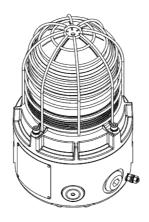
INSTRUCTION MANUAL D1xB2LD2 **LED Beacon**

For use in Hazardous Locations





D1xB2LD2

1) Warnings



- DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT
- DO NOT OPEN WHEN ENERGISED
- POTENTIAL ELECTROSTATIC CHARGING HAZARD - CLEAN ONLY WITH A DAMP **CLOTH**
- DO NOT PAINT
- TO REDUCE THE RISK OF IGNITION OF HAZARDOUS ATMOSPHERES. THE FIRST CONDUIT RUN MUST HAVE A SEALING FITTING CONNECTED WITHIN 18 INCHES OF ENCLOSE, SUBSEQUENT CONDUIT RUNS MUST HAVE A SEALING FITTING CONNECTED AS CLOSE AS PRACTICAL TO THE WALL OF THE ENCLOSURE, BUT IN NO CASE MORE THAN THE SIZE OF THE CONDUIT OR 50MM, WHICHEVER IS THE LESSER.
- TO PREVENT IGNITION OF GROUP A, B, C AND DATMOSPHERES - SEE INSTRUCTION FOR CHEMICAL **COMPATIBILITY**

Avertissement:

- NE PAS OUVRIR UN PRESENCE D'ATMOSPHERE EXPLOSIVE
- NE PAS OUVRIR ENERGIE
- DANGER POTENTIEL CHARGE ÉLECTROSTATIQUE - NETTOYER UNIQUEMENT AVEC UN CHIFFON HUMIDE
- NE PAS PEINTURER
- POUR RÉDUIRE LE RISQUE D'INFLAMMATION DES ATMOSPHÈRES DANGEREUSES, LE PREMIER CONDUIT DE CONDUIT DOIVENT AVOIR UN RACCORD D'ÉTANCHÉITÉ RACCORDÉ À MOINS DE 18 POUCES DE L'ENFERMEMENT. POUR SUBSÉQUENT LES CONDUITES DE CONDUIT LA DISTANCE ENTRE LA SURFACE DE LA MASSE DE REMPLISSAGE AU PLUS PRÈS DE L'ENVELOPPE DOIT ÊTRE AUSSI PETITE QUE CE QUI EST RÉALISABLE MAIS EN AUCUN CAS

- SUPÉRIEURE À LA PLUS PETITE DES DIMENSIONS CORRESPONDANT À LA TAILLE DU CONDUIT OU À 50 MM.
- POUR PRÉVENIR L'INFLAMMATION DES ATMOSPHÈRES DES GROUPES A, B, C ET D-VOIR L'INSTRUCTION POUR LA COMPATIBILITÉ CHIMIQUE

2) Rating & Marking Information

2.1 NEC & CEC Class / Division Ratings for US / Canada

The D1xB2LD2 LED beacons comply with the following standards:

> UL 1203 (Ed. 5) 2015 CSA C22.2 No. 30-M1986 (Ed. 1) 2003 CSA C22.2 No. 25 (Ed. 4) 2017 CSA C22.2 No. 205 (Ed. 3) 2017

The D1xB2LD2 LED Beacon is rated as follows:

Class I Div 1 Group ABCD T5 Ta -55°C to +80°C Class I Div 1 Group ABCD T6 Ta -55°C to +75°C Class II Div 1 Group EFG T5 Ta -55°C to +80°C Class III Div 1 Ta -55°C to +80°C

Installation must be carried out in compliance with the National Flectric Code / Canadian Flectric Code

E2S Warning Signals Impress House, Mansell Road, Acton, London W3 7QH www.e2s.com Document No. D191-00-401-IS Issue 3 28-11-22

2.2 NEC Class / Zone ratings US

The D1xB2LD2 LED beacons comply with the following standards:

UL 60079-0-2013 UL 60079-1-2015 UL 60079-31-2015

The D1xB2LD2 LED Beacon is rated as follows:

Class I Zone 1 AEx db IIC T5 Ta -55°C to +80°C Class I Zone 1 AEx db IIC T6 Ta -55°C to +70°C Zone 21 AEx tb IIIC T100°C Ta -55°C to +80°C

Installation must be carried out in compliance with the National Electric Code.

2.3 CEC Class / Zone ratings Canada

The D1xB2LD2 LED beacons comply with the following standards:

CAN/CSA C22.2 No. 60079-0-2015 CAN/CSA C22.2 No. 60079-1-2016 CAN/CSA C22.2 No. 60079-31-2015

The D1xB2LD2 LED Beacon is rated as follows:

Ex db IIC T5 Ta -55°C to +80°C Ex db IIC T6 Ta -55°C to +70°C Ex tb IIIC T100°C Ta -55°C to +80°C

Installation must be carried out in compliance with the Canadian Electric Code

2.4 ATEX / IECEx & UKEx Certification

The D1xB2LD2 LED beacons comply with the following standards:

EN IEC60079-0:2018 / IEC60079-0:2017 (Ed 7) EN60079-1:2010 / IEC60079-1: ed. 7.0 (2014-06) EN60079-31:2014 / IEC60079-31:2013 ed. 2.0 (2013-11)

The D1xB2LD2 LED Beacon is rated as follows:

Ex db IIC T5 Gb Ta -55°C to +80°C Ex db IIC T6 Gb Ta -55°C to +70°C Ex tb IIIC T100°C Db Ta -55°C to +80°C

For D1xB2LD2AC230 units, the certification approval has validated continuous use up to 38°C ambient and are for transient use up to 80°C ambient

Certificate No.

DEMKO 19 ATEX 2009X IECEX ULD 19.0006X UL21UKEX2130X

ATEX Mark, Equipment Group and Category:

 $\langle E_{X} \rangle$

II 2G II 2D

CE Marking and Notified Body No.

2813

UKCA Marking and Notified Body No.

UK 0518

The units can be installed in locations with the following conditions:

Area Classification Gas:

Zone 1	Explosive gas air mixture likely to occur in normal operation.
Zone 2	Explosive gas air mixture not likely to occur in normal operation, and if it does, it will only exist for a short time.

Gas Groupings:

Group IIA	Propane
Group IIB	Ethylene
Group IIC	Hydrogen and Acetylene

Temperature Classification:

T1	450°C
T2	300°C
Т3	200°C
T4	135°C
T5	100°C
Т6	85°C (up to 70°C ambient)

Dust Groupings:

Group IIIA	Combustible Flyings	
Group IIIB	Non-conductive Dust	
Group IIIC	Conductive Dust	

Maximum Surface Temperature for Dust Applications:

100°C

Equipment Category: 2G / 2D

Equipment Protection Level: Gb, Gc, Db, Dc

Ambient Temperature Range: -55°C to +80°C

2.5 Ingress Protection Ratings

The product is rated for ingress Protection as follows:

IP rating per EN60529: IP66

Type rating per UL50E / NEMA250: 4 / 4X / 3R / 13

Suitable for exposure to Acetone , Ammonium Hydroxide , Diethyl Ether , Ethyl Acetate , Ethylene Dichloride , Furfural, n-hexane , Methyl Ethyl Ketone , Methanol , 2-NitroPropane and Toluene.

To maintain the ingress protection rating, the cable entries must be fitted with suitably rated, certified cable entry and/or blanking devices during installation.

E2S Warning Signals Impress House, Mansell Road, Acton, London W3 7QH www.e2s.com Tel: +44 (0)208 743 8880 Document No. D191-00-401-IS Issue 3 28-11-22 Sheet 2 of 6

2.6 Electrical Ratings

Model D1xB2	Nom. Voltage	Voltage Range	Nom. operating current#	Max. Operating Current
LD2DC024	24Vdc	18-30Vdc	230mA	500mA
LD2AC115	115Vac	110-120Vac	95mA	180mA
LD2AC230	230Vac	220-240Vac	50mA	100mA

#Rated at 1Hz

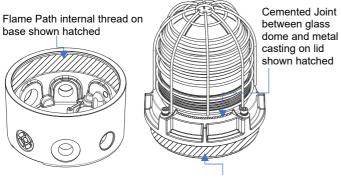
Table 1: Electrical Ratings

It is important that a suitable power supply is used to run the equipment. The power supply selected must have the necessary capacity to provide the input current to all the units.

The input current will vary according to the voltage input level.

3) Special Conditions of Use

The enclosure coating is non-conductive and may generate an ignition-capable level of electrostatic charges under certain extreme conditions. The user should ensure that the equipment is not installed in a location where it may be subjected to external conditions (such as high pressure steam) which might cause a build-up of electrostatic charges on non-conducting surfaces. Additionally, cleaning of the equipment should be done only with a damp cloth.



Flame Path external thread on lid shown hatched

4) Installation

There are no restrictions on unit orientation.

The junction box must only be installed by suitably qualified personnel in accordance with the latest issues of the relevant standards:

EN60079-14 / IEC60079-14: Explosive atmospheres - Electrical installations design, selection and erection

EN60079-10-1 / IEC60079-10-1: Explosive atmospheres - Classification of areas. Explosive gas atmospheres

EN60079-10-2 / IEC60079-10-2: Explosive atmospheres - Classification of areas. Explosive dust atmospheres

The installation of the units must also be in accordance with any local codes that may apply and should only be carried out by a competent electrical engineer who has the necessary training.

4.1 Safe Installation Requirements:

To maintain the ingress protection rating and mode of protection, the cable entries must be fitted with suitably certified cable entry and/or blanking devices during installation. If conduit is used for installation, seal conduit within 18 inches from the first enclosure, subsequent conduit runs must have a sealing fitting connected as close as practical to the wall of the enclosure, but in no case more than the size of the conduit or 50mm, whichever is the lesser.

If entries are fitted with adaptors they must be suitably certified for the application. Fitting of blanking elements into adaptors is not permitted.

Check that the 'O' ring seal is in place before replacing the explosion proof cover.

Lens guard must be fitted for Class Division installations.

5) Location and Mounting

The location of the beacon should be made with due regard to the area over which the warning signal must be visible. It should only be fixed to services that can carry the weight of the unit.

The D1xB2LD2 beacon can be mounted using one of three methods.

- The beacon can be surface mounted by removing, rotating and reinstalling the stowed mounting lugs. These are suitable for 6mm diameter fixings.
 - a. Remove 2 x M5 fasteners per mounting lug
 - Reverse and rotate lug and reseat onto enclosure
 - c. Secure lug using the 2 x M5 Fasteners
- 2. Alternatively the beacon can be conduit mounted using the 3/4"NPT entry on the base of the unit.
- Additionally, the beacon can be mounted using the ratchet adjustable stainless-steel wall bracket assembly. This is available as an accessory – part code: SP77-0001.

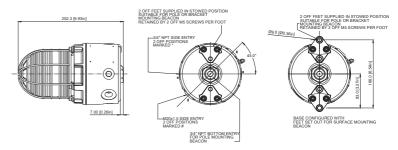


Fig. 1 Fixing Location for Beacon

6) Access to the Enclosure



Warning – High voltage may be present, risk of electric shock. DO NOT open when energised, disconnect power before opening.



Warning – Hot surfaces. External surfaces and internal components may be hot after operation, take care when handling the equipment.

In order to connect the electrical supply cables to the beacon, it is necessary to open the explosion proof enclosure. Loosen the locking grub screw in the cover and then remove the glass dome cover assembly to gain access to the chamber. This can be achieved by unscrewing the glass dome cover, taking extreme care not to damage the threads when doing so

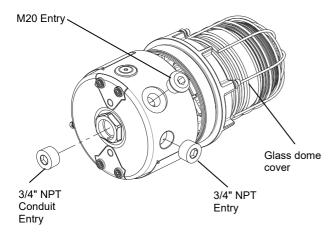


Fig. 2 Accessing the Enclosure.

On completion of the installation the flameproof threads should be inspected to ensure that they are clean and that they have not been damaged during installation. Ensure the O-ring seal is in place and undamaged.

When fitting the flameproof cover ensure the thread is engaged correctly. Fully tighten the cover all the way, ensure no gap is visible between the cover and base of the beacon enclosure.

Selection of Cable, Cable Glands, Blanking Elements & Adapters

When selecting the cable size, consideration must be given to the input current that each unit draws (see section 12), the number of beacons on the line and the length of the cable runs. The cable size selected must have the necessary capacity to provide the input current to all of the beacons connected to the line.

The entries are 2-off M20 x 1.5 thread & 3-off 3/4" NPT thread

If a high IP (Ingress Protection) rating is required then a suitable sealing washer must be fitted under the cable glands or blanking plugs.

For use in explosive dust atmospheres, a minimum ingress protection rating of IP6X must be maintained.

For use in explosive gas atmospheres, a minimum ingress protection rating of IP54 must be maintained.

NPT plugs should be greased before insertion.

For high ambient temperatures the cable entry temperature or the cable branching point temperature may exceed 60°C and therefore suitable heat resisting cables and cable glands must be used, with a rated service temperature of at least the values stated below:

Max Ambient temperature (°C)	50	55	60	65	70	75	80
Req. cable gland rating (°C)	65	70	75	80	85	90	95

8) Cable Connections

The units have 2-off M20 x 1.5 threaded entries and 3-off $\frac{3}{4}$ " NPT x 14 threaded entries.

Electrical Connections are to be made into the terminal blocks using solid or stranded wire, sizes 0.5-2.5mm2 / AWG 20-14. Wire insulation needs to be stripped 6-7mm. Wires may be fitted securely with crimped ferrules. Terminal screws need to be tightened down with a tightening torque of 0.4 Nm / 3.5 Lb-in.

See section 5 of this manual for access to the enclosure.

9) Wiring

A 6-way terminal block is provided on the beacons for power. The DC units have 2-off +ve, 2-off -ve, a stage 2, a stage 3 and an Earth terminal.

See Schematic diagram D191-06-401.

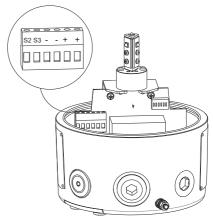


Fig. 4 D1xB2LD2DC024 Terminals

The AC units have 2-off Live, 2-off Neutral and 2-off Earth terminals.

See Schematic diagram D191-06-405.

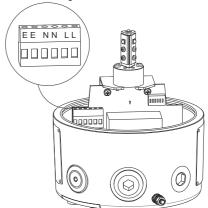


Fig. 6 D1xB2LD2AC Terminals

9.1 Line Monitoring

On the D2xB1X unit, DC reverse line monitoring can be used if required.

All DC beacons have a blocking diode fitted in their supply input lines. An end of line monitoring resistor can be connected across the +ve and -ve terminals in the explosion proof enclosure. If an end of line resistor is used it must have the following values:

Minimum resistance 3K3 Ohms Minimum Power 0.5W Minimum resistance 500 Ohms Minimum Power 2.0W

The resistor must be connected directly across the +ve and -ve terminals as shown in the following drawing. Form the resistor legs as shown in Fig. 7a, fit the resistor across the two terminals, as shown in Fig. 7b.

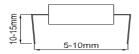


Fig. 7a End of Line Resistor Forming

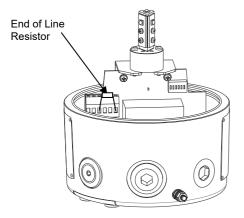


Fig. 7b End of Line Resistor Placement

10) Settings

10.1 Flash Rate Setting



Warning – high-intensity light source. Avoid looking directly at the light source for extended periods of time.

The D1xB2LD2 beacon can produce different flash patterns as shown in Table 1. The flash patterns are selected by operation of the flash setting DIP switch on the PCB, Fig 8.

Switch Setting (123456)	S1 Mode	S2 Mode	S3 Mode
000000	Steady High Power	Flashing 1Hz	Flashing Triple Strike
000001	Steady Low Power	Flashing 1Hz	Flashing Triple Strike
100000	Flashing 1Hz	Flashing Double Strike	Flashing Triple Strike
101000	Flashing 1.5Hz	Flashing 2Hz	Flashing Double Strike
010000	Flashing 2Hz	Flashing Triple Strike	Flashing Triple Strike
110000	Flashing Double Strike	Steady High Power	Flashing Triple Strike
001000	Flashing Triple Strike	Flashing 2Hz	Flashing Double Strike

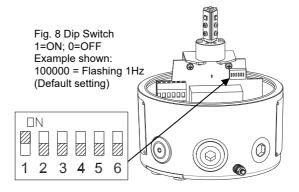


Fig. 8 DIP Switch location

11) Earthing

The unit has an external and an internal earth terminal, (please see fig 9).

Please note that for AC supply voltage product versions the Earth terminal on the PCBA does not provide an earth connection to the product enclosure. The enclosure must be independently earthed using either the external or internal earth fixing point, (see fig 9 and notes below).

Internal earthing connections should be made to the internal Earth terminal in the base of the housing using a ring crimped terminal to secure the earth conductor under the earth clamp. The earth conductor should be at least equal in size and rating to the incoming power conductors.

External earthing connections should be made to the M5 earth stud, using a ring crimp terminal to secure the earth conductor to the earth stud. The external earth conductor should be at least 4mm in size.

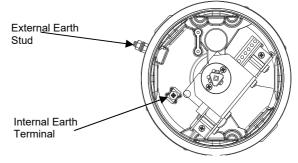


Fig. 9: Internal & External Earth Locations

12) Maintenance, Overhaul & Repair

Maintenance, repair and overhaul of the equipment should only be carried out by suitably qualified personnel in accordance with the current relevant standards:

EN60079-19 / IEC60079-19 Explosive atmospheres - Equipment repair, overhaul and reclamation

EN 60079-17 / IEC60079-17 Explosive atmospheres - Electrical installations inspection and maintenance

To avoid a possible ELECTROSTACTIC CHARGE the unit must only be cleaned with a damp cloth.

Units must not be opened while an explosive atmosphere is present.

If opening the unit during maintenance operations a clean environment must be maintained and any dust layer removed

Flameproof joints are not intended to be repaired.

13) Interchangeable & Spare Parts



Warning – Hot surfaces. External surfaces and internal components may be hot after operation, take care when handling the equipment.

The Beacon lens cover is interchangeable, contact E2S Ltd for a replacement lens cover available in various colours.

To change the lens cover, unscrew the 4-off M5 socket head screws, spring and flat washers using a 4mm Hex key. Remove the wire guard and replace the old lens cover with the new lens cover.

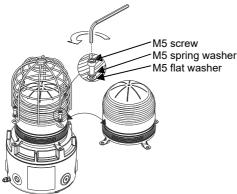


Fig. 10 Replacement of beacon lens cover

Fit the wire guard back onto the housing, over the new lens cover aligning the fixing holes of the guard, lens cover and housing. Refit the fixings to hold into place, the fixings MUST be fitted in the order shown above.

14) SIL 2 Reliability Data

Reliability and Functional safety IEC/EN61508 which has been assessed and is considered suitable for use in low demand safety function:

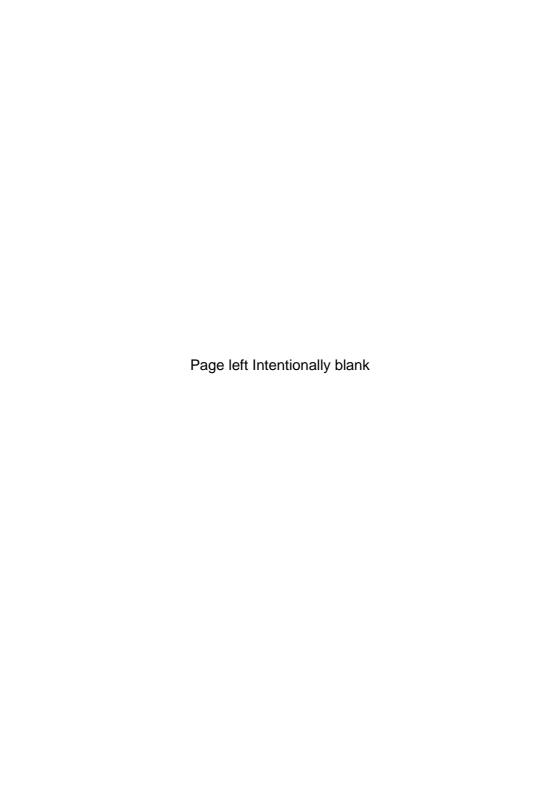
- 1. Random Hardware Failures and Architectural constraints (route 2_H).
- 2. As an unvoted item (i.e. hardware fault tolerance of 0) at SII 2

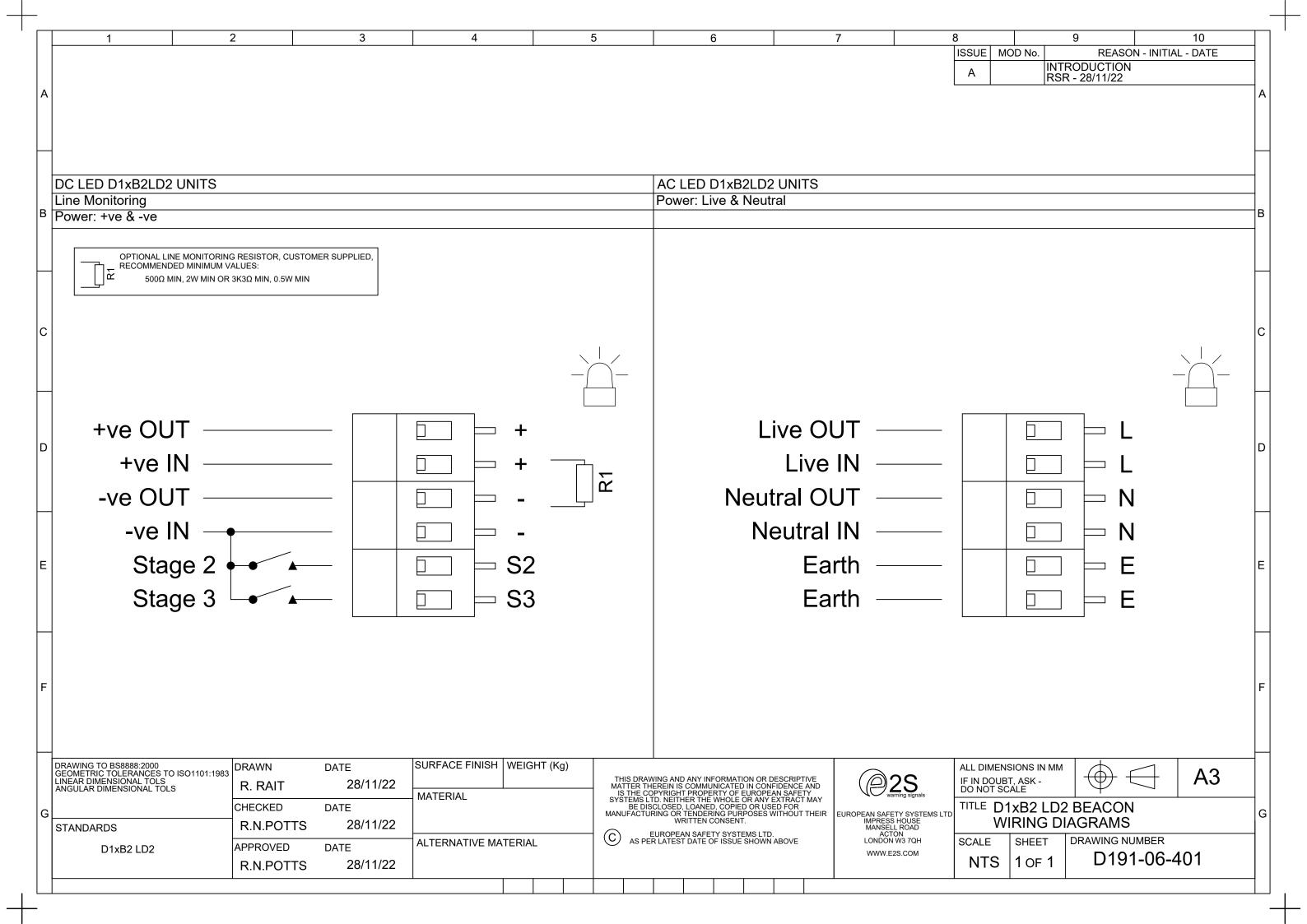
The product was assessed against failure modes:

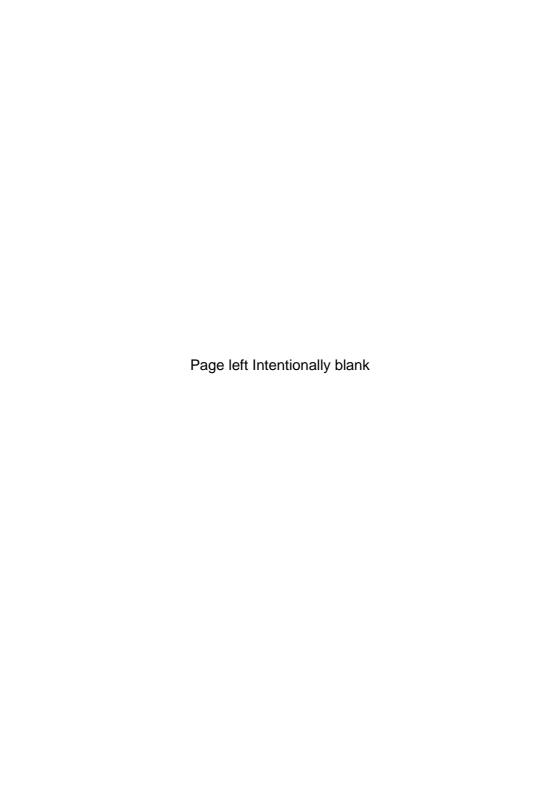
- Failure respond to an input by lighting a beacon.
- Spurious light output despite no input.
- 3. When employing the device in a SIL2 compliant system the user should ensure frequent or continuous automatic monitoring of continuity.

Integrity in respect of failure to function	SIL2 & SIL1
Total Failure rate	0.48 pmh
"Hazardous" failure rate (revealed)	0 pmh
"Hazardous" failure rate (unrevealed)	0.48 pmh
"Safe" failure rate (revealed)	0 pmh
"Safe" failure rate (unrevealed)	0
System type	В
Hardware Fault Tolerance	0
Diagnostic Coverage	>60%
PFD (hazardous failure)	2.1 x 10 ⁻³
Proof Test Interval	Up to 1 year

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EU Declaration of Conformity



Manufacturer: European Safety Systems Ltd.

Impress House, Mansell Road, Acton

London, W3 7QH United Kingdom

Authorised Representative: E2S Warnsignaltechnik UG

Charlottenstrasse 45-51

72764 Reutlingen

Germany

Equipment Type: D1xB2X05, D1xB2X10, D1xB2X15, D1xB2X21, D1xB2LD2, D1xJ2

Directive 2014/34/EU: Equipment and Protective Systems for use in Potentially Explosive Atmospheres (ATEX)

Notified Body for EU type Examination (Module B):

UL International Demko A/S

Notified Body No.: 0539

Borupvang 5A, 2750 Ballerup, Denmark

EU-type Examination Certificate (Module B): DEMKO 19 ATEX 2009X Rev. 1

Notified Body for Quality Assurance Notification / Conformity to EU-type

based on

Sira Certification Service Notified Body No.: 2813

quality assurance of the production process (Module D): CSA Group Netherlands B.V, Utrechtseweg 310, 6812 AR, Arnhem, Netherlands

Quality Assurance Notification (Module D): SIRA 05 ATEX M342

Provisions fulfilled by the equipment: II 2G Ex d IIC T6...T3 Gb

II 2D Ex tb IIIC T95°C...T169°C Db

Standards applied: EN 60079-0:2018

EN 60079-1:2014 EN 60079-31:2014

IP6X Dust Protection to EN60079-0 / EN60079-31

<u>Directive 2014/30/EU: Electromagnetic Compatibility Directive (EMC)</u>

Standards applied: EN IEC 61000-6-1:2019 & IEC 61000-6-1:2016

EN IEC 61000-6-2:2019 & IEC 61000-6-2:2016 EN IEC 61000-6-3:2021 & IEC 61000-6-3:2020 EN IEC 61000-6-4:2019 & IEC 61000-6-4:2018

Directive 2011/65/EU: Restriction of the use of certain hazardous substances in electrical and electronic equipment (ROHS)

The product and all the components contained within it are in accordance with the restriction of the use of hazardous substances in electrical and electronic equipment, including amendment by Directive 2015/863/EU.

Regulation (EC) 1907/2006: Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

The product and all the components contained within it are free from substances of very high concern.

Other Standards and Regulations

EN~60529:1991 + A1:2000 + A2:2013. - Degrees~of~protection~provided~by~enclosures~(IP~code) - enclosure~rated~IP66/67~and the contract of th

On behalf of European Safety Systems Ltd., I declare that, on the date the equipment accompanied by this declaration is placed on the market, the equipment conforms with all technical and regulatory requirements of the above listed directives, regulations and standards.

This Declaration is issued under the sole responsibility of the manufacturer.

Martin Streetz Document No.: DC-077_Issue_E

Quality Assurance Manager Date and Place of Issue: London, 07/07/2022



UKCA Declaration of Conformity



Manufacturer: European Safety Systems Ltd.

Impress House, Mansell Road, Acton

London, W3 7QH United Kingdom

Equipment Type: D1xB2X05, D1xB2X10, D1xB2X15, D1xB2X21, D1xB2LD2, D1xJ2

<u>Directive UKSI 2016:1107 (as amended by UKSI 2019:696) – Schedule 3A, Part 1 : Product or Protective System Intended for use in Potentially Explosive Atmospheres (UKCA)</u>

Notified Body for UK type Examination (Module B): UL International (UK) Ltd

Notified Body No.: 0843

Unit 1-3 Horizon Kingsland Business Park, Wade Road,

Basingstoke, Hampshire RG24 8AH UK

UK-type Examination Certificate (Module B): UL21UKEX2130X

Notified Body for Quality Assurance Notification / Conformity to EU-type

based or

Sira Certification Service Notified Body No.: 0518

quality assurance of the production process (Module D):

Rake Lane, Eccleston, Chester CH4 9JN, UK

Quality Assurance Notification (Module D): CSAE 22UKQAN0046

Provisions fulfilled by the equipment:

II 2G Ex d IIC T6...T3 Gb

II 2D Ex tb IIIC T95°C...T169°C Db

Standards applied:

EN 60079-0:2018 EN 60079-1:2014 EN 60079-31:2014

IP6X Dust Protection to EN60079-0 / EN60079-31

Directive 2014/30/EU: Electromagnetic Compatibility Directive (EMC)

Standards applied:

EN 61000-6-1:2007 EN 61000-6-2:2005

EN 61000-6-3:2007 / A1:2011 / AC: 2012 EN 61000-6-4:2007 / A1: 2011

Directive 2011/65/EU: Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

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Regulation (EC) 1907/2006: Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

The product and all the components contained within it are free from substances of very high concern.

Other Standards and Regulations

EN 60529:1991 + A1:2000 + A2:2013. - Degrees of protection provided by enclosures (IP code) – enclosure rated IP66/67

On behalf of European Safety Systems Ltd., I declare that, on the date the equipment accompanied by this declaration is placed on the market, the equipment conforms with all technical and regulatory requirements of the above listed directives, regulations and standards.

This Declaration is issued under the sole responsibility of the manufacturer.

Quality Assurance Manager

Document No.:
Date and Place of Issue:

DC-096_Issue_A London, 24/02/2022

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DC-096_Issue_A - Page 1 of 1 - QAF_252_Issue_5

