



HIGH-LOW FLAME OR MODULATING HEAVY OIL PROGRESSIVE BURNERS

MOD.: FNDP 190/M
FNDP 250/M

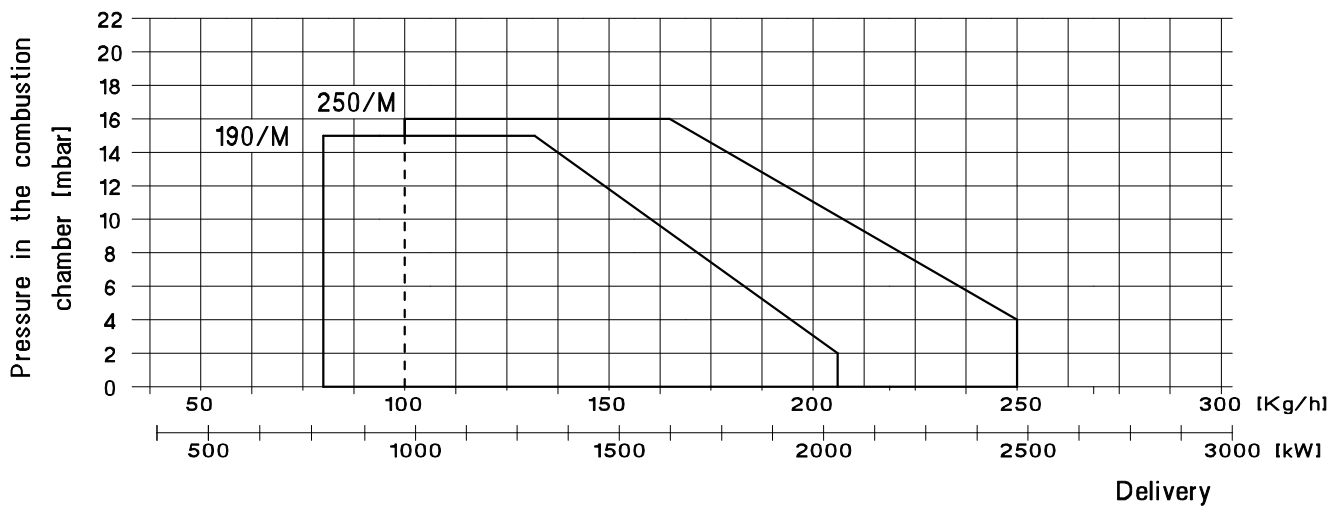
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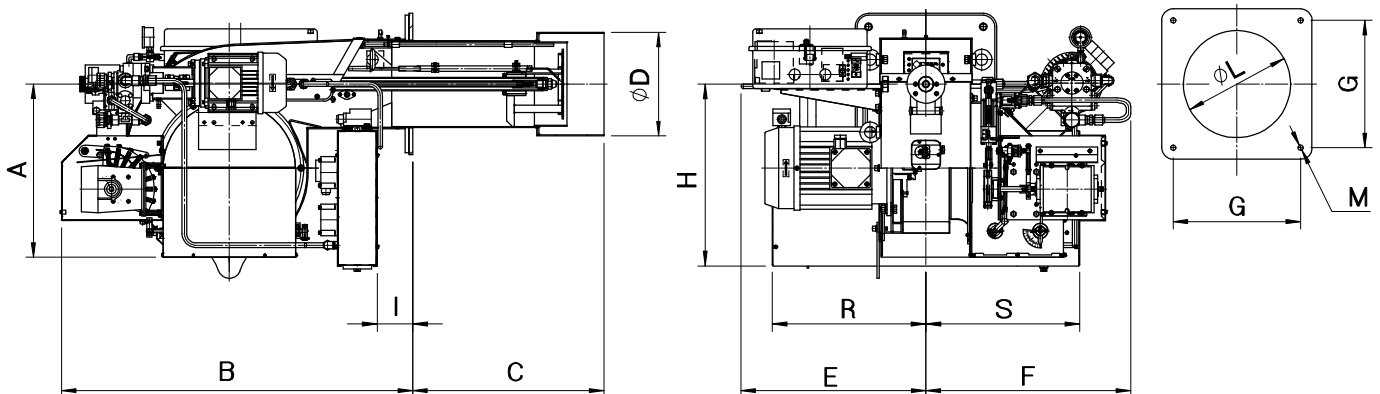
TECHNICAL DATA

MODEL		FNDP 190/M	FNDP 250/M
Delivery	[Kg/h]	80-206	100-250
Thermal power	[Mcal/h]	784-2020	980-2450
Thermal power	[kW]	911-2343	1140-2840
Fan motor power	[kW]	5.6	7.5
Pump motor power	[kW]	0.75	0.75
Resistance power	[kW]	15	20
Electrical supply:	Three-phase 230/400V(-15%+10%)-50Hz		
Fuel:	Heavy oil: 5-20°C a 50°C		
Safety time of the control-box:	≤ 5secs. at starting; ≤ 1sec. in operation		

OPERATING RANGE DIAGRAM: Thermal power - Pressure in the combustion chamber



OVERALL DIMENSION [mm.]



MODEL	A	B	C	∅D	E	F	G	H	I	∅L	M	R	S
FNDP 190/M	453	920	495	234	484	536	300	490	93	245	M14	400	400
FNDP 250/M	453	920	500	271	484	536	300	490	93	280	M14	400	400

