



Instructions

95-8517

Protect•ir Multispectrum IR Flame Detector
with Pulse Output
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.**

Protect•ir

Multispectrum IR Flame Detector with Pulse Output X3300



DESCRIPTION

The X3300 Protect•ir with pulse output is a multispectrum infrared (IR) flame detector for use in controller based systems. In addition to use in new systems, it can serve as a direct field replacement for Det-Tronics controller based flame detectors that generate a pulse output (not compatible with R7484 and R7409B/C).

When used as a field replacement, all operating features of the current controller are retained in addition to gaining the advanced features of the X3300 detector. In typical applications, the four wire X3300 can utilize all existing system wiring.

The X3300 contains three IR sensors and provides unsurpassed detection of flames 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. Models are available for 'EEx d e', 'EEx d' or Class I/II/III, Division 1/2 hazardous locations.

*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.

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

A tricolor LED on the detector faceplate indicates normal, fire alarm, and fault conditions. Table 1 indicates the condition of the LED for each detector status. The LED is non-latching.

The X3300 is available in aluminum or stainless steel and features multiple mounting options, including:

- Direct to flexible conduit with the use of a Q9001L swivel mount
- Direct to conduit elbow mount.

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.

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

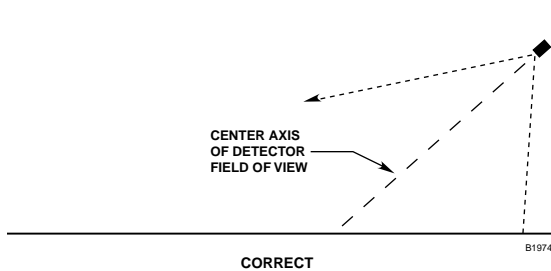
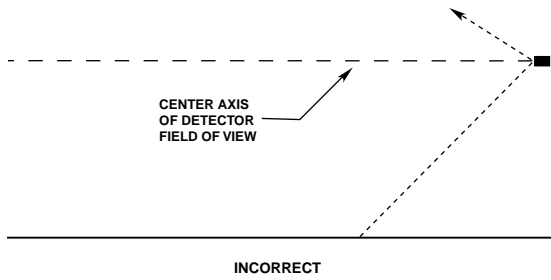
The X3300 is a multiple spectrum IR device with detection limited to carbonaceous fuels. It should not be used to detect fires that do not contain carbon, such as hydrogen, sulfur and burning metals.

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



NOTE: DETECTOR MUST ALWAYS BE AIMED DOWNWARD AT LEAST 10 TO 20 DEGREES.

Figure 1—Detector Orientation Relative to Horizon

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.
- 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. See Table 2. In some cases where the X3300 is replacing existing pulse

output detectors, the wiring and power supplies may not be adequate. Consult the factory for assistance.

A minimum input voltage of 18 vdc must be present at the X3300.

The use of shielded cable is required to protect against interference caused by EMI and RFI. Consult the factory if not using shielded cable.

The “B” (pulse output) and “D” (oi driver) leads from each detector should be shielded from the “B” and “D” leads of all other detectors in order to prevent false alarms resulting from crosstalk between zones. It is recommended that the “A” and “C” leads also be shielded to provide maximum immunity to EMI/RFI. (See Figures 6 to 10.)

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 wiring pigtail for the X3300 is factory sealed for easy installation onto a junction box where electrical connections are made. The integrity of the system regarding moisture protection must be maintained for proper operation and is the responsibility of the installer.

If conduit is used, drains must be installed at water collection points to automatically drain accumulated moisture. Conduit breathers should be installed at upper locations to provide ventilation and allow water vapor to escape. At least one breather should be used with each drain.

Table 2—Detector Wiring Requirements

Wire Size AWG	Minimum Voltage at Controller	Maximum Distance	
		Feet	Meters
22	23 VDC	500	152
22	20.5 VDC	250	76
18	22 VDC	1000	305
18	20 VDC	500	152
16	23 VDC	2000	610
16	20.5 VDC	1000	305
14	21.5 VDC	2000	610
14	20 VDC	1000	305

Conduit raceways should be inclined so that water will flow to low points for drainage and will not collect inside enclosures or on conduit seals. If this is not possible, install conduit drains above the seals to prevent the collection of water or install a drain loop below the detector with a conduit drain at the lowest point of the loop.

The detector is factory sealed. While conduit seals are not required for compliance with explosion-proof installation requirements, steps must be taken to prevent water ingress into the junction box area. Units with M25 threads must use an IP66 washer.

MOUNTING AND WIRING PROCEDURE

IMPORTANT

If installing an X3300 in place of an existing detector, be sure to move the “A” Lead (detector power) at the controller from the +290 VDC source to the +24 VDC source. Do not apply 290 VDC to the X3300.

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

- Figure 1 – Detector Orientation Relative to Horizon
- Figure 2 – Front View of the X3300 Detector
- Figure 3A/B – X3300 Mounting Options
- Figure 4A/B – Mounting Bracket Dimensions
- Figure 5A/B – X3300 Wiring Identification

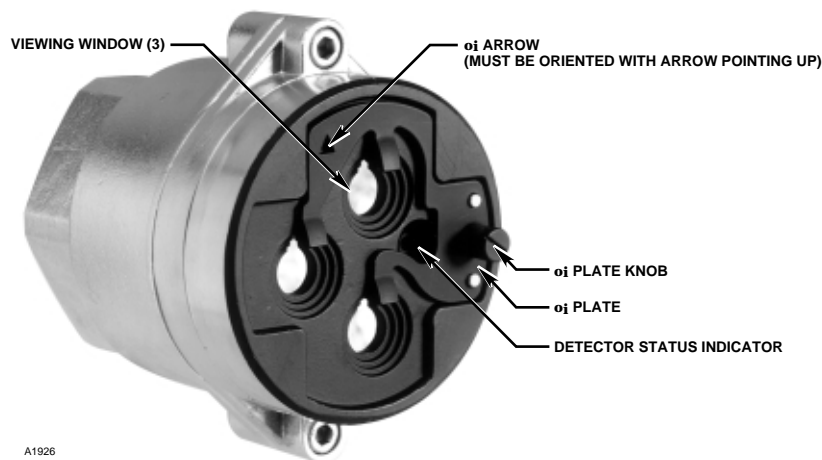


Figure 2—Front View of the X3300 Detector

- Figure 6 – A Typical System, X3300 Detectors Wired to R7404 Controller
- Figure 7 – A Typical System, X3300 Detectors Wired to R7404 Star Logic Controller
- Figure 8 – A Typical System, X3300 Detectors Wired to R7494 Controller
- Figure 9 – A Typical System, X3300 Detectors Wired to R7495 Controller
- Figure 10 – A Typical System, X3300 Detectors Wired to R7405 Controller

oi PLATE ORIENTATION

Refer to Figure 2 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 (40 oz./inches recommended).*

INSTALLATION PROCEDURE

1. Install the mounting bracket assembly on the wall. The installation surface should be free of vibration and suitable to receive 1/4 inch (M6) screws with a length of at least 1 inch (25 mm).
2. Attach the detector to the mounting bracket and tighten the nut to secure it in place. Refer to Figures 3A, 3B, 4A and 4B.



