BURNERS
BRULEURS
BRENNER
QUEMADORES
BRUCIATORI

MANUAL OF
- INSTALLATION
- OPERATION
- MAINTENANCE

GAS BURNERS

S10
S18

DOUBLE STAGE VERSION

M03952CC Rev. 02 04/01

CE

Complying with
90 / 396 / CEE
GAS DIRECTIVE

NOTICES

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

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

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

CAREFULLY KEEP THIS MANUAL FOR FUTURE REFERENCE.

1) GENERAL INTRODUCTION

The equipment must be installed in compliance with the regulations in force, following the manufacturer's instructions, by qualified personnel.

Qualified personnel means those having technical knowledge in the field of components for civil or industrial heating systems, sanitary hot water generation and particularly service centres authorised by the manufacturer.

Improper installation may cause injury to people and animals, or damage to property, for which the manufacturer cannot be held liable.

* Remove all packaging material and inspect the equipment for integrity.

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

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

* Before any cleaning or servicing operation, disconnect the unit from the mains by turning the master switch OFF, and/or through the cut-out devices that are provided.

* Make sure that inlet or exhaust grilles are unobstructed.

* In case of breakdown and/or defective unit operation, disconnect the unit. Make no attempt to repair the unit or take any direct action.

Contact qualified personnel only.

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

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

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

* When a decision is made to discontinue the use of the equipment, those parts likely to constitute sources of danger shall be made harmless.

* In case the equipment is to be sold or transferred to another user, or in case the original user should move and leave the unit behind, make sure that these instructions accompany the equipment at all times so that they can be consulted by the new owner and/or the installer.

* For all the units that have been modified or have options fitted then original accessory equipment only shall be used.

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

The manufacturer shall not be held liable, by agreement or otherwise, for damages resulting from improper installation, use and failure to comply with the instructions supplied by the manufacturer.

2) SPECIAL INSTRUCTIONS FOR BURNERS

*The burner should be installed in a suitable room, with ventilation openings complying with the requirements of the regulations in force, and sufficient for good combustion.

* Only burners designed according to the regulations in force should be used.

* This burner should be employed exclusively for the use for which it was designed.

* Before connecting the burner, make sure that the unit rating is the same as delivery mains (electricity, gas oil, or other fuel).

*Observe caution with hot burner components. These are, usually, near to the flame and the fuel pre-heating system, they become hot during the unit operation and will remain hot for some time after the burner has stopped.

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

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

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

Special warnings

* Make sure that the burner has, on installation, been firmly secured to the appliance, so that the flame is generated inside the appliance firebox.

* Before the burner is started and, thereafter, at least once a year, have qualified personnel perform the following operations:

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

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

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

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

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

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

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

* In case of repeated burner shut-downs, do not continue resetting the unit manually. Contact qualified personnel to take care of such defects.

* 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, GASOIL 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.

TECHNICAL DATA

BURNER TYPE		S10	S18
Input	min. low flame kW	42	45
	min. high flame kW	60	65
	max. high flame kW	140	200
	min. low flame kcal/h	36.120	38.700
	min. high flame kcal/h	51.600	55.900
	max. high flame kcal/h	120.400	172.000
Fuel		natural gas	natural gas
Category		I_{2h}	I_{2h}
Gas flow rate min. - max.	Stm^3/h	4.4 - 14.8	4.8 - 21.2
Gas pressure - min.*	mbar	20	20
Gas pressure - max.	mbar	200	200
Power supply		230 V - 50 Hz	230 V - 50 Hz
Total power consumption	W	400	400
Motor (2800 rpm)	W	150	150
Protection		IP40	IP40
Weight ca.	Kg	14.5	23.5
Gas train dimension		3/4”	1”
Gas connection		Rp 3/4	Rp 1
Operation		double stage	double 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 required 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: **S18**	Model:	**M-.**	**AB.**	**S.**	***.**	**A.**	**0.**	**25**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

(1)	BURNER TYPE		
(2)	FUEL		M - Natural gas
(3)	OPERATION	Available versions	AB - High - low flame
(4)	BLAST TUBE LENGHT (See overall dimensions)		
			S - Standard
			L - Long
(5)	DESTINATION COUNTRY		* - see data plate
(6)	SPECIAL VERSIONS		A - Standard
(7)	EQUIPMENT	Available versions	0 - 2 Valves
			1 - 2 Valves + leakage control (optional if burner input < 1200 kW)
(8)	GAS TRAIN SIZE	(See technical data)	20= Rp 3/4 25 = Rp 1

OVERALL DIMENSIONS (mm)

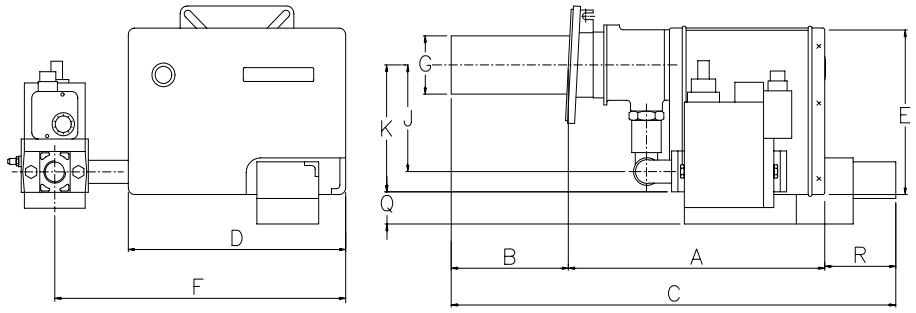


Fig. 4a

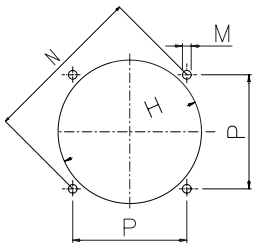


Fig. 4b

B: standard blast tube
BL: long blast tube

	A	B	BL	C	CL	D	E	F	G	K	J	H	P	M	N	Q	R
S10	355	180	275	635	730	340	230	455	108	200	210	125	120	M8	169.7	55	100
S18	355	205	300	660	755	340	230	455	126	200	210	132	120	M8	169.7	55	100

PERFORMANCE CURVES

S10

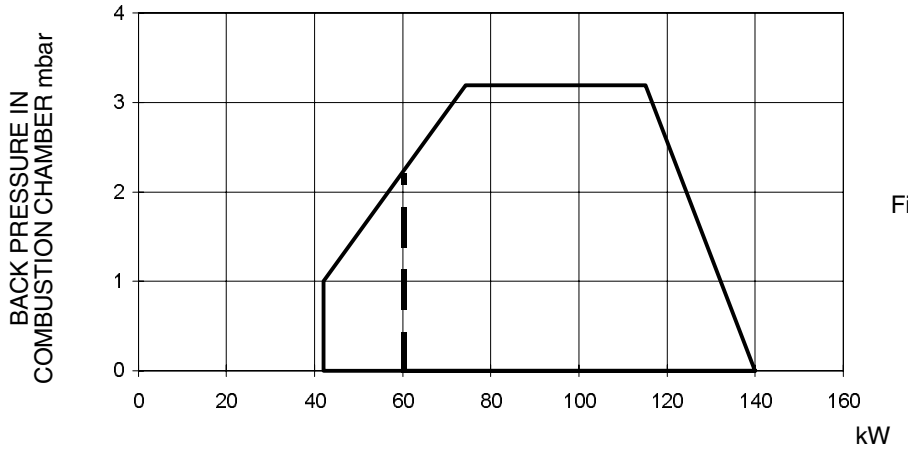


Fig. 5

S18

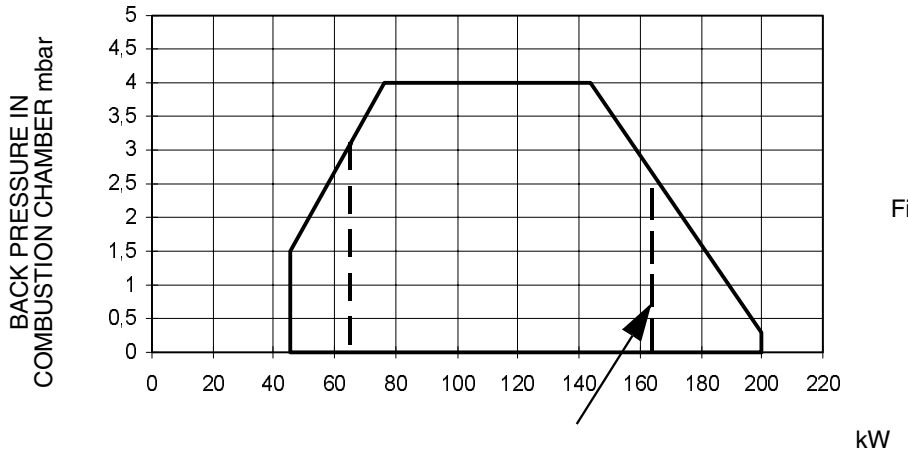


Fig. 6

NOTE: Applications involving power greater than 162 kW (139.320 kcal/h), are allowed only for heat generators and depression owens.

--------- Minimum high flame

To get the input in kcal/h, multiply 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. 4, showing the correct way to take the gas pressure, considering values of backpressure in combustion chamber.

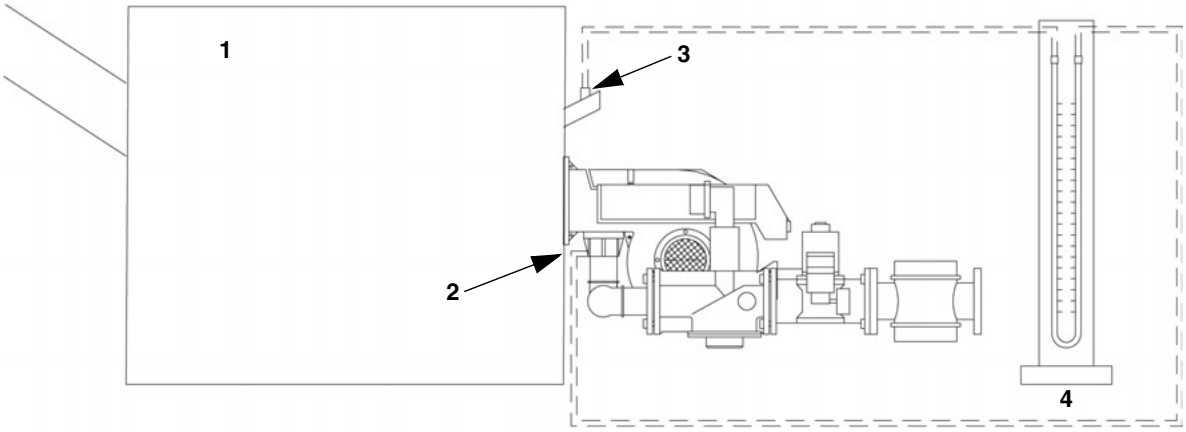


Fig. 4

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.

S10

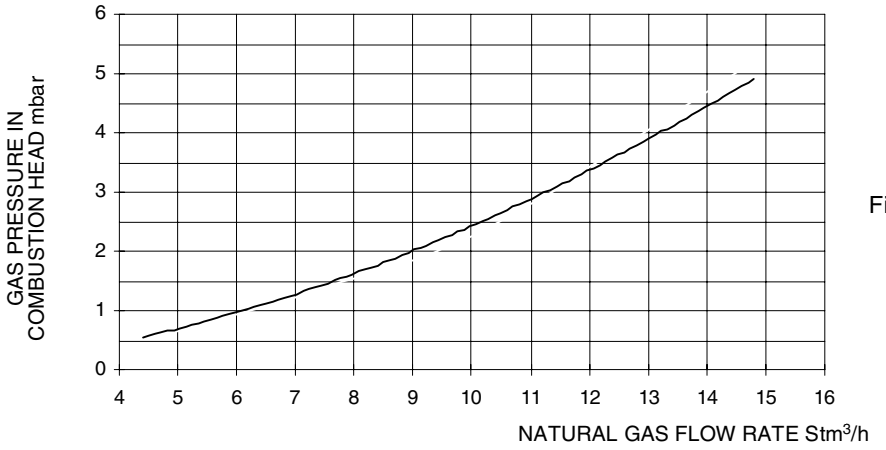


Fig. 5

S18

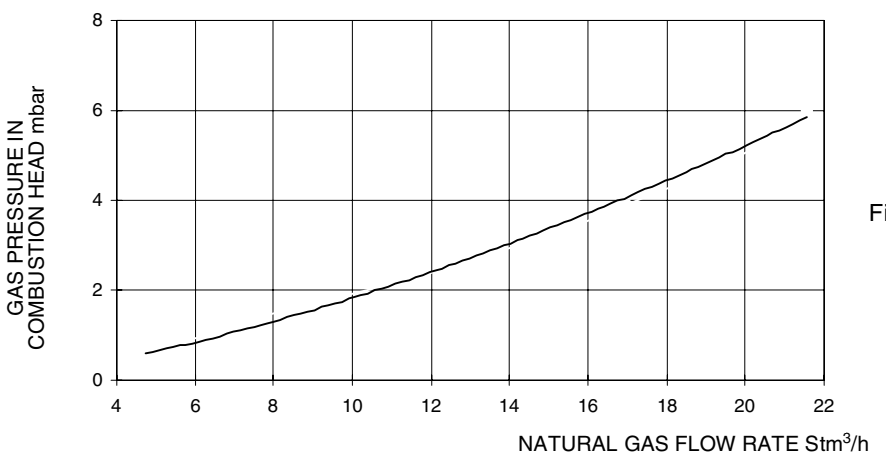


Fig. 6

MOUNTINGS AND CONNECTIONS

Packing

The burners are dispatched in cardboard pakages with dimensions: 760 x 510 x 440 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;

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. 7 - Fitting the burner to the boiler

Fix the flange of the burner to the boiler as shown in Fig. 7.

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).

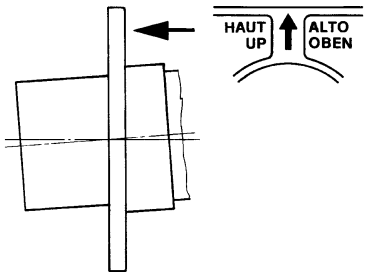


Fig. 7

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. 8. 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)

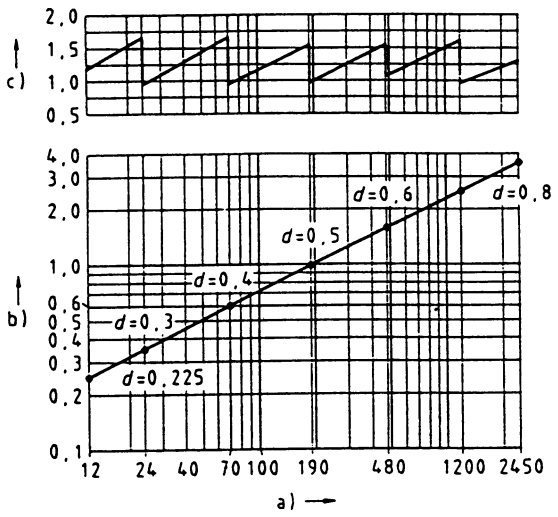


Fig. 8 - Firing intensity, diameter and lenght of the test flame tube as a function of the heat input Q.

ELECTRICAL CONNECTION

- Remove the burner cover.
- Carry out the electrical connections to the multiple connector as shown in Fig. 9.
- Refit the burner cover.

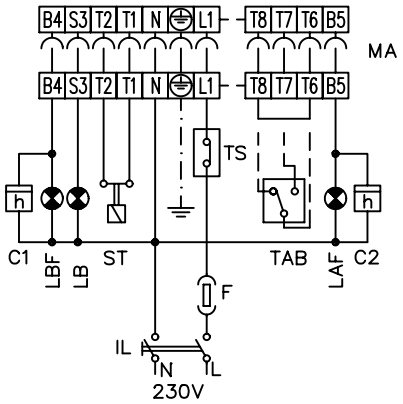


Fig. 9

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 diagram in Fig. 10 show the components of the gas train which are included in the delivery and those which must be fitted by the installer. The diagram complies with regulations in force.

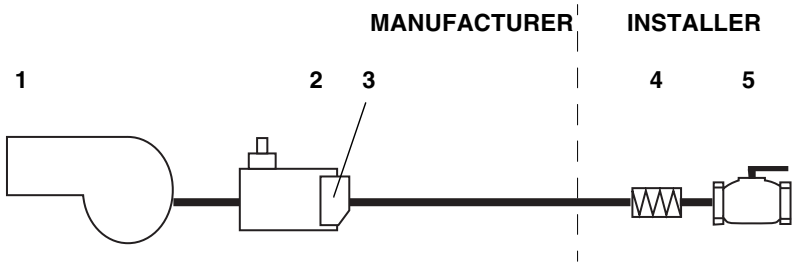


Fig. 10

Key

1 Burner
2 Multibloc valves group
3 Leakage control device (optional if burner input < 1200 kW)
4 Bellow joint
5 Manual shut-off valve

AIR AND GAS FLOW SETTINGS

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

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.

WARNING: changes to the gas flow rate require a new setting of the air rate and a new combustion check.

MULTIBLOC DUNGS

MULTIBLOC DUNGS

The multibloc is a compact assembly made up of two solenoid valves, a gas pressure switch, a pressure stabilizer and a gas filter. It can be used in combination with the Dungs VPS504 leakage control.

Fig. 11 - Burners fitted with the Multibloc MB-DLE valve assembly

The servocontrol cams corresponding to the stand-by (0°) and high flame (70°) positions are factory-set and must not be modified. The low flame regulation cam is set to 10°, and, unless strictly necessary, should not be modified. To adjust the burner when installed in the system, proceed as follows.

High Flame Calibration

1 Ignite the burner, bring it to high flame, adjust the gas flow-rate (Fig. 11) by loosening the screw VB (not sealed), turn the adjustment nut RP, anticlockwise to increase the flow-rate (+ sign), and clockwise to decrease it (- sign); to increase the gas flow-rate, use the screw (VS) located under the cover C (clockwise increases it, anticlockwise decreases it).
2 To adjust the flow-rate of the air at high flame, loosen the nut RA and turn the screw VRA (clockwise increases the flow-rate of the air, anticlockwise decreases it) until reaching the desired flow-rate (Fig. 14).
3 To adjust the quick release, remove the cap T, turn it upside-down and place it on the pin (VR) with the groove on the upper part. Tightening the pin decreases the ignition flow-rate, loosening it increases the flow-rate.

