Data and Installation

S4 Beam Sensor & brackets

(for Vigilon and Nano Systems)

GENT by Honeywell

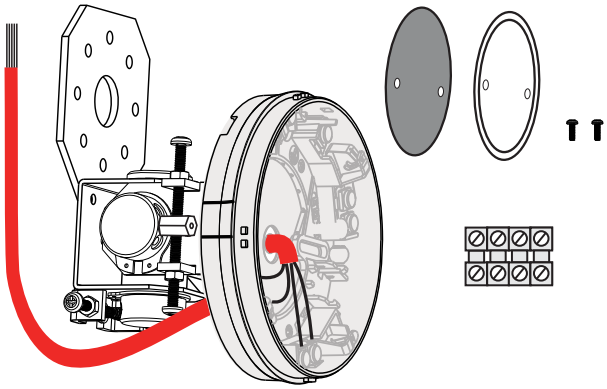
Transmitter (red retainer) Receiver (black retainer)

☐ Beam sensor pair (Transmitter & Receiver)
S4-34740

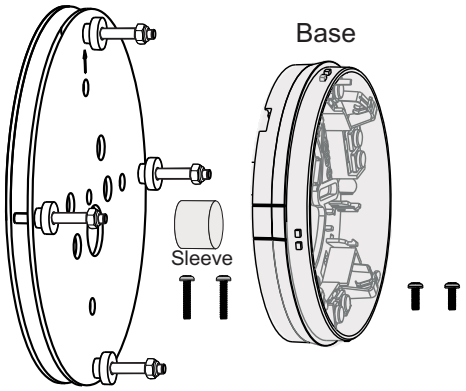
☐ Beam Transmitter only
S4-34741

☐ Beam Receiver only
S4-34742

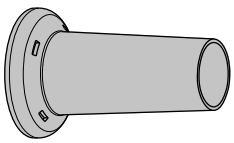
042bh/01



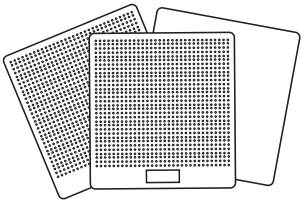
☐ Angle bracket with base
S4-34741-01



☐ Parallel bracket with base
S4-34741-03



☐ Light Shield (5 per pack)
S4-34741-99



Test Cards
S4-34741-50

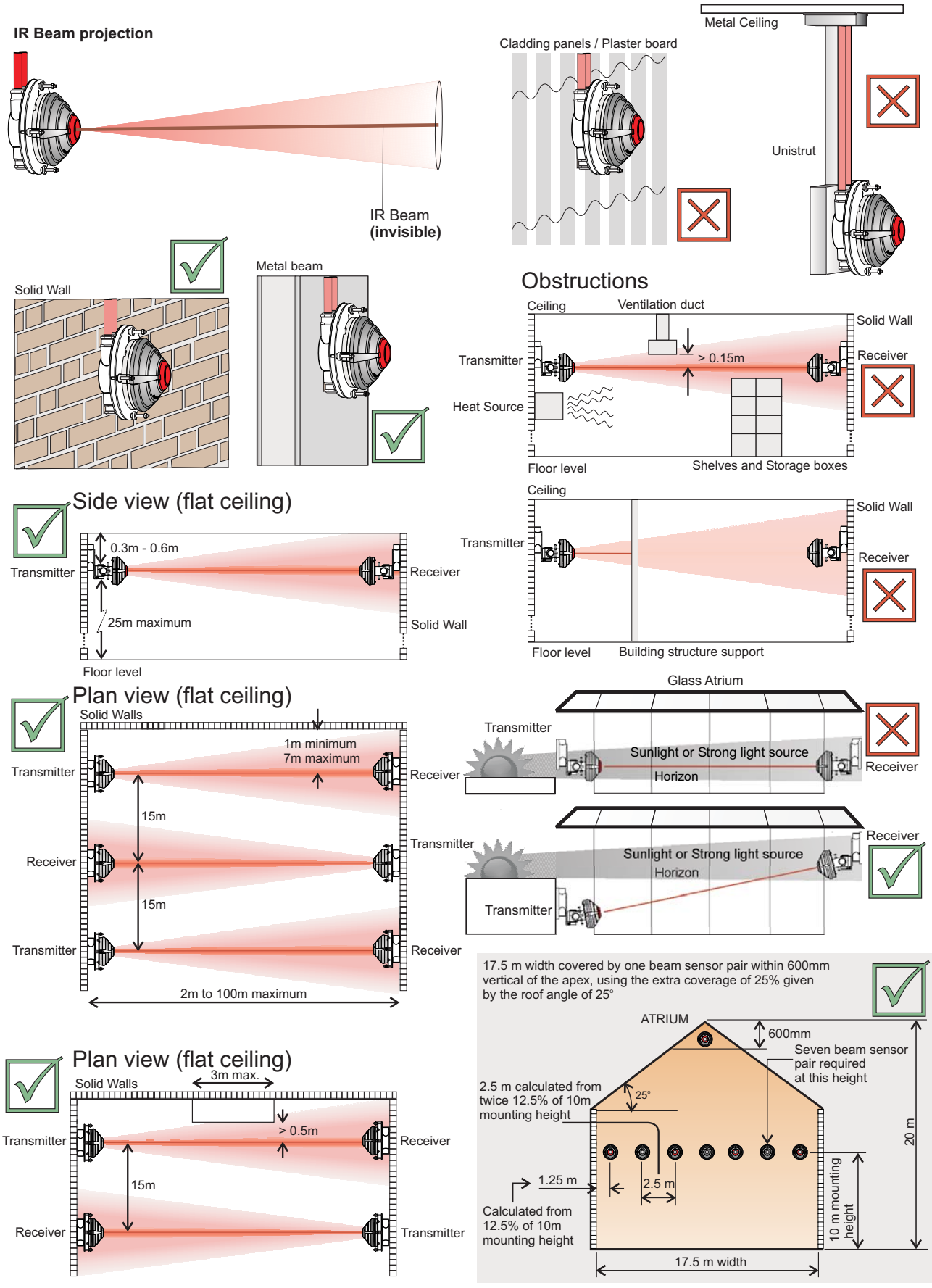
The Beam Sensor pair allows the detection of smoke over distances from 2 m to 100 m, using a 'beam transmitter' and a 'beam receiver', each mounted on a base fixed to either bracket.

Technical Data

Standards - designed to meet	EN54 : Part 12 : 2002 EN54 : Part 17 : 2005
Approvals	LPCB Approved STATES 0, 1, 2 and 3
Overall assembled dimensions in mm	**Transmitter or receiver**: ∅ 117 x d 54 **Angle bracket with base**: h 145 x w 106 x d 130 **Parallel bracket with base**: ∅ 152 x d 27 **Light shield**: ∅ 50 x 75
Assembled weight (approximate)	Transmitter or receiver:105g Angle bracket + base: 620g Parallel bracket + base: 600g Light shield: 14g
Enclosure	ABS
Colour (Sensor)	RAL9010
Storage temperature	-20 to +70ºC
Ambient operating temperature	-10 to +50°C
Relative Humidity (Non condensing)	up to 95% Temperature +5 to +45°C
Emission	BS EN61000-6-3: 2007 EMC for residential, commercial & light Industry.
Immunity	BS EN50130-4: 1996 + A1:1998 +A2 2003 for alarm systems
Ingress Protection (estimated)	IP30 IP20 mounted on bracket
Operating voltage	35-41V
Indicators	Two Red and Seven Green LEDs visible at 500LUX ambient light levels 5m
EN54-17 : 2005 (section 4.8) data:	V_{max} 42V $I_{C\ max}$ 0.4A V_{nom} 40V $I_{S\ max}$ 1A V_{min} 24V $I_{L\ max}$ 20µA $V_{SO\ max}$ 16V $V_{SO\ min}$ 8V $Z_{C\ max}$ 0.130Ω
Compatible Backward compatibility is possible, refer to your supplier	Vigilon : MCC ≥ V4.41 / V3.96 LPC ≥ V4.39 / V3.96 Nano : MC ≥ V1.39 LD ≥ V1.03

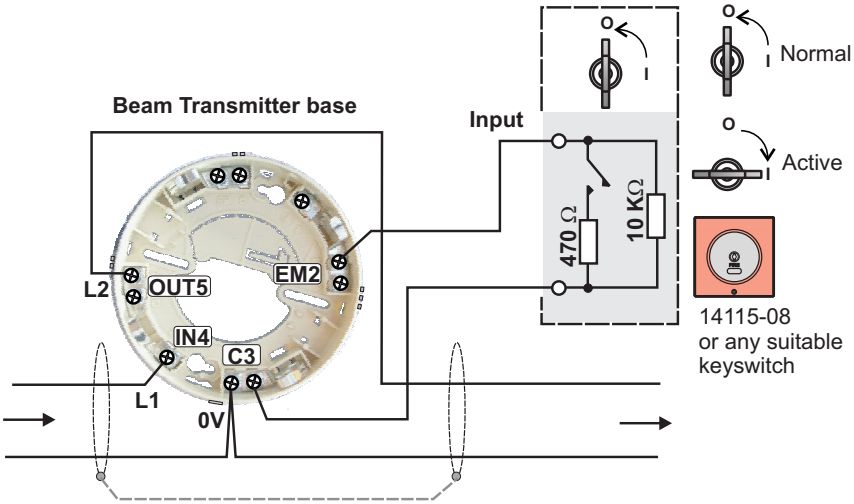
Do's and Dont's

A general guidance on Do's and Dont's is illustrated here, however for full information on siting beam sensor pair refer to BS5839 Part 1.



Test Keyswitch

A test keyswitch unit can be connected to the 'beam transmitter' to facilitate simulation of a test fire condition. The test keyswitch function is supported on Vigilon system only. The keyswitch unit is required to have a series resistor of value 470Ω coupled with an end-of-line 10KΩ resistor wired as illustrated below.



There is a maximum cable length limit of 15 metres from the 'beam transmitter' base to the external Keyswitch Unit.

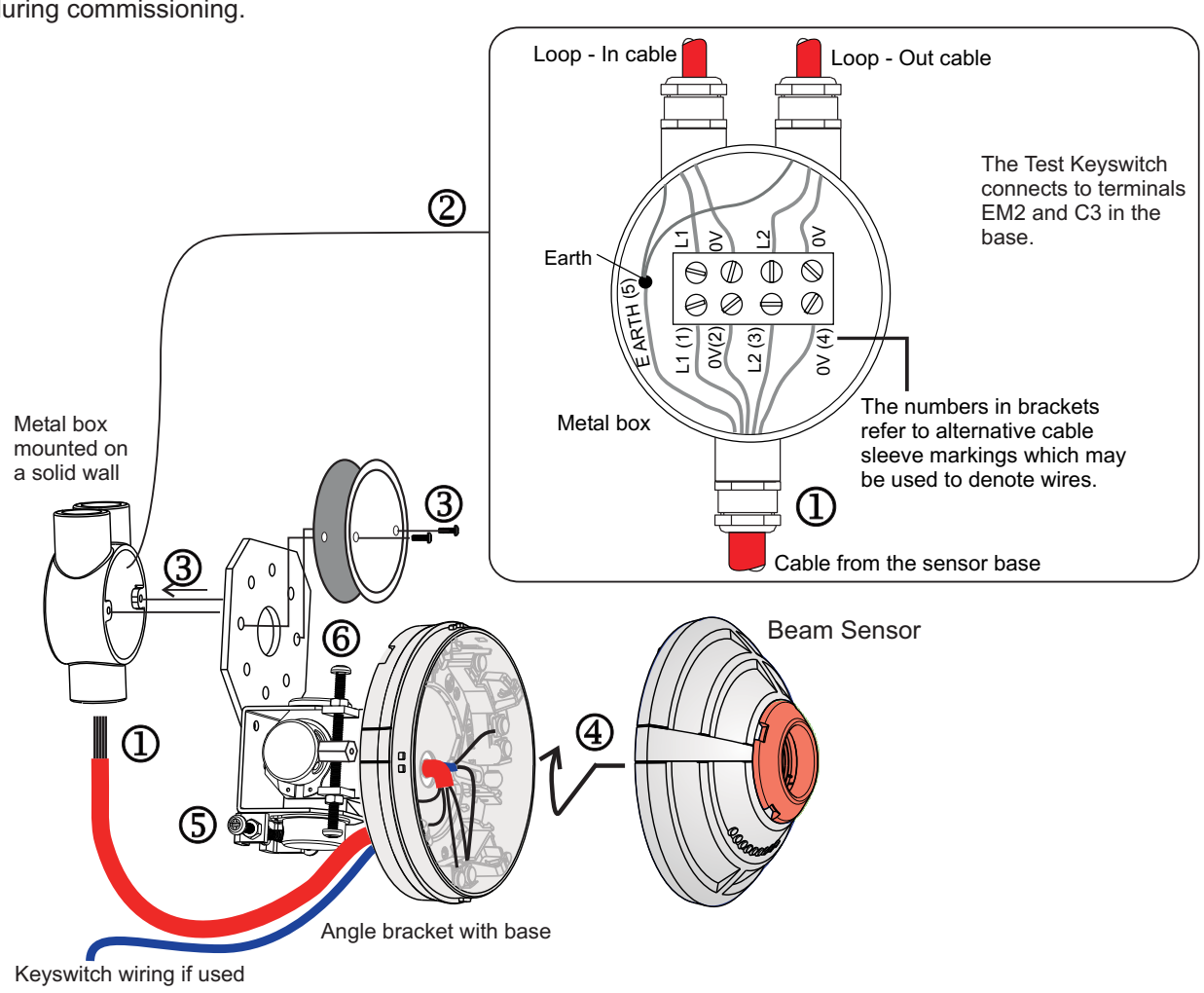
A keyswitch input at the 'beam transmitter' must be enabled during commissioning.

The wiring is monitored for open and short circuit failure.

On operating the keyswitch it will cause a ramp down signal to generate a test fire condition.

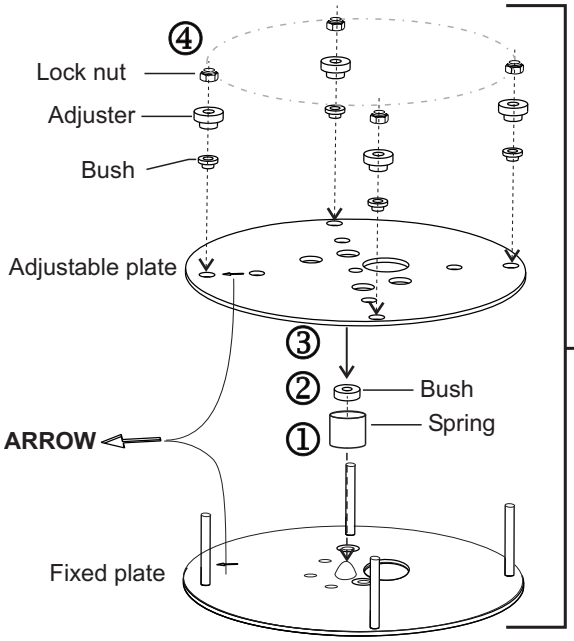
How to install an Angle bracket and fit a Beam sensor

The installation of the angle bracket and beam sensor are illustrated by steps ① to ⑥. Note steps ⑤ and ⑥ require setting of adjusters for sensor to face the opposite sensor assembly, which is normally done during commissioning.

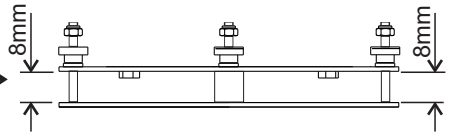


How to pre-assemble the parallel bracket

The parallel bracket may be pre-assembled as illustrated by steps ① to ④.

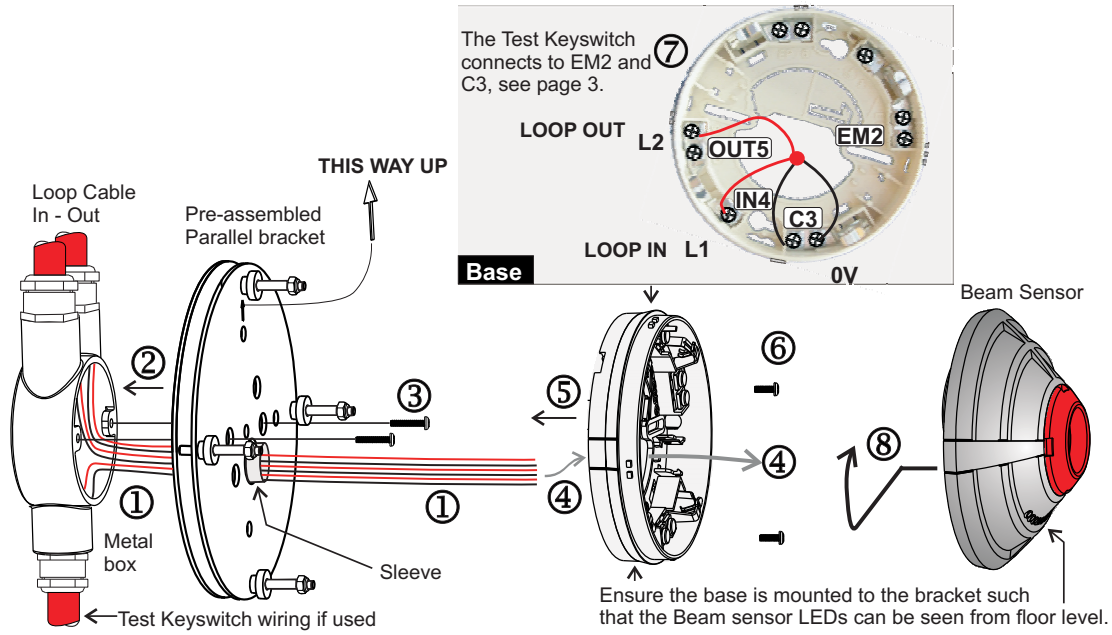


Ensure the adjusters are set to provide an 8mm gap all around between the adjustable and fixed plates.



How to install a Parallel Bracket and fit a Beam sensor

The installation of the parallel bracket and beam sensor are illustrated by steps ① to ⑧.



Further information about this product can be found in Part 2 of this document available on Gent Expert website.

At the end of their useful life, the packaging, product and batteries should be disposed of via a suitable recycling centre and in accordance with national or local legislation.

WEEE Directive:
At the end of their useful life, the packaging, product and batteries should be disposed of via a suitable recycling centre.
Do not dispose of with your normal household waste. Do not burn.

CE
0832
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Product No.	EC Certification of Conformity No.
S4-34741	0832-CPD-1365
S4-34742	0832-CPD-1365

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Commissioning information

S4 Beam Sensor & brackets

(for Vigilon and Nano Systems)

GENT by Honeywell

This document describes how to adjust the beam sensor using adjusters on the angle or parallel bracket, align beam sensor pairs and test the installation.

Transmitter (red retainer) Receiver (black retainer)

A beam sensor pair consist of a:

- ☐ 'beam transmitter' that can be identified by a **red** lens retainer and a
- ☐ 'beam receiver' that can be identified by a **black** lens retainer.
- ☐ each sensor is fitted onto a base that is a part of an angle or parallel bracket.

Compatibility

The S4 Beam Sensor pair are compatible for use in Vigilon and Nano systems having the following panel firmware.

Control Panel	having card and firmware
Vigilon	Main Controller Card ≥ V4.41 / V3.96
	Loop Processor Card ≥ V4.39 / V3.96
Nano	Main Controller ≥ V1.39 Loop Driver ≥ V1.03

Backward Compatibility

An S4 Beam sensor pair can be converted to be a BACKWARD COMPATIBLE Beam Sensor pair.

The conversion is done using a Programming base interface for S4 beam sensor pair, see section headed 'Backward Compatibility'.

Commissioning checks

Compatibility
Check the control panel in the system has compatible software for the S4 beam sensors installed on its loop circuit.

↓

Brackets
If necessary, check the method of adjusting the parallel and angle brackets.

↓

Laser tool
Read the instructions supplied with the recommended laser tool and roughly align the beam sensor using the tool.

↓

Light shield
A light shield is only required to be fitted onto a beam receiver where direct sunlight or strong light is likely to fall in the path of the 'beam receiver'. Where necessary fit the light shield.

↓

Normal indications
Check the operational indications given by the red LEDs on the beam sensor.

↓

Find Beam
Finding the device address of the 'beam transmitter' and 'beam receiver' on the loop.

↓

Beam STATES
Determine which Beam sensor STATE is required.

↓

Select a STATE
Program the required Beam sensor STATE, the factory default is STATE 0.

↓

Alignment indications
Interpreting the alignment indications given at a beam device.

↓

Align beam sensor pair
Align the 'beam transmitter' with 'beam receiver'.

↓

Time averages
Reading the time averages during beam sensor alignment.

↓

Gain and STATE
Check the Beam STATE selected is applicable.
Check the Gain value after alignment is within the distance range.

↓

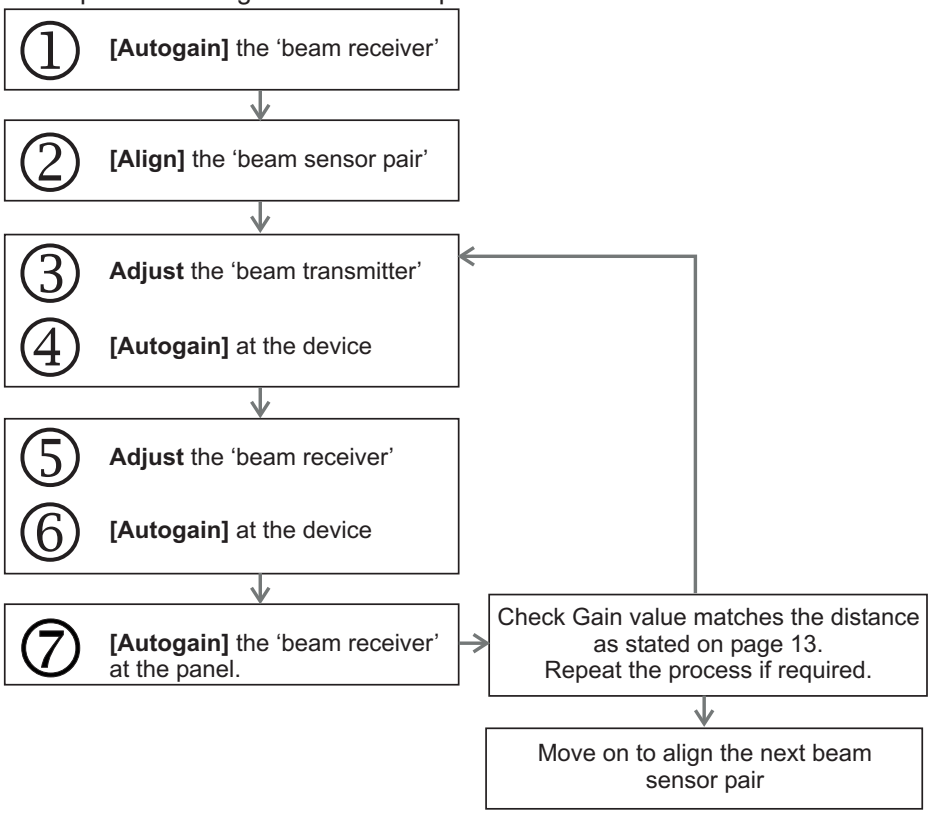
Tests
Perform tests on the installed beam sensor pair.

↓

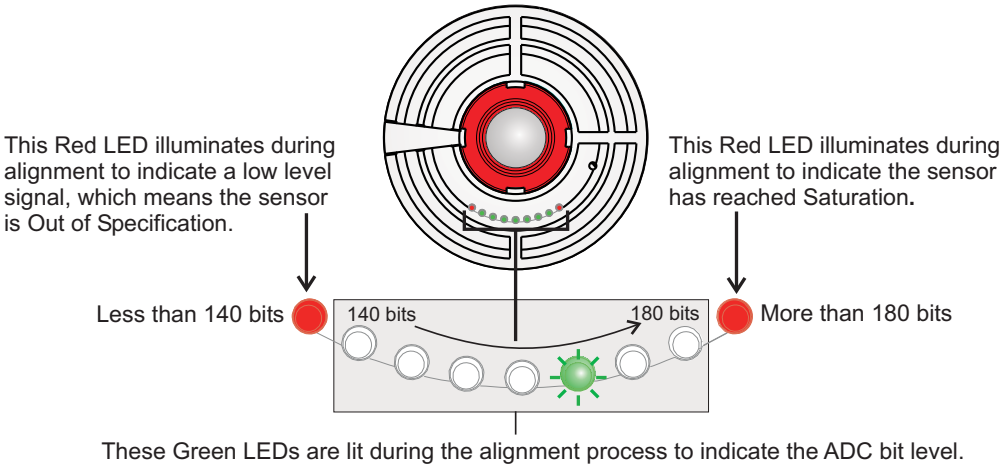
Commissioning tool
Where required, configure the monitored input and working indication features.

How to align a Beam Sensor pair

Overall process to align Beam sensor pair



During the alignment process all the LEDs on the 'beam transmitter' and 'beam receiver' act as a simple level meter to indicate the ADC bit level. An increase in level causes the intensity of the particular LED to increase, until the level is enough to turn on the next LED to the right.



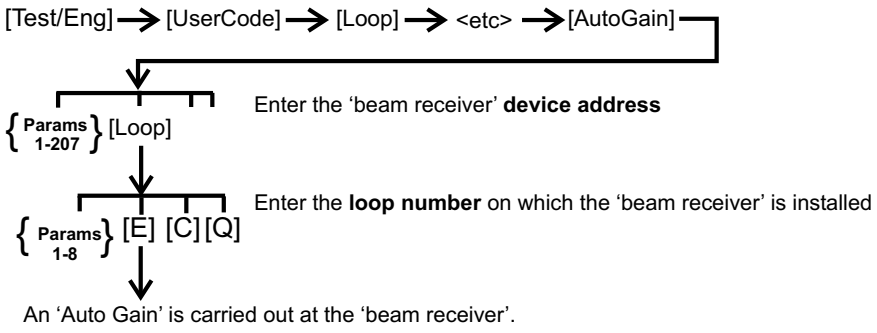
Make adjustments in the X axis and Y axis, using adjusters on the beam sensor bracket to let the highest Green LED to illuminate. The LEDs update every 2 seconds, so make small adjustments and wait for the indication to refresh.

The illumination of red LEDs on a beam sensor will indicate the level is either too low or too high and it is important to carry out a sensor **[Auto Gain]** after adjustment of the bracket.

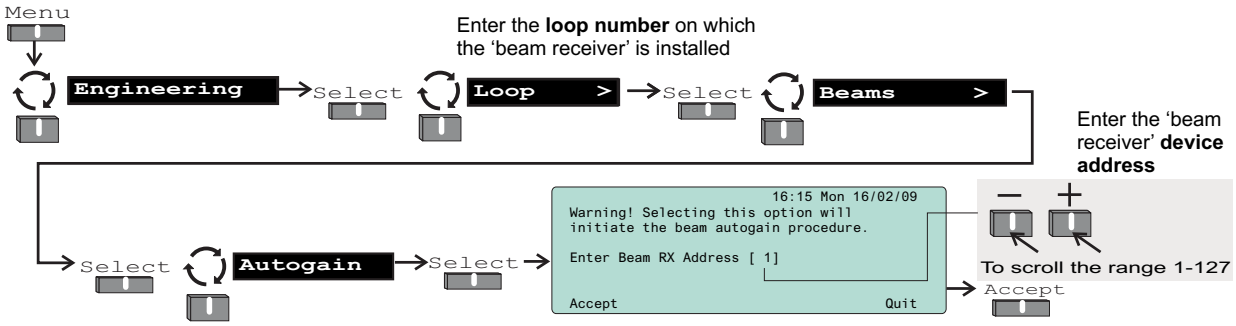
On first power up of the system having beam sensors a light indication of 'Sensor out of Specification' is given at each beam sensor, with the left most Red LED on the beam sensor lit.

① Assuming the beam sensor pair are in rough alignment at the control panel activate the **[Autogain]** function on the **'beam receiver'** of the beam sensor pair to be commissioned. You will need to know the device address of the 'beam receiver' and the loop number on which it resides.

Procedure for Vigilon panel (Access level 3)

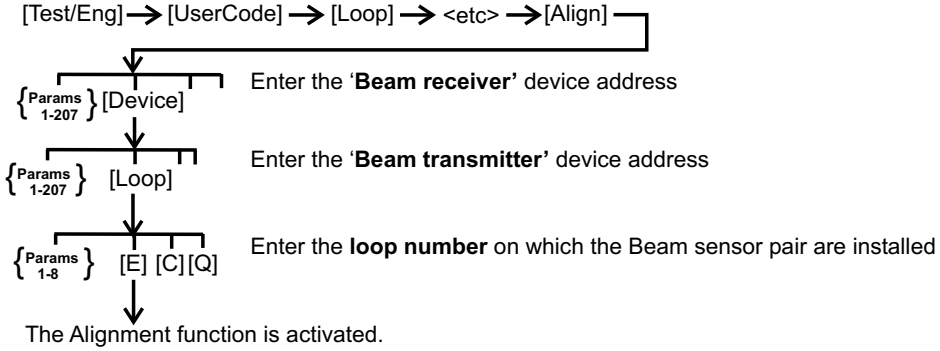


Procedure for Nano panel (Access level 4)



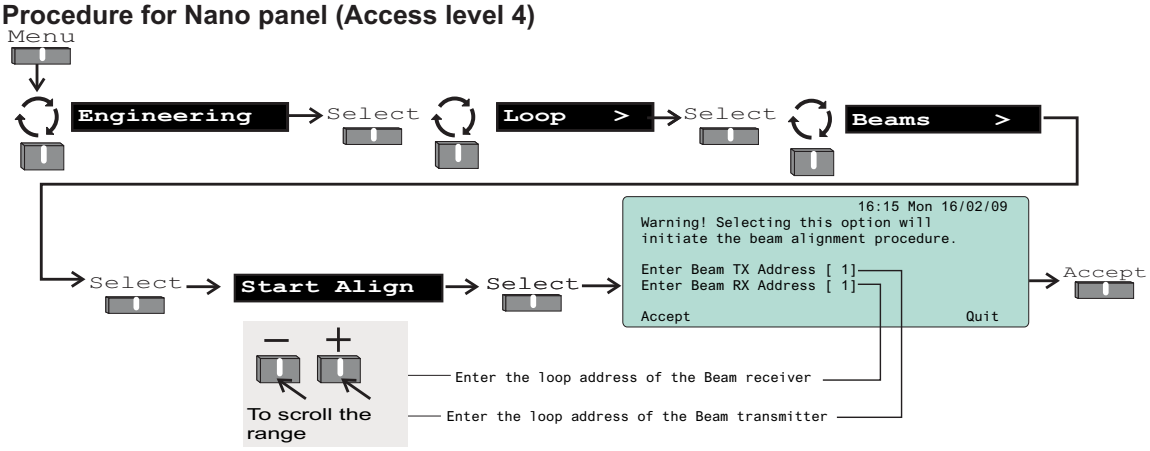
② Using the options in **[Test/Eng]** menu put the required beam pair into **[Align]** mode.

Procedure for Vigilon panel (Access level 3)

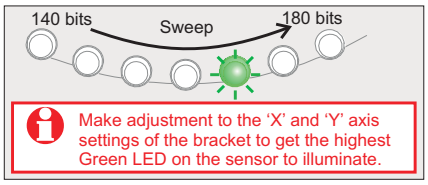


The alignment function will timeout after 1 hour.

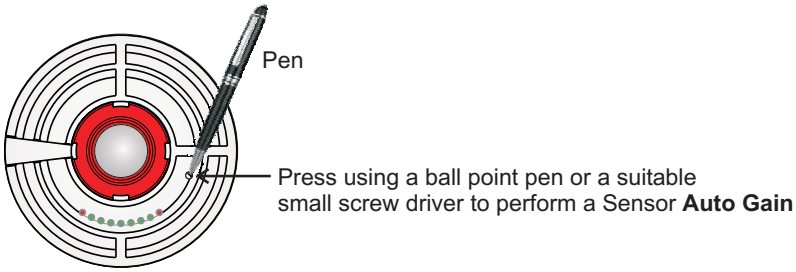
Procedure for Nano panel (Access level 4)



③ Using the adjustments at the bracket of the **'beam transmitter'** align this device with the 'beam receiver' and obtain a best bit level indication by getting an illumination of the highest green LED.



④ To auto gain at the device **press and hold** on the ***Autogain button***. This will actually perform an autogain on the **'beam receiver'** of the beam sensor pair. At the device all the LEDs turn off and after a delay the green LEDs indicate the new ADC bit level. If necessary make further bracket adjustment and perform an autogain again by a **press and hold** of the **Autogain button** on the device.



⑤ Using the adjustments at the bracket of the **'beam receiver'** align this device to face the 'beam transmitter' and obtain a best bit level indication by getting an illumination of the highest green LED.

⑥ Auto gain at the device by a **press and hold** of the ***Autogain button***. At the device all the LEDs turn off and after a delay the green LEDs indicate the new ADC bit level. If necessary make further bracket adjustments and perform a further autogain by a **press and hold** of the **Autogain button** on the device.

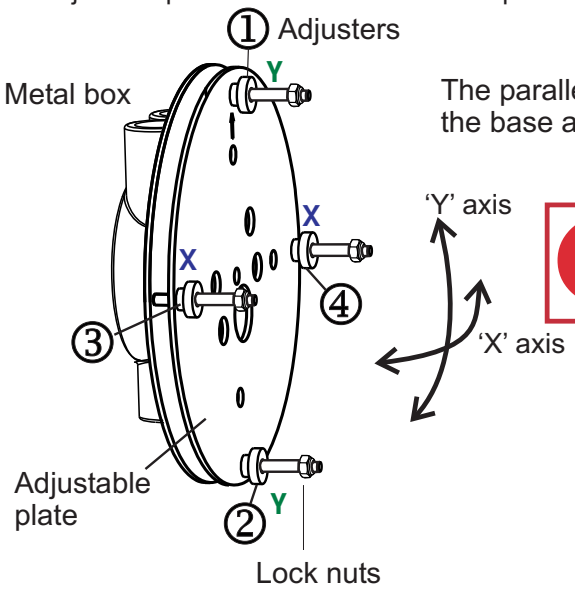
⑦ Finally perform an **Auto gain** at the **'beam receiver'** using the **PANEL CONTROLS ONLY**. After performing an auto gain at the panel the green LEDs will turn off.

Now move on to align the next beam sensor pair by carrying out procedures ① to ⑦ above.

Brackets

How to adjust the Parallel bracket

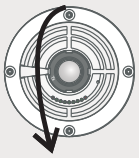
To adjust the parallel bracket follow these procedures:



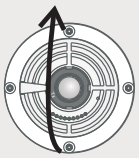
The parallel bracket shown is without the base and sensor fitted for clarity

Up to ± 8° adjustment is possible in the X and Y axis.

Ensure the lock nuts are opened out.

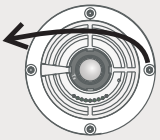


To tilt the 'adjustable plate' in the 'Y' axis towards the bottom:
In small movements unscrew the **top Y adjuster** ①
and at the same time screw down the **bottom Y adjuster** ②

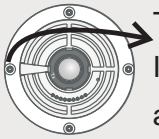


To tilt the 'adjustable plate' in the 'Y' axis towards the top:
In small movements screw down the **top Y adjuster** ①
and at the same time unscrew the **bottom Y adjuster** ②

On completion secure the adjustment by the two **lock nuts Y,** using a 7mm nut driver.



To tilt the 'adjustable plate' in the 'X' axis towards the left hand side:
In small movements screw down the **left X adjuster** ③
and at the same time unscrew the **right X adjuster** ④

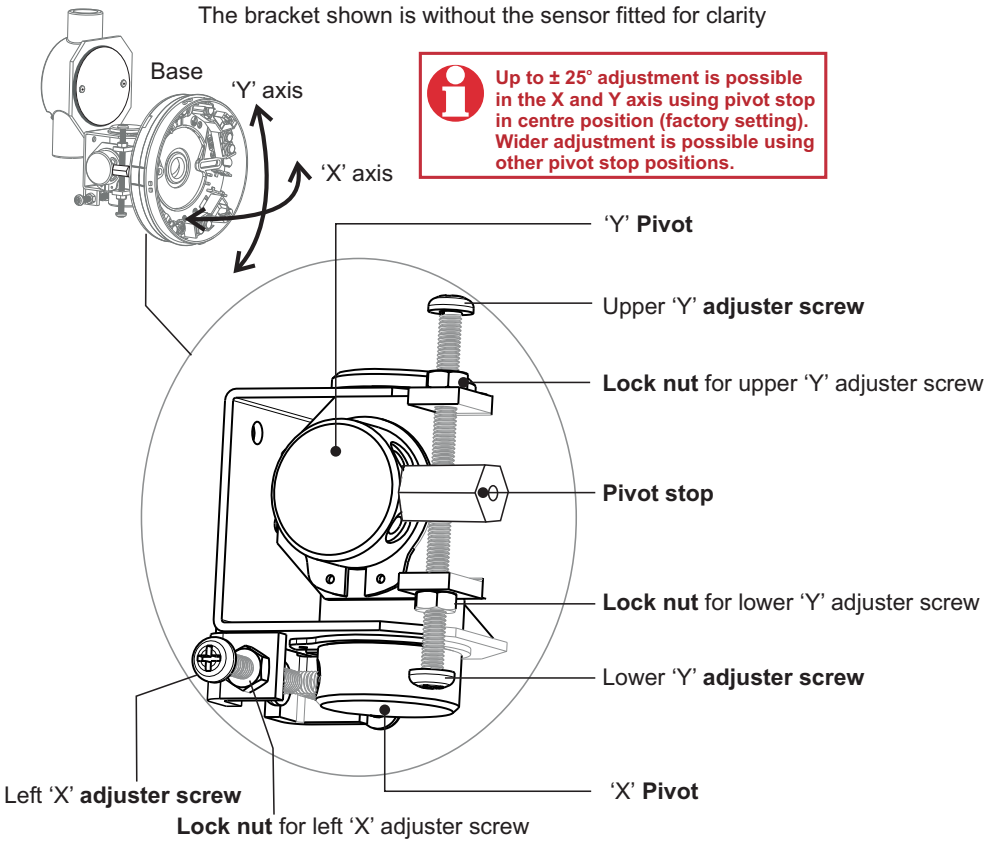


To tilt the 'adjustable plate' in the 'X' axis towards the right hand side:
In small movements unscrew the **left X adjuster** ③
and at the same time screw down the **right X adjuster** ④

On completion secure the adjustment by the two **lock nuts X,** using a 7mm nut driver.

Hold the **adjuster** in place to prevent movement while it is being locked to retain the setting.

How to adjust the Angle bracket



To adjust the angle bracket follow these procedures:

a. Slacken both 'Y' adjuster **lock nuts** on the bracket and then unscrew the **'Y' adjuster screws**.

b. Adjust the base in the 'Y' axis to roughly face the opposite beam sensor bracket assembly.

c. Where a large angle adjustment is required, then it may be necessary to move the **pivot stop** from the **'Y' Pivot** and fit it in the appropriate screw hole on the 'Y' pivot to assist alignment.

d. Once the base is facing the opposite beam sensor bracket secure this position by locking the **pivot stop** using the **'Y' adjuster screws**.

e. Now secure the **'Y' adjuster screws** by their **lock nuts**. To do this ensure each **'Y' adjuster screw** is locked in the set position by its **lock nut** to prevent movement of adjuster screw.

f. Similarly make adjustments in the 'X' axis using the 'X' adjuster screws and lock the settings using the lock nuts.

Alignment Angles

The table below shows the maximum misalignment angles at the medium sensitivity setting of 25% (and the default sensitivity of 50%).

	Transmitter	Receiver
Measurable signal during installation	± 3 degree	± 5 degree
Maximum movement after installation	± 1 degree (± 2)	± 2 degree (± 3)
Movement claim for EN54-12	± 0.5 degree	± 1 degree

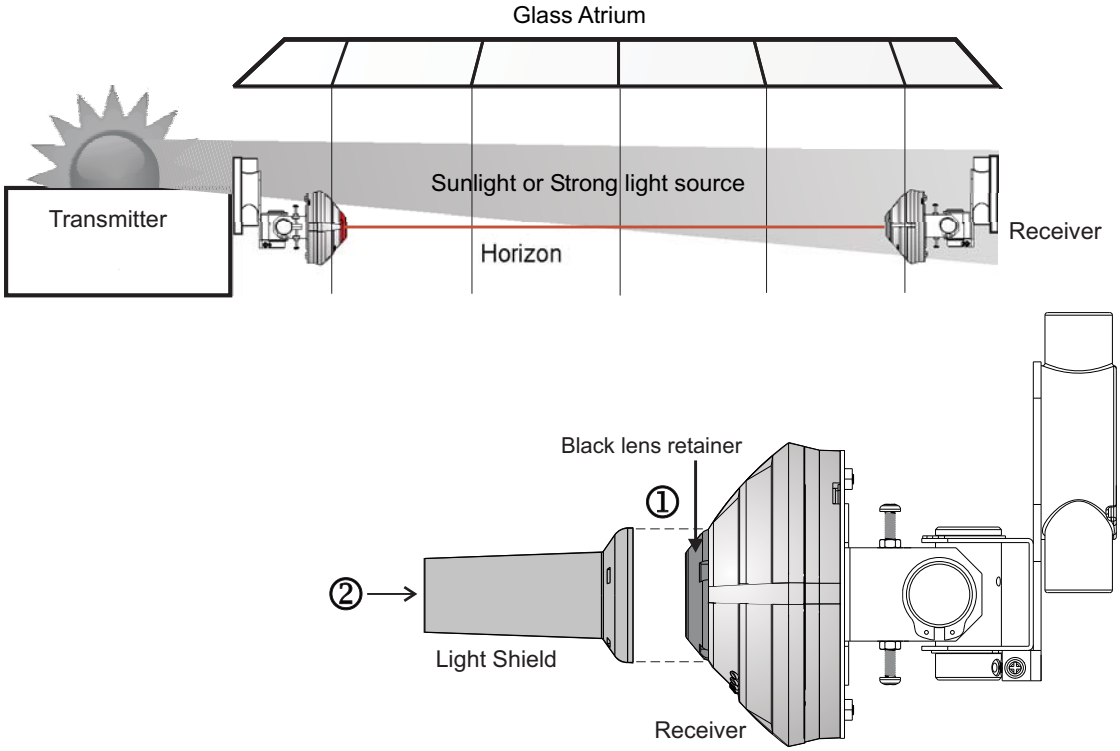
Light Shield

How to fit a Light Shield

A '**light shield**' must only be fitted to the 'beam receiver' to prevent sunlight or strong light affecting signals received at the 'beam receiver'.

① Align the 'light shield' with lens retainer on the 'beam receiver'.

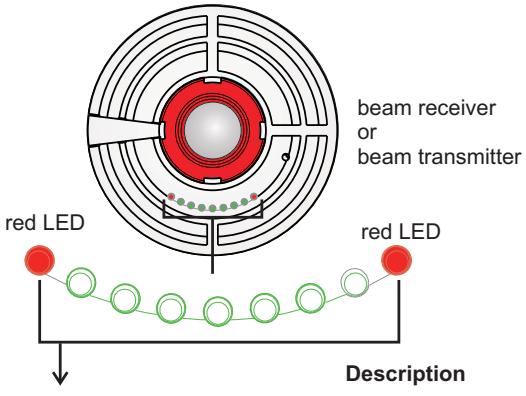
② Press the 'light shield' onto the 'lens retainer' of the 'beam receiver' until it locks into place, a 'click' sound can be heard when there is a positive lock.



Indicators

How to interpret operational indications at a Beam sensor

The two red end LEDs on a beam sensor provide Working indication, Fire indication, Device found indication.



	Description	Indicates
Flashing	On the **'beam receiver' only**	**FIRE Event**
Continuous Long flashes	On the '**beam receiver**' or '**beam transmitter**'	**Found device**
Frequent Short flashes	On the '**beam receiver**' or **beam transmitter**' (The working indication is optional and must be set at the commissioning tool)	**Device working**

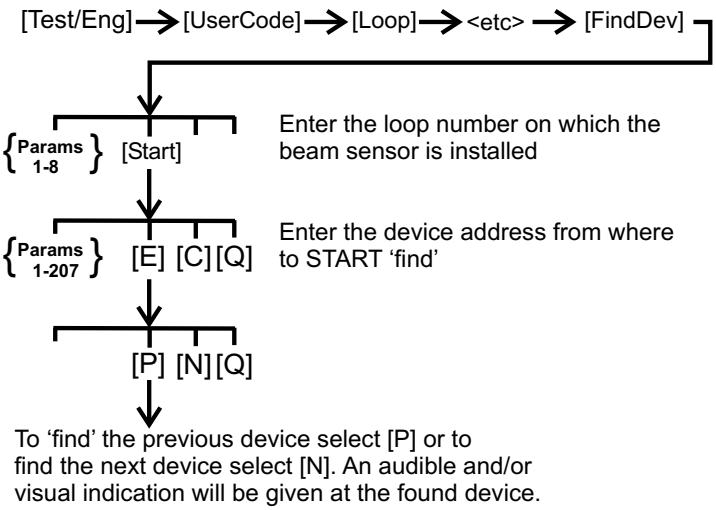
Find Device

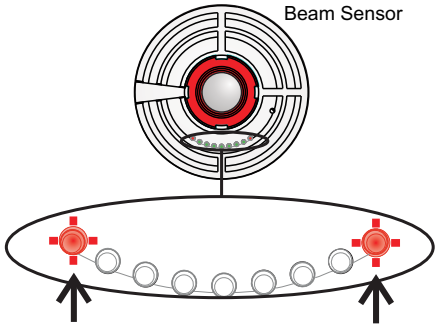
How to find a 'Beam receiver' or 'Beam transmitter'

You can find a 'beam transmitter' or 'beam receiver' device on a loop circuit by using the **Find Device** function at the control panel.

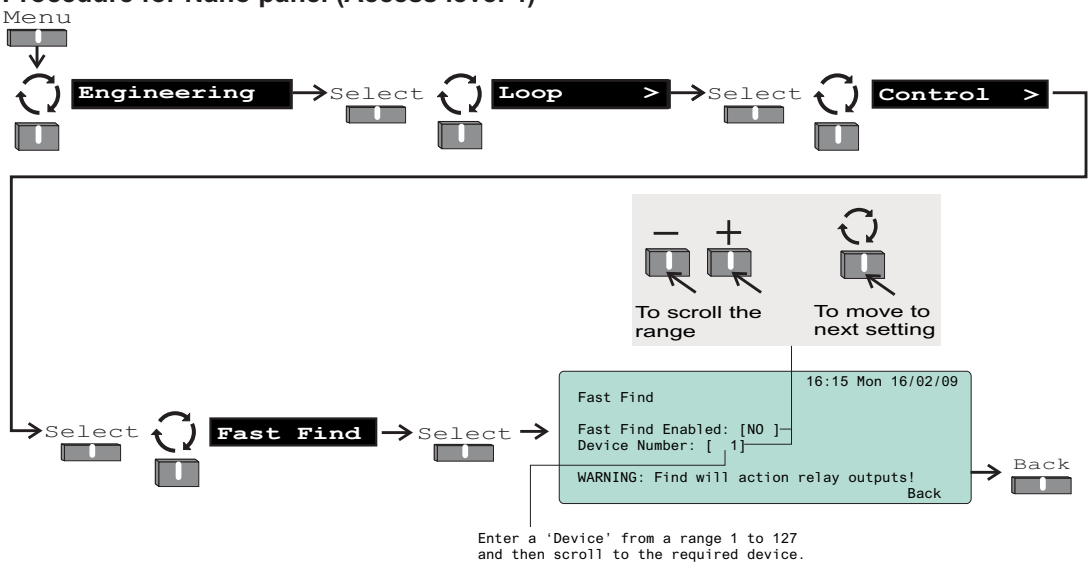
To speed up the search to find the location of a Beam sensor you must first refer to the '*as fitted wiring drawings'* which provides the address or approximate address of the device on the loop circuit. Enter the device address at the panel and **[Start]** the 'find device' function. When the beam sensor is found then its red LEDs flash.

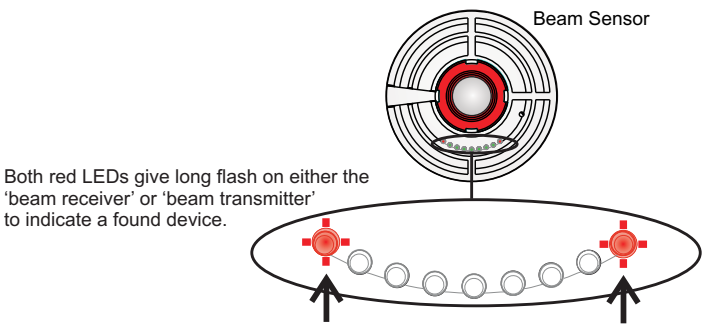
Procedure for Vigilon panel (Access level 3)





Procedure for Nano panel (Access level 4)





Beam sensor STATES

The Beam Sensor is designed to operate in any one of the following sensor STATES.

Do not use beam sensor STATES that are not listed below, as selecting an UNUSED STATE will be interpreted by the panel as STATE 0.

States verses distance

Sensor STATES	Ideal range minimum to maximum
4 or 5	2m to 30m
2 or 3	5m to 100m
0 or 1	12m to 100m

LPCB approval

The Beam sensor STATES 0, 1, 2 and 3 are approved test at LPCB.

Beam Sensor STATES

STATES	Definition	Application
STATE 0	Default detection	A **fire** is detected when there is a 50% (3dB) fall in signal level, however if the fall is by 90% (10dB) in less than 1second and is maintained for 40 seconds, then a **fault** is registered. This allows the Control panel to differentiate between a fire and a fault signal caused by accidental obscuration.
STATE 1	Normal sensitivity	A **fire** is detected when there is a 50% (3dB) fall in signal level, however if the fall is by 90% (10dB) in less than 1 second and is maintained for 40 seconds then a **fire** is registered.
STATE 2	Medium Sensitivity	A **fire** is detected when there is a 25% (1.3dB) fall in signal level, however if the fall is by 90% (10dB) in less than 1 second and is maintained for 40 seconds then a **fault** is registered.
STATE 3	Medium Sensitivity	A **fire** is detected when there is a 25% (1.3dB) fall in signal level, however if the fall is by 90% (10dB) in less than 1 second and is maintained for 40 seconds then a **fire** is registered.
STATE 4	High Sensitivity	A **fire** is detected when there is a 10% (0.5dB) fall in signal level, however if the fall is by 90% (10dB) in less than 1 second and is maintained for 40 seconds then a **fault** is registered.
STATE 5	High Sensitivity	A **fire** is detected when there is a 10% (0.5dB) fall in signal level, however if the fall is by 90% (10dB) in less than 1 second and is maintained for 40 seconds then a **fire** is also registered.
STATE 15	No detection.	This is a total disablement of the sensor.

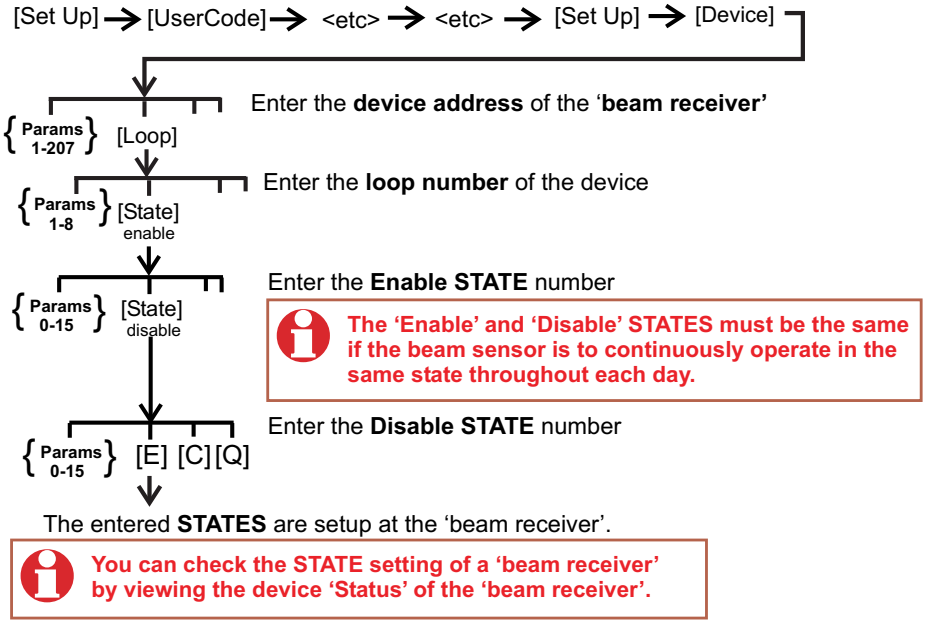
How to set up a Beam sensor STATE

The Beam Sensor is factory set to operate at **STATE 0**. To configure the beam sensor to operate in a different STATE you will need to change the device setup of the **'beam receiver'**.

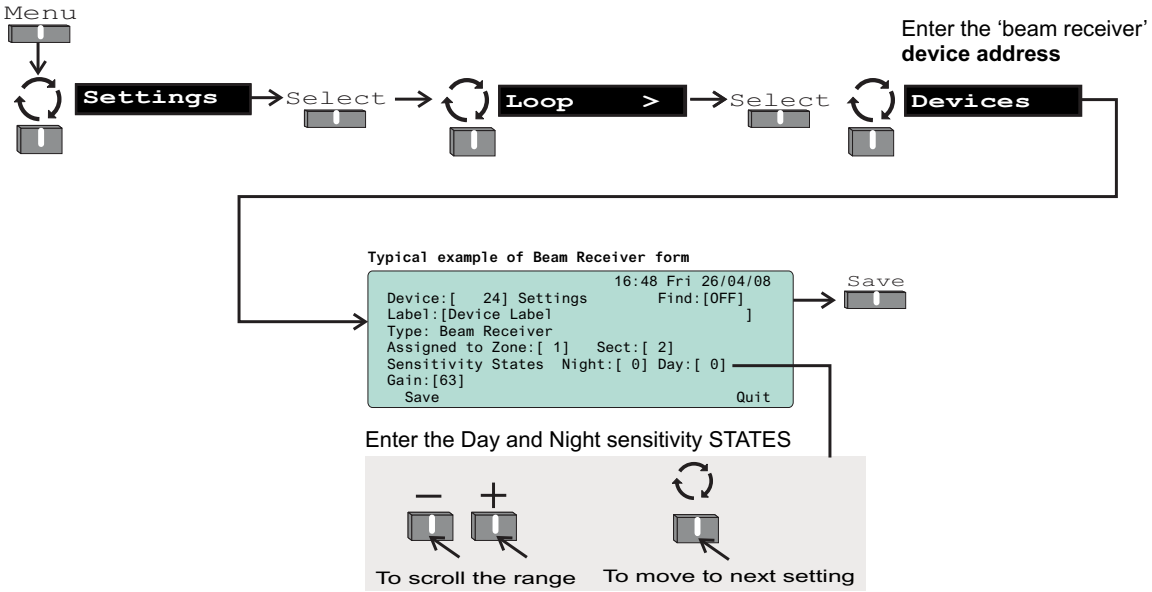
The STATE setting of a 'beam receiver' is usually done during commissioning of the system using the **commissioning tool**, however it is possible to use the panel menus to change the sensor operating STATE. Enter the required STATE number for both *Enable (Day)* and *Disable (Night)* time periods.

You will need to know the 'beam receiver' device address and loop number on which it is installed.

Procedure for Vigilon panel (Access level 3)



Procedure for Nano panel (Access level 3)

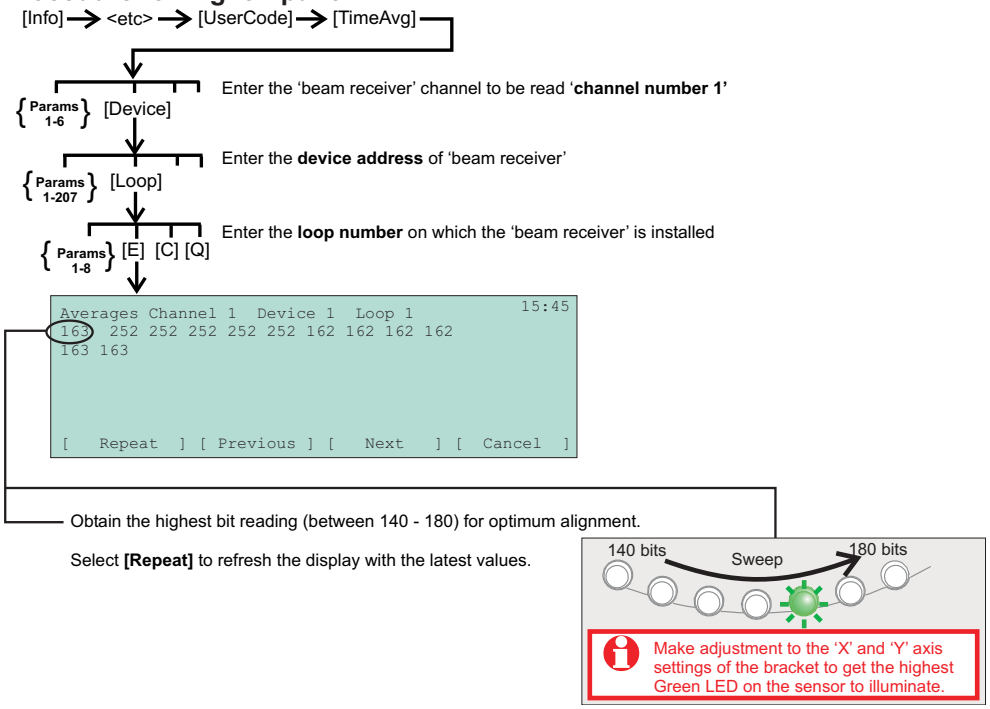


Time averages

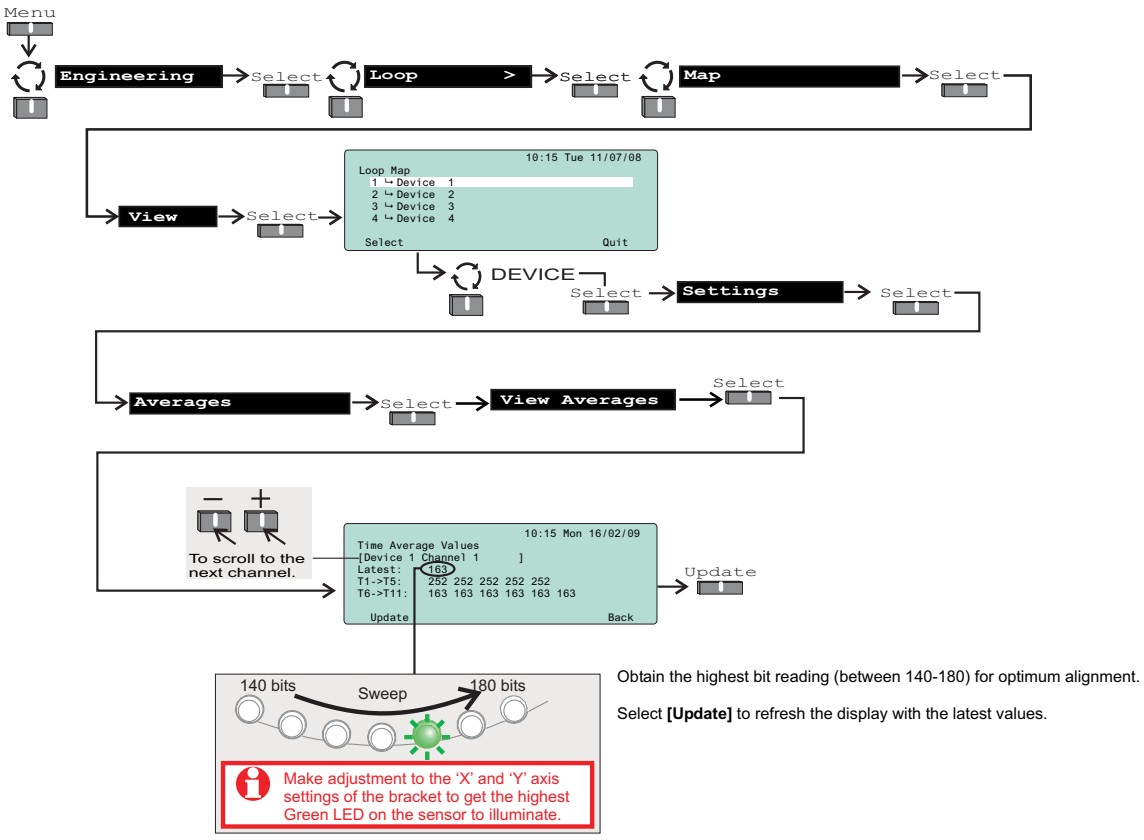
How to read the time average values of a beam sensor

Where two people are available for commissioning beam sensor pairs, then it may be appropriate to view the time average readings to get the best bit value setting during fine adjustment.

Procedure for Vigilon panel



Procedure for Nano panel (Access level 4)



Gain Value

How to view the 'Status' of a Beam sensor and check the set Gain value

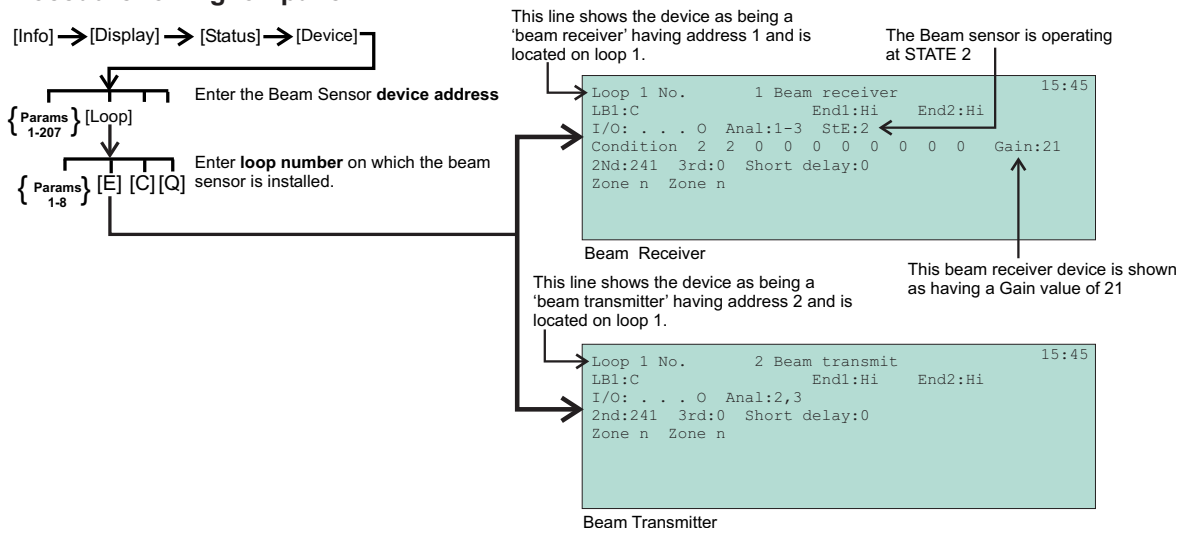
At the control panel use the **Device Status** function to view the beam sensor STATUS. You will need to know the device address of the 'beam transmitter' or 'beam receiver' and the loop number on which the devices are installed.

The Gain value read from 'beam receiver' device status should approximately correspond to the value in the *table* for typical distances between the 'beam transmitter' and 'beam receiver'.

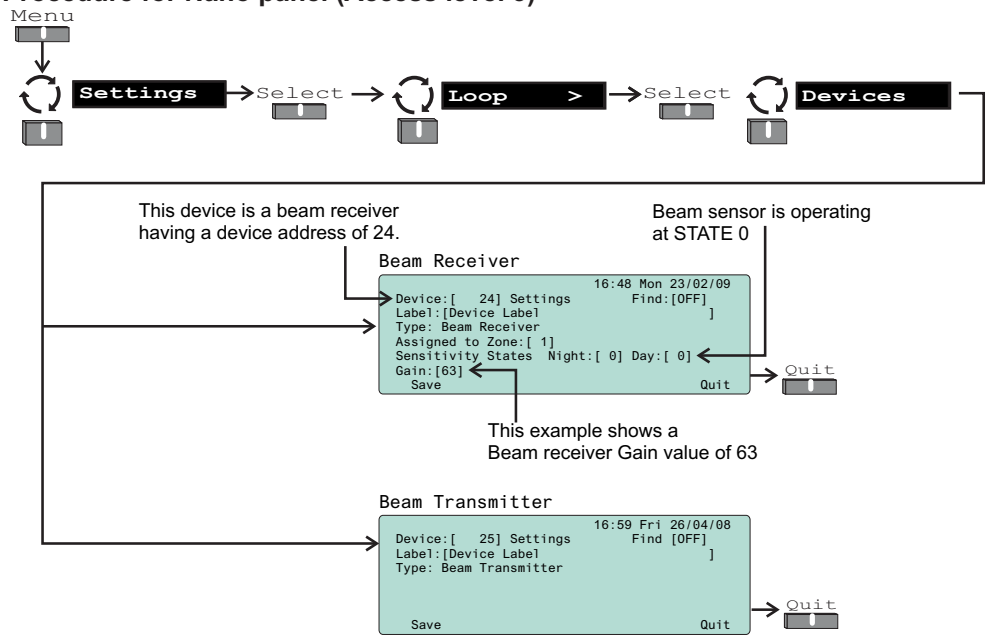
Distance between beam transmitter and receiver (path length)	2m	6m	10m	15m	20m	30m	45m	60m	70m	80m	90m	100m	110m	120m
Gain Value (± 4)	6	19	25	33	38	41	44	46	47	49	51	53	55	56

If a beam sensor pair path length is greater than 100m then the requirements of EN54: Part 12 will not be met.

Procedure for Vigilon panel



Procedure for Nano panel (Access level 3)



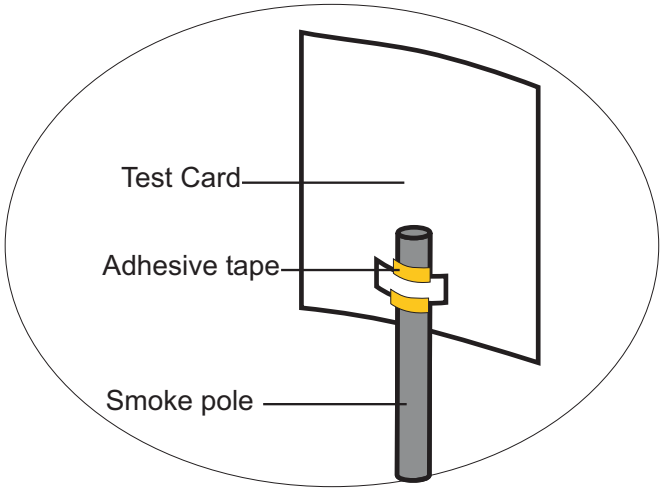
Test

How to test a beam sensor pair

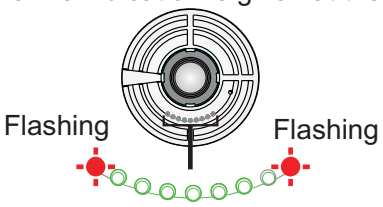
After all the beam sensor pairs are fully commissioned use the appropriate test card (S4-34741-50) to obscure the beam to simulate a FIRE or FAULT condition.

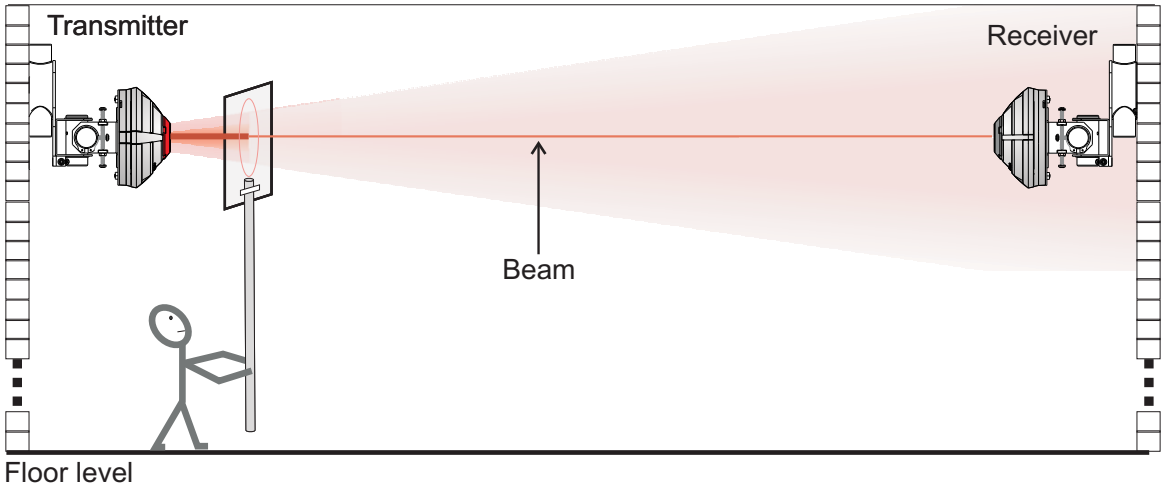
If a **Test Keyswitch** unit is connected to a 'beam transmitter' of a beam sensor pair then, if appropriate, operate the switch to test the beam sensor pair. A test using a Test Keyswitch is not applicable for S4 beam sensors converted to be backward compatible.

STATE	FIRE test using a test card	FAULT test using a card
0	Use the 50% obscuration Test card in the beam path	Use a piece of cardboard to block the beam path for 40 seconds
1	Use the 50% obscuration Test card in the beam path Use cardboard to block the beam path for 40 seconds	N/A
2	Use the 25% obscuration test card in the beam path	Use a piece of cardboard to block the beam path for 40 seconds
3	Use the 25% obscuration test card in the beam path Use a cardboard to block the beam path for 40 seconds	N/A



A fire indication is given at the '**Beam receiver' only** and not at a 'Beam transmitter'. Also a fire indication is given at the panel.



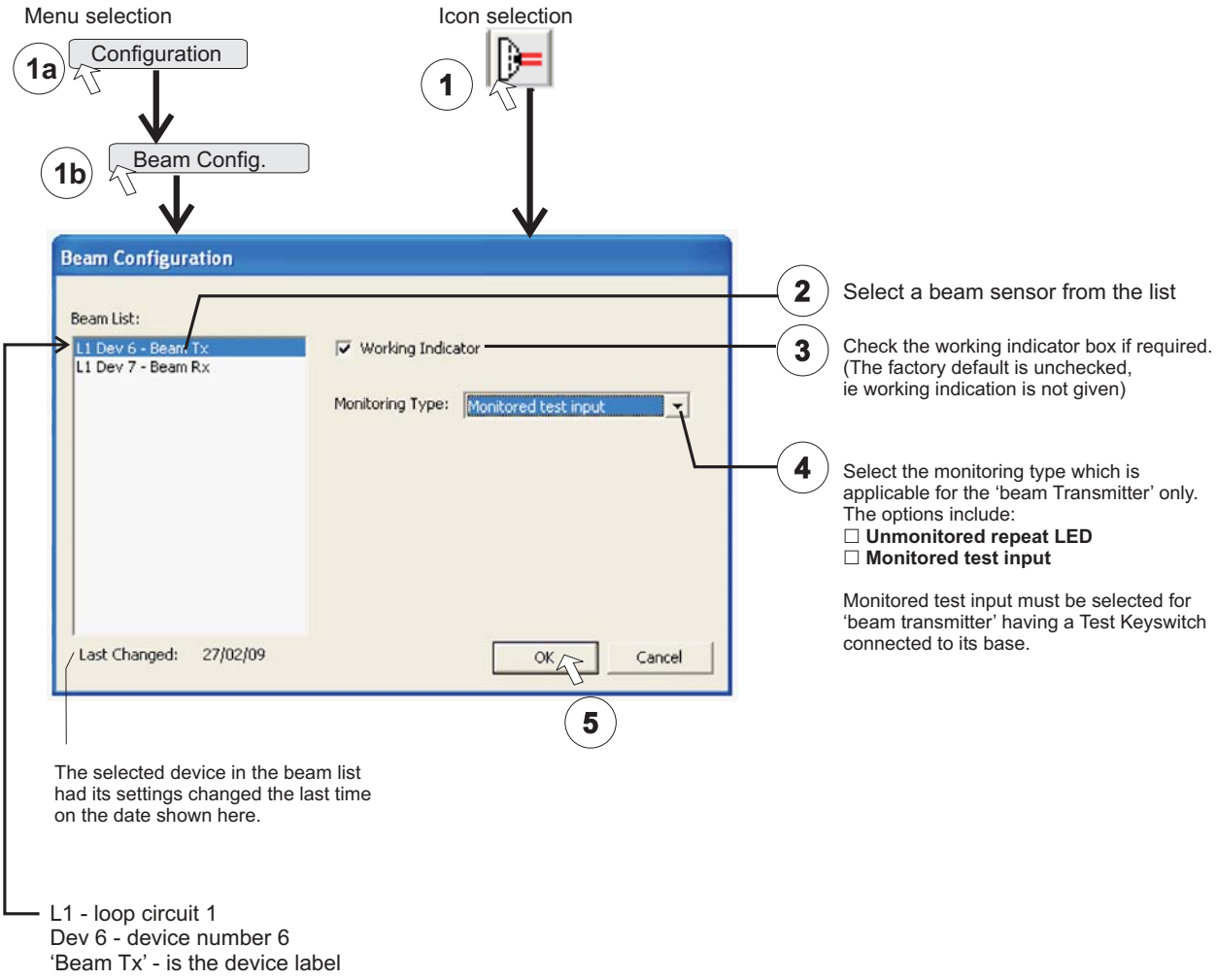


Floor level

Commissioning tool

Vigilon - Commissioning tool

The S4 Beam sensor pairs connected to the loop circuits of a Vigilon panel be configured using Commissioning tool (≥ V1.26). Ensure the 'working indicator' operation and 'monitoring type' are correctly configured for each beam sensor pair.



Nano - Commissioning tool

The Nano Commissioning tool V1.2 does not allow for 'working indicator' operation and 'monitoring type' functions.

Backward compatibility

The **S4 Programming tool** (S4-BASE-PROGRAM) and **S4 Programming Base Interface for S4 Beam sensor pair** software is used to convert an S4 Beam Sensor pair to be compatible with the older type 34740 Beam sensor pair.

1. You will need to program BOTH S4 beam transmitter and S4 beam receiver for backward compatibility.

2. When installing a backward compatible S4 beam sensor pair to replace an existing 34740 beam sensor pair you will also need to replace the brackets, use either S4-34741-01 (angle bracket) or S4-34741-03 (parallel bracket).

2. The monitored test input for test fire is NOT applicable on a S4 beam sensor pair that is made backward compatible.

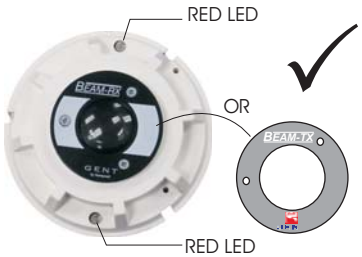
3. The sensor working indicator function on the backward compatible S4 beam sensor pair is NOT applicable.

4. The Autogain function button on a backward compatible S4 beam sensor pair is NOT applicable, use instead the Autogain function at the Control panel.

How to determine backward compatibility of S4-34740 Beam Sensor pair

Type 3 S4-34740 Beam Sensor pair

Before converting the S4-34740 beam sensor pair (Type 3) to a backward compatible beam sensor pair, check the type of beam sensor build installed in your system to ensure it is supported to accept a backward compatible S4-34740.



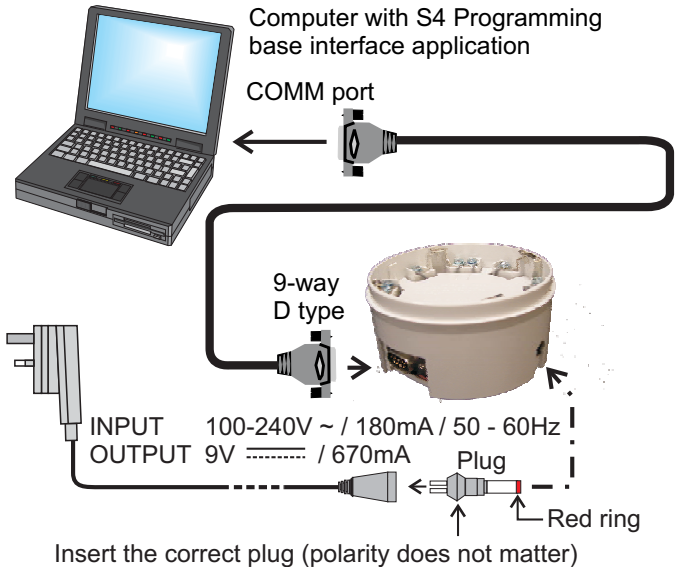
Supported Type 2 Beam Sensor pair build

With panel having **Local Controller Card & Loop Processor Card:**

- ☐ BS version equal to or greater than V3.40
- ☐ EN version equal to or greater than V4.00

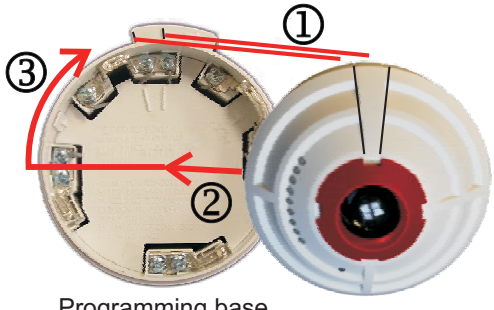
Not Supported Type 1 Beam Sensor pair build

How to connect the S4 Programming tool and how to fit a beam sensor to the tool



Insert the correct plug (polarity does not matter)

⚠ Damage will occur if you fail to align sensor markings to the markings on the programming base ①.



S4 Beam Programming Base Interface software

The S4 Beam programming base interface application can be downloaded from Gent Expert (http://gentexpert.co.uk/). Once the software is downloaded onto your computer simply **Run** the **setup.exe** of the application.

The installation of software will check to see if the computer has **.netframework 3.5 with Service pack 2** installed and will automatically install these from the internet if the computer is connected to the internet.

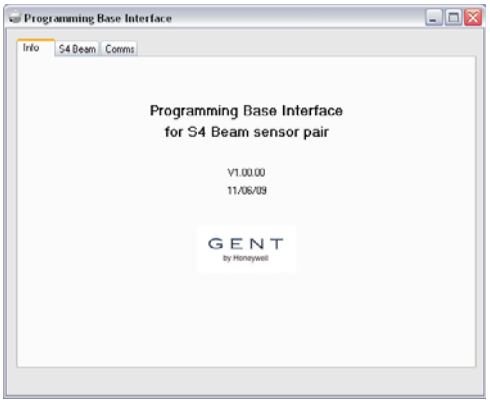
Allow sufficient time for the installation of *.netframework 3.5 with Service pack 2*, as this will take several minutes.

How to change the mode of an S4 Beam Sensor pair

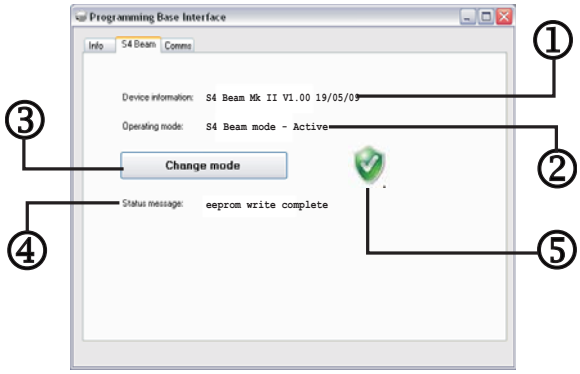
Using this programming tool and software application on your laptop you can change an S4 beam sensor pair to be backward compatible with 34740 beam sensor pair. The tool also allows conversion from a backward compatible S4 beam sensor back to its original factory set mode.

a. Ensure the S4 beam sensor is correctly and securely fitted into the programmable base. Connect the power and communication leads to the programmable base and computer as shown, then switch ON the mains power. Note the outside LEDs on the Beam sensor will flash on power up.

b. Click on the ***S4 Programming Base Interface*** icon on your desktop to run the application.



c. Click on the *S4 Beam* tab.



d. The *Device information* ① and *Operating mode* ② will provide a message once the device fitted to the Programming base is detected.

- The *Device information* ① will always read *'S4 Beam Mk II V1.00 19/05/09'*
- An original S4 beam sensor device will show its *Operating mode* as:
  'S4 Beam mode - Active' ②.
- A Backward Compatible S4 Beam sensor will show its *Operating mode* as:
  'Backward compatible Beam sensor - Active' ②.

e. Select the *Change mode* button ③ to switch the S4 Beam Sensor mode.

f. The *Status message* ④ will initially read '***Waiting for write confirmation***' and on completion of the configuration it will read '***eeprom write completed'*** followed by a  ⑤ to the right of the *Change mode* button ③. The *Operating mode* will show the respective compatibility message. A cross at ⑤ indicates failure to convert the beam sensor, so power down the programming base, remove the beam sensor from base and repeat steps **a.** to **f.** There is no need to power down the programming base to program the next beam sensor.

Notes

At the end of their useful life, the packaging, product and batteries should be disposed of via a suitable recycling centre and in accordance with national or local legislation.

WEEE Directive:
At the end of their useful life, the packaging, product and batteries should be disposed of via a suitable recycling centre.
Do not dispose of with your normal household waste. Do not burn.

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