Figure 3A—X3300 with Q9001L Swivel Mount

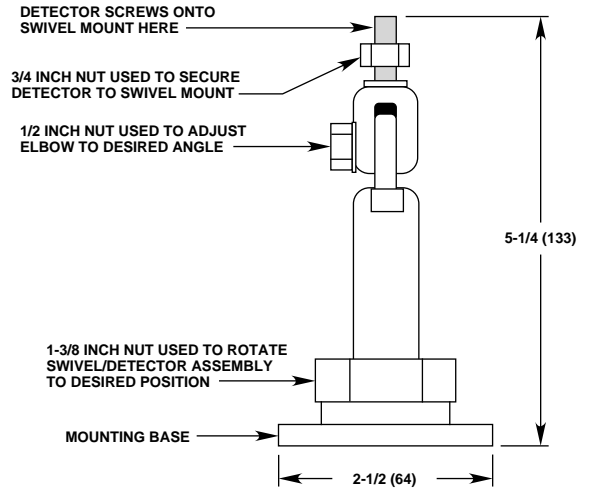


Figure 3B—X3300 with Q9033 Mounting Bracket (EExe Installation Only)

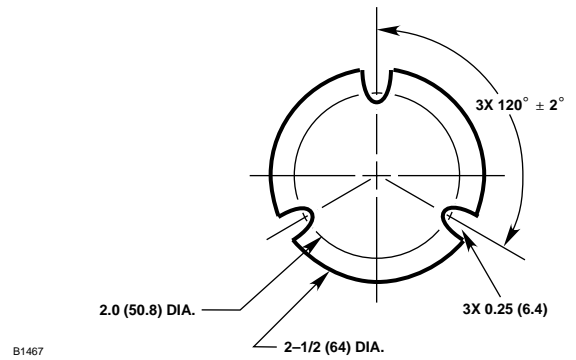
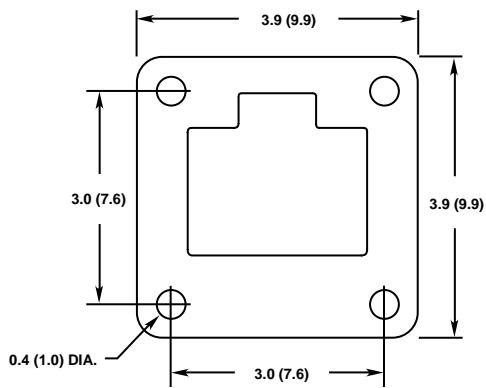


Figure 4A—Q9001L Swivel Mount Dimensions in Inches (mm)



A1981

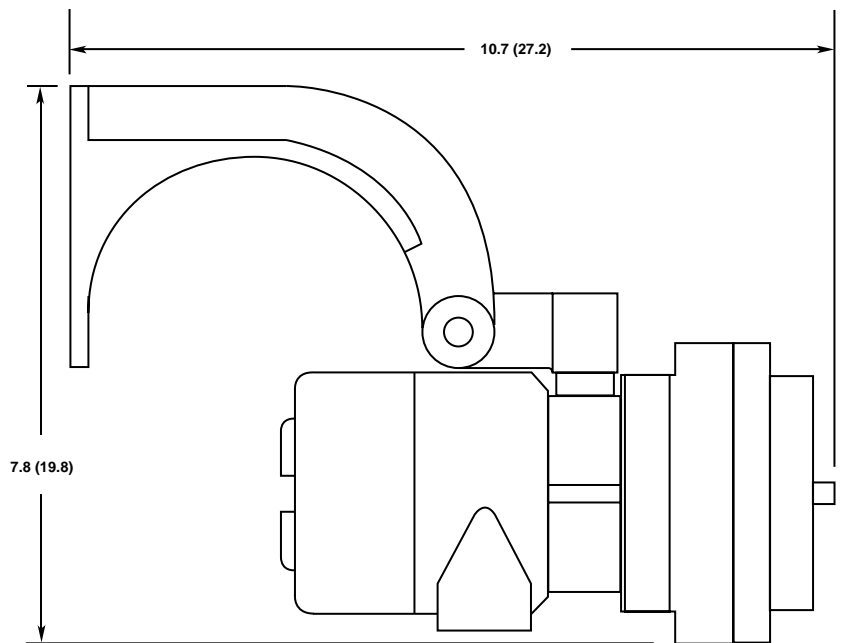


Figure 4B—Dimensions of X3300 with Q9033 Mounting Bracket in Inches (cm)

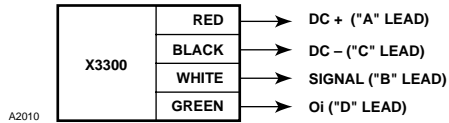


Figure 5A—Wiring Identification for X3300 with Pigtails

TERMINAL NO.	FUNCTION
1	DC+ ("A" LEAD)
2	SIGNAL ("B" LEAD)
3	DC- ("C" LEAD)
4	Oi ("D" LEAD)

Figure 5B—Terminal Identification for X3300 with Integral Junction Box

3. Make the field wiring connections following local ordinances and the guidelines in this manual. Refer to Figures 5A and 5B for identification of detector wires/terminals and Figures 6 through 10 for wiring diagrams of typical systems.

Wire the X3300 Detector as follows:

- Red– DC + ("A" Lead)
- Black– DC - ("C" Lead)
- White– Signal ("B" Lead)
- Green– Oi ("D" Lead)

Leave the shield open at the detector end and permanently isolate it from accidental contact with the case and/or other conductors. Connect the shield to power minus (-) at the controller end. (Refer to Figures 6 through 10.)

