

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, CO₂, 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.

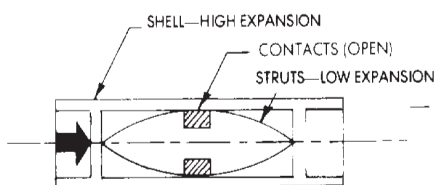


Figure 1. READY

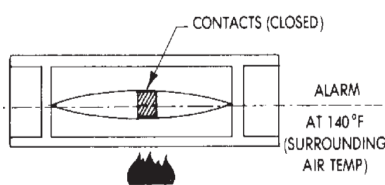


Figure 2. SLOW FIRE

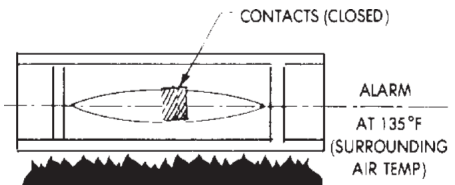


Figure 3. FAST FIRE

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-X27020-000 12-X27020-001 | Opens 325°F (Max) | 10 oz | 5.0 Amps 125 VAC 0.5 Amps 125 VDC |
| 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.

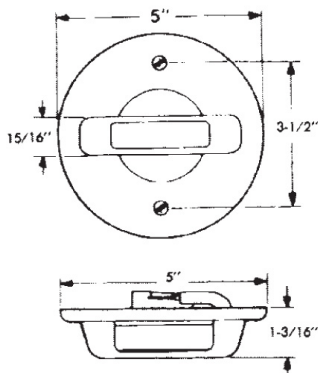
TABLE 2

| 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



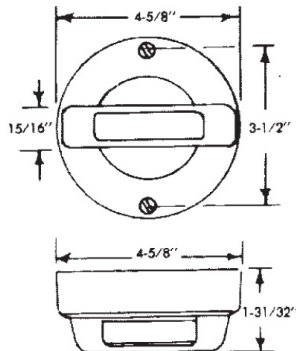
**Flush Mounting Unit
for Concealed Wiring**



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

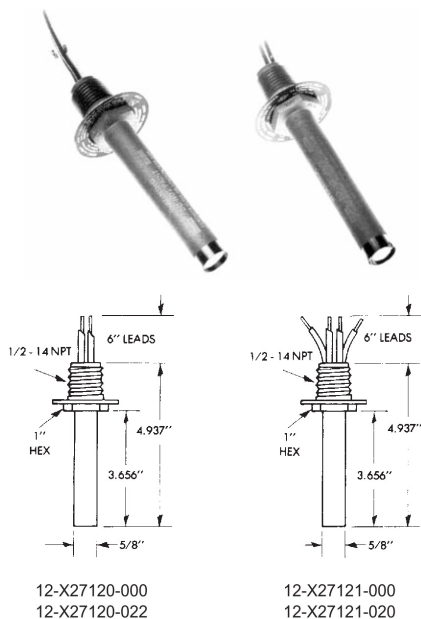
| X | °F Setting | °F Tolerance | Spacings (in feet) | | | RTI | Color Coding |
|---|------------|--------------|--------------------|-----|----|--------|--------------|
| | | | UL | ULc | FM | | |
| E | 140 | +7/-8 | 50 | 50 | 30 | V-Fast | Black |
| E | 160 | +7/-8 | 25 | 25 | 30 | V-Fast | Black |
| 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.

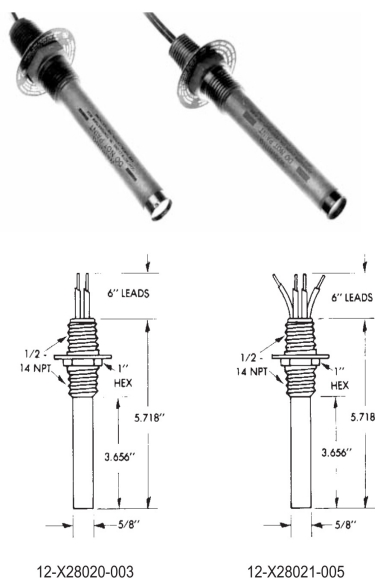
Note: 28020 is a 2-wire device and RTI is not applicable.

