

GAS XP60 - P100 - P150/M-LX-FGR-EL

Burners for gas modulating (PID fully modulating) equipped with electronic control box LAMTEC BT3.

They are composed by: die-cast aluminum body, fan at high pressurisation and combustion head with adjustment at high efficiency and high flame stability.

Compact overall dimensions and disposition rationalized of the components with accessibility facilitated for the operations of setting and maintenance.

Gas train completely assembled and tested; complete of working valve with flow adjustment, safety valve, minimum gas pressure switch and gas filter.

Complete of flange and gasket for installation on generator.

The actuators are independent and are managed directly by the electronic cam:

- one actuator for the gas modulator
- one actuator for the air shutter
- one actuator for the FGR shutter

The burners are equipped with an operating display that allows:

- Adjustment of the parameters of the burner operation
- Adjustment of the setpoint and operation range of the pressure / temperature probe
- Adjustment of the burner's curveset

With the addition of optional accessories (probes) thanks to the most advanced systems for automatic modulation in mechanical or electronic version, the burner constantly ensures the proper gas / air ratio. The maximum efficiency of the returns in each combustion point derived from the punctual adaptation of the thermal load to the heat requirements of the burner at any instant of operation.

In the version with the electronic cam the fuel / combustion air curve, more extended, is fully exploited, guaranteeing excellent performance in terms of accuracy and speed, even during the calibration phase. A microprocessor monitors the different stages of the process and allows the correct repetition of the sequences of operation.

Some accessories are available, like: PC interface, VSD (inverter), O₂ control, O₂+CO control, Profibus, Modbus.

