



Instructions

95-8502

Protect•ir Multispectrum IR Flame Detector
with Integral 'EEx e' Junction Box
X3300



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IMPORTANT

Be sure to read and understand the entire instruction manual before installing or operating the flame detection system.

WARNING

Do not open the detector assembly in a hazardous area when power is applied. The detector contains no user serviceable components and should never be opened, with the exception of the rear wiring compartment. Doing so could disturb critical optical alignment and calibration parameters, possibly causing serious damage. This type of damage could be undetected and could result in failure to see a fire and/or false alarm.

CAUTION

The wiring procedures in this manual are intended to ensure proper functioning of the device under normal conditions. However, because of the many variations in wiring codes and regulations, total compliance to these ordinances cannot be guaranteed. Be certain that all wiring complies with the NEC as well as all local ordinances. If in doubt, consult the authority having jurisdiction before wiring the system. Installation must be done by a properly trained person.

CAUTION

To prevent unwanted actuation or alarm, extinguishing devices must be disconnected prior to performing detection system tests or maintenance.

ATTENTION

Remove protective cap from front of the detector before activating the system.

ATTENTION

Observe precautions for handling electrostatic sensitive devices.

ATTENTION

The X3300 includes the Automatic Optical Integrity (**oi**) feature — a calibrated performance test that is automatically performed once per minute to verify complete detector operation capabilities. **No testing with an external test lamp is required.**

***oi** is Detector Electronics' Trademark for its patented Optical Integrity Systems, U.S. Patent 3,952,196, United Kingdom Patent 1,534,969, Canada Patent 1,059,598.



Protect•ir Multispectrum IR Flame Detector with Integral 'EEx e' Junction Box X3300



DESCRIPTION

The X3300 Protect•ir with Integral 'EEx e' Junction Box is a multispectrum infrared (IR) flame detector. It provides unsurpassed detection of fires from light to heavy hydrocarbon fuels combined with the highest degree of false alarm rejection. The detector is suitable for use in indoor and outdoor applications with NEMA 4X/IP66 classifications as well as 'EEx d e' explosion-proof ratings.

The X3300 contains three IR sensors, signal processing circuitry, and fire and fault relays. A tricolor LED on the detector faceplate indicates normal, fire alarm, and fault conditions.

Factory configurable options include:

- Automatic or Manual Optical Integrity (**oi**)
- Fire and Fault Relay Operation
 - Normally Open (N.O.) or Normally Closed (N.C.) Contacts
 - Normally Energized or Normally De-Energized (Fire relay)
 - Latching or Non-latching.
- 4 to 20 mA output.

Table 1—Detector Status Indicator

Detector Status	LED Indicator
Power On/Normal Operation (no fault or fire alarm)	Green
Fault	Yellow
Fire (Alarm)	Red
Medium Sensitivity	Two Yellow Flashes During Power-up
Very High Sensitivity	Four Yellow Flashes During Power-up

Table 2—Factory Configuration Options (Not Changeable in the Field)

Option		Available Configurations
Sensitivity		<ul style="list-style-type: none"> • Detects 1 square foot gasoline fire at 210 feet (very high sensitivity) or 100 feet (medium sensitivity).
Optical Integrity (oi)		<ul style="list-style-type: none"> * Automatic oi - Automatically checks internal circuitry and cleanliness of viewing windows to ensure proper operation. If a fault condition exists, the amber Fault LED lights. • Manual oi - Cleanliness of viewing windows test can be manually initiated by closing an external switch that is electrically connected between the oi lead and circuit ground. Warning: Successful Manual oi test results in fire alarm relay activation and red Alarm LED lights. • Internal circuitry is automatically tested independent of the Manual oi test
Fire Relay	Latching/Non-Latching	<ul style="list-style-type: none"> • Latching - Relay remains in "Fire" condition after fire has been detected until X3300 power is cycled. * Non-latching - Relay remains in "Fire" condition only as long as a fire is being detected.
	Normally Energized/De-Energized	<ul style="list-style-type: none"> • Normally Energized - Fire relay is energized in non-alarm (no fire) condition. * Normally De-Energized - Fire relay is de-energized in non-alarm (no fire) condition.
	Contacts Normally Open/Closed	<ul style="list-style-type: none"> * Normally Open - Fire relay contacts are open in non-alarm (no fire) condition. • Normally Closed - Fire relay contacts are closed in non-alarm (no fire) condition.
Fault Relay	Latching/Non-Latching	<ul style="list-style-type: none"> • Latching - Relay remains in "Fault" condition after fault has been detected until X3300 power is cycled. * Non-latching - Relay remains in "Fault" condition only as long as a fault is being detected.
	Normally Energized	<ul style="list-style-type: none"> * Normally Energized - Fault relay is energized with no fault present.
	Contacts Normally Open/Closed	<ul style="list-style-type: none"> * Normally Open - Fault relay contacts are open when fault is present. • Normally Closed - Fault relay contacts are closed when fault is present.
4 to 20 mA Output		<ul style="list-style-type: none"> • Current output level indicates detector status condition.

* Standard Configuration

Refer to the "Ordering Information" section for a complete list of available options and accessories.

Table 1 indicates the condition of the LED for each detector status. The LED is non-latching. Fire and Fault relay condition for each detector status varies according to the factory configuration.

FACTORY CONFIGURATION OPTIONS

The X3300 is configured at the factory to operate as specified when ordered. Refer to the descriptions in Table 2 for a functional explanation of each configuration option.

NOTE

Factory configurable options cannot be changed in the field.

4 TO 20 MA OUTPUT

This option provides a 4 to 20 mA dc current output for transmitting detector status information to other devices. The circuit can be wired in either an isolated or non-isolated configuration and can drive a maximum loop resistance of 500 ohms from 18 to 19.9 volts dc and 600 ohms from 20 to 32 volts dc. Table 3 indicates the detector status conditions represented by the various current levels. The output is calibrated at the factory, with no need for field calibration.

NOTE

The output of the 4 to 20 mA current loop is not monitored by the fault detection circuitry of the X3300. Therefore, an open circuit on the loop will not cause the detector status LED to indicate a fault.

GENERAL APPLICATION INFORMATION

RESPONSE CHARACTERISTICS

Response is dependent on the type of fuel, the temperature of the fuel, and the time required for the fire to come to equilibrium. As with all fire tests, results must be interpreted according to an individual application.

See Appendix A for fire test results.

Table 3—Detector Status Conditions Indicated by Current Level

Current Level	Detector Status
0 mA	Open Circuit
1 mA	General Fault
2 mA	Oi Fault
3 mA	Hi Background IR
4 mA	Normal Operation
20 mA	Alarm

IMPORTANT APPLICATION CONSIDERATIONS

In applying any type of sensing device as a fire detector, it is important to know of any conditions that can prevent the device from responding to fire, and also to know what other sources besides fire can cause the device to respond.

Welding

Arc welding should not be performed within 40 feet of the very high sensitivity detector (10 feet for medium sensitivity detector). It is recommended that the system be bypassed during welding operations in situations where the possibility of a false alarm cannot be tolerated. Gas welding mandates system bypass, since the gas torch is an actual fire. Arc welding rods can contain organic binder materials in the flux that burn during the welding operation and are detectable by the X3300. Welding rods with clay binders do not burn and will not be detected by the X3300. However, system bypass is always recommended, since the material being welded may be contaminated with organic substances (paint, oil, etc.) that will burn and possibly trigger the X3300.

