HP60..VS
HP72..VS
HP73..VS

Gas - light oil burners

LMV2x

Microprocessor-controlled

MANUAL OF INSTALLATION - USE - MAINTENANCE

BURNERS - BRUCIATORI - BRULERS - BRENNER - QUEMADORES - ГОРЕЛКИ

M039326CD Rel. 0.4 12/2015

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.

The following:

- Entails the customer's acknowledgement and acceptance of the company's general terms and conditions of sale, in force at the date of order confirmation and available in the appendix to the current price lists.
- Is intended exclusively for specialised, experienced and trained users able to operate in conditions that are safe for people, the device and the environment, and in full compliance with the requirements set out on the following pages and with current health and safety regulations.

Information regarding assembly/installation, maintenance, replacement and repair is always and exclusively intended for (and therefore only to be carried out by) specialised personnel and/or directly by the Authorised Technical Service

IMPORTANT :

The supply has been made at the best conditions on the basis of the customer's order and technical indications concerning the state of the places and the installation systems, as well as the need to prepare certain certifications and / or additional adaptations with respect to the standard observed and transmitted for each product. In this respect, the manufacturer declines any responsibility for complaints, malfunctions, criticalities, damages and/or anything else consequent to incomplete, inaccurate and/or missing information, as well as failure to comply with the technical requirements and installation regulations, initial start-up, operational management and maintenance.

For proper operation of the device, it is necessary to ensure the readability and conservation of the manual, also for future reference. In case of deterioration or more simply for reasons of technical and operational insight, contact the manufacturer directly. Text, descriptions, images, examples and anything else contained in this document are the exclusive property of the manufacturer. Any reproduction is prohibited.

RISK ANALYSIS

Instruction manual delivered with the device:

This is an integral and essential part of the product and must not be separated from it. It must therefore be kept carefully for any necessary consultation and must accompany the burner even if it is transferred to another owner or user, or to another system. In the event of damage or loss, another copy must be requested from the local customer service centre;

Delivery of the system and instruction manual

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The supplier of the system is obliged to accurately inform the user about:– Use of the system;

– any further testing that may be necessary before activating the system;

– maintenance and the requirement to have the system checked at least once a year by a contractor or other specialised technician.

To ensure periodic monitoring, the manufacturer recommends drawing up a Maintenance Agreement.

WARRANTY AND LIABILITY

In particular, warranty and liability claims will no longer be valid in the event of damage to persons and/or property if such damage is due to any of the following causes:

- Incorrect installation, start-up, use and maintenance of the burner;
- Improper, incorrect or unreasonable use of the burner;
- Operation by unqualified personnel;
- Carrying out of unauthorised changes to the device;
- Use of the burner with safety devices that are faulty, incorrectly applied and/or not working;
- Installation of untested supplementary components on the burner;
- Powering of the burner with unsuitable fuels;
- Faults in the fuel supply system;
- Use of the burner even after an error and/or fault has occurred;
- Repairs and/or overhauls incorrectly carried out;
- Modification of the combustion chamber with inserts that prevent the regular development of the structurally established flame;
- Insufficient and inappropriate supervision and care of the burner components most subject to wear and tear;
- Use of non-original components, whether spare parts, kits, accessories and optionals;
- Force majeure.

Furthermore, the manufacturer declines all responsibility for non-compliance with this manual.

WARNING! Failure to comply with this manual, operational negligence, incorrect installation and unauthorised modifications will result in the manufacturer's warranty for the burner being voided.

Personnel training

The user is the person, organisation or company that has acquired the appliance and intends to use it for the specific purpose. The user is responsible for the appliance and for training the personnel that operate it.

The user:

- Undertakes to entrust the machine to suitably trained and qualified personnel;
- Must take all measures necessary to prevent unauthorised people gaining access to the appliance;
- Undertakes to adequately inform personnel about application and observance of the safety requirements, and therefore ensure that they are familiar with the operating instructions and safety requirements;
- Must inform the manufacturer if any faults or malfunctions of the accident prevention systems occur, and if there is any suspected danger;
- Personnel must always use the personal protective equipment required by law and follow the instructions provided in this manual;
- Personnel must observe all danger and caution notices on the appliance;
- Personnel must not carry out, on their own initiative, operations or interventions outside their area of expertise;
- Personnel must inform their superiors of any problem and danger that may arise;
- The assembly of parts of other makes, or any modifications made, may alter the characteristics of the appliance and may therefore compromise operational safety. The manufacturer therefore declines all responsibility for damages arising from the use of non-original parts.

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 WARNING! Failure to observe the information given in this manual, operating negligence, incorrect installation and carrying out of non authorised

modifications will result in the annulment by the manufacturer of the guarantee that it supplies with the burner.
The 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

SPECIAL INSTRUCTIONS FOR BURNERS

a Make the following checks:
- • 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 shutoff 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.

GENERAL INSTRUCTIONS DEPENDING ON FUEL USED

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
should be switched off.

FIRING WITH GAS, LIGHT OIL OR OTHER FUELS GENERAL

General Warnings

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

Special instructions for using gas

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

Precautions if you can smell gas

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

Using oil pressure gauges

Generally, pressure gauges are equipped with a manual valve. Open the valve only to take the reading and close it immediately afterwards.

Safety and prevention

- Opening or tampering with the burner components is not allowed, apart from the parts requiring maintenance.
- Only those parts envisaged by the manufacturer can be replaced.

SYMBOLS USED

	WARNING	Failure to observe the warning may result in irreparable damage (electrical or meccanichal source respectively) to the unit or damage to the environment
	DANGER!	Failure to observe the warning may result in serious injuries or death (electrical or meccanichal source respectively).

NOTE This symbol distinguishes warnings of an annotative, reminder, general nature

BURNER SAFETY

The burners- and the configurations described below - comply with the regulations in force regarding health, safety and the environment. For more in-depth information, refer to the declarations of conformity that are an integral part of this Manual.

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DANGER! Incorrect motor rotation can seriously damage property and injure people.

.Do not touch any mechanical moving parts with your hands or any other part of your body. Injury hazard

Do not touch any parts containing fuel (i.e. tank and pipes). Scalding hazard

Do not use the burner in situations other than the ones provided for in the data plate.

Do not use fuels other than the ones stated.

Do not use the burner in potentially explosive environments.

Do not remove or by-pass any machine safety devices.

Do not remove any protection devices or open the burner or any other component while the burner is running.

Do not disconnect any part of the burner or its components while the burner is running.

Untrained staff must not modify any linkages.

- After any maintenance, it is important to restore the protection devices before restarting the machine.
- All safety devices must be kept in perfect working order.
- Personnel authorized to maintain the machine must always be provided with suitable protections.

ATTENTION: while running, the parts of the burner near the generator (coupling flange) are subject to overheating. Where necessary, avoid any contact risks by wearing suitable PPE.

DIRECTIVES AND STANDARDS

Gas - Light oil burners

European directives

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

Harmonized standards

UNI EN 676 (Automatic forced draught burners for gaseous fuels)
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);

Industrial burners

European directives

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

Harmonized standards

EN 746-2 (Industrial thermoprocessing equipment - Part 2: Safety requirements for combustion and fuel handling systems)
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);
UNI EN ISO 12100:2010 (Safety of machinery - General principles for design - Risk assessment and risk reduction);

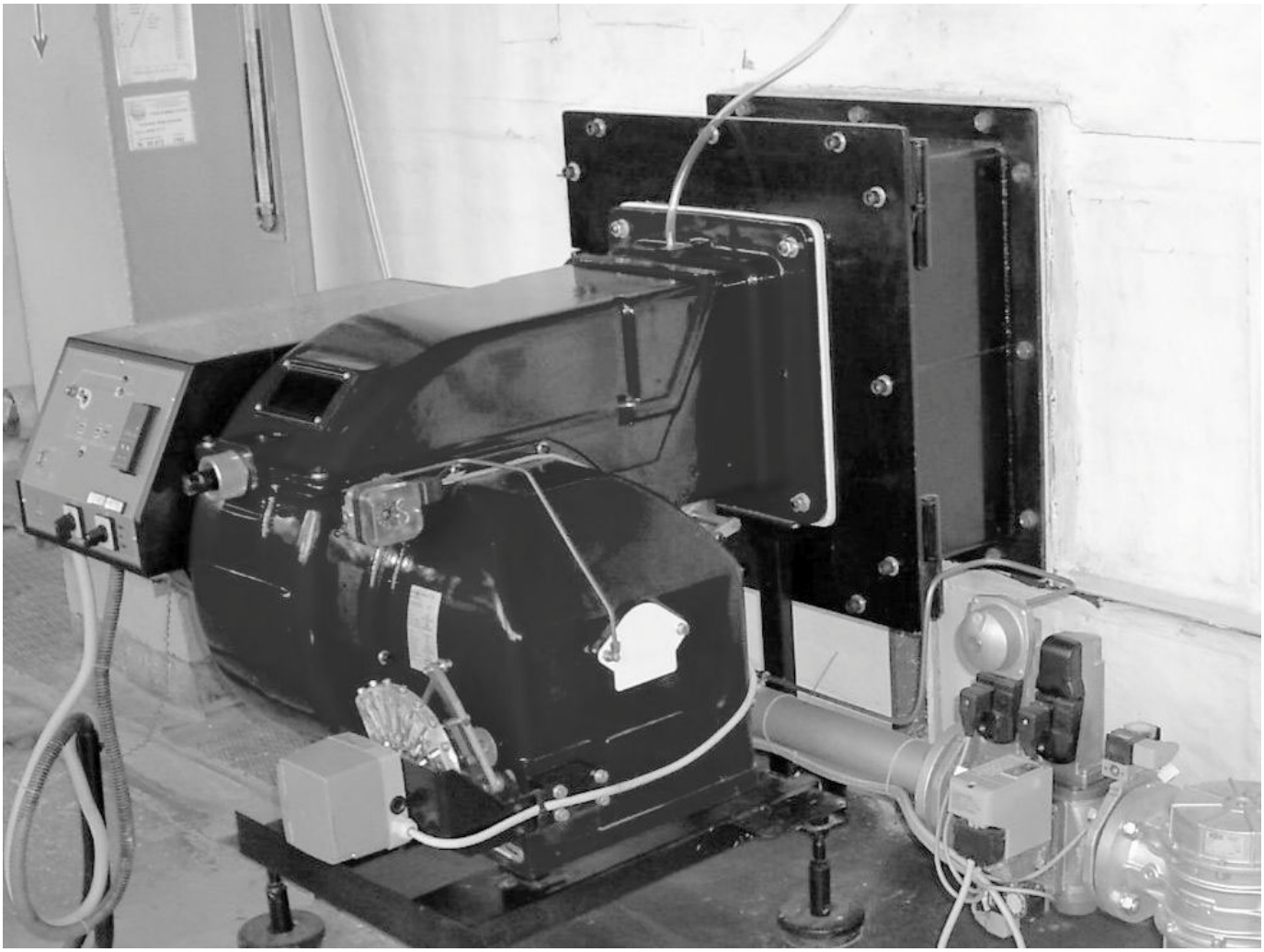
BURER DATA PLATE

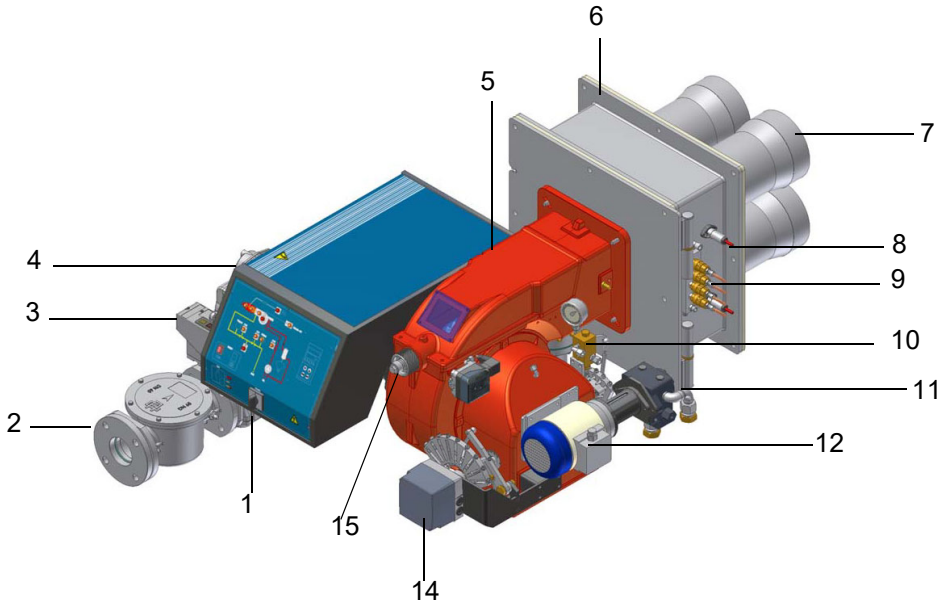
For the following information, please refer to the data plate:

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

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

These burners are designed to be installed into boilers provided with very big combustion chamber but the tube nest very close to the burner stokhole. The flame produced by this burner series is very short, but has the energy necessary to take up all the combustion chamber and then exchange this energy to the water, as to get very high efficiency. The construction and test of these burners are performed both in laboratories and directly on site, observing the peculiarities of these boilers: the need to operate in slight depression and to heat the boiler in low flame for a long time before exploiting the highest performance. The flame is divided into smaller flames performing the same output but distributing the energy uniformly without stressing the boiler structure. To complete this product range, the flame modulation is performed by a modulator with pressure probe connected to. These burners can be provided for all kinds of fuels and can be designed according to the customer requests. They are provided with all the safety requirements according to the Standards in force These burners can be installed in the newest microprocessor-controlled systems.





Note: the figure is indicative only

1 Control panel with startup switch
2 Gas filter
3 Gas proving system
4 Gas valve group
5 Cover
6 Flange
7 Blast tube-Combustion head group
8 Detection probe
9 Oil adjusting cam
10 Light oil pump
11 Pump motor
12 Actuator
13 Gas adjusting cam

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.

TypeTipo **HP60** Model **MG.** **PR.** **S.** **RU.** **VS.** **8.** **50** **EC** (1) (2) (3) (4) (5) (6) (7) (8) (9)	
(1)BURNER TYPE	**HP60 - HP72 - HP73**
(2)FUEL	MG - Natural gas
(3)OPERATION Available versions	PR - Progressive MD - Fully modulating
(4)BLAST TUBE	S - standard L - long
(5)DESTINATION COUNTRY	* - see data plate* Destination country
(6)BURNER VERSION	VS -
(7) EQUIPMENT	0 = 2 Gas valves 1 = 2 Gas valves + gas proving system 7 = 2 Gas valves+high gas pressure switch 8 = 2 Gas valves + gas proving system+high gas pressure switchl
(8) GAS CONNECTION (see Specifications)	50 = Rp2 65 = DN65 80 = DN80
(9) MICRO-PROCESSOR CONTROL	EC = micro-processor control, without inverter ED = micro-processor control, with inverter

Fuel

Type	--
Model	--
Year	--
S.Number	--
Output	--
Oil Flow	--
Fuel	--
Category	--
Gas Pressure	--
Viscosity	--
El.Supply	--
El.Consump.	--

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

The burner technical specifications, described in this manual, refer to natural gas (calorific net value Hi = 9.45 kWh/Stm^3, density ρ = 0.717 Kg/Stm^3). For different fuel such as LPG, town gas and biogas, multiply the values of flow and pressure by th corrective factors shown in the table below.

Fuel	**Hi** (KWh/Stm^3)	**ρ** (kg/Stm^3)	f_Q	f_p
LPG	26,79	2,151	0,353	0,4
Town gas	4,88	0,6023	1,936	3,3
Biogas	6,395	1,1472	1,478	3,5

For example, to obtain the flow and pressure values for the biogas:

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

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

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

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

Specifications

BURNER TYPE		HP60..VS.0(7).50	HP60..VS.1(8).50	HP60..VS.1(8).65
Output	min. - max. kW	332 - 1100		
Fuel				
Category		see next paragraphsee next paragraph: “		
Gas rate min.-max.	(Stm³/h)	35 - 116		
Gas pressure min.* - max.	mbar	(see Note 2)		
Light oil rate	kg/h	28 - 93		
Power supply		230V 3~ / 400V 3N ~ 50		
Total power consumption	kW	2.55		
Electric motor (2800 rpm)	kW	1.5		
Pump motor	kW	0.55		
Protection		IP40		
Approx. weight	kg	120	120	130
Operation		Progressive Fully modulatingProgressive Fully modulating		
Gas Train		50	50	65
Valves size		2” / Rp2	2” / Rp2	2”$_{1/2}$ / DN65
Operating temperature	°C	-10 / +50		
Storage Temperature	°C	-20 / +60		
Working service *		Intermittent		
noise level (sound power level)(**)	dBa, max	80		

BURNER TYPE		HP72..VS.1(8).50	HP72..VS.1(8).65	HP72..VS.1(8).80
Output	min. - max. kW	330 - 1650		
Fuel				
Category		see next paragraphsee next paragraph: “		
Gas rate min.-max.	(Stm³/h)	32 - 174.6		
Gas pressure min.* - max.	mbar	(see Note 2)		
	Light oil ratekg/h	25.3 - 139		
Power supply		230V 3~ / 400V 3N ~ 50Hz		
Total power consumption	kW	3.25		
Electric motor (2800 rpm)	kW	2.2		
Pump motor	kW	0.55		
Protection		IP40		
Approx. weight	kgkg	160	170	180
Operation		Progressive Fully modulatingProgressive Fully modulating		
Gas Train		50	65	80
Valves size		2” / Rp2	2”$_{1/2}$ / DN65	3” / DN80
Operating temperature	°C	-10 / +50		
Storage Temperature	°C	-20 / +60		
Working service *		Intermittent		
noise level (sound power level)(**)	dBa, max	80		

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

BURNER TYPE		HP73 MG..VS.x.50	HP73 MG..VS.x.65	HP73 MG..VS.x.80
Output	min. - max. kW	300 - 2150		
Fuel		Natural gas Light oil		
Category		(see next paragraph: “)		
Gas rate min.-max.	(Stm^3/h)	32 - 227.6		
Pressure min.*	mbar	(see Note 2)		
Light oil rate min. - max.	kg/h	25.3 - 181		
Power supply		230V 3~ / 400V 3N ~ 50Hz		
Total power consumption	kW	4.05		
Electric motor	kW	3		
Pump motor	kW	0.55		
Index of Protection		IP40		
Approx. weight	kg	160	170	180
Operation		Progressive Fully modulating		
Gas train		50	65	80
Valves size/Gas connection		2” / Rp2	$2”_{1/2}$ / DN65	3” / DN80
Operating temperature	°C	-10 / +50		
temperature	°C	-20 / +60		
Duty		Internittent		
noise level (sound power level)(**)	dBa, max	80		

Note1:	**All gas flow rates are referred to Stm^3 / h (1.013 mbar absolute pressure, 15° C temperature) and are valid for G20 gas (net calorific value H_i = 34,02 MJ / Stm^3 = 9,45 kWh / Stm^3);**
Note2:	**Maximum gas pressure= 360 mbar (with Dungs MBDLE)** **Maximum gas pressure= 500 mbar (with Siemens VGD or Dungs MultiBloc MBE)** **Minimum gas pressure= see gas curves.**
Warning:	**Burners are suitable only for indoor operation with a maximum relative humidity of 80%**

Note1:	**All gas flow rates are referred to Stm^3/h (1013 mbar absolute pressure, 15 °C temperature) and are valid for G20 gas (net calorific value H_i = 34.02 MJ/Stm^3).**
Note2:	**Maximum gas pressure = 360mbar (with Rp1” 1/2 . 2” Dungs MBDLE/MBC valves)** **= 500mbar (with DN65/80 and Siemens VGD gas valves).** **Minimum gas pressure = see gas curves.**

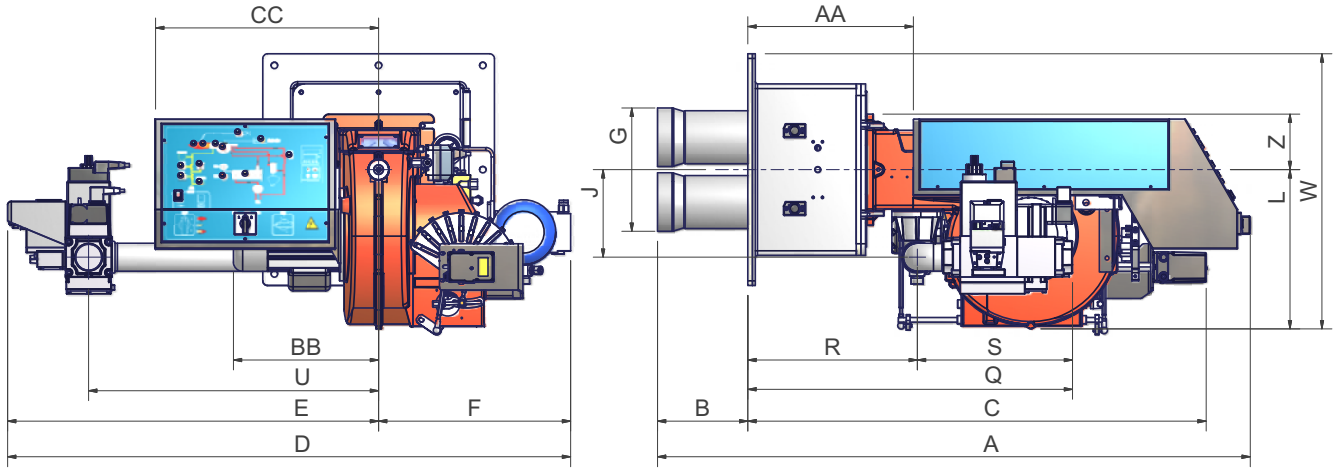
*** NOTE ON THE BURNER WORKING SERVICE:** for safety reasons, one controlled shutdown must be performed every 24 hours of continuous operation.

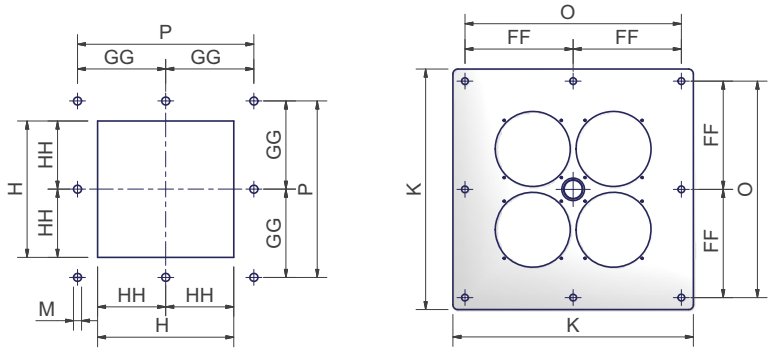
Country and usefulness gas categories

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

Overall dimensions (mm)

HP60..VS



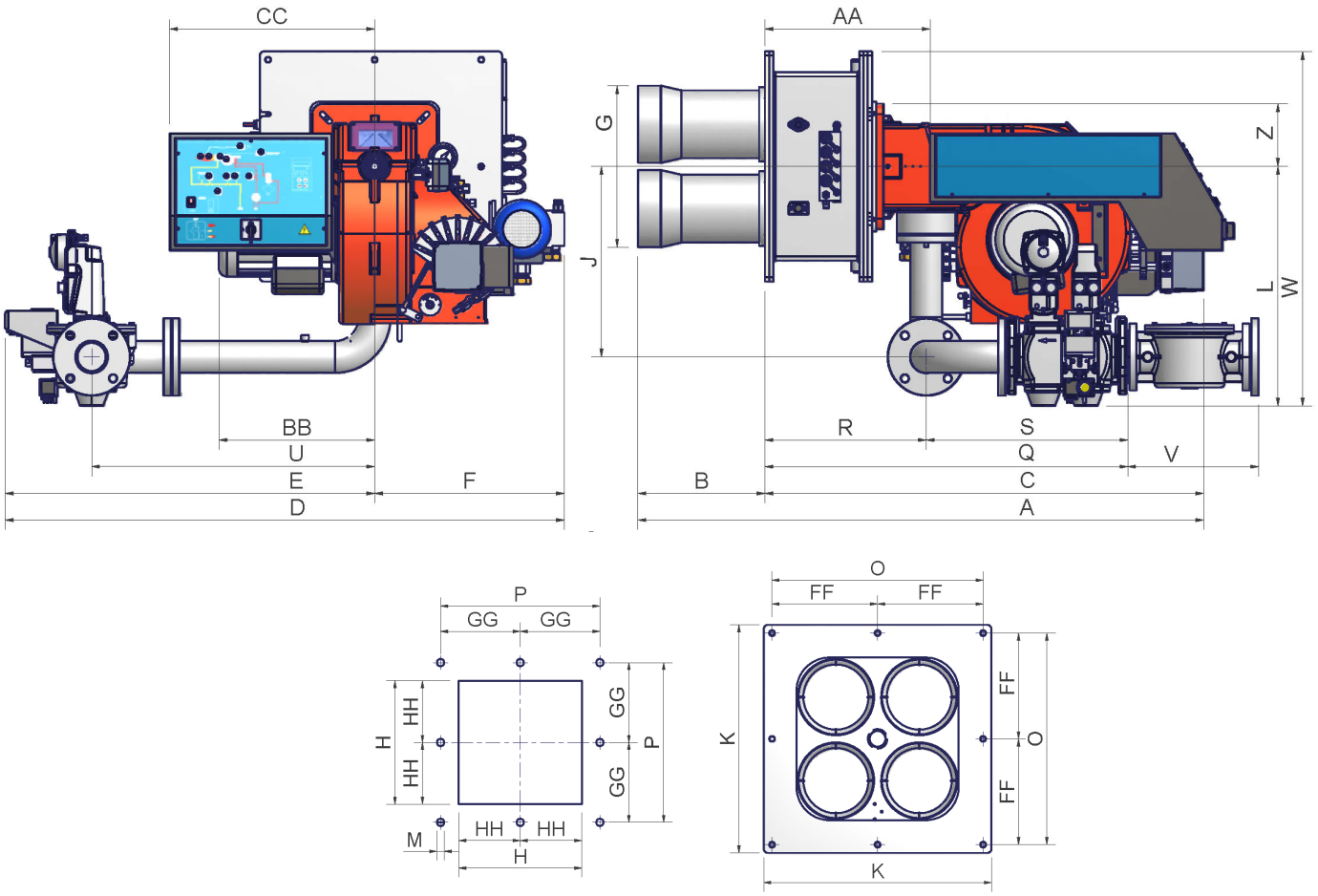


Recommended boiler drilling jig

	DN*	A	AA	B	BB	C	CC	D	E	F	FF	G	GG	H	HH	J	K	L	M	O	P	Q	R	S	U	V	W	Z
HP60 VS - 1(8).50	50	1280	357	195	314	989	482	1216	801	415	225	266	225	306	153	189	500	344	M12	450	450	701	366	335	626	-	594	120
HP60 VS - 1(8).65	65	1280	357	195	314	989	482	1261	846	415	225	266	225	306	153	250	500	376	M12	450	450	803	366	437	639	313	626	120

*DN = gas valves diameter

HP72..VS - HP73..VS

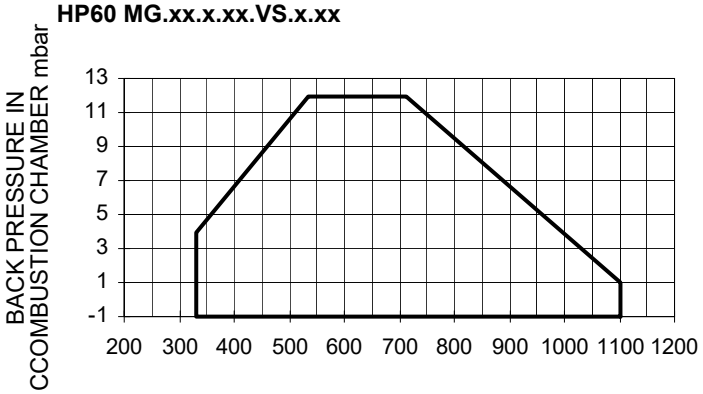


Recommended boiler drilling jig

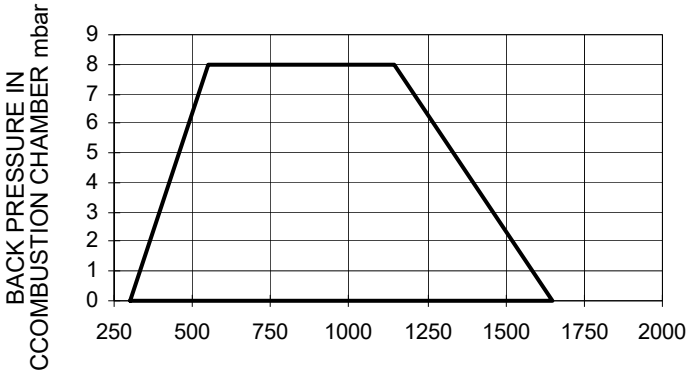
	DN	A	AA	B	BB	C	CC	D	E	F	FF	G	GG	H	HH	J	K	L	M	O	P	Q	R	S	U	V	W	Z
HP72 VS - 1.50	50	1387	393	281	373	1106	491	1148	694	454	225	312	225	364	182	455	500	573	M12	450	450	719	384	335	519	-	823	150
HP72 VS - 1.65	65	1387	393	281	373	1106	491	1338	884	454	225	312	225	364	182	455	500	573	M12	450	450	867	384	483	678	313	823	150
HP72 VS - 1.80	80	1387	393	281	373	1106	491	1373	919	454	225	312	225	364	182	455	500	587	M12	450	450	919	384	535	710	344	837	150
HP73 VS - 1.50	50	1412	395	304	373	1108	491	1338	694	454	255	386	255	442	221	455	550	573	M12	510	510	719	386	335	519	-	848	150
HP73 VS - 1.65	65	1412	395	304	373	1108	491	1338	884	454	255	386	255	442	221	455	550	573	M12	510	510	869	386	483	678	313	848	150
HP73 VS - 1.80	80	1412	395	304	373	1108	491	1373	919	454	255	386	255	442	221	455	550	587	M12	510	510	1001	386	615	678	344	862	150

*DN = gas valves diameter

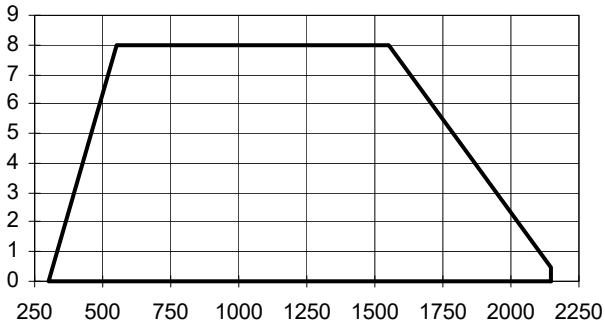
HP60 MG.xx.x.xx.VS.x.xx



HP72 MG.xx.x.xx.VS.x.xx



HP73 MG.xx.x.xx.VS.x.xx

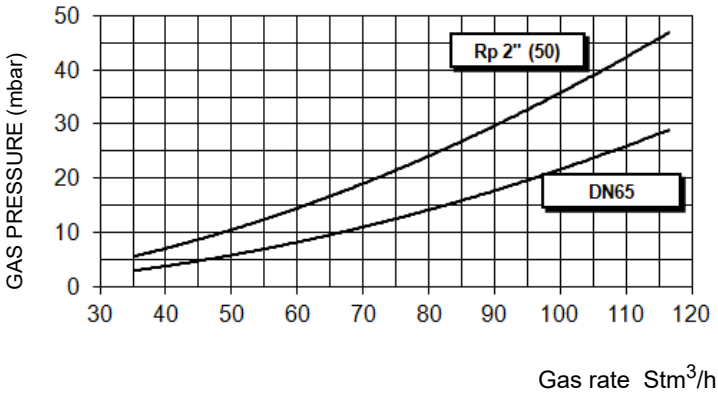


To get the input in kcal/h, multiply value in kW by 860.Data are referred to standard conditions: atmospheric pressure at 1013mbar, ambient temperature at 15°C.

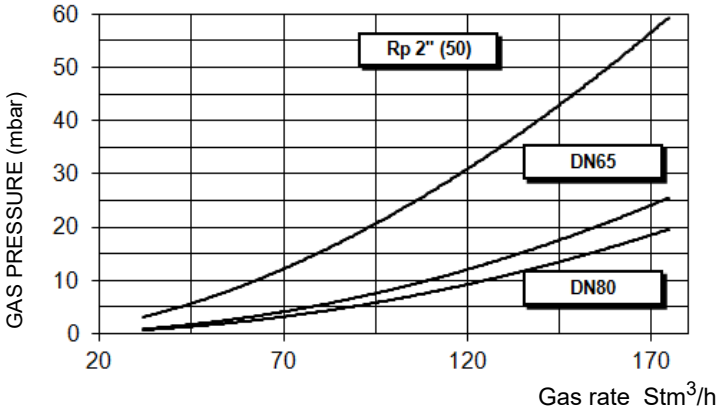
NOTE: The performance curve is a diagram that represents the burner performance in the type approval phase or in the laboratory tests, but does not represent the regulation range of the machine. On this diagram the maximum output point is usually reached by adjsuting the combustion head to its “MAX”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

Pressure in the network - gas rate curves

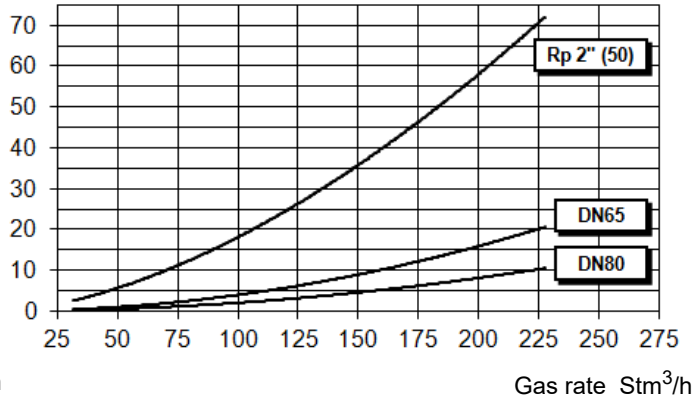
HP60 MG.xx...VS....



HP72 MG.xx...VS....



HP73 MG.xx...VS....



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

Transport and storage

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. The packages containing the burners must be locked inside the means of transport in such a way as to guarantee the absence of dangerous movements and avoid any possible damage.

In case of storage, the burners must be stored inside their packaging, in storerooms protected from the weather. Avoid humid or corrosive places and respect the temperatures indicated in the burner data table at the beginning of this manual.

Упаковка

Packing

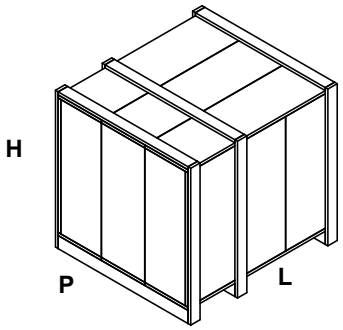
The burners are despatched wooden cages whose dimensions:

HP60..VS: 1370 x 1170 x 1010 (L x P x H)

HP72..VS - HP73..VS: 1515 x 1165 x 1130 (L x P x H)

Packing cases of this kind are affected by humidity and are not suitable for stacking. The following are placed in each packing case:

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

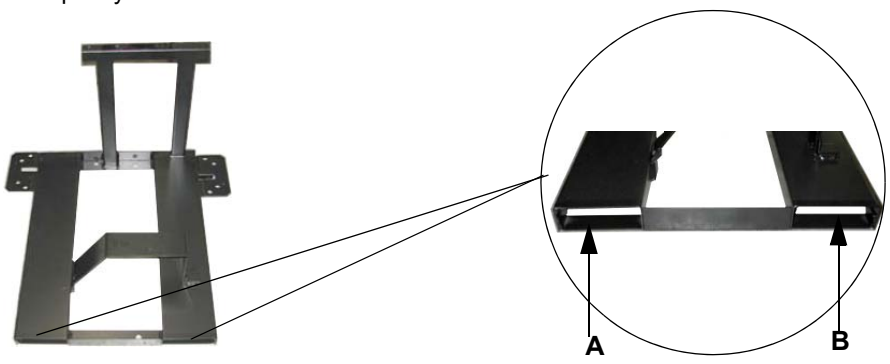


To get rid of the burner's packing, follow the procedures laid down by current laws on disposal of materials

Handling the burner

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

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



Fitting the burner to the boiler

To perform the installation, proceed as follows:

1 fix 4 holes on the boiler's door, according to the burner's drilling plate described on paragraph "Overall dimensions";

2 place the gasket on the burner's flange;

3 install the burner into the boiler;

4 fix the burner to the stud bolt, by means of the fixing nuts, according to Fig. 1.

5 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).

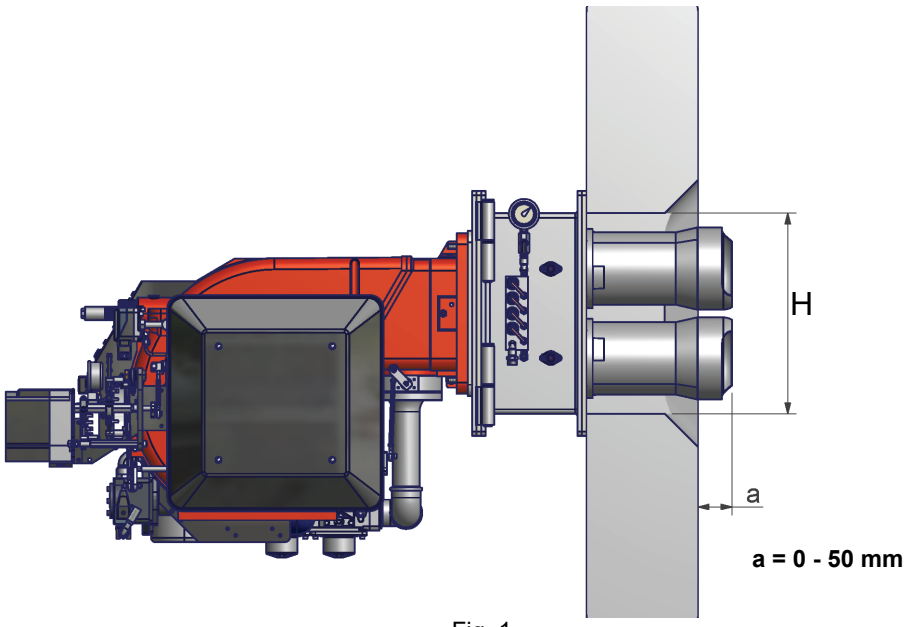


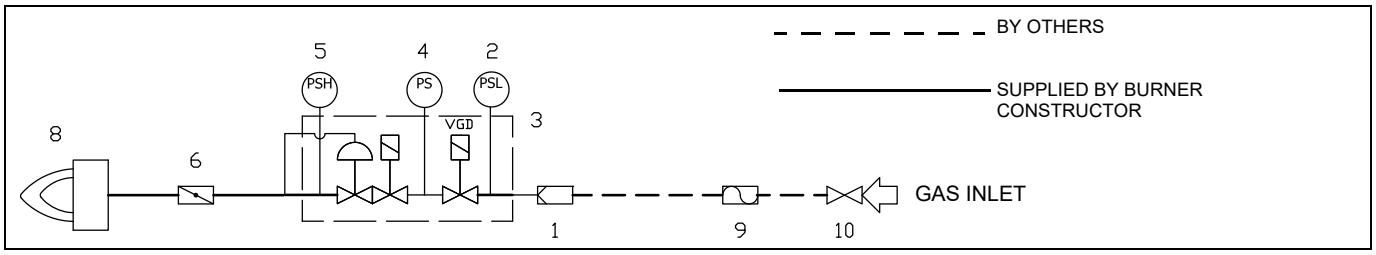
Fig. 1

GAS TRAIN CONNECTIONS

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

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

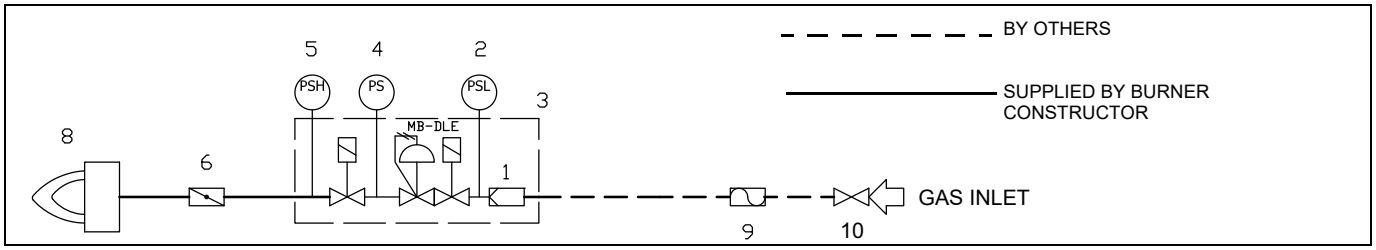
Gas train with valves group VGD with built-in gas pressure governor + gas leakage pressure switch (PGCP)



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(*optional)		

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



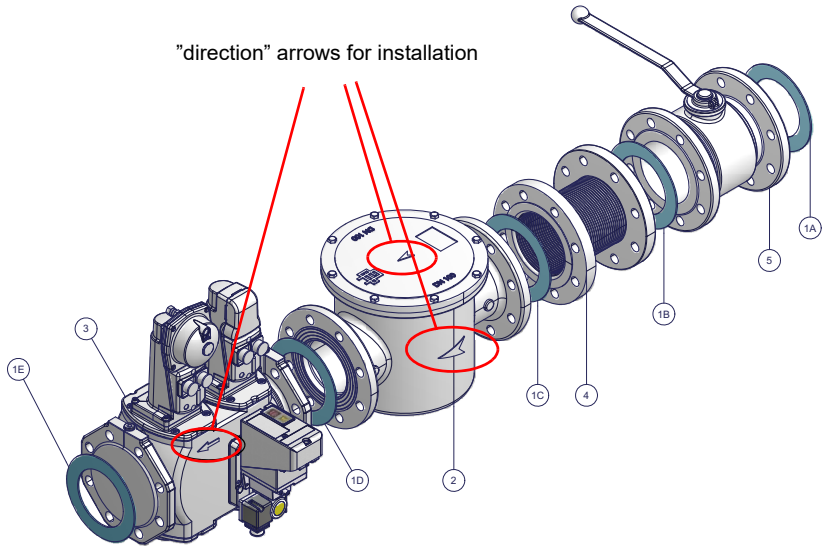
* Note: the maximum gas pressure switch can be mounted either upstream or downstream the gas valve but upstream the butterfly gas valve (see item no.4 in the scheme above).

