

# DETECT-A-FIRE®

## Detection and Release Devices

### FEATURES

- Repeatable - resets itself, nothing to replace, testable
- Rugged - withstands shock and vibration
- Versatile - available various temperature settings
- Durable - long lasting stainless steel shell
- Economical - wide spacing reduce installation costs
- Factory set internal contact area is hermetically sealed in stainless steel

### APPLICATIONS

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

### GENERAL DESCRIPTION

DETECT-A-FIRE units are the "heart" of many Fire Protection Systems. These highly reliable devices have been a standard of the industry for over 45 years. Many thousands of these units are now 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. In other systems, it is used as a RELEASE device, to sense fire and actuate fire attack systems. DETECT-A-FIRE units 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 unit accurately senses the surrounding air temperature regardless of the fire growth rate. At precisely the predetermined 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 lower expanding alloy. Designed to resist thermal energy absorption and sealed inside the shell, the struts fol-



low 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 40F°/min. may expand the shell, but not enough to trigger the unit. By ignoring transient warm air excursions, the DETECT-A-FIRE unit 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 or releasing the agent. The faster the fire rate of growth, the sooner the DETECT-A-FIRE unit will react.

This chart 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.

Type of device	RATE - OF - RISE		
	Under 10°F/min.	Between 10÷40°F/min	Over 40°F/min
Rate Compensated DETECT-A-FIRE Unit	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

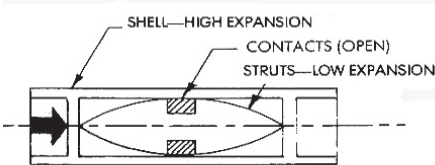


figure 1: ready

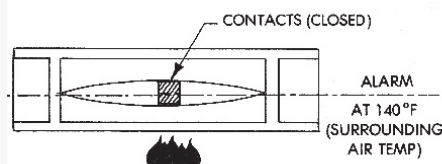


figure 2: slow fire

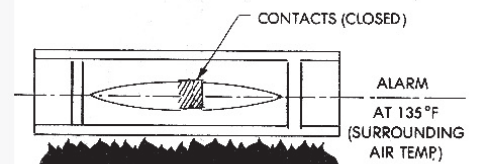


figure 3: fast fire

# SPECIFICATION

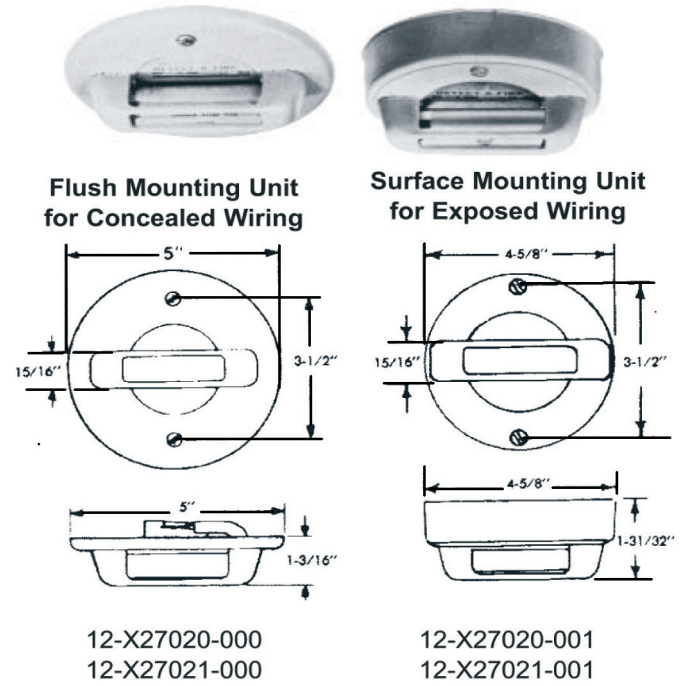
## HORIZONTAL DETECT-A-FIRE UNITS

Horizontal 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 and public buildings, institutions and ships in non-hazardous locations (those classified as "ordinary" under the National Electric Code). Flush mounted units are designed to fit standard 4" octagonal electrical boxes and surface mounting units are designed to mount directly on ceilings or on 4" electrical junction boxes. Canadian Electrical Code requires mounting only to an electrical junction box.

## VERTICAL DETECT-A-FIRE UNITS

Vertical 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 preference and codes. Four leadwires are provided on normally open vertical units (that close on temperature rise), per UL requirement, to facilitate supervision of system wiring. Instruments are Underwriters Laboratory and Underwriters Laboratory of Canada listed and Factory Mutual approved for hazardous locations, when mounted in a suitable fitting.

