17343-124

Operation and Maintenance Instructions For Fire/Overheat Detector

FENWAL®

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DESCRIPTION

The Fire/Overheat Detector, shown in Figure 1 is a normally open device that helps to monitor fire and overheat conditions. It can be used in locations with high ambient temperatures.

The detector is made from welded stainless steel and is completely sealed. It is not repairable and cannot be disassembled. The detector is set to a specific alarm temperature when it is made at the factory and the temperature cannot be adjusted.

The detector electrically connects to its related equipment through two terminal posts with internal threads. Stainless steel screws attach the wiring from the related equipment to the two terminals. The detector mechanically attaches to the monitored area by 3/4-14 National Pipe Thread (NPT) located on the head of the detector.

Korean Cert # 14-KB4BO-0749U
Ex nC IIC T3

II 3G IIC Gc IECEx ETL 12.0008U
ITS03ATEX41211U

Class I, Division 1, Groups BCD
CSA: 159064
UL: E139663

The following details are shown on a detector head:

- Customer Part Number
- Customer Code
- Part Number: **17343-124**
- Date Code: XXYY (where XX = year, YY = week)

Schedule of Limitations for Ex Components:

- The detector must be mounted in a suitably IEC Ex certified enclosure that complies with the appropriate requirements for zone 2 applications.
- Maximum surface temperature is dependent on ambient temperatures and must be determined in the final
assembly installation. The temperature rise of the outside of the shell should not exceed 2°C above ambient when
carrying the maximum power load of 62.5W (.5A, 125 VDC).

Limitations for Class I Div I Group BCD Components:

- The detector must be mounted in a certified enclosure with the appropriate Class, Division, and Group Ratings for the application.
- The Fire/Overheat Detector has a color band on the end opposite the electrical connection points. The color band is an indication of the temperature range of the detector. Refer to the color code chart that follows for the color band of the detectors and additional data.

Color Code Chart

Temperature Set-Point	Color Band
140°F±7.5°F (60°C±4.2°C)	None
325°F±10°F (163°C±5.6°C)	Red
425°F±15°F (218°C±8.3°C)	Green
600°F±20°F (316°C±11.0°C)	Orange
725°F±25°F (385°C±14°C)	Grey
The settings are noted by the color of the band applied to the tip of the heat detector shell of 17343-124.	

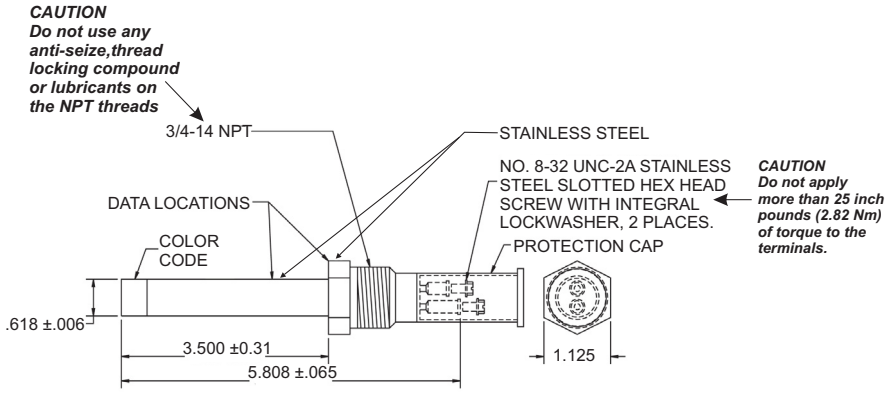

Figure 1. Fire/Overheat Detector

Specified data for the Fire/Overheat Detector is given in the table below.

Specified Item or Function	Data
Temperature Range for Operation	-50°F to +825°F (-45.5°C to +440.5°C)
Electrical Contact Rating	0.5 Ampere at 125VDC
Electrical Interface Connection	2 each terminal posts with No. 8-32 UNC-2A Stainless Steel Slotted Hex Head Screws with Integral Lockwasher
Electrical Connection Torque	25 lbf in. (2.8 Nm) maximum
Electrical Connection Protection Cap	P/N RCL-10 (Vendor: Protective Closures Co., CAGE Code 99017)
Dimensions	See Figure 1
Approval	ATEX approved for Zone 2, Category 3. Type of protection "nC".

