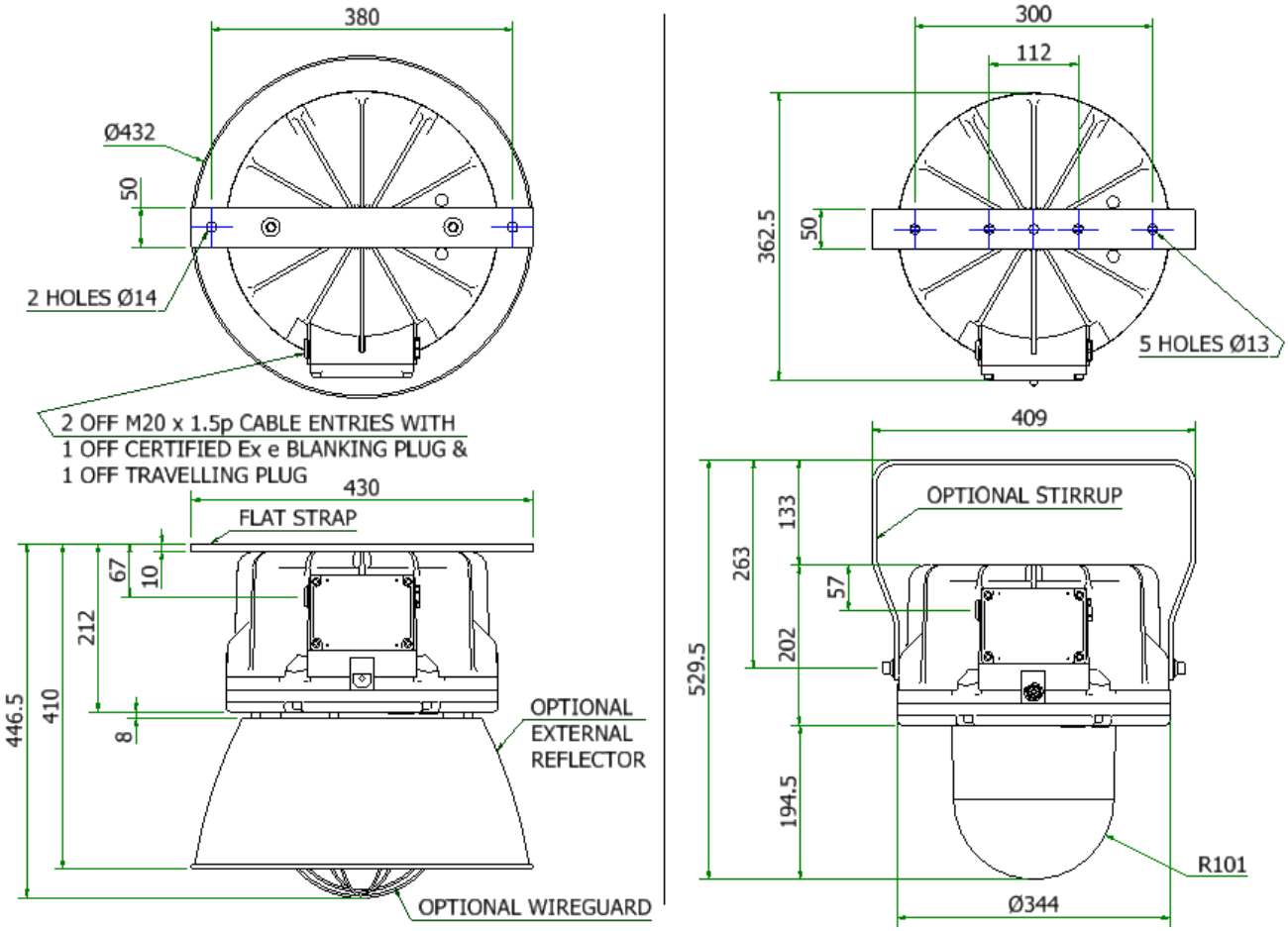
Issue 06

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

238 - Wellglass Luminaires

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	CAN/CSA C22.2 No. 60079-0: 07 CAN/CSA C22.2 No. 60079-1: 07 CAN/CSA C22.2 No. 60079-7: 12
Area Classification	Class I, Zone 1 or Class I, Zone 2 hazardous locations.
Certification	File No.: 201067 CSA 14.2683406
Equipment Coding	Ex d e IIB Gb T( ), Ambient Temperature: -50ºC to +( )ºC (See Table 0 for ratings.)
Ingress Protection	IP66

1.0 Introduction - 238 Wellglass Luminaire.

The type 238 Wellglass Luminaire is designed for all round and high bay applications. It is suitable for use with elliptical discharge lamps. An external reflector is available.

Note: *Lamp ranges and temperature ratings are outlined in TABLE 0.*
The wellglass is certified for -50ºC

2.0 Storage

Luminaires and control gear boxes 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 are no health hazards associated with this product whilst in normal use. However, care should be exercised during the following operations. Installation shall be carried out in accordance with *CSA C22.1, Part I of the Canadian Electrical Code (specifically for hazardous locations, installation shall be in accordance with Section 18 of Part I of the Canadian Electrical Code)* and in addition if applicable in accordance with the local hazardous area code of practice and fitting of specified insulating material to be adhered to where a specific fire resistance rating is required.

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.

3.2 Tools

8, 6, 5mm A/F socket keys.
3mm and 5mm flat blade screwdriver, 19mm A/F spanner.
Suitable spanners for installing cable glands.
Pliers, knife, wire strippers/cutters.

3.3 Electrical Supplies

The supply voltage and frequency should be specified when ordering. A maximum voltage variation of +6%/-6% on the nominal is expected. (The safety limit for T rating is +10%). Luminaires should not be operated continuously at more than +6%/-10% of the rated supply voltage of the control gear or tapping. The user must determine the ***actual*** underlying site

supply and purchase or adjust accordingly. In this case, the luminaires have multi-tapped control gear which can be set to the appropriate voltage. The tappings are shown on the control gear and the limits are shown on the rating plate. They are selected by the supply cable. If the equipment is located in high or low voltage sections of the system, an appropriate voltage tap should be selected, but care must be taken to log or mark the equipment so that the tapping is re-set if the equipment is re-located. If in doubt, tappings should be set on the high side. 10V Max. drop is desirable for HPS and advised for MBI. The light output will be reduced. The figures given are at the luminaire. Where Metal Halide (MBI) lamps are used, the tapping must be set accurately for best performance.
Where shore or construction site supplies are used, which are different to the service supplies, the tappings should be re-set. If not, advice on the effect of these temporary supplies should be sought from the Technical Department.
Where adverse system conditions occur, luminaires can be supplied without pfc. The circuit current will then be the lamp current, the circuit power does not change.

3.4 Lamps

The lamps used in this range are of a standardised type, and there is no preference between makes, or in the case of HPS colour. The cap is E40 or E27. Due to the need to control photometric performance and certification conditions, and avoid incorrect lamps being fitted, the type of lamp and size is specified on the rating plate. If mixed installations are used, care must be taken to ensure that the correct lamp is fitted on installation and replacement.
HPS/MH lamps substantially maintain their light output to the end of their electrical half life, which again can be up to 24,000 hours. However, lamp replacement at around 16,000 hours is desirable to avoid piecemeal replacement on a large scale. ***HPS and MH lamps should be replaced shortly after they do not light***. One indication of the end of life for HPS lamps is 'cycling' where the lamp goes out then re-ignites after a minute or so interval. If discharge luminaires are burned continuously they should be switched off occasionally, to allow old lamps to fail to re-ignite rather than possibly become diodes with detrimental effects on control gear. The above information is current at the time of publication. The development of lamps and control gear is ongoing and detailed advice on lamp performance can be obtained from the Technical Department or the lamp supplier. ***HPS and MH circuits should not be energised without a lamp fitted***. HPS lamps without an internal ignitor should be used. The current HPS control gear is incompatible with internal ignitor lamps.

3.5 Mounting

Luminaires should be installed where access for maintenance is practical 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.

3.6 Cabling and Cable Glands

3.6.1 Cable Glands

The cable entry temperatures are given as the rise over the maximum rated ambient (Tamb). This allows the user to adjust the cable spec. for actual maximum site ambient.
The maximum conductor size is 6mm². Internal and external earth points are provided. 300/500V cable ratings are adequate and no special internal construction is necessary as the terminations are Ex e. The standard looping cable size is 6mm². The selection of cable size must be suitable for the fuse rating. Some guidance on this is given below. The fuse ratings apply to the circuit on the supply side of the control gear.

3.6.2 Cable Entry

The installer and user must take responsibility for the selection of cables, cable glands and seals.
Cable glands used must be Ex e certified to CAN/CSA C22.2 No. 60079-0 and CAN/CSA C22.2 No. 60079-7.
Cable glands for entry into Ex e enclosures when fitted with any gland to body sealing method and the supply cable must reliably maintain the IP rating of the enclosure (IP66). 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.
Sealing plugs must be certified and rated the same as the cable gland 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 Newtons of 20x the cable OD in mm for non-armoured cable and 80x 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, other sizes are available on request.

3.6.3 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. The conductors should be bared back so that they make full contact in the terminals, but the bare conductor should not be more than 1mm beyond the terminal. With the ceramic terminal block (2.5mm² max) either there

should be a pair of equal conductors or, where the conductors are not looped, a 'U' should be made to allow equal clamping of both sides. Unused terminal screws should be tightened. 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. Cover bolt torque 6Nm (8lbf).. Where control gear tappings need to be re-selected, the lampglass needs to be removed (see below). Undo the three screws and extract the reflector then re-select the taps (see 'Electrical Supplies' above).

3.7 Fitting Lamps

Make sure the correct lamp is selected as detailed above. Access for fitting lamps is gained through the lamp glass cover. This should be removed. Take care not to hang the lamp glass on one bolt when removing or replacing. Before removing the lamp glass on any occasion, check that the suspension chain is secure and in good condition. The lamp should be firmly screwed into place. The flameproof path should have a coat of silicone grease (Dow Corning "Molykote III" or similar) or other protective non-setting grease suitable for high temperature. Replace all bolts and fully tighten. Torque 16Nm (11.8lbf).

3.8 Inspection and Maintenance

Visual inspection should be carried out at a minimum of 12 monthly intervals and more frequently if conditions are severe, refer to *CEC 22.1 and IEC 60079-17*. The time between lamp changes could be very infrequent and this is too long a period without inspection.

3.8.1 Routine Examination

The equipment must be de-energised before opening and note taken of the rated opening delay periods alternatively the nameplate may read ‘do not open when an explosive gas atmosphere is present’. Individual organisations will have their own procedures. What follows are guidelines based on *IEC 60079-17* and on our experience:

1 Ensure the lamp is lit when energised and that the lamp glass is not damaged.
2 When de-energised and left to cool there should be no significant sign of internal moisture. If there are signs of water ingress, the luminaire should be opened up, dried out, and any likely ingress points eliminated by re-gasketting, re-greasing or other replacement.
3 Check the terminal chamber bolts for tightness. Torque 6Nm (8lbf)..
4 Check the cable gland for tightness and nip up if necessary.
5 Check any external earthing.
6 Examine the lampglass 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.
7 Check all cover bolts for tightness. Torque 16Nm (11.8lbf).
8 Check for signs of corrosion between the lampglass cover and the main housing. Evaluation of this will be a matter for judgement gained by experience, as there may be little evidence on the outside. If there is any sign of corrosion, remove the cover and wipe the flameproof paths with a clean cloth and non-metallic scraper. Examine the surfaces for pitting; any pitted component should be replaced. A damaged or non-resilient gasket must be replaced. The cord is 3mmØ. The cover should be re-greased with silicone (Dow Corning 'Molykote III' or similar) or other non-setting grease suitable for high temperatures, and re-fitted with all bolts fully tightened. Any replacement bolts must be identical to the original. All are 18/8 stainless steel with a minimum of ISO262 grade A2-70. With this type of flameproof path all bolts must be in place and tight. The maximum gap for IIB in this case is 0.2mm (0.008”). It will be unusual for any luminaire to have a gap of more than 0.1mm (0.004”) when tried with a feeler gauge. If 0.1mm is exceeded, check that no foreign bodies or debris at the bottom of the blind tapped holes is keeping the surfaces apart and, if not, a workshop overhaul should be carried out to bring the apparatus to as new condition. Periodically, when the lampglass is removed, the opportunity should be taken to remove the reflector, check the lampholder connections for signs of over-heating and similarly check the control gear.
9 The terminal chamber should be opened periodically and checked for moisture and dirt ingress. The cable connections should be checked for tightness. The gasket should be checked for cracks or lack of elasticity, and if necessary, replaced. (It may well be practical to also replace the gasket on each occasion if this is at a 3-year interval). Torque 6Nm (8lbf).
10 If painting operations have taken place around the luminaire, ensure that coatings have not entered the flameproof path or been deposited on the lampglass. If they have, dismantle and clean carefully.
11 Check that mountings are secure.
12 Cover the bolt heads with silicone grease to prevent corrosion and accumulation of dirt in the screw threads.
13 Clean the lampglass.

14 If there is suspicion that the luminaire has suffered mechanical damage, a stringent workshop check should be made.

Important: *Where spares are needed, these must be replaced with manufacturers parts. No modifications should be made without the knowledge and approval of the manufacturer.*

3.9 Electrical Fault Finding and Replacement

The supply must be isolated before opening the luminaire.

Control gear will not normally go open circuit unless it has overheated first and the signs of this are obvious, being severe discoloration of the paint on the gear and cracks in any exposed insulation. Similarly, a bad contact at the lamp cap will usually result in signs of overheating. Any fault finding must be done by a competent electrician and, if carried out with the luminaire in place, under a permit to work.

With HPS and MBI lamps the ignitor can become faulty. If the lamp is fitted, the choke has continuity and the connections are good and correct, they should produce an 'attempt to start' effect and a buzzing sound from the ignitor. It will be unusual to have no other parts available to perform a substitution fault finding routine and this is the normal procedure. Before re-assembling, all connections should be checked and any damaged cable replaced. The ignition connection to the lampholder is sleeved with H.T. sleeving and this must be kept in place.

4.0 Fuse Ratings

The fuse ratings for HID lamp circuits need to take account of three components of circuit current. Current inrush to PFC capacitors which can be up to 25 x the rated capacitor current and last 1-2 millisecs; lamp starting current including steady capacitor current which together may decline from up to 200% of normal at 10 seconds after switch-on to normal after 4 minutes; rectification effects caused by asymmetrical cathode heating for a few seconds after starting, this effect is random and very variable.

With the availability of MCB's with a wide range of characteristics, the individual engineer can make a better judgement of what is required. Use MCB's suitable for inrush currents to reduce ratings. The normal capacitor current will probably be the determining factor, 0.076A per µF at 240V, 50Hz (adjust for other volts by multiplication, x 6/5 for 60Hz). For HBC fuses use 1.5 x normal capacitor current. All calculations must satisfy CEC 22.1 wiring regulations.

Note: *Starting and running currents for 240V, 50Hz are as indicated in TABLE 1. A conventional matrix for HBC fuses is shown in TABLE 2.*

5.0 Disposal of Material

The unit is mostly made from incombustible materials. The capacitor is of the dry film type and does not contain PCB's. The control gear contains plastic parts and polyester resin. The ignitor contains electronic components and synthetic resins. All electrical components may give off noxious fumes if incinerated. Take care to render these fumes harmless or 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.

5.1 Lamps

Discharge lamps in modest quantities are not "special waste". The outer envelope should be broken in a container to avoid possible injury by fragmentation. Pay close attention to local regulations regarding waste.

Important: *Do not incinerate lamps.*

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.

	Table 0	Lamp Ranges and Temperature Ratings					Refer to Section: 1.0
	Lamp	**Wattage**	**Rated Supply**	**T Class**	**T amb ºC**	**Rated Cable ºC**	**Cable Temp. Rise Above amb ºC**
	SON/E	70	208 to 254V 110 to 130V 50/60Hz	T4	50	75	25
	SON/E	70		T4	60	90	25
	SON/E	70		T5	40	75	25
	SON/E	100		T4	60	90	30
	SON/E	100		T4	40	75	30
	SON/E	150		T3	55	90 (90ºC 120V)	35
	SON/E	150		T4	40	75	35
	MBI	70		T4	50	75	25
	MBI	70		T4	60	90	25
	MBI	70		T5	40	75	25
	MBI	100		T4	60	90	25
	MBI	100		T4	40	75	25
	MBI	150		T4	40	75	35
	MBI	150		T3	55	90 (90ºC 120V)0	35
	SON/E	250	208 to 254V, 50/60Hz	T3	45	90	45
	MBI	250		T3	45	90	40

	Table 1	Starting and Running Currents (at 240V)			Refer to Section: 4.0
	Lamp	**Start A**	**Run A**	**Capacitance µF**	**Circuit Power (W)**
	70W HPS	0.72	0.45	10	85
	100W HPS	1.00	0.56	10	114
	150W HPS	1.35	0.9	20	175
	250W HPS	2.34	1.4	30	286
	70W MBI	0.72	0.45	10	85
	100W MBI	1.00	0.56	10	114
	150W MBI	1.60	0.9	20	175
	250W MBI	2.70	1.4	30	286

For 110/120V versions increase current values by a factor of two

Note: *Minimum power factor correction: 0.85.*

	Table 2	Fuse Ratings (At 240V)					Refer to Section: 4.0
	Lamp	Number of Lamps					
		1	2	3	4	5	6
	70W HPS	4A	4A	4A	6A	6A	10A
	100W HPS	4A	4A	6A	10A	10A	10A
	150W HPS	4A	6A	10A	10A	16A	16A
	250W HPS	10A	16A	16A	20A	20A	20A
	70W MBI	4A	4A	4A	6A	6A	10A
	100W MBI	4A	4A	6A	10A	10A	10A
	150W MBI	4A	6A	10A	10A	16A	16A
	250W MBI	10A	16A	16A	20A	20A	20A

For 110/120V versions increase fuse values by a factor of two

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