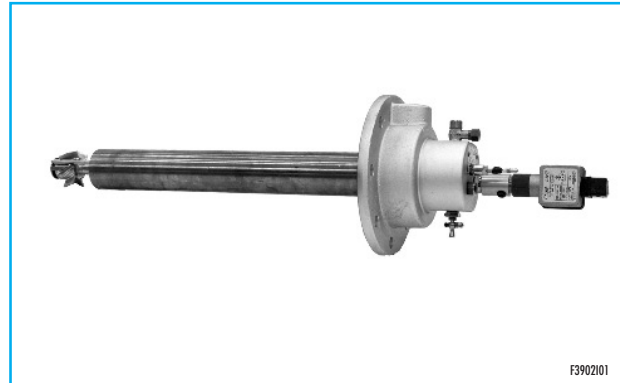


# SINGLE-ENDED RECUPERATIVE RADIANT TUBES

## SER SERIES

### FEATURES

- |                                                                                                                                                                                                                              |                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| • Mixer body:                                                                                                                                                                                                                | cast iron G25                                |
| • Flame tube:                                                                                                                                                                                                                | AISI310                                      |
| • Nozzle:                                                                                                                                                                                                                    | AISI310                                      |
| • External radiant tube:                                                                                                                                                                                                     | 25/20                                        |
| • Inner combustion tube:                                                                                                                                                                                                     | inconel                                      |
| • Pre-heated air:                                                                                                                                                                                                            | up to 400°C                                  |
| • Capacity range:                                                                                                                                                                                                            | 28 to 52 kW                                  |
| • Air and gas pressure at burner:                                                                                                                                                                                            | 40 mbar                                      |
| • Suitable for different types of gas:                                                                                                                                                                                       | CH <sub>4</sub> /L.P./propane/etc.           |
| • Wide turndown range:                                                                                                                                                                                                       | 12÷1                                         |
| • Excellent flame stability:                                                                                                                                                                                                 | excess air<br>excess fuel<br>on ratio firing |
| • Low noise level.                                                                                                                                                                                                           |                                              |
| • Easily replaced electrodes.                                                                                                                                                                                                |                                              |
| • Separated air and gas inlets, mixing at discharge point, 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. |                                              |



### APPLICATIONS

- Heat treat furnaces.
- Foodstuff ovens.
- Glass hardening furnaces.
- Copper and aluminium pipe processing furnaces.

### DESCRIPTION

The SER combustion system of ESA-PYRONICS is a complete unit combining the burner, the radiant tube and the recuperator into a single compact device. As it passes through the SER's recuperator section, incoming combustion air is preheated by the hot exhaust

gases. Burner ignition is achieved by a direct spark ignition electrode (Wand) which may be easily installed from outside without disassembling the burner. A micrometer type valve, air and gas orifices allow for accurate combustion control.



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## INSTALLATION

SER burners may be mounted to operate in any position; installation is simplified by adjustable mounting flanges.

Air and gas connections, which are one opposite the other, and flue outlet may rotate by 90°.

## IGNITION AND FLAME DETECTION

Burner ignition is mainly achieved by a Wand direct spark ignition electrode. Flame detection is done by a UV-2 ultraviolet scanner.

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
SER-50/114	(not available)	(not available)	Wand	UV-2
SER-66/152	(not available)	(not available)	Wand	UV-2
SER-66/190	(not available)	(not available)	Wand	UV-2

