



NC Series Conventional Beam Detector Installation Manual

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Conformity



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 see: recyclethis.info.

Contact information
and product
documentation

For contact information or to download the latest product documentation, visit firesecurityproducts.com.

Product warnings and
disclaimers



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Important information

Introduction

This is the installation manual for the NC Series NC-DBO Conventional Beam Detector. Read these instructions and all related documentation entirely before installing or operating this product.

Limitation of liability

To the maximum extent permitted by applicable law, in no event will KGS Fire & Security be liable for any lost profits or business opportunities, loss of use, business interruption, loss of data, or any other indirect, special, incidental, or consequential damages under any theory of liability, whether based in contract, tort, negligence, product liability, or otherwise. Because some jurisdictions do not allow the exclusion or limitation of liability for consequential or incidental damages the preceding limitation may not apply to you. In any event the total liability of KGS Fire & Security shall not exceed the purchase price of the product. The foregoing limitation will apply to the maximum extent permitted by applicable law, regardless of whether KGS Fire & Security has been advised of the possibility of such damages and regardless of whether any remedy fails of its essential purpose.

Installation in accordance with this manual, applicable codes, and the instructions of the authority having jurisdiction is mandatory.

While every precaution has been taken during the preparation of this manual to ensure the accuracy of its contents, KGS Fire & Security assumes no responsibility for errors or omissions.

Advisory messages

Advisory messages alert you to conditions or practices that can cause unwanted results. The advisory messages used in this document are shown and described below.

WARNING: Warning messages advise you of hazards that could result in injury or loss of life. They tell you which actions to take or to avoid in order to prevent the injury or loss of life.

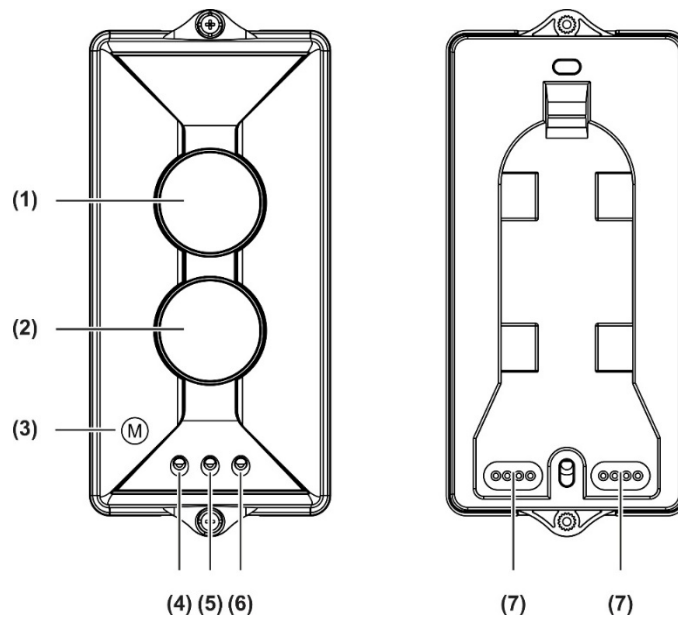
Caution: Caution messages advise you of possible equipment damage. They tell you which actions to take or to avoid in order to prevent the damage.

Note: Note messages advise you of the possible loss of time or effort. They describe how to avoid the loss. Notes are also used to point out important information that you should read.

Introduction

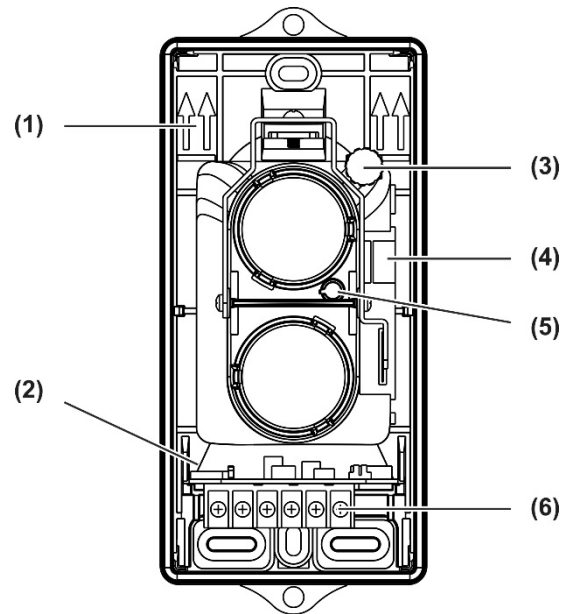
Product overview

Figure 1: Front and back views



1. Receiving lens
2. Emitting lens
3. Calibration area
4. Fire LED
5. Fault LED
6. Adjustment LED
7. Cable knockouts

Figure 2: Inside view



1. Orientation marking
2. Reed switch
3. Vertical adjustment wheel
4. Seven-segment display
5. Alignment laser
6. Terminal block

Status indications during normal operation

The following table shows the detector Fire and Fault status LED indications during normal operation.

