

Instructions

Multispectrum IR Flame

Detector with Pulse Output

Model X3302



Table of Contents

DESCRIPTION	1	TROUBLESHOOTING	16
Outputs	2		
LED	2	MAINTENANCE	17
oi (Optical Integrity)	2	Cleaning Procedure	17
Communication	3	oi Reflector Plate Removal and Replacement	17
Data Logging	3	Periodic Checkout Procedure	18
Integral Wiring Compartment	3	Clock Battery	18
Detector Sensitivity Levels	3		
		FEATURES	18
GENERAL APPLICATION INFORMATION	4	SPECIFICATIONS	18
Response Characteristics	4		
Important Application Considerations	4	REPLACEMENT PARTS	20
		DEVICE REPAIR AND RETURN	20
IMPORTANT SAFETY NOTES	5	ORDERING INFORMATION	20
		Accessories	20
INSTALLATION	5	X3302 Model Matrix	21
Detector Positioning	5		
Detector Orientation	6	APPENDIX A – FM APPROVAL AND	
Protection Against Moisture Damage	6	PERFORMANCE REPORT	26
		APPENDIX B – CSA APPROVAL	34
STARTUP PROCEDURE	15	APPENDIX C – ATEX APPROVAL	35
Manual oi Test (Output to Controller)	15	APPENDIX D – IECEx APPROVAL	37
Count Test Mode (Output to Controller)	15	APPENDIX E – ADDITIONAL APPROVALS	38
Fire Alarm Test (Pulse Output to Fire Alarm Panel)	16	APPENDIX F - DECLARATION OF CONFORMITY	39

AUTOMATIC

**Multispectrum IR Flame Detector
with Pulse Output
Model X3302****IMPORTANT**

Be sure to read and understand the entire instruction manual before installing or operating the flame detection system. Any deviation from the recommendations in this manual may impair system performance and compromise safety.

ATTENTION

*The X3302 includes the Automatic **oi**[®] (Optical Integrity) feature — a calibrated performance test that is automatically performed once per minute to verify complete detector operation capabilities. **Testing with an external test lamp is not approved or required.***

**DESCRIPTION**

The X3302 brings state-of-the-art IR flame detection to the difficult task of detecting invisible hydrogen flames. Focusing on the water-band IR emissions of hydrogen and hydrocarbon flame, the X3302 overcomes the limited detection range and false alarm tendencies of other flame detectors by employing field proven multispectrum infrared (MIR) technology. The result is unsurpassed flame sensitivity and discrimination of nonflame sources in situations where existing multispectrum IR detectors are unsuitable.

Utilizing the X3301's multi-patented signal processing algorithms, the X3302 provides a breakthrough in flame detection of hazardous materials that produce mostly water vapor, and little or no Carbon Dioxide (CO₂) in the combustion process. The detection capability of the X3302 is double that of traditional UV and UVIR detectors. At the same time, it attains solar resistance and insensitivity to artificial lights, lightning, and "blackbody" radiation, which still plague other detection technologies.

The X3302 with pulse/relay output is designed for use in controller based systems. In addition to use in new systems, it can serve as a direct field replacement for Detector Electronics Corporation's (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 X3302 Flame Detector. In typical applications, the four wire X3302 can utilize all existing system wiring.

The detector has Division and Zone explosion-proof ratings and is suitable for use in indoor and outdoor applications.

A tri-color LED on the detector faceplate indicates normal condition and notifies personnel of fire alarm or fault conditions.

Microprocessor controlled heated optics increase resistance to moisture and ice.

The X3302 housing is available in copper-free aluminum or stainless steel, with Type 4X and IP66/IP67 rating.

OUTPUTS

Relays

The detector is furnished with fire and fault relays. The relays are rated 5 amperes at 30 Vdc.

The Fire Alarm relay has redundant terminals and normally open / normally closed contacts, normally de-energized operation, and latching or non-latching operation.

The Fault relay has redundant terminals and normally open contacts, normally energized operation, and latching or non-latching operation.

Latching relays can be reset by removing input power (0.1 second minimum).

An alarm condition will normally over-ride a fault condition, unless the nature of the fault condition impairs the ability of the detector to generate or maintain an alarm output, i.e. loss of operating power.

LED

A tri-color LED on the detector faceplate indicates normal condition and notifies personnel of fire alarm or fault conditions. Table 1 indicates the condition of the LED for each status.

Table 1—Detector Status Indicator

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

NOTE

See “Detector Sensitivity Levels” for additional information.

oi (OPTICAL INTEGRITY)

Automatic oi

The X3302 includes the Automatic **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. However, a successful Automatic **oi** test does not produce an alarm condition.

The X3302 signals a fault condition when less than half of the detection range remains. This is indicated by the Fault output and is evident by the yellow color of the LED on the face of the detector. The **oi** fault condition is self-clearing if the optical contamination is temporary. If the contamination is not automatically cleared and the **oi** fault remains, the detector may require cleaning or service. See the “Troubleshooting” section for further information.

Magnetic oi / Manual oi

CAUTION

These tests require disabling of all extinguishing devices to avoid release resulting from a successful test.

The detector also incorporates both Magnetic **oi** (Mag **oi**) and Manual **oi** (Man **oi**) test capabilities. These tests provide pulses (80 to 100 CPS) to the controller (R7404 or R7494) when the detector is not in fault. If the test is successful, the controller indicates a fire and the appropriate zone output is active.

NOTE

*If the detector is in a fault condition, a successful Mag **oi** or Man **oi** test cannot be performed.*

The Mag **oi** test is performed by placing a magnet at the location marked “MAG OI” on the outside of the detector (see Figure 2). This action causes the detector to immediately send pulses to the controller. Controller response is as follows:

- The Zone LED blinks.
- The digital display indicates which Zone is in alarm.
- The status indicator shows “6” (fire).

IMPORTANT

*Mag **oi** can be performed with the controller’s (R7404/R7494) keylock switch in either the NORMAL or TEST position. In NORMAL, the controller goes into alarm and activates its outputs. If no controller alarm output is desired, place the keylock switch in the TEST position before touching the magnet to the outside of the detector. Man **oi** operates only with the keylock switch in the TEST position.*

During the entire test, the detector gives no indication of alarm.

To reset the controller status and alarms, place the keylock switch in Reset. Return the keylock switch to Normal when testing is complete.

The Man **oi** test is nearly identical to the Mag **oi** test, except for the manner in which the test is initiated:

- Place the keylock switch on the controller (R7404/R7494) in the TEST position.
- Press the SELECT button to select the appropriate detector for test.
- Press the TEST/ACCEPT button to initiate the test.

Controller and detector responses are identical to the Mag **oi** test described above.

To reset the controller status and alarms, place the keylock switch in RESET. Return the keylock switch to NORMAL when testing is complete.

NOTE

*Refer to Appendix A for FM verification of the **oi** function.*

COMMUNICATION

The X3302 is furnished with an RS-485 interface for communicating status and other information with external devices. The RS-485 supports Modbus protocol, with the detector configured as a slave device.

DATA LOGGING

Data logging capability is also provided. Status conditions such as normal, power down, general and **oi** faults, fire alarm, time and temperature are recorded. Each event is time and date stamped, along with the temperature and input voltage. Event data is stored in non-volatile memory when the event becomes active, and again when the status changes. Data is accessible using the Inspector Connector accessory or RS-485.

INTEGRAL WIRING COMPARTMENT

All external wiring to the device is connected within the integral junction box. The detector is furnished with four conduit entries, with either 3/4 inch NPT or M25 threads.

DETECTOR SENSITIVITY LEVELS

There are four factory configured sensitivity levels available for the X3302 Flame Detector:

Very High, High, Medium, and Low.

The following criteria should be considered when choosing a sensitivity level for the intended application:

- Detector placement
- Speed of response based on fuel type and fire size (see Appendix A for response times)
- Distance between the hazard and the flame detector

Additional information on X3302 Flame Detector performance results and sensitivities can be found in Appendix A, the FM Approval and Performance Report.

SUSTAINED FIRE MODE

Sustained Fire Mode is an optional software configuration that provides an increased verification time to a sustained fire. The algorithm has been optimized to provide a longer processing time to fires while maintaining detection range. Consult the factory with any questions on how to choose the optimum sensitivity level for the intended application.

GENERAL APPLICATION INFORMATION

RESPONSE CHARACTERISTICS

Response is dependent on the detector's sensitivity setting, distance, type of fuel, temperature of the fuel, and 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 third-party approved fire test results. Additional fire test results are available from Det-Tronics.

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

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 X3302. Welding rods with clay binders do not burn and will not be detected by the X3302. 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 cause the X3302 to alarm.

Due to the possibility of an alarm condition, arc welding should not be performed within 40 feet (12.2 m) of the detector configured to very high sensitivity, within 35 feet (10.7 m) at high sensitivity, within 25 feet (7.6 m) at medium sensitivity, within 15 feet (4.6 m) at Low sensitivity.

Artificial Lighting

The X3302 should not be located within 2 feet (0.6 m) of artificial lights. Excess heating of the detector could occur due to heat radiating from the lights.

EMI/RFI Interference

The X3302 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 (0.3 m). Do not operate a walkie-talkie within 1 foot (0.3 m) of the X3302.

Carbon Containing Fires

The X3302 is a multiple spectrum IR device with detection limited to flames that produce water vapor as a by-product of combustion. These include hydrogen, ammonia, arsine, silane, and light hydrocarbons such as methane and methanol. Some lighter carbonaceous fuels may be detectable by the X3302, but heavier carbon containing substances that burn with a dark yellow-orange flame

and emit dense sooty smoke may not be sensed with this device. Other fuels that are not detectable include sulfur and burning metals. Fuels that contain a mixture of hydrocarbons and non-hydrocarbons may be detectable, please consult Det-Tronics for additional information on this subject.

Sunlight

Infrared based flame detectors that operate in the H2O emission band can become desensitized by modulated sunlight under certain conditions. If the location where the detector is to be installed may expose the detector to modulated sunlight, in order to optimize the detectors performance, Det-Tronics suggests fitting the X3302 with a Q2033A10R 10 degree FOV sight limiter / weather shield accessory. As an option, a sun shield may also be installed. See the Accessories section of this instruction manual for ordering information.

Background Infrared

Infrared (IR) energy is emitted from fire as well as non-fire sources. Because non-fire sources may in some cases emit IR energy in wavelengths that are monitored by the detector, special detector installation and configuration considerations need to be given in these situations.

The detector differentiates fire from non-fire sources by using algorithms that analyze the emission characteristics of the IR energy that is within its field of view (FOV). Typically, non-fire IR sources do not qualify these algorithms. However, if an object or person moves between the non-fire IR source and the detector the randomly modulated IR energy that is produced could mimic a fire signal.

In order to optimize the detector's false alarm rejection performance, it is preferred that the detectors FOV be controlled to the area that requires flame detection monitoring. Whenever possible, sources of intense IR emissions should be eliminated from the detector's FOV. Although elimination of all background IR sources may not be possible, controlling the detectors FOV through careful installation and aiming will help to optimize the detector's performance.

It is recommended that a flame detector that has an intense IR source within its FOV (e.g., turbine enclosure, fin-fan cooler) be inhibited prior to personnel working on or in close proximity to the detector. Consult the factory for software and hardware configurations that can help mitigate the effects of background IR sources.

IMPORTANT SAFETY NOTES

⚠ WARNING

Do not open the detector assembly in a hazardous area when power is applied. The detector contains limited serviceable components and should never be opened. Doing so could disturb critical optical alignment and calibration parameters, possibly causing serious damage.

⚠ 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 disabled prior to performing system tests or maintenance.

⚠ CAUTION

The multispectrum IR flame detectors are to be installed in places where the risk of mechanical damage is low.

ATTENTION

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

ATTENTION

Observe precautions for handling electrostatic sensitive devices.

INSTALLATION

NOTE

The recommended lubricant for threads and O-rings is a silicone free grease (p/n 005003-001) available from Det-Tronics. Under no circumstances should a lubricant containing silicone be used.

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.
- Be sure that the unit is easily accessible for cleaning and other periodic servicing.

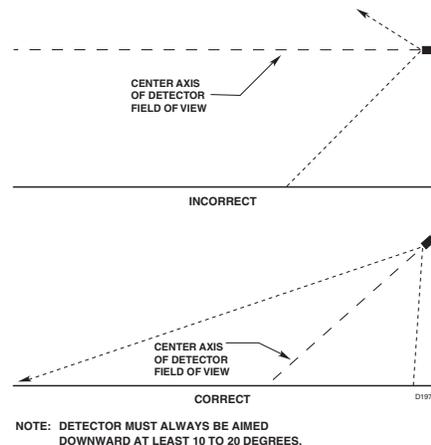


Figure 1—Detector Orientation Relative to Horizon

- Verify that all detectors in the system are properly located and positioned so that any fire hazards are within both the Field of View (FOV) and detection range of the detector. The Q1201C Laser Aimer is recommended for establishing the detector's FOV. Refer to High Resolution Field of View Diagrams for specific information regarding detector range and FOV.
- 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 FOV does not cover areas outside the area that requires flame detection monitoring** This will minimize the possibility of false alarms caused by activities outside the area requiring protection.
- The detector must 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. To ensure optimum performance, be certain that the internal optical heater is enabled on detectors that are used in applications where snow, ice, and/condensation are likely to occur.
- Although IR detectors are less affected by smoke than other detectors, the X3302 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 X3302. 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 can be conducted to verify correct detector positioning and coverage.
- For ATEX/IECEx installations, the X3302 Flame Detector housing must be electrically connected to earth ground.

DETECTOR ORIENTATION

Refer to Figure 2 and ensure that the **oi** reflector plate will be oriented as shown when the X3302 is installed and sighted. This will ensure proper operation of the **oi** system and will also minimize the accumulation of moisture and contaminants between the **oi** reflector plate and the viewing windows.

IMPORTANT

*If removed, the **oi** reflector plate must be securely tightened to ensure proper operation of the **oi** system (40 oz./inches [28.2 N·cm] recommended).*

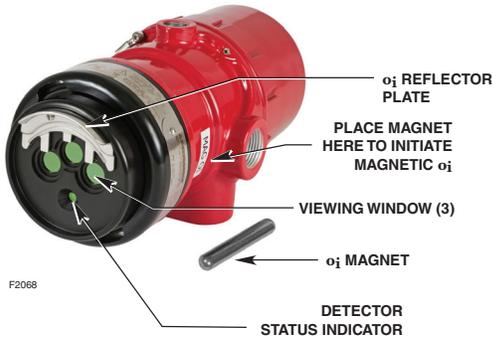


Figure 2—Front View of the X3302

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. Verify that all covers are securely tightened following installation.

If conduit is used, we recommend installing drains, according to local codes, at water collection points to automatically drain accumulated moisture. It is also recommended to install at least one breather, according to local codes, at upper locations to provide ventilation and allow water vapor to escape.

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.

Conduit seals are not required for compliance with explosion-proof installation requirements, but are highly recommended to prevent water ingress in outdoor applications. Units with M25 threads must use an IP66/

IP67 washer to prevent water ingress.

WIRING PROCEDURE

Wire Size and Type

The system should be wired according to local codes. The wire size selected should be based on the number of detectors connected, the supply voltage, and the cable length. Typically 16 AWG, 2.5 mm² shielded cable is recommended. Wires should be stripped 3/8 inch (9 mm). In some cases where the X3302 is replacing existing pulse output detectors, the wiring and power supplies may not be adequate. Consult the factory for assistance.

IMPORTANT

A minimum input voltage of 18 Vdc must be present at the X3302.

The use of shielded cable is required to protect against interference caused by EMI and RFI. When using cables with shields, terminate the shields as shown in Figures 6 through 10. 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 must not be used for wiring to other electrical equipment.

If disconnection of power is required, separate disconnect capability must be provided.