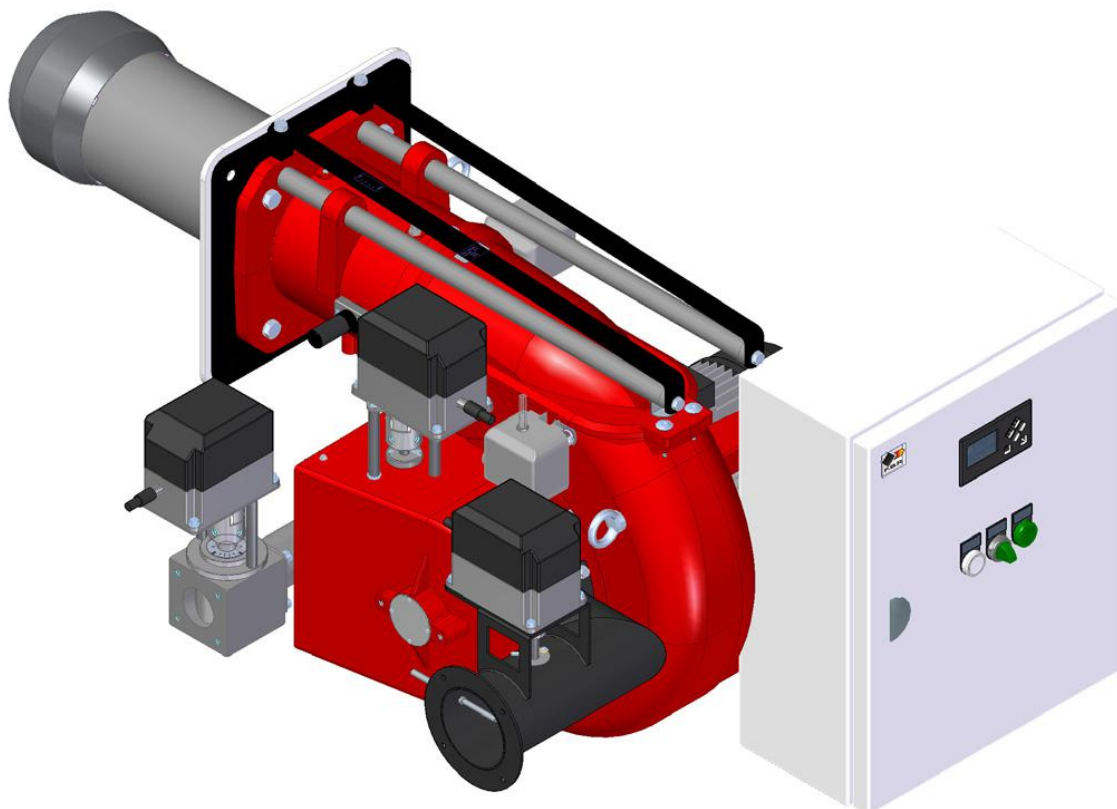


Fig. 1 GAS P100/M-LX-FGR-EL

CONTROL BOX LAMTEC BT3

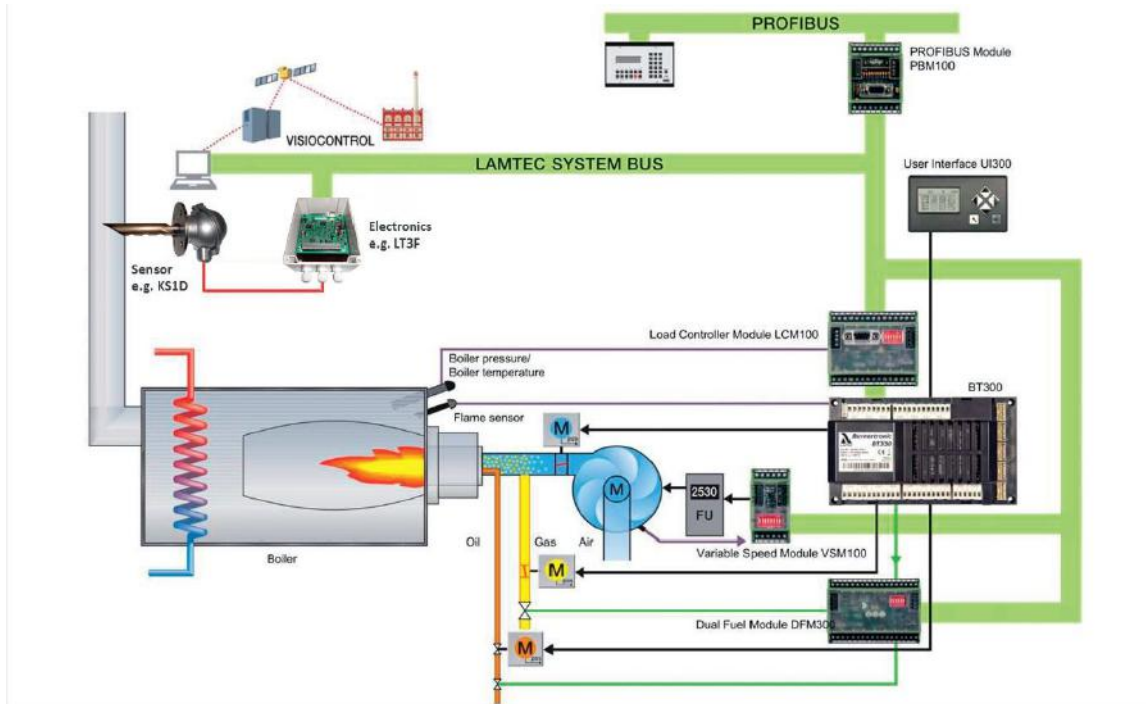


Fig. 2 Control box Lamtec BT3

PRINCIPLE OF OPERATION BURNER WITH FGR

In these burners, to recirculate the exhaust gases from the flue it is used the combustion air fan.
 N.B. THE ACTION OF THE FUEL AND AIR ACTUATORS IS NOT AFFECTED BY THE FLUE GAS RECIRCULATION.

The FGR damper stays closed at the beginning of the pre-purge period.
 After the adjusted delay (parameter 414 of the BT3 - factory setting: 10) the pre-purge time is stopped temporarily and the recirculation actuator runs to OPEN position. When the FGR actuator reach the pre-purge position (set to the parameter 367), the pre-purge time resumes.
 At the end of the pre-purge time the air damper and the FGR damper runs to the ignition position; the fuel actuator is already in the ignition position.
 When the BT3 reach the ignition positions of the actuators, the burner ignites.
 When the BT3 change it operation in "MODULATION MODE", only the fuel and the air actuators run to the programmed curve.
 The FGR actuator remains at its position until the release conditions were met:

- Condition 1: The time period set in parameter 331 of the BT3 - factory setting: 200, it must be expired and
- Condition 2: The release temperature of the flue gas set in parameter 332 of the BT3 - factory setting: 50, it must be reached.

When the 2 conditions are met, the FGR actuator runs to the programmed curve.
 You can see the spent time and the FGR temperature on the BT3 operating panel after the "MODULATION MODE".

If, during the operation of the burner, the FGR temperature drops below the threshold set in parameter 332, the recirculation channel remains active.

During the burner operation, the recirculation channel runs to the close position in one of these conditions:

- Condition 1: If the flue gas temperature drops below 0°C
- or
- Condition 2: If the Pt100 temperature probe it fails or interrupts

N.B. IF ONE OF THESE TWO CONDITIONS HAPPENS, THE BURNER KEEP OPERATING WITHOUT THE FGR RECIRCULATION CHANNEL. SO ONLY AIR AND FUEL ACTUATORS WORK THROUGH THE PROGRAMMED CURVE.

When you turn off the burner, the recirculation channel will be closed together with the fuel actuator.



FGR (FLUE GAS RECIRCULATION)

FGR (flue gas recirculation) it is a technique for lowering NOx emissions from burners.

FGR lowers NOx in two ways:

- 1) The cooled, relatively inert, recirculated flue gases act as a heat sink, absorbing heat from the flame and lowering peak flame temperatures.
- 2) When mixed with the combustion air, recirculated flue gases lower the average oxygen content of the air, starving the NOx-forming reaction for one of the ingredients they need.

The percentage of the flue gas back to the combustion chamber it is defined by the opening of the FGR actuator damper.

FGR quantity must be adjusted so as to recirculate the smallest quantity necessary to obtain the required Nox rate.

DISADVANTAGES OF THE FGR SYSTEM

LOSS OF THE BURNER CAPACITY

If you replace the combustion air with low oxygen flue gases, the burner has to be downrated to compensate for the reduced weight of oxygen flowing through it.

You'll also suffer an additional capacity loss because the flue gas/combustion air mixture is at elevated temperature.

LOSS OF THE BURNER STABILITY AND FLEXIBILITY

The FGR system can be increase the emissions of he carbon monoxide and unburned hydrocarbons.

TECHNICAL DATA AND OPERATING RANGE DIAGRAM GAS XP60/M-LX-FGR-EL

MODEL	GAS XP60/M-LX-FGR-EL	
Thermal power min. 1°st. / min. 2°st. - max. 2°st. *	[Mcal/h]	130/200-474
Thermal power min. 1°st. / min. 2°st. - max. 2°st. *	[kW]	151/232-551
Gas flow G20 (NATURAL GAS) min. 1°st. / min. 2°st. - max. 2°st. *	[Nm³/h]	15.4/23.7-56
Fuel: NATURAL GAS (second family)		
Fuel category:	I2R,I2H,I2L,I2E,I2E+,I2Er,I2ELL,I2E(R)B	
NOx **	[mg/kWh]	<30
Intermittent operation (min.1 stop every 24h), modulating		
Environmental conditions operation / storage:	-15...+40°C / -20...+70°C, rel. humidity max. 80%	
Max. temperature combustion air	[°C]	60
Minimum pressure gas train D1"-S NATURAL GAS ***	[mbar]	75
Maximum pressure at the entry of valves (Pe. max)	[mbar]	360
Nominal electric power	[W]	935
Fan motor	[W]	740
Nominal fan motor current absorption	[A]	2
Nominal auxiliary absorption	[A]	0.5
Power supply:	3~400V, 1N~230V - 50Hz	
Electric protection degree:	IP 40	

* Reference conditions: Environment temperature 20°C - Barometric pressure 1013 mbars - Altitude 0 metre (sea level).

