

HOPE

**HOPE PBX
PILOT BURNER**

INSTRUCTION MANUAL

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1. Checking, Outline and Specifications of the Product and Accessories

Thank you very much for purchasing our HOPE PBX Pilot Gas Burner. In order for you to enjoy the performance fully and ensure safety and perform maintenance and inspection, please read this instruction manual carefully.

Please be sure to deliver this instruction manual to the end user as well as the contractor.

Receiving inspection:

Upon receiving, check the product with the nameplate on the burner and the specifications given below to confirm that it is exactly what you have ordered. Also check the product for damages and other defects due to transportation. In particular, verify that the colors of the gas regulation valve plate are distinguished correctly according to the following:

- Black: High calorific gas of $29\text{MJ}/\text{Nm}^3$ or more (LP gas, natural gas)
- Red: Low calorific gas of less than $29\text{MJ}/\text{Nm}^3$ (city gas)

If you have any question, please contact us.

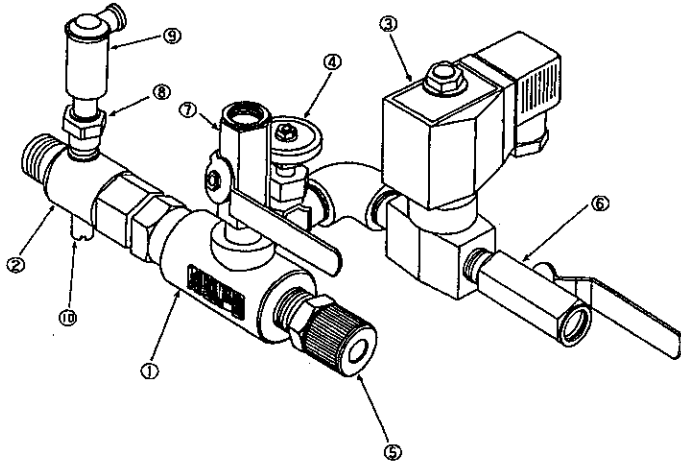
Outline:

HOPE PBX Pilot Gas Burner was developed in order to obtain more reliable ignition ability and stable flames by improving on our conventional pilot burners. This burner has the following features:

- 1) Low-volume, sharp flames can be obtained, which assures reliable ignition of the main burner.
- 2) The inside of the burner is lined with ceramics, which prevents the burner head from being heated red even if combustion continued for a long time.
- 3) A flame detector can be mounted easily, which assures reliable flame detection.

Specifications:

Model	Combustion capacity (kW)	Air pressure (kPa)	Gas pressure (kPa)	Site hole connection bore (A)	Air connection bore (A)	Gas connection bore (A)	Set weight (kg)
PBX-2	3.4	4	1 - 3	20	15	10	6.1
PBX-3	6.5			25	20		6.9



No.	Name
1	Pilot mixer
2	Pilot burner
3	Gas solenoid valve
4	Gas regulation valve
5	Looking glass
6	Gas cock
7	Air cock
8	Spark plug
9	Plug cap
10	Blind plug

※In addition to the above, an ignition transformer and a high-voltage cord (2m) are included in the standard accessories.

※Options:

- Zero governor
- Heat-resistant high-voltage cord

2. Precautions for Safety

Before starting installation, trial run and adjustment, or maintenance and inspection, be sure to read this instruction manual and other relevant documents attached hereto carefully, and ensure your good understanding.

In this instruction manual, the safety precautions are ranked according to the degree of risk as "warning," "caution" and "note."



For warning against such a danger that improper handling of this product would cause an extremely dangerous situation and death or severe injury may be assumed.



For cautioning against such a danger that improper handling of this product would cause a dangerous situation and death or severe injury may be assumed.



For warning against such a danger that improper handling of this product would cause a dangerous situation and medium or light injury or only physical loss or damage may be assumed.

Even if the situation of



occurs, it may lead even to serious results depending on the situation.

Since all these safety precaution symbols indicate important contents, be sure to observe them.