⚠ WARNING

All entries must contain appropriately rated plugs or fittings. It is required that each plug or fitting be wrench-tightened to an appropriate installation torque and meet the minimum thread engagement requirements per the applicable local standards, codes, and practices in order to retain the defined ratings. PTFE sealant or equivalent should be used on NPT threads.

IMPORTANT

Devices certified for hazardous locations shall be installed in accordance with EN/IEC 60079-14 and NEC 505.

⚠ CAUTION

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

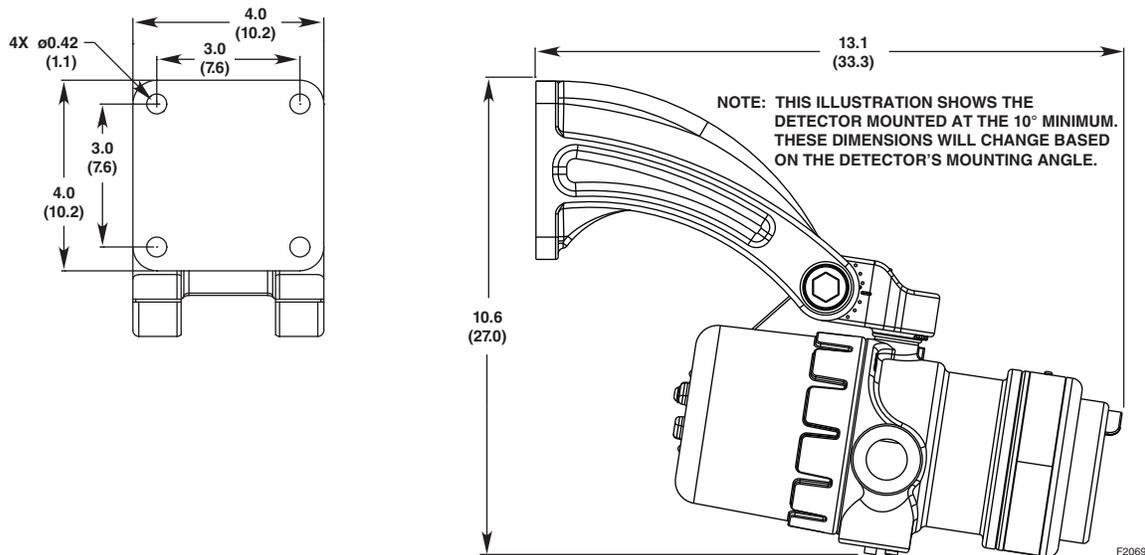


Figure 3—Q9033 Mounting Arm without Collar Attachment Dimensions in Inches (cm)
(See Figure 1 for Correct Detector Orientation.)

Detector Installation

Install the mounting arm assembly on a rigid surface. The ideal installation surface should be free of vibration and suitable to receive 3/8 inch or M10 bolts with a length of at least 1 inch (25 mm). The surface must also have sufficient capacity to hold the detector and mounting arm weights (see “Specifications” section). Refer to the Q9033 Mounting Arm and Collar Attachment manual (95-8686) for additional installation information. See Figure 3 for dimensions.

9		19	PULSE OUT	29	SPARE
8		18		28	SPARE
7	COM FIRE	17	COM FIRE	27	
6	NO FIRE	16	NO FIRE	26	
5	NC FIRE	15	NC FIRE	25	
4	COM FAULT	14	COM FAULT	24	RS485 A
3	NO FAULT	13	NO FAULT	23	RS485 B
2	+VIN	12	+VIN	22	MAN O ₁
1	-VIN	11	-VIN	21	-VIN

Figure 5—X3302 Pulse Wiring Terminal Identification



Figure 4—X3302 Terminal Block

Detector Wiring

IMPORTANT

If installing an X3302 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 X3302.

1. Make field connections following local ordinances and guidelines in this manual.

Figure 4 shows the wiring terminal strip located inside the detector’s integral junction box.

Figure 5 shows the wiring terminal identification for the X3302 Flame Detector with pulse output.

Leave the shield open at the detector end and

permanently isolate it from accidental contact with the case and/or other conductors. At the controller/ fire panel end, connect the shield and power minus (-) to chassis (earth) ground either directly or through a 0.47 µF 400 Volt non-polarized capacitor (not supplied). (Refer to Figures 6 through 10.)

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

IMPORTANT

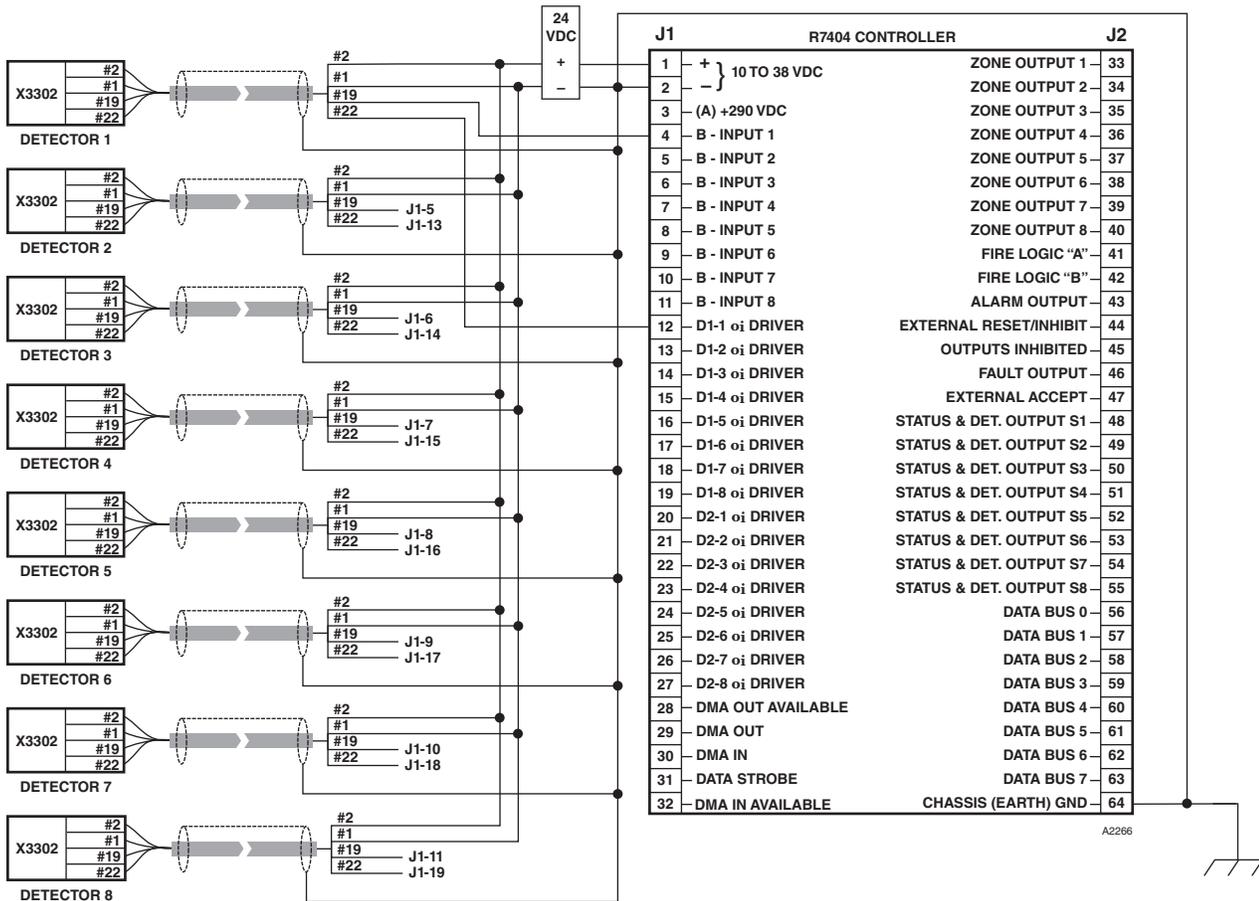
Do not test any wiring connected to the detector with a meg-ohmmeter. Disconnect wiring at the detector before checking system wiring for continuity.

Figures 11,12 and 13 provide examples of typical installations with a X3302 wired to a fire alarm panel.

3. Make the final sighting adjustments and use a 14 mm hex wrench to ensure that the mounting arm assembly is tight.

Figure 14 shows an EOL resistor installed within the integral wiring compartment of the detector (refer to "EOL, Fire and Fault Resistors" for details).

NOTE: DO NOT CONNECT THE X3302 "A" LEAD (#2/12) TO TERMINAL J1-3 (290 VDC).



TERMINAL IDENTIFICATION FOR X3302 WITH PULSE OUTPUT.

TERMINAL NO.	FUNCTION
1/11	DC- ("C" LEAD)
2/12	DC+ ("A" LEAD)
19	SIGNAL ("B" LEAD)
22	oi ("D" LEAD)

NOTE: IF THE POWER SUPPLY MINUS CANNOT BE CONNECTED TO CHASSIS (EARTH) GROUND, CONNECT A 0.47 µF 400 VDC NON-POLARIZED CAPACITOR BETWEEN J1-2 AND J2-64.

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

NOTE: DETECTOR/CONTROLLER CIRCUITS MEET CLASS B, STYLE 0.5 REQUIREMENTS (SIGNALLING LINES A AND C).

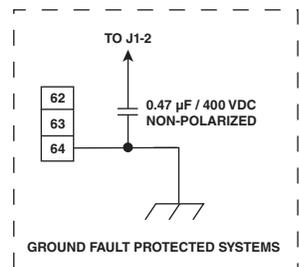
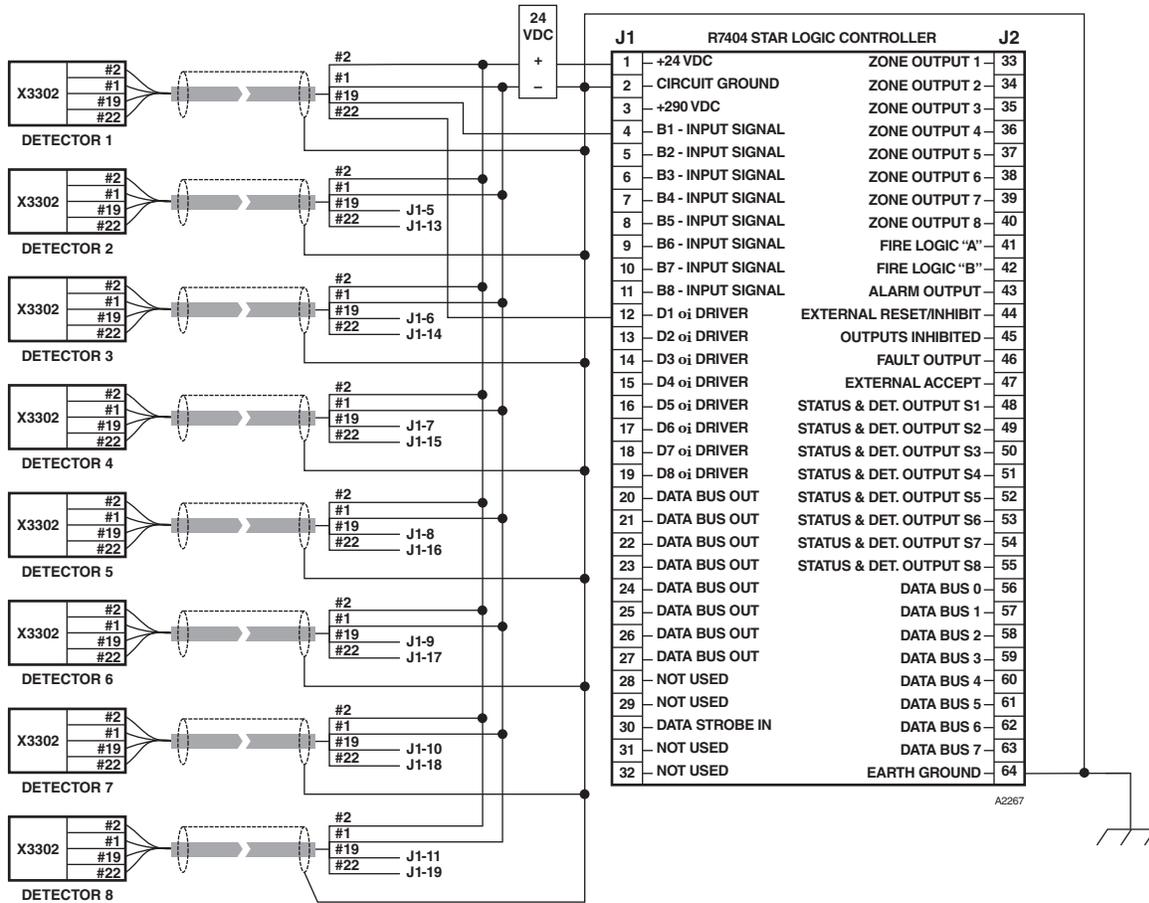


Figure 6—A Typical System, X3302 Detectors Wired to R7404 Controller

NOTE: DO NOT CONNECT THE X3302 "A" LEAD (#2/12) TO TERMINAL J1-3 (290 VDC).



TERMINAL IDENTIFICATION FOR X3302 WITH PULSE OUTPUT.

TERMINAL NO.	FUNCTION
1/11	DC- ("C" LEAD)
2/12	DC+ ("A" LEAD)
19	SIGNAL ("B" LEAD)
22	oi ("D" LEAD)

NOTE: IF THE POWER SUPPLY MINUS CANNOT BE CONNECTED TO CHASSIS (EARTH) GROUND, CONNECT A 0.47 µF 400 VDC NON-POLARIZED CAPACITOR BETWEEN J1-2 AND J2-64.

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

NOTE: DETECTOR/CONTROLLER CIRCUITS MEET CLASS B, STYLE 0.5 REQUIREMENTS (SIGNALING LINES A AND C).

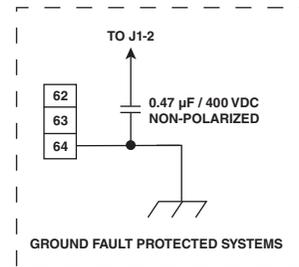
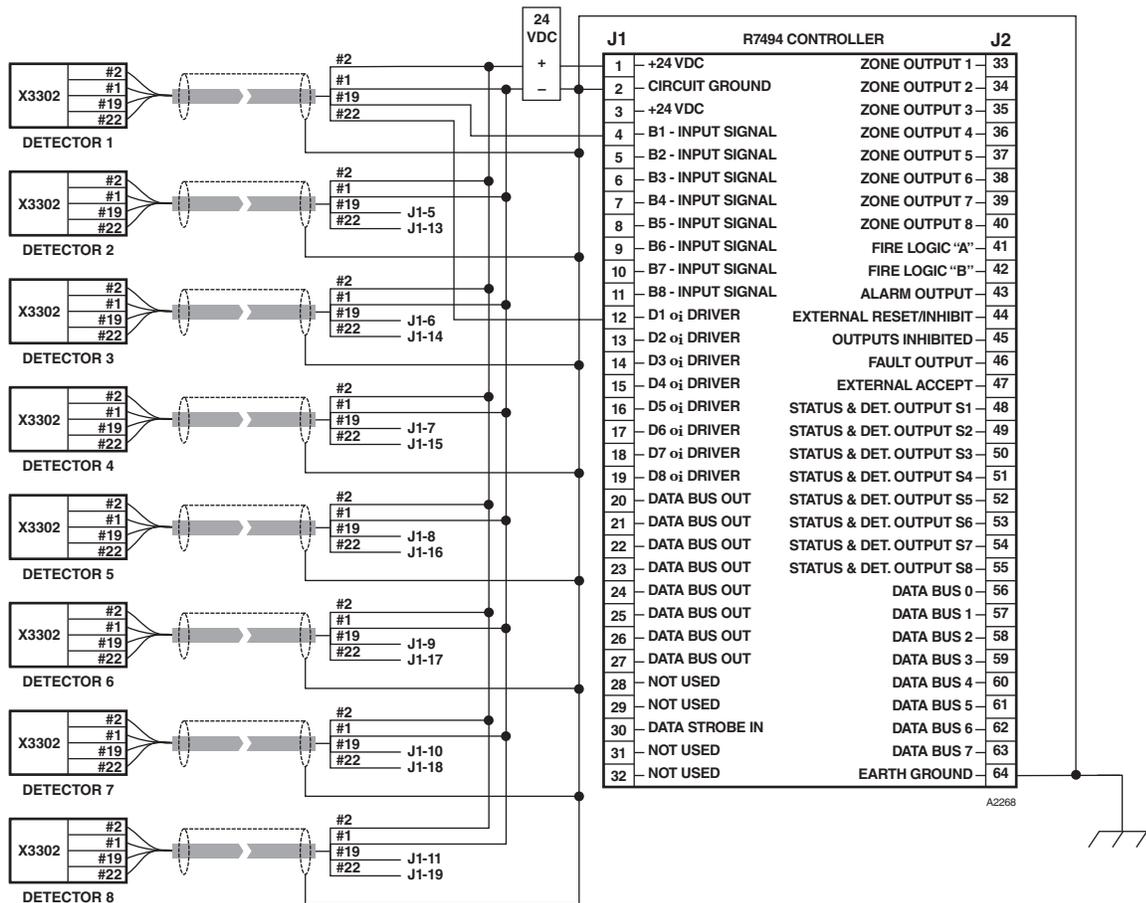


Figure 7—A Typical System, X3302 Detectors Wired to R7404 Star Logic Controller



TERMINAL IDENTIFICATION FOR X3302 WITH PULSE OUTPUT.

