


Self-recuperative burner SINMAX..PRO



GUANGZHOU SINON COMBUSTION

TECHNOLOGY CO., LTD.

 020-39388398

 020-39388310

 www.gzsinon.com

 sinon@gzsinon.net

CHARACTERISTICS

- Integrated high-efficiency double-stage recuperator. The waste heat of flue gas can be recovered before leaving the chamber.
- The fuel efficiency can reach over 85%. (related to the operating temperature).
- Outlet flame velocity up to 150 m/s.
- Air staged, the flue gas in furnace chamber is recirculated efficiently, low NOx emission.
- Exhaust gas from burner housing, no additional flue tunnel needed in furnace.
- The burner can be accessed with room-temp. air and no insulation needed for air pipelines.
- Fuel: LPG, COG, natural gas, mixture gas and other fuel gas.

APPLICATIONS

SINMAX..PRO series burner is applicable for heating furnace and the heat treatment furnace heated by direct fire, such as roller hearth furnace, trolley furnace, chamber furnace, normalizing furnace, etc. They are also applicable for the heat treatment furnaces indirectly heated by I-shape, P-shape

and 2-P-shape radiant tubes, such as roller hearth furnace, mesh belt furnace, silicon steel production line, galvanized operation line, etc.

CONFIGURATION

Burner insert

The burner insert is composed of a gas housing and a burner core. The gas housing is installed with gas orifice plate, pressure test nipples, observation hole, ground screw and other accessories. The burner core is composed of gas pipe and burner head, the burner head is used for mixing air and gas and stabilizing the flame.

The electrode is installed on the burner insert, commonly using a single electrode for ignition and ion detection.

Air housing

The multifunctional air housing which is used for the diversion and distribution of flue gas and air. The burner insert, recuperator and air pipe are installed on the air housing. The burner is installed on furnace wall or radiant tube by the flange on air housing.

Recuperator

Double-stage recuperator, the first stage is installed in the furnace wall to preliminarily recover the waste heat from flue gas. And the second stage is built in the air housing to further recover the waste heat from the flue gas.

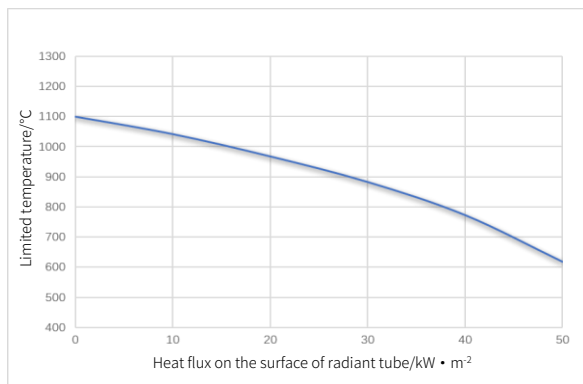
SPECIFICATION

Parameters

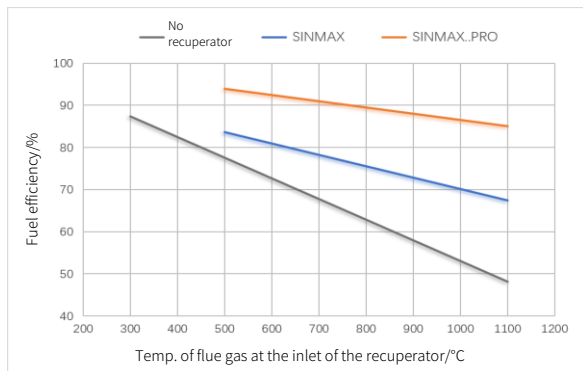
Material of recuperator	Code	Limited temperature/°C*	Turndown ratio	
			Pulse control	Continuous control
Metal	M	1100	1: 2	1: 3

*The limited temperature indicates limited furnace temperature for direct heating, or limited entrance temperature of flue gas of recuperator for indirect heating. The limited temperature is related to the surface heat load of radiant tube.

The chart for I-shape radiant tube heat flux~The limited temperature is as follow, for reference only.



Burner capacity(= Effective output capacity/Fuel efficiency)



Data above is based on natural gas.

Selection example

Conditions: natural gas, direct heating, the limited temperature of flue gas entering recuperator is 900 °C, and the required effective output capacity is 70 kW.

