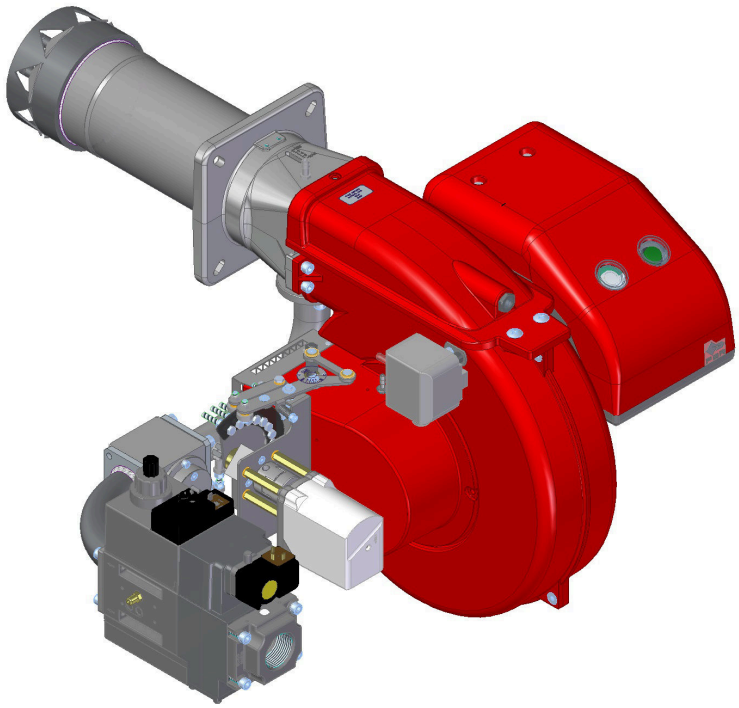
FBR
BURNERS MADE IN ITALY



GAS XP60/MCE-LX-EVO

Installation, use and maintenance instructions

073017_2_A

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TECHNICAL DATA AND OPERATING RANGE DIAGRAM GAS XP60/MCE-LX-EVO

MODEL		GAS XP60/MCE-LX-EVO
Thermal power min. 1°st. / min. 2°st. - max. 2°st. *	[Mcal/h]	101/241-542
Thermal power min. 1°st. / min. 2°st. - max. 2°st. *	[kW]	117/280-630
Gas flow G20 (NATURAL GAS) min. 1°st. / min. 2°st. - max. 2°st. *	[Nm³/h]	11.7/28-63.3
Fuel: NATURAL GAS (second family)		
Fuel category:	I2R,I2H,I2L,I2E,I2E+,I2Er,I2ELL,I2E(R)	
NOx **	[mg/kWh]	< 80: class 3 (EN 676)
Intermitted working operation (min. 1 stop every 24 hours) two stages progressive or modulating		
Environmental conditions operation / storage:	-15...+40°C / -20...+70°C, umidità rel. max. 80%	
Max. temperature combustion air	[°C]	60
Minimum pressure gas train D1"-S NATURAL GAS ***	[mbar]	126
Minimum pressure gas train D1"1/4-S NATURAL GAS ***	[mbar]	67
Minimum pressure gas train D1"1/2-S NATURAL GAS ***	[mbar]	28
Maximum pressure at the entry of valves (Pe. max)	[mbar]	360
Nominal electric power	[W]	700
Fan motor	[W]	550
Nominal motor current absorption	[A]	1.4
Nominal auxiliary absorption	[A]	0.5
Power supply:		3~400V, 1N~230V - 50Hz
Electric protection degree:		IP 40
Noisiness **** min. - max.	[dB(A)]	69-72
Burner weight *****	[kg]	???

* Reference conditions: Environment temperature 20°C - Barometric pressure 1013 mbars - Altitude 0 metre (sea level).
** To obtain the NOx emissions so reduced as declared, the burner must be coupled to boilers designed for this purpose: boilers with three smoke passes, condensation and any direct discharge generator with a thermal load no higher than 1.1 MW / m³.
*** Minimal feeding-gas pressure to the gas train to get the maximum power of the burner, considering counter-pressure in combustion chamber of value 0 (zero).
**** Measured sonorous pressure in the laboratory combustion, with functional burner on beta boiler to 1 metre of distance (UNI EN ISO 3746 - Class 3 control method - The measured sound pressure tolerance can be assumed to be ± 1 [dB (A)]).
***** For burner with long head add 1 kg to the weight.

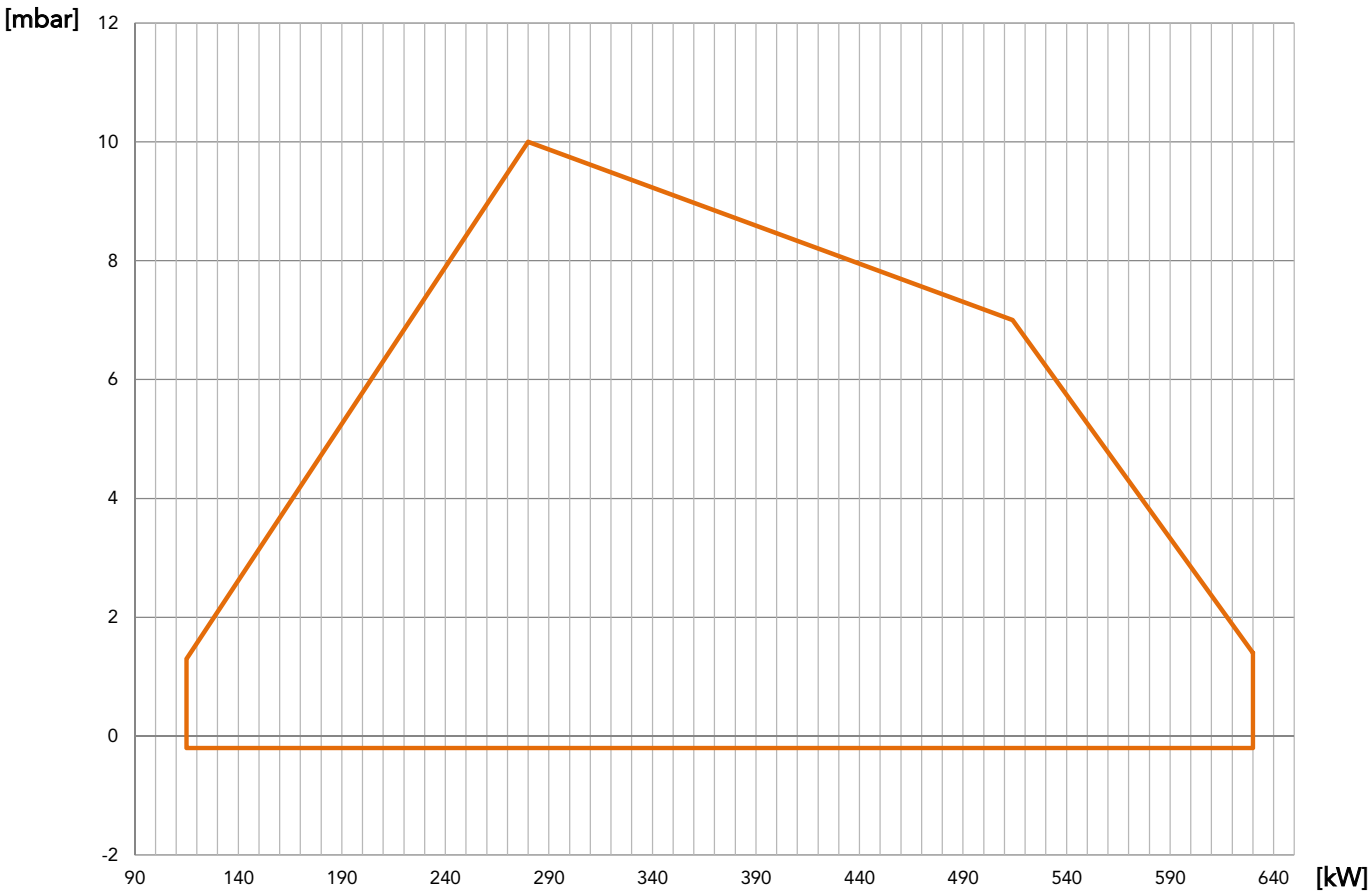


Fig. 1 X = Thermal power Y = Pression in the combustion chamber

The firing rates has been obtained based on test boilers in accordance with EN267 standards and are indicative of matching the burner to the boiler. For the correct operation of the burner, combustion chamber dimensions must be in accordance with current regulation. In case of non-compliance, contact the manufacturer.

DIMENSIONS [MM]

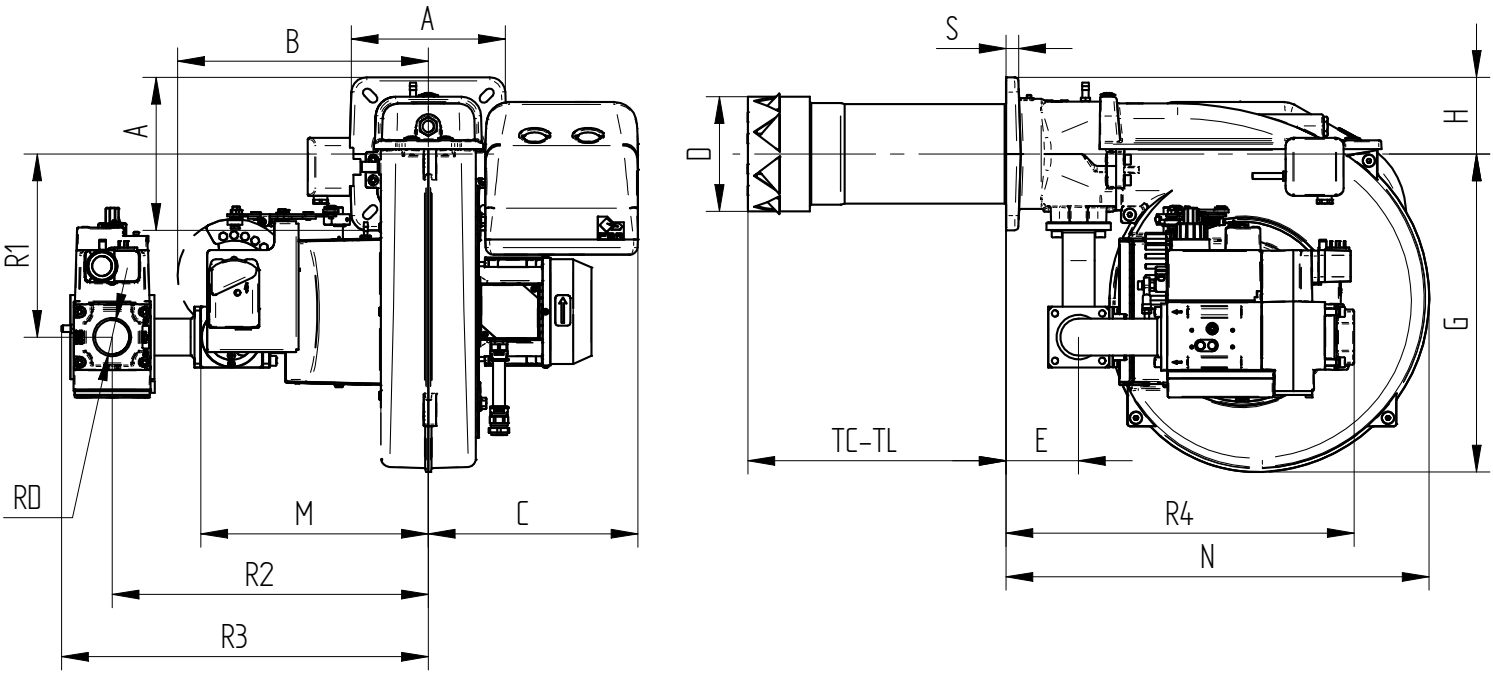


Fig. 2 Dimensions GAS XP60/MCE-LX-EVO

MODEL	A	B	C	D	E	F	H	M	N	S	R1	R2	R3	R4	RD
GAS XP60/MCE-LX-EVO - D1"-S	200	330	275	150	99	417	100	298	558	20	240	414	472	445	Rp 1
GAS XP60/MCE-LX-EVO - D1"1/4-S	200	330	275	150	99	417	100	298	558	20	240	414	472	445	Rp 1 1/4
GAS XP60/MCE-LX-EVO - D1"1/2-S	200	330	275	150	99	417	100	298	558	20	240	414	480	460	Rp 1 1/2

BURNER SIGNAL DESCRIPTION

In the picture below there are indicated all the signalation present on the burner:

