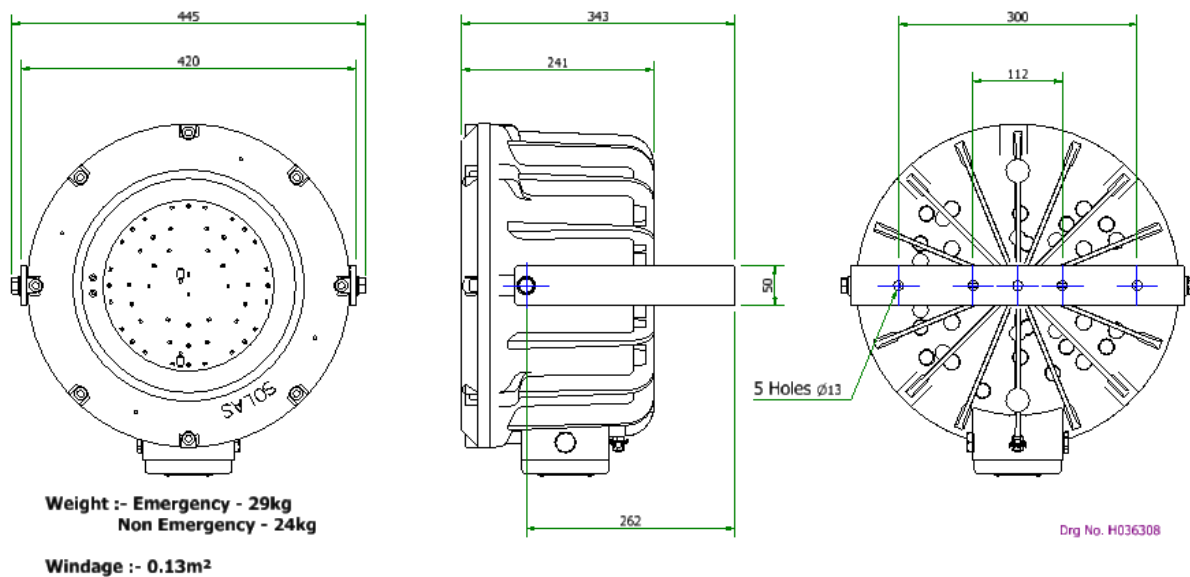


# INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

## SOLAS – LED Luminaire

**Important:** Please read these instructions carefully before installing or maintaining this equipment. Good electrical practices should be followed at all times and this data should be used as a guide only.





## 0.0 Specification

Type of Protection	Ex de (flameproof and increased safety).
Protection Standards	ABNT NBR IEC 60079-0, 60079-1, 60079-7, 60079-31,
Area Classification	Zone 1 and Zone 2 areas to ABNT NBR IEC 60079-10 and installation to ABNT NBR IEC 60079-14. Zone 21 and Zone 22 areas to ABNT NBR IEC 60079-10-2 and installation to ABNT NBR IEC 61241-14.
Certificate	IEx 15.0300
Equipment Coding	Ex db eb IIB T5 Gb, Ex tb IIIC T100°C Db IP6X -55°C to +55°C
Ingress Protection	IP66/67

### SPECIAL CONDITIONS FOR SAFE USE

None

## 1.0 Introduction – SOLAS Luminaire

The Solas is designed to be used from mains voltage and as a maintained or non-maintained emergency light. The emergency duration is for 90 minutes on full power or 180 minutes on half power. Situations where an area needs to be lit for escape purposes (life boat stations) 90 minute full power would be used. This is a specialised system which the luminaire incorporates 34 x 1w LED's, mains driver, emergency inverter and internal battery pack.

The battery is a 7Ah Ni-Cd with 18 cells. The battery is split into three sections which are individually monitored for voltage, in order to control over voltage and low voltage cut-off in a safe manner.

Two versions of the LED arrangement are provided. The circular arrangement provides a narrow spot beam. The array provides a wider beam. For details contact our lighting design section.

## 2.0 Storage

Luminaires are to be stored in cool dry conditions preventing ingress of moisture and condensation. Any specific instructions concerning emergency luminaires must be complied with.

## 3.0 Installation and Safety

### 3.1 General

There is no health hazards associated with this product whilst in normal use. However, care should be exercised during the following operations. Installation should be carried out in accordance with (IEC) EN 60079-14 or the local hazardous area code of practice, whichever is appropriate.

In the UK the requirements of the "*Health and Safety at Work Act*" must be met.

Handling and electrical work associated with this product to be in accordance with the "*Manual Handling Operations Regulations*" and "*Electricity at Work Regulations, 1989*". Your attention is drawn to the paragraphs (i) 'Electrical Supplies', (ii) 'Electrical Fault Finding and Replacement' and (iii) 'Inspection and Maintenance'. The luminaires are Class 1 and should be effectively earthed.

The luminaires are quite heavy and suitable means of handling on installation must be provided.

Certification details on the rating plate must be verified against the application requirements before installation.

The information in this leaflet is correct at the time of publication. The company reserves the right to make specification changes as required.



### **3.1.1 Use in Combustible Dust Atmospheres**

Where the SOLAS is used in ignitable dust atmospheres reference must be made to the selection and installation standards in order that the equipment is used correctly. In particular this applies to the de-rating of surface temperature for use where dust clouds may be present. Dust layers should not be allowed to accumulate on the fitting surface and good housekeeping is required for safe operation. Dust in layers has the potential to form ignitable clouds and to burn at lower temperatures.

Refer to ABNT NBR IEC 60079-10-2 & ABNT NBR IEC 61241-14 for additional details of selection, installation and maintenance.

### **3.1.2 Hybrid Mixtures – Gas plus Dust.**

Where Hybrid mixtures exist as defined in EN1127 as a potentially explosive atmosphere, consideration should be given to verifying that the maximum surface temperature of the SOLAS is below the ignition temperature of the hybrid mixture.

### **3.2 Tools**

5mm A/F socket keys.

4mm flat blade screwdriver. 19mm A/F spanners.

Suitable spanners for installation of cable glands.

Pliers, knife, wire strippers/cutters.

### **3.3 Electrical Supplies**

The charging system will accept rated voltages of 220 to 254V or alternatively 100 to 130V 50 or 60Hz

A maximum nominal variation from this is +/-6%. The safety limit for T rating is +10%.

### **3.4 Light Source**

This product is fitted with LED's that can last 60,000 hours depending on ambient temperatures. Therefore depending on the functionality of the fitting replacement of LED's will be rare /unnecessary. If the LED assembly needs replaced refer to **5.0 LED Replacement**.

### **3.5 Emergency Operation**

When the mains voltage is on, the battery is charged. Indicator LED's will tell if the fitting is charging or is fully charged.

The fitting can be either maintained or non-maintained with a 90 minute fully power emergency duration or 180 minute half power emergency duration (both when specified can't retrospectively be changed).

Emergency inhibition is standard to allow the emergency light to be used only when required.

i.e. as an abandonment light.

#### **3.5.1 Emergency Operation at -40 to -55 deg C.**

If the fitting is left without mains voltage after battery discharge (emergency function) for 12 hours or more it will result in a time delay to the charging regime when the mains voltage is available.

At -40 deg C there will be a delay of approx 45 minutes.

At -55 deg C there will be a delay of approx 65 minutes.

This is allowing the battery heater to raise the temperature of the batteries to accept the charge this is further indicated with the green LED starting to flash indicating that the batteries are charging, a further 24 hours will be required to achieve full charge.

### **3.6 Mounting**

Luminaires should be mounted where it is possible to gain access for maintenance and in accordance with any lighting design information provided for the installation. This will usually consist of aiming points and aiming angles.

The top mounting or trunnion mounting arrangements should be secured with lock washers or self-locking nuts and bolts.



### 3.7 Cabling and Cable Glands

#### 3.7.1 Cable Glands

The installer and user take responsibility for the selection of cables, cable glands and seals.

Cable glands and sealing plugs must have "Generation E". component approval.

The cable and gland assembly when installed must maintain the IP66/67 rating of the luminaire.

The cable gland must withstand an impact value of 7Nm where the risk of mechanical damage is high or 4Nm where the risk of mechanical damage is low.

The cable gland when fitted must a minimum of 6mm clearance from the Exe terminal block.

Sealing plugs must be similarly rated and a tool must be used for their removal. Where the cable is not reliably clamped externally to the apparatus, the cable gland must clamp the cable against a pull in Newton's of 20 x the cable OD in mm for non-armoured cable and 80 x the cable OD for armoured cable. Where brass cable glands are used in a corrosive environment cadmium or nickel plating should be used. Two tapped cable entries are provided, one with a plug and seal suitable for permanent use, the other has a travelling plug. M20 x 1.5 entries are standard, M25 x 1.5 entries optional.

#### 3.7.2 Cable

The temperature ratings of the entries are suitable for ordinary PVC cable (70°C). Users may wish to use fire resistant cables of 1.5mm<sup>2</sup>).

#### 3.7.3 Cable Connection

The cable connections are made by removing the terminal chamber cover. The retaining screws are captive and should be re-greased as required. No more than one single or multiple strand lead shall be connected into either side of any terminal, unless multiple conductors have been joined in a suitable manner, e.g. two conductors into a single insulated crimped bootlace ferrule. Leads connected to the terminals shall be insulated for at least 275v and this insulation shall extend to within 1mm of the metal of the terminal throat. All terminal screws, used and unused, shall be tightened down to between 1.2 Nm and 2 Nm. The core must be identified by polarity and connected in accordance with the terminal markings. Before re-fitting the cover, a final check on the correctness of connections should be made. Ex e cover bolt torque 6Nm.

### 4.0 Commissioning

The luminaire is always wired for connection to a remote switch. Inside the Exe terminal box you will see two (white sleeved) cables connected into the terminal block these are the inhibition wires, supplied and fitted will be a comb or link (fitted for transit only). **The comb or link must be removed** to allow the fitting to work in emergency mode when mains voltage fails. If the inhibition function is to be used connect to a remote inhibition switch.

Following the wiring up and checking of the equipment, the operation is checked when the mains supply becomes available. Energise the mains for an hour or more. Switch off the mains and run fitting till it goes out. Re-energise the mains supply for 24 hours. Switch off the mains and the LED's will go on (unless fitted with inhibition switch). The duration should be 90 or 180 minutes minimum depending on what was specified. If the mains voltage is still available re-energise the mains supply for 24 hours or more to fully charge batteries.

### 5.0 LED Replacement.

The need and frequency of replacing LED's be dependent on the functionality of the fitting. If it is running as a maintained or non-maintained unit and if it is continually running at high ambient temperatures these will affect the frequency of LED replacement. If it is necessary to replace the LED's, all the LED's will be replaced as an assembly mounted on an aluminium back plate. The full assembly supplied by Chalmit.

The area should be gas free, (this is because there are un-assessed electronic components in the unit and these could retain stored energy). Release the front cover, before letting the cover hang check that the securing chain is secure and in good condition.



Removal of LED assembly is as follows:

1. Unscrew 6 off M3 screws that secure the aluminium plate to the case.
2. Carefully remove the red and green indicating LED's from the plate (retain as these will be used).
3. Disconnect the LED + and – wires from the terminal block.

Replacement of LED assembly is the reverse of the removal. Take care that the + and – wires from the assembly are connected correctly into the terminal block.

The flameproof path should have a generous coat of silicone (*Dow Corning Molykote III* or similar), or other protective non-setting grease. Replace all bolts and fully tighten. Torque to 16Nm.

## 6.0 Electrical fault finding and Replacement

Any fault finding must be done by a competent electrician with the luminaire isolated and if carried out with the luminaire in place, under a permit to work. Fault finding is by substitution with known good components.

## 7.0 Inspection and Maintenance

Individual organisations will have their own procedures for inspection and maintenance. What follows are guidelines based on ABNT NBR IEC EN60079-17 and on our experience. Maintenance work and fault finding must be performed by competent personnel under an appropriate permit to work and with the apparatus isolated. Frequency of maintenance will depend on experience and the operating conditions.

**Luminaire should not be opened when an explosive atmosphere is present.**

- 1 Check if any LED's have failed (do not light).
- 2 If there is 7 or more not working the light output will have dropped to a level the LED assembly may need replaced. Refer to 5.0 LED Replacement.
- 3 Check the luminaire terminal chamber bolts for tightness. Torque to 6Nm.
- 4 Check the cable glands for tightness and nip if necessary.
- 5 Check any external earthing.
- 6 Examine the lamp glass for any signs of damage and for any signs of sealant damage, cracking or discoloration. If thought necessary, the silicone weather seal can be re-sealed with a proprietary brand of clear RTV silicone, but only if the underlying sealant is in good condition. Any damage to the glass the front glass cover assembly must be replaced. Check luminaire cover bolts for tightness. Torque to 16Nm.
- 7 Check for signs of corrosion between the front glass cover and main housing. Evaluation of this will be a matter of judgement and experience, as there may be little evidence on the outside. If there are serious signs of corrosion remove the cover, wipe the flameproof path with a clean cloth and non metallic scrapper. Examine the surface for pitting any pitted component must be replaced. A damaged or non resilient cover gasket must be replaced and bonded into groove. The cord diameter is 3mm.  
The cover should be re-greased with silicone (*Dow Corning Molykote III* or any non-setting grease) and all bolts fully tightened. Any replacement bolts must be identical with the original.  
All are 18/8 stainless steel with a minimum of ISO262 Grade A 2-70.  
With this type of flameproof enclosure all the bolts must be in place and tightened. The maximum gap for IIB in this case is 0.15mm. It would be unusual for any of our luminaires to have a gap exceeding 0.1mm when tried with a feeler gauge. If 0.1mm is exceeded check that no foreign bodies or debris at the bottom of blank tapped holes are keeping the surfaces apart and if not, a workshop overhaul should be carried out to bring the unit into new condition. Even if there are no signs of external corrosion the front cover should be removed at a minimum of every 3 years and the internal connections checked for tightness and any signs of overheating.
- 8 Examine the batteries for any signs of leakage or corrosion and if this has taken place the battery packs must be replaced. Refer to 5.0 LED Replacement (which will allow you to examine the batteries). Use only replaceable batter pack, SAFT battery pack Part No: 6VT FH 70 EX.
- 9 The terminal chamber should be opened periodically and checked for moisture ingress. The cable connections should be checked for tightness. The gasket should be checked for lack of elasticity and if necessary replaced and bonded into groove (it may well be practical to replace the gasket on each occasion if this is 2-3 year interval). Torque to 6Nm.



- 10 If painting operations have taken place near the luminaire ensure that coatings have not entered into the flameproof path or been deposited on the glass. If they have been, dismantle and clean carefully.
- 11 Check the mountings are secure.
- 12 Cover the bolt heads with silicone grease to prevent corrosion and the accumulation of dirt and screw threads.
- 13 Clean the glass.
- 14 If there is suspicion that the luminaire has suffered mechanical damage, a stringent workshop check should be made.

## 8.0 Current Ratings

The power drawn by luminaire when charging:

Solas Emergency	Watts Boost charge No heater	Watts Constant charge No heater	Watts Boost charge with heater	Watts Constant charge with heater
maintained	80	73	119	114
Non-maintained	23	11	62	52
Normal Operation Non Emergency Version				
Solas	62	-	-	-

Battery charging regime: a. 0.5 hours at C/20 (350mA)  
b. 5 hours boost at C/10 (700mA)  
c. constant charge C/20 (350mA)

Solas Emergency	Mains current. Amps	During 5 hour boost charge with heater on.
Maintained with heater	0.5	0.6
Non-maintained with heater	0.23	0.37
Maintained without heater	0.33	-
Non-maintained without heater	0.05	-
Solas non-emergency	0.27	-

For voltages between 100-130V 50/60Hz power values remain as shown, current values increase by x 2.

Fuse & MCB Rating:- Inrush current 60A - 100µs.

## 9.0 Disposal of Material

The units are chiefly made of incombustible material. The control gear contains electronic components and synthetic resin. All these may give off noxious fumes if incinerated. Care must be taken to render these fumes harmless and avoid inhalation. Any local regulations concerning disposal must be complied with. Any disposal must satisfy the requirements of the WEEE directive [2012/19/EU] and therefore must not be treated as commercial waste. The unit is mainly made from incombustible materials. The control gear contains plastic, resin and electronic components. All electrical components may give off noxious fumes if incinerated.

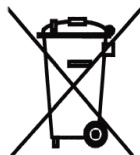
### 9.1 Battery Disposal

Nickel cadmium batteries are defined as 'controlled waste' under the hazardous waste regulations and the disposer needs to observe a 'duty of care'.

Batteries can be returned to the manufacturers for recycling. They must be stored and transported safely and any necessary pollution control forms completed prior to transportation. Take care to fully discharge batteries





before transporting or otherwise ensure that there can be no release of stored energy in transit. For further details refer to our Technical Department.



To comply with the Waste Electrical and Electronic Equipment directive 2012/19/EU the apparatus cannot be classified as commercial waste and as such must be disposed of or recycled in such a manner as to reduce the environmental impact.

**Chalmit Lighting is a leading supplier of Hazardous Area lighting products**

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**For technical support, please contact: techsupport@chalmit.com**

Note: Chalmit Lighting reserves the right to amend characteristics of our products and all data is for guidance only.