D-9107RExd Digital Flame Proof Dual IR Flame Detector

Installation and Operation Manual

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CONTENTS

1 Overview 1
2 Specification 1
3 Construction and Operation Principle 2
3.1 Construction 2
3.2 Adjustment Frame 3
3.3 Operation Principle 3
4 Installation and Connection 3
4.1 Installation 3
4.2 Connection 4
5 Testing 6
6 Operation 6
7 Application 7
8 Troubleshooting 7
9 Maintenance 8
10 Caution 8
11 Accessories 8

1 Overview

- ✧ Dual-band infrared light detection for fire alarm.
- ✧ Sensitive to flame from material containing carbon. Suitable for fire happen with flame at the start.
- ✧ Addressable (connecting GST fire alarm control panel) and non-addressable (through relay contact) working modes optional.
- ✧ Flame-proof. Applicable to either commercial or hazardous industrial areas, such as explosive Zone 1 and 2, and flammable dust atmosphere.

2 Specification

✧ Operating Voltage:
- ➢ Loop 24V come from control panel Z1,Z2 terminals(addressable mode application) or power supply(non-addressable mode application)
- ➢ 24VDC come from 24VDC power supply

✧ Operating Current:
- ➢ Loop: Standby current≤1mA, alarm current≤1mA, Maximum Consumption 28mW
- ➢ 24VDC: Standby current≤20mA, alarm current≤30mA, Maximum Consumption:840mW

✧ Classifications:

The detector has 3 classifications. The factory default sensitivity is class 1, which can be reduced in field using GST handheld programmer.

✧ Detection Distance:
- ➢ Class 1 : 25m (furthest)
- ➢ Class 2: 17m
- ➢ Class 3: 12m

Test Fire: 33cm×33cm n-heptane fire.

The correlation between detection distance and angle is shown in Fig. 1. The shaded area is detectable.

The semicircle in the figure represents the detection distance in percentage.

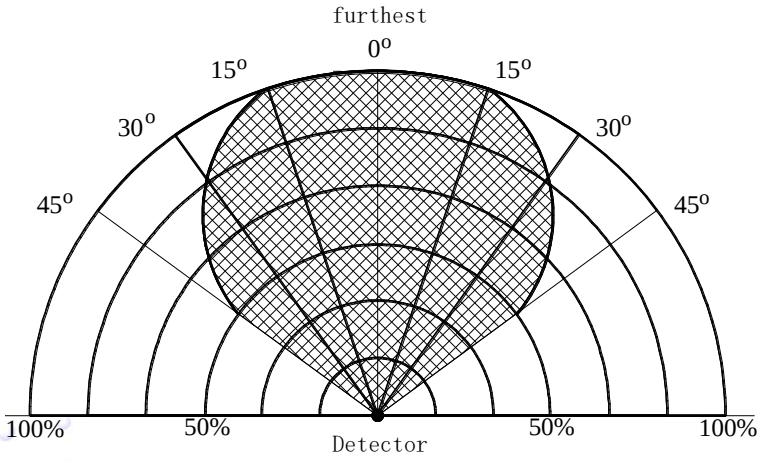

Fig. 1

Note: The detection angle to all directions are the same. Fig. 1 only gives a section illustration.

- ✧ Response Spectral Range: 4.4μm±0.5μm
- ✧ Response Time ≤30s
- ✧ Indicators:

  In addressable mode and non-addressable mode ,
  - ➢ Red LED: Flashes periodically in standby state, and steadily illuminates in fire alarm.
  - ➢ Yellow LED: Off in standby state, and steadily illuminates in fault.
- ✧ Contact Output:
  - ➢ Fire alarm contact: 1A/25VDC, normally closed in fire alarm, and normally open in other states.
  - ➢ Fault contact: 1A/25VDC, normally open in fault state, and normally closed in other states.
- ✧ Operating Environment:

  Temperature: -20℃～+55℃

  Relative Humidity: ≤95%, non-condensing
- ✧ Ingress Protection: IP65
- ✧ Dimensions: 166mm×235mm×199mm (with adjustment frame)
- ✧ Installation Hole Space: 125.5mm×80mm
- ✧ Installation Hole for Cable Entry: M27×2
- ✧ Material and Color of Enclosure: Stainless steel, metallic grey
- ✧ Weight:
  - ➢ Detector: 4.8kg
  - ➢ Adjustment frame: 1.3kg
- ✧ Explosion-proof Mark: Exd IIC T6 Gb/Ex tb IIIC T85℃ Db
- ✧ Explosion-proof Certificate Number: Presafe 14 ATEX 5548X
- ✧ Standard: EN60079-0：2009，EN60079-1：2007，EN60079-31：2009

3 Construction and Operation Principle

3.1 Construction

The construction of the detector is shown in Fig. 2.