TERMINAL NO.	FUNCTION
1/11	DC- ("C" LEAD)
2/12	DC+ ("A" LEAD)
19	SIGNAL ("B" LEAD)
22	O _i ("D" LEAD)

NOTE: IF THE POWER SUPPLY MINUS CANNOT BE CONNECTED TO CHASSIS (EARTH) GROUND, CONNECT A 0.47 μF 400 VDC NON-POLARIZED CAPACITOR BETWEEN J1-2 AND J2-64.

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

NOTE: DETECTOR/CONTROLLER CIRCUITS MEET CLASS B, STYLE 0.5 REQUIREMENTS (SIGNALING LINES A AND C).

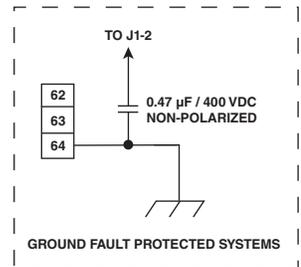
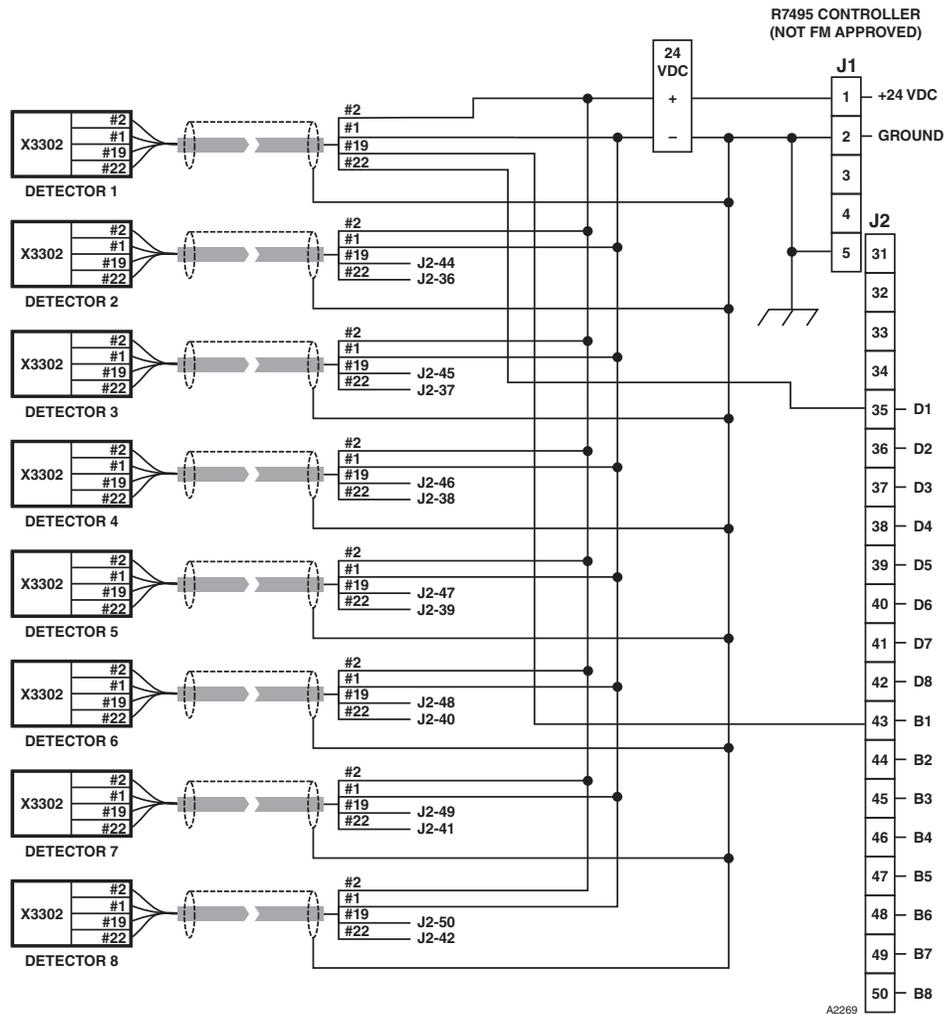


Figure 8—A Typical System, X3302 Detectors Wired to R7494 Controller



TERMINAL IDENTIFICATION FOR X3302
WITH PULSE OUTPUT.

TERMINAL NO.	FUNCTION
1/11	DC- ("C" LEAD)
2/12	DC+ ("A" LEAD)
19	SIGNAL ("B" LEAD)
22	O _i ("D" LEAD)

NOTE: IF THE POWER SUPPLY MINUS CANNOT BE CONNECTED TO CHASSIS (EARTH) GROUND, CONNECT A 0.47 μF 400 VDC NON-POLARIZED CAPACITOR BETWEEN J1-2 AND J1-5.

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

NOTE: DETECTOR/CONTROLLER CIRCUITS MEET CLASS B, STYLE 0.5 REQUIREMENTS (SIGNALING LINES A AND C).

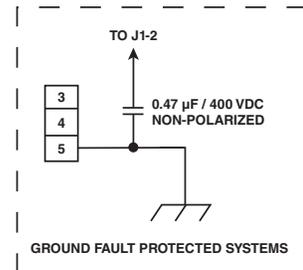
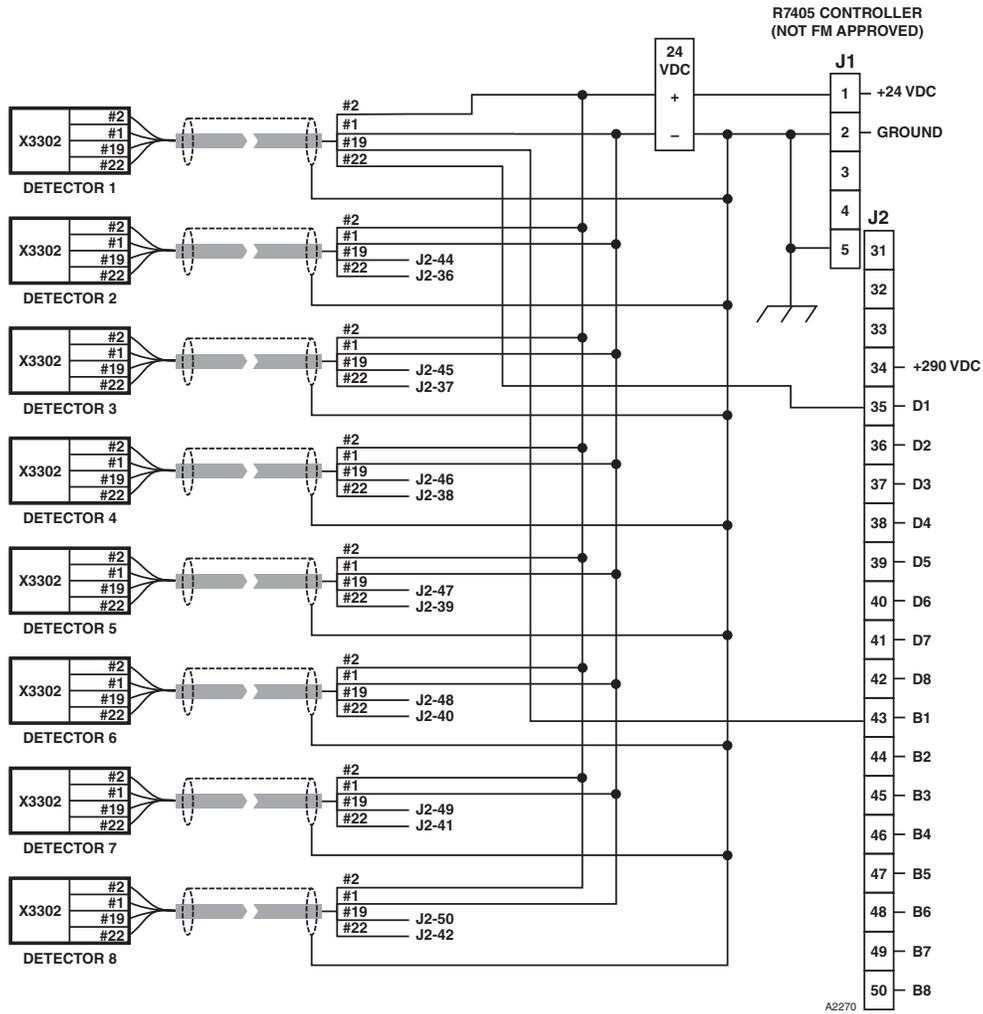


Figure 9—A Typical System, X3302 Detectors Wired to R7495 Controller

NOTE: DO NOT CONNECT THE X3302 "A" LEAD (#2/12) TO TERMINAL J2-34 (290 VDC).



A2270

TERMINAL IDENTIFICATION FOR X3302 WITH PULSE OUTPUT.

TERMINAL NO.	FUNCTION
1/11	DC- ("C" LEAD)
2/12	DC+ ("A" LEAD)
19	SIGNAL ("B" LEAD)
22	oi ("D" LEAD)

NOTE: IF THE POWER SUPPLY MINUS CANNOT BE CONNECTED TO CHASSIS (EARTH) GROUND, CONNECT A 0.47 μ F 400 VDC NON-POLARIZED CAPACITOR BETWEEN J1-2 AND J1-5.

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

NOTE: DETECTOR/CONTROLLER CIRCUITS MEET CLASS B, STYLE 0.5 REQUIREMENTS (SIGNALING LINES A AND C).

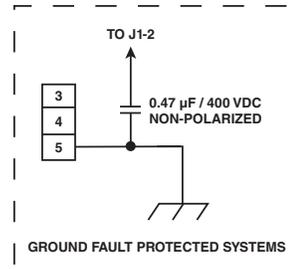
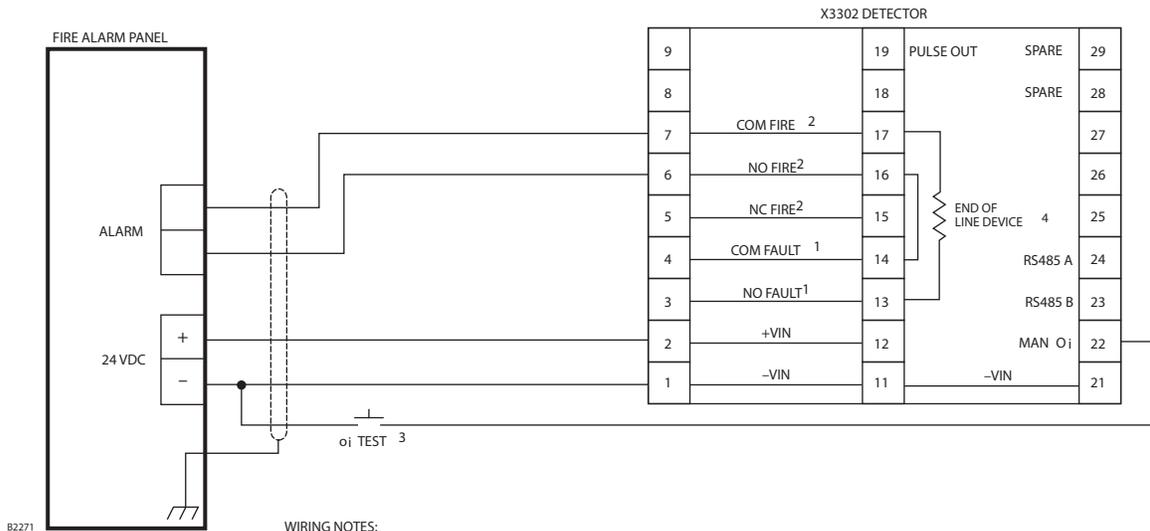


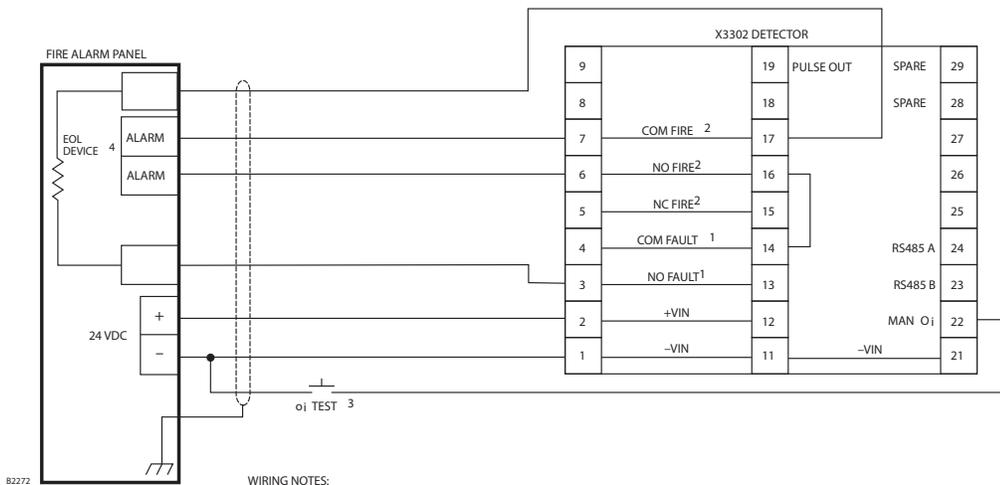
Figure 10—A Typical System, X3302 Detectors Wired to R7405 Controller



WIRING NOTES:

- 1 IN NORMAL OPERATION WITH NO FAULTS OCCURRING, THE FAULT RELAY COIL IS ENERGIZED AND THE CONTACTS ARE CLOSED.
- 2 ALARM RELAY IS 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 REFER TO SPECIFICATIONS SECTION FOR EOL RESISTOR VALUES. REFER TO EOL RESISTORS SECTION FOR INSTALLATION DETAILS.
- 5 PROPERLY CERTIFIED HAZARDOUS LOCATION METALLIC CABLE GLANDS OR STOP PLUGS ARE REQUIRED TO FILL CONDUIT ENTRIES.
- 6 SHIELD MUST BE CONNECTED TO THE METALLIC CABLE GLAND. MAKE CERTAIN THAT THE INSULATION IS REMOVED TO ENSURE ELECTRICAL CONNECTION BETWEEN THE SHIELD AND THE HOUSING.

