SPARANDO

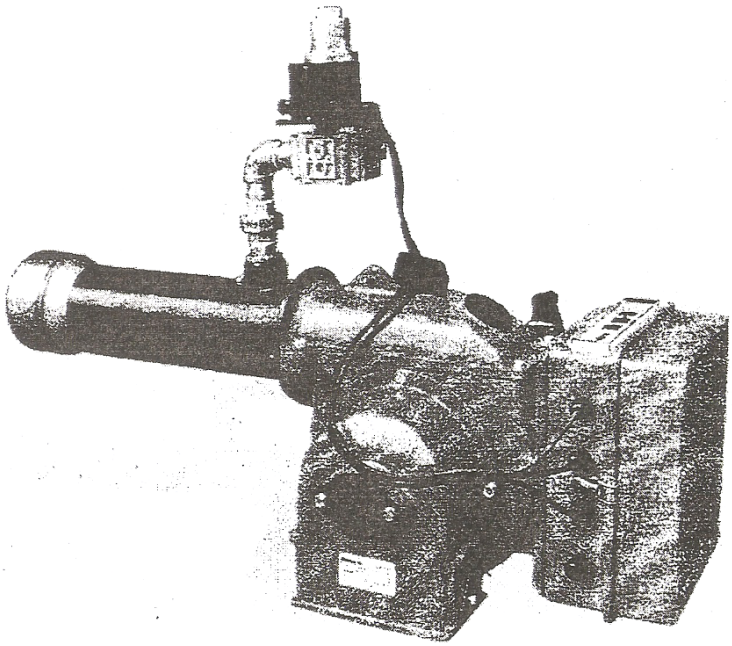
ITALIAN TECHNOLOGY

TO THE SERVICE OF THE INDUSTRY

GASMISEA S.R.L.

- Instruction for burners model

BG40T
BG60T
BG100T
BG120T
BG150T
BG180T
BG200T
BG250T
BG300T
BG350T



The works on the burner and on the system have to be carried out only by competent people.
Read carefully the instructions before starting the burner and service it.
The system electric feeding must be disconnected before starting working on it.
If the works are not carried out correctly it is possible to cause dangerous accidents.

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BG40T-350T

TECHNICAL DATA		BG 40T	BG 60T	BG 100T	BG 120T	BG 150T	BG 180T	BG 200T	BG 250T	BG 300T	BG 350T
THERMIC CAPACITY	MAX kW	425	738	995	1200	1428	1750	2000	2500	2982	3500
	MIN kW	185	248	280	350	414	540	590	490	657	924
MOTOR	kW	0,37	1,1	1,1	1,5	2,2	3	3	7,5	7,5	7,5
	r.p.m.	2800	2800	2800	2800	2825	2870	2870	2870	2870	2870
ABSORBED ELECTRICAL POWER	kW	0,80	1,56	1,57	1,97	2,67	3,16	3,56	8,06		
LINE FUSE	A 400 V	6	10		16	20		25			
IGNITION TRANSFORMER		8kV-30mA									
VOLTAGE		3~400V-50Hz									
FLAME DETECTOR		IONISATION PROBE									

Natural Gas

FLOW RATE	MAX m^3_n/h	43	75	101	121	144	173	202	252	300	353
	MIN m^3_n/h	19	25	28	35	42	53	60	50	66	93
	MAX mbar	40									
PRESSURE	MIN mbar	11÷18	18÷24	17÷34	19÷33	20÷150	11÷30	26÷150	38÷150	20÷150	26÷150

L.P.G

FLOW RATE	MAX m^3_n/h	17,0	27,2	39,0	46,6	56,0	68	78,4	98,0	117,0	137,3
	MIN m^3_n/h	7,0	9,7	11,0	14,0	16,2	21	23,1	19,2	25,8	36,2
PRESSURE	MIN mbar	30									

Minimum gas pressure, depending on the type of gas train used for obtaining max. flow rate with null pressure in the combustion chamber.

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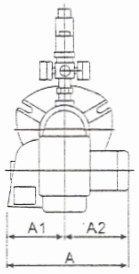
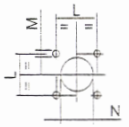
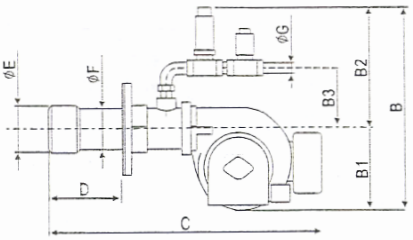
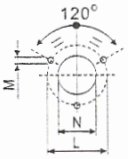
BG40T-350T





BG40T-250T



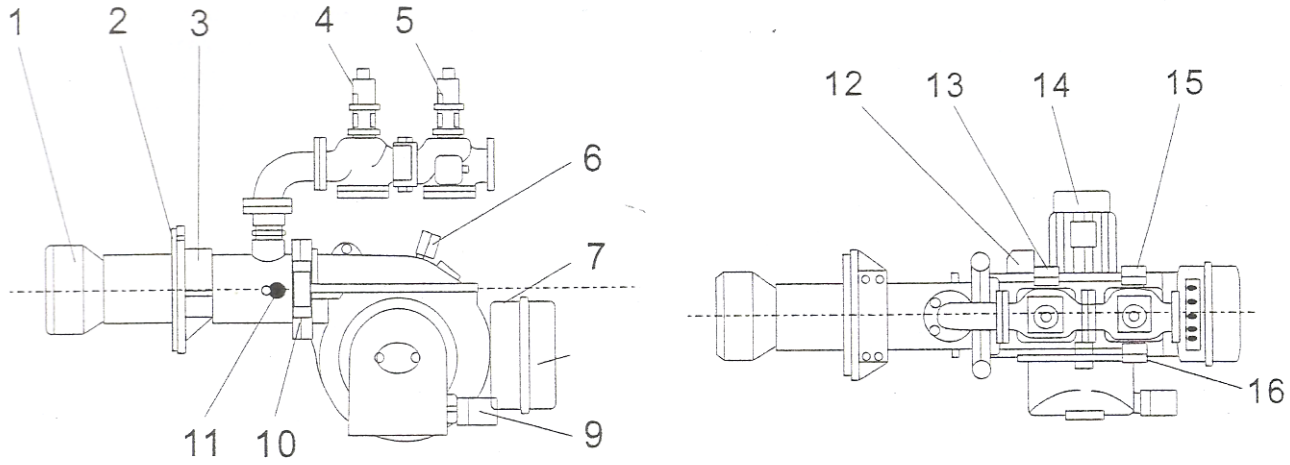


BG300T
BG350T

MOD.	A	A1	A2	B	B1	B3	C	D min	D max	E Ø	F Ø	G Ø	L min	L max	M	N
BG40T	470	220	250	690	295	200	1100	150	330	155	135	Rp 1"1/4	140	175	M12	165
BG60T	560	250	310	845	365	240	1270	170	400	205	160	Rp 1"1/2	165		M12	190
BG100T	560	250	310	845	365	240	1330	240	460	230	160	Rp 2	165		M12	190
BG120T	590	250	340	865	365	260	1400	220	440	270	195	Rp 2	195		M16	220
BG150T	655	290	365	950	450	260	1500	220	440	270	195	Rp 2	195		M16	220
BG180T	695	290	405	950	450	260	1600	220	440	320	220	Rp 2	240		M16	240
BG200T	830	395	435	1130	580	305	1850	300	600	320	220	DN65	240		M16	240
BG250T	875	395	480	1175	580	305	1850	300	600	320	220	DN80	240		M16	240
BG300T	875	395	480	1205	580	335	1850	275	465	320	275	Rp 2	490		M20	340
BG350T	880	400	480	1265	580	395	1850	275	465	356	275	DN65	490		M20	390

STANDARD ACCESSORIES

	BG40T	BG60T	BG100T	BG120T	BG150T	BG180T	BG200T	BG250T	BG300T	BG350T
BURNER FIXING FLANGE	2	2	2	2	2	2	2	2	--	-
ISOLATING GASKET	1	1	1	1	1	1	1	1	2	2
ELASTIC COLLAR	1	1	1	1	1	1	1	1	-	-
STUD BOLTS	N°4 M12	N°4 M12	N°4 M12	N°4 M16	N°4 M16	N°4 M16	N°4 M16	N°4 M16	N°3 M20	N°3 M20
EXAGONAL NUTS SECHSKANTMUTTERN	N°8 M12	N°8 M12	N°8 M12	N°8 M16	N°8 M16	N°8 M16	N°8 M16	N°8 M16	N°3 M20	N°3 M20
FLAT WASHERS	N°8 Ø12	N°8 Ø12	N°8 Ø12	N°8 Ø16	N°8 Ø16	N°8 Ø16	N°8 Ø16	N°8 Ø16	N°3 Ø20	N°3 Ø20



1) Combustion head
2) Gasket
3) Burner mounting flange
4) Operating valve
5) Safety valve
6) Air pressure switch
7) Switch for the valve tightness control lok-out
8) Electric control panel
9) Air control servomotor
10) Hinge
11) Head air control knob
12) Ignition transformer
13) Pressure switch for the valve tightness control
14) Motor
15) Gas pressure switch (minimum)
16) Gas pressure switch (maximum)

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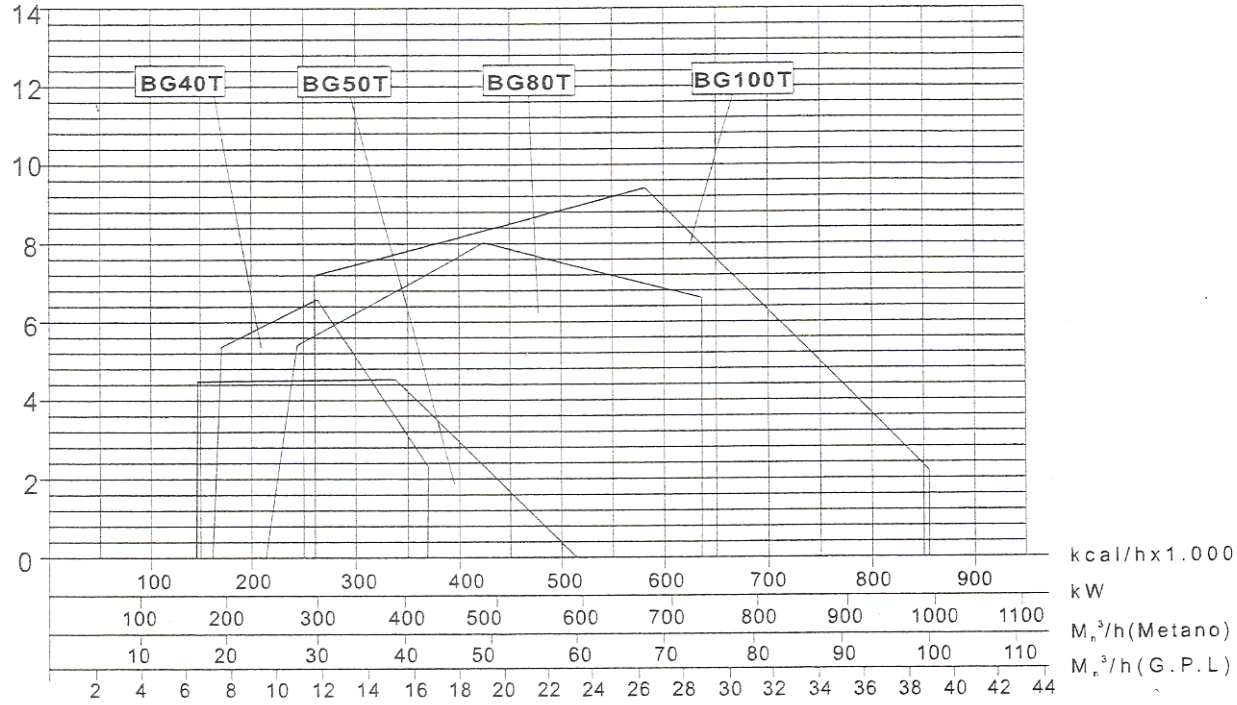
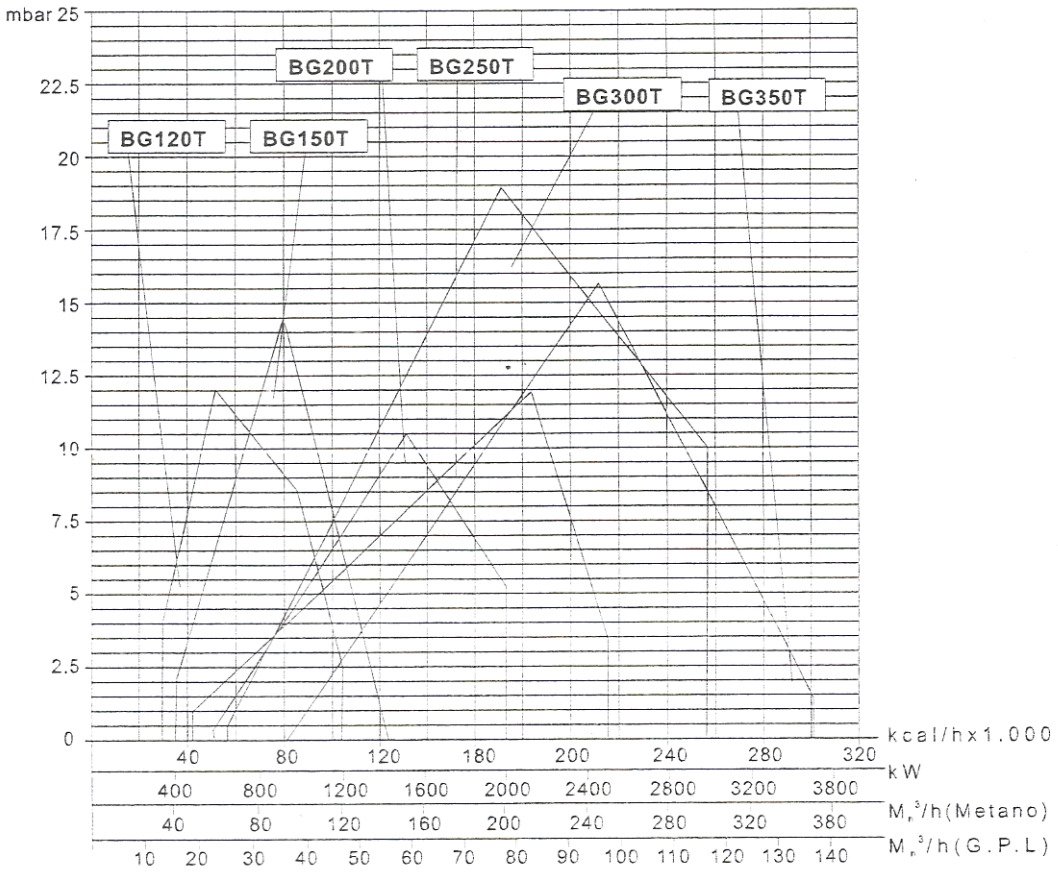
WORKING FIELD

BG40T-100T



BG120T-350T



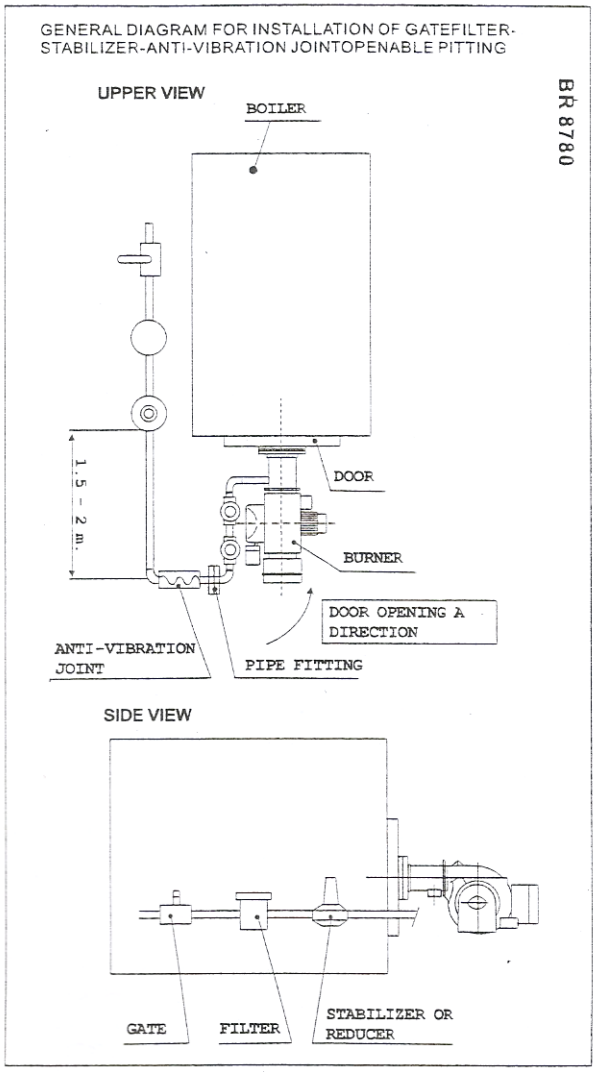
GAS FEED SYSTEM AT LOW PRESSURE (max - 400 mm.W.C.)