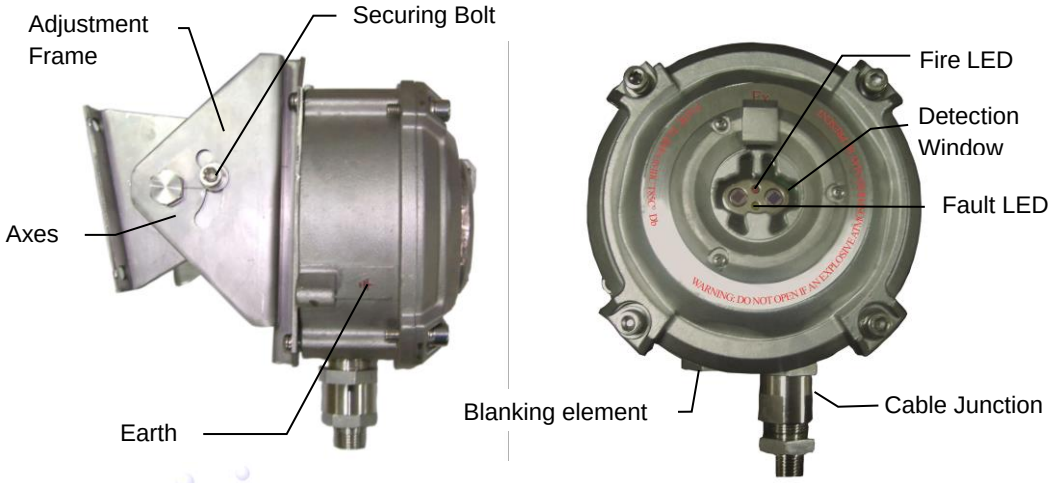

Fig. 2

3.2 Adjustment Frame

The adjustment frame can rotate by 60°around the axe, as shown in Fig. 3.

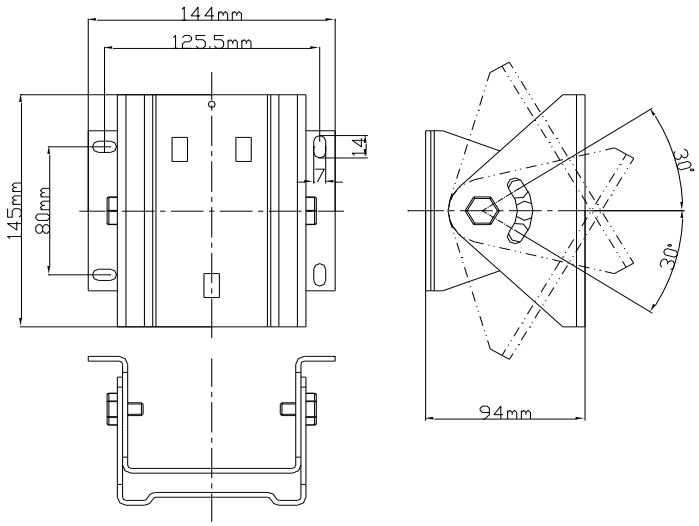

Fig. 3

3.3 Operation Principle

The detector uses two pyroelectric infrared sensors to detect the change of light signal of flame and background light signal at two bands of infrared spectrum through two signal processing channels. Its microprocessor analyzes the signal through the flame channel and background channel to judge if there is flame.

4 Installation and Connection

4.1 Installation

Before installation, check first if the enclosure is in good condition with all necessary markings. Then set the detector address and classifications (please refer to Section 6 Operation), and then install it according to Fig. 4.

