



# FIREYE® FLAME SCANNERS



48PT1  
(Obsolete)



48PT2



69ND1

**INFRARED: 48PT1, 48PT2 and 48PT2-CEX**

**FLAME ROD: 69ND1**

**For UV Self-Check Scanners use SC-101**

**For Hazardous Locations or NEMA 4X Scanners use SC-106**

**For Non Self-Check UV Scanners use SC-102**



## DESCRIPTION

The 48PT2 scanner comes with cables rated for **Tray Cable - Exposed Run (TC-ER)** and complies with the crush and impact requirements of the standard for metal clad cable, UL 1569.

### **48PT1 (Obsolete)**

The 48PT1 lead sulfide infrared scanner contains a high impedance detector and is designed to be used only on P-Series controls.

### **48PT2**

The 48PT2 lead sulfide infrared scanner contains a low impedance detector and is designed to detect low flicker frequency IR signals from gas and oil flames. It is designed for use on D-Series, Flame-Monitor, FlameWorx, MicroM and Burnerlogix controls.

### **48PT2-CEX**

The 48PT2-CEX is a 48PT2 mounted in a ATEX compliant housing for environments requiring the rating of Exd IIC T6 ATEX hazardous location.

### **69ND1**

The 69ND1 flame rod is made of high temperature resistant metal and can be used only to detect gas flames. The rods come in 12, 18 and 24 inch lengths.



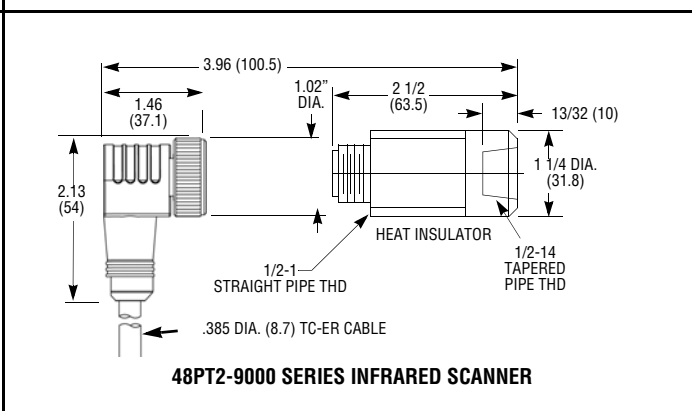
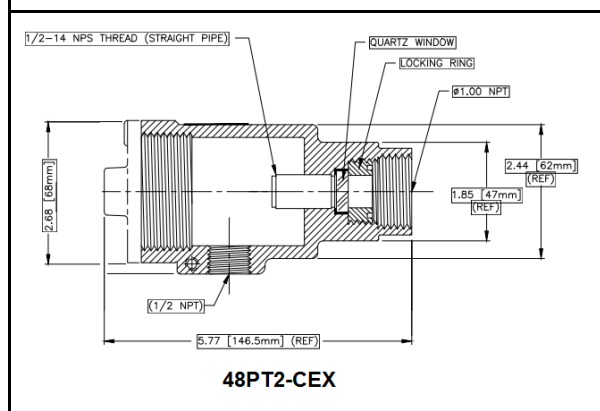
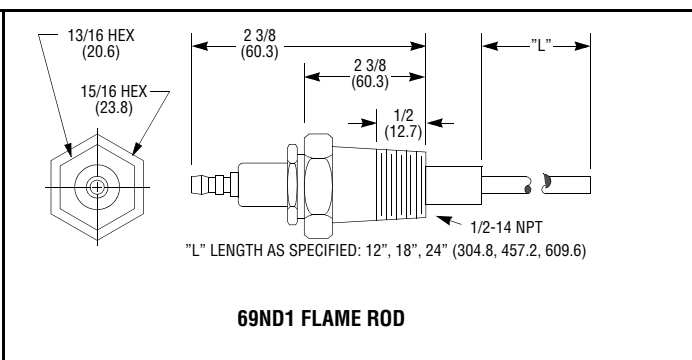
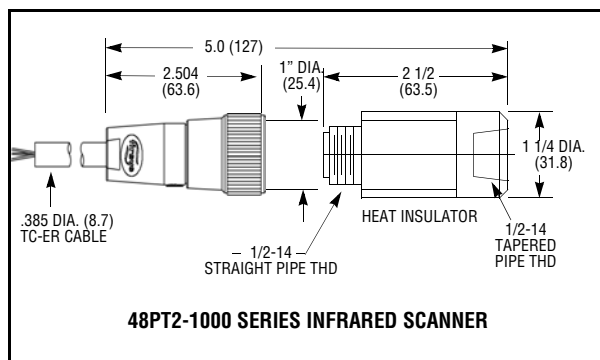
**CAUTION: Fireye scanners are for use only with Fireye controls. Do not connect Fireye scanners with controls not manufactured by FIREYE.**