** To obtain this low Nox emission like in the declaration, it's necessary to couple the burner to the proper boiler for this application: boilers with 3 turns for the exhaust gas, condensing boilers and any generator with direct exhaust outlet and the thermal load isn't higher then 1,8 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).

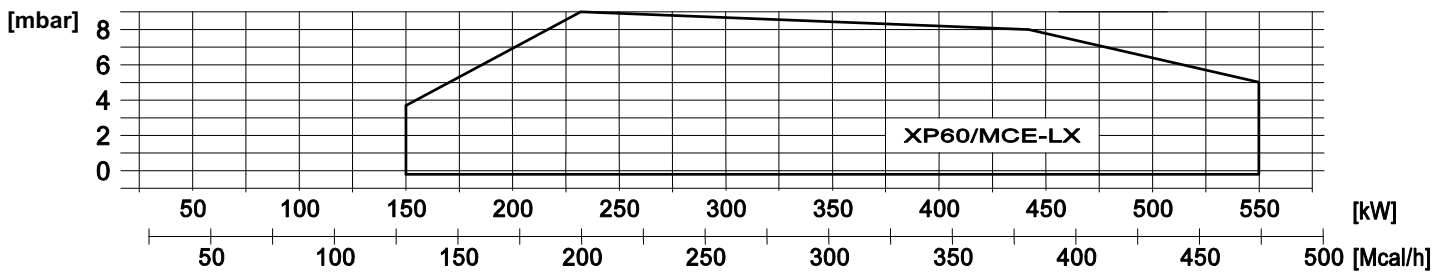


Fig. 3 X = Thermal power Y = Pression in the combustion chamber

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.

TECHNICAL DATA AND OPERATING RANGE DIAGRAM GAS P100/M-LX-FGR-EL

MODEL	GAS P100/M-LX-FGR-EL	
Thermal power min. 1°st. / min. 2°st. - max. 2°st. *	[Mcal/h]	133/400-774
Thermal power min. 1°st. / min. 2°st. - max. 2°st. *	[kW]	155/465-900
Gas flow G20 (NATURAL GAS) min. 1°st. / min. 2°st. - max. 2°st. *	[Nm³/h]	15.5/46.7-90.5
Fuel: NATURAL GAS (second family)		
Fuel category:	I2R,I2H,I2L,I2E,I2E+,I2Er,I2ELL,I2E(R)B	
NOx **	[mg/kWh]	<30
Continuous operation, modulating		
Environmental conditions operation / storage:	-15...+40°C / -20...+70°C, rel. humidity max. 80%	
Max. temperature combustion air	[°C]	60
Minimum pressure gas train D1"1/2-S NATURAL GAS ***	[mbar]	34
Maximum pressure at the entry of valves (Pe. max)	[mbar]	360
Nominal electric power	[kW]	2.7
Fan motor	[kW]	2.2
Nominal fan motor current absorption	[A]	5.4
Nominal auxiliary absorption	[A]	0.5
Power supply:	3~400V, 1N~230V - 50Hz	
Electric protection degree:	IP 40	

* Reference conditions: Environment temperature 20°C - Barometric pressure 1013 mbars - Altitude 0 metre (sea level).

** To obtain this low Nox emission like in the declaration, it's necessary to couple the burner to the proper boiler for this application: boilers with 3 turns for the exhaust gas, condensing boilers and any generator with direct exhaust outlet and the thermal load isn't higher then 1,8 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).

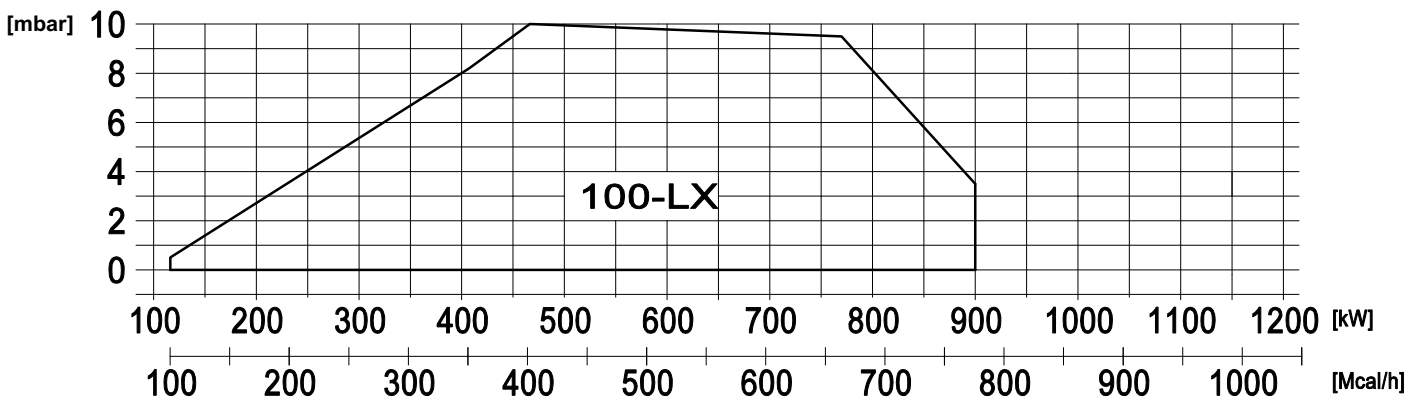


Fig. 4 X = Thermal power Y = Pression in the combustion chamber

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.