INSTALLATION

This section gives the procedure to install the fire overheat detector.

The fire/overheat detector must be attached to an IP 54 suitable/rated junction box with the applicable Equipment Group II and Category 3 for the installation. The box must have a 3/4 NPT opening to install the detector.

The installer of the detector must supply a means to prevent non-permitted decrease of clearance per IEC60079-15, paragraph 6.7.

Replacement parts must be the same part number as the part being replaced.

Fastening of the fire detector is through the 3/4 NPT thread. Do not use any anti-seize thread locking compound or lubricant on the NPT threads. The installer must ensure that a proper ground connection is made to the IP 54 box-grounding terminal.

Procedure

1. Turn the detector clockwise into the related equipment's 3/4 NPT opening a minimum of 5 full turns. Torque the detector to 20 lbf ft (27 Nm).

CAUTION

Do not supply more than 25 lbf in. torque to the detector's terminal screws or you can damage the detector. If the detector is damaged, you must discard it.

2. Connect the related equipment's system wiring to the detectors terminals with the No. 8-32 UNC-2A SS slotted hex head screws with integral washer. Make sure the wire connections do not touch each other. Torque the screws to a value between 20 and 25 lbf in. (2.26 and 2.82 Nm).
3. Make sure that no objects touch the detector or can touch or damage it during usual system operation.

CAUTION

Do not paint the detector or let paint from another source get on the detector or it will not operate correctly.

4. Keep the detector free of contamination and unwanted materials. Refer to the Cleaning section.

OPERATION

The Fire/Overheat Detector's outer shell is made of stainless steel that expands with an increase in temperature. It closely follows changes in the air temperature that surround it. Two inner struts, made of an alloy that expands at a lower rate than the outer shell, are sealed inside the outer shell. An overheat condition causes the shell to expand faster than the inner struts. This makes the struts move together and make electrical connection through the contacts that are attached to the struts . The electrical connection of the contacts completes the circuit through the terminal posts on the end of the detector. Figure 2 shows a simplified diagram of the Fire/Overheat Detector operation. When the shell and inner struts cool, the contacts open again.

There are three conditions that can have an effect on the operation of the detector, especially when a functional test of the detector is done. These conditions are:

1. Temperature Overshoot: This condition can occur when the temperature of a detector increases far above its set-point range when heat is supplied too rapidly. This can cause the contacts to close before the specified temperature range.
2. Anticipation Effect: This condition causes the alarm circuit to close well before the alarm set-point. This condition is the result of the supply of high heat too rapidly.
3. Temperature Undershoot: This condition occurs when the temperature of a detector decreases suddenly below its set-point range when made to cool too rapidly. The detector should be air cool only.

If possible, these conditions must be prevented, specially when tests of the detector are done.

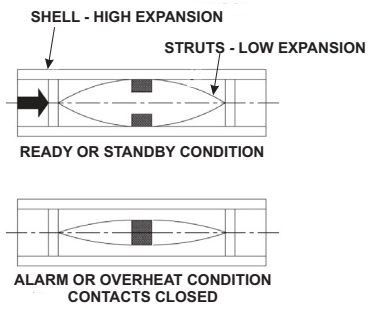

Figure 2. Detector Simplified Diagram

Testing

This section gives the equipment and procedures necessary to do tests of the detector and find if there is a malfunction.
You must do a no-continuity test and an insulation resistance test to make sure the detector is serviceable.
You must do a calibration verification test (or functional test) to make sure that the detector gives an alarm at the correct temperature.

Testing Equipment

The test equipment necessary to do the tests on the detector is given in the table below. You can use equivalent alternative items for those given in the table.

Equipment Item	Range/Accuracy	Manufacturer or Source
Digital Multimeter, Fluke Model 77	100VDC to 1000 VDC, 0.1Ω to 20MΩ, 1% Accuracy	Fluke (CAGE 89536)
Dry-Well Calibrator, Model 9141-A (used to verify calibration set-point value)	50 to 400°C ±0.5°C	Hart Scientific (CAGE 64841)
Custom Insert, Model 3141-7 (for 9141-A, with one opening 0.629± 0.002 in dia.)	Not Applicable	Hart Scientific (CAGE 64841)
Power Source (to supply power to Dry-Well Calibrator	115 VAC, 50-60 Hz, 10 Amps or 230 VAC, 5 Amps	Get Locally
Megohmmeter, Model 1867	500 VDC, 20 MΩ and higher	Quad Tech (CAGE 0PK96)

Pretest Inspection

Before you test the detector, make sure that the detector's visual inspection is acceptable. Refer to the Inspection section of this manual.

