

C7061M Miniature Dynamic Self-Check Ultraviolet Flame Detector

PRODUCT DATA



APPLICATION

The C7061M is a dynamic self-checking flame detector for sensing the ultraviolet radiation generated by the combustion of gas, oil, or other fuels.

FEATURES

- Shutter interrupts ultraviolet radiation reaching the UV sensor to provide the UV sensor tube checking function. Amplifier circuitry components are checked from the microprocessor in the 7800 Series Control.
- Detectors can be mounted -45° to $+90^{\circ}$ in vertical direction.
- Ultraviolet radiation sensing tube is field replaceable.
- Threaded conduit fitting and color-coded leadwires allow rapid electrical installation.
- C7061M1016 uses Molex Woodhead 1R5006A20A120 (formerly Brad Harrison® Type 41310) connector.
- Two flame detectors can be wired in parallel to reduce nuisance shutdowns in difficult flame sighting applications.
- -4°F (-20°C) to 175°F (80°C) ambient temperature.
- Incorporates UV sensor tube checking feature; used with R7861 Dynamic Self-check Amplifiers.
- Housing protection is IP66. (similar to Nema IV).
- Integrated collar threaded for mounting on a 1 in. sight pipe.
- Viewing window rated for 50psi (350 kPa).

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SPECIFICATIONS

IMPORTANT

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

Models:

C7061M1008 - with 8 foot (2.4m) leadwires.
C7061M1016 - With connector.

Electrical Ratings:

The C7061 is powered from the Flame Safeguard unit that delivers the necessary voltages to operate the tube and shutter.

Ambient Operating Temperature Ratings

(Outside the Case):

-4°F to 175°F (-20°C to 80°C) using part no. 129464N UV Sensing Tube.

Storage Temperature Ratings:

-4°F to 158°F (-20°C to 70°C).

Housing:

Violet, plastic cover.

Housing protection is IP66. Similar to Nema 4 (indoor, outdoor protection; rain-tight, dust-tight, hose-directed water protection).

Pressure Rating of Quartz Viewing Window:

50 psi (350 kPa)

Mounting:

Threaded collar (internal 1-11 1/2 NPSM) internal threads for attaching to a 1 inch sight pipe.

Wiring Connections: (C7061M1008)

Leadwire: NEC Class 1 color coded.

Length: 8 ft (2.4m).

Threaded Leadwire Faceplate Opening:

1/2-14 NPSM internal threads for attaching conduit (avoid overtightening that could crack the housing).

Connector:

C7061M1016: Molex Woodhead 1R5006A20A120 (formerly Brad Harrison® Type 41310).

Dimensions:

See Fig. 1.

Weight:

1.4 lbs (630 g).

Approvals:

Underwriters Laboratories Inc. Listed: MP268, Guide MCCZ2, MCCZ8

Factory Mutual approved.

SwissRe (formerly Industrial Risk Insurers) Acceptable.

Replacement Parts:

129464N Ultraviolet Sensing Tube

Accessories:

123539 Antivibration Mount.

204341 Mirror Assembly.

105172C Pressure Sealoff adapter (3/4 in. npt)

118367 Swivel Mount

136733 Heat Block (3/4 in. npt)

SIL 3 Capable:

The C7061M when used with a R7861 Self Check amplifier in relay module EC7810A, 20A, 30A, 40L, 50; RM7800 [E, G, L, M], 30A, 38[A,B,C], 40[E,G,L,M], 50A, 88A, 90[A,B], 97[A,C], 98A is SIL 3 Capable in a properly designed safety instrumented system. See Form number 65-0312 for certificate agreement.

ORDERING INFORMATION

When purchasing replacement and modernization products from your TRADELINE® wholesaler or distributor, refer to the TRADELINE® Catalog or price sheets for complete ordering number. 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 Environmental and Combustion Controls Sales Office (check white pages of your phone directory).
2. Honeywell Customer Care
1885 Douglas Drive North
Minneapolis, Minnesota 55422-4386
3. <http://customer.honeywell.com> or <http://customer.honeywell.ca>

International Sales and Service Offices in all principal cities of the world. Manufacturing in Belgium, Canada, China, Czech Republic, Germany, Hungary, Italy, Mexico, Netherlands, United Kingdom, and United States.