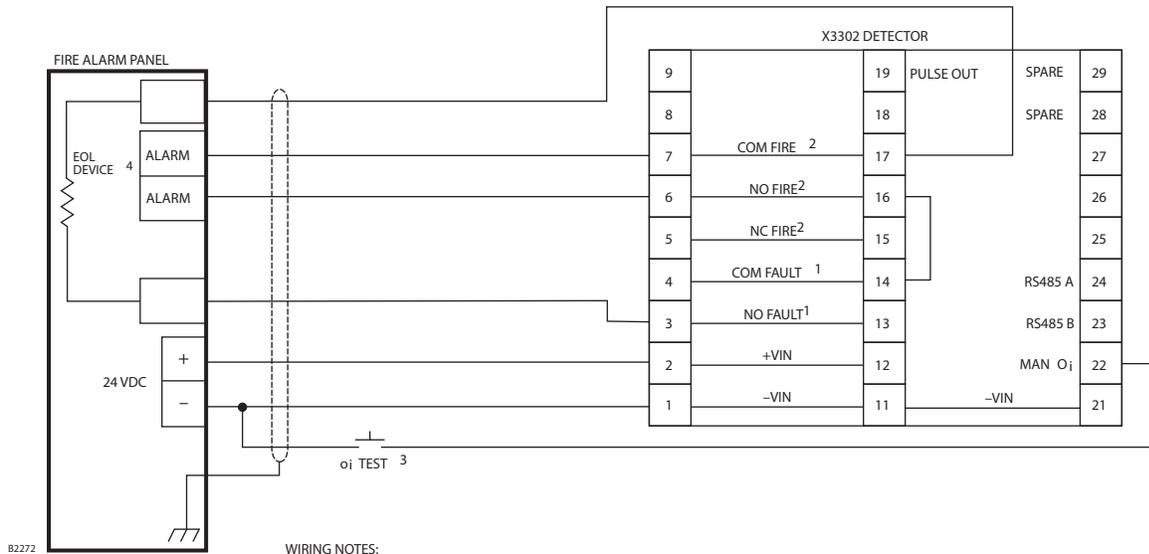
Figure 11—Ex d Wiring Option



WIRING NOTES:

- 1 IN NORMAL OPERATION WITH NO FAULTS OCCURRING, THE FAULT RELAY COIL IS ENERGIZED AND THE CONTACTS ARE CLOSED.
- 2 ALARM RELAY IS 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 EOL RESISTOR SUPPLIED BY PANEL.
- 5 PROPERLY CERTIFIED HAZARDOUS LOCATION METALLIC CABLE GLANDS OR STOP PLUGS ARE REQUIRED TO FILL CONDUIT ENTRIES.
- 6 SHIELD MUST BE CONNECTED TO THE METALLIC CABLE GLAND. MAKE CERTAIN THAT THE INSULATION IS REMOVED TO ENSURE ELECTRICAL CONNECTION BETWEEN THE SHIELD AND THE HOUSING.

Figure 12—Ex d Wiring Option with Fire and Fault Resistors



WIRING NOTES:

- 1 IN NORMAL OPERATION WITH NO FAULTS OCCURRING, THE FAULT RELAY COIL IS ENERGIZED AND THE CONTACTS ARE CLOSED.
- 2 ALARM RELAY IS 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 EOL RESISTOR SUPPLIED BY PANEL.
- 5 PROPERLY CERTIFIED HAZARDOUS LOCATION METALLIC CABLE GLANDS OR STOP PLUGS ARE REQUIRED TO FILL CONDUIT ENTRIES.
- 6 SHIELD MUST BE CONNECTED TO THE METALLIC CABLE GLAND. MAKE CERTAIN THAT THE INSULATION IS REMOVED TO ENSURE ELECTRICAL CONNECTION BETWEEN THE SHIELD AND THE HOUSING.

Figure 13—Ex e Wiring Option

EOL, Fire and Fault Resistors

To ensure that the insulating material of the wiring terminal block will not be affected by the heat generated by resistors, observe the following guidelines when installing the resistors.

1. Resistors must be rated appropriately for the application and have a maximum power dissipation of 5 watts.

NOTE

This applies to ATEX/IECEx installations only.

2. Resistor leads should be cut to a length of approximately 1 1/2 inches (40 mm).
3. Bend the leads and install the resistors as shown in Figure 14.

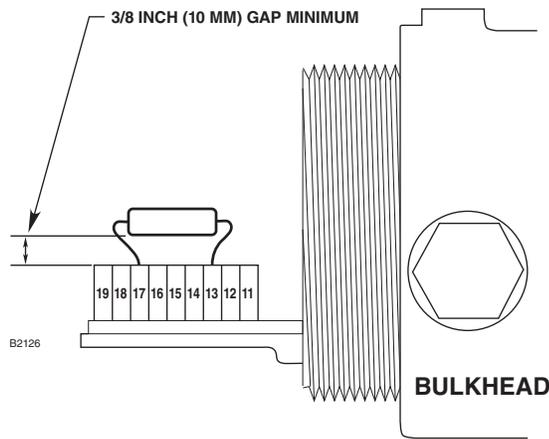


Figure 14—Resistor Installation (For Ex d Wiring Only)

4. Maintain a 3/8 inch (10 mm) minimum gap between the resistor body and the terminal block or any other neighboring parts.

NOTE

The resistors can only be used within the flameproof (Ex d) terminal compartment. Unused apertures shall be closed with suitable blanking elements.

STARTUP PROCEDURE

When installation of the equipment is complete, perform one or more of the following tests:

- **Manual Test** — Tests detector output and wiring, without generating a fire alarm.
- **Count Test Mode** — Measures actual detector output to controller (cps), without generating a fire alarm.
- **Fire Alarm Test** — For complete system test including detector relays. Generates fire alarm output.

MANUAL TEST (Output to Controller)

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. 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 the 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 (Output to Controller)

When in the Count Test mode, the frequency of the digital pulses from the detector is displayed on the ZONE and DETECTOR indicators on the controller faceplate. The Count Test mode may be used to check 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 on the ZONE indicator on the controller front panel.

4. Press and hold the TEST button. 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 80 to 110 cps. For a live fire test, 270 - 330 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.

FIRE ALARM TEST (Pulse Output to Fire Alarm Panel)

1. Disable any extinguishing equipment that is connected to the system.
2. Apply input power to the system.
3. Initiate a live fire test or a Mag oi test (see “Magnetic oi / Manual oi” under “Optical Integrity” in the Description section of this manual).
4. Repeat this test for all detectors in the system. If a unit fails the test, refer to the “Troubleshooting” section.
5. Verify that all detectors in the system are properly aimed at the area to be protected. (The Q1201C Laser Aimer is recommended for this purpose.)
6. Enable extinguishing equipment when the test is complete.

TROUBLESHOOTING

WARNING

The sensor module (“front” half of the detector) contains no user serviceable components and should never be tampered with.

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 windows.)
3. Check input power to the unit.
4. Check system and detector logs.
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 reflector 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.
7. Remove the factory supplied cover or aluminum foil from the detector and verify the detector has returned to normal operation before enabling any extinguishing equipment connected to the unit.

If none of these actions corrects the problem, please contact your local Det-Tronics Representative or alternatively you may contact Det-Tronics Technical Support by Calling 1-800-765-3473 to obtain assistance.

NOTE

It is highly recommended that a complete spare be kept on hand for field replacement to ensure continuous protection.

NOTE

For additional troubleshooting guides, refer to the ENhanced Flame Inspector instruction manual (95-8751).

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

To avoid a potential electrostatic discharge (ESD), the painted surface of the detector should only be cleaned with a damp cloth.

⚠ WARNING

The sensor module (“front” half of the detector) contains no user serviceable components and should never be tampered with.

To maintain maximum sensitivity and false alarm resistance, the viewing windows of the X3302 must be kept relatively clean. Refer to the following procedure for cleaning instructions.

CLEANING PROCEDURE

⚠ CAUTION

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

To clean the windows and **oi** reflector plate, use the window cleaner (p/n 001680-001) and a soft cloth, cotton swab, or tissue and refer to the following procedure.

1. **Disable any extinguishing equipment that is connected to the unit.**
2. Since the X3302 is less affected by contamination than other detectors, removal of the **oi** reflector 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** reflector plate using the **oi** reflector plate Removal and Replacement procedure.
3. In all environments, clean all three viewing windows and reflector surfaces thoroughly. Use a cotton swab and the Det-Tronics window cleaning solution. Use Isopropyl alcohol for contaminations that the Det-Tronics window cleaning solution can not remove.

IMPORTANT

When used in extreme environments, the reflective surface of the detector **oi** reflector plate may eventually deteriorate, resulting in reoccurring **oi**

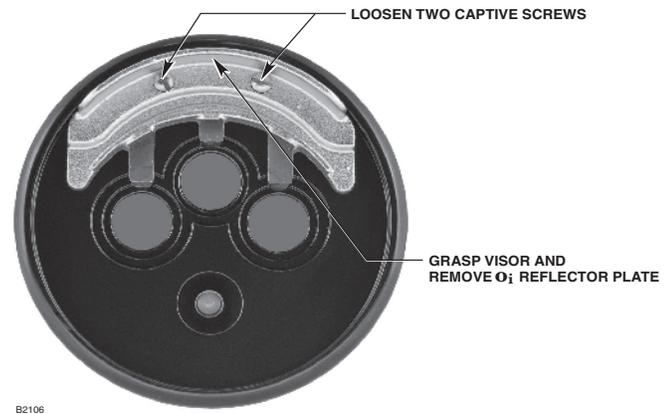


Figure 15—**oi** Reflector Plate Removal

faults and the need for **oi** reflector plate replacement.

OI REFLECTOR PLATE REMOVAL AND REPLACEMENT

1. **Disable any extinguishing equipment that is connected to the unit.**
2. Loosen the two captive screws, then grasp the **oi** reflector plate by the visor and remove it from the detector. See Figure 15.
3. Install the new (or cleaned) **oi** reflector plate.

NOTE

When installing the stainless steel reflector plate, ensure that the gasket is present and correctly seated to prevent moisture or contaminants from penetrating behind the reflector plate. To ensure even seating, tighten both screws equally.

4. Recalibrate the detector's **oi** system. Refer to the Enhanced Flame Inspector instruction manual, number 95-8751, for instructions regarding **oi** reflector plate replacement and **oi** system recalibration.

⚠ IMPORTANT

If the **oi** reflector plate is replaced, you must recalibrate the **oi** system.

Recalibration of the **oi** system requires the use of the Inspector Connector Cable and Inspector Monitor Software. These two items are included in the **oi** replacement kit, or they can be purchased separately. See Ordering Information for details. The **oi** system may also be recalibrated using Modbus on models that are so equipped.

X3302 Reflector Plates

X3302 models are supplied with either a black or a stainless steel reflector plate. These plates are **not** interchangeable. Order the replacement that matches the reflector plate on your X3302 detector.

PERIODIC CHECKOUT PROCEDURE

A checkout of the system using the Man **oi** or Mag **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," "Count Test Mode" or "Fire Alarm Test" as described in the "Startup Procedure" section of this manual.

CLOCK BATTERY

The real time clock has a backup battery that will operate the clock with no external power. Return the device to the factory for battery replacement if needed.

NOTE

If the backup battery is depleted, there is no effect on the operation of the flame detector, but the time stamping of the data log may be affected.

FEATURES

- Unequaled false alarm rejection
- Responds to a fire in the presence of modulated blackbody radiation (i.e. heaters, ovens, turbines) without false alarm
- Pulse output for compatibility with controller based systems
- Microprocessor controlled heated optics for increased resistance to moisture and ice
- Automatic, manual or magnetic **oi** testing
- Easily replaceable **oi** reflector plate
- Fire and fault relays
- Sustained Fire Mode (optional)
- Multiple sensitivity levels
- A tri-color LED on the detector faceplate indicates normal condition and notifies personnel of fire alarm or fault conditions
- Operates under adverse weather conditions and in dirty environments
- Mounting arm allows easy sighting
- Integral wiring compartment for ease of installation.
- Explosion-proof/flame-proof detector housing. Meets FM, CSA, ATEX Directive , and IECEx certification requirements

- Class A wiring per NFPA-72 (Pulse output version is equivalent to class A when detectors are installed in a redundant configuration)
- 5 year warranty
- RFI and EMC Directive Compliant

SPECIFICATIONS

OPERATING VOLTAGE—

24 volts dc nominal (18 Vdc minimum, 30 Vdc maximum).
Maximum ripple is 2 volts peak-to-peak.



For CSA compliance, the power source must utilize a SELV (Safety Extra Low Voltage) or Class 2 style power supply.

POWER CONSUMPTION—

Without heater: 4 watts at 24 Vdc nominal;
4.6 watts at 24 Vdc in alarm.
4.5 watts at 30 Vdc nominal;
5.9 watts at 30 Vdc in alarm.

Heater only: 8 watts maximum.

Total Power: 17 watts at 30 Vdc with EOL resistor installed and heater on 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 has redundant terminals and normally open / normally closed contacts, normally de-energized operation, and latching or non-latching operation.

Fault relay, Form A, 5 amperes at 30 Vdc:

The Fault relay has redundant terminals and normally open contacts, normally energized operation, and latching or non-latching operation.

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.

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 perfect cone of vision (full coverage at maximum detection distance, both on and off axis) for hydrogen and methanol flame detection.

Refer to Appendix A for FM Approved cone of vision data.

RESPONSE TIME—

Typical response times are under 10 seconds.

ENCLOSURE MATERIAL—

Copper-free aluminum (painted) or Stainless Steel (316/CF8M Cast).

VIBRATION—

Conformance per FM 3260: 2000, MIL-STD 810C (Curve AW).

DIMENSIONS—

See Figure 16.

WIRING—

Field wiring screw terminals are UL/CSA rated for up to 14 AWG wire, and are DIN/VDE rated for 2.5 mm² wire. Screw terminal required torque range is 3.5–4.4 in.-lbs. (0.4-0.5 N·m).

Important: 18 Vdc minimum must be available at the detector. For ambient temperatures below -10°C (14°F) and above +60°C (140°F) use field wiring suitable for both minimum and maximum ambient temperature.

THREAD SIZE—

Conduit connection: Four entries, 3/4 inch NPT or M25.
Conduit seal not required.

SHIPPING WEIGHT (Approximate)—

Aluminum: 7 pounds (3.2 kilograms).
Stainless Steel: 13.8 pounds (6.3 kilograms).
Mounting Arm (AL): 6 pounds (2.75 kilograms).
Mounting Arm (SS): 14 pounds (6.4 kilograms).

WARRANTY PERIOD—

5 years.

CERTIFICATION—



For complete approval details, refer to the appropriate Appendix:

- Appendix A - FM
- Appendix B - CSA
- Appendix C - ATEX
- Appendix D - IECEx
- Appendix E - Additional approvals
- Appendix F - Declaration of Conformity

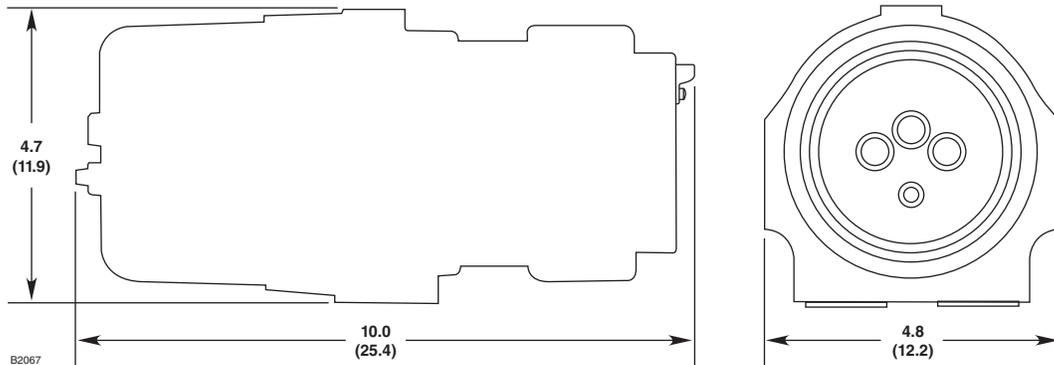


Figure 16—X3302 Dimensions in Inches (cm)

REPLACEMENT PARTS

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.