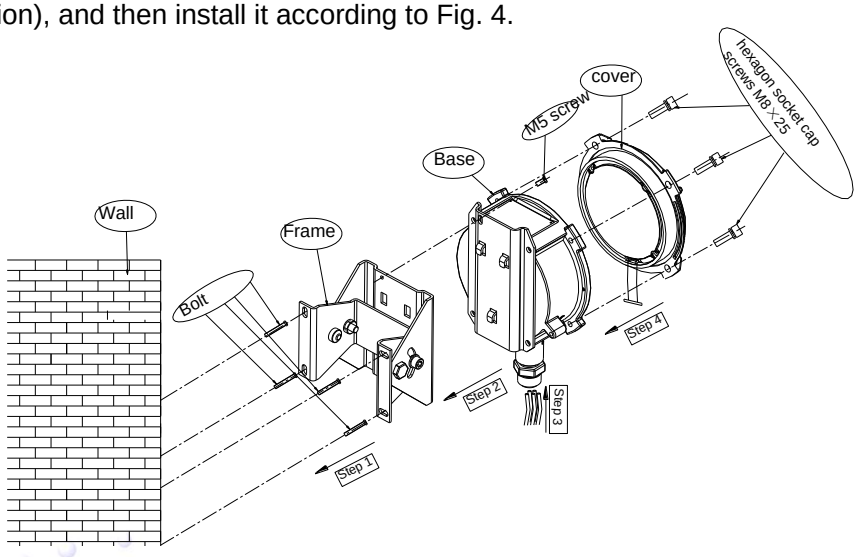

Fig. 4

Step 1: Install the adjustment frame.

Fix the adjustment frame securely on the wall using 4 M6 expansion bolts.

Step 2: Install the base.

Remove the protective cover (Fig. 5) from the base leaving the screws and washer with the base, and install the base onto the adjustment frame using a M5 screw.

Fig. 5

Step 3: Cable connection. Pleaser refer to “Connection” section.

Step 4: Install the cover. Remove the protective washer, insert the ribbon cable to XT3 of the base circuit, and then install the enclosure onto the base with reference to the aligning element with the U-shaped slot and secure the four screws using an Allen key.

Note: The base and enclosure shall be securely installed. There shall not be any scratches or cracks on the detection window. The enclosure shall be earthed.

Fig. 6

Finally, adjust the frame to make sure the detection window is facing the protected area, and fix the screws after adjustment.

Note: The detector shall be installed in compliance with relative installation codes and make sure the enclosure is in good condition. Please always contact your installer in case of any off-normal condition. Never conduct maintenance or repair with the power on.

4.2 Connection

(1) It is recommended to use multi-core copper cable with core cross section≥1.0mm^2, and external diameter ϕ8mm～ϕ10mm.

(2) The cable shall meet field requirements on resistance to explosion, heat,

corrosion and fire.

(3) The cable layout for hazardous explosive area must comply with corresponding codes. The connecting cable can be copper-core screened cable or explosion-proof hose with suitable junction thread matching with the detector taper thread of the cable nut (Fig. 7).

(4) The cable must enter the detector through the junction nut, and there must be an O-ring, a seal and a washer, as shown in Fig. 7.

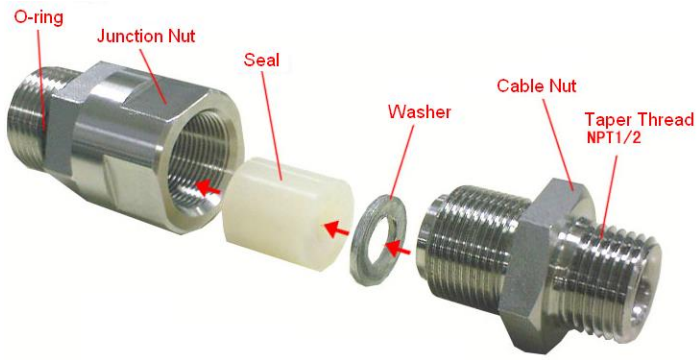

Fig. 7

(5) Connect the screen cover of the cable with the protective earth inside the detector.

(6) Terminals on the base are shown in Fig. 8.

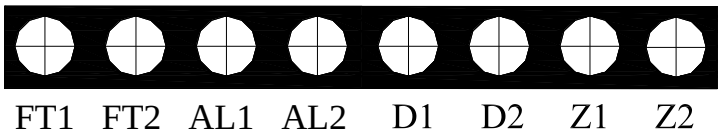

Fig. 8

- ✧ Z1, Z2: Communication loop input from fire alarm control panel. Polarity insensitive.
- ✧ D1, D2: 24VDC power input. Polarity insensitive.
- ✧ AL1, AL2: Fire alarm contact output. Normally open contact. Closed in fire alarm.
- ✧ FT1, FT2: Fault contact output. Normally closed contact. Open in fault.

The loop cable and the power shall enter the detector through a cable nut, and the signal cable through another cable nut (Fig. 9). If no signal cable is needed, the cable outlet shall be inserted with an blanking element with O-ring.

If Z1 and Z2 does not connect with the loop, they must be connected with D1 and D2 polarity-insensitively.

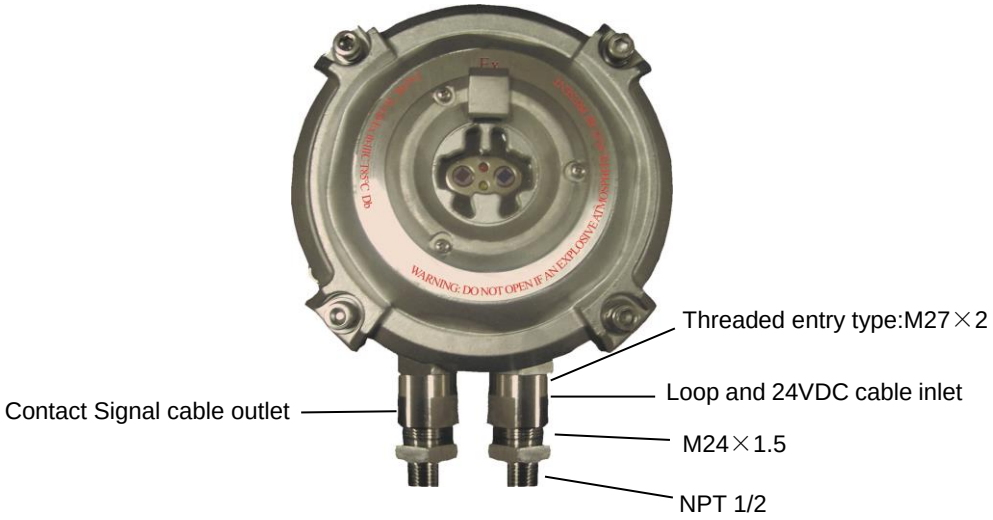

Fig. 9

(7) After connection, screw down the cable nut.

5 Testing

Warning: Power up only after all detectors are installed.

1 The detector must be tested after installation and regular maintenance.

2 Tests:

(1) Connect the detector to loop and 24VDC, it should be able to be registered by the control panel, and the red LED should flash periodically. After the detector is powered up for 20 minutes, igniting an infrared light source at 1.5m distance in front of it, it shall report a fire alarm to the control panel within 30s and light the fire LED, and it should be reset from the control panel to standby state.

(2) Connect the detector to 24VDC only, the red LED should flash periodically in standby state. After the detector is powered up for 20 minutes, igniting an infrared light source at 1.5m distance in front of it, it shall give fire signal within 30s and light the fire LED.

3 After testing, reset the detector from control panel if it connects to the loop. If it's not connected to loop, disconnect 24VDC power and re-power it up. Notify the proper authorities the system is back in operation.

4 If a detector fails in testing, clean and test it again. If it still fails, return it for repair.

6 Operation

1 The address and classifications can be programmed using a handheld programmer. Please refer to the manual for the programmer.
The range of address is 1~242.
For setting classifications, number 1 represents class 1, number 2 for class 2 and number 3 for class 3.

2 If the detector connects with the loop, it needs to be programmed with an address to be identified by the control panel. If it doesn't connect with the loop, no address setup is required. But terminal Z1 and Z2 must be connected with D1 and D2 in an

polarity-insensitive way.

7 Application

1 Fig. 10 shows the connection of the detector with GST fire alarm control panel.

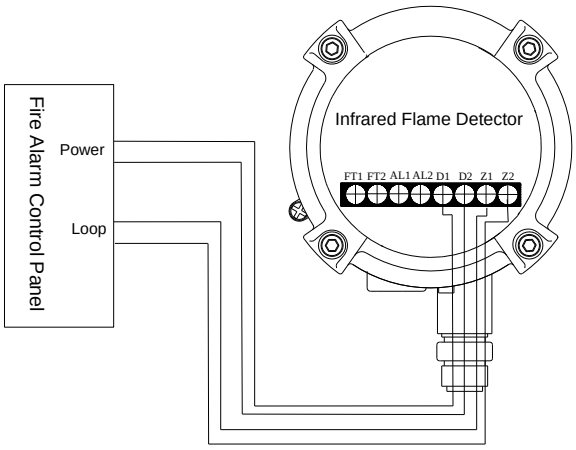

Fig. 10

2 Connection of the detector with control panels of other suppliers are shown in Fig. 11.

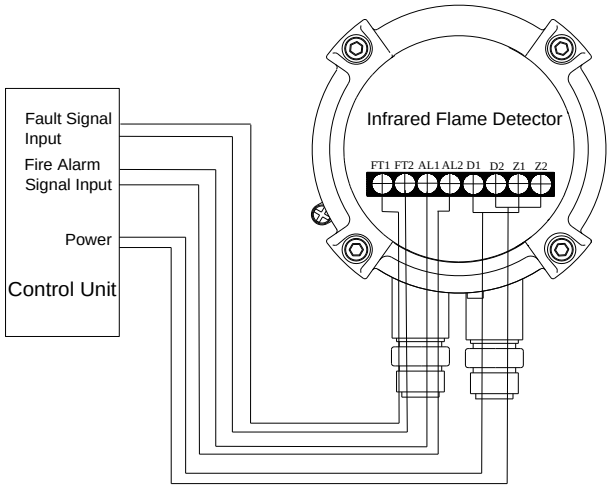

Fig. 11

8 Troubleshooting

Possible Problem	Resolution
The indicator doesn't flash	Check the cable connection. If there is no problem, replace the detector.
Incorrect contact signal	
Registration failure	
Other problems	

9 Maintenance

1 The detection window should be cleaned at least every three months.

2 Before cleaning, notify relative departments that the system is undergoing maintenance and will be out of service. Disable the zone or system in maintenance to avoid unwanted alarms.

3 After cleaning, install the detector back and test again.

10 Caution

(1) The detector should be handled with care during maintenance to avoid damage.

(2) Installation and maintenance should strictly comply with relative codes for explosive and hazardous areas.

(3) Never open the cover for maintenance in field.

(4) The enclosure must be earthed.

(5) False alarms may occur if there is arc welding operation within 5 meters to the detector.

(6) The following places are not suitable for the detector:

- ✧ Where flameless fires are to be expected.
- ✧ Where intensive smoke spreads before flames.
- ✧ Where the "view" of the detector is easy to be obscured.
- ✧ Where the sun can directly shine the detection window.
- ✧ Where the detector may encounter frequent vibration.

(7) Special conditions for safe use:Repairs of the flameproof joints must be made in compliance with the structural specifications provided by the manufacturer. Repairs must not be made on the basis of values specified in tables 1 and 2 of IEC 60079-1.

(8) The screws used for the assembly must be of yield stress higher or equal to 700N/mm^2.

(9) The threaded entries comply with following parameters:

- ✧ Threaded entries type: M27×2
- ✧ Position on the equipment: see Fig 9
- ✧ The number permitted: one is installed in back cover, and two at most
- ✧ Sealing and washer size: Sealing and washer size: ϕ11mm(internal diameter) ×ϕ21mm(external diameter)×22mm(thickness)
- ✧ Cable external diameter ϕ8mm～ϕ10mm is recommended.
- ✧ The torque for cable nut is 25 N.m to compress sealing ring.

(10) One blanking element of threaded entries type M27×2 is delivered with the detector and installed in back cover.

11 Accessories

- ✧ 1 installation and operation manual
- ✧ 4 M6×60 expansion bolts
- ✧ 1 M5×10 screws
- ✧ 1 adjustment frame
- ✧ 1 Allen Key

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