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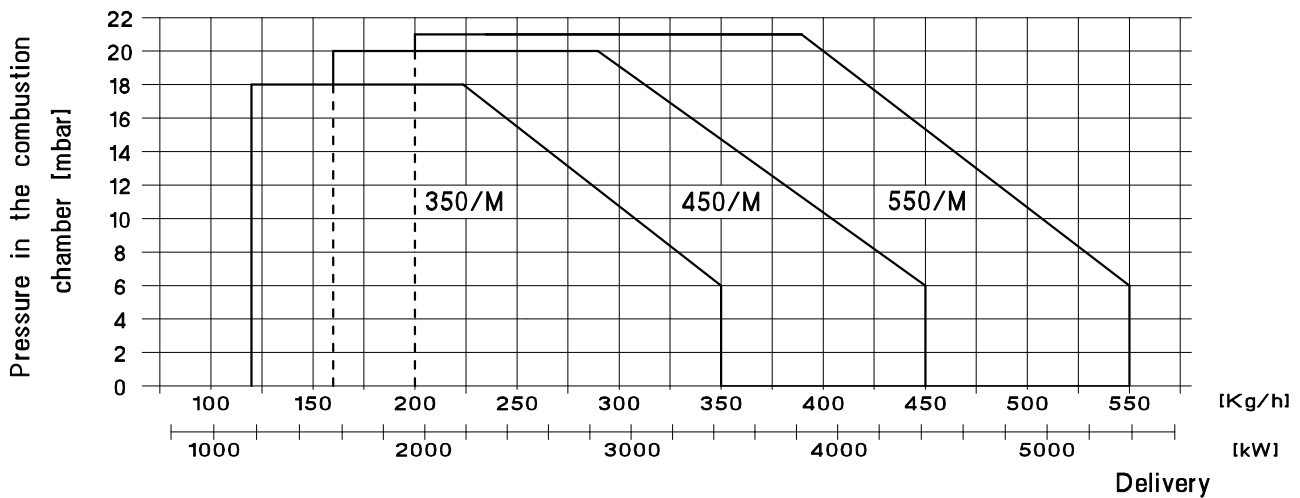
HIGH-LOW FLAME OR MODULATING HEAVY OIL PROGRESSIVE BURNERS

MOD.: FNDP 350/M
FNDP 450/M-FNDP 550/M
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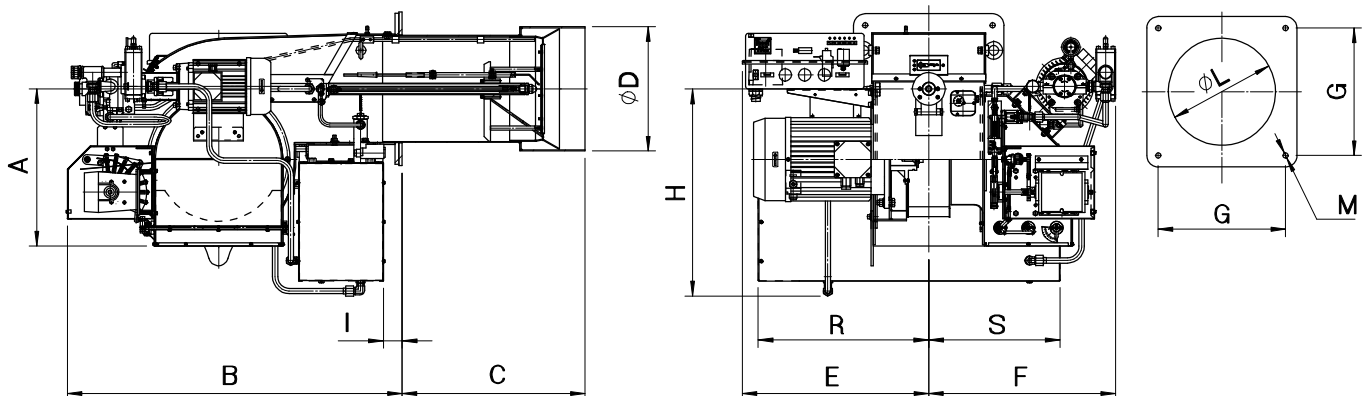
TECHNICAL DATA

MODEL		FNDP 350/M	FNDP 450/M	FNDP 550/M
Delivery	[Kg/h]	120-350	160-450	200-550
Thermal power	[Mcal/h]	1176-3430	1568-4410	1960-5390
Thermal power	[kW]	1364-3979	1819-5115	2274-6252
Fan motor power	[kW]	9	11	15
Pump motor power	[kW]	1.5	2.2	2.2
Resistance power	[kW]	24	30	36
Electrical supply:	Three-phase 230/400V(-15%+10%)-50Hz			
Fuel:	Heavy oil 5-20°E a 50°C			
Safety time of the control-box:	≤ 5secs. at starting; ≤ 1sec. in operation			

OPERATING RANGE DIAGRAM: Thermal power - Pressure in the combustion chamber



OVERALL DIMENSION [mm.]



MODEL	A	B	C	∅D	E	F	G	H	I	∅L	M	R	S
FNDP 350/M	481	1025	520	292	537	565	390	495	75	310	M14	400	400
FNDP 450/M	481	1025	560	380	571	571	390	635	57	400	M14	520	400
FNDP 550/M	481	1025	560	380	571	571	390	635	57	400	M14	520	400

