C-1006R

Smart Reflective Beam Smoke Detector
Installation and Operation Manual

CHENGTUO TECHNOLOGY
Technology and Service for people

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1 Introduction

1.1 Overview

C-1006R Smart Reflective Beam Smoke Detector (the detector) is a two-wire conventional reflective beam smoke detector, which is uniquely suited for protecting open areas with high ceilings, where other methods of smoke detection are difficult to install and maintain.

The detector consists of a transmitter/receiver unit and a reflector. When smoke enters the area between the unit and the reflector, the smoke causes a reduction in the signal. When the smoke level reaches the predetermined threshold, an alarm is activated.The detector has three standard sensitivity selections to meet different environment and demands of the users.

The advantage of detector is that it is easier installation and commission. By using hand held programmer, the laser beam pointer can be turn on to help localization.IF the detector is powered on, it will automatically adjust itself using advanced software algorithms to choose the optimum parameters for the specific environment.

The detector is ideal for use high ceiling and wide areas such as historic architecture, warehouses, airports, stations, etc.

1.2 Features

1. Wiring convenience, two-bus and non-polarity.
2. Over-voltage Protection, protection of wrong power connection of power supply.
3. Ultra low power, ultra-low standby current and alarm current.
4. Convenient commission, the function of auxiliary positioning and automatic calibration.
5. Three users programming sensitivity adjustment.
6. Auto compensation for factors weakening received signals.

1.3 Technical Specifications

PART NUMBER	C-1006R
STANDARD	
Reference Standard:	EN 54-12:2002
GENERAL	
Range:	10 to 100m;
Sensitivity:	37% to 55% Total obscuration in 3 levels
	Level 1 = 55% (about 2.6dB) High sensitivity
	Level 2 = 45% (about 3.5dB) Medium sensitivity
	Level 3 = 37% (about 4.3dB) Low sensitivity
Response Time:	ALARM - 20 seconds typical;
	FAULT - 30 seconds typical
Alignment Guide	Laser Beam Pointer
ELECTRICAL	
Operating Voltage	24V DC (16V to 28V DC)
Current (at 24VDC)	Standby Current ≤2mA
	Alarm Current ≤4mA
Relay Capacity (Alarm & FAULT):	Normally Open & Close /0.4A; 40VDC
MECHANICAL	
Material/Color	PA-ABS / Beige
Dimension	L:138mm×W:152mm×H:85mm
Weight	450g (excluding base)
Beam Path Angle	±0.5° Horizontal and Vertical(at 100m)
ENVIRONMENTAL	
Operating Temperature	-10°C～+55°C
Ingress Protection Rating	IP65
Relative Humidity	0% to 95% RH, non-condensing

2 Appearance and Principle

2.1 Appearance of product

1. Appearance of product. Refer to Figure 1.

Figure 1 Appearance of product

2. The component description of the detector. Refer to Figure 2.

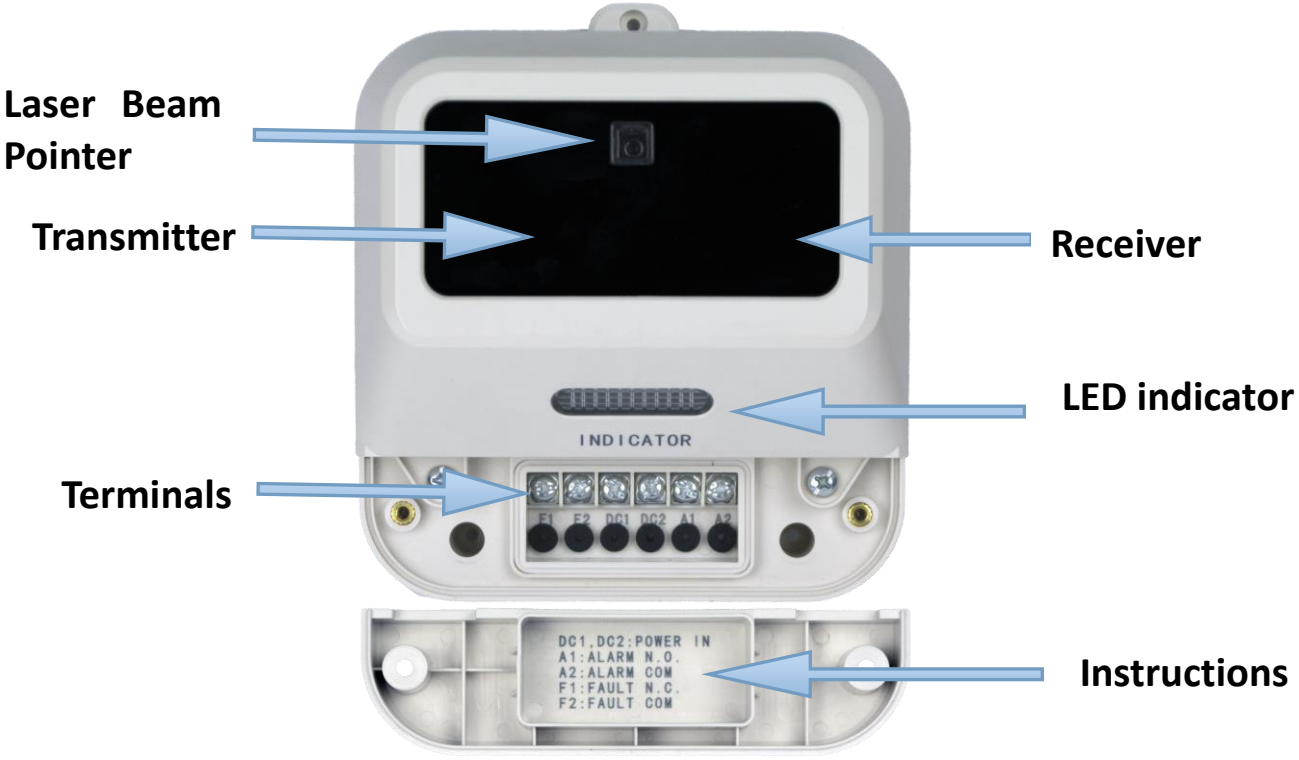


Figure 2 the component description of the detector.

2.2 Principle of the Detector

The C-1006R Smart Reflective Beam Smoke Detector incorporates a transmitter and receiver both within the detector unit. Infrared beam of certain intensity sent out from the transmitter is reflected by the reflector, and then received by the receiving part of the detector. The receiving part simultaneously collects and amplifies the returned infrared beam, analyze and judge the collected signals through its microprocessor.

In a fire, when smoke entering the area between the detector and reflector, it will causes a reduction in returned infrared beam. At the same time, it creates a decrease in the received signal. When the obscuration reaches alarm thresholds, the detector generates an alarm signal. Slow changes in obscuration due to a buildup of dirt or dust on the lens of the detector are compensated for by internal microcontroller that continuously monitors the signal strength and periodically updates the alarm thresholds.

When the detector in the mode of operation, it emits infrared beam continually, care should be taken that do not obstruct the beam transmission or reflection, which may will cause an alarm signal or a fault signal. Refer to Figure 3.

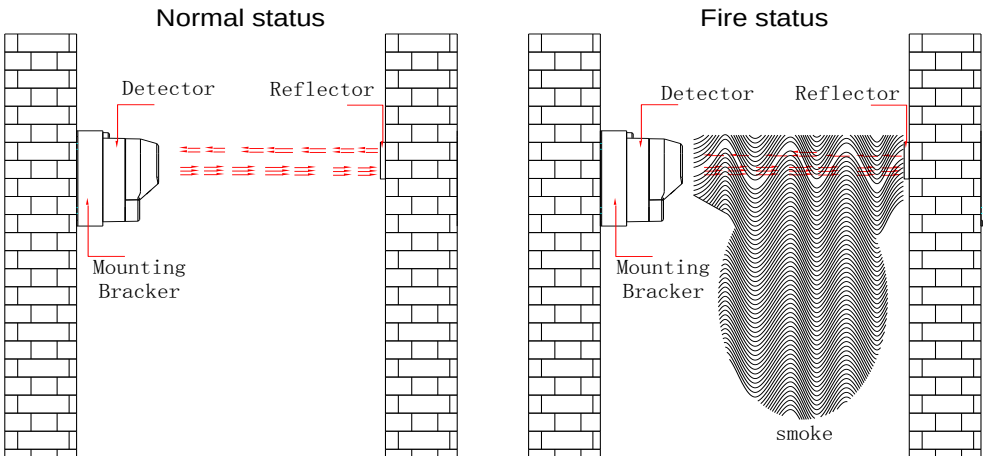


Figure 3 Beam detector principle

3 Installation Procedures

3.1 Mounting Details

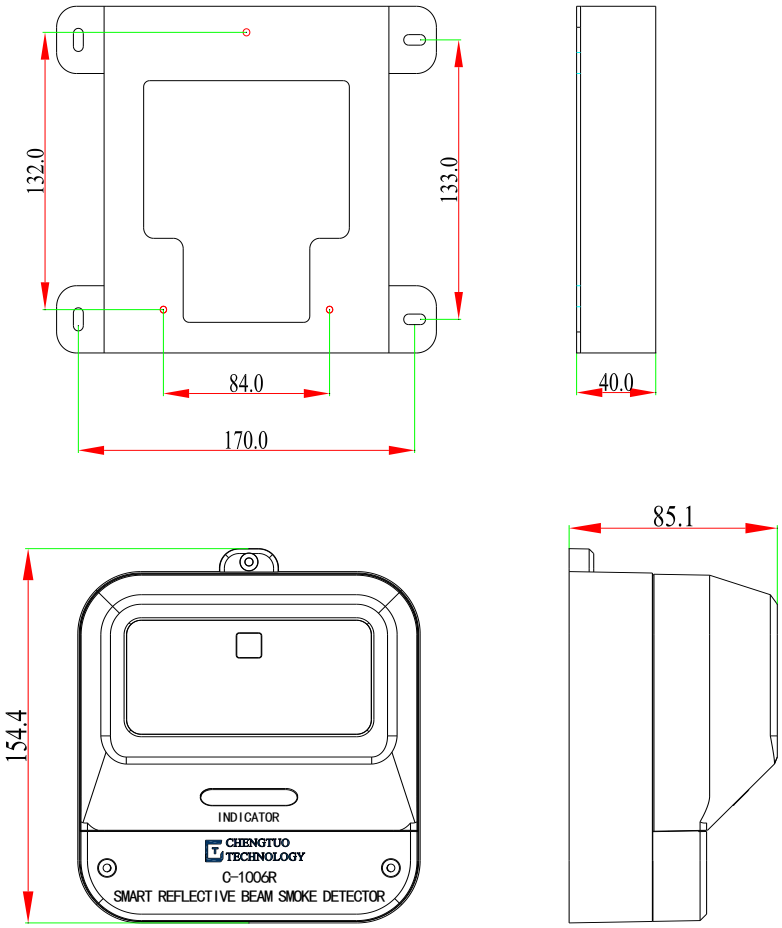


Figure 4 Detector Diagram

3.2 Installation Preparation

The detector must be installed 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.Before installing the detector, please inspect components on the parts list.

PARTS LIST

Description	Quantity
Detector(Transmitter/Receiver Unit)	1
Reflector	4
plastic expansion bolt	12
ST3.5*30 tap cross recessed pan head screw	12
Opaque/Translucent Material (Testing Material)	1
M3*10 cross recessed countersunk head screws	3

3.3 Detector Placement

The detector requires a stable mounting surface for working . A proper mounting surface will make detector running stable. The chosen for the location should be clean and dry and not subject to shock, vibration and free from glass wall, sunlight direction any reflective.

The optimal choice for mounting the detector is a surface that is not expected to experience vibration or movement over time ,such as brick, concrete, a sturdy load-bearing wall, support column, structural beam.

- ✧ Avoid following conditions:
- ✧ Direct sunlight.
- ✧ exposed to outdoor conditions such as rain, snow, sleet, or fog
- ✧ Any fixed or movable objects within 1m from the beam path of detector.
- ✧ No access for maintenance.
- ✧ A lot of dust, powder or vapor.
- ✧ Normally clean, but can be dusty in some special cases.
- ✧ Mechanical vibration.
- ✧ Strong magnetic field.
- ✧ heavy condensation or icing

The mounting height of the detector and reflector should not exceed 20 meters. The distance between detector and sidewall should be limited to 0.5 meter to 7 meters. The horizontal distance between adjacent detectors should under 14 meters.

- ✧ Under flat spare area, if the ceiling height is less than 5.0m, the detector should be installed 0.5 m to 1.0m below the ceiling level. Refer to Figure 5.
- ✧ Under flat spare area, if the ceiling height is more than 8.0m, the detector should be installed minimum of 0.5 meter below the top ceiling. Refer to Figure 5.

Note: Make sure the beam path is free from obscuration against moving items.

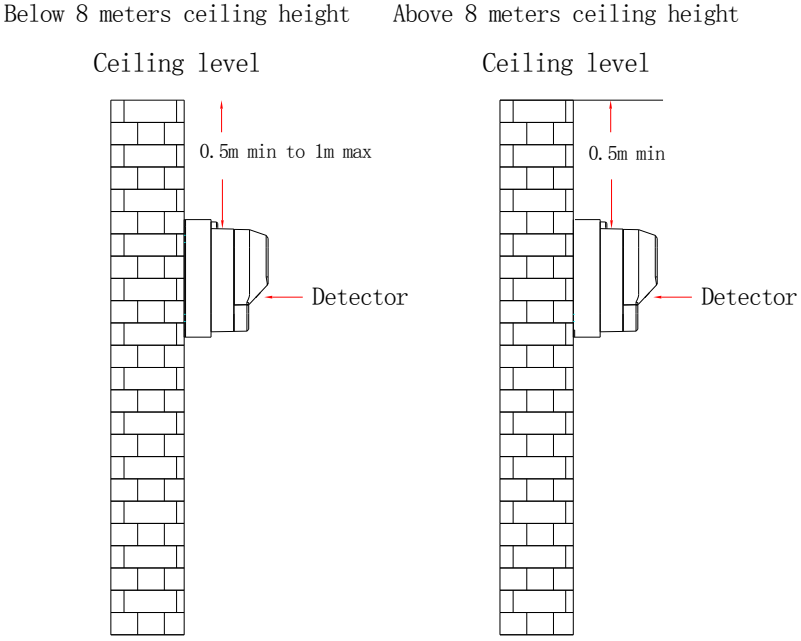


Figure 5 Installation Details

3.4 Mounting of the 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 ST3.5x30 screw.
4. Fix the detector base onto the bracket using three M3*10 screws. Refer to Figure 4.

3.5 Mounting of the Reflector

1. Depending on the project requirement, if the distance between the detector and the reflector is 10m-40m, install one reflector is enough; if the distance is 40m-100m, four reflectors is required. Refer to Figure 6.
2. Mark the position of the fixing holes plastic expansion bolts, which is located by laser beam pointer.
3. Fix the reflector using two ST4x30 standard screws, in the case of one unit mirror, do the same step for other reflector if required.

NOTE:

- ✧ The reflector should be mounted in the same horizontal line with the detector.
- ✧ The reflector should be placed tightly .If multiple reflectors need to be installed ,make sure there are no gaps between them.
- ✧ There is no need to find an accurate installation position of reflector. An installation scope of reflector has been noted in Figure 7

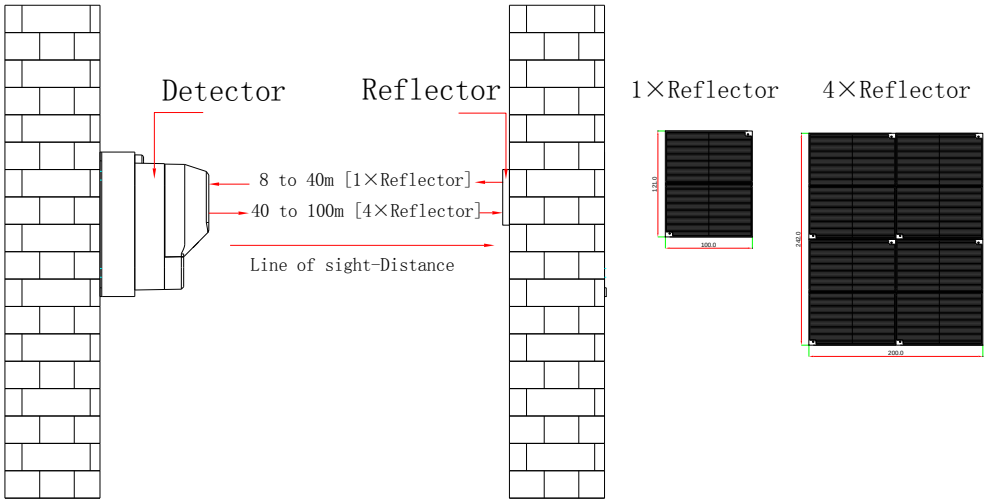


Figure 6 Mounting of Reflector

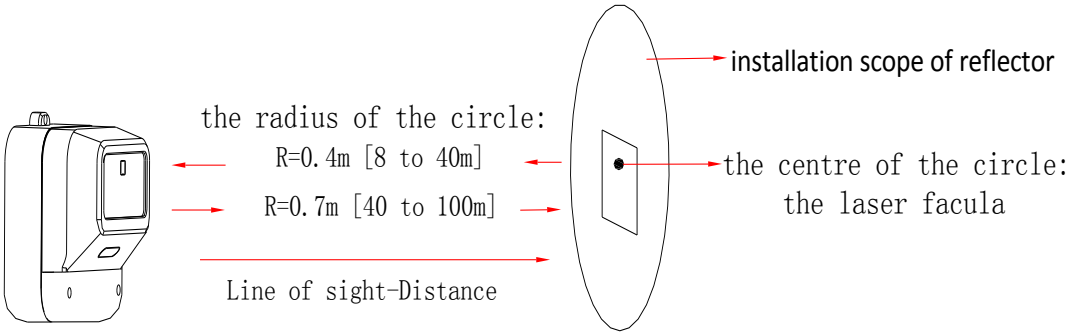


Figure 7 The installation scope of Reflector

3.6 Wiring Notes

Cut off the power supply of the circuit before installation, and make sure the installation of the bracket is firm.The maximum size of the cable which can be terminated is 1.5mm².Pay attention to the Terminal label during wiring.

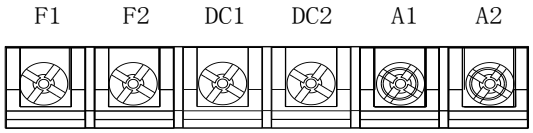


Figure 8 Detector Terminal

- ✧ Terminal DC1 and DC2 for connecting Power supply (No polarity)
- ✧ Terminal A1 and A2 for connecting Fire signal relay output (Normally Open and Fire Close)
- ✧ Terminal F1 and F2 for connecting Fault signal relay output (Normally Close and Fault Open)

4 Programming Sensitivity and Span

The C-1006R sensitivity and the operation range can be adjusted through hand held programmer. The programmer can be purchased separately. It is mandatory for the commissioning personnel have programmer tool in order to adjust the detector according to the site situation and environmental requirement.Refer to Figure 9.

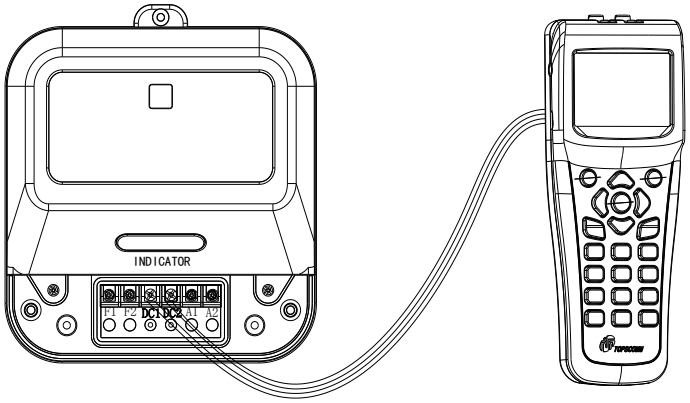


Figure 9 Programming connection Details

4.1 Preparation

- ✧ Before commissioning, make sure that the detector is installed and wired correctly.
- ✧ Make sure that the line of sight is clear and both detector and reflector are in placed with correct axis angle.
- ✧ Make sure that the suitable numbers of reflector are installed depending on the distance between detector and reflector.
- ✧ Take off the protective membrane carefully on the surface of the reflector and the detector. Do not scratch or contaminate their surfaces.

4.2 Parameter setting

The product information of the detector can be write or read. The detector information includes the following：

information	write	read
Optical path distance	√	√
Sensitivity	√	√
Laser modes	√	√

4.2.1 Optical path distance setting

- ✧ Connect the programming cable to DC1 and DC2 terminals. Polarity is not required.
  Warning: Disconnect the power and loop connection whilst connecting to the handheld programmer.
- ✧ Switch on the programmer, then press button“▲” or “▼”to chose “1.parameter set”,then press button“ENTER” ,press button“▲” or “▼”to chose the Optical path distance referred to as Distance.

NOTE:The distance parameter that you set in the handheld programmer is an approximate number that close to the real mounting distance between detector and reflector.

- ✧ Press button "▶" or "◀to increase or reduce the Distance parameter.
- ✧ Press button the "ENTER" to confirm the Distance parameter.
- ✧ Press button "ESC" to exit. Refer to Figure 10.

Figure 10

4.2.2 Sensitivity setting

- ✧ Connect the programming cable to DC1 and DC2 terminals. Polarity is not required.

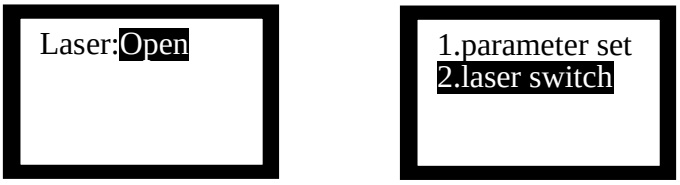
  Warning: Disconnect the power and loop connection whilst connecting to the handheld programmer.
- ✧ Switch on the programmer, then press button "▲" or "▼"to chose "1.parameter set",then press button "ENTER" , press button "▲" or "▼"to chose the Sensitivity.
- ✧ Press button "▶" or "◀to chose the High or Middle or Low sensitivity.
- ✧ Press button the "ENTER" to confirm the Sensitivity parameter.
- ✧ Press button "ESC" to exit. Refer to Figure 11.

Figure 11

4.2.3 Laser modes setting

- ✧ Connect the programming cable to DC1 and DC2 terminals. Polarity is not required. Reference: (Figure10)

  Warning: Disconnect the power and loop connection whilst connecting to the hand held programmer.
- ✧ Switch on the programmer, then press button "▲" or "▼"to chose "2.Laser switch",then press button "ENTER" to view the laser switch station.
- ✧ Press button "▶" or "◀to close or open laser.
- ✧ Press button the "ENTER" to confirm the laser switch station.
- ✧ Press button "ESC" to exit. Refer to Figure 12.



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4.3 Commission

1. Power on the detector, 20 seconds later,the detector will automatically shot laser for 40 seconds. if the detector have not been adjusted successfully last time.And then the detector will automatically adjust .The LED flashes once every 2 seconds during the adjustment. After the successful commission, the alarm indicator runs out . If the above commission fails, the LED will flash quickly(refer to the sixth chapter to solve).
2. After the adjustment, cover the receiving window or emitting window with the translucent side of testing material until the detector alarms(no more than 30 seconds).When the detector alarms, the indicator is always be on, the detector sends an alarm message. Refer to Figure 13.
3. Remove the testing material and cut the power off for at least 1 second to reset the detector. the detector should be in the normal monitoring state, which means not report a fire or fault.
4. Cover the receiving window or emitting window with the opaque side of testing material until the detector general a fault signal(no more than 60 seconds). When the detector alarms, the indicator is always be on, the detector sends an alarm message. Refer to Figure 13.

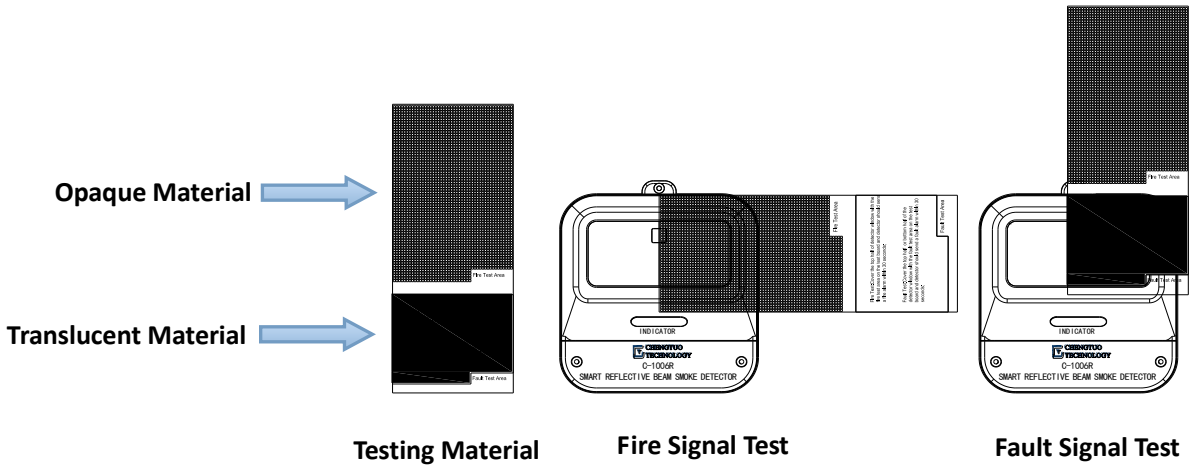

Figure 13 Testing Details

5 Indicator Description

LED Indicators	Flash way	Colo	Function
Fire	always on	Red	Flash when at least one fire alarm event occur
Fault	Cycle100 millisecond	Red	Flash when at least one fault alarm event occur
Commission	cycle 2 seconds	Red	Flash during the commission
Normal monitoring	cycle 6 seconds	Red	Flash during the normal monitoring

6 Fault analysis and exclusion

Trouble	Reasons	Troubleshooting advice
Indicates Fault after commissioning	the optical pathway between the detector and the reflector is blocking	Remove blockage and re-commission the detector
	The angle of optical pathway has changed	Re-commission the detector
	the surface of the detector or reflector has been contaminated	Wipe the detector and reflector surface and re-commission the detector
	The reflector has not mounted in the same horizontal line with the detector	re-mounte the reflector and then and re-commission the detector
Keep indicating fault signal	Self-compensation limit reached	Wipe the detector and reflector surface and re-commission the detector
Fire signal can't be cleared	the optical pathway between the detector and the reflector is blocking	Remove blockage and re-commission the detector
	The angle of optical pathway has changed	Re-commission the detector
Keep indicating fire signal	Sunlight into detector or reflector	Re-align detector and then re-commission the detector
The detector does not indicate fire or alarm after Opaque/Translucent material test	The time for test is short	Extend test time and Re-test again (The time for testing is close to the parameter of respond time but less than it.)

7 Maintenance

- ✧ The detector should be properly stored before installation, avoid from dust, moisture, and corrosion.
- ✧ Testing or maintenance, please notify the relevant departments, avoid triggering unnecessary alarm linkage.
- ✧ The detector needs to perform fire test in a regular way to check if the detector is working properly.

8 Cautions

- ✧ Powers on only after all devices are well connected.
- ✧ Commission the detector after installation and maintenance.
- ✧ The detector work properly only after commission successful.