BURNERS
BRULEURS
BRENNER
QUEMADORES
BRUCIATORI

MANUAL OF
- INSTALLATION
- OPERATION
- MAINTENANCE

GAS BURNERS

S3
S5
S10
S18

SINGLE STAGE VERSION

M03946CF Rev. 05 04/01

CE

Complying with
90 / 396 / CEE
GAS DIRECTIVE

DANGERS, WARNINGS AND NOTES OF CAUTION

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

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

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

CAREFULLY KEEP THIS MANUAL FOR FUTURE REFERENCE.

1) GENERAL INTRODUCTION

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

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

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

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

Contact qualified personnel only.

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

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

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

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

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

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

2) SPECIAL INSTRUCTIONS FOR BURNERS

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

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

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

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

Special warnings

- Make sure that the burner has, on installation, been firmly secured to the appliance, so that the flame is generated inside the appliance fire-box.
- Before the burner is started and, thereafter, at least once a year, have qualified personnel perform the following operations:

a set the burner fuel flow rate depending on the heat input of the appliance;

b set the flow rate of the combustion-supporting air to obtain a combustion efficiency level at least equal to the lower level required by the regulations in force;

c check the unit operation for proper combustion, to avoid any harmful or polluting unburnt gases in excess of the limits permitted by the regulations in force;

d make sure that control and safety devices are operating properly;

e make sure that exhaust ducts intended to discharge the products of combustion are operating properly;

f on completion of setting and adjustment operations, make sure that all mechanical locking devices of controls have been duly tightened;

g make sure that a copy of the burner use and maintenance instructions is available in the boiler room.

- In case of a burner shut-down, reser the control box by means of the RESET pushbutton. If a second shut-down takes place, call the Technical Service, **without trying to RESET further**.
- The unit shall be operated and serviced by qualified personnel only, in compliance with the regulations in force.

3) GENERAL INSTRUCTIONS DEPENDING ON FUEL USED

3a) ELECTRICAL CONNECTION

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

3b) FIRING WITH GAS, LIGHT OIL OR OTHER FUELS

GENERAL

- The burner shall be installed by qualified personnel and in compliance with regulations and provisions in force; wrong installation can cause injuries to people and animals, or damage to property, for which the manufacturer cannot be held liable.
- Before installation, it is recommended that all the fuel supply system pipes be carefully cleaned inside, to remove foreign matter that might impair the burner operation.
- Before the burner is commissioned, qualified personnel should inspect the following:

a the fuel supply system, for proper sealing;
b the fuel flow rate, to make sure that it has been set based on the firing rate required of the burner;
c the burner firing system, to make sure that it is supplied for the designed fuel type;
d the fuel supply pressure, to make sure that it is included in the range shown on the rating plate;
e the fuel supply system, to make sure that the system dimensions are adequate to the burner firing rate, and that the system is equipped with all the safety and control devices required by the regulations in force.

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

SPECIAL INSTRUCTIONS FOR USING GAS

Have qualified personnel inspect the installation to ensure that:

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

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

Precautions if you can smell gas

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

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

DIRECTIVES AND STANDARDS

Gas burners

European directives

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

Harmonized standards

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

Light oil burners

European directives

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

Harmonized standards

-UNI EN 267-2011(Automatic forced draught burners for liquid fuels)
-EN 55014-1 (Electromagnetic compatibility- Requirements for house hold appliances, electric tools and similar apparatus)
-EN 60204-1:2006 (Safety of machinery – Electrical equipment of machines.)
-CEI EN 60335-1 (Specification for safety of household and similar electrical appliances);
-CEI EN 60335-2-102 (Household and similar electrical appliances. Safety. Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections).
-UNI EN ISO 12100:2010 (Safety of machinery - General principles for design - Risk assessment and risk reduction);

Heavy oil burners

European Directives

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

Harmonized standards

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

Gas - Light oil burners

European Directives

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

Harmonized standards

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

Gas - Heavy oil burners

European directives:

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

Harmonized standards

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

Industrial burners

European directives

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

Harmonized standards

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

Burner data plate

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

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

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

SYMBOLS USED



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



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



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

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

BURNER SAFETY

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



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

Residual risks deriving from misuse and prohibitions

The burner has been built in order to make its operation safe; there are, however, residual risks.



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.

TECHNICAL DATA

BURNER TYPE		S3	S5	S10	S18
Input	min. kW	20	35	65	80
	max. kW	35	70	120	200
	min. kcal/h	17.200	30.000	55.900	68.800
	max. kcal/h	30.000	60.200	103.200	172.000
Fuel		natural gas	natural gas	natural gas	natural gas
Category		I_{2H}	I_{2H}	I_{2H}	I_{2H}
Gas flow rate min. - max.	Stm^3/h	2.1 - 3.7	3.7 - 7.4	6.9 - 12.7	8.5 - 21.2
Gas pressure min.*	mbar	20	20	20	20
Gas pressure max.	mbar	65	200	200	200
Electric supply - frequency		230V - 50 Hz	230V - 50 Hz	230V - 50 Hz	230V - 50 Hz
Total power consumption	W	230	250	400	400
Fan motor (2800 rpm)	W	50	100	150	150
Protection		IP40	IP40	IP40	IP40
Approx. weight	Kg	12.5	14	14.5	23.5
Gas train size		1/2”	1/2”	3/4”	1”
Gas connection		Rp1/2	Rp1/2	Rp3/4	Rp1
Operation		single stage	single stage	single stage	single stage
Destination country		*	*	*	*

Note: all the gas flow rates (Stm^3/h) are referred to standard gas conditions: 1013 mbar pressure, 15° C temperature.

Flow rates are referred to G20 natural gas (nett calorific value, 34.02 MJ/Stm^3); if G25 is used (n.c.v. 29.25 MJ/Stm^3), flow rates must be multiplied by 1.16 factor.

* Minimum pressure requested to get the maximum rate with any back-pressure in combustion chamber (referring to the performance curves). The burner operates correctly also with lowest pressure only if these are enough to guarantee the necessary gas rate.

BURNER MODEL IDENTIFICATION

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

Type: **S3**	Model:	**M-.**	**TN.**	**S.**	***.**	**A.**	**0.**	**15**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

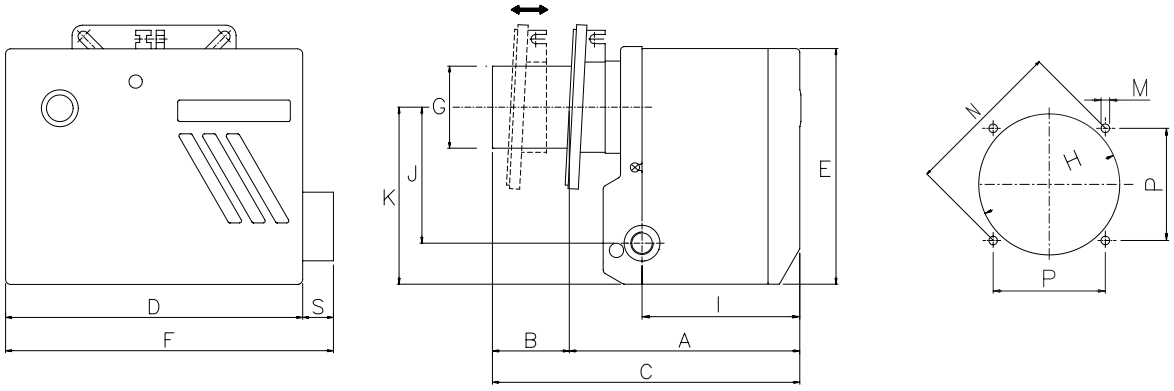
(1)	BURNER TYPE		
(2)	FUEL		M - Natural gas
(3)	OPERATION	Available versions	TN - Single stage
(4)	BLAST TUBE LENGHT	(See overall dimensions)	
		Available versions	S - Standard
			L - Long
(5)	DESTINATION COUNTRY		* - See data plate
(6)	SPECIAL VERSIONS		A - Standard
(7)	BURNER EQUIPMENT	Available versions	0 - 2 valves
			1 - 2 valves + leak detection monitor (optional for input < 1200 kW)
(8)	GAS TRAIN SIZE	(See technical data)	
		15= Rp1/2 20=Rp3/4 25= Rp1	

WARNING:
Applications involving power greater than 160 kW (137.600 kcal/h), are allowed only for heat generators and depression owens.

OVERALL DIMENSIONS

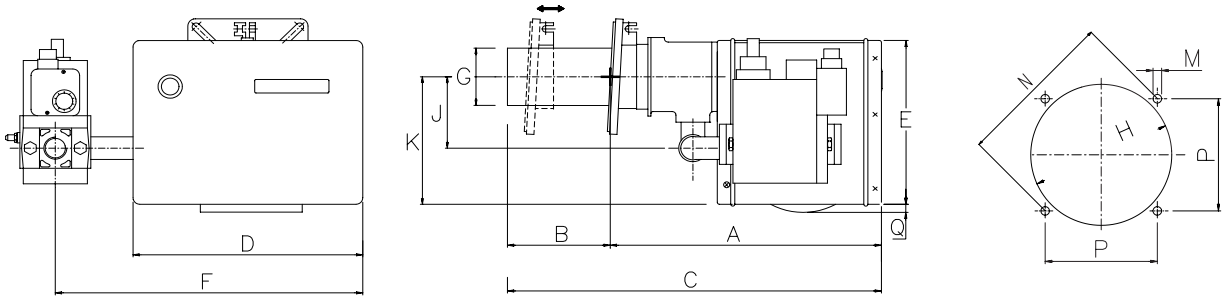
S3

Fig. 4a



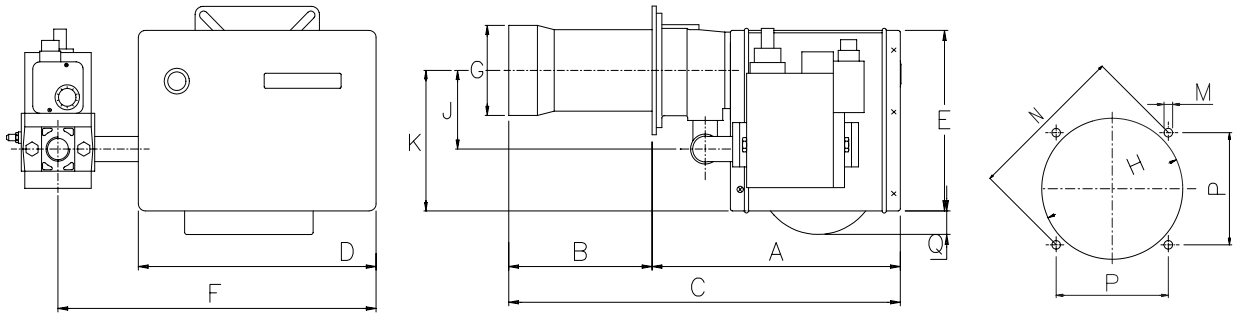
S5

Fig. 4b



S10 - S18

Fig. 4c



	A	B	BL	C	CL	D	E	F	G	K	J	I	H	S	P	M	N	Q
S3	225	75÷0	150÷0	300	375	290	420	320	80	175	135	155	90	30	110	M8	155.5	-
S5	325	80÷0	180÷0	410	510	310	420	395	80	180	85	-	90	-	110	M8	155.5	7

	A	B	BL	C	CL	D	E	F	G	K	J	H	P	M	N	Q
S10	355	180	275	535	630	340	255	455	108	200	110	125	120	M8	169.7	30
S18	355	205	300	560	655	340	255	455	126	200	110	132	120	M8	169.7	30

PERFORMANCE CURVES

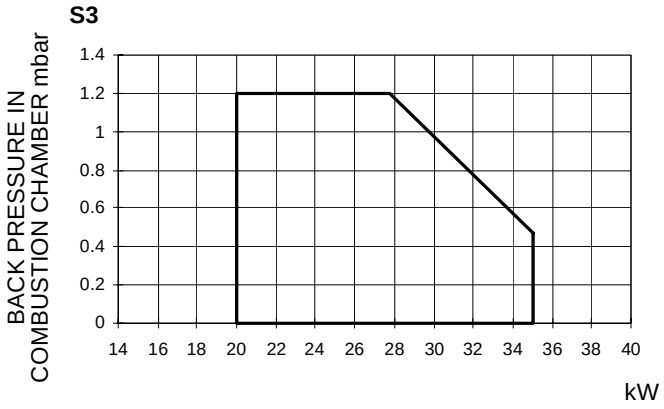


Fig. 5

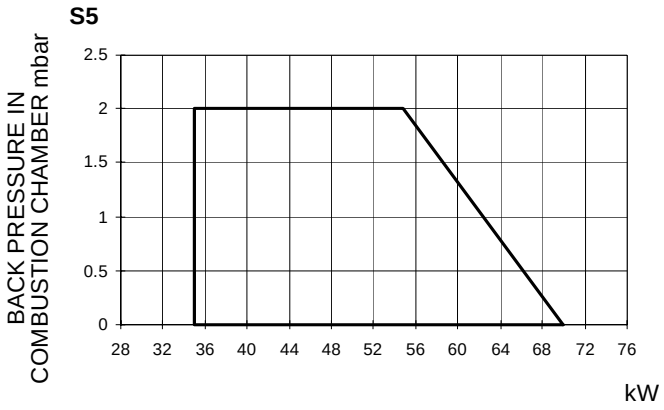


Fig. 6

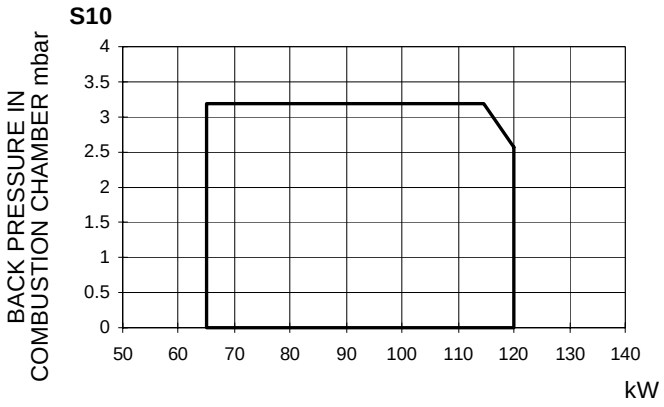


Fig. 7

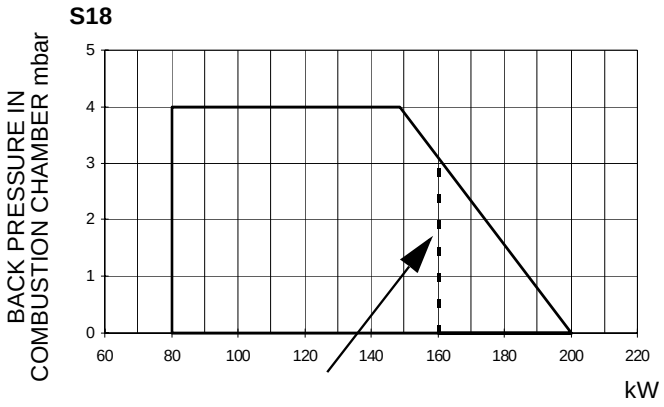


Fig. 8

NOTE: Applications involving power greater than 160 kW (137.600 kcal/h), are allowed only for heat generators and depression owens.