TECHNICAL DATA AND OPERATING RANGE DIAGRAM GAS P150/M-LX-FGR-EL

MODEL	GAS P150/M-LX-FGR-EL	
Thermal power min. 1°st. / min. 2°st. - max. 2°st. *	[Mcal/h]	230/700-1300
Thermal power min. 1°st. / min. 2°st. - max. 2°st. *	[kW]	267/814-1511
Gas flow G20 (NATURAL GAS) min. 1°st. / min. 2°st. - max. 2°st. *	[Nm³/h]	26.9/81.7-152
Fuel: NATURAL GAS (second family)		
Fuel category:	I2R,I2H,I2L,I2E,I2E+,I2Er,I2ELL,I2E(R)B	
NOx **	[mg/kWh]	<30
Continuous operation, modulating		
Environmental conditions operation / storage:	-15...+40°C / -20...+70°C, rel. humidity max. 80%	
Max. temperature combustion air	[°C]	60
Minimum pressure gas train D2"-S NATURAL GAS ***	[mbar]	42
Maximum pressure at the entry of valves (Pe. max)	[mbar]	360
Nominal electric power	[kW]	3.4
Fan motor	[kW]	3
Nominal fan motor current absorption	[A]	6.4
Nominal auxiliary absorption	[A]	0.6
Power supply:	3~400V, 1N~230V - 50Hz	
Electric protection degree:	IP 40	

* Reference conditions: Environment temperature 20°C - Barometric pressure 1013 mbars - Altitude 0 metre (sea level).

** To obtain this low Nox emission like in the declaration, it's necessary to couple the burner to the proper boiler for this application: boilers with 3 turns for the exhaust gas, condensing boilers and any generator with direct exhaust outlet and the thermal load isn't higher then 1,8 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).

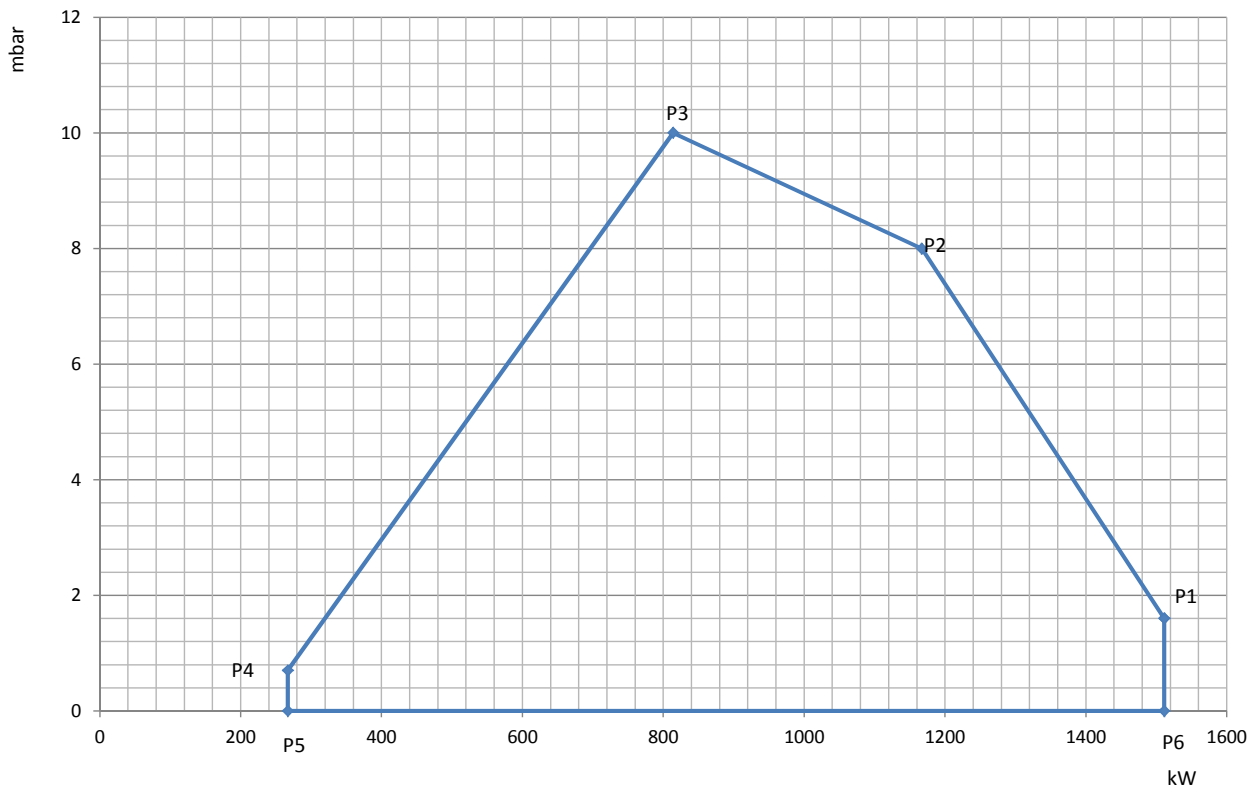


Fig. 5 X = Thermal power Y = Pression in the combustion chamber

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 GAS XP60/M-LX-FGR-EL WITH GAS TRAIN [MM]

