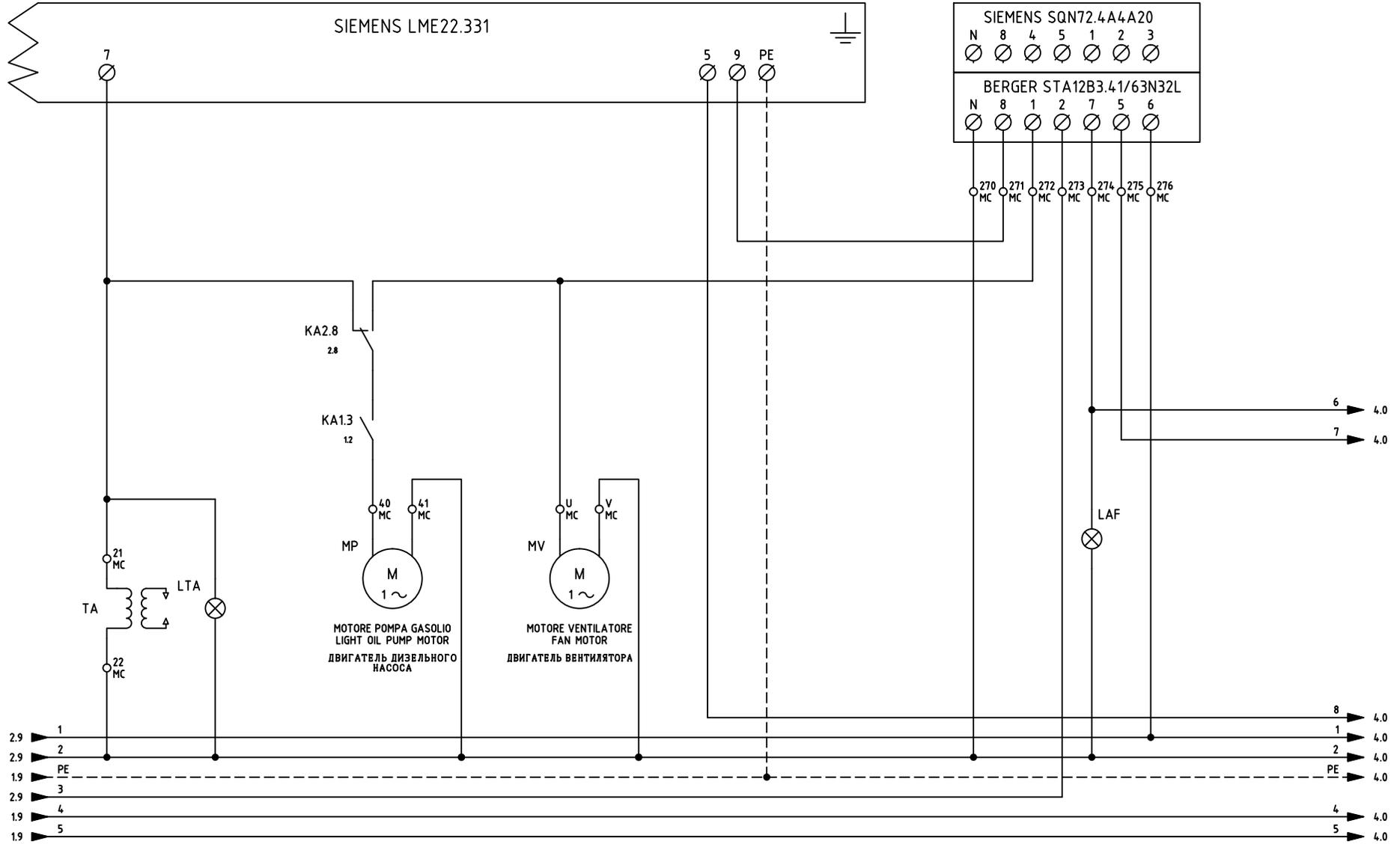
SIEMENS LME22.331

SIEMENS AGQ3.1A27

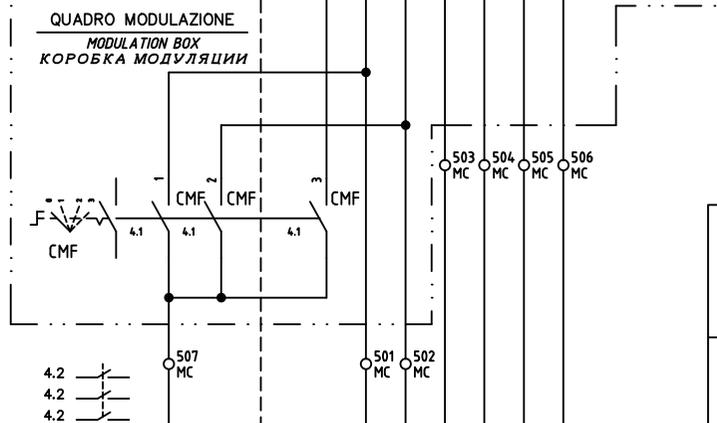
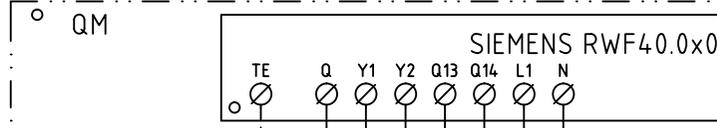
CAVIERA
MULTIPLEX CABLE
МНОГОПОЛЮСНЫЙ КАБЕЛЬ



Data	11/04/2000	PREC.	FOGLIO
Revisione	05	1	2
Dis. N.	04 - 626	SEGUE	TOTALE
		3	7



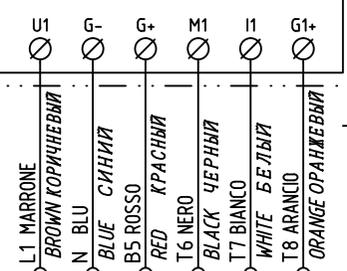
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Revisione	05	2	3
Dis. N.	04 - 626	SEGUE	TOTALE
		4	7