REPLACEMENT PARTS

Part Number	Description
009208-003	oi Replacement kit for X3302 (5 Black Reflector Plates) with Inspector Connector and Monitor
010831-002	oi Replacement kit for X3302 (5 Stainless Steel Reflector Plates) with Inspector Connector and Monitor
007307-003	Replacement oi Reflector Plate for X3302 with Black plate (requires Inspector Connector to calibrate)
010830-002	Replacement oi Reflector Plate for X3302 with Stainless Steel plate (requires Inspector Connector to calibrate)

NOTE: Refer to Instruction Manual 95-8530 to determine the correct Replacement oi Reflector Plate.

DEVICE REPAIR AND RETURN

Prior to returning devices, contact the nearest local Detector Electronics office so that a Return Material Identification (RMI) number can be assigned. **A written statement describing the malfunction must accompany the returned device or component to assist and expedite finding the root cause of the failure.**

Pack the unit properly. Always use sufficient packing material. Where applicable, use an antistatic bag as protection from electrostatic discharge.

NOTE

Det-Tronics reserves the right to apply a service charge for repairing returned product damaged as a result of improper packaging.

Return all equipment transportation prepaid to the factory in Minneapolis.

NOTE

It is highly recommended that a complete spare be kept on hand for field replacement to ensure continuous protection.

ORDERING INFORMATION

When ordering, please specify:

X3302 Multispectrum IR Flame Detector with Pulse Output
Refer to the X3302 Model Matrix for details

Q9033 Mounting Arm is required:

- Q9033A for aluminum detectors only
- Q9033B for aluminum and stainless steel detectors

ACCESSORIES

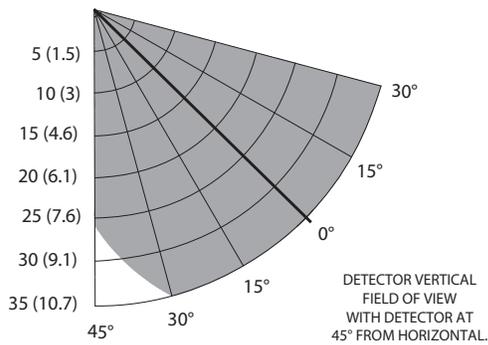
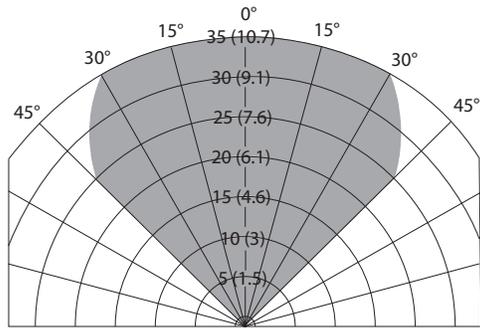
Part Number	Description
000511-029	Converter RS485 to RS232
103881-001	Converter RS485 to USB
007819-001	W6300B1002 Serial Inspector Connector (Inspector Monitor software included)
007819-002	W6300B1003 USB Inspector Connector (Inspector Monitor software included)
009207-001	Flame Inspector Monitor CD
103922-001	Model 475 HART Communicator
102740-002	Magnet
008082-001	Magnet and Adapter for Extension Pole
007739-001	Magnet and Extension Pole
007240-001	Q1116A1001, Air Shield (AL)
007818-001	Q1118A1001 Aluminum Air Shield/Flange Mount (AL)
007818-002	Q1118S1001 Stainless Steel Air Shield/Flange Mount (SS)
009177-001	Q1120A1001 Paint Shield mounting ring (AL)
010857-001	Q1130A1001 Flange Mount Assembly
006097-001	Q1201 Laser
102871-001	Laser Battery, 3V Lithium (laser)
007255-001	Q1201C1001 X-Series Laser Holder (AL/Plastic)
007338-001	Q2000A1001 X-Series Weather Shield (AL)
007338-010	Q2033A10R X3301/X3302 FOV Limiter 10° (AL)
007338-020	Q2033A20R X3301/X3302 FOV Limiter 20° (AL)
007338-030	Q2033A30R X3301/X3302 FOV Limiter 30° (AL)
007912-010	Spare Restrictor Plate 10° (AL)
007912-020	Spare Restrictor Plate 20° (AL)
007912-030	Spare Restrictor Plate 30° (AL)
000003-067	Stainless Steel Sun Shade
000609-026	4-Inch Pipe Mount Bracket and U-Bolt Kit
000609-035	2-Inch U-Bolt Kit
007290-001	Q9033B Stainless Steel Mounting Arm Assembly is for aluminum and stainless steel detectors
007290-002	Q9033A Aluminum Mounting Arm Assembly is for aluminum detectors only
011385-001	Q9033 Collar Attachment
101197-001	Stop Plug, 3/4" NPT, AL
101197-004	Stop Plug, 3/4" NPT, SS
101197-005	Stop Plug, M25, AL, IP66
101197-003	Stop Plug, M25, SS, IP66
010816-001	Stop Plug, 20 Pack, 3/4"NPT, AL
010817-001	Stop Plug, 20 Pack, 3/4"NPT, SS
010818-001	Stop Plug, 20 Pack, M25, AL, IP66
010819-001	Stop Plug, 20 Pack, M25, SS, IP66
103363-001	14 mm Hex Wrench (Steel)
103406-001	Screwdriver
107427-040	O-ring - Rear Cover (Viton) - black or brown
005003-001	1 oz grease for detectors (silicone-free)
104346-154	O-ring - Rear Cover (Fluorosilicone) - blue
012549-001	1 oz PTFE silicone-free lubricant
005003-001	1 oz grease for detectors (silicone-free)
001680-001	Window cleaner (6 pack)
012549-001	1 oz PTFE silicone-free lubricant

X3302 MODEL MATRIX

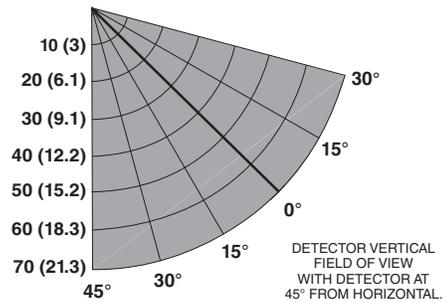
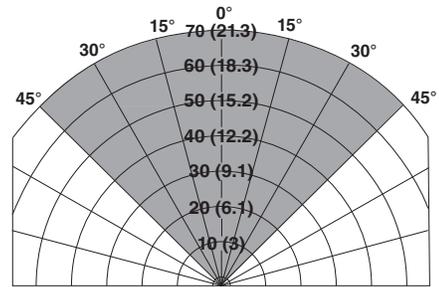
MODEL	DESCRIPTION	
X3302	Multispectrum IR Flame Detector	
	TYPE	MATERIAL
	A	Aluminum (AL)
	S	Stainless Steel (SS)
	TYPE	THREAD TYPE
	4M	4 Port, Metric M25
	4N	4 Port, 3/4" NPT
	TYPE	OUTPUTS
	15	Relay and Pulse
	TYPE	APPROVALS
	B	INMETRO (Brazil)
	W	FM/CSA/ATEX/IECEX
	TYPE	CLASSIFICATION
	1	Division/Zone Ex d e
	2	Division/Zone Ex d

HIGH RESOLUTION FIELD OF VIEW

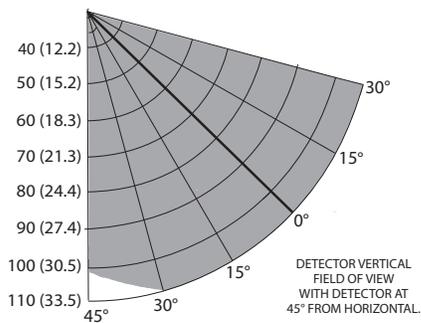
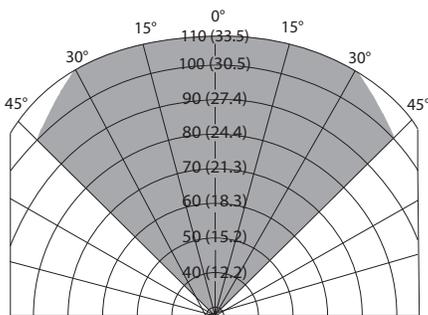
The following high resolution field of view diagrams depict the detectors horizontal and vertical response to various fires. Note that the response distance indicated in each diagram differs between fuel type, fire size, and the sensitivity configuration of the flame detector.



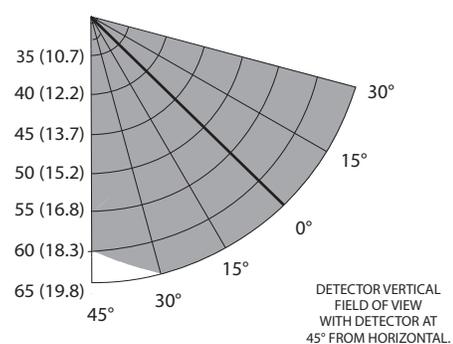
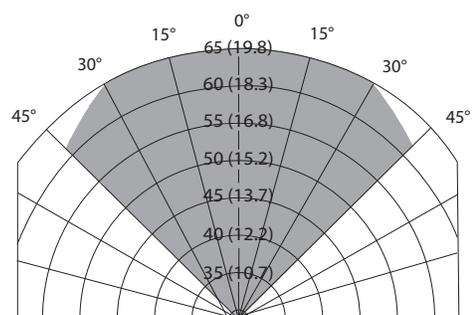
Field of View at Indicated Distance in Feet (m) for **Hydrogen** at **Very High Sensitivity** (30 inch plume, with 100 SLPM flow rate)



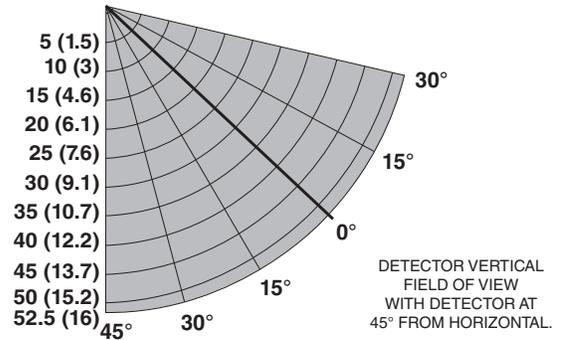
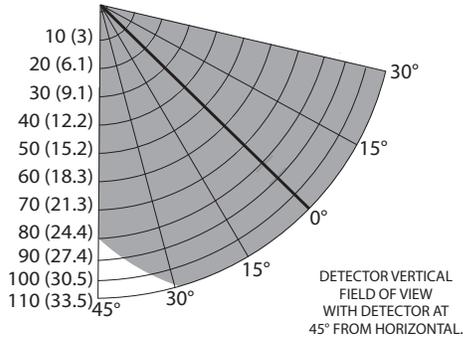
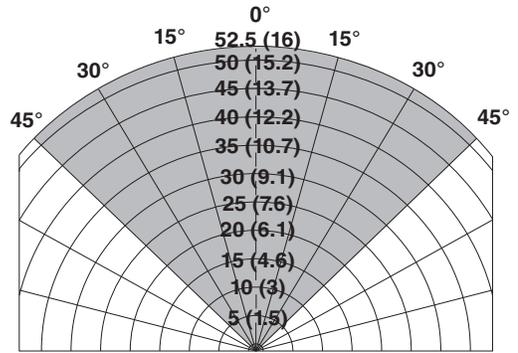
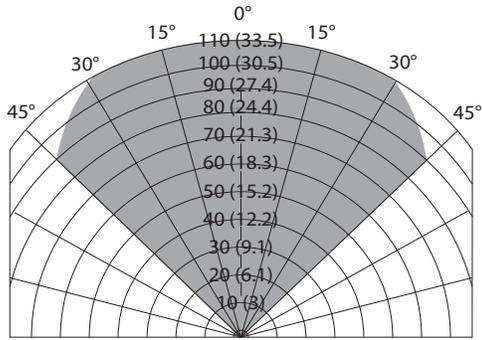
Field of View at Indicated Distance in Feet (m) for **Methanol** at **Very High Sensitivity** (1 x 1 ft)



Field of View at Indicated Distance in Feet (m) for **Syngas** at **Very High Sensitivity** (30 inch plume, with 120 SLPM flow rate)

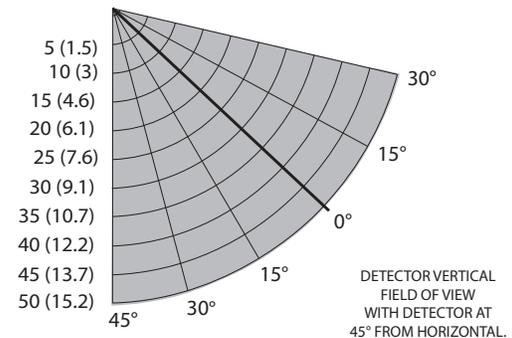
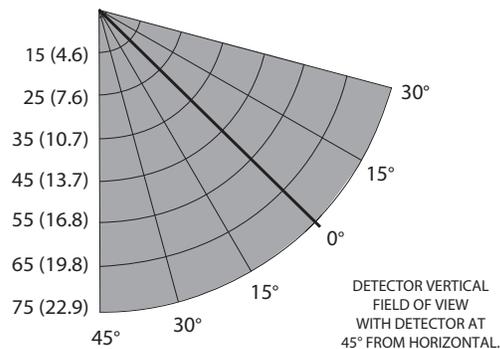
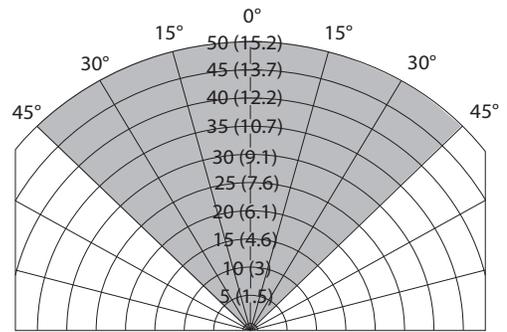
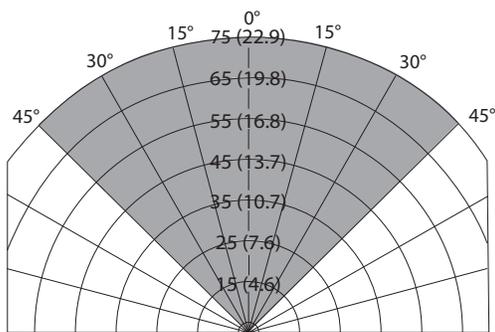


Field of View at Indicated Distance in Feet (m) for **Methane** at **Very High Sensitivity** (30 inch plume, with 40 SLPM flow rate)