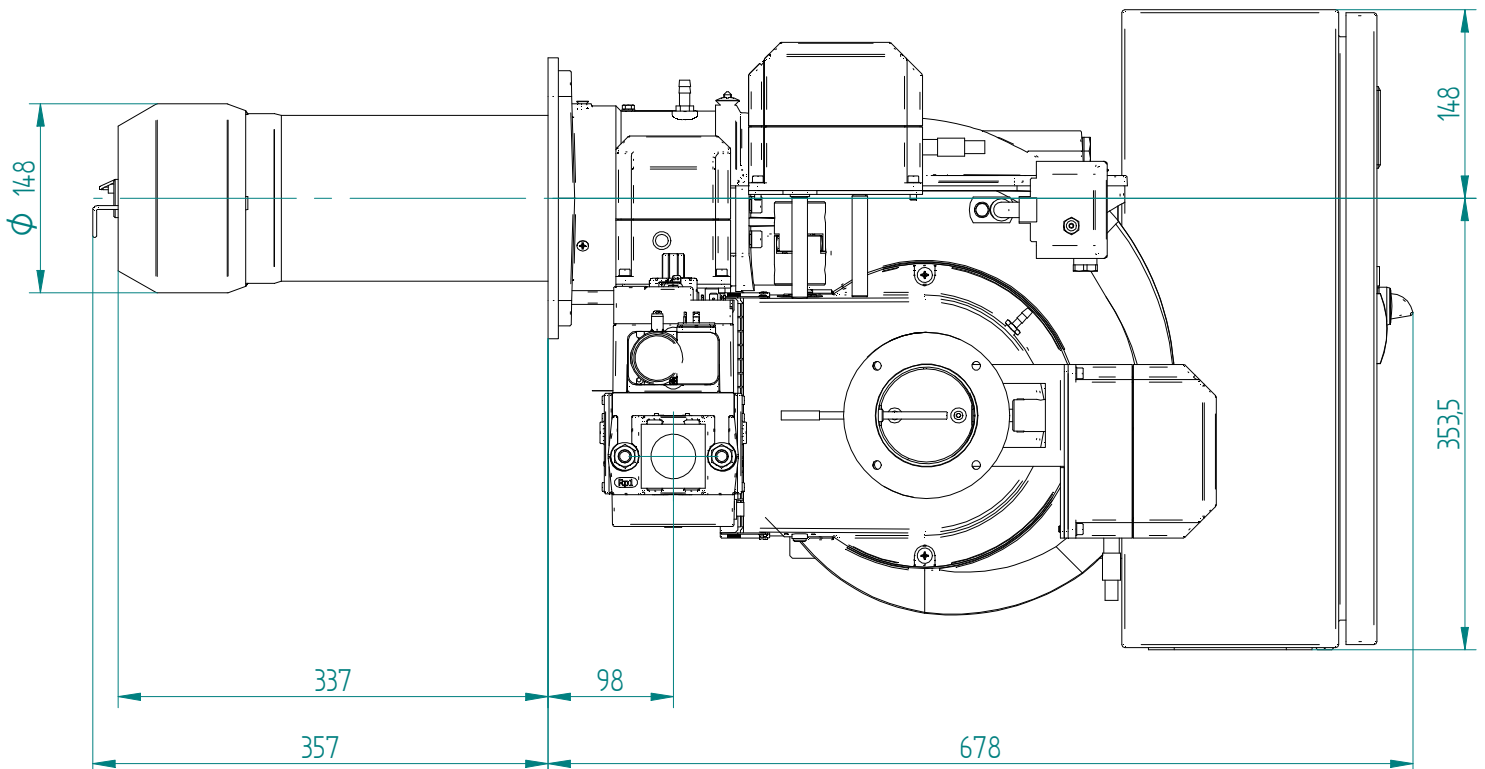
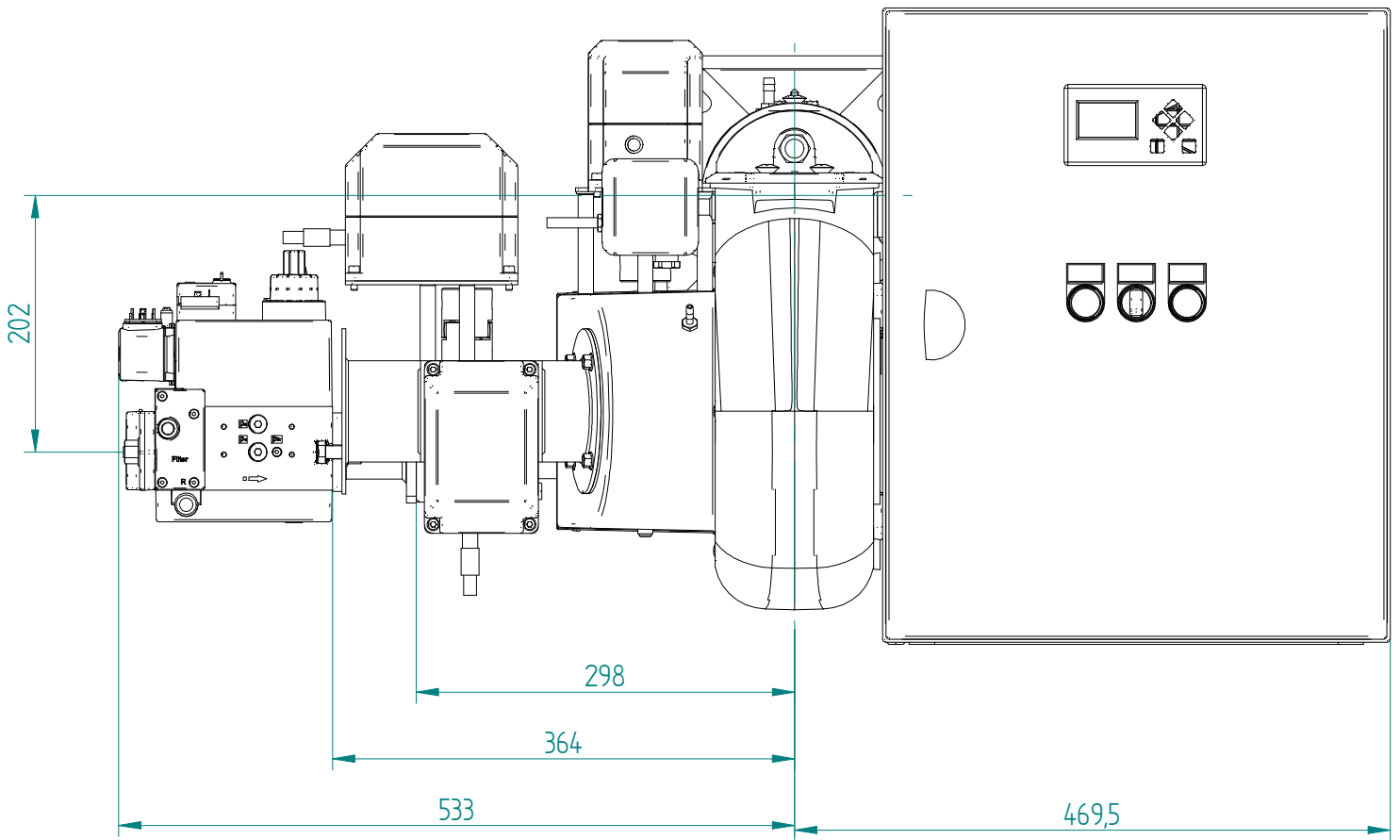


