

Detection and Control Components



Vertical Rate Compensated Thermal Detector (IQ-318, IQ-636X-2, 542R, 542D, Z-10)

Features

- Resets itself, nothing to replace, testable
- Withstands shock and vibration
- Wide temperature setting
- Long lasting stainless steel shell
- Wide spacing, reduces installation cost
- Factory set and hermetically-sealed in stainless steel – permanently protects internal mechanism

Applications

Vertical Rate Compensated Thermal Detectors are designed for use in both “ordinary” or “hazardous” locations. These highly reliable devices have been installed in schools, factories, offices, libraries, paint spray booths, and range hoods.

The detectors are used with an AUTOPULSE control unit as an alarm initiating device to sense overheat or fire, to alert personnel, and actuate fire suppression systems.

Description

The Vertical Rate Compensated Thermal Detectors are designed to compensate for thermal lag. When a rate-compensation heat detector operates, the actual operating temperature will be approximately equal to the rated operating temperature, regardless of the rate at which the air is being heated. The rate-compensation detector consists of a pair of expansion struts and electrical contacts enclosed by an expansion shell.

The two contact points are mounted on, but electrically insulated from, the two curved struts which have a low coefficient of expansion. Contacts and struts make up the internal strut assembly. This assembly is mounted under compression in a tubular stainless steel shell. The shell’s coefficient of expansion is much higher than that of the strut assembly.

Increase in temperature causes the shell to expand. This decreases compression on the strut and the contacts make their motion being magnified by the action of the strut assembly. Note that the shell is the temperature-sensitive, activating component – always totally in direct contact with the surrounding air.

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 follow temperature changes more slowly.

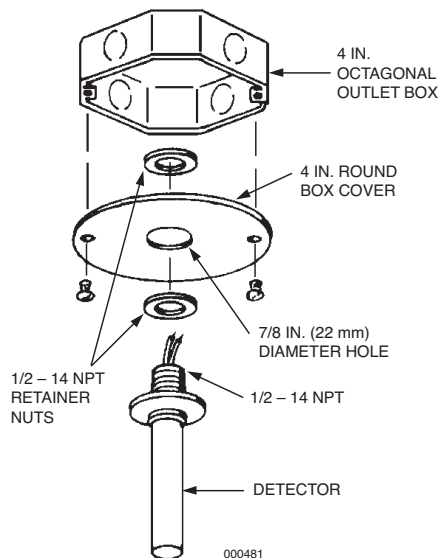
A slow rate fire will heat the shell and struts together. At the “set point,” the unit will trigger, sending a signal to the AUTOPULSE control unit. A momentary rush of warm air up to 40 °F (4 °C) per minute may expand the shell, but not enough to trigger the detector. By ignoring momentary warm air increases, the detector virtually eliminates false alarms.

If a fast rate fire starts, the shell will expand rapidly. The struts will close signaling the control unit. The faster the fire rate of growth, the sooner the detector will react.

The detectors may be mounted to any approved junction box with 7/8 (22 mm) inch diameter opening by using 1/2 – 14 NPT mounting nuts. Four lead wires are provided to facilitate supervision of system wiring. On units up to 375 °F (191 °C) – No. 18 AWG teflon insulated wire is supplied. Above 375 °F (191 °C) – No. 16 AWG TGGT insulated wire is used. The device may be wired in or out of conduit, depending on local preference and codes.

For ceiling heights up to 15 ft (4.6 m), a spacing of 15 ft (4.6 m) between detectors is utilized. Locations with ceiling heights greater than 15 ft (4.6 m) require reduced spacing. Contact Applications Engineering for assistance in locating detectors in high ceiling applications.

- ▶ A minimum setting of 100 °F (38 °C) above ambient temperature is recommended.



Technical Information

Electrical Rating (resistive): 5 amps @ 125 VAC
0.5 amps @ 125 VDC
2 amps @ 24 VDC
1 amps @ 48 VDC