* 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. For field wiring requirements please refer to DAF installation instructions.
- e. Per UL521 requirements - low temperature exposure test is -22°F (-30°C).
- f. 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.
- g. Replace DETECT-A-FIRE after any fire or heat related event, any mechanical damage, or after 10 years of continuous service.
- h. 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) ^{1/2} | 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.

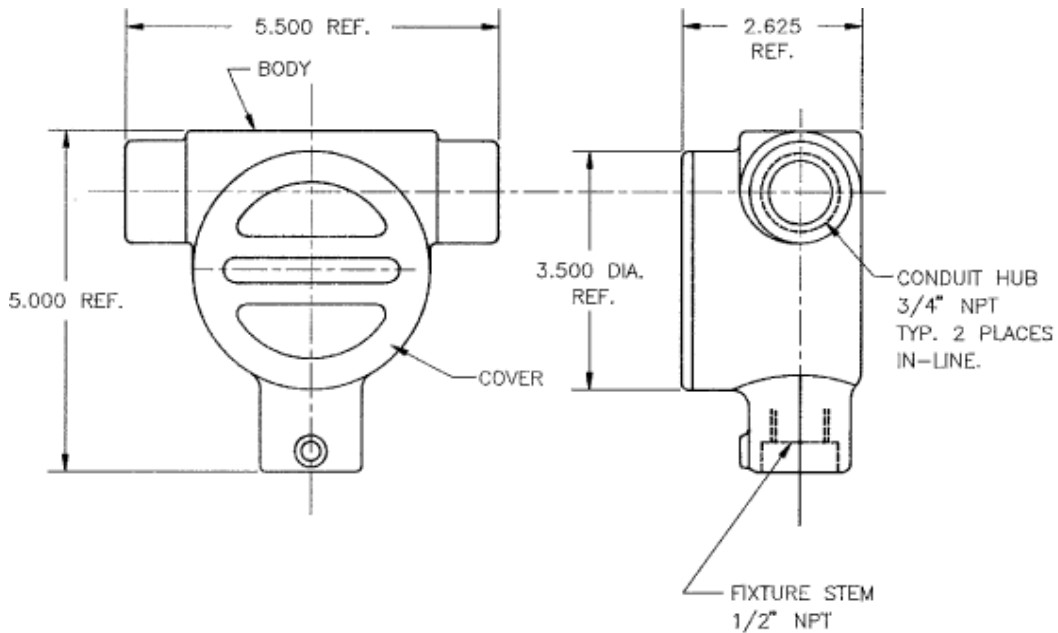


Figure 4. Optional Explosion Proof Enclosure, P/N 06-116317-001

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.

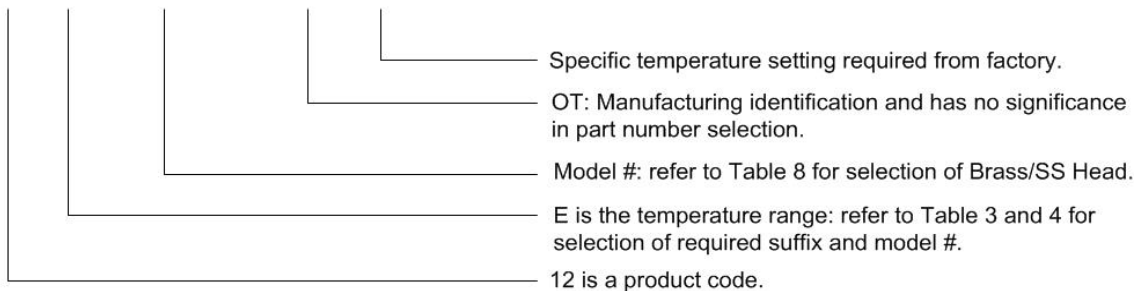
HOW TO ORDER

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



Specifications are subject to change without notice. This literature is provided for informational purposes only. KIDDE-FENWAL, INC. assumes no responsibility for the product's suitability for a particular application. The product must be properly applied to work correctly. If you need more information on this product, or have a particular problem or question, contact KIDDE-FENWAL, INC.

**FENWAL
CONTROLS**

F-12-0-001 Rev AB

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