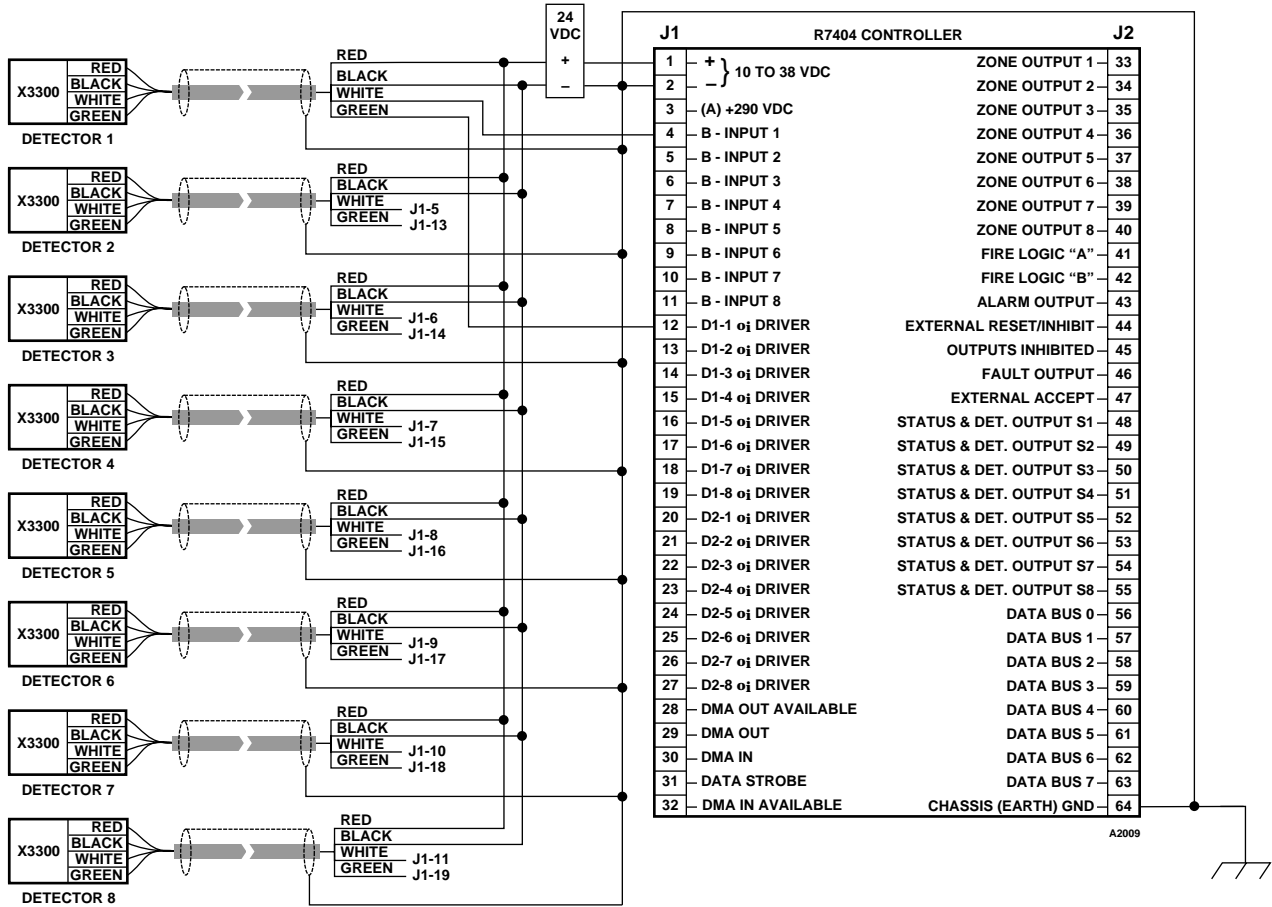
4. Check all field wiring to be sure that the proper connections have been made.

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.

5. Make the final detector sighting adjustments and ensure that the swivel mount is tightened.

NOTE: DO NOT CONNECT THE X3300 "A" LEAD (RED) TO TERMINAL J1-3 (290 VDC).



TERMINAL IDENTIFICATION FOR X3300 WITH INTEGRAL JUNCTION BOX.

TERMINAL NO.	FUNCTION
1	DC+ ("A" LEAD)
2	SIGNAL ("B" LEAD)
3	DC- ("C" LEAD)
4	O _i ("D" LEAD)

NOTE: IF THE POWER SUPPLY MINUS CANNOT BE CONNECTED TO CHASSIS (EARTH) GROUND, CONNECT A 0.47 μF 250 VDC NON-POLARIZED CAPACITOR BETWEEN J1-2 AND J2-64.

NOTE: 2.5 AMPERES @ 24 VDC REQUIRED PER EIGHT DETECTORS.

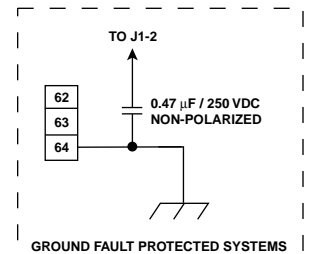
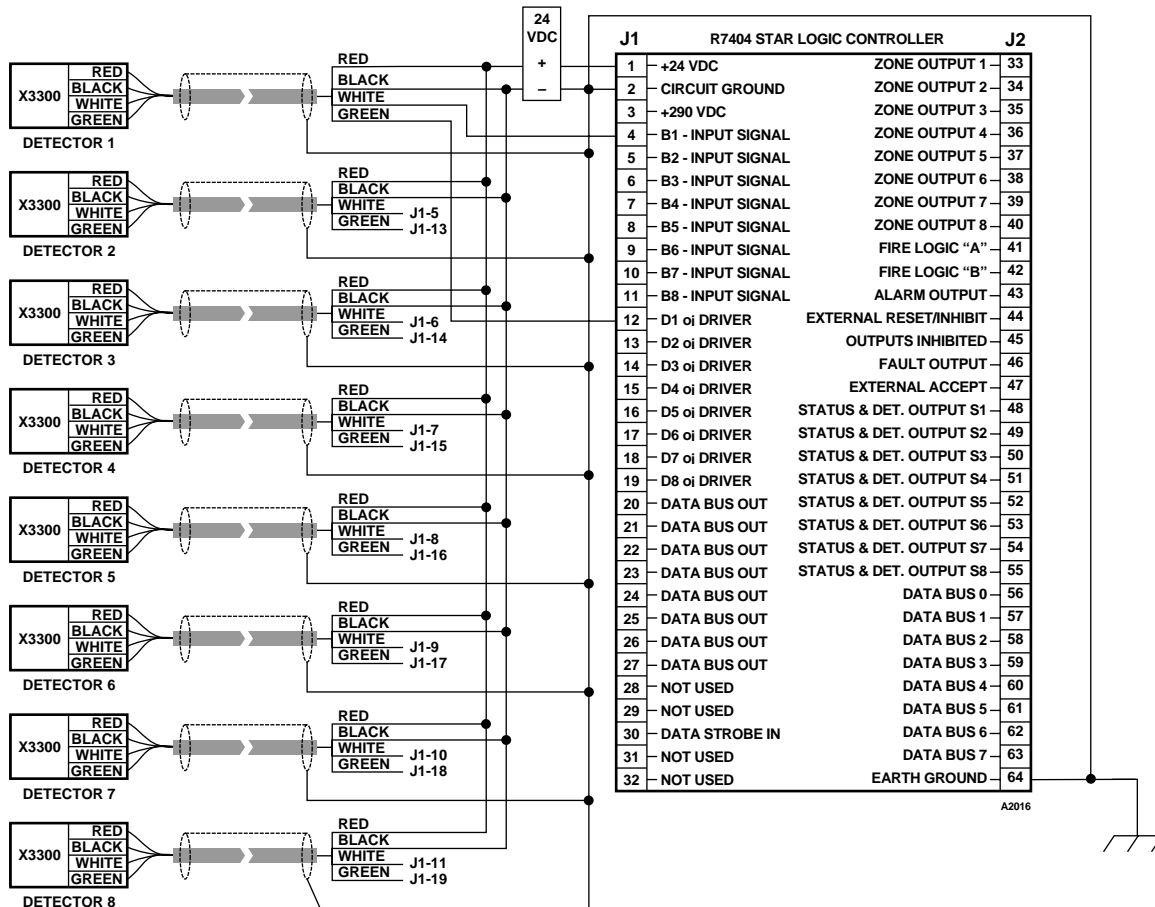


Figure 6—A Typical System, X3300 Detectors Wired to R7404 Controller

NOTE: DO NOT CONNECT THE X3300 "A" LEAD (RED) TO TERMINAL J1-3 (290 VDC).



