SECTION 28 46 00

FIRE DETECTION AND ALARM

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\*\* NOTE TO SPECIFIER \*\* CONSPEC Controls Inc.; Gas Detection Instruments and Controls.
This section is based on the products of CONSPEC Controls Inc., which is located at:
6 Guttman Blvd.
Charleroi, PA 15022
Toll Free Tel: 800-487-8450
Tel: 724-489-8450
Email: [request info (null)](https://arcat.com/rfi?action=email&company=CONSPEC%252BControls%252BInc.&message=RE%253A%2520Spec%2520Question%2520(13852cop)%253A%2520&coid=54019&spec=13852cop&rep=&fax=)
Web: [https://conspec-controls.com/?utm\_source=arcat&amp;utm\_medium=referral](https://conspec-controls.com/?utm_source=arcat&utm_medium=referral)
 [ [Click Here](https://arcat.com/company/conspec-controls-inc-54019) ] for additional information.
CONSPEC Controls is internationally recognized gas detection system company and is a leader in the design, development and manufacturing of gas detection instruments and control systems. Since 1968 Conspec has offered a complete array of products, ranging from fully integrated installations to stand-alone independent devices.
Our user-friendly devices are engineered to coexist and interface with both new and existing control equipment. We combine state-of-the art manufacturing with cutting-edge research to create specialized instrumentation and equipment that meets individual customer applications and requirements.

1. GENERAL
	1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Explosion proof Xenon strobe beacons.
		2. Horn sounders.
		3. Compact Low Current Indoor Wall Mounted Horns, Strobes and Horn/Strobes.
		4. Flame detectors.
		5. Smoke detectors.
		6. Heat detection cabling system.
	1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 26 05 00 - Common Work Results for Electrical.
	1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. FM Global (FM).
		2. International Electrotechnical Commission (IEC):
			1. IEC61508 - Electronic Functional Safety Package.
		3. United States Military Standards (MIL):
			1. MIL 217: MIL-HDBK-217 is the military handbook for the reliability prediction of electronic equipment.
			2. MIL-STD 810C: Military Environmental Testing.
		4. National Fire Protection Association (NFPA):
		5. State of California Fire Marshall.
		6. Underwriters Laboratories (UL):
			1. UL 94: Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.
			2. UL 464: Audible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories.
			3. UL 1638: Visible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories.
			4. UL 1971: Signaling Devices for the Deaf and Hard of Hearing.
			5. UL: 50E: Enclosures for Electrical Equipment, Environmental Considerations.
		7. Underwriters Laboratories ,Canada (ULC):
			1. ULC S526: Visible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories.
	1. SUBMITTALS
		1. Submit under provisions of Section 01 30 00.
		2. Product Data:
			1. Manufacturer's data sheets on each product to be used.
			2. Preparation instructions and recommendations.
			3. Storage and handling requirements and recommendations.
			4. Typical installation methods.

\*\* NOTE TO SPECIFIER \*\* Delete if not applicable to product type.

* + 1. Verification Samples: Two representative units of each type, size, pattern, and color.
		2. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.
	1. QUALITY ASSURANCE
		1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum of five years documented experience.
		2. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.
		3. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

\*\* NOTE TO SPECIFIER \*\* Include mock-up if the project size or quality warrant the expense. The following is one example of how a mock-up might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.

* + 1. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
			1. The intent of a mock-up is to demonstrate quality of workmanship and visual appearance.
			2. If the mock-up is not acceptable, rebuild the mock-up until satisfactory results are achieved.
			3. Retain mock-up during construction as a standard for comparison with completed work.
			4. Do not alter or remove mock-up until work is completed or removal is authorized.
	1. PRE-INSTALLATION CONFERENCE
		1. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.
	2. DELIVERY, STORAGE, AND HANDLING
		1. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
		2. Protect from damage due to weather, excessive temperature, and construction operations.
	3. PROJECT CONDITIONS
		1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
	4. WARRANTY
		1. Manufacturer's standard limited warranty unless indicated otherwise.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: CONSPEC Controls Inc., which is located at:
		6 Guttman Blvd.
		Charleroi, PA 15022
		Toll Free Tel: 800-487-8450
		Tel: 724-489-8450
		Email: [request info (null)](https://arcat.com/rfi?action=email&company=CONSPEC%252BControls%252BInc.&message=RE%253A%2520Spec%2520Question%2520(13852cop)%253A%2520&coid=54019&spec=13852cop&rep=&fax=);Web: [https://conspec-controls.com/?utm\_source=arcat&amp;utm\_medium=referral](https://conspec-controls.com/?utm_source=arcat&utm_medium=referral)

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
		2. Requests for substitutions will be considered in accordance with the provisions of Section 01 60 00.
	1. EXPLOSION PROOF XENON STROBE BEACONS
		1. Basis of Design: e2s No. D1xB2XH2 UL1971 Auto Sync CI D1 190cd Strobe as manufactured by Conspec Inc. Lightweight, marine grade, enclosures. A fire signal for ADA compliant, hearing impaired applications. Conduit or surface mounting capability without additional accessories. An optional stainless-steel bracket enables the explosion proof warning light to be rotated and positioned in any orientation. Units will auto-synchronize when powered from the same power source; removing the need for any sync modules on the circuit.
			1. Standards Compliance:
				1. Public mode fire use UL1971 and CAN/ULC-S526.
				2. Listed Approvals: UL/cUL File ref: E496070.
				3. CSFM Listing: 7300-2279:0507.
				4. Approved for Class I / II Div 1, Class I Zone 1/Zone 21 for gas and dust environments.
			2. Mounting: Conduit: 3/4 inch NPT entry.
			3. Mounting: Surface: User installed lugs.

\*\* NOTE TO SPECIFIER \*\* The wall bracket below is optional Delete if not required.

