HORIZONTAL DETECT-A-FIRE DETECTOR SPECIFICATIONS

Horizontal D-A-F detectors are designed for locations where appearance is a factor. The low-profile, functional design lends physical protection of the detector while making it suitable for commercial, industrial, mercantile public buildings, institutions, and marine applications in non-hazardous locations (those classified as "ordinary" under the National Electric Code). Flush mounted detectors are designed to fit standard 4-inch octagonal electric boxes and surface mounting detectors are designed to mount directly on ceilings or on 4-inch electrical junction boxes. Canadian Electrical Codes requires mounting only to an electrical junction box.

Horizontal Models

Table 3: Model Numbers: 27021-0, 27021-1, 27020-0*, 27020-1*

°F Setting	°F Tolerance	Spacing (in feet)			RTI	Color Coding
		UL	ULC	FM		
140	+7/-8	50	50	20	Quick	Black
160	+7/-8	25	25	20	Quick	Black
190	+7/-8	50	50	25	Fast	White
210	+7/-8	25	50	25	Fast	White
225	+7/-8	25	50	25	Fast	White
275	±10	25	50	25	Fast	Blue
325	±10	50	50	25	Fast	Red

- *27020-0 and 27020-1 are normally closed devices and do not meet the requirements of NFPA-72 for use as initiating devices (they are 2-wire devices).
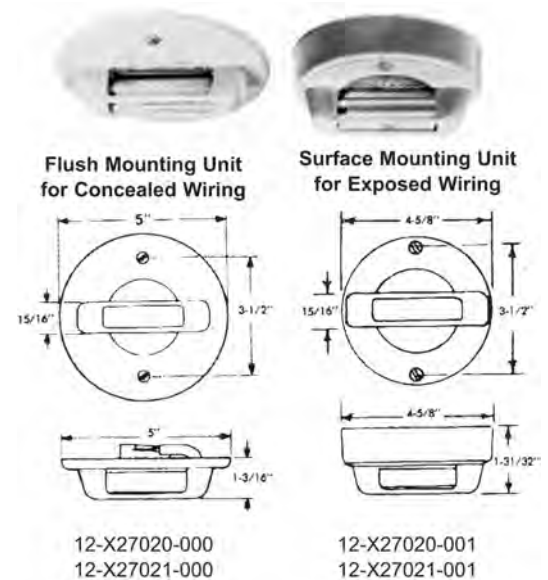- *27020-0 and 27020-1 are not listed by FM with RTI.

Table 4: Horizontal D-A-F Specifications

Model Number	Mounting Style	Contact Operation	Electrical Rating (Resistive Only)
27020-0	Flush Mount	Normally Closed (Open on Rise)	5.0 Amps 125 VAC 0.5 Amps 125 VDC
27020-1	Surface Mount		
27021-0	Flush Mount	Normally Open (Close on Rise)	5.0 Amps 125 VAC 0.5 Amps 125 VDC
27021-1	Surface Mount		2.0 Amps 24 VDC 1.0 Amps 48 VDC
Approximate weight: 10 oz.			

Figure 6. Horizontal Detectors

Note: Horizontal D-A-F detectors are equipped with connector blocks in place of leadwires.

FENWAL CONTROLS

HORIZONTAL AND VERTICAL DETECT-A-FIRE

Table 5: D-A-F Response Time Index (RTI) and Spacing

Model No.	Configuration	Contact Operation	Temperature (Set Point)	Response Time Index (ft-s) $^{1/2}$	RTI Classification	RTI Rated Spacing	Old Rated Spacing
27021-0	Horizontal Flush Mount	Normally Open (Close on Rise)	140°F (60°C), 160°F (71°C)	110	Quick	(20 X 20) ft (6 x 6) m	(25 x 25) ft (8 x 8) m
27021-1	Horizontal Surface Mount						
27021-0	Horizontal Flush Mount	Normally Open (Close on Rise)	190°F (88°C), 210°F (99°C), 225°F (107°C), 275°F (135°C), 325°F (163°C)	140	Fast	(25 x 25) ft (8 x 8) m	(25 x 25) ft (8 x 8) m
27021-1	Horizontal Surface Mount						
27121-0	Vertical Brass Head	Normally Open (Close on Rise)	140°F (60°C), 160°F (71°C), 190°F (88°C), 210°F (99°C), 225°F (107°C), 275°F (135°C), 325°F (163°C), 360°F (182°C), 450°F (232°C), 500°F (260°C), 600°F (316°C), 725°F (385°C)	99 (140°F, 160°F) 148 (190°F, 210°F, 225°F, 275°F, 325°F, 360°F, 450°F, 500°F, 600°F, 725°F)	V-Fast	(30 X 30) ft (9 x 9) m	(25 x 25) ft (8 x 8) m
27121-20	Vertical Stainless Head						
28021-5	Vertical Stainless Coupling Head						

