

# RADIANT TUBE BURNERS

## RT SERIES

### FEATURES

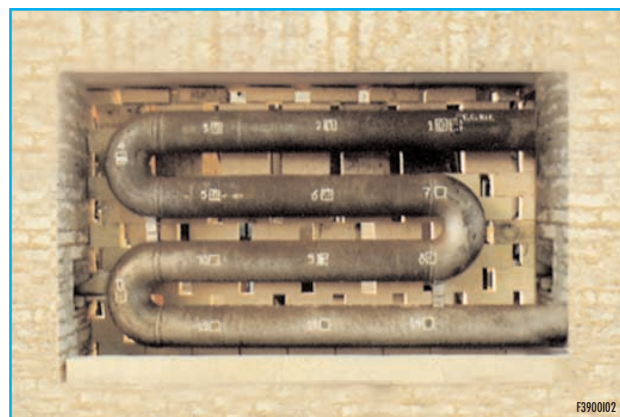
- Mixer body: cast iron G25
  - Gas inlet body: cast iron G25
  - Flame tube: AISI304 / AISI310
  - Nozzle: AISI310
  - Fixing flange: iron
  - Pre-heated air: up to 450°C
  - Optional refractory block, max. temperature: 1750°C
  - Capacity range: 30 to 300 kW
  - Air and gas pressure at burner: 45 mbar
  - Adequate to different types of gas: CH<sub>4</sub>/L.P./propane/etc.
  - Turndown range: 4 ÷ 1
  - Excellent flame stability: excess air  
excess fuel  
on ratio firing
- Low NO<sub>x</sub> level.
  - Low noise level.
  - Easily replaced electrodes.
  - Separated air and gas inlets, mixing at nozzle, no flashback.
  - Light-weight, small-sized compact burners supplied with micrometer type gas flow adjuster, spark electrode and flame rod, peepsight, calibrated orifice plate flow meters and pressure plugs to measure air and gas flows.



F3900101

### APPLICATIONS

- High temperature immersed tubes in dip furnaces or in light alloy melting.
- Hardening furnaces.
- Cone or pit furnaces.
- Ferrous and synthetic material, glass and ceramic treating furnaces.
- Foodstuff ovens.



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## DESCRIPTION

The main feature of RT burners is the dual air mixing. The primary air mixes on the combustion head; the secondary air, guaranteed by holes on the flame tube, completes the mixing making the flame longer. This extends the life of the radiant tube and increase the heat transfer efficiency.

Calibration of RT burners is simplified by plugs for gas and air flow controls. Air-gas ratio usually used in radiant tube burners are 12÷1, 13÷1. RT burners may operate with cold air and preheated air up 450° C (by using heat exchangers) allowing up to a 25-30% of energy saving.

## INSTALLATION

RT burners may be mounted to operate in any position; installation is simplified by adjustable mounting flanges. Flexible connectors are recommended for air and gas connections to the burner to allow

slight movement or misalignment of piping and are required when preheated air is involved. Air and gas connections are Pyronics standard threaded, or welding flanges. They may be rotated by 90°.

## IGNITION AND FLAME DETECTION

Burner ignition is achieved by EN or WAND direct spark ignition electrode; a pilot burners may be supplied on request (only for the version listed on the table below). Flame detection is done by EN or

WAND electrode and, on request, a UV-2 ultraviolet scanner may be used. Flame detection systems are required on all burners operating at furnace temperatures below 750° C.

Catalog No.	Pilot burner ignition		Electrode ignition	
	Ignition	Detection	Ignition	Detection (*)
RT - 1	-	-	Wand	Wand
RT - 2	-	-	Wand	Wand
RT - 3	P42PBST-W/X	Wand	3EN / IS-4	3EN / IS-4
RT - 4	P42PBST-W/X	Wand	3EN / IS-4	3EN / IS-4
RT - 5	-	-	3EN / IS-4	3EN / IS-4

\* UV 2 Optional

## CAPACITY TABLE

Catalog No.	Air/Gas pressure mbar	Capacity kW @ 30 °C	Capacity kW @ 400 °C	Radiant tube diameter - mm
RT - 1	45	30	20	70 ÷ 114
RT - 2	45	70	46	90 ÷ 150
RT - 3	45	150	100	130 ÷ 165
RT - 4	45	200	140	150 ÷ 210
RT - 5	45	300	195	168 ÷ 250

