TP1030
TP1050
TP1080

Gas burners

MANUAL OF INSTALLATION - USE - MAINTENANCE

CIB UNIGAS

BURNERS - BRUCIATORI - BRULERS - BRENNER - QUEMADORES - ГОРЕЛКИ

M039168CC Rev. 2 05/2008

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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 repeated burner shut-downs, do not continue re-setting the unit manually. Contact qualified personnel to take care of such defects.
- The unit shall be operated and serviced by qualified personnel only, in compliance with the regulations in force.

3) GENERAL INSTRUCTIONS DEPENDING ON FUEL USED

3a) ELECTRICAL CONNECTION

- For safety reasons the unit must be efficiently earthed and installed as required by current safety regulations.
- It is vital that all saftey requirements are met. In case of any doubt, ask for an accurate inspection of electrics by qualified personnel, since the manufacturer cannot be held liable for damages that may be caused by failure to correctly earth the equipment.
- Qualified personnel must inspect the system to make sure that it is adequate to take the maximum power used by the equipment shown on the equipment rating plate. In particular, make sure that the system cable cross section is adequate for the power absorbed by the unit.
- No adaptors, multiple outlet sockets and/or extension cables are permitted to connect the unit to the electric mains.
- An omnipolar switch shall be provided for connection to mains, as required by the current safety regulations.
- The use of any power-operated component implies observance of a few basic rules, for example:

  © do not touch the unit with wet or damp parts of the body and/or with bare feet;

  © do not pull electric cables;

  © do not leave the equipment exposed to weather (rain, sun, etc.) unless expressly required to do so;

  © do not allow children or inexperienced persons to use equipment;

- The unit input cable shall not be replaced by the user.

In case of damage to the cable, switch off the unit and contact qualified personnel to replace.

When the unit is out of use for some time the electric switch supplying all

the power-driven components in the system (i.e. pumps, burner, etc.) should be switched off.

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

GENERAL

- The burner shall be installed by qualified personnel and in compliance with regulations and provisions in force; wrong installation can cause injuries to people and animals, or damage to property, for which the manufacturer cannot be held liable.
- Before installation, it is recommended that all the fuel supply system pipes be carefully cleaned inside, to remove foreign matter that might impair the burner operation.
- Before the burner is commissioned, qualified personnel should inspect the following:

a the fuel supply system, for proper sealing;
b the fuel flow rate, to make sure that it has been set based on the firing rate required of the burner;
c the burner firing system, to make sure that it is supplied for the designed fuel type;
d the fuel supply pressure, to make sure that it is included in the range shown on the rating plate;
e the fuel supply system, to make sure that the system dimensions are adequate to the burner firing rate, and that the system is equipped with all the safety and control devices required by the regulations in force.

- When the burner is to remain idle for some time, the fuel supply tap or taps should be closed.

SPECIAL INSTRUCTIONS FOR USING GAS

Have qualified personnel inspect the installation to ensure that:

a the gas delivery line and train are in compliance with the regulations and provisions in force;
b all gas connections are tight;
c the boiler room ventilation openings are such that they ensure the air supply flow required by the current regulations, and in any case are sufficient for proper combustion.

- Do not use gas pipes to earth electrical equipment.
- Never leave the burner connected when not in use. Always shut the gas valve off.
- In case of prolonged absence of the user, the main gas delivery valve to the burner should be shut off.

Precautions if you can smell gas

a do not operate electric switches, the telephone, or any other item likely to generate sparks;
b immediately open doors and windows to create an air flow to purge the room;
c close the gas valves;
d contact qualified personnel.

- Do not obstruct the ventilation openings of the room where gas appliances are installed, to avoid dangerous conditions such as the development of toxic or explosive mixtures.

DIRECTIVES AND STANDARDS

Gas burners

European directives:

- 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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Gas - Heavy oil burners

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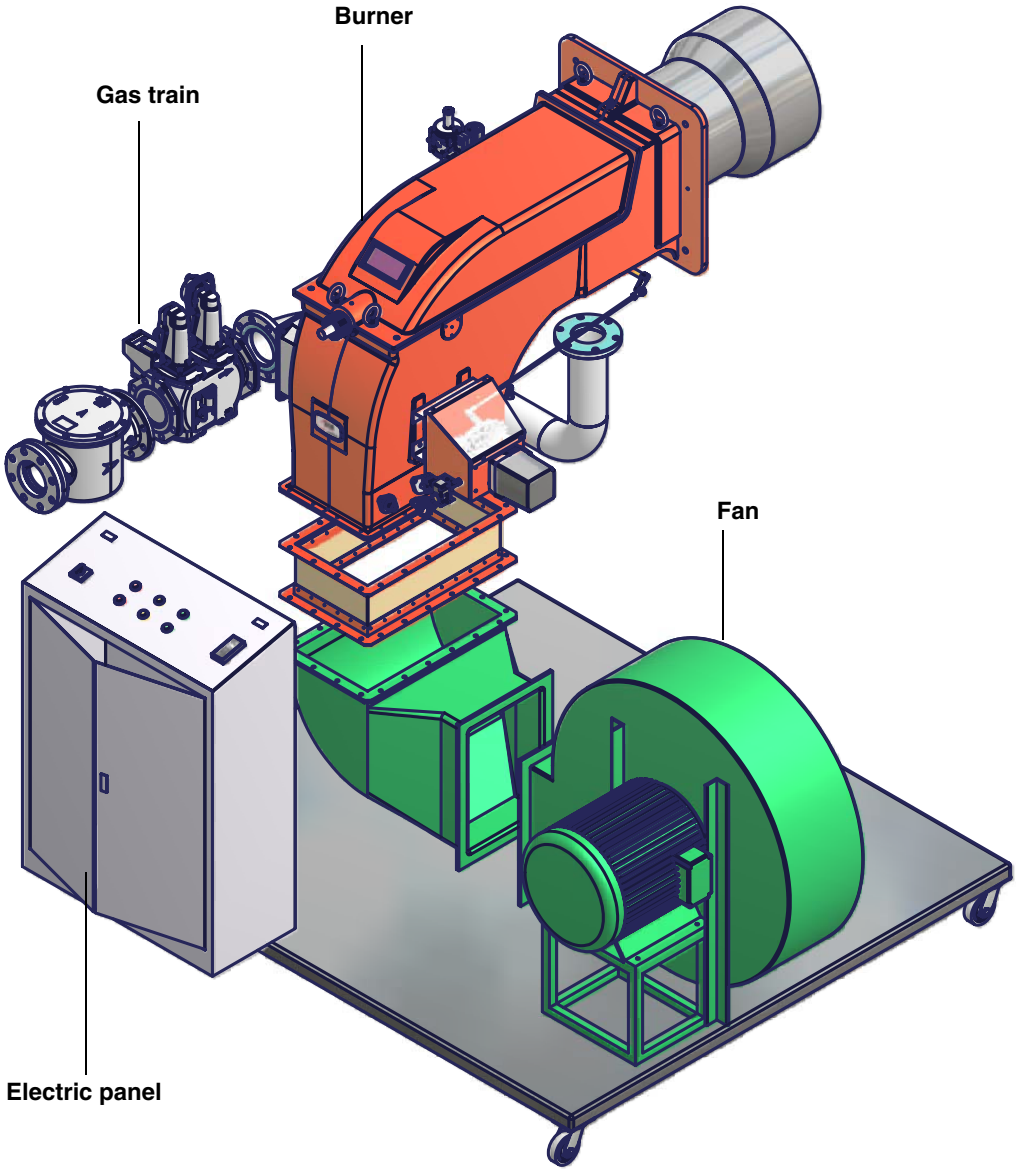
PART I: INSTALLATION

GENERAL FEATURES

This series of industrial burners is designed for all those applications that require big-sized air fans or air-flue heat exchangers to be installed in sound-proof areas to reduce noise. They can be provided with built-in or separate-mounted control panel (console or wall-mounted).



Note: the picture shows one of the possible installations. Fan and electrical panel can be placed according to the customer needs.

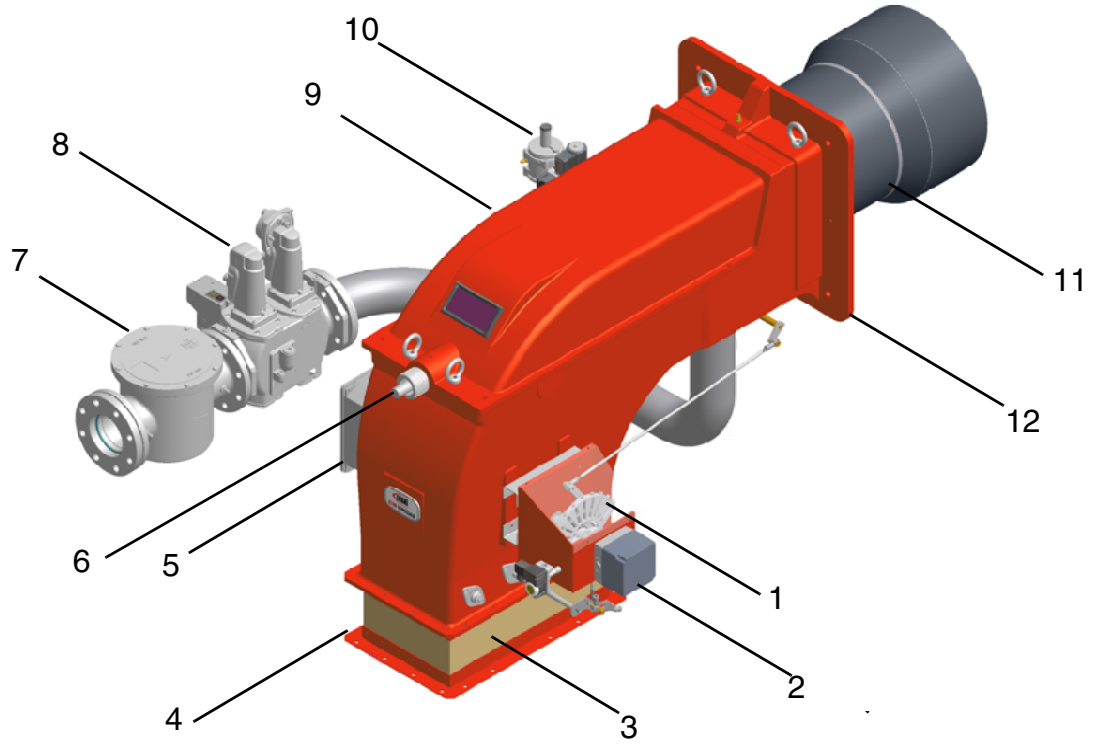


Fig. 1

1 Adjusting cam
2 Actuator
3 Bellows
4 Air inlet flange
5 Junction box
6 Combustion head adjusting screw
7 Gas filter
8 Gas valves group
9 Cover
10 Ignitor gas train
11 Combustion head-blast tube ass.y
12 Burner flange

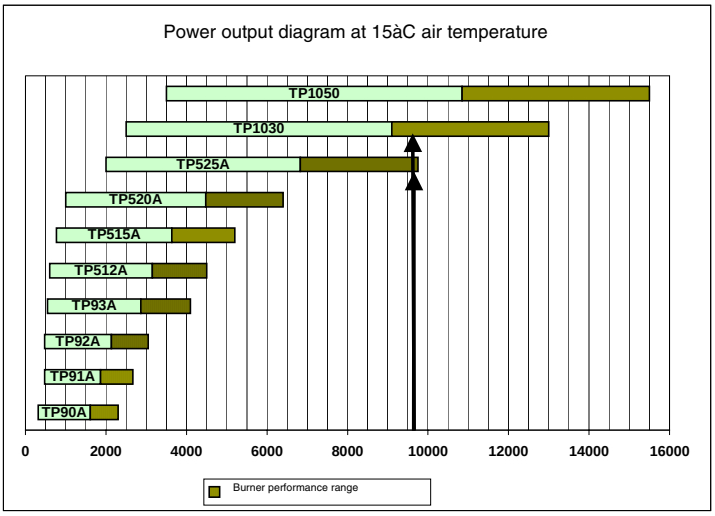
The gas coming from the supply line, passes through the valves group provided with filter and stabiliser. This one forces the pressure in the utilisation limits. The electric actuator (2), that moves proportionally the air damper and the gas butterfly valve, uses an adjusting cam (1) with variable shape. This one allows the optimisation of the gas flue values, as to get an efficient combustion. The combustion head positioning determines the burner's output. The combustion head (11) 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 air (comburent) and fuel (gas) are forced into the combustion chamber.

How to choose the burner

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

- fuel
- furnace input, in kW or kcal/h (kW = kcal/h / 860);
- boiler type;
- combustione head type (reverse flame or three phase)'
- temperature or pressure of the thermal carrier fluid
- Comburent air temperature
- Air duct positioning
- Pressure in the combustion chamber
- Elevation (altitude) of burner installation
- Gas train (only for gas burners)
- Pumping unit (only for light-oil or heavy-oil burners)
- Air fan
- Bilt-in or separated control panel
- backpressure (data are available on the boiler's ID plate or in the user's manual).

Burners provided with built-in control panel are designed for IP40 index of protection. For other values of IP, please contact the manifacturer Technical Dpt.



Data requested:

- furnace input;
- air temperature
- altitude
- generator pressure or temperature

Example:

- furnace input: 9600kW
- air temperature: 15°C
- altitude: 0m

Fig. 2

See the diagram in Fig. 2, as to find the burners that better suite the power range requested in the exmple (9600kW). Once the models are founded out, the choice regards technical and economical features. Technical features can be summarised in a higher modulation ratio (fewer start-ups, less consumption, fewer swigings in the generator temperature and pressure values.

Checking the proper gas train size

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

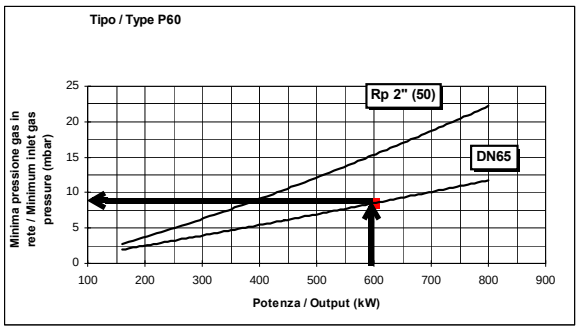


Fig. 3

Burner model identification

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

Type **TP1030** Model **M-. PR. S. *. A. 1. 80** (1) (2) (3) (4) (5) (6) (7) (8)	
(1) BURNER TYPE	**TP1030 - TP1050 - TP1080**
(2) FUEL	M - Natural gas
(3) OPERATION (Available versions)	PR - Progressive MD - Fully modulating
(4) BLAST TUBE	S - Standard L - extended
(5) DESTINATION COUNTRY	* - see data plate
(6) BURNER VERSION	A - Standard
(7) EQUIPMENT	1 = 2 valves + gas proving system 8 = 2 valves + gas proving system + high gas pressure switch
(8) GAS CONNECTION see Specifications	50 = Rp2 65 = DN65 80 = DN80 100 = DN100

Technical specifications

BURNER TYPE		**TP1030**	**TP1050**	**TP1080**
Output	min - max kW	2550-13000	3500-15500	4500-19000
Fuel		Natural gas		
Category		(see next paragraph)		
Gas rate	min.-max. (Stm^3/h)	270-1376	370-1641	476-2010
Power supply		400V 3N~ 50Hz		
Total power consumption	kW	0.5		
Protection		IP40		
Operation		Progressive - Fully modulating		
Pressure		(see Note 2)		
Gas train 80	ØValves/ Connection	80 / DN80		
Gas train 100	ØValves / Connection	100 / DN100		
Weight	kg	250		
Operating temperature	°C	-10 ÷ +50		
Storage Temperature	°C	-20 ÷ +60		
Working service*		Intermittent		

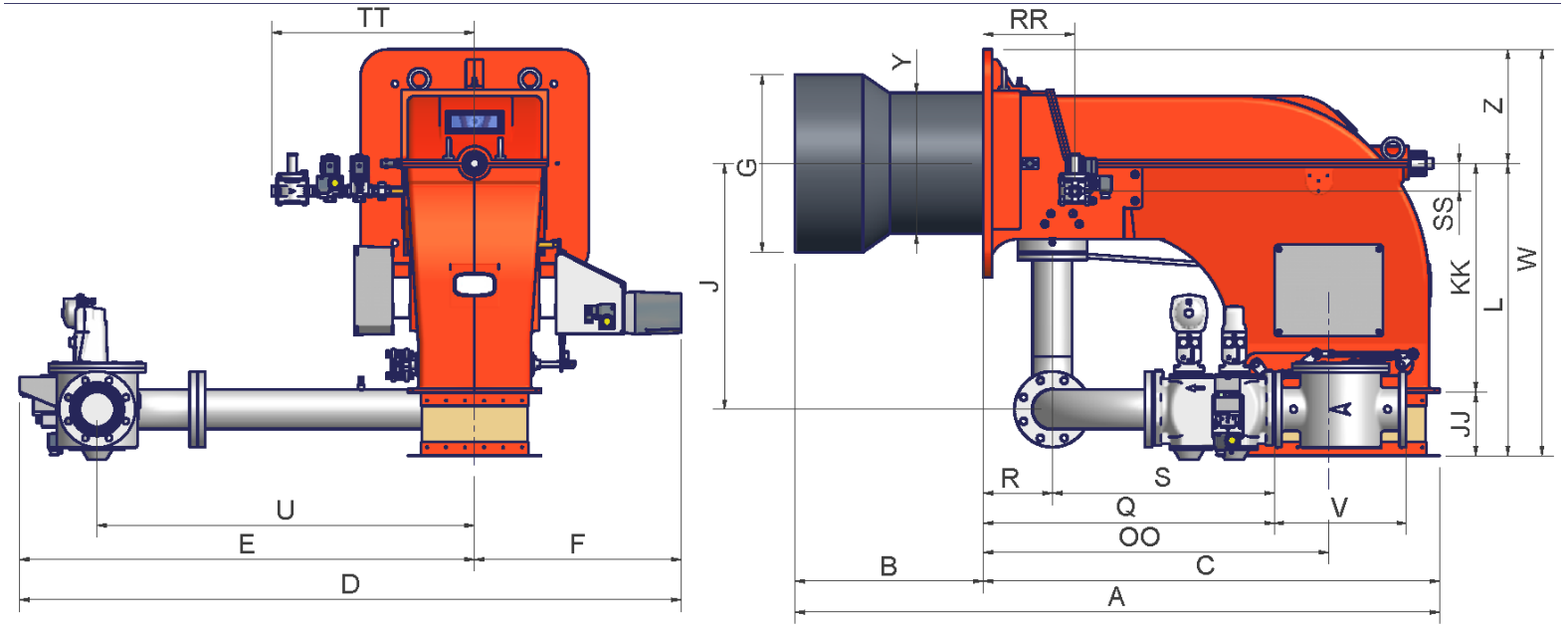
Note1:	**all gas flow rates are referred to Stm^3/h (1013 mbar absolute pressure, 15 °C temperature) and are valid for G20 gas (net calorific value H_i = 34.02 MJ/Stm^3).**
Note2:	**Maximum gas pressure = 500mbar (with Siemens VGD gas valves).** **Minimum gas pressure = see gas curves.**

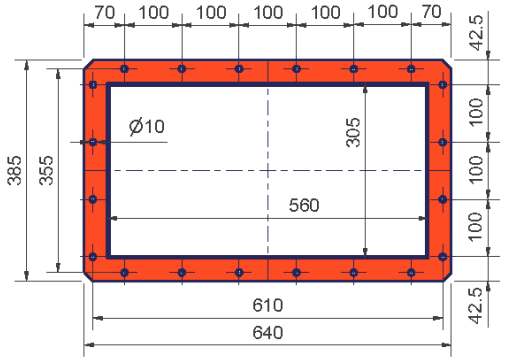
***NOTE ON THE BURNER WORKING SERVICE:** for safety reasons, one controlled shutdown must be performed every 24 hours of continuous operation.

Country and usefulness gas categories

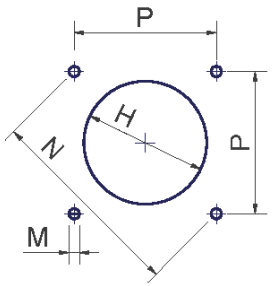
GAS CATEGORY	**COUNTRY**																								
I_{2H}	AT	ES	GR	SE	FI	IE	HU	IS	NO	CZ	DK	GB	IT	PT	CY	EE	LV	SI	MT	SK	BG	LT	RO	TR	CH
I_{2E}	LU	PL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$I_{2E(R)B}$	BE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I_{2L}	NL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-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

Overall dimensions (mm)

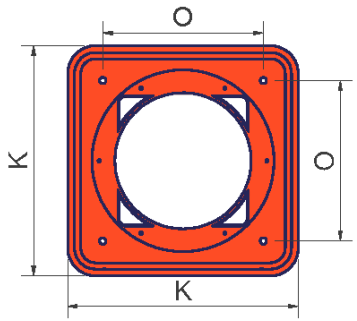




Air inlet flange



Boiler drilling plate

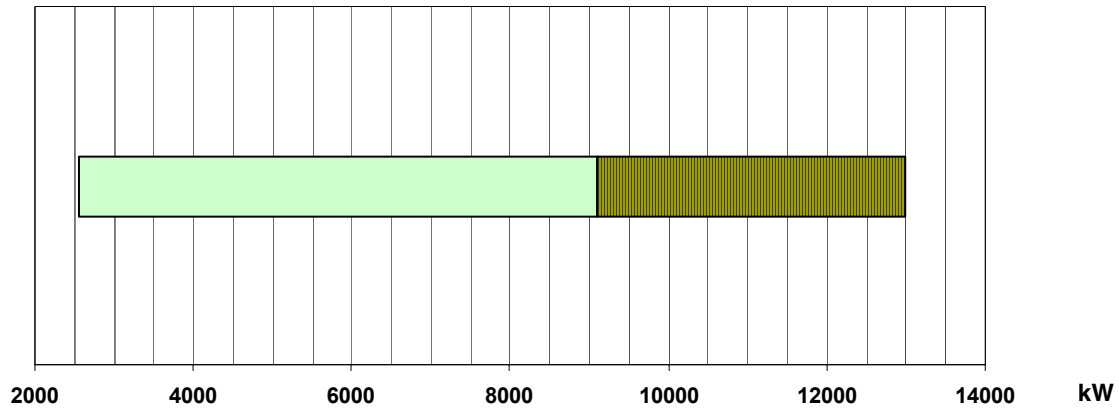


Burner flange

	DN	A	B	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	RR	S	SS	TT	U	V	W	Y	Z
TP1030	80	1864	544	1320	348	1898	1301	597	464	504	710	185	660	660	845	M16	651	460	1000	460	936	200	265	736	80	587	1092	322	1175	372	330
TP1030	100	1864	544	1320	348	1914	1317	597	464	504	710	185	660	660	845	M16	651	460	1000	460	842	200	265	642	80	587	1092	382	1175	372	330
TP1050	80	1864	544	1320	348	1898	1301	597	489	539	710	185	660	660	845	M16	651	460	1000	460	936	200	265	736	80	587	1092	322	1175	408	330
TP1050	100	1864	544	1320	348	1914	1317	597	489	539	710	185	660	660	845	M16	651	460	1000	460	842	200	265	642	80	587	1092	382	1175	408	330
TP1080	100	1864	544	1320	348	1914	1317	597	514	564	710	185	660	660	845	M16	651	460	1000	460	842	200	265	642	80	587	1092	382	1175	408	330
TP1080	125	1864	544	1320	348	1946	1349	597	514	564	710	185	660	660	845	M16	651	460	1000	460	954	200	265	754	80	587	1192	480	1175	408	330

