



HGOS11-E

HOPE RSTB
REGENERATIVE RADIANT TUBE BURNER
HANDLING MANUALS



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TABLE OF CONTENTS

1 . Checking the Packages	
1-1 Inspection	1
1-2 Parts for installation	1
2 . REGENERATIVE RADIANT TUBE BURNER (R S T B)	
2-1 Outline	2
2-2 Features	2
2-3 Specifications	2
2-4 Mass	2
2-5 How to ignite	2
3 . Matters to be attended for safety	
3-1 How to read symbols	3
3-2 Precautions for Safety	3
4 . How to Fill the Ceramic Balls	
4-1. How to Fill the Ceramic Balls	4 ~ 7
5 . Installation	
5-1 How to install vertically (Mounting the burner on the radiant tube base flush-cut bolts)	8 ~ 10
5-2 How to install vertically (when the burner is mounted on the JIS 5K flange)	11 ~ 13
5-3 How to install horizontally (Mounting the burner on the radiant tube base flush-cut bolts)	14 ~ 18
5-4 How to install horizontally (when the burner is mounted on the JIS 5K flange)	19 ~ 24
5-5 Piping	25
6 . Flow sheet	
6-1 Flow sheet (1Set)	26
6-2 Equipment (1Set)	26

7 . Test Operation	
7-1Preparing	2 7
7-2Adjusting	2 7
7-3Example of the adjustment	2 8
8 . Inspection	
8-1Inspection	2 9
8-2Precautions	2 9
9 . Ceramic Ball Replacement	
9-1How to replace the ceramic balls for the vertically installed radiant tube	3 0
9-2How to replace the ceramic balls for the horizontally installed radiant tube	3 1
1 0 . Spare Parts Warning Plate	
10-1 Spare Parts	3 2
10-2 Warning Plate	3 2
1 1 . Troubleshooting	
11-1 Troubleshooting	3 3
1 2 . Structural Drawing	
12-1 Structural Drawing	3 4
1 3 . Delta Valve (DV-80)	
13-1 Outline	3 5
13-2Overview drawing	3 5
13-3 Specifications	3 6
13-4 Reed Auto Switch Internal Circuit	3 7
13-5Solenoid Valve JIS Sign	3 7
13-6Precautions	3 7
1 4 . Temperature Control	
14-1 Igniting	3 8
14-2 Adjusting the temperature (Time control)	3 9

1. Checking the Packages

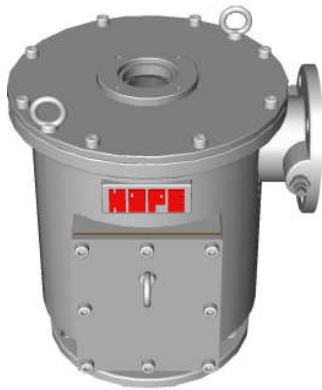
Thank you for your selection of Hope REGENERATIVE RADIANT TUBE BURNER Type RSTB Please carefully read this instruction manual in order for you to be fully satisfied with the performance of this burner and to secure the safety in operation, maintenance and inspection.

The following shows the delivery packing contents. Please check if you have received them all. Also, please check them for any damage or the like.

Also, please be sure to deliver this instruction manual to the end user, as well as to the constructor.

1-1 Inspection

This regenerative radiant tube burner is delivered to you in the disassembled state into 4 components as shown in the below photo. Please check if they are exactly the same as you have ordered.



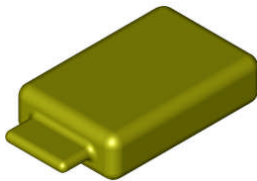
Burner Body



Burner Gun



Combustor Tube



Seramic Ball (25kg / 1Bag)

1-2 Parts for installation

- When mounting the burner on the horizontal radiant tube base flush-cut bolts
Reamer Bolt . . . 2
Hexagon Socket Head Circular Nut . . . 2
M 12 Plain Washer . . . 2
- When mounting the burner on the horizontal JIS 5K flange
Circular Nut . . . 2
Hexagon Socket Circular Nut . . . 2
M 12 Plain Washer . . . 2



Circular Nut



Hexagon Socket Head Circular Nut



M 12 Plain Washer



Reamer Bolt

2. REGENERATIVE RADIANT TUBE BURNER (RSTB)

2-1 Outline

This regenerative radiant tube burner supplies combustion air alternately to 2 burners having a regenerative chamber each and recovers exhaust heat with the twin burners.

By using the recovered exhaust heat as high-temperature preheat air, this regenerative radiant tube burner realizes a substantial energy saving.

2-2 Features

1. High thermal efficiency as much as 85% or more
2. As combustion is made with the twin burners alternately, dispersion in the surface temperature distribution of the radiant tube can be controlled.
3. As ceramics are used for the combustion tube not to allow it to contact the radiant tube as much as possible, the local heating of the radiant tube can be controlled, which elongates the service life of the radiant tube.
4. CO₂ can be cut down by the substantial fuel saving effect.

2-3 Specifications

Type	Capacity.kw kW ($\times 10^3$ kcal/h)	Radiant Tube (A)	Connection			
			Main Air (JIS5K)	Main Gas (Rc)	Hold Air (Rc)	Exh. (JIS5K)
RSTB-125	58 (50)	125A	80A	3/4	1/2	80A
RSTB-150	93 (80)	150A	80A	3/4	1/2	80A

- Fuel : Fuel gases
- Standard Pressure : Gas 10kPa Air 10kPa
- Flame Safeguard System: UV Phototube

2-4 Mass

Type	Burner Mass (kg)	Burner Body Mass (kg)	Combustion Tube Mass (kg)	Burner Gun Mass (kg)	Seramic Ball Mass (kg)	Seramic Ball Size (Inch)
RSTB-125	82	52	8	5	17	1/2
RSTB-150	95	58	10	5	22	1/2

2-5 How to ignite

For the initial 30 min, operate this regenerative radiant tube burner at 70% of the rated combustion capacity (low combustion) not to allow steam or dew generated in the initial cold period to make combustion instable, and then operate the burner at the rated combustion capacity (high combustion).

3. Matters to be attended for safety

Before installing, trial- operating, maintaining or inspecting this burner, please learn the inside of this burner, information of safety and other matters to be attended by reading this instruction manual and all of attached documents. In this manual, the matters to be attended for safety are divided into “MUST DO,” “DANGER,” “WARNING” and “CAUTION.”

3-1 How to read symbols



MUST DO

This symbol indicates compelling request for doing



DANGER

In case of wrong operating, it is predicted that dangerous situation will happen and operator or other people may die or may be seriously injured.



WARNING

This symbol indicates that handling against this warning will pose a risk of serious injury.



CAUTION

In case of wrong operating, it is predicted that dangerous situation will happen and the operator or other people will be injured or only material described.

3-2 Precautions for Safety



MUST DO



DANGER

Never fail to exhaust the air in the furnace (pre-purge) before igniting. Repeated ignitions may cause explosion due to the gas stagnated in the furnace. Please install safety devices like a flame suppressor.



Danger



ELECTRIC SHOCK

Never fail to cut the electricity of transformer when you take off the ignition plug in order to check the spark of it.



WARNING



PROHIBITION

Never fail to take off the sight hole when igniting or firing the burner.
※flame in the furnace may blow out.



CAUTION

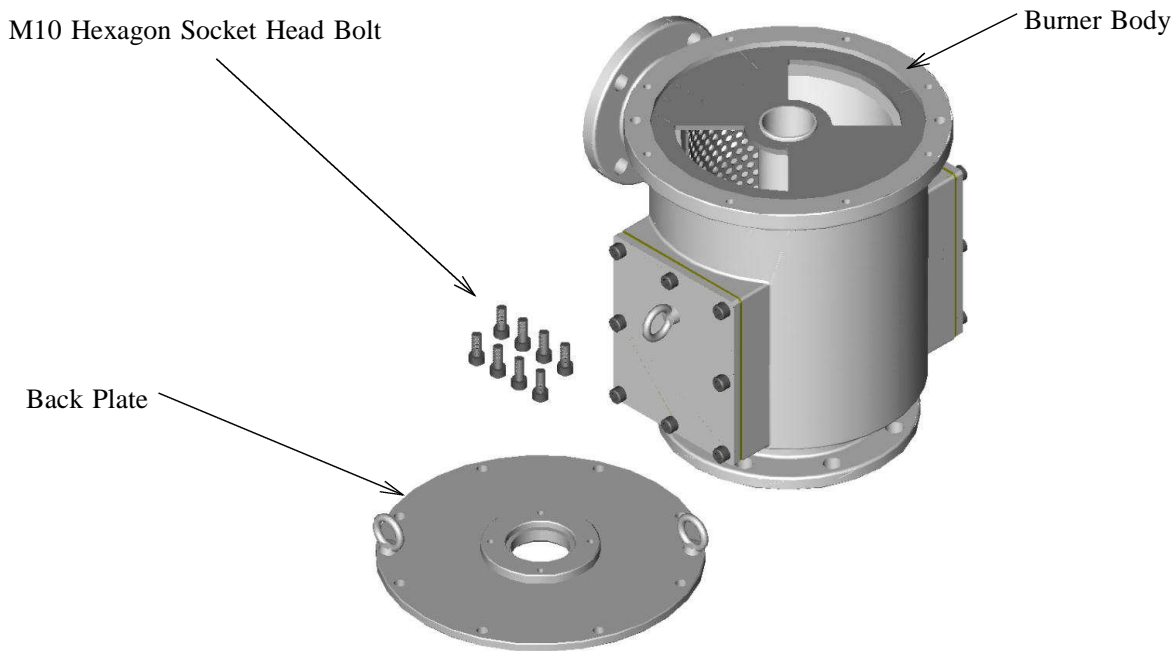


TOUCHING PROHIBITED

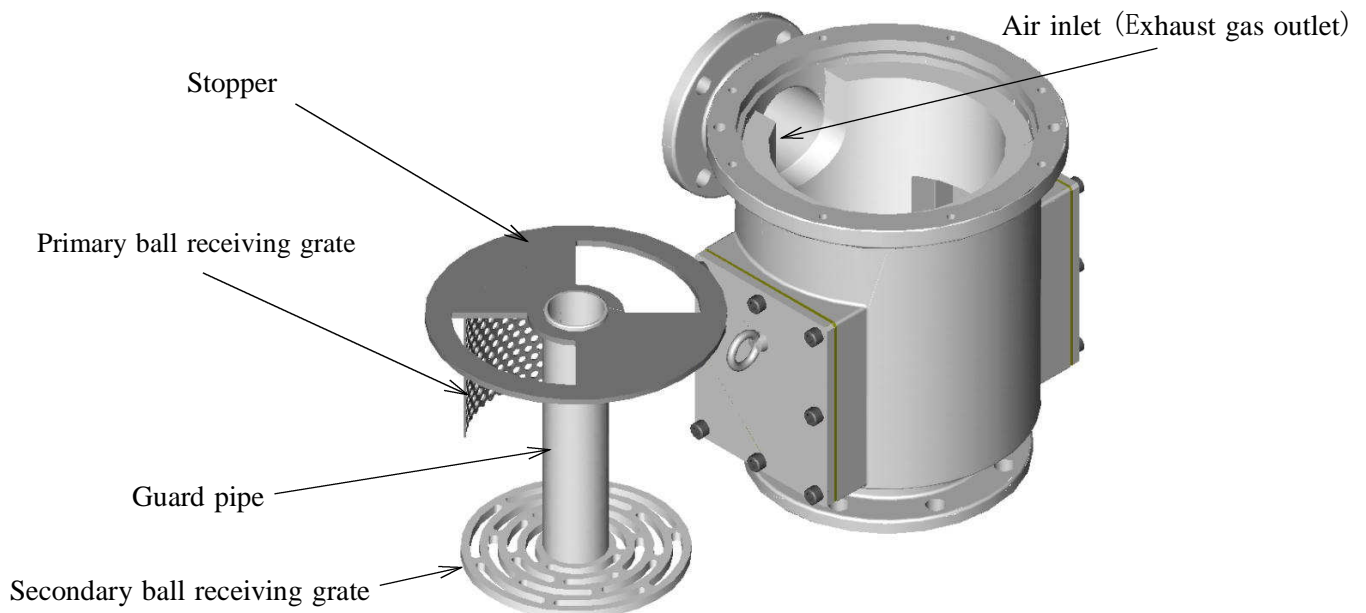
Never touch the body of the burner and fitting parts of the burner gun. These areas are high temperature when the burner is burning.

4 . How to Fill the Ceramic Balls

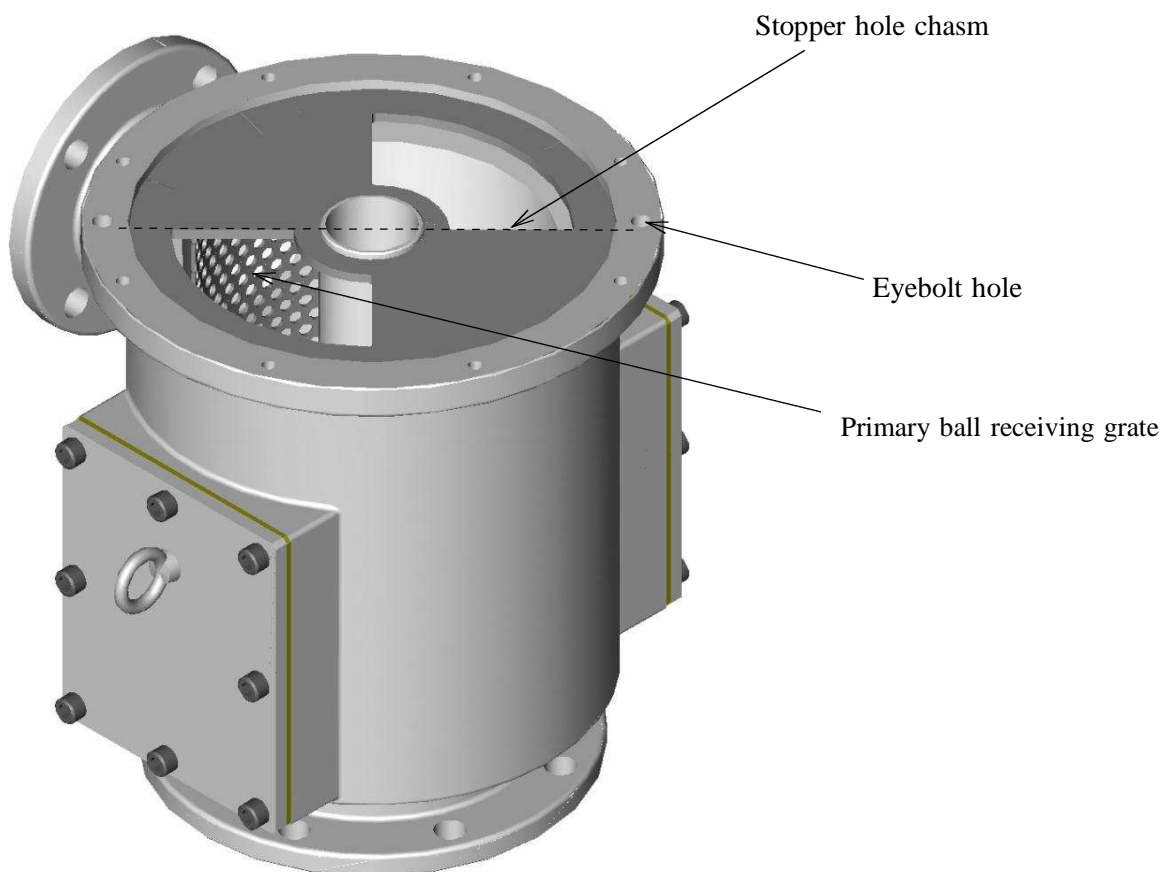
① Loosen the M10 hexagon socket head bolts and remove the back plate from the burner body from the burner body.



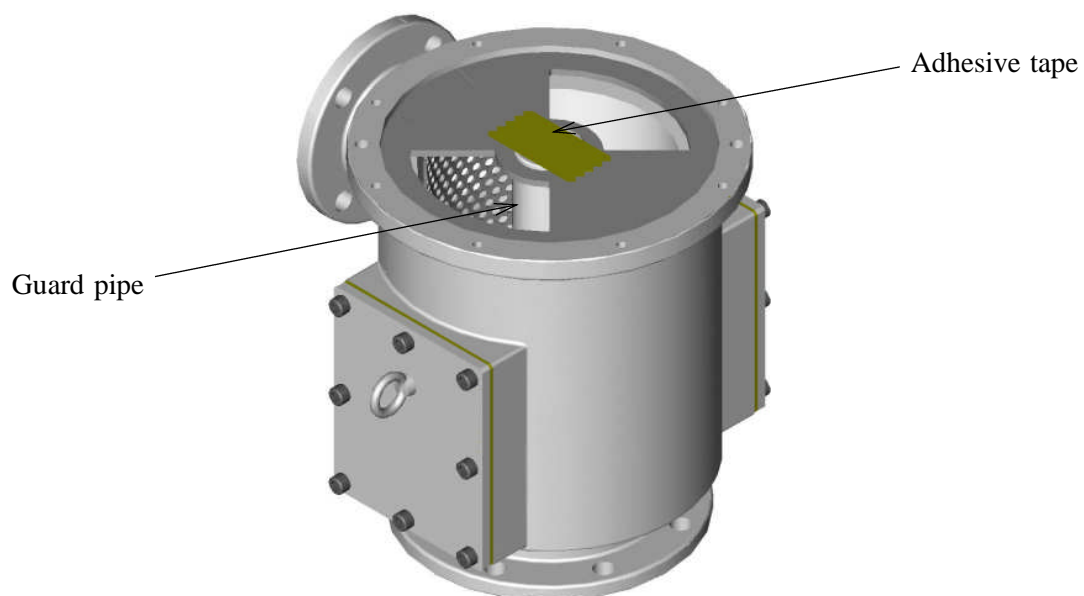
②-1 As shown in the below figure, the stopper, the guard pipe, the primary ball receiving grate and the secondary ball receiving grate can be removed together from the burner body. While confirming that the air inlet (exhaust gas outlet) is covered by the primary ball receiving grate (punching metal) not to allow the ceramic balls to fall in, make the insertion into the burner body.



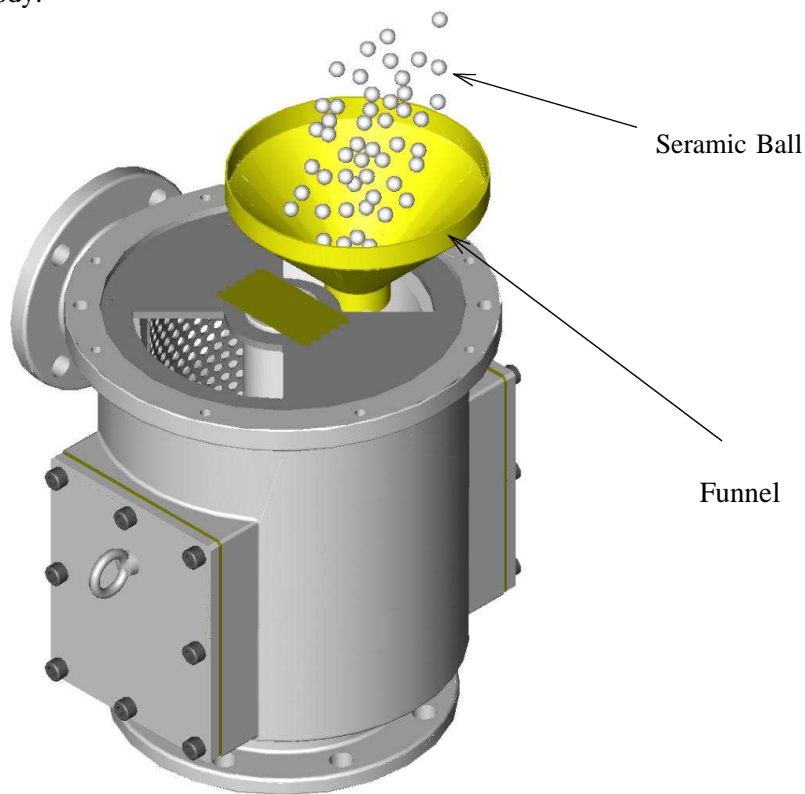
②-2 When the eyebolt hole and the stopper hole chasm both on the back plate are used as earmarks, the primary ball receiving grate can cover the air inlet (exhaust gas outlet) successfully. After the insertion, be sure to make the check visually.



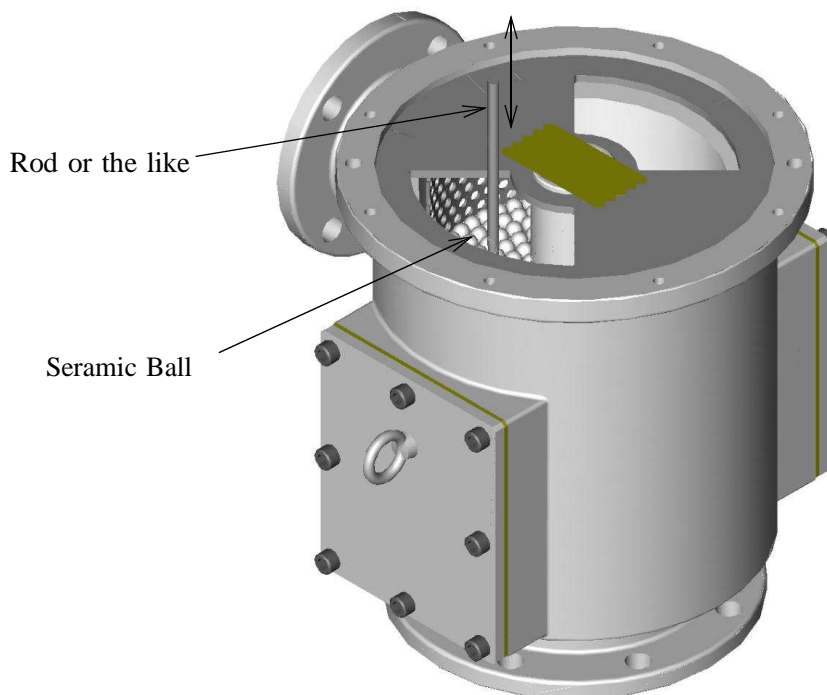
③ Not to allow the ceramic balls to enter the guard pipe, make a seal with adhesive tape or the like.



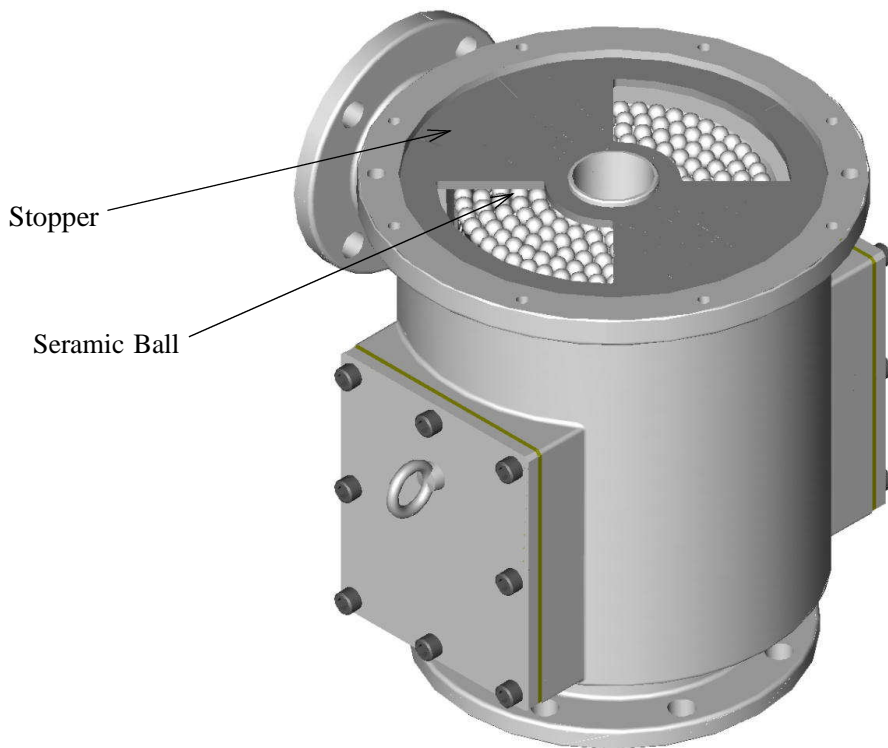
④ Charge the ceramic balls in the burner body. When a funnel or the like is used, the ceramic balls can be charged into the burner body.



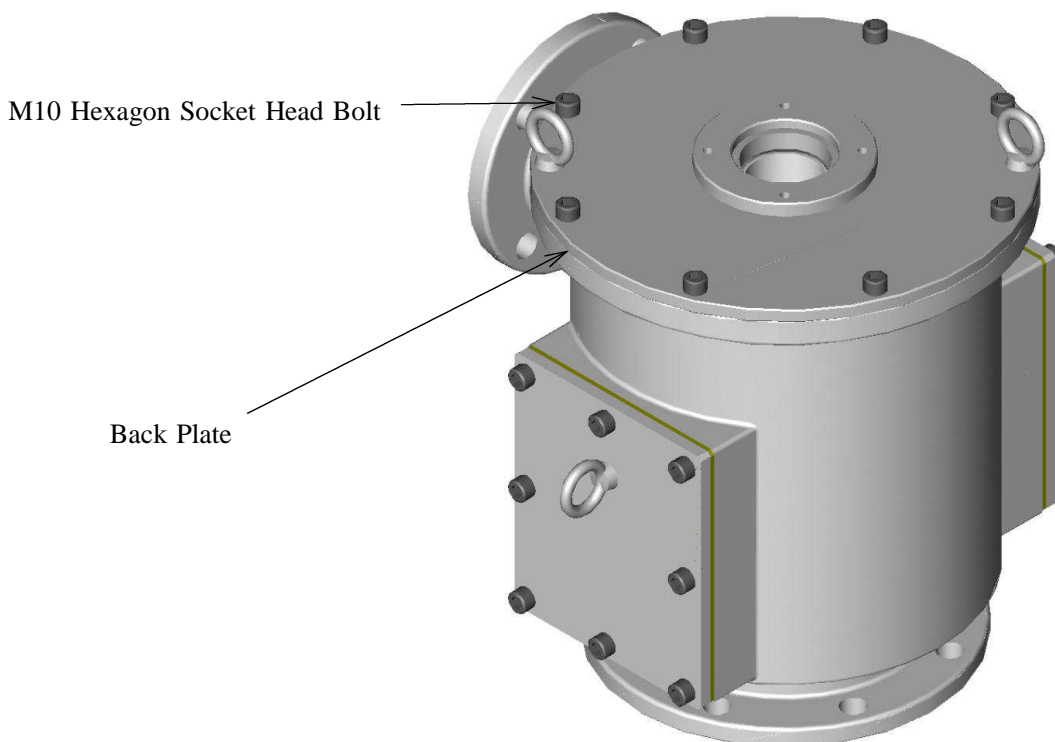
⑤ Charge the ceramic balls slowly, while ramming them with a rod or the like, until the burner body is filled with them evenly and tightly.



⑥ Charge the ceramic balls up to the bottom of the stopper. After filling, be sure to remove the adhesive tape or the like.

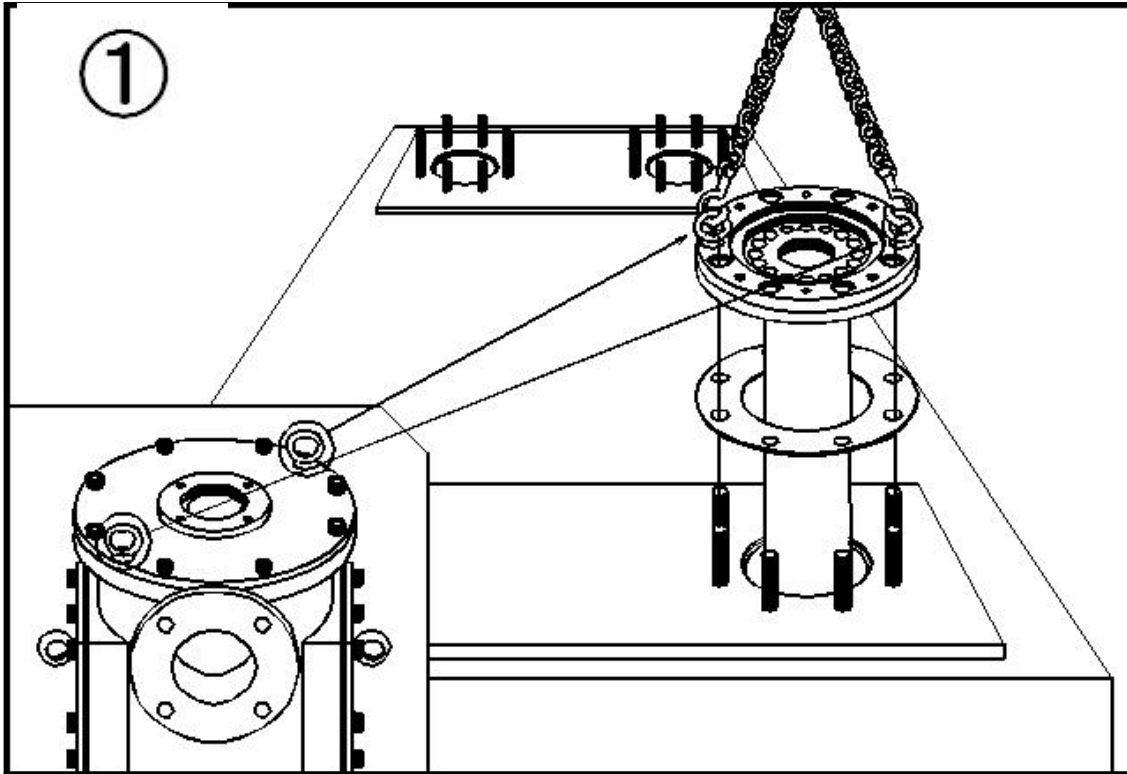


⑦ Mount the back plate to the burner body with the M10 hexagon socket head bolts. Now, the ceramic ball charging is completed.



5. Installation

5-1 How to install vertically (Mounting the burner on the radiant tube base flush-cut bolts)



①-1 To mount the burner on the radiant tube base flush-cut bolts, use flush-cut bolts 8-M16 × 65L.

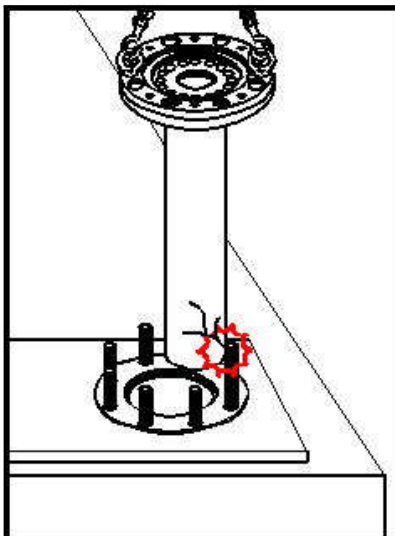


Be sure to select flush-cut bolts 8-M16 × 65L.

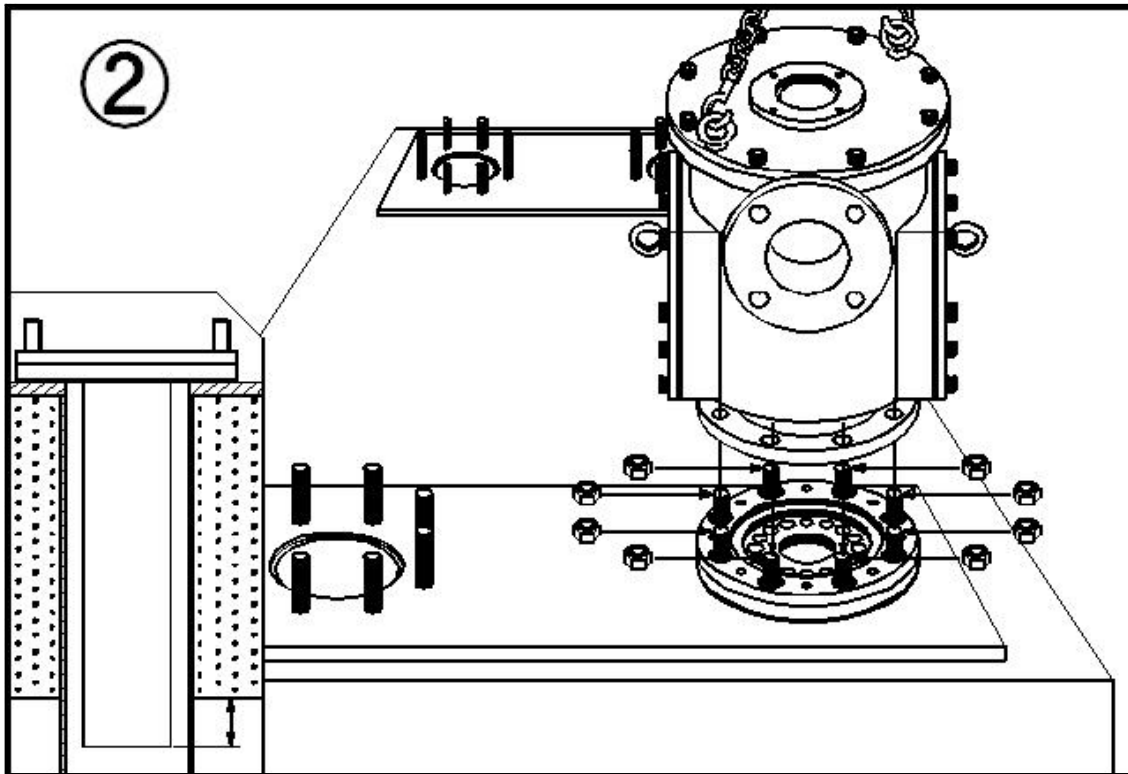
Otherwise, the burner body cannot be mounted (on condition that packing 1 – 3t is used).

①-2 Attach packing 1 – 3t (to be procured by you) to the radiant tube.

①-3 When mounting the combustor tube, relocate the eyebolts 2-M10 from the burner body to the 4-M10 tap of the combustor tube. Then, hoist the burner body with a crane or the like, and attach the eyebolts to the radiant tube.



The combustor tube is ceramic, and therefore vulnerable. When handling, direct good care to the combustor tube not to allow it to contact the radiant tube, the flush-cut bolts, etc.