3.8 6
3.8 7

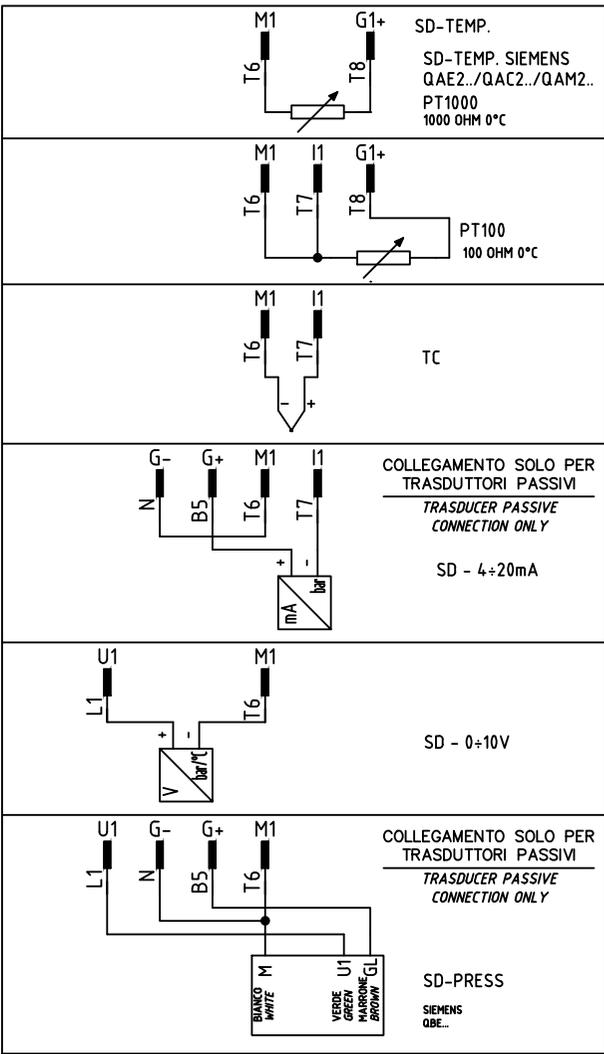
3.8 8
3.8 1
3.8 2
3.8 PE
3.8 4
3.8 5

(xx)



CAVO 7x0,75mmq
7x0,75mmq CABLE
КАБЕЛЬ 7x0,75mmq

CONN. 7 PINS



SD-TEMP.
SD-TEMP. SIEMENS
QAE2../QAC2../QAM2..
PT1000
1000 OHM 0°C

PT100
100 OHM 0°C

COLLEGAMENTO SOLO PER
TRASDUTTORI PASSIVI
TRSDUCER PASSIVE
CONNECTION ONLY

SD - 4+20mA

SD - 0+10V

COLLEGAMENTO SOLO PER
TRASDUTTORI PASSIVI
TRSDUCER PASSIVE
CONNECTION ONLY

SD-PRESS

SIEMENS
QBE...

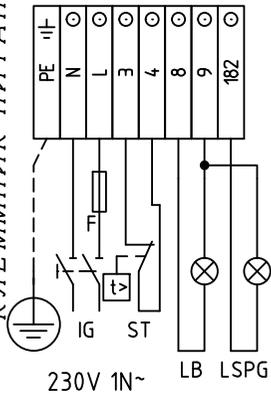
COLLEGAMENTO SOLO PER
TRASDUTTORI PASSIVI
ПОДКЛЮЧЕНИЕ ТОЛЬКО ДЛЯ
ПАСИВНОГО ПРЕОБРАЗОВАТЕЛЯ

COLLEGAMENTO SOLO PER
TRASDUTTORI PASSIVI
ПОДКЛЮЧЕНИЕ ТОЛЬКО ДЛЯ
ПАСИВНОГО ПРЕОБРАЗОВАТЕЛЯ

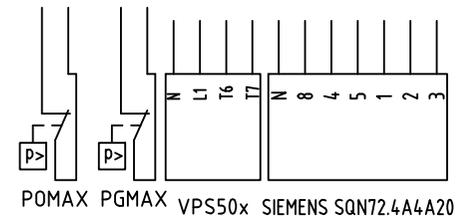
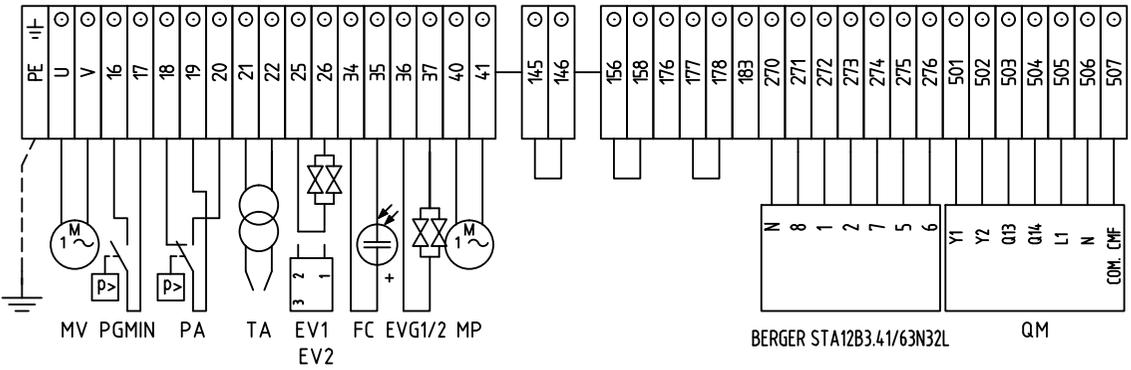
(xx)
ATTENZIONE COLLEGAMENTO SONDE CON CONNETTORE 7 POLI
WARNING PROBE CONNECTION WITH 7 PINS CONNECTOR
ВНИМАНИЕ! ПОДСОЕДИНЕНИЕ ДАТЧИКОВ С 7-МИ ПОЛЮСНЫМИ ШТЕКЕРАМИ

Data	11/04/2000	PREC.	FOGLIO
Revisione	05	3	4
Dis. N.	04 - 626	SEGUE	TOTALE
		5	7

QUADRO QG - MORSETTIERA MA
MORSETTIERA ALIMENTAZIONE
SUPPLY TERMINAL BOARD
КЛЕММНИК ПИТАНИЯ



QUADRO QG - MORSETTIERA MC
MORSETTIERA COMPONENTI BRUCIATORE
BURNER COMPONENT TERMINAL BOARD
КЛЕММНИК КОМПОНЕНТОВ ГОРЕЛКИ



(OPTIONAL)
(ОПЦИЯ)

SERVOCOMANDO SERRANDA ARIA
AIR DAMPER ACTUATOR
BERGER STA12B3.41/63N32L

ST2 ALTA FIAMMA
HIGH FLAME
ST0 SOSTA
STAND-BY
ST1 BASSA FIAMMA
LOW FLAME

SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)
AIR DAMPER ACTUATOR (ALTERNATIVE)
SIEMENS SQN72.4A4A20

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

SERVOCOMANDO SERRANDA ARIA
СЕРВОПРИВОД ВОЗДУШНОЙ ЗАСЛОНКИ
BERGER STA12B3.41/63N32L

ST2 ALTA FIAMMA
БОЛЬШОЕ ПЛАМЯ
ST0 SOSTA
РЕЖИМ ВЫЖИДАНИЯ
ST1 BASSA FIAMMA
МАЛОЕ ПЛАМЯ

SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)
СЕРВОПРИВОД ВОЗДУШНОЙ ЗАСЛОНКИ (АЛЬТЕРНАТИВНЫЙ)
SIEMENS SQN72.4A4A20