Performance curves

TP1030



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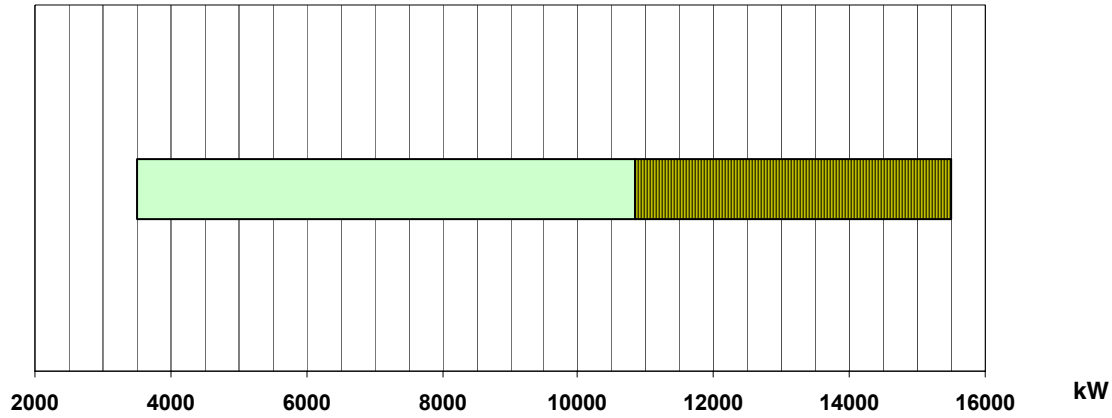

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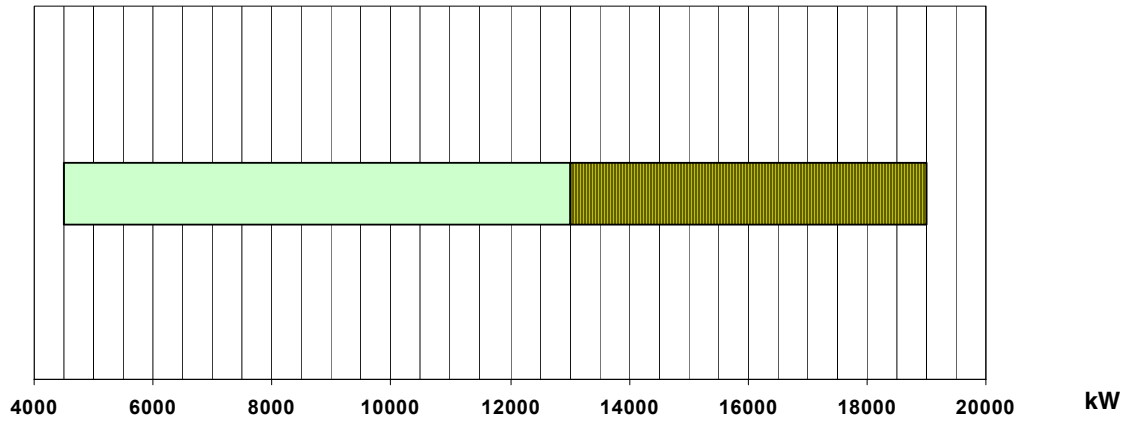
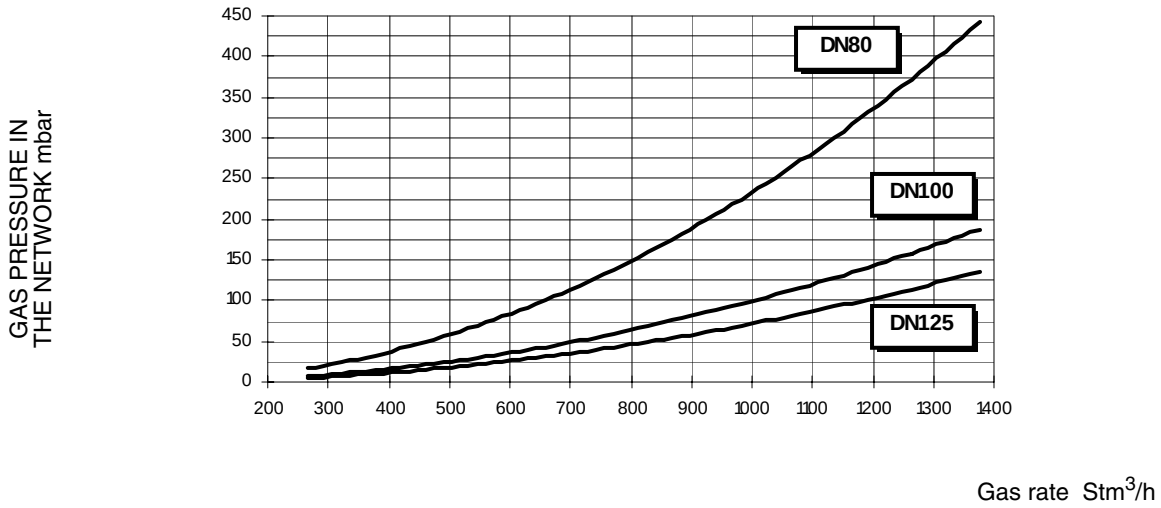


Performance range

To get the input in kcal/h, multiply value in kW by 860.
Data are referred to standard conditions: 1013mbar, 15°C.

Pressure in the network / gas rate curves

TP1030



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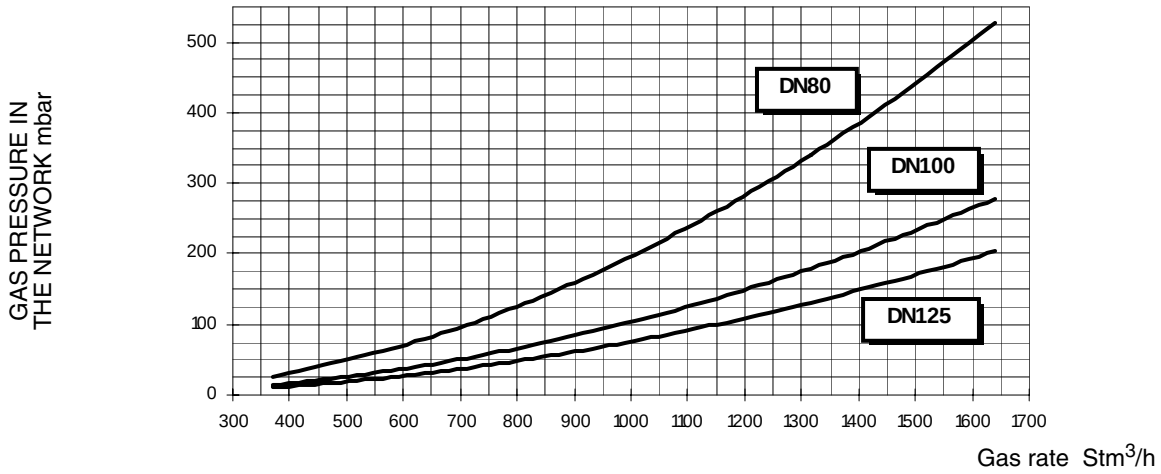

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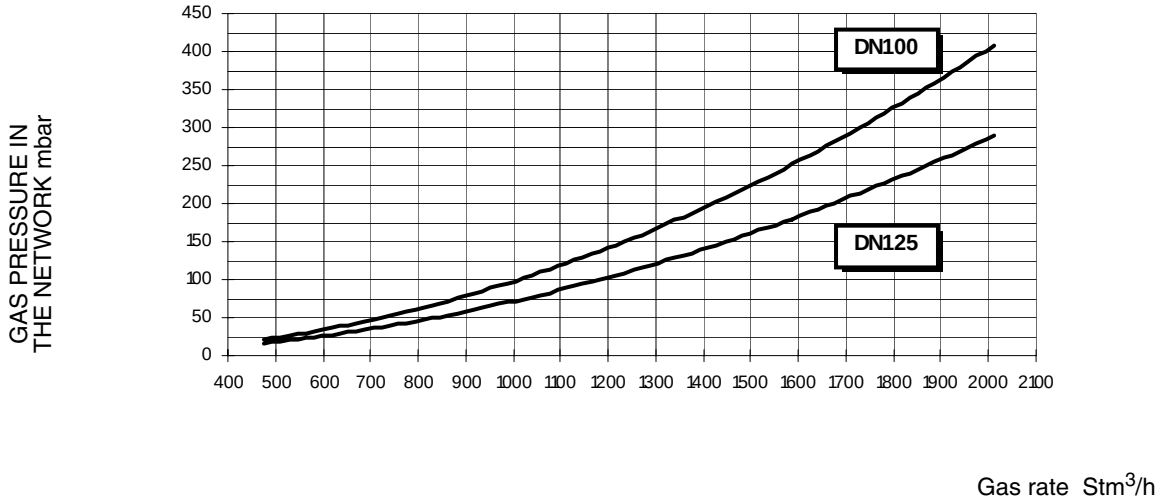
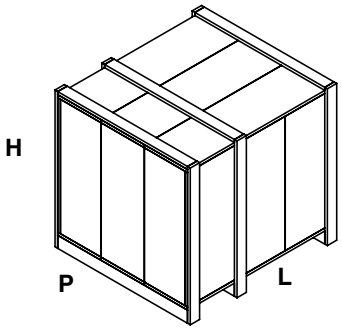


INSTALLATION

Packing



The burners are despatched in wooden crates whose dimensions are:
TP1030 - TP1050: 2180mm x 1580mm x 1210mm (L x P x H)
TP1080: 2180mm x 1580mm x 1560mm (L x P x H)
Packing cases of this type are affected by humidity and are not suitable for stacking.
The following are placed in each packing case:

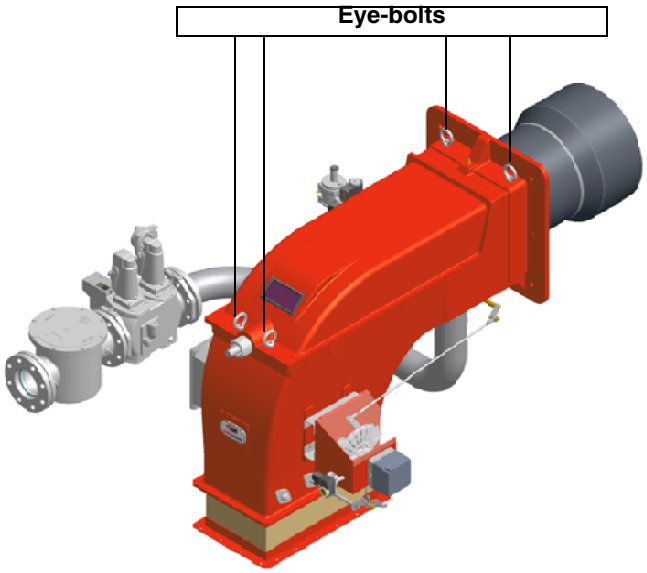
1 burner with gas train detached;
1 gasket to be inserted between the burner and the boiler;
1 envelope containing this manual.

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

Handling the burner

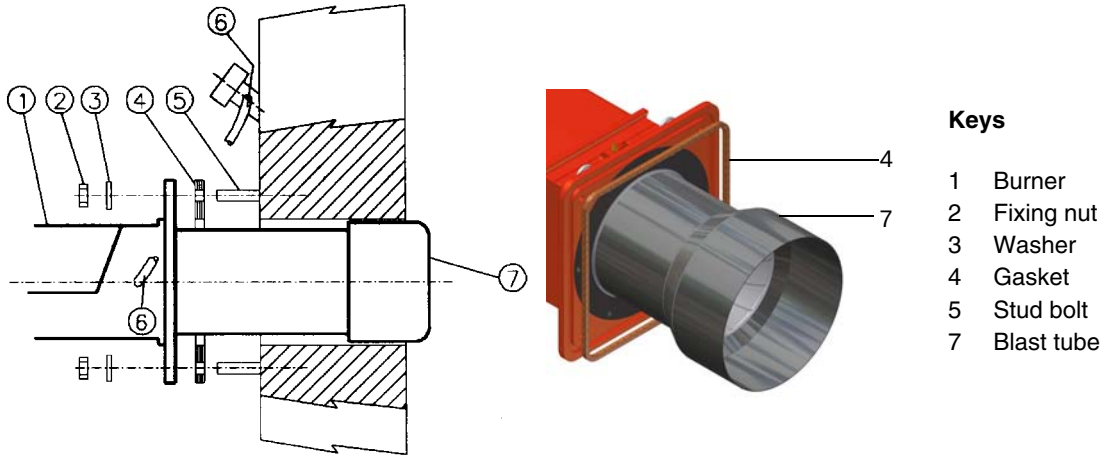
	ATTENTION! Handling operations must be performed by trained personnel specialised on handling loads. If these operations are not carried out correctly, the residual risk for the machine to overturn and fall down remains.
	To handle the machine, use means suitable to handle requested loads (see par. "Technical specifications")."

The burner is provided with eye-bolts for lifting.



Fitting the burner to the boiler

1 To perform the installation, it is necessary to drill the boiler door as described on paragraph “Overall dimensions”;
2 screw the studbolts (5) on the boiler door, according to the drilling plate (see paragraph “Overall dimensions”);
3 move the burner towards the boiler: lift the burner by means of the eyebolts placed on its top side;
4 place the flange to the boiler and a gasket between them;
5 fit the glass fibre plait;
6 replace the blast tube: before fastening completely the screws, avoid any misalignement between the blast tube axis and the combustion head axis;
7 install the burner to the boiler;
8 fix the burner to the stud bolts, by means of the fixing nuts, according to Fig. 4.
9 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 Gasket
5 Stud bolt
7 Blast tube

Fig. 4

Fan installation

Pay attention when designing the air duct: dimensioning must be performed according to the flow rate, the temperature, the distance between the fan and the burner and according to the fan features as well.

⚠	**ATTENTION!** The bellows unit provided is made of canvas and is provided with blocking spacers to avoid breaking it during installation: **first** place the bellows unit between flanges, **then** remove the spacers. Canvas has to be stretched after the installation, but not stressed.

Matching the burner to the boiler

To correctly match the burner to the boiler verify the necessary input and the pressure in combustion chamber are included in the burner performance curve; otherwise the choice of the burner must be revised consulting the burner manufacturer.

To choose the blast tube lenght follow the instructions of the boiler manufacturer. In absence of these consider the following:

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

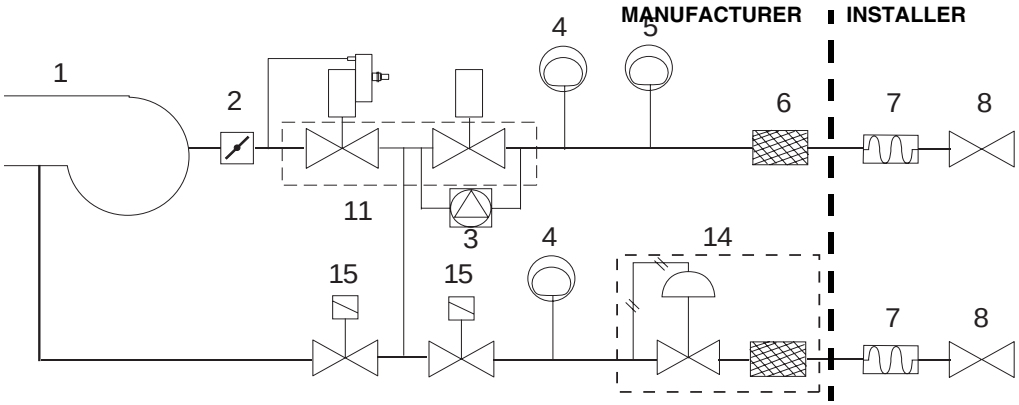
The length of the blast tubes does not always allow this requirement to be met, and thus it may be necessary to use a suitably-sized spacer to move the burner backwards.

GAS TRAIN CONNECTIONS

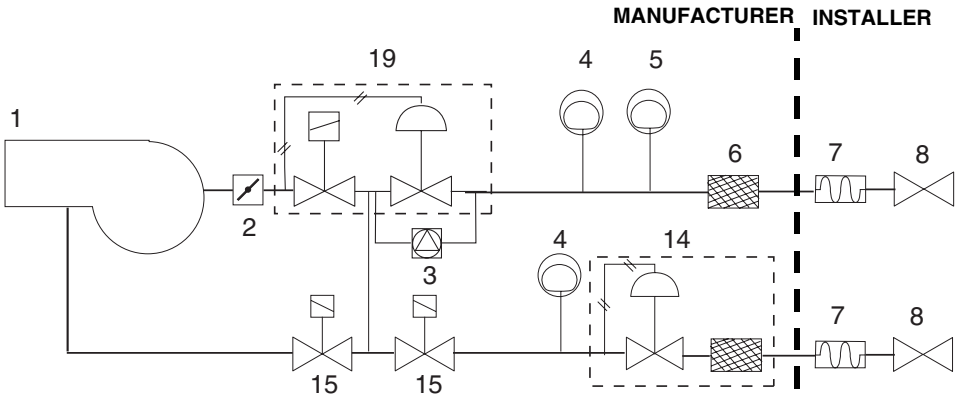
The diagrams show the components of the gas trai included in the delivery and which must be fitted by the installer.The diagrams are in compliance with the current laws.

ATTENTION: BEFORE EXECUTING THE CONNECTIONS TO THE GAS PIPE NETWORK, BE SURE THAT THE MANUAL CUTOFF VALVES ARE CLOSED.

Gas train - 1: Gas train with valves group VGD 20/40 with built-in gas pressure governor + VPS504 gas proving system



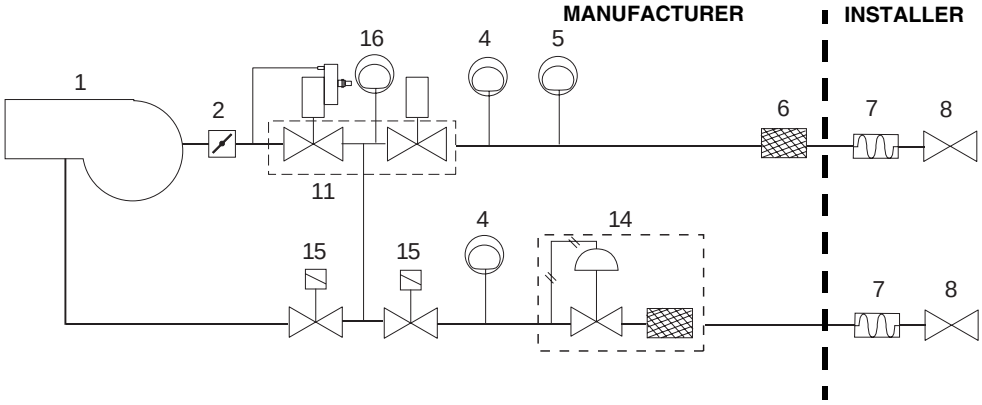
Gas train 2(DN65/80/100): Gas train with valves group MBC 1900/3100/5000SE (2 valves + gas filter + pressure governor + pressure switch) + VPS504 gas proving system



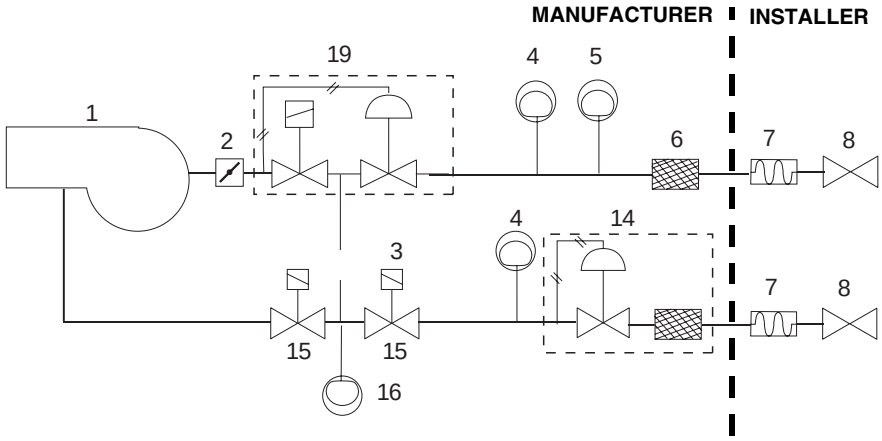
Key

1	Burner	8	Manual cutoff valve
2	Butterfly valve	11	VGD Valves group
3	Gas proving system	14	Pressure governor with filter
4	Maximum gas pressure switch (optional)	15	Pilot gas valve
5	Minimum gas pressure switch	19	MBC Valves group (DN65/80/100)
6	Gas filter		
7	Bellow joint		

Gas train - 3: Gas train with valves group VGD 20/40 with built-in gas pressure governor + PGCP



Gas train 4(DN65/80/100): Gas train with valves group MBC 1900/3100/5000SE (2 valves + gas filter + pressure governor + pressure switch) + PGCP



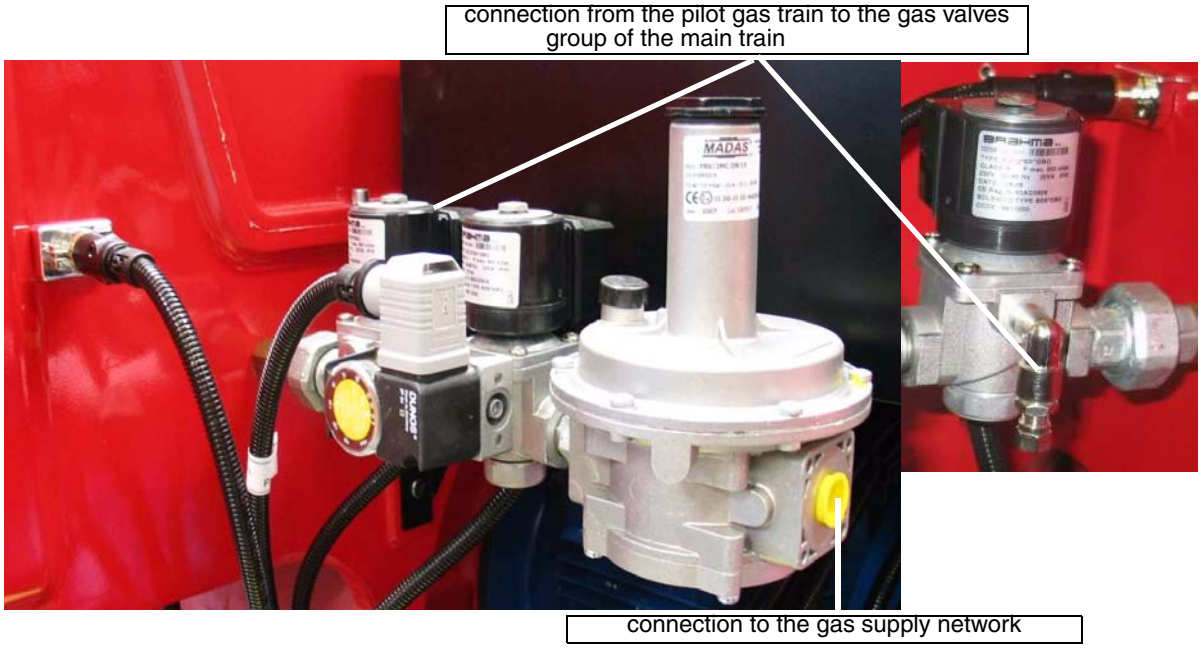
Key

1	Burner	8	Manual cutoff valve
2	Butterfly valve	11	VGD Valves group
4	Maximum gas pressure switch (optional)	14	Pressure governor with filter
5	Minimum gas pressure switch	15	Pilot gas valve
6	Gas filter	16	PGCP (leakage control pressure switch)
7	Bellow joint	19	MBC Valves group (DN65/80/100)

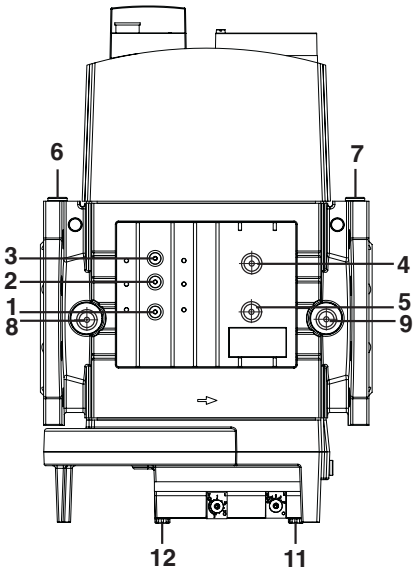
Pilot burner mounting

The pilot gas train is already installed to the burner, the following connections must be executed:

- connection from the filter with stabiliser to the gas supply network
- connection from the valve to the main gas train, by means of the pipe provided with the burner.



SIEMENS VGD40..



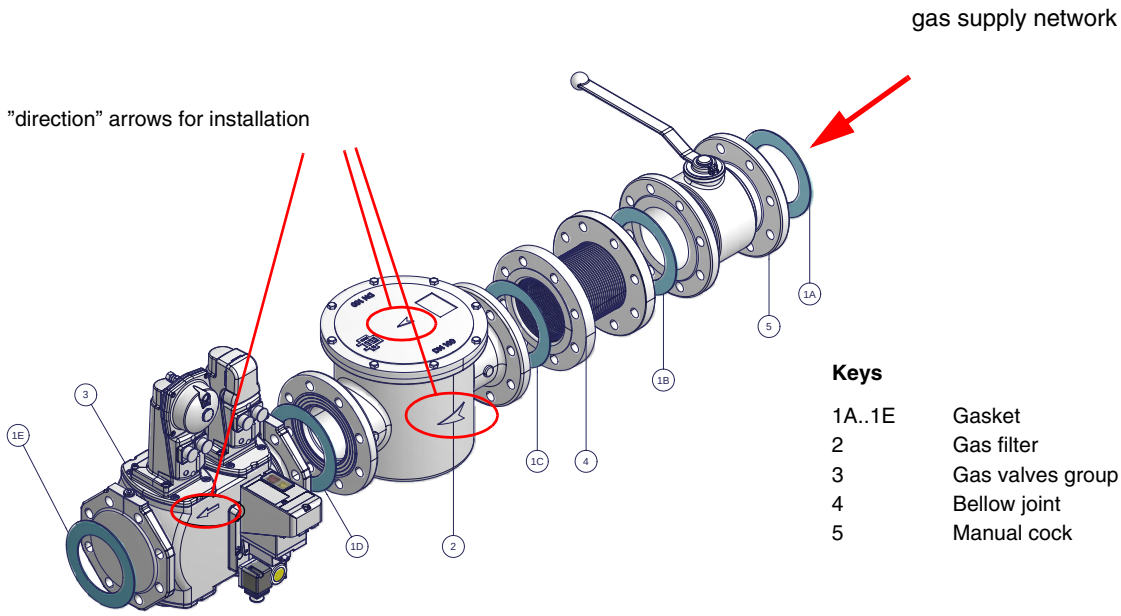
DUNGS MBC3100-5000SE

Fig. 5 - pipe port (3) for connecting the pilot gas train to the valves group of the main gas train

-

Assembling the gas grain

To assemble the main gas train, proceed as follows:



Keys

1A..1E	Gasket
2	Gas filter
3	Gas valves group
4	Bellow joint
5	Manual cock

Fig. 6 - Example of gas train

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 valve and the gaskets are not part of the standard supply.

⚠	**ATTENTION:** once the gas train is mounted according to the diagram on Fig. 6, the gas proving test mus be performed, according to the procedure set by the laws in force.

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

- flanged gas trains with Multibloc Dungs MBC..SE 1900-3100-5000 or Siemens VGD40.. (flanged valves group)

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

Mounting

- When mounting the VGD.. double gas valve, two flanges are required (as for VGD20.. model, the flanges are threaded);
- to prevent cuttings from falling inside the valve, first fit the flanges to the piping and then clean the associated parts;
- install the valve;
- the direction of gas flow must be in accordance with the direction of the arrow on the valve body;
- ensure that the bolts on the flanges are properly tightened;
- ensure that the connections with all components are tight;
- make certain that the O-rings and gaskets between the flanges and the double gas valve are fitted.
- Connect the reference gas pipe (**TP** in figure), to the gas pressure nipples placed on the gas pipe, downstream the gas valves: gas pressure must be measured at a distance that must be at least 5 times the pipe size .

Leave the blowhole free (**SA** in figure). Should the spring fitted not permit satisfactory regulation, ask one of our service centres for a suitable replacement.

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

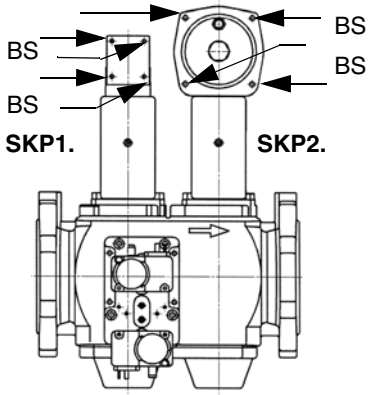


Fig. 7

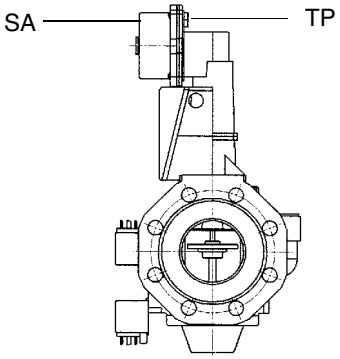


Fig. 8

SIEMENS VGD..MOUNTING POSITIONS

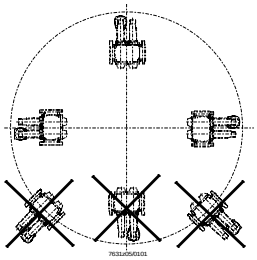


Fig. 9

MULTIBLOC DUNGS MBC1900-3100-5000SE (Flanged valves group)

Mounting

1. Insert setscrews A
2. Insert seals
3. Insert setscrews B
4. Tighten setscrews A + B.

Ensure correct seating of the seal!

6. After installation, perform leakage and functional test.
7. Disassembly in reverse order.

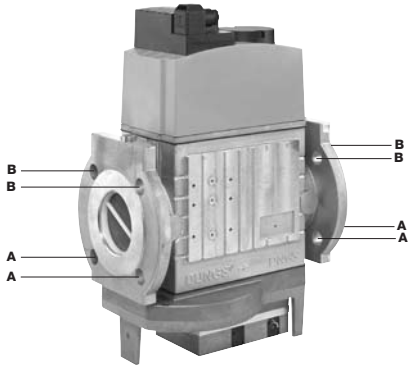
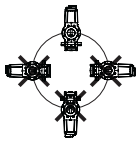
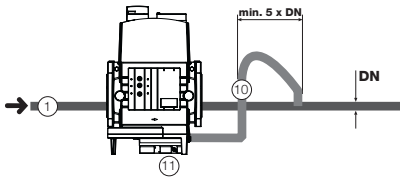


Fig. 10

Mounting positions



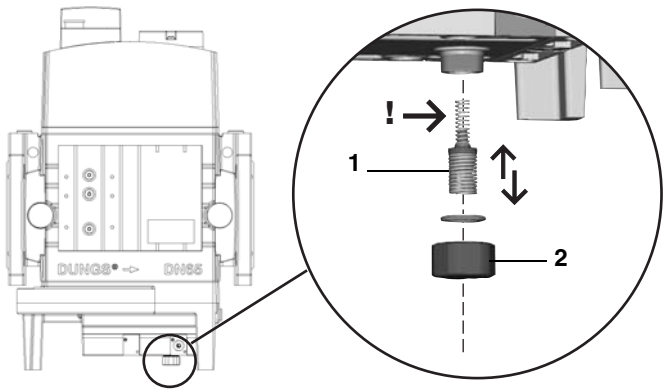
OPTION



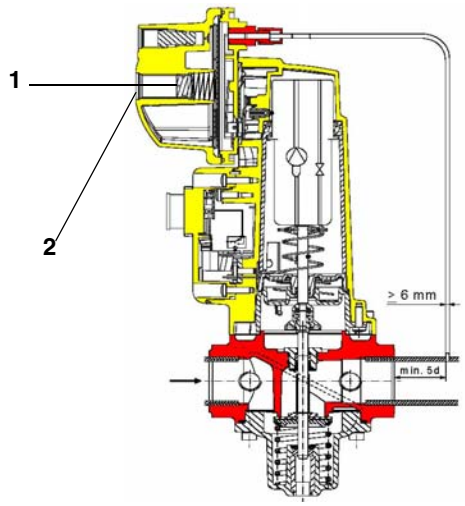
10 = pulse lines

Pressure adjusting range

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



DUNGS MBC..SE



Siemens SKP actuator

Keys

1 spring

2 cap

DUNGS MBC valves:

Performance range (mbar)	4 - 20	20 - 40	40 - 80	80 - 150
Spring colour	-	ed	black	green

Siemens VGD valves with SKP actuator:

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

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

	**ATTENTION:** once the gas train is mounted according to the diagram on Fig. 6, the gas proving test mus be performed, according to the procedure set by the laws in force.

Electrical connections

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

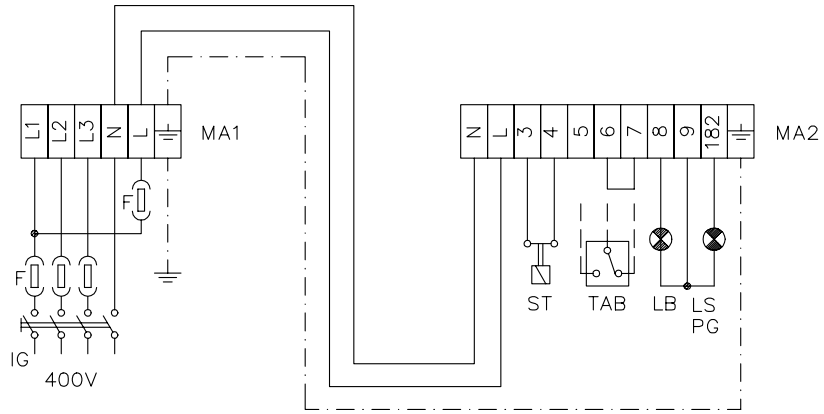
To execute the electrical connections, proceed as follows:

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 fan motor (see next pargraph)
4 refit the panel cover.

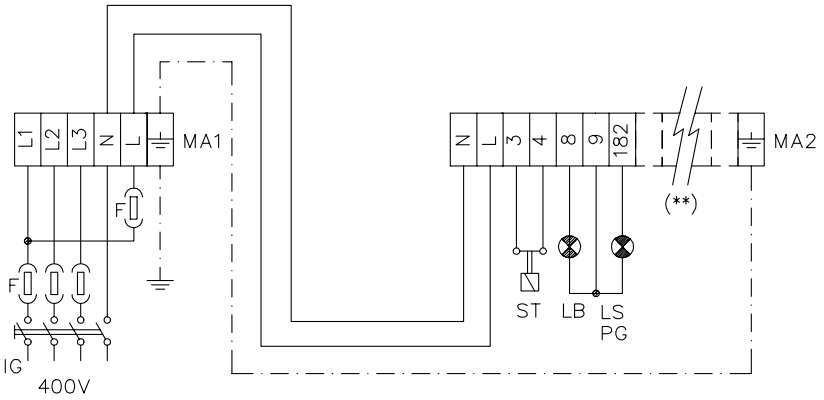
	WARNING: The burner is provided with an electrical bridge between terminals 6 and 7; when connecting the high/ low flame thermostat, remove this bridge before connecting the thermostat.
	IMPORTANT: Connecting electrical supply wires to the burner teminal block MA, be sure that the ground wire is longer than phase and neutral ones.

As for a complete decription of electrical diagrams, see page 39.

PROGRESSIVE BURNERS



FULLY MODULATING BURNERS



PROBE CONNECTION

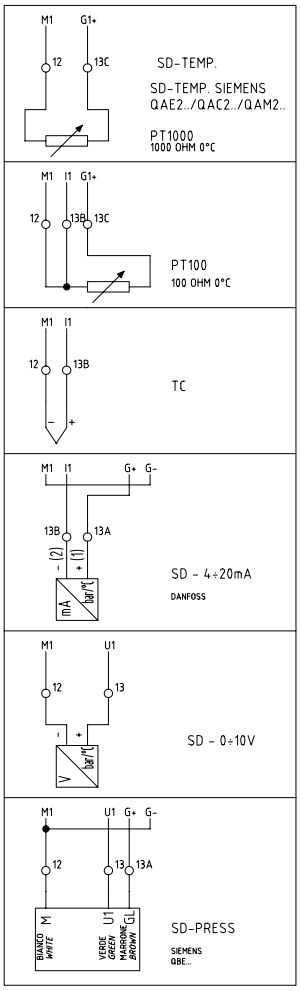


Fig. 11

Rotation of fan motor

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

Combustion head pressure curves depending on the gas flow rate

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

The curves referred to the gas pressure in the combustion head, depending on the gas flow rate, are referred to the burner properly adjusted (3% of residual O_2 in the flues 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. 12, 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.

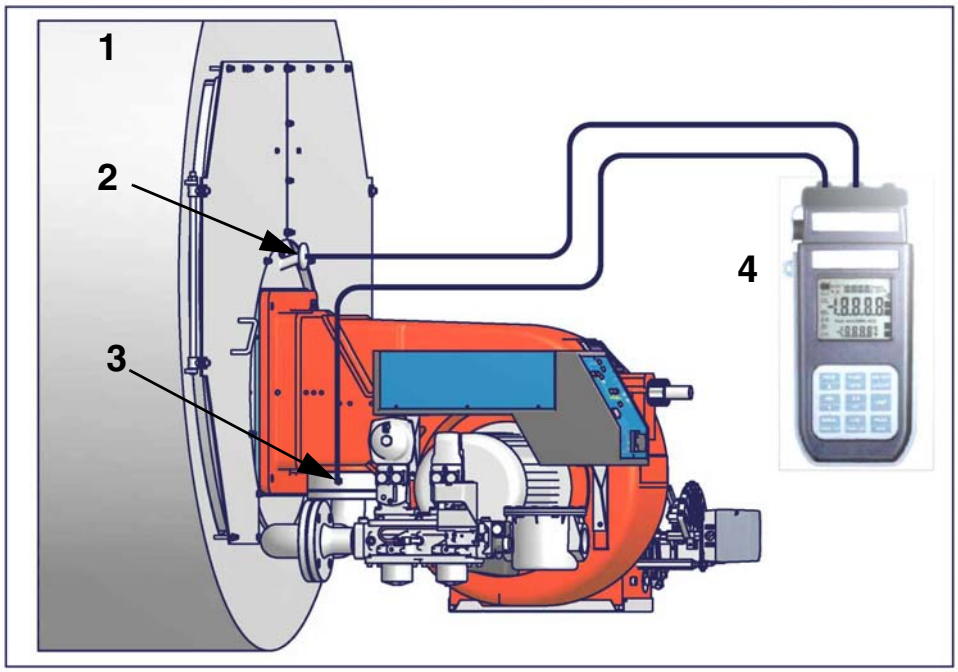


Fig. 12

Key

1 Boiler
2 Gas pressure outlet on the boiler
3 Gas pressure outlet on the butterfly valve
4 Differential pressure gauge

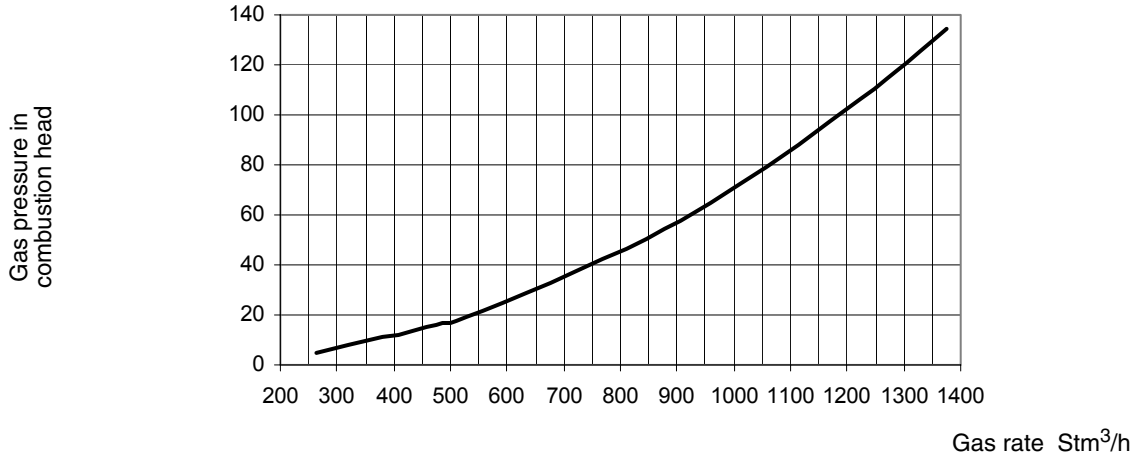
Measuring the gas pressure in the combustion head

In order to measure the pressure in the combustion head, insert the pressure gauge probes: one into the boiler's pressure outlet (Fig. 12-2) to get the pressure in the combustion chamber and the other one into the butterfly valve's pressure outlet of the burner (Fig. 12-3). 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 Stm3/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.

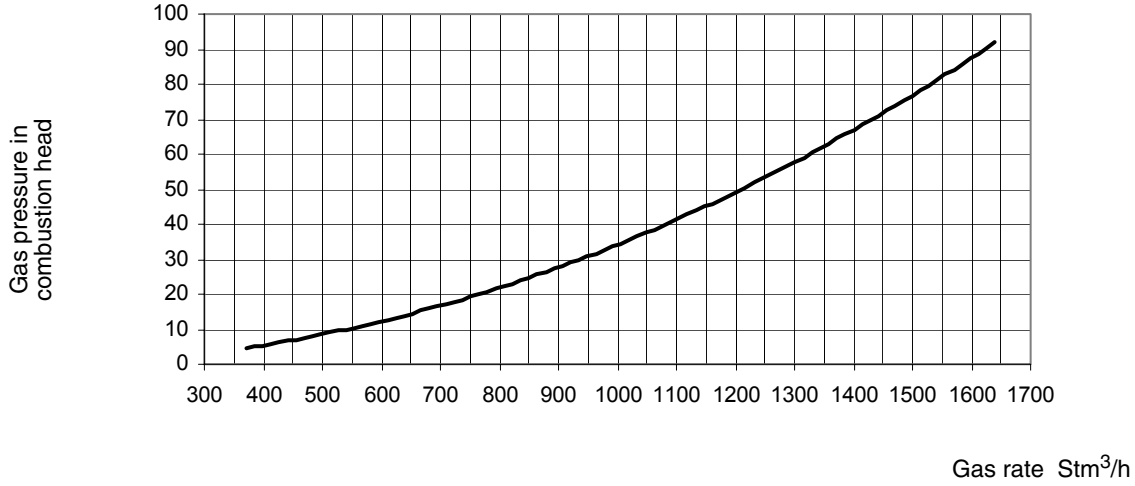
NOTE: THE PRESSURE-RATE CURVES ARE GIVEN AS INFORMATION ONLY; FOR A PROPER SETTING OF THE GAS RATE, PLEASE REFER TO THE GAS METER READING.

Pressure in combustion head- gas rate curves

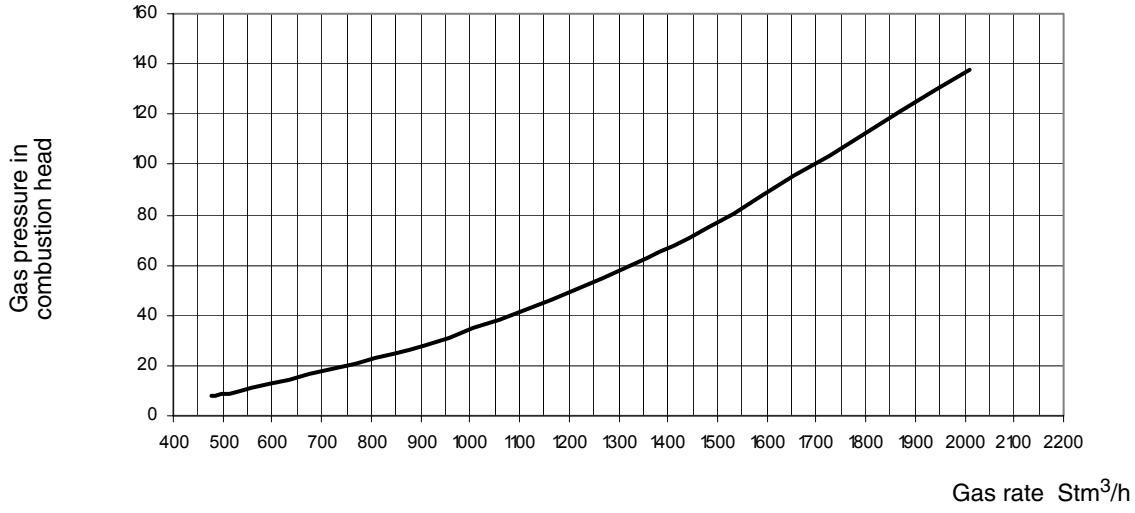
TP1030



TP1050



TP1080



ADJUSTING AIR AND GAS FLOW RATES

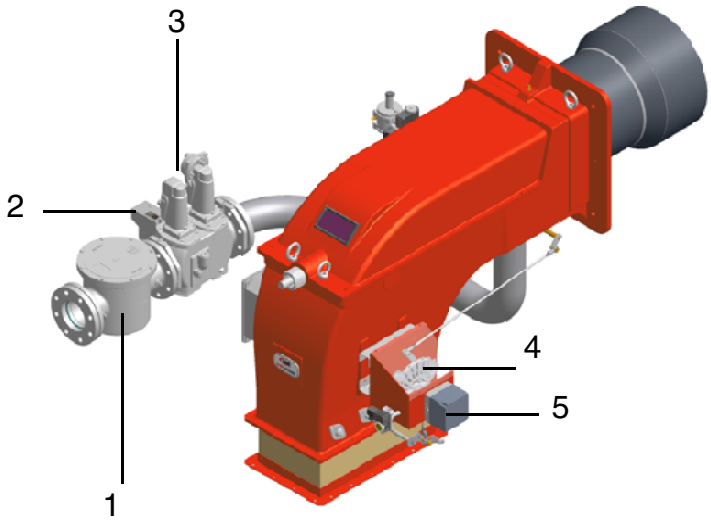


Fig. 13

Keys

1 Gas filter
2 Gas proving system
3 Gas valves
4 Adjusting cam
5 Actuator

Gas Filter (Fig. 13 - 2)

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

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.

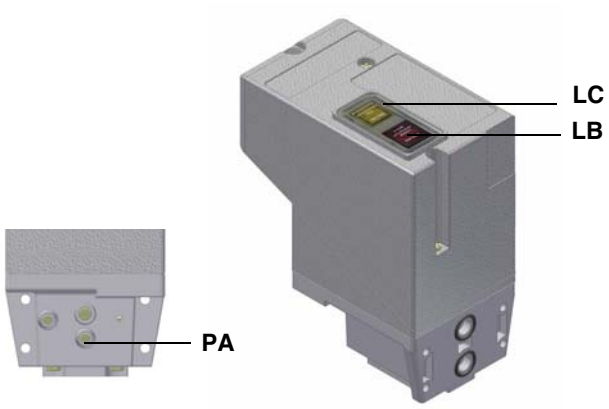


Fig. 14

*Adjusting the pilot gas flow rate: Brahma EG12*R valve and pressure governor*

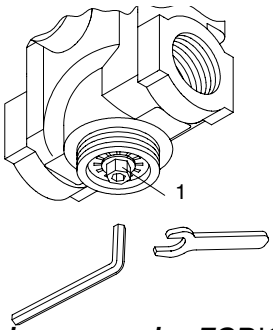
figuraTo change the injector gas valve flow rate, proceed as follows:

1 remove the protection on the bottom of the valve, moving it counterclockwise (see next picture);

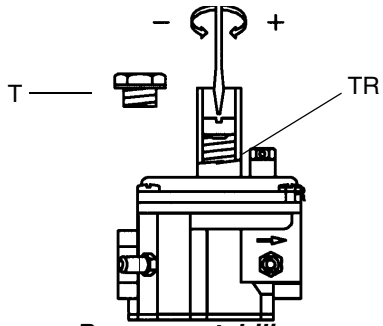
2 rotate clockwise the nut 1 as shown, to close the valve; counterclockwise to open the valve.