Key

	MAIN GAS TRAIN
1	Filter (*optional)
2	Pressure switch - PGMIN
3	Safety valve with built in gas governor
4	Proving system pressure switch (if present) - PGCP
5	Pressure switch - PGMAX(*optional)
6	Butterfly valve
8	Main burner
9	Bellows unit(*optional)
10	Manual valve(*optional)

Assembling the gas grain

To assemble the gas train, proceed as follows:



Keys

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

Fig. 2 - Example of gas train

To mount the gas train, proceed as follows:

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

1-b) in case of flanged joints: place a gasket (no. 1A..1E - Fig. 2) between the elements

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

ATTENTION: once the gas train is mounted according to the diagram on Fig. 2, the gas proving test mus be performed, according to the procedure set by the laws in force.

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

- threaded gas trains with Multibloc Dungs MBC..SE 1200 or Siemens VGD20..
- flanged gas trains with Multibloc Dungs MBC..SE 1900-3100-5000 or Siemens VGD40..

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).

MULTIBLOC DUNGS MB-DLE 415..420

Mounting

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

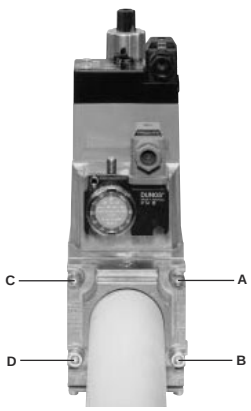


Fig. 3

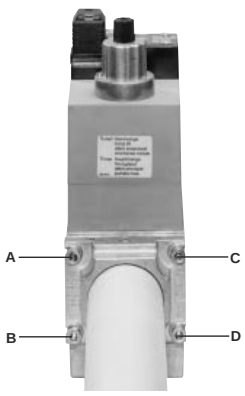


Fig. 4

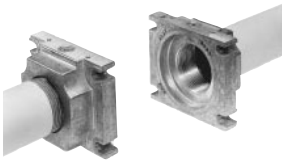


Fig. 5

MOUNTING POSITIONS

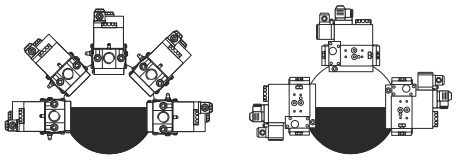


Fig. 6

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

Mounting

- When mounting the VGD.. double gas valve, two flanges are required (as for VGD20.. model, the flanges are threaded);
- to prevent cuttings from falling inside the valve, first fit the flanges to the piping and then clean the associated parts;
- install the valve;
- the direction of gas flow must be in accordance with the direction of the arrow on the valve body;
- ensure that the bolts on the flanges are properly tightened;
- ensure that the connections with all components are tight;
- make certain that the O-rings and gaskets between the flanges and the double gas valve are fitted.
- Connect the reference gas pipe (**TP** in figure; 8mm-external size pipe supplied loose), to the gas pressure nipples placed on the gas pipe, downstream the gas valves: gas pressure must be measured at a distance that must be at least 5 times the pipe size.

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

Caution: the SKP2 diaphragm D must be vertical (see Fig. 9).

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

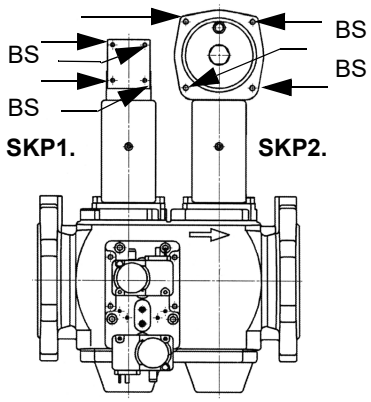


Fig. 7

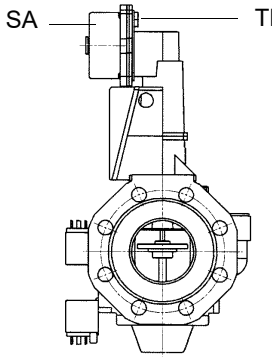


Fig. 8

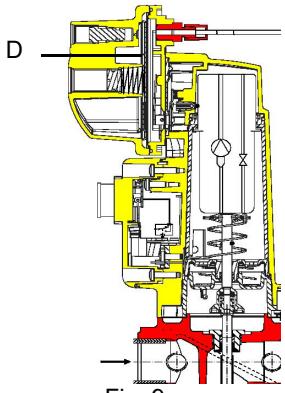


Fig. 9

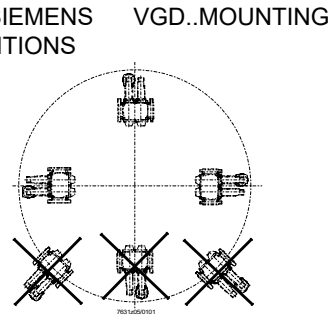


Fig. 10

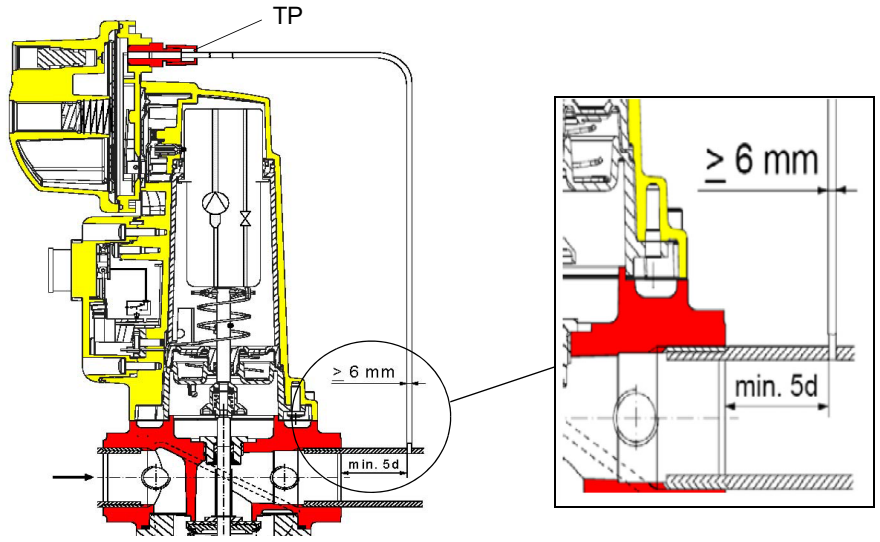
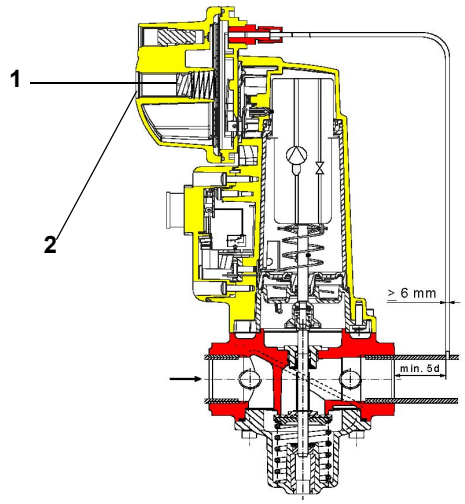


Fig. 11

Pressure adjusting range

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



Siemens SKP actuator

Keys

1 spring

2 cap

Siemens VGD valves with SKP actuator:

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

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

⚠	**ATTENTION:** once the gas train is mounted according to the diagram on Fig. 2, the gas proving test mus be performed, according to the procedure set by the laws in force.

Hydraulic diagrams for light oil supplying circuits

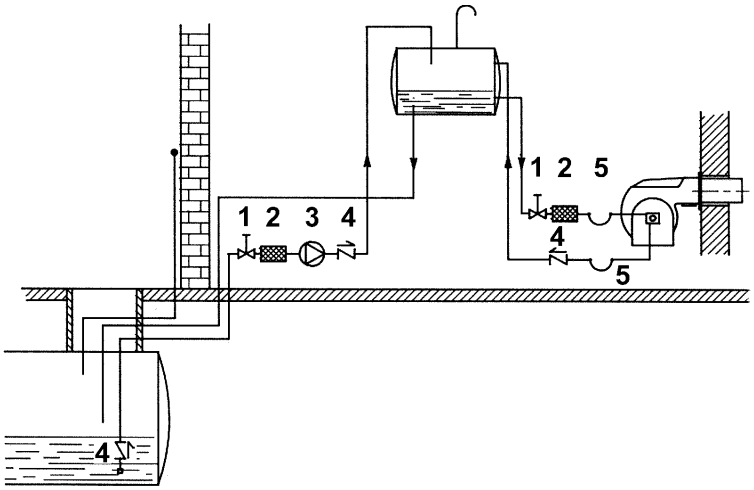


Fig. 12 - Gravity circuit

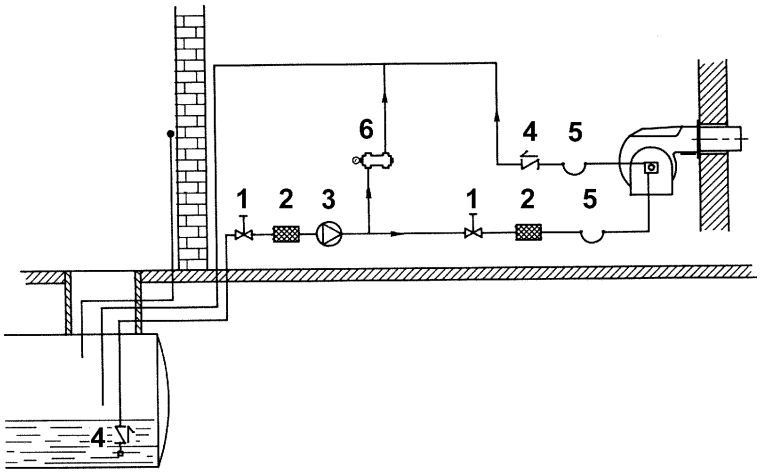


Fig. 13 - Ring circuit

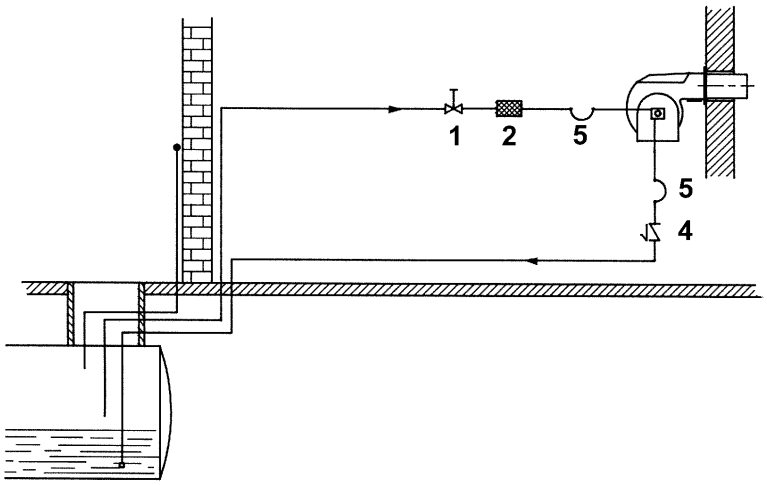


Fig. 14 - Suction circuit

Key

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

Light oil piping installation diagram*Installation diagram of light oil pipes*

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

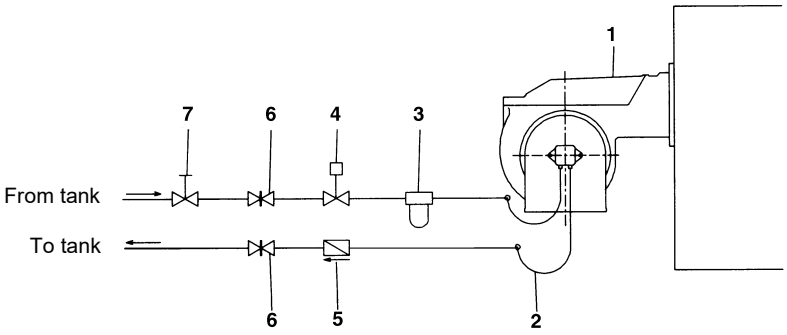


Fig. 15 - Double-pipe system

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

Key

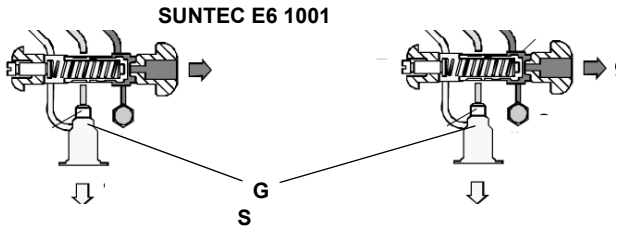
1 Burner
2 Flexible hoses (fitted)
3 Light oil filter (fitted)
4 Automatic interceptor (*)
5 One-way valve (*)
6 Gate valve
7 Quick-closing gate-valve (outside the tank or boiler rooms)

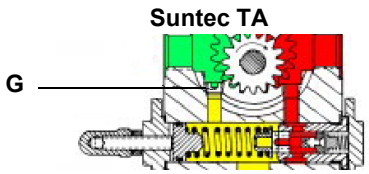
(*) Only for installations with gravity, siphon or forced circulation feed systems. If the device installed is a solenoid valve, a timer must be installed to delay the valve closing.
The direct connection of the device without a timer may cause pump breaks.

Burners come out from the factory provided for double-stage systems. They can be suited for single-pipe system (recommended in the case of gravity feed) as decribed before. The pumps that are used can be installed both into single-pipe and double-pipe systems.

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

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





About the use of fuel pumps

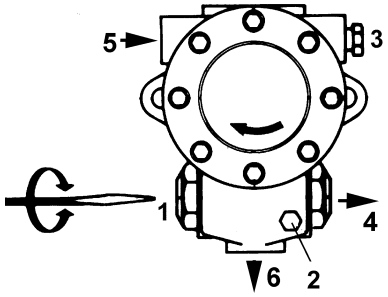
- Do not use fuel with additives to avoid the possible formation over time of compounds which may deposit between the gear teeth, thus obstructing them.
- After filling the tank, wait before starting the burner. This will give any suspended impurities time to deposit on the bottom of the tank, thus avoiding 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.*

The pumps provided with these burners can be:

- HP60 : Suntec E6
- HP72 : Suntec E7
- HP73: Suntec TA2

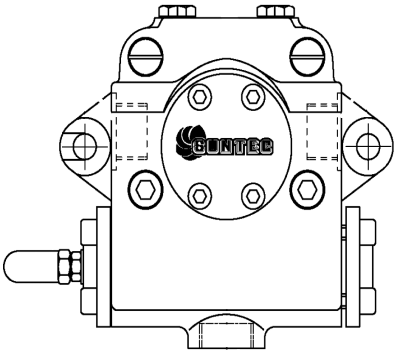
Suntec E6 - E7 1001	
Oil viscosity	3 - 75 cSt
Oil temperature	90°C max
Inlet maximum pressure	3,5 bar
Maximum return pressure	3,5 bar
Minimum inlet pressure	- 0,45 to avoid gasing
Rotation speed	3600 rpm max.



Key

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

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

Keys SUNTEC TA

Keys

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

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

pipeline length in meters.

Assembling the light oil flexible hoses

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

1 remove the closing nuts **A** and **R** on the inlet and return connections of the pump;

screw the rotating nut of the two flexible hoses on the pump **being careful to avoid exchanging the inlet and return lines**: see the arrows marked on the pump that show the inlet and the return (see prevoius paragraph).

Suntec E..	Suntec TA

ELECTRICAL WIRING

To execute the electrical connections, proceed as follows:

1 remove the cover from the electrical board, unscrewing the fixing screws;

2 execute the electrical connections to the supply terminal board as shown in the following diagrams,

3 check the direction of the fan motor (see next pargraph)

refit the panel cover.

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

To execute the electrical connections, proceed as follows:

1 remove the cover from the electrical board, unscrewing the fixing screws;

2 execute the electrical connections to the supply terminal board as shown in the attached wiring diagrams;

3 check the direction of the fan motor (see next paragraph);

4 refit the panel cover.

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

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

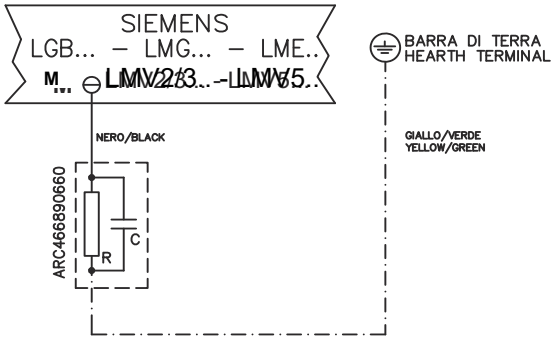
NOTE: the burners are supplied for three-phase 380 V or 400 V supply, and in the case of three-phase 220 V or 230 V supply it is necessary to modify the electrical connections into the terminal box of the electric motor and replace the overload tripped relay.

Note on elecrtical supply

If the power supply to the burner is 230V three-phase or 230V phase-phase (without a neutral), with the Siemens control box, between the terminal 2 (terminal X3-04-4 in case of LMV2x, LMV3x, LMV5x, LME7x) on the board and the earth terminal, an RC Siemens RC466890660 filter must be inserted.

Key

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



For LMV5 control box, please refer to the clabeling recommendations avaible on the Siemens CD attached to the burner

ADJUSTMENTS

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

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

Recommended combustion parameters		
Fuel	Recommended (%) CO_2	Recommended (%) O_2
Natural gas	9 ÷ 10	3 ÷ 4.8
Light oil	11.5 ÷ 13	2.9 ÷ 4.9

COMBUSTION HEAD PRESSURE CURVES DEPENDING ON THE GAS FLOW RATE*Combustion head gas pressure curves depending on the flow rate*

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

The curves referred to the gas pressure in the combustion head, depending on the gas flow rate, are referred to the burner properly adjusted (percentage of residual O_2 in the flues as shown in the "Recommended combustion values" table and CO in the standard limits). During this stage, the combustion head, the gas butterfly valve and the actuator are at the maximum opening. Refer to Fig. 16, 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.

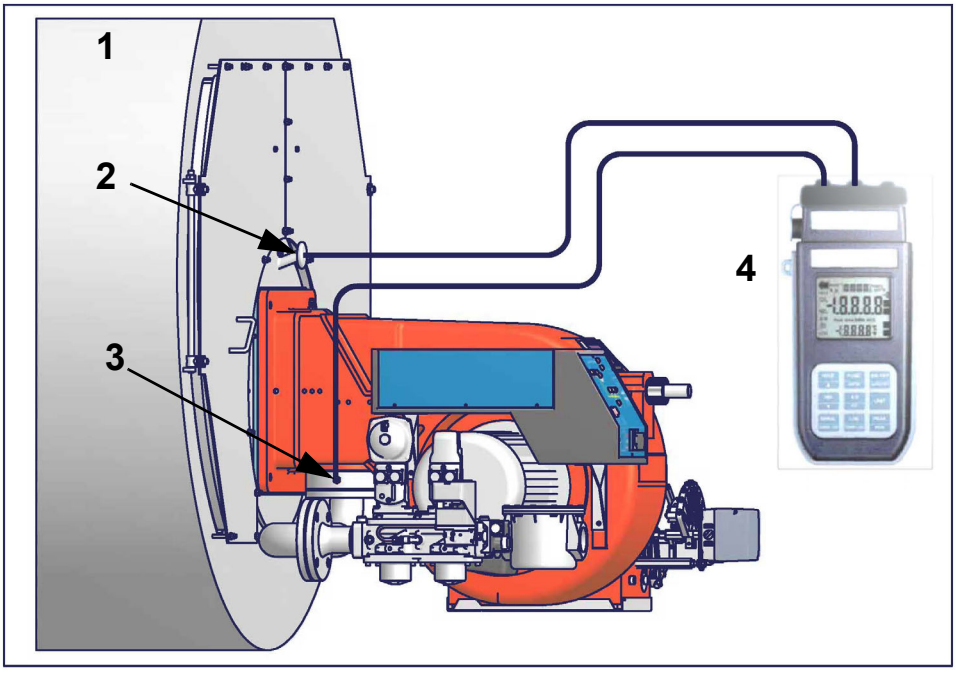


Fig. 16

Key

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

Measuring the gas pressure in the combustion head

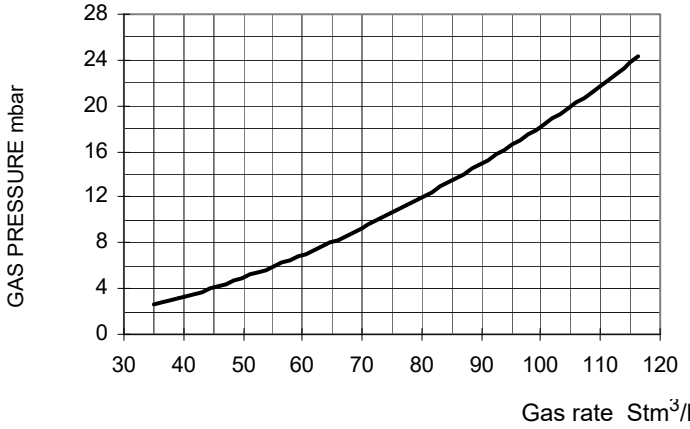
In order to measure the pressure in the combustion head, insert the pressure gauge probes: one into the combustion chamber's pressure outlet to get the pressure in the combustion chamber and the other one into the butterfly valve's pressure outlet of the burner. On the basis of the measured differential 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 Stm^3/h (quoted on the x axis) from the pressure measured in the combu-

stion head (quoted on the y axis). The data obtained must be considered when adjusting the gas flow rate.

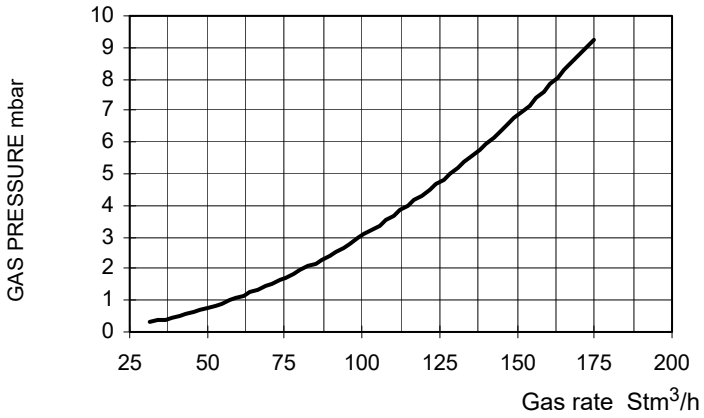
NOTE: THE PRESSURE-RATE CURVES ARE GIVEN AS INFORMATION ONLY; FOR A PROPER SETTING OF THE GAS RATE, PLEASE REFER TO THE GAS METER READING.

PRESSURE - RATE IN COMBUSTION HEAD CURVES

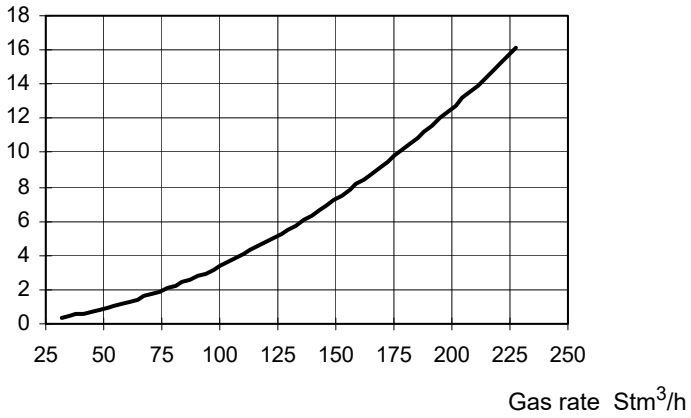
HP60 VS



HP72VS



HP73 VS



Gas Filter

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

ActuatorAdjustments - brief description

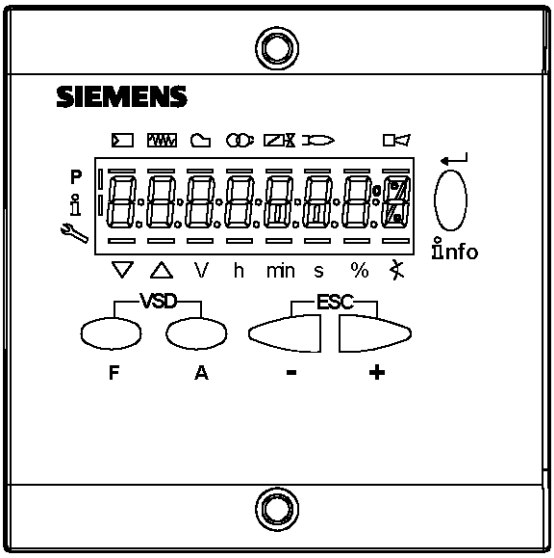
The air and fuel rates adjustments must be performed at the maximum ouptput first (“high flame”): see the LMV2.. related manual..

- Check that the combustion parameters are in the suggested limits.
- Then, adjust the combustion values by setting the “fuel/air” ratio” curvepoints (see the LMV2.. related manual).
- Set, now, the low flame output, 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.

User interface

The AZL2x.. display is shown below:

The keys functions are the following:



Key F

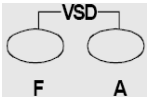
Used to adjust the “fuel” actuator position (**F**uel): :

While pressing the **F** key, the “fuel” actuator position can be changed by means of the **+** and **-** keys.

Key A

Used to adjust the “air” actuator position (**A**ir):

While pressing the **A** key, the “air” actuator position can be changed by means of the **+** and **-** keys.



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.

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 -

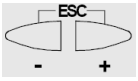
Used to decrease a a value

Used to enter Info and Serivce during the curve adjustments

+Key +

Used to increase a a value

Used to enter Info and Serivce during the curve adjustments

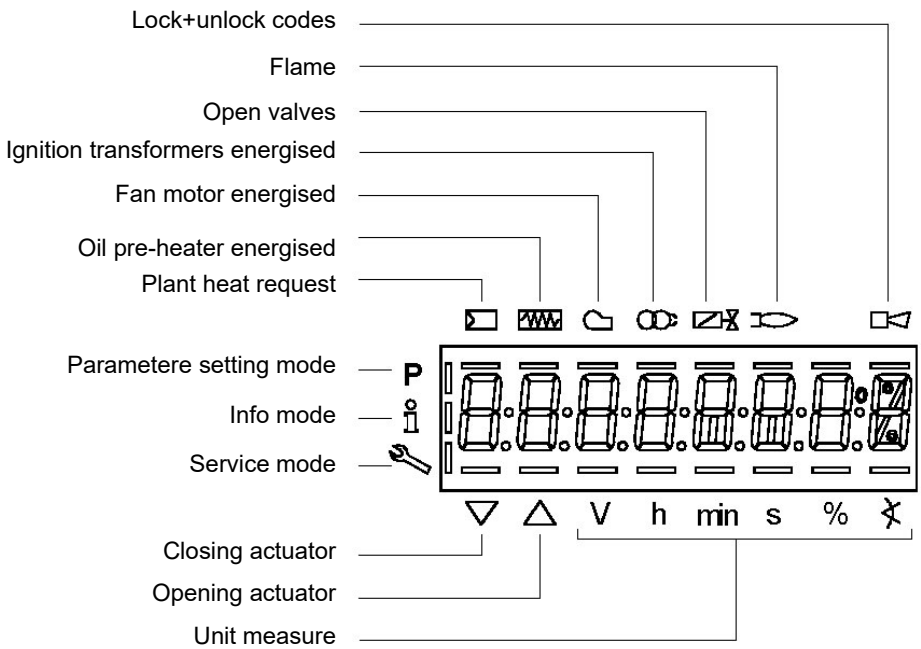


Keys (+ & -)= ESC

By pressing + and - at the same time, the ESCAPE function is perfomed:

to enter a lower level menu

The display will show these data:



The display will show these data:

Setting menu

The setting menu is divided into different blocks:

Bloc.	Descrizione	Description	Password
100	Informazioni generali	General	OEM / Service / Info
200	Controllo bruciatore	Burner control	OEM / Service
400	Curve rapporto	Ratio curves	OEM / Service
500	Controllo rapporto	Ratio control	OEM / Service
600	Servocomandi	Actuators	OEM / Service
700	Storico errori	Error history	OEM / Service / Info
900	Dati di processo	Process data	OEM / Service / Info

The accesses to the various blocks are allowed by passwords. Passwords are divided into three levels:

- User level (info): no password needed
- Service level (Service)
- Manifacturer level (OEM)

PHASES LIST

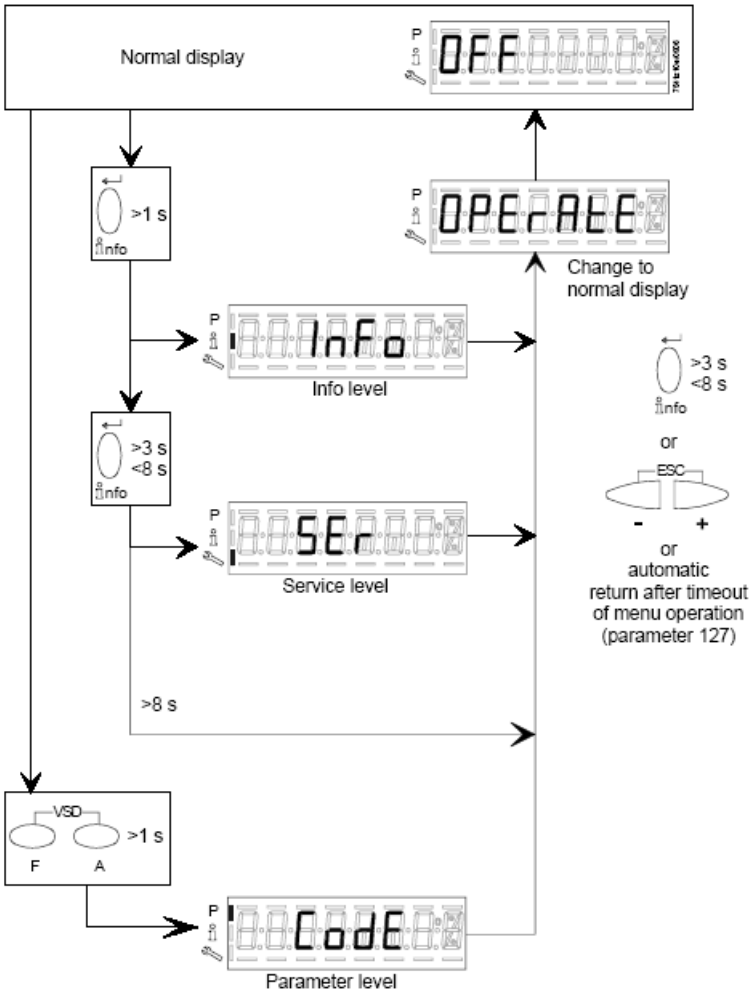
During operation, the following program phases are shown. The meaning for each phase is quoted in the table below

Fase /Phase	Funzione	Function
Ph00	Fase blocco	Lockout phase
Ph01	Fase di sicurezza	Safety phase
Ph10	t10 = tempo raggiungimento posizione riposo	t10 = home run
Ph12	Pausa	Standby (stationary)
Ph22	t22 = tempo di salita ventilatore (motore ventilatore = ON, valvola intercettazione di sicurezza = ON)	t22 = fan ramp up time (fan motor = ON, safety shutoff valve = ON)
Ph24	Verso posizione preventilazione	Traveling to the prepurge position
Ph30	t1 = tempo preventilazione	t1 = prepurge time
Ph36	Verso posizione accensione	Traveling to the ignition position
Ph38	t3 = tempo preaccensione	t3 = preignition time
Ph40	TSA1 = primo tempo sicurezza (trasformatore accen-sione ON)	TSA1= 1st safety time (ignition transformer ON)

Ph42	TSA1 = primo tempo sicurezza (trasformatore accensione OFF)	TSA1 = 1st safety time (ignition transformer OFF) t42 = preignition time OFF
Ph44	t44 = intervallo 1	t44 = interval 1
Ph50	TSA2 = secondo tempo sicurezza	TSA2 = 2nd safety time
Ph52	t52 = intervallo 2	t52 = interval 2
Ph60	Funzionamento 1 (stazionario)	Operation 1 (stationary)
Ph62	t62 = massimo tempo bassa fiamma (funzionamento 2, in preparazione per spegnimento, verso bassa fiamma)	t62 = max. time low-fire (operation 2, preparing for shutdown, traveling to low-fire)
Ph70	t13 = tempo postcombustione	t13 = afterburn time
Ph72	Verso posizione postcombustione	Traveling to the postpurge position
Ph74	t8 = tempo postventilazione	t8 = postpurge time
Ph80	t80 = tempo evacuazione controllo tenuta valvole	t80 = valve proving test evacuation time
Ph81	t81 = tempo perdita pressione atmosferica, prova atmosferica	t81 = leakage time test time atmospheric pressure, atmospheric test
Ph82	t82 = test perdita, test riempimento	t82 = leakage test filling test, filling
Ph83	t83 = tempo perdita pressione gas, test pressione	t83 = leakage test time gas pressure, pressure test
Ph90	Tempo attesa “mancanza gas”	Gas shortage waiting time

Entering the Parameter levels

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



The burner and consequently the LMV2x.. are factory set; the air and fuel curves as set as well.

Info level

To enter the **Info** level, proceed as follows:

1 in any menu position, press keys **+** and **-** at the same time, then the program will start again: the display will show **OFF**.

2 until the display will show **InFo**, Press the **enter (InFo)** key

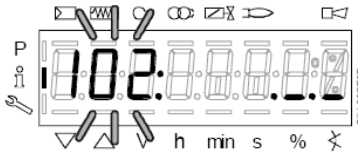
3 then il will show the first code (167) flashing, on the right side it will show the data entered. By pressing **+** or **-** it is possible to scroll (up or down) the parameter list.

4 If a dot-line is shown on the right, there is no enough room for complete visualisation: press **enter** again the data will be completely shown for 1 to 3 seconds. By pressing **enter** or **+** and**-** at the same time, the system will exit the parameter visualisation and go back to the flashing number.

The **Info** level shows some basic parameters as:

Parameter	***Description***
167	Cubic meters of fule (resettable)
162	Operating hours (resettable)
163	Device operating hours
164	Burners start-ups (resettable)
166	Total number of start-ups
113	Burner number (i.e. serial number)
107	Software version
102	Software date
103	Device serial number
104	Customer code
105	Version
143	Free

5 Example: choose parameter 102 to show the date



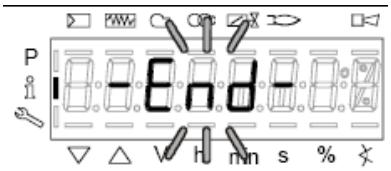
the display shows parameter **102** flashing on the left and characters **._._** on the right.

6 press InFo for 1-3 seconds: the date will appear

7 press InFo to go back to parameter “102”

8 by pressing + / -, it is possible to scroll up/down the parameter list (see table above), or, by pressing ESC or InFo for more seconds, the display will show

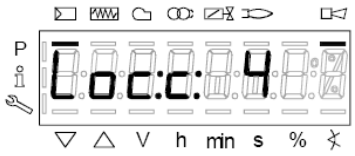
9 Once the last parameter is accessed (143) by pressing **+** , the **End** message will flash.



10 Press **InFo**

for more than three seconds or for more than three seconds orto return to the normal display.

If a message like the one below is shown during operation,



it means that the burner is locked out and the Errore code is shown (in the example “error code:4”); this message is alternating with another message

Diagnostic code (in the example “diagnostic code:3”). Record the codes and find out the fault in the Error table.
To perform the reset, press InFo for one second:

The unit displays an event which does not lead to shutdown.
The display shows current error code **c:** alternating with diagnostic code **d**:

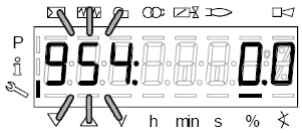
.
Press **InFo** to return to the display of phases.
Example: Error code **111** / diagnostic code 0

To reset, press InFo for a second. Record the codes and check the Error List to find the type of faults.

Service level
To enter the Service mode, press InFo until the display will show:

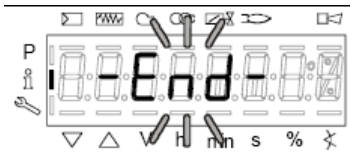
The service level shows all the information about flame intensity, actuators position, number and lock codes:

Parameter	*Description*
954	Flame intensity
121	% output, if set = automatic operation
922	Actuators position, 00=combustibile; 01= aria
161	Lock-outs number
701..725	Lock-outs History (see chapter 23 in the LMV2x manual)



1 .the first parameter will be “954”: the percentage of flame is shown on the right. By pressinf + or - it is possible to scroll up/down the parameter list.

2 Once the last parameter is accessed (143) by pressing **+** , the **End** message will blink.



3 Press **InFo**

for more than three seconds or for more than three seconds orto return to the normal display.

For further nformation, see tha LMV2 related manual.

Adjusting the gas valves group

Multibloc MB-DLE

The multibloc unit is a compact unit consisting of two valves, gas pressure switch, pressure stabilizer and gas filter.

The valve is adjusted by means of the **RP** regulator after slackening the locking screw **VB** by a number of turns. By unscrewing the regulator **RP** the valve opens, screwing the valve closes. To set the fast 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**!

The pressure stabilizer is adjusted by operating the screw **VS** located under the cover **C**. By screwing down the pressure is increased and by unscrewing it is reduced.