Fig. 6 Dimensions with gas train GAS XP60/M-LX-FGR-EL

DIMENSIONS GAS P100/M-LX-FGR-EL WITH GAS TRAIN D1"1/2-S [MM]

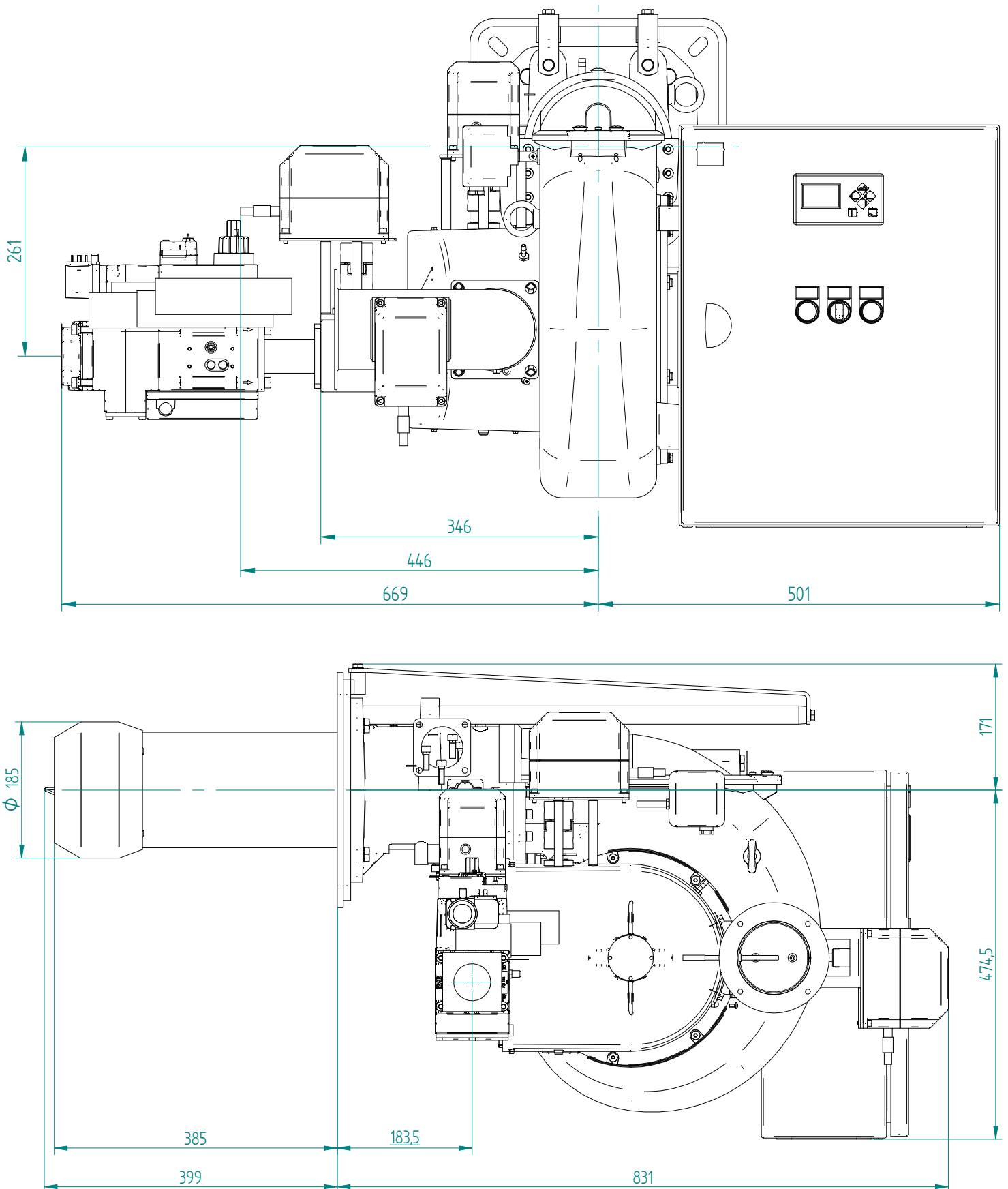


Fig. 7 Dimensions GAS P100/M-LX-FGR-EL with gas train D1"1/2-S

DIMENSIONS GAS P150/M-LX-FGR-EL WITH GAS TRAIN D2"-S [MM]