Low Flame Calibration

1 Bring the burner to low flame. To adjust the gas flow-rate loosen the nuts DB (Fig. 13a) and adjust the angle of opening of the butterfly valve by turning the stud TG (Fig. 13b); turning it clockwise increases the gas flow-rate, anticlockwise decreases it. The slit (S in Fig. 13a) on the pin of the butterfly valve indicates the angle of opening in reference to the horizontal axis.
2 To adjust the output of the burner in low flame operation, use the corresponding servocontrol cam. After this operation, check the gas flow-rate and if necessary repeat point 4.
3 When the operations have been completed, make sure the check nuts RA and DB have been tightened.
4 Replace the cover on the servocontrol.

Note: tighten the screw VB.

N.B. The high flame cam on the servocontrol is set to 70°, as this position corresponds to the maximum opening of the butterfly valve (90°).

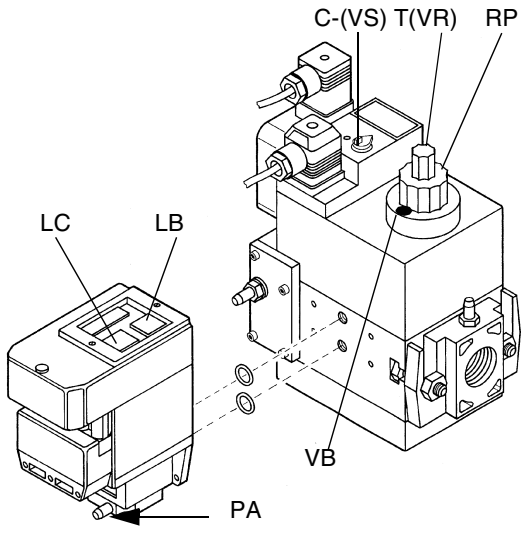


Fig. 11

Key

LC	Consent light (successful leak test)
LB	Illuminated lockout and reset button
PA	Pressure test point
C	Cover
T	Cap
VS	Flow-rate adjustment screw
VR	Quick release adjustment pin
RP	Adjustment ring
VB	Adjustment locking screw

Fig. 12 - Burners fitted with Multibloc MB-ZRDLE valve assemblies (Multibloc two-stage)

To adjust the burner when testing the system, proceed as follows:

- **High flame calibration**

1 Ignite the burner, bring it to high flame, adjust the gas flow-rate (Fig. 12) by loosening the screw VB (not sealed), turn the adjustment nut RP2, anticlockwise to increase the gas flow-rate (+ sign), and clockwise to decrease it (- sign), to increase the gas flow-rate, use the screw (VS) located under the cover C (clockwise increases it, anticlockwise decreases it).

2 Adjust the flow-rate of the air at high flame, using the corresponding servocontrol cam (Fig. 15a, Fig. 15b, Fig. 15c, Fig. 15d).

3 To adjust the quick release, remove the cap T, turn it upside-down and place it on the pin (VR) with the groove on the upper part. Tightening the pin decreases the ignition flow-rate, loosening it increases the flow-rate.

Note: the screw VB should be tightened after having adjusted the first stage.

Low Flame Calibration

1 Bring the burner to low flame by switching the High - Low flame thermostat, or alternatively moving the jumper from T6-T8 to T6-T7 (Fig. 9).

2 Adjust the gas flow-rate using the nut RP1, turning it anticlockwise to increase it (+ sign), or clockwise to decrease it (- sign).

3 To adjust the output of the burner in low flame operation, use the corresponding servocontrol cam (Fig. 15a, Fig. 15b, Fig. 15c, Fig. 15d). After this operation, check the gas flow-rate and if necessary repeat point 2.

Note: tighten the screw VB.

Leakage control VPS504 (Fig. 11 - Fig. 12) - optional if burner input < 1200 kW

This has the purpose of checking for leaks from the gas shut-off valves in the MB-DLE. This check is performed as soon as the boiler thermostat has provided consent for the operation of the burner, creating, by the diaphragm pump inside, a pressure in the test circuit that is 20 mbar higher than the supply pressure. To perform the check, connect a pressure gauge to the pressure test point PA.

If the test cycle is successful, after a few seconds the consent light LC (yellow) will turn on.

If the test fails, the lockout light LB (red) will turn on. To start operation again, the appliance must be reset by pressing the illuminated button LB.

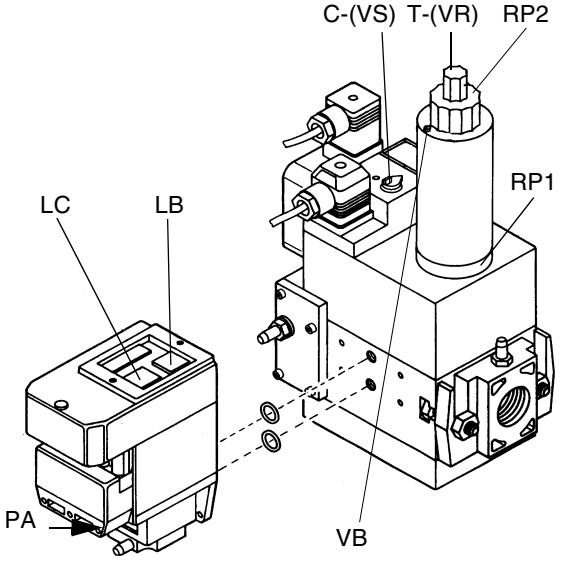


Fig. 12

Key

LC	Consent light (successful leakage test)
LB	Illuminated lockout and reset button
PA	Pressure test point
C	Cover
T	Cap
VS	Flow-rate adjustment screw
RP	Adjustment ring
VB	Adjustment locking screw
RP1	Low flame adjustment ring
RP2	High flame adjustment ring

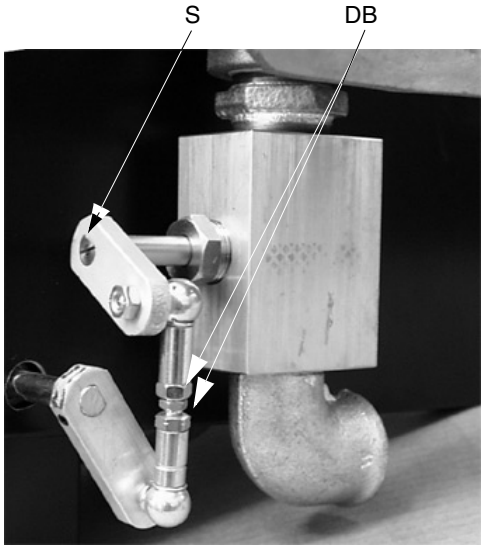


Fig. 13a

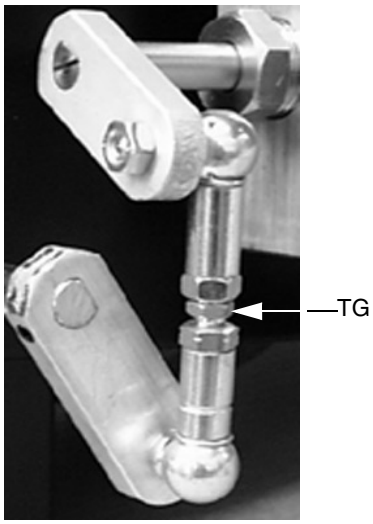


Fig. 13b

Key

S Slit indicating the butterfly opening angle
DB Stud TG lock nuts
TG Butterfly valve opening adjustment stud
RA Lock nut
VRA Screw for adjusting combustion air to maximum flow-rate

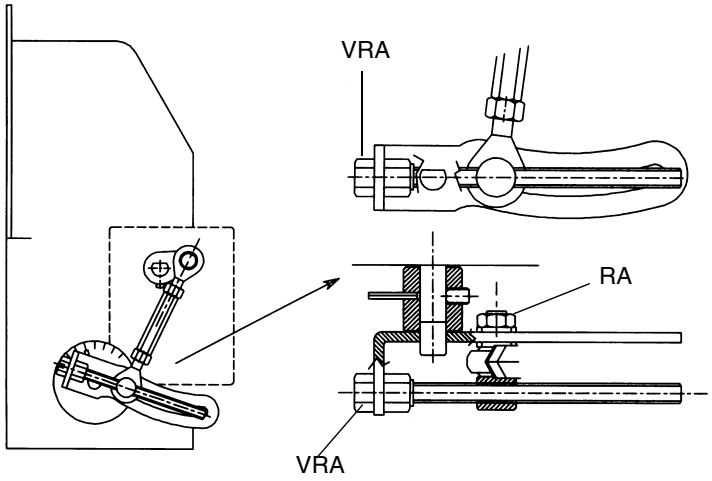
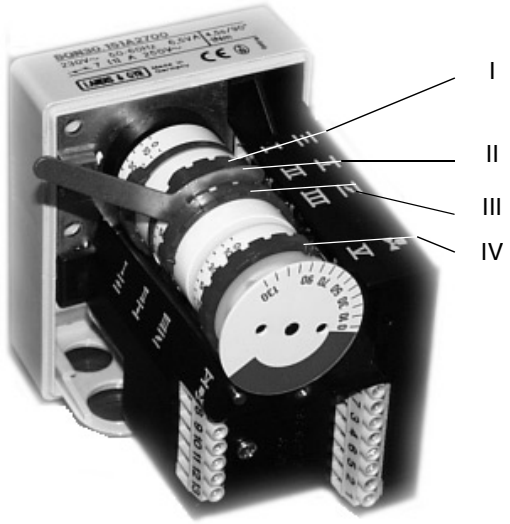


