

## Detection and Release Devices

### FEATURES

- Repeatable - self-restoring, nothing to replace, testable
- Rugged - withstands shock and vibration
- Versatile - various temperature settings available
- Durable - long lasting stainless steel shell
- Economical - wide spacings reduce installation costs
- Factory set
- Internal contact area hermetically sealed in stainless steel shell
- ROHS Compliant

### APPLICATIONS

- Protection of schools, factories, offices, libraries, etc.
- Power generation
- Gas station islands
- Paint spray booths
- Range hoods
- Engine compartments



### DESCRIPTION

DETECT-A-FIRE® detectors are the “heart” of many fire protection systems. These highly reliable devices have been a standard for over 65 years. Thousands of these detectors are in use controlling the release of extinguishants such as clean agents, CO<sub>2</sub>, water, or dry chemicals. In some systems the device is used as an ALARM device, to sense overheat or fire and alert personnel.

DETECT-A-FIRE detectors have met with wide acceptance because they are designed with RATE COMPENSATION. This provides a unique advantage over both fixed temperature and rate-of-rise types of detectors because only the DETECT-A-FIRE detector accurately senses the surrounding air temperature regardless of the fire growth rate. At precisely the pre-determined danger point, the system is activated.

Fixed temperature detectors must be completely heated to alarm temperature and therefore a disastrous lag in time may occur with a fast rate fire. Rate-of-rise devices, on the other hand, are triggered by the rate of increase in ambient temperature and are subject to false alarms caused by harmless, transient thermal gradients such as the rush of warm air from process ovens.

The secret of the unit’s sensitivity is in the design (Figure 1). The outer shell is made of a rapidly expanding alloy which closely follows changes in surrounding air temperature. The inner struts are made of a slower expanding alloy. Designed to resist thermal energy absorption and sealed inside the shell, the struts follow temperature changes more slowly.

A slow rate fire (Figure 2) will heat the shell and struts together. At the “set point”, the unit will trigger, actuating the alarm or releasing the extinguishant.

A transient rush of warm air up to 40°F/min. may expand the shell, but not enough to trigger the unit. By ignoring transient warm air excursions, the DETECT-A-FIRE detector virtually eliminates false alarms prevalent with rate-of-rise devices.

If a fast rate fire (Figure 3) starts, the shell will expand rapidly. The struts will close, actuating the alarm and/or releasing the agent. The faster the fire rate of growth, the sooner the DETECT-A-FIRE detector will react.

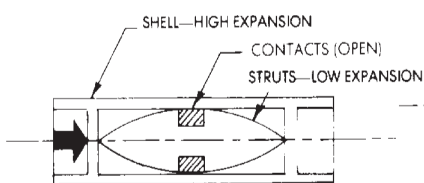


Figure 1. READY

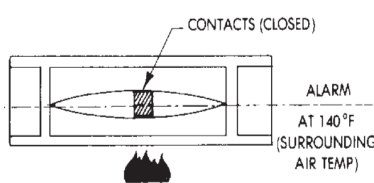


Figure 2. SLOW FIRE

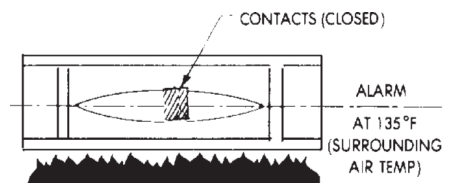


Figure 3. FAST FIRE

## HORIZONTAL DETECT-A-FIRE DETECTOR SPECIFICATIONS

Horizontal DETECT-A-FIRE detectors are designed for locations where appearance is a factor. The attractive, functional design lends physical protection of the unit 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 units are designed to fit standard 4-inch octagonal electric boxes and surface mounting units 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 ONLY

**TABLE 1**

Model No. (See Table 2 for “X”)	Contact Operation on Temperature Rise	Approx. Weight per Unit	Electrical Rating (Resistive Only)
12-X27021-000 12-X27021-001	Closes 325°F (Max)	10 oz	5.0 Amps 125 VAC 0.5 amps 125 VDC 2.0 Amps 24 VDC 1.0 Amps 48 VDC

Model 12-X27020-00X is a normally closed device and does not meet the requirements of NFPA-72 for use as an initiating device.

