These Flame Rod Holders facilitate the use of flame rods for flame proving on gas burners or gas-pilot ignited oil burners controlled by electronic flame safeguard control systems.

- The C7004B holder together with a flame rod (ordered separately) can be used with any electronic flame safeguard control utilizing the rectification principle of flame detection.

- The flame rod holders are straight-bodied and are available for sleeve mounting on 1-1/4 and 2 inch pipes. The holders are secured to the mounting pipe with three setscrews.

- The ruggedized body mounts on a permanently attached pipe to the burner face plate—which provides for convenient servicing.

- A C7004B model is available for use with pressurized combustion chambers and is internally threaded (1-1/4–11 -1/2 NPT) for pipe mounting.

- A chuck and setscrew arrangement securely position the flame rod to facilitate detection of the flame. A terminal screw is provided to make the electrical connection to the flame rod.

- An internal 1/2–14NPT body tapping provides for optional air cooling of the flame rod assembly while minimizing soot deposition.

- An internally threaded iron pipe can be coupled to the extension assembly (external 1/8–27 NPT) if flame rod support is required.
Specifications

MODELS:

<table>
<thead>
<tr>
<th>Model</th>
<th>Mounting Adapter</th>
<th>Size</th>
<th>Body Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C7004B</td>
<td>Sleevea</td>
<td>2 in. pipe</td>
<td>Straight</td>
<td>Fits over</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 in. pipe</td>
</tr>
<tr>
<td>1002</td>
<td>Sleevea</td>
<td>1-1/4 in. pipe</td>
<td>Straight</td>
<td>Fits over</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1-1/4 in. pipe</td>
</tr>
<tr>
<td>1028</td>
<td>Internal Threaded</td>
<td>Straight</td>
<td>Compression fittings for l-1/4 -11-1/2 NPT pipe</td>
<td>Use on positive pressure fire boxes.</td>
</tr>
<tr>
<td>1051</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*a* Has 3 setscrews. See Fig. 1.

MOUNTING: See table above.

ELECTRICAL CONNECTION: Terminal screw.

APPROVALS: Underwriters’ Laboratories Inc. listed, File No. MP268; Factory Mutual approved, Canadian Standards Association certified Master Report LR 95329-1; Industrial Risk Insurers acceptable.

DIMENSIONS: See Fig. 1.

ACCESSORIES: 102708A Chuck Assembly for holding Globar rod.

R1061012 Ignition Cable; for ignition installations in a high temperature environment; rated at 350° F [177° C] for continuous duty, and up to 500° F [260° C] for intermittent use; tested for operation up to 600 V and breakdown up to 15,000 V.

R1298020 Cable; for flame detector (“F” lead wire) installations in a high temperature environment; rated up to 400° F [204° C] for continuous duty, tested for operation up to 600 V and breakdown up to 7500 V.

Ordering Information

1. Model number.
2. Length and part number of flame rod.
3. Accessories, if required.
4. Replacement parts, if desired.

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 Honeywell Residential and Building Controls Division Sales Office (check white pages of phone directory).
2. Residential and Building Controls Division Customer Satisfaction Honeywell Inc., 1885 Douglas Drive North Minneapolis, Minnesota 55424-4386 (612) 542-7500

(a) Sleeve of flame rod holder protrudes 51/32 in. [4.0 mm].
REPLACEMENT PARTS:
102769 Adapter, 1-3/4 inch setscrew sleeve mounting.
103761 Chuck for holding flame rod.

38561 Gasket (two required) adapter to insulator, insulator to housing.
38566 Insulator
38560 Terminal, electrical

Installation

WHEN INSTALLING THIS PRODUCT . .
1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained experienced flame safeguard control service technician.
4. After installation is complete, check out product operation as provided in these instructions.

CAUTION
Disconnect power supply before wiring to prevent electrical shock or equipment damage, more than one disconnect may be involved.

If the manufacturer of the burner has not provided a place for mounting the flame rod holder, the installer should select a suitable place in the burner face plate or a place at the front of the boiler for installing this unit. See Figs. 3, 4 and 5 for typical mountings on various burners. When selecting a location:

1. Locate the unit so that the flame rod checks the pilot flame at the desired point.
2. Locate the unit so that it will be clear of the fire door opening radius.
3. Locate the unit where drafts will not blow the pilot flame away from the flame rod.
4. It is preferable to locate the unit so that the flame rod will be vertical or at least angled downward. A rod so installed is less likely to sag at high temperatures.
5. The unit may be installed so the flame rod is horizontal or angled upward, but extra support is needed for rods over 12 in. [305 mm] long.

NOTE: For extra support, a length of 1/8–27 internal NPT iron pipe may be coupled to the extension assembly, which is already threaded.

6. If the flame rod is to supervise a gas pilot for an oil burner installation, the rod must be located far enough from the oil flame to prevent oil spray from impinging and burning on the surface of the rod.
7. A horizontal or inclined flame rod should enter the pilot flame from the side.

CAUTION
If the rod is located above and parallel to a horizontal or semi-horizontal pilot burner, it may falsely indicate that a weak or candeling pilot flame is adequate for igniting the main burner. See Fig. 2.

After selecting the location which best fits the individual installation (if the burner manufacturer has not provided a mounting plate on the burner), cut a hole large enough for either a 1-1/4 or 2 in. pipe in the burner face plate or in the front of the boiler. Be sure to cut the hole at approximately the angle needed to bring the flame rod into proper position to prove the flame.

Fig. P-Positions of flame rod with horizontal type pilot burner.
Tack-weld or temporarily cement a short piece of 1-1/4 or 2 in. pipe into the hole. If a flange is used, it should be placed over the hole and the pipe welded to the flange. Do not mount permanently until checkout is complete.

3. Keep the flame rod at least 1/2 in. [13 mm] away from hot refractory material.

When the flame rod has been properly positioned, weld or cement the flue pipe and/or flange permanently. Mount the unit on the adapter pipe and tighten it in place. The C7004B1002, 1028 units are not designed for pressure-tight applications; there is no assurance of an absolutely tight seal at the joint between the unit sleeve and the adapter pipe. If a tighter seal is required, place a washer formed from suitable material at this joint to improve seal-off characteristics.

**FLAME GROUNDING**

The installer must provide an adequate ground surface for the pilot flame. The grounding surface in actual contact with the flame must be at least four times greater than the area of the portion of the flame rod in contact with the flame. The area of actual flame-to-ground contact available with a raw gas pilot is usually not satisfactory for use in the flame rectification circuit. Illustrated in Fig. 6 are three proven methods of providing an adequate grounding surface: a) the bomb fin assembly; b) grounding rods threaded into the pilot nozzle; and c) grounding rods welded to a collar. The bomb fin assembly may be made by welding two pieces of high temperature stainless steel in the pattern shown in Fig. 6-a. Then weld the assembly directly over the pilot burner nozzle. The threaded rod assembly is made by cutting a flame rod to provide six or seven four inch lengths. Tap the face of the nozzle, thread the rods and screw them in place as shown in Fig. 6-b. The welded rod assembly is made by cutting a flame rod to provide six or seven pieces, as noted above, and then welding these rods to collar made of high temperature stainless steel. This assembly is then welded in place over the pilot nozzle. See fig. 6-c.

If the flame rod is used to prove the main flame only, the flame contact with the furnace walls is generally sufficient for adequate grounding. In some cases, it may be necessary to provide a grounding target. A stainless steel plate or a rod assembly similar to that used for the pilot should make an effective target.

In all cases make sure that the grounding area is securely connected to ground.

Connect the lead from the flame rod terminal to the proper terminal on the combustion control.
It should be noted that even with grounding assemblies made with high temperature stainless steel, the metal oxidizes when it is exposed to temperatures exceeding 2000°F [1093°C]. Where this deterioration cannot be avoided, a scheduled replacement program should be considered.

Fig. 6-a) Bomb fin assembly; b) Threaded rod assembly; c) Welded rod assembly.

Fig. 7-Wiring connection at flame rod terminal.

**WIRING**

*Caution*

Disconnect power supply to prevent electrical shock and equipment damage. More than one disconnect may be involved. Wiring must conform to local codes and ordinances.

Fig. 7 shows the correct connections to the C7004B flame rod. Protect the leadwires from excessive radiant or reflected heat. In any portion of these wires must be exposed to temperatures in excess of 125°F [52°C], a heat-resistant wire should be used (see Accessories, page 2). For ordinary wiring where temperatures do not exceed 125°F [52°C], it is recommended that wire with thermoplastic insulation be used. It is advisable to install a 2-ft flexible lead to the flame rod terminal of the unit. This permits easy removal of the unit from the mounting pipe.

**VENTILATION**

If the flame rectifier is used on an oil installation, oil or soot deposits should not be allowed to form on the flame rod insulator. Such deposits might form leakage resistance paths, which in turn could cause nuisance shutdowns of the main burner.

All models of the C7004B are made with a 1/2-14 NPT internal pipe tapping for ventilation of the flame rod assembly head. Either atmospheric pressure or compressed air may be used for this purpose.

**Checkout**

The performance of the C7004B holder and flame rod can be determined by measuring the flame signal (current/voltage) during pilot/burner operation. The flame signal of most existing Honeywell flame safeguard controls is measured as a flame current (microamps) while the BCS 7700 and 7800 SERIES controls have a voltage flame signal measurement.

To measure the flame signal of existing controls, use a meter such as the Honeywell W136A volt-ohmmeter with a zero to 25 microampere scale. Most existing Honeywell flame safeguard controls incorporate a flame current jack on either the control amplifier or the control itself (see Fig. 8). The cable connector (part no. 196146, provided with the W136A) is used in conjunction with the W136A. With the scale selector positioned to the zero to 25 microampere scale, connections are made from the meter probes to the two ends of the connector plug (red to red, black to black). The plug end of the connector inserts directly into the flame current jack of the control itself or its plug-in amplifier. During pilot/burner operation, a steady flame current of at least 2.0 microamps indicates satisfactory positioning of the flame rod and ad-
voltage can be read directly at the module. A steady flame voltage of at least 1.25 Vdc for the 7800 SERIES controls and 2.2 Vdc for the BCS 7700 control indicates satisfactory positioning of the flame rod and adequate grounding.

Fig. 8—Measuring microamp flame signal.

Fig. 9—Measuring BCS 7700 control flame signal voltage.

Replacement

To replace Kanthal A1 rods, remove the cover from the C7004B (see Fig. 1). Loosen the setscrew which holds the flamerod in place. Withdraw the old flame rod, or push it into the firebox. Where either operation is impractical, remove the entire unit from the mounting pipe and replace the rod.

If replacing a Globar rod, remove the entire unit from the mounting pipe. Loosen the clamp nut (see Fig. 11) at the end of the adapter and remove the old section of the Globar rod. Replace with a new Globar, but use care in handling because the Globar rod is fragile.

In replacing either the Kanthal A1 flame rod or the Globar rod, be sure to adjust for correct position in the flame as outlined in Installation section of this installation sheet.

Fig. 11—Globar chuck assembly.

Honeywell

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