**CAUTION: If component checking is required during burner operation for constantly fired burners, utilize the infrared flame scanner (48PT2) with associated AutoCheck amplifier. For Flame-Monitor systems use the E1R1, E1R3 or E1R2 and for MicroM systems use the MEIR1 or MEIR4.**



**Warning- all installation, service and troubleshooting of Fireye products must be performed by a qualified technician.**



| Scanner Model                                                                                                                                                                | Type      | Approx. Volts Across Cell | Approx. Resistance* of Cell | Ambient Temp. Limits             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------|-----------------------------|----------------------------------|
| 48PT1                                                                                                                                                                        | Infrared  | 125VDC                    | 1.5 Meg. ohms               | 140°F/ 60°C, -40°                |
| 48PT2<br>48PT2-CEX                                                                                                                                                           | Infrared  | 7-15VDC                   | 20K - 80K ohms              | 140°F / 60°C, -40°               |
| 69ND1                                                                                                                                                                        | Flame Rod | 280-305 VAC               | Infinite                    | Tip 2460°F<br>1500°F/816°C, -40° |
| * Resistance measured with 20K Ohms/ Volt Meter<br>For proper Flame Signal Voltage see technical bulletin for the appropriate control.<br>48PT2 scanners comply with NEMA 4X |           |                           |                             |                                  |

| PART NUMBER                                                         | DESCRIPTION                                                                                                                                                                                          | USE WITH                                                                |
|---------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| 48PT1-1003<br>48PT1-1007<br>48PT1-9003<br>48PT1-9007<br>48PT1-9007W | IR Straight Head 8 feet (2440mm) leads<br>IR Straight Head 4 feet (1220mm) Leads<br>IR 90 deg. Head 8 ft. (2440mm) Leads<br>IR 90 deg. Head 4 ft. (1220mm) Leads<br>- 9007 Water Repellent           | P-Series                                                                |
| 48PT2-1003<br>48PT2-1007<br>48PT2-9003<br>48PT2-9007<br>48PT2-CEX   | IR Straight Head 8 feet (2440mm) leads<br>IR Straight Head 4 feet (1220mm) Leads<br>IR 90 deg. Head 8 ft. (2440mm) Leads<br>IR 90 deg. Head 4 ft. (1220mm) Leads<br>IR Straight Head, 1/2" NPT inlet | C & D Series, MicroM,<br>FLAME-MONITOR,<br>BurnerLogix                  |
| 35-69                                                               | Heat Insulator for 48PT Scanners                                                                                                                                                                     |                                                                         |
| 69ND1-1000K4<br>69ND1-1000K6<br>69ND1-1000K8                        | Flame Rod 12 inches (305mm) 1/2 in. mount<br>Flame Rod 18 inch (460mm) 1/2 in. mount<br>Flame Rod 24 inches (710mm) 1/2 in. mount                                                                    | P, C, D, M-Series, MicroM,<br>MB Systems, BurnerLogix,<br>FLAME-MONITOR |

For information on the 45UV scanners, see Bulletin SC-101.

For information on the 55UV scanners, see Bulletin SC-106.

For information on the UV1A, UV2, and UV8A scanners, see Bulletin SC-102.

## SCANNER MAINTENANCE

### 48PT1 and 48PT2, 48PT2-CEX Infrared Scanners and 69ND1 Flame Rods

The viewing area of the scanner must be kept clean. Even a small amount of contamination will reduce the flame signal reaching the detector by a measurable amount. Wipe the viewing area routinely using a soft cloth dampened with concentrated detergent.

Type **48PT1** scanner includes a replaceable #4-128-1 cell

Type **48PT2, 48PT2-CEX** scanner includes a replaceable #4-263-1 Firetron cell.

Type **69ND1 Flame Rod**. Rods should be routinely replaced as they oxidize.

**Flame Signal Strength.** Routine observation of the flame signal strength or as read on the display of the FLAME-MONITOR will forewarn of any deterioration in the capability of the flame detector or its application.

**Periodic Safety Check.** It is recommended that a procedure be established to test, at least once a month, the complete flame safeguard system. This test should verify the proper operation of all limit switches and safety interlocks as well as flame failure protection and fuel safety shutoff valve tightness.

**Rotation.** It is recommended that control and scanner units purchased as spares be installed periodically.

**Contacts.** There are no accessible contacts in the Fireye burner programming controls. Where contacts are used, their design assures long trouble-free life when the load circuits are maintained within the published load ratings.

**Humidity.** In areas of high humidity, the control chassis should be removed and placed in a dry atmosphere when the system is expected to be out of service for an extended period.

**For scanner installation and wiring instructions, see the appropriate FIREYE technical bulletin for each control.**

| CONTROL       | BULLETIN             |
|---------------|----------------------|
| FLAME-MONITOR | E-1101               |
| D-Series      | D-1020, D-30, D-4041 |
| M-Series      | C-4000               |
| MB-Systems    | CC-82                |
| MicroM        | MC-5000              |
| BurnerLogix   | BL-1001              |



**WARNING: FIREYE SCANNERS CAN BE USED ONLY WITH THE APPROPRIATE FIREYE CONTROL. DO NOT CONNECT FIREYE SCANNERS TO CONTROLS NOT MANUFACTURED BY FIREYE.**

### INSTALLATION—INFRARED SCANNER TYPE 48PT2

The following UL standards have been revised and now allow the use of TC-ER rated cable on Commercial boilers and burners:

- UL 295: Commercial - Industrial Gas Burners – Sections 10.1.6, 10.1.9, and 11.2.2.
- UL 296: Oil Burners – Sections 31.1.8, 31.1.11, and 32.2.2.
- UL 726: Oil fired Boiler Assemblies – Sections 15.1.6, 15.1.9, and 16.1.6.
- UL 795: Commercial - Industrial Gas Heating Equipment – Section 12.5.

Where possible, obtain the burner manufacturer's instructions for mounting the scanner, otherwise proceed as follows:

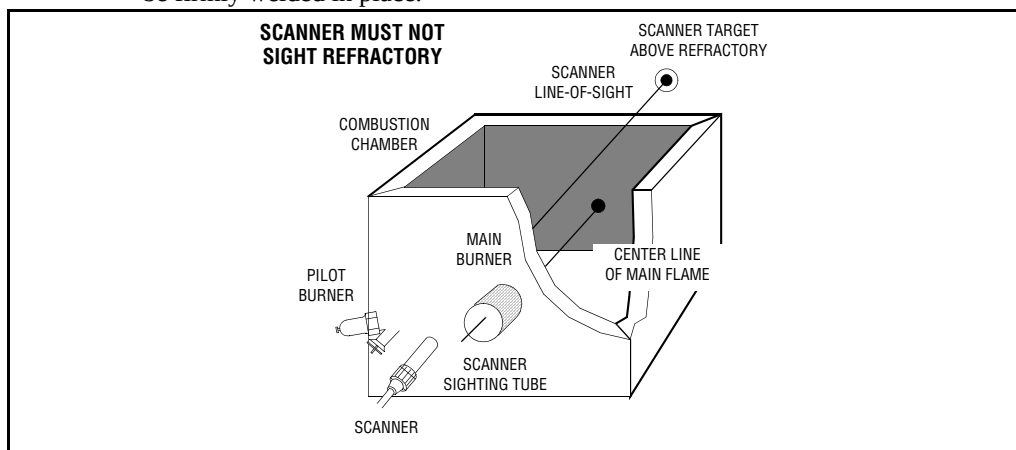


A single scanner is used to detect both pilot and main flames. The sight pipe on which the scanner mounts must be aimed so that the scanner sights a point at the intersection of main and pilot flames.

Two IR Scanners may be installed on one burner if it is necessary to view two areas to obtain reliable detection of the flame. They should be wired in parallel.

Proper scanner positioning must assure the following:

1. Reliable pilot flame signal.
2. Reliable main flame signal.
3. A pilot flame too short or in the wrong position to ignite the main flame reliably, must not be detected.
4. Scanner must have an unobstructed view of flame being monitored.
5. Flame being monitored must completely cover the scanner field of view.
6. To avoid nuisance shutdowns, it is important to avoid sighting hot refractory and to keep scanner temperature low (below 125° F) (52°C).
7. When the proper position has been established, drill a hole through the furnace wall and install a 4" to 8" length of threaded  $\frac{1}{2}$ " black iron pipe on which to mount the 48PT2 scanner.
8. When satisfactory sighting position has been confirmed by operating tests, the sight tube should be firmly welded in place.



## Wiring

### Wiring Instructions:

Wire the black and red wires (18 AWG) on the 48PT2 flame scanner to terminals S1 and S2 on the Fireye flame safeguard control. **There is no polarity associated with the wire colors. Either wire (red or black) can be wired to either terminal (S1 or S2).**

### Shield and Drain Wire:

The scanner provides a shield and drain wire that are internally bonded to the metal threaded  $\frac{1}{2}$ " NPT coupling nut. This allows a conduit clamp to provide an electrical ground around the exposed shield when entering a metal junction box or control cabinet, or connect the drain wire to a suitable ground connection when using a non-metallic (or metallic) junction box or control cabinet.

### Conduit required:

On those applications where conduit is required, Fireye recommends the Thomas and Betts 449-TB (or suitable) fitting which is used to couple  $\frac{3}{8}$ " flexible metal conduit to  $\frac{1}{2}$ " EMT conduit. The set screw on the fitting bites into the flat section of the plastic on the 48PT2 scanner and seats onto the metal casing below, providing a secure connection.

### Extended Wiring:

If necessary to extend scanner wiring, attach the cable supplied with the scanner to a junction box. Splice the cable wires to a pair of wires not smaller than #18. Install the complete run in a separate

conduit to the control. **Continuous conduit bonding between scanner and the control is mandatory!** Scanner may be located up to 100 feet from control. Do not pass scanner wiring through any junction box containing other wires. Do not run other wires through scanner conduit. Asbestos insulated wire should be avoided.

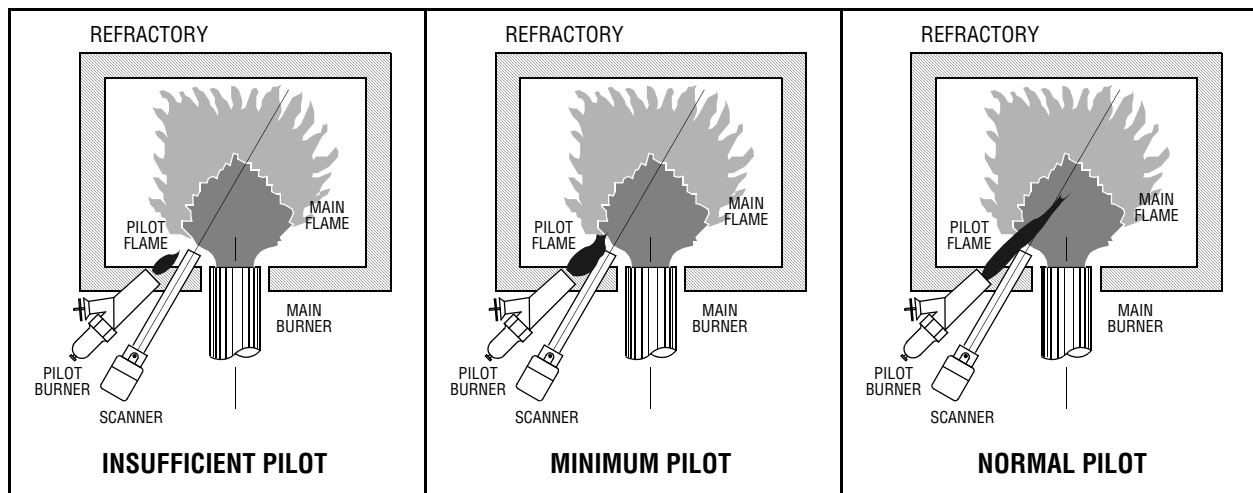
### Keeping the Scanner Cool

The Infrared Scanner (Temperature Limit 125° F) should never get too hot to grasp comfortably in the hand. Keep the scanner cool by one or more of the following methods.

1. Use 6" to 8" length of pipe between scanner and hot furnace front plate.
2. Use insulating tube (Part No. 35-69) on the end of the iron pipe.
3. Force air into sighting tube. Use Fireye Sealing Union (Part No. 60-801).
4. Make sure sighting tube does not extend more than halfway into refractory wall.

### Minimum Pilot Test

This test assures that the flame detector will not detect a pilot flame too small to reliably light off the main flame. The test should be made on every new installation, and following any repositioning of the flame detector. **THE MINIMUM PILOT TEST MUST BE ACCOMPLISHED BY A TRAINED AND QUALIFIED BURNER TECHNICIAN.**



**SPARK REJECTION TEST. CAUTION:** The scanner must not sight the ignition spark directly or any part of the burner that can reflect the spark back to the scanner. The scanner must not see a pilot flame that is too small to reliably ignite the main flame. Test procedures vary according to the control used. See procedures as described in the technical bulletin for the control being installed.





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## **DECLARATION OF CONFORMITY**

*Fireye Inc.  
3 Manchester Road  
Derry, NH, 03038*

*Declare that the products: **48PT2 infrared scanners & 69ND1 flame rods***

*are in conformity with the provisions of the following EC Directive(s) when installed in accordance with the installation instructions contained in the product documentation:*

|            |                                                     |
|------------|-----------------------------------------------------|
| 73/23/EEC  | Low Voltage Directive as amended by 93/68/EEC       |
| 89/336/EEC | EMC Directive as amended by 92/31/EEC and 93/68/EEC |
| 90/396/EEC | Gas Appliance Directive                             |

*and that the standards and/or technical specifications referenced below have been applied:*

|                    |                                                                                                                                                                   |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DIN EN 230:2005-10 | Automatic burner control systems for oil burners                                                                                                                  |
| DIN EN 298:2004-01 | Automatic gas burner control systems for gas burners and gas burning appliances with or without fans                                                              |
| EN 61000-4-11:1994 | Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity test                                                       |
| EN 61000-4-5:1994  | Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test                                                          |
| EN 61000-4-2:1996  | Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques Section 4.2 Electrostatic discharge immunity test                                |
| EN 61000-4-4:1996  | Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques Section 4. Electrical fast transient/burst immunity test                         |
| EN 61000-4-6:1995  | Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques Section 6. Immunity to conducted disturbances, induced by radio-frequency fields |
| EN 61000-4-3:1995  | Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques section 3. Radiated, radio-frequency, electromagnetic field immunity test        |

Signature: *Raymond A Labore*  
Name: Raymond A Labore  
Position: Product Certification Administrator  
Date: February 24, 2011



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## NOTICE

When Fireye products are combined with equipment manufactured by others and/or integrated into systems designed or manufactured by others, the Fireye warranty, as stated in its General Terms and Conditions of Sale, pertains only to the Fireye products and not to any other equipment or to the combined system or its overall performance.

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## WARRANTIES

FIREYE guarantees for *one year from the date of installation or 18 months from date of manufacture* of its products to replace, or, at its option, to repair any product or part thereof (except lamps, electronic tubes and photocells) which is found defective in material or workmanship or which otherwise fails to conform to the description of the product on the face of its sales order. **THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES AND FIREYE MAKES NO WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED.** Except as specifically stated in these general terms and conditions of sale, remedies with respect to any product or part number manufactured or sold by Fireye shall be limited exclusively to the right to replacement or repair as above provided. In no event shall Fireye be liable for consequential or special damages of any nature that may arise in connection with such product or part.



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