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

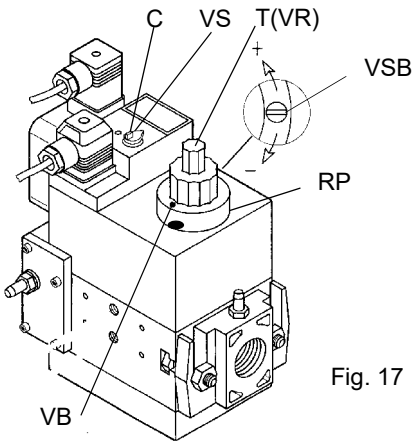


Fig. 17

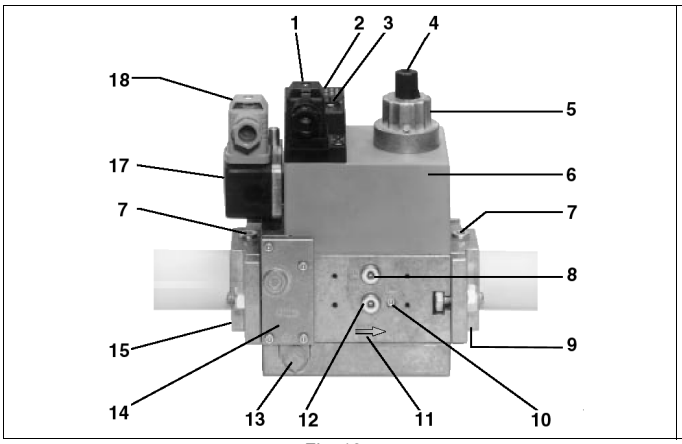


Fig. 18

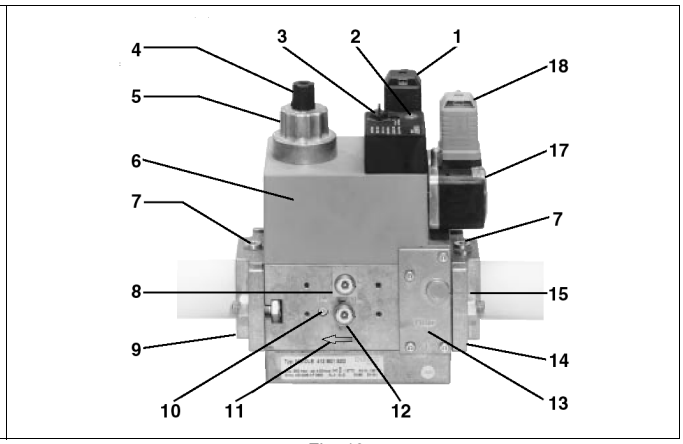


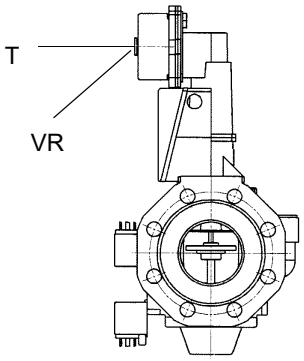
Fig. 19

Key

1 Electrical connection for valves
2 Operation display (optional)
3 Pressure governor closing tap
4 Start setting cap
5 Hydraulic brake and rate regulator
6 Coil
7 Test point connection G 1/8
8 Test point connection G 1/8 downstream of valve 1, on both sides
9 Output flange
10 Test point connection M4 downstream of valve 2
11 Gas flow direction
12 Test connection G 1/8 downstream of valve 1, on both sides
13 Vent nozzle pressure regulator
14 Filter (below cover)
15 Input flange
17 Pressure switch
18 Pressure switch electric connection

Gas valves Siemens VGD - Version with SKP2. (provided with pressure stabilizer).

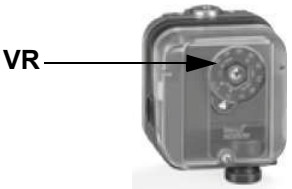
To increase or decrease gas pressure, and therefore gas flow rate, remove the cap **T** and use a screwdriver to adjust the regulating screw **VR**. Turn clockwise to increase the flow rate, counterclockwise to reduce it.



Calibration of air and gas pressure switches

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

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



Calibration of air pressure switch

To calibrate the air pressure switch, proceed as follows:

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

Calibration of low gas pressure switchCalibration of low gas pressure switch

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

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

Adjusting the maximum gas pressure switch (when provided)

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

1 remove the pressure switch plastic cover;

2 if the maximum pressure switch is mounted 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%.

3 if the maximum pressure switch is mounted downstream the “gas governor-gas valves” group and upstream the butterfly valve: light the burner, adjust it according to the procedure in the previous 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%;

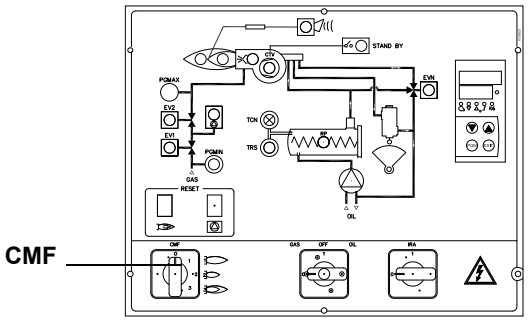
4 replace the plastic cover.

Fully modulating burners

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

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

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



CMF = 0 stop at the current position
CMF = 1 high flame operation
CMF = 2 low flame operation
CMF = 3 automatic operation
CMF = 4 automatic operation

Adjusting light oil flow rate

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 chart below and the diagram on Fig. 21 (as far as reading the pressure values, see next paragraphs).

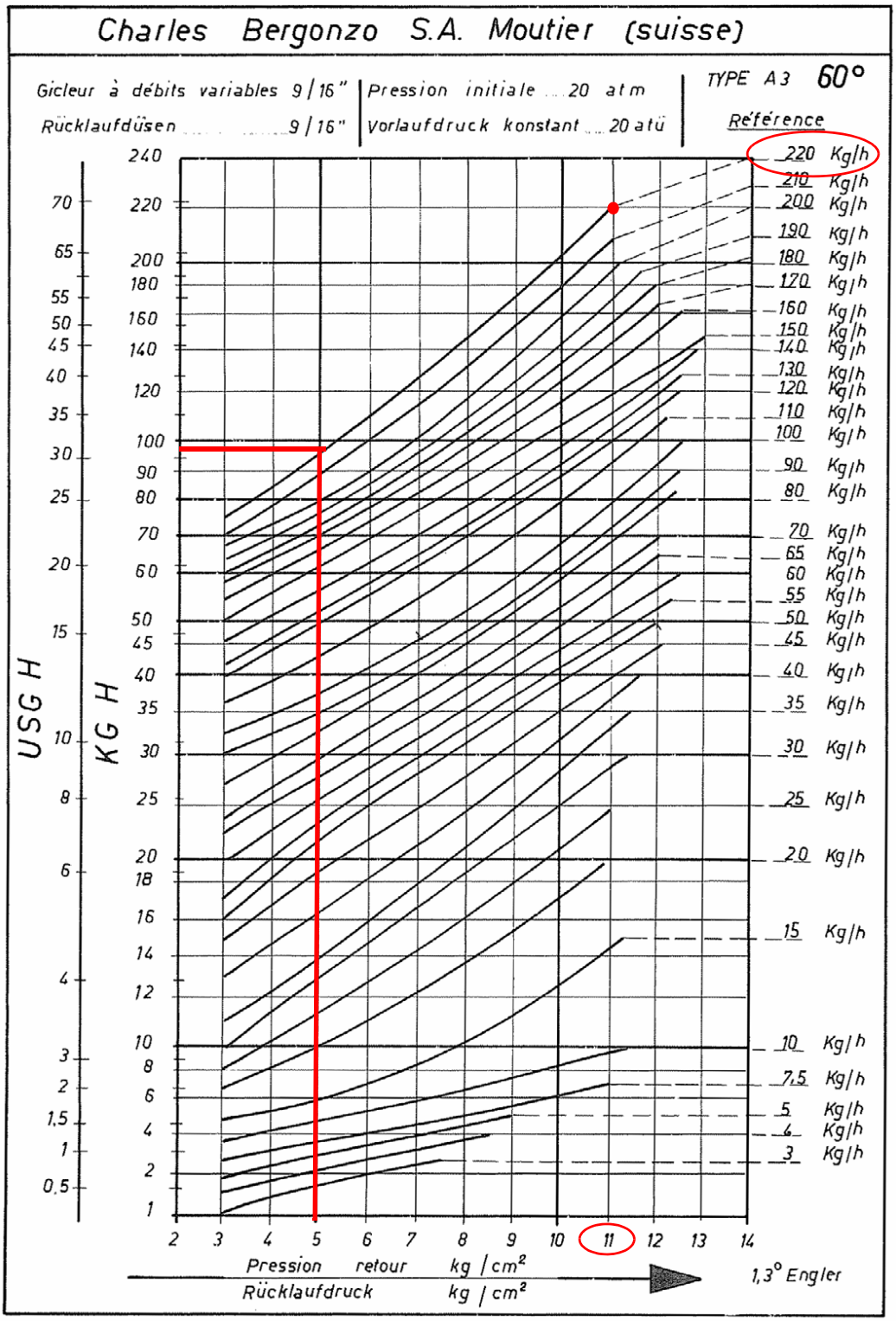
NOZZLE	DELIVERY PRESSURE bar	RETURN PRESSURE MAX. bar	RETURN PRESSURE MIN. bar
MONARCH BPS	20		
BERGONZO A	20	13-19	6 (recommended)

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

Таб. 1 - MonarchMonarch nozzle

N.B. Specific gravity of the light oil: 0.840kg/dm^3

Example: If the nozzle provided is mod. MONARCH 10.5 GPH, when the return pressure is 13.8 bar, the flow rate will be 35.5kg/h (see the chart above). If the return pressure is 13.80bar (with the same nozzle), the flow rate value will be 15.4kg/h. The flow rate in the High-flame operation is related to the nozzle provided with close return. The flow rate in the Low-flame operation can be adjusted by means of the adjusting cam, taking care no to go under 8bar. The flow rate depends on the pressure set on the return by means of the **SV2** adjusting cam (see page 32).



NOZZLE SUPPLY PRESSURE = 20 bar

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).

Example (Bergonzo): if a 220kg/h flow rate BERGONZO nozzle is provided, set the return pressure at 11bar, supply at 20bar on the delivery to get a 220kg/h flow rate. If the return pressure needed is 5bar, instead, act on the **V** adjusting screw on the pressure governor (see chapter on page 35). The flow rate will then be about 95kg/h (see the example showed on the Bergonzo diagram).

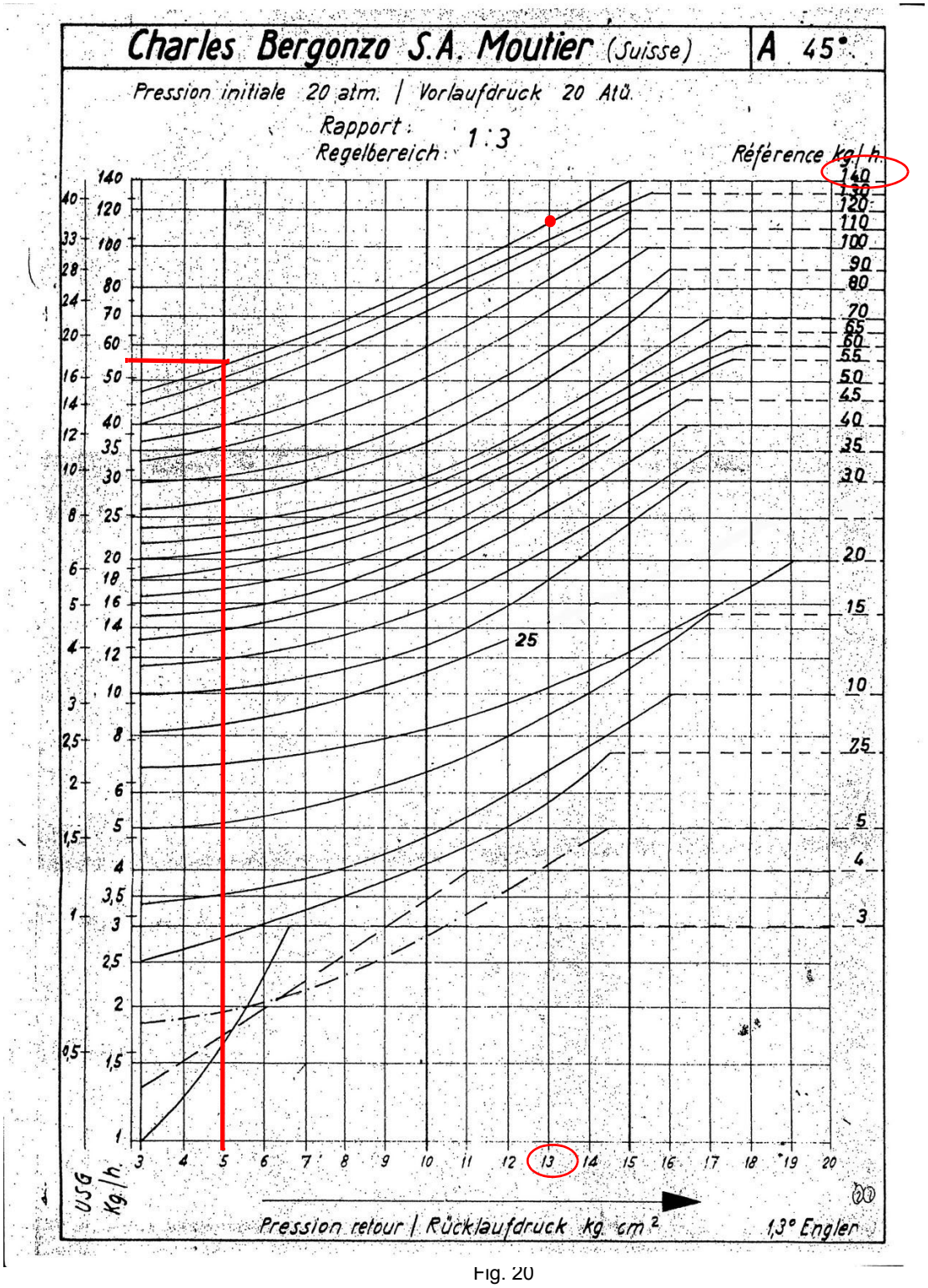


Fig. 20

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

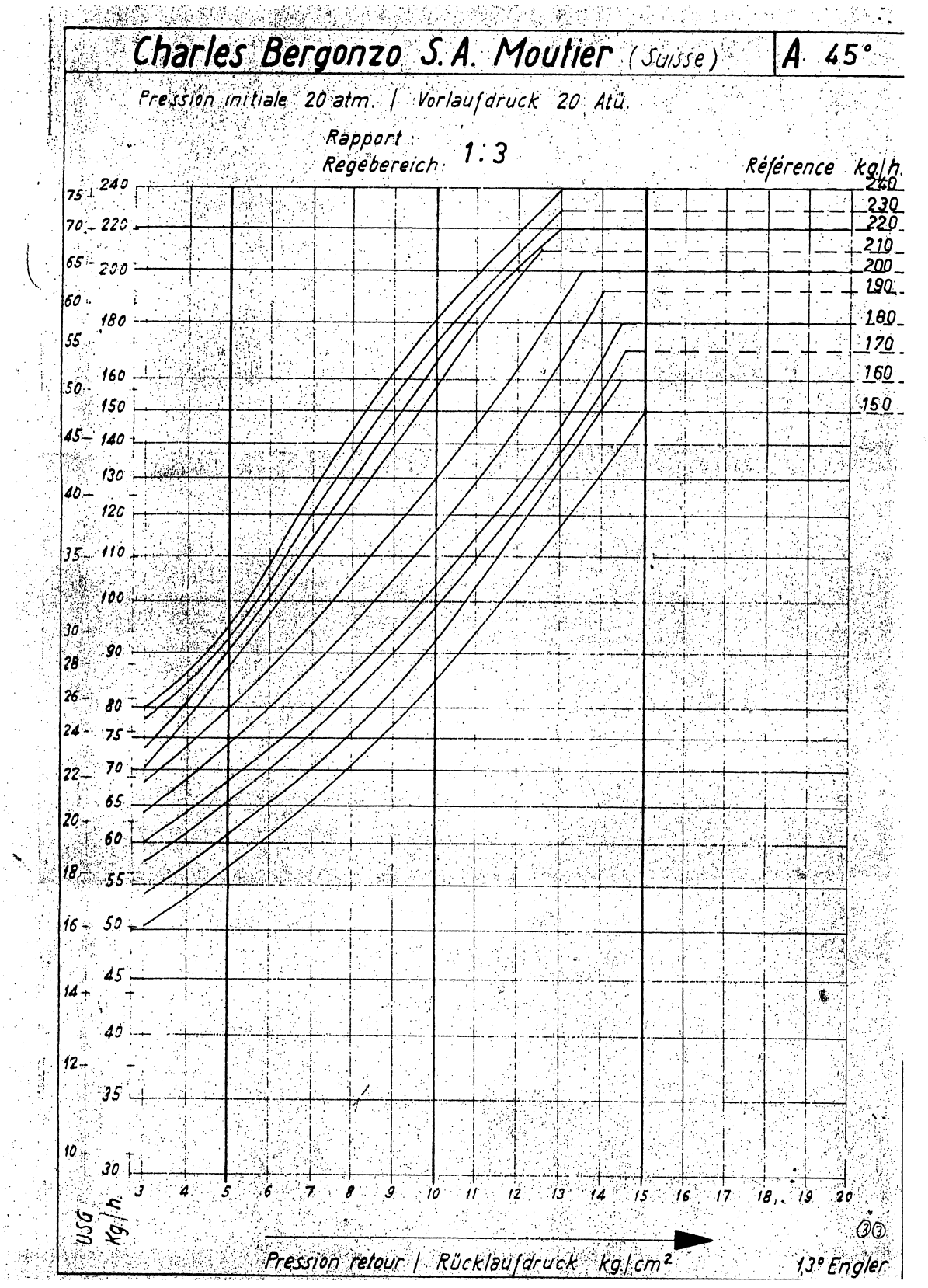
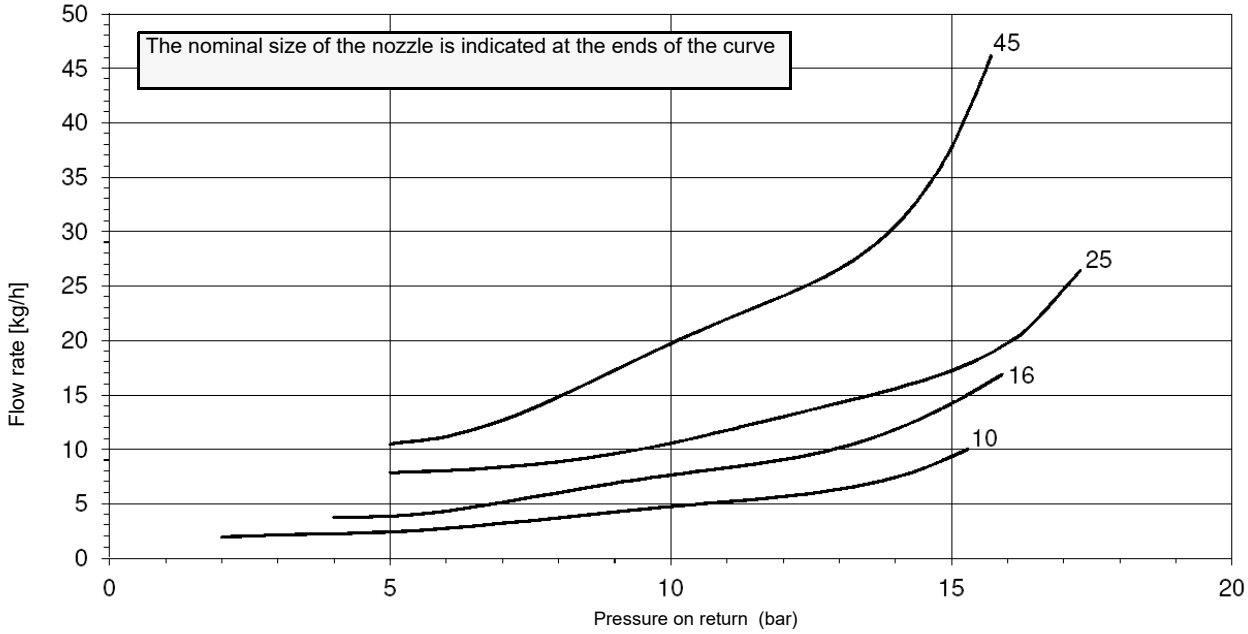
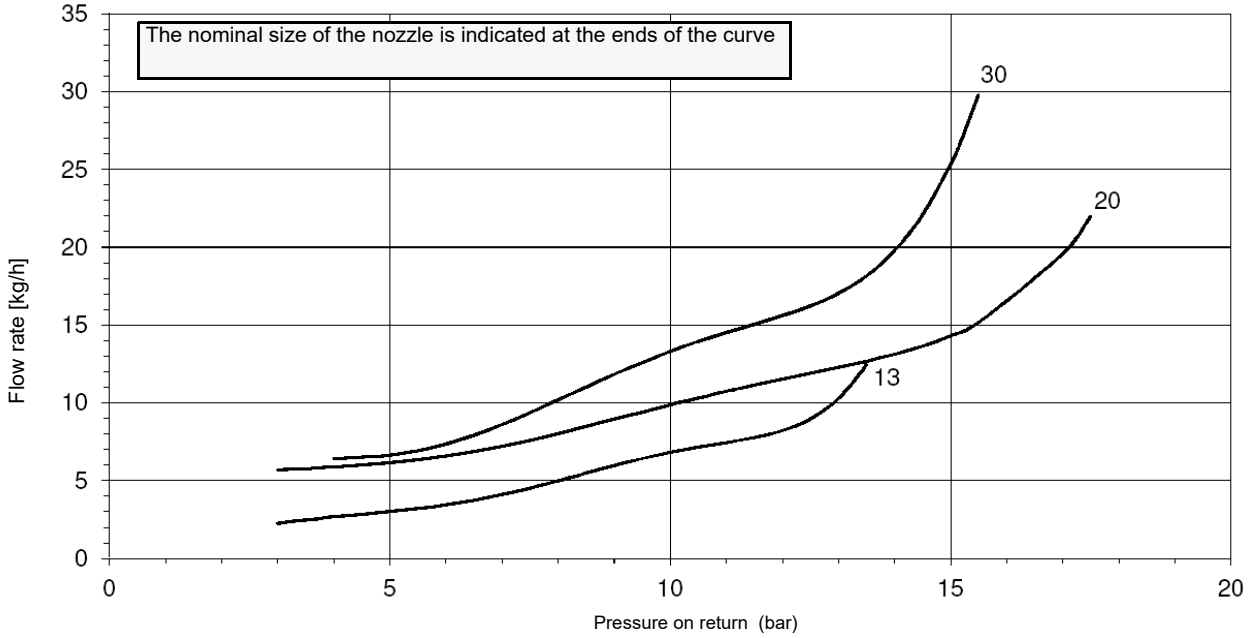

Charles Bergonzo S.A. Moutier (Suisse)
A 45°
Pression initiale 20 atm. | Vorlaufdruck 20 Atü.
Rapport :
Regebereich 1 : 3
Référence kg/h.
240
230
220
210
200
190
180
170
160
150
USG
Kg/h.
Pression retour | Rücklaufdruck kg/cm²
1,3° Engler

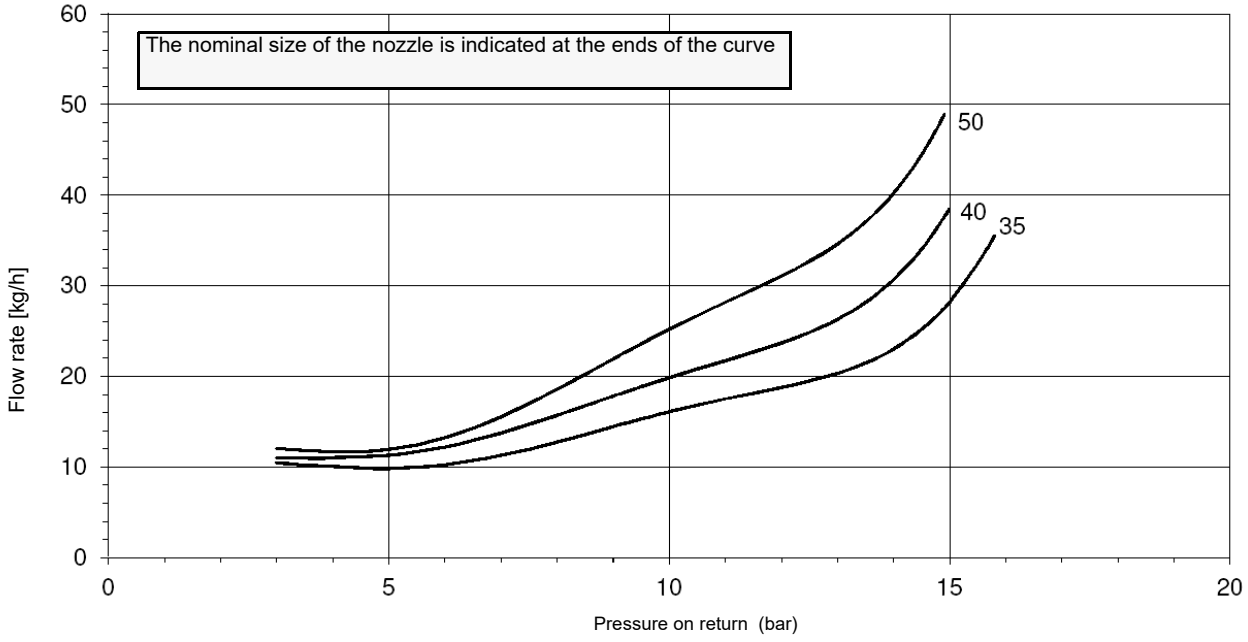
Fig. 21

FLUIDICS KW3...45°

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

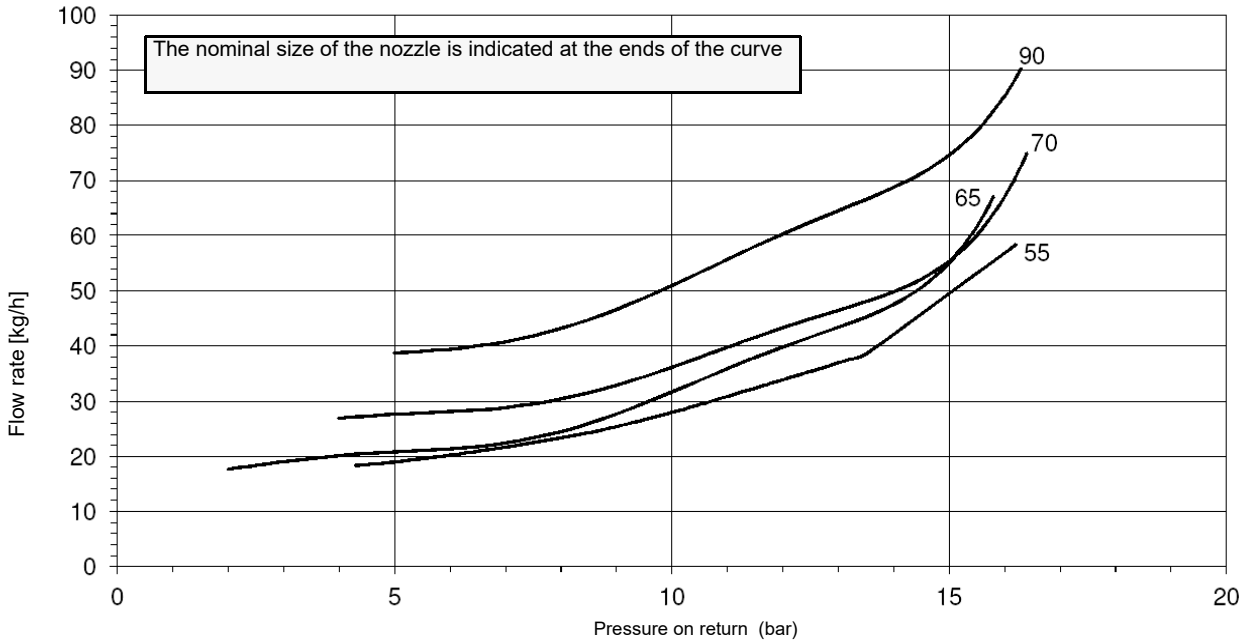


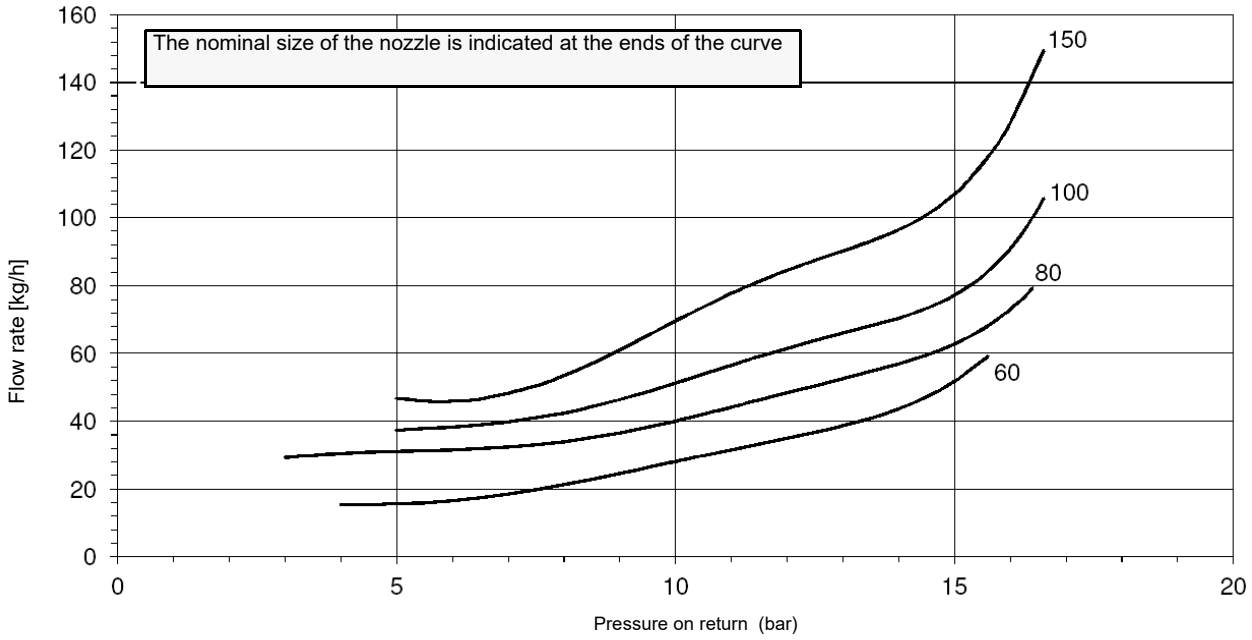


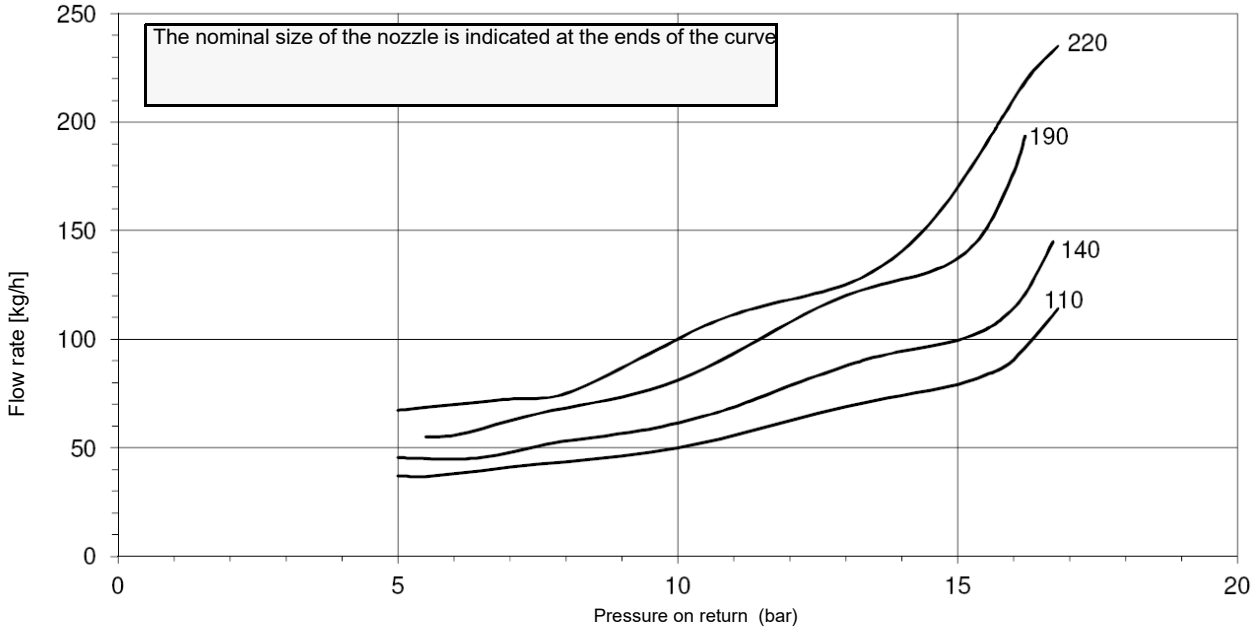


FLUIDICS KW3...45°

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

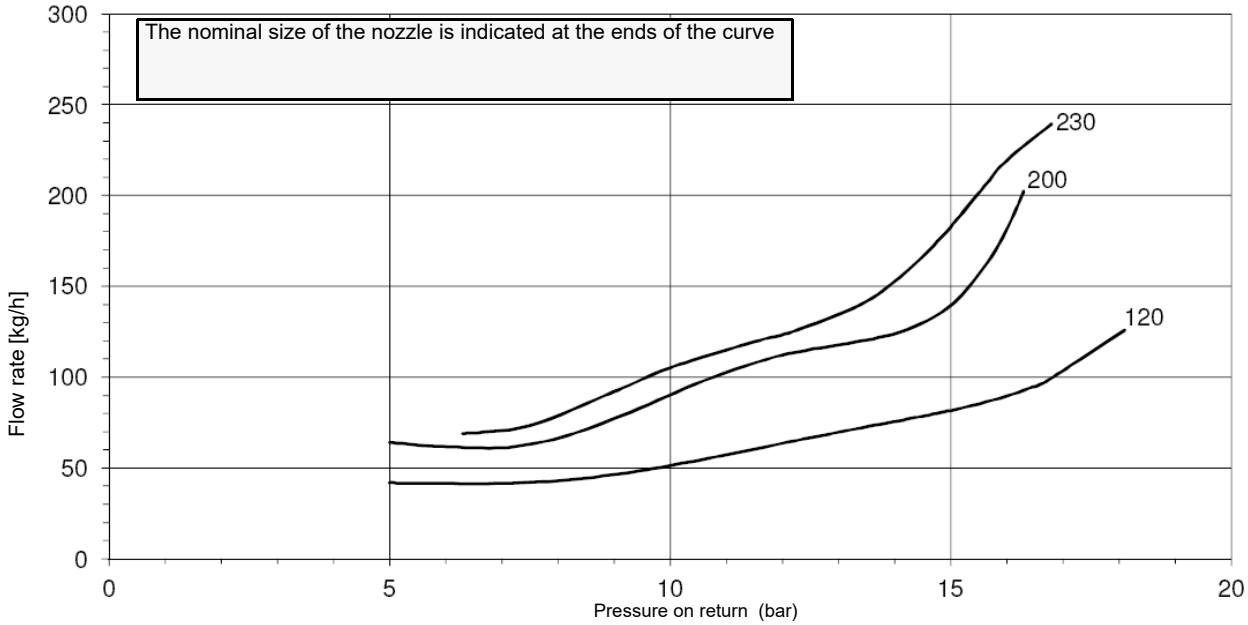


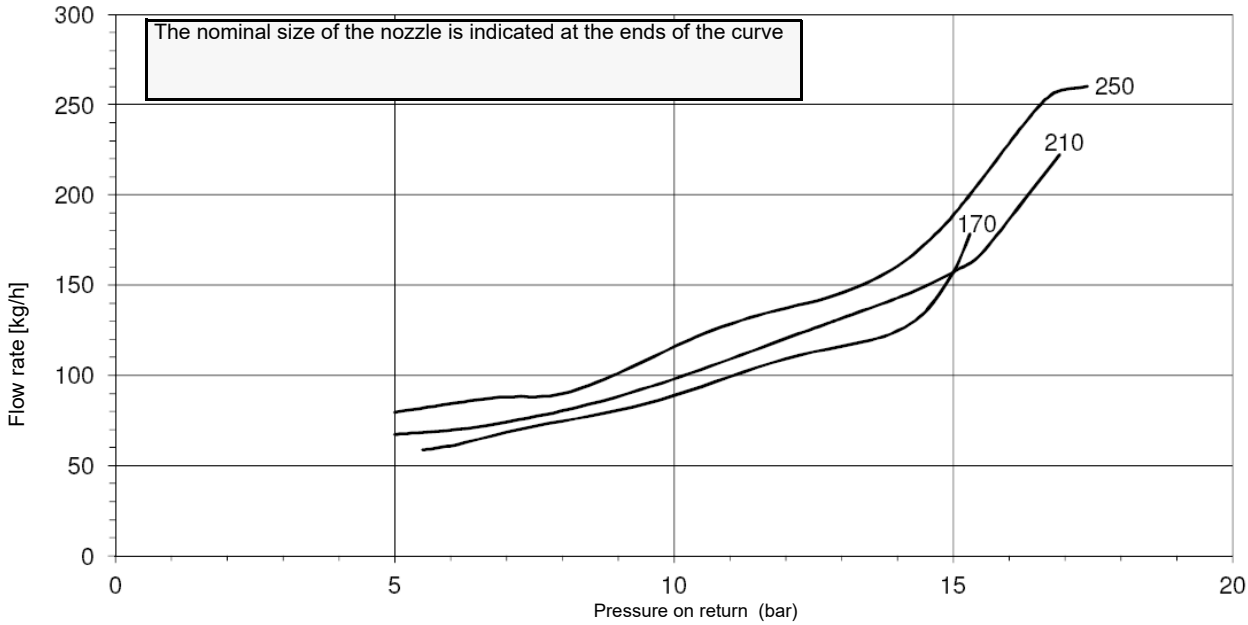


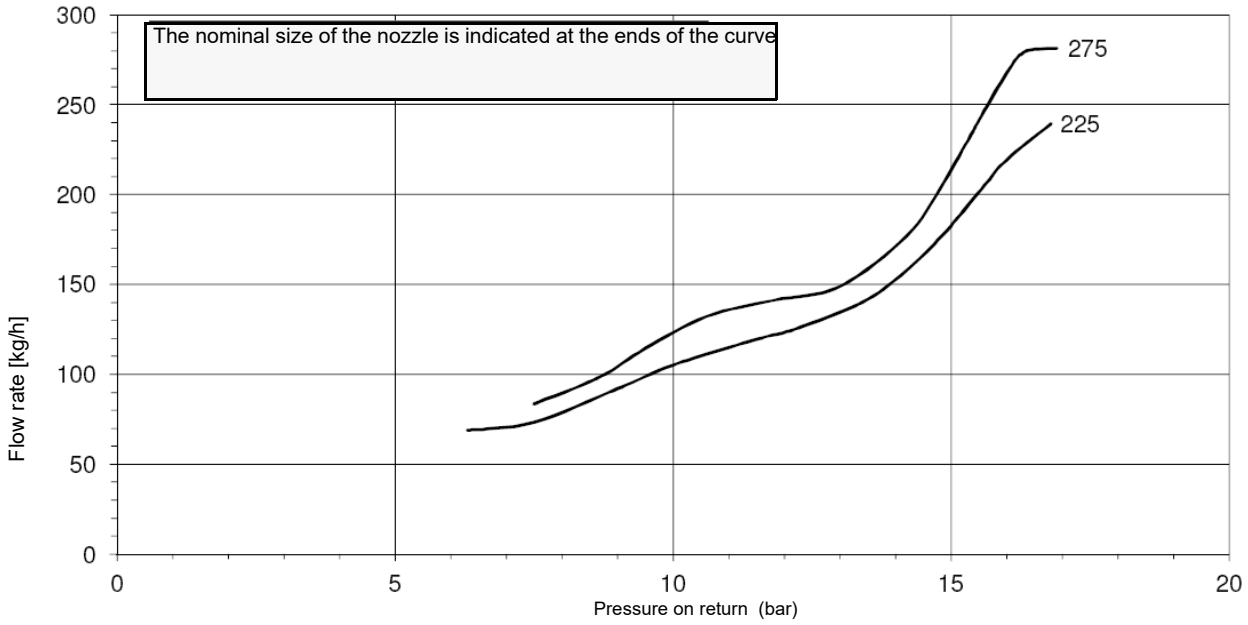


FLUIDICS KW3...45°

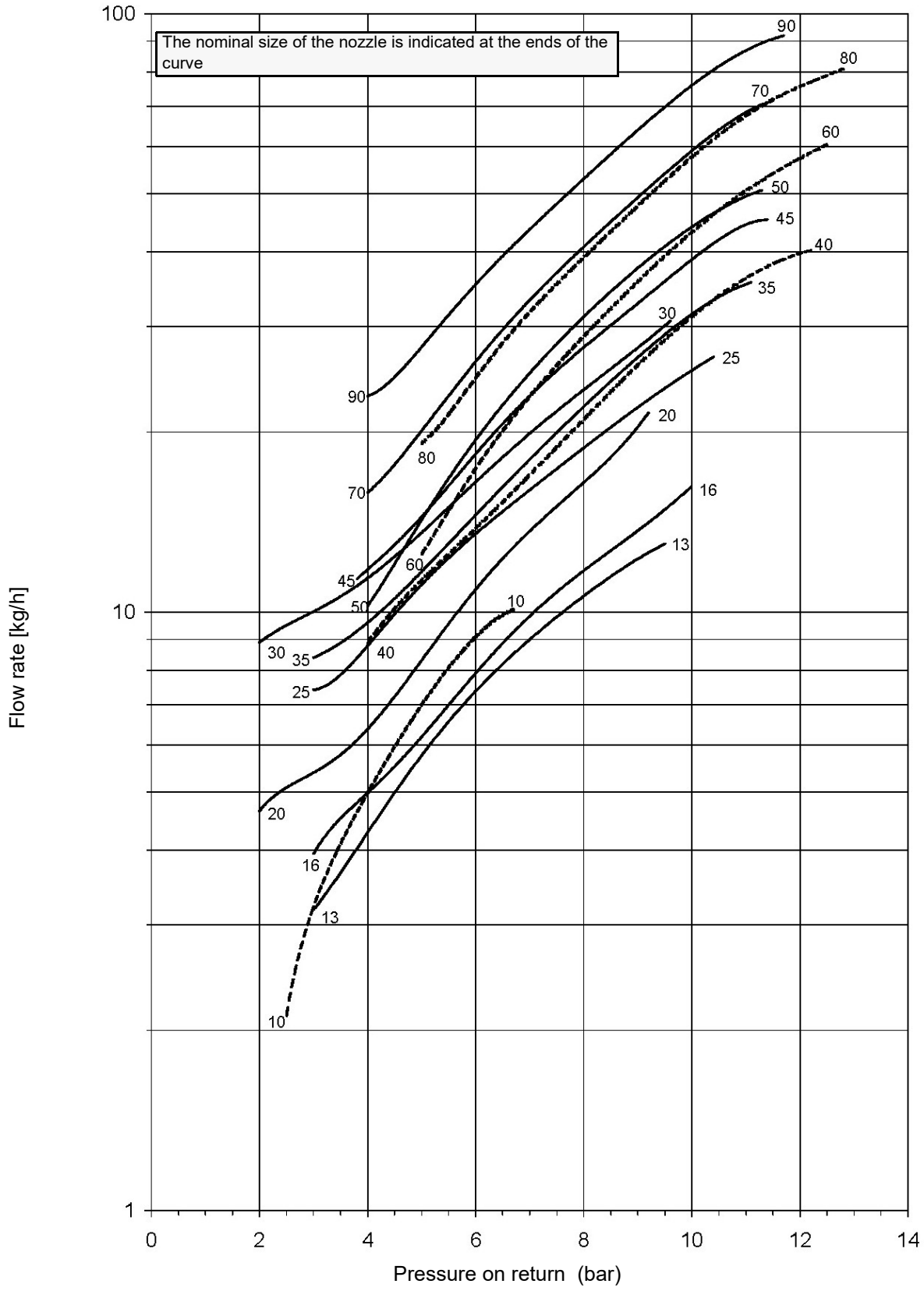
NOZZLE SUPPLY PRESSURE = 20 bar. VISCOSITY AT NOZZLE = 5 cSt