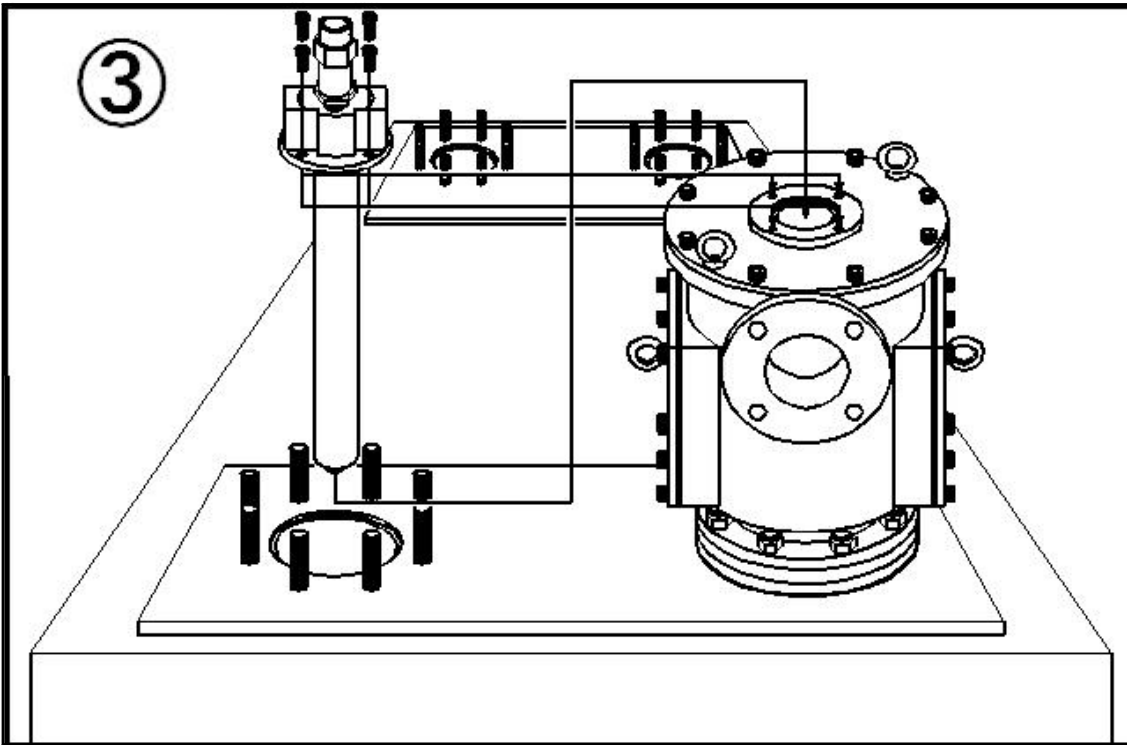
Be sure to protrude the combustor tube end from the furnace wall by over 50 mm to protect the radiant tube from burnout.

②-1Put the eyebolts 2-M10 used for hoisting the combustor tube back to the 2-M10 tap of the burner body. Then, host the burner body with a crane or the like and attach it to the radiant tube.

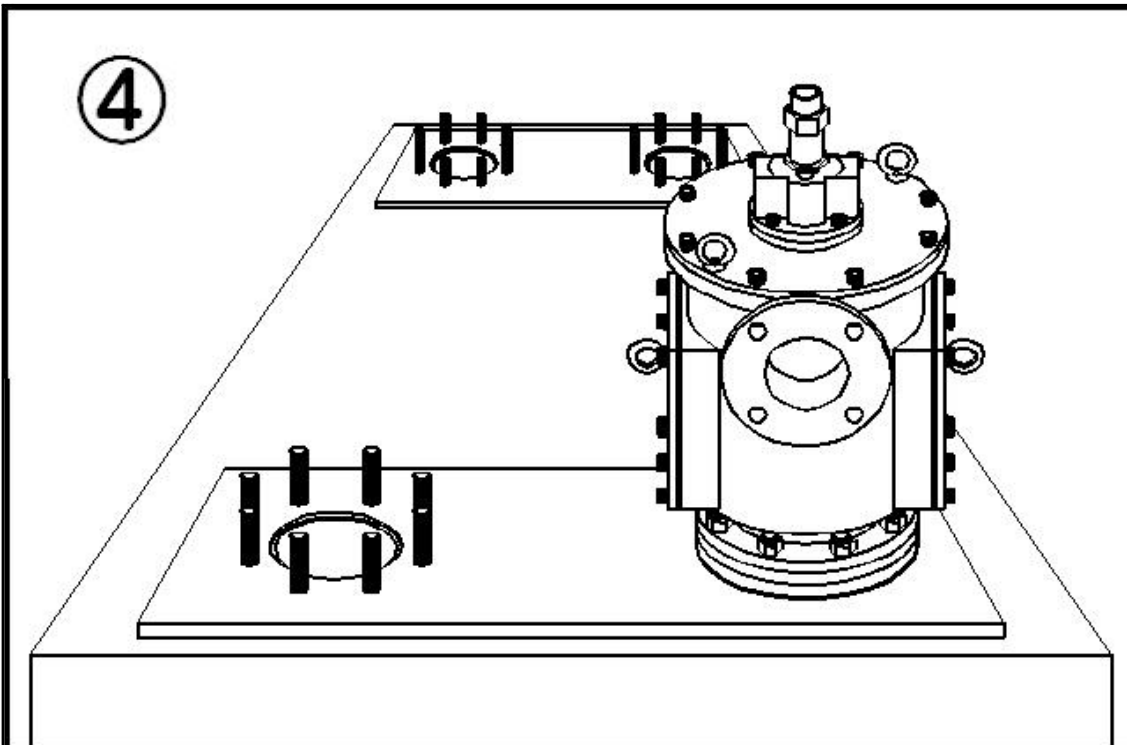
②-2Fix the burner body with the hexagon nuts 8-M16 (to be procured by you).



When mounting the burner vertically, the side plate may take any direction but should be in such a direction that enables easy replacement of ceramic balls. (Side plate: Refer to the structural drawing.)

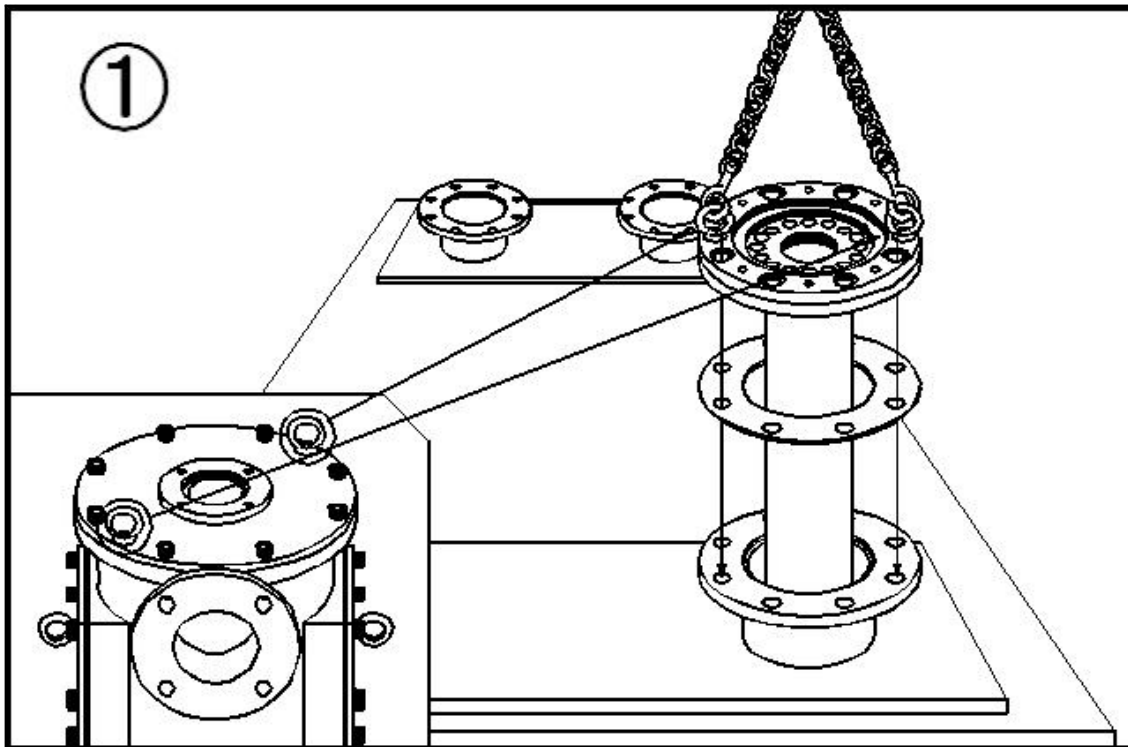


③-1Mount the burner gun with hexagon socket head bolts 4-M8 × 20L.



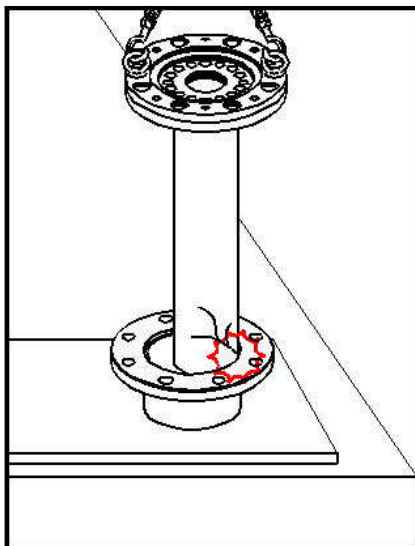
④-1Now, the mounting of one burner is completed. Mount another burner on the radiant tube to complete the installation of the burner set.

5-1 How to install vertically (when the burner is mounted on the JIS 5K flange)

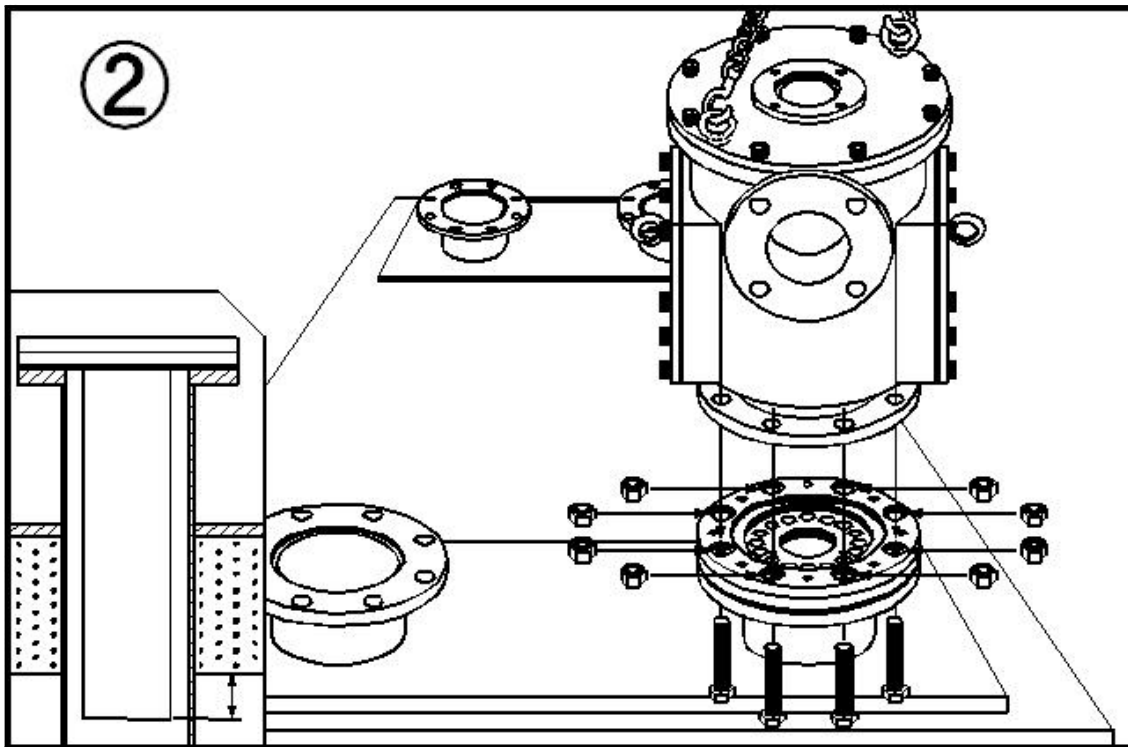


①-1 Attach packing 1 – 3t (to be procured by you) to the radiant tube.

①-2 When mounting the combustor tube, relocate the eyebolts 2-M10 from the burner body to the 4-M10 tap of the combustor tube. Then, hoist the burner body with a crane or the like, and attach the eyebolts to the radiant tube.



The combustor tube is ceramic, and therefore vulnerable. When handling, direct good care to the combustor tube not to allow it to contact the radiant tube, the flush-cut bolts, etc.



Be sure to protrude the combustor tube end from the furnace wall by over 50 mm to protect the radiant tube from burnout.

②-1 Put the eyebolts 2-M10 used for hoisting the combustor tube back to the 2-M10 tap of the burner body. Then, hoist the burner body with a crane or the like and attach it to the radiant tube.

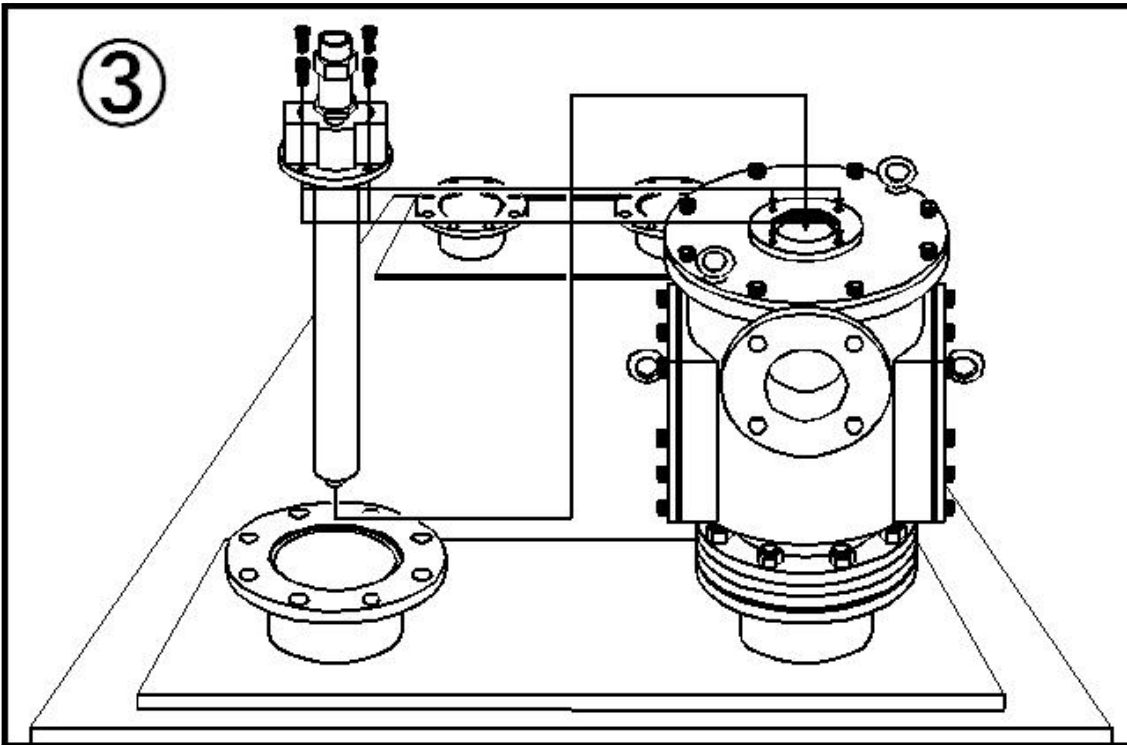
②-2 Fix the burner body with hexagon bolts 8-M16 × 85L (to be procured by you) and hexagon nuts 8-M16 (to be procured by you).



