HR75A

Gas - light oil burners

MANUAL OF INSTALLATION - USE - MAINTENANCE

CIB UNIGAS

BURNERS - BRUCIATORI - BRULERS - BRENNER - QUEMADORES - ГОРЕЛКИ

M039327CA Rel. 1.0 10/2020

DANGERS, WARNINGS AND NOTES OF CAUTION

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

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

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

CAREFULLY KEEP THIS MANUAL FOR FUTURE REFERENCE.

1) GENERAL INTRODUCTION

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

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

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

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

Contact qualified personnel only.

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

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

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

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

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

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

2) SPECIAL INSTRUCTIONS FOR BURNERS

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

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

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

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

Special warnings

- Make sure that the burner has, on installation, been firmly secured to the appliance, so that the flame is generated inside the appliance 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
-2009/142/EC (Gas Directive)
-2014/35/UE (Low Tension Directive)
-2014/30/UE (Electromagnetic compatibility Directive)
-2006/42/EC (Machinery Directive)
Harmonized standards
-UNI EN 676 (Automatic forced draught burners for gaseous fuels)
-EN 55014-1 (Electromagnetic compatibility- Requirements for house hold appliances, electric tools and similar apparatus)
-EN 60204-1:2006 (Safety of machinery – Electrical equipment of machines.)
-CEI EN 60335-1 (Specification for safety of household and similar electrical appliances);
-CEI EN 60335-2-102 (Household and similar electrical appliances. Safety. Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections).
-UNI EN ISO 12100:2010 (Safety of machinery - General principles for design - Risk assessment and risk reduction);

Light oil burners

European directives
-2014/35/UE (Low Tension Directive)
-2014/30/UE (Electromagnetic compatibility Directive)
-2006/42/EC (Machinery Directive)
Harmonized standards
-UNI EN 267-2011(Automatic forced draught burners for liquid fuels)
-EN 55014-1 (Electromagnetic compatibility- Requirements for house hold appliances, electric tools and similar apparatus)
-EN 60204-1:2006 (Safety of machinery – Electrical equipment of machines.)
-CEI EN 60335-1 (Specification for safety of household and similar electrical appliances);
-CEI EN 60335-2-102 (Household and similar electrical appliances. Safety. Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections).
-UNI EN ISO 12100:2010 (Safety of machinery - General principles for design - Risk assessment and risk reduction);
National Standard
-UNI 7824 (Atomizing burners of the monobloc type. Characteristics and test methods)

Heavy oil burners

European Directives
-2014/35/UE (Low Tension Directive)
-2014/30/UE (Electromagnetic compatibility Directive)
-2006/42/EC (Machinery Directive)
Harmonized standards
-UNI EN 267(Automatic forced draught burners for liquid fuels)
-EN 55014-1 (Electromagnetic compatibility- Requirements for house hold appliances, electric tools and similar apparatus)
-EN 60204-1:2006 (Safety of machinery – Electrical equipment of machines.)
-CEI EN 60335-1 (Specification for safety of household and similar electrical appliances);
-CEI EN 60335-2-102 (Household and similar electrical appliances. Safety. Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections).
-UNI EN ISO 12100:2010 (Safety of machinery - General principles for design - Risk assessment and risk reduction);
Norme nazionali / National Standard
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Gas - Light oil burners

European Directives
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Harmonized standards
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-UNI EN 267(Automatic forced draught burners for liquid fuels)
-EN 55014-1 (Electromagnetic compatibility- Requirements for house hold appliances, electric tools and similar apparatus)

-EN 60204-1:2006 (Safety of machinery – Electrical equipment of machines.)
-CEI EN 60335-1 (Specification for safety of household and similar electrical appliances);
-CEI EN 60335-2-102 (Household and similar electrical appliances. Safety. Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections).
-UNI EN ISO 12100:2010 (Safety of machinery - General principles for design - Risk assessment and risk reduction);

Norme nazionali / National Standard

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

Gas - Heavy oil burners,

European directives:

-2009/142/EC (Gas Directive)
-2014/35/UE (Low Tension Directive)
-2014/30/UE (Electromagnetic compatibility Directive)
-2006/42/EC (Machinery Directive)

Harmonized standards

-UNI EN 676 (Automatic forced draught burners for gaseous fuels)
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-EN 60204-1:2006 (Safety of machinery – Electrical equipment of machines.)
-CEI EN 60335-1 (Specification for safety of household and similar electrical appliances);
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-UNI EN ISO 12100:2010 (Safety of machinery - General principles for design - Risk assessment and risk reduction);

National Standard

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

Industrial burners

European directives

-2009/142/EC (Gas Directive)
-2014/35/UE (Low Tension Directive)
-2014/30/UE (Electromagnetic compatibility Directive)
-2006/42/EC (Machinery Directive)

Harmonized standards

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

Burner data plate

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

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

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

SYMBOLS USED

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

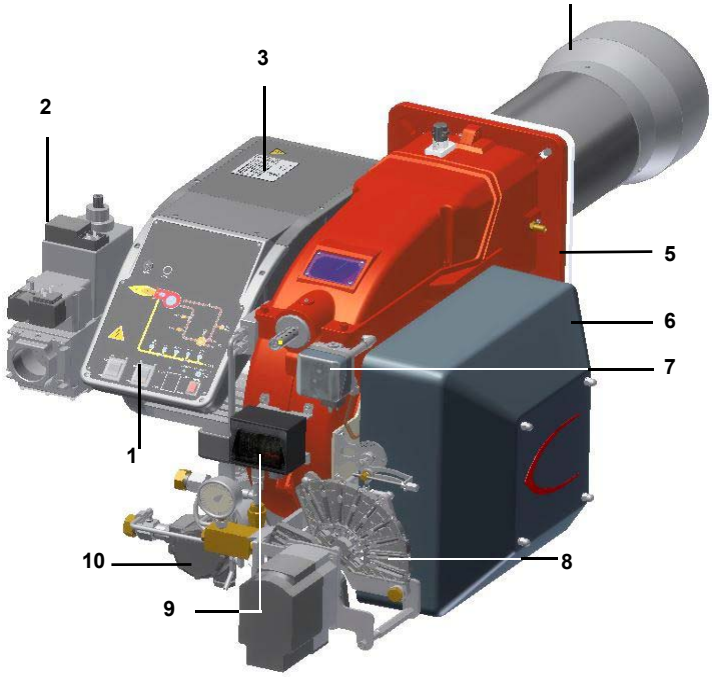
DANGER! Failure to observe the warning may result in serious injuries or death.

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

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

PART I: SPECIFICATIONS

BURNERS FEATURES



Note: the figure is indicative only.

1 Control panel with startup switch
2 Gas valves group
3 Electrical panel
4 Blast tube + Combustion head
5 Flange
6 Silencer
7 Air pressure switch
8 Adjusting cam (progressive/fully modulating burners only)
9 Oil pressure switch
10 Pump

Fig. 1

Gas operation: the gas coming from the supply line, passes through the valves group provided with filter and stabiliser. This one forces the pressure in the utilisation limits. The electric actuator , that moves proportionally the air damper and the gas butterfly valve, uses an adjusting cam with variable shape. This one allows the optimisation of the gas flue values, as to get an efficient combustion. The combustion head positioning determines the burner's output. The combustion head 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's front side, shows each operating stage.

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.

Type	**HR75A**	Model	**MG.**	**MD.**	**S.**	***.**	**A.**	**1.**	**40.**
	(1)		**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**

1	BURNER TYPE	**HR75A**
2	FUEL	M - Natural gas L - LPG G - Light oil B - Biogas
3	OPERATION (Available versions)	PR - Progressive MD - Fully modulating AB - Double stage
4	BLAST TUBE	S - Standard
5	DESTINATION COUNTRY	* - see data plate
6	BURNER VERSION	A - Standard Y - SpecialeSpecial
7	EQUIPMENT	1 = 2 gas valves + gas proving system 8 = 2 gas valves + gas proving system + maximum gas pressure switch
8	GAS CONNECTION	40 = $Rp1_{1/2}$ 50 = Rp2 65 = DN65 80 = DN80

Fuel

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) and LPG (calorific net value Hi = 26.79 kWh/Stm^3, density ρ = 2.151 Kg/Stm^3). For different fuel such as 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)	$\mathbf{f_Q}$	$\mathbf{f_p}$
Town gas	4.88	0.6023	1.936	3.3
Biogas	6.395	1.1472	1.478	3.5
LPG	26.79	2.151	0.353	0.4

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.

Technical Specifications

BURNER TYPE		HR75A MG..	HR75A LG..
Output	min - max kW	320 - 2050	
Fuel		Natural gas - Light oil	L.P.G. - Light oil
Category		(see next paragraph)	$I_{3B/P}$
Gas rate	min.-max. (Stm^3/h)	34 - 217	11.9 - 77
Gas pressure		(see Note 2)	
Power supply		400V 3N~ 50Hz	
Total power consumption	kW	4.05	
Pump motor	kW	0.55	
Fan motor power consumption	kW	3	
Light oil rate	min. - max. kg/h	27-173	
Oil viscosity		2 - 7.4 cSt @ 40°C	
Oil density	kg/m^3	840	
Approximate weight	kg	150	
Protection		IP40	
Operation		Two stages - Progressive - Fully modulating	
Gas train 50 Connection	Ø Valves / Connections	50 / Rp 2	
Gas train 65	Ø Valves / Connections	65 / DN65	
Gas train 80	Ø Valves / Connections	80 / DN80	
Gas train 100	Ø Valves / Connections	100 / DN100	
Operating temperature	°C	-10 ÷ +50	
Storage Temperature	°C	-20 ÷ +60	
Working service*		Intermitent	
noise level (sound power level)(**)	dBa, max	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); for L.P.G. (net calorific value H_i = 93.5 MJ/Stm^3)**
Note2:	**Maximum gas pressure = 360mbar (with Dungs MBDLE)** **= 500mbar (with Siemens VGD)** **Minimum gas pressure = see gas curves.**
Note3:	**Burners are suitable only for indoor operation with a maximum relative humidity of 80%**

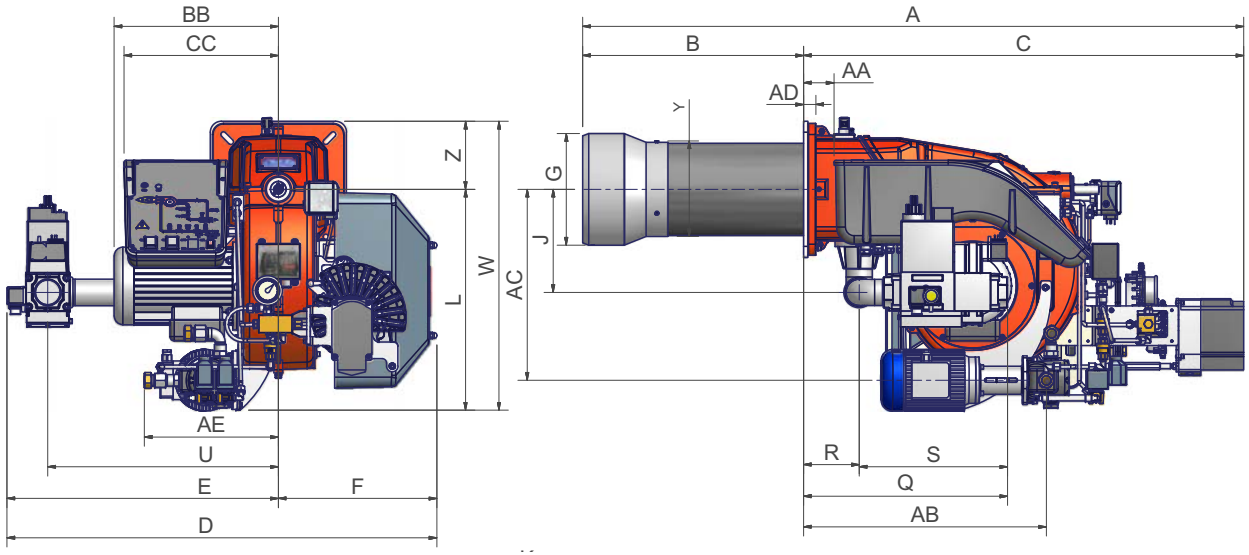
(*) NOTE ON THE WORKING SERVICE: the control box automatically stops after 24h of continuous working. The control box immediately starts up, automatically.

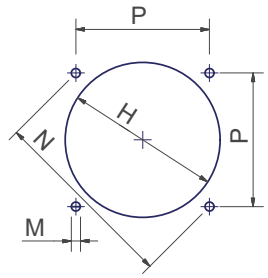
Country and usefulness gas categories

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_{2EK}	NL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I_{2ELL}	DE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I_{2Er}	FR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

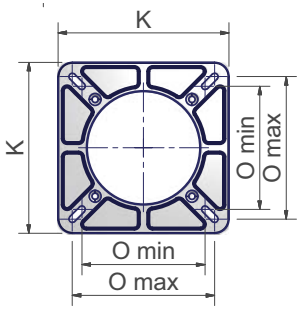
(*) Only for I_{2EK} : the appliance was configured for the appliance category K (I2K) and is suitable for the use of G and G+ distribution gases according to the specifications as included in the NTA 8837:2012 Annex D with a Wobbe index of 43.46 – 45.3 MJ/m3 (dry, 0 °C, upper value) or 41.23 – 42.98 (dry, 15 °C, upper value). This appliance can moreover be converted and/or be calibrated for the appliance category E (I2E). This therefore implies that the appliance "is suitable for G+ gas and H gas or is demonstrably suitable for G+ gas and can demonstrably be made suitable for H gas" within the meaning of the "Dutch Decree of 10 May 2016 regarding amendment of the Dutch Gas Appliances Decree and the Dutch Commodities (Administrative Fines) Act in connection with the changing composition of gas in the Netherlands as well as technical amendment of some other decrees.

Overall dimensions (mm)





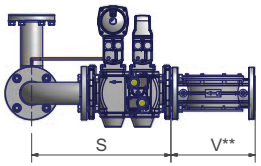
Boiler recommended drilling tem-



Burner flange

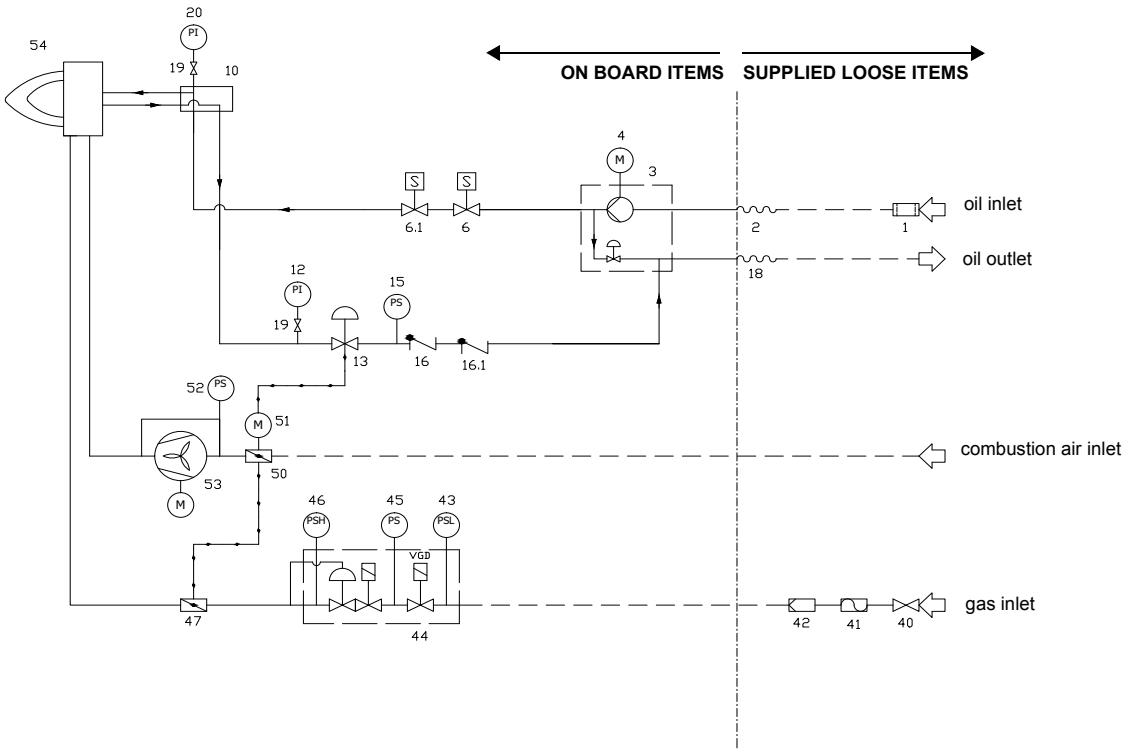
	*DN	A (AS)	AA	AB	AC	AD	AE	B (BS)	BB	C	CC	D	E	F	G	H	J	K	L	M	Omin	Omax	P	Q	R	S	U	V(**)	W	Y	Z
HR75A AB	1.50	1336	69	553	435	28	305	503	374	833	352	1061	700	361	254	270	235	300	503	M10	216	250	233	465	127	338	525	-	658	218	155
	1.65	1336	69	553	435	28	305	503	374	833	352	1135	774	361	254	270	282	300	503	M10	216	250	233	535	127	408	565	292	658	218	155
	1.80	1336	69	553	435	28	305	503	374	833	352	1135	774	361	254	270	284	300	503	M10	216	250	233	555	127	428	565	310	658	218	155
HR75A PR/MD	1.50	1506	69	553	435	28	305	503	374	1002	352	979	618	361	254	270	235	300	503	M10	216	250	233	465	127	338	525	-	658	218	155
	1.65	1506	69	553	435	28	305	503	374	1002	352	1051	690	361	254	270	282	300	503	M10	216	250	233	535	127	408	565	292	658	218	155
	1.80	1506	69	553	435	28	305	503	374	1002	352	1051	690	361	254	270	284	300	503	M10	216	250	233	555	127	428	565	310	658	218	155

*DN = gas valves size



(**) According to the gas train size and the burner type, MB-DLE or VGD valves are supplied. The "V" measure, refers to the gas filter, for burners provided with Siemens VGD valves. MB-DLE valves have a built-in filter.

Fig. 2 - 3I2MG-09 v1 **Hydraulic diagram**



According to the gas train size and the burner type, MB-DLE safety valves are supplied. In this case, the item 42 is integrated in the valves. See the following drawing.

BY OTHERS

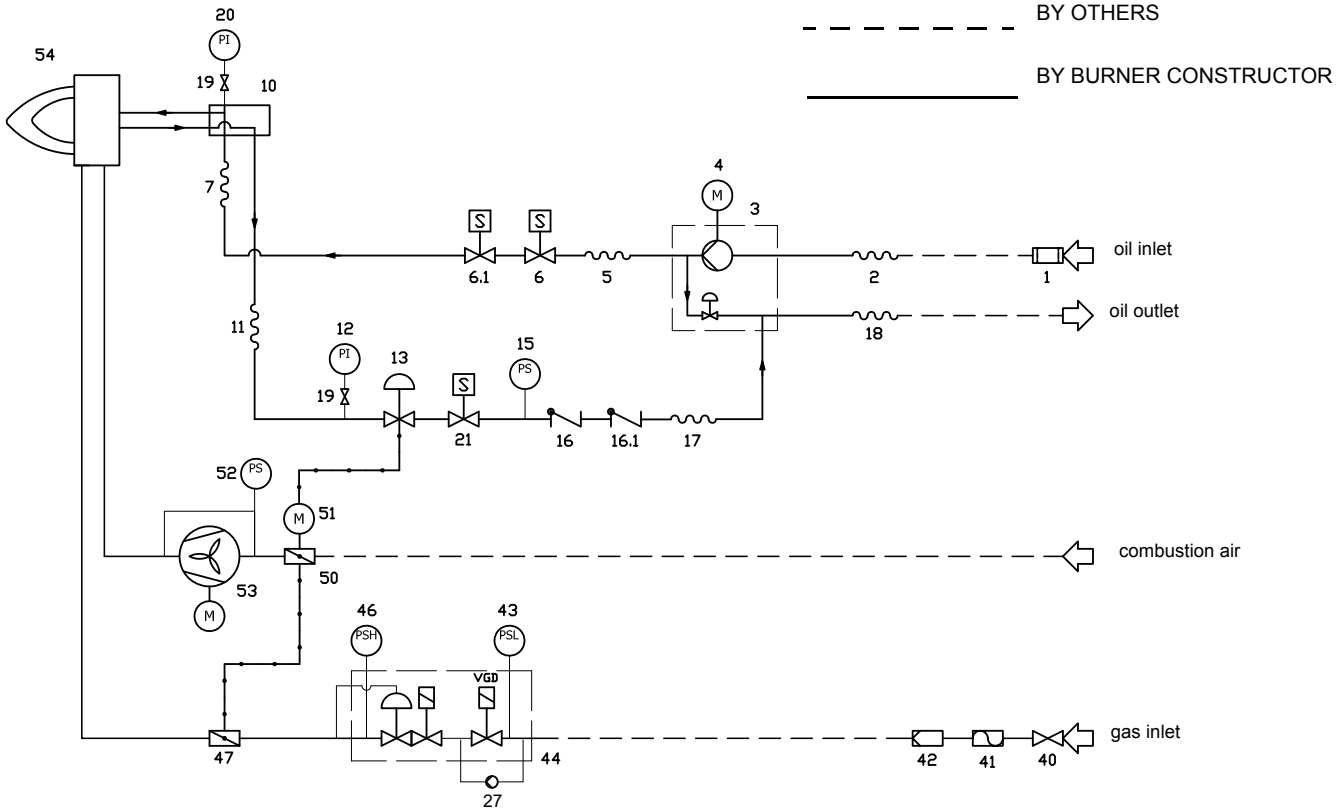
BY BURNER CONSTRUCTOR

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

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

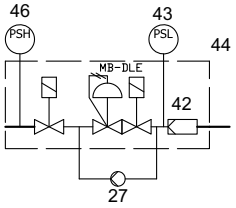
Double stage Version

Fig. 3 - **Hydraulic diagram**



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

Note: The following POS are optional: 19, 20, 40, 41, 46
Note: The following POS are included only on certain types of burner: 5,7,11,17



According to the gas train size and the burner type, MB-DLE safety valves are supplied. In this case, the item 42 is integrated in the valves. See the following drawing.