## MAXIMUM RADIANT TUBE DISSIPATION

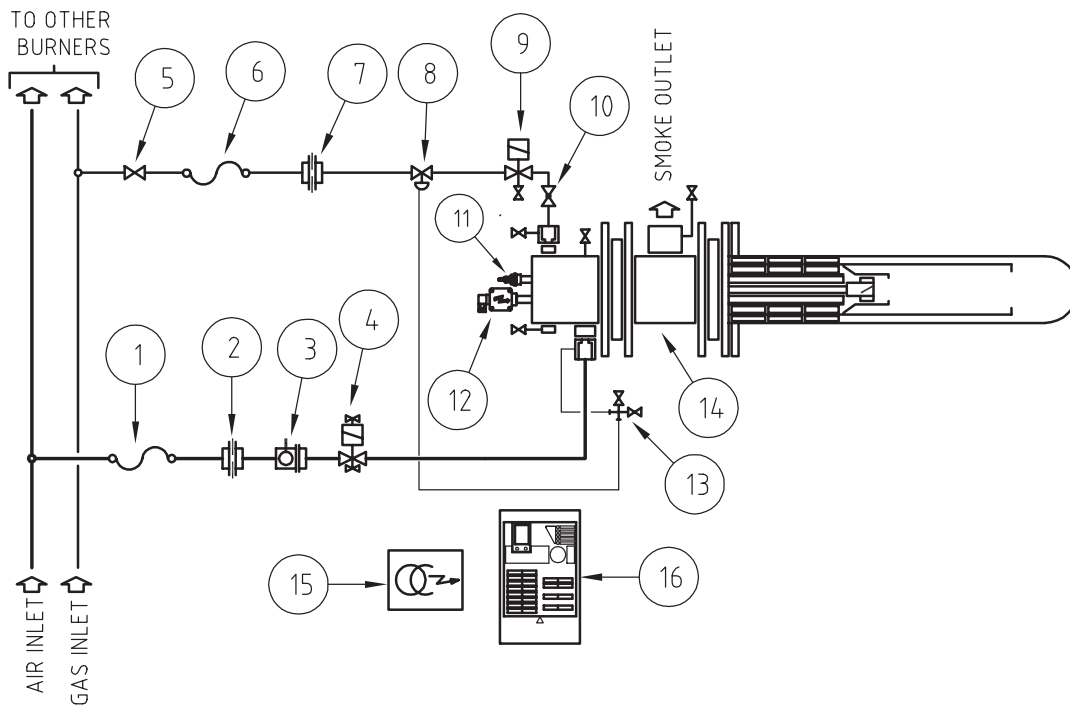
Operating temperature of furnace	Maximum dissipation in kW/m <sup>2</sup>
1050 °C	18.0
1000 °C	22.6
950 °C	27.1
900 °C	30.7
850 °C	34.8
800 °C	38.4
750 °C	41.5
700 °C	45.1

## 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%

\* Experimented data - Other data are calculated.

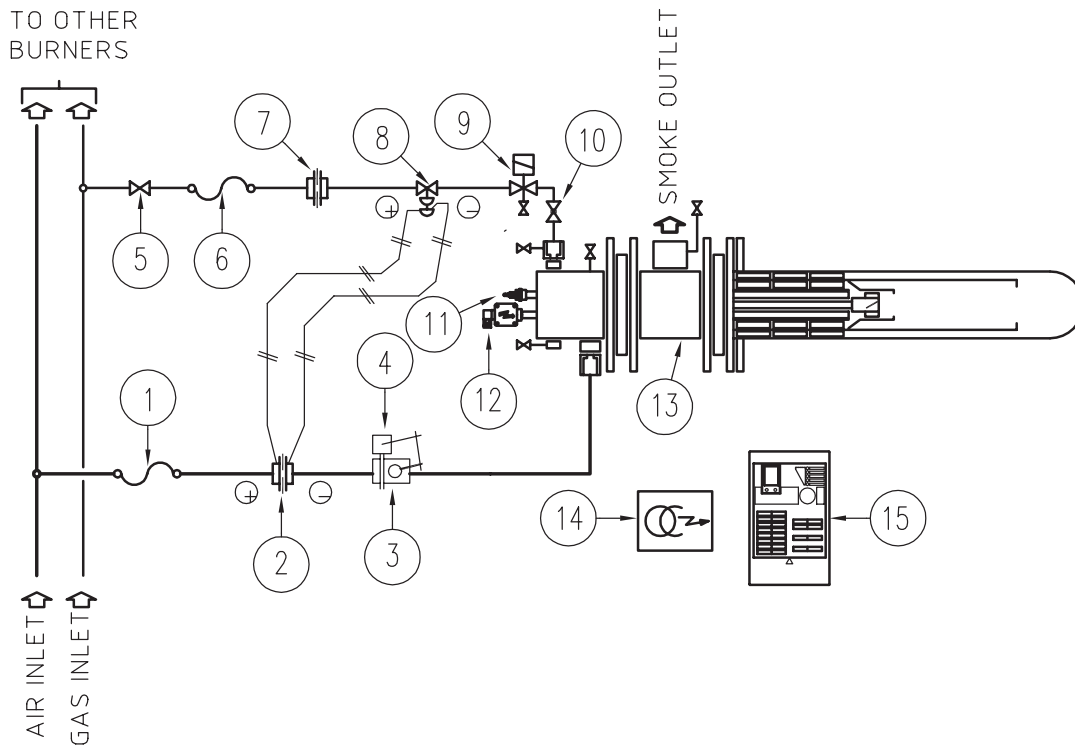
FLOW CHART (TWO STEPS)