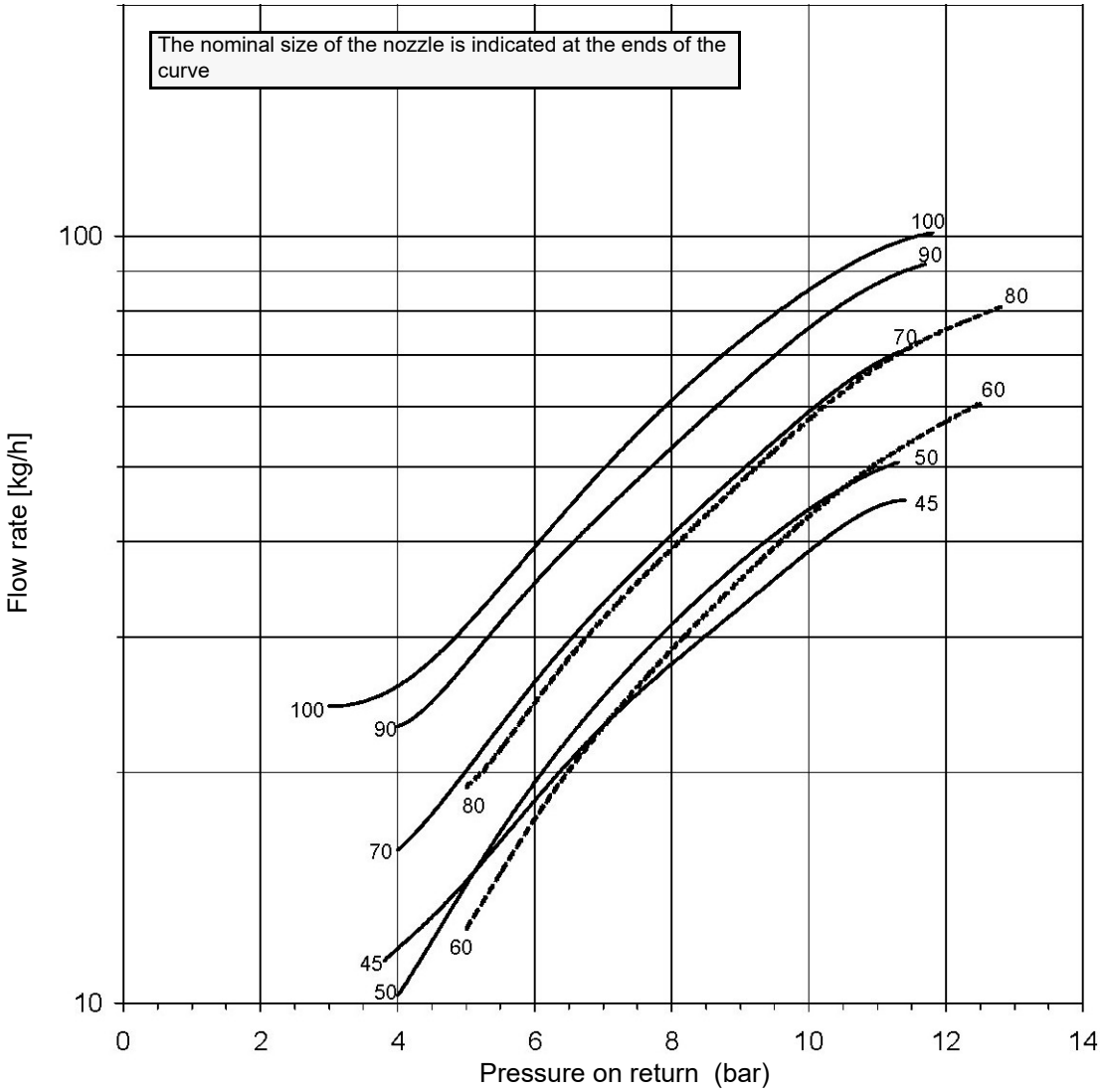


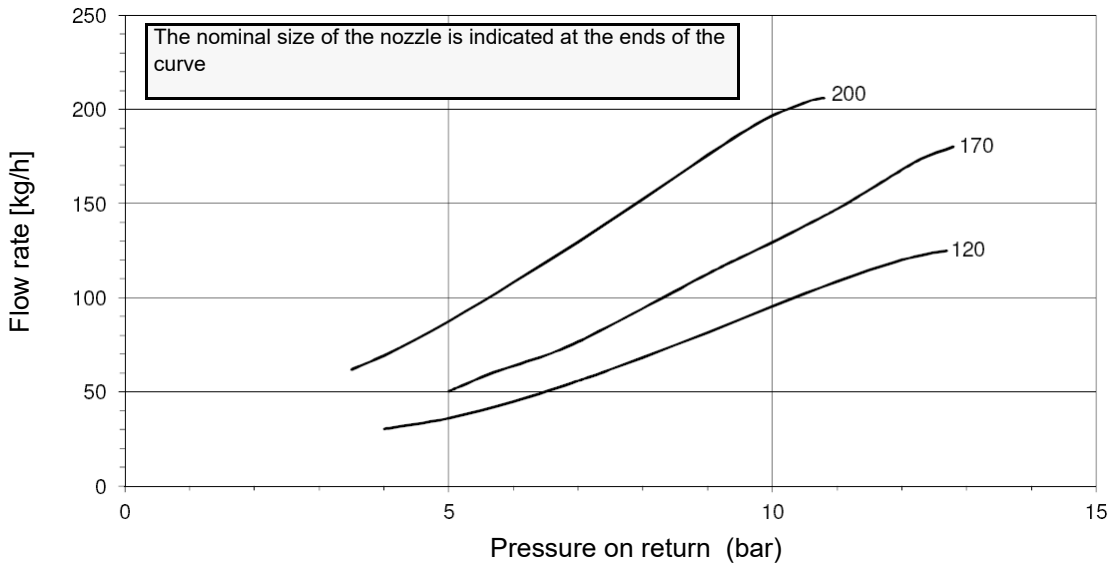
NOZZLE SUPPLY PRESSURE = 20 bar. VISCOSITY AT NOZZLE = 5 cSt



FLUIDICS KW3...60°

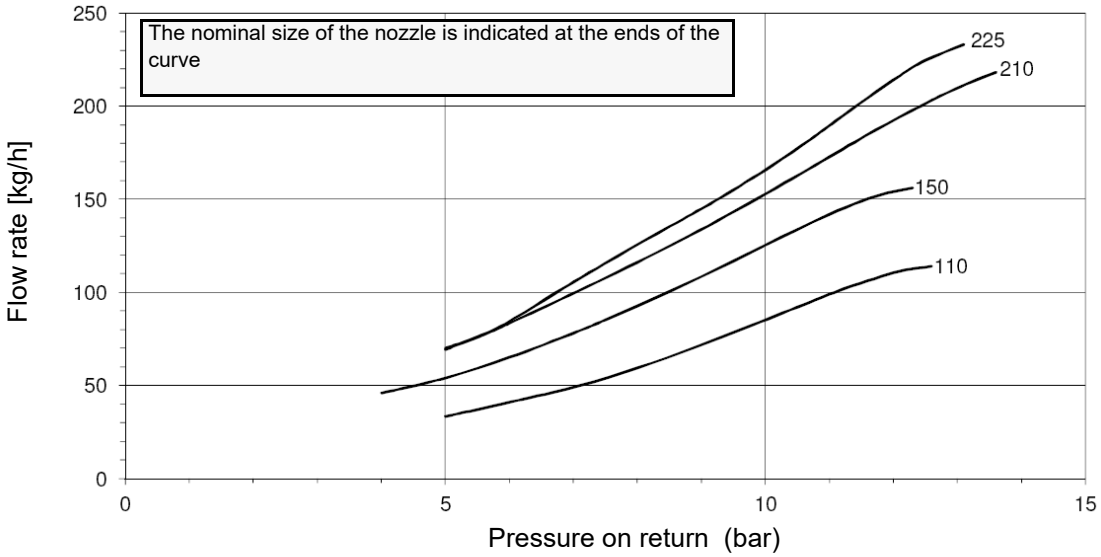
NOZZLE SUPPLY PRESSURE = 20 bar. VISCOSITY AT NOZZLE = 5 cS

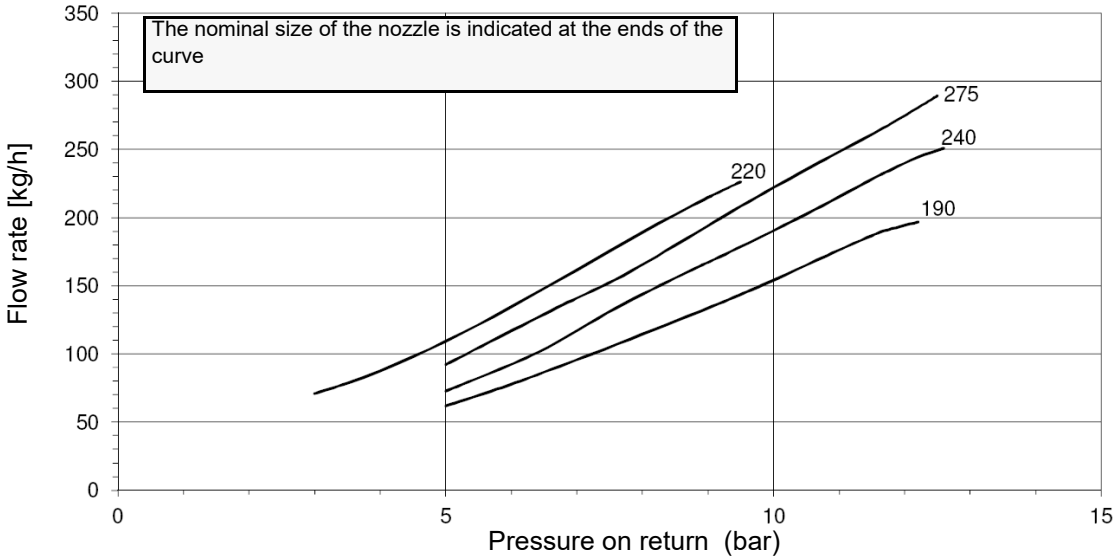


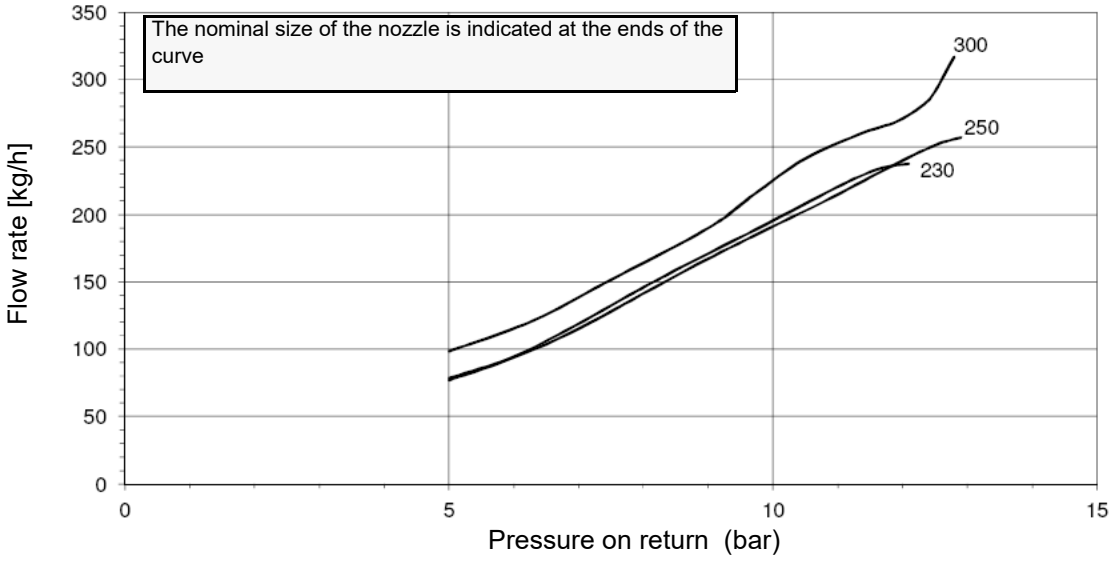


FLUIDICS KW3...60°

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

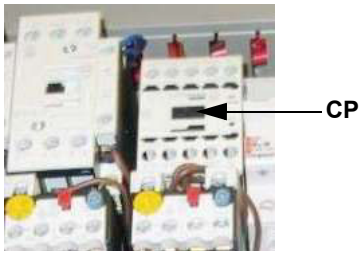






1 Once the air and gas flow rates are adjusted, turn the burner off, switch the **CM** switch to the heavy oil operation (OIL, on the burner control panel (see page 34).

2 with the electrical panel open, prime the oil pump acting directly on the related **CP** contactor (see next picture): check the pump motor rotation and keep pressing for some seconds until the oil circuit is charged;



3 bleed the air from the **M** pressure gauge port (Fig. 22) by loosing the cap without removing it, then release the contactor.

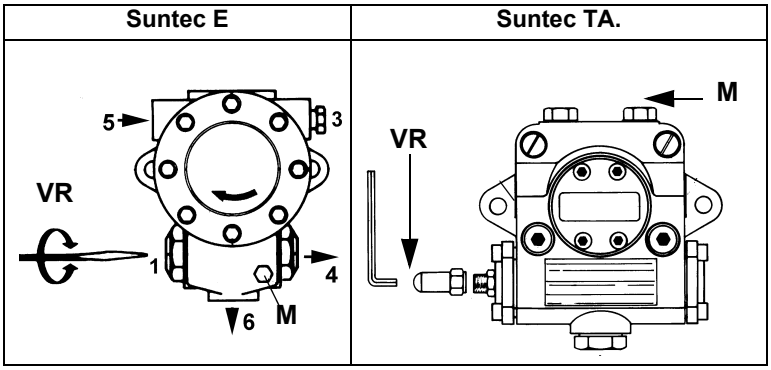


Fig. 22

4 As for setting the fuel/air ratio curve, see the LMV related manual.

5 the nozzle suplly pressureis already factory-set and must not be changed. Only if necessary, adjust the supply pressure as follows (see related paragraph);insert a pressure gauge into the port showed on Fig. 55 and act on on the pump adjusting screw **VR** (see Fig. 22) as to get the nozzle pressure at 21 bar or 25bar (according to the nozzle model provided: Monarch or Fluidics nozzles - see page 35).

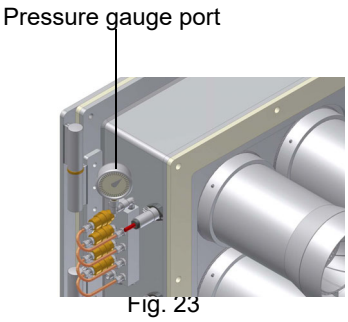


Fig. 23

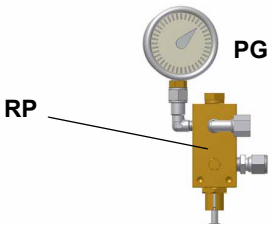


Fig. 24

6 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.

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

Oil circuit

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

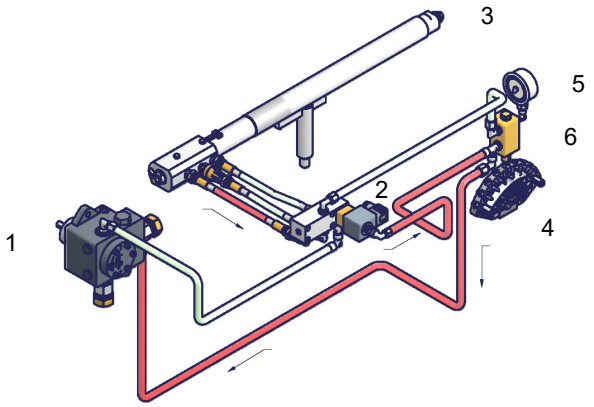


Fig. 25 - Stand-by

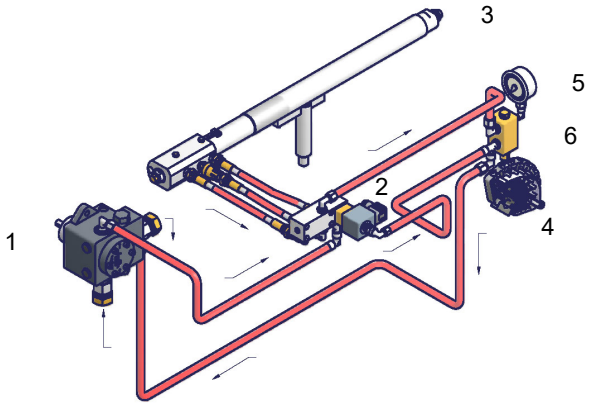


Fig. 26 - Prepurge

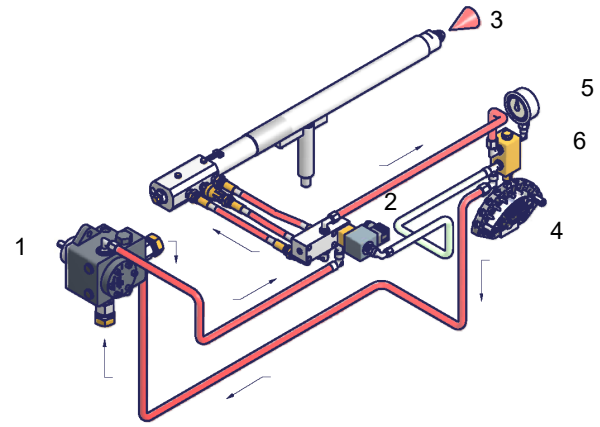


Fig. 27 - Low flame

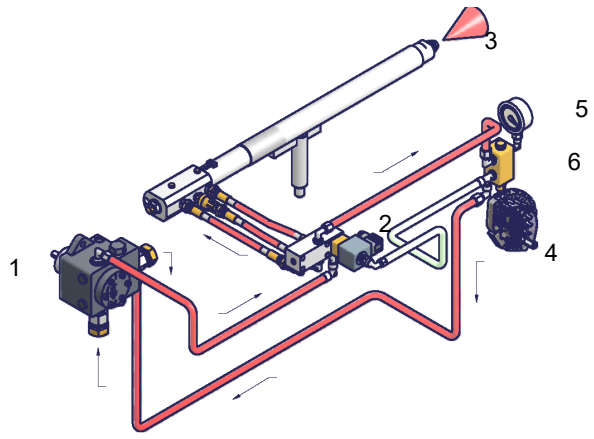


Fig. 28 - High flame

Key

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

PART II: OPERATION

LIMITATIONS OF USE

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

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

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

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

NEVER OPEN OR DISMANTLE ANY COMPONENT OF THE MACHINE.

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

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

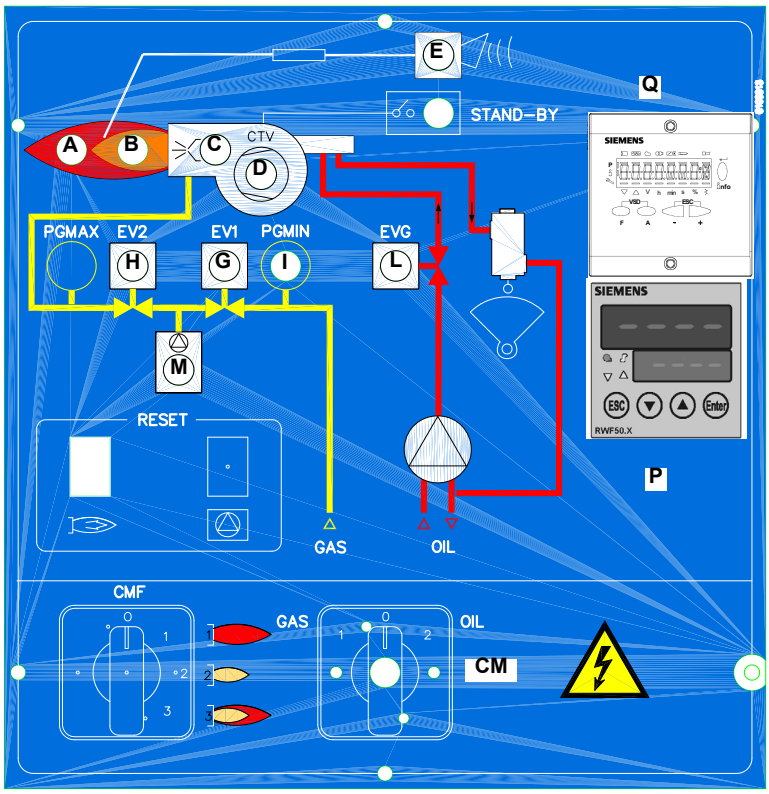
WARNING: DURING NORMAL OPERATION THE PARTS OF THE BURNER NEAREST TO THE GENERATOR (COUPLING FLANGE) CAN BECOME VERY HOT, AVOID TOUCHING THEM SO AS NOT TO GET BURNT.

OPERATION

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

- Choose the typer of fuel by turning the **A** switch, on the burner control panel.
  CAUTION: if the fuel chosen is light oil, be sure the cutoff valves on the feed and return pipes are open.
- Check the control box is not locked (signalling light **O**, on); if so, reset it by means of the pushbutton **C**.
- Check the series of thermostats and pressure switches turn the burner to on.

Burner control panel



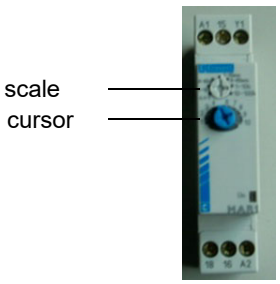
Key

A	High flame mode indicating light
B	Low flame mode indicating light
C	Ignition transformer operation
CM	Main switch/operation mode Gas / Oil
D	Fan motor therma cutout intervention
E	Burner lockout indicating light
G	Gas valve EV1 operation
H	Gas valve EV2 operation
I	Gas pressure switch enabling signal
L	Oil solenoid valve operation
M	Gas proving system intervention
P	Modulator
Q	AZLx

PART III: MAINTENANCE

Starting the burner up by slowly increasing the output

The first burner lighting (at the beginnig of the cold season) must be performed in order to gradually heat the boiler.For this reason, timers are installed inside the burner built-in or separate control panel, in oder to control the low flame time. This function can be set by means of the CMF 4-positions switch and three multiscale timers that can be set from 0.5 seconds to more than 10 hours.The burner performs the normal ignition phase. Once it lights, the actuator starts opening (output increases) until the limiter cam IV operates. The limiter cam is set 5° more than the low flame cam III.According to the CMF switch position the settable functions are:



MAR1 TIMER

pos. 0: with the burner on, the actuator stops at its current position

pos. 1: burner drives to and stays at the high flame stage

pos. 2: burner drives to and stays at the low flame stage

pos. 3: burners is on and works in the modulating operation (TAB/RWF40)

pos.4: burner is on and the output increases very slowly according to the times set on the three timers (KT1, KT2 and KT3).

KT1 Timer: it sets the actuator "On" time (usually 1 second)

KT2 Timer: it sets the actuator "Off" time

KT3 Timer: it sets the period of the actuator passing from the low flame to the high flame stage to the complete opening (90°)

Example:

Actuator "On" time = 1 second è Set the 0.1÷1 seconds scale and the cursor to 10 for the KT1 timer

Actuator "Off" time = 3 minutes è Set the 1÷10 minutes scale and the cursor to 3 for the KT2 timer

In this way, the actuator will move for 3° in 1 second period a will stay still for 3 minutes. To perform the 30°-90° stroke it will take 1 hour.

Set KT3 for about 1 hour time. After this time the function will be off. The burner will operate by means of the Siemens RWF40 modulator (for fully-modulating burners) or by the "High/Low" thermostat (for progressive burners).

SET THE TIMER FUNCTION KT1(MAR1)**ACTUATOR "On" TIME**

Set the 0.1÷1 seconds scale, Set cursor to 10

SET THE TIMER FUNCTION KT2 (MAR1)**ACTUATOR "Off" TIME**

ISet the 1÷10 minutes scale

CURSOR	"Off" TIME	ACTUATOR 30°-90° CYCLE TIME
1	1 min.	20 min.
2	2 min.	40 min.
3	3 min.	1 hour
4	4 min.	1.3hours
5	5 min.	1.6 hours
6	6 min.	2 hours
7	7 min.	2.16 hours
8	8 min.	2.3 hours
9	9 min.	3 hours
10	10 min.	3.3 hours

for higher times: set the 6÷60 minutes

CURSOR	"Off" TIME	ACTUATOR 30°-90° CYCLE TIME
1	6 min.	~2 hours
2	11.4 min.	~3.8 hours
3	16.8 min.	~5.6 hours
4	22.2 min.	~7.4 hours
5	27.6 min.	~9.2 hours
6	33 min.	11 hours

SET THE TIMER FUNCTION KT2(MAR1): **CYCLE OFF TIME** AND BURNER MODULATION STARTING

ISET THE FULL-SCALE TIMES: set the 1÷10 hours scale

Set the cursor to the maximum reqired time (i.e. 1 = 1 hour, 2 = 2 hours, according to the actuator cycle total time set by the KT1 and KT2 timers)

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

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

NOTE: The check on the ignition and detection electrodes is carried out after removing the combustion head.

Gas filter maintenance

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

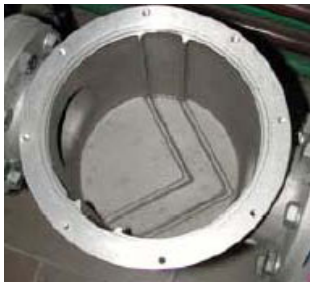
To clean or remove the filter, proceed as follows:

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

A

B

C



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

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

You can change the filter without removing the fitting.

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

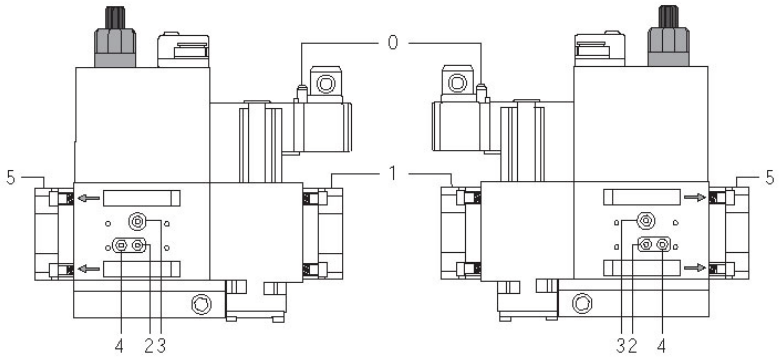


Fig. 1

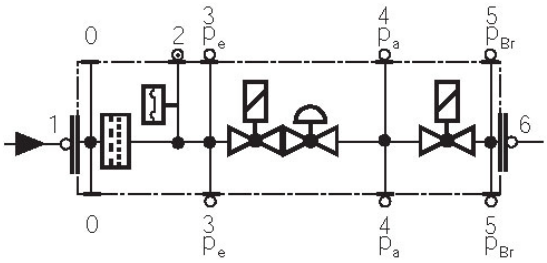


Fig. 2

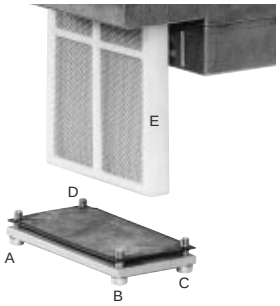
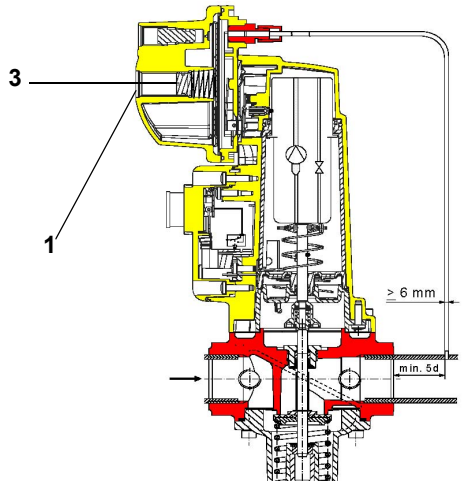


Fig. 3

Replacing the spring in the gas valve group

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

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



SKP Siemens actuator

Removing the combustion head

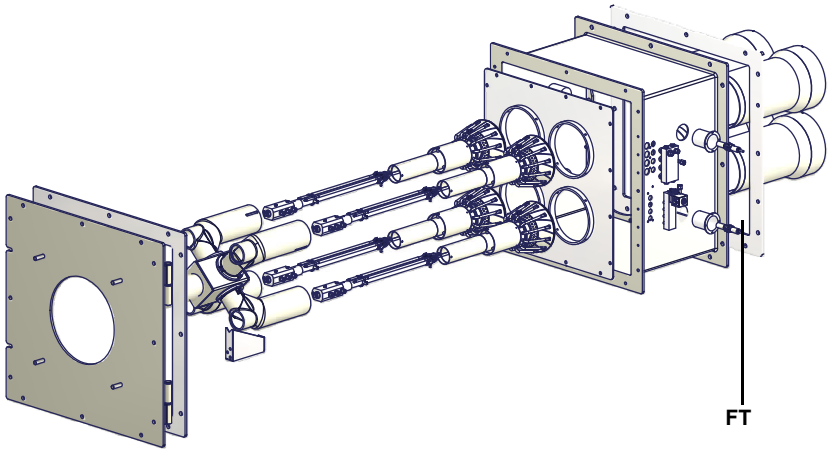


Рис. 4

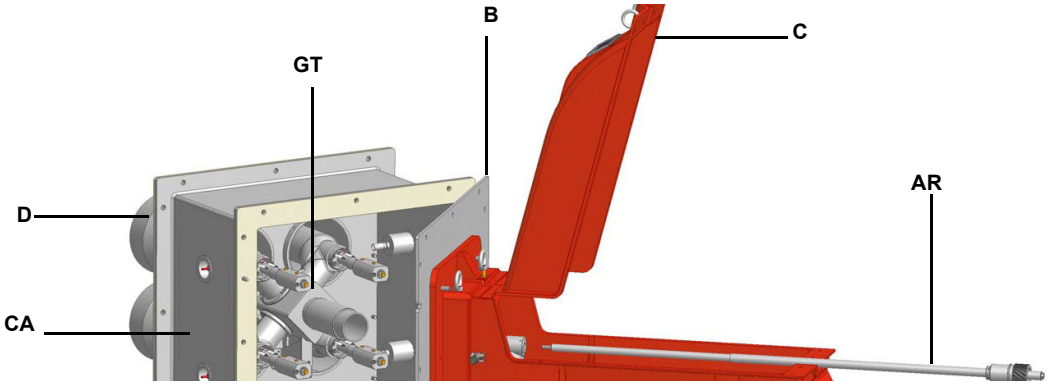


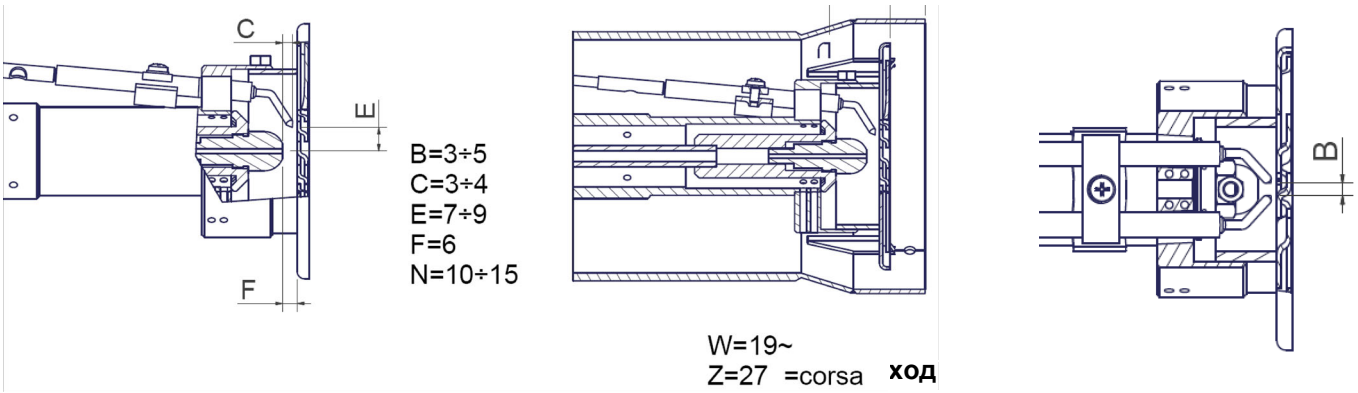
Рис. 5

Electrodes position adjustments

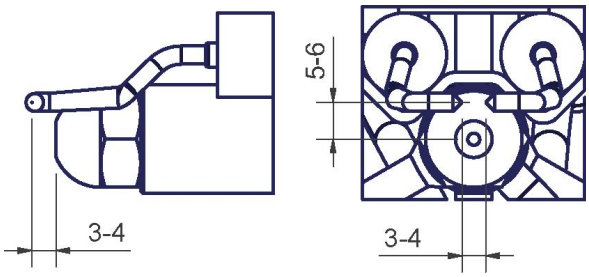
NOTE: The check on the ignition and detection electrodes is carried out after removing the combustion head.

Размеры в мм.

HP60..VS



HP72..VS - HP3A..VS



Matching the combustion heads and the control boxes

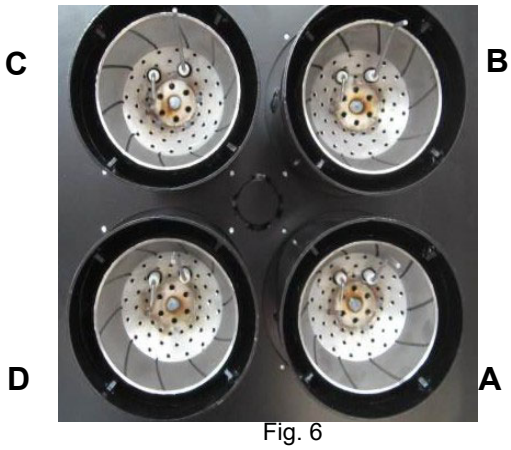


Fig. 6

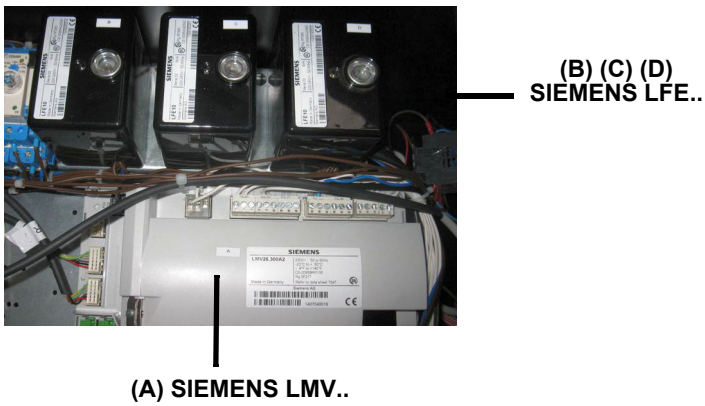


Fig. 8

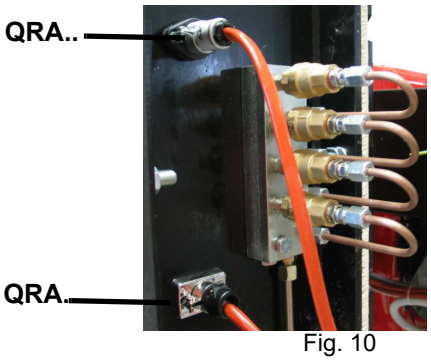


Fig. 10

Новую фотоячейку не трогать голыми пальцами.

