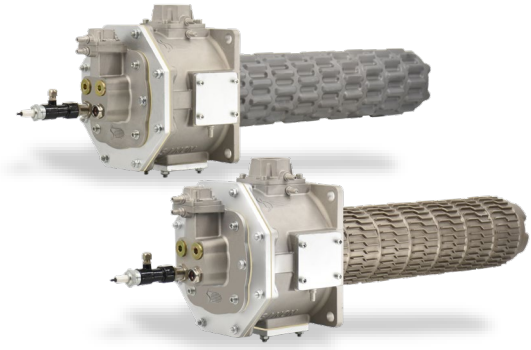
Self-recuperative burner SINMAX



GUANGZHOU SINON COMBUSTION TECHNOLOGY CO., LTD.

020-39388398

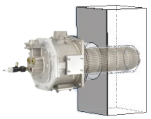
020-39388310

www.gzsinon.com

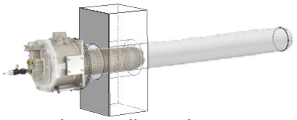
sinon@gzsinon.net

CHARACTERISTICS

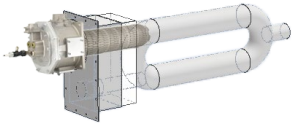
- Integrated high-efficiency recuperator. The waste heat of flue gas can be recovered before leaving the chamber.
- Air preheating temperature up to 650 ℃ (Related to the operating temperature).
- Outlet flame velocity up to 150 m/s.
- Air staged, the flue gas in furnace chamber is recirculated efficiently, lower 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.



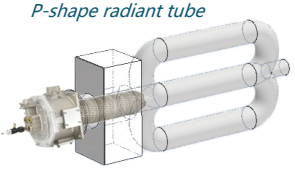
Direct heating



I-shape radiant tube



P-shape radiant tube



2-P-shape radiant tube

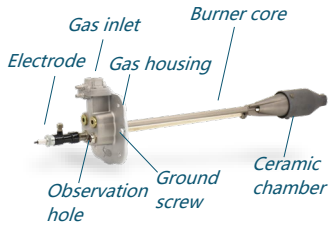
APPLICATIONS

SINMAX 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

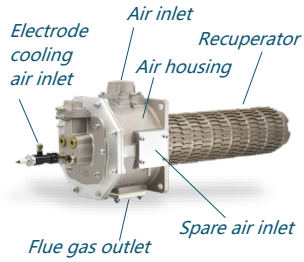
The burner insert is composed of a gas housing and a burner core. The gas housing is installed with gas orifice plate, pressure test nipples, observation hole, ground screw and other accessories. The burner core is composed of a gas pipe and a burner head, the burner head is used for mixing air and gas,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



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

Air housing

The multifunctional air housing is made of die-casting aluminum alloy, 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. The flue in burner is installed with fiber insulation.



Recuperator

The recuperator is used to recover waste heat of flue gas and preheat combustion air. According to different working state, the materials of recuperator can be metal or SiC ceramic, optional. The fins arranged on the inner and outer surfaces of the metal recuperator and the protrusions arranged on the inner and outer surfaces of ceramic recuperator can improve the heat exchange efficiency.

Flame tubes

The segmented flame tubes are made of SiC ceramic, which can operate in high temperature. Their standard segment spherical coupling joints has a certain deflection, allowing the radiation tube to have slight bending deformation.

SPECIFICATION

Parameters

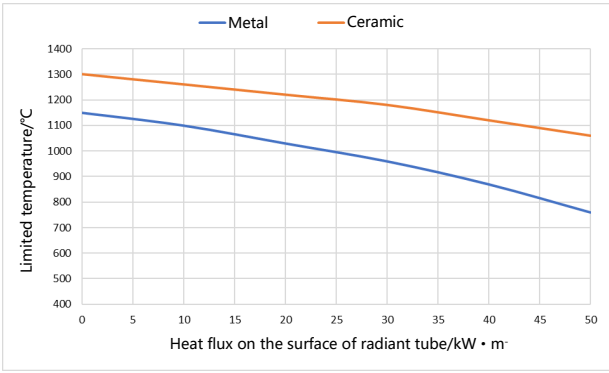
Materials of recuperator

Materials*	Code	Limited temperature /℃**	Regulation rate	
			Pulse control	Continuous control
Metal	M	1150	1: 2	1: 3
Ceramic	C	1300	1: 2	1: 3

** Available type for metal burner: SINMAX 1～6, for ceramic burner: SINMAX 0～6.*

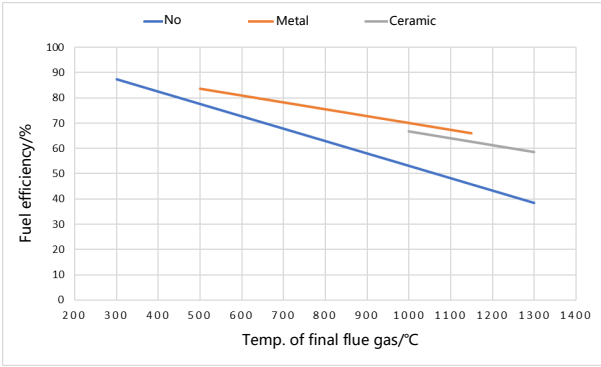
*** The limited temperature indicates limited furnace temperature for direct heating, or limited entrance temperature of flue gas of recuperator for indirect heating. The limited temperature is related to the surface heat load of radiant tube.*

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



Capacity

Burner capacity = Effective output capacity/Fuel efficiency



Data above is based on natural gas.

Selection example

Conditions: *natural gas; direct heating; fuel efficiency is 73%; the limited temperature of flue gas entering recuperator is 900 ℃; effective output capacity required is 70 kW.*

Solution: *Capacity = 70 kW / 73% = 95 kW*

Selection: *SIMAX 3MN*

Flame parameters

Type	Code	Rate capacity / kW	Visible flame length /mm	Visible flame diameter /mm	Outlet flame velocity /m·s^{-1}
SINMAX	0	25	220	50	150
SINMAX	1	36	220	65	130
SINMAX	2	60	350	80	120
SINMAX	3	100	400	80	150
SINMAX	4	180	500	120	160
SINMAX	5	250	650	130	130
SINMAX	6	500	800	200	120

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.

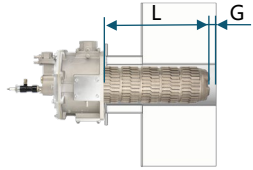
Type table

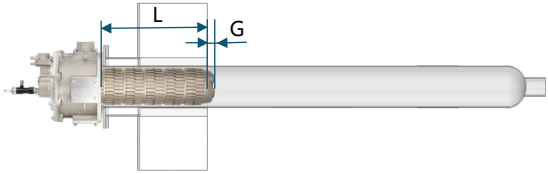
Type								SINMAX	3	M	N	545
Model	0	1	2	3	4	5	6					
Recuperator materials	M: metal		C: SiC ceramic									
Fuel	N: natural gas E: low caloric value gas		P: LPG		T: town gas		M: mixture gas					
Burner length	545	595	645	545+50n								

Dimensions

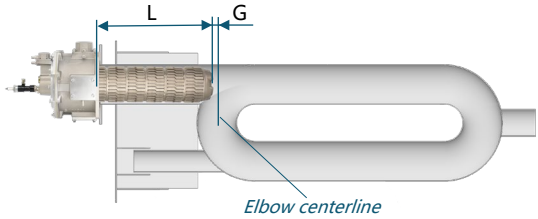
Length specifications

Type	L /mm
0C	545 / 645
1～6 C	545 / 595 / 645 / 695
1～6 M	545 / 595 / 545 + 50n



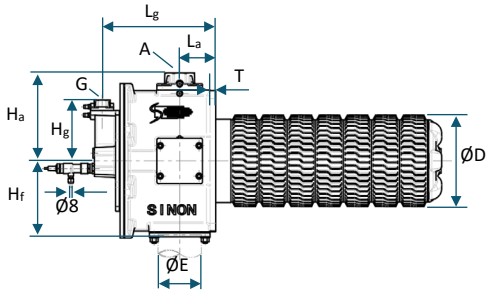


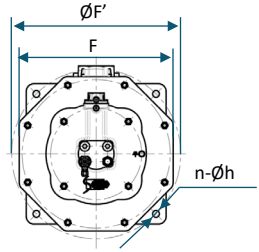
The distance between the top of burner and the insulation layer in direct heating or I-shape radiant tube heating:
-20 mm ≤ G ≤ 20 mm.



The distance between the top of burner and the left elbow of radiant tube in P-shape or 2-P-shape radiant tube heating:
-20 mm ≤ G ≤ 20 mm.

SINMAX 1M～6M

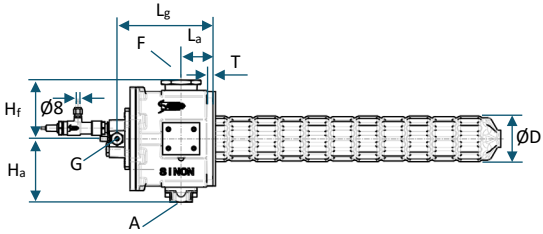


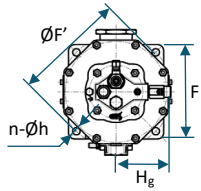


Type	Capacity /kW	A	G	E/mm	D/mm	H_a/mm	H_g/mm	H_f/mm
1M	36	Rp1"	Rp 1/2"	60	123	163	121	132
2M	60	Rp1 1/2"	Rp 1/2"	60	142	163	121	132
3M	100	Rp2"	Rp 1/2"	76	178	185	121	153
4M	180	Rp2"	Rp 3/4"	114	240	231	160	199
5M	250	Rp2"	Rp1"	114	273	231	160	199
6M	500	Rp3"	Rp1 1/2"	168	370	383	220	330