In addition. the following should be installed: a cut-off cock, a gas filter, a pressure stabilizer or a pressure regulator (when the feed pressure is superior to 400 mm.W.C. = 0.04 kg/cm2), and an antivibration Joint. These parts should be installed as described in our drawing (see BR 8780).
We consider it useful to give the following practical tips for installing the essential accessories on the gas pipeline near to the burner:

1) To avoid big drops in pressure on ignition the length of the pipeline between the point where the stabilizer or reducer is fitted and the burner should be from 1,5 to 2 m. This pipe must have a diameter equal or superior to that of the burner attachment fitting.

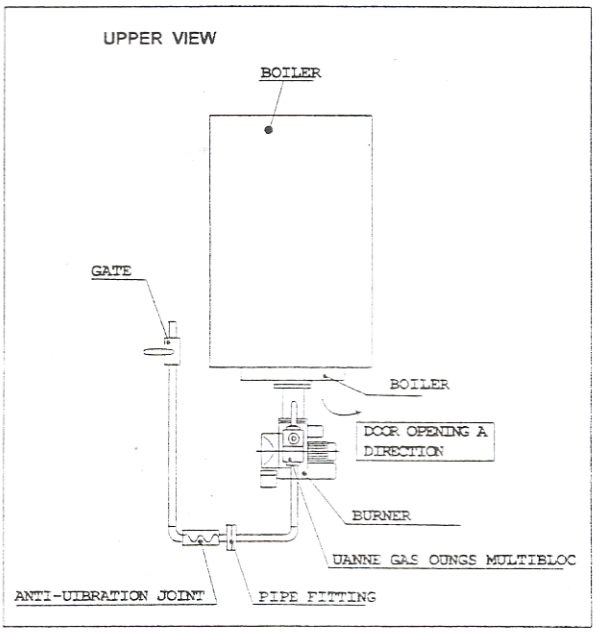
2) To get the best performance out of the pressure stabilizer, it is advisable to fit it onto horizontal pipes after the filter. The gas pressure regulator must be adjusted while it is working at the maximum capacity actually displayed by the burner. The output pressure must be adjusted to a value slightly lower than the maximum possible value (that obtained by turning the adjusting screws almost up to the limit). In this specific case, tightening the adjusting screws will increase the pressure at the regulator outlet, and slackening them will reduce the pressure.

3) We advise installing a bend directly onto the burner gas ramp before applying the removable fitting. This layout makes it possible to open the boiler door if there is one, after the pipe fitting itself has been opened.

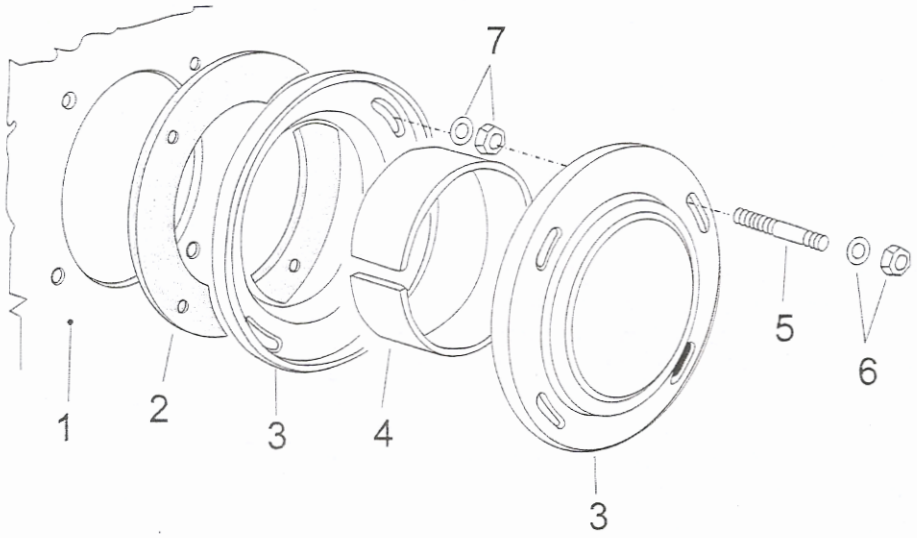


FOR BURNERS WITH DUNGS GAS VALVE mod. MB.....

The DUNGS mod. MB.... valve has a filter and gas pressure stabilizer, which means that only the cut-off cock and the vibration damper joint should be fitted to the gas feed pipe. A pressure reduction unit should be installed outside the heating system only in cases where the gas pressure exceeds the level permitted by the standard (400 mm.C.A.).
It is recommended to put a bend directly on the burner gas train before fitting the detachable connector. This is to allow the opening of the boiler door, when the connector itself has been opened.
These details are clearly illustrated in the following diagram.

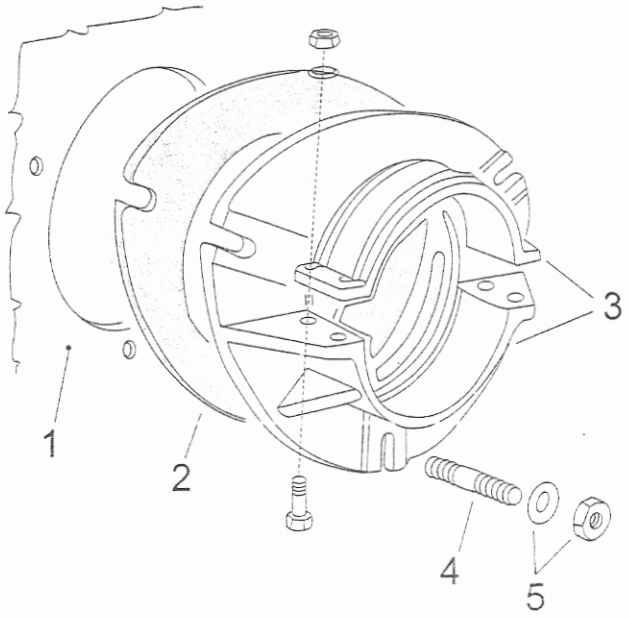


for model **BG40T-BG 250T** (steel fixing flange)



1 - Boiler plate
2 - Insulating gasket
3 - Burner fixing flange
4 - Elastic collar
5 - Stud bolt
6 - Locking nut with washer
7 - Nut and washer for fastening the first flange

for model **BG300T-BG350T** (Aluminium coupling flange)



1 - Boiler plate
2 - Insulating gasket
3 - Burner fixing flange
4 - Stud bolt
5 - Locking nut with washer

REMARKS

When tightening the flange, it is important to do it evenly so that the inner faces are parallel between them.
Since the locking system is highly efficient, do not tighten the nuts too much.
During this operation (tightening of the flange locking nuts) keep the body of the burner lifted so that the combustion head is kept in a horizontal position.

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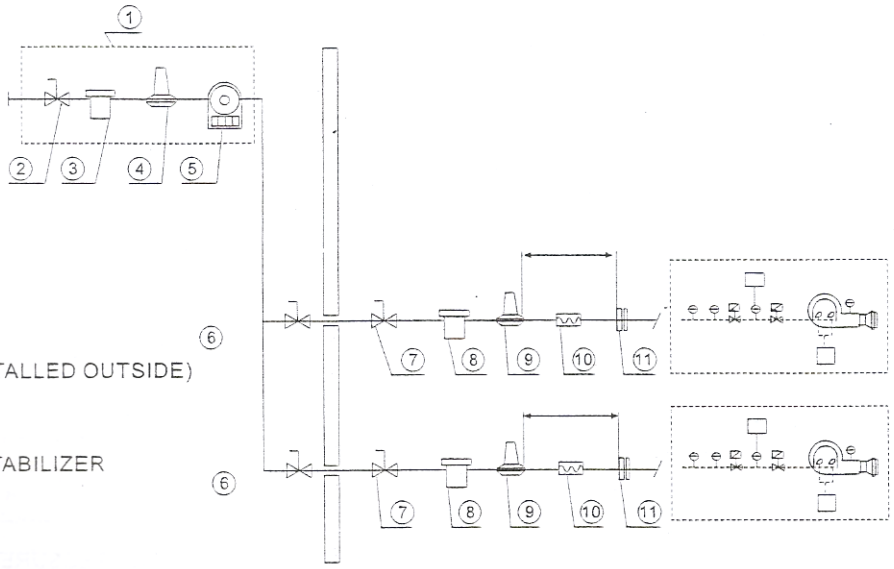
DIAGRAM OF CONNECTING MORE THAN ONE BURNER TO THE GAS PIPE NETWORK AT AVERAGE PRESSURE



1 MEASURING AND REDUCING UNIT
2 INTERCEPTION
3 GAS FILTER
4 PRESSURE REDUCER
5 METER
6 EMERGENCY INTERCEPTION (INSTALLED OUTSIDE)
7 BALL COCK
8 GAS FILTER
9 FINAL REDUCER OR PRESSURE STABILIZER (ADAPT TO THE SPECIFIC CASE)
10 ANTI-VIBRATION JOINT
11 A COUPLE OF FLANGE
D DISTANCE BETWEEN PRESSURE STABILIZER AND FLANGES (about 1.5÷2m).

ELECTRICAL CONNECTIONS

The three-phase or single-phase electric supply line of the minimum section in proportion to the power absorbed by the burner must be equipped with a fused switch. Furthermore, regulations require a switch on the burner's feed line, which should be located outside the boiler room in an easily accessible position. All electric lines must be protected by flexible sheaths, be firmly secured and be laid a long way from high temperature parts. For the electrical connections (line and thermostat) see the relevant diagram.

DESCRIPTION OF OPERATIONS

By closing the main switch, and if the thermostats are closed, voltage will reach the cyclic relay motor which will then start operating. The fan motor is then turned on and it will carry out a pre-ventilation of the combustion chamber. At the same times the motor which controls the combustion air shutter moves the air shutter to the correct open position for the 2nd flame. Pre-ventilation of the combu-stion chamber takes place when the air shutter is open at the 2nd flame position. At the end of the pre-ventilation phase, the combu-stion air shutter is taken back to the 1st flame position ignition takes place and, after three seconds, the principle and safety gas valves open and the burner starts up.
We should point out that:
a) The two-stage principle valve is fitted with a device, which regulates gas delivery for the let and 2nd flames (see specific instructions for the 2-stage valve model fitted to the burner).
b) The safety valve is an ON/OFF version (see specific instructions for valve model fitted to the burner).
Flame presence detected by its own relative control device, permits the continuation and completion of the ignition phase with the disconnection of the ignition transformer.
Subsequently, the 2nd flame is inserted (there is an increase in combustion air and the principle valve is open at the 2nd stage position). In the case of flame failure, the control box activates a "safety shut down" within three seconds of the opening at the let flame position of the principle valve. When there is a "safety shut down", the valves are immediately re-closed. To unblock the control box from the safety position push the luminous button on the control panel.
NOTE - The air shutter is activated by an electric motor (see specific instructions in the following pages). It should be kept in mind that when the burner comes to a standstill due to the intervention of the thermostats, the air shutter will be taken back to its completely closed position (energostop) by its electric motor.

Control box or programmer	Safety time	Preventilation time	Pre-ignition	Post-ignition	Time between opening of pilot valves and opening of main valves	Cut out of pilot flame after opening of main valves	Time between opening 1st flame valve and 2nd flame valve
	s	s	s	s	s	s	s
LFL 1.333	3	31,5	6	3	12	3	12

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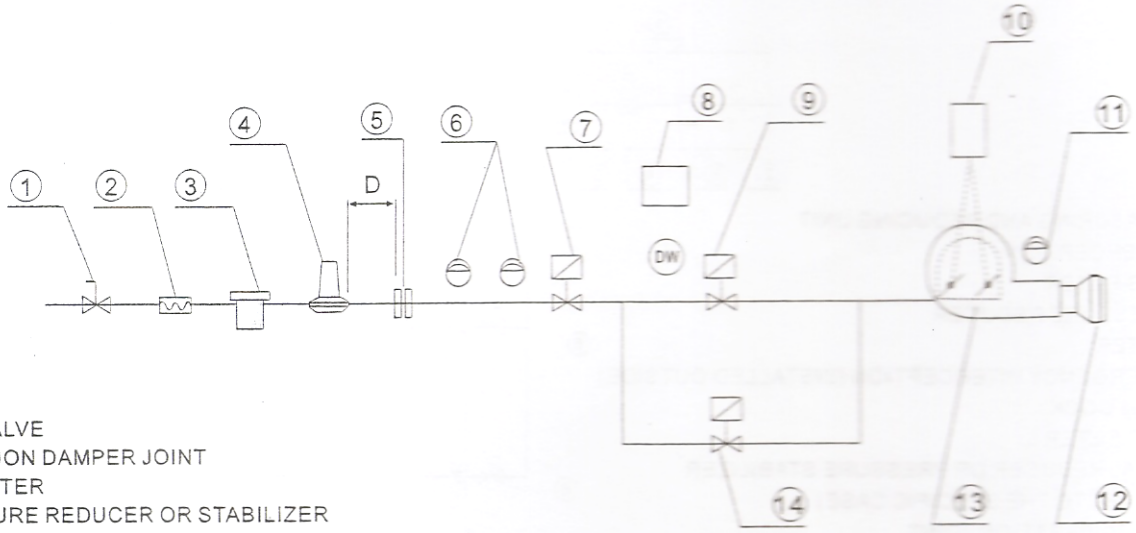
SCHEMATIC DIAGRAM OF TWO-STAGE GAS BURNER



1 BALL VALVE
2 VIBRATION DAMPER JOINT
3 GAS FILTER
4 PRESSURE REDUCER OR STABILIZER
5 PAIR OF FLANGES
6 MINIMUM AND MAXIMUM PRESSURE SWITCHES
7 RELIEF VALVE
8 SEAL CONTROL DEVICE AND RELATIVE DW PRESSURE SWITCH
9 TWO STAGE MAIN FLAME VALVE (CLOSED -1st STAGE-2nd STAGE)
10 AIR DAMPER CONTROL SERVOMOTOR
11 AIR PRESSURE SWITCH
12 COMBUSTION HEAD
13 AIR REGULATION DAMPER
14 IGNITION FLAME VALVE (PILOT) WITH SUPPLY REGULATOR
D DISTANCE BETWEEN PRE SSURE STABILIZER AND FLANGES (about 1.5-2m).

STARTING UP AND REGULATION WITH METHANE GAS
(FOR L.P.G. VERSION SEE THE RELATIVE CHAPTER)

NOTE: The burner in equipped with switch to change normally from 1st stage to 2nd stage.

1) Check that there is water in the boiler and that the system's gate valves are open.

2) Check, with absolute certainty, that the discharge of combustion products can take place freely (boiler and chimney lock-gates should be open).

3) Make sure that the voltage of the electric line to which the burner is to be connected corresponds to that required by the burner and that the electrical connections (motor and principle lines) have been prepared to match the voltage rating available. Cheek that all the electrical connections carried out on the spot are in accordance with our electric wiring diagram. Open the 2nd flame thermostat circuit. Do not connect the thermostat when regulating the let flame; in this way the 2nd flame will not be inserted.

4) Regulate the air for the ignition flame. The burner is fitted with an electric servomotor, which commands the air shutter (see specific instructions for its regulation in the following pages).

5) By operating the, regulating devices of the gas valves open, to the amount considered necessary, the flow regulator of the 1st flame (see instructions with regard to specific two-stage gas valve model fitted on the burner). Obviously, if there is a flow regulator for the safety valve, it should be opened completely too.

6) With the switch on the burner's control panel in the "0" position and the main switch inserted check, by manually closing the relay, that the motor rotates in the right direction. If it does not exchange the places of the two cables of the motor's supply line in order to invert its sense of rotation.

7) Now insert the switch on the command panel. The control box receives voltage in this way and the programmer turns on the burner as described in chapter "Description of Operations". During the pre-ventilation phase check that the air pressure switch effects a changeover (it should pass from a closed position without measurement of pressure to a closed position with measurement of air pressure). If the air pressure switch does not measure sufficient pressure (it will not effect the changeover) and neither the ignition transformer nor the gas valves will be inserted and the control box will go to "shut down". Successive "shut downs" can occur during the first ignition phase due to the following reasons:

a) The gas pipeline has not been sufficiently expelled of air and therefore there is not enough gas present to permit a stable flame.

b) A"shut down" with flame presence may be caused by flame instability in the ionization zones due to an incorrect air/gas ratio. This can be remedied by varying the quantity of air and/or gas delivered in such a way as to find the correct ratio. It could also be caused by an incorrect distribution of air/gas in the combustion head. Correct this by operating the combustion head regulating device (close more or open more the air passage between the head and the gas diffuser).

c) It could happen that the ionization current is held up by the discharge current of the ignition transformer (the two currents have to run the same course on the burner's earth) and so the burner goes to "shut down" due to insufficient ionization. This can be remedied by inverting the input (230V side) of the ignition transformer (change the places of the two wires that take voltage to the transformer). A shut down can also be caused by the burner's casing not being properly grounded. The minimum value of the ionization current to ensure the working of the control box is shown on the specific electrical diagram.

8) With the burner lighted to the minimum, it is necessary to visually check the entity and appearance of the flame immediately, and make the necessary corrections by adjusting the gas and air supply regulators (see points 4 and 5). Subsequently, read the meter to check the quantity of gas supplied. If necessary, correct the gas and combustion air supply by proceeding as described above (points 4 and 5). Then check the combustion using the special instruments provided for the purpose. For a correct gas/air ratio, the carbon dioxide (CO2) value for methane must be at least 8%, or O2 = 6% at minimum supply to the burner, up to an optimum value of 10% or O2 = 3% for maximum supply.It is essential to check the percentage of carbon monoxide (CO) present in the fumes, to ensure that it does not exceed the maximum permitted value of 0.1% (1000 ppm).

9) Repeatedly check to ensure that ignition of the first flame occurs correctly. After adjusting functioning with the first flame, switch off the burner, turn off the main switch and close the electric circuit that controls the ignition of the second flame. (The 1st and 2nd stage switch must be in the 2nd stage position.)

10) Open the gas flow manual regulator to the extent necessary for the second flame (main flame).

11) Switch on the burner again by turning on the main switch and the appliance switch. The burner lights up and automatically ignites the second flame (main flame). Visually check the entity and appearance of the flame immediately,making the necessary corrections by adjusting the gas and air supply regulators as described at points 4 and 5.

12) Adjust the flow regulator suitably for the second flame to suit the specific case. Avoid keeping the burner in operation if the flow rate is greater than the maximum value permitted for the boiler. To prevent possible damage to it, it is therefore advisable to switch off the burner immediately after two meter readings.

13) Subsequently, with the burner at the maximum supply required for the burner, check the combustion using the instruments provided, and modify, if necessary, the adjustment made earlier (air, and gas, if necessary) by means of visually checking only (CO2 max. = 10%; O2 min. = 3%; CO max. = 0.1%).

14) The air pressure switch has the function of preventing opening of the gas valve if the air pressure is incorrect. The pressure switch must therefore be adjusted to operate by closing the contact when the pressure of air in the burner reaches a sufficient value. The connecting circuit of the pressure switch involves self-control; therefore, it is necessary that the contact provided for closing with the fan stopped (absence of air pressure in the burner) actually brings about this condition. Otherwise the control box is not activated (the burner remains stopped). If the air pressure switch does not measure a pressure higher than the calibration value, the equipment performs its cycle, but does not activate the ignition transformer and the gas valves do not open; therefore, the burner is stopped by"lock-out".To en sure correct working of the air pressure switch, it is necessary to increase the regulation value, with the burner lighted, with only the first flame, resulting in the action that will be immediately followed by the burner stopping in "lock-out". Restart the burner by pressing the push-button provided, and adjust the pressure switch to restore the pressure to a value sufficient for measuring the air pressure existing during the pre-ventilation phase.

15) The gas pressure control switches (minimum and maximum) have the function of preventing the burner from functioning when the air pressure is not within the required values. From the specific function of the pressure switches, it is quite clear that the minimum pressure control switch must use the contact that is closed when the pressure switch measures a pressure higher than that for which it is adjusted. The maximum pressure switch must use the contact that is closed when the pressure switch measures a pressure lower th an the one for which it is adjusted. Regulation of the minimum and maximum pressure switches must therefore occur when the burner starts operating depending on the pressure encountered every so often. The pressure switches are electrically connected in series; therefore the action (understood as opening of the circuit) of the gas pressure switches does not allow the appliance to be activated. It must be specified that the action (understood as opening of the circuit) of any one of the pressure switches, when the burner is operating (flame on) immediately causes the burner to stop.On first ignition of the burner, it is essential to check that the pressure switches are working correctly. The respective regulation controls can be used to check the action of the pressure switch (opening of the circuit) which causes the burner to stop.

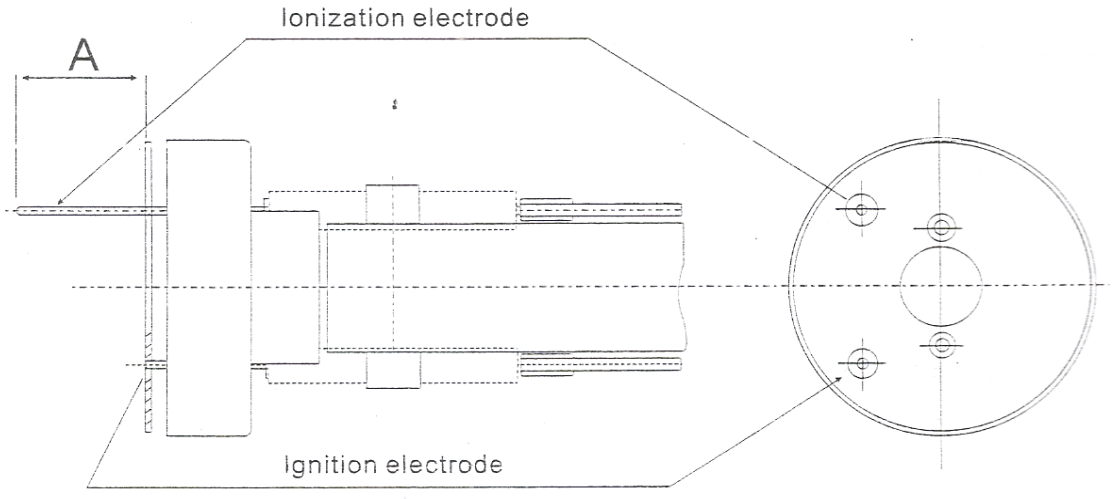
16) Check the action of the flame detector (ionization electrode) by disconnecting the wire from the electrode and activating the burner. The appliance must perform its cycle completely and, three seconds after the ignition flame appears, it must stop in "lock-out". This check must also be carried out with the burner already switched on. On disconnecting the wire from the ionization electrode, the appliance must immediately go into "lock-out". In the case of the UV photocell, after at least one minute following ignition, remove the photocell from its seat. When the UV photocell is removed from its seat, it cannot "see" the ultraviolet radiation emitted by the flame, so the relative relay is de-energized. The burner stops immediately in "lock-out". Slight greasiness will have considerable effect on the passage of ultraviolet rays through the UV photocell bulb, thus preventing the internal sensitive element from receiving the quantity of radiation necessary for correct working. In the event of fouling of the bulb with gas oil, fuel oil, etc., it is essential to clean it carefully. It must be specified that mere contact with the finger can leave a slight grease mark, sufficient to affect proper working of the UV photocell. The UV photocell does not "see" day light or the light from a lamp. Checking the sensitivity can be done with a flame (lighter, candle) or a slight electric charge that appears between the electrodes of a common ignition transformer. To ensure correct working, the value of the UV cell current must be sufficiently stable, and must not fall below the minimum value required for the specific appliance;this value is shown in the wiring diagram. It may be necessary to try and find the best position experimentally, by sliding (axial movement or rotating) the body containing the photocell relative to the fixing clamp. Checking is carried out by connecting a micro-ammeter, of suitable scale, in series to one or more connecting wires of the UV photocell; the polarity (+ and -) must, of course, be respected. The appliance can only be restarted manually by pressing the push-button provided (release). The efficiency of the lock-out must be tested at least twice.

17) Check the efficiency of the boiler thermostats or pressure switches (activation must stop the burner).

INSTRUCTIONS OF FUNCTIONING

Ensure that the burner head is perfectly centered in relation to the disk.
If it is not Perfectly centered, the flame may burn badly And overheat the head, causing rapid deterioration.
N.B. Check that the ignition occurs in a regular manner, if the passage between the head and the disk is closed, it may occur that the speed of the mixture (combustible air) is so high that ignition is made difficult. If this occurs, then the regulator must be opened gradually until it is in a position where the ignition occurs in a regular manner, and this position must be accepted as the act position. Remember that, for the First flame, it is preferable to limit the quantity of air to the bare minimum necessary for a safe ignition, even in the most demanding cases.

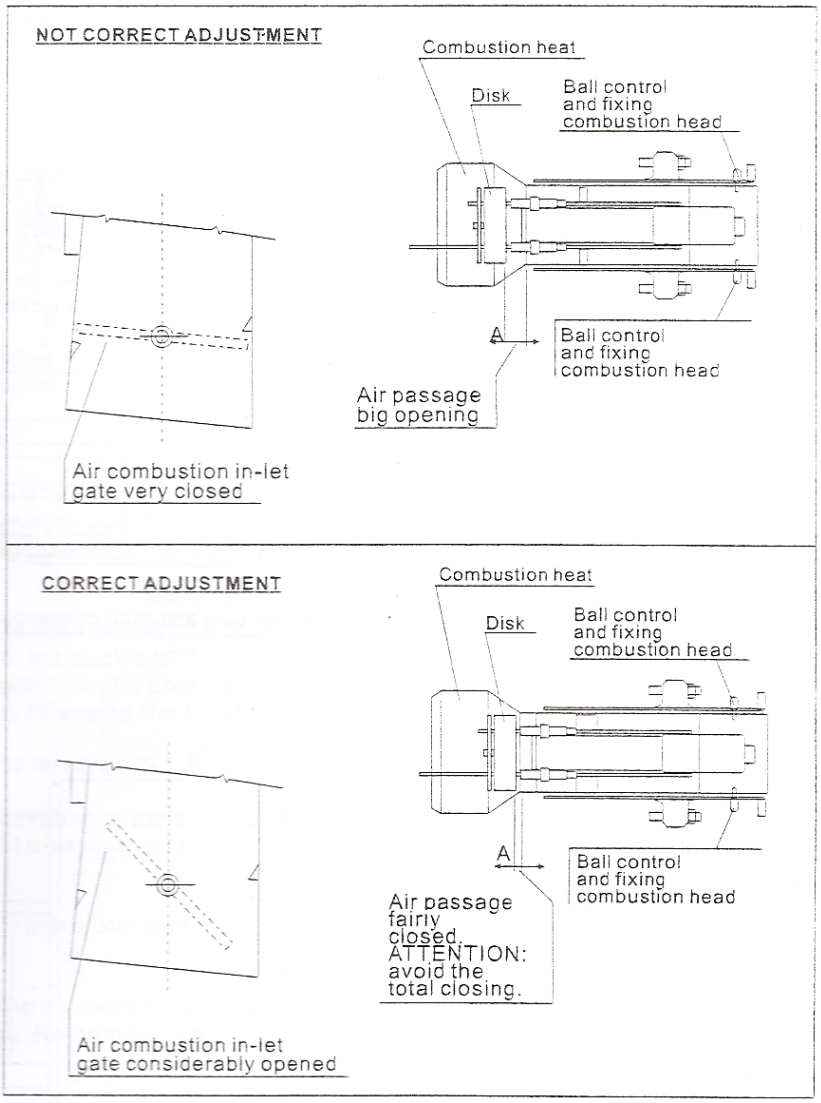
ELECTRODES ADJUSTMENT DIAGRAM



MOD.	A
BG40T	90
BG60T	110
BG100T	110
BG120T	140
BG150T	140
BG200T	190
BG250T	190
BG300T	180
BG350T	180

MAINTENANCE

The burner does not need particular maintenance, it will be otherwise better to check periodically that the gas filter is clean and the ionisation electrode efficient. The cleaning of the combustion head may result necessary.
For this reason it's necessary to disassemble the head's components. The reassembly operation must be done carefully so as to avoid the or in short circuit with following burner's lock."Check the safety devices (thermostats, pressure switches, etc.) to make sure they are in perfect working order."



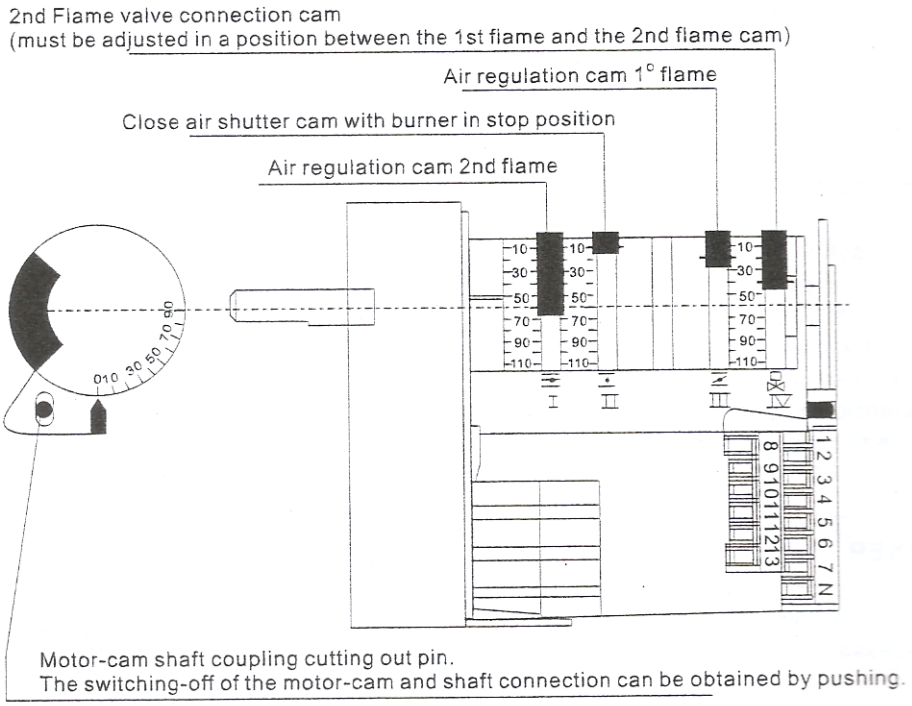
USE OF THE BURNER

The burner operates fully automatically; therefore it is non necessary to carry out any kind at adjustment during its operation. The "block" position is a safety position reached by the burner automatically when some of the components of the burners or the plant do not work properly. It is necessary to check then whether the cause to the problem is a dangerous one before unblocking the burner. The causes to the block may be temporary, for example when air in inside the pipes. When it is unblocked, the burner starts operating properly. If the burner stops three or four times at a stretch, it is necessary either to look for the cause to the problem and solve it or ask for the intervention of the after sales service.
The burner can remain in the "block" position without any limit in time. In emergency cases it is advisable and to close the fuel valve, to disconnect the burner electrically.

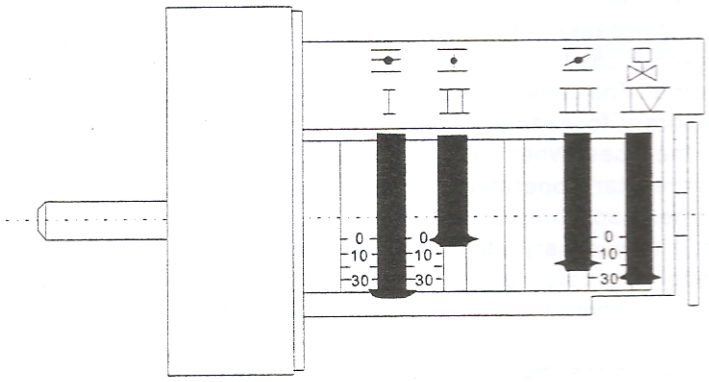
TWO-STAGE GAS BURNER

It is normally advisable to avoid connecting a burner that operates on a water heating boiler with two flames. In this case, the burner may operate even for long periods with just one flame. The boiler is thus insufficiently heated (i.e. low fuel flow rate); as a result, the products of fumes combustion are given out at an extremely low temperature (less than dew point), leading to the formation of condensate in the chimney. When the two-flame burner is installed on a boiler for the production of heating water, it must be connected in such a way as to operate at normal speed, with both flames stopping completely, without passing to the first flame, when the predefined temperature is reached. To obtain this special type of functioning, the second flame thermostat must not be installed, and a direct connection (bridge) must be made between the respective terminals of the appliance.