To get the power in Kcal/h, multiply the value in kW by 860.

PRESSURE - RATE IN COMBUSTION HEAD CURVES

Curves are referred to a null pressure in combustion head!

The pressure - gas rate curves are referred to the burner in operation with 3% of O_2, with the combustion head at the maximum opening, servocontrol at the maximum opening and gas butterfly valve fully opened.. Refer to Fig. 9, showing the correct way to take the gas pressure, considering values of backpressure in combustion chamber.

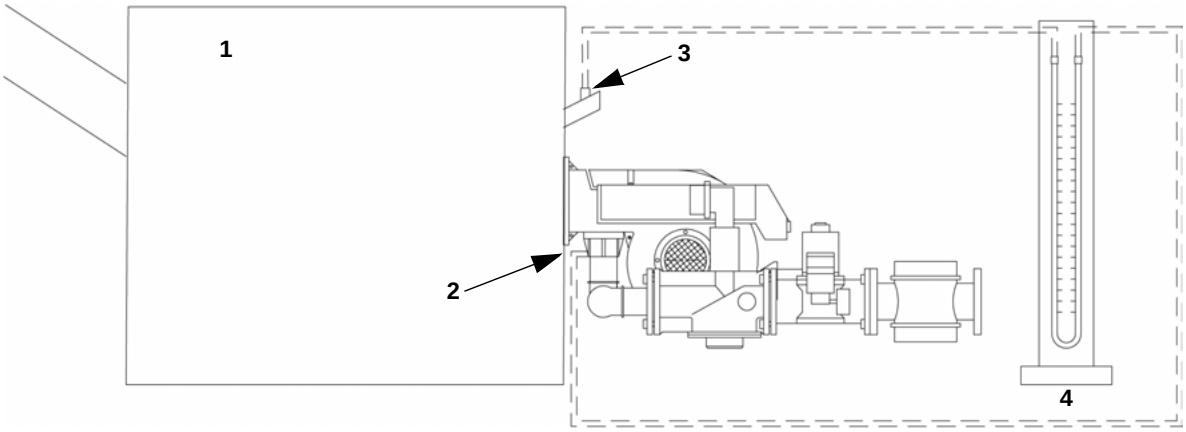


Fig. 9

Key

1 Boiler
2 Gas pressure port on butterfly valve
3 Sightglass cooling port
4 Water column pressure gauge

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

S3

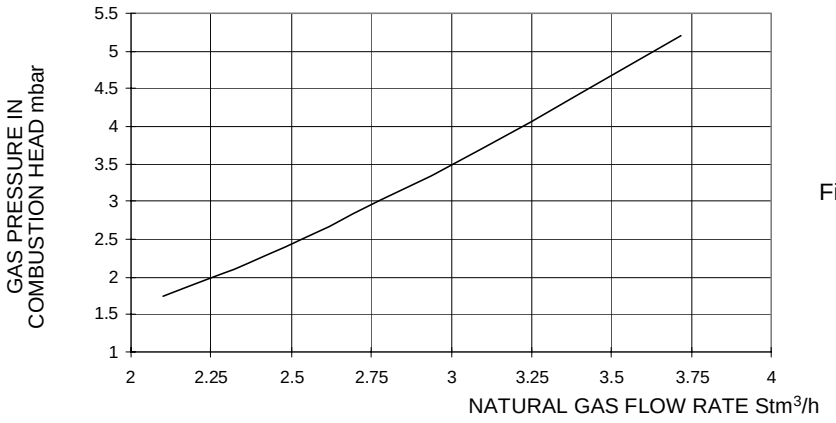


Fig. 10

S5

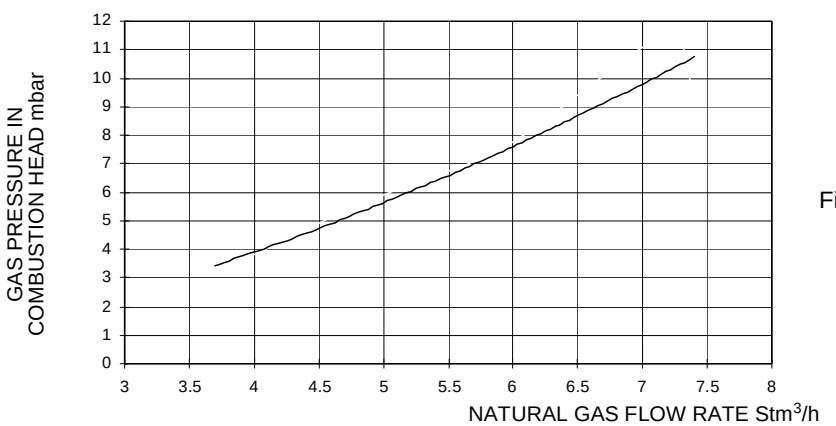


Fig. 11

S10

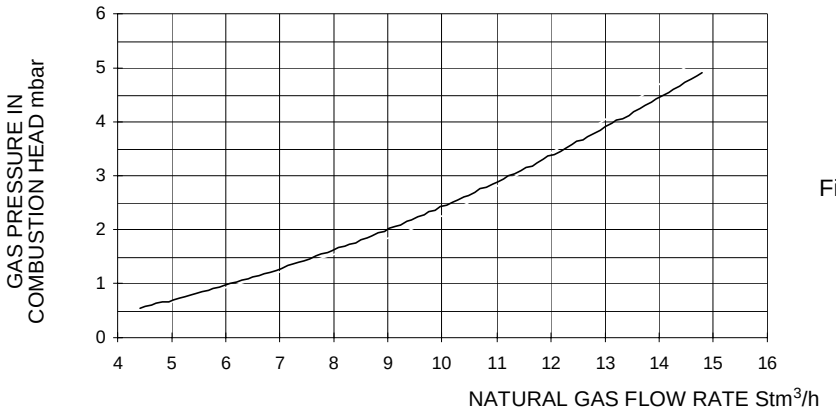


Fig. 12

S18

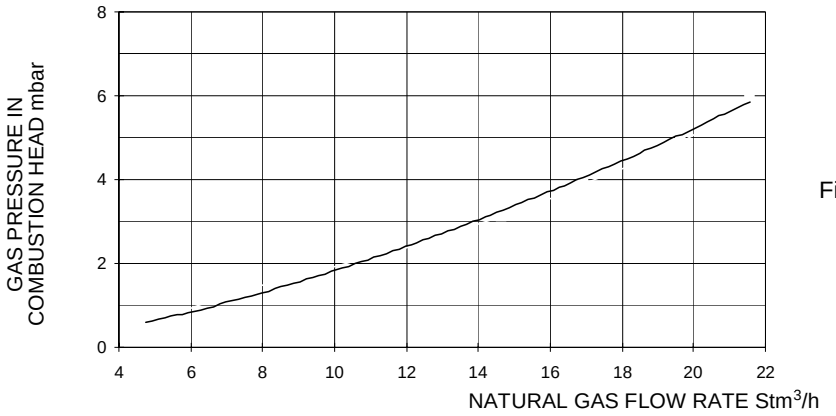


Fig. 13

MOUNTINGS AND CONNECTIONS

Packing

The burners are despatched in cardboard packages of dimensions:

S3	400 x 300 x 360 mm (W x H x D)
S5	370 x 560 x 310 mm (W x H x D)
S10/S18	420 x 620 x 340 mm (W x H x D)
S10/S18 long blast tube	770 x 440 x 510 mm (W x H x D)

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

1 burner with detached gas train (excluded S3);

1 gasket to be inserted between the burner and the boiler;

1 envelope containing this manual

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

Fig. 14 - Fitting the burner to the boiler

Fix the flange of the burner to the boiler as shown in Fig. 14.

After fitting the burner to the boiler ensure that the space between the blast tube and the refractory lining is sealed with appropriate insulating material (ceramic fibre cord or refractory cement).

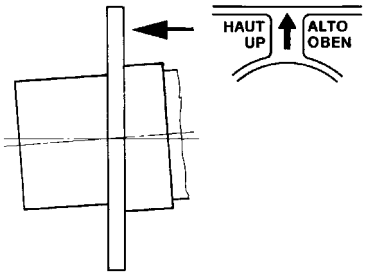


Fig. 14

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 Fig. 15. 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 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 100 mm into the combustion chamber.

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.

- Pressurised boilers with flame reversal: in this case the blast tube must penetrate at least 50 - 100 mm into combustion chamber in respect to the tube bundle plate.

Key

a) Heat input Q in kW

b) Lenght of the flame tube in meters

c) Flame tube firing intensity in kW/m^3

d) Combustion chamber diameter (m)

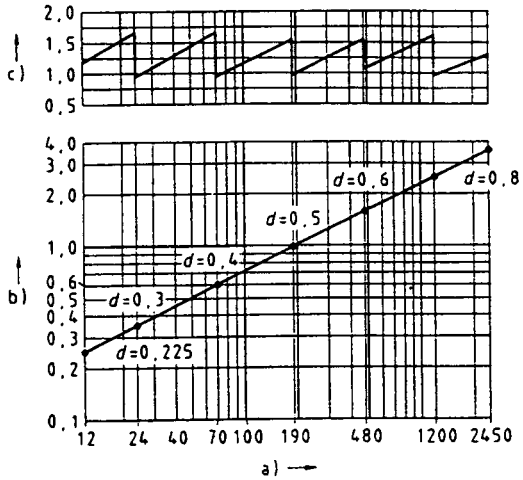


Fig. 15 - Firing intensity, diameter and lenght of the test flame tube as a function of the heat input Q..

ELECTRICAL CONNECTIONS

- Remove the burner cover.
- Carry out the electrical connections to the multiple connector as shown in Fig. 16.
- Refit the burner cover.

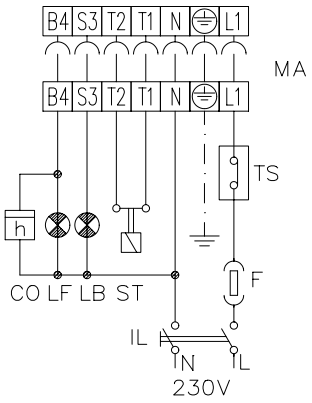


Fig. 16

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.

GAS TRAIN INSTALLATION DIAGRAM

The diagrams in Fig. 17a and Fig. 17b show the components of the gas train which are included in the delivery and those which must be fitted by the installer. The diagrams complies with regulations in force.

Fig. 17a

Burners equipped with two separate gas valves

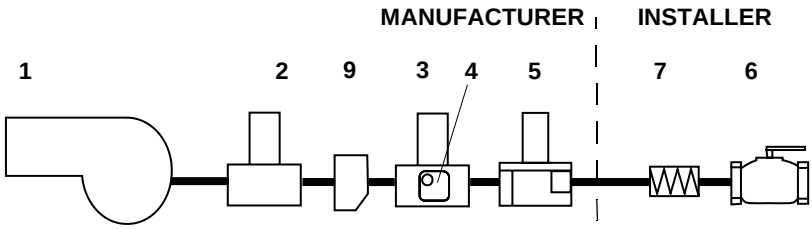
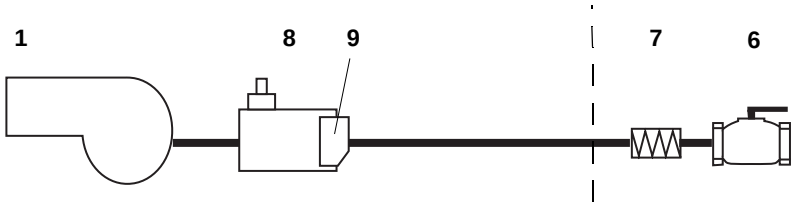


Fig. 17b

Burners equipped with Multibloc DUNGS MB-DLE... valves group, or BM771; (2 valves + pressure switch + gas filter + governor)



Key

1 Burner
2 Gas valve EV2
3 Gas valve EV1
4 Minimum gas pressure switch
5 Governor + gas filter
6 Manual shut-off valve
7 Bellow joint
8 Multibloc valves group
9 Leakage control device

SETTINGS

WARNING!
THE SEALED SCREWS MUST NOT BE UNSCREWED!
IN A SUCH CASE THE DEVICE WARRANTY IS IMMEDIATELY INVALIDATE!

Fig. 18 - Multifunction gas valve BM771

The multifunction gas valve BM 771 includes 2 gas valves, a pressure governor and a gas filter.

- To carry out the regulations, use the fitted 2 mm Allen key.
- Gas flow regulation is possible by means of the RP regulator: screwing, the gas flow increases and unscrewing it decreases.
- To set the ignition gas flow, turn the screw VR: screw to increase and unscrew to decrease.

Note: PP= gas pressure gauge

Settings

- Connect the manometer to the pressure gauge PP
- Turn on the burner with adequate air flow, measure the gas pressure at burner start and during normal operation (10 s after ignition).The pressure during ignition must be lower than during normal operation.
- If the ignition pressure is too high and settings by means of the screw RP are not successful, reduce the ignition pressure by means of the screw VR.

Coil replacement

To remove the coil slacken the screw VSB and pull the coil upward.

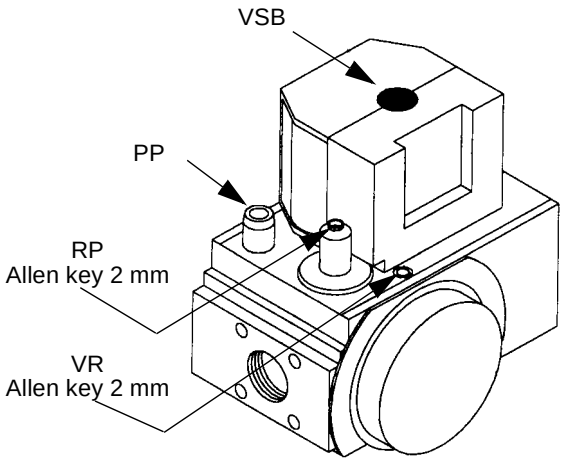


Fig. 18

Fig. 19 - Solenoid valve Brahma EG..L

- To adjust the gas flow unscrew the screw VB and turn the element n° 3.
- Screw to decrease the gas rate and unscrew to increase.
- To set the fast stroke turn the screw n° 1; screw to increase the opening time and unscrew to decrease.
- The nut n° 2 allows to set the ignition gas rate; use a 6 mm key. Screw to decrease the gas rate and unscrew to increase.

