H455A
H630A
H685A

Gas - light oil burners

MANUAL OF INSTALLATION - USE - MAINTENANCE

CIB UNIGAS

BURNERS - BRUCIATORI - BRULERS - BRENNER - QUEMADORES - ГОРЕЛКИ

M039618CA 0.4 04/2023

DANGERS, WARNINGS AND NOTES OF CAUTION

This manual is supplied as an integral and essential part of the product and must be delivered to the user.

Information included in this section are dedicated both to the user and to personnel following product installation and maintenance.

The user will find further information about operating and use restrictions, in the second section of this manual. we highly recommend to read it.

Carefully keep this manual for future reference.

The following:

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

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

IMPORTANT *:*

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

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

RISK ANALYSIS

Instruction manual supplied with the burner:

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

Delivery of the system and instruction manual

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

– Use of the system;

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

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

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

WARRANTY AND LIABILITY

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

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

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

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

Personnel training

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

The user:

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

GENERAL INTRODUCTION

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

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

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

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

Contact qualified personnel only.

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

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

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

- When a decision is made to discontinue the use of the equipment, those parts likely to constitute sources of danger shall be made harmless.
- In case the equipment is to be sold or transferred to another user, or in case the original user should move and leave the unit behind, make

sure that these instructions accompany the equipment at all times so that they can be consulted by the new owner and/or the installer.

- This unit shall be employed exclusively for the use for which it is meant. Any other use shall be considered as improper and, therefore, dangerous.

The manufacturer shall not be held liable, by agreement or otherwise, for WARNING! Failure to observe the information given in this manual, operating negligence, incorrect installation and carrying out of non authorised modifications will result in the annulment by the manufacturer of the guarantee that it supplies with the burner.

The damages resulting from improper installation, use and failure to comply with the instructions supplied by the manufacturer.The occurrence of any of the following circustances may cause explosions, polluting unburnt gases (example: carbon monoxide CO), burns, serious harm to people, animals and things:

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

SPECIAL INSTRUCTIONS FOR BURNERS

a Make the following checks:

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

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

a • remove the power supply by disconnecting the power cord from the mains;

b • disconnect the fuel supply by means of the hand-operated shutoff valve and remove the control handwheels from their spindles.

Special warnings

- Make sure that the burner has, on installation, been firmly secured to the appliance, so that the flame is generated inside the appliance firebox.
- Before the burner is started and, thereafter, at least once a year, have qualified personnel perform the following operations:
  - a set the burner fuel flow rate depending on the heat input of the appliance;
  - b set the flow rate of the combustion-supporting air to obtain a combustion efficiency level at least equal to the lower level required by the regulations in force;
  - c check the unit operation for proper combustion, to avoid any harmful or polluting unburnt gases in excess of the limits permitted by the regulations in force;
  - d make sure that control and safety devices are operating properly;
  - e make sure that exhaust ducts intended to discharge the products of combustion are operating properly;
  - f on completion of setting and adjustment operations, make sure that all mechanical locking devices of controls have been duly tightened;
  - g make sure that a copy of the burner use and maintenance instructions is available in the boiler room.
- In case of a burner shut-down, reser the control box by means of the RESET pushbutton. If a second shut-down takes place, call the Technical Service, without trying to RESET further.
- The unit shall be operated and serviced by qualified personnel only, in compliance with the regulations in force.
-

GENERAL INSTRUCTIONS DEPENDING ON FUEL USED

ELECTRICAL CONNECTION

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

  - do not touch the unit with wet or damp parts of the body and/or with bare feet;
  - do not pull electric cables;
  - do not leave the equipment exposed to weather (rain, sun, etc.) unless expressly required to do so;
  - do not allow children or inexperienced persons to use equipment;
- The unit input cable shall not be replaced by the user. In case of damage to the cable, switch off the unit and contact qualified personnel to replace.

When the unit is out of use for some time the electric switch supplying all the power-driven components in the system (i.e. pumps, burner, etc.) should be switched off.

FIRING WITH GAS, LIGHT OIL OR OTHER FUELS GENERAL

General Warnings

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

Special instructions for using gas Have qualified personnel inspect the installation to ensure that:

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

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

Precautions if you can smell gas

a ;;;.do not operate electric switches, the telephone, or any other item likely to generate sparks;

b immediately open doors and windows to create an air flow to purge the room;

c close the gas valves;

d contact qualified personnel.

e

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

Using oil pressure gauges

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

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

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

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.

BURNER SAFETY

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

.

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

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

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

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

Do not use fuels other than the ones stated.

Do not use the burner in potentially explosive environments.

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

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

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

Untrained staff must not modify any linkages.

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

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

Safety and prevention

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

DIRECTIVES AND STANDARDS

Gas - Light oil burners

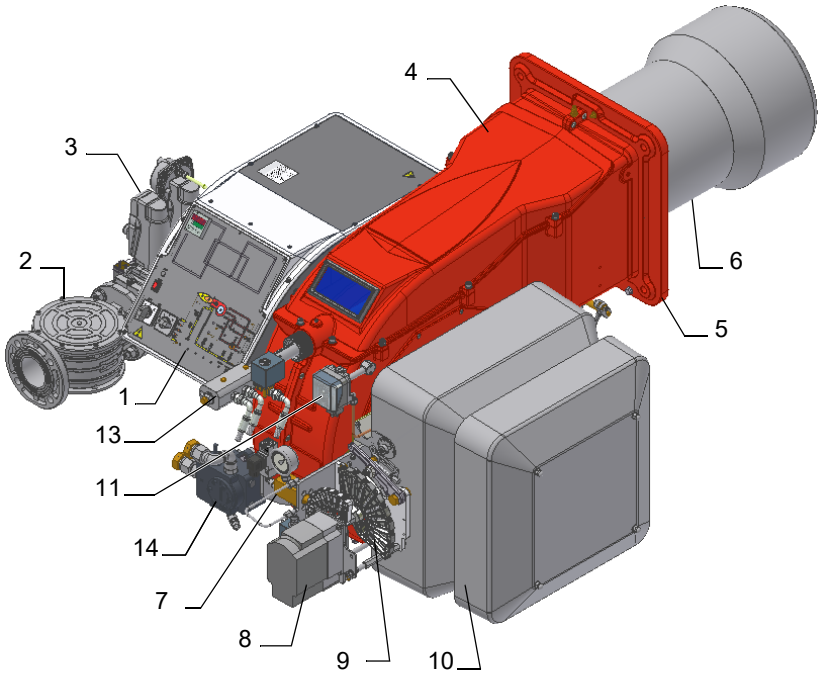
European Directives

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

Harmonized standards

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

PART I: SPECIFICATIONS



Note: the figure is indicative only

1 Mimic panel with startup switch
2 Gas filter
3 Gas valve group
4 Cover
5 Flange
6 Blast tube-Combustion head group
7 Oil pressure governor
8 Actuator
9 Adjusting cams
10 Air intake
11 Air pressure switch
12 Oil manifold
13 Head adjusting ring nut
14 Pump

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

Light oil operation: the fuel coming from the supply line, is pushed by the pump to the nozzle and then into the combustion chamber, where the mixture between fuel and air takes place and consequently the flame.
In the burners, the mixture bertween fuel and air, to perform clean and efficient combustion, is activated by atomisation of oil into very small particles. This process is achieved making pressurised oil passing through the nozzle.
The pump main function is to transfer oil from the tank to the nozzle in the desired quantity and pressure. To adjust this pressure, pumps are provided with a pressure regulator (except for some models for which a separate regulating valve is provided). Other pumps are provided with two pressure regulators: one for the high and one for low pressure (in double-stage systems with one nozzle).

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

Gas categories and countries of application

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

Fuel

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

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

Burner model identification

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

Type	**H630A**	Model	**MG.**	**MD.**	**SR.**	***.**	**A.**	**1.**	**80.**
	(1)		**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**

1	BURNER TYPE	**H455A, H630A, H685A,**
2	FUEL	**MG**: Natural gas-Light oil, **LG**: LPGLight oil, **CG**: Off-gas - Light oil
3	OPERATION (Available versions)	PR - Progressive MD - Fully modulating
4	BLAST TUBE	SR = Standard blast tube + ABS polymer (silenced) air intake
5	DESTINATION COUNTRY	* - see data plate
6	BURNER VERSION	A - Standard, Y - SpecialeSpecial
7	EQUIPMENT	1 = 2 gas valves + gas proving system 8 = 2 gas valves + gas proving system + maximum gas pressure switch
8	GAS CONNECTION	50 = Rp2, 65 = DN65, 80 = DN80, 100 = DN100

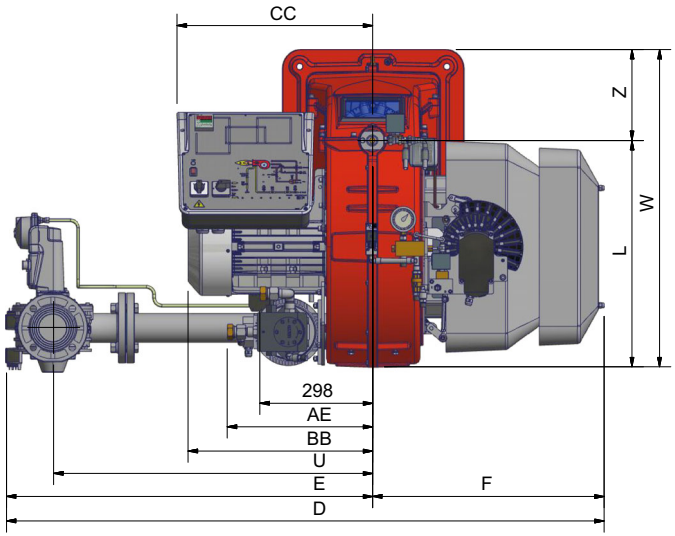
Technical Specifications

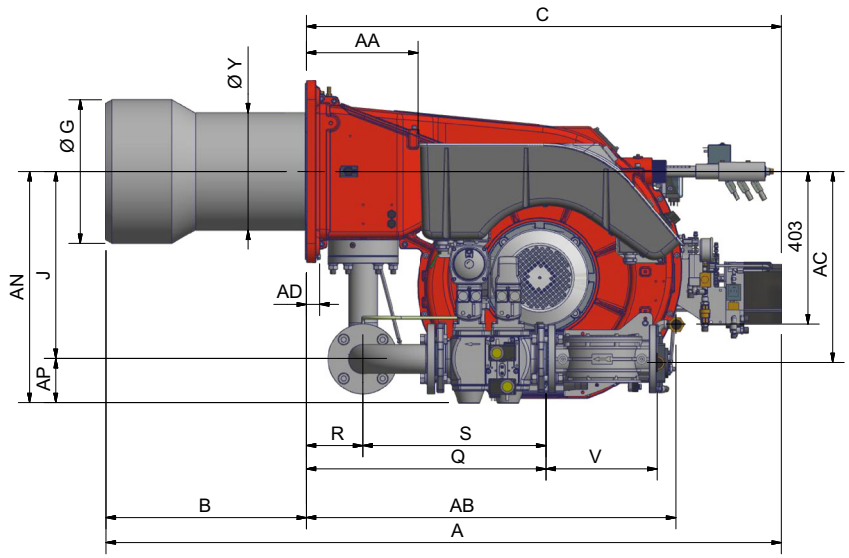
BURNER TYPE		**H455A MG..**	**H630A MG..**	**H685A MG..**	**H455A LG..**	**H630A LG..**	**H685A LG..**	**H455A CG..**	**H630A CG..**	**H685A CG..**
Output	min. - max. kW	750 - 4550	700 - 6300	740 - 6850	750 - 4550	700 - 6300	740 - 6850	750 - 4550	700 - 6300	740 - 6850
Fuel		MG - Natural gas-Light oil			LG - LPG-Light oil			CG: Off-gas - Light oil		
Category		(see next paragraph)			(see next paragraph)			(see next paragraph)		
Gas rate- Natural gas	min.- max. (Stm^3/h)	79 - 481	74 - 667	78 - 725	-	-	-	-	-	-
Gas pressure	mbar	(see Note 2)			(see Note 2)			(see Note 2)		
Light oil rate	min.- max. (Stm^3/h)	63 - 384	59 - 531	62 - 578	63 - 384	59 - 531	62 - 578	63 - 384	59 - 531	62 - 578
LPG rate	min.- max. (Stm^3/h)	-	-	-	28 - 170	26 - 235	28 - 256	-	-	-
Off-gas rate	min.- max. (Stm^3/h)	-	-	-	-	-	-	154 - 932	143 - 1291	152 - 1404
Oil viscosity	cSt @ 40°C	2 - 7,4								
Oil density	kg/m^3	840								
Light oil train inlet	bar max	2								
Power supply triphase		220V/230V 3~ / 380V/400V 3N ~ 50Hz								
Auxiliary Power supply		220V/230V 2~ / 220V/230V 1N ~ 50Hz								
Total power	kW	9,1	11,2	11,2	9,1	11,2	11,2	9,1	11,2	11,2
Electric motor	kW	7,5	9,2	9,2	7,5	9,2	9,2	7,5	9,2	9,2
Pump motor	kW	1,1	1,5	1,5	1,1	1,5	1,5	1,1	1,5	1,5
Protection		IP40								
Operation		Progressive - Fully modulating								
Gas train 50	Valves size / Gas connection	50 / Rp 2								
Gas train 65	Valves size / Gas connection	65 / DN65								
Gas train 80	Valves size / Gas connection	80 / DN80								
Gas train 100	Valves size / Gas connection	100 / DN100								
Operating temperature	°C	-10 ÷ +50								
Storage Temperature	°C	-20 ÷ +60								
Working service (*)		Intermitent								

