

# RADIANT CONE FLAME BURNERS

## RAD-3, RAD-10, RAD-30 SERIES

### FEATURES

- Mixer body: cast iron G25
- Mounting plate: cast iron G20
- Gas pipe: AISI304
- Nozzle: AISI303
- Flame shield (only for RAD-3-SIK): silicon carbide
- Pre-heated air (only for RAD-30): up to 450°C
- Suitable for different types of gas: CH<sub>4</sub>/L.P./propane/etc.
- Max. temperature standard refractory block: 1750°C
- Capacity: 30 to 300 kW
- Excellent flame stability: excess air, excess fuel, on ratio firing
- Low NO<sub>x</sub> level
- Separated air and gas inlets, mixing at discharge point, no flash-back.

### APPLICATIONS

- Annealing furnaces
- Forging furnaces
- Glass furnaces
- Heating furnaces

### DESCRIPTION

Radiant cone flame burners model RAD-3, RAD-10 and RAD-30 are "nozzle mix" burners. Gas and air are mixed only at the point of discharge. High-velocity air flow produces a negative vortex at the refractory block mouth. Gas enters the vortex, mixing rapidly, producing intense combustion. The shape of the block and the vortex create a conic-shaped concentration that transmits heat mainly in radiant form.



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## INSTALLATION

RAD-3, RAD-10 and RAD-30 may be mounted to operate in any position, both on roof and on wall. The furnace refractory should be set to leave some room on all sides of the block. This space should be packed with flexible, refractory ceramic fiber protected by 20 mm of refractory concrete on all sides to allow for expansion of the walls (see technical note). On RAD-3-SIK burner, silicon carbide flame tube

usually is hanging in combustion chamber. Flexible connectors are recommended for air and gas connections at the burner to allow for slight movement or misalignment of piping and are absolutely essential when pre-heated air is involved. Air and gas connections are Pyronics standard, welding or threaded flanged type. They may rotate by 90°.

## IGNITION AND FLAME DETECTION

RAD-3 and RAD-10 must be ignited at low fire by a Wand electrode (supplied with the burner). Flame detection is made by the same electrode; we suggest installing a flame control device ESA ESTRO and a low impedance transformer (TAR-10). RAD-30 burner is supplied without any ignition and detection system, because it is arranged for mounting pilot burner P42PBST (please specify when order);

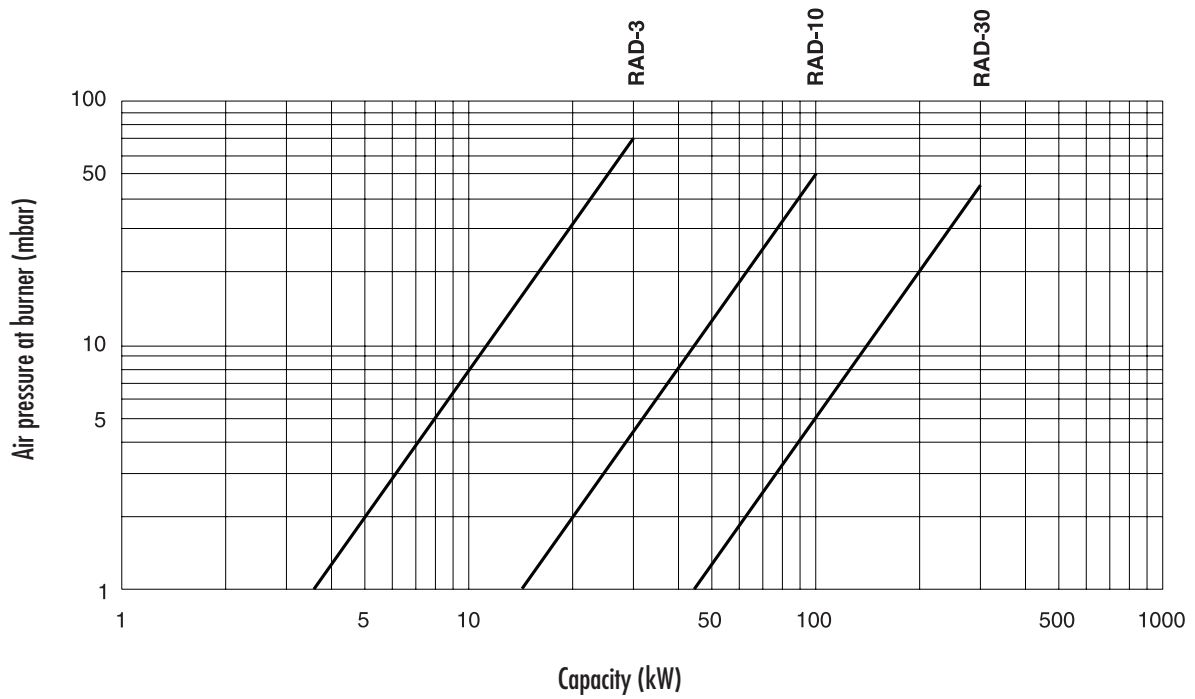
detection is done by a UV-2 ultraviolet scanner (to be ordered separately). Flame detection systems are required on all burners with furnace temperatures below 750°C.

