

User Guide



EN

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www.ffeuk.com

Introduction

The Fireray Hub Reflective is a Modular Beam Detection System which allows three Reflective Detector Heads to be connected to its System Controller simultaneously. The Detector needs a 'Line of Sight' of a 1m (40 inches) clearance to align through.

Each Detector has its own dedicated Fire and Fault relay outputs. The Detectors are commissioned and monitored by the System Controller and each Detector has its own Event Log, the operation of which is described in the Event Log section of the manual.

The Fireray Hub Reflective can be powered from a +24 V DC 1 A power supply and a 2 core cable connects the Fireray Hub Reflective to each Detector (these cables should conform to local fire regulations).

The Fire and Fault contacts are voltage free and are wired back to the fire panel. The Fireray Hub Reflective System Controller should be placed with ease of service in mind.

Contents

In the Box p.4

General Information p.5

Wiring Information p.6-9

External Reset p.10

Mounting p.11

1. Apply Power p.12

2. Select Language, Date & Time p.13

3. Select Power Mode p.14

4. Find Detectors p.15

5. Alignment p.16

6. Settings/Settings Icon Functions p.17-19

7. Event Log p.20

8. Test for Fire and Fault p.21

9. System Controller Functions (Unlocked) p.22-23

10. System Controller Functions (Locked)..... p.24-27

11. Prism Targeting p.28

12. Manual Alignment p.29

13. Cleaning..... p.30

14. Error Codes p.31

15. Glossary of Terms p.32

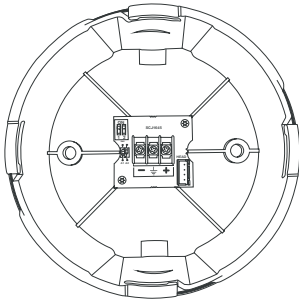
16. Technical Specification p.33

17. Open Source Notice p.34

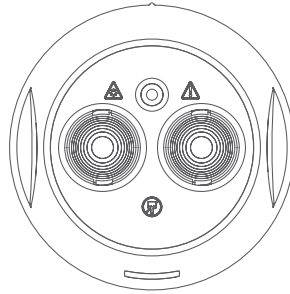
What you need to know:

- The default passcode to unlock the Fireray Hub Reflective is 1,2,3,4.
- The icon with the flashing square is the one which is active.
- To align a Detector, select the 'Target' icon. 
- Use the cursor keys to navigate through the menu. 

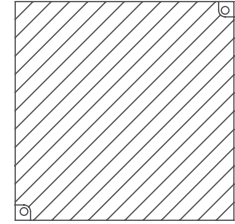
In the Box



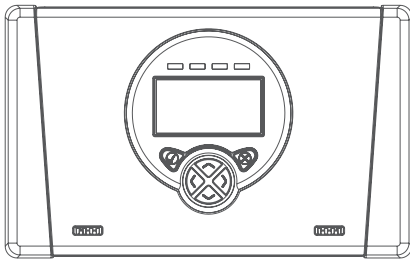
① Detector Base



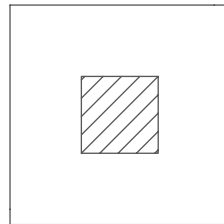
② Detector Head



③ Reflector(s)



④ System Controller



⑤ Short Range Mask

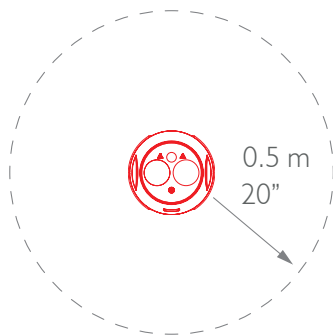


⑥ User Guide

General Information

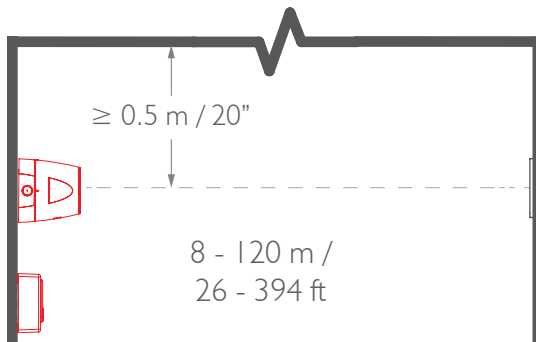
Installation

All installations should comply with local regulations.



Do NOT position the Detector where personnel or objects can enter the Beam path.

Do NOT install the Detector or Reflector in environments where condensation or icing are likely to occur unless preventative measures have been taken.



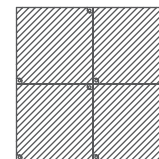
Position Beam as high as possible, but with a minimum distance of 0.5 m / 20" from Detector and Reflector to ceiling.



8 - 20 m / 26 - 66 ft =
1 Reflector + Short Range Mask



20 - 50 m / 66 - 164 ft = 1 Reflector



50 - 120 m / 164 - 394 ft = 4 Reflectors

Ensure the correct Reflector is selected for the appropriate distance.

Mount Detector and Reflector directly opposite each other.

Do not mount Reflector onto reflective surfaces.

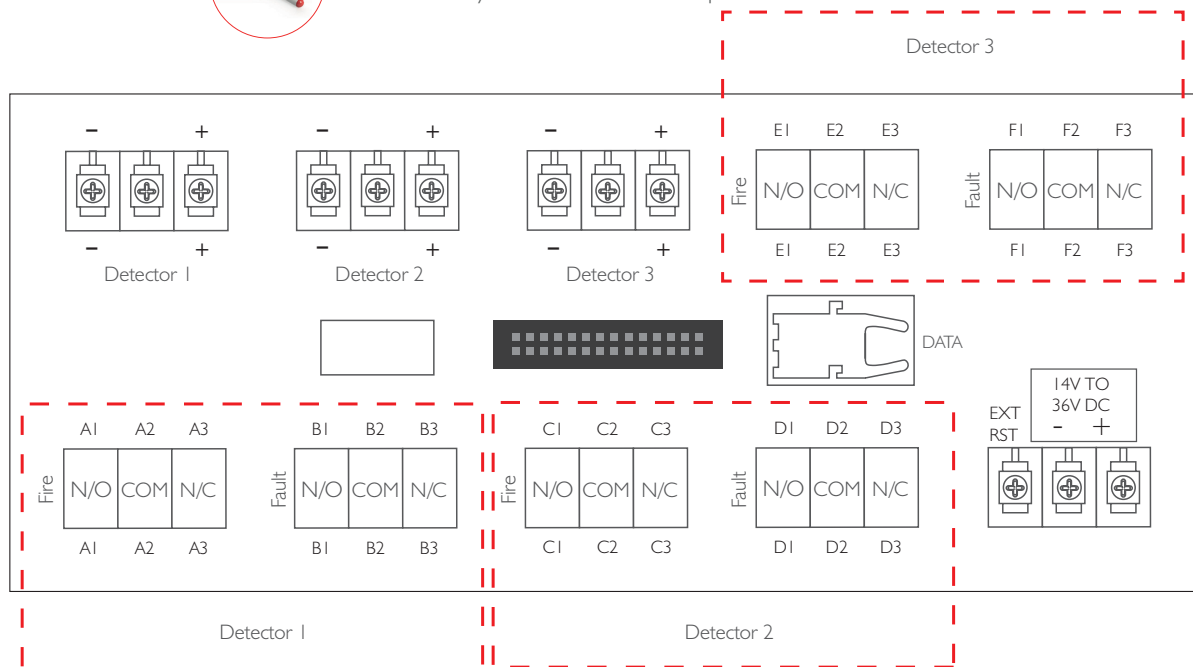
Wiring Information



To remove the System Controller cover, use a flat screwdriver to lever the catch in both slots.

Note: Reflective Detector Heads are connected to Detectors 1, 2 and 3 (first to Detector 1, second to Detector 2 etc.).

When the system is operating with no Fire or Fault condition the relay contacts marked 'N/O' will be open and the contacts marked 'N/C' will be closed. When the system is not powered the Fault relays will be in the 'N/O' position.

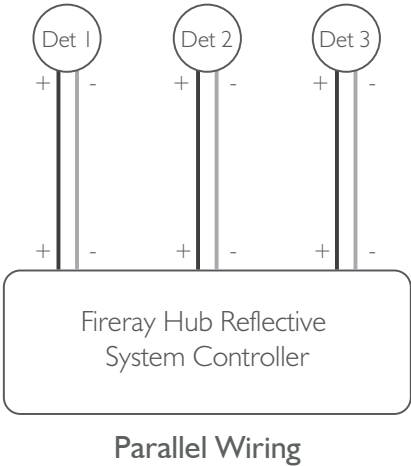
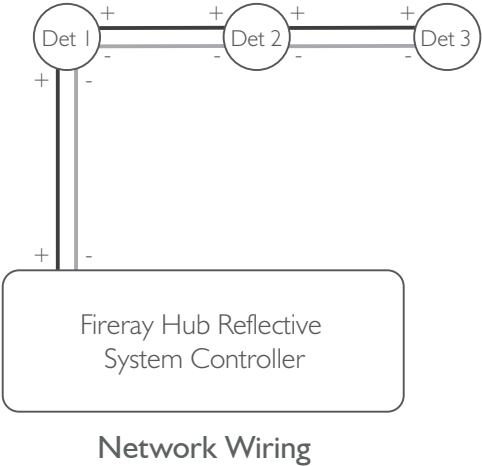


There can be up to 100 m (262ft) of cable between the Fireray Hub Reflective System Controller and the Reflective Detector.

The Fireray Hub Reflective System Controller can be wired to the Detectors in either Parallel or Network modes. If in Network mode, the address of the each Detector needs to be set, as shown in the table below, using the 2-way DIP switch found in the Detector Base. The Detectors will not be found correctly if two Detectors share the same address.

1	2	
OFF	OFF	Detector 1
OFF	ON	Detector 2
ON	ON	Detector 3

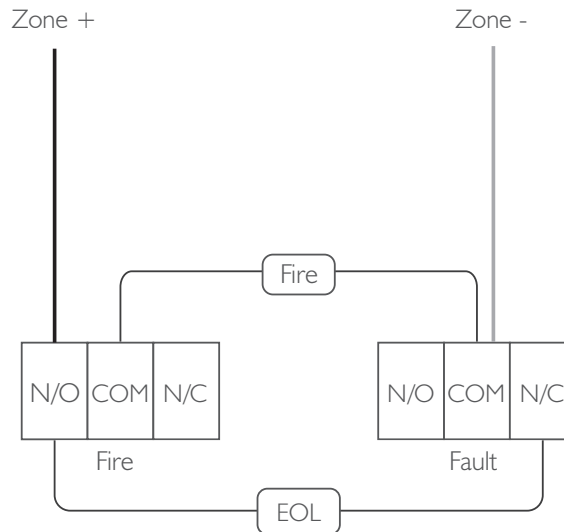
(Network Mode)



When using more than one Detector on a single zone of a conventional fire panel, it is important to choose the correct method of wiring. Incorrect wiring may result in a Detector isolating subsequent devices on that zone if it enters a Fault condition, and may prevent these subsequent devices signalling a Fire condition back to the fire panel.

When the system is operating with no Fire or Fault condition the relay contacts marked 'N/O' will be open and the contacts marked 'N/C' will be closed. When the system is not powered the Fault relays will be in the 'N/O' position.

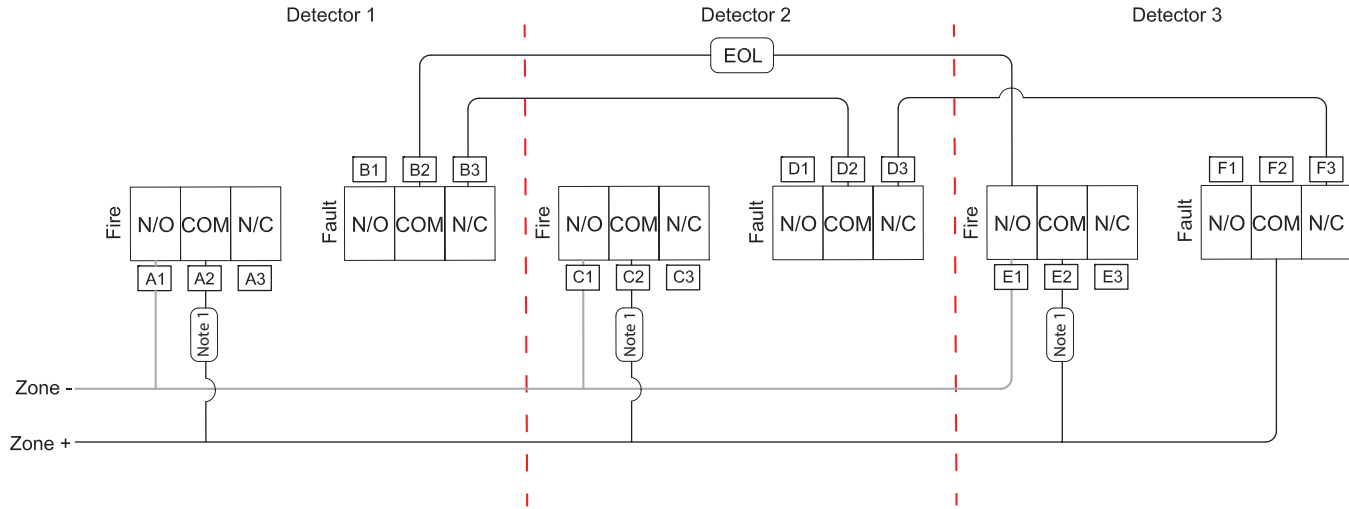
If the fire panel is addressable, the Fireray Hub Reflective System Controller should be wired to the switch monitor(s) using the same configurations as for the zone connections.



N/O = Normally open
N/C = Normally closed
COM = Common
EOL = End of Line

Fireray Hub Reflective wiring for 3 Detectors connected to 1 Zone

This wiring diagram provides an example of how to wire three (or any number of) Detectors to provide a common alarm and fault.



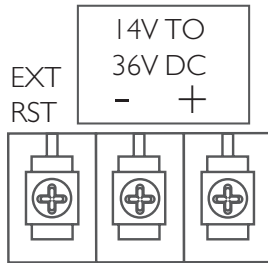
When the system is operating with no Fire or Fault condition the relay contacts marked 'N/O' will be open and the contacts marked 'N/C' will be closed. When the system is not powered the Fault relays will be in the 'N/O' position.

Components not supplied:

1. Fire Resistor ('Note 1') – value is specified by the FCP manufacturer. Not required in UL 268 (NFPA 72) installations and should be replaced with a jumper.
2. End Of Line ('EOL') component – supplied by FCP manufacturer

External Reset

If Latching Mode is selected then to clear a Fire condition, apply a voltage of between 5 V to 36 V to the EXT RST terminal for longer than 2 seconds.



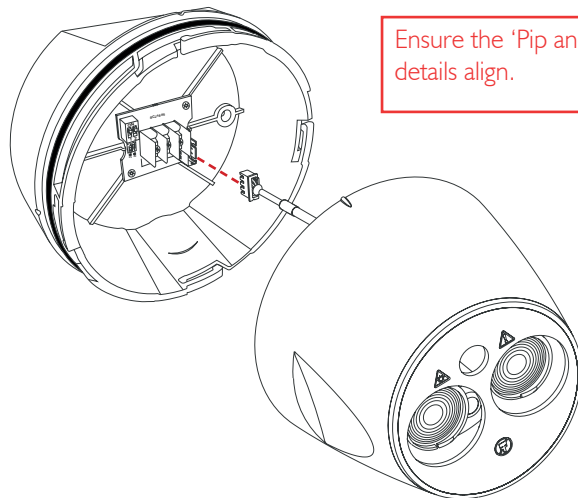
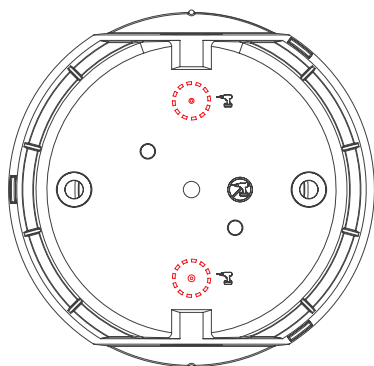
Mounting

Mount Base

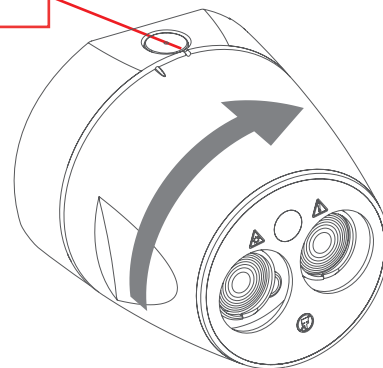
Mark and drill holes for mounting the base. Using appropriate hardware (not supplied) mount the base securely in orientation shown.

Plug the cable from the Detector Head into the connector on the PCB in the base.

Locate the Detector Head on the base. Grip sides of Detector Head and rotate clockwise to lock together.



Ensure the 'Pip and Dip' details align.

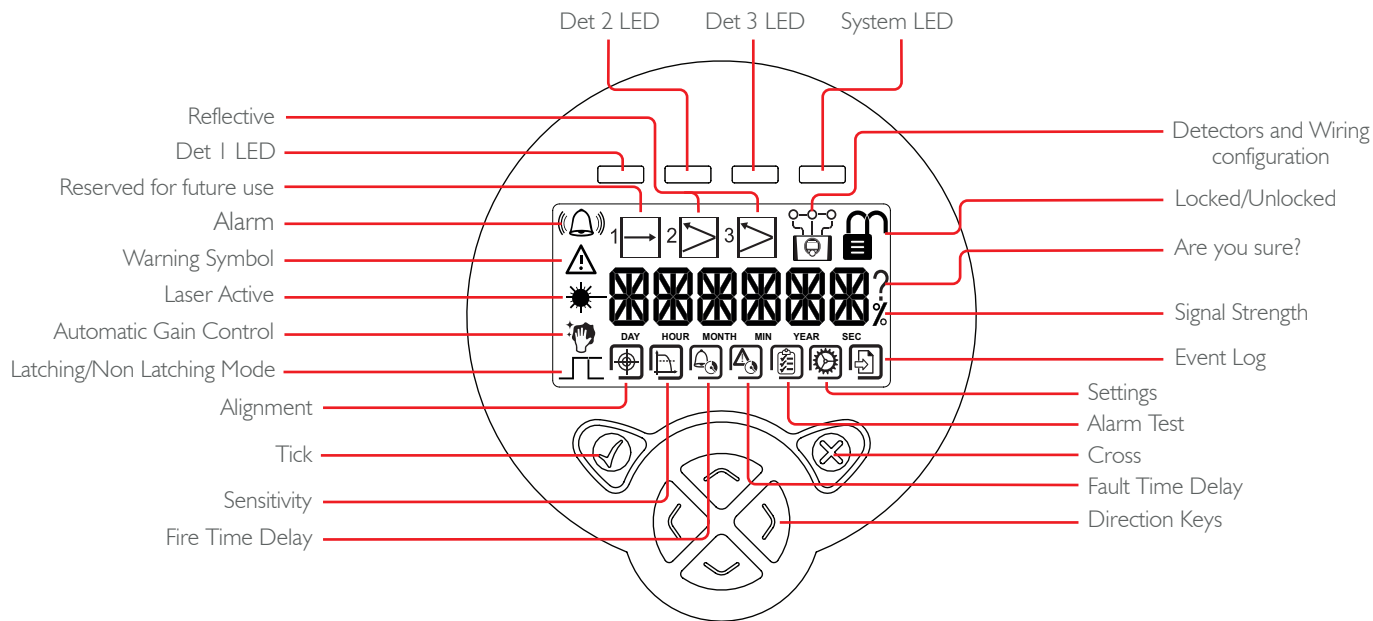


Ensure the base is mounted on solid surface such as a structural wall or girder. For mounting accessories please see our website.

All installations should be as per the latest version of BS 5839, NFPA 72 or local equivalent. There can be up to 100 m (262ft) of cable between the Detector and the System Controller.

I. Apply Power

All the LCD segments will momentarily light up, the screen will go blank and then the language selection menu will appear.



The Detector LEDs flash amber for Fault and red for Fire. The system LED is green when there are no Fires or Faults. Green LEDs flash every 10 seconds, red & amber LEDs flash every 5 seconds.

Press 'Tick' to activate the System Controller with a blank screen, to select a menu or to save a change. Press 'Cross' to exit a menu.

The display will 'time out' and go blank after a short period of time.

2. Select Language, Date & Time

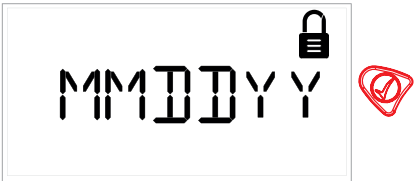
Set the language

This can be English, Italian, French, Spanish, German or Slovenian.
Use the 'Up' and 'Down' arrow keys to go through the languages,
then press 'Tick' to select.



Set the date format

Use the 'Up' and 'Down' arrow keys to choose between
'DDMMYY', 'YYMMDD' and 'MMDDYY', then press 'Tick'
to select.



Set the date and time

Use the 'Up' and 'Down' arrow keys to change the value of each
item and the 'Left' and 'Right' arrow keys to move between items.
Press 'Tick' to save the 'Date' and 'Time' settings.

YEAR22

Set Year

MNTH

Set Month

DAY 01

Set Day

HOUR

Set Hour

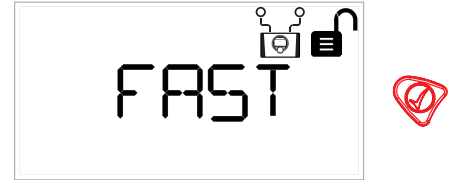
MIN 00

Set Minute

3. Select Power Mode

Use the 'Up' and 'Down' arrow keys to choose between 'Fast Alignment' (33 mA) and 'Standard' (5 mA), and press 'Tick' to select.

Note: 'Fast Alignment' mode is recommended. When Standard mode is selected the LCD backlight will not switch on.



4. Find Detectors

Select 'Find' by pressing the 'Tick' key, this will find the number of Detectors and the wiring configuration of the Detectors that are connected to the System Controller.

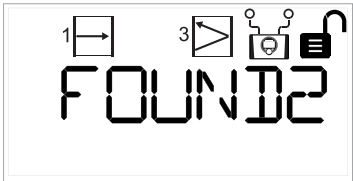
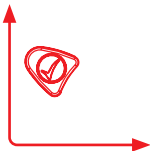
The number of Detectors will be displayed after a count down of 60 seconds. The wiring configuration (Parallel or Network) will also be displayed. Press the 'Tick' key to confirm.

Note: If you are using Network mode, you need to set the address of each Detector as shown in the table below.

1	2	
OFF	OFF	Detector 1
OFF	ON	Detector 2
ON	ON	Detector 3

(Network Mode)

The 2 way DIP switch is found in the Detector Base.

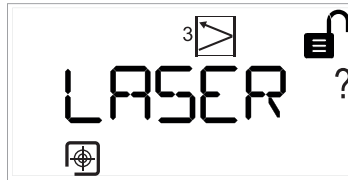


5. Alignment

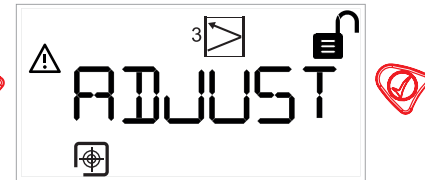
Select the Detector to be aligned by using the 'Left' and 'Right' arrow keys. The flashing icon is the one that is selected.



Press 'Tick' to select the Detector to align, press 'Tick' again to unlock the Controller by entering the passcode. The default passcode is 1,2,3,4.



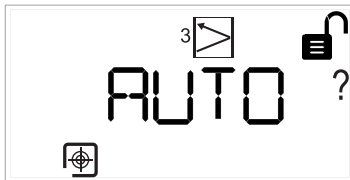
Press the 'Left' and 'Right' arrow keys to select the 'Targeting' icon, and press the 'Tick' key. Press the 'Tick' key again to switch on the laser.



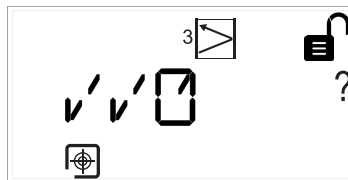
Use the arrow keys to guide the laser onto the Reflector(s). Press the 'Tick' key to confirm. Note: the laser just needs to be on the Reflector(s), it is not necessary to position it precisely.

If the laser cannot be seen, for example in very bright environments or over long distances, then prism targeting mode can be used.

See Section 11: Prism Targeting.



Press the 'Tick' key to select the 'Auto' alignment option.



The Detector is aligning.



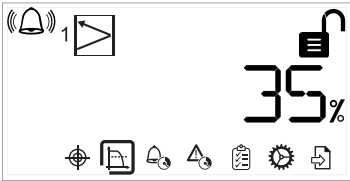
When the alignment process succeeds, 'Aligned OK' will be shown.

The Detector can now be configured for sensitivity, time delays to Fire and Fault and latching alarm mode. The default settings are 35% sensitivity, 5 second time delay for Fire, 10 second time delay for Fault and non-latching alarms. If the Detector will not align after several attempts, see **Section 12: Manual Alignment.**

6. Settings

With the Beam aligned you have access to the following functions. Move between functions using the 'Left' and 'Right' arrow keys and press the 'Tick' key to confirm your selection. Values can be changed by pressing the 'Up' and 'Down' arrow keys and confirmed by pressing the 'Tick' key.

Sensitivity



Sensitivity ranges are 25%, 35%, 55% and 85% (upper and lower limits 10% and 85%). 35% is the default. The signal must drop **by** this value (and remain there for the time delay to Fire) to go into a fire condition.

Alarm Test



Alarm test will perform a Fire relay test. Press the 'Tick' button twice.

Note: The fire panel will go into alarm, so make sure it is safe to test. For EN 54 installations the Alarm Test should only be used to prove connection to the fire panel; for UL 268 installations the Alarm Test is acceptable for Fire Authority Acceptance and Routine Maintenance per UL 268.

Time Delay to Fire



The time delay to Fire can be set between 2 and 30 seconds. 5 seconds is the default value. Note: The unit is approved to EN 54-12 with 5 seconds delay to fire.

EN 54-12 Threshold Selection:
Only the 25% and 35% thresholds are approved. Both are suitable for separations of 8 m to 120 m.

Time Delay to Fault



The time delay to Fault can be set between 2 and 30 seconds. 10 seconds is the default value.

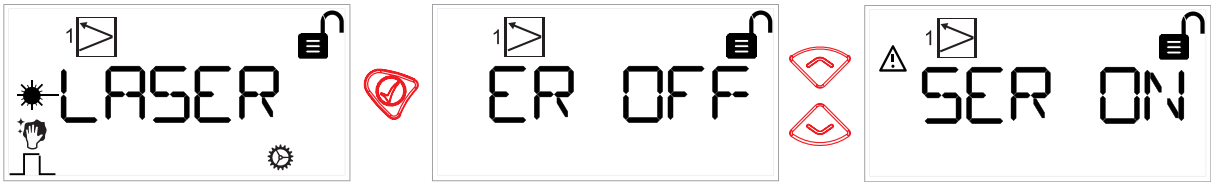
UL 268 Threshold Selection: Select the correct threshold for the installed distance:

Separation between Detector and Reflector	Acceptable Alarm Thresholds
<25 ft (<7.5 m)	25%
25 – 55 ft (7.5 – 16.5 m)	25%, 35%
55 – 110 ft (16.5 – 33.5 m)	35%, 55%
110 – 175 ft (33.5 – 53 m)	55%, 85%
175 – 394 ft (53 – 120 m)	85%

Detector Settings

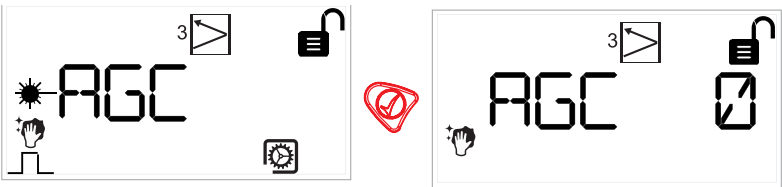
Select the 'Settings' icon and press the 'Tick' key to access the settings functions.

Laser



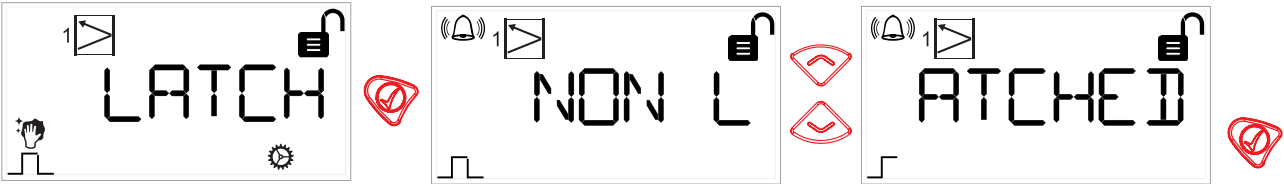
Use the 'Up' and 'Down' arrow keys to switch the Detector laser on and off.

AGC (Automatic Gain Control)



This shows the AGC value. It can be **between -50 & +205**. A positive value indicates that the signal has been dropping, a negative value indicates the signal has increased (**see section 14, cleaning**).

Latching alarm modes

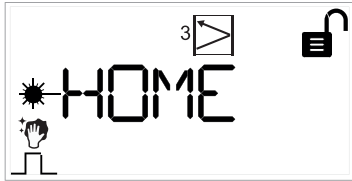


Non-Latching (default) mode

Latching mode

When latched, the Detector can be reset in three ways, entering the passcode, using the Ext Rst function or by power cycling the Controller. Latching mode cannot be enabled when Ganged Relay Mode is selected (see page 22)

Home



Resets the Beam to its default position prior to alignment. This will reset the Detector to an unaligned state.

Set Compensation



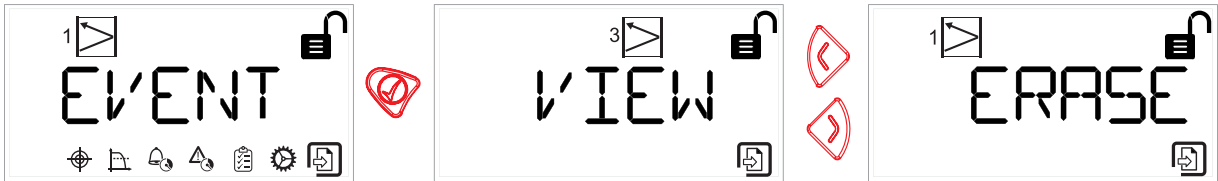
In order to test the obstruction fault detection after aligning a Detector, the Reflector should be covered quickly (clear to covered in under two seconds). The Detector should go into Fault after the 'time delay to fault' period.

If the Detector goes into Fire instead then it is likely that there are stray reflections entering the Detector and preventing the signal from dropping to the fault threshold. This can be overcome by using the Set Compensation feature. This will tell the Detector that the previously recorded Fire should have been a Fault, allowing the Detector to compensate for the stray reflections.

This feature can only be used once after the Detector is aligned. Repeating the obscuration test should then result in a Fault being indicated.

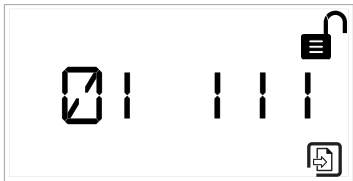
7. Event Log

The Event Log allows you to access up to 50 events related to the selected Detector.



By selecting 'View' and pressing the 'Tick' key the events can be viewed. Use the 'Up' and 'Down' arrow keys to step through the Event Log, or 'Left' and 'Right' to scroll between events. Selecting erase will clear the event log.

The first event

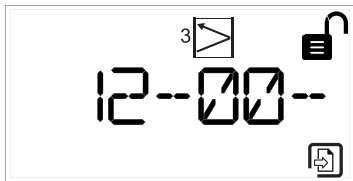


Event number followed by the event code

Event information



Time the event occurred



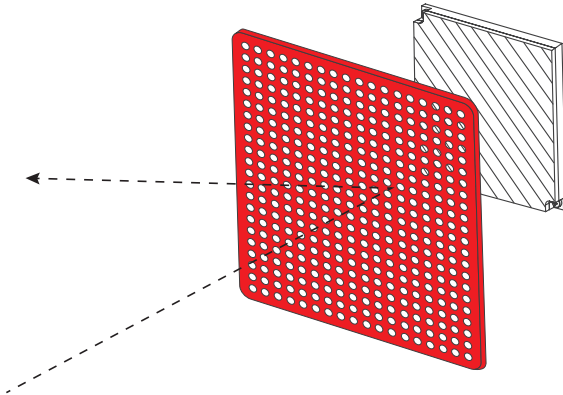
Date the event occurred



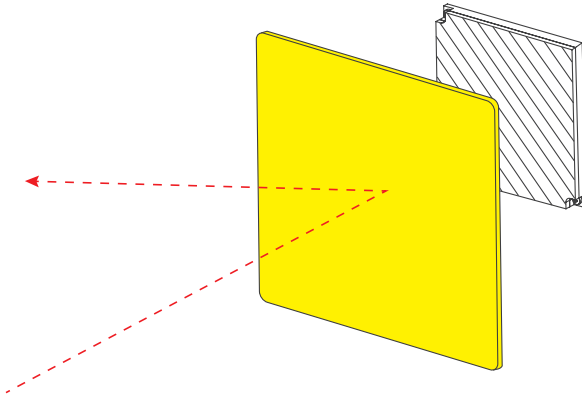
8. Test for Fire and Fault

After installation or cleaning, it is recommended that a Fire and Fault test is performed.

Fire test: Cover the Reflector with the perforated filter from the Commissioning and Maintenance Kit (1150-000). The Detector will indicate Fire after the 'Time Delay to Fire' period (5 seconds by default). If the perforated filter is not available, cover the Reflector slowly so that it takes longer than 5 seconds to cover.



Fault test: Cover the Reflector completely within 2 seconds. The Detector will indicate Fault after the 'Time Delay to Fault' period (10 seconds by default). If the Detector goes into Fire instead then it is likely that there are stray reflections entering the Detector and preventing the signal from dropping to the fault threshold. This can be overcome by using the Set Compensation feature (see page 19).



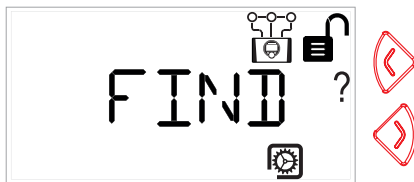
Note: Commissioning and Maintenance kits are available to order. (See page 30).

9. System Controller Settings (Unlocked)

With the System Controller locked, select the Lock icon, press 'Tick' key and enter the 1,2,3,4 passcode to unlock the System Controller.

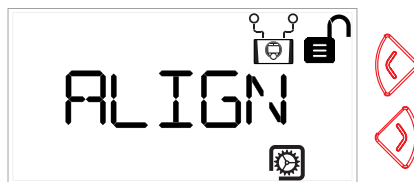
To access the System Controller settings, select the System Controller icon and press the 'Tick' key. Then select the Settings icon and press the 'Tick' key. Press the 'Right' and 'Left' arrow keys to step through the options. Press the 'Tick' key to select the setting to be changed.

Find Detectors



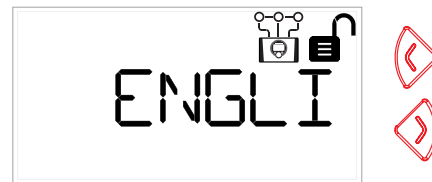
Repeats the find process.
See page 15.

Align Mode



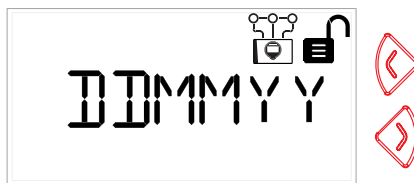
Selects the alignment mode.
See page 16.

Language



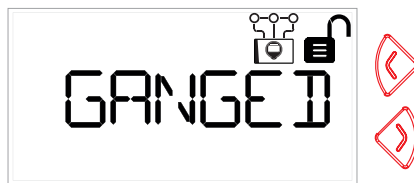
Selects the language. See page 13.

Set Time



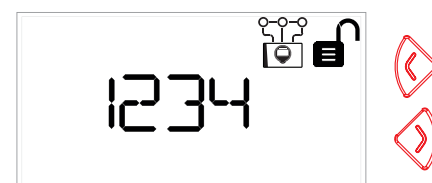
Sets the time and date.
See page 13.

Relay Mode



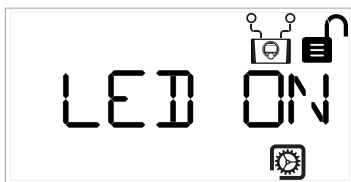
Use the 'Up' and 'Down' Keys to select between the four possible options: 'Indiv', 'Ganged Fire', 'Ganged Fault' and 'Ganged'. This selects whether the relays work independently or together.

Passcode



Change passcode if required,
default: 1,2,3,4.

Status LEDs



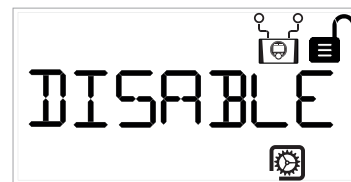
System Controller LEDs On/Off.

Detector Temperature



Use the 'Up' and 'Down' keys to switch between Centigrade and Fahrenheit.

Optical Comms



Reserved for future expansion.

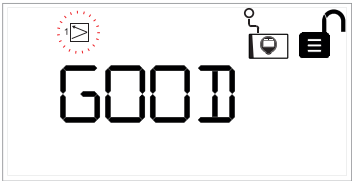
Log Mode



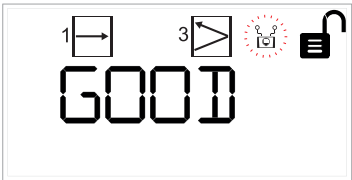
Event Log On/Off (on by default).

10. System Controller Functions (Locked)

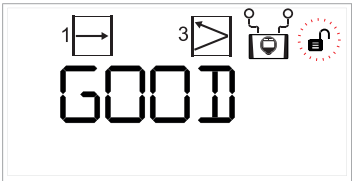
With the Beam aligned (and not in Fault), the System Controller will display the following **without** entering the passcode. With a blank screen, press the 'Tick' button. This will display the word 'Good' and the number and type of Detectors connected to the System Controller.



To access the Detector Settings, select the Detector you want to check and press the 'Tick' key. See page 25 for details.



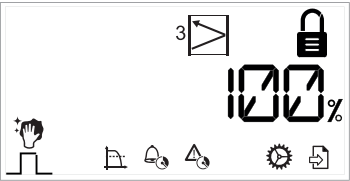
To view the System Controller Settings, select the Controller Icon and press the 'Tick' key. See page 27 for details.



To unlock the Controller, select the Padlock Icon and press the 'Tick' key.

Detector Settings

Detector Signal Strength



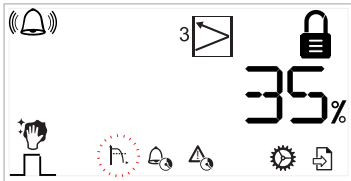
e.g. 100%

AGC Value



e.g. 2

Alarm Theshold



Graph icon flashing.

Time Delay to Fire



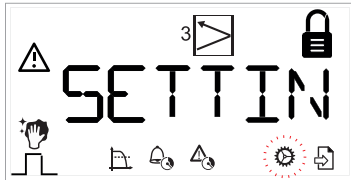
Bell icon flashing.

Time Delay to Fault



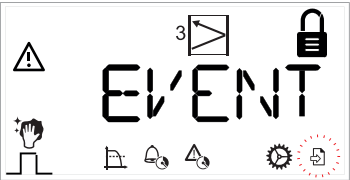
Triangle icon flashing.

Settings



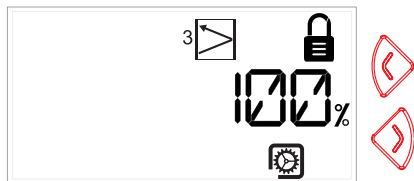
Cogwheel icon flashing. Press the 'Tick' key to access more Detector Settings screens (see next page).

Event Log



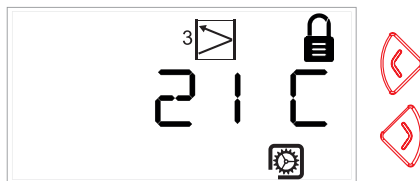
Press 'Tick' to view. (See Section 7)

Detector Signal Strength



e.g. 100%

Detector Temperature



e.g. 21°C

Address Switch



e.g. 1,2 or 3

System Controller settings (locked)

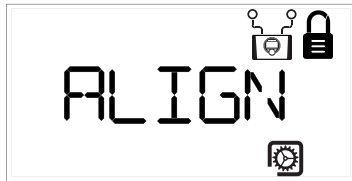


With the cogwheel icon flashing, press the 'Tick' key to view the Controller Settings below. Pressing the 'Tick' key on any screen will take you to the passcode entry screen so that you can unlock the Controller and change the Settings. **(See Section 9)**



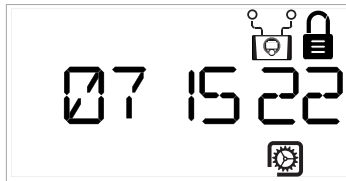
With the Event Log Icon flashing, press the 'Tick' key to view the log. **(See Section 7)**

Align Mode

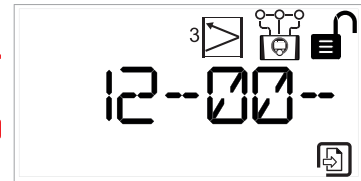


'Fast Align' (33 mA) or 'Standard' (5 mA)

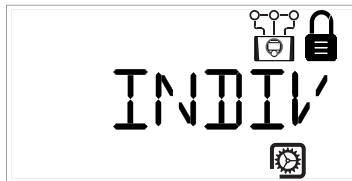
Date



Time

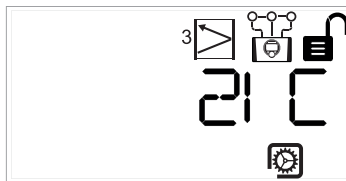


Relay Mode

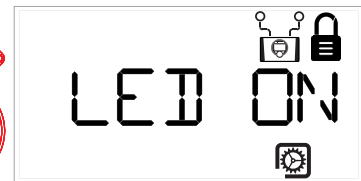


'Indiv', 'Ganged Fire', 'Ganged Fault' or 'Ganged'.

Temperature



Status LEDs



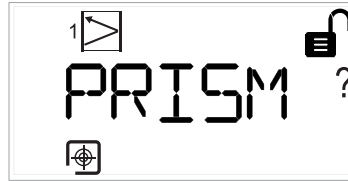
System Controller LEDs On/Off.

11. Prism Targeting

Prism Targeting should only be used when the laser cannot be seen, for instance in high ambient lighting conditions or over very long distances.



Press 'Tick' to select the Detector to align, press 'Tick' again to unlock the Controller by entering the passcode. The default passcode is 1,2,3,4.



Press the 'Left' and 'Right' arrow keys to select the 'Targeting' icon, and press the 'Tick' key. Press the 'Down' key to select Prism Targeting. Press the 'Tick' key again to confirm.



Use the arrow keys to move the Detector in one axis until the number displayed increases. If the number stays the same, keep going in the same direction. If the number decreases, then reverse direction. Once the number starts to increase, keep going until the number starts to decrease again, at which point reverse the direction for two steps and perform the same process in the other axis.

If Prism Targeting has been performed on both axes, and the number is above 400, cover the Reflector(s) with a non-reflective material and check the signal drops to less than half the uncovered value. If the signal does not drop then the light received by the Detector is being reflected by some other object in or around the beam path. Take care to make sure there are no reflective objects within 0.5 m of the centre of the beam path, and try again.

When the number is as high as possible and drops by over half when the Reflector is covered, press 'Tick' to complete the process. If the number is below 400 then ensure the following:

- The correct number of Reflectors for the range has been used
- The distance has not exceeded the maximum (120 metres)
- The Reflector and Detector are parallel to each other

12. Manual Alignment

After completing the Laser Targeting process as described on page 16, use the 'Down' key to switch from 'Auto' to 'Manual' and press the 'Tick' key to confirm.

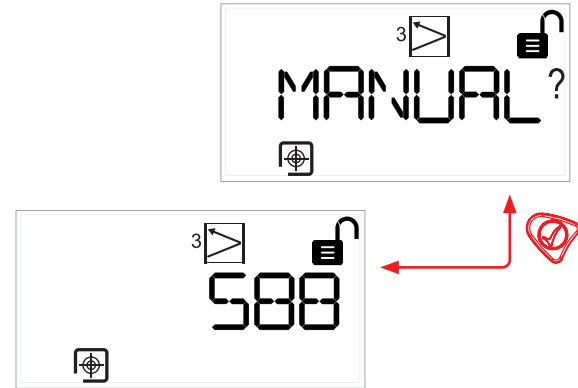
Use the arrow keys to move the Detector in the up-down axis. First, use the 'Down' key. Press it once, and wait to see how the number on the display changes. If the number decreases, the signal is smaller and the Detector has moved away from the Reflector(s). Using the arrow keys, reverse direction for 2 steps. If the number increases, the signal is larger and the Detector is moving closer to the Reflector(s). The next movement must be in the same direction. Keep moving the Detector, and:

- If the number continues to increase, keep going in the same direction.
- If the signal does not change, no further movement in that axis is needed so move onto the other axis.
- If the number decreases move back in the opposite direction once, then move onto the other axis

Follow the same process, this time in the left-right axis. Start by moving in the left direction, and follow the same procedure as for the up-down axis.

Once the highest value possible has been obtained (should be over 400) cover the Reflector(s) with a non-reflective material and check the signal drops to less than half the uncovered value. If the signal does not drop then the light received by the Detector is being reflected by some other object in or around the beam path. Take care to make sure there are no reflective objects within 0.5 m of the centre of the beam path, and try again.

When the manual value is as high as possible and drops by over half when the Reflector is covered, press 'Tick' to complete the alignment.

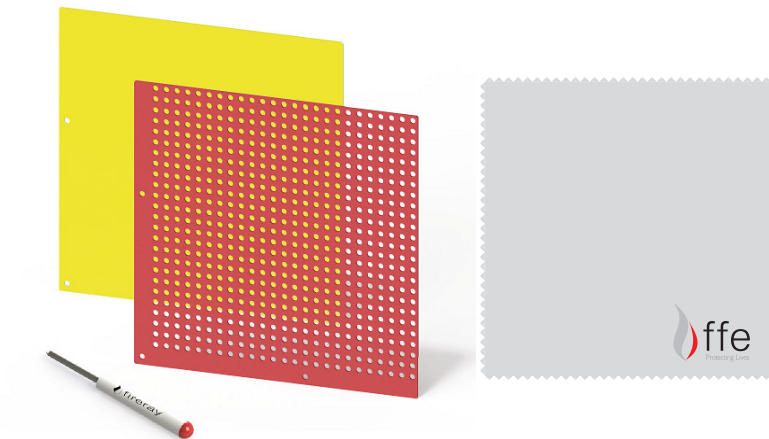


13. Cleaning

The Detector will automatically compensate for dust build up by changing its AGC (Automatic Gain Control) level. This feature keeps the Beam's signal at 100% +/- 2%. Once the maximum or minimum limit (-50 & +205) has been reached, the Detector will indicate a Fault and cleaning must be performed.

It is recommended that the Detector lens window and Reflector are periodically cleaned with a soft lint-free cloth to prevent AGC limit faults occurring.

After cleaning, if the Detector is in a Fault state, the signal strength may have increased above the 'signal too high' threshold. If this is the case, re-align the Detector.



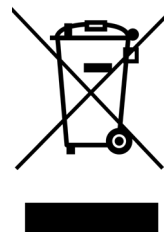
Note: Commissioning and Maintenance kits are available to order. Includes cleaning cloth. Part No: 1150-000.

I4. Error Codes

E-00	AIM not communicating.	Refer to manufacturer for further technical assistance.
E-01	Detector Communications Fault.	Check wiring between Controller and Detector.
E-02	'Find' not successfully executed.	Follow 'Find' process.
E-03	Compensation limit reached.	Clean and re-align system.
E-04	Missed too many readings.	Check power supply to the Controller and wiring between Controller and Detector.
E-05	Detector is not aligned.	Follow alignment procedure.
E-06	Rapid Obscuration Fault.	Ensure clear line of sight between the Detector and the Reflector.
E-07	Signal High Fault.	Ensure there is no stray light from another source.
E-15	Signal too low at end of alignment.	Ensure clear line of sight between the Detector and the Reflector.
E-16	Signal too high at end of alignment.	Follow alignment procedure again. Do not exit the alignment process before it has finished.
E-18	Short circuit detected on communications between Controller and Detector.	Check wiring between Controller and Detector.
E-19	IR signal integrity fault.	Check there are no strong sources of light near the Detector, or direct sunlight.
E-20	Ambient light fault.	Check there are no strong sources of light near the Detector, or direct sunlight.
E-21	Power too low fault.	Check power supply to the Controller.
E-26	Internal controller fault.	Refer to manufacturer for technical assistance.

For help contact Technical@ffeuk.com or visit our website at www.ffeuk.com

Equipment Disposal



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: www.recyclethis.info.

I5. Glossary of Terms

AGC: Automatic Gain Control: This function keeps the Beams signal at 100% ($\pm 2\%$) and can boost or reduce the signal as required. (Limits -50 to $+205$).

Power Mode: Can be Fast align (33 mA) or Standard align (5 mA).

Relay Mode: This can either be Individual (meaning the relays work independently of each other) or Ganged, where all Fire and Fault relays work as one.

Fault/Trouble: For the purposes of this manual, the term 'Fault' should be considered equivalent to 'Trouble' in those markets where this is the preferred term.

16. Technical Specification

Firearay Hub Reflective - Reflective Detectors Parameters	Min	Typical	Max	Unit
Operating Voltage	14	-	36	V
Operating Current	4.5	5.0	5.5	mA
Operating Current – Alignment Modes	31	33	35	mA
Response Thresholds (25%, 35%, 55%, 85%) (note – only 25% and 35% are EN 54-12 approved)	1.25 25	1.87 35	8.24 85	dB %
Delay to Alarm. Note: The Firearay Hub Reflective is approved to EN 54-12 with a delay to fire of 5 seconds	2	5	30	s
Delay to Fault	2	10	30	s
Operating Distance (Separation between Detector and Reflector) (4 Reflectors required for >50 m, >164 ft)	8 26	-	120 394	m feet
Rapid Obscuration Fault Threshold	-	85	-	%
Maximum angular alignment range of Detector	-	-	±4.5	Deg
Tolerance to beam misalignment (per EN 54-12) – Detector	-	±0.5	-	Deg
Tolerance to beam misalignment (per EN 54-12) – Reflector	-	±5	-	Deg
Optical Wavelength	-	850	-	nm
Operating Temperature	-10 +14	-	+55 +131	°C °F
Storage Temperature	-40 -40	-	+85 +185	°C °F
Relative Humidity (non-condensing)	-	-	93	%RH
IP rating	-	IP55*	-	-
Fire & Fault Relays (VFCO, Resistive) - Contact voltage	-	-	30	V DC
Fire & Fault Relays (VFCO, Resistive) - Contact current	-	-	2	A
Cable gauge	22 0.5	- -	14 1.6	AWG mm
Housing flammability rating	-	UL940 V0	-	-

* IP rating is not EN54 approved

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