* + - 1. Mounting: Multi-position wall bracket.
			2. Enclosure: Marine grade aluminum. Type: 4 / 4X / 3R / 13, IP66.
				1. Material: Marine grade LM6 aluminum alloy.
				2. Color: Red No. RAL3000.
			3. Lens Material: High impact Borosilicate glass. Color: Clear.
			4. Source: Xenon Strobe.
				1. Energy: 21 Joules.
				2. Modes: 1 Hz flash (60 fpm).
				3. Modes: 1.3 Hz flash (80 fpm).
				4. Modes: 1.5 Hz flash (90 fpm).
				5. Modes: Double flash (120 fpm).
				6. Eff. Intensity cd: 190.6 cd UL1971 Public mode fire.
				7. Peak Intensity cd: 2,100,000 cd.
				8. Flash Rate Synchronization: 2 hour minimum per UL1971.
			5. Voltage: 24 Vdc (20 to 28 Vdc).
			6. Operating Current: 1.165 A. In-rush: Less than 1.5 A within 5ms at 24 Vdc.
			7. Ingress Protection (IP) Rating per EN60529: IP66.
				1. Type rating per UL50E / NEMA250: 4/4X/3R/13.
			8. Cable Entries:
				1. Two, 3/4 inch NPT.
				2. Two, M20 x1.5.
				3. One, 3/4 inch NPT.
			9. Terminals: 20-14 AWG (0.5 to 2.5 sq mm).
			10. Line Monitoring: Blocking diode included. EOL can be factory or user installed.
			11. Stopping Plugs: Nickel plated brass plugs included.
			12. Operating Temperature Range: -67 to 176 degrees F (-55 to 80 degrees C).
			13. Storage Temperature Range: -67 to 176 degrees F (-55 to 80 degrees C).
			14. Relative Humidity: 95 percent. Additional topicalization is recommended for applications where both high relative humidity and high ambient temperatures exist.
			15. Weight: 7.1 lbs (3.2 kg).
		1. Basis of Design: e2s No. D1xB2X10 Explosion Proof Xenon Strobe Beacon 10J as manufactured by Conspec Inc. Approved to UL1638 and CAN/ULC S526 for fire alarm use. The beacons produce a high output Xenon flash required for effective signaling in environments with elevated levels of ambient light. The field replaceable color filter enhances the strobe and is constructed from UV stable PC. The enclosure has a threaded flame path, four cable entries. Mounting options include surface via integrated lugs, pendant or by addition of optional multi direction stainless steel bracket. SIL1 and SIL2 Route 2H compliant to IEC61508 (2010) as standard, with optional diagnostic module for Route 1H SIL2 compliance.
			1. Standards Compliance:
				1. UL/cUL/ULC File ref: E245313.
				2. IECEx Certificate: IECEx ULD 19.0006X.
				3. ATEX Certificate: DEMKO 19 ATEX 2009X.
				4. UKCA certificate: UL21UKEX2130X.
				5. TR CU Ex EAC Certificate: EAC RU C-GB.AA.71.B.00273/20.
				6. PESO CCOE Certified: P493433-1.
				7. CSFM Listing: 7300-2279:0508.
				8. CCCEx Certificate: 2022122309114969.
				9. SIL1 and SIL2: Compliant to IEC61508 (2010).
			2. Enclosure Material: Corrosion proof marine grade LM6 aluminum alloy.
				1. Volume: Less than 2 liters.
				2. Finish: Chromate and powder coated.
				3. Color: Red.
				4. Color: Grey.
				5. Color: \_\_\_\_\_\_\_\_.
			3. Lens Material: High impact Borosilicate glass.
				1. Field replaceable UV stable polycarbonate color filter lens.
				2. Colors: Amber.
				3. Colors: Blue.
				4. Colors: Clear.
				5. Colors: Green.
				6. Colors: Magenta.
				7. Colors: Red and Yellow.
			4. Source: Xenon Strobe.
				1. Energy: 10 Joules (10 Ws).
				2. Flash rates: 1Hz flash (60 fpm).
				3. Flash rates: 1.3Hz flash (80 fpm).
				4. Flash rates: 1.5Hz flash (90 fpm).
				5. Flash rates: Double flash (120 fpm).
				6. Eff. Intensity cd: 69.81cd UL1638 Private mode fire.
				7. Eff. Intensity cd: 645.21cd measured ref to I.E.S.
				8. Eff. Intensity cd: 500 cd - calculated from energy (J).
				9. Peak Intensity Candela: 1,000,000 cd, calculated from energy (J).
				10. Automatic synchronization on multi-beacon system.
			5. Guard: A4 316 Stainless Steel.
			6. Voltage DC: 24V dc (20-28 Vdc), 48 Vdc (42-54 Vdc)
				1. In-rush: 813 mA within 6 ms at 24 Vdc.
			7. Voltage AC: 115 Vac (110-120 Vac), 230 Vac (220-240 Vac).
			8. Ingress Protection:
				1. IP rating per EN60529: IP66/67.
				2. Type rating per UL50E/NEMA250:4/4X/3R/13.
			9. Cable Entries:
				1. Side: Two, 3/4 inch NPT and Two, M20 x 1.5 mm.
				2. Pendant: 1 x 3/4 inch NPT.
				3. Stopping plugs included. Material: Brass, nickel plated, or stainless steel.
			10. Terminals: 20-14 AWG (0.5 to 2.5 sq mm). 12 AWG solid core conductor duplicated terminals.
			11. Line monitoring: Blocking diode included. EOL Min. 500 Ohm 2W, or 3k3 Ohm 0.5W resistor or diode (DC versions) can be fitted.
			12. Signaling Device for Fire Alarm: UL 1638 and CAN/ULC S526.
			13. Safety Integrity Level:
				1. Product A: SIL1 and SIL2 Route 2H.
				2. Product S: SIL2 Route 1H with diagnostics SFF: Greater than 99 percent.
			14. Ground/Earth stud: M5.
			15. Operating Temperature Range: -67 to 176 degrees F (-55 to 80 degrees C).
			16. Storage Temperature Range: -67 to 176 degrees F (-55 to 80 degrees C).
			17. Relative Humidity: 95 percent. Additional topicalization is recommended for applications where both high relative humidity and high ambient temperatures exist.
			18. MTBF DC: 198.88 years / 1,742,161 hours; MIL 217.
			19. MTBF AC: 253.68 years / 2,222,223 hours; MIL 217.
			20. Weight: 7.1 lbs (3.2 kg).
	1. HORN SOUNDERS
		1. Basis of Design: e2s D1xS1R 110dB(A) Radial Alarm Horn Sounder as Manufactured by Conspec Inc. A performance certified alarm horn sounder with a compact, omni-directional horn and a sound output up to 110 dB(A). Available with custom tone configurations and frequencies. 4 remotely selectable alarm stages/channels. Positive or negative line stage/channel switching. Automatic synchronization on multi-sounder system. Ratchet adjustable 316 stainless steel bracket.
			1. Standards Compliance:
				1. UL / cUL / ULC File ref: E230764.

UL464 Public mode fire alarm use.

CAN/ULC S525 Audible Signaling Devices for Fire Alarm.

* + - * 1. IECEx Certificate: IECEx ULD 19.0008X.
				2. ATEX Certificate: DEMKO 19 ATEX 2141X.
				3. CSFM listing: 7136-2279:0506.
				4. UKCA certificate: UL21UKEX2132X.
				5. SIL1 and SIL2 Compliant to IEC61508.
			1. Enclosure: NEMA 4/4X, IP66 marine grade corrosion resistant LM6 aluminum alloy.
				1. Approved for Class I and II Div 1, Zone 1 and 20, IECEx and ATEx Zone 1 and 2 explosion proof signaling applications.
				2. Vibration test per UL 464: 35 Hz for a duration 4 Hours.
				3. Jarring test per UL 464: 3 ft per lb Energy.
				4. Impact test per UL 464: 3 x 5 lbs.
				5. Enclosure Volume: Less than 2 Liters.
				6. Finish: Chromate and powder coated finish.

Color: Red.

Color: Grey.

Color: \_\_\_\_\_\_\_\_. custom colors available on request.

* + - 1. Sound Pressure Output:
				1. Maximum: 110dB(A) at 3 ft (1 m) 101 dB(A) at 10 ft (3 m).

Class II version: 94 dB(A) at 3 ft 4 inches (1 m). 85dB(A) at 10 ft (3 m).

* + - * 1. Nominal: 105 dB(A) at 3 ft (1 m) +/- 3 dB. Tone 4, 96 dB(A) at 10 ft (3m).

Class II version: 90 dB(A) at 3 ft (1 m). 81 dB(A) at 10 ft (3 m).