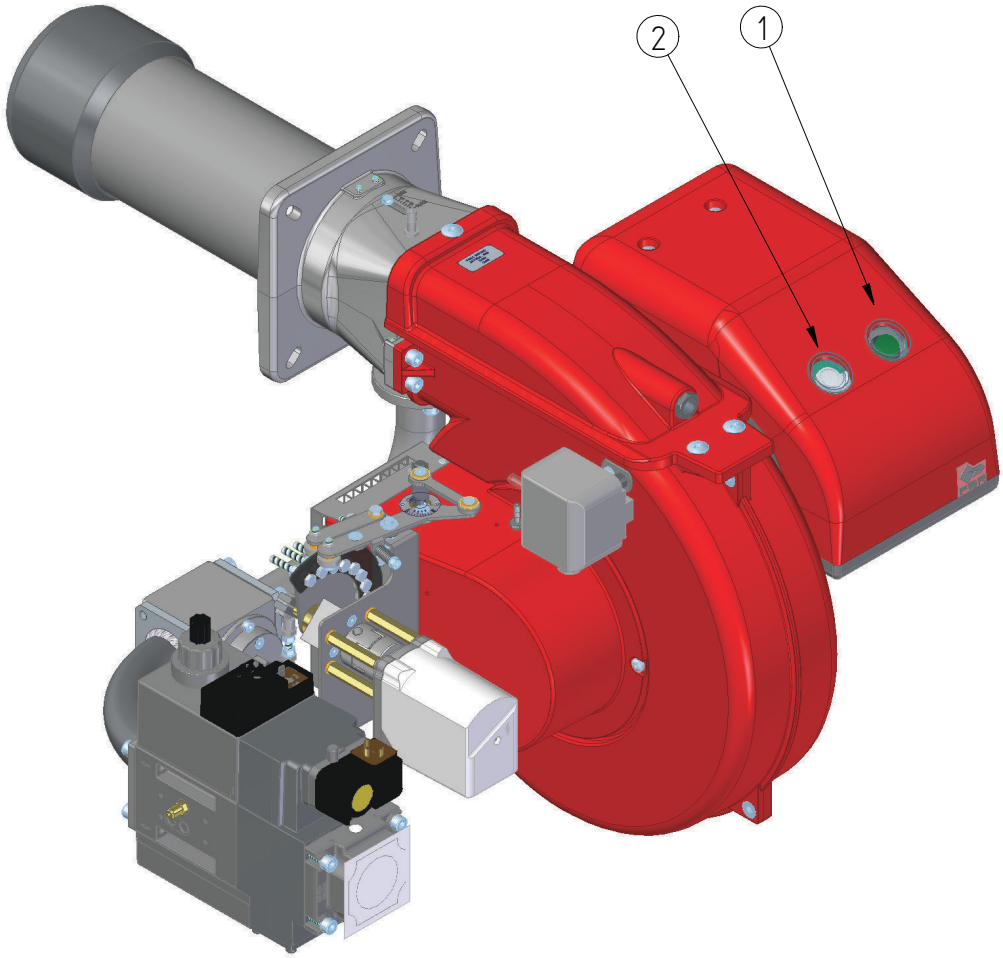


Fig. 3 Burner signal description

LEGEND

1) ON/OFF button

2) Reset from lockout button + status lamp

The multicolor signal lamp in the lockout reset button (pos.2) is the key indicating element for visual diagnostics and interface diagnostics.
In normal operation, the different operating states are indicated in the form of color codes; please refer to electrical device handbook supplied with the present instructions.

After a non-alterable lockout, the red signal lamp in the lockout reset button (pos.2) lights up.
By pressing the lockout reset button (pos.2) for more than 3 seconds, the visual diagnostics of the cause of fault can be activated; please refer to electrical device handbook supplied with the present instructions.

For close the diagnostics mode and for switch on the burner again, it is necessary to reset the burner control.
Press the lockout reset button (pos.2) for about 1 second (<3 seconds).

After a non-alterable lockout, the red signal lamp in the lockout reset button (pos.2) lights up.
For reset the control box press the lockout reset button (pos.2) for about 1 second (<3 seconds).

BURNER INSTALLATION

For the installation of the burner to the generator, follow to the diagram shown below:

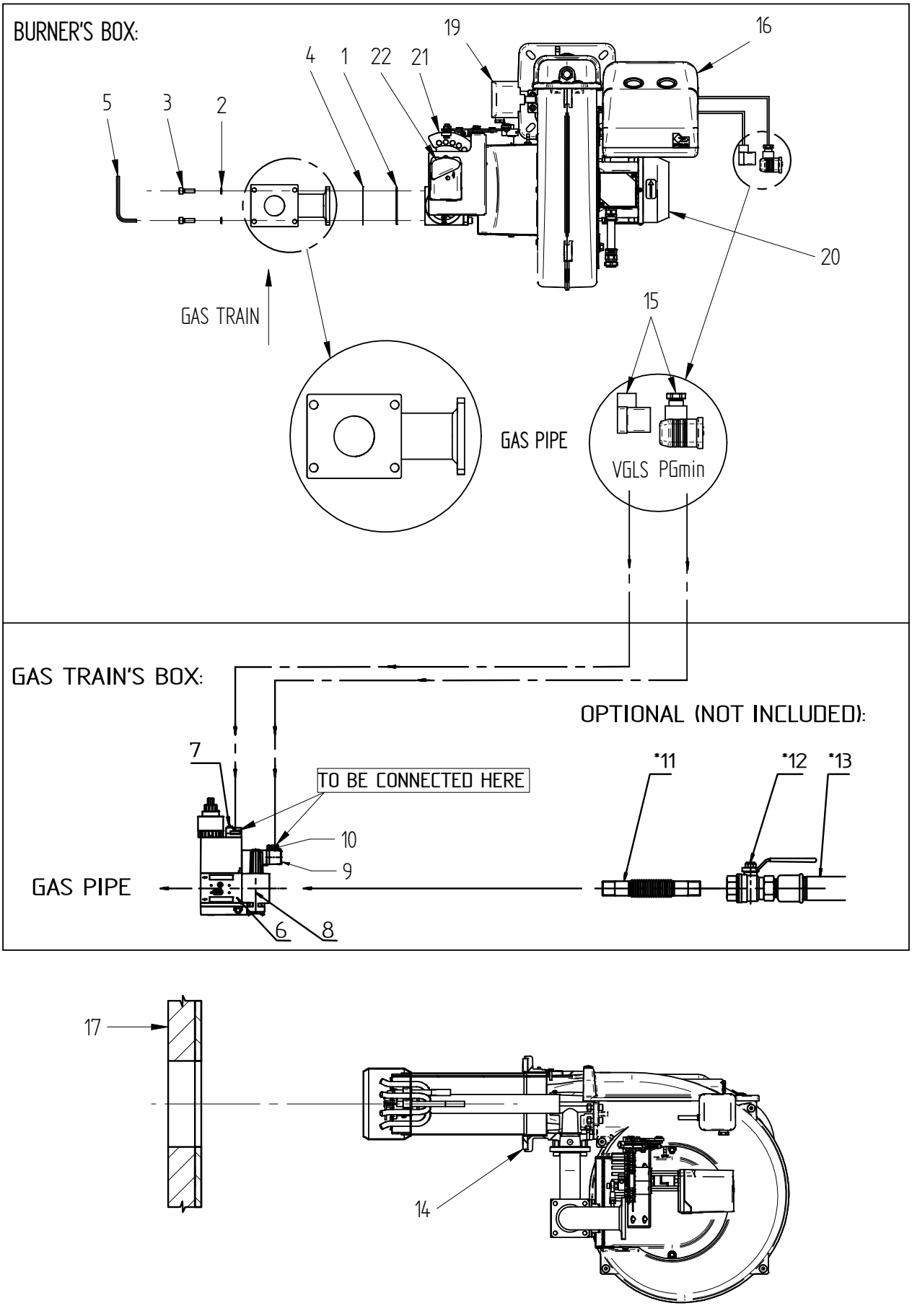


Fig. 4 Burner installation GAS XP60/MCE-LX-EVO

LEGEND

1) O-ring	7) Stabilizer	13) GAS pipe	19) Air pressure switch
2) Washer	8) Filter	14) Gasket	20) Fan motor
3) Screw	9) Minimum GAS pressure switch	15) Gas train connectors	21) Cams area
4) Cap	10) GAS pressure outlet	16) Burner electrical panel	22) Servomotor
5) Hexagonal spanner	11) Antivibration coupling (OPTIONAL)	17) Generator	
6) Gas solenoid valve	12) GAS tap (OPTIONAL)	18) PG	

* To be mounted by the installer.