TERMINAL IDENTIFICATION FOR X3300 WITH INTEGRAL JUNCTION BOX.

TERMINAL NO.	FUNCTION
1	DC+ ("A" LEAD)
2	SIGNAL ("B" LEAD)
3	DC- ("C" LEAD)
4	Oi ("D" LEAD)

NOTE: IF THE POWER SUPPLY MINUS CANNOT BE CONNECTED TO CHASSIS (EARTH) GROUND, CONNECT A 0.47 μ F 250 VDC NON-POLARIZED CAPACITOR BETWEEN J1-2 AND J2-64.

NOTE: 2.5 AMPERES @ 24 VDC REQUIRED PER EIGHT DETECTORS.

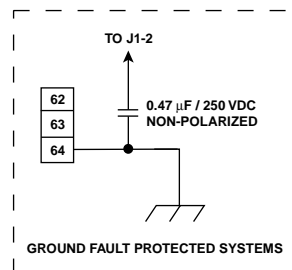
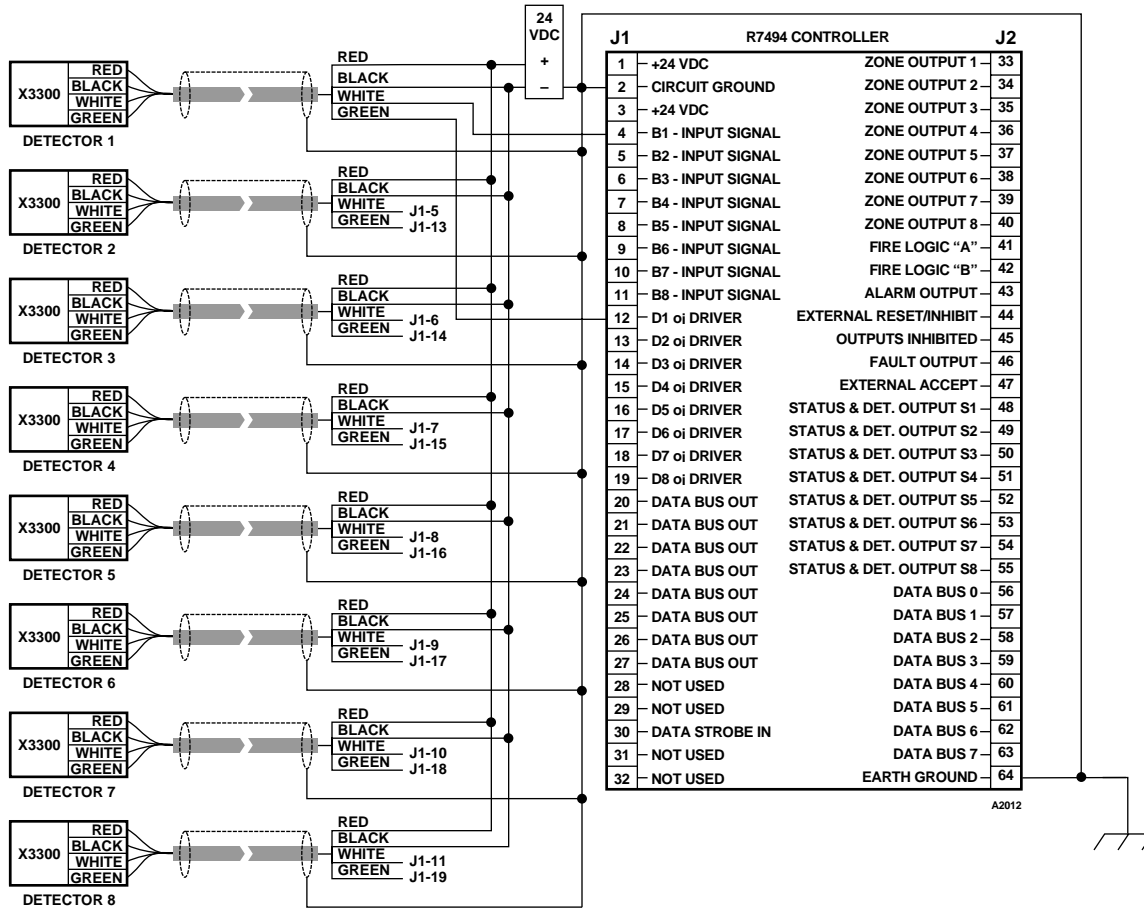


Figure 7—A Typical System, X3300 Detectors Wired to R7404 Star Logic Controller



TERMINAL IDENTIFICATION FOR X3300 WITH INTEGRAL JUNCTION BOX.

TERMINAL NO.	FUNCTION
1	DC+ ("A" LEAD)
2	SIGNAL ("B" LEAD)
3	DC- ("C" LEAD)
4	Oi ("D" LEAD)

NOTE: IF THE POWER SUPPLY MINUS CANNOT BE CONNECTED TO CHASSIS (EARTH) GROUND, CONNECT A 0.47 μ F 250 VDC NON-POLARIZED CAPACITOR BETWEEN J1-2 AND J2-64.

NOTE: 2.5 AMPERES @ 24 VDC REQUIRED PER EIGHT DETECTORS.

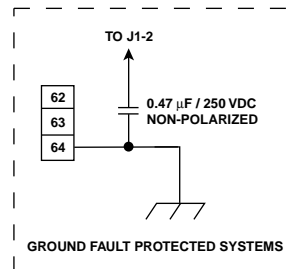
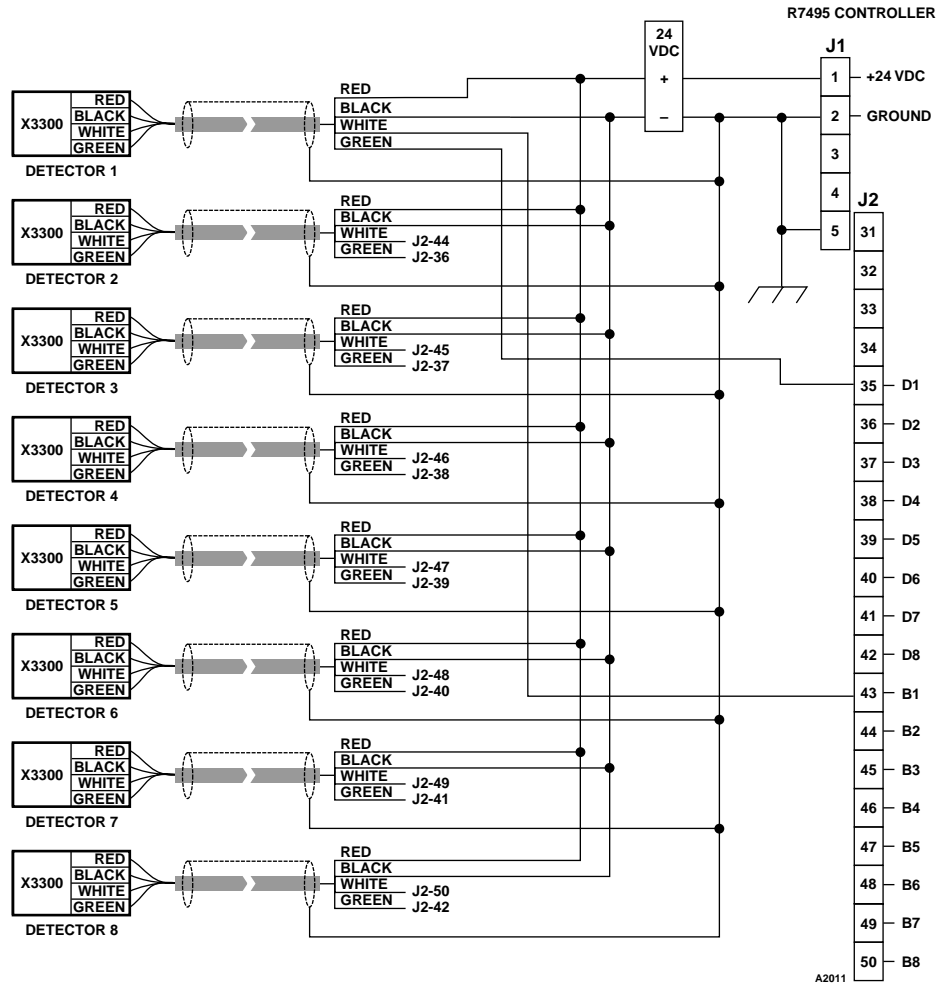