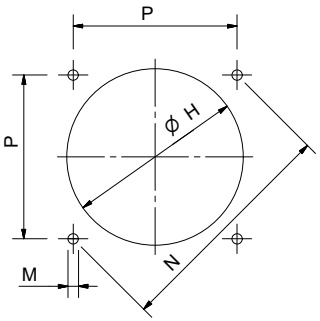
Note1:	**All gas flow rates are referred to Stm^3/h (1013 mbar absolute pressure, 15 °C temperature) and are valid for G20 gas (net calorific value H_i = 34.02 MJ/Stm^3); for L.P.G. (net calorific value H_i = 93.5 MJ/Stm^3)**
Note2:	**Maximum gas pressure = 500mbar (with Siemens VGD or Dungs MultiBloc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

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

Overall dimensions (mm)

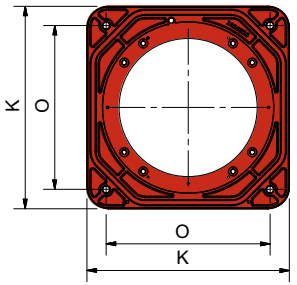






Boiler recommended drilling template

Burner flange

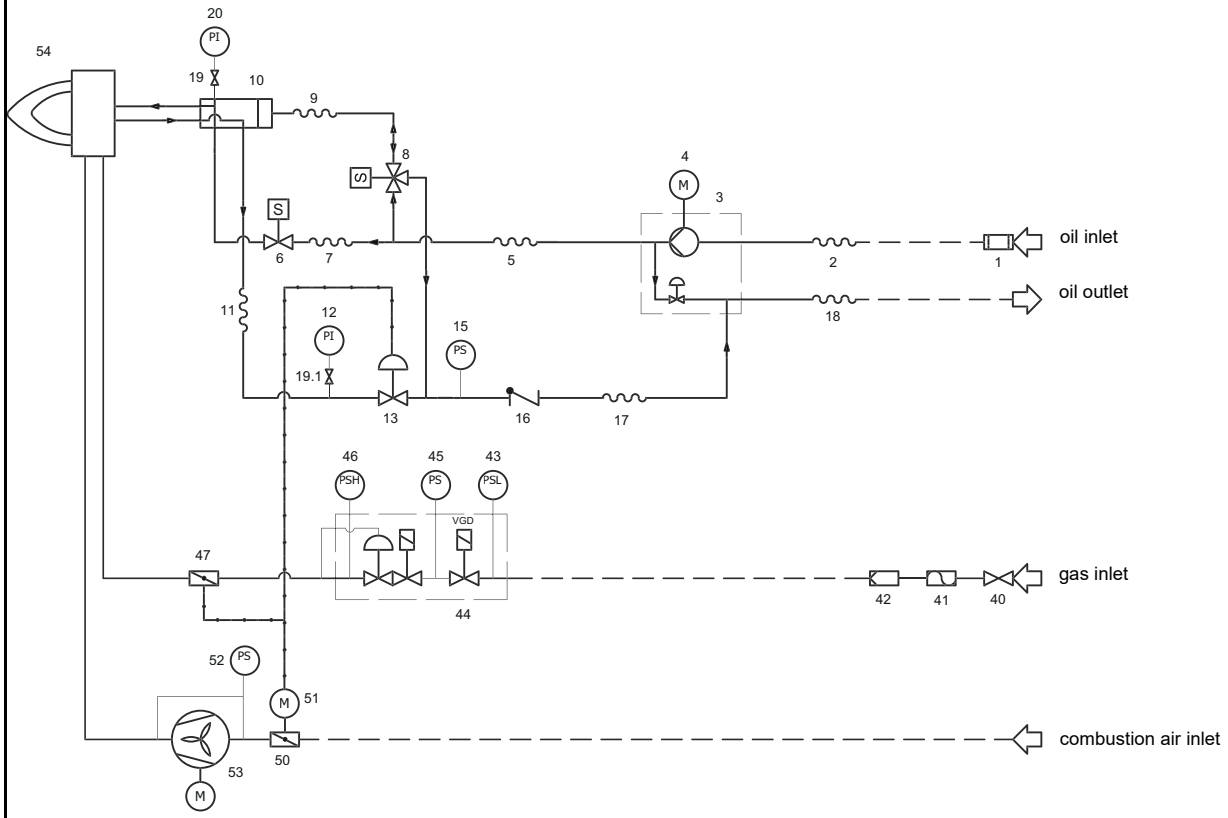


***DN = gas valves size**

TIPO	DN	A (AS)	AA	AD	AN	AP	B (BS)	BB	C	CC	D	E	F	G	H	J	K	L	M	N	O min	O max	P	Q	R	S	U	V	W	Z
H455A	50	1712	295	35	595	100	495	471	1217	511	1561	946	615	304	350	494	480	586	M14	552	390	390	390	764	150	613	845	190	856	270
H455A	65	1712	295	35	611	117	495	471	1217	511	1584	969	615	304	350	494	480	586	M14	552	390	390	390	634	150	484	845	294	856	270
H455A	80	1712	295	35	626	132	495	471	1217	511	1617	1002	615	304	350	494	480	586	M14	552	390	390	390	686	150	535	875	313	856	270
H455A	100	1712	295	35	639	145	495	471	1217	511	1697	1082	615	304	350	494	480	586	M14	552	390	390	390	791	150	642	942	353	856	270
H630A	50	1747	295	35	595	100	530	488	1217	511	1561	946	615	340	380	494	480	586	M14	552	390	390	390	764	150	613	845	190	856	270
H630A	65	1747	295	35	611	117	530	488	1217	511	1584	969	615	340	380	494	480	586	M14	552	390	390	390	634	150	484	845	294	856	270
H630A	80	1747	295	35	626	132	530	488	1217	511	1617	1002	615	340	380	494	480	586	M14	552	390	390	390	686	150	535	875	313	856	270
H630A	100	1747	295	35	639	145	530	488	1217	511	1697	1082	615	340	380	494	480	586	M14	552	390	390	390	791	150	642	942	353	856	270
H685A	50	1747	295	35	595	100	530	488	1217	511	1561	946	615	380	430	494	480	586	M14	552	390	390	390	764	150	613	845	190	856	270
H685A	65	1747	295	35	611	117	530	488	1217	511	1584	969	615	380	430	494	480	586	M14	552	390	390	390	634	150	484	845	294	856	270
H685A	80	1747	295	35	626	132	530	488	1217	511	1617	1002	615	380	430	494	480	586	M14	552	390	390	390	686	150	535	875	313	856	270
H685A	100	1747	295	35	639	145	530	488	1217	511	1697	1082	615	380	430	494	480	586	M14	552	390	390	390	791	150	642	942	353	856	270

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

Fig. 4 - 3I2MG-24 v0 **Hydraulic diagram**



Note: The following POS are optional: 19, 19.1, 20, 40, 41, 46

Note: The following POS are included only on certain types of burner: 5,7, 9, 11,17

BY OTHERS

BY BURNER CONSTRUCTOR

3I2MG24 rev.0 - LEGEND	
POS	**OIL TRAIN**
1	Filter
2	Flexible hose
3	Pump and pressure governor
4	Electrical motor
5	Flexible hose
6	Solenoid valve
7	Flexible hose
8	3-way solenoid valve
9	Flexible hose
10	Oil distributor
11	Flexible hose
12	Pressure gauge
13	Pressure governor
15	Pressure switch
16	One-way valve
17	Flexible hose
18	Flexible hose
19	Manual valve
19.1	Manual valve
20	Pressure gauge
	MAIN GAS TRAIN
40	Manual valve
41	Bellows unit
42	Filter
43	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

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).

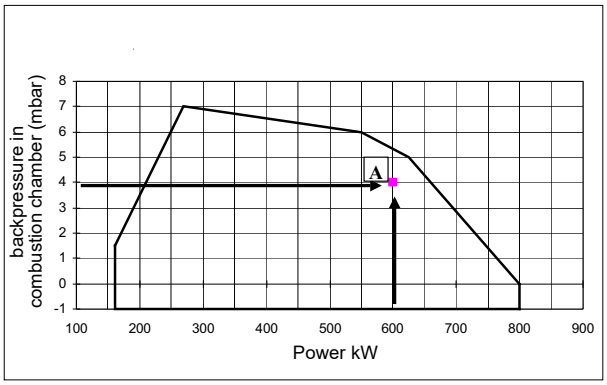
Example:

Furnace input: 600kW

Backpressure: 4 mbar

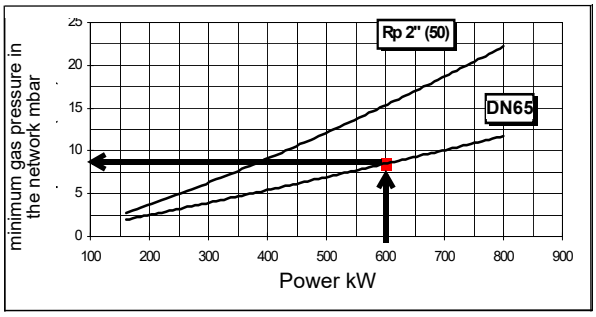
In the "Performance curve" diagram, draw a vertical line matching the furnace input value and an horizontal line matching the backpressure value. The burner is suitable if the intersection point A is inside the performance curve.

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



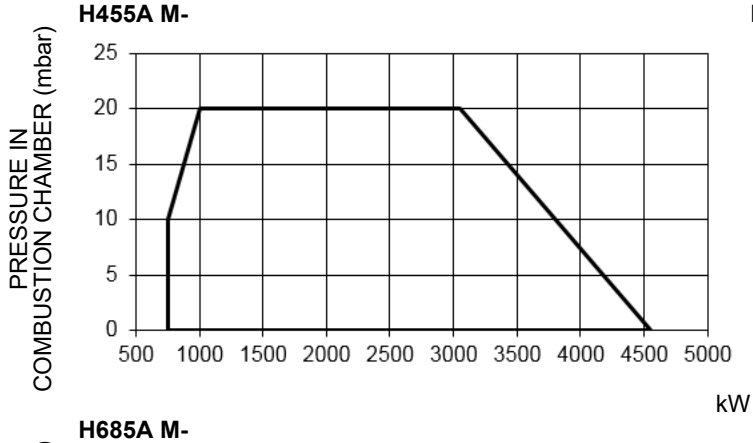
Checking the proper gas train size

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

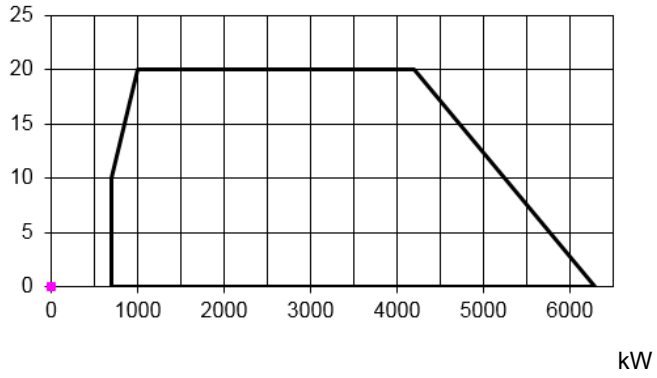


Performance Curves

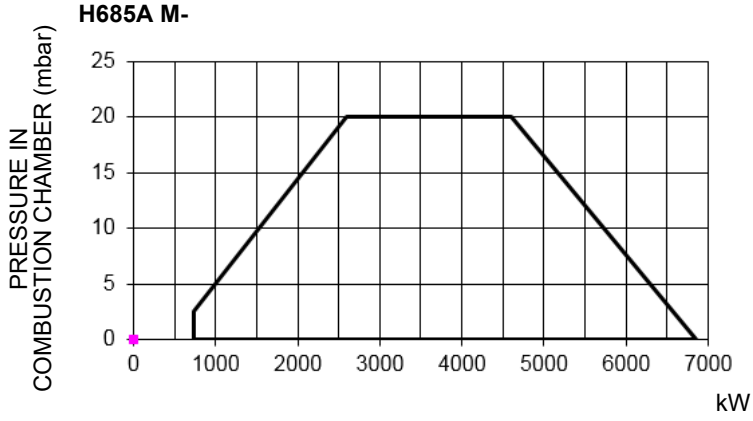
H455A M-



H630A M-



H685A M-



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

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

The values in the diagrams refer to **GPL** with a calorific value of 22300 kcal/Stm^3 (15°C, 1013 mbar) and a density of 2.14 kg/Stm^3. When the calorific value and the density change, the pressure values should be adjusted accordingly.