Artificial Lighting

The X3300 should not be located within 3 feet of artificial lights. Artificial lights should not be positioned so that they are pointed directly at the detector.

EMI/RFI Interference

The X3300 is resistant to interference by EMI and RFI, and is EMC Directive compliant. It will not respond to a 5 watt walkie-talkie at distances greater than 1 foot. Do not operate a walkie-talkie within 1 foot of the X3300.

Non-Carbon Fires

The X3300 is a multiple spectrum IR device with detection limited to carbonaceous fuels. It should not be used to detect fires that do not contain carbon, such as hydrogen, sulfur and burning metals.

INSTALLATION

DETECTOR POSITIONING

Detectors should be positioned to provide the best unobstructed view of the area to be protected. The following factors should also be taken into consideration:

- Identify all high risk fire ignition sources.
- Be sure that enough detectors are used to adequately cover the hazardous area.
- Locate and position the detector so that the fire hazard(s) are within both the field of view and detection range of the device. Refer to Appendix A for specific information.
- Be sure that the unit is easily accessible for cleaning and other periodic servicing.
- For outdoor applications, the detector should be aimed downward at least 10 to 20 degrees to allow lens openings to drain. See Figure 1. The detector should be positioned so that its field of view does not cover areas outside the hazardous area. This will minimize the possibility of false alarms caused by activities outside the area requiring protection.
- For best performance, the detector should be mounted on a rigid surface in a low vibration area.
- Dense fog, rain or ice can absorb IR radiation and reduce the sensitivity of the detector.

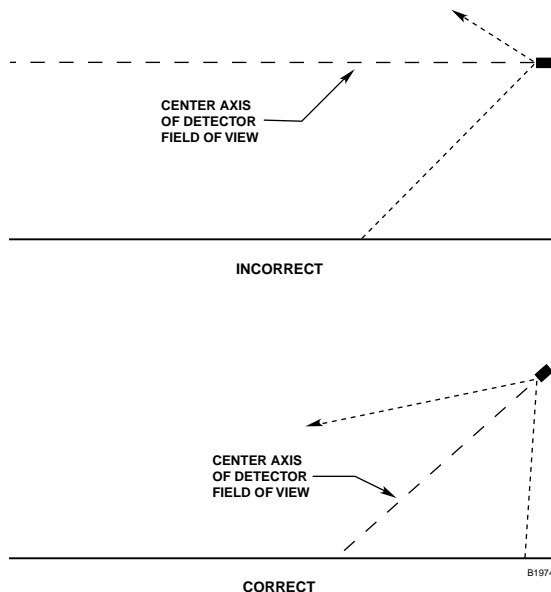


Figure 1—Detector Orientation Relative to Horizon

- Although IR detectors are less affected by smoke than other detectors, the X3300 should not be placed where rising combustion products can obscure its vision. If smoke is expected before fire, smoke or other alternative detectors should be used in conjunction with the X3300. For indoor applications, if dense smoke is expected to accumulate at the onset of a fire, mount the detector on a side wall at least a few feet (approximately 1 meter) down from the ceiling.
- If possible, fire tests should be conducted to verify correct detector positioning and coverage.

WIRING REQUIREMENTS

WIRE SIZE AND TYPE

The system should be wired using a 14 to 22 gauge (1.3 to 0.5 mm²) cable. The wire size selected should be based on the number of detectors connected, the supply voltage and the cable length. A minimum input voltage of 18 vdc must be present at the X3300.

The use of shielded cable is recommended to protect against interference caused by EMI and RFI. When using cables with shields, terminate the shields as shown in Figures 6 through 8. Consult the factory if not using shielded cable.

In applications where the wiring cable is installed in conduit, the conduit should not be used for wiring to other electrical equipment.

CAUTION

Installation of the detector and wiring should be performed only by qualified personnel.

PROTECTION AGAINST MOISTURE DAMAGE

It is important to take proper precautions during installation to ensure that moisture will not come in contact with the electrical connections or components of the system. The integrity of the system regarding moisture protection must be maintained for proper operation and is the responsibility of the installer. Units with M25 threads must use an IP66 washer.

Figure 2—Wiring Terminal Identification

RELAY		TERMI- NAL #	4 TO 20 MA	
FUNCTION	COLOR		COLOR	FUNCTION
MANUAL Oi	WHITE	1	WHITE	MANUAL Oi
DC –	BLACK	2	BLACK	DC –
DC+	RED	3	RED	DC+
FAULT NO	GRAY	4	WHT/BRN	4 TO 20 (-)
FAULT C	PURPLE	5	WHT/RED	4 TO 20 (+)
FIRE NO	BROWN	6		
FIRE C	BLUE	7		
		8		
CHASSIS	GREEN		GREEN	CHASSIS

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MOUNTING AND WIRING PROCEDURE

Refer to the procedure below and the listed figures to mount and wire the X3300.

- Figure 1 – Detector Orientation Relative to Horizon
- Figure 2 – Wiring Terminal Identification
- Figure 3 – X3300 with Q9033 Swivel Mount
- Figure 4 – Front View of the X3300
- Figure 5 – X3300 Terminal Block
- Figure 6 – A Typical System
- Figure 7 – X3300 Detector with 4 to 20 mA Output

oi PLATE ORIENTATION

Refer to Figure 4 and insure that the **oi** plate will be oriented as shown when the X3300 is mounted and sighted. This will ensure proper operation of the **oi** system and will also minimize the accumulation of moisture and contaminants between the **oi** plate and the viewing windows. The **oi** plate includes an arrow, which should be pointed in the up direction, indicating that the **oi** plate and detector are correctly oriented.

IMPORTANT

The **oi** plate **must** be securely tightened to ensure proper operation of the **oi** system.

INSTALLATION USING Q9033 MOUNTING BRACKET

1. Install the swivel mounting bracket assembly on the wall. The installation surface should be free of vibration. Refer to Figure 8 for dimensions of the Q9033 swivel mount.
2. Make field connections following local ordinances and guidelines in this manual. Refer to Figures 2 and 6. If the detector is equipped with 4 to 20 mA output, refer to Figure 7.

NOTE

Connect the shield to power supply minus (circuit ground) at the detector end. At the fire panel end, connect the shield and power supply minus to chassis ground through a 0.47 μ F 400 Volt non-polarized capacitor (not supplied).

3. Check all field wiring to be sure that the proper connections have been made.

IMPORTANT

Do not test any wiring connected to the detector with a meg-ohmmeter. Disconnect wiring at the detector before checking system wiring for continuity.