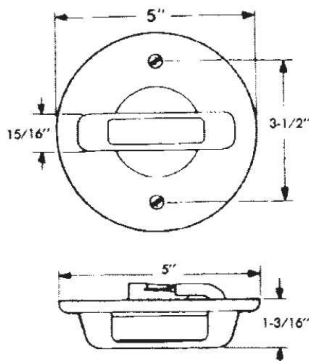
**TABLE 2**

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

### HORIZONTAL DESIGNS



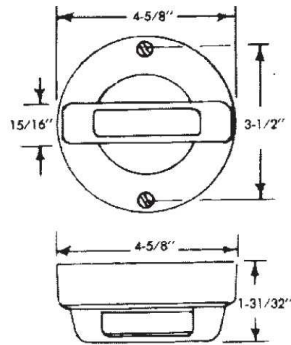
**Flush Mounting Unit  
for Concealed Wiring**



12-X27020-000  
12-X27021-000



**Surface Mounting Unit  
for Exposed Wiring**



12-X27020-001  
12-X27021-001

## VERTICAL DETECT-A-FIRE DETECTOR SPECIFICATIONS

Vertical DETECT-A-FIRE detectors are designed for use in both “ordinary” or “hazardous” locations. For “ordinary” use, they may be mounted to any approved junction box with 7/8” diameter opening by using 1/2-14 NPT mounting nuts. The device may be wired in or out of conduit, depending on local preferences and codes. To facilitate supervision of system wiring, four lead wires are provided on normally open vertical units (that close on temperature rise). Per UL requirements, when mounted in a suitable fitting, instruments are Underwriters Laboratory and Underwriters Laboratory of Canada listed and Factory Mutual approved for hazardous locations.

### VERTICAL MODELS

**TABLE 3: MODEL NUMBER 27120\*, 27121**

X	°F Setting	°F Tolerance	Spacings (in feet)			RTI	Color Coding
			UL	ULc	FM		
E	140	+7/-8	50	50	20	Quick	Black
E	160	+7/-8	25	25	20	Quick	Black
E	190	+7/-8	50	50	25	Fast	White
E	210	+7/-8	25	50	25	Fast	White
E	225	+7/-8	25	50	25	Fast	White
F	275	±10	25	50	25	Fast	Blue
F	325	±10	50	50	25	Fast	Red
F	360	±10	25	50	30	V-Fast	Red
G	450	±15	25	50	30	V-Fast	Red
G	500	±15	50	50	30	V-Fast	Green
H	600	±20	N/A	50	30	V-Fast	Orange
H	725	±20	N/A	50	30	V-Fast	Orange

\*27120 is a normally closed device and does not meet the requirements of NFPA-72 for use as an initiating device.

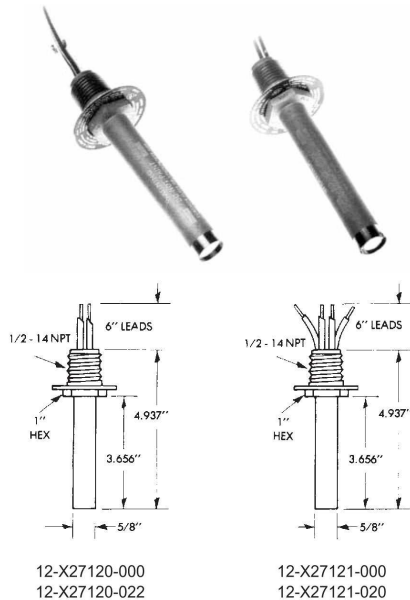
**TABLE 4: MODEL NUMBER 28020\*, 28021**

X	°F Setting	°F Tolerance	Spacings (in feet)			RTI	Color Coding
			UL	ULc	FM		
E	140	+7/-8	50	50	30	V-Fast	Black
E	160	+7/-8	25	25	30	V-Fast	Black
E	190	+7/-8	50	50	30	V-Fast	White
E	210	+7/-8	25	50	30	V-Fast	White
E	225	+7/-8	25	50	30	V-Fast	White
F	275	±10	25	50	30	V-Fast	Blue
F	325	±10	50	50	30	V-Fast	Red
F	360	±10	25	50	30	V-Fast	Red
G	450	±15	25	50	30	V-Fast	Green
G	500	±15	50	50	30	V-Fast	Orange
H	600	±20	N/A	50	30	V-Fast	Orange
H	725	±20	N/A	50	30	V-Fast	Orange

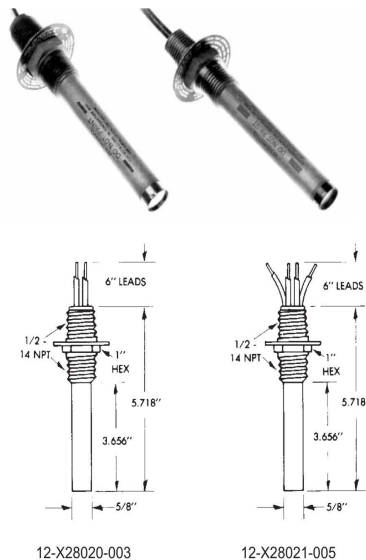
Note: For clean agents and CO2 suppression systems, ceiling spacing 20 ft. apart unless otherwise specified.

