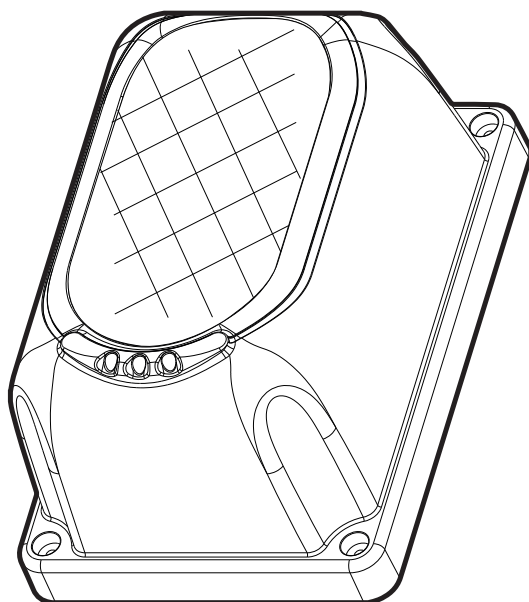


EF-CBD130 Conventional Reflective Beam Detector

Installation and operation manual



EAT•N

Powering Business Worldwide

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DOCUMENT UPDATE NOTES

S.No.	Release / Change Notes	Date
A	Eaton update - first release	July 2022
B	Eaton update - images and layout	July 2022
C	Eaton update - supplied accessories	March 2023

1. IMPORTANT PRODUCT SAFETY INFORMATION

To prevent severe injury and loss of life or property, read the instruction carefully before installing the beam detector to ensure proper and safe operation of the system.

1.1. Definitions and Symbols

WARNING




Indicates a potentially hazardous situation which, if not avoided, can result in serious injury or death.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, can result in minor to moderate injury, or serious damage to the product.



This product must only be disposed of in accordance with the WEEE directive.

 0832 DoP0506-UK	 2831 DoP0506	 EN54-12:2015 378aa/01
Eaton Electrical Products Ltd. Llantarnam Park Cwmbran NP44 3AW EF-CBD130 2831-CPR-F4717 EF-CBD130 0832-UKCA-CPR-F1371		
EN54 Part 12 Compliance EF-CBD130 Conventional Reflective Beam Detector complies with the requirements of EN 54-12:2015.		

2. About the EF-CBD130

2. About the EF-CBD130

The EF-CBD130 reflective beam detector is for use with the Eaton range of conventional fire systems. Alignment is made easy with a built in laser pointer and digital display.

The laser pointer is used to mark the exact location where the reflector is to be installed. Once the reflector is installed the digital display indicates the light intensity between the detector and the reflector enabling the user to adjust for optimal alignment

The EF-CBD130 has four adjustable operational ranges of between 8 to 20, 20 to 40, 40 to 70 and 70 to 100 meters beside with three adjustable sensitivity setting ranges from 2.6dB, 3.8dB and 5.8dB to meet the specific environmental requirement. The EF-CBD130 works on the principle of reflective infrared beam obscuration. Used in conjunction with a reflector, it will notify the fire alarm panel when the infrared beam is obscured by smoke.

The EF-CBD130 is ideal for use high ceiling and wide areas such as warehouses, large stores, shopping malls, leisure centres, exhibition halls, hotel lobbies, printing houses, garment factories, museums and prisons, as well as places where slight smoke particles or corrosive gas exist.

2.1. Feature and Benefits

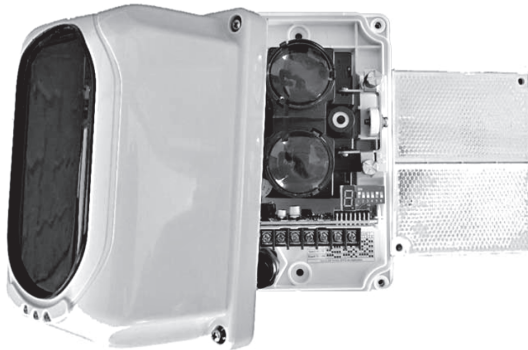
1. EN54-12 Compliance
2. Intuitive alignment with built in laser pointer and digital display
3. Employ single-ended design through reflector
4. Four ranges wide monitoring from 8-100 meters via encoder
5. Three users programing sensitivity adjustment
6. Built-in microprocessor
7. Self-diagnosis function can monitor for internal faults
8. Automatic compensation for factors weakening received signals, such as dust contamination, positional movement and ageing of the transmitter
9. Fire and Fault interfacing relays
10. Aesthetically pleasing