4. Make the final sighting adjustments and ensure that the mounting bracket hardware is tight.



Figure 3—X3300 with Q9033 Mounting Bracket



Figure 4—Front View of the X3300 Detector/Controller

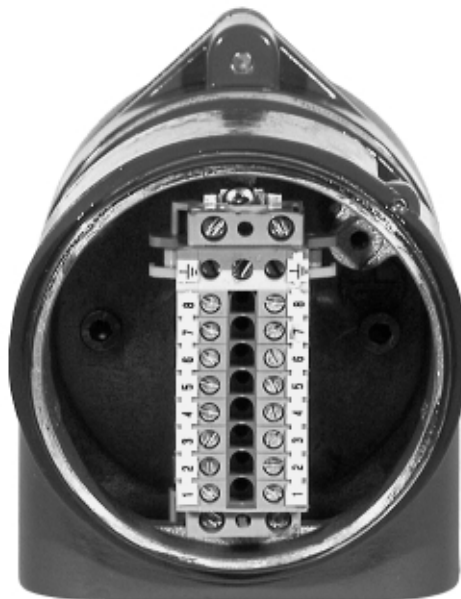
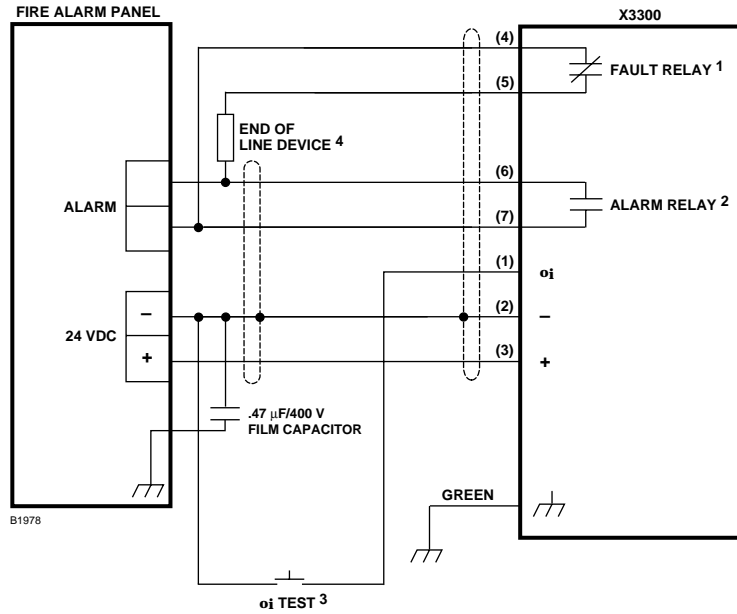


Figure 5—X3300 Terminal Block



WIRING NOTES:

- 1 FAULT RELAYS SHOWN HAVE BEEN SPECIFIED (WHEN ORDERED) TO HAVE NORMALLY CLOSED CONTACTS AND TO BE NORMALLY ENERGIZED WITH NO FAULT PRESENT.
- 2 ALARM RELAYS SHOWN HAVE BEEN SPECIFIED (WHEN ORDERED) TO HAVE NORMALLY OPEN CONTACTS AND TO BE NORMALLY DE-ENERGIZED WITH NO ALARM CONDITION PRESENT.
- 3 INDIVIDUAL MANUAL oi TEST SWITCHES CAN BE INSTALLED REMOTELY OR A DETECTOR SELECTOR AND ACTIVATION SWITCH CAN BE INSTALLED AT THE FIRE PANEL. TEST SWITCHES ARE NOT SUPPLIED.
- 4 END OF LINE DEVICE SUPPLIED BY PANEL.

RELAY		TERMI-NAL #	4 TO 20 MA	
FUNCTION	COLOR		COLOR	FUNCTION
MANUAL Oi	WHITE	1	WHITE	MANUAL Oi
DC -	BLACK	2	BLACK	DC -
DC+	RED	3	RED	DC+
FAULT NO	GRAY	4	WHT/BRN	4 TO 20 (-)
FAULT C	PURPLE	5	WHT/RED	4 TO 20 (+)
FIRE NO	BROWN	6		
FIRE C	BLUE	7		
		8		
CHASSIS	GREEN		GREEN	CHASSIS

Figure 6—A Typical System

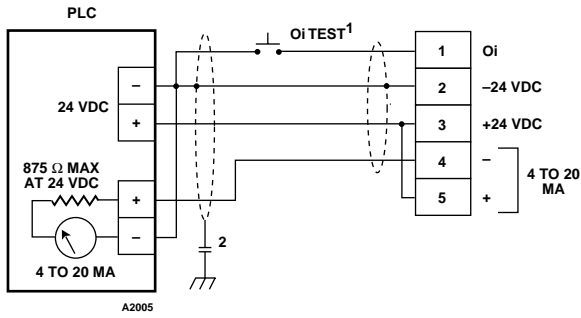


Figure 7A—X3300 Detector Wired for Non-Isolated 4 to 20 ma Current Output (Sourcing)

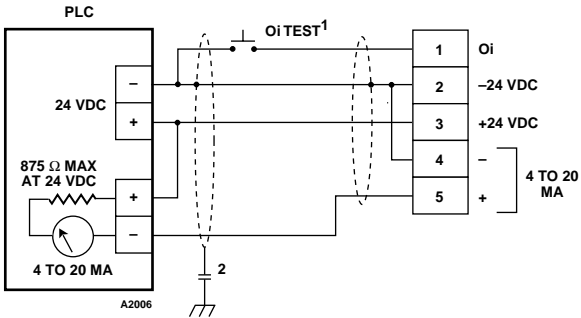


Figure 7B—X3300 Detector Wired for Non-Isolated 4 to 20 ma Current Output (Sinking)

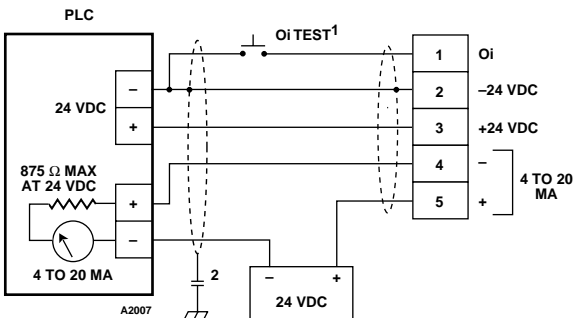


Figure 7C—X3300 Detector Wired for Isolated 4 to 20 ma Current Output (Sourcing)

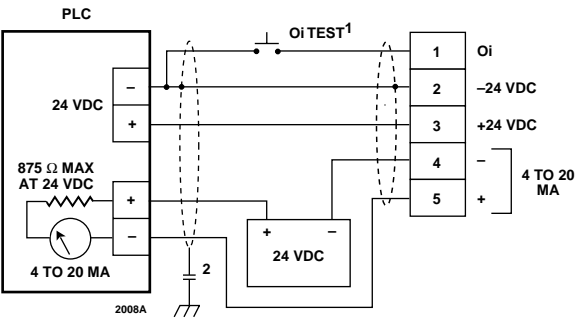


Figure 7D—X3300 Detector Wired for Isolated 4 to 20 ma Current Output (Sinking)

- NOTES: 1. INDIVIDUAL MANUAL oi TEST SWITCHES CAN BE INSTALLED REMOTELY OR A DETECTOR SELECTOR AND ACTIVATION SWITCH CAN BE INSTALLED AT THE FIRE PANEL. TEST SWITCHES ARE NOT SUPPLIED.
2. SHIELD IS CONNECTED TO EARTH GROUND THROUGH A 0.47µF/400V FILM CAPACITOR.

OPTICAL INTEGRITY (oi)

AUTOMATIC oi

The X3300 includes the Automatic Optical Integrity (oi) feature — a calibrated performance test that is automatically performed once per minute to verify complete detector operation capabilities. No testing with an external test lamp is required. The detector automatically performs the same test that a maintenance person with a test lamp would perform — once every minute, 60 times per hour. A successful automatic oi test **does not** produce an alarm condition.