Figure 8—A Typical System, X3300 Detectors Wired to R7494 Controller



TERMINAL IDENTIFICATION FOR X3300 WITH INTEGRAL JUNCTION BOX.

TERMINAL NO.	FUNCTION
1	DC+ ("A" LEAD)
2	SIGNAL ("B" LEAD)
3	DC- ("C" LEAD)
4	Oi ("D" LEAD)

NOTE: IF THE POWER SUPPLY MINUS CANNOT BE CONNECTED TO CHASSIS (EARTH) GROUND, CONNECT A 0.47 μF 250 VDC NON-POLARIZED CAPACITOR BETWEEN J1-2 AND J1-5.

NOTE: 2.5 AMPERES @ 24 VDC REQUIRED PER EIGHT DETECTORS.

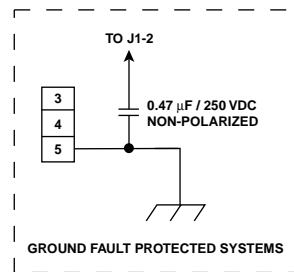
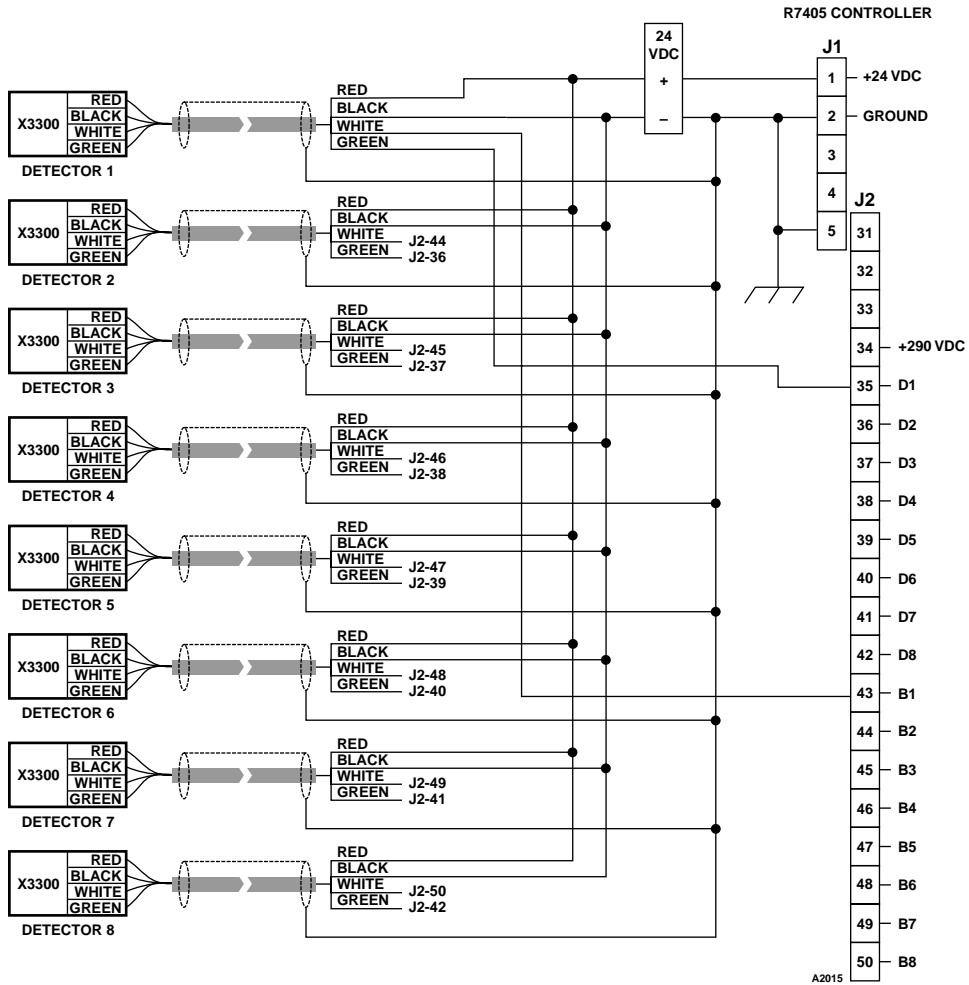


Figure 9—A Typical System, X3300 Detectors Wired to R7495 Controller

NOTE: DO NOT CONNECT THE X3300 "A" LEAD (RED) TO TERMINAL J2-34 (290 VDC).



TERMINAL IDENTIFICATION FOR X3300 WITH INTEGRAL JUNCTION BOX.

TERMINAL NO.	FUNCTION
1	DC+ ("A" LEAD)
2	SIGNAL ("B" LEAD)
3	DC- ("C" LEAD)
4	Oi ("D" LEAD)

NOTE: IF THE POWER SUPPLY MINUS CANNOT BE CONNECTED TO CHASSIS (EARTH) GROUND, CONNECT A 0.47 μ F 250 VDC NON-POLARIZED CAPACITOR BETWEEN J1-2 AND J1-5.

NOTE: 2.5 AMPERES @ 24 VDC REQUIRED PER EIGHT DETECTORS.

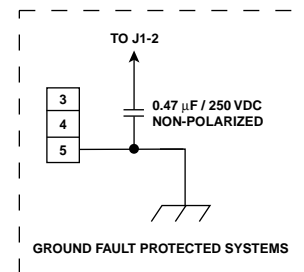


Figure 10—A Typical System, X3300 Detectors Wired to R7405 Controller

OPTICAL INTEGRITY (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, as determined by three consecutive oi checks. This is indicated by the amber color of the LED on the face of the detector. See the "Troubleshooting" section for further information.

STARTUP PROCEDURE

When installation of the equipment is complete, perform the "Manual oi Test" and/or "Count Test Mode" below.