Capacity referred to Air/Gas ratio 12÷1

## MAXIMUM RADIANT TUBE DISSIPATION

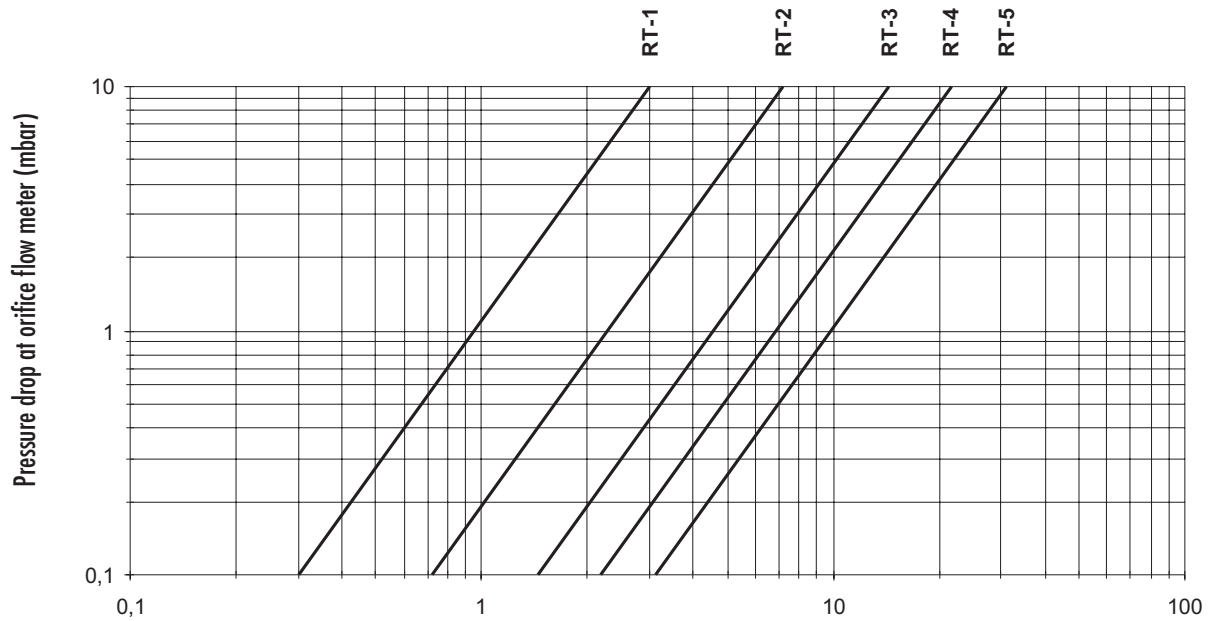
Operating temperature of furnace	Maximum dissipation in kW/m <sup>2</sup> AISI310	Maximum dissipation in kW/m <sup>2</sup> SiC
1150 °C	/	27,5
1100 °C	/	55
1050 °C	18,0	78
1000 °C	22,6	100
950 °C	27,1	120
900 °C	30,7	137,5
850 °C	34,8	152,5
800 °C	38,4	165
750 °C	41,5	175
700 °C	45,1	187,5

## HEAT EFFICIENCY

Operating temperature of furnace in °C	Straight and "U" non-recuperative tubes		Straight and "U" recuperative tubes		Recuperative tubes inlet-outlet on one side	
	Maximum dissipation rate	22.6 kW/m <sup>2</sup> dissipation rate	Maximum dissipation rate	22.6 kW/m <sup>2</sup> dissipation rate	Maximum dissipation rate	22.6 kW/m <sup>2</sup> dissipation rate
1050	42%	–	56%	–	64%	–
1000	43%	–	56%	–	65%	–
950	44%	45%	57%	58%*	67%	68%*
900	45%	47%	58%	60%	68%	70%
850	47%	49%	59%	61%	68%	70%
800	48%	51%	60%	63%	69%	72%
750	49%	52%	61%	64%	71%	74%
700	50%	54%	62%	65%	74%	74%

\* Experimental data - Other data are calculated.

## NATURAL GAS CAPACITY TABLE

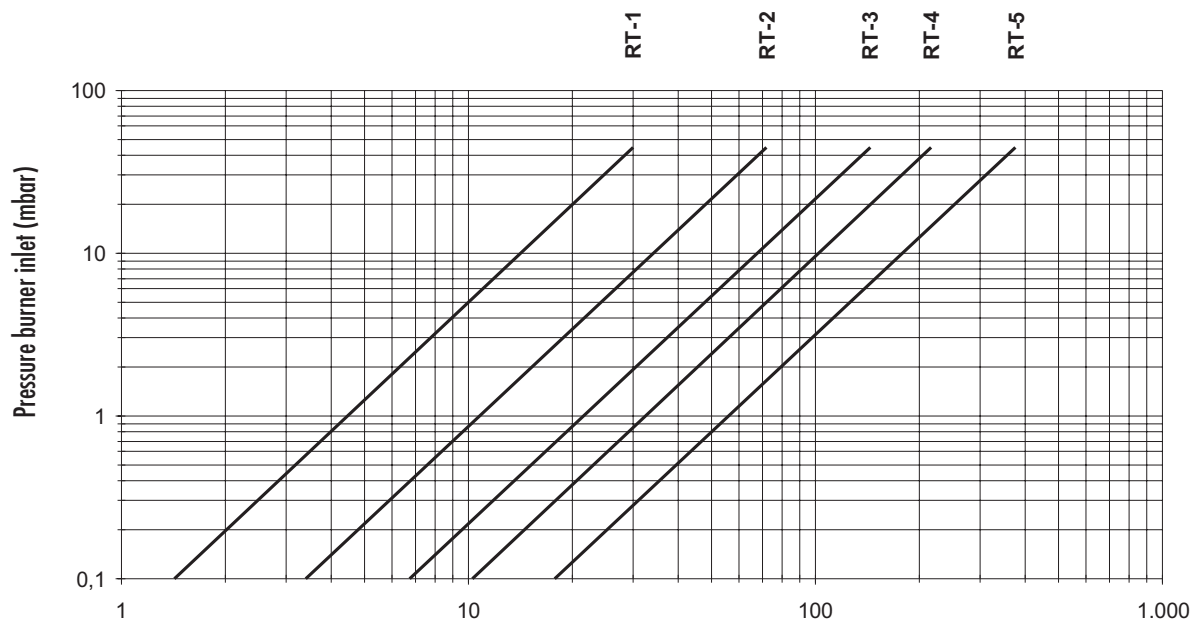


Natural gas flow @ 20°C P.S. = 0.6 (Nm³/h)

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N.B. Air/gas ratio in radiant tube burners are usually 12÷1, 13÷1.