I (ROSSO) ALTA FIAMMA
I (КРАСНЫЙ) БОЛЬШОЕ ПЛАМЯ
II (BLU) SOSTA
II (СИНИЙ) РЕЖИМ ВЫЖИДАНИЯ
III (ARANCIO) BASSA FIAMMA
III (ОРАНЖЕВЫЙ) МАЛОЕ ПЛАМЯ

Data	11/04/2000	PREC.	FOGLIO
Revisione	05	4	5
Dis. N.	04 - 626	SEGUE	TOTALE
		6	7

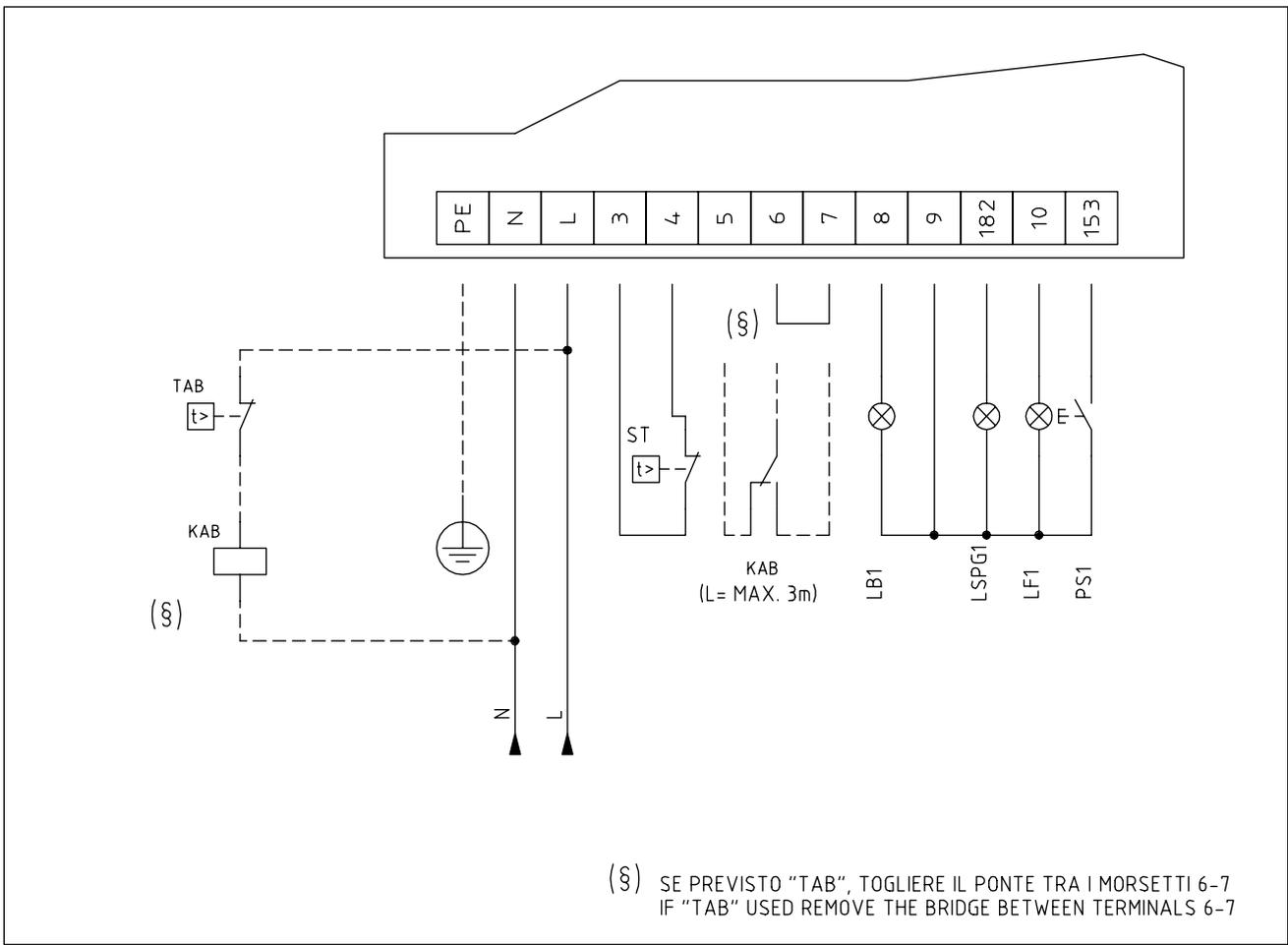
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SIGLA/ITEM	FOGLIO/SHEET	FUNZIONE	FUNCTION
BERGER STA12B3.41/63N32L	3	SERVOCOMANDO SERRANDA ARIA	AIR DAMPER ACTUATOR
CM	1	SELETTORE MANUALE COMBUSTIBILE 1) GAS 0) OFF 2) GASOLIO	COMBUSTIBLE SELECTOR 1)GAS 0)OFF 2)LIGHT OIL
CMF	4	COMMUT. MANUALE FUNZ. 0)FERMO 1)ALTA FIAMMA 2)BASSA FIAMMA 3)AUTOMATICO	MANUAL SWITCH 0)OFF 1)HIGH FLAME 2)LOW FLAME 3)AUTOMATIC
EV1	2	ELETTROVALVOLA GAS LATO RETE (O GRUPPO VALVOLE)	UPSTREAM GAS SOLENOID VALVE (OR VALVES GROUP)
EV2	2	ELETTROVALVOLA GAS LATO BRUCIATORE (O GRUPPO VALVOLE)	DOWNSTREAM GAS SOLENOID VALVE (OR VALVES GROUP)
EVG1/2	2	ELETTROVALVOLE GASOLIO	ДИЗЕЛЬНЫЕ ЭЛЕКТРОКЛАПАНЫ
FC	2	SONDA UV RILEVAZIONE FIAMMA	UV FLAME DETECTOR
FU	4	FUSIBILE	FUSE
FU1.0	1	FUSIBILE DI LINEA	LINE FUSE
FU1.1	1	FUSIBILE LINEA AUSILIARI	AUXILIARY LINE FUSE
IG	1	INTERRUTTORE GENERALE	MAINS SWITCH
KA1.3	1	RELE' AUSILIARIO	AUXILIARY RELAY
KA2.8	2	RELE' AUSILIARIO	AUXILIARY RELAY
LAF	3	LAMPADA SEGNALAZIONE ALTA FIAMMA BRUCIATORE	BURNER IN HIGH FLAME INDICATOR LIGHT
LB	1	LAMPADA SEGNALAZIONE BLOCCO BRUCIATORE	INDICATOR LIGHT FOR BURNER LOCK-OUT
LBF	2	LAMPADA SEGNALAZIONE BASSA FIAMMA BRUCIATORE	BURNER IN LOW FLAME INDICATOR LIGHT
LEV1	2	LAMPADA SEGNALAZIONE APERTURA [EV1]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV1]
LEV2	2	LAMPADA SEGNALAZIONE APERTURA [EV2]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV2]
LEV3	2	LAMPADA SEGNALAZIONE APERTURA [EVG]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EVG]
LPGMIN	1	LAMPADA SEGNALAZIONE PRESENZA GAS IN RETE	INDICATOR LIGHT FOR PRESENCE OF GAS IN THE NETWORK
LSPG	1	LAMPADA SEGNALAZIONE BLOCCO CONTROLLO TENUTA VALVOLE	INDICATOR LIGHT FOR LEAKAGE OF VALVES
LTA	3	LAMPADA SEGNALAZIONE TRASFORMATORE DI ACCENSIONE	IGNITION TRANSFORMER INDICATOR LIGHT
MP	3	MOTORE POMPA GASOLIO	LIGHT OIL PUMP MOTOR
MV	3	MOTORE VENTILATORE	FAN MOTOR
PA	1	PRESSOSTATO ARIA	AIR PRESSURE SWITCH
PGMAX	2	PRESSOSTATO GAS DI MASSIMA PRESSIONE (OPTIONAL)	MAXIMUM PRESSURE GAS SWITCH (OPTIONAL)
PGMIN	1	PRESSOSTATO GAS DI MINIMA PRESSIONE	MINIMUM GAS PRESSURE SWITCH
POMAX	2	PRESSOSTATO DI MASSIMA PRESSIONE OLIO (OPTIONAL)	MAXIMUM OIL PRESSURE SWITCH (OPTIONAL)
PS	1	PULSANTE SBLOCCO FIAMMA	LOCK-OUT RESET BUTTON
PT100	4	SONDA DI TEMPERATURA	TEMPERATURE PROBE
QM	4	QUADRO MODULAZIONE	MODULATION BOX
SD-PRESS	4	SONDA DI PRESSIONE	PRESSURE PROBE
SD-TEMP.	4	SONDA DI TEMPERATURA	TEMPERATURE PROBE
SD - 0÷10V	4	TRASDUTTORE USCITA IN CORRENTE	TRANSDUCER CURRENT OUTPUT
SD - 4÷20mA	4	TRASDUTTORE USCITA IN CORRENTE	TRANSDUCER CURRENT OUTPUT
SIEMENS AGQ3.1A27	2	ADATTATORE PER SONDA UV RILEVAZIONE FIAMMA	ADAPTER FOR UV FLAME DETECTOR
SIEMENS LME22.331	1	APPARECCHIATURA CONTROLLO FIAMMA	CONTROL BOX
SIEMENS RWF40.0x0	4	REGOLATORE MODULANTE	BURNER MODULATOR
SIEMENS SQN72.4A4A20	3	SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)	AIR DAMPER ACTUATOR
ST	1	SERIE TERMOSTATI/PRESSOSTATI	SERIES OF THERMOSTATS OR PRESSURE SWITCHES
TA	3	TRASFORMATORE DI ACCENSIONE	IGNITION TRANSFORMER
TC	4	TERMOCOPPIA	THERMOCOUPLE
VPS50x	1	CONTROLLO DI TENUTA VALVOLE GAS (OPTIONAL)	GAS PROVING SYSTEM (OPTIONAL)

