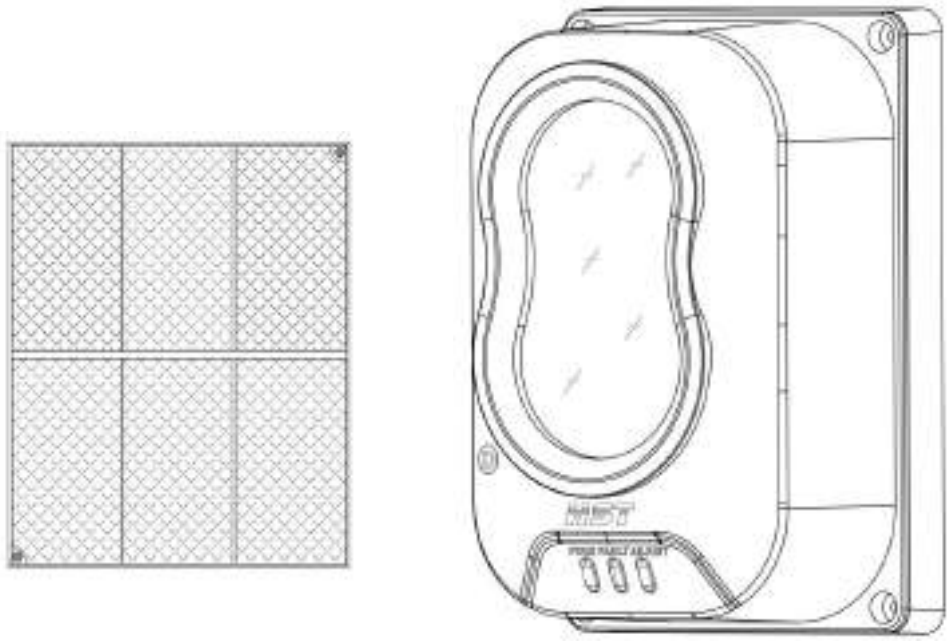
HD106P

Conventional Reflective Beam Detector

Installation and Operation Manual



HLogic Security Technology Co., Ltd.

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Product Safety

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.

European Union directive



2012/19/EU (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points.

For more information please visit the website at www.recyclethis.info

1. Introduction

1.1. Overview

HD106P Conventional Reflective Beam Detector has built in Laser beam pointing and Digital guide display for real user friendly alignment method. The Laser beam pointing accurately point the exact location where to mount mirror and with additional digital guide display allows to monitor and guide on the actual light intensity between the mirror and detector which cannot be seen by our naked eye making it more easy and convenient in alignment commissioning.

The HD106E 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 HD106E 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 HD106E is ideal for use high ceiling and wide areas such as warehouses, large storages, 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.

1.2. Feature and Benefits

1). Hassle free alignment, built with digital guide display and laser beam pointing.
2). Employ single-ended design through reflective mirror.
3). Four ranges wide monitoring from 8-100 meters via DIP switch.
4). Three users programming sensitivity adjustment.
5). Built-in microprocessor
6). Self-diagnosis function can monitor for internal faults.
7). Automatic compensation for factors weakening received signals, such as dust contamination, positional movement and ageing of the transmitter.
8). Fire and Fault interfacing relays.
9). Attractive and pleasing appearance.
10). Real User friendly alignment method.

1.3. Technical Specification

Specification

Operating Voltage	20 V to 28 V DC
Current Parameters	Standby: 23mA, Alarm: 33mA
Beam Sensor Sensitivity	Level 1: 2.6 dB High Sensitivity Level 2: 3.8 dB Medium Sensitivity Level 3: 5.8 dB Low Sensitivity
Beam Pathway Length	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 5 Second
Relay Capacity [Fire & Fault]	Normally Open & Close/ 2.0 A; 30 VDC
Setting Switch	Setting path and sensitivity

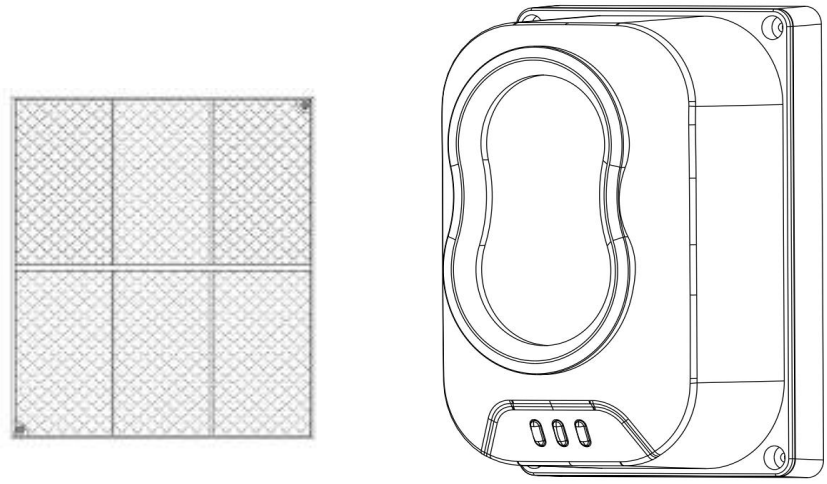
Physical

Material / Colour	ABS / White
Dimension	L:183.5 x W:123.1 x H:103.0 mm
Weight	0.130 Kg with base

Environmental

Operating Temperature	-10°C to +50°C
Ingress Protection Rating	IP66 glue seal-For permanent fixing
Humidity	0 to 95% Relative Humidity, Non condensing

1.4. Product Appearance



Reflecting mirror **Beam Detector**

Figure 1: Beam detector and Reflecting mirror

1.5. Principle of the Beam Detector

The HD106E reflective optical beam smoke detector incorporates a light transmitter and the detector on the same unit. The light path is created by reflecting light emitted from the transmitter off a retro- reflector, meaning it is reflecting light back to its source with a minimum of scattering, which is placed opposite the detector.

