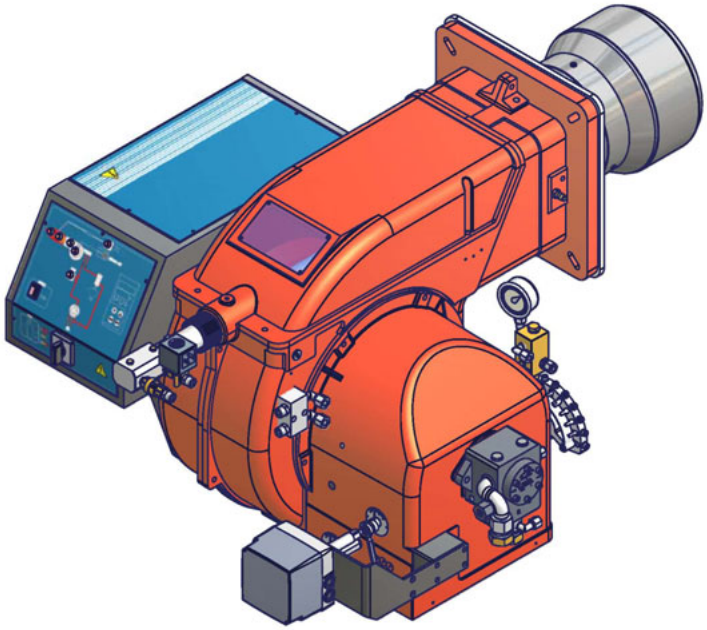
PG91
PG92
PG93



Progressive, Fully-modulating BurnersLight oil burners

MANUAL OF INSTALLATION - USE - MAINTENANCE

CIB UNIGAS

BURNERS - BRUCIATORI - BRULERS - BRENNER - QUEMADORES - ГОРЕЛКИ

M039186CC Rev. 2.2 01/2013

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APPENDIX

DANGERS, WARNINGS AND NOTES OF CAUTION

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

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

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

CAREFULLY KEEP THIS MANUAL FOR FUTURE REFERENCE.

1) GENERAL INTRODUCTION

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

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

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

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

Contact qualified personnel only.

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

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

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

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

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

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

2) SPECIAL INSTRUCTIONS FOR BURNERS

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

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

a Remove the power supply by disconnecting the power cord from the mains.

b Disconnect the fuel supply by means of the hand-operated shut-off valve and remove the control handwheels from their spindles.

Special warnings

- Make sure that the burner has, on installation, been firmly secured to the appliance, so that the flame is generated inside the appliance fire-box.
- Before the burner is started and, thereafter, at least once a year, have qualified personnel perform the following operations:

a set the burner fuel flow rate depending on the heat input of the appliance;

b set the flow rate of the combustion-supporting air to obtain a combustion efficiency level at least equal to the lower level required by the regulations in force;

c check the unit operation for proper combustion, to avoid any harmful or polluting unburnt gases in excess of the limits permitted by the regulations in force;

d make sure that control and safety devices are operating properly;

e make sure that exhaust ducts intended to discharge the products of combustion are operating properly;

f on completion of setting and adjustment operations, make sure that all mechanical locking devices of controls have been duly tightened;

g make sure that a copy of the burner use and maintenance instructions is available in the boiler room.

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

3) GENERAL INSTRUCTIONS DEPENDING ON FUEL USED

3a) ELECTRICAL CONNECTION

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

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

GENERAL

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

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

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

SPECIAL INSTRUCTIONS FOR USING GAS

Have qualified personnel inspect the installation to ensure that:

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

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

Precautions if you can smell gas

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

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

DIRECTIVES AND STANDARDS

Gas burners

European directives

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

Harmonized standards

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

Light oil burners

European directives

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

Harmonized standards

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

National Standard

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

Heavy oil burners

European Directives

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

Harmonized standards

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

Norme nazionali / National Standard

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

Gas - Light oil burners

European Directives

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

Harmonized standards

-UNI EN 676 (Automatic forced draught burners for gaseous fuels)
-UNI EN 267(Automatic forced draught burners for liquid fuels)
-EN 55014-1 (Electromagnetic compatibility- Requirements for house hold appliances, electric tools and similar apparatus)
-EN 60204-1:2006 (Safety of machinery – Electrical equipment of machines.)
-CEI EN 60335-1 (Specification for safety of household and similar electrical appliances);
-CEI EN 60335-2-102 (Household and similar electrical appliances. Safety. Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections).
-UNI EN ISO 12100:2010 (Safety of machinery - General principles for design - Risk assessment and risk reduction);

Norme nazionali / National Standard

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

Gas - Heavy oil burners

European directives:

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

Harmonized standards

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

National Standard

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

Industrial burners

European directives

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

Harmonized standards

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

Burner data plate

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

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

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

SYMBOLS USED



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



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



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

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

PART I: INSTALLATION

GENERAL FEATURES

The burners of this series represent monoblock burners made in die-cast aluminium housing with relative flange to work on heating generators. The output range is from 700kW to 4100kW (according to the model).They can be provided in progressive or fully-modulating version.

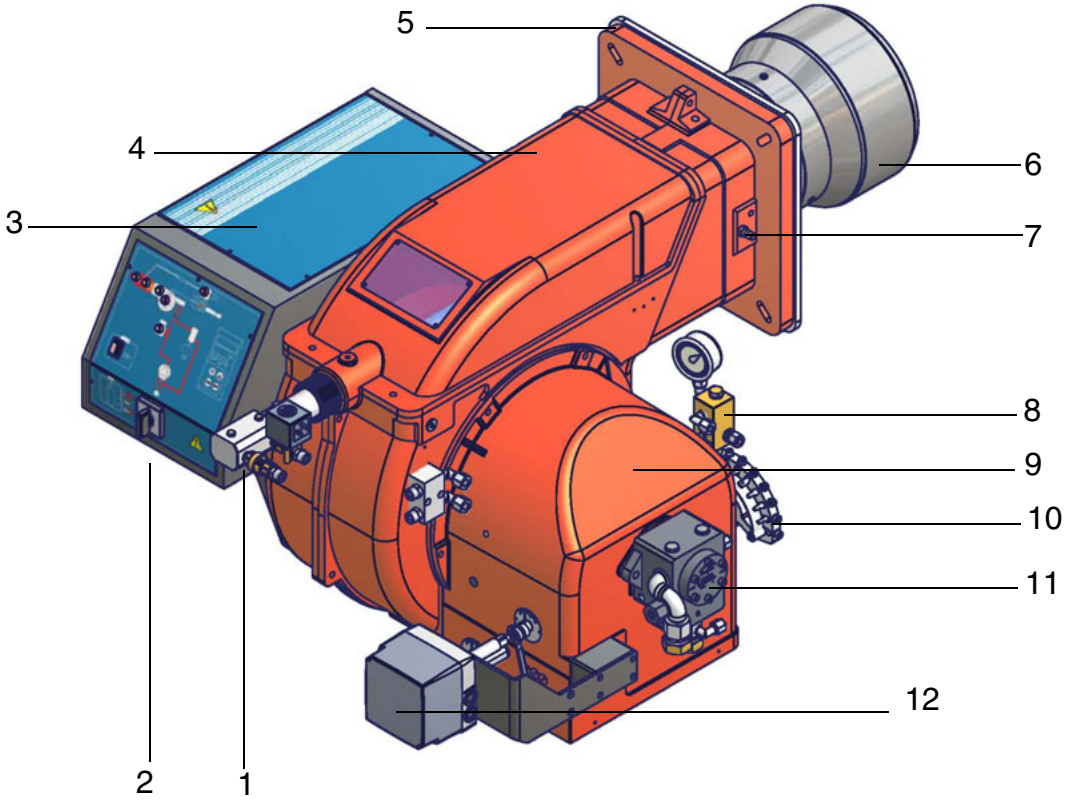


Fig. 1

1 Gun and head adjusting ring nut
2 Synoptic panel and burner main switch
3 Control panel
4 Burner cover
5 Burner flange
6 Blast tube-combustion head ass.y
7 Photoresistor
8 Pressure governor
9 Air intake
10 Adjusting cam
11 Pump
12 Actuator

The fuel coming from the supply line, is pushed by the pump (11) to the nozzle and then into the combustion chamber, where the mixture between fuel and air takes place and consequently the flame.

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

The pump (11) main function is to transfer oil from the tank to the nozzle at required quantity and pressure. To adjust pressure, pumps are provided with a pressure governor.

The electric actuator (12) moves the air damper and allows the optimisation of the gas flue values, as to get an efficient combustion. The position of the combustion head determines the burner output. The air (comburent) and fuel (light oil) are forced into the combustion chamber, as to let the flame light up.

How to interpret the burner's "Performance curve"

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

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

Example:

Furnace input: 600kW

Backpressure: 4mbar

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

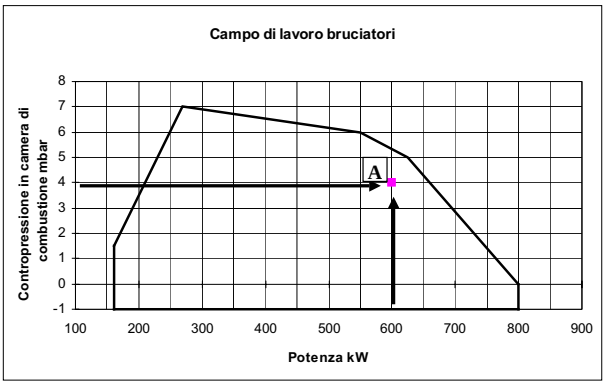


Fig. 2

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

Burner model identification

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

Type **PG92** Model	**G-.**	**PR.**	**S.**	***.**	**A.**
(1)	(2)	(3)	(4)	(5)	(6)

(1) BURNER TYPE	**PG91-PG92-PG93**
(2) FUEL	**G -** Light oil **A -** Biodiesel
(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

Technical specifications

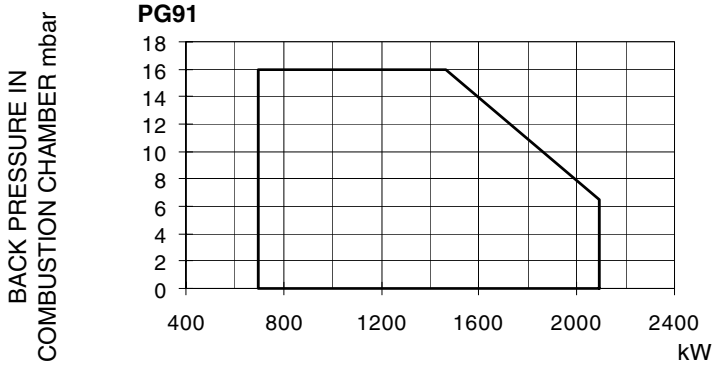
BURNERS		PG91	PG92	PG93
Output	min. -max. kW	698 - 2093	849 - 2558	550 - 4100
Light oil rate	min. -max. kg/h	59 - 176	72 - 215	46 - 345
Fuel		Light oil		
Viscosity	cSt @ 40 °C	2 - 7.4		
Density	kg/m^3	840		
Power supply		400V 3N ~ 50Hz		
Electric motor	kW	4	5.5	7.5
Total power consumption	kW	4.5	6	8
Index of protection		IP40		
Approx. weight	kg	220	220	230
Operation		Progressive - Fully modulating		
Operating temperatureOperating temperature	°C	-10 ÷ +50		
Storage TemperatureStorage temperature	°C	-20 ÷ +60		
Working service *		Intermittent		

NOTE: Choosing the nozzle for light oil, consider Hi equal to 10210 kcal/kg.

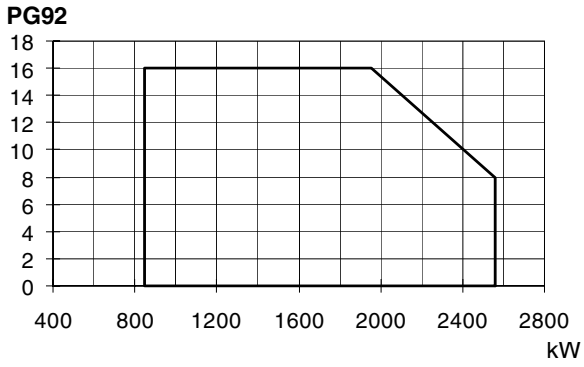
*** NOTE ON THE WORKING SERVICE: the Siemens LMO.. control box automatically stops after 24h of continuous working. The control box immediately starts up, automatically.**

Performance curves

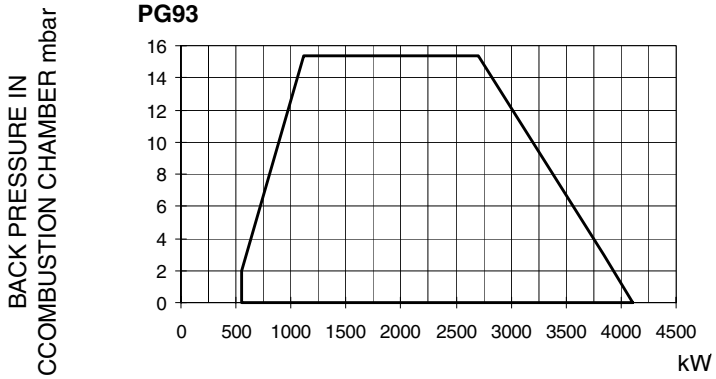
PG91



PG92



PG93

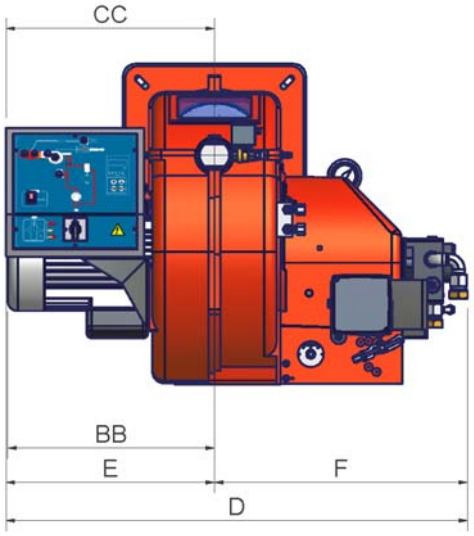


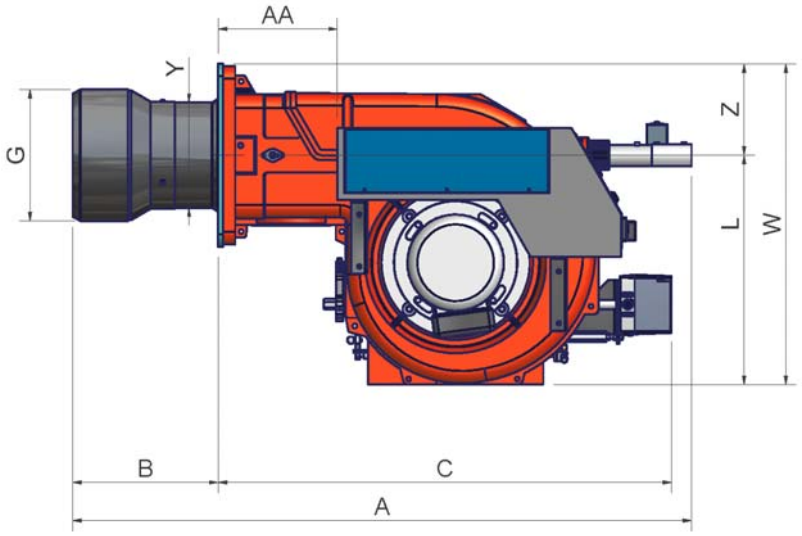
To get the input in kcal/h, multiply value in kW by 860.

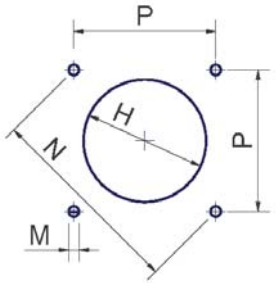
Data are referred to standard conditions: atmospheric pressure at 1013mbar, ambient temperature at 15°C.

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

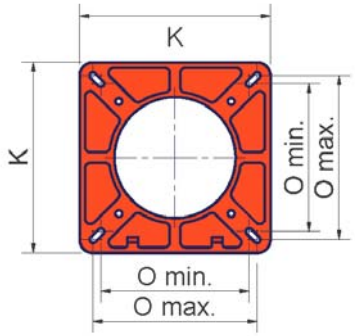
Overall dimensions (mm)







boiler recommended drilling template



burner flange

	A(S*)	A(L*)	AA	B(S*)	B(L*)	BB	C	CC	D	E	F	G	H	K	L	M	N	Omin	Omax	P	W	Y	Z
PG91	1259	1432	242	300	473	419	918	422	935	422	513	238	268	360	464	M12	417	280	310	295	649	228	185
PG92	1253	1426	242	294	467	419	918	422	935	422	513	266	296	360	464	M12	417	280	310	295	649	228	185
PG93	1256	1431	243	301	491	460	918	422	935	422	513	292	322	360	464	M12	417	280	310	295	649	228	185

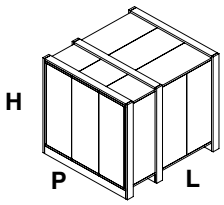
*S: standard blast tube

*L: extended blast tube

MOUNTINGS AND CONNECTIONS

Packing

The burners are dispatched in wooden packages whose dimensions are:1730mm x 1280mm x 1020mm (L x P x H)
Packing cases of this kind are affected by humidity and are not suitable for stacking. The following are placed in each packing case.



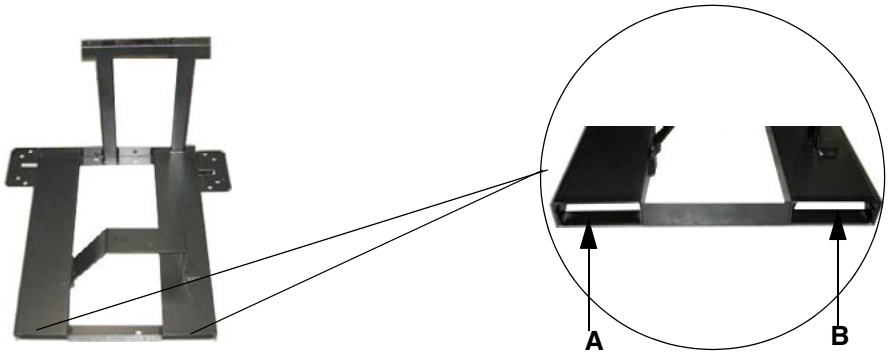
- burner;
- light oil flexible hoses;
- light oil filter;
- gasket to be inserted between the burner and the boiler;
- envelope containing this manual.

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

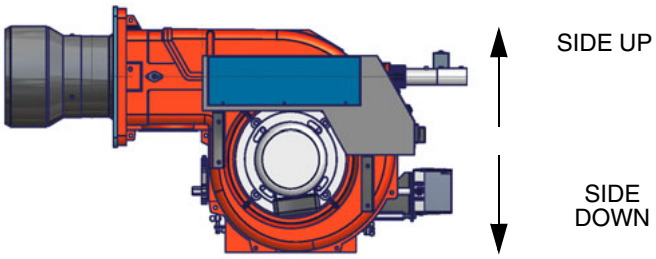
Handling the burner

⚠	**ATTENTION! The lhandling operations must be carried out by specialised and trained personnel. If these operations are not carried out correctly, the residual risk for the burner to overturn and fall down still persists.**
	To move the burner, use means suitable to support its weight (see paragraph "Technical specifications").
	The unpacked burner must be lifted and moved only by means of a fork lift truck.

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



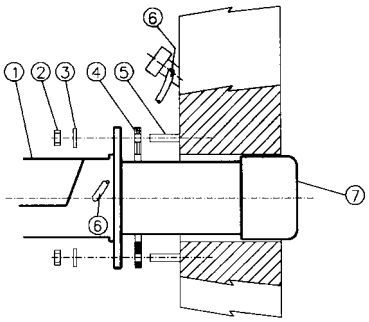
The burner is designed to work positioned according to the picture below. For different installations, please contact the Technical Department.



Fitting the burner to the boiler

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

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



Keys

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

Hydraulic diagrams for light oil supplying circuits

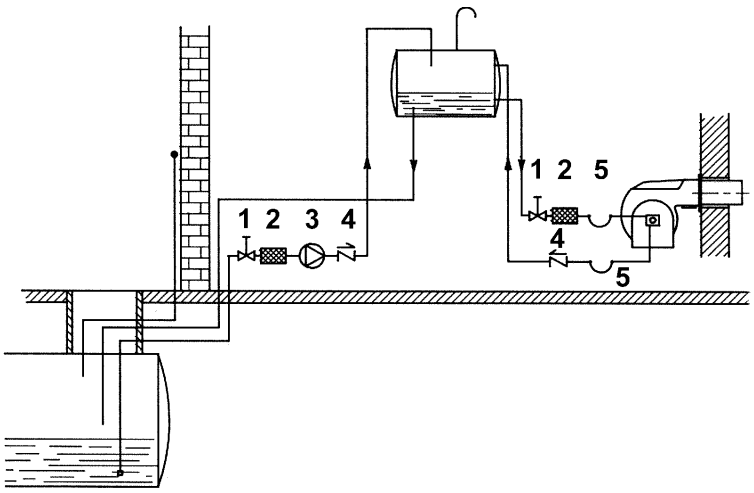


Fig. 3 - Gravity circuit

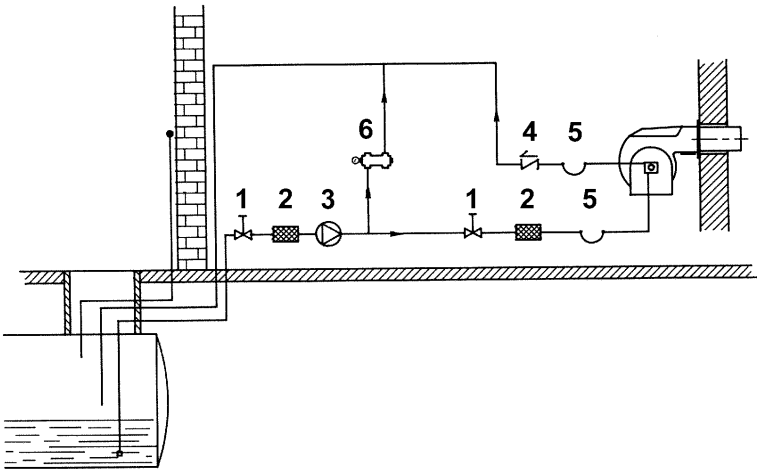


Fig. 4 - Ring circuit

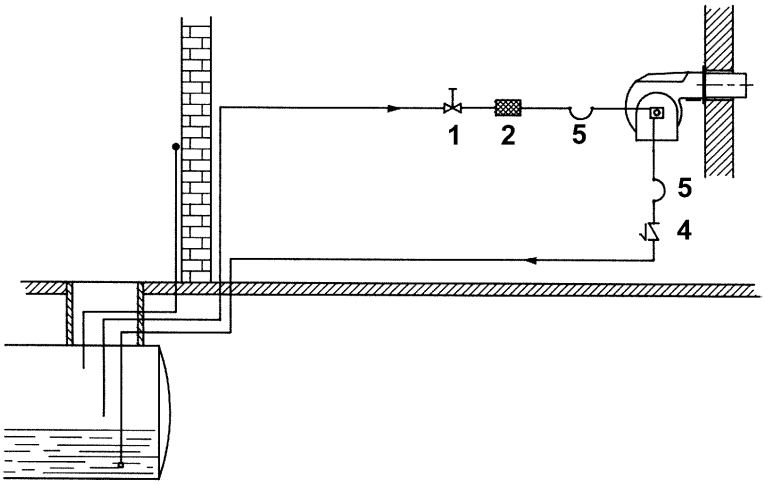


Fig. 5 - Suction circuit

Key

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

NOTE: in plants where gravity or ring feed systems are provided, install an automatic interception device (see n. 4 - Fig. 6).

Installation diagram of light oil pipes

⚠ **PLEASE READ CAREFULLY THE "WARNINGS" CHAPTER AT THE BEGINNING OF THIS MANUAL.**

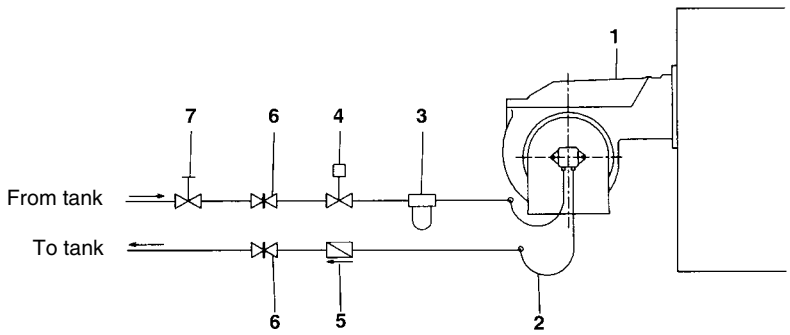


Fig. 6 - Double-pipe system

The burner is supplied with filter and flexible hoses, all the parts upstream the filter and downstream the return flexible hose, must be installed by the customer. As far as the hoses connection, see the related paragraph.

Key

1 Burner
2 Flexible hoses (fitted)
3 Light oil filter (fitted)
4 Automatic interceptor (*)
5 One-way valve (*)
6 Gate valve
7 Quick-closing gate-valve (outside the tank or boiler rooms)

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

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

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

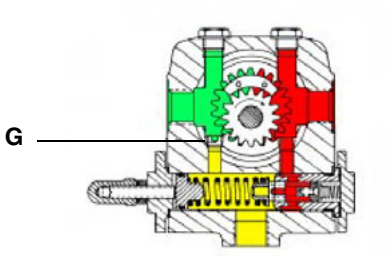
Double-pipe system: as for the single pipe system, a pipe that connects the tank to the pump's inlet is used besides another pipe that connects the pum's return port to the tank, as well. The excess of oil goes back to the tank: this installation can be considered self-bleeding. If provided, the inside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

Burners come out from the factory provided for double-stage systems. They can be suited for single-pipe system (recommended in the case of gravity feed) as decribed before.

To change from a 1-pipe system to a 2-pipe-system, insert the by-pass plug **G** (as for ccw-rotation- referring to the pump shaft).

Caution: Changing the direction of rotation, all connections on top and side are reversed.
pipeline length in meters.

Suntec TA

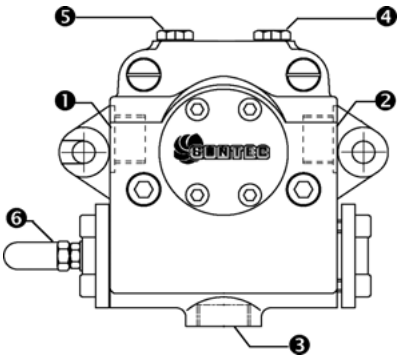


Bleed

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

Light oil pumps

Suntec TA..	
Oil viscosity	4 ÷ 450 cSt
Oil temperature	0 ÷ 140°C
Min. suction pressure	- 0.45 bar to avoid gasing
Max. suction pressure	5 bar
Max. return pressure	5 bar
Rotation speed	3600 rpm max.



Key

1 Suction G1/2
2 To the noozle G1/2
3 Return G1/2t
4 Pressure gauge port G1/4
5 Vacuum gauge port G1/4
7 Pressure governor
8 Preheater cavity

Assembling the light oil flexible hoses

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

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

Suntec TA



About the use of fuel pumps

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

Light oil circuit

The fuel is pushed into the pump 1 to the nozzle 3 at the delivery pressure set by the pressure governor. The solenoid valve 2 set the fuel immission into the combustion chamber. The part of fuel that is not burnt goes back to the tank through the return circuit. The fuel amount to be burnt is adjusted by means of the burner actuator according to the adjustments set (see page 18).

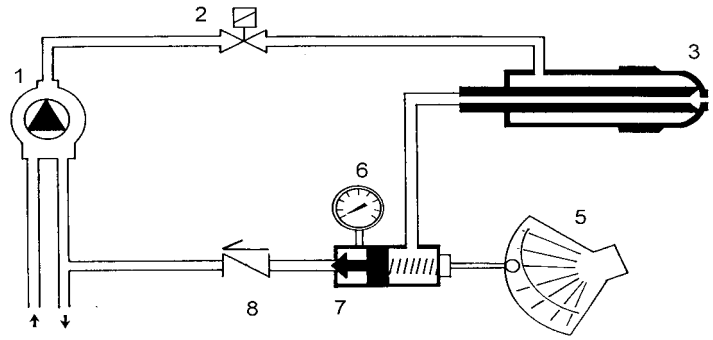


Fig. 7 - Stand-by

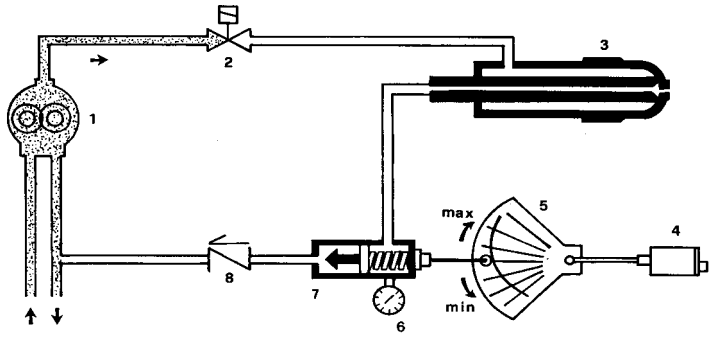


Fig. 8 - Prepurge

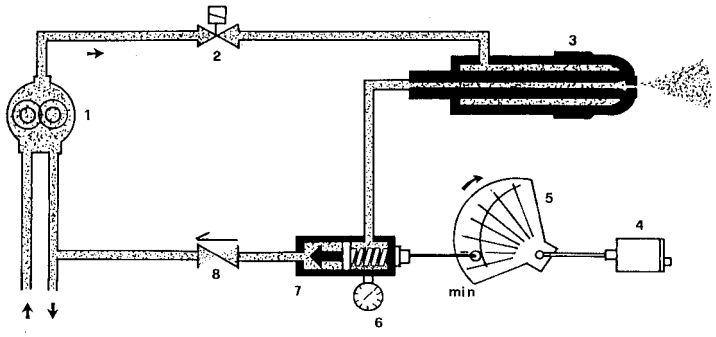
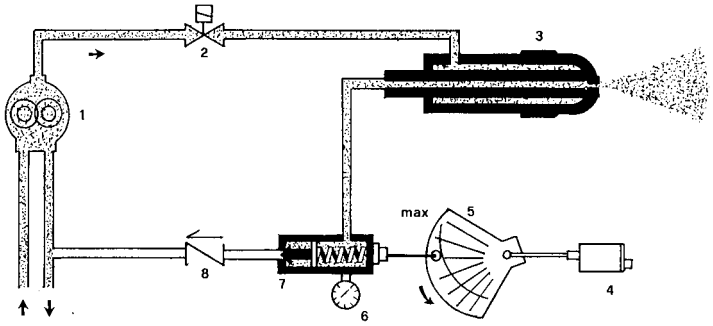


Fig. 9 - Low flame

Fig. 10 - High flame



Key

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

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. STRICTLY OBSERVE THE DATA PLATE.**

- Remove the cover from the burner electrical panel.
- Execute the electrical connections to the power supply terminal board as shown here following, check the direction of the motor (see next paragraph) and replace the cover of the electrical panel.

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

Progressive burners

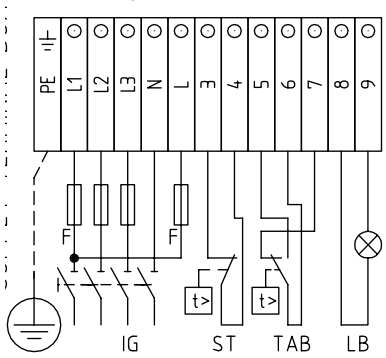


Fig. 11

Fully-modulating burners

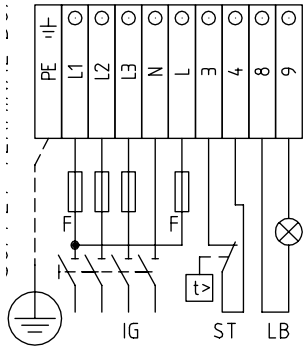


Fig. 13

Probes connection oby means of the 7-pins plug (Fig. 14) - see Fig. 12 for connections.

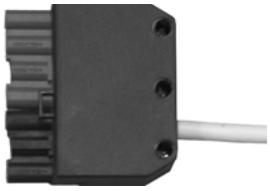


Fig. 14

Probes connection

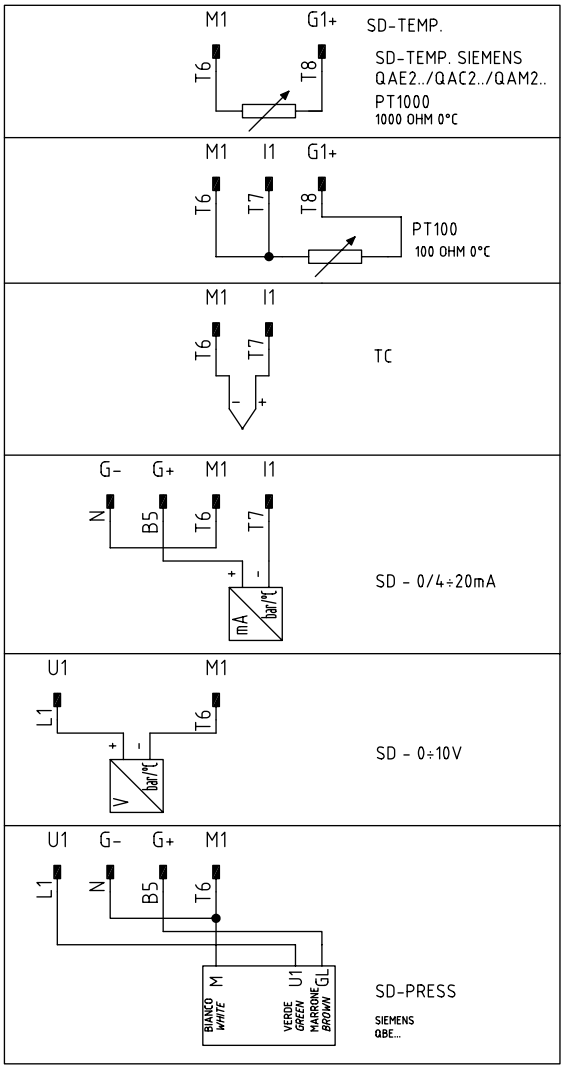


Fig. 12

Motor rotation

Once the burner electrical connection is accomplished, remember to check the rotation of the fan motor.

The motors must rotate in the direction showed on their casing. In the event of wrong rotation, reverse the three-phase supply and check again the motor rotation.

NOTEBurners are provided for three-phase 400 V supply, and in the case of three-phase 230 V supply it is necessary to modify the electrical connections inside the terminal box of the electric motor and replace the thermal cutout relay.

ADJUSTING LIGHT OIL FOLW RATE

Light oil nozzles

The light oil flow rate can be adjusted choosing a by-pass nozzle that suits the boiler/utilisation's output and setting the delivery and return pressure values according to the values quoted on diagrams on Fig. 15 and Fig. 16, according to the burner type.

Nozzles provided are the following according to the burner type. As far as reading the pressure values, see next paragraphs.

PG91 - PG92: Bergonzo A3 (Fig. 16)

PG93: Fluidics WR2 (Fig. 15)

NOZZLE	DELIVERY PRESSURE bar	RETURN PRESSURE MAX. bar	RETURN PRESSURE MIN. bar
BERGONZO A3	20	11 - 13	5 (recommended))
FLUIDICS WR2	25	19 - 20	7 (recommended)

Example (Fulidics): as far as over 100kg/h nozzle the 80% of the nozzle rated flow rate is achieved with 18bar return pressure (see picture above).

	FLOW RATE kg/h	
DIMENSIONS	**Min**	**Max**
40	13	40
50	16	50
60	20	60
70	23	70
80	26	80
90	30	90
100	33	100
115	38	115
130	43	130
145	48	145
160	53	160
180	59	180
200	66	200
225	74	225
250	82	250
275	91	275
300	99	300
330	109	330
360	119	360
400	132	400
450	148	450
500	165	500
550	181	550
600	198	600
650	214	650
700	231	700
750	250	750
800	267	800

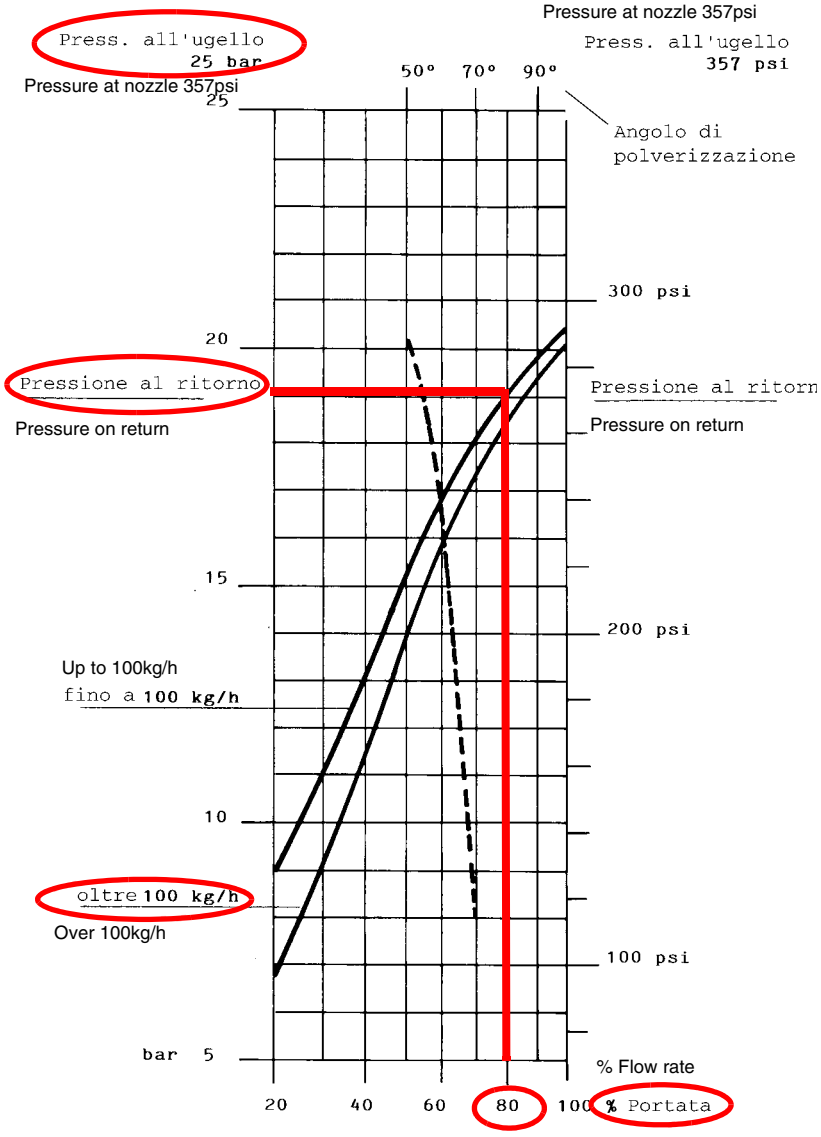


Fig. 15

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

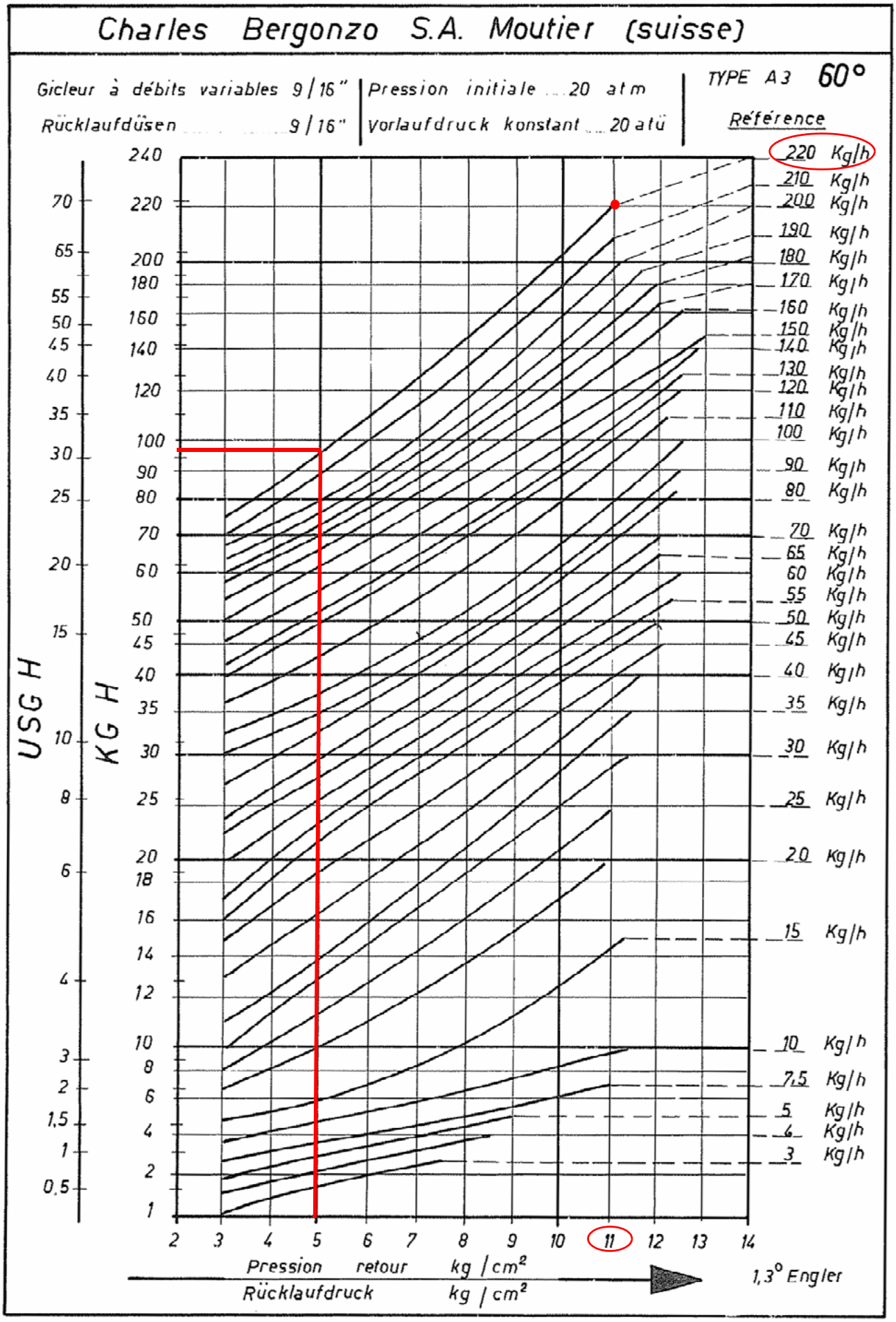

Charles Bergonzo S.A. Moutier (suisse)
Gicleur à débits variables 9/16"
Rücklaufdüsen 9/16"
Pression initiale 20 atm
Vorlaufdruck konstant 20 atü
TYPE A3 60°
Référence
220 Kg/h
210 Kg/h
200 Kg/h
190 Kg/h
180 Kg/h
170 Kg/h
160 Kg/h
150 Kg/h
140 Kg/h
130 Kg/h
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45 Kg/h
40 Kg/h
35 Kg/h
30 Kg/h
25 Kg/h
20 Kg/h
15 Kg/h
10 Kg/h
7,5 Kg/h
5 Kg/h
4 Kg/h
3 Kg/h
USG H
KG H
Pression retour kg/cm²
Rücklaufdruck kg/cm²
1,3° Engler

Fig. 16

Adjustments - brief description

⚠	***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.**
	Before starting up the burner, make sure that the return pipe to the tank is not obstructed. Any obstruction would cause the pump seal to break.
	.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 fuel decrease slowly until the normal combustion values are achieved.

⚠	**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
Light oil	11.5 ÷ 13	2.9 ÷ 4.9

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

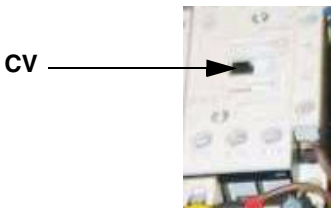
- Check that the combustion parameters are in the suggested limits.
- Check the flow rate measuring it on the counter.
- Then, adjust the combustion values corresponding to the points between maximum and minimum: set the shape of the adjusting cam foil. The adjusting cam sets the air/fuel ratio in those points, regulating the opening-closing of the fuel governor.
- Set, now, the low flame output, acting on the low flame microswitch of the actuator in order to avoid the low flame output increasing too much or that the flues temperature gets too low to cause condensation in the chimney.

Adjustment procedure

To change the burner setting during the testing in the plant, follow the next procedure, according to the actuator model provided (mod. Berger or mod. Siemens).

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

1 Check the fan-pump motor rotation and acting on its contactor **CV** (inside the control panel - see next picture): keep pressed for some seconds until the oil circuit is charged;



2 bleed the air from the **M** pressure gauge port (Fig. 17) by loosing the cap without removing it, then release the contactor and fasten the cap.

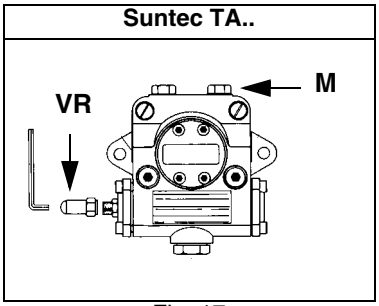
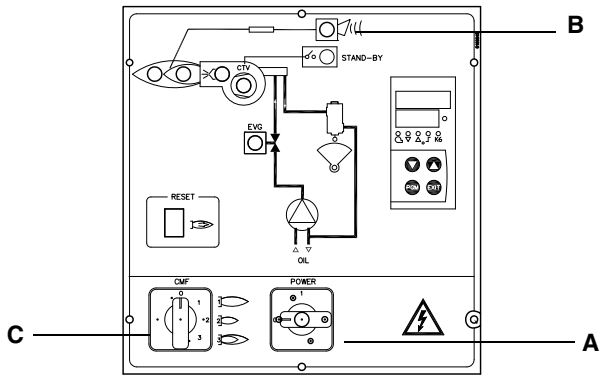


Fig. 17

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

4 Turn the burner on by means of its main switch **A**: if the burner locks (LED **B** on in the control panel) press the RESET button (**C**) on the control panel (see next picture) - see chapter "OPERATION" on page 26.



5 be sure that the actuator cam for the “Startup enabling signal” (when used) is about 5° more than the ignition cam;

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

7 drive the burner to high flame stage, by means fo the thermostat **TAB** (high/low flame thermostat - see Wiring diagrams), as far as fully-modulating burners, see related paragraph.

8 Then move progressively the microswitch to higher values until it reaches the high flame position; always check the combustion values and eventually adjusting the oil pressure (see next step).

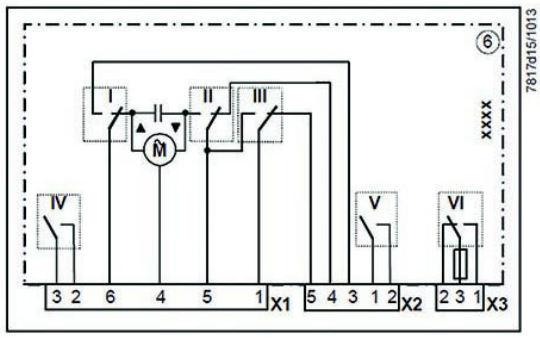
SQM40.265 Actuator cams

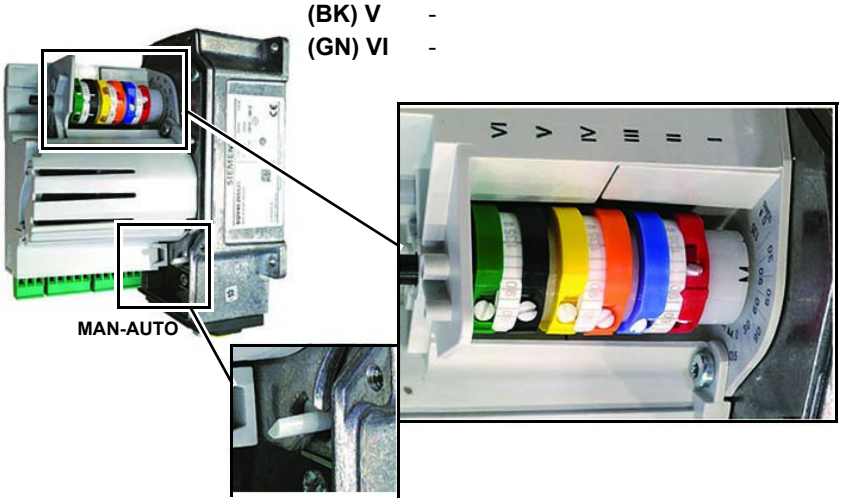
Version with flame control LMO 24.255 / 44.255

(RD) I High flame
(BU) II Stand-by
(OG) III Low flame
(YE) IV -
(BK) V -
(GN) VI Advance stroke limitation cam - set +5° to cam **(BU) II**

Version with flame control LAL 2.25

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





9 the nozzle suplly pressureis already factory-set and must not be changed. Only if necessary, adjust the supply pressure as follows (see related paragraph);insert a pressure gauge into the port showed on Fig. 18 and act on on the pump adjusting screw **VR** (see Fig. 17) as to get the nozzle pressure at 20bar or 25bar (according to the nozzle model: Bergonzo or Fluidics nozzle - see page 18).

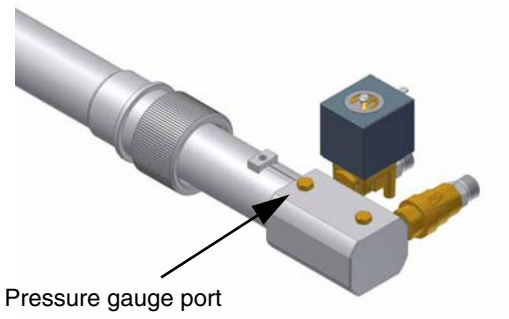


Fig. 18

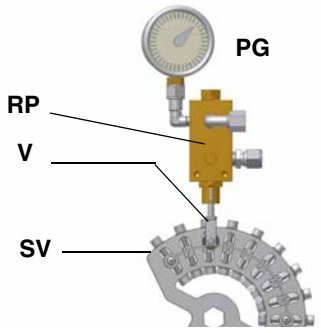
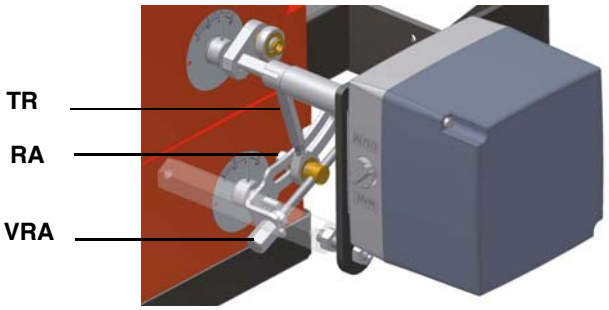


Fig. 19

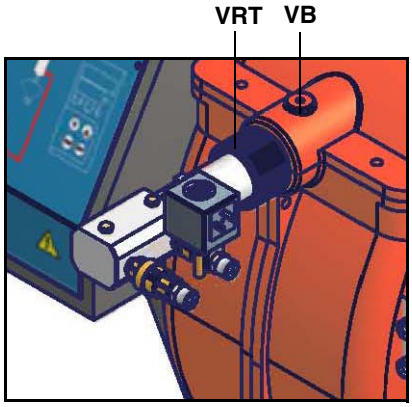
10 in order to get the maximum oil flow rate, adjust the pressure (reading its value on the **PG** pressure gauge) without changing the air flow rate set during the gas operation adjustments (see prevoius paragraph): checking always the combustion parameters, the adjustment is to be performed by means of the **SV** adjusting cam screw (see picture) when the cam has reached the high flame position.

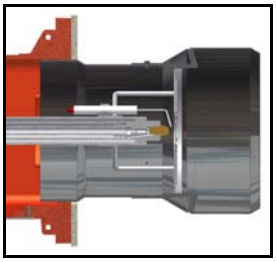
11 To adjust the **air flow rate in the high flame stage**, loose the **RA** nut and screw **VRA** as to get the desired air flow rate: moving the rod **TR** towards the air damper shaft, the air damper opens and consequently the air flow rate increases, moving it far from the shaft the air damper closes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

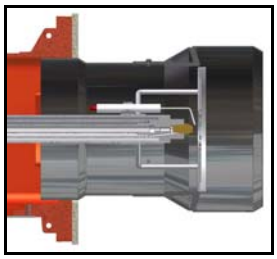


12 Only if necessary, change the combusiton head position: to let the burner operate at a lower output, loose the **VB** screw and move progressively back the combustion head towards the MIN position, by turning clockwise the **VRT** ring nut. Fasten **VB** screw when the adjustment is accomplished.





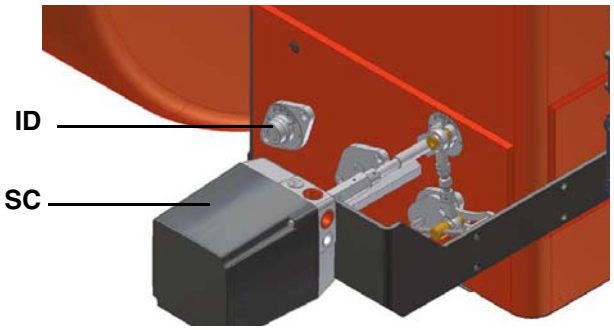
”MIN” position

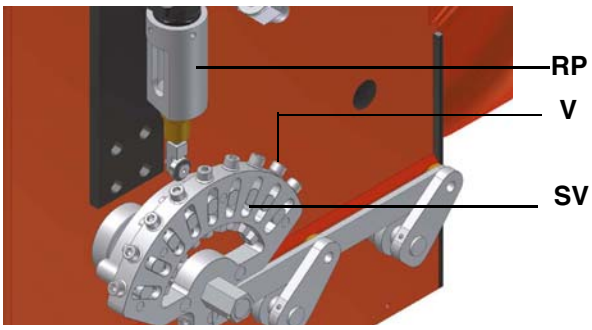


”MAX” position

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

13 the air and oil 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.





14 as for the point-to-point regulation in order to set the cam foil shape, move the low flame microswitch (cam III) a little lower than the maximum position (90°);

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

16 move cam III (low flame) towards the minimum to move the actuator towards the low flame until the two bearings find the adjusting screw that refers to a lower position: screw **V** to increase the rate, unscrew to decrease, in order to get the pressure as showed on diagram in Fig. 28, according to the requested rate.

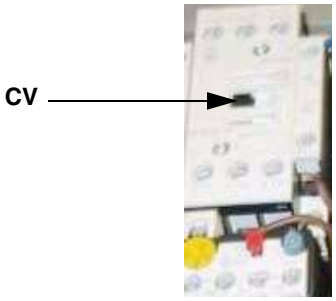
17 Move again cam III towards the minimum to meet the next screw on the adjusting cam and repeat the previous step; go on this way as to reach the desired low flame point.

18 The low flame position must never match the ignition position that is why cam **III** must be set 20°- 30° more than the ignition position.

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

Adjustment by the Siemens SQL33.. actuator

1 Check the fan-pump motor rotation and acting on its contactor **CV** (inside the control panel - see next picture): keep pressed for some seconds until the oil circuit is charged;**CV**



2 **CP**bleed the air from the **M** pressure gauge port (Fig. 20) by loosing the cap without removing it, then release the contactor and fasten the cap.

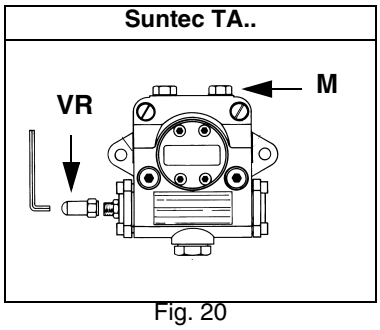
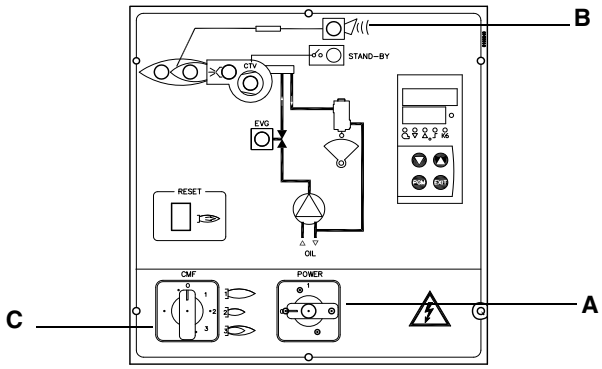
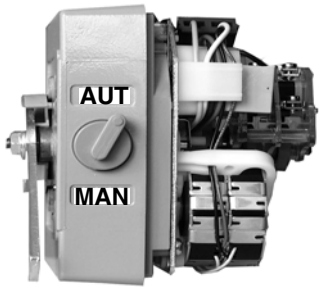


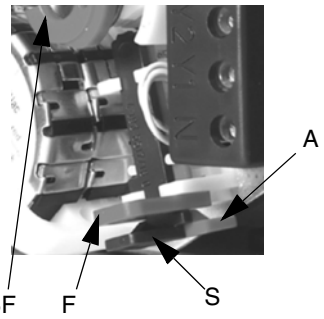
Fig. 20

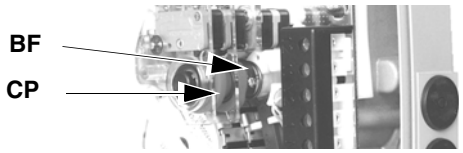
3 Turn the burner on by means of its main switch **A**: if the burner locks (LED **B** on in the control panel) press the RESET button (**C**) on the control panel (see next picture) - see chapter “OPERATION” on page 26.



4 be sure that the actuator cam for the “Startup enabling signal” (when used) is about 5° more than the ignition cam;







SQL330.. actuator cams

A = (red) cam locking lever for “high flame”
S = (green) cam locking lever for “stand-by and ignition”
BF = Low flame
F = plastic cam
CP= Start signal cam

5 Start the burner up by means of the thermostat series and wait unitl the pre-purge phase comes to end;

6 the burner starts up with the actuator on the ignition position, set it to the **MAN** (manual mode), by the **MAN/AUTO** selector (ignition position= read on the air damper index **ID1** - see picture on pag.23);

7 disconnect the **TAB** thermostat removing the wire from the terminal no. 6 or by setting MAN on the RWF40 modulatore or by setting 0 by means of the **CMF** switch (only for fully-modulating burners);

8 set the actuator on the manual mode (MAN) by means of the MAN/AUTO switch (see next pictures).

9 manually drive the adjusting cam **SV** to the high flame position and set the actuator to the AUTO mode (by the related switch - see picture) to lock the adjusting cam.

10 the nozzle suplly pressureis already factory-set and must not be changed. Only if necessary, adjust the supply pressure as follows (see related paragraph);insert a pressure gauge into the port showed on Fig. 18 and act on on the pump adjusting screw **VR** (see Fig. 20) as to get the nozzle pressure at 20bar or 25bar (according to the nozzle model: Bergonzo or Fluidics nozzles - see page 18).

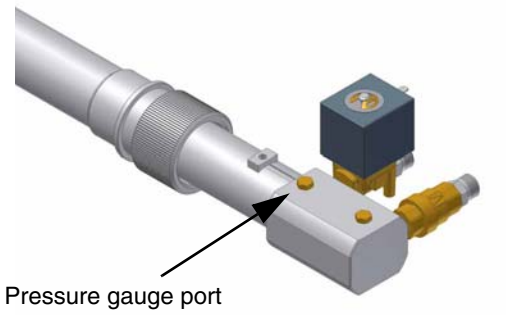


Fig. 21

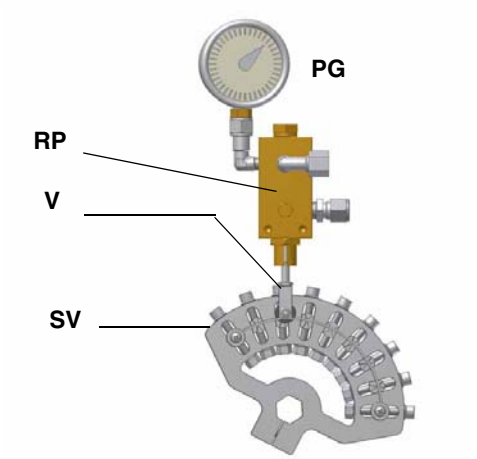
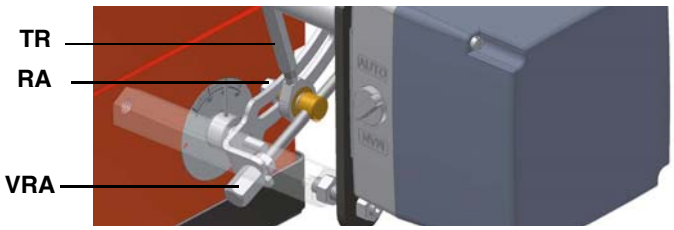


Fig. 22

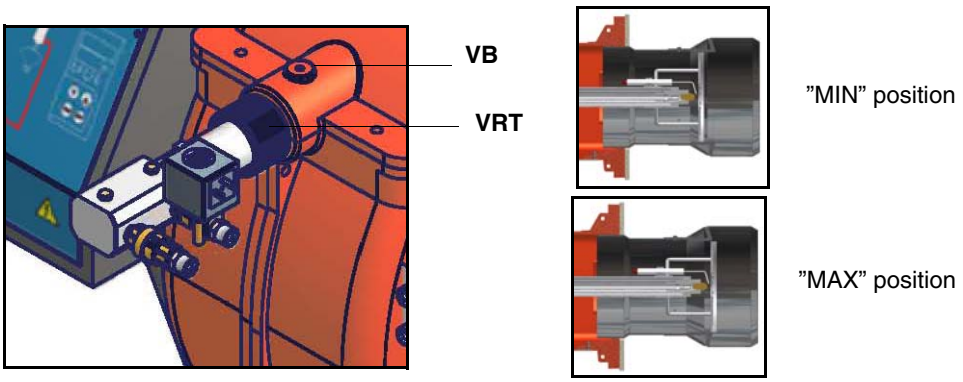
11 in order to get the maximum oil flow rate, adjust the pressure (reading its value on the **PG** pressure gauge) without changing the air flow rate set during the gas operation adjustments (see prevoius paragraph): checking always the combustion parameters, the adjustment is to be performed by means of the **SV** adjusting cam screw (see picture) when the cam has reached the high flame position.

12 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.

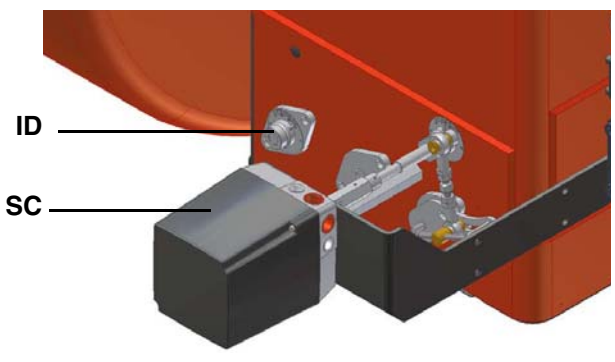


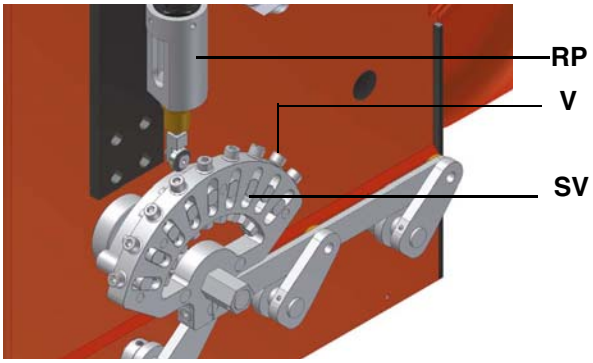
13 Only if necessary, change the combusiton head position: to let the burner operate at a lower output, loose the **VB** screw and move progressively back the combustion head towards the MIN position, by turning clockwise the **VRT** ring nut. Fasten **VB** screw when the adjustment is accomplished.



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

14 once the air and oil flow rate have been adjusted at the maximum output, go on with the point to point adjustment on the **SV** adjusting cam as to reach the minimum output point: gradually move the adjusting cam in order to adjust each of the **V** screws as to describe the cam foil shape.





15 to change the **SV** position set the actuator on the manual mode (MAN), turn the adjusting cam **SV** and set again the actuator to the AUTO mode to lock the adjusting cam;

16 act on the **V** screw that mathces the bearings referring to the adjusting cam position;

17 to adjust the next screw, set again the actuator mode to **MAN**, turn the adjusting cam and set the actuator to **AUTO** mode to lock the adjusting cam on the next screw; adjust it and go on this way to adjust all the screws in order to set the cam foil shape, according to the combustion values read.

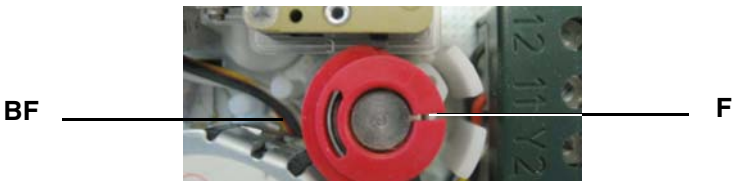
18 Once the cam foil shape is defined, reconnect the **TAB** thermostat reconnecting the wire to the terminal no.6 or setting the RWF40 burner modulator to AUTO or the CMF switch to 3 (only for fully-modulating burner).

19 Turn the burner off then start it up again.

20 Once the pre-purge time comes to end, wait for the burner startup;

21 drive the burner to the high flame stage by the **TAB** thermostat: check the combustion values;

22 drive the burner to low flame, if necessary adjust the low flame size (output) by inserting a screwdriver on the slot **F** to move the **BF** cam.



23 The low flame position must never match the ignition position that is why cam **BF** must be set 20°- 30° more than the ignition position.

NOTE: to change the low flame position, act exclusively on the actuator cam.

24 Now adjust the pressure switch (if provided -see page 24).

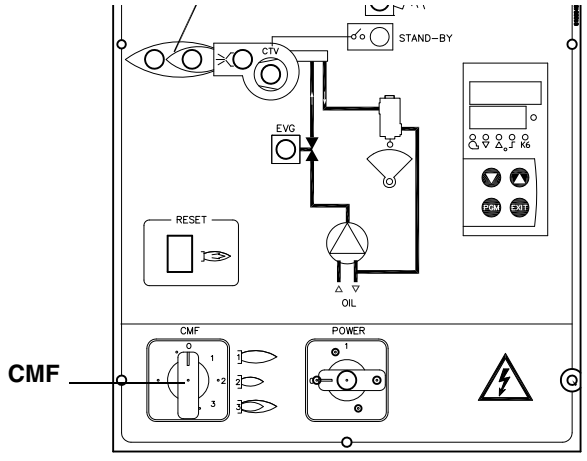
Fully modulating burners

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

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

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



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

Calibration of air pressure switch (when provided)

To calibrate the air pressure switch, proceed as follows:

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

PART II: OPERATION

LIMITATIONS OF USE

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

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

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

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

NEVER OPEN OR DISMANTLE ANY COMPONENT OF THE MACHINE.

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

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

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

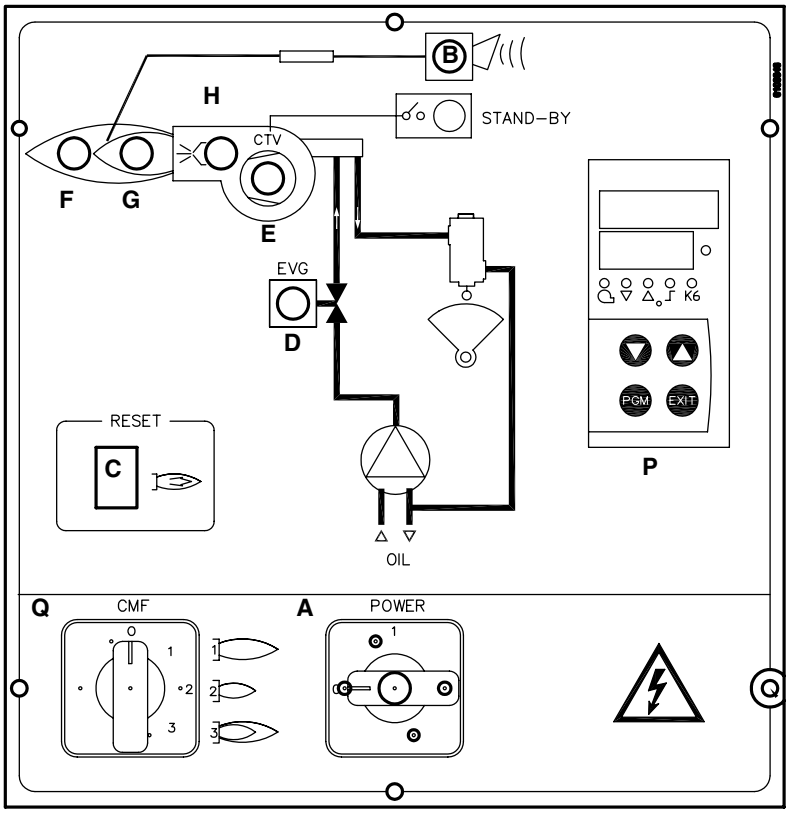
OPERATION

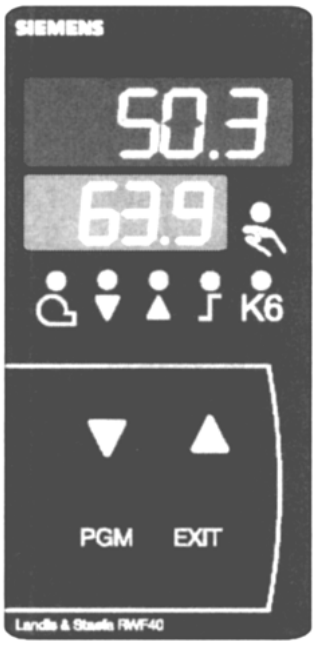
⚠	***ATTENTION:*** **before starting the burner up, be sure that the manual cutoff valves are open . Be usre that the mains switch is closed.**

1 Set to the ON position the switch **A** on the control panel of the burner.
2 Check the control box is not in the lockout position (light **B** must be off); in such a case reset it by the reset pushbutton **C**.
3 Check the series of thermostats (or pressure switches) sends the burner the signal to operate.
4 The startup sequence begins: the control box ignites the fan/pump motor and energises the ignition transformer as well (signalled by the light **H** on the burner control panel).
5 At the end of the pre-purge stage, the light oil solenoid valve EVG is energised (signalled by the lamp **G** on the control panel) and the burner is on.
6 The ignition transformer is energized for few seconds after the ignition of the flame (post-ignition time) and at the end of this time is de-energised (light **H** off).
7 After the ignition the servocontrol moves to the high flame position for some seconds, then the operation begins and the burner switches to high flame or to low flame, according to the plant demand.
8 The high/low flame operation is showed by the **F** LED turning on/off.

Burner control panel

Keys





P

Fig. 23

A ON-OFF main switch
B Lockout signalling lamp
C Conreol box release pushbutton
D Signalling lamp for light oil solenoid valve opening
E Thermal cutout intervention signalling lamp
F High flame operation signalling lamp
G Low flame operation signalling lamp
H Ignition transformer operation signalling lamp
P Siemens RWF40 modulator
Q Manual operation mode switch

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

- Check and clean the cartdrige of the fuel filter, replace it if necessary (see next paragraph);
- carefully check for leaks, the fuel flexible hoses;
- check and clean the filter on the fuel pump: bilter must be thoroughly cleaned at least once in a season to ensure correct working of the fuel unit. To remove the filter, unscrew the four screws on the cover. When reassemble, make sure that the filter is mounted with the feet toward the pump body. If the gasket between cover and pump housing should be damaged, it must be replaced;
- remove, check and clean the combustion head (page 28); when reassembling, carefully observe the measures on page 29;
- check the ignition electrodes and their ceramic insulators, clean, adjust and replace if necessary, page 29);
- remove and clean the oil nozzles (IMPORTANT: do not clean the nozzles using metallic or sharp utensils, use only solvents or steam); at the end of maintenance operations, refit the burner, turn it on and check the combustion. If in doubt, replace the defective nozzle/s. In case of intensive use of the burner, the nozzles must be replaced at the end of the working season;
- check and carefully clean the flame detection photoresistor (page 29), if necessary replace it and, if in doubt, check the detection current following the scheme in Fig. 25;
- clean and grease leverages and rotating parts.

Light oil filter maintenance

For correct and proper servicing, proceed as follows:

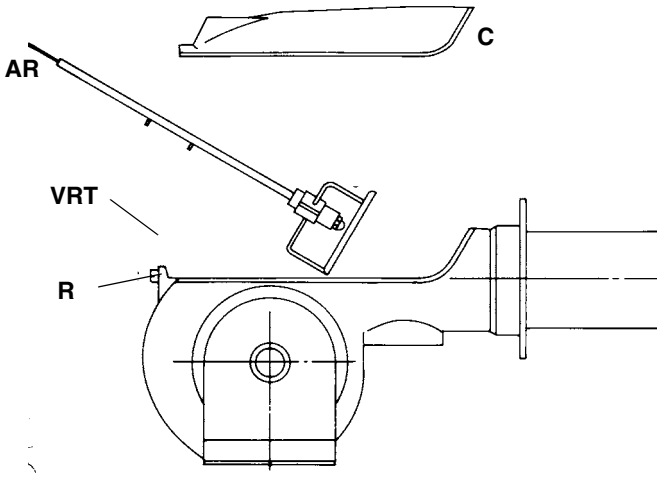
1 shut off fuel in the line section being serviced;
2 unscrew the tray;
3 remove the filter cartridge from its support and wash it with petrol or replace if necessary; check seal O-Ring, replace if necessary;
4 reassemble the tray and restore fuel flow.



Removing the combustion head

1 Remove the top cover **C**;
2 remove the photoresistor from its seat;
3 unscrew the revolving connectors (**E** in figure) on the fuel pipes (use 2 spanners to avoid loosening the connections attached to the distributor block);
4 loosen **VRT** screw to free the threaded rod **AR**, then screw out the 2 screws **V** holding the washer **R** and the screw **VRT** again;
5 remove the whole assembly as shown in figure;
6 clean the combustion head by means of a vacuum cleaner; to scrape off the scale use a metallic brush.

Note: to replace the combustion head reverse the procedure described above.

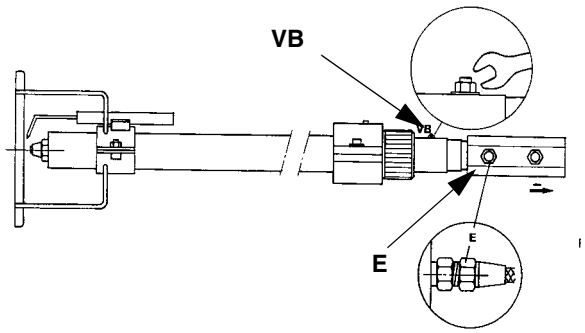


Removing the oil gun

Once the combustion head is removed, as described before, remove the oil gun as foloows:

1 unscrew the connectors from the 2 oil pipes (**E** in figure) using 2 spanners to avoid loosening the connections attached to the distributor block);
2 loosen the screw **VB**
3 remove the gun with the light oil nozzle holder.
4 clean the oil gun by means of a vacuum cleaner; to scrape off the scale use a metallic brush
5 replace the oil gun, if necessary.

Note: To re-assemble, follow the procedure above in reversed order.



Correct position of electrodes and nozzle

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

To guarantee a good ignition the measures showed on the next picture Fig. 24 must be observed.
Be sure to tighten the screw on the electrodes group before reassembling the combustion head.

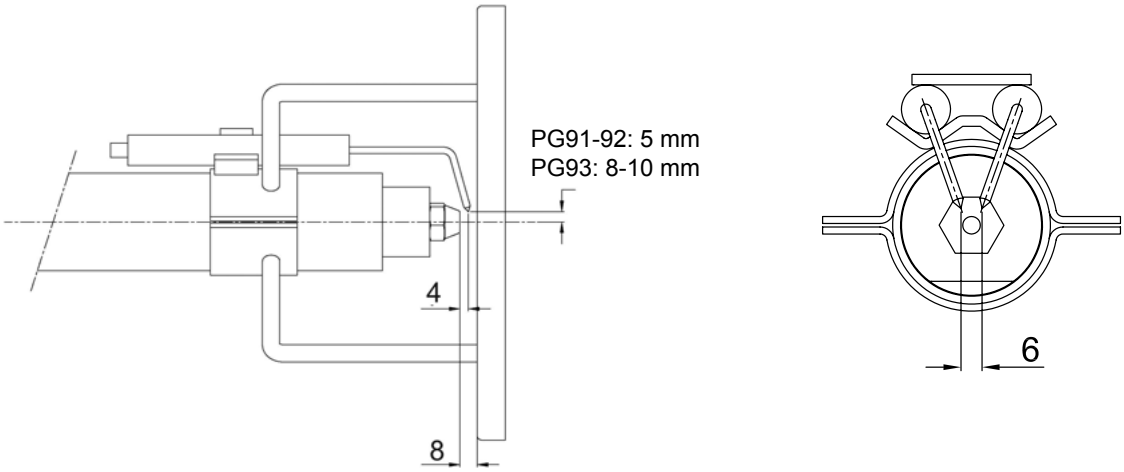


Fig. 24

Replacing the ignition electrodes

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

To replace the ignition electrodes, proceed as follows:

1 remove the burner cover;
2 disconnect the electrodes cables;
3 remove the combustion head (see par. “Removing the combustion head”);
4 loose screw (B) that fasten the ignition electrodes;
5 remove the electrodes and replace them, referring to the values quoted on Fig. 24.

Cleaning and replacing the detection photoresistor

When cleaning the photoresistive detector, always use a clean cloth. If necessary, remove it from its slot to replace it.

Checking the detection current

To measure the detection signal follow the diagram in Fig. 25.
If the signal is not in the advised range, check the electrical contacts, the cleaning of the combustion head, the position of the photoresistor and if necessary replace it.

Minimum current intensity with flame: 45µA

Maximum current intensity without flame: 5.5µA

Maximum possible current intensit with flame: 100µA

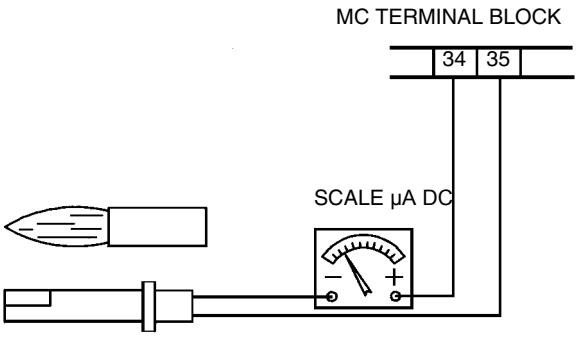


Fig. 25

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".

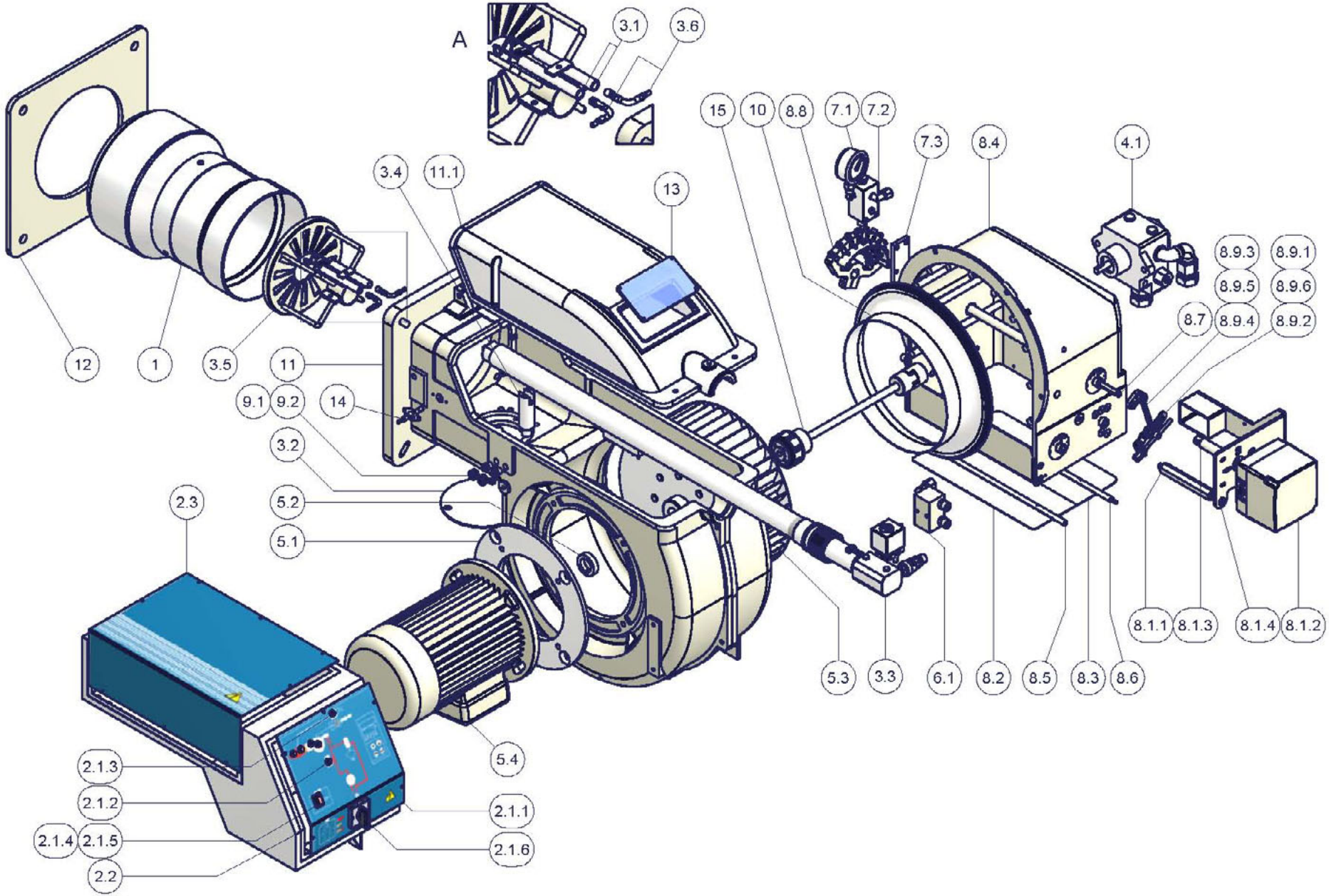
TROUBLESHOOTING

	THE BURNER DOESN'T START	THE BURNER REPEATS PRE-PURGE	NOISY FUEL PUMP	THE BURNER DOESN'T START AND STOPS	THE BURNER STARTS AND STOPS	THE BURNER DOESN'T SWITCH TO HIGH FLAME	THE BURNER STOPS DURING OPERATION	THE BURNER STOPS AND REPEATS THE CYCLE DURING OPE-RATION
MAIN SWITCH OPEN	●							
LINE FUSE INTERVENTION	●							
MAX. PRESSURE SWITCH FAULT	●							●
FAN THERMAL CUTOUT INTERVENTION	●							
AUXILIARY RELAIS FUSES INTERVENTION	●							
CONTROL BOX FAULT	●	●		●	●		●	
ACTUATOR FAULT						●		
SMOKEY FLAME					●		●	
IGNITION TRANSFORMER FAULT				●				
IGNITION ELECTRODE DIRTY OR WRONG POSITIONED				●				
DIRTY NOZZLE				●			●	
FUEL SOLENOID VALVE DEFECTIVE				●			●	
PHOTORESISTOR DIRTY OR DEFECTIVE					●		●	
HI-LO FLAME THERMOSTAT DEFECTIVE						●		
WRONG POSITION OF ACTUATOR CAMS						●		
FUEL PRESSURE TOO LOW				●				
DIRTY FUEL FILTERS			●	●			●	

BURNER EXPLODED VIEW

ITEM	DESCRIPTION
1	STANDARD BLAST TUBE
2.1.1	FRONT CONTROL PANEL
2.1.2	LIGHT
2.1.3	LIGHT
2.1.4	LOCK-OUT RESET BUTTON
2.1.5	PROTECTION
2.1.6	SWITCH
2.2	BOARD
2.3	COVER
3.1	LONG IGNITION ELECTRODE
3.2	CLOSING PLATE
3.3	STANDARD COMPLETE OIL GUN
3.4	OIL GUN HOLDER
3.5	COMBUSTION HEAD
3.6	IGNITION CABLE
4.1	PUMP
5.1	MOTOR MOUNTING FLANGE
5.2	SPACER
5.3	FAN WHEEL
5.4	MOTOR
6.1	OIL MANIFOLD
7.1	PRESSURE GAUGE
7.2	PRESSURE GOVERNOR
7.3	BRACKET
8.1.1	SPACER

ITEM	DESCRIPTION
8.1.2	ACTUATOR
8.1.3	ACTUATOR SHAFT
8.1.4	BRACKET
8.2	AIR INTAKE DAMPER
8.3	AIR INTAKE DAMPER
8.4	AIR INTAKE
8.5	LOUVER SHAFT
8.6	LOUVER SHAFT
8.7	ADJUSTING CAM SHAFT
8.8	ADJUSTING CAM
8.9.1	SCREW
8.9.2	CAM
8.9.3	LEVERAGE
8.9.4	ROD
8.9.5	JOINT
8.9.6	JOINT
9.1	FAIRLEAD
9.2	FAIRLEAD
10	AIR INLET CONE
11	BURNER HOUSING
11.1	COVER
12	GENERATOR GASKET
13	INSPECTION GLASS
14	PHOTORESISTOR
15	COUPLING


A
3.1
3.6
15
10
8.8
7.1
7.2
7.3
8.4
4.1
3.4
11.1
13
8.9.3
8.9.1
8.9.5
8.9.6
8.7
8.9.4
8.9.2
12
1
3.5
11
9.1
9.2
14
3.2
5.2
5.1
2.3
8.1.1
8.1.3
8.1.4
8.1.2
5.3
3.3
6.1
8.2
8.5
8.3
8.6
5.4
2.1.3
2.1.2
2.1.4
2.1.5
2.2
2.1.1
2.1.6

SPARE PARTS

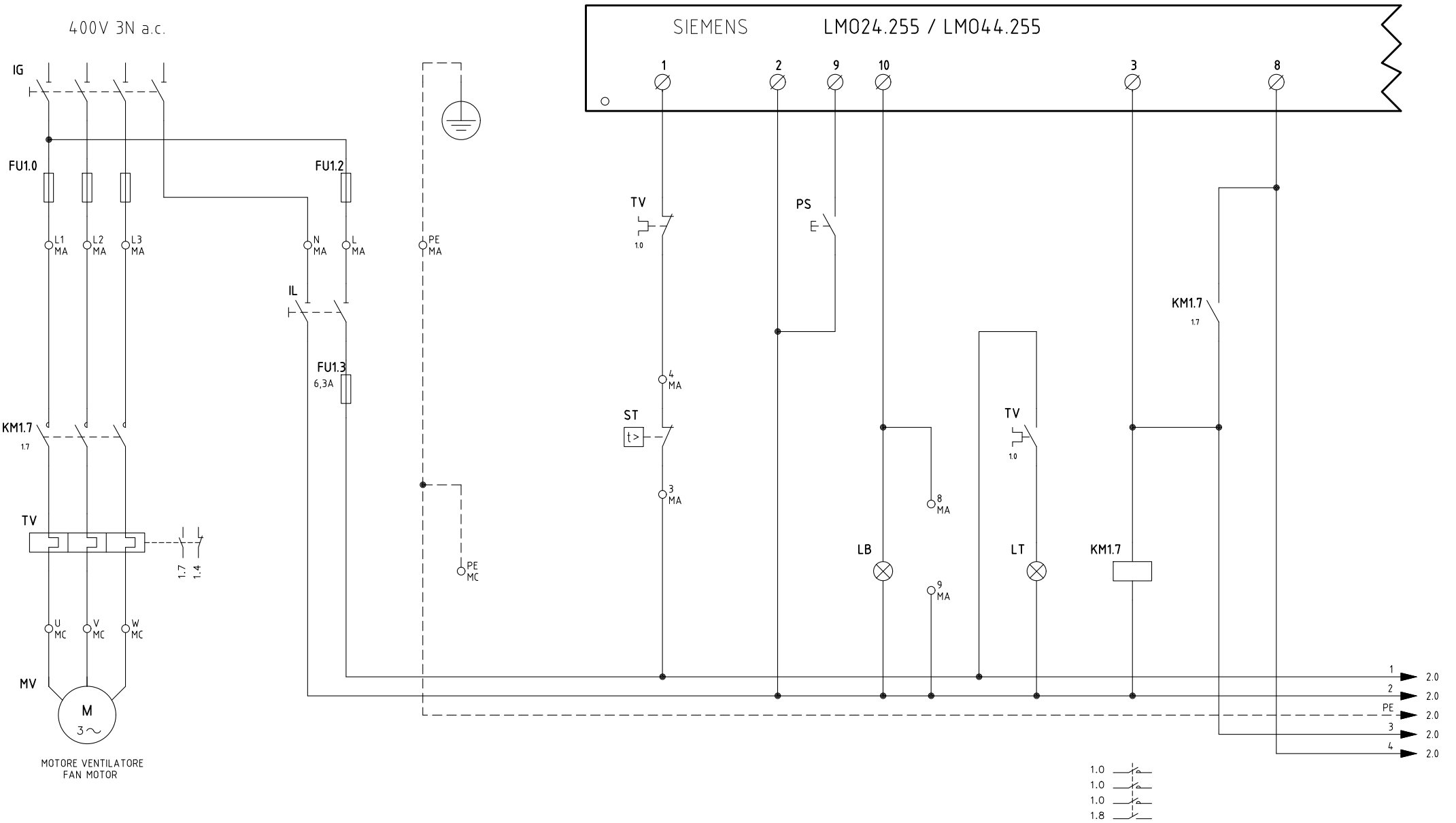
Desription	Code		
	PG91	PG92	PG93
CONTROL BOX	2020455	2020455	2020455
IGNITION ELECTRODES	2080206	2080206	2080206
FUEL FILTER	2090018	2090018	2090018
GASKET	2110048	2110048	2110048
FAN WHEEL	2150031	2150033	2150032
IGNITION TRANSFORMER	2170302	2170302	2170302
ELECTRIC MOTOR	2180276	2180277	2180206
SOLENOID VALVE	2190403	2190403	2190403
FLEXIBLE HOSESL = 1500 1”MX	2340004	2340004	2340004
FLEXIBLE HOSES L = 335 3/8”	2340087	2340087	2340087
FLEXIBLE HOSES L = 385 3/8”	2340088	2340088	2340088
ADJUSTING CAM FOIL	2440013	2440013	2440013
ACTUATOR mod. SIEMENS SQL..	2480040	2480040	2480007
ACTUATOR mod. BERGER STM30..	2480090	2480090	2480090
ACTUATOR mod. SIEMENS SQM40..	24800A4	24800A4	24800A4
PHOTORESISTOR mod. SIEMENS QRB..	2510003	2510003	2510003
COUPLING	2540121	2540121	2540134
PRESSURE GOVERNOR	2570054	2570054	2570077
BURNER MODULATOR	2570112	2570112	2570112
PUMP mod. SUNTEC	2590118	2590119	2590120
PUMP mod. DANFOSS	2590310	2590311	2590312
NOZZLE mod. BERGONZO A3	2610202	2610202	-
NOZZLE mod. FLUIDICS WR2 50°	-	-	2610203
OIL GUN (standard)	2700217	2700217	27002xx
OIL GUN (extended)	2700223	2700223	27002xx
COMBUSTION HEAD	3060160	3060161	3060161
BLAST TUBE (standard)	30910C5	30910C6	30910C6
BLAST TUBE (extended)	3091082	3091084	3091084
IGNITION CABLES	6050129	6050129	6050129

ELECTRIC WIRING DIAGRAMS

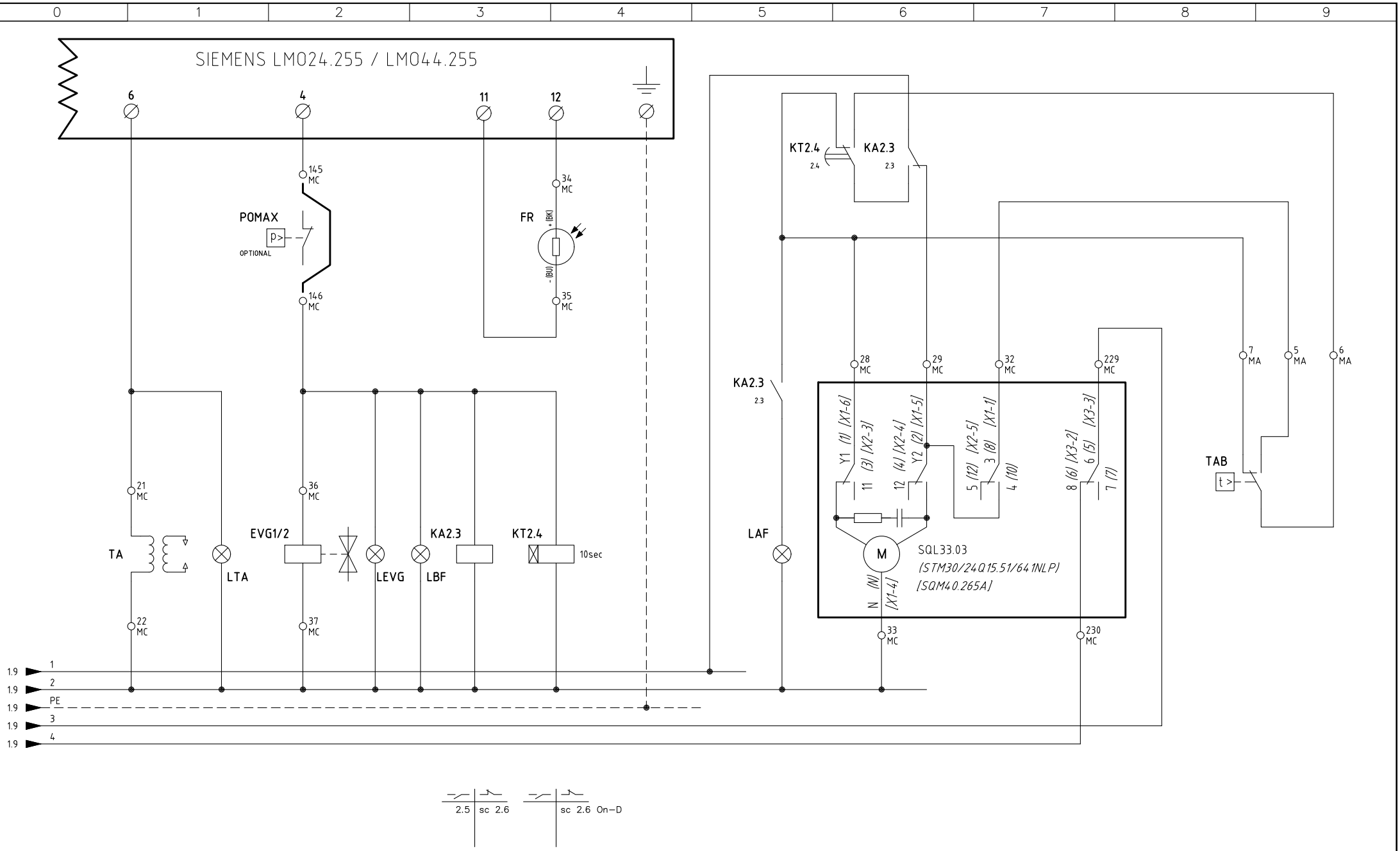
ATTENTION:
1 - Electric supply 230V/400V 50Hz 3N a.c.
2 - Don't reverse phase and neutral
3 - Make sure that the burner is properly hearted

Wiring diagram SE07-352 - Progressive Burners

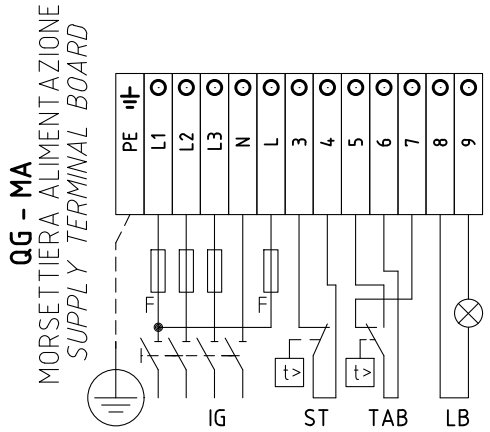
Wiring diagram SE07-401 - Fully-modulating Burners

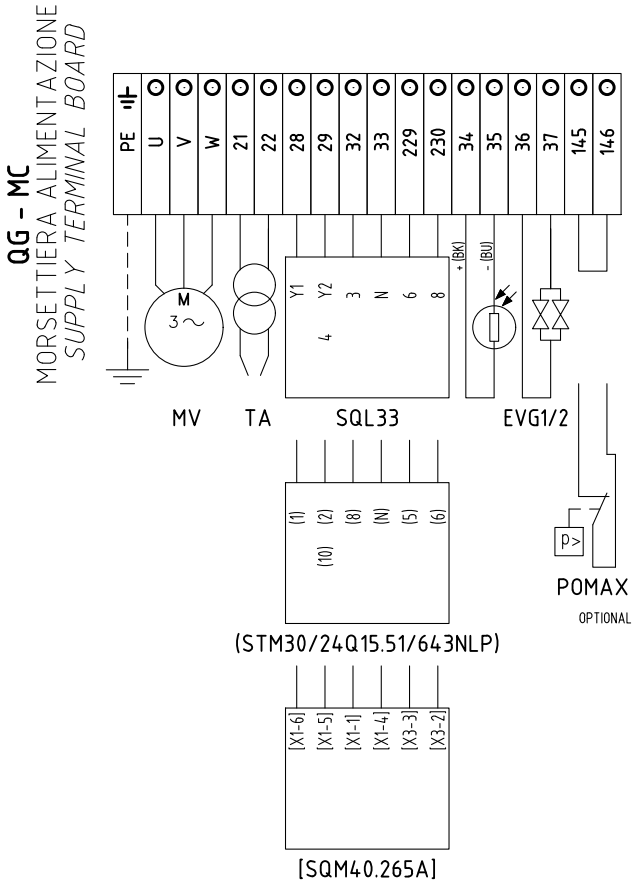


Data 11/12/1996		PREC.	FOGLIO
Revisione 07		/	1
Dis. N. 07 – 0352		SEGUE	TOTALE
		2	4



Data 11/12/1996		PREC.	FOGLIO
Revisione 07		1	2
Dis. N. 07 – 0352		SEGUE	TOTALE
		3	4





CAMME SERVOCOMANDO

SERVO CONTROL CAMS

SQL33.03

Y1	ALTA FIAMMA *HIGH FLAME*
Y2	SOSTA E ACCENSIONE *STAND-BY AND IGNITION*
3	BASSA FIAMMA *LOW FLAME*
6	CONSENSO ALLA PARTENZA *INPUT TO START*

SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)

AIR DAMPER SERVO CONTROL (ALTERNATIVE)

(STM30/24Q15.51/641NLP)

I	ALTA FIAMMA *HIGH FLAME*
II	SOSTA E ACCENSIONE *STAND-BY AND IGNITION*
III	BASSA FIAMMA *LOW FLAME*
V	CONSENSO ALLA PARTENZA *INPUT TO START*

SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)

AIR DAMPER SERVO CONTROL (ALTERNATIVE)

[SQM40.265A]

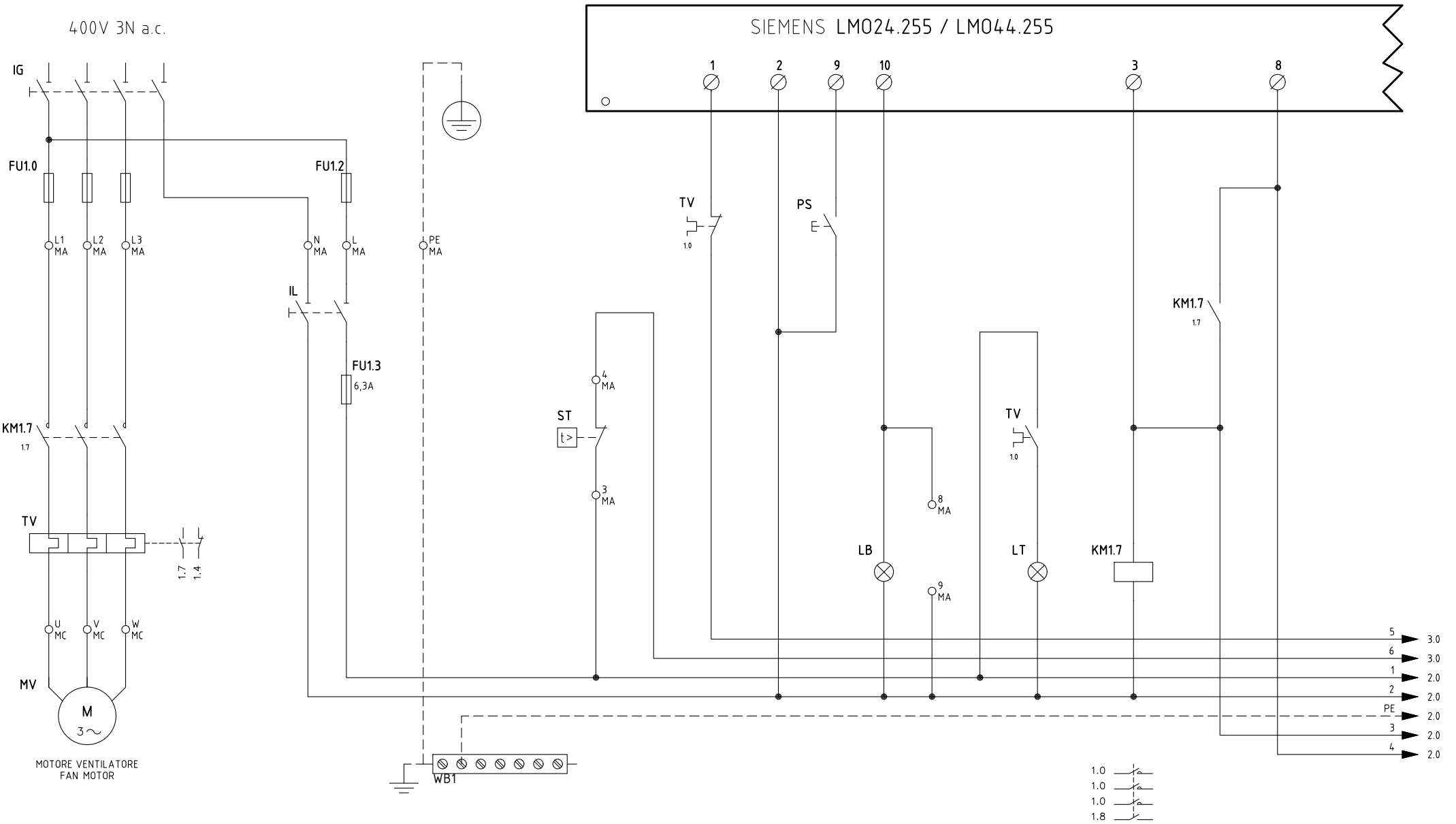
I	ALTA FIAMMA *HIGH FLAME*
II	SOSTA E ACCENSIONE *STAND-BY AND IGNITION*
III	BASSA FIAMMA *LOW FLAME*
VI	CONSENSO ALLA PARTENZA *INPUT TO START*

Data 11/12/1996		PREC.	FOGLIO
Revisione 07		2	3
Dis. N. 07 – 0352		SEGUE	TOTALE
		4	4

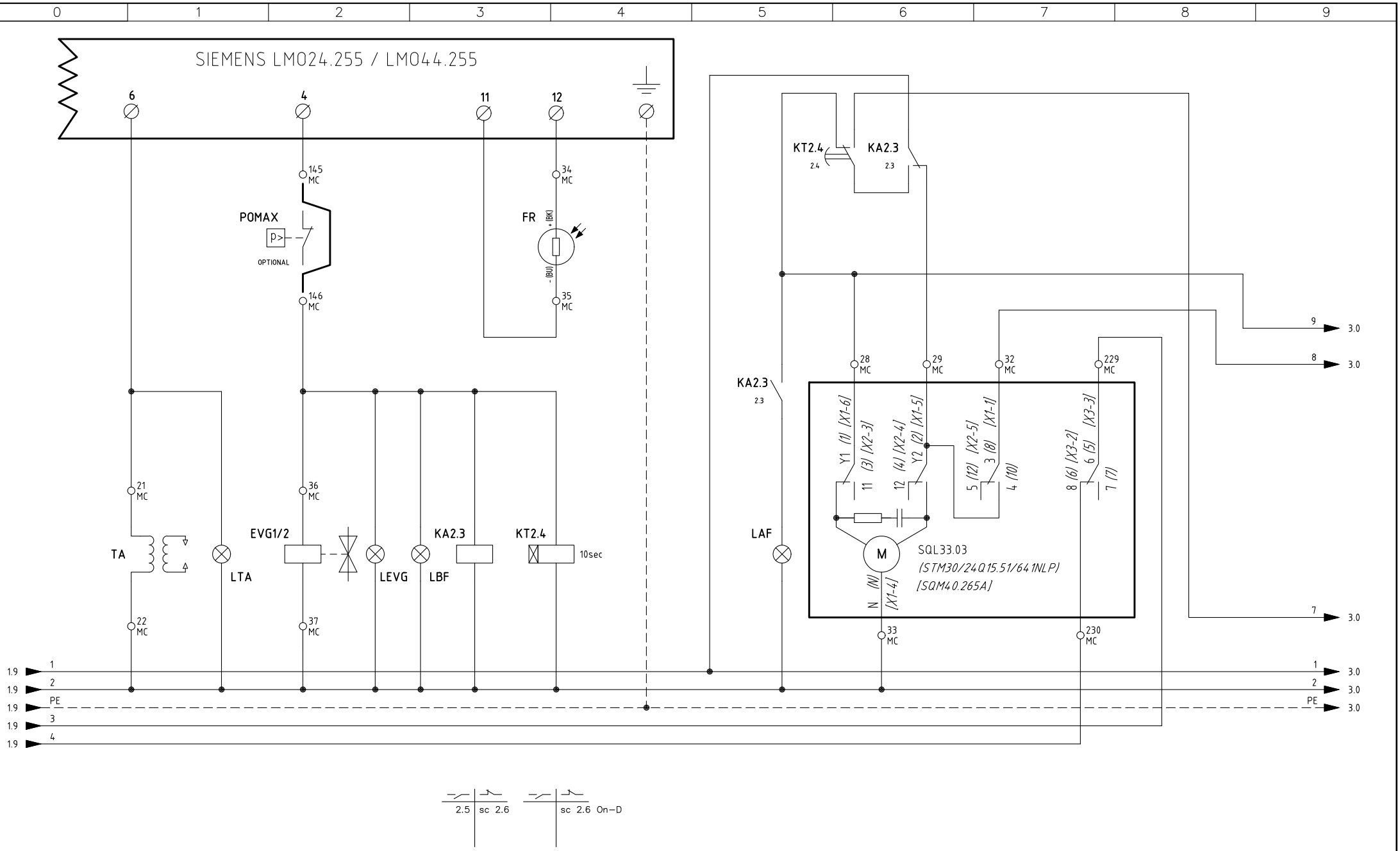
0	1	2	3	4	5	6	7	8	9

Sigla/Item	Foglio/Sheet	Funzione	Function
(STM30/24Q15.51/641NLP)	2	SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)	AIR DAMPER ACTUATOR (ALTERNATIVE)
EVG1/2	2	ELETTROVALVOLE GASOLIO	LIGHT OIL ELECTRO VALVE
FR	2	SONDA RILEVAZIONE FIAMMA	FLAME DETECTOR PROBE
FU1.0	1	FUSIBILI DI LINEA	LINE FUSES
FU1.2	1	FUSIBILE DI LINEA	LINE FUSE
FU1.3	1	FUSIBILE LINEA AUSILIARI	AUXILIARY LINE FUSE
IG	1	INTERRUTTORE GENERALE	MAIN DISCONNECTOR
IL	1	INTERRUTTORE LINEA AUSILIARI	AUXILIARY LINE SWITCH
KA2.3	2	RELE'' AUSILIARIO	AUXILIARY RELAY
KM1.7	1	CONTATTORE MOTORE VENTILATORE	FAN MOTOR CONTACTOR
KT2.4	2	RELE'' TEMPORIZZATORE	DELAYED RELAY
LAF	2	LAMPADA SEGNALAZIONE ALTA FIAMMA BRUCIATORE	BURNER IN HIGH FLAME INDICATOR LIGHT
LB	1	LAMPADA SEGNALAZIONE BLOCCO FIAMMA	BURNER LOCK-OUT INDICATOR LIGHT
LBF	2	LAMPADA SEGNALAZIONE BASSA FIAMMA BRUCIATORE	BURNER IN LOW FLAME INDICATOR LIGHT
LEVG	2	LAMPADA SEGNALAZIONE APERTURA EVG	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE EVG
LMO24.255 / LMO44.255	1	APPARECCHIATURA CONTROLLO FIAMMA	FLAME MONITOR DEVICE
LT	1	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
POMAX	2	PRESSOSTATO DI MASSIMA PRESSIONE OLIO (OPTIONAL)	MAXIMUM OIL PRESSURE SWITCH (OTIONAL)
PS	1	PULSANTE SBLOCCO FIAMMA	LOCK-OUT RESET BUTTON
SQL33.03	2	SERVOCOMANDO SERRANDA ARIA	AIR DAMPER ACTUATOR
ST	1	SERIE TERMOSTATI/PRESSOSTATI	SERIES OF THERMOSTATS OR PRESSURE SWITCHES
TA	2	TRASFORMATORE DI ACCENSIONE	IGNITION TRANSFORMER
TAB	2	TERMOSTATO/PRESSOSTATO ALTA-BASSA FIAMMA	HIGH-LOW THERMOSTAT/PRESSURE SWITCHES
TV	1	TERMICO MOTORE VENTILATORE	FAN MOTOR THERMAL
[SQM40.265A]	2	SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)	AIR DAMPER ACTUATOR (ALTERNATIVE)

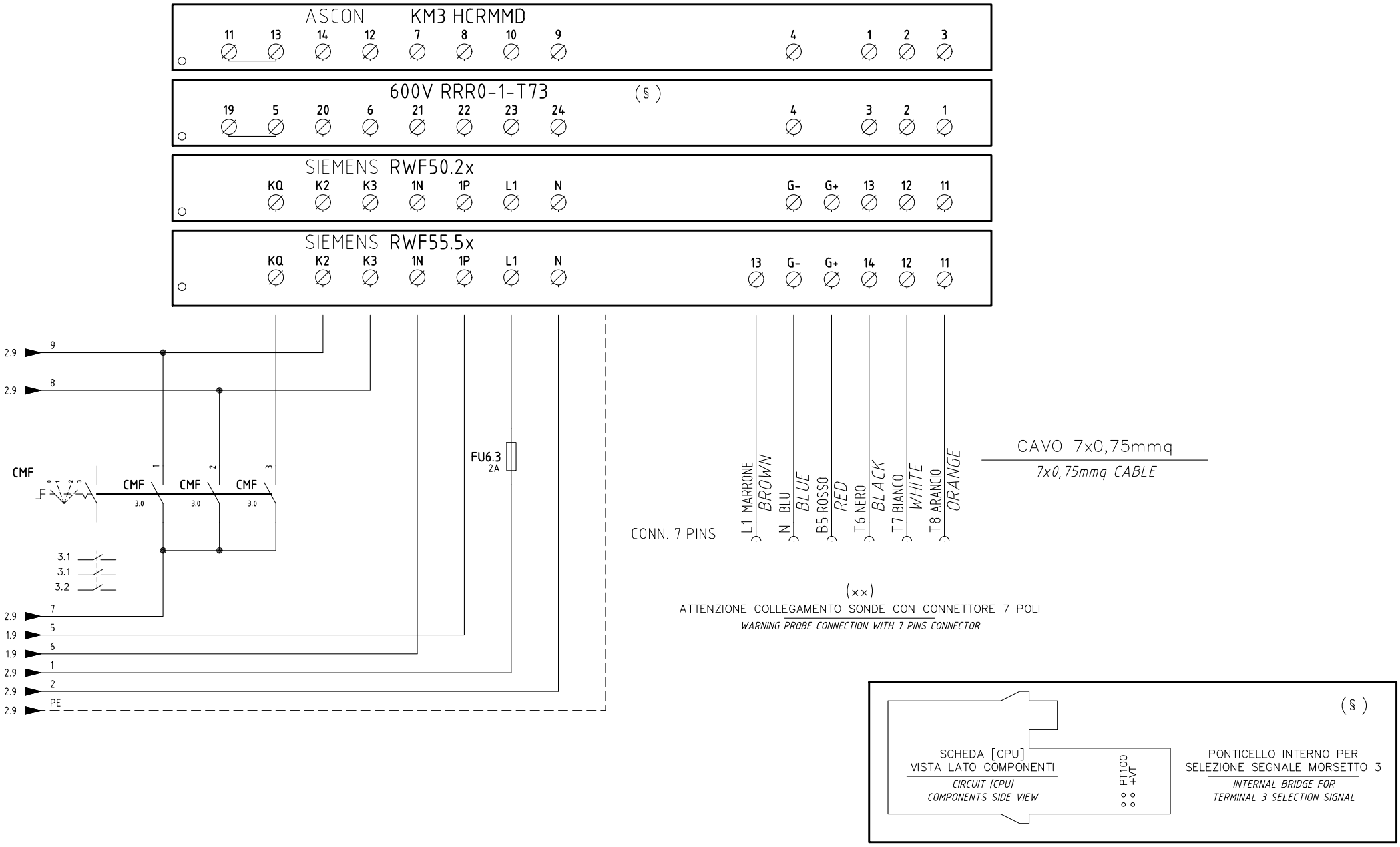
Data 11/12/1996		PREC. 3	FOGLIO 4
Revisione 07			
Dis. N. 07 – 0352		SEGUE 1	TOTALE 4



Data 23/02/2000		PREC.	FOGLIO
Revisione 10		/	1
Dis. N. 07 – 0401		SEGUE	TOTALE
		2	6



Data 23/02/2000	PREC.	FOGLIO
Revisione 10	1	2
Dis. N. 07 – 0401	SEGUE	TOTALE
	3	6



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

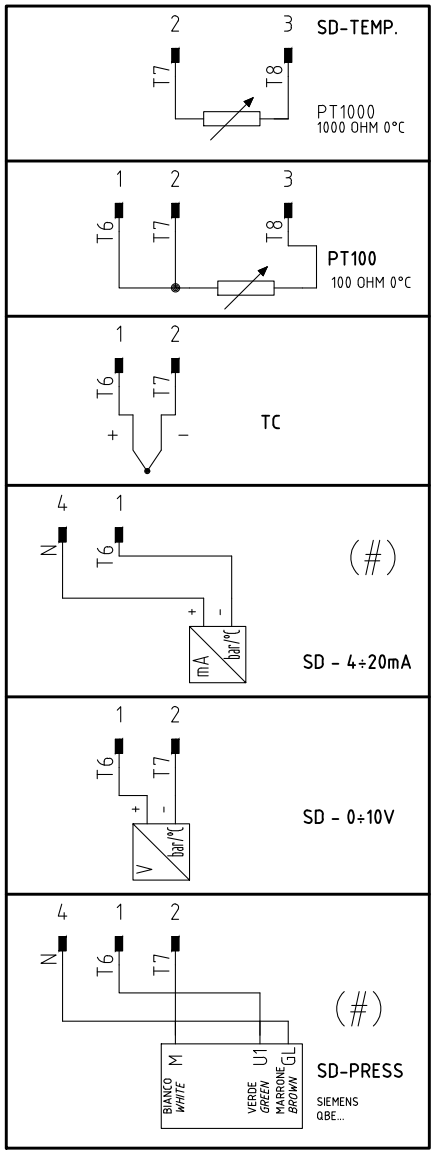
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Revisione 10			
Dis. N. 07 – 0401		SEGUE 4	TOTALE 6

(××)

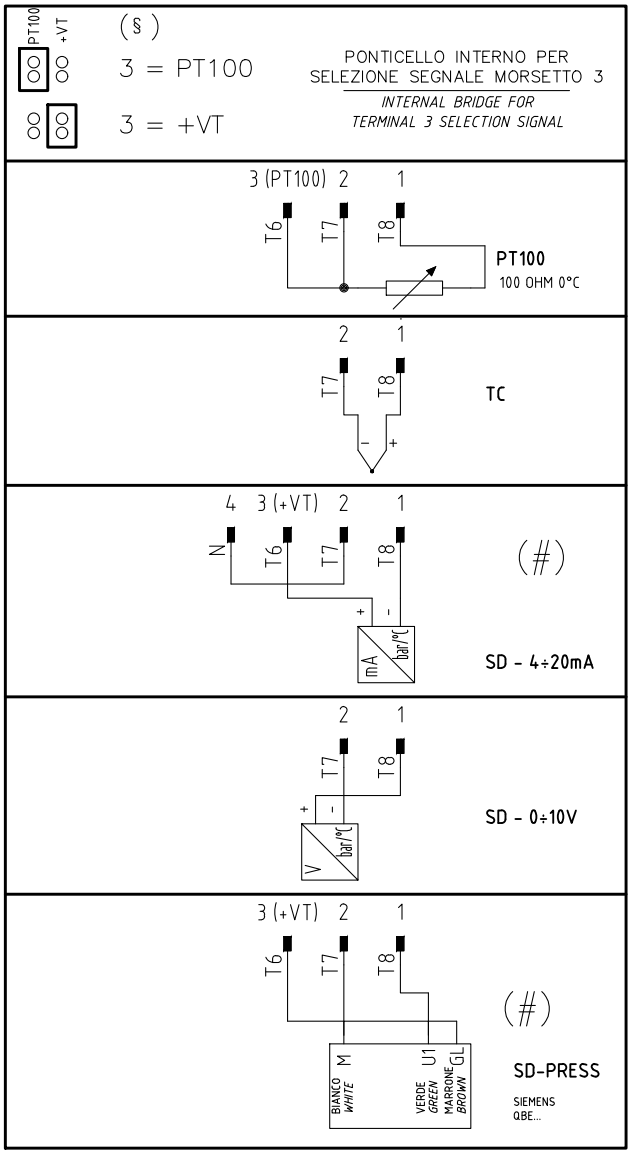
ATTENZIONE COLLEGAMENTO SONDE CON CONNETTORE 7 POLI

WARNING PROBE CONNECTION WITH 7 PINS CONNECTOR

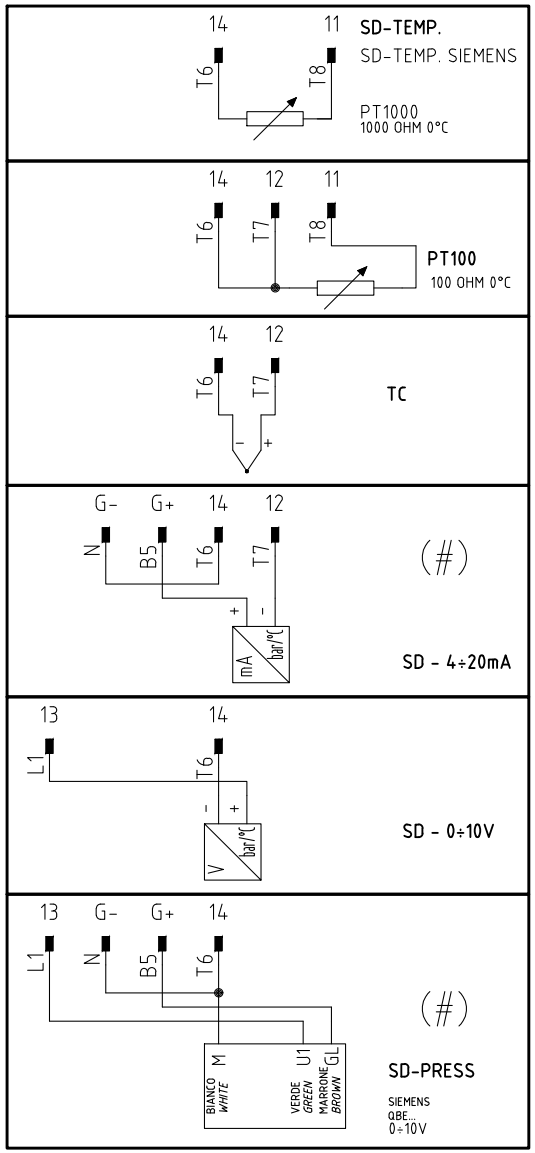
KM3 HCRMMD



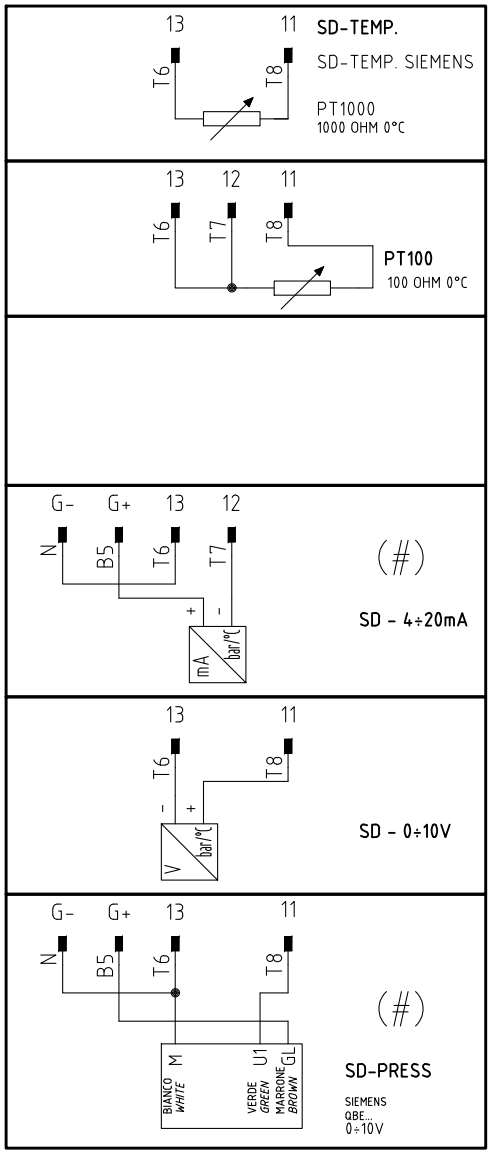
600V RRR0-1-T73



RWF55.5x



RWF50.2x

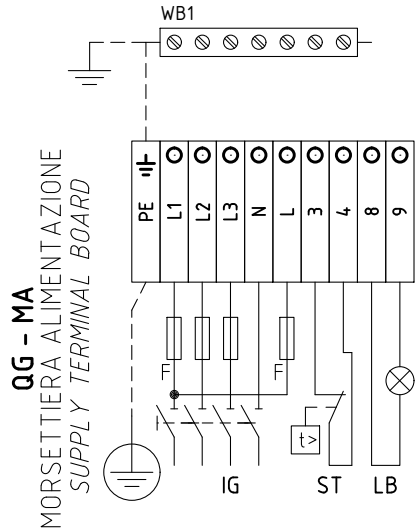


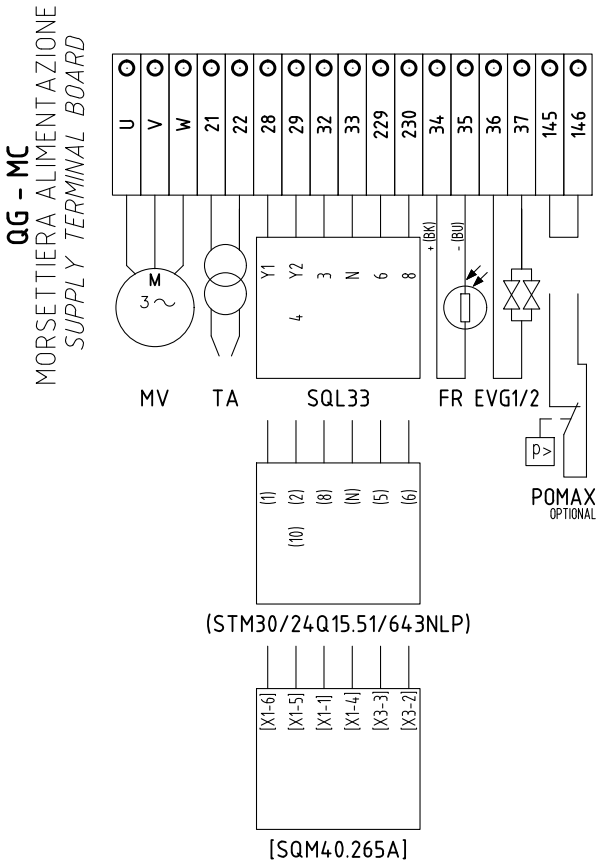
(#)

COLLEGAMENTO SOLO PER
TRASDUTTORI PASSIVI

TRASDUCER PASSIVE
CONNECTION ONLY

Data 23/02/2000		PREC.	FOGLIO
Revisione 10		3	4
Dis. N. 07 – 0401		SEGUE	TOTALE
		5	6





CAMME SERVOCOMANDO

ACTUATOR CAMS

SQL33.03

Y1	ALTA FIAMMA *HIGH FLAME*
Y2	SOSTA E ACCENSIONE *STAND-BY AND IGNITION*
3	BASSA FIAMMA *LOW FLAME*
6	CONSENSO ALLA PARTENZA *INPUT TO START*

SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)

AIR DAMPER ACTUATOR (ALTERNATIVE)

(STM30/24Q15.51/641NLP)

I	ALTA FIAMMA *HIGH FLAME*
II	SOSTA E ACCENSIONE *STAND-BY AND IGNITION*
III	BASSA FIAMMA *LOW FLAME*
V	CONSENSO ALLA PARTENZA *INPUT TO START*

SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)

AIR DAMPER ACTUATOR (ALTERNATIVE)

[SQM40.265A]

I	ALTA FIAMMA *HIGH FLAME*
II	SOSTA E ACCENSIONE *STAND-BY AND IGNITION*
III	BASSA FIAMMA *LOW FLAME*
VI	CONSENSO ALLA PARTENZA *INPUT TO START*

Data 23/02/2000		PREC.	FOGLIO
Revisione 10		4	5
Dis. N. 07 – 0401		SEGUE	TOTALE
		6	6

0	1	2	3	4	5	6	7	8	9

Sigla/Item	Foglio/Sheet	Funzione	Function
600V RRR0-1-T73	3	REGOLATORE MODULANTE (ALTERNATIVO)	BURNER MODULATOR (ALTERNATIVE)
(STM30/24Q15.51/641NLP)	2	SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)	AIR DAMPER ACTUATOR (ALTERNATIVE)
CMF	3	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
EVG1/2	2	ELETTROVALVOLE GASOLIO	LIGHT OIL ELECTRO VALVES
FR	2	SONDA RILEVAZIONE FIAMMA	FLAME DETECTOR PROBE
FU1.0	1	FUSIBILI DI LINEA	LINE FUSES
FU1.2	1	FUSIBILE DI LINEA	LINE FUSE
FU1.3	1	FUSIBILE LINEA AUSILIARI	AUXILIARY LINE FUSE
FU6.3	3	FUSIBILE	FUSE
IG	1	INTERRUTTORE GENERALE	MAINS SWITCH
IL	1	INTERRUTTORE LINEA AUSILIARI	AUXILIARY LINE SWITCH
KA2.3	2	RELE'' AUSILIARIO	AUXILIARY RELAY
KM1.7	1	CONTATTORE MOTORE VENTILATORE	FAN MOTOR CONTACTOR
KM3 HCRMMD	3	REGOLATORE MODULANTE (ALTERNATIVO)	BURNER MODULATOR (ALTERNATIVE)
KT2.4	2	RELE'' TEMPORIZZATORE	DELAYED RELAY
LAF	2	LAMPADA SEGNALAZIONE ALTA FIAMMA BRUCIATORE	BURNER IN HIGH FLAME INDICATOR LIGHT
LB	1	LAMPADA SEGNALAZIONE BLOCCO FIAMMA	BURNER LOCK-OUT INDICATOR LIGHT
LBF	2	LAMPADA SEGNALAZIONE BASSA FIAMMA BRUCIATORE	BURNER IN LOW FLAME INDICATOR LIGHT
LEVG	2	LAMPADA SEGNALAZIONE APERTURA [EVG]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EVG]
LMO24.255 / LMO44.255	1	APPARECCHIATURA CONTROLLO FIAMMA	CONTROL BOX
LT	1	LAMPADA SEGNALAZIONE BLOCCO TERMICO MOTORE VENTILATORE	INDICATOR LIGHT FOR FAN MOTOR OVERLOAD THERMAL CUTOUT
LTA	2	LAMPADA SEGNALAZIONE TRASFORMATORE DI ACCENSIONE	IGNITION TRANSFORMER INDICATOR LIGHT
MV	1	MOTORE VENTILATORE	FAN MOTOR
POMAX	2	PRESSOSTATO DI MASSIMA PRESSIONE OLIO (OPTIONAL)	MAXIMUM OIL PRESSURE SWITCH (OTIONAL)
PS	1	PULSANTE SBLOCCO FIAMMA	FLAME UNLOCK BUTTON
PT100	4	SONDA DI TEMPERATURA	TEMPERATURE PROBE
RWF50.2x	3	REGOLATORE MODULANTE	BURNER MODULATOR
RWF55.5x	3	REGOLATORE MODULANTE (ALTERNATIVO)	BURNER MODULATOR (ALTERNATIVE)
SD-PRESS	4	SONDA DI PRESSIONE	PRESSURE PROBE
SD-TEMP.	4	SONDA DI TEMPERATURA	TEMPERATURE PROBE
SD - 0÷10V	4	TRASDUTTORE USCITA IN TENSIONE	TRANSDUCER VOLTAGE OUTPUT
SD - 4÷20mA	4	TRASDUTTORE USCITA IN CORRENTE	TRANSDUCER CURRENT OUTPUT
SQL33.03	2	SERVOCOMANDO SERRANDA ARIA	AIR DAMPER ACTUATOR
ST	1	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
WB1	1	BARRA DI TERRA	EARTH TERMINAL
[SQM40.265A]	2	SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)	AIR DAMPER ACTUATOR (ALTERNATIVE)

Data 23/02/2000		PREC.	FOGLIO
Revisione 10		5	6
Dis. N. 07 – 0401		SEGUE	TOTALE
		/	6

APPENDIX

SIEMENS OIL BURNERS AUTOMATIC CONTROLLER SIEMENS LMO14 - LMO24 - LMO44

The LMO... burner controls are designed for the start-up and supervision of single- or 2-stage forced draught oil burners in intermittent operation. Yellow-burning flames are supervised with photoresistive detectors QRB..., blue-burning flames with blue-flame detectors QRC...

In terms of housing dimensions, electrical connections and flame detectors, the LMO... are identical to the LOA... oil burner controls.

Preconditions for startup

- Burner control is reset
- All contacts in the line are closed
- No undervoltage
- Flame detector is darkened, no extraneous light

Undervoltage

- Safety shut-down in the operating position takes place should the mains voltage drop below about AC 165 V
- Restart is initiated when the mains voltage exceeds about AC 175 V

Time supervision oil pre-heater

If the oil pre-heater's release contact does not close within 10 minutes, the burner control will initiate lock-out.

Controlled intermittent operation

After no more than 24 hours of continuous operation, the burner control will initiate an automatic safety shut-down followed by a restart.

Control sequence in the event of fault

If lock-out occurs, the outputs for the fuel valves and the ignition will immediately be deactivated (< 1 second).

Cause	Response
After a mains failure	Restart
After voltage has fallen below the undervoltage threshold	Restart
In the event of a premature, faulty flame signal during «t1»	Lock-out at the end of «t1»
In the event of a premature, faulty flame signal during «tw»	Prevention of start-up, lock-out after no more than 40 seconds
If the burner does not ignite during «TSA»	Lock-out at the end of TSA
In the event the flame is lost during operation	Max. 3 repetitions, followed by lock-out
Oil pre-heater's release contact does not close within 10 min.	Lock-out

Lock-out

In the event of lock-out, the LMO... remains locked (lock-out cannot be changed), and the red signal lamp will light up. This status is also maintained in the case of a mains failure.

Resetting the burner

Whenever lock-out occurs, the burner control can immediately be reset. To do this, keep control the lock-out reset button depressed for about 1 second (< 3 seconds).

Ignition program with LMO24.113A2

If the flame is lost during «TSA», the burner will be reignited, but not later than at the end of «TSAmax.». This means that several ignition attempts can be made during TSA (refer to «Program sequence»).

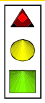
Limitation of repetitions

If the flame is lost during operation, a maximum of 3 repetitions can be made. If the flame is lost for the 4th time during operation, the burner will initiate lock-out. The repetition count is restarted each time controlled switching on by «R-W-SB» takes place.

Operation



Lock-out reset button «EK...» is the key operating element for resetting the burner control and for activating / deactivating the diagnostic functions.



The multicolour «LED» is the key indicating element for both visual diagnosis and interface diagnosis.

s Red
l Yellow
o Green

Colour code table		
Status	Colour code	Colour
Oil pre-heater heats, waiting time «tw»	lllllllllll	Yellow
Ignition phase, ignition controlled	lmlmlmlmlml	Yellow-off
Operation, flame o.k.	ooooooooooo	Green
Operation, flame not o.k.	omomomomomo	Green-off
Undervoltage	lslslslslsl	Yellow-red
Fault, alarm	sssssssssss	Red
Output of fault code (refer to Fault code table)	smsmsmsmsm	Red-off
Extraneous light prior to burner start-up	osososososo	Green-red
Interface diagnosis	ssssssssssssss	Red flicker light

Key

m Off
l Yellow
o Green
s Red

Diagnosis of cause of fault

After lock-out, the red fault signal lamp remains steady on.

In that condition, the visual diagnosis of the cause of fault according to the error code table can be activated by pressing the lock-out reset button for more than 3 seconds.

Error code table	
Blink code	**Possible cause**
2 blinks **	No establishment of flame at the end of TSA ● Faulty or soiled fuel valves ● Faulty or soiled flame detector ● Poor adjustment of burner, no fuel ● Faulty ignition
3 blinks ***	Free
4 blinks ****	Extraneous light on burner startup
5 blinks *****	Free
6 blinks ******	Free
7 blinks *******	Too manny losses of fleme during operation (limitattion og the number of repetitions) ● Faulty or soiled fuel valves ● Faulty or soiled flame detector ● Poor adjustment of burner
8 blinks ********	Time supervision oil pre-heater
9 blinks *********	Free
10 blinks **********	Wiring error or internal error, output contacts

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

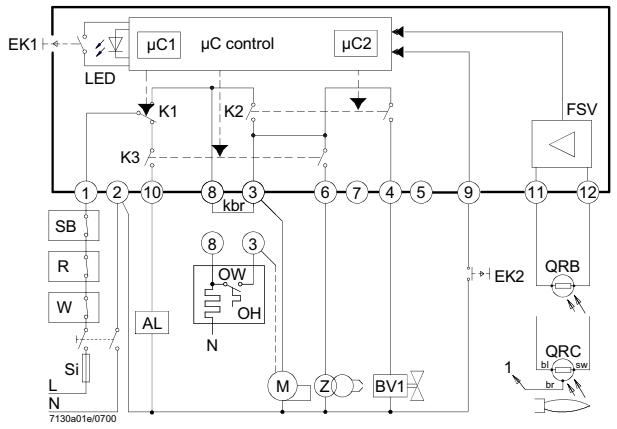
- Burner remains shut down
- Fault status signal «AL» at terminal 10 is activated

The diagnosis of the cause of fault is quit and the burner switched on again by resetting the burner control.

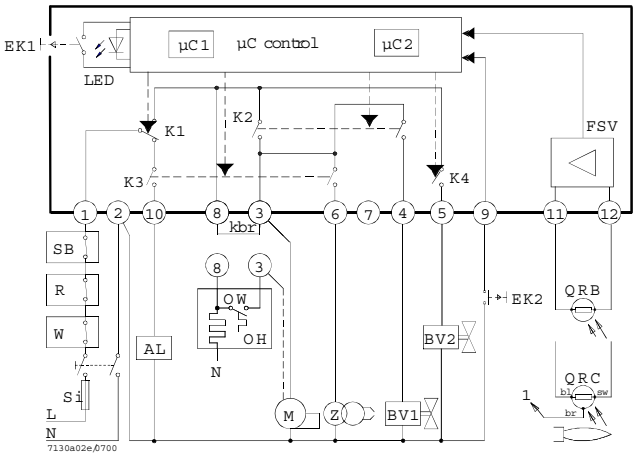
Press lock-out reset button for about 1 second (< 3 seconds).

Connection diagram and internal diagram

LMO14

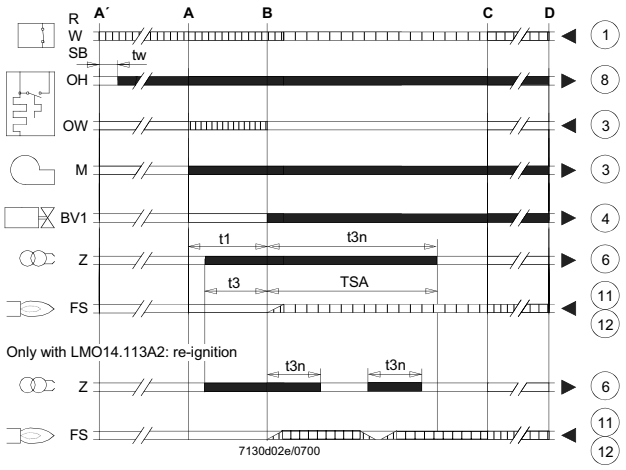


LMO24 - LMO44

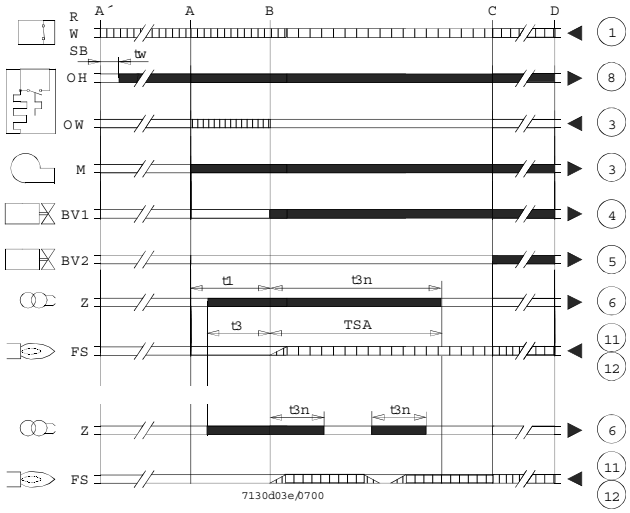


Control sequence

LMO14



LMO24 - LMO44



Key

AL	Alarm device
kbr...	Cable link (required only when no oil pre-heater is used)
BV...	Fuel valve
EK1	Lock-out reset button
EK2	Remote lock-out reset button
FS	Flame signal
FSV	Flame signal amplifier
K...	Contacts of control relay
LED	3-colour signal lamps
M	Burner motor
OW	Release contact of oil pre-heater
t1	Pre-purge time
t3	Pre-ignition time
t3n	Post-ignition time
A´	Beginning of start-up sequence with burners using an oil pre-heater
A	Beginning of start-up sequence with burners using no oil pre-heater
	Controller output signals
	Required input signals
OH	Oil pre-heater
QRB	Photoresistive detector
QRC	Blue-flame detector
bl = blue	
br = brown	
sw = black	
R	Control thermostat or pressurestat
SB	Safety limit thermostat
Si	External primary fuse
W	Limit thermostat or pressure switch
Z	Ignition transformer
t4	Interval from flame signal to release «BV2»
TSA	Ignition safety time
tw	Waiting time for oil pre-heating
B	Time of flame establishment
C	Operating position
D	Controlled shut-down by «R»
µC1	Microcontroller 1
µC2	Microcontroller 2

General unit data

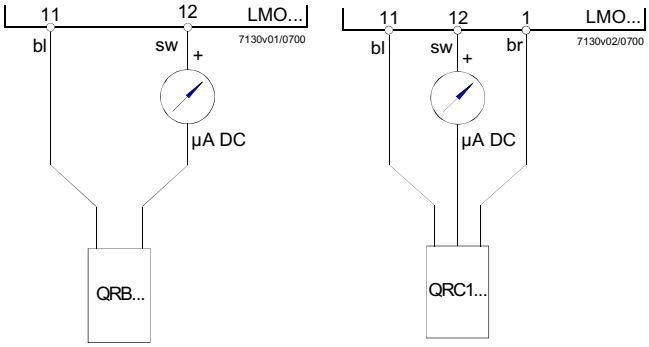
Mains voltage	AC 230 V +10 % / -15 % AC 120 V +10 % / -15 %
Mains frequency	50...60 Hz ±6 %
External primary fuse (Si)	6.3A (slow)
Power consumption	12 VA
Mounting orientation	optional
Weight	approx. 200 g
Degree of protection	IP40 (to be ensured through mounting)
Perm. cable lengths	max. 3m at line capacitance of 100 pF/m
Detector cable laid separately	10 m
Remote reset laid separately	20m

	LMO14	LMO24	LMO44
Terminal 1	5 A	5 A	5 A
Terminals 3 and 8	3 A	5 A	5 A
Terminals 4, 5 and 10	1 A	1 A	1A
Terminals 6	1 A	1 A	2A

Flame supervision with QRB and QRC

	QRB	**QRC**
Min. detector current required (with flame)	45 µA	70 µA
Min detector current permitted (without flame)	5.5 µA	5.5 µA
Max. possible with flame (tipically)	100 µA	100 µA

Measurement circuit for detector current



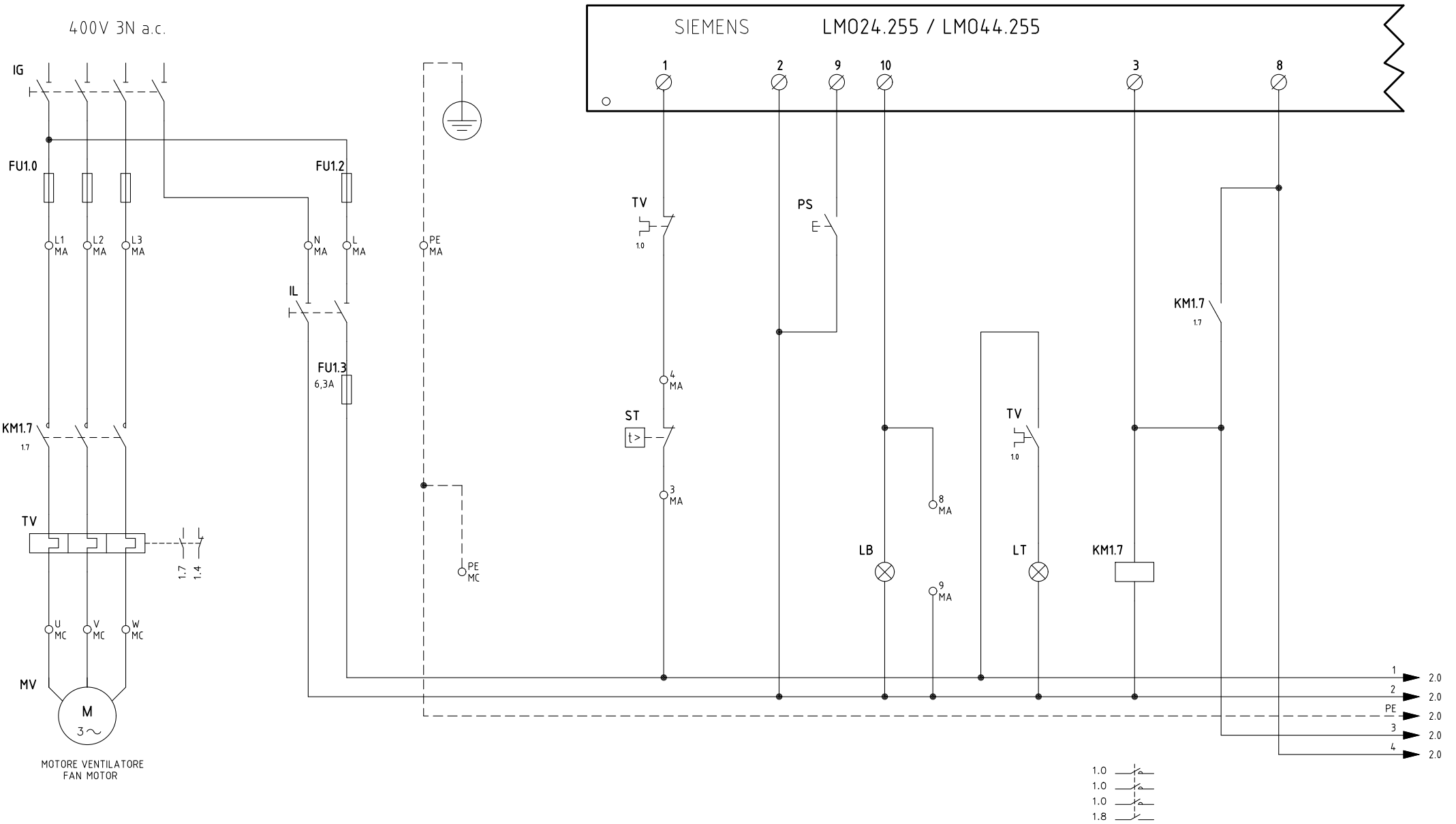
Key

µA DC	DC microamperometer with an internal resistance of 5 kΩ max.
bl	Blue
sw	Black
br	Brown



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



REV.	MODIFICA	DATA	FIRME
05	AGGIUNTO/ADDED SQM40.265A	12/11/09	U. PINTON
04	AGGIUUNTO/ADDED PG93	26/05/08	U. PINTON
03	AGGIUNTO/ADDED STM30..	07/09/06	U. PINTON
07	AGGIUNTO/ADDED LMO24.255	07/01/13	U. PINTON
06	AGGIUNTO/ADDED "POMAX"	02/07/12	U. PINTON

UNIGAS

Impianto: *TIPI/TYPES PG70 ÷ PG93*
MODELLO/MODEL G–.PR.x.xx.Y

Descrizione: *VERSIONE DI SERIE*
SERIES VERSION

Ordine:

Commessa:

Esecutore: U. PINTON

Data Controllato: 07/01/2013

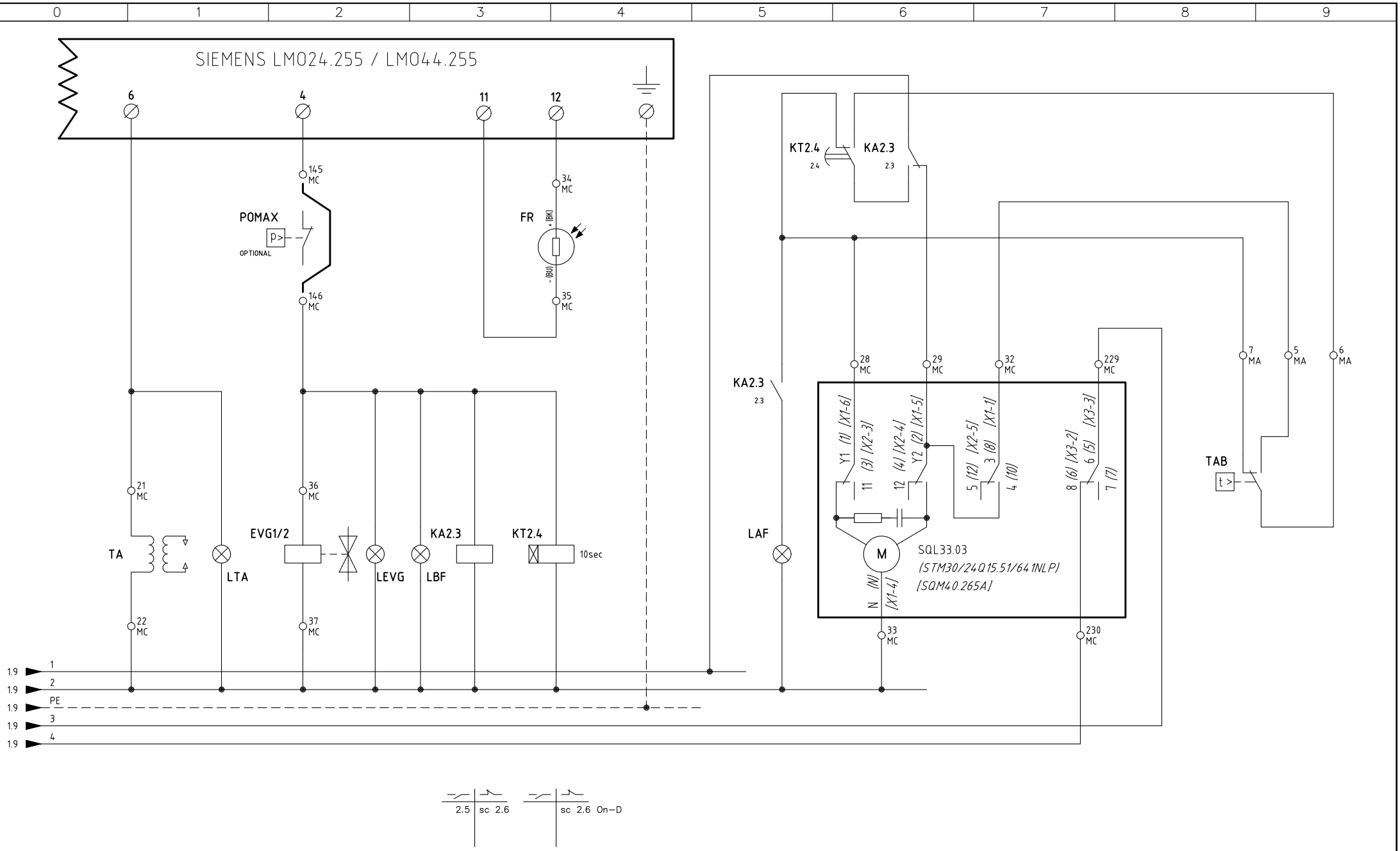
Controllato: S. MARCHETTI

Data: 11/12/1996

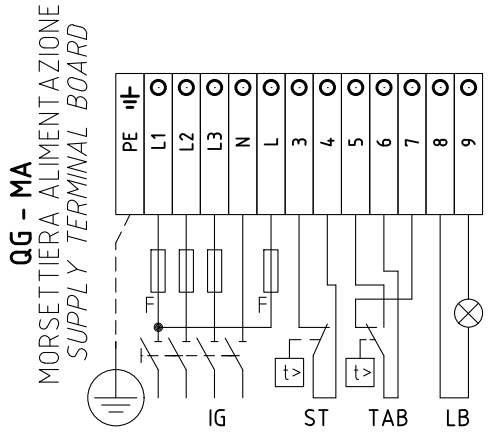
Revisione: 07

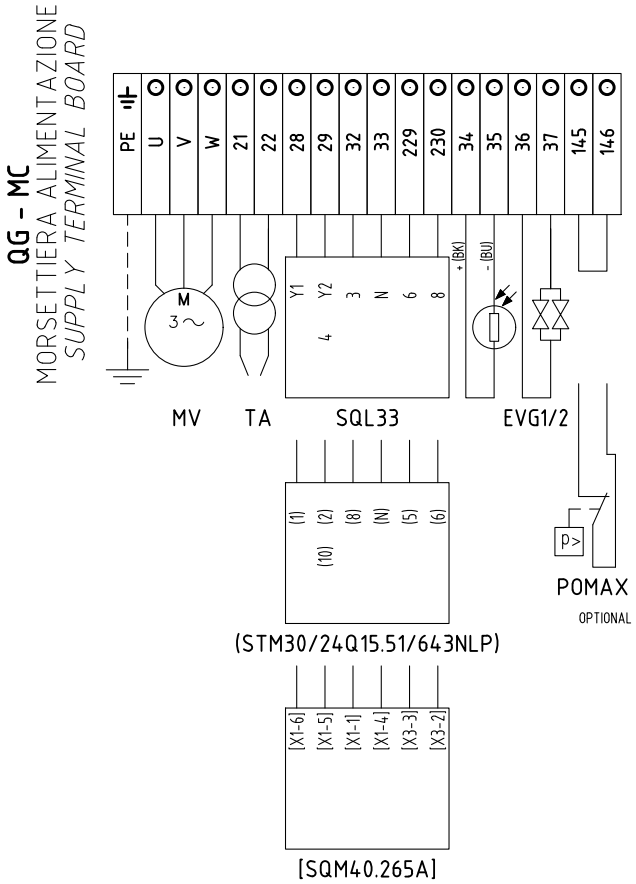
Dis. N. 07 – 0352

PREC.	FOGLIO
/	1
SEGUE	TOTALE
2	4



Data 11/12/1996		PREC.	FOGLIO
Revisione 07		1	2
Dis. N. 07 – 0352		SEGUE	TOTALE
		3	4





CAMME SERVOCOMANDO

SERVO CONTROL CAMS

SQL33.03

Y1	ALTA FIAMMA *HIGH FLAME*
Y2	SOSTA E ACCENSIONE *STAND-BY AND IGNITION*
3	BASSA FIAMMA *LOW FLAME*
6	CONSENSO ALLA PARTENZA *INPUT TO START*

SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)

AIR DAMPER SERVO CONTROL (ALTERNATIVE)

(STM30/24Q15.51/641NLP)

I	ALTA FIAMMA *HIGH FLAME*
II	SOSTA E ACCENSIONE *STAND-BY AND IGNITION*
III	BASSA FIAMMA *LOW FLAME*
V	CONSENSO ALLA PARTENZA *INPUT TO START*

SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)

AIR DAMPER SERVO CONTROL (ALTERNATIVE)

[SQM40.265A]

I	ALTA FIAMMA *HIGH FLAME*
II	SOSTA E ACCENSIONE *STAND-BY AND IGNITION*
III	BASSA FIAMMA *LOW FLAME*
VI	CONSENSO ALLA PARTENZA *INPUT TO START*

Data 11/12/1996		PREC.	FOGLIO
Revisione 07		2	3
Dis. N. 07 – 0352		SEGUE	TOTALE
		4	4

0	1	2	3	4	5	6	7	8	9

SIGLA/ITEM	FOGLIO/SHEET	FUNZIONE	FUNCTION
(STM30/24Q15.51/641NLP)	2	SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)	AIR DAMPER ACTUATOR (ALTERNATIVE)
EVG1/2	2	ELETTROVALVOLE GASOLIO	LIGHT OIL ELECTRO VALVE
FR	2	SONDA RILEVAZIONE FIAMMA	FLAME DETECTOR PROBE
FU1.0	1	FUSIBILI DI LINEA	LINE FUSES
FU1.2	1	FUSIBILE DI LINEA	LINE FUSE
FU1.3	1	FUSIBILE LINEA AUSILIARI	AUXILIARY LINE FUSE
IG	1	INTERRUTTORE GENERALE	MAIN DISCONNECTOR
IL	1	INTERRUTTORE LINEA AUSILIARI	AUXILIARY LINE SWITCH
KA2.3	2	RELE' AUSILIARIO	AUXILIARY RELAY
KM1.7	1	CONTATTORE MOTORE VENTILATORE	FAN MOTOR CONTACTOR
KT2.4	2	RELE' TEMPORIZZATORE	DELAYED RELAY
LAF	2	LAMPADA SEGNALAZIONE ALTA FIAMMA BRUCIATORE	BURNER IN HIGH FLAME INDICATOR LIGHT
LB	1	LAMPADA SEGNALAZIONE BLOCCO FIAMMA	BURNER LOCK-OUT INDICATOR LIGHT
LBF	2	LAMPADA SEGNALAZIONE BASSA FIAMMA BRUCIATORE	BURNER IN LOW FLAME INDICATOR LIGHT
LEVG	2	LAMPADA SEGNALAZIONE APERTURA EVG	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE EVG
LMO24.255 / LMO44.255	1	APPARECCHIATURA CONTROLLO FIAMMA	FLAME MONITOR DEVICE
LT	1	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
POMAX	2	PRESSOSTATO DI MASSIMA PRESSIONE OLIO (OPTIONAL)	MAXIMUM OIL PRESSURE SWITCH (OTIONAL)
PS	1	PULSANTE SBLOCCO FIAMMA	LOCK-OUT RESET BUTTON
SQL33.03	2	SERVOCOMANDO SERRANDA ARIA	AIR DAMPER ACTUATOR
ST	1	SERIE TERMOSTATI/PRESSOSTATI	SERIES OF THERMOSTATS OR PRESSURE SWITCHES
TA	2	TRASFORMATORE DI ACCENSIONE	IGNITION TRANSFORMER
TAB	2	TERMOSTATO/PRESSOSTATO ALTA-BASSA FIAMMA	HIGH-LOW THERMOSTAT/PRESSURE SWITCHES
TV	1	TERMICO MOTORE VENTILATORE	FAN MOTOR THERMAL
[SQM40.265A]	2	SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)	AIR DAMPER ACTUATOR (ALTERNATIVE)

Data 11/12/1996		PREC. 3	FOGLIO 4
Revisione 07			
Dis. N. 07 – 0352		SEGUE 1	TOTALE 4