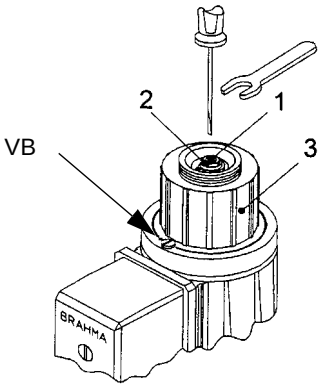


Fig. 19

Fig. 20 - Solenoid valve Brahma EG..S

- To adjust the flow rate unscrew the plug T and use an Allen key on the regulator VR, located in the bottom side of the valve.
- Screw to decrease the gas rate and unscrew to increase.

At the end of settings refit the plug T.

Coil replacement

- Remove the retaining ring on the upper section and withdraw the coil (B).
- Refit the retaining ring after settings.

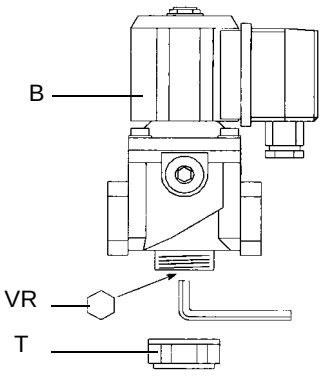


Fig. 20

Gas valve Dungs MV-DLE

- To adjust the gas flow rate loosen the screw VB and rotate the regulator RP as necessary. Flow decreases screwing and increases unscrewing.
- Tighten the screw VB.
- To set the fast opening remove cover T, reverse it upside down and use it as a tool to rotate the screw VR. Clockwise rotation reduces the ignition flow rate, anticlockwise rotation increase it.

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

Do not use a screwdriver on the screw VR!

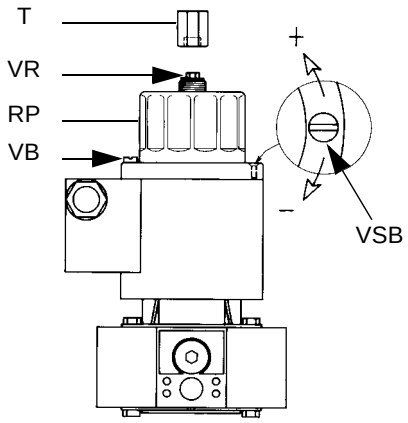


Fig. 21

Fig. 22 - Multibloc MB-DLE - VPS504

The multibloc unit is a compact unit consisting of two valves, gas pressure switch, pressure stabilizer and gas filter. It can be paired jointly to the Dungs VPS504 sealing controls.

The gas flow 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 flow increases and screwing it is reduced.

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.

Leakage control device VPS504 (Optional)

The VPS504 check the operation of the seal of the gas shut off valves costituting the MB-DLE. This check, carried out as soon as the boiler thermostat gives a start signal to the burner, creates, by means of the diaphragm pump inside it, a pressure in the test space of 20 mbar higher than the supply pressure. When wishing to monitor the test, install a pressure gauge ranged to that of the pressure supply point PA. If the test cycle is satisfactory, after a few seconds the consent light LC (yellow) comes on. In the opposite case the lockout light LB (red) comes on.

To restart it is necessary to reset the appliance by pressing the illuminated pushbutton LB.

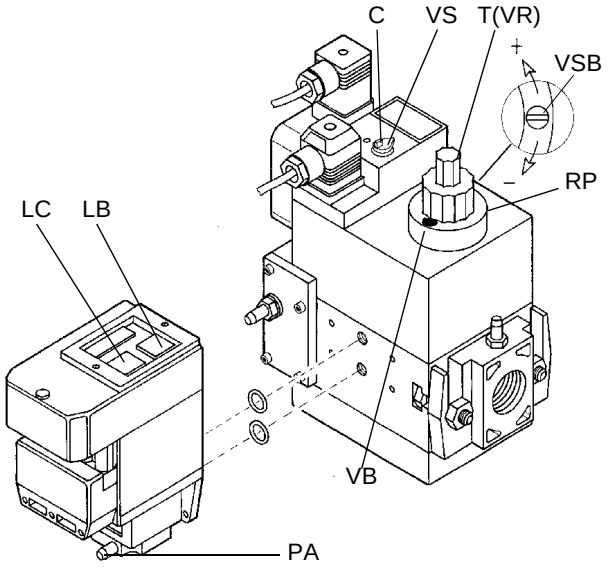


Fig. 22

Pressure governor

Remove the cap T.

To increase the gas pressure at the outlet use a screwdriver on the screw TR as shown in Fig. 23.

Screw to increase the pressure, unscrew to decrease.

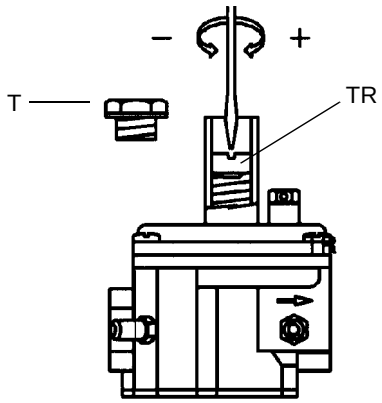


Fig. 23

AIR FLOW SETTING

WARNING: During commissioning operations, do not let the burner operate with insufficient air flow (danger of formation of carbon monoxide); if this should happen, shut down the burner, increase the opening of the air damper and start up the burner again to ensure the purging of the carbon monoxide from the combustion chamber.

Type S3

Adjust the air flow rotating the screw VBS.

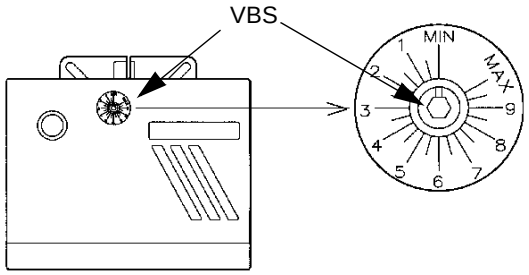


Fig. 24

Type S5, S10 and S18

Slacken the screw VBS and turn the air damper manually as required.

At the end of adjustment tight the screw VBS.

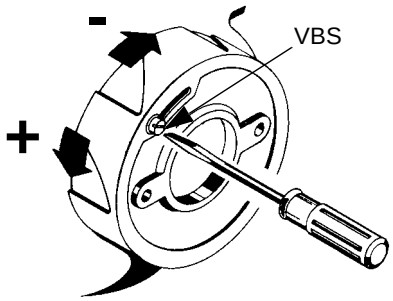


Fig. 25

NOTE: Check the combustion with the cover fitted on the burner!

IMPORTANT: Set the air flow rate referring to the following values: minimum CO2 value for G20, 9.75%; if the burner is calibrated to its minimum rate the value must be 9%.

Calibration of air pressure switch

Calibration is carried out as follows.:

- Remove the transparent plastic cap.
- With the burner in operation, after air and gas setting have been completed, slowly turn the adjusting ring nut VR in the clockwise direction until the burner lockout, read the value on the pressure switch scale and reduce it by 0.5 mbar.
- Repeat the ignition cycle of the burner and check it starts properly.
- Refit the transparent plastic cover on the pressure switch.

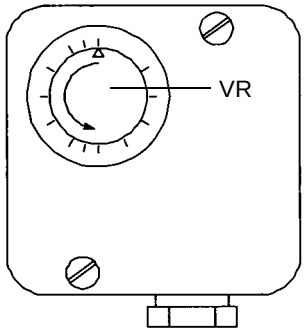


Fig. 26

Calibration of minimum gas pressure switch

Calibration is carried out as follows:

- Remove the transparent plastic cap (not on SIT pressure switch).
- With the burner in operation test the pressure on the pressure port at the input of the gas filter; slowly close the manual shut-off valve (n. 6 in Fig. 17a and Fig. 17b) until the detected pressure is reduced by 50%.
- Verify CO emissions of the burner; if the measured value is less than 80 ppm rotate the ring nut until the burner shuts off.

If CO emissions are greater than 80 ppm open the manual shut-off valve until the CO value is reduced to 80 ppm, then screw down the adjusting ring nut until the burner shuts off.

- Fully open the manual shut-off valve n. 6 in Fig. 17a and Fig. 17b.
- Refit the transparent plastic cover on the pressure switch (not on SIT pressure switch).

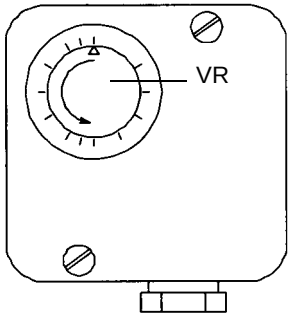


Fig. 27

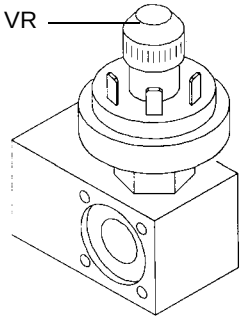


Fig. 28 - Pressure switch SIT

Adjusting the combustion head

The burner is adjusted in the factory with the combustion head in the "MAX" position, corresponding to the maximum capacity.

To operate at a reduced capacity move back the burner head progressively, towards the "MIN" position.

Adjust the combustion head by means of the screw VRT as shown in Fig. 29 and Fig. 30.

Burner type S3

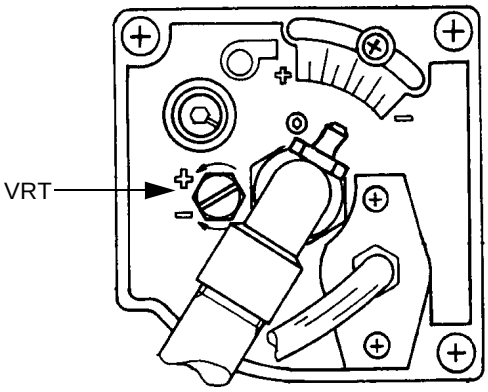


Fig. 29

Burners type S5, S10 and S18

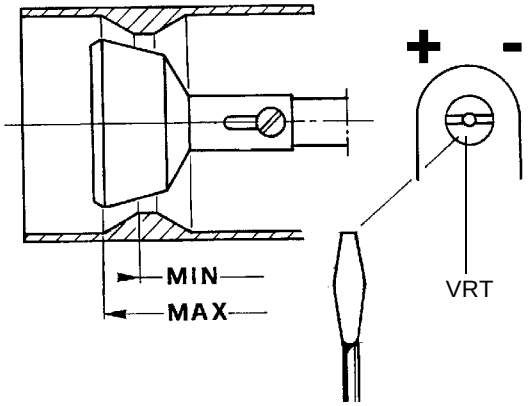


Fig. 30

PART II: OPERATION MANUAL

LIMITATIONS OF USE

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

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

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

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

NEVER OPEN OR DISMANTLE ANY COMPONENT OF THE MACHINE.

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

IN THE EVENT OF REPEATED LOCKOUTS, DO NOT PERSIST WITH THE RESET BUTTON AND CONTACT QUALIFIED PERSONNEL WHO WILL PROCEED TO ELIMINATE THE MALFUNCTION.

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

OPERATION

- Turn on the burner operating on the boiler main switch.
- Check the flame control device is not locked and, if necessary, reset it operating on the reset button, accessible from the hole on the burner's casing.
- Check the serie of thermostats or pressure switches enable the burner to operate.
- (Only burners fitted with leakage control device): the check cycle of the leakage control starts, the end of check is signalled by the lamp LC on the leakage control device. Once the check has been completed, the ignition cycle of the burner starts. In the event of a gas leak in a valve, the leakage control device locks and the LB lamp lights.To release press the button LB on the device.
- The burner starts and the flame control device drives the burner's fan.
- At the end of pre-purgue phase the gas solenoid valves are energized and the burner starts up.

PART III: MAINTENANCE MANUAL

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.

N.B. All operations on the burner must be carried out with the power disconnected

PERIODIC OPERATIONS

- Remove, check and clean the combustion head (see Fig. 31a, Fig. 31b, Fig. 31c);
- Check the ignition electrode, clean and adjust it and, if necessary, replace it (Fig. 32);
- Check the detection electrode, clean and adjust it and, if necessary, replace it (Fig. 32). If in doubt, verify the detection circuit with the burner in operation, referring to the diagram in Fig. 33.

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

Removing the combustion head

S3

Type S3 (Fig. 31a) and S5 (Fig. 31b)

- Remove the burner from the gas supply;
- Slacken the screw VE on the blast tube and pull off the burner: at this point the combustion head and the electrodes are easy accessible.

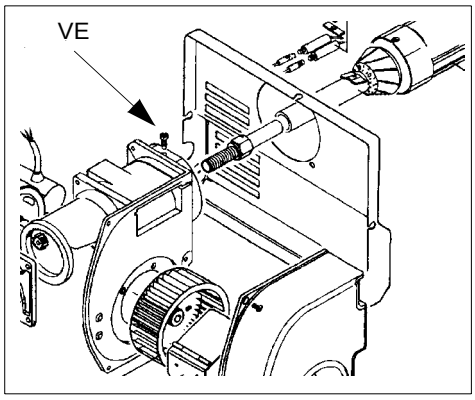


Fig. 31a

S5

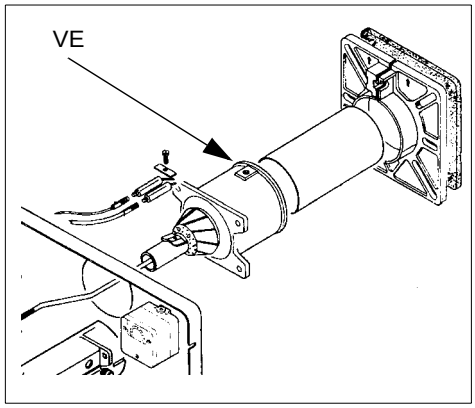


Fig. 31b

S10 - S18

Type S10 - S18 (Fig. 31c)

- Remove the burner from the gas supply;

To access the combustion head and the electrodes, slacken the screw VE on the blast tube and pull off the burner; provide a stable surface where leave the burner during such operations.

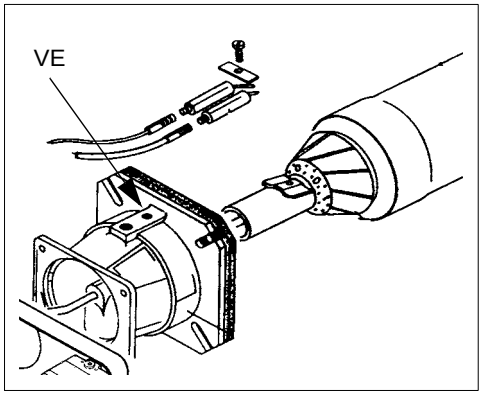


Fig. 31c

Correct electrodes position

To guarantee a proper ignition, the measures indicated in Fig. 32 must be respected.

Ensure the locking screw of the electrodes group is tight before refit the burner.