In a fire, when smoke falls within the path of the beam detector, some of the light is absorbed or scattered by the smoke particles. This creates a decrease in the received signal, leading to an increase in optical obscuration. This unit decodes or analysts received signals and compare to the pre-programmed algorithm stored on the processor. Through this algorithm the detector will decide whether fire is defined or not and lead to enablement the corresponding relays and LED indicators. The unit on the operating mode maintaining continually emitting 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 2.

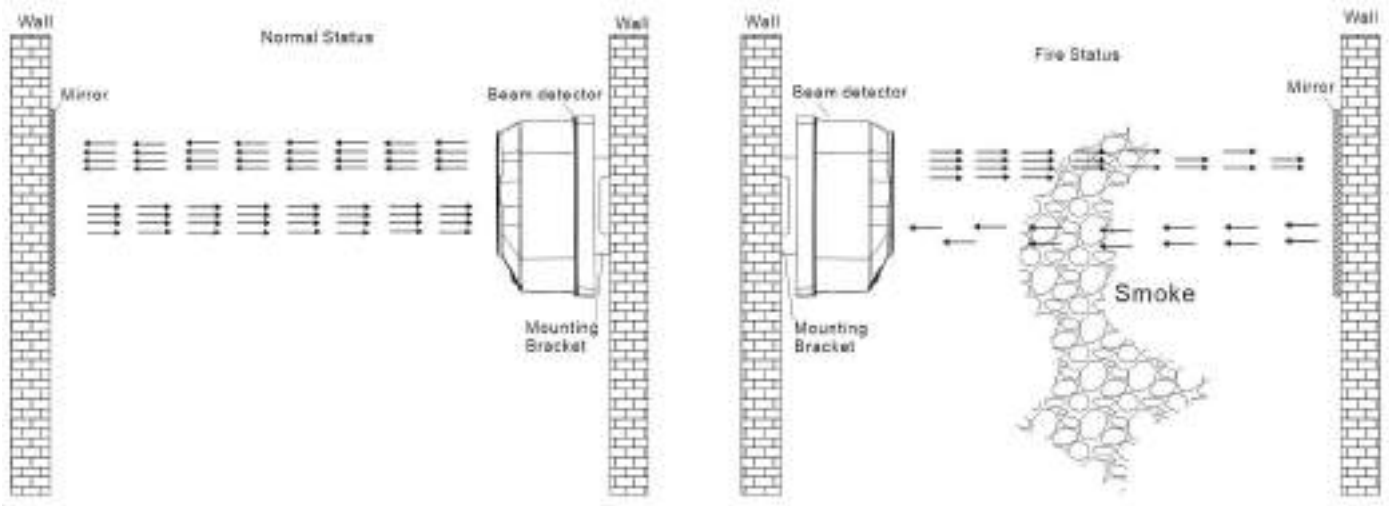


Figure 2: Beam detector principle

2. Installation Procedures

2.1. Mounting Details

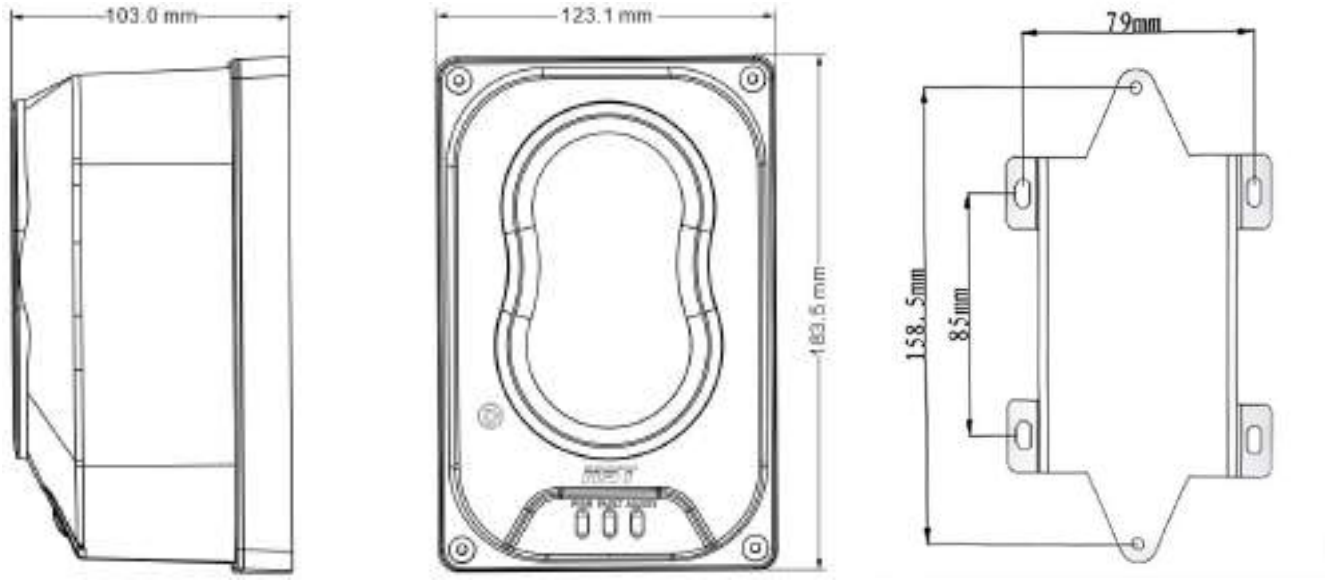


Figure3: External and installation dimension diagram

2.2. LED Indicators

LED Indicators	Colour	Function
Fire	Red	Illuminates when at least one fire alarm event occur
Fault	Yellow	Illuminates when at least one fault alarm event occur in the Detector
Adjust	Green	Illuminates during the commissioning

2.3. Mounting Preparation

This beam detector must be installed, commissioned and maintained by a qualified or factory trained service personnel. The installation must be installed in compliance with all local codes having a jurisdiction in your area or BS 5839 Part 1 and EN54.

Note: The device component within the device is vulnerable specially the reed switch. It is advisable to use the magnetic tool when needed to prevent physical damage.

1). Under flat spare area. If the ceiling height is less than 8 meters, the beam detector should be installed 0.5 meter to 1 meter below the ceiling level. Refer to Figure 4.

2). Under flat spare area. If the ceiling height is more than 8 meters, the beam detector should be installed minimum of 0.5 meter below the top ceiling. Refer to Figure 4.

3). The chosen for the location should be clean and dry and not subject to shock, vibration or electro-statistic discharge, and free from glass wall, sunlight direction any reflective barrier.

4) . Make sure that the beam path is free form obscuration against moving items.

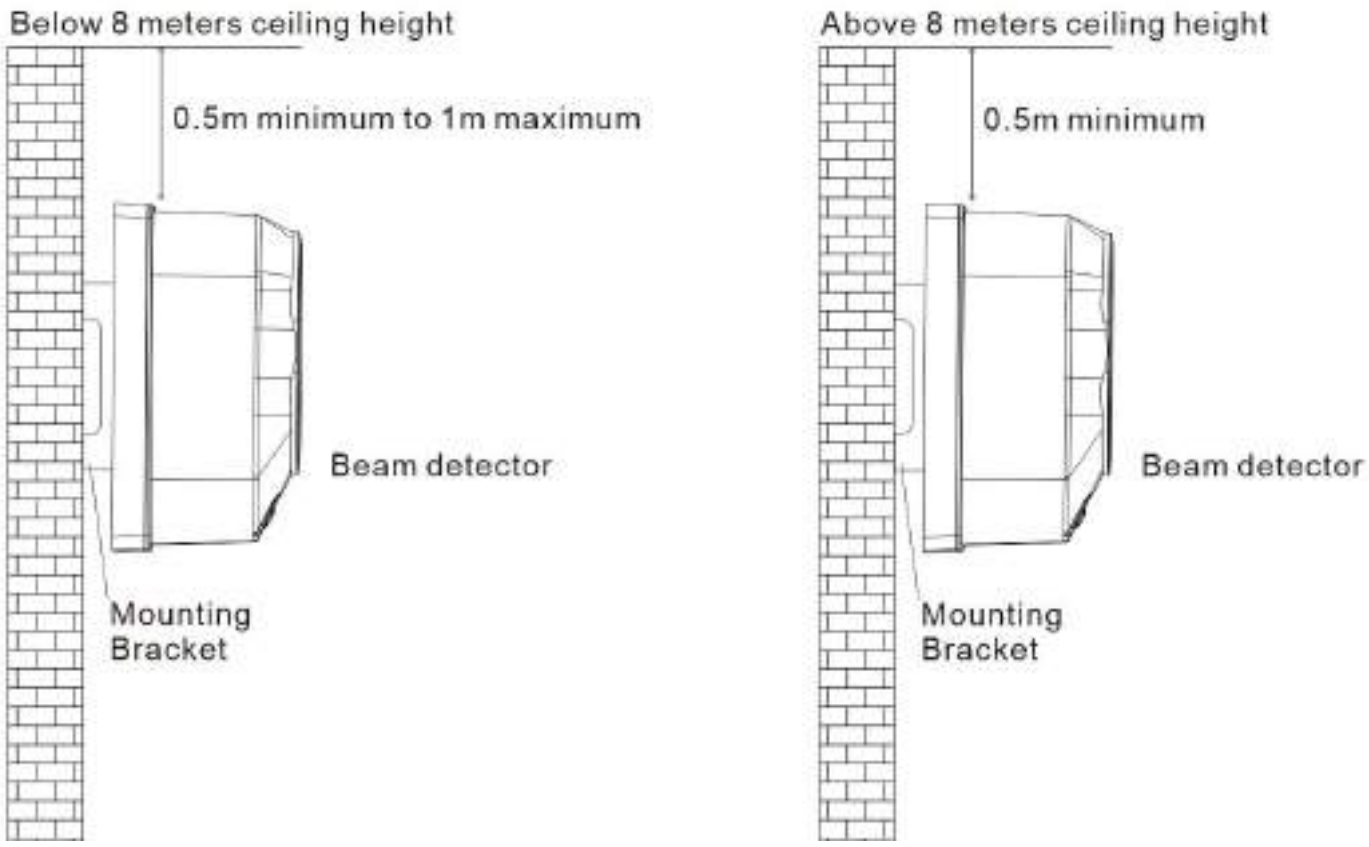


Figure4: Installation Details

2.4. Mounting of the Beam Detector

1). Using the supplied bracket, mark the position of the fixing holes.

2). Drill four holes and insert an 8mm wall plug into each.

3). Fix the mounting bracket to the wall using four ST4x30 screw. Refer to Figure 5.

4). Fix the detector base onto the bracket using two M4x12x10 standard screws. Refer to Figure 6.

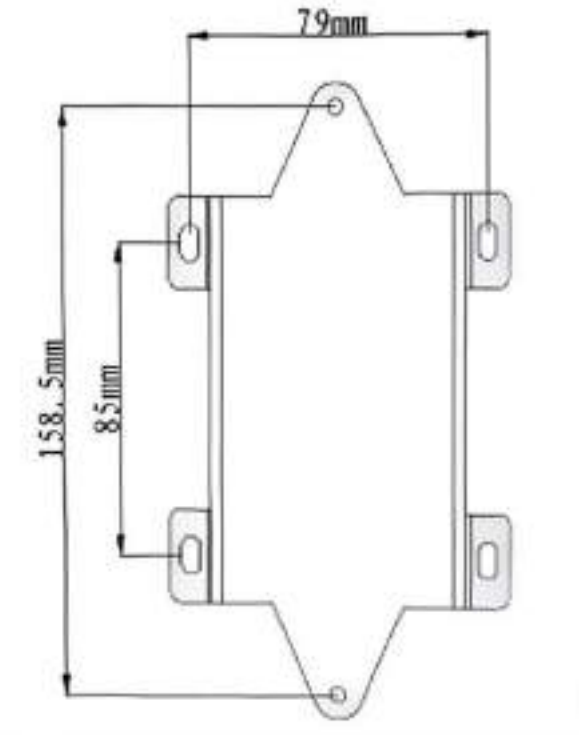


Figure 5: Mounting Bracket

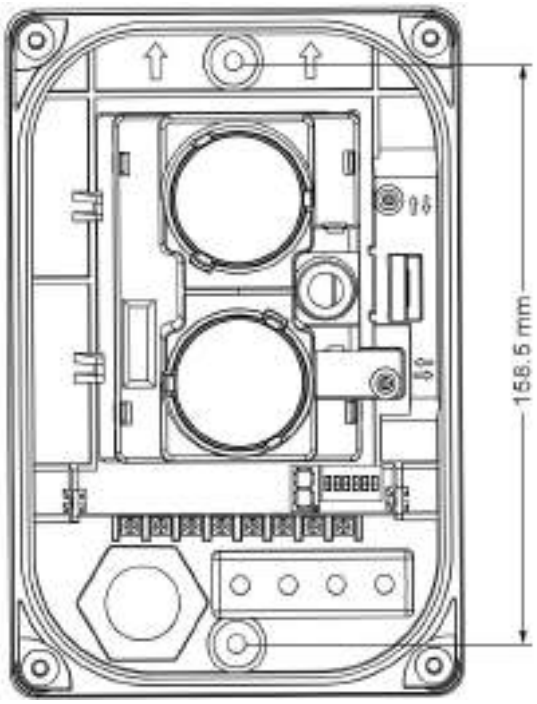


Figure 6: Beam Detector

2.5. Mounting of the Reflective Mirror

1).Depending on the project requirement, If the reflector is installed on the wall, the distance between the detector and the reflector mirror is 8m-40m, install one reflector is enough; if the distance is 40m-100m, four reflectors is required. If the mirrors are not installed on the wall, the number of mirrors needs to be doubled. Refer to Figure 9 and Figure 10.

2). Mark the position of the fixing holes plastic expansion bolts.

3). Fix the reflector mirror using two ST4x30 standard screws, in the case of one-unit mirror, do the same steps for other mirrors if required. Refer to Figure 7 and Figure 8.

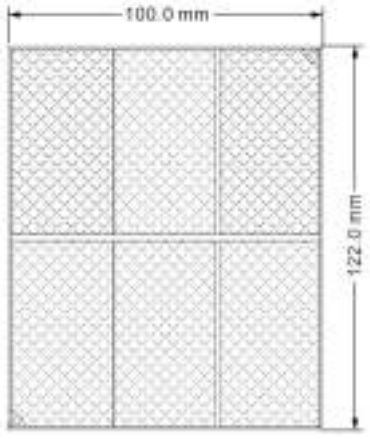


Figure 7: 1*mirror

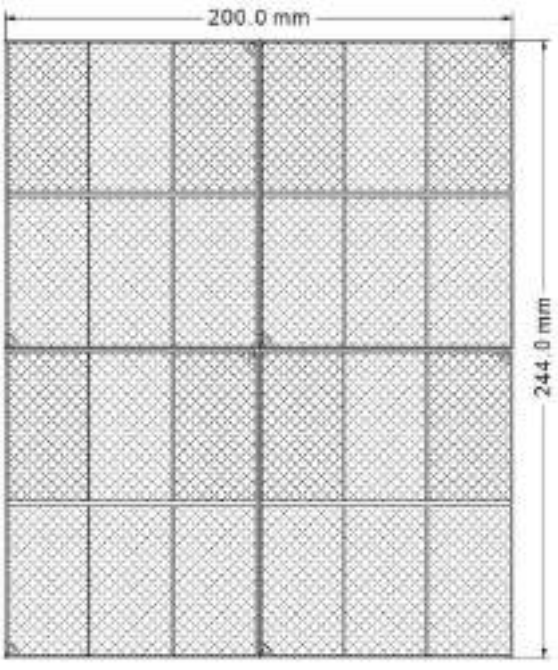


Figure 8: 4*mirror

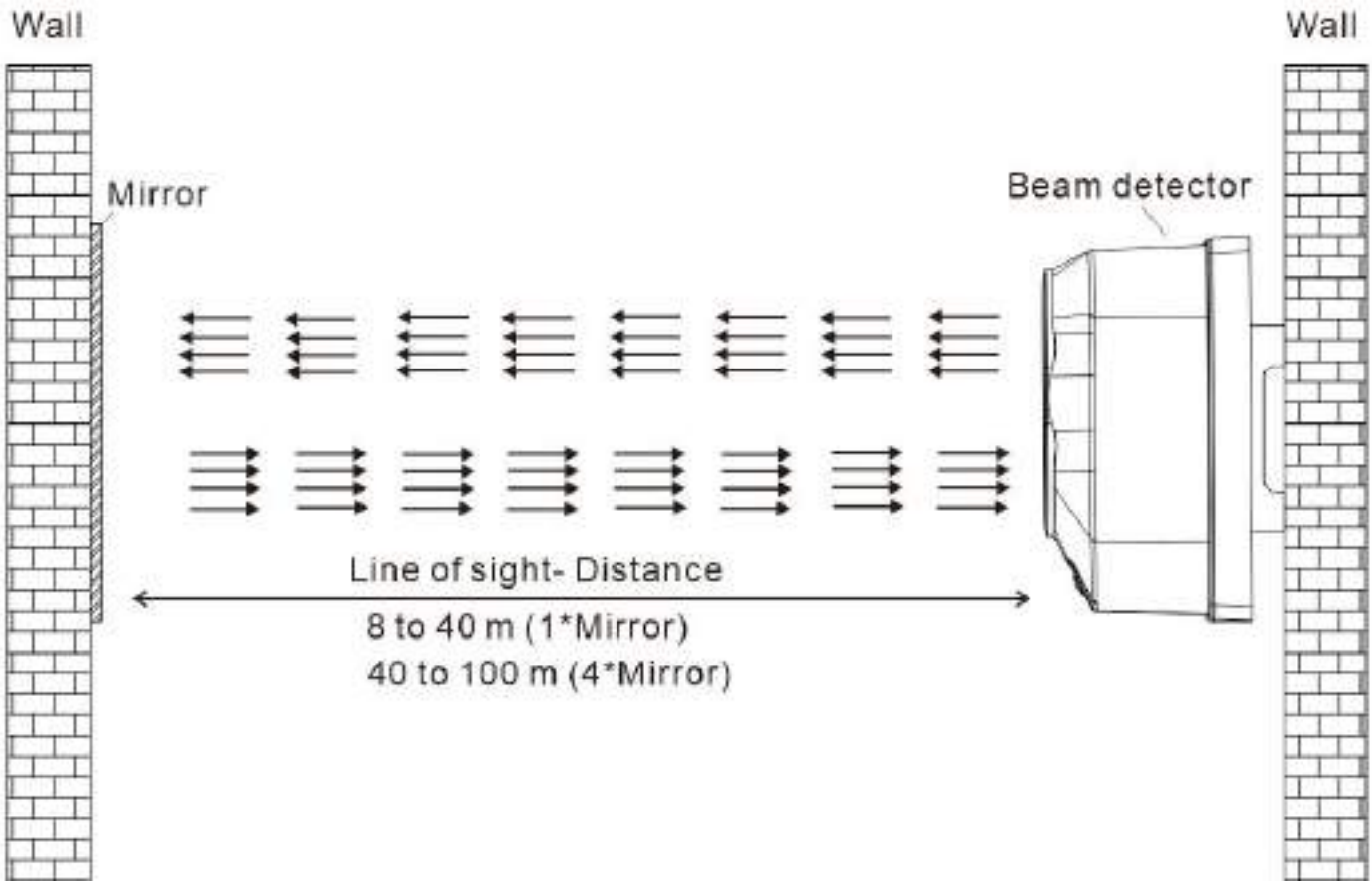


Figure 9: Mounting of Reflector Mirror（On the wall）

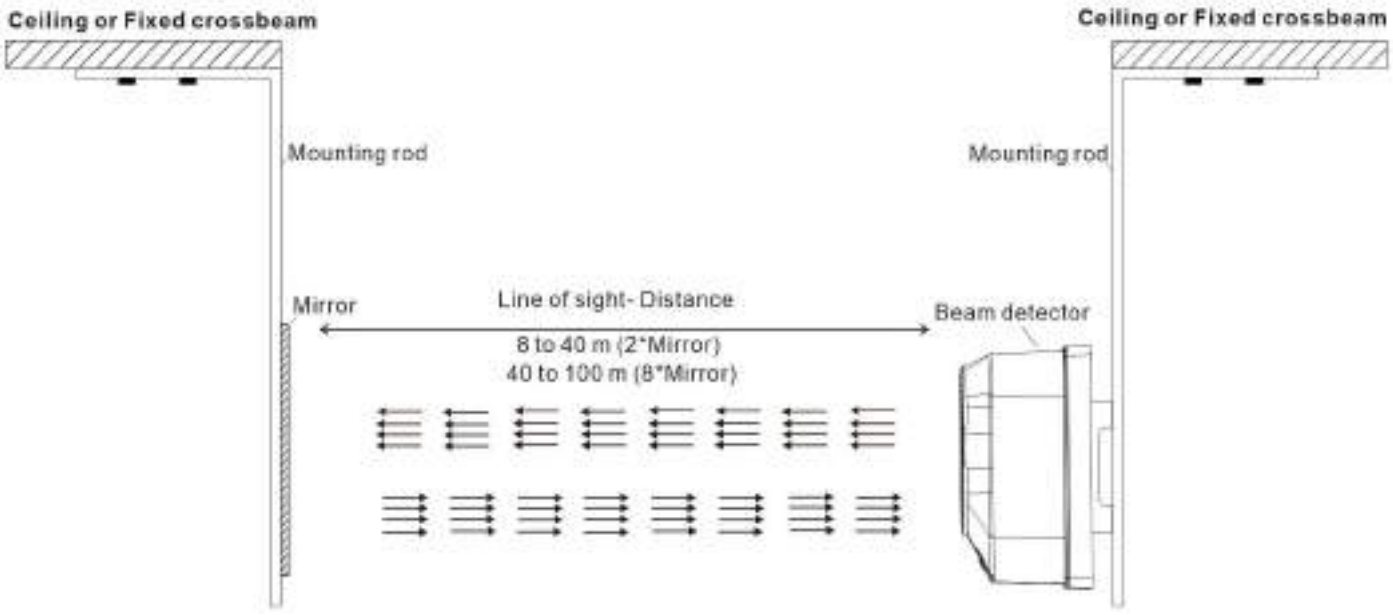


Figure 10: Mounting of Reflector Mirror（No wall）

2.6. Cabling Details

Cables should be brought into the detector using the supplied glad cable. The maximum size of the cable which can be terminated is 1.5mm². Observe the polarity. Refer to Figure 11.

1).Terminal IN+ and IN- for connecting Power supply [24VDC].

2). Terminal OUT+(Internal connection with IN+) and OUT-(Internal connection with IN-)for connecting next beam detector.

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] .

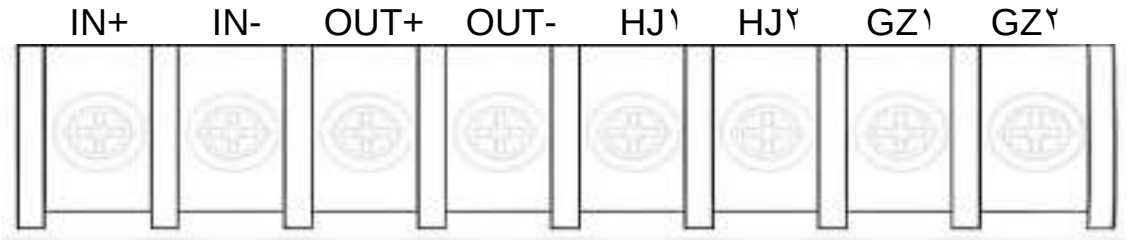


Figure 11: Wiring Terminals

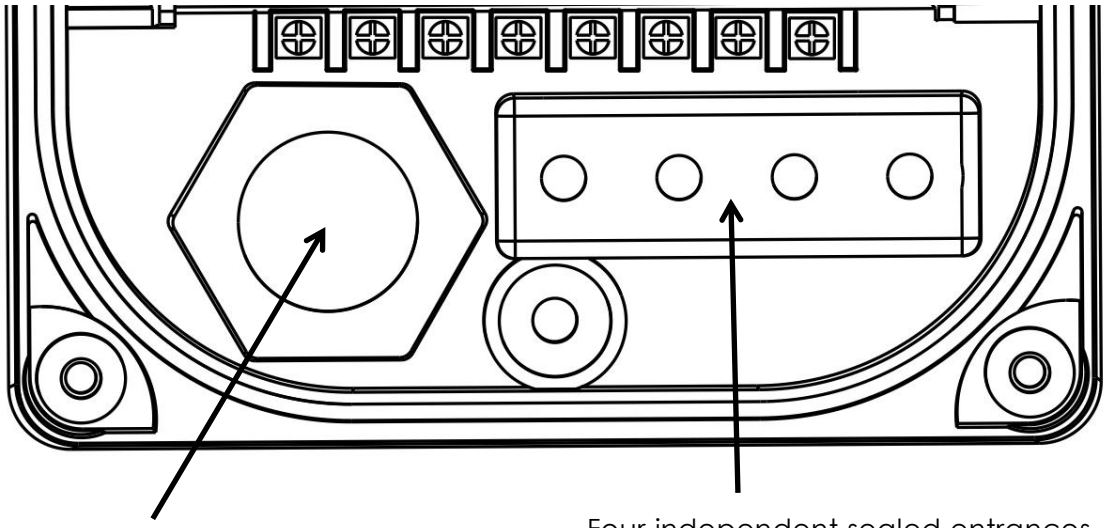
Label 1. Terminal Function Table

Terminal	Function	Description
IN+	Power supply 24VDC INPUT	Non-polarity
IN-		
OUT+	Power supply 24VDC OUTPUT	Non-polarity,Optional wiring
OUT-		
HJ1	Fire alarm relay output	Normally Open,Close in fire alarm.
HJ2		Relay contact capacity:2A@30VDC
GZ1	Fault relay relay output	Normally Close,Open in fault alarm.
GZ2		Relay contact capacity:2A@30VDC

There are two ways to connect wires:

1) . A multi-core cable which can be threaded through a sealed cable head. After connecting the wire,should be to tightening the cable head nut to clamp the cable and ensure that the detector is sealed. Refer to Figure 12.

2) .The detector has four independent sealed entrances. Thread the wire through the silicone sealing sleeve, then screw the sealing sleeve with the wire into the entrance hole of the detector and tighten it. Refer to Figure 12.



Multi core cable entry head, suitable for cables with diameters ranging from 6mm ^{2}to 12mm^2.

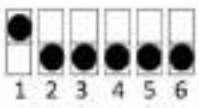
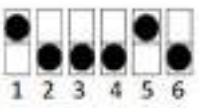
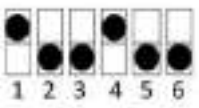
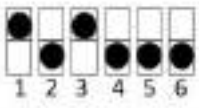
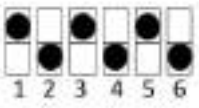
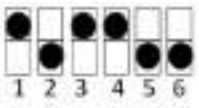
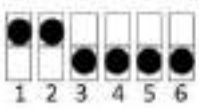
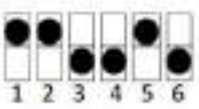
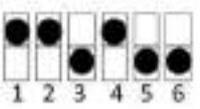
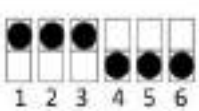
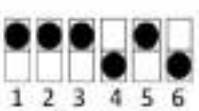
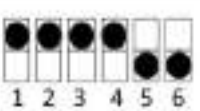
Four independent sealed entrances, suitable for cables with diameters ranging from 1.0mm^2 to 2.5mm^2.

Figure 12: Entrance of the Wiring

3. Setting Sensitivity and Span

Before using the detector, the operation range and sensitivity should be set according to the application environment. It is can be set through the inner DIP switch, As shown in the figure of the shell base. Use DIP switch(SW2) to set the parameter set you want (see table below).

Label ٢. Setting Sensitivity and Span

Sensitivity / Span	Level 1	Level 2	Level 3
Span 1: 8~20m			
Span 2: 20~40m			
Span 3: 40~70m			
Span 4:70~100m			

4. Commissioning Beam Detector

4.1. Detector component description

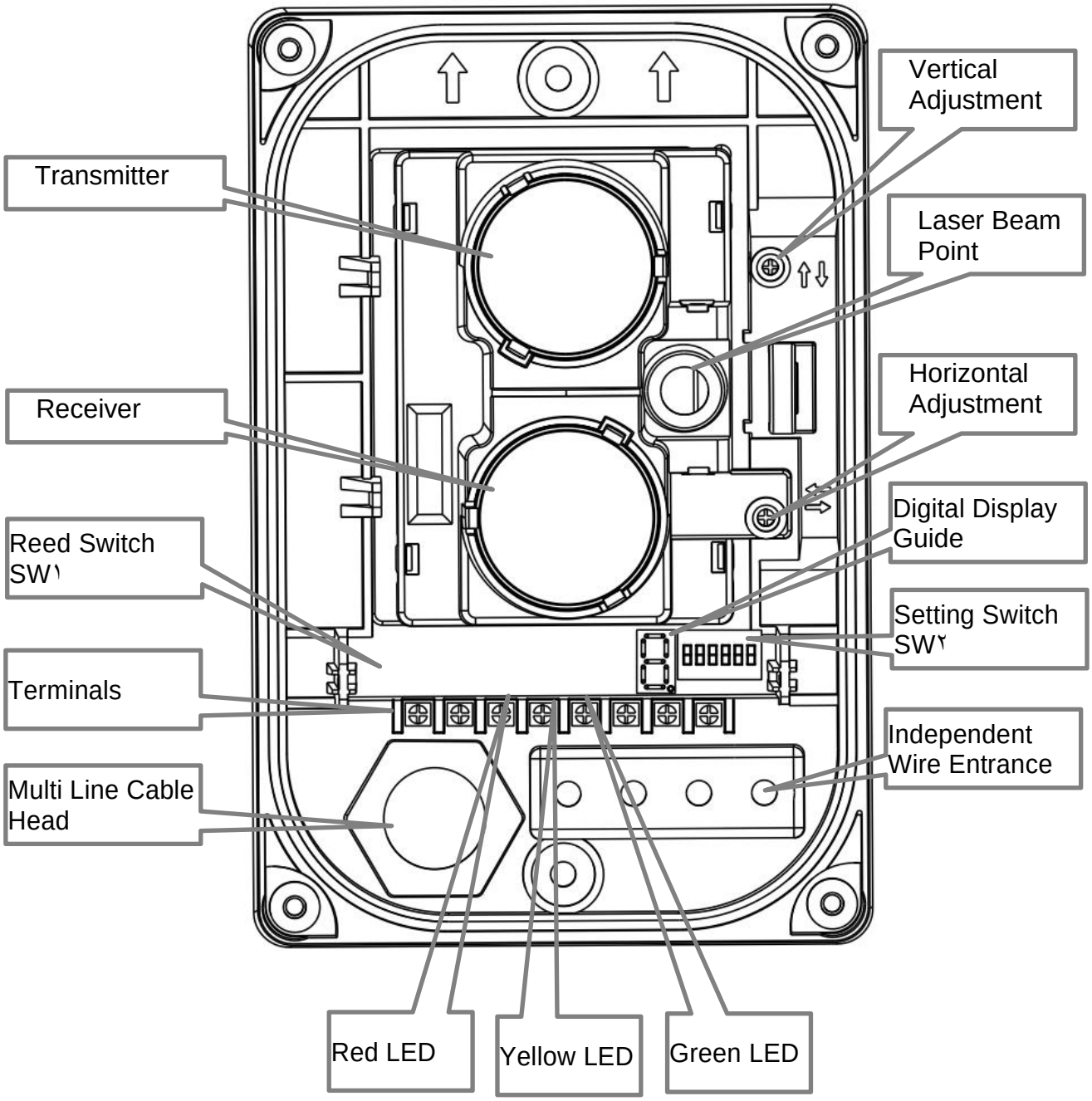


Figure 13: Detector components

4.2. Commissioning Preparation

1). Make sure both beam detector and reflective mirror are properly and securely mounted.

2). Make sure that the line of sight is clear and both beam detector and reflective mirror are in placed with accurate axis angle.

3). Make sure that the suitable numbers of reflective mirror are installed depending on the distance between detector and mirror.

4). Make sure require Span setting is adjusted through DIP switch depending on the distance between the detector and mirror.Refer to label 2.

5). Wiring should be done correctly.

4.3. Commissioning Steps

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 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 mirror. Do not disturb the detector auto alignment process.

Step 2: Sight line Alignment Procedure

a. The Laser Beam Pointer should turn on automatically. Look through on the reflective mirror if the laser beam mark at the centre.

b. Once you located the mark, loosen the M4x12 screw and adjust the horizontal or vertical adjustment wheel until the Laser beam mark at the centre of the mirror. Refer to figure 13.

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

Step 3: Acceptable Adjustment Procedure

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

Note: If the number display nine [**9**] it means the setting of the Span is not appropriate. Power off the detector and re-programmed the appropriate distance between the detector and mirror through DIP switch or programmer.

b. If Green LED steady on, it means that the signal intensity is acceptable.

c. Tighten M4x12 Screw, and then ready to proceed to the next step.

Step 4: Finalizing Installation

a. Insert the detector cover and screw the 4 sides of the detector.

b. Place the magnetic tool alongside the "(**D**)" marked on the cover.

c. Right after the Green LED is turn-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 mirror.

Note: The Yellow LED and Green LED will begin blinking simultaneously for about 3 seconds then Red LED will begin blinking every 3 seconds, indicating that the beam detector is commissioned. Keep the detector run for at least 20 seconds then proceed to the next step.

Step 5: Testing Fire Signal

a. Using supplied Opaque/Translucent materials, cover-on half of the beam detector using the translucent portion of the material. With 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 close. Refer to Figure 14.

b. Remove the testing material and cut the power off for at least 5 seconds to reset the detector.

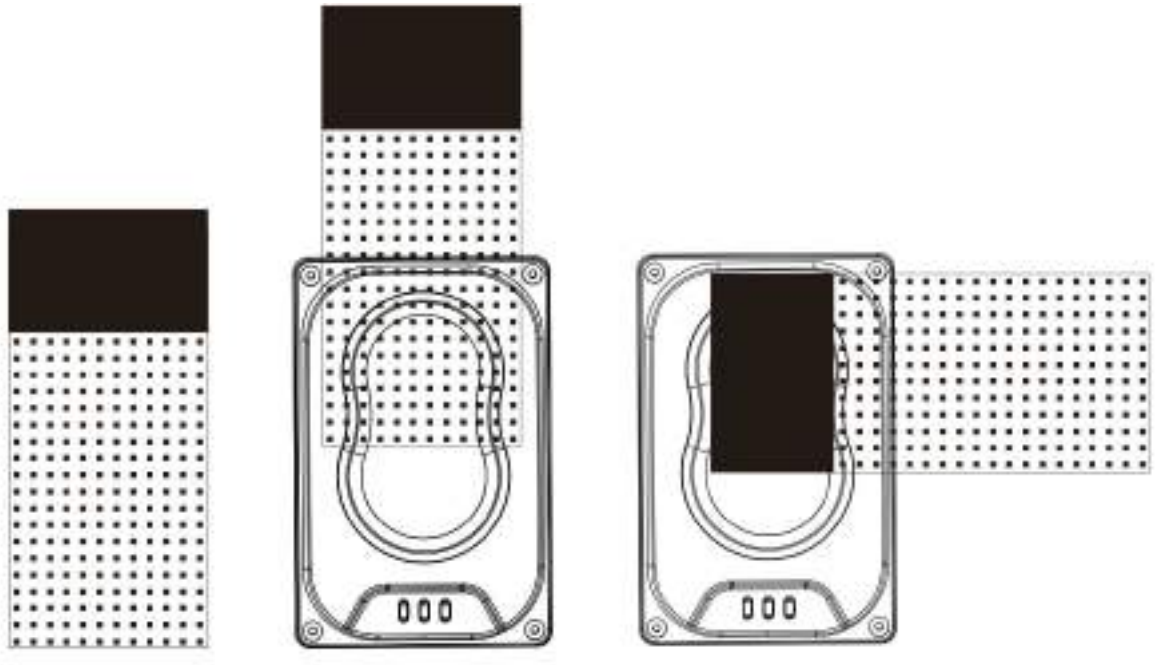
Step 6: Testing Fault Signal

a. Using supplied Opaque/Translucent materials, cover-on the half of the beam using the opaque portion of the material. Right after the Yellow LED [Fault] turn on, indicating the fault signal. The fault alarm relay [GZ1 and GZ2] will latch to normally open. Refer to Figure 14.

Note:

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 5 seconds to reset the detector.



Testing Material Fire signal test Fault signal test

Figure 14: Testing fire and fault signal

5. Other Function

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.

6. 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.

5) . Perform the maintenance on semi-annually or quarterly depending on the site conditions.

7. Troubleshooting Guide

Label 3.Troubleshooting guide

Trouble	Comment	Troubleshooting Advice
Indicates Faults after commissioning	1). The detector is dirty. 2). The line of sight between detector and mirror was moved. 3). Not properly commission at the start.	Conduct maintenance Re-Commission the detector
Unable to commission	1).Transmit/Receive diode is not working . 2).The reed switch is damaged. 3).Insufficient magnetic attraction of debugging tool.	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

8. Supplied Accessories

The following accessories are included in the package:

1). Four plastic expansion bolts.

2). Two M4*12*10 three combination cross recessed pan head screws.

3). Four ST4*30 tap cross recessed pan head screws.

4). Mounting Bracket.

5). Opaque/Translucent Material.

6). Magnetic Tool.

7).Reflector mirror (Option)

9. Limitation of Smoke Detectors

The smoke detector is designed for triggering and initiating emergency fire equipment's, but it only functions when matching with other equipment's. Installation of this smoke detector must conform to electrical codes and standards in your country.

All types of smoke detector have limitations. Because fires develop in different ways and are often unpredictable in their growth, it is impossible to predict which type of detector will provide the earliest warning. No types of smoke detector can sense every kind of fire every time. Generally speaking, detectors may not warn you about fires 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 smoke detector has to be maintained frequently because there will be more dust contamination.

The smoke 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 nation codes and laws. Take specific maintenance measures on the basis of different environments.

The smoke detector contains electronic parts. Even though it's made to last for a long period of time, any of these parts could fail at any time. Therefore, test your smoke detector at least every half-year according to national codes or laws. Any smoke detectors, fire alarm devices or any other components of the system must be repaired or replaced as long as they fail.