* + - * 1. Number of Tones: 64 (UKOOA / PFEER compliant).
				2. Number of Stages: 4.
				3. Volume Control: Full range.
				4. Effective Range: 410 ft (125 m) at 1 kHz.
				5. Choice of 64 alarm tone frequencies.
			1. Voltages AC: 230 Vac (100-240 Vac)
				1. Stage switching, AC Units: Common supply line.
			2. Voltages DC: 24 Vdc (11.5-54 Vdc).
				1. In-rush: 815 mA within 4ms at 24 Vdc
				2. Stage switching, DC Units: Positive or negative.
			3. Ingress Protection:
				1. IP rating per EN60529:IP66/67.
				2. Type rating per UL50E/NEMA250:4/4X/3R/13.
			4. Cable Entries: One, 1/2 inch NPT and Two, 2 x M20.
				1. Stopping plugs: Brass, Nickel Plated or Stainless Steel.
			5. Terminals: 20-14 AWG (0.5 to 2.5 sq mm). 12 AWG solid core conductor.
				1. Pluggable and duplicated terminals.
			6. Line Monitoring:
				1. Diode polarized for use in supervised circuits.
				2. Blocking diode for reverse polarity monitoring. EOL Min. 500 Ohm 2W, or 3k3 Ohm 0.5W resistor or diode (DC versions) can be fitted.
			7. Safety Integrity Level: SIL1 and SIL2 Route 2H IEC61508.
			8. Ground/Earth stud: M5.
			9. Installation Temperature: -67 to 185 degrees F (-55 to 85 degrees C).
			10. Storage Temperature: -67 to 185 degrees F (-55 to 85 degrees C).
			11. Relative Humidity: 99 percent.
			12. MTBF DC: 225.16 years / 1,972,386 hours - MIL 217.
			13. MTBF AC: 138.96 years / 1,217,285 hours - MIL 217.
			14. Weight: 8.80 lbs (4.00 kg).
			15. Accessories:
				1. Pole Mount Bracket: Kit 2 inch (51 mm) Stainless steel A4, 316.
				2. Sunshade: Stainless steel A4, 316.
		1. Basis of Design: e2s D2xS1 Alarm Horn Sounder as Manufactured by Conspec Inc. A high output, 116dB(A) alarm horn sounder. Low current consumption and high SPL. Suitable for all haz loc fire alarm system and general signaling applications. 4 remotely selectable alarm stages/channels. Choice of 64 alarm tone frequencies. Automatic synchronization on multi-sounder system.
			1. Standards Compliance:
				1. UL File ref: E230764.
				2. IECEx cert: IECEx ULD 14.0004X.
				3. ATEX cert: DEMKO 14 ATEX 4786493904X.
				4. CSFM listing: 7136-2279:0503.
				5. Ex EAC certified: EAC RU C GB.AA71.B.00273/20.
			2. Enclosure Material: Marine grade aluminum Al Si12 Cu.
				1. Color: Red.
				2. Color: Grey.
				3. Color: \_\_\_\_\_\_\_\_. custom colors available on request.
			3. Sound Pressure:
				1. High Output: 116 dB(A).
				2. Volume Control: Adjustable 12 dB(A) (Tone 2).
				3. Maximum Output: 116 dB(A) at 3 ft (1 m). 107 dB(A) at 10 ft (3 m).
				4. Nominal Output: 112 dB(A) at 3 ft (1m) +/- 3 dB 103 dB(A) at 10ft (3 m).
				5. Number of Tones: 64. UKOOA / PFEER compliant.
				6. Effective Range: 410 ft (125 m) at 1 kHz.
			4. Fire Alarm: UL 464, CAN/ULC-S525 Fire Alarm.
			5. Voltage DC: 24V dc 10-30V dc; Stage Switching: DC Units: negative or positive.
			6. Voltage DC: 48V dc 38-58V dc; Stage Switching: DC Units: negative or positive.
			7. Voltage AC: 115V ac 50/60Hz; Stage Switching: AC Units: common supply line.
			8. Voltage AC: 230V ac 50/60Hz; Stage Switching: AC Units: common supply line.
			9. Ingress Protection (IP) Rating per EN60529: IP66.
				1. Type rating per UL50E / NEMA250: 4/4X/3R/13.
			10. Cable entries: 2 x M20 x 1.5 mm threaded gland entries.
				1. Adaptors available to 1/2 inch NPT, 3/4 inch NPT and M25. Haz loc rated.
			11. Terminals: 20-14 AWG (0.5 to 2.5 sq mm).
			12. Grounding stud: M5.
			13. Operating Temperature: Class I Div 2: -40 to 158 degrees F (-40 to 70 degrees C).
				1. All other markings: -40 to 122 degrees F (-40 to 50 degrees C).
			14. Relative humidity: 95 percent.
			15. Weight: DC: 4.96 Ibs (2.48 kg).
			16. Weight: AC: 5.46 lbs (2.73 kg).
	1. COMPACT LOW CURRENT INDOOR WALL MOUNTED HORNS, STROBES AND HORN/STROBES
		1. Basis of Design: System Sensor L-Series line of wall-mount horns, strobes, and horn strobes with lower current draws and modern aesthetics. Small profile devices.
			1. Plug-in designs with minimal intrusion into the back box.
			2. Universal Mounting Plate: Onboard shorting spring. Installers can test wiring continuity before the device is installed.
			3. Standards Compliance:
				1. Listed: UL, ULc, and State of California Fire Marshall. For wall mounting only.
			4. General:
				1. Operation Power: Automatic selection of 12 or 24 Volt.

\*\* NOTE TO SPECIFIER \*\* Full Wave Rectified (FWR) voltage is a non-regulated, time-varying power source that is used on some power supply and panel outputs.

* + - * 1. Strobe products will operate at 12 V nominal only for 15 cd and 30 cd.
				2. Nominal Voltage: Regulated 12 DC or regulated 24 DC/FWR.

Operating Voltage Range:

Nominal 12 Vdc; 8 to 17.5 V.

Nominal 24 Vdc; 16 to 33 V.

Operating Voltage Range MDL3 Sync Module:

Nominal 12 Vdc; 8.5 to 17.5 V.

Nominal 24 Vdc; 16.5 to 33 V.

Input Terminal Wire Gauge: 12 to 18 AWG.

* + - * 1. Electrically Compatible with legacy SpectrAlert and SpectAlert Advance devices.
				2. Compatible with MDL3 sync module.
				3. Housings: White and red plastic. Tamper-resistant construction.

Plug-in design with minimal intrusion mounting into the back box.

* + - * 1. Mounting L-Series products mount into the following back boxes:

Back Box: Single gang 2 x 4 x1-7/8 inch rectangular.

Back Box: 2 x 4 x 1-7/8 inch rectangular.

Back Box: 4 x 4 x 1-1/2 inch square.

Back Box: 4 inch octagon back box.

Back Box: Double-gang back box.

* + - * 1. Universal Mounting Plate: For standard and compact wall units.

Mounting plate includes a Shorting Spring. Allows wiring continuity to be checked before device installation.

* + - * 1. Notification Appliance Circuit Wiring: Terminates at universal mounting plate.
				2. SyncCircuit Module Accessory:

Alarms will be powered from a non-coded notification appliance circuit output and operate on a nominal 12 or 24 volts.

12-volt-rated notification appliance circuit outputs operate between 8.5 and 17.5 volts.

24-volt-rated notification appliance circuit outputs operate between 16.5 and 33 volts.

* + - * 1. Operating Temperature Range: 32 to 120 degrees F (0 to 49 degrees C).
				2. Relative Humidity Range: 10 to 93 percent non-condensing.
			1. Horns:
				1. Horn Rating: 88+ dBA at 16 volts.
				2. Rotary Switch: For horn tone and two volume selections.
				3. Two audibility options and an option to switch between a temporal three pattern and a non-temporal, continuous, pattern. Options: Set with position switch.
				4. Horn Dimensions (LxWxD): 5.6 x 4.7 x 1.25 inches (143 x 119 x 32 mm).
				5. Compact Horn Dimensions (LxWxD): 5.25 x 3.45 x 1.25 inches (133 x 88 x 32 mm).