(

Cleaning and replacing the detection photocell

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 LFE	150μA

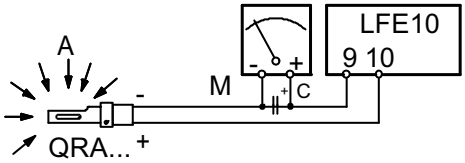
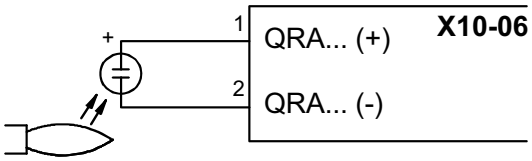


Fig. 11

Device	Flame detector	Minimum detection signal
Siemens LMV2x/3x	QRA	70 μA (intensity of flame >24%)



Control box	Minimum detection signal
Kromschroeder IFW15	1 μA

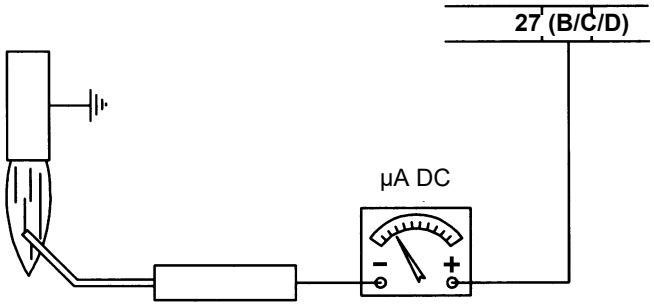


Fig. 12

Control box	Minimum detection signal
Siemens LFS 1.21	20 ... 24 µA

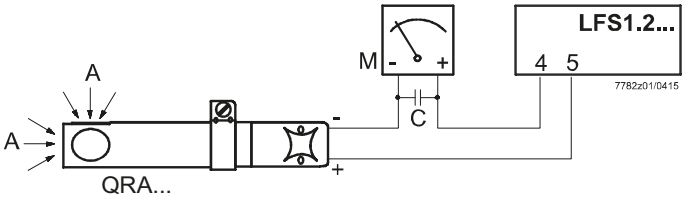


Fig. 13

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

TROUBLESHOOTING GUIDE Gas operation

BURNER DOESN'T LIGHT	No electric power supply	Restore power supply
	Main switch open	Close switch
	Thermostats open	Check set points and thermostat connections
	Bad thermostat set point or broken thermostat	Reset or replace the thermostat
	No gas pressure	Restore gas pressure
	Safety devices (manually operated safety thermostat, pressure switches and so on) open	Restore safety devices; wait till boiler reaches operating temperature then check safety device functionality.
	Broken fuses	Replace fuses. Check current absorption
	Fan thermal contacts open (three phases motors only)	Reset contacts and check current absorption
	Burner control lock out	Reset and check its functionality
	Burner control damaged	Replace burner control
GAS LEAKAGE: BURNER LOCKS OUT (NO FLAME)	Gas flow is too low	Increase the gas flowCheck gas filter cleanness Check butterfly valve opening when burner is starting (only Hi-Low flame and progressive)
	Ignition electrodes discharge to ground because dirty or broken	Clean or replace electrodes
	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
BURNER LOCKS OUT WITH FLAME PRESENCE	Wrong setting of flame detector	Adjust flame detector
	Flame detector damaged	Replace flame detector
	Bad cables of flame detector	Check cables
	Burner control damaged	Replace burner control
	Phase and neutral inverted	Adjust connections
	Ground missing or damaged	Check ground continuity
	Voltage on neutral	Take off tension on neutral
	Too small flame (due to not much gas)	Adjust gas flow Check gas filter cleanness
	Too much combustion air	Adjust air flow rate
only FOR LME22: BURNER CONTINUES TO PERFORM ALL ITS FEATURES WITHOUT IGNITING THE BURNER	Air pressure switch damaged or bad links	Check air pressure switch functions and links
	Burner control damaged	Replace burner control
BURNER LOCKS OUT WITHOUT ANY GAS FLOW	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
	Pressure governor too closed	Adjust the pressure governor
	Butterfly valve closed	Open the butterfly valve
	Maximum pressure switch open.	Check connection and functionality
	Air pressure switch doesn't close the NO contact	Check connections Check pressure switch functionality
THE BURNER IS BLOCKED AND THE EQUIPMENT PROVIDES A LOCK CODE "CAUSE AIR PRESSURE SWITCH FAULT"	Air pressure switch damaged (it keeps the stand-by position or badly set)	Check air pressure switch functionality Reset air pressure switch
	Air pressure switch connections wrong	Check connections
	Air fan damaged	Replace motor
	No power supply	Reset power supply
	Air damper too closed	Adjust air damper position
BURNER LOCKS OUT DURING NORMAL RUNNING	Flame detector circuit interrupted	Check wiring Check photocell
	Burner control damaged	Replace burner control
	Maximum gas pressure switch damaged or badly set	Reset pressure switch or replace it
THE BURNER STARTS AND AFTER A WHILE IT REPEATS THE STARTING CYCLE.	Gas pressure switch badly set	Reset the pressure switch
	Gas filter dirty	Clean gas filter
	Gas governor too low or damaged	Reset or replace the governor
BURNER STANDS WHILE RUNNING WITHOUT ANY SWITCHING OF THERMOSTATS	Thermal contacts of fan motor open	Reset contacts and check values Check current absorption
FAN MOTOR DOESN'T START	Internal motor wiring broken	Replace wiring or complete motor
	Fan motor starter broken	Replace starter
	Fuses broken (three phases only)	Replace fuses and check current absorption
BURNER DOESN'T SWITCH TO HIGH FLAME	Hi-low flame thermostat badly set or damaged	Reset or replace thermostat
	Servomotor cam badly set	Reset servomotor cam
***mechanical only*: SOMETIMES THE SERVOMOTOR RUNS IN THE WRONG WAY**	Servomotor capacitor damaged	Replace capacitor
PHASE-TO-PHASE SUPPLY OR PRESENCE OF VOLTAGE ON NEUTRAL*	Lights up and freezes	In such cases, insert an RC circuit (our code 2531003).

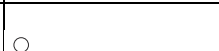
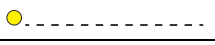
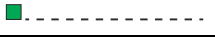
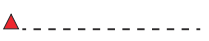
TROUBLESHOOTNG GUIDE Light oil operation

BURNER DOESN'T LIGHT	* 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 gas pressure	* Restore gas pressure
	* Safety devices (manually operated safety thermostat or pressure switch, and so on ...) open	* 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
BURNER LOCKS OUT WITH FLAME PRESENCE	* Flame detector dirty or damaged	* Clean or replace flame detector
	* Burner control damaged	* Replace burner control
	* Smoking flame	* Reset combustion air flow rate * Check the nozzle and, if necessary, replace it * Check cleanness of combustion head * Check chimney suction * Check boiler cleanness
	* Combustion head dirty	* Clean combustion head
BURNER LOCKS OUT WITHOUT ANY FUEL FLOW RATE	* No fuel	* 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
	* Oil valve not energized	* Check wiring path or replace valve
	* Fan motor not efficient	* Adjust or replace the motor
	* Fan or pump motor runs in the wrong way	* Change rotation
	* Obstructed nozzle	* Clean or replace the nozzle
	* Check valve in the tank locked or leaking	* Clean or replace the valve
	* Oil filter dirty * Pump filter dirty	* Clean filter
	* Solenoid valve dirty or broken	* Clean or replace solenoid valve
BURNER LOCKS OUT WITH FUEL FLOW RATE (NO FLAME)	* 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
	* Suction too high	* Check suction before pump. If necessary clean filters.
	* 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 damaged	* Replace the transformer
PUMP TOO NOISY	* Suction too high (over 0,35 bar) (dirty filters, check valve in the tank locked, and so on ...)	* Clean filters * Replace check valve in the tank
	* Flexible hoses damaged	* Replace flexible hoses
	* Air infiltration in the pipes	* Take off all infiltration
	* Pipe too long or too narrow	* Increase line size
BURNER RUMBLES WHEN MODULA-TING TO HIGH FIRE	* Burner is too lean	* Adjust air-oil ratio
	* Drawer assembly not set properly	* Check drawer position
	* Oil may be too hot	* Check oil temperature
	* Flame is blowing off head	* Check head position
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER	* Oil flame not retaining to head	
	* Dirty nozzle	* Clean the nozzle
	* Oil spray impinging on burner head	* Check position of the nozzle respect to the head
	* Spray angle of the nozzle too wide	* Reduce spray angle
FLAME IRREGULAR OR SPARKING	* Oil pressure at nozzle too low	* Reset oil pressure
	* Air flow rate too high	* Adjust air flow rate
	* Oil is too cold	* Adjust oil temperature
	* Dirt in the oil	* Check filters
	* Water in the fuel	* Take off all the water
	* Oil impingement on the combustion head	* Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head
	* Nozzle dirty or damaged	* Clean or, if necessary, replace the nozzle
BURNER LIGHTS BUT FLAME DOESN'T RETAIN TO BURNER HEAD	* Drawer assembly not positioned correctly	* Move forward or backward
	* Nozzle too far forward through centerhole of diffuser	* Move nozzle backward respect to diffuser
	* Oil or air pressure at nozzle is too low	* Increase oil or air pressure
	* Air louver too open	* Reduce air louver opening
	* Too much spread between oil and air (or steam) pressure	* Set the spread to a proper value
FLAME IRREGULAR OR SMOKING	* Not enough combustion air	* Adjust air flow rate
	* Nozzle dirty or damaged	* Clean or, if necessary, replace the nozzle
	* Flame is too big for furnace or nozzle spray angle is wrong	* Check burner-furnace coupling * Change nozzle with a suitable one
	* Nozzle spray angle wrong (flame too long or too wide)	* Replace nozzle
	* Boiler dirty	* Clean the boiler
	* Not enough suction at chimney	* Check chimney cleanness or size
	* Pressure at nozzle too low	* Reset oil pressure
	* Oil too cold	* Reset oil temperature
	* Combustion air inlet dirty	* Clean the air inlet
	* Flame is too small respect to furnace volume	* Replace nozzle or reset pump pressure
FUEL GAS TEMPERATURE TOO HIGH	* Boiler dirty	* Clean the boiler
	* Oil flow rate too high	* Adjust oil pressure or replace nozzle

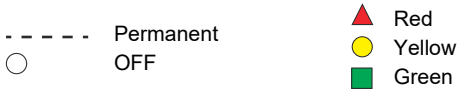
FLAME RELAY SIEMENS LFS1.2

COLOR CODE TABLE FOR THE MULTICOLOR SIGNAL LAMP (LED)

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

Status	Color code	Color
Waiting time (tw) or no operating voltage		OFF
Waiting for flame signal		Yellow
Test mode active, no extraneous light signal available		Flashing yellow
Test mode active, extraneous light signal available		Yellow-green
Operation, flame OK		Green
Operation, flame not OK		Flashing green
Undervoltage		Yellow-red
Error, alarm		Red
Error code output; refer to Error code table		Flashing red
Interface diagnostics		Red flickering light
Warning message: 1 million switching cycles exceeded (switching cycle counter)		Also flashes yellow in addition to the current color “x”

The multicolor signal lamp (LED) in the lockout reset button is the key indicating element for both visual diagnostics and interface diagnostics.



Service counter

Press the lockout reset button (EK) for 10 seconds to activate a yellow flashing warning signal when 1 million switching cycles have been performed. In this case, it is advisable to carry out a safety test or to replace the unit.

If 1 million switching cycles have not yet been performed, there will be no yellow flashing warning signal. Press the lockout reset button (EK) for 10 seconds again to deactivate this function.

Diagnostics of cause of error

After lockout, the red signal lamp (LED) lights up. In this status, visual diagnostics of the cause of the error according to the error code table can be activated by pressing the lockout reset button for more than 3 seconds. By pressing the lockout reset button again for more than 3 seconds, the interface diagnostics will be activated. The interface diagnostics only work if the AGK20 lockout reset button extension is not fitted.

If the interface diagnostics have been activated by accident – in which case the slightly red light of the signal lamp (LED) flickers – it can be deactivated by pressing the lockout reset button again for more than 3 seconds. The moment of switching over is indicated by a yellow light pulse.

Signal lamp (LED) flashing code	Possible cause
1-9 flashes	Libero
10 flashes	Wiring error or internal error, output contact error, other errors.
	Flame detector RAR9 current outside permissible range (defective flame detector RAR9 or glare).
	Short circuit at the connection terminals of the UV flame detectors QRA at the operating level (terminal 6 of the LFS1 active)
15 flashes	Manual locking active (LOC167)

When diagnosing the cause of errors, the built-in relays FR and HR are in the no-load position.

Reset to quit the diagnostics of the cause of the error and switch the flame safeguard on again. Press the lockout reset button for about 1 second (less than 3 seconds).

SIEMENS LFE10/LAE10 FLAME DETECTOR

The **LFE10** is suited for the supervision of gas flames and luminous or blue-burning oil flames in connection with UV detectors QRA... or a flame rectification probe.

The **LAE10** is designed for the supervision of oil flames in connection with selenium photocell detectors RAR...

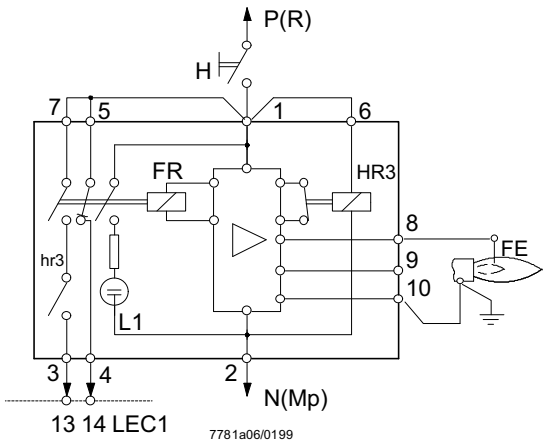
Technical data

Mains voltage: AC 220 V -15 %...AC 240 V +10 %
AC 100 V -15 %...AC 110 V +10 %
Mains frequency: 50...60 Hz ±6 %
Prefuse (external) max. 10 A (slow)
Power consumption 4.5 VA
Max. contact rating 2 A
Degree of protection IP 40, **provided cable entry is in compliance with IP 40**
Temperature range -20...+60 °C
Humidity < 95 % r.h.

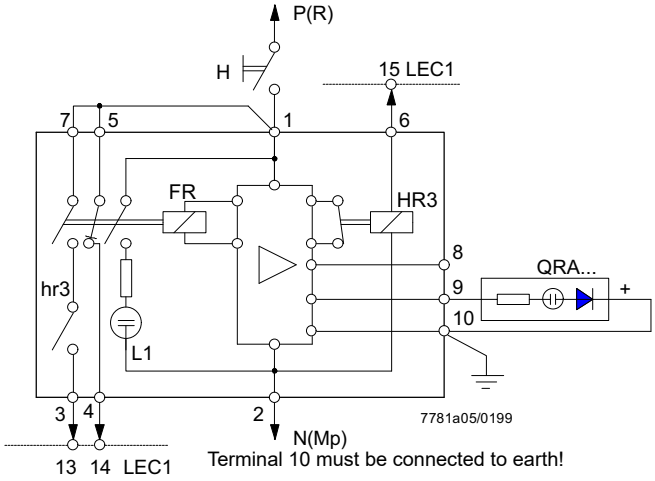
Condensation, formation of ice and ingress of water are not permitted!

Basic circuit diagrams

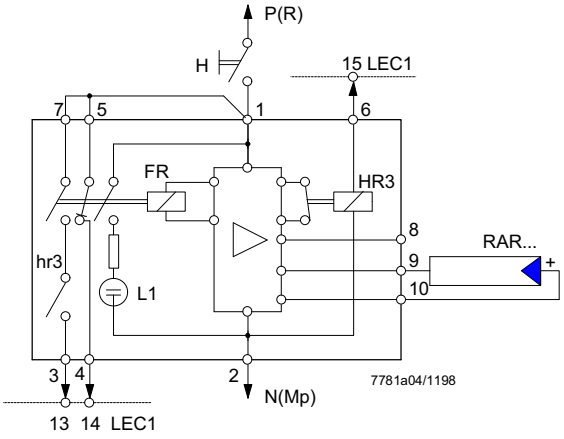
LFE and eletcrode



LFE andQRA



LAE and RAR



Keys

FE Detector electrode for flame rectification
FR Flame relay
H Main isolator
HR3 Auxiliary relay for UV detector or flame simulation test
L1 Built-in signal lamp - Indication of flame
QRA... UV detector
RAR... Selenium photocell detector

SIEMENS LFL 1.3.. CONTROL BOX

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

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

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

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

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

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

■ Block due to malfunction of the flame detector circuit.

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

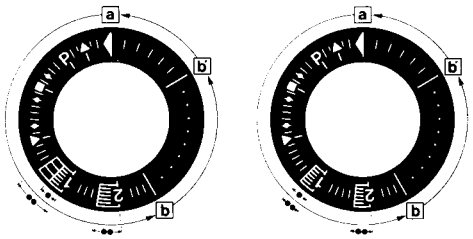
1 Block due to absence of flame signal at the end of the 1st safety period.

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

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

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

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



a-b Start-up programme

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

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

. Safety time duration for mono-tube burners

.. Safety time duration for twin-tube burners

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

Operation

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

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

A consent to start-up by means of the thermostat or pressostat "R"
A-B start-up program
B-C normal burner operation
C regulation stop caused by "R"
C-D programmer returns to start-up position A.

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

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

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

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

Start-up program

A Start-up

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

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

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

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

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

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

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

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

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

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

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

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

Mono-tube burner

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

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

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

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

Twin-tube burners (**)

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

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

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

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

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

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

B Operational position of the burner

B-C Burner operation (production of heat)

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

C Regulation stop for operation of "R"

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

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

t13 Admissible post-ignition time

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

D-A End of automatic programme

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

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

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

Specifications

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

Ionisation monitor

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

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

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

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

Ignition spark monitor with QRE1 series 02 detector	
Minimum detector current	30µA

Operating times

t7 initial delay for ventilator G2 2
t16 initial delay of air damper OPEN consent 4
t11 opening time for damper any
t10 initial delay for air pressure monitor8
t1 pre-ventilation time with damper open36
t12 travel time for air damper to MIN positionany
t3 t3' pre-ignition time t3 4
t3 '-
t2 t2' safety time (1st safety time for burners with intermittent pilot lighter t2 2
t2 '-
t4 t4' interval between start of t2 and response to valve at terminal 19
t4 10
t4 '-
t9 2nd safety time for burners with intermittent pilot lighter 2
t5 interval between end of t4 and response at terminal 20 10
t20 interval before programmer cuts out after start-up-
duration of start-up 60
t6 post-ventilation time (G2 only) 12
t13 permitted post-ignition time 12
t16 initial delay from opening consent of the air damper
t20 interval until the automatic shut-off of the programming mechanism after the burner start

Key

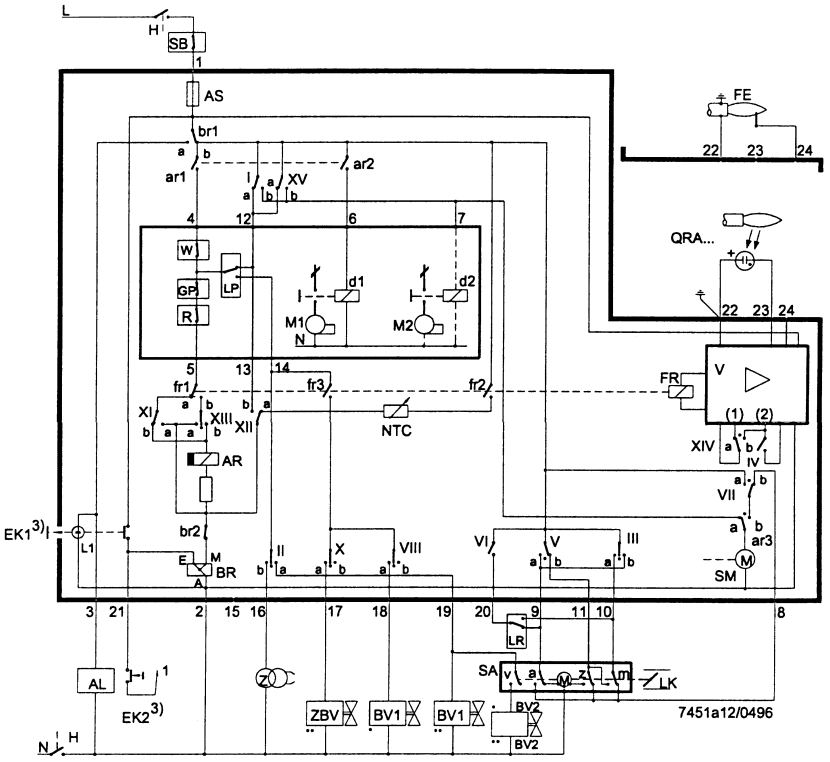
A	limit contact switch for damper OPEN position
AI	block remote signal
AR	main relay (working network) with contacts "ar"
AS	Monitor fuse
BR	block relay with "br" contacts
BV	fuel valve
EK	reset button
FE	detector electrode of ionisation circuit
FR	flame relay with "fr" contacts
G	ventilator motor or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

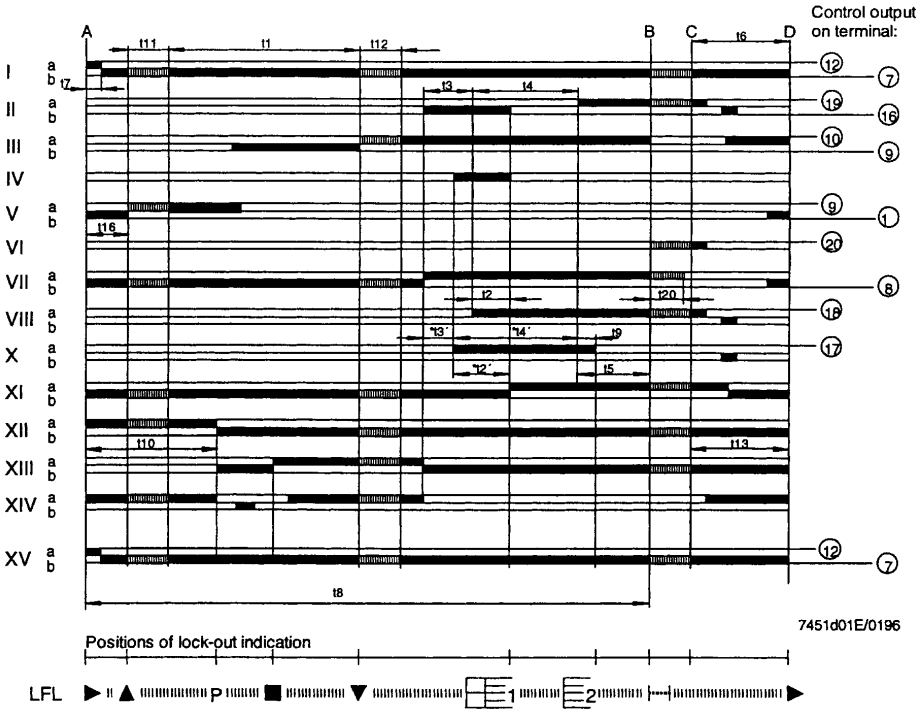
(1)	input for raising QRA detector voltage to test level
(2)	input for excitation of flame relay during flame detector test circuit (contact XIV) and during safety time (contact IV)
(3)	Do not press EK for more than 10 seconds

Programmer diagram

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

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





KROM-SCHROEDER IFW15 FLAME DETECTOR

- For flame detection
- For multi-flame control for intermittent
- operation in conjunction with the
- flame control units IFS
- Ionisation or UV control
- Potential-free change-over contacts
- Integrated flame control signal

APPLICATION

For the detection and signalling of the presence of a flame by means of ionisation or UV control. The flame detector is intended for use in conjunction with the flame control units IFS 110 IM, IFS 111 IM, IFS 410 or IFS 414. It can also be used where there is no fully automatic control required.

FEATURES

- Flame control with ionisation electrode or UV probe
- For intermittent operation
- Potential-free contacts for flame detection (1 normally closed, 1 normally open)

Function

The flame detector is ready for operation as soon as the mains voltage is applied to it. When the flame is established, the d.c. current energises a relay. The contacts of this relay can be used for control functions according to the application.

In a **multi-flame control system** (Fig. 2), several burners may be controlled at the same time. A flame control unit (e.g. IFS 110 IM) is used for the entire control functions and this also controls the first burner (only in the case of ionisation control). All remaining burners of this group are each controlled by an IFW 15 flame detector.

Should the flame controlled by a flame detector be extinguished during operation, the flame signal to the control unit is interrupted and an emergency cut-off occurs. This also occurs if a flame is simulated prior to igni-

tion.

Technical data

Mains voltage:

IFW 15: 220/240 VAC -15/+10%, 50/60 Hz for earthed mains

IFW 15T: 110/120 VAC -15/+10%, 50/60 Hz or
220/240 VAC -15/+10%, 50/60 Hz for earthed or non-earthed mains

Consumption: 12 VA

Output voltage for ionisation electrode: 230 VAC

Ionisation current: > 1 µA

Output signal:

Potential-free contacts (1 normally closed, 1 normally open)

Contact load: max. 2 A

Connection terminals: 2 x 1.5 mm2

Flame detection: Lamp in the device

Ambient temperature: 20 °C to +60 °C

Fitting position: Arbitrary

Weight: 370 g

Construction: Housing made of impact-resistant plastic.

Plug-in upper housing with amplifying stage and green lamp for flame detection.

Plug socket with terminals, earthing strip and neutral bar 5 openings for Pg 9 cable gland provided.

Project planning information

Multi-flame control: No more than 5 flame detectors should be used per flame control unit since it must be guaranteed that all burners are ignited within the flame control unit's safety period (3 s, 5 s or 10 s).

Very long gas pipes may possibly lead to delayed ignition of a burner and to switchoff of the entire system. This is why the pilot gas valves should be installed directly on the burners. In the case of ionisation control, one of the burners can be monitored by the flame control unit.

In the case of UV control, one IFW 15 flame detector must be used per burner. A diode of type EM 513 must be fitted as shown on the wiring diagram (Fig. 4).

Load of the flame control unit per output: 1A, total current: 2 A.

Decoupling relays must be provided if the currents exceed these values.

Ionisation line: Max. 50 m; condition: well away from mains cable and sources of radiated noise - no electrical interference.

Several ionisation lines may be laid together in one plastic conduit. Avoid metal conduits wherever possible. Use high-voltage cables, non-screened.

Fig. 1

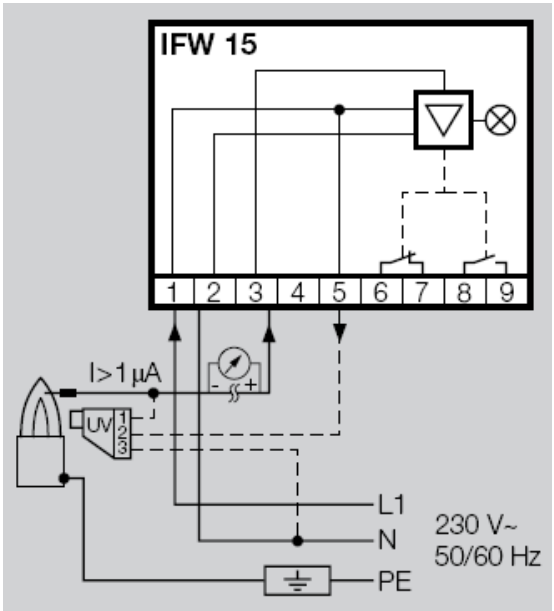
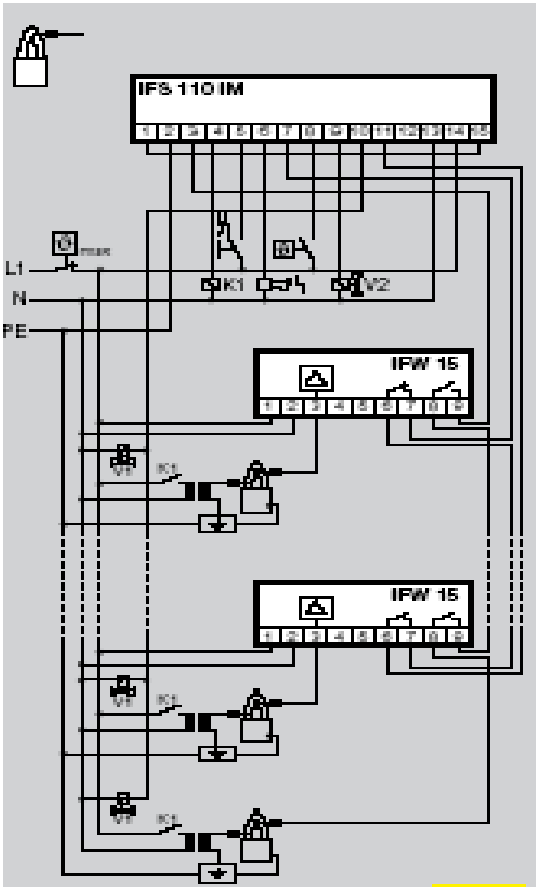


Fig. 2



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

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

AZL2x - LMV2x/3x
Burner Management System

Service manual

M12916CD Rev. 3.4 03/2023

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DANGERS, WARNINGS AND NOTES OF CAUTION

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

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

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

CAREFULLY KEEP THIS MANUAL FOR FUTURE REFERENCE.

1) GENERAL INTRODUCTION

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

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

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

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

Contact qualified personnel only.

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

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

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

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

The manufacturer shall not be held liable, by agreement or otherwise, for damages resulting from improper installation, use and failure to comply with the instructions supplied by the manufacturer.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;
c the burner firing system, to make sure that it is supplied for the designed fuel type;
d the fuel supply pressure, to make sure that it is included in the range shown on the rating plate;
e the fuel supply system, to make sure that the system dimensions are adequate to the burner firing rate, and that the system is equipped with all the safety and control devices required by the regulations in force.

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

SPECIAL INSTRUCTIONS FOR USING GAS

Have qualified personnel inspect the installation to ensure that:

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

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

Precautions if you can smell gas

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

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

DIRECTIVES AND STANDARDS

Gas burners

European directives:

- Directive 2009/142/EC - Gas Appliances;
- Directive 2006/95/EC on low voltage;
- Directive 2004/108/EC on electromagnetic compatibility

Harmonised standards :

-UNI EN 676 (Gas Burners;-EN 55014-1Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus.

-CEI EN 60335-1(Household and similar electrical appliances - Safety. Part 1: General requirements;

-EN 50165 (Electrical equipment of non-electric appliances for household and similar purposes. Safety requirements.

-EN 60335-2-102 (Household and similar electrical appliances. Safety. Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections)

Light oil burners

European directives:

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

Harmonised standards :

-CEI EN 60335-1(Household and similar electrical appliances - Safety. Part 1: General requirements;

-UNI 267 Automatic forced draught burners for liquid fuels

-EN 55014-1Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus.

-EN 50165 (Electrical equipment of non-electric appliances for household and similar purposes. Safety requirements.

National standards :

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

Heavy oil burners

European directives:

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

Harmonised standards :

-CEI EN 60335-1 Household and similar electrical appliances - SafetyPart 1: General requirements;

-EN 55014-1Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus.

- EN 50165 Electrical equipment of non-electric appliances for household and similar purposes. Safety requirements.

National standards :

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

Gas - Light oil burners

European directives:

- Directive 2009/142/EC - Gas Appliances;
- Directive 2006/95/EC on low voltage;
- Directive 2004/108/EC on electromagnetic compatibility

Harmonised standards :

-UNI EN 676 Gas Burners

-EN 55014-1Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus.

-UNI 267 Automatic forced draught burners for liquid fuels

-CEI EN 60335-1(Household and similar electrical appliances - Safety. Part 1: General requirements;

- EN 50165 Electrical equipment of non-electric appliances for household and similar purposes. Safety requirements.

National standards :

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

Gas - Heavy oil burners

European directives:

- Directive 2009/142/EC - Gas Appliances;
- Directive 2006/95/EC on low voltage;
- Directive 2004/108/EC on electromagnetic compatibility

Harmonised standards :

-EN 55014-1Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus.

-UNI EN 676 (Gas Burners;

-CEI EN 60335-1(Household and similar electrical appliances - Safety. Part 1: General requirements;

- EN 50165 Electrical equipment of non-electric appliances for household and similar purposes. Safety requirements.

National standards :

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

Industrial burners

European directives:

- Directive 2009/142/EC - Gas Appliances;
- Directive 2006/95/EC on low voltage;
- Directive 2004/108/EC on electromagnetic compatibility

Harmonised standards :

-EN 55014-1Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus.

-EN 50165 Electrical equipment of non-electric appliances for household and similar purposes. Safety requirements.

-UNI EN 746-2: Industrial thermoprocessing equipment

Burner data plate

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

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

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

SYMBOLS USED

WARNING!

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

DANGER!

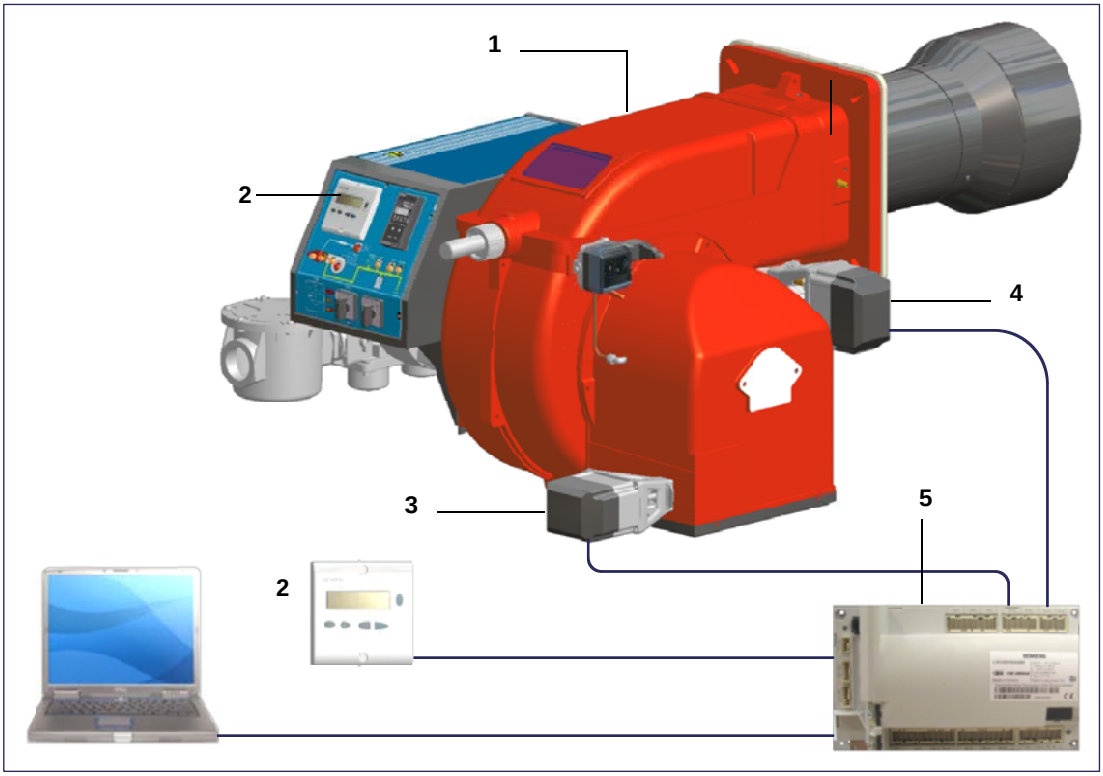
Failure to observe the warning may result in serious injuries or death.

WARNING!

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

MICROPROCESSOR CONTROLLED SYSTEM

The control system is made of the Siemens LMV central unit that performs all the burner control functions and of the Siemens AZL local programming unit that interfaces the system with the user.

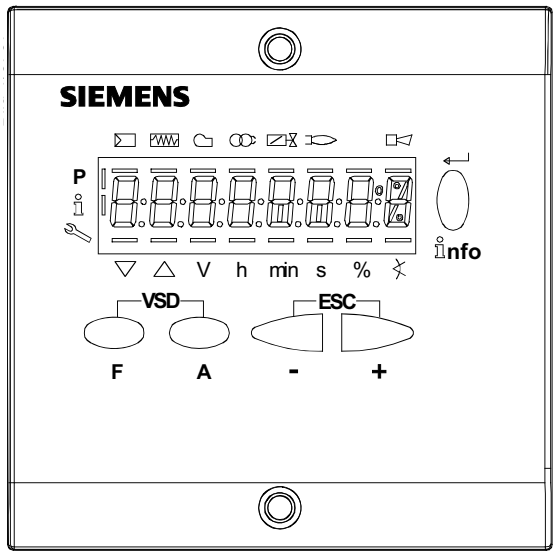


Keys

1 Burner
2 AZL2..
3 Air actuator
4 Fuel actuator
5 LMV2..

User interface

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



The keys functions are the following:

Key F

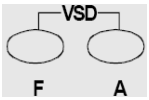
Used to adjust the “fuel” actuator position (**F**uel): :

While pressing the **F** key, the “fuel” actuator position can be changed by means of the **+** and **-** keys.

Key A

Used to adjust the “air” actuator position (**A**ir):

While pressing the **A** key, the “air” actuator position can be changed by means of the **+** and **-** keys.



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.

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 to decrease a a value

Used to enter Info and Serivce during the curve adjustments

+Key +

Used to increase a a value

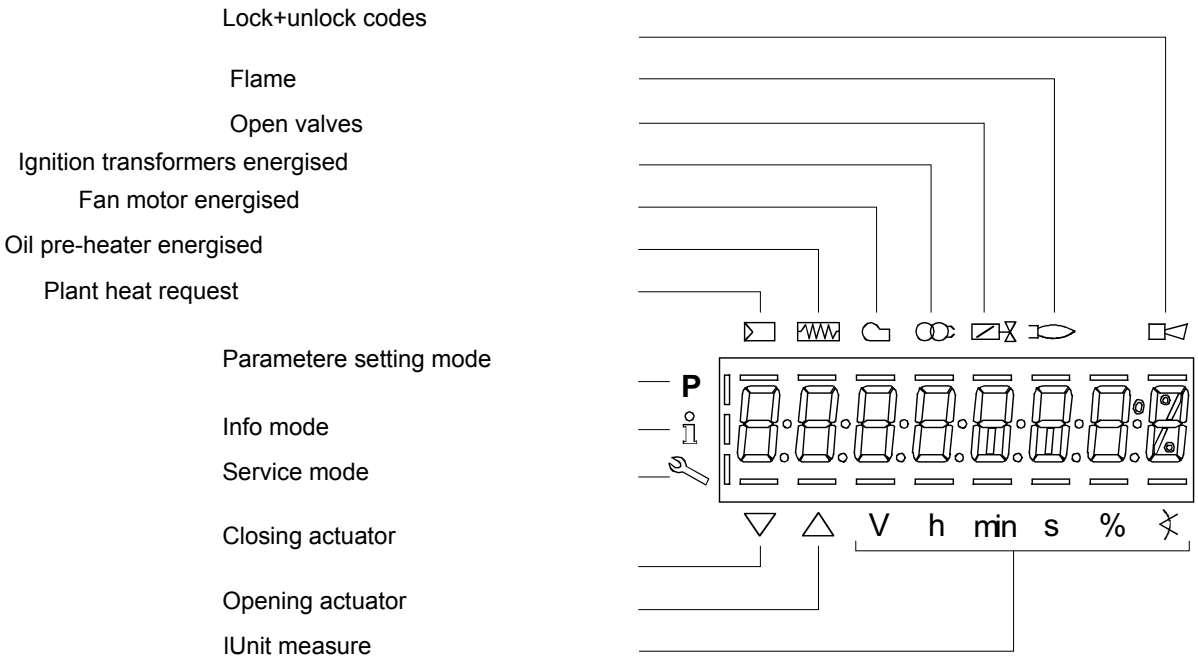
Used to enter Info and Serivce during the curve adjustments

Keys (+ & -)= ESC

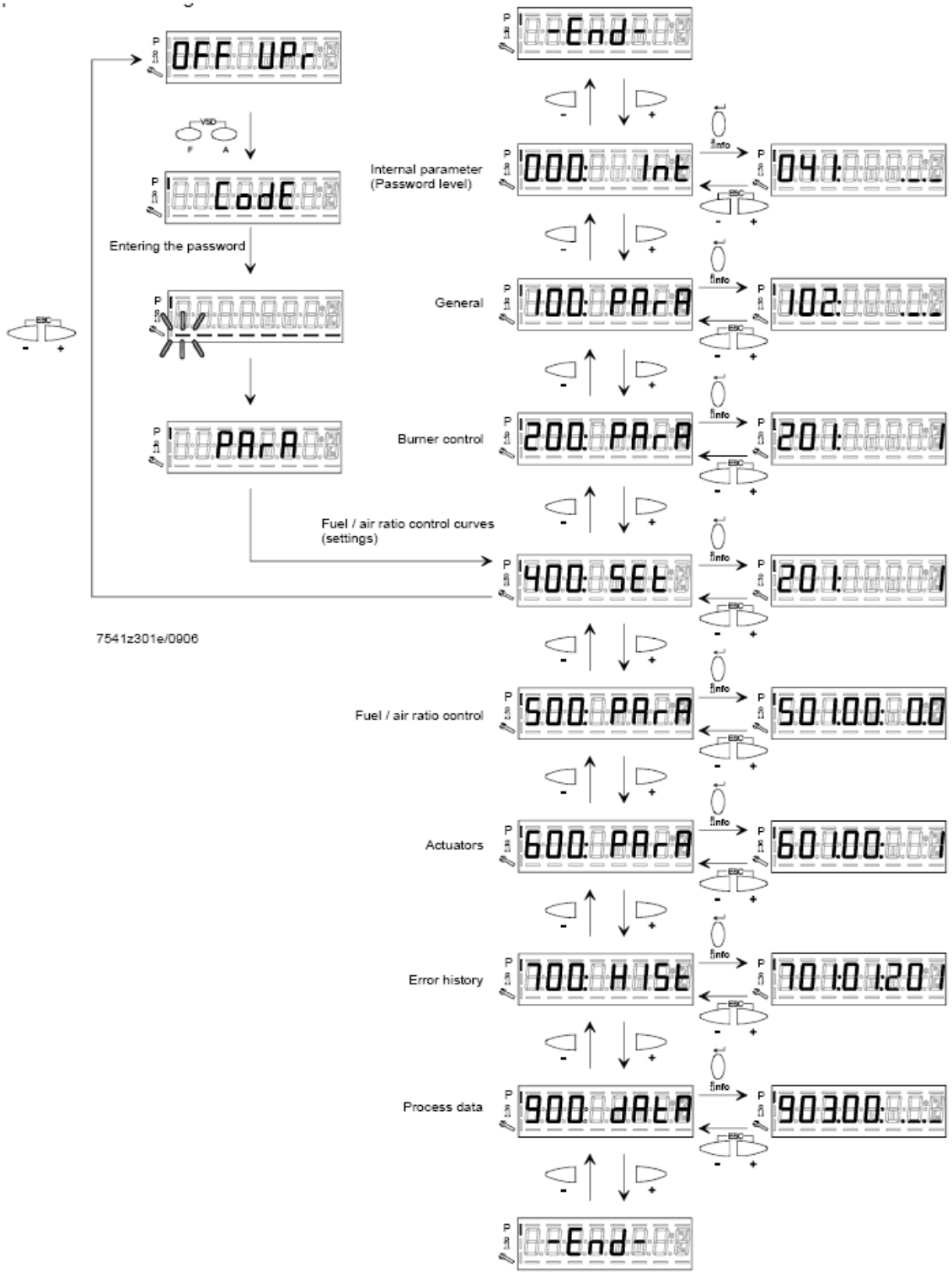
By pressing + and - at the same time, the ESCAPE function is perfomed:

to enter a lower level menu

The display will show these data:



Parameters level (heating engineer)



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Setting menu

The seeting menu is divided into different blocks:

Bloc.	Descrizione	Description	Password
000		Internal parameters	OEM / Service
100	Informazioni generali	General	OEM / Service / Info
200	Controllo bruciatore	Burner control	OEM / Service
300	Controllo bruciatore (solo **LMV26**)	Burner control (**LMV26** only)	OEM / Service
400	Curve rapporto	Ratio curves	OEM / Service
500	Controllo rapporto	Ratio control	OEM / Service
600	Servocomandi	Actuators	OEM / Service
700	Storico errori	Error history	OEM / Service / Info
900	Dati di processo	Process data	OEM / Service / Info

The access to the various blocks is allowed by passwords. Passwords are divided into three levels:

- User level (info): no password needed
- Service level (Service)
- Manifacturer level (OEM)

Block 000: Internal Parameter

Param.	Descrizione	Description	Password
041	Password livello assistenza (ingegnere del calore)	Password heating engineer (4 characters)	OEM
042	Password livello OEM (costruttore del bruciatore)	Password OEM (5 characters)	OEM
050	Start backup/restore via AZL2x/PC	Start backup / restore via AZL2.../ PC software (set parameter to 1) Index 0: Create backup Index 1: Execute restore Error diagnostics via negative values (see error code 137)	SO
055	Identificazione bruciatore (backup dati)	Burner identification of AZL2... backup data set	SO
056		ASN extraction of AZL2... backup data set	SO
057	Versione software creata dal set dati backup	Software version when creating the AZL2... backup data set	Service / Info

Block 100: General information

Param.	Descrizione	Description	Password	LMV20 LMV27	LMV26	LMV37
102	Data produzione (in gg-mm-aa)	Identification date (yy-mm-dd)	Service / Info	x	x	x
103	Numero identificativ	Identification number	Service / Info	x	x	x
104	Set di parametri preimpostati: codice cliente	Preselected parameter set: customer code	Service / Info	x	x	x
105	Set di parametri preimpostati: versione	Preselected parameter set: version	Service / Info	x	x	x
107	Versione softwar	Software version	Service / Info	x	x	x
108	Variante software	Software variant	Service / Info	x	x	x
113	Identificativo bruciatore	Burner identification	Service / Info SO password for writing	x	x	x
121	Potenza manuale Valore “Undefined = automatico Impostare un valore inferiore a = in modo che il display mostri --- altrimenti, il controllore rimarrà sempre in stand-by e il display mostrerà la scritta OFF lampeggiante.	Manual output Undefined = automatic mode	Service / Info	x	x	x

125	Frequenza di rete 0 = 50 Hz 1 = 60 Hz	Mains frequency 0 = 50 Hz 1 = 60 Hz	Service / Info	x	x	x
126	Luminosità display	Display brightness	Service / Info	x	x	x
127	Tempo dopo il quale, se non viene premuto nessun tast il software esce dalla modalita programmazione (valore fabbrica = 60min - range impostazione: 10 - 120 min)	Timeout for menu operation (default value = 60min - range: 10 - 120 min)	OEM	x	x	x
130	Azzeramento Storico errori Impostare prima il parametro a 1 e poi a 2; se compare “0” = lo Storico è stato azzerato se compare “-1” = scaduto tempo sequ. 1_2	Delete display of error history To delete display : set to 1 then to 2; return value “0” = error history deleted return value “-1” = timeout of 1_2 sequence	OEM / Service	x	x	x
141	Attivazione comunicazione bus 0 = off 1 = Modbus 2 = riserva	Operating mode BACS 0 = off 1 = Modbus 2 = reserved	OEM / Service		x	x
142	Tempo d'arresto in caso di guasto di comunicazione	Setback time in the event of communication breakdown	OEM / Service		x	x
143	Riserva	Reserved	Service / Info		x	x
144	Riserva	Reserved	OEM / Service		x	x
145	Indirizzo dispositivo per Modbus	Device address for Modbus	OEM / Service		x	x
146	Velocità di trasmissione per Modbus	Baud rate for Modbus	OEM / Service		x	x
147	Parità per Modbus	Parity for Modbus	OEM / Service		x	x
148	on una interruzione della comunicazione bus: 0 ... 19.9 = bruciatore spento 20 ... 100 = 20 ... 100% potenza Per il funzionamento multistadio: 0 = bruciatore OFF, P1, P2, P3 non valido = nessun standard di prestazione della LMV.	Performance standard at interruption of communication with building automation For modulation operation the setting range is as fol-lows: 0…19.9 = burner off 20…100 = 20…100% burner rating For multistage operation apply to setting range: 0 = burner OFF, P1, P2, P3 Invalid = no performance standards of the building auto-mation	OEM / Service		x	x
161	Numero di avarie	Number of faults	Service / Info	x	x	x
162	Ore di esercizio (azzerabile da Service)	Operating hours (resettable by Service)	Service / Info	x	x	x
163	Ore di esercizio (con dispositivo sotto tensione)	Operating hours (when unit is live)	Service / Info	x	x	x
164	Numero di partenze (azzerabile da Service)	Number of startups (resettable by Service)	Service / Info	x	x	x
165	Numero di partenze	Number of startups	Service / Info	x	x	x

166	Numero totale di partenze (non azzerabile)	Total number of startups	Service / Info	x	x	x
167	Volume combustibile (azzerabile da OEM)	Fuel volume (resettable by OEM)	Service / Info	x	x	x
172	Fuel 1(secondo combustibile)Ore di esercizio (azzerabile da Service)	Fuel 1: Operation hours resettable	Service / Info		x	
174	Fuel 1 (secondo combustibile) Numero di partenze (azzerabile da Service)	Fuel 1: Number of startups resettable	Service / Info		x	
175	Fuel 1 (secondo combustibile) Numero di partenze	Fuel 1: Number of startups	Service / Info		x	
177	Fuel 1 (secondo combustibile) Volume combustibile (azzerabile da OEM)	Fuel 1: Fuel volume resettable (m^3, l, ft^3, gal)	Service / Info		x	

Block 200: Burner control

Param.	Descrizione	Description	Password	LMV20 LMV27	LMV26	LMV37
201	Modalità funzionamento bruciatore (rampa combustibile, modulante / multistadio, servo-comandi, ecc.) __= non definito (cancellazione curve) **1** = accensione diretta a gas (G mod) **2** = accensione tramite pilota gas con attacco tra le due elettrovalvole EV1/EV2 del gas (Gp1 mod) **3** = accensione tramite pilota gas con attacco a monte dell'elettrovalvola EV1 del gas (Gp2 mod) **4** = accensione a gasolio - modulante (Lo mod) **5** = accensione a gasolio - bistadio (Lo 2 stage) **6** = accensione a gasolio - tristadio (Lo 3 stage) **7** = accensione diretta a gas - regolazione pneumatica (G mod pneu) **8** = accensione tramite pilota gas con attacco tra le due elettrovalvole EV1/EV2 del gas - regolazione pneumatica (Gp1 mod pneu) **9** = accensione tramite pilota gas con attacco a monte dell'elettrovalvola EV1 del gas - regolazione pneumatica (Gp2 mod pneu)	Burner operating mode (fuel train, modulating / multistage, actuators, etc..) __= undefined (delete curves) **1** = gas direct ignition (G mod) **2** = ignition by gas pilot connected between the two gas solenoid valves EV1/EV2 (Gp1 mod) **3** = ignition by gas pilot connected upstream the gas EV1 (Gp2 mod) **4** = light oil ignition - modulating (Lo mod) **5** = light oil ignition - double stage (Lo 2 stage) **6** = light oil ignition - three stage (Lo 3 stage) **7** = gas direct ignition - pneumatic regulation (G mod pneu) **8** = ignition by gas pilot connected between the two gas solenoid valves EV1/EV2 - pneumatic regulation (Gp1 mod pneu) **9** = ignition by gas pilot connected upstream the gas EV1 - pneumatic regulation (Gp2 mod pneu)	OEM / Service	x	x	x
	10 = olio modulante con accensione tramite pilota (LOGp mod) **11** = olio 2 stadi con accensione tramite pilota (LOGp 2-stage) **12** = olio modulante con 2 valvole combustibile (LOmod 2 valvole) **13** = olio modulante con 2 valvole combustibile e con accensione tramite pilota (LOGp 2 valvole) **14** = gas modulante pneumatico senza servomotori (Gmod pneu)	**10** = LoGp mod **11** = LoGp 2-stage **12** = Lo mod 2 fuel valves **13** = LoGp mod 2 fuel valves **14** = G mod pneu without actuator				

	15 = gas rampa Gp1 modulante pneumatico senza servomotori (Gp1 mod pneu) **16** = gas rampa Gp2 modulante pneumatico senza servomotori (Gp2 mod pneu) **17** = olio LO 2 stadi senza servomotori **18** = olio LO 3 stadi senza servomotori **19** = gas Gmod con solo servomotore gas **20** = gas Gp1 mod con solo servomotore gas **21** = gas Gp2 mod con solo servomotore gas **22** = olio LO mod con solo servomotore olio	**15** = Gp1 mod pneu without actuator **16** = Gp2 mod pneu without actuator **17** = Lo 2-stage without actuator **18** = Lo 3-stage without actuator **19** = G mod gas actuator only **20** = Gp1 mod gas actuator only **21** = Gp2 mod gas actuator only **22** = Lo mod oil actuator only				
208	Stop programma **0** = non attivo **1** = posizione preventilazione (Ph24 - fase 24 del programma) **2** = posizione accensione (Ph36 - fase 36 del programma) **3** = intervallo di tempo 1 (Ph44 - fase 44 del programma) **4** = intervallo di tempo 2 (Ph52 - fase 52 del programma)	Program stop **0** = deactivated **1** = pre-purge position (Ph24 - program phase 24) **2** = ignition position (Ph36 - program phase 36) **3** = interval 1 (Ph44 - program phase 44) **4** = interval 2 (Ph52 - program phase 52)	OEM / Service	x	x	x
210	Allarme impedimento avviamento **0** = non attivo **1** = attivo	Alarm in the event of start prevention **0** = deactivated **1** = activated	OEM / Service	x	x	x
211	Tempo aumento giri ventilatore (valore fabbrica = 2s - range impostazione: 2 - 60 s)	Fan ramp up time (default value = 2s - range: 2 - 60 s)	OEM / Service	x	x	x
212	Tempo massimo raggiungimento bassa fiamma (valore fabbrica = 45 s - range impostazione: 0.2 s - 10 min) Stabilisce il massimo intervallo di tempo durante il quale il bruciatore raggiunge la minima potenza e poi si spegne	Maximum time down to low-fire (default value = 45 s - range: 0.2 s - 10 min) It states the maximum time interval during which the burner drives to the low output and then turns off	OEM / Service		x	
213	Tempo minimo raggiungimento posizione di stand by (valore fabbrica = 2 s - range impostazione: 2 - 60 s)	Min. time home run (default value = 2 s - range: 2 - 60 s)	OEM	x	x	x
214	Tempo massimo inizio partenza	Max. time start release	OEM	x	x	x
215	Limite ripetizioni catena di sicurezza (valore fabbrica = 16 - range impostazione:1 - 16)	Repetition limit safety loop (default value = 16 - range: 1 - 16)	OEM / Service	x	x	x
217	Tempo massimo per rilevazione segnale (valore fabbrica = 30s - range impostazione: 5s - 10 min)	Max. time to detector signal (default value = 30s - range: 5s - 10 min)	OEM	x	x	x

221	Gas: sonda rilevazione fiamma attivo (valore fabbrica = 1)	Gas: active detector flame evaluation (default value = 1) **0** = QRB../QRC.. **1** = ION / QRA..	OEM / Service	x	x	x
222	Gas: Preventilazione (valore fabbrica = 1) **1** = attivo **0** = non attivo ATTENZIONE : In ambito civile la norma EN676 rende obbligatoria la preventilazione. In ambito industriale, vedere i casi in cui la norma EN746-2 prevede la possibilità di non fare la preventilazione. In questi ultimi casi il bruciatore deve essere costruito obbligatoriamente con controllo di tenuta e valvole gas in classe A	Gas: Pre-purging (default value = 1) **1** = active **0** = deactivated WARNING: in the civil field, the prepurge is mandatory according to the standard EN676. In the industrial fiels, check if the pre purge can be avoided according to the stanrds EN746-2 If the prepurge is not performed, the burner must be equipped with two valves and the proving system.	OEM / Service	x	x	x
223	Limite ripetizioni pressostato gas di minima pressione (valore fabbrica = 16 - range impostazione:1 - 16)	Repetition limit pressure switch-min-gas (default value = 16 - range:1 - 16)	OEM / Service	x	x	x
225	Gas: tempo di preventilazione (valore fabbrica = 20s - range impostazione:20s - 60min)	Gas: Prepurge time (default value = 20s - range:20s - 60min)	OEM / Service	x	x	x
226	Gas: tempo di preaccensione (valore fabbrica = 2s - range impostazione:0.2s - 60min)	Gas: Preignition time (default value = 2s - range: 0.2s - 60min)	OEM / Service	x	x	x
227	Gas: tempo di sicurezza 1 (TSA1) (valore fabbrica = 3s - range impostazione:0.2 - 10s)	Gas: Safety time 1 (TSA1) (default value = 3s - range: 0.2 - 10s)	OEM	x	x	x
229	Gas: tempo di risposta a cadute di pressione entro TSA1 e TSA2 (valore fabbrica = 1.8s - range impostazione:0.2s - 9.8s)	Gas: time to respond to pressure faults in TSA1 e TSA2 (default value = 1.8s - range: 0.2s - 9.8s)	OEM	x	x	x
230	Gas: Intervallo 1 (valore fabbrica = 2s - range impostazione:0.2s - 60min)	Gas: Interval 1 (default value = 2s - range: 0.2s - 60min)	OEM / Service	x	x	x
231	Gas: tempo di sicurezza 2 (TSA2) (valore fabbrica = 3s - range impostazione:0.2 - 10s)	Gas: Safety time 2 (TSA2) (default value = 3s - range:0.2 - 10s)	OEM	x	x	x
232	Gas: Intervallo 2 (valore fabbrica = 2s - range impostazione:0.2s - 60min)	Gas: Interval 2 (default value = 2s - range:0.2s - 60min)	OEM / Service	x	x	
233	Gas: Tempo postcombustione (valore fabbrica = 8s - range impostazione:0.2s - 60s)	Gas: postcombustion time (default value = 8s - range:0.2s - 60s)	OEM / Service	x	x	x
234	Gas: Tempo postventilazione (valore fabbrica = 0.2s - range impostazione:0.2s - 180min)	Gas: Postpurge time (default value = 0.2s - range:0.2s - 180min)	OEM / Service	x	x	x

236	Gas: Pressostato gas di minima (default = 1) 0 = inattivo 1 = pressostato gas di minima (a monte valvola V1) 2 = controllo perditavalvole via pressostato (montato tra le valvole V1 e V2)	Gas: Pressure switch-min input 0 = inactive 1 = pressure switch-min (upstream of fuel valve 1 (V1)) 2 = valve proving via pressure switch-min (between fuel valves 1 (V1) and 2 (V2))	OEM / Service	x	x	
237	Gas: Pressostato gas di massima / ingresso-POC 0 = inattivo 1= pressostato gas di massima 2= POC 3 = pressostato controllo perdite	Gas: Pressure switch-max / POC input 0 = inactive 1 = pressure switch-max 2 = POC 3 = pressure switch valve proving			x	x
239	Gas: Forzatura al funzionamento intermittente 0 = disattivato 1 = attivato Attenzione : di default questo parametro è attivo = (1); esso è modificabile solo su LMV37. Dal punto di vista della sicurezza, il funzionamento continuo è valido esclusivamente per bruciatori di gas con elettrodo di rilevazione.	Gas: Forced intermittent operation 0 = deactivated 1 = activated	OEM			x
240	Limite ripetizioni perdita di fiamma (valore fabbrica = 2 - range impostazione:1 - 2)	Repetition limit loss of flame (default value= 2 - range:1 - 2)	OEM	x	x	x
241	Gas: esecuzione controllo tenuta (valore fabbrica = 2) **0** = no controllo tenuta **1** = controllo tenuta in avviamento **2** = controllo tenuta in arresto **3** = controllo tenuta in arresto e in avviamento	Gas: execution proving test (default value= 2) **0** = no proving test **1** = proving test on startup **2** = proving test on shutdown **3** = proving test on shutdown and on startup	OEM / Service	x	x	x
242	Gas: tempo evacuazione controllo tenuta (valore fabbrica = 3s - range impostazione:0.2s - 10s)	Gas: proving test evacuation time (default value = 3s - range:0.2s - 10s)	OEM	x	x	x

243	Gas: tempo pressione atmosferica controllo tenuta (valore fabbrica = 10s - range impostazione:0.2s - 60s)	Gas: proving test time atmospheric pressure (default value = 10s - range:0.2s - 60s)	OEM	x	x	x
244	Gas: tempo riempimento controllo tenuta (valore fabbrica = 3s - range impostazione:0.2s - 10s)	Gas: proving test filling time (default value = 3s - range:0.2s - 10s)	OEM	x	x	x
245	Gas: tempo test pressione gas (valore fabbrica = 10s - range impostazione:0.2s - 60s)	Gas: proving test time gas pressure (default value = 10s - range:0.2s - 60s)	OEM	x	x	x
246	Gas: tempo attesa consenso pressostato di minima (valore fabbrica = 10s - range impostazione:0.2s - 60s) Se la pressione del gas è troppo bassa, in fase 22 non verrà eseguito l'avviamento: il sistema compie un numero impostabile di tentativi finché non si arriva al blocco. Il tempo di attesa tra un tentativo e il successivo viene raddoppiato ad ogni tentativo.	Gas: waiting time gas shortage (default value = 10s - range:0.2s - 60s) If the gas pressure is too low, in phase 22 the startup will not be performed: the system tries for a certain number of times the it locks out. The time interval between two attempts is doubled at each attempt.	OEM	x	x	x
248	Gas: Tempo di post-ventilazione 3 (abortito con regolatore di potenza (LR)-ON	Gas: Postpurge time 3 (abortion with load controller (LR)-ON	OEM / Service	x	x	x
261	Olio: sonda rilevazione fiamma attivo (valore fabbrica = 0) **0** = QRB../QRC.. **1** = ION / QRA..	Oil: active detector flame evaluation (default value = 0) **0** = QRB../QRC.. **1** = ION / QRA..	OEM / Service	x	x	x
262	Olio: preventilazione (valore fabbrica = 1) **1** = attivo **0** = non attivo In ambito civile la norma EN267 rende obbligatoria la preventilazione. In ambito industriale, vedere i casi in cui la norma EN746-2 prevede la possibilità di non fare la preventilazione.	Oil: prepurging (default value = 1) **0** = deactivated **1** = activated **0** = deactivated WARNING: in the civil field, the prepurge is mandatory according to the standard EN267. In the industrial fiels, check if the pre purge can be avoided according to the standard EN746-2	OEM / Service	x	x	x
265	Olio: tempo preventilazione (valore fabbrica = 15s - range impostazione:15s - 60min)	Oil: prepurging time (default value = 15s - range:15s - 60min)	OEM / Service	x	x	x
266	Olio: tempo preaccensione (valore fabbrica = 2s - range impostazione:0.2s - 60min)	Oil: preignition time (default value = 2s - range:0.2s - 60min)	OEM / Service	x	x	x
267	Olio: tempo di sicurezza 1 (TSA1) (valore fabbrica = 5s - range impostazione:0.2 - 15s)	Oil: safety time 1 (TSA1) (default value = 5s - range:0.2 - 15s)	OEM	x	x	x
269	Olio: tempo di risposta a cadute di pressione entro TSA1 e TSA2 (valore fabbrica = 1.8s - range impostazione:0.2s - 14.8s)	Oil: time to respond to pressure faults in TSA1 and TSA2 (default value = 1.8s - range:0.2s - 14.8s)	OEM	x	x	x

270	Olio: Intervallo 1 (valore fabbrica = 2s - range impostazione:0.2s - 60min)	Oil: Interval 1 (default value = 2s - range:0.2s - 60min)	OEM / Service	x	x	x
271	Olio: tempo di sicurezza 2 (TSA2) (valore fabbrica = 3s - range impostazione:0.2 - 10s)	Oil: safety time 2 (TSA2) (default value = 3s - range:0.2 - 10s)	OEM	x	x	x
272	Olio: Intervallo 2 (valore fabbrica = 2s - range impostazione:0.2s - 60min)	Oil: Interval 2 (default value = 2s - range:0.2s - 60min)	OEM / Service	x	x	x
273	Olio: Tempo postcombustione (valore fabbrica = 8s - range impostazione:0.2s - 60s)	Oil: Postcombustion time (default value = 8s - range:0.2s - 60s)	OEM / Service	x	x	x
274	Olio: Tempo postventilazione (valore fabbrica = 0.2s - range impostazione:0.2s - 180min)	Oil: Postpurging time (default value = 0.2s - range:0.2s - 180min)	OEM / Service	x	x	x
276	Olio : Pressostato olio di minima (default = 1) 0 = inattivo 1 = attivo dalla fase 38 2 = attivo dal tempo di sicurezza (TSA)	Oil. Pressure switch-min input 0 = inactive 1 = active from phase 38 2 = active from safety time (TSA)	OEM / Service	x	x	
277	Olio: Pressostato olio di massima / ingresso-POC 0 = inattivo 1= pressostato olio di massima 2= POC	Oil: Pressure switch-max/POC input 0 = inactive 1 = pressure switch-max 2 = POC			x	
279	Olio: Forzatura al funzionamento intermittente 0 = disattivato 1 = attivato Attenzione : di default questo parametro è attivo = (1); esso è modificabile solo su LMV37..	Oil: Forced intermittent operation 0 = deactivated 1 = activated	OEM		x	x
280	Limite ripetizioni perdita di fiamma (valore fabbrica = 2 - range impostazione:1 - 2)	Repetition limit value loss of flame (default value = 2 - range:1 - 2)	OEM	x	x	x
281	Olio: tempo iniezione olio (valore fabbr. = 1) **0** = preaccensione corta (Ph38 - fase programma 38) **1** = preaccensione lunga (con ventilatore) (Ph22 - fase programma 22)	Oil: time oil ignition (default value = 1) **0** = short preignition (Ph38-progr. phase 38) **1** = long preignition (with fan) (Ph22 - program phase 22)	OEM / Service	x	x	x
284	Olio: Tempo di post-ventilazione 3 (abortito con regolatore di potenza (LR)-ON	Oil: Postpurge time 3 (abortion with load controller (LR)-ON	OEM / Service	x	x	x

Block 300: Burner control (only with LMV26)

Param.	Descrizione	Description	Password	LMV20 LMV27	LMV26	LMV37
301	Combustibile 1 : Modalità funzionamento bruciatore (rampa combustibile, modulante / multistadio, servocomandi, ecc.) __= non definito (cancellazione curve) **1** = accensione diretta a gas (G mod) **2** = accensione tramite pilota gas con attacco tra le due elettrovalvole EV1/EV2 del gas (Gp1 mod) **3** = accensione tramite pilota gas con attacco a monte dell'elettrovalvola EV1 del gas (Gp2 mod) **4** = accensione a gasolio - modulante (Lo mod) **5** = accensione a gasolio - bistadio (Lo 2 stage) **6** = accensione a gasolio - tristadio (Lo 3 stage) **7** = accensione diretta a gas - regolazione pneumatica (G mod pneu) **8** = accensione tramite pilota gas con attacco tra le due elettrovalvole EV1/EV2 del gas - regolazione pneumatica (Gp1 mod pneu) **9** = accensione tramite pilota gas con attacco a monte dell'elettrovalvola EV1 del gas - regolazione pneumatica (Gp2 mod pneu) **10** = olio modulante con accensione tramite pilota (LOGp mod)	Fuel 1 : Burner operating mode (fuel train, modulating / multistage, actuators, etc..) __= undefined (delete curves) **1** = gas direct ignition (G mod) **2** = ignition by gas pilot connected between the two gas solenoid valves EV1/EV2 (Gp1 mod) **3** = ignition by gas pilot connected upstream the gas EV1 (Gp2 mod) **4** = light oil ignition - modulating (Lo mod) **5** = light oil ignition - double stage (Lo 2 stage) **6** = light oil ignition - three stage (Lo 3 stage) **7** = gas direct ignition - pneumatic regulation (G mod pneu) **8** = ignition by gas pilot connected between the two gas solenoid valves EV1/EV2 - pneumatic regulation (Gp1 mod pneu) **9** = ignition by gas pilot connected upstream the gas EV1 - pneumatic regulation (Gp2 mod pneu) **10** = LoGp mod	OEM / Service		x	

	11 = olio 2 stadi con accensione tramite pilota (LOGp 2-stage) **12** = olio modulante con 2 valvole combustibile (LOmod 2 valvole) **13** = olio modulante con 2 valvole combustibile e con accensione tramite pilota (LOGp 2 valvole) **14** = gas modulante pneumatico senza servomotori (Gmod pneu) **15** = gas rampa Gp1 modulante pneumatico senza servomotori (Gp1 mod pneu) **16** = gas rampa Gp2 modulante pneumatico senza servomotori (Gp2 mod pneu)	**11** = LoGp 2-stage **12** = Lo mod 2 fuel valves **13** = LoGp mod 2 fuel valves **14** = G mod pneu without actuator **15** = Gp1 mod pneu without actuator **16** = Gp2 mod pneu without actuator				
	17 = olio LO 2 stadi senza servomotori **18** = olio LO 3 stadi senza servomotori **19** = gas Gmod con solo servomotore gas **20** = gas Gp1 mod con solo servomotore gas **21** = gas Gp2 mod con solo servomotore gas **22** = olio LO mod con solo servomotore olio	**17** = Lo 2-stage without actuator **18** = Lo 3-stage without actuator **19** = G mod gas actuator only **20** = Gp1 mod gas actuator only **21** = Gp2 mod gas actuator only **22** = Lo mod oil actuator only			x	
321	Combustibile 1 - Gas: sonda rilevazione fiamma attivo (valore fabbrica = 1) - **0** = QRB../QRC.. **1** = ION / QRA..	Fuel 1 - Gas: active detector flame evaluation (default value = 1) **0** = QRB../QRC.. **1** = ION / QRA..	OEM / Service		x	
322	Combustibile 1 - Gas: Preventilazione (valore fabbrica = 1) **1** = attivo **0** = non attivo ATTENZIONE : In ambito civile la norma EN676 rende obbligatoria la preventilazione. In ambito industriale, vedere i casi in cui la norma EN746-2 prevede la possibilità di non fare la preventilazione. In questi ultimi casi il bruciatore deve essere costruito obbligatoriamente con controllo di tenuta e valvole gas in classe A.	Fuel 1 - Gas: Pre-purging (default value = 1) **1** = active **0** = deactivated WARNING: in the civil field, the prepurge is mandatory according to the standard EN676. In the industrial fiels, check if the pre purge can be avoided according to the stanrds EN746-2 If the prepurge is not performed, the burner must be equipped with two valves and the proving system.	OEM / Service		x	
323	Limite ripetizioni pressostato gas di minima pressione (valore fabbrica = 16 - range impostazione:1 - 16)	Repetition limit pressure switch-min-gas (default value = 16 - range:1 - 16)	OEM / Service		x	
325	Combustibile 1 - Gas: tempo di preventilazione (valore fabbrica = 20s - range impostazione:20s - 60min)	Fuel 1 - Gas: Prepurge time (default value = 20s - range:20s - 60min)	OEM / Service		x	

326	Combustibile 1 - Gas: tempo di preaccensione (valore fabbrica = 2s - range impostazione:0.2s - 60min)	Fuel 1 - Gas: Preignition time (default value = 2s - range: 0.2s - 60min)	OEM / Service		x	
327	Combustibile 1 - Gas: tempo di sicurezza 1 (TSA1) (valore fabbrica = 3s - range impostazione:0.2 - 10s)	Fuel 1 - Gas: Safety time 1 (TSA1) (default value = 3s - range: 0.2 - 10s)	OEM		x	
329	Combustibile 1 - Gas: tempo di risposta a cadute di pressione entro TSA1 e TSA2 (valore fabbrica = 1.8s - range impostazione:0.2s - 9.8s)	Fuel 1 - Gas: time to respond to pressure faults in TSA1 e TSA2 (default value = 1.8s - range: 0.2s - 9.8s)	OEM		x	
330	Combustibile 1 - Gas: Intervallo 1 (valore fabbrica = 2s - range impostazione:0.2s - 60min)	Fuel 1 - Gas: Interval 1 (default value = 2s - range: 0.2s - 60min)	OEM / Service		x	
331	Combustibile 1 - Gas: tempo di sicurezza 2 (TSA2) (valore fabbrica = 3s - range impostazione:0.2 - 10s)	Fuel 1 - Gas: Safety time 2 (TSA2) (default value = 3s - range:0.2 - 10s)	OEM		x	
332	Combustibile 1 - Gas: Intervallo 2 (valore fabbrica = 2s - range impostazione:0.2s - 60min)	Fuel 1 - Gas: Interval 2 (default value = 2s - range:0.2s - 60min)	OEM / Service		x	
333	Combustibile 1 - Gas: Tempo postcombustione (valore fabbrica = 8s - range impostazione:0.2s - 60s)	Fuel 1 - Gas: postcombustion time (default value = 8s - range:0.2s - 60s)	OEM / Service		x	
334	Combustibile 1 - Gas: Tempo postventilazione (valore fabbrica = 0.2s - range impostazione:0.2s - 180min)	Fuel 1 - Gas: Postpurge time (default value = 0.2s - range:0.2s - 180min)	OEM / Service		x	
336	Combustibile 1 - Gas: Pressostato gas di minima (default = 1) 0 = inattivo 1 = pressostato gas di minima (a monte valvola V1) 2 = controllo perditavalvole via pressostato (montato tra le valvole V1 e V2)	Fuel 1 - Gas: Pressure switch-min input 0 = inactive 1 = pressure switch-min (upstream of fuel valve 1 (V1)) 2 = valve proving via pressure switch-min (between fuel valves 1 (V1) and 2 (V2))	OEM / Service		x	
337	Combustibile 1 - Gas: Pressostato gas di massima / ingressoPOC 0 = inattivo 1= pressostato gas di massima 2= POC 3 = pressostato controllo perdite	Fuel 1 - Gas: Pressure switch-max / POC input 0 = inactive 1 = pressure switch-max 2 = POC 3 = pressure switch valve proving			x	

340	Limite ripetizioni perdita di fiamma (valore fabbrica = 2 - range impostazione:1 - 2)	Repetition limit loss of flame (default value= 2 - range:1 - 2)	OEM		x	
341	Combustibile 1 - Gas: esecuzione controllo tenuta (valore fabbrica = 2) **0** = no controllo tenuta **1** = controllo tenuta in avviamento **2** = controllo tenuta in arresto **3** = controllo tenuta in arresto e in avviamento	Fuel 1 - Gas: execution proving test (default value= 2) **0** = no proving test **1** = proving test on startup **2** = proving test on shutdown **3** = proving test on shutdown and on startup	OEM / Service		x	
342	Combustibile 1 - Gas: tempo evacuazione controllo tenuta (valore fabbrica = 3s - range impostazione:0.2s - 10s)	Fuel 1 - Gas: proving test evacuation time (default value = 3s - range:0.2s - 10s)	OEM		x	
343	Combustibile 1 - Gas: tempo pressione atmosferica controllo tenuta (valore fabbrica = 10s - range impostazione:0.2s - 60s)	Fuel 1 - Gas: proving test time atmospheric pressure (default value = 10s - range:0.2s - 60s)	OEM		x	
344	Combustibile 1 - Gas: tempo riempimento controllo tenuta (valore fabbrica = 3s - range impostazione:0.2s - 10s)	Fuel 1 - Gas: proving test filling time (default value = 3s - range:0.2s - 10s)	OEM		x	
345	Combustibile 1 - Gas: tempo test pressione gas (valore fabbrica = 10s - range impostazione:0.2s - 60s)	Fuel 1 - Gas: proving test time gas pressure (default value = 10s - range:0.2s - 60s)	OEM		x	
346	Combustibile 1 - Gas: tempo attesa consenso pressostato di minima (valore fabbrica = 10s - range impostazione:0.2s - 60s) Se la pressione del gas è troppo bassa, in fase 22 non verrà eseguito l'avviamento: il sistema compie un numero impostabile di tentativi finché non si arriva al blocco. Il tempo di attesa tra un tentativo e il successivo viene raddoppiato ad ogni tentativo.	Fuel 1 - Gas: waiting time gas shortage (default value = 10s - range:0.2s - 60s) If the gas pressure is too low, in phase 22 the startup will not be performed: the system tries for a certain number of times the it locks out. The time interval between two attempts is doubled at each attempt.	OEM		x	
348	Combustibile 1 - Gas: Tempo di post-ventilazione 3 (abortito con regolatore di potenza (LR)-ON	Fuel 1 - Gas: Postpurge time 3 (abortion with load controller (LR)-ON	OEM / Service		x	
361	Combustibile 1 - Olio: sonda rilevazione fiamma attivo (valore fabbrica = 0) **0** = QRB../QRC.. **1** = ION / QRA..	Fuel 1 - Oil: active detector flame evaluation (default value = 0) **0** = QRB../QRC.. **1** = ION / QRA..	OEM / Service		x	

362	Combustibile 1 - Olio: preventilazione (valore fabbrica = 1) **1** = attivo **0** = non attivo In ambito civile la norma EN267 rende obbligatoria la preventilazione. In ambito industriale, vedere i casi in cui la norma EN746-2 prevede la possibilità di non fare la preventilazione.	Fuel 1 - Oil: prepurging (default value = 1) **0** = deactivated **1** = activated **0** = deactivated WARNING: in the civil field, the prepurge is mandatory according to the standard EN267. In the industrial fiels, check if the pre purge can be avoided according to the standard EN746-2	OEM / Service		x	
365	Combustibile 1 - Olio: tempo preventilazione (valore fabbrica = 15s - range impostazione:15s - 60min)	Fuel 1 - Oil: prepurging time (default value = 15s - range:15s - 60min)	OEM / Service		x	
366	Combustibile 1 - Olio: tempo preaccensione (valore fabbrica = 2s - range impostazione:0.2s - 60min)	Fuel 1 - Oil: preignition time (default value = 2s - range:0.2s - 60min)	OEM / Service		x	
367	Combustibile 1 - Olio: tempo di sicurezza 1 (TSA1) (valore fabbrica = 5s - range impostazione:0.2 - 15s)	Fuel 1 - Oil: safety time 1 (TSA1) (default value = 5s - range:0.2 - 15s)	OEM		x	
369	Combustibile 1 - Olio: tempo di risposta a cadute di pressione entro TSA1 e TSA2 (valore fabbrica = 1.8s - range impostazione:0.2s - 14.8s)	Fuel 1 - Oil: time to respond to pressure faults in TSA1 and TSA2 (default value = 1.8s - range:0.2s - 14.8s)	OEM		x	
370	Combustibile 1 - Olio: Intervallo 1 (valore fabbrica = 2s - range impostazione:0.2s - 60min)	Fuel 1 - Oil: Interval 1 (default value = 2s - range:0.2s - 60min)	OEM / Service		x	
371	Combustibile 1 - Olio: tempo di sicurezza 2 (TSA2) (valore fabbrica = 3s - range impostazione:0.2 - 10s)	Fuel 1 - Oil: safety time 2 (TSA2) (default value = 3s - range:0.2 - 10s)	OEM		x	
372	Combustibile 1 - Olio: Intervallo 2 (valore fabbrica = 2s - range impostazione:0.2s - 60min)	Fuel 1 - Oil: Interval 2 (default value = 2s - range:0.2s - 60min)	OEM / Service		x	
373	Combustibile 1 - Olio: Tempo postcombustione (valore fabbrica = 8s - range impostazione:0.2s - 60s)	Fuel 1 - Oil: Postcombustion time (default value = 8s - range:0.2s - 60s)	OEM / Service		x	
374	Combustibile 1 - Olio: Tempo postventilazione (valore fabbrica = 0.2s - range impostazione:0.2s - 180min)	Fuel 1 - Oil: Postpurging time (default value = 0.2s - range:0.2s - 180min)	OEM / Service		x	
377	Combustibile 1 - Olio: Pressostato olio di massima / ingressoPOC 0 = inattivo 1= pressostato olio di massima 2= POC	Fuel 1 - Oil: Pressure switch-max/POC input 0 = inactive 1 = pressure switch-max 2 = POC			x	

380	Limite ripetizioni perdita di fiamma (valore fabbrica = 2 - range impostazione:1 - 2)	Repetition limit value loss of flame (default value = 2 - range:1 - 2)	OEM		x	
381	Combustibile 1 - Olio: tempo iniezione olio (valore fabbr. = 1) **0** = preaccensione corta (Ph38 - fase programma 38) **1** = preaccensione lunga (con ventilatore) (Ph22 - fase programma 22)	Fuel 1 - Oil: time oil ignition (default value = 1) **0** = short preignition (Ph38-progr. phase 38) **1** = long preignition (with fan) (Ph22 - program phase 22)	OEM / Service		x	
384	Combustibile 1 - Olio: Tempo di post-ventilazione 3 (abortito con regolatore di potenza (LR)-ON	Fuel 1 - Oil: Postpurge time 3 (abortion with load controller (LR)-ON	OEM / Service		x	

Block 400: Setting air/fuel ratio curves

Param.	Descrizione	Description	Password	LMV20 LMV27	LMV26	LMV37
401	Curve controllo servocomando combustibile (F): si accede alla lista dei punti da impostare (da P0 a P9) - consultare paragrafo “Impostazione curve”	Ratio control curve fuel actuator (F): it accesses to the parameter list of the points to be set (P0 to P9) - see paragrapf “Setting the curves”	OEM / Service	x	x	x
402	Curve controllo servocomando aria (A): si accede alla lista dei punti da impostare (da P0 a P9) - consultare paragrafo “Impostazione curve”	Ratio control curve air actuator (A): it accesses to the parameter list of the points to be set (P0 to P9) - see paragraph “Setting the curves”	OEM / Service	x	x	x
403	Curve controllo inverter (F + A): si accede alla lista dei punti da impostare (da P0 a P9) - consultare paragrafo “Impostazione curve”	Ratio control curves VSD (curve setting only)	SO		x	x
404	Combustibile 1 - Curve controllo servocomando combustibile 1 (F): si accede alla lista dei punti da impostare (da P0 a P9) - consultare paragrafo “Impostazione curve”	Fuel 1: Ratio control curves fuel actuator (curve setting only)	SO		x	
405	Combustibile 1 - Curve controllo servocomando aria (A): si accede alla lista dei punti da impostare (da P0 a P9) - consultare paragrafo “Impostazione curve”	Fuel 1: Ratio control curves air actuator (curve setting only)	SO		x	
406	Combustibile 1 - Curve controllo inverter (F + A): si accede alla lista dei punti da impostare (da P0 a P9) - consultare paragrafo “Impostazione curve”	Fuel 1: Ratio control curves VSD (curve setting only)	SO		x	

Block 500: Air/fuel ratio control

Param.	Descrizione	Description	Password	LMV20 LMV27	LMV26	LMV37
501	Posizione **servocomando combustibile** in assenza di fiamma (no-flame) **Indice 0** = posizione di sosta = 0° **Indice 1** = posizione preventilazione = 0° **Indice 2** = posizione postventilazione = 15°	No-flame position fuel actuator **Index 0** = no-load position = 0° **Index 1** = prepurge position = 0° **Index 2** = postpurge position = 15°	OEM / Service	x	x	x
502	Posizione **servocomando aria** in assenza di fiamma (no-flame) **Indice 0** = posizione di sosta = 0° **Indice 1** = posizione preventilazione = 90° **Indice 2** = posizione postventilazione = 45°	No-flame position air actuator **Index 0** = no-load position = 0° **Index 1** = prepurge position = 90° **Index 2** = postpurge position = 45°	OEM / Service	x	x	x
503	**% giri motore con inverter** 0% = ventilatore fermo, 100% = ventilatore al massimo della velocità **Indice 0** = posizione di sosta = 0% **Indice 1** = posizione preventilazione = 100% **Indice 2** = posizione postventilazione = 50%	No-flame speeds VSD Index 0 = no-load speed = 0% Index 1 = prepurge speed = 100% Index 2 = postpurge speed = 50%	OEM / Service		x	x
504	Combustibile 1 - Posizione **servocomando combustibile** in assenza di fiamma (no-flame) **Indice 0** = posizione di sosta = 0° **Indice 1** = posizione preventilazione = 0° **Indice 2** = posizione postventilazione = 15°	Fuel 1 No-flame position fuel actuator **Index 0** = no-load position = 0° **Index 1** = prepurge position = 0° **Index 2** = postpurge position = 15°	OEM / Service		x	
505	Combustibile 1 - Posizione **servocomando aria** in assenza di fiamma (no-flame) **Indice 0** = posizione di sosta = 0° **Indice 1** = posizione preventilazione = 90° **Indice 2** = posizione postventilazione = 45°	Fuel 1 No-flame position air actuator **Index 0** = no-load position = 0° **Index 1** = prepurge position = 90° **Index 2** = postpurge position = 45°	OEM / Service		x	
506	Combustibile 1 - **% giri motore con inverter** 0% = ventilatore fermo, 100% = ventilatore al massimo della velocità **Indice 0** = posizione di sosta = 0% **Indice 1** = posizione preventilazione = 100% **Indice 2** = posizione postventilazione = 50%	Fuel 1 No-flame speeds VSD Index 0 = no-load speed = 0% Index 1 = prepurge speed = 100% Index 2 = postpurge speed = 50%	OEM / Service		x	
522	Tempo rampa di salita inverter	Ramp up	OEM / Service		x	x
523	Tempo rampa di discesa inverter	Ramp down	OEM / Service		x	x

542	Activation of VSD / PWM fan (PWM = Pulse-Width Modulation) 0=deactived 1=actived	Activation of VSD / PWM fan (PWM = Pulse-Width Modulation)	OEM / Service		x	x

544			Parameter 544				OEM / Service	x	x	x
			Modulation **32s**	Modulation **48s**	Modulation **64s**	Modulation **80s**				
	Actuator	Actuating speed parameter 613	Max. delta between the curve points							
	Actuator (<= 5Nm)	5s / 90°	31°	46°	62°	77°				
	Actuator **SQM33.7**	17s / 90°	**9° (1)**	13°	18°	22°				

(1) in this case the max. position of 90° can't be reached

545	Percentuale minima di carico per modulazione (valore fabbrica = n.d. - range impostazione:20%-100%)	Lower load limit (default value = n.d. - range:20%-100%)	OEM / Service	x	x	x
546	Percentuale massima di carico per modulazione (valore fabbrica = n.d. - range impostazione:20%-100%)	Higher load limite (default value = n.d. - range:20%-100%)	OEM / Service	x	x	x
565	Combustibile 1 - Percentuale minima di carico per modulazione (valore fabbrica = n.d. - range impostazione:20%-100%)	Fuel 1 Lower load limit (default value = n.d. - range:20%-100%)	OEM / Service		x	
566	Combustibile 1 - Percentuale massima di carico per modulazione (valore fabbrica = n.d. - range impostazione:20%-100%)	Fuel 1 Higher load limite (default value = n.d. - range:20%-100%)	OEM / Service		x	

Block 600: Actuators

Param.	Descrizione	Description	Password	LMV20 LMV27	LMV26	LMV37
601	Impostazione punto di riferimento **Indice 0** = combustibile **Indice 1** = aria **0** = chiuso (<0°) **1** = aperto (>90°)	Selection of reference point **Index 0** = fuel **Index 1** = air **0** = closed (<0°) **1** = open (>90°)	OEM	x	x	x
602	Direzione rotazione del servocomando **Indice 0** = combustibile **Indice 1** = aria **0** = antiorario **1** = orario VEDI MESSAGGIO DI “ATTENZIONE” RIPORTATO SOTTO.	Actuator’s direction of rotation **Index 0** = fuel **Index 1** = air **0** = counterclockwise **1** = clockwise SEE “WARNING” MESSAGE QUOTED BELOW.	OEM	x	x	x
606	Limite tolleranza per monitoraggio posizione (0.1°) **Indice 0** = combustibile **Indice 1** = aria	Tolerance limit of position monitoring (0.1°) **Index 0** = fuel **Index 1** = air	OEM / Service	x	x	x
608	Combustibile 1 - Impostazione punto di riferimento **Indice 0** = combustibile **Indice 1** = aria **0** = chiuso (<0°) **1** = aperto (>90°)	Fuel 1 : Selection of reference point **Index 0** = fuel **Index 1** = air **0** = closed (<0°) **1** = open (>90°)	OEM		x	
609	Combustibile 1 - Direzione rotazione del servocomando **Indice 0** = combustibile **Indice 1** = aria **0** = antiorario **1** = orario VEDI MESSAGGIO DI “ATTENZIONE” RIPORTATO SOTTO.	Fuel 1 : Actuator’s direction of rotation **Index 0** = fuel **Index 1** = air **0** = counterclockwise **1** = clockwise SEE “WARNING” MESSAGE QUOTED BELOW.	OEM		x	
610	Combustibile 1 - Limite tolleranza per monitoraggio posizione (0.1°) **Indice 0** = combustibile **Indice 1** = aria	Fuel 1 : Tolerance limit of position monitoring (0.1°) **Index 0** = fuel **Index 1** = air	OEM / Service		x	

611	Tipo di riferimento dei servocomandi index 0 = fuel (default = 0 (riferimento standard) index 1 = air (default = 0 (riferimento standard) 0 = standard 1 = fermo entro il raggio utile 2 = fermi interni (SQN1...) 3 = entrambi	Type of referencing Index 0 = fuel Index 1 = air 0 = standard 1 = stop within usable range 2 = internal stop (SQN1...) 3 = both	OEM	x	x	x
612	Combustibile 1 - Tipo di riferimento del servocomando combustibile 0 = standard 1 = fermo entro il raggio utile 2 = fermi interni (SQN1...) 3 = entrambi	Fuel 1: Type of reference for fuel actuator 0 = standard 1 = range stop in the usable range 2 = internal range stop (SQN1…) 3 = both	OEM		x	
613	Tipo di servocomando **Indice 0** = combustibile **Indice 1** = aria 0 = 5s / 90° (1Nm, 1,2Nm, 3Nm) 1 = 10s / 90° (6Nm) 2 = 17s / 90° (10Nm)	Type of actuator **Index 0** = fuel **Index 1** = air 0 = 5 s / 90° (1Nm, 1,2Nm, 3Nm) 1 = 10 s / 90° (6Nm) 2 = 17 s / 90° (10Nm)	OEM	x	x	x
614	Combustibile 1 :Tipo di servocomando **Indice 0** = combustibile **Indice 1** = aria 0 = 5s / 90° (1Nm, 1,2Nm, 3Nm) 1 = 10s / 90° (6Nm) 2 = 17s / 90° (10Nm)	Fuel 1 : Type of actuator **Index 0** = fuel **Index 1** = air 0 = 5 s / 90° (1Nm, 1,2Nm, 3Nm) 1 = 10 s / 90° (6Nm) 2 = 17 s / 90° (10Nm)	OEM		x	
641	Attivazione procedura di standardizzazione inverter (riferirsi al codice errore 82) 0 = standardizzazione disattivata 1 = standardizzaione attivata	Control of speed standardization of VSD Error diagnostics of negative values (refer to error code 82)0 = no speed standardization 1 = speed standardization active			x	x

645	Configurazione uscita analogica % di carico (valore fabbrica = 0) **0** = DC 0..10 V **1** = DC 2..10 V **2** = DC 0/2..10 V	Configuration of analog output (default value = 0) **0** = DC 0..10 V **1** = DC 2..10 V **2** = DC 0/2..10 V	OEM / Service	**LMV27**	x	x

ATTENTION: as for SQM3x actuators, set the direction according to the acutator function. As far as SQN1x actuators, set **always** the counterclockwise direction, independently from the model chosen for the specific function.

Block 700: Error history

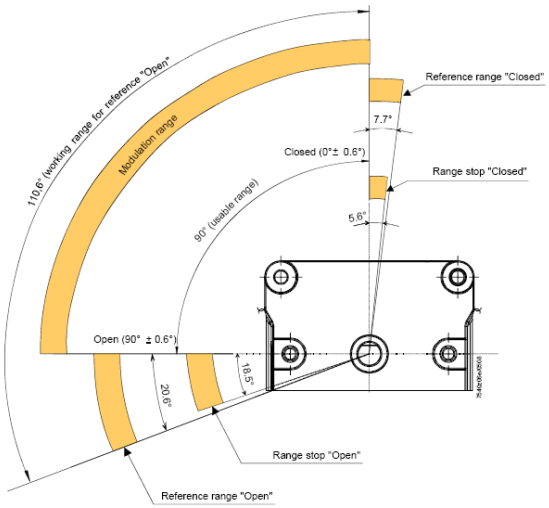
Param.	Descrizione	Description	Password
701	Storico errori: 701 - 725.01.codice	Error history: 701 - 725.01.code	Service / Info
°	Storico errori: 701 - 725.02.codice diagnostico	Error history: 701 - 725.02.diagnostic code	Service / Info
°	Storico errori: 701 - 725.03.classe errore	Error history: 701 - 725.03.error class	Service / Info
°	Storico errori: 701 - 725.04.fase	Error history: 701 - 725.04.phase	Service / Info
°	Storico errori: 701 - 725.05.contatore avvii	Error history: 701 - 725.05.startup counter	Service / Info
725	Storico errori: 701 - 725.06.carico	Error history: 701 - 725.06.load	Service / Info

Block 900: Process data

Param.	Descrizione	Description	Password
903	Potenza attuale (valore fabbrica = 0% - range impostazione = 0-100%) **Indice 0** = combustibile **Indice 1** = aria	Current output (default value = 0% - range = 0-100%) **Index 0** = fuel **Index 1** = air	Service / Info
922	Posizione incrementale servocomandi (valore fabbrica = 0% - range impostazione = -50% - 150%) **Indice 0** = combustibile **Indice 1** = aria	Incremental position of actuators (default value = 0% - range = -50% - 150%) **Index 0** = fuel **Index 1** = air	Service / Info
935	Giri motore assoluti	Absolute speed	OEM / Service
936	Giri motore in fase standardizzazione	Standardized speed	Service / Info
942	Sorgente potenza attiva	Active load source	OEM / Service
945	Solo con **LMV26:** Combustibile attuale 0 = combustibile 0 1 = combustibile 1	Actual fuel 0 = fuel 0 1 = fuel 1	Service / Info
947	Risultato interrogazione contatti (codifica bit)	Result of contact sensing (bit-coded)	Service / Info
950	Stato relè (codifica bit)	Required relay state (bit-coded)	Service / Info
954	Intensità di fiamma (0% ÷ 100%); minima corrente 30% = 4µA; massima corrente100% = 16µA; massima corrente ammissibile = 40µA.	Intensity of flame (range = 0% - 100%) minimum current 30% = 4µA; maximum current100% = 16µA; maximum current possible = 40µA.	Service / Info
961	Stato moduli esterni e display	Status of external modules and display	Service / Info
981	Errore memoria: codice	Error memory: code	Service / Info
982	Errore memoria: codice diagnostica	Error memory: diagnostic code	Service / Info
992	Flag di errore	Error Flags	OEM / Service

Actuators references

An incremental transducer is used to ensure position feedback. Referencing of the actuators must be performed after power-on. In addition, at the end of each shutdown in phase 10, the actuators are referenced to ensure that individual stepping errors, which could lead to shutdown, do not accumulate. If a position error occurs, the system switches to the safety phase (phase 01), enabling the actuators with detected position errors to be referenced. During the following phase 10, the only actuators that are referenced are those that were not referenced before in the safety phase (phase 01). The position of the reference point can be selected depending on the type of burner design, either the CLOSED position (<0°) or the OPEN position (>90°).



Param.	Descrizione	Description	Password
601	Impostazione punto di riferimento **Indice 0** = combustibile **Indice 1** = aria **0** = chiuso (<0°) **1** = aperto (>90°)	Selection of reference point **Index 0** = fuel **Index 1** = air **0** = closed (<0°) **1** = open (>90°)	OEM

If the acutators position is exchanged (error code: 85), the burner will lockout and will try to adjust for three times, then it will lock out.

Gas proving system

Valve proving is only active when firing on gas. This is a leakage test designed to detect leaking gas valves and, if necessary, to prevent the valves from opening or ignition from being switched on. Lockout is initiated. When performing valve proving, the gas valve on the burner side is opened first to bring the test space to atmospheric pressure. Then, the valve is closed whereupon the pressure in the test space must not exceed a certain level, measured by the gas leakage pressure switch (PGCP). Then, the gas valve on the mains side is opened to fill the gas pipe. When the valve is closed again, the gas pressure must not drop below a certain level. Valve proving can be parameterized to take place on startup, shutdown, or on both phases.

Air-fuel curve points

There are 10 air-fuel curve points: T

P0 = ignition position. Only for ignition; after the ignition, the burner works between Point P1 (low flame) and point P9 (high flame) without going back to P0.

P0 can be set everywhere irrespective of all the other points.

COMMISSIONING THE BURNER

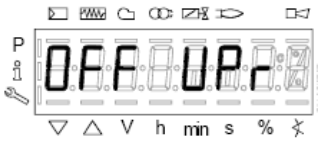
The LMV2x complete programming must be performed on units that has never been set before or reset units (e.g. spare parts).
The programming procedure is performed by setting the following main parameters:

1 if LMV.. is a spare part, insert burner ID (parameter **113**) at least 4 digit.
2 type of fuel train (parameter "**201**")
3 air/fuel ratio curvepoints (Block "**400**")
4 maximum load percentage (parameter "**546**")
5 minimum load percentage (parameter "**545**")

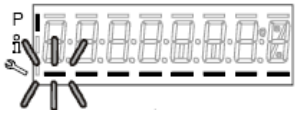
⚠	CAUTION: if an error message as "Loc.." appears when the unit is turned to on for the first time, press ENTER (InFo) until the "Reset" message apperas. After few seconds, the message "OffUpr" will be displayed.

This message shows that the unit has not been programmed before or that the operating mode (fuel train) is not set yet or that the unit has not been completely programmed. Pree keys **F** (Fuel) and **A** (Air) at the same time unitl the display shows **code** and next it will show 7 bars the first on the left is flashing. If the display shows "Off", it means that the unitis already set, then see the instructions on chapter "Adjsuting the burner with LMV2x already programmed").

At the first LMV startup, the AZL display will show

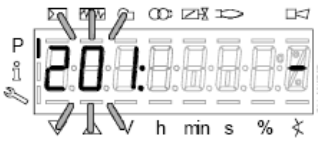


It means that the unit was never set or that no mode was chisen or that some parameters have to be set furthert.
Push F (fuel) and A (Air) together untilthe display shows **code** and then a 7 digit dashed line blinking on the left.



Press the "**+**" key until the first character of the password (the default password is 9876), then press **ENTER (InFo)**, the character now turn to a bar while the second bar starts flashing. Press "**+**" until the second character is entered, then press **ENTER (InFo)**.
Repeat the procedure until the last character si set, then press **ENTER (InFo)**, then **ENTER** again until the message **PArA** appears: then the first parameters block ("**400**") will be shown:

Press **ENTER (InFo)** again, to gain access to programming the operating mode (fuel train):

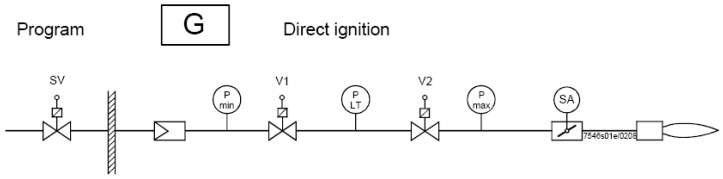


In the example, set configuration **1** = direct gas ignition (G mod).
Other possibilities are below listed:

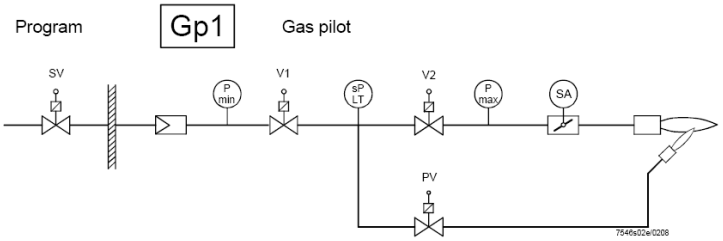
the types of fuel trains are the following:

Param.	Descrizione	Description	Password
201	Modalità funzionamento bruciatore (rampa comb., mod. / multistadio, servocom., ecc.) __= non definito (cancellazione curve)___= **1** = accensione diretta a gas (G mod) **2** = accensione tramite pilota gas con attacco tra le due elettrovalvole EV1/EV2 gas (Gp1 mod) **3** = accens. tramite pilota gas con attacco a monte dell'elettrov. EV1 del gas (Gp2 mod) **4** = accensione a gasolio - modul. (Lo mod) **5** = accens. a gasolio - bistadio (Lo 2 stage) **6** = accens. a gasolio - tristadio (Lo 3 stage)	Burner operating mode (fuel train, mod / multi-stage, actuators, etc.) __= undefined (delete curves) **1** = gas direct ignition(G mod) **2** = gas pilot ignition with connection between the two gas solenodi valves EV1/EV2 (Gp1 mod) **3** = gas pilot ignition with connection upstrem the gas solenoid valve EV1 (Gp2 mod) **4** = Light Oil - modulating (Lo mod) **5** = Light Oil - 2stages (Lo 2 stage) **6** = Light Oil - 3stages (Lo 3 stage)	OEM / Service

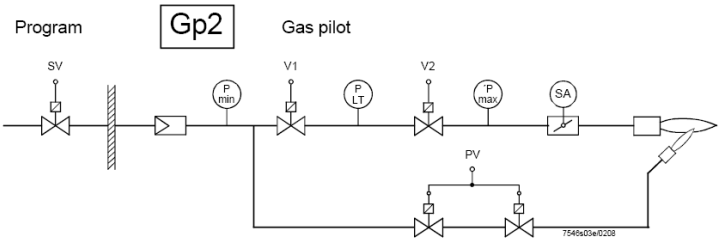
G mod



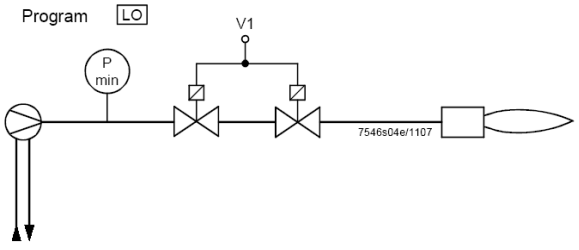
Gp1 mod



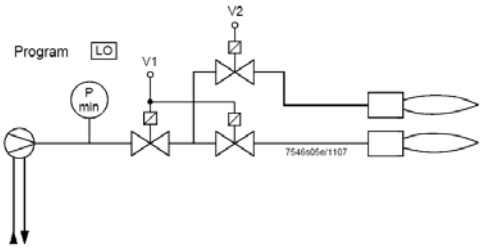
Gp2 mod



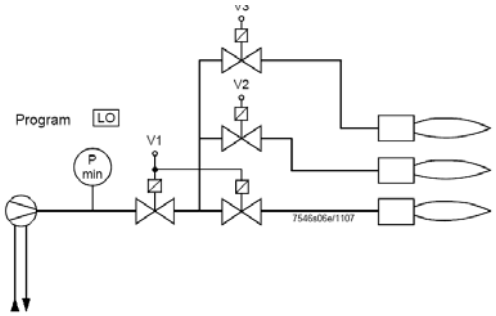
Lo mod



Lo 2-stage

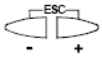


Lo 3-stage



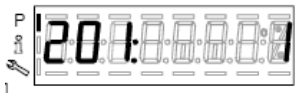
In the example the Gmod gas train has been set (Configuration “1”).

Choose the fuel train by pressing ENTER, then press “**+**” / “**-**”. Press ENTER to confirm: number “1” will appear on the right side of the display.

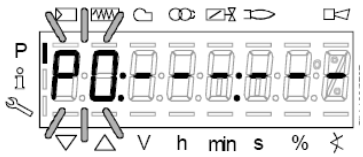


Then press ESC

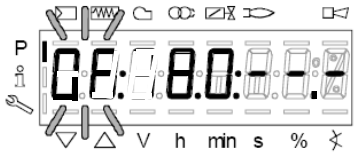
to quit. The following display is:



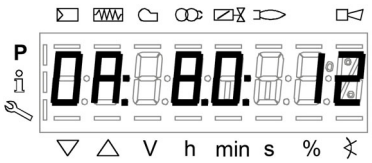
Press “**+**” to show the first point to be set P0.



Press **F** and **“+”** to increase the opening angle of the fuel actuator “**0F”** until the requested value is reached (for example 12°÷15°, see below) for the ignition point; or press **F** and **“-”** to decrease the angle:



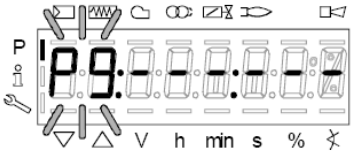
To set the air damper opening angle “0A” in the ignition point (10° for example - see below), press “A” and “+” “A” and “-” at the same time:



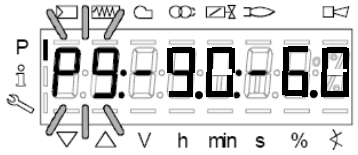
LMV37:

Now the air and fuel quantities are set at the ignition point P0:

By pressing “+”, point P9 can be programmed to set the air and fuel values at the maximum output

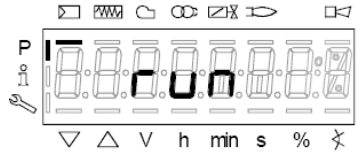


go on as described above to the the opening angles of the air actuator (A) and fuel actuator (F):



⚠	**CAUTION:** at the first burner adjustment, it is recommended to set the maximum output P9 at the same value (or little higher) of the ignition point, in order to safely reach point P9 next (see next paragraph).

By pressing “+” the display will show:



The burner is ready to startup. Now it is possible to re-set the curve points while the burner is operating (“warm setting”) by pressing the ENTER (InFo) or while the burner is in stand-by mode (“cold setting”) by pressing ENTER .

Warm setting

1 Once pressed button **"enter"** and the chain thermostats open (X5-03 terminals), the LMV.. show Ph12.Then close the chain termostat and the unit performs the prepurge cycle (see "Phases List") and stops at the ignition point P0 without ignition anyway.

2 By pressing "+", the burners lights abd the air/fuel ratio can be properly set in presence of flame.

3 By pressing "+" again, the next point P1 is shown (eqaul to P0 as the unit automatically set P0=P1);

4 By pressing "+" again, the "Calc" message will be displayed: the unit is processing the sir/fuel ratio curvepoints until point P9, previuosly set. Once the processing is perfomed the calculated point P2 is shown.By pressing "+" again, the "Calc" message will be displayed: the unit is processing the sir/fuel ratio curvepoints until point P9, previuosly set. Once the processing is perfomed the calculated point P2 is shown.

5 By pressing "+", it is possible to go through the processed curve until point P9 is reached.

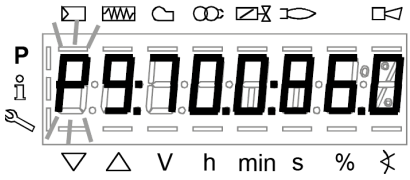
Note: if the point doesn't blink, servomotors are still running.

6 n order to set P9 with the gas flow rate according to the generator needs, follow this procedure:

Note: the purpose is to fully open the gas throttle and later on to adjust the gas flow rate through the gas pressure governor.

- Operate smoothly opening by just a few degrees the air damper and later on increasing the gas throttle opening it by a few degrees. Keep monitoring the flue through the flue analyser. Keep the air excess inside normal figures (from 3% to 7% residual O2) operating by means for the air damper servomotor;
- Keep increasing the air damper opening and then the gas throttle, as done in the sequence above, remebering to get the full firing rate wih the gas throttle fully open (or the oil pressure regulator at its maximum pressure position).

See example below:



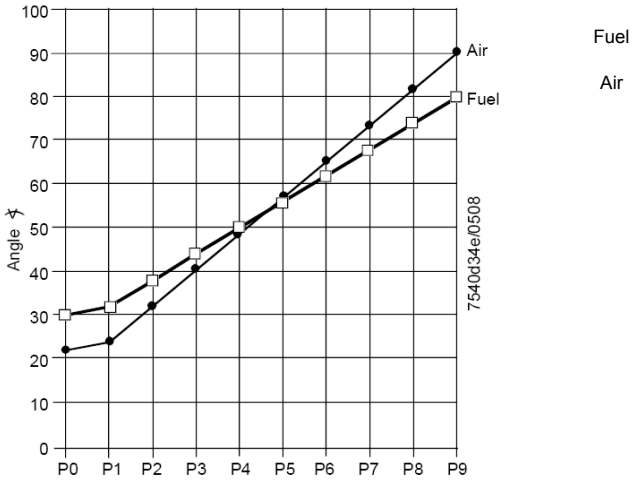
- If, while opening the gas throttle, the gas flow rate was too high, reduce it only through the gas governor and keep opening the throttle until the 60÷70° position is got.
- If the gas train is equipped with a governor and a valve with an adjustable gas flow rate, fully open also this last valve, smoothly! The gas flow rate is always set by means of the governor.

7 As soon as all the devices are fully open, set the gas flow rate through the governor.

8 Set the air damper position in order to get the reccomended air excess (3÷4.8% O2 on gas and 2.9÷4.9 % on oil).

Note1: on high flame, if the gas flow rate is changed by means of the governor, all the other points below high flame must be checked again.

9 After having set the high flame point P9, keep "-" pressed for some seconds unitl "Calc" is displayed in order to have the LMV recalculating all the points:



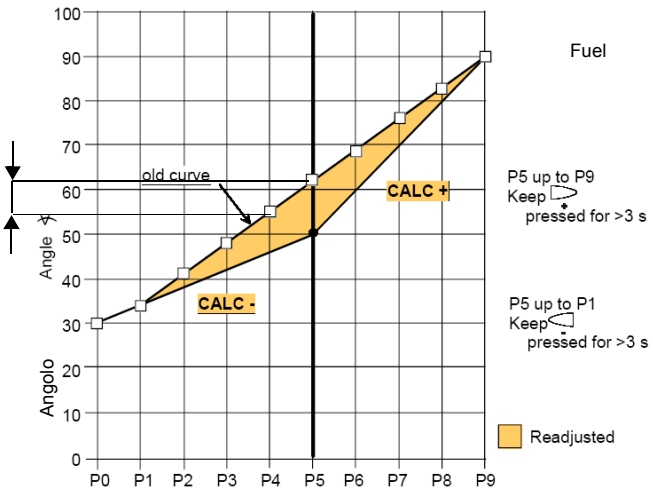
10 the unit will automatically reach point P8 processed: check the combustion values in this point and, if necessary, change it.

11 Press "-" to go down to the lower points and check the combustion values, change the points if necessary.

Note: if in an intermediate point (for example P5), the change of the actuators position is important according to the processed point

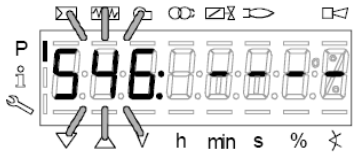
P5, keep pressing “-” unitl “Calc” is displayed. The curve will be processed again downwards point P1.

deviation between two following points: 25°max.

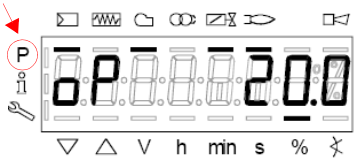


12 press “-” to go through the lower points and check the combustion values, if necessary change the points as described above.

13 By pressing ESC, at the end of the points adjusments, the parameter “**546”** (setting the maximum load) will be displayed; press ENTER (InFo), then “+” until 100%, then press ENTER (InFo) again, ESC and then “+”.



14 The parameter “**545”** (setting the minimum load) is displayed: press ENTER (InFo), then “+” until 20%. Press ENTER, then press ESC for three times. The message “oP” will be displayed as well as the load percentage at the burner is working on.



he hyphen related to the symbol “P” (highlited in the picture) will be off to show that the unit exited the programmig mode. The burner will then work automatically, following the curve set.

.**Note1:** if the curvepoints settings is quit before end (by pressing ESC or for a faulty shutdown), the message “OFF UPr” (Start prevention) will be diplayed until all the curvepoints will be set.

Note2: if the gas flow rate at high flame point (maximum load) is changed by means of the pressure stabiliser, all the curvepoints must be checked by going through the curve downwards and resetting them if necessary.

Note3: if the point does not flash, it means thet the actuators have not reached the set position yet.

Note4: if an error occurs causing a safety shutdwon during the processing of the curve, the processing itself will be interrupted.

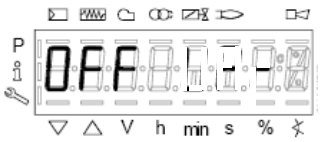
Cold setting

The ”cold setting“ (without flame) can be performed only when all the curve points values are known (for instance, in case of replacement).

⚠	**When the burner is off, if you modify one curve set point, when the burner restarts the AZL2x shows OFF UPr (OFF UPr0 or OFF UPr1 for LMV26). The LMV.. then, requires a new "warm" startup (see procedure paragraph "Warm Setting”) by checking again all points of curve from P0 to P9.**

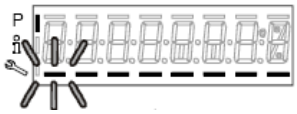
BURNER STARTUP WITH LMV2x ALREADY PROGRAMMED

Once the LMV turns on, the AZL display will show



The burners is basically factory set. The air/fuel ratio curve is set with the maximum output point P9 a little higher or equal to P0. To adjust the burner on the plant site, adjust the maximum output point to the flow rate values really requested. Then go through the curve-points, by pressing "+" several times to reach point P9: then adjust the air actuator position (for the air damper) and the fuel acttuator (for the butterfly valve, in case of gas or the oil pressure governor incase of oil), by adjusting the fuel flow rate by means of the gas pressure stabiliser (for gas) or the oil pressure governor (for oil), checking the combustion valeus contemporarly. Once the burner is adjusted at the maximum output, press "-" for more than 5 seconds to process the curve downwards. The curve is then a straight line: go on checking the combustion values point by point; change them if necessary and in case linearise the curve again.

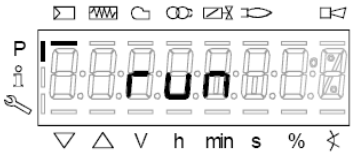
Before starting the burner up, press **F** and **A** at the same time



enter the password following the procedure on chapter "Programming LMV2x".

Press ENTER until the display will show:

Press ENTER again: it will show



press ENTER (InFo) : the display will show phase 12.

Ph12: *Standby* phase (stationary)

Ph12: *Standby* phase (stationary)

By closing the thermostatic series, the burner startup cycle will take place:

Ph22: *Fan ramp up* phase (fan motor = ON, safety shutoff valve = ON)

Ph24: *Traveling to prepurge position* phase

Ph30: *Prepurge* phase

Ph36: *Traveling to ignition position* phase

Ph38: *Preignition* phase

Ph40: *1st safety time* phase (ignition transformer ON)

Ph42: *1st safety time* phase (ignition transformer OFF), preignition time OFF

Ph44: *Interval1*

The startup sequence stops at phase 44.

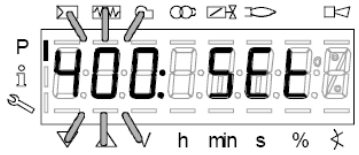
The burners is lit and is in"P1" position (low flame point):

Set the air/fuel ratio curvepoints as described on chapter “Programming the LMV2x”

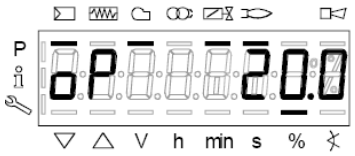
Note: the other phases are
Ph60 = operation (OP= in modulation)
Ph62 = travelling to shutdown
Ph70 = off but in prepurge after the burntime
Ph72 = travelling to postpurging
Ph74 = postpurge (countdown is displayed)

Press ESC the parameter “**546**” (Setting the maximum load) is displayed

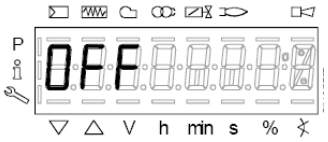
Then press to exit the programming mode.
The display will show:



Press for a second time: the display will show the load percentage the burner is working at.



When the generator reaches the programmed set-point, the burner will be in stand-by: the display will show



Reset / manual lockout

The system can be manually locked by simultaneously pressing the **ENTER (InFo)** button and **any other button** on the AZL2.... This function allows the user to stop the system from the operating level should an emergency occur. When making a reset, the following actions are carried out:

- Alarm relay and the fault display are off
- the lockout position is cancelled
- the unit performs a reset, then it switches to stand-by

If the unit is in the lockout position, a reset can be made by pressing the **InFo** button for 1…3 seconds. The function is available only when the unit is in the lockout position. Longer or shorter pushes on the button do not produce a reset so that the system maintains the lockout position.

Codice errore / Error code	Codice diagnostico / Diagnostic code	Descrizione / Meaning
167	2	/ Manual lockout via AZL2…

Timeout for menu operation

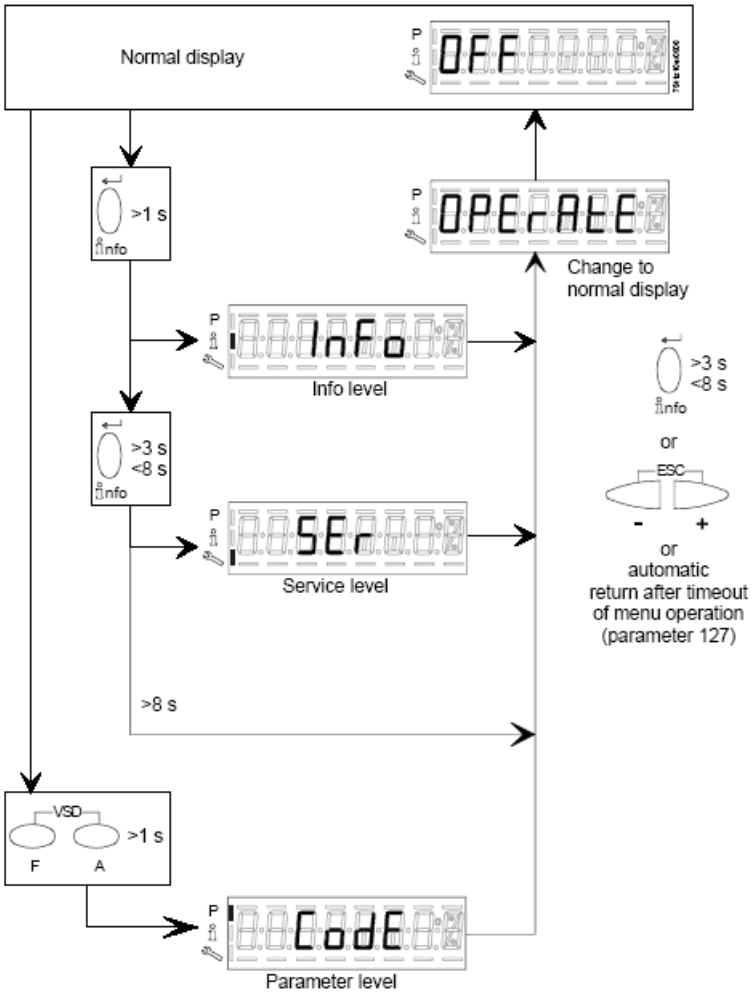
The time for automatically leaving the parameter setting level can be adjusted between 10 and 120 minutes, using the parameter 127 (Timeout for menu operation). If, during that period of time, there is no operation via the AZL2..., the parameter setting level is quit and the password level reset to *Info / Service*.

Caution! In addition, this timeout or interruption of communication between the LMV2.. and the AZL2... during the time the curves are set leads to lockout!

Codice erroreC Error code	Codice diagnostico Diagnostic code	DescrizioneMeaning
167	8	Manual locking

Entering the Parameter levels

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



The burner and consequently the LMV2x.. are factory set; the air and fuel curves as set as well.

Info level

To enter the **Info** level, proceed as follows:

1 in any menu position, press keys **+** and **-** at the same time, then the program will start again: the display will show **OFF**.

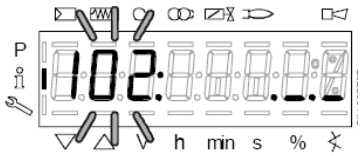
2 , until the display will show **InFo**, Press the **enter (InFo)** key

3 then il will show the first code (167) flashing, on the right side it will show the data entered. By pressing **+** or **-** it is possible to scroll (up or down) the parameter list.

4 If a dot-line is shown on the right, there is no enough room for complete visualisation: press **enter** again the data will be completely shown for 1 to 3 seconds. By pressing **enter** or **+** and**-** at the same time, the system will exit the parameter visualisation and go back to the flashing number.The **Info** level shows some basic parameters as:

Parameter	***Description***
167	Cubic meters of fule (resettable)
162	Operating hours (resettable)
163	Device operating hours
164	Burners start-ups (resettable)
166	Total number of start-ups
113	Burner number (i.e. serial number)
107	Software version
102	Software date
103	Device serial number
104	Customer code
105	Version
143	Free

5 Example: choose parameter 102 to show the date



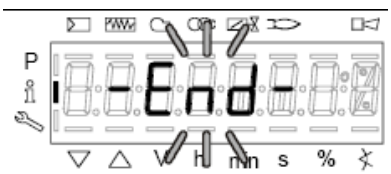
the display shows parameter **102** flashing on the left and characters **._._** on the right.

6 press InFo for 1-3 seconds: the date will appear

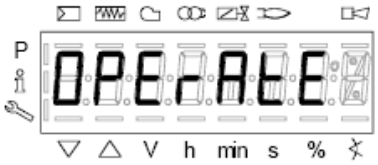
7 press InFo to go back to parameter “102”

8 by pressing + / -, it is possible to scroll up/down the parameter list (see table above), or, by pressing ESC or InFo for more seconds, the display will show

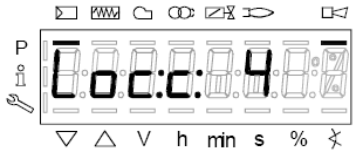
9 Once the last parameter is accessed (143) by pressing **+** , the **End** message will flash.



10 Press **InFo** for more than three seconds or for more than three seconds orto return to the normal display.



If a message like the one below is shown during operation,



it means that the burner is locked out and the Errore code is shown (in the example “error code:4”); this message is alternating with another message

Diagnostic code (in the example “diagnostic code:3”). Record the codes and find out the fault in the Error table

To perform the reset, press InFo for one second:

The unit displays an event which does not lead to shutdown.

The display shows current error code **c:** alternating with diagnostic code **d**:

.

Press **InFo** to return to the display of phases.

Example: Error code **111** / diagnostic code 0

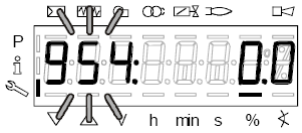
To reset, press InFo for a second. Record the codes and check the Error List to find the type of faults.

Service level

To enter the Service mode, press InFo until the display will show:

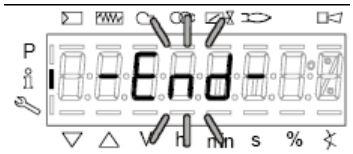
The service level shows all the information about flame intensity, actuators position, number and lock codes:

Parameter	***Description***
954	Flame intensity
121	% output, if set = automatic operation
922	Actuators position, 00=combustibile; 01= aria
161	Lock-outs number
701..725	Lock-outs History (see chapter 23 in the LMV2x manual)

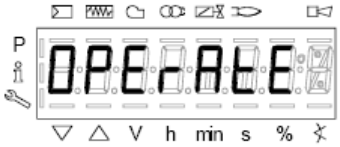


1 the first parameter will be “954”: the percentage of flame is shown on the right. By pressinf + or - it is possible to scroll up/down the parameter list.

2 Once the last parameter is accessed (143) by pressing **+** , the **End** message will blink.



3 Press **InFo** for more than three seconds or for more than three seconds orto return to the normal display.



PHASES LIST

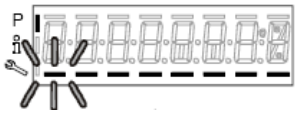
Fase /Phase	Funzione	Function
Ph00	Fase blocco	Lockout phase
Ph01	Fase di sicurezza	Safety phase
Ph10	t10 = tempo raggiungimento posizione riposo	t10 = home run
Ph12	Pausa	Standby (stationary)
Ph22	t22 = tempo di salita ventilatore (motore ventilatore = ON, valvola intercettazione di sicurezza = ON)	t22 = fan ramp up time (fan motor = ON, safety shutoff valve = ON)
Ph24	Verso posizione preventilazione	Traveling to the prepurge position
Ph30	t1 = tempo preventilazione	t1 = prepurge time
Ph36	Verso posizione accensione	Traveling to the ignition position
Ph38	t3 = tempo preaccensione	t3 = preignition time
Ph40	TSA1 = primo tempo sicurezza (trasformatore accensione ON)	TSA1= 1st safety time (ignition transformer ON)
Ph42	TSA1 = primo tempo sicurezza (trasformatore accensione OFF)	TSA1 = 1st safety time (ignition transformer OFF), t42 = preignition time OFF
Ph44	t44 = intervallo 1	t44 = interval 1
Ph50	TSA2 = secondo tempo sicurezza	TSA2 = 2nd safety time
Ph52	t52 = intervallo 2	t52 = interval 2
Ph60	Funzionamento 1 (stazionario)	Operation 1 (stationary)
Ph62	t62 = massimo tempo bassa fiamma (funzionamento 2, in preparazione per spegnimento, verso bassa fiamma)	t62 = max. time low-fire (operation 2, preparing for shutdown, traveling to low-fire)
Ph70	t13 = tempo postcombustione	t13 = afterburn time
Ph72	Verso posizione postcombustione	Traveling to the postpurge position
Ph74	t8 = tempo postventilazione	t8 = postpurge time
Ph80	t80 = tempo evacuazione controllo tenuta valvole	t80 = valve proving test evacuation time
Ph81	t81 = tempo perdita pressione atmosferica, prova atmosferica	t81 = leakage time test time atmospheric pressure, atmospheric test
Ph82	t82 = test perdita, test riempimento	t82 = leakage test filling test, filling
Ph83	t83 = tempo perdita pressione gas, test pressione	t83 = leakage test time gas pressure, pressure test
Ph90	Tempo attesa “mancanza gas”	Gas shortage waiting time

BACKUP PARAMETER WITH AZL2x

On the AZL2x you can save the configuration to download on another appliance LMV.

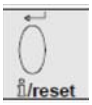
To do this:

access up, press **F** and **A** at the same time

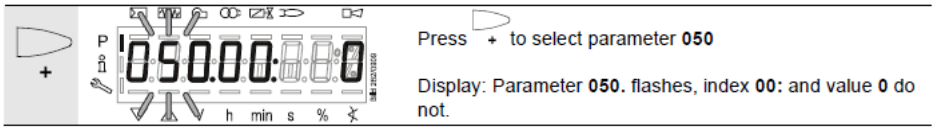


enter the password following the procedure on chapter “Programming LMV2x”.

Press ENTER until the display will show:

with the button go to the group **000** of the parameters and press 

;with the buttons **+** and **-** go to **050** parameter



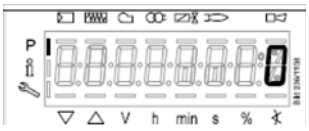
press

the disply show

press again

with the button **+** select **1** and start the backup process by pressing

.

After about 5 seconds the backup process ends and the display shows 

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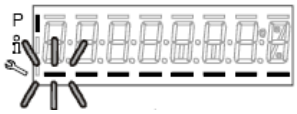
⚠	**It is recommended that you perform a backup procedure whenever you change the parameters of the LMV for having a copy in AZL2x!**

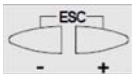
RESTORE PARAMETER FROM AZL2x TO LMV..

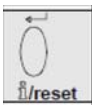
To copy the previously saved configuration on AZL2x proceed as follows:
access up, press **F** and **A** at the same time



enter the password following the procedure on chapter “Programming LMV2x”.
Press ENTER until the display will show:

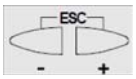
⚠	**To copy the configuration from AZL2x to LMV. It is important that the type of LMV is the same (for example LMV20 with LMV20, etc.) and that 113 "Burner ID" of the burner is the same value that is saved in the configuration you want to copy.**

With the buttons 

go to the group **100** of the parameters, press на 

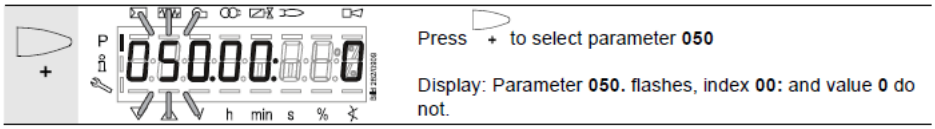
and always with the buttons **+** and **-** go to **113** parameter "Burner ID", press

and verify (and/or change with buttons by pressing enter to confirm)

iWith the buttons 

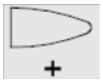
go to the group **000** of the parameters, press

end select the **050** parameter



press

the disply show

with the button 

the display shows

press again

with the button **+** select **1** and start the restore process by pressing

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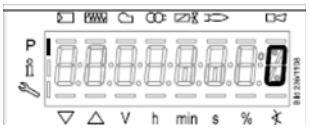
After about 5 seconds the restore process ends and the display shows 

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Now, LMV has the same configuration that was stored on AZL2x.

ERROR CODE TABLE

Error code	Diagnostic code	Meaning for the LMV2x/3x... system	Remedy
no Comm		**No communication between LMV26... basic unit and AZL2...**	Check wiring for line interruption/loose contact
2	**#**	**No flame at the end of safety time (TSA)**	
	1	*No flame at the end of safety time 1 (TSA1)*	
	2	*No flame at the end of safety time 2 (TSA2)*	
3	**#**	Air pressure failure	
	0	*Air pressure off*	
	1	*Air pressure on*	
	4	*Air pressure on – prevention of startup*	
	20	*Air pressure, combustion pressure – start prevention*	
	68	*Air pressure, POC – start prevention*	
	84	*Air pressure, combustion pressure, POC – start prevention*	
4	**#**	**Extraneous light**	
	0	*Extraneous light during startup*	
	1	*Extraneous light during shutdown*	
	2	*Extraneous light during startup – prevention of startup*	
	6	*Extraneous light during startup, air pressure – start prevention*	
	18	*Extraneous light during startup, combustion pressure – start prevention*	
	24	*Extraneous light during startup, air pressure, combustion pressure – start prevention*	
	66	*Extraneous light during startup, POC – start prevention*	
	70	*Extraneous light during startup, air pressure, POC – start prevention*	
	82	*Extraneous light during startup, combustion pressure, POC – start prevention*	
	86	*Extraneous light during startup, air pressure, combustion pressure, POC – start prevention*	
7	**#**	**Loss of flame**	
	0	*Loss of flame*	
	3...255	*Loss of flame due to TÜV test (loss-of-flame test)*	Diagnostics corresponds to the period of time from shutdown of fuel valves to the detection of loss of flame (resolution 0.2 s → Value 5 = 1 s)

Error code	Diagnostic code	Meaning for the LMV20... system	Remedy
12	**#**	**Valve proving**	
	0	*Fuel valve 1 (V1) leaking* *(fuel valve 2 with valve proving via X5-01)*	With valve proving via X5-01 (gas pressure switch-min) - Check if valve on the burner side is leaking - Check if pressure switch for valve proving is closed, if gas pressure exist - Check wiring for short-circuit
	1	*Fuel valve 2 (V2) leaking* *(fuel valve 1 with valve proving via X5-01)*	With valve proving via X5-01 (gas pressure switch-min) - Check if valve on the gas side is leaking - Check wiring for short-circuit
	2	*Valve proving not possible*	Valve proving activated, but pressure switch-min selected as input function for X9-04 (check parameters 238 and 241)
	3	*Valve proving not possible*	Valve proving activated, but no input assigned (check parameters 236 and 237)
	4	*Valve proving not possible*	Valve proving activated, but 2 inputs assigned (set parameter 237 to pressure switch-max or POC)
	5	*Valve proving not possible*	Valve proving activated, but 2 inputs assigned (check parameters 236 and 237)
	81	*V1 leaking*	Check to see if the valve on the gas side is leaking Check wiring to see if there is an open-circuit
	83	*V2 leaking*	Check to see if the valve on the burner side is leaking Check to see if the pressure switch for the leakage test is closed when gas pressure is present Check wiring for short-circuit
14	**#**	**POC**	
	0	*POC open*	Check to see if the valve's closing contact is closed
	1	*POC close*	Check wiring Check to see if the valve's closing contact opens when valve is controlled
	64	*POC open - start prevention*	Check wiring to see if there is a line interruption. Check to see if the valve's closing contact is closed
19	*80*	*Combustion pressure, POC – start prevention*	Check to see if pressure switch has closed with no combustion pressure present Check wiring for short-circuit
20	**#**	**Pressure switch-min (Pmin)**	
	0	*No minimum gas /oil pressure*	Check wiring for open-circuit
	1	*Gas shortage – start prevention*	Check wiring for open-circuit
21	**#**	**Pressure switch-max / POC**	
	0	*Pressure switch-max: Max. gas / oil pressure exceeded* *POC: POC open (software version ≤ V02.00)*	Check wiring to see if there is a line interruption. POC: Check to see if the valve's closing contact is closed.

Error code	Diagnostic code	Meaning for the LMV2x/3x... system	Remedy
22 OFF S	**#**	**Safety loop / burner flange**	
	0	*Safety loop / burner flange open*	
	1	*Safety loop / burner flange open - prevention of startup*	
	3	*Safety loop/burner flange, extraneous light – start prevention*	
	5	*Safety loop/burner flange, air pressure – start prevention*	
	17	*Safety loop/burner flange, combustion pressure – start prevention*	
	19	*Safety loop/burner flange, extraneous light, combustion pressure – start prevention*	
	21	*Safety loop/burner flange, air pressure, combustion pressure – start prevention*	
	23	*Safety loop/burner flange, extraneous light, air pressure, combustion pressure – start prevention*	
	65	*Safety loop/burner flange, POC – start prevention*	
	67	*Safety loop/burner flange, extraneous light, POC – start prevention*	
	69	*Safety loop/burner flange, air pressure, POC – start prevention*	
	71	*Safety loop/burner flange, extraneous light, air pressure, POC – start prevention*	
	81	*Safety loop/burner flange, combustion pressure, POC – start prevention*	
	83	*Safety loop/burner flange, extraneous light, combustion pressure, POC – start prevention*	
	85	*Safety loop/burner flange, air pressure, combustion pressure, POC – start prevention*	
	87	*Safety loop/burner flange, extraneous light, air pressure, combustion pressure, POC – start prevention*	
50	**#**	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
51	**#**	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
55	**#**	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
56	**#**	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
57	**#**	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit

Error code	Diagnostic code	Meaning for the LMV2x/3x... system	Remedy
58	**#**	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
61 Fuel Chg	**#**	**Fuel changeover**	
Fuel Chg	*0*	*Fuel 0*	No error - change to Fuel 0
Fuel Chg	*1*	*Fuel 1*	No error - change to Fuel 1
62 Fuel Err	**#**	**Invalid fuel signals / fuel information**	
Fuel Err	*0*	*Invalid fuel selection (Fuel 0 + 1 = 0)*	Check wiring to see if there is an open-circuit Note Curves cannot be set.
Fuel Err	*1*	*Different fuel selection between the µCs*	Make a reset; if error occurs repeatedly, replace the unit
Fuel Err	*2*	*Different fuel signals between the µCs*	Make a reset; if error occurs repeatedly, replace the unit
Fuel Err	*3*	*Invalid fuel selection (Fuel 0 + 1 = 1)*	Check wiring for short-circuit Note Curves cannot be set. LMV26...: Optional press reset button >3 seconds.
65	**#**	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
66	**#**	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
67	**#**	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
70	**#**	**Internal error fuel-air ratio control: Position calculation modulating**	
	23	*Output invalid*	No valid output
	26	*Curvepoints undefined*	Adjust the curvepoints for all actuators
71	**#**	**Special position undefined**	
	0	*Home position*	Parameterize the home position for all actuators used
	1	*Prepurge position*	Parameterize the prepurge position for all actuators used
	2	*Postpurge position*	Parameterize the postpurge position for all actuators used
	3	*Ignition position*	Parameterize the ignition position for all actuators used
72	**#**	**Internal error fuel-air ratio control**	Make a reset; if error occurs repeatedly, replace the unit
73	**#**	**Internal error fuel-air ratio control: Position calculation multistep**	
	23	*Output invalid*	No valid output
	26	*Curvepoints undefined*	Adjust the curvepoints for all actuators

Error code	Diagnostic code	Meaning for the LMV2x/3x... system	Remedy
75	**#**	**Internal error fuel-air ratio control: Data clocking check**	
	1	*Current output different*	
	2	*Target output different*	
	4	*Target positions different*	
	16	*Different positions reached*	Can be caused by different standardized speeds (e.g. after restore of data set) when the VSD is activated → standardize again and check adjustment of the fuel-air ratio control system
76	**#**	**Internal error fuel-air ratio control**	Make a reset; if error occurs repeatedly, replace the unit
80	**#**	**Control range limitation of VSD**	Basic unit could not correct the difference in speed and reached a control range limit. 1. Basic unit is not standardized for this motor → repeat standardization. **Caution!** **Settings of fuel-air ratio control must be checked.** 2. Ramp time settings of the VSD are not shorter than those of the basic unit (parameters 522, 523). 3. Characteristic of the VSD is not linear. Configuration of the voltage input at the VSD must accord with that of the basic unit (parameter 645). 4. VSD does not follow quickly enough the changes of the basic unit. Check settings of the VSD (input filter, slippage compensation, hiding different speeds)
	1	*Control range limitation at the bottom*	VSD speed was too high
	2	*Control range limitation at the top*	VSD speed was too low
81	*1*	*Interrupt limitation speed input*	Too much electromagnetic interference on the sensor line → improve EMC

Error code	Diagnostic code	Meaning for the LMV2x/3x... system	Remedy
82	**#**	**Error during VSD's speed standardization**	
	1	*Timeout of standardization (VSD ramp down time too long)*	Timeout at the end of standardization during ramp down of the VSD → ramp time settings of the VSD are not shorter than those of the basic unit (parameter: 523)
	2	*Storage of standardized speed not successful*	Error during storage of the standardized speed → lock the basic unit, then reset it and repeat the standardization
	3	*Line interruption speed sensor*	Basic unit receives no pulses from the speed sensor: 1. Motor does not turn. 2. Speed sensor is not connected. 3. Speed sensor is not activated by the sensor disk (check distance)
	4	*Speed variation / VSD ramp up time too long / speed below minimum limit for standardization*	Motor has not reached a stable speed after ramp up. 1. Ramp time settings of the VSD are not shorter than those of the basic unit (parameters 522, 523). 2. Characteristic of the VSD is not linear. Configuration of the voltage input at the VSD must accord with that of the basic unit (parameter 645). 3. VSD does not follow quickly enough the changes of the basic unit. Check settings of the VSD (input filter, slippage compensation, hiding different speeds) 4. Speed of VSD lies below the minimum for standardization (650 1/min)
	5	*Wrong direction of rotation*	Motor's direction of rotation is wrong. 1. Motor turns indeed in the wrong direction → change parameterization of the direction of rotation or interchange 2 live conductors. 2. Sensor disk is fitted the wrong way → turn the sensor disk.
	6	*Unplausible sensor signals*	The required pulse pattern (60°, 120°, 180°) has not been correctly identified. 1. Speed sensor does not detect all tappets of the sensor disk → check distance 2. As the motor turns, other metal parts are detected also, in addition to the tappets → improve mounting. 3. Electromagnetic interference on the sensor lines → check cable routing, improve EMC
	7	*Invalid standardized speed*	The standardized speed measured does not lie in the permissible range → motor turns too slowly or too fast
	15	*Speed deviation µC1 + µC2*	The speeds of microcomputer 1 and 2 deviated too much. This can be caused by wrong standardized speeds (e.g. after restoring a data set to a new unit) → repeat standardization and check the fuel-air ratio

Error code	Diagnostic code	Meaning for the LMV2x/3x... system	Remedy
	20	*Wrong phase of phase manager*	Standardization was made in a wrong phase. Permitted are only phases ≤12 → controller OFF, start standardization again
	21	*Safety loop / burner flange open*	Safety loop or burner flange is open → repeat standardization with safety loop closed
	22	*Air actuator not referenced*	Air actuator has not been referenced or has lost its referencing. 1. Check if the reference position can be approached. 2. Check if actuators have been mixed up. 3. If error only occurs after the start of standardization, the actuator might be overloaded and cannot reach its destination.
	23	*VSD deactivated*	Standardization was started with VSD deactivated → activate the VSD and repeat standardization
	24	*No valid operating mode*	Standardization was started without valid operating mode → activate valid operating mode and repeat standardization
	25	*Pneumatic air-fuel ratio control*	Standardization was started with pneumatic air-fuel ratio control → standardization with pneumatic air-fuel ratio control not possible
	128	*Running command with no preceding standardization*	VSD is controlled but not standardized → make standardization
	255	*No standardized speed available*	Motor turns but is not standardized → make standardization

Error code	Diagnostic code	Meaning for the LMV2x/3x... system	Remedy
83	**#**	**Speed error VSD**	Required speed has not been reached
	Bit 0 *Valency 1*	*Lower control range limitation of control*	Speed has not been reached because control range limitation has become active → for measures, refer to error code 80
	Bit 1 *Valency 2...3*	*Upper control range limitation of control*	Speed has not been reached because control range limitation has become active → for measures, refer to error code 80
	Bit 2 *Valency 4...7*	*Interruption via disturbance pulses*	Speed has not been reached due to too much electromagnetic interference on the sensor line → for measures, refer to error code 81
	Bit 3 *Valency ≥ 8*	*Curve too steep in terms of ramp speed*	Speed has not been reached because detected curve slope was too steep. 1. With a LMV26... ramp of 20 s, the curve's slope may be a maximum of 10% speed change between 2 curvepoints in modulating mode. With a LMV26... ramp of 10 s, the curve's slope may be a maximum of 20% speed change between 2 curvepoints in modulating mode. With a LMV26... ramp of 5 s, the curve's slope may be a maximum of 40% speed change between 2 curvepoints in modulating mode. → Between the ignition point (P0) and the low-fire point (P1), the speed change in modulating mode may be a maximum of 40%, independent of the LMV26... ramp. 2. The setting of the VSD ramp must be about 20% faster than the ramps in the basic unit (parameters 522, 523).
	Bit 4 *Valency ≥ 16*	*Interruption of speed signal*	No speed detected in spite of control. 1. Check if the motor turns. 2. Check if the speed sensor delivers a signal (LED / check distance from the sensor disk). 3. Check wiring of the VSD.
	Bit 5 *Valency ≥ 32*	*Quick shutdown due to excessive speed deviation*	Speed deviation was for about 1 s >10% outside the anticipated range. 1. Check ramp times of the LMV26... and VSD. 2. Check wiring of the VSD.

Error code	Diagnostic code	Meaning for the LMV2x/3x... system	Remedy
84	**#**	**Curve slope actuators**	
	Bit 0 *Valency 1*	*VSD: Curve too steep in terms of ramp speed*	1. The curve's slope may be a maximum of 10% speed change between 2 curvepoints in modulating operation, with a LMV26... ramp of 20 seconds The curve's slope may be a maximum of 20% speed change between 2 curvepoints in modulating operation, with a LMV26... ramp of 10 seconds The curve's slope may be a maximum of 40% speed change between 2 curvepoints in modulating operation, with a LMV26... ramp of 5 seconds → Between the ignition point (P0) and the low-fire point (P1), the speed change in modulating mode may be a maximum of 40%, independent of the LMV26... ramp. 2. Setting of the VSD ramp must be about 20% shorter than the ramps in the basic unit (parameters 522 and 523)
	Bit 1 *Valency 2..3*	*Fuel actuator: Curve too steep in terms of ramp rate*	The slope of the curve may be a maximum position change of 31° between 2 curvepoints in modulating mode
	Bit 2 *Valency 4..7*	*Air actuator: Curve too steep in terms of ramp rate*	The slope of the curve may be a maximum position change of 31° between 2 curvepoints in modulating mode
85	**#**	*Referencing error ones actuators*	
	0	*Referencing error of fuel actuator*	Referencing of fuel actuator not successful. Reference point could not be reached. 1. Check to see if actuators have been mixed up. 2. Check to see if actuator is locked or overloaded.
	1	*Referencing error of air actuator*	Referencing of fuel actuator not successful Reference point could not be reached. 1. Check to see if actuators have been mixed up. 2. Check to see if actuator is locked or overloaded.
	Bit 7 *Valency ≥ 128*	*Referencing error due to parameter change*	Parameterization of an actuator (e.g. the reference position) has been changed. To trigger new referencing, this error is set
86	**#**	**Error fuel actuator**	
	0	*Position error*	Target position could not be reached within the required tolerance band → check to see if actuator is locked or overloaded
	Bit 0 *Valency 1*	*Line interruption*	*Line interruption* detected at actuator's terminals → check wiring (voltage X54 across pin 5 or 6 and pin 2 >0.5 V)
	Bit 3 *Valency ≥8*	*Curve too steep in terms of ramp rate*	The slope of the curve may be a maximum position change of 31° between 2 curvepoints in modulating mode
	Bit 4 *Valency ≥ 16*	*Step deviation in comparison with last referencing*	Actuator was overloaded or mechanically twisted. 1. Check to see if the actuator is blocked somewhere along its working range. 2. Check to see if the torque is sufficient for the application.

Error code	Diagnostic code	Meaning for the LMV2x/3x... system	Remedy
87	**#**	**Error air actuator**	
	0	*Position error*	Target position could not be reached within the required tolerance band → check to see if actuator is locked or overloaded
	Bit 0 *Valency 1*	*Line interruption*	Line interruption detected at actuator's terminals → check wiring (voltage X53 across pin 5 or 6 and pin 2 >0.5 V)
	Bit 3 *Valency ≥ 8*	*Curve too steep in terms of ramp rate*	The slope of the curve may be a maximum position change of 31° between 2 curvepoints in modulating mode
	Bit 4 *Valency ≥ 16*	*Sectional deviation in comparison with last referencing*	Actuator was overloaded or mechanically twisted. 1. Check to see if the actuator is blocked somewhere along its working range. 2. Check to see if the torque is sufficient for the application.
90	**#**	**Internal error basic unit**	
91	**#**	**Internal error basic unit**	
93	**#**	**Error flame signal acquisition**	
	3	*Short-circuit of sensor*	Short-circuit at QRB... 1. Check wiring. 2. Flame detector possibly fault.
95	**#**	**Error relay supervision**	
	3 Ignition transformer *4 Fuel valve 1* *5 Fuel valve 2* *6 Fuel valve 3*	*External power supply NO contact*	Check wiring
96	**#**	**Error relay supervision**	
	3 Ignition transformer *4 Fuel valve 1* *5 Fuel valve 2* *6 Fuel valve 3*	*Relay contacts have welded*	Test the contacts: 1. Unit connected to power: Fan output must be dead. 2. Disconnect power: Disconnect fan. No resistive connection between fan output and neutral conductor allowed. If one of the 2 tests fails, release the unit since contact have definitively welded and safety can no longer be ensured.
97	**#**	**Error relay supervision**	
	0	*Safety relay contacts have welded or external power supply fed to safety relay*	Test the contacts: 1. Unit connected to power: Fan output must be dead. 2. Disconnect power: Disconnect fan. No resistive connection between fan output and neutral conductor allowed. If one of the 2 tests fails, release the unit since contacts have definitively welded and safety can no longer be ensured.

Error code	Diagnostic code	Meaning for the LMV2x/3x... system	Remedy
98	**#**	**Error relay supervision**	
	2 Safety valve *3 Ignition transformer* *4 Fuel valve 1* *5 Fuel valve 2* *6 Fuel valve 3*	*Relay does not pull in*	Make a reset; if error occurs repeatedly, replace the unit
99	**#**	**Internal error relay control**	Make a reset; if error occurs repeatedly, replace the unit
	3	*Internal error relay control*	Make a reset. If error occurs repeatedly, replace the unit Software version V03.10: If error C:99 D:3 occurs during standardization of the VSD, deactivate temporarily function *Alarm in case of start prevention* (parameter number 210 = 0, when using a release contact) or *interrupt* the controller-ON signal
100	**#**	**Internal error relay control**	Make a reset; if error occurs repeatedly, replace the unit
105	**#**	**Internal error contact sampling**	
	0 Pressure switch-min *1 Pressure switch-max / POC* *2 Fuel selection 0 / Reset* *3 Air pressure* *4 Load controller open* *5 Load controller on / off* *6 Load controller close* *7 Safety loop / Burner flange* *8 Safety valve* *9 Ignition transformer* *10 Fuel valve 1* *11 Fuel valve 2* *12 Fuel valve 3* *13 Fuel selection 1 / Reset*	*Stuck-At failure*	Can be caused by capacitive loads or supply of DC voltage to the mains voltage inputs. The diagnostic code indicates the input where the problem occurred
106	**#**	**Internal error contact request**	Make a reset; if error occurs repeatedly, replace the unit
107	**#**	**Internal error contact request**	Make a reset; if error occurs repeatedly, replace the unit
108	**#**	**Internal error contact request**	Make a reset; if error occurs repeatedly, replace the unit
110	**#**	**Internal error voltage monitor test**	Make a reset; if error occurs repeatedly, replace the unit
111	**#**	**Power failure**	Mains voltage to low Exchange ratio diagnostics code → voltage value (230 V: 1.683)
112	*0*	*Mains voltage recovery*	Error code for triggering a reset on power restoration (no error)
113	**#**	**Internal error mains voltage supervision**	Make a reset; if error occurs repeatedly, replace the unit
115	**#**	**Internal error system counter**	
116	*0*	*Designed life time exceeded (250´000 startups)*	Warning threshold has been reached. The unit should be replaced

Error code	Diagnostic code	Meaning for the LMV2x/3x... system	Remedy
117	*0*	*Life time exceeded* *Operation no longer allowed*	Switch-off threshold has been reached
120	*0*	*Interrupt limitation fuel meter input*	Too many disturbance pulses at the fuel meters input → Improve EMC
121	**#**	**Internal error EEPROM access**	Make a reset, repeat last parameterization / check. Restore the parameter set, if error occurs repeatedly, replace the unit
122	**#**	**Internal error EEPROM access**	Make a reset, repeat last parameterization / check. Restore the parameter set, if error occurs repeatedly, replace the unit
123	**#**	**Internal error EEPROM access**	Make a reset, repeat last parameterization / check. Restore the parameter set, if error occurs repeatedly, replace the unit
124	**#**	**Internal error EEPROM access**	Make a reset, repeat last parameterization / check. Restore the parameter set, if error occurs repeatedly, replace the unit
125	**#**	**Internal error EEPROM read access**	Make a reset, repeat last parameterization / check. If error occurs repeatedly, replace the unit
126	**#**	**Internal error EEPROM write access**	Make a reset, repeat last parameterization / check. If error occurs repeatedly, replace the unit
127	**#**	**Internal error EEPROM access**	Make a reset, repeat last parameterization / check. Restore the parameter set, if error occurs repeatedly, replace the unit
128	*0*	*Internal error EEPROM access - synchronization during initialization*	Make a reset; if error occurs repeatedly, replace the unit
129	**#**	**Internal error EEPROM access – command synchronization**	Make a reset, repeat last parameterization / check. If error occurs repeatedly, replace the unit
130	**#**	**Internal error EEPROM access - timeout**	Make a reset, repeat last parameterization / check. If error occurs repeatedly, replace the unit
131	**#**	**Internal error EEPROM access - page on abort**	Make a reset, repeat last parameterization / check. If error occurs repeatedly, replace the unit
132	**#**	**Internal error EEPROM register initialization**	Make a reset; if error occurs repeatedly, replace the unit
133	**#**	**Internal error EEPROM access – Request synchronization**	Make a reset, repeat last parameterization / check. If error occurs repeatedly, replace the unit
134	**#**	**Internal error EEPROM access – Request synchronization**	Make a reset, repeat last parameterization / check. If error occurs repeatedly, replace the unit
135	**#**	**Internal error EEPROM access – Request synchronization**	Make a reset, repeat last parameterization / check. If error occurs repeatedly, replace the unit
136	*1*	*Restore started*	Restore of a backup has been started (no error)

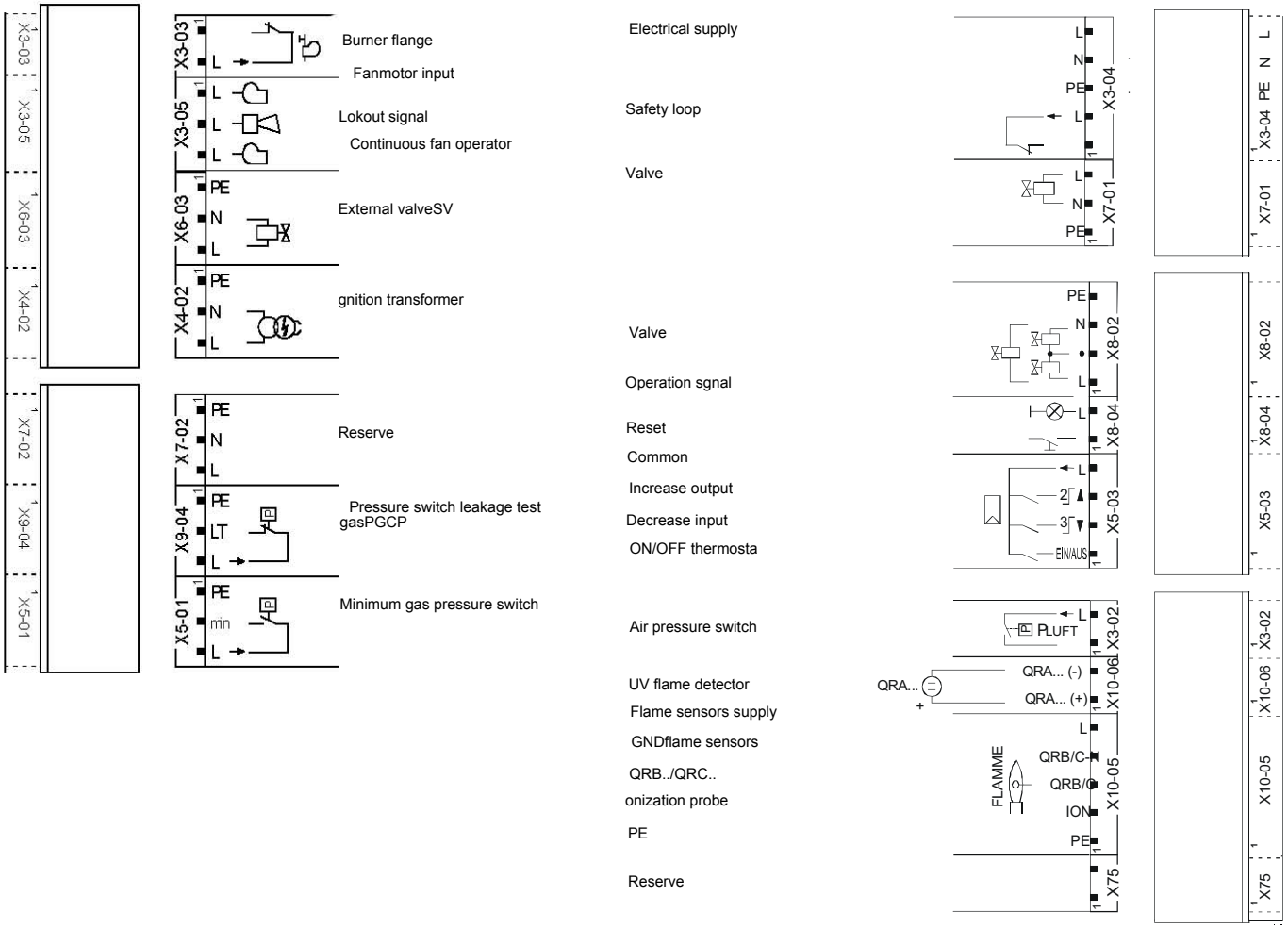
Error code	Diagnostic code	Meaning for the LMV2x/3x... system	Remedy
137	**#**	**Internal error – backup / restore**	
	157 (-99)	*Restore – ok, but backup < data set of current system*	Restore successful, but backup data record is smaller than in the current system
	239 (-17)	*Backup – storage of backup in AZL2... faulty*	Reset and repeat backup
	240 (-16)	*Restore – no backup in AZL2...*	No backup stored in AZL2...
	241 (-15)	*Restore – abortion due to unsuitable product no. (ASN)*	Backup has an unsuitable product no. (ASN) and must not be restored
	242 (-14)	*Backup – backup made is inconsistent*	Backup is faulty and cannot be transferred back
	243 (-13)	*Backup – data comparison between µCs faulty*	Reset and repeat backup
	244 (-12)	*Backup data are incompatible*	Backup data are incompatible with the current software version, restore not possible
	245 (-11)	*Access error to parameter Restore_Complete*	Reset and repeat backup
	246 (-10)	*Restore – timeout when storing in EEPROM*	Reset and repeat backup
	247 (-9)	*Data received are inconsistent*	Backup data record invalid, restore not possible
	248 (-8)	*Restore cannot at present be made*	Reset and repeat backup
	249 (-7)	*Restore – abortion due to unsuitable burner identification*	Backup has an unsuitable burner identification and must not be transferred to the unit
	250 (-6)	*Backup – CRC of one page is not correct*	Backup data record invalid, restore not possible
	251 (-5)	*Backup – burner identification is not defined*	Define burner identification and repeat backup
	252 (-4)	*After restore, pages still on ABORT*	Reset and repeat backup
	253 (-3)	*Restore cannot at present be made*	Reset and repeat backup
	254 (-2)	*Abortion due to transmission error*	Reset and repeat backup
	255 (-1)	*Abortion due to timeout during backup / restore*	Make a reset, check the connections and repeat backup / restore In case of repeated backup timeout, the AZL2... does not yet support backup functionality
146	**#**	**Timeout building automation interface**	Refer to Modbus User Documentation (A7541)
	1	*Modbus timeout*	
	2	*reserved*	

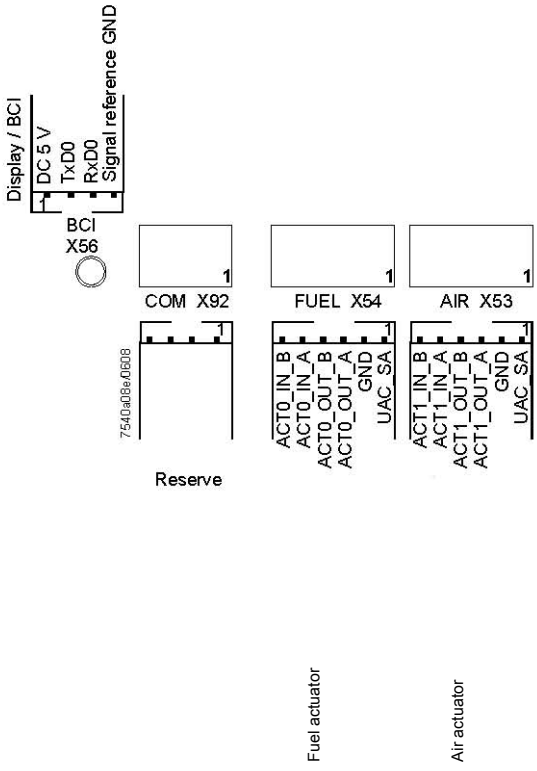
Error code	Diagnostic code	Meaning for the LMV2x/3x... system	Remedy
150	**#**	**TÜV test**	
	1 (-1)	*Invalid phase*	TÜV test may only be started in phase 60 (operation)
	2 (-2)	*TÜV test default output too low*	TÜV test default output must not be smaller than the lower output limit
	3 (-3)	*TÜV test default output too high*	TÜV test default output must not be greater than the upper output limit
	4 (-4)	*Manual interruption*	No error: Manual abortion of TÜV test by user
	5 (-5)	*TÜV test timeout*	No loss of flame after shutdown of fuel valves 1. Check to see if there is extraneous light 2. Check wiring to see if there is a short-circuit 3. Check to see if valve is leaking
165	**#**	**Internal error**	
166	*0*	*Internal error watchdog reset*	
167	**#**	**Manual locking**	Unit has been manually locked (no error)
	1	*Manual locking by contact*	
	2	*Manual locking by AZL2...*	
	3	*Manual locking by PC tool*	
	8	*Manual locking by the AZL2...* *Timeout / communication breakdown*	During a curve adjustment via the AZL2..., the timeout for menu operation has elapsed (setting via parameter 127), or communication between the LMV26... and the AZL2... has broken down
	9	*Manual locking by the PC tool* *Communication breakdown*	During a curve adjustment via the ACS410, communication between the LMV26... and the ACS410 was interrupted for more than 30 seconds
	33	*Manual locking by the PC tool* *Test of lockout*	PC tool made a reset attempt with an error-free system
168	**#**	**Internal error management**	Make a reset; if error occurs repeatedly, replace the unit
169	**#**	**Internal error management**	Make a reset; if error occurs repeatedly, replace the unit
170	**#**	**Internal error management**	Make a reset; if error occurs repeatedly, replace the unit
171	**#**	**Internal error management**	Make a reset; if error occurs repeatedly, replace the unit
200 OFF	**#**	**System error-free**	No error

Error code	Diagnostic code	Meaning for the LMV2x/3x... system	Remedy
201 OFF UPr0 or **OFF UPr1**	**#**	**Prevention of startup**	Start prevention due to unparameterized unit Go to error history, entry 702, for initial cause of the error with shutdown in connection with the first curve settings
	Bit 0 *Valency 1*	*No operating mode selected*	
	Bit 1 *Valency 2..3*	*No fuel train defined*	
	Bit 2 *Valency 4..7*	*No curves defined*	
	Bit 3 *Valency 8..15*	*Standardized speed undefined*	
	Bit 4 *Valency 16..31*	*Backup / restore was not possible*	
202	**#**	**Internal error operating mode selection**	Redefine the operating mode (parameter 201)
203	**#**	**Internal error**	Redefine the operating mode (parameter 201). Make a reset; if error occurs repeatedly, replace the unit
204	**Phase number**	**Program stop**	Program stop is active (no error)
205	**#**	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
206	*0*	*Inadmissible combination of units (basic unit – AZL2...)*	
207	**#**	**Version compatibility basic unit – AZL2...**	
	0	*Basic unit version too old*	
	1	*AZL2... version too old*	
208	**#**	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
209	**#**	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
210	*0*	*Selected operating mode is not released for the basic unit*	Select a released operating mode for the basic unit
240	**#**	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
245	**#**	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
250	**#**	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit

WIRING DIAGRAM

Wiring connection for LMV20





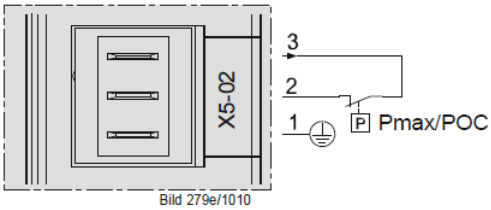
Wiring variants for LMV27

ConnectorX75

2 - Fuel meter input

1 - Supply fuel meter

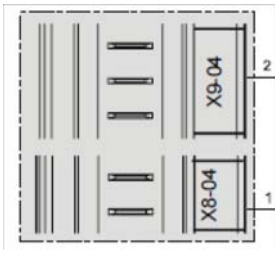
ConnectorX5-02



ConnectionsPmax

Wiring variants for LMV26

ConnectorX08-04 / X09-04



2 - Fuel 0

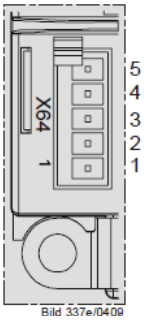
1 - Fuel1

ConnectorX75

2 - Fuel meter input

1 - Supply fuel meter

ConnectorX64



5 -Power supply speed sensor

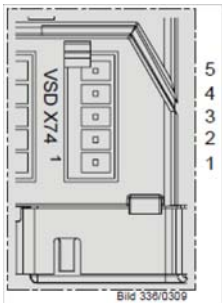
4 -Speed sensor input

3 - PWM (Pulse Width Modulation) speed output

2 - GND (signal reference)

1 -Controller input (4÷20mA)

ConnectorX74



5 -Supply

4 -Feedback signal

3 - PWM (Pulse Width Modulation) speed output

2 - GND (signal reference)

1 -External supply 24V DC

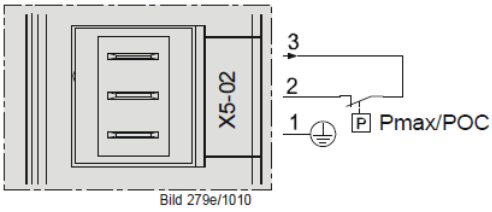
Wiring variants for LMV37

ConnectorX75

2 - Fuel meter input

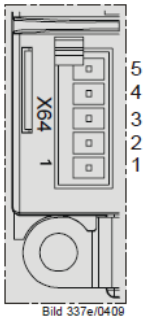
1 - Supply fuel meter

ConnectorX5-02



Connections Pmax

ConnectorX64



5 -Power supply speed sensor

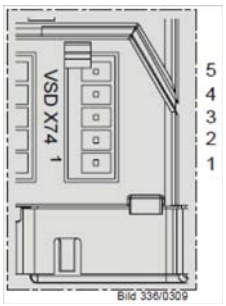
4 -Speed sensor input

3 - PWM (Pulse Width Modulation) speed output

2 - GND (signal reference)

1 -Controller input (4÷20mA)

ConnectorX74



5 -Supply

4 -Feedback signal

3 - PWM (Pulse Width Modulation) speed output

2 - GND (signal reference)

1 -External supply 24V DC

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 and data subject to change. Errors and omissions excepted.