Data	11/04/2000	PREC.	FOGLIO
Revisione	05	5	6
Dis. N.	04 - 626	SEGUE	TOTALE
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0	1	2	3	4	5	6	7	8	9	
SIGLA/ITEM	FOGLIO/SHEET	FUNZIONE			FUNCTION					
BERGER STA12B3.41/63N32L	3	SERVOCOMANDO SERRANDA ARIA			СЕРВОПРИВОД ВОЗДУШНОЙ ЗАСЛОНКИ					
CM	1	SELETTORE MANUALE COMBUSTIBILE 1) GAS 0) OFF 2) GASOLIO			РУЧНОЙ ПЕРЕКЛЮЧАТЕЛЬ ТОПЛИВА 1)ГАЗ 0)ВЫКЛ 2)ДИЗТОПЛИВО					
CMF	4	COMMUT. MANUALE FUNZ. 0)FERMO 1)ALTA FIAMMA 2)BASSA FIAMMA 3)AUTOMATICO			РУЧНОЙ ПЕРЕКЛЮЧАТЕЛЬ РАБОТЫ 0)НЕ РАБ. 1)БОЛЬШОЕ ПЛАМЯ 2)МАЛОЕ ПЛАМЯ 3)АВТОМАТ					
EV1	2	ELETTROVALVOLA GAS LATO RETE (O GRUPPO VALVOLE)			ГАЗОВЫЙ ЭЛЕКТРОКЛАПАН СО СТОРОНЫ СЕТИ (ИЛИ ГРУППЫ КЛАПАНОВ)					
EV2	2	ELETTROVALVOLA GAS LATO BRUCIATORE (O GRUPPO VALVOLE)			ГАЗОВЫЙ ЭЛЕКТРОКЛАПАН СО СТОРОНЫ ГОРЕЛКИ (ИЛИ ГРУППЫ КЛАПАНОВ)					
EVG1/2	2	ELETTROVALVOLE GASOLIO			ДИЗЕЛЬНЫЕ ЭЛЕКТРОКЛАПАНЫ					
FC	2	SONDA UV RILEVAZIONE FIAMMA			УФ ДАТЧИК КОНТРОЛЯ ПЛАМЕНИ					
FU	4	FUSIBILE			ПРЕДОХРАНИТЕЛЬ					
FU1.0	1	FUSIBILE DI LINEA			ПЛАВКИЙ ПРЕДОХРАНИТЕЛЬ ЛИНИИ					
FU1.1	1	FUSIBILE LINEA AUSILIARI			ПЛАВКИЙ ПРЕДОХРАНИТЕЛЬ ЛИНИИ ВСПОМОГАТЕЛЬНОГО ОБОРУДОВАНИЯ					
IG	1	INTERRUTTORE GENERALE			ОБЩИЙ ВЫКЛЮЧАТЕЛЬ					
KA1.3	1	RELE' AUSILIARIO			ВСПОМОГАТЕЛЬНОЕ РЕЛЕ					
KA2.8	2	RELE' AUSILIARIO			ВСПОМОГАТЕЛЬНОЕ РЕЛЕ					
LAF	3	LAMPADA SEGNALAZIONE ALTA FIAMMA BRUCIATORE			СИГНАЛЬНАЯ ЛАМПОЧКА БОЛЬШОГО ПЛАМЕНИ ГОРЕЛКИ					
LB	1	LAMPADA SEGNALAZIONE BLOCCO BRUCIATORE			СИГНАЛЬНАЯ ЛАМПОЧКА БЛОКИРОВКИ ГОРЕЛКИ					
LBF	2	LAMPADA SEGNALAZIONE BASSA FIAMMA BRUCIATORE			СИГНАЛЬНАЯ ЛАМПОЧКА МАЛОГО ПЛАМЕНИ ГОРЕЛКИ					
LEV1	2	LAMPADA SEGNALAZIONE APERTURA [EV1]			СИГНАЛЬНАЯ ЛАМПОЧКА ОТКРЫТИЯ [EV1]					
LEV2	2	LAMPADA SEGNALAZIONE APERTURA [EV2]			СИГНАЛЬНАЯ ЛАМПОЧКА ОТКРЫТИЯ [EV2]					
LEVG	2	LAMPADA SEGNALAZIONE APERTURA [EVG]			СИГНАЛЬНАЯ ЛАМПОЧКА ОТКРЫТИЯ [EVG]					
LPGMIN	1	LAMPADA SEGNALAZIONE PRESENZA GAS IN RETE			СИГНАЛЬНАЯ ЛАМПОЧКА НАЛИЧИЯ ГАЗА В СЕТИ					
LSPG	1	LAMPADA SEGNALAZIONE BLOCCO CONTROLLO TENUTA VALVOLE			СИГНАЛЬНАЯ ЛАМПОЧКА БЛОКИРОВКИ БЛОКА КОНТРОЛЯ ГЕРМЕТИЧНОСТИ КЛАПАНОВ					
LTA	3	LAMPADA SEGNALAZIONE TRASFORMATORE DI ACCENSIONE			СИГНАЛЬНАЯ ЛАМПОЧКА ЗАПАЛЬНОГО ТРАНСФОРМАТОРА					
MP	3	MOTORE POMPA GASOLIO			ДВИГАТЕЛЬ ДИЗЕЛЬНОГО НАСОСА					
MV	3	MOTORE VENTILATORE			ДВИГАТЕЛЬ ВЕНТИЛЯТОРА					
PA	1	PRESSOSTATO ARIA			РЕЛЕ ДАВЛЕНИЯ ВОЗДУХА					
PGMAX	2	PRESSOSTATO GAS DI MASSIMA PRESSIONE (OPTIONAL)			РЕЛЕ МАКСИМАЛЬНОГО ДАВЛЕНИЯ ГАЗА (ОПЦИЯ)					
PGMIN	1	PRESSOSTATO GAS DI MINIMA PRESSIONE			РЕЛЕ МИНИМАЛЬНОГО ДАВЛЕНИЯ ГАЗА					
POMAX	2	PRESSOSTATO DI MASSIMA PRESSIONE OLIO (OPTIONAL)			РЕЛЕ МАКСИМАЛЬНОГО ДАВЛЕНИЯ ЖИДКОГО ТОПЛИВА (ОПЦИЯ)					
PS	1	PULSANTE SBLOCCO FIAMMA			КНОПКА СБРОСА БЛОКИРОВКИ ПЛАМЕНИ					
PT100	4	SONDA DI TEMPERATURA			ТЕМПЕРАТУРНЫЙ ДАТЧИК					
QM	4	QUADRO MODULAZIONE			КОРОВКА МОДУЛЯЦИИ					
SD-PRESS	4	SONDA DI PRESSIONE			ДАТЧИК ДАВЛЕНИЯ					
SD-TEMP.	4	SONDA DI TEMPERATURA			ТЕМПЕРАТУРНЫЙ ДАТЧИК					
SD - 0÷10V	4	TRASDUTTORE USCITA IN CORRENTE			ПРЕОБРАЗОВАТЕЛЬ С ТОКОВЫМ ВЫХОДОМ					
SD - 4÷20mA	4	TRASDUTTORE USCITA IN CORRENTE			ПРЕОБРАЗОВАТЕЛЬ С ТОКОВЫМ ВЫХОДОМ					
SIEMENS AGQ3.1A27	2	ADATTATORE PER SONDA UV RILEVAZIONE FIAMMA			АДАПТЕР ДЛЯ УФ ДАТЧИКА КОНТРОЛЯ ПЛАМЕНИ					
SIEMENS LME22.331	1	APPARECCHIATURA CONTROLLO FIAMMA			ЭЛЕКТРОННЫЙ БЛОК КОНТРОЛЯ ПЛАМЕНИ					
SIEMENS RWF40.0x0	4	REGOLATORE MODULANTE			МОДУЛИРУЮЩИЙ РЕГУЛЯТОР					
SIEMENS SQN72.4A4A20	3	SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)			СЕРВОПРИВОД ВОЗДУШНОЙ ЗАСЛОНКИ (АЛЬТЕРНАТИВНЫЙ)					
ST	1	SERIE TERMOSTATI/PRESSOSTATI			РЯД ТЕРМОСТАТОВ/РЕЛЕ ДАВЛЕНИЯ					
TA	3	TRASFORMATORE DI ACCENSIONE			ЗАПАЛЬНЫЙ ТРАНСФОРМАТОР					
TC	4	TERMOCOPPIA			ТЕРМОПАРА					
VPS50x	1	CONTROLLO DI TENUTA VALVOLE GAS (OPTIONAL)			БЛОК КОНТРОЛЯ ГЕРМЕТИЧНОСТИ ГАЗОВЫХ КЛАПАНОВ (ОПЦИЯ)					
							Data	11/04/2000	PREC.	FOGLIO
							Revisione	05	6	7
							Dis. N.	04 - 626	SEGUE	TOTALE
								/		7

