



Installation and User Manual

TAKE CONTROL 



Features:

- ATEX/IECEx Zone 1 and Zone 21 certified for use in explosive gas and dust areas. (Certificate:- Baseefa11ATEX0005)
- Multiple sensor / multiple light configurations are possible
- Microwave Doppler technology
- Ambient light level sensor
- Adjustable switch on time
- Adjustable sensitivity and detection range
- ATEX Certified Remote control programmer (Certificate:-Baseefa03ATEX0187)
- 110 / 230Vac operation or 24Vdc operation
- 10A direct relay output
- Control input 12/24Vdc to override the detection sensor

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Description

The Ex-Mo comprises of an Ex d enclosure, containing an electronic assembly. All field and customer wiring is to the Ex d enclosure and the cover of the Ex d enclosure is only removed for commissioning and periodic adjustment. Detailed instructions on the wiring, first time use and normal operation of the system are described in this Manual

Normal Use

The Ex-Mo normally operates within a Hazard Zone 1 / 21. All electrical signals to and from the unit are protected by suitable cables, glands and conduits. In normal use the unit emits a signal and receives a reflection from an object. By this means it can determine whether to switch the relays to control lighting or alarm triggers.

Installation and Calibration

The Ex-Mo must be installed and commissioned by suitably trained personnel. Normally, the unit is mounted and wired to a fixed position on a building; if this is not the case then specific instructions will be provided. The user is required to make electrical connections to their systems according to the wiring instructions in this Manual using suitable cables and connection components. No changes to the equipment or the wiring instructions are permitted. Following connection, and with no hazard present, the unit may be powered up to adjust the sensitivity and other settings. If the electronics are set to “Remote Control” use, the glass cover lid may be fitted and the unit sealed for hazardous operation while still allowing adjustment via the remote control through the window.

Maintenance

The cover on the Ex d enclosure must not be removed when a hazardous atmosphere is present. The unit must be left for 30 minutes with power off before the cover is removed. With access to the instrument, it is possible to modify the configuration according to this Manual. In the event of suspected damage to the electronic assembly, the circuit boards can be unclipped and removed. The internal chassis plate carrying the instrument can be removed by unscrewing the rear terminal connectors from the power circuit board, removing the circuit board, unscrewing the securing fixings, and removing. The instrument should be packed in antistatic material and sent to the Manufacturer for evaluation. No part of the equipment is user-serviceable.

Zone of Operation

The Ex-Mo can be used hazardous area Zone 1 where a hazardous atmosphere is likely to occur occasionally. The equipment must not be installed in a Zone 0 area. The enclosure is protected to a liquid ingress rating of IP66 - it is dust-tight and can withstand liquids exposure equivalent to heavy seas, if the Ex d enclosure lid threads are liberally coated with a conductive lubricant.

Safety Instructions

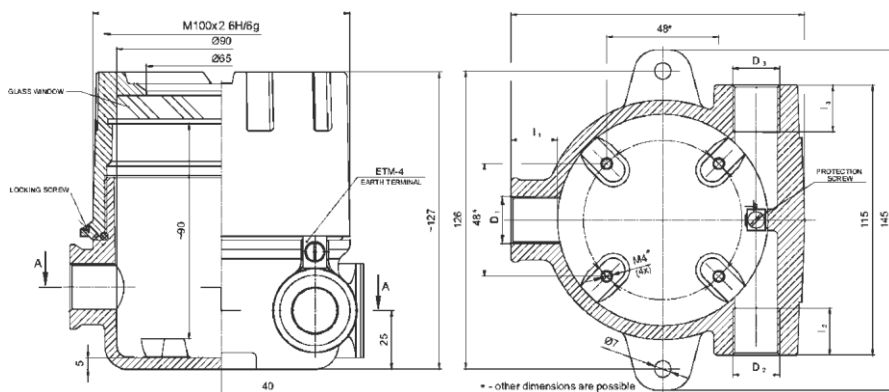
The equipment must be installed by skilled electricians or instructed personnel in accordance with National Legislation and relevant technical standards.

The equipment must NOT be operated in Zone 0 hazardous area. The technical data listed on the enclosure label must be observed. Changes to the design of the equipment are not permitted.

The equipment shall only be operated as intended and only in an undamaged condition. No parts of the equipment are user-serviceable.

Physical Description

Overall Size	145 x 132 x 129
Weight	2.5kg (Ex d enclosure), 1.5kg (Aluminium enclosure)
Material	Aluminium in yellow chemical resistant paint (outside only) or 316L Stainless Steel
Equipment rating	IP66 – Ex d enclosure lid threads liberally coated with conductive lubricant
Earth point	Right hand side M5 internal/external bolt (provided)
Cable entries	In the Ex d enclosure base. Unused entries must be plugged with Ex d certified plugs.



Applications

This unit can provide energy saving by automatically switching off lights in areas that are unoccupied.

- Movement detection in remote working areas, remote sites.
- Control lighting in infrequently used spaces.
- Alerting control centre; Detecting: people / vehicles / other moving objects.

Operation

Sensing movement by microwave, the Ex-Mo will switch on the lights for a period of time while the area is occupied. Roof or wall mounted with the optional adjustable bracket, several Ex-Mo units can be paralleled to obtain a large area of coverage controlling the same lighting circuit. Alternatively, several lights can be controlled from one sensor up to the maximum 10A current. Ex-Mo can operate a higher rated external contactor if required, or supply a signal to an energy management system.

Adjustable on-time from 5 minutes to 60 minutes and adjustable range sensitivity. Operating with a range of 15 to 20 metres.

Connections

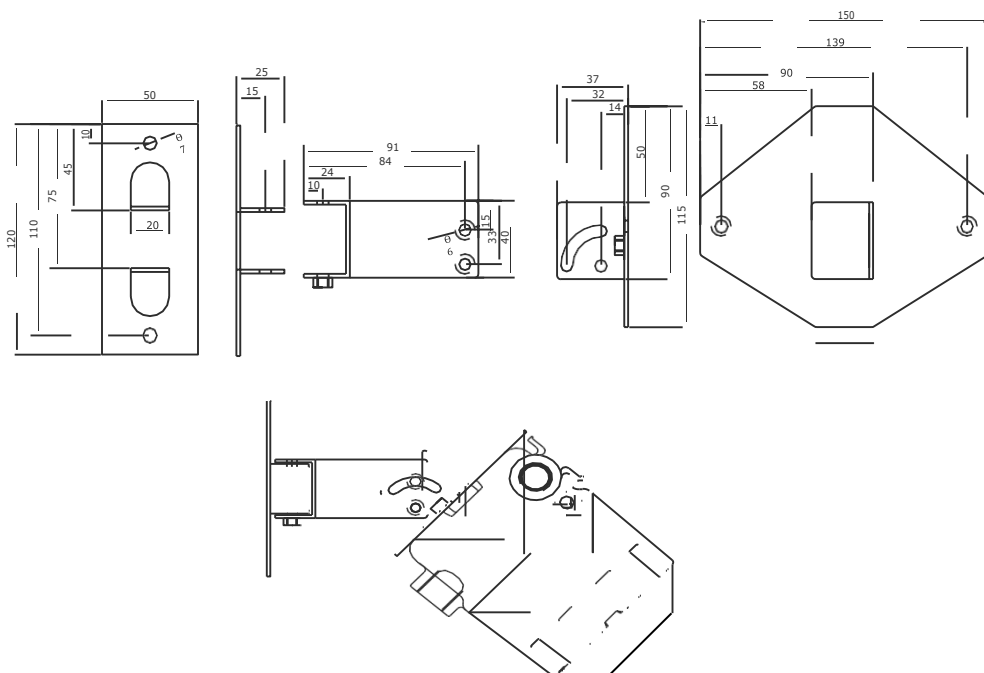
ATEX / IECEx approved cable glands, entry blanking plugs and correctly sized cable are mandatory for the use of this equipment in hazardous areas. All these products are available on request.

Power supply

The standard Ex-Mo is powered by mains 230Vac or alternatively we can offer 110Vac or 24Vdc as a factory supplied option. This information is usually supplied when ordering the Ex-Mo.

Ex-Mo Mounting Bracket

Manufactured from 3mm stainless steel. M6 clinch nuts throughout.



Coverage

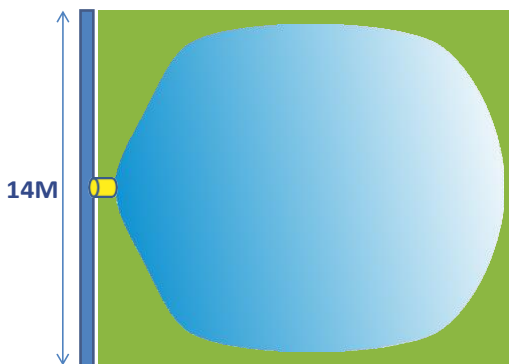
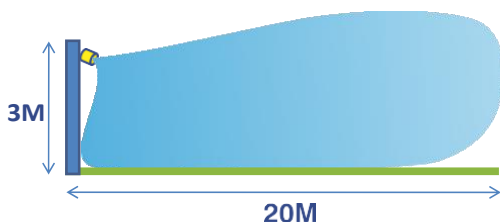
Ex-Mo has a coverage pattern of $\sim 72^\circ$ horizontally and $\sim 36^\circ$ vertically. This represents the angular coverage where 70% of Ex-Mo's sensitivity is maintained. In practice Ex-Mo will detect 90° so that a single Ex-Mo placed in the corner of a rectangular room will give complete coverage along the walls

Mounting

Ex-Mo must be securely mounted to a fixed object. Any movement of the sensor could activate the unit as if it were detecting a moving target.

Mount the Ex-Mo on a wall facing the direction of the area to be monitored. Using the adjustable bracket, angle the face of the Ex-Mo toward the target area.

The high frequency radar operates best when a target is approaching or moving away from it. The Microwave Beam is emitted from the front face and is directional. See diagram below.



Relay outputs

One output relay is provided. The relay output is capable of taking a 10A continuous load.

- 'Relay 1' (10A) operates to switch on lighting when movement is detected and it is sufficiently dark.

Relay 1 is configured as normally open (NO).

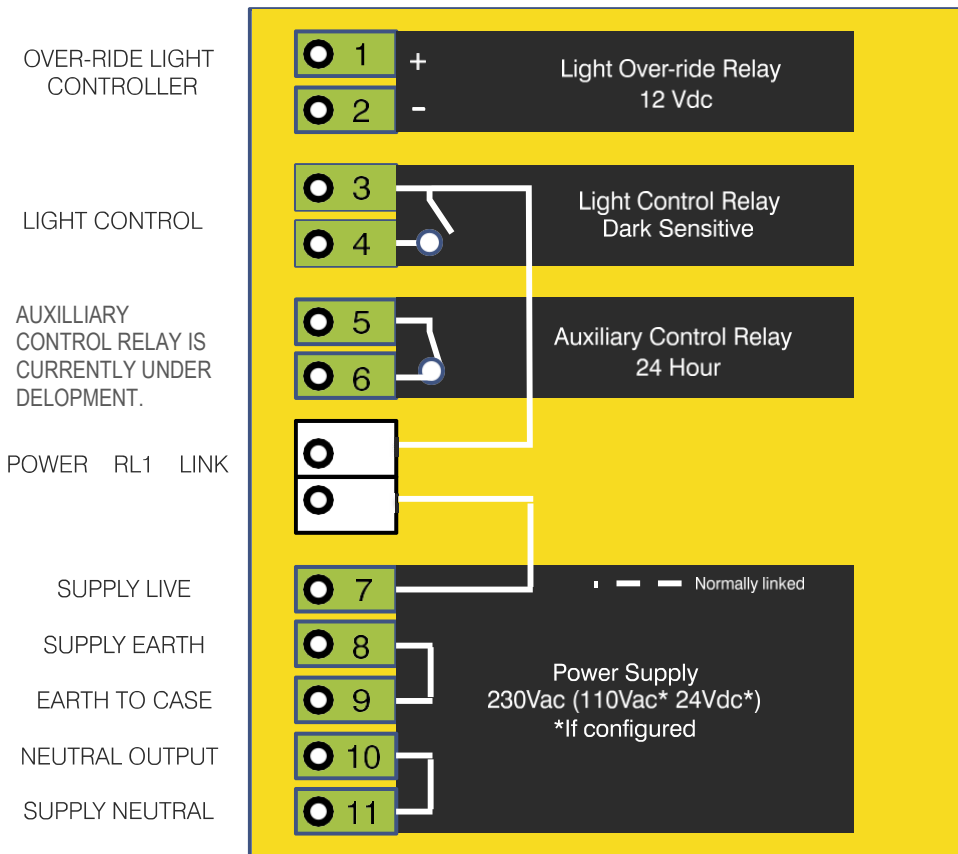
The relay output is isolated (1000Vrms) and can be used as 'volt free' contacts with an external supply not exceeding 125Vac/250Vac. Useful as a signal for example into a lighting control system or to feed a larger contactor.

Alternatively Relay 1 can power lighting directly from the internal mains supply.

PLEASE NOTE

If you are required to use the Ex-Mo as a motion-sensor to switch lighting or inductive loads, please ensure that Relay 1 (10A) is used.

Connection diagram - Typical 230 VAC connection



Installation And Initial Setup

Ex-Mo's parameters are set using the remote controller.

The equipment must be installed by skilled electricians or instructed personnel in accordance with National Legislation and relevant technical standards.

Please read this handbook carefully before commencing installation of Ex-Mo and retain for future reference.

Remove Ex-Mo and any accessories carefully from its packaging.

Ex-Mo can be mounted in two orientations dependent on your preferred cabling route. The optional Ex-Mo mounting bracket must be appropriately positioned facing the target area as described in the coverage and mounting section of this manual.

Make sure mounting surface is flat

Ex-Mo can now be attached in either orientation to the fixed mounting bracket and positioned toward the target area. Once the required position has been established all adjustment points should now be fully tightened.

Ensure that Ex-Mo is earthed and note that the unit is not internally fused.

After loosening the retaining locking screw on the lid turn the lid anti-clockwise to remove from the main body. Any internal packaging is for transport purposes ONLY and should be removed before replacing the lid. For termination within the Ex-Mo unit please remove the top circuit board by gently extending the two fixing prongs outwards. The green terminal block on the lower circuit board can now be unplugged to aid termination.

On completion of Ex-Mo internal termination ensure that the top circuit board is re-fitted in the correct orientation i.e. with the Ex-Mo label the correct way up.

The Ex-Mo lid can now be re-fitted ensuring that the lid is tight enough to maintain the IP rating, remembering to tighten down the retaining locking screw.

Ex-Mo can now be installed within the recognized code of practice e.g. EN60079-0

IMPORTANT NOTE

THE Ex-Mo unit is shipped with “Power RL1 Link” in place. For “Volt Free” operation please REMOVE RL1 Link.

Installation - Setup via Remote Controller

The remote controller can be operated in the hazardous area with the lid to the unit fitted and sealed. The remote control is directed towards the glass front and should have a range of up to 10 metres. The Red LED quick flash indicates that the remote-control signal was acknowledged.

Setting the Light Sensitivity- Method 1 (Pre-set Light Levels)

- Press 'Walk Test' (Ensure the Ex-Mo is in walk-test mode by red and yellow LED lights flash together)
- Set the light sensitivity level with the arrow keys. Refer to page 8 of the user manual for desired setting (Level 1-5)
- The level set is indicated by the amount of times the red and yellow LED flash together. For example; two flashes indicates that the Ex-Mo is set to level 2. Please see light Level Indicator Chart for further options.
- You can only go up and down through the levels one at a time. For example, you cannot go from level 1 straight to level 5.
- Set the time delay that you require. You can choose to have 5 minutes, 30 minutes or a one-hour time delay. This is the amount of time that the lights will stay on after the last movement within the vicinity of the Ex-Mo
- Press 'Auto Mode,' to confirm the changes that you have made.










Setting the Light Sensitivity- Method 2 (Current Ambient Light)

- Make sure lighting environment is to desired conditions.
- Press 'Walk Test' (Ensure the Ex-Mo is in walk-test mode by red and yellow LED lights flash together)
- Press 'Light Set Now.' The red LED will then flash on off for 2-4 seconds. This indicates that the Ex-Mo has measured the current light ambience. This operation will now enable the Ex-Mo to switch the lights on when movement is sensed. This now means that if gets lighter than the measured light ambience... The Ex-Mo will switch off the lights.
- Set the time delay that you require. You can choose to have 5 minutes, 30 minutes or a one-hour time delay. This is the amount of time that the lights will stay on after the last movement within the vicinity of the Ex-Mo
- Press 'Auto Mode,' to confirm the changes that you have made.

Setting the Movement Sensitivity (Range)

- Make sure that the Ex-Mo is in 'Auto Mode,' (working mode).
- Either set the sensitivity up or down with the sensitivity arrows
- To test the sensitivity, either walk towards or away from the Ex-Mo. When the strobe light goes out you know that you are out of range. This enables the installer to determine whether to decrease or increase the movement sensitivity.
- Any change in sensitivity is acknowledged, by the Ex-Mo, by a brief flash from the red and yellow LED lights.

Example: If the unit is on **Level 3 already**, pressing 'Light inc' will show the following sequence.

LED SHOWN		
Remote Acknowledged		Brief flash at button press
2 seconds		
Count 1		
2 seconds		
Count 2		
2 seconds		
Count 3		
2 seconds		
Count 4		
3 seconds		
Back to Normal Operation		

This indicates that the unit is now set to ambient light Level 4

Notes: These settings are stored in the memory of the Ex-Mo to be recovered after power off and on.

LED indicator functions:

- RED:**
- Indicates the remote control has been pressed, brief flash.
 - 1 second on, 1 second off, indicates 'Auto mode' is set and the unit powered and running properly.
 - Brief flash on, 1 second off indicates 'Manual mode' is set and the unit powered and running properly
- YELLOW:**
- On, indicates the ambient light is below the threshold level set. Off indicates the ambient light is bright enough to switch the lights off.

- WHITE: · On, indicates that movement has been detected. (Operates only below ambient light levels).
- YELLOW and RED: · Show together in normal operation. Also shown together during 'count' for light level setting with remote control.
- YELLOW and RED: · These three can be on briefly during normal operation.
- and WHITE: · On continuously: Indicates the 'Override relay' has been energised externally.
- and WHITE: · This puts the lighting relay on permanently while energised. (For emergency override use etc.)

Common Light Levels Outdoor**

Common light levels outdoor at day and night can be found in the table below:

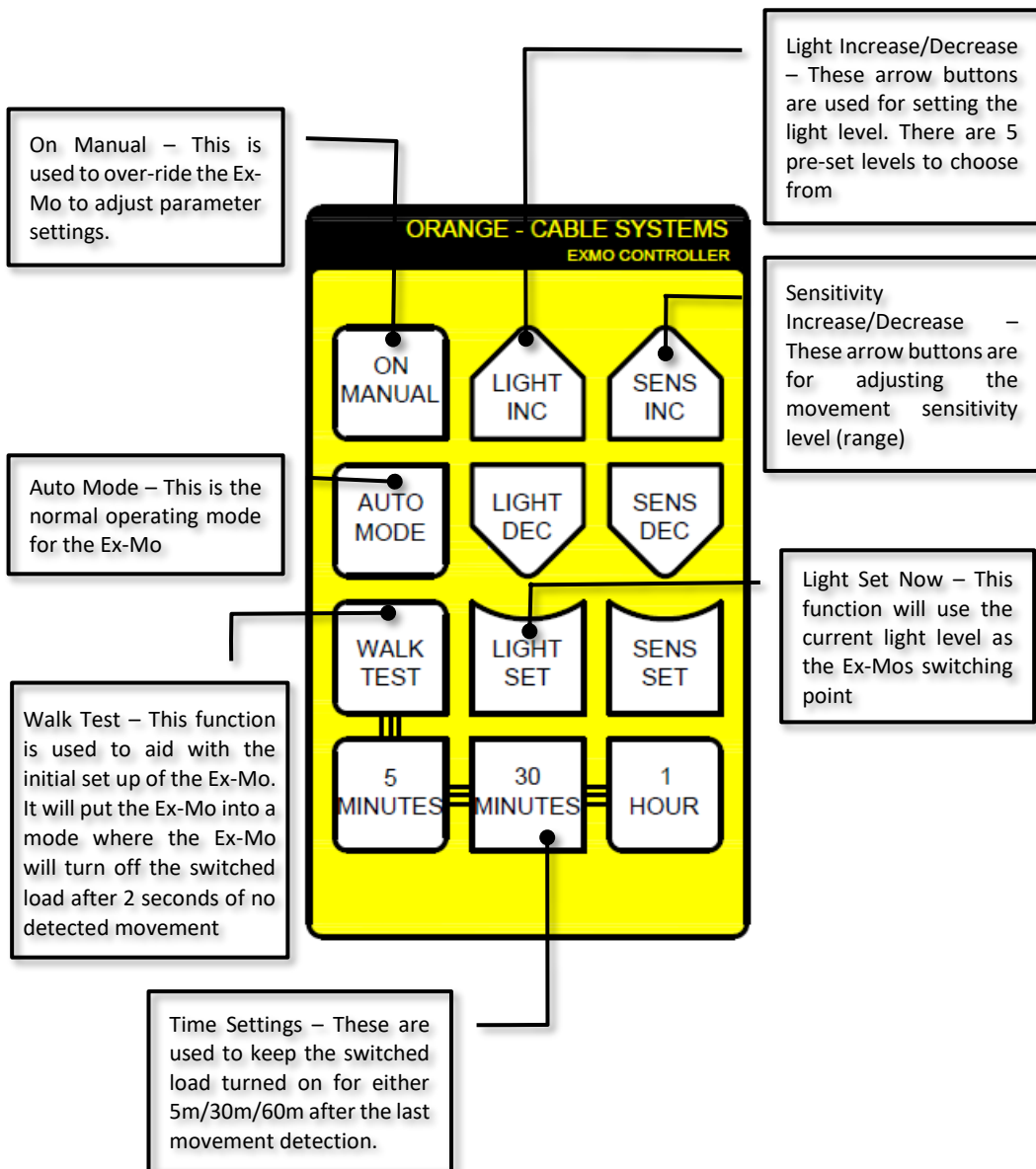
Condition	Illumination (ftcd)*	Ex-Mo Light Level Set (lux)	
Sunlight	10,000	107,527	
Full Daylight	1,000	10,752	
Overcast Day (Light cloud)	325	3500	1
Overcast Day (Dark cloud)	100	1,075	2
Very Dark Day	10	107	3
Twilight	1	10.8	4
Deep Twilight	0.1	1.08	5
Full Moon	0.01	0.108	
Quarter Moon	0.001	0.0108	
Starlight	0.0001	0.0011	
Overcast Night	0.00001	0.0001	

Ex-Mo Range


*foot/candles

**Data from http://www.engineeringtoolbox.com/light-level-rooms-d_708.html

IR900 Infra-Red Controller Functions




Specification

Supply voltage	110 / 230Volts AC, 50 Hz
Relay 1 current maximum	10A 250Vac continuous each (resistive load)
Relay 1 Voltage maximum	250Vac
Relay 1 Isolation	1000Vrms
Relay 1 maximum breaking capacity	2500VA
Relay 2 current maximum	1A at 24Vdc 0.5A at 125Vac
Relay 2 Voltage maximum	125Vac, 60 Vdc
Relay 2 Isolation	1000 Vac
Relay 2 maximum switching power	62.5VA, 30W
Override input relay	Factory standard: 12Vdc coil 12mA rated current. 960Ohm coil Must operate voltage 80% of max rated voltage Must release voltage 10% of min rated voltage
Adjustable Time	5-30 and 60 minute delay times available
Safety	 II 2 G D Ex d IIC T6 Ta -40°C to 54°C Gb Ex tb IIIC T85°C Ta -40°C to 54°C Db IP66
Current capability	1 x 10A + 1 x 1A Open contact relays selectable NC or NO operation
Temperature range	Ambient -40°C to 54°C
Fixing	Flat surface mounting or with optional swivel and tilt bracket
Conformity	ATEX / IECEx / CE
Remote control unit	ATEX / IECEx / IS approved
Sealing	IP66

IR900 Infa-red Controller User Handbook

Approvals Details

The IR900 has the following specific approvals

Name and Type:	INFRA-RED CONTROLLER TYPE IR900
Certificate Number:	Baseefa 03ATEX0187X
Specific Marking of Explosion Protection: ATEX Directive Marking:	
EEx ia IIC T4 Gb (-20°C ≤ Ta ≤ +40°C)  II 2 G	
Notified body:	Baseefa (2001) CE1180
IECEX	IECEX BAS 12.0126

General Description

The IR900 handheld infra-red controller is designed for use with the Ex-Mo motion sensor. It can be used freely within a hazardous area to calibrate and configure this instrument via a window in their flameproof enclosures without having to purge the area of hazardous gases or liquids

Zone of Operation

The IR900 is an intrinsically safe device approved for operation in the following environment according to Specific Marking of explosion protection:

EEx ia IIC T4 Gb (-20°C ≤ Ta ≤ +40°C) Ta = ambient temperature

IEC CENELEC

North America

Zone 1 – likely to be hazard present

Division 1

Gas Group – IIC (hydrogen, acetylene, carbon disulphide)

Class 1A (Hydrogen)

Class 1B (acetylene)

Surface temperature – T4 135°C – Ambient temperature -20°C to +40°C

Physical Description

Size – 63mm wide, 113mm high, 31mm deep

Weight – 0.25kg

Enclosure – die cast aluminium, nylon coated

Switch membrane – polyester

Equipment rating – IP40

First Time Use

The IR900 is supplied fully tested with a battery pack fitted, but not connected ready for immediate use.

Normal Use

The top end of the IR900 (with the projecting IR emitter) should be aimed at the window in the flameproof enclosure housing the equipment to be controlled. Changes in state of indicators behind the window will show correct reception of the IR pulse train from the IR900. The IR900 should be used within 2 metres of the window and it might be necessary to temporarily shade the window under intense ambient light conditions.

Maintenance

The outside of the enclosure can be cleaned using a damp cloth. Do not use solvents. Do not unscrew the enclosure retaining screw when a hazard is present. Apart from battery changes there are no user serviceable parts within the IR900. Suspected faulty units must be returned to the manufacturers.

Changing the Battery Pack

The battery pack will last for at least 1 year with normal use. Replacement at 1 year is recommended. Removal of battery while not in use will prolong battery life.

The following work **MUST** be carried out in a **SAFE** environment with no hazardous atmosphere present.

- 1) Have the replacement pack to hand.
- 2) Remove the four posi head screws securing the enclosure back.
- 3) Remove the enclosure back exposing the battery pack and printed circuit board.
- 4) Remove the old battery pack and unplug from printed circuit.
- 5) Plug in new battery pack noting the polarising tab on the circuit board connector.
- 6) Replace enclosure back and secure with the four screws.
- 7) Dispose of the old battery pack (manganese) according to local environmental regulations.

Specification

Size:	63mm wide, 113mm high, 31mm deep
Enclosure:	Die cast aluminium, nylon coated
Switch membrane:	Polyester
Enclosure retainers:	4 screws M3 x 10 posi-drive countersunk
Weight:	0.25kg
Equipment rating:	IP40
Quiescent current:	26µA (no key pressed)
Running current:	400µA (key pressed)
Infra-red wavelength:	940nm
Radiated Intensity:	15.4mW/sr
Battery Pack terminal voltage:	9V nominal
Battery Pack size:	52mm long x 28mm wide x 19.5mm deep
Battery Pack connection:	Polarised 0.1" 2-way free socket
Battery weight:	0.1kg

For Copies of the ATEX/IECEX Certificates



To Download a Copy of This Manual




Unit Manufacturing Data
Sticker here

EU Declaration of Conformity



Equipment Type: Ex-Mo Motion Sensor and Light Controller. In aluminium with coated surface or stainless steel with uncoated or coated surface.

Markings:  II 2GD
Ex d IIC T6 Ta -40°C to +54°C Gb
Ex tb IIIC T85°C Ta -40°C to +54°C Db IP66

We declare, as the manufacturer, the equipment type described above conforms to the following directives and harmonised standards.

ATEX Directive: 2014/34/EU

Harmonised Standards: EN 60079-0:2012 + A11:2013
EN 60079-1:2014
EN 60079-31:2014
EN 61326-1:2013

Notification Body for
EU-Type Examination: Baseefa 1180
Rockhead Business Park
Staden Lane, Buxton
Derbyshire, SK17 9RZ
United Kingdom

EU-Type Examination
Certificate: Baseefa11ATEX0005
Latest supplement Baseefa11ATEX0005/2 issued 31st January 2013

Approved by:

Mr DJ Rigby:
Managing Director

Document Reference: - Declaration of Conformity Baseefa03ATEX0187-00

EU Declaration of Conformity

Manufacturer: Bifold Fluidpower Ltd
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Chadderton, Oldham
Greater Manchester
OL9 9XA
UK

Tel: +44 (0)161-345-4777
E-mail: sales@bifold.co.uk

Product Type (Object of the Declaration):

Infra-Red Controller Type IR900

Declaration statement:

On behalf of the above company, I declare that, the *Object of the Declaration* described above is in conformity with the relevant Union harmonisation legislation: Directive 2014/34/EU, with the following limitation;

Limitation on the validity of the Declaration of Conformity:

None

Provisions of the Directive fulfilled by the Equipment:

Group II Category 2 G Ex ia IIC T4 Gb

Notified Body for EU-Type Examination:

Baseefa 1180 Buxton UK

EU-type Examination Certificate:

Baseefa03ATEX0187

Technical basis for compliance with the Essential Health and Safety Requirements of Directive 2014/34/EU: -
Harmonised Standards used: -

BS EN 60079-0: 2012 – Explosive atmospheres. Equipment. General requirements

BS EN 60079-11: 2012 – Explosive atmospheres. Equipment protection by intrinsic safety "i"

(A review against the following harmonised standards, shows no significant changes relevant to this equipment):

BS EN 60079-0: 2012+A11:2013 – Explosive atmospheres. Equipment. General requirements



Andrew Gillespie
Lead Certification Engineer

3rd August 2017