## HORIZONTAL DETECT-A-FIRE UNITS



Dimensions in inch

Hazardous Location	Detector type	Fitting required for UL & ULC Listings and FM approval
Class I, groups A, B C and D; Class II	12 - X27120-022 12 - X27121-020	Mount detector to a suitable listed fitting in accordance with National Electric Code and/or local authority having jurisdiction
Groups E, F, and G	12 - X28020-003 12 - X28021-005	
Class I, groups, B ,C and D; Class II	12 - X27120-000 12 - X27121-000	
Groups E, F, and G		

Model no.	Contract Operation on Temp. Rise	Approx. weight per unit	Electrical Rating (resistive only)
12-X27020-000	Opens (325°F Max)	284g	5.0 Amps 125 VAC
12-X27020-001			0.5 Amps 125 VDC
12-X27021-000	Closes (325°F Max)	284g	5.0 Amps 125 VAC
12-X27021-001			0.5 Amps 125 VDC 2.0 Amps 24 VDC 1.0 Amps 48 VDC

**NOTE A:** Spacings 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.

**NOTE B:** Temperature preset at factory only. Special settings available upon request. Consult factory or Fenwal Representative for additional information.

**NOTE C:** In applications where corrosion is suspect, care should be taken to protect the DETECT-A-FIRE unit to realize optimum performance and maximum life. Consult factory for suggestions.

**NOTE D:** Up to 375°F - #18 AWG Teflon insulated wire used on units. Above 375°F - #16AWG TGGT insulated wire used on units.

Specifications subject to change without notice.

- UL or Canada labelling available upon request.

- Although incandescent lamps are considered resistive, their inrush current is 10 - 15 times their steady current. Do not exceed ratings.

## CONSTRUCTION

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

## TEMPERATURE RATING

Suggested setting a minimum of 100°F above ambient.

## HORIZONTAL DETECT-A-FIRE MODELS

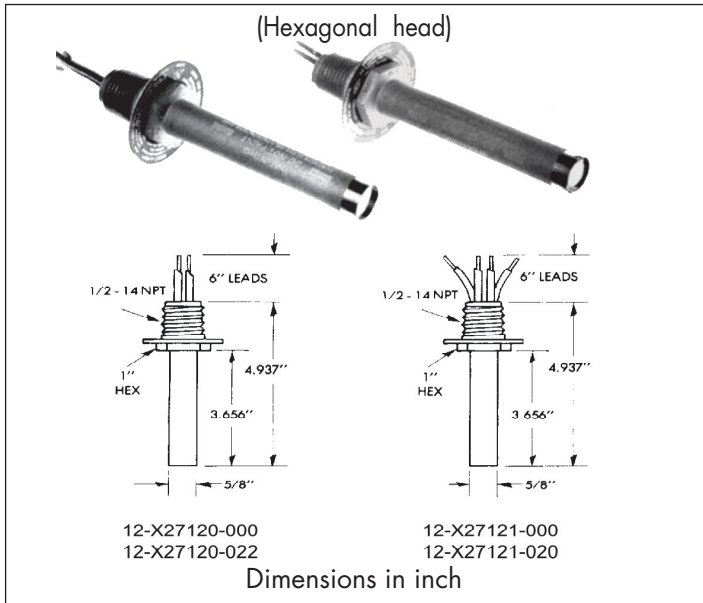
Model number 27020\*, 27021

°F Setting	°F Tolerance	Spacings (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	50	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

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

# VERTICAL DETECT-A-FIRE UNITS

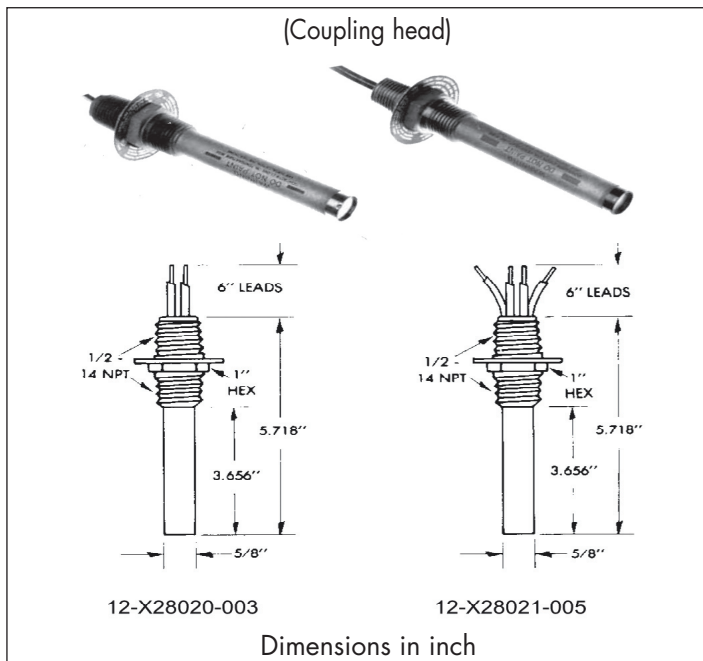
## Model Number 27120\*, 27121



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

## Model Number 28020, 28021



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

Note: For clean agents and CO2 suppression systems, ceiling spacing 20ft. 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

Model Number	Mounting Head Material	Shell Material	Contact Operation on Temperature Rise	Electrical Rating (Resistive Only)	Approx. Weight per unit
12-X27120-000 12X27120-022	Brass Type 300 Stainless Steel	Type 300 Stainless Steel	Opens (450°F Max)	5,0 Amps 125 VAC 0,5 Amps 125 VDC	142g
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	142g
12X28020-003	Type 300 Stainless Steel		Opens (450°F Max)	5,0 Amps 125 VAC 0,5 Amps 125 VDC	142g
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	142g

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