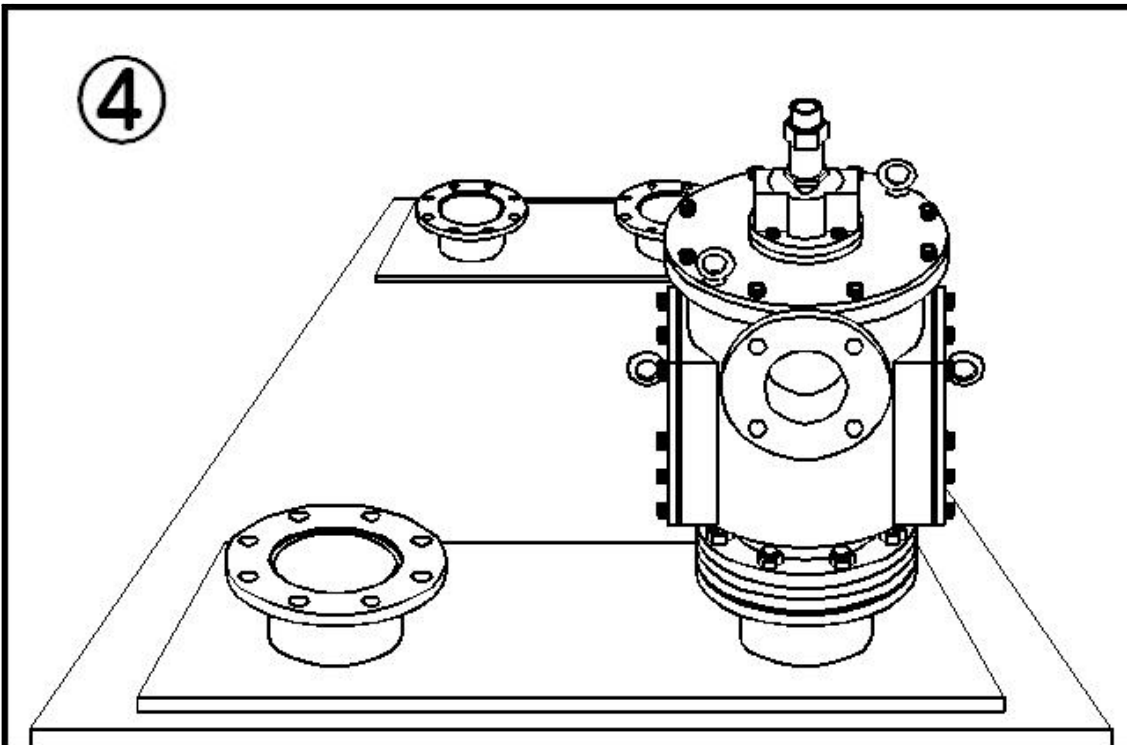
Be sure to select hexagon bolts 8-M16 × 85L. otherwise the burner body cannot be mounted (on condition that JIS 5K flange thickness is 18t and packing 1-3t is used).



When mounting the burner vertically, the side plate may take any direction but should be in such a direction that enables easy replacement of ceramic balls. (Side plate: Refer to the structural drawing.)

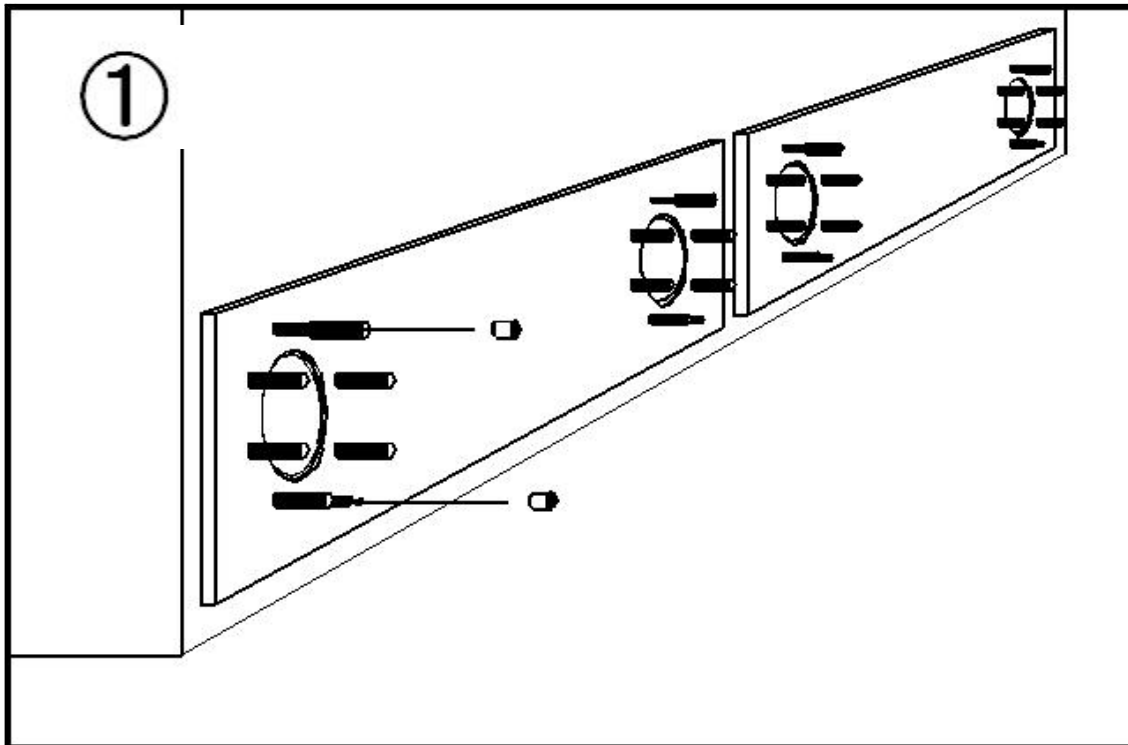


③-1Mount the burner gun with hexagon socket head bolts 4-M8 × 20L.



④-1Now, the mounting of one burner is completed. Mount another burner on the radiant tube to complete the installation of the burner set.

5-3How to install horizontally (Mounting the burner on the radiant tube base flush-cut bolts)

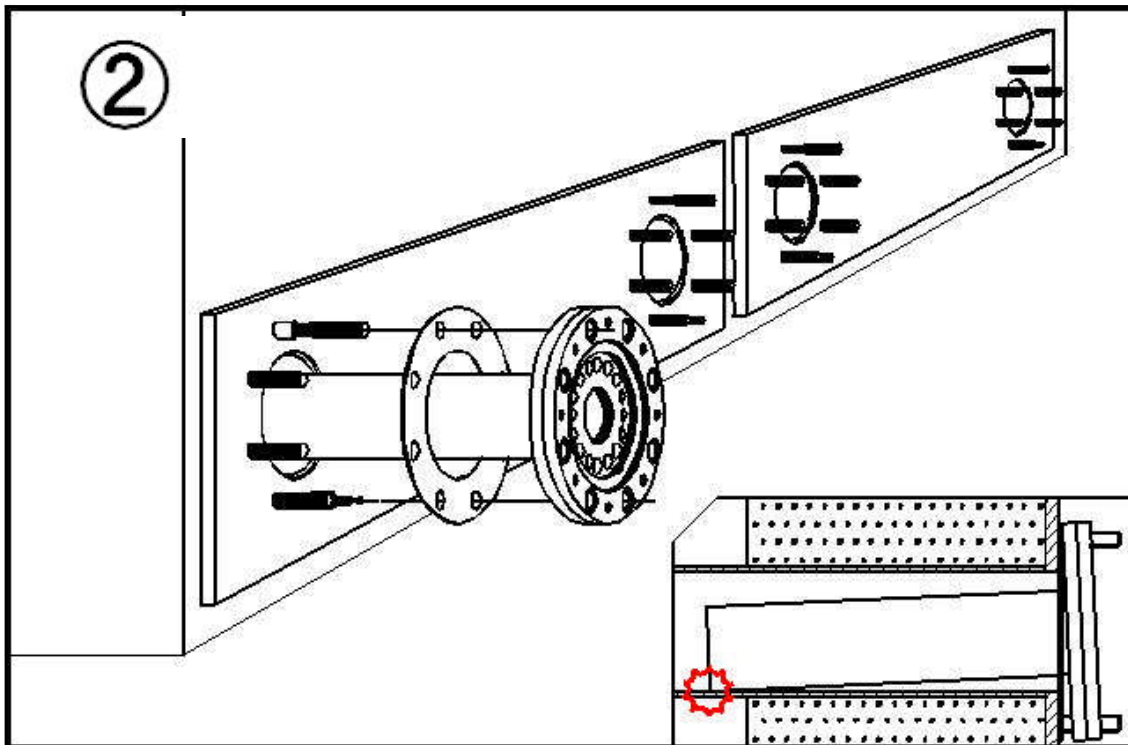


①-1 To mount the burner with the radiant tube base flush-cut bolts, select flush-cut bolts $M10 \times 45L$ for 2 pcs for the top and bottom opposite sides and flush-cut bolts $M16 \times 65$ for the balance 6 pcs as shown in Fig. ①.



Be sure to select hexagon bolts 2- $M10 \times 45L$ and 6- $M16 \times 65L$. otherwise the burner body cannot be mounted (on condition that JIS 5K flange thickness is 18t and packing 1-3t is used) .

①-2Screw in 2 circular nuts on the 2 flush-cut bolts 2- $M10 \times 54L$ on the top and bottom opposite sides as shown in Fig.

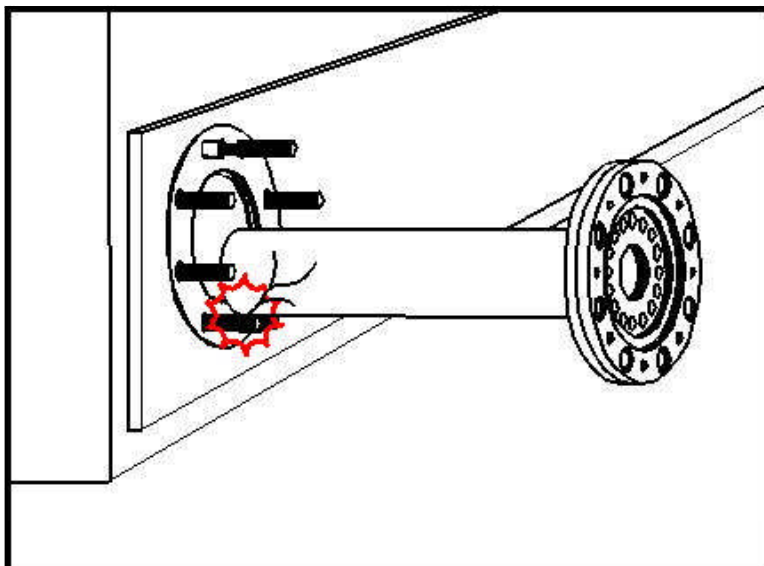


②-1 Attach packing 1 – 3t (to be procured by you) to the radiant tube.

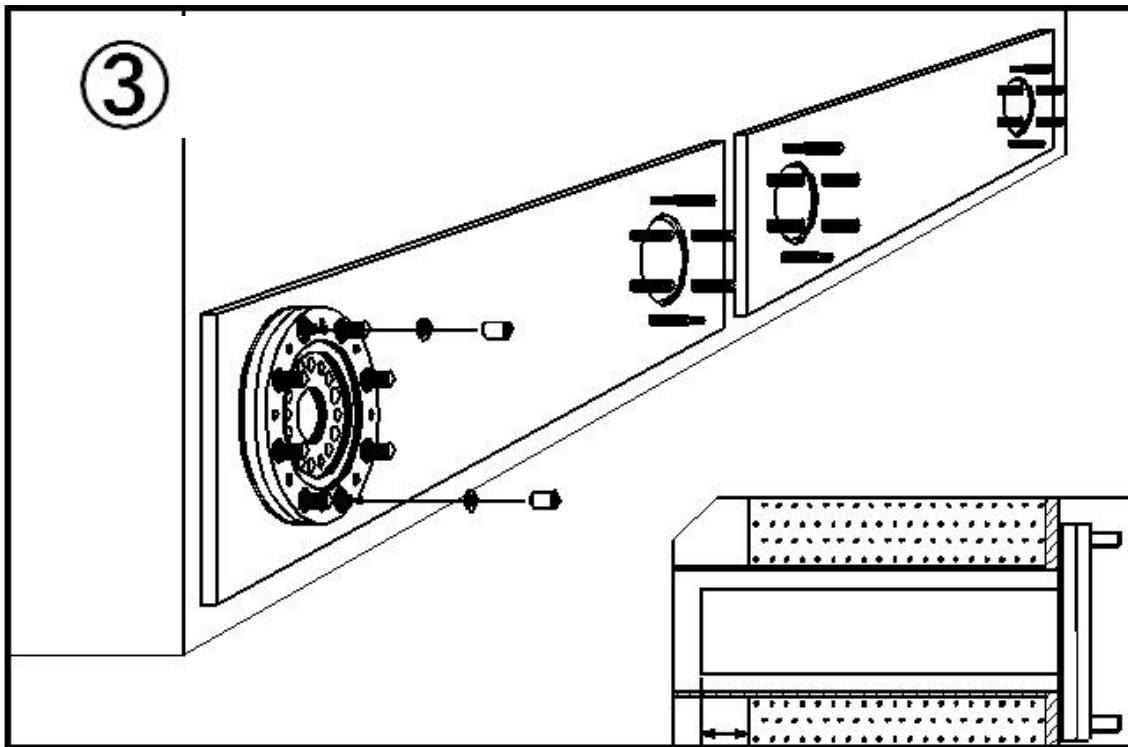
②-2 Attach the combustor tube.



When the combustor tube is inserted on the flush-cut bolts, the combustor tube has not yet been fixed! Slowly put the end of the combustor tube at the bottom inside the radiant tube inside bottom.



The combustor tube is ceramic, and therefore vulnerable. When handling, direct good care to the combustor tube not to allow it to contact the radiant tube, the flush-cut bolts, etc.



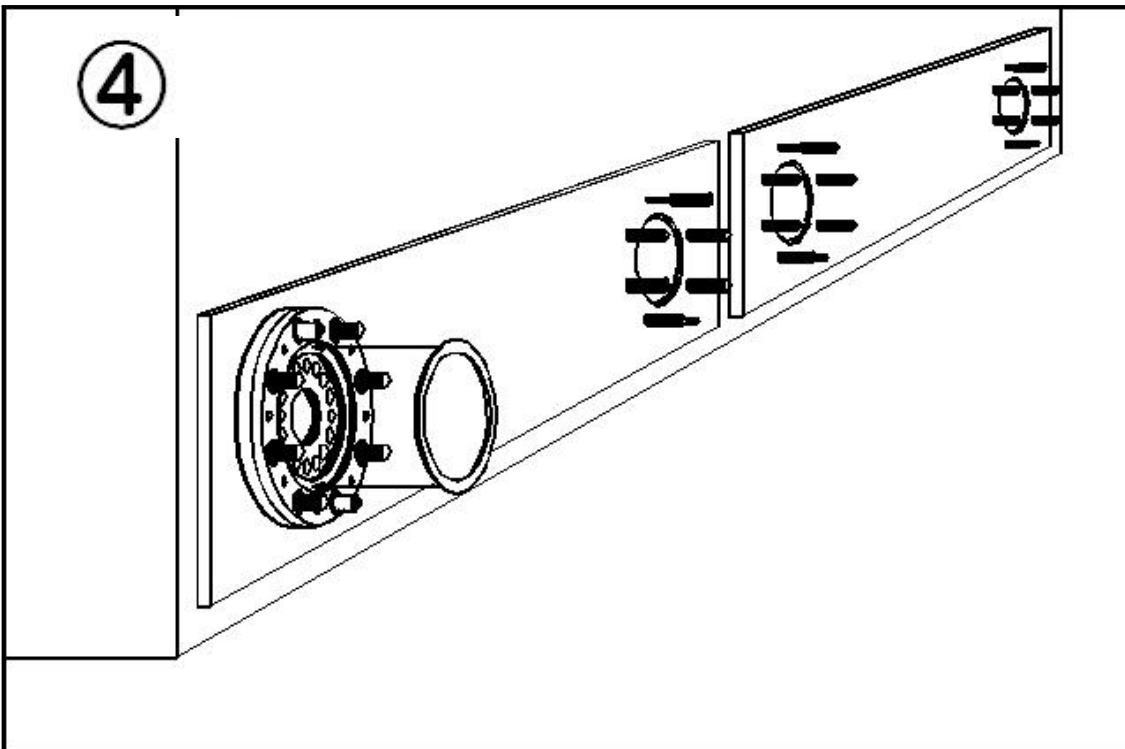
③-1 While pressing of the combustor tube, screw in 2 flat washers M12 and 2 hexagon socket circular nuts supplied as accessories on the flush-cut bolts 2-M10 × 45L to fix the combustor tube.



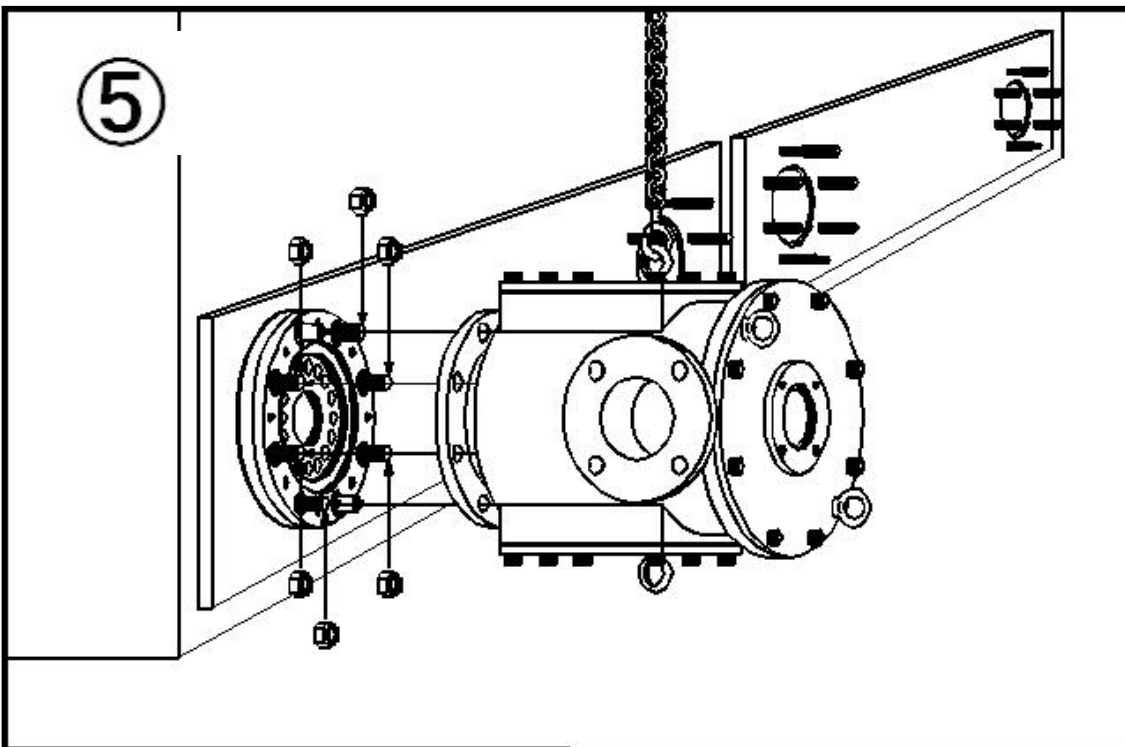
Be sure to protrude the combustor tube end from the furnace wall by over 50 mm to protect the radiant tube from burnout.