To perform a finest adjustment, act directly on the pressure governor as follows (see next picture):

3 remove the cap **T**: to increase theoutlet gas pressure, use a screwdriver on the screw **TR** as shown in the picture below. Screw to increase the pressure, unscrew to decrease; once the regulation is performed, replace cap **T**.



Brahma gas valve EGR*12



Pressure stabiliser

Adjusting air and gas flow rates

⚠	***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: EVER LOOSE THE SEALED SCREWS, OTHERWISE THE DEVICE WARRANTY WILL BE IMMEDIATELY INVALIDATE!

⚠	**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

Adjustments - brief description

Adjust the air and gas flow rates at the maximum output ("high flame") first, by means of the air damper and the adjusting cam respectively.

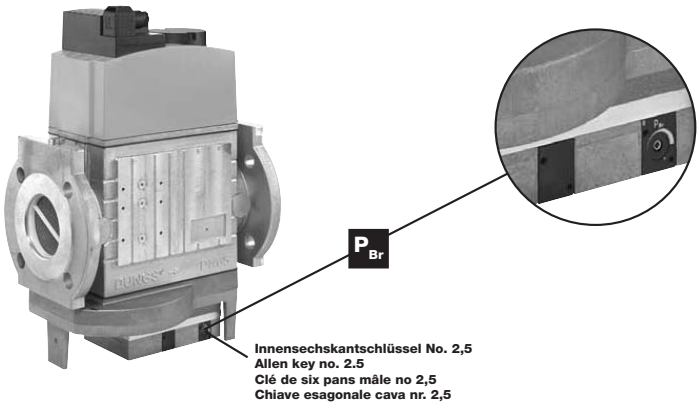
- Check that the combustion parameters are in the suggested limits.
- Check the flow rate measuring it on the counter or, if it was not possible, verifying the combustion head pressure by means of a differential pressure gauge, as described on par. "Measuring the gas pressure in the combustion head" on page 21.
- 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.

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

Adjustment procedure

To change the burner setting during the testing in the plant, follow the next procedure.

On the DUNGS MBC..SE gas valves group, set the pressure regulator to 1/3 of its stroke, using a 2.5 allen key.

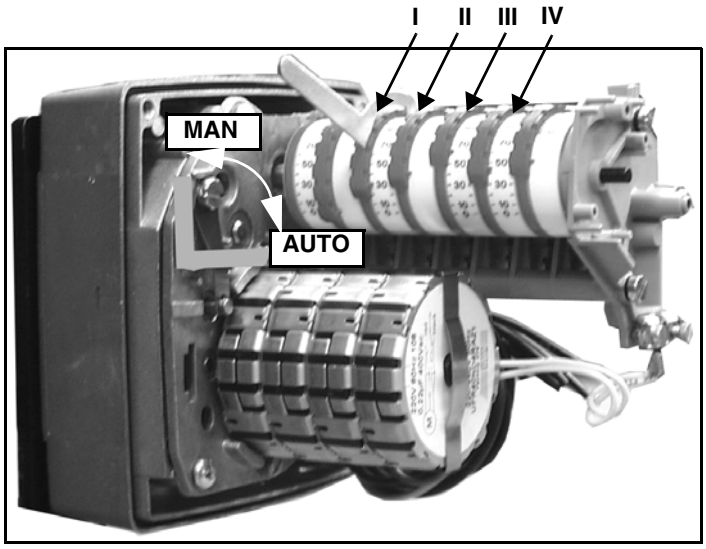


Pressure setting

1 Before starting the burner up, drive the high flame actuator microswitch matching the low flame one (in order to let the burner operates at the lowest output) to safely achieve the high flame stage.

2 cam IV (stroke limitation cam) must be set a little higher than the cam III to limit the output in the first seconds the flame appears;

NOTE: cam IV must shift according to cam III.



Servocontrol cams

I	High flame
II	Stand-by and Ignition
III	Low flame
IV	Stroke limitation

3 Turn the burner on by means of its main switch : if the burner locks press the RESET button on the control panel - see chapter "OPERATION".;

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

5 drive the burner to high flame stage, by means fo the thermostat **TAB**.

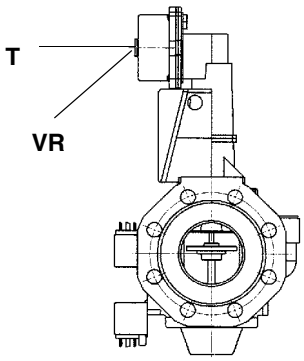
6 Then move progressively the microswitch to higher values until it reaches the high flame position; always check the combustion values and eventually adjusting the gas by means of the valves group governor.

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

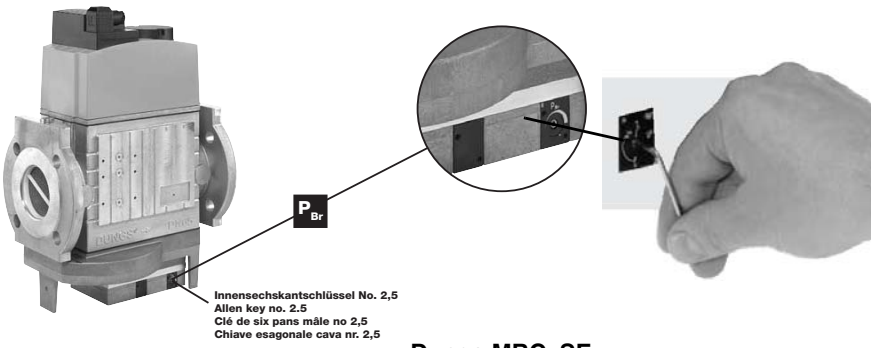
8 acting on the pressure stabiliser of the valves group, adjust the **gas flow rate in the high flame stage** as to meet the values requested by the boiler/utilisation:

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

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

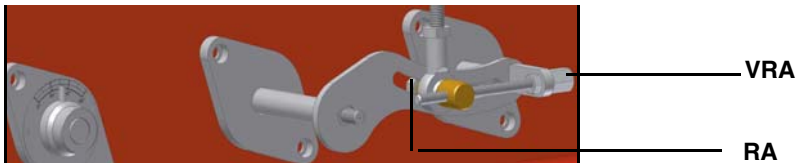


Siemens VGD..



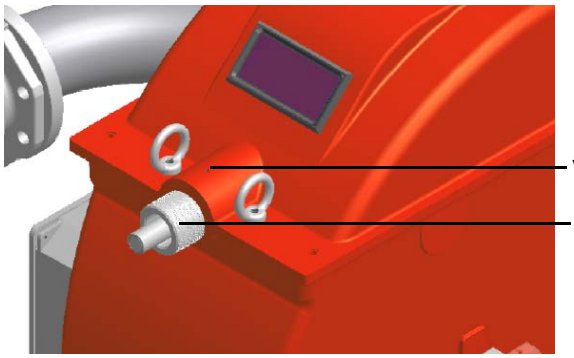
Dungs MBC..SE

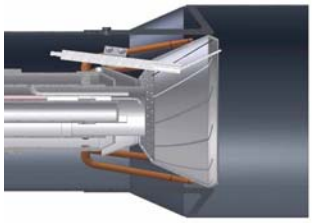
9 To adjust the **air flow rate in the high flame stage**, loose the **RA** nut and screw **VRA** as to get the desired air flow rate: moving the rod **TR** towards the air damper shaft, the air damper opens and consequently the air flow rate increases, moving it far from the shaft the air damper closes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



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

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





"MAX"head position

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 adjustement on the **SV** adjusting cam as to reach the minimum output point.

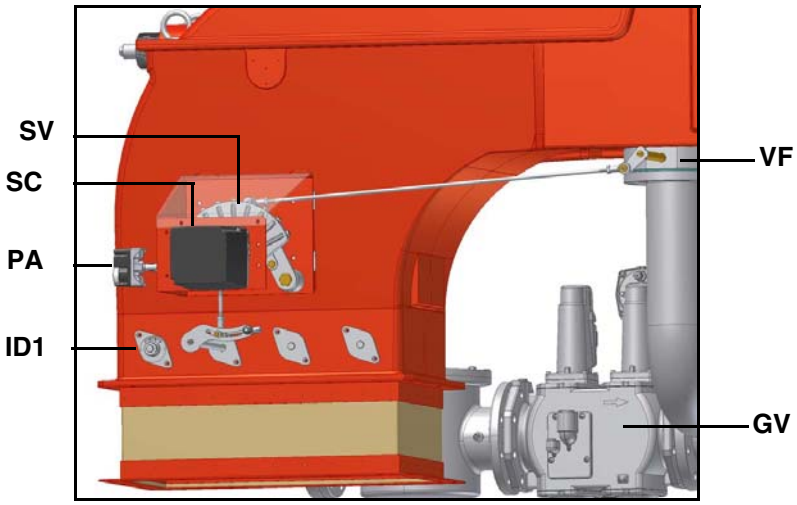
12 as for the point-to-point regulation, move the gas low flame microswitch (cam III) a little lower than the maximum position (90°);

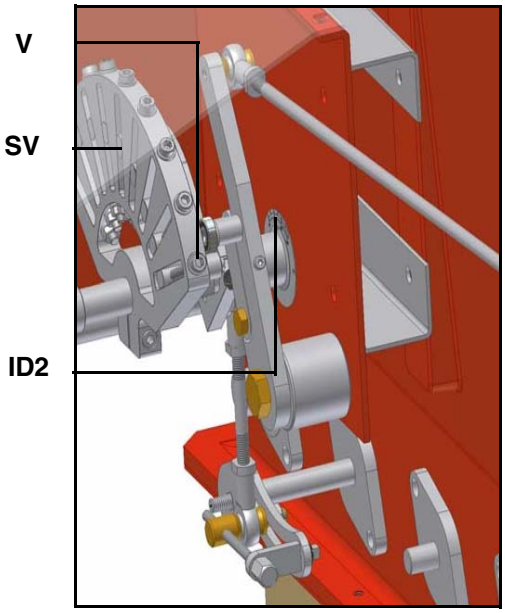
13 set the **TAB** thermostat to the minimum in order that the actuator moves progressively towards the low flame position;

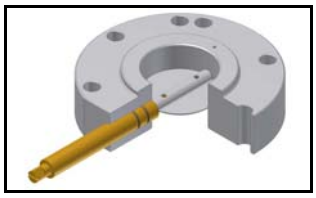
14 move cam III to the minimum to move the actuator towards the low flame until the two bearings find the adjusting screw that refers to the lower position: screw **V** to increase the rate, unscrew to decrease.

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.

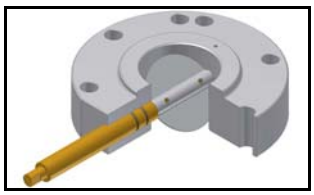
16 Now adjust the pressure switches (see next par.).







Gas butterfly valve closed



Gas butterfly valve open

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 o 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 minimum 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:

- remove the plastic cover;
- measure the gas pressure in the network, when flame is off;
- by means of the adjusting ring nut **VR**, set the value read on step 2, increased by the 30%;
- replace the plastic cover.

PGCP Gas leakage pressure switch (witn Siemens LDU/Siemens LMV burner control)

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

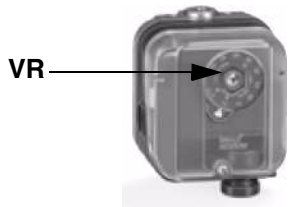


Fig. 15

PART II: OPERATION

LIMITATIONS OF USE

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

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

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

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

NEVER OPEN OR DISMANTLE ANY COMPONENT OF THE MACHINE.

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

IN THE EVENT OF REPEATED LOCKOUTS, DO NOT PERSIST WITH THE RESET BUTTON AND CONTACT QUALIFIED PERSONNEL WHO WILL PROCEED TO ELIMINATE THE MALFUNCTION.

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".**

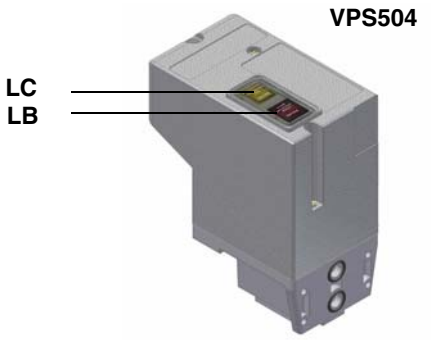
1 Turn on the burner main switch.

2 Check that the control box is not in lockout position , otherwise press reset button.

3 Check that the pressure switches and thermostats make the burner operate

4 Check that the gas pressure is sufficient

5 The gas proving system checking cycle starts: the proving system **LC** LED lights up when the cycle ends.



6 When the gas valves checking ends, the burner starting up cycle takes place: if there is a leakage in a gas valve, the gas proving system locks and the **LB** and **F** LEDs light up. To unlock, press **LB** if the VPS504 gas proving system is provided (see figure), or the related button for LDU system if provided.

7 Tha fan motor starts, the actuator drives the air damper ot the maximum opening position; the pre-purge time counting starts.

8 At the end of the pre-purge time, the air damper moves to the ignition position, the ignition transformer is energised the solenoid gas valves EVP1 and EVP2 are energised as well and consequently EV1 and EV2 .

9 Few seconds after the gas valves opening, the transformer is de-energised the pilot gas valves are disconnected later.

10 After some seconds the double-stage, progressive or modulating operation starts (according to the burner model): the burner is driven automatically into high or low flame (progressive burners) or driven by the modulator (see the related user's guide) in modulating burners, according to the requirements of the plant.

PART III: MAINTENANCE

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

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

ROUTINE MAINTENANCE

- Clean and examine the gas filter cartridge and replace it if necesssary (see next paragraphs);
- Remove and clean the combustion head (see page 31);
- Examine and clean the ignition electrode, adjust and replace it if necessary (see page 32-page 33)
- Examine and clean the detection photoelement, replace it if necessary (see page 34), in case of doubt, check the detection circuit, after the burner start-up (see Fig. 18-Fig. 19);
- Cleaning and greasing of leverages 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.

Gas filter maintenance

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

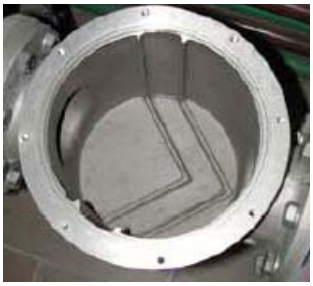
To clean or remove the filter, proceed as follows:

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

A

B

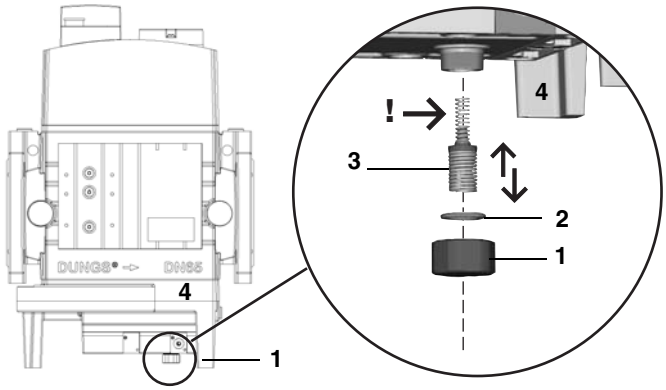
C



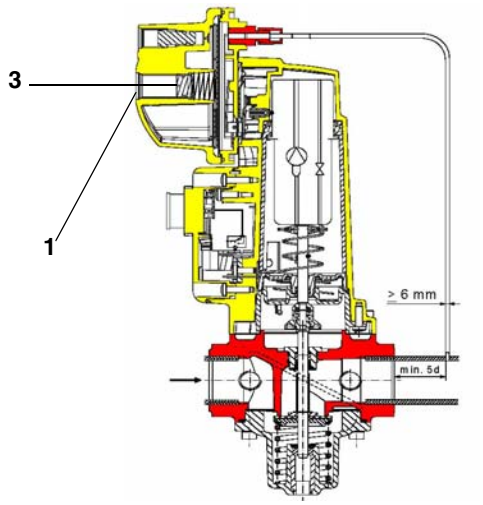
Replacing the spring in the gas valve group

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

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



DUNGS MBC..SE

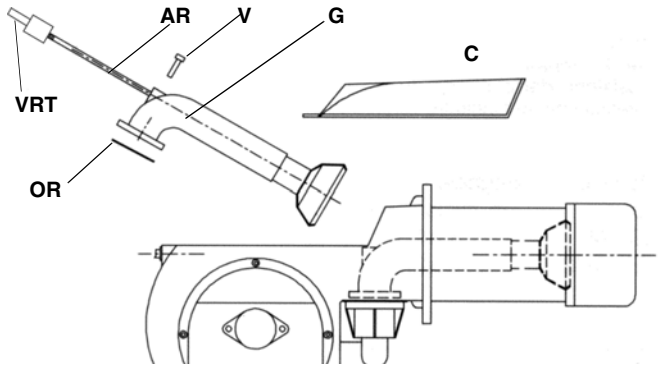


SKP Siemens actuator

Removing the combustion head

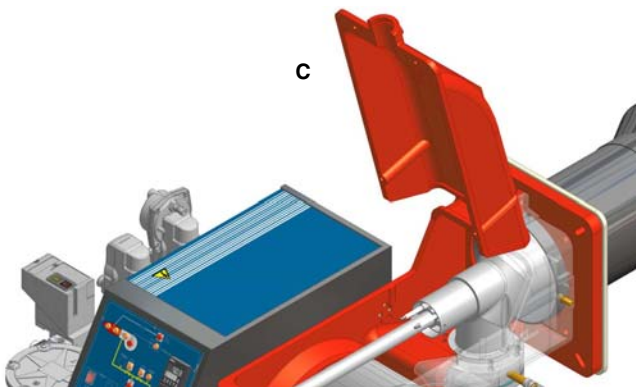
- Remove the cover **C**.
- remove the electrodes cables;
- unscrew the 3 screws **V** which hold in position the gas manifold **G** and pull out the complete group as shown in figure.

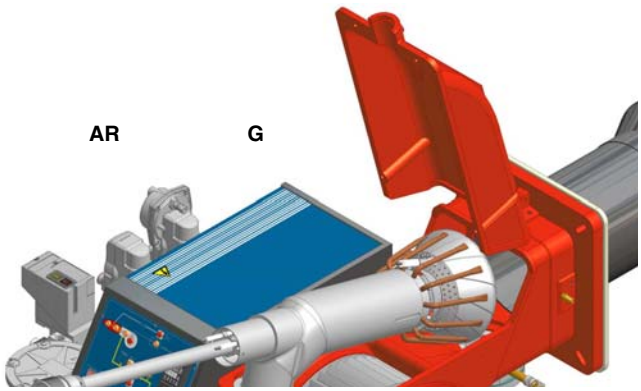
Note: to replace the combustion head reverse the procedure described above having care to place correctly the O ring (**OR**) between burner and gas manifold.



Key

VRT	Head adjusting screw
AR	Threaded rod
V	Fixing screw
G	Gas manifold
OR	“O” ring
C	Cover





Adjusting the ignition electrode

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

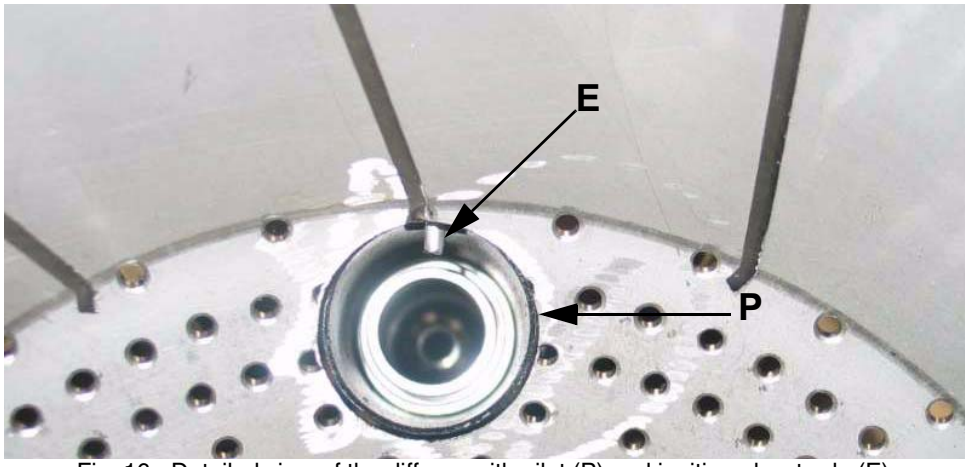


Fig. 16 - Detailed view of the diffuser with pilot (P) and ignition elecctrode (E)

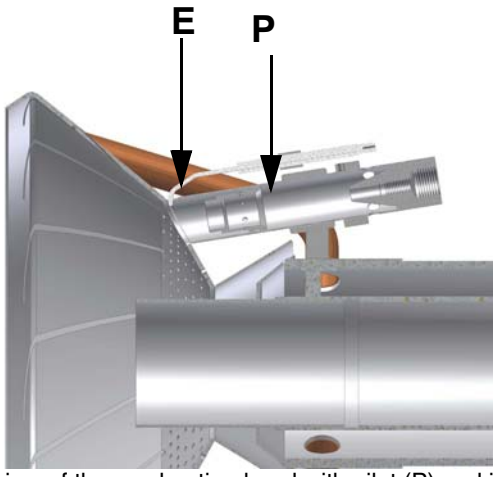


Fig. 17 - Detailed view of the combustion head with pilot (P) and ignition elecctrode (E)

Observe the values quoted on the next picture.

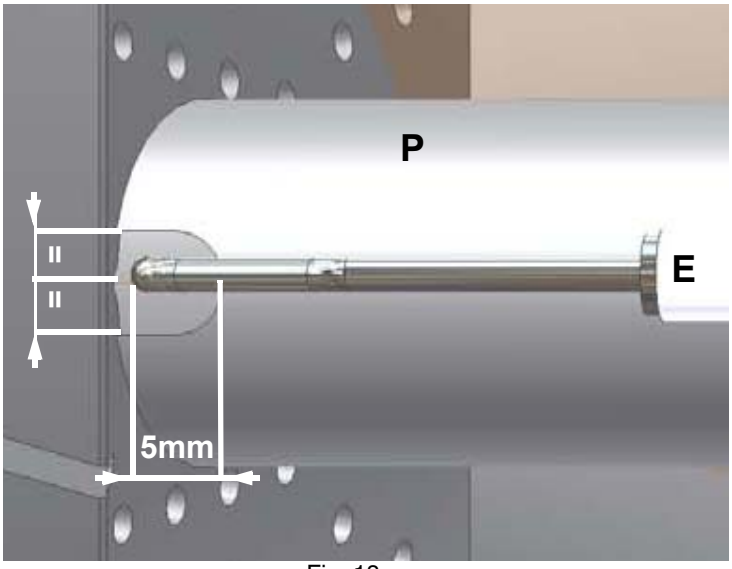


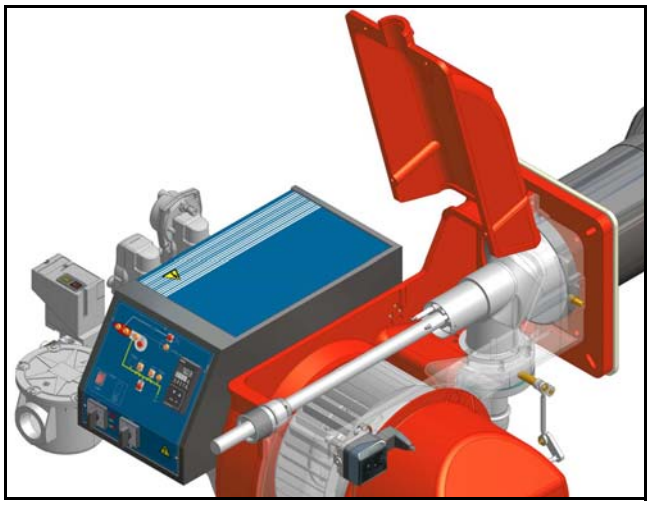
Fig. 18

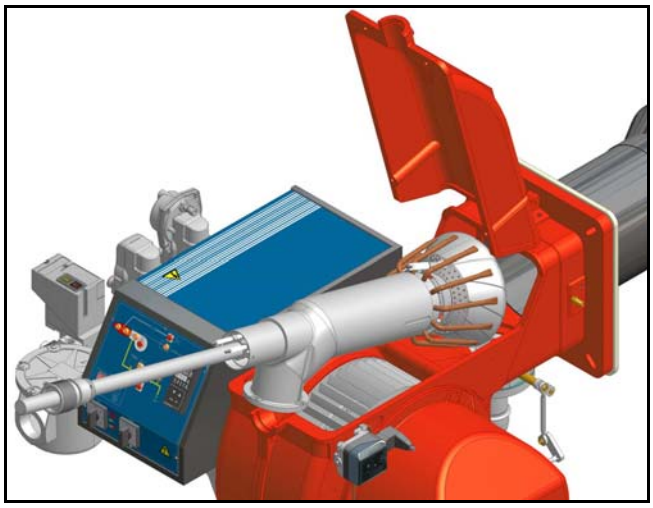
Replacing the ignition electrode

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

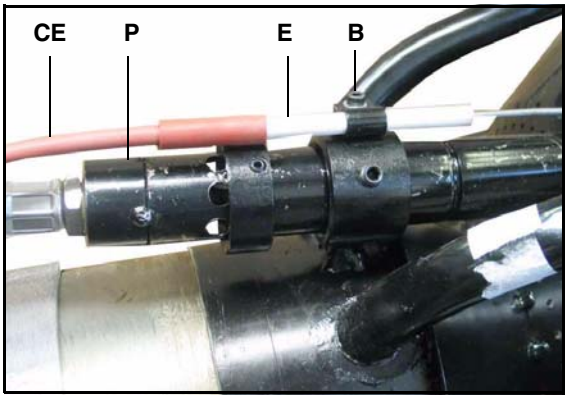
To replace the ignition electrode, proceed as follows:

1 remove the burner cover
2 disconnect the electrode (E) cable (CE);
3 remove the combustion head (see par. "Removing the combustion head");





4 loose screw (B) that fasten the ignition electrode (E) to the burner pilot (P);
5 remove the electrode and replace it, referring to the values quoted on Fig. 18;



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.

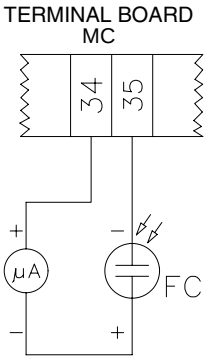
To clean/replace the detection photocell, proceed as follows:

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

Checking the detection current

To check the detection signal follow the scheme in Fig. 19.

If the signal is lower than the value quoted, check the position of the UV detector (photocell), the electrical contacts and, if necessary, replace the UV detector.



Control box	Minimum detection signal
Siemens LFL1.3..	70μA with UV detector)

Fig. 19: Detection by photocell QRA..

Seasonal stop

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

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

Burner disposal

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

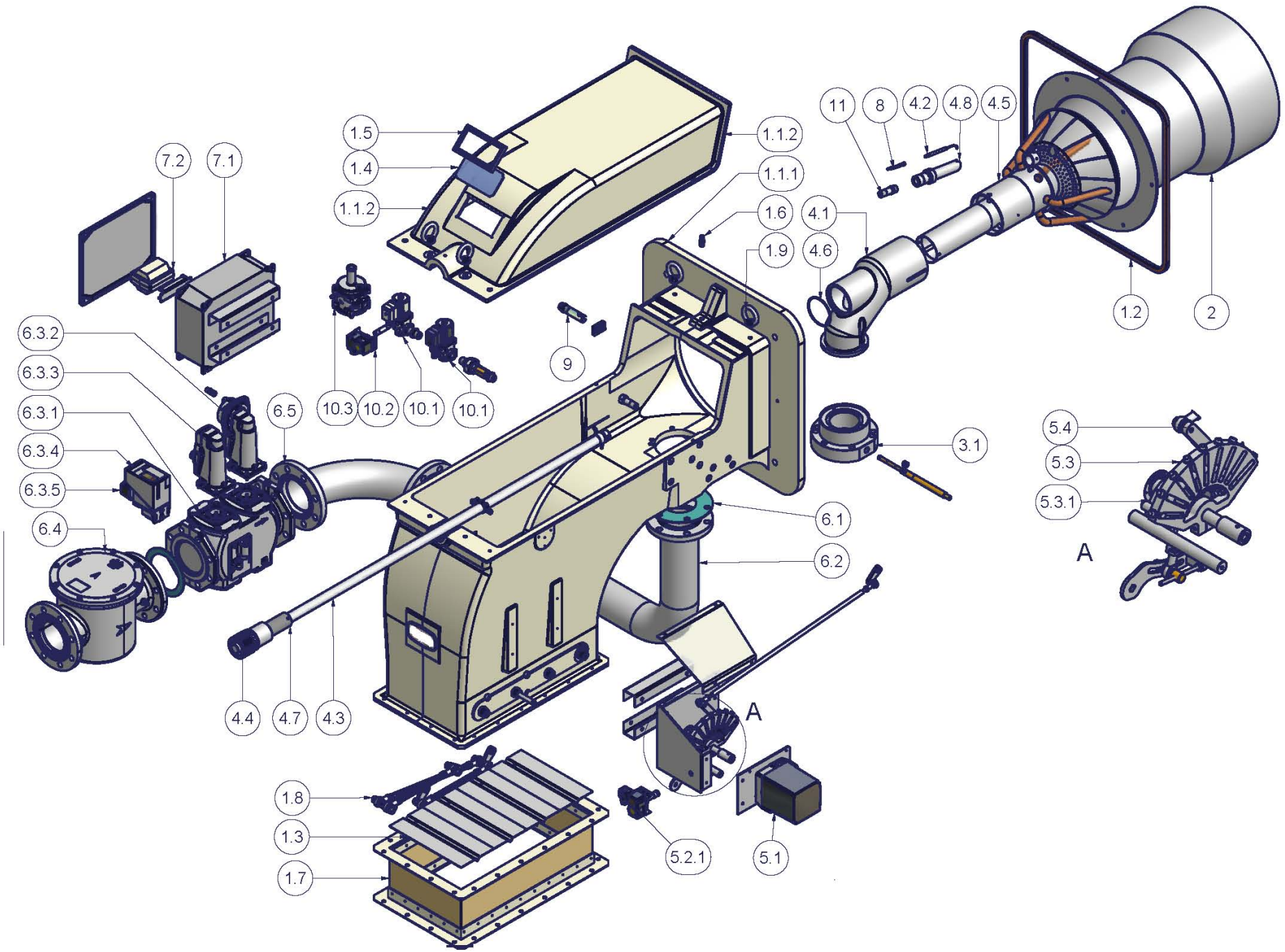
TROUBLESHOOTING

CAUSE / TROUBLE	THE BURNER DOESN'T START	CONTINUES WITH PRE-PRGEe	DOESN'T START AND LOCK-OUT	DOESN'T START AND REPEATS THE CYCLE	STARTS AND REPEATS THE CYCLE	DOESN'T SWITCH TO HI FLAME	LOCKOUT DURING OPERATION	TURNS OFF AND REPEATS CYCLE DURING OPERATION
MAIN SWITCH OPEN	●							
LACK OF GAS	●							
HIGH GAS PRESSURE SWITCH DEFECTIVE	●							
DEFECTIVE THERMOSTAT	●							
OVERLOAD TRIPPED INTERVENTION	●							
AUXILIARIES FUSES INTERRUPTED	●							
DEFECTIVE AIR PRESSURE SWITCH	●							
DEFECTIVE CONTROL BOX	●		●				●	
DEFECTIVE SERVOCONTROL	●	●	●				●	
AIR PRESSURE SWITCH FAULT OR BAD SETTING		●						
GAS PRESSURE SWITCH BAD SETTING							●	
IGNITION TRANSFORMER FAULT			●	●	●			●
DETECTION ELECTRODE BAD POSITION			●					
BUTTERFLY VALVE BAD SETTING			●					
DEFECTIVE GAS GOVERNOR			●					
DEFECTIVE GAS GOVERNOR				●	●			●
DEFECTIVE HI-LO FLAME THERMOSTAT						●		
WRONG SETTING FOR ACTUATOR CAM						●		
PHOTODETECTOR FAULT OR WRONG SETTING							●	

BURNERS EXPLODED VIEW

POS.	DESCRIPTION
1.1.1	BURNER FLANGE
1.1.2	COVER
1.2	CERAMIC FIBRE PLAIT
1.3	AIR INTAKE DAMPER
1.4	INSPECTION GLASS
1.5	BRACKET
1.6	INLET
1.7	BELLOWS
1.8	LEVERAGE
1.9	BRACKET
2	STANDARD BLAST TUBE
3.1	BUTTERFLY GAS VALVE
4.1	GAS MANIFOLD
4.2	IGNITION ELECTRODE
4.3	FALSE LANCE
4.4	RING NUT
4.5	STANDARD COMBUSTION HEAD
4.6	O RING
4.7	ADJUSTING BUSH
4.8	IGNITOR
5.1	ACTUATOR

POS.	DESCRIPTION
5.2.1	AIR PRESSURE SWITCH
5.3	ADJUSTING CAM
5.3.1	ADJUSTING CAM FOIL
5.4	LEVERAGE
6.1	GASKET
6.2	REVERSIBLE PIPE
6.3.1	GAS VALVE HOUSING
6.3.2	"SKP" ACTUATOR
6.3.3	"SKP" ACTUATOR
6.3.4	GAS PROVING SYSTEM
6.3.5	GAS PRESSURE
6.4	GAS FILTER
6.5	FLANGED REVERSIBLE CURVE
7.1	JUNCTION BOX
7.2	IGNITION TRANSFORMER
8	IGNITION CABLE
9	PHOTOCELL
10.1	GAS SOLENOID VALVE
10.2	GAS PRESSURE
10.3	GAS GOVERNOR WITH FILTER
11	GAS FLEXIBLE HOSE


11
8
4.2
4.8
4.5
1.5
1.4
1.1.2
1.1.2
1.1.1
1.6
4.1
1.9
4.6
7.2
7.1
1.2
2
6.3.2
6.3.3
6.3.1
6.3.4
6.3.5
6.4
6.5
10.3
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10.1
10.1
9
3.1
5.4
5.3
5.3.1
A
6.1
6.2
4.4
4.7
4.3
A
1.8
1.3
1.7
5.2.1
5.1

SPARE PARTS

Desription	Code		
	TP1030	**TP1050**	**TP1080**
GAS PROVING SYSTEM SIEMENS LDU	2020413	2020413	2020413
CONTROL BOX SIEMENS LFL	2020448	2020448	2020448
DETECTION ELECTRODE	2080258	2080258	2080258
GAS FILTER DN80	2090112	-	-
GAS FILTER DN100	2090113	2090113	2090113
GAS FILTER DN125	2090128	2090128	2090128
AIR PRESSURE SWITCH DUNGS GW50 A6	2160085	2160085	2160085
GAS PRESSURE SWITCH DUNGS GW500 A5	2160089	2160089	2160089
IGNITION TRANSFORMER	2170301	2170301	2170301
GAS VALVE GROUP SIEMENS VGD.. DN80	2190169	2190169	2190169
GAS VALVE GROUP SIEMENS VGD.. DN100	2190174	2190174	2190174
GAS VALVE ACTUATOR SKP15	2190181	2190181	2190181
GAS VALVE ACTUATOR SKP25	2190183	2190183	2190183
GAS VALVE GROUP SIEMENS VGD.. DN125	2190184	2190184	2190184
GAS VALVE GROUP DUNGS MBC3100SE DN80	21903M7	21903M7	21903M7
GAS VALVE GROUP DUNGS MBC5000SE DN100	21903M8	21903M8	21903M8
PILOT GAS ELECTROVALVE	2190502	2190502	2190502
GAS PROVING SYSTEM VPS504	2191604	2191604	2191604
GAS FLEXIBLE HOSES	234FX07	234FX07	234FX07
ADJUSTING CAM FOIL	2440014	2440014	2440014
ACTUATOR	2480004	2480004	2480004
UV PROBE	2510001	2510001	2510001
BURNER MODULATOR	2570112	2570112	2570112
PRESSURE GOVERNOR WITH FILTER	2800085	2800085	2800085
COMBUSTION HEAD	3060277	3060292	3060292
BLAST TUBE	30910N9	30910Q9	30910Q8
IGNITION CABLE	6050143	6050143	6050143

REFERENCE ELECTRICAL WIRING DIAGRAMS

COMPLETE KEY

BL	Fan motor remote contactor coil (line)
BS	Fan motor remote contactor coil (star)
BT	Fan motor remote contactor coil (triangle)
CAS	Auxiliary fan motor contactor (star)
CAT	Auxiliary fan motor contactor (triangle)
CL	Fan motor contactor (line)
CMF	Manual switch: 0)off - 1)high flame - 2)low flame - 3)automatic (from TAB)
CR1	Relay contacts
CR1-CR2	Relay contacts
CS	Fan motor contactor (star)
CT	Fan motor contactor (triangle)
CTV	Fan motor overload contacts
EV1	Gas electro-valve upstream (or valves group)
EV2	Gas electro-valve downstream (or valves group)
EVP1-2	Pilot gas electro-valve
F÷F1	Fuses
FC	UV flame detector
IG	Main switch
IL	Auxiliary line switch
L	Phase
LAF	Burner in high flame indicator light
LB	Burner lockout indicator light
LBF	Burner in low flame indicator light
LEV1	Indicator light for opening of electro-valve EV1
LEV2	Indicator light for opening of electro-valve EV2
LEVP	Indicator light for opening of electro-valve EVP...
LFL1.xx	SIEMENS control box
LPG MIN	Indicator light for presence of gas in the network
LPGP	Indicator light for presence of gas in the pilot network
LS	Burner in stand-by indicator light
LSPG	Indicator light for leakage of valves
LT	Indicator light for fan overload tripped
LTA	Ignition transformer lindicator light
MA1	Supply terminal block, plate 1
MA2	Supply terminal block, plate 2
MC1	Terminal block for connection of burner components, plate 1
MC2	Terminal block for connection of burner components, plate 2
MV	Fan motor
N	Neutral
PA	Combustion air pressure switch
PGMAX	High gas pressure switch (where supplied, remove the bridge between terminal 156 and 158 in terminal block MC)
PGMIN	Low gas pressure switch
PGP	Pilot gas pressure switch
PS	Lockout reset button
Pt100	Temperature probe 3 terminals Pt100
R1	Auxiliary relay
RT	Delayed relay for start-up fan motor
RWF40.000 **	SIEMENS modulator
SD-0/4÷20mA	Probe with signal 0÷20mA or 4÷20mA
SD-0÷10V	Probe with signal 0÷20V
SD-PRESS.	Pressure probe with 3 terminals (SIEMENS QBE620p..)
SD-TEMP.	Temperature probe 2 terminals (Pt1000 - SIEMENS QAE2.., QAC2..)
SQM10	SIEMENS Actuator for air damper
ST	Series of thermostats or pressure switches
TA	Ignition transformer
TAB	High/low thermostat (where supplied, remove the bridge between terminals 6 and 7 in terminal block MA)
TC	Connection for termocouple
TM (°)	Fan motor thermal
VPS504	DUNGS gas proving system

ACTUATOR CAMS

I High flame

II Stand-by and ignition

III Low flame

IV Actuator automatic advance restriction

** The modulator includes a limit switch (terminals Q13 and Q14), it stops the burner if the work parameter overcomes set differential.

(°) Set the TM overload tripped to an equal value to: Absorption of data plate (Ampere) to triangle / 1.73

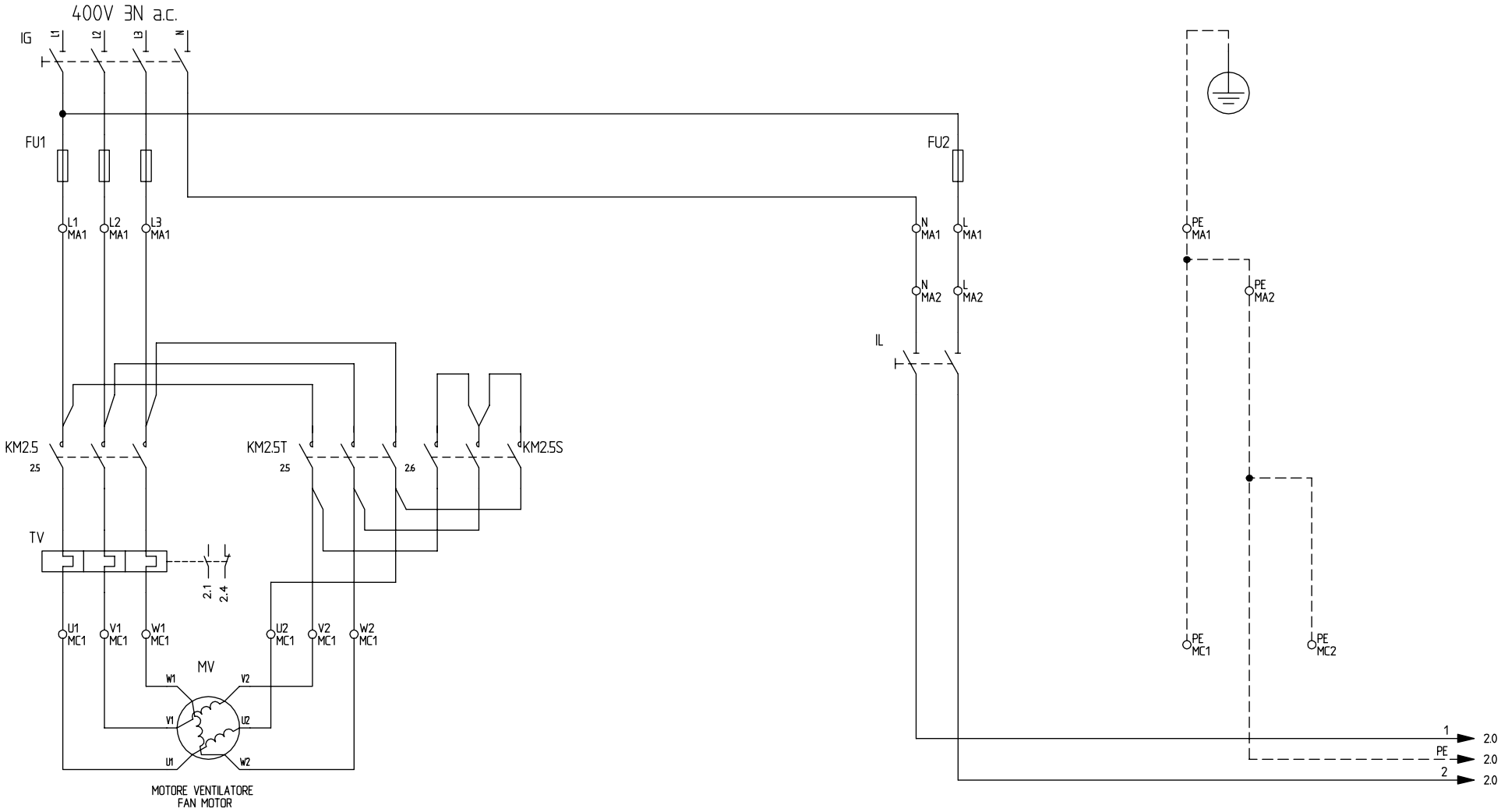
WARNING

1 - Electrical supply 400V 50Hz 3N a.c.

2 - Do not reverse phase with neutral

3 - Ensure burner is properly earthed

I



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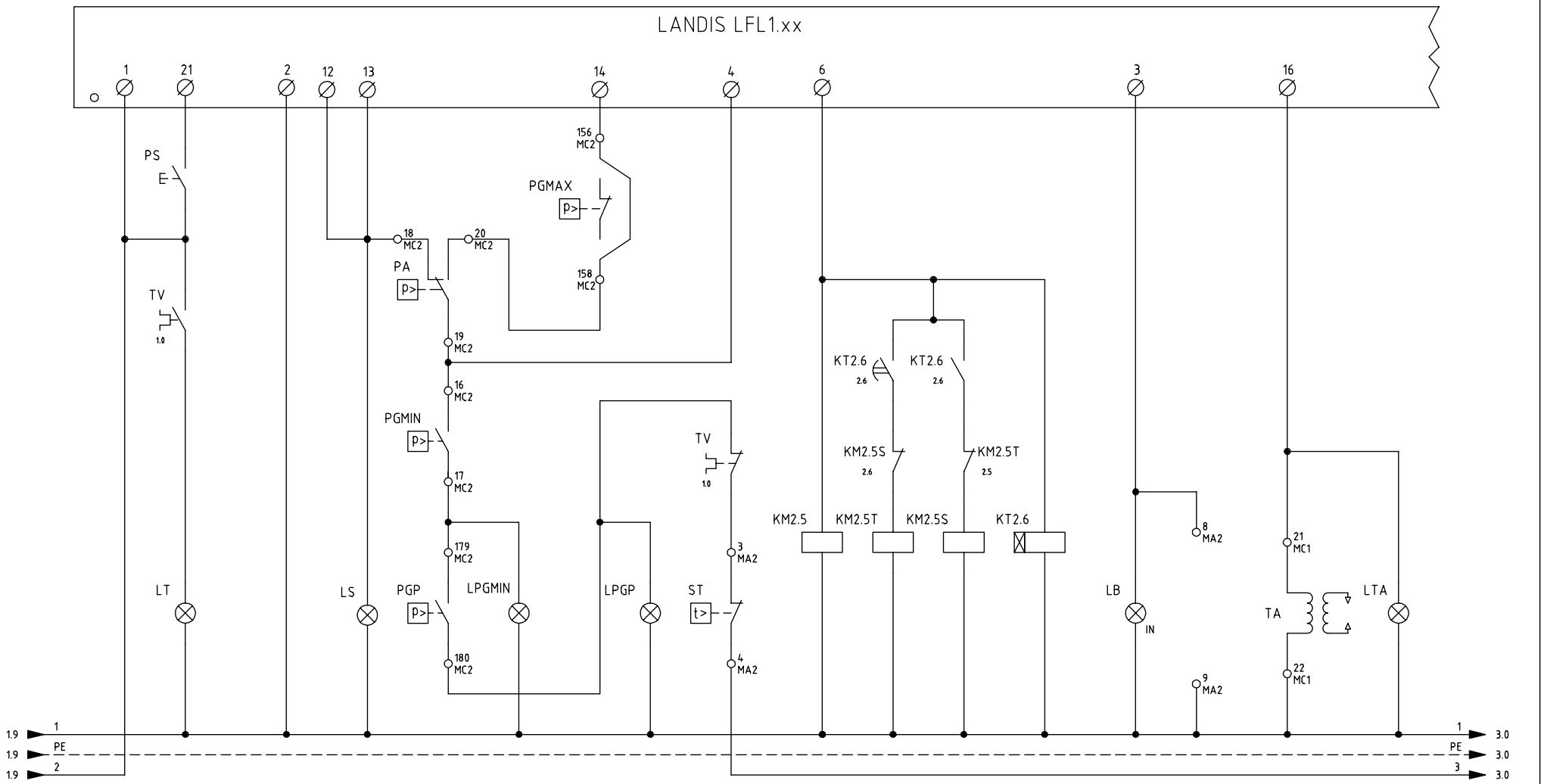
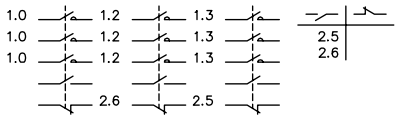
Dis. N. 12 – 063		SEGUE	TOTALE
		2	6





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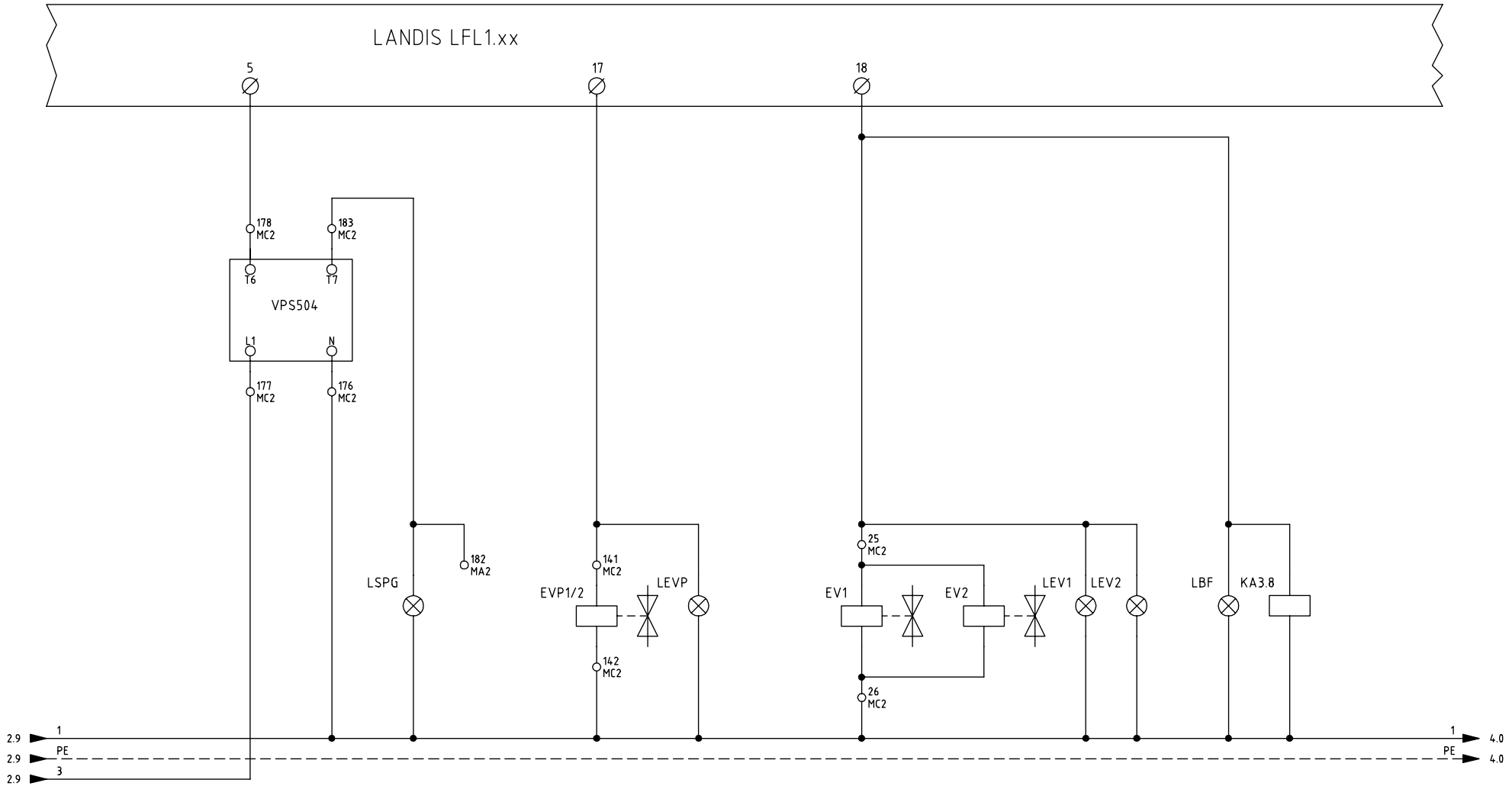
Dis. N. 12 – 063		SEGUE 3	TOTALE 6



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Revisione 02			
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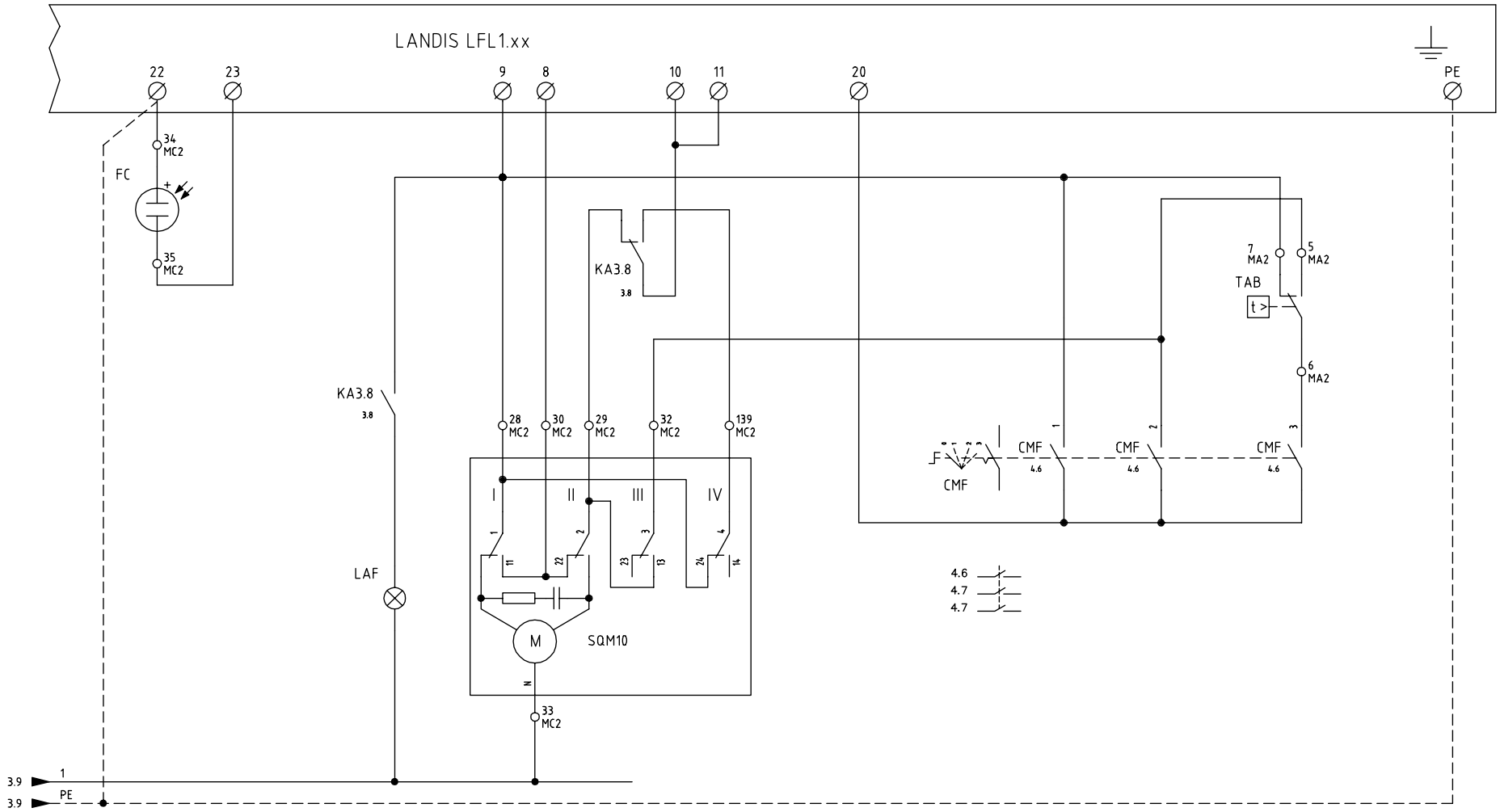

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Revisione 02			
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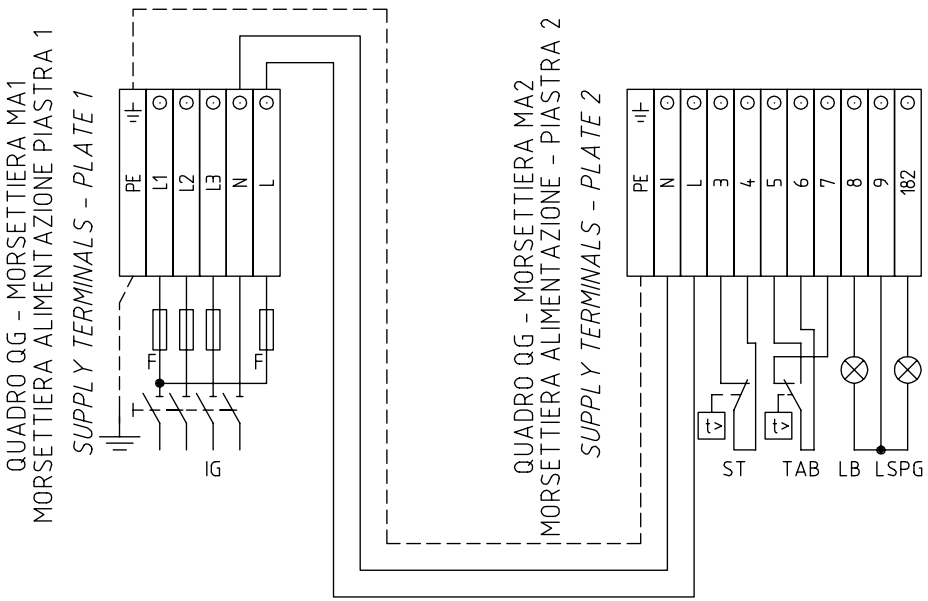
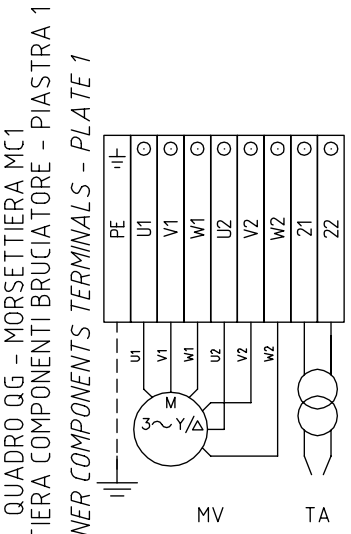
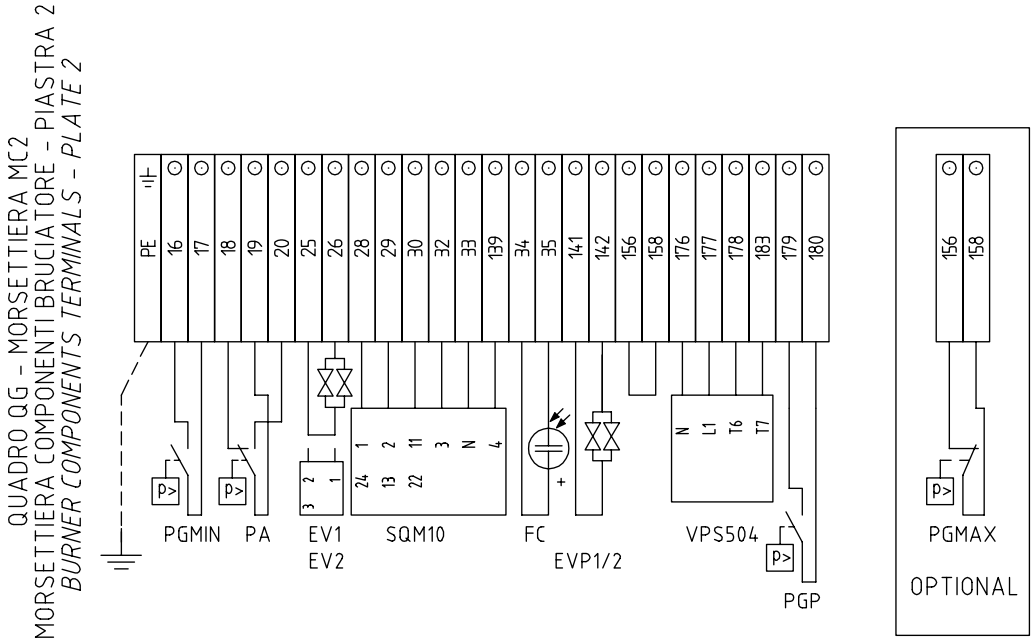






CAMME SERVOCOMANDO
SERVO CONTROL CAMS
SQM10

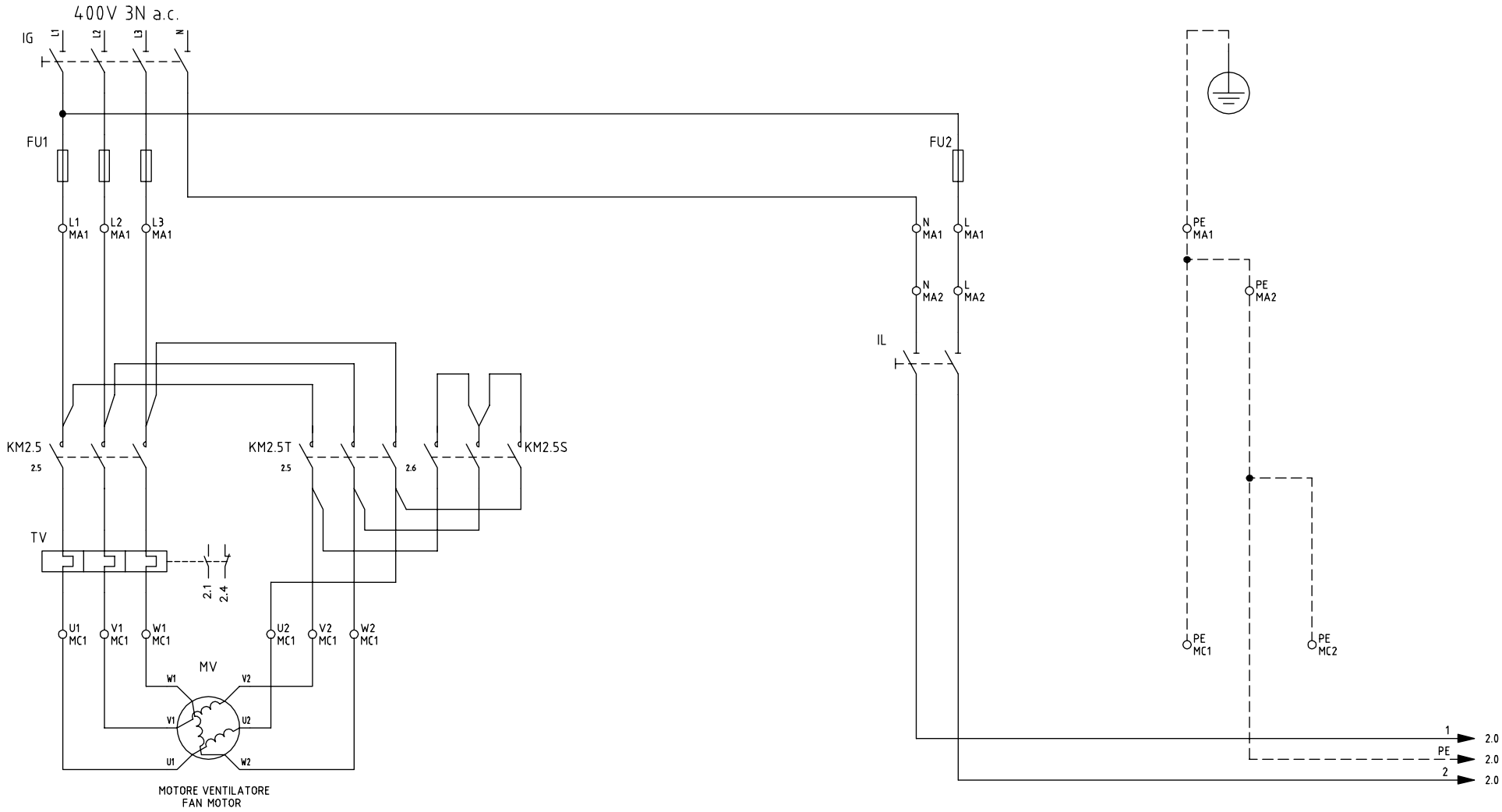
I	ALTA FIAMMA *HIGH FLAME*
II	SOSTA E ACCENSIONE *STAND-BY AND IGNITION*
III	BASSA FIAMMA *LOW FLAME*
IV	LIMITAZIONE ANTICIPO SERVOCOMANDO *SERVO CONTROL AUTOMATIC ADVANCE RESTRICTION*

Data	17/06/2002	PREC.	FOGLIO
Revisione	02	4	5
Dis. N.	12 – 063	SEGUE	TOTALE
		6	6

0	1	2	3	4	5	6	7	8	9

SIGLA/ITEM	FOGLIO/SHEET	FUNZIONE	FUNCTION
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	3	ELETTROVALVOLA GAS LATO RETE (O GRUPPO VALVOLE)	GAS ELECTRO-VALVE UPSTREAM (OR VALVES GROUP)
EV2	3	ELETTROVALVOLA GAS LATO BRUCIATORE (O GRUPPO VALVOLE)	GAS ELECTRO-VALVE DOWNSTREAM (OR VALVES GROUP)
EVP1/2	3	ELETTROVALVOLE GAS PILOTA	PILOT GAS ELECTRO-VALVES
FC	4	SONDA UV RIVELAZIONE FIAMMA	UV FLAME DETECTOR
FU1	1	FUSIBILI DI LINEA	LINE FUSES
FU2	1	FUSIBILE DI LINEA	LINE FUSE
IG	1	INTERRUTTORE GENERALE	MAIN DISCONNECTOR
IL	1	INTERRUTTORE LINEA AUSILIARI	AUXILIARY LINE SWITCH
KA3.8	3	RELE' AUSILIARIO	AUXILIARY RELAY
KM2.5	2	CONTATTORE MOTORE VENTILATORE (LINEA)	FAN MOTOR CONTACTOR (LINE)
KM2.5S	2	CONTATTORE MOTORE VENTILATORE (STELLA)	FAN MOTOR CONTACTOR (STAR)
KM2.5T	2	CONTATTORE MOTORE VENTILATORE (TRIANGOLO)	FAN MOTOR CONTACTOR (DELTA)
KT2.6	2	TEMPORIZZATORE STELLA/TRIANGOLO	STAR/DELTA DELAYED RELAY
LAF	4	LAMPADA SEGNALAZIONE ALTA FIAMMA BRUCIATORE	BURNER IN HIGH FLAME INDICATOR LIGHT
LANDIS LFL1.xx	2	APPARECCHIATURA CONTROLLO FIAMMA	FLAME MONITOR DEVICE
LB	2	LAMPADA SEGNALAZIONE BLOCCO BRUCIATORE	INDICATOR LIGHT FOR BURNER LOCK-OUT
LBF	3	LAMPADA SEGNALAZIONE BASSA FIAMMA BRUCIATORE	BURNER IN LOW FLAME INDICATOR LIGHT
LEV1	3	LAMPADA SEGNALAZIONE APERTURA [EV1]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV1]
LEV2	3	LAMPADA SEGNALAZIONE APERTURA [EV2]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV2]
LEVP	3	LAMPADA SEGNALAZIONE APERTURA EVP1/2	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVES EVP1/2
LPGMIN	2	LAMPADA SEGNALAZIONE PRESENZA GAS IN RETE	INDICATOR LIGHT FOR PRESENCE OF GAS IN THE NETWORK
LPGP	2	LAMPADA SEGNALAZIONE PRESSOSTATO GAS PILOTA	INDICATOR LIGHT FOR PRESENCE OF GAS IN THE PILOT NETWORK
LS	2	LAMPADA SEGNALAZIONE SOSTA BRUCIATORE	INDICATOR LIGHT FOR BURNER STAND-BY
LSPG	3	LAMPADA SEGNALAZIONE BLOCCO CONTROLLO TENUTA VALVOLE	INDICATOR LIGHT FOR LEAKAGE OF VALVES
LT	2	LAMPADA SEGNALAZIONE BLOCCO TERMICO MOTORE VENTILATORE	INDICATOR LIGHT FOR FAN OVERLOAD TRIPPED
LTA	2	LAMPADA SEGNALAZIONE TRASFORMATORE DI ACCENSIONE	IGNITION TRANSFORMER INDICATOR LIGHT
MV	1	MOTORE VENTILATORE	FAN MOTOR
PA	2	PRESSOSTATO ARIA COMBURENTE	COMBUSTION AIR PRESSURE SWITCH
PGMAX	2	PRESSOSTATO GAS DI MASSIMA PRESSIONE (OPTIONAL)	MAXIMUM PRESSURE GAS SWITCH (OPTIONAL)
PGMIN	2	PRESSOSTATO GAS DI MINIMA PRESSIONE	MINIMUM GAS PRESSURE SWITCH
PGP	2	PRESSOSTATO GAS PILOTA	PILOT MINIMUM GAS PRESSURE SWITCH
PS	2	PULSANTE SBLOCCO FIAMMA	LOCK-OUT RESET BUTTON
SQM10	5	CAMME SERVOCOMANDO	SERVO CONTROL CAMS
SQM10	4	SERVOCOMANDO SERRANDA ARIA	AIR DAMPER SERVO CONTROL
ST	2	SERIE TERMOSTATI/PRESSOSTATI	SERIES OF THERMOSTATS OR PRESSURE SWITCHES
TA	2	TRASFORMATORE DI ACCENSIONE	IGNITION TRANSFORMER
TAB	4	TERMOSTATO/PRESSOSTATO ALTA-BASSA FIAMMA	HIGH-LOW THERMOSTAT/PRESSURE SWITCHES
TV	1	TERMICO MOTORE VENTILATORE	FAN MOTOR THERMAL
VPS504	3	CONTROLLO DI TENUTA VALVOLE GAS	GAS LEAKAGE CONTROL UNIT

Data 17/06/2002		PREC. 5	FOGLIO 6
Revisione 02			
Dis. N. 12 – 063		SEGUE /	TOTALE 6



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Dis. N. 12 – 059		SEGUE	TOTALE
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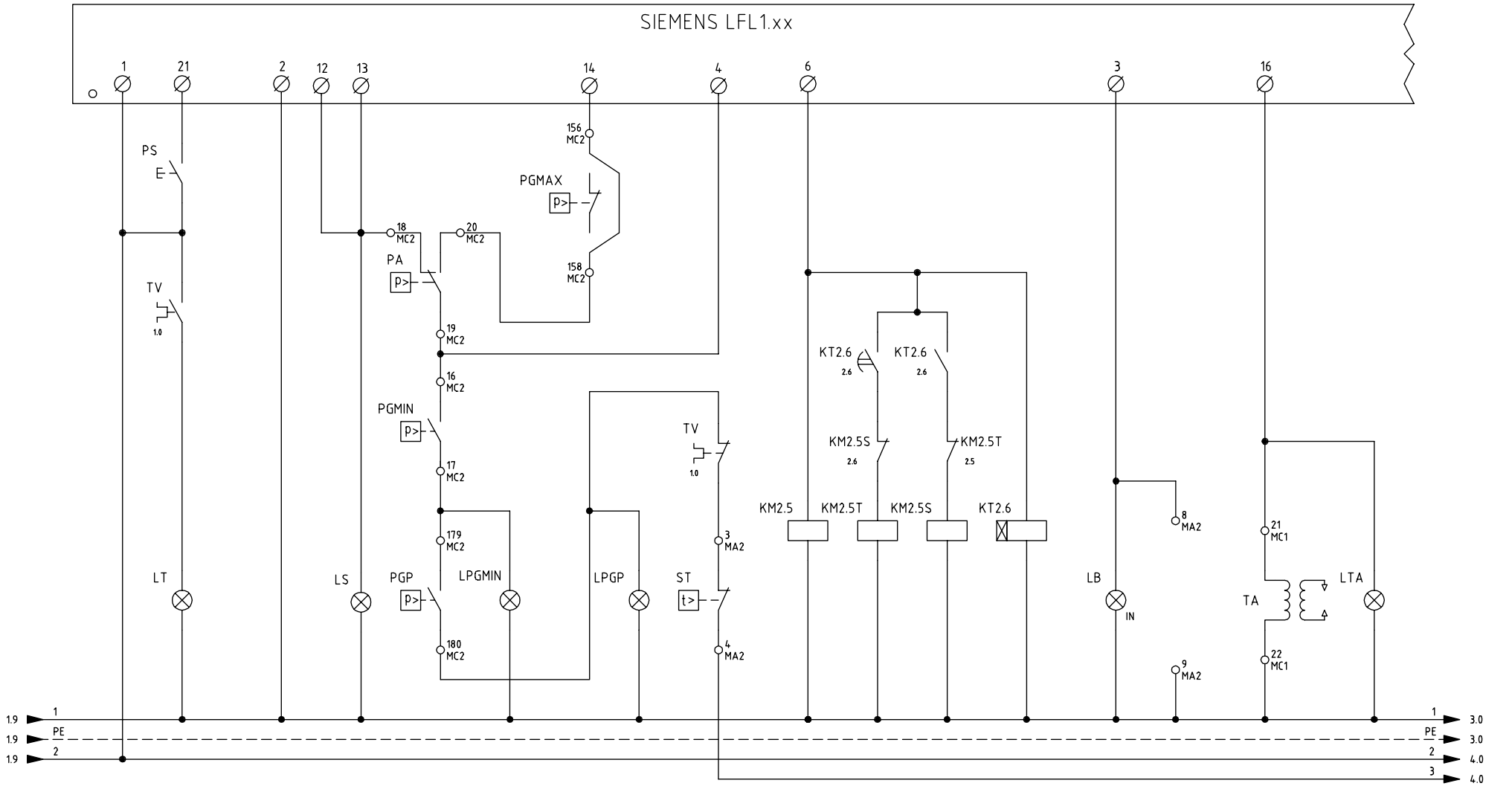

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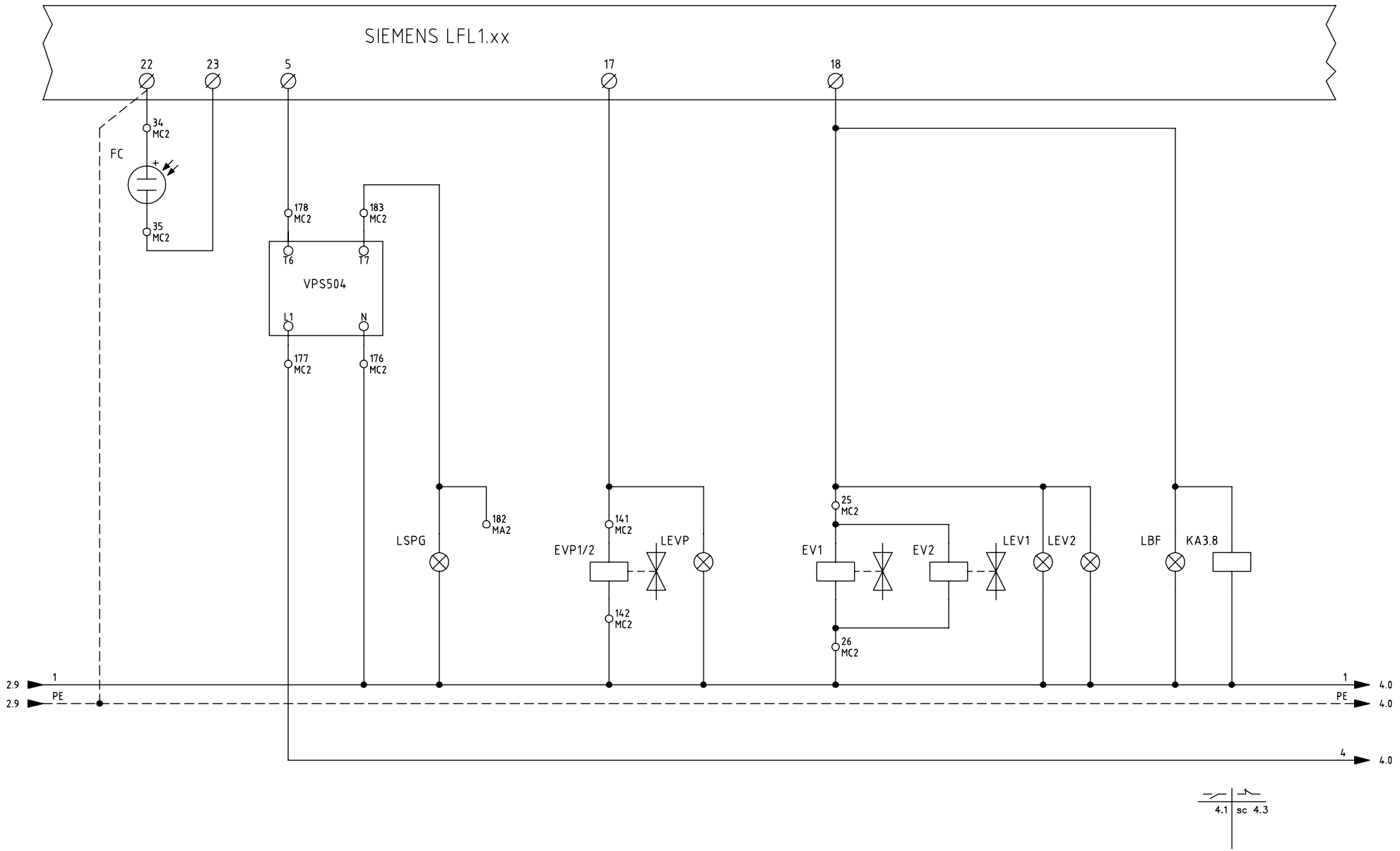
Revisione 03		1	2
Dis. N. 12 – 059		SEGUE 3	TOTALE 6



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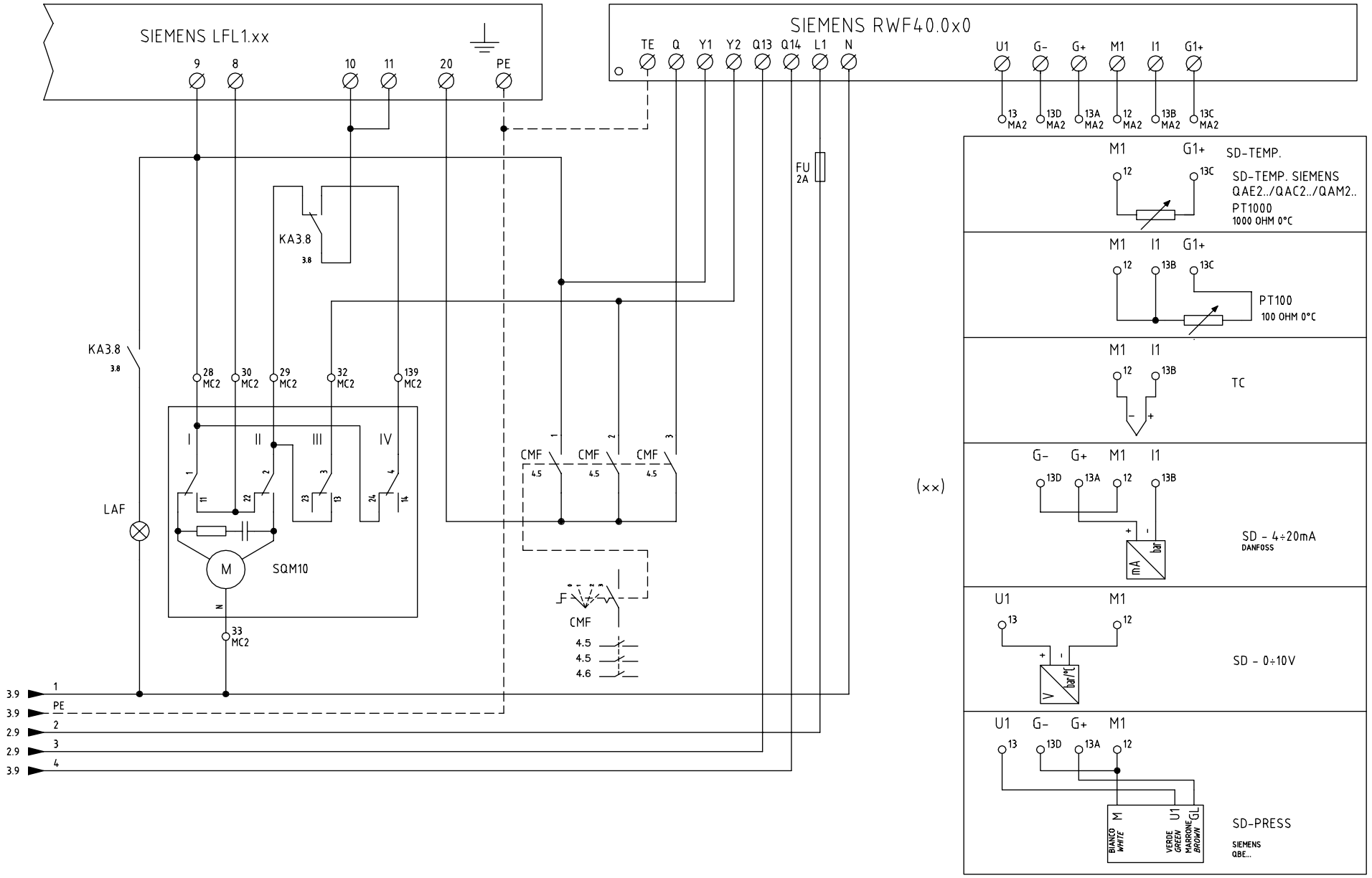
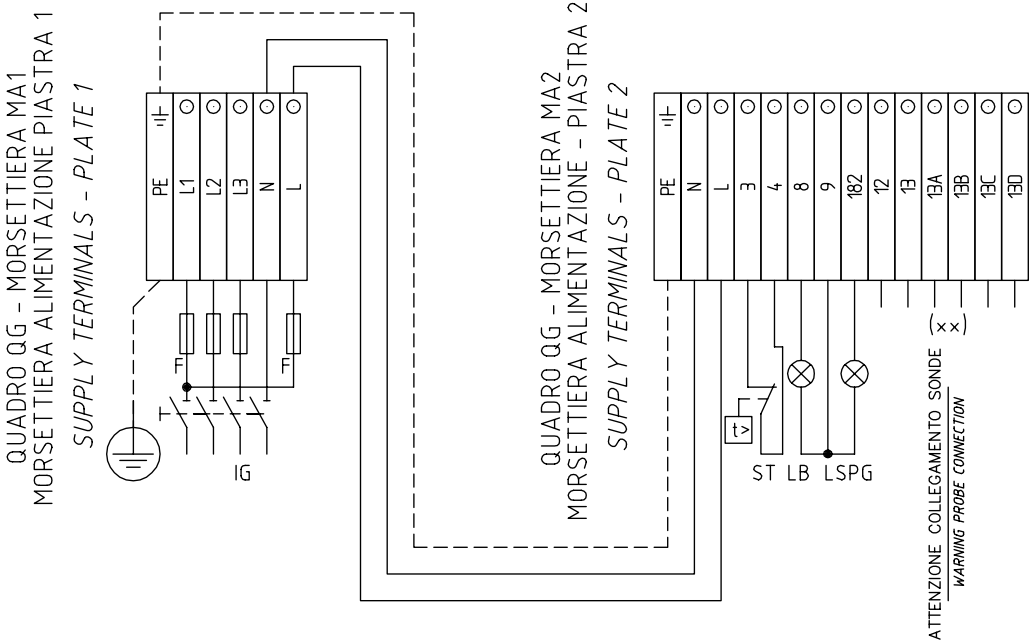
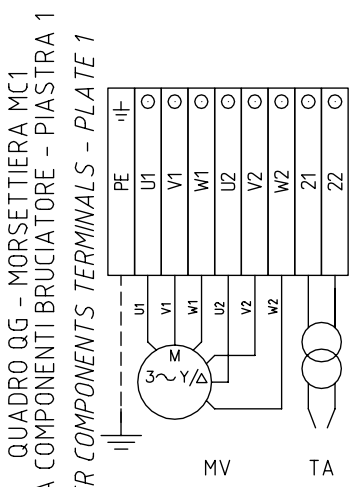
Revisione 03			
Dis. N. 12 – 059		SEGUE 4	TOTALE 6

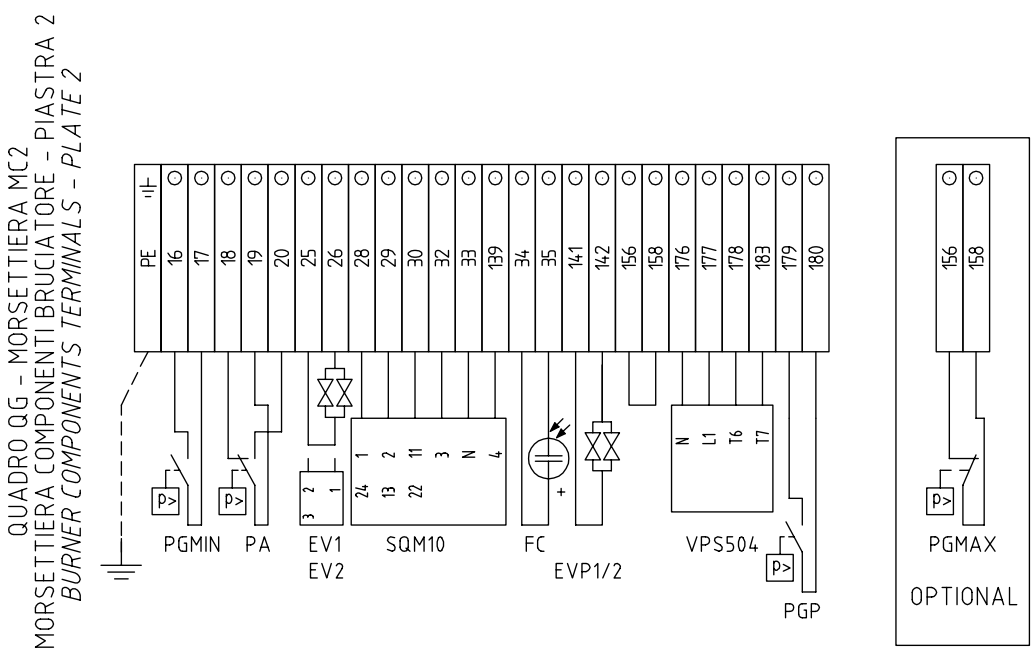


(××)
ATTENZIONE COLLEGAMENTO SONDE
WARNING PROBE CONNECTION

Data 11/10/2001		PREC. 3	FOGLIO 4
Revisione 03			
Dis. N. 12 – 059		SEGUE 5	TOTALE 6







CAMME SERVOCOMANDO
SERVO CONTROL CAMS
SQM10

I	ALTA FIAMMA *HIGH FLAME*
II	SOSTA E ACCENSIONE *STAND-BY AND IGNITION*
III	BASSA FIAMMA *LOW FLAME*
IV	LIMITAZIONE ANTICIPO SERVOCOMANDO *SERVO CONTROL AUTOMATIC ADVANCE RESTRICTION*

Data 11/10/2001		PREC.	FOGLIO
Revisione 03		4	5
Dis. N. 12 – 059		SEGUE	TOTALE
		6	6

0	1	2	3	4	5	6	7	8	9

SIGLA/ITEM	FOGLIO/SHEET	FUNZIONE	FUNCTION
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	3	ELETTROVALVOLA GAS LATO RETE (O GRUPPO VALVOLE)	GAS ELECTRO-VALVE UPSTREAM (OR VALVES GROUP)
EV2	3	ELETTROVALVOLA GAS LATO BRUCIATORE (O GRUPPO VALVOLE)	GAS ELECTRO-VALVE DOWNSTREAM (OR VALVES GROUP)
EVP1/2	3	ELETTROVALVOLE GAS PILOTA	PILOT GAS ELECTRO-VALVES
FC	4	SONDA UV RILEVAZIONE FIAMMA	UV FLAME DETECTOR
FU	4	FUSIBILE	FUSE
FU1	1	FUSIBILI DI LINEA	LINE FUSES
FU2	1	FUSIBILE DI LINEA	LINE FUSE
IG	1	INTERRUTTORE GENERALE	MAIN DISCONNECTOR
IL	1	INTERRUTTORE LINEA AUSILIARI	AUXILIARY LINE SWITCH
KA3.8	3	RELE' AUSILIARIO	AUXILIARY RELAY
KM2.5	2	CONTATTORE MOTORE VENTILATORE (LINEA)	FAN MOTOR CONTACTOR (LINE)
KM2.5S	2	CONTATTORE MOTORE VENTILATORE (STELLA)	FAN MOTOR CONTACTOR (STAR)
KM2.5T	2	CONTATTORE MOTORE VENTILATORE (TRIANGOLO)	FAN MOTOR CONTACTOR (DELTA)
KT2.6	2	TEMPORIZZATORE STELLA/TRIANGOLO	STAR/DELTA DELAYED RELAY
LAF	4	LAMPADA SEGNALAZIONE ALTA FIAMMA BRUCIATORE	BURNER IN HIGH FLAME INDICATOR LIGHT
LB	2	LAMPADA SEGNALAZIONE BLOCCO BRUCIATORE	INDICATOR LIGHT FOR BURNER LOCK-OUT
LBF	3	LAMPADA SEGNALAZIONE BASSA FIAMMA BRUCIATORE	BURNER IN LOW FLAME INDICATOR LIGHT
LEV1	3	LAMPADA SEGNALAZIONE APERTURA [EV1]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV1]
LEV2	3	LAMPADA SEGNALAZIONE APERTURA [EV2]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV2]
LEVP	3	LAMPADA SEGNALAZIONE APERTURA EVP1/2	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVES EVP1/2
LPGMIN	2	LAMPADA SEGNALAZIONE PRESENZA GAS IN RETE	INDICATOR LIGHT FOR PRESENCE OF GAS IN THE NETWORK
LPGP	2	LAMPADA SEGNALAZIONE PRESSOSTATO GAS PILOTA	INDICATOR LIGHT FOR PRESENCE OF GAS IN THE PILOT NETWORK
LS	2	LAMPADA SEGNALAZIONE SOSTA BRUCIATORE	INDICATOR LIGHT FOR BURNER STAND-BY
LSPG	3	LAMPADA SEGNALAZIONE BLOCCO CONTROLLO TENUTA VALVOLE	INDICATOR LIGHT FOR LEAKAGE OF VALVES
LT	2	LAMPADA SEGNALAZIONE BLOCCO TERMICO MOTORE VENTILATORE	INDICATOR LIGHT FOR FAN OVERLOAD TRIPPED
LTA	2	LAMPADA SEGNALAZIONE TRASFORMATORE DI ACCENSIONE	IGNITION TRANSFORMER INDICATOR LIGHT
MV	1	MOTORE VENTILATORE	FAN MOTOR
PA	2	PRESSOSTATO ARIA COMBURENTE	COMBUSTION AIR PRESSURE SWITCH
PGMAX	2	PRESSOSTATO GAS DI MASSIMA PRESSIONE (OPTIONAL)	MAXIMUM PRESSURE GAS SWITCH (OPTIONAL)
PGMIN	2	PRESSOSTATO GAS DI MINIMA PRESSIONE	MINIMUM GAS PRESSURE SWITCH
PGP	2	PRESSOSTATO GAS PILOTA	PILOT MINIMUM GAS PRESSURE SWITCH
PS	2	PULSANTE SBLOCCO FIAMMA	LOCK-OUT RESET BUTTON
PT100	4	SONDA DI TEMPERATURA	TEMPERATURE PROBE
SD-0÷10V	4	SEGNALE IN TENSIONE	TENSION SIGNAL
SD-PRESS	4	SONDA DI PRESSIONE	PRESSURE PROBE
SD-TEMP.	4	SONDA DI TEMPERATURA	TEMPERATURE PROBE
SD - 4÷20mA	4	TRASDUTTORE USCITA IN CORRENTE	TRASDUCER CURRENT OUTPUT
SIEMENS LFL1.xx	2	APPARECCHIATURA CONTROLLO FIAMMA	FLAME MONITOR DEVICE
SIEMENS RWF40.0x0	4	REGOLATORE MODULANTE	BURNER MODULATOR
SQM10	5	CAMME SERVOCOMANDO	SERVO CONTROL CAMS
SQM10	4	SERVOCOMANDO SERRANDA ARIA	AIR DAMPER SERVO CONTROL
ST	2	SERIE TERMOSTATI/PRESSOSTATI	SERIES OF THERMOSTATS OR PRESSURE SWITCHES
TA	2	TRASFORMATORE DI ACCENSIONE	IGNITION TRANSFORMER
TC	4	TERMOCOPPIA	THERMOCOUPLE
TV	1	TERMICO MOTORE VENTILATORE	FAN MOTOR THERMAL
VPS504	3	CONTROLLO DI TENUTA VALVOLE GAS	GAS LEAKAGE CONTROL UNIT

Data 11/10/2001		PREC.	FOGLIO
Revisione 03		5	6
Dis. N. 12 - 059		SEGUE	TOTALE
		/	6

APPENDIX

SIEMENS LFL 1.3.. CONTROL BOX

Automatic programme in the event of interruption and indication of position when interrupted

By default, in the event of any kind of interruption, the flow of fuel is immediately interrupted. At the same time the programmer stops and this indicates the position at the time of the interruption.

A symbol on the indicator disc shows each time the type of stoppage:

◄ No start-up (for example fault in the CLOSED signal for the limit contact "Z" at terminal 8 or some other contact between the terminals 12 and 4 or 4 and 5 is not closed).

◄ Start-up suspended because of a fault in the OPEN signal for the limit contact "A" at terminal 8.

P Block due to absence of air pressure signal. From this moment onwards any absence of air pressure will cause a block.

■ Block due to malfunction of the flame detector circuit.

▼ Start-up interrupted because there is a fault in the MINMUM signal for the auxiliary contact of the damper servo motor at terminal 8.

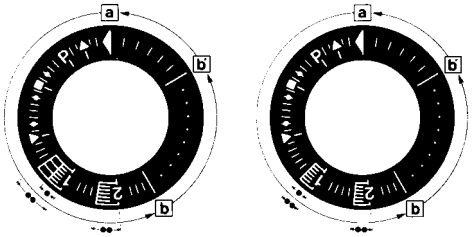
1 Block due to absence of flame signal at the end of the 1st safety period.

From this moment onwards any absence of a flame signal will cause a block.

2 Blockdue to absence of flame signal at the end of the 2nd safety period (flame signal of main burner).

▌ Blockdue to absence of flame signal or air pressure during operation.

Where a block stoppage occurs at any moment between switch on and pre-ignition without registering any symbol, the cause is normally an unscheduled flame signal.



a-b Start-up programme

b-b' For time variants:move the programmer on to the automatic stop after the burner starts up (b' = position of the programmer during normal burner operation).

b(b')-aPost-ventilation programme after a regulation stop.At the start-up position "a" the programmer stops automatically.

. Safety time duration for mono-tube burners

.. Safety time duration for twin-tube burners

The apparatus can be reset immediately after a block. After resetting (and after the elimination of any problem causing the stoppage or after a power failure) the programmer returns to its start-up position. In this event only the terminals 7, 9, 10 and 11 are live in accordance with the monitoring programme. Only after this the device programs a new startup.

Operation

The wiring system and also the control system of the programmer "P" have already been given in this manual. The response signals required for the active parts and the flame monitor circuit are shown by a hatching.

In the absence of these response signals the mechanism interrupts the start-up programme; the exact time of the interruption can be identified from the visual indicator and will cause a block if the safety code requires it.

A consent to start-up by means of the thermostat or pressostat "R"

A-B start-up program

B-C normal burner operation

C regulation stop caused by "R"

C-D programmer returns to start-up position A.

During the regulation stop only terminals 11 and 12 are live and the damper, through the limit contact "Z" of its servo-motor is in the CLOSED position.The flame detector circuit F is activated (terminals 22 and 23 or 23/4) for the detector test and the paracitic light test.

Where the burners do not have dampers (or have an independent 00 damper control mechanism) there must be a bridge between terminals 6 and 8, otherwise the mechanism will not start up the burner.

For a burner to start up the following conditions must be met:

- Mechanism not blocked/reset.
- Damper closed.Limit contact switchZ must be in the CLOSED position and allow current to flow between terminals 11 and 8.
- Any contacts checking that the fuel valve (bv...) is closed, or other contacts with similar functions, must be closed between terminal 12 and the air pressostat LP.
- The contact for the air pressostat LP must be in the off position (LP test) so as to feed terminal 4.
- The gas pressostat contacts GP and the safety thermostat and pressostat contacts W must also be closed.

Start-up program

A Start-up

(R closes the start-up control ring between terminals 4 and 5)

The programmer starts up.At the same time the ventilator motor is fed through terminal 6 (only for pre-ventilation) and, after t7, the ventilator motor or the combustion gas exhaust fan is fed through terminal 7 (pre-ventilation and post-ventilation).

At the end of t16, the command opening the damper passes through terminal 9; during the damper opening time the programmer does not move since terminal 8, through which the programmer is fed, is dead.

Only once the damper is fully open and the limit contact switch A has switched on, feeding terminal 8, does the programme proceed.

t1 Pre-ventilation time with damper fully open (nominal air flow).

Shortly after the beginning of the pre-ventilation time, the air pressostat should switch off the current between terminals 4 and 13;otherwisethe apparatus would block (air pressure monitor).

At the same time the terminal 14 should be live since current feeding the ignition transformer and the fuel valves passes through this circuit.

During pre-ventilation time the flame detector circuit is checked and in the event of an operational defect the monitor brings about a block.

At the end of the pre-ventilation time the monitor automatically moves the damper servo-motor, through terminal 10, to the flame ignition position which is governed by the auxiliary contact "M".

During this period the programmer stops until terminal 8, is again activatedthrough contact "M".

After a few seconds the little programmer motor is directly fed by the active part of the apparatus.

After this point terminal 8 plays no further part in the burner ignition process.

Mono-tube burner

t3 Pre-ignition time waiting the response from the fuel valve at terminal 18.

t2 Safety time (start up flame strenght); at the end of the safety time a flame signal should appear at terminal 22 of the amplifier and it should stay on until a regulation stop; if this does not happen the mechanism will block.

t4 Interval; at the end of t4, terminal 19 is live.

t5 Interval At the end of t5 terminal 20 is live.At the same time the monitor outlets from 9 and 11 and terminal 8 into the active part of the apparatus are kept galvanically separatedso as to protect the monitor itself from recovery voltage through the capacity regulator circuit.

Twin-tube burners (**)

t3 Preignition time until the all clear to the pilot burner valve at terminal 17.

t2 First safety time (pilot flame strenght); at the end of the safety time a flame signal should appear at terminal 22 of the amplifier and it should stay on, until a regulation stop; if it does not, the apparatus will block.

t4 Interval until the consent to the fuel valve at terminal 19, for the first flame of the main burner.

t9 2nd safety time; at the end of the second safety time the main burner should be lit by means of the pilot. At the end of this period, terminal 17 is dead and therefore the pilot burner will be out.

t5 Interval; at the end of t5 terminal 20 is live. At the same time the monitor outlets from 9 to 11 and the terminal 8at the input of the active part of the apparatus are galvanically separated so as to protect the apparatus itself from recovery voltage through the strenght regulator circuit.

When the strenght regulator LR at terminal 20 gives the consent, the start-up programme for the apparatus comes to an end. Depending on time variants, the programmer stops either immediately or at the end of a set time, without effecting the position of the contacts.

B Operational position of the burner

B-C Burner operation (production of heat)

While the burner is working the strnght regulator controls the damper, according to the demand for heat, by means of the positioning at nominal load of the auxiliary contact "V" of the damper servocontrol.

C Regulation stop for operation of "R"

When there is a regulation stop the fuel valves immediately close. At the same time the programmer starts to programme:

t6 Post-ventilation time (post-ventilation with the ventilator "G" at terminal 7).Shortly after beginning of the post-ventilation time terminal 10 becomes live and moves the damper to the "MIN" position. The full closure of the damper only happens towards the end of the post-ventilation time and is prompted by an automatic signal from terminal 11

t13 Admissible post-ignition time

During this time the flame monitor circuit may still receive a flame signal without the apparatus blocking.

D-A End of automatic programme

At the end of t6, at the point where the programmer and the automatic contacts have reverted to the starter position, the detection probe test restarts.

During an operational stop even an unscheduled flame signal lasting a few seconds can cause a block because during this period an NTC in the circuit acts as retarder.This means that brief unscheduled influences cannot cause a block.

(**) Times t3, t2 and t4 only apply only to safety devices in the series 01.

Specifications

Mains voltage	220V -15%...240V +10%
Frequency	50Hz -6%...60Hz +6%
Absorbed capacity	3.5 VA
Built-in fuse	T6.3/250E slow action DIN41571 No. 451915070
External fuse	max. 16A
Interference	N-VDE0875
Flow permitted at terminal 1	5A (DIN 0660 AC3)
Flow permitted at control terminals	4A (DIN 0660 AC3)
Flow at monitor contacts:	
input at terminals 4 & 5	1A, 250V
input at terminals 4 & 11	1A, 250V
input at terminals 4 & 14	function of the load at terminals 16 and 19, min.1A, 250V
Emplacement	Any
Protection	IP40
Permitted ambient temp	-20...+60° C
Min.temperature (trans/storage)	-50° C
Weight:	
apparatus	approx. 1,000g.
base	approx. 165g.

Ionisation monitor

voltage in detector electrode	
normal working	330V ±10%
test	380V ±10%
short circuit current	max. 0,5 mA
Ionisation current, min.request	6 µA
max. permitted length for connecting cables	
normal cable (laid separately**)	80m
armoured cable(high frequency)	protection at terminal 22 140m

UV monitor	
Voltage in UV detector	
normal working	330V ±10%
test	380V ±10%
Detector current, min. request*	70µA
Max. detector current	
normal working	630 µA
test	1300 µA
Max.length of connecting cable	
normal cable (laid separately**)	100m
armoured cable (high frequency)	protected at terminal 22 200m
Weight	
QRA2	60 g
QRA10	450 g.

*Connect up in parallel to the measuring device a condenser 100µF, 10...25V.

** The wire connecting up the detector electrode should not be in the same sleeve as the other conductor wires.

Ignition spark monitor with QRE1 series 02 detector

Minimum detector current	30µA

Operating times

t7 initial delay for ventilator G2	2	
t16 initial delay of air damper OPEN consent		4
t11 opening time for damper	any	
t10 initial delay for air pressure monitor	8	
t1 pre-ventilation time with damper open	36	
t12 travel time for air damper to MIN position	any	
t3 t3' pre-ignition time	t3	4
	t3	'-
t2 t2' safety time (1st safety time for burners with intermittent pilot lighter	t2	2
	t2	'-
t4 t4' interval between start of t2 and response to valve at terminal 19	t4	10
	t4	'-

t9 2nd safety time for burners with intermittent pilot lighter 2

t5 interval between end of t4 and response at terminal 20 10

t20 interval before programmer cuts out after start-up-

duration of start-up	60
t6 post-ventilation time (G2 only)	12
t13 permitted post-ignition time	12

t16 initial delay from opening consent of the air damper

t20 interval until the automatic shut-off of the programming mechanism after the burner start

Key

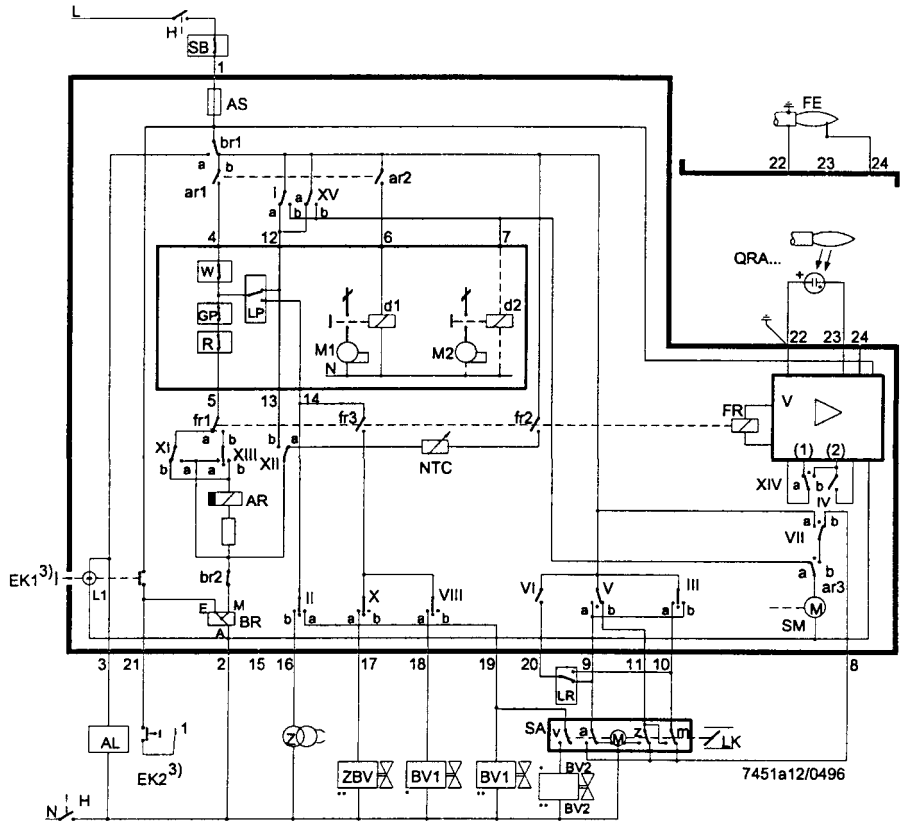
A	limit contact switch for damper OPEN position
AI	block remote signal
AR	main relay (working network) with contacts "ar"
AS	Monitor fuse
BR	block relay with "br" contacts
BV	fuel valve
EK	reset button
FE	detector electrode of ionisation circuit
FR	flame relay with "fr" contacts
G	ventilator motor or burner motor
GP	gas pressure switch
H	main interruptor switch
L	block stoppage LED
LK	air damper
LP	air pressostat
LR	safety regulator
M	auxiliary contact switch for damper "MIN" position
QRA	UV detector
QRE	ignition spark detector
R	thermostat or pressostat
S	fuse
SA	damper servo-motor
SM	synchronous programmer motor
V	flame signal amplifier
V	in case of servo-motor: auxiliary contact for response to fuel valve with regard of damper position
W	safety pressostat or thermostat
Z	ignition transformer
Z	in case of servomotor: end of limit contact switch for damper CLOSED position
ZBV	pilot burner fuel valve
°	for mono-tube burners
°°	for twin-tube burners

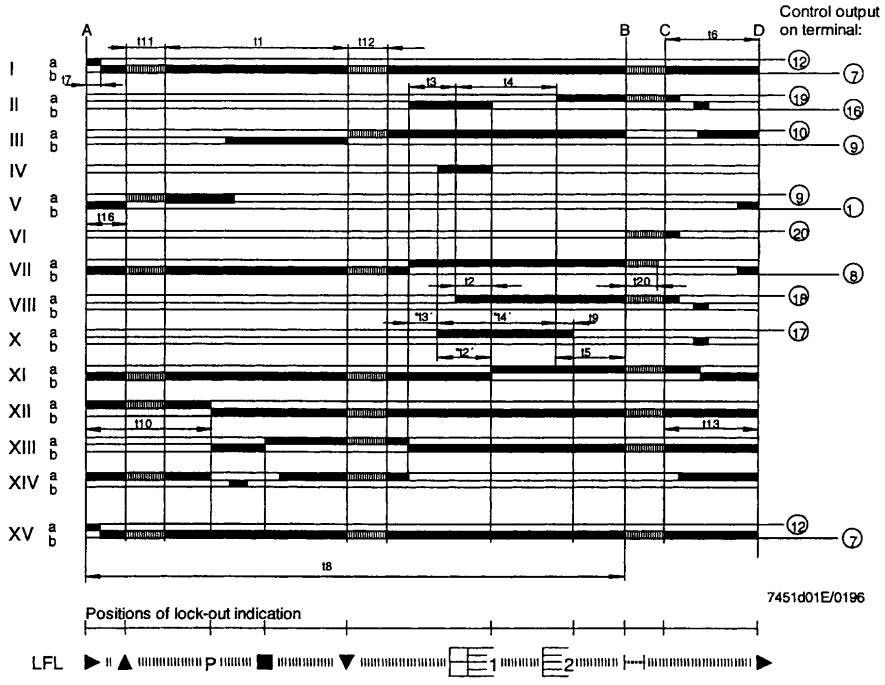
(1)	input for raising QRA detector voltage to test level
(2)	input for excitation of flame relay during flame detector test circuit (contact XIV) and during safety time (contact IV)
(3)	Do not press EK for more than 10 seconds

Programmer diagram

t1	pre-ventilation time
t2	safety time
*t2	'1st safety time
t3	pre-ignition time
*t3	'pre-ignition time
t4	interval for creating current between terminals 18 and 19
*t4	'interval for creating current between terminals 17 and 19
t5	interval for creating current between terminals 19 and 20
t6	post-ventilation time
t7	interval between startup consent and current created at terminal 7
t8	duration of start-up
*t9	2nd safety time
t10	interval before air pressure monitoring begins
t11	damper opening travel time
t12	damper closure travel time
t13	permissible post-combustion time
t16	initial delay of damper OPEN response
t20	interval before programmer automatically stops

* These times are valid with the use of a series 01 safety device for monitoring burners with intermittent pilot lighter.





VALVE PROVING SYSTEM SIEMENS LDU11

The LDU11... gas valve proving system is designed for use in gas-fired plant equipped with two safety shutoff valves. During each startup cycle, the control unit automatically programs the valve proving test and, in the event of a leak, prevents burner startup.

The LDU11… control unit is designed to provide automatic gas valve proving (leakage test) based on the pressure proving principle. It is for use in gas-fired plant with or without vent pipe to the atmosphere. For plants without vent pipe, where DIN/DVGW regulations apply, refer to the hints given on "Connection examples with vent pipe to the atmosphere".

Gas valve proving is initiated automatically with every burner startup using one or two standard pressure monitors, either

- prior to burner startup,
- during the pre-purge time, if it lasts at least 60 s,
- immediately after the controlled shutdown, or
- on completion of the burner control's control program, e.g. on completion of the post-purge time

The valve proving test is based on the two-stage pressure proving principle: first, the valve on the mains side is tested by evacuating the test space and by monitoring the atmospheric pressure in it. Then, the valve on the burner side is checked by pressurizing the test space and by monitoring the gas pressure. If the pressure increases excessively during the first test phase (Test 1), or decreases excessively during the second test

phase (Test 2), the control unit inhibits burner startup and goes to lockout. In that case, the lockout reset button lights up to indicate the fault. Remote indication of the fault is also possible.

A program indicator, which stops whenever a fault occurs, indicates which of the two valves is leaking.

Mode of operation

To carry out the first phase of the valve proving test, called "Test 1", there must be atmospheric pressure in the length of pipe between the two valves to be tested. In plants with a vent to the atmosphere, this pressure is available if the valve proving test isconducted prior to or during the prepurge time. In plants without a vent pipe, atmospheric pressure is made available as the control unit opens the valve on the burner side during the time "t4". If the valve proving test is performed after the operation of the burner, the valve on the burner side after the controlled shutdown can be kept open until "t4" has elapsed, thus reducing the pressure in the test space and making certain its gas content is burnt off in the combustion chamber during the post-purge time. A prerequisite for this procedure is an appropriate control program of the burner control as provided by Landis & Staefa burner controls type LFE..., LFL..., LGK.... or LEC.... The test space is closed off after it has been evacuated.

During the first test phase (Test 1) which follows immediately, the control unit checks if the atmospheric pressure in the test space is maintained using the pressure monitor. If the valve on the mains side is leaking, causing the pressure to rise above the switching point of the pressure monitor, the control unit initiates an alarm and goes to lockout.

The program indicator then stops and indicates "Test 1".

If the pressure does not increase because the valve closes correctly, the control unit immediately programs the second test phase (Test 2). To do this, the valve on the mains side is pressurized ("filling" of test space). During the second test phase, the pressure may not fall below the switching point of the pressure monitor due to a leak of the valve on the burner side.

If it does, the control unit goes to lockout again, thus inhibiting burner startup.

On the successful completion of the second test phase, the control unit closes the internal control loop between terminals 3 and 6 (circuit path: terminal 3 - contact "ar 2" -terminals 4 and 5 - contact III - terminal 6). This control loop is usually included in the start control loop of the burner control.

After the control loop has been closed, the programming mechanism of the control unit returns to its start position where it switches itself off. During these "idle steps", the position of the control contacts of the programming mechanism remains unchanged.

Program and lockout indicator

When the unit goes to lockout, the programming mechanism stops and also the position indicator fitted to the spindle of the mechanism. The symbol that stops above the reading mark not only indicates during which test phase lockout occurred, but also after how many programming steps within the test phase (1 step = 2.5 seconds).

Specifications

Mains voltage	AC 220 V -15 %...240 V +10 % AC 100 V -15 %...110 V +10 % Mains frequency 50 Hz -6 %...60 Hz +6 %
Power consumption	
- during the test	3.5 VA
- during burner operation	2.5 VA
Prefuse (externally)	T16/500 V
Unit fuse	T6,3H250 V to IEC 127
Radio interference protection	N to VDE 0875
Perm. input current at terminal 15	A continuous to VDE 0660 AC3
Environmental conditions:	
Temperature	-50...+60 °C
Humidity	< 95 % r.h.
Mechanical conditions	class 2M2
Climatic conditions	class 3K5
Temperature	-20...+60 °C
Humidity	< 95 % r.h.

Condensation, formation of ice and influence of water are not permitted

Perm. current rating of control terminals4 A to VDE 0660 AC3

Required switching capacity of pressure switch "DW"1 A min., AC 250 V

Mounting position	optional
Degree of protection	IP40
Weight	
control unit approx.	1000 g
base approx.	165 g
CE conformity	According to the directives of the European Community
Electromagnetic compatibility	EMC 89/336

EWG include. 92/31 EEC, Gas appliance directive 90/396 EEC

Emissions	EN 50081-1
Immunity	EN 50082-2


Start position = operating position


In plants without a vent valve: evacuation of test space through opening of the valve on the burner side

Test 1 "Test 1" with atmospheric pressure (valve proving test on the mains side)


Filling the test space through opening of the valve on the mains side

Test 2 "Test 2" with gas pressure (valve proving test on the burner side)


Idle steps until programming mechanism switches itself off


Operating position = start position for the next valve proving test

In the event of lockout, all terminals receiving voltage from the control unit are de-energized, except terminal 13, which is used for lockout indication.

After the unit has been reset, the programming mechanism automatically returns to its

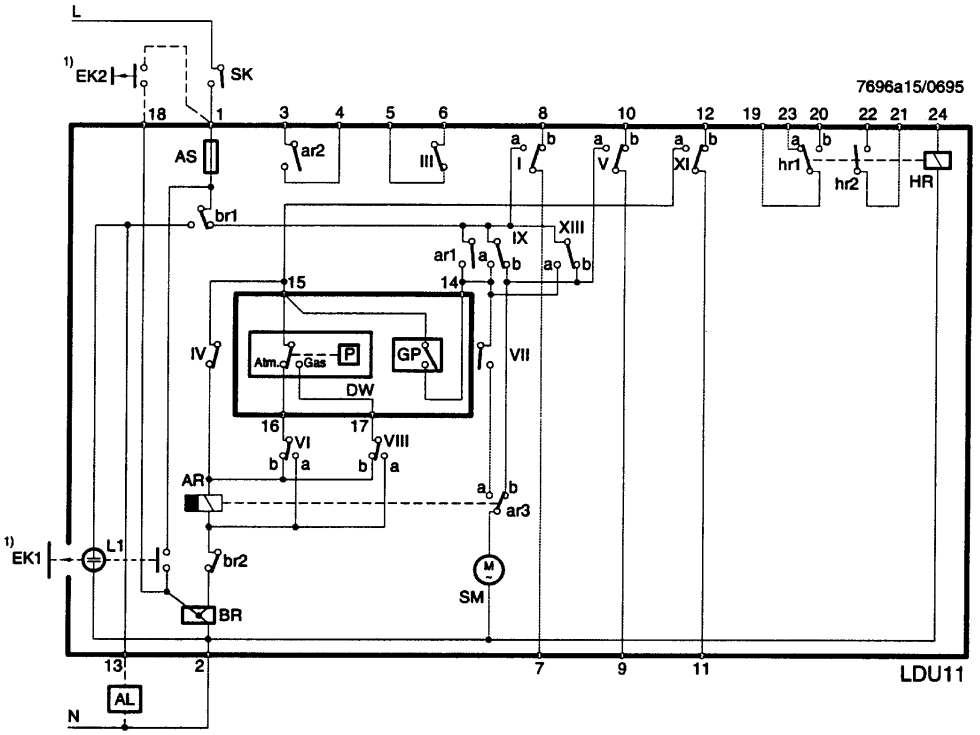
start position and immediately reprograms a new valve proving test.

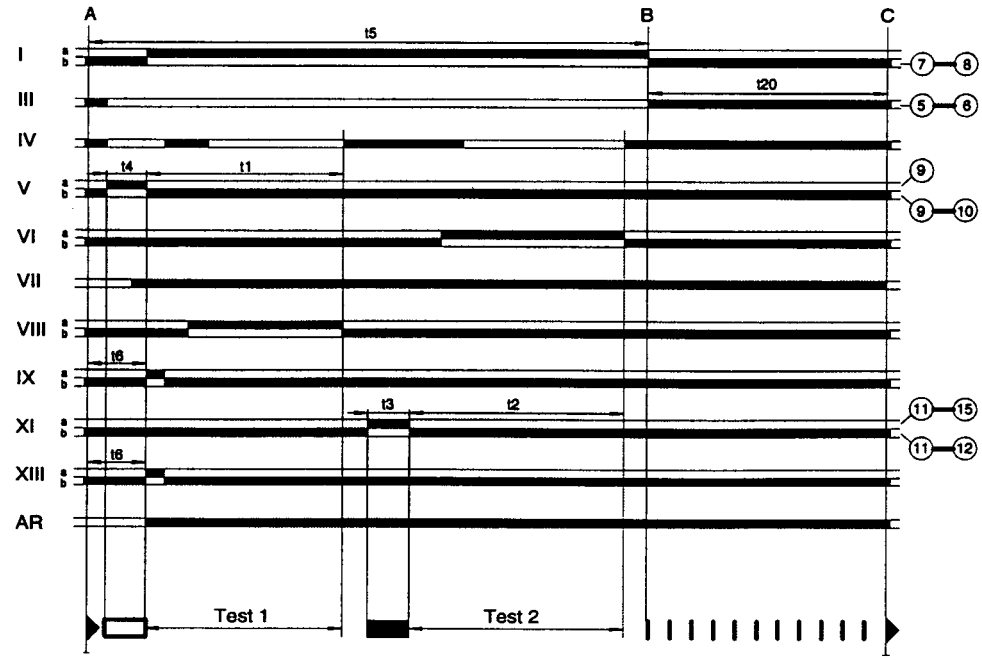
Note: do not press the reset button for more than 10 seconds.

Control program after a power failure

A power failure prior to evacuating the test space does not cause the program sequence to change.

If a power failure occurs after the evacuation, the valve proving test will not be continued when power is restored, but the programming mechanism first returns to its start position to reprogram the complete proving test.





KEY

AL	Alarm signal "Leaking valve"
AR	Main relay with contacts "ar..."
AS	Built-in fuse
BR	Lockout relay with contacts "br..."
DW	Pressure monitor for valve proving test (does not replace the gas pressure monitor used to signal lack of gas)
EK...	Lockout reset button
GP	Gas pressure monitor (for lack of gas)
HR	Auxiliary relay with contacts "hr..."
L1	Built-in lockout warning lamp
SM	Synchronous motor of programming mechanism
SK	Mains switch

Warning notes

- The electrical wiring must comply with local and country-specific standards and regulations!
- The LDU11... must be completely isolated from the mains before performing any work on it!
- The LDU11... is a safety device. It is therefore not permitted to open, interfere with or modify the unit!
- Check wiring carefully before putting the unit into operation!
- Check all safety functions when putting the unit into operation or after replacing a fuse!
- Ensure protection against electric shock hazard on the unit and at all electrical connections through appropriate mounting!
- Electromagnetic emissions must be checked from an application point of view!
- The regulations and standards covering the specific application must be observed!
- All installation and commissioning work must be carried out by qualified personnel!
- In the geographical areas where DIN standards are in use, the installation must be in compliance with VDE requirement, particularly with the standards DIN/VDE 0100 and 0722!
- Condensation and ingress of humidity must be avoided!
- Ignition cable must always be laid separately, observing the greatest possible distance to other cables!

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