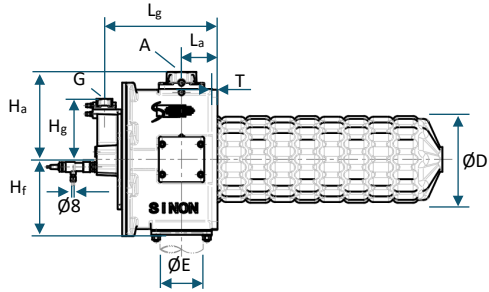
Type	Capacity /kW	L_a/mm	L_g/mm	F/mm	F'/mm	T/mm	h/mm	n
1M	36	60	213	240	290	14	18	4
2M	60	60	213	240	290	14	18	4
3M	100	83	264	276	330	14	18	4
4M	180	95	299	368	445	14	18	4
5M	250	95	299	368	445	14	18	4
6M	500	150	403	580	650	12	23	4

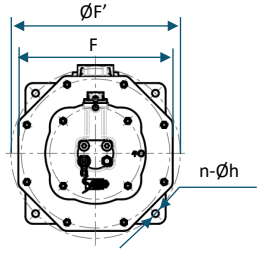
SINMAX 0C





SINMAX 1C ~ 6C





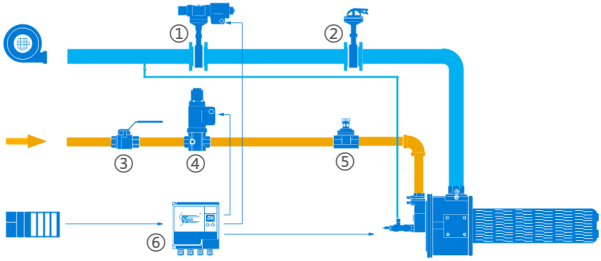
Type	Capacity /kW	A	G	E/mm	D/mm	H_a/mm	H_g/mm	H_f/mm
0C	25	Rp1"	R $1/2$"	Rp1 $1/4$"	86	119	102	117
1C	36	Rp1"	Rp $1/2$"	60	122	163	121	132
2C	60	Rp1 $1/2$"	Rp $1/2$"	60	140	163	121	132
3C	100	Rp2"	Rp $1/2$"	76	177	185	121	153
4C	180	Rp2"	Rp $3/4$"	114	229	231	160	199
5C	250	Rp2"	Rp1"	114	260	231	160	199
6C	500	Rp3"	Rp1 $1/2$"	168	360	383	220	330

Type	Capacity /kW	L_a/mm	L_g/mm	F/mm	F'/mm	T/mm	h/mm	n
0C	25	60	181	178	210	10	14	4
1C	36	60	213	240	290	14	18	4
2C	60	60	213	240	290	14	18	4
3C	100	83	264	276	330	14	18	4
4C	180	95	299	368	445	14	18	4
5C	250	95	299	368	445	14	18	4
6C	500	150	403	580	650	12	23	4

SOLUTIONS

Example 1

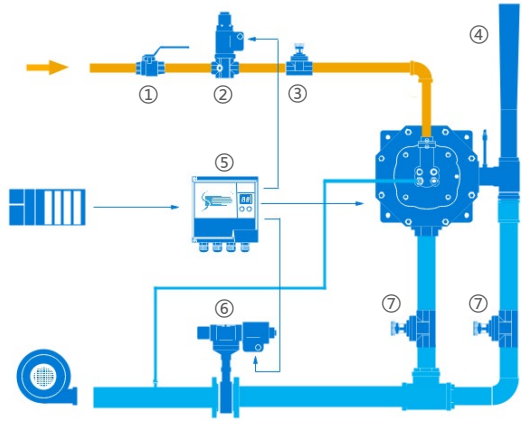
For indirect heating of I-shape radiant tube:



① Pulse air solenoid butterfly valve MC+HTB
② Manual air valve HK
③ Gas manual shut-off valve
④ Gas solenoid valve SG
⑤ Manual linear flow control KV
⑥ Burner controller SCU 4.1

Example 2

For direct heating, P-shape radiant tube or negative pressure needed in I-shape radiant tube:



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

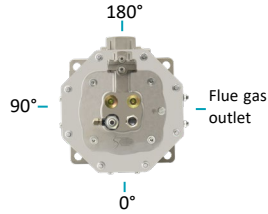
Recommend diameter of air valve:

SINMAX	0	1	2	3	4	5	6
Combustion air adjusting valve	DN25	DN25	DN40	DN50	DN50	DN50	DN80
Ejector air adjusting valve	DN32	DN32	DN40	DN50	DN65	DN65	DN100
Air shut-off valve	DN40	DN50	DN65	DN65	DN80	DN80	DN100

INSTALLATION

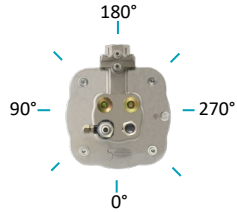
Burner

- 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 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 air 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 matters 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 burners SINMAX shall be operated at an excess air coefficient over 1.05 and could not be operated at a reductive atmosphere.

Maintenance

- At least once every six months. Increase the times of maintenance, as appropriate.
- Maintenance: burner tube, spark insert, flame state and others.