E165A
E205A

LMV5x
Microprocessor controlled

Gas burners

MANUAL OF INSTALLATION - USE - MAINTENANCE

BURNERS - BRUCIATORI - BRULERS - BRENNER - QUEMADORES - ГОРЕЛКИ

M039435CC 0.2 11/2024

DANGERS, WARNINGS AND NOTES OF CAUTION

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

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

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

Carefully keep this manual for future reference.

The following:

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

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

IMPORTANT :

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

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

RISK ANALYSIS

Instruction manual delivered with the device:

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

Delivery of the system and instruction manual

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

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

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

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

WARRANTY AND LIABILITY

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

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

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



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

Personnel training

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

The user:

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

GENERAL INTRODUCTION

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

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

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

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

Contact qualified personnel only.

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

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

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

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

The manufacturer shall not be held liable, by agreement or otherwise, for WARNING! Failure to observe the information given in this manual, operating negligence, incorrect installation and carrying out of non authorised

modifications will result in the annulment by the manufacturer of the guarantee that it supplies with the burner.
The damages resulting from improper installation, use and failure to comply with the instructions supplied by the manufacturer.The occurrence of any of the following circustances may cause explosions, polluting unburnt gases (example: carbon monoxide CO), burns, serious harm to people, animals and things:
- Failure to comply with one of the WARNINGS in this chapter
- Incorrect handling, installation, adjustment or maintenance of the burner
- Incorrect use of the burner or incorrect use of its parts or optional supply

SPECIAL INSTRUCTIONS FOR BURNERS

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

When the decision is made to discontinue the use of the burner, the user shall have qualified personnel carry out the following operations:
a • remove the power supply by disconnecting the power cord from the mains;
b • disconnect the fuel supply by means of the hand-operated shutoff valve and remove the control handwheels from their spindles.

Special warnings

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

GENERAL INSTRUCTIONS DEPENDING ON FUEL USED

ELECTRICAL CONNECTION

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

When the unit is out of use for some time the electric switch supplying all the power-driven components in the system
should be switched off.

FIRING WITH GAS, LIGHT OIL OR OTHER FUELS GENERAL

General Warnings

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

Special instructions for using gas

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

Precautions if you can smell gas

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

Using oil pressure gauges

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

Safety and prevention

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

BURER DATA PLATE

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

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

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

Precautions if you can smell gas

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

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

c close the gas valves;

d contact qualified personnel.

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

Using oil pressure gauges

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

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.

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

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

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

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

Do not use fuels other than the ones stated.

Do not use the burner in potentially explosive environments.

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

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

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

Untrained staff must not modify any linkages.

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

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

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 burners

European directives

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

Harmonized standards

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

Industrial burners

European directives

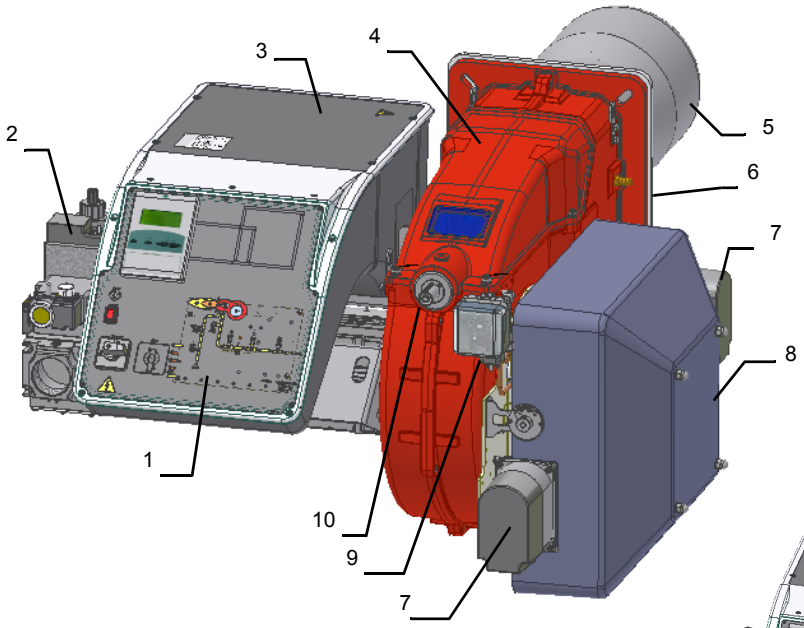
2006/42/CE (Machinery Directive)
2014/35/UE (Low Tension Directive)
2014/30/UE (Electromagnetic compatibility Directive)
2006/42/CE (Machinery Directive)

Harmonized standards

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

PART I: SPECIFICATIONS

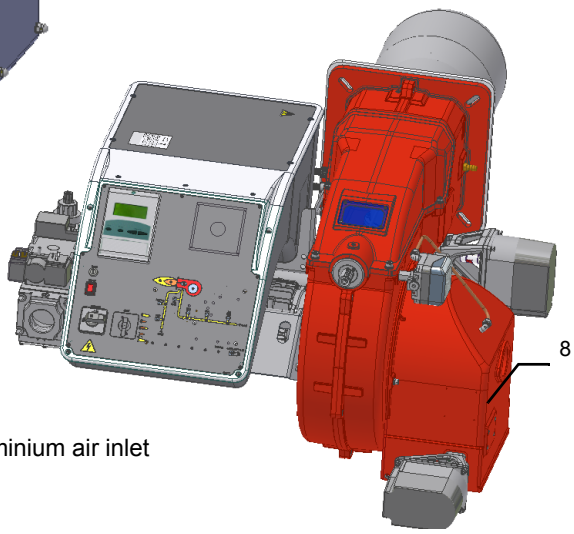
BURNERS FEATURES



Burner with ABS polymer (silenced) air inlet

Note: the figure is indicative only

1 Control panel with startup switch
2 Gas train
3 Electrical panel
4 Cover
5 Blast tube
6 Flange
7 Actuator
8 Silencer
9 Air pressure switch
10 Head adjusting ring



Burner with aluminium air inlet

Gas operation: From the supply line the gas fuel passes through the gas train (filter, safety valves, gas pressure regulator and butterfly valve). The pressure regulator sets the gas pressure within the combustion head utilization limits. Air is supplied by a fan, which may be onboard or separated depending on burner configuration, and is channeled through an air damper.

The air damper and the gas butterfly valve are actuated by servomotors according to load curves, in order to achieve the correct proportion between fuel and air flows, and to optimize flue gas parameters.

The adjustable combustion head can improve the burner performance by controlling the flame geometry and combustion efficiency.

Fuel and air are routed through separated channels inside the combustion head, then mixed to ignite the flame inside the combustion chamber. The ignition spark is provided by electrodes and a high voltage transformer (a pilot flame may also be employed, depending on burner configuration).

Pre-ventilation of the combustion chamber is usually implemented according to gas directives.
The control panel, onboard or separated, allows the operator to monitor each operating phase.

Identificación de los quemadores

Los quemadores se identifican por tipo y modelo. Seguidamente se ilustran los modelos.

Tipo	**E165A**	Modelo	**M-.**	**MD.**	**LR.**	***.**	**A.**	**1.**	**40.**	**ES**
	(1)		**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**

1	QUEMADOR TIPO	**E165A, E205A**
2	COMBUSTIBLE	M - Gas natural, L - LPG, B- Biogás
3	FUNCIONAMIENTO: (Versiones disponibles)	PR - Progresivo MD - Modulante
4	TOBERATIPO DE TOBERA Y CAJA ASPIRACIÓN DE AIRE ver dibujo página 5)	SR = Tobera estándar, caja aspiración de aire en polímero (ABS) LR = Tobera larga, caja aspiración de aire en polímero (ABS)
5	PAIS DE DESTINO	ES - España
6	VERSIONES ESPECIALES	A - Estándar, Y - Especial
7	EQUIPO (Versiones disponibles)	0 = 2 Válvulas + control de estenqueidad 1 = 2 Válvulas + control de estenqueidad 7 = 2 Válvulas + presostato gas maxima 8 = 2 Válvulas + control de estenqueidad + presostato gas maxima
8	DIÁMETRO RAMPA	40 = $Rp1_{1/2}$ 50 = Rp2 65 = DN65 80 = DN80
9	QUEMADOR A CONTROL ELECTRÓNICO	ES = sin control oxígeno y sin inverter EO = con control oxígeno y sin inverter EI = sin control oxígeno y con inverter EK = con control oxígeno y con inverter

Caracterisiticas tecnicas

		E165A M-..	**E205A M-..**	**E165A L-..**	**E205A L-..**	**E165A B-..**	**E205A B-..**
Potencialidad	min. -max. kW	320 - 1650	340 - 2050	320 - 1650	340 - 2050	320 - 1650	340 - 2050
Combustible		M- = Gas natural		L- = LPG		B- Biogás	
Categoría gas		(ver apartado siguiente)		$I_{3B/P}$		-	
Tipo de regulación		Progresivo - Modulante					
Temperatura de funcionamiento	°C	-10 ÷ +50					
Temperatura de almacenamiento	°C	-20 ÷ +60					
Tipo de servicio *		Intermitente					

Datos eléctricos 50 Hz

Tensioni possibili, verificare l'effettiva tensione di alimentazione Trifase e Monofase sulla targa dati del bruciatore.

Alimentación eléctrica	V	220 / 230 / 265 / 277 / 380 / 440 / 460 / 480 / 525 3 a.c.					
Alimentación auxiliar Monofásica	V	110 / 120 / 220 / 230 2 a.c.					
	Hz	50					
Potencia eléctrica total	kW	2,7	3,5	2,7	3,5	2,7	3,5
Motor eléctrico	kW	2,2	3,0	2,2	3,0	2,2	3,0

Datos eléctricos 60 Hz

Tensioni possibili, verificare l'effettiva tensione di alimentazione Trifase e Monofase sulla targa dati del bruciatore.

Alimentación eléctrica	V	220 / 230 / 265 / 277 / 380 / 440 / 460 / 480 / 525 3 a.c.					
Alimentación auxiliar Monofásica	V	110 / 120 / 220 / 230 2 a.c.					
	Hz	60					
Potencia eléctrica total	kW	3,14	4,1	3,14	4,1	3,14	4,1
Motor eléctrico	kW	2,64	3,6	2,64	3,6	2,64	3,6

Datos del combustible

Caudal de Gas (1)	min.-max. Stm^3/h	34 - 175	36 - 217	-	-	-	-
Caudal de gas - LPG	min.-max. Stm^3/h	-	-	11,9 - 62	12,7 - 77	-	-
Caudal de Biogas	min.-max. Stm^3/h	-	-	-	-	50 - 258	53 - 321
Presión de gas (2)	mbar	(ver Nota2)					
Valor calorífico superior del gas nat. (1)	Btu/ft^3	1,038					

(*) **NOTA SOBRE EL TIPO DE SERVICIO DEL QUEMADOR:** El dispositivo de control de la llama se detiene automáticamente después de 24 horas de funcionamiento continuo. El dispositivo se reinicia inmediatamente siempre de manera automática.

Nota 1:	Todos los caudales gas le están en Stm3 / h, presión 1.013 mbar y temperatura 15 °C, y valen por Gas Natural G20, capacidad calorífica inferior H_i = 34,02 MJ / Stm^3; por G.P.L. Capacidad calorífica inferior H_i = 93,5 MJ / Stm^3.	
Nota 2:	Presión gas maxima	360 mbar, con válvulas Dungs MBDLE.
		500 mbar, con válvulas Siemens VGD o Dungs MultiBloc MBE.
	Presión gas minima	ves curvas presion gas en la red.
Nota 3:	Funcionamiento en locales cerrados; uumedad del aire: máx. 80 % h.r. .	
Nota 4:	Con electrodo: por razones de seguridad, el quemador debe pararse automáticamente cada 24 horas.	
Nota 5:	El tipo de servicio puede ser continuo (presencia de señal de llama durante más de 24 h sin ninguna parada) o intermitente (al menos una vez cada 24 h se produce una parada de trabajo y se apaga la llama) en función de la configuración solicitada. El funcionamiento puede ser continuo en presencia de detección de llama mediante ionización ION o Siemens QRI..., QRA5..., QRA7... o Lamtec FSS... con equipos de control de llama (BMS) Siemens LMV37x o LMV5x y Lamtec BT3...	

Tipo de combustible utilizado

Las características técnicas de los quemadores, indicadas en este manual, corresponden al gas natural (poder calorífico Hi = 9,45 kWh / Stm^3, densidad ρ =0,717Kg / Stm^3) y LPG (poder calorífico Hi= 26,79 kWh / Stm^3, densidad ρ =2,151 Kg / Stm^3). Para combustible como gas ciudad y biogas, multiplicar los valores y presión para los coeficientes correctivos indicados en la tabla.

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

Por ejemplo, para calcular el caudal y la presión para biogas:

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

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

ADVERTENCIA! El tipo y el ajuste de la cabeza de combustión depende del tipo de gas quemado. El quemador debe ser utilizado para el fin previsto especificados en la placa del quemador.

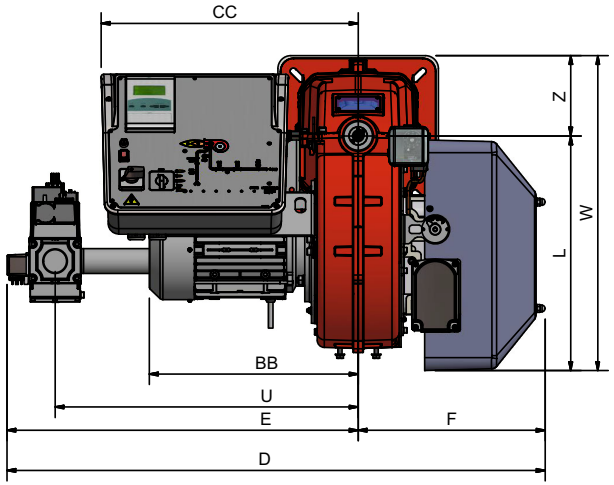
ATENCIÓN: los factores correctivos indicados en la tabla dependen de la composición del combustible y, por ende, de su poder calorífico Hi y densidad ρ. Los valores indicados arriba deben considerarse exclusivamente como valores de referencia.

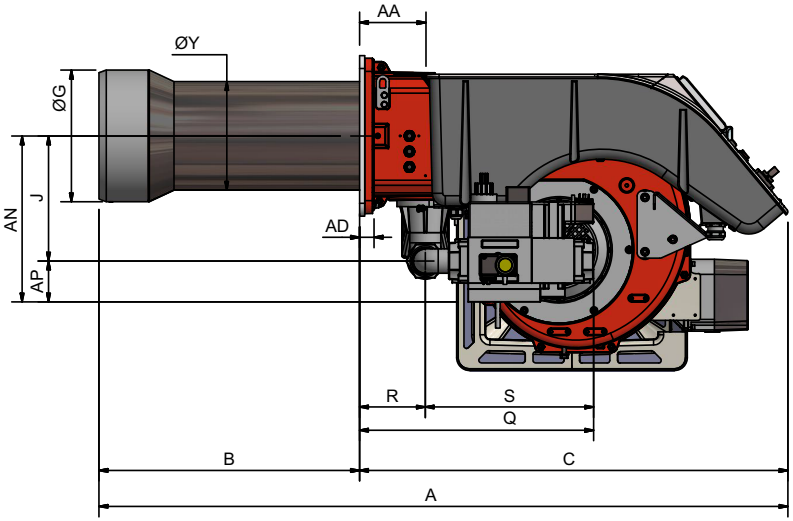
Tipo de combustible utilizado

PELIGRO! El quemador debe ser utilizado solamente con el combustible especificados en la placa del quemador.

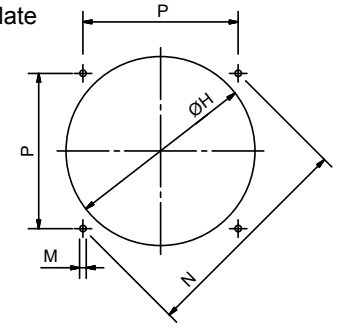
Tipo	--
Modelo	--
Año	--
N"serie	--
Potencia	--
Caudal	--
Combusible	--
Categoría	--
Presón	--
Viscosidad	--
Tensión	--

Overall dimensions (mm)

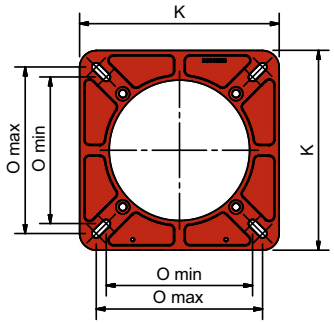




Boiler recommended drilling template



Burner flange

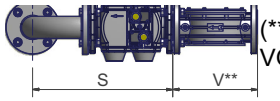


E...A M-.xx.xR.xx.A.x.xx.ES

TIPO	DN	A (AS)	A (AL)	AA	AD	AN	AP	B (BS)	B (BL)	BB	C	CC	D	E	F	G	H	J	K	L	M	N	O min	O max	P	Q	R	S	U	V	W	Y	Z
E165A	1.40	1220	1333	128	28	321	79	390	500	369	830	496	1033	673	360	234	265	242	300	453	M10	330	220	250	233	452	127	325	585	x	608	210	155
	1.50												1078	718												465		338	625				
	1.65					408	118						1050	690				290								525		404	565	292			
	1.80					422	132																			552		425	565	310			
E205A	1.40	1330	-	128	28	321	79	503	-	403	830	496	1033	673	360	254	285	242	300	453	M10	330	220	250	233	452	127	325	585	x	608	210	155
	1.50												1078	718												465		338	625				
	1.65					408	118						1050	690				290								525		404	565	292			
	1.80					422	132																			552		425	565	310			

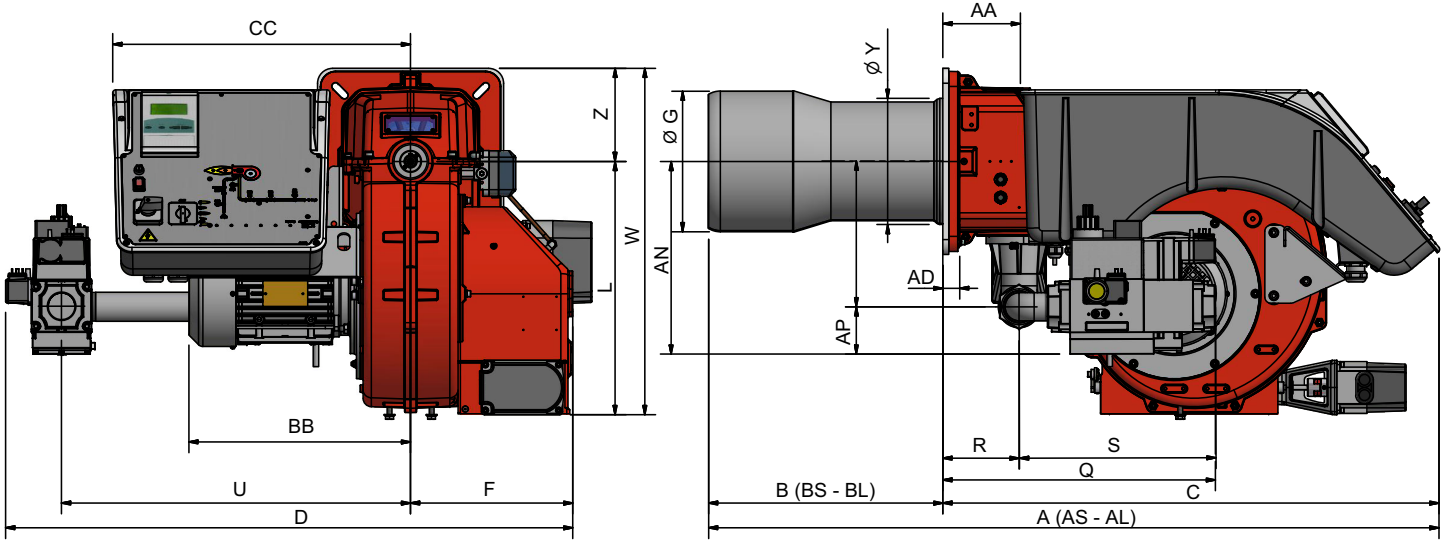
BS = standard blast tube BL = long blast tube DN = gas valves size

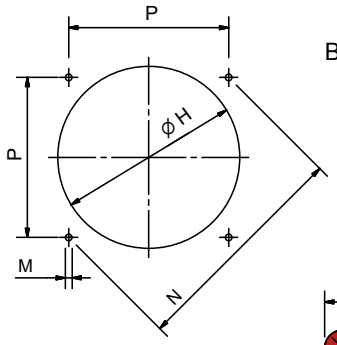
B*: SPECIAL blast tube lengths must be agreed with **Cib Unigas**



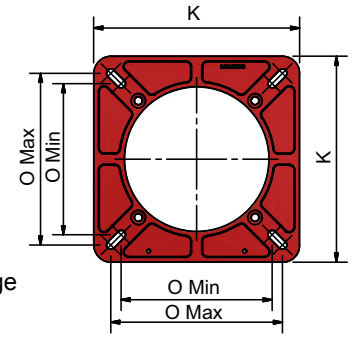
(**) According to the gas train size and the burner type, MB-DLE or VGD valves are supplied. The "V" measure, refers to the gas filter, for burners provided with Siemens VGD valves. MB-DLE valves have a built-in filter.

Overall dimensions (mm)





Boiler recommended drilling template



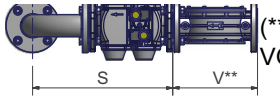
Burner flange

E...A M-.xx.xP.xx.A.x.xx.ES

TIPO	DN	A (AS)	A (AL)	AA	AD	AN	AP	B (BS)	B (BL)	BB	C	CC	D	E	F	G	H	J	K	L	M	N	O min	O max	P	Q	R	S	U	V	W	Y	Z
E165A	1.40	1220	1333	128	28	314	79	390	500	369	830	496	943	673	270	234	265	242	300	420	M10	330	220	250	233	452	127	325	585	x	575	210	155
	1.50												988	718												465		338	625				
	1.65					408	118						960	690				290								525		404	565	292			
	1.80					422	132																			552		425		310			
E205A	1.40	1330	-	128	28	314	79	503	-	403	830	496	943	673	270	254	285	242	300	420	M10	330	220	250	233	452	127	325	585	x	575	210	155
	1.50		-						-				988	718												465		338	625				
	1.65		-			408	118		-				960	690				290								525		404	565	292			
	1.80		-			422	132		-																	552		425		310			

B*: SPECIAL blast tube lengths must be agreed with **Cib Unigas**

BS = standard blast tube BL = long blast tube DN = gas valves size



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

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).