Before mount the flange, make sure that the O-ring (pos.1) is correctly installed in it's venue.
ATTENTION: Remove the cap (pos.4).

SAFETY

Before burner installation, clean carefully all around the area where the burner will be installed and arrange the correct lighting of the room.

The installation, adjustment and maintenance of the appliance must be carried out by professionaly qualified person in compliance with the standards and regulations of the laws in force as a wrong installation may cause damages to people, animals and things for which the Manufacturer will not be responsable.

Before starting installation, maintenance and disassembly turn off the electrical supply and check that it is not possible to turn accidentally the main switch on, close fuel inlet valves and make sure they could not accidentally be opened.

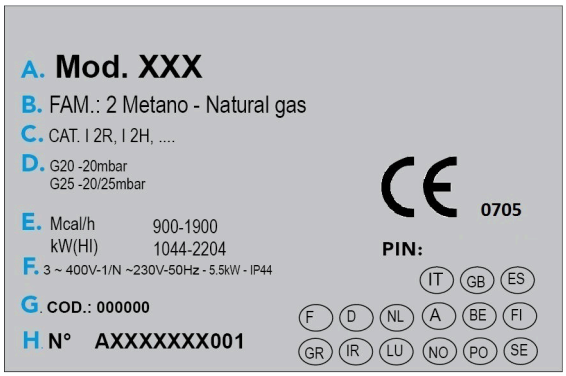
PRELIMINARY CHECKS

CHECK SUPPLY, TRANSPORT, PACKAGING, STORAGE

CHECK SUPPLY
Check that the supply is complete and without transport damages. After removing all the packaging, check the integrity of the contents. If in dubt do not use the burner and contact the supplier.
TRANSPORT
The transport weights of the burner and the gas train are indicated in the technical data.
STORAGE
Observe the environment temperatures which are allowed for storage and indicated in the technical data.

The packaging materials must not be abandoned as they may cause danger and pollution, but they should be collected and left in a appropriate place.

BURNER CHARACTERISTICS CHECK



The data plate of the burner shows:
A. the model;
B. fuel family;
C. fuel category;
D. fuel 1 pressure (if appicable, fuel 2 pressure);
E. minimum and maximum thermal power;
F. the data for electrical supply, absorbed electrical power and electric protection degree;
G. the code;
H. the serial number.
Moreover the data plate includes CE labeling, CE Certification PIN and the list of countries where the certification is applicable.

Check that the capacity of the boiler is within the operating range of the burner.

Violation, removal or loss of the data plate of the burner and any other components compromise the correct identification of the burner and hinder the installation and maintenance operation.

CORRECT BURNER POSITION

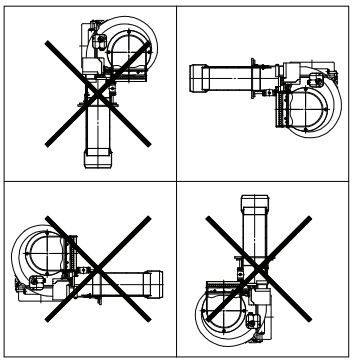


Fig. 5 Burner position

The burner is designed to work only in the positions as shown in the picture.

Any other position could compromise the correct working of the burner.
Crossed positions are forbidden for safety reasons.

BOILER PLATE

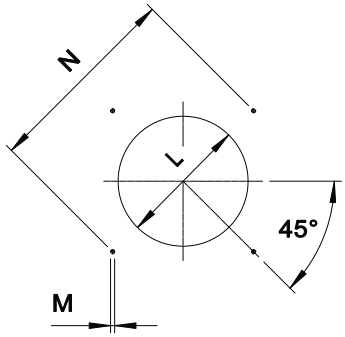


Fig. 6 Boiler plate

* Suggested dimension of connection between burner and generator.

MODEL		L min	L *	L max	M	N min	N *	N max
GAS XP60/MCE-LX-EVO	mm	160	160	180	M10	205	205	226

FLAME TUBE LENGTH

Flame tube length must be selected based on the specifications supplied by boiler manufacturer and, in any case, it must be greater than the thickness of the boiler door included its insulation.
In case of boilers with flame inversion or front flue combustion chambers, it is necessary to insulate the area between the flame tube and front door with refractory material. This protection material must not impede flame tube extraction.

MODEL		TC	TL **
GAS XP60/MCE-LX-EVO	mm	250	335

** For different flame lengths, please contact our Technical-Sales Department.

BURNER TRANSFORMATIONS

For the transformations from short head to long head it is necessary to require the HEAD KIT.
After every transformation it is indispensable to recalibrate the burner.

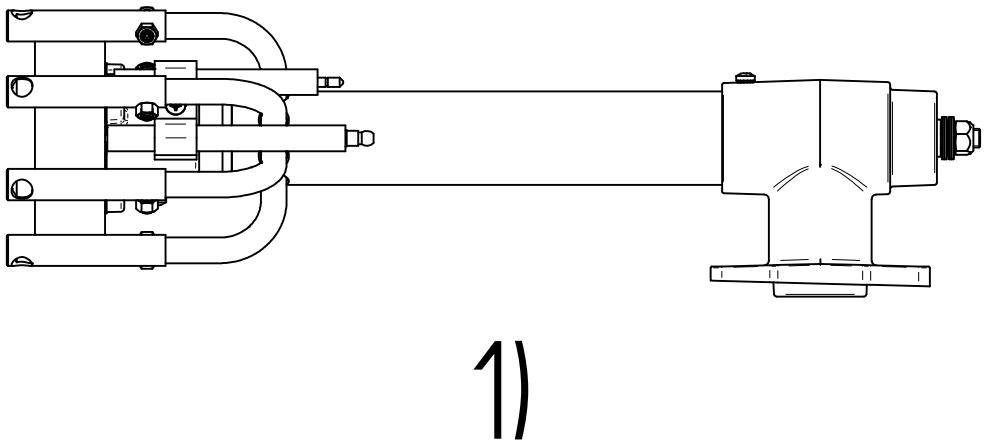


Fig. 7 1) Head kit

Burner model	BURNER Code	HEAD KIT Code
GAS XP60/MCE-LX-EVO TC NATURAL GAS	002800_41	050187
GAS XP60/MCE-LX-EVO TL NATURAL GAS	002801_41	050189

Legend:

TC: Short head
TL: Long head

Different mixing KITS are used for the combustion of the various gases.
Therefore the burner must be used only for the kind of gas indicated on the label.
Then, in case of transformation, it is necessary to apply the labels indicating the new kind of utilized gas.

HANDLING AND LIFTING OF THE BURNER

- Check that suitable lifting means are set for the weight of the burner and that all safety measures for handling are taken.
- The weight of the burner is indicated in the manual.
- The lifting systems described below refer to raising the burner only.
- It is not allowed to apply additional loads to the burner during lifting.
- Take care not to damage the burner components during lifting and handling.
- Depending on the burner model, the gripping points for lifting and handling are defined.

BURNER MODELS GAS XP60 :

To lift the burner it is necessary to use a band that is passed under the burner structure as shown in the images below:





ELECTRICAL PANEL LAYOUT

Please refer to elctrical panel layout supplied with the present instructions.

WORKING DIAGRAM OF THE ELECTRICAL DEVICE

Please refer to electrical device handbook supplied with the present Instructions.

ELECTRICAL CONNECTIONS TO THE GAS TRAIN

For the electrical connections to the gas train, please refer to the following photo and to the electrical panel layout supplied with the present instructions.



Fig. 8 Electrical connections to the gas train

CALIBRATION OF THE BURNER

Attention! Before starting the burner it's necessary to respect the general standards of security, in particularly check:

- **electrical supply.**
- **type of gas.**
- **gas pressure.**
- **the tightness of the plant and its correct realization.**
- **the presence of water in the plant.**
- **the ventilation of the heater area where the boiler is installed.**
- **the intervention of the thermostats or pressure switches of the boiler.**

Open the faucet and start the burner.
Wait for formation of the flame at the end of prepurge.
Set the capacity of the burner in according of the tables from the indicative calibrations.
Proceed to definitive settings of the burner with the help of the combustion analyser.
Set the air pressure switch and test the intervention, obstructing gradually the air inlet.
Also test the intervention of the minimum GAS pressure switch closing the gas faucet slowly.

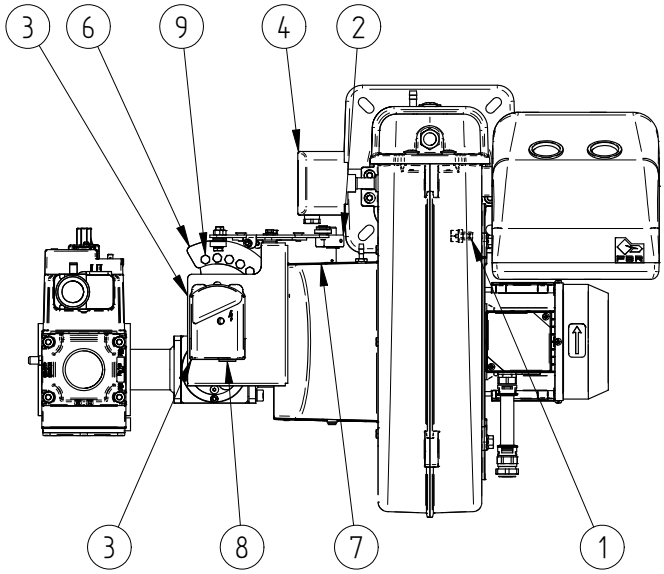


Fig. 9 Calibration of the burner

LEGEND

1) GAS pressure on the head
2) ATTENTION DON'T FORCE THE AIR SHUTTER JOINT (it is already calibrated and sealed)
3) ATTENTION DON'T FORCE THE GAS MODULATION JOINT (it is already calibrated and sealed)
4) Air pressure switch
5) Servomotor
6) Cams area
7) Air regulation opening indicator (N° Notches)
8) Gas regulation opening indicator
9) Air regulation screws

GAS OPERATION

By pushing the button (SG) the green lamp of the button will be illuminated, if the limit thermostat (STL) is in operating position and there is the correct minimum gas pressure (PGmin in operating position), the burner's control box starts its operating cycle.

The fan motor (MV) starts, the air pressure (PA) switch must change from pin 6 to pin 11.
The servomotor goes to the maximum opening position (red cam).

The prepurge time starts.

At the end of the prepurge time the servomotor goes to the ignition position (orange cam), the ignition transformer (TA) starts.

After few seconds of the activation of the ignition transformer the burner's control box opens the safety valve (VGS) and the operating valve (VGL). The main flame of the burner is alight.

At the end of the safety time, the ignition trasformer (TA) turns off.

A few seconds after the ignition of the main flame of the burner, and with power increase request from the PLC/ REGULATOR, the burner opens, through the servomotor, the air shutter and the gas modulator gradually.
Now the burner is in the modulation mode and in accordance to the power request, increase or decrease its thermal power.

The flame it is monitored by the ionisation probe.

If, after the security time, there is no formation of a flame the burner control unit establish a lock out.

CALIBRATION OF THE AIR PRESSURE SWITCH (PA)

The air pressure switch checks the minimum AIR pressure of the fan.

N.B. The help of a combustion analyser will be necessary for the setting.

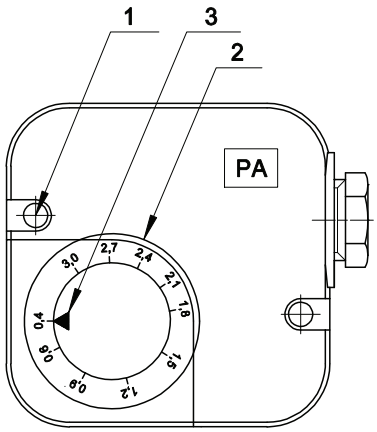


Fig. 10 1-Cover screw 2-Regulation collar 3-Regulation indicator

The air pressure switch checks the minimum AIR pressure of the fan. When the air pressure value generated by the fan is lower than the value set to the air pressure switch, the burner goes to lockout.
For the setting it is necessary the support of a combustion analyser: then proceed like follows:
A) Obstruct the air inlet gradually without changing the position of the shutter, until you obtain a defect of air: CO <= 10.000 ppm.
B) Turn the regulation collar of the pressure switch slowly until you obtain the safety lock-out of the burner.
C) Open completely the air inlet and start the burner.
D) Repeat point-A) and control the "intervention" of the air pressure switch.

CALIBRATION OF THE MINIMUM GAS PRESSURE SWITCH (PGMIN)

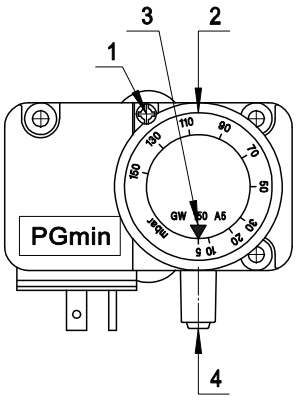


Fig. 11 1-Cover screw 2-Regulation collar 3-Regulation indicator 4-Pressure control connection of the pressure switch

It is connected in series with the thermostats of the boiler and it stops the burner when the gas pressure is less then the value of the set point (set the value 20% inferior of the operation gas pressure). The minimum gas pressure switch is mounted on the gas train in correspondence of the valve VS. For setting it proceed as follows:
A) Bring the burner to the maximum power setted (relative to the heat generator).
B) Measure the pressure on the outlet of the pressure switch and close slowly the manual gas valve until the pressure is 20% less than the measured pressure.
C) Turn slowly the regulation collar of the pressure switch, until the lock-out of the burner is obtained.
D) Open the manual gas valve completely and start the burner.
E) Repeat point A) and control the intervention of the pressure switch.

CALIBRATION OF THE MAXIMUM GAS PRESSURE SWITCH (PGMAX) (OPTIONAL)

The maximum gas pressure switch (PGmax) is an optional equipment for the models GAS XP60/MCE-LX-EVO

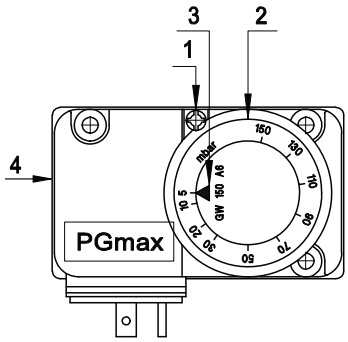


Fig. 12 1-Cover screw 2-Regulation collar 3-Regulation indicator 4-Pressure control connection of the pressure switch

It is connected in series with the flame sensor and it interrupts the current when the gas pressure is higher then the set point (set the value 20% higher then the operation gas pressure).
The maximum gas pressure switch is mounted on the burner in proximity of the connection flange of the gas train.
For setting proceed like follows:
a) Bring the burner up to the maximum power (relative to the heat generator).
b) Measure the pressure on the outlet of the pressure switch.
c) Turn the collar of the pressure switch regulation slowly until you obtain the lock-out of the burner.
d) Increase the pressure (set point) of intervention the 20% turning the regulation collar. Repeat the cycle of the burner again and in case of lock-out increase the set point for the pressure of intervention.

SERVOMOTOR CALIBRATION SIEMENS SQN71.424A20

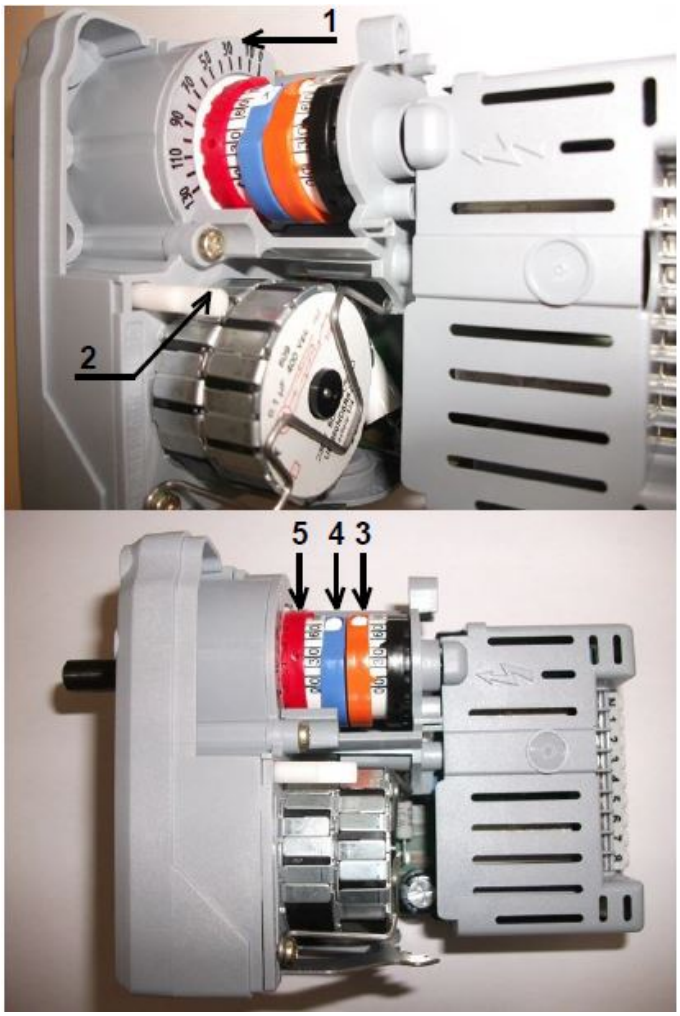


Fig. 13 SIEMENS SQN71.424A20

LEGEND

1) Index of air shutter opening
2) Release pivot (PUSH TO RELEASE)
3) Minimum cam [10°] (ORANGE)
4) Close cam [0°] (BLUE)
5) Maximum cam [130°] (RED)

CALIBRATION OF THE BURNER

Start the burner and set at the maximum opening of the servobrake [cam (I) set at the factory], regulate the gas flow by means of the activity valve and regulate the quantity of air by means of the screws which are on the sector; then return at the position of minimum modulation and regulate the power by means of the cam (III) of minimum modulation of the servobrake and calibrate the quantity of air.
It is necessary only the regulation of air for intermediate points.
In order to ensure a better calibration of all points, it is necessary to align every screw of the sector with the axis of the superior bearing then proceed with the regulation of the required quantity of air.

During the whole operation of calibration of the burner it is necessary the aid of a combustion analyzer.

Example of calibration of the cams:

- Close cam: 0° cam (II) (BLUE)
- Minimum modulation cam: 10° cam (III) (ORANGE)
- Maximum modulation cam: 130° cam (I) (RED)

GAS TRAIN CALIBRATION

GAS TRAIN CALIBRATION - DUNGS MODEL

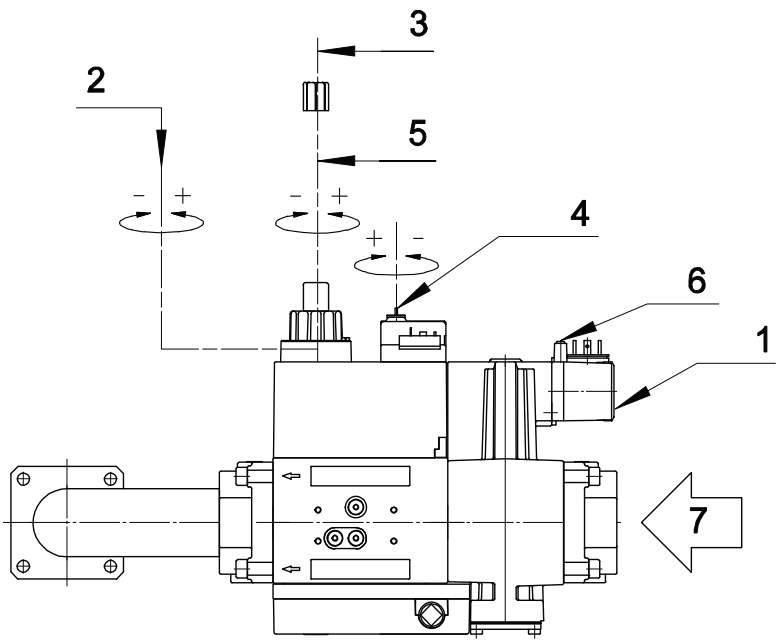


Fig. 14 DUNGS MB-DLE

1) Minimum GAS pressure switch
2) Adjustment of GAS flow
3) To adjust it is necessary to remove the cover from the upper side of the valve
4) Stabilizer
5) Adjustment of START flow (quick starting step)
6) Entrance GAS pressure
7) GAS inlet

CRUSHING RISK



It is necessary to pay attention to the parts of the cam group that are moving outside the burner.