No-Continuity Test

Do the no-continuity test per the following procedure. Do the test at room temperature. If the test is unsatisfactory, replace the detector. Detector is not a repairable unit.

Procedure

1. Connect one lead of a digital multimeter (DMM) to one of the two terminals posts of the detector and the other lead of the DMM to the other terminal post. See the no-continuity test setup in Figure 3.
2. With the DMM set to measure ohms (Ω) on the highest scale, read the resistance.
3. The resistance value must read an open condition or infinite (∞).
4. Disconnect the DMM from the detector.

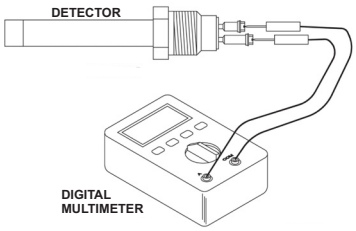

Figure 3. No-Continuity Test Setup

Insulation Resistance Test

Do the insulation resistance test per the following procedure. Do the test at room temperature. If the test is unsatisfactory, replace the detector. Detector is not a repairable unit.

Procedure

WARNING Prevent possible dangerous shock. Do not supply power to the megohmmeter until it is connected to the detector.

1. Connect one lead of a megohmmeter to the two terminal posts of the detector jumpered together. Connect the other lead of the megohmmeter to the detector shell. See the insulation resistance test setup in Figure 4.
2. Set the megohmmeter to supply 500 VDC and measure the insulation resistance of the detector.
3. The resistance must be 20 megohms (MΩ) or higher.
4. Remove the power from the megohmmeter and disconnect the leads and jumper from the detector.

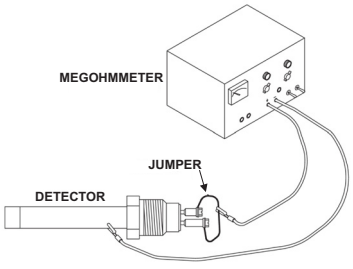

Figure 4. Insulation Resistance Test Setup

Calibration Verification Test

1. The detector no-continuity test and insulation resistance test must be satisfactory before you do the calibration verification test.
2. Make a test setup with the Model 9141 Dry-Well Calibrator. Make sure that you follow the safety instructions given in Section 3 of the Model 9141 Dry-Well Calibrator User Manual.
3. Install the detector in the dry-well calibrator insert.

CAUTION

Do not supply more than 25 lbf in. (2.82 Nm) torque to the screws in the detector terminals or you can damage the detector and it must be discarded.

4. Connect the dry-well calibrator test leads to the terminal posts on the detector.
5. Connect the dry-well calibrator power cable to an applicable 115 or 230 VAC, 50-60 Hz power source.

WARNING

Be careful not to get burned from the hot heater block in the dry-well calibrator or the hot detector. The temperature can exceed 800˚F or more.

6. Follow the procedures in Section 7 of the Model 9141 Dry-Well Calibrator User Manual to make sure that the detector's set-point is in limits.
7. Record the temperature for each of three consecutive detector contact closures.
8. Get an average of the three recorded values (add the three recorded values and divide by three). This is the detector set-point valve. The value must be the temperature shown on the detector ±25˚F (±14˚C).

WARNING

Be careful not to get burned by the hot heater block in the dry-well calibrator or the hot detector. The temperature can exceed 800˚F or more.

9. Remove the power from the dry-well calibrator and let the heater block and detector cool before you remove the detector under test.
10. If the calibration verification test is unsatisfactory, replace the detector.

Disassembly

The fire/overheat detectors are hermetically sealed units. The detector cannot be disassembled.

MAINTENANCE

Cleaning

This section gives the procedure and materials necessary to clean the detector.

Materials

The materials necessary to clean the detector are given in the table below. You can use equivalent alternatives for the items given in the table.

Materials	Specification or Part No.	Source
Cloth, Clean Lint-free Solvent, LPS Presolve	None 01428	Get Locally LPS Laboratories (CAGE Code 66724)
Nitrogen or Clean, Dry Air	A-A-59503-1B1	Get Locally

Procedure

WARNING

Clean with solvents in an area that has good airflow. Do not clean near heat or open flame.

CAUTION

While cleaning the detector, do not use abrasive material or excessive force. This action will adversely affect the set point of the heat detector, compromising the accuracy of the detector.

1. Use a clean lint-free cloth wet with LPS Presolve solvent to clean the detector.

WARNING

Be careful when you use compressed air or gas. Always point the flow away from personnel. Compressed air or gas and the material moved by the air or gas pressure is dangerous and can cause injuries. Wear applicable eye protection.

2. Use nitrogen dry air at a maximum pressure of 30 psig (205 Kpa) to dry the detector.

Inspection

Make sure the detector is clean before you do the inspection. Refer to the Cleaning section.

1. Examine the electrical connection terminals. Look for cracks or damage. If the connection terminals are damaged or cracked, discard the detector.
2. Examine the electrical connection terminal screws. Look for damage to the screw threads and head. If damaged, replace the screws. Make sure the screws turn freely in the connection terminals. If the screws cannot be turned completely into the terminals, discard the detector.
3. Examine the shell or tube of the detector. If there is a dent, scratch, or abrasion to the outer area, discard the detector.

Storage and Movement

1. Install a protection cap, P/N FS06-250099-071, over the electrical connection end of the detector.
2. Make sure the detector has sufficient protection to prevent damage to the threads and outer shell.
3. Put the detector in a container that is approved for storage.
4. Keep the detector in a cool, dry area that has no contamination.
5. If you must move the detector to another location, make sure it has sufficient protection to prevent damage.

Fits and Clearances

Torque Values

CAUTION

Do not torque the terminal post screws to a value more than 25 lbf in. or you can damage the detector. If the detector is damaged, you must discard it.

1. When you make electrical connection to the terminal posts, torque the screws to a value between 20 and 25 lbf. in (between 2.26 and 2.28 Nm).
2. When you install the detector, torque it to a value of 20 lbf. ft (27 Nm).

Special Tools, Fixtures, Equipment and Consumables

The table below outlines the special tools, fixtures, equipment and consumable items needed to maintain the detector. Also provided are the vendors and the Commercial and Government Entity [CAGE] code.

Description	Part Number	Vendors	Recommended Source
Multimeter	Model 77	Fluke Corporation 6920 Seaway Boulevard P.O. Box 9090 Everett, WA 98206	Fluke (CAGE 89536)
Megohmmeter, 500 VDC, 20 M and higher	Model 2867	Quad Tech Inc. 5 Clock Tower Place 210 East Maynard, MA 01754-2530	Quad Tech (CAGE 0PK96)
Dry-Well Calibrator	Model 9141-A	Hart Scientific 799 E. Utah Valley Drive American Fork, Utah 84003-9775	Hart Scientific (CAGE 64841)
Customer Insert (used with Dry-Well Calibrator)	Model 3141-7		
Cleaner/Degreaser, LPS Pre-Solve	01428	LPS Laboratories, Inc 4647 Hugh Howell Rd Tucker, GA 30085-5052	LPS Laboratories (CAGE 66724)
Protection Cap	RCL-10	Protective Closures Co., Inc. DBA Caplugs LLC Div. Caplugs Division 2150 Elmwood Avenue Buffalo, NY 14207-1984	Protective Closures Co. (CAGE 99017)
Torque Screwdriver, 20 to 25 lbf in.	None Specified	Commercially Available	Commercially Available
Torque Wrench, 20 lbf ft.	None Specified	Commercial Available	Commercially Available
Power Source, 115 VAC, 50-60 Hz, 10 Amps or 230 VAC, 5 Amps (Necessary for Dry-Well Calibrator)	None	Get Locally	Get Locally
Cloth, Lint free	None	Get Locally	Get Locally
Nitrogen or Clean, Dry Air	A-A-59503-1B1	Get Locally	Get Locally

Note: All vendors are located in the United States.

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