
LUMAWISE

ENDURANCE S CONNECTOR SYSTEM



EVERY CONNECTION COUNTS



INDEX

1	Flyer 1-1773915-3_Lumawise Endurance S-02.2019-v2	4-7
2	Application specification 114-133074 rev6	8-19
3	Product specification 108-133073 rev A2	20-26
4	Qualification test report 501-134069_A	27-42
5	Eu certificate UL-EU- 01303-A3	44-49
6	CB test certificate standard IEC 61984-2008	50-54
7	CE declaration	55
8	Product drawing receptacle 2213858	56-57
9	Product drawing 40mm base 2213837	58-59
10	Product drawing 40mm dome 2329013	60
11	Product drawing 80mm base 2213831	61-63
12	Product drawings dome 80mm 2328823	64-65
13	Lumawise endurance S training	66
14	Attestation of conformity	67
15	Dekra cert 2213795	68
16	Dekra cert 2213831	69
17	Dekra cert 2213858	70
18	Dekra cet 2213837	71
19	Smarter LED Street Lighting Applications	72-73
20	Notes	74

LUMAWISE ENDURANCE S CONNECTOR SYSTEM

TE connectivity (TE) LUMAWISE Endurance S Connector System is a complete set of products specially designed for street lighting control, compliant with Zhaga Book 18. This consists of a receptacle connector placed on a streetlight and several base and dome combinations to house, sense and control modules from the surrounding harsh environments. The IP66 rated receptacle assembly, base and dome combinations provide a sealed electrical interface between new slim design LED streetlights and the associated sensor modules.

The LUMAWISE Endurance S base and dome form the module that is IK09 impact resistance rated which provides a robust packaging solution. This compact design is UV resistant, appealing to the eye and can be mounted facing upward, downwards or sideways bringing flexibility to the street light designer.



Applications

- Street and Area Lighting
- Sensor Ready Control Applications
- Outdoor Luminaires
 - Wall Packs
 - Parking Lots
 - Walkways
- Photo Controls
- Central Management System
- City Management System
- Other sensor modules e.g. occupancy

Electrical

- Contacts rating: 1.5A, 30V (24V typical)
- Meets 10kV dielectric withstand voltage to mounting surface
- 4 pole contacts
 - Pin 1: 24Vdc
 - Pin 2: DALI (or DALI based protocol) -/common ground
 - Pin 3: DALI (or DALI based protocol) +
 - Pin 4: General I/O

Mechanical

- Mounting: M20X1.5 thread
- Height above luminaire: 10mm
- IP65 & IP66
- Receptacle: Ø30mm
- Gasket: Ø36.5mm
- Thread length: 18.5mm
- IK09 rated system solution

Benefits

- Follows industry standard Zhaga Book 18
- Extend product life in harsh environments with an IP65 and IP66 rated product
- IK09 high impact resistant
- Flexibility in design with upwards, downwards and sideways facing mounting versatility
- Secure low torque mating of sealing cap or base and receptacle
- Condensation minimized with an optional vent feature

Materials

- PBT receptacle
- LSR gasket
- Polycarbonate domes

Specifications

- Application Specification: [114-133074](#)
- Product Specification: [108-133073](#)
- Rated IEC61984 and UL773
- New specification in progress through Zhaga Consortia

LUMAWISE ENDURANCE S CONNECTOR SYSTEM

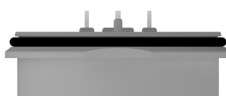
Product Selection Information

		Part Number	Description	Color	Height
RECEPTACLE - SEALING CAP		2213858-1	Receptacle (includes sealing ring, washer and nut)	-	-
		2213795-1 2213795-2	Sealing Cap	Dark Gray Light Gray	-

		Part Number	Description	Color	Height
40MM BASE - DOMES		2213837-1	Base	-	-
		2329013-1	Dome	Smoke Gray	Low (24.25 mm)
		1-2329013-1	Dome	Clear	Low (24.25 mm)
		2329013-2	Dome	Smoke Gray	Tall (39.25 mm)
		1-2329013-2	Dome	Clear	Tall (39.25 mm)



[2329013-2](#)
LUMAWISE Endurance S Dome
Smoke Gray - Tall - 40mm



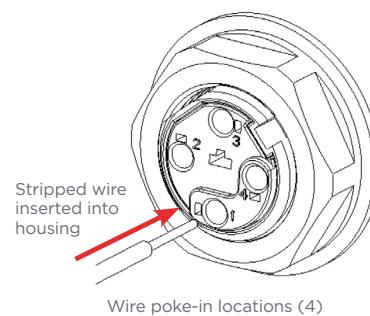
[2213837-1](#)
LUMAWISE Endurance S Base
40mm



[2213858-1](#)
LUMAWISE Endurance S
Receptacle

LUMAWISE Endurance S products represented on this page are not shown actual size.

Receptacle



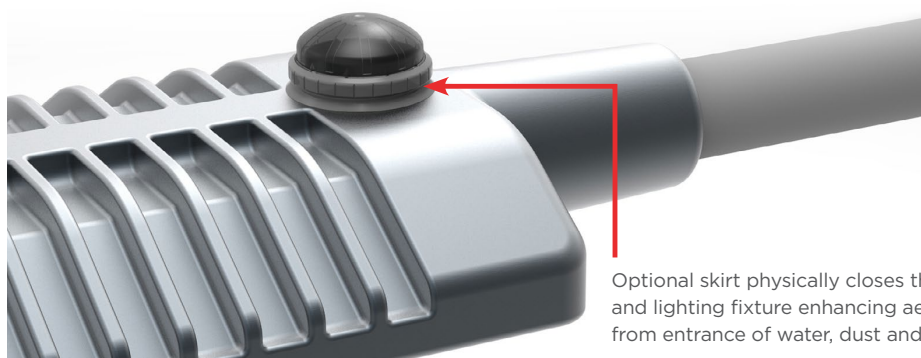
Pin #	Function
1	+24V power supply
2	Negative pole for Dali or Dali based protocol & shared ground return for 24V power supply
3	Positive pole for Dali or Dali based protocol
4	General digital I/O (greater than 7V)

Colored wire insertion markings and additional keying solutions are also available, contact Product and Customer Support +1 800 522 6752.