Fig. 15 Crushing risk

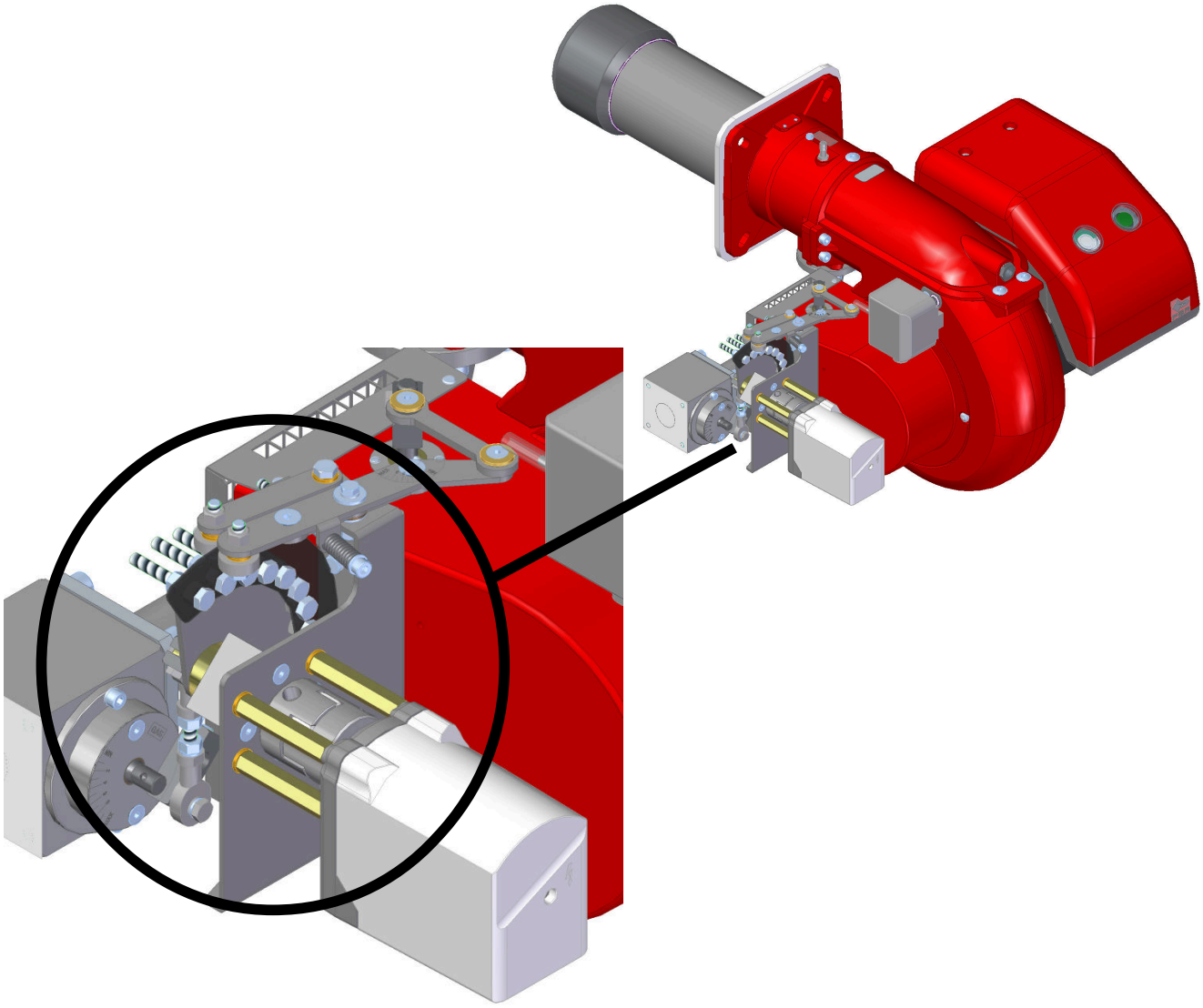


Fig. 16 Crushing risk GAS XP60/MCE-LX-EVO

TABLE OF INDICATIVE CALIBRATIONS

TABLE OF INDICATIVE CALIBRATIONS GAS XP60/MCE-LX-EVO G20 (NATURAL GAS)

Calibrations effected with pressure in chamber 0,1 mbar.
The definitive calibration must be done in operation by means of a combustion analiser.

THERMAL POWER		1st STAGE				2nd STAGE			
1st STAGE [kW]	2nd STAGE [kW]	FLOW [Nm³/h]	GAS HEAD PRESSURE [mbar]	AIR SHUTTE OPENING [°]	PRESSURE OF VENTILATION AIR [mbar]	FLOW [Nm³/h]	GAS HEAD PRESSURE [mbar]	AIR SHUTTE OPENING [°]	PRESSURE OF VENTILATION AIR [mbar]
115	280	11.6	0.6	0.8	0.1	28.1	4.3	2.5	2.4
115	300	11.6	0.6	0.8	0.1	30.1	4.9	2.8	2.7
115	350	11.6	0.6	0.8	0.1	35.2	6.7	3.3	3.8
115	400	11.6	0.6	0.8	0.1	40.2	8.9	3.8	5.3
115	450	11.6	0.6	0.8	0.1	45.2	11.0	4.3	6.7
115	500	11.6	0.6	0.8	0.1	50.2	13.5	5	8.4
115	550	11.6	0.6	0.8	0.1	55.3	16.4	5.5	10
115	600	11.6	0.6	0.8	0.1	60.3	19.0	7.5	11
115	630	11.6	0.6	0.8	0.1	63.3	20.4	7.5	11

EXTRACTION OF THE COMBUSTION HEAD

ATTENTION: REMOVE VOLTAGE!

The combustion head can be taken out without removing the burner from the boiler:
a) Take-off the lid (2) by loosening the 3 screws.
b) Loosen the screw (1) with a 10mm fixed wrench
c) Take-out the head (3) by rotating it of 180°
d) Pull the ignition cables (RED)
e) Pull the probe cable (Black).

ATTENTION: During the reassembling be careful not to take the cables by mistake. (See section about POSITIONING ELECTRODES).