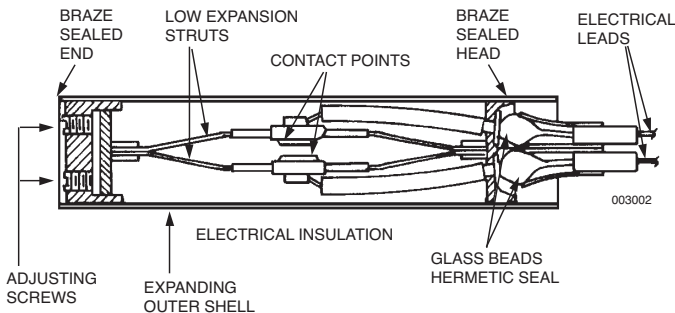
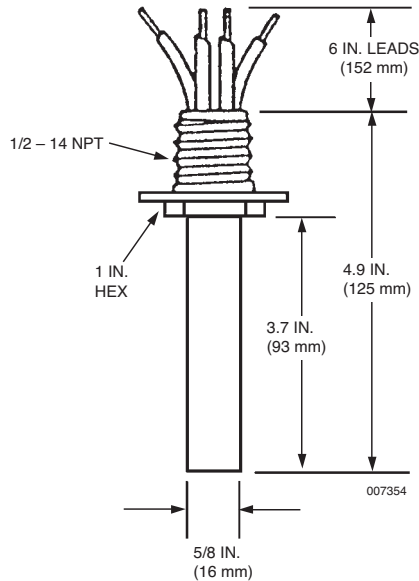
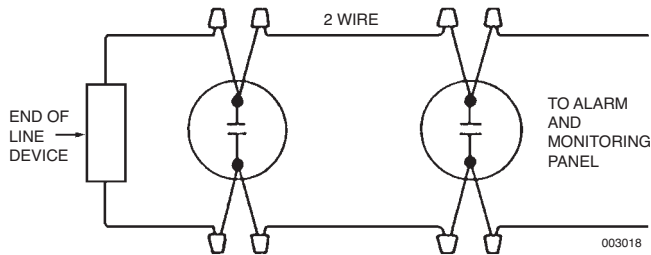
Color Coding: 140 °F (60 °C) Yellow
160 °F (71 °C) Yellow
190 °F (88 °C) White
225 °F (107 °C) White
325 °F (163 °C) Red
450 °F (232 °C) Green
600 °F (315 °C) Orange
725 °F (385 °C) Orange

Technical Information (Continued)

Maximum Torque Tolerance:

- ▶ Without Thread Lubricant. 20 ft lb (27.1 N m)
- ▶ With Teflon Tape Lubricant. 3 ft lb (4.1 N m)

Weight: 5 3/8 oz (152.3 g)



Compliances

Hazardous Locations Applications

Class I, Groups A, B, C and D
Class II, Groups E, F and G

Class I, Groups B, C and D;
Class II, Groups E, F and G

Fitting Required for UL, ULC Listings, MEA and FM Approval

In accordance with National Electric Code

In accordance with National Electric Code and/or local authority

Note: Only units with stainless steel shell and head are approved for Class 1, Group A locations.

Listings and Approvals*

	Ordinary	Hazardous
UL	S492	E19310
UL for 600 °F and 725 °F.	S2410	E89599
ULC	CS-341-E	CS-341-E
Factory Mutual (FM).	17302	J.I.OV3HO.AE
MEA	12-95-E	12-95-E
California State Fire Marshal (CSFM)	7270-0074:104.	7270-0074:104
USCG	161.002/A42/1	

* Listings and Approvals are under FENWAL

Ordering Information

Part No.	Description	Shipping Weight	
		lb	(kg)
4727	140 °F (60 °C) Vertical Rate Compensated Detector	0.5	(0.23)
404751	160 °F (71 °C) Vertical Rate Compensated Detector	0.5	(0.23)
13970	190 °F (88 °C) Vertical Rate Compensated Detector	0.5	(0.23)
13976	225 °F (107 °C) Vertical Rate Compensated Detector	0.5	(0.23)
▶ 432974	225 °F (107 °C) Vertical Rate Compensated Detector – 24 in. (610 mm) Leads	0.5	(0.23)
13975	325 °F (163 °C) Vertical Rate Compensated Detector	0.5	(0.23)
13974	450 °F (232 °C) Vertical Rate Compensated Detector	0.5	(0.23)
13971	600 °F (315 °C) Vertical Rate Compensated Detector	0.5	(0.23)
13977	725 °F (385 °C) Vertical Rate Compensated Detector	0.5	(0.23)
14286	Heat Trap	0.5	(0.23)
407842	225 °F (107 °C) Stainless Steel, Coupling Head, Vertical Rate Compensated Detector	0.5	(0.23)
407038	450 °F (232 °C) Stainless Steel, Coupling Head, Vertical Rate Compensated Detector	0.5	(0.23)
407798	600 °F (316 °C) Stainless Steel, Coupling Head, Vertical Rate Compensated Detector	0.5	(0.23)