The Protect•ir signals a fault condition when less than 50% of the detection range remains. This is indicated by the Fault relay and is evident by the amber color of the LED on the face of the detector. See the “Troubleshooting” section for further information.

MANUAL oi

The detector also incorporates a manual oi feature that provides the same test as the automatic oi, and in addition actuates the Alarm relay to verify output operation. The manual oi feature is available in all models and can be performed at any time. **This test requires bypass of all extinguishing devices to avoid release resulting from a successful test.**

The manual oi test is activated by connecting the white lead to power supply minus. This places the detector in a special operating mode. First, the device de-latches any latching outputs. Next, the IR emitters are activated. If the resulting signals meet the test criteria, the Alarm relay changes state and the indicating LED changes to red. This condition remains until the white lead is disconnected from dc minus. If the test criteria are not met, no alarm is produced and no fault is generated. See the “Troubleshooting” section for further details.

STARTUP PROCEDURE

When installation of the equipment is complete, perform the “Fire Alarm Test” below.

Allow 20 to 30 minutes for the detector optics to reach equilibrium. Housing will be warm to the touch.

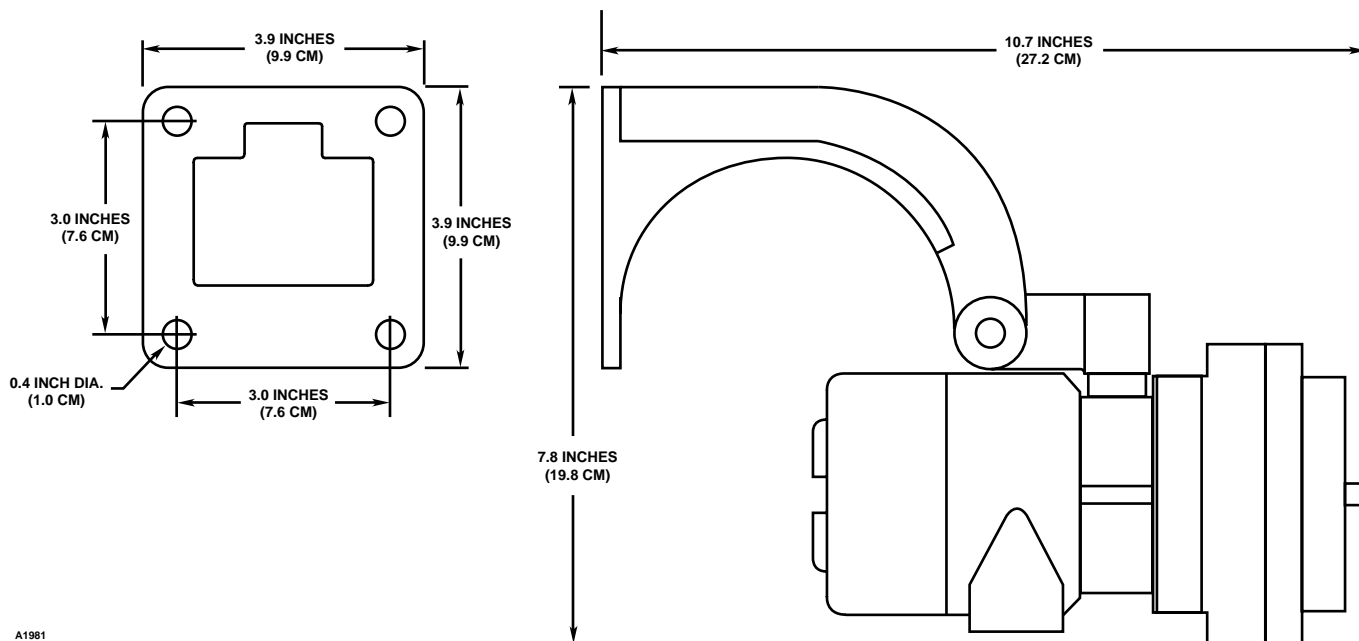


Figure 8—Q9033 Mounting Bracket Dimensions in Inches (cm)

FIRE ALARM TEST

1. Disable any extinguishing equipment that is connected to the system.
2. Apply input power to the system.
3. Connect the **oi** test line to dc minus for 5 to 10 seconds or perform a pan fire test. The alarm relay will change states and the red alarm LED will illuminate when the device goes into an alarm condition.
4. Disengage the **oi** test line or extinguish the test fire. If the Alarm relay is configured for the standard non-latching operation, it will change states and the red LED will turn off. If the unit has latching relays, they can be reset by removing input power (0.1 second minimum).
5. Repeat this test for all detectors in the system. If a unit fails the test, refer to the "Troubleshooting" section.
6. Verify that all detectors in the system are properly aimed at the area to be protected.
7. Enable extinguishing equipment when the test is complete.

TROUBLESHOOTING

WARNING

The detector contains no user serviceable components and should never be opened.

1. Disable any extinguishing equipment that is connected to the unit.
2. Inspect the viewing windows for contamination and clean as necessary. The detector is relatively insensitive to airborne contaminants, however, thick deposits of ice, dirt, or oil will reduce sensitivity. (Refer to the "Maintenance" section for complete information regarding cleaning of the detector viewing window.)
3. Check input power to the unit.
4. If the fire system has a logging function, check the fire panel log for relay status and/or 4 to 20 mA output information. See Table 4.
5. Turn off the input power to the detector and check all wiring for continuity. **Important:** Disconnect wiring at the detector before checking system wiring for continuity.

Table 4—Troubleshooting Guide

Current Level	Status	Action
0 mA	Open Circuit	Check wiring connections.
1 mA	General Fault	Cycle power.
2 mA	Oi Fault	Clean windows.
3 mA	Hi Background IR	Remove IR source or aim detector away from IR source.
4 mA	Normal Operation	
20 mA	Alarm	

- If all wiring checks out and cleaning of the **oi** plate/window did not correct the fault condition, check for high levels of background IR radiation by covering the detector with the factory supplied cover or aluminum foil. If the fault condition clears within 6 minutes or less, extreme background IR is present. Re-adjust the view of the detector away from the IR source or relocate the detector.

If none of these actions corrects the problem, return the detector to the factory for repair.

NOTE

Since the entire unit must be returned to the factory for repair, it is highly recommended that a complete spare be kept on hand for field replacement to ensure continuous protection.

PERIODIC CHECKOUT PROCEDURE

Periodic testing is not required when the detector is configured for automatic optical integrity testing. If the X3300 is configured for manual **oi** operation, a checkout of the system using the **oi** feature should be performed on a regularly scheduled basis to ensure that the system is operating properly. To test the system, perform the "Fire Alarm Test" as described in the "Startup Procedure" section of this manual.

MAINTENANCE

IMPORTANT

Periodic flamepath inspections are not recommended since the product is not intended to be serviced and provides proper ingress protection to eliminate potential deterioration of the flamepaths.

WARNING

The detector contains no user serviceable components and should never be opened.

To maintain maximum sensitivity, the viewing windows of the X3300 must be kept relatively clean. Refer to the procedure below for instructions.

CLEANING PROCEDURE

CAUTION

Disable any extinguishing equipment that is connected to the unit to prevent unwanted actuation.