LUMAWISE ENDURANCE S CONNECTOR SYSTEM

Product Selection Information

		Part Number	Description	Color	Height
80MM BASES - DOMES		2213831-3	Base	-	-
		2213831-2	Base w/Vent	-	-
		2328823-1	Dome	Smoke Gray	Low (33.43 mm)
		1-2328823-1	Dome	Clear	Low (33.43 mm)
		2328823-2	Dome	Smoke Gray	Medium (43.43 mm)
		1-2328823-2	Dome	Clear	Medium (43.43 mm)
		2328823-3	Dome	Smoke Gray	Tall (58.43 mm)
		1-2328823-3	Dome	Clear	Tall (58.43 mm)
OPTIONAL ACCESSORIES		1-2337216-1	Skirt	Black	-
		1-2337216-2	Skirt	Light Gray	-
		1-2337216-3	Skirt	Dark Gray	-



Optional skirt physically closes the gap between control module and lighting fixture enhancing aesthetics and further protecting from entrance of water, dust and insects.

INDUSTRIAL /// LUMAWISE ENDURANCE S CONNECTOR SYSTEM



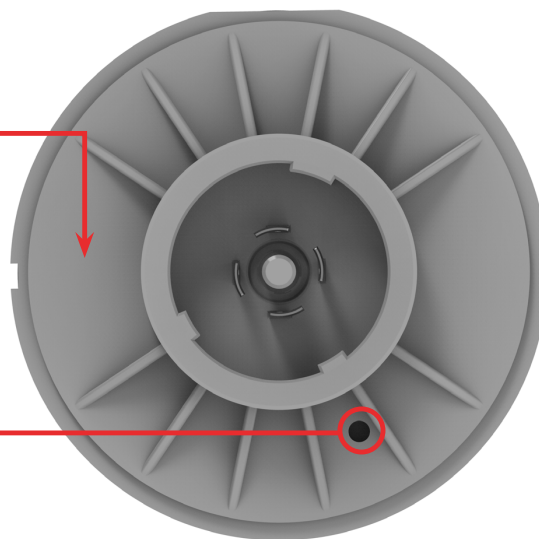
LUMAWISE ENDURANCE S CONNECTOR SYSTEM

[2213831-2](#)

LUMAWISE Endurance S Base w/Vent
80mm

Flat surface for label placement.

An optional vent in the 80mm base assembly enables pressure optimization inside the sealed control module. The vent also helps to minimize condensation through vapor diffusion.



[1-2328823-1](#)

LUMAWISE Endurance S Dome
Clear - Low - 80mm

[2213831-3](#)

LUMAWISE Endurance S Base
80mm

[2213858-1](#)

LUMAWISE Endurance S Receptacle

LUMAWISE Endurance S products represented on this page are shown actual size.



TE Connectivity is a participating member of the Zhaga Consortium, an industry-wide cooperation enabling the interchangeability of LED light sources and simplifying LED applications for general lighting.

[te.com](#)

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1-1773915-3 JN 02/2019

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The Netherlands: +31 (0) 73-6246-999
China: +86 (0) 400-820-6015

INDUSTRIAL /// LUMAWISE ENDURANCE S CONNECTOR SYSTEM





LUMAWISE Endurance S Connector System

Application Specification

114-133074

15 MAR 19 Rev 6

i All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters. Unless otherwise specified, dimensions have a tolerance of ± 0.13 mm and angles have a tolerance of $\pm 2^\circ$. Figures and illustrations are for identification only and are not drawn to scale.

1. INTRODUCTION

This specification covers the requirements for application of the LUMAWISE Endurance S series Receptacle, Sealing Cap, and Module base. This connector system is typically used for roadway lighting and sensing applications, as well as area lighting and sensing applications. The LUMAWISE Endurance S series is supplied as a 4 position contact system with all contacts being pre-installed into both the receptacle and module base assemblies. The LUMAWISE Endurance S Receptacle contacts are wire poke-in style termination contacts, while the mating LUMAWISE Endurance S Module base contacts are blade style contacts with PCB solder tails.

The LUMAWISE Endurance S Module cover is not supplied with the base assembly, but available separately. It is the responsibility of the customer to provide and install the light or sensor control electronics.

When corresponding with TE Connectivity (TE) Personnel, use the terminology provided in this specification to facilitate inquiries for information. Basic terms and features of this product are provided in Figure 1a, 1b, and 1c.