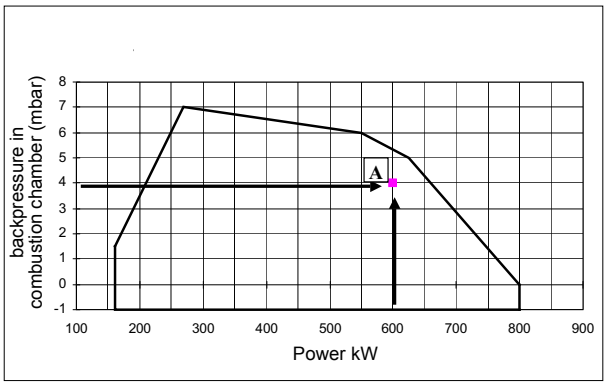
Example:

Furnace input: 600kW

Backpressure: 4 mbar

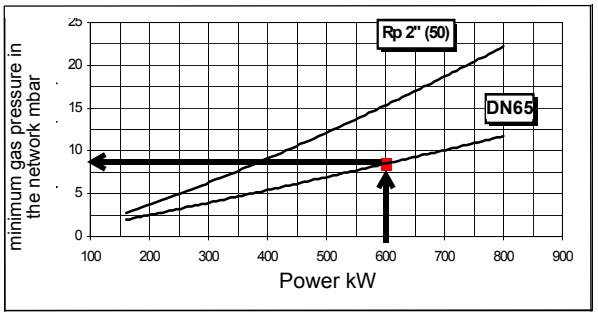
In the "Performance curve" diagram, draw a vertical line matching the furnace input value and an horizontal line matching the backpressure value. The burner is suitable if the intersection point A is inside the performance curve.

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



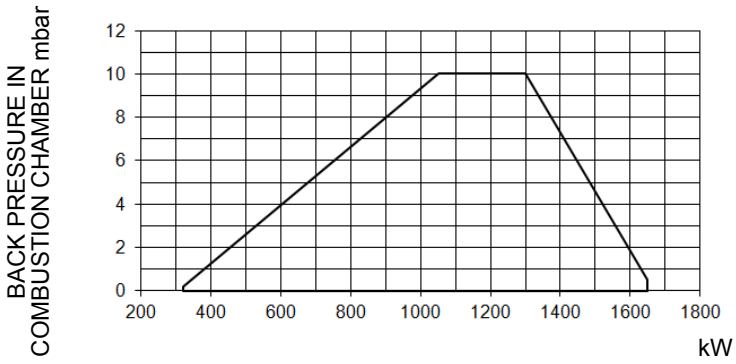
Checking the proper gas train size

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.

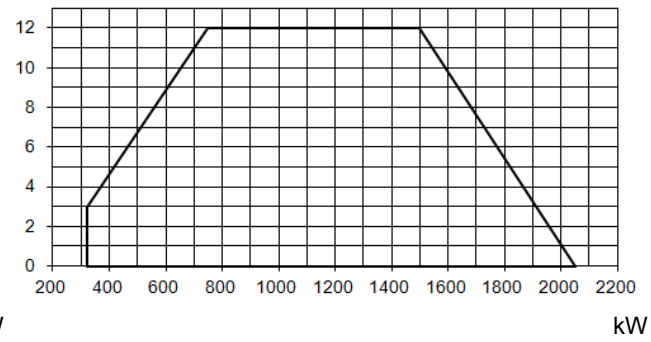


Performance Curves

E165A



E205A



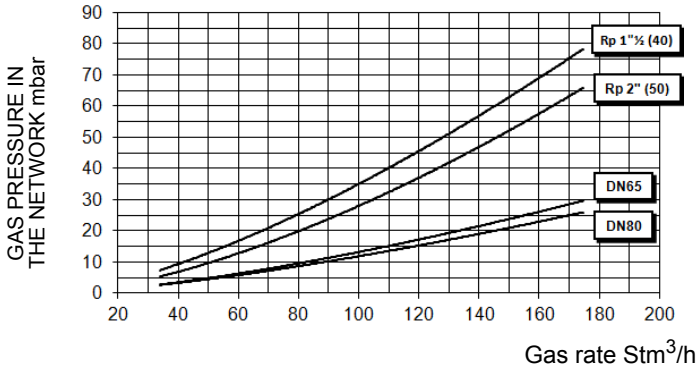
To get the input in kcal/h, multiply value in kW by 860.

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

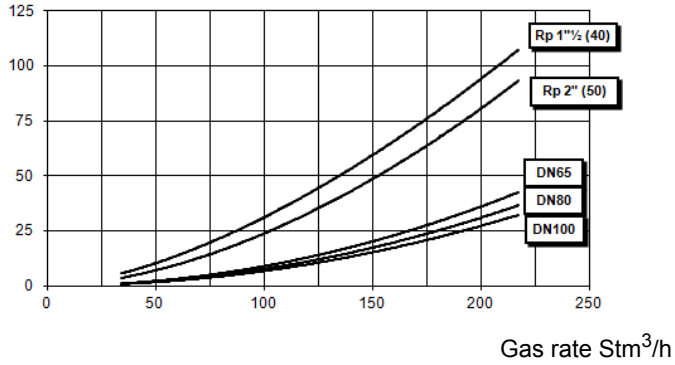
NOTE: The performance curve is a diagram that represents the burner performance in the type approval phase or in the laboratory tests, but does not represent the regulation range of the machine. On this diagram the maximum output point is usually reached by adjsuting the combustion head to its "MAX"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

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

E165A



E205A



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

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.

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

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

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.
.

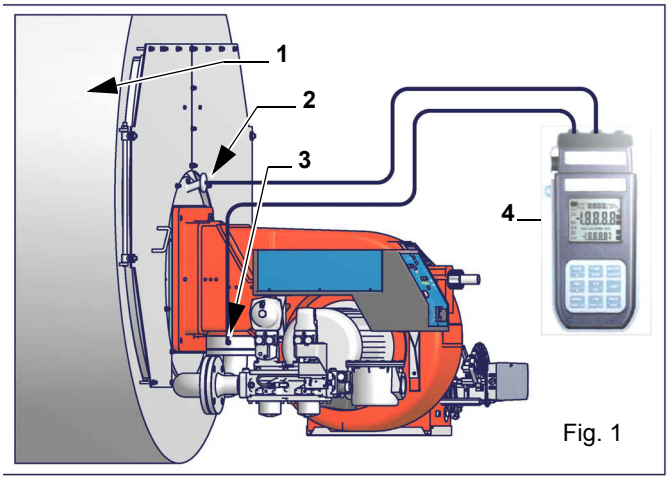


Fig. 1

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.

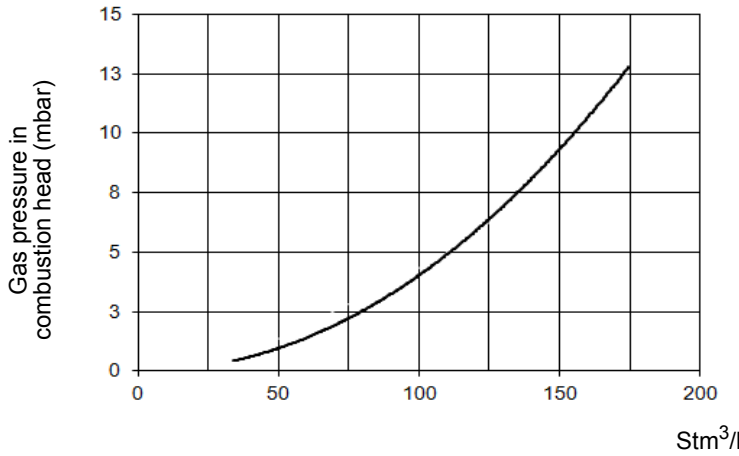
Measuring gas pressure in the combustion head

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.

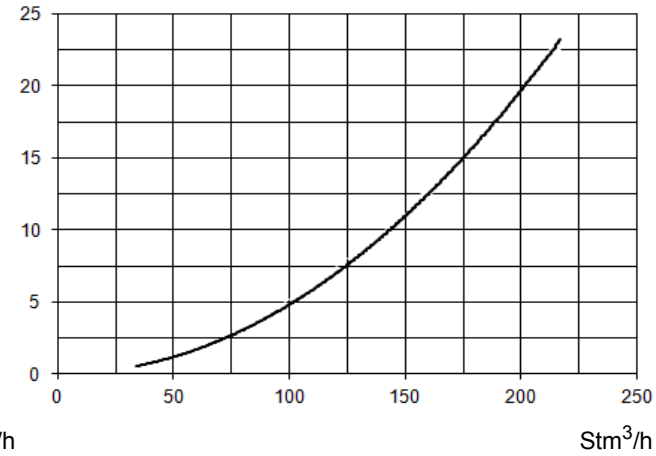
Pressure - rate in combustion head curves (natural gas)

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

E165A M-..



E205A M-..



PART II: INSTALLATION

MOUNTING AND CONNECTING THE BURNER

Transport and storage

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

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

If the product must be stored, avoid humid and corrosive places. Observe the temperatures stated in the burner data table at the beginning of this manual. The packages containing the burners must be locked inside the means of transport in such a way as to guarantee the absence of dangerous movements and avoid any possible damage.

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

Packing

Burners are despatched in cardboard packages whose dimensions are:

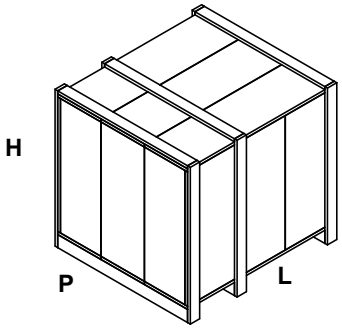
- 1636mm x 1036mm x 1016mm (L x P x H).

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

The following are placed in each packing case:

- burner with detached gas train;
- gasket or ceramic fibre plait (according to burner type) to be inserted between the burner and the boiler;
- (if provided) detection photoelement deatached from the burner
- envelope containing this manual and other documents.

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

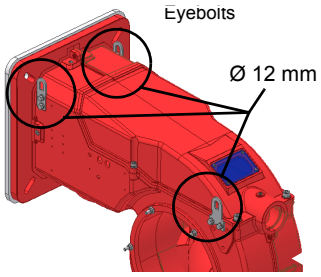


Handling the burner

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.

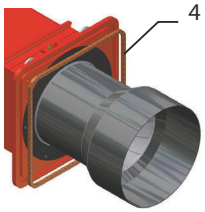
The burner is provided with eyebolts, for handling operations and it can be lifted with a hydraulic lift or a small manual crane. (A)

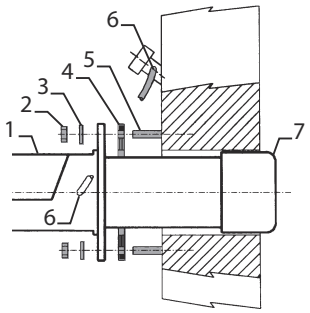




Fitting the burner to the boiler

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

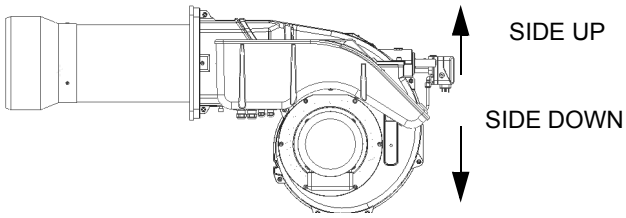




Keys

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

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



Note: the figure is indicative only.

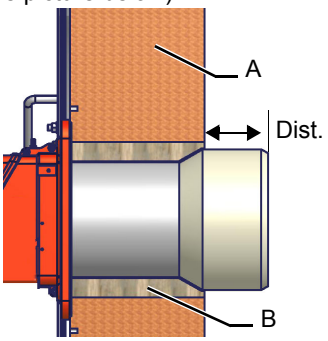
Matching the burner to the boiler

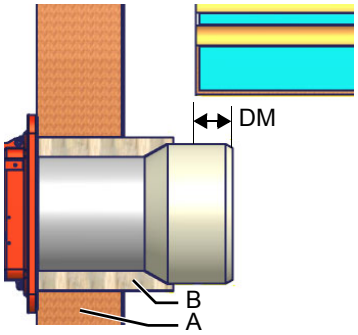
The burners described in this manual have been tested with combustion chambers that comply with EN676 regulation and whose dimensions are described in the diagram . In case the burner must be coupled with boilers with a combustion chamber smaller in diameter or shorter than those described in the diagram,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

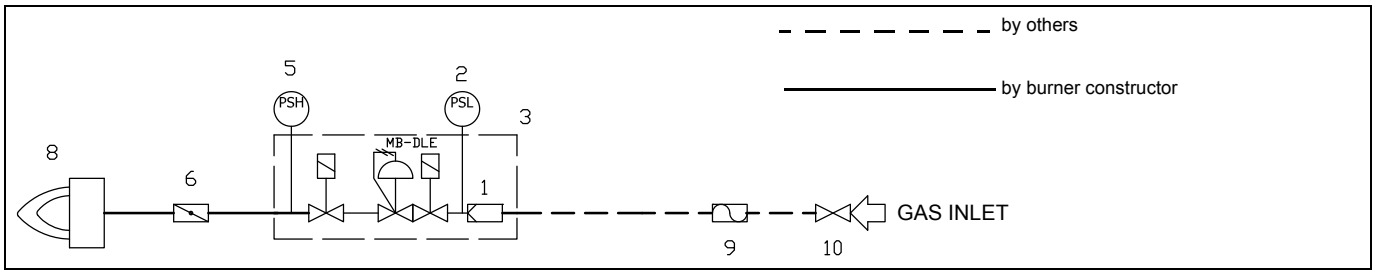




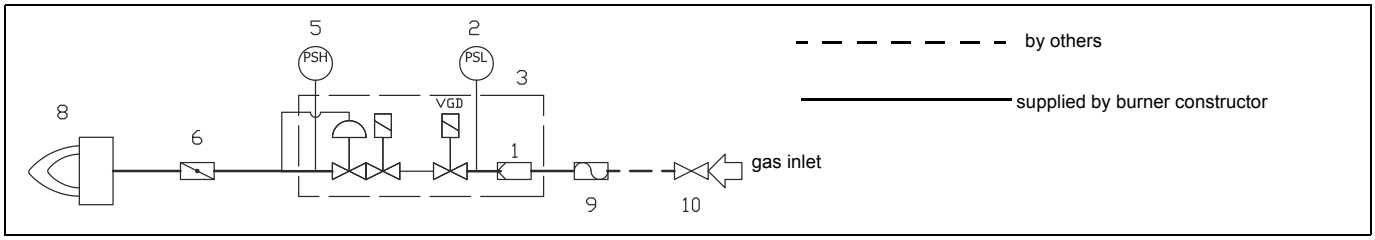
WARNING! Carefully seal the free space between blast tube and the refractory lining with ceramic fibre rope or other suitable means.

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).

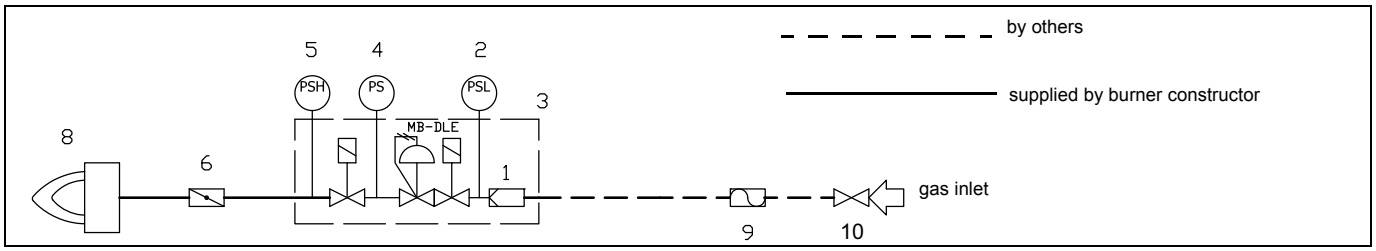
Gas train with valves group MB-DLE (2 valves + gas filter + pressure governor)



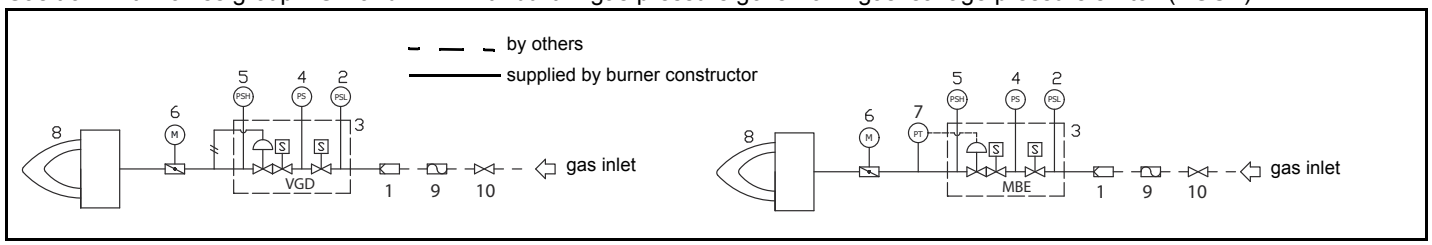
Gas train with valves group VGD with built-in gas pressure governor



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



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

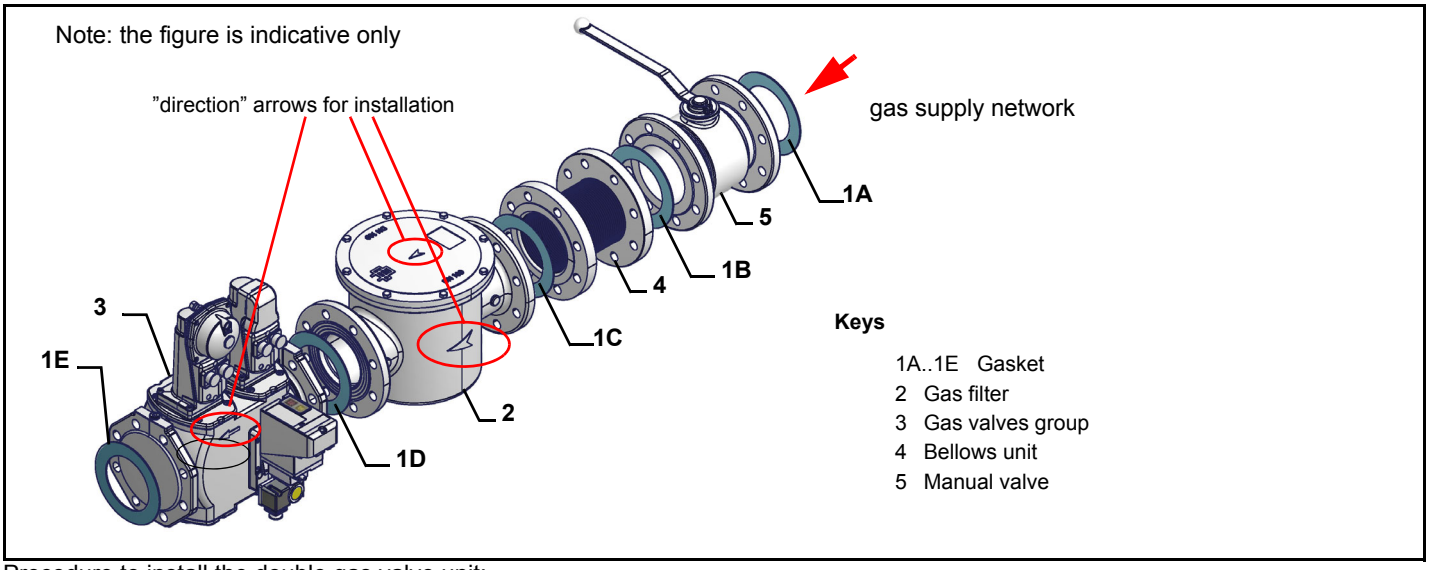


Legend

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)

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:

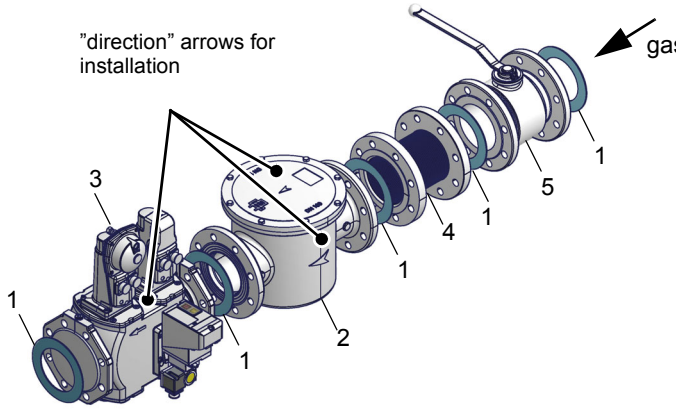
-

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

MultiBloc MB-DLE - Assembling the gas train



Keys

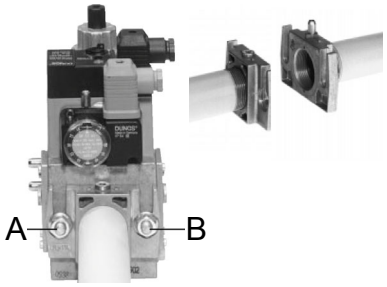
1 Gasket
2 Gas filter
3 Gas valves group
4 Bellows unit
5 Manual valve

MULTIBLOC DUNGS Mounting

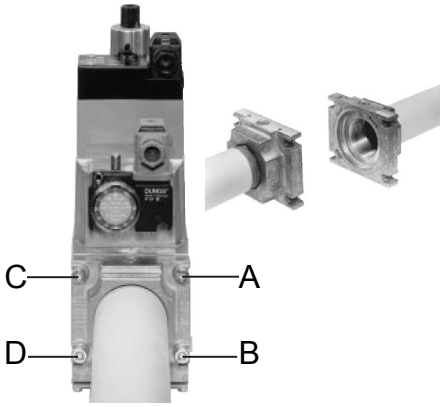
MB-DLE 405..412
MB-DLE 415..420

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

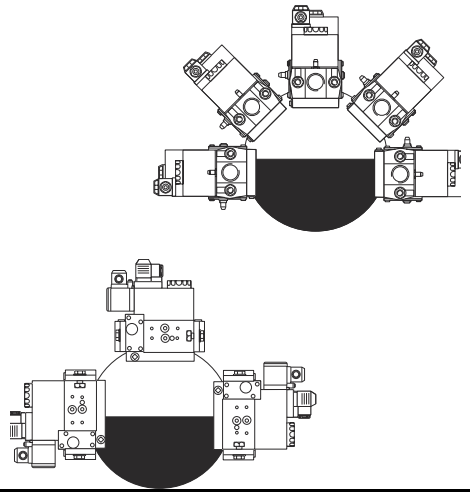
MB-DLE 405..412



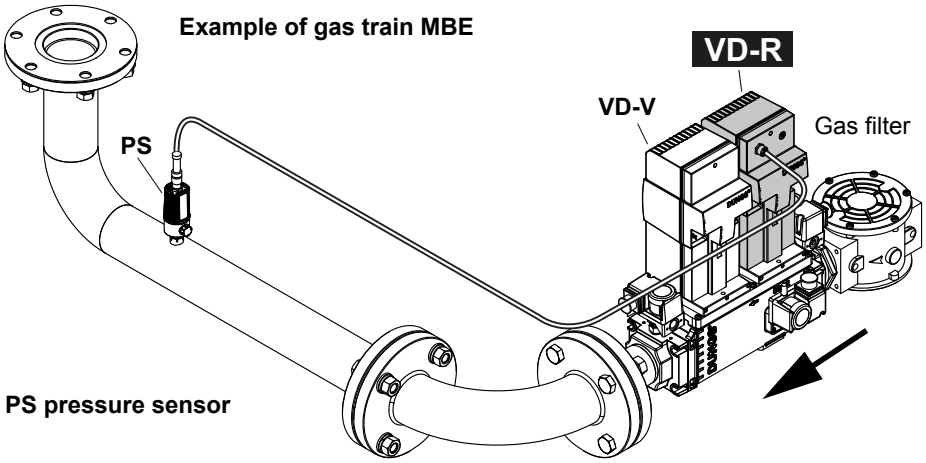
MB-DLE 415..420

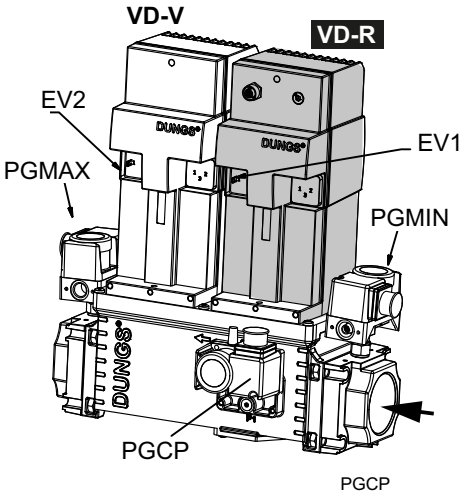


MOUNTING POSITIONS



MultiBloc MBE



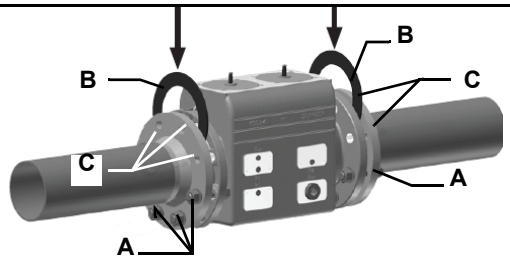


ATTENTION: once the gas train is mounted according, the gas proving test mus be performed, according to the procedure set by the laws in force.