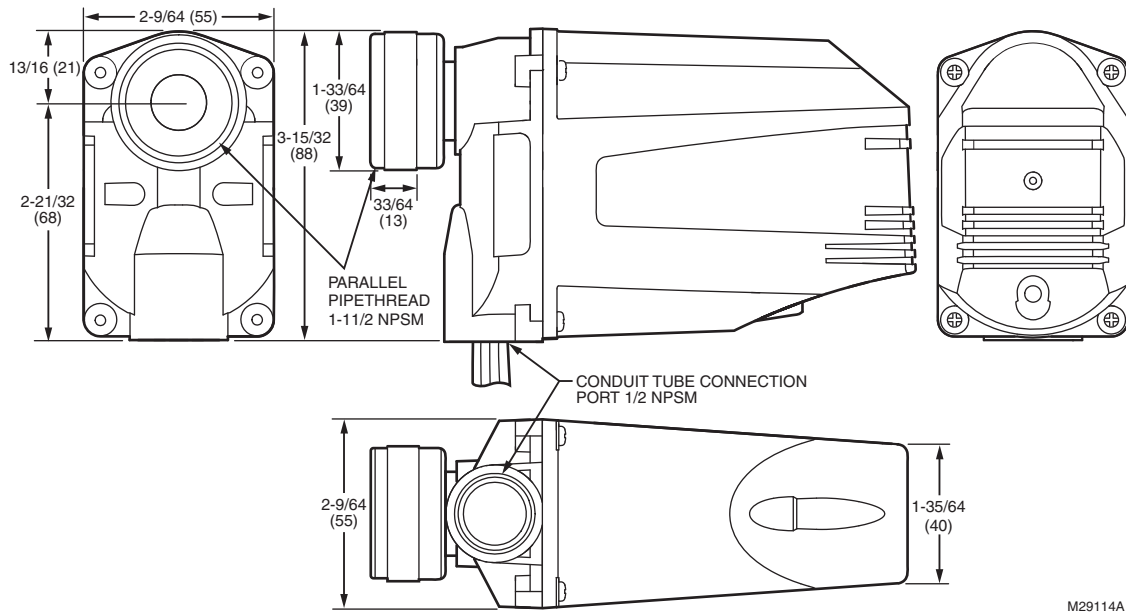


Fig. 1. Dimensions of C7061M in inches. (mm).

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 service technician.
4. After installation is complete, check out product operation as provided in these instructions.



CAUTION

Equipment damage hazard.
Sensing tube can fail to discriminate between flame conditions. Change sensing tube after 40,000 hours of continuous use.



WARNING

Electrical shock hazard.
Can cause serious injury or death.
Disconnect power supply before beginning installation to prevent electrical shock and equipment damage. More than one disconnect may be involved.

NOTICE

Per industry standards, a conduit seal or a cable type that is sealed is required to be installed in a device that can result in flammable gas or flammable liquid flow through a conduit or cable to an electrical ignition source in the event of a seal leakage or diaphragm failure.

IMPORTANT

1. Do not connect these detectors to non-Honeywell manufactured controls (primaries, programmers, multiburner systems, and burner management systems). Unsafe conditions could result.
2. All wiring must be NEC Class 1 (line voltage).
3. The C7061 is powered from the Flame Safeguard unit that delivers the necessary voltages to operate the sensing tube and shutter.
4. Sight the detector so it does not respond to ignition spark.
5. On multiburner installations, each detector must respond only to the flame of the burner it is supervising.
6. Do not connect more than two C7061 Flame Detectors in parallel.

Proper flame detector installation is the basis of a safe and reliable flame safeguard installation. Refer also to the burner manufacturer instructions. Carefully follow all instructions for the best possible flame detection application.

Basic Requirements

The combustion flames of most carbon-based fuels emit sufficient ultraviolet radiation to enable the C7061 (Purple Peeper) Ultraviolet Flame Detector to prove the presence of a flame in a combustion chamber. The detector is mounted outside the combustion chamber with its mounting nut threaded to one end of a sight pipe inserted through the wall of the combustion chamber. The ultraviolet sensing tube in the flame detector sights the flame through the pipe.

When a flame is present, the UV tube in the C7061 senses the ultraviolet radiation emitted. The C7061 then produces a signal that is sent to the amplifier in the flame safeguard control. The amplified signal energizes the flame relay in the control to allow proper system operation.

Because it is necessary for the UV sensing tube to actually see the flame, it is best to locate the detector as close to the flame as physical arrangement, temperature, and other restrictions permit. These restrictions are described in detail in the following paragraphs.

Determine Location

Before beginning the actual installation, determine the best location for mounting the detector. Carefully consider the factors discussed in this section before deciding on the location.

Temperature

Install the C7061 where the ambient temperature (outside the case) stays within the ambient operating temperature ratings.

To keep the C7061 below its maximum rating, it may be necessary to add additional insulation between the wall of the combustion chamber and the detector. A shield or screen can be added to reflect radiated heat away from the detector. If the detector continues to get too hot, cooling is necessary. Refer to the Sight Pipe Ventilation section.

Vibration

The detector withstands normal burner vibration. If the C7061 is subject to excessive vibration, use a special 123539 Antivibration Mount. If you use this mount, install it before you position and sight the detector.

Clearance

Make sure there is enough room to easily mount the sight pipe, detector, and all required fittings, and to remove the detector for troubleshooting and servicing.

Radiation Sources (Other than Flame)

Examples of radiation sources (other than flame) that could actuate the detection system:

1. Ultraviolet Sources:
 - a. Hot refractory above 2500°F (1371°C).
 - b. Spark:
 - c. Ignition transformers.
 - d. Welding arcs.
 - e. Lightning.
 - f. Gas lasers.
 - g. Sun lamps.
 - h. Germicidal lamps.
2. Gamma Ray and X-ray Sources:
 - a. Diffraction analyzers.
 - b. Electron microscopes.
 - c. Radiographic X-ray machines.
 - d. High voltage vacuum switches.
 - e. High voltage condensers.
 - f. Radioisotopes.

Except under unusual circumstances, none of these sources except hot refractory and ignition spark would be present in or near the combustion chamber.

The detector can respond to hot refractory above 2300°F (1260°C) if the refractory surface represents a significant percentage of the detector field of view. If the temperature of

the hot refractory causes the flame relay (in the flame safeguard control) to pull in, re-aim the sight pipe so the detector views a cooler area of the refractory.

Ignition spark is an intense source of ultraviolet radiation.

When installing the detector, make sure it does not respond to ignition spark by following the Ignition Spark Response Test listed on page 9.

Single Burner Requirements

The detector must have an unobstructed view of a steady part of the flame it is supervising. This requires a proper sighting angle and minimized ultraviolet radiation attenuation effects. However, when supervising only one burner, sighting requirements are simplified.

Sighting Angle

The first 30 percent of a flame closest to the burner nozzle (the flame root) emits the most ultraviolet energy. Also, if the detector sights the flame at an angle instead of perpendicularly, it views more flame depth. Therefore, the best sighting angle is nearly parallel to the axis of the flame, permitting the detector to view a large portion of the first 30 percent of the flame closest to the burner nozzle, as illustrated in Fig. 2.

Low angle sighting permits the detector to view a greater depth of flame, thus reducing the effects of instabilities in the flame pattern. Also, the environment near the burner nozzle is usually cleaner than at any other part of the combustion chamber. This provides a clearer line of sight and can keep the viewing window cleaner, thus reducing the maintenance required.

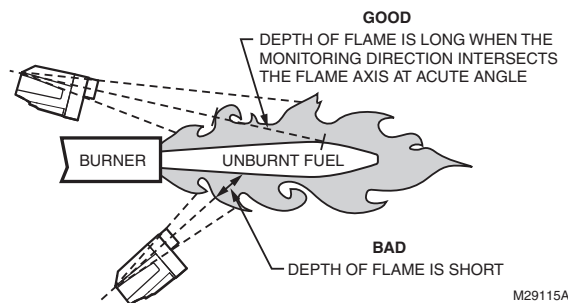


Fig. 2. Detector sighting angle.

NOTE: When possible, it is desirable to tilt the detector and sight pipe downward to prevent the buildup of soot in the pipe or on the viewing window.

In most installations, the detector needs to respond to the pilot flame alone, then the pilot and main burner flame together, and finally the main burner flame alone. The detector must meet all sighting requirements that apply:

- Pilot flame alone—the smallest pilot flame that can be detected must be capable of reliably igniting the main burner.
- Pilot and main burner flame together—the detector must sight the junction of both flames.
- Main burner flame alone—the detector must sight the most stable part of the flame for all firing rates.

Parallel Flame Detectors

Shifting flame patterns, commonly encountered on burners with high turndown ratios, can require two parallel detectors to prove the flame at the highest and lowest firing rates and for modulation in between. In this case, one detector supervises the pilot (interrupted) and both detectors supervise the main burner flame. During the main burner run period, either detector is capable of maintaining system operation. A maximum of two C7061 Detectors can be connected in parallel.

In addition to assuring more reliable flame detection, parallel detectors facilitate maintenance during burner operation. Each detector can be removed, in turn, without shutting down the supervised burner. However, a flame simulating failure occurring in the flame signal amplifier or in either detector will cause a shutdown.

Screening Effects

Smoke, oil mist, dirt and dust are masking agents that attenuate the ultraviolet radiation that the flame emits. If they absorb too much radiation, the amount of ultraviolet radiation reaching the detector is reduced. The flame signal can then become too low to hold in the flame relay, resulting in burner shutdown.

The problem can be eliminated by diluting the contaminants. A strong flow of air through the sight pipe will clear a viewing path through the attenuating material. Refer to the Sight Pipe Ventilation section.

It is also desirable to sight the detector at an area containing fewer masking agents such as near the burner nozzle or near the entrance of the combustion air. Increasing the viewing area of the detector by shortening the sight pipe or by increasing the diameter of the sight pipe also reduces the attenuating effects of masking agents.

Multiburner Requirements

(Flame Discrimination)

In addition to meeting the requirements for a single burner, a multiburner installation requires discrimination between flames. Flame discrimination can be defined as locating all flame detectors so that each detector responds only to the flame of the burner it is supervising.