Catalog No.	Pilot burner ignition		Electrode ignition	
	Ignition	Detection	Ignition	Detection
RAD - 3	(not available)	(not available)	Wand	Wand
RAD - 3 - SIK	(not available)	(not available)	Wand	Wand
RAD - 10	(not available)	(not available)	Wand	Wand
RAD - 30	P42PBST	UV-2	Wand	UV-2

CAPACITY TABLE

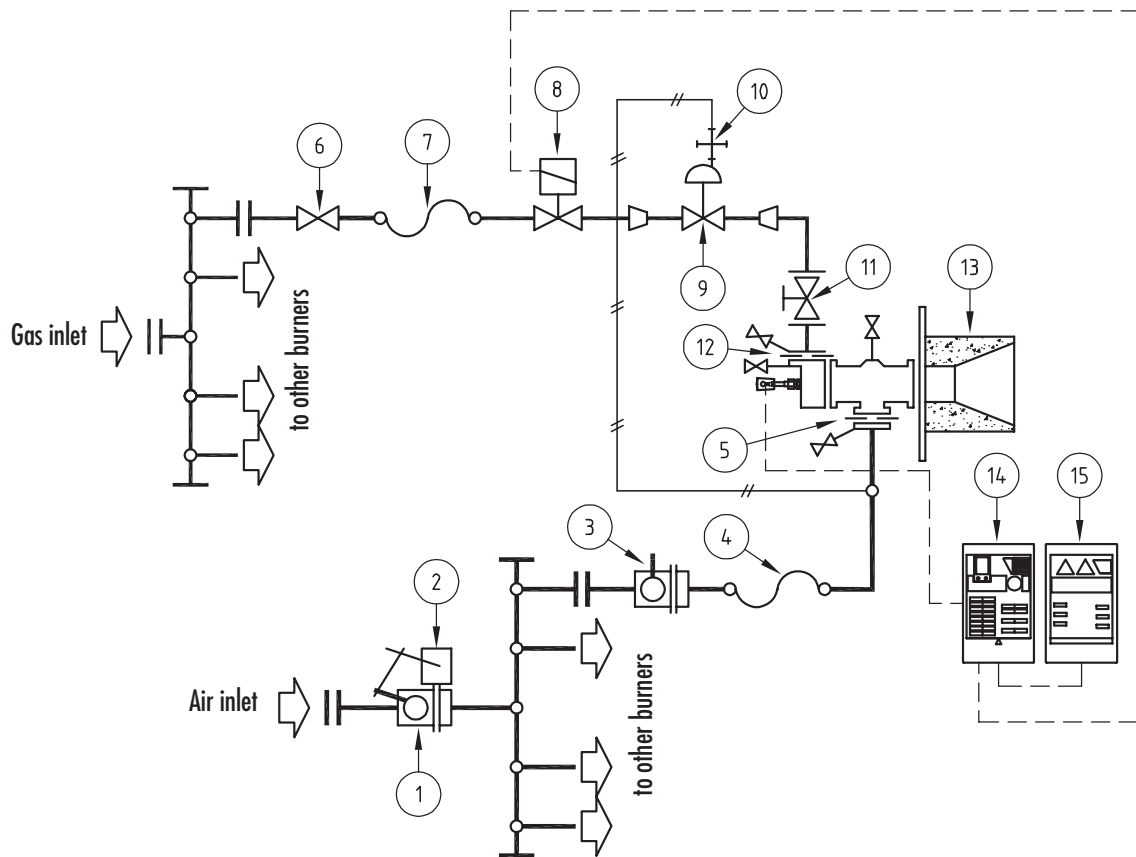
Catalog No.	Air/Gas pressure mbar	Capacity kW @ 30 °C	Capacity kW @ 400 °C
RAD - 3	70	30	-
RAD - 3 - SIK	70	30	-
RAD - 10	50	100	-
RAD - 30	45	300	200