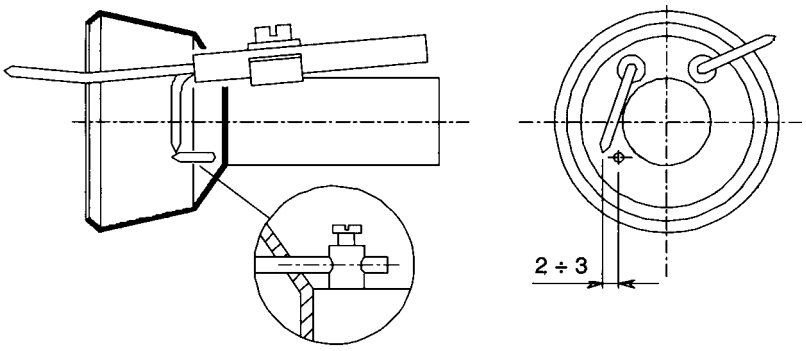


Fig. 32

Checking the ionization current

To measure the detection signal intensity, follow the scheme in Fig. 33.

If the signal is less than the value indicated, check the position of the detection electrode, the electric contacts and, if necessary, replace the electrode.

.

Flame controller	Minimum flame signal
LGB21/22	3 µA
LMG21/22	3 µA
VM41	1.2 µA

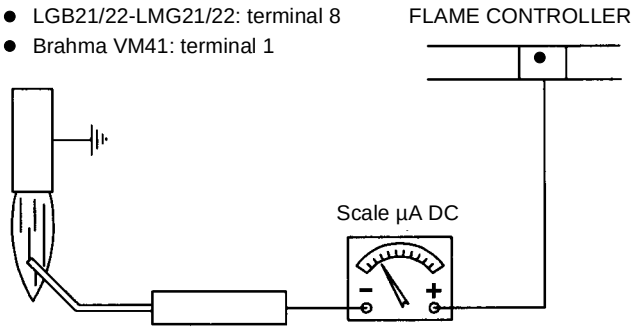


Fig. 33

If the power supply to the burner is 230V phase-phase (without a neutral), with the Landis LGB2... o LMG2... flame control device, between the terminal 2 on the board and the earth terminal, an RC Landis RC466890660 filter must be inserted

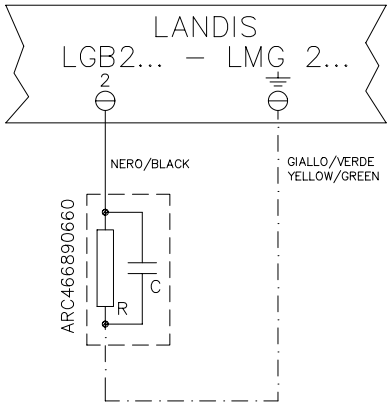


Fig. 34a

Key

C - Capacitor (22nF/250V)
LGB - LMG - Landis flame control device
R - Resistor (1Mohm)
RC466890660 - RC Landis filter

If the power supply to the burner is 230V phase-phase (without a neutral), with the Brahma VM4.., to increase the voltage between the electrode and the ground, you need to use the insulation transformer Brahma AR1 (our code 2531006), connected as shown in Fig. 34b

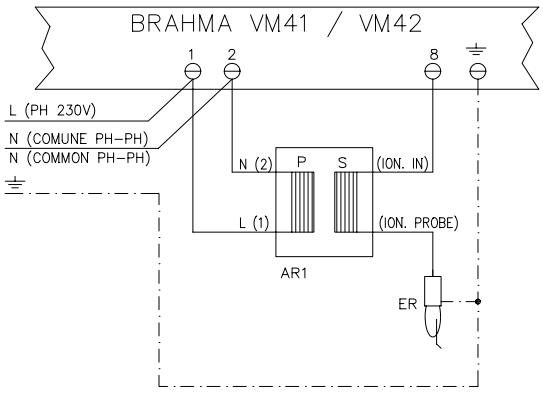


Fig. 34b

Key

AR1 Brahma insulation transformer
ER Detection electrode
L Phase
N Common
P Transformer primary winding
S Transformer secondary winding
VM4..Brahma flame control device

TROUBLESHOOTING

	BURNER DOESN'T START	BURNER CONTINUES PRE-PURGUE PHASE	BURNER DOESN'T START AND LOCKS	BURNER DOESN'T START AND REPEATS CYCLE	BURNER STARS AND REPEATS CYCLE	BURNER LOCKS DURING OPERATION	BURNER SHUTS OFF AND REPEATS CYCLE DURING OPERATION	FLAME CONTROLLER REPEATS THE CYCLE WITHOUT GIVE CONSENT	BURNER STARTS AND LOCKS
LACK OF GAS	●								
GAS PRESSURE SWITCH FAULT	●								
OPEN THERMOSTATS OR PRESSURE SWITCHES ON BOILER	●								
FLAME CONTROLLER FAULT	●	●	●			●			●
PRESSURE SWITCH FAULT OR BAD SETTING	●		●			●		●	
FUSES INTERVENTION	●				●				
GAS PRESSURE SWITCH BAD SETTING				●	●		●		
IGNITION TRANSFORMER FAULT			●						
IGNITION ELECTRODE BAD POSITION			●						
PHASE-PHASE ELECTRICAL SUPPLY*									●
GAS GOVERNOR FAULT				●	●		●		
DETECTION ELECTRODE BAD POSITION						●			●

* See Fig. 34a and Fig. 34b.

ELECTRICAL DIAGRAMS

Electrical diagrams complete key

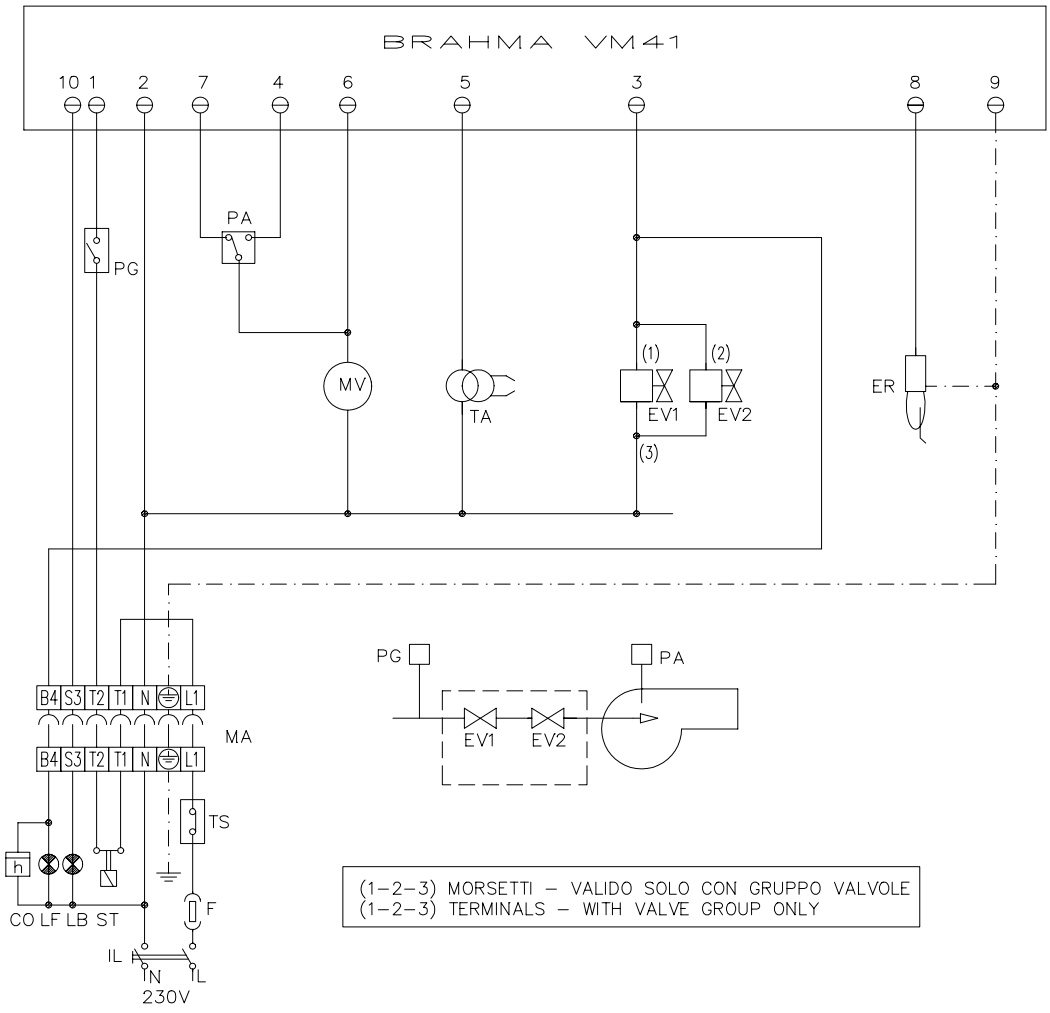
CO	Operation time counter
ER	Flame detetion electrode
EV1	Network side solenoid gas valve (or valves group)
EV2	Burner side solenoid gas valve (or valves group)
F	Fuse
IL	Line switch
L	Phase
LB	Flame lockout signalization light
LF	Burner in operation light
LGB.. / LMG..	Landis flame control device
MA	Burner power supply terminal block
MV	Fan motor
N	Neutral
PA	Air pressure switch
PG	Minimum gas pressure switch
ST	Thermostats or pressure switches group
STA12B3.41/63N21L	Berger servocontrol for air damper
TA	Ignition transformer
TS	Boiler safety thermostat/pressure switch
VM41	Brahma flame control device
VPS504	Dungs valves leakage control device (otional)

NOTE: The bridge between terminals 7 and 9 must be present only if LANDIS LGB21.33 flame controller is used.

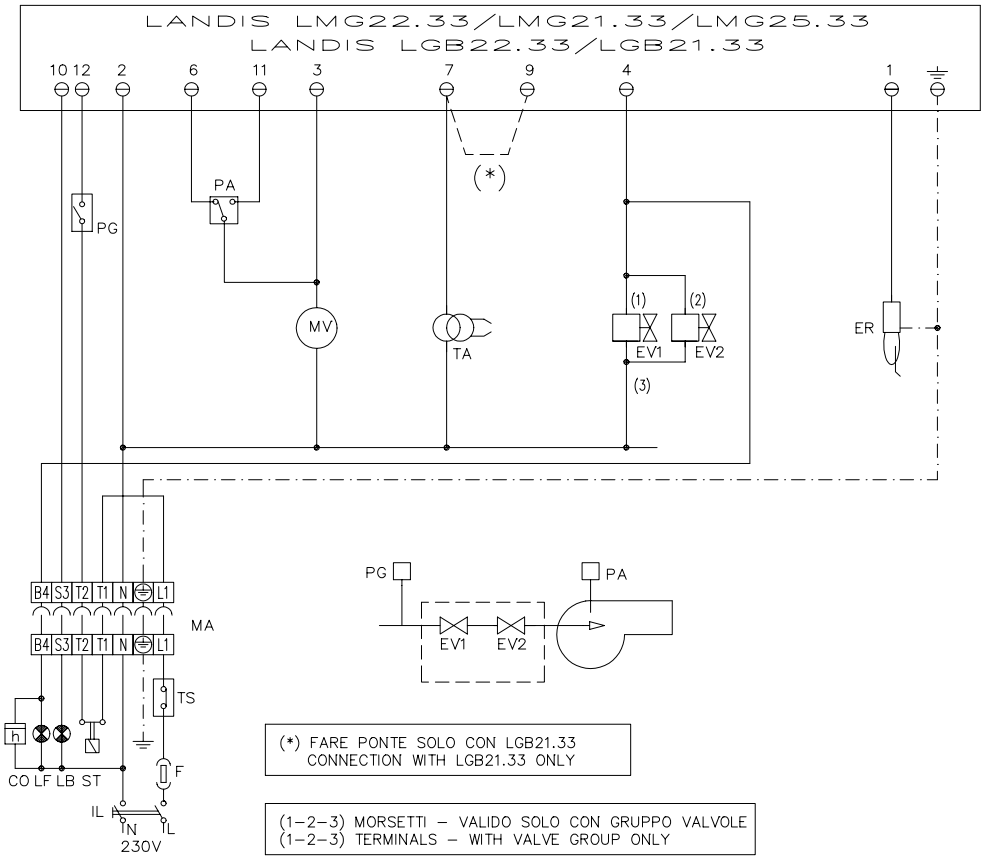
WARNING:

1 - Electrical supply 230V 50/60Hz 2N a.c.
2 - Do not reverse phase with neutral
3 - Ensure the burner is properly hearted

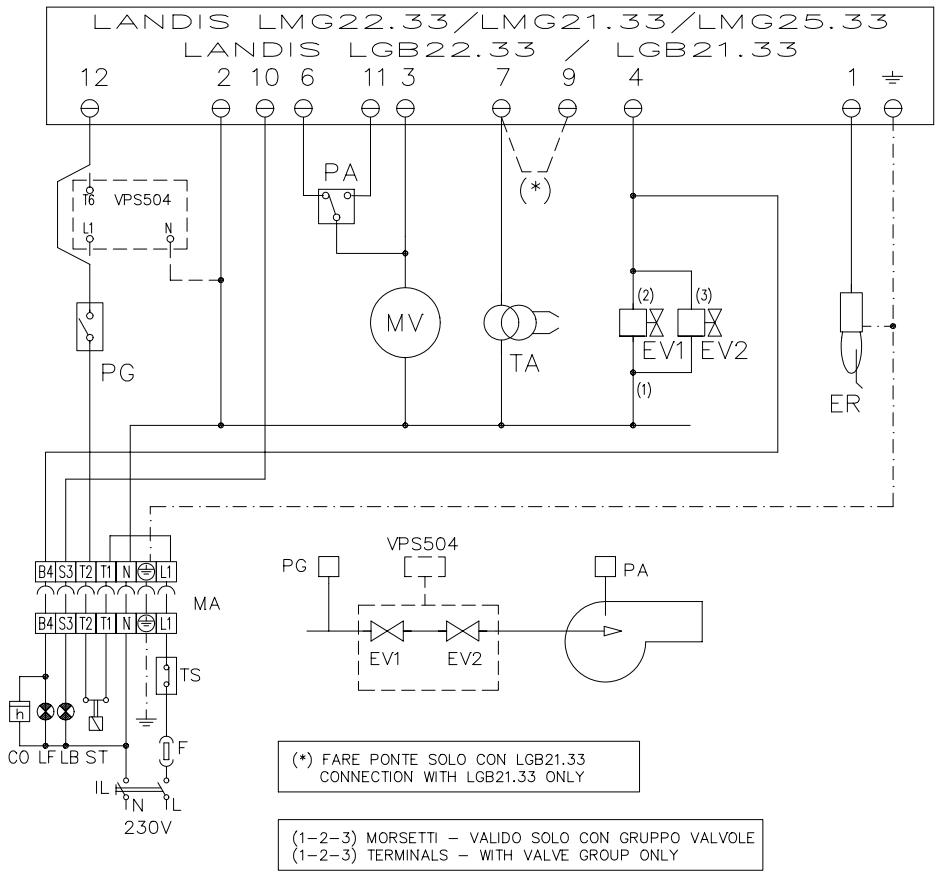
Electrical diagram code 01-374 - Burner type S3