To clean the window and **oi** plate, use Det-Tronics window cleaner (part number 001680-001) and a soft cloth or tissue and refer to the procedure below.

- Disable any extinguishing equipment that is connected to the unit.**
- Since the X3300 is less affected by contamination than other detectors, removal of the **oi** plate is needed only under extreme conditions. In addition, it is not necessary to achieve perfect cleanliness, because IR is not significantly absorbed by slight films of oil and/or salt. If a fault condition is still indicated after cleaning, remove and clean the **oi** plate using the procedure below.
- Clean all three viewing windows and reflector surfaces thoroughly using a clean cloth, cotton swab or tissue and Det-Tronics window cleaning solution. If a stronger solution is needed, isopropyl alcohol may be used.

O_i PLATE REMOVAL

- Remove the **oi** plate from the detector by loosening the **oi** plate knob.
- Thoroughly clean the **oi** plate reflective surfaces, holding it by its edges to avoid leaving fingerprints on the inside reflective surface.
- Re-install the **oi** plate. Ensure that the plate is flat on the detector surface. Tighten the **oi** plate knob securely (40 oz/inches).

NOTE

*If the **oi** plate is removed, be sure to install the original **oi** plate. **oi** plates are not interchangeable and should not be mixed with **oi** plates from other detectors.*

NOTE

*If corrosive contaminants in the atmosphere cause the **oi** plate surface to deteriorate to the extent that it is no longer possible to restore it to its original condition, it must be replaced. Consult factory for **oi** plate replacement procedure.*

FEATURES

- Long detection range to carbonaceous fires.
- Unequaled false alarm rejection.
- Responds to a fire in the presence of modulated blackbody radiation (i.e. heaters, ovens, turbines) without false alarm.
- Heated optics for increased resistance to moisture and ice.
- Automatic and manual optical integrity (**oi**) testing.
- Easily replaceable **oi** plate.
- Fire and fault relays standard.
- Tricolor LED indicates normal operation, fire and fault conditions.
- Factory available fire and fault relay operation: latching/non-latching, energized/de-energized (fire relay only), normally open/normally closed.
- 4 to 20 mA isolated output.
- Multiple mounting options include mounting directly onto most junction boxes using a simple adapter, or the use of a swivel union or swivel mount available from Det-Tronics.
- Operates under adverse weather conditions and in dirty environments.
- 'EEx d e' flame-proof/increased safety detector housing. Meets CENELEC and DNV certification requirements.
- Class A wiring per NFPA-72.
- Meets NFPA-33 response requirement for under 0.5 second (available when option selected).
- 5 year warranty.

SPECIFICATIONS

OPERATING VOLTAGE—

24 volts dc nominal (18 vdc minimum, 32 vdc maximum).

POWER CONSUMPTION—

7.5 watts at 24 volts dc nominal; 9.0 watts at 32 volts dc maximum.

POWER UP TIME—

Fault indication clears after 0.5 second; device is ready to indicate an alarm condition after 30 seconds.

OUTPUT RELAYS—

Fire Alarm relay, Form C, 5 amperes at 30 vdc:

The Fire Alarm relay is factory configurable for normally open or normally closed contacts, normally energized or normally de-energized operation, and latching or non-latching operation.

Fault relay, Form C, 5 amperes at 30 vdc:

The Fault relay is factory configurable for normally open or normally closed contacts, normally energized operation, and latching or non-latching operation.

CURRENT OUTPUT (Not available with relays)—

4 to 20 milliampere dc current, with a maximum loop resistance of 500 ohms from 18 to 19.9 volts dc and 600 ohms from 20 to 32 volts dc.

TEMPERATURE RANGE—

Operating: -40°F to +158°F (-40°C to +70°C).

Storage: -67°F to +185°F (-55°C to +85°C).

HUMIDITY RANGE—

0 to 95% relative humidity, can withstand 100% condensing humidity for short periods of time.

CONE OF VISION—

The detector has a 90° cone of vision (horizontal) with the highest sensitivity lying along the central axis. Unlike conventional detectors, the X3300 provides full coverage at a minimum of 70% of the maximum detection distance.

Perfect cone of vision for methane fire detection — 100 feet on and off axis. See Figures 9A to 9K.

RESPONSE TIME—

Typical response times are under 10 seconds. Models are available that can respond to automotive paint gun fires in under 0.5 seconds. See Appendix A for actual response times.

ENCLOSURE MATERIAL—

Aluminum (red-painted) or 316 stainless steel.

DIMENSIONS—

See Figure 10.

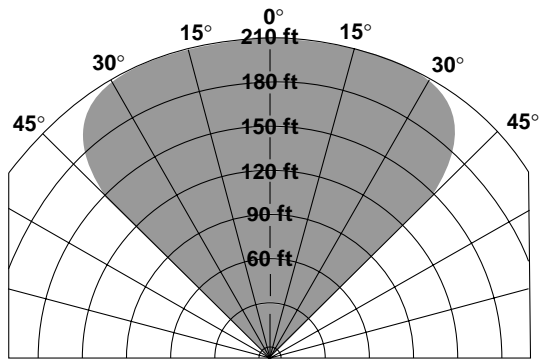
WIRING—

14 AWG (1.5 mm²) to 22 AWG (0.3 mm²) shielded cable is recommended.

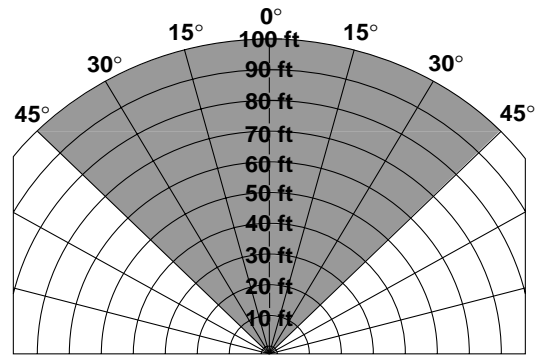
Important: 18 vdc minimum must be available at the detector.

THREAD SIZE—

Cable gland entries: M25.



DETECTOR VERTICAL FIELD OF VIEW WITH DETECTOR AT 45° FROM HORIZONTAL.



DETECTOR VERTICAL FIELD OF VIEW WITH DETECTOR AT 45° FROM HORIZONTAL.

