

Installation Guide

PH Burner Installation

SAFETY

These instructions pertain only to the PH Burner series and should only be used for its intended purpose. Only qualified personnel should work on the PH Burner to ensure proper installation, especially when installing gas piping or electrical wiring. All installations MUST follow/meet region requirements. If unsure about this information, contact your local gas or electric company. This product can cause serious injury/harm if misused; any person working with the PH Burner should be equipped with proper protective equipment, such as safety glasses, close-toed shoes, and adequate clothing attire. Contact the factory if you have any questions or concerns regarding the PH Burner series.

Warning: *This guide does not provide every eventuality; the information provided should be considered when working with the PH Burner Series.*

Description: How It Works

PH series of gas burners are nozzle-mixed linear burners for rapid heat distribution and short flame lengths for industrial processes. Fuel is introduced into the burner inside a cast iron body with a series of fuel ports. Combustion air is uniformly distributed through stainless steel mixing wings to progressively blend with the fuel in a V-shaped flame area. PH burners modulate only fuel and provide turndown ratios up to 40:1 for precise temperature control and process flexibility. Combustion may be supervised by use of a flame rod or UV scanner. Ignition may be provided via a pilot flame or direct spark ignition in most applications. Consult Selas Heat Technology Company for assistance.

Applications

The PH Burner series is ideal for air heating applications up to 1200°F. These applications include:

- Industrial Dyers
- Air Replacement Systems
- Drying and Curing Rooms
- Industrial Spray Booths
- Air Handling Units



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1. Before installation, carefully examine the burner for physical damage due to transporting, storage, or offloading. Damages found should be reported immediately to the factory.
2. Under no circumstances should pipe work or gas valves be used for lifting; it can cause fittings to loosen or damage the valves which may cause leaks during operation.
3. The PH burner can be mounted on the external oven walls in a “letter box” style, firing horizontally or vertically (refer to Figure 1).
 - Burners can be equipped with gapped or sealed flange-type mounting (refer to Figures 2 and 3).
4. PH Burners can come with a fully pre-packaged combustion module, which includes,
 - Packages and Pre-piped valve assembly
 - Combustion air fan
 - Electrical panel
5. Use the structure of your application and supplied mounting brackets to mount the burner in the firing position
 - Transmission of vibration and heat should be minimized.
6. The burner can be mounted on the negative or positive pressure side of the central air process supply fan.
 - Upstream air temperature can reach up to 750°F (400°C)
 - Downstream air temperature is limited to 1200°F (650°C)
7. Establish a suitable supply of fresh air available for combustion and general ventilation.
8. Allow enough space around the burner to be accessible for maintenance and adjustments.

For specific questions consult Selas Heat Technology Company.

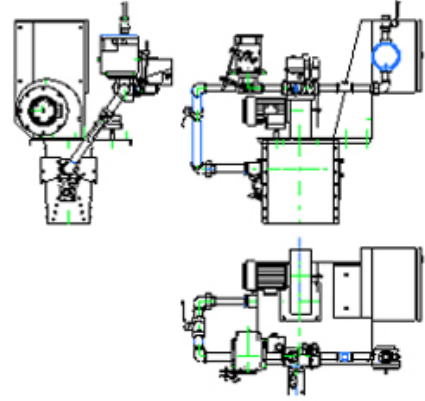


Figure 1: Vertical Down-Firing PH Burner

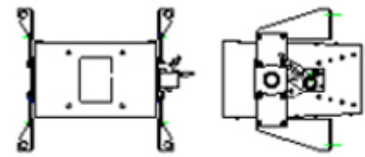


Figure 2: Gap-Fired Mounting

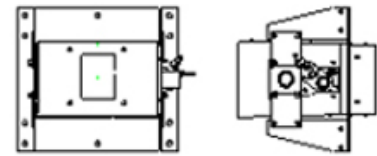


Figure 3: Sealed Flange Mounting



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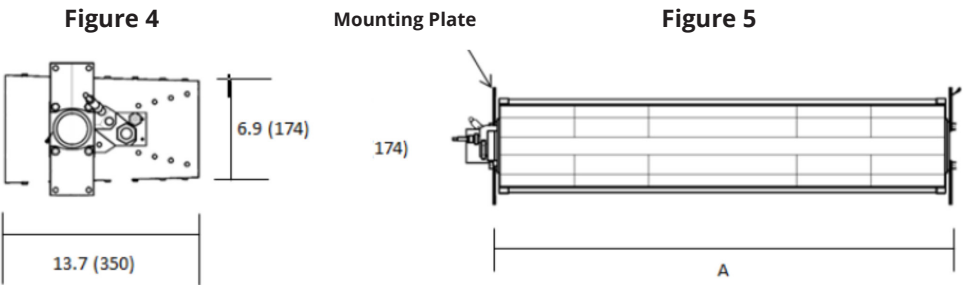
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PH-O

Using process air for combustion without a blower, use the “open back” configuration and gap-fired.

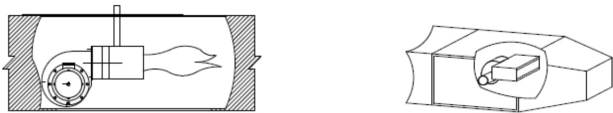
- The configuration requires a minimum pressure drop of 1” of water column across the burner.
- Operating ranges are:

Maximum Upstream Temperature	752°F (400°C)
Maximum Downstream Temperature	1200°F (650°C)



PH-SP

- The PH-SP burner is a wall-plate-mounted configuration which allows the burner, blower, and blower motor to be mounted on the inside. Other components will be mounted outside the duct.
- A combustion fan is mounted behind the burner for in-duct operations.
- Low-temperature, ambient air heating applications are ideal for the SP burner.
- Upstream temperature below 104°F (40°C)
- Downstream temperature up to 248°F (120°C)



The SP arrangement includes an integral combustion fan and burner side-mounted inside the air duct.



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PH-RSP

- Like the SP burner, the PH-RSP burner can be side-plate-mounted, and all the burner components can be mounted inside the burner, except the burner head.
- Ideal for in-duct firing in industrial recirculation ovens.
- Center-mounted burner head inside the duct and combustion fan will be mounted outside the duct.
- Upstream up to 752° F (400°C)
- Downstream up to 1200° F (~650°C)
- Supplied with an integral air duct from the external combustion fan.



The RTP arrangement includes a combustion blower mounted outside the air duct. and a burner center-mounted in the air duct

Gas Supply

- Gas piping to the burner must be an adequate size to have the correct pressure at the burner valve assembly inlet.
 - > If unsure about sizing, contact the gas company with any questions.
- The pressure loss in the gas supply pipe should follow pipeline velocities listed below. Ensure that maximum velocities are not exceeded to avoid excessive noise, poor burner performance and piping erosion:

Unfiltered Supply	65.6 ft.sec (20 m/s)
Filtered Supply (250 microns)	148 ft.sec (45 m/s)

- For low-pressure supplies up to 10 "wc (25 mbar), the pressure drops between the supply
 - > Meter and the burner inlet should typically not exceed 1 mbar (0.4 w.c).
- For high-pressure supplies, this pressure drop should not exceed 10% of the available gas pressure.
- A manual shut-off valve should be built into the gas supply pipe, followed by a union or flanged joint; the valve should be next to the burner.
 - > This valve provides the supply and removal of the burner assembly for maintenance purposes.
 - > The manual shut-off valve needs to be easy to access.

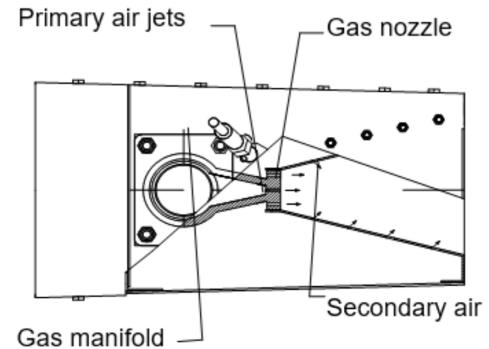


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- Valves and gas piping should not be used for lifting or supporting, as stated in the instructions. Instead use appropriate brackets for support and installation.
- Prior to connecting the gas supply, ensure the available gas pressure is correct.
- Check the design and installation of the gas supply system to ensure that pressures over the maximum design rating of the equipment cannot be reached during fault conditions.
- Vent pipes should be used for the regulator if a burner is assembled in a sealed space.
- There should not be multiple vents used for regulators.
- Vents should be terminated to a safe location outdoors (preferably above roof level).
- The gas supply pipe will be full of air and will require purging.
- Only a gas engineer should start and conduct purging and leak testing that follow local safety requirements.
- The manual shut-off valves should be left in the closed position till the plant has been commissioned by a gas engineer.



PH Burner Cross Section

Electrical Supply

- Confirm that the electrical power supply fits the system voltage and frequencies (HZ) requirements.
- All wiring should comply to local and relevant codes
- All conduits should be kept clear of heat zones.
- Local means of electrical isolation should be installed close to the burner.
- Ensure that the electrical voltage does not vary from the specified by more than 6%.
- High-temperature wire should be used for all electrical connections.
- Do not use gas pipe work as electrical earth.

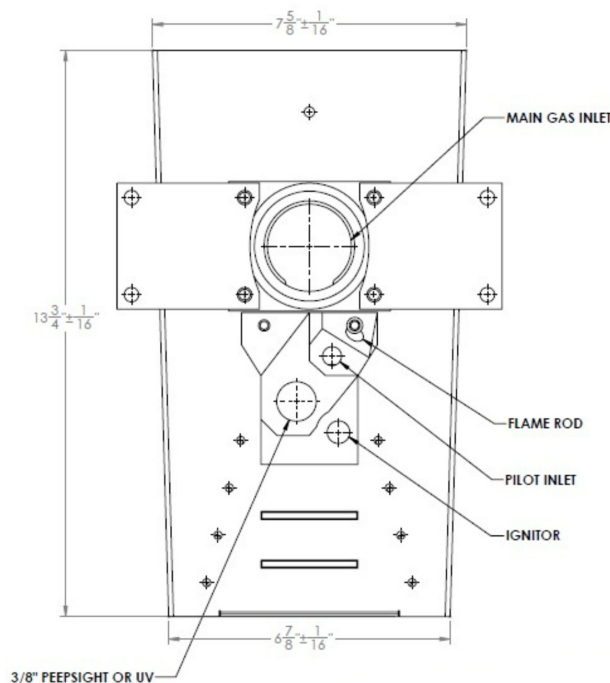
Optional Accessories

- Ultra-violet scanner
- Temperature controller
- High temperature limit
- Main gas regulator

Recommended Spare Parts

- Flame rod
- Spark ignitor
- Air filter (optional)

PH Burner Side View Drawing

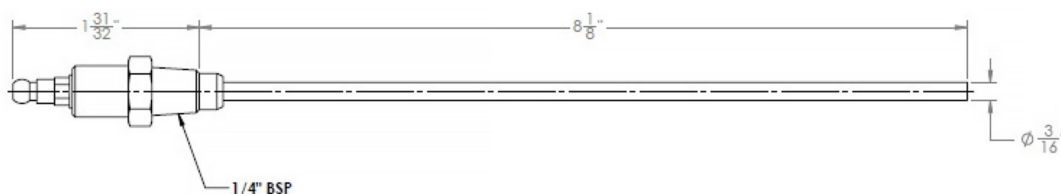


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PH Burner Flame Rod Drawing



Maintenance

The factory suggests qualified personnel should do maintenance for the PH burners at a minimum of every six (6) months. Other variables might occur for the burner to need maintenance earlier than the suggested time; for specific questions, consult Selas Heat Technology Company.

1. First, start by removing the spark electrode, then using a wire brush, clean the electrode.
 - Once clean, check the plug gap setting of 0.1"-0.125" (2.5 to 3mm) and examine the plug ceramic for any cracks or damage.
2. Next, remove the flame-sensing electrode; once removed using emery paper, clean the electrode.
 - Then check the plug ceramic for any cracks or damage.
 - Another option is to remove the U.V cell, then clean the bulb with a clean cloth. Make sure not to touch the bulb itself.
3. Check the burner body/air baffle plate and clean any dirt or debris.
4. Inspect the burner air wings for severe damage by locating them from inside the combustion chamber/duct.
 - Small cracks or slight distortion in the air wing are acceptable and not dangerous to the operation of the burner.
 - If the burner air wings are severely damaged, the burner head needs to be disassembled to fit a replacement.
5. Remove and check the pressure switch impulse lines for any blockage.
6. While the burner is shut down, check the integrity, and correct operation of safety pressure switches and solenoids.
7. It is essential to check for gas leaks in the burner valve assembly.
8. Qualified personnel should preform a test fire before putting the burner back into operation.
9. Lastly, compare the previous recorded commission or service setting of all burner gas and air settings.



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Troubleshooting Chart

Symptom	Cause	Remedy
Burner light up sequence does not start	No electrical supply	Check electrical supply at local isolator Check the control fuse
	Burner electrical control circuits are not in 'start up' condition.	Check controls and switches in control circuit Check all pressure switches and microswitches
	Airflow pressure switch not made	Check setting on switch. If this is correct, check the airflow
	Low gas pressure switch not made	Check setting on switch. If this is correct, check the gas pressure.
Start Cycle begins but burner locks out or shuts down before initiating the ignition sequence	Low combustion air pressure differential	Reset burner pressure switch If pressure switch is set correctly, open the air damper on the combustion air fan Check that combustion air fan motor is rotating in the correct direction Check that the combustion air fan is running, if not check the overload or circuit breakers



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Troubleshooting Chart (continued)

Symptom	Cause	Remedy
Pilot does not light	No spark	Check electrical supply to ignition transformer Check electrical connection to spark plug Check operation of ignition transformer Check condition of spark plug and clean, reset or replace
	No pilot gas	Check controls and switches in control circuit Check all pressure switches and microswitches
	Not enough pilot gas	Check setting on switch. If this is correct, check the airflow
	Pilot blown out	Check setting on switch. If this is correct, check the gas pressure.
Pilot lights but locks out when ignition de-energized	Pilot gas rate too low	Adjust pilot gas rate
Pilot lights but the burner locks out before the main valves are energized	Flame sensor not detecting the flame	Check sensor for damage or moisture Clean flame sensor Check flame sensor installation and position
	Faulty sensor	Replace sensor



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Troubleshooting Chart (continued)

Symptom	Cause	Remedy
Main flame does not light, and burner locks out the end of the pilot phase	Faulty main shut-off valve	Check electrical supply to valve Check condition of the valve, if faulty, replace it
	No main gas	Check manual valve open Check the adjustment of the gas control valve Ensure gas is available at burner
	Not enough main gas	Check main gas flow adjuster and main gas regulator
Main flame lights but shuts down after a short period of time	Pilot gas rate too high	Adjust pilot gas rate
	Control circuit operating	Checks control circuit, over temperature limits etc.
	Burner gas or air ports blocked	Check and clean Identify source of blockage and rectify
	Flame sensor not detecting the flame	Over firing and flame is 'lifting off' reset main flame firing rate Check flame sensor installation and position Check the main gas pressure governor



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Troubleshooting Chart (continued)

Symptom	Cause	Remedy
Flame failure (lockout) during normal main flame operation	Faulty main shut off valve	Check electrical supply to valve Check condition of the valve if faulty, replace it
	No main gas	Check manual valve open Check the adjustment of the gas control valve Ensure gas is available at burner
	Not enough main gas	Check main gas flow adjuster and main gas regulator
	Low fire set too low	Check and adjust
	Control circuit operating	Check control circuit, over temperature limits etc.
	Burner gas or air ports blocked	Check and clean Identify source of blockage and rectify
	Flame sensor not detecting the flame	Over firing and flame is 'lifting off' reset main flame firing rate Check flame sensor installation and position
	Combustion air failure	Inspect combustion air fan for damage Check fan overloads Check air filter (if fitted) and clean if necessary



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Troubleshooting Chart (continued)

Symptom	Cause	Remedy
Flame Failure (lockout) at low fire	Faulty low fire bypass valve (high low burners only)	Check electrical supply to valve Check condition of the valve if faulty, replace it
	Low fire flame set too low	Check the adjustment of the gas control valve Ensure gas is available at burner
	Too much air	Check and reset air at high and low fire
	Low fire air set too low (modulating gas and air burners only)	Check and adjust
	Control circuit operating due to temperature 'creep'	Check control circuit, over temperature limits and low fire settings
	Flame sensor not detecting the flame	Check flame sensor installation and position
Burner shuts down	Too much gas	Check main gas pressure and reset Check gas control valve and reset Check fuel type
	Combustion air set too low	Check air dampers, linkages, and air filter (where fitted)



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Troubleshooting Chart (continued)

Symptom	Cause	Remedy
Combustion chamber glows red	Low process airflow	Reset air
	Main flame too long	Check the adjustment of the gas control valve
	Combustion air set too low	Check air dampers, linkages, and air filter (where fitted)
Unit will not achieve temperature	Too much process air	Check and reset air
	Burner input setting too low	Check and reset burner
	Leakage of cold air into system	Source and rectify
Burner shuts down	Control circuit operating	Check control circuit, process airflow switch, over temperature limits and low fire setting
	Flame sensor not detecting the flame	Check flame sensor installation and position
	Too much pressure in chamber	Check flue
Unit produces condensation	Burner turned down too low	Check the adjustment of the gas control valve
	Low process air volume	Check and reset air



SCAN FOR MORE INFORMATION

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