Note: Spaces shown are distances between detectors on smooth ceilings, the distances from partitions or walls would be half that shown.
Authority Having Jurisdiction (AHJ) should be consulted before installation.

DETECT-A-FIRE MOUNTING

D-A-F detectors are not position sensitive. Horizontal and vertical detectors refer to the most common mounting configuration for that detector. However each type can be mounted either horizontally or vertically depending on the application and installation requirements.

Table 6: Mounting and Hazardous Location Class

Model Number (Vertical Only)	Hazardous Location	Fitting required for UL & ULC Listing and FM Approval
27120-2 27121-20 28020-3 28021-5	Class I, Groups A, B, C and D; Class II, Groups E, F and G	Mount detector to a suitable listed fitting in accordance with National Electric Code and/or local authority having jurisdiction.
27120-0 27121-0	Class I, Groups B, C and D; Class II Groups E, F and G	

Table 7: Derating Factor for Ceiling Height

Heat Detector Spacing Reduction Based on Ceiling Height				
Ceiling Height Above		Up to and Including		Derating Factor
m	ft	m	ft	
0	0	3.05	10	1.00
3.05	10	3.66	12	0.91
3.66	12	4.27	14	0.84
4.27	14	4.88	16	0.77
4.88	16	5.49	18	0.71
5.49	18	6.10	20	0.64
6.10	20	6.71	22	0.58
6.71	22	7.32	24	0.52
7.32	24	7.93	26	0.46
7.93	26	8.54	28	0.40
8.54	28	9.14	30	0.34

This table outlines the derating factor required depending on ceiling height based on NFPA 72 guidelines for D-A-F detector installation.

CONSTRUCTION

- Stainless steel shell sensing element. Cold rolled steel mounting facility. Off-White finish.
- #18 AWG Teflon™ insulated wire is used on detectors exposed to temperatures up to 375°F.
- #16 AWG TGGT insulated wire is used on detectors exposed to temperatures above 375°F.

MODIFICATIONS

- Add ULC Label to any temperature setting.
- Add fluorocarbon coating for better corrosion resistance on select models and temperatures. (Models 27120-22, 27121-20, 28020- 3, 28021-5. Maximum temperature is 500°F.)
- Add extended leadwires on select models and temperatures.

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TEMPERATURE SETTING SELECTION

To avoid nuisance activations, Fenwal Controls strongly suggests selecting a D-A-F detector with a temperature setting a minimum of 100°F above the maximum ambient expected temperature.

DEVICE SELECTION

The table below shows three categories of fire detection devices and their relative response levels for reaction to three different rate-of-rise conditions. Consult the AHJ for specific applications.

Table 8: Device Selection for Rate-of-Rise Conditions

Device Type	Under 10°/Min	Between 10-40°/Min	Over 40°/Min
D-A-F Rate Compensated Detector	First	First	Second but at selected protection level
Fixed Temp. Detector	Second	Second	Third
Rate-of-Rise Detector	Third	Third	First but may be a false alarm

AGENCY LISTINGS

D-A-F detectors are UL and ULC listed and FM Approved as fire detection thermostats (close on temperature rise) and as releasing devices (open on temperature rise).

Table 9: Agency Approvals

Agency	File Number	Location
UL	S492	Ordinary
UL	E19310	Hazardous
ULC	CS341-E	Ordinary and Hazardous
FM	J.I. OV2HO.AE	Hazardous
FM	17302	Ordinary
UL	S2410	Ordinary (600 & 725°F)
UL	E89599	Hazardous (600 & 725°F)
CE	IEC 60947-5-1	—

NOTES:

- D-A-F detectors are temperature preset at the factory.
- For corrosive environments, care should be taken to protect the D-A-F detector to obtain optimal performance and maximum life. Consult factory for fluorocarbon coating option.
- For field wiring requirements to connect to D-A-F, please refer to the installation instructions.
- Per UL521 requirements - low temperature exposure test is - 22°F (-30°C)
- D-A-F detectors are designed for long life expectancy, however due to various field conditions it is required that the detectors be tested annually per NFPA guidelines or local fire codes.
- Replace D-A-F detector after any fire or heat related event, any mechanical damage, or after 10 years of continuous service.
- D-A-F detectors are CE Listed. The product family has been evaluated in accordance with IEC 60947-1 and IEC 60947-5- 1, and is documented under Intertek Report No. 102294754 BOX-001 as an overheat detector. Detectors have a rated insulation and impulse voltages of 1500 VAC.