Figure 9A—Field of View at Indicated Distance in Feet for **Gasoline** at **Very High Sensitivity**

Figure 9B—Field of View at Indicated Distance in Feet for **Methane** at **Very High Sensitivity**

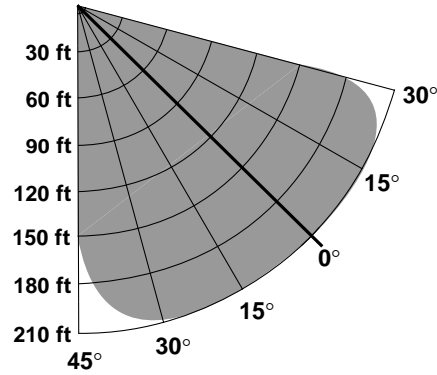


Figure 9C—Field of View at Indicated Distance in Feet for **Methanol** at **Very High Sensitivity**

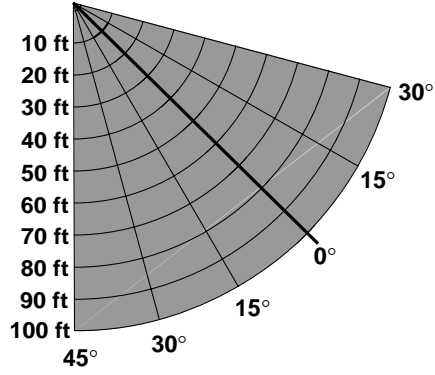


Figure 9D—Field of View at Indicated Distance in Feet for **Diesel** at **Very High Sensitivity**

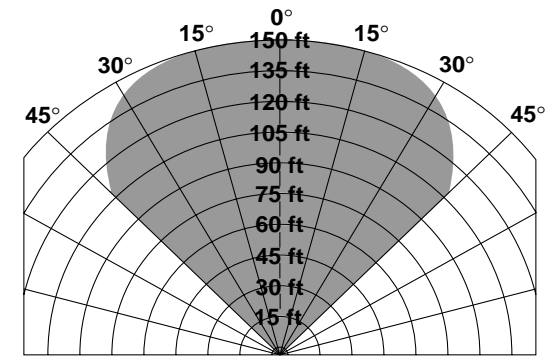


Figure 9E—Field of View at Indicated Distance in Feet for **JP-5** at **Very High Sensitivity**

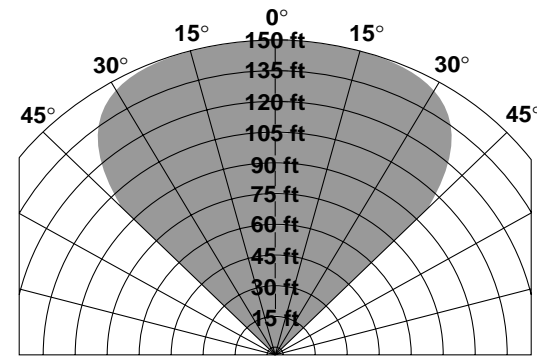


Figure 9F—Field of View at Indicated Distance in Feet for **Gasoline** at **Medium Sensitivity**

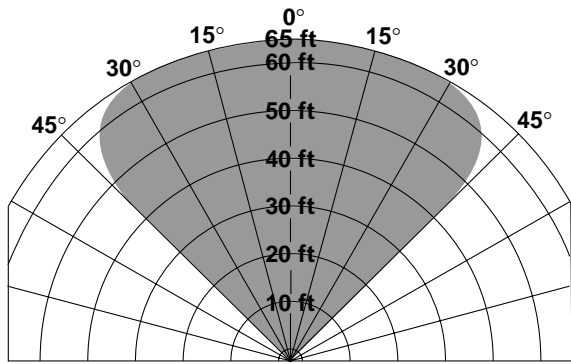


Figure 9G—Field of View at Indicated Distance in Feet for **Methane** at **Medium Sensitivity**

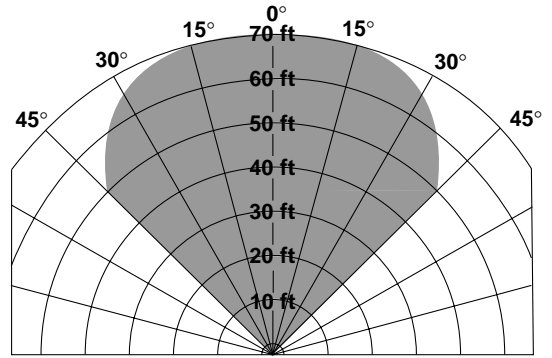


Figure 9H—Field of View at Indicated Distance in Feet for **Methanol** at **Medium Sensitivity**

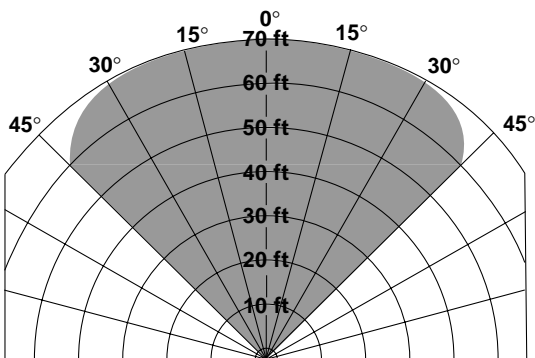


Figure 9J—Field of View at Indicated Distance in Feet for **Diesel** at **Medium Sensitivity**

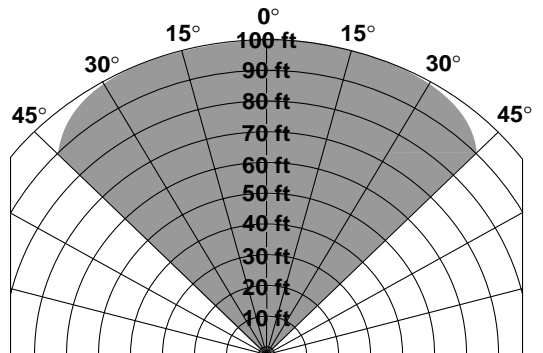


Figure 9K—Field of View at Indicated Distance in Feet for **JP-5** at **Medium Sensitivity**

SHIPPING WEIGHT (Approximate)—

Aluminum: 6.0 pounds (2.7 kilograms).
 Stainless Steel: 10.0 pounds (4.5 kilograms).

CERTIFICATION—

CENELEC: EEx d e IIC T6
 ($T_{amb} = -40^{\circ}\text{C}$ to $+60^{\circ}\text{C}$).
 EEx d e IIC T5
 ($T_{amb} = -40^{\circ}\text{C}$ to $+70^{\circ}\text{C}$).
 IP66.

DNV: Compliance to DNV Certification Notes No. 2.4.
 (Stainless steel version must be direct mounted for DNV Type Approval.)

CE: Conforms to all relevant European norms.

NOTE

Operational performance verified from -40°C to $+70^{\circ}\text{C}$.

WARRANTY PERIOD—

5 years, sensor and electronics.

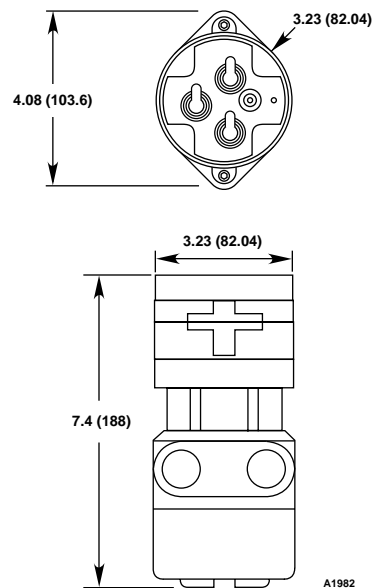


Figure 10—X3300 Dimensions in Inches (mm)

DEVICE REPAIR AND RETURN

The detector is not designed to be repaired in the field. If a problem should develop, refer to the Troubleshooting section. If it is determined that the problem is caused by an electronic defect, the device must be returned to the factory for repair.

Prior to returning devices, contact the nearest local Detector Electronics office so that a Service Order number can be assigned. A written statement describing the malfunction must accompany the returned device or component to expedite finding the cause of the failure.

Pack the unit properly. Use sufficient packing material in addition to an antistatic bag or aluminum-backed cardboard as protection from electrostatic discharge.

Return all equipment transportation prepaid to the factory in Minneapolis.

NOTE

Since the entire unit must be returned to the factory for repair, it is highly recommended that a complete spare be kept on hand for field replacement to ensure continuous protection.

ORDERING INFORMATION

When ordering, refer to Table 5, Ordering Factory Configuration. For further information on the function of each configuration option, refer to Table 2.

Table 5—Ordering Factory Configuration Options

Option	Available Configurations
Optical Integrity (oi)	<ul style="list-style-type: none"> * Automatic oi/manual oi • Manual oi (only)
Fire Relay	<ul style="list-style-type: none"> • Latching * Non-latching
	<ul style="list-style-type: none"> • Normally Energized * Normally De-Energized
	<ul style="list-style-type: none"> * Normally Open • Normally Closed
Fault Relay	<ul style="list-style-type: none"> • Latching * Non-latching
	<ul style="list-style-type: none"> * Normally Energized
	<ul style="list-style-type: none"> * Normally Open • Normally Closed
4 to 20 mA Output	<ul style="list-style-type: none"> • No Fire and Fault Relay Contacts

* Standard Configuration

ACCESSORIES

Q9033 Swivel Mount Assembly is recommended for mounting the detector when using flexible electrical conduit.

REPLACEMENT PARTS

Part Number	Description
001680-001	Window cleaner squeeze bottle (package of six bottles)
006967-001	oi plate kit
107427-049	O-ring
400525-006	Bolts (2)
005143-001	Silicone-free grease

For assistance in ordering a system to fit your application, please contact:

Detector Electronics Corporation
 6901 West 110th Street
 Minneapolis, Minnesota 55438 USA
 Operator: (952) 941-5665 or (800) 765-FIRE
 Customer Service: (952) 946-6491
 Fax: (952) 829-8750
 Web site: www.detrionics.com
 E-mail: detrionics@detrionics.com

APPENDIX A

Response Characteristics of the X3300

RESPONSE CHARACTERISTICS:

Very High Sensitivity

Fuel	Size	Distance (feet)	Average Response Time (seconds)
Gasoline	1 x 1 foot	210*	8.4
Gasoline	1 x 1 foot	100	1.4
Diesel**	1 x 1 foot	150*	9.6
Methanol	1 x 1 foot	150*	5.7
Methane	30 inch plume	100	2.5
JP-5**	2 x 2 foot	210*	8.5
JP-5**	2 x 2 foot	100	2.6
Office Paper 0.5 lb.	18" x 16" x 10"	100	4.5
Corrugated Panel	18" x 36"	100	15.8

* Outdoor test condition.

** 10 second pre-burn from ignition.

Medium Sensitivity

Fuel	Size	Distance (feet)	Average Response Time (seconds)
Gasoline	1 x 1 foot	100	6.0
Gasoline	1 x 1 foot	50	3.8
Diesel**	1 x 1 foot	70	7.4
Methanol	1 x 1 foot	70	9.7
Methane	30 inch plume	65	2.4
Methane	30 inch plume	55	0.8
JP-5**	2 x 2 foot	100	5.7

** 10 second pre-burn from ignition.

RESPONSE CHARACTERISTICS — AUTOMOTIVE APPLICATIONS:

X3300 Response Characteristics (0.5 Sec. Response Only)				
Fuel	Size	Medium Sensitivity		
		Distance Ft. (M)	Ave. Response Time, Sec.	
			On Axis (0°)	Off Axis (45°)
Methanol	Atomized Fuel Fire 10 CC Per Sec.	50 (15)	.39	.40
Isopropanol	Atomized Fuel Fire 10 CC Per Sec.	50 (15)	.39	.40
Acetone	Atomized Fuel Fire 10 CC Per Sec.	50 (15)	.36	.38
Heptane	Atomized Fuel Fire 10 CC Per Sec.	50 (15)	.39	.40

X3300 Response Characteristics				
Fuel	Size	Medium Sensitivity		
		Distance Ft. (M)	Ave. Response Time, Sec.	
			On Axis (0°)	Off Axis (45°)
Methanol	36 Sq. In. (0.023 Sq. M.)	20 (6)	6.9	9.9
Isopropanol	36 Sq. In. (0.023 Sq. M.)	35 (10.5)	3.3	7.3
Heptane	36 Sq. In. (0.023 Sq. M.)	40 (12)	2.6	8.6

NOTE: Atomized fuel fires of methanol, isopropanol, acetone and heptane are detectable within 0.5 second at a distance of 50 feet. Fuel flow rate equals 10 cc per second.

OPTICAL FAULT:

The detector generated an optical fault in the presence of contamination on any single or combination of lens surfaces verifying that the detector performs an optical integrity (oi) test for each sensor. Upon removal of the contaminant the detector fault was cleared and the detector was verified to detect a fire.

RESPONSE CHARACTERISTICS IN THE PRESENCE OF FALSE ALARM SOURCES:**Very High Sensitivity**

False Alarm Source	Distance (feet)	Fire Source	Distance (feet)	Average Response Time (seconds)
Sunlight, direct, modulated, reflected	—	6-inch propane	6	< 4
Vibration	N/A	6-inch propane	6	< 10
Radio frequency interference	1	6-inch propane	12	< 1
Arc welding	40	1 x 1 foot gasoline	40	3.1
6 kw heater, modulated	100	1 x 1 foot gasoline	100	1.9
6 kw heater, unmodulated	10	1 x 1 foot gasoline	100	5.3
250 w vapor lamp, modulated	3	1 x 1 foot gasoline	100	2.7
300 w incandescent lamp, modulated	3	1 x 1 foot gasoline	100	3.6
500 w unshielded quartz halogen lamp, modulated	8	1 x 1 foot gasoline	100	2.7
1500 w electric radiant heater, modulated	10	1 x 1 foot gasoline	100	4.2
Two 34 w fluorescent lamps, modulated	3	1 x 1 foot gasoline	100	1.7

Medium Sensitivity

False Alarm Source	Distance (feet)	Fire Source	Distance (feet)	Average Response Time (seconds)
Sunlight, direct, modulated, reflected	—	6-inch propane	6	< 4
Vibration*	N/A	N/A	N/A	N/A
Radio frequency interference	1	6-inch propane	6	< 1
Arc welding	10	1 x 1 foot gasoline	10	0.2
6 kw heater, modulated	100	1 x 1 foot gasoline	100	5.0
6 kw heater, unmodulated	10	1 x 1 foot gasoline	100	10.7
250 w vapor lamp, modulated	3	1 x 1 foot gasoline	100	7.1
300 w incandescent lamp, modulated	3	1 x 1 foot gasoline	100	9.6
500 w unshielded quartz halogen lamp, modulated	8	1 x 1 foot gasoline	100	6.3
1500 w electric radiant heater, modulated	10	1 x 1 foot gasoline	90	6.4
Two 34 w fluorescent lamps, modulated	3	1 x 1 foot gasoline	100	4.6

* Fire was verified with very high sensitivity only.