Solution: according to the table, the fuel efficiency is 88%, the burner capacity = 70 kW / 88% = 79.5 kW

Selection: SIMAX 3MN PRO

Flame parameters

Type	Size	Rate capacity / kW	Visible flame length / mm	Visible flame di- ameter / mm	Outlet flame ve- locity / m · s ⁻¹
SINMAX..PRO	1	36	220	65	130
SINMAX..PRO	2	60	350	80	120
SINMAX..PRO	3	100	400	80	150
SINMAX..PRO	4	180	500	120	160
SINMAX..PRO	5	250	650	130	130

Data above is based on natural gas in atmospheric environment, the excess air coefficient is 1.15. The visible flame length is related to ambient brightness, for reference only.

Type table

Type	SINMAX					3	M	N	PRO	545
Size	1	2	3	4	5					
Recuperator material	M: Metal									
Fuel	N: Natural gas		P: LPG		T: Town gas					
	M: Mixture gas		E: Low caloric value gas							
Efficient recuperator										
Burner length/mm	545		595		645		545+50n			

Dimensions

Length specifications

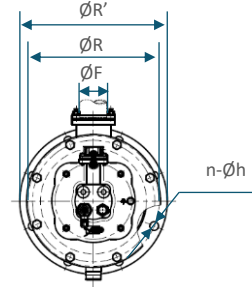
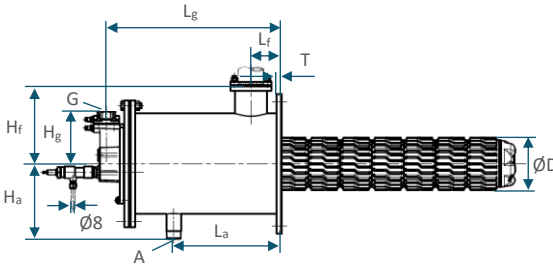
Size	L/mm
1~5 M	545 / 595 / 545 + n*50

The required distance between the top of burner and the insulation layer in direct heating or I-shape radiant tube heating: $-20 \text{ mm} \leq G \leq 20 \text{ mm}$.

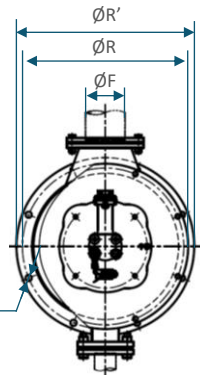
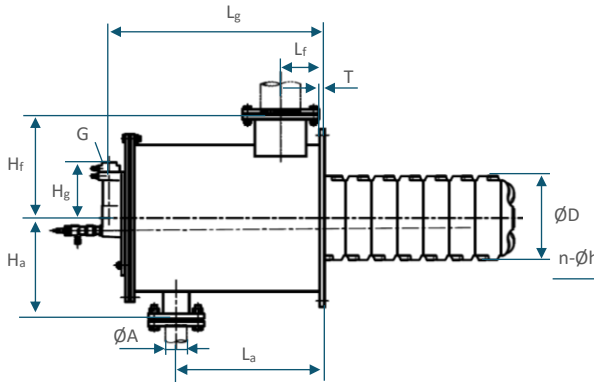
The required distance between the top of burner and the first elbow of radiant tube in P-shape or 2-P-shape radiant tube heating: $-20 \text{ mm} \leq G \leq 20 \text{ mm}$.

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SINMAX 1M~2M PRO



SINMAX 3M~5M PRO



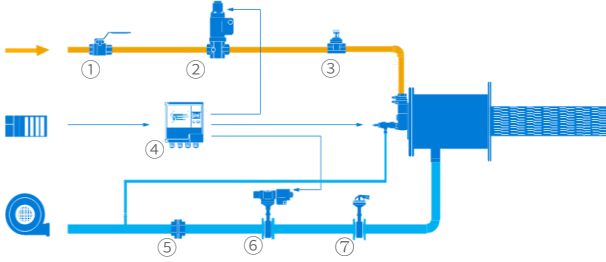
Type	Capacity /kW	A/mm	G	F/mm	D/mm	H _r /mm	H _g /mm	H _a /mm
1M	36	R 1"	Rp 1/2"	60	123	180	121	175
2M	60	R 1 1/2"	Rp 1/2"	60	142	210	121	200
3M	100	60	Rp 1/2"	76	178	245	121	240
4M	180	60	Rp 3/4"	114	240	295	160	290
5M	250	60	Rp 1"	114	273	325	160	320