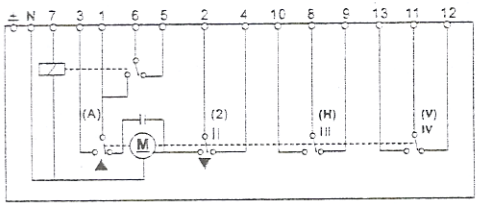
GASMISEA AIR REGULATION SERVOMOTOR SQN 30.111A3500
PREVENTILATION WITH AIR OPEN
(2° FLAME POSITION)
AIR CLOSED WITH BURNER IN STOP POSITION



In order to modify the cams regulation it's necessary to intervene on the relative red rings. Pushing by sufficient strength,in the sens one desires, each red ring can turn in respect to the reffering scale. The pointer of the red ring indicates on the respective reffering scale the rotation angle set for each cam.



ELECTRIC DIAGRAM FOR SERVOMOTOR SQN 30 Drawn in the position in which is used



GASMISEA

CONNECTRON AIR MOTOR
LKS 300 REGULATION

To regulate please do as follows:
A) open the thermostats' circuit (disconnect the connection thermostats lcable)
B) give voltage to the burner by closing the switches on the feeding line and the one on the burner. The control box must not, be in "lock position", the control box fuse must be correctly at work and the cyclic relay must be stand in start position.

ATTENTION : the following operations must be done with circuits under voltage, pay the utmost attention when operating.

C) with the burner in above described conditions, act on the regulation screw of the cam **"O"** to obtain the complete closing of the air shutter. In this position **"O"** cam must push on the relative micro-switch. Releasing the screw, the air shutter moves towards closure. If the "close" position is overcome, the shutter opens in the opposite sense of the requested one (to remedy, tighten adequately the regulation screw and soon after let the shutter open temporarily, by operating as described at point "E"). This position (closed shutter with burner at a stand) is usually already regulated at factory. We remember once again that not all burners are equipped with an electric circuit suitable to use this cam (see Note).

ATTENTION : **the cam step MUST NOT GO further the position which causes the micro switch to get into operation.** If the micro-switch has not come to operation, the burner's control box stops in the "prewashing"position.

D) air regulation 1st stage (cam **"ST1"**).
Disconnect the cable connected to the buckle N° 9 of the junction box of LKS 300 and connect it temporarily to the buckle N° 3. Operating on the regulation screw of **"ST1"** cam, the displacement of the air shutter in the desired position can be obtained. By screwing the air shutter opens, by releasing the air shutter closes.

E) air regulation 2nd stage (cam **"ST2"**).
Disconnect temporarily the cable connected to buckle N° 3 (the same which was previously disconnected from buckle N° 9) and connect it temporarily to the buckle N°7.
Operating on the regulation screw of **"ST2"** cam it can be obtained the air shutter displacement on the desired position. By screwing the air shutter opens, by releasing the air shutter closes.

F) Return the temporarily disconnected wire to its terminal (No. 9).

G) The position of cam **"MV2"**, which controls activation of the second stage fuel valve, can be adjusted by means of the adjuster screws. The adjustment is usually carried out at the factory in the intermediate position between **"ST1"** and **"ST2"**.

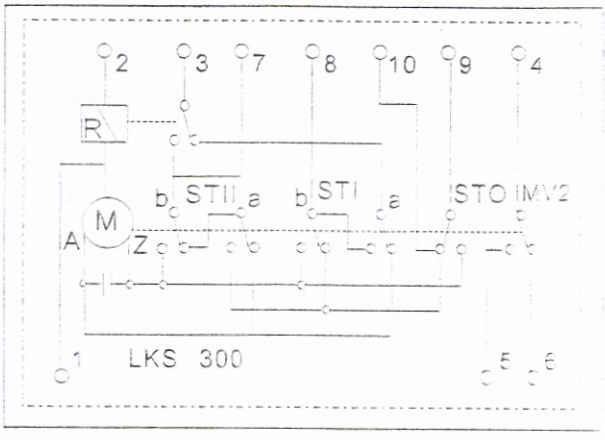
NOTE: The cam **"MV2"** is integral with the **"ST2"**; therefore, modifying the adjustment of the latter (**"ST2"**) also modifies the position of **"MV2"**.

H) Thus, after pre-adjustment of the position of the air damper, proceed with lighting the burner and adjusting the combustion air supply for the 1st and 2nd stages. Remember that slackening the cam adjuster screws will cause the air damper to close, and vice-versa.

N.B.:

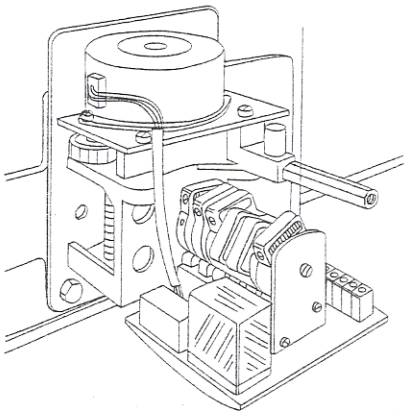
1) When the wires coming from the outside of the LKS 300 motor are not connected to terminals 7-8-9 and 10 of the motor, the electric circuit of the burner in question is not set for using cam "O". In this condition, it is obviously unnecessary to adjust this cam (**"O"**) because it is not operative, so its position is indifferent for the working of the burner. In this case, during the pre-ventilation and stop of the burner, the air damper automatically sets itself in the position corresponding to the 1st flame.

2) When the wires coming from the outside of the LKS 300 motor are connected to terminals 7-8-9 and 10 of the LKS 300 motor, the electric circuit of the burner is such that it uses cam **"O"**; therefore, the cam must be adjusted correctly as described above. In this case, pre-ventilation occurs with the air damper open in the position corresponding to the 2nd flame and the air damper is automatically closed when the burner stops.



GASMISEA

CONNECTRON AIR MOTOR
LKS 300 REGULATION



0	Close air shutter cam with burner in stop position
ST1	Air regulation cam 1° flame
ST2	Air regulation cam 2nd flame
MV2	2nd Flame valve connection cam (must be adjusted in a position between the 1st flame and the 2nd flame cam)

COMBINED GAS VALVE (monobloc) DUNGS (GASMULTIBLOC)
mod. MD-ZRDLE 415 B01 S22 (1"1/2) / MB-ZRDLE 420 B01 S22 (2")

LEGEND

1 - Access cover for initial rapid release adjustment

2 - 2nd flame supply adjusting handle (second position = second stage)

3 - Screw with projecting cylindrical head to clamp the handle 2 and the ring 5

4 - Terminal board for second position valve (2nd stage)

5 - 1st flame supply adjusting ring (first position = first stage)

6 - Main valve coil

7 - Pressure regulator (pressure stabiliser)

8 - Gas filter

9 - Safety valve coil

10 - Pressure switch for min gas pressure (5-120 mbar)

11 - Electric connection for min pressure switch

12 - Electric connection for safety valve

13 - Access cover (laterally sliding) to the pressure regulator adjusting screw (min=4 mbar max=32 mbar) approx. 80 full turns

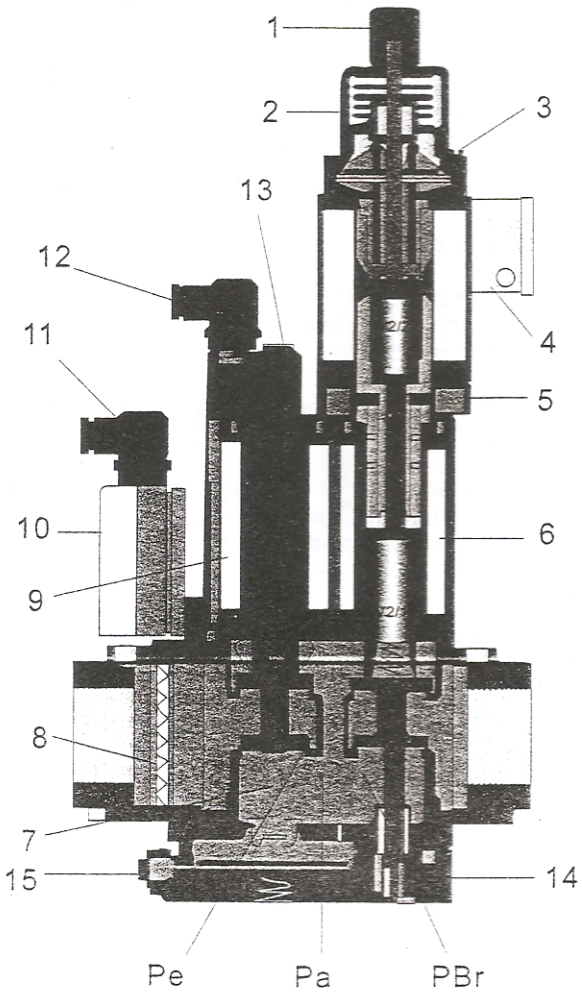
14 - Valve model identification plate (laterally)

15 - Pressure regulator bleeding hole

Pa - Pressure intake after the pressure regulator (1/8")

Pe - Pressure intake after the filter (1/8")

PBr- Pressure intake after the two-stage-valve (1/8")

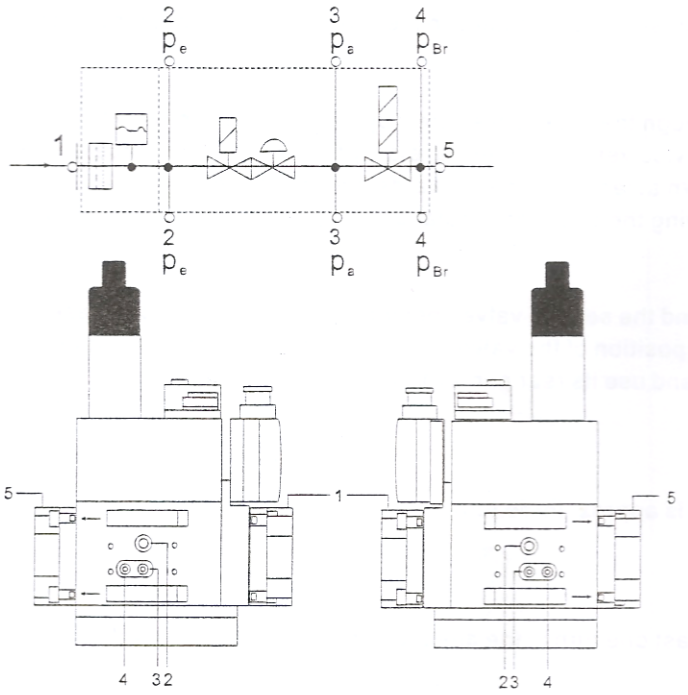


GASMISEA

COMBINED GAS VALVE (monobloc) DUNGS (GASMULTIBLOC) mod. MD-ZRDLE 415 B01 S22 (1"1/2) / MB-ZRDLE 420 B01 S22 (2")

TECHNICAL DATA
Max working pressure 360 mbar (36 kPa)
Exit pressure (Pa): MB....S20/S22 = 4÷32 mbar
MB....S50/S52 = 20÷50 mbar
Valves of the class A, group 2 (DIN STANDARD EN 161) suitable for gas belonging to the families 1-2-3.
D.C. coils, noise incidence (solenoid valve against radio noises).
Possibility to exclude the pressure regulator for the use of gaseous LPG (tighten completely, sign +, the pressure regulator screw). Closing time of the valves 1 and 2 within one second from electric supply interception.
Temperature from -15°C to +70°C, for gaseous L.P.G. systems do not use at temperatures below zero centigrade.
The L.P.G. can condense and, in the liquid state, it would damage sealings and membranes.
Voltage and frequency: AC 50/60Hz, 230V -10% + 15%
Connection time: 100%
Electric protection: IP54
Assembly position: coil in vertical or horizontal position; possibility to employ the tightness check for valves mod. VPS 504.

pressure take-off point



1,2,3,4,5, G 1/8 SCREW CAP

1 - Pressure intake on entry (before the filter)

2 - (Pe) Pressure intake after the filter

3 - (Pa) Pressure intake after the pressure regulator

4 - (PBr) Pressure intake after the main two-stage-valve (head pressure)

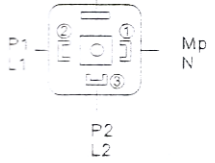
5 - Pressure intake on exit (head pressure)

APPROVALS
The request for the utility model test certification according to Ce-directives for gas appliances has been already submitted.

MB-ZR....415...B01 CE-0085 AQ 0233
MB-ZR....420...B01 CE-0085 AQ 0233
Approvals in other important gas consuming countries.

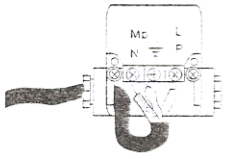
Electric connection
IEC 730-1 (VDE 0631 T1)
see valve drawing

Point (12)

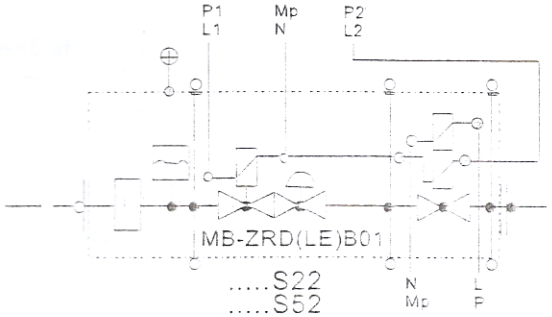


Valves V1,V2
1st stage

Point (4)



Valves V2
2nd stage



GASMISEA

COMBINED GAS VALVE (monobloc) DUNGS (GASMULTIBLOC) mod. MD-ZRDLE 415 B01 S22 (1"1/2) / MB-ZRDLE 420 B01 S22 (2")

The monobloc DUNGS model MB-ZRDLE B1..S... consists of:

a) Min. gas pressure pressure switch (10) adjustable from 5 to 120 mbar.

b) Gas filter (8).

c) Pressure regulator (stabiliser) (7).

d) Safety valve (incorporated in the pressure regulator), rapid opening and closing (9).

e) Main valve with two positions (1st and 2nd flame), slow opening with adjustable initial rapid release and rapid closing (6).

Adjustment instructions:

1) Entry filter (8) accessible for cleaning by removing the closing plate situated in the lower valve wall near the filter seat

2) Pressure stabilisation adjustable from 4 to 32 mbar through the accessible screw by displacing the cover (13) laterally. The full stroke from minimum to maximum and vice versa requires ca. eighty full turns, do not force against the limit switches. Before starting the burner, turn at least 15 times towards the sign (+). Around the access hole there are the arrows with the symbols showing the direction of rotation to increase pressure (clockwise rotation) and to reduce it (anticlockwise rotation).

Initial rapid release adjustment affecting both the first and the second valve opening position. The rapid release adjustment and the hydraulic brake affect the 1st and 2nd position of the valve proportionally to delivery adjustments. To carry out adjustments, loosen the protection cover (1) and use its rear part as tool to rotate the pin.

Clockwise rotation = smaller rapid release
Anticlockwise rotation = bigger rapid release
The stroke from "completely closed" to "completely open" is approx. three turns.

FIRST POSITION ADJUSTMENT (1st FLAME)
Loosen the screw with projecting cylindrical head (3).
Rotate the second flame delivery adjustment handle by least one turn in the direction shown by the arrow with the sign (+) (anticlockwise rotation).

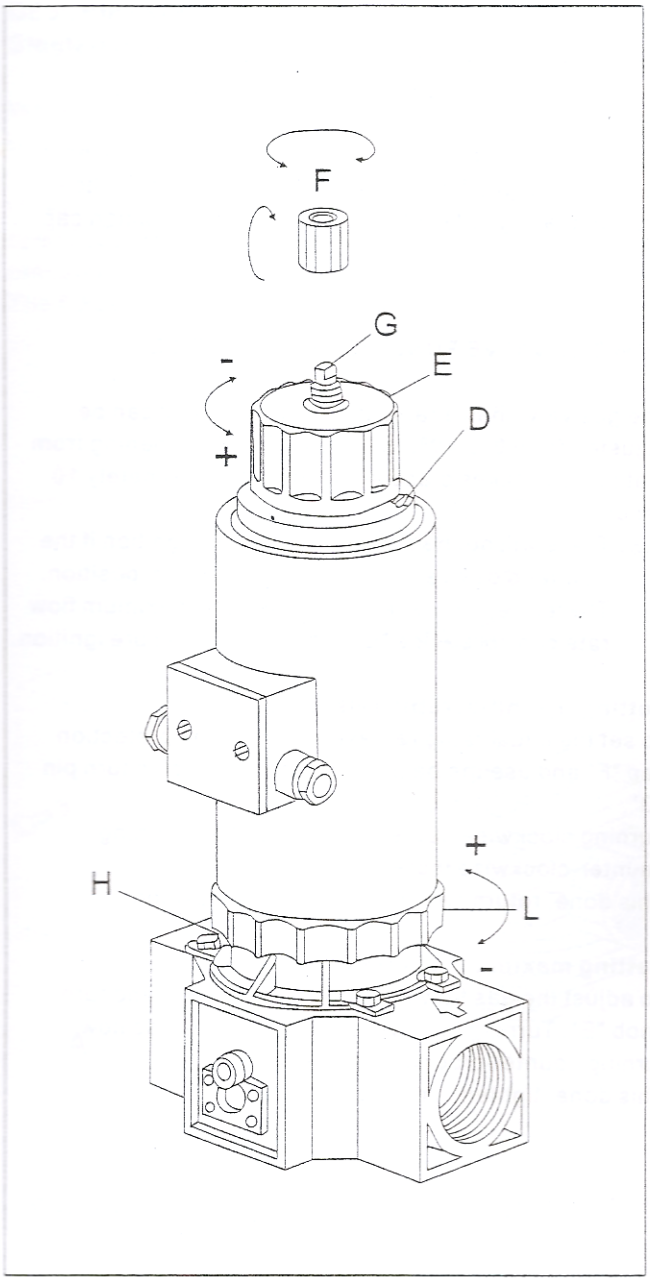
CAUTION: if said adjusting handle for the 2nd flame is not rotated by at least one turn towards (+), the valve does not open for the first position.

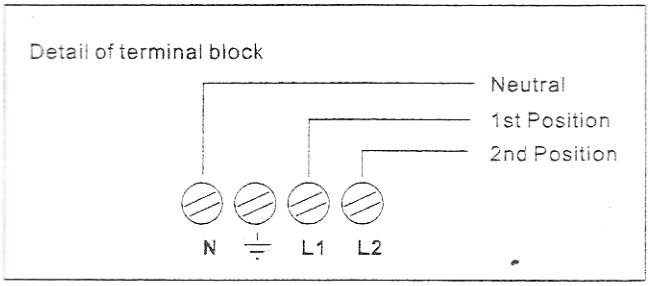
Rotate the adjusting ring (5) of the 1st position in the direction shown by the arrow with the sign (+) (anticlockwise rotation), i.e. a little more than two turns considering the limit switch. The regulator clockwise rotation brings about a supply reduction, while an anticlockwise rotation brings about a supply increase.

SECOND POSITION ADJUSTMENT (2ND FLAME)

Loosen the screw with projecting cylindrical head (3).
Rotate the handle (2) in the direction shown by the arrow with the sign (+) (anticlockwise rotation) and adjust the quantity You regard as necessary to obtain the desired gas supply for the second flame. The regulator clockwise rotation brings about a supply reduction, while an anticlockwise rotation brings about a supply increase.
After adjusting the gas supply for the first and second flame do not forget to tighten the screw (3) to avoid undesired displacements.

GASMISEA INSTRUCTIONS FOR SETTING DUNGS GAS VALVES mod. ZRDLE





OPERATING PRINCIPLE

This valve has two open positions and is equipped with a regulator. The regulator sets the hydraulic brake activation point which, in turn, causes rapid release of the opening first stage. After the initial release, the brake cuts in, ensuring that the valve continues to open slowly. This valve is also equipped with two gas flow regulators: one for the first flame and the other for the second.

Setting the initial rapid release trip

To set the initial rapid release trip, unscrew the protection cap "F" and use the back of the cap as a tool to turn pin "G". Turning clockwise decreases the gas flow, turning counter-clockwise increases it. This done, screw down cap "F" in its original position.

Setting gas flow for the 1st flame

Before setting the gas flow for the 1st and 2nd flames, loosen screw "D" (unpainted screw with raised cylindrical head). After the gas flow has been set, remember to tighten this screw once more.

N.B. To open to the 1st flame position, turn the 2nd flame regulation ring "L" counter-clockwise by at least one full turn. To set the gas flow for the 1st flame, turn knob "E": turning it clockwise decreases gas flow, turning it counter-clockwise increases it. Full travel of regulator "E" for the 1st flame, from + to -, is approximately $3^1/_2$ turns. When this regulator is fully open, the gas flow to the 1st flame can be approximately 40% of the total available when the valve is fully open in the second position.

Setting gas flow for the 2nd flame

Loosen screw "D" (unpainted screw with raised cylindrical head).

To set the gas flow for the 2nd flame, turn ring "L": turning it clockwise decreases gas flow, turning it counter clockwise increases it.

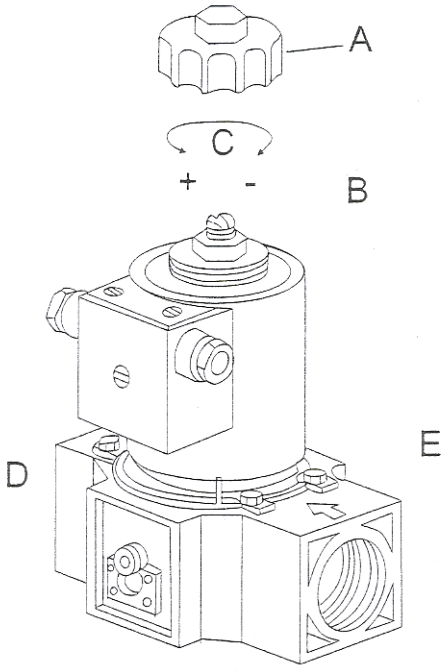
This done, tighten screw "D". Full travel for regulator "L" for the 2nd flame, from + to -, is approximately $5^1/_2$ turns.

H = Identification plate
I = Flow direction indicator

GASMISEA

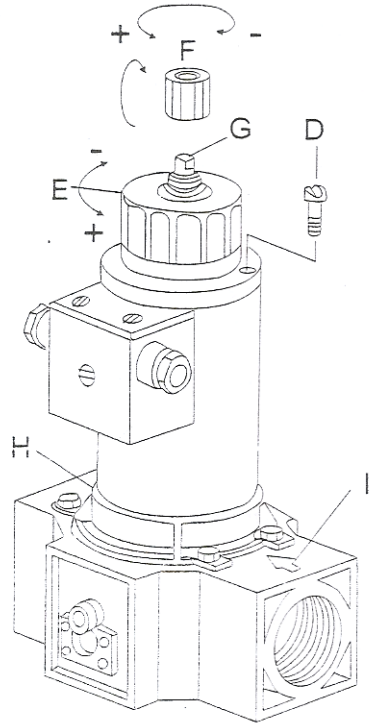
INSTRUCTIONS FOR SETTING DUNGS GAS VALVES mod. MVD ... and MVDLE ...

Mod.MVD....



D=Identification plate
E=Flow direction indicator

Mod.MVDLE....



H=Identification plate
I =Flow direction indicator

The MVD gas valves open and close rapidly.
To regulate the gas flow, unscrew and remove cap "A" and loosen nut "B".
Then, using a screwdriver turn screw "C". Unscrewing it increases the gas flow, tightening it decreases the flow.
After regulating, lock nut "B" in place and reposition cap "A".

HOW THE VALVE FUNCTIONS mod. MVDLE

The gas valve has a rapid initial trip (opening can be adjusted from 0 to 40% using pin "G"). Full opening from that point on takes place slowly over approximately 10 seconds.

N.B. There will not be sufficient supply for ignition if the flow feed device "E" is set at its minimum position. Therefore, it is essential to open the maximum flow rate control device "E" sufficiently to ensure ignition.

Setting the initial rapid release trip

To set the initial rapid release, unscrew the protection cap "F" and use the back of this cap as a tool to turn pin "G".
Turning clockwise decreases the gas flow, turning counter-clockwise increases it.
This done, return cap "F" to its original position.

Setting maximum gas flow

To adjust the gas flow rate, loosen screw "D" and turn knob "E". Turning clockwise decreases the gas flow, turning counter-clockwise increases it.
This done, tighten screw "D".

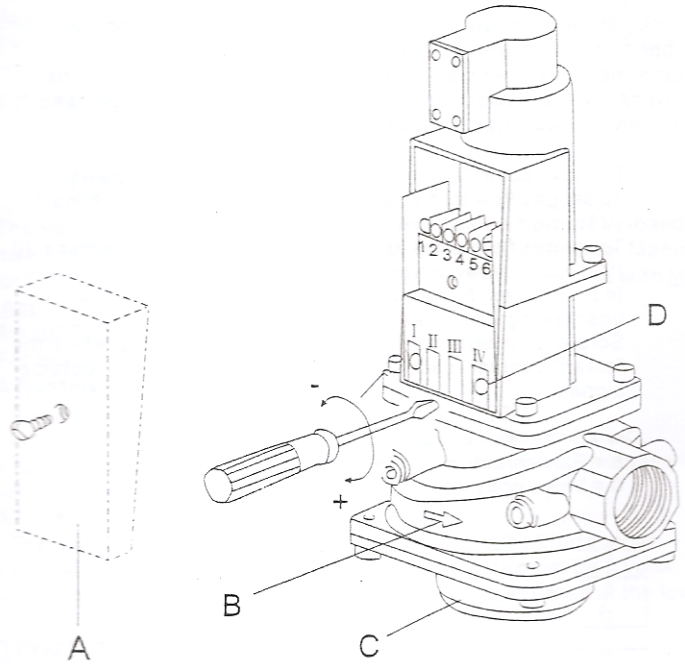
GASMISEA

INSTRUCTIONS FOR SETTING LANDIS & GYR mod. SKP 10.110 B27 - SKP 10.111B27 SINGLE STAGE GAS VALVES

DESCRIPTION OF HOW THE VALVE OPERATES

Single-stage valves

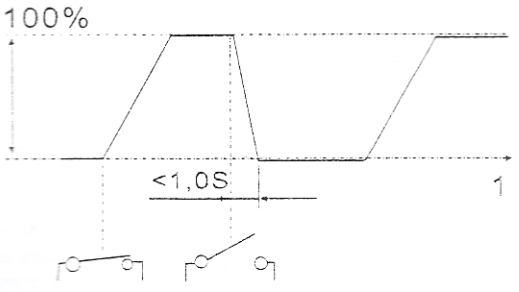
When the valve receives the signal to open, the pump cuts in and the magnetic valve closes. The pump transfers the oil from under the piston to above it, forcing the piston downward, which compresses the closure return spring with the rod and plate. The valve remains in the open position while the pump and magnetic valve remain powered.
When the unit receives the signal to close (or if power supply is cut off) the pump shuts down, the magnetic valve opens decompressing the chamber above the piston. The plate is closed both by the return spring and by gas pressure.
The flow rate for this valve is calculated to ensure full closure in less than one second.



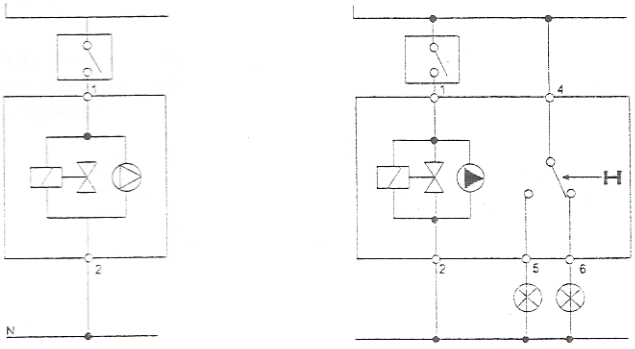
This type of valve cannot regulate the gas flow rate (closure/opening).
Screw "D" on terminal "IV" sets the "clean contact" position which can be used for an outside signal.

A = Driver identification plate
B = Flow direction indicator
C = Valve body identification plate

SKP10.110B27-SKP10.111B27



SKP10.110B27 - SKP10.111B27



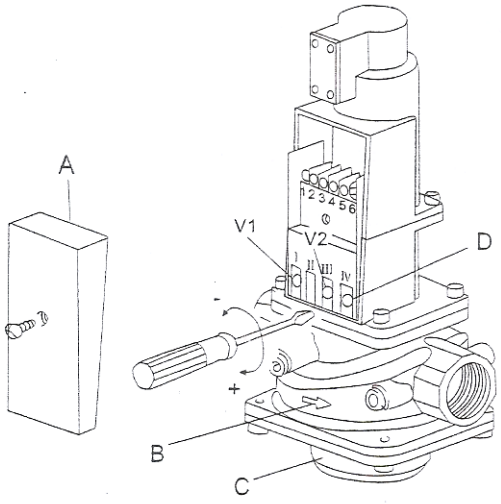
DESCRIPTION OF HOW THE VALVE OPERATES

Servomotor

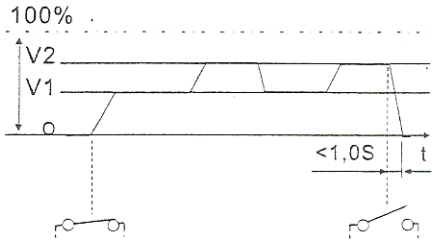
The hydraulic control system consists of a cylinder filled with oil and an oscillating pump with thrust piston. There is also a solenoid valve located between the intake chamber and the pump thrust chamber which serves to close the valve. The piston moves against a sealed joint inserted into the cylinder; in turn, this joint hydraulically separates the intake chamber from the delivery chamber. The piston transmits the stroke directly to the valve.
A disk is secured to the valve shaft and can be seen through a slit in the valve, indicating the stroke. Through an oscillating system this disk simultaneously activates the limit switch contacts for the partial and nominal output positions.

Two - stage operation

When the valve receives the signal to open, the pump cuts in and the magnetic valve closes. The pump transfers the oil under the piston to above it, forcing the piston downward, which compresses the closure return spring with the rod and plate. When the valve reaches the first stage, a disk connected to the shaft activates contact "V1" by means of an oscillating system. As a result, the pump cuts out and the valve remains in the first-stage position.
The pump begins functioning again only when terminal 3 is powered either from the control panel or directly by the power regulator. The full load stroke terminates when the contact is tripped and the pump cuts out.
If the power regulator cuts off power supply to terminal 3, the magnetic valve opens and the valve will remain open until the piston reaches the 1st stage position. If regulation is shut down because the power supply has been cut off, terminals 1 and 3 are no longer powered - this causes the servocontrol to close the valve in less than 1 second.

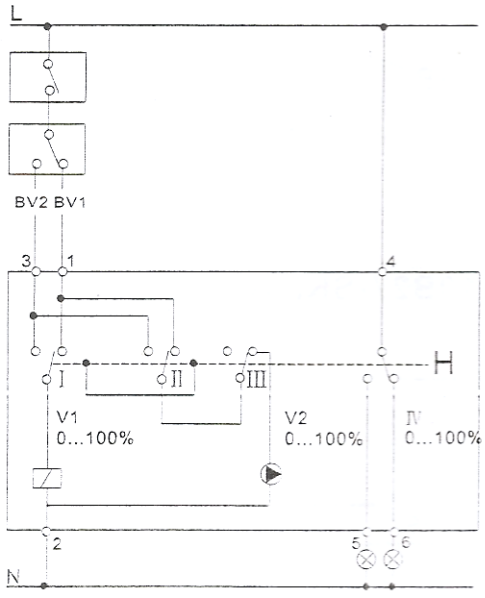


SKP10.123A27



Remove cover "A" to access the gas regulation screws.
To set gas flow to the 1st flame, turn the screw in terminal I (V1) with a screwdriver.
To set gas flow to the 2nd flame, turn the screw in terminal III (V2) with a screwdriver.
In both cases, tightening the screw increases gas flow, unscrewing it decreases the flow.
Screw "D" in terminal "IV" regulates the position at which the "clean" contact is activated. This can be used for an outside signal.

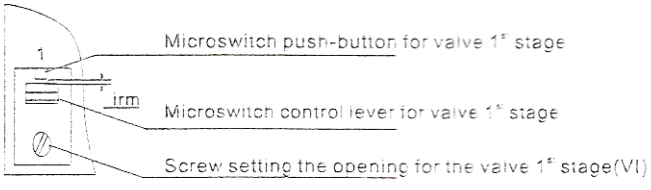
A = Driver identification plate
B = Flow direction indicator
C = Valve body identification plate



SUGGESTIONS FOR SETTING

1) We therefore advise you to prepare the burner for ignition by setting screw V1 (regulating the gas flow to the 1st flame) so that the distance between the control lever and the microswitch push-button does not exceed 1 mm (see the figure below). Set the combustion air gate in a highly closed position.

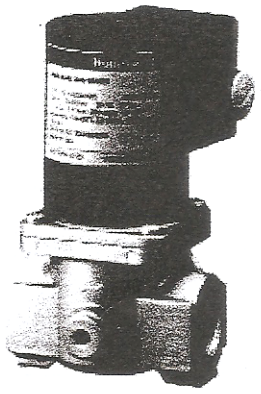
2) Second flame. Set V2 in the position where the gas flow required for the 2nd flame is obtained. Obviously, the position at which V2 is set (the distance between the microswitch control lever and the microswitch push-button) must be greater than that set for V1.



GASMISEA

INSTRUCTIONS FOR HONEYWELL GAS VALVES UNIVERSAL GAS VALVES TYPE: VE 4000A1 (....A .... = Opening - Closure, rapid)

The VE 4000A1 valves are Class A solenoid valves, normally closed. They may be used as ON/OFF valves in the supply trains with Natural Gas, Manufactured Gas or GPL, on burners or combustion installations.
They are provided with M.I. and CE Approval for EN161.



FEATURES

- Valves normally closed
- Without flow regulator
- Rapid opening and closing

INSTRUCTIONS FOR HONEYWELL GAS VALVES UNIVERSAL GAS VALVES TYPE: VE 4000B1 (....B.... = Opening - Closure, rapid. Flow regulator)

FEATURES

- Valve normally closed
- With flow regulator
- Rapid opening and closing

The VE4000B1 valves are Class A solenoid valves, normally closed.They may be used as ON/OFF valves in the supply trains with NaturalGas, Manufactured Gas or GPL, on burners or combustion plants. They are provided with M.I. and CE Approval for EN 161.

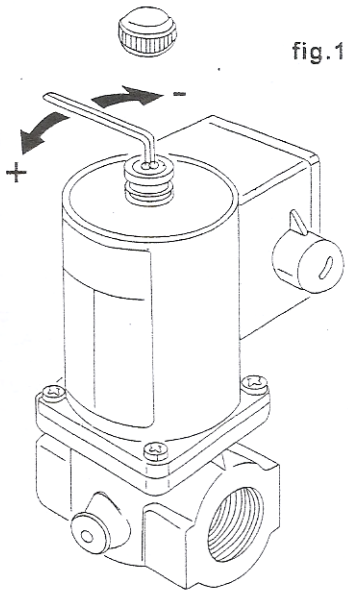


fig.1

ADJUSTMENT
For models VE 4000B1
Adjustment to the flow
- Remove the cover from the upper section of the coil.
- Insert a hexagonal Allen key into the central section at the top.
- Turn clockwise to decrease the flow or anti-clockwise to increase it.
- Replace the cover and tighten it.

ATTENTION
- The adjustment must only be carried out by qualified personnel.
- For valve closure the tension at the coil terminals must be 0 volts.
- The flow regulator of the VE 4100 valve series is situated in the lower section.

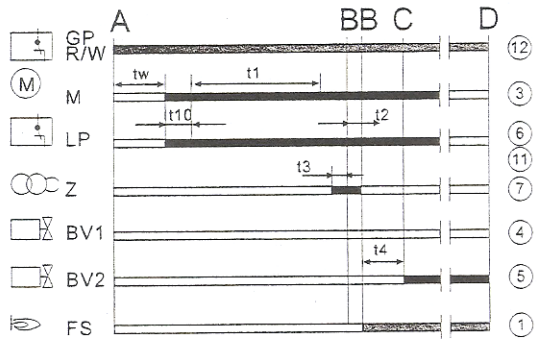
CONTROL BOX FOR LFL 1... SERIES 02 GAS BURNERS

Control box for burners of average and high power, with forced draught, intermittent service (*), 1 or 2 stages, or modulating types, with supervision of the air pressure for controlling the air damper.This control box bears the EC mark, in accordance with the Gas and Electromagnetic Compatibility Directive.
* For reasons of safety, it is necessary to make at least one controlled stop every 24 hours!

As regards the standards
The following LFL1...features exceed the standards, offering a high level of additional safety:
- The flame detector test and false flame test start immediately after the tolerated post-combustion time. If the valves remain open, or do not close completely after adjustment stops, a lock-out stop is triggered at the end of the tolerated post-combustion period. The tests will end only at the end of the pre-ventilation time of the next start-up.
- The validity of working of the flame control circuit is checked each time the burner starts up.
- The fuel valve control contacts are checked for wear during the post-ventilation time.
- A built-in fuse in the appliance protects the control contacts from any overloads that may occur.

As regards the burner control
- The equipment allows operation with or without post-ventilation.
- Controlled activation of the air damper to ensure pre-ventilation with nominal airflows. Positions checked: CLOSED or MIN (position of ignition flame on start-up); OPEN at the beginning and MIN at the end of the pre-ventilation time.If the servomotor does not position the air damper at the points described, the burner does not start-up.
- Ionization current minimum value = 6mA
- UV cell current minimum value = 70mA
- Phase and neutral must not be inverted.
- Any place may be used for installation and assembly (IP40 protection).

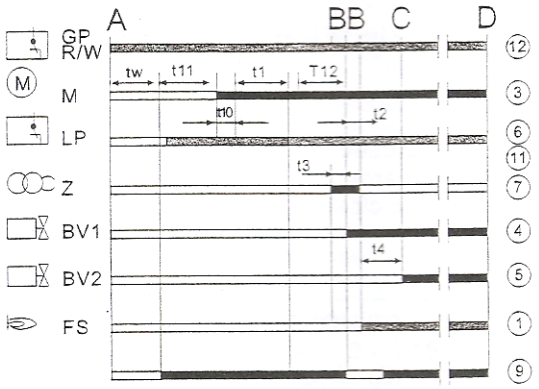
LGB21
For forced draught burners,single-stage or 2-stage operation, air damper control for pre-purge with low load air volume



LGB21...

Application
2-stage or modulating kind burner,air damper control for pre-purge with low load air volume

LGB22.../ LGB32
For forced draught burners,single-stage or 2-stage operation, air damper control for pre-purge with full load air volume



LGB22...

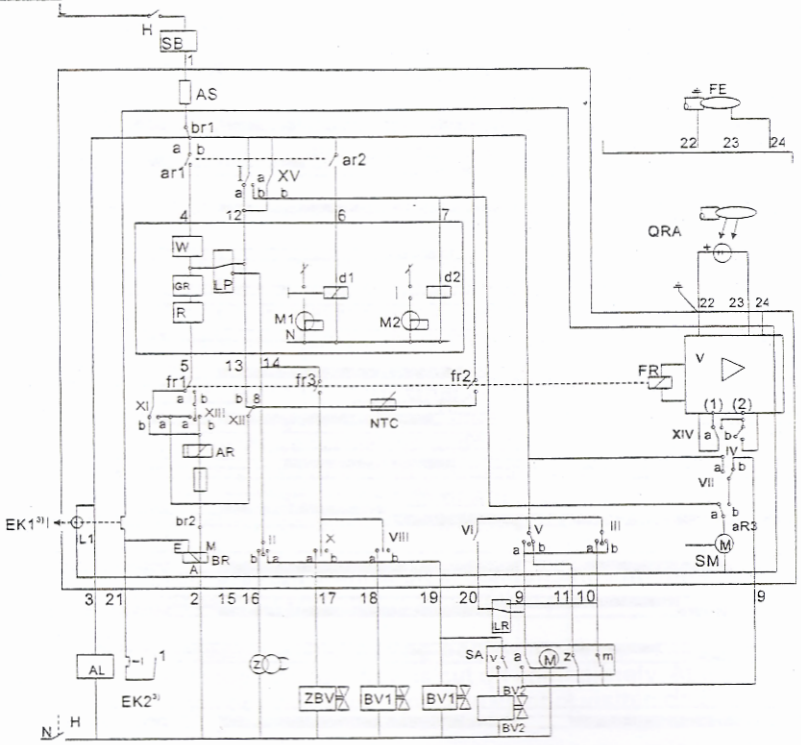
Application
2-stage or modulating kind burner,air damper control for pre-purge with low full air volume

Flame detector of Types	LGB2...Type	tw S Approx	T1 S min	T2 S MAX	t3n S Approx	T3 S Approx	T4 S Approx	T5[9] S max	T10 S min	T11[3] S max	T12 S max	T20 S Approx
For the supervision of pre-purge with low load air volume, have the function of air damper controller												
Electrode detector(FE) QRAUV photoelectric cell With or without flame detector	LGB21.130A27[4)7)]	8	7	3	2,4	2	8	-	5	-	-	6
	LGB21.230A27[5)]	8	15	3	2,4	2	8	-	5	-	-	38
	LGB21.330A27BT[5)]	8	30	3	2,4	2	8	-	5	-	-	23
	LGB21.350A27[5)7)]	8	30	5	4,0	2	10	-	5	-	-	21
	LGB21.550A27[5)]	8	50	5	4,0	2	10	-	5	-	-	2
For the supervision of pre-purge with full load air volume, have the function of air damper controller												
Electrode detector(FE) QRAUV photoelectric cell	LGB22.130A27[4)]	9	7	3	2,4	3	8	-	3	12	12	21
	LGB22.230A27[5)]	9	20	3	2,4	3	8	-	3	16.5	16.5	2
	LGB22.330A27BT[5)7)]	9	30	3	2,4	3	8	-	3	11	11	2
	LGB21.350A27[5)8)]	9	30	3	2,4	3	8	-	3	11	11	2

Tw:Waiting time
t1 Prepurge time
t2 Safety time
t3n:Postignition time
t3:Preignition time
t4:Interval between BV1-BV2 and BV1-LR
t10:Specified time for the air pressure signal
t11:Programmed time open the damper SA
t12:Programmed time close the damper SA
t20:Interval up to the self-shutdown of the sequence switch

2)For the natural draught burners up to 120kw
3)Max.running time available for actuator SA, the actuator's running time must be shorter
4)Also suited for use with flash-steam generators
5)Also suited for use with direct fired air heaters
6)Also have 100...10v, under this condition, the last two no. is ...17 not...27
8)Without fuse,use damper switchAGK 86... with max 6.3 A exterior delays fuse
9)T5+flame relay reaction time
For safety reasons(inherent testing of the flame supervision circuit,etc)

Electrical connections



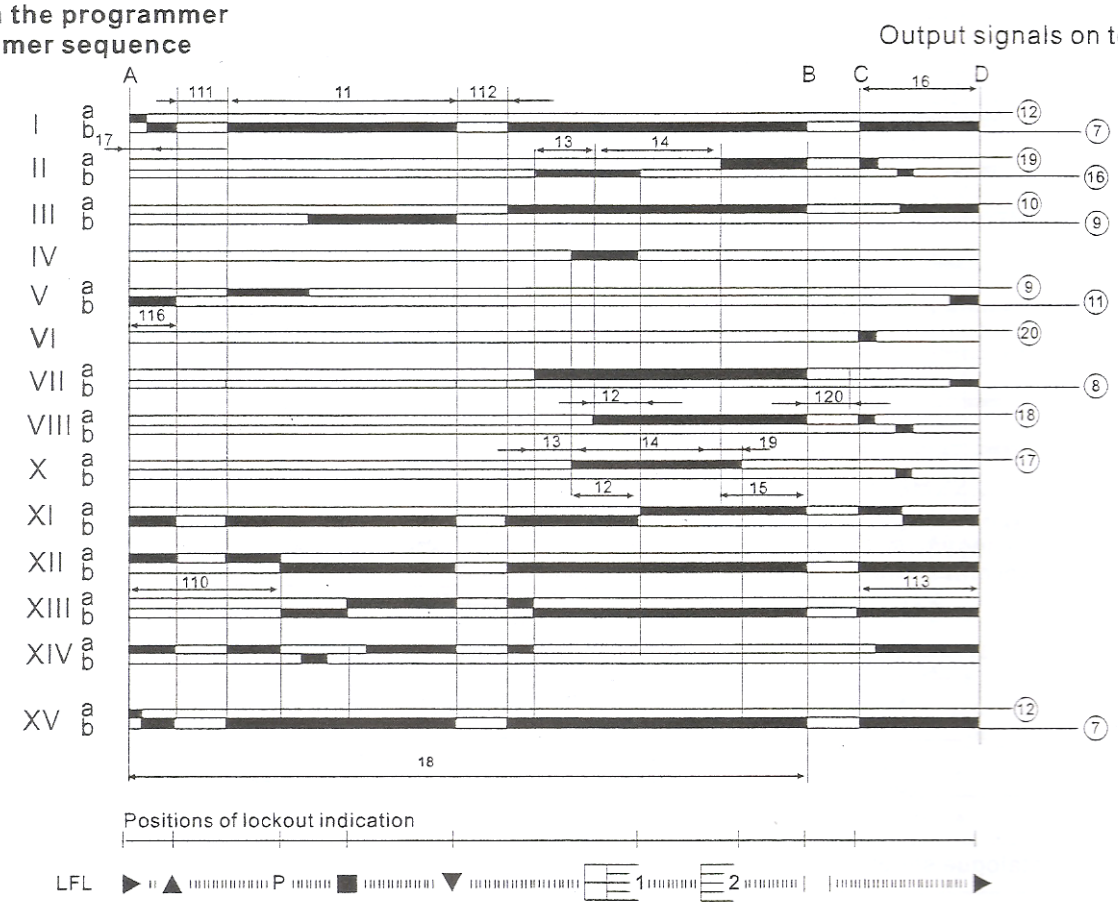
The burner manufacturer's diagram is valid for the relief valve connections.

LEGEND

For the entire catalogue sheet

a Limit switch commutation contact for air damper OPEN position
AL Remote signalling of lock-out stop (alarm)
AR Main relay (operating relay) with "ar..." contacts
AS Appliance fuse
BR Lock-out relay with "br..." contacts
BV Fuel valve
bv... Control contact for gas valve CLOSED position
d... Remote control switch or relay
EK... Lock-out push-button
FE Ionization current probe electrode
FR Flame relay with "fr..." contacts
GP Gas pressure switch
H Main switch
L1 Fault indicator light
L3 Ready for operation indicator
LK Air damper
LP Air pressure switch
LR Power regulator
m Auxiliary commutation contact for air damper MIN position
M... Motor fan or burner
NTC NTC resistor
QRA.. UV probe
R Thermostat or pressure probe
RV Fuel valve with continuous regulation
S Fuse
SA Air damper servomotor
SB Safety limiter (temperature, pressure, etc.)
SM Programmer synchronous motor
v In the case of servomotor: auxiliary contact for consensus for fuel valve depending on air damper position
V Flame signal amplifier
W Thermostat or safety pressure switch
z In the case of servomotor: limit switch commutation contact for air damper CLOSED position
Z Ignition transformer
ZBV Pilot burner fuel valve
. Valid for forced draught burners, with obe tube
.. Valid for pilot burners with intermittent operation
(1) Input for increasing operating voltage for UV probe (probe test)
(2) Input for forced energizing of flame relay during functional test of flame supervision circuit (contact XIV) and during safety time t2 (contact IV)
3) **Do not press EK for more than 10 seconds**

Notes on the programmer
Programmer sequence



Times Legend

time (50 Hz) in seconds

31.5	t1	Pre-ventilation time with air damper open
3	t2	Safety time
-	t2'	Safety time or safety time with burners that use pilot burners
6	t3	Short pre-ignition time (ignition transformer on terminal 16)
-	t3'	Long pre-ignition time (ignition transformer on terminal 15)
12	t4	Time between beginning of t2' and valve consensus on terminal 19 with t2
-	t4'	Time between beginning of t2' and valve consensus on terminal 19
12	t5	Time between end of t4 and consensus at power regulator or at valve on terminal 20
18	t6	Post-ventilation time (with M2)
3	t7	Time between consensus for start-up and voltage at terminal 7 (start delay for fan motor M2)
72	t8	Start-up duration (without t11 and t12)
3	t9	Second safety time for burners that use pilot burners
12	t10	Time from start-up to beginning of air pressure control without air damper travel time
	t11	Air damper opening travel time
	t12	Air damper in flow flame position (MIN) travel time
18	t13	Permitted post-combustion time
6	t16	Initial delay of consensus for air damper OPENING
27	t20	Time up to automatic closure of programmer mechanism after burner start-up

NOTE: With voltages at 60 Hz, the times are reduced by about 20%.

t2', t3', t3':
These times are valid **only** for **series 01** or LFL1.335, LFL1.635, LFL1.638 burner control and command equipment.
They are not valid for types of Series 032, since they involve **simultaneous activation of cams X and VIII**.

Working

The above diagrams illustrate both the connection circuit and the sequencer mechanism control program.

A Consensus for start-up by means of installation thermostat or pressure switch "R".
A-B Start-up program
B-C Normal burner operation (on the basis of "LR" power regulator control commands)
C Stop controlled by "R"
C-D Return of programmer to start-up position "A", post-ventilation.
During periods of inactivity of the burner, only the command outputs 11 and 12 are powered, and the air damper is in the CLOSED position, determined by limit switch "z" of the air damper servo motor. During the probe test and false flame test, the flame supervision test is also powered (terminals 22/23 and 22/24).

Safety standards

. In association with the use of QRA..., earthing of terminal 22 is compulsory.
. The power cables must conform to existing national and local standards.
. LFL1... is a safety device, and it is therefore forbidden to open it, tamper with it or modify it!
. The LFL1... device must be completely insulated from the mains before carrying out any operations on it!
. Check all the safety functions before activating the unit or after replacing a fuse!
. Provide protection against electric shock on the unit and all electric connections. This is ensured by following the assembly instructions correctly!
. During operation and maintenance, prevent infiltration of condensate into the command and control equipment.
. Electromagnetic discharges must be checked on the application plan.

Control program in the event of stopping, indicating position of stop

As a rule, in the event of any kind of stop, the fuel flow is cut off immediately. At the same time, the programmer remains immobile, as does the switch position indicator. The symbol visible on the indicator reading disk indicates the type of fault.

◀ **No start-up,** because of failure in closing of a contact or lock-out stop during or at the end of the command sequence because of external lights (for example: flames not extinguished, loss at the level of the fuel valve, defects in the flame control circuit, etc.)

▲ **Start-up sequence stops**, because the OPEN signal was not sent to terminal 8 by limit switch contact "a". Terminals 6, 7 and 15 remain powered until the defect is eliminated.

P **Lock-out stop**, because of lack of air pressure signal.
Any lack of pressure from this moment onwards will cause a lock-out stop!

■ **Lock-out stop** because of flame detection circuit malfunction.

▼ **Start-up sequence stops**, because the position signal for low flame was not sent to terminal 8 by auxiliary switch"m". Terminals 6, 7 and 15 remain powered until the fault is eliminated.

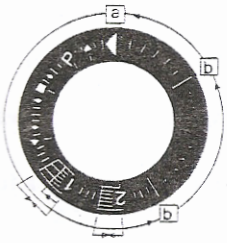
1 **Lock-out stop**, due to lack of flame signal at the end of the first safety time.

2 **Lock-out stop**, because no flame signal was received at the end of the second safety time (main flame signal with pilot burners at intermittent operation).

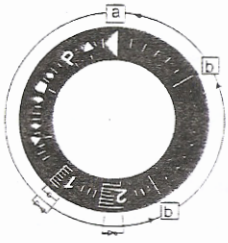
| **Lock-out stop**, due to lack of flame signal during burner operation.

If a lock-out stop occurs at any moment between the start and pre-ignition without a symbol, the cause is generally to be attributed to a premature or abnormal flame signal caused, for example, by self-ignition of a UV tube.

Stop indications



LFL ..., Series 01



LFL ..., Series 02

a-b Start-up program
b-b' "Trips" (without contact confirmation)
b(b')-a Post-ventilation program

LDU 11.. GAS VALVE TIGHTNESS CONTROL EQUIPMENT

Use

LDU 11 equipment is used to verify tightness of valves on natural gas burners.
The LDU 11 combined with a normal pressure switch automatically verifies tightness of natural gas burners valves, before every start up and immediately after each stop.
Tightness control is carried out by two-stage verification of gas circuit pressure in the section between the two burner valves.

Operation

During the first stage of the tightness control (TEST 1), the pipeline between the valves being checked must be at atmospheric pressure. In plant without atmospheric pressure setting pipes, this pressure is achieved by tightness control equipment. The latter opens the valve on the furnace side for 5 seconds during **"t4"** time.
When the 5 seconds are up, the furnace side valve is closed.
During the first phase (**TEST 1**) the control equipment ensures that atmospheric pressure in the pipes is kept constant. Surveillance is carried out by the **"DW"** thermostat.
If there is blow-by in the safety valve while closing, pressure increases and as a result the **"DW"** pressure switch operates. For this reason, in addition to indicating pressure, the equipment goes into fault state and the position indicator stops blocked in the **"TEST 1"** position (red pilot lamp lit).
Vice-versa, if pressure does not increase because there is no blow-by in the relief valve as it closes, the equipment immediately programmes the second stage **"TEST 2"**.
Under these conditions, the relief valve opens for 5 seconds during **"t3"** time and introduces gas pressure into the pipeline ("filling operation"). During the second verification stage, this pressure must remain constant.
Should it drop, this means that the burner on the furnace side has a blow-by (fault) when closing. The refore the **"DW"** pressure switch operates and the tightness control equipment prevents burner start-up and stops in blocked state (red pilot lamp lit). If second stage verification is positive, the LDU 11 equipment closes the internal control circuit between terminals **3** and **6** (terminal **3** - contact **ar2** - outer cross-connection for terminals **4** and **5** - contact **III** - terminal **6**).
This is the circuit that usually enables the equipment start-up control circuit. After circuit between terminals **3** and **6** has closed, the LDU 11's programmer returns to rest position and stops. This means it enables fresh verification without changing the position of the programmer's control contacts.
N.B. Adjust the **"DW"** pressure switch to about half the pressure of the gas supply network.

Key to symbols :

} Start-up = operating position

▭ In plants without a bleed valve = test circuit put under atmospheric pressure by opening of valve on the furnace side of the burner.

TEST 1 "TEST 1" pipeline at atmospheric pressure (blow-by verification at closure of relief valve)

▬ Putting test circuit gas under pressure by opening of relief valve

TEST 2 "TEST 2" pipeline at gas pressure (blow-by verification of valve on furnace side of burner)

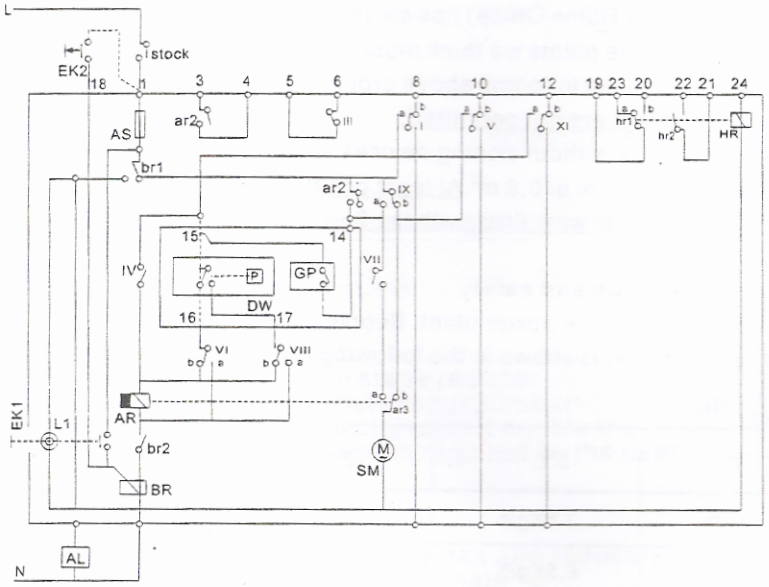
III Automatic zero (or inoperative mode) reset of programmer

} Operation = set for new blow-by verification

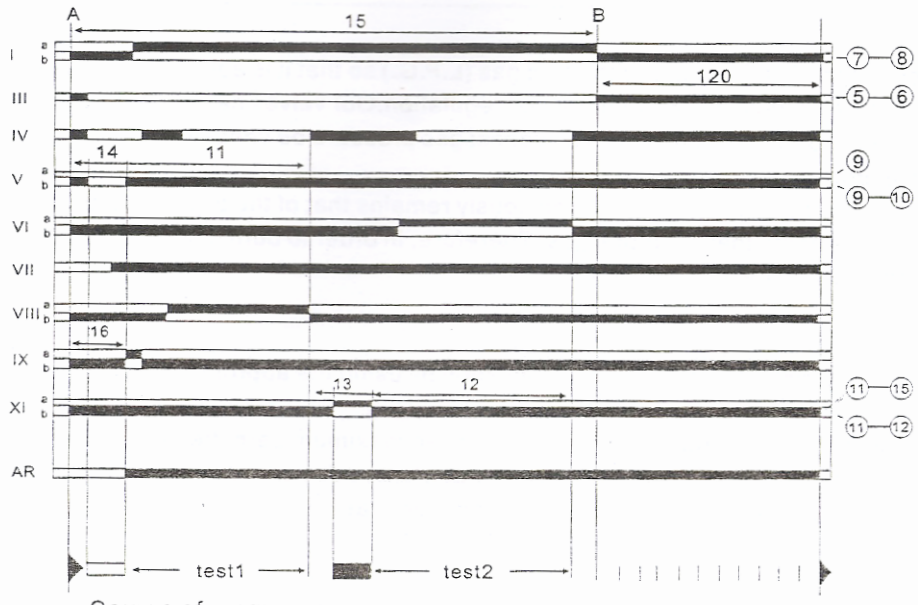
If trouble is signalled, there is no voltage in all control equipment terminals excepting terminals 13 which gives remote, visual indication of trouble.
When verification is over, the programmer automatically returns to rest position, and is ready to carry out a further programme for checking tightness of valves as they close.

Control programme

t_4	5s	Putting control circuit under atmospheric pressure
t_6	7,5s	Time between start-up and energizing of main **"AR"** relay
t_1	22,5s	1st verification stage at atmospheric pressure
t_3	5s	Putting control circuit gas under pressure
t_2	27,5s	2nd verification stage at gas pressure
t_5	67,5s	Total time of tightness control, up to burner operation consent
t_{20}	22,5s	Return of programmer to rest position = fresh verification is enabled



AL	remote alarm signalling
AR	main relay with "ar" contacts
AS	equipment fuse
BR	blocking relay with "ar" contacts
DW	outer pressure switch (tightness control)
EK...	unblocking button
GP	outer pressure switch (for mains gas pressure)
HR	auxiliary relay with "ar" contacts
L1	equipment trouble signalling lamp
SK	line switch
I...XI	programmer cam contacts



Course of programme

Terminals activated by equipment or by electric connections

GASMISEA

NOTES ON USE OF PROPANE (L.P.G.)

We think it would be useful to inform you on a few points regarding use of liquid propane gas (L.P.G.).

1) Approximate evaluation of running costs

a) 1 m^3 of liquid gas in gaseous state has heating power inferior by about 22.000 Kcal.

b) to obtain 1 m^3 of gas about 2 Kg of liquid gas are required. This is equal to about 4 litres of liquid gas.According to the above, it can be deduced that by using liquid gas (L.P.G.) the following approximate equivalence is obtained: 22.000 Kcal = 1 m^3 (in gaseous state) = 2 Kg of L.P.G. (liquid) = 4 litres L.P.G. (liquid). From this, running costs can be calculated.

2) Safety measures

Liquid gas (L.P.G.) has, in it gaseous state, a specific gravity superior to that of air (specific gravity of propane gas in relation to air = 1,56) and therefore does not disperse in air like natural gas, which has a lower specific gravity (specific gravity of natural gas in relation to air = 0,60), but precipitates and spreads at ground level as if it were a liquid. In view of the above principle, the Ministero dell'Interno (Home Office) has set limitations for use of Liquid Gas in circular n° 412/4183 of 6 February 1975. We will look into the points we think most important:

a) Liquid Gas (L.P.G.) for burners and/or boilers can only be used in rooms above ground and overlooking open spaces.Installations using liquid gas in basements or cellars are not permitted.

b) Rooms where liquid gas is used must have ventilation inlets without closing devices, located on external walls with a surface of at least 1/15 of the room's area and a minimum of 0,5 m^2.At least one third of the entire surface of these inlets must be located in the lower part of the external wall, flush with the floor.

3) Requirements for liquid gas plant to ensure correct operation and safety

Natural gasification, from cylinder unit or tank, can only be used for low power plant. Supply capacity at gaseous stage, depending on tank dimensions and minimum external temperature, is shown in the following table but only as a rough guide.

Minimun temperature	-15°C	-10°C	-5°C	-0°C	+5°C
Tank 990l.	1,6Kg/h	2,5Kg/h	3,5Kg/h	8Kg/h	10Kg/h
Tank 3000l.	2,5Kg/h	4,5Kg/h	6,5Kg/h	9Kg/h	12Kg/h
Tank 5000l.	4Kg/h	6,5Kg/h	11,5Kg/h	16Kg/h	21Kg/h

4) Burner

The burner must be ordered specifically for use with liquid gas (L.P.G.) so that it is equipped with gas valves of sufficient dimensions to ensure correct ignition and gradual regulation.Our valves have dimension is planned for use at a supply pressure of about 300 mm.W.C. We suggest gas pressure be checked at the burner by using a water column pressure gauge.

N.B. Maximum and minimum burner pressure (kcal/h) obviously remains that of the original natural gas burner (L.P.G. has heating power superior to that of natural gas. Therefore, in order to burn fully, it requires air quantity in proportion to the thermal power created).

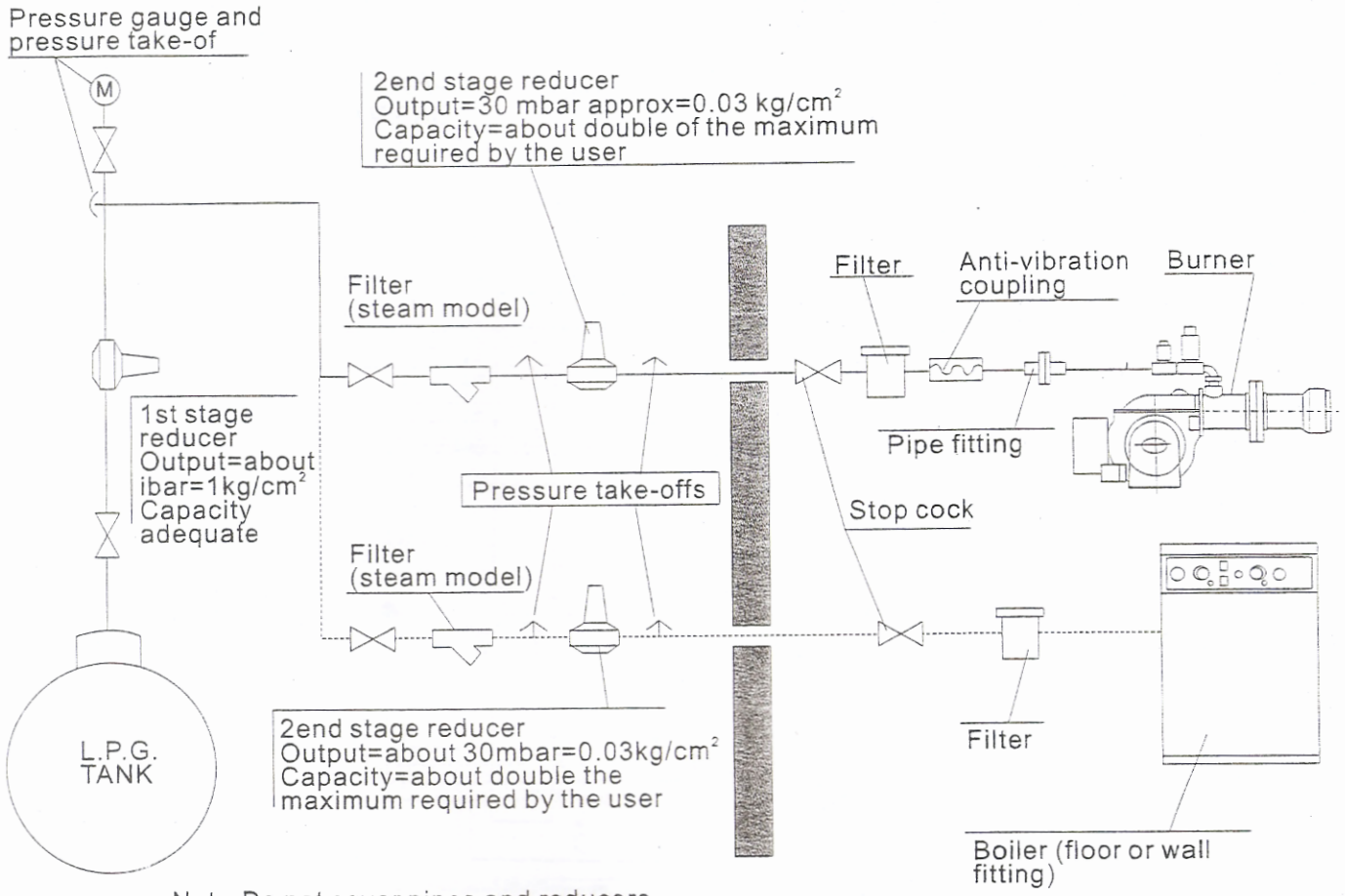
5) Combustion control

To limit consumption and avoid serious trouble, adjust combustion by using the appropriate instruments.It is absolutely essential to

check that the percentage of carbon monoxide (CO) does not exceed maximum permitted value of 0,1 % (use a phial analyser or other similar instrument). Please note that our guarantee does not cover burners operating on liquid gas (L.P.G.) in plant for which the above measures have not been taken.

GASMISEA

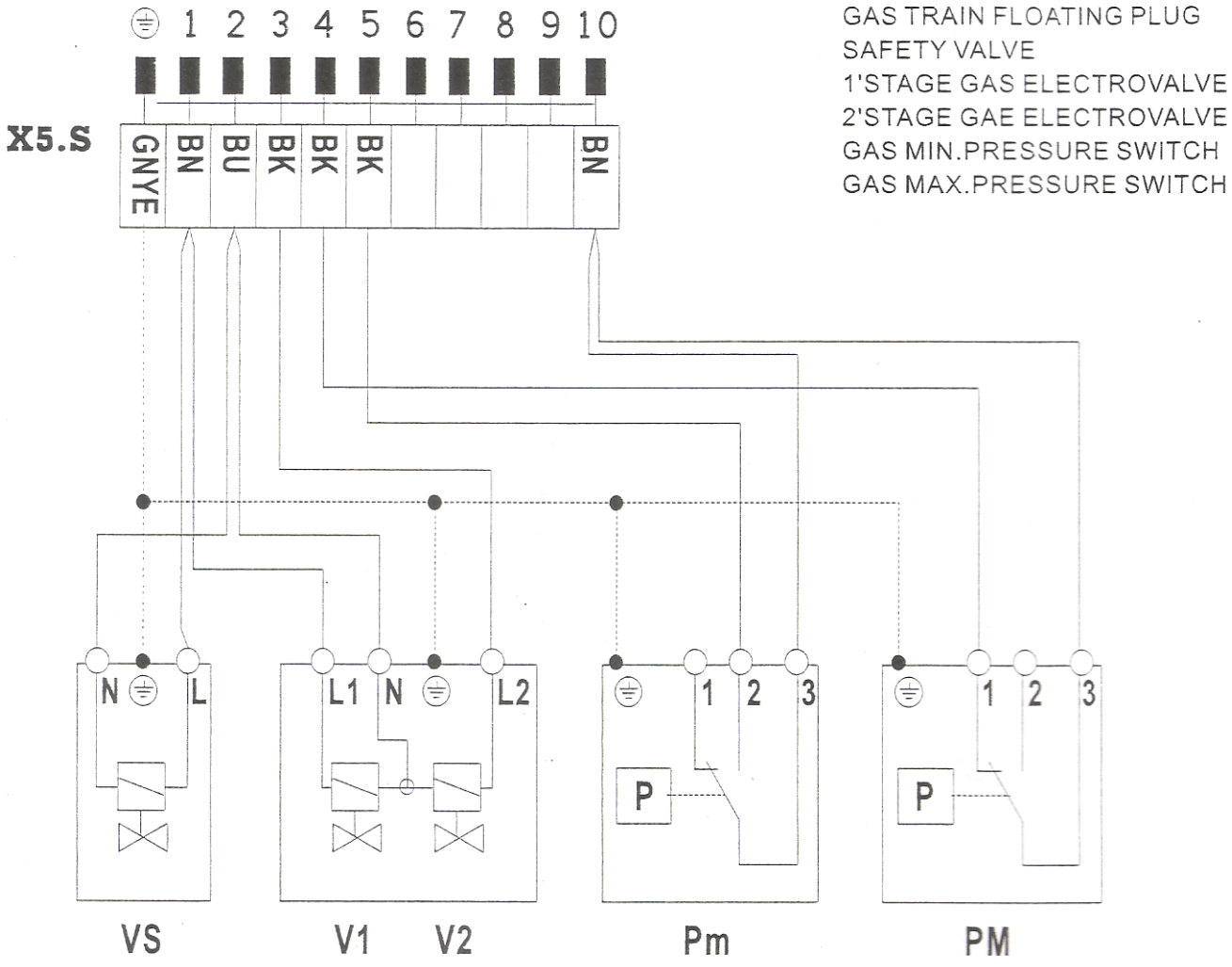
GENERAL DIAGRAM FOR TWO-STAGE L.P.G. PRESSURE REDUCTION FOR BURNER OR BOILER



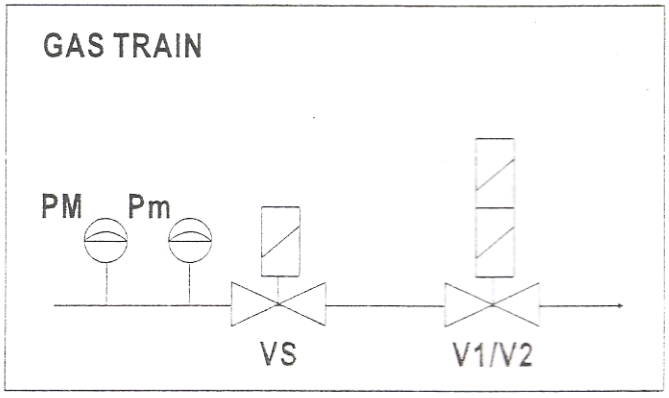
Note: Do not cover pipes and reducers with insulating material

GASMISEA

2 STAGES GAS TRAIN ELECTRIC DIAGRAM

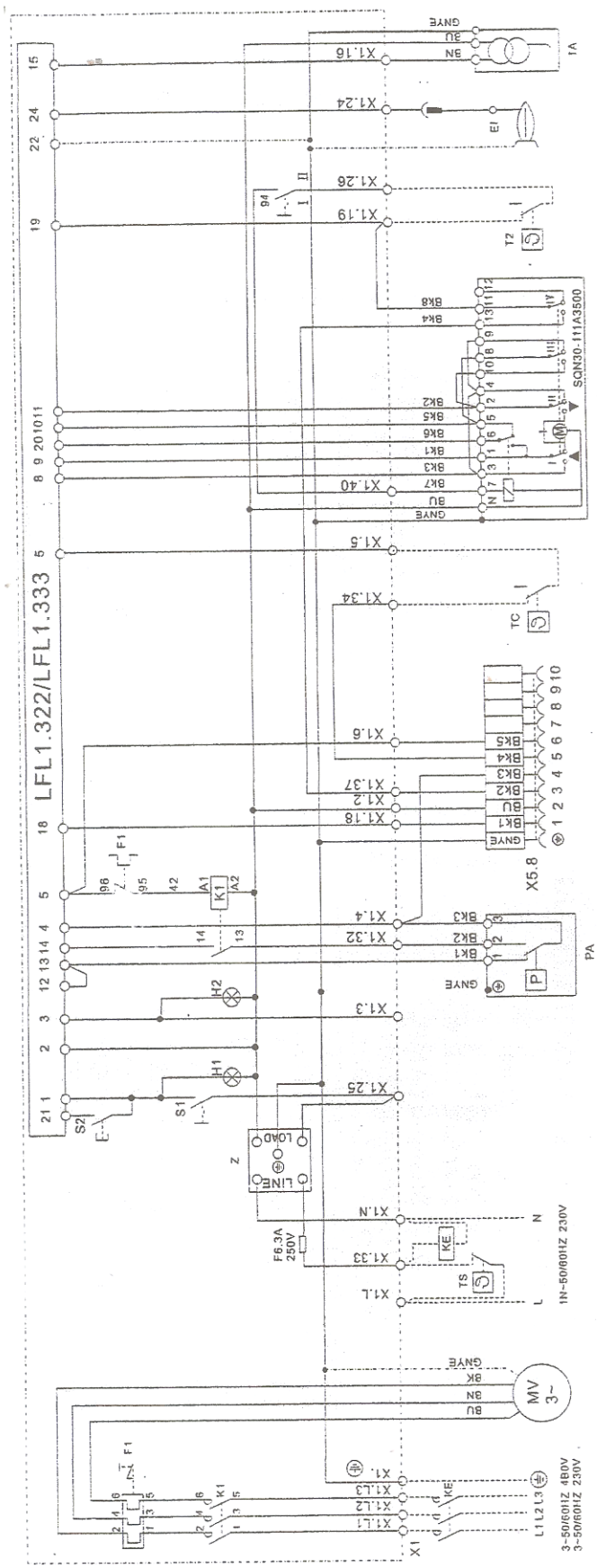


DIN/ IEC	GB
GNYE	GREEN/ YELLOW
BU	BLUE
BN	BROWN
BK	BLACK
BK *	BLACK WIRE WITH IMPRINT



GASMISEA

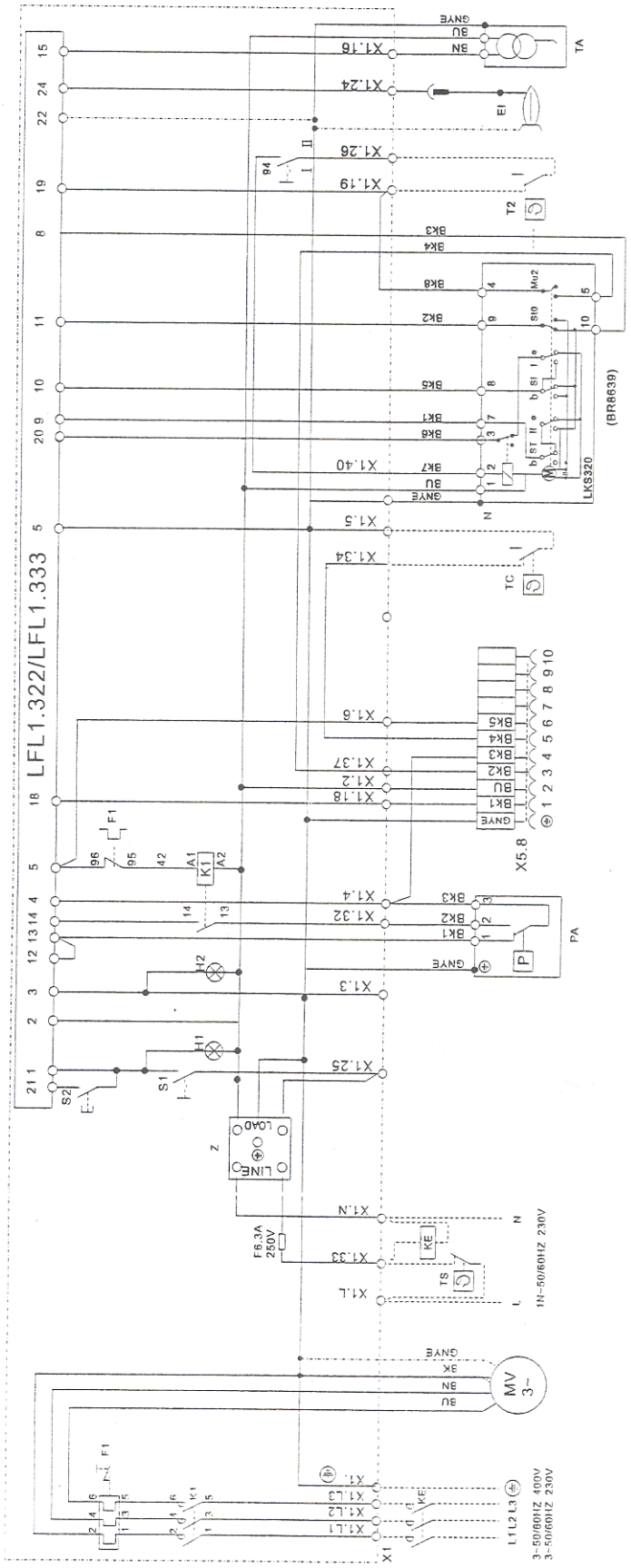
ELECTRIC DIAGRAM FOR
BGN 40T-60T-100T-120T-150T-200T-250T-300T-350TP



DIN/ IEC	GB
GNYE	GREEN/ YELLOW
BU	BLUE
BN	BROWN
BK	BLACK
BK *	BLACK WIRE WITH IMPRINT

GASMISEA

ELECTRIC DIAGRAM FOR
BGN 150T-200T-250T-300T-350TP .LKS300



DIN/ IEC	GB
GNYE	GREEN/ YELLOW
BU	BLUE
BN	BROWN
BK	BLACK
BK *	BLACK WIRE WITH IMPRINT

X1.-BURNER TERMINAL
X5.B-MAIN GAS TRAIN FLOATING PLUG
S1-ON-OFF SWITCH
S2-RE-SET PUSH BUTTON
S4-1°-2°STAGE SWITCH
H1-OPERATION LIGHT
H2-LOCK-OUT SIGNAL LAMP
TA-IGNITION TRASFORMER
EI-IONISATION ELECTRODE
K1-FAN MOTOR CONTACTOR
KE-EXTERNAL CONTACTOR
F1-THERMAL RELAY
PA-AIR PRESSURE SWITCH
MV-MOTOR
TS-SAFETY THERMOSTAT
TC-BOILER THERMOSTAT
T2-2°STAGE THERMOSTAT
LKS300-AIR SERVOMOTOR
LFL1.322/LFL1.333-CONTROL BOX
Z-FILTER

DETAILS OF PROBLEM	POSSIBLE CAUSE	SOLUTION
The apparatus goes into "lockout"with the flame (red light on).Fault restricted to flame control device.	1) Disturbance to ionization current from ignition transformer. 2) Flame sensor (ionization probe or UVcell) inefficient. 3) Flame sensor (ionization probe or UVcell) position incorrect. 4) Ionization probe or relative earth cable. 5) Electrical connection cut-off by flame sensor. 6) Inefficient draught or fumes passage blocked. 7) Flame disk or combustion heads dirty or worn. 8) UV cell dirty or greasy. 9) Equipment fault. 10) No ionization.	1) Invert the ignition transformer power supply (230V side) and check using an analog microammeter. 2) Replace flame sensor. 3) Correct the position of the flame sensor, and then check its efficiency by inserting the analog micro-ammeter. 4) Check visually and using the instrument. 5) Restore the connection. 6) Ensure that the boiler fumes passage and chimney connection are free. 7) Visually check and replace, if necessary. 8) Clean carefully. 9) Replace. 10) If the "earth" of the apparatus is not efficient, do not check the ionization current. Check the efficiency of the "earth" at the terminal concerned of the apparatus and at the "earth" connection of the electric system.
The apparatus goes into "lockout",gas flows out, but there is no flame (red light on). Fault restricted to ignition circuit.	1) Fault in ignition circuit. 2) Ignition transformer cable discharges to earth. 3) Ignition transformer cable disconnected. 4) Ignition transformer faulty. 5) The distance between electrode and earth is incorrect. 6) Isolator dirty, so electrode discharges to earth.	1) Check the ignition transformer power supply (230V) and high voltage circuit (electrode to earth or isolator broken under locking terminal). 2) Replace. 3) Connect. 4) Replace. 5) Position at the correct distance. 6) Clean or replace isolator and electrode.
The apparatus goes into "lockout", gas flows out, but there is no flame (red light on).	1) air/gas ratio incorrect. 2) Gas pipe has not been properly bled of air (in the case of first ignition). 3) The gas pressure is insufficient or excessive. 4) Air flow between disk and head too narrow.	1) Correct the air/gas ratio (there is probably too much air or very little gas). 2) Bleed the gas pipe again, taking great care. 3) Check the maximum gas pressure value at the time of ignition (use a water pressure gauge, if possible). 4) Adjust the disk/head opening.


GASMISEA
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