VERSIONE ALTA-BASSA FIAMMA / PROGRESSIVO "PR" CON RELE' "KAB" DI SEZIONAMENTO
"PR" HIGH-LOW / PROGRESSIVE VERSION WITH "KAB" RELAY OF DISCONNECTED



Data	26/06/2008	PREC. /	FOGLIO 1
Revisione	00		SEGUE 2
Dis. N.	TAB_2		

SIGLA/ITEM	FUNZIONE	FUNCTION
KAB	RELE' AUSILIARIO	AUXILIARY RELAY
LB1	LAMPADA SEGNALAZIONE BLOCCO BRUCIATORE	INDICATOR LIGHT FOR BURNER LOCK-OUT
LF1	LAMPADA SEGNALAZIONE FUNZIONAMENTO BRUCIATORE	INDICATOR LIGHT BURNER OPERATION
LSPG1	LAMPADA SEGNALAZIONE BLOCCO CONTROLLO TENUTA VALVOLE	INDICATOR LIGHT FOR LEAKAGE OF VALVES
PS1	PULSANTE SBLOCCO FIAMMA	LOCK-OUT RESET BUTTON
ST	SERIE TERMOSTATI/PRESSOSTATI	SERIES OF THERMOSTATS OR PRESSURE SWITCHES
TAB	TERMOSTATO/PRESSOSTATO ALTA-BASSA FIAMMA	HIGH-LOW THERMOSTAT/PRESSURE SWITCHES