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - * 1. Horn Model, HRL: Red.
				2. Horn Model, HWL: White.
				3. Horn Model, HGRL: Compact, Red.
				4. Horn Model, HGWL: Compact, White.
			1. Strobe Light: Xenon flash tube and associated lens/reflector system flashing at 1 Hz (one flash per second) over the strobe's entire operating voltage range.
				1. Listed to UL 1971 and approved for fire protective service.
				2. Wired as a primary-signaling notification appliance and comply with the Americans with Disabilities Act requirements for visible signaling appliances.
				3. Wall Unit Field Selectable Candela Settings: 15, 30, 75, 95, 110, 135, and 185.
				4. Wall-Mount Dimensions, Including Lens (LxWxD): 5.6 x 4.7 x 1.91 inches (143 x 119 x 49 mm).
				5. Compact Wall-Mount Dimensions, Including Lens (LxWxD): 5.26 x 3.46 x 1.91 inches (133 x 88 x 49 mm).

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - * 1. Wall Strobe Model, SRL: Red.
				2. Wall Strobe Model, SWL: White.
				3. Wall Strobe Model, SGRL: Compact, Red.
				4. Wall Strobe Model, SGWL: Compact, White.
				5. Wall Strobe Model, SRL-P: Red, Plain.
				6. Wall Strobe Model, SWL-P: White, Plain.
				7. Wall Strobe Model, SRL-SP: Red, FUEGO.
				8. Wall Strobe Model, SWL-CLR-ALERT: White, ALERT.
			1. Horn Strobe Combination:
				1. Listed to UL 1971 and UL 464 and approved for fire protective service.
				2. Wired as a primary-signaling notification appliance and comply with the Americans with Disabilities Act requirements for visible signaling appliances.
				3. Strobe Light: Xenon flash tube and associated lens/reflector system flashing at 1 Hz (one flash per second) over the strobe's entire operating voltage range.
				4. Horn: Two audibility options and an option to switch between a temporal three pattern and a non-temporal, continuous, pattern.

Options are set by a multiple position switch.

Horn on horn strobe models: Operate on a coded or non-coded power supply.

* + - * 1. Wall-Mount Dimensions, Including Lens (LxWxD): 5.6 x 4.7 x 1.91 inches (143 x 119 x 49 mm).
				2. Compact Wall-Mount Dimensions, Including Lens (LxWxD): 5.26 x 3.46 x 1.91 inches (133 x 88 x 49 mm).

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - * 1. Wall Horn Strobe Model, P2RL: 2-Wire, Red.
				2. Wall Horn Strobe Model, P2WL: 2-Wire, White.
				3. Wall Horn Strobe Model, P2GRL: 2-Wire, Compact, Red.
				4. Wall Horn Strobe Model, P2GWL: 2-Wire, Compact, White.
				5. Wall Horn Strobe Model, P2RL-P: 2-Wire, Red, Plain.
				6. Wall Horn Strobe Model, P2WL-P: 2-Wire, White, Plain.
				7. Wall Horn Strobe Model, P2RL-SP: 2-Wire, Red, FUEGO.
				8. Wall Horn Strobe Model, P2WL-SP: 2-Wire, White, FUEGO.
			1. Synchronization Module: SyncCircuit model MDL3 listed to UL 464 and approved for fire protective service.
				1. Synchronizes SpectrAlert strobes at 1 Hz and horns at temporal three.
				2. When Operating Strobes: Will silence horns on horn strobe models over a single pair of wires.
				3. Mounting to Back Box: 4-11/16 x 4-11/16 x 2-1/8 inch.
				4. Control two, Style Y, class B, circuits or one Style Z, class A, circuit.
				5. Synchronizes multiple zones.
				6. Daisy chain two or more synchronization modules together. Will synchronize all the zones they control.
				7. Will not operate on a coded power supply.
	1. FLAME DETECTORS.
		1. Basis of Design: Model D371 3IR+UV. Multi-Spectrum Flame Detector as Manufactured by Conspec Inc. A stand-alone fire and flame detector. Responds to Hydrocarbon, Non-Hydrocarbon, and Hydrogen fires while rejecting false alarm sources. Senses UV radiation and infrared radiation in 3 discrete bands of IR spectrum. Flame response and false source rejection is accomplished by utilizing the Convolution Method and Advanced DSP (Digital Signal Processing) in conjunction with hard coded algorithms identifying specific wavelengths of energy.
			1. Approvals and Classifications: FM/CFM/CSFM Approved.
				1. usFM: Certification No: FM17US0336X.

Class I, Div. 1, Groups A, B, C and D.

Ta: -40 to 110 degrees C.

Class II.

T4: -40 to 85 degrees C.

T5: -40 to 75 degrees C.

T6: -40 to 60 degrees C.

Class I, Zone 1 AEx db be.

IIC T4 Gb, Ta = -40 to 110 degrees C AEx tb.

IIIC 135 degrees C Db T4, Ta = -40 to 110 degrees C.

T4: -40 to 85 degrees C.

T5: -40 to 75 degrees C.

T6: -40 to 60 degrees C.

Type 4X and IP66/IP67.

* + - * 1. CanadaFM: Certification No: FM17CA0120X.

Class I, Div. 1, Groups A, B, C and D; T4.

Ta = -40 to 110 degrees C.

Class II/III, Groups E, F and G; T4.

Ta = -40 to 110 degrees C.

T4 = -40 to 85 degrees C.

T5 = -40 to 75 degrees C.

T6 = -40 to 60 degrees C.

Class I, Db T4.

Ta = -40 to 110 degrees C.

T4 = -40 to 85 degrees C.

T5 = -40 to 75 degrees C.

T6 = -40 to 60 degrees C.

Type 4X and IP66 and IP67.

Meets or Exceeds MIL-STD 810C.

In Compliance with FM3260-2003.

Meets SIL 2 requirements.

RFI and EMC compliant.

* + - 1. Field-of-View: 90 degrees horizontal and vertical.
			2. Spectral Sensitivity UV: 180 to 260 nanometers.
			3. Infrared (IR): 2 to 5 microns; 3 discrete bands.
			4. Flame Detection Range: 12 x 12 inch (305 x 305 mm) n-Heptane fire (hydrocarbon, non-hydrocarbon, and hydrogen fires); 200 ft (61 m). 36 inch (914 mm) Hydrogen Plume: 100 ft (30.5 m).
			5. Response Time: Typically 3 to 5 seconds.
			6. Enclosure: NEMA 4 and 4X, IP66/IP67,m explosion proof for indoor/outdoor Class 1, Div. 1 (Zone 1) installations.
				1. Enclosure Material: 316 Stainless Steel.
				2. Weight: 10 lbs (4.5 kg).

\*\* NOTE TO SPECIFIER \*\* Swivel arm is optional. Delete if not required.