$$\Delta p2 = \Delta p1 \ * \left(\frac{Q2}{Q1}\right)^2 * \left(\frac{\rho 2}{\rho 1}\right)$$

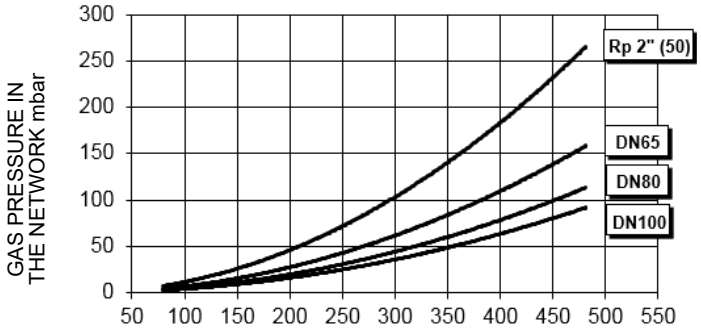
Where:

$p1$	Natural gas pressure shown in diagram
$p2$	Real gas pressure
$Q1$	Natural gas flow rate shown in diagram
$Q2$	Real gas flow rate
$\rho 1$	Natural gas density shown in diagram
$\rho 2$	Real gas density

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

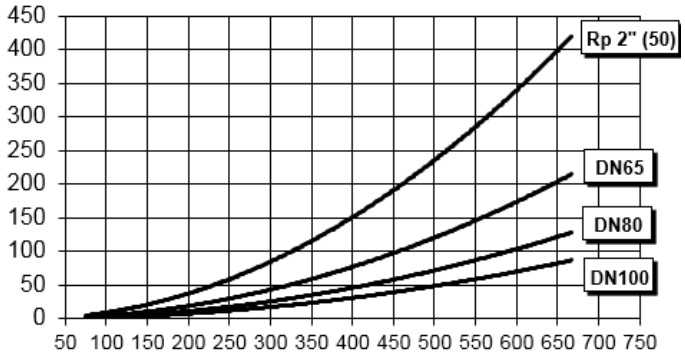
WARNING: the diagrams refers to natural gas. For different type of fuel please refer to the paragraph "Fuel" at the beginning of this chapter.

H455A



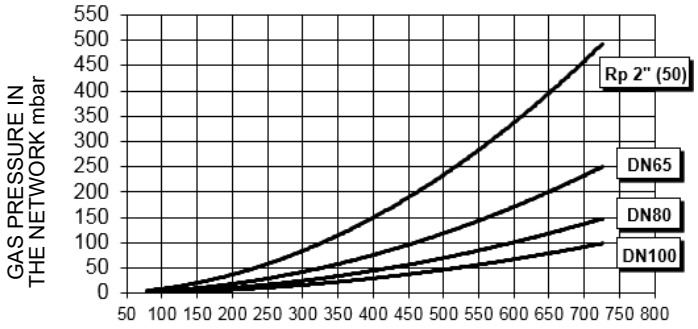
Gas rate Stm^3/h

H630A



Gas rate Stm^3/h

H685A



Gas rate Stm^3/h

Combustion head gas pressure curves

Combustion head gas pressure depends on gas flow and combustion chamber backpressure. When backpressure is subtracted, i depends only on gas flow, provided combustion is properly adjusted, flue gases residual O2 percentage complies with “Recommendec 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 , showing the correct way to measure the gas pressure, considering the values o pressure in combustion chamber, surveyed by means of the pressure gauge or taken from the boiler’s Technical specifications.
.

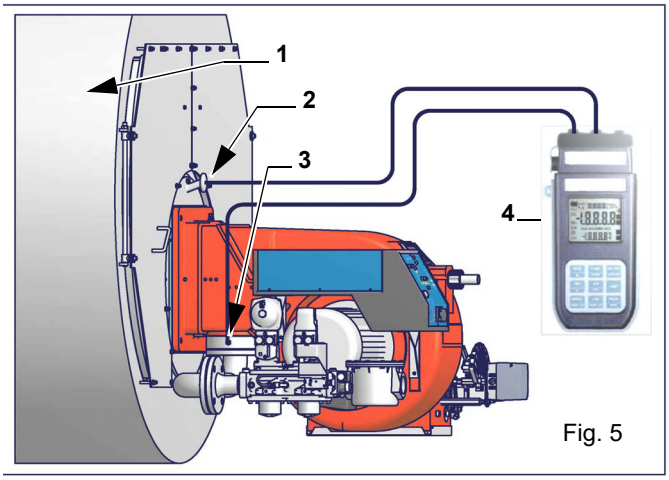


Fig. 5

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

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.

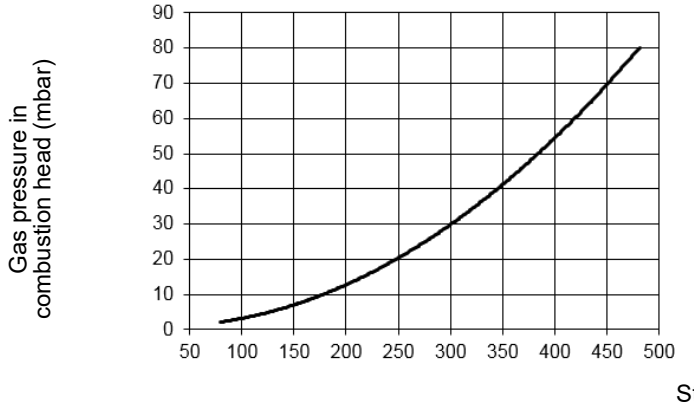
Measuring gas pressure in the combustion head

In order to measure the pressure in the combustion head, insert the pressure gauge probes: one into the combustion chamber’s pressure outlet to get the pressure in the combustion chamber and the other one into the butterfly valve’s pressure outlet of the burner. On the basis of the measured differential pressure, it is possible to get the maximum flow rate: in the pressure - rate curves (showed on the next paragraph), it is easy to find out the burner’s output in 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.

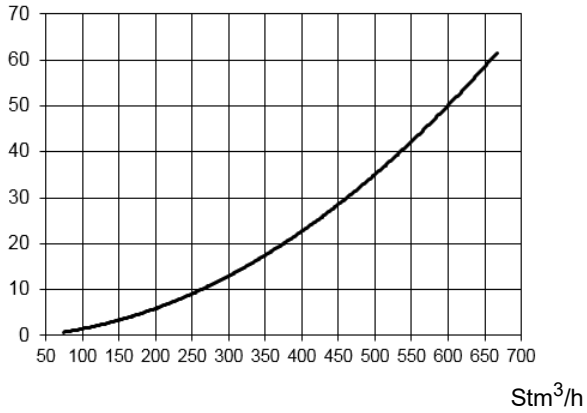
Gas pressure burner head vs natural gas flow rate

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

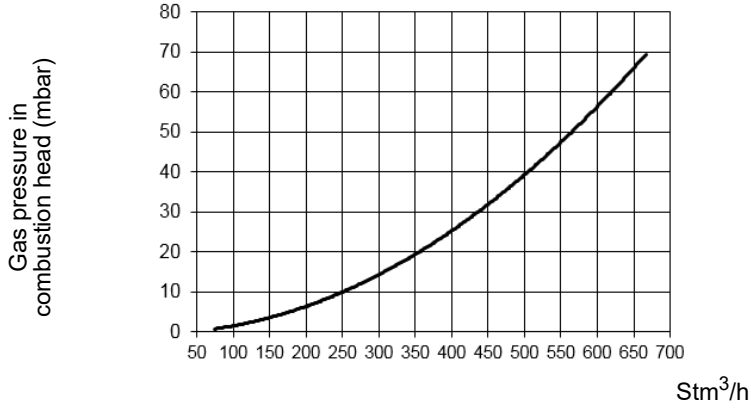
H455A MG..



H630A MG..



H685A MG..



PART II: INSTALLATION

MOUNTING AND CONNECTING THE BURNER

Packing

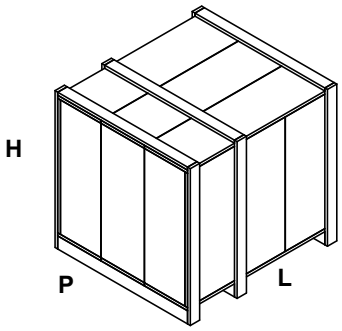
The burners are despatched in wooden crates whose dimensions are:

- **series: 1810mm x 1310mm x 1060mm (L x P x H)**

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

The following are placed in each packing case:

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

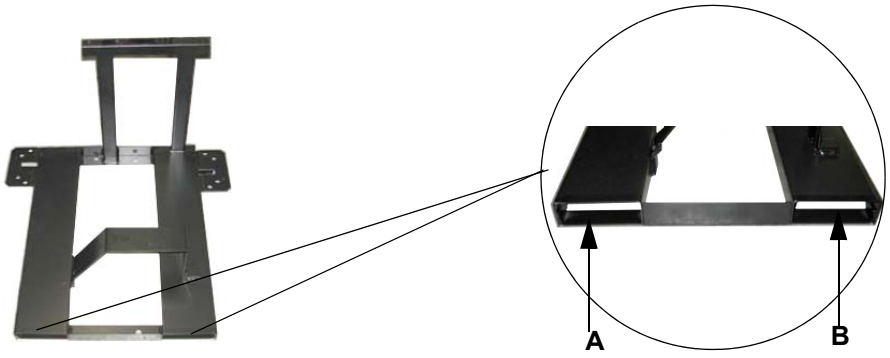


To get rid of the burner's packing, follow the procedures laid down by current laws on disposal of materials.

Handling the burner

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

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



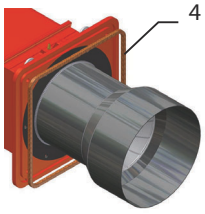
Matching the burner to the boiler

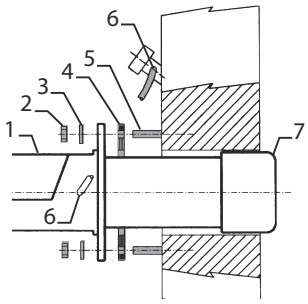
The burners described in this manual have been tested with combustion chambers that comply with EN676 regulation and whose dimensions are described in the diagram . In case the burner must be coupled with boilers with a combustion chamber smaller in diameter or shorter than those described in the diagram, 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 (type 1 or type 2). 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:

Fitting the burner to the boiler

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

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





Keys

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

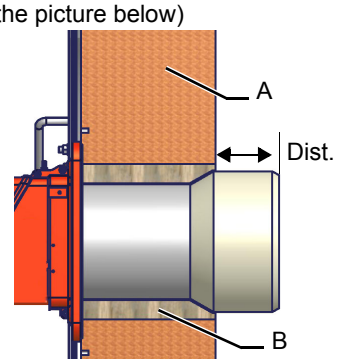
Matching the burner to the boiler

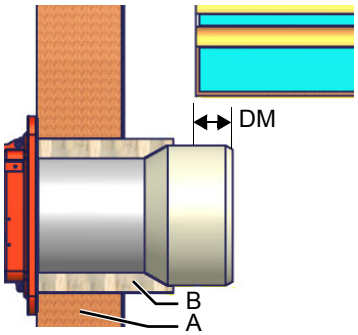
The burners described in this manual have been tested with combustion chambers that comply with EN676 regulation and whose dimensions are described in the diagram . In case the burner must be coupled with boilers with a combustion chamber smaller in diameter or shorter than those described in the diagram, 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)