\* 28020 is a normally closed device and does not meet the requirements of NFPA-72 for use as an initiating device.

### VERTICAL DESIGNS (HEXAGONAL HEAD)



### VERTICAL DESIGNS (COUPLING HEAD)



## MOUNTING

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

**TABLE 5**

Hazardous Locations	Detector Type	Fitting Required For UL & ULC Listing and FM Approval
Class I, Groups A, B, C and D; Class II, Groups E, F and G	12-X27120-002 12-X27121-020 12-X28020-003 12-X28021-005	Mount detector to a suitable listed fitting in accordance with National Electric Code and/or local authority having jurisdiction.
Class I, Groups B, C and D; Class II Groups E, F and G	12-X27120-000 12-X27121-000	

**Notes:**

- a. DETECT-A-FIRE temperature preset at factory only.
- b. In applications where corrosion is suspect, care should be taken to protect the DETECT-A-FIRE detector to realize optimal performance and maximum life. Consult factory for fluorocarbon coating option.
- c. Up to 375°F - #18 AWG Teflon insulated wire used on units. Above 375°F - #16 AWG TGGT insulated wire used on units.
- d. Per UL521 requirements - low temperature exposure test is -22°F (-30°C).
- e. DETECT-A-FIRE 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.
- f. Replace DETECT-A-FIRE after any fire or heat related event, any mechanical damage, or after 10 years of continuous service.
- g. UL of Canada labeling available upon request.

## CONSTRUCTION

Stainless steel shell sensing element. Cold rolled steel mounting facility. Off-White finish.

## TEMPERATURE SETTING SELECTION

Fenwal suggests selecting a DETECT-A-FIRE with a temperature setting a minimum of 100°F above the maximum ambient temperature expected.

Table 6 shows three categories of fire detection devices and their relative response levels for reaction to three different rate-of-rise conditions. Statistics indicate that 97% of all fires fall within these categories.

**TABLE 6**

Type of Device	Rate-Of-Rise		
	Under 10°F/Min	Between 10-40°F/Min	Over 40°F/Min
Rate Compensated DETECT-A-FIRE Detector	FIRST	FIRST	SECOND but at selected protection level
Fixed Temperature	SECOND	SECOND	THIRD
Rate-of-Rise	Will not operate unless fixed temperature supplement at 165°F is provided, then it is THIRD in sequence	Will not operate unless fixed temperature supplement at 165°F is provided then it is THIRD in sequence	FIRST but may be a false alarm

## MODIFICATIONS

12-992012-XXX, Fluorocarbon coating, available on 27120-022, 27121-020, 28020-003, 28021-005 models only (500°F max.) for better corrosion resistance.

## AGENCY LISTINGS

Fenwal DETECT-A-FIRE 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 7**

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)

**TABLE 8**

**DETECT-A-FIRE PART SELECTION GUIDE**

Model Number	Mounting Head Material	Shell Material	Contact Operation on Temperature Rise	Electrical Rating (Resistive Only)	Approximate Weight per Unit
12-X27120-000 12-X27120-022	Brass Type 300 Stainless Steel	Type 300 Stainless Steel	Opens (450°F Max)	5.0 Amps 125 VAC 0.5 Amps 125 VDC	5 oz.
12-X27121-000 12-X27121-020	Brass Type 300 Stainless Steel		Closes	5.0 Amps 125 VAC 0.5 Amps 125 VDC 2.0 Amps 24 VDC 1.0 Amps 48 VDC	5 oz.
12X28020-003	Type 300 Stainless Steel		Opens (450°F Max)	5.0 Amps 125 VAC 0.5 Amps 125 VDC	5 oz.
12-X28021-005	Type 300 Stainless Steel		Closes	5.0 Amps 125 VAC 0.5 Amps 125 VDC 2.0 Amps 24 VDC 1.0 Amps 48 VDC	5 oz.

**TABLE 9**

**STOCKED MODELS AND TEMPERATURE SETTINGS  
(SUGGESTED SETTING A MINIMUM OF 100°F ABOVE THE MAXIMUM EXPECTED AMBIENT)**

Model	Temperature Setting (°F)									
	140	160	190	225	275	325	360	450	600	725
12-X27020-000	X		X							
12-X27020-001	X									
12-X27021-000	X		X							
12-X27021-001	X		X							
12-X27120-000		X	X	X		X				
12-X27121-000	X	X	X	X	X	X	X	X	X	X
12-X28021-005				X				X		

X: Indicates a stock unit

**TABLE 10**

**DETECT-A-FIRE DETECTOR - RESPONSE TIME INDEX (RTI)**

Model P/N	Model Type	Contacts	Temperature (Set point)	Response Time Index (ft-s) <sup>1/2</sup>	RTI Classification	RTI Rated Spacing	Old Rated Spacing
27021-0	Horizontal Flush Mount	N/O	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	N/O					
27021-0	Horizontal Flush Mount	N/O	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)	148	FAST	(25 x 25) ft (8 x 8) m	(25 x 25) ft (8 x 8) m
27021-1	Horizontal Surface Mount	N/O					
27121-0	Vertical Brass Head	N/O	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	N/O					
28021-0	Vertical Brass Coupling Head	N/O					
28021-5	Vertical Stainless Coupling Head	N/O					

**Note:** Spaces shown are distances between units on smooth ceilings, the distances from partitions or walls would be half that shown. Authority having LOCAL jurisdiction should be consulted before installation.

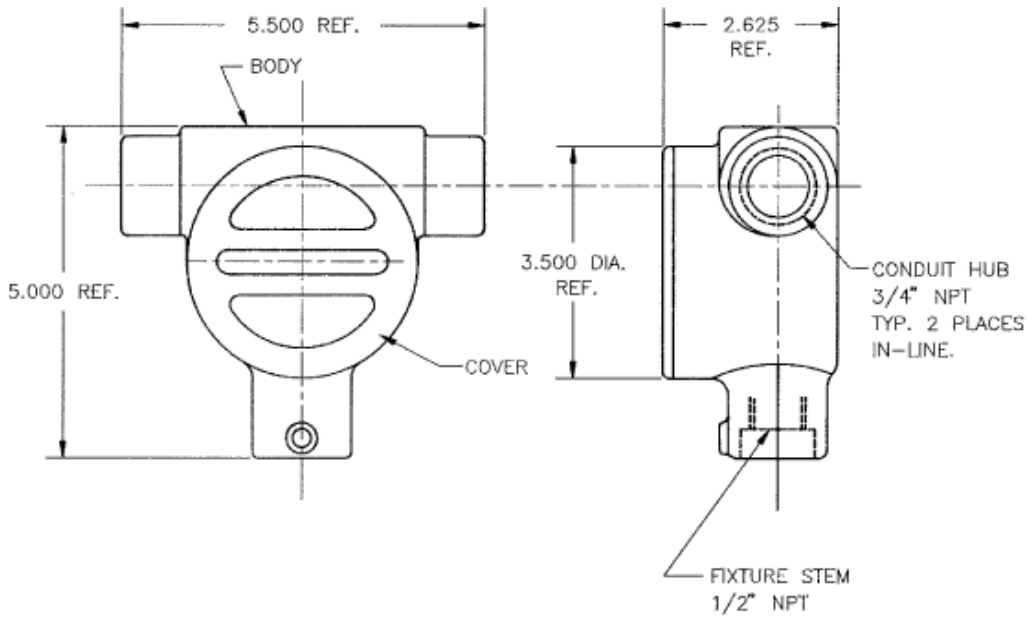


Figure 4. Optional Explosion Proof Enclosure, P/N 06-116317-001

**Note:** Complies with NEC Class I, Groups A, B, C, D, Class II, Group E,F,G, Class III, and U.L. Standard 886. Explosion Proof Enclosure must be purchased separately from the DETECT-A-FIRE.

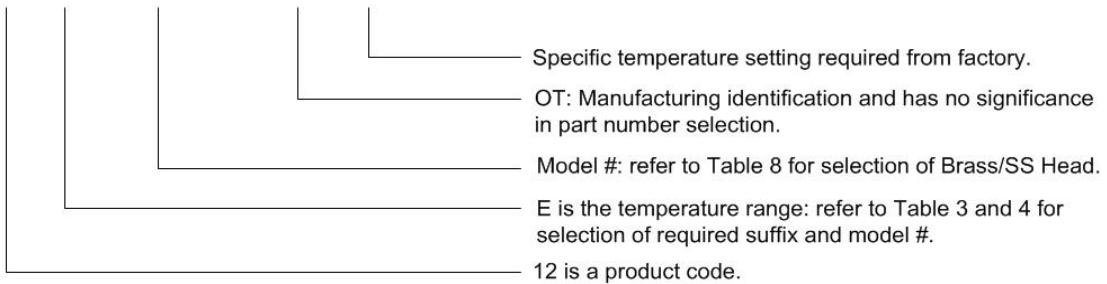
### HOW TO ORDER

1. Select the DETECT-A-FIRE detector model from specifications in Table 1 for horizontal DAF or Table 8 for Vertical DETECT-A-FIRE.
2. Refer to temperature rating chart in Table 2 for horizontal DETECT-A-FIRE or Table 3 and 4 for Vertical DETECT-A-FIRE, select temperature setting required and add this number to base catalog number.

**EXAMPLE:** Vertical DETECT-A-FIRE detector set to close at 225°F.

12 – E 27121-000-(OT)-225

### Description



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