Table 1: Status LED indications during normal operation

Status LED	Colour	State	Description
Fire	Red	Steady	Alarm indication
		Flashing	Normal monitoring state
Fault	Yellow	Steady	Fault indication

For status LED indications during commissioning, see Table 5 on page 16.

Installation

Caution: This product must be installed and maintained by qualified personnel adhering to the CEN/TS 54-14 standard (or the corresponding national standard) and any other applicable regulations.

Electrical safety

WARNING: Electrocution hazard. To avoid personal injury or death from electrocution, remove all sources of power and allow stored energy to discharge before installing or removing equipment.

Caution: Equipment damage hazard. This product is sensitive to electrostatic discharge (ESD). To avoid damage, follow accepted ESD handling procedures.

Configuration

The default sensitivity level and beam length settings are shown below.

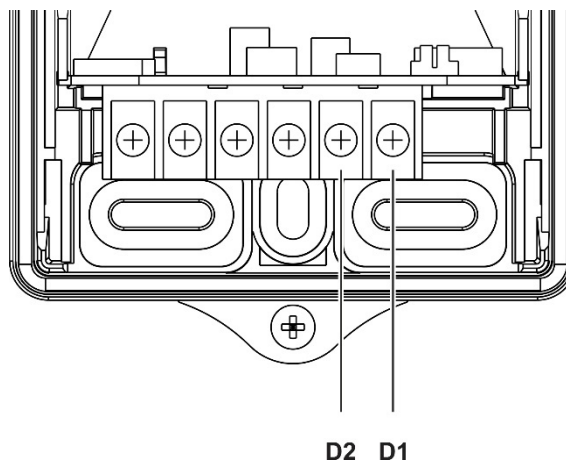
	Setting	Description
Sensitivity level	2	1.8 dB (34% obs.)
Beam length	100	70 to 100 m

If required, change the configuration settings before installation using the NC-D-PT Handheld Programmer.

To connect the handheld programmer to the detector:

1. Connect the 3.5 mm jack of the cable (supplied with the handheld programmer) to the BUS connector on the programmer.
2. Connect the two crocodile clips to terminals D1 and D2 on the terminal block on the inside of the detector (see Figure 3 below).

Figure 3: Terminals D1 and D2



To change the detector sensitivity level:

1. Connect the programmer to the detector, and then turn the programmer on.
The LCD displays H003 to indicate that the programmer is powered up and ready to use.
2. Enter the Unlock password 456, and then press Clear.
3. Press Function, and then press 3.
The LCD displays –.
4. Enter the required sensitivity setting (see Table 2 on page 6), and then press Program.
The LCD displays P to indicate that the setting is configured.
5. Press Clear to clear the screen.
6. Enter the Lock password 789, and then press Clear to lock the programmer.

The available sensitivity settings are shown below.

Table 2: Sensitivity settings

Setting	Description
1	1.3 dB (26% obs.)
2 (default)	1.8 dB (34% obs.)
3	2.3 dB (41% obs.)
4	2.8 dB (48% obs.) [1]

[1] Not EN 54-12 approved

To change the detector beam length:

1. Connect the programmer to the detector, and then turn the programmer on.

The LCD displays H003 to indicate that the programmer is powered up and ready to use.

2. Enter the Unlock password 456, and then press Clear.
3. Press Function, and then press 4.

The LCD displays –.

4. Enter the required beam length setting (see Table 3 below), and then press Program.

The LCD displays P to indicate that the setting is configured.

5. Press Clear to clear the screen.
6. Enter the Lock password 789, and then press Clear to lock the programmer.

The available beam length settings are shown below.

Table 3: Beam length settings

Setting	Description
20	5 to 20 m
40	20 to 40 m
70	40 to 70 m
100 (default)	70 to 100 m

See the NC-D-PT Handheld Programmer User Guide for more information on how to configure or read detector settings.

Installation

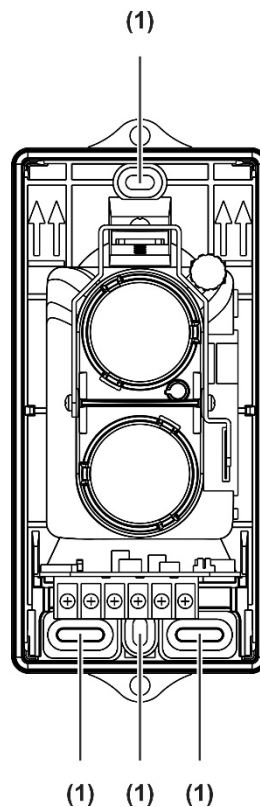
General installation requirements:

- Ensure that the detector is installed within the installation height range for the device (1.5 to 40 m).
- Ensure that the installation location is free from construction dust and debris, not subject to extreme temperature ranges and/or humidity, and protected from excessive vibration or shock.
- Ensure that there are no moving objects or strong magnetic fields within 1 m of the detector.
- Ensure that the mounting surface for the detector and the reflector is stable and flat.
- Change the sensitivity level and beam length configuration settings before installation, if required (see “Configuration” on page 5).
- Use a sunshade to cover the optical beam in installations where the detector is exposed to direct sunlight.

Harsh environment installation

For increased protection from dust and damp in harsh environments, seal the areas shown below with silicone sealant gel after installation.

Figure 4: Harsh environment installation

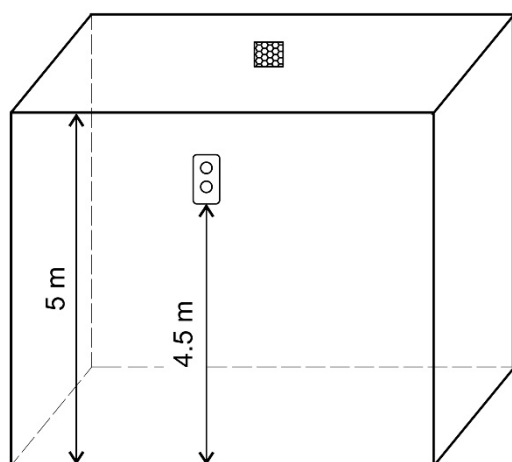


1. Seal with silicone sealant gel

Mounting height

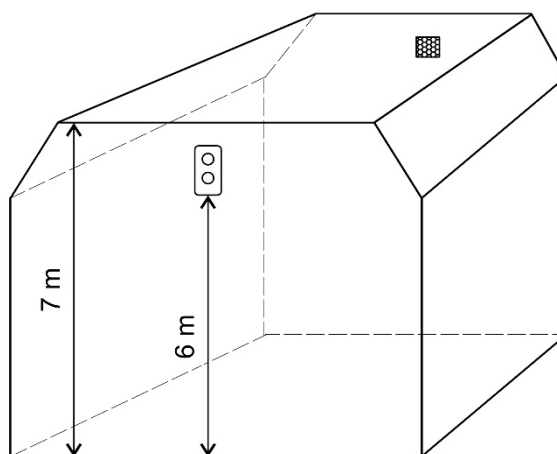
The mounting height for the detector and reflector/s can vary depending on the height of the installation space, as shown in the examples below.

Figure 5: Installation height less than 5 m



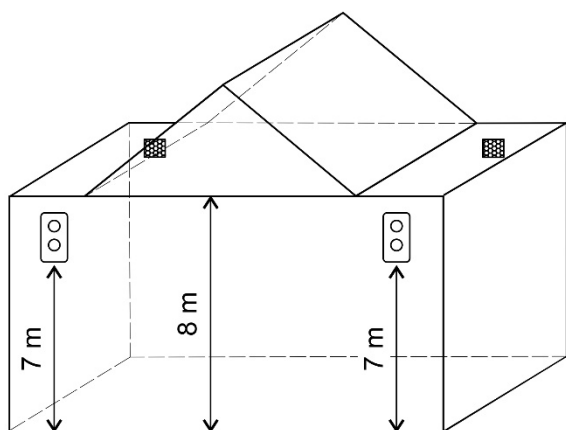
Mount the detector and reflector/s on opposite walls, about 0.5 m from the ceiling.

Figure 6: Installation height 5 to 8 m



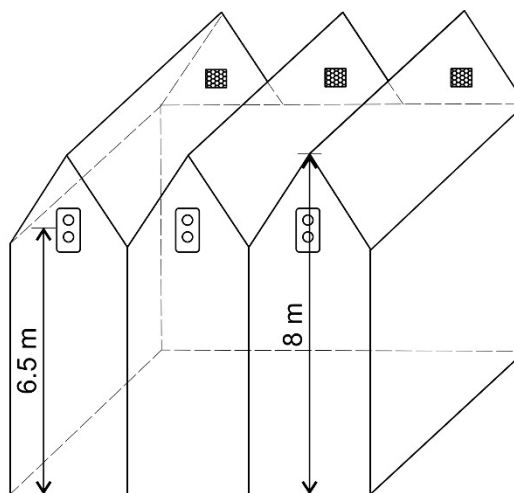
Mount the detector and reflector/s on opposite walls, about 0.5 to 1 m from the ceiling.

Figure 7: Installation height 8 m



Mount the detector and reflector/s on opposite walls, about 1.5 m from the gabled girder.

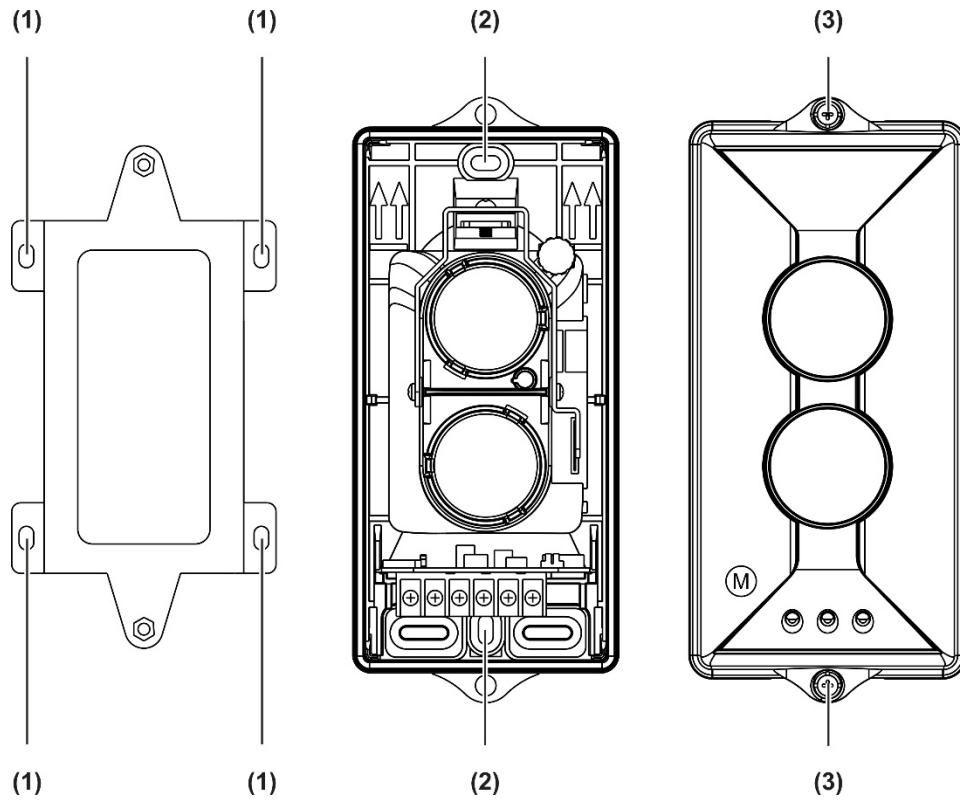
Figure 8: Installation height over 8 m



Mount the detector and reflector/s on opposite walls, about 7 m from the floor with over 0.5 m from the highest point.

Mounting holes and holding screws

Figure 9: Mounting holes and holding screws



1. Mounting holes to surface mount the mounting bracket
2. Mounting holes to fix the detector base to the mounting bracket (surface wiring) –OR– to the mounting surface (recessed wiring).
3. Captive screws to fix the detector cover to the detector base

Mounting the detector

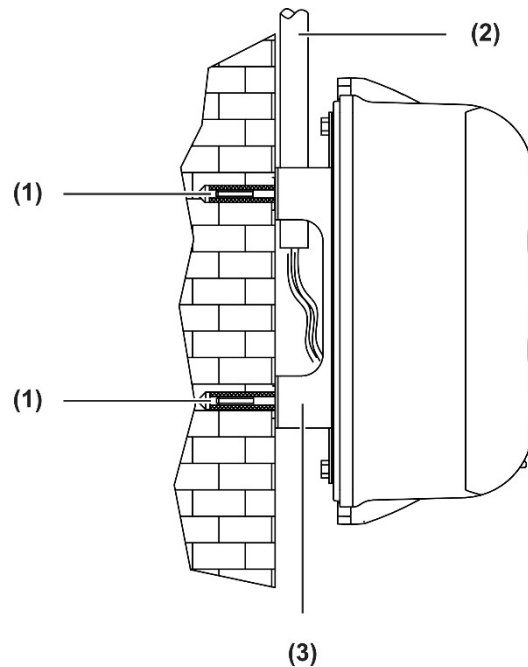
The detector may be mounted for surface wiring (using conduit) or recessed wiring (using a standard electrical backbox).

Mounting for surface wiring:

1. Hold the mounting bracket to the wall at the required installation height.
2. Mark the four drill points using the four mounting holes on the bracket as a guide (Figure 9 item 1).
3. Drill the four required holes.
4. Fix the mounting bracket to the wall using 4 × M6 plastic expansion bolts.
5. Remove the detector cover from the detector base by loosening the two captive screws (Figure 9 item 3).
6. Fix the detector base to the mounting bracket using 2 × M4 bolts (Figure 9 item 2).

Earth the mounting bracket via a mounting hole.

Figure 10: Mounting for surface wiring

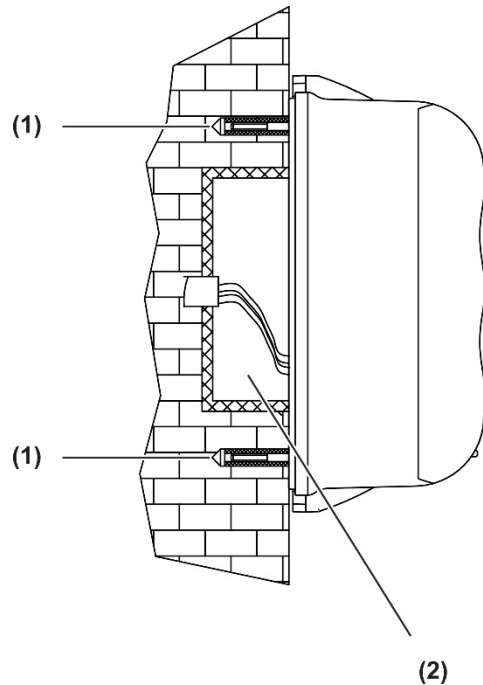


1. Plastic expansion bolts (×4)
2. Conduit
3. Mounting bracket

Mounting for recessed wiring:

1. Remove the detector cover from the detector base by loosening the two captive screws (Figure 9 item 3).
2. Hold the detector base to the wall (covering the electrical backbox) and mark the two drill points (Figure 9 item 2).
3. Drill the two required holes.
4. Fix the detector base to the wall using 2 × M6 plastic expansion bolts.

Figure 11: Mounting for recessed wiring



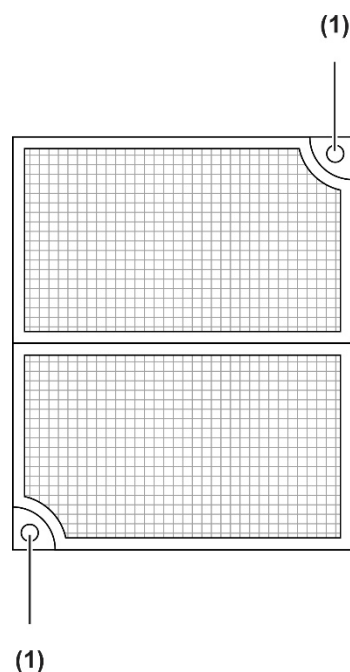
1. Plastic expansion bolts (×2)
2. Backbox

Mounting the reflector

Mount the reflector opposite the detector.

The number of reflectors required depends on the distance from the detector to the reflector (see Table 4 below). When four reflectors are required, they should be mounted side by side and each reflector should be fixed to the wall using 2 plastic expansion bolts.

Figure 12: Reflector mounting holes



1. Mounting holes

Mounting the reflector:

1. Hold the reflector to the wall at the required installation height and mark the two drill points.
2. Drill the two required holes.
3. Fix the reflector to the wall using 2 × M6 plastic expansion bolts.

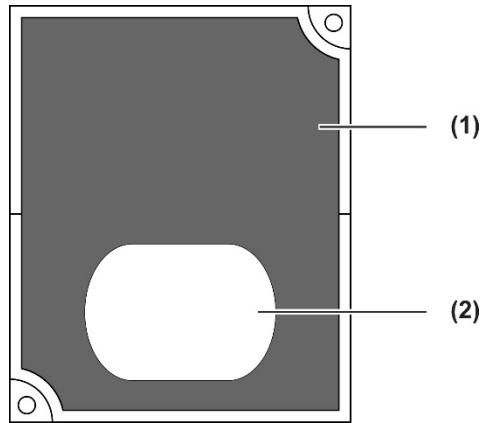
Table 4: Reflectors required

Distance from the detector	Number of reflectors required
5 to 40 m	1
40 to 100 m	4

Masking the reflector

When the distance from the detector to the reflector is less than 10 m, place the supplied non-reflective mask onto the reflector (see below) to reduce the strength of the reflected optical beam.

Figure 13: Masking the reflector



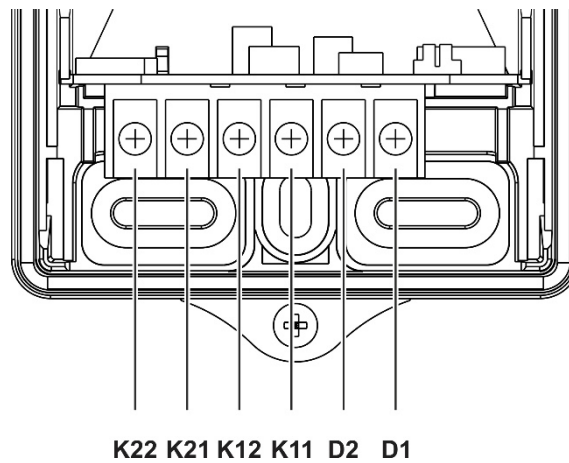
1. Non-reflective mask
2. Exposed area of the reflector

Wiring

Wire the detector as shown below. No terminals are polarity sensitive.

Terminal	Description	Recommended wire
K21, K22	Fault output	1.0 to 2.6 mm ² (17 to 13 AWG) twisted pair
K11, K12	Fire output	1.0 to 2.6 mm ² (17 to 13 AWG) twisted pair
D1, D2	24 VDC power	1.5 mm ² or above fire cable

Figure 14: Terminal block



Commissioning

Commissioning consists of aligning and calibrating the detector. This should be performed after installation and repeated after maintenance.

Remember to remove all protective film from the detector and reflector/s before alignment and calibration.

Note: During commissioning the detector may indicate a fault from the fault output contact.

To align the detector:

1. Connect the detector to the power source and remove the detector cover.
2. Approximately two minutes after powering up, hold a magnet close to the reed switch (see Figure 2 on page 2) until the red alignment laser is activated, and then remove the magnet.
3. Verify that the alignment laser points to the center of the reflector on the opposite wall.

If necessary, adjust the vertical alignment using the vertical adjustment wheel and/or the horizontal alignment by moving the rocking cradle.

4. If the reflected light level is acceptable, autosetup starts (the seven-segment display shows PP). Do not move or knock the detector during autosetup.

The seven-segment display shows P when autosetup is complete.

If the seven-segment display shows 0-99 or H0-H9, there is an error with the reflected light (see "Troubleshooting reflected light errors" on page 17).

5. If the green Adjustment LED is steady, replace the detector cover (fixing it in place with the two captive screws).

If the green Adjustment LED flashes, repeat steps 1 to 4.

To calibrate the detector:

1. While the green Adjustment LED is steady, hold a magnet close to the calibration area (M) on the detector cover until the yellow Fault LED is steady. Remove the magnet and make sure that there are no obstacles in the optical path.

If the steady yellow Fault LED and steady green Adjustment LED turn off after about 20 seconds and the red Fire LED flashes, the detector is correctly calibrated and enters normal monitoring state.

If the steady yellow Fault LED and steady green Adjustment LED don't turn off after about 20 seconds, the detector calibration has failed. Remove the detector power and repeat the commissioning process.

Table 5: Status LED indications during commissioning

Status LED	Colour	State	Description
Fire	Red	Fast flashing	Detector in commissioning state
Fault	Yellow	Steady	Calibration in progress
Adjustment	Green	Steady	Calibration in progress
		Flashing	Calibration error

Troubleshooting reflected light errors

Below is a summary of reflected light errors and how to correct them.

Always ensure that the reflected light is from the reflector and not from other surfaces (walls, ceilings, pillars). If you can't confirm this by observation, use an opaque object or IR light filter to block the beam.

Table 6: Troubleshooting reflected light errors

Seven-segment display	Description
0-99	<p>The reflected light is too weak.</p> <p>A lower number indicates weaker light and a higher number indicates stronger light.</p> <p>Use the adjustment wheel and/or rocking cradle to fine tune the laser alignment and improve the light reading.</p> <p>When the strength of the reflected light is acceptable, autosetup starts (the seven-segment display shows PP). The seven-segment display shows P when autosetup is complete.</p>
H0-H9	<p>The reflected light is too strong.</p> <p>A lower number indicates less intense light and a higher number indicates more intense light.</p> <p>Use the adjustment wheel and/or rocking cradle to fine tune the laser alignment and improve the light reading.</p> <p>When the strength of the reflected light is acceptable, autosetup starts (the seven-segment display shows PP). The seven-segment display shows P when autosetup is complete.</p>

Maintenance and testing

Maintenance

To ensure correct functioning of the detector and fire alarm system, and compliance with all European regulations, the following maintenance checks should be followed periodically:

- Clean the detector and reflector surfaces using a soft cloth dampened with alcohol (do not use water or other chemicals). Do not scratch the lens or the reflector during cleaning.
- Check the alignment of the detector and the reflector.

Repeat the commissioning process after cleaning or any other maintenance (see “Commissioning” on page 15).

Testing

The detector must be in standby state for at least 20 seconds before tests are performed.

IR light filters

Caution: Remove the protective film covering from each side of the IR light filters before the filter is used for the first time.

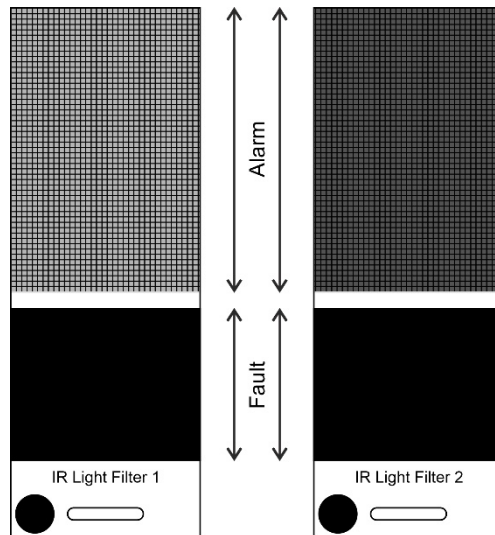
Use the supplied IR light filters for fire and fault testing. The filter to use depends on the detector sensitivity setting.

Table 7: IR light filters

Detector sensitivity setting	Filter
1 or 2	IR light filter 1
3 or 4	IR light filter 2

The alarm and fault areas for the IR filters are shown in Figure 15 on page 19.

Figure 15: IR light filters



Fire and fault tests

Perform fire alarm and fault tests as described below.

To perform a fire alarm test

1. Block the receiver and transmitter lenses using the Alarm area of the corresponding filter.

After 30 seconds the red Fire LED is steady.

To perform a fault test

1. Block the receiver and transmitter lenses using the Fault area of the corresponding filter.

After 30 seconds the yellow Fault LED is steady.

The fault indication disappears when the IR Filter is removed.

Technical specifications

Operating voltage	18 to 28 VDC (24 VDC nominal)
Current consumption	
Standby	≤12 mA
Commissioning	≤20 mA
Alarm	≤22 mA
Relay output	2A / 28 VDC
Sensitivity	1.3 (26%) to 2.8 dB (48% obs.), configurable
Installation height	1.5 to 40 m
Zone length	< 100 m
Beam range	5 to 100 m
Lateral detection	14 m
Maximum coverage area	1400 m ²
Adjustment angle	–6° to +6°
Misalignment tolerance	±0.5°
Dimensions	
Detector	206 × 95 × 95 mm
Mounting bracket	171 × 90 × 40 mm
Reflector	122 × 100 mm
Weight	450 g
Number of cable knockouts	2
IP rating	
Standard	IP20
Sealed unit [1]	IP66
Environmental	
Operating temperature	–10 to +55°C
Storage temperature	–30 to +75°C
Relative humidity	10 to 95% noncondensing

[1] Requires silicone gel sealant – see “Harsh environment installation” on page 7.

Figure 16: Detector dimensions

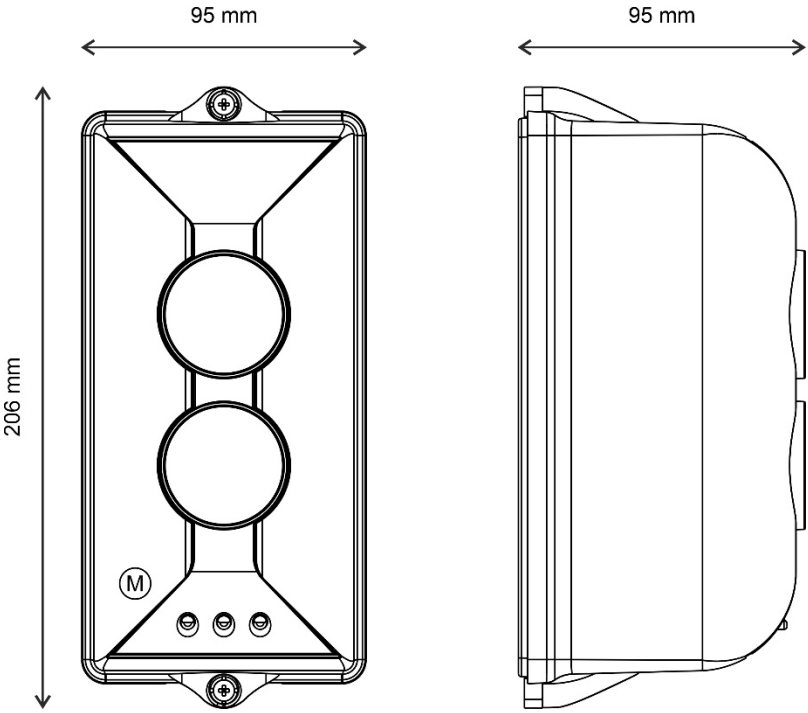


Figure 17: Mounting bracket dimensions

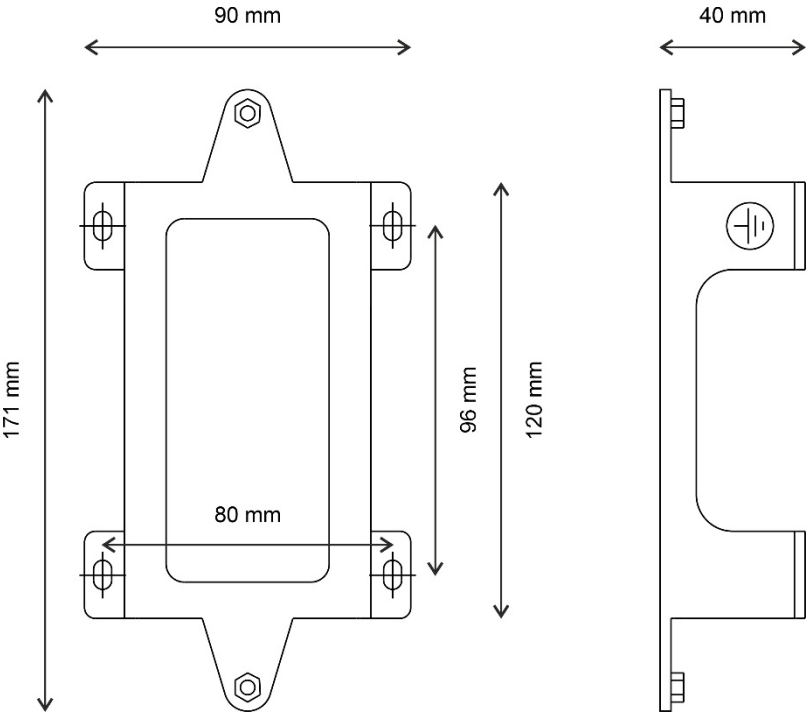
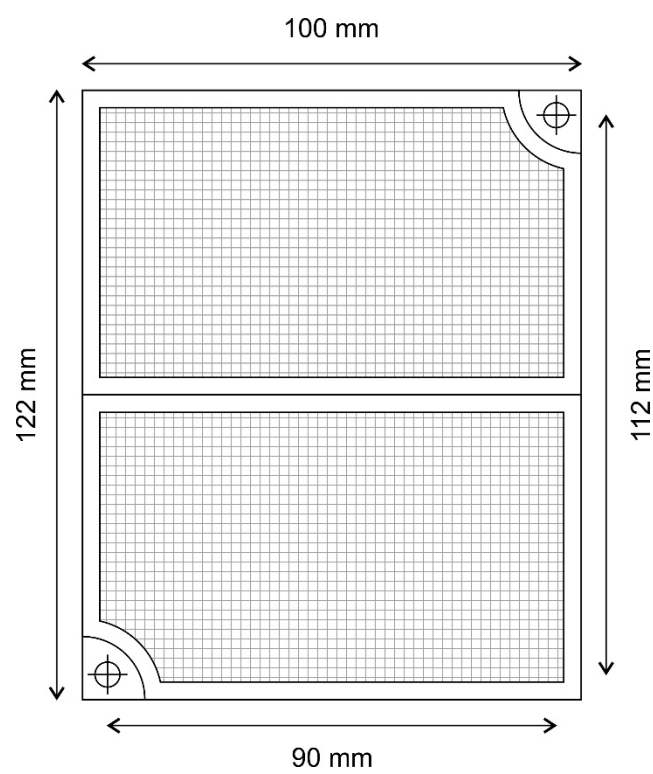


Figure 18: Reflector dimensions



Regulatory information

European regulations for construction products

This section provides a summary on the declared performance according to the Construction Products Regulation (EU) 305/2011 and Delegated Regulations (EU) 157/2014 and (EU) 574/2014.

For detailed information, see the product Declaration of Performance (available at firesecurityproducts.com).

Table 8: Declared performance summary

Conformity	CE
Notified/Approved body	0370
Manufacturer	Gulf Security Technology Co. Ltd., 80 Changjiang East Road, QETDZ, Qinhuangdao 066004, Hebei, China. Authorized EU manufacturing representative: KGS Fire & Security B.V., Kelvinstraat 7, 6003 DH Weert, Netherlands.
Year of first CE marking	2024
Declaration of Performance number	03-4231-360-8884
Standards	EN 54-12
Product identification	NC-DBO
Intended use	See the product Declaration of Performance
Declared performance/s	See the product Declaration of Performance