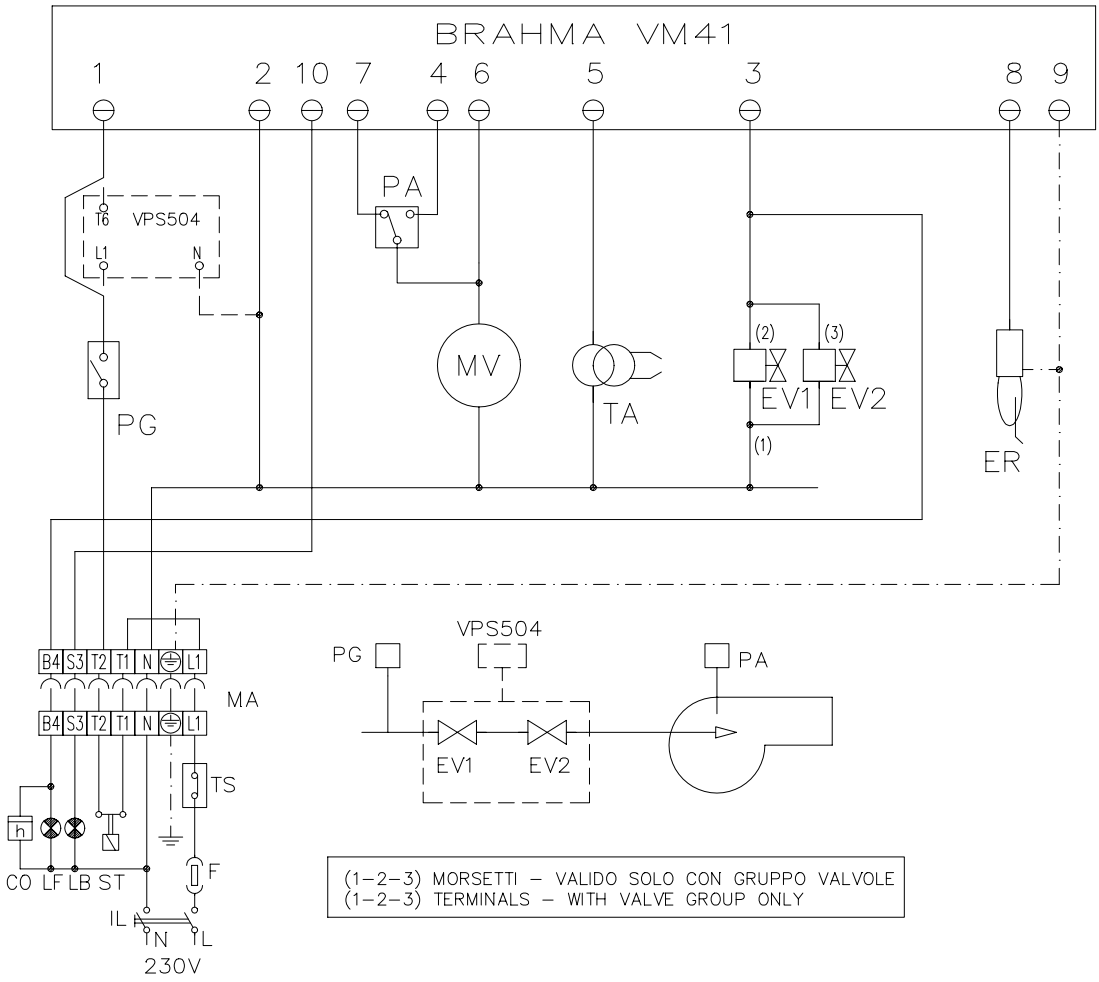
Electrical diagram code 01-318/4 - Burners type S3

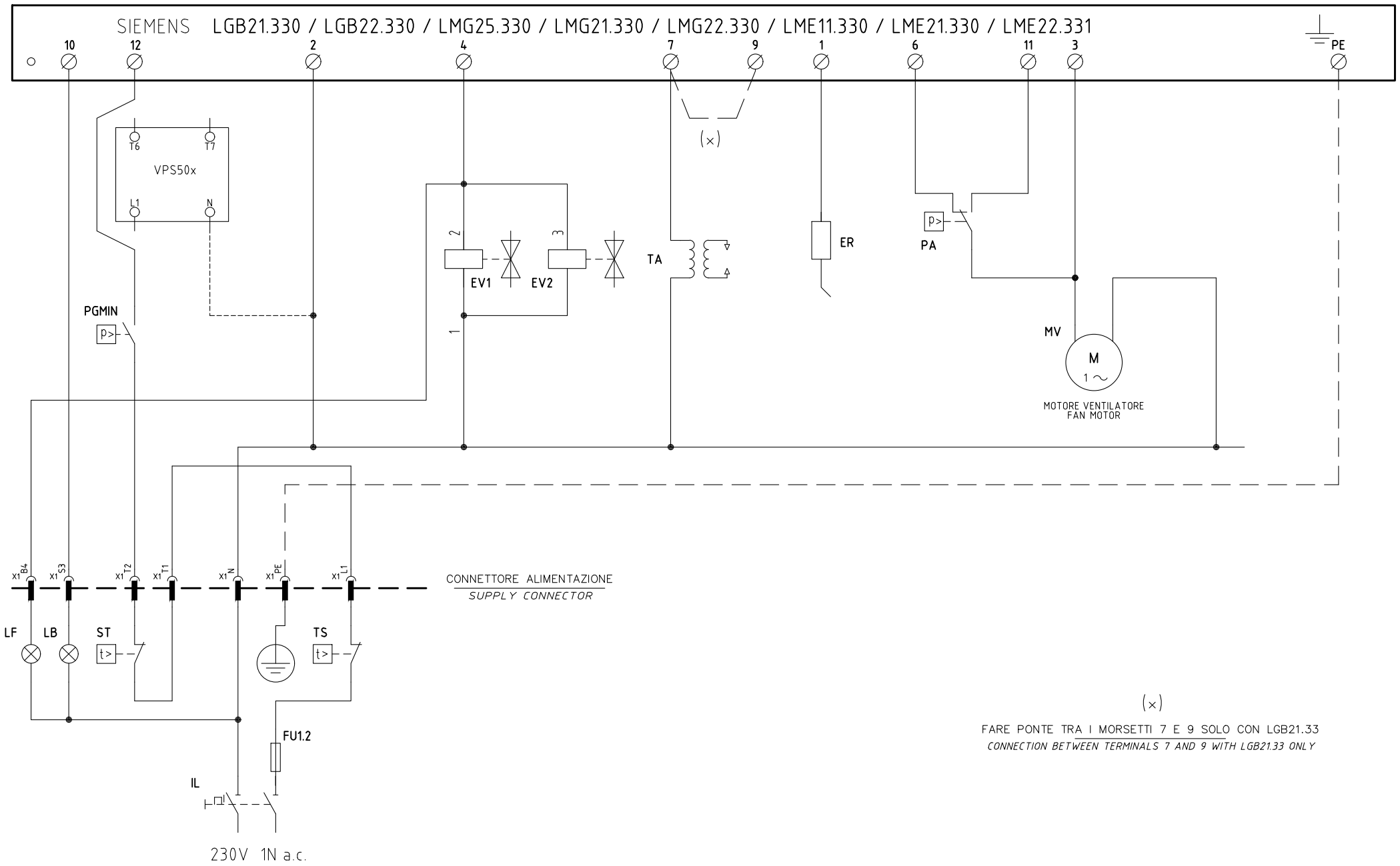


Electrical diagram code 01-319/3 - Burners type S5 - S10 - S18



Electrical diagram code 01-324/2 - Burners type S5 - S10 - S18





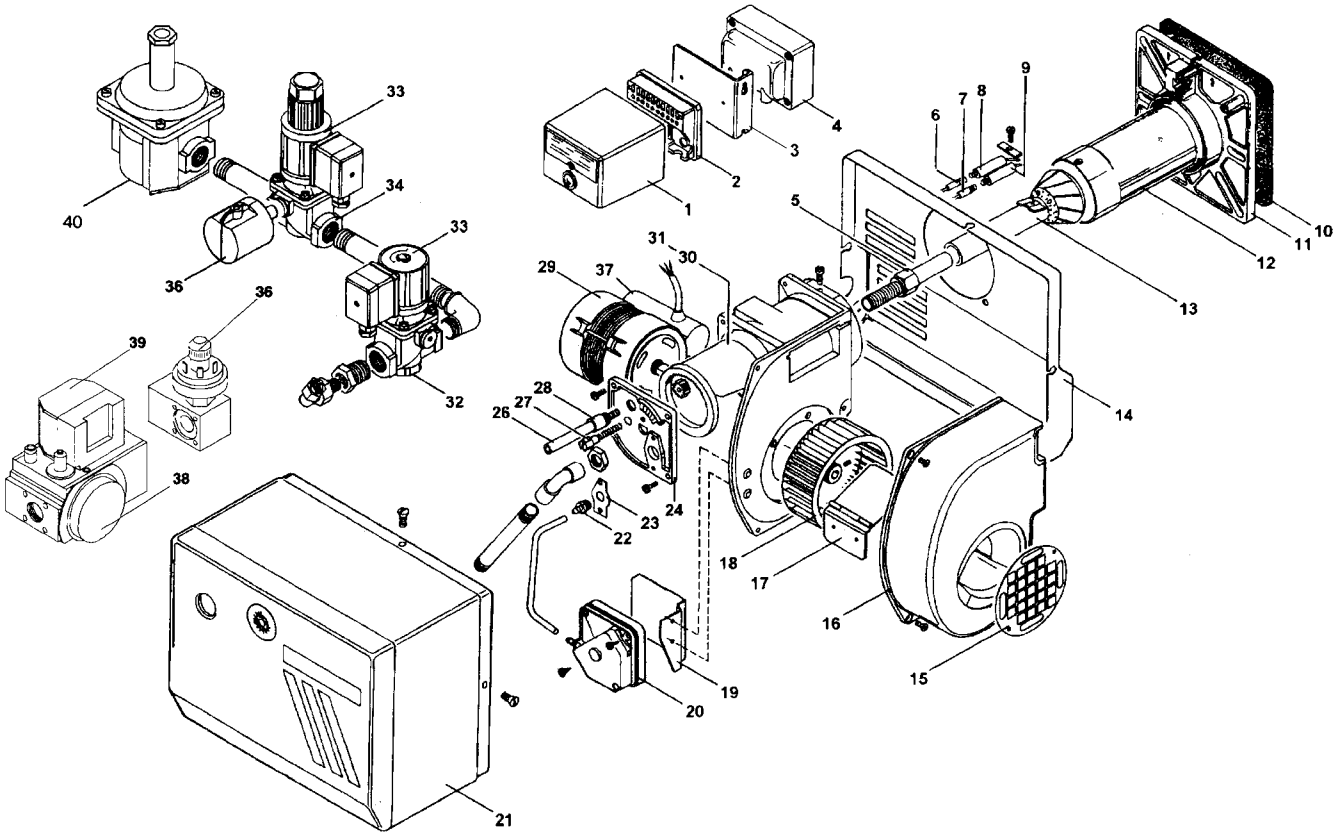
Data 06/02/1996		PREC.	FOGLIO
Revisione 05		/	1
Dis. N. 01 – 0319		SEGUE	TOTALE
		2	2

0	1	2	3	4	5	6	7	8	9

SIGLA/ITEM	FOGLIO/SHEET	FUNZIONE/FUNCTION [1]	FUNZIONE/FUNCTION [2]
ER	1	ELETTRODO RILEVAZIONE FIAMMA	FLAME DETECTION ELECTRODE
EV1	1	ELETTROVALVOLA GAS LATO RETE (O GRUPPO VALVOLE)	UPSTREAM GAS SOLENOID VALVE (OR VALVES GROUP)
EV2	1	ELETTROVALVOLA GAS LATO BRUCIATORE (O GRUPPO VALVOLE)	DOWNSTREAM GAS SOLENOID VALVE (OR VALVES GROUP)
FU1.2	1	FUSIBILE DI LINEA	LINE FUSE
IL	1	INTERRUTTORE GENERALE	MAINS SWITCH
LB	1	LAMPADA SEGNALAZIONE BLOCCO BRUCIATORE	INDICATOR LIGHT FOR BURNER LOCK-OUT
LF	1	LAMPADA SEGNALAZIONE FUNZIONAMENTO BRUCIATORE	INDICATOR LIGHT BURNER OPERATION
LGB.. / LMG.. / LME..	1	APPARECCHIATURA CONTROLLO FIAMMA	CONTROL BOX
MV	1	MOTORE VENTILATORE	FAN MOTOR
PA	1	PRESSOSTATO ARIA	AIR PRESSURE SWITCH
PGMIN	1	PRESSOSTATO GAS DI MINIMA PRESSIONE	MINIMUM GAS PRESSURE SWITCH
ST	1	SERIE TERMOSTATI/PRESSOSTATI	SERIES OF THERMOSTATS OR PRESSURE SWITCHES
TA	1	TRASFORMATORE DI ACCENSIONE	IGNITION TRANSFORMER
TS	1	TERMOSTATO/PRESSOSTATO DI SICUREZZA	SAFETY THERMOSTAT OR PRESSURE SWITCH
VPS50x	1	CONTROLLO DI TENUTA VALVOLE GAS (OPTIONAL)	GAS PROVING SYSTEM (OPTIONAL)

Data 06/02/1996		PREC.	FOGLIO
Revisione 05		1	2
Dis. N. 01 – 0319		SEGUE	TOTALE
		/	2