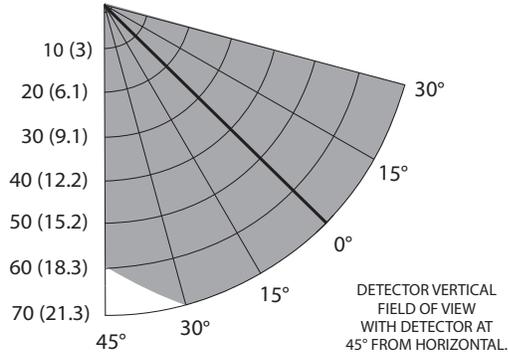
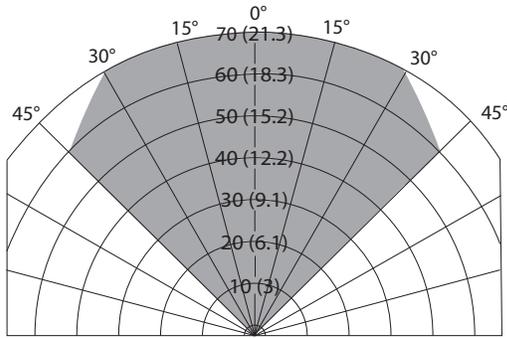
Field of View at Indicated Distance in Feet (m) for **Hydrogen** at **High Sensitivity** (30 inch plume, with 100 SLPM flow rate)

Field of View at Indicated Distance in Feet (m) for **Methanol** at **High Sensitivity** (1 x 1 ft)

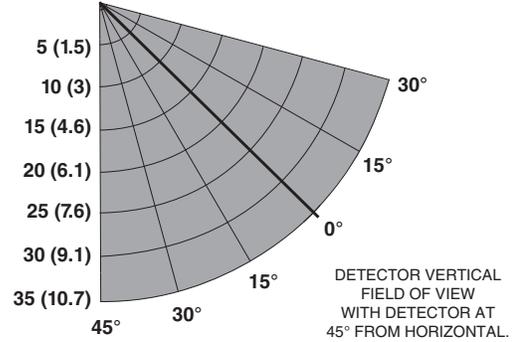
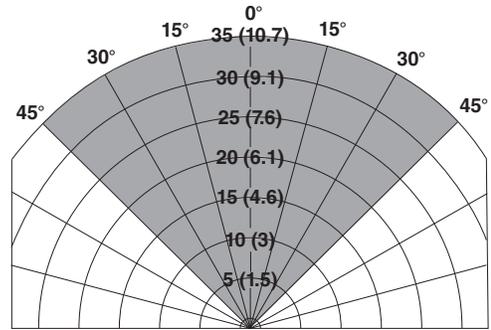


Field of View at Indicated Distance in Feet (m) for **Syngas** at **High Sensitivity** (30 inch plume, with 120 SLPM flow rate)

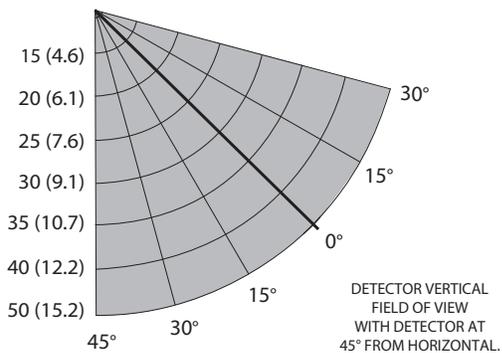
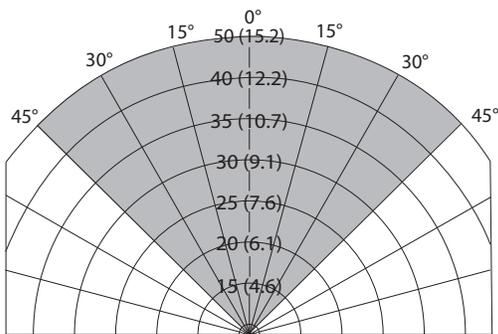
Field of View at Indicated Distance in Feet (m) for **Methane** at **High Sensitivity** (30 inch plume, with 40 SLPM flow rate)



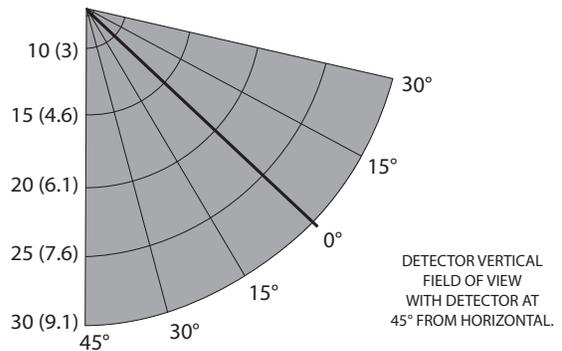
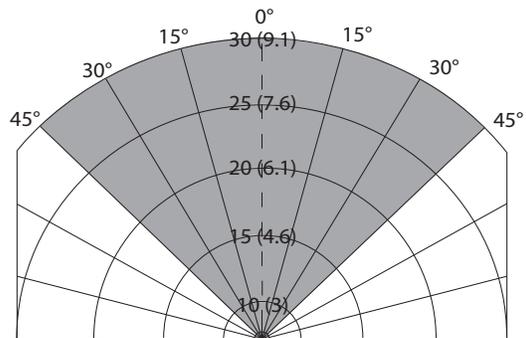
Field of View at Indicated Distance in Feet (m) for **Hydrogen** at **Medium Sensitivity** (30 inch plume, with 100 SLPM flow rate)



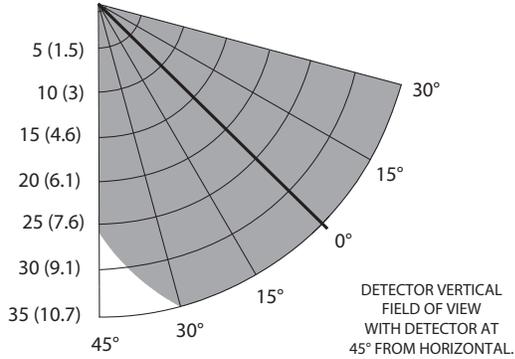
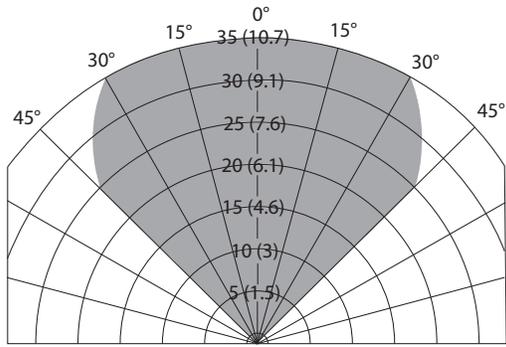
Field of View at Indicated Distance in Feet (m) for **Methanol** at **Medium Sensitivity** (1 x 1 ft)



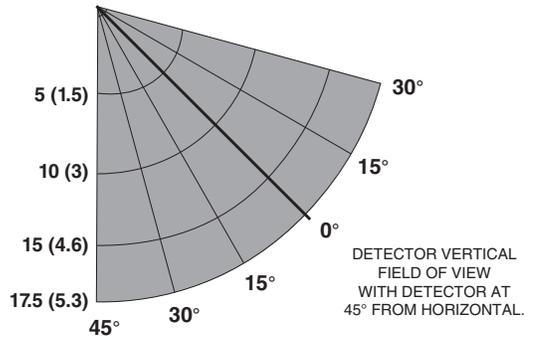
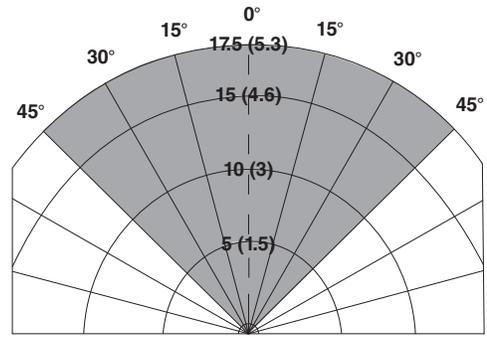
Field of View at Indicated Distance in Feet (m) for **Syngas** at **Medium Sensitivity** (30 inch plume, with 120 SLPM flow rate)



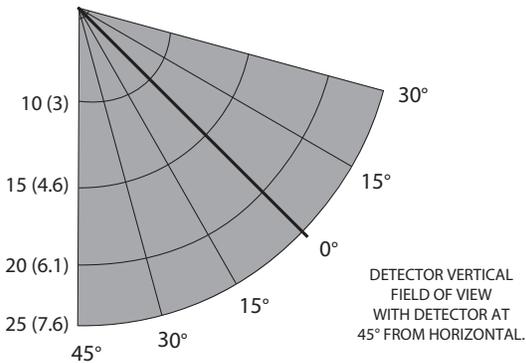
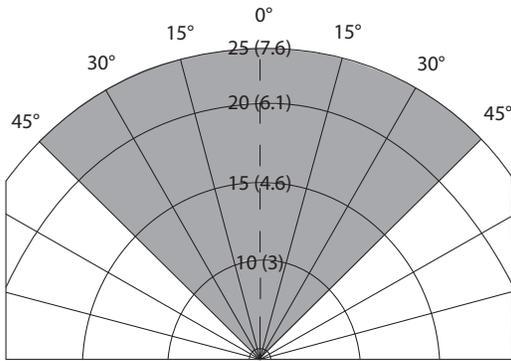
Field of View at Indicated Distance in Feet (m) for **Methane** at **Medium Sensitivity** (30 inch plume, with 40 SLPM flow rate)



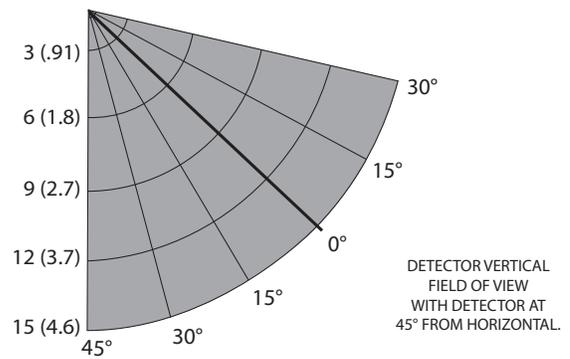
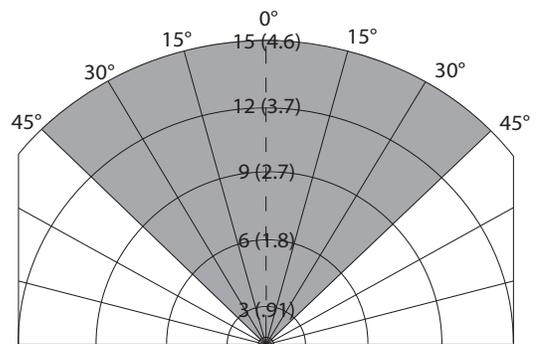
Field of View at Indicated Distance in Feet for **Hydrogen** at **Low Sensitivity** (30 inch plume, with 100 SLPM flow rate)



Field of View at Indicated Distance in Feet for **Methanol** at **Low Sensitivity** (1 x 1 ft)



Field of View at Indicated Distance in Feet (m) for **Syngas** at **Low Sensitivity** (30 inch plume, with 120 SLPM flow rate)



Field of View at Indicated Distance in Feet (m) for **Methane** at **Low Sensitivity** (30 inch plume, with 40 SLPM flow rate)

APPENDIX A

FM APPROVAL AND PERFORMANCE REPORT

THE FOLLOWING ITEMS, FUNCTIONS AND OPTIONS DESCRIBE THE FM 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.
- Nonincendive for Class I, Div. 2, Groups A, B, C and D (T3C) Hazardous (Classified) Locations per FM 3611.
- Nonincendive for Class II, 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 (2018).

Flameproof per ANSI/ISA 60079-0, -1, -7, -31

Class I, ZONE 1, AEx db eb IIC T6...T5
T6 (Tamb -40°C to +60°C)
T5 (Tamb -40°C to +75°C)
ZONE 21, AEx tb IIIC T130°C
Tamb -40°C to +75°C
IP66

Class I, ZONE 1, AEx db IIC T6...T5
T6 (Tamb -40°C to +60°C)
T5 (Tamb -40°C to +75°C)
IP66/IP67

The following accessories are FM approved for use with the X3302 Flame Detector:

Part Number	Description
102740-002	Magnet
007739-001	Magnet and Extension Pole
010857-001	Q1130A1001 Flange Mount Assembly
007290-001	Q9033B Stainless Steel Mounting Arm Assembly is for aluminum and stainless steel detectors
007290-002	Q9033A Aluminum Mounting Arm Assembly is for aluminum detectors only
011385-001	Q9033 Collar Attachment

Special conditions for safe use:

- The front window assembly contains a special cemented joint construction. In accordance with ANSI/ISA 60079-1 clause 5.1.c, all inspections, repair and/or adjustments to this front window assembly shall be done by Detector Electronics Corporation only.
- The EOL resistor can only be used within the flameproof terminal compartment.
- EOL resistors must be ceramic, wirewound type, rated 5 watts minimum, with actual power dissipation not to exceed 2.5 watts.
- The Multispectrum infrared (IR) flame detector type X3302 is to be installed in places where there is a low risk of mechanical damage.
- See the "Maintenance" section of this manual for guidance on minimizing the risk from electrostatic discharge.
- Flameproof joints are not intended to be repaired. See the "Device Repair and Return" section of this manual for more information on conducting repairs.

FM Approval and Performance Report – Continued

The following performance criteria were verified:

AUTOMATIC OPTICAL INTEGRITY TEST:

The detector generated an optical fault in the presence of contamination on any single or combination of lens surfaces resulting in a loss of approximately 50% of its detection range, verifying that the detector performs a calibrated Automatic **oi** test for each sensor. Upon removal of the contamination, the detector fault was cleared and the detector was verified to detect a fire.

MANUAL OPTICAL INTEGRITY TEST:

The Manual/Magnetic **oi** test performs the same calibrated test as the Automatic **oi** test. These tests provide 80 to 100 Counts Per Second (CPS) to the R74XX series controller when the detector is not in fault. This action causes the detector to immediately send pulses to the R74XX series controller. Controller response is as follows:

- The Zone LED blinks.
- The digital display indicates which Zone is in alarm.
- The status indicator shows "6" (fire).

Depending upon the configuration of the R74XX series controller, the above action may result in the initiation of additional action, including an alarm condition. If the pulse output detector is in an Automatic **oi** fault condition, a successful Mag **oi** or Man **oi** test cannot be performed. During an Automatic **oi** fault, the pulse output detectors LED will be yellow and the detectors fault relay will change states.

FM Approval and Performance Report – Continued

RESPONSE CHARACTERISTICS

Very High Sensitivity

Fuel	Size/Flow Rate	Distance feet (m)	Average Response Time (seconds)**
Hydrogen	30 inch plume/100 SLPM*	125 (38.1)	3.4
Methanol	1 x 1 foot	70 (21.3)	3.1
Syngas***	30 inch plume/120 SLPM*	110 (33.5)	3.5
Methane	30 inch plume/40 SLPM*	65 (19.8)	2.8

* Standard Liters Per Minute (Standard conditions defined as +25°C and 14.696 PSIA).

** Add 2 seconds for EQP model.

***Syngas composition: 53% H₂, 24% CH₄, 11% N₂, 8% CO, 4% CO₂.

Very High Sensitivity - Sustained Fire Mode

Fuel	Size/Flow Rate	Distance feet (m)	Average Response Time (seconds)**
Hydrogen	30 inch plume/100 SLPM*	125 (38.1)	9.1

* Standard Liters Per Minute (Standard conditions defined as +25°C and 14.696 PSIA).

** Add 2 seconds for EQP model.

High Sensitivity

Fuel	Size/Flow Rate	Distance feet (m)	Average Response Time (seconds)**
Hydrogen	30 inch plume/100 SLPM*	110 (33.5)	2.0
Methanol	1 x 1 foot	52.5 (16.0)	2.4
Syngas***	30 inch plume/120 SLPM*	75 (22.9)	1.8
Methane	30 inch plume/40 SLPM*	50 (15.2)	2.6

* Standard Liters Per Minute (Standard conditions defined as +25°C and 14.696 PSIA).