CAPACITY GRAPH



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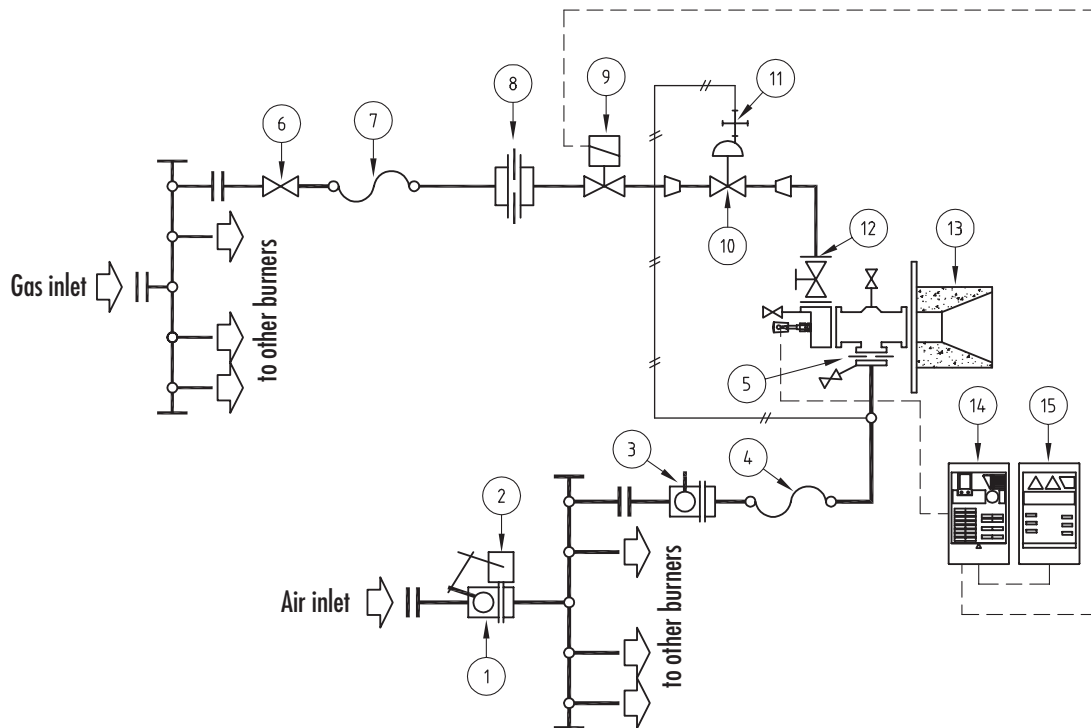
## FLOW CHART (RAD-3)



Pos.	Model Identification
1	Motorized air valve
2	Electric control
3	Manual butterfly air valve
4	Flexible pipe
5	Orifice flow meter for $\Delta P$ air
6	Main gas ball valve
7	Flexible pipe
8	Burner safety solenoid gas valve
9	Zero regulator
10	Impulse line
11	Gas adjuster
12	Orifice flow meter for $\Delta P$ gas
13	Burner
14	Flame control device
15	Box with ignition transformer

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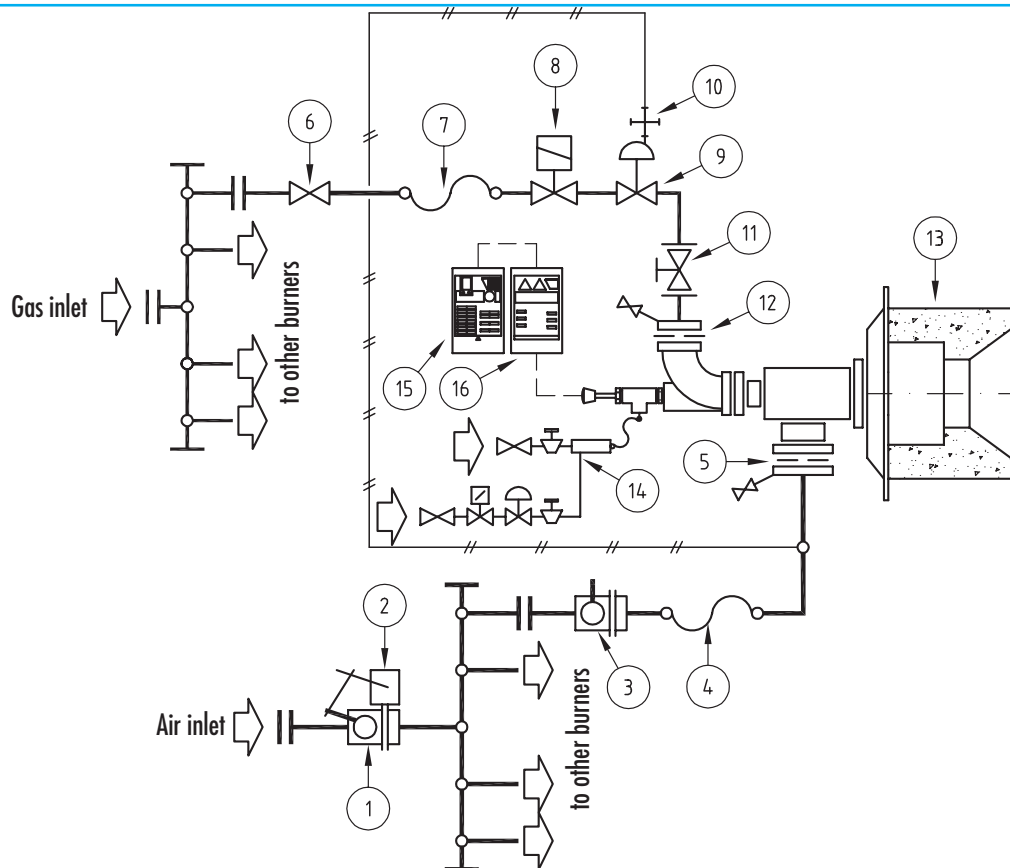
## FLOW CHART (RAD-10)



Pos.	Model Identification
1	Motorized air valve
2	Electric control
3	Manual butterfly air valve
4	Flexible pipe
5	Orifice flow meter for $\Delta P$ air
6	Main gas ball valve
7	Flexible pipe
8	Orifice flow meter for $\Delta P$ gas
9	Burner safety solenoid gas valve
10	Zero regulator
11	Impulse line
12	Gas adjuster
13	Burner
14	Flame control device
15	Box with ignition transformer

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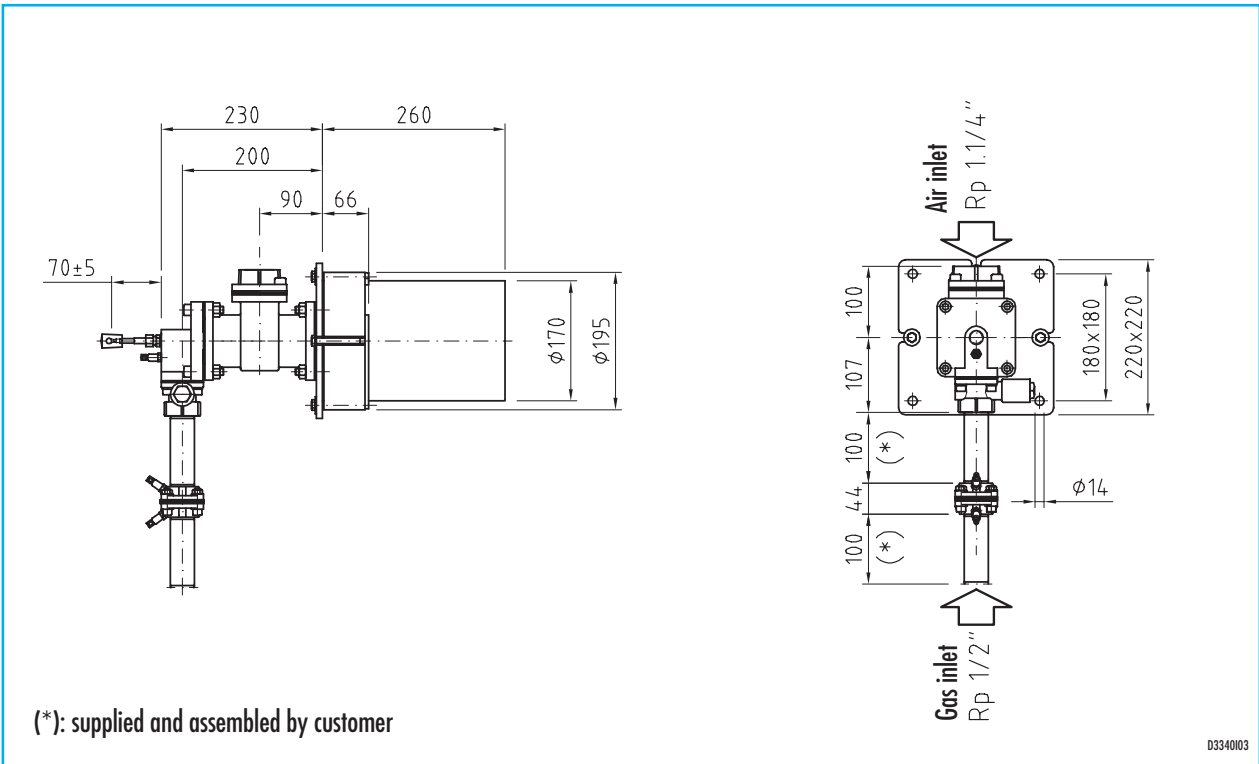
## FLOW CHART (RAD-30)



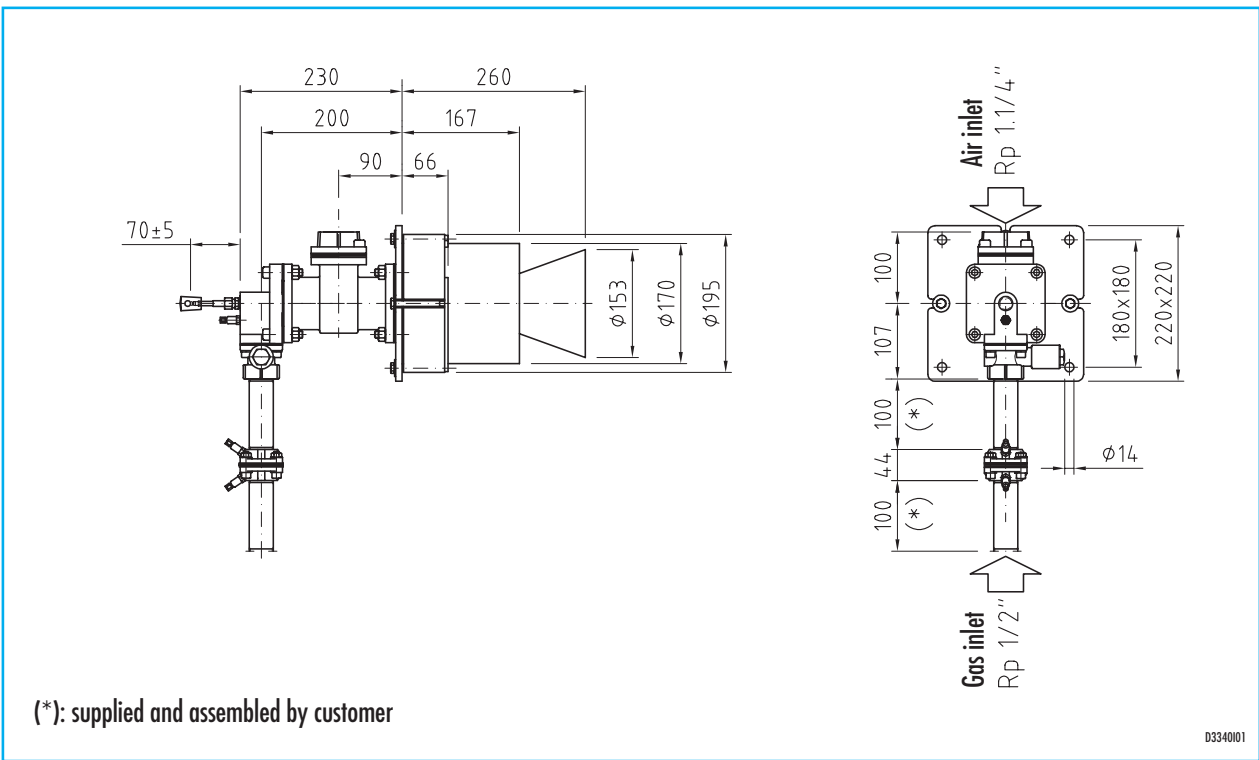
Pos.	Model Identification
1	Motorized air valve
2	Electric control
3	Manual butterfly air valve
4	Flexible pipe
5	Orifice flow meter for $\Delta P$ air
6	Main gas ball valve
7	Flexible pipe
8	Burner safety solenoid gas valve
9	Zero regulator
10	Impulse line
11	Gas adjuster
12	Orifice flow meter for $\Delta P$ gas
13	Main burner
14	Pilot burner
15	Flame control device
16	Box with ignition transformer

