



# FIREYE<sup>®</sup> FLAME SCANNERS



UV90



UV1A



UV8A



45UV3

**UV non self-checking Scanner Models:  
UV1A3, UV1A6, UV8A, UV2, UV2A6, UV1A-1-CEX,  
45UV3, UV90-3, UV90-6, UV90-9**

**For UV self-check Scanners refer to SC-101  
For Infrared Photocell Scanners refer to SC-103**



## DESCRIPTION

The UV1A3/6, UV1A-1-CEX, UV2/UV2A6, 45UV3, UV90-3/6/9 Scanners are used with the M-Series, M-Series II, MicroM, FlameWorx, MB-2 and D-Series controls as well as the Fireye FLAME-MONITOR™, BurnerLogix and Nexus System. The UV1A3/6 scanners come with 3 ft. and 6 ft. 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. The UV1A-1-CEX is an ATEX rated version of the UV1A. The UV2 (36 inch) and UV2A6 (72 inch) are fitted with a 3/8" NPT female to 1/2" NPT male adapter fitted into the 1/2" threaded coupling of the UV1A3/6 respectively. The UV90-3/6/9 is available with 3 ft., 6 ft. and 9 ft. shielded flexible cables.

The UV8A Scanner is a 90° right angle ultraviolet flame scanner used in conjunction with the M-Series, M-Series II, MicroM, FlameWorx, MB-2 and D series controls as well as the Fireye<sup>®</sup> FLAME-MONITOR™, BurnerLogix and the Nexus System. It is available only with 72 inch (1830mm) unshielded lead wires.

The 45UV3 Scanner has a rugged cast housing that mounts on a 3/4 inch pipe with sleeve and set-screw. The replaceable UV tube is mounted in a vertical position for greater sensitivity. Non self-checking.

The UV90 Series Scanners are designed for front and lateral (90°) mounting which, in some applications allow the scanners to obtain a clearer view of the flame. The UV90, with its exclusive snug-fit mounting block, eliminates the need for a threaded sight pipe.

The UV tube is made of quartz and is filled with a gas that ionizes when struck by UV radiation from the flame. In the absence of UV radiation, the gas acts as an insulator between two electrodes which are mounted inside the tube. These electrodes are energized continuously by a high voltage. During combustion, UV radiation ionizes the gas, causing current pulses to flow between the electrodes. These current pulses result in a flame signal which is transmitted to the amplifier in the control, where it is processed to energize or hold in the flame relay.



**WARNING: When installing or replacing UV scanners, a minimum pilot turndown test on pilot ignited burners and a spark pickup test on all burners must be performed. Refer to bulletins E-1101, C-4000, MC-5000 or BurnerLogix for recommended procedures.**

**- All installations, service and troubleshooting of Fireye products must be performed by qualified technicians!**



## APPLICATION

UV scanners are recommended for detecting flames from standard fuel gases, some waste gases and light oil fuels such as No. 2 oil. Flames from heavier oils can be detected with UV scanners but the unburned fuel shroud and/or atomization shroud can block passage of the UV from the flame zone to the UV tube, causing nuisance burner/boiler trips. Infrared detection is recommended for fuel oil heavier than No. 2, and some installations where waste gases are burned together with natural gas as a main flame.

*NOTE: Certain safety codes and regulations require the use of self-checking ultraviolet scanners. For information on self-checking UV scanners, refer to Bulletin SC-101.*

## SPECIFICATIONS

- Operating Voltage:** (S1-S2): 560 VAC @120V (230V) 50/60 Hz applied
- Operating Temperature Limits:** Maximum: 200° F (94° C)  
Minimum: -40° F (-40° C)
- Humidity:** 85% RH maximum non-condensing
- UV1A3: \*** 1/2" NPT, 36" (915mm) shielded leads
- UV1A6: \*** 1/2" NPT, 72" (1830mm) shielded leads
- UV8A:** 1/2" NPT, 72" (1830mm) unshielded leads,
- UV1A-1-CEX:** 1 NPT, 1/2" NPT conduit cable entry
- UV2: \*** 3/8" NPT, 36" (915mm) shielded leads
- UV2A6: \*** 3/8" NPT, 72" (1830mm) shielded leads
- 45UV2-1020** 1" NPT mount 60 Hz, 72" (1830mm) unshielded leads - **OBSOLETE**
- 45UV3-1050** 3/4" Sleeve/setscrew mount, 72" (1830mm) unshielded leads
- UV90-3** 36" (915mm) shielded leads
- UV90-6** 72" (1830mm) shielded leads
- UV90-9** 108 " (3660mm) shielded leads

For scanner dimensions refer to Figures 2 and 4.

Consult factory for custom lead lengths.

