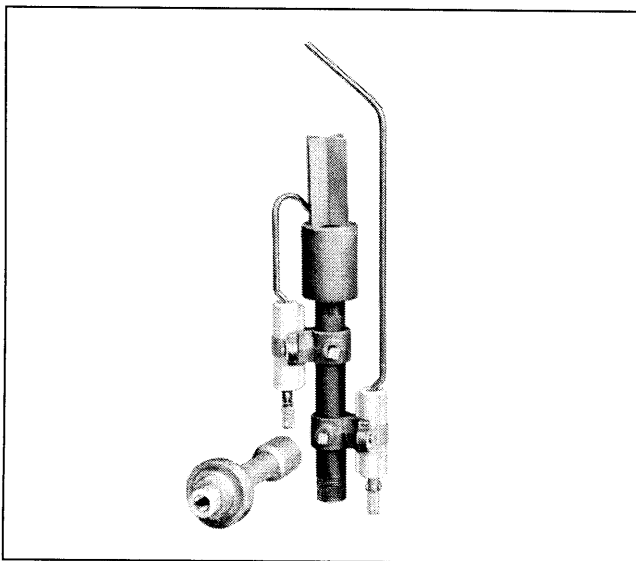


## C7005A,B Gas Pilot and Flame Rod Assemblies

### PRODUCT DATA



### GENERAL

The C7005A,B Gas Pilot Burner Assemblies include a flame rod to prove the pilot flame. The assemblies are used with a suitable flame safeguard control on industrial or commercial gas burners or oil burners with gas pilots.

### FEATURES

- Used with Honeywell controls using the flame rectification principle.
- C7005A is for continuous pilot applications. It includes an insulated flame rod, properly positioned relative to the flame retention type nozzle.
- C7005B is similar to C7005A, but includes an ignition electrode suitable for automatic, electric-spark ignition, gas pilot applications.
- Individually mounted flame rod and ignition electrode in ceramic insulators allow the head assembly to fit inside a 3-inch pipe.
- Stainless steel fins on the flame retention type pilot head provide the correct ratio of flame rod area to ground area for maximum flame signal, and are beneficial in stabilizing the pilot flame.
- Pilot flame retention nozzle and mixing tube are threaded internally, 1/2-14 NPT and 3/8-18 NPT, respectively, and can be assembled with standard pipe fittings.
- Pilot can be installed in vertical, horizontal, or inclined position.
- Rajah connectors facilitate electrical connections.

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## SPECIFICATIONS

### IMPORTANT

*The specifications given in this publication do not include normal manufacturing tolerances. Therefore, this unit may not exactly match the listed specifications. Also, this product is tested and calibrated under closely controlled conditions, and some differences in performance can be expected if those conditions are changed.*

### Models:

- C7005A Gas Pilot and Flame Rod Assembly—for continuous pilot applications; includes flame rod only.
- C7005B Gas Pilot and Flame Rod Assembly—for automatic pilot applications; includes flame rod and ignition electrode.

### Pilot Head:

Flame retention type with stainless steel bomb type fins. Threaded onto 1/2 x 6 inch (152 mm) pipe nipple with 1/2-14 NPT external threads.

### Type of Gas:

Models available for use with natural and propane gases.

### Gas Capacity (Varies with Gas Pressure):

Gas Pressure in. wc	Capacity kPa	ft <sup>3</sup> /hr	m <sup>3</sup> /hr
3	0.75	12.0	0.34
4	0.99	13.7	0.39
5	1.24	15.3	0.43
6	1.49	16.8	0.48
7	1.74	18.2	0.52

### Flame Rod/Ignition Electrode Insulators:

Ceramic.

### Maximum Temperature at Flame Rod Insulator:

500°F (260°C).

### Flame Rod/Ignition Electrode Material:

Kanthal A-1 (2462°F [1350°C] maximum operating temperature rating).

Optional: Stainless steel (2000°F [1093°C] maximum operating temperature rating).

### Electrical Connectors:

Rajah, male; companion connectors included.

### Insulator Brackets:

Adjustable to change location of flame rod or ignition electrode; lock securely using setscrew.

### Mixing Tube:

Inspirating (Venturi type) with primary air adjustment. Approximately 4-9/16 inches (116 mm) long, 1-3/4 inches (44.5 mm) diameter. Inlet tapping 1/4-18 NPT; outlet tapping 3/8-18 NPT.

### Mounting:

Vertical, horizontal, or inclined.

### Dimensions:

Overall—Height 13-1/2 inches (343 mm); width can be adjusted to pass through a 3-inch pipe.

Pilot Head—Length 4-7/16 inches (113 mm), diameter 1-5/8 inches (41.3 mm).

Spark Gap (C7005B only)—1/8 to 3/16 inch (3.2 to 4.8 mm).

### Approvals:

Underwriters Laboratories Inc. Listed: File No. MP268.

Canadian Standards Association Certified: C7005 only—Master file LR-95329—1.

Industrial Risk Insurers acceptable.

### Accessories:

- High Temperature Cable (for operation above 125°F [52°C])—specify length:
  - R1298020 Flame Rod Leadwire, rated up to 400°F (204°C) for continuous duty.
  - R1061012 Ignition Leadwire, rated at 350°F (176°C) for continuous duty.
  - R1239001 High Tension Ignition Leadwire, for installations in a contaminating environment, rated at 200°F (93°C) for continuous duty.

## ORDERING INFORMATION

When purchasing replacement and modernization products from your Authorized Flame Safeguard Distributor, refer to the TRADELINE® Catalog or price sheets for complete ordering number.

1. Order number.
2. High temperature cable, if required (specify length).
3. Ignition transformer, if required (C7005B only).

If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

1. Your local Home and Building Control Sales Office (check white pages of your phone directory).
2. Home and Building Control Customer Relations  
Honeywell, 1885 Douglas Drive North  
Minneapolis, Minnesota 55422-4386

In Canada—Honeywell Limited/Honeywell Limitee, 35 Dynamic Drive, Scarborough, Ontario M1V 4Z9 International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, U.S.A.

- Ignition Transformer, 6000 volts secondary (C7005B only):
  - Part no. 22042; 120V, 60 Hz primary.
  - Part no. 101079; 240V, 60 Hz primary.

**Replacement Parts:**

- 100204B Mixing Tube (Venturi type used with natural gas).
- 101867B Mixing Tube (Venturi type used with LP gas).
- 100205B Grounding Assembly
- 101738A Ignition Assembly—includes electrode, Rajah connector and bracket (C7005B).
- 101738B Flame Rod Assembly.
- 101739 Ignition Electrode, 4 inch (102 mm), stainless steel (C7005B).
- 101740 Flame Rod, 8 inch (203 mm) stainless steel.
- 103534 Flame Rod, 8 inch (203 mm) Kanthal.
- 101741 Connector—Rajah, plug end, 7/8 inch long.
- 101742 Clamp—for flame rod or ignition electrode mounting.
- 101743 Bracket—mounting.
- 14182 Washer—brass (plain), between Rajah connector and flame rod or ignition electrode mounting.
- 37356 Connector—Rajah, socket end straight.
- 7617CV Insulator Assembly—includes electrode insulator and mounting hardware.

**INSTALLATION**

**CAUTION**

1. Installer must be a trained, experienced, flame safeguard control service technician.
2. Turn off the gas supply before beginning installation.
3. Disconnect power supply to the flame safeguard control before beginning installation to prevent electrical shock and equipment damage. There may be more than one disconnect involved.
4. All wiring must comply with applicable local electrical codes, ordinances, and regulations.
5. All wiring must be NEC Class 1 (line voltage).
6. Perform all required checkout tests after installation is complete.

**Mounting**

If special provisions for mounting the pilot were made by the burner manufacturer, carefully follow those instructions. If the manufacturer did not supply instructions, use the recommendations below.

Fig. 1 illustrates the use of a 90 degree reducing elbow (not furnished) to provide a right-angle connection. Use a straight reducing coupling or a 45 degree reducing elbow (not furnished) for piping and mounting if more convenient.

Position the flame rod so that a weak pilot flame contacts the flame rod only at the junction of the main burner flame and pilot flame. *Do not position the flame rod so it can detect a weak pilot flame that is incapable of igniting the main burner* (Fig. 2).

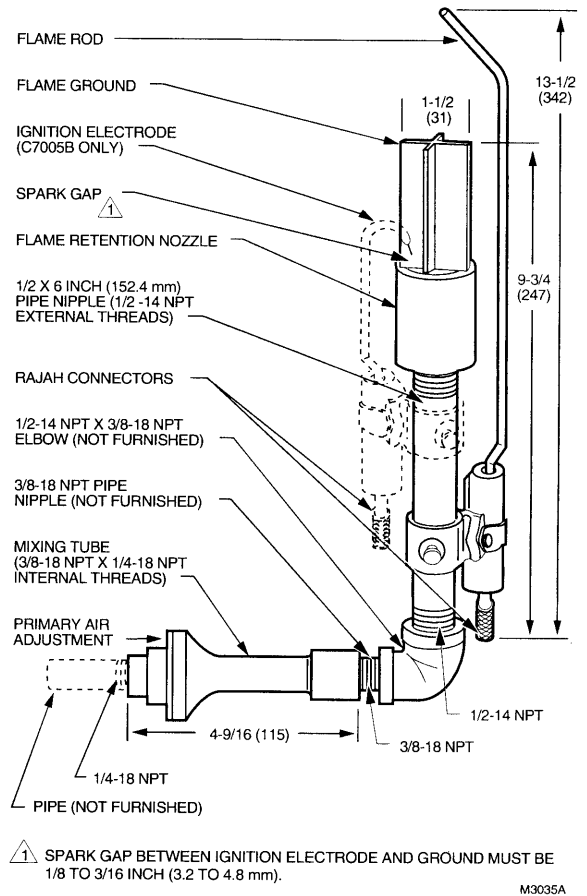
**IMPORTANT**

To assure an adequate pilot flame to ignite the main burner, you **MUST** perform the pilot turndown test, as described in the instructions for the flame safeguard control.

Install the pilot so the pilot flame has full contact with the gas stream from the main burner heads, jets or nozzles (Fig. 3, 4, 5). If it is necessary to prove both pilot and main flames, mount the pilot so the flame travels in the same direction as the air movement at the mounting point, rather than where the air movement is at right angles to the flame travel. The pilot should be mounted far enough forward so that the flame rod just enters the envelope of the main burner flame. The pilot can be mounted either beside or below the burner head.

Keep the pilot burner below or behind the main burner so that the burner frame and refractory help protect the pilot from radiant heat. Locating the pilot in the secondary airstream also provides considerable cooling. The primary air adjustment must be accessible and outside the high temperature area.

On radiant type burners, the pilot is often mounted outside the burner box. Fig. 3 shows the pilot assembly in a diagonal channel cut through the brickwork and a straight-through connection used to support the pilot. The flame rod is at the junction of the main burner flame and pilot flame. The pilot assembly can be mounted below or alongside the burner box and an angle connection used so the pilot flame travels into the main flame. The air mixer is normally mounted outside the boiler.



**Fig. 1. C7005 gas pilot and flame rod assembly in in. (mm).**

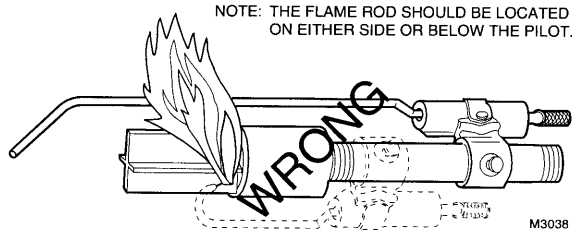


Fig. 2. Improper position of flame rod.

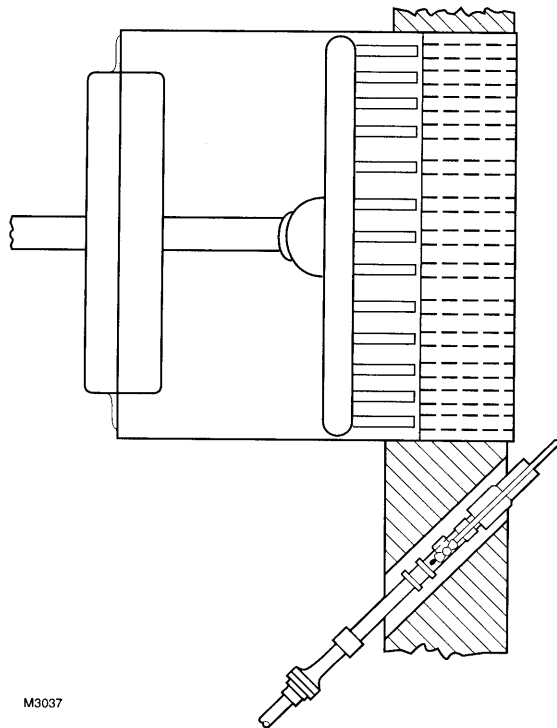


Fig. 3. Typical mounting of gas pilot and flame rod assembly on radiant inshot type burner.

On multiple head installations (Fig. 4), the pilot is usually centrally located. The pilot can usually be mounted vertically between burner heads with the pilot flame traveling upward across the junction of the gas stream from the burner heads. If the pilot is mounted horizontally on a level with the burner heads or the flat arch, the pilot flame should travel across the junction of the gas streams coming from at least two heads.

If a group of inspirating (Venturi type) burners are mounted within a burner box, sufficient spacing is usually available so the pilot can be mounted as illustrated in Fig. 5 to simultaneously light as many burners as possible. If available space does not allow central mounting within the burner box, see Fig. 3.

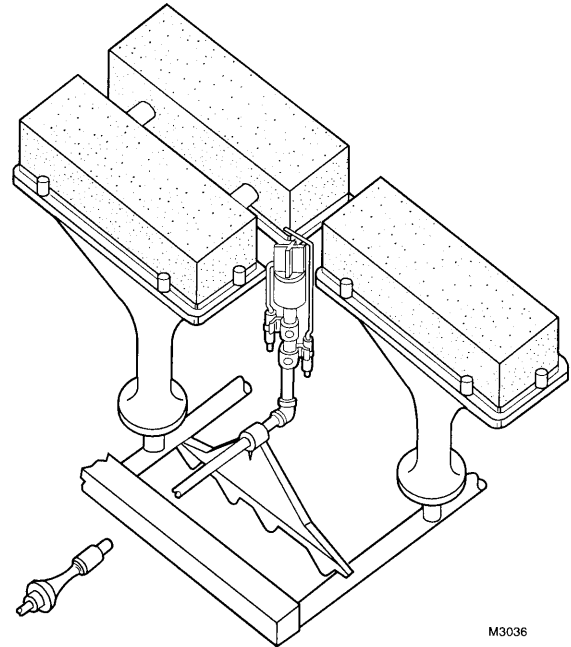


Fig. 4. Typical mounting of gas pilot and flame rod assembly on multiple head gas burner.

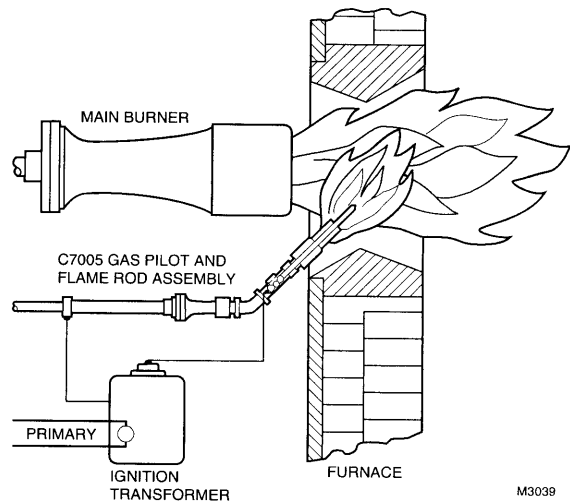


Fig. 5. Typical mounting of gas pilot and flame rod assembly on inspirating (Venture type) gas burner.

## Wiring



## CAUTION

1. Turn off gas supply before starting installation.
2. Disconnect power supply before beginning installation to prevent electrical shock and equipment damage. There may be more than one disconnect involved.

All wiring must comply with applicable electrical codes, ordinances, and regulations. Use NEC Class 1 (Line Voltage) wiring.

For normal installations:

- For the ignition electrode, use high tension wire electrically equivalent to type GTO-10, and rated for the temperature and humidity encountered in the application.
- For the flame rod, use moisture-resistant no. 14 AWG wire suitable for at least 167°F (75°C) if used with a flame safeguard primary control, or suitable for at least 194°F (90°C) if used with a flame safeguard programming control.

For high temperature installations:

- For the ignition electrode, use Honeywell specification no. R1061012 Ignition Cable or equivalent. (This wire is rated at 350°F (176°C) for continuous duty, and up to 500°F (260°C) for intermittent use. It has been breakdown tested to 15,000 volts.)
- For the flame rod, use Honeywell specification no. R1298020 or equivalent. This wire is rated up to 400°F (204°C) for continuous duty. It is tested for operation up to 600 volts and breakdown up to 7500 volts.

For ignition installations in a contaminating environment, use Honeywell specification no. R1239001 High Tension Ignition Cable or equivalent. This wire is very resistant to severe conditions of oil, heat, and corona, and is tested to withstand high voltages up to 25,000 Vrms in a salt bath for one minute without breakdown. It is rated at 200°F (93°C) for continuous duty, and up to 350°F (176°C) for intermittent use.

Make connections to the flame rod and ignition electrode (C7005B) using Rajah connectors. See Fig. 6 for typical field wiring connections.

Connect the flame rod (see callout 1, Fig. 1) to the F terminal of the flame safeguard control. Keep this leadwire as short as possible; capacitance increases with leadwire length, reducing the flame signal strength. *The ultimate limiting factor is the flame signal* (see Table 1).

For a C7005B:

- Use a 6000 volt ignition transformer with the same electrical ratings as the power supply of the flame safeguard control. Select the appropriate Honeywell transformer, or its equivalent.
  - For 120V, 60 Hz, use part no. 22042.
  - For 240V, 60 Hz, use part no. 101079.
- Connect the primary leadwires of the ignition transformer between the ignition and the L2 terminals of the flame safeguard control.
- Connect the ignition electrode of the C7005B (callout 3, Fig. 1) to the secondary high tension terminal of the ignition transformer.

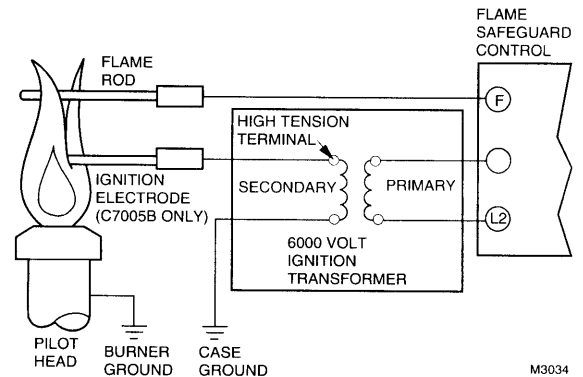


Fig. 6. Typical field wiring diagram for C7005 gas pilot and flame rod assembly.

#### IMPORTANT

Do not run high voltage ignition transformer wires in the same conduit with the flame rod wiring.

No ground leadwires are required. The flame ground and flame retention nozzle (callouts 2 and 4, Fig. 1) act as the ground electrode for the flame rod and the ignition electrode. The case of the ignition transformer will act as the ground connection when it is securely fastened to the burner.

## ADJUSTMENTS AND CHECKOUT

### Adjust the Air-Gas Mixture

#### IMPORTANT

For initial burner lightoff, consult the burner manufacturer's instructions or the instructions for the flame safeguard control.

With the gas pilot installed and the pilot burner running, adjust the primary air adjustment (callout 10, Fig. 1) for an air-gas mixture that provides the type of flame required for the particular installation. Be sure you have the proper mixing tube for the type of gas (natural or LP) being used. A medium-hard flame generates the greatest response from the flame detector circuit.

If air movement conditions are severe or change with modulation, it may be desirable to operate the premixed pilot on moderate to high gas pressure (normally not more than one psi). This is particularly true when the main burner fires with high pressure gas. Increasing the pilot pressure tends to harden and lengthen the pilot flame, increasing its stability under adverse draft conditions.