2.2. Technical Specifications

Part Number	EF-CBD130
Standard	
Listed	LPCB Certification
Compliance	EN 54-12:2015
Fire Detection and Alarm Systems	BS 5839 Part 1:2017
Specification	
Operating Voltage	20 V to 28 V DC
Current Parameters	Standby: 23mA Commission: 56mA Alarm: 33mA
Beam Sensor Sensitivity [via Encoder]	Level 1: 2.6 dB High Sensitivity Level 2: 3.8 dB Medium Sensitivity Level 3: 5.8 dB Low Sensitivity
Beam Pathway Length [via Encoder]	Span 1: 8 to 20 meters Limited Path Span 2: 20 to 40 meters Short Path Span 3: 40 to 70 meters Normal Path Span 4: 70 to 100 meters Long Path
Beam Path Angle	±0.4° Directional (This data takes the average of the left and right deflection angles.)
Alignment Guide	Laser Beam Pointer
Digital Display Guide	Nixie Tube
LED Indicator Guide	Red: Fire ; Yellow: Fault ; Green: Alignment
Reset Time	Less than 2 Second
Relay Capacity [Fire & Fault]	Normally Open & Close/ 2.0 A; 30 VDC
Physical	
Material / Colour	ABS / White
Dimension / Weight	L:190.87 x W:126.87 x H:91.96 mm / 440 gm
Weight	0.130 Kg with base
Environmental	
Operating Temperature	-10°C to +50°C
Ingress Protection Rating	IP30 [IP66 glue seal-For permanent fixing, Not EN54-12 approved]
Humidity	0 to 95% Relative Humidity, Non condensing

2. About the EF-CBD130

2.3. Product Appearance



2.4. Principle of the Beam Detector

In a fire, when smoke enters the path of the beam detector, some of the light is absorbed or scattered by the smoke particles. This decreases the received signal, leading to an increase in optical obscuration. This unit decodes the received signals and compares to the pre-programmed algorithm stored on the processor. Through this algorithm the detector will take appropriate action and activate the corresponding relays and LED indicators.”

To avoid false alarms the detector and reflector should be mounted on a solid structure, care should be taken to avoid obstructing the path of the beam. Refer to Figure 1.

In operation mode, the unit continually emits light, care should be taken that the activities in the space do not obstruct the beam or move the device to avoid false operation of the detector. Refer to Figure 1.