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

MANUAL Oi TEST

1. Place the keylock switch in the TEST position.
2. Press the SELECT button to display the desired zone on the ZONE indicator on the front panel of the controller.
3. Press and hold the TEST button to energize the test lamps for the selected detector. The ZONE OUTPUT LED for the tested zone flashes and the SYSTEM STATUS display indicates a "6" (fire condition) if the test is successful.
4. Release the TEST button. The ZONE OUTPUT LED for the tested zone should remain on steadily.
5. Return to step 2 to test next detector.

If the system responds differently than indicated above, proceed with the count test for the problem zone to verify detector and wiring operation.

COUNT TEST MODE

The detector can be tested using the Count Test mode. When in the Count Test mode, the frequency of the digital pulses from the detector is displayed in the ZONE and DETECTOR indicators on the controller faceplate. The Count Test mode may be used to check the oi signal strength, the signal (cps) from a test fire, or false alarm source. This can be useful during system set-up for sensitivity and time delay settings. This test is performed in the following manner:

1. Place the keylock switch in the TEST position.
2. Simultaneously press and release the SELECT and TEST buttons. The Status display will change from a "1" to an "8" indicating that the controller is in the Count Test mode of operation.
3. Press the SELECT button until the desired zone is displayed in the ZONE indicator on the controller front panel.
4. Press and hold the TEST button to energize the oi source lamps for the selected detector. The DETECTOR/ZONE display indicates the counts per second (cps) received from the detector. If the counts per second exceeds 99, the FIRE LOGIC LEDs are illuminated to indicate that the number shown on the display must be multiplied by 10. **The normal reading for an oi test is 100 cps. For a live fire test, 300 cps will be generated.**

A zero reading may indicate a dirty window, oi problem, faulty detector or defective wiring.

Release the Test button, the ZONE and DETECTOR display should drop to a reading of 0 to 1 counts per second.

TROUBLESHOOTING

WARNING

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

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.

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 status.
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.
6. 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, contact the factory.

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 "Manual **oi** 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.

1. **Disable any extinguishing equipment that is connected to the unit.**
2. 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.
3. 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.

oi PLATE REMOVAL

1. Remove the **oi** plate from the detector by loosening the **oi** plate knob.
2. Thoroughly clean the **oi** plate reflective surfaces, holding it by its edges to avoid leaving fingerprints on the inside reflective surface.
3. 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.
- Factory sealed device eliminates need for explosion-proof conduit seal.
- Automatic and manual optical integrity (**oi**) test.
- Easily replaceable **oi** plate.
- Tricolor LED indicates normal operation, fire and fault conditions.
- 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.
- Hazardous location capabilities:
 - Explosion-proof/flame-proof detector housing. CSA, FM and CENELEC Certified.
 - Models available with CENELEC Certified EEx d e.
- Class A wiring per NFPA-72.
- 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.

TEMPERATURE RANGE—

Operating: -40°F to +167°F (-40°C to +75°C).

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

Hazardous location ratings from -55°C to +125°C available on extended temperature model.

HUMIDITY RANGE—

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

DIMENSIONS—

See Figures 11A and 11B.

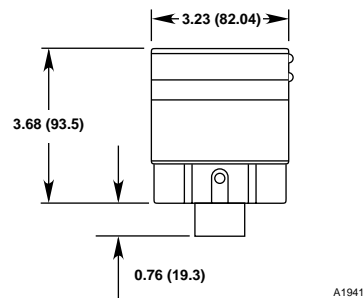
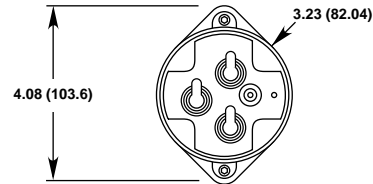


Figure 11A—Dimensions of Standard X3300 in Inches (mm)

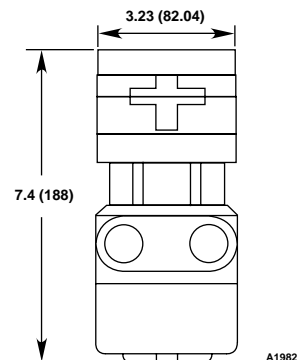
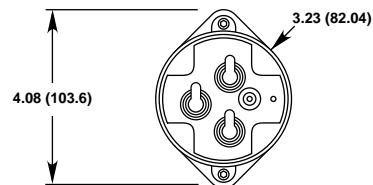


Figure 11B—Dimensions of X3300 with Integral Junction Box in Inches (mm)

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.

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. See Figures 12A to 12K.

Perfect cone of vision for methane fire detection — 100 feet on and off axis. See Figures 12B and A1.

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.

THREAD SIZE—

Cable gland entries: M25.

Conduit connection: 3/4 inch NPT or M25.

SHIPPING WEIGHT (Approximate)—

Standard Model:

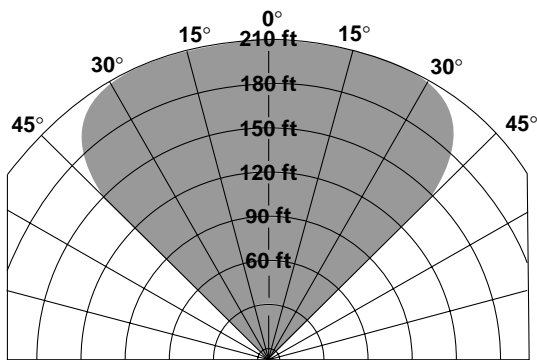
Aluminum: 2.4 pounds (1.1 kilograms).

Stainless Steel: 4.8 pounds (2.2 kilograms).

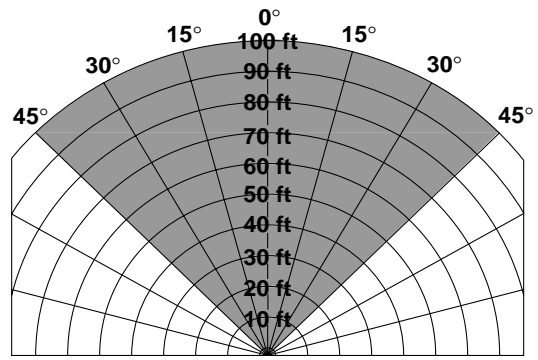
Integral Junction Box Model:

Aluminum: 6.0 pounds (2.7 kilograms).

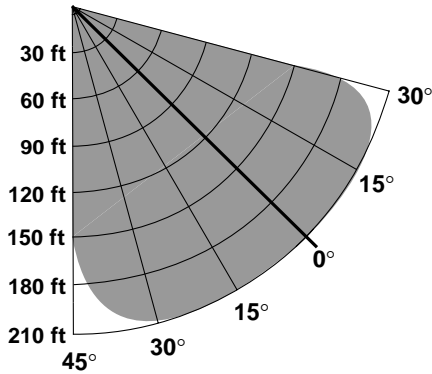
Stainless Steel: 10.0 pounds (4.5 kilograms).