Fig. 14

SERVOCONTROL CAMS SETTING

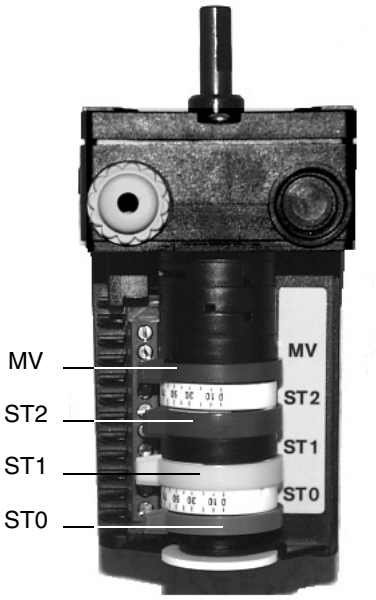
Landis SQN30.151

Fig. 15a



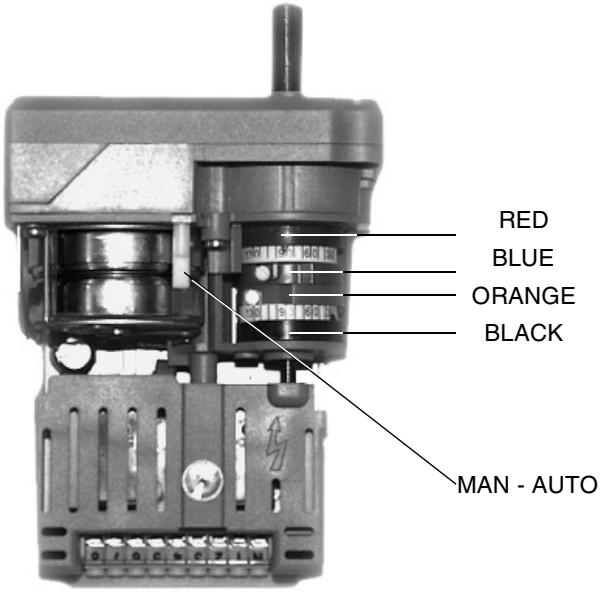
Berger STA6B3.41

Fig. 15b



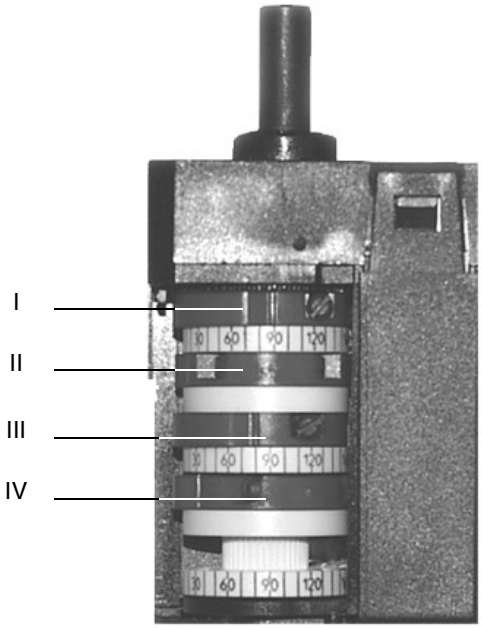
Landis SQN70.224A20

Fig. 15c



Berger STA4.5BO.37/6

Fig. 15d



Servocontrol cams setting

The setting procedure is the same for Berger and Landis servocontrols. Refer to the table below for the correct correspondence of cams. Values in parenthesis shown the factory settings.

LANDIS SQN30.151	BERGER STA6BB3.41	LANDIS SQN70.224A20	BERGER STA4.5B0.37		ADJUSTMENT (only with MB-DLE)
I	ST2	RED	I (70°)	High flame	70°
II	ST0	BLUE	II (0°)	Stand-by	0°
III	ST1	ORANGE	IV (10°)	Low flame	10°
V	MV	BLACK	III	Used only with double stage Multibloc	-

In the servocontrols BERGER STA6B3.41 e STA4.5, the manual air damper control is not provided. The regulations are carried out by means of the appropriate tool fitted with the servocontrol (with SQN30) or by means of a screwdriver, affecting on the screw into the cam (all other servocontrols).

Calibration of air pressure switch

Calibration is carried out as follows:

- Remove the transparent plastic cap.
- After air and gas setting have been completed, start the burner and, while prepurge phase is running, 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 15%.
- Repeat the ignition cycle of the burner and check it runs properly.
- Refit the transparent plastic cover on the pressure switch.

Calibration of minimum gas pressure switch

Calibration is carried out as follows:

- Remove the transparent plastic cap.
- 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. 5 in Fig. 10) until the detected pressure is reduced by 50%. Verify CO emissions of the burner; if the measured value is less than 80 ppm screw down the adjusting ring nut until the burner lockout. If CO emissions are greater than 80 ppm open the shut off valve until the CO value is reduced to 80 ppm, then screw down the adjusting ring nut until the burner lockout.
- Fully open the manual shut-off valve **(WARNING: carry out this operation ONLY with the burner turned off!).**
- Refit the transparent plastic cover on the pressure switch.

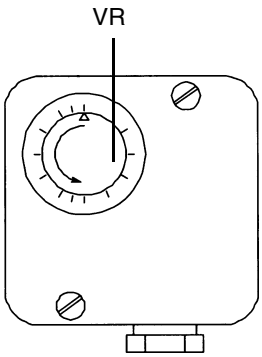


Fig. 16

Adjusting the combustion head

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

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

To adjust the combustion head operate on the screw VRT, turning clockwise to move the head back to the "MIN" position.

Don't close the combustion head completely!

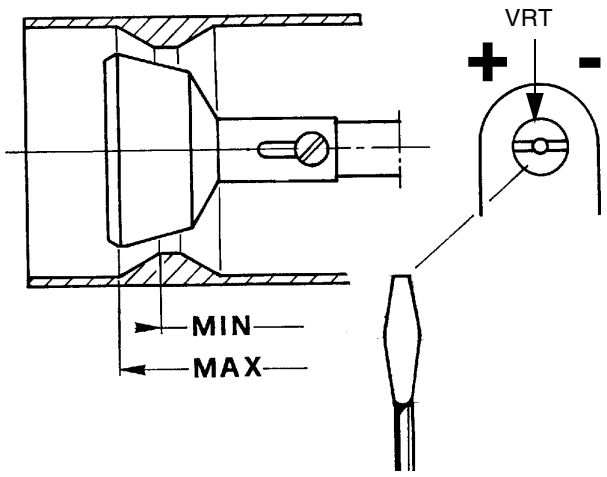


Fig. 17

PART II: OPERATION

LIMITATIONS OF USE

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

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

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

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

NEVER OPEN OR DISMANTLE ANY COMPONENT OF THE MACHINE.

OPERATE ONLY THE MAIN SWITCH ("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

- Bring to the ON position the mains switch on the boiler.
- Check the flame control device is not in the lockout position, if necessary reset it by means of the pushbutton accessible from the hole on the burner's cover;
- Verify that the control thermostats or pressure switches give the consent to the burner to operate.

Only burners equipped with leakage control device: the check cycle of the leakage control device starts; the completion of this check is signalled by the light of the lamp on the device. When the valves check is finished, the start up cycle of the bur ner begins. In the case of a leak in a valve, the leakage control device locks and the lamp LB lights. To reset the device operate on the device pushbutton LB.

- When the startup cycle begins, the servocontrol drives the air damper to the maximum opening position, the fan motor starts and the pre-purgue phase begins.
- At the end of the pre-purgue phase, the air damper goes to the ignition position, the ignition transformer comes on and 3 seconds later the solenoid valves EV1 and EV2 are energized. 3 seconds after the opening of the valves, the ignition transformer comes off**;** the burner is on in low flame, 8 seconds later the two stage operation begins and the burner switches automatically to high flame or remains in low flame operation, depending on the plant needs.

PART III: 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.

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

PERIODIC OPERATIONS

- Remove, check and clean the combustion head (Fig. 18);
- Check of ignition electrode, cleaning, adjustment and, if necessary, replacement (Fig. 19);
- Check of detection electrode, cleaning, adjustment and, if necessary, replacement (Fig. 19). f in doubt check the detection circuit as shown in Fig. 20.

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

Removing the combustion head

- Remove the burner from the gas supply line.
- To access the combustion head abd the electrodes, slcken the screw VE (Fig. 18) on the blast tube and unthread it; provide a stable surface where lie the burner during maintenance operations.