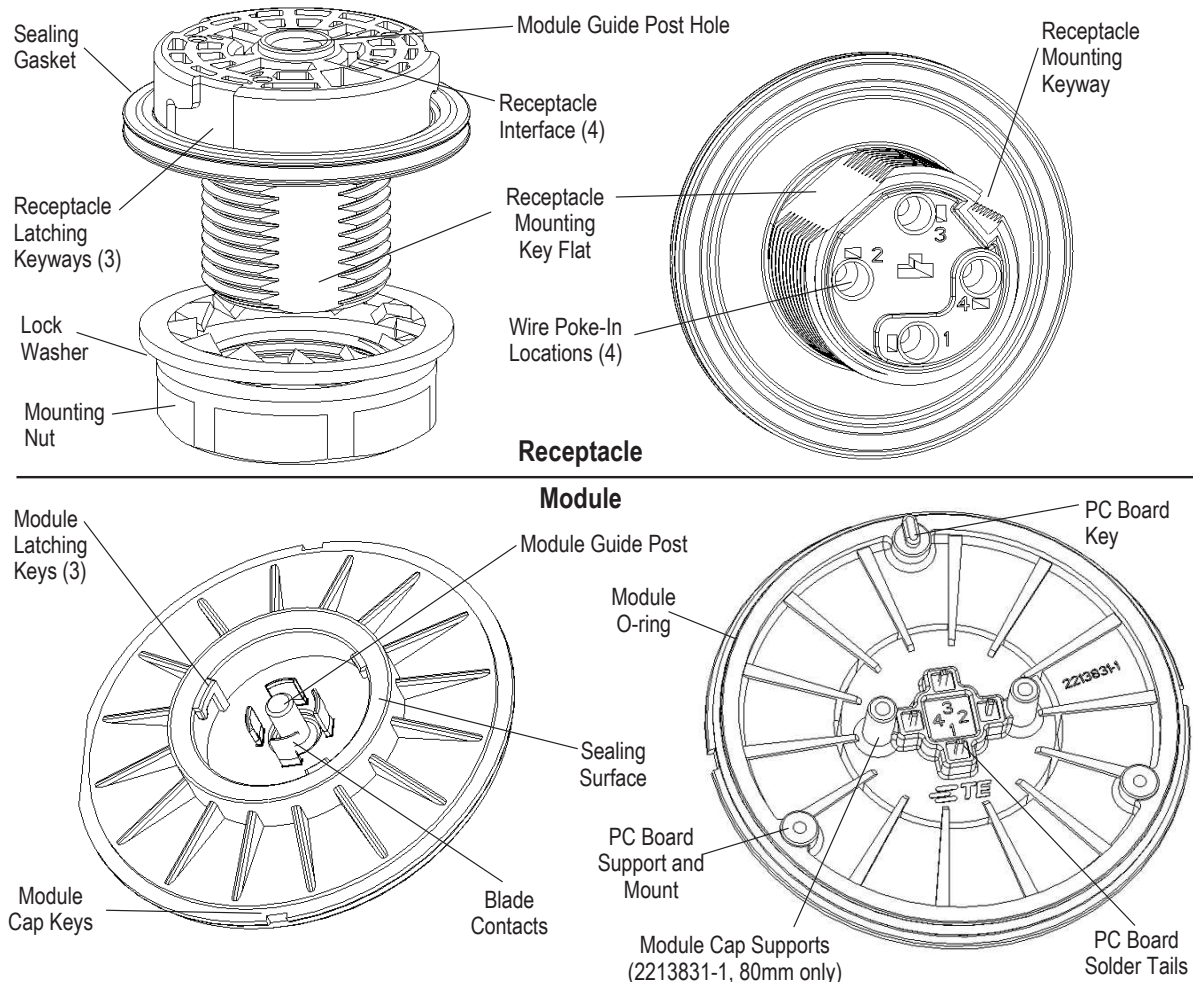


Figure 1a

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TOOLING ASSISTANCE CENTER 1-800-722-1111
PRODUCT INFORMATION 1-800-522-6752

This controlled document is subject to change.
For latest revision and Regional Customer Service,
visit our website at www.te.com.

1 of 12

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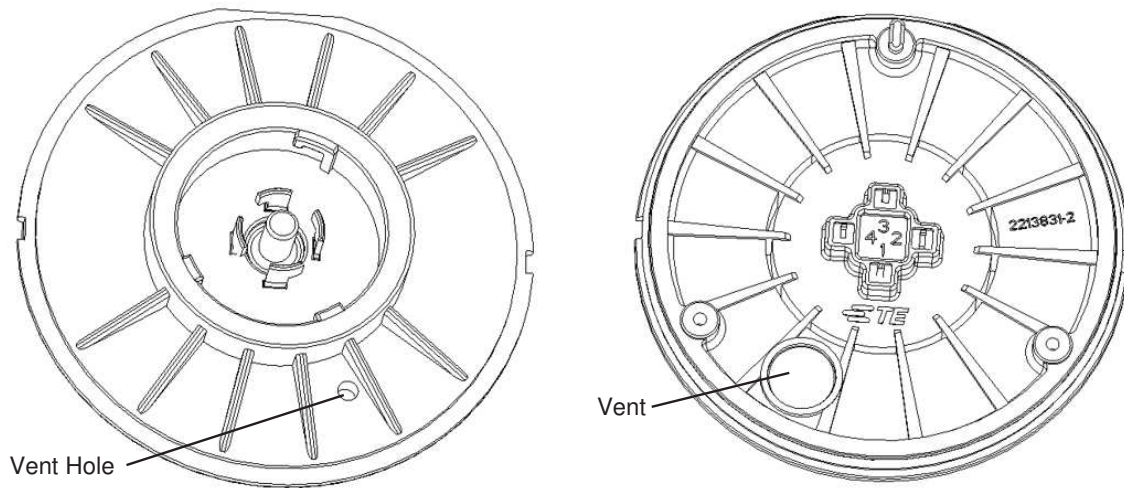


Figure 1b - Vented Module (2213831-2 only)



NOTE: To ensure the vented features work properly, do not allow any external features or internal components in vented area shown in Figure 1b.



Caution: During handling, do not touch the vent material. Mishandling could damage the vent.

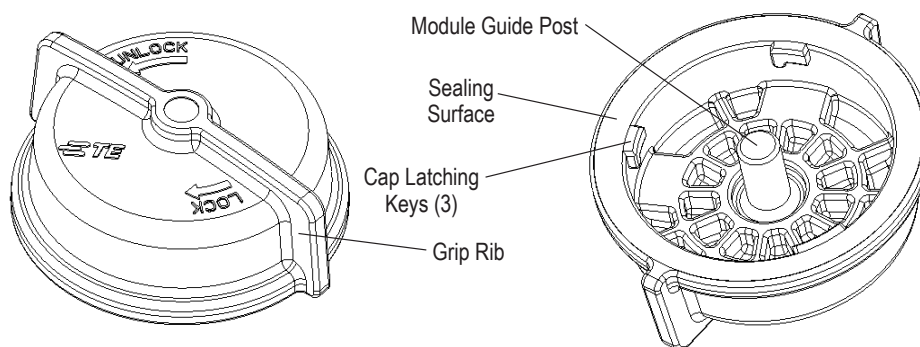


Figure 1c - Sealing Cap

2. REFERENCE MATERIAL

2.1. Revision Summary

Revise figure 9 into 9a, 9b, and 9c.

2.2. Customer Assistance

Reference Product Base Part Numbers:
Receptacle Assembly – 2213858
Sealing Cap – 2213795



40mm Base Assembly – 2213837
80mm Base Assembly – 2213831
40mm Dome – 2329013
80mm Dome – 2328823

Product Code L937. Use of these numbers will identify the product line and help you to obtain product and tooling information when visiting www.te.com or calling the number at the bottom of this page.

2.3. Drawings

Customer drawings for product part numbers are available from www.te.com. Information contained in the customer drawing takes priority.

2.4. Specifications

Product Specification 108-133073 provides product performance and test information for the LUMAWISE Endurance S products.

3. REQUIREMENTS

3.1. Safety

Perform all electrical wiring of the receptacle with power turned OFF.

3.2. Limitations

The connectors are designed to operate in a temperature range of -40° to 90°C [-40° to 194°F].

3.3. Material

The receptacle housing, sealing cap, module bases, and domes are made of UL 94V-0 and UL UV-f1 rated thermoplastic. The locking nut is made of UL 94V-2 rated thermoplastic. The lock washer is stainless steel. The module blades contacts are made of brass plated overall with tin. Receptacle contacts are made of copper alloy plated with tin overall. Sealing gasket and module o-ring are silicon rubber.

3.4. Storage

A. Shelf Life

The product should remain in the shipping containers until ready for use to prevent deformation to components. The product should be used on a first in, first out basis to avoid storage contamination that could adversely affect performance.

B. Chemical Exposure

Do not store or use product near any chemical listed below as they may cause stress corrosion cracking in the material.

Alkalies	Ammonia	Citrates	Phosphates	Citrates	Sulfur Compounds
Amines	Carbonates	Nitrites	Sulfur	Nitrites	Tartrates

3.5. Handling

The receptacle assembly is supplied with the sealing gasket installed, with the lock washer and mounting nut bagged separately with the receptacle assembly. Sealing caps are supplied in bulk packaging. Module assemblies are supplied with o-ring and power contacts preinstalled; therefore, take precautions not to damage or misplace parts prior to assembly. Ensure receptacle sealing gasket and module O-ring are present prior to final assembly.

3.6. Receptacle Mounting

A. Mounting

A surface shall be provided on luminaire housing that is ideally flat. If a flat surface is not possible a secondary possibility is to have a flat surface in one direction and a minimum radius in the other of 500mm to mount the receptacle. To provide a water tight mounting seal, the luminaire surface must be free of dirt, debris, or burrs. Sealing gasket provided with the receptacle assembly must be used. Receptacle can be used on a luminaire housing thickness between 1.5mm to 6.0mm. When mounting receptacle assembly, it must not rotate during locking washer and locking nut application. Torque mounting nut within the range of 1.8 to 2.4 N-m using a 27mm hex socket. See Figure 2.

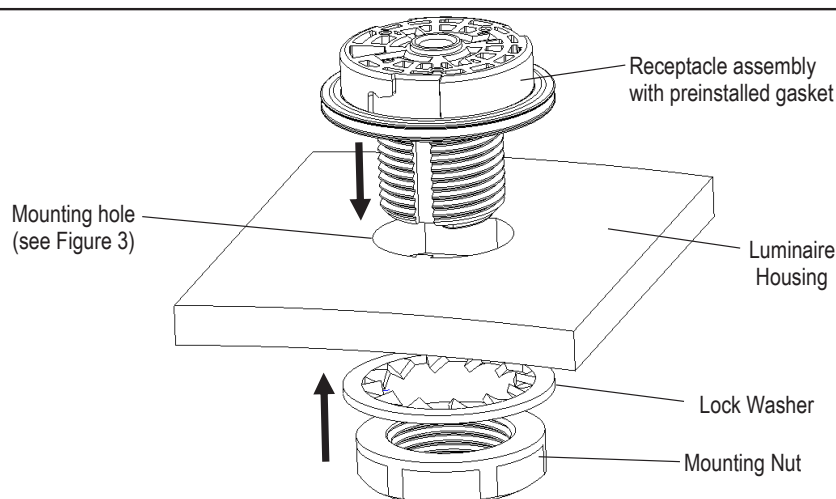


Figure 2

B. Mounting Hole Pattern

The recommended mounting hole is shown in Figure 3. Refer to product drawing for additional details.

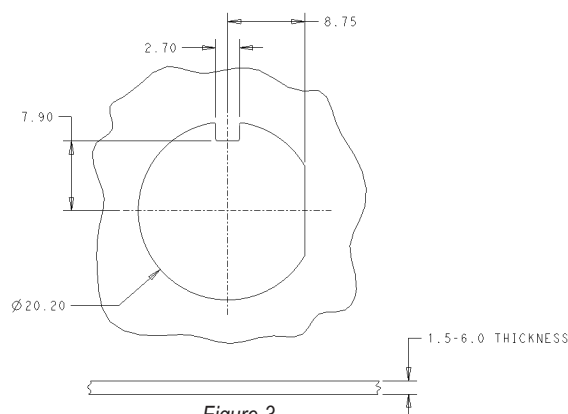


Figure 3

NOTE



Variations to the recommended mounting hole are possible but must be verified by the end user to ensure they do not result in excessive movement of the receptacle assembly during mounting or use. Excessive movement could result in reduced system performance. An absolute maximum hole diameter of 22.0mm should be used.

C. Mounting Location and Orientation

Locate the receptacle in any orientation based on your module operation requirements.

D. Workmanship

The receptacle housing and sealing gasket must not be damaged in anyway. There shall be no nicks or marks on gasket top and bottom surfaces.

3.7. Wire Connections

A. Wire Locations

The receptacle is wired on the bottom side of the assembly; access from the inside of the luminaire. Wire entry locations are labeled 1, 2, 3, and 4. Corresponding contact designations are marked the same on the module bases for PCB alignment. See figure 4.

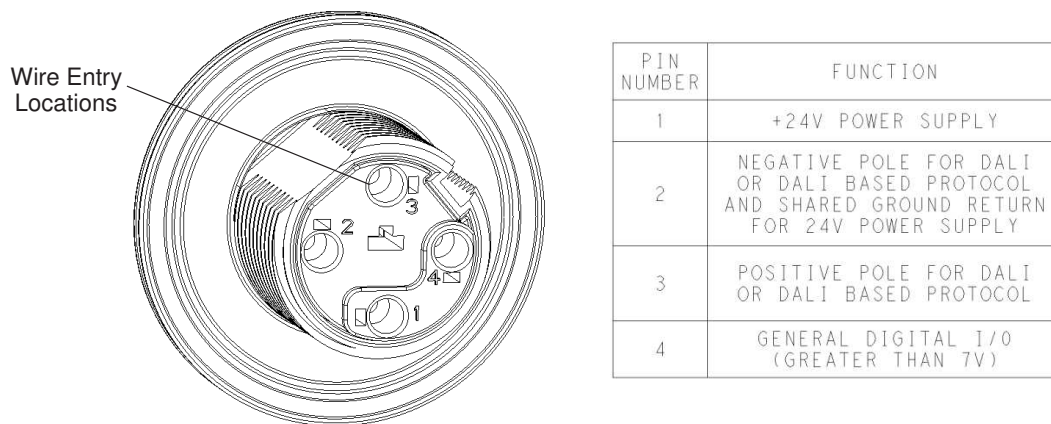


Figure 4

3.8. Wire Selection and Preparation

The receptacle assembly will accept 16 thru 20AWG solid and 18 thru 20AWG stranded tin-dipped copper wire only. The table in Figure 5 provides wire selection for the Poke-In Connectors. See Figure 5.

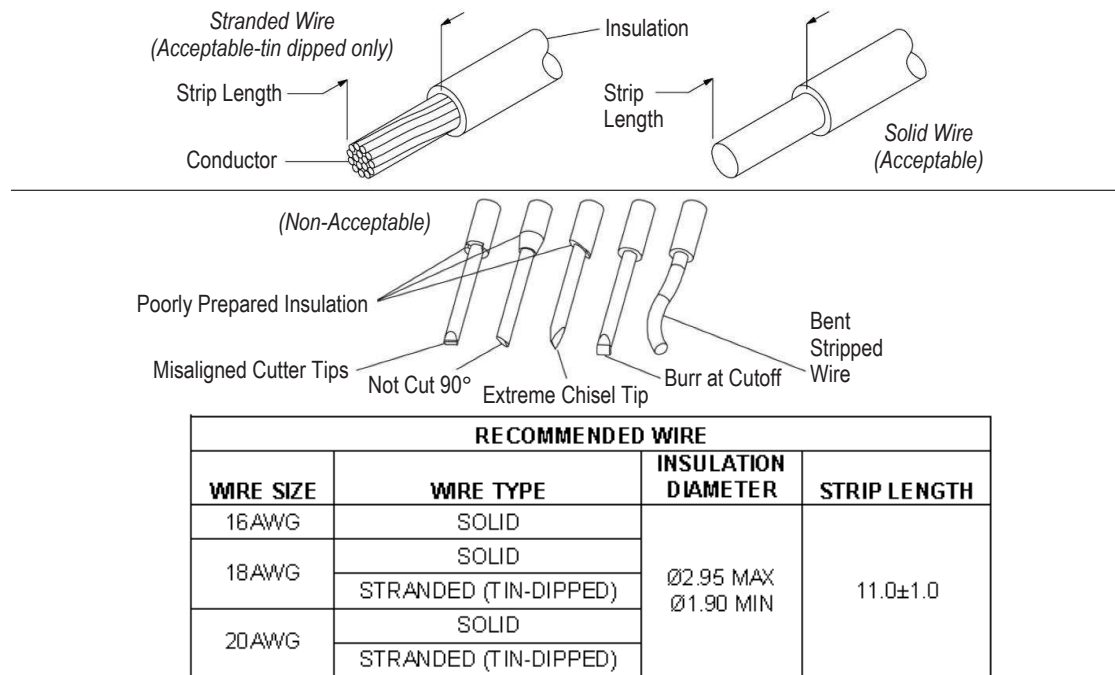


Figure 5



NOTE

Recommended maximum insulation diameter should be as provided in Figure 5. Wires with larger insulation diameters will not fit within the housing's poke-in hole insulation tunnel. Wires utilizing semi-rigid insulation are recommended to minimize movement of the insulation along the axis of the wire. Movement of the insulation will result in variation of the wire strip length which can lead to incorrect wire termination.

3.9. Wire Termination

The receptacles must be terminated according to the following instructions.

A. Workmanship



CAUTION

The housing must not be damaged in any way. There shall be no bending of the contacts. There shall be no exposed copper wire or broken or bent conductor strands.

B. Wire Insertion

All wires must be pushed firmly inside the contact wire openings. The wires must be fully inserted so that the wire insulation is inserted between three and five millimeters into the rear of the housing. Refer to Figure 6.

C. Wire Termination Depth

The required wire termination depth is achieved when the wire has bottomed in the connector housing. Connector design has an internal wire stop. Refer to Figure 6

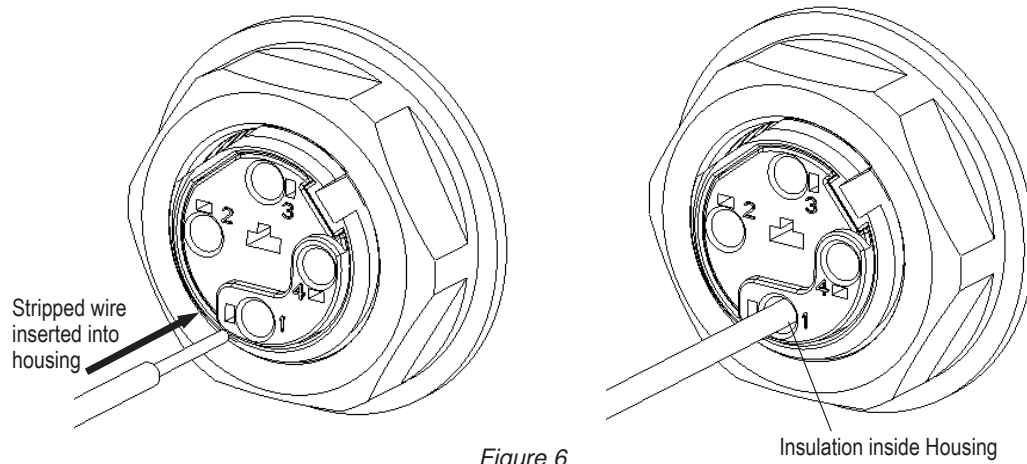


Figure 6

D. Wire Extraction

A fully inserted wire can be extracted from the receptacle using a tool and the release tool window located on the bottom of the receptacle housing. Using tool tip that is 0.8mm x 1.4 mm in cross section and 16.0mm long, insert it into the window (one per wire) and open the contact beams. The wire may then be extracted from the connector along the axis of wire insertion direction. Refer to Figure 7.



CAUTION: Extraction device to be free from burrs and sharp edges to ensure no damage is done to connector terminals.

CAUTION: A new stripped wire must be re-inserted into cavity after extraction of existing wire. DO NOT re-use extracted wire.



DANGER: Extreme caution to ensure there is no power in the system prior to insertion of wire extraction device. Exercise extreme care to avoid electrical shock or system damage.

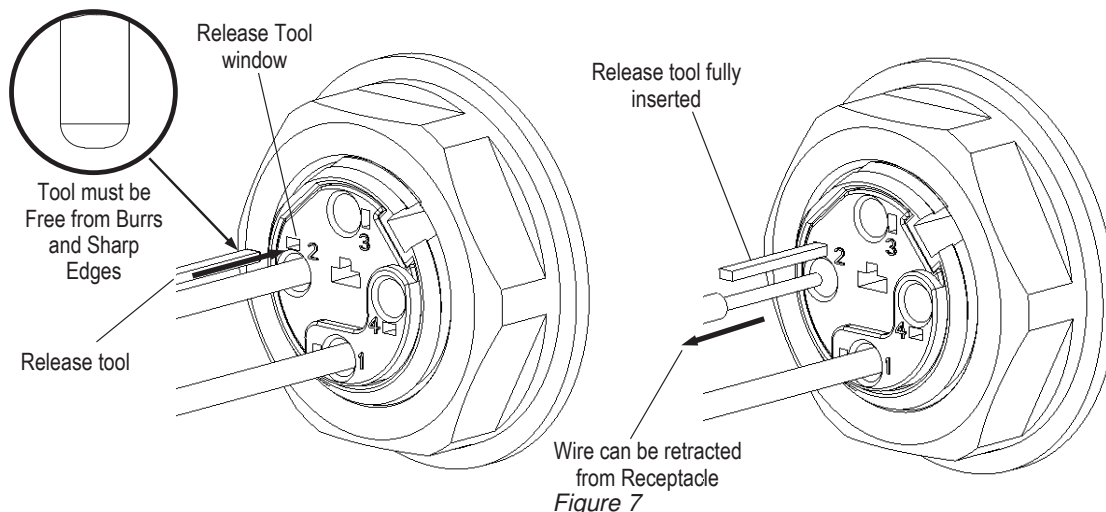


Figure 7

3.10. Printed Circuit (PC) Board Placement and Soldering (Module)

A. PC Board Placement

The solder tails are thru-hole type. The PC Board thru-hole solder tail pattern may be found on the appropriate TE Connectivity customer drawing. The customers populated pc board shall be first positioned onto the power contact solder tails. The PC Board shall be resting on the board standoffs at the tail pillars, additional board standoffs may be at the perimeter if module diameter allows. PC Board to be aligned with PC Board key. Optional mounting holes may be used to secure the PC Board to the module base. Due to the variety of self-tapping screws for plastic, the customer must determine the best-fit hardware for their assembly process. Refer to Figure 8.

B. Soldering

Observe guidelines and procedures when soldering contact solder tails. The connectors should be soldered using acceptable hand-soldering techniques. All solder joints should conform to the Workmanship Specification IPC-A-610, "Acceptability of Electronic Assemblies" and IPC J-STD-001, "Requirements for Soldering Electrical and Electronic Assemblies End Item Standards".

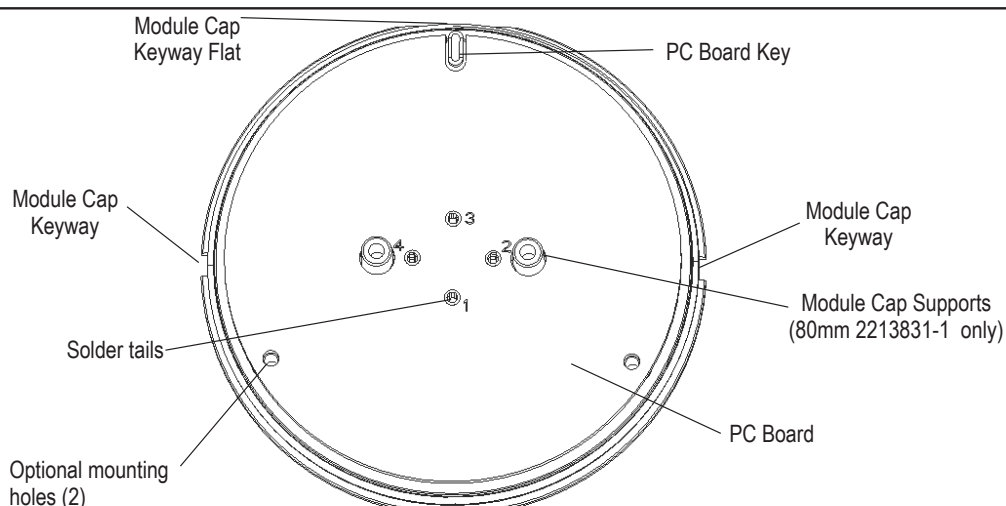


Figure 8

3.11. Module Dome Assembly

Prior to assembly, inspect the module base O-ring for proper placement and damage.

The dome has three raised keys (two small and one large flat) which must be properly aligned with the corresponding keyways in the perimeter of the module base. Always ensure the large flat key of the dome aligns with the large flat keyway on the module base. Refer to Figures 8 and 9b.

An assembly fixture mounted in a small press with an adjustable ram are recommended for assembly. The cover and base must be pressed together squarely. Take precautions not to damage the base assembly and dome during the assembly process. Inspect the dome and module base assembly to ensure the dome latches are fully latched to the base ledge. Refer to Figures 9a, 9b, and 9c.



CAUTION

Hand pressing of the cover to the base is not recommended due to not being able to control simultaneous engagement of all latches. Not engaging the latches simultaneously can result in the O-ring being distorted or damaged.