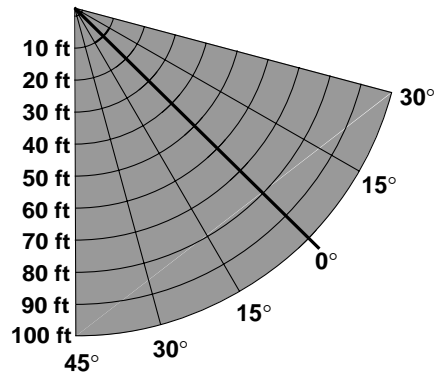
DETECTOR HORIZONTAL FIELD OF VIEW



DETECTOR HORIZONTAL FIELD OF VIEW



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



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

Figure 12A—Field of View at Indicated Distance in Feet for **Gasoline** at **Very High** Sensitivity

Figure 12B—Field of View at Indicated Distance in Feet for **Methane** at **Very High** Sensitivity

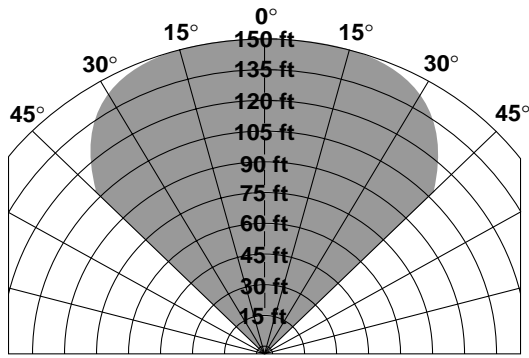


Figure 12C—Horizontal Field of View at Indicated Distance in Feet for **Methanol at Very High Sensitivity**

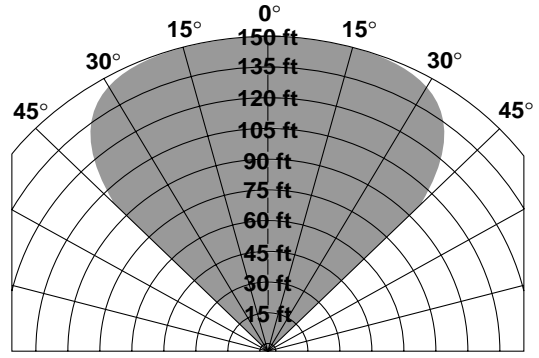


Figure 12D—Horizontal Field of View at Indicated Distance in Feet for **Diesel at Very High Sensitivity**

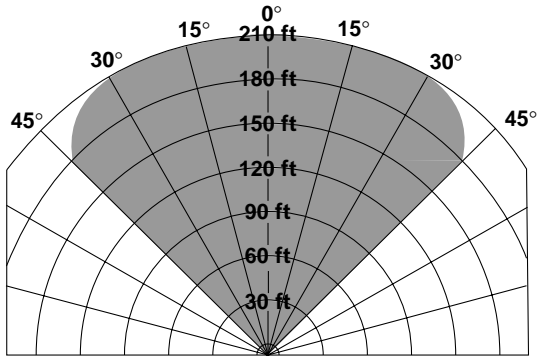


Figure 12E—Horizontal Field of View at Indicated Distance in Feet for **JP-5 at Very High Sensitivity**

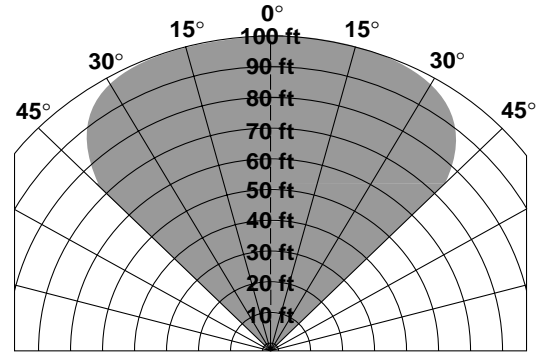


Figure 12F—Horizontal Field of View at Indicated Distance in Feet for **Gasoline at Medium Sensitivity**

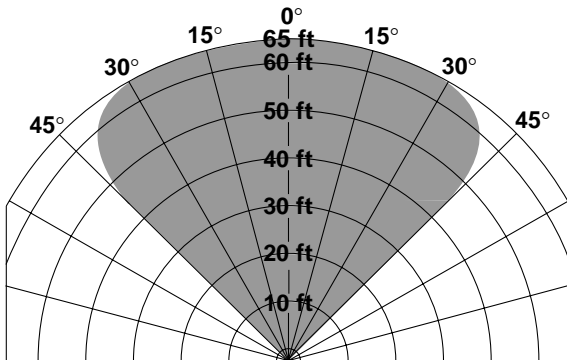


Figure 12G—Horizontal Field of View at Indicated Distance in Feet for **Methane at Medium Sensitivity**

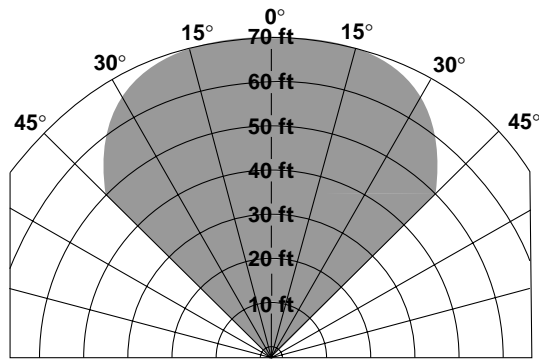


Figure 12H—Horizontal Field of View at Indicated Distance in Feet for **Methanol at Medium Sensitivity**

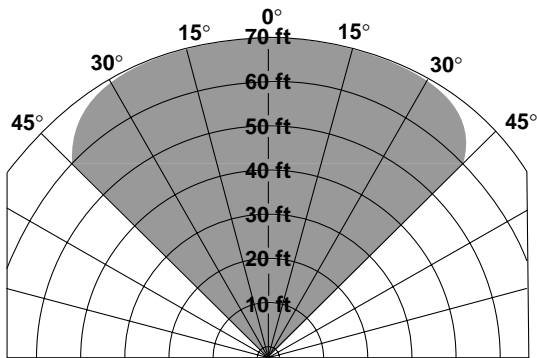


Figure 12J—Horizontal Field of View at Indicated Distance in Feet for **Diesel at Medium Sensitivity**

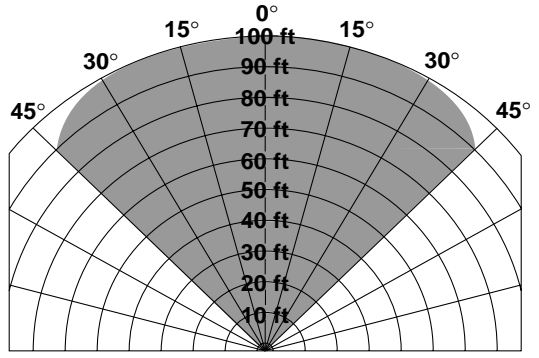


Figure 12K—Horizontal Field of View at Indicated Distance in Feet for **JP-5 at Medium Sensitivity**

CERTIFICATION—

FM: Reference Appendix A.
CSA: Class I, Div. 1, Groups B, C and D;
Class II, Div. 1, Groups E, F and G (T4A);
Class II/III.
Class I, Div. 2, Groups A, B, C and D;
Class II, Div. 2, Groups F and G (T3C);
Class II/III.
Enclosure Type 4X.
Explosion-proof Ambient Temperature Limits:
-55°C to 125°C.