** Add 2 seconds for EQP model.

***Syngas composition: 53% H₂, 24% CH₄, 11% N₂, 8% CO, 4% CO₂.

High Sensitivity - Sustained Fire Mode

Fuel	Size/Flow Rate	Distance feet (m)	Average Response Time (seconds)**
Hydrogen	30 inch plume/100 SLPM*	110 (33.5)	8.1

* Standard Liters Per Minute (Standard conditions defined as +25°C and 14.696 PSIA).

** Add 2 seconds for EQP model.

FM Approval and Performance Report – Continued

Medium Sensitivity

Fuel	Size/Flow Rate	Distance feet (m)	Average Response Time (seconds)**
Hydrogen	30 inch plume/100 SLPM*	70 (21.3)	2.4
Methanol	1 x 1 foot	35 (10.7)	3.3
Syngas***	30 inch plume/120 SLPM*	50 (15.2)	4.5
Methane	30 inch plume/40 SLPM*	30 (9.1)	2.4

* Standard Liters Per Minute (Standard conditions defined as +25°C and 14.696 PSIA).

** Add 2 seconds for EQP model.

***Syngas composition: 53% H₂, 24% CH₄, 11% N₂, 8% CO, 4% CO₂.

Medium Sensitivity - Sustained Fire Mode

Fuel	Size/Flow Rate	Distance feet (m)	Average Response Time (seconds)**
Hydrogen	30 inch plume/100 SLPM*	70 (21.3)	8.1

* Standard Liters Per Minute (Standard conditions defined as +25°C and 14.696 PSIA).

** Add 2 seconds for EQP model.

Low Sensitivity

Fuel	Size/Flow Rate	Distance feet (m)	Average Response Time (seconds)**
Hydrogen	30 inch plume / 100 SLPM*	35 (10.7)	4.7
Methanol	1 x 1 foot	17.5 (5.3)	5.1
Syngas***	30 inch plume/120 SLPM*	25 (7.6)	5.1
Methane	30 inch plume/40 SLPM*	15 (4.6)	5.1

* Standard Liters Per Minute (Standard conditions defined as +25°C and 14.696 PSIA).

** Add 2 seconds for EQP model.

***Syngas composition: 53% H₂, 24% CH₄, 11% N₂, 8% CO, 4% CO₂.

Low Sensitivity - Sustained Fire Mode

Fuel	Size/Flow Rate	Distance feet (m)	Average Response Time (seconds)**
Hydrogen	30 inch plume/100 SLPM*	35 (10.7)	9.1

* Standard Liters Per Minute (Standard conditions defined as +25°C and 14.696 PSIA).

** Add 2 seconds for EQP model.

NOTE

Refer to the "High Resolution Field of View" charts (page 21) for additional information.

FM Approval and Performance Report – Continued

FIELD OF VIEW

Very High Sensitivity

Fuel	Size/ Flow Rate	Distance feet (m)	Horizontal (degrees)	Horiz. Average Response Time (seconds)**	Vertical (degrees)	Vert. Average Response Time (seconds)**
Hydrogen	30 inch plume/ 100 SLPM*	100 (30.5)	+45	1.1	+45	2.1
			-45	2.1	-30	2.4
Methanol	1 x 1 foot	70 (21.3)	+45	3.8	+45	6.6
			-45	8.2	-30	4.5
Syngas***	30 inch plume/ 120 SLPM*	85 (25.9)	+45	2.6	+45	3.8
			-45	4.1	-30	1.4
Methane	30 inch plume/ 40 SLPM*	55 (16.8)	+45	3.3	+45	2.3
			-45	3.2	-30	3.0

* Standard Liters Per Minute (Standard conditions defined as +25°C and 14.696 PSIA).

** Add 2 seconds for EQP model.

***Syngas composition: 53% H₂, 24% CH₄, 11% N₂, 8% CO, 4% CO₂.

Very High Sensitivity – Sustained Fire Mode

Fuel	Size/ Flow Rate	Distance feet (m)	Horizontal (degrees)	Horiz. Average Response Time (seconds)**	Vertical (degrees)	Vert. Average Response Time (seconds)**
Hydrogen	30 inch plume/ 100 SLPM*	100 (30.5)	+45	8.5	+45	7.7
			-45	7.1	-30	8.6

* Standard Liters Per Minute (Standard conditions defined as +25°C and 14.696 PSIA).

** Add 2 seconds for EQP model.

High Sensitivity

Fuel	Size/ Flow Rate	Distance feet (m)	Horizontal (degrees)	Horiz. Average Response Time (seconds)**	Vertical (degrees)	Vert. Average Response Time (seconds)**
Hydrogen	30 inch plume/ 100 SLPM*	80 (24.4)	+45	1.6	+45	2.5
			-45	2.6	-30	2.9
Methanol	1 x 1 foot	52.5 (16.0)	+45	3.7	+45	4.0
			-45	2.9	-30	3.4
Syngas***	30 inch plume/ 120 SLPM*	75 (22.9)	+45	2.7	+45	4.2
			-45	2.8	-30	2.0
Methane	30 inch plume/ 40 SLPM*	50 (15.2)	+45	2.0	+45	4.1
			-45	2.3	-30	3.5

* Standard Liters Per Minute (Standard conditions defined as +25°C and 14.696 PSIA).

** Add 2 seconds for EQP model.

***Syngas composition: 53% H₂, 24% CH₄, 11% N₂, 8% CO, 4% CO₂.

High Sensitivity – Sustained Fire Mode

Fuel	Size/ Flow Rate	Distance feet (m)	Horizontal (degrees)	Horiz. Average Response Time (seconds)**	Vertical (degrees)	Vert. Average Response Time (seconds)**
Hydrogen	30 inch plume/ 100 SLPM*	80 (24.4)	+45	7.8	+45	8.1
			-45	8.7	-30	7.9

* Standard Liters Per Minute (Standard conditions defined as +25°C and 14.696 PSIA).

** Add 2 seconds for EQP model.

FM Approval and Performance Report – Continued

Medium Sensitivity

Fuel	Size/ Flow Rate	Distance feet (m)	Horizontal (degrees)	Horiz. Average Response Time (seconds)**	Vertical (degrees)	Vert. Average Response Time (seconds)**
Hydrogen	30 inch plume/ 100 SLPM*	50 (15.2)	+45	2.6	+45	2.5
			-45	2.0	-30	2.2
Methanol	1 x 1 foot	35 (10.7)	+45	4.3	+45	3.3
			-45	6.0	-30	4.4
Syngas***	30 inch plume/ 120 SLPM*	50 (15.2)	+45	3.6	+45	6.0
			-45	3.3	-30	3.9
Methane	30 inch plume/ 40 SLPM*	30 (9.1)	+45	3.1	+45	3.6
			-45	3.4	-30	2.4

* Standard Liters Per Minute (Standard conditions defined as +25°C and 14.696 PSIA).

** Add 2 seconds for EQP model.

***Syngas composition: 53% H₂, 24% CH₄, 11% N₂, 8% CO, 4% CO₂.

Medium Sensitivity – Sustained Fire Mode

Fuel	Size/ Flow Rate	Distance feet (m)	Horizontal (degrees)	Horiz. Average Response Time (seconds)**	Vertical (degrees)	Vert. Average Response Time (seconds)**
Hydrogen	30 inch plume/ 100 SLPM*	50 (15.2)	+45	8.1	+45	9.9
			-45	7.8	-30	8.3

* Standard Liters Per Minute (Standard conditions defined as +25°C and 14.696 PSIA).

** Add 2 seconds for EQP model.

Low Sensitivity

Fuel	Size/ Flow Rate	Distance feet (m)	Horizontal (degrees)	Horiz. Average Response Time (seconds)**	Vertical (degrees)	Vert. Average Response Time (seconds)**
Hydrogen	30 inch plume/ 100 SLPM*	25 (7.6)	+45	5.4	+45	6.4
			-45	5.3	-30	4.7
Methanol	1 x 1 foot	17.5 (5.3)	+45	7.6	+45	7.0
			-45	7.5	-30	4.9
Syngas***	30 inch plume/ 120 SLPM*	25 (7.6)	+45	7.1	+45	6.9
			-45	5.6	-30	6.1
Methane	30 inch plume/ 40 SLPM*	15 (4.6)	+45	7.2	+45	6.9
			-45	6.0	-30	4.9

* Standard Liters Per Minute (Standard conditions defined as +25°C and 14.696 PSIA).

** Add 2 seconds for EQP model.

***Syngas composition: 53% H₂, 24% CH₄, 11% N₂, 8% CO, 4% CO₂.

Low Sensitivity – Sustained Fire Mode

Fuel	Size/ Flow Rate	Distance feet (m)	Horizontal (degrees)	Horiz. Average Response Time (seconds)**	Vertical (degrees)	Vert. Average Response Time (seconds)**
Hydrogen	30 inch plume/ 100 SLPM*	25 (7.6)	+45	7.2	+45	7.6
			-45	8.8	-30	8.4

* Standard Liters Per Minute (Standard conditions defined as +25°C and 14.696 PSIA).

** Add 2 seconds for EQP model.

RESPONSE CHARACTERISTICS IN THE PRESENCE OF FALSE ALARM SOURCES

Very High Sensitivity

False Alarm Source	Distance to source feet (m)	Fire source and size/ flow rate	Distance to fire feet (m)	Average Response time (seconds)**
Sunlight, direct, unmodulated*	—	Hydrogen @ 100 SLPM	125 (38.1)	2.6
Sunlight, direct, modulated*	—	Hydrogen @ 25 SLPM	10 (3.0)	7.0
Sunlight, reflected, unmodulated*	—	Hydrogen @ 100 SLPM	125 (38.1)	2.6
Sunlight, reflected, modulated*	—	Hydrogen @ 100 SLPM	60 (18.2)	2.1
Arc welding, unmodulated	30 (9.1)	Hydrogen @ 100 SLPM	125 (38.1)	3.8
Arc welding, modulated	40 (12.2)	Hydrogen @ 100 SLPM	125 (38.1)	4.6
70 W sodium vapor lamp, unmodulated	10 (3.0)	Hydrogen @ 100 SLPM	125 (38.1)	2.4
70 W sodium vapor lamp, modulated	10 (3.0)	Hydrogen @ 100 SLPM	125 (38.1)	2.3
250 W mercury vapor lamp, unmodulated	10 (3.0)	Hydrogen @ 100 SLPM	125 (38.1)	2.4
250 W mercury vapor lamp, modulated	10 (3.0)	Hydrogen @ 100 SLPM	125 (38.1)	2.1
300 W clear incandescent lamp, unmodulated	10 (3.0)	Hydrogen @ 100 SLPM	125 (38.1)	1.4
300 W clear incandescent lamp, modulated	10 (3.0)	Hydrogen @ 100 SLPM	125 (38.1)	2.3
500 W shielded quartz halogen lamp, unmodulated	15 (4.6)	Hydrogen @ 100 SLPM	125 (38.1)	1.7
500 W shielded quartz halogen lamp, modulated	15 (4.6)	Hydrogen @ 100 SLPM	125 (38.1)	4.7
1500 W electric quartz heater, unmodulated	15 (4.6)	Hydrogen @ 100 SLPM	125 (38.1)	2.7
1500 W electric quartz heater, modulated	15 (4.6)	Hydrogen @ 100 SLPM	125 (38.1)	3.1
Two 34 W fluorescent lamps, unmodulated	5 (1.5)	Hydrogen @ 100 SLPM	125 (38.1)	2.7
Two 34 W fluorescent lamps, modulated	5 (1.5)	Hydrogen @ 100 SLPM	125 (38.1)	2.2
4000K, 8000 Lumen LED Lamp, unmodulated	5 (1.5)	Hydrogen @ 100 SLPM	125 (38.1)	1.9
4000K, 8000 Lumen LED Lamp, modulated	5 (1.5)	Hydrogen @ 100 SLPM	125 (38.1)	2.2

* Outdoor test conditions.

** Add 2 seconds for EQP model.

High Sensitivity

False Alarm Source	Distance to source feet (m)	Fire source and size/ flow rate	Distance to fire feet (m)	Average Response time (seconds)**
Sunlight, direct, unmodulated*	—	Hydrogen @ 100 SLPM	110 (33.5)	1.8
Sunlight, direct, modulated*	—	Hydrogen @ 50 SLPM	10 (3.0)	3.2
Sunlight, reflected, unmodulated*	—	Hydrogen @ 100 SLPM	110 (33.5)	2.8
Sunlight, reflected, modulated*	—	Hydrogen @ 100 SLPM	60 (18.3)	3.2
Arc welding, unmodulated	25 (7.6)	Hydrogen @ 100 SLPM	110 (33.5)	8.5
Arc welding, modulated	35 (10.7)	Hydrogen @ 100 SLPM	110 (33.5)	5.8
70 W sodium vapor lamp, unmodulated	8 (2.4)	Hydrogen @ 100 SLPM	110 (33.5)	2.2
70 W sodium vapor lamp, modulated	8 (2.4)	Hydrogen @ 100 SLPM	110 (33.5)	2.1
250 W mercury vapor lamp, unmodulated	8 (2.4)	Hydrogen @ 100 SLPM	110 (33.5)	2.1
250 W mercury vapor lamp, modulated	8 (2.4)	Hydrogen @ 100 SLPM	110 (33.5)	2.1
300 W clear incandescent lamp, unmodulated	8 (2.4)	Hydrogen @ 100 SLPM	110 (33.5)	2.6
300 W clear incandescent lamp, modulated	8 (2.4)	Hydrogen @ 100 SLPM	110 (33.5)	2.1
500 W shielded quartz halogen lamp, unmodulated	12 (3.7)	Hydrogen @ 100 SLPM	110 (33.5)	2.4
500 W shielded quartz halogen lamp, modulated	12 (3.7)	Hydrogen @ 100 SLPM	110 (33.5)	4.7
1500 W electric quartz heater, unmodulated	14 (4.3)	Hydrogen @ 100 SLPM	110 (33.5)	2.2
1500 W electric quartz heater, modulated	14 (4.3)	Hydrogen @ 100 SLPM	110 (33.5)	2.5
Two 34 W fluorescent lamps, unmodulated	4 (1.2)	Hydrogen @ 100 SLPM	110 (33.5)	2.7
Two 34 W fluorescent lamps, modulated	4 (1.2)	Hydrogen @ 100 SLPM	110 (33.5)	2.0
4000K, 8000 Lumen LED Lamp, unmodulated	4 (1.2)	Hydrogen @ 100 SLPM	110 (33.5)	2.0
4000K, 8000 Lumen LED Lamp, modulated	4 (1.2)	Hydrogen @ 100 SLPM	110 (33.5)	1.4

* Outdoor test conditions.

