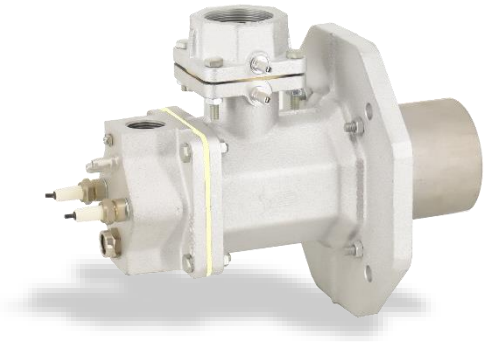
Conventional burner SCEM



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CHARACTERISTICS

- SCEM series burners are sub-high flame velocity burners with forced air supply.
- Capacity range: 40～1000 kW, optional.
- Fuel: LPG, COG, natural gas, town gas, mixed gas and low calorific value gas.
- Non-premixing burner, air and gas are supplied separately. No flareback.
- Flame shapes: long flame, short flame and flat flame, optional.
- Suitable for mostly direct heated applications.

APPLICATIONS

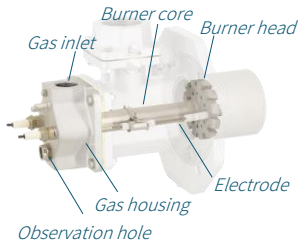
SCEM series gas burners are applicable for various directly heated industrial furnaces, such as the industries of iron, nonferrous metal, machinery, forging, ceramic, food processing and other industries. It can also be used on hot blast stove or as a safety burner.

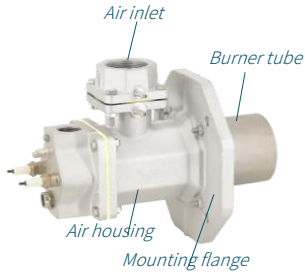
CONFIGURATION

Burner insert

The burner insert of SCEM is composed of a gas housing and a burner core. The gas housing is equipped with a gas orifice plate (The orifice plate has been installed on SCEM 65 ~ 140 by default, while needs to be ordered and installed separately on SCEM 165～200), pressure test nipples, an observation hole, a ground screw and other accessories. The burner core is composed of a gas pipe and a burner head, which is used for mixing the gas and air and stabilizing the flame.

Electrodes are installed on the burner insert, double-electrode flame ignition/detection is adopted generally, one electrode is used to generate high-voltage spark and the other is used for ion detection.





Air housing

The air housing routes and distributes the combustion air. The burner insert and burner tube are installed on the air housing, and the burner is installed on the furnace wall by the mounting flange on air housing. The air inlet has been installed with an orifice plate to measure air parameters.

SCEM series must be used with burner blocks, SiC ceramic tube burners see SCEC series.

Burner tube

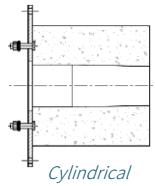
The burner head is installed inside the burner tube, and they are installed together in burner block. The burner tube ensures the well mixing of air and gas, and acts as the shaper of flame.

Burner block

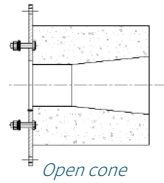
The SCEM burner must be used with a burner block. The burner block works as the combustion chamber of burner, the change of its internal structure may affect the stability of combustion and flame shaping.

The burner block is normally prepared by the furnace company and installed with the insulation of furnace.

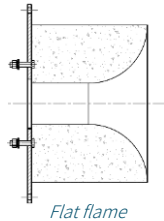
Contact us for the detailed burner block dimensions of specific project.



Cylindrical



Open cone



Flat flame

Flame shape	Burner block shape
S	Cylindrical or open cone
L	Cylindrical
F	Flat flame block

SPECIFICATION

Parameters

Applicable temperature

Flame shape	Code	Air temperature/℃	Furnace temperature /℃	Regulation ratio	Excess air coefficient*
Long	L	20～450	500～1600	1:10	0.8～1.5
Short	S	20～150	50～1350	1:10	0.8～1.3
Flat	F	20～400	50～1200	1:3	0.9～1.2