A: ceramic fibre
B: refractory wall

Dist. = 100 mm
DM = 50 ÷ 100 mm



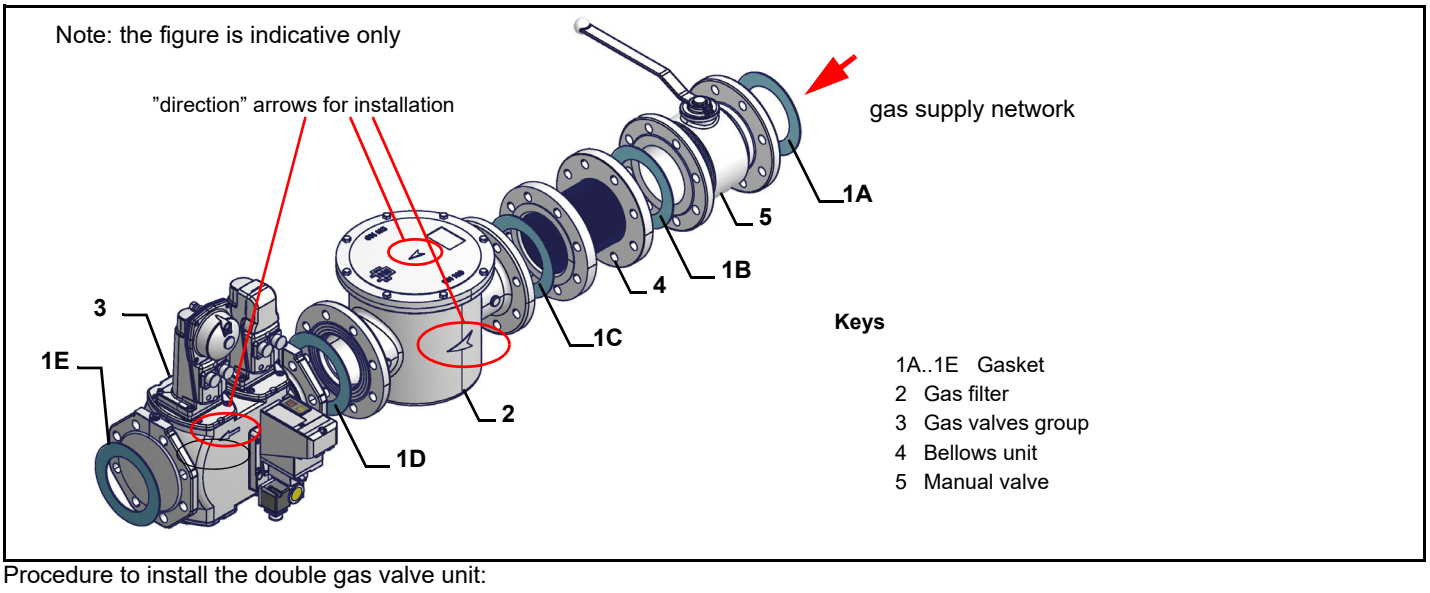


WARNING! Carefully seal the free space between blast tube and the refractory lining with ceramic fibre rope or other suitable means.

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

GAS TRAIN CONNECTIONS

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



Procedure to install the double gas valve unit:

- **two (2) gas flanges are required; they may be threaded or flanged depending on size**
- **first step: install the flanges to prevent entry of foreign bodies in the gas line**
- **on the gas pipe, clean the already assembled parts and then install the valve unit**
- **check gas flow direction: it must follow the arrow on the valve body**
- **VGD20: make sure the O-rings are correctly positioned between the flanges and the valve**
- **VGD40 and MBE: make sure the gaskets are correctly positioned between the flange**
- **fasten all the components with screws, according to the following diagrams**
- **make sure bolts on the flanges are properly tightened**

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

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

ATTENTION: once the gas train is mounted, the gas proving test must be performed, according to the procedure set by laws in force.

To mount the gas train, proceed as follows:

-

1 In case of threaded joints: use proper seals according to the gas used- in case of flanged joints: place a gasket between the elements

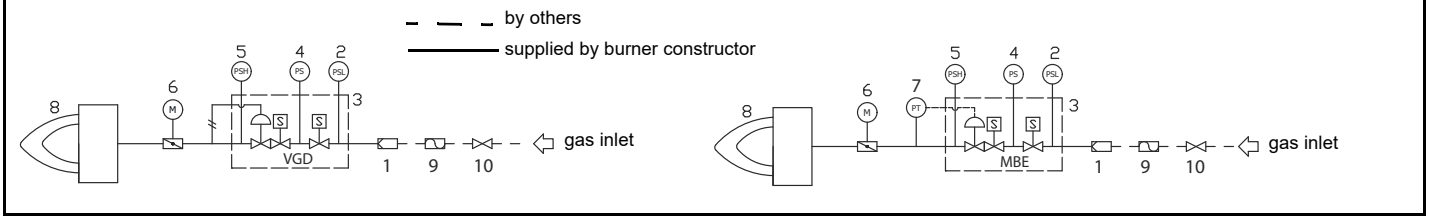
2 Fasten all the items by means of screws, according to the diagrams showed, observing the mounting direction for each item

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

GAS TRAIN CONNECTIONS

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

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



Legend

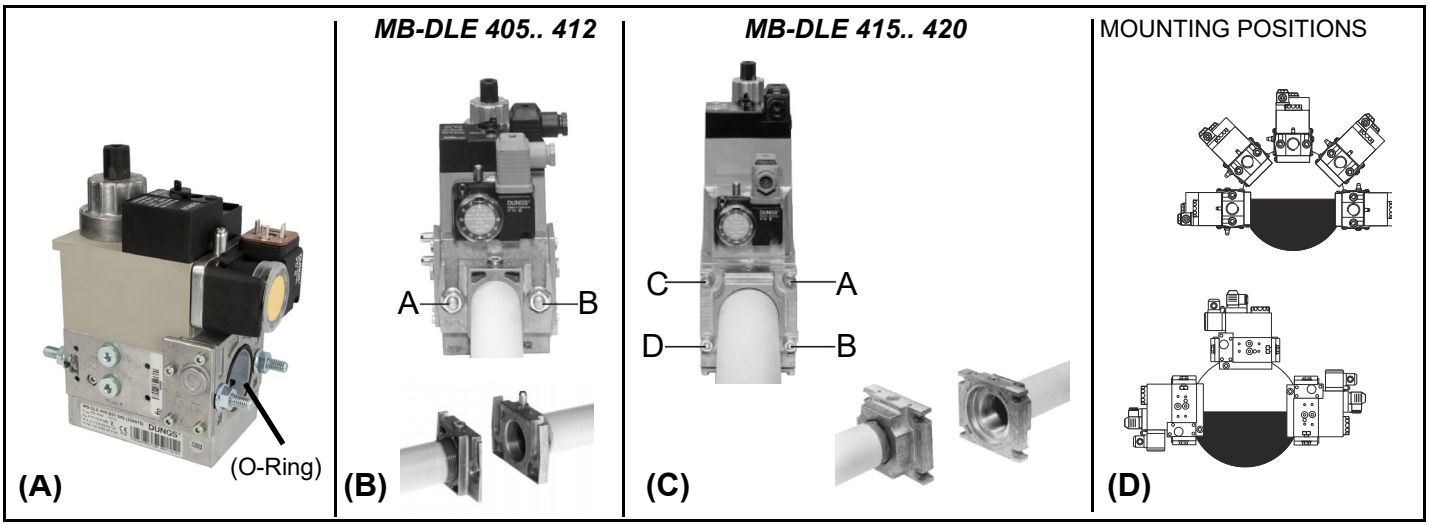
1	Filter	6	Butterfly valve
2	Pressure switch - PGMIN	7	Pressure transducer
3	Safety valve with built in gas governor	8	Main burner
4	Proving system pressure switch - PGCP	9	Antivibration joint (*optional)
5	Pressure switch PGMAX: mandatory for MBE, optional for VGD and MB-DLE	10	Manual valve(*optional)

MultiBloc MB-DLE - Assembling the gas train

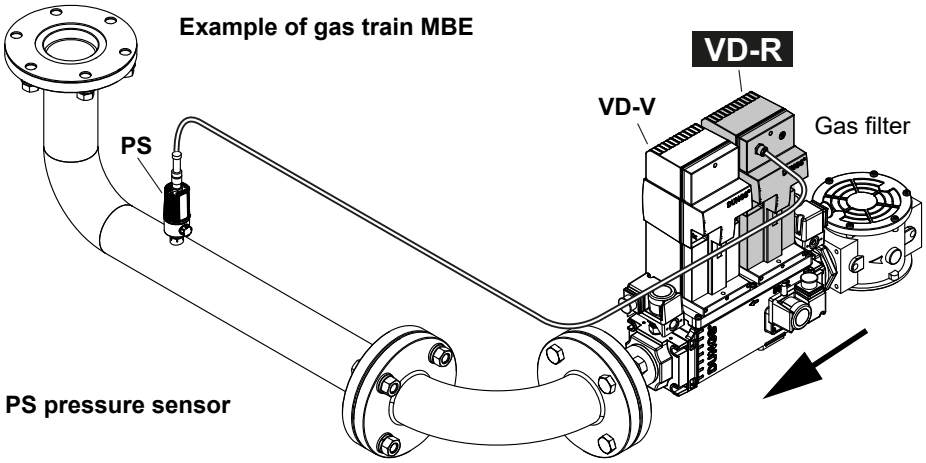
MULTIBLOC DUNGS **Mounting**

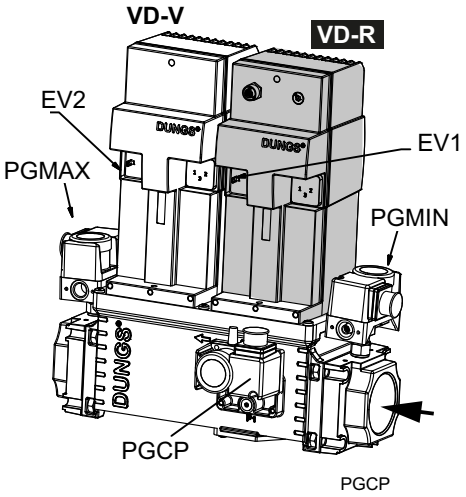
MB-DLE 405..412
MB-DLE 415..420

1 Mount flange onto tube lines: use appropriate sealing agent
2 Insert MB-DLE: note position of O rings
3 Remove MultiBloc between the threaded flanges
4 After installation, perform leakage and functional test
5 Disassembly in reverse order



MultiBloc MBE





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

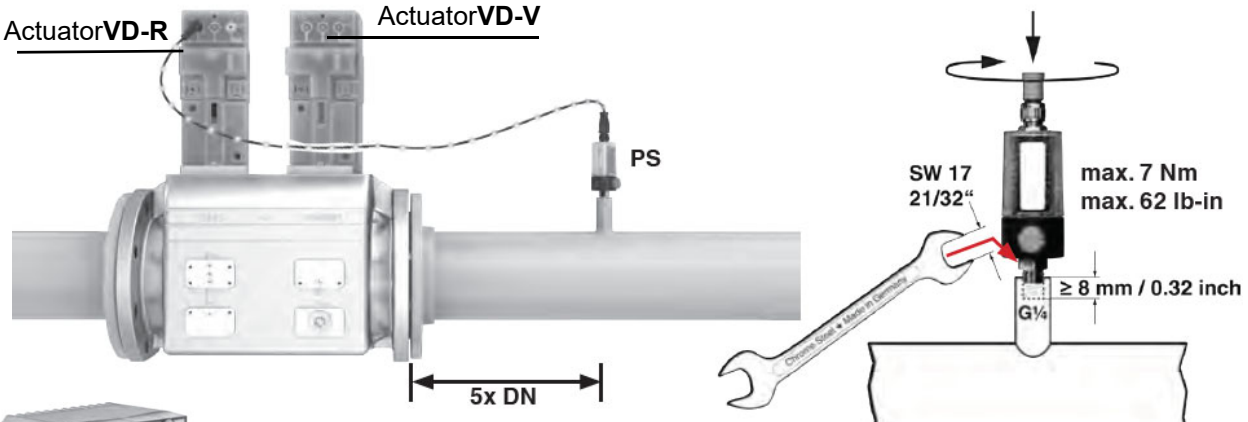
ATTENTION: it is recommended to mount filter and gas valves to avoid that extraneous material drops inside the valves, during maintenance and cleaning operation of the filters (both the filters outside the valves group and the ones built-in the gas valves).

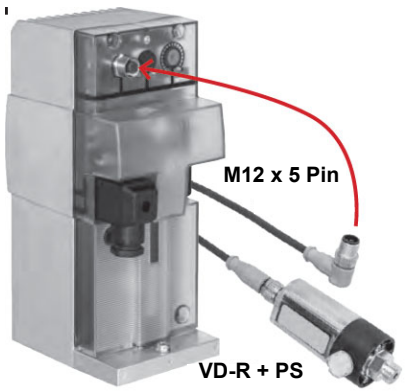
WARNING: Slowly open the fuel cock to avoid breaking the pressure regulator.

Threaded train with MultiBloc MBE - Mounting

Attention: In the case of the MBE... valve, a pressure limit switch downstream of the safety valve is mandatory.

Mounting VD-R & PS-...





- The actuator **VD-V** does not need any adjustment (funzione ON-OFF)
- The actuator **VD-R** It must be combined with the **PS** sensor (include regolatore di pressione)

1. Gas pressure regulation is possible with VD-R and PS pressure sensor only. **WARNING! For US/CN installation, the output pressure must be monitoried by min. and max. pressure switches set to +/- 20% of the setpoint.**
2. Mounting on pipe. Sensor position: 5x DN according to MBE. Pipe fitting with female thread size ¼, mount sensor with seal, observe torque.
3. The pressure sensor includes a vent limiter according to UL 353 and ANSI Z21.18/CSA 6.3. No venting required in locations where vent limiters are accepted by the jurisdiction.
4. Only PS pressure sensors specified by DUNGS are authorised to be connected to the VD-R's M12 interface.
5. Only PS cables specified by DUNGS are authorised to be used to connect the PS to the VD-R. Max. cable length 3 m.