FALSE ALARM IMMUNITY:**Very High Sensitivity**

False Alarm Source	Distance (feet)	Modulated Response	Unmodulated Response
Sunlight, direct, reflected	—	No alarm	No alarm
Vibration	N/A	No alarm	N/A
Radio frequency interference	1	No alarm (keyed)	No alarm (steady)
Arc welding	40	No alarm	No alarm
6 kw heater	3	No alarm	No alarm
250 w vapor lamp	3	No alarm	No alarm
300 w incandescent lamp	3	No alarm	No alarm
500 w unshielded quartz halogen lamp	8	No alarm	No alarm
1500 w electric radiant heater	3	No alarm	No alarm
Two 34 w fluorescent lamps	3	No alarm	No alarm

Medium Sensitivity

False Alarm Source	Distance (feet)	Modulated Response	Unmodulated Response
Sunlight, direct, reflected	—	No alarm	No alarm
Vibration	N/A	No alarm	N/A
Radio frequency interference	1	No alarm (keyed)	No alarm (steady)
Arc welding	10	No alarm	No alarm
6 kw heater	3	No alarm	No alarm
250 w vapor lamp	3	No alarm	No alarm
300 w incandescent lamp	3	No alarm	No alarm
500 w unshielded quartz halogen lamp	8	No alarm	No alarm
1500 w electric radiant heater	3	No alarm	No alarm
Two 34 w fluorescent lamps	3	No alarm	No alarm

FIELD OF VIEW:**Very High Sensitivity**

Fuel	Size	Distance (feet)	Horizontal (degrees)	Avg. Horiz. Response Time (seconds)	Vertical (degrees)	Avg. Vert. Response Time (seconds)
Gasoline	1 x 1 foot	150	+45 -45	11.9 9.5	+45 -30	8.5 6.0
Gasoline	1 x 1 foot	100	+45 -45	3.5 4.0	+45 -30	4.2 3.2
Diesel**	1 x 1 foot	100	+45 -45	2.2 4.4	+45 -30	2.1 2.8
Methanol	1 x 1 foot	110	+45 -45	8.5 9.2	+45 -30	9.5 4.3
Methane	30 inch plume	100	+45 -45	1.9 4.3	+45 -30	3.5 2.0
JP-5**	2 x 2 feet	180*	+45 -45	13.3 17.3	+45 -30	10.4 5.0
JP-5**	2 x 2 feet	90	+45 -45	2.9 4.1	+45 -30	1.4 2.5
Office Paper 0.5 lb.	18" x 16" x 10"	80	+45 -45	6.4 9.8	+45 -30	8.2 6.0
Corrugated Panel	18" x 36"	80	+45 -45	15.6 12.2	+45 -30	14.7 10.6

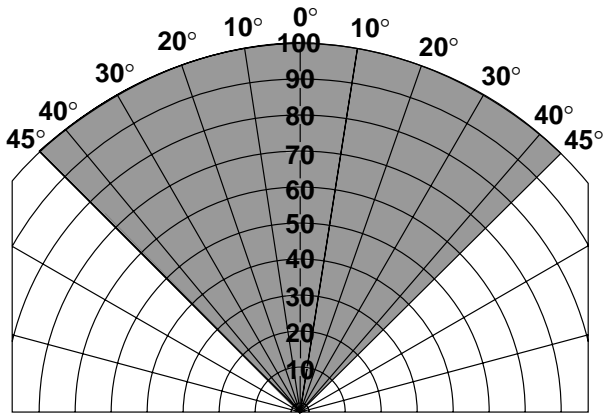
Medium Sensitivity

Fuel	Size	Distance (feet)	Horizontal (degrees)	Avg. Horiz. Response Time (seconds)	Vertical (degrees)	Avg. Vert. Response Time (seconds)
Gasoline	1 x 1 foot	75	+45 -45	9.5 9.5	+45 -30	6.4 5.4
Gasoline	1 x 1 foot	50	+45 -45	3.8 3.8	+45 -30	4.1 3.1
Diesel**	1 x 1 foot	60	+45 -45	4.5 6.8	+45 -30	5.5 2.1
Methanol	1 x 1 foot	45	+45 -45	9.0 9.7	+45 -30	9.8 6.6
Methane	30 inch plume	45	+45 -45	4.4 0.9	+45 -30	2.0 0.5
Methane	30 inch plume	40	+45 -45	1.7 0.4	+45 -30	3.4 1.4
JP-5**	2 x 2 feet	90	+45 -45	2.9 8.1	+45 -30	3.4 2.5

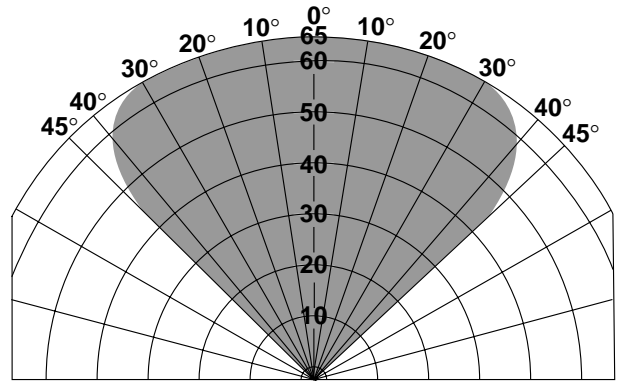
* Outdoor test condition.

** 10 second flame pre-burn from ignition.

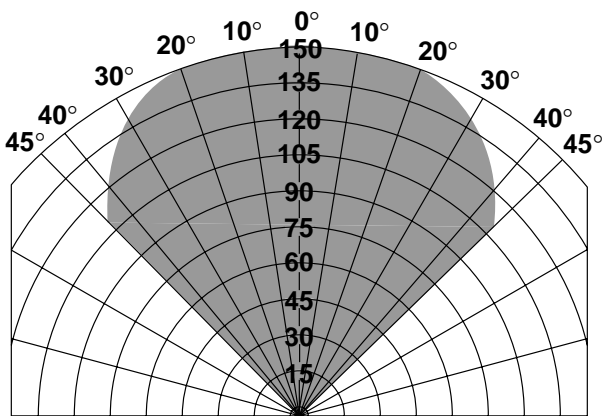
HIGH RESOLUTION FIELD OF VIEW



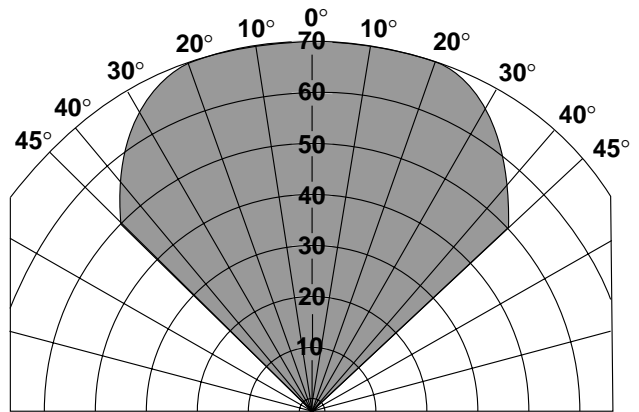
Field of View at Indicated Distance in Feet
for Methane at Very High Sensitivity



Field of View at Indicated Distance in Feet
for Methane at Medium Sensitivity



Field of View at Indicated Distance in Feet
for Methanol at Very High Sensitivity



Field of View at Indicated Distance in Feet
for Methanol at Medium Sensitivity

NOTE

These high resolution field of view diagrams show the measured response distances at all the indicated angles in the horizontal plane.



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