** At high-capacity state.*

Flame parameters

Burner size	Capacity /kW	Flame shape	Visible flame length* /mm	Flame outlet velocity** $/m \cdot s^{-1}$
SCEM 50	40	S	300	53
SCEM 50	40	L	500	48
SCEM 50	40	F	300	N/A
SCEM 65	90	S	500	68
SCEM 65	90	L	600	63
SCEM 65	90	F	400	N/A
SCEM 80	150	S	600	73
SCEM 80	150	L	700	68
SCEM 80	150	F	550	N/A
SCEM 100	230	S	700	73
SCEM 100	230	L	800	68
SCEM 100	230	F	700	N/A
SCEM 125	320	S	1000	63
SCEM 125	320	L	1150	58
SCEM 125	320	F	830	N/A
SCEM 140	450	S	1200	73
SCEM 140	450	L	1400	68
SCEM 140	450	F	1000	N/A
SCEM 165	630	S	1100	73
SCEM 165	630	L	1600	68
SCEM 165	630	F	1200	N/A
SCEM 200	1000	S	1300	82
SCEM 200	1000	L	2000	77
SCEM 200	1000	F	1500	N/A

** The visible flame length is related to ambient brightness, and the flame length of flat flame burner indicates the diameter of flame, for reference only. The flame diameter is less than 1.5 times of burner block outlet diameter.*

***The flame temperature when measuring the flame outlet velocity: long flame 1400 °C, short flame 1500 °C.*

Data above is based on natural gas in atmospheric environment, the excess air coefficient is 1.15.

The burner capacity is calibrated by gas chemical heat, no air physical heat considered.

Type table

Type				SCEM	(I)	100	L	N	-200	/135
Structure	I: Built-in thermal insulation A: Aluminum air housing									
Size	50	65	80	100	125	140				
	165	200								
Flame shape	L: Long flame		S: Short flame		F: Flat flame					
Fuel	N: Natural gas		P: LPG		T: Town gas		M: Mixture gas			
Burner tube length (mm)	50*	100	150	50n						
Burner core length (mm)	35	85	135	35+50n						

** The shortest length of burner tube of L type burner is 100mm.*

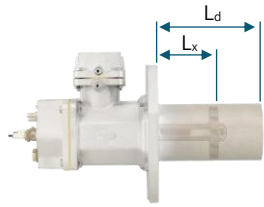
When using low calorific value gas, the maximum capacity of the burner is 70% of the state above.

Dimensions

The difference between the burner tube length L_d and the burner core length L_x: $\Delta L_1=L_d-L_x$ (mm)

Flame shape	Code	Burner tube base length L_d */mm	$\Delta L_1=L_d-L_x$/mm
Long	L	100	65
Short	S	50	15
Flat	F	50	15

** The length of burner tube increases by integral multiple of 50mm.*



The difference between the burner block length L_z and the burner tube length L_d: $\Delta L_2=L_z-L_d$ (mm)

Flame shape	50	65	80	100
L	50～200	50～200	100～200	100～250
S	100～250	100～250	150～250	150～250
F*	115～120	140～160	190～210	215～235

Flame shape	125	140	165	200
L	150～300	200～350	200～400	250～400
S	200～300	250～350	250～400	300～450
F*	175～195	200～220	225～245	240～260

** The size of flat flame burner in the table above is the size while using natural gas or LPG as fuel.*

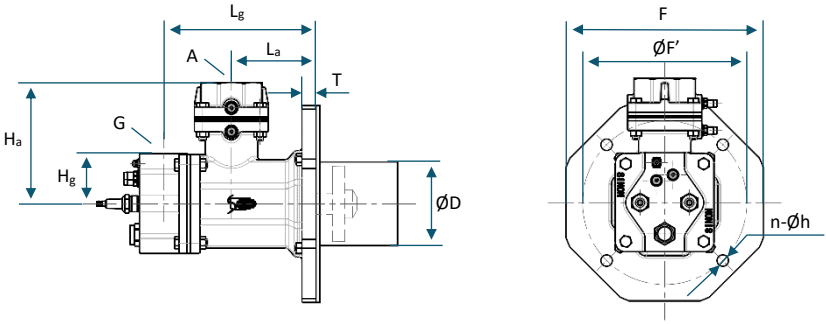
Please contact us for the length of burner for other types of fuel.

The standard value of $\Delta L_1=L_d-L_x$ for low temperature heat treatment furnace (⩽600 °C) (mm):

Flame shape	50～65	80～100	125	140	165	200
S	115	165	215	265	165	215
L	115	165	215	265	265	315

The SCEM can be installed without burner block in low temperature heat treatment furnace with stirring blower or hot blast stove, but the burner tube must be lengthened. A sleeve shall be installed outside the burner tube to protect the flame from being influenced by stirring blower.