Pos.	Model identification
1	Flexible connector
2	Orifice flow meter for $\Delta P$ air
3	Manual air valve
4	Safety solenoid air valve
5	Gas ball valve
6	Flexible connector
7	Orifice flow meter for $\Delta P$ gas
8	Flow regulator
9	Safety solenoid gas valve
10	Gas throttle orifice
11	Spark electrode
12	UV-scanner
13	Impulse line
14	Radiant tube burner
15	Ignition transformer
16	Flame control

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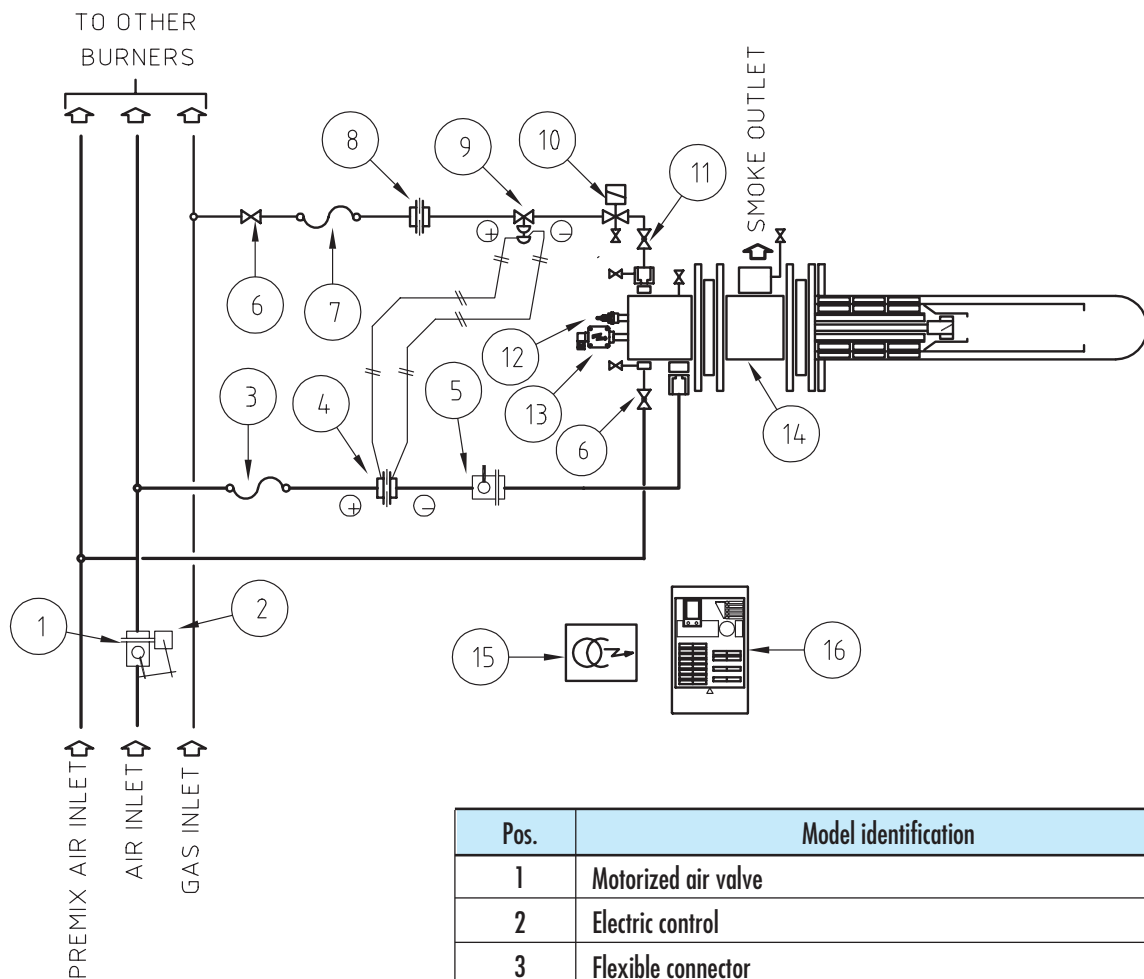
FLOW CHART (FOR ADJUSTING)



Pos.	Model identification
1	Flexible connector
2	Orifice flow meter for $\Delta P$ air
3	Motorized air valve
4	Electric control
5	Gas ball valve
6	Flexible connector
7	Orifice flow meter for $\Delta P$ gas
8	Flow regulator
9	Safety solenoid gas valve
10	Gas throttle orifice
11	Spark electrode
12	UV-scanner
13	Radiant tube burner
14	Ignition transformer
15	Flame control

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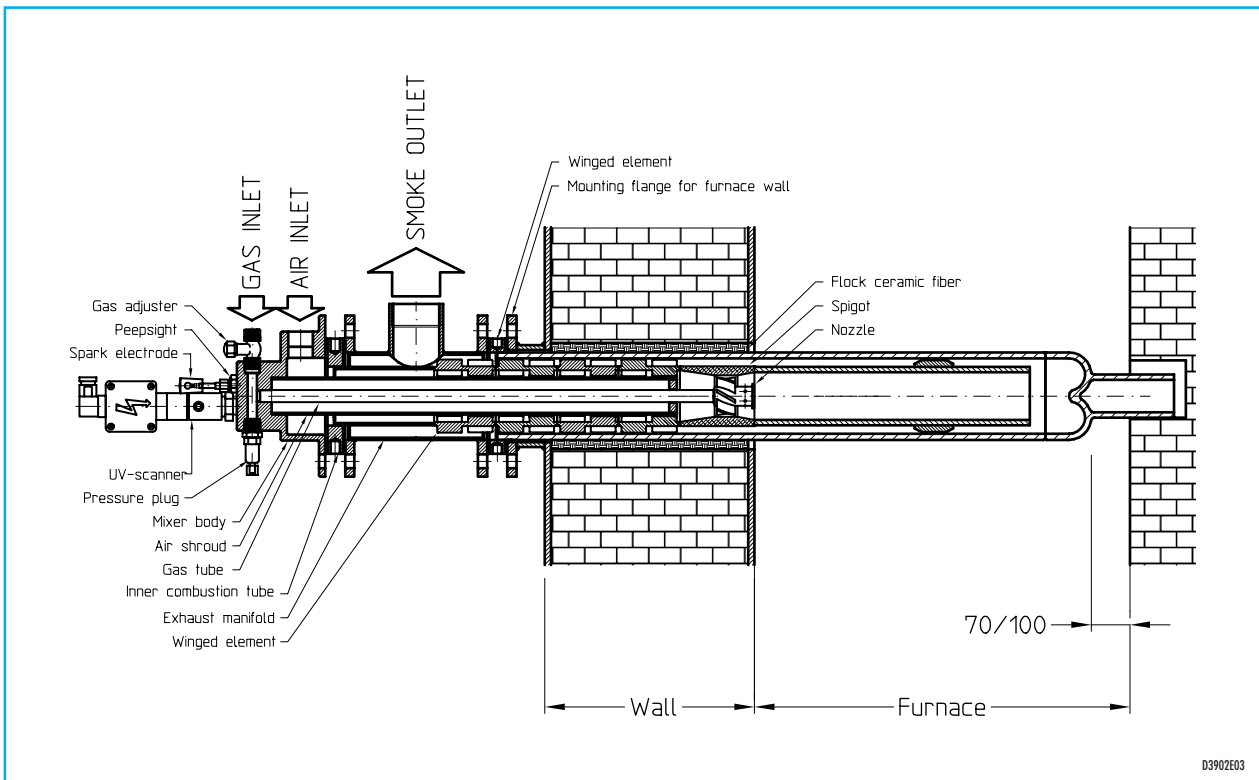
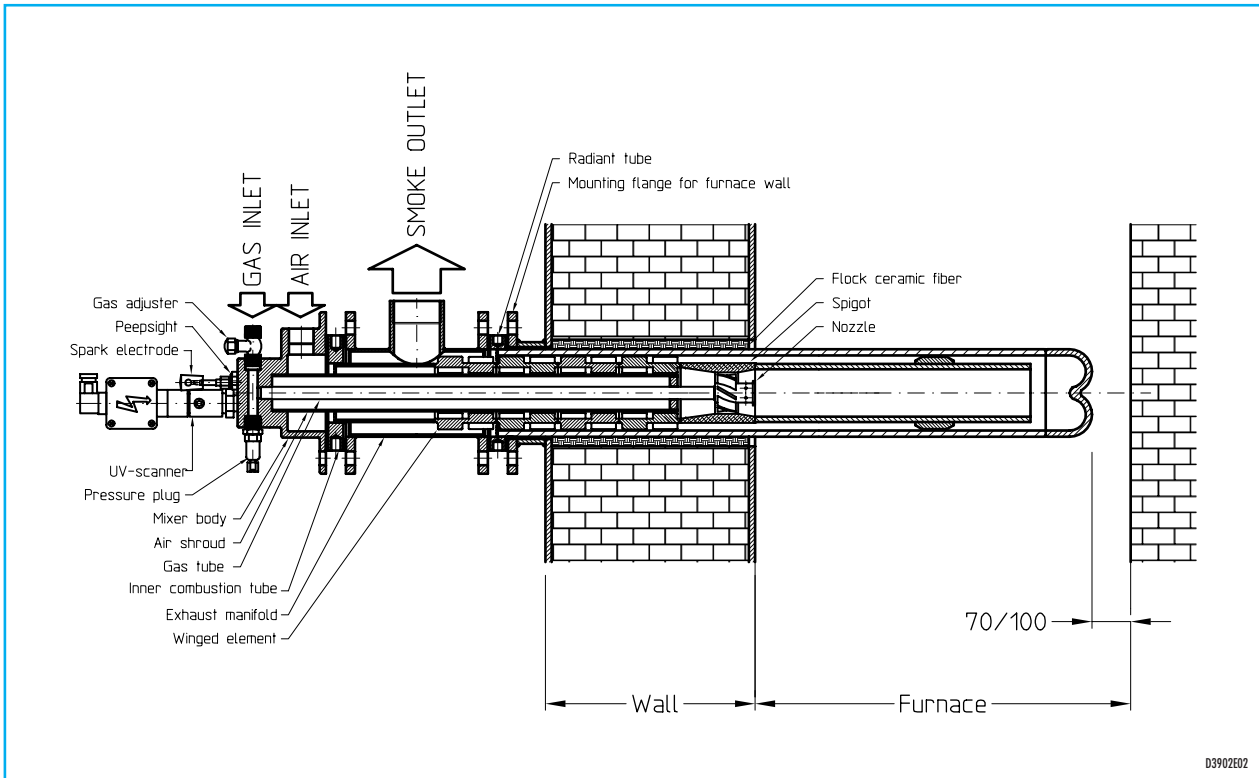
FLOW CHART (FOR ADJUSTING WITH L.P.)



Pos.	Model identification
1	Motorized air valve
2	Electric control
3	Flexible connector
4	Orifice flow meter for $\Delta P$ air
5	Manual air valve
6	Gas throttle orifice
7	Flexible connector
8	Orifice flow meter for $\Delta P$ gas
9	Flow regulator
10	Safety solenoid gas valve
11	Gas throttle orifice
12	Spark electrode
13	UV-scanner
14	Radiant tube burner
15	Ignition transformer
16	Flame control

D3902/05

## BURNER SECTION



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.