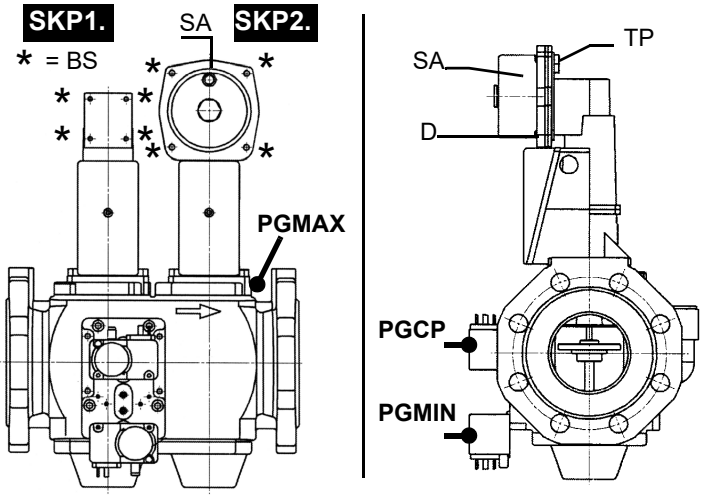
Siemens VGD20.. e VGD40..

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

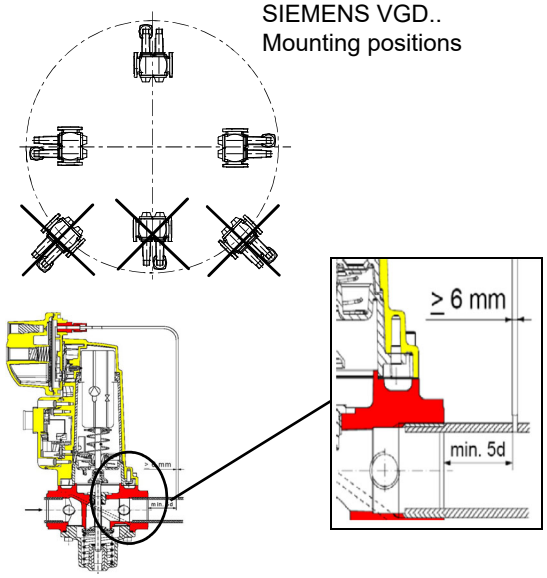
- Connect the reference gas pipe (**TP** in figure; 8mm-external size pipe supplied loose), to the gas pressure nipples placed on the gas pipe, downstream the gas valves: gas pressure must be measured at a distance that must be at least 5 times the pipe size.
- Leave the blowhole free (**SA** in figure).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

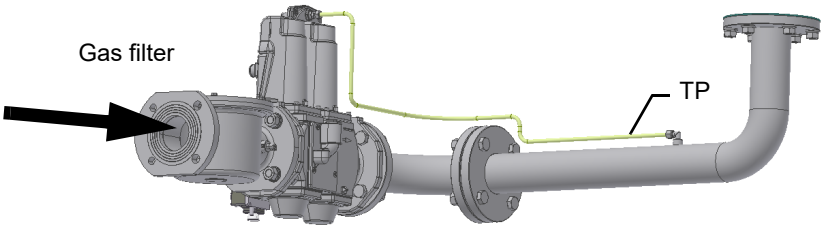
Caution: the SKP2 diaphragm D must be vertical

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



Siemens VGD... con SKPx Example of gas train

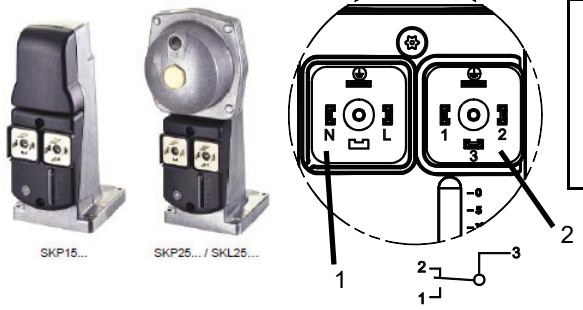


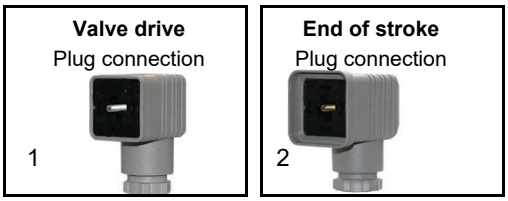


Attention: check that the range of the installed spring is compatible with the gas pressure at the burner head (see appropriate diagram) to which must be added the back pressure and approx. 5 /10 mbar for various leaks and gas line.

Siemens VGD SKPx5 (Auxiliary-optional micro switch)

Actuator connection





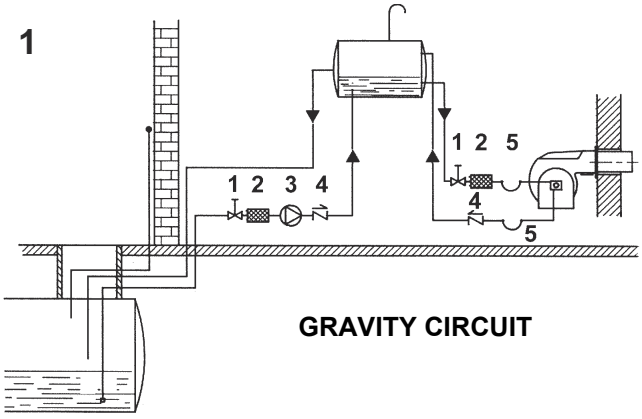
(only with SKPxx.xx1xx)

A Valve closed

OIL TRAIN CONNECTIONS

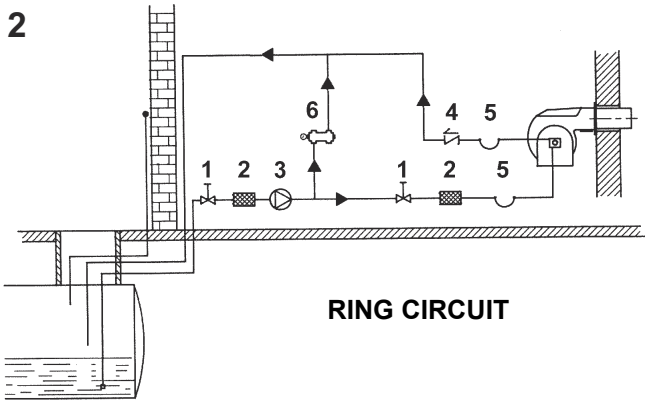
Hydraulic diagrams for light oil supplying circuits

1



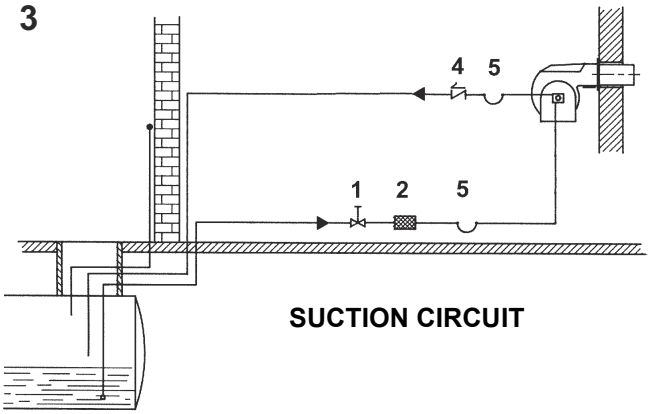
GRAVITY CIRCUIT

2



RING CIRCUIT

3



SUCTION CIRCUIT

Key

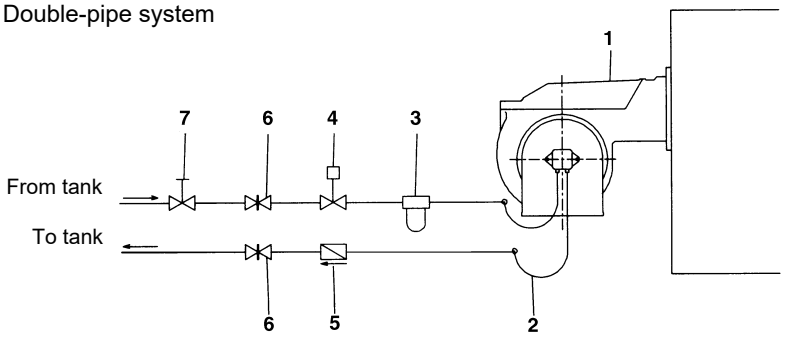
1 Manual valve
2 Light oil filter
3 Light oil feeding pump
4 One way valve
5 Flexible hoses
6 Relief valve

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. 5 - 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

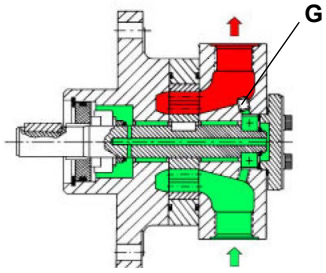
Single-pipe system: a single pipe drives the oil from the tank to the pump’s inlet. Then, from the pump, the pressurised oil is driven to the nozzle: a part comes out from the nozzle while the othe part goes back to the pump. In this system, the by-pass plug, if provided, must be removed and the optional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

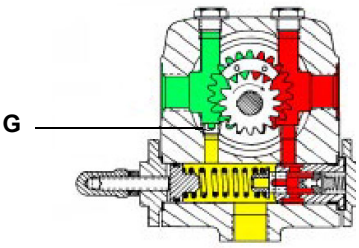
Burners come out from the factory provided for double-pipe systems. They can be suited for single-pipe system (recommended in the case of gravity feed) as decribed before.To change from a 1-pipe system to a 2-pipe-system, insert the by-pass plug **G** (as for ccw-rotation- referring to the pump shaft).

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

Suntec T



Suntec TA



About the use of fuel pumps

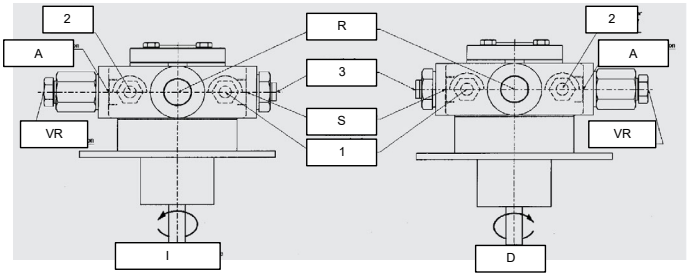
- Do not use fuel with additives to avoid the possible formation over time of compounds which may deposit between the gear teeth, thus obstructing them.
- After filling the tank, wait before starting the burner. This will give any suspended impurities time to deposit on the bottom of the tank, thus avoiding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

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

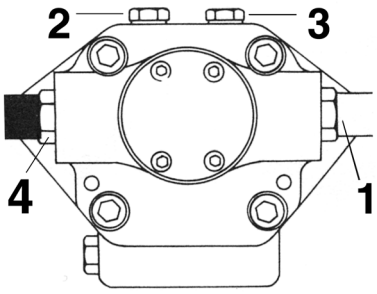
HP-Technick UHE-A..	
Oil viscosity	3 ÷ 75 cSt
Oil temperature	0 ÷ 150°C
Min. suction pressure	- 0.45 bar to avoid gasing
Max. suction pressure	5 bar
Max. return pressure	5 bar
Rotation speed	3600 rpm max.

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

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



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

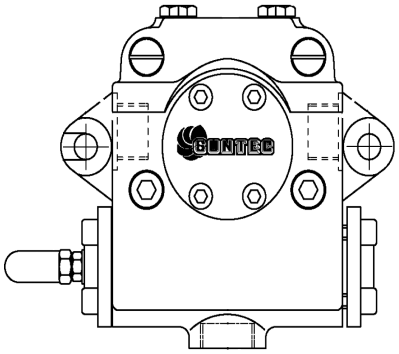


Key

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

"Note: pump with “C” rotation.

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



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

Connecting the oil flexible hoses to the pump

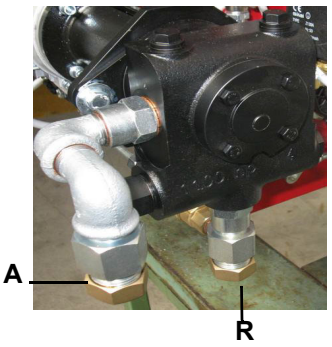
To connect the flexible oil hoses to the pump, proceed as follows, according to the pump provided:

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

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

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

.

Suntec T+TV	HP Technik UHE-A	Suntec TA
		

Diesel filters



	Item	Note	Connection	Max. operating pressure	Max. operating temperature	Filtering degree	Protection
5	20151PE (*)	-	3/8”	1 bar	-20, 60 °C	100 µ	-
6	20201PL (*)	-	3/8”	1 bar	-20, 60 °C	100 µ	-
7	GA70501	-	1”	4 bar	90 °C	100 µ	IP65

(*) Supplied per pilot diesel fuel if present

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.