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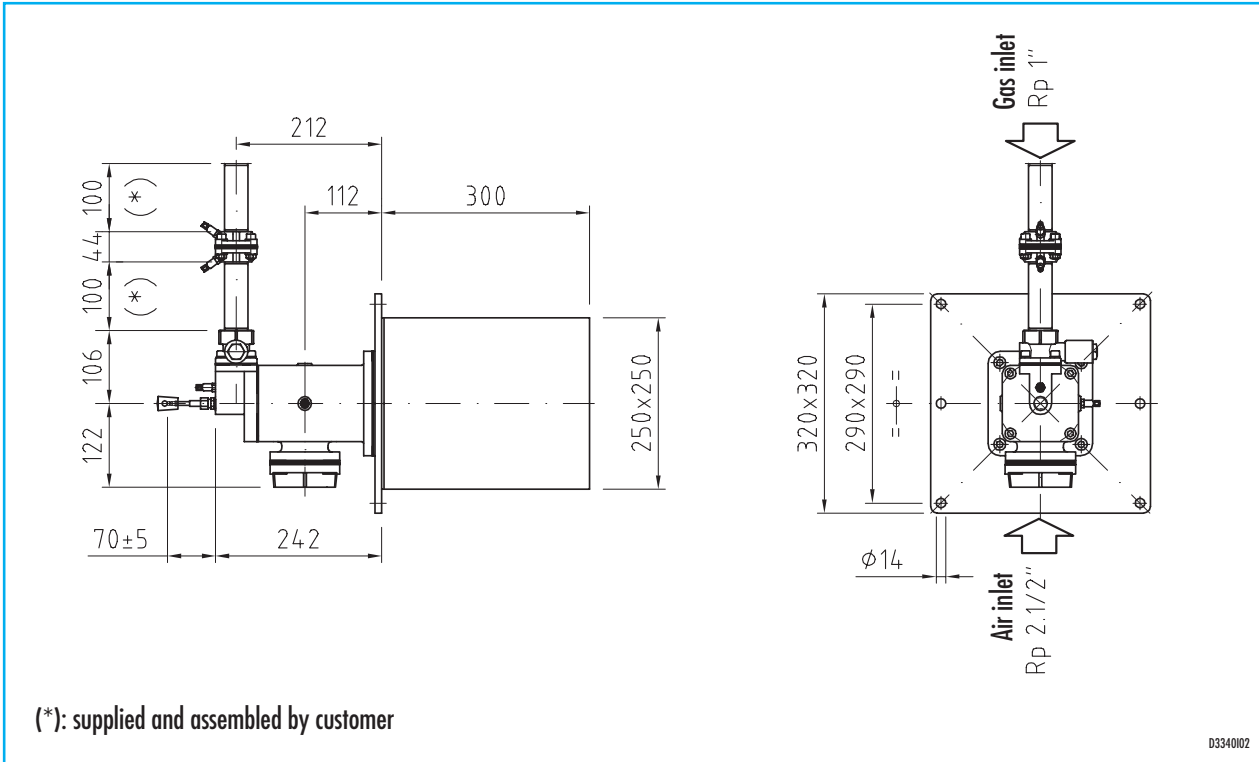
DIMENSIONS (RAD-3)



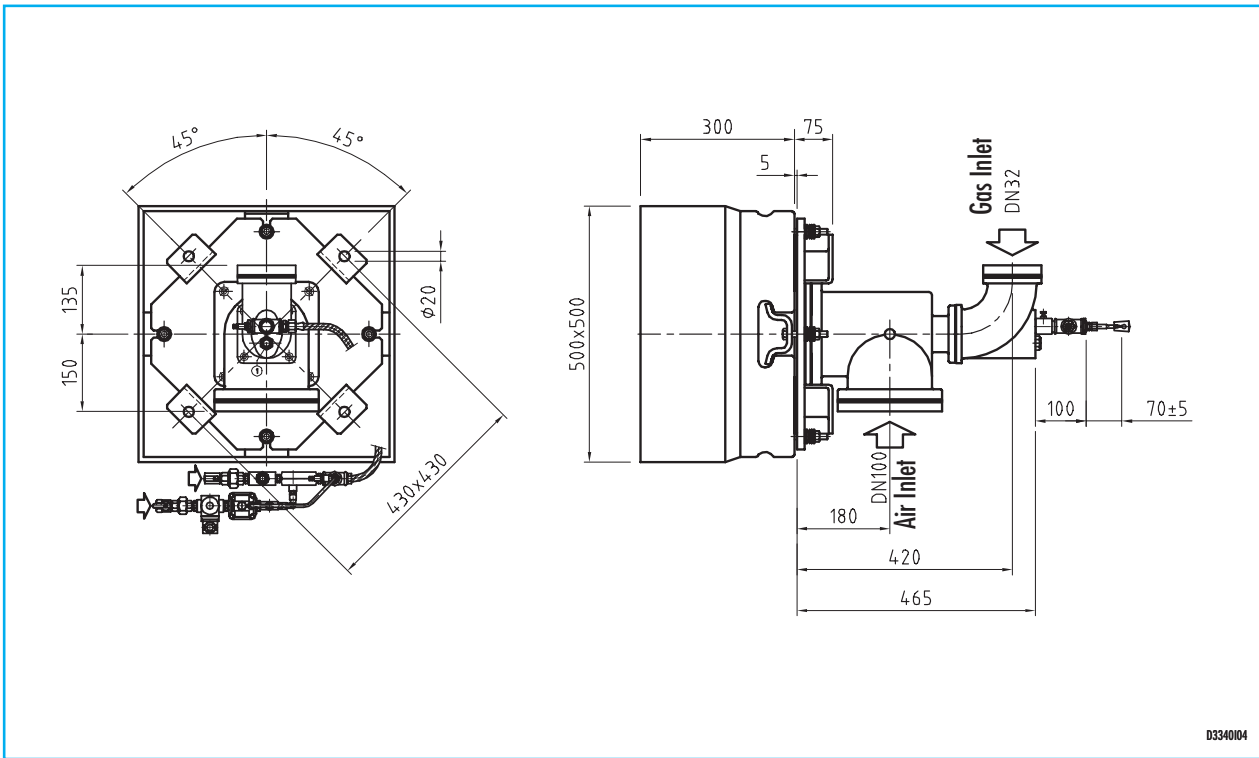
DIMENSIONS (RAD-3-SIK)



DIMENSIONS (RAD-10)



DIMENSIONS (RAD-30)



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.