Data	26/06/2008	PREC.	FOGLIO
Revisione	00	1	2
Dis. N.	TAB_2	SEGUE	TOTALE
		/	1

APPENDIX

SIEMENS LME11/21/22 CONTROL BOX

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

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

Comparative table

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

Preconditions for burner startup

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

Undervoltage

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

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

Controlled intermittent operation

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

Reversed polarity protection with ionization

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

Control sequence in the event of fault

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

Operational status indication

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

	red LED Steady on
	yellow LED	○... Off
	green LED	

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

Status	Color code	Color
Waiting time tw, other waiting states	○.....	Off
Ignition phase, ignition controlled	●○●○●○●○●○●○●○	Flashing yellow
Operation, flame ok	□.....	Green
Operation, flame not ok	□○□○□○□○□○□○	Flashing green
Extraneous light on burner startup	□▲□▲□▲□▲□▲□▲	Green - red

Status	Color code	Color
Undervoltage	●▲●▲●▲●▲●▲●▲	Yellow - red
Fault, alarm	▲.....	Red
Error code output (refer to "Error code table")	▲○ ▲○ ▲○ ▲○	Flashing red

START-UP PROGRAM

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

A Start command (switching on)

This command is triggered by control thermostat / pressure controller «R». Terminal 12 receives voltage and the programming mechanism starts running. On completion of waiting time «tw» with the LME21..., or after air damper «SA» has reached the nominal load position (on completion of «t11») with the LME22..., fan motor «M» will be started.

tw Waiting time

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

t11 Programmed opening time for actuator «SA»

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

t10 Specified time for air pressure signal

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

t1 Prepurge time

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

t12 Programmed closing time for actuator «SA»

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

t3 Preignition time

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

TSA Ignition safety time

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

t4 Interval BV1 and BV2-LR

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

B - B' Interval for flame establishment

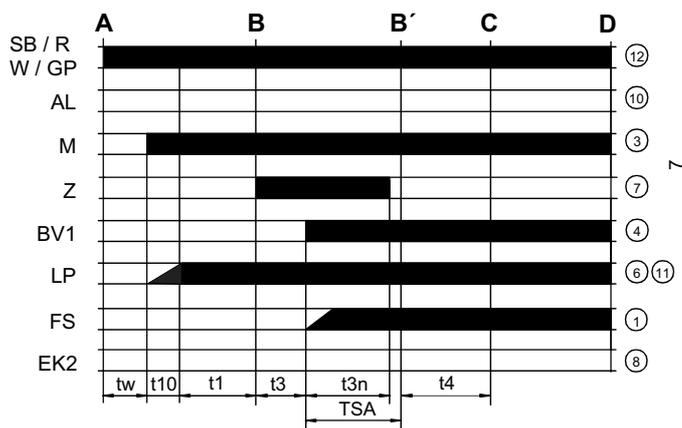
C Burner operation position

C - D Burner operation (heat production)