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.

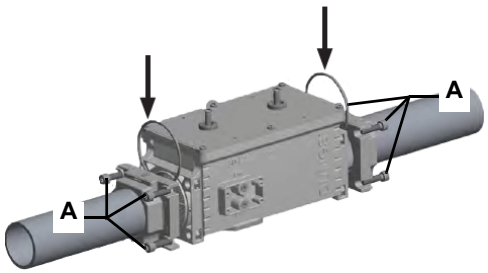
Threaded train with MultiBloc MBE - Mounting



1. Insert studs A.
2. Insert seals B.
3. Insert studs C.
4. Tighten studs in accordance with section 8.

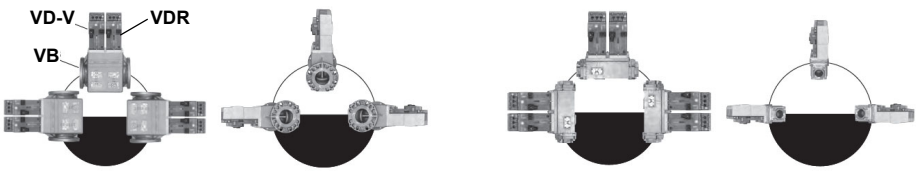
Ensure correct position of the seal!

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

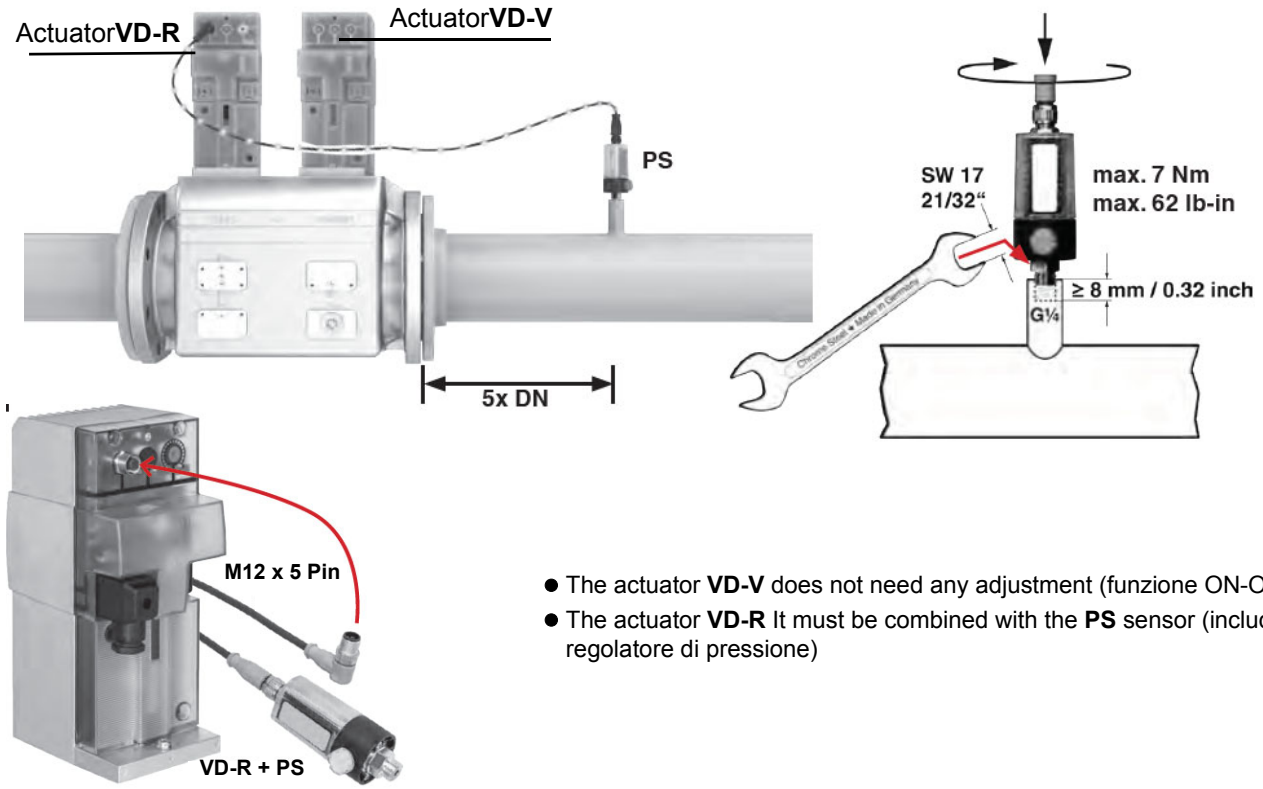


1. Mount flange into pipe systems. Use appropriate sealing agent.
2. Insert VB together with supplied O-rings.
Check current position of O-rings.
3. Tighten supplied screws (8xM8x30) in accordance with section 8.
4. Screws (4xM5x25) for VD assembly are supplied.
5. After installation, perform leakage and functional test.
6. Disassembly in reverse order.

Mounting position MBE / VB / VD



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.

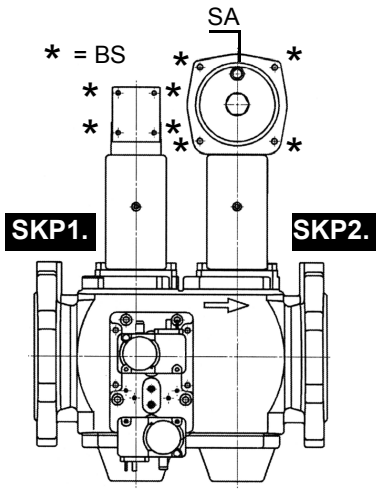
Siemens VGD20.. e VGD40..

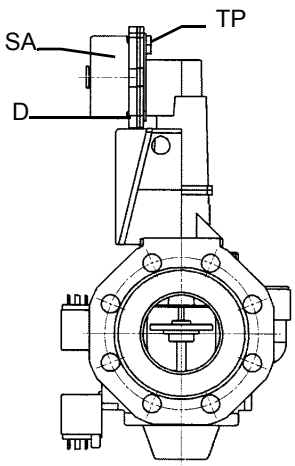
Siemens VGD20.. and VGD40.. gas valves - with SKP2.. (pressure governor)

- 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.

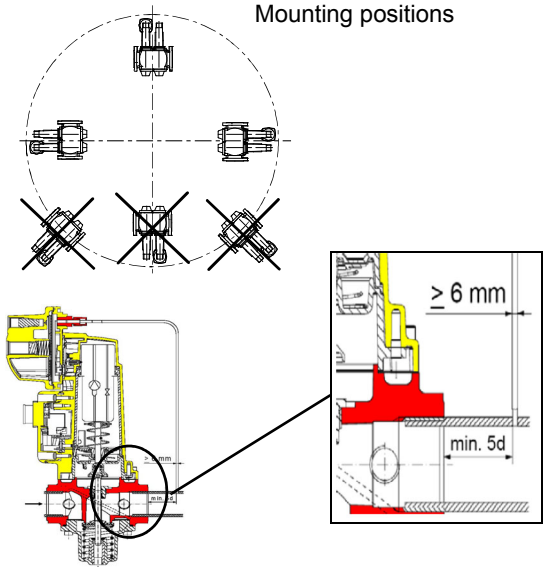
Caution: the SKP2 diaphragm D must be vertical

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

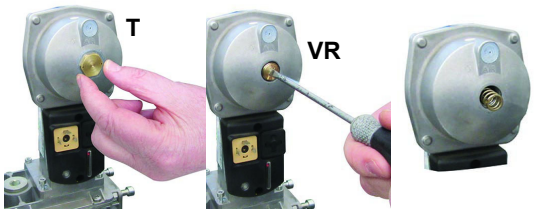




SIEMENS VGD..
Mounting positions



version with SKP2 (built-in pressure stabilizer)



Performance range (mbar)			
	neutral	**yellow**	**red**
Spring colour SKP 25.0	0 ÷ 22	15 ÷ 120	100 ÷ 250
Spring colour SKP 25.4		7 ÷ 700	150 ÷ 1500

Siemens VGD valves with SKP actuator:

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

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

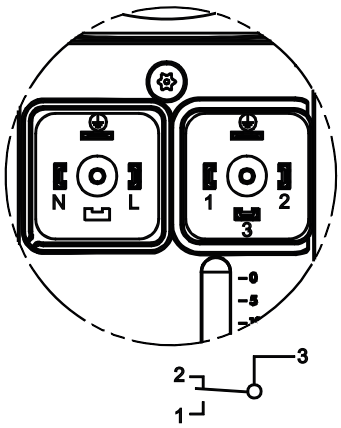
- Remove the cap (T)
- Unscrew the adjusting screw (VR) with a screwdriver
- Replace the spring

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

Siemens VGD SKPx5 (Auxiliary-optional micro switch)

Actuator connection





Valve drive
Plug connection



End of stroke
Plug connection



(only with SKPxx.xx1xx)

A Valve closed

Gas valveGas Filter (if provided)

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

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

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

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

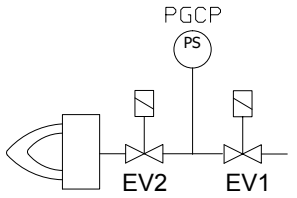
This paragraph describes the integrated proving system operation sequence:

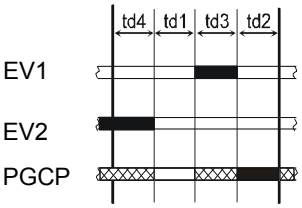
- At the beginning both the valves (EV1 and EV2) must be closed.
- Test space evacuating: EV2 valve (burner side) opens and keep this position for a preset time (td4), in order the bring the test space to ambient pressure.Test atmospheric pressure: EV2 closes and keep this position for a preset time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

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

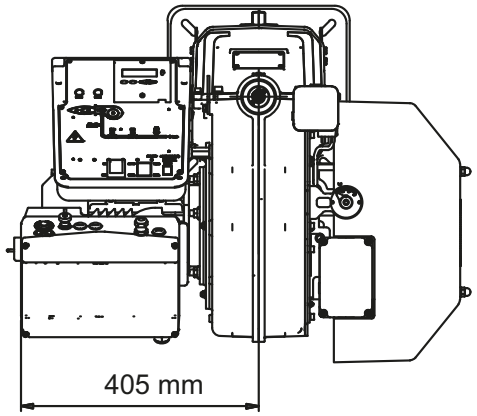
On LMV5x and LMV2x/3x and LME73 (except LME73.831BC), the valve proving can be parameterized to take place on startup, shutdown, or both.

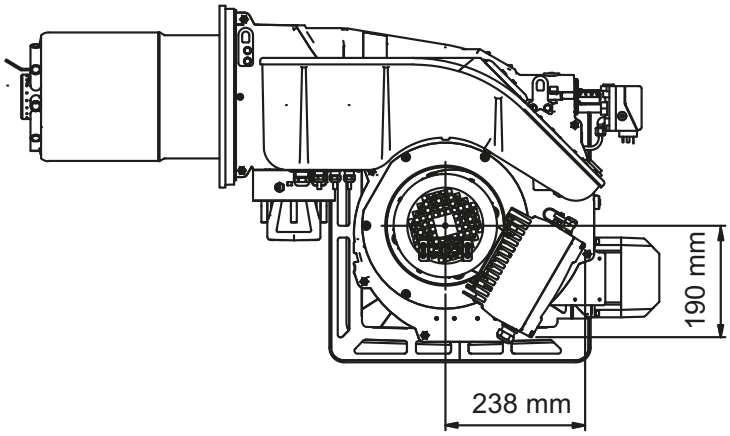
On LME73.831BC the valve proving is parameterized to take place on startup only.



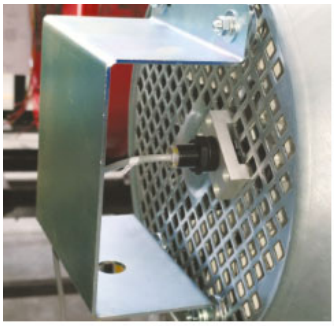


Overall dimensions (mm) - BURNERS WITH INVERTER VARIANT (if provided)



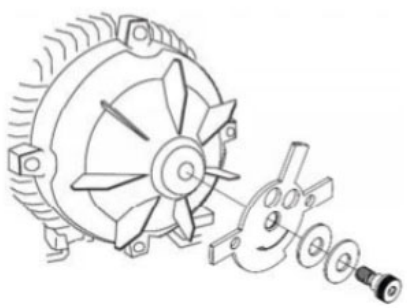


Speed Sensor AGG 5.310 is a speed sensor kit used to monitor the speed of a motor. This kit is used to mount the speed sensor directly on the motor casing.









BURNERS WITH INVERTER VARIANT (if provided)

		Type	Model
DANFOSS	**LMV5**	XXXXX	M-. MD. xx. xx. x. x. xxx. EI.
		XXXXX	M-. MD. xx. xx. x. x. xxx. EG.
		XXXXX	MG. MD. xx. xx. x. x. xxx. EK.
		XXXXX	MG. MD. xx. xx. x. x. xxx. ER.
	LMV2x/3x	XXXXX	M-. MD. xx. xx. x. x. xxx. EB.
		XXXXX	MG. MD. xx. xx. x. x. xxx. EC.

The **LMV51.300 / LMV52.xxx e LMV37.400/LMV26.300** electronic cam burners with fan motor driven by inverter in addition to the air and fuel adjustment curves also have a fan motor speed adjustment curve.

The **LMV5x** equipment through a sensor controls the fan motor revolutions and with a signal in **4÷20mA** controls it through the inverter.

The **LMV2x** equipment through a sensor controls the fan motor revolutions and with a signal in **0÷10V** controls it through the inverter.

Generally the curve of the inverter goes from 50% to 100% of the engine revolutions. This, in addition to improving the setting of the burner also allows a saving on the consumption of the fan engine..

Two series of interchangeable Inverters version with Inverter FC101 and FC102



Danfoss FC102

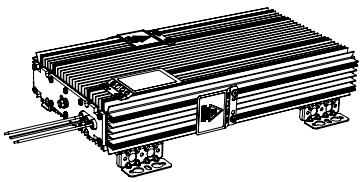


Danfoss FC101

Terminal interface with Inverter

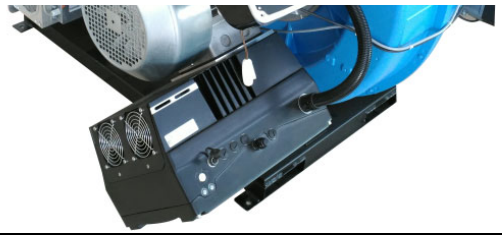
Braking resistances
possibility of use only for **FC102**





BURNERS WITH INVERTER VARIANT (if provided)

KOSTAL



	Tipo	Modello
LMV5	XXXXX	M-. MD. xx. xx. x. x. xxx. EI.
	XXXXX	M-. MD. xx. xx. x. x. xxx. EG.
	XXXXX	MG. MD. xx. xx. x. x. xxx. EK.
	XXXXX	MG. MD. xx. xx. x. x. xxx. ER.
LMV2x/3x	XXXXX	M-. MD. xx. xx. x. x. xxx. EB.
	XXXXX	MG. MD. xx. xx. x. x. xxx. EC.

The **LMV51.300 / LMV52.xxx, HAGC31-CU01 e LMV37.400/LMV26.300** electronic cam burners with fan motor driven by inverter in addition to the air and fuel adjustment curves also have a fan motor speed adjustment curve.

The **LMV5x, HAGC31-CU01** equipment through a sensor controls the fan motor revolutions and with a signal in **4÷20mA** controls it through the inverter.The **LMV2x** equipment through a sensor controls the fan motor revolutions and with a signal in **0÷10V** controls it through the inverter.

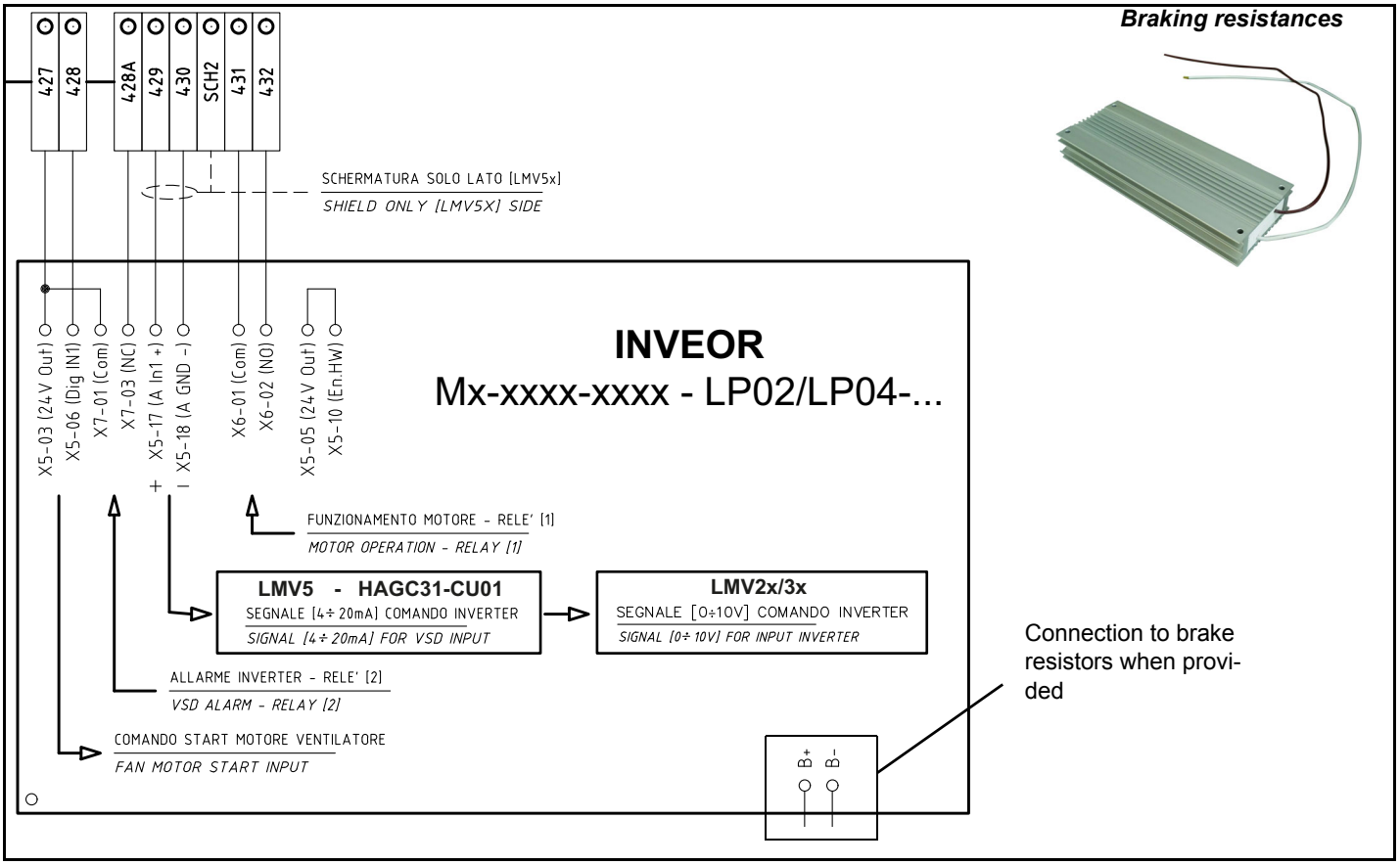
Generally the curve of the inverter goes from 50% to 100% of the engine revolutions. This, in addition to improving the setting of the burner also allows a saving on the consumption of the fan engine.

INVEOR M



α **A** **B** **C** **D**

Terminal interface with Inverter



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);
1 refit the panel cover.
2

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

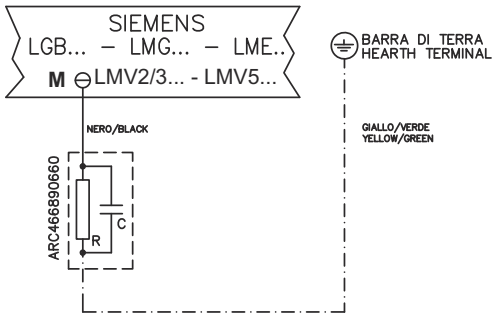
NOTE: the burners are supplied for three-phase 380/400/415/480 V supply, and in the case of three-phase 220/230/240 V supply it is necessary to modify the electrical connections into the terminal box of the electric motor and replace the overload tripped relay.