CENELEC: Standard Temperature Model

EEx d IIC T6, EEx d e IIC T6
($T_{amb} = -40^{\circ}\text{C}$ to $+60^{\circ}\text{C}$).
EEx d IIC T5, EEx d e IIC T5
($T_{amb} = -40^{\circ}\text{C}$ to $+75^{\circ}\text{C}$).
IP66.

Extended Temperature Model

EEx d IIC T6, EEx d e IIC T6
($T_{amb} = -55^{\circ}\text{C}$ to $+60^{\circ}\text{C}$).
EEx d IIC T5, EEx d e IIC T5
($T_{amb} = -55^{\circ}\text{C}$ to $+75^{\circ}\text{C}$).
EEx d IIC T4, EEx d e IIC T4
($T_{amb} = -55^{\circ}\text{C}$ to $+100^{\circ}\text{C}$).
IP66.

Integral J-Box Model

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.

Special Conditions for Safe Use ("X"):

The extended temperature model can withstand repeated exposures to $+125^{\circ}\text{C}$ for periods of up to 12 hours while maintaining its explosion-proof rating. It is recommended that the unit housing be replaced after 500 hours of exposure to the $+125^{\circ}\text{C}$ temperature condition to maintain explosion-proof rating.

CE: Conforms to all relevant European norms.

NOTE

Operational performance verified from -40°C to $+75^{\circ}\text{C}$.

WARRANTY PERIOD—

5 years, sensor and electronics.

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, specify detector sensitivity. Refer to Appendix A for details.

ACCESSORIES

Q9001L Mounting Bracket is recommended for mounting the detector when using flexible conduit.

Q9033 Mounting Bracket is for cable gland installation.

Swivel Union is recommended for mounting the detector to a junction box and allows detector sighting.

REPLACEMENT PARTS

Part Number	Description
001680-001	Window cleaner squeeze bottle (package of six bottles)
006967-001	oi plate kit
005003-001	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 [Factory Mutual Research (FMR) Approval Description]

THE FOLLOWING ITEMS, FUNCTIONS AND OPTIONS DESCRIBE THE FMR APPROVAL:

- Explosion-proof for Class I, Div. 1, Groups B, C and D (T4A) Hazardous (Classified) Locations per FM 3615.
- Dust-ignition proof for Class II/III, Div. 1, Groups E, F and G (T4A) Hazardous (Classified) Locations per FM 3615.
- Non-incendive for Class I, Div. 2, Groups A, B, C and D (T3C) Hazardous (Classified) locations per FM 3611.
- Suitable for Class II/III, Div. 2, Groups F and G (T3C) Hazardous (Classified) locations per FM 3611.
- Enclosure rating NEMA Type 4X per NEMA 250.
- Ambient Temperature Limits: -40°F to +167°F (-40°C to +75°C).
- Automatic Fire Alarm Signaling Performance verified per FM 3260.

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	14.8

* 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.

X3300 Pulse Output Response Characteristics Medium Sensitivity						
Fuel	Size	Ave. Response Time, Sec.				
		Distance Ft. (M)	Connection to R7404 Controller		Connection to R7494 Controller	
			On Axis (0°)	Off Axis (45°)	On Axis (0°)	Off Axis (45°)
Heptane	36 Sq. In. (0.023 Sq. M.)	40 (12)	4.5	10.6	5.3	11.4

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

* Outdoor test condition.

** 10 second flame pre-burn from ignition.

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
(Factory Mutual Research Verified)**

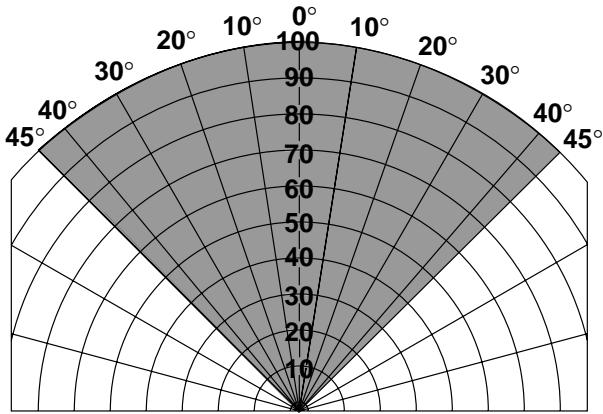


Figure A1—Horizontal Field of View at Indicated Distance in Feet for Methane at Very High Sensitivity

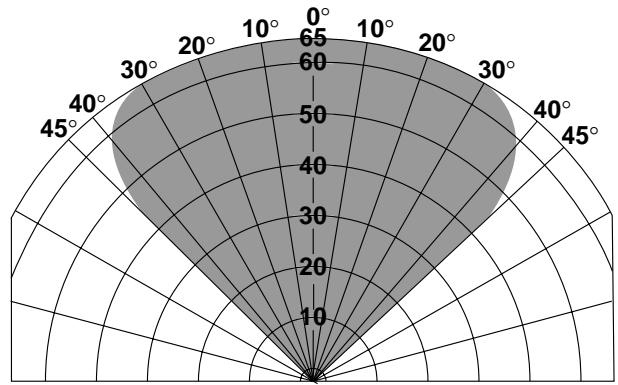


Figure A2—Horizontal Field of View at Indicated Distance in Feet for Methane at Medium Sensitivity

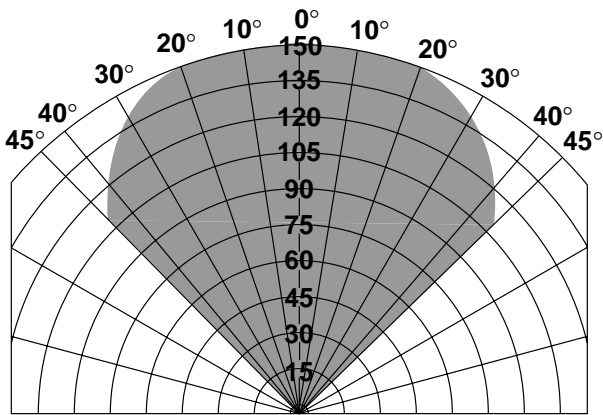


Figure A3—Horizontal Field of View at Indicated Distance in Feet for Methanol at Very High Sensitivity

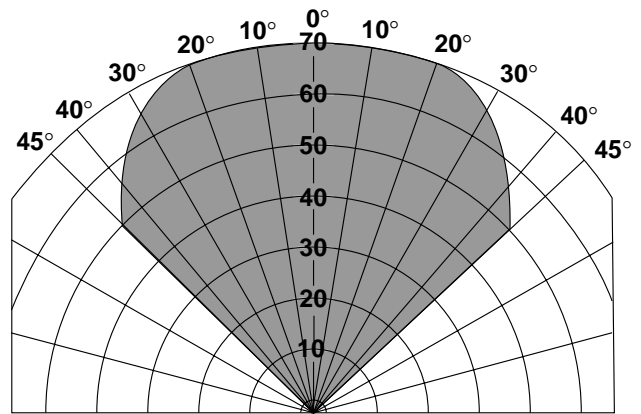


Figure A4—Horizontal Field of View at Indicated Distance in Feet for Methanol at Medium Sensitivity

NOTE

Factory Mutual Research minimum requirements are response distance measurements at 0° (on axis) and the limits of the field of view. 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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