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HIGH-LOW FLAME OR MODULATING HEAVY OIL PROGRESSIVE BURNERS

MOD.: FNDP 190/M-250/M
FNDP 350/M-450/M-550/M

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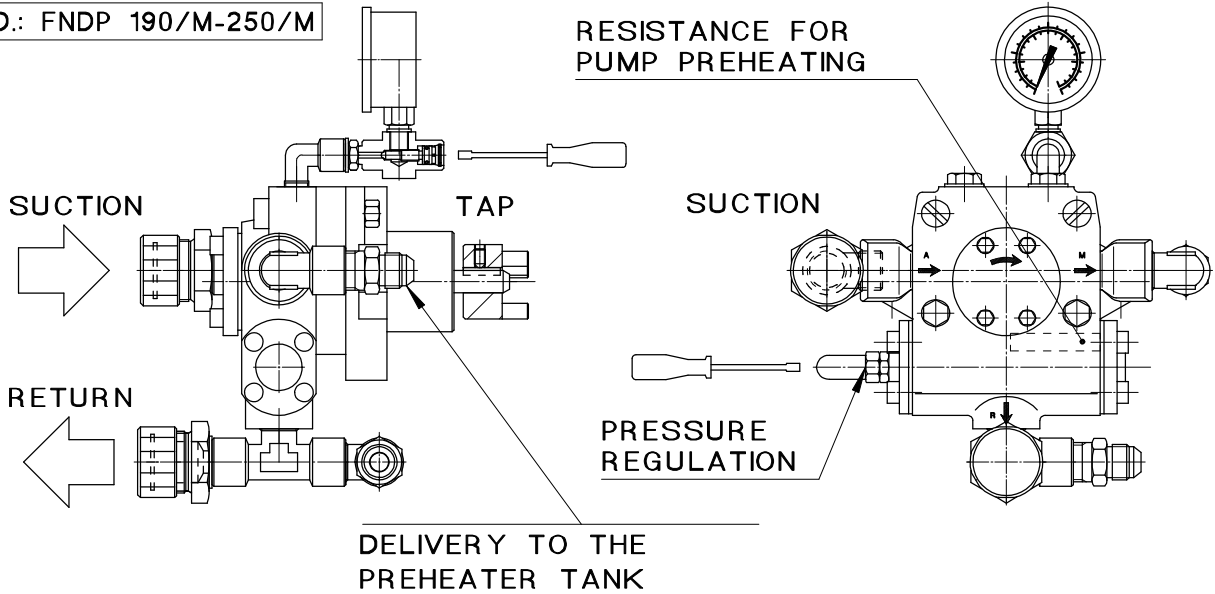
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PUMP CALIBRATION

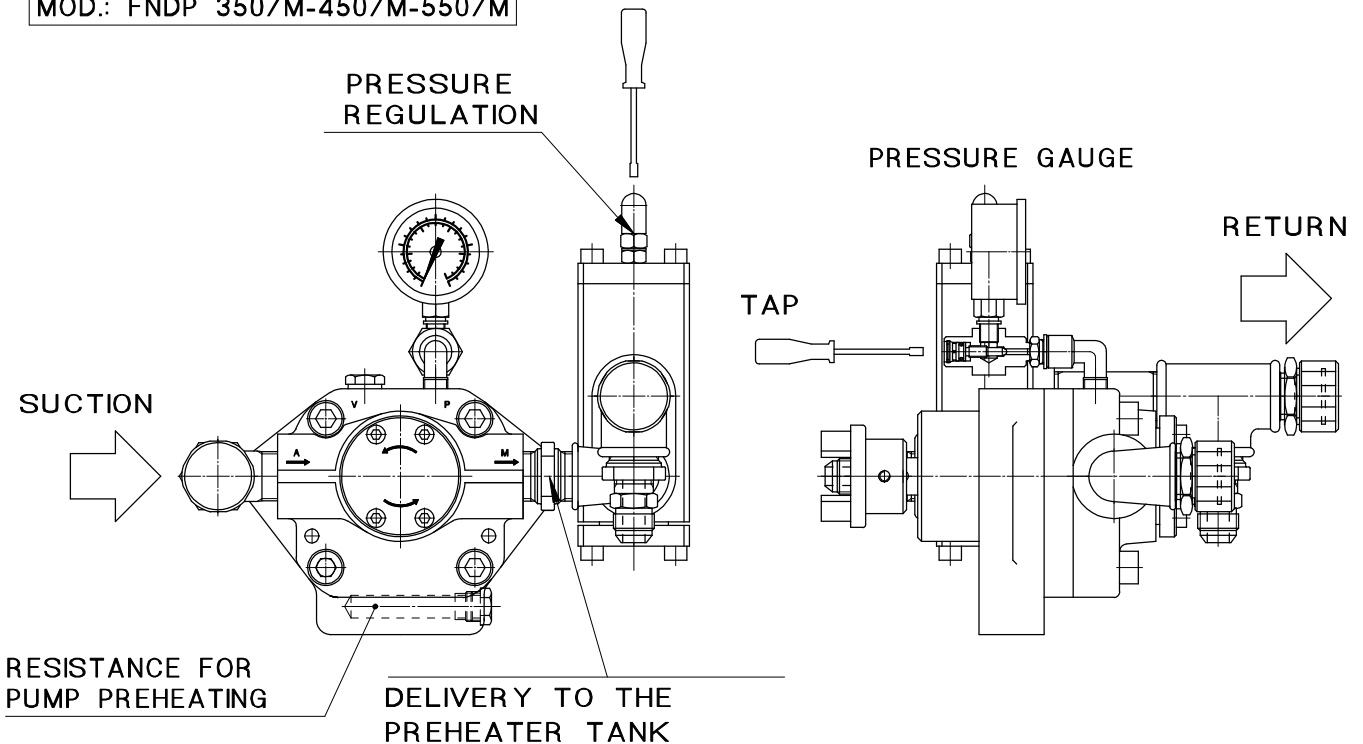
BE CAREFUL: After the connection of the electrical line, verify the rotation direction of motor-pump and motor-fan.

PRESSURE GAUGE

MOD.: FNDP 190/M-250/M



MOD.: FNDP 350/M-450/M-550/M



The fuel pump has to suck in the heavy-oil and send it under pressure (25-28 bar) to the preheater tank.

The pressure is regulated through a screwdriver by the pressure regulator.

The pressure gauge is needed to control the delivery pressure to the preheater tank.

NOTE: after control, close the tap.

The resistance is used to keep the pump hot during the pause and therefore to make easier the starting: the resistance remains always inserted.

The return pipe is needed to by-pass the excess of heavy oil.

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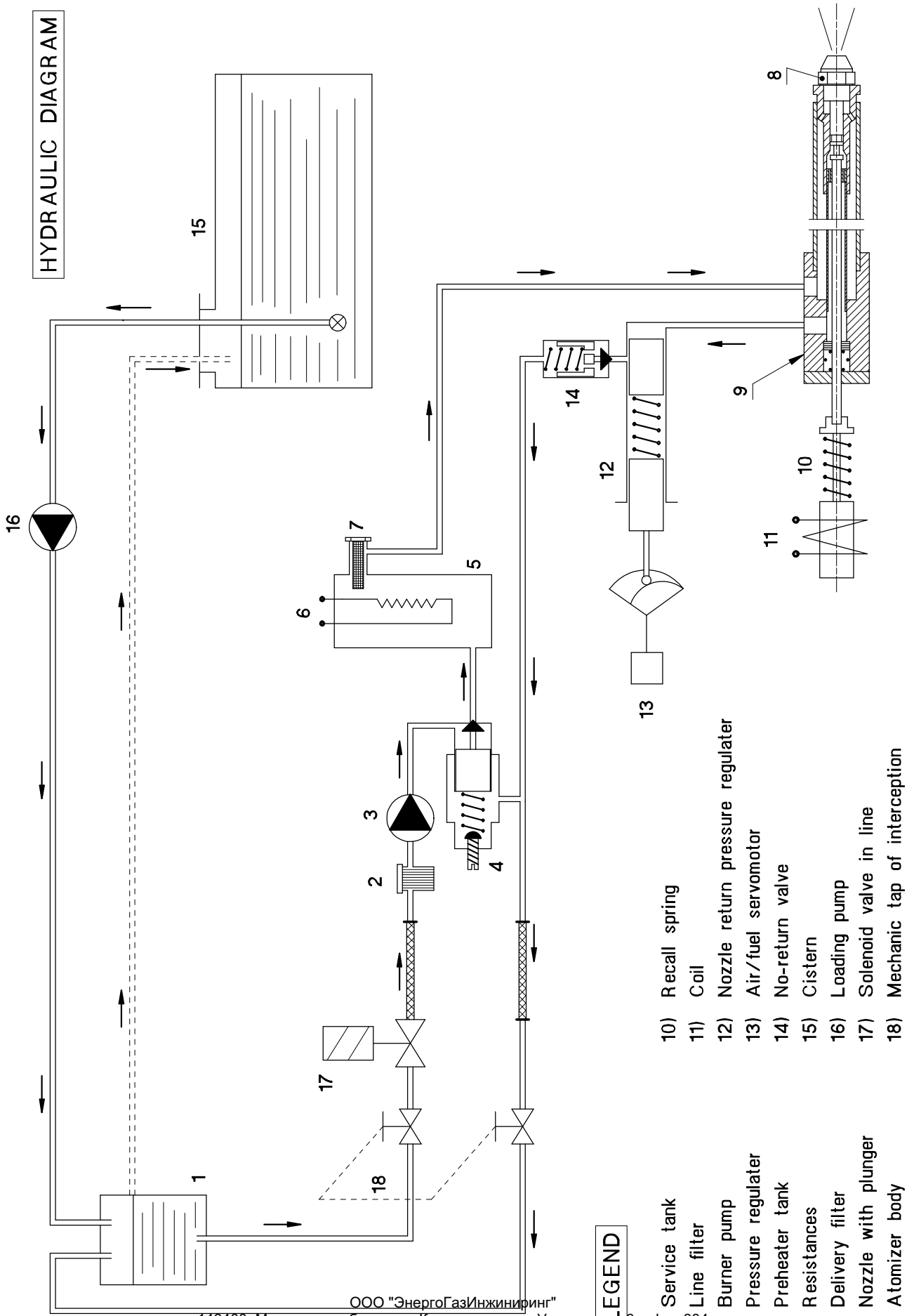
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HYDRAULIC DIAGRAM



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HIGH-LOW FLAME OR MODULATING
HEAVY OIL PROGRESSIVE BURNERS
[SERVOMOTOR CONTROLLI MDL 24]

MOD.: FNDP 190/M-250/M
FNDP 350/M-450/M-550/M

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BURNER OPERATION

At the closing of the thermostats, the SERVOMOTOR AIR-HEAVY OIL closes the air at minimum (calibration of red cam 4). The servomotor, by taking place at minimum, makes the contact of pale blue cam 7 close, which gives its consent to the burner starting.

NOTE: Verify that, with the air in minimum position, the cam 7 closes its electrical contact. (Example: cam 4 at 0°-cam 7 at 5°).

1st PHASE: PRE-VENTILATION AND PRE-WASHING

At start, the burner makes a pre-ventilation of about 25-30 secs. In this phase the burner pump makes a pre washing of the hydraulic circuit and the nozzle plunger remains closed because the COIL remains unexcited.

2nd PHASE: 1st STAGE IGNITION AT MINIMUM

After the pre-ventilation phase, the COIL gets excited and releases the nozzle plunger and the fuel comes out atomized and is ignited by the electric arc generated by the ignition transformer.

3rd PHASE: OPERATION AT MAXIMUM

After about 20 secs from ignition, the control-box (LAL 1.25) gives tension to the air servomotor, which gradually opens itself (opening run: about 30 secs.) and reaches the maximum value, sated by the cam 5.

When the pressure or the temperature set up on the device is reached, the servomotor starts closing and in this way the modulating action, proportional to the calibration value, start.

NOTE: The air pressure-switch (PA) controls the fan pressure and therefore, if in any moment the motor should not start or gets locked-out for lock of phase, this pressure switch disexcites the COIL and therefore the nozzle plunger closes and the burner goes immediately into lock-out.

4th PHASE: POST-VENTILATION

At the burner stop (opening of thermostats TL or TS), the pump motor MP stops and the coil EM gets disexcited and the post-ventilation of motor MV continues for about 15 secs.

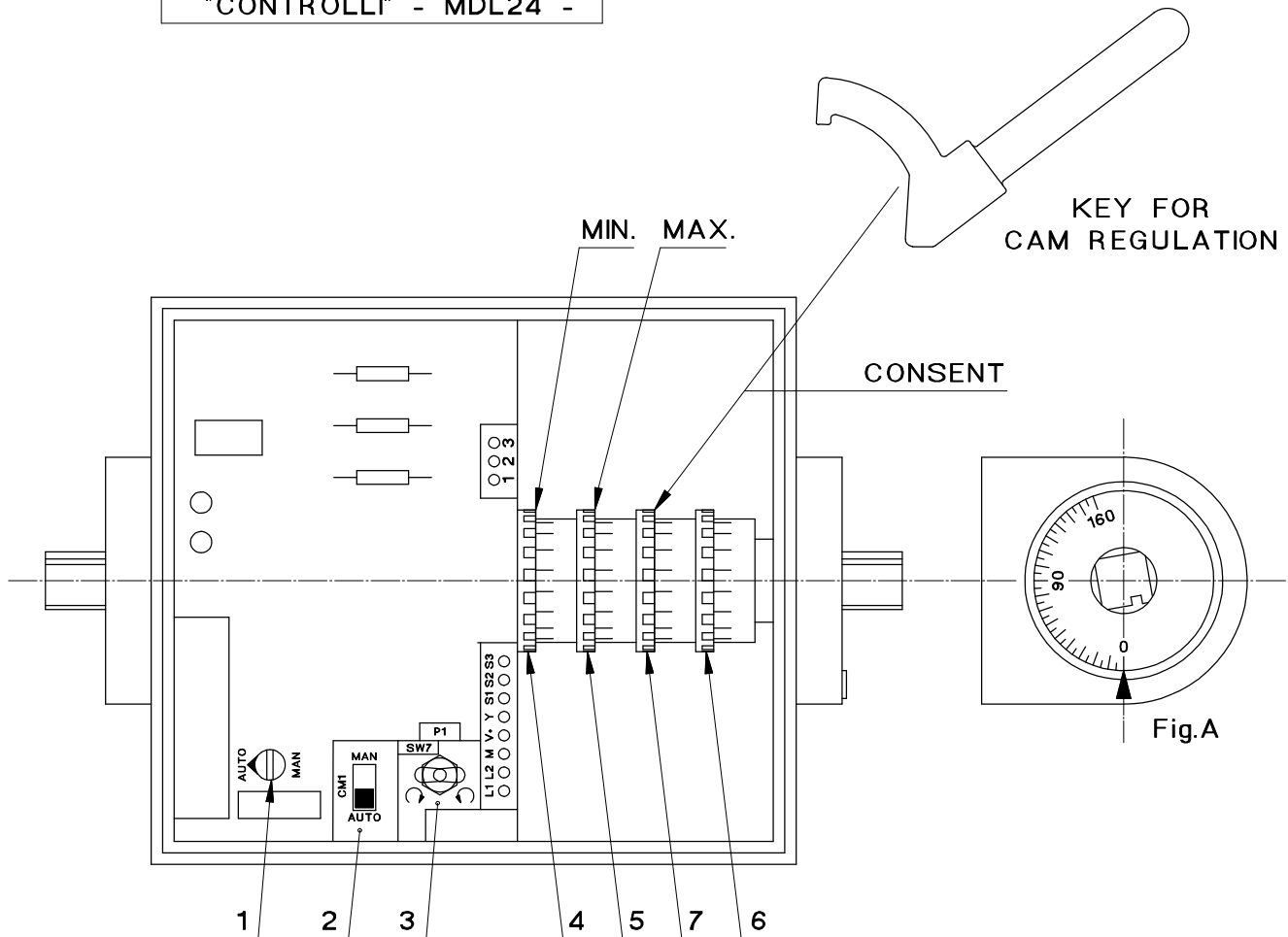
LOCK-OUT

The control-box stops the burner in safety lock-out in the following cases:

- a- Within 5 secs from coil excitement if the fuel does not ignite.
- b- If during the operation there is the lack of flame, there is the immediate lock out \leq 1sec.
- c- If during the operation there is the opening of the air pressure-switch contact, there is the immediate lock-out \leq 1 sec.



SERVOMOTOR CALIBRATION
"CONTROLLI" - MDL24 -



LEGEND

- 1) Shaft release for movement verification. Pos. AUTO: connected gears
Pos. MAN: disconnected gears
- 2) Commutator: AUTOMATIC - MANUAL
(You must set in MANUAL when you want to operate with the switch 6.)
- 3) Manual command of opening and closing.
- 4) Cam of MIN (MINIMUM OPENING OF AIR SHUTTER 0°)
- 5) Cam of MAX (MAXIMUM OPENING OF AIR SHUTTER 90°)
- 6) Release.
- 7) Consent to starting.



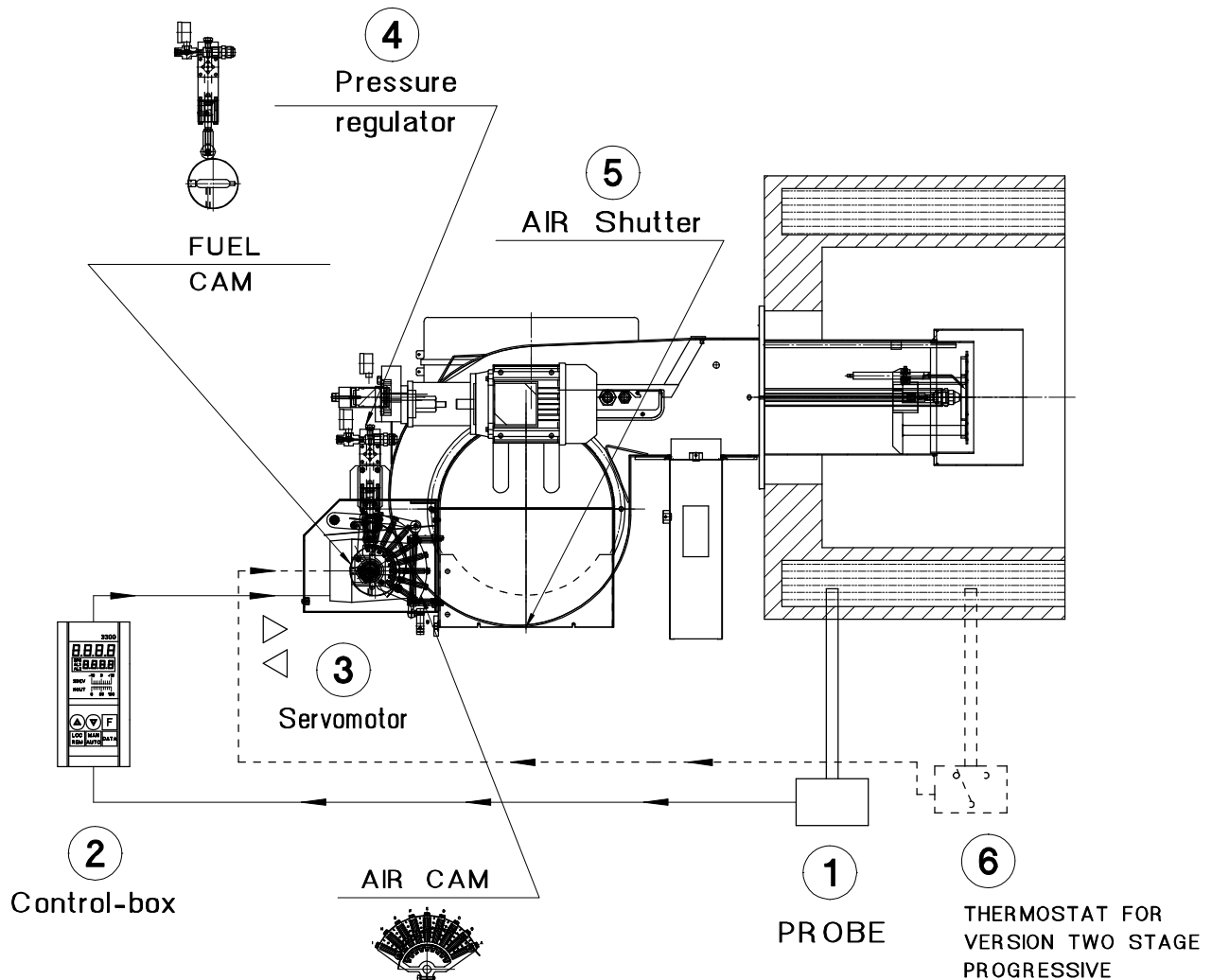
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OPERATION PRINCIPLE



MODULATING VERSION

The probe [1] notices the temperature (or pressure) and transmits it to the control-box [2], which, dependent upon the fixed value, commands the servomotor [3]. The servomotor makes rotate contemporary both the fuel cam and the air cam, obtaining in this way a progressive variation of the flame potentiality related to the user requirement. The fuel variation is arranged by the pressure regulator [4], while the variation of the air quantity is arranged by the shutter [5].

VERSION AT TWO STAGE PROGRESSIVE

In the version two stage progressive (high-low flame) the thermostat (or pressure switch) [6] at three contacts commands directli the servomotor [3].

CALIBRATION OF AIR/FUEL

The servomotor operates directly on the cams "at variable profile":

FUEL CAM: operates on the pressure regulator.

AIR CAM: operates on the air shutter.

ATTENTION: the servomotor is already calibrated at on factory and makes a fixed rotation 0-90°.
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This calibration must not be manomitted.



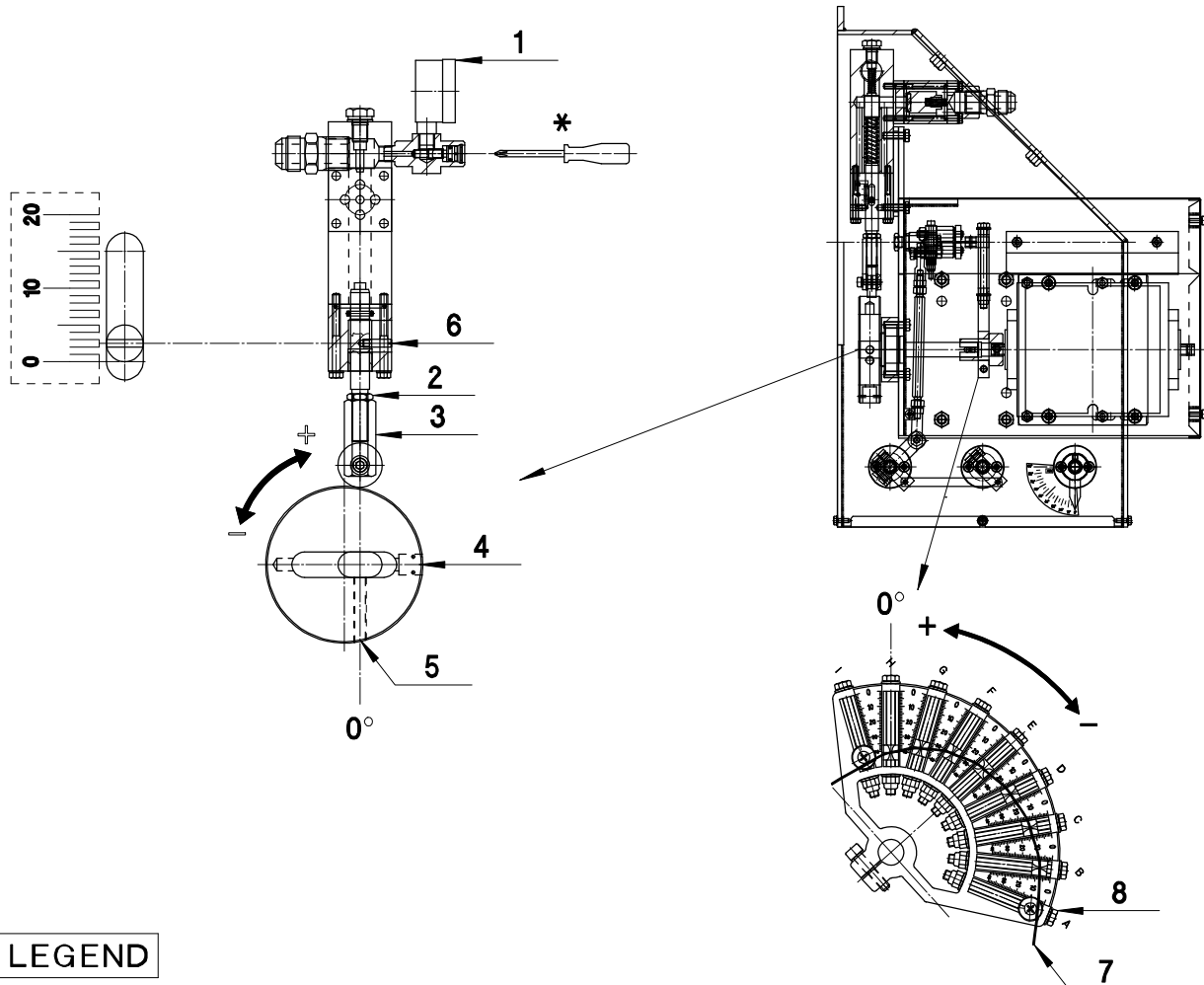
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FNDP 350/M-450/M-550/M