Note on electrical supply

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

Key

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



PART III: OPERATION

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

DANGER: During commissioning operations, do not let the burner operate with insufficient air flow (danger of formation of carbon monoxide); if this should happen, make the gas decrease slowly until the normal combustion values are achieved.WARNING: never loose the sealed screws! otherwise, the device warranty will be immediately invalidate!

LIMITATIONS OF USE

THE BURNER IS AN APPLIANCE DESIGNED AND CONSTRUCTED TO OPERATE ONLY AFTER BEING CORRECTLY 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.

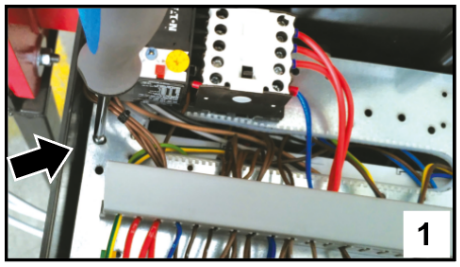
TO SECURE THE MACHINE, ACT ON THE ISOLATOR SWITCH. IN CASE OF ANOMALIES THAT REQUIRED A SHUT DOWN OF THE BURNER, IT'S POSSIBLE TO ACT ON THE AUXILIARY LINE SWITCH, LOCATED ON THE BURNER FRONT PANEL.

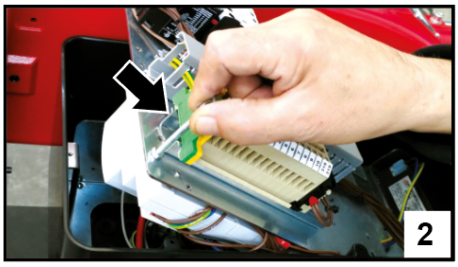
IN CASE OF A BURNER SHUT-DOWN, RESET THE CONTROL BOX BY MEANS OF THE RESET PUSHBUTTON. IF A SECOND SHUT-DOWN TAKES PLACE, CALL THE TECHNICAL SERVICE, WITHOUT TRYING TO RESET FURTHER.

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.

Procedure for accessing the equipment and making electrical connections

1 Unscrew the screw as shown in Fig. 1
2 Lift the plate using the screws as shown in Fig. 2
3 Make the electrical connections





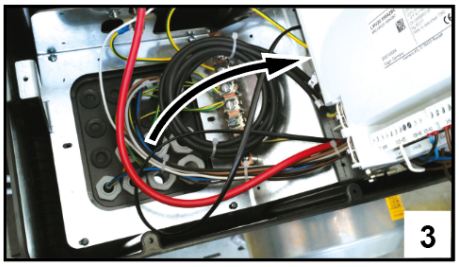


Fig. 1 - Burner front panel

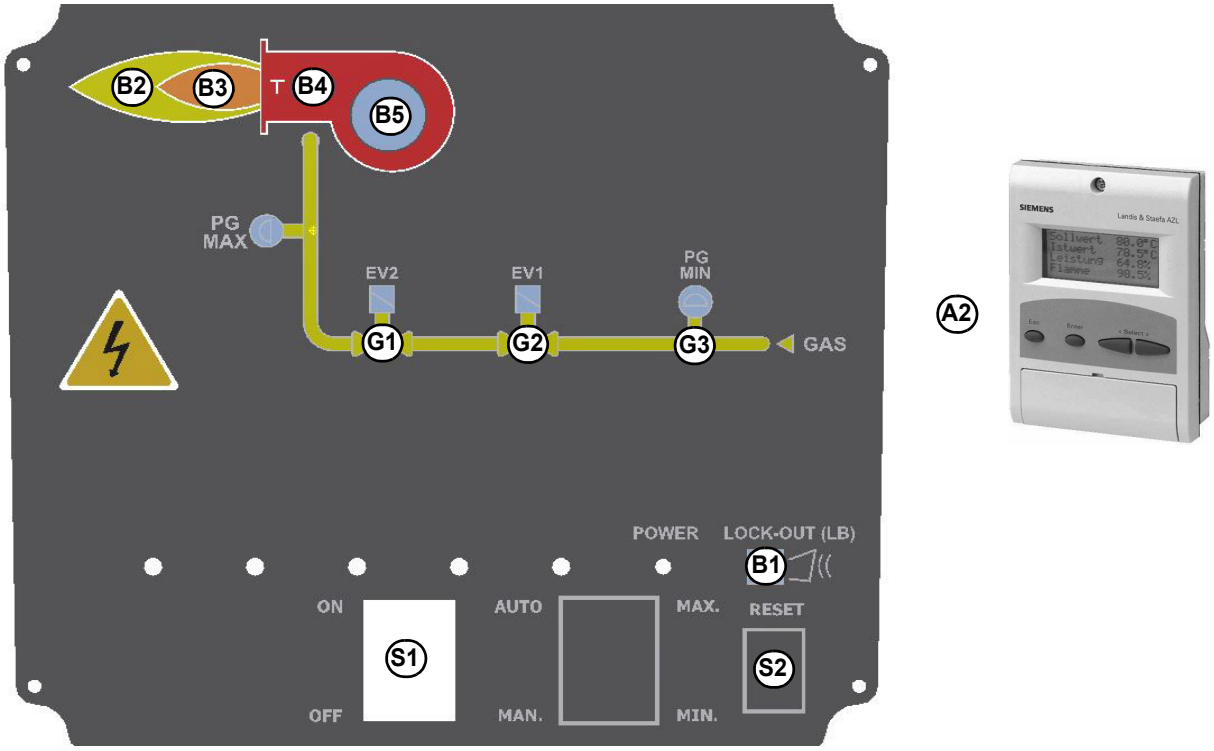


Abb. 1

Keys

B1	Lock-out LED
B2	Hi-flame operation LED
B3	Lo-flame operation LED
B4	“Ignition transformer operation” LED
B5	“Fan motor overload tripped” LED
G1	“EV2 opening” LED
G2	“EV1 opening” LED
G3	“Gas pressure switch signal ” LED
S1	Main switch
S2	Reset pushbutton for control box
A2	AZL..

Gas operation

- Check that the control box is not in the lockout position; in case unlock it by pressing the relevant key (for further information on the LMV.., see the related manual).
- Check that the pressure switches/thermostats series enables the burner operation.
- Check that the gas pressure is sufficient (signalled by an error code on the AZL.. display).
- **Burners fitted with gas proving system:** the gas proving system test begins; when the test is performed the proving system LED turns on. At the end of the test, the burner staring cycle begins: in case of leakage in a valve, the gas proving system stops the burner and the lamp **B1** turns on.
- At the beginning of the start-up cycle, the actuator drives the air damper to the maximum opening position, then the fan motor starts up: the pre-purge phase begins. During the pre-purge phase, the air damper complete opening is signalled by the light **B2** on (see front panel).
- At the end of the pre-purge, the air damper is driven to the ignition position, the ignition transformer is energised (signalled by the light **B4** on the front panel) then, few seconds later, the EV1 and EV2 gas valves are energised (light G1 and G2 on the front panel).
- Few seconds after the gas valves opening, the ignition transformer is de-energised and light **B4** turns to off.
- The burner operates in the low flame stage; few seconds later the two-stages operation begins and the burner output increases or decreases, driven by the external thermostats (progressive burners) or by the modulator (fully-modulating burners).

.

ADJUSTING AIR AND GAS FLOW RATES

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	9,0 ÷ 10	3,0 ÷ 4,8
LPG	11 ÷ 12	2.8 ÷ 4,3

Adjustments - brief description

The air and fuel rates adjustments must be performed at the maximum ouptput first (“high flame”): see the LMV5.. related manual..

- 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 by setting the “gas/air” ratio” curvepoints (see the LMV5.. related manual).
- Set, now, the low flame output, in order to avoid the low flame output increasing too much or that the flues temperature gets too low to cause condensation in the chimney.

(First) Start-up preliminary operations - gas supply

Recommended actions to be carried out in sequence:

1 Check the burner and all its components are installed correctly
2 Check that all electrical and mechanical parts are connected correctly
3 Check that there is water or other vector fluids in the generator
4 Check that the ventilation gates/dampers in the plant are open and the stack is free
5 Connect the gauges used to adjust and check pressures on the incoming line and on the head, air and fuel side.
6 Open the thermostatic series and the safety chain
7 Turn the main switch on the panel front with the "MAN/AUTO" selector to position "0".
8 Select the GAS mode with the fuel selector on the front of the panel (if any)
9 Check the phase and neutral position is correct
10 Open the manual shut-off valves slowly, in order to prevent any water hammers that might seriously damage valves and pressure regulator
11 Check the sense of rotation of the electrical motors
12 Bleed the line, getting rid of all the air in the pipe as far as the main gas valve
13 Ensure the pressure entering the main valves is not excessive due to damage to or wrong adjustment of the line pressure regulator
14 Ensure the gas supply minimum pressure is at least equal to the pressure required by the pressure curves - burnt gas flow

DANGER! Venting the air from the piping must take place in safe conditions, avoiding dangerous concentrations of fuel in the rooms. You must therefore ventilate the rooms and wait long enough for the gases to dissipate outside before switching on.

To ensure the proper operation of the flow sensors, the fuel/air pipes must be free of liquid residues such as oil or water. Also, make sure that the silencer is installed on the air intake.

Start-up procedure

1 Turn the burner on.
2 the LMV control box starts the system test cycle: the AZL display shows the **System Test** message; at the end of the test, it shows the main page and the system stops (the safety chain is open) waiting for the startup enabling signal (standby - Program phase no. 12)

Setpoint	80°C
Act.value	78°C
Fuel	GAS
Standby	12

Main page

3 check the fan motor rotation (see related paragraph).
4 make the safety chain enabling the system to start up
5 the combustion cycle starts: the system will show the operating stages

- Prepurging (program phase no.30)
- Driving to ignition position (program phase no.36)
- Ignition position (program phase no.38)
- Fuel (the fuel solenoid valves open)
- Flame (the flame lights up)
- Driving to low flame (the actuator drives to low flame).
NOTE: the **C** and **A**, on the .
Once the ignition cycle ends, the main page is shown:

Setpoint	80°C
Act.value	78°C
Load	24%
Flame	60%

Main page

Set point: temperature set-point
Act value: actual temperature value
Load: load percentage (burner output)
Flame: percentage of flame detection current.
By pressing the ENTER key the display shows the second page:

Fuel	0.0	Air	1.8
Ax		VSD	0.0
Ax		O2	
Ax		Ld.	0.0

Second page

Fuel: it shows (in degrees) the fuel actuator position.
Air: it shows (in degrees) the air actuator position.
Ax1..3: auxiliaries.
VSD: % value on the inverter maximum frequency
O2: oxygen percentage
Ld: load percentage (burner output).

Press the ENTER key to go back to the main page.
To access the **main menu**, from the main page, press the ESC key tiwce:

OperationalStat
Operation
ManualOperation
Params & Display

Main menu

By pressing the ESC key once, the ***Operational Status*** (first item in the main menu) menu is directly shown:

Normal operation
Status/Reset
Fault History
Lockout History

the ***Operational Status*** menu provides the following items:

Normal operation: by selecting this item and pressing the ENTER key, the main page is showed; press ESC to go back to the main menu.

Status/Reset: it shows system errors or faults occuring / it represents the lockout reset function.

Fault History: by selecting this item and pressing the ENTER key, the Lockout History will be showed about the last 21 faults occured.

Lockout History: by selecting this item and pressing the ENTER key, the Lockout History will be showed about the last 9 lockouts occured, and the related date and hour.

Alarm act/deact: enable/disable the horn in case of alarm.

Fault History

To visualise the **Fault History**, select it and press the ENTER key. The message will be as:

1 Class:			05Gas
code	BF	Phase:	10
Diag.:	00	Lod:	0.0
Start No.			88

alternating by an error message as:

O2 control and
limiter automat
deactivated

To see the other Fault History pages, press the arrow keys.

To exit the Fault History pages, press ESC.

Lockout History

To visualise the **Lockout History**, choose the related item and press ENTER. The message will be:

1	10.08.07		13.47
C:71	D:00	F:	12
Start No.			88
Load	0.0		Gas

alternating by an error message as:

No flame at end
of safety time

To see the other Lockout History pages, press the arrow keys.

To exit the Lockout History pages, press ESC.

Setting the temperature/pressure set-point value

To set the temperature/pressure set-point value, that is the generator operating temperature/pressure; proceed as follows.

From the main page, enter the main menu by pressing the ESC key twice:

OperationalStat
Operation
ManualOperation
Params & Display

by means of the arrow keys, select “Params&Display”, press ENTER: the system will ask you to enter the proper password

Access w-out PW
Access Serv
Access OEM
Access LS

by means of the arrow keys, select “Access w-out pass” (access without password - user level), confirm by pressing ENTER.
The other levels require password reserved to the Technical Service, to the Manifacurer, etc.
The menu shown accessing without password is the following:

BurnerControl
RatioControl
O2Contr./Guard.
LoadController

Choose “LoadController” and press ENTER: the following menu is shown:

ControllerParam
Configuration
Adaption
SW Version

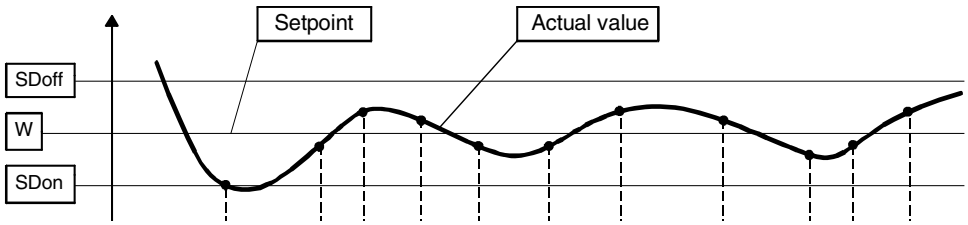
Choose “ControllerParam” and press ENTER: the following menu is shown:

ContrlParamList
MinActuatorStep
SW_FilterTmeCon
SetPointW1

Choose “**SetPointW1**” and press ENTER:

SetpointW1	
Curr:	90°
New:	90°

Curr: it shows the current set-point; use the arrows keys to change.
NOTE: the availabel range for this parameter depends on the probe provided; the unit measure of the detected value and its limits are bound up with parameters set at the “Service” level.
Once the new set-point is set, confirm by pressing ENTER, otherwise exit without changings by pressing ESC.
Press ESC to exit the set-point programming mode.
Once the temperature set-point W1 is imposed, set the Switch-on (SDon) and the Switch-off (SDoff) point of the 2-position controller:



To set these values, select the item SD_ModOn (SDOn), by scrolling down the “Load controller” menu with the arrow keys and press ENTER:

SetpointW1
SetpointW2
SD_ModOn
SD_ModOff

the display will show:

SD_ModOn	
Curr::	1.0%
New:	1.0%

The deafult value for this parameter is1% that is, the burner will light again at a temperature 1% lower than the set-point. Change value, if needed, by means of the arrow keys; press ENTER to confirm and the press ESC to exit. Press only ESC to exit without changing.

Now choose SD_ModOff always scrolling down theLoad Controller menu, by menas of the arrow keys, and press ENTER.

SetpointW1
SetpointW2
SD_ModOn
SD_ModOff

the display will show:

SD_ModOff	
Curr::	10.0%
New:	10.0%

The deafult value for this parameter is10% that is, the burner will turn off at a temperature 1% higher than the set-point.

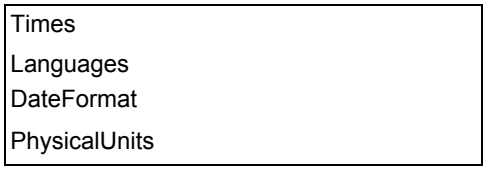
Change value, if needed, by means of the arrow keys; press ENTER to confirm and the press ESC to exit. Press only ESC to exit without changing. Press the ESC key until the following menu is shown:

BurnerControl
RatioControl
O2Contr./Guard.
LoadController

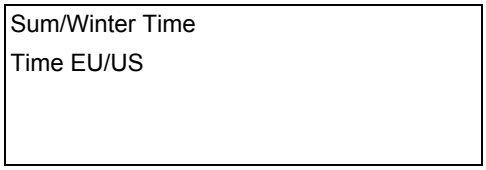
scroll this menu down until the tiem “AZL” is reached

LoadController
AZL
Actuators
VSD Module

confirm by pressing ENTER:

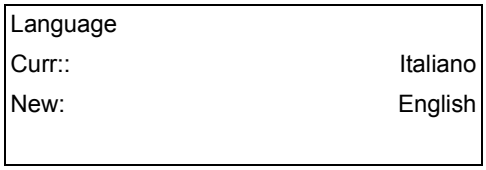


Times: it sets the “Summer (SUM) Time / Winter (WIN) Time” operation and the continent (EU - Europe; US - United States)



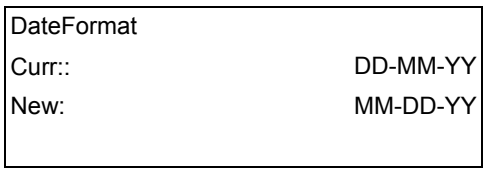
choose the Summertime/Wintertime mode desired and cofirm by pressing ENTER; press ESC to exit. Set the time zone (Time EU/US) in the same way.

Languages: it allows setting the current language

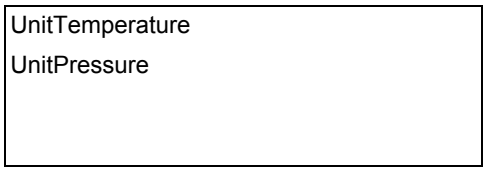


choose the desired language and cofirm by pressing ENTER; press ESC to exit.

DateFormat: it allows setting the date format as DD-MM-YY (day-month-year) or MM-DD-YY (month-day-year)



choose the desired format and cofirm by pressing ENTER; press ESC to exit.
PhysicalUnits: it allows setting the measuring units for temperature and pressure

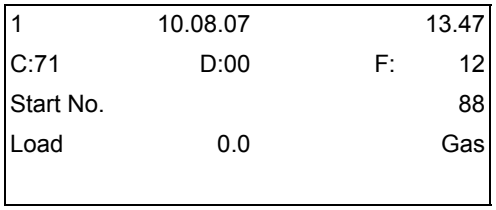


Settable temperature units: °C or °F
Settable pressure units: bar or psi.

- choose the desired unit and cofirm by pressing ENTER; press ESC to exit.
- choose the temperature and pressure unit and cofirm by pressing ENTER; press ESC to exit.

System lockout

If the system locks out, the following message will appear:



call the Technical Service and tell the message data.

Cold start thermal shock (CSTP)

If the generator cannot suffer thermal shocks, the CSTP (Cold Start Thermal Schock) function can be enabled. This function is already set by the Technical service (access by reserved password).

if this function is enabled, when the burner starts upthe “Thermal shock protection activated” message will be showed.

If this function is not enabled, after startup, the burner will rapidly increase the load according to the requested value and, if necessary, to the maximum output.

Manual mode

To by-pass the thermal protection or not to let the buner operate in high flame stage (maximum output) after ignition, the manual mode is provided.

To choose the manual mode (Manual Operation), use the SELECT arrow keys

OperationalStat
Operation
ManualOperation
Params & Display

Items to be set are the following:

SetLoad
Autom/Manual/Off

SetLoad: to set the required load percentage

SetLoad	
Curr::	0.0%
New:	20.0%

set the required percentage and confirm by pressing ENTER; press ESC to exit.

choose “Autom/Manual/Off

SetLoad
Autom/Manual/Off

Autom/Manual/Off	
Curr::	Automatic
New:	Burner On

three modes are provided:

Automatic: automatic operation

Burner on: manual operation

Burner off: burner in stand-by

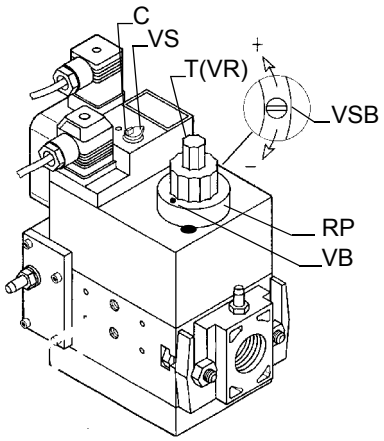
If the BurnerOn mode is choosen,the burner does not follow the modulator and probe settings, but operates at the set load.

Caution: if BurnerOff mode is selected, the burner stays in stand-by.
Caution: in the BurnerOn mode, the safety thresholds are set by the Technical Service.

For further details, see the LMV5x annexed manuals.

Adjusting the gas valves group

Multibloc MB-DLE



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

The valve is adjusted by means of the **RP** regulator after slackening the locking screw **VB** by a number of turns. By unscrewing the regulator **RP** the valve opens, screwing the valve closes. To set the fast opening remove cover **T**, reverse it upside down and use it as a tool to rotate screw **VR**. Clockwise rotation reduces start flow rate, anticlockwise rotation increases it.

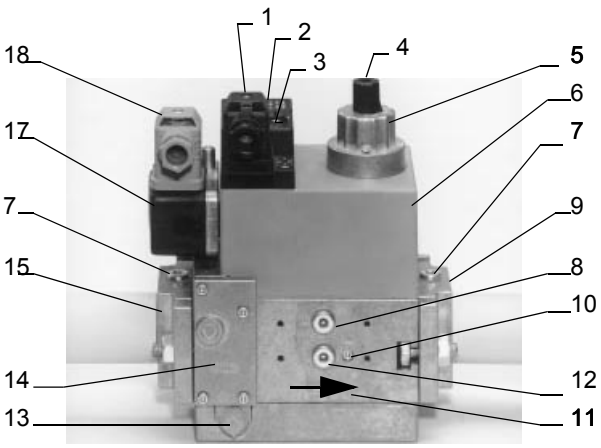
Do not use a screwdriver on the screw **VR**!

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

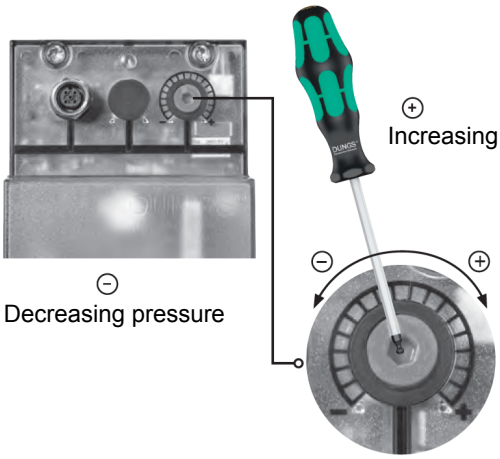
Note: the screw **VSB** must be removed only in case of replacemente of the coil.

Key

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



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. 2

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.

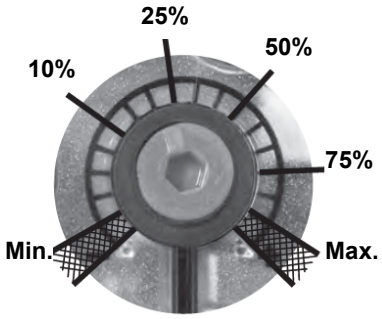
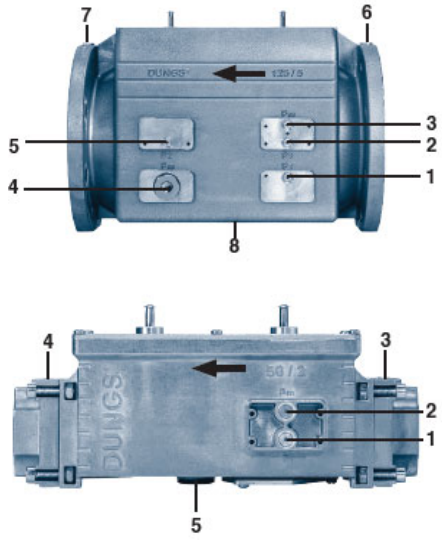
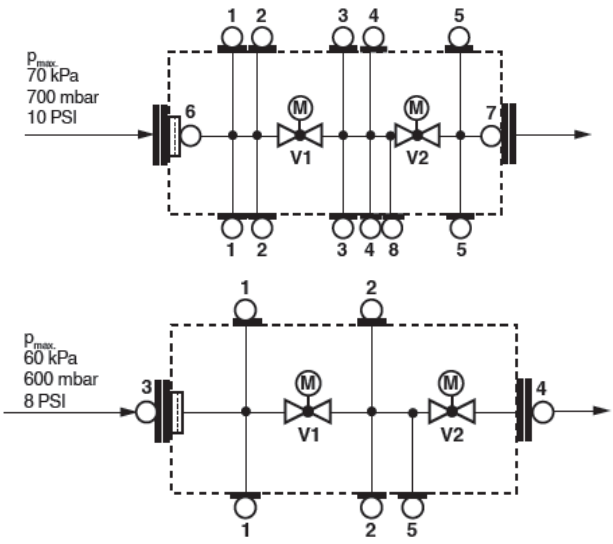


Fig. 3

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

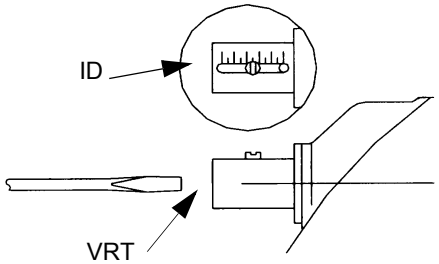
Fig. 4

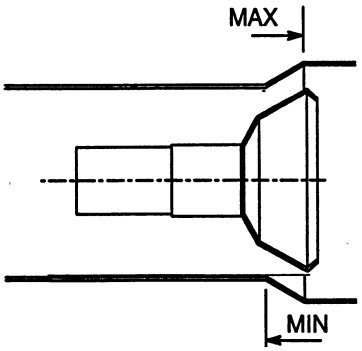
Adjusting the combustion head

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

E165A, E205A

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





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

Center head holes gas flow regulation

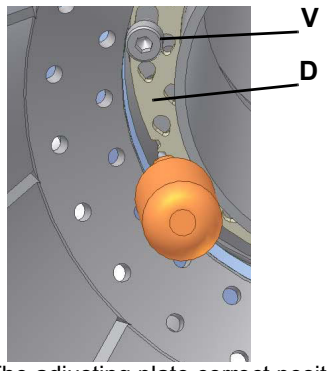
To adjust the gas flow, partially close the holes, as follows:

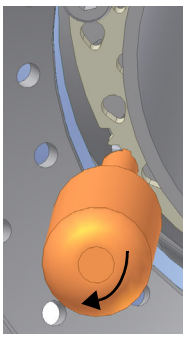
1 loosen the three **V** screws that fix the adjusting plate **D**;

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

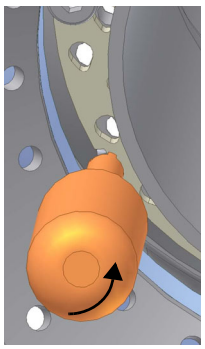
3 once the adjustmet is performed, fasten the **V** screws.

4





opened holes



closed holes

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

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

- For natural gas burners, plate holes are fully opened

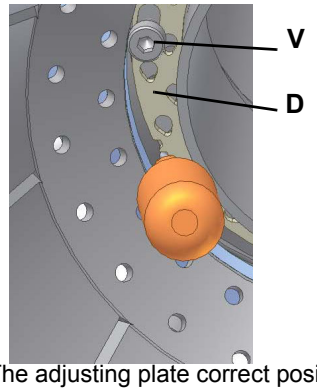
Center head holes gas flow regulation

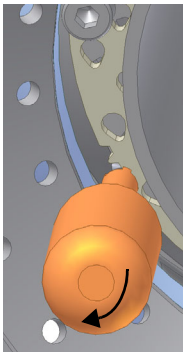
To adjust the gas flow, partially close the holes, as follows:

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

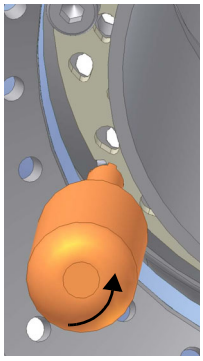
2 insert a screwdriver on the adjusting plate notches and let it move CW/CCW as to open/close the holes;

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





opened holes



closed holes

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

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

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

Calibration 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 the maximum gas pressure switch (when provided)

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

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

Calibration of air pressure switch

To calibrate the air pressure switch, proceed as follows:

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

Calibration of low gas pressure switch

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

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

Calibration the maximum gas pressure switch (when provided)

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

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

Calibration gas leakage pressure switch (PGCP)

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

PART IV: MAINTENANCE

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

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

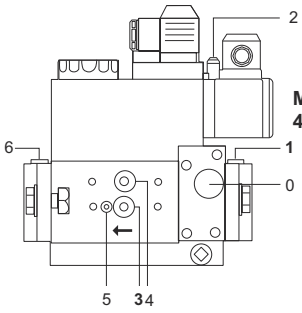
ATTENTION: READ CAREFULLY THE "WARNINGS" CHAPTER AT THE BEGINNIG OF THIS MANUAL.

ROUTINE MAINTENANCE

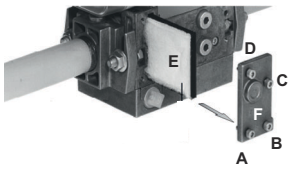
- Check that the gas meter is not moving when the burner is off. In case it is rotating, look for possible leaks.
- Check the cleaning condition of the vent. Clean the vent by using exclusively a dry brush. If needed, disassemble it from the motor's shaft and wash it by using non corrosive detergents. Prior to disassemble the vent, take the measurements in relation to the motor's shaft, so as to reassemble it in the same position.
- Check that all parts in contact with combustive air (air box, protection mesh and Archimedean screw) are clean and free from any obstruction that might impede free afflux. Clean it with compressed air if available and/or a dry brush or cloths. Eventually wash it with non corrosive detergents.
- Check the blast tube; it must be substituted in case of obvious cracks or anomalous holes. Slight deformations that do not affect combustion may be tolerated
- Check the condition of the burner-boiler gasket. Eventually substitute it.
- Check the fan's motor: no specific maintenance is needed. In case of anomalous noises when running, check the condition of the bearings and eventually substitute them or completely substitute the motor.
- Clean and examine the gas filter cartridge and replace it if necesssary;
- Remove and clean the combustion head;
- Examine and clean the ignition electrodes, adjust and replace them if necessary;
- Examine and clean the detection electrode/photoelement (according to the burner models), replace it if necessary, in case of doubt, check the detection circuit, after the burner start-up;
- Clean and grease leverages and rotating parts.
- At least every 2 months, or more often if needed, clean the room where the burner is installed.
- Avoid leaving installations, papers, nylon bags, etc., inside the room. They could be sucked by the burner and cause malfunctioning.
- Check that the room's vents are free from obstructions.

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.

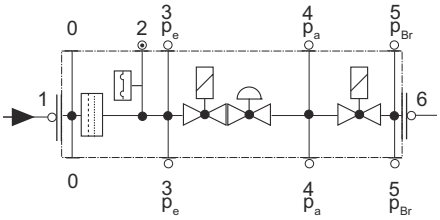
Adjusting the gas valves group and removing the filter

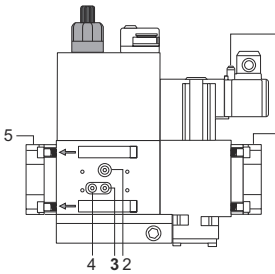


0 Coperchio del filtro
1,3,4,6 Tappo a vite G 1/8
2 Attacco misuratore
5 Tappo a vite M4

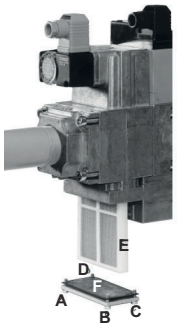


Prese di pressione

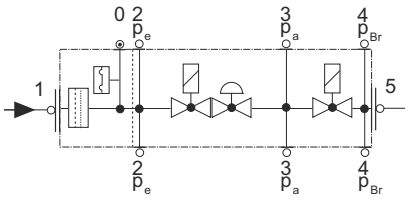




0, 1, 2, 3, 4, 5
Tappo a vite G 1/8



Prese di pressione

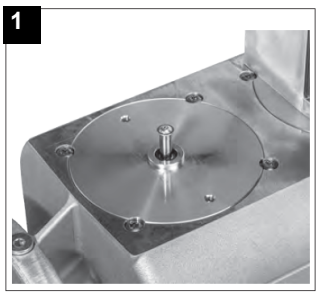


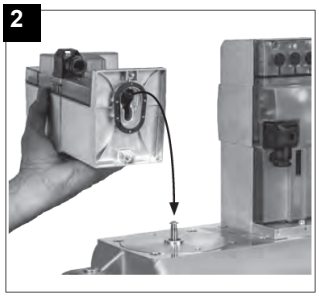
- Check the filter at least once a year!
- Change the filter if the pressure difference between pressure connection 1 and 3 (Fig. 1-Fig. 3)is $\Delta p > 10$ mbar.
- Change the filter if the pressure difference between pressure connection 1 and 3 (Fig. 1-Fig. 3) is twice as high compared to the last check.

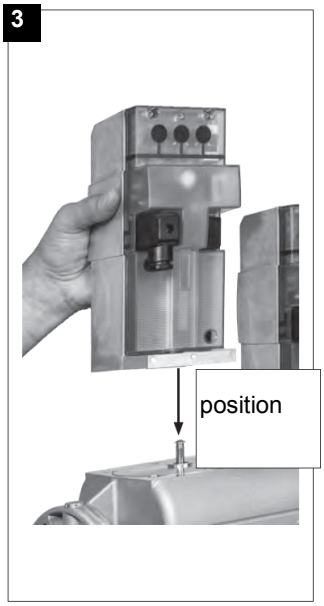
You can change the filter without removing the fitting.

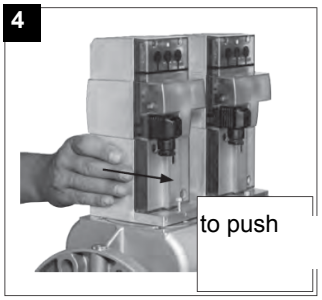
1 Interrupt the gas supply closing the on-off valve.
2 Remove screws 1 ÷ 4 using the Allen key n. 3 and remove filter cover 5 in Fig. 5.
3 Remove the filter 6 and replace with a new one.
4 Replace filter cover 5 and tighten screws 1 ÷ 4 without using any force and fasten.
5 Perform leakage and functional test, $p_{max.}$ = 360 mbar.

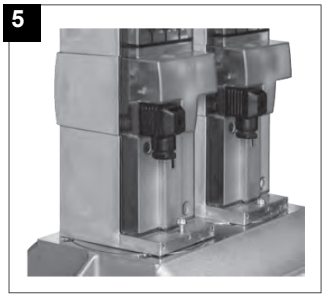
MultiBloc MBE*MultiBloc VD Mounting*

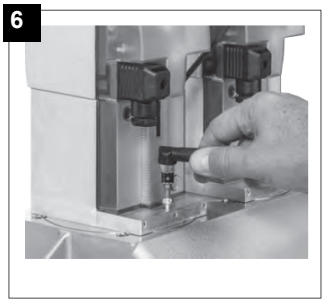


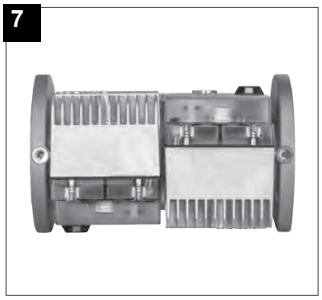










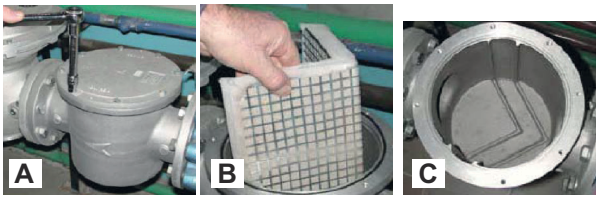


1. Position VD on VB, fig. 2+3.
2. Slide VD forward up to the stop, fig. 4.
3. Screw VD on with 2 M5 screws for each, max. 5 Nm/44 in.-lb., fig. 5/6.
4. VD can be mounted rotated by 180°, fig. 7.

Gas filter maintenance

To clean or remove the filter, proceed as follows:

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



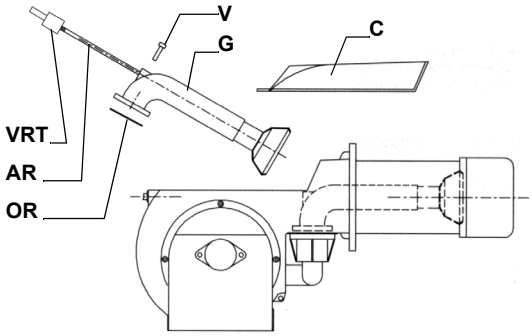
WARNING: Before opening the filter, close the manual cutoff valve downstream the filter and bleed the gas; check that inside the filter there is no pressurised gas.

Removing the combustion head

- Remove the lid C.
- Unscrew the screws V holding in position the manifold G and pull out the complete group as shown in figure.

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

To remove the combustion head, pull it out. Once removed, check that the air and gas holes are not obstructed. Clean the combustion head by means of compressed air or scrape off the scale using a metallic brush



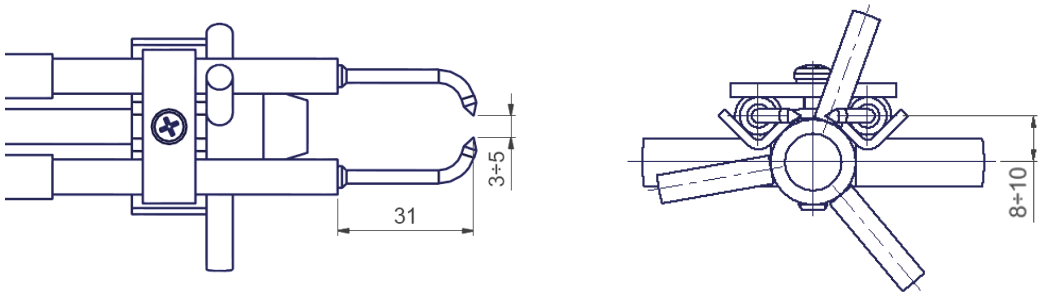
Adjusting the electrodes

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

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

Electrodes position settings

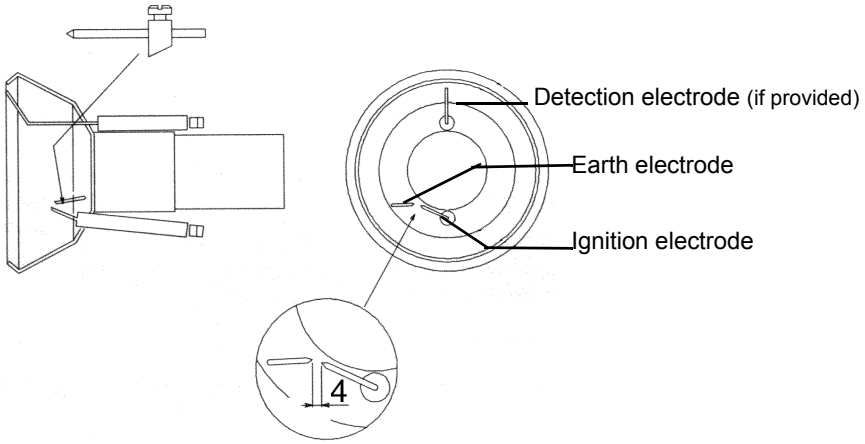
E205A



Adjusting the electrodes

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

E165A



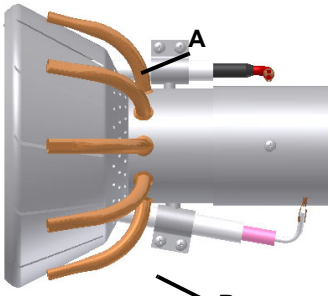
ATTENTION: avoid the ignition and detection electrodes to contact metallic parts (blast tube, head, etc.), otherwise the boiler's operation would be compromised. Check the electrodes position after any intervention on the combustion head.

Replacing the electrodes

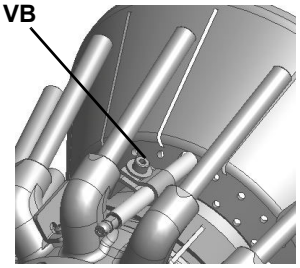
ATTENTION: avoid the ignition and detection electrodes to contact metallic parts (blast tube, head, etc.), otherwise the boiler's operation would be compromised. Check the electrodes position after any intervention on the combustion head.

To replace the ignition electrodes, proceed as follows:

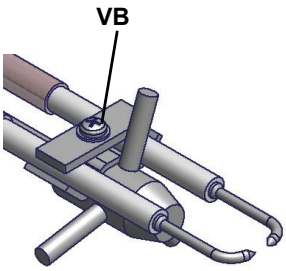
1 remove the burner cover
2 disconnect the electrodes cables;
3 loose the screw **VB** that fasten the electrodes group to the combustion head;
4 remove the electrodes and replace them paying attention to the measures showed in previous paragraph.
5 Reassemble the burner by fllowing the procedure in the reversed order.



E165A



E165A



E205A

Flame detection probe

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

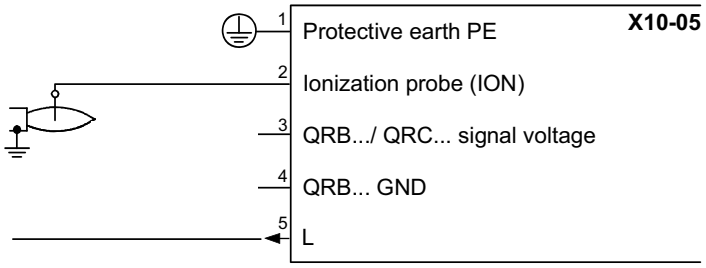
1 Disconnect the system from the electrical power supply.
2 Shut off the fuel supply;
3 remove the photocell from its slot (see next figure);
4 clean the bulbe if dirty, taking care not to touch it with bare hands;
5 if necessary, replace the bulb;
6 replace the photocell into its slot.



Checking the detection current with electrode (natural gas)

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.

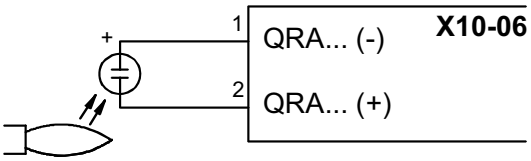
Device	Flame detector	Minimum detection signal
Siemens LMV2x/3x	Ionization probe	3 µA (values on display: 30%)



Checking the detection current with photocell (LME) (L.P.G.)

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.

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



Minimum detection signal: 3.5Vdc (optional)

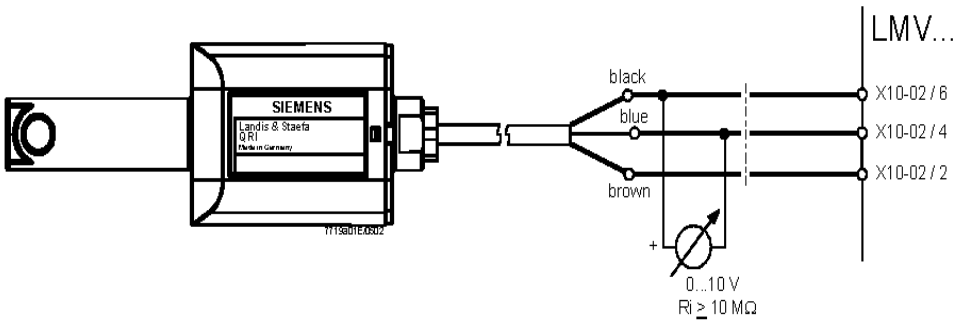


Fig. 1 - Detection with detector QRI...

Burner service term

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

Seasonal stop

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

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

Burner disposal

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

WIRING DIAGRAMS

Refer to the attached wiring diagrams.

WARNING

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

TROUBLESHOOTNG GUIDE Gas operation

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
***mechanical only*: SOMETIMES THE SERVOMOTOR RUNS IN THE WRONG WAY**	* Lights up and freezes	* In such cases, insert an RC circuit (our code 2531003).
PHASE-TO-PHASE SUPPLY OR PRESENCE OF VOLTAGE ON NEUTRAL*	* Servomotor capacitor damaged	* Replace capacitor

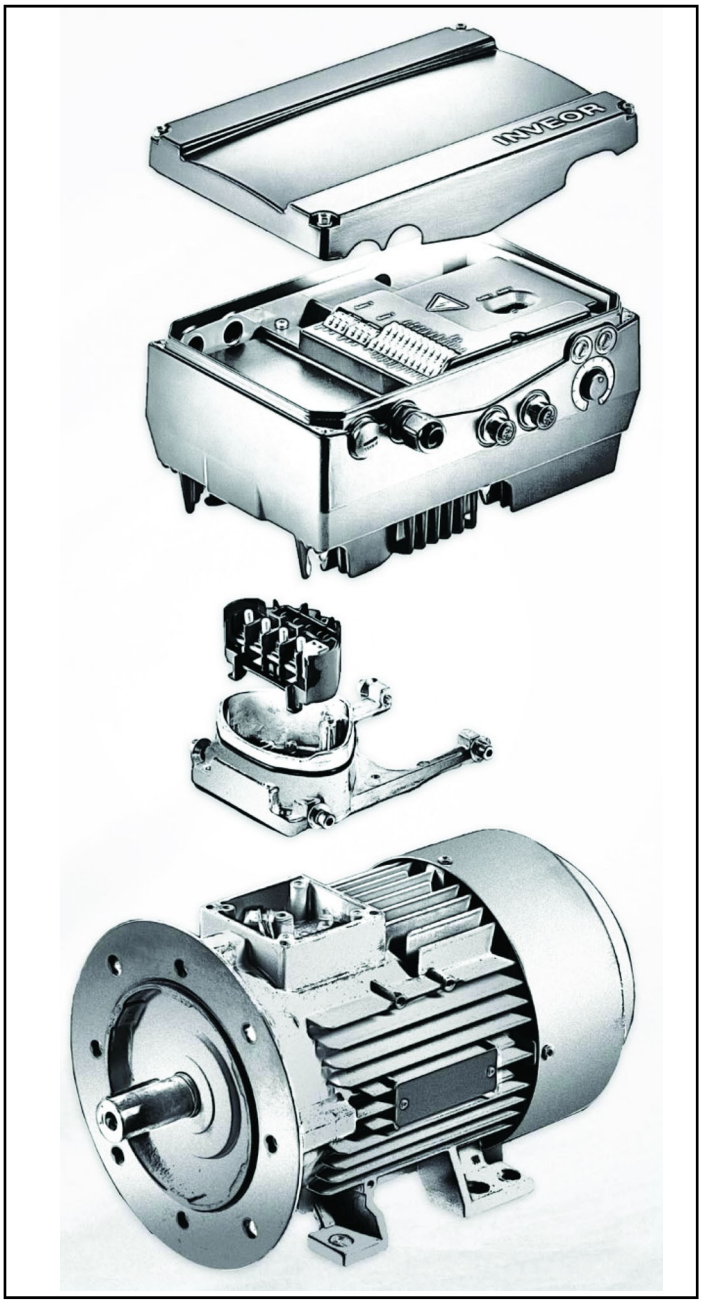
C.I.B.UNIGAS S.p.A.
Via L.Galvani ,9 - 35011Campodarsego (PD) - ITALY
Tel. +39 049 9200944 - Fax +39 049 9200945
website:www.cibunigas.it-e-mail:cibunigas@cibunigas.it

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

KOSTAL INVERTER

Connection and programming
for electronically controlled burners with

LMV2x/3x, LMV5x, ETAMATIC
and INVERTER regulation



Service Manual
TECHNICAL
INSTRUCTIONS

M12938CA - Rel. 0 - 10/2021

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Electrical connections, 5

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Configuration of control contact / INVERTER starting and stopping, 9

Configuration of INVERTER start / stop parameters and operating mode, 10

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Output signal variant for reading motor rpm (optional), 12

Brake chopper connections, 14

Burner terminal with INVERTER interface, 16

IDENTIFICAZIONE INVERTER

INVEOR Mx IVxx PWxx LPxx APxx GHxx DKxx COxx 1

1 2 3 4 5 6 7 8 9 10

	Key		Key
1	Drive controller series: INVEOR	**6**	Application circuit board: AP12 - Standard AP13 - CANopen
2	Installation location/size: motor-integrated - M,size: α, A, B, C, D	**7**	Control: DK01 - Standard (without membrane keypad) DK04 – With membrane keypad
3	Input voltage : IV02 - 230 V	**8**	Housing : GH10 – standard heat sink (black painted)
4	Recommended motor rating : kW: 0.55; 0.75; 1.1; 1.5; 2.2; 3.0; 4.0; 5.5; 7.5; 11.0; 15.0; 18.5; 22.0	**9**	Firmware version : CO00 - Standard CO01 - Specific
5	Printed circuit boards : LP01 / LP03 – Standard (without brake chopper); LP02 / LP04 – Standard (with brake chopper);	**10**	Equipment generation: 1 – current version

The **LMV5x** device controls fan motor rpm via a sensor and commands it via the inverter with a **4÷20mA** signal.
The **LMV3x/LMV2x** device controls fan motor rpm via a sensor and commands it via the inverter with a **0÷10V** signal.
Generally, the inverter curve goes from 50% to 100% of motor rpm. As well as improving burner regulation, this allows for a saving in terms of fan motor consumption.

INVEOR M INVERTER SIZES

TAGLIE
INVERTER INVEOR M...



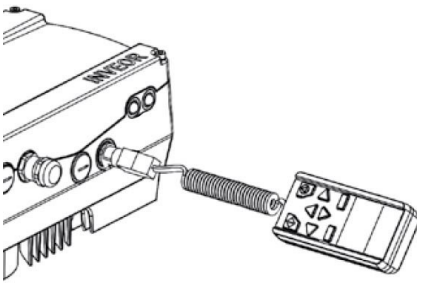
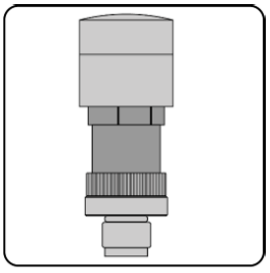
α ***A*** ***B*** ***C*** ***D***

User interface

COMMUNICATION (on request)

The drive controller can be put in operation in the following ways:

Attention: Contact the manufacturer to order the most suitable device.

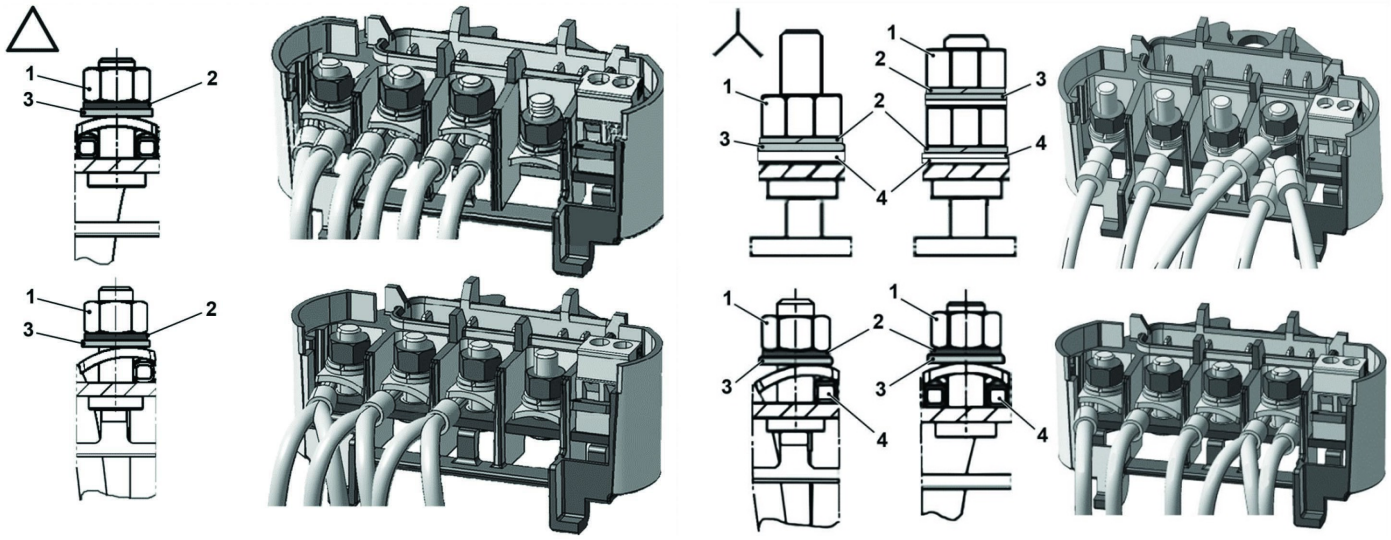
USB adaptor for PC	
Via the INVERTER PC software	
	
INVEOR MMI remote display:	
INVEOR MMI is a portable display on which all inverter parameters can be viewed and changed. Manual available on the KOSTAL website.	
Bluetooth connection:	
Using the Bluetooth adaptor you can connect via app from any device. Download the app for Android / iOS from the Google Play Store / App Store.	
The Bluetooth adaptor is required to create a Bluetooth connection with the inverter. To view and change the inverter parameters, use an external interface device – tablet or mobile phone. Download the app for Android / iOS from the Google Play Store / App Store.	

ELECTRICAL CONNECTIONS

Motor connection variants for INVERTERS sizes A, B and C

Star or delta connection for speed controller integrated on the motor

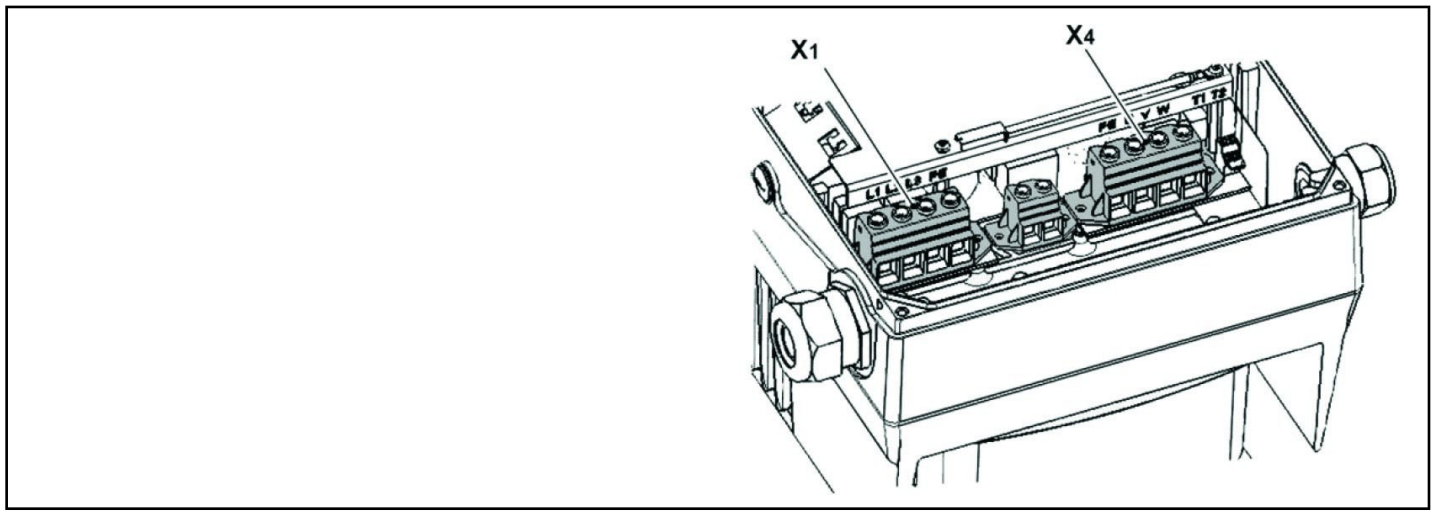
Delta connection variant ***Star connection variant***



1 Nut MA = 5 Nm
2 Circlip
3 Plain washer
4 Cable shoe

Fig. 1

Motor connection variants for INVERTER size D



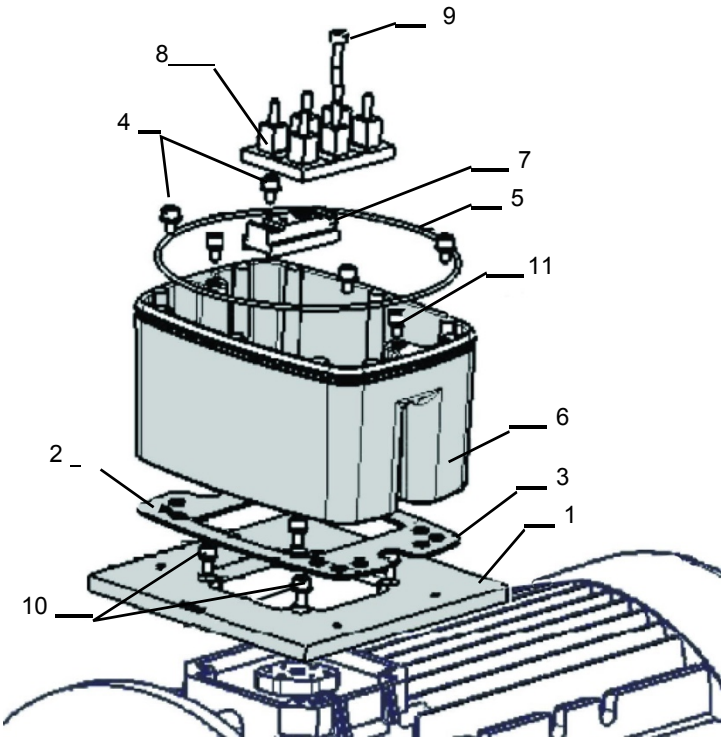
X1 terminal no.	Designation	Assignment
1	L1	Mains phase 1
2	L2	Mains phase 2
3	L3	Mains phase 3
4	PE	Protective conductor

Tab. 1 - X1 terminal assignment - 3 x 400 VAC

X4 terminal no.	Designation	Assignment
1	PE	Protective conductor
2	U	Mains phase 1
3	V	Mains phase 2
4	W	Mains phase 3

Tab. 2 - X1 terminal assignment - 3 x 400 VAC

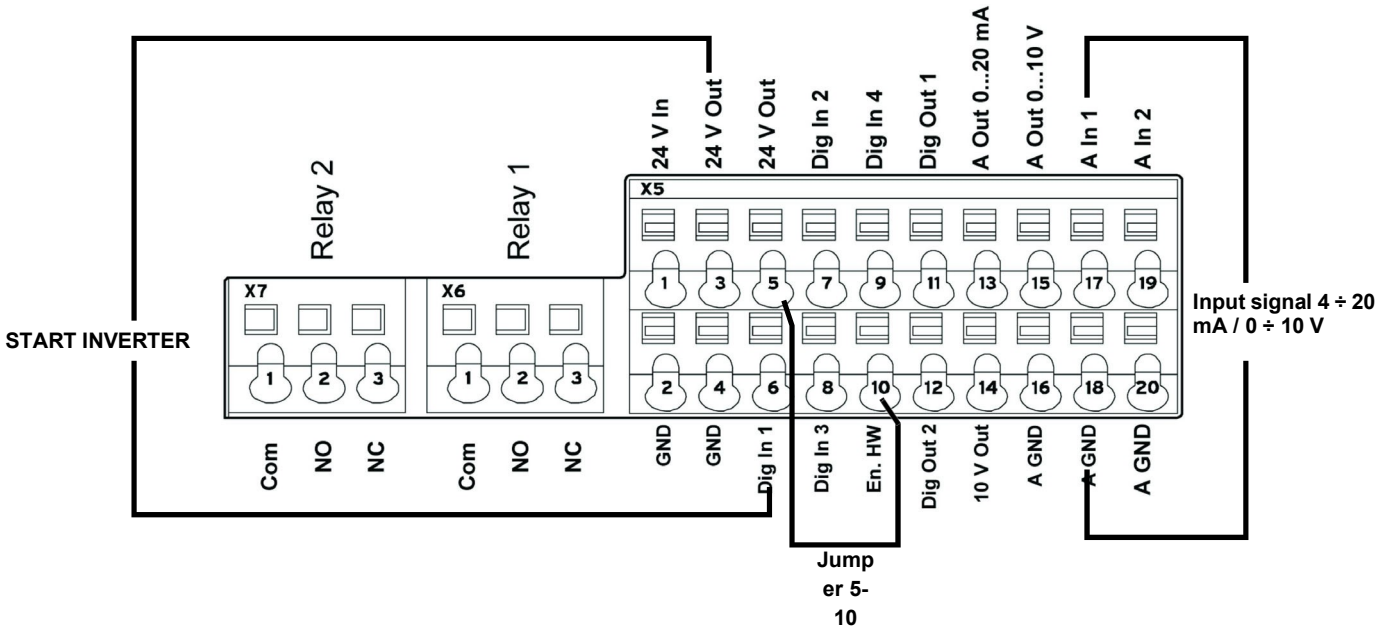
Fig. 2 – Assembly sequence: Connection box – adapter plate size D



Key:

1 Adapter plate option (variant)
2 Holes depending on motor
3 Seal
4 Retaining bolts with spring elements
5 O-ring seal
6 INVEOR / adapter plate support
7 Terminal heightening option
8 Original terminal (not included)
9 Extended screw option (for pos.7)
10 Retaining bolts with spring elements option
11 INVEOR/support retaining bolts

Connection of INVERTER signals and commands

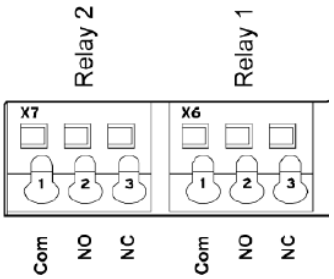


Electrical connections and parameter configuration

There are 2 relays on the INVERTER. Connecting terminals X7-1-2-3 and X6-1-2-3 are used for:

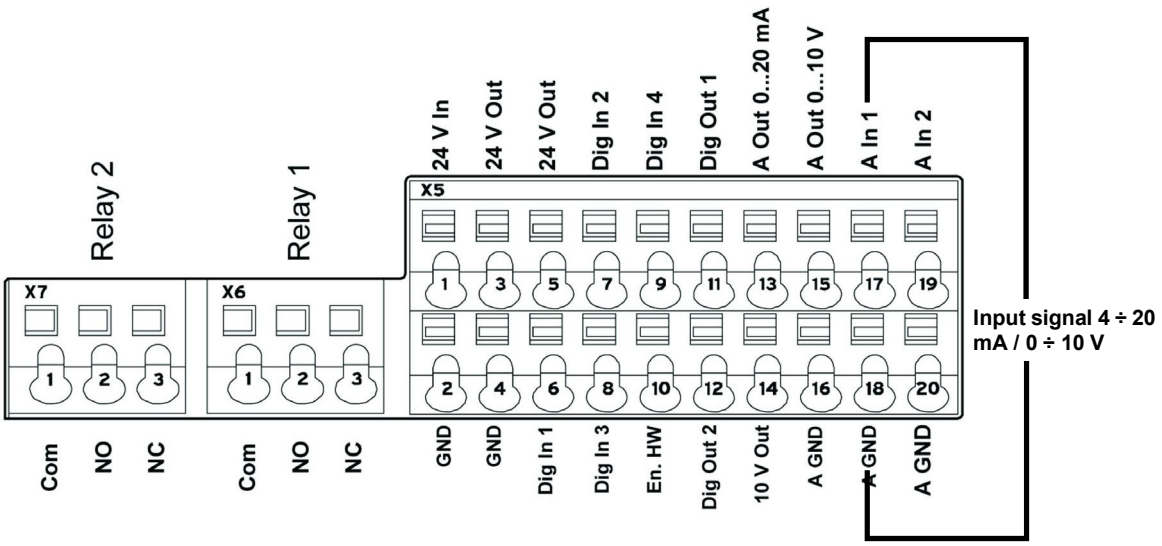
LMV2/3x: Relay 1 is used as a safety contact on the safety loop series of the equipment. Relay 2 is used as a fault indicator on the burner panel front.

LMV5x / ETAMATIC: Relay 1 is used as a contact for control of fan motor start. Relay 2 is used as a fault indicator of the INVERTER to the LMV5x / ETAMATIC equipment.



Parameter		
1.181	Automatic reset function	Automatic reset of faults. The INVERTER resets the fault after the set time. **Set value = 30 seconds**
1.182	Automatic reset numbers	With the reset function the maximum number of automatic resets can be limited. **Set value = 0 (maximum number of automatic resets)**
4.190	Relay 1 functions	Select the operating mode of relay 1. **Set value = LMV2x/3x..= 11 (NC inverted error)** **Set value = LMV5x / ETAMATIC = 19 (motor is in NO function)**
4.210	Relay 2 functions	Select the operating mode of relay 2. **Set value = LMV2x/3x..= 11 (NC inverted error)** **Set value = LMV5x / ETAMATIC = 11 (NC inverted error)**
4.210	V O operation	**Set value = 10 (NO error)**

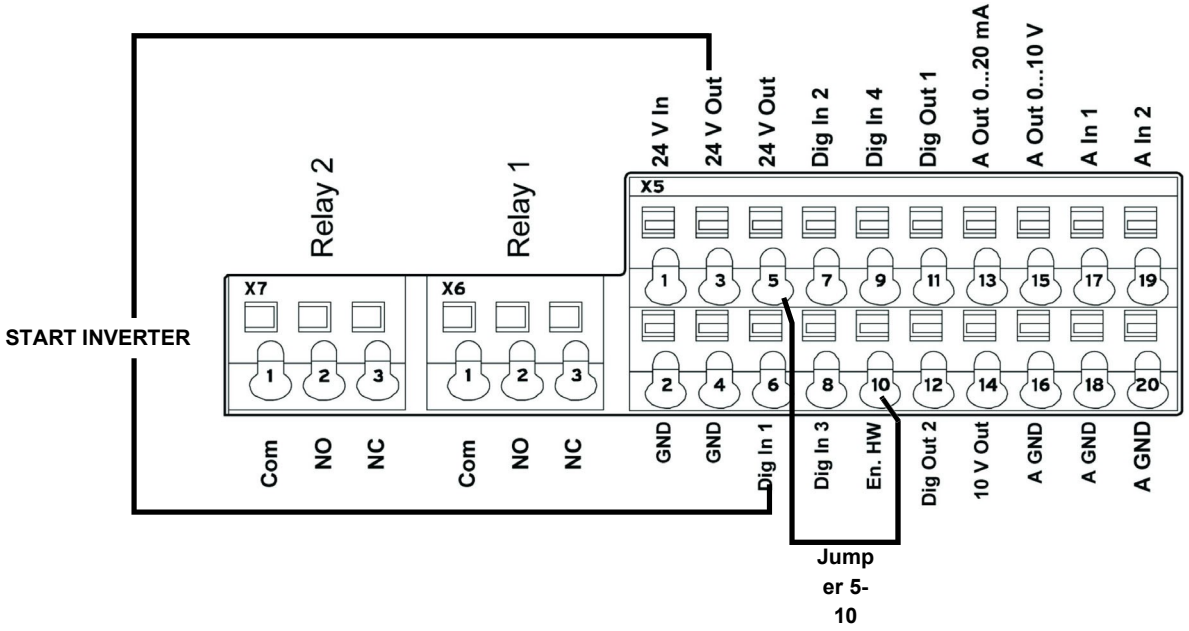
0-10V / 4-20mA analogue input configuration



Input AIn1 can be configured as voltage or current input. It is configured as 4-20mA input current for LMV5-Etamatic, and 0-10V input voltage for LMV2x/3x.

4.020	Input type AI1	Specifies the input type, whether voltage or current. **1**= Voltage input 0-10V (LMV2x/3x) **2**= Current input 0/4-20mA (LMV5 ETAMATIC)
4.021	AI1 Standard low	Specifies the minimum value of the analogue input as a percentage of the range. E.g.: 0…10 V or 0…20 mA = 0 %...100 % 2…10 V or 4…20 mA = 20 %...100 % **Set value = 20% for LMV2x/3x, LMV5x, ETAMATIC**
4.022	AI1 Standard high	Specifies the maximum value of the analogue input as a percentage of the range at 10V or 20mA. **Set value = 100%**
4.023	AI1 Response time	Specifies the deadband on the input signal. **Set value = 1%**
4.024	AI1 Filter time	An input change is taken into consideration after this time. If it is too short, a wire break error may appear if the 4-20 mA signal goes to 0 for a short time. **Set value = 4 seconds**
4.030	AI1 Input function	Specifies whether the input is 0 = analogue / 1 = digital input. **Set value = 0 analogue**
4.033	AI1 Measure unit, input 1	Specifies the unit of measurement of input 1. **Set value = 0 (%)**
4.034	AI1 Lower limit	Specifies the lower limit of input 1. **Set value = 0 (%)**
4.035	AI1 Upper limit	Specifies the upper limit of input 1. **Set value = 100 (%)**
4.036	AI1 Wire break time, 5s	Specifies the time after which the fault appears if input AI1 is interrupted (wire break). **Set value = 5 seconds**
4.037	AI1 Inversion	Inverts the signal of input 1. **Set value = 0 (disabled)**

Configuration of control contact / INVERTER starting and stopping



Terminal	
X5-3 (24V Out)… X5-6 (Digit In1)..	Bringing 24V to terminal **X5-6** enables INVERTER operation and the contact that switches it on/off. On LMV2/3x **X5-3** (24V Out) also powers the motor speed encoder.
X5-5 (24V Out) connected with X5-10 (En.HW)…	Required to enable braking ramp xxxx

Configuration of INVERTER start / stop parameters and operating mode

Parameter		
1.020	Min. frequency (Hz)	Minimum input frequency in Hz. **Set value = 0 Hz (LMV2x-3x / LMV5x)** **Set value = > 35 Hz (ETAMATIC)**
1.021	Max. frequency (Hz)	Maximum input frequency in Hz. **Set value = 51,5 Hz (LMV2x-3x / LMV5x)** **Set value = 50 Hz (ETAMATIC)**
1.050	Ramp 1 Braking time 1	Braking time at switch-off to reach the speed of 0 Hz after the start/stop contact has opened (not used). **Set value = 10 seconds**
1.051	Ramp 1 Acceleration time 1	Acceleration time 1 is the time necessary for the drive controller to accelerate from 0 Hz to maximum frequency (not used). **Set value = 10 seconds**
1.052	Ramp 2 Braking time 2	Braking time at switch-off to reach the speed of 0 Hz after the start/stop contact has opened. **Set value = 10 seconds**
1.053	Ramp 2 Acceleration time 2	Acceleration time 2 is the time necessary for the drive controller to accelerate from 0 Hz to maximum frequency. **Set value = 10 seconds**
1.054	Selects ramp used	Digital input 1 (**dig In1 / X5-6**) selects the ramp used. **Set value = 1 (parameters 1.052 and 1.053)**
1.088	Quick stop	Not used but set. **Set value = 10 seconds**
1.100	Operating mode	Frequency control mode: specifies the operating mode of the INVERTER. In our case it is always frequency control (0). **Set value = 0**
1.130	Reference set point	Determines the source from which the reference value is read. In our case it is always analogue input AI1. **Set value = 1 (analogue input 1)**
1.131	Enabling software	Depending on the change made, the motor may start immediately. Selection of the source for enabling control. **Set value = 0**
1.132	Start-up protection	Selection of behaviour in response to enabling software. **Set value = 1** **(Start only with rising edge at input of control enable)**
1.150	Motor rotation direction	Do not change this parameter. To invert the direction of rotation, invert 2 of the 3 INVERTER / MOTOR cabling wires, so that the INVERTERS always have the same setting. **Set value = 1 forwards only / clockwise rotation** **(no changes to direction of rotation are possible)**

Motor data

The motor data depend on the type of motor used. Refer to the data shown on the motor nameplate. Follow the steps below:

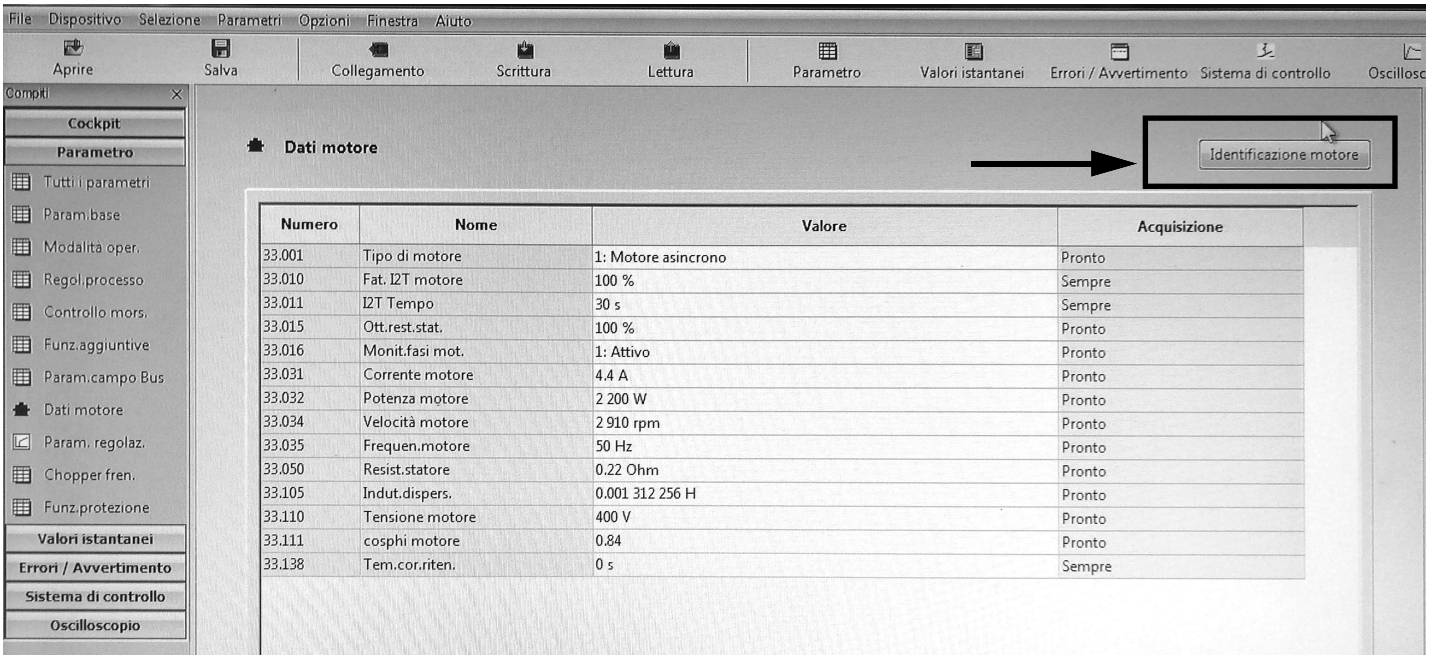
- Enter the motor data;
- Activate the motor recognition function;
- If the operation ends successfully, enter the remaining parameters.

During the recognition phase, the INVERTER measures some parameters and changes some settings.

N.B.: At each start-up of the recognition programme, recheck all the parameters in this manual.

Parameter		
33.001	Motor type	Selection of motor type. **Set value = 1 (asynchronous motor)**
33.010	Motor I^2t factor	Not used. Only for encoders. **Set value = 100%**
33.011	I^2t time	Not used. Only for encoders **Set value = 30 seconds**
33.015	R optimisation	If necessary, this parameter can be used to optimise the start-up behaviour. Not used **Set value = 100%**
33.016	Motor phase control	The "Motor connection interrupted" error monitoring (error 45) can be enabled/disabled with this parameter. **Set value = 1 (enabled control)**
33.031	Motor current	Maximum motor current. **Set value = motor nameplate current value in amps**
33.032	Motor rating	Motor shaft rating. **Set value = motor nameplate rating value in watts**
33.034	Motor rpm	Motor rpm. **Set value = motor nameplate speed in rpm**
33.035	Motor frequency	Nominal motor frequency. **Set value = motor nameplate frequency in Hz**
33.050	Stator resistance	Recognised by INVERTER. **Set value = automatically detected, value in Ohm**
33.105	Leakage inductance	Recognised by INVERTER. **Set value = automatically detected, value in henry**
33.110	Motor voltage	Nominal motor voltage. **Set value = 400V**
33.111	Motor cos phi	Data on motor nameplate. **Set value = 0,xx**
33.138	Holding current time	Needed to stop the motor!! After braking it is held at continuous current for a specified time interval. Ensure that there is no overheating in this phase. Recommended time: max 5 s. **Set value = 0 seconds**

Activate the “Motor identification” function and follow the instructions proposed by the INVERTER, then change the parameters described below. The image shows the software screen on the PC.



Parameter		
34.010	**Control type**	Open-loop asynchronous motor. **Set value = 100 (open-loop asynchronous motor)**
34.020	**Flying restart**	**Set value = 1 (enabled)**
34.021	**Flying restart time**	Calculated by Inverter. **Set value = value calculated by INVERTER in ms**
34.090	**Speed controller KP**	Calculated by the inverter during the motor recognition phase. Reset it to 2000 after motor recognition. **Set value = 2000 mA/rad/sec**
34.091	**Speed controller TN**	Calculated by the inverter during the motor recognition phase. Reset it to 7.5 seconds after motor recognition. **Set value = 7.5 seconds**
34.110	**Slip trimmer**	If set to **1** the function is enabled. If set to **0** the motor performs as if connected to the mains. If compensation is enabled, the system aligns the stator frequency with the rotor. As a result, the actual motor rpm increase and are brought in line with the theoretical motor nameplate rpm. The motor is supplied with the same voltage and frequency, but the current increases and the rpm are brought to the nameplate data. **Set value = 1 (compensation for slippage)**

Output signal variant for reading motor rpm (optional)

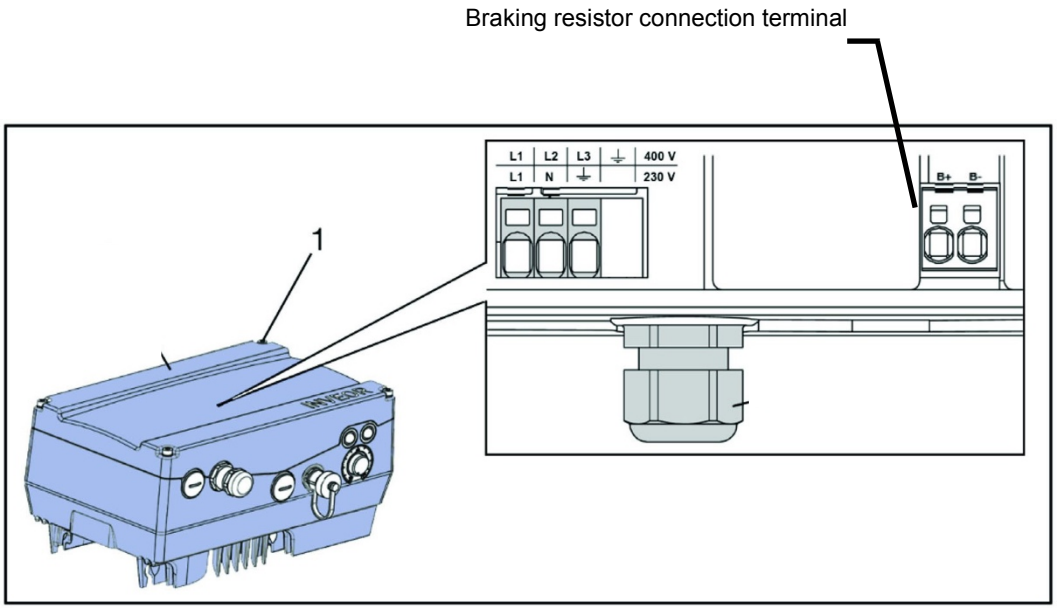
To have a 4-20 mA analogue output that indicates the motor rpm to the terminals X5-13 (Aout 0-20 mA) and X5-16 (A GND), set the parameters below:

Parameter		
4.100	Analogue output AO1	Selection of analogue output options. In our case, to have an output proportional to the rpm, set 19. **Set value = 19 (actual rpm)**
4.101	Minimum value of analogue output AO1	Output signal at 0-20 mA. To obtain a 4-20 mA signal with (4 mA = 0 motor rpm), follow the example: if motor rpm are a maximum 2900, calculate: 2900 / 20 x 4 = **580**, which is the negative value corresponding to 0 mA from which to start. Therefore: 0 mA = - 580, 20 mA = 2900 **Set value = - xxx (-580 in the example)**
4.102	Maximum value of analogue output AO1	Maximum rpm value for 20 mA. **Set value = xxxx (2900 in the above example)**

NOTE 1	If the system enters pendulum mode with LMV.. / ETAMATIC, adjust parameters **34.090** and **34.091** by increasing them, in particular parameter **34.090**, in steps of 100mA/rad/sec.
NOTE 2	With LMV 2x/3x with INVERTER control, the device controls the standby rpm with **param. 653**. If, after the fan is switched off, the device LMV 2x/3x sees that the motor continues to run, error **83** diagnostic **32** appears. This occurs if there is significant fan inertia (e.g. on burners with very heavy forward curved blades), then always disable parameter 653, setting it to **0**.
NOTE 3	With LMV 2x/3x the signal 0-10V for motor rpm control during standardisation is brought to approximately 9.7 V and the fan motor rpm is saved. According to the LMV manual, the INVERTER should be set to max 52.5 Hz During standardisation, the INVERTER is driven at approximately 51 ÷ 51.5 Hz and may go out of absorption range with the motor. For this reason, set the INVERTER to max 51.5 Hz. During standardisation, the INVERTER will reach 50Hz and the over-absorption problem will be reduced.
NOTE 4	**If the <u>analogue wire break fault</u> is displayed on the INVERTER and the 4-20 mA inverter signal continues to oscillate between 1 ÷ 6 mA, it does not always mean that the LMV 2x/3x or ETAMATIC equipment is faulty. It could be due to the old firmware of the INVERTER and should therefore be updated. If this is the case, contact the Service Centre.**

FAULTS / PROBLEMS.. SOLUTIONS		
Parameter 36.020	If error 36 appears	Problems detected in the mains supply. By setting this parameter to 0, the INVERTER no longer checks the mains and the error message disappears. It is recommended to leave the parameter set to 1.
Parameter 33.105	If mains voltage drops during operation	When the mains voltage drops, the INVERTER decreases the motor rpm. To reduce this change, set the parameter to 0, which should solve the problem.

Brake chopper connections



Brake chopper connections

Terminal no.	Designation	Assignment
1	B+	Braking resistor connection (+)
2	B-	Braking resistor connection (-)

Optional assignment of brake chopper

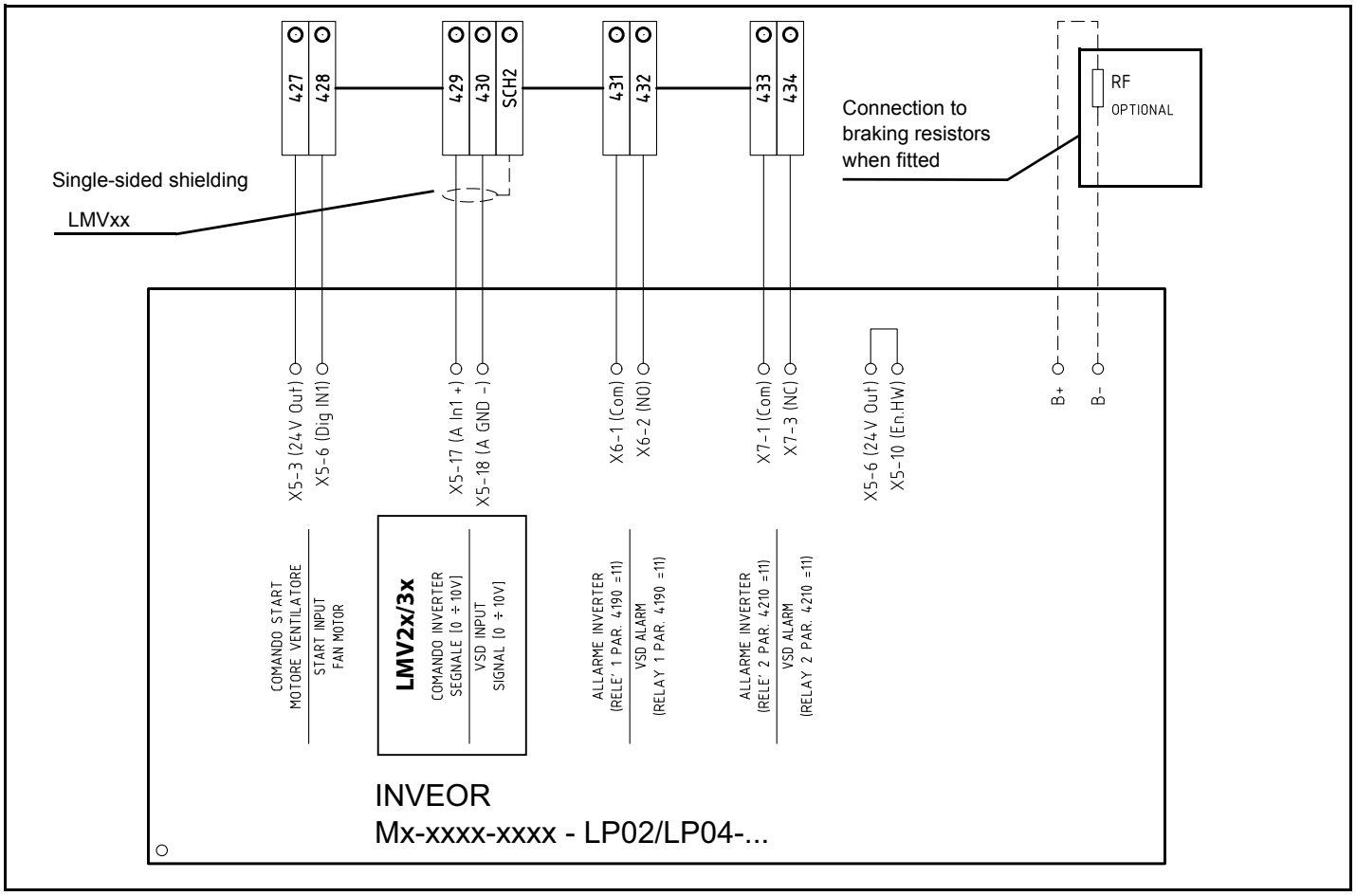
Parameter	
Braking resistor	Enabled or disabled

Braking resistors

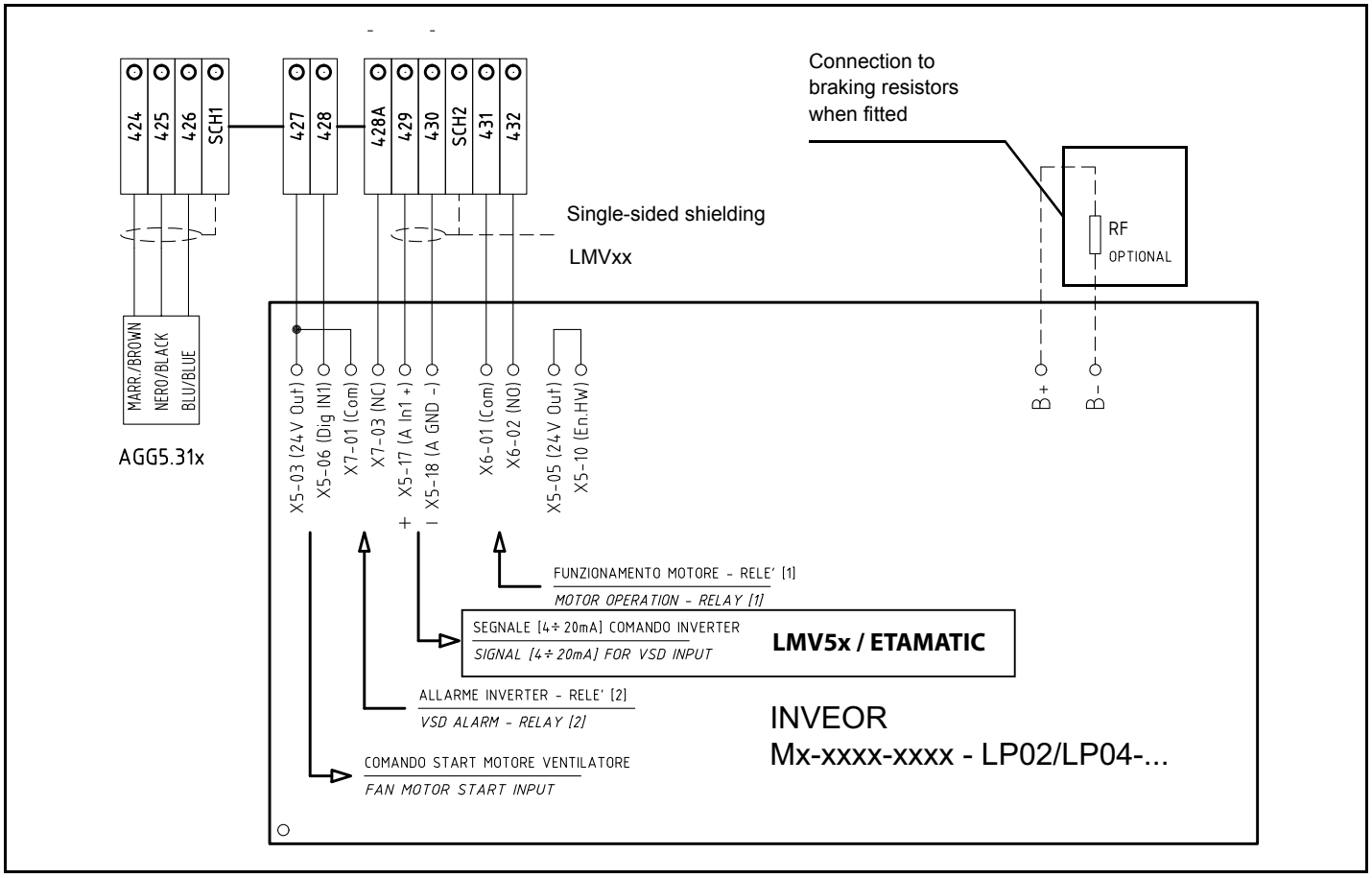


Burner terminal block with interface INVERTER

Versioni bruciatore con LMV2x/3x



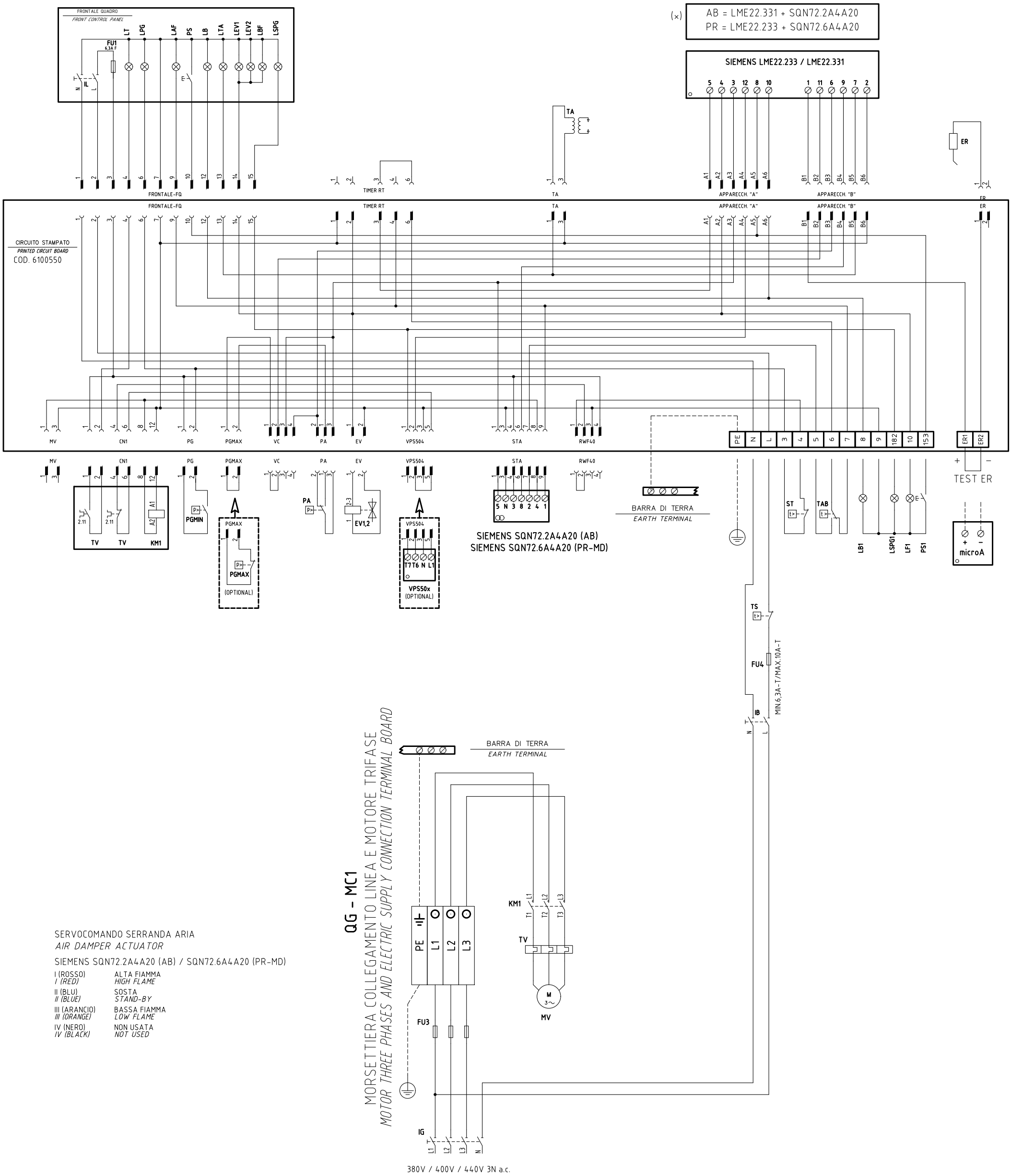
Versioni bruciatore con LMV5x o ETAMATIC