Indication of precaution symbol		Example
 Compulsion	This symbol indicates the contents that force or direct an action. Specific contents of such action are given nearby.	 Be sure to do!
 Prohibition	This symbol indicates the contents that prohibit an action. Specific contents of such action are given nearby.	 Don't touch!
 Precaution	This symbol indicates the contents that call attention. Specific contents of such attention calling are given nearby.	 Be careful. It's hot!

Be sure to read the following.

●WARNING



Be sure to pre-purge the burner before ignition. If ignition is repeated consecutively, explosion may be caused due to residual gas in the furnace.

◇CAUTION



**Electric
shock**

When detaching the spark plug for the purpose of checking or the like, be sure to turn off the power supply to the transformer.



When igniting or during combustion, never remove the site hole.
※Otherwise, hot gas may be blown out of the furnace.

△NOTE



**Don't
touch!**

Do not touch the burner front panel or the circumference of the burner installed part since they are hot during combustion.

3. Installation of the Burner, Piping and Wiring, and Solenoid Valve

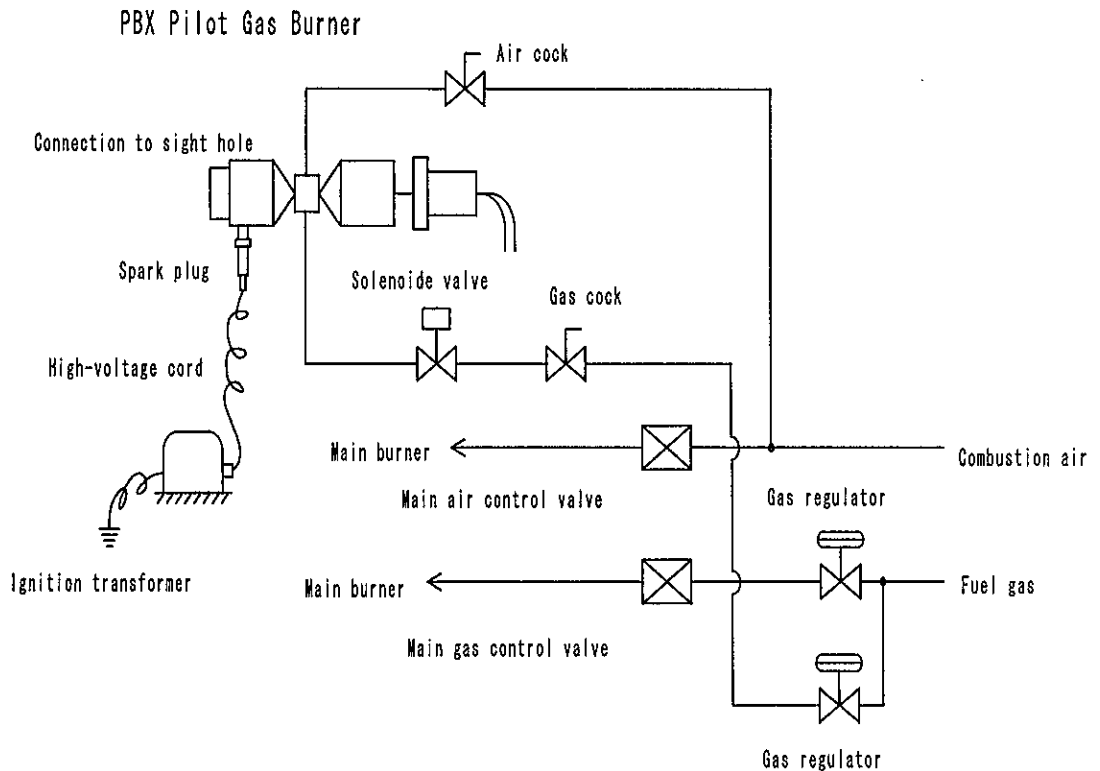
Installation:

- 1) Screw the burner into the pilot burner installation hole or sight hole in the main burner front plate.
- 2) When screwing the burner into the main burner front plate, do not apply seal tape to the thread part (since toxic is generated by heat).
- 3) When the zero governor is used, install the burner so that the zero governor top can be horizontal.

Piping and wiring:

- 1) Take the air from a air line branched from the main air line, and connect the pipe to the air cock.
- 2) Connect the gas pipe to the pilot gas line.
- 3) Check the solenoid valve whether it is of 100V or 200V specifications. Check the wiring method for the ignition transformer whether it is applicable to the required voltage, and provide wiring from the operation box. (Wrong voltage could cause damage to the solenoid valve or brownout to the secondary voltage.)
- 4) Connect the ignition transformer to the spark plug with a high-voltage cord, and ground it to the transformer body and the furnace or burner.

Flow sheet:



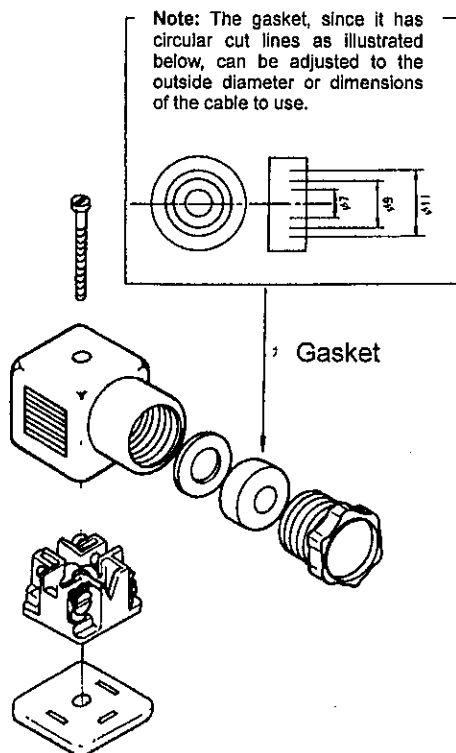
Solenoid valve DIN terminal:

The PBX Pilot Gas Burner is equipped with a solenoid valve AB41037 of CKD make. The contact strength and wiring method of the DIN terminal of this solenoid valve are as follows:

The contact strength of this solenoid valve is such that it can withstand about 100 times of attachments/detachments with no problem with practical use. However, there are some cases where this solenoid valve does not work due to ambient atmosphere. Therefore, considering the moisture resistance well, it is recommendable to use a cabtyre cable for the wire lead-out of the plug-in socket (terminal box). For load from the outside, limit it to 35kg.

Specifications

Wire lead-out directions	4 directions at 90° intervals
Locking of terminal box	With M3 flat fillister head machine screw
Number of terminals	2 + 1 (ground terminal)
Wire connection to terminal	Fixed with M3 machine screw
Cross-section area of conductor	0.5 – 1.5mm ²
Female screw of socket	15A
Applicable cable	Max. outside diameter ϕ 11
Ambient temperature	-40°C to +88.5°C
Armoring	Dust-proof and drip-proof mechanism (DIN 40050)
Material	Polyamide



4. Ignition and Adjustment

Ignition and flame adjustment:

- 1) Bleed the air completely from the gas line.
- 2) Open the air cock fully.
- 3) Check the pressure of the air to be supplied to the pilot burner. The standard pressure is 4kPa (acceptable range: 2 – 7kPa). (If the pressure cannot be detected in the piping, remove the looking glass from the rear of the burner, and detect the pressure there.)
- 4) Check the gas pressure. For LPG, the standard pressure is 2.8kPa.
- 5) Turn ON the solenoid valve, and check its operation. When it opens, sound should be heard.
- 6) Turn ON the ignition transformer, and check the spark of the spark plug.
- 7) Open the gas cock fully, open the gas regulation valve, and ignite the gas. At Looking through the looking glass, fix the flame to the best condition while watching the flame.
- 8) After adjustment, fasten the lock nut on the gas regulation valve for locking. Then, when the switch is turned ON, ignition and combustion will be carried out automatically.

Adjustment of excess air ratio:

This is the most important for the operation of the pilot burner. If this adjustment is not complete, it would cause ignition failure. The opening of the gas regulation valve when propane gas is used is shown below. The values are only for the reference purpose, and subject to slight variations.