SCEM 50～125 (ordinary housing)

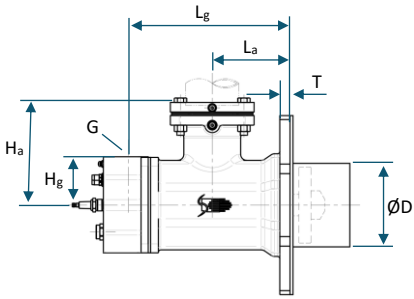


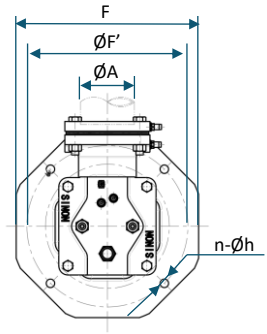
Size	Capacity /kW	A	G	D*/mm	H_a/mm	H_g/mm	L_a/mm
50	40	Rp1 1/2"	Rp 1/2"	51	114	38	73
65	90	Rp1 1/2"	Rp 3/4"	65	124	49	73
80	150	Rp2"	Rp 3/4"	85	148	61	90
100	230	Rp2"	Rp1"	102	148	61	103
125	320	Rp2 1/2"	Rp1 1/2"	127	191	73	119

Size	L_g/mm	F/mm	F'/mm	T/mm	h/mm	n
50	148	180	151	12	12	4
65	154	195	165	12	12	4
80	177	240	210	14	14	4
100	185	240	200	17	14	4
125	254	270	240	17	14	4

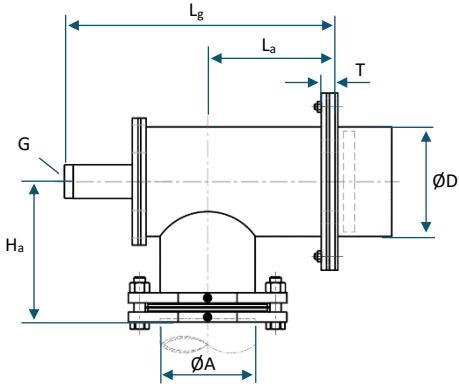
** The outer diameter of the burner tube including welding seam thickness is D+5 mm.*

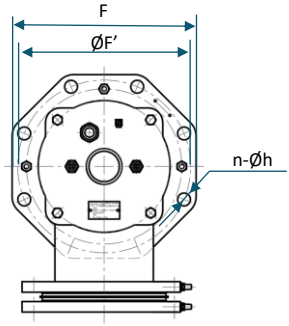
SCEM 140(ordinary housing)





SCEM 165～200(ordinary housing)





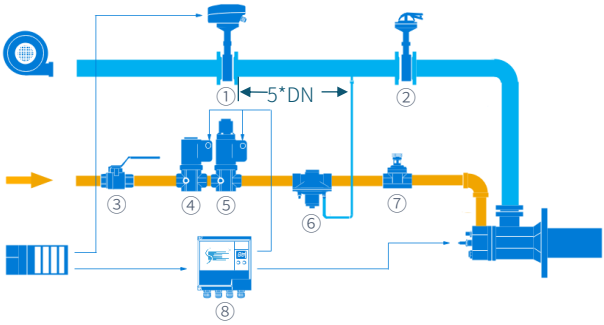
Size	Capacity /kW	A/mm	G	D*/mm	H_a/mm	H_g/mm	L_a/mm
140	450	89	Rp1 $^1/_2$"	140	172	81	130
165	630	114	R1 $^1/_2$"	168	248	N/A	166
200	1000	168	R2"	194	249	N/A	225

Size	L_g/mm	F/mm	F'/mm	T/mm	h/mm	n
140	270	300	265	17	14	4
165	369	240	240	24	14	4
200	478	314	295	24	22	8

** The outer diameter of the burner tube including welding seam thickness is D+5 mm.*

SOLUTIONS

Continuous control



① Air electrical butterfly valve SAM+HTB（SAM..I or SAM..3)

② Air manual butterfly valve HK

③ Gas manual shut-off valve

④ Gas quick opening solenoid valve SG..Q

⑤ Gas slow opening solenoid valve SG..S

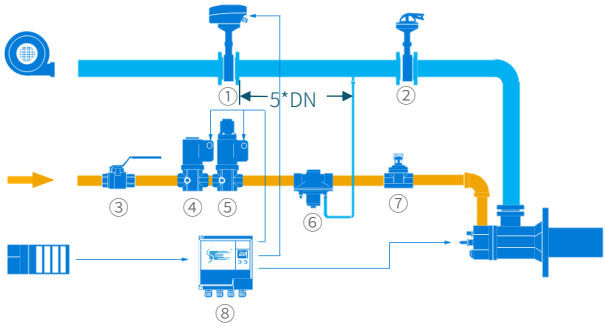
⑥ Air-gas proportional valve GRC

⑦ Manual linear flow control KV

⑧ Burner control unit SCU 4.1

Pulse control

Example 1



① Air electrical butterfly valve SAM+HTB（SAM..2)