**\* Comply with NEMA 4X**

## IMPORTANT NOTE

The information provided in this bulletin is directed to assist boiler and combustion service technicians who are experienced in the installation and operation of Fireeye Flame Safety equipment. Persons not familiar with Fireeye products should contact the nearest Fireeye representative or other qualified service group.

The UV1A, UV2, UV8A, UV1A-1-CEX, 45UV3 and UV90 as well as all other Fireeye scanners, are designed to be used exclusively with the appropriate Fireeye Flame safeguard and Burner Management controls. The application of these scanners to other than Fireeye equipment should be reviewed for approval by Fireeye.

## APPLICATION REFERENCE

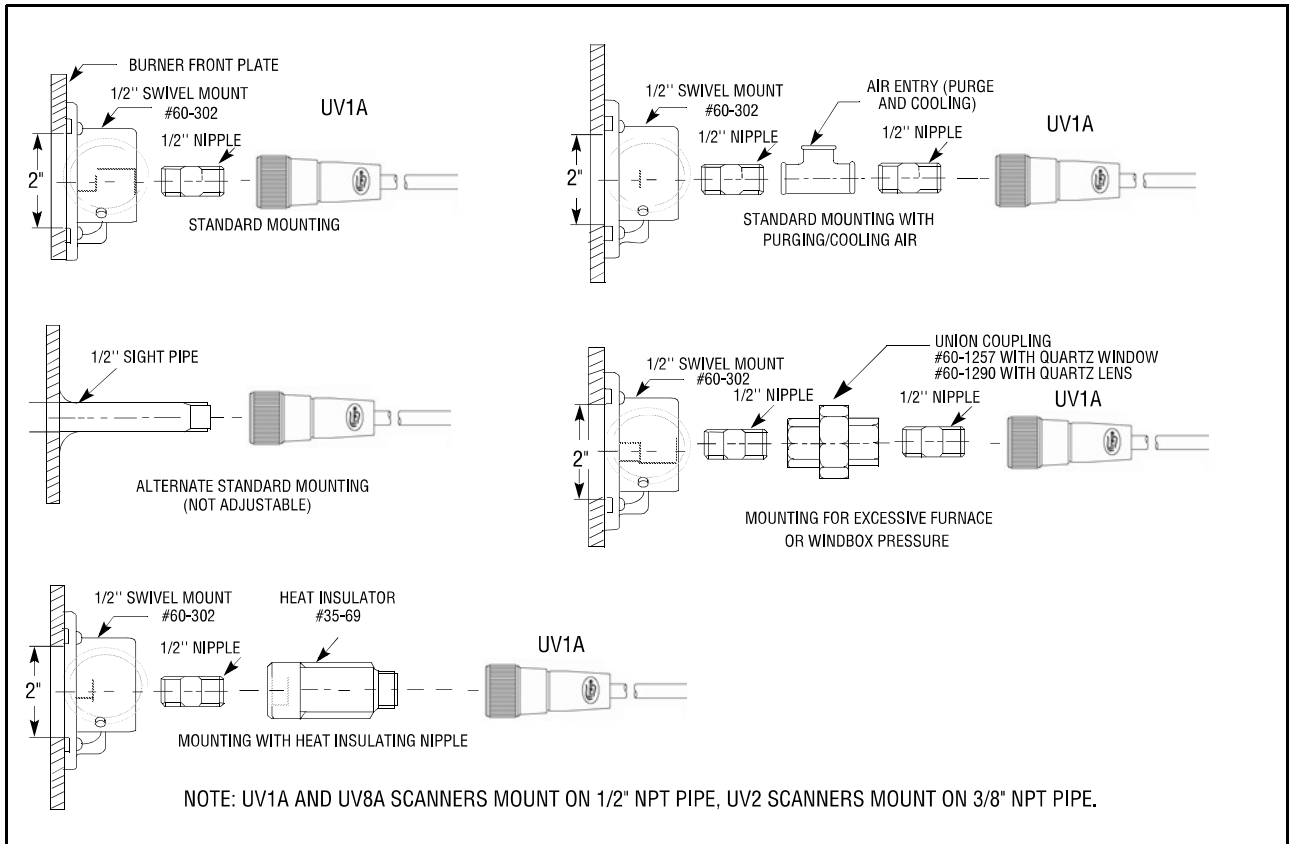
UV1A, UV2, UV8A, 45UV3 and UV90 can be used only with the following FIREYE flame safeguard controls.