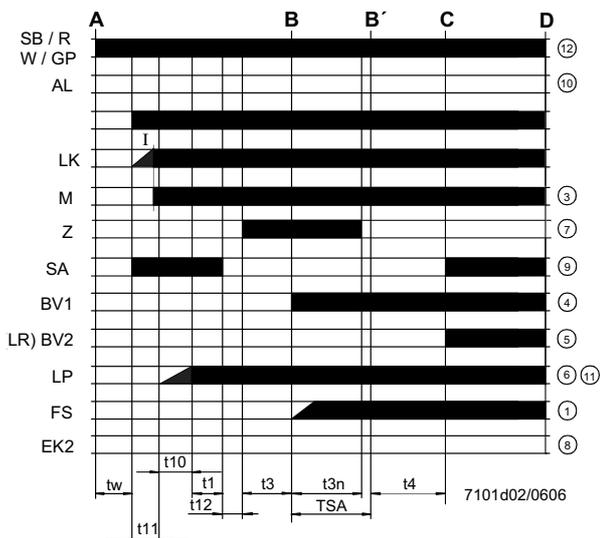
D Controlled by "R" shutdown

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

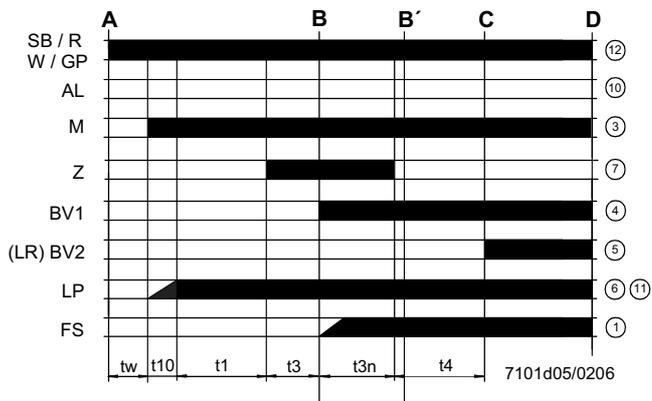
LME11 control sequence



LME22 control sequence



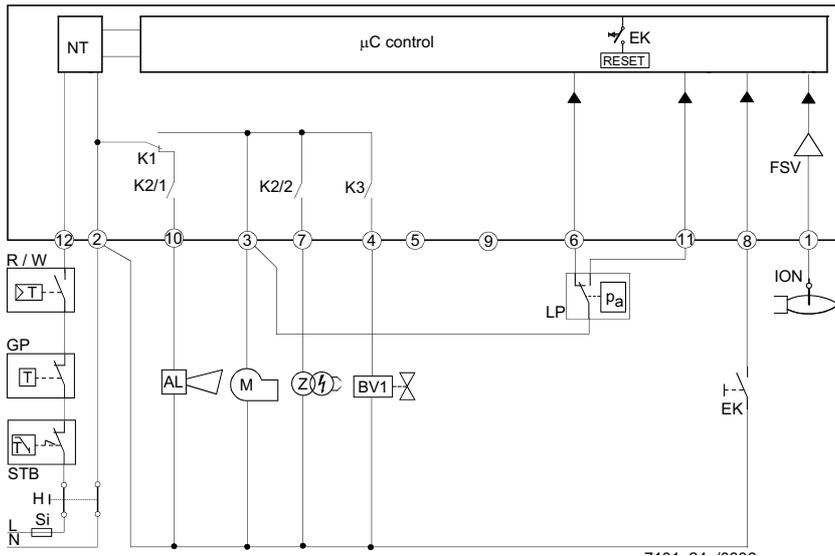
LME21 control sequence



Control sequence

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

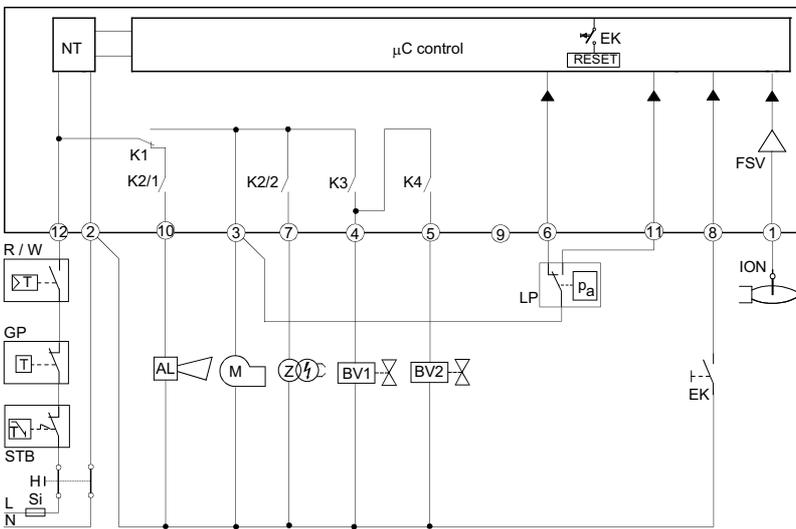
LME11 connection diagram



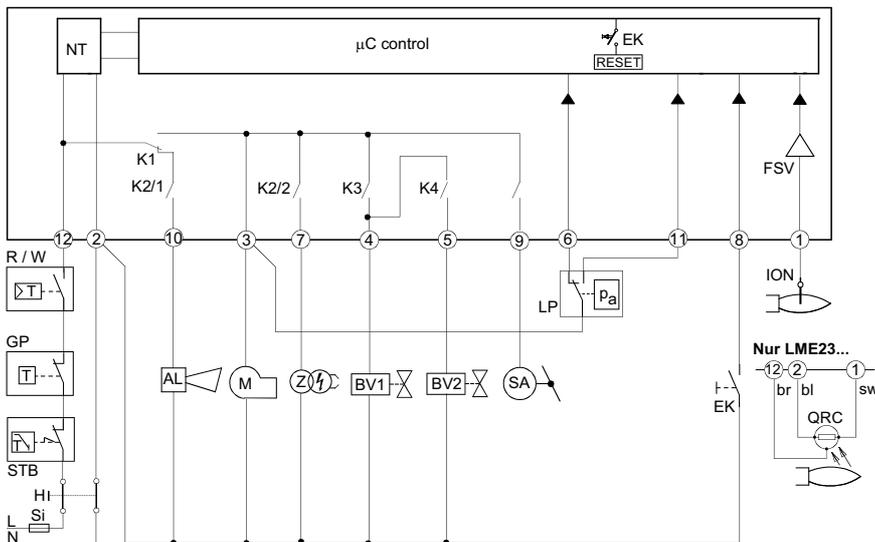
Connection diagram

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

LME21 connection diagram



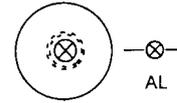
LME22 connection diagram



CONTROL PROGRAM IN THE EVENT OF FAULT

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

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



DIAGNOSTICS OF THE CASE OF FAULT

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

During diagnostics, the control outputs are deactivated:

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

CONTROL BOX LOCKED

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

RESETTING THE BURNER CONTROL

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

LIMITATION OF REPETITIONS (only for LME11.. model)

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

TECHNICAL CHARACTERISTICS

Mains voltage	120V AC +10% / -15% 230V AC +10% / -15%
Frequency	50 ... 60 Hz +/- 6%
Power consumption	12VA
External primary fuse	max. 10 A (slow)
input current at terminal 12	max. 5 A
Thermostats cable length	max. 3 m
Index of protection	IP40 (to be ensured during mounting)
Operating conditions	-20... +60 °C, < 95% UR
Storage conditions	-20... +60 °C, < 95% UR
Weight	approx. 160 g

SIEMENS LGB 21/22.. CONTROL BOX

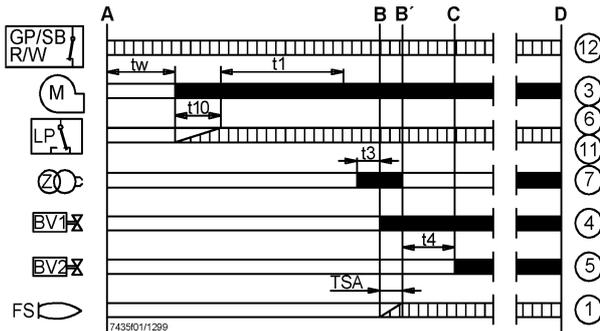
Function

The programme run is shown in the diagrams. The required and permissible input signals for the control part and flame supervision part are pictured as a hatching correspondingly in the function diagrams. If these input signals are missing, the controller interrupts the start-up programme and initiates a lock-out at the place where the safety regulations demand it.

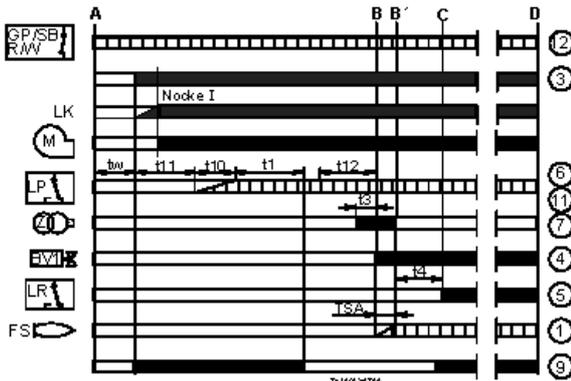
The LGB types are fitted with under voltage protection, i.e. the load relay AR is de-energized when the supply voltage falls below 160 V. The burner control automatically attempts a new start-up when the supply voltage again exceeds 160 V

- A Start-up command from the temperature or pressure controller "R"
- A-C Start-up programme
- C-D Burner operation (heat production corresponding to the control commands)
- D Controlled shut-down by "R"

LGB21



LGB22



Key for operation diagram

- A - C Startup sequence
- tw Waiting time, 8s for LGB21, 9s for LGB22
- t1 Prepurge time 30s
- TSA Ignition safety time 3s
- t3 Preignition time, 2s for LGB21, 3s for LGB22
- t4 Interval «BV1-BV2» or «BV1-LR», 8s
- t10 Specified time for air pressure signal, 5s for LGB21, 3s for LGB22
- t11 Programmed opening time for actuator «SA», max. 12s
- t12 Programmed closing time for actuator «SA», max. 11s
- BV Fuel valves
- FS Flame presence signal
- GP Gas pressure switch
- LP Air pressure switch
- LR Load controller
- M Fan motor
- R Temperature or pressure controller
- W Safety thermostat or pressure switch
- Z Ignition transformer
- 1...12 Terminals of the burner flame controls on AGK11's socket
- Command signal from flame control
- ▨ Input signals

Conditions for starting up the burner:

- The burner control must not be locked out.
- The contacts of the gas pressure switch "GP", the temperature or pressure switch "W" and the controller "R", must be closed.

Start-up programme

A Start command (switching on)

This command is triggered by control thermostat / pressure controller «R». Terminal 12 receives voltage and the programming mechanism starts running. On completion of waiting time «tw» with the LGB21..., or after air damper «SA» has reached the nominal load position (on completion of «t11») with the LGB22..., fan motor «M» will be started.

tw Waiting time

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

t11 Programmed opening time for actuator «SA»

(Only with LGB22...) The air damper opens until the nominal load position is reached. Only then will fan motor «M» be switched on.

t10 Specified time for air pressure signal

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

t1 Prepurge time

Purging the combustion chamber and the secondary heating surfaces: required with low-fire air volumes when using the LGB21... and with nominal load air volumes when using the LGB22.... The diagrams show the so-called prepurge time «t1» during which air pressure monitor «LP» must indicate that the required air pressure is available. The effective prepurge time «t1» comprises interval end «tw» through «t3».

t12 Programmed closing time for actuator «SA»

(Only with LGB22...) During «t12», the air damper travels to the low-fire position.

t3 Preignition time

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

TSA Ignition safety time

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

t4 Interval

LGB21...: time to the release of the second fuel valve «BV2»

LGB22...: on completion of «t4», the heat source is controlled depending on the load (release of load controller «LR»)

B - B' Interval for flame establishment

C Burner operation position

C - D Burner operation (heat production)

Operation of the burner at the maximum strength or, with a flame controller for the load.

D Controlled by "R" shutdown

The burner stops, waiting for the next ignition.

Command program in the event of a defect

In the event of a defect the inflow of fuel is interrupted. When the block occurs in the preventilation time (not indicated by the symbol) the causes may be the air pressostat LP or a premature signal of flame presence.

- With voltage failure: repetition of the start-up with complete programme
- Premature presence of flame at the start of preventilation time: safety stop (block)
- Contact of air pressostat LP stuck during time t_w : start-up cannot take place.
- Air pressure failure after t_{10} : safety stop after safety time TSA
- Absence of confirmation of air pressure: safety stop(block) after t_{10}
- Failure to start up the burner: safety stop after safety time TSA
- Absence of flame during functioning: immediate safety stop.
- Checking the ignition spark with QRE: with absence of spark there is no consent to the fuel, safety stop (block) after time t_2 .

Unblocking the appliance

Unblocking of the appliance can be effected immediately after the safety stop without causing modification of the programme.

Indicator of the command programme of the defective item

On the front part of the safety appliance is located a plexiglass lunette under which there is the indicator disc of programme's progress.

In the event of safety stop, the programmer stops. The disc shows, as follows, the position of the programme at which the interruption occurred:

- ▶ no start-up, the command ring is open
- |||| interval t_w or t_{10} on LGB21; t_w or t_{11} on LGB22
- ▲ air damper open (LGB22)
- P safety stop (block) through absence of the air pressure signal (LGB21) or because (LGB22) the air damper is not open
- interval t_1 , t_3 (t_{12})
- ▼ fuel consent (LGB22)
- 1 safety stop (block) through absence of the flame signal at the end of the 1st safety time
- 2 consent of the 2nd fuel valve (LGB 21) or consent at the power regulator (LGB22)
- oooo functioning of the burner at partial or maximum power (or return to the service position)

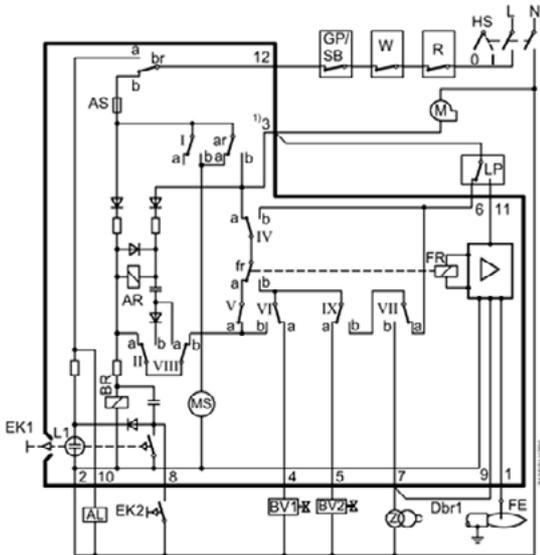
Specifications

Supply voltage	220 V AC -15%...240 VAC +10%
Frequency	50 Hz -6%...60 Hz +6%
Consumption	3 VA
Flow rate of the contacts at terminals	
- terminal 3	max. 3 A (15 A max. for 0.5s)
- terminals 4, 5, 7	max. 2 A
- terminal 10	max. 1 A
- terminal 12 (for U_{max} 264 V)	max. 5 A*
Fuse max.	10 A, with slow blow-out
Radio disturbance	N - VDE0875
Protection	IP40
Permissible ambient temperature	
- operating	-20...+ 60°C
- transport and storage	-40...+ 70°C
Mounting pos. permitted	any
Mass (weight) without/with basec.	230/310 g
Mass (weight) AGK66	c. 12 kg
*) At permissible voltage and that is 187...264 V	

Key - internal diagram

- AL Block signal
- AR Main relay with "ar" contacts
- BR Block relay with "br" contacts
- BV Fuel valve
- Dbr1 U bolt
- EK Unblocking button
- FE Detection electrode
- FR Flame relay with "fr" contacts
- GP Gas pressostat
- HS Main selector
- L Phase conductor
- L1 Block light (blinking)
- LP Air pressostat
- M Fan motor
- MS Synchronous motor
- N Neutral conductor
- R Thermostat or pressostat
- W Safety thermostat or pressostat
- Z Ignition transformer

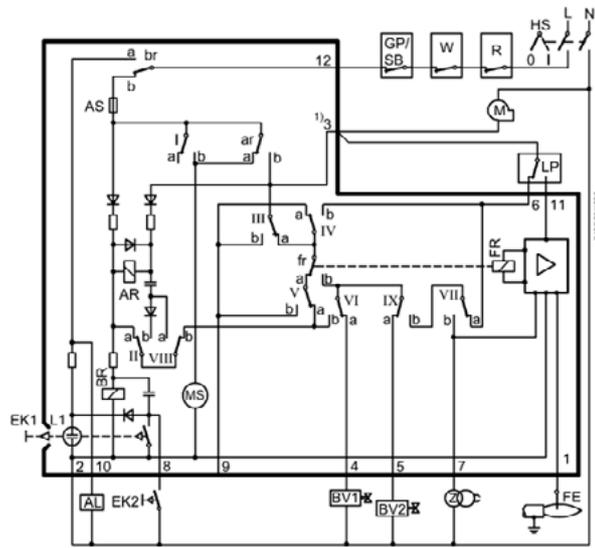
LGB21



Key - programmer's diagram

- A start-up (command from regulator "R")
- B burner operation
- C program start position (start up)
- tw waiting time
- t1 prevention time
- TSA safety time
- t3 pre-ignition time
- t4 interval of time BV1-BV2 or BV1-LR
- t10 waiting time for confirmation of air pressure
- t11 air damper movement time to open position
- t12 air damper movement time to close position
- t20 travel time for auto-return of the programmer
- T programmer's total time
- I.IX contacts of programmer's cams

LGB22







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