② Air manual butterfly valve HK

③ Gas manual shut-off valve

④ Gas quick opening solenoid valve SG..Q

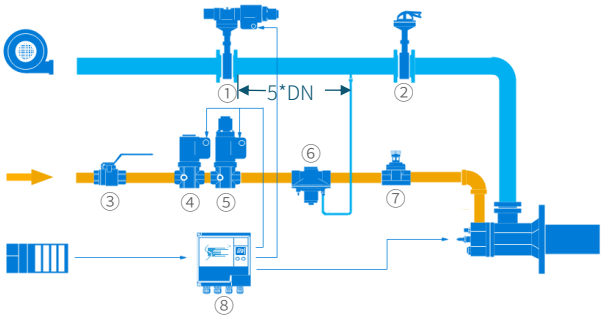
⑤ Gas slow opening solenoid valve SG..S

⑥ Air-gas proportional valve GRC

⑦ Manual linear flow control KV

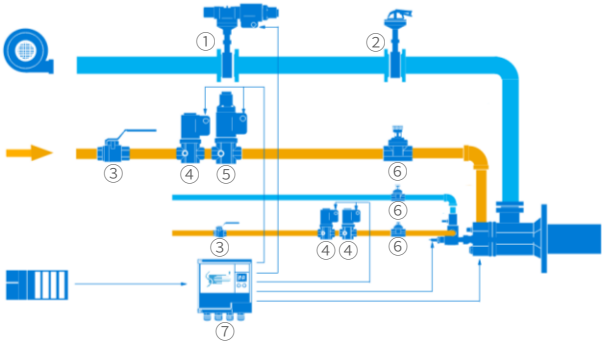
⑧ Burner control unit SCU 4.1

Example 2



① Air pulse solenoid butterfly valve MC+HTB
② Air manual butterfly valve HK
③ Gas manual shut-off valve
④ Gas quick opening solenoid valve SG..Q
⑤ Gas slow opening solenoid valve SG..S
⑥ Air-gas proportional valve GRC
⑦ Manual linear flow control KV
⑧ Burner control unit SCU 4.1

Example 3



① Air pulse solenoid butterfly valve MC+HTB
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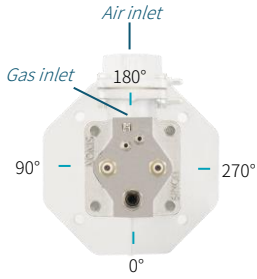
③ Gas manual shut-off valve
④ Gas quick opening solenoid valve SG..Q
⑤ Gas slow opening solenoid valve SG..S
⑥ Manual linear flow control KV
⑦ Burner control unit SCU 4.1

INSTALLATION



- Based on the direction of air inlet, the gas inlet of SCEM 50～140 could be adjusted to an angle of 90°, 180° and 270° as shown as the picture.
- The air measuring orifice plate has been installed on SCEM 50～200 and the gas measuring orifice plate has been installed on SCEM 50～140 by default, while need to be ordered separately on other types. To ensure the accuracy of orifice plate measurement, the pipe connected to the air and gas inlet on burner should be straight in the length of 5*DN without other resistance elements.
- The pipelines must be purged before connected to the burner to prevent any welding slag or other foreign matter from entering the burner. If a pipe welding is required after connection, ensure that there is no welding slag or molten substance falls into the pipe or burner.

OPERATION

Select the type of SCEM burner reasonably to avoid using the burner beyond its capacity range or air/fuel ratio range.

When heating the furnace with external heat source, it is necessary to open air blower to ensure that there is more than 5% of air flows in to prevent furnace chamber gas backflow, internal condensation or other conditions affecting the burner.

If the burner needs to be shut off during operation, keep the air blower operating to ensure that there is more than 5% of air enters the furnace to prevent the damage caused by furnace chamber hot gas backflow.

Connection	Pressure /mbar
Air	50
Gas	50

For reference only, for more details, please consult.

Regularly check and clean the burner and electrode, and check the combustion state of burner.