Type	L _r /mm	L _g /mm	L _a /mm	R/mm	R'/mm	T/mm	h/mm	n
1M	70	407	250	290	325	10	19	8
2M	70	562	397	335	370	10	18	8
3M	95	572	385	395	430	10	18	8
4M	125	617	425	475	510	12	18	8
5M	125	617	425	540	580	12	19	8

SOLUTIONS

Example 1

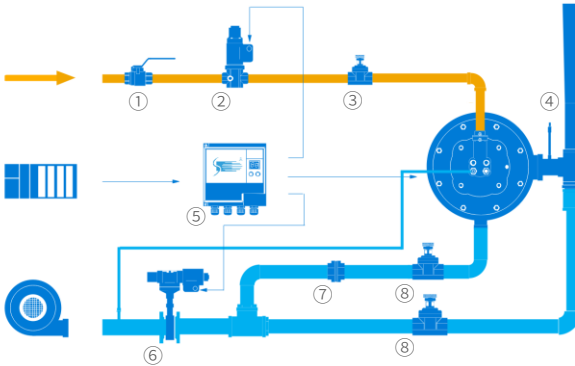
For indirect heating of radiant tube:



- ① Gas manual shut-off valve
- ② Gas solenoid valve SG
- ③ Manual linear flow control KV
- ④ Burner control unit SCU 4.1
- ⑤ Double-flange orifice plate
- ⑥ Pulse air solenoid butterfly valve MC+HTB(Use SA series as air shut-off valve while DN < 40)
- ⑦ Manual air valve HK

Example 2

For direct heating:



- ① Gas manual shut-off valve
- ② Gas solenoid valve SG
- ③ Manual linear flow control KV
- ④ Flue gas ejector
- ⑤ Burner control unit SCU 4.1
- ⑥ Pulse air solenoid butterfly valve MC+HTB (Use SA series as air shut-off valve while DN < 40)
- ⑦ Double-flange orifice plate
- ⑧ Manual linear flow control KV

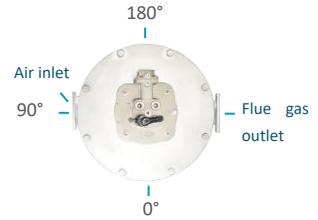
Recommend diameter of air valve:

SINMAX..PRO	0	1	2	3	4	5
Combustion air adjusting valve	DN 25	DN 25	DN40	DN50	DN50	DN50
Ejector air adjusting valve	DN 32	DN32	DN40	DN50	DN65	DN65
Air shut-off valve	DN 40	DN 50	DN65	DN65	DN80	DN80

INSTALLATION

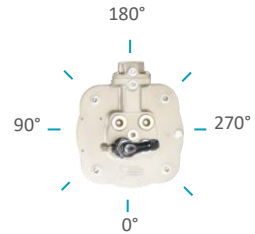
Burner

- Based on the direction of flue gas outlet, the direction of air inlet could be adjusted to an angle of 0°, 90° and 180° shown as the picture. The direction needs to be determined in advance, and the final direction is not adjustable.
- The direction of gas inlet is adjustable for every 45° shown as the picture.



Pipeline

- To ensure the accuracy of orifice plate measurement, the pipe connected to the gas inlet on burner shall be straight in the length of 5*DN without other resistance elements.
- Purge the pipelines before connect them to the burner to prevent any welding slag or other foreign matter from entering the burner. If a pipe welding is required after the connection, ensure that there is no welding slag or molten substance falls into the pipe or burner.
- Electrode with cooling air is installed by default. The connection of cooling air is a Ø8 ferrule fitting. Suggest to intake the cooling air at upstream of the air shut-off valve.



OPERATION

Attention

- The burner SINMAX..PRO shall be operated at an excess air coefficient over 1.05 and could not be operated at a reductive atmosphere.

Maintenance

- Checking and cleaning the burner and electrode regularly, at least once every six months. Increase the times of maintenance, as appropriate.