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

VERSIONE ALTA-BASSA FIAMMA "AB" / PROGRESSIVO "PR"
"AB" HIGH-LOW / "PR" PROGRESSIVE VERSION



SERVOCOMANDO SERRANDA ARIA
AIR DAMPER ACTUATOR

SIEMENS SQN72.2A4A20 (AB) / SQN72.6A4A20 (PR-MD)

I (ROSSO) *I (RED)*	ALTA FIAMMA *HIGH FLAME*
II (BLU) *II (BLUE)*	SOSTA *STAND-BY*
III (ARANCIO) *III (ORANGE)*	BASSA FIAMMA *LOW FLAME*
IV (NERO) *IV (BLACK)*	NON USATA *NOT USED*

UNIGAS	Impianto: *TIPI/TYPES CxxA/CxxX/ExxxA/ExxxX MODELLO x–.AB.xx.xx.A.xx*	Ordine		Data 09/02/2018	PREC. /
		Commessa	Data Controllato 09/02/2018	Revisione 00	FOGLIO 1
	Descrizione: *TIPI/TYPES CxxA/CxxX/ExxxA/ExxxX/CxxX–FGR/ExxxX–FGR MODELLO x–.PR(MD).xx.xx.A.xx*	Esecutore U. PINTON	Controllato M. MASCHIO	Dis. N. 18 – 0317	SEGUE 2 / TOTALE 4

VERSIONE MODULANTE "MD"
"MD" MODULATING VERSION

FRONTALE QUADRO
FRONT CONTROL PANEL

FU1 6,3A F

IL

LT LPG LAF PS LB LTA LEV1 LEV2 LBF LSPG

FRONTALE-FQ

TIMER RT

TA

SIEMENS LME22.233

APPARECCH. "A"

APPARECCH. "B"

ER

CIRCUITO STAMPATO
PRINTED CIRCUIT BOARD
COD. 6100550

MV CN1 PG PGMAX VC PA EV VPS504 STA RWF40

PE N L 3 4 5 6 7 8 9 10 11 12 13

ER1 ER2

TEST ER

TV TV KM1

PGMIN

PGMAX (OPTIONAL)

EV1,2

VPS504 (OPTIONAL)

SIEMENS SQN72.6A4A20 (PR-MD)

FU2 2A-F

BARRA DI TERRA
EARTH TERMINAL

ST

LB1 LSPG1 LF1 PS1

microA

ASCON KM3 HCRMMD

600V RRR0-1-T73 (§)

SIEMENS RWF50.2x

SIEMENS RWF55.5x

TS

FU4 MIN.6,3A-T/MAX.10A-T

IB

SMA (2) (3) MAN (1) AUTO

SMF (6) MIN (5) (4) MAX

CAVO 7x0,75mmq
7x0,75mmq CABLE

CONN. SONDE

L1	(1) MARRONE	*BROWN*
N	(2) BLU	*BLUE*
B5	(3) ROSSO	*RED*
T6	(4) NERO	*BLACK*
T7	(5) BIANCO	*WHITE*
T8	(6) ARANCIO	*ORANGE*

(××)
COLLEGAMENTO SONDE
PROBE CONNECTION

SERVOCOMANDO SERRANDA ARIA
AIR DAMPER ACTUATOR

SIEMENS SQN72.2A4A20 (AB) / SQN72.6A4A20 (PR-MD)

I (ROSSO) *I (RED)*	ALTA FIAMMA *HIGH FLAME*
II (BLU) *II (BLUE)*	SOSTA *STAND-BY*
III (ARANCIO) *III (ORANGE)*	BASSA FIAMMA *LOW FLAME*
IV (NERO) *IV (BLACK)*	NON USATA *NOT USED*

(§)
SCHEDA [CPU] VISTA LATO COMPONENTI
CIRCUIT [CPU] COMPONENTS SIDE VIEW
PONTICELLO INTERNO PER SELEZIONE SEGNALE MORSETTO 3
INTERNAL BRIDGE FOR TERMINAL 3 SELECTION SIGNAL

QG - MC1
MORSETTIERA COLLEGAMENTO LINEA E MOTORE TRIFASE
MOTOR THREE PHASES AND ELECTRIC SUPPLY CONNECTION TERMINAL BOARD

BARRA DI TERRA
EARTH TERMINAL

PE L1 L2 L3

KM1 L1 T1 L2 T2 L3 T3

TV

M 3~ MV

FU3

IG L1 L2 L3 N

380V / 400V / 440V 3N a.c.

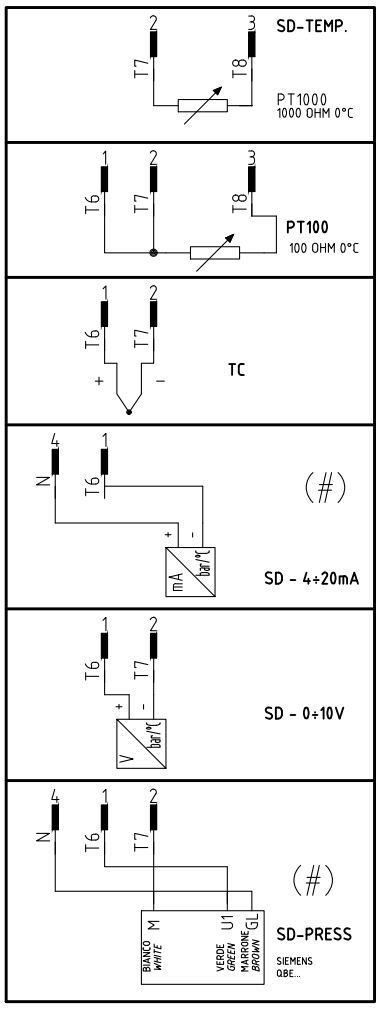
Data	09/02/2018	PREC. 1	FOGLIO 2
Revisione	00		
Dis. N.	18 – 0317	SEGUE 3	TOTALE 4

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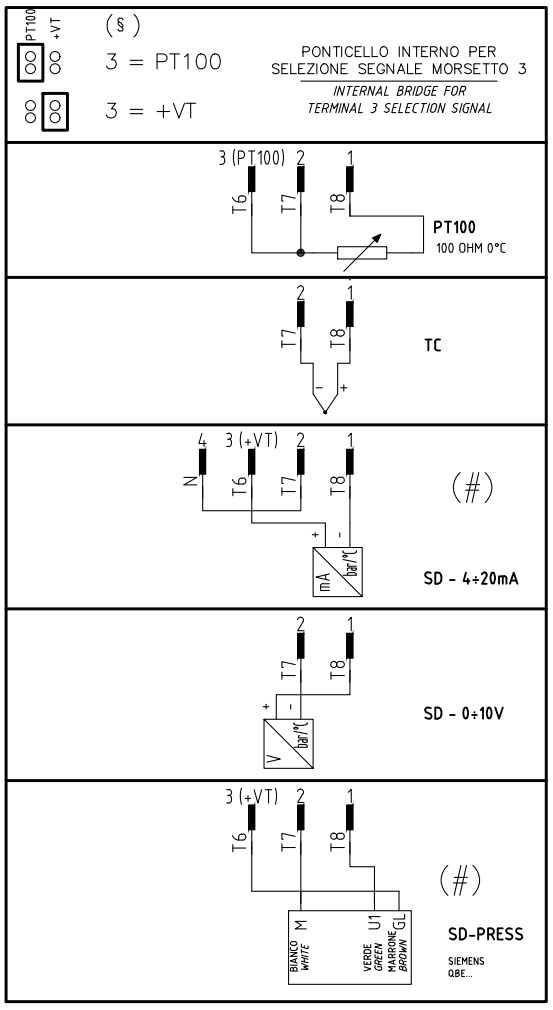
ATTENZIONE COLLEGAMENTO SONDE CON CONNETTORE 7 POLI

WARNING PROBE CONNECTION WITH 7 PINS CONNECTOR

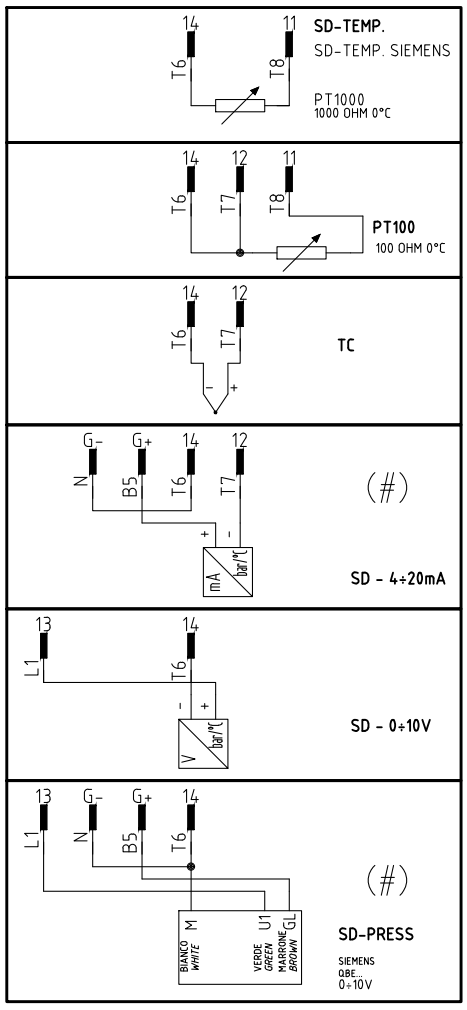
KM3 HCRMMD



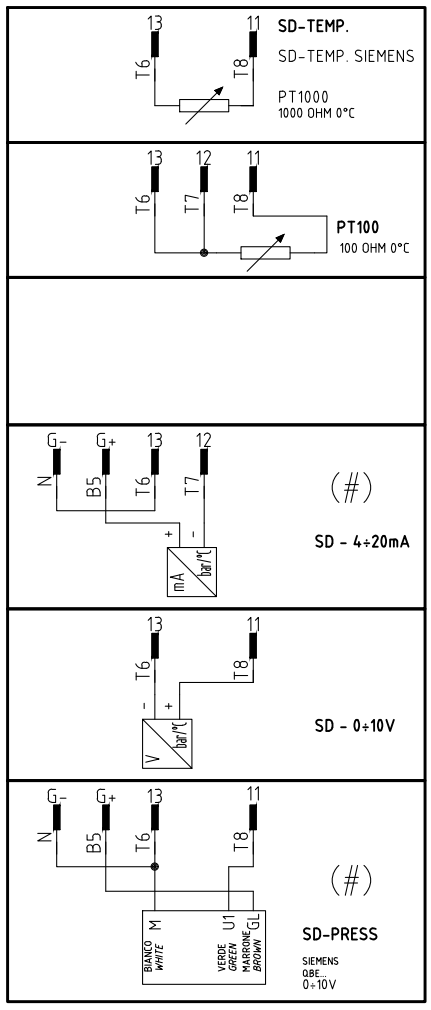
600V RRR0-1-T73



RWF55.5x



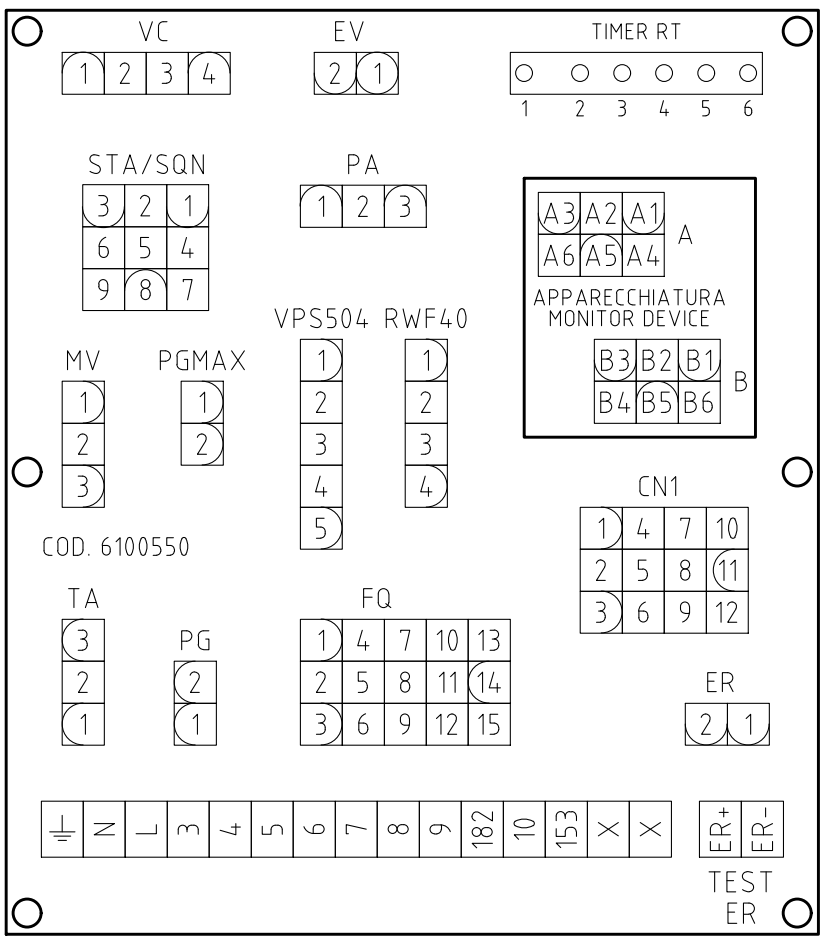
RWF50.2x



(#)

COLLEGAMENTO SOLO PER TRASDUTTORI PASSIVI

TRASDUCER PASSIVE CONNECTION ONLY



Data 09/02/2018		PREC. 2	FOGLIO 3
Revisione 00			
Dis. N. 18 – 0317		SEGUE 4	TOTALE 4

Sigla/Item	Funzione	Function
600V RRR0-1-T73	REGOLATORE MODULANTE (ALTERNATIVO)	BURNER MODULATOR (ALTERNATIVE)
ER	ELETTRODO RILEVAZIONE FIAMMA	FLAME DETECTION ELECTRODE
EV1,2	ELETTROVALVOLE GAS (O GRUPPO VALVOLE)	GAS ELECTRO-VALVES (OR VALVES GROUP)
FU1	FUSIBILE DI LINEA	LINE FUSE
FU2	FUSIBILE AUSILIARIO	AUXILIARY FUSE
FU3	FUSIBILI LINEA MOTORE VENTILATORE	FAN MOTOR LINE FUSES
FU4	FUSIBILE DI LINEA	LINE FUSE
IB	INTERRUTTORE LINEA BRUCIATORE	BURNER LINE SWITCH
IG	INTERRUTTORE GENERALE	MAINS SWITCH
IL	INTERRUTTORE LINEA AUSILIARI	AUXILIARY LINE SWITCH
KM1	CONTATTORE MOTORE VENTILATORE	FAN MOTOR CONTACTOR
KM3 HCRMMD	REGOLATORE MODULANTE (ALTERNATIVO)	BURNER MODULATOR (ALTERNATIVE)
LAF	LAMPADA SEGNALAZIONE ALTA FIAMMA BRUCIATORE	BURNER IN HIGH FLAME INDICATOR LIGHT
LB	LAMPADA SEGNALAZIONE BLOCCO BRUCIATORE	INDICATOR LIGHT FOR BURNER LOCK-OUT
LB1	LAMPADA SEGNALAZIONE BLOCCO BRUCIATORE	INDICATOR LIGHT FOR BURNER LOCK-OUT
LBF	LAMPADA SEGNALAZIONE BASSA FIAMMA BRUCIATORE	BURNER IN LOW FLAME INDICATOR LIGHT
LEV1	LAMPADA SEGNALAZIONE APERTURA [EV1]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV1]
LEV2	LAMPADA SEGNALAZIONE APERTURA [EV2]	INDICATOR LIGHT FOR OPENING OF ELECTRO-VALVE [EV2]
LF1	LAMPADA SEGNALAZIONE FUNZIONAMENTO BRUCIATORE	INDICATOR LIGHT BURNER OPERATION
LPG	LAMPADA SEGNALAZIONE PRESENZA GAS IN RETE	INDICATOR LIGHT FOR PRESENCE OF GAS IN THE NETWORK
LSPG	LAMPADA SEGNALAZIONE BLOCCO CONTROLLO TENUTA VALVOLE	INDICATOR LIGHT FOR LEAKAGE OF VALVES
LSPG1	LAMPADA SEGNALAZIONE BLOCCO CONTROLLO TENUTA VALVOLE	INDICATOR LIGHT FOR LEAKAGE OF VALVES
LT	LAMPADA SEGNALAZIONE BLOCCO TERMICO	INDICATOR LIGHT FOR MOTOR OVERLOAD THERMAL CUTOUT
LTA	LAMPADA SEGNALAZIONE TRASFORMATORE DI ACCENSIONE	IGNITION TRANSFORMER INDICATOR LIGHT
MV	MOTORE VENTILATORE	FAN MOTOR
PA	PRESSOSTATO ARIA	AIR PRESSURE SWITCH
PGMAX	PRESSOSTATO GAS DI MASSIMA PRESSIONE	MAXIMUM PRESSURE GAS SWITCH
PGMIN	PRESSOSTATO GAS DI MINIMA PRESSIONE	MINIMUM GAS PRESSURE SWITCH
PS	PULSANTE SBLOCCO FIAMMA	FLAME UNLOCK BUTTON
PS1	PULSANTE SBLOCCO FIAMMA	FLAME UNLOCK BUTTON
PT100	SONDA DI TEMPERATURA	TEMPERATURE PROBE
RWF50.2x	REGOLATORE MODULANTE	BURNER MODULATOR
RWF55.5x	REGOLATORE MODULANTE (ALTERNATIVO)	BURNER MODULATOR (ALTERNATIVE)
SD-PRESS	SONDA DI PRESSIONE	PRESSURE PROBE
SD-TEMP.	SONDA DI TEMPERATURA	TEMPERATURE PROBE
SD - 0÷10V	TRASDUTTORE USCITA IN TENSIONE	TRANSDUCER VOLTAGE OUTPUT
SD - 4÷20mA	TRASDUTTORE USCITA IN CORRENTE	TRANSDUCER CURRENT OUTPUT
SIEMENS LME22.233	APPARECCHIATURA CONTROLLO FIAMMA	CONTROL BOX
SIEMENS LME22.233 / LME22.331	APPARECCHIATURA CONTROLLO FIAMMA	CONTROL BOX
SIEMENS SQN72.2A4A20 (AB)	SERVOCOMANDO SERRANDA ARIA	AIR DAMPER ACTUATOR
SIEMENS SQN72.6A4A20 (PR-MD)	SERVOCOMANDO SERRANDA ARIA	AIR DAMPER ACTUATOR
SMA	SELETTORE MANUALE/AUTOMATICO	MANUAL/AUTOMATIC SWITCH
SMF	SELETTORE MANUALE FUNZIONAMENTO MIN-0-MAX	MIN-0-MAX MANUAL OPERATION SWITCH
ST	SERIE TERMOSTATI/PRESSOSTATI	SERIES OF THERMOSTATS OR PRESSURE SWITCHES
TA	TRASFORMATORE DI ACCENSIONE	IGNITION TRANSFORMER
TAB	TERMOSTATO/PRESSOSTATO ALTA-BASSA FIAMMA	HIGH-LOW THERMOSTAT/PRESSURE SWITCHES
TC	TERMOCOPPIA	THERMOCOUPLE
TS	TERMOSTATO/PRESSOSTATO DI SICUREZZA	SAFETY THERMOSTAT OR PRESSURE SWITCH
TV	TERMICO MOTORE VENTILATORE	FAN MOTOR THERMAL
VPS50x	CONTROLLO DI TENUTA VALVOLE GAS (OPTIONAL)	GAS PROVING SYSTEM (OPTIONAL)
microA	MICROAMPEROMETRO	MICROAMMETER

Data 09/02/2018		PREC. 3	FOGLIO 4
Revisione 00			
Dis. N. 18 - 0317		SEGUE 1	TOTALE 4