* + - * 1. Mounting, Swivel Arm: Stainless Steel.
			1. Features and Benefits:
				1. Output Relays: Warning / Alarm / Fault / Auxiliary relays, 0 to 20 mA and RS485.
				2. 200 event history log and 6 FireGraphs in FRMA memory.
				3. Adjustable Time/Verification Delay up to 20 seconds.
				4. Automatic Self-Test checking electronic circuitry and Optical Path Integrity test with OptiRadar.
				5. Solar blind.
				6. High False Alarm immunity to external non-fire sources.
			2. Electrical:
				1. Operating Voltage: 24 VDC nominal (18 to 31), Regulated.
				2. Power Consumption: Standby: 60 mA at 24 Vdc.
				3. Alarm: 90 mA at 24 Vdc.
				4. SPDT: Contacts rated 2A at 24 Vdc.
				5. Alarm and Auxiliary Relays: Programmable.
				6. Fault Relay: Energized.
				7. Adjustable Time/ Aux relay setting .3, 3, 10, 20 seconds.
				8. Verification delay.
				9. Analog Output: 0-20 mA Stepped, Source.
				10. Communication: RS485 ModBus.
				11. Visual Indications: Normal: Green LED. Alarm: Red LED.
				12. Conduit Entries: Two, M25. 1 M25 x 3/4 inch NPT adaptor Included.
				13. Wiring: 12 AWG (3.3 sq mm), 22 AWG (0.33 sq mm).

\*\* NOTE TO SPECIFIER \*\* Heater is optional. Delete if not required.

* + - * 1. Heater: 120 mA additional.
			1. Environmental:
				1. Relative Humidity Range, Non-Condensing: 5 to 95 percent.
				2. Operation Temperature Range: -40 to 185 degrees F (-40 to 85 degrees C).

With Heater: -55 to 185 degrees F (-48.3 to 85 degrees C).

* + 1. Basis of Design: Model D381 3IR+UV. Multi-Spectrum Flame Detector as Manufactured by Conspec Inc. A stand-alone fire and flame detector. Responds to Hydrocarbon, Non-Hydrocarbon, and Hydrogen fires while rejecting false alarm sources. Senses UV radiation and Infrared radiation in 3 discrete bands of IR spectrum. Flame response and false source rejection is accomplished by utilizing the Convolution Method and Advanced DSP (Digital Signal Processing) in conjunction with hard coded algorithms identifying specific wavelengths of energy. High-speed detection for liquid spray paint and powder coating applications and wherever fast detection time is required.
			1. Approvals and Classifications:
				1. FM/CFM/CSFM Approved.

USA FM: Certification No: FM17US0336X.

Canada FM.

* + - * 1. VE Mark.
				2. Meets or exceeds MIL-STD 810C.
				3. In compliance with FM3260-2003.
				4. Meets SIL 2 requirements.
				5. Meets or Exceeds MIL-STD 810C.
				6. Vibration: In compliance with FM 3260-2003.
				7. RFI and EMC compliant.
			1. Field-of-View: 90 degrees horizontal and vertical.
			2. Spectral Sensitivity UV: 180 to 260 nanometers.
			3. Infrared (IR): 2 to 5 microns; 3 discrete bands.
			4. Flame Detection Range: With high false alarm immunity.
				1. FM: 12 x12 inch (305 x 305 mm) n-Heptane Fire: 40 ft (24.4 m).
				2. DI: 12 x 12 inch (305 x 305 mm) n-Heptane Fire or IPA: 200 ft (61 m) within approximately 3 to 5 seconds.
			5. Responds to Hydrocarbon and Non-Hydrocarbon Fires: 80 ft (48.8 m).
			6. Enclosure: Watertight NEMA 4 (IP66/67). Material: 360 Copper-Free Aluminum.
				1. Finish: Powder coated. Color: Red.
				2. Weight: 2.5 lbs. (1.1 kg).
			7. Mounting: Stainless steel swivel arm. 6.6 lbs (3 kg).
			8. Features and Benefits:
				1. Standard Outputs: Warning / Alarm / Fault / Auxiliary relays and RS-485 ModBus.

Analog Output: 0-20 mA option.

* + - * 1. 200 event history log and 6 FireGraphs.
				2. Adjustable Time/Verification Delay up to 20 seconds.
				3. Automatic Self-Test checking electronic circuitry and Optical Path Integrity test with OptiRadar.
				4. Solar blind.
				5. High False Alarm immunity to external non-fire sources.
				6. Test Mode for manual testing.
				7. Screw Terminal Block for easy connections.
				8. Heater Option to avoid condensation and icing.
				9. High False Alarm immunity to external non-fire sources.
			1. Electrical:
				1. Operating Voltage: 24 Vdc nominal (18 to 31), Regulated.
				2. Power Consumption: Standby: 60 mA at 24 Vdc.
				3. Alarm: 90 mA at 24 Vdc.
				4. SPDT: Contacts rated 2A at 24 Vdc.
				5. Alarm and Auxiliary Relays: De-Energized.
				6. Fault Relay: Energized.
				7. Adjustable Time/ Aux relay setting .3, 3, 10, 20 seconds.
				8. Verification Delay.
				9. Analog Output: 0-20 mA stepped source.
				10. Communication: RS485 ModBus.
				11. Visual Indications: Normal: Green LED. Alarm: Red LED. Fault Amber LED.
				12. Conduit Entries: Standard: One, M25.
				13. Wiring: 12 AWG (3.3 sq mm), 22 AWG (0.33 sq mm).

\*\* NOTE TO SPECIFIER \*\* Heater is optional. Delete if not required.

* + - * 1. Heater: 120 mA additional.
			1. Environmental:
				1. Relative Humidity Range, Non-Condensing: 5 to 95 percent.
				2. Operation Temperature Range: -40 to 185 degrees F (-40 to 85 degrees C)

With Heater: -55 to 185 degrees F (-48.3 to 85 degrees C).

* 1. SMOKE DETECTOR
		1. Basis of Design: FFE Ltd. Fireray 3000 End-to-End Infrared Optical Beam Smoke Detector and manufactured by Conspec. Projected beam type smoke detector. One or two transmitters, two receivers and a single low level remote control unit. Offers cost effective protection of large, open area spaces with high ceilings. Suited to applications where access to ceiling mounted smoke detectors presents practical difficulties. For use where line of sight for infra-red detection path is narrow and building structure uses reflective surfaces.
			1. Standards Listings: UL 268, UL-S3417, ULC-S3417, CSFM - 7260-1508-105, and Maryland - 2243.
			2. Separate transmitter and receiver heads.
			3. Integral laser alignment in receiver.
			4. 2-wire interface between controller and receiver.
			5. Single and twin channel capability.
			6. Separate fire and fault relays per detector.
			7. Programmable sensitivity and fire threshold.
			8. Automatic gain control (AGC) for drift compensation.
			9. Knockouts for ease of installation and wiring.
			10. Transmitter powering from controller.
			11. Engineering Requirements: A 4-wire 24 Vdc device used with a Nationally Recognized Testing Laboratory's Listed and separately supplied 4- wire control panel.
				1. Operating Range: 16.5 to 393 ft. (5 to 120 m).

Lateral Spacing per NFPA 72: 60 ft (18.288 m).

* + - * 1. Temperature Range: -4 to 131 degrees F (-20 to 55 degrees C).
				2. Relative Humidity, Non-Condensing: 93 percent.
				3. Receiver: Built-in laser pointer to assist in optimum alignment.

Beam Detector: Automatic gain control, which compensates for gradual signal deterioration from dirt accumulation on the lenses.

Receiver Heads: A Wide Field of View ensures unit is always receiving maximum signal available.

* + - * 1. Low level remote display and control unit with LCD read-out for set-up, reporting and testing up to 2 separate sets of receiver heads.
				2. System Capability:

Sending separate Trouble and Alarm signals for each of the sets of receiver `heads.

Programming Alarm Thresholds: 25 to 60 percent in 1 percent increments.

Programming Delay to Fault: From 2 to 30 seconds in 1 second increments.

Programming Delay to Alarm: From 2 to 30 seconds in 1 second increments.

* + - * 1. System Test and Acceptance: Executed using UL/ ULC approved internal electronic obscuration fire test.
				2. Light Cancellation Technology: Cancels unwanted light, including sunlight, sodium lamps, and fluorescent lighting.
				3. Housing Material, Transmitter / Receiver / Controller: UL94 V2 PC
			1. Technical Requirements:
				1. Operating Voltage Range: 12 to 36 Vdc &#177;10 percent.
				2. Operating Controller Current (with 1 or 2 Receivers): 14 mA, constant.
				3. Operating Transmitter Current: 8 mA, per Transmitter.
				4. Power Down Reset Time: Greater than 20 seconds.
				5. Fire and Fault Relay Contacts: Resistive VFCO 2A at 30 Volts DC.
				6. Optical Wavelength: 850 nm.
				7. LED Indications on Control Unit: Red: Fire, Amber: Fault, Green: System OK.
				8. Receiver: Alignment LEDs for single person alignment.
				9. IP Rating: IP54.
				10. Cabling between each Receiver and Controller: 18 to 14 AWG 1-Pair Twisted, Jacketed.
				11. Maximum Cable Distance between Receiver and Controller: 330 Feet (100 m)
			2. Dimensions:
				1. Control Unit (WxHxD): 7.99 x 4.88 x 2.81 inches. (203 x 124 x 71 mm).

Weight: 1.34 lbs (608 grams).

* + - * 1. Transmitter and Receiver: 3.07 x 3.03 x 6.33 inches (78 x 77 x 161 mm).

Weight: 0.456 lbs (207 grams).

* + 1. Basis of Design: FFE Ltd. Fireray 5000 Motorized Reflective Optical Beam Smoke Detector and manufactured by Conspec. A 4-wire 24 Vdc device to be used with a separately supplied 4-wire control panel.
			1. Auto-aligning, self-correcting infrared reflective Beam Smoke Detector. Up to 2 Detector heads can report to a single ground level controller. A system controller houses two pairs of fire and trouble relays, one per Detector. After Detector head installation, an integral Laser is activated to locate the reflective Prism.
			2. Auto-Align Function: Ensures alignment and maximum signal from Beam installation.
			3. Building Movement Tracking: Automatically steers and maintains Beam position to optimize performance.
			4. Transmitter Element Generated Signal: Is reflected by the Prism back to the Receiver where it is analyzed. An internal microprocessor determines an alarm condition when a predetermined level obscuration is reached.
			5. Mount so Beam projects between 19 inches (483 mm) and 24 inches (610 mm) below the ceiling. Lateral detection may be up to 30 ft (9.144 m) on either side of the Beam, providing a maximum total coverage area of up to 19,800 square feet; 60 x 330 ft ( 18.288 x 100.584 m).
			6. Installations Complying with UL268/NFPA72: The maximum distance of Detector and Reflector from the ceiling must be 10 percent of the distance between floor and ceiling.
			7. Standards Compliance:
				1. Listed to UL 268.
			8. Engineering Specification:
				1. Up to two integrated Transmitters, Receiver Detector heads, and single Low-Level remote control unit.

Detector Operation Range: 26.2 to 328 ft (8 to 100 m).

System Temperature Range: -4 to 131 degrees F (-20 to 55 degrees C).

Beam Detectors:

Heads have integral built-in laser pointer for Prism mounting.

Automatic Gain Control: Compensate for gradual signal deterioration from dirt accumulation on the lenses and Prisms.

Include Building Movement Tracking self-correcting motorized head feature to ensure unit is always receiving the maximum signal available, and automatically compensate for building shift.

* + - * 1. Low-Level Remote Display and Control Unit: LCD read-out for set-up, reporting and testing of up to 2 separate Detector heads.

Separate Trouble and Alarm relays for each of the 2 channels.

* + - * 1. Program Alarm Thresholds: 10 to 60 percent in 1 percent increments.
				2. Programmable Delay to Fault: From 2 to 30 seconds in 1 second increments.
				3. Programmable Delay to Alarm: From 2 to 30 seconds in 1 second increments.
				4. System Testing and Acceptance: Carried out by using UL/ULC/FM approved internal electronic obscuration fire test.
			1. Attributes:
				1. Detector Heads: Up to 2, reporting to one Low-Level Controller.
				2. Range: 26.2 to 328 ft (8 m to 100 m).
				3. Long Range Prism Kit: Extends range from 160 to 330 ft (50 to 100 m).
				4. Built in laser assisted prism mounting.
				5. Auto-Alignment: 2 to 4 minutes per head.
				6. Building Movement Tracking: Auto-Correction due to building shift.
				7. Contamination compensation.
				8. Settings: Password protected settings.
				9. Low Current Draw: 5 to 8.5 mA.
				10. Conduit Knock-Outs on the System Controller: Built-in 1/2 inch or M-20.
				11. Programmable Alarm Thresholds: 10 to 60 percent in 1 percent increments.
				12. Programmable Fault and Alarm Delay: 2 to 30 seconds.
			2. Construction:
				1. Housing: Flame Retardant PC: UL94 V0.

IP Rating: IP54.

Finish: Light Grey.

Finish: Black.

Weight: Head and Controller 3.24 lbs (1.47 kg).

Dimensions: (HxLxW).

Head: 5.28 x 5.16 x 5.28 inches (134 x 131 x 134 mm).

Controller: 3.43 x 9.06 x 7.95 inches (87 x 230 x 202 mm).

Prism: 0.37 x 4.13 x 3.94 inches (9.5 x 105 x 100 mm).

* + - * 1. Electrical Requirements:

Primary Input Power: 14 to 36 Vdc.

Standby Current:

Low Current Mode: 5 to 8.5 mA at 24 Vdc depending on number of detector heads used.

High Current Mode: 37 mA at 24 Vdc.

Alarm Current: 5 to 8.5 mA at 24 Vdc depending on number of detector heads used.

Relay Contacts: 1A at 30 Vdc resistive.

Reset Time: 5 seconds maximum.

Start Up Time: 45 seconds.

Optical Wavelength: 850 nm.

Alarm Threshold: 10 to 60 percent. Default: 35 percent.

Temperature Rating: -4 to 131 degrees F (-20 to 55 degrees C).

For UL Listed Installations: 32 to 100 degrees F (0 to 38 degrees C).

Relative Humidity Non-Condensing: 0 to 93 percent.

Range: 26.2 ft to 328 ft (8 m to 100 m).

Cabling Between each Detector and Controller: 18-14 AWG 1-Pair.

* + 1. Basis of Design: FFE Ltd. Fireray One, A Standalone Beam Smoke Detector and manufactured by Conspec. A standalone beam smoke detector that prioritizes ease of installation.
			1. No specialist tools or knowledge needed for installation and operation.
			2. Auto-Alignment: Steers laser onto the Reflector, then via a switch, aligns itself.
			3. One person installation.
			4. Standards Compliance:
				1. Listed: UL, ULc, and State of California Fire Marshall.
			5. Detection Range:
				1. 16 to 164 ft (5 to 50 m).
				2. 16 to 394 ft (5 to 120 m) with Reflective Long Range Kit.
			6. Alignment Methods:
				1. Manual Alignment: Optional.
				2. Laser Assisted, Auto-Alignment:

Auto-Alignment Protocol: Background check. Box search. Adjust and Center.

Integrated Laser Alignment: 650 nm visible. Class 3R Less than 5 mW.

* + - * 1. Building Movement Tracking: Compensates for natural shifts in alignment from building movement.
				2. Contamination Compensation: Compensates for gradual build-up of contamination on the optical surfaces.
				3. Light Cancellation Technology: Compensates for high levels of sunlight and artificial lighting.
				4. Optical Wavelength, Smoke Detection: 850 nm near infrared (invisible).
				5. Dynamic Beam Phasing: Allows beam detectors to be mounted facing each other with the reflectors in the middle. Eliminates false alarms caused by crosstalk between beams.
				6. Signal Output: Individual Alarm and Fault relays (VFCO) 0.5 A at 30 Vdc.
			1. Programmable User Settings:
				1. Alarm Response Threshold Levels:

25 percent (1.25 dB): Fastest response to smoke.

35 percent (1.87 dB): Default value.

55 percent (3.46 dB): High immunity to false alarms, slow response to smoke.

85 percent (8.23 dB): Highest immunity to false alarms, slowest response to smoke.

Configured via the integrated user interface.

* + - * 1. Delay to Alarm: 10 seconds, for momentary partial obstruction of beam path.
				2. Delay to Fault: 10 seconds, for momentary obstruction of beam path.
			1. User Features:
				1. Integrated User Interface: Alignment mode switch, alignment directional buttons and configuration switches for alarm response threshold.
				2. Alignment Status Indication: 2 Green LEDs and 1 Yellow LED.
				3. System Status Indication:

Normal Operation: Green LED flashing every 10 seconds.

Alarm Condition: Red LED flashing every 5 seconds.

Fault Condition: Yellow LED flashing every 10 seconds for obscuration.

Fault Condition: Yellow LED flashing every 5 seconds for contamination.

* + - * 1. Cleaning: Flat front face with enclosed optics. Cleaning the optics does not affect alignment.
			1. Design Requirements:
				1. Beam path clearance: 3.3 ft (1 m) in diameter from center line between Detector and Reflector.
				2. Lateral Spacing Between Detectors: 60 ft (18.3 m) maximum per NFPA 72.
				3. Detector Location: In the top 10 percent of the floor to ceiling height, unless otherwise stipulated.
				4. Detector Dimensions (WxHxD): 5.12 x 7.13 x 5.28 inches (130 x 181 x 134 mm).
				5. Reflector Dimensions:

Separation Distance: Up to 164 ft (50 m): 3.94 x 3.94 x 0.36 inches (100 x 100 x 9 mm).

Separation Distance up to 393.6 ft (120): Four reflectors 7.88 x 7.88 x 0.36 inches (200 x 200 x 9 mm) in square pattern.

* + - * 1. Product Weight:

Detector: 1.55 lbs (0.7 kg).

Reflector: 0.22 lbs (0.1 kg).

* + - * 1. Multi-Detector Arrangement: Dynamic Beam Phasing allows for Detectors to face each other with the reflectors in the middle.
				2. Housing Color: White RAL9016, UV stable.
			1. Electrical Specifications:
				1. Operating Voltage: 14 to 36 Vdc.
				2. Operating Current:

All Operational Modes: 5 mA.

Fast Alignment Mode: 33 mA.

* + - 1. Field Wiring:
				1. Cable Gauge and Type: 2 core, dedicated, 24 to 14 AWG (0.5 to 1.6 mm) System compatible with fireproof and non-fireproof cable meeting local installation standards.
				2. Cable entry: 3 knock-out locations capable of accepting M20, 1/2 inch (13 mm) and 3/4 inch (18 mm) glands 4 drill out locations capable of accepting glands up to 0.82 inches (21 mm) diameter.
			2. Test and Maintenance:
				1. Optical Alarm test: Using Commissioning and Maintenance Kit accessory.
			3. Environmental Requirements:
				1. Operating temperature: -4 to 131 degrees F (-20 to 55 degrees C)
				2. Storage temperature: -40 to 185 degrees F (-40 to 85 degrees C)
				3. Relative Humidity Non-Condensing or Icing: 0 to 93 percent.
				4. IP Rating: IP55
				5. Housing Flammability Rating: UL94 V0 polycarbonate.
			4. Optical Requirements:
				1. Fault Level / Rapid Obscuration (Delta: 2 seconds or less): 85 percent or greater.
				2. Maximum Angular Alignment of Reflective Detector: &#177;4.5 degrees (&#177;70 degrees with adjustment bracket accessory)
				3. Maximum Angular Misalignment of Reflective Detector: &#177;0.5 degrees.
				4. Maximum Angular Misalignment of Reflector: &#177;5 degrees.
			5. Accessories:

\*\* NOTE TO SPECIFIER \*\* Delete accessories not required.

* + - * 1. Commissioning and Maintenance Kit.
				2. Reflective Detector Adjustment Bracket.
				3. Fireray One Protective Cage.
				4. Single Reflector Adjustment Bracket.
				5. Four Reflector Adjustment Bracket.
				6. Reflector Wall Bracket: White.
				7. Reflector Wall Bracket: Black.
				8. Fireray One Anti-Condensation Heater.
				9. Reflector Anti-Condensation Heater.
				10. Fireray One Back Box.
				11. Double Gang Electrical Box Cover Plate.
	1. HEAT DETECTION CABLING SYSTEM
		1. Basis of Design: SafeCable digital linear heat detection (LHD) cable and manufactured by Conspec. A combination of advanced polymer and digital technologies detects heat anywhere along its entire length. Compatible with any listed addressable or conventional panel. A twisted pair of extremely low resistance, 0.05 ohm per ft (0.164 ohms per m) trimetallic conductors, sheathed in new advanced thermal polymers.
			1. Polymers: Chemically engineered to break down at specific fixed temperatures allowing the twisted conductors to make contact and initiate an alarm at the control panel without any calibration for changes in the ambient temperature.
				1. The polymer used for the protective outer coating of SafeCable is chemically inert and UV protected. This allows for SafeCable to be used in an extremely wide variety of installations and hazards.
			2. The Distance Locating Option: Allows control panel to identify and display the location, in feet or meters from the panel, where the heat source interacted with the detection cable.
			3. Single, Multiple, and cross zoned Distance locating available
			4. Multiple alarm temperatures can be mixed on the same zone
			5. Total zone length replacement unnecessary after alarm
			6. Custom lengths available.
			7. Standards Compliance:
				1. Listed: UL, ULc, FM Approved, and State of California Fire Marshall.
			8. Up to 15,000 linear feet (3,048 m) of SafeCable per zone.
			9. Approved for up to 35 ft (10.7m) spacing.
			10. 0.05 ohms/ft (.164 ohms/m) resistance for twisted pair wire.
			11. Compatible with Fire Alarm Control and Releasing Panels.
			12. Use with addressable contact monitor modules.
			13. Multiple Alarm Temperatures:
				1. 155 degrees F( 68 degrees C).

Listed Spacing cULus: 35 ft (10.7 m).

Listed Spacing FM: 30 ft (9 m).

Maximum Install Temperature: Up to 113 degrees F (45 degrees C).

* + - * 1. 172 degrees F(78 degrees C).

Listed Spacing cULus: 35 ft (10.7 m).

Listed Spacing FM: 30 ft (9 m).

Maximum Install Temperature: Up to 122 degrees F (50 degrees C).

* + - * 1. 190 degrees F(88 degrees C).

Listed Spacing cULus: 35 ft (10.7 m).

Listed Spacing FM: 30 ft (9 m).

Maximum Install Temperature: Up to 158 degrees F (70 degrees C).

* + - * 1. 220 degrees F(105 degrees C).

Listed Spacing cULus: 35 ft (10.7 m).

Listed Spacing FM: 25 ft (7.6 m).

Maximum Install Temperature: Up to 190 degrees F (70 degrees C).

* + - * 1. 365 degrees F(.185 degrees C).

Listed Spacing cULus: 35 ft (10.7 m).

Listed Spacing FM: 25 ft (7.6 m).

Maximum Install Temperature: Up to 305 degrees F (152 degrees C).

* + - 1. Attributes:
				1. Diameter: 1/8 inches (3 mm).
				2. Weight: Nominal 15 lbs per 1000 ft. (6.8 kg per 305 m).
				3. Bend Radius: 3 inches (76 mm).
				4. Max. Voltage Rating: 30 Vac or 42 Vdc.
				5. Resistance: .05 ohms per ft (.164 ohms per m).
				6. Operating Temperature: -75 degrees F(-60 degrees C) to Alarm Temperature.

\*\* NOTE TO SPECIFIER \*\* Delete sheathing options not required.

* + - * 1. PVC Sheathing: Multipurpose flame retardant outer jacket resistant to common chemicals while maintaining flexibility at low temperatures.
				2. NXT Nylon Sheathing: For industrial environments that need a second layer of heavy duty abrasion resistance. High UV resistance for outdoor applications.
				3. Polypropylene Sheathing: For harsh chemical environments such as chemical plants. Will not react to water, detergents, acids, or bases.
				4. GuideWire Sheathing: A stainless steel cable wound around SafeCable used to support SafeCable over long spans where there is nothing from which to support the cable. GuideWire can be used on any temperature cable or coating.

Guidewire Minimal Support: 15 ft (4.6 m) intervals.

* + 1. Basis of Design: DLM-Z2 SafeCable Alarm Distance Locator Module and manufactured by Conspec. Use With Any Addressable or Conventional System. Compatible with Any Listed Fire Alarm Panel, Can Be Used As A Single or Multi-Zone Distance Locator.
			1. Dual Zone Module: For monitoring two zones of the SafeCable Digital Linear Heat Detection (LHD) Cable.
			2. If an overheat or fire situation triggers either zone of the LHD cable the unit automatically calculates and displays the distance along the cable, in feet and meters, to the alarm point.
			3. The two zones can operate independently of each other, or in interlock mode and a separate alarm and normally conducting fault output are provided for each zone. The unit is intended to be installed between the Digital Linear Heat Detection cable and a conventional or addressable fire alarm control panel. It has power, fault, and alarm lights, as well as volt free outputs for fault and alarm, corresponding to each zone. It may also be connected to a industrial process control system using the two wire RS-485 Modbus RTU output.
			4. UL Approved.
			5. Can be One or Two Zones.
			6. Single or Cross Zone.
			7. Displays in Feet or Meters.
			8. Built in MODBUS Interface.
			9. Each Zone Can Use The Same or Different Temperature Cables.
			10. If Two Different Temperatures Are Used, one can be a Pre-alarm.
			11. Can be used with any UL Listed Panel.
			12. Dimensions (H x W x D): 7.1 x 4.72 x 2.38 inch (180 x 120 x 60.5 mm).
			13. Weight: 1 lb. (0.45 kg).
			14. Operating Temperature: -4 to 122 degrees F (-20 to 50 degrees C).
			15. Power Requirements:
				1. Normal Operation: 8 mA at 24 Vdc.
				2. Alarm Point Locating: 28 mA at 24 Vdc.
			16. Systems: Addressable or Conventional.
			17. Enclosure: NEMA 4x.
			18. Max. LHD length: 15,000 ft. (4,571 m).
		2. Basis of Design: Junction and ELR Boxes No, RG5222, as manufactured by Conspec. For Connecting LHD Cable to Leader Wire and End of Line Resistor. Recommended for All Outdoor Splices. A nonmetallic junction and termination box. UL listed with a NEMA 4X, (IP66) rating and manufactured from PVC or PPO thermoplastic.
			1. Foam-in-place gasketed lids attaches with stainless steel screws.
			2. Must use a Strain Relief Connector for all Linear Heat Detection Cable penetrations made through the enclosure wall.
			3. A 7/8 inch (22 mm) hole is required to insert the Strain Relief Connector which secures and prevents damage to the LHD Cable, and seals the penetration from moisture and dirt helping prevent corrosion.
			4. Requires a Screw Terminal, two point or six point, for connecting the leader wire from the panel to the beginning of the LHD Cable run.
			5. Screw Terminals are also used to securely connect the LHD Cable to the end of line resistor located at the end of the LHD Cable run.
			6. Dimensions (W x H x D): 4 x 4 x 2 inch (102 x 102 x 51mm).
			7. Weight: 1.00 lbs (0.46 kg).
			8. Current Limitation: Resistive.
			9. Rated Voltage: -4 to 140 degrees F(-20 to 60 degrees C).
			10. Mounting Location: Non-Hazardous or Class 1 Division 2.
		3. Basis of Design: Linear Heat Detection Switch, RG5223, as manufactured by Conspec. For annual system testing. not recommended for systems ! connected directly to a suppression system.
			1. Standards Compliance: UL cULus.
			2. Test Switches: Placed at end of a Linear Heat Detection Cable zone and used for commissioning, system inspections, and system testing.
			3. Switch Housing: RedGear Test Box. Heavy duty nonmetallic NEMA 4 (IP66) termination box.
			4. A foam-in-place gasketed lid attaches with stainless steel screws.
			5. All junction and termination boxes must use a Strain Relief Connector for all LHD Cable penetrations made in the test box.
			6. No hole saws are required to insert the Strain Relief Connector which secures and prevents damage to the LHD Cable, and seals the penetration from moisture and dirt helping prevent corrosion.
			7. Specifications, Test Switch:
				1. Dimensions (WxHxD): 4-5/8 x 4-1/8 x 4-5/8 inches (117 x 105 x 117 mm).
				2. Weight: 1.07 lbs (0.49 kg).
				3. Current Limitation: Resistive.
				4. Rated Voltage: 24 to 28 VDC max.
				5. Rated Current: 100 mA max.
				6. Leakage Current: 1iA unless stated otherwise.
				7. Replaceable Fuse Rating: 160 mA per channel.
				8. Mounting Location: Non-Hazardous or Class 1 Division 2.
				9. Temperature Effect: Less than 0.25 percent per 10 degrees K.
				10. Short Circuit Proof: Yes, unless stated otherwise.
				11. Frequency Range: 100 kHz at lsc Greater than 50 mA.
				12. Grounding Method: Through mounting platform.
				13. OperatingTemperature: -4 to 140 degrees F(-20 to 60 degrees C).
				14. Enclosure Mounting: 35 mm DIN Rail in HDJ/ELR Box.
				15. Relative Humidity, Non-Condensing Range: To 95 percent.
1. EXECUTION
	1. EXAMINATION
		1. Do not begin installation until the substrates have been properly constructed and prepared.
		2. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.
	2. PREPARATION
		1. Clean surfaces thoroughly prior to installation.
		2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
	3. INSTALLATION
		1. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
	4. FIELD QUALITY CONTROL
		1. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

\*\* NOTE TO SPECIFIER \*\* Include if manufacturer provides field quality control with onsite personnel for instruction or supervision of product installation, application, erection, or construction. Delete if not required.

* + 1. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.
	1. CLEANING AND PROTECTION
		1. Clean products in accordance with the manufacturers recommendations.
		2. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION