

AIRPORT EQUIPMENT

INSTALLATION AND MAINTENANCE INSTRUCTIONS

and

SPARE PARTS LIST

for the

SWITCHABLE, 203_{MM} (8") HIGH INTENSITY, INSET TAXIWAY
CENTRELINE & STOPBAR FITTINGS

TYPE ZA280S & ZA281S



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ISSUE RECORD

	Issue Status		
ISSUE:	1	2	
DATE:	August 02	Dec. 2003	
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SAFETY ADVICE NOTICE

Please ensure that personnel are made aware of all safety aspects. **Appendix 'A'** contains safety advice. This appendix can be copied and used to record authorised personnel.

TOOLS AND CONSUMABLES

- 11mm A/F socket.
- 17mm A/F socket.
- Ratchet spanner.
- Torque wrench.
- Fitting extractor tool. Alstom SLC 21226.
- Mild detergent.
- Stiff bristle paint brush.
- Contact cleaning fluid in an aerosol.
- Lint free cloth.
- Loctite grade 222.
- Compressed air system capable of 10 PSI minimum.
- 1/8th BSP adaptor for compressed air system.
- Tank of clean water.

Issue : 2
 Fitting : Switchable ZA280 S & ZA281S, 200mm (8") dia. High Intensity, Inset Taxiway Centreline & Stopbar fittings.
 Ref : L:\Avd\IMM CURRENT\immza280s_281s-2

Date : Dec. 2003
 Author : ALL
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SWITCHABLE ZA280 S & ZA281 S, 203_{MM} (8") HIGH INTENSITY, INSET TAXIWAY CENTRELINE & STOPBAR

1. INTRODUCTION

The ZA280 S and ZA281 S, high intensity, taxiway centreline and stopbar fitting meets ICAO requirements for Categories I, II and III, all weather operation lighting systems.

Fittings are normally supplied complete with two long life, low energy reflector lamps and two 'B' type (L823) plug leads.

The fitting is lightweight and robust due to its predominantly aluminium alloy construction which also gives good protection against corrosion. The glass prisms or aluminium prism blanks are accurately located in the main body casting, secured by a retaining clamp without the need for sealing compounds.

The optical system employed is completely adjustment free on installation and in service thereby considerably simplifying installation and maintenance procedures.

It is suitable for installation into:

- 203mm (8") ZM109 2 stud version of seating pot, . dry or wet versions.
- 203mm (8") ZM181 seating pot, 'wet' versions.
- 203mm (8") ZM203 i seating pot, dry or wet versions.
- A range of PSA and FAA adaptors to suit 305mm (12") dia. and 394mm (15.5") dia. mountings.

All of these options are supplied separately to order.

2. SITE PREPARATION FOR INSTALLATION OF ZM109, ZM181 OR ZM203I SEATING POT

Prior to the installation of the selected style of seating pot, the runway pavement will have been correctly prepared in accordance with **IMM-ZM-seating-pots-3**.

- Align the seating pot level so that the two fixing studs locate the fitting in the correct orientation to provide the required beam angle(s), relative to the runway centreline.

Important Note:

When an Alstom ZA280 S or ZA281 S Taxiway Centreline or Stop Bar fitting is to be mounted into an ALSTOM ZM181 or a ZM203 i Seating Pot.

- Install the pot into the taxiway in the orientation shown in diagram below. (i.e. An axis taken through the M10 holding down studs is at 60° to the Taxiway Centreline). See **Fig. 1**.

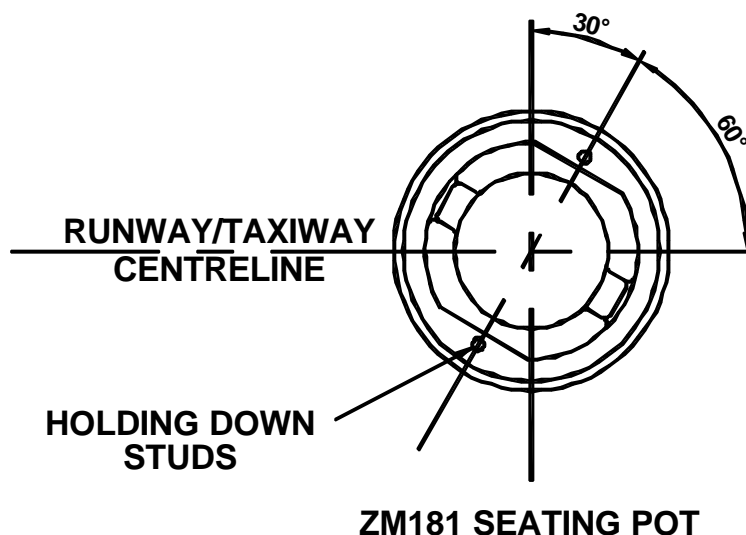
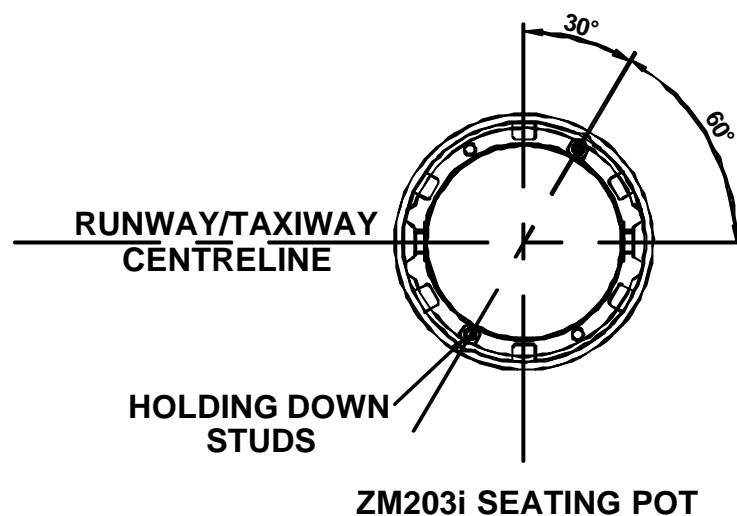


Fig. 1.

3. INSTALLATION INTO ZM109, ZM181 OR ZM203I SEATING POT OR ADAPTOR

The seating pot and transformer secondary socket lead will have been installed in accordance with section 2.

Note. When the ZA280 body casting is viewed from above with the ALSTOM logo at the 12 O'clock position, the left hand lead supplies the left hand prism. The light colours are specified using this same convention so, for example, in a fitting designated as green/yellow, the left hand prism will show green light and the right hand prism will show yellow light when both lamps are illuminated.

WARNING DO NOT USE THE EXTRACTOR TOOL FOR CARRYING A FITTING TO OR FROM THE SEATING POT.

- Check that the light unit is of the correct type/option for the relevant position on the runway in accordance with a site plan.
- Remove the two holding down M10 nuts and washers in the seating pot; Check that the studs themselves are fully home in the seating pot. (ie. do not project more than 2mm above the rim of the pot).
- Clean out any debris from the pot seating area. Check that there are no internal protrusions or casting faults on the seating surface.
- Check the underside of the seating surface of the light unit for debris, which would prevent correct beam alignment.
- Wipe clean the moulded plug and socket connector mating surfaces. Ensure that the female connector contacts are free from debris. When necessary, flush out with a suitable contact cleaner aerosol.
- Connect the secondary lead plugs into the appropriate transformer secondary lead sockets in accordance with the site layout information. Take care to observe correct pin polarisation.
- Insert the light unit into the seating pot, oriented correctly to the site plan, using the extractor tool recommended for this purpose, ALSTOM type SLC21226. Take care not to trap any leads between mating surfaces.
- Re-assemble both M10 crinkle washers and nuts to secure the light unit in the seating pot. Tighten each nut a little at a time, in turn, until a torque of 40Nm (29lbf.ft) is achieved.
- RE-TIGHTEN THE HOLDING DOWN NUTS TO 35Nm (25lbs. ft) TORQUE, 1-2 WEEKS AFTER INITIAL INSTALLATION THEN PERIODICALLY AT PLANNED MAINTENANCE INTERVALS.

4. REMOVE A FITTING FROM A SEATING POT

WARNING. DO NOT USE THE EXTRACTOR TOOL TO CARRY THE FITTING TO OR FROM THE SEATING POT.

For all light fittings.

- Release and remove the M10 nuts and washers and put safely aside for use when re-assembling a 'new' taxiway light. Discard and replace any damaged items and replace with new items to the same specification.
- Lift the light fitting out of the seating pot using the extractor tool ALSTOM type SLC21226.

- For installation of a replacement fitting, see section 3.

5. ON SITE MAINTENANCE

On site maintenance will normally be restricted to cleaning of prisms, and inspection for damage to the prisms and seals.

- Clean dirt and oil from the exposed surfaces using a suitable detergent applied with a bristle paint brush.

DO NOT use abrasives or detergents with high alkalinity on the prism surfaces.

- Replace a failed fitting with a new or re-furbished fitting of an identical type.
- Re-lamp the fitting in a workshop environment.

When a fitting fails to energise.

- Return a failed fitting to ALSTOM Power Conversion Ltd., Airports Division, for evaluation & possible overhaul.

6. WORKSHOP MAINTENANCE

The main tool required for dis-assembling the fitting is a 5mm A/F Allen Key.

When a fitting is dis-assembled either for lamp changing or at planned maintenance periods.

- Carry out a comprehensive inspection. (This can prevent future failures in service and allows an efficient spares holding policy to be defined).
- Generate local site documentation to record the status of fittings and major components kept.
- Only use approved replacement components. DO NOT attempt to repair any components.
- Re-assemble the fitting in reverse order to dis-assembly, with the addition of Loctite 222 Screwlock applied on all M6 screw threads to ensure the correct torque is maintained after tightening.

6.1 PREPARATION AND CLEANING

To avoid internal contamination when the fitting is dis-assembled.

- Locate in a 'dirty' area.
- Clean any dirt or oil from its external surfaces prior to opening the fitting for inspection and maintenance reasons. Use a suitable household detergent applied with a stiff bristle paint brush.

- Clean the prisms external surfaces. DO NOT use abrasive substances or detergents with high alkalinity.
- Wash in clean water and remove all traces of moisture from the light units exterior surfaces. DO NOT use compressed air to the prism surfaces.
- Locate in a 'clean' area.

6.2 DIS-ASSEMBLE BODY ASSEMBLY FROM BOTTOM COVER ASSEMBLY

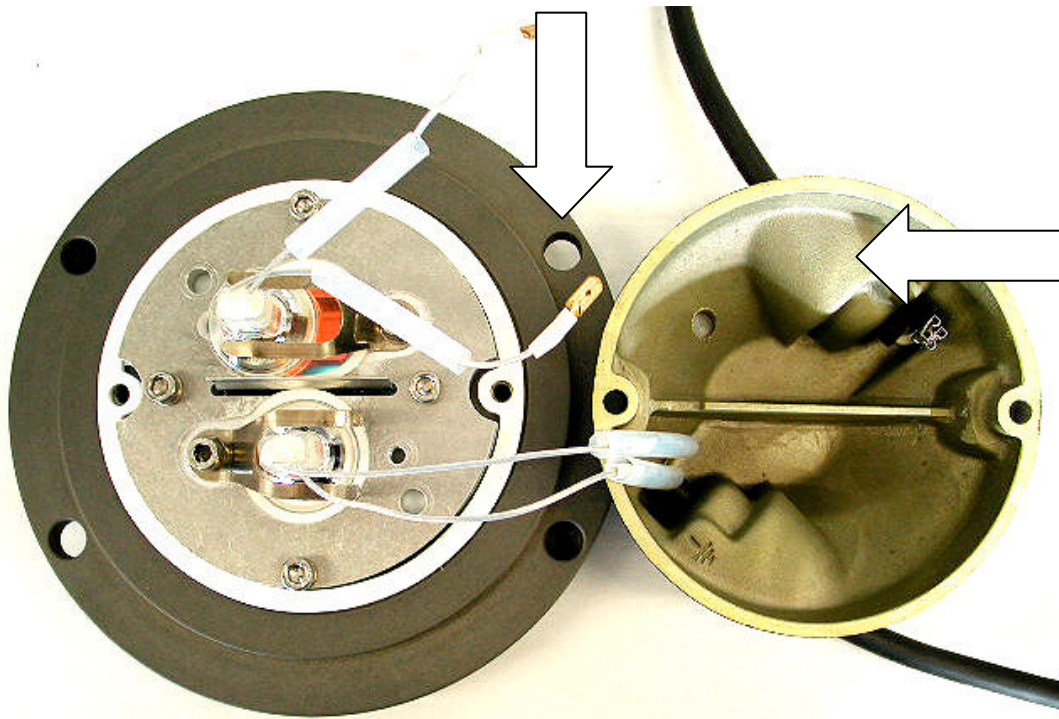


Fig. 2. Fitting inverted and Bottom Cover dis-assembled.

Carry out the following work in a workshop environment that is free from dust, vapours and other atmospheric pollutants likely to cause contamination of prism, lamp and reflector surfaces.

- Place the light fitting on a clean, flat, work surface with its bottom cover uppermost.
- Release and remove the two M6 cap head screws attaching the bottom cover to the body assembly. Place the screws and crinkle washers aside for re-assembly. Discard any damaged items.
- Carefully remove the bottom cover (9) and disconnect lamp from the plug lead terminations. See **Fig. 2**.
- Place bottom cover onto the work surface, bell mouth uppermost.

6.3 BODY ASSEMBLY MAINTENANCE

6.3.1 Removal of Prism

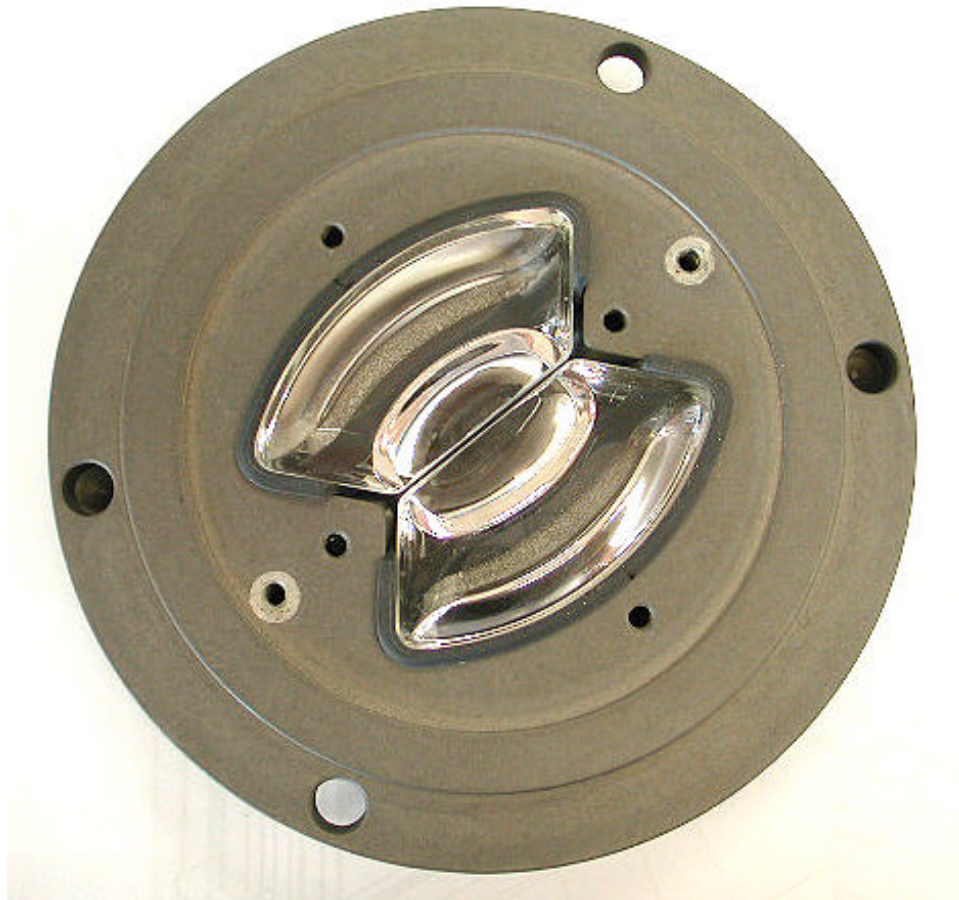


Fig. 3. Body inverted showing prisms in place.

- Release and remove the four M6 socket head screws to release the prism clamp and gasket.
- Check the prisms internal and external surfaces, for contamination, physical damage, (i.e. chips and cracks). See **Fig. 3**.
- Check prism gaskets for obvious signs of physical damage or for evidence of water ingress.

When removing a prism that is intact place body casting on some cushioning material such as bubble wrap and wear protective gloves.



Fig. 4. Remove a prism by hand.

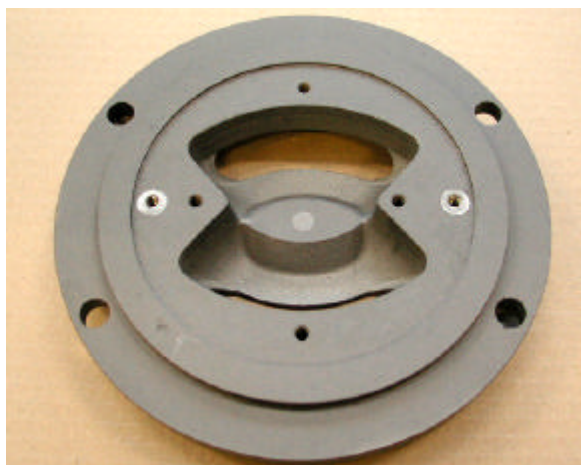
- Place both thumbs on the outer surface of the prism and press the prism/gasket assembly back through into the lamp cavity in the same direction as the light channel, until free of the casting. See **Fig. 4**.
- Remove prism gasket and check for damage and or signs of deterioration. Replace if necessary.

6.3.2 Replacement of Prism

DO NOT OVER TIGHTEN THE PRISM RETAINING CLAMP SCREWS AS THIS CAN CAUSE DAMAGE TO THE PRISM.

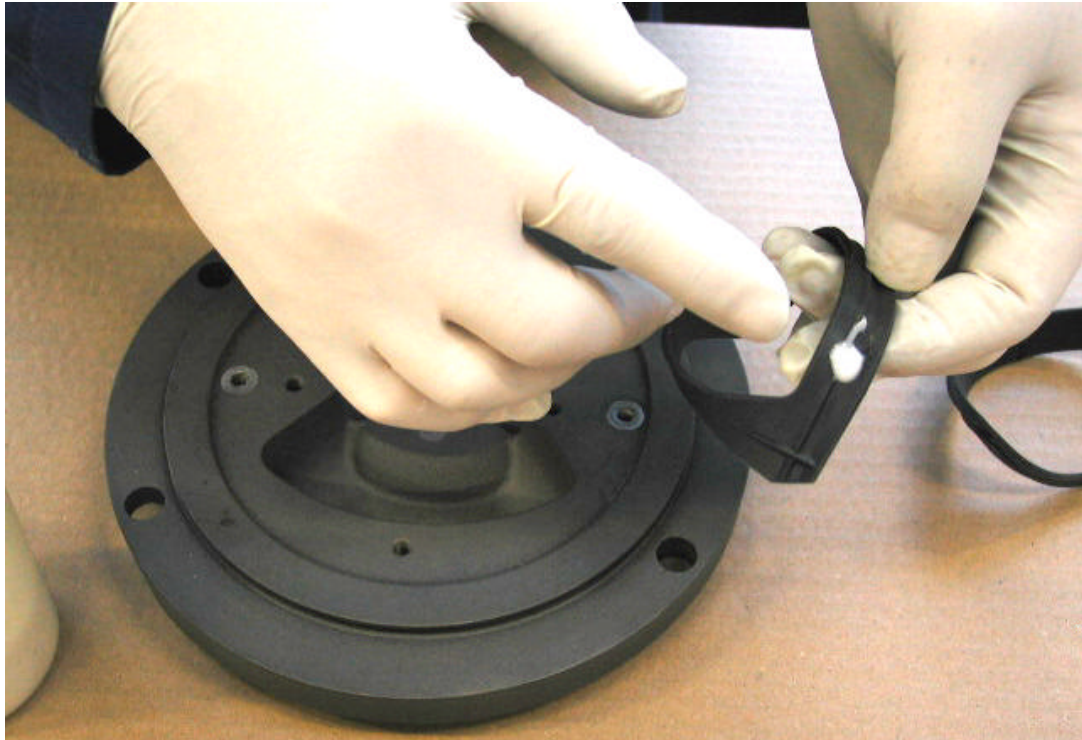
WHEN HANDLING A COLOURED PRISM, DO NOT SCRATCH OR OTHERWISE DAMAGE THE DICHROIC COATING IF.

- Lay the body casting on a flat surface. (**Step 1**).



Step 1.

- Prepare gasket for insertion in the lens cavity. Lightly lubricate the corners of the gasket with P80 rubber lubrication emulsion or similar. **(Step 2)**.



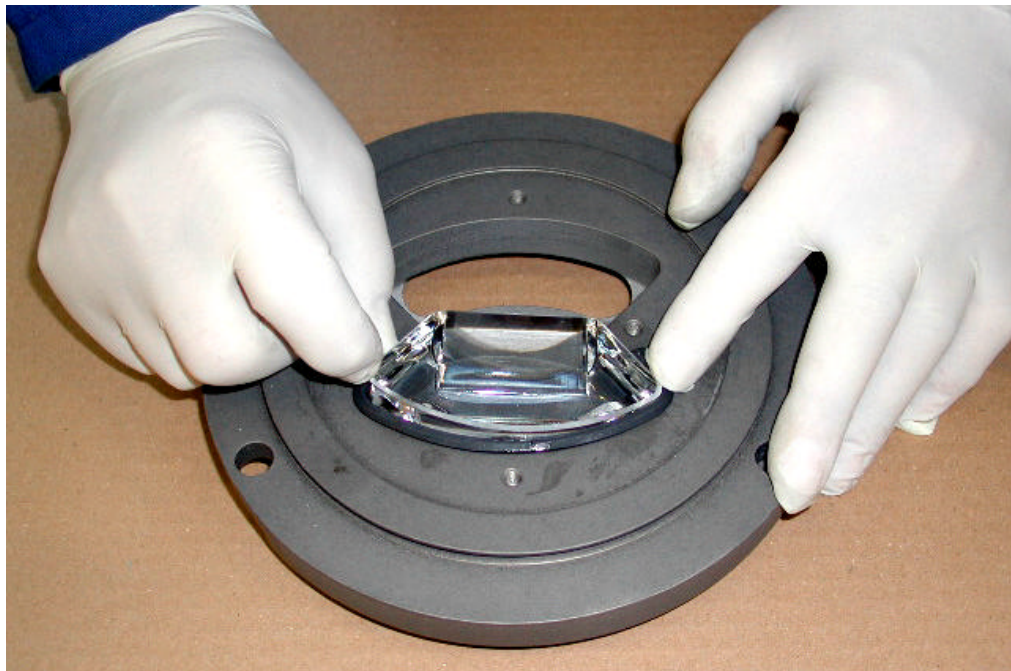
Step 2.

- Insert the prism gasket and hold in place at the corners with thumb and first finger **(Step 3)**.



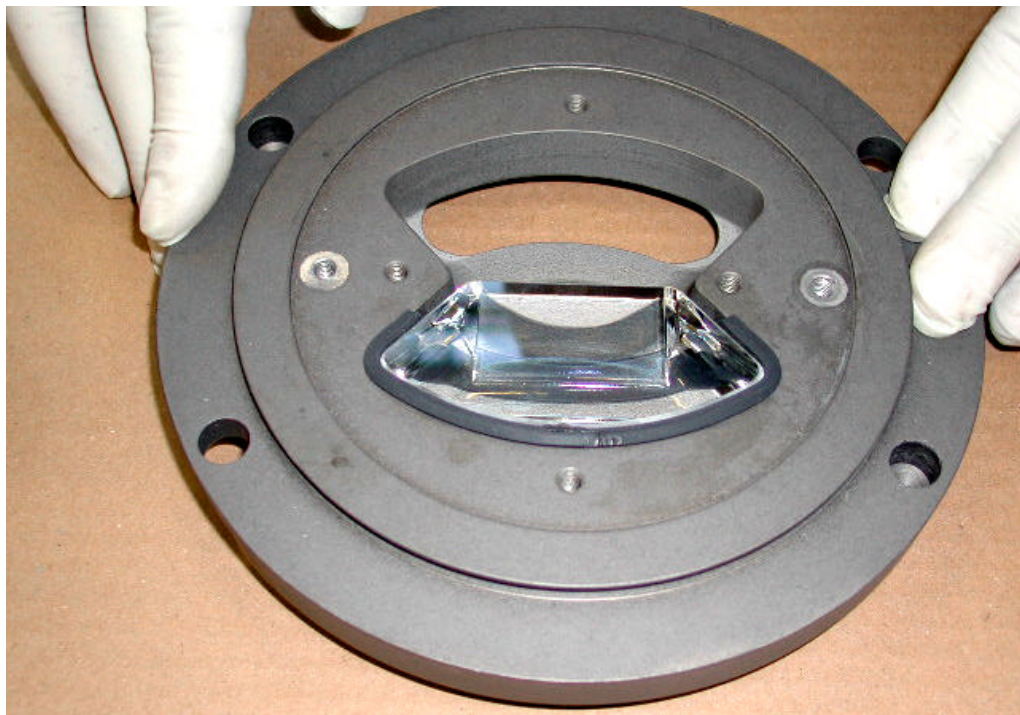
Step 3.

- Hold the gasket in place at the two corners with thumb and first finger. Gently insert the prism with the other hand. (**Step 4**).



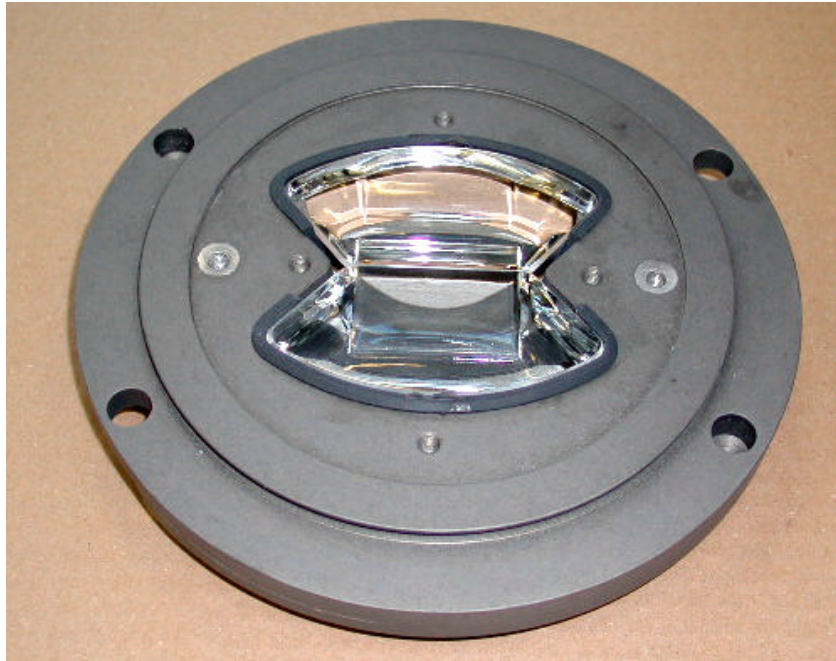
Step 4.

- Ensure that prism does not snag on the wall of the gasket. Carefully push the prism down into the cavity. Ensure that gasket is not pushed out of the window area and ensure that the gasket is equally spaced around the prism.. (**Step 5**)



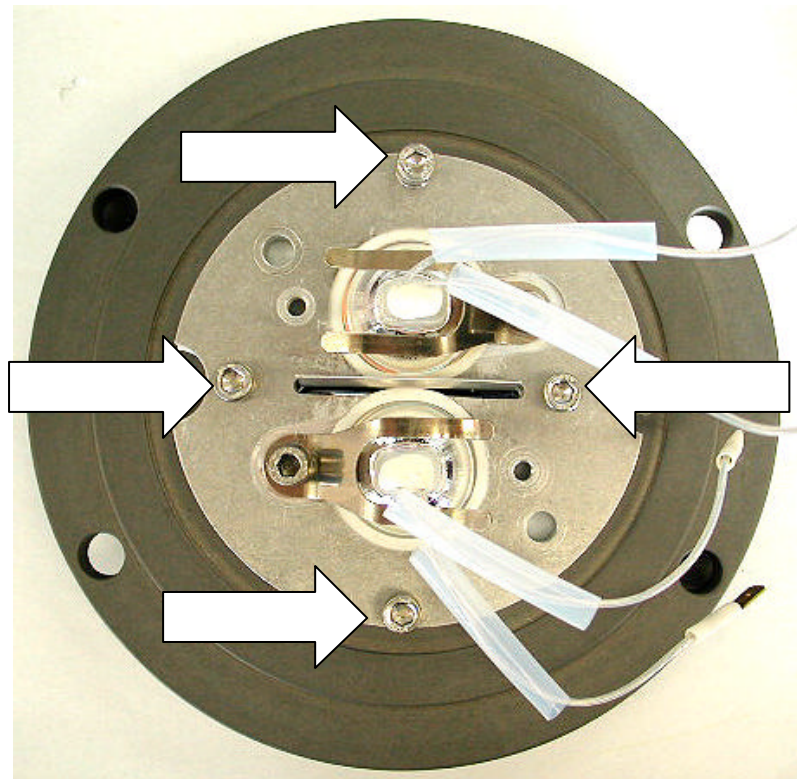
Step 5.

- Repeat steps 2 to 5 for the second prism resulting in **step 6**.



Step 6.

- Re-assemble the prism retaining clamp and prism clamp gasket. Tighten prism retaining clamp screws progressively to a torque of 9.04 Nm (80 lbf ins). (**Step 7**).



Step 7.

6.3.3 Bottom Cover Gasket

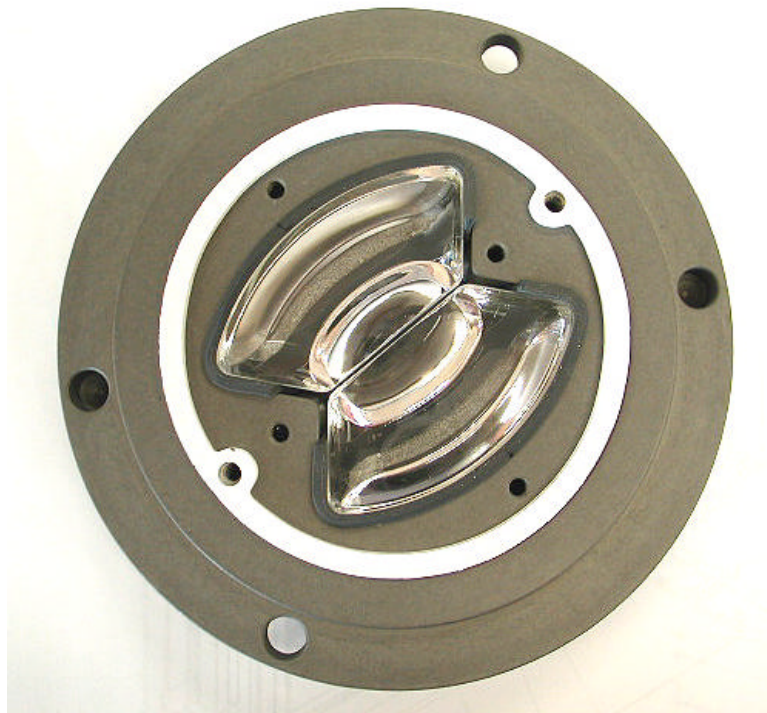


Fig. 5. Body inverted showing gasket in place.

The bottom cover gasket is located in a recess in the prism body casting and is subject to ageing . See **Fig. 5**.

- Check for evidence of water contamination of internal components and casting surfaces.
- Remove the bottom cover gasket from its recess in the body casting.
- Clean the bottom cover gasket and examine carefully.

When it is in good condition.

- Place the gasket on one side for re-use.

When it shows evidence of deterioration or damage.

- Replace the gasket prior to re-assembly.
- Clean the bottom cover gasket sealing face, to ensure the gasket forms an effective pressure seal on re-assembly.

6.3.4 Remove & Replace Lamp, Lamp Gasket and Colour Filter (When Fitted)

DO NOT touch or otherwise contaminate the bulb of the lamp or the reflector surface.

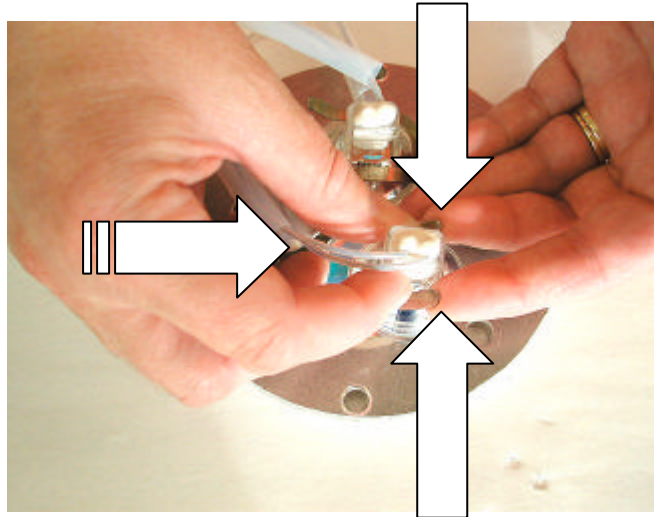


Fig. 6. Remove and replace a lamp.

- Push the lamp retaining spring fingers away from the lamp reflector using two fingers on one hand. With the other hand pull the lamp back until the reflector rim is clear of the prism clamp enabling the lamp to be lifted clear. See **Fig. 6**.

Alternatively,

- Release the M6 cap head screws retaining the lampholder and remove the lamp.

When a colour filter is fitted and the prism clamp is still in place.

- Remove the lamp gasket by carefully pinching the rim of the gasket using tweezers or long nose pliers.

When the prism clamp has been removed from the body assembly.

- Remove the lamp gasket & filter by pushing out from the prism side of the prism clamp.
- Re-assemble in reverse of the dis-assembly procedure. Ensure that the lamp gasket is seated correctly in the prism clamp before locating the lamp.

6.3.5 Lamp Retaining Spring

- Check the lamp retaining springs and for damage or loss or tension. (It is important that the lamp is held securely in position).

When necessary, replace the retaining spring.

- Release and remove the two M6 cap head screws.
- Remove and replace the lamp retaining spring with a new approved component.

6.4 BOTTOM COVER ASSEMBLY

6.4.1 Plug Lead and Cable Gland

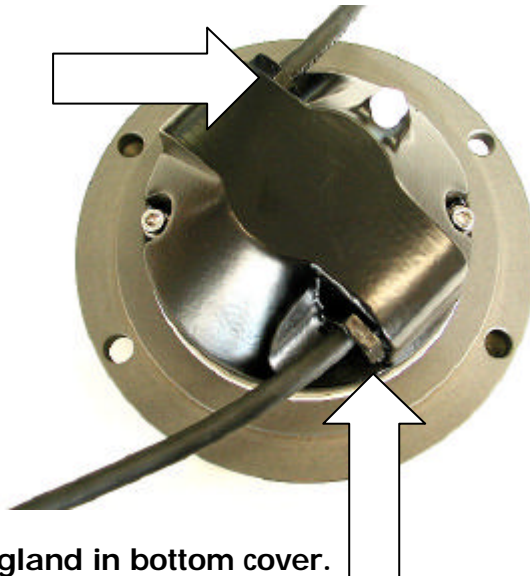


Fig.7. Cable gland in bottom cover.

- Check the cable outer sheath for abrasion, nicks, cuts and cracks. Ensure that the cable moulds into the connector housing and enters the bottom cover cable gland.
- Check for arcing or physical damage to the cable plug pins.
- Check the cable tail receptacles for looseness, evidence of arcing and overheating of the cable cores.

When there is evidence of water contamination within the fitting, this can indicate a permeable cable or faulty gland seal, therefore replace a plug lead.

ALWAYS assemble a new gland and lead assembly, DO NOT repair the 'old' power lead or seal.

- Unscrew the cable gland and withdraw plug lead with the gland assembly from bottom cover.
- Check and clean the cable gland entry hole.
- Thread the cable gland assembly onto the end of the plug lead cable.
- Assemble the components in the order of, gland nut, skid washer, compression bush and position the gland components at 80mm from the free end of the lead.
- Thread the lead tails through the cable entry hole in the bottom cover until the outer sheath projects approximately 5mm into the inner chamber of the bottom cover.
- Tighten gland screw fully into cable entry hole to create a water tight seal. (This will be checked at a later stage by conducting a pressure test).

6.5 RE-ASSEMBLE BOTTOM COVER AND BODY ASSEMBLIES

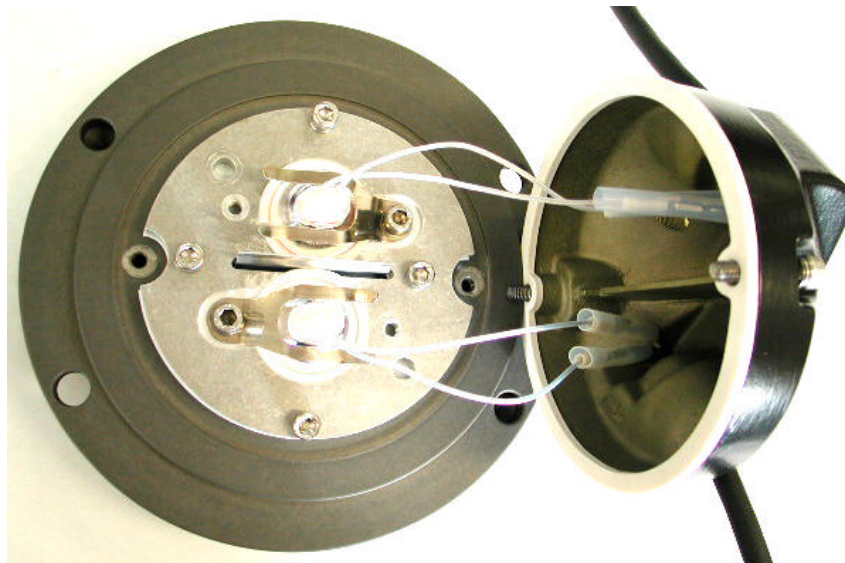


Fig. 8. Bottom cover being offered up to the body assembly.

The bottom cover is 'handed' by means of locating cut-outs in the integral light baffle plate which only allows the bottom cover to be replaced in one position thereby ensuring the correct matching of lamps with their respective plug lead.

- Place the body assembly, flat onto a work surface, with the underside uppermost.
- Locate the bottom cover gasket correctly into the body casting recess.
- Re-connect lamp terminals to the plug lead receptacles. Ensure that the electrical connections are tight.
- Re-assemble and position the PTFE insulation sleeving, to ensure that no electrical shorting occurs.
- Re-assemble the bottom cover to the body assembly.
- Re-assemble the two M6 cap head screws with crinkle washers. Torque tighten progressively to 6.8Nm (60 lbf ins).
- Pressure test the assembled unit for leaks by attaching a compressed air line to the test plug hole, using a 1/8" BSP adaptor.
- Apply an air pressure of 350 mbar (approx 5 p.s.i.) to the fitting and immerse in a tank of clean water. Check for the emission of air bubbles from the bottom cover, prism seals, and the cable gland. See **Fig. 9**.

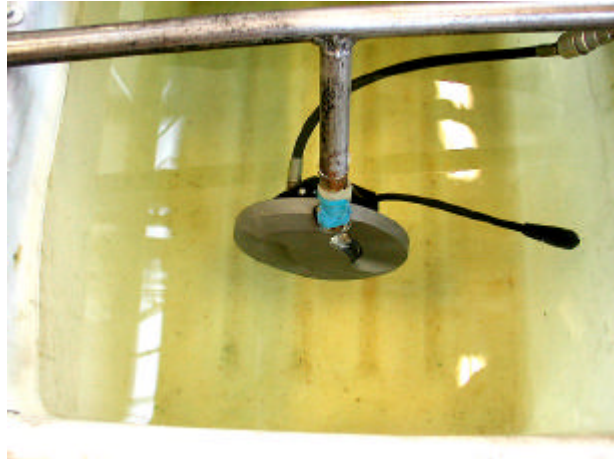


Fig. 9. Air Pressure Test. ZA280 fitting immersed in clean water to detect any leak paths. No bubbles so no leaks.

When a satisfactory test has been completed.

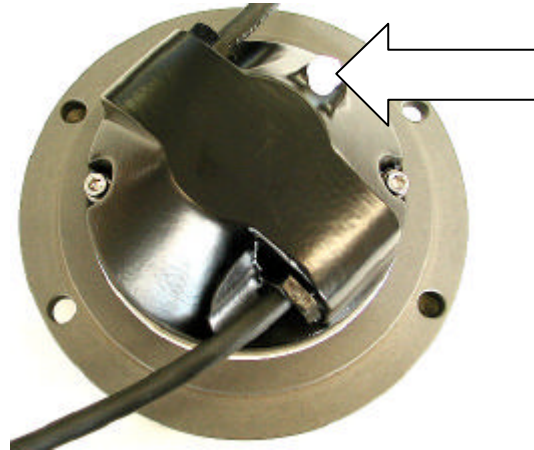


Fig. 10. Pressure test plug is nylon and can be over tightened.

- Re-assemble the pressure test plug. **DO NOT OVER TIGHTEN TEST PLUG.**

A torque value of 3.5Nm (30 lbs f ins.), must not be exceeded, other wise there is a danger of stripping the thread on the nylon pressur test plug.

7. SPARES

7.1 SPARE PARTS ORDERING

When ordering spare **PARTS** refer to the parts schedule identifying those items required by stating:

Fitting type.
Item description.
Part No.
Stock List Code.

SPARE PARTS SCHEDULE

Key to Abbreviations:

ST.STL = Stainless steel.

SKT HD = Socket head.

IEC = International Electrotechnical Committee.

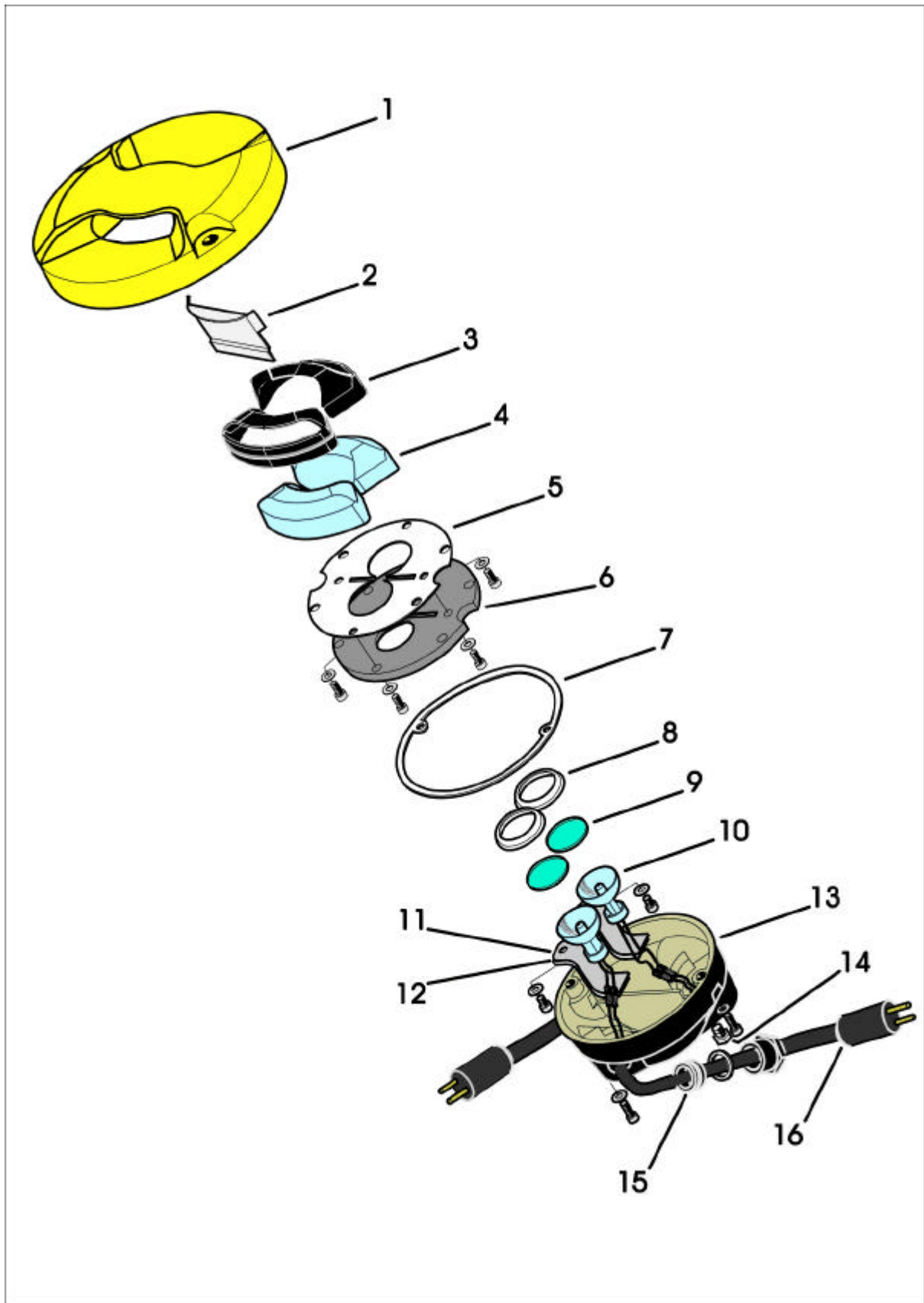
Item No.	Part No.	Stock List Code	Description	Quantity Per Fitting	
				ZA280S	ZA281S
2	29067	021336	Light Divider Baffle	1	1
3	29020	033071	Prism Gasket	2	2
4	29016 X	016078	Clear Prism (Flat)	2	-
ALT	29016 Z	016076	Clear Prism (Reeded)	-	2
ALT	29016 B	019152	Blue Prism	2	2
ALT	29037	040102	Blank for Prism Aperture	2	2
5	29047 J	033087	Prism Clamp Gasket Straight	1	-
ALT	29047 K	033088	Prism Clamp Gasket Curved	-	1
6	29046 J	021304	Prism Clamp Straight	1	-
ALT	29046 K	021305	Prism Clamp Curved	-	1
7	29023 B	033080	Bottom Cover Gasket	1	1
8	29048	033086	Lamp Gasket	2	2
9	29030 RC	019178	Red Filter	1 or 2	-
ALT	29030 GC	019176	Green Filter	1 or 2	1 or 2
ALT	29030 YC	019177	Yellow Filter	1 or 2	1 or 2
10	-	008082	40W Reflector Lamp with male terminals	2	2
11	29063	021302	Lamp Spring Insulating Sheet	2	2
12	29049	021303	Lamp Retaining Spring	2	2
14	28934	021256	Pressure Test Plug (Nylon)	1	1
15	ELKAY	021114/5 & 021343	Elkay, M20 Gland Set, inc bush Cat No. 380	2	2
16	10453	013001	'B' Type Plug Lead	2	2
			M6 x 20 SKT HD Screw ST.STL	4	4

Issue : 2
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		M6 x 25 SKT HD Screw ST.STL	2	2
		M6 x 8 SKT HD Screw ST.STL	2	2
		M6 Crinkle Washer	8	8
		Optional By-Pass Assembly		
	28848	By-Pass Block Assembly	2	2
	27752	PTFE Sleeving 450 x 6.81 I/D	2	2



7.2 FITTING OPTION ORDERING CODES

When ordering spare **FITTINGS** identify those required by using the following ordering code:

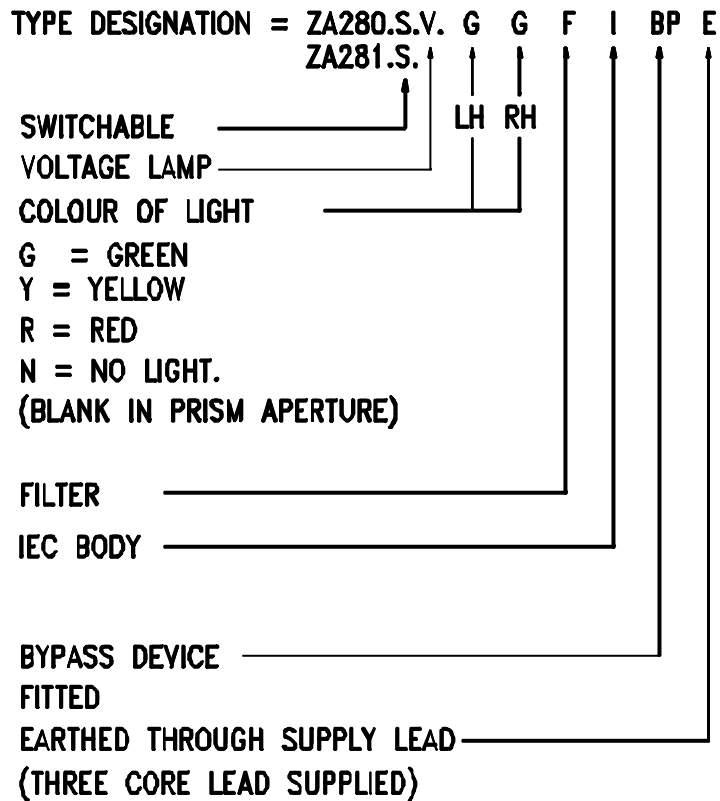
ZA280S/ZA281S SWITCHABLE INSET

TAXIWAY/ STOPBAR CODE

BASIC OPTION FOR 200mm DIA.

(IE.GREEN,GREEN) TYPE DESIGNATION = ZA281.G.G

WHEN ALL STANDARD OPTIONS ARE SUPPLIED,
THIS BECOMES:



Notes:

7.2.1 Lamp Rating

When a voltage lamp is used in a fitting with light colour of yellow/green, (designated .V.), then the lamp = 40W, 12V.

7.2.2 Stopbar fitting

This fitting uses a Prism, drawing No. H29016 X and a 40W lamp

When this fitting is uni-directional it uses the prism clamp specified for the switchable fitting.

7.2.3 Filters

A fitting is designated **ZA281 X.Z.F**, this denotes that a coloured filter is used with clear prisms. Half filters are not used.

7.2.4 IEC Body

When a fitting is designated **ZA281 X.Y.I**, it denotes that the IEC style body is used.

7.2.5 General

The convention for specifying light colour relates to the company logo. When the ALSTOM logo can be read (i.e. right way up), left hand light is specified first and right hand light is specified second. (ie. Green/yellow, or yellow/green).

X denotes any colour on the LHS,

Z denotes any colour on the RHS,

X¹ G means any colour except green.

Dichroic coated prisms and filters are **not** used in the same product.

On twin lead fittings only, blanks are **not** used.

APPENDIX 'A' - SAFETY ADVICE

1. COMPLIANCE WITH INSTRUCTIONS IN THIS MANUAL

The purchaser/user is advised to comply with the instructions and information in this manual and ensure that all personnel to be associated with the apparatus under this contract are made familiar with the information contained herein.

2. GUIDANCE NOTES FOR USERS ON THE SAFETY OF PERSONNEL

Every employer shall ensure that his employees are informed, trained and supervised and use a safe system of work to ensure their safety. He is advised to comply with the information provided, to maintain the plant in a safe condition.

Electrically skilled personnel may have to gain access to apparatus which is not completely isolated. The burden of responsibility, for the safety of such personnel carrying out the work, rests on those under whose authority they act.

3. INSTALLATION, OPERATION AND MAINTENANCE

The purchaser/user is advised to ensure that each piece of apparatus supplied to the purchaser's order is correctly installed, in a suitable location, by technically qualified and competent persons experienced in the class of work involved. The rules for ensuring the safety of personnel can be summarised as follows:-

During normal use, ensure that plant operators:-

- are fully conversant with all controls, particularly those for emergency shut down,
- comply with safety warning notices and keep all enclosures shut,
- are trained to recognise signs of mal-operation and know what action to take in the event of trouble or difficulty.

During Maintenance, Testing etc., ensure that only suitably skilled persons are permitted to carry out work and that they:-

- comply with user's safe system of work and safe working procedures,
- isolate the apparatus completely, where possible, before opening enclosures and starting work,
- are conversant with the information provided particularly on measures relating to their safety,
- recognise the hazards which can arise when working on live apparatus and take all the necessary precautions,
- comply with all local safety regulations.

4. VOLTAGES GREATER THAN 50V A.C./120V D.C.

The purchaser/user is advised to ensure that apparatus operating on a voltage greater than 50V a.c./120V d.c. is isolated and made safe before any work is carried out upon it.

5. APPARATUS SUPPLIED AS LOOSE ITEMS, CHASSIS ETC.

The purchaser/user responsible for installing such apparatus is advised that, when live, it could constitute a safety hazard and relevant safety procedures are necessary.

6. ACCESS TO THE APPARATUS DESCRIBED IN THIS MANUAL

It is the purchaser's/user's responsibility to ensure that all personnel obtaining access to the apparatus are competent and work in accordance with the user's safe system of work

Record of Personnel made aware of Safety Advice.

Position/Job title:

Signature:

Date: