

HR91A HR92A HR93A HR512A HR515A HR520A HR525A

Gas - Light oil burners

MANUAL OF INSTALLATION - USE - MAINTENANCE

CIB UNIGAS

BURNERS - BRUCIATORI - BRULERS - BRENNER - QUEMADORES - ГОРЕЛКИ

M039348CA 0.7 10/2020

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 cutout 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 firebox.
- Before the burner is started and, thereafter, at least once a year, have qualified personnel perform the following operations:
- a set the burner fuel flow rate depending on the heat input of the appliance;
- b set the flow rate of the combustion-supporting air to obtain a combustion efficiency level at least equal to the lower level required by the regulations in force;
- c check the unit operation for proper combustion, to avoid any harmful or polluting unburnt gases in excess of the limits permitted by the regulations in force;
- d make sure that control and safety devices are operating properly;
- e make sure that exhaust ducts intended to discharge the products of combustion are operating properly;
- f on completion of setting and adjustment operations, make sure that all mechanical locking devices of controls have been duly tightened;
- g make sure that a copy of the burner use and maintenance instructions is available in the boiler room.
- In case of a burner shut-down, 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;
- 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) 2006/40/EC (Machinese 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 Year 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)

WARNING!

 information about fuel type and network pressure
 Protein Drivation



SYMBOLS USED

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



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



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: SPECIFICATIONS

BURNERS FEATURES



Note: the figure is indicative only

Keys 1 Gas filter

- 2 Gas valve group
- 3 Mimic panel with startup switch

4 Cover

- 5 Flange
- 6 Blast tube-Combustion head group

7 Air intake

- 8 Adjusting cams
- 9 Air pressure switch
- 10 Actuator
- 11 Oil pressure governor

12 Pump

13 Oil manifold

14 Head adjusting ring nut

Gas operation: the gas coming from the supply line, passes through the valves group provided with filter and governor. This one forces the pressure in the utilisation limits. The actuators move proportionally the air damper and the gas butterfly valve, in order to achieve the optimisation of the gas flue values, as to get an efficient combustion.

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

In the burners, the mixture 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 passing through the nozzle.

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

The adjustable combustion head can improve the burner performance. The combustion head determines the energetic quality and the geometry of the flame. Fuel and comburent are routed into separated ways as far as the zone of flame generation (combustion chamber). The control panel, placed on the burner front side, shows each operating stage.

Burner model identification

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

Туре	HR512A	Model	MG.	MD.	S.	*.	Α.	1.	80.
	(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)

1	BURNER TYPE	HR91A, HR92A, HR93A, HR512A, HR515A, HR520A, HR525A
2	FUEL	M - Natural gas
		L - LPG
		G - Light oil
3	OPERATION (Available versions)	PR - Progressive
		MD - Fully modulating
4	BLAST TUBE	S - Standard
5	DESTINATION COUNTRY	* - see data plate
6	BURNER VERSION	A - Standard
		Y - SpecialeSpecial
7	EQUIPMENT	1 = 2 gas valves + gas proving system
		8 = 2 gas valves + gas proving system + maximum gas pressure switch
8	GAS CONNECTION	50 = Rp2 65 = DN65
		80 = DN80 100 = DN100

Technical Specifications

BURNER TYPE		HR91A MG	HR92A MG	HR93A MG					
Output	min max. kW	480 - 2670	480 - 3050	550 - 4100					
Fuel		Na	atural gas - Light	oil					
Category		(s	ee next paragrap	oh)					
Gas rate- Natural gas	min max. (Stm ³ /h)	51 - 283	51 - 323	58 - 434					
Gas pressure	mbar		(see Note 2)						
Light oil rate	minmax. kg/h	40 - 225	40 - 257	46 - 345					
Oil viscosity	cSt @ 40°C		2 - 7.4						
Oil density	kg/m ³		840						
Light oil train inlet pressure	bar max		2						
Power supply triphase		220V	/230V 3~ / 380V/40	00V 3N ~ 50					
Auxiliary Power supply		220V	/230V 2~ / 220V/23	30V 1N ~ 50					
Total power consumption	kW	5.6	7.1	9.1					
Electric motor	kW	4	5.5	7.5					
Pump motor	kW	1.1	1.1	1.1					
Protection			IP40						
Operation		Progre	ssive - Fully mod	Julating					
Gas train 50	Valves size / Gas connection		50 / Rp 2						
Gas train 65	Valves size / Gas connection		65 / DN65						
Gas train 80	Valves size / Gas connection		80 / DN80						
Gas train 100	Valves size / Gas connection	Valves size / Gas connection 100 / DN100							
Operating temperature	C°		-10 ÷ +50						
Storage Temperature	O°		-20 ÷ +60						
Working service (*)			Intermitent						

Note1:	All gas flow rates are referred to Stm ³ /h (1013 mbar absolute pressure, 15 °C temperature) and are valid for G20 gas (net calorific value H _i = 34.02 MJ/Stm ³); for L.P.G. (net calorific value H _i = 93.5 MJ/Stm ³)
Note2:	Maximum gas pressure = 500mbar (with Siemens VGD or Dungs MultiBloc MBE) Minimum gas pressure = see gas curves.
Note3:	Burners are suitable only for indoor operation with a maximum relative humidity of 80%

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

BURNER TYPE		HR91A LG	HR92A LG	HR93A LG						
Output	min max. kW	480 - 2670	480 - 3050	550 - 4100						
Fuel			L.P.G Light oil	ł						
Category			I _{3B/P}							
Gas rate- LPG	min max. (Stm ³ /h)	min max. (Stm ³ /h) 17.9 - 100 17.9 - 114								
Gas pressure	mbar		(see Note 2)							
Light oil rate	minmax. kg/h	40 - 225	40 - 257	46 - 345						
Oil viscosity	cSt @ 40°C		2 - 7.4	- 7.4						
Oil density	kg/m ³		840							
Light oil train inlet pressure	bar max		2							
Power supply triphase		220\	//230V 3~ / 380V/40	0V 3N ~ 50						
Auxiliary Power supply		220\	//230V 2~ / 220V/23	0V 1N ~ 50						
Total power consumption	kW	5.6	7.1	9.1						
Electric motor	kW	4	5.5	7.5						
Pump motor	kW	1.1	1.1	1.1						
Protection			IP40							
Operation		Progr	essive - Fully mod	ulating						
Gas train 50	Valves size / Gas connection		50 / Rp 2							
Gas train 65	Valves size / Gas connection		65 / DN65							
Gas train 80	Valves size / Gas connection		80 / DN80							
Gas train 100	Valves size / Gas connection		100 / DN100							
Operating temperature	C°		-10 ÷ +50							
Storage Temperature	O°		-20 ÷ +60							
Working service (*)			Intermitent							

BURNER TYPE		HR512A MG	HR515A MG	HR520A MG	HR525A50 MG	HR525Axx MG					
Output	min max. kW	600 - 4500	770 - 5200	1000 - 6400	2000 - 6700	2000 - 8000					
Fuel			Nat	ural gas - Ligh	t oil						
Category			(se	e next paragra	ph)						
Gas rate- Natural gas	min max. (Stm ³ /h)	63 - 476	81 - 550	106 - 677	212 - 709	212 - 847					
Gas pressure	mbar			(see Note 2)							
Light oil rate	minmax. kg/h	50 - 379	65 - 438	84 - 539	168 - 564	168 - 674					
Oil viscosity	- 7.4 cSt @ 40°	C									
Oil density	kg/m ³			840							
Light oil train inlet pressure	bar max			2							
Power supply triphase	pply triphase 220V/230V 3~ / 380V/400V 3N ~ 50										
Auxiliary Power supply		220V/2	230V 2~ / 220V/2	230V 1N ~ 50	400V 3N	l ~ 50Hz					
Total power consumption	kW	10.8	13	17	22	22					
Electric motor	kW	9.2	11	15	18.5	18.5					
Pump motor	kW	1.1	1.5	1.5	1.5 3 3						
Protection				IP40							
Operation			Progres	sive - Fully mo	dulating						
Gas train 50	Valves size / Gas connection	50 / Rp2	50 / Rp2	50 / Rp2	50 / Rp2						
Gas train 65	Valves size / Gas connection	65 / DN65	65 / DN65	65 / DN65	-	65 / DN65					
Gas train 80	Valves size / Gas connection	80 / DN80	80 / DN80	80 / DN80	-	80 / DN80					
Gas train 100	Valves size / Gas connection	100 / DN100	100 / DN100	100 / DN100	-	100 / DN100					
Operating temperature	°C			-10 ÷ +50							
Storage Temperature	C°			-20 ÷ +60							
Working service (*)				Intermitent							

Note1:	All gas flow rates are referred to Stm ³ /h (1013 mbar absolute pressure, 15 °C temperature) and are valid for G20 gas (net calorific value H _i = 34.02 MJ/Stm ³); for L.P.G. (net calorific value H _i = 93.5 MJ/Stm ³)
Note2:	Maximum gas pressure = 500mbar (with Siemens VGD or Dungs MultiBloc MBE) Minimum gas pressure = see gas curves.
Note3:	Burners are suitable only for indoor operation with a maximum relative humidity of 80%

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

BURNER	ТҮРЕ		HR512A LG	HR515A LG	HR520A LG	HR525A50 LG	HR525Axx LG										
Output		min max. kW	600 - 4500	770 - 5200	1000 - 6400	2000 - 6700	2000 - 8000										
Fuel					L.P.G Light oil												
Category					I _{3B/P}												
Gas rate- LPG		min max. (Stm ³ /h)	22 - 167	22 - 167 28 - 194 37 - 238 74 - 250													
Gas pressure		mbar	(see Note 2)														
Light oil rate		minmax. kg/h	50 - 379	65 - 438	84 - 539	168 - 564	168 - 674										
Oil viscosity				2	- 7.4 cSt @ 40°	C	R525A50 HR525Axx LG 2000 - 8000 74 - 250 74 - 300 74 - 250 74 - 300 168 - 564 168 - 674 400V 3N ~ 50Hz 400V 3N ~ 50Hz 22 22 18.5 18.5 3 3 ating 50 / Rp2 - 65 / DN65 - 80 / DN80 - 100 / DN100 nd are valid for G20 gas										
Oil density		kg/m ³	840														
Light oil train inlet p	ressure	bar max	2														
Power supply tripha	se		220V/2	2 //230V 3~ / 380V/400V 3N ~ 50 400V 3N ~ 50													
Auxiliary Power sup	ply		220V/2	230V 2~ / 220V/2	230V 1N ~ 50	400V 3N	√ ~ 50Hz										
Total power consum	nption	kW	10.8	13	17	22	22										
Electric motor		kW	9.2	11	15	18.5	18.5										
Pump motor		kW	1.1	1.5	1.5	3	3										
Protection					IP40												
Operation			Progressive - Fully modulating														
Gas train 50		Valves size / Gas connection	50 / Rp2	50 / Rp2	50 / Rp2	50 / Rp2											
Gas train 65		Valves size / Gas connection	65 / DN65	65 / DN65	65 / DN65	-	65 / DN65										
Gas train 80		Valves size / Gas connection	80 / DN80	80 / DN80	80 / DN80	-	80 / DN80										
Gas train 100		Valves size / Gas connection	100 / DN100	100 / DN100	100 / DN100	-	100 / DN100										
Operating temperat	ure	С°			-10 ÷ +50												
Storage Temperatu	re	°C			-20 ÷ +60												
Working service (*)					Intermitent												
Note1:	All gas flow r (net calorific	rates are referred to Stm ³ /h (10 value H _i = 34.02 MJ/Stm ³); for	13 mbar absolu L.P.G. (net calo	ute pressure, 15 rific value H _i = 9	°C temperature 3.5 MJ/Stm ³)	e) and are valid	for G20 gas										
Note2:	Maximum ga Minimum gas	s pressure = 500mbar (with Si s pressure = see gas curves.	emens VGD or I	Dungs MultiBlo	c MBE)												
Note3:	Burners are	suitable only for indoor operati	on with a maxi	mum relative hu	umidity of 80%												

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

Country and usefulness gas categories

GAS CATEGORY												со	UNT	RY											
I _{2H}	AT	ES	GR	SE	FI	IE	HU	IS	NO	CZ	DK	GB	IT	PT	CY	EE	LV	SI	MT	SK	BG	LT	RO	TR	СН
I _{2E}	LU	PL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I _{2E(R)} B	BE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(*) I _{2EK}	NL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I _{2ELL}	DE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
lor i	FD	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_

 Image: Interpret to the second sec

Fuel



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

	Туре	
	Model	
	Year	
	S.Number	
	Output	
	Oil Flow	
	Fuel	
~	Fuel	
_	Category	 \sim
	Category Gas Pressure	
	Category Gas Pressure Viscosity	
	Category Gas Pressure Viscosity El.Supply	
	Category Gas Pressure Viscosity El.Supply El.Consump.	



971 435 304 344 228 447 360 523 M12

495 460 1045 507 1520 1085 435 304 344 228 447 360 523 M12

1002 435 304 344 228 447 360 523 M12 424

280

280

280

424

424

310

310

300 632

*DN = gas valves size

HR93A

NOTE: the overall dimensions are referred to burners provided with Siemens VGD valves.

35

35

327 35

300 564

300 592

495 460

300 579 132 495 460 1045 507 1437

117

145

1045 507 1406

65 1540 135 835

80 1540 135 835 327

100 1540 135 835 327

PART I: SPECIFICATIONS

148 484 846 292 708

300 790 148 642 942 353 708 228 185

310 300 683 148 535 875 313 708 228 185

228 185

B*: SPECIAL BLAST TUBE LENGTHS MUST BE AGREED WITH CIB UNIGAS









Boiler recommended drilling tem-

	DN*	Α	AA	AB	AC	AD	AE	AN	AP	В	BB	С	СС	D	Е	F	G	н	J	κ	L	М	Ν	0	Р	Q	R	S	U	V	w	Y	Z
	50	1723	220	924	364	35	326	595	100	530	517	1193	529	1590	946	644	340	380	494	540	560	M14	552	390	390	763	149	614	845	190	830	307	270
HP512A	65	1723	220	924	364	35	326	611	117	530	517	1193	529	1613	969	644	340	380	494	540	560	M14	552	390	390	636	149	487	845	292	830	307	270
TINGTZA	80	1723	220	924	364	35	326	626	132	530	517	1193	529	1646	1002	644	340	380	494	540	560	M14	552	390	390	687	149	538	875	310	830	307	270
	100	1723	220	924	364	35	326	639	145	530	517	1193	529	1726	1082	644	340	380	494	540	560	M14	552	390	390	791	149	642	942	353	830	307	270
	50	1723	220	928	371	35	333	595	100	530	517	1193	529	1590	946	644	380	420	494	540	560	M14	552	390	390	763	149	614	845	190	830	310	270
HR515A	65	1723	220	928	371	35	333	611	117	530	517	1193	529	1613	969	644	380	420	494	540	560	M14	552	390	390	636	149	487	845	292	830	310	270
Interes	80	1723	220	928	371	35	333	626	132	530	517	1193	529	1646	1002	644	380	420	494	540	560	M14	552	390	390	687	149	538	875	310	830	310	270
	100	1723	220	928	371	35	333	639	145	530	517	1193	529	1726	1082	644	380	420	494	540	560	M14	552	390	390	791	149	642	942	353	830	310	270
	50	1723	220	928	371	35	333	595	100	530	517	1193	529	1590	946	644	400	440	494	540	560	M14	552	390	390	763	149	614	845	190	830	328	270
HR520A	65	1723	220	928	371	35	333	611	117	530	517	1193	529	1613	969	644	400	440	494	540	560	M14	552	390	390	636	149	487	845	292	830	328	270
TINGEOR	80	1723	220	928	371	35	333	626	132	530	517	1193	529	1646	1002	644	400	440	494	540	560	M14	552	390	390	687	149	538	875	310	830	328	270
	100	1723	220	928	371	35	333	639	145	530	517	1193	529	1726	1082	644	400	440	494	540	560	M14	552	390	390	791	149	642	942	353	830	328	270
HR525A	50	1723	220	884	580	35	350	595	100	530	650	1193	529	1590	946	644	434	484	494	540	604	M14	552	390	390	763	149	614	845	190	874	328	270
	65	1723	220	884	580	35	350	611	117	530	650	1193	529	1613	969	644	434	484	494	540	604	M14	552	390	390	636	149	487	845	292	874	328	270
HR525A	80	1723	220	884	580	35	350	626	132	530	650	1193	529	1646	1002	644	434	484	494	540	604	M14	552	390	390	687	149	538	875	310	874	328	270
	100	1723	220	884	580	35	350	639	145	530	650	1193	529	1726	1082	644	434	484	494	540	604	M14	552	390	390	791	149	642	942	353	874	328	270

*DN = gas valves size

NOTE: the overall dimensions are referred to burners provided with Siemens VGD valves.



Note: The following POS are optional: 19, 20, 40, 41, 46

	σ
	Ъ
	Л
	3
	_
	S
	D
	m
	ö
	≚
	1
	Õ
	ъ
	4
	≍
	δ
1	2
	()

LEGEND

POS

1

2

3

4

5

6

6.1

7

10

11

12

13

15

16

16.1

17

18

19

20

40

41

42

43

44

45 46 47

50

51

52

53

54

OIL TRAIN

Flexible hose

Flexible hose

Solenoid valve

Solenoid valve

Flexible hose

Oil distributor

Flexible hose

Pressure gauge

Pressure switch

One-way valve

One-way valve

Flexible hose

Flexible hose

Manual valve

Manual valve

Bellows unit

Butterfly valve

Air damper

Actuator

Burner

Filter

Pressure gauge

MAIN GAS TRAIN

Pressure switch - PGMIN

COMBUSTION AIR TRAIN

Draught fan with electromotor

Pressure switch - PA

Safety valve with built in gas governor

Proving system pressure switch - PGCP Pressure switch - PGMAX

Pressure governor

Electrical motor

Pump and pressure governor

Filter

12

Fig. 5 - 3I2MG-24 v0 Hydraulic diagram



3I2MG24	LEGEND	
rev.0		
POS	OIL TRAIN	
1	Filter	
2	Flexible hose	
3	Pump and pressure governor	
4	Electrical motor	
5	Flexible hose	
6	Solenoid valve	
7	Flexible hose	
8	β-way solenoid valve	
9	Flexible hose	
10	Oil distributor	
11	Flexible hose	
12	Pressure gauge	
13	Pressure governor	
15	Pressure switch	
16	One-way valve	
17	Flexible hose	
18	Flexible hose	
19	Manual valve	
19.1	Manual valve	
20	Pressure gauge	
	MAIN GAS TRAIN	
40	Manual valve	
41	Bellows unit	
42	Filter	
43	43 Pressure switch - PGMIN	
44	Safety valve with built in gas governor	
45	5 Proving system pressure switch - PGCP	
46	Pressure switch - PGMAX	
47	Butterfly valve	
	COMBUSTION AIR TRAIN	
50	Air damper	
51	Actuator	
52	Pressure switch - PA	
53	Draught fan with electromotor	
54	Burner	

How to read the burner "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: 4 mbar

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

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

Checking the proper gas train size

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







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

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

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

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





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

Pressure in the Network / gas flow rate curves (LPG) HR91A LG..



HR512A LG..



HR520A LG..





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

Stm³/h



The values in the diagrams refer to **natural gas** with a calorific value of 8125 kcal/Stm³ (15°C, 1013 mbar) and a density of 0.714 kg/Stm³.

The values in the diagrams refer to **GPL** with a calorific value of 22300 kcal/Stm³ (15°C, 1013 mbar) and a density of 2.14 kg/Stm³. When the calorific value and the density change, the pressure values should be adjusted accordingly.

$$\Delta p 2 = \Delta p 1 \quad * \left(\frac{Q^2}{Q^1}\right)^2 * \left(\frac{\rho^2}{\rho^1}\right)$$

Where:

- p 1 natural gas pressure shown in diagram
- p 2 real gas pressure
- Q_1 natural gas flow rate shown in diagram
- Q^2 real gas flow rate
- $\rho 1$ natural gas density shown in diagram
- $\rho 2$ real gas density

GAS PRESSURE mbar

16

Combustion head gas pressure curves

Combustion head gas pressure depends on gas flow and combustion chamber backpressure. When backpressure is subtracted, it depends only on gas flow, provided combustion is properly adjusted, flue gases residual O2 percentage complies with "Recommended combustion values" table and CO in the standard limits). During this stage, the combustion head, the gas butterfly valve and the actuator are at the maximum opening. Refer to Fig. 6, showing the correct way to measure the gas pressure, considering the values of pressure in combustion chamber, surveyed by means of the pressure gauge or taken from the boiler's Technical specifications.



Fig. 6

Note: the figure is indicative only.

Key

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

Measuring gas pressure in the combustion head

In order to measure the pressure in the combustion head, insert the pressure gauge probes: one into the combustion chamber's pressure outlet to get the pressure in the combustion chamber and the other one into the butterfly valve's pressure outlet of the burner. On the basis of the measured differential pressure, it is possible to get the maximum flow rate: in the pressure - rate curves (showed on the next paragraph), it is easy to find out the burner's output in Stm³/h (quoted on the x axis) from the pressure measured in the combustion head (quoted on the y axis). The data obtained must be considered when adjusting the gas flow rate.



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

Pressure - rate in combustion head curves (natural gas)



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



Pressure - rate in combustion head curves (LPG)



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





HR512A LG..



HR520A LG..

GAS PRESSURE mbar





The values in the diagrams refer to **natural gas** with a calorific value of 8125 kcal/Stm³ (15°C, 1013 mbar) and a density of 0.714 kg/Stm^3 .

The values in the diagrams refer to **GPL** with a calorific value of 22300 kcal/Stm³ (15°C, 1013 mbar) and a density of 2.14 kg/Stm³. When the calorific value and the density change, the pressure values should be adjusted accordingly.

Where:

p 1 natural gas pressure shown in diagram

 $\Delta p 2 = \Delta p 1 \quad * \left(\frac{Q^2}{QI}\right)^2 * \left(\frac{\rho^2}{\rho I}\right)$

- p_2 real gas pressure
- $Q1 \;\;$ natural gas flow rate shown in diagram
- Q2 real gas flow rate
- $\rho 1$ natural gas density shown in diagram
- ρ^2 real gas density

MOUNTING AND CONNECTING THE BURNER

Transport and storage



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



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

If the product must be stored, avoid humid and corrosive places. Observe the temperatures stated in the burner data table at the beginning of this manual.

Packing

The burners are despatched in wooden crates whose dimensions are:

- 9xA series HLG-E 210/240/350 AS: 1666mm x 1066mm x 1130mm (L x P x H)
- 5xxA series : 1886mm x 1456mm x 1120mm (L x P x H)

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

The following are placed in each packing case:

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

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

Handling the burner



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

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

The burner is mounted on a 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.





н

Fitting the burner to the boiler

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

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



Matching the burner to the boiler

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

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





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

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

GAS TRAIN CONNECTIONS

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

Procedure to install the double gas valve unit:

- two (2) gas flanges are required; they may be threaded or not depending on size;
- first step: install the flanges to prevent the entry of foreign bodies in the gas line;
- on the gas pipe, clean the already assembled parts and then install the valve unit;
- check gas flow direction: it must follow the arrow on the valve body;
- VGD20: make sure the O-rings are correctly positioned between the flanges and the valve;
- VGD40 and MBE: make sure the gaskets are correctly positioned between the flanges;
- fasten all the components with screws, according to the following diagrams;
- make sure bolts on the flanges are properly tightened;



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



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



ATTENTION: once the gas train is mounted according to the diagram on Fig. 1, the gas proving test mus be performed, according to the procedure set by the laws in force.

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



Key

1	Filter	6	Butterfly valve
2	Pressure switch - PGMIN	8	Main burner
3	Safety valve with built in gas governor	9	Bellows unit(*optional)
4	Proving system pressure switch - PGCP 10 Manual valve(*optional)		
5	Pressure switch PGMAX:included MBE, for VGD e MB-DLE Optional		

MultiBloc MBE



Fig. 7Example of gas train MBE

To mount the gas train, proceed as follows:

- 1-a) in case of threaded joints: use proper seals according to the gas used;
- 1-b) in case of flanged joints: place a gasket (no. 1A..1E Fig. 4) between the elements;
- 2) fasten all the items by means of screws, according to the diagrams showed, observing the mounting direction for each item;

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



ATTENTION: once the gas train is mounted according to the diagram on Fig. 4, the gas proving test mus be performed, according to the procedure set by the laws in force.

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



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

Threaded train with MultiBloc MBE - Mounting



4. Tighten studs in accordance with section 8.

Ensure correct position of the seal!

- 5. Perform leak and functional tests after mounting.
- 6. Screws (4xM5x20) for VD assembly are supplied.

Fig. 8

- 3. Tighten supplied screws (8xM8x30) in accordance with section 8.
- 4. Screws (4xM5x25) for VD assembly are supplied.
- 5. After installation, perform leakage and functional test.
- 6. Disassembly in reverse order.



Mounting VD-R & PS-...



Siemens VGD20.. e VGD40..

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

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



Caution: the SKP2 diaphragm D must be vertical (see Fig. 11).



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



Gas valveversion with SKP2 (built-in pressure stabilizer)



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

POSITIONS

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

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

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

Gas Filter (if provided)

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



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

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

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

This paragraph describes the integrated proving system operation sequence:

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

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

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

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





OIL TRAIN CONNECTIONS

Hydraulic diagrams for light oil supplying circuits



Installation diagram of light oil pipes



please read carefully the "warnings" chapter at the beginning of this manual.

Fig. 9 - 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.

(*) 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.

1 Burner

Key

- 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)

Depending on the installed pump, it is possible to design the plant for single or double pipe feeding line

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 plug, if provided, must be removed and the optional return port, on the pump's body, must be sealed by steel plug and washer.