The circular nuts, the hexagon socket head circular nuts and the flat washers are parts for fixing the combustor tube on the radiant tube. It is recommended to use them, otherwise, when the burner body is removed during maintenance, there is nothing to keep the combustor tube fixed, and the combustor tube end may tilt downward and the combustor tube could be broken.



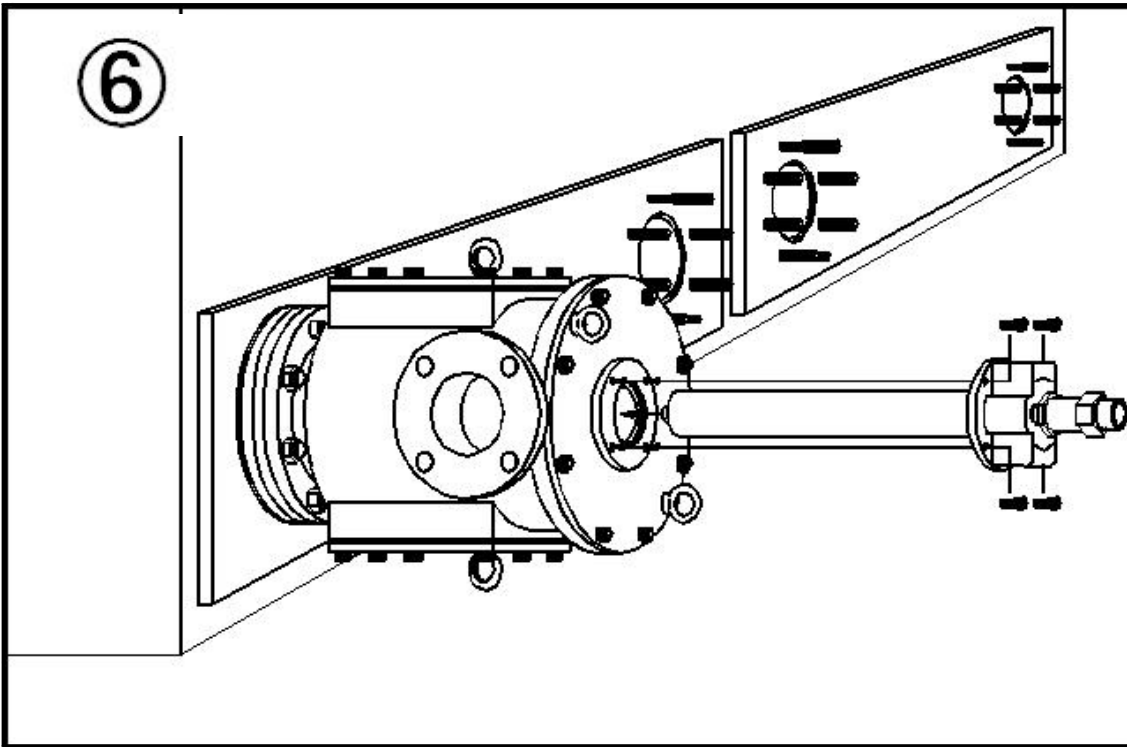
④-1 Attach the burner packing to the combustor tube.



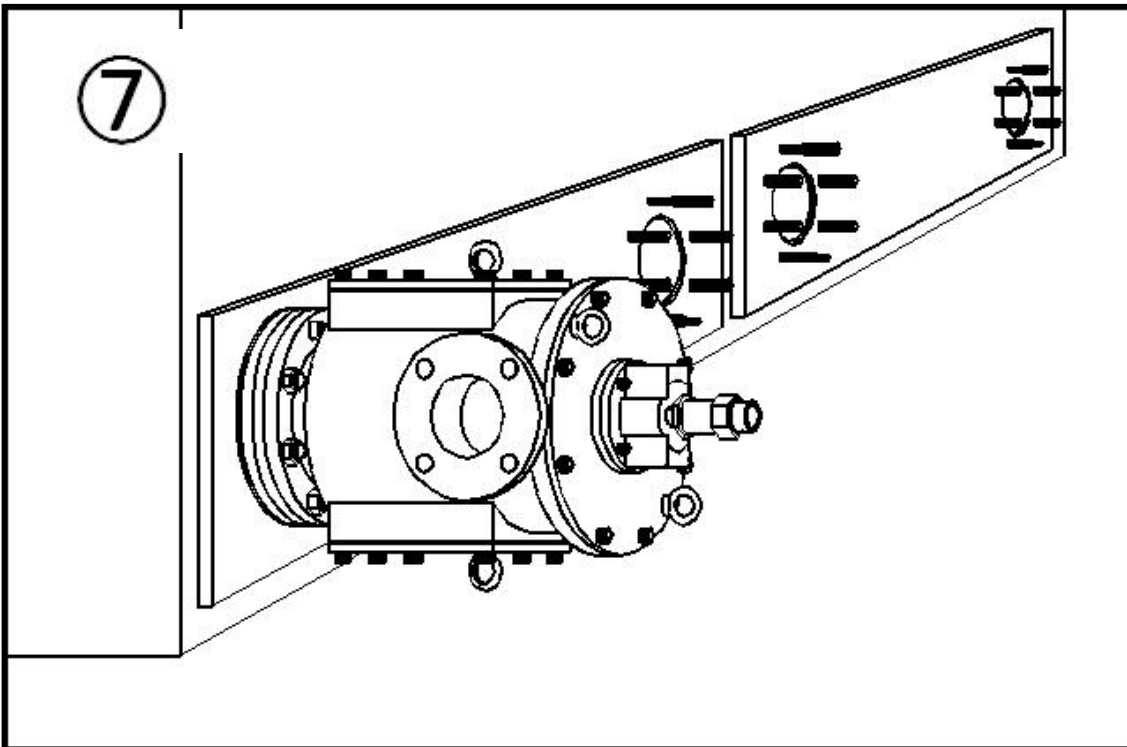
⑤-1 Hoist the burner body with the eyebolts attached to the side plates with a crane or the like, and fix the burner body with hexagon nuts 6-M16.



When mounting the burner horizontally, be sure to direct the side plates on the burner body upside/downside to facilitate the Ceramic ball replacement. (Side plate: Refer to the structural drawings.)

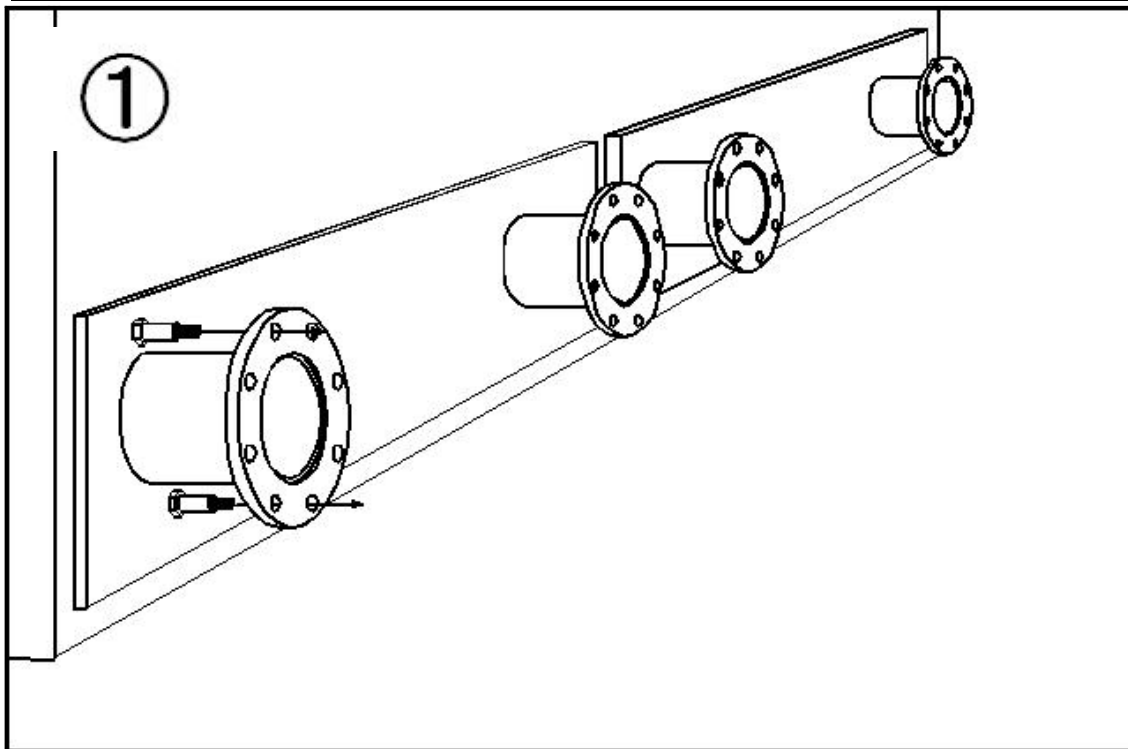


⑥-1Mount the burner gun with hexagon socket head bolts 4-M8 × 20L.

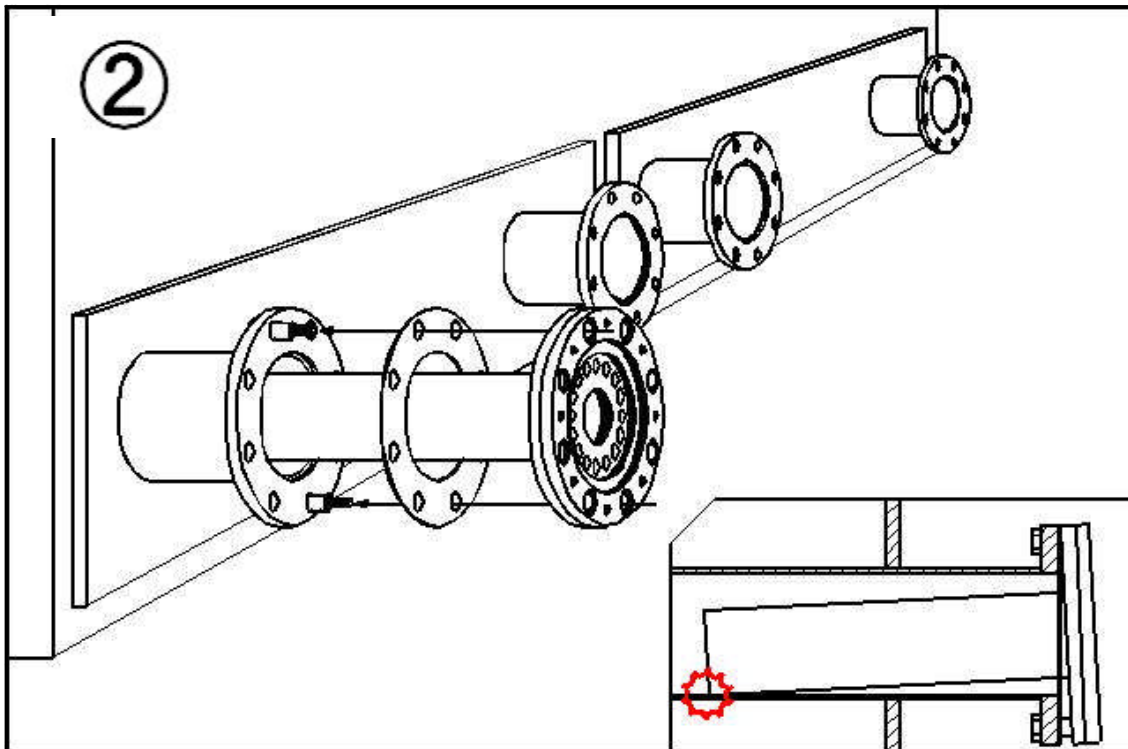


⑦-1Now, the mounting of one burner is completed. Mount another burner on the radiant tube to complete the installation of the burner set.

5-4How to install horizontally (when the burner is mounted on the JIS 5K flange)



①-1Insert 2 reamer bolts into 2 flange holes 8- ϕ 19 on the top and bottom opposite sides.

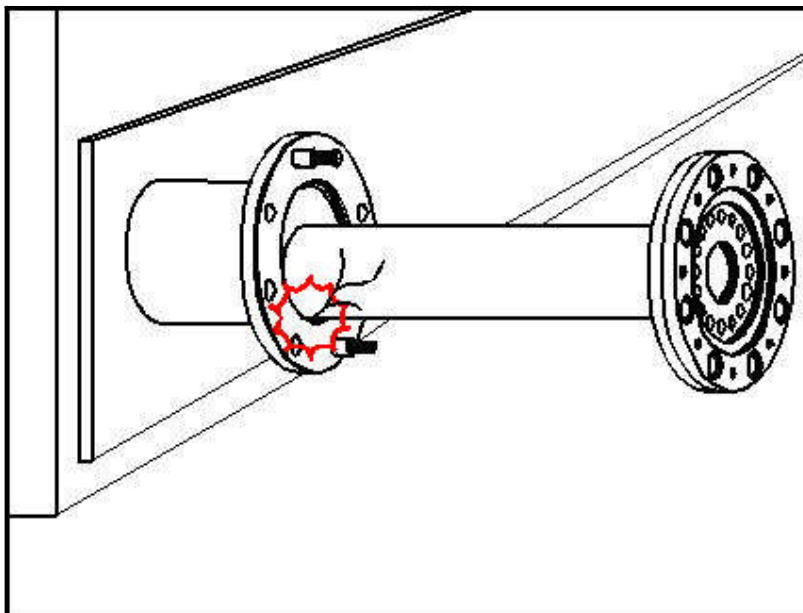


②-1 Attach packing 1 – 3t (to be procured by you) to the radiant tube.

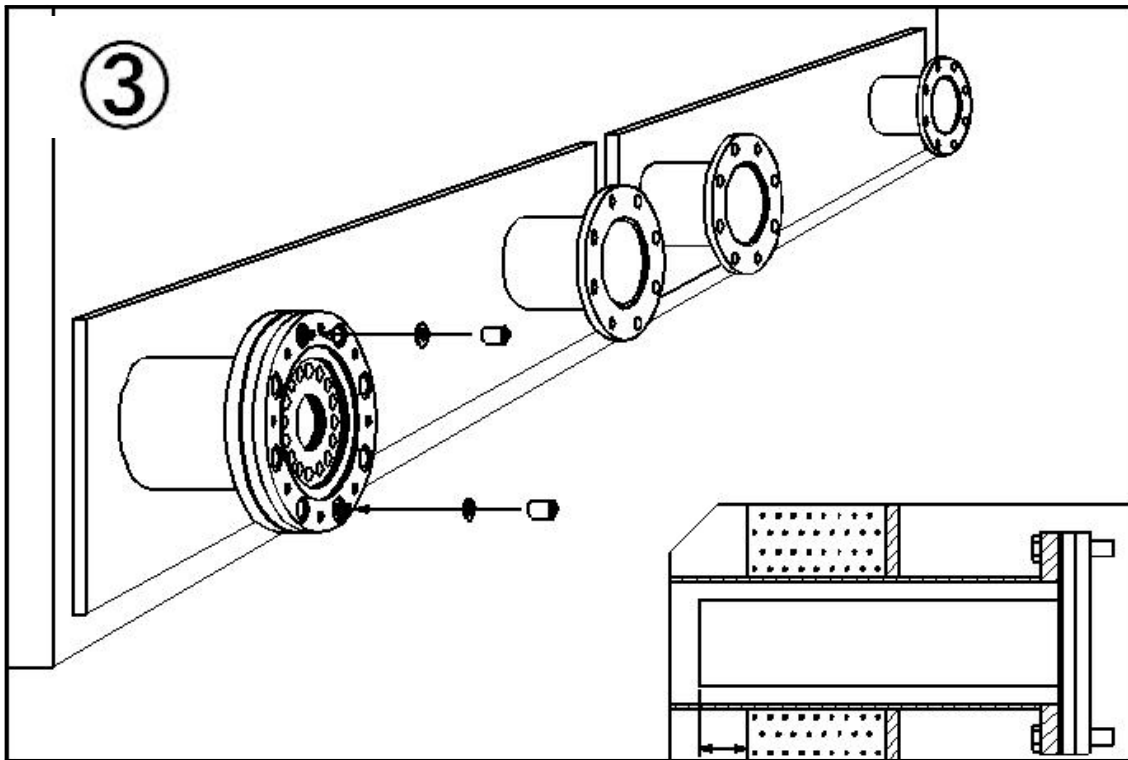
②-2 Attach the combustor tube.