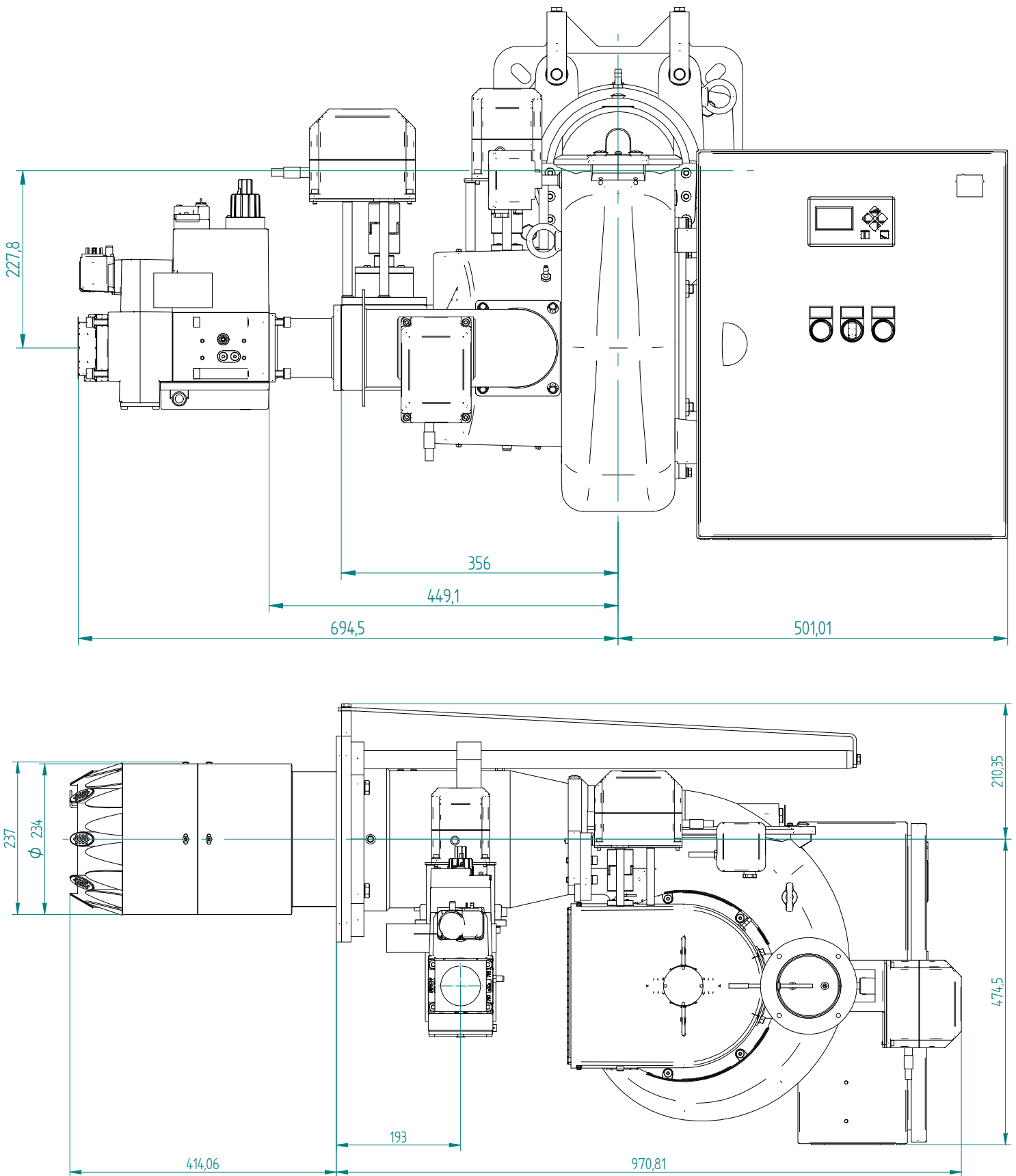
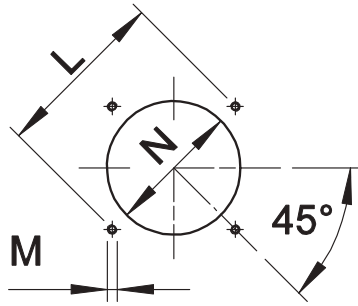


Fig. 8 Dimensions GAS P150/M-LX-FGR-EL with gas train D2"-S



* Suggested dimension of connection between burner and generator.

Fig. 9 Boiler plate

MODEL		L min	L *	L max	M	N min	N *	N max
GAS XP60/M-LX-FGR-EL	mm	205	205	226	M10	160	160	180
GAS P100/M-LX-FGR-EL	mm	340	340	368	M12	195	195	250
GAS P150/M-LX-FGR-EL	mm	340	340	368	M14	250	250	250

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/M-LX-FGR-EL	mm	250	335
GAS P100/M-LX-FGR-EL	mm	250	385
GAS P150/M-LX-FGR-EL	mm	280	400