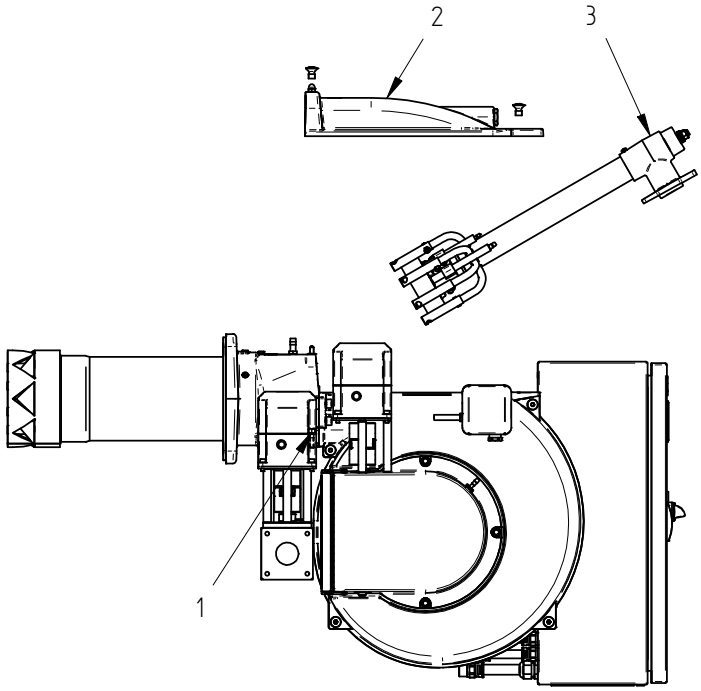


Fig. 17 Extraction of the combustion head

ELECTRODES POSITIONING

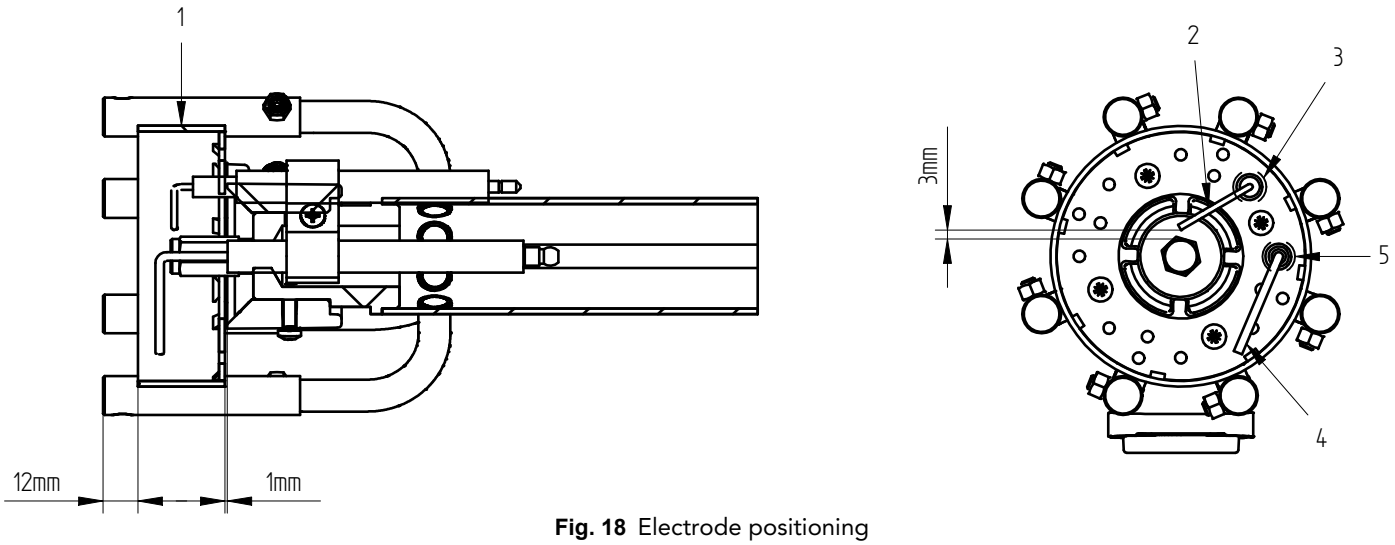


Fig. 18 Electrode positioning

LEGEND

1) 3mm: Ignition electrode - flame disk distance
2) Flame disk
3) 1mm: Ionisation probe - flame disk distance
4) Ignition electrode
5) RED pipe
6) Ionisation probe
7) BLACK pipe

POSSIBLE CAUSES - SOLUTIONS

TYPE OF IRREGULARITY	PROBABLE CAUSE	RIMEDY
The burner does not start.	1) Lack of current.	1) Check the fuses of the feed line. Check the line of the thermostats.
	2) Gas does not reach the burner.	2) Check the opening of the detecting devices located along the feeding pipes.
	3) Defective fan motor contactor.	3) Replace the fan motor contactor.
	4) Defective fan motor.	4) Replace the fan motor.
	5) Defective control box.	5) Replace the control box.
	6) A limit or safety control device is open.	6) Adjust or replace.
	7) Control box lock-out.	7) Reset the control box.
	8) Air pressure switch in operating position.	8) Replace or adjust the air pressure switch.
	9) No gas supply.	9) Check if in the supply line there is no electric or manual shut-off valves closed and that there are no obstructions, if the checks are positive, contact your gas company.
	10) Minimum gas pressure switch not switch in operating position.	10) Replace or adjust the minimum gas pressure switch.
The burner does not start and it goes into lock-out position.	1) The control box sees flame.	1) Check cleaning and tightness of the fuel valves.
	2) Flame sensor short-circuit.	2) Replace the flame sensor.
The burner starts, but it no performs the prepurge phase and then it goes into lock-out position.	1) Air pressure switch not switch in operating position.	1) Check to air pressure to the pressure switch. Check the rotation direction of the fan motor.
	2) Defective air pressure switch.	2) Replace the air pressure switch.
	3) Dirty fan.	3) Clean the fan.
The burner, after the prepurge and the safety phase, goes into lock-out position without appearance of the flame.	1) Erroneous fuel valves connections.	1) Check the electrical connections.
	2) Erroneous ignition transformer connections.	2) Check the electrical connections.
	3) Defective ignition transformer.	3) Replace the ignition transformer.
	4) Defective control box.	4) Replace the control box.
	5) There is no spark at the electrode.	5) Check the operation of the ignition transformer. Check the position of the electrodes ends.
	6) Insufficient gas pressure.	6) Increase pressure at governor.
	7) High voltage cable defective.	7) Replace the high voltage cable.
	8) High voltage cable deformed by high temperature.	8) Replace the high voltage cable.
The burner starts, the flame ignites then it goes into lock-out position.	1) The flame it isn't detect.	1) Check the flame intensity.
	2) Erroneous flame sensor connections.	2) Check if the phase and neutral conductor are connected propely or if the electrical supply is phase-phase.
	3) Maximum gas pressure switch operates. *	3) Adjust or replace. *
Flame is smokey.	1) Combustion air is to low.	1) Check that the air damper opens normally. Check if the fan is dirty.

TYPE OF IRREGULARITY	PROBABLE CAUSE	RIMEDY
During operation, the burner goes into lock-out position.	1) Inadequate flame signal.	1) Check the flame intensity. Check the burner calibration.
	2) Defective flame sensor.	2) Replace the flame sensor.
	3) Maximum gas pressure switch operates. *	3) Adjust or replace. *
The burner does not go into maximum position.	1) The modulation thermostat does not closes.	1) Replace or adjust.
	2) The servomotor is wrong calibrated or defective.	2) Check calibration of the servomotor or replace it.
	3) Defective control box.	3) Replace the control box.

*: Only for models with maximum gas pressure switch.



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