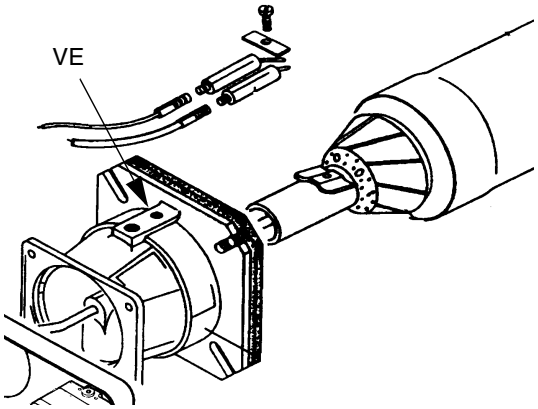


Fig. 18

Correct electrodes position

To guarantee a proper ignition, the measures indicated in Fig. 19 must be respected.

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

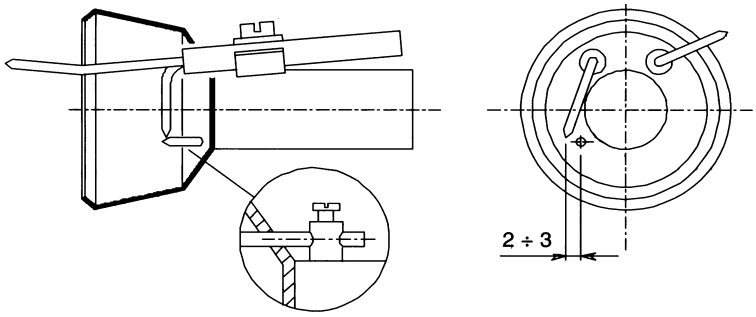


Fig. 19

Checking the ionization current

To measure the detection signal intensity, follow the scheme in Fig. 20.

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	Min. detection signal
Landis LGB21-22	3µA
Landis LMG21-22	3µA

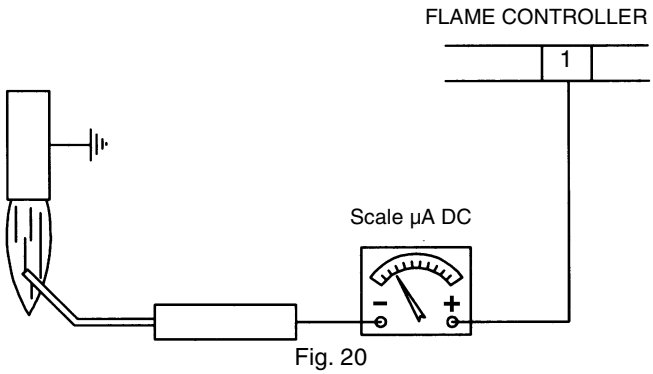


Fig. 20

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

Key

C - Capacitor (22nF/250V)

LGB - LMG - Landis flame control device

R - Resistor (1Mohm)

RC466890660 - RC Landis filter

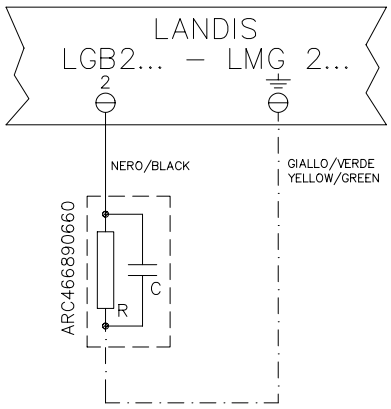


Fig. 21

TROUBLESHOOTING

CAUSE / FAULT	BURNER DOESN'T START	BURNER CONTINUES PRE-PURGUE	BURNER DOESN'T START AND LOCKS	BURNER DOESN'T START AND REPEATS THE CYCLE	BURNER STARTS AND REPEATS THE CYCLE	NURMER DOESN'T SWITCH TO HIGH FLAME	BURNER'S LOCKUOT DURING OPERATION	BURNER STOPS AND REPEATS CYCLE DURING OPERATION	BURNER'S LOCKOUT AFTER START	THE FLAME CONTROL DEVICE REPEATS CYCLE WITHOUT GIVE CONSENT
MAIN SWITCH OPEN	●									
FUSES INTERVENTION	●									
ABSENCE OF GAS	●									
MINIMUM GAS PRESSURE SWITCH FAULT OR BAD SETTING	●			●	●			●		
BOILER THERMOSTATS OPEN	●									
AIR PRESSURE SWITCH FAULT OR BAD SETTING	●		●				●			●
DEFECTIVE FLAME CONTROL DEVICE	●	●	●				●		●	●
DEFECTIVE AIR DAMPER SERVOCONTROL		●								
DEFECTIVE IGNITION TRANSFORMER			●							
IGNITION ELECTRODE WRONG POSITION			●							
BUTTERFLY VALVE BAD SETTING			●							
DEFECTIVE GAS GOVERNOR			●	●	●			●		
DEFECTIVE HIGH-LOW FLAME THERMOSTAT						●				
SERVOCONTROL CAM BAD SETTING						●				
DETECTION ELECTRODE BAD POSITION OR DEFECTIVE DETECTION CIRCUIT							●		●	
PHASE-PHASE SUPPLY OR PRESENCE OF VOLTAGE ON NEUTRAL*									●	

* See Fig. 21.

ELECTRICAL DIAGRAMS

Electrical diagrams 01-320 Rev. 3 e 01-427 - Complete key

C1	Operation time counter first stage
C2	Operation time counter first stage
ER	Flame detection electrode
EV1	Gas solenoid valve, Ist stage, DUNGS MB-ZRDLE
EV2	Gas solenoid valve, 2nd stage, DUNGS MB-ZRDLE
F	Fuse
IL	Main switch
L	Phase
LAF	Burner in high flame operation light
LB	Flame lockout light
LBF	Burner in low flame operation light
LGB.. / LMG..	LANDIS flame control device
MA	Burner supply terminal board
MV	Fan motor
N	Neutral
PA	Air pressure switch
PG	Minimum gas pressure switch
SQN30.151	LANDIS servocontrol for air damper (alternate)
SQN70.224A20	LANDIS servocontrol for air damper (alternate)
ST	Group of thermostats or pressure switches
STA4.5B0.37/63N21L	BERGER servocontrol for air damper
STA6B3.41/63N21L	BERGER servocontrol for air damper (alternate)
TA	Ignition transformer
TAB	High-low flame pressure switch or thermostat (if fitted remove the bridge between terminals T6 and T8)
TS	Safety thermostat or pressure switch on boiler
VPS504	Dungs valves leakage control (optional)

SERVOCONTROL CAMS

LANDIS SQN30.151	BERGER STA6BB3.41	LANDIS SQN70.224A20	BERGER STA4.5B0.37	
I	ST2	RED	I	High flame
II	ST0	BLUE	II	Stand-by
III	ST1	ORANGE	IV	Low flame
V	MV	BLACK	III	Not used

ATTENTION:

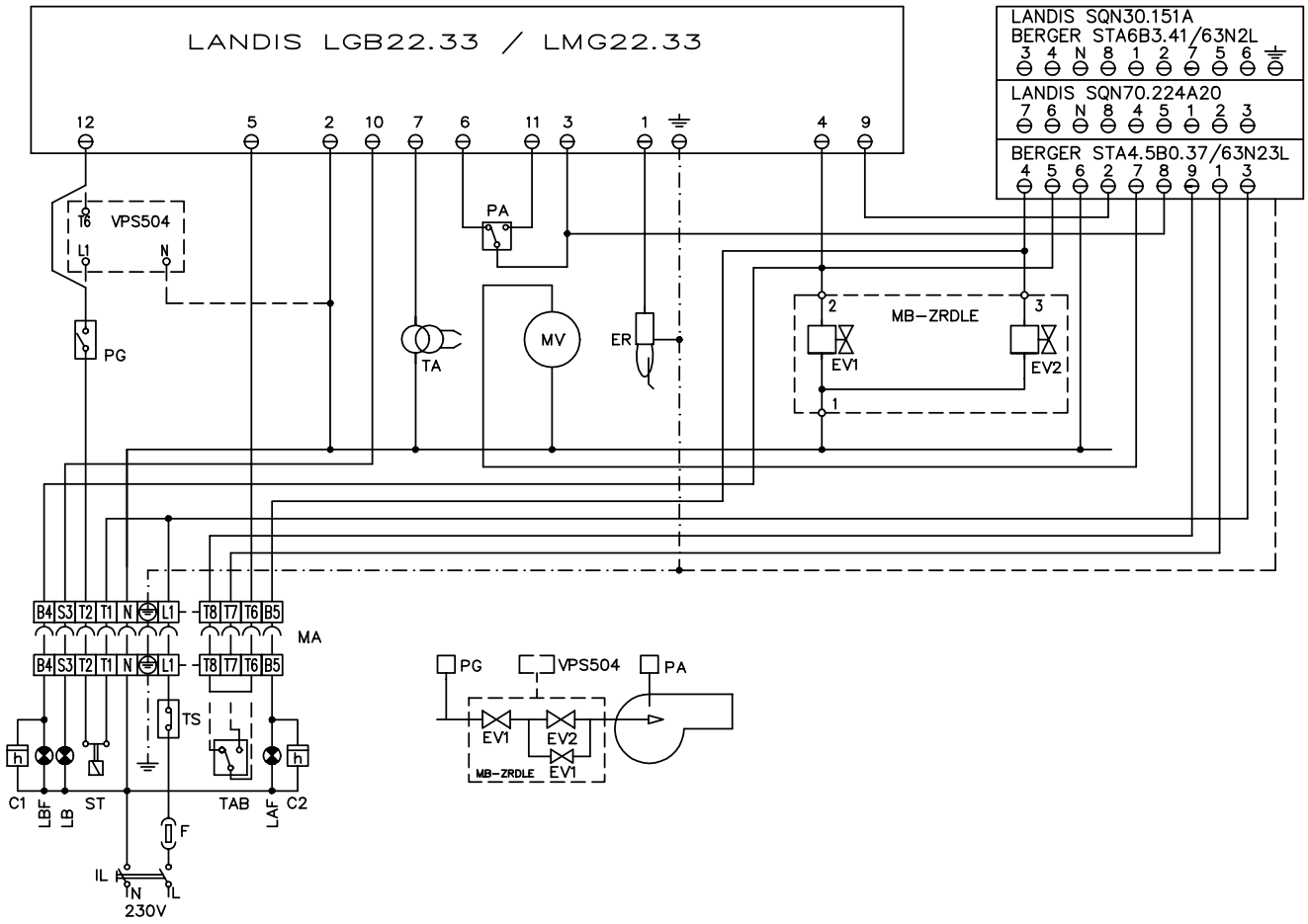
1 - Power supply 230V 50Hz 2N a.c.

2 - Don’t reverse phase and neutral

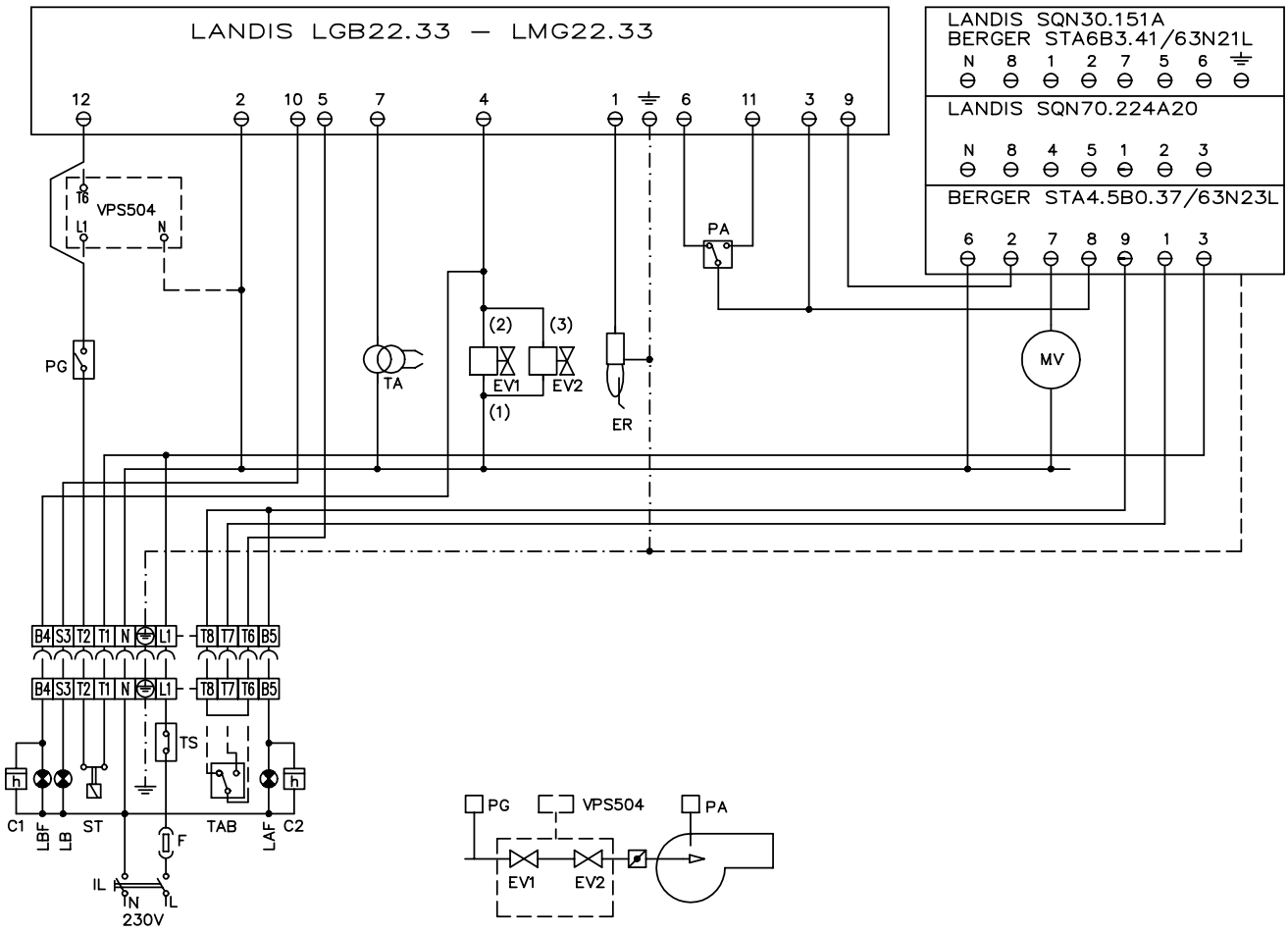
3 - Ensure the burner is properly earthed

ELECTRICAL DIAGRAMS

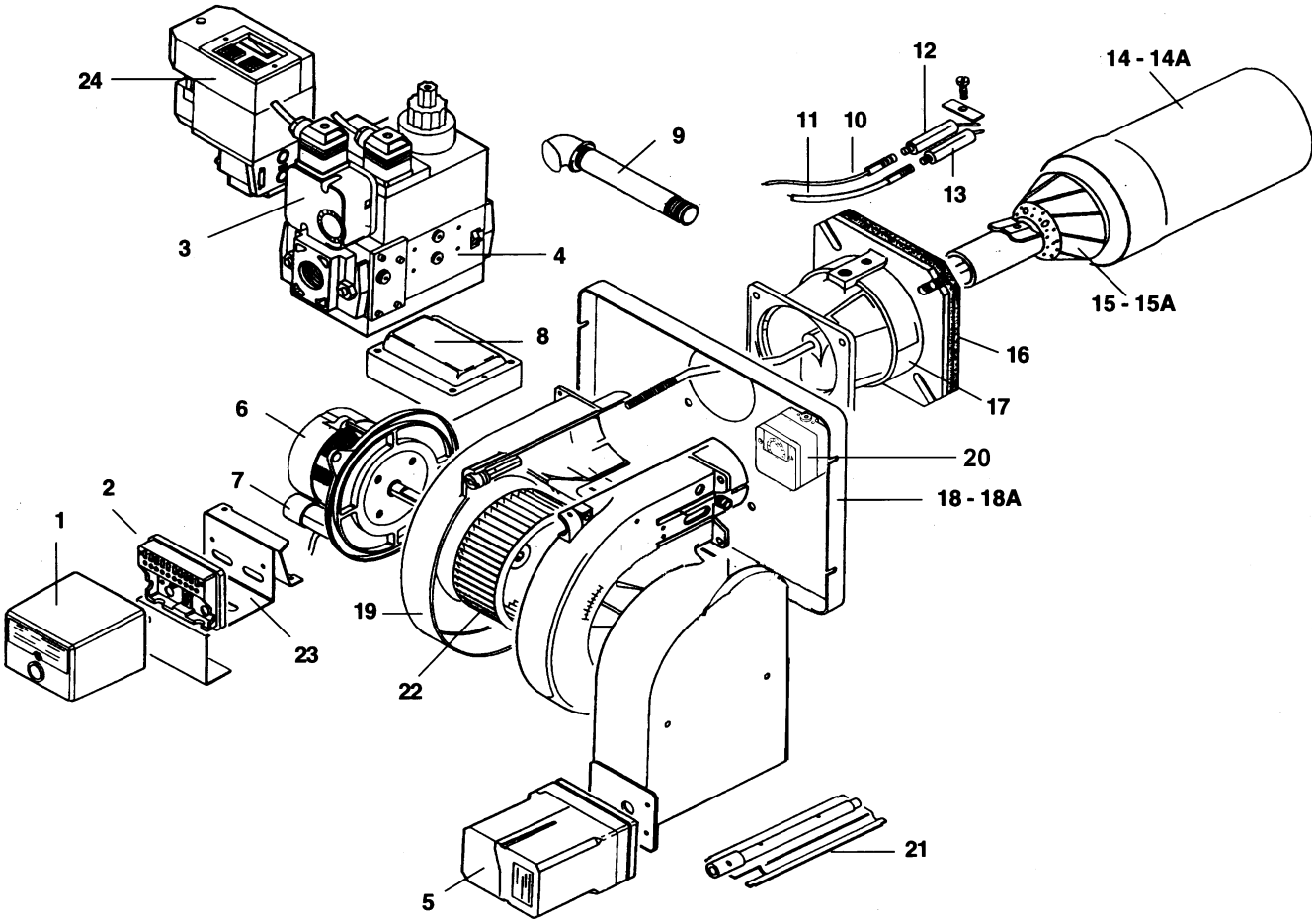
Electrical diagram 01-320 Rev. 3



Electrical diagram 01-427



SPARE PARTS



POS.	DESCRIPTION	S10	S18
1	FLAME CONTROL DEVICE LANDIS LGB22	2020430	2020430
1	FLAME CONTROL DEVICE LANDIS LMG22	2020450	2020450
2	SOCKET FOR FLAME CONTROL DEVICE	2030415	2030415
3	GAS PRESSURE SWITCH	2160052	2160052
4	MULTIBLOC MB-DLE	2190340	2190341
4	MULTIBLOC MB-ZRDLE (DOUBLE STAGE)	2190358	2190354
5	SERVOCONTROL BERGER STA6 B 3.41	2480042	2480042
5	SERVOCONTROL BERGER STA4.5 B0.37/6	2480057	2480057
5	SERVOCONTROL LANDIS SQN30.151	2480031	2480031
5	SERVOCONTROL LANDIS SQN70.224	2480037	2480037
6	MOTOR (SIMEL)	2180005	2180005
6	MOTOR (AEG)	2180703	2180703
7	CAPACITOR FOR SIMEL MOTOR	6030005	6030005
7	CAPACITOR FOR AEG MOTOR	6030003	6030003
8	TRANSFORMER	2170108	2170108
9	EXTENSION SCREW	2130016	2130027
10	DETECTION CABLE	6050211	6050211
11	IGNITION CABLE	6050122	6050122
12	DETECTION ELECTRODE	2080108	2080108
13	IGNITION ELECTRODE	2080218	2080218
14	BLAST TUBE	3090002	3090036
14A	BLAST TUBE, LONG	3090010	3090037
15	COMBUSTION HEAD	30600A6	30600A2
15A	COMBUSTION HEAD, LONG	30600A7	30600A5
16	GASKET	2110031	2110031
17	FLANGE PIECE	2300050	2300050
18	BOTTOM	2010102	2010102
18A	HOUSING	3010019	3010019
19	BURNER'S BODY	2050216	2050216
20	AIR PRESSURE SWITCH	2160053	2160053
21	AIR DAMPER	2140006	2140006
22	FAN	2150004	2150004
23	SUPPORT BRACKET	3050008	3050008
24	LEAKAGE CONTROL (ON DEMAND)	2191604	2191604

APPENDIX: COMPONENTS CHARACTERISTICS

LANDIS LGB 21/22.. FLAME CONTROLLER 23

LANDIS LMG21/22/25 FLAME CONTROLLER 26

GAS MULTIBLOC REGULATOR DUNGS MB-DLE 405-407-410-412-415-420 28

GAS MULTIBLOC REGULATOR DUNGS MB-ZRDLE 28

VALVE PROVING SYSTEM DUNGS VPS504 28

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 140 V. The burner control automatically attempts a new start-up when the supply voltage again exceeds 140 V

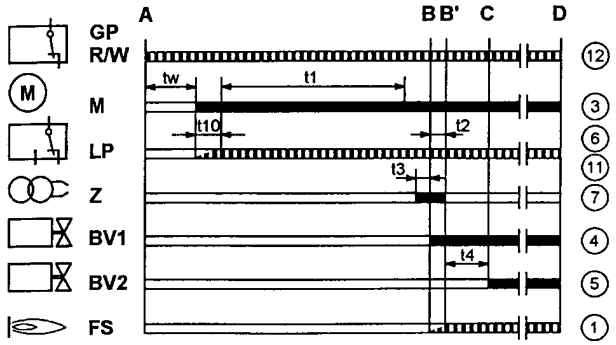
A Start-up command from the temperature or pressure controller “R”

A-C Start-up programme

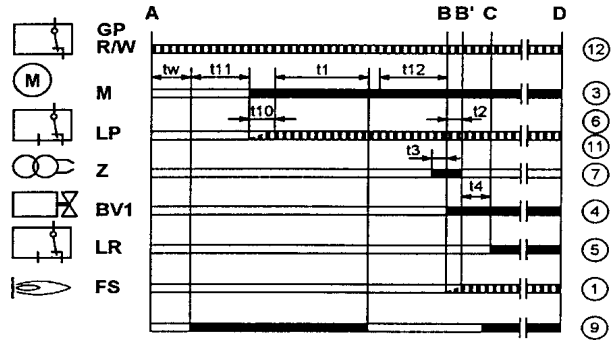
C-D Burner operation (heat production corresponding to the control commands)

D Controlled shut-down by “R”

LGB21



LGB22



Key for operation diagram

A Start-up (control start-up by “R”)

B-B' Interval for flame establishment

C Operating position of the burner or release of the 2nd stage via load controller LR

D Controlled shut-down by "R"

tw Waiting time, 8 sec. for LGB21; 9 sec. for LGB22

t1 Controlled pre-purge time, 30 sec.

t2 First safety time, 3 sec.

t3 Pre-ignition time, 2 sec. for LGB21; 3 sec. for LGB22

t4 Interval BV1- BV2 = Interval BV1- LR, 8 sec.

t10 Specified time for the air pressure signal, 5 sec. for LGB21; 3 sec for LGB22

t11 Programmed time to open the damper SA, max 12 sec.

t12 Programmed running time for air damper from OPEN to LOW FLAME position, max 11 sec.

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

ZV1 Main flame ignition gas valve or BV1 for burners with main flame supervision

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-up command (controlled start-up)

The regulator "R" supplies (due to terminal 12) the mechanism; the fan starts up for pre-purge. The actuator SA moves the air damper to the maximum load position (after the time t11).

tw Waiting time

During this time the air pressure switch check for correctoperation.

t11 Running time for complete damper opening (OPEN) (only for LGB22)

The fan motor is started only after the air damper has reached the full load position.

t10 Specified time for the air pressure signal

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

t1 Pre-purge time

For LGB21.. purging of the combustion chamber with the nominal air load; for LGB22.. purging of the combustion chamber with the maximum air load. During this time, the pressure switch LP must give its consent. The real time of pre-purgue is between the end of tw and the start of t3.

t12 Programmed time to close the damper SA (MINIMUM)

During the time t12, the air damper moves to the low flame position.

t3 Pre-ignition time

During this time, and until to the end of the safety time t2, the flame relay is forced to close. When time t3 has elapsed, the fuel release is initiated at terminal 4.

t2 Safety time

At the end of safety time there must be a flame signal at the input 1 of the flame signal amplifier, which must continues uninterruptedly until controlled shut-down occurs, or the flame relay will deenergize, and remains blocked in the fault position.

t4 Interval

When time t4 has elapsed, the controller starts.

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 t2
- Absence of confirmation of air pressure: safety stop(block) after t10
- Failure to start up the burner: safety stop after safety time t2
- 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
Current at input to terminal 12	max 5 A 1
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

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

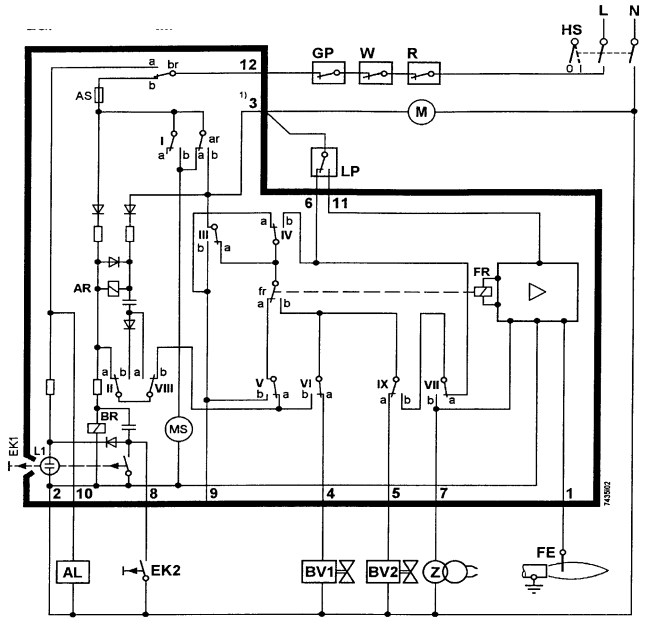
KEY - internal diagram

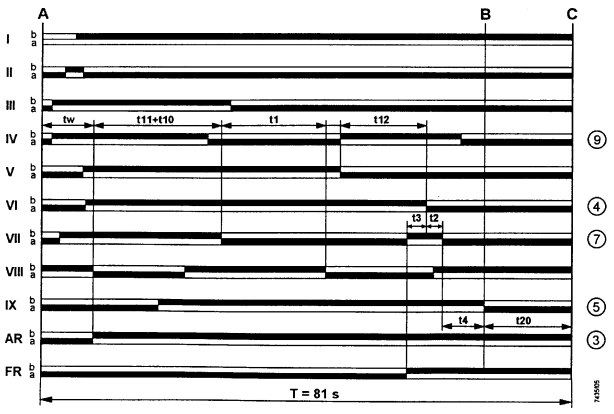
AL Block signal
AR Main relay with "ar" contacts
BR Block relay with "br" contacts
BV Fuel valve
Dbr1 U bolt
EK Unblocking button
FE Detection electrode
FR Flame relay with "fr" contacts
GP Gas pressostat
HS Main selector
L Phase conductor
L1 Block light (blinking)
LP Air pressostat
M Fan motor
MS Synchronous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

Key - programmer's diagram

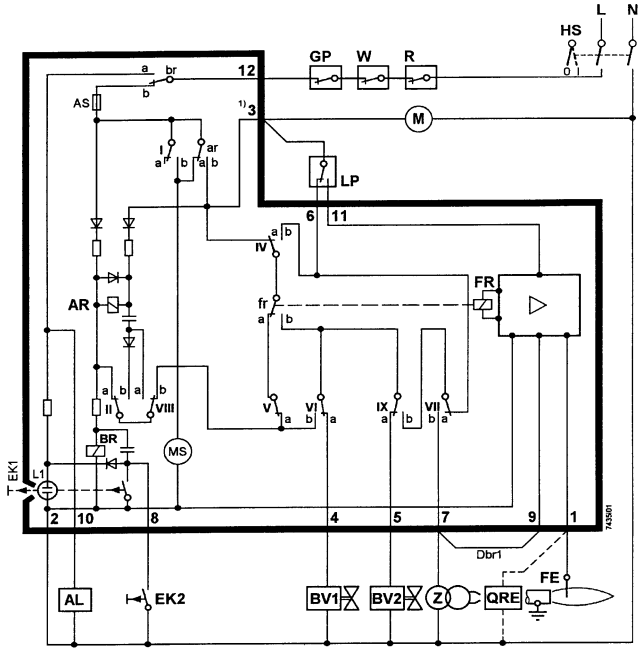
A start-up (command from regulator “R”)
AR main relay
B burner operation
C program start position (start up)
FR flame relay
tw waiting time
t1 preventilation time
t2 safety time
t3 pre-ignition time
t4 interval of time BV1-BV2 or BV1-LR
t10 waiting time for confirmation of air pressure
t11 air damper 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

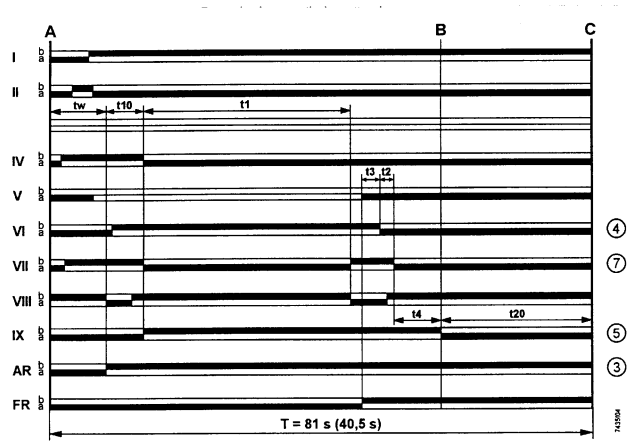
LGB21





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:

- Protection against overvoltage:
  with voltages lower than160V ~ (with input 230V ~) the equipment stops, when the voltage overcome 195V ~ (with input 230V ~) the equipment starts again and repeats the starting cycle;
- 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"

Operations key

BV Fuel valve
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

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.

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.

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.

t3 Pre-ignition time.

Ignition time until the opening of BV1.

t3n Ignition time during "TSA".

Interval between the start of TSA and the shut-off of ignition transformer Z. The transformer is shut-off 400ms before 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.

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.

t11 Programmed time for the opening of the servocontrol SA,

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

B-B' Interval for the flame establishment.

C Operating position of the burner.

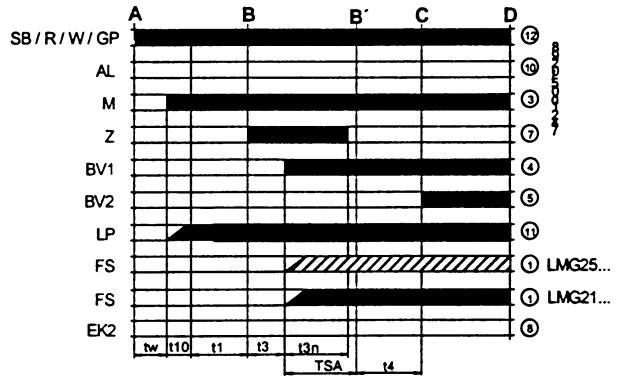
C-D Burner operation (heat production)

D Controlled shut-down by LR.

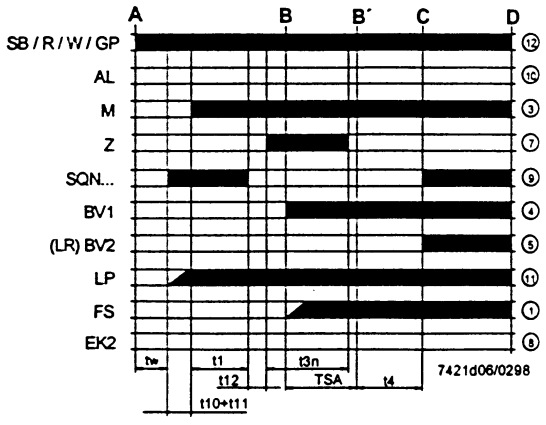
The burner is shut-off immediately and the flame control device is ready for a new start.

FUNCTIONS

LMG21.../LMG25...



LMG22...



Control program in the event of fault

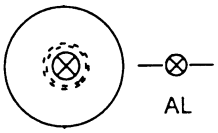
- If a fault occurs, all outputs will immediately be deactivated (in less than 1s).
- On restoration of power, a restart will be made with the full progra sequence.
- If the operating voltage drops below the undervoltage thresold.
- If there is a premature faulty flame signal during t1, a lockout occurs.
- 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 *******************

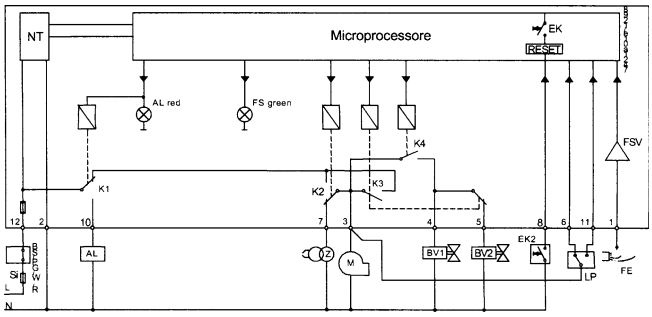
Trouble of contacts outlet:

- Errors of electric connection
- Anomalous voltage to outlet terminals

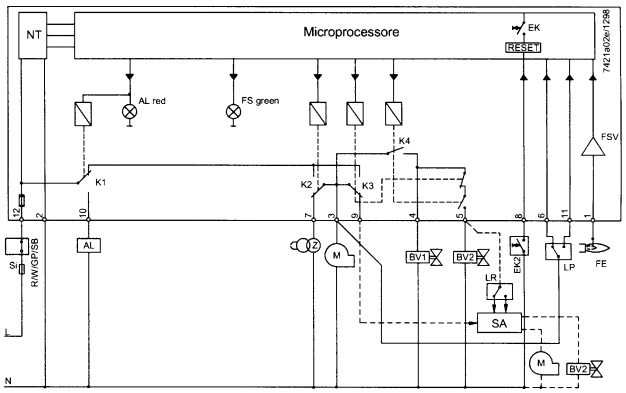
20 flashing ********************

Internal error of the flame control equipment

Internal diagram LMG21/25



Internal diagram LMG22



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

GAS MULTIBLOC REGULATOR DUNGS MB-ZRDLE

Specifications

Nominal diameters	MB405/407 B01 MB410/412 B01
Flange with pipe threads	as per ISO 7/1 (DIN 2999)
MB405/407	Rp 1/2, 3/4 and their combinations
MB410/412	Rp 3/4, 1 1/4 and their combinations
Max. operating pressure	360 mbar
Output pressure ranges	MB-.. S20/S22: 4 to 20 mbar MB-.. S50/S52: 4 to 50 mbar
Media	Gases of families 1, 2, 3 and other neutral gaseous media
Ambient pressure	-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.

Solenoid valve V1	Valve as per DIN EN 161 Class A Group 2, fast closing, fast opening
Solenoid valve V2	Valve as per DIN EN 161 Class A Group 2, fast closing
Measuring/ignition gas connection	For G 1/8 as per DIN ISO 228,
Burner pressure monitor p_{br}	Connection downstream of valve V2, pressure switch mountable on adapter laterally
Voltage/frequency	AC 230V -15% +10%, 50/60 Hz
Electrical connectio	Plug connection as per DIN 43 650, IEC 335, IEC 730 (VDE 0700, VDE 0722)for valves and pressure switches
Switch-on duration	100%
Degree of protection	IP 54 as per IEC 529 (EN 60529)
Radio interference	Interference degree N
Materials 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.
Closed position signal contact	Closed position signal contact, type K01/1 (DIN-tested), mountable to V2

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



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