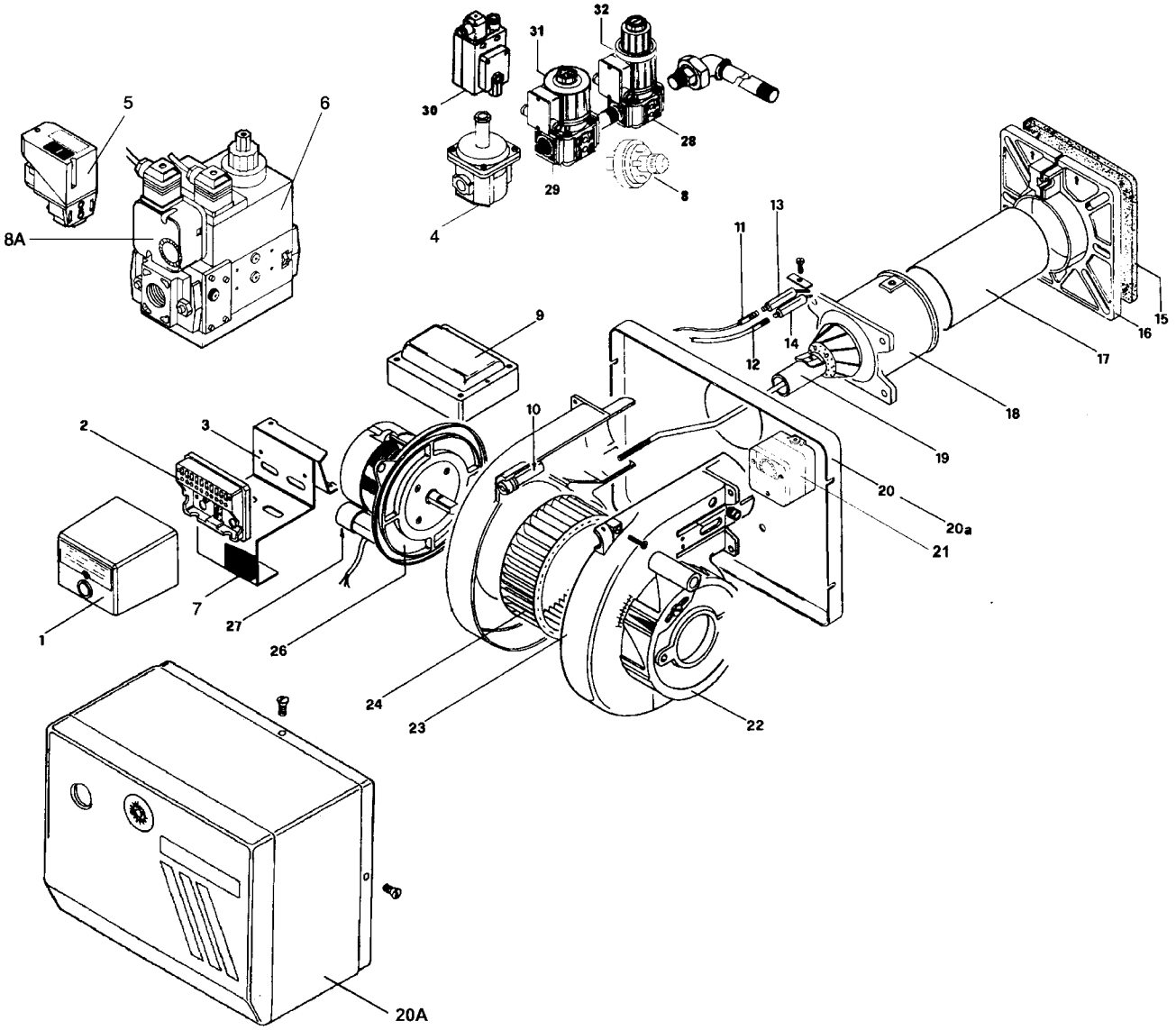
SPARE PARTS
BURNERS TYPE S3



S3

POS.	DESCRIPTION	CODE
1	FLAME CONTROL DEVICE VM 41	2020221
1A	FLAME CONTROL DEVICE LGB 21	2020443
1B	FLAME CONTROL DEVICE LMG 21	2020450
1C	FLAME CONTROL DEVICE LMG25	2020444
2	SOCKET FOR FLAME CONTROL DEVICE VM 41	2030205
2A	SOCKET FOR FLAME CONTROL DEVICE LGB-LMG	2030415
3	SUPPORT BRACKET FOR FLAME CONTROL DEVICE	2430019
4	TRANSFORMER	2170119
5	COMBUSTION HEAD CENTRAL TUBE	22701C0
6	DETECTION CABLE	6050211
7	IGNITION CABLE	6050119
7A	IGNITION CABLE FOR LONG BLAST TUBE MODEL	6050122
8	DETECTION ELECTRODE	2080108
9	IGNITION ELECTRODE	2080218
10	GASKET	2110027
11	SLIDING FLANGE	2100025
12	BLAST TUBE	30900B8
12A	LONG BLAST TUBE	30900C1
13	COMBUSTION HEAD	3060039
13A	COMBUSTION HEAD FOR LONG BLAST TUBE MODEL	30600A0
14	BOTTOM END	3190102
15	PROTECTION MESH	2040202
16	COMPLETE HOUSING	2050270
17	AIR DAMPER	2140206
18	FAN	2150020
19	THERMOSTAT SUPPORT BRAKET	2430090
20	AIR PRESSURE SWITCH	2160060
21	BURNER COVER	3010045
22	PRESSURE GAUGE	23500A9
23	SUPPORT PLATE	2030230
24	COMBUSTION HEAD SUPPORT FLANGE	2100070
26	AIR DAMPER ADJUSTING SCREW	2320024
27	COMBUSTION HEAD ADJUSTING SCREW	2320031
28	SLOT FOR AIR DAMPER ADJUSTING SCREW	2320025
29	MOTOR	2180056
30	CYLINDRICAL AIR DAMPER	2140205
31	AIR DAMPER GEAR	2140501
32	GAS VALVE EG12 SR	2190502
33	GAS VALVE COIL EG12 BE6-GM0	2580302
34	GAS VALVE EG12 L	2190510
36	GAS PRESSURE SWITCH	2160059
37	CAPACITOR	6030001
38	MULTIFUNCTION VALVE BM 771	21903G1
39	COIL FOR GAS VALVE BM 771	2580047
40	FILTER WITH GOVERNOR	2800047

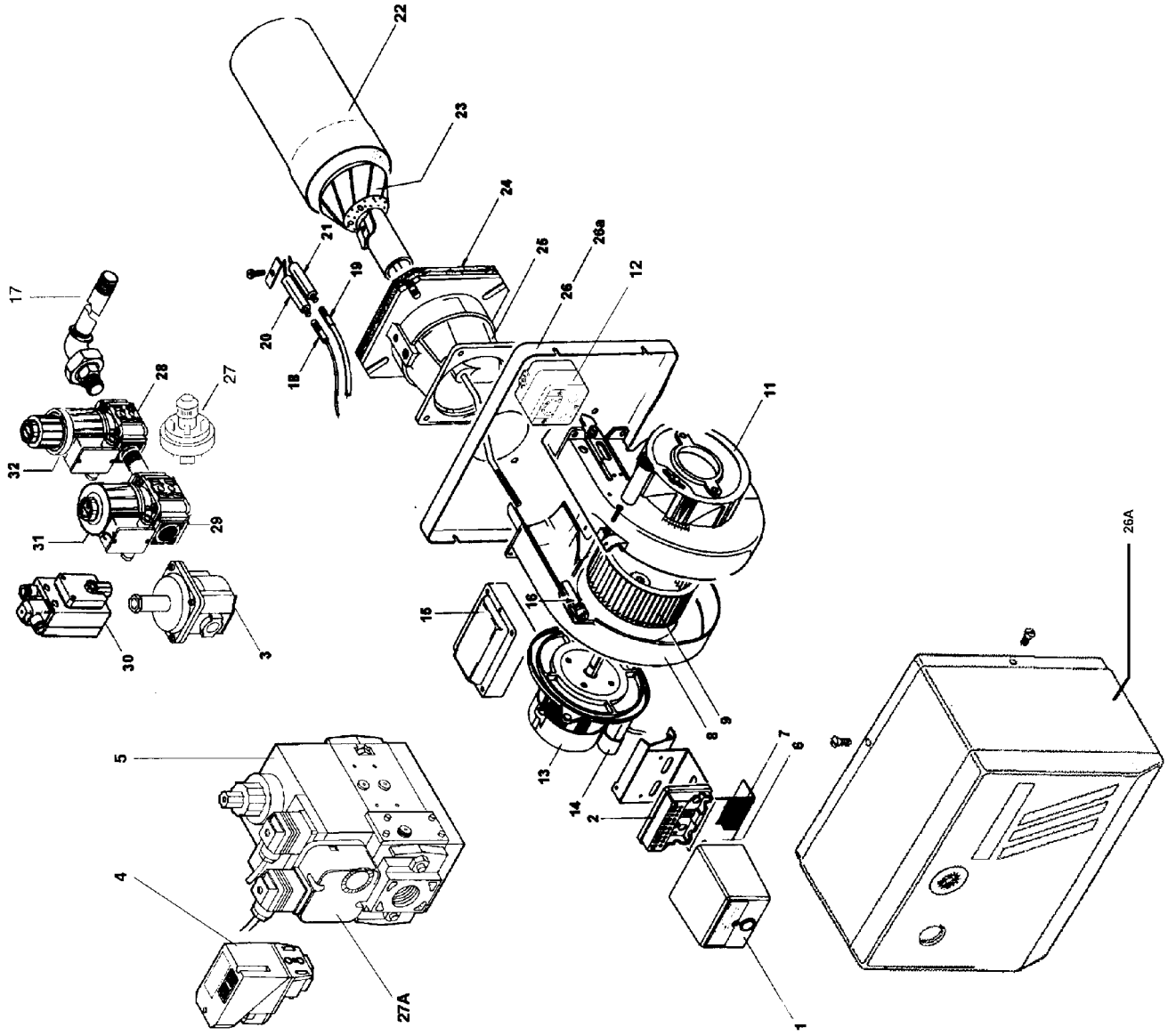
BURNER TYPE S5



S5

POS.	DESCRIPTION	CODE
1	FLAME CONTROL DEVICE VM 41	2020221
1A	FLAME CONTROL DEVICE LGB21	2020443
1B	FLAME CONTROL DEVICE LMG25	2020444
2	SOCKET FOR FLAME CONTROL DEVICE VM41	2030205
2A	SOCKET FOR FLAME CONTROL DEVICE LGB-LMG	2030415
3	SUPPORT BRACKET FOR FOR FLAME CONTROL DEVICE	2430004
3A	SPACER	2060002
4	FILTER WITH GOVERNOR	2800048
5	LEAKAGE CONTROL DEVICE (Optional)	2191604
6	MULTIBLOC VALVES GROUP	2190339
7	CONNECTOR 7 PINS FEMALE	6200043
7A	CONNECTOR 7 PINS MALE	6200042
8	MINIMUM GAS PRESSURE SWITCH	2160059
8A	MINIMUM GAS PRESSURE SWITCH	2160052
9	IGNITION TRANSFORMER	2170108
10	HEAD ADJUSTING SCREW	2320003
11	DETECTION CABLE	6050211
12	IGNITION CABLE	6050119
13	DETECTION ELECTRODE	2080108
14	IGNITION ELECTRODE	2080218
15	GASKET	2110027
16	SLIDING FLANGE	2100025
17	BLAST TUBE	3090001
17A	LONG BLAST TUBE	3090076
18	FLANGE PIECE	2300020
19	COMBUSTION HEAD	30600A1
19A	COMBUSTION HEAD FOR LONG BLAST TUBE MODEL	30600A4
20	BOTTOM SIDE	2010112
20A	COVER	3010018
21	AIR PRESSURE SWITCH	2160053
22	AIR DAMPER	1010701
23	COMPLETE HOUSING	2050238
24	FAN	2150003
26	MOTOR	2180013
27	CAPACITOR	6030005
28	GAS VALVE EV2 EG25 L3	2190512
29	GAS VALVE EV1 EG25 S3	2190513
30	LEAKAGE CONTROL DEVICE (Optional)	2191601
31	COIL FOR SOLENOID VALVE EV1 BM8 GM0	2580304
32	COIL FOR SOLENOID VALVE EV2 BM8 GM0	2580304

BURNERS TYPE S10 - S18



S10 - S18

POS.	DESCRIPTION	S10	S18
1	FLAME CONTROL DEVICE VM 41	2020221	---
1A	FLAME CONTROL DEVICE LGB 21	2020443	2020443
1B	FLAME CONTROL DEVICE LMG 21	2020450	2020450
2A	SOCKET FOR FLAME CONTROL DEVICE LGB 21	2030415	2030415
3	FILTER WITH GOVERNOR	2800048	2800050
4	LEAKAGE CONTROL DEVICE (Optional)	2191604	2191604
5	VALVES GROUP	2190340	2190341
6	SUPPORT BRACKET FOR FLAME CONTROL DEVICE	2430004	2430004
6A	SPACER	- - -	2060002
7	CONNECTOR 7 PINS FEMALE	6200043	6200043
7A	CONNECTOR 7 PINS MALE	6200042	6200042
8	COMPLETE HOUSING	2050216	2050216
9	FAN	2150004	2150004
11	AIR DAMPER	1010702	1010702
12	AIR PRESSURE SWITCH	2160053	2160053
13	MOTOR	2180005	2180005
14	CAPACITOR	6030005	6030005
15	TRANSFORMER	2170108	2170108
16	HEAD ADJUSTING SCREW	2320003	2320003
17	EXTENSION SCREW	2130016	2130027
18	DETECTION CABLE	6050211	6050211
19	IGNITION CABLE	6050122	6050122
20	DETECTION ELECTRODE	2080108	2080108
21	IGNITION ELECTRODE	2080218	2080218
22	BLAST TUBE	3090002	3090036
22A	LONG BLAST TUBE	3090010	3090037
23	COMBUSTION HEAD	30600A6	30600A2
23A	COMBUSTION HEAD FOR LONG BLAST TUBE MODEL	30600A7	30600A5
24	GASKET	2110031	2110031
25	FLANGE PIECE	2300050	2300050
26	BOTTOM END	2010102	2010102
26A	COVER	3010019	3010019
27	MINIMUM GAS PRESSURE SWITCH	2160076	2160076
27A	MINIMUM GAS PRESSURE SWITCH	2160052	2160052
28	GAS VALVE EV2 EG25 L3	2190512	- - -
29	GAS VALVE EV1 EG25 S3	2190513	- - -
30	LEAKAGE CONTROL DEVICE (Optional)	2191604	2191604
31	COIL FOR SOLENOID VALVE EV1 BE8 GM0	2580304	- - -
32	COIL FOR SOLENOID VALVE EV2 BE8 GM0	2580304	- - -

APPENDIX: COMPONENTS CHARACTERISTICS

LANDIS LGB 21/22.. FLAME CONTROLLER 29

LANDIS LMG21/22/25 FLAME CONTROLLER 32

GAS MULTIBLOC REGULATOR DUNGS MB-DLE 405-407-410-412-415-420 35

VALVE PROVING SYSTEM DUNGS VPS504 35

SAFETY SOLENOID VALVES DUNGS MV/5, MVD/5, MVDLE/5 SINGLE STAGE 35

MULTIFUNCTIONAL VALVE DUNGS BM 771 36

BRAHMA GAS SOLENOID VALVE FOR LOW PRESSURE BURNERS 36

LANDIS LGB 21/22.. FLAME CONTROLLER

Function

The programme run is shown in the diagrams. The required and permissible input signals for the control part and flame supervision part are pictured as a hatching correspondingly in the function diagrams. If these input signals are missing, the controller interrupts the start-up programme and initiates a lock-out at the place where the safety regulations demand it.