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REGULATOR OF RETURN PRESSURE TO NOZZLE THE POSITION OF MINIMUM POWER



LEGEND

- 1 : Pressure gauge for the control of return pressure to the nozzle.
- 2 : Nut.
- 3 : Nut of bearing support for return pressure regulation at minimum power.
- 4 : Regulation of the cam for the determination of the return pressure for maximum power.
- 5 : Screw for cam locking.
- 6 : Index of the pressure regulator travel.
- 7 : Cam with variable profile for air calibration.
- 8 : Screw of regulation of the cam with variable profile for air calibration.

NOTE: After of regulation of the cam with variable profile for air calibration.

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ISTRUCTION FOR MODULATER REGULATION

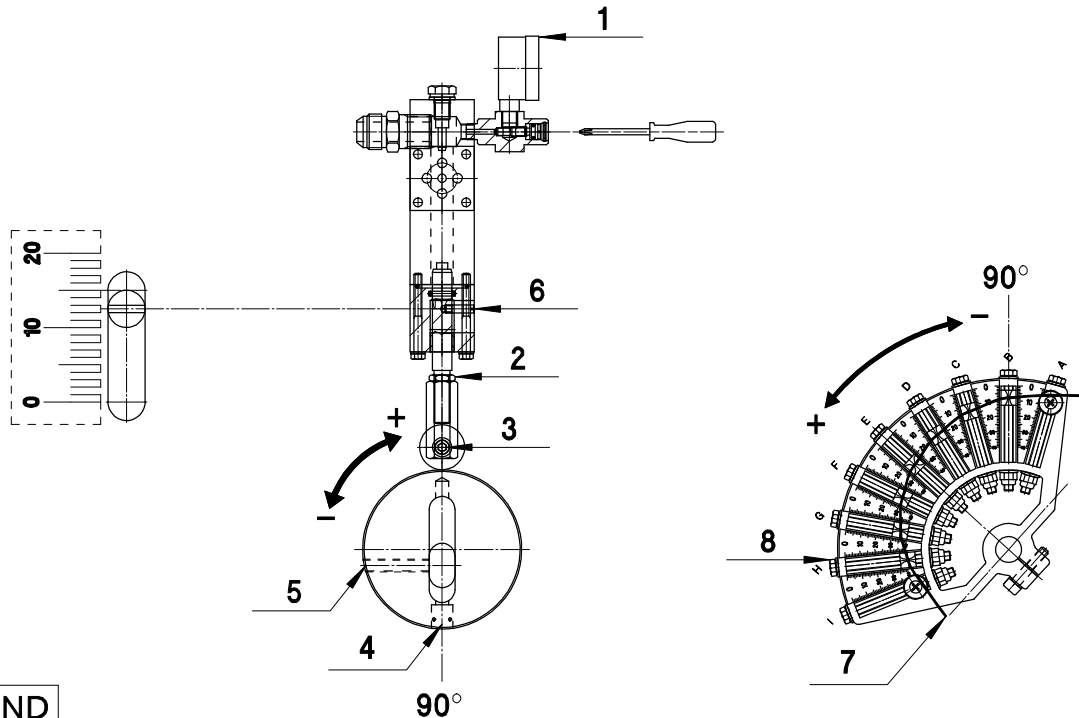
- 1) Turn on the burner and remain in minimum power.
Verify that the pressure at the manometer return (1) is minimum 3bar if you use Bergonzo nozzles, or minimum 7bar if you use Fluidics nozzles.

- 2) Make the regulation of pressure by acting on the nut (3), then block the nut by operation on the nut (2).

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REGULATOR OF RETURN PRESSURE TO NOZZLE
THE POSITION OF MINIMUM POWER



LEGEND

- 1 : Pressure gauge for the control of return pressure to the nozzle.
- 2 : Nut.
- 3 : Nut of bearing support for return pressure regulation at minimum power.
- 4 : Regulation of the cam for the determination of the return pressure for maximum power.
- 5 : Screw for cam locking.
- 6 : Index of the pressure regulator travel.
- 7 : Cam with variable profile for air calibration.
- 8 : Screw of regulation of the cam with variable profile for air calibration.

NOTE: After of regulation of the cam with variable profile for air calibration.

*

ISTRUCTION FOR THE MODULATER REGULATION

- 3) Go to the position of maximum power and verify the pressure on the return through the manometer 1. The maximum capacity of the nozzle is obtained with pressure of about 20 bar for Bergonzo nozzles, and about 20bar for Fluidics nozzles.
- 4) Make the eventual regulation of pressure by acting on the screw (4) and the nut (3). It is important to divide the increase or decrease of pressure between the two regulation (3-4).
Example: increase by 0.5bar with the screw (4) and increase by 0.5bar with the nut (3) and viceversa if you have to decrease.
- 5) It is important to check that th increase of pressure on the return takes place for the complete duration of the servomotor opening and stops only when this letter stops. In case of advanced reachment of the maximum pressure before the complete opening of servomotor, operate as follows:
 - reach the complete opening and act on the regulations (3-4) until you have a little reduction of pressure; then return to the minimum power and verify again the pressure. In case that the pressure of minimum does not come back repeat the regulation from point (1) (fg.7).



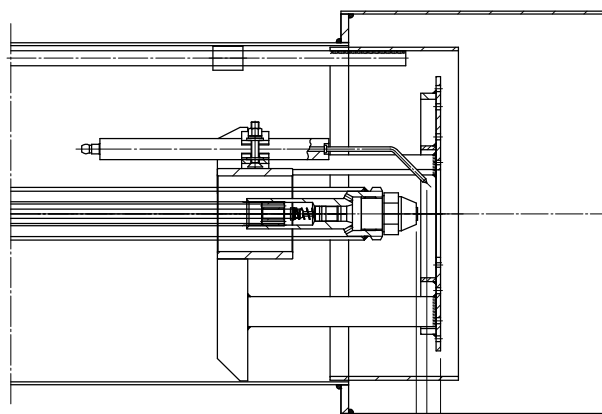
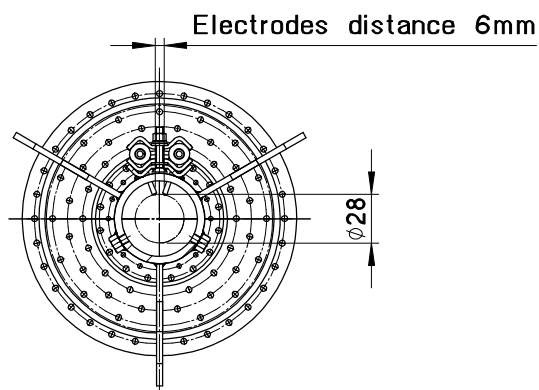
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ELECTRODES CORRECT POSITIONING



Disc-Electodes distance 6mm

Disc-Nozzle distance 15mm

MAINTENANCE

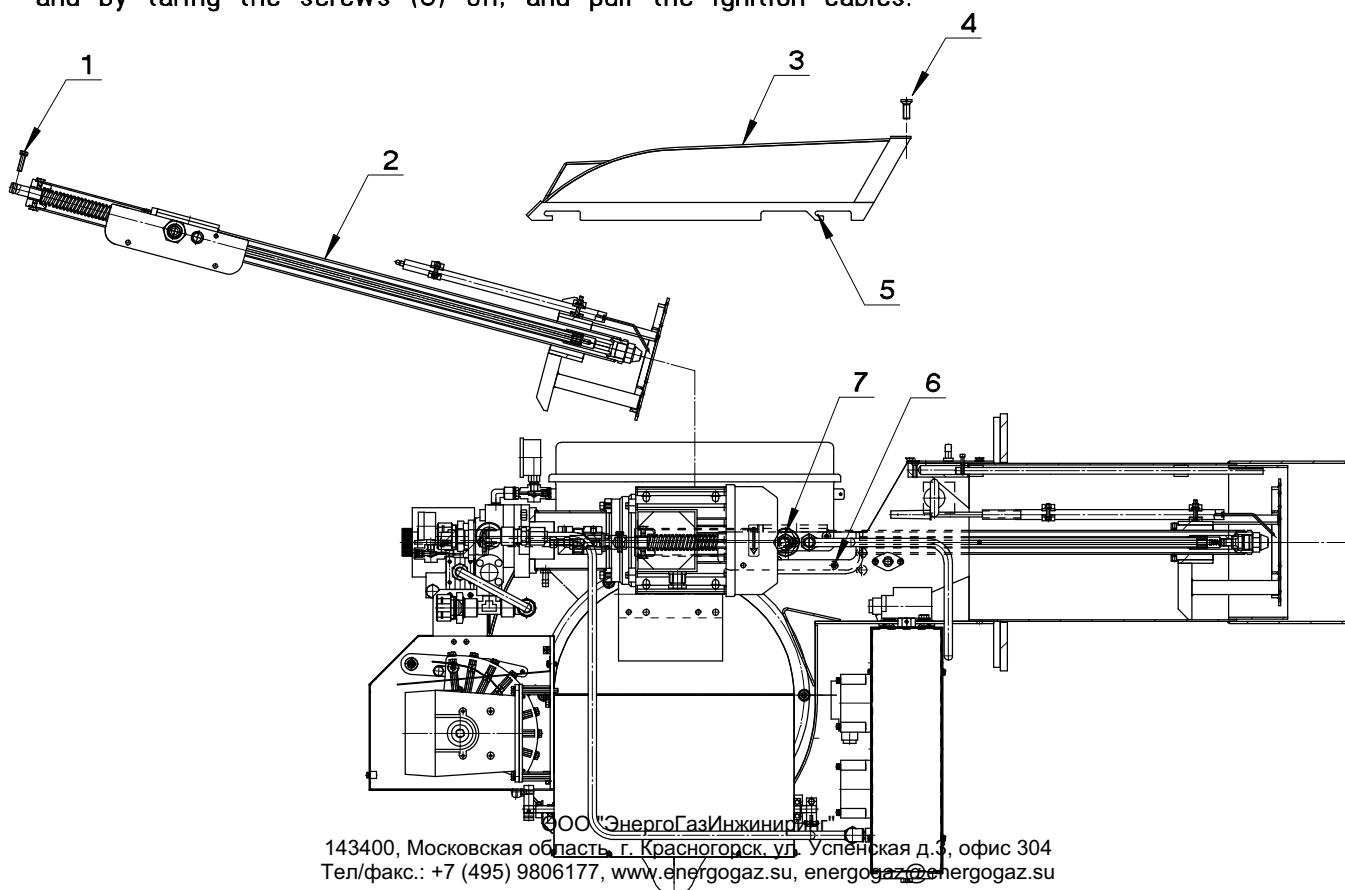
Periodically (every 500-1000 operating hours approx.) it is necessary to execute:

- 1° -Cleaning of cartridge filters placed on the preheater tank: take care not to break the OR ring.
- 2° -Cleaning of all the suction filters including that one inside the pump.
- 3° -Clean the electrical resistances (heaters). An excessive scaling considerably reduces the fuel oil heating thus causing a worse combustion and a worse efficiency.
- 4° -Carefully clean the disc blades and the air shutter in the air intake.
- 5° -Every 2000 operating hours replace the nozzles.

COMBUSTION HEAD EXTRACTION

The combustion head can be taken-out without removing the burner from the boiler:

- Take the lid (3) off, by loosening the 4 screw (5) and by taring the 2 screw (4) off.
- Take out the head group (2) and by taring the screw (1) off, by loosening the nuts (7) and by taring the screws (6) off, and pull the ignition cables.



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