** Add 2 seconds for EQP model.

Medium Sensitivity

False Alarm Source	Distance to source feet (m)	Fire source and size/ flow rate	Distance to fire feet (m)	Average Response time (seconds)**
Sunlight, direct, unmodulated*	—	Hydrogen @ 100 SLPM	70 (21.3)	2.8
Sunlight, direct, modulated*	—	Hydrogen @ 100 SLPM	10 (3.0)	2.6
Sunlight, reflected, unmodulated*	—	Hydrogen @ 100 SLPM	70 (21.3)	1.9
Sunlight, reflected, modulated*	—	Hydrogen @ 100 SLPM	30 (9.1)	1.6
Arc welding, unmodulated	20 (6.1)	Hydrogen @ 100 SLPM	70 (21.3)	5.0
Arc welding, modulated	25 (7.6)	Hydrogen @ 100 SLPM	70 (21.3)	7.2
70 W sodium vapor lamp, unmodulated	5 (1.5)	Hydrogen @ 100 SLPM	70 (21.3)	2.2
70 W sodium vapor lamp, modulated	5 (1.5)	Hydrogen @ 100 SLPM	70 (21.3)	2.6
250 W mercury vapor lamp, unmodulated	5 (1.5)	Hydrogen @ 100 SLPM	70 (21.3)	2.3
250 W mercury vapor lamp, modulated	5 (1.5)	Hydrogen @ 100 SLPM	70 (21.3)	3.6
300 W clear incandescent lamp, unmodulated	5 (1.5)	Hydrogen @ 100 SLPM	70 (21.3)	1.9
300 W clear incandescent lamp, modulated	5 (1.5)	Hydrogen @ 100 SLPM	70 (21.3)	2.1
500 W shielded quartz halogen lamp, unmodulated	10 (3.0)	Hydrogen @ 100 SLPM	70 (21.3)	2.0
500 W shielded quartz halogen lamp, modulated	10 (3.0)	Hydrogen @ 100 SLPM	70 (21.3)	3.3
1500 W electric quartz heater, unmodulated	10 (3.0)	Hydrogen @ 100 SLPM	70 (21.3)	2.4
1500 W electric quartz heater, modulated	10 (3.0)	Hydrogen @ 100 SLPM	70 (21.3)	4.9
Two 34 W fluorescent lamps, unmodulated	3 (0.9)	Hydrogen @ 100 SLPM	70 (21.3)	2.3
Two 34 W fluorescent lamps, modulated	3 (0.9)	Hydrogen @ 100 SLPM	70 (21.3)	2.5
4000K, 8000 Lumen LED Lamp, unmodulated	3 (0.9)	Hydrogen @ 100 SLPM	70 (21.3)	2.5
4000K, 8000 Lumen LED Lamp, modulated	3 (0.9)	Hydrogen @ 100 SLPM	70 (21.3)	1.7

* Outdoor test conditions.

** Add 2 seconds for EQP model.

Low Sensitivity

False Alarm Source	Distance to source feet (m)	Fire source and size/ flow rate	Distance to fire feet (m)	Average Response time (seconds)**
Sunlight, direct, unmodulated*	—	Hydrogen @ 100 SLPM	35 (10.7)	5.1
Sunlight, direct, modulated*	—	Hydrogen @ 200 SLPM	10 (3.0)	7.1
Sunlight, reflected, unmodulated*	—	Hydrogen @ 100 SLPM	35 (10.7)	5.2
Sunlight, reflected, modulated*	—	Hydrogen @ 100 SLPM	15 (4.6)	4.8
Arc welding, unmodulated	15 (4.6)	Hydrogen @ 100 SLPM	35 (10.7)	6.9
Arc welding, modulated	15 (4.6)	Hydrogen @ 100 SLPM	35 (10.7)	8.9
70 W sodium vapor lamp, unmodulated	3 (0.9)	Hydrogen @ 100 SLPM	35 (10.7)	5.0
70 W sodium vapor lamp, modulated	3 (0.9)	Hydrogen @ 100 SLPM	35 (10.7)	4.0
250 W mercury vapor lamp, unmodulated	3 (0.9)	Hydrogen @ 100 SLPM	35 (10.7)	4.8
250 W mercury vapor lamp, modulated	3 (0.9)	Hydrogen @ 100 SLPM	35 (10.7)	6.6
300 W clear incandescent lamp, unmodulated	3 (0.9)	Hydrogen @ 100 SLPM	35 (10.7)	4.9
300 W clear incandescent lamp, modulated	3 (0.9)	Hydrogen @ 100 SLPM	35 (10.7)	4.7
500 W shielded quartz halogen lamp, unmodulated	6 (1.8)	Hydrogen @ 100 SLPM	35 (10.7)	5.2
500 W shielded quartz halogen lamp, modulated	6 (1.8)	Hydrogen @ 100 SLPM	35 (10.7)	5.9
1500 W electric quartz heater, unmodulated	8 (2.4)	Hydrogen @ 100 SLPM	35 (10.7)	4.8
1500 W electric quartz heater, modulated	8 (2.4)	Hydrogen @ 100 SLPM	35 (10.7)	9.3
Two 34 W fluorescent lamps, unmodulated	2 (0.6)	Hydrogen @ 100 SLPM	35 (10.7)	4.7
Two 34 W fluorescent lamps, modulated	2 (0.6)	Hydrogen @ 100 SLPM	35 (10.7)	4.3
4000K, 8000 Lumen LED Lamp, unmodulated	2 (0.6)	Hydrogen @ 100 SLPM	35 (10.7)	4.7
4000K, 8000 Lumen LED Lamp, modulated	2 (0.6)	Hydrogen @ 100 SLPM	35 (10.7)	4.9

* Outdoor test conditions.

** Add 2 seconds for EQP model.

APPENDIX B

CSA APPROVAL

DIVISION CLASSIFICATION

Multispectrum IR Flame Detector/Controller X3302 Series, rated 18-30 Vdc, 4.6 Watts to 17 Watts.
Relay contacts rated 30 Vdc, 5 Amps.

CLASS 4818 04 - SIGNAL APPLIANCES - Systems - For Hazardous Locations

Class I, Division 1, Groups B, C, and D (T4A); Class II, Division 1, Groups E, F, and G (T4A);
Class I, Division 2, Groups A, B, C, and D (T3C); Class II, Division 2, Groups F and G (T3C);
Class III; Enclosure NEMA/Type 4X;
Conduit seal not required.

APPLICABLE REQUIREMENTS

- CAN/CSA-C22.2 No. 0-M91 – General Requirements — Canadian Electrical Code, Part II
- CAN/CSA-C22.2 No. 25-1966 – Enclosures for use in Class II Groups E, F & G Hazardous Locations
- CAN/CSA-C22.2 No. 30-M1986 – Explosion-Proof Enclosures for use in Class I Hazardous Locations
- CAN/CSA-C22.2 No. 94-M91 – Special Purpose Enclosures
- CAN/CSA-C22.2 No. 142-M1987 – Process Control Equipmen
- CAN/CSA-C22.2 No. 213-M1987 – Nonincendive Electrical Equipment for use in Class I, Division 2 Hazardous Location

ZONE CLASSIFICATION:

CLASS 4818 04 - SIGNAL APPLIANCES - Systems - For Hazardous Locations

Ex db eb IIC T6...T5
T6 (Tamb = -50°C to +60°C)
T5 (Tamb = -50°C to +75°C)
Ex tb IIIC T130°C
(Tamb = -50°C to +75°C)
Seal required adjacent to enclosure
IP66

Ex db IIC T6...T5
T6 (Ta -55°C to +60°C)
T5 (Ta -55°C to +75°C)
Seal required adjacent to enclosure
IP66/IP67

APPLICABLE REQUIREMENTS

- CAN/CSA-C22.2 No. 60079-0:2015 – Electrical apparatus for explosive gas atmospheres. Part 0: General requirements
- CAN/CSA-C22.2 No. 60079-1:2016 – Explosive atmospheres. Part 1: Equipment protection by flameproof enclosures "d"
- CAN/CSA-C22.2 No. 60079-7:2012 – Explosive atmospheres. Part 7: Equipment protection by increased safety "e"
- CAN/CSA-C22.2 No. 60079-31:2015 – Explosive atmospheres. Part 31: Equipment dust ignition protection by enclosure "t"

The following accessories are CSA approved for use with the X3302 Flame Detector:

Part Number	Description
102740-002	Magnet
007739-001	Magnet and Extension Pole
010857-001	Q1130A1001 Flange Mount Assembly
007290-001	Q9033B Stainless Steel Mounting Arm Assembly is for aluminum and stainless steel detectors
007290-002	Q9033A Aluminum Mounting Arm Assembly is for aluminum detectors only
011385-001	Q9033 Collar Attachment

APPENDIX C

ATEX APPROVAL

EC-TYPE EXAMINATION CERTIFICATE

DEMKO 01 ATEX 130204X

Increased Safety Model

CE 0539  II 2 G
II 2 D

Ex db eb IIC T6...T5 Gb

Ex tb IIIC T130°C Db

T6 (Tamb = -50°C to +60°C)

T5 (Tamb = -50°C to +75°C)

IP66

Flameproof Model

CE 0539  II 2 G

Ex db IIC T6...T4 Gb

T6 (Tamb = -55°C to +60°C)

T5 (Tamb = -55°C to +75°C)

T4 (Tamb = -55°C to +125°C)

IP66/IP67

Compliance with:

EN 60079-0: 2012+A11: 2013

EN 60079-1: 2014

EN 60079-7: 2015

EN 60079-31: 2014

EN 60529: 1991:+A1: 2000+A2: 2013

INSTALLATION INSTRUCTIONS

The field wiring connections in the terminal compartment are ATEX certified and accepts wiring specifications from 14-24 AWG or 2.5-0.2 mm².

The Multispectrum infrared (IR) flame detector type X3302 shall be installed according to the instructions given by the manufacturer.

The cable entry devices shall be certified in type of explosion protection flameproof enclosure "d" for use with the terminal compartment in type of explosion protection flameproof enclosure "d", or in type of explosion protection increased safety "e" for use with the terminal compartment in type of explosion protection increased safety "e". They shall be IP66/IP67 rated, suitable for the conditions of use and correctly installed.

Unused entries shall be closed with suitable certified blanking elements.

The metal housing for the Multispectrum infrared (IR) flame detector type X3302 must be electrically connected to earth ground.

For ambient temperatures below -10°C and above +60°C use field wiring suitable for both minimum and maximum ambient temperature.

Special conditions for safe use:

- The front window assembly contains a special cemented joint construction. In accordance with EN60079-1 clause 5.1.c, all inspections, repair and/or adjustments to this front window assembly shall be done by Detector Electronics Corporation only.
- Up to two resistors may be used within the flameproof terminal compartment only.
- Each resistor may dissipate a maximum of 5 watts and must be rated appropriately for the application.
- The Multispectrum infrared (IR) flame detector type X3302 is to be installed in places where there is a low risk of mechanical damage.
- See the "Maintenance" section of this manual for guidance on minimizing the risk from electrostatic discharge.
- Flameproof joints are not intended to be repaired. See the "Device Repair and Return" section of this manual for more information on conducting repairs.

The following accessories are ATEX approved for use with the X3302 Flame Detector:

Part Number	Description
007290-001	Q9033B Stainless Steel Mounting Arm Assembly is for aluminum and stainless steel detectors
007290-002	Q9033A Aluminum Mounting Arm Assembly is for aluminum detectors only
011385-001	Q9033 Collar Attachment

APPENDIX D

IECEX APPROVAL

CERTIFICATE OF CONFORMITY

IECEX ULD 06.0017X

Ex db eb IIC T6...T5 Gb	or	Ex db IIC T6...T4 Gb
Ex tb IIIC T130°C Db		T6 (Tamb = -55°C to +60°C)
T6 (Tamb = -50°C to +60°C)		T5 (Tamb = -55°C to +75°C)
T5 (Tamb = -50°C to +75°C)		T4 (Tamb = -55°C to +125°C)
IP66		IP66/IP67

Compliance with:

IEC 60079-0: 2011, Ed. 6
 IEC 60079-1: 2014, Ed. 7
 IEC 60079-7: 2015, Ed. 5
 IEC 60079-31: 2013, Ed. 2
 IEC 60529: 2013, Ed. 2.2

INSTALLATION INSTRUCTIONS

The field wiring connections in the terminal compartment are suitable certified and accepts wiring specifications from 14-24 AWG or 2.5-0.2 mm².

The Multispectrum infrared (IR) flame detector type X3302 shall be installed according to the instructions given by the manufacturer.

The cable entry devices shall be certified in type of explosion protection flameproof enclosure "d" for use with the terminal compartment in type of explosion protection flameproof enclosure "d" or in type of explosion protection increased safety "e" for use with the terminal compartment in type of explosion protection increased safety "e". They shall be IP66/IP67 rated, suitable for the conditions of use and correctly installed.

Unused entries shall be closed with suitable certified blanking elements.

The metal housing for the Multispectrum infrared (IR) flame detector type X3302 must be electrically connected to earth ground.

For ambient temperatures below -10°C and above +60°C use field wiring suitable for both minimum and maximum ambient temperature.

Special conditions for safe use:

- The front window assembly contains a special cemented joint construction. In accordance with IEC 60079-1 clause 5.1.c, all inspections, repair and/or adjustments to this front window assembly shall be done by Detector Electronics Corporation only.
- Up to two resistors may be used within the flameproof terminal compartment only.
- The resistor(s) must be ceramic, wirewound type, rated 5 watts minimum, with actual power dissipation not to exceed 2.5 watts.
- Each resistor may dissipate a maximum of 5 watts and must be rated appropriately for the application.
- See the "Maintenance" section of this manual for guidance on minimizing the risk from electrostatic discharge.
- Flameproof joints are not intended to be repaired. See the "Device Repair and Return" section of this manual for more information on conducting repairs.

The following accessories are IECEx approved for use with the X3302 Flame Detector:

Part Number	Description
007290-001	Q9033B Stainless Steel Mounting Arm Assembly is for aluminum and stainless steel detectors
007290-002	Q9033A Aluminum Mounting Arm Assembly is for aluminum detectors only
011385-001	Q9033 Collar Attachment

APPENDIX E

ADDITIONAL APPROVALS

BRAZIL



UL-BR 12.0093X

Ex db eb IIC T6...T5

Ex tb IIIC T130°C

T6 (Tamb = -50°C to +60°C)

T5 (Tamb = -50°C to +75°C)

IP66

- OR -

Ex db IIC T6...T4

T6 (Tamb = -55°C to +60°C)

T5 (Tamb = -55°C to +75°C)

T4 (Tamb = -55°C to +125°C)

IP66/IP67

APPENDIX F

DECLARATION OF CONFORMITY

	EU Declaration of Conformity
Model X3302 (Multispectrum Infrared Flame Detector) 014052-XXX, 022XXX-XXX, 028XXX-XXX, 029XXX-XXX	
The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:	
ATEX Directive: 2014/34/EU Certificate No.: DEMKO 01 ATEX 130204X Issued by: DEMKO	EN 60079-0:2012+A11:2013 EN 60079-1:2014 EN 60079-7:2015 EN 60079-31:2014
EMC Directive: 2014/30/EU	EN 50130-4:2011 EN 61000-6-2:2005 EN 61000-6-4:2007
RoHS Directive: 2011/65/EU	EN 50581:2012
QAN by: UL International DEMKO A/S, NB. No. 0539 Borupvang 5A, 2750 Ballerup, Denmark	
 II 2 G Ex db eb IIC T6...T5 Gb IP66/IP67	
 II 2 G Ex db IIC T6...T4 Gb IP66/IP67	
 II 2 D Ex tb IIIC T130°C Db IP66/IP67	
This declaration of conformity is issued under the sole responsibility of the manufacturer	
Signature: 	
2019-05-23	
Meghan Olson Global Approvals Lead	
Page 1 of 1	DEC-1208
Manufactured by: Detector Electronics Corporation 6901 West 110th Street Minneapolis, MN 55348 USA Phone: +1 (1) 952-946-6488 www.det-tronics.com	



95-8779



FlexSonic® Acoustic
Leak Detector



X3301 Multispectrum
IR Flame Detector



PointWatch Eclipse® IR
Combustible Gas Detector



FlexVu® Universal Display
with GT3000 Toxic Gas Detector



Eagle Quantum Premier®
Safety System

Specifications subject to change without notice.

All trademarks are the property of their respective owners.
© 2020 Detector Electronics Corporation. All rights reserved.

Det-Tronics manufacturing system is certified to ISO 9001—
the world's most recognized quality management standard.



Corporate Office
6901 West 110th Street
Minneapolis, MN 55438 USA
www.det-tronics.com

Phone: +1 952.941.6665
Toll-free: +1 800.765.3473
Fax: 952.829.8750
det-tronics@carrier.com