When the combustor tube is inserted on the flush-cut bolts, the combustor tube has not yet been fixed! Slowly put the end of the combustor tube at the bottom inside the radiant tube inside bottom.



The combustor tube is ceramic, and therefore vulnerable. When handling, direct good care to the combustor tube not to allow it to contact the radiant tube, the flush-cut bolts, etc.



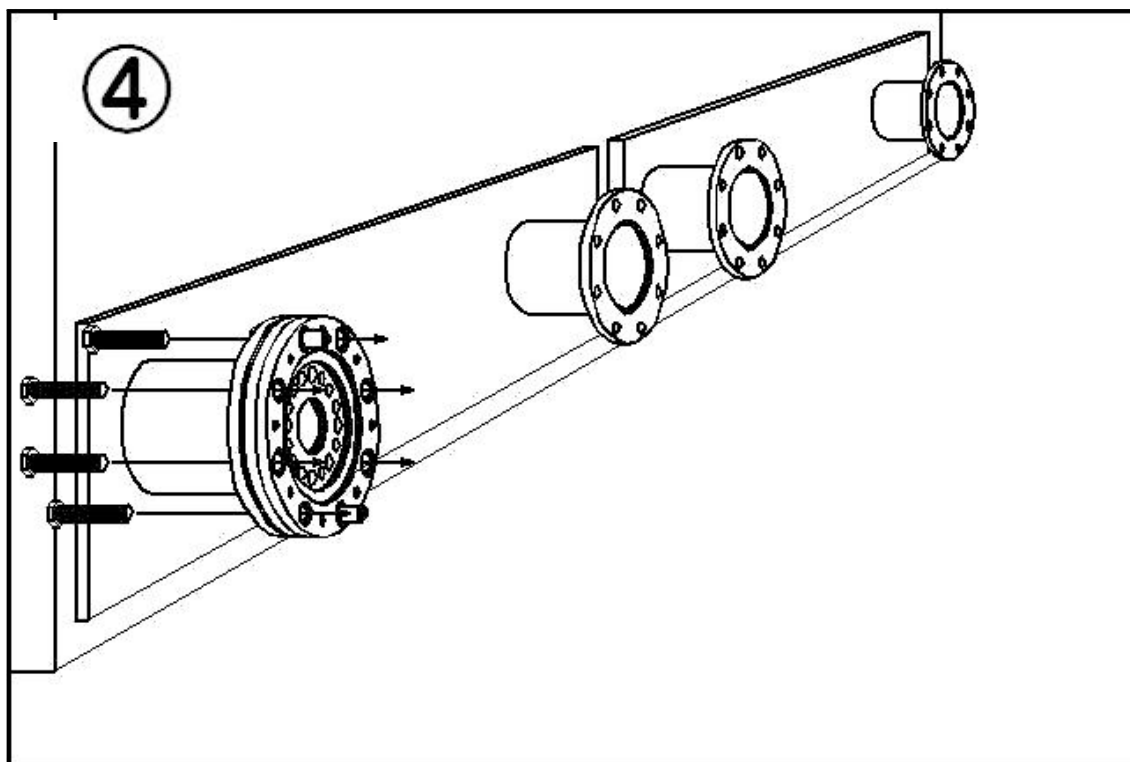
③-1 While pressing of the combustor tube, screw in 2 flat washers M12 and 2 hexagon socket circular nuts supplied as accessories on the flush-reamer bolt to fix the combustor tube.



Be sure to protrude the combustor tube end from the furnace wall by over 50 mm to protect the radiant tube from burnout.



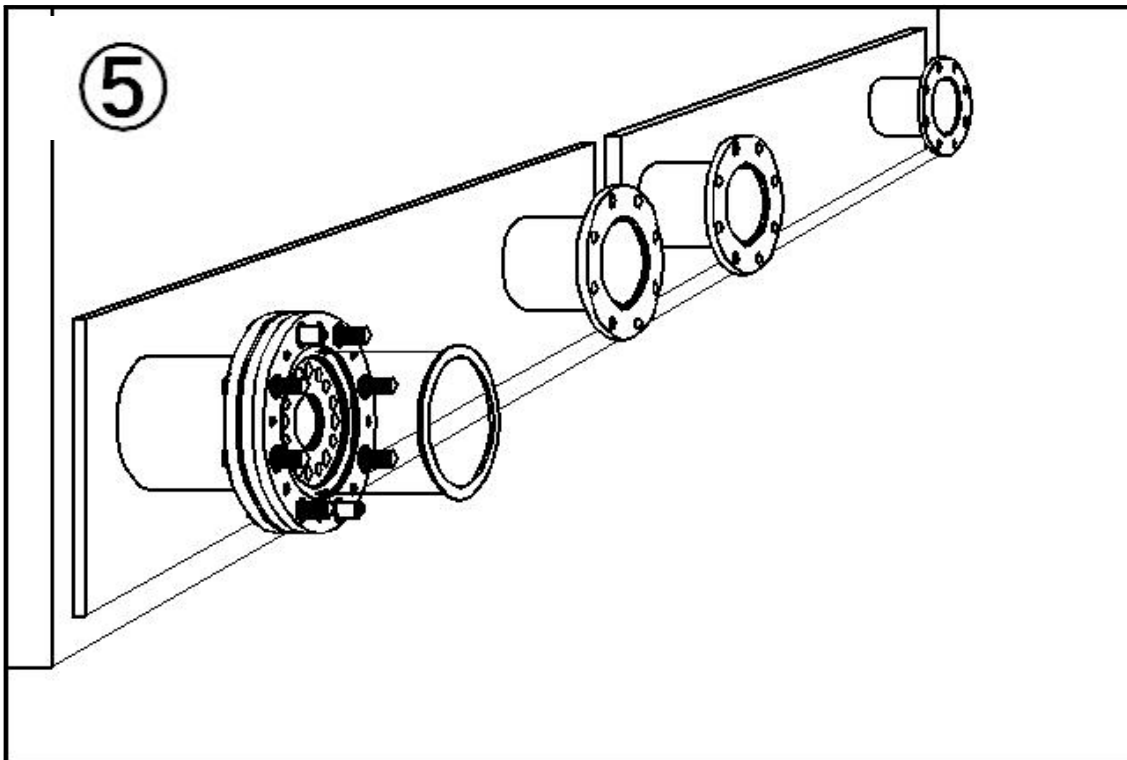
The reamer bolt, the hexagon socket head circular nuts and the flat washers are parts for fixing the combustor tube on the radiant tube. It is recommended to use them, otherwise, when the burner body is removed during maintenance, there is nothing to keep the combustor tube fixed, and the combustor tube end may tilt downward and the combustor tube could be broken.



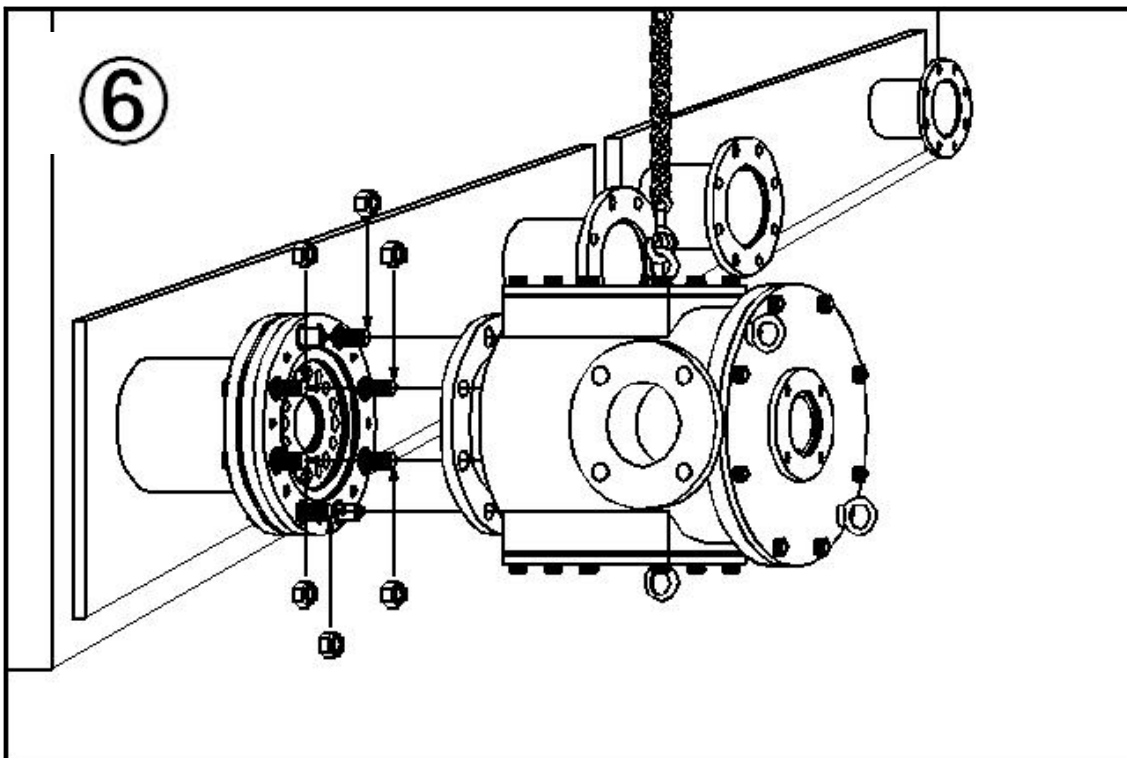
④-1 Attach the hexagon bolts 6-M16 × 85L (to be procured by you) to the radiant tube flange 6-φ 19.



Be sure to select hexagon bolts 6-M16 × 85L. otherwise the burner body cannot be mounted (on condition that JIS 5K flange thickness is 18t and packing 1-3t is used).



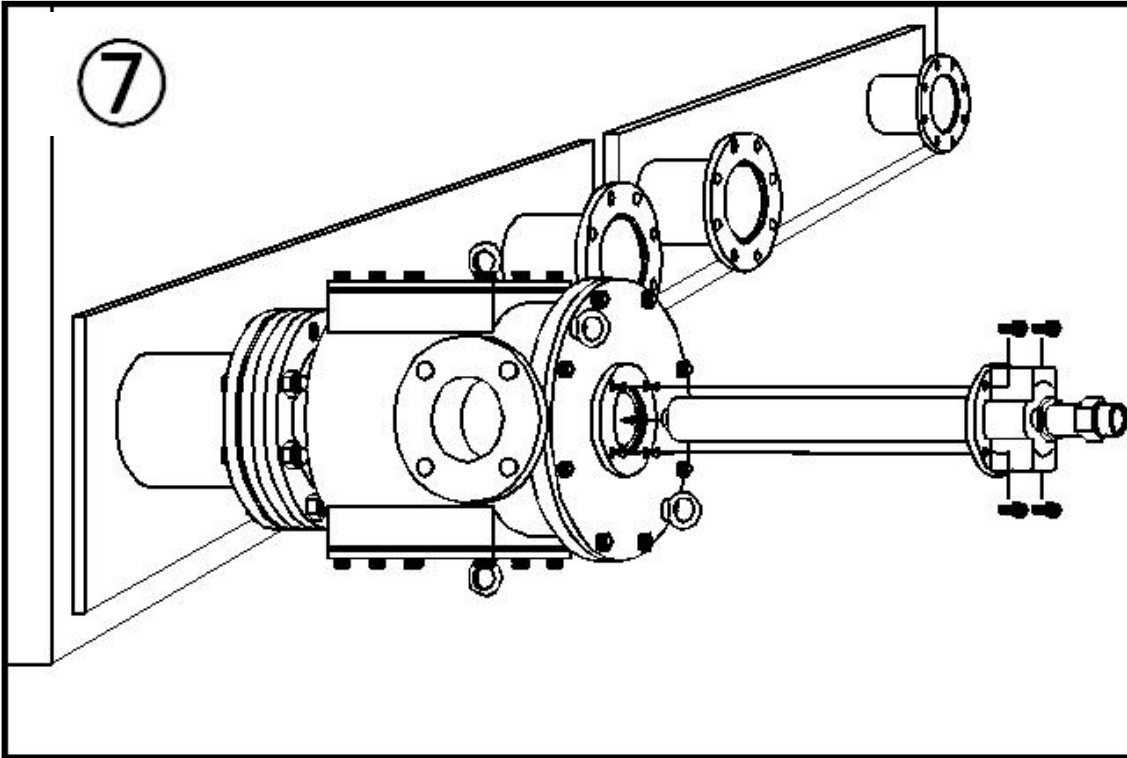
⑤-1 Attach the burner packing to the combustor tube.



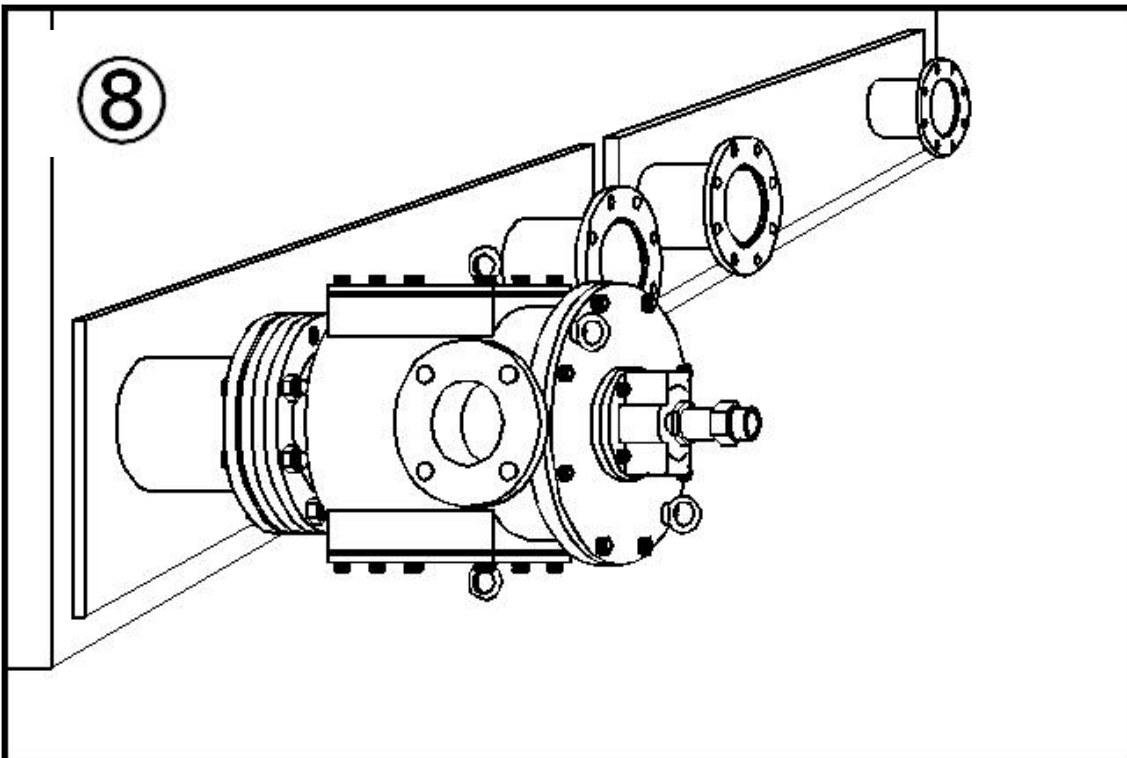
⑥-1 Hoist the burner body with the eyebolts attached to the side plates with a crane or the like, and fix the burner body with hexagon nuts 6-M16.



When mounting the burner horizontally, be sure to direct the side plates on the burner body upside/downside to facilitate the Ceramic ball replacement. (Side plate: Refer to the structural drawings.)



⑦-1Mount the burner gun with hexagon socket head bolts 4-M8 × 20L.



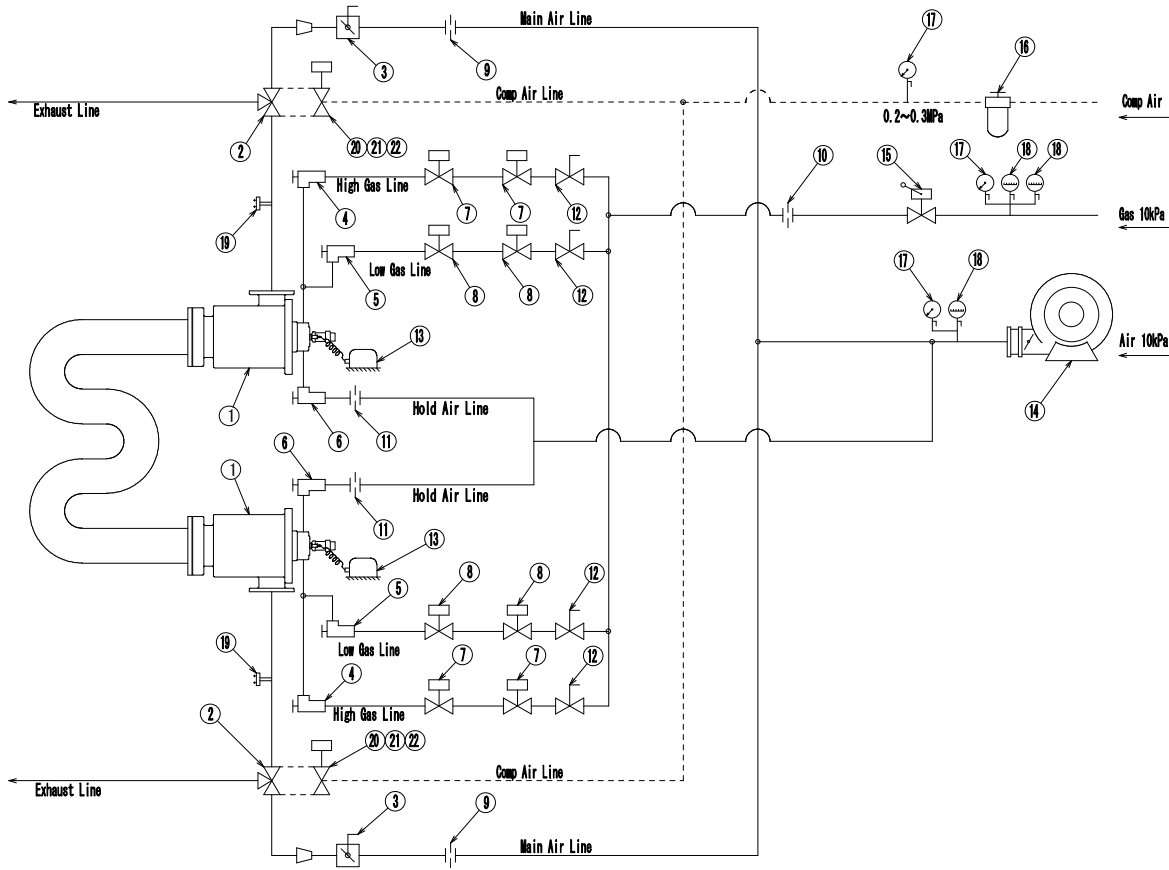
⑧-1Now, the mounting of one burner is completed. Mount another burner on the radiant tube to complete the installation of the burner set.

5-5 Piping

- 1) Direct good care to the inside of the pipe not to leave seal tape fractions, bond, cutting chips, etc. there which may cause malfunction of the solenoid valve, governor, valve, etc.
- 2) In connecting the pipes, provide pipe support in proper positions to prevent the application of any excess force.
- 3) Attach an MO type orifice flow meter to each piping. Also, provide a straight pipe segment that is as long as 5 times or more of the pipe diameter before and behind each orifice flow meter.
The flow direction of the orifice flow meter is fixed. Be careful not to turn around IN and OUT directions.
- 4) Since high-temperature gas containing a large amount of moisture passes through the exhaust side piping, it is advisable to take countermeasures against corrosion, such as draining.
Since the exhaust side piping is held at a high temperature, seclude the piping from the direct contact by human bodies.
- 5) In mounting the gas regulating valve, the butterfly damper, the orifice flow meter, etc., position them to be easy for adjustment.
- 6) Gas regulating valve and the butterfly damper should be lockable.
- 7) Mount the gas solenoid valve as close as possible to the burner inlet.

6 . Flow sheet

6-1Flow sheet (1Set)



6-2Equipment (1Set)

NO.	Parts Name	Quan	NO.	Parts Name	Quan
1	REGENERAIVE RADIANT TUBE BURNER	2	12	Gas Cock	4
2	Delta Valve	2	13	Trans Fomer	2
3	Butterfly Damper	2	14	Blower	1
4	High Gas Limitting Valve	2	15	Emergency Shut-Off Valve	1
5	Low Gas Limitting Valve	2	16	Pressurer Regulator	1
6	Hold Air Limitting Valve	2	17	Pressurer Gauge	3
7	High Gas Solenoid Valve	4	18	Pressure Switch	3
8	Low Gas Solenoid Valve	4	19	Temperature sensor	3
9	Main Air Orifice Flow Meter	2	20	Solenoid Valve	2
10	Gas Orifice Flow Meter	1	21	Speed controller	4
11	Hold Air Orifice Flow Meter	2	22	Silencer	4

7 .Test Operation

7-1Preparing

- 1) Confirm that all gas cocks are closed.
- 2) Check the gas piping for leak with air or nitrogen gas.
- 3) Confirm that all instruments in each line of air and gas can operate normally.
- 4) Confirm that gas is in supply under the specified pressure and that the inside of the piping is being substituted.
- 5) Start the blower, and confirm that the pressure at the outlet is as specified.
- 6) Confirm that the high-pressure air is of the specified pressure level.
- 7) Supply high-pressure air and electricity to the delta valve, and set the changeover time to 30 sec.
- 8) Set the operating time of the delta valve to approx. 0.4 sec with a speed controller.
- 9) Set the auto switch of the delta valve sets the center of the indicator lamp lighting range.

7-2Adjusting

※ Read this section by referring to the flow diagram on P. 26.

- 1) Confirm that the gas cock ⑫, solenoid valve ⑦⑧ and limiting valve ④⑤⑥ fully closed..
- 2) Activate the blower ⑭ and the delta valve ②.
- 3) Read from the main air orifice flowmeter ⑨ the main air amount of air ratio 1.2 calculated from the rated gas amount, and adjust the amount with the butterfly damper ③.
- 4) Read the hold air flow rate from the hold air orifice flowmeter ⑪, and adjust the flow rate with the hold air limiting valve ⑥
- 5) Start the igniting operation. Open the gas cock ⑫ and the low combustion gas solenoid valve ⑧, read the gas flow rate, which is 70% of the rated level (a half of the rated gas differential pressure) from the gas orifice flowmeter ⑩ while maintaining the high combustion gas solenoid valve ⑦ in the closes state, and adjust the gas flow rate with the low combustion gas limiting valve ⑤.
- 6) After the combusting a 70% of the rated level for 30 min, close the low combustion gas solenoid valve ⑧, open the high combustion gas solenoid valve ⑦, read the rated gas flow rate from the gas orifice flowmeter ⑩, and adjust the gas flow rate with the high combustion gas limiting valve ⑤.
- 7) After the furnace temperature rises to the set temperature, check the orifice flowmeters .
- 8) Now, the adjustment is completed.

7-3Adjustment example

Type	Gas (13A)		Main Air Flow quantity (m ³ /h)	Hold Air Flow quantity (m ³ /h)
	Low gas Flow quantity	High gas Flow quantity		
	(m ³ /h)	(m ³ /h)		
RSTB-125	3.5	5.0	66.0	5.0
RSTB-150	5.6	8.0	105.6	5.0

8. Inspection

8-1 Inspection

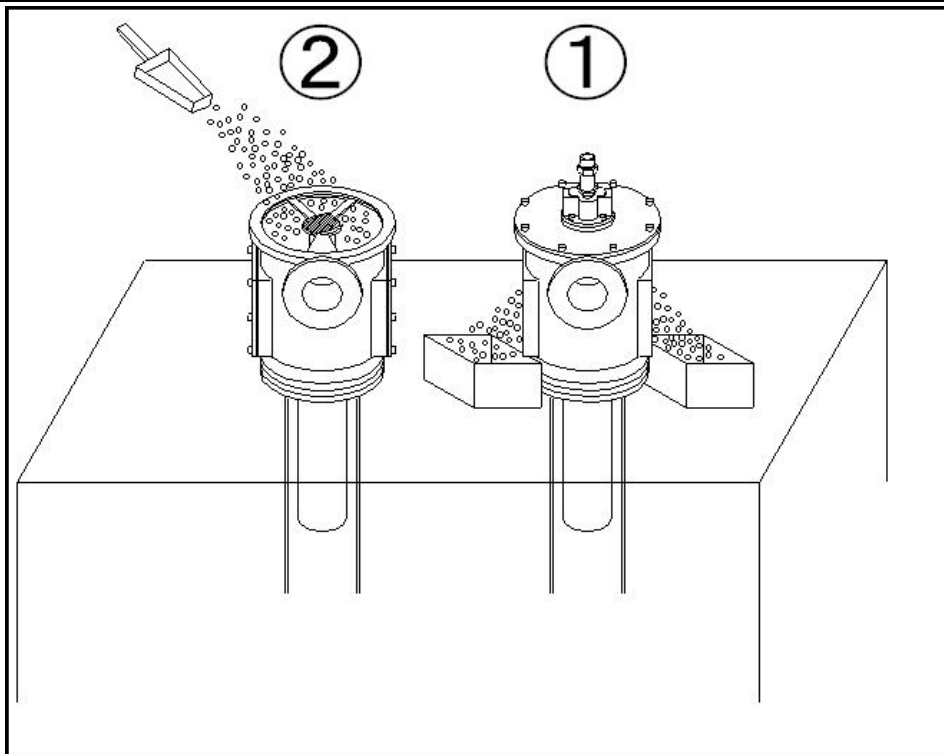
- 1) Check the orifice differential pressure between air and gas, and if there is any deviation, readjust the differential pressure.
- 2) In starting the operation (with the furnace at a cold temperature), set the reference burner pressure appropriately, and record the combustion air differential pressure under that pressure. If the differential pressure lowers to 80% or less clean or replace the heat storage body. If the differential pressure rises to 120% or more, check or replace the delta valve.
- 3) If ignition fails, check the insulator of the spark plug for crack and its tip end for damage or the like.
- 4) Check Ultra Vision for contamination, signal, etc. (semiannually or so).
- 5) Check the bolts and nuts for looseness.
- 6) Check, clean or replace the blower filter (once or so a week).
- 7) Check and clean the filter, mist separator, auto drain, etc, of the high-pressure air (semiannually or so).
- 8) Check the movement and condition of the delta valve. (periodically).

8-2 Precautions

- 1) Stop the combustion blower after the in-furnace temperature lowers to 400 °C or less to protect the nozzle and delta valve. Also, when the blower is in operation, do not stop the actuator of the delta valve.
- 2) When you have to come close to the burner or its periphery or touch the burner or the piping for the purpose of checking, etc., since their temperatures are high, be sure to wear protective gloves, a protective cap, protective glasses, etc.
- 3) Design the piping with allowance enough to prevent pressure loss or drift.
- 4) Take countermeasures against noise, such as attaching a noise filter or the like, as need arises.

9.Ceramic Ball Replacement

9-1How to replace the ceramic balls for the vertically installed radiant tube



※ Read this section referring to the structural drawing on P. 34.

※ When changing the ceramic balls, be sure to make the side plate packing (23) (4 pcs for one burner set) ready beforehand.

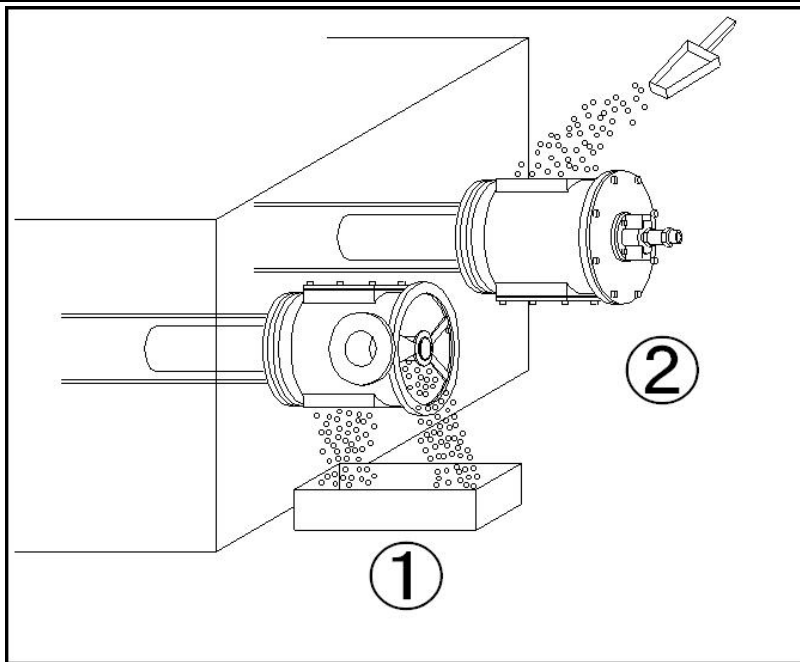
● How to take out the ceramic balls (1) in the above figure

- 1) Place a saucer under the Ceramic ball discharge spout.
- 2) Loosen the hexagon socket head bolts (27) fixing the side plates (14), and remove the side plates (14). Then, the ceramic balls tumble out. Be very careful that the balls may be hot.
- 3) If there is any ceramic ceramic ball cracked or contaminated with foreign objects, replace it by a new one.

● How to charge the ceramic balls (2) in the above figure

- 1) Replace the side plate packing (23) by new ones, and attach the side plates (14) to the burner body.
- 2) Loosen the hexagon socket head bolts (28), and remove the burner gun.
- 3) Loosen the hexagon socket head bolts (26), and remove the back plate (2).
- 4) Seal the pipe hole for inserting the burner gun with adhesive tape or the like (otherwise, the balls may enter the radiant tube).
- 5) Charge the ceramic balls from the hole in the stopper (8).
- 6) Charge the ceramic ball to stopper (8)
- 7) Mount the back plate (2) with the hexagon socket head bolts (26).
- 8) Mount the burner gun with the hexagon socket head bolts (28). Now, the ceramic ball replacement is completed.

9-2 How to replace the ceramic balls for the horizontally installed radiant tube



※ Read this section referring to the structural drawing on P. 34.

※ When changing the ceramic balls, be sure to make the side plate packing (23) (4 pcs for one burner set) ready beforehand.

● How to take out the ceramic balls (1) in the above figure

- 1) Place a saucer under the Ceramic ball discharge spout.
- 2)-1 Loosen the hexagon socket head bolts (28), remove the burner gun, and loosen the hexagon socket head bolts (26) and remove the back plate (2). Then, the balls tumble out. Be very careful that the ceramic balls may be hot.
- 2)-2 Loosen the hexagon socket head bolts (27) fixing the side plates (14), and remove the side plates (14). Then, the ceramic balls tumble out. Be very careful that the balls may be hot.
- 3) If there is any ceramic ball cracked or contaminated with foreign objects, replace it by a new one.

● How to charge the ceramic balls (2) in the above figure

- 1) Replace the side plate packing (23) by new ones, and attach the side plates (14) to the burner body.
- 2) Loosen the hexagon socket head bolts (26), and remove the back plate (2).
- 3) Loosen the hexagon socket head bolts (28), and remove the burner gun.
- 4) Loosen the hexagon socket head bolts (27) fixing the above side plates (14), and remove the side plates (14).
- 5) Charge the ceramic balls from the holes from which the above side panels (14) were removed.
- 6) Charge the ceramic balls at 10 to 12 mm away from the mounting plane of the side plates (14).
- 7) Replace the side plate packing (23) by new ones, and mount the side plates (14). Now, the ceramic ball replacement is completed.

10. Spare Parts Warning Plate

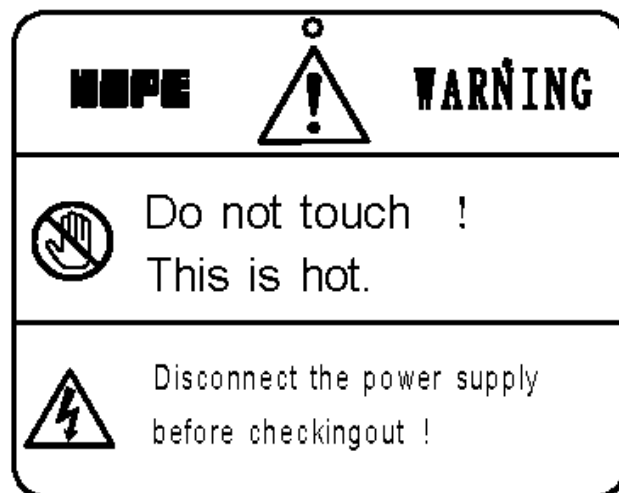
10-1 Spare Parts

There are consumables and replacements as listed below. It is recommended to make them ready as spare parts for use on site.

- 1) Ceramic Ball (25kg/1 bag)
- 2) Delta Valve (DV-80)
- 3) Solenoid Valve (Delta Valve)
- 4) Ignition Plug
- 5) Plate Packing

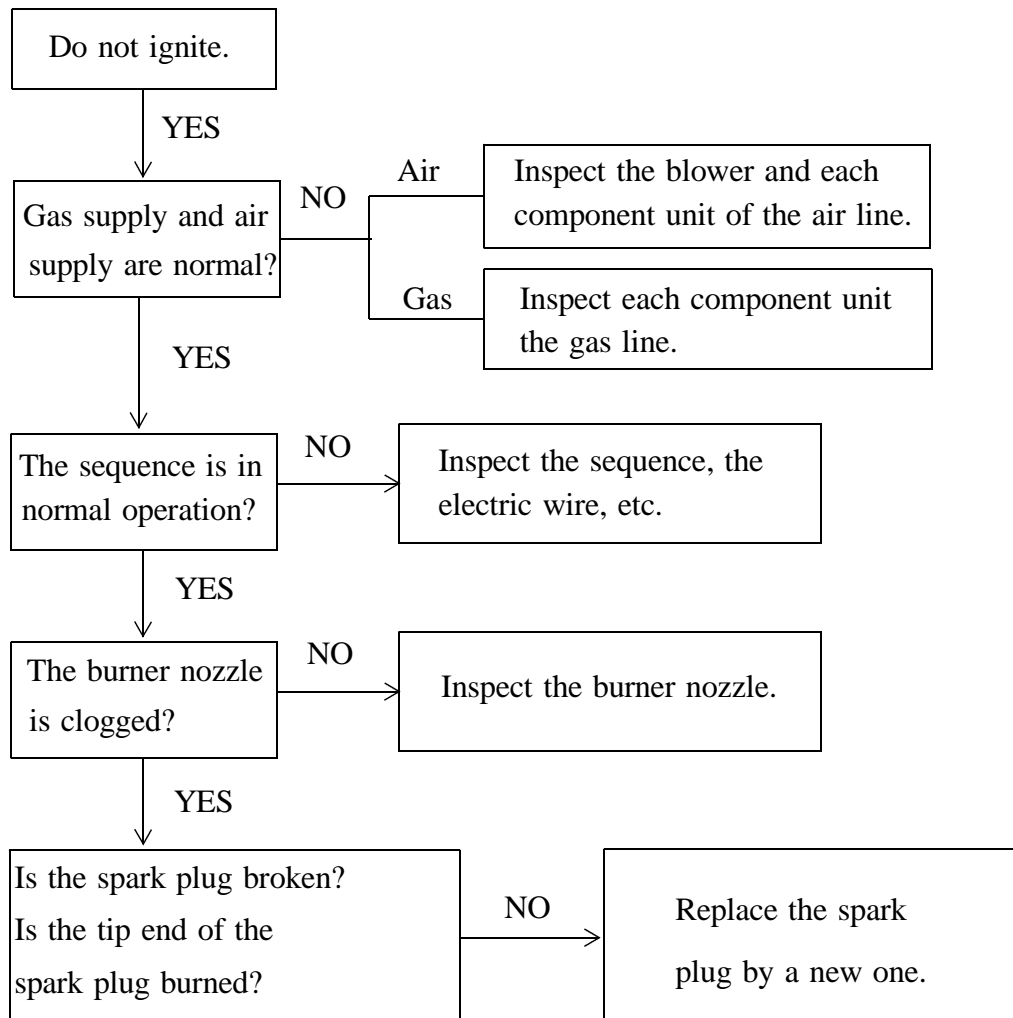
9-2 Warning Plate

When the installation construction has been completed, check to confirm that the warning plate shown below is firmly attached to the burner body. If the warning plate is lost, immediately contact our sales department for instructions.



11.Troubleshooting

11.Troubleshooting

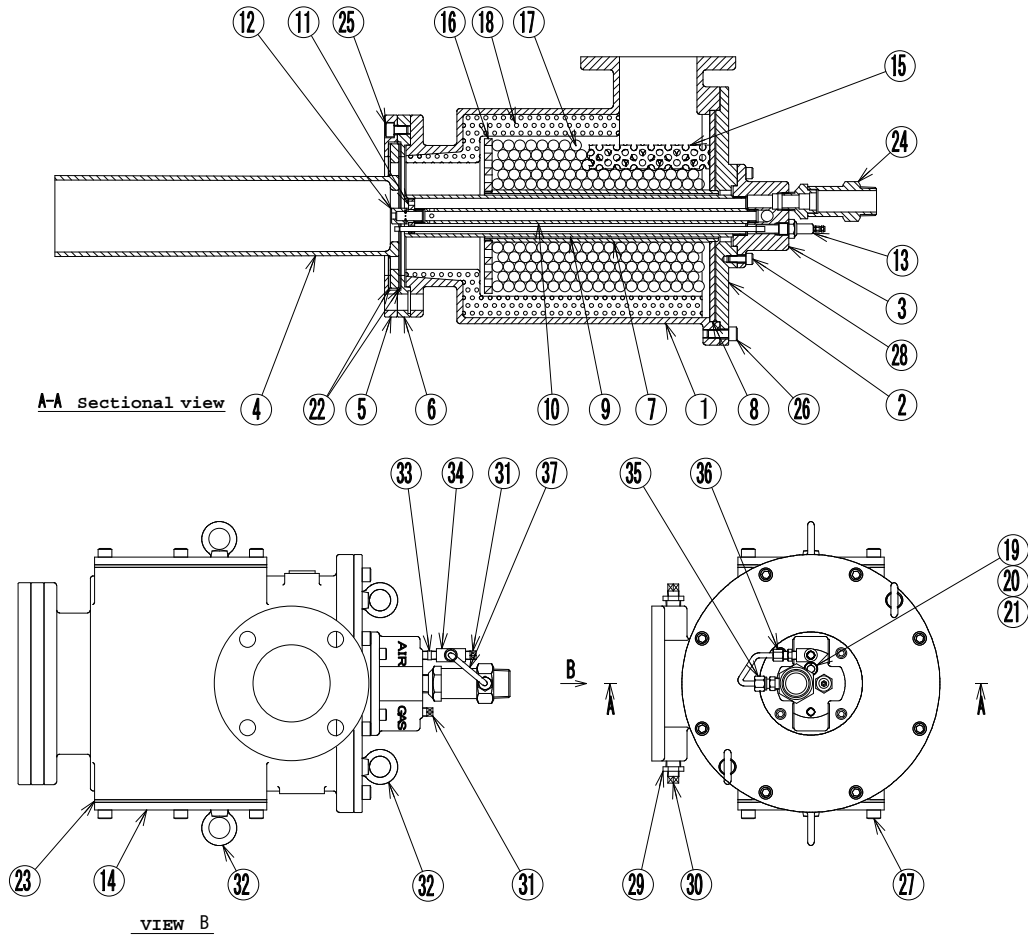


※ Before inspecting the burner and its peripheral units, carefully read the instruction manual attached to each equipment.

※ If there is any questions, contact our sale department.

12.Structural drawing

12-1 Structural Drawing (RSTB)



NO.	Parts Name	Quan	NO.	Parts Name	Quan
1	Burner Body	1	20	Sight Glass Holder	1
2	Back Plate	1	21	Sight Glass Packing	2
3	Burner Gun Body	1	22	CombustorTube Packing	2
4	Combustor Tube	1	23	Plate Packing	2
5	Combustor tube receiving flange	1	24	U.VAdapter	1
6	Combustor Tube Holder Flange	1	25	Hexagon Socket Head Bolt M10 × 16L	4
7	Guide Pipe	1	26	Hexagon Socket Head Bolt M10 × 20L	8
8	Stopper	1	27	Hexagon Socket Head Bolt M10 × 20L	12
9	Hold Air Pipe	1	28	Hexagon Socket Head Bolt M8 × 20L	4
10	Gas Pipe	1	29	Bushing 3/4 × 1/4	2
11	Hold Air Nozzle	1	30	Plug R1/4	2
12	Gas Nozzle	1	31	Plug R1/8	2
13	Ignition Plug	1	32	Eye Bolt	2
14	Lid	2	33	Nipple 6A	1
15	Primary ball receiving grate	1	34	Tee 6A	1
16	Secondary ball receiving grate	1	35	Ring Joint 6A × φ 6	1
17	Ceramic Ball	1	36	Ring Joint 8A × φ 6	1
18	In Sulating Material	1	37	Copper Pipe φ 6	1
19	Sight Glass	1			

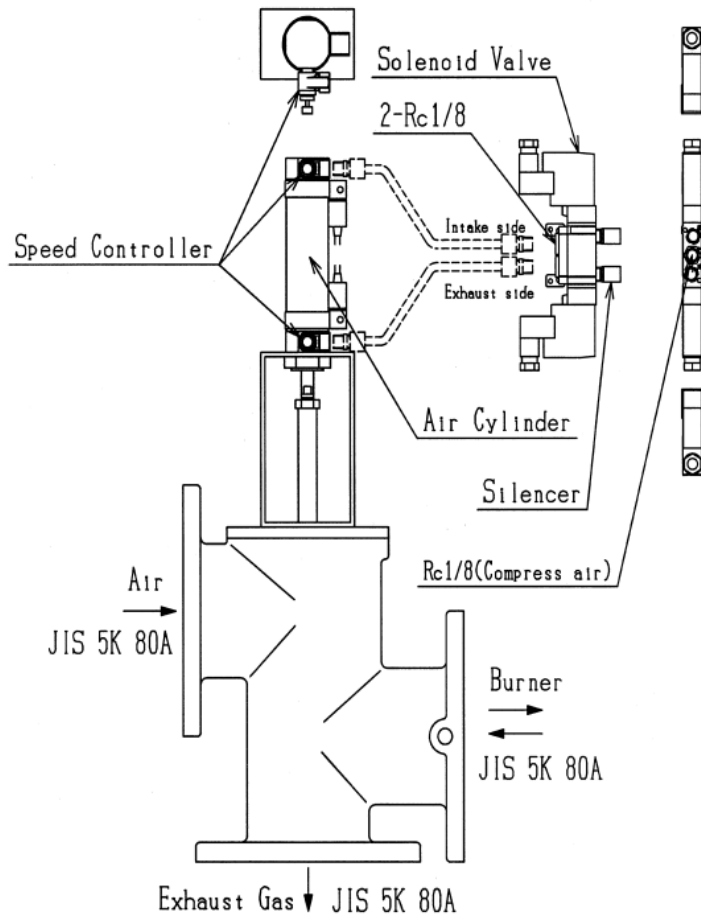
1 3 . Delta Valve (D V - 8 0)

As a delta valve controlling this regenerative radiant tube burner, please use HOPE DV-80.

13-1Outline

By feeding compressed air alternately to both ends of the driving cylinder, the flow passages for combustion air and combustion exhaust gas are changed over each other. The 3 connection ports are connected to the burner, the combustion air and the exhaust gas, respectively.

13-2Overview drawing



※ When installing, make the air cylinder erected upright.

13-3Specification

1) Delta Valv

Type : DV-80
Fluid : Air Exhaust Gas
Exhaust Temperature : 400 °C or less

2) Cylinder

Type : CDM2BZ32-75-B54
Fluid : Air
Prexxure Range : 0.2 ~ 0.3MPa
Temp Range : -10 ~ 60 °C (No freezing)
Air Cylinder consumption : 0.25L/min
Air consumption (Copper Pipe 1m) : 0.12L/min

3) Reed auto Switch

Type : D-B54
Temp Range : -10 ~ 60 °C (No freezing)
Applicable load : Relay、 P L C
Load voltage : DC24V、 AC100V、 AC200V
Load current range : 5 ~ 50mA (DC24V)
 5 ~ 25mA (AC100V)
 5 ~ 12.5mA (AC200V)
Indicator light : Red LED illuminates when turned ON

4) Solenoid Valve

(Select electrical specification.)
Type : SY5220- DZ-01-F2
Fluid : Air
Prexxure Range : 0.2 ~ 0.3MPa
Temp Range : -10 ~ 50 °C (No freezing)
Load voltage : DC24V (5), AC100V (1), AC200V (2)
Type of actuation : 2 Position double

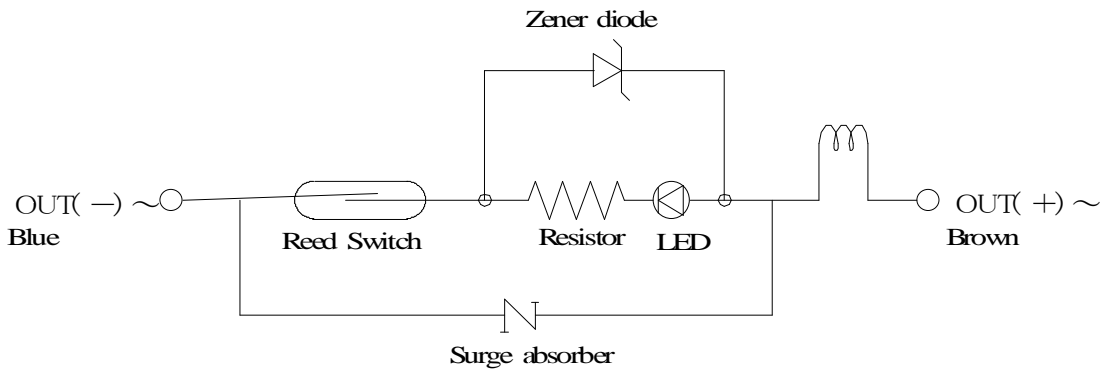
5) Speed Controller

Type : AS2200-01-S
Fluid : Air
Prexxure Range : 0.2 ~ 0.3MPa
Temp Range : -10 ~ 60 °C (No freezing)

6) Silencer

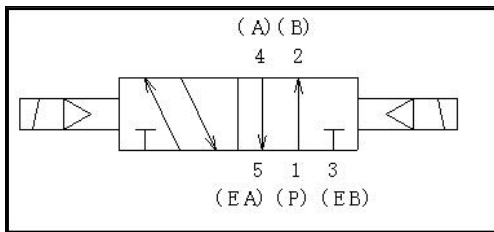
Type : AN103-01
Fluid : Air
Prexxure Range : 0.2 ~ 0.3MPa
Temp Range : 5 ~ 60 °C (No freezing)
Effect : 25dB (A)

13-4 Auto Switch Internal Circuit



13-5 Solenoid Valve JIS Sign

2 Position double



13-6 Precautions



● **Auto switch with contact**

Do not allow overcurrent or inrush current above the rated level to flow in, or the auto switch may become inoperative.

Possible causes of the flowing in of overcurrent or inrush current

CAUTION

- 1) The load current is above the rated level.
- 2) The lead wire is drawn around extremely long (over 30m).
- 3) There is a power cable or high-voltage cable nearby.
- 4) A quantitative circuit is used for the sequencer input section.



● **Solenoid Valve**

Do not allow leak voltage to flow in, or the solenoid valve may become inoperative.

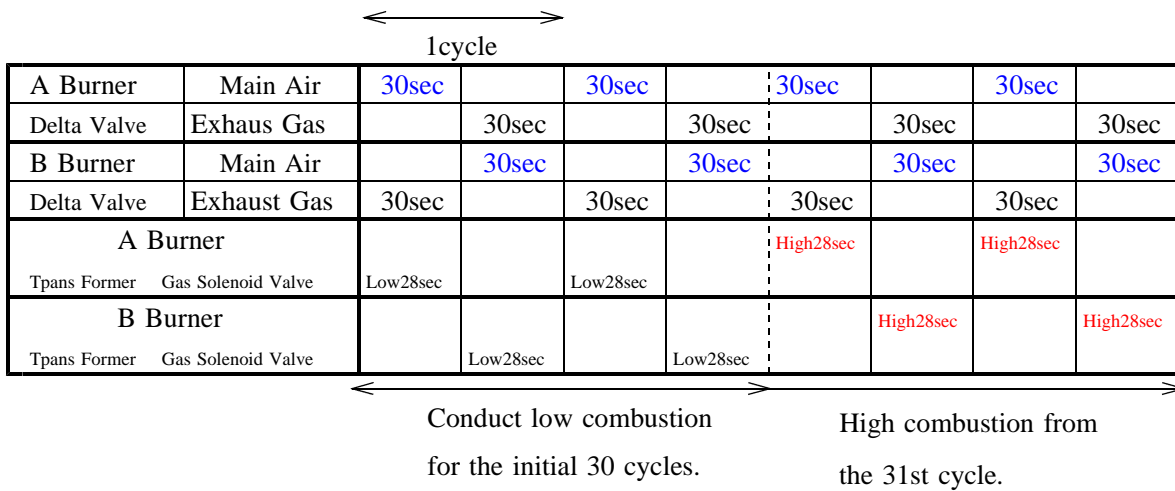
Control the remaining leak voltage to the following

CAUTION

- For DC coils, 3% or less of the rated voltage
- For AC coils, 8% or less of the rated voltage

1 4 . Temperature Control

14-1 Igniting



- ※ For pre-purging, blow 5 times or more air of the radiant tube volume.
- ※ During the blower is in operation, do not stop the changeover operation of the delta valv.
- ※ Even if flame failure occurs, do not stop the changeover operation of the delta valv.
- ※ If the ON/OFF of the delta valv auto switch continues inoperative for over 2 sec, judge it abnormal, and stop the blower.
- ※ After 1 sec from the delta valv changeover, operate the ignition transformer for 4 sec.
- ※ After 1 sec from the delta valv changeover, open the gas solenoid valve (Low, High).
- ※ Before 1 sec to the delta valv changeover, close the gas solenoid valve (Low, High).
- ※ After 1 sec from the gas solenoid valve (Low, High) opening, start the flame relay.
- ※ Before 1 sec to the gas solenoid valve (Low, High) closing, stop the flame relay.
- ※ Conduct low combustion for the initial 30 cycles, and then high combustion from the 31st cycle.
- ※ Set 70% of the high combustion capacity (rated level) to the low combustion capacity.

14-2 Adjusting the temperature (Time control)

A Burner	Main Air	30sec		30sec		30sec		30sec	
Delta Valve	Exhaus Gas		30sec		30sec		30sec		30sec
B Burner	Main Air		30sec		30sec		30sec		30sec
Delta Valve	Exhaust Gas	30sec		30sec		30sec		30sec	
A Burner		High		High		High			
Traps Former	Gas Solenoid Valve	7sec	OFF	6sec	OFF	5sec	OFF	OFF	OFF
B Burner			High		High		High		
Traps Former	Gas Solenoid Valve	OFF	7sec	OFF	6sec	OFF	5sec	OFF	OFF

- ※ Add up the one-cycle combustion time with the ON/OFF signal from the temperature control, and open the gas solenoid valve for as much as the total time in the next combustion cycle.
- ※ Start the proportional operation from the A burner.
- ※ For the combustion time with the A burner, make the combustion for the same time with the B burner.
- ※ Even if the gas solenoid valve is closed, stick to the 30-sec changeover of the delta valv.
- ※ Set the shortest combustion time to 5 sec.

The specifications are subject to change for improvement without notice.

2011.09