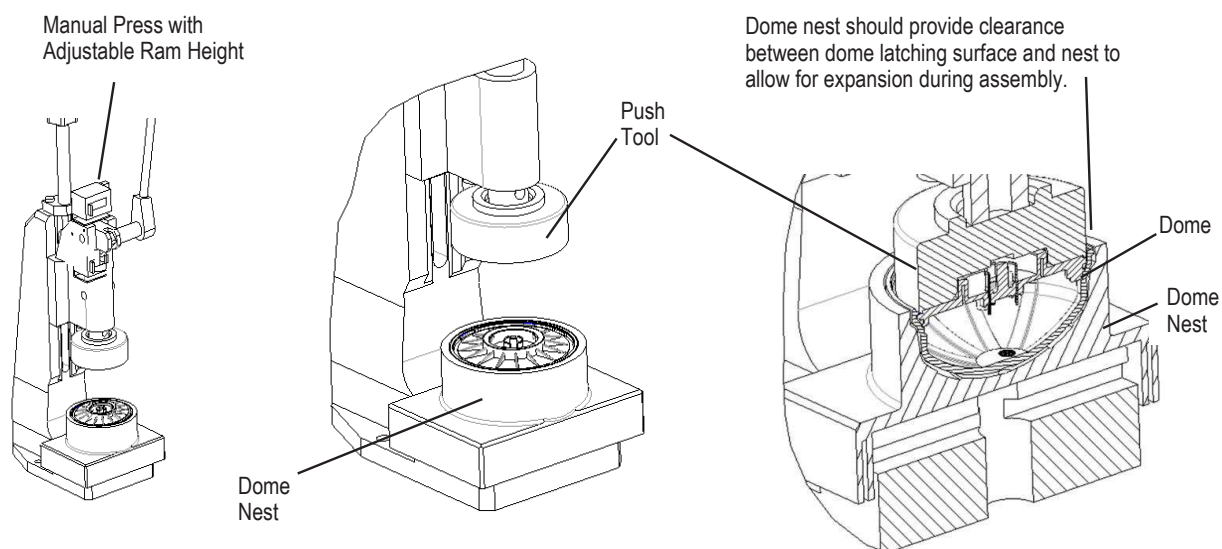


Figure 9a

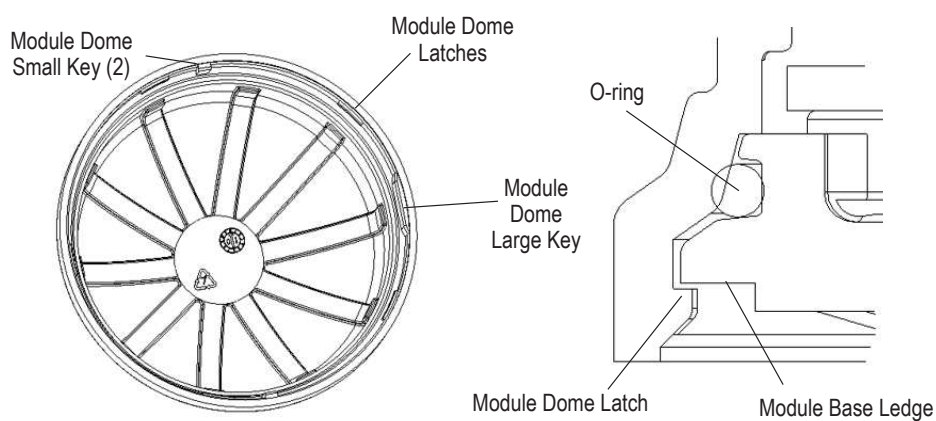


Figure 9b

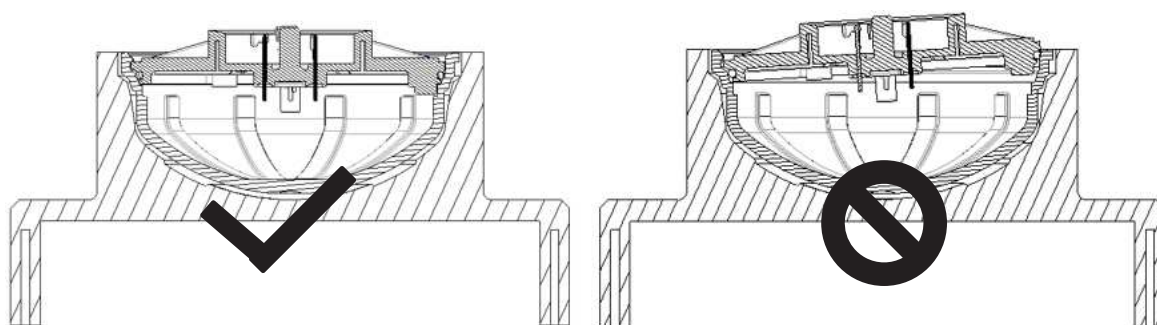


Figure 9c

3.12. Module Dome Design

The interior surface design for the sealing aspect of the module cap may be found on the appropriate TE Connectivity customer drawings. Geometry must be followed to ensure the cap seals with the O-ring on the TE module base and that the dome latches engage the base ledge. Refer to Figure 9.

3.13. Strain Relief

It is recommended that a means be provided to support the wire bundle extending away from the receptacle assembly to prevent inadvertent application of high force to the wire bundle from transmitting into the wire/connector interface. The suggested strain relief method is to use a cable tie and anchor mounted inside the luminaire.

3.14. Mating and Un-mating Module and/or Sealing Cap to Receptacle

Align the Module or Sealing Cap over the mounted receptacle. Based on polarizing features on each, the Module or Sealing Cap can only be installed in one position. Lightly rotate the Module or Sealing Cap until you feel the alignment keys and the blades align to the proper location. After alignment, push downward until the Module or Sealing Cap is bottomed on the receptacle's mating face. Then complete mating by rotating Module or Sealing Cap with downward pressure while twisting in a clockwise direction. The Module or Sealing Cap will lock into position with an audible 'click'. To un-mate, gently push down and reverse the aforementioned mating process. Refer to Figure 10.



CAUTION

When in field use it is important that a receptacle is mated to either the specified sealing cap or a module assembly. The receptacle by itself is not a sealed device and would allow moisture to enter the luminaire.



NOTE

It is recommended that the luminaire design incorporates a breathable vent. The use of a vent will help to equalize pressure changes within the luminaire which will intern help to maintain the integrity of the sealing capability of the connector system.

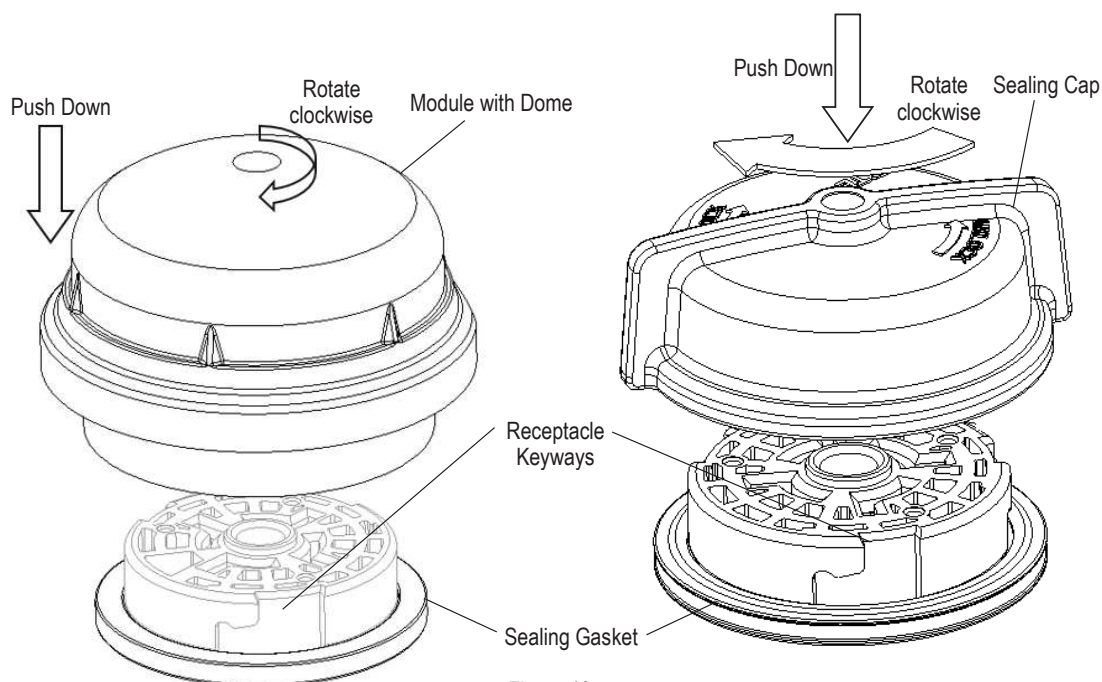


Figure 10

3.15. Replacement and Repair

The contacts and housings are not repairable. DO NOT use an assembly with damaged or defective contacts and/or housings. If damaged, replace the receptacle assembly or module assembly with a new one.

4. QUALIFICATIONS

LUMAWISE Endurance S connectors are component recognized by Underwriters Laboratories, Inc. in File E66375, Volume 7, and have been investigated to CSA International by UL.



NOTE

UL UV-f1 outdoor rated plastics in accordance with UL 746C are used for the LUMAWISE Endurance S connector system.

LUMAWISE Endurance S connectors have been evaluated to IEC-61984 by Underwriters Laboratories, Inc. and is included in CB report certificate US-29611-UL.

5. TOOLING

A customer supplied assembly fixture and a small press is recommended to assemble the cover to the base. The press can be mechanical or pneumatic, but it should be adjustable to ensure cover latch engagement is achieved.

6. VISUAL AID

The illustration below shows a typical application of LUMAWISE Endurance S product. This illustration should be used by production personnel to ensure a correctly applied product. Applications which DO NOT appear correct should be inspected using the information in the preceding pages of this specification and in the instructional material shipped with the product or tooling.