Opening of the gas regulation valve when propane gas is used

	Air pressure (kPa)	Gas pressure (kPa)	Valve opening (number of turns)	
			When zero governor is used	When zero governor is not used
PBX-2	4	2.8	7/8	1 1/8
PBX-3	4	2.8	1 7/8	2 3/8

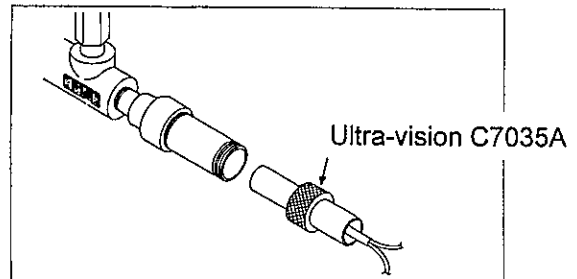
When the zero governor is used, the valve opening is not affected so much even if the air pressure varies. When the zero governor is not used, the valve opening becomes larger when the air pressure exceeds 4kPa, and the valve opening becomes smaller when the air pressure lowers below 4kPa. The values in the above table are applicable to the use of propane gas, and subject to change if different type of gas is used. Adjust the excess air ratio completely by referring to the above table.

5. Detection of Flame, and Maintenance and Checking

Detection of flame

1) Ultra-vision method

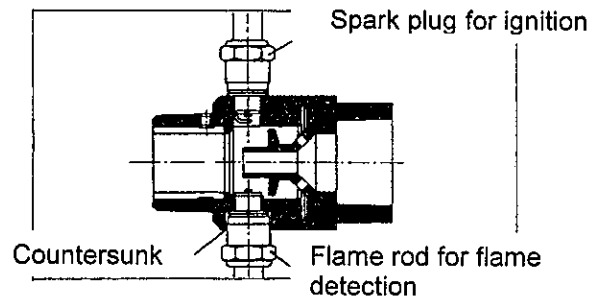
For the ultra-vision method, remove the looking glass from the rear of the burner, and install the ultra-vision there as illustrated on the right. Be sure to install the spark plug on the non-countersunk side. The countersunk side is blind-plugged. If this is reversed, the ultra-vision would detect the spark of the spark plug, and send false signal.



How to install the ultra-vision C7035A

2) Flame rod method

For the flame rod method, remove the blind plug from the countersunk side, and install the flame rod (FL-3) there to detect the flame (as illustrated on the left). At this time, be careful not to make wrong wiring for the high-voltage cord and the flame rod.



How to install the flame rod

Maintenance and checking

- 1) Clean the spark plug once a month or so. This is also applicable to the case where the spark plug is used for flame detection.
- 2) Check the plug cap installed condition and the high-voltage cord for damage at regular intervals.
- 3) Clean the ultra-vision, when used, by wiping the detection tube with a soft cloth once to four times a month.
- 4) Check the other parts periodically.

Notes

- 1) Use the air pressure at 4kPa or more, in principle, though it can be used within a range of 2 to 7kPa.
- 2) Open the gas cock and air cock fully before using.

6. Troubleshooting

Symptom	Possible cause		Remedy
No combustion	Low pressure of gas or air		Check supply source. Check supply line.
	Defect of solenoid valve		Check electric system. Overhaul valve. Replace valve.
	Clogging of gas regulation valve		Overhaul valve. Replace valve.
	No sparking		Check electric system Clean plug. Replace plug.
	No adjustment of excess air ratio		Adjust excess air ratio using gas regulation valve.
Flame failure	Defect of ultra-vision (for rear detection)		Check electric system. Clean detection tube. Replace detection tube.
	Instability of combustion	Wrong adjustment of excess air ratio	Adjust excess air ratio.
		Fluctuations in air pressure	Install zero governor.
		Fluctuations in gas pressure	Install pressure regulator.
Red heat of burner head	Damage of ceramics		Replace burner head.
	Excess of combustion capacity		Adjust air pressure to reduce combustion capacity

※ When checking the burner and its peripheral units, read their instruction manuals carefully beforehand.

※ If you have any question, contact our Sales Department at:

Tel: +81-52-736-0773

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