## AIR CAPACITY TABLE

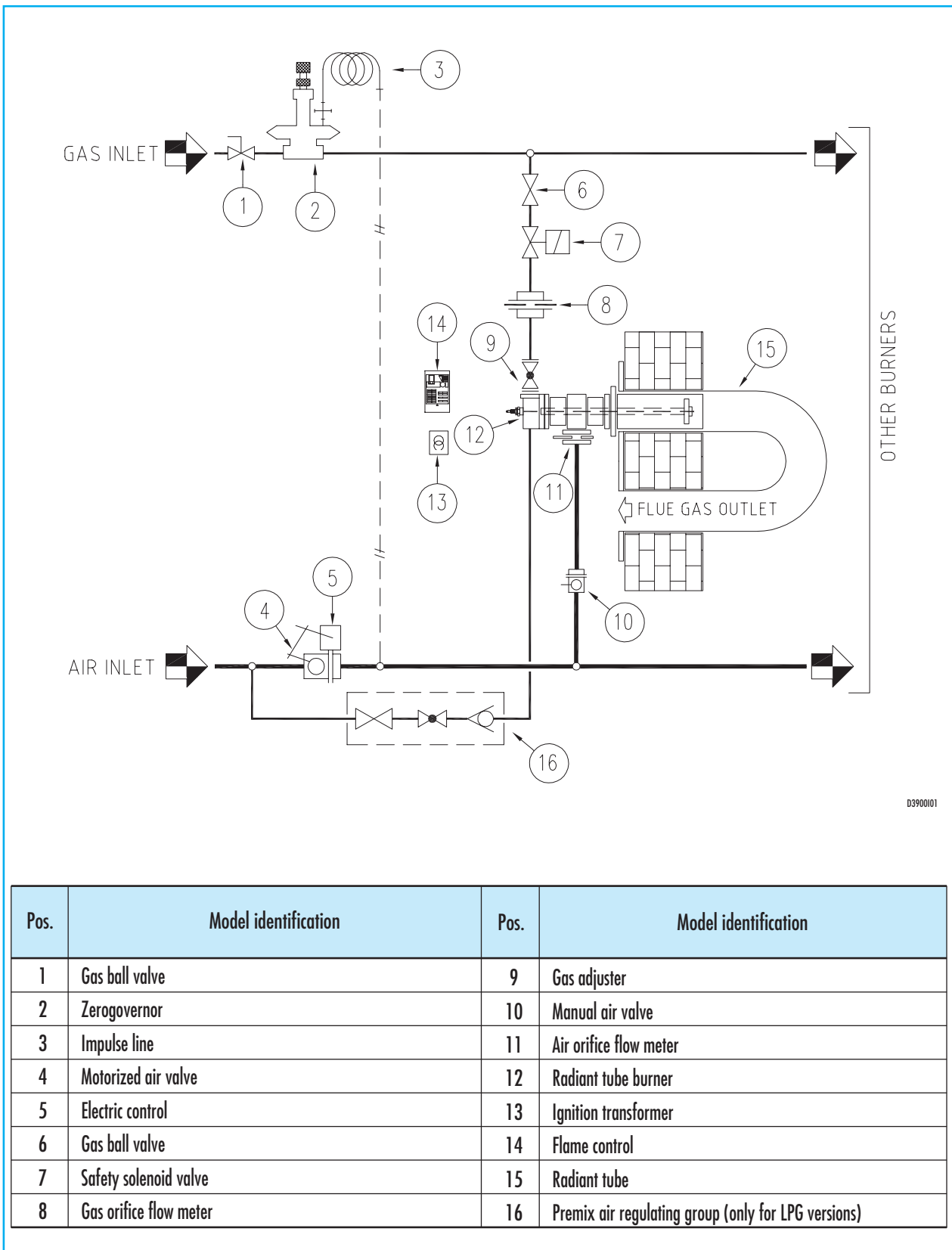


Air flow @ 30°C P.S. = 1 (Nm³/h)

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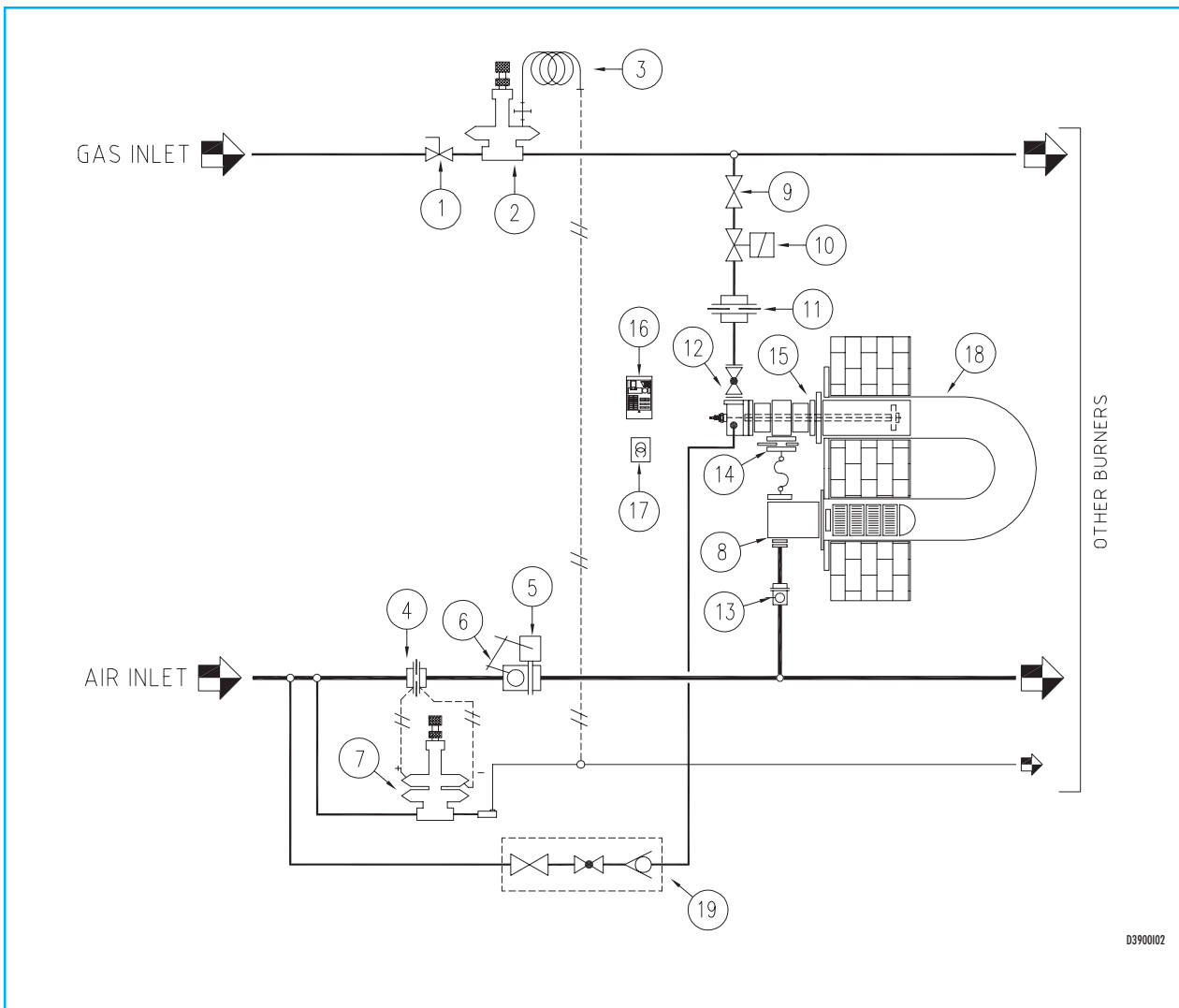
N.B. Air/gas ratio in radiant tube burners are usually 12÷1, 13÷1.

## FLOW CHART WITHOUT RECUPERATOR



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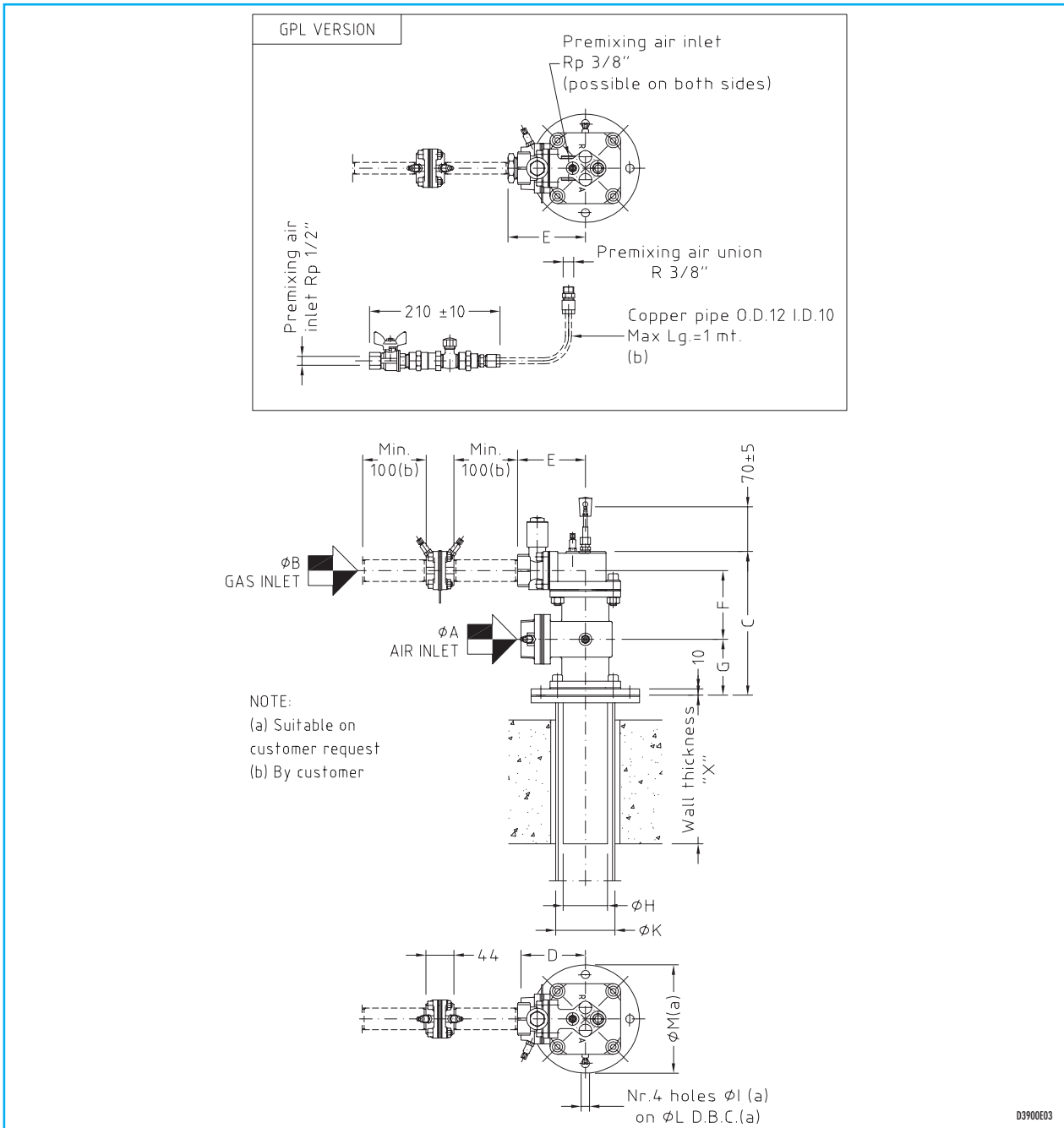
## FLOW CHART WITH RECUPERATOR



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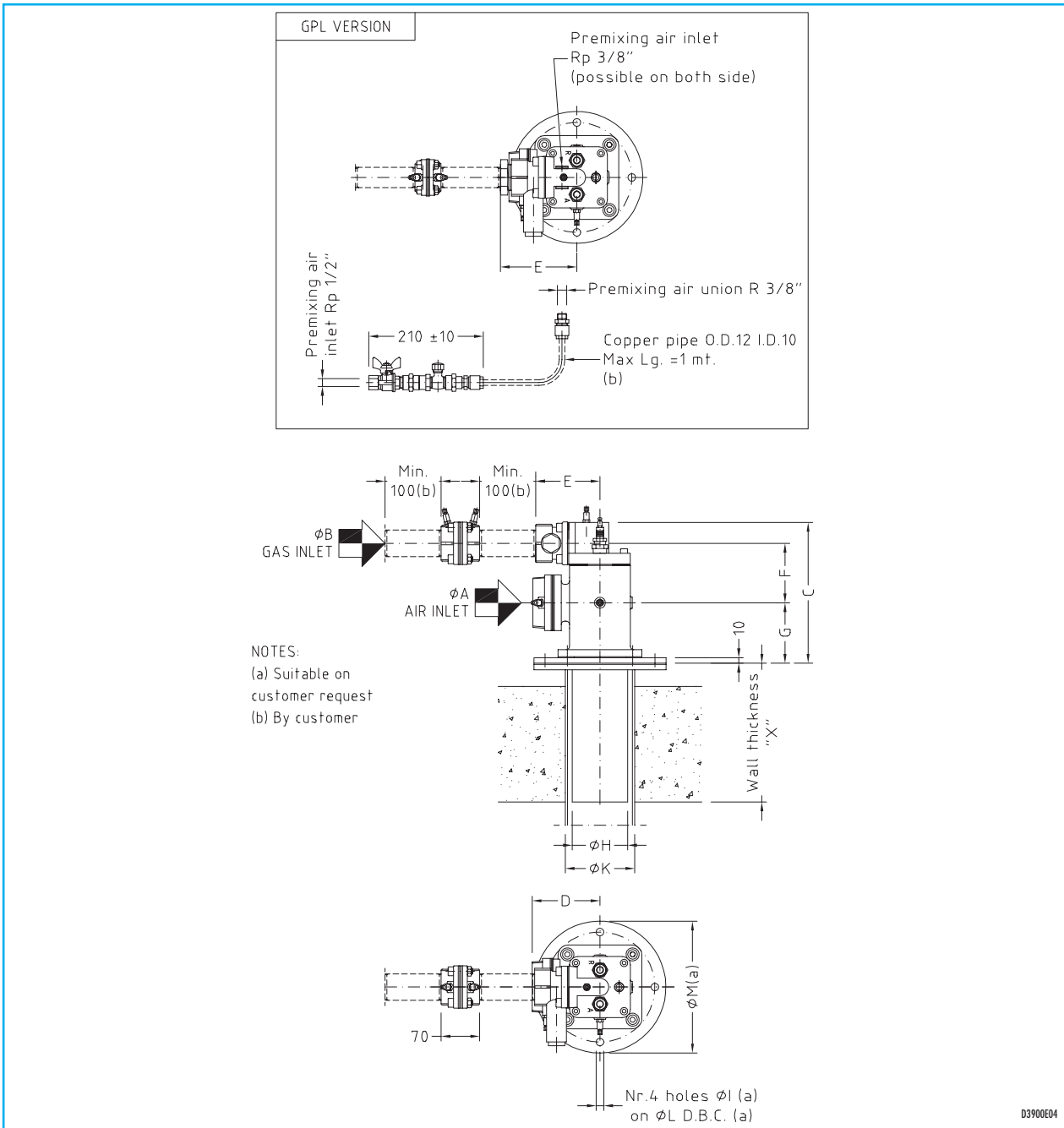
Pos.	Model identification	Pos.	Model identification
1	Gas ball valve	11	Gas adjuster
2	Zerogovernor	12	Gas orifice flow meter
3	Impulse line	13	Manual air valve
4	Air orifice flow meter	14	Air orifice flow meter
5	Electric control	15	Radiant tube burner
6	Motorized air valve	16	Flame control
7	Flow adjuster	17	Ignition transformer
8	Heat exchanger and flexible joint	18	Radiant tube
9	Gas ball valve	19	Premix air regulating group (only for LPG versions)
10	Safety solenoid valve		

DIMENSIONS (RT-1 / RT-2)



Model	ø A	ø B	C mm	D mm	E mm	F mm	G mm	H mm	I mm	L mm	M mm
RT-1-CH4	Rp 1.1/2"	Rp 1/2"	201	87	107	83	88	ø 48	ø 13	ø 120	ø 150
RT-1-GPL	Rp 1.1/2"	Rp 1/2"	201	87	107	83	88	ø 48	ø 13	ø 120	ø 150
RT-2-CH4	Rp 1.1/2"	Rp 3/4"	226	101	107	110	88	ø 70	ø 13	ø 140	ø 170
RT-2-GPL	Rp 1.1/2"	Rp 1/2"	226	101	122	110	88	ø 70	ø 13	ø 140	ø 170

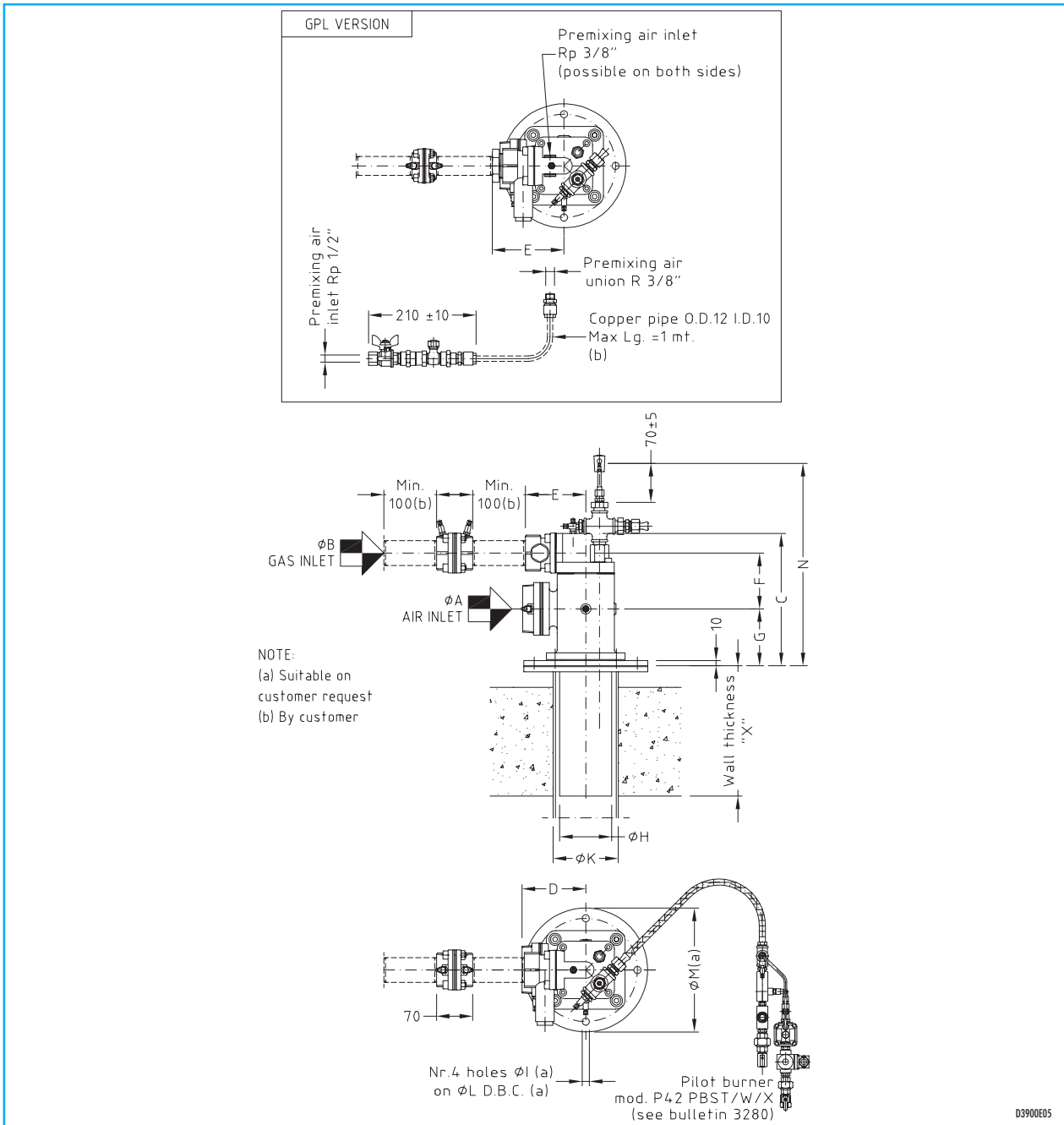
DIMENSIONS (RT-3 / RT-4)



Model	$\phi A$	$\phi B$	C mm	D mm	E mm	F mm	G mm	H mm	I mm	L mm	M mm
RT-3-CH4	Rp 2.1/2"	Rp 1"	240	122	107	100	110	$\phi 101$	$\phi 14$	$\phi 200$	$\phi 240$
RT-3-GPL	Rp 2.1/2"	Rp 3/4"	240	122	122	100	110	$\phi 101$	$\phi 14$	$\phi 200$	$\phi 240$
RT-4-CH4	Rp 2.1/2"	Rp 1.1/2"	256	122	117	108	110	$\phi 101$	$\phi 14$	$\phi 200$	$\phi 240$
RT-4-GPL	Rp 2.1/2"	Rp 1"	256	122	132	108	110	$\phi 101$	$\phi 14$	$\phi 200$	$\phi 240$

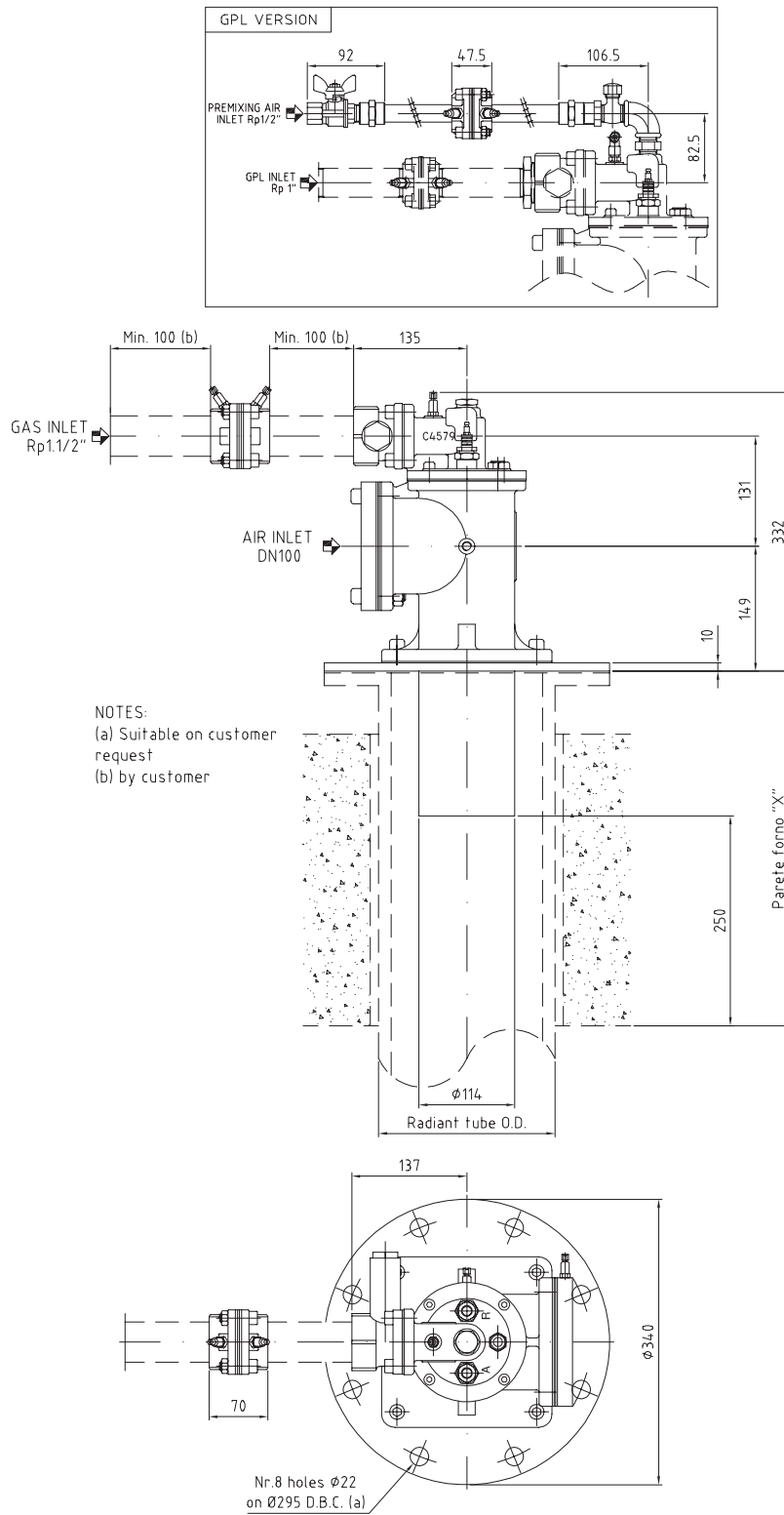


DIMENSIONS (RT-3-P / RT-4-P)



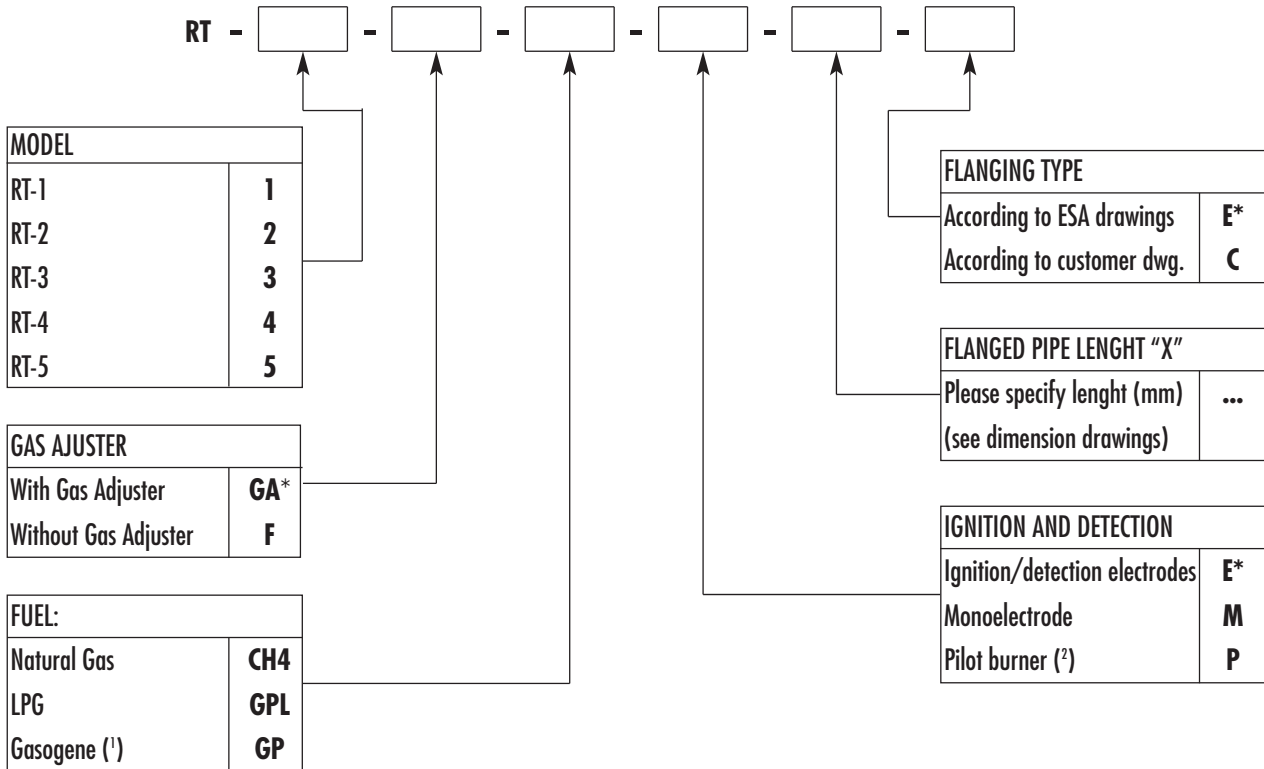
Model	ø A	ø B	C mm	D mm	E mm	F mm	G mm	H mm	I mm	L mm	M mm	N mm
RT-3-CH4-P	Rp 2.1/2"	Rp 1"	240	122	107	100	110	ø 101	ø 14	ø 200	ø 240	370
RT-3-GPL-P	Rp 2.1/2"	Rp 3/4"	240	122	122	100	110	ø 101	ø 14	ø 200	ø 240	370
RT-4-CH4-P	Rp 2.1/2"	Rp 1.1/2"	256	122	117	108	110	ø 101	ø 14	ø 200	ø 240	370
RT-4-GPL-P	Rp 2.1/2"	Rp 1"	256	122	132	108	110	ø 101	ø 14	ø 200	ø 240	370

## DIMENSIONS (RT-5)



D3900E06

ORDERING CODE - BURNERS



\* Standard configuration

Note:

- ¹ Special manufacture made according to gas features
- ² Available only for version 3 and 4 (see "Ignition and flame detection")



NOTE: Based on the company's policy aimed at a continuous improvement on product quality, ESA-PYRONICS reserves the right to bring changes to the technical characteristics of this device without previous notice. Our catalog updated to the latest version is available on our web site [www.esapyronics.com](http://www.esapyronics.com) and it is possible to download modified documents

WARNING: When operating, this combustion system can be dangerous and cause harm to persons or damage to equipment. Every burner must be provided with a protection device that monitors the combustion. The installation, adjustment and maintenance operations should only be performed by trained and qualified personnel.