In multiple burner systems, not every detector can be positioned so its line-of-sight does not intercept flames from other burners. For example, this situation occurs in front-fired boiler-furnaces having more than one row of burners, or in multilevel opposed-fired furnaces where the burners face each other.

When planning such an installation, locate each flame detector so that it has the best possible view of the first 30 percent closest to the burner nozzle (the flame root) it is supervising, and the worst possible view of all other flames.

Fig. 3 illustrates a critical detector application problem that requires flame discrimination. Flame discrimination is accomplished for Detector A by repositioning it until the flame relay (or Flame LED in the flame safeguard control) does not respond to Flame B. Note that Detector A is aimed at the first 30 percent of Flame A where the ultraviolet radiation is most intense. It sights the tip of Flame B, but it is not aimed at the first 30 percent of Flame B where UV is intense. Detector A is repositioned to assure maximum response to Flame A while rejecting Flame B. Similarly, Detector B is positioned to assure maximum response to Flame B while rejecting Flame A.

If you reposition a detector and still cannot achieve flame discrimination, try reducing the viewing area by increasing the length or decreasing the diameter of the sight pipe, or adding an orifice plate.

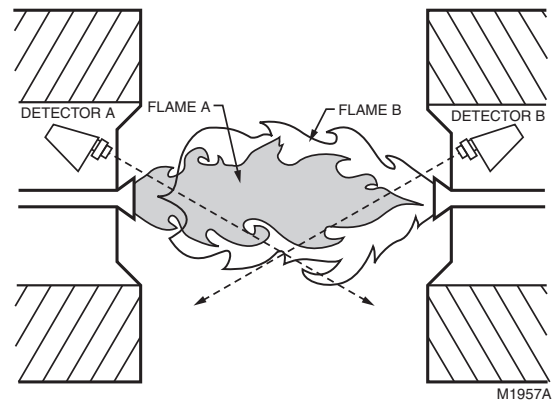


Fig. 3. Example of flame discrimination problem (opposed fired burners).

Install the Sight Pipe (Fig. 4)

After you have determined the location and sighting angle, select the sight pipe. A black iron pipe with a diameter of at least 1-1/2 in. (38 mm) is recommended. Do not use stainless steel or galvanized pipe because they reflect ultraviolet radiation internally and complicate aiming the pipe.

Sight pipes with diameters 2 to 3 in. (51 to 76 mm) produce better results for horizontal rotary burners, which require wide viewing angles. A wide viewing angle can also be obtained by using a short sight pipe.

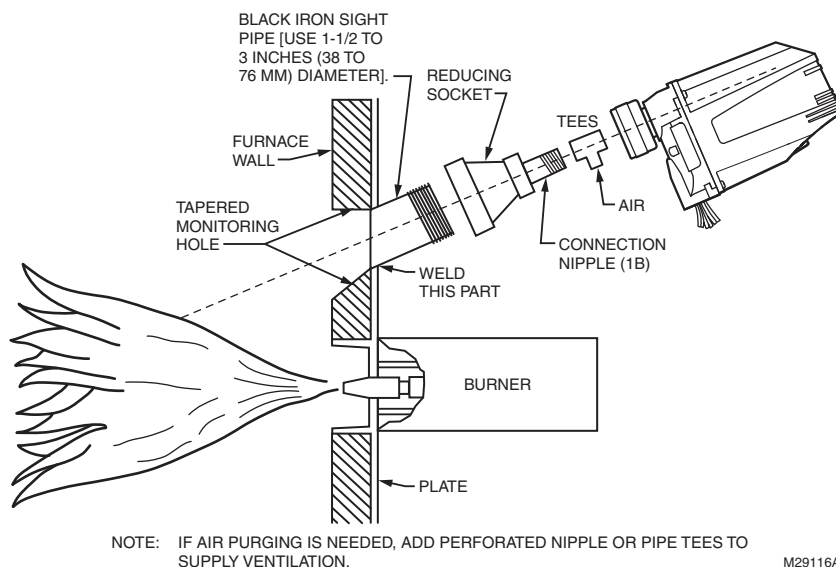


Fig. 4. Typical mounting of C7061M.

Prepare Hole in Combustion Chamber Wall

Cut or drill a hole of the proper diameter for the sight pipe in the wall of the combustion chamber at the selected location. Flare the hole to leave room for small adjustments of the sighting angle. The taper of the hole should be about 1 in. for every 3 in. (25 mm for every 76 mm) of wall thickness.

Mount Sight Pipe

Thread one end of the pipe to fit the 1 in. mounting nut, or required coupling. Cut the pipe to the desired length (as short as practical) and at an angle so it fits flush with the wall of the combustion chamber. Tack weld the pipe to the wall in a trial position. Do not weld the sight pipe permanently in place until after completing the Adjustments and Checkout.

NOTE: If you use 118367A Swivel Mount and you are positive about the location and sighting angle, you can permanently weld the pipe.

Install Fittings

In some cases, the sight pipe does not directly fit the C7061 mounting nut. Also, it may be desirable or necessary to ventilate the sight pipe. You may also want to use a swivel mount or an antivibration mount. Each of these cases can require additional fittings.

Reducer

For sight pipes of larger diameter than the mounting nut, install a reducer as illustrated in Fig. 4. The reducer requires a close nipple with 1 in. NPT external threads:

Sight Pipe Ventilation

It may be necessary to ventilate the sight pipe to cool the detector or to clear a viewing path through UV radiation attenuating material.

For a negative pressure combustion chamber, drilling a few holes in the section of the sight pipe outside of the combustion chamber allows air at atmospheric pressure to flow through the sight pipe and into the chamber. A perforated pipe nipple between the sight pipe and the detector can also be used.

For a positive pressure combustion chamber, connect a supply of pressurized air from the burner blower to flow through the sight pipe and into the chamber. The air pressure must be greater than the chamber pressure (see Fig. 4).

Mount the Detector

Mount the detector onto the sight pipe, reducer, or other fitting (see Fig. 4, 5, 6).

NOTE: The C7061 Self-Checking Flame Detectors incorporate a shutter mechanism and, therefore, require special consideration for mounting positions other than vertically sighting downward, as illustrated in Fig. 5 & 6.

- The C7061 has an arrow indicator on the back of the cover to facilitate mounting (see Fig. 5). The arrow must be vertically aligned and pointing downward.
- The C7061 must be mounted with the conduit opening located 90 degrees below the horizontal (see Fig. 5 & 6) pointing down.
- While the C7061 may be mounted as much as 45 degrees below the horizontal plane as shown in Fig. 5, this may increase the likelihood of soot buildup on the viewing window.

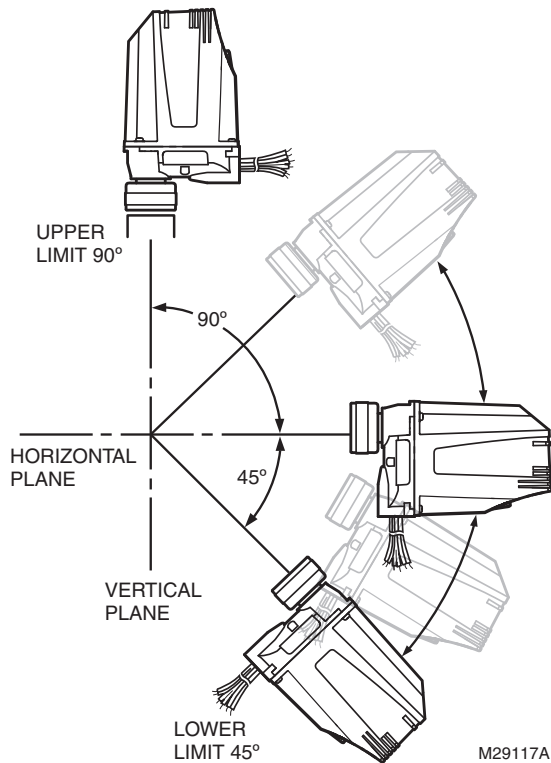


Fig. 5. C7061 mounting positions.

To mount a C7061M (see Fig. 6):

1. Hold the unit securely with one hand to prevent it from rotating.
2. Tighten the mounting nut approximately 4 turns with the other hand until the unit is held securely in place.
3. Make sure the unit is properly aligned in the vertical plane when viewed from the front.

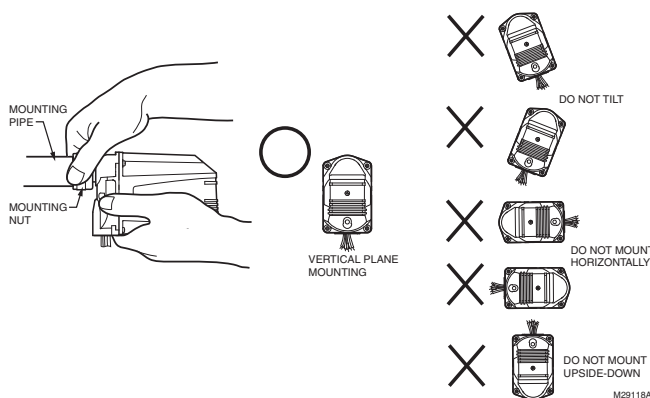


Fig. 6. Mounting C7061M Detector.

NOTES:

1. Be sure the C7061M is properly aligned vertically when seen from the front. If not, the shutter may be damaged or malfunction.
2. File any burrs or protrusions from the monitoring pipe. If the packing in the mounting nut is damaged, any chance of leakage may be caused.
3. Do not use a tool such as a pipe wrench when tightening the mounting nut. Excessive torque by a tool could damage the packing and compromise the seal.
4. Do not adjust the mounting pose by forcibly holding the unit or wiring pipe. Failure to do so may damage the packing and compromise the seal.

WIRING



CAUTION

Equipment damage hazard.

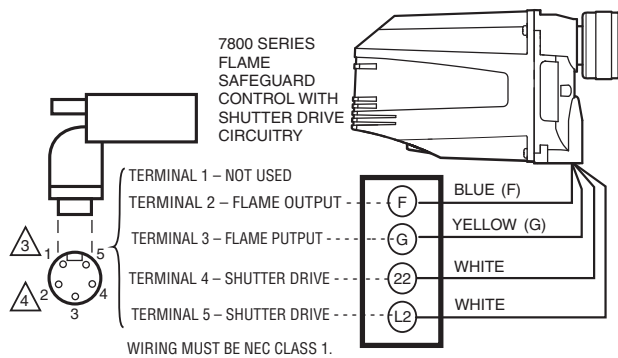
Improper wiring can permanently damage amplifier.

When using the C7061 and the R7861 Dynamic Self-Check Amplifier, be careful not to short the white shutter leadwires together (by wiring incorrectly, leaving an incorrect jumper wire, or stripping the insulation too much so the bare leadwires can touch).

NOTICE

Per industry standards, a conduit seal or a cable type that is sealed is required to be installed in a device that can result in flammable gas or flammable liquid flow through a conduit or cable to an electrical ignition source in the event of a seal leakage or diaphragm failure.

1. All wiring must comply with applicable local electrical codes, ordinances, and regulations. Use NEC Class 1 wiring.
2. Keep the flame signal leadwires as short as possible from the flame detector to the terminal strip or wiring subbase. Capacitance increases with leadwire length, reducing the signal strength. The maximum permissible leadwire length depends on the type of leadwire and conduit type and diameter. *The ultimate limiting factor in flame signal leadwire length is the signal voltage.* Refer to Table 1.
3. The C7061M1008 detector has color-coded plastic-insulated, no. 18 leadwires, 8 ft (2.4m) long, rated for 221°F (105°C). *These wires must be run in a conduit.* The C7061M1016 has a Brad Harrison® Type 41310 connector.
4. If the leadwires are not long enough to reach the terminal strip or wiring subbase, make the required splices in a junction box.
5. If splicing is necessary, use moisture-resistant no. 14 wire suitable for at least 167°F (75°C) if the detector is used with a flame safeguard primary control, or at least 194°F (90°C) if used with a flame safeguard programming control.
6. *For high temperature installations*, use Honeywell specification no. R1298020 wire or equivalent for the F leadwire. This wire is rated up to 400°F (204°C) for continuous duty. It is tested for operation up to 600 volts and for breakdown up to 7500 volts. For the other leadwires, use moisture-resistant no. 14 wire selected for a temperature rating above the maximum operating temperature.
7. Refer to Fig. 7 for wiring connections.



- 1 AN R7861 DYNAMIC SELF-CHECK AMPLIFIER MUST BE USED.
- 2 TWO C7061M DETECTORS CAN BE CONNECTED IN PARALLEL TO THE SAME TERMINAL.
- 3 C7061M1016 ONLY: KEYED CONNECTOR ALLOWS CONNECTION IN ONLY ONE POSITION.
- 4 C7061M1016 ONLY: REFERENCE MOLEX WOODHEAD 1R5006A20A120 (FORMERLY BRAD HARRISON™ 41310 TYPE CONNECTOR).
- M34066

Fig. 7. Wiring diagram for C7061M Detectors with 7800 Series Flame Safeguard controls with shutter drive circuitry.

IMPORTANT

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

Connecting Detectors in Parallel

For a flame that is difficult to sight, using two parallel C7061 Flame Detectors reduces nuisance shutdowns. If only one of the parallel detectors loses the flame signal, the other indicates the presence of the flame and keeps the burner running. When two parallel C7061 Detectors are used, a flame-simulating failure in either detector causes the burner to shut down. Two C7061 Detectors can be connected in parallel to the same terminals on 120 volt flame safeguard controls. To avoid exceeding the rating of the solid-state shutter switch in the R7861 Flame Signal Amplifier, do not connect more than two C7061 Detectors in parallel.

When the flame detectors are connected in parallel, the low level background signals are additive. This background signal increases as the temperature decreases.

IMPORTANT

Voltage and frequency: The C7061 is powered from the flame safeguard unit that delivers the necessary voltages to operate the tube and shutter.

ADJUSTMENTS AND CHECKOUT

UV Sensor Tube Test

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

If the system does not start during the initial burner lightoff, check the UV sensor tube in the flame detector. If a reddish glow appears when there is no flame present, replace the UV sensing tube. When performing this test, make sure there are no extraneous sources of ultraviolet radiation in the test area [see "Radiation Sources (Other than Flame)" on page 4].

Adjust Detector Sighting

With the flame detector installed and the burner running, adjust the sighting position of the detector for optimum flame signal.

It is suggested that a volt-ohm meter with a minimum sensitivity of one megohm/volt and a zero to five or ten Vdc scale be used for R7861 Amplifier flame signal measurements. Measure the flame signal as illustrated in

Fig. 8. Be careful to make the proper connections of positive (red) meter lead to positive (+) control jack and negative (black) meter lead to negative (-) or (-Com) jack with 7800 Series controls. When the 7800 Series control has a Keyboard Display Module, a zero to five Vdc voltage is displayed on the module.

NOTES:

1. The shutter operation may cause fluctuations in the voltage reading. Read the average stable reading, disregarding the peaks.
2. The flame signal must be steady (or stable as described in note 1).

Move the detector and sight pipe around to sight the flame from various positions and angles. Try to get a maximum steady (or stable) reading on the meter that is above the minimum acceptable voltage listed in Table 1.

Measure the flame signal for the pilot alone, the main burner flame alone, and both together (unless monitoring only the pilot flame when using an intermittent pilot, or only the main burner flame when using direct spark ignition). Also measure the flame signal at low and high firing rates and while modulating in between (as applicable). With the detector in its final position, all required flame signals must be steady (or stable) and as specified in Table 1. If you cannot obtain the proper signal, refer to the Troubleshooting section.

Pilot Turndown Test

When the detector is used to prove a pilot flame before the main fuel valve(s) can be opened, perform a Pilot Turndown Test before welding the sight pipe into position. Follow the procedures in the flame safeguard control instructions and in the burner manufacturer instructions.

Ultraviolet Response Tests Ignition Spark Response Test

Test to be sure that ignition spark is not actuating the flame relay in the flame safeguard control.

1. Close the pilot and main burner manual shutoff valves.
2. See Table 1 below for Flame Signal. Start the burner and run through the Ignition period. Ignition spark should occur, but the flame LED must not light. The flame signal should not be greater than 0.25 Vdc.



Fig. 8. Measuring voltage flame signal with 7800 Series controls.

Table 1. Flame Signal.

Flame Detector	Plug-in Flame Signal Amplifier	Minimum ^a Acceptable Steady Voltage (Vdc)	Maximum Expected Voltage (Vdc)
C7061M	R7861 Dynamic Self-Check ^{a,b}	1.25	5.0

^a Shutter operation of the C7061M may cause fluctuations in the voltage reading. Read the average stable voltage, disregarding the peaks.

^b Shutter operates at 12 cycles per minute.

3. If the flame relay does pull in, reposition the detector farther from the spark, or relocate/resight the detector to eliminate/reduce the detector response to reflected UV radiation. It may be necessary to construct a barrier to block the ignition spark from the detector view. Continue adjustments until the flame signal due to ignition spark is less than the flame signal values indicated in step 2.

Response to other Ultraviolet Radiation Sources

Some sources of artificial light produce small amounts of ultraviolet radiation. Under certain conditions, an ultraviolet detector responds as if it is sensing a flame. Do not use an artificial light source to check the response of an ultraviolet flame detector. To check for proper detector operation, conduct flame failure response tests under all operating conditions.

Weld the Sight Pipe

When the flame signal is acceptable after all adjustments are made, remove the detector and weld the sight pipe in its final position. (If you are using a swivel mount, the pipe may be already welded.) Then reinstall the detector.

Final Checkout

Before putting the burner into service, check out the installation using the Checkout procedures in the Instructions for the appropriate flame safeguard control. After completing the Checkout, run the burner through at least one complete cycle to verify correct operation.

IMPORTANT

Do not put the system into operation until all Checkout tests in the Instructions for the appropriate flame safeguard control and any others specified in the burner installation instructions are satisfactorily completed.

TROUBLESHOOTING

WARNING

Electrical shock hazard.

Can cause serious injury or death.

Open the master switch to disconnect power before removing or installing the detector or its cover. More than one disconnect may be involved.

UV Sensor Tube Test

See "UV Sensor Tube Test" on page 8.

Inadequate Flame Signal

If a satisfactory flame signal (see Table 1) cannot be obtained while adjusting the sighting position of the detector, follow these procedures. If you encounter other problems in the system, refer to the Troubleshooting section in the instructions for the appropriate flame safeguard control.

NOTE: For instructions to replace the sensing tube, see "Service" in next column.

1. Check for the proper line voltage. Make sure the master switch is closed, connections are correct, and power supply is of the correct voltage and frequency.
2. Check the detector wiring for defects:
 - a. Incorrect connections.
 - b. Wrong type or size of wire.
 - c. Deteriorated wire.
 - d. Open circuits.
 - e. Short circuits.
 - f. Leakage paths caused by moisture, soot, or dirt.
3. With the burner running, check the temperature at the detector. If it exceeds 175°F (80°C):
 - a. use a heat block (part number 136733) or seal off assembly (part number 105172C).

NOTE: A bushing will be needed as these parts are 3/4-in. npt.

- b. Add additional insulation between the wall of the combustion chamber and the detector.
 - c. Add a shield or screen to reflect radiated heat away from the detector, or
 - d. Add cooling (refer to Sight Pipe Ventilation).
4. Remove detector from the sight pipe and clean the viewing window with a soft clean cloth.
 5. Clean the inside of the sight pipe before re-installing the flame detector (Fig. 6).

NOTE: Do NOT remove the detector while the equipment is operating.

NOTE: The detector is free when the collar is unscrewed; do not drop it.

6. If the flame signal continues to be too low, replace the plug-in amplifier. Then recheck the flame signal.
7. Replace the ultraviolet sensing tube (see "Service" on page 10). Then recheck the flame signal.

8. Remove detector from the sight pipe and sight it on a UV source, and note the flame LED on the 7800 Series device.
9. If you cannot yet obtain a meter reading, replace the detector.

IMPORTANT

At the completion of Troubleshooting, be sure to perform the Adjustments and Checkout procedures.

SERVICE

WARNING

Electrical shock hazard.

Can cause serious injury or death.

Open the master switch to disconnect power before removing or installing the detector or its cover. More than one disconnect can be involved.

Periodic Maintenance

1. Clean the viewing window when necessary. Remove the detector (see "Troubleshooting" on page 10) and use a clean cloth over the eraser end of a pencil. Do not remove the window (or lens) to clean it. If it is broken or damaged or it is coated with a substance that cannot be removed, replace the detector.
2. Keep the flame detection system adjusted for the smoothest, most reliable operation as recommended by the burner manufacturer.
3. Ultraviolet sensing tubes have a life expectancy of 40,000 hours of continuous use within the ambient temperature and voltage ratings. Replace the sensing tube at appropriate intervals.

Replacing Ultraviolet Sensing Tube (Fig. 9)

IMPORTANT

Be very careful not to jar the flame detector.

1. Turn OFF the power.
2. Wait at least one minute before loosening the mounting nut, then remove the C7061M detector from the sight pipe.
3. Remove the cover by unscrewing the 4 mounting screws.
4. Remove 2 tube unit fixing screws on the rear of the tube unit and remove the UV sensing tube unit.

NOTE: These screws are NOT captivated. Put them in a safe place to avoid losing them.

5. Remove UV sensing tube from the tube unit.
6. Carefully remove rubber cover from the old tube and install onto the new UV tube (Part Number 129464N).
7. Slide new tube into tube unit holder.
8. Insert the top part of the new tube unit into the round hole in the upper portion of the shutter unit and push the bottom part of the tube unit down into place.

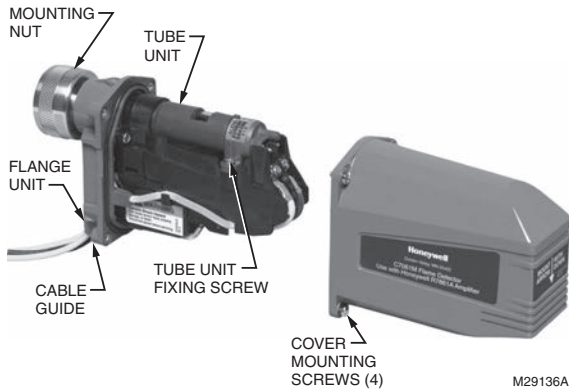


Fig. 9. Replacing ultraviolet radiation sensing tube.

9. Tighten 2 tube unit fixing screws removed during Step 4.
10. Make sure that the O-ring is not disengaged from the flange unit.
11. Secure the cover with 4 cover mounting screws.

NOTES:

1. After replacing the ultraviolet sensing tube, be sure to carefully mount the O-ring on the flange unit before reattaching the cover. Otherwise the UV sensor will not be properly sealed.
2. Tighten the terminal screws and mounting screws with a tightening torque of 6 in.-lbs.

Operation check

1. Mount the C7061M on the monitoring pipe
2. Turn on the power.
3. Start the combustion of the burner.
4. Measure the flame voltage at the Flame Amplifier.

Table 2.

Recommended flame voltage	Inspection item
Stable 1.25Vdc or more. (The flame voltage may fluctuate with the shutter operation of this unit.)	<ul style="list-style-type: none"> • The flame is monitored correctly. • The light-receiving lens of this unit is not dirty. • No soot or other foreign matter has accumulated in the monitoring pipe.

NOTE: If the flame voltage exceeds 4.5Vdc, limit the quantity of ultraviolet rays with an orifice ring or the like. If there is too much ultraviolet radiation, it can penetrate the tube unit even when the shutter is closed, causing faulty operation.

Inspection and Adjustment

After replacing the UV sensing tube, perform a pilot turndown test, an ignition spark response test and a safety shutoff test to verify proper functioning of the tube unit.

IMPORTANT

Do not put the system into operation until all Checkout tests in the Instructions for the appropriate flame safeguard control and any others specified in the burner installation instructions are satisfactorily completed.

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