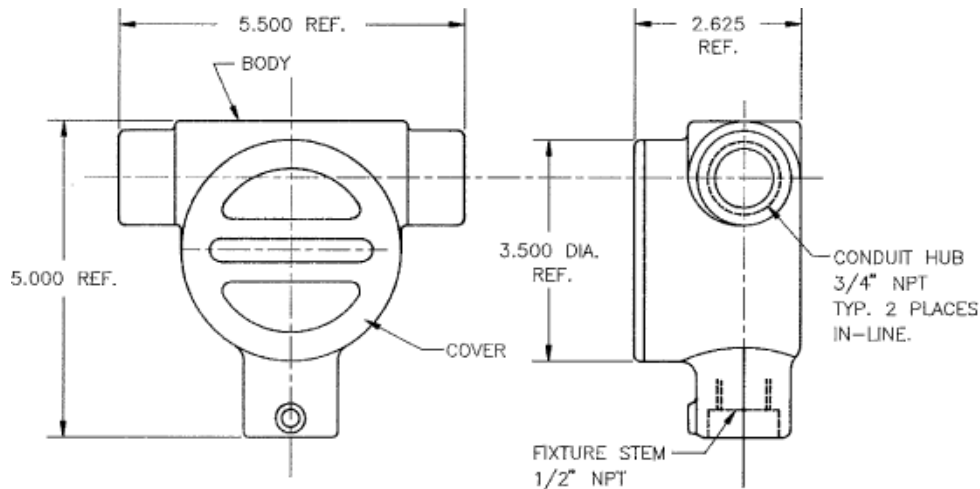## DETECT-A-FIRE MOUNTING BOX

Figure 7. Optional Explosion Proof Mounting Box,
P/N 06-116317-001

Note: Figure 7. Complies with NEC Class I, Groups A, B, C, D, Class II, Group E,F,G, Class III, and U.L. Standard 1203. Explosion Proof Mounting Box must be purchased separately from the D-A-F.

HOW TO ORDER

1. Select a D-A-F model from specifications in Table 2 for vertical design or Table 4 for horizontal design.
2. Select a temperature rating from Table 1 for vertical design or Table 3 for horizontal design.

Note: To avoid nuisance activations, Fenwal Controls strongly suggests selecting a D-A-F detector with a temperature setting a minimum of 100°F above the maximum ambient expected temperature.

3. Optional, select item from the Modifications Section. Consult Fenwal Controls to ensure modifications are available on the selected model.

Example: **27121-20** at **190°F** with **Fluorocarbon Coating**

Table 10: Stocked Models and Temperature Settings

Model	Style	Contact Type	Temperature Setting (°F)											
			140	160	190	210	225	275	325	360	450	500	600	725
27020-0	Horizontal, Flush Mount	NC	S		S					N/A	N/A	N/A	N/A	N/A
27020-1	Horizontal, Surface Mount	NC	S							N/A	N/A	N/A	N/A	N/A
27021-0	Horizontal, Flush Mount	NO	S		S		S			N/A	N/A	N/A	N/A	N/A
27021-1	Horizontal, Surface Mount	NO	S		S					N/A	N/A	N/A	N/A	N/A
27120-0	Vertical, Brass Head	NC	S	S	S		S		S				N/A	N/A
27120-22	Vertical, Stainless Steel	NC	S		S		S						N/A	N/A
27121-0	Vertical, Brass Head	NO	S	S	S	S	S	S	S	S	S	S	S	S
27121-20	Vertical, Stainless Steel	NO	S	S	S		S	S	S		S		S	
28021-5	Vertical, Coupling Head	NO			S		S		S	S	S			

S - Stocked D-A-F detector available for quick delivery of a limited quantity. Other models and variations are manufactured on demand.

FENWAL CONTROLS

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