

## 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

### Avertissement:

- NE PAS OUVRIR UN PRESENCE D'ATMOSPHERE EXPLOSIVE
- NE PAS OUVRIR ENERGIE
- DANGER POTENTIEL CHARGE ÉLECTROSTATIQUE - NETTOYER UNIQUEMENT AVEC UN CHIFFON HUMIDE

## 2) Rating & Marking Information

### 2.1 Public Mode Fire Alarm Ratings

The D2xB1LD2DC024 is certified for use as a public mode visual alarm device in accordance with UL1971 Third Edition and UL1638 Fifth Edition / CAN/ULC-S526 Fourth Edition.

For use in public-mode fire alarm systems the beacon must be installed without the wire guard or plastic lens cover.

The beacon must be set to one of the certified flash patterns of 1Hz, 1.5Hz or 2Hz (for DIP switch settings see section 10). For light output ratings see section 12.

Up to 6-off units can be connected to the same wire run without a separate synchronization module and meet the synchronization requirements of UL1971 & UL1638 / CAN/ULC-S526.

### 2.2 Private Mode Fire Alarm Ratings

All models are approved for use as Visual Appliance for use in Fire Alarm Systems – Private Mode.

For private mode fire alarm use the beacons must only be fitted with clear or red plastic lens covers and must be set to one of the certified flash patterns of 1Hz, 1.5Hz or 2Hz (for DIP switch settings see section 10).  
For light output ratings see section 12.

### 2.3 NEC & CEC Class / Division Ratings for US / Canada

The D2xB1LD2 LED beacon complies with the following standards:

ANSI/ISA 12.12.01-2015  
CSA C22.2 No. 213-16

The D2xB1LD2 LED beacon is rated as follows:

Class I Div 2 ABCD T4 Ta -40°C to +50°C  
Class I Div 2 ABCD T4A Ta -40°C to +40°C  
Class II Div 2 FG T6 Ta -40°C to +50°C  
Class III Div 1&2 Ta -40°C to +50°C

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

### 2.4 NEC Class / Zone ratings US

The D2xB1LD2 LED beacon complies with the following standards:

UL 60079-0-2013  
UL 60079-15-2013  
UL 60079-31-2015

The D2xB1LD2 LED beacon is rated as follows:

Class I Zone 2 AEx nA IIC Gc T4 Ta -40°C to +50°C  
AEx tc IIIC 75°C Dc Ta -40°C to +50°C

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

### 2.5 CEC Class / Zone ratings Canada

The D2xB1LD2 LED beacon complies with the following standards:

CAN/CSA C22.2 No. 60079-0:2015  
CAN/CSA C22.2 No. 60079-15:2016  
CAN/CSA C22.2 No. 60079-31:2015

The D2xB1LD2 LED beacon is rated as follows:

Ex nA IIC Gc X T4 Ta -40°C to +50°C  
Ex tc IIIC 75°C Dc X Ta -20°C to +50°C

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


## 2.6 ATEX / IECEx certification

The D2xB1LD2 LED beacon complies with the following standards:

EN60079-0:2012+A11:2013 / IEC60079-0: ed. 6.0 (2011-06)  
EN60079-15:2010 / IEC60079-15: ed. 4.0 (2010-01)  
EN60079-31:2014 / IEC60079-31:2013 ed. 2.0 (2013-11)

**Certificate No.** DEMKO 14 ATEX 4786493904X  
IECEx ULD 14.0004X

The D2xB1LD2 LED beacon is rated as follows:

 II 3G Ex nA IIC T4 Gc Ta -40°C to +50°C  
II 3D Ex tc IIIC 75°C Dc Ta -40°C to +50°C

CE Marking



## Zones, Gas / Dust Groups and Temperature Classification

When connected to an approved system the D2XB1LD2 LED beacon may be installed in:

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.

Zone 22 explosive dust air mixture not likely to occur in normal operation, and if it does, it will only exist for a short time.

## May be used with gases in groups:

Group IIA	propane
Group IIB	ethylene
Group IIC	hydrogen / acetylene

## Having a temperature classification (for Gas applications) of:

T1	450°C
T2	300°C
T3	200°C
T4	135°C

## May be used with Dust types:

Group IIIA	combustible flyings
Group IIIB	non-conductive dust
Group IIIC	conductive dust

## Maximum Surface Temperature for Dust Applications: 75°C

## Installation must be carried out in compliance with the latest issue of the following 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

## 2.7 Ingress Protection Ratings

The product is rated for ingress Protection as follows:

IP rating: IP66  
Type rating per UL50E / NEMA250: 4 / 4X / 3R / 13

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

## 2.8 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. The current levels shown above are for the worst-case input voltage and flash setting resulting in max. current.

For detailed current ratings of the device please see Section 13.

## 3) Special Conditions of Use

Special Condition for safe Use as stated on the Type Examination Certificate DEMKO 14 ATEX 4786493904X / CoC IECEx ULD 14.0004X:

When used for a Group III application, the surface of the enclosure may store electrostatic charge and become a source of ignition in applications with a low relative humidity <~30% relative humidity where the surface is relatively free of surface contamination such as dirt, dust, or oil.

Guidance on protection against the risk of ignition due to electrostatic discharge can be found in EN TR50404 and IEC TR60079-32.

End user shall adhere to the manufacturer's installation and instruction when performing housekeeping to avoid the potential for hazardous electrostatic charges during cleaning, by using a damp cloth.

To maintain the ingress protection rating and mode of protection, the cable entries must be fitted with suitably rated, certified cable entry and/or blanking devices during installation. If conduit is used for installation, seal conduit within 18 inches from the enclosure.

## 4) 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 D2x beacon should be secured to any flat surface using the two 7mm fixing holes in the feet of the base. The 2-off mounting feet supplied with the unit must first be fitted to the base using the 2-off M4 X 12mm countersunk screws provided. Additional feet are available as spare parts if required. The unit can also be pole mounted using the 3/4" NPT Entry in the centre of the base. See Fig. 1a/1b.

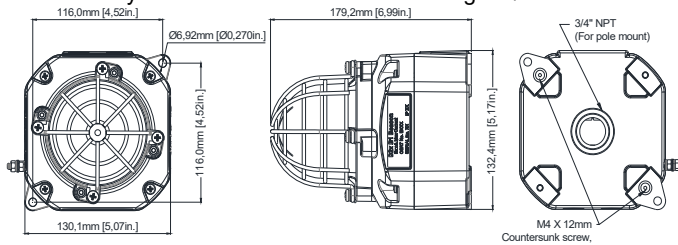


Fig. 1a Fixing Location for General Signaling or Private Mode

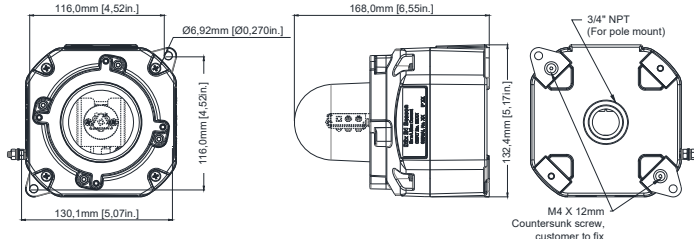


Fig. 1b Fixing Location for Public Mode

## 5) 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.

To access the enclosure, loosen the four M4 posi pan head screws and withdraw the cover.

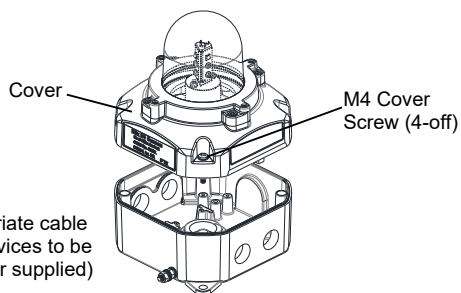


Fig. 2 Accessing the Enclosure.

To replace cover, check that the 'O' ring seal is in place. Carefully push the cover in place. Insert M4 screws with fibre washers and tighten to 3.0Nm torque.

## 6) 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 Table 1), 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 sounders connected to the line.

When selecting the cable size consideration must be given to the voltage drop over the length of the cable run to ensure the min. input voltage at the point of use (voltage range, see section 13)

The voltage drop depends on:

- The total current draw if the devices installed on this cable run
- The wire size and total length of the cable run, determining the total resistance of this cable run
- The minimum output voltage supplied by the power supply

The voltage drop and input voltage at the point of use can be calculated as follows (for guidance on the resistance of different wire sizes see section 14)

$$\text{Total Wire resistance} = \text{Wire resistance} / 1000\text{ft} \times \text{length of cable run} \times 2$$

(length of cable run needs to be multiplied by two to account for two wires going to and from the unit)

$$\text{Total current draw} = \text{Current draw per unit} \times \text{number of units}$$

$$\text{Voltage Drop} = \text{Total current draw} \times \text{Total wire resistance}$$

$$\text{Minimum output of power supply} = \text{Min. voltage at point of use} + \text{voltage drop}$$

The entries can be ordered with one of the following options:

2-off M20 x 1.5 thread, 2-off 1/2" NPT thread & 1-off 3/4" NPT thread

For ambient temperatures over +45°C the cable entry temperature may exceed +70°C. Therefore suitable heat resisting cables and cable glands, rated to min. 75°C must be used.

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.

## 7) Cable Connections

Electrical connections are to be made into the terminal blocks on the PCBA located in the enclosure. See section 5 of this manual for access to the enclosure.

Wires having a cross sectional area between 0.5 mm<sup>2</sup> to 2.5mm<sup>2</sup> can be connected to each terminal way. If an input and output wire is required the 2-off Live/Neutral or +/- terminals can be used. If fitting 2-off wires to one terminal way the sum of the 2-off wires must be a maximum cross sectional area of 2.5mm<sup>2</sup>. Strip wires to 8mm. Wires may also be fitted using ferrules. Terminal screws need to be tightened down with a tightening torque of 0.56 Nm / 5 Lb-in. When connecting wires to the terminals great care should be taken to dress the wires so that when the cover is inserted into the chamber the wires do not exert excess pressure on the terminal blocks. This is particularly important when using cables with large cross sectional areas such as 2.5mm<sup>2</sup>.

## 8) AC Wiring

3-off 2-way terminal blocks are provided on the AC beacon for power. There are 2-off Live, 2-off Neutral and 2-off Earth terminals in total.

### 8.1 Wiring Diagrams

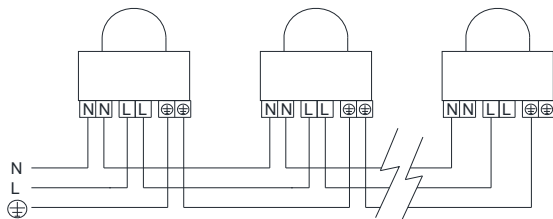


Fig 3. D2XB1LD2 AC Simplified Block Diagram

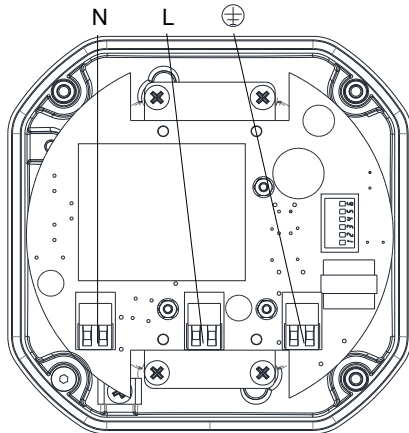


Fig. 4 D2XB1LD2 AC Terminals

## 9) DC Wiring

3-off 2-way terminal blocks are provided on the AC beacon for power. There are 2-off +ve, 2-off -ve, 1-off Stage 2 and 1-off stage 3 terminals in total.

### 9.1 Wiring Diagrams

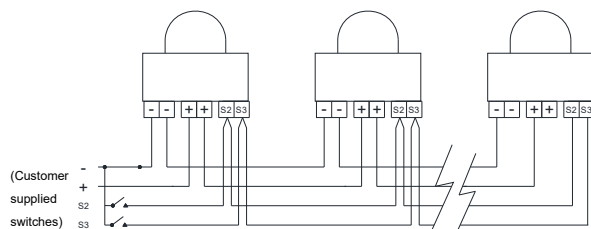


Fig. 5 D2XB1LD2 DC Simplified Block Diagram

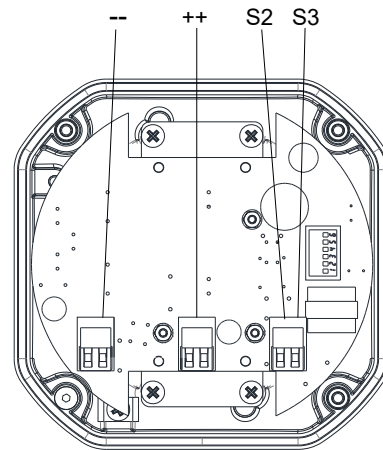


Fig. 6 D2XB1LD2 DC Terminals

### 9.2 Line Monitoring

On D2XB1LD2 DC units, 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. If an end of line resistor is used it must have the following values:

24V DC applications

Minimum resistance 3K9 Ohms

Minimum Power 0.5W

Minimum resistance 1K Ohms

Minimum Power 2.0W

48V DC applications

Minimum resistance 15K Ohms

Minimum Power 0.5W

Minimum resistance 3K9 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. 8a, remove the +ve and -ve terminal plugs and fit the resistor across the two terminal plugs before refitting them to the PCBA as shown in Fig. 8b. A spacing of at least 1/16" (1.58mm) must be provided through air and over surfaces between uninsulated live parts.

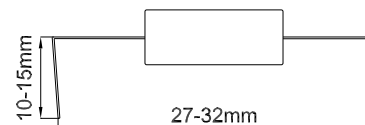


Fig. 7 End of Line Resistor Forming

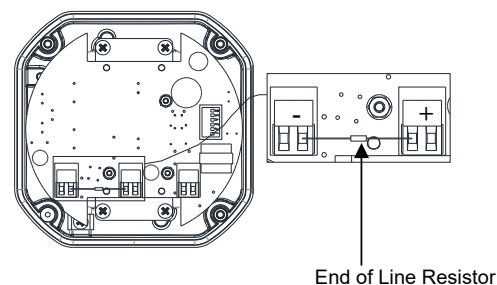


Fig. 8 End of Line Resistor Placement

## 10) Earthing

The unit has both internal and external earth terminals, (please see fig 3).

Internal earthing connections should be made to the internal earth terminal on the PCBA, (please see fig 5 for AC, fig 8 for DC). The earth conductor should be at least equal in size and rating to the incoming power conductors. The internal earth bonding wire connects the PCBA earth terminal to the internal earth terminal in the enclosure back box.

External earth 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<sup>2</sup> in size. The external earth crimp ring should be located between the two M5 plain washers provided and securely locked down with the M5 spring washer and M5 nut.

## 11) Settings

### 11.1 Flash Rate Setting



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

The D2xB1LD2 beacons 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 6.

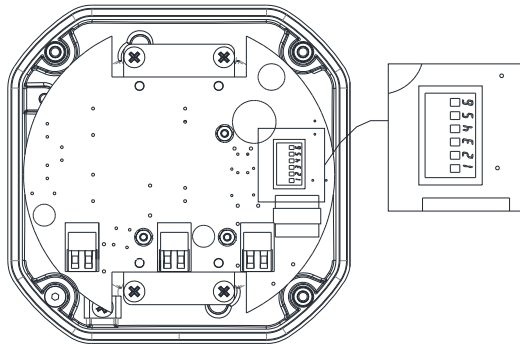


Fig. 9: DIP Switch Location

Switch Setting	S1 Mode	S2 Mode	S3 Mode
(123456)	(DC & AC)	(DC Only)	(DC Only)
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

(\*setting permitted for use as public mode fire alarm device)

Table 1: Switch Positions for Flash Patterns



Fig. 10 Dip Switch

1=ON; 0=OFF

Example shown: 100000 = Flashing 1Hz (Default setting)

## 12) Interchangeable & Spare Parts (General Signaling and Private Mode Alarm Versions only)



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. Please note that Private Mode Fire Alarm units can only be used with either clear or red lenses, Public Mode Fire Alarm units cannot be used with a lens or a guard.

To change the lens cover, unscrew the 4-off M5 posi pan head screws, spring and flat washers using a screwdriver. Remove the wire guard and replace the old lens cover with the new lens cover.

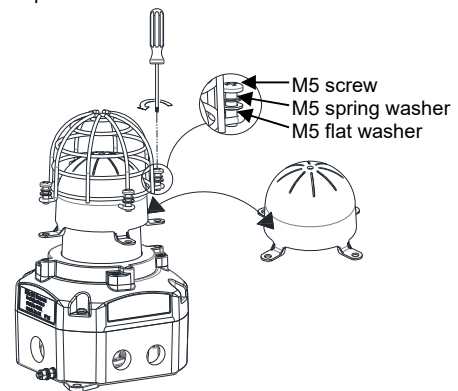


Fig. 11 Replacement of beacon lens cover

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.

### 13) 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 Explosive atmospheres - Equipment repair,  
IEC60079-19 overhaul and reclamation

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

To avoid a possible ELECTROSTATIC 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 prior to opening the unit.

## 14) Light output for Fire alarm use

In order to meet the requirements for UL 1971, (D2xB1LD2DC024 when used with 1Hz, 1.5Hz or 2Hz Flash rates and without plastic lens cover and wire guard only), the installation must be carried out to the correct NFPA standards and guidelines.

### 14.1 Horizontal Light Output Dispersion for wall mounting – public mode

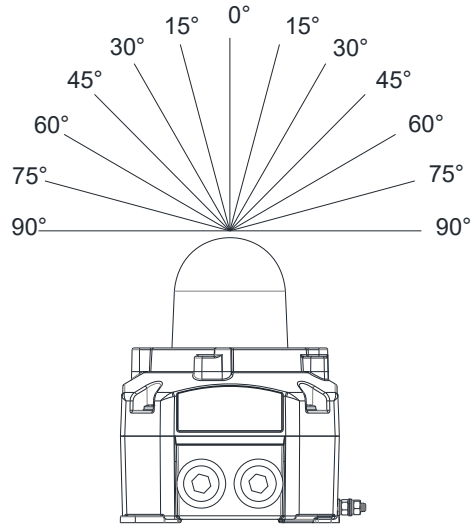


Fig. 12 – Horizontal dispersion angles for wall mounting

Table 3 - Horizontal Light Output Dispersion for Wall Mounting				
Viewing Angle	% Of Rating	Intensity (cd) at 1Hz flash rate	Intensity (cd) at 1.5Hz flash rate	Intensity (cd) at 2Hz flash rate
0°	100	38.38	35.87	25.97
5-25°	90	34.54	32.28	23.37
30-45°	75	28.79	26.90	19.48
50°	55	21.11	14.28	14.28
55°	45	17.27	11.69	11.69
60°	40	15.35	10.39	10.39
65°	35	13.43	9.09	9.09
70°	35	13.43	9.09	9.09
75°	30	11.51	7.79	7.79
80°	30	11.51	7.79	7.79
85°	25	9.60	6.49	6.49
90°	25	9.60	6.49	6.49
Compound 45° to Right	24	9.21	8.61	6.23
Compound 45° to Left	24	9.21	8.61	6.23

## 14.2 Vertical Light Output Dispersion for wall mounting – public mode

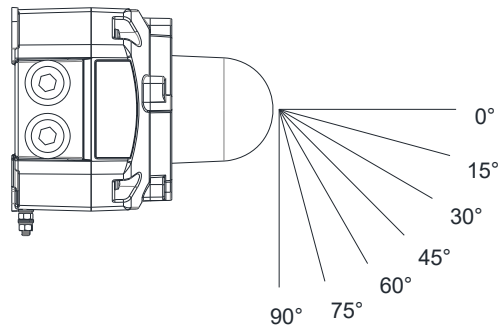


Fig. 13 – Vertical dispersion angles for wall mounting

Table 4 - Vertical Light Output Dispersion for Wall Mounting				
Viewing Angle	% Of Rating	Intensity (cd) at 1Hz flash rate	Intensity (cd) at 1.5Hz flash rate	Intensity (cd) at 2Hz flash rate
0°	100	38.38	35.87	25.97
5-30°	90	34.54	32.28	23.37
35°	65	24.95	23.32	16.88
40°	46	17.65	16.50	11.95
45°	34	13.05	12.20	8.83
50°	27	10.36	9.68	7.01
55°	22	8.44	7.89	5.71
60°	18	6.91	6.46	4.67
65°	16	6.14	5.74	4.16
70°	15	5.76	5.38	3.90
75°	13	4.99	4.66	3.38
80-90°	12	4.61	4.30	3.12



### 14.3 Vertical Light Output Dispersion for ceiling mounting – public mode

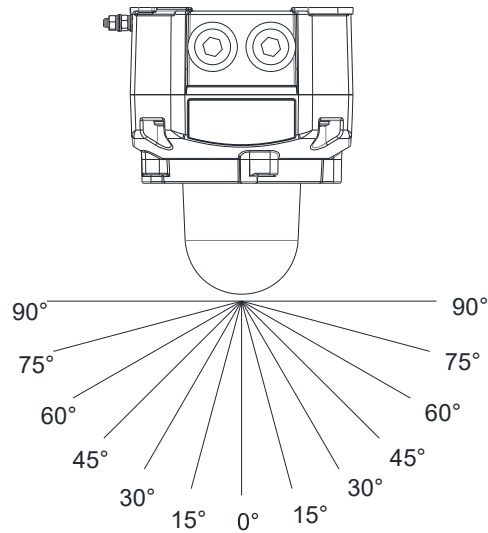


Fig. 14 – Vertical dispersion angles for ceiling mounting X and Y planes

Table 5 – Vertical Light Output Dispersion for Ceiling Mounting				
Viewing Angle	% Of Rating	Intensity (cd) at 1Hz flash rate	Intensity (cd) at 1.5Hz flash rate	Intensity (cd) at 2Hz flash rate
0°	100	38.38	35.87	25.97
5-25°	90	34.54	32.28	23.37
30-45°	75	28.79	26.90	19.48
50°	55	21.11	19.73	14.28
55°	45	17.27	16.14	11.69
60°	40	15.35	14.35	10.39
65°	35	13.43	12.55	9.09
70°	35	13.43	12.55	9.09
75°	30	11.51	10.76	7.79
80°	30	11.51	10.76	7.79
85°	25	9.60	8.97	6.49
90°	25	9.60	8.97	6.49

All light output ratings min. values as per UL 1971 / UL1638 / CAN/ULC-S526 at worst-case (min.) input voltage.

### 14.4 On-axis light output rating – private mode

Table 5 – Vertical Light Output Dispersion for Ceiling Mounting		
Model	Lens Cover Colour	Intensity (cd) at 1Hz flash rate
D2xB1LD2DC024	clear	73.4
	red	67.27

## 15) Electrical Ratings

### 15.1 Operating current Consumption

Model	Nom. Voltage	Voltage Range	Flash Rate Setting	Nom. operating current#	Max. operating current##
D2xB1LD2DC024	24Vdc	Regulated 24 (16-33Vdc)*	1Hz (60fpm)	99.5mA	273mA
			80 fpm	104mA	275mA
			2Hz (120fpm)	103mA	240mA
		18-54Vdc**	Steady High Power	242mA	346mA
			Steady Low Power	128mA	184mA
			Flashing 1Hz	99.5mA	147mA
			Flashing 1.5Hz	104mA	143mA
			Flashing 2Hz	103mA	146mA
			Flashing Double Strike	122.4mA	180mA
			Flashing Triple Strike	144.8mA	211.2mA
D2xB1LD2AC115	115Vac 60Hz	115-120Vac 50/60Hz	Steady High Power	83mA	102.4mA
			Steady Low Power	53mA	88.1mA
			Flashing 1Hz	68mA	99.7mA
			Flashing 1.5Hz	64.1mA	97.6mA
			Flashing 2Hz	59.2mA	93.8mA
			Flashing Double Strike	68.3mA	99.9mA
			Flashing Triple Strike	72.8mA	102.3mA
D2xB1LD2AC230	230Vac 50Hz	220-230Vac 50/60Hz	Steady High Power	52mA	52mA
			Steady Low Power	42mA	42mA
			Flashing 1Hz	70mA	75mA
			Flashing 1.5Hz	61mA	75mA
			Flashing 2Hz	51mA	62mA
			Flashing Double Strike	71mA	71mA
			Flashing Triple Strike	66mA	69mA

\* For Public Mode Fire Alarm use

\*\* For private mode Fire Alarm or General Signalling use

# nominal rms current at nominal voltage

## max. rms current at worst-case voltage in voltage range.

### 15.2 Surge current for Fire Alarm system use

Model	Nom. Voltage	Voltage Range	Flash Rate Setting	Init. Peak Surge Current (A)	Init. RMS Surge Current (mA)
D2xB1LD2DC024	24Vdc	Regulated 24 (16-33Vdc)*	1Hz (60fpm)	2.73	240
			80 fpm	2.75	214
			2Hz (120fpm)	2.33	204