The LGB types are fitted with under voltage protection, i.e. the load relay AR is de-energized when the supply voltage falls below 160 V. The burner control automatically attempts a new start-up when the supply voltage again exceeds 160 V

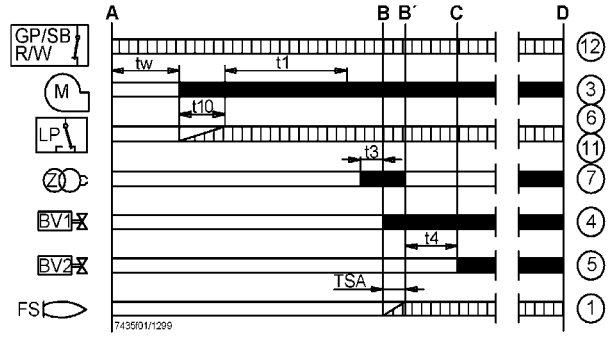
A Start-up command from the temperature or pressure controller “R”

A-C Start-up programme

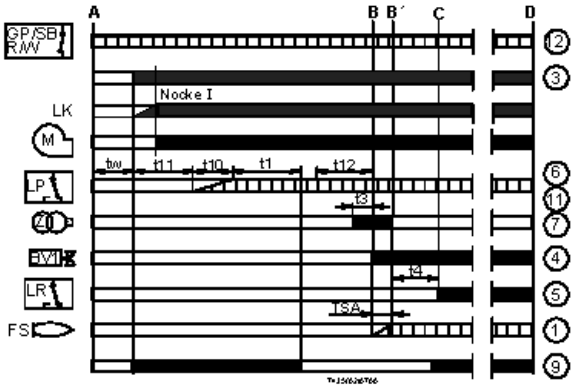
C-D Burner operation (heat production corresponding to the control commands)

D Controlled shut-down by “R”

LGB21



LGB22



Key for operation diagram

A - C Startup sequence

tw Waiting time, 8s for LGB21, 9s for LGB22

t1 Prepurge time 30s

TSA Ignition safety time 3s

t3 Preignition time, 2s for LGB21, 3s for LGB22

t4 Interval «BV1-BV2» or «BV1-LR», 8s

t10 Specified time for air pressure signal, 5s for LGB21, 3s for LGB22

t11 Programmed opening time for actuator «SA», max. 12s

t12 Programmed closing time for actuator «SA», max. 11s

BV Fuel valves

FS Flame presence signal

GP Gas pressure switch

LP Air pressure switch

LR Load controller

M Fan motor

R Temperature or pressure controller

W Safety thermostat or pressure switch

Z Ignition transformer

1...12 Terminals of the burner flame controls on AGK11's socket

Command signal from flame control

Input signals

Conditions for starting up the burner:

- The burner control must not be locked out.
- The contacts of the gas pressure switch ”GP", the temperature or pressure switch “W" and the controller “R", must be closed.

Start-up programme

A Start command (switching on)

This command is triggered by control thermostat / pressure controller «R». Terminal 12 receives voltage and the programming mechanism starts running. On completion of waiting time «tw» with the LGB21..., or after air damper «SA» has reached the nominal load position (on completion of «t11») with the LGB22..., fan motor «M» will be started.

tw Waiting time

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

t11 Programmed opening time for actuator «SA»

(Only with LGB22...) The air damper opens until the nominal load position is reached. Only then will fan motor «M» be switched on.

t10 Specified time for air pressure signal

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

t1 Prepurge time

Purging the combustion chamber and the secondary heating surfaces: required with low-fire air volumes when using the LGB21... and with nominal load air volumes when using the LGB22.... The diagrams show the so-called prepurge time «t1» during which air pressure monitor «LP» must indicate that the required air pressure is available. The effective prepurge time «t1» comprises interval end «tw» through «t3».

t12 Programmed closing time for actuator «SA»

(Only with LGB22...)During «t12», the air damper travels to the low-fire position.

t3 Preignition time

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

TSA Ignition safety time

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

t4 Interval

LGB21...: time to the release of the second fuel valve «BV2»

LGB22...: on completion of «t4», the heat source is controlled depending on the load (release of load controller «LR»)

B - B' Interval for flame establishment

C Burner operation position

C - D Burner operation (heat production)
Operation of the burner at the maximum strenght or, with a flame controller for the load.

D Controlled by "R" shutdown
The burner stops, waiting for the next ignition.

Command program in the event of a defect

In the event of a defect the inflow of fuel is interrupted. When the block occurs in the preventilation time (not indicated by the symbol) the causes may be the air pressostat LP or a premature signal of flame presence.

- With voltage failure: repetition of the start-up with complete programme
- Premature presence of flame at the start of preventilation time: safety stop (block)
- Contact of air pressostat LP stuck during time tw: start-up cannot take place.
- Air pressure failure after t10: safety stop after safety time TSA
- Absence of confirmation of air pressure: safety stop(block) after t10
- Failure to start up the burner: safety stop after safety time TSA
- Absence of flame during functioning: immediate safety stop.
- Checking the ignition spark with QRE: with absence of spark there is no consent to the fuel, safety stop (block) after time t2.

Unblocking the appliance

Unblocking of the appliance can be effected immediately after the safety stop without causing modification of the programme.

Indicator of the command programme of the defective item

On the front part of the safety appliance is located a plexiglass lunette under which there is the indicator disc of programme's progress.

In the event of safety stop, the programmer stops. The disc shows, as follows, the position of the programme at which the interruption occurred:

►	no start-up, the command ring is open
IIII	interval tw or t10 on LGB21; tw or t11 on LGB22
▲	air damper open (LGB22)
P	safety stop (block) through absence of the air pressure signal (LGB21) or because (LGB22) the air damper is not open
➔➔➔	interval t1, t3 (t12)
▼	fuel consent (LGB22)
1	safety stop (block) through absence of the flame signal at the end of the 1st safety time
2	consent of the 2nd fuel valve (LGB 21) or consent at the power regulator (LGB22)
°°°°	functioning of the burner at partial or maximum power (or return to the service position)

Specifications

Supply voltage	220 V AC -15%...240 VAC +10%
Frequency	50 Hz -6%...60 Hz +6%
Consumption	3 VA
Flow rate of the contacts at terminals	
- terminal 3	max. 3 A (15 A max. for 0.5s)
- terminals 4, 5, 7	max. 2 A
- terminal 10	max. 1 A
- terminal 12 (for Umax 264 V)	max. 5 A*
Fuse max.	10 A, with slow blow-out
Radio disturbance	N - VDE0875
Protection	IP40
Permissible ambient temperature	
- operating	-20....+ 60°C
- transport and storage	-40....+ 70°C
Mounting pos. permitted	any
Mass (weight) without/with base	c. 230/310 g
Mass (weight) AGK66	c. 12 kg

*) At permissible voltage and that is 187...264 V

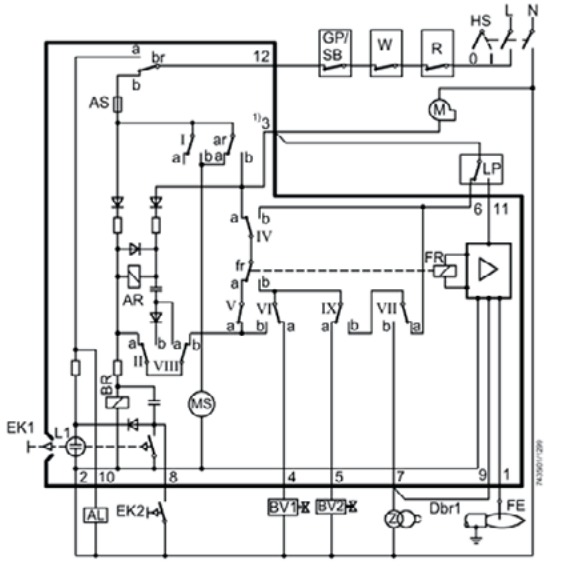
Key - internal diagram

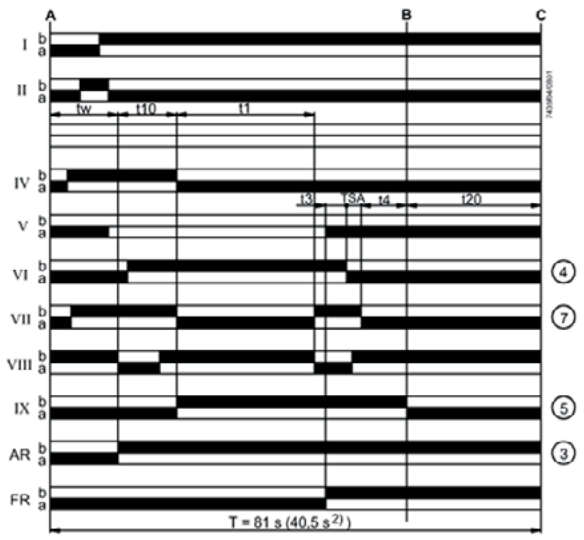
AL	Block signal
AR	Main relay with "ar" contacts
BR	Block relay with "br" contacts
BV	Fuel valve
Dbr1	U bolt
EK	Unblocking button
FE	Detection electrode
FR	Flame relay with "fr" contacts
GP	Gas pressostat
HS	Main selector
L	Phase conductor
L1	Block light (blinking)
LP	Air pressostat
M	Fan motor
MS	Synchronous motor
N	Neutral conductor
R	Thermostat or pressostat
W	Safety thermostat or pressostat
Z	Ignition transformer

Key - programmer's diagram

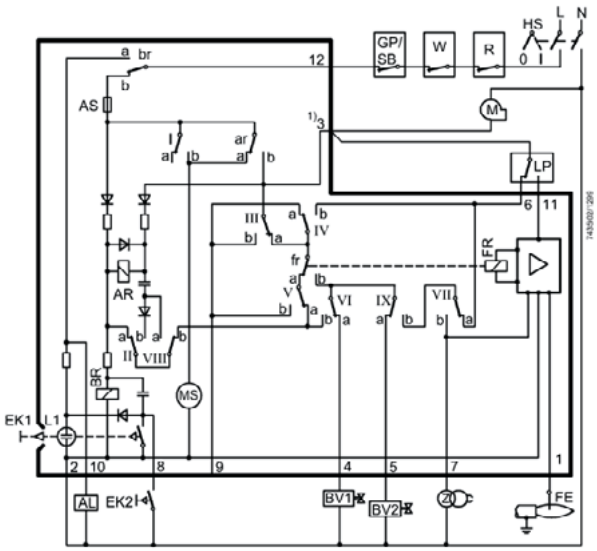
A	start-up (command from regulator “R”)
B	burner operation
C	program start position (start up)
tw	waiting time
t1	preventilation time
TSA	safety time
t3	pre-ignition time
t4	interval of time BV1-BV2 or BV1-LR
t10	waiting time for confirmation of air pressure
t11	air damper movement time to open position
t12	air damper movement time to close position
t20	travel time for auto-return of the programmer
T	programmer's total time
I.IX	contacts of programmer's cams

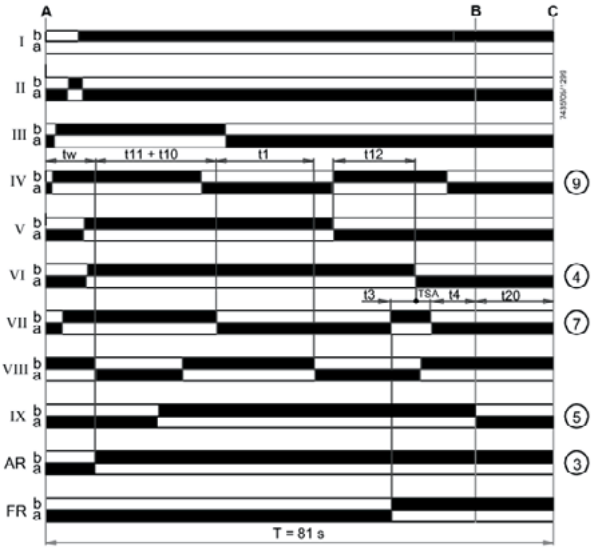
LGB21





LGB22





LANDIS LMG21/22/25 FLAME CONTROLLER

FEATURES

The series of equipment LMG.. is interchangeable with the series LGB.., all diagrams and accessories are interchangeable, the main features are:

- Indications of error codes by a signalling red light in the release button;
- Programmer times fix for the digital management of signals.
  In case of lack of the flame during working the model LMG 25.33 doesn't stop but repeat the starting cycle
  maximum 3 times), if the problem persists, after the fourth starting the equipment stops .

Comparative table

Old series LGB	New series LMG
---	LMG 25.33
LGB 21.33	LMG 21.33
LGB 22.33	LMG 22.33

Conditions for startup

- Burner control is reset
- All contacts in the line are closed
- Fan motor "M" or AGK25 is connected
- Air pressure monitor "LP" is in idle position
- No undervoltage

Undervoltage

- Safety shutdown in the event the mains voltage is lower than typically AC 160V;
- a restart is made when the mains voltage exceeds AC 195V

Reversed polarity protection

If the connections of line (terminal 12) and neutral (terminal 2) have been exchanged, the burner control will initiatelockout at the end of "TSA"

Startup program

A Start-up, controlled by LR

Fan command after the waiting time tw for LMG21/25, or after the period t11 for LMG22.

tw Waiting time.

During this time the air pressure switch and the flame relay are tested for correct contact position.

t11 Programmed time for the opening of the servocontrol SA,

only with LMG22. The servocontrol SA moves to the low flame position.

t10 Specified time for the air pressure signal.

When this time has elapsed, the set value of air pressure must have built up, else a lock-out is initiated.

t1 Pre-purgue time.

Purguing of the combustion chamber and the secondary heating surfaces with low-load combustion head for LMG21/25, or with fully load combustion air for LMG22. The affective pre-purgue time comprises the interval between the end of tw and the start of t3.

t12 Programmed time to close the damper SA (MINIMUM)

(LMG22): During the time t12, the air damper moves to the low flame position.

t3n Postignition time

Ignition time during «TSA». Just before reaching the end of «TSA», ignition transformer «Z» will be switched off. This means that «t3n» is somewhat shorter than «TSA». This is necessary in order to give the forcedly closed flame relay «FR» sufficient time to drop out if there is no flame.

t3 Pre-ignition time.

Ignition time until the opening of BV1.

TSA Ignition safety time.

Opening of fuel valve BV1; the flame signal must be present at the terminal 1 up tho the end of TSA.

t4 Interval BV-BV2 or BV1-LR.

Interval between the end of TSA and the consent to the second fuel valve BV2 or to the load regulator LR.

B-B' Interval for the flame establishment.

C Operating position of the burner.

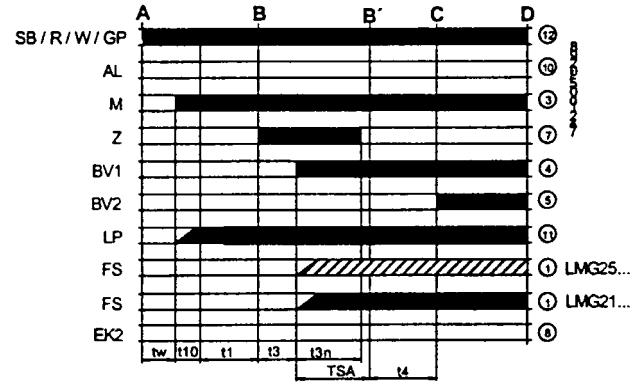
C-D Burner operation (heat production)

D Controlled shut-down by LR.

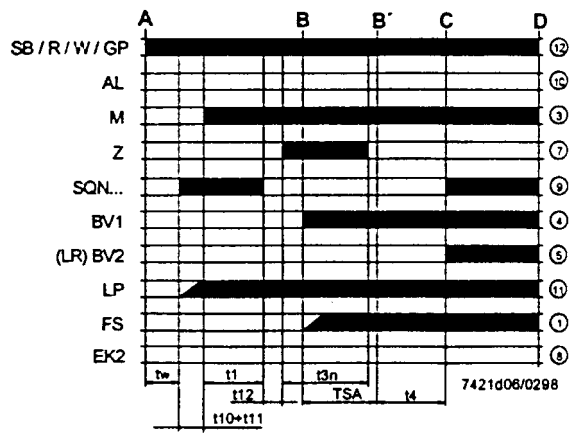
The burner is shut-off immediately and the flame control device is ready for a new start.

FUNCTIONS

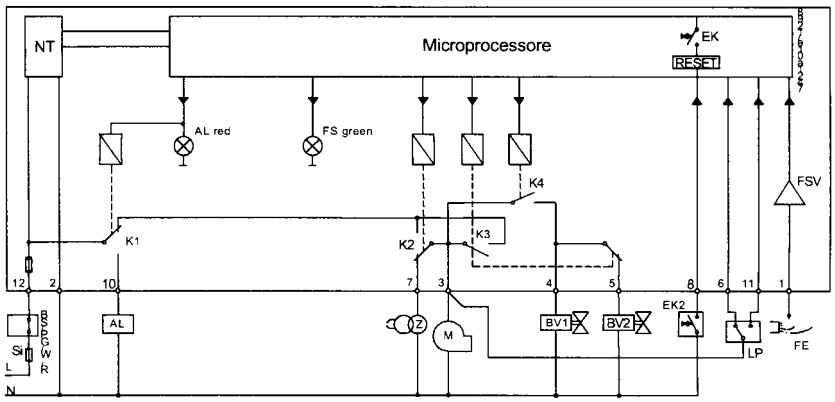
LMG21.../LMG25...



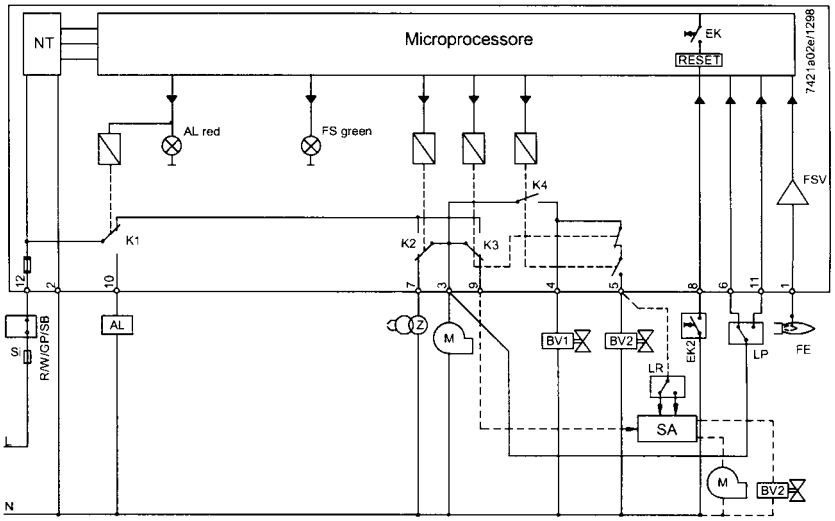
LMG22...



Internal diagram LMG21/25



Internal diagram LMG22



Operations key

AL Alarm
BV Fuel valve
EK2 Remote reset button
FS Flame presence signal
GP Gas detection pressure switch
LP Air pressure switch
LR Burner's output regulation
M Fan motor
R Safety thermostat or pressure switch
SB Safety limit
W Regulation thermostat or pressure switch
Z Ignition transformer
tw Waiting time
t1 Pre-ventilation time
TSA Ignition safety time
t3 Pre-ignition time
t3n Ignition time during “TSA”
t4 Interval BV-BV2 or BV1-LR
t10 Specified time for air pressure signal
t11 Programmed opening time for actuator SA
t12 Programmed closing time for actuator SA

Control program in the event of fault

- If a fault occurs, all outputs will immediately be deactivated (in less than 1s).
- On restoration of power, a restart will be made with the full progra sequence.
- If the operating voltage drops below the undervoltage thresold.
- If there is a premature faulty flame signal during t1, a lockout occurs.
- If the contact of air pressure monitor LP has welded in the working position, prevention of startup and, after 8.5s: lockout.
- If the contact of the air pressure monitor LP has welded in the idle position: lockout at the end of t10.
- If the burner doesn't ignite by the end of TSA: lockout
- If flame is lost during operation: lockout

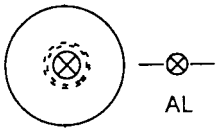
IMPORTANT:

- **The release of the equipment can be carried out after each stop pressing the release button for 0.5- 3 seconds. Then the equipment pulses to signal the happened release.**

- **To control the stop cause it is necessary to wait for 10 seconds, then press the release button for more than 3 seconds and count pulses (the equipment repeats pulses at regular intervals).**

Flame control device stopped

- Stop red lamp switched on.



Release of the flame control device

- Press the release button for 0.5 ÷ 3 seconds.

Diagnosis of troubles

- Wait at least 10s.
- Press the release button for >3s.
- - Count the number of flashing of the green lamp and compare with the “Diagnosis Table”

Diagnosis table

Number of flashing

- Possible causes

2 flashing **

No flame at the end of the "Safety time":

- Detection electrode dirty
- Fuel valve faulty
- Gas doesn't reach the burner

3 flashing ***

The air pressure switch doesn't commute or is at rest:

- Pressure switch faulty
- The fan motor doesn't work
- Air lock servocontrol (where arranged) faulty

4 flashing ****

The air pressure switch is not commuted at rest as well as on air, or it remains commuted on air:

- Pressure switch faulty
- The calibration of air pressure switch is too sensible

5 flashing *****

Foreign light

7 flashing *******

Lack of flame during working:

- Calibration of the burner not optimum
- Trouble or gag of the fuel valve

8 ÷ 17 flashing * ÷ ******

Not used

18 flashing ******************

During pre-ventilation the oressure switch commutes and then comes back to the rest:

- Air pressure switch faulty or calibration too high

19 flashing *******************

Trouble of contacts outlet:

- Errors of electric connection
- Anomalous voltage to outlet terminals

20 flashing ********************

Internal error of the flame control equipment

GAS MULTIBLOC REGULATOR DUNGS MB-DLE 405-407-410-412-415-420

Specifications

Nominal diameters - Flange with pipe threads as per ISO 7/1 (DIN 2999)

MB 405-407: Rp1/2, 3/4 and their conbinations

MB 410-412: Rp3/4, Rp1, $Rp1_{1/4}$ and their combinations

MB 415 B01: Rp1, $Rp1_{1/4}$, $Rp1_{1/2}$, Rp2 and their combinations

MB420 B01: Rp1, $Rp1_{1/4}$, $Rp1_{1/2}$, Rp2 and their combinations

Max. operating pressure	360 mbar
Output pressure range	4 mbar to 20 mbar
Pressure stage	PN1

Media gas of families 1, 2, 3 and other neutral gaseous media

Ambient temperature	-15 °C to +70 °C

Dirt trap Sieve with 0.8 mm mesh width, filter made of random laid nonwoven fabric microfilter, two-layer, changing the filter is possible without removing the valve.

Pressure switches	Types GW A5, GW A2, NB A2, ÜB A2 mountable as per DIN EN 1854.
Pressure regulator	Pressure regulator compensated for

residual pressure, leakproof seal when switched off by means of valve V1 as per DIN EN 88 Class A. Setpoint spring permanently installed (no spring exchange possible). A vent line above roof is not required. Internal pulse tap provided.

Solenooid valve 1	Valve as per DIN EN 161, Class A, Group 2, fast closing, fast opening
Solenoid valve 2	valve as per DIN EN 161, Class A, Group 2, fast closing, slow opening

Measuring/ignition gas connection

For G 1/8 as per DIN ISO 228

Burner pressure monitor pBr

Connection downstream of valve V2, pressure switch A2 mountable on adapter laterally

Closed position signal contact	Closed position signal contact type K01/1 (DIN tested), mountable on V2
Voltage/frequency	~(AC) 50-60Hz 230 V -15% +10%
Preferred voltages	240VAC, 110-120VAc, 24-28VDC, 48VDC
Electrical connection	Plug connection as per DIN 43 650, IEC 335, IEC 730 (VDE 0700, VDE 0722) for valves and pressure switches
Rating power/consumption	upon request
Switch on duration	100% ED
Degree of protection	IP54 as per IEC 529 (EN 60529)
Radio interference	Interference degreeN

Material of gas-conveying parts

housing:	aluminium die casting;
diaphragms, seals:	NBR basis, Silopren (silicone rubber)
solenoid drive:	steel, brass, aluminium.

Installation position

Solenoid	vertically upright or lying horizontally as well as its intermediate positions

VALVE PROVING SYSTEM DUNGS VPS504

Specifications

Operating pressure	max.500 mbar (50 kPa)
Test volume	4.0 l
Pressure increase by motor pump	20 mbar
Nominal voltage	~(AC) 230V -15%...240V +10% DC 24V
Frequency	50 Hz
Rating requirement during pumping time	approx, 60 VA, in operation 17 VA
Prefuse (provided by the customer)	10 A quick-acting fuse or 6.3 slow-blow fuse
Fuse	installed in housing cover, replaceable microfuse 6.3 A slow-blow L 250 V; IEC-127-2/III (DIN 41 662)
Degree of protection	IP40 (IP54 series 04, 05)
Ambient temperature	50 Hz 230 VAC -15°C to +70°C, others: -15°C to +60°C
Release time	Approx. 10 - 26s, depending on test volume and input pressure
Sensitivity limit	max. 50 l/h
Switch on duration of control	100%
Max. number of test cycles	20/h
Installation position	upright, horizontal, not inverted

SAFETY SOLENOID VALVES DUNGS MV/5, MVD/5, MVDLE/5 SINGLE STAGE

Specifications

Flange Connection	flange as per DIN 2501 Part1
Max. operating pressure	up to 200 mbar (20 kPa), 360 mbar (36kPa) or up to 500 (50 kPa) mbar
Solenoid valve	Valve as per EN 161, Class A, Group 2, single-stage mode
Pressure stage	PN 1
Closing time	< 1 s
Opening time	< 1 s for MVDLE approx. 20 s at room temperature 20°C and without fast stroke
Fast stroke	Adjustable
Main volume adjustment	Manually adjustable on MVD and MVDLE

Materials of gas-conveying parts

Housing	aluminium, steel, brass
Seals	NBR basis
Voltage/frequency	230 V AC (+10 % -15 %); 50-60 Hz - other voltages on request
Rating / power consumption	Refer to type overview
Switch-on duration	100 %
Degree of protection	P 54, IP 65 on request
Electrical connection	At screw terminals via PG* 11 cable gland (* = heavy-gauge conduit thread)
Plug connection	as per DIN 43650 can be retrofitted

Switching rate

MVD…/5	max. 1000/h MVD 2200,
MVDLE…/5	max. 100/h MV 5100/5 S, MV 2125/5 S
MV 2150/5 S	max. 20/h
Measuring/ignition gas connection	G 1/4 ISO 118, on both sides in inlet section, additionally G 3/4 on input side, form size DN 40 (flange) upwards
Dirt trap	Sieve installed, mesh width 1 mm
Ambient temperature	-15 ° C to + 60 ° C
Installation position	Solenoid from vertically upright to horizontally lying
Closed position signal contact	Type K01/1, DIN-tested, mountable on DN 10 - DN 150
Valve proving system	Type VDK 200 A S02, mountable via G1/4 test connection, Type VPS 504, mountable with adapter up to DN 80

MULTIFUNCTIONAL VALVE DUNGS BM 771

Nominal diameter	DN 15
Gas connections	RP 1/2 ISO 7/1
Threaded flange	RP 1/2 ISO 7/1
Pilot gas output	M10 x 1 Ø 6 mm Ø 4 mm or 1/4 o.d.
Max. imput pressure	65 mbar
Output pressure field	2.5 mbar to 38 mbar
Flow rate	3.7 m³/h (air) with Dp 5 mbar, adjusted to p1 20 mbar and p2 15mbar
Ambient temperature	0° C up to 70° C
Safety valve	class A, according to EN 161
Group	2
Servocontrolled regulator	class C
Protection level	IP 40
Opening time	fast < 1 s slow < 10 s
Shut off time	< 1 s
Intermittent	100% ED
Voltage and frequency	~AC 50/60Hz 24V +10% -15% ~AC 50-60Hz 230V +10% -15%
Coil absorption	2 x 0.80 VA 2 x 8.8 VA
Electric connection, standard	flat connector according to DIN 46244, connector socket according to DIN 43650
On request	RAST 5 male connector
Mounting position	any

BRAHMA GAS SOLENOID VALVE FOR LOW PRESSURE BURNERS

Specifications

Approval mark	EG 12
Class	A2
Approvals	Min. of Interior prot. 3787/27 DIN DWG (cert.St 1852 of 24.9.85)
Operation	Valve normally closed with rapid opening and closing and with direct action
Body	Made of die-cast aluminium
Filter	Formed from pressed nylon gauze
Seal	Made of NBR to DIN3535 standard
Fixed and mobile core	Made of stainless steel
Springs	Made of stainless steel
Internal passage	Ø 15 mm
Assembly	any position
Union thread	R 1/2"
Pressure test points	2 lateral upstream test-points at inlet
Coil	All coils use Class H wire (180 C with DIN standard designation: V 180) and are designed for continuous operation
Standard voltage	220 V 50 Hz On request versions with DC or AC can be supplied for other voltages and frequencies
Coil covering	Made of pressed nylon
Protection grade	IP54
Spare coil	BE6GMO
Fairlead	PG9
Ambient temperature	-10° C +60° C
Operating Pmax	250 mbar



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