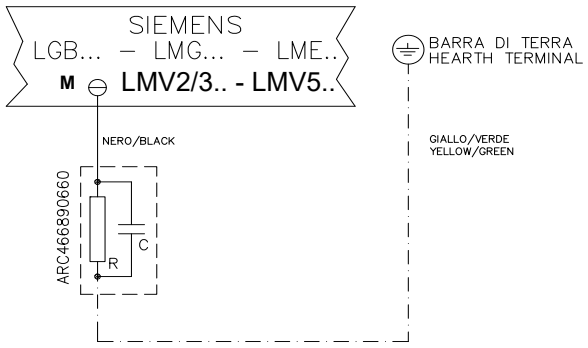
CAUTION: check the motor thermal cut-out adjustment

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

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.

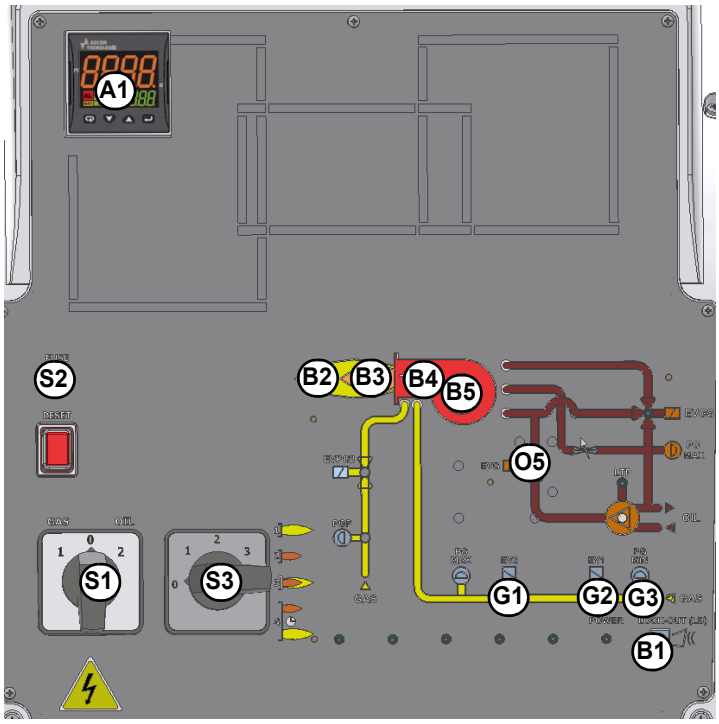


DANGER! Incorrect motor rotation can seriously damage property and injure people.WARNING: before starting the burner up, be sure that the manual cutoff valves are open and check that the pressure upstream the gas train complies the value quoted on paragraph "Technical specifications". Be sure that the mains switch is closed.

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

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

Fig. 7 - Burner control panel



Keys

A1	Burner Modulator (only on fully modulating burners)
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
B6	Stand-by signalling lamp
S1	Main switch (0=Off, 1=GAS, 2=OIL)
S2	Reset pushbutton for control box
S3	CMF switch (0=stop, 1=low flame, 2=high flame, 3=automatic) - fully modulating burners only
G1	Gas valves EV2 operation signalling lamp
G2	Gas valves EV1 operation signalling lamp
G3	Gas pressure switch signal lamp
G4	Gas proving system lockout signalling lamp
O5	Oil valve EVG operation signalling lamp

Gas operation

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

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

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

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

Light oil operation

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

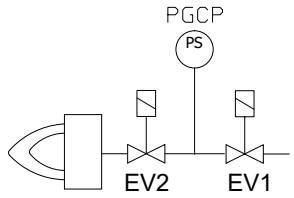
/

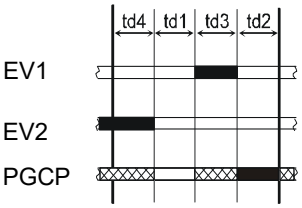
The fuel is pushed into the pump to the nozzle at the delivery pressure set by the pressure governor. The solenoid valve stops the fuel immission into the combustion chamber. The fuel flow rate that is not burnt goes back to the tank through the return circuit. The nozzle is feeded at constant pressure,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

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

This paragraph describes the integrated proving system operation sequence:

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





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

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

AIR FLOW AND FUEL ADJUSTMENT

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

Recommended combustion parameters		
Fuel	Recommended (%) CO_2	Recommended (%) O_2
Natural gas	9 ÷ 10	3 ÷ 4.8
Light oil	11,5 ÷ 13	2,9 ÷ 4,9
LPG	11 ÷ 12	2,8 ÷ 4,3

Adjustments - brief description

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

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

ADJUSTMENTS FOR GAS OPERATION

Adjustments - brief description

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

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

Air and Gas Flow Rate Settings by means of Berger STM30../Siemens SQM40.. actuatorcheck the fan motor rotation.

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

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

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

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

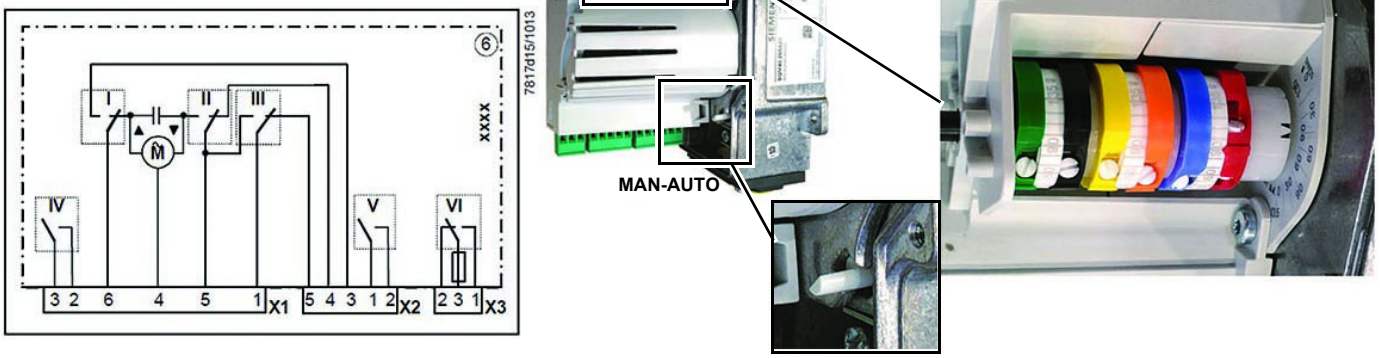
8 drive the burner to high flame stage, by means fo the thermostat **TAB**.

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

10 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;

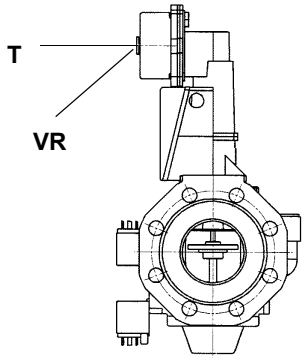
SQM40.265 CSV Actuator cams

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



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

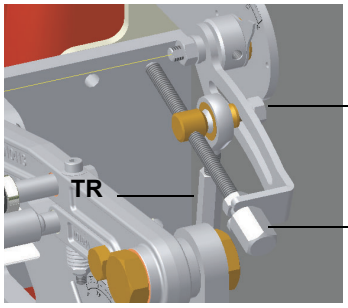
- Siemens VGD valves group: remove cap **T** and act on the **VR** adjusting screw to increase or decrease the pressure and consequently the gas rate; screwind **VR** the rate increases, unscrewing it decreases (see next figure).



Siemens VGD..

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

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



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

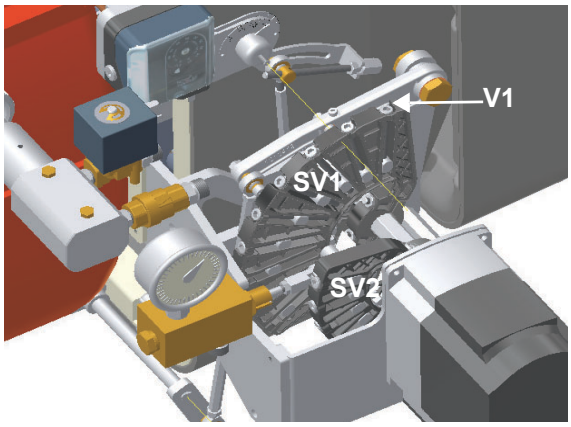
Attention! if it is necessary to change the head position, repeat the air and gas adjustments described above.

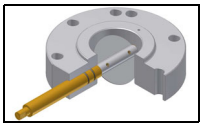
14 The air and gas rate are now adjusted at the maximum power stage, go on with the point to point adjustement on the **SV1** (gas side) adjusting cam as to reach the minimum output point.

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

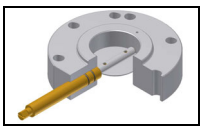
16 set the **TAB** thermostat to the minimum in order that the actuator moves progressively towards the low flame position;

17 move the gas low flame microswitch to the minimum to move the actuator towards the low flame until the two bearings find the adjusting screw that refers to the lower position: screw **V1** to increase the rate, unscrew to decrease.





Gas throttle valve open



Gas throttle valve closed

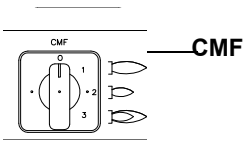
18 Move again the gas low flame microswitch towards the minimum to meet the next screw on the adjusting cam and repeat the previous step; go on this way as to reach the desired low flame point.

19 Now adjust the pressure switches.

Fully-modulating burners

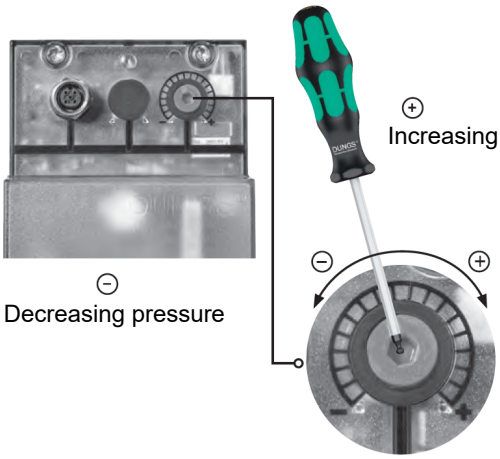
.To adjust the fully-modulating burners, use the **CMF** switch on the burner control panel (see next picture), instead of the **TAB** thermostat as described on the previous paragraphs about the progressive burners. Go on adjusting the burner as described before, paying attention to use the CMF switch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

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



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

MultiBloc MBE *Regulation VD-R whith PS*



Setting scale is „Not“ linear! Various sensors available. Output pressure according to sensor‘s measuring range.

Adjust the outlet pressure to the value specified by the burner or equipment manufacturer!

While making outlet pressure adjustments, do not exceed a value that creates a hazardous condition to the burner!

Fig. 8

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

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

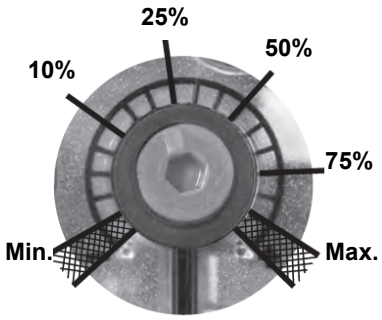
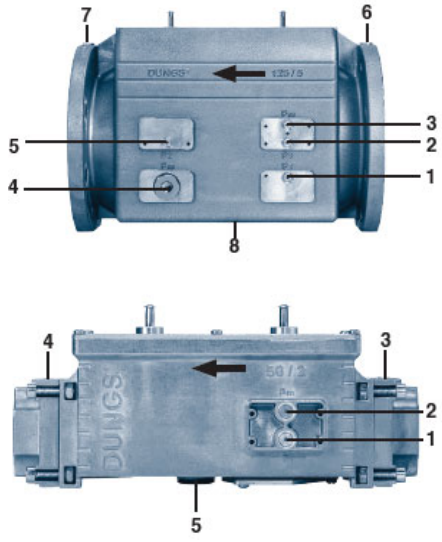
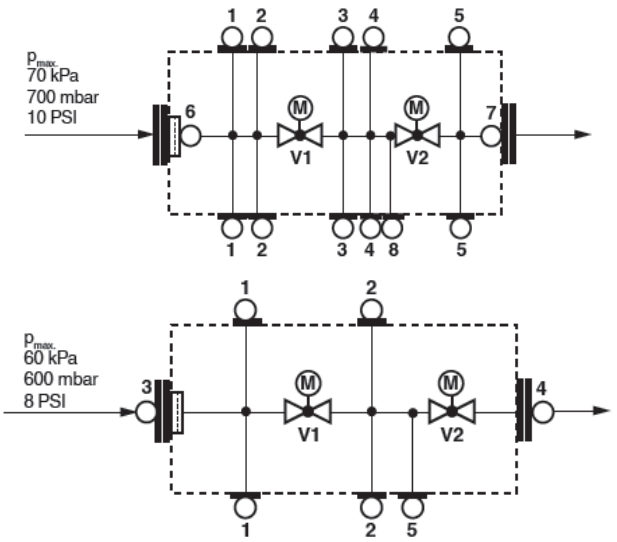


Fig. 9

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

Pressure taps MultiBloc MBE





1, 2, 3, 5
Sealing plug

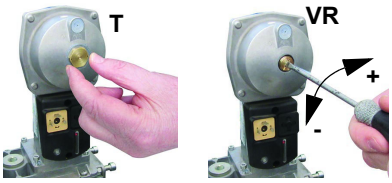
G ⅛ ISO 228
4
For system accessories

G ¾

Fig. 10

Gas valve Siemens VGD - Version with SKP2. (Built-in pressure stabilizer)

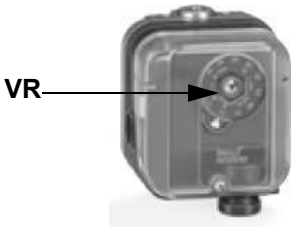
To increase or decrease gas pressure, and therefore gas flow rate, remove the cap **T** and use a screwdriver to adjust the regulating screw **VR**. Turn clockwise to increase the flow rate, counterclockwise to reduce it.



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.

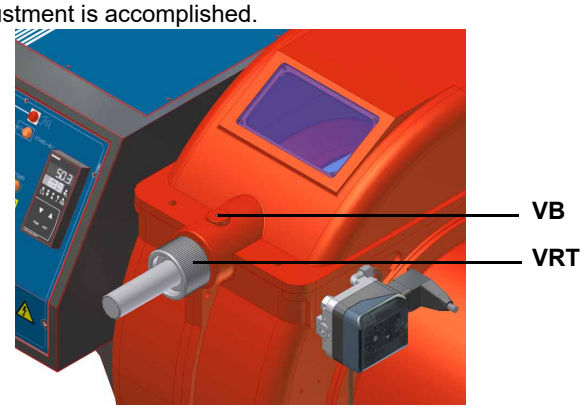
PGCP Gas leakage pressure switch (witn Siemens LDU/LME7x burner control/Siemens LMV Burner Management System/Lamtec BT3xx)

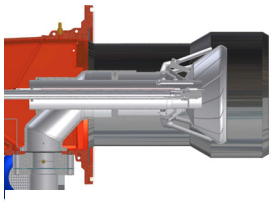
- remove the pressure switch plastic cover;
- adjust the PGCP pressure switch to the same value set for the minimum gas pressure switch;
- replace the plastic cover.

Adjusting the combustion head

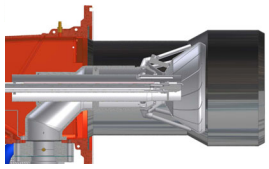
Attention! if it is necessary to change the head position, repeat the air and fuel adjustments described above.

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





“MAX” head position



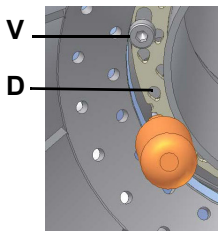
”MIN” head position

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

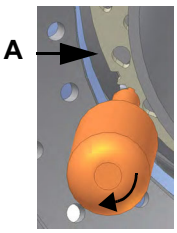
Center head holes gas flow regulation (natural gas burners)

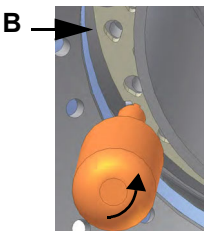
To adjust the gas flow, partially close the holes, as follows:

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



A: opened holes
B: closed holes





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

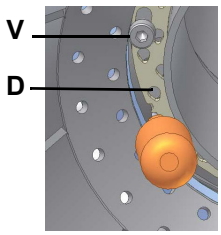
The factory setting depends on the type of fuel for which the burner is designed:

- For natural gas burners, plate holes are fully opened

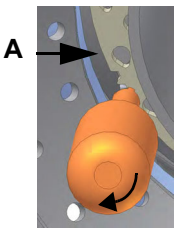
Center head holes gas flow regulation (LPG burners)

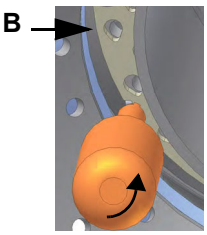
To adjust the gas flow, partially close the holes, as follows:

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



A: opened holes
B: closed holes





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

- 9xA **series**: 1,5 mm 5xxA **series**: 1,3 mm

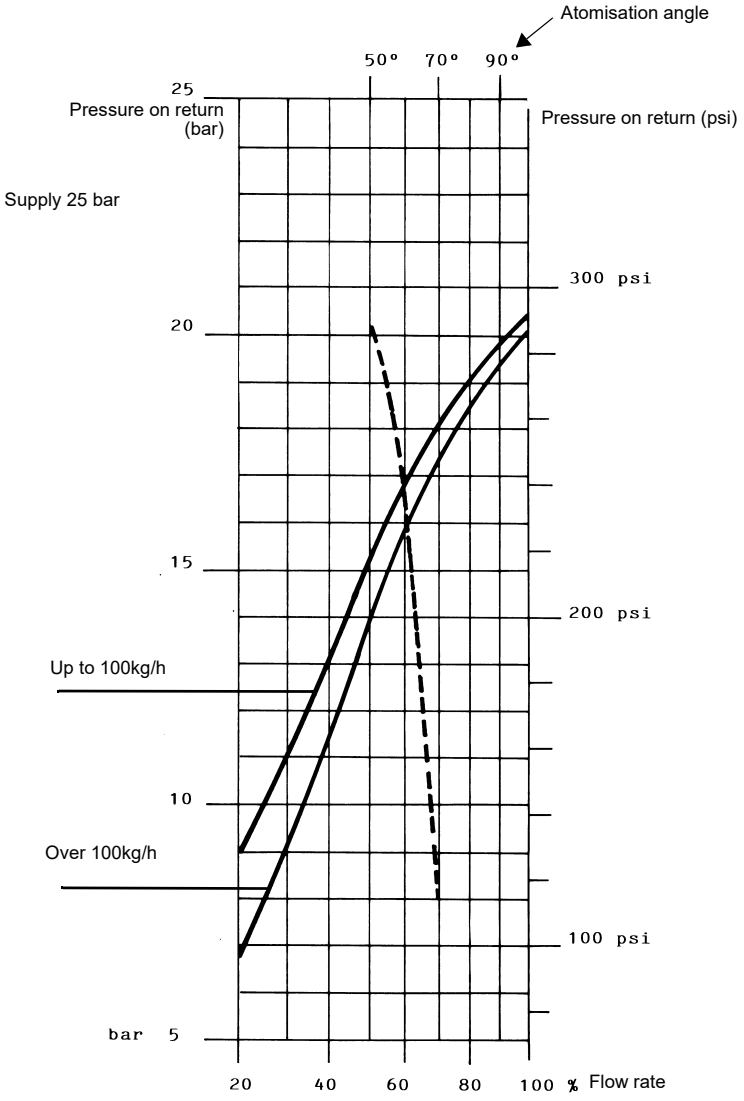
Adjustment procedure for light oil operation

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

FLUIDICS NOZZLE: REFERENCE DIAGRAM (INDICATIVE ONLY)

DIMENSIONS	FLOW RATE kg/h		Indicative pessure on return (bar)
	Min	Max	
40	13	40	19
50	16	50	22
60	20	60	20
70	23	70	23
80	26	80	23
90	30	90	22
100	33	100	22
115	38	115	21
130	43	130	22
145	48	145	21
160	53	160	21
180	59	180	22
200	66	200	21
225	74	225	22
250	82	250	22
275	91	275	22
300	99	300	23
330	109	330	23
360	119	360	22
400	132	400	22
450	148	450	22
500	165	500	22
550	181	550	22
600	198	600	23
650	214	650	23
700	231	700	23
750	250	750	23
800	267	800	22
850	284	850	22

Tab. 1



NOZZLE SUPPLY PRESSURE = 25 bar

- - - - - Atomisation angle according to the return pressure

——— % Flow rate

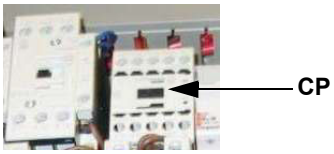
viscosity at nozzle = 5 cSt

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

Oil Flow Rate Settings

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

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



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

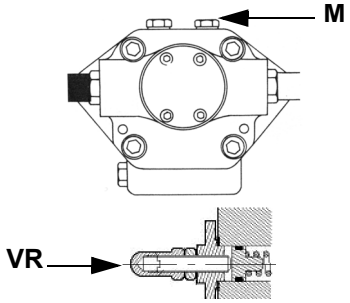
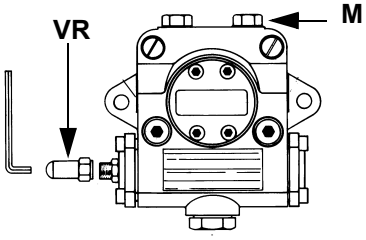
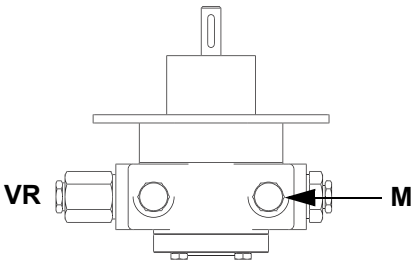
Suntec T..	Suntec TA.	HP Technik UHE
		

Fig. 11

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

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

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

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

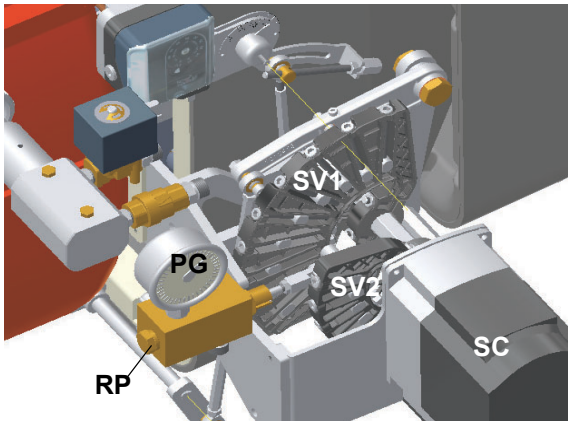


Fig. 12

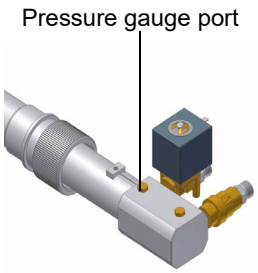


Fig. 13

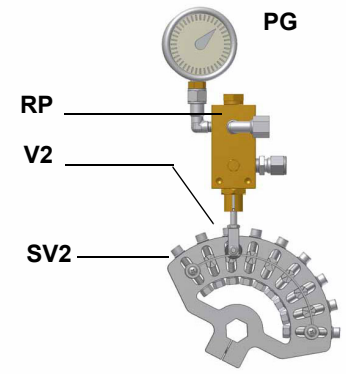


Fig. 14

8 Only if necessary, adjust the supply pressure as follows;insert a pressure gauge into the port shown on figure and act on on the pump adjusting screw **VR**. Pressure values are indicated at the beginning of this paragraph.

9 in order to get the maximum oil flow rate, adjust the pressure (reading its value on the **PG** pressure gauge) without changing the air flow rate set during the gas operation adjustments (see previous paragraph): checking always the combustion parameters, the adjustment is to be performed by means of the **SV2** adjusting cam screw (see picture) when the cam has reached the high flame position.

10 once the oil rate is adjusted at the maximum output (the air rate was adjusted in the gas regulation), go on with the point to point adjustment on the **SV2** (light oil side) adjusting cam as to reach the minimum output point, as described on the next steps.

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

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

13 move the low flame cam to the minimum to move the actuator towards the low flame until the two bearings find the adjusting screw that refers to the lower position: screw **V2** to increase the rate, unscrew to decrease.

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

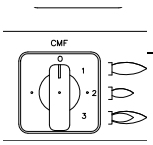
15 The low flame position must never match the ignition position that is why the cam must be set 20°- 30° more than the ignition position.

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

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



CMF

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

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.

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.

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

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

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).

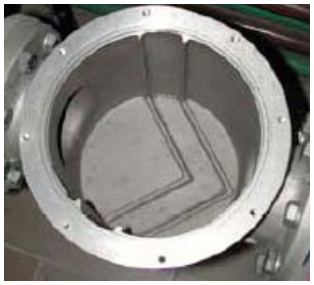
A



B



C





Thecnical procedure of self cleaning filters substitution (valid for all models)

1 Close the bowl valve before the self cleaning filter
2 Switch off any electrical equipment on board on the filter (example motorization or heaters)

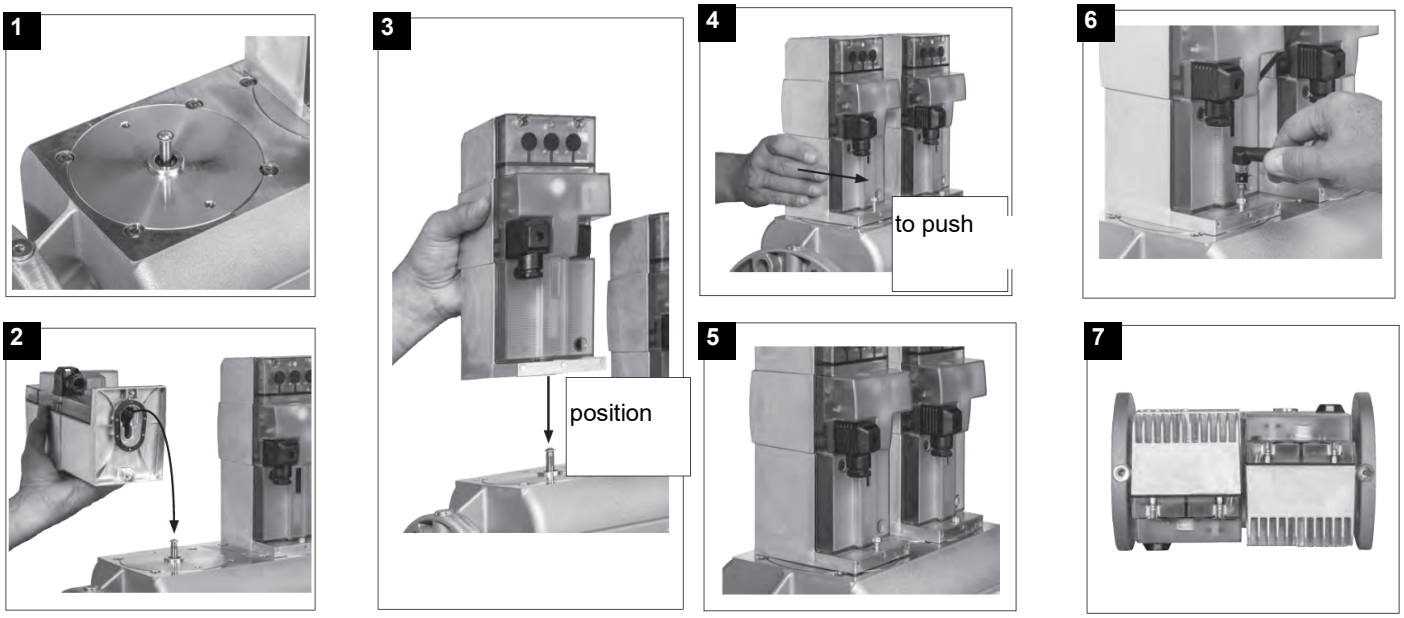
WARNING! Drain the system by unscrewing the drain screw on the bottom of the self cleaning filter

3 Disconnect the outlet pipe from the cover of the self cleaning filter
4 Remove the cover with all the filter pack, leaving only the bowl on the line
5 Clean any residue on the bottom of the bowl and clean the seat of the O-ring seal

WARNING! Replace the O-ring seal between the bowl and cover

6 Insert the filter pack again making sure to respect the correct inlet/outlet direction or any references on the cover and tray
7 Replace the filter by following the reverse order operations
8 Make sure there is no leakage and give the power to any electrical equipmente on the filter

MultiBloc MBE*MultiBloc VD Mounting*

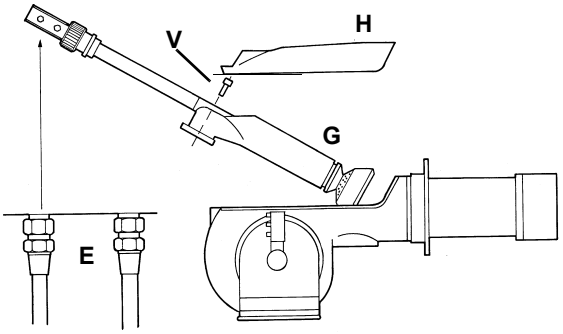


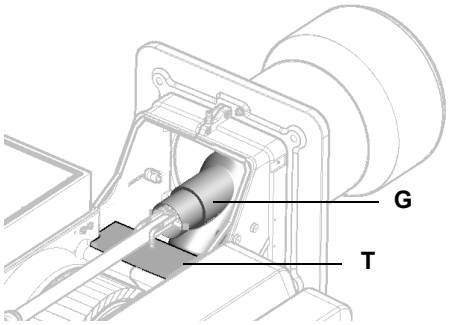
1. Position VD on VB, fig. 2+3.
2. Slide VD forward up to the stop, fig. 4.
3. Screw VD on with 2 M5 screws for each, max. 5 Nm/44 in.-lb., fig. 5/6.
4. VD can be mounted rotated by 180°, fig. 7.

Removing the combustion head

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

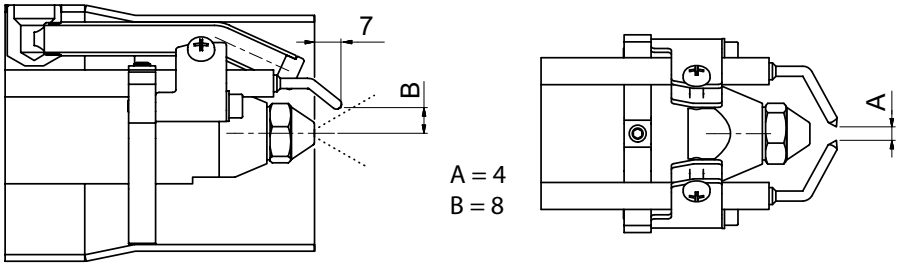
Note: to replace the combustion head, reverse the operations described above.





Electrodes Adjustment

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



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.

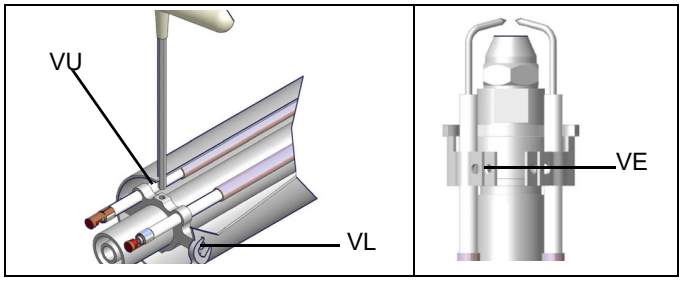
Cleaning/replacing the electrodes

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

To remove the oil gun, proceed as follows:

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

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



Checking the detection current

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

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

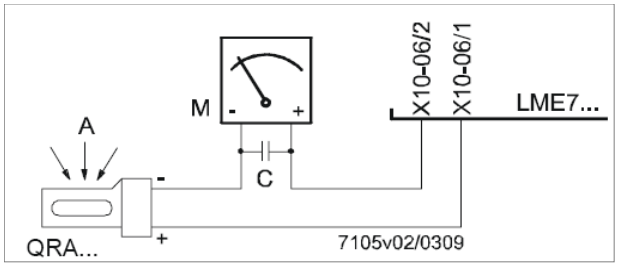


Fig. 15: Detection by photocell QRA..

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.



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

TROUBLESHOOTNG GUIDE Gas operation

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

TROUBLESHOOTNG GUIDE Light oil operation

BURNER DOESN'T LIGHT	* No electric power supply	* Wait for electric power supply is back
	* Main switch open	* Close the switch
	* Thermostats open	* Check set points and thermostat connections
	* Bad thermostat set point or broken thermostat	* Set or replace the thermostat
	* No gas pressure	* Restore gas pressure
	* Safety devices (manually operated safety thermostat or pressure switch, and so on ...) open	* Restore safety devices; wait that boiler reaches its temperature then check safety device functionality.
	* Broken fuses	* Replace fuses. Check current absorption
	* Fan thermal contacts open (only three phases)	* Reset contacts and check current absorption
	* Burner control locked out	* Reset and check its functionality
	* Burner control damaged	* Replace burner control
BURNER LOCKS OUT WITH FLAME PRESENCE	* Flame detector dirty or damaged	* Clean or replace flame detector
	* Burner control damaged	* Replace burner control
	* Smoking flame	* Reset combustion air flow rate * Check the nozzle and, if necessary, replace it * Check cleanness of combustion head * Check chimney suction * Check boiler cleanness
	* Combustion head dirty	* Clean combustion head
BURNER LOCKS OUT WITHOUT ANY FUEL FLOW RATE	* No fuel	* Fill the tank
	* Pump joint broken	* Check pump pressure
	* Pump damaged	* Check pump suction
		* Replace pump
	* Compressed air (or steam) too high	* Released compressed air (or steam) pressure
	* Oil metering valve not open far enough	* Check air pressure
		* Check servomotor position
	* Oil valve not energized	* Check wiring path or replace valve
	* Fan motor not efficient	* Adjust or replace the motor
	* Fan or pump motor runs in the wrong way	* Change rotation
	* Obstructed nozzle	* Clean or replace the nozzle
	* Check valve in the tank locked or leaking	* Clean or replace the valve
	* Oil filter dirty * Pump filter dirty	* Clean filter
	* Solenoid valve dirty or broken	* Clean or replace solenoid valve
BURNER LOCKS OUT WITH FUEL FLOW RATE (NO FLAME)	* Oil pressure too low	* Reset oil pressure
	* Nozzle dirty or damaged	* Clean or replace nozzle
	* Water in the tank	* Take off all the water from the tank
		* Clean all filters
	* Suction too high	* Check suction before pump. If necessary clean filters.
	* Ignition electrodes grounded because dirty or damaged	* Clean or replace electrodes
	* Ignition electrodes badly set	* Check electrodes position referring to instruction manual
	* Cables damaged	* Replace cables
	* Bad position of cables in the ignition transformer or into the electrodes	* Improve the installation
	* Ignition transformer damaged	* Replace the transformer
PUMP TOO NOISY	* Suction too high (over 0,35 bar) (dirty filters, check valve in the tank locked, and so on ...)	* Clean filters * Replace check valve in the tank
	* Flexible hoses damaged	* Replace flexible hoses
	* Air infiltration in the pipes	* Take off all infiltration
	* Pipe too long or too narrow	* Increase line size
BURNER RUMBLES WHEN MODULATING TO HIGH FIRE	* Burner is too lean	* Adjust air-oil ratio
	* Drawer assembly not set properly	* Check drawer position
	* Oil may be too hot	* Check oil temperature
	* Flame is blowing off head	* Check head position
CARBON BUILD-UP ON THE FIRESIDES OF THE BOILER	* Oil flame not retaining to head	
	* Dirty nozzle	* Clean the nozzle
	* Oil spray impinging on burner head	* Check position of the nozzle respect to the head
	* Spray angle of the nozzle too wide	* Reduce spray angle
FLAME IRREGULAR OR SPARKING	* Oil pressure at nozzle too low	* Reset oil pressure
	* Air flow rate too high	* Adjust air flow rate
	* Oil is too cold	* Adjust oil temperature
	* Dirt in the oil	* Check filters
	* Water in the fuel	* Take off all the water
	* Oil impingement on the combustion head	* Drawer assembly far too rear * Nozzle is not protruding through centerhole of air diffuser * Oil flame not retaining to the head
	* Nozzle dirty or damaged	* Clean or, if necessary, replace the nozzle
BURNER LIGHTS BUT FLAME DOESN'T RETAIN TO BURNER HEAD	* Drawer assembly not positioned correctly	* Move forward or backward
	* Nozzle too far forward through centerhole of diffuser	* Move nozzle backward respect to diffuser
	* Oil or air pressure at nozzle is too low	* Increase oil or air pressure
	* Air louver too open	* Reduce air louver opening
	* Too much spread between oil and air (or steam) pressure	* Set the spread to a proper value
FLAME IRREGULAR OR SMOKING	* Not enough combustion air	* Adjust air flow rate
	* Nozzle dirty or damaged	* Clean or, if necessary, replace the nozzle
	* Flame is too big for furnace or nozzle spray angle is wrong	* Check burner-furnace coupling * Change nozzle with a suitable one
	* Nozzle spray angle wrong (flame too long or too wide)	* Replace nozzle
	* Boiler dirty	* Clean the boiler
	* Not enough suction at chimney	* Check chimney cleanness or size
	* Pressure at nozzle too low	* Reset oil pressure
	* Oil too cold	* Reset oil temperature
	* Combustion air inlet dirty	* Clean the air inlet
	* Flame is too small respect to furnace volume	* Replace nozzle or reset pump pressure
FUEL GAS TEMPERATURE TOO HIGH	* Boiler dirty	* Clean the boiler
	* Oil flow rate too high	* Adjust oil pressure or replace nozzle

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

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