FIREYE FLAME-MONITOR	MB-2 SERIES	MicroM & M-SERIES II	D SERIES	PFM ADAPTOR KITS	FLAMEWORX	NEXUS	BURNERLOGIX
To be used with EUV1 Amplifier Card	Use with 61-3359 UV Amplifier	MAUV1 MAUV1T MEUV1 MEUV4	All D-Series using 72DUV1 Amplifier	PFM2UV PFM3UV	MBUV-300D MBUV-310D	NX3000 NX3100 NX4000 NX4100	YB110UV YB230UV

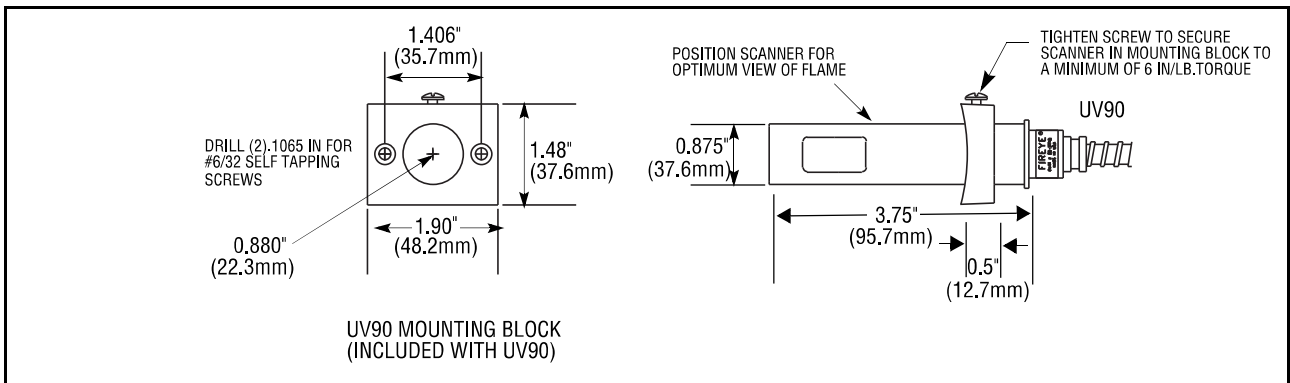


**CAUTION:** The UV1A, UV2, UV8A, 45UV3 and UV90 ultra-violet flame scanners and associated amplifier modules are non-self checking UV systems and should be applied only to burners that cycle often (e.g.: a minimum of once per 12 hours) in order for the safety checking circuit to be exercised. If component checking is required during burner operation for constantly fired burners, utilize the self-checking ultra-violet flame scanners (45UV5) with associated amplifier module (EUVS4), (MEUVS, (MBUVS) or YB110UVSC or the infrared flame scanner (48PT2) with associated Auto Check amplifier (E1R1, E1R2, E1R3, MEIR1, MEIR4, YB110IR).

**FIGURE 1. TYPICAL SCANNER MOUNTING**



**FIGURE 2. SCANNER MOUNTING FOR UV90**





## WIRING - UV SCANNERS

To connect the scanner to the control, the UV1, UV2 and UV90 Scanners are supplied with up to 96" of flexible cable.

### Wiring Instructions:

Wire the black and red wires (18 AWG) on the UV1A / UV2 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 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 for the UV1A/UV2 scanner, Fireye recommends the Thomas and Betts 449-TB (or suitable) fitting which is used to couple 3/8" flexible metal conduit to 1/2" EMT conduit. The set screw on the fitting bites into the plastic on the UV1A / UV2 scanner and seats onto the metal casing below, providing a secure connection.

The 45UV3 is supplied with 72 in. (1830mm) lead wires. Install them in a suitable length of flexible armor cable and connect it to the control. A conduit connector is supplied with the scanner. Connect black wires (UV tube) of the 45UV3 to terminals S1 & S2 of the appropriate P-Series.

If it is necessary to extend the scanner wiring, the following instructions apply:

Scanner wires should be installed in a separate conduit. The wires from several scanners may be installed in a common conduit.



**The voltage applied to UV scanners is nominally 560 VAC with no flame present.**

### Selection of Wire

1. Use #14, 16, or 18 wire with 75° C, 600 volt insulation for up to 100 foot distances (signal loss approximately 20% at 100 feet).
2. For extended scanner wiring up to 500 feet, or for shorter lengths to reduce signal loss, use a shielded wire (Belden 8254, RG-62/U coaxial cable, or equal) for *each* scanner wire. The ends of the shielding must be taped and **not** grounded.
3. Asbestos insulated wire should be avoided.
4. Multiconductor cable is not recommended.
5. High voltage ignition wiring should **not** be installed in the same conduit with flame detector wires.



**CAUTION: Keep scanner leads well clear of ignition high voltage wiring or any other high voltage or high current wiring in order to prevent false signal pickup in the scanner leads.**

**WARNING: Protective filtered lenses should be worn when viewing flame. Infrared and ultraviolet energy can be damaging to the eyes.**



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## NOTICE

When Fireeye products are combined with equipment manufactured by others and/or integrated into systems designed or manufactured by others, the Fireeye warranty, as stated in its General Terms and Conditions of Sale, pertains only to the Fireeye 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 Fireeye shall be limited exclusively to the right to replacement or repair as above provided. In no event shall Fireeye be liable for consequential or special damages of any nature that may arise in connection with such product or part.



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