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

BURNER CONTROL PANEL

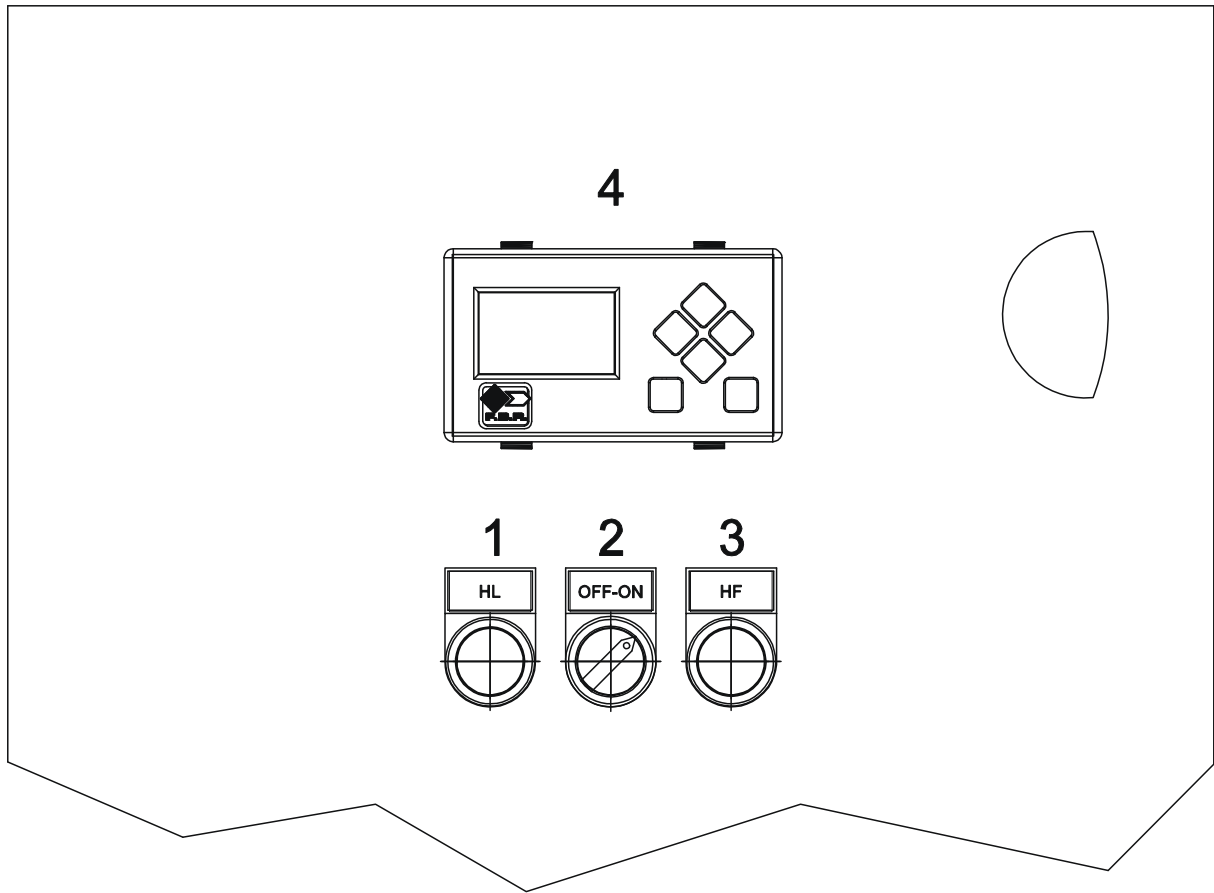


Fig. 10 Burner control panel

LEGEND

- 1) HL: line lamp
- 2) OFF-ON: OFF-ON switch
- 3) HF: operation lamp
- 4) Display

PRODUCT SPECIFICATION**SHORT DESCRIPTION**

Burners for gas modulating (PID fully modulating) equipped with electronic control box LAMTEC BT3.

DETAILED SPECIFICATION

Burners for gas modulating (PID fully modulating) equipped with electronic control box LAMTEC BT3; composed by:

- Die-cast aluminum body;
- Fan at high pressurisation;
- Combustion head with adjustment at high performance and elevated flame stability equipped with inox steel blast tube and steel flame disc;
- Flange and insulating gasket for fixing at boiler;
- Three-phase power supply;
- Safety air pressure switch to stop the burner in lock-out in case of failed or anomalous fan operation;
- Gas train with working and safety valve class A, gas pressure switch with stabilizer filter;
- Ionisation probe for flame detection GAS XP60/M-LX-FGR-EL;
- UV flame scanner for flame detection GAS P100/M-LX-FGR-EL - GAS P150/M-LX-FGR-EL;
- IP 40 electric protection level;
- Servomotor for air shutter
- Servomotor for gas modulator;
- Servomotor for FGR shutter;
- Moving air shutter with total closure when idle in order to reduce at the least energy losses related to boiler cooling down;
- Supports and tierods for burner extraction GAS P100/M-LX-FGR-EL - GAS P150/M-LX-FGR-EL;
- Easy extraction of combustion head without get off the burners by bolier;
- Maximum gas pressure switch to stop the burner in lock-out in case of the gas pressure is higher then the set point value, as standard for models: GAS P100/M-LX-FGR-EL - GAS P150/M-LX-FGR-EL;;
- Output signal 4-20mA to verify the instantaneous load of the burner;
- 3 point step modulation with the possibility, thanks to appropriate modifications to the electrical wiring and to the programming of the control box, to have different type of modulation such as: Pt100 - Pressure probe - 4-20mA input signal;
- Pt100 probe to detect the flue gas temperature.

CONFORMING TO:

- CE rules;
- 2014/30/UE Directive E.M.C.;
- 2014/35/UE Directive L.V.;
- 2014/68/EU Directive M.D.;
- 97/23/CE Directive P.E.D.;
- 2009/142/CE Directive GAS;
- Reference rules: EN676 (gas) - EN746-2 (industrial thermoprocessing equipment).

STANDARD EQUIPMENT

- Isomart gasket;
- Flange with insulating gasket;
- Burner nameplate;
- Warranty;
- Instruction handbook for installation, use and maintenance.

OPTIONAL

- Temperature probe 0°C-400°C (PT 100 a 0° C);
- Temperature probe 0°C-1200°C (K probe);
- Pressure probe 0-3 bar, 0-6 bar. 0-16 bar, 0-20 bar, 0-30 bar;
- Noise protection;
- Antivibration couplings;
- Handle gas taps.