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

Burners come out from the factory provided for double-pipe 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-rota-tion- referring to the pump shaft).

Caution: Changing the direction of rotation, all connections on top and side are reversed.**HP UHE series pumps**: a kit (Art.-Nr.: 0841211) is required for the transition from 2-pipe to 1-pipe system



About the use of fuel pumps

- 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 the fuel unit.



ATTENTION: before the burner first start, it is mandatory to fill the adduction pipes with diesel fuel and bleed out residual air bubbles. Prior to switching on the burner, check direction of rotation of the pump motor by briefly pressing the starter switch; ensure there are no anomalous sounds during equipment operation, and only then turn on the burner. Neglect to comply with this requirement will invalidate the burner warranty.

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

- 1. Connection for manometer 1 delivery (M1) G1/4
- 2. Connection for manometer 2 suction (M2) G1/4
- 3. Connection for manometer 3 (M3)
- A. Suction connection- G1/2
- D. Direct clockwise
- I. Indirect counter clockwise
- R. By-pass connection- G1/2
- S. Delivery connection G1/2
- VR. After removal of cover screw: pressure regulation



Suntec T		
Viscosity	3 - 75 cSt	
Oil temperature	0 - 150 °C	
Minimum suction pressure	- 0.45bar to prevent gasing	
Maximum suction pressure	5 bar	
Rated speed	3600 rpm max.	



- 1 Inlet G3/4
- 2 Pressure gauge port G1/4
- 3 Vacuum gauge port to measure the inlet vacuum G1/4
- 4 To pressure adjusting valve G3/4

"Note: pump with "C" rotation.



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



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

Connecting the oil flexible hoses to the pump

To connect the flexible 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 lines**: see the arrows marked on the pump.

For further information, refer to the technical documentation of the pump.



ELECTRICAL CONNECTIONS



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

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

To execute the electrical connections, proceed as follows:

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



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

Rotation of electric motor

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



CAUTION: check the motor thermal cut-out adjustment

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

Note on elecrtical supply

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

Key

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



PART III: OPERATION



DANGER! Incorrect motor rotation can seriously damage property and injure people.WARNING: before starting the burner up, be sure that the manual cutoff valves are open and check that the pressure upstream the gas train complies the value quoted on paragraph "Technical specifications". Be sure that the mains switch is closed. DANGER: During commissioning operations, do not let the burner operate with insufficient air flow (danger of formation of carbon monoxide); if this should happen, make the gas decrease slowly until the normal combustion values are achieved.

WARNING: never loose the sealed screws! otherwise, the device warranty will be immediately invalidate!

LIMITATIONS OF USE

THE BURNER IS AN APPLIANCE DESIGNED AND CONSTRUCTED TO OPERATE ONLY AFTER BEING CORRECTLY CONNEC-TED TO A HEAT GENERATOR (E.G. BOILER, HOT AIR GENERATOR, FURNACE, ETC.), ANY OTHER USE IS TO BE CONSIDE-RED 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 EXCEPT FOR ITS MAINTENANCE. TO SECURE THE MACHINE, ACT ON THE ISOLATOR SWITCH. IN CASE OF ANOMALIES THAT REQUIRED A SHUT DOWN OF THE BURNER, IT'S POSSIBLE TO ACT ON THE AUXILIARY LINE SWITCH, LOCATED ON THE BURNER FRONT PANEL.

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

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

Fig. 12 - Burner front panel



Keys

- B1 Lock-out LED
- B2 Hi-flame operation LED
- B3 Lo-flame operation LED
- B4 "Ignition transformer operation" LED
- B7 Burner ignition LED
- G1 "EV2 opening" LED
- G2 "EV1 opening" LED
- G3 "Gas pressure switch signal " LED
- S2 Reset pushbutton for control box
- S4 Fuel selection
- S7 CMF switch (0=stop, 1=high flame,2=low flame, 3=automatic) fully modulating burners only
- O1 EVG1 solenoid valve operation LED
- O2 EVG2 solenoid valve operation LED
- O3 "Pump motor overload tripped" LED
- O4 Oil pump in operation LED
- A1 Burner Modulator (only on fully modulating burners)

Fig. 13 - Burner front panel



Keys

- B1 Lock-out LED
- B2 Hi-flame operation LED
- B3 Lo-flame operation LED
- B4 "Ignition transformer operation" LED
- B7 Burner ignition LED
- G1 "EV2 opening" LED
- G2 "EV1 opening" LED
- G3 "Gas pressure switch signal " LED
- S2 Reset pushbutton for control box
- S4 Fuel selection
- S7 CMF switch (0=stop, 1=high flame,2=low flame, 3=automatic) fully modulating burners only
- O3 "Pump motor overload tripped" LED
- O4 Oil pump in operation LED
- O5 Oil valve EVG operation signalling lamp
- O7 Oil valve EVGS operation signalling lamp
- A1 Burner Modulator (only on fully modulating burners)

Fuel selection:

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

If the selector is set on (1) the gas cock must be open, while the light oil cock must be closed. Viceversa if the selector is set on (2). **CAUTION:** if the fuel chosen is oil, be sure the cutoff valves on the feed and return pipes are open.

- Check the control box is not locked (signalling light **B1**, on); if so, reset it by means of the reset button.
- Check the series of thermostats and pressure switches turn the burner to on.

Gas operation

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

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

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

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

Light oil operation

- The fan motor starts and the pre-purge phase as well. Since the pre-purge phase must be carried out at the maximum air rate, the control box drives the actuator opening and when the maximum opening position is reached, the pre-purge time counting starts.
- At the end of the pre-purge time, the actuator is in the light oil ignition position: the ignition transformer is energised (lamp B4 on); the ignitor gas valves (if provided) and the light oil valves open. Few seconds after the valves opening, the transformer is de-energised and lamp B4 turns off.
- The burner is now operating, meanwhile the actuator goes to the high flame position; after some seconds, the two-stage operation begins; the burner is driven automatically to high flame or low flame, according to the plant requirements. Operation in high or low flame is signalled by LED B2 on the burner control panel.

The fuel is pushed into the pump to the nozzle at the delivery pressure set by the pressure governor. The solenoid valve stops the fuel immission into the combustion chamber. The fuel flow rate that is not burnt goes back to the tank through the return circuit. The nozzle is feeded at constant pressure, while the return line pressure is adjusted by means of the pressure governor controlled by an actuator.

AIR FLOW AND FUEL ADJUSTMENT



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

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

Recommended combustion parameters				
Fuel	Recommended (%) CO ₂	Recommended (%) O ₂		
Natural gas	9 ÷ 10	3 ÷ 4.8		
Light oil	11.5 ÷ 13	2.9 ÷ 4.9		
LPG	11 ÷ 12	2.8 ÷ 4.3		

Adjustments - brief description

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

- Check that the combustion parameters are in the suggested limits.
- Check the flow rate measuring it on the counter or, if it was not possible, verifying the combustion head pressure by means of a differential pressure gauge.
- Then, adjust the combustion values corresponding to the points between maximum and minimum: set the shape of the adjusting cam foil. The adjusting cam sets the air/gas ratio in those points, regulating the opening-closing of the throttle gas valve.
- Set, now, the low flame output, acting on the low flame microswitch of the actuator in order to avoid the low flame output increasing too much or that the flues temperature gets too low to cause condensation in the chimney.

ADJUSTMENTS FOR GAS OPERATION

Adjustments - brief description

- Adjust the air and gas flow rates at the maximum output ("high flame") first, by means of the air damper and the valves group pressure stabiliser respectively.
- Check that the combustion parameters are in the suggested limits.
- Check the flow rate measuring it on the counter or, if it was not possible, verifying the combustion head pressure by means of a differential pressure gauge, as described on par. "Measuring the gas pressure in the combustion head".
- Then, adjust the combustion values corresponding to the points between maximum and minimum (progressive -fully modulating burners only): set the shape of the adjusting cam foil. The adjusting cam sets the air/gas ratio in those points, regulating the opening-closing of the air damper.
- 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.

To change the burner setting during the testing in the plant, follows the next procedure, according to the model provided. *Air and Gas Flow Rate Settings by means of Berger STM30../Siemens SQM40.. actuator*

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

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

- 3 Before starting the burner up, drive the high flame actuator microswitch matching the low flame one (in order to let the burner operates at the lowest output) to safely achieve the high flame stage.
- 4 Start the burner up by means of the thermostat series and wait until the pre-purge time comes to an end and that the burner starts up;
- 5 drive the burner to high flame stage, by means fo the thermostat TAB.
- 6 Then move progressively the microswitch to higher values until it reaches the high flame position; always check the combustion values and eventually adjusting the gas by means of the valves group stabiliser.
- 7 go on adjusting air and gas flow rates: check, continuosly, the flue gas analisys, as to avoid combustion with little air; dose the air according to the gas flow rate change following the steps quoted below;



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

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



Siemens VGD..

9 To adjust the air flow rate in the high flame stage, loose the RA nut and screw VRA as to get the desired air flow rate: moving

∕∖∖

the rod **TR** towards the air damper shaft, the air damper opens and consequently the air flow rate increases, moving it far from the shaft the air damper closes and the air flow rate decreases.

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



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

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

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







Gas throttle valve open

Gas throttle valve closed

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

Fully-modulating burners

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



- CMF = 0 stop at the current position
- CMF = 1 high flame operation
- CMF = 2 low flame operation
- CMF = 3 automatic operation
MultiBloc MBE Regulation VD-R whith PS



ATTENTION: To set the outlet pressure of the VD-R regulator, act on the adjustment ring nut (Fig. 10) The position of the indicator in the dial indicates the value of the outlet pressure calculated as a percentage of the full scale of the PS sensor (Fig. 11)

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



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



Pressure taps MultiBloc MBE

Gas valveversion with SKP2 (built-in pressure stabilizer)

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



Calibration of low gas pressure switch

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

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

Calibration the maximum gas pressure switch (when provided)

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

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

Calibration of air pressure switch

To calibrate the air pressure switch, proceed as follows:

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

Refit the transparent plastic cover on the pressure switch.

Calibration gas leakage pressure switch (PGCP)

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

Adjusting the combustion head

A

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

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





"MAX" head position

"MIN" head position



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

Center head holes gas flow regulation (natural gas burners)

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

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









closed holes

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

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

• For natural gas burners, plate holes are fully opened

Center head holes gas flow regulation (LPG burners)

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

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





opened holes



closed holes

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

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

For LPG burners, plate holes are opened about:

9xA **series**: 1.5 mm 5xxA **series**: 1.3 mm

Adjustment procedure for light oil operation

The light oil flow rate can be adjusted choosing a by-pass nozzle that suits the boiler/utilisation output and setting the delivery and return pressure values according to the ones quoted on the below diagrams.

FLUIDICS NOZZLE: REFERENCE DIAGRAM (INDICATIVE ONLY)

	FLOW R	ATE kg/h	Indicative
DIMENSIONS	Min	Мах	return (bar)
40	13	40	19
50	16	50	22
60	20	60	20
70	23	70	23
80	26	80	23
90	30	90	22
100	33	100	22
115	38	115	21
130	43	130	22
145	48	145	21
160	53	160	21
180	59	180	22
200	66	200	21
225	74	225	22
250	82	250	22
275	91	275	22
300	99	300	23
330	109	330	23
360	119	360	22
400	132	400	22
450	148	450	22
500	165	500	22
550	181	550	22
600	198	600	23
650	214	650	23
700	231	700	23
750	250	750	23
800	267	800	22



Tab. 1

---- Atomisation angle according to the return pressure % Flow rate viscosity at nozzle = 5 cSt



ATTENTION! To achieve the maximum flow rate close completely the return line.





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





FLUIDICS KW3...60°



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

FLUIDICS KW3...60°



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

FLUIDICS KW3....60°



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

Oil Flow Rate Settings

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



3 bleed the air from the **M** pressure gauge port by loosing the cap without removing it, then release the contactor.



Fig. 18

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



- 8 Only if necessary, adjust the supply pressure as follows;insert a pressure gauge into the port shown on figure and act on on the pump adjusting screw **VR**. Pressure values are indicated at the beginning of this paragraph.
- 9 in order to get the maximum oil flow rate, adjust the pressure (reading its value on the PG pressure gauge) without changing the air flow rate set during the gas operation adjustments (see previous paragraph): checking always the combustion parameters, the adjustment is to be performed by means of the SV2 adjusting cam screw (see picture) when the cam has reached the high flame position.
- 10 once the oil rate is adjusted at the maximum output (the air rate was adjusted in the gas regulation), go on with the point to point adjustment on the **SV2** (light oil side) adjusting cam as to reach the minimum output point, as described on the next steps.
- 11 as for the point-to-point regulation, move the gas low flame microswitch a little lower than the maximum position (90°);
- 12 set the **TAB** thermostat to the minimum in order that the actuator moves progressively towards the low flame position (as far as fully-modulating burners, see the related paragraph);
- 13 move the low flame cam to the minimum to move the actuator towards the low flame until the two bearings find the adjusting screw that refers to the lower position: screw V2 to increase the rate, unscrew to decrease.
- 14 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.
- 15 The low flame position must never match the ignition position that is why the cam must be set 20°- 30° more than the ignition posi-

tion.

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

Fully-modulating burners

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



CMF = 0stop at the current positionCMF = 1high flame operationCMF = 2low flame operationCMF = 3automatic operation

Oil pressure switch adjustment

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



Maximum oil pressure switch

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

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

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

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

Minimum oil pressure switch (when provided)

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

PART IV: MAINTENANCE

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



WARNING: ALL OPERATIONS ON THE BURNER MUST BE CARRIED OUT WITH THE MAINS DISCONNECTED AND THE FUEL 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;
- carefully check the fuel flexible hoses for leaks;
- 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;
- check the ignition electrodes and their ceramic insulators, clean, adjust and replace if necessary;
- 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;
- examine and clean the detection electrode/photoelement (according to the burner models), replace it if necessary, in case of doubt, check the detection circuit, after the burner start-up;
- clean and grease levers and rotating parts.

Gas filter maintenance

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





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

MultiBloc MBEMultiBloc VD Mounting







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

Light oil filter maintenance



- For correct and proper servicing, proceed as follows:
- I cutoff the required pipe section;
- 2 unscrew the filter cup;

- 3 remove the filtering cartridge, wash it with gasoline; if necessary, replace it; check the tightening O-rings and replace them if necessary;
- 4 replace the cup and restore the pipe line.

Removing the combustion head

- 1 Remove the top H.
- 2 Remove the UV detector out of its housing: disconnect electrode cables and the light oil flexible hoses.
- 3 Loosen the screws V holding the gas manifold G, loosen the connectors E.
- 4 Some models are provided with the **T** baffle. Move the gas manifold ahead and remove the baffle.
- 5 Pull out the complete group as shown in the picture below.
- 6 Clean the combustion head by means of a vacuum cleaner; scrape off the scale by means of a metallic brush.
- Note: to replace the combustion head, reverse the operations described above.

G

Т



Electrodes Adjustment

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



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

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



Cleaning/replacing the electrodes

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

To remove the oil gun, proceed as follows:

- 1 remove the combustion head as described on the prevoius paragraph;
- 2 loosen the VL screw and remove the oil gun and the electrodes: check the oil gun, replace it if necessary;
- 3 after removing the oil gun, unscrew the nozzle and replace it if necessary;
- 4 in order to replace the electrodes, unscrew the **VE** fixing screws and remove them: place the new electrodes being careful to observe the measures showed on pag.: reassemble following the reversed procedure.

Caution: adjust the nozzle position according to the air pipe, by means of the VU screw, ance the VL screw is fastened.



Checking the detection current

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

Control box	Minimum detection signal
Siemens LME7	70µA (with UV detector)



Fig. 22: Detection by photocell QRA..

Flame detection probe

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

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

Burner service term

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

Seasonal stop

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

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

Burner disposal

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

WIRING DIAGRAMS

Refer to the attached wiring diagrams. **WARNING**

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



TROUBLESHOOTNG GUIDE - Gas operation

· · ·	* No electric power supply	* Wait until power supply is back
	* Main switch open	* Close the switch
	* Thermostate open	* Check set points and thermostat connections
	* Pad thermostat set point or broken thermostat	* Set or replace the thermostat
BURNER DOESN'T LIGHT	No gas pressure	Restore gas pressure
	 Safety devices (manually operated safety thermostat or pressure switch and so on) open 	r Restore safety devices; wait that boiler reaches its temperature then check safety device functionality.
	* Broken fuses	* Replace fuses. Check current absorption
	* Fan thermal contacts open (only three phases)	* Reset contacts and check current absorption
	* Burner control locked out	* Reset and check its functionality
	* Burner control damaged	* Replace burner control
	* Gas flow too low	 * Increase the gas flow * Check gas filter cleanness * Check butterfly valve opening when burner is starting (only Hi-Low flame and progressive)
GAS LEAKAGE: BURNER LOCKS OUT	* Ignition electrodes discharge to ground because dirty or broken	* Clean or replace electrodes
(NO FLAME)	* Bad electrodes setting	* Check electrodes position referring to instruction manual
	* Electrical ignition cables damaged	* Replace cables
	* Bad position of cables in the ignition transformer or into the electrodes	* Improve the installation
	* Ignition transformer damaged	* Replace the transformer
	* Bad flame detector set	
	* Elame detector damaged	* Replace or adjust flame detector
	* Bad cables of flame detector	* Check cables
	* Burner control damaged	* Benjace humer control
	* Phase and neutral inverted	* Adjust connections
BURNER LOCKS OUT WITH FLAME PRESENCE	* Cround missing or domaged	* Check ground continuity
	* Voltage on neutral	* Take off tanging on poutrol
	* Too small flame (due to not much das)	
		* Adjust gas now * Check gas filter cleanness
	* Too much combustion air	* Adjust air flow rate
FORM ALL ITS FEATURES WITHOUT IGNITING	* Air pressure switch damaged or bad links	* Check air pressure switch functions and links
THE BURNER	* Burner control damaged	* Replace burner control
	* Gas valves don't open	* Check voltage on valves; if necessary replace valve or the burner control * Check if the gas pressure is so high that the valve cannot open
	* Gas valves completely closed	* Open valves
BURNER LOCKS OUT WITHOUT ANY GAS FLOW	* Pressure governor too closed	* Adjust the pressure governor
	* Butterfly valve too closed	* Open the butterfly valve
	* Maximum processor outlich (if installed) open	* Check connection and functionality
	* Air pressure switch doesn't close the NO contact	* Check connections
	···· •·····	* Check pressure switch functionality
	* Air pressure switch damaged (it keeps the stand-by position or badly set	* Check air pressure switch functionality * Reset air pressure switch
THE BURNER IS BLOCKED AND THE EQUIPMENT	* Air pressure switch connections wrong	* Check connections
PROVIDES A LOCK CODE "CAUSE AIR PRESSURE	* Air fan damaged	* Replace motor
SWITCH FADEL	* No power supply	* Reset power supply
	* Air damper too closed	* Adjust air damper position
	* Flame detector circuit interrupted	* Check wiring * Check batocell
BURNER LOCKS OUT DURING NORMAL RUNNING	* Burner control damaged	* Benjace humer control
	* Maximum das pressure switch damaged or hadly set	* Reset pressure switch or replace it
	* Gas pressure switch hadly set	* Pasat the pressure switch
THE BURNER STARTS AND AFTER A WHILE IT	* Cas filter dirty	* Cloop goo filter
REPEATS THE STARTING CYCLE.	* Gas dovernor too low or domaged	* Deset or replace the governor
	* Thermal contacts of fan meter open	* Poset contacts and check values
BURNER 3 LANDS WHILE KUNNING WITHOUT ANY	mermai contacts of fait motor open	* Check current absorption
SWITCHING OF THERMOSTATS	*1.1	
	* Internal motor wiring broken	* Replace wiring or complete motor
SWITCHING OF THERMOSTATS	* Internal motor wiring broken * Fan motor starter broken	* Replace wiring or complete motor * Replace starter
SWITCHING OF THERMOSTATS	* Internal motor wiring broken * Fan motor starter broken * Fuses broken (three phases only)	* Replace wiring or complete motor * Replace starter * Replace fuses and check current absorption
SWITCHING OF THERMOSTATS FAN MOTOR DOESN'T START BURNER DOESN'T SWITCH TO HIGH FLAME	 * Internal motor wiring broken * Fan motor starter broken * Fuses broken (three phases only) * Hi-low flame thermostat badly set or damaged 	* Replace wiring or complete motor * Replace starter * Replace fuses and check current absorption * Reset or replace thermostat
SWITCHING OF THERMOSTATS FAN MOTOR DOESN'T START BURNER DOESN'T SWITCH TO HIGH FLAME	Internal motor wiring broken Fan motor starter broken Fuses broken (three phases only) Hi-low flame thermostat badly set or damaged Servomotor cam badly set	* Replace wiring or complete motor * Replace starter * Replace fuses and check current absorption * Reset or replace thermostat * Reset servomotor cam

TROUBLESHOOTNG GUIDE - Light oil operation

	* No electric power supply	* Wait for electric power supply is back
	* Main switch open	* Close the switch
	* Thermostats open	* Check set points and thermostat connections
	* Bad thermostat set point or broken thermostat	* Set or replace the thermostat
	* No das pressure	* Restore das pressure
BURNER DOESN'T LIGHT	* Safety devices (manually operated safety thermostat or pressure switch	* Restore safety devices: wait that boiler reaches its temperature the
	and so on) open	check safety device functionality.
	* Broken fuses	* Replace fuses. Check current absorption
	* Fan thermal contacts open (only three phases)	* Reset contacts and check current absorption
	* Burner control locked out	* Reset and check its functionality
	* Burner control domaged	* Deplace human control
	builler control damaged	* Clean ar rankasa flama dataatar
	Finite detector diffy of damaged	
	Burner control damaged	Replace burner control
	[^] Smoking flame	* Reset compustion air flow rate
		* Check cheappage of combustion bood
TRESERVE		* Check chempey sustion
		* Check boiler cleanness
	* Combustion bood dirty	Check Doller Cleanness
		* Fill the tank
	* Pump joint broken	* Check pump pressure
	* Pump damaged	* Check pump suction
		* Replace pump
	* Compressed air (or steam) too high	* Released compressed air (or steam) pressure
	* Oil metering valve not open far enough	* Check air pressure
		* Check servomotor position
BURNER LOCKS OUT WITHOUT ANY	* Oil valve not energized	* Check wiring path or replace valve
FUEL FLOW KATE	* Fan motor not efficient	* Adjust or replace the motor
	* Ean or pump motor runs in the wrong way	* Change rotation
	* Obstructed nozzle	* Clean or replace the pozzle
	Check value in the tank looked or looking	
	[*] Oil filter dirty	^ Clean filter
	^ Pump filter dirty	
	* Solenoid valve dirty or broken	* Clean or replace solenoid valve
	* Oil pressure too low	* Reset oil pressure
	* Nozzle dirty or damaged	* Clean or replace nozzle
	* Water in the tank	* Take off all the water from the tank
		* Clean all filters
BURNER LOCKS OUT WITH FUEL FLOW	* Suction too high	* Check suction before pump. If necessary clean filters.
RATE (NO FLAME)	* Ignition electrodes grounded because dirty or damaged	* Clean or replace electrodes
	* Ignition electrodes badly set	* Check electrodes position referring to instruction manual
	* Cables damaged	* Replace cables
	* Bad position of cables in the ignition transformer or into the electrodes	* Improve the installation
	* Ignition transformer demoged	* Deplace the transformer
	Ignituon transionner uanageu	
	and so on)	* Replace check valve in the tank
	* Flexible hoses damaged	* Replace flexible hoses
FOMF TOO NOIST	* Air infiltration in the pipes	* Take off all infiltration
	* Pine too long or too parrow	* Increase line size
	* Burner is too lean	* Adjust air oil ratio
	* Drawer accombly not act properly	* Check drower position
	Drawer assembly not set property	
	Cli may be too not	
	* Flame is blowing off head	* Check head position
	I* Oil flame not retaining to head	
	en name net retaining to nead	
CARBON BUILD-UP ON THE FIRESIDES	* Dirty nozzle	* Clean the nozzle
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER	* Dirty nozzle * Oil spray impinging on burner head	* Clean the nozzle * Check position of the nozzle respect to the head
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER	* Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide	* Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER	* Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide * Oil pressure at nozzle too low	* Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER	* Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide * Oil pressure at nozzle too low * Air flow rate too high	* Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER	* Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide * Oil pressure at nozzle too low * Air flow rate too high * Oil is too cold	* Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust oil temperature
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER	* Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide * Oil pressure at nozzle too low * Air flow rate too high * Oil is too cold * Dirt in the oil	* Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust oil temperature * Check filters
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER	* Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide * Oil pressure at nozzle too low * Air flow rate too high * Oil is too cold * Dirt in the oil * Water in the fuel	* Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER	* Dirty nozzle * Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide * Oil pressure at nozzle too low * Air flow rate too high * Oil is too cold * Dirt in the oil * Water in the fuel * Oil insegment as the combustion bead	* Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Descure assembly for the second
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER	* Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide * Oil pressure at nozzle too low * Air flow rate too high * Oil is too cold * Dirt in the oil * Water in the fuel * Oil impingement on the combustion head	* Clean the nozzle * Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not pretuding through contected of air difference
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER	* Dirty nozzle * Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide * Oil pressure at nozzle too low * Air flow rate too high * Oil is too cold * Dirt in the oil * Water in the fuel * Oil impingement on the combustion head	* Clean the nozzle * Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER	[*] Dirty nozzle [*] Oil spray impinging on burner head [*] Spray angle of the nozzle too wide [*] Oil pressure at nozzle too low [*] Air flow rate too high [*] Oil is too cold [*] Dirt in the oil [*] Water in the fuel [*] Oil impingement on the combustion head [*] Nozzle dirty or damaged	* Clean the nozzle * Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean der if processory conject the pression
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER	* Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide * Oil pressure at nozzle too low * Air flow rate too high * Oil is too cold * Dirt in the oil * Water in the fuel * Oil impingement on the combustion head * Nozzle dirty or damaged * Doruge cooperative set as attigated access?	* Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean or, if necessary, replace the nozzle
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER	* Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide * Oil pressure at nozzle too low * Air flow rate too high * Oil is too cold * Dirt in the oil * Water in the fuel * Oil impingement on the combustion head * Nozzle dirty or damaged * Drawer assembly not positioned correctly	* Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean or, if necessary, replace the nozzle * Move forward or backward
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER FLAME IRREGULAR OR SPARKING	* Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide * Oil pressure at nozzle too low * Air flow rate too high * Oil is too cold * Dirt in the oil * Water in the fuel * Oil impingement on the combustion head * Nozzle dirty or damaged * Drawer assembly not positioned correctly * Nozzle too far forward through centerhole of diffuser	 * Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean or, if necessary, replace the nozzle * Move forward or backward * Move nozzle backward respect to diffuser
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER FLAME IRREGULAR OR SPARKING BURNER LIGHTS BUT FLAME DOESN'T RETAIN TO BURNER HEAD	* Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide * Oil pressure at nozzle too low * Air flow rate too high * Oil is too cold * Dirt in the oil * Water in the fuel * Oil impingement on the combustion head * Nozzle dirty or damaged * Drawer assembly not positioned correctly * Nozzle too far forward through centerhole of diffuser * Oil or air pressure at nozzle is too low	* Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean or, if necessary, replace the nozzle * Move forward or backward * Move nozzle backward respect to diffuser * Increase oil or air pressure
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER FLAME IRREGULAR OR SPARKING BURNER LIGHTS BUT FLAME DOESN'T RETAIN TO BURNER HEAD	* Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide * Oil pressure at nozzle too low * Air flow rate too high * Oil is too cold * Dirt in the oil * Water in the fuel * Oil impingement on the combustion head * Nozzle dirty or damaged * Drawer assembly not positioned correctly * Nozzle too far forward through centerhole of diffuser * Oil or air pressure at nozzle is too low * Air louver too open	* Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean or, if necessary, replace the nozzle * Move forward or backward * Move nozzle backward respect to diffuser * Increase oil or air pressure * Reduce air louver opening
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER FLAME IRREGULAR OR SPARKING BURNER LIGHTS BUT FLAME DOESN'T RETAIN TO BURNER HEAD	 * Dirty nozzle * Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide * Oil pressure at nozzle too low * Air flow rate too high * Oil is too cold * Dirt in the oil * Water in the fuel * Oil impingement on the combustion head * Nozzle dirty or damaged * Nozzle too far forward through centerhole of diffuser * Oil or air pressure at nozzle is too low * Air louver too open * Too much spread between oil and air (or steam) pressure 	 * Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean or, if necessary, replace the nozzle * Move forward or backward * Move nozzle backward respect to diffuser * Increase oil or air pressure * Reduce air louver opening * Set the spread to a proper value
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER FLAME IRREGULAR OR SPARKING BURNER LIGHTS BUT FLAME DOESN'T RETAIN TO BURNER HEAD	* Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide * Oil pressure at nozzle too low * Air flow rate too high * Oil is too cold * Dirt in the oil * Water in the fuel * Voil impingement on the combustion head * Nozzle dirty or damaged * Drawer assembly not positioned correctly * Nozzle too far forward through centerhole of diffuser * Oil or air pressure at nozzle is too low * Air louver too open * Too much spread between oil and air (or steam) pressure * Not enough combustion air	 * Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean or, if necessary, replace the nozzle * Move forward or backward * Move nozzle backward respect to diffuser * Increase oil or air pressure * Reduce air louver opening * Set the spread to a proper value * Adjust air flow rate
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER FLAME IRREGULAR OR SPARKING BURNER LIGHTS BUT FLAME DOESN'T RETAIN TO BURNER HEAD	* Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide * Oil pressure at nozzle too low * Air flow rate too high * Oil is too cold * Dirt in the oil * Water in the fuel * Oil impingement on the combustion head * Nozzle dirty or damaged * Nozzle too far forward through centerhole of diffuser * Oil or air pressure at nozzle is too low * Air louver too open * Too much spread between oil and air (or steam) pressure * Nozzle dirty or damaged	 * Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean or, if necessary, replace the nozzle * Move forward or backward * Move nozzle backward respect to diffuser * Increase oil or air pressure * Reduce air louver opening * Set the spread to a proper value * Adjust air flow rate * Clean or, if necessary, replace the nozzle
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER FLAME IRREGULAR OR SPARKING BURNER LIGHTS BUT FLAME DOESN'T RETAIN TO BURNER HEAD	* Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide * Oil pressure at nozzle too low * Air flow rate too high * Oil is too cold * Dirt in the oil * Water in the fuel * Oil impingement on the combustion head * Nozzle dirty or damaged * Drawer assembly not positioned correctly * Nozzle too far forward through centerhole of diffuser * Oil or air pressure at nozzle is too low * Air louver too open * Too much spread between oil and air (or steam) pressure * Nozzle dirty or damaged * Nozzle dirty or damaged * Too much spread between oil and air (or steam) pressure * Nozzle dirty or damaged * Nozzle dirty or damaged * Too much spread between oil and air (or steam) pressure * Nozzle dirty or damaged * Too much spread between oil and air (or steam) pressure * Nozzle dirty or damaged * Too much spread between oil and air (or steam) pressure * Nozzle dirty or damaged * Too much spread between oil and air (or steam) pressure * Nozzle dirty or damaged * Tame is too big for furnace or nozzle spray angle is wrong	 * Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Toawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean or, if necessary, replace the nozzle * Move forward or backward * Move nozzle backward respect to diffuser * Increase oil or air pressure * Reduce air louver opening * Set the spread to a proper value * Adjust air flow rate * Clean or, if necessary, replace the nozzle
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER FLAME IRREGULAR OR SPARKING BURNER LIGHTS BUT FLAME DOESN'T RETAIN TO BURNER HEAD	 Dirty nozzle Dirty nozzle Oil spray impinging on burner head Spray angle of the nozzle too wide Oil pressure at nozzle too low Air flow rate too high Oil is too cold Dirt in the oil Water in the fuel Oil impingement on the combustion head Nozzle dirty or damaged Drawer assembly not positioned correctly Nozzle too far forward through centerhole of diffuser Oil or air pressure at nozzle is too low Air louver too open Too much spread between oil and air (or steam) pressure Not enough combustion air Nozzle dirty or damaged Flame is too big for furnace or nozzle spray angle is wrong 	 * Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean or, if necessary, replace the nozzle * Move forward or backward * Move nozzle backward respect to diffuser * Increase oil or air pressure * Reduce air louver opening * Set the spread to a proper value * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Clean or, if necessary, replace the nozzle * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Check burner-furnace coupling * Check burner-furnace with a suitable one
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER FLAME IRREGULAR OR SPARKING BURNER LIGHTS BUT FLAME DOESN'T RETAIN TO BURNER HEAD	 [*] Dirty nozzle [*] Dirty nozzle [*] Oil spray impinging on burner head [*] Spray angle of the nozzle too wide [*] Oil pressure at nozzle too low [*] Air flow rate too high [*] Oil is too cold [*] Dirt in the oil [*] Water in the fuel [*] Oil impingement on the combustion head [*] Nozzle dirty or damaged [*] Nozzle too far forward through centerhole of diffuser [*] Oil or air pressure at nozzle is too low [*] Air louver too open [*] Too much spread between oil and air (or steam) pressure [*] Nozzle dirty or damaged [*] Flame is too big for furnace or nozzle spray angle is wrong [*] Nozzle spray angle wrong (flame too long or too wide) 	 * Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean or, if necessary, replace the nozzle * Move forward or backward * Move nozzle backward respect to diffuser * Increase oil or air pressure * Reduce air louver opening * Set the spread to a proper value * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Reduce air louver opening * Set the spread to a support value * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Check burner-furnace coupling * Check burner-furnace noupling * Change nozzle with a suitable one * Replace nozzle
FLAME IRREGULAR OR SPARKING BURNER LIGHTS BUT FLAME DOESN'T RETAIN TO BURNER HEAD	 * Dirty nozzle * Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide * Oil pressure at nozzle too low * Air flow rate too high * Oil is too cold * Dirt in the oil * Water in the fuel * Oil impingement on the combustion head * Nozzle dirty or damaged * Drawer assembly not positioned correctly * Nozzle too far forward through centerhole of diffuser * Oil or air pressure at nozzle is too low * Air louver too open * Too much spread between oil and air (or steam) pressure * Nozzle dirty or damaged * Flame is too big for furnace or nozzle spray angle is wrong * Nozzle spray angle wrong (flame too long or too wide) * Boiler dirty 	 * Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean or, if necessary, replace the nozzle * Move forward or backward * Move nozzle backward respect to diffuser * Increase oil or air pressure * Reduce air louver opening * Set the spread to a proper value * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Clean or, if necessary, replace the nozzle * Reduce air louver opening * Set the spread to a sproper value * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Check burner-furnace coupling * Cheange nozzle with a suitable one * Replace nozzle * Clean the boiler
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER FLAME IRREGULAR OR SPARKING BURNER LIGHTS BUT FLAME DOESN'T RETAIN TO BURNER HEAD	 * Dirty nozzle * Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide * Oil pressure at nozzle too low * Air flow rate too high * Oil is too cold * Dirt in the oil * Water in the fuel * Oil impingement on the combustion head * Nozzle dirty or damaged * Drawer assembly not positioned correctly * Nozzle too far forward through centerhole of diffuser * Oil or air pressure at nozzle is too low * Air louver too open * Too much spread between oil and air (or steam) pressure * Nozzle dirty or damaged * Flame is too big for furnace or nozzle spray angle is wrong * Nozzle spray angle wrong (flame too long or too wide) * Boiler dirty * Not enough section at chimpey 	 * Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean or, if necessary, replace the nozzle * Move forward or backward * Move nozzle backward respect to diffuser * Increase oil or air pressure * Reduce air louver opening * Set the spread to a proper value * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Clean or, if necessary, replace the nozzle * Reduce air louver opening * Set the spread to a proper value * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Clean the boiler * Check burner-furnace coupling * Chean the boiler * Chean the boiler
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER FLAME IRREGULAR OR SPARKING BURNER LIGHTS BUT FLAME DOESN'T RETAIN TO BURNER HEAD	 [*] Dirty nozzle [*] Dirty nozzle [*] Oil spray impinging on burner head [*] Spray angle of the nozzle too wide [*] Oil pressure at nozzle too low [*] Air flow rate too high [*] Oil is too cold [*] Dirt in the oil [*] Water in the fuel [*] Oil impingement on the combustion head [*] Nozzle dirty or damaged [*] Torawer assembly not positioned correctly [*] Nozzle too far forward through centerhole of diffuser [*] Oil or air pressure at nozzle is too low [*] Air louver too open [*] Too much spread between oil and air (or steam) pressure [*] Nozzle dirty or damaged [*] Flame is too big for furnace or nozzle spray angle is wrong [*] Nozzle spray angle wrong (flame too long or too wide) [*] Boiler dirty [*] Not enough suction at chimney [*] Drawer of azzle too hard 	 * Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Torawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean or, if necessary, replace the nozzle * Move forward or backward * Move nozzle backward respect to diffuser * Increase oil or air pressure * Reduce air louver opening * Set the spread to a proper value * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Beat of the spread to a proper value * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Check burner-furnace coupling * Chean or, if necessary, replace the nozzle * Chean or, if necessary, replace the nozzle * Chean or, if necessary, replace the nozzle * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Chean or, if necessary, replace the nozzle * Check chimney cleanness or size * Repace nozzle * Check chimney cleanness or size
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER FLAME IRREGULAR OR SPARKING BURNER LIGHTS BUT FLAME DOESN'T RETAIN TO BURNER HEAD FLAME IRREGULAR OR SMOKING	 [*] Dirty nozzle [*] Dirty nozzle [*] Oil spray impinging on burner head [*] Spray angle of the nozzle too wide [*] Oil pressure at nozzle too low [*] Air flow rate too high [*] Oil is too cold [*] Dirt in the oil [*] Water in the fuel [*] Oil impingement on the combustion head [*] Nozzle dirty or damaged [*] Drawer assembly not positioned correctly [*] Nozzle too far forward through centerhole of diffuser [*] Oil or air pressure at nozzle is too low [*] Air louver too open [*] Too much spread between oil and air (or steam) pressure [*] Nozzle dirty or damaged [*] Flame is too big for furnace or nozzle spray angle is wrong [*] Nozzle spray angle wrong (flame too long or too wide) [*] Boiler dirty [*] Not enough suction at chimney [*] Pressure at nozzle too low 	 * Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean or, if necessary, replace the nozzle * Move forward or backward * Move nozzle backward respect to diffuser * Increase oil or air pressure * Reduce air louver opening * Set the spread to a proper value * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Check burner-furnace coupling * Clean or, if necessary, replace the nozzle * Check burner-furnace soupling * Clean the boiler * Clean the boiler * Check chimney cleanness or size * Reset oil pressure
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER FLAME IRREGULAR OR SPARKING BURNER LIGHTS BUT FLAME DOESN'T RETAIN TO BURNER HEAD	 [*] Dirty nozzle [*] Dirty nozzle [*] Oil spray impinging on burner head [*] Spray angle of the nozzle too wide [*] Oil pressure at nozzle too low [*] Air flow rate too high [*] Oil is too cold [*] Dirt in the oil [*] Water in the fuel [*] Oil impingement on the combustion head [*] Nozzle dirty or damaged [*] Nozzle too far forward through centerhole of diffuser [*] Oil or air pressure at nozzle is too low [*] Air louver too open [*] Too much spread between oil and air (or steam) pressure [*] Nozzle dirty or damaged [*] Flame is too big for furnace or nozzle spray angle is wrong [*] Nozzle spray angle wrong (flame too long or too wide) [*] Boiler dirty [*] Not enough suction at chimney [*] Pressure at nozzle too low 	 * Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean or, if necessary, replace the nozzle * Move forward or backward * Move nozzle backward respect to diffuser * Increase oil or air pressure * Reduce air louver opening * Set the spread to a proper value * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Check burner-furnace coupling * Check burner-furnace coupling * Check nozzle with a suitable one * Replace nozzle * Clean the boiler * Check chimney cleanness or size * Reset oil pressure * Reset oil temperature * Alige to the temperature
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER FLAME IRREGULAR OR SPARKING BURNER LIGHTS BUT FLAME DOESN'T RETAIN TO BURNER HEAD FLAME IRREGULAR OR SMOKING	 Dirty nozzle Dirty nozzle Oil spray impinging on burner head Spray angle of the nozzle too wide Oil pressure at nozzle too low Air flow rate too high Oil is too cold Dirt in the oil Water in the fuel Oil impingement on the combustion head Nozzle dirty or damaged Drawer assembly not positioned correctly Nozzle too far forward through centerhole of diffuser Oil or air pressure at nozzle is too low Air flow rate too open Too much spread between oil and air (or steam) pressure Nozzle dirty or damaged Flame is too big for furnace or nozzle spray angle is wrong Nozzle spray angle wrong (flame too long or too wide) Boiler dirty Not enough suction at chimney Pressure at nozzle too low Oil too cold Combustion air inlet dirty 	* Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust air flow rate * Adjust oil temperature * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean or, if necessary, replace the nozzle * Move forward or backward * Move nozzle backward respect to diffuser * Increase oil or air pressure * Reduce air louver opening * Set the spread to a proper value * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Check burner-furnace coupling * Change nozzle with a suitable one * Replace nozzle * Check chimney cleanness or size * Reset oil pressure * Reset oil pressure * Reset oil temperature * Clean the air inlet
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER FLAME IRREGULAR OR SPARKING BURNER LIGHTS BUT FLAME DOESN'T RETAIN TO BURNER HEAD	 * Dirty nozzle * Dirty nozzle * Oil spray impinging on burner head * Spray angle of the nozzle too wide * Oil pressure at nozzle too low * Air flow rate too high * Oil is too cold * Dirt in the oil * Water in the fuel * Oil impingement on the combustion head * Nozzle dirty or damaged * Drawer assembly not positioned correctly * Nozzle too far forward through centerhole of diffuser * Oil or air pressure at nozzle is too low * Air louver too open * Too much spread between oil and air (or steam) pressure * Notzle dirty or damaged * Flame is too big for furnace or nozzle spray angle is wrong * Nozzle spray angle wrong (flame too long or too wide) * Boiler dirty * Not enough suction at chimney * Pressure at nozzle too low * Oil too cold * Combustion air inlet dirty * Flame is too small respect to furnace volume 	 * Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean or, if necessary, replace the nozzle * Move forward or backward * Move nozzle backward respect to diffuser * Increase oil or air pressure * Reduce air louver opening * Set the spread to a proper value * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Clean or, if necessary, replace the nozzle * Reduce air louver opening * Set the spread to a proper value * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Check burner-furnace coupling * Check burner-furnace coupling * Check chimney cleanness or size * Reset oil pressure * Reset oil temperature * Clean the air inlet * Replace nozzle or reset pump pressure
FLAME IRREGULAR OR SPARKING BURNER LIGHTS BUT FLAME DOESN'T RETAIN TO BURNER HEAD	 [*] Dirty nozzle [*] Dirty nozzle [*] Oil spray impinging on burner head [*] Spray angle of the nozzle too wide [*] Oil pressure at nozzle too low [*] Air flow rate too high [*] Oil is too cold [*] Dirty in the oil [*] Water in the fuel [*] Oil impingement on the combustion head [*] Nozzle dirty or damaged [*] Drawer assembly not positioned correctly [*] Nozzle too far forward through centerhole of diffuser [*] Oil or air pressure at nozzle is too low [*] Air louver too open [*] Too much spread between oil and air (or steam) pressure [*] Not enough combustion air [*] Nozzle dirty or damaged [*] Flame is too big for furnace or nozzle spray angle is wrong [*] Not enough suction at chimney [*] Pressure at nozzle too low [*] Oil too cold [*] Combustion air inlet dirty [*] Flame is too small respect to furnace volume [*] Boiler dirty 	 * Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean or, if necessary, replace the nozzle * Move nozzle backward respect to diffuser * Increase oil or air pressure * Reduce air louver opening * Set the spread to a proper value * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Reduce air louver opening * Set the spread to a proper value * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Clean or, if necessary, replace the nozzle * Clean the boiler * Check chimney cleanness or size * Reset oil pressure * Clean the air inlet * Replace nozzle or reset pump pressure * Clean the boiler
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER FLAME IRREGULAR OR SPARKING BURNER LIGHTS BUT FLAME DOESN'T RETAIN TO BURNER HEAD FLAME IRREGULAR OR SMOKING	 [*] Dirty nozzle [*] Dirty nozzle [*] Oil spray impinging on burner head [*] Spray angle of the nozzle too wide [*] Oil pressure at nozzle too low [*] Air flow rate too high [*] Oil is too cold [*] Dirt in the oil [*] Water in the fuel [*] Oil impingement on the combustion head [*] Nozzle dirty or damaged [*] Drawer assembly not positioned correctly [*] Nozzle too far forward through centerhole of diffuser [*] Oil or air pressure at nozzle is too low [*] Air louver too open [*] Too much spread between oil and air (or steam) pressure [*] Nozzle dirty or damaged [*] Flame is too big for furnace or nozzle spray angle is wrong [*] Nozzle spray angle wrong (flame too long or too wide) [*] Boiler dirty [*] Not enough suction at chimney [*] Pressure at nozzle too low [*] Oil too cold [*] Combustion air inlet dirty [*] Flame is too small respect to furnace volume [*] Boiler dirty [*] Oil flow rate too high 	 * Clean the nozzle * Check position of the nozzle respect to the head * Reduce spray angle * Reset oil pressure * Adjust air flow rate * Adjust air flow rate * Adjust oil temperature * Check filters * Take off all the water * Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head * Clean or, if necessary, replace the nozzle * Move forward or backward * Move nozzle backward respect to diffuser * Increase oil or air pressure * Reduce air louver opening * Set the spread to a proper value * Adjust air flow rate * Clean or, if necessary, replace the nozzle * Check burner-furnace coupling * Clean the boiler * Clean the boiler * Reset oil pressure * Reset oil pressure * Reset oil pressure * Reset oil pressure * Reset oil temperature * Clean the boiler * Adjust oil pressure or replace nozzle



C.I.B. UNIGAS S.p.A. Via L.Galvani, 9 - 35011 Campodarsego (PD) - ITALY Tel. +39 049 9200944 - Fax +39 049 9200945/9201269 web site: www.cibunigas.it - e-mail: cibunigas@cibunigas.it

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

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



Service instruction manual

M12921CB Rel.1.2 02/2016

GENERAL FEATURES

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

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

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

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

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

The flame is supervised with an ionization probe, optionally with UV flame detector QRA2..., QRA4.U or QRA10.... Integrated in the LME7... basic unit are:

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

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

Functions:

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



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

User interface :



A	Button A - Display preset output - In lockout position: Power value to the time of fault
^{≜nfo}	I <i>nfo and Enter button</i> - Reset in the event of fault, changeover visual diagnostic of the cause of fault (refer to chapter Diagnostics of cause of fault)
·	 button Display flame signal current 2 or phases display In lockout position: MMI phase to the time of fault
+	 + button - Display flame signal current 1 or phases display - In lockout position: MMI phase to the time of fault
\bigcirc	3 multicolor signal lamp - Refer to chapter "Blink code table"
· · ·	+ and - button: Escape function (press + and - simultaneously) - No adoption of value - One menu level up - Keen depressed for >1second for backup / restore function

First startup when PME is supplied or PME replacement:

First startup:

1) insert a new PME

2) turn the power on; The diplay shows "rst" and "PrC" one after the other.

3) keep pushing the INFO button more than 3 seconds; "run" appears; PME parameters will be transferred to LME 4) at the end, "End" and "rst" appears one after the other; Later (2'), the control box locks out "Loc 138"

5) reset the control box by pressing the INFO is button (for less than 3 seconds) Now the display shows "OFF"; the burner is ready to be started.

Replacement:

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

List of phase display on board LME :

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

Operation:

[≜] info	The lockout reset button (info button) (EK) is the key operating element for resetting the burner control and for activating / deactivating the diagnostics functions.
Red Vellow Green LED	The multicolor signal lamp (LED) is the key indicating element for visual diagnostics.

Both lockout reset button (EK) and signal lamp (LED) are located in the control panel. There are 2 diagnostics choices:

1. Visual diagnostics: Indication of operating state or diagnostics of cause of fault

2. Diagnostics: Via internal display or to AZL2.. display and operating unit

Visual diagnostics:

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

Color code table for multicolor signal lamp (LED) :

State	Color code	Color
Waiting time (tw), other waiting states	О	OFF
Ignition phase, ignition controlled	$\bullet \bigcirc \bullet \bigcirc$	Blinking yellow
Operation, flame o.k.	0	Green
Operation, flame not o.k.		Blinking green
Extraneous light on burner startup		Green-red
Undervoltage		Yellow-red
Fault, alarm	▲	Red
Error code output (refer to «Error code table»)	$\bigcirc \land \bigcirc \land$	Blinking red
Interface diagnostics		Red flicker light
Heating request	•	Yellow
Heating request		Yellow

Key

	Steady on
0	Led off
A	Led red
•	Led yellow
	Led green

Program sequence :

Version 1:

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

				Star	ndby	4					Sta	rtup										(Opera	ation		Shu	utdov	/n		1	Valv	⁄e pro	iving	*4
													23	- TO	- 4						Γ					Γ					if pa P24	#rame 41 = 1	eter (ON)
					t.			+14	+10		> 	+10	+0	< 10 +On	^{≫~} >		+0		1.10	+=						*2	L.				para	ameta	erize	d teta
		Phase number		OFF	OFF	21	22	111 24	22	" 30	30	36	13 38	13N	12	14 11	19 50	54	54	10 0P	DP.	yy (g	ctual	load	n 961	72	18 74	10		_	80	81	.03 82	83
0	Operating	unit parameter number				21	22	259	22	225	00	260	226	257	72	230	231	259.01	260	232						12	234			_			1	
		LED permanent				•	•	•	•	•	•	•			•											•	•	•			•	•	•	•
		LED blinking	Γ										•0	•0												Γ							T	
RAST5 plug Pin number	Relay contact	Function / inputs																																
X3-04 Pin 5		Maine voltage																												ε				
X3-04 Pin 1		SK 🔽																												Σ				
X5-03 Pin 1		R ┣┯┱																										\square	5	7			₩.	
V6.00 Din 0			800	2000		x x x x														x x x x						xxx			E	5		<u></u>	2	
X0-00 Pill 0						~~~~		\square			$\sum_{i=1}^{\infty}$			0000	$\int_{-\infty}^{\infty}$			$\sum_{i=1}^{\infty}$	\sum								$\sum_{i=1}^{\infty}$	$\prod_{i=1}^{\infty}$	Ľ				Ĩ	xxx
X5-03 Pin 2			~~~	~~~~	~~~~	~~~	****	~~~	~~~		Ĩ	~~~	~~~	***		~~~	****	××××	Ĩ							***	Ĩ	~~~		4	~~~~	***	٣	888
X65 Pin 1		Analog Input LR upper	***	***	***	***	***	***	****	888	***	***	***	***	***	××	***	***	×	***			_	-	-	***	***	***		Σ	***	鱳	쫵	8
X65 Pin 1		Analog input LR lower	***	***	***	***	***	***	***	***	***	***	***	***	***	****	****	****	***	****						***	***	***		Σ	ண	ண	疄	88
X3-02 Pin 1		₽₩₽	***	***	***		****	***																		***		×		Σ		=	≠	
X5-01 Pin 2		Pmin HP		***	***	****	***	***	***					***	***											***	***	***		Σ				
X2-02 Pin 4		input LT (ON)		 	***	***	****	***	***		*3	****	***	***		****			 ****		***	 ****	***	****			***	***		Σ	****	***	*	***
X2-02 Pin 4		Input LT (OFF)		~~~~	~~~	~~~				_	*1 888	~~~~	~~~	***						~~~~										Γ		~~~	_	***
X9-04 Pin 2																				 									5	7				
X10-05 Pin 2			200	Ē							ŗ			200					ſ	Ĩ	ľ.	\sim			Ĩ				Ľ.	5			1	
X10-06 Pin 1/2		Not active 200	2000							$\prod_{i=1}^{\infty}$	L			0000													Ĩ	$\prod_{i=1}^{\infty}$	É	2	\square	<u> </u>	Ĩ	200
X10-06 Pin 3			2002		~~~~	~~~	****		~~~		~~~	~~~~	~~~	~~~		~~~	~~~~				~~~		~~~~	~~~		~~~			-	2			Ĩ	888
RAST5 plug Pin number	Relay contact	Function / outputs																															\downarrow	
X2-02 Pin 3	K1	Mains voltage for Input LT (ON/OFF)		F																										Σ			e¢	
X6-03 Pin 3	K1	s∨ ⊡-X																												Σ				
X2-01 Pin 3	K4	мС																												τ				
X4-02 Pin 3	K5/K6	z CAD							_																			\square	5	7		\neg	7	_
¥7-01 Pin 3	K2/K3																		L										5	5		\mp	7	
X7 04 Din 4	1/2//0																	XXX					XXX						Ľ					
X7-04 PIN 4	K IIKO																												Ľ	2				
X7-02 Pin 3	K9/K10	∨2 □ <u>⊀</u>	⊢	-			-		-	-		8	****	***		~~~					1						\vdash			۷		+	+	-
X2-03 Pin 3	K2/K3	al 🖂		\square			_		-	F	F			F	\vdash			F	F	F	F	\vdash		-	F	F	F	P		Σ	\square	7	7	
X2-09 Pin 3	K11	QA_MI																											5	۶	\square	\neg	コ	
V0.00.00-0	1/10	3A-NL																											Ľ	5		=	#	
A2-09 Pin 2	K12	SA-KL																											Ľ	2		\pm	\pm	-
X2-09 Pin 1		SA-ZU																						E					Ľ	2	H		╉	
X2-09 Pin 4		SA-R		-					_					-			-				F		_				F	H	\square	Σ	H	+	\mp	7
X2-09 Pin 7	K2/K3	Output SA-ZL cams	F			H		Ħ						-				***	鱜	***	****	***	****	****	***			Ħ		Σ	Ħ	4	4	
X2-09 Pin 8		Input SA-ZL cam s	E	F				H										***	*	***	***	***	***	***	***			₩		Σ	Ħ	\pm	\pm	
		1.15 miles Prove				+													H		F			\vdash		E		[+]		_				
sition		High-fire		V///	///																		V///		V///	////	¥///					IIK	TIX	111.
tor po:		LOW-TIP		¥///	///							1						Z													\square		\square	
Actuat		ignition load		V///		2																									\square	\square	\square	
Ĺ	L													_		1			1						1	-	1			_	Ļ	71140	105e/	0115

Program sequence :

Version 2:

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

				Standby						Star	tup							_	I a		Opera	ation		Shu	itdow	n			Val	ve pr	ovinç	3
													TO						Γ				1			-			if p P2	aram 41 = 1	eter 1 (ON	4)
				1		Т	1		< <u>t1</u>	>			< 18	A >															par	ramet	terize	ed
		_		tw	arte	1	t11	t10	*1		t12	t3	t3n	10	t4	t9	t12	t5	_					*2	t8	10	_	_	td4	td1	td3	td2
<u> </u>		Phase number	LOC	OFFOFF	21 2	2	24 V50	22	30	30	36	38 220	40 277	42	44	50 224	54 000	0P1	aP:	xx (a	ctual	load i	ń %)	72	74	10		_	80	81	82	83
)perating	unit parameter number				4	259	_	225	-	260	226	257		230	231	260	232	-					_	234		-	_			_	
<u> </u>		LED permanent					-	•	•	-	•		*^	•						ш		Ч		•			_	_	-	-	-	-
RAST5 plug	Relay				\vdash	+	+	\neg	-	+	_	•••			_				⊢	-	-			-		_	_	_	\vdash		-	\vdash
Pin number	contáct	Function / inputs			\vdash	+	-	_	\rightarrow	+	_								⊢	_	-				\vdash	_	-	_	\square		—	\square
X3-04 Pin 5		Maine voltage						=			-										_						2	Σ				
X3-04 Pin 1		SK 🔽	***																									Ξ				
X5-03 Pin 1			***																									Л				
			***										~~~																		~~~	
X5-03 Pin 3			***		*****	Ŷ	×	×	×××	***	~~~	***	***	***	***	****	~~~	<u> </u>						~~~	×××	~~	-4	4	~~~	<u> </u>	***	***
X5-03 Pin 2			***		****	疄	**	***	***	***	***	***	***	***	***	***	***	***	***					***	***	***		Σ	***	***	***	***
X65 Pin 1		Analog Input LR upper	**	*****	***	∞	*	***	***	**	***	***	***	***	***	***	***	***						***	***	***		Σ	***	ண	***	***
X65 Pin 1		Analog input LR lower	~~		*	${\otimes}$	‱	~~			***		<u></u>	~~	~~~													7	~~	***	***	~
¥3.02 Bin 4		Le Mai	~~~				~		Ĩ															2000			Ē,	Ļ				
70-02 PIII I			2002		Ľ	Ĩ	~~~																	2002		~~~~	É	4				
X5-01 Pin 2		Pmin He	⋙		****	¥	쫵	***	*3				****	***		***								***	***	****		2				
X2-02 Pin 4		Input LT (ON)	***	******	***	×	ண	***	#1	**	***	***	***	***	***	****	***	***	***	****	****	***	***	888	***	***		Σ	***	ண	***	***
X2-02 Pin 4		input LT (OFF)	***		***	∞	8	***	B	***		***	***	***	~	***	***	***	***	***	****			***	***	***		Ξ	***	***	***	***
X9-04 Pin 2			888			*			***	<u> </u>	***			<u></u>	***						****							Л				\square
X10-05 Pin 2			~~~~			1	Ĩ						~~~~											~~~				2				
X10-06 Pin 1/2		ION 7 GRA	***	800	~~~~~	Ť	Ĩ	***	<u></u>		_	****	****													~~~~	-4	4	***	~~~	2002	****
X10-05 Pin 3		Not active 🚬 🔿	***	******	****	×	ᄦ	***	****	***	***	****	***	****	***	****	****	***	***	****	****	****	***	***	***	***		Π	***	***	***	***
RAST5 plug Pin number	Relay	Function / outputs				+	1			1																			Η			
V2 02 Din 2	1/1	Mains voltage for																	-								_	<u>,</u>				
A2-02 FIII 3	KI.	input LT (ON/OFF)																										4				
X6-03 Pin 3	K1	sv⊡X	-																-					-				2				
X2-01 Pin 3	K4	M C⊐																									\Box	Ζ				
X4-02 Pin 3	K5/K6	z ODD				\pm					_																	Σ				
X7-01 Pin 3	K2/K3		-		\vdash	+	-	_	-	+										***				_		_	\neg	л				
V7.04 Din 4	1/7///0																											H				
∧7-04 PI∏4	K 1/K8	⊻1 ∟13∡																										4				
X7-02 Pin 3	K9/K10	∨2 □-₩			H	+	1		7	7	×	****	***	****	***												7	Σ		H	\square	
X2-03 Pin 3	K2/K3	al 🖂			Ħ	+																						Σ				
																													H			
X2-09 Pin 3	K11	SA-NL	-						-	-								\vdash					H					Σ	P	\neg		F
X2-09 Pin 2	K12	SA-KL			Ħ	+				\downarrow																	\Box	Σ				
X2-09 Pin 1		SA-ZU															L	L		L	L	E						Σ	H			\square
X2-09 Pin 4		QA_D				1				-																	5	,		\square		
12 001 1114		SA-R																									Ľ	5				
X2-09 Pin 7	K2/K3	Output SA-ZL cams			\vdash	+	+	-	-	-							***	***	***	****	****	****	***		\vdash	-		4	Η			\vdash
X2-09 Pin 8		Input SA-ZL cam s			Ħ	1											***	***	****	****	****	****	***				7	Σ	Ħ			
					\vdash	+																					-	-	H			
sition		High-fire					Π													111				////	////							////
or pos		iynition ioad	11/	X//X//		1														¥///	X///				(///						[[]]	(///
Stuatc		Low-fire				1				1												1				T						
Ř		CLOSe																													-10.41	
Actuator positio		Ignition load Low-fire CLOSe				4																						_				

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

Error code table :

Red blink code of fault signal lamp (LED)	Possible cause	
2 x blinks	No establishment of flame at the end of the safety time (TSA)	
	- Faulty or soiled flame detector	
	- Faulty or soiled fuel valves	
	- Poor adjustment of burner, no fuel	
	- Faulty ignition equipment	
3 x blinks	Air pressure switch (LP) faulty	
	 Loss of air pressure after specified time (t10) 	
	 - Air pressure switch (LP) welded in no-load position 	
4 x blinks	Extraneous light on burner startup	
5 x blinks	Time supervision air pressure switch (LP)	
	- Air pressure switch (LP) welded in working position	
6 x blinks	Actuator position not reached	
	- Actuator faulty	
	- Wrong adjustment of cam	
	- Actuator defective or blocked	
	- False connection	
	- Misadjustment	
7 x blinks	Too many losses of flame during operation (limitation of repetitions)	
	- Faulty or soiled flame detector	
	- Faulty or soiled fuel valves	
	Poor adjustment of burner	
8 x blinks	Free	
9 x blinks	Free	
10 x blinks	Wiring error or internal error, output contacts, other faults	
12 x blinks	Valve proving (LT)	
	- Fuel valve 1 (V1) leaking	
13 x blinks	Valve proving (LT)	
	- Fuel valve 2 (V2) leaking	
14 x blinks	Error in connection with valve closure control POC	
15 x blinks	Error code ≥15	
	Error code 22: Error of safety loop (SL)	

During the time the cause of fault is diagnosed, the control outputs are deactivated: - Burner remains shut down

- External fault indication (AL) at terminal X2-03, pin 3 steady on Diagnostics of cause of fault is quit and the burner switched on again by resetting the burner control. Press the lockout reset button (info button) for about 1 second (<3 seconds).

Flame detection – detection electrode :

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

Measuring circuit



Keys

C	-	Electrolytic condenser 100470 µF; DC 1025 V
ION	-	Ionization probe
Μ	-	Microammeter Ri max. 5,000 Ω

Flame detection – UV probe :

Threshold values when flame is supervised by QRA...

- Start prevention (extraneous light)	Intensity (parameter 954) approx. 12 %
- Operation	Intensity (Parameter 954) approx. 13 %
Operating voltage	AC 280 V ±15 %
Mains frequency	5060 Hz ±6 %
Required detector current	Min. 70 μA
Possible detector current	
- Operation	Max. 700 μA
Perm. length of detector cable	
 Normal cable, laid separately ¹) 	Max. 100 m

¹) Multicore cable not permitted



Keys

	-		
А	-	Exposure to ligh	٦t

- C Electrolytic condenser 100...470 µF; DC 10...25 V
- M Microammeter Ri max. 5,000 Ω

Warning!

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

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

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

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

Gas proving system :

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

Valve proving with separate pressure switch (P LT)

Step 1: td4 – Evacuation of test space

Gas valve on the burner side is opened to bring the test space to atmospheric pressure.

Step 2: td1 – Test atmospheric pressure

When the gas has closed, the gas pressure in the test space must not exceed a certain level.

Step 3: td3 Filling of test space

Gas valve on the mains side opens to fill the test space.

Step 4: td2 - Test gas pressure

When the gas valve has closed, the gas pressure in the test space must not drop below a certain level.



Controllo tenuta con pressostati separati

Keys

td1 Test atmospheric pressure

td2 Test gas pressure

td3 Filling of test space

td4 Evacuation of test space

V... Fuel valve

PLT Pressure switch valve proving Input / output signal 1 (ON)

Input / output signal 0 (OFF)

Input permissible signal 1 (ON) or 0 (OFF)

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

Instruction, control and modify via AZL2x :

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



The keys functions are the following:

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

The display will show these data:



While pushing the $\frac{2}{3}$ nfo button together with whatever else button, LME73 locks out; the display shows Ρ ñ \bigtriangleup ٧ h 8 min % ñ On stand-by position, appears h ¥ \triangle ν min s %



On operation, all the phases appears with their number.

List of phase with display AZL2x :

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

Error code list with operation via internal AZL :

Error code	Clear text	Possible cause
Loc 2	No establishment of flame at the	- Faulty or soiled fuel valves
	end of the safety time (TSA)	- Faulty or soiled flame detector
		- Poor adjustment of burner, no fuel
		- Faulty ignition equipment
Loc 3	Air pressure faulty (air pressure	Air pressure switch (LP) faulty
	switch (LP) welded in no-load	- Loss of air pressure signal after specified time (t10)
	position, decrease to spe-cified time	- Air pressure switch (LP) is welded in no-load
	(t10) (air pressure switch (LP) re-	position
	sponse time)	
Loc 4	Extraneous light	Extraneous light when burner startup
Loc 5	Air pressure faulty, air pressure	Time out air pressure switch (LP)
	switch wel-ded in working position	- Air pressure switch (LP) is welded in working
		position
Loc 6	Fault of actuator	- Actuator faulty or blocked
		- Faulty connection
		- Wrong adjustment
Loc /	Loss of flame	I oo many losses of flame during operation (limitation
		of repetitions)
		- Faulty or solled fuel valves
		- Faulty or solied flame detector
1 0		
		Free
LOC 10	Error not relatable (application),	foulte
1 00 10		
	Valve proving	
	Valve proving	
LOC ZZ	Satety loop open	- Gas pressure switch-max open
		- Safety limit thermostat cut out
LOC 138	Restore process successful	Restore process successful
LOC 167	Manual locking	
Loc: 206	AZL2 incompatible	Use the latest version

Entering the Parameter levels:

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


Info level :



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

full description. Push $\frac{1}{2}$ nfo again for 1 to 3 s in order to show the full description.

Below the visible Info parameters:

Parameter	Parameter list	Edit	Value range		Resolution	Factory	Password	Password level
number	LME73.831AxBC		Min.	Max.		Setting	reading from level	writing from level
100	General							
102	Identification date	Read only					Info	
103	Identification number	Read only	0	9999	1		Info	
113	Burner identification	Read only	х	XXXXXXXX	1		Info	
164	Numbers of startups resettable	Resettable	0	999999	1		Info	Info
166	Total number of startups	Read only	0	999999	1		Info	
170.00	Switching cycles actuator relay K12	Read only	0	999999	1		Info	
170.01	Switching cycles actuator relay K11	Read only	0	999999	1		Info	
170.02	Switching cycles actuator relay K2	Read only	0	999999	1		Info	
170.03	Switching cycles actuator relay K1	Read only	0	999999	1		Info	
171	Max. switching cycles actuator relay	Read only	0	999999	1		Info	

Service level :



full description. Push $\frac{2}{3}$ nfo again for 1 to 3 s in order to show the full description.

Below the visible Info parameters:

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

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

Parameter level (Heating engeneering) :

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

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

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

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

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

600	Power setting							
654	Analog input (feedback potentiometer ASZxx.3x required)	Edit	0	5	1	0	SO	SO
	0 = 3-position step input							
	1 = 010 V							
	2 = 0135 Ω							
	3 = 020 mA							
	4 = 420 mA with lockout at I <4 mA							
	5 = 420 mA							

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

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



					Impianto	Ordine		Data	22/05/2015	PREC.	FOGLIO
					TIPI/TYPES HR91A÷520A/HTP91A÷520A/G/H/K			Data	22/00/2010	· /	1 1
					MODELLO/MODEL xGPR(MD).x.xx.A.1.xx	Commessa	Data Controllato	Revisione	01	/	
				(Sevenias)	Descrizione		30/03/2016			SEGUE	TOTALE
01	"RWF40" MODULATOR ADDED	30/03/16	U. PINTON		LME73.xx + COD. 6100574 + COD. 6100566	Esecutore	Controllato	Dis. N.	09 - 0432	2	15
REV.	MODIFICA	DATA	FIRME			U. PINTON	G. SCATTOLIN			2	13











SQM40.265Axx CDV

1	ALTA FIAMMA
11	SOSTA
Ш	BASSA FIAMMA GAS
IV	GAS LOW FLAME BASSA FIAMMA GASOLIO
v	<i>LIGHT OIL LOW FLAME</i> ACCENSIONE GASOLIO
VI	LIGHT OIL IGNITION ACCENSIONE GAS GAS IGNITION
	das lamiton

Data	22/05/2015	PREC.	FOGLIO
Revisione	01	5	6
	0 0470	SEGUE	TOTALE
Dis. N. U	9 - 0432	7	15















Data	22/05/2015	PREC.	FOGLIO
Revisione	01	9	10
	0.0470	SEGUE	TOTALE
Dis. N. U	9 - 0432	11	15



- IV
- LIGHT OIL LOW FLAME
- ACCENSIONE GASOLIO V
- LIGHT OIL IGNITION ٧I
- ACCENSIONE GAS GAS IGNITION

KEY1 KEY2 KEY3 KEY4 KEY5 KEY6 KEY7 1 2 1 2 1 2 1 2 1 2 1 2 1 2 |0|0|0|0|0|0|0|0|

Data	22/05/2015		FOGLIO
Revisione	01	10	11
	0.0470	SEGUE	TOTALE
Dis. N. U	9 - 0432	12	15

|--|





Data	Data 22/05/2015		FOGLIO
Revisione	01	11	12
	0.0470	SEGUE	TOTALE
Dis. N. U	9 - 0432	13	15

0	1	2	3	4	5	6	7	8	9

Sigla/Item	Foglio/Sheet	Funzione	Function
600V RRR0-1-T73	7	REGOLATORE MODULANTE (ALTERNATIVO)	BURNER MODULATOR (ALTERNATIVE)
AZL2x	6	INTERFACCIA UTENTE	USER INTERFACE
СМ	1	COMMUTATORE FUNZIONAMENTO 1)GAS 0)SPENTO 2)GASOLIO	MANUAL OPERATION SWITCH 1)GAS 0)OFF 2)LIGHT OIL
CMF	7	COMMUT. MANUALE FUNZ. 0)FERMO 1)ALTA FIAMMA 2)BASSA FIAMMA 3)AUTOMATICO	MANUAL SWITCH 0)OFF 1)HIGH FLAME 2)LOW FLAME 3)AUTOMATIC
EV1	5	ELETTROVALVOLA GAS LATO RETE	UPSTREAM GAS SOLENOID VALVE
EV2	5	ELETTROVALVOLA GAS LATO BRUCIATORE	DOWNSTREAM GAS SOLENOID VALVE
EVG 1/2	5	ELETTROVALVOLE GASOLIO	LIGHT OIL ELECTRO VALVES
FQ-LED	12	PANNELLO FRONTALE (LED)	FRONT PANEL (LED)
FU1	1	FUSIBILE AUSILIARIO	AUXILIARY FUSE
FU3	1	FUSIBILI LINEA POMPA	PUMP LINE FUSES
FU4	1	FUSIBILE AUSILIARIO	AUXILIARY FUSE
FU6.3	7	FUSIBILE	FUSE
FU-A	1	FUSIBILI DI LINEA	LINE FUSES
FU-B	1	FUSIBILE DI LINEA	LINE FUSE
IG	1	INTERRUTTORE GENERALE	MAINS SWITCH
KA1	1	RELE" AUSILIARIO	AUXILIARY RELAY
KA2	1	RELE" AUSILIARIO	AUXILIARY RELAY
КАЗ	5	RELE" AUSILIARIO	AUXILIARY RELAY
KM3 HCRMMD	7	REGOLATORE MODULANTE (ALTERNATIVO)	BURNER MODULATOR (ALTERNATIVE)
KM-P	2	CONTATTORE MOTORE POMPA GASOLIO	LIGHT OIL PUMP MOTOR CONTACTOR
KM-V	2	CONTATTORE MOTORE VENTILATORE	FAN MOTOR CONTACTOR
LAF	6	LAMPADA SEGNALAZIONE ALTA FIAMMA BRUCIATORE	BURNER IN HIGH FLAME INDICATOR LIGHT
LB	3	LAMPADA SEGNALAZIONE BLOCCO BRUCIATORE	INDICATOR LIGHT FOR BURNER LOCK-OUT
LBF	5	LAMPADA SEGNALAZIONE BASSA FIAMMA BRUCIATORE	BURNER IN LOW FLAME INDICATOR LIGHT
LEV1	5	LAMPADA SEGNALAZIONE APERTURA [EV1]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV1]
LEV2	5	LAMPADA SEGNALAZIONE APERTURA [EV2]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV2]
LEVG	5	LAMPADA SEGNALAZIONE APERTURA [EVG]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EVG]
LME73.000xx + PME73.831xxBC	2	APPARECCHIATURA DI COMANDO	CONTROL SCHEME
LME73.831xxBC	2	APPARECCHIATURA DI COMANDO	CONTROL SCHEME
LP	2	LAMPADA SEGNALAZIONE FUNZIONAMENTO POMPA	INDICATOR LIGHT FOR PUMP OPERATION
LPGMIN	4	LAMPADA SEGNALAZIONE PRESENZA GAS IN RETE	INDICATOR LIGHT FOR PRESENCE OF GAS IN THE NETWORK
LT	2	LAMPADA SEGNALAZIONE BLOCCO TERMICO MOTORE VENTILATORE	INDICATOR LIGHT FOR FAN MOTOR OVERLOAD THERMAL CUTOUT

Data	a 22/05/2015		FOGLIO
Revisione	01	12	13
0	0 0470	SEGUE	TOTALE
Dis. N. U	9 - 0432	14	15

0	1	2	3	4	5	6	7	8	9

Sigla/Item	Foglio/Sheet	Funzione	Function
LTA	4	LAMPADA SEGNALAZIONE TRASFORMATORE DI ACCENSIONE	IGNITION TRANSFORMER INDICATOR LIGHT
LTP	2	LAMPADA SEGNALAZIONE BLOCCO TERMICO MOTORE VENTILATORE	INDICATOR LIGHT FOR FAN MOTOR OVERLOAD THERMAL CUTOUT
MB-DLESx0	5	GRUPPO VALVOLE GAS	GAS VALVES GROUP
MB-DLESx2	5	GRUPPO VALVOLE GAS	GAS VALVES GROUP
MBCSEx0	5	GRUPPO VALVOLE GAS (ALTERNATIVO)	GAS VALVES GROUP (ALTERNATIVE)
MBCSEx2	5	GRUPPO VALVOLE GAS (ALTERNATIVO)	GAS VALVES GROUP (ALTERNATIVE)
MP	1	MOTORE POMPA GASOLIO	LIGHT OIL PUMP MOTOR
MV	1	MOTORE VENTILATORE	FAN MOTOR
PA	3	PRESSOSTATO ARIA	AIR PRESSURE SWITCH
PGCP	5	PRESSOSTATO GAS CONTROLLO PERDITE	GAS LEAKAGE PRESSURE SWITCH
PGMAX	6	PRESSOSTATO GAS DI MASSIMA PRESSIONE (OPTIONAL)	MAXIMUM PRESSURE GAS SWITCH (OPTIONAL)
PGMIN	4	PRESSOSTATO GAS DI MINIMA PRESSIONE	MINIMUM GAS PRESSURE SWITCH
POMAX	3	PRESSOSTATO DI MASSIMA PRESSIONE OLIO (OPTIONAL)	MAXIMUM OIL PRESSURE SWITCH (OTIONAL)
PS	3	PULSANTE SBLOCCO FIAMMA	FLAME UNLOCK BUTTON
PT100	8	SONDA DI TEMPERATURA	TEMPERATURE PROBE
RWF40.0xx	7	REGOLATORE MODULANTE	BURNER MODULATOR
RWF50.2x	7	REGOLATORE MODULANTE	BURNER MODULATOR
RWF55.5x	7	REGOLATORE MODULANTE (ALTERNATIVO)	BURNER MODULATOR (ALTERNATIVE)
SD-PRESS	8	SONDA DI PRESSIONE	PRESSURE PROBE
SD-TEMP.	8	SONDA DI TEMPERATURA	TEMPERATURE PROBE
SD - 0÷10V	8	TRASDUTTORE USCITA IN TENSIONE	TRANSDUCER VOLTAGE OUTPUT
SD - 4÷20mA	8	TRASDUTTORE USCITA IN CORRENTE	TRANSDUCER CURRENT OUTPUT
SQM40.265Axx CDV	6	SERVOCOMANDO SERRANDA ARIA	AIR DAMPER ACTUATOR
ST	4	SERIE TERMOSTATI/PRESSOSTATI	SERIES OF THERMOSTATS OR PRESSURE SWITCHES
ТА	4	TRASFORMATORE DI ACCENSIONE	IGNITION TRANSFORMER
ТАВ	4	TERMOSTATO/PRESSOSTATO ALTA-BASSA FIAMMA	HIGH-LOW THERMOSTAT/PRESSURE SWITCHES
TC	8	TERMOCOPPIA	THERMOCOUPLE
TP	1	TERMICO MOTORE POMPA	PUMP MOTOR THERMAL
TV	1	TERMICO MOTORE VENTILATORE	FAN MOTOR THERMAL
UV	6	SONDA UV RILEVAZIONE FIAMMA	UV FLAME DETECTOR

Data	22/05/2015	PREC.	FOGLIO
Revisione	01	13	14
	0 0470	SEGUE	TOTALE
Dis. N. U	9 - 0432	15	15