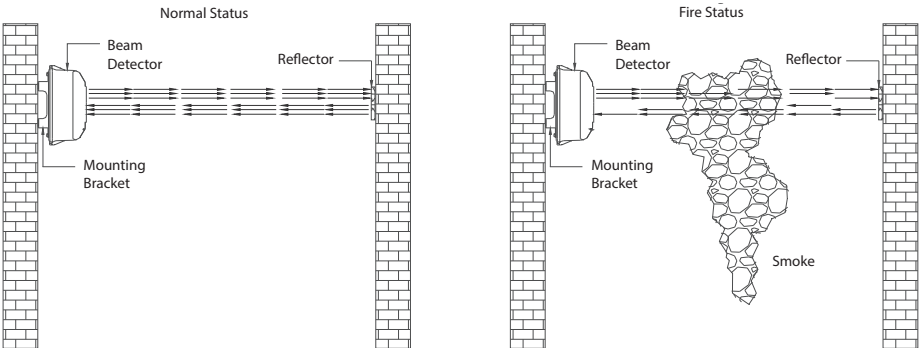


Figure 1. Beam detector principle 2 Installation Procedures

3. Installation Procedures

3.1. Mounting Details

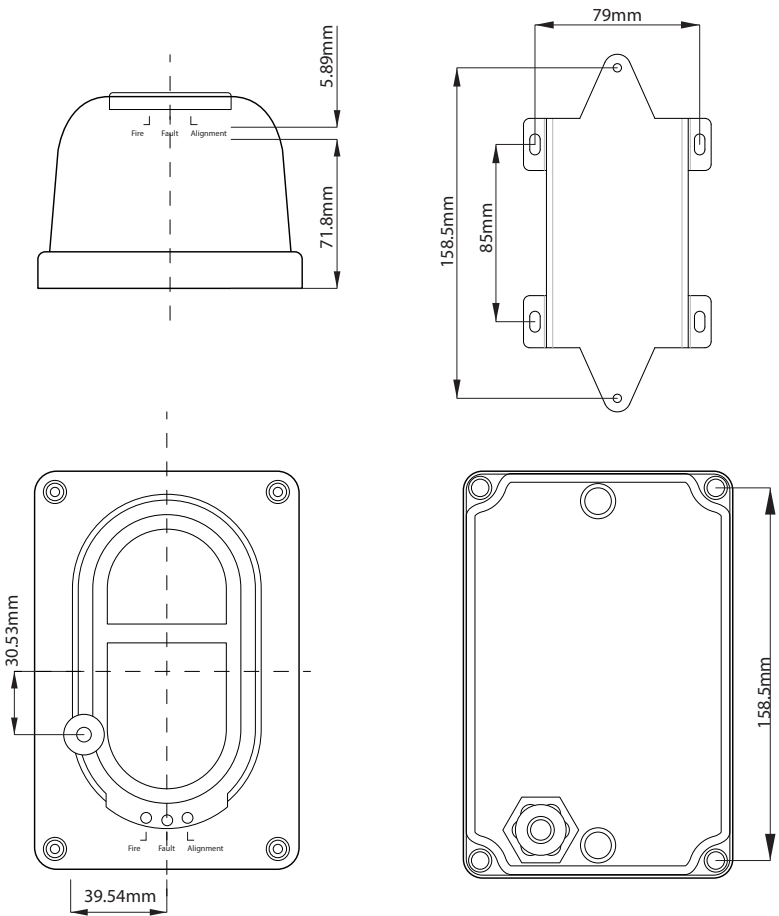


Figure 2. Detector Diagram

3.2. LED Indicators

LED Indicators	Colour	Function
Fire	Red	Illuminates when at least one fire alarm event occurs
Fault	Yellow	Illuminates when at least one fault alarm event occurs in the detector
Alignment	Green	Illuminates during commissioning

2. About the EF-CBD130

3.3. Mounting Preparation

This beam detector must be installed, commissioned and maintained by competent personnel. The installation should comply with all local standards and/or codes of practice in the region.

Note - to avoid damage to critical components such as the reed switch it is advisable to use the magnetic tool when needed.

If the ceiling height is less than 8 meters, the beam detector should be installed between 0.5 meters to 1 meter below the ceiling level. Refer to Figure 3.

If the ceiling height is more than 8 meters, the beam detector should be installed at least 0.5 meters below the ceiling. Refer to Figure 3.

The chosen location should be clean and dry and not subject to shock, vibration, electro-statistic discharge, and free from glass walls, direct sunlight and any reflective barriers.

Make sure that the beam path is free from obscuration caused by moving items.

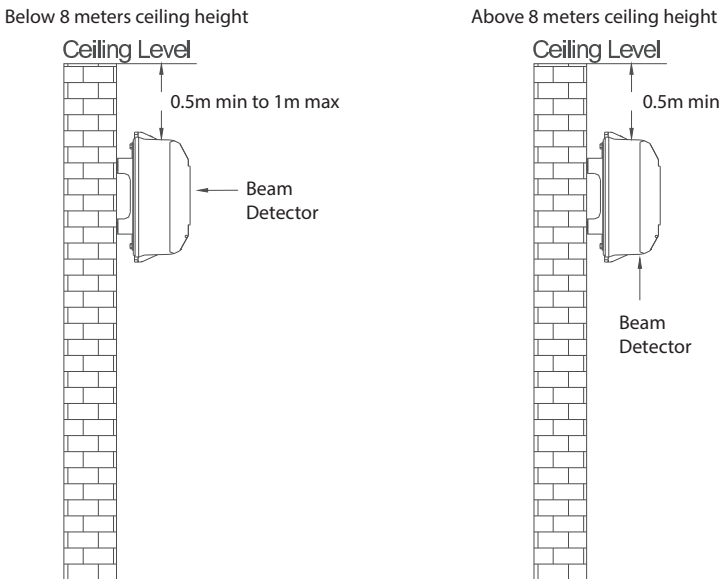


Figure 3. Installation Details

3.4. Mounting of the Beam Detector

1. Using the supplied bracket, mark the position of the fixing holes.
2. Fit the mounting bracket using appropriate fixings for the surface, ensure that the bracket is secure and free from movement. Refer to Figure 4
3. Fix the detector base onto the bracket using two M4x12x10 standard screws.

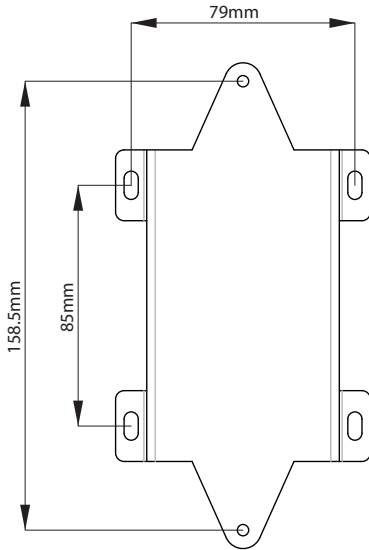


Figure 4. Mounting Bracket

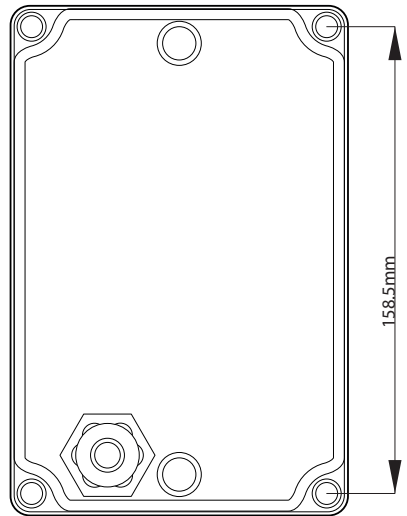


Figure 5. Beam Detector

3.5. Mounting of the EF-CBD130-R Reflector

1. For distances between 8m and 40m one reflector is required, for distances between 40m and 100m four reflectors are required
2. Mark the position of the fixing holes
3. Fit the reflector with suitable fixings. Refer to Figure 6.

2. About the EF-CBD130

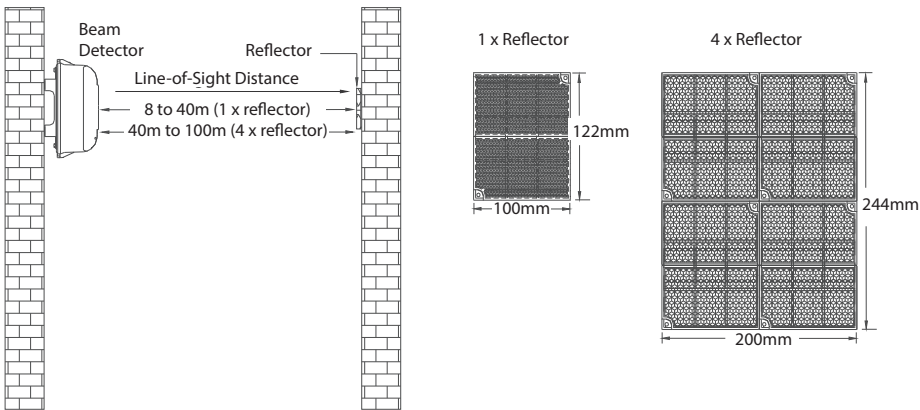


Figure 6. Mounting of EF-CBD130-R Reflector Reflector

3.6. Cabling Details

Cables should be brought into the detector using the supplied cable gland. The maximum size of the cable which can be terminated is 1.5mm². Observe the polarity. Refer to Figure 7.

1. Terminal D1 (+) and D2 (-) for connecting Power supply [24VDC]
2. Terminals S1(+) and S2(-) to be linked to D1 (+) and D2 (-)
3. Terminal HJ1 and HJ2 for connecting Fire signal relay output [Normally Open]
4. Terminal GZ1 and GZ2 for connecting Fault signal relay output [Normally Close]

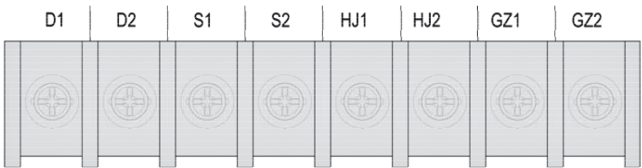


Figure 7. Wiring Terminals

4. Programming Sensitivity and Span

Before using the detector, the operation range and sensitivity should be set according to the application environment. The sensitivity and span of the detector can be set using the DIP switches. Use DIP switch (SW2) to set the parameter set you want (see table below).

<div>Sensitivity</div> <div>Span</div>	Level 1	Level 2	Level 3
Span 1: 8~20m	<div><div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>123456</div></div>	<div><div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>123456</div></div>	<div><div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>123456</div></div>
Span 2: 20~40m	<div><div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>123456</div></div>	<div><div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>123456</div></div>	<div><div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>123456</div></div>
Span 3: 40~70m	<div><div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>123456</div></div>	<div><div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>123456</div></div>	<div><div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>123456</div></div>
Span 4: 70~100m	<div><div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>123456</div></div>	<div><div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>123456</div></div>	<div><div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>123456</div></div>
Disable Mode	<div><div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>123456</div></div>		

5. Commissioning Beam Detector

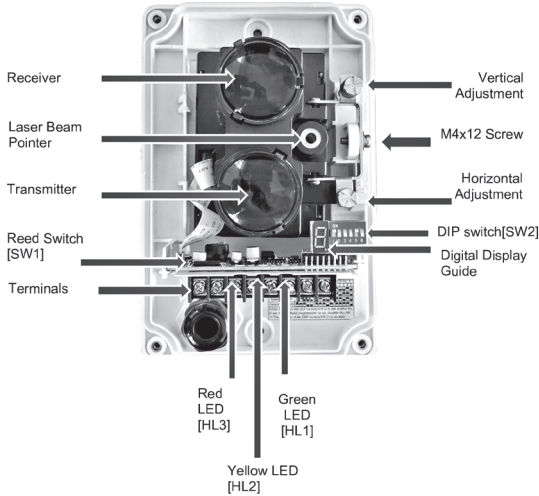


Figure 8. Names and Location

5. Commissioning Beam Detector

5.1. Commissioning Preparation

1. Make sure both beam detector and reflector are mounted correctly and secure.
2. Make sure that there is a clear line of sight between the beam detector and the reflector and the alignment angle is correct.
3. Make sure that the correct number of reflectors are installed for the distance covered.
4. Make sure the Span settings are correct for the distance covered, these are adjusted through the DIP Switch depending on the distance between the detector and reflector. [Span1:8-20meters; Span2:20-40meters, Span3:40-70meters, Span4:70-100meters].
5. Confirm cable terminations are correct.

5.2. Step 1: Entering Commissioning Method

- A. Remove the detector cover and power on the device.
- B. Place the supplied magnetic tool alongside the Reed Switch. After a while the Green LED [HL1] should turn on steady or blinking, and then take out the magnetic tool to start the detector auto alignment process.

Note: Keep the line of sight clear between the detector and reflector. Do not disturb the detector auto alignment process.

5.3. Step 2: Sightline Alignment Procedure

- A. The Laser Beam Pointer should turn on automatically. Look at the reflector and check to see if the laser is pointing at the centre.
- B. Once you have located the mark, loosen the M4x12 screw and adjust the horizontal or vertical adjustment wheel until the Laser is pointing at centre of the reflector. Refer to figure 8.

Note: During the adjustment period the digital display guide indicates a number- it is not indicating the signal intensity. If the number turns to zero [0] it means the Sightline Adjustment is not appropriate and more adjustment is required.

5.4. Step 3: Acceptable Adjustment Procedure

- A. Adjust the signal intensity through the horizontal or vertical adjustment wheel monitor the signal intensity through digital display guide, the number is indicating the signal intensity from 1 to 8. Try to reach number eight [8] to achieve acceptable adjustment. However, for long path span number 2 or 3 is an acceptable adjustment. Make sure that the line of sight is clear between the detector and reflector.

5. Commissioning Beam Detector

Note: If the number displayed is nine [9] it means that the setting of the Span is not appropriate. Power off the detector and adjust the DIP switches to the correct settings.

- B. If the Green LED [HL1] is steady on, it means that the signal intensity is acceptable.
- C. Tighten M4x12 Screw and then ready to proceed to the next step.

5.5. Step 4: Finalizing the Installation

- A. Replace the detector cover and fix using the screws.
- B. Place the magnetic tool alongside the "(D)" marked.
- C. Right after the Green LED [HL1] is turned-off, take out the magnetic tool to allow the detector exit in commissioning mode and turn to monitoring mode.

WARNING

Do not obstruct or interrupt the signal between the detector and reflector.

Note: The Yellow LED [Fault] and Green LED [Alignment] will begin blinking simultaneously for about 3 seconds then Red LED [Fire] will begin blinking every 3 seconds, indicating that the beam detector is commissioned.

Keep the detector running for at least 20 seconds then proceed to the next step.

5.6. Step 5: Testing Fire Signal

- A. Using the supplied Opaque/Translucent testing material, cover one half of the beam detector using the translucent portion of the material. Within less than 30 seconds the Red LED [Fire] will turn on steady, indicating Fire signal. [The fire alarm relay [HJ1 and HJ2] will latch to normally closed]. Refer to Figure 9.
- B. Remove the testing material and cut the power off for at least 2 seconds to reset the detector.

5.7. Step 6: Testing Fault Signal

Note: Using the supplied Opaque/Translucent testing material, cover one the half of the beam detector using the opaque portion of the material. Right after the Yellow LED [Fault] turns on, indicating the fault signal. [The fault alarm relay [GZ1 and GZ2] will latch to normally closed]. Refer to Figure 9.

6. Other Functions

1. If the opaque material is taken out from the detector in less than 15 seconds, then the detector automatically reset to normal status.
2. If the opaque material is not taken out from the detector and is maintained for more than 15 seconds then a fire signal is registered, turn-off the power for at least 2 seconds to reset the detector.

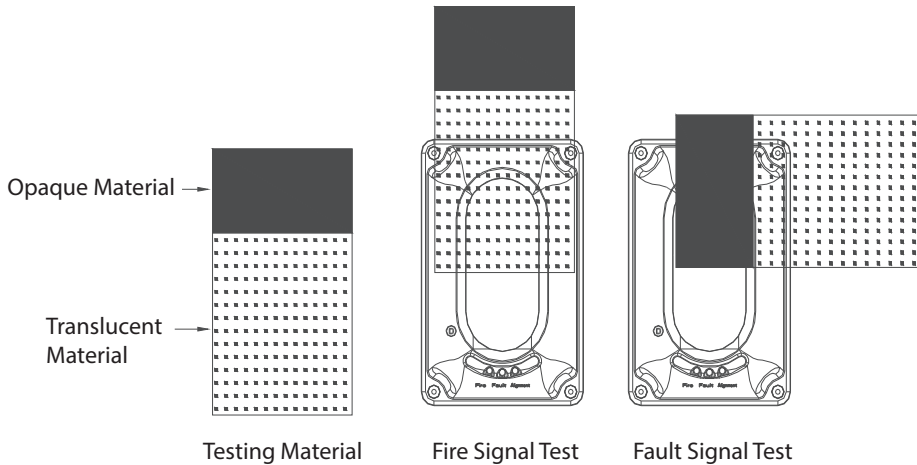


Figure 9. Testing Details

6. Other Functions

Automatic Compensation of Light

When dust exists in the working environment of the detector, the emitting window, receiving window and reflector will be covered with dust, which will affect normal operation. In order to solve the problem, we designed the function of automatic compensation of light. When there is dust on windows, the detector can judge the amount of dust, and compensate the received signal through internal program and circuit to ensure the detector can continue to work normally. The detector gives fault signal when dust on the lens and reflector surface reaches a certain level and light compensation reaches the limit for the detector to work normally.

Self-diagnosis on Optical Signal

The detector has functions of checking emitting, receiving and amplifying circuit. When there is fault with these three parts of circuit during operation, the detector will generate fault information.

7. Maintenance

1. Inform the suitable personnel before conducting the maintenance.
2. Disable the detector on the control panel to prevent false alarm.
3. Do not attempt to adjust or modify the detector, it may affect the ability of the detector to respond to a fire condition and will void the manufacturer's warranty.
4. Use a damp cloth to clean the detector. Do not use cleaning chemicals that may leave residue on the electronic parts and smoke sensor.
5. Notify again proper personnel after conducting the maintenance and make sure to enable the detector and confirm if up and running.
6. Perform the maintenance on semi-annually or quarterly depending on the site conditions.

8. Troubleshooting Guide

Trouble	Comment	Troubleshooting Advice
Indicates Faults after commissioning	The detector is Dirty. The line of sight between detector and reflector was moved. Not properly commission at the start.	Conduct maintenance. Re-Commission the detector.
Unable to commission	Transmit/Receive diode is not working. The reed switch is damaged.	Replace the component.
Keep Indicating Fire signal	Check if vibration or electro-statistic discharge is pre-set after commissioned.	Re-Commission the detector.
Fire signal can't be cleared	There is obscuration on the optical pathway between the detector and the reflector. The angle of optical pathway has changed and need to be aligned again.	Re-Commission the detector.

9. Supplied Accessories

The following accessories are included in the package:

1. Four reflectors.
2. One Mounting Bracket.
3. Two M4 pan head screws with washers.
4. One Opaque/Translucent Test Material.
5. One Magnetic Tool.

10. Appendix 1

10.1. Limitation of Beam Detectors

The beam detector is designed for triggering and initiating emergency fire equipment's; however, it only functions when configured correctly with other equipment. Installation of this beam detector must conform to electrical codes and country standards.

All kinds of smoke detectors have restrictions, since fire develops in various ways and can often be unpredictable in their progression, it is unforeseeable which type of detector will provide the earliest warning. No types of beam detector can sense every form of fire all the time. Generally speaking, detectors may not warn you about fire caused by insufficient safety measures, violent explosions, leaking gas, improper storage of flammable materials like diluents and other safety hazards, arson or children playing with fire. The alarm of a smoke detector used in high velocity environment will be delayed due to dilution of smoke by frequent and fast airflow. What's more, the beam detector has to be frequently maintained for it is exposed to more dust contamination.

The beam detector cannot last forever. In order to keep the detector working in good condition, please maintain the equipment continuously according to recommendations from manufacturers and relative national codes and laws. Take specific maintenance measures on the basis of different environments.

The beam detector contains electronic parts. Even though it is designed manufactured to last for a long time, any of these parts could fail at any time. Therefore, test your beam detector at least every 6 months according to national codes or laws. Any smoke detectors, fire alarm devices or any other components of the system must be repaired and/or replaced immediately as they fail.

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