How to read the burner "Performance curve"

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

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

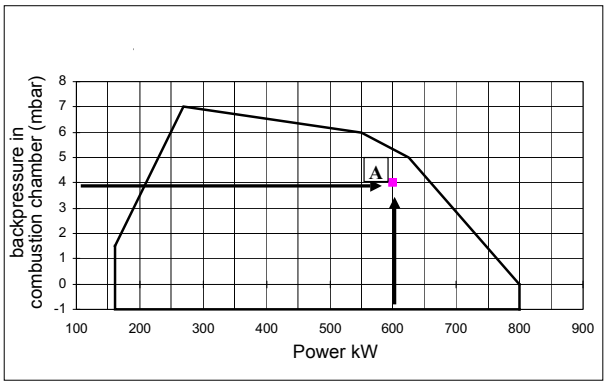
Example:

Furnace input: 600kW

Backpressure: 4mbar

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

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



Performance Curves

HR75A



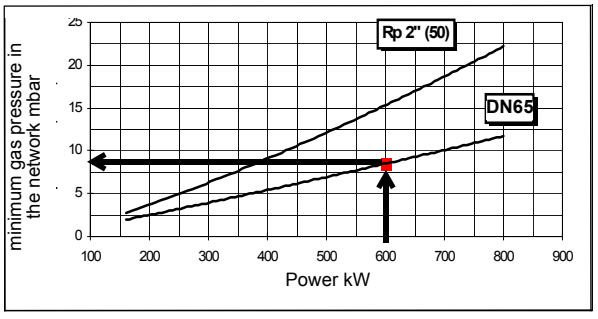
To get the input in kcal/h, multiply value in kW by 860.

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.

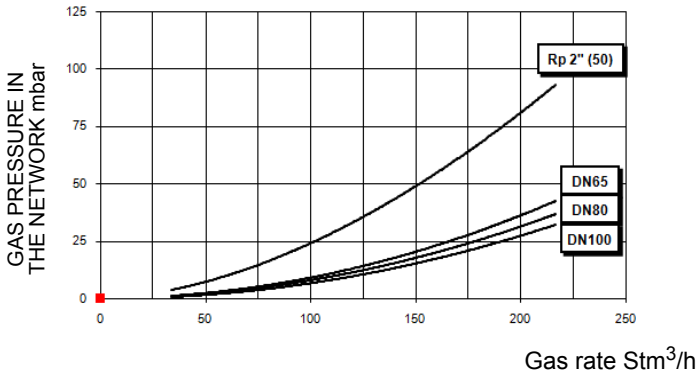
Checking the proper gas train size

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



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

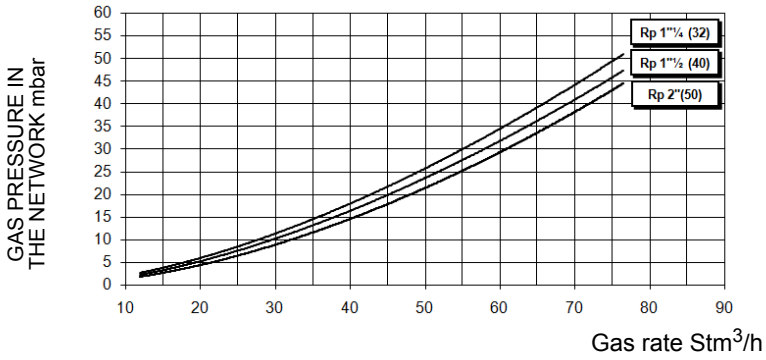
HR75A M-..



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.

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

HR75A L-..



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.

Combustion head gas pressure curves depending on the flow rate

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. 4, 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.

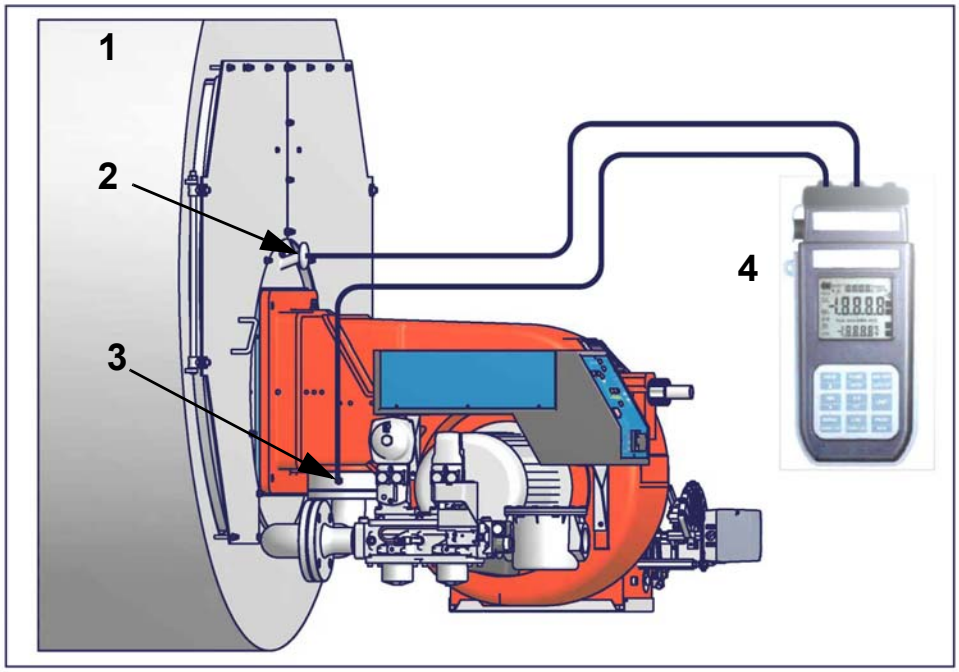


Fig. 4

Note: the figure is indicative only.

Key

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

Measuring the gas pressure in the combustion head

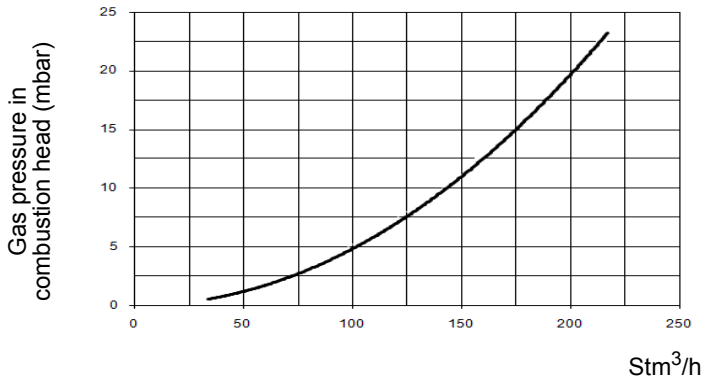
In order to measure the pressure in the combustion head, insert the pressure gauge probes: one into the combustion chamber's pressure outlet to get the pressure in the combustion chamber and the other one into the butterfly valve's pressure outlet of the burner. On the basis of the measured differential 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 combustion head (quoted on the y axis). The data obtained must be considered when adjusting the gas flow rate.

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

Pressure - rate in combustion head curves (natural gas)

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

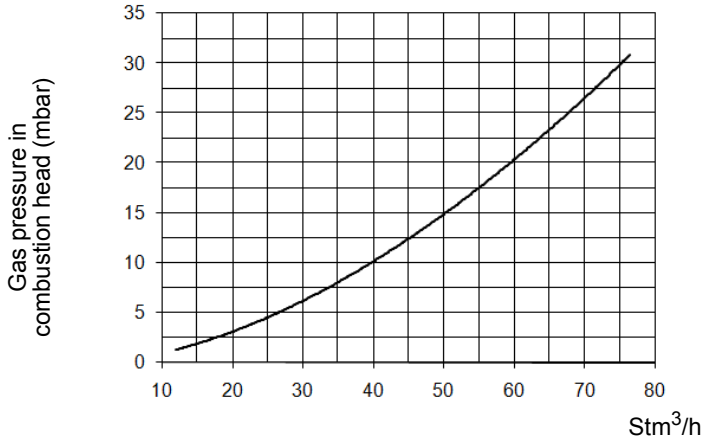
HR75A M-..



Pressure - rate in combustion head curves (LPG)

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

HR75A L-..



PART II: INSTALLATION

MOUNTING AND CONNECTING THE BURNER

Transport and storage

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

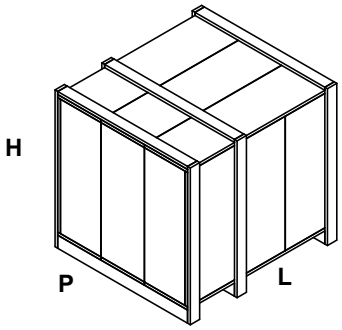
ATTENTION: Use intact and correctly dimensioned hoisting equipment, conforms to the local regulations and health and safety regulations. Do not stand under lifted loads.

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

Packing

The burners are despatched in wooden crates whose dimensions are:

1672mm x 1072mm x 1016mm (L x P x H)



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

The following are placed in each packing case:

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

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

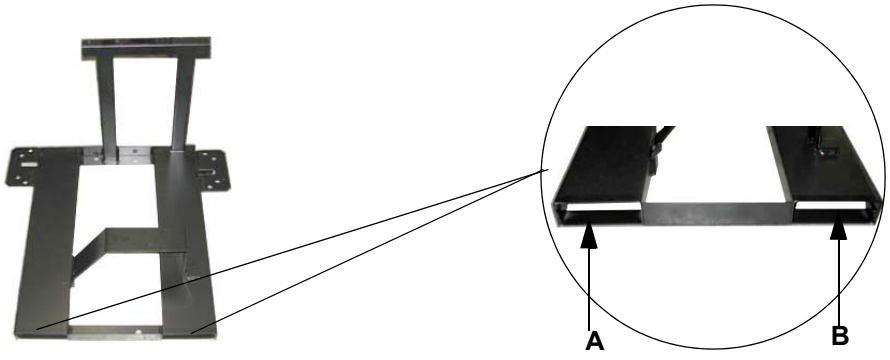
Handling the burner

ATTENTION! The handling operations must be carried out by specialised and trained personnel. If these operations are not carried out correctly, the residual risk for the burner to overturn and fall down still persists.

To move the burner, use means suitable to support its weight (see paragraph "Technical specifications").

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

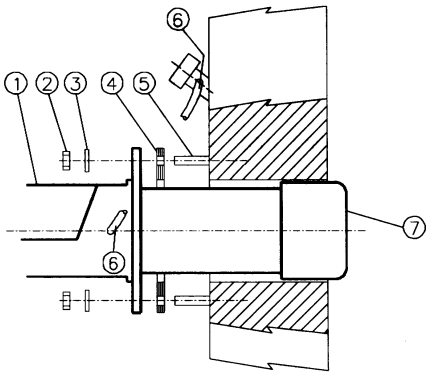
The burner is mounted on a stirrup provided for handling the burner by means of a fork lift truck: the forks must be inserted into the A anb B ways. Remove the stirrup only once the burner is installed to the boiler.



Fitting the burner to the boiler

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

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



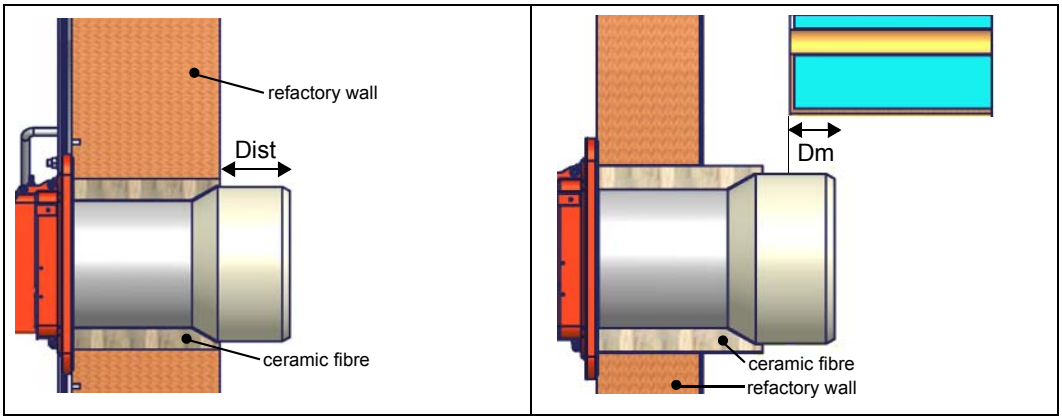
Keys

1 Burner
2 Fixing nut
3 Washer
4 Ceramic fibre plait
5 Stud bolt
7 Blast tube

Matching the burner to the boiler

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

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



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

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

GAS TRAIN CONNECTIONS

Referring to the P&ID of the burner, execute the connection.

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

Assembling the gas train

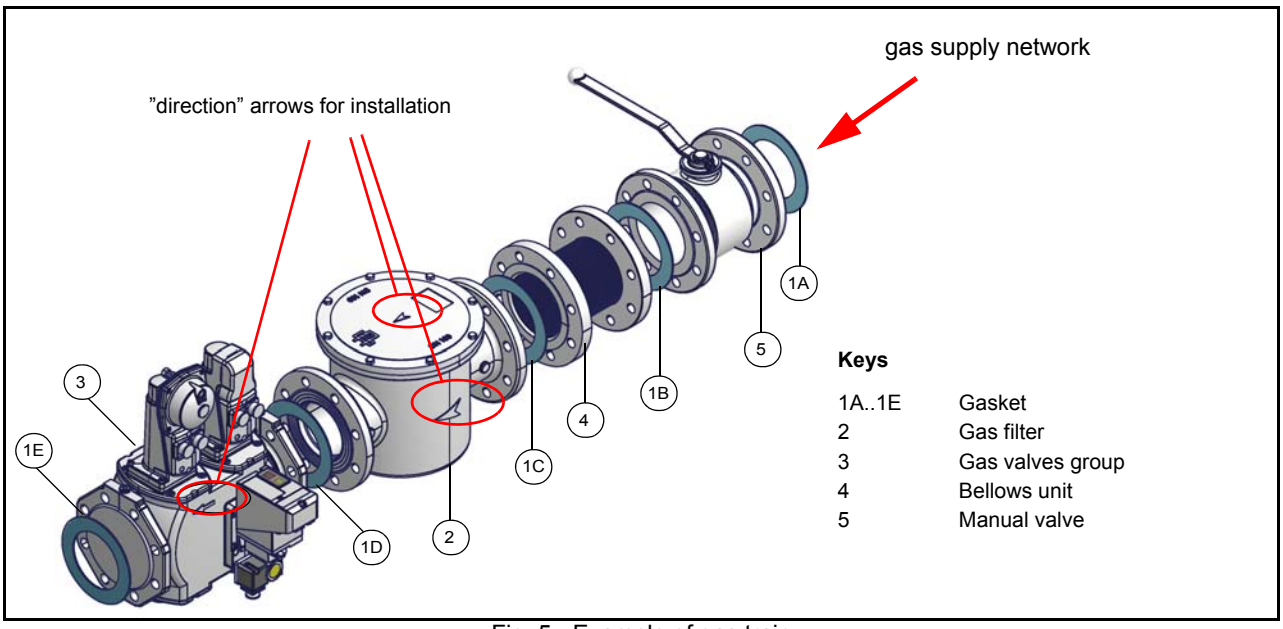


Fig. 5 - Example of gas train

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. 5) between the elements

2) fasten all the items by means of screws, according to the diagrams showed, observing the mounting direction for each item;

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

ATTENTION: once the gas train is mounted according to the diagram on Fig. 5, the gas proving test mus be performed, according to the procedure set by the laws in force.

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

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 MB-DLE or Siemens VGD20..
- flanged gas trains with Siemens VGD40..

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

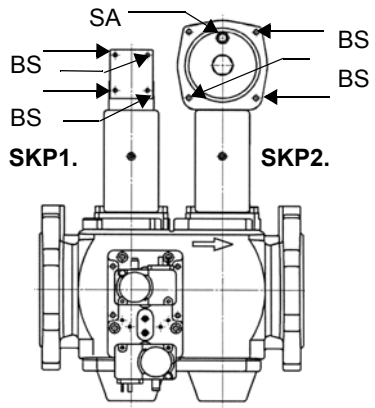
Mounting

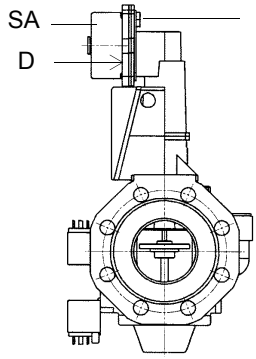
- When mounting the VGD.. double gas valve, two flanges are required (as for VGD20.. model, the flanges are threaded); to prevent cuttings from falling inside the valve, first fit the flanges to the piping and then clean the associated parts;
- install the valve;
- the direction of gas flow must be in 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.

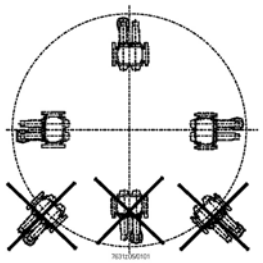
Leave the blowhole free (**SA** in figure). Should the spring fitted not permit satisfactory regulation, ask one of our service centres for a suitable replacement.

Caution: the SKP2 diaphragm D must be vertical (see Fig. 6).

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







SIEMENS VGD..MOUNTING POSITIONS

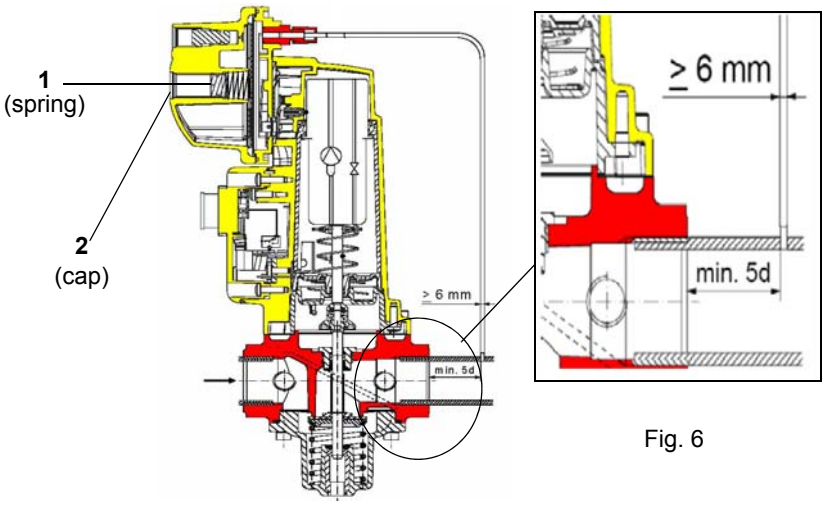


Fig. 6

Siemens VGD valves with SKP actuator:

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

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

MULTIBLOC DUNGS MB-DLE 415..420

Mounting

1. Loosen screws A and B **do not** unscrew (Fig. 7 - Fig. 8).
2. unscrew screws C and D (Fig. 7 - Fig. 8).
3. Remove MultiBloc between the threaded flanges (Fig. 8).
4. After mounting, perform leakage and functional tests.

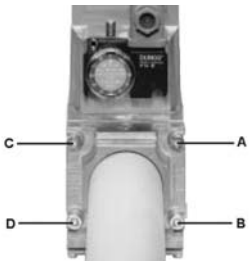


Fig. 7

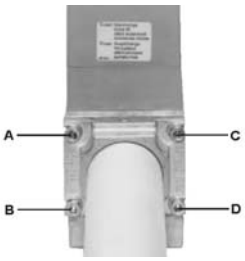


Fig. 8



Fig. 9

MOUNTING POSITIONS

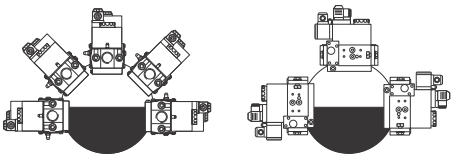


Fig. 10

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

Gas Filter (if provided)

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

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

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

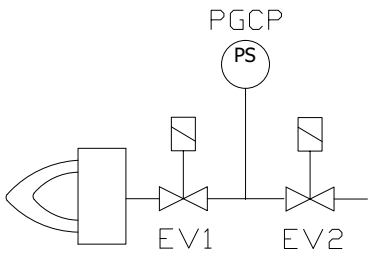
This paragraph describes the integrated proving system operation sequence:

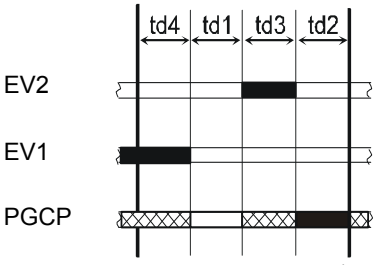
- At the beginning both the valves (EV1 and EV2) must be closed.
- Test space evacuating: EV1 valve (burner side) opens and keep this position for a preset time (td4), in order the bring the test space to ambient pressure.Test atmospheric pressure: EV1 closes and keep this position for a preset time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

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

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

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





OIL TRAIN CONNECTIONS

Hydraulic diagrams for light oil supplying circuits

Fig. 15 - Gravity circuit

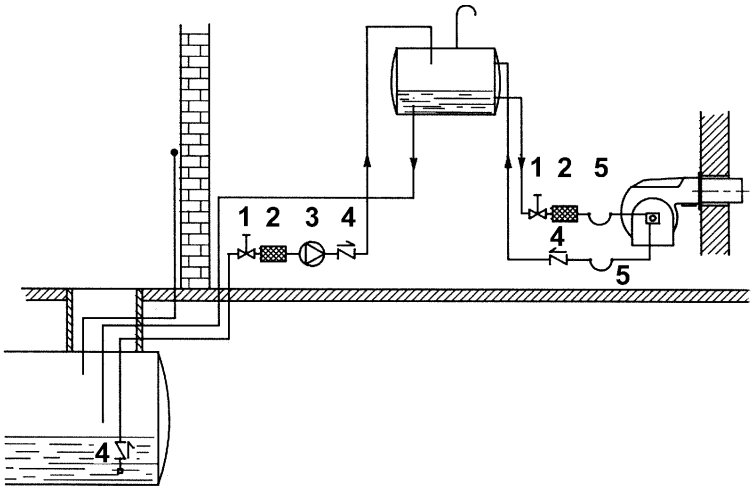


Fig. 16 - Ring circuit

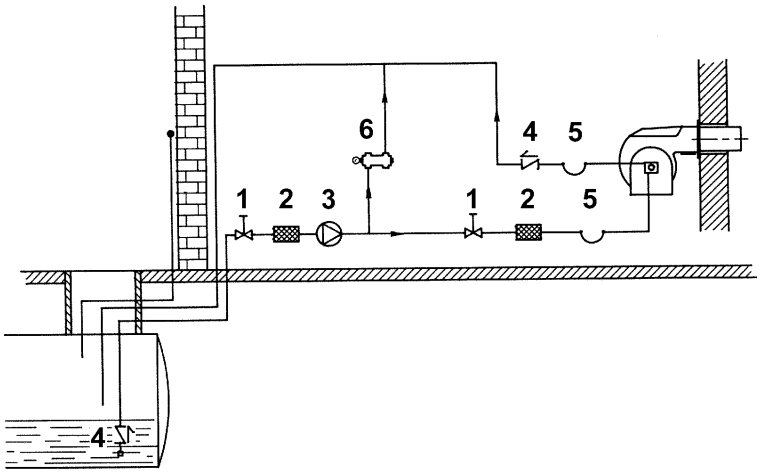
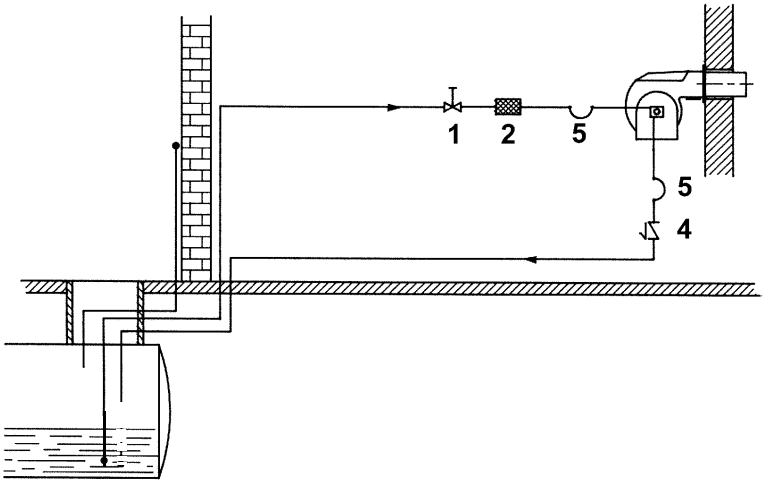


Fig. 17 - Suction circuit



Key

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

NOTE: in plants where gravity or ring feed systems are provided, install an automatic interception device.

Installation diagram of light oil pipes

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

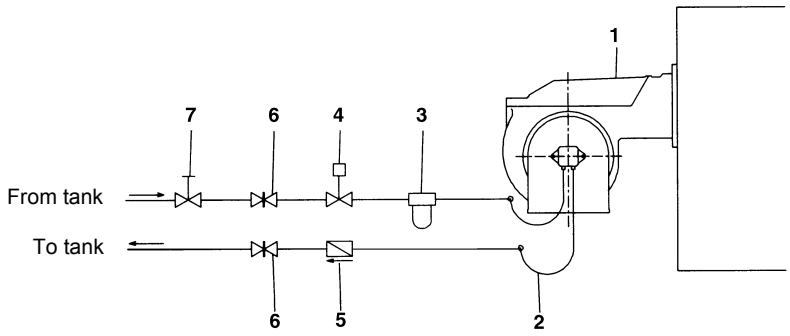


Fig. 14 - Double-pipe system

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.

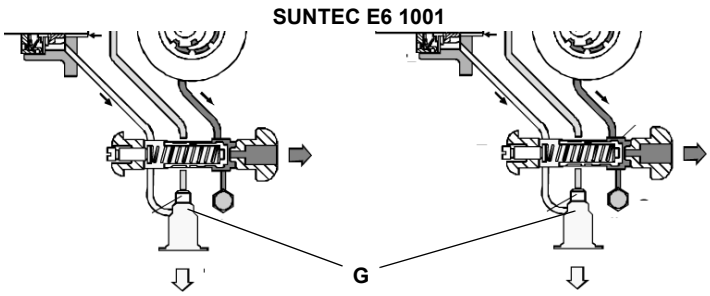
Depending on the installed pump, it is possible to design the plant for single or double pipe feeding line

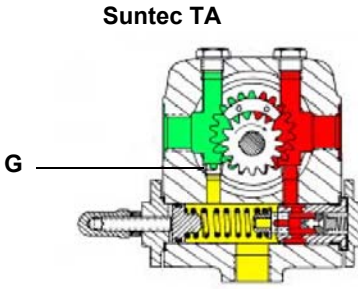
Single-pipe system: a single pipe drives the oil from the tank to the pump's inlet. Then, from the pump, the pressurised oil is driven to the nozzle: a part comes out from the nozzle while the othe part goes back to the pump. In this system, the by-pass plug, if provided, must be removed and the optional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

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

Burners come out from the factory provided for double-pipe systems. They can be suited for single-pipe system (recommended in the case of gravity feed) as decribed before.To change from a 1-pipe system to a 2-pipe-system, insert the by-pass plug **G** (as for ccw-rotation- referring to the pump shaft).

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



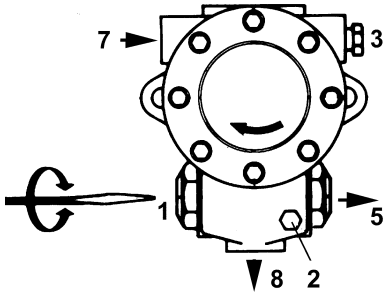


About the use of fuel pumps

- 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.*

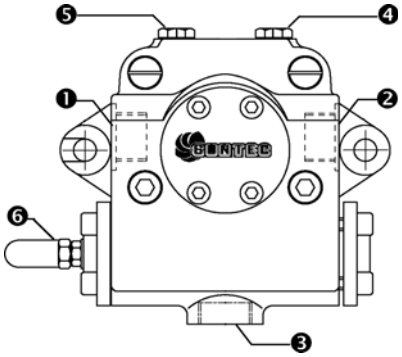
Suntec E6 - E7 1001	
Oil viscosity	3 - 75 cSt
Oil temperature	0 - 90°C
Inlet maximum pressure	1,5 bar
Maximum return pressure	1,5 bar
Minimum inlet pressure	- 0,45 to avoid gasing
Rotation speed	3600 rpm max.



Key

1. Pressure governor
2. Pump pressure gauge
3. Vacuum gauge
5. To the nozzle
7. Inlet
8. 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.



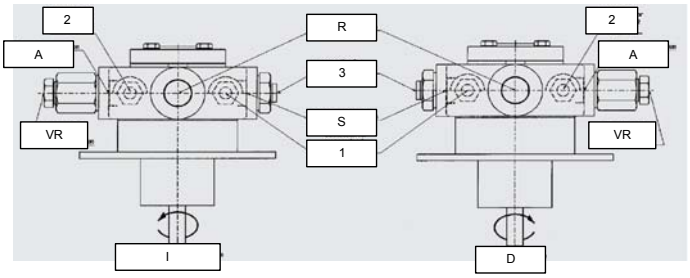
1. Inlet G1/2
2. To the nozzle G1/2
3. Return G1/2
4. Pressure gauge port G1/4
5. Vacuum gauge port G1/4
6. Pressure governor

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

Rotation speed	3600 rpm max.

1. Connection for manometer 1 – delivery (M1) – G1/4
2. Connection for manometer 2 – suction (M2) – G1/4
3. Connection for manometer 3 (M3)

A. Suction connection– G1/2
D. Direct - clockwise
I. Indirect – counter clockwise
R. By-pass connection– G1/2
S. Delivery connection – G1/2
VR. After removal of cover screw: pressure regulation



Connecting the oil flexible hoses to the pump

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

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

2 screw the rotating nut of the two flexible hoses on the pump **being careful to avoid exchanging the lines**: see the arrows marked on the pump.

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

.

Suntec E..	Suntec TA	HP Technik UHE-A
		

ELECTRICAL CONNECTIONS

WARNING! Respect the basic safety rules. make sure of the connection to the earthing system. do not reverse the phase and neutral connections. fit a differential thermal magnet switch adequate for connection to the mains.

WARNING! before executing the electrical connections, pay attention to turn the plant's switch to OFF and be sure that the burner's main switch is in 0 position (OFF) too. Read carefully the chapter "WARNINGS", and the "Electrical connections" section.

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

To execute the electrical connections, proceed as follows:

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

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

Rotation of electric motor

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

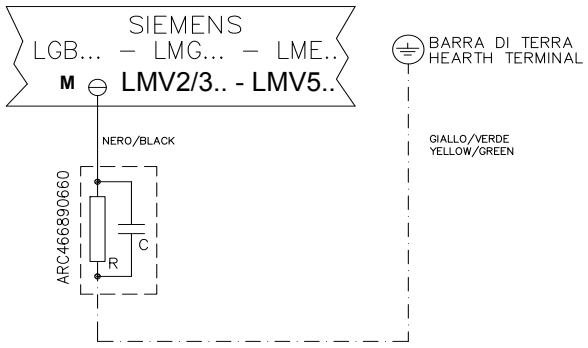
CAUTION: check the motor thermal cut-out adjustment

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

Note on elecrtical supply

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

PART III: OPERATION



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

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

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

LIMITATIONS OF USE

THE BURNER IS AN APPLIANCE DESIGNED AND CONSTRUCTED TO OPERATE ONLY AFTER BEING CORRECTLY 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 EXCEPT FOR ITS MAINTENANCE.

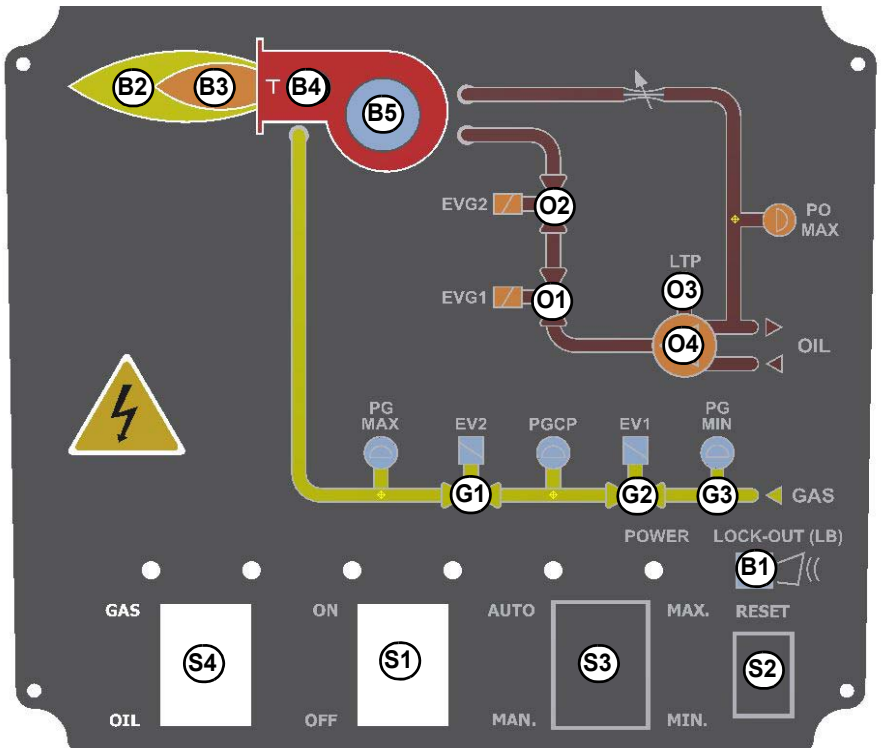
TO SECURE THE MACHINE, ACT ON THE ISOLATOR SWITCH. IN CASE OF ANOMALIES THAT REQUIRED A SHUT DOWN OF THE BURNER, IT'S POSSIBLE TO ACT ON THE AUXILIARY LINE SWITCH, LOCATED ON THE BURNER FRONT PANEL.

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

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

Fully modulating / Progressive Burners

Fig. 15 - Burner front panel

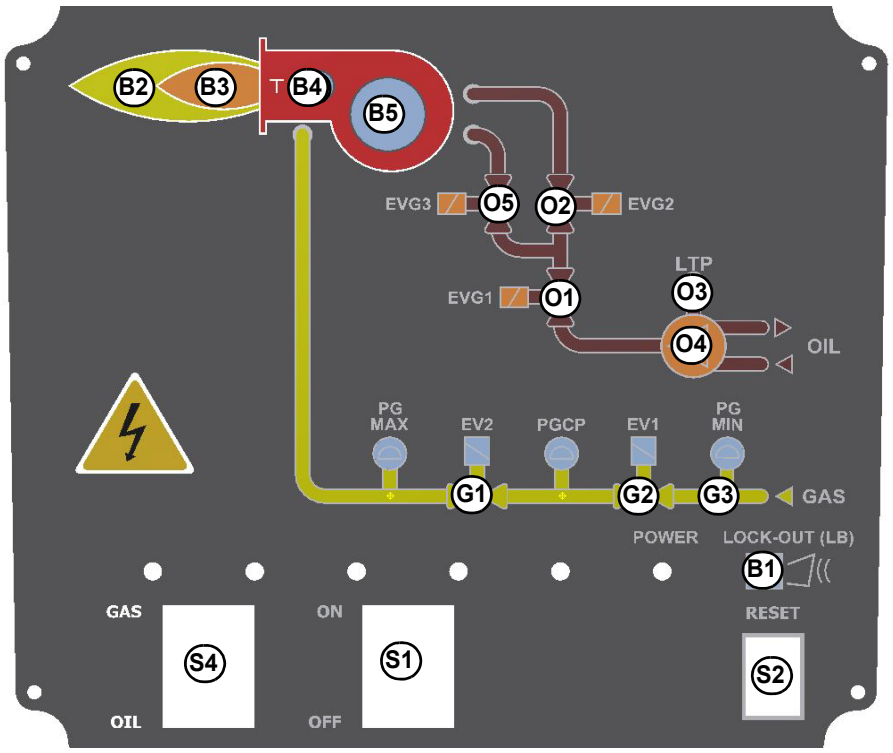


Keys

B1 Lock-out LED
B2 Hi-flame operation LED
B3 Lo-flame operation LED
B4 “Ignition transformer operation” LED
B5 “Fan motor overload tripped” LED
G1 “EV2 opening” LED
G2 “EV1 opening” LED
G3 “Gas pressure switch signal ” LED
S1 Main switch
S2 Reset pushbutton for control box
S3 Operation selector MAN - AUTO (operation in manual or automatic mode):
MIN = operation with minimum output
0 = Stop
MAX = operation at the maximum output
S4 Fuel selection
O1 EVG1 solenoid valve operation LED
O2 EVG2 solenoid valve operation LED
O3 “Pump motor overload tripped” LED
O4 Oil pump in operation LED

Double stages burner

Fig. 16 - Burner front panel



Keys

B1 Lock-out LED
B2 Hi-flame operation LED
B3 Lo-flame operation LED
B4 “Ignition transformer operation” LED
B5 “Fan motor overload tripped” LED
G1 “EV2 opening” LED
G2 “EV1 opening” LED
G3 “Gas pressure switch signal ” LED
S1 Main switch
S2 Reset pushbutton for control box
S4 Fuel selection
O1 EVG1 solenoid valve operation LED
O2 EVG2 solenoid valve operation LED
O3 “Pump motor overload tripped” LED
O4 Oil pump in operation LED
O5 EVG3 solenoid valve operation LED

Fuel selection:

- In order to start the burner with gas or light oil, the operator must commute the selector on the burner control panel on (1) = gas, or (2) = light oil.
  If the selector is set on (1) the gas cock must be open, while the light oil cock must be closed. Viceversa if the selector is set on (2).
  CAUTION: if the fuel chosen is oil, be sure the cutoff valves on the feed and return pipes are open.

Gas operation

- Turn to the ON position the mains switch S1 on the burner front panel.
- Check the flame control box is not in the lockout position (light B1 on), if necessary reset it by means of the pushbutton S2 (reset);
- Check that the control thermostats or pressure switches enable the burner to operate.
- Check the gas supply pressure is sufficient (light G3 on), if necessary, adjust the pressure switches.

Only burners provided with the gas proving system: the check cycle of the gas proving system starts; the end of this check is signalled by the light of the lamp on the device. When the valves check is finished, the startup cycle of the burner begins. In the case of a leak in a valve, the gas proving system locks and the lamp G4 lights. To reset the device press the device pushbutton.

- The startup cycle begins, the actuator drives the air damper to the maximum opening position, the fan motor starts and the pre-purgue phase begins. During the pre-purgue phase, the complete opening of the air damper is signalled by the lamp B2 on the frontal panel of the electrical board.
- At the end of the pre-purgue phase, the air damper goes to the ignition position, the ignition transformer turns on (signalled by the lamp B4) and few seconds later the solenoid valves EV1 and EV2 are energized (lights G1 and G2 on the front panel).
- Few seconds after the opening of the valves, the ignition transformer turns off and the lamp B4 turns off subsequently:

Double-stage burners: the burner is on in low flame stage (light G is on); some seconds later, the high flame operation begins and the burner switches automatically to high flame (light B2 is on) or remains in low flame operation, accordign to the plant requests.

Progressive and fully modulating burners - few seconds after the gas valve opening, the ignition transformer is de-energized. The burner is in low flame operation and some seconds later, the two-stages operation begins; the burner increases or decreases its output, directly driven by the external thermostat (progressive version) or by the modulator (fully modulating burners only).

Light oil operation

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

/

AIR FLOW AND FUEL ADJUSTMENT

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

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

Recommended combustion parameters		
Fuel	Recommended (%) CO_2	Recommended (%) O_2
Natural gas	9 ÷ 10	3 ÷ 4.8
LPG	11 ÷ 12	2.8 ÷ 4.3
Light oil	11.5 ÷ 13	2.9 ÷ 4.9

Adjustments - brief description

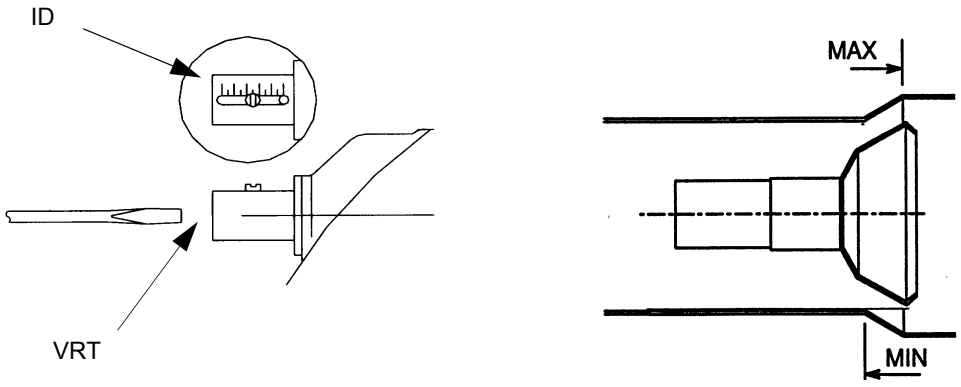
- Adjust the air and gas flow rates at the maximum output (“high flame”) first, by means of the air damper and the valves group pressure stabiliser respectively.
- Check that the combustion parameters are in the suggested limits.
- Check the flow rate measuring it on the counter or, if it was not possible,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

To change the burner setting during the testing in the plant, follows the next procedure, according to the model provided.

Adjusting the combustion head

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

The burner is factory-adjusted with the combustion head in the "MAX" position, accordingly to the maximum power. To operate the burner at a lower power, progressively shift back the combustion head, towards the "MIN" position, screwing the screw **VRT**. The ID index shows how much the combustion head moved.



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

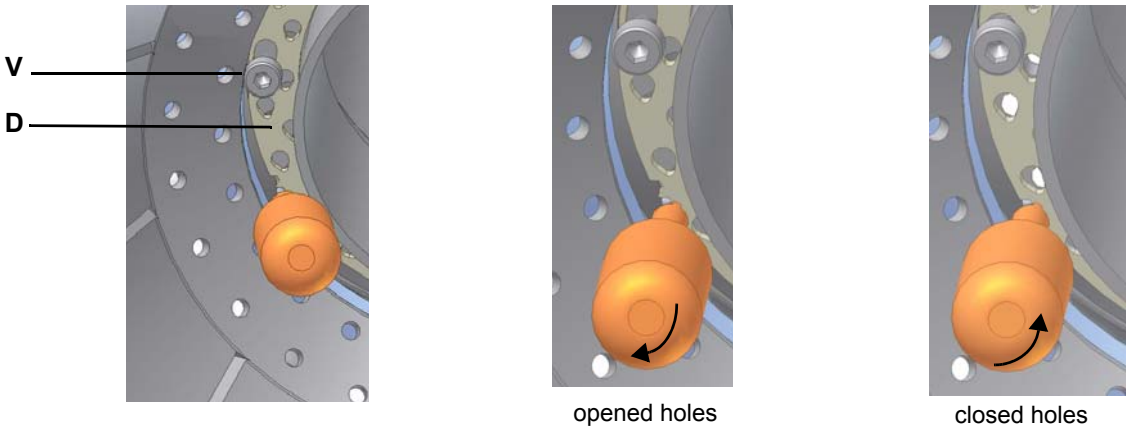
(HR75A M-..) Center head holes gas flow regulation

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

1 loosen the three **V** screws that fix the adjusting plate **D**;

2 insert a screwdriver on the adjusting plate notches and let it move CW/CCW as to open/close the holes;

3 once the adjustmet is performed, fasten the **V** screws.



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

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

- For natural gas burners, plate holes are fully opened

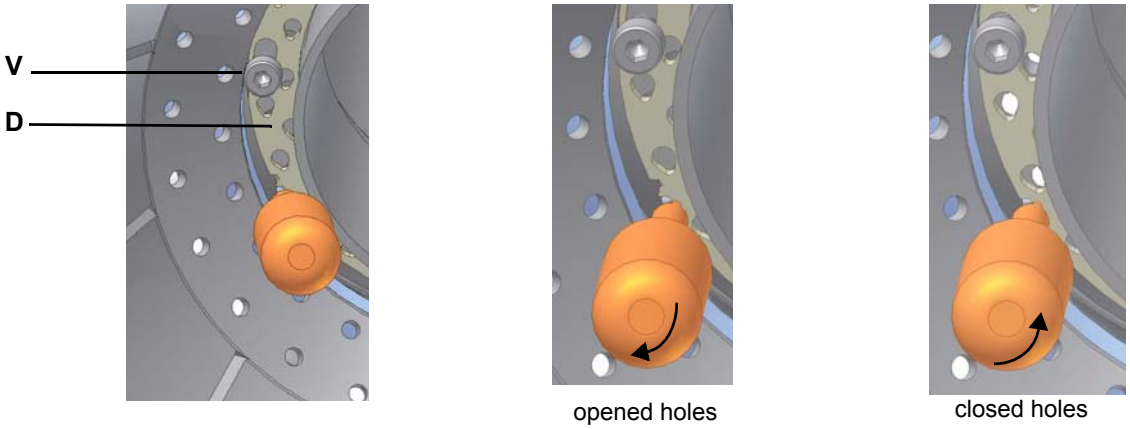
(HR75A L-..) Center head holes gas flow regulation

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

1 loosen the three **V** screws that fix the adjusting plate **D**;

2 insert a screwdriver on the adjusting plate notches and let it move CW/CCW as to open/close the holes;

3 once the adjustmet is performed, fasten the **V** screws.



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

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

- For LPG burners, plate holes are opened about 1.7mm

ADJUSTMENTS FOR GAS OPERATION

Adjustment procedure

1 Turn the burner on by means of its main switch **S1**: if the burner locks (LED **B1** on in the control panel) press the RESET button (**S2**) on the control panel. See chapter “Operation” for further details.

2 check the fan motor rotation

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

4 the burner starts up in the low flame stage: drive the burner to high flame stage, by means of the “high/low flame” thermostat **TAB**.

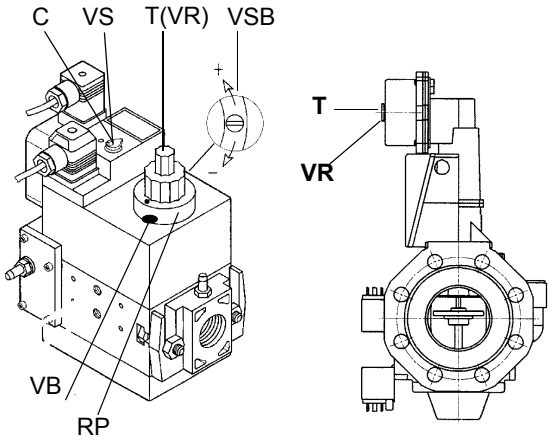
5 adjust the burner combustion values in the high flame stage as described in the following steps.

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

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

- **Multibloc MB-DLE:** 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. 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.

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

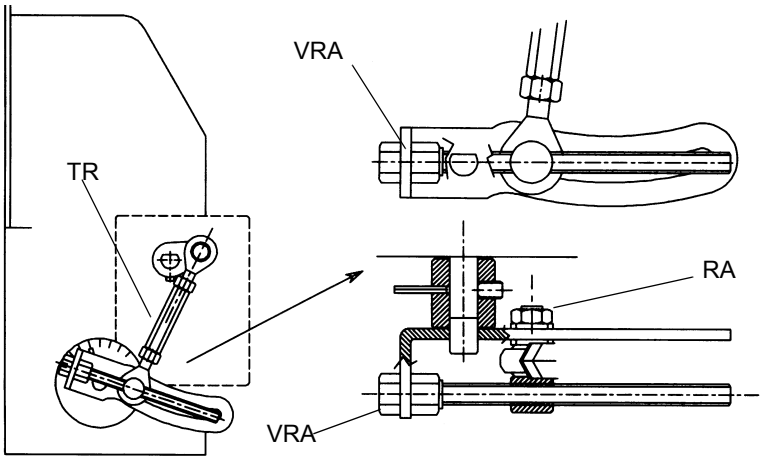


Dungs Multibloc MB-DLE **Siemens VGD..**

⚠ Pressure governor is factory-set. The setting values must be locally adapted to machine conditions. Important! Follow the instructions carefully!

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

Note: once the procedure is perfomed, be sure that the blocking nut **RA** is fasten.



Go on adjusting the burner according to the model (double-stage, progressive, fully-modulating).

Double-stage burners

9 drive the burner to the low flame stage by means of the **TAB** thermostat;

10 In order to change the gas flow rate slacken the nuts **DB** (Fig. 17) and adjust the opening angle of the gas butterfly valve by rotating the rod **TG** (clockwise rotation increases gas flow, anticlockwise rotation decreases it). The slot on the butterfly valve shaft shows the opening degree of the valve regardingthe horizontal axis (Fig. 17).

NOTE: At the end of settings, make sure the locking screws **RA** and **DB** are fully tightened.

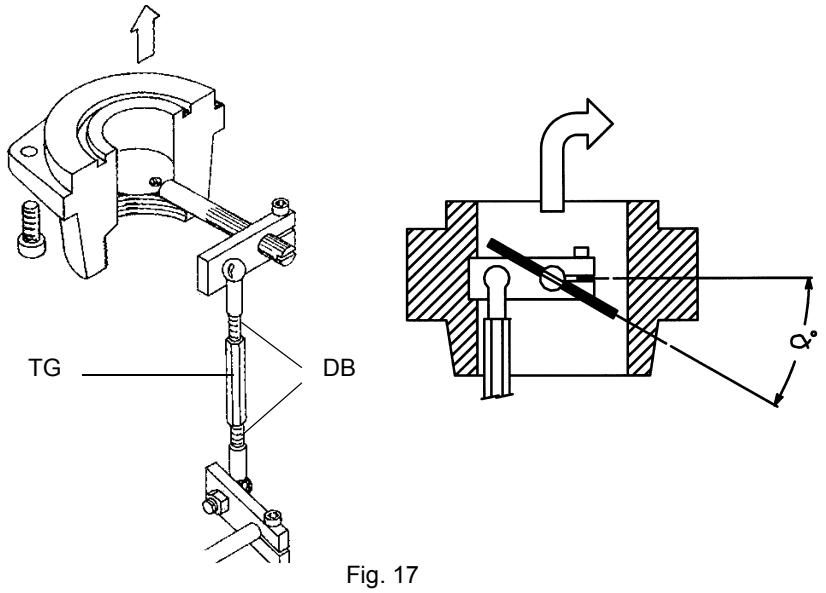


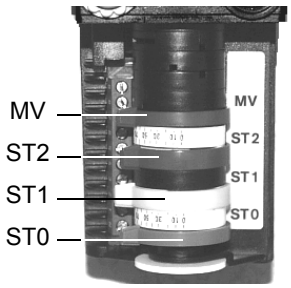
Fig. 17

11 Now adjust the pressure switches.

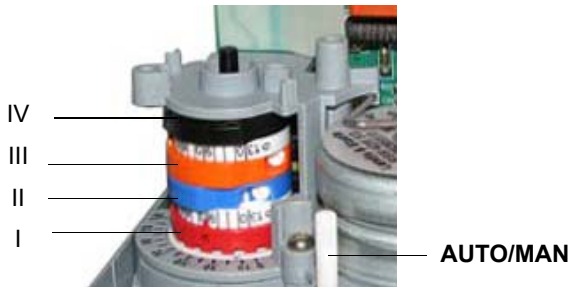
12 If it is necessary to change the burner output in the low flame stage, move the low flame cam: the low flame position matches the ignition position. As far as burners fitted with Dungs MBC gas valves, the low flame cam does not match the ignition cam position, that is why it must be set at about 30° more than the ignition cam.

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

Berger STA6 B 3.41 (high-low flame burners)



Siemens SQN72.2A4Axx (high-low flame burners)



For DUNGS MB-DLE / Siemens VGD gas valves	Actuator camsBerger STA	Siemens SQN72
High flame position (set to 90°)	ST2	I (red)
Low flame and ignition position	ST1	III (orange)
Stand-by position (set to 0°)	ST0	II (blue)
Not used	MV	IV (black)

- Berger STA: on this actuator, the manual control of the air damper is not provided; the setting of the cams is carried out working with a screwdriver on the **VS** screw placed on the cam.
- .

Berger STA12: a key is provided to move the cams.

Siemens SQN72: a key is provided to move cams I and IV, the other cams can be moved by means of screws.

On the BERGER STA12B3.41 actuator, the manual air damper control is not provided. On the Siemens actuator the AUTO/MAN mode is provided (see picture).

Progressive burners

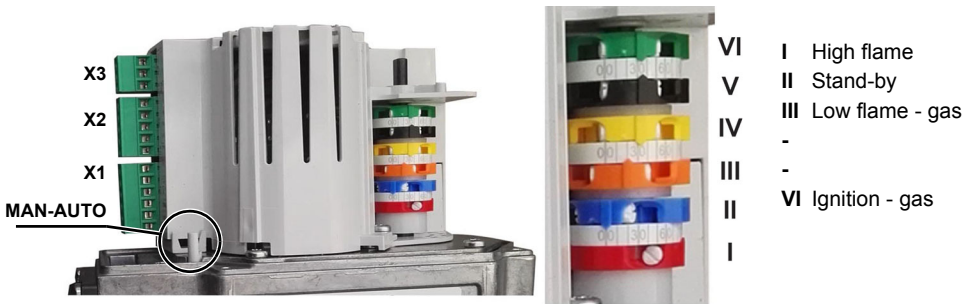
Once the procedure till step 8 described on paragraph “Adjustment procedure” on page 31, is accomplished, go on as follows:

9 set the low flame cam matching the high flame cam;

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

The manual air damper control is not provided on these actuators. The adjustments must be carried out acting manually on the cams.

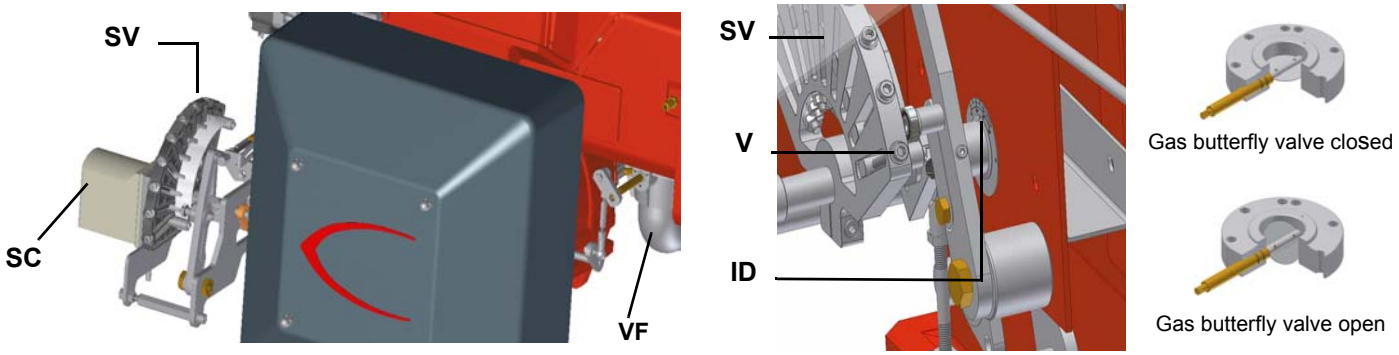
SQM40.265 CSW Actuator cams



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

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

13 Now adjust the pressure switches.



14 If it is necessary to change the burner output in the low flame stage, move the low flame cam: the low flame position matches the ignition position. As far as burners fitted with Dungs MBC gas valves, the low flame cam does not match the ignition cam position, that is why it must be set at about 30° more than the ignition cam.

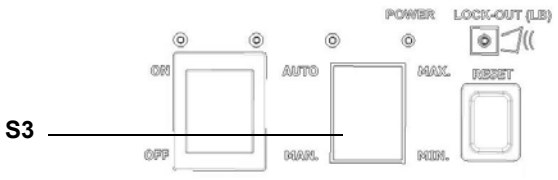
15 Turn the burner off and then start it up again. If the adjustment is not correct, repeat the previous steps.

Fully modulating burners

To adjust the fully-modulating burners, use the **S3** 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 **S3** position sets the oprating stages: to drive the burner to the high-flame stage, set S3=MAX; to drive it to the low-flame stage, set S3=MIN.

To move the adjusting cam set S3=MIN or MAX and then S3=MAN.



S3 = MAN stop at the current position
S3 = MAX high flame operation
S3 = MIN low flame operation
S3 = AUTO automatic operation

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.

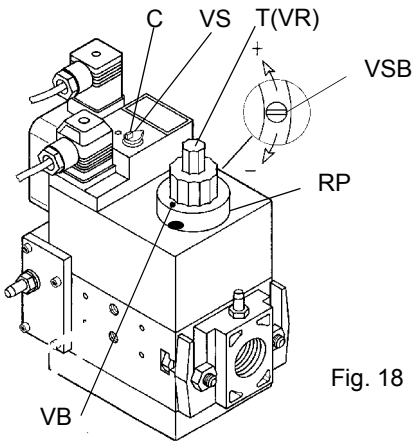


Fig. 18

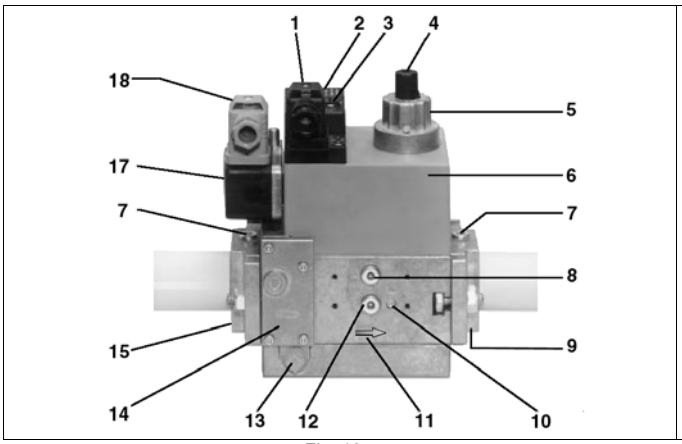


Fig. 19

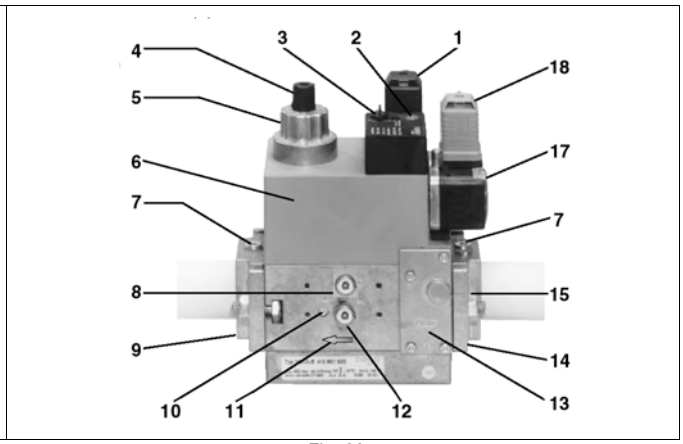


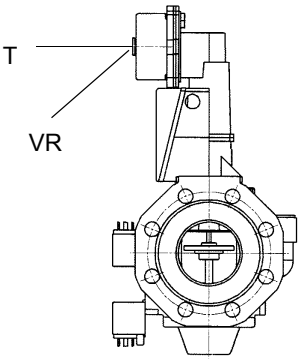
Fig. 20

Key

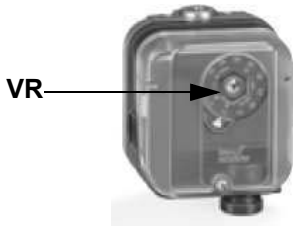
1 Electrical connection for valves
2 Operation display (optional)
3 Pressure governor closing tap
4 Start setting cap
5 Hydraulic brake and rate regulator
6 Coil
7 Test point connection G 1/8
8 Test point connection G 1/8 downstream of valve 1, on both sides
9 Output flange
10 Test point connection M4 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.



Setting 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 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.

Calibration of air pressure switch

To calibrate the air pressure switch, proceed as follows:

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

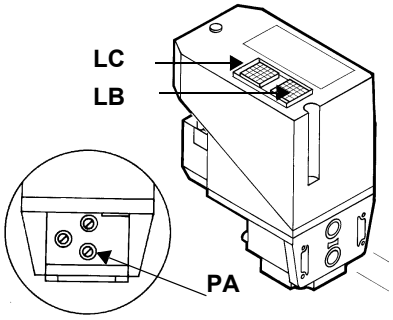
PGCP Gas leakage pressure switch (witn Siemens LDU/LME7x burner control/Siemens LMV Burner Management System)

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

Gas Proving System VPS504 (Option)

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

When wishing to monitor the test, install a pressure gauge ranged to that of the pressure supply point **PA**. If the test cycle is satisfactory, after a few seconds the consent light **LC** (yellow) comes on. In the opposite case the lockout light **LB** (red) comes on. To restart it is necessary to reset the appliance by pressing the illuminated pushbutton **LB**.



ADJUSTMENT PROCEDURE FOR LIGHT OIL OPERATION

The light oil flow rate can be adjusted choosing a by-pass nozzle that suits the boiler/utilisation output and setting the delivery and return pressure values according to the ones quoted on the table below and the diagram on Fig. 21 (as far as reading the pressure values, see next paragraphs).

NOZZLE	NOZZLE SUPPLY PRESSURE bar	HIGH FLAME RETURN PRESSURE bar	LOW FLAME RETURN PRESSURE bar
MONARCH BPS	23	See table below	See table below
BERGONZO A3	23	11 ÷ 13	6 (recommended)

	RETURN PRESSURE bar													
Nozzle sizeNozzle 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

Tab. 1- Monarch 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.

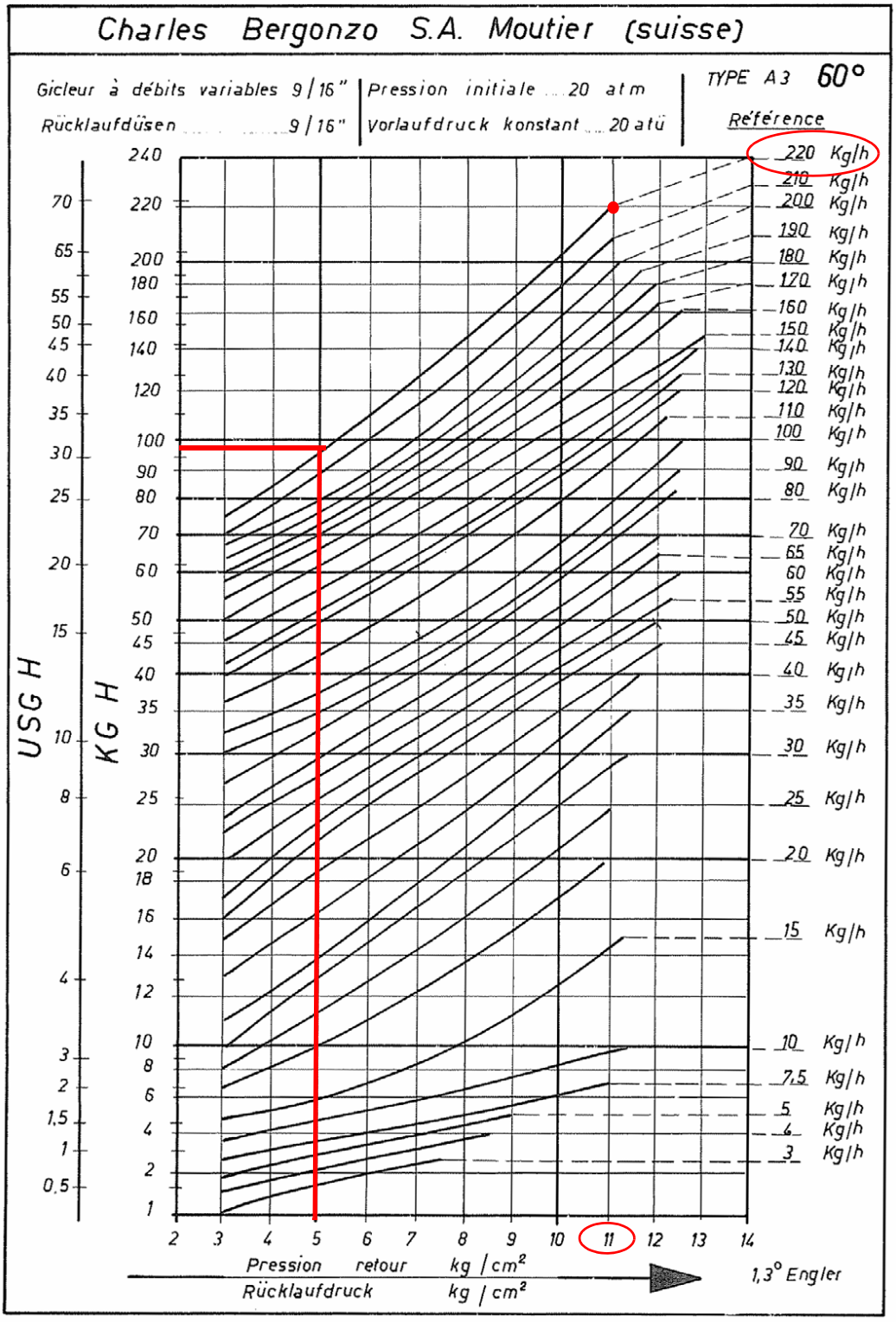


Fig. 21

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 36). The flow rate will then be about 95kg/h (see the example showed on the Bergonzo diagram).

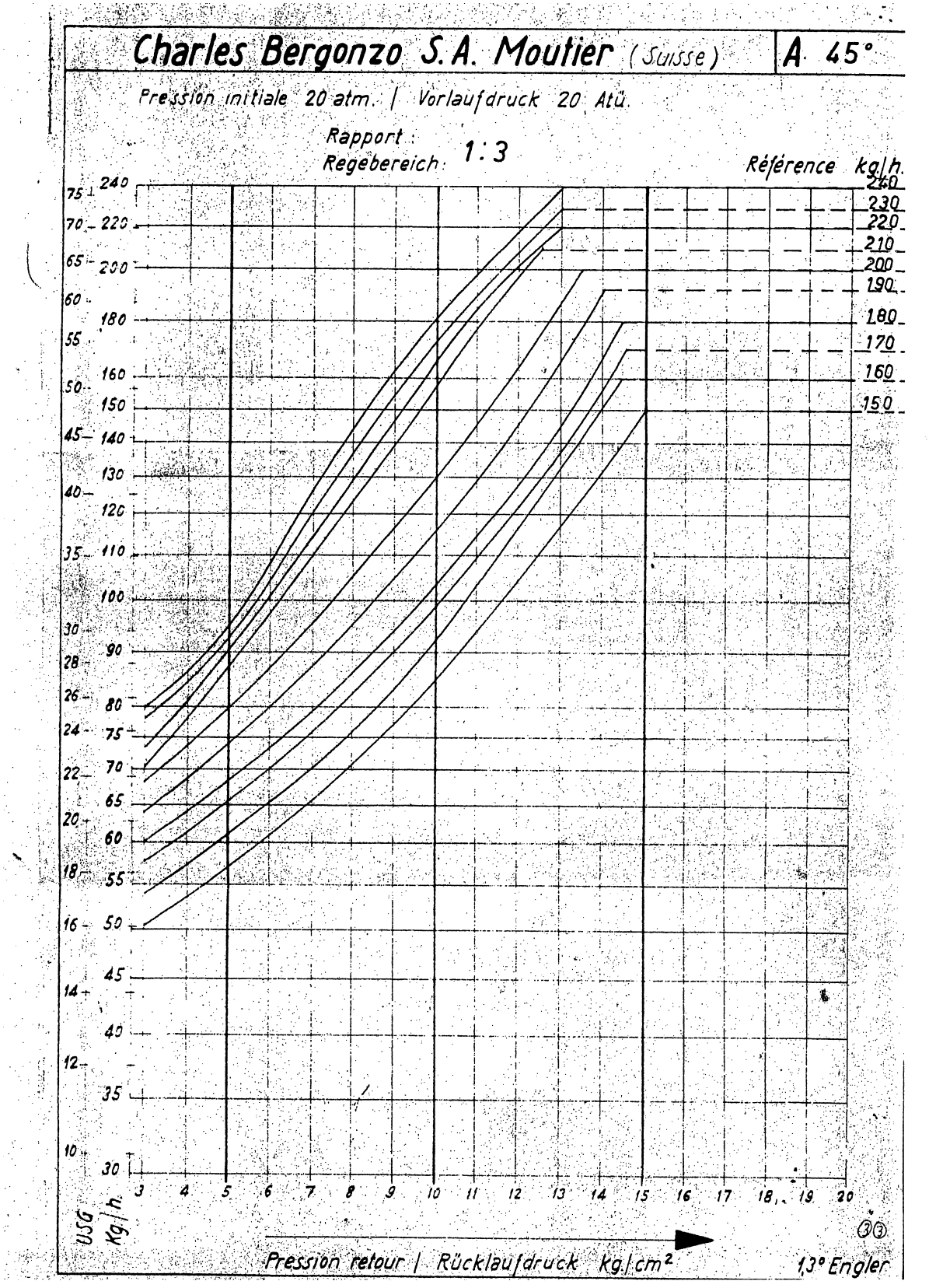

Charles Bergonzo S.A. Moutier (Suisse)
A 45°
Pression initiale 20 atm. | Vorlaufdruck 20 Atü.
Rapport :
Regebereich 1 : 3
Référence kg/h.
240
230
220
210
200
190
180
170
160
150
75 240
70 220
65 200
60 180
55 160
50 150
45 140
130
40 120
35 110
100
30 90
28
26 80
24 75
22 70
65
20 60
18 55
16 50
45
14 40
12 35
10 30
3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
USG
Kg/h.
Pression retour | Rücklaufdruck kg/cm²
1,3° Engler

Fig. 22

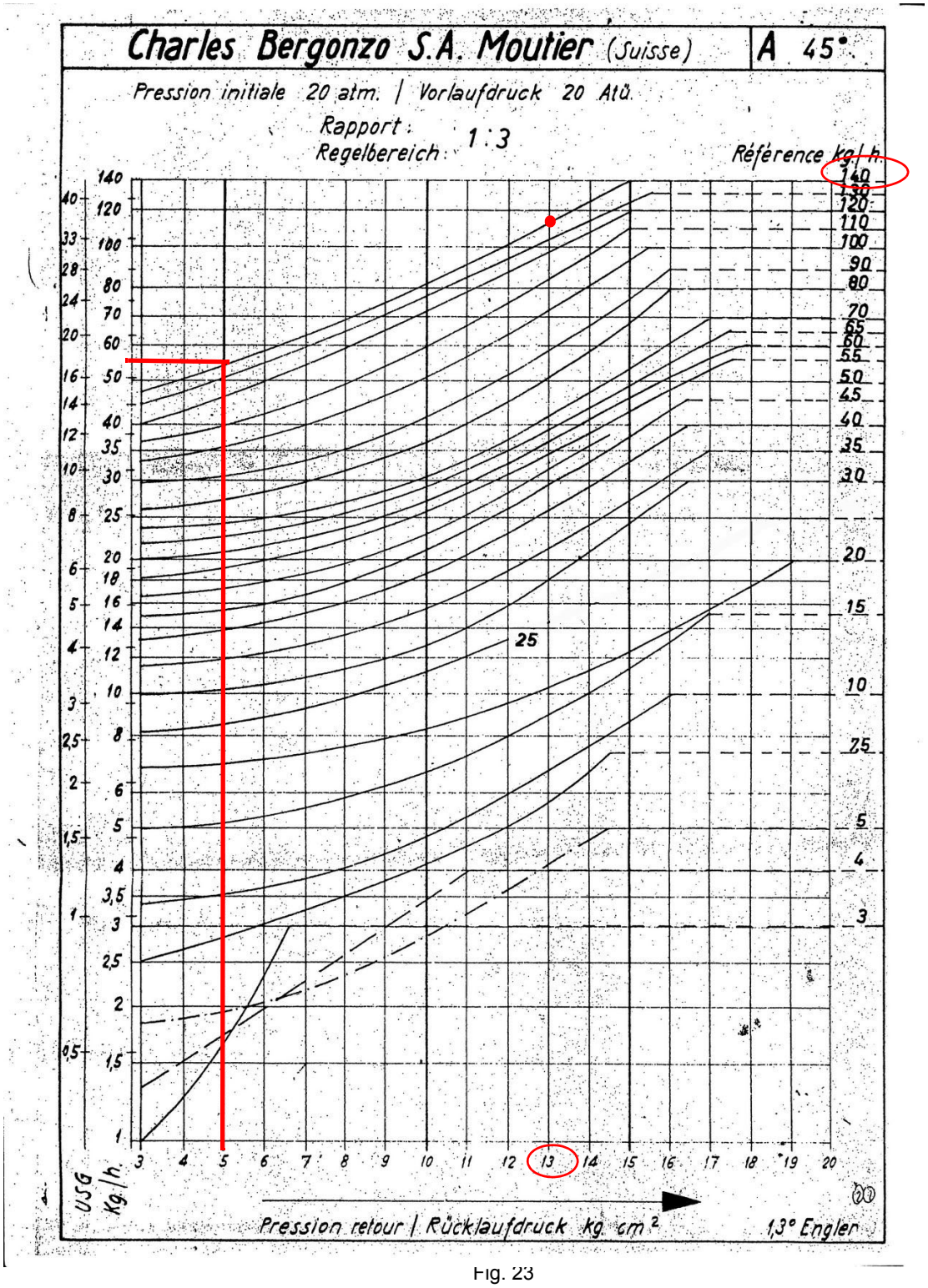
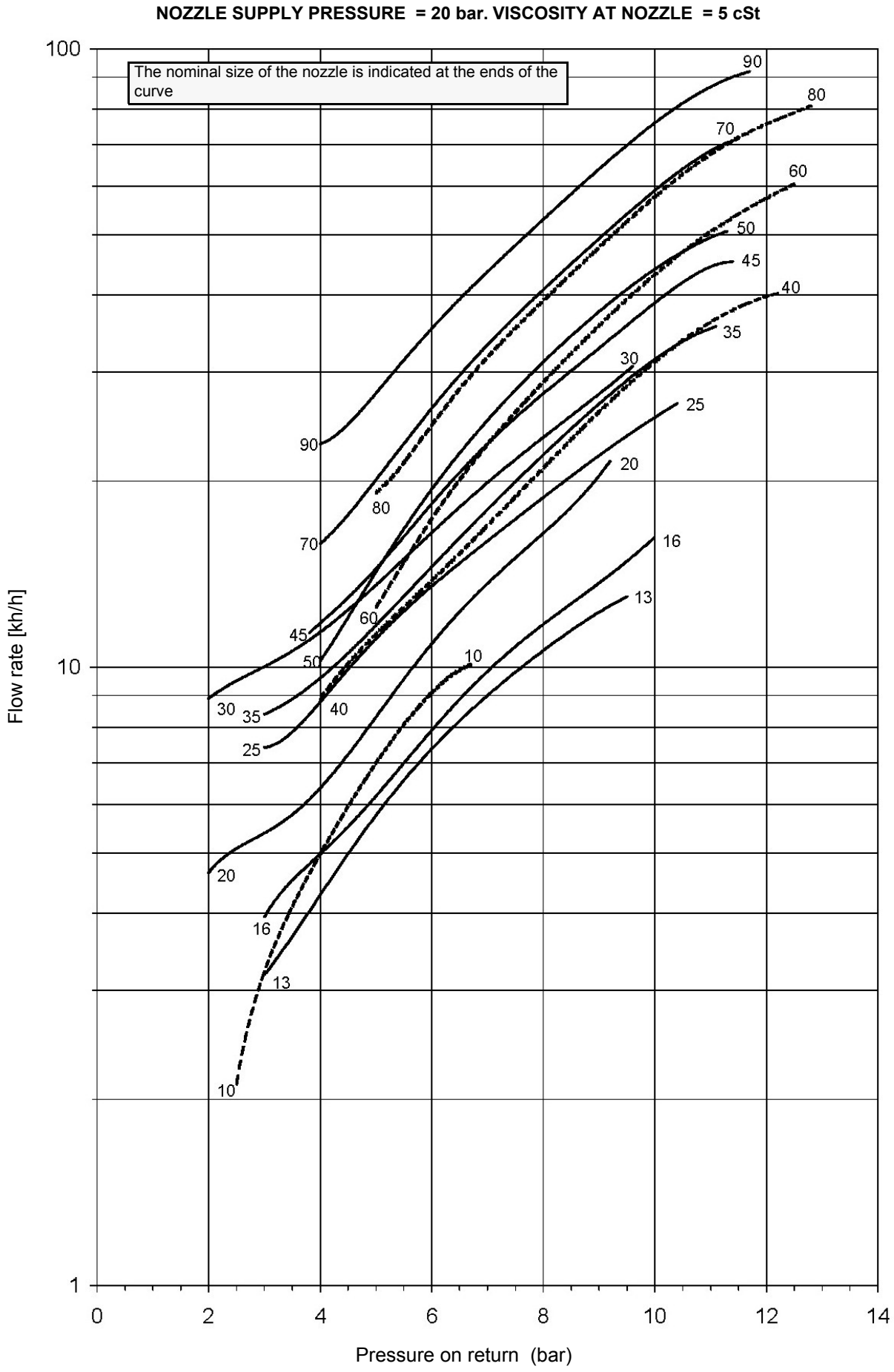


Fig. 23

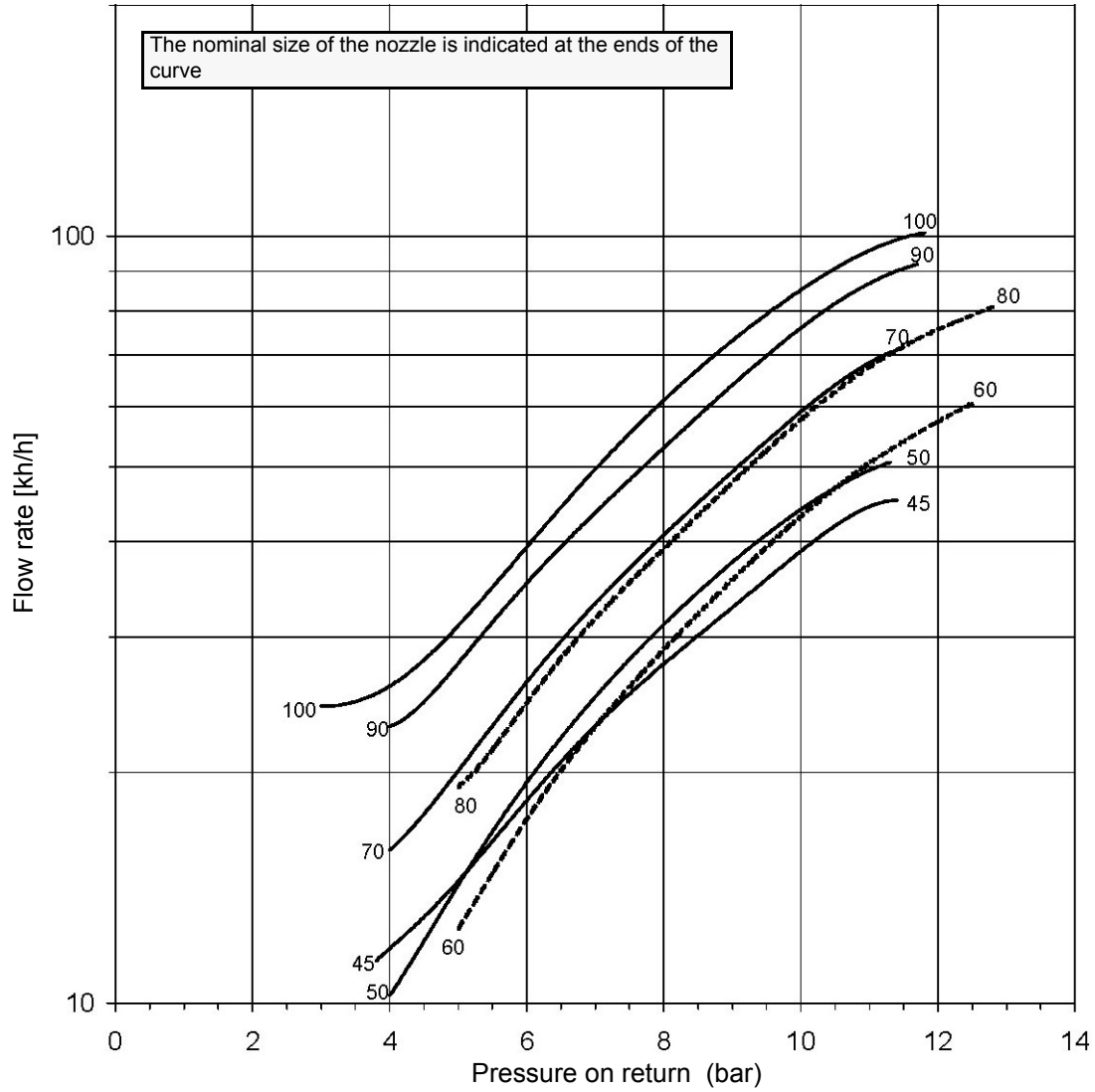
Example (Bergonzo): if a 140kg/h flow rate BERGONZO 45° nozzle is provided, set the return pressure at 13bar, supply at 20bar on the delivery to get a 110kg/h flow rate. If the return pressure needed is 5bar, instead, act on the adjusting screw on the pressure governor. The flow rate will then be about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

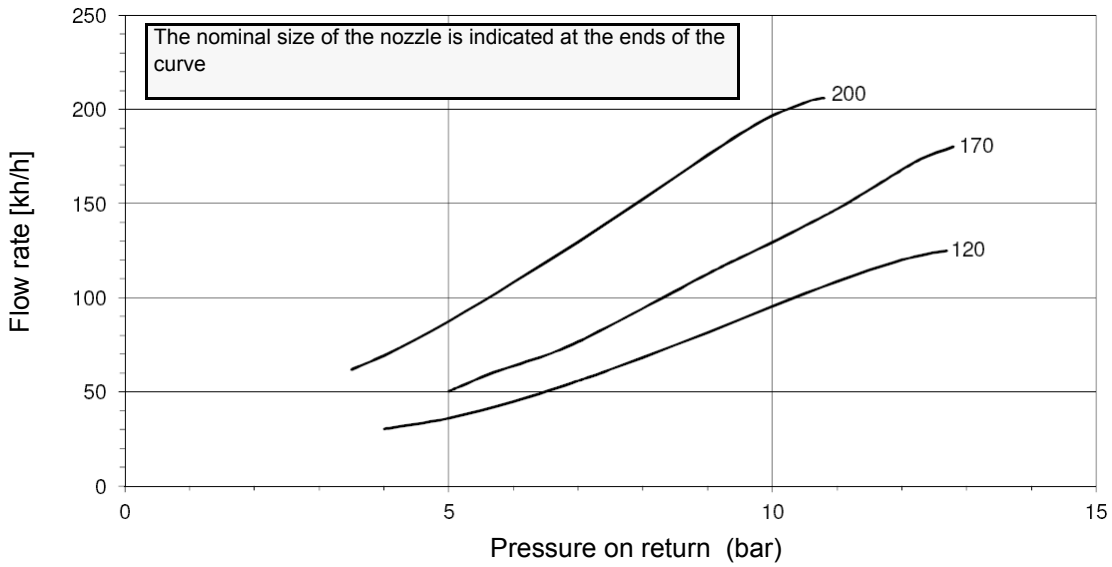
FLUIDICS KW3...60°



FLUIDICS KW3...60°

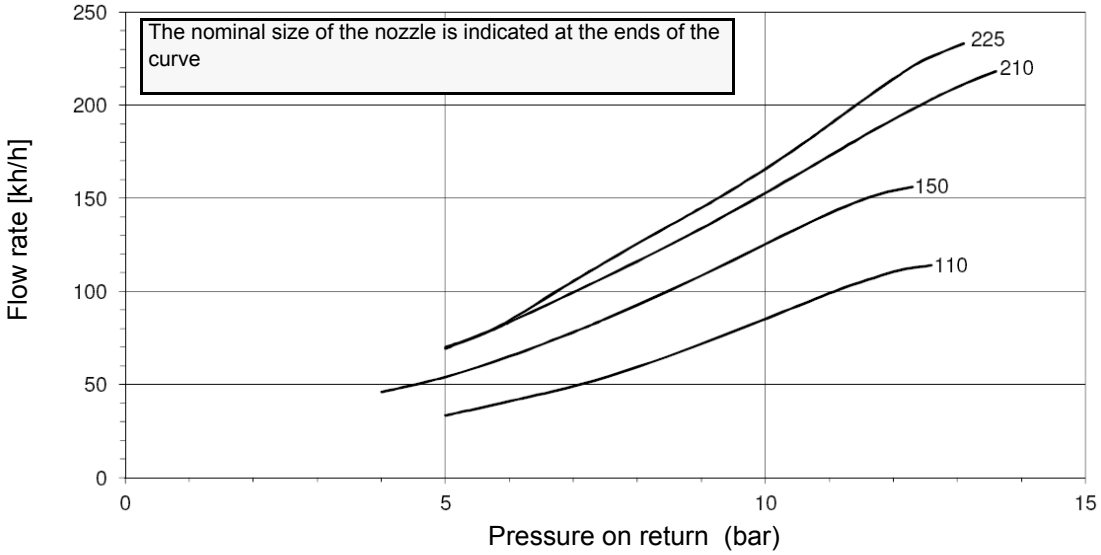
NOZZLE SUPPLY PRESSURE = 20 bar. VISCOSITY AT NOZZLE = 5 cSt

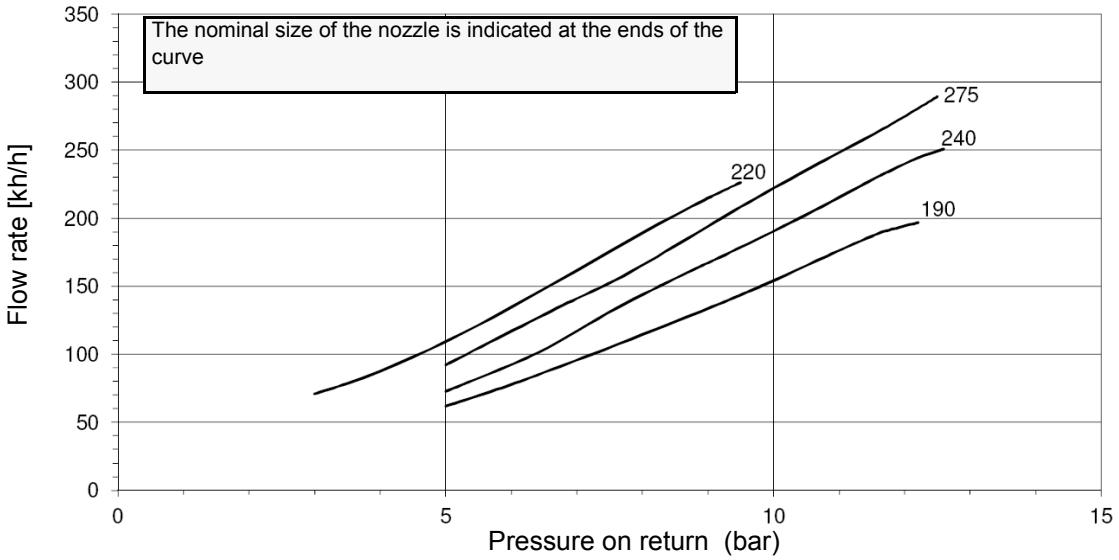


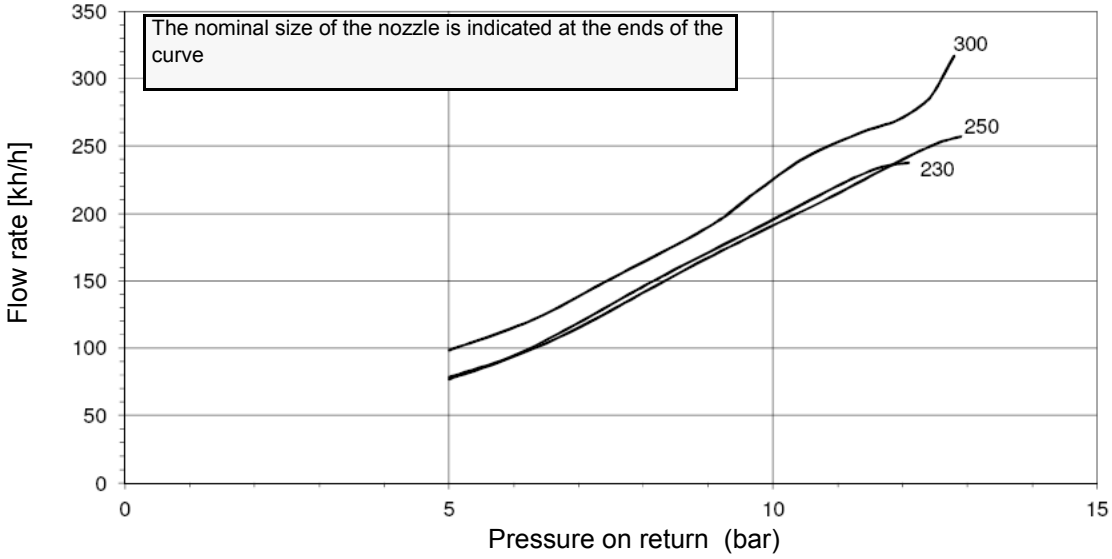


FLUIDICS KW3...60°

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

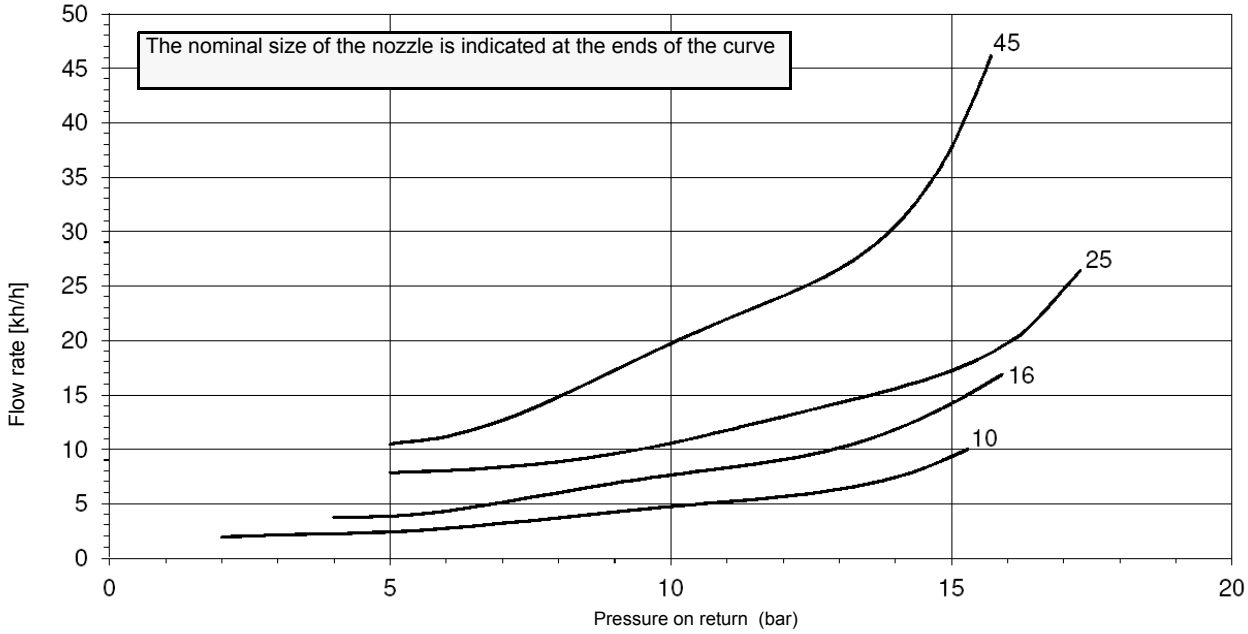


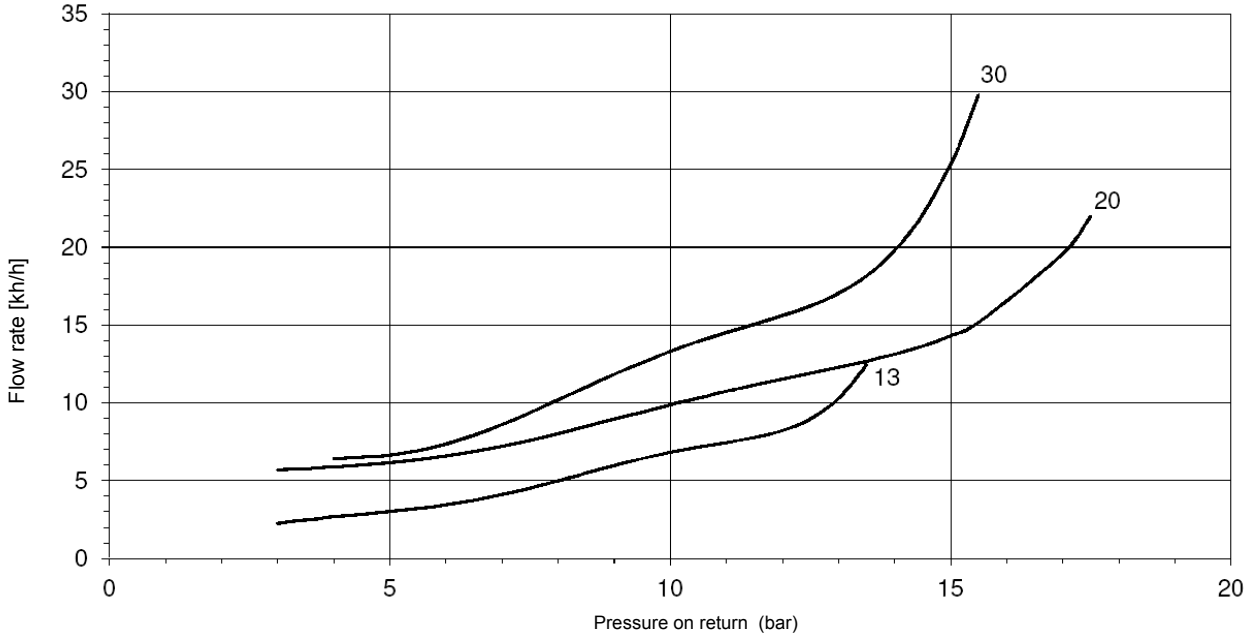


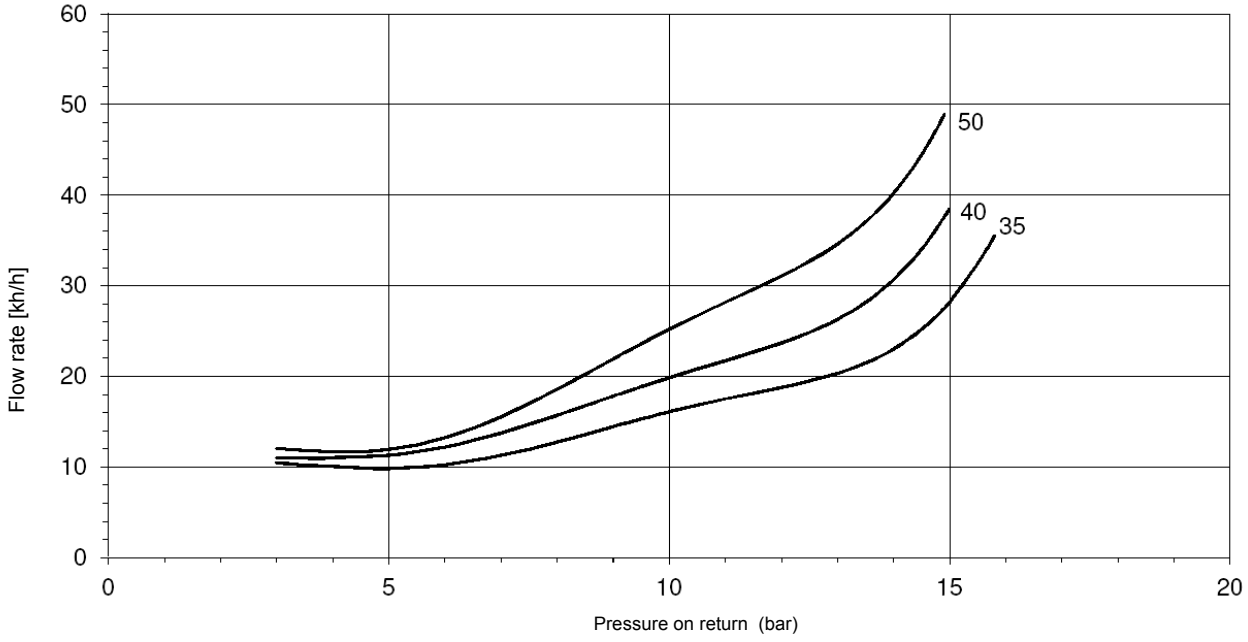


FLUIDICS KW3...45°

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

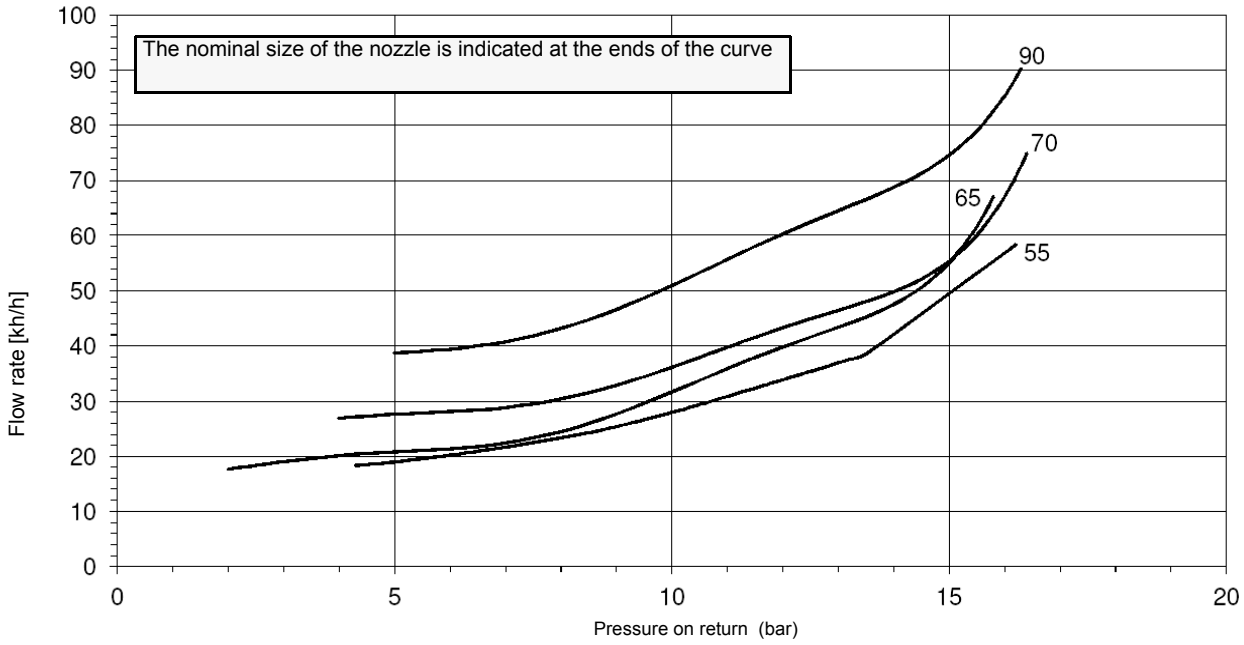


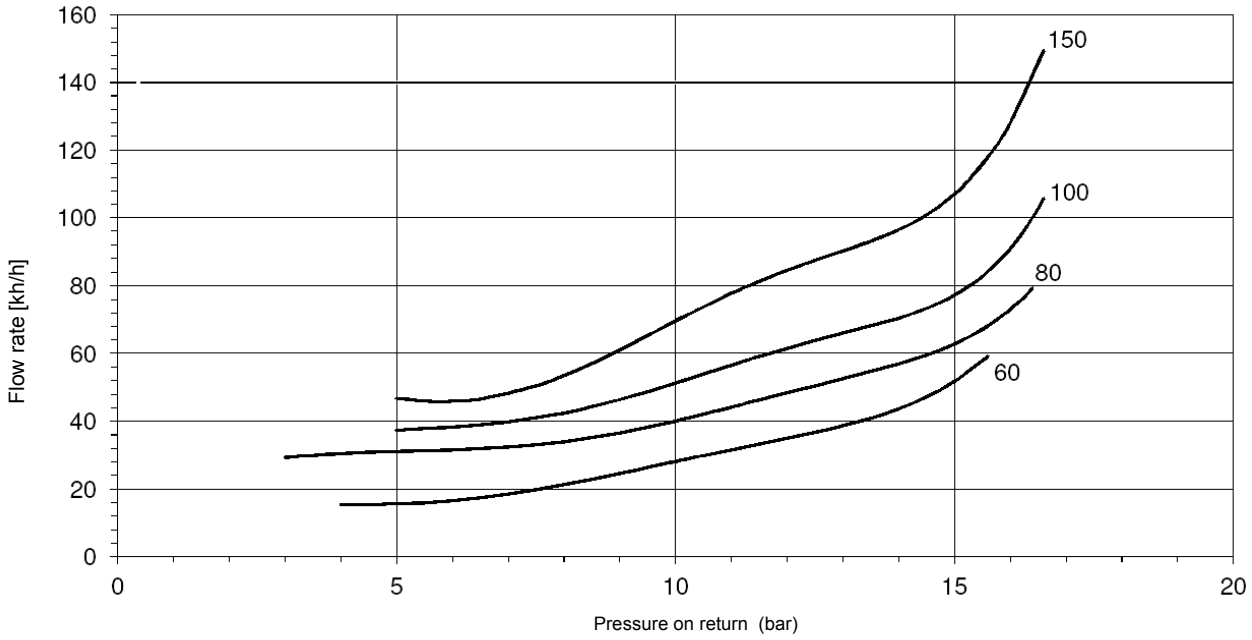


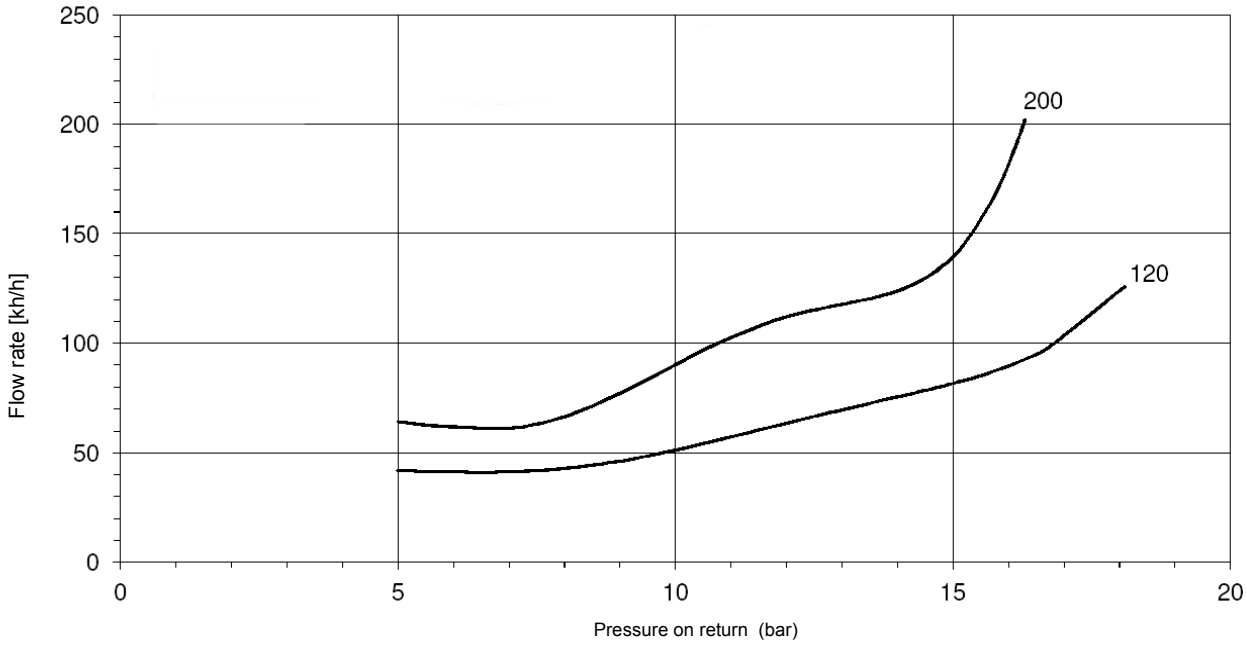


FLUIDICS KW3...45°

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



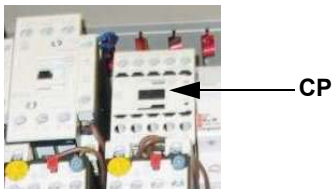




Double-stage burners

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.

2 with the electrical panel open, prime the oil pump acting 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 start the burner up by means of the thermostat series;

4 bleed the air from the **M** pressure gauge port (Fig. 24) by loosing the cap without removing it, then release the contactor.

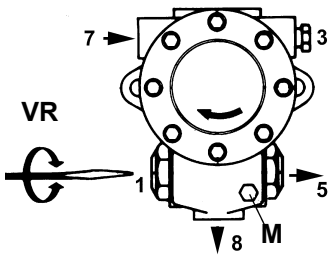
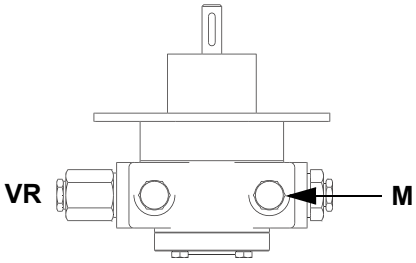
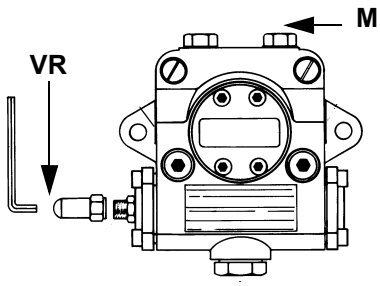
Suntec E7	HP Technik UHE	Suntec TA.
		

Fig. 24

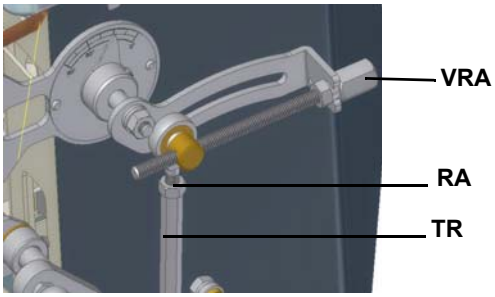
5 drive the burner to high flame stage, by means fo the thermostat **TAB** (high/low flame thermostat - see Wiring diagrams).

6 the nozzle supply pressure is already factory-set and must not be changed. Only if necessary, adjust the supply pressure as follows (see related paragraph); insert a pressure gauge into the port shown on Fig. 25 and act on on the pump adjusting screw **VR** (see Fig. 38) as to get the nozzle pressure at 20bar (Monarch or Fluidics nozzles - see page 36).

7 the oil flow rate in the high flame stage is the maximum pressure with the return line closed

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

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



9 drive the burner to low flame by means of the **TAB** thermostat.

10 To perform the regulation, remove the cap **D** and loosen the screw **V** (see Fig. 40), by means of a screwdriver (see Fig. 40). The regulating screw **V** acts on the return pressurefrom the nozzle. Set the pressure to the minimum value of 5 bar. Read the values on the pressure gauge placed on the regulator's coupling **M**. Once the regulation is accomplished, replace cap **D**.

Note: After a certain operating period, the pressure can change because of some dirt on the needle's seal: remove the screw **VT** (see Fig. 38) and clean.

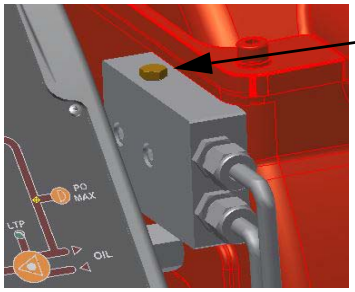


Fig. 25

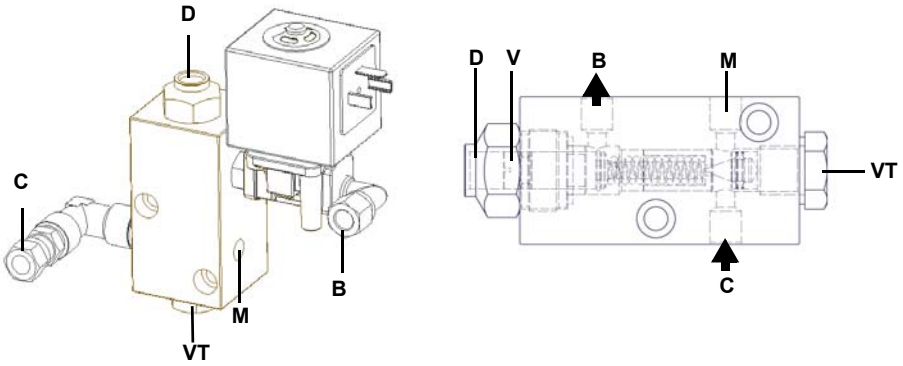


Fig. 26 - Oil manual governor

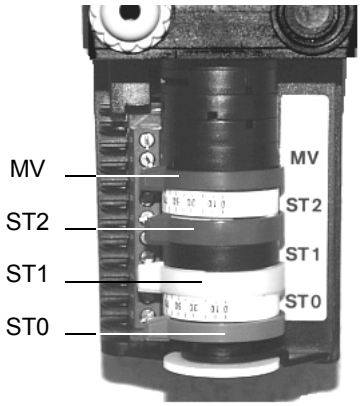
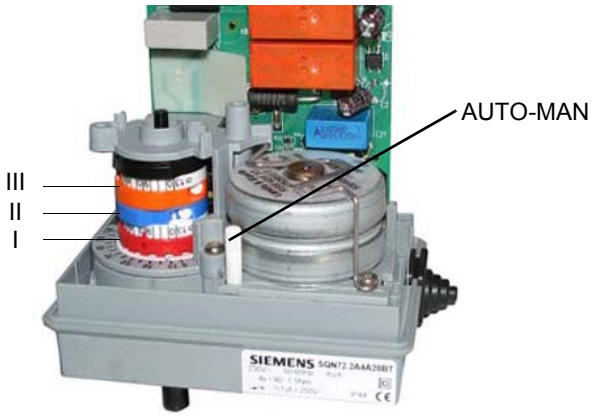
11 always checking the combustion values, adjust the low flame air flow rate by means of the actuator ST1 (Berger)/III (Siemens) cam;

12 The low flame position must never match the ignition position that is why cam MV (Berger)/IV (Siemens) must be set 20°- 30° more than the ignition position ST1 (Berger)/III (Siemens).

13 Turn the burner off and go on with the gas operation adjustment.

Attention:

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

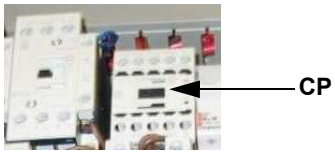
Berger STA12 B 3.41	**Siemens SQN72**
	
ST2 = High flame cam ST0 = Ignition position ST1 = Low flame MV = Auxiliary cam for the second valve enabling	I = High flame cam (red) II = Ignition position (blue) III = Low flame (orange)) IV = Auxiliary cam for the second valve enabling (black)

Progressive burners

Oil Flow Rate Settings by means of Siemens SQM40.. actuator

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.

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



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

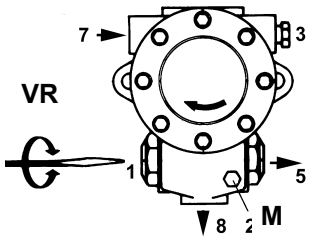
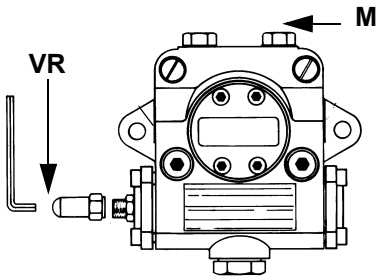
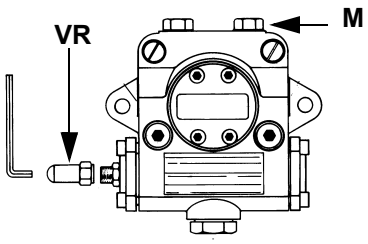
Suntec E7	Suntec TA.	Suntec TA.
		

Fig. 27

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

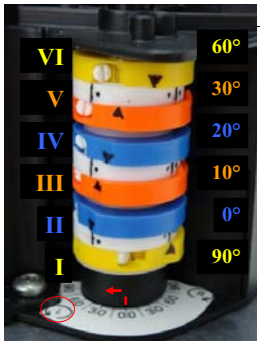
5 record the high flame value set during the gas operation adjustments (see previous paragraphs);

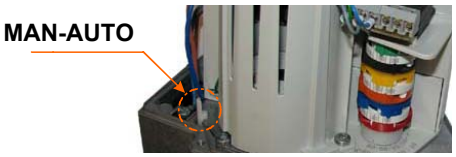
6 start the burner up by means of the thermostat series and wait until the pre-purge time comes to an end and that the bruner starts up;

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

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

Siemens SQM40





Actuator cams

II	High flame
II	Stand-by
III	Low flame - gas
IV	Low flame - oil (SQM40..)
V	Oil Ignition
VI	Gas Ignition

9 the nozzle suplly pressureis already factory-set and must not be changed. Only if necessary, adjust the supply pressure as follows (see related paragraph); insert a pressure gauge into the port shown on Fig. 28 and act on on the pump adjusting screw **VR** (see

Fig. 27) as to get the nozzle pressure at 20bar (Monarch or Fluidics nozzles - see page 36-34).

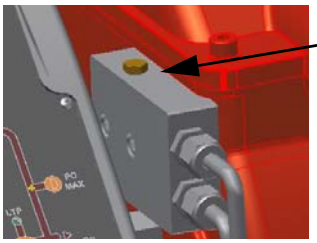


Fig. 28

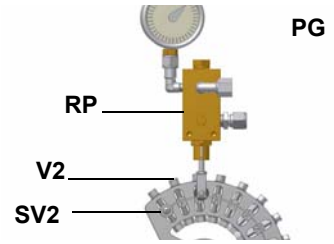


Fig. 29

10 in order to get the maximum oil flow rate, adjust the pressure (reading its value on the **PG** pressure gauge) without changing the air flow rate set during the gas operation adjustments (see 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.

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

12 set the **TAB** thermostat (as for fully-modulating burners, see next paragraphs) to the minimum in order that the actuator moves progressively towards the low flame position;

13 move the oil low flame cam towards the minimum to move the actuator towards the low flame until the two bearings find the adjusting screw that refers to a lower position: screw **V2** to increase the rate, unscrew to decrease, in order to get the pressure as showed on chart/diagram on “ADJUSTMENT PROCEDURE FOR LIGHT OIL OPERATION” on page 36, according to the requested rate.

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

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

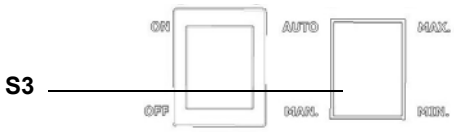
Turn the burner off; then start it up again. If the adjustment is not correct, repeat the previous steps.

Fully modulating burners

To adjust the fully-modulating burners, use the **S3** 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 **S3** position sets the oprating stages: to drive the burner to the high-flame stage, set S3=MAX; to drive it to the low-flame stage, set S3=MIN.

To move the adjusting cam set S3=MIN or MAX and then S3=MAN.



MAN stop at the current position
MAX high flame operation
MIN low flame operation
AUTO automatic operation

Minimum oil pressure switch (when provided)

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

Maximum oil pressure switch

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

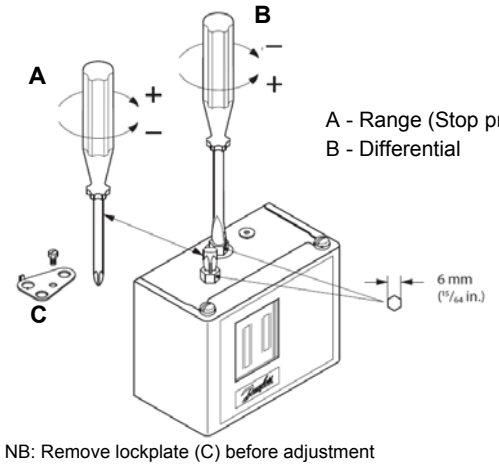
It is recommended to verify that the combustion parameters are within the range of acceptable values even against a pressure variation that gets close to the limit of the pressure switch.

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

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

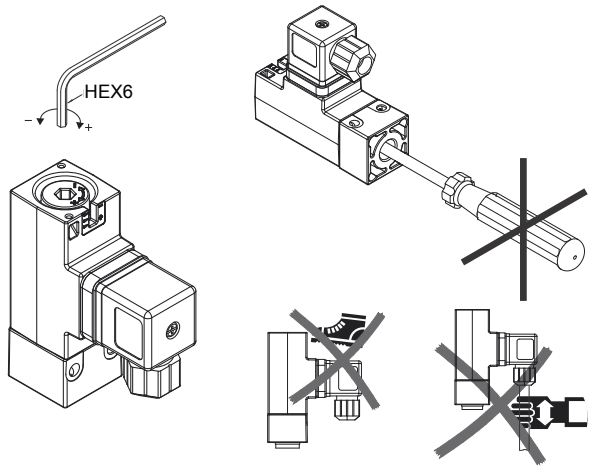
Oil pressure switch adjustment

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



NB: Remove lockplate (C) before adjustment

Danfoss KP..



Trafag Picostat 9B4..

PART IV: MAINTENANCE

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



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

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

ROUTINE MAINTENANCE

- Clean and examine the gas filter and replace it if necessary.
- Clean and examine the oil filter cartridge and replace it if necessary.
- Examine the flexible hoses and check for possible leaks.
- Check and clean if necessary the oil heaters and the tank, according to the fuel type and its use; remove the heaters flange fixing nuts and remove the heaters from the tank: clean by using steam or solvents and not metallic things.
- Remove and clean the combustion head.
- Examine and clean the ignition electrode, adjust and replace if necessary.
- Examine and clean the detection probe, adjust and replace if necessary.
- Examine the detection current.
- Remove and clean the heavy oil nozzle ***(Important: use solvents for cleaning, not metallic tools)*** and at the end of the maintenance procedures, after replacing the burner, turn it on and check the shape of the flame; if in doubt replace the nozzle. Where the burner is used intensively it is recommended to replace the nozzle as a preventive measure, at the begin of the operating season.
- Clean and grease joints and rotating parts.

IMPORTANT:Remove the combustion head before checking the ignition electrode.

- Remove and clean the compressed air regulator
- Remove and clean the oil regulator (if provided)



CAUTION: avoid the contact of steam, solvent and other liquids with the electric terminals of the resistor.
On flanged heaters, replace the seal gasket before refitting it.
Periodic inspections must be carried out to determine the frequency of cleaning.



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

Gas filter maintenance

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

To clean or remove the filter, proceed as follows:

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

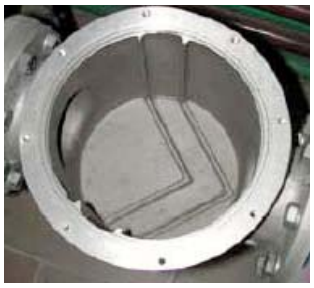
A



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. 30-Fig. 31) $\Delta p > 10$ mbar.
- Change the filter if the pressure difference between pressure connection 1 and 2 (Fig. 30-Fig. 31) 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. 32).
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.

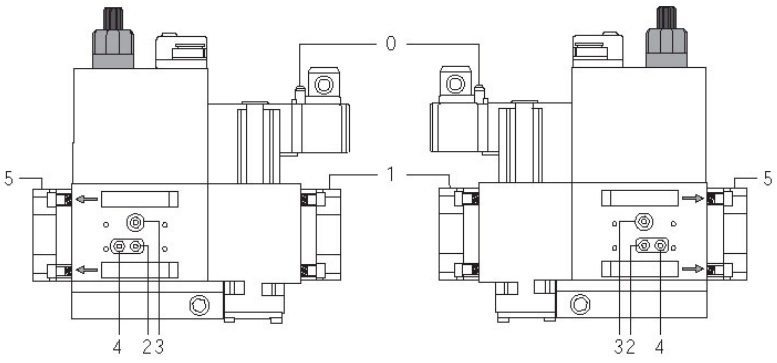


Fig. 30

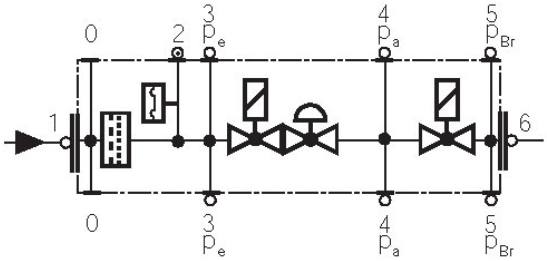


Fig. 31

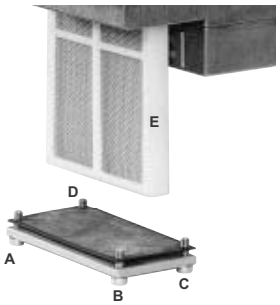
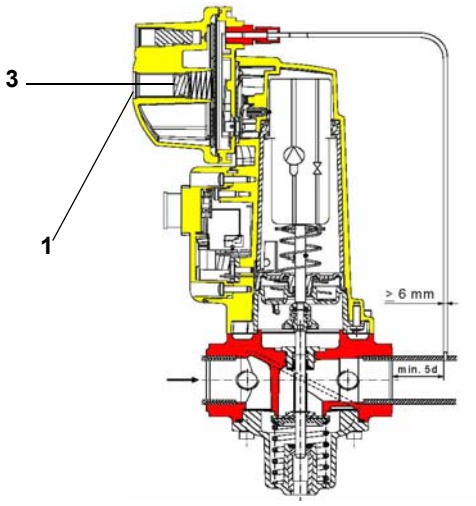


Fig. 32

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

Light oil filter maintenance

For correct and proper servicing, proceed as follows:

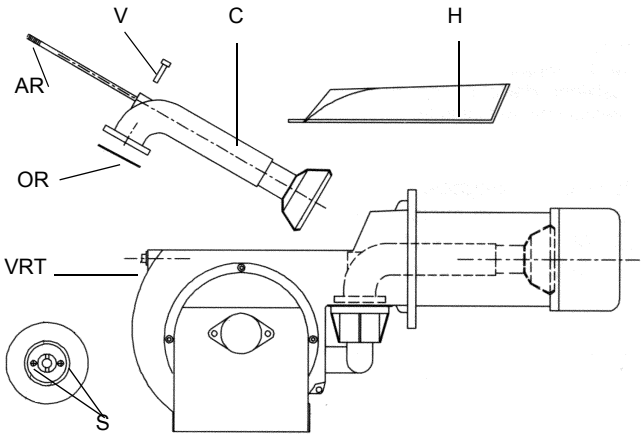
1 cutoff the required pipe section;
2 unscrew the filter cup;
3 remove the filtering cartridge, wash it with gasoline; if necessary, replace it; check the tightening O-rings and replace them if necessary;
4 replace the cup and restore the pipe line.

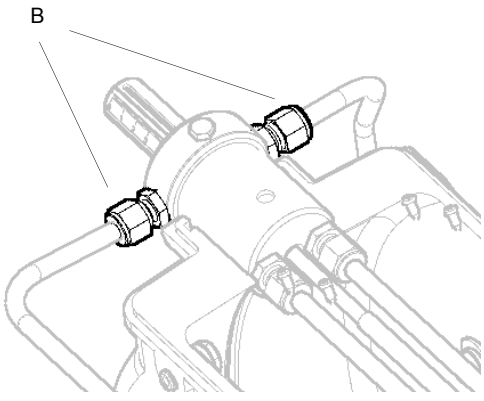


Removing the combustion head

- Remove the top H.
- Slide the UV detector from its housing.
- Unscrew the two screws **S** holding in position the washer and then unscrew **VRT** to free the threaded rod **AR**.
- Slacken the screws **V** holding the gas manifold **C**, slacken the connectors **B** and remove the complete assembly as shown in figure.

Note: for the subsequent assembly carry out the above described operations in the reverse order, checking the correct position of the OR ring.



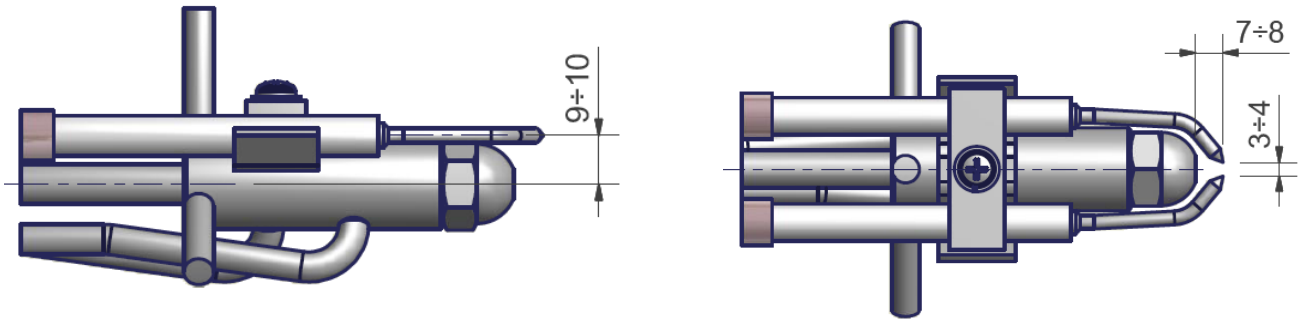


Electrodes Adjustment

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

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

T



Cleaning/replacing the electrodes

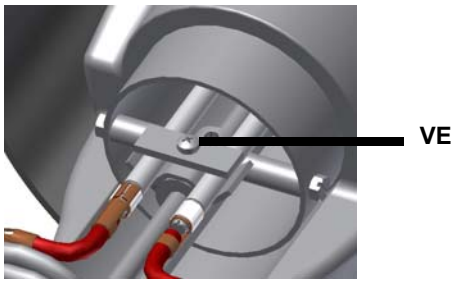
ATTENTION: avoid the electrodes to get in touch with metallic parts (blast tube, head, etc.), otherwise the boiler operation would be compromised. Check the electrodes position after any intervention on the combustion head.

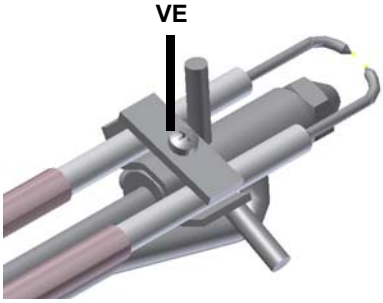
To clean/replace the electrodes, proceed as follows:

1 remove the combustion head as described in the previous paragraph;

2 remove the electrodes ass.y and clean them;

in order to replace the electrodes, unscrew the **VE** fixing screws and remove them: place the new electrodes being careful to observe the measures in the previous paragraph; reassemble the electrodes and the combustion head following the reversed procedure.





Cleaning and replacing the detection photocell

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

1 Disconnect the system from the electrical power supply.

2 Shut off the fuel supply;

3 remove the photocell from its slot (see next figure);

4 clean the bulbe if dirty, taking care not to touch it with bare hands;

5 if necessary, replace the bulb;

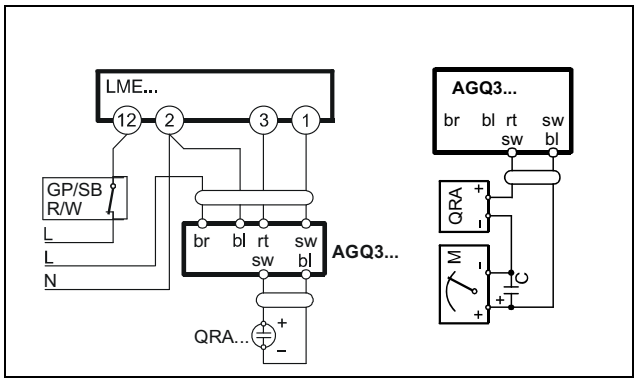
6 replace the photocell into its slot.



Checking the detection current

To check the detection 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 LME21-22	200 µA



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

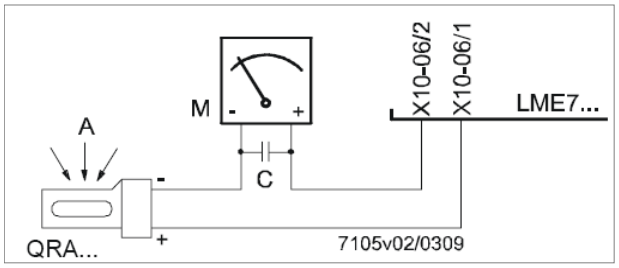


Fig. 33: Detection by photocell QRA..

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

CAUSE	TROUBLE													
	THE BURNER DOESN'TSTART	CONTINUE WITH PRE-PURGE	DOESN'T START AND LOCK-OUT	DOESN'T START AND REPEATS THE CYCLE	STARTS AND REPEATS THE CYCLE	STARTS AND LOCK-OUT	THE FLAME MONITOR DEVICE DOESN'T GIVECONSENT TO START	DOESEN'T SWITCH TO HIGH FLAME	DOESEN'T RETURN IN LOW FLAME	HE SERVO CONTROL IS LOCK AND VIBRATE	LOCK-OUT DURING OPERATION	TURNS OF AND REPEATS CYCLE DURING OPERATION	URNS OF AND REPEATS CYCLE DURING OPERATION	URNS OF AND REPEATS CYCLE DURING OPERATION
MAIN SWITCH OPEN	●													
LACK OF GAS	●			●										
MAXIMUM GAS PRESSURE SWITCH DEFECTIVE (IF PROVIDED)	●		●											
THERMOSTATS/PRESSURE SWITCHES DEFECTIVE	●			●								●		
FAN MOTOR THERMAL CUTOUT INTERVENTION	●													
OVERLOAD TRIPPED INTERVENTION	●													●
AUXILIARY FUSES INTERRUPTED	●													
CONTROL BOX FAULTY	●	●	●			●					●			
DEFECTIVE ACTUATOR	●	●	●				●							
AIR PRESSURE SWITCH FAULT OR BAD SETTING	●					●	●				●			
MINIMUM GAS PRESSURE SWITCH DEFECTIVE OR GAS FILTER DIRTY	●			●	●		●					●		
IGNITION TRANSFORMER FAULT			●											
IGNITION ELECTRODES BAD POSITION			●											
BUTTERFLY VALVE BAD SETTING			●			●								
DEFECTIVE GAS GOVERNOR			●	●	●							●		
GAS VALVE DEFECTIVE			●											
BAD CONNECTION OR DEFECTIVE HIGH/LOW FLAME THERMOSTAT OR PRESSURE SWITCH								●	●	●				
WRONG SETTING ACTUATOR CAM							●	●	●					
UV PROBE DIRTY OR DEFECTIVE			●			●					●			
OIL FILTER DIRTY													●	

APPENDIX

SIEMENS LME11/21/22 CONTROL BOX

The series of equipment LME.. is used for the starup and supervisione of 1- or 2- stage gas burners. The series LME.. is interchangeable with the series LGB.. and LMG.., all diagrams and accessories are interchangeable.

Comparative table

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

Preconditions for burner startup

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

Undervoltage

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

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

Controlled intermittent operation

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

Reversed polarity protection with ionization

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

Control sequence in the event of fault

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

Operational status indication

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

red LED **yellow LED** **green LED** LED	..... Steady on ❍... Off

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

Status	Color code	Color
Waiting time tw, other waiting states	❍.....	Off
Ignition phase, ignition controlled	● ❍ ● ❍ ● ❍ ● ❍ ● ❍ ●	Flashing yellow
Operation, flame ok	□.....	Green
Operation, flame not ok	□ ❍ □ ❍ □ ❍ □ ❍ □ ❍	Flashing green
Extraneous light on burner startup	□ ▲ □ ▲ □ ▲ □ ▲ □ ▲	Green - red
Undervoltage	● ▲ ● ▲ ● ▲ ● ▲ ● ▲	Yellow - red
Fault, alarm	▲.....	Red
Error code output (refer to “Error code table”)	▲❍ ▲❍ ▲❍ ▲❍	Flashing red

START-UP PROGRAM

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

A Start command (switching on)

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

tw Waiting time

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

t11 Programmed opening time for actuator «SA»

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

t10 Specified time for air pressure signal

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

t1 Prepurge time

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

t12 Programmed closing time for actuator «SA»

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

t3 Preignition time

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

TSA Ignition safety time

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

t4 Interval BV1 and BV2-LR

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

B - B' Interval for flame establishment

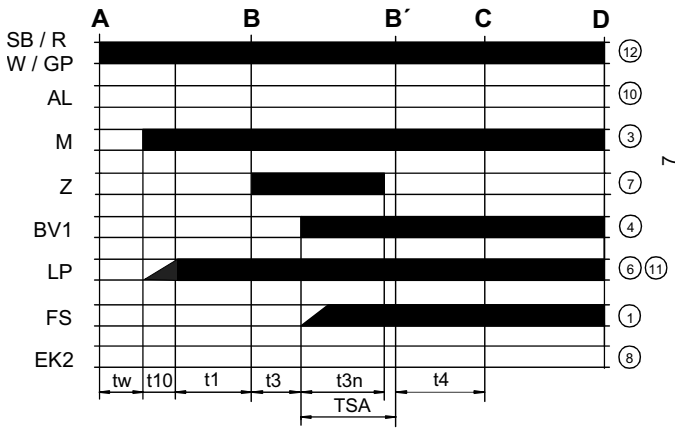
C Burner operation position

C - D Burner operation (heat production)

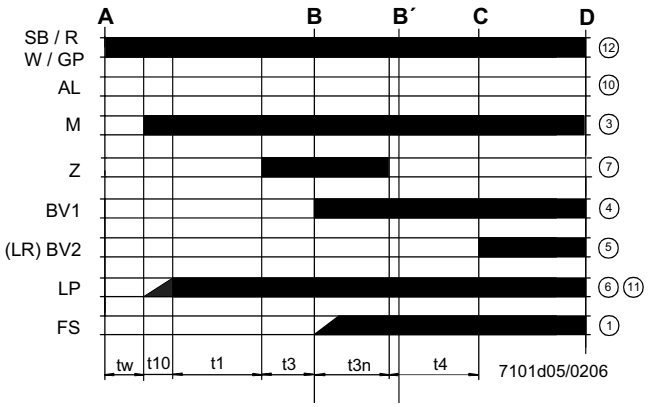
D Controlled by "R" shutdown

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

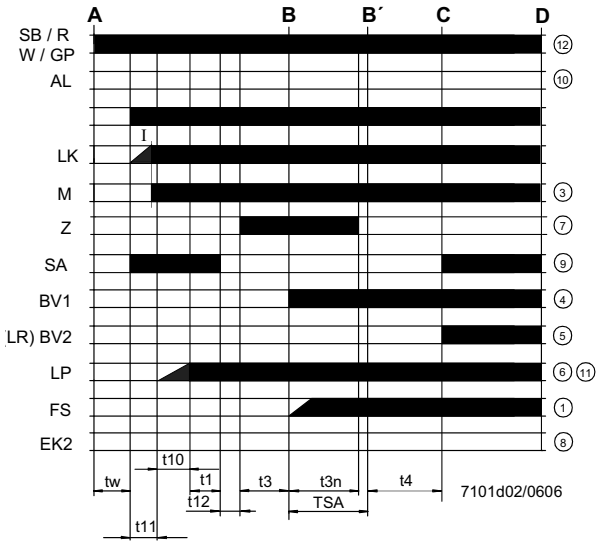
LME11 control sequence



LME21 control sequence



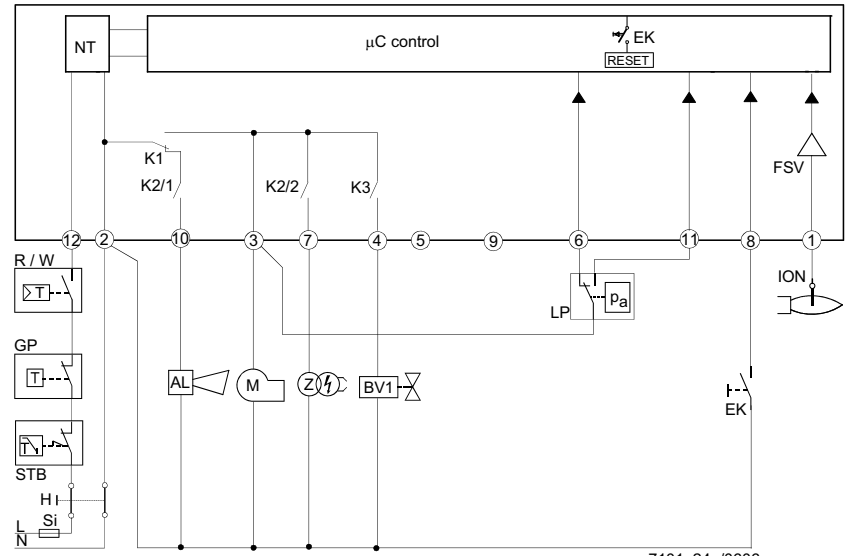
LME22 control sequence



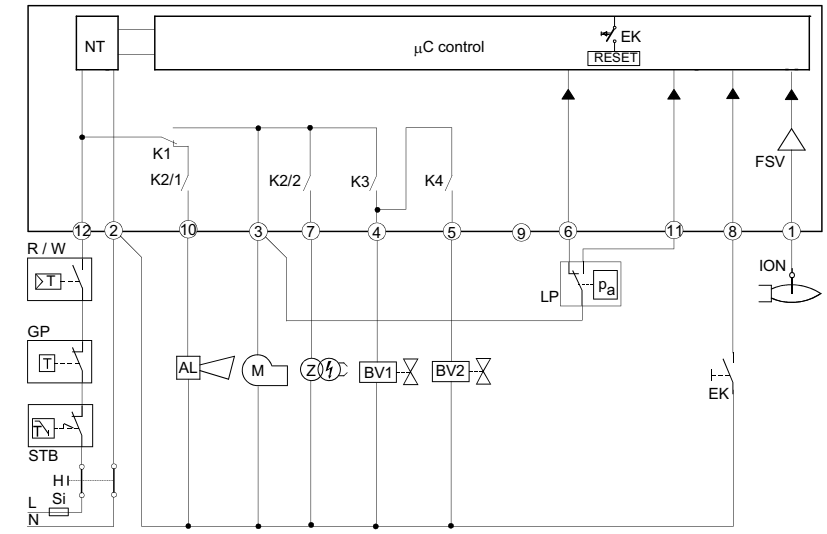
Control sequence

tw	Waiting time
t1	Purge time
TSA	Ignition safety time
t3	Preignition time
t3n	Postignition time
t4	Interval between BV1 and BV2/LR
t10	Specified time for air pressure signal
t11	Programmed opening time for actuator SA
t12	Programmed closing time for actuator SA

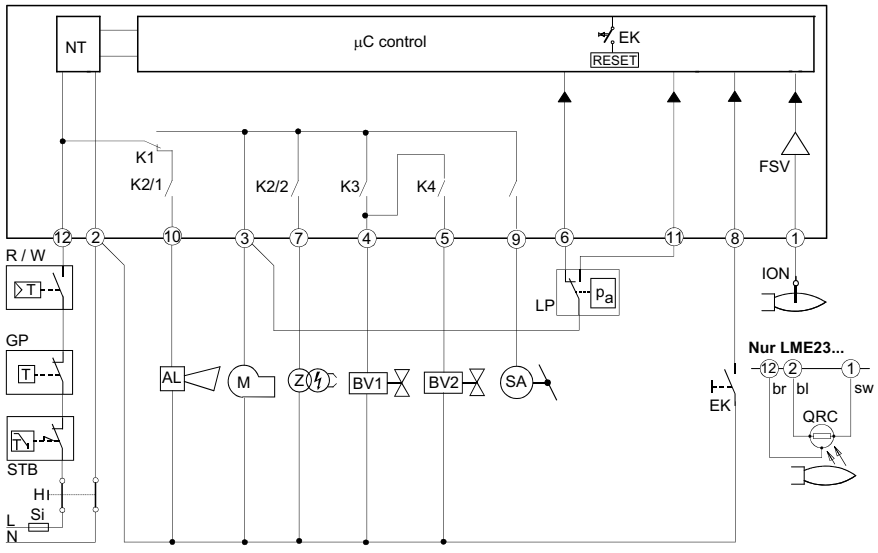
LME11 connection diagram



LME21 connection diagram



LME22 connection diagram



Connection diagram

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

CONTROL PROGRAM IN THE EVENT OF FAULT

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

CONTROL BOX LOCKED

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

DIAGNOSITICS OF THE CASUE OF FAULT

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

During diagnostics, the control outputs are deactivated:

- the burner remains shut down;
- external fault indication is deactivated;
- fault status is showed by the red LED, inside the LME’s lockout reset buttonaccording to the “Error code table”:

ERROR CODE TABLE	
2 blinks **	**No establishment of flame at the end of TSA** - Faulty or soiled fuel valves - Faulty or soiled flame detector - Inadequate adjustement of burner, no fuel - Faulty ignition equipment
3 blinks ***	**The air pressure switch does not switch or remains in idle position:** - LP is faulty - Loss of air pressure signal after t10 - LPis welded in normal position.
4 blinks ****	- Extraneous light when burner starts up.
5 blinks *****	- LP is working position.
6 blinks *****	Free.
7 blinks *******	**Loss of flame during operation** - Faulty or soiled fuel valves - Faulty or soiled flame detector - Inadequate adjustement of burner
8 ÷ 9 blinks	Free
10 blinks **********	**Faulty output contacts** ***Attention: “lockout” remote signal (terminal no. 10) not enabled*** - Wiring error - Anomalous voltage on ouput terminals - Other faults
14 blinks ************ (only for LME4x)**	- CPI contact (gas valve microswitch) not closed.

RESETTING THE BURNER CONTROL

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

LIMITATION OF REPETITIONS (only for LME11.. model)

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

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

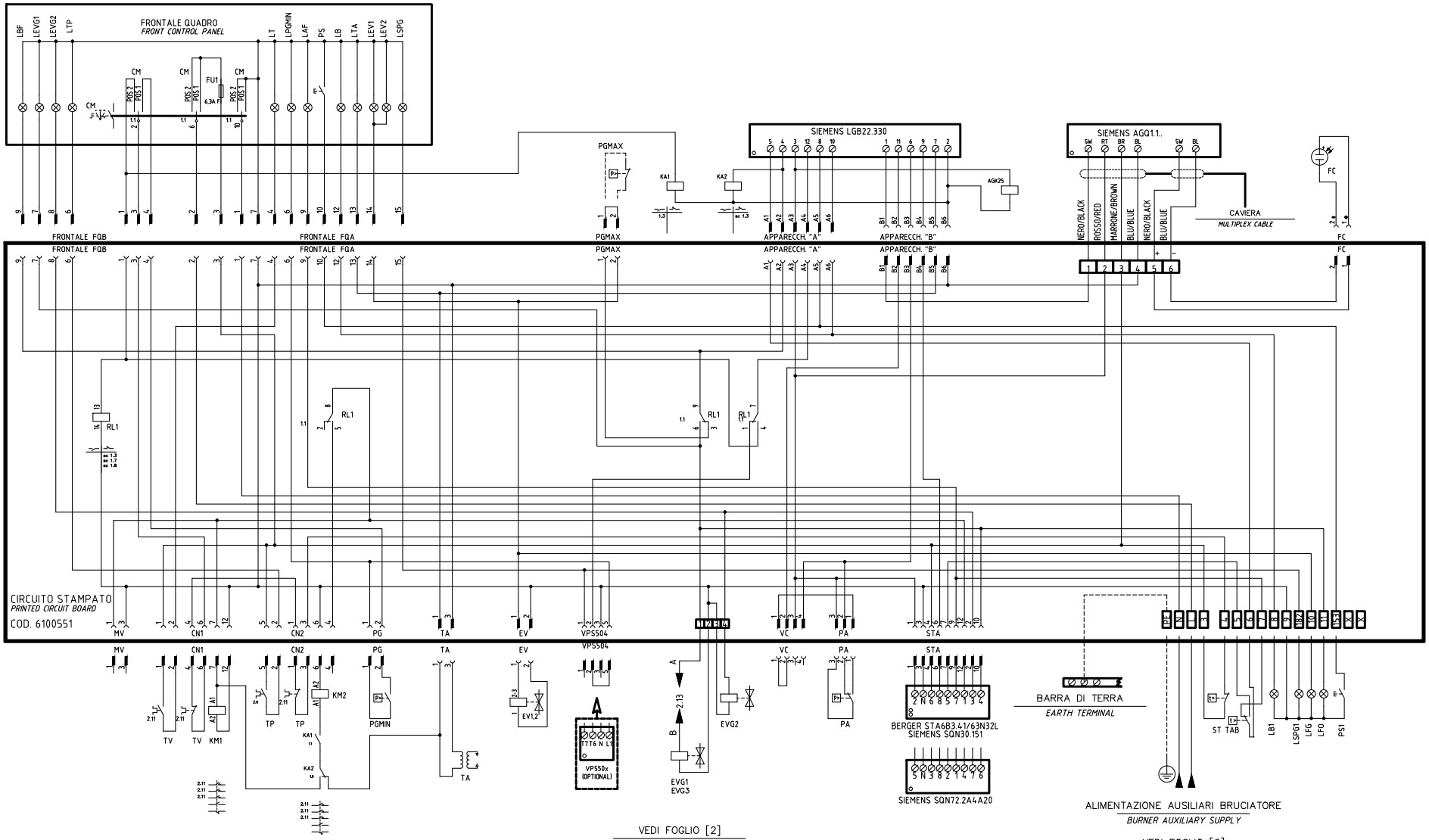
TECHNICAL CHARACTERISTICS

Mains voltage	120V AC +10% / -15% 230V AC +10% / -15%
Frequency	50 ... 60 Hz +/- 6%
Power consumption	12VA
External primary fuse	max. 10 A (slow)
input current at terminal 12	max. 5 A
Detection cable length	max. 3m (for electrode)
Detection cable length	max. 20 m (laid separately, for QRA probe)
Reset cable length	max. 20 m (posato separatamente)
Term. 8 & 10 cable length	max. 20 m
Thermostat cable length and other terminals	max. 3 m
Safety class	I
Index of protection	IP40 (to be ensured during mounting)
Operating conditions	-20... +60 °C, < 95% UR
Storage conditions	-20... +60 °C, < 95% UR
Weight	approx. 160 g



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web site: www.cibunigas.it - e-mail: cibunigas@cibunigas.it

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



CAMME SERVOCOMANDO
ACTUATOR CAMS
STA6B3.41/63N32L

ST2	ALTA FIAMMA *HIGH FLAME*
ST0	SOSTA *STAND-BY*
ST1	BASSA FIAMMA *LOW FLAME*
MV	APERTURA EVG2 *OPEN EVG2*

CAMME SERVOCOMANDO (ALTERNATIVO)
ACTUATOR CAMS (ALTERNATIVE)
SQN30.151

I	ALTA FIAMMA *HIGH FLAME*
II	SOSTA *STAND-BY*
III	BASSA FIAMMA *LOW FLAME*
V	APERTURA EVG2 *OPEN EVG2*

CAMME SERVOCOMANDO (ALTERNATIVO)
ACTUATOR CAMS (ALTERNATIVE)
SQN72.2A4A20

I (ROSSO) *I (RED)*	ALTA FIAMMA *HIGH FLAME*
II (BLU) *II (BLUE)*	SOSTA *STAND-BY*
III (ARANCIO) *III (ORANGE)*	BASSA FIAMMA *LOW FLAME*
IV (NERO) *IV (BLACK)*	APERTURA EVG2 *OPEN EVG2*

REV.	MODIFICA	DATA	FIRME
03	ADDED "POMAX" + "MP" & "TA"	23/04/12	U. PINTON
02	AGGIUNTO/ADDED SQN72...	22/05/09	U. PINTON
01	ADDED EARTH TERMINAL	10/12/07	U. PINTON

UNIGAS

Impianto
TIPI/TYPES HP60 ÷ HP73A
MODELLO/MODEL xG-.AB.x.xx.A.x.xx

Descrizione
VERSIONE CON CIRCUITO STAMPATO
WITH PRINTED CIRCUIT VERSION

Ordine

Commessa

Esecutore
U. PINTON

Data Controllato
23/04/2012

Controllato
S. MARCHETTI

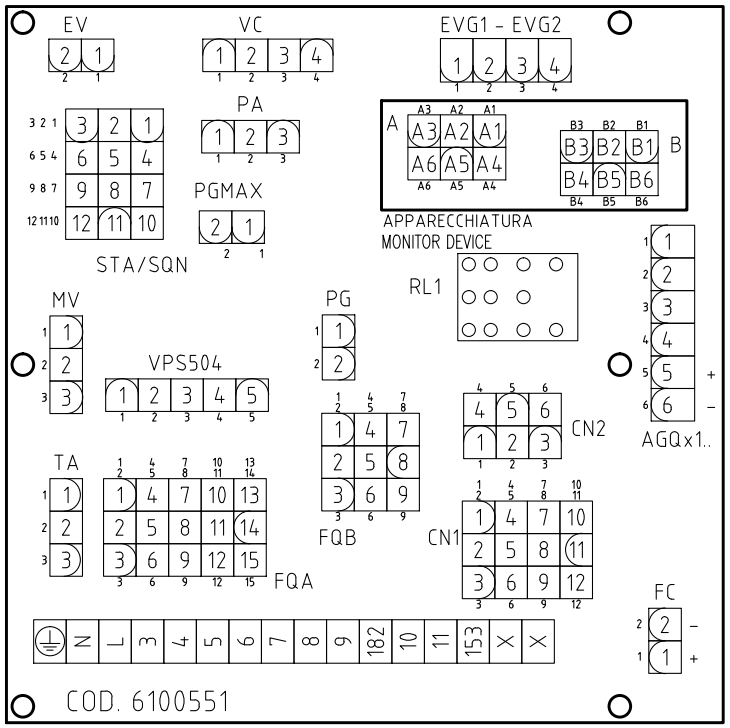
Data 10/12/2007
Revisione 03
Dis. N. 18 - 119 / A

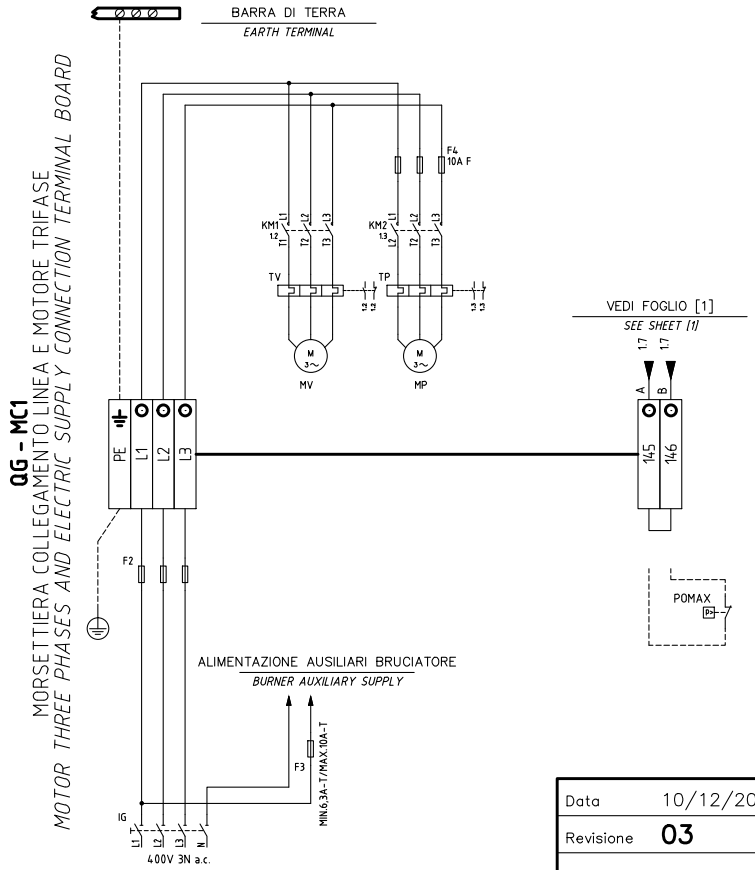
PREC.	FOGLIO
/	1
SEGUE	TOTALE
2	2

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14

SIGLA/ITEM	FUNZIONE	FUNCTION
AGK25	RESISTENZA SIMULAZIONE CARICO MOTORE VENTILATORE	RESISTANCE FOR FAN MOTOR LOAD SIMULATION
BERGER STA6B3.41/63N32L	SERVOCOMANDO SERRANDA ARIA	AIR DAMPER ACTUATOR
CM	SELETTORE MANUALE COMBUSTIBILE 1) GAS 0) OFF 2) GASOLIO	COMBUSTIBLE SELECTOR 1)GAS 0)OFF 2)LIGHT OIL
EV1,2	ELETTROVALVOLE GAS (0 GRUPPO VALVOLE)	GAS ELECTRO-VALVES (OR VALVES GROUP)
EVG1	ELETTROVALVOLE GASOLIO	LIGHT OIL ELECTRO VALVE
EVG2	ELETTROVALVOLA GASOLIO	LIGHT OIL SOLENOID VALVE
F2	FUSIBILI LINEA MOTORE VENTILATORE	FAN MOTOR LINE FUSES
F3	FUSIBILE DI LINEA	LINE FUSE
F4	FUSIBILI LINEA POMPA	PUMP LINE FUSES
FC	SONDA UV RILEVAZIONE FIAMMA	UV FLAME DETECTOR
FU1	FUSIBILE DI LINEA	LINE FUSE
IG	INTERRUTTORE GENERALE	MAINS SWITCH
KA1	RELE' AUSILIARIO	AUXILIARY RELAY
KA2	RELE' AUSILIARIO	AUXILIARY RELAY
KM1	CONTATTORE MOTORE VENTILATORE	FAN MOTOR CONTACTOR
KM2	CONTATTORE MOTORE POMPA GASOLIO	LIGHT OIL PUMP MOTOR CONTACTOR
LAF	LAMPADA SEGNALAZIONE ALTA FIAMMA BRUCIATORE	BURNER IN HIGH FLAME INDICATOR LIGHT
LB	LAMPADA SEGNALAZIONE BLOCCO BRUCIATORE	INDICATOR LIGHT FOR BURNER LOCK-OUT
LB1	LAMPADA SEGNALAZIONE BLOCCO BRUCIATORE	INDICATOR LIGHT FOR BURNER LOCK-OUT
LBF	LAMPADA SEGNALAZIONE BASSA FIAMMA BRUCIATORE	BURNER IN LOW FLAME INDICATOR LIGHT
LEV1	LAMPADA SEGNALAZIONE APERTURA [EV1]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV1]
LEV2	LAMPADA SEGNALAZIONE APERTURA [EV2]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV2]
LEVG1	LAMPADA SEGNALAZIONE APERTURA [EVG1]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EVG1]
LEVG2	LAMPADA SEGNALAZIONE APERTURA [EVG2]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EVG2]
LFG	LAMPADA SEGNALAZIONE FUNZIONAMENTO BRUCIATORE A GAS	BURNER GAS OPERATION INDICATOR LIGHT
LFO	LAMPADA SEGNALAZIONE FUNZIONAMENTO BRUCIATORE A GASOLIO	BURNER LIGHT OIL OPERATION INDICATOR LIGHT

SIGLA/ITEM	FUNZIONE	FUNCTION
LPGMIN	LAMPADA SEGNALAZIONE PRESENZA GAS IN RETE	INDICATOR LIGHT FOR PRESENCE OF GAS IN THE NETWORK
LSPG	LAMPADA SEGNALAZIONE BLOCCO CONTROLLO TENUTA VALVOLE	INDICATOR LIGHT FOR LEAKAGE OF VALVES
LSPG1	LAMPADA SEGNALAZIONE BLOCCO CONTROLLO TENUTA VALVOLE	INDICATOR LIGHT FOR LEAKAGE OF VALVES
LT	LAMPADA SEGNALAZIONE BLOCCO TERMICO MOTORE VENTILATORE	INDICATOR LIGHT FOR FAN MOTOR OVERLOAD THERMAL CUTOUT
LTA	LAMPADA SEGNALAZIONE TRASFORMATORE DI ACCENSIONE	IGNITION TRANSFORMER INDICATOR LIGHT
LTP	LAMPADA SEGNALAZIONE BLOCCO TERMICO MOTORE POMPA	INDICATOR LIGHT FOR PUMP MOTOR OVERLOAD THERMAL CUTOUT
MP	MOTORE POMPA GASOLIO	LIGHT OIL PUMP MOTOR
MV	MOTORE VENTILATORE	FAN MOTOR
PA	PRESSOSTATO ARIA	AIR PRESSURE SWITCH
PGMAX	PRESSOSTATO GAS DI MASSIMA PRESSIONE (OPTIONAL)	MAXIMUM PRESSURE GAS SWITCH (OPTIONAL)
PGMIN	PRESSOSTATO GAS DI MINIMA PRESSIONE	MINIMUM GAS PRESSURE SWITCH
POMAX	PRESSOSTATO DI MASSIMA PRESSIONE OLIO (OPTIONAL)	MAXIMUM OIL PRESSURE SWITCH (OTIONAL)
PS	PULSANTE SBLOCCO FIAMMA	LOCK-OUT RESET BUTTON
PS1	PULSANTE SBLOCCO FIAMMA	LOCK-OUT RESET BUTTON
RL1	RELE' AUSILIARIO	AUXILIARY RELAY
SIEMENS AGQ1.1A27	ADATTATORE PER SONDA UV RILEVAZIONE FIAMMA	ADAPTER FOR UV FLAME DETECTOR
SIEMENS LGB22.330	APPARECCHIATURA CONTROLLO FIAMMA	CONTROL BOX
SIEMENS SQN30.151	SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)	AIR DAMPER ACTUATOR (ALTERNATIVE)
SIEMENS SQN72.2A4A20	SERVOCOMANDO SERRANDA ARIA (ALTERNATIVO)	AIR DAMPER ACTUATOR (ALTERNATIVE)
ST	SERIE TERMOSTATI/PRESSOSTATI	SERIES OF THERMOSTATS OR PRESSURE SWITCHES
TA	TRASFORMATORE DI ACCENSIONE	IGNITION TRANSFORMER
TAB	TERMOSTATO/PRESSOSTATO ALTA-BASSA FIAMMA	HIGH-LOW THERMOSTAT/PRESSURE SWITCHES
TP	TERMICO MOTORE POMPA GASOLIO	LIGHT OIL PUMP MOTOR THERMAL
TV	TERMICO MOTORE VENTILATORE	FAN MOTOR THERMAL
VPS50x	CONTROLLO DI TENUTA VALVOLE GAS (OPTIONAL)	GAS PROVING SYSTEM (OPTIONAL)





Data 10/12/2007		PREC. 1	FOGLIO 2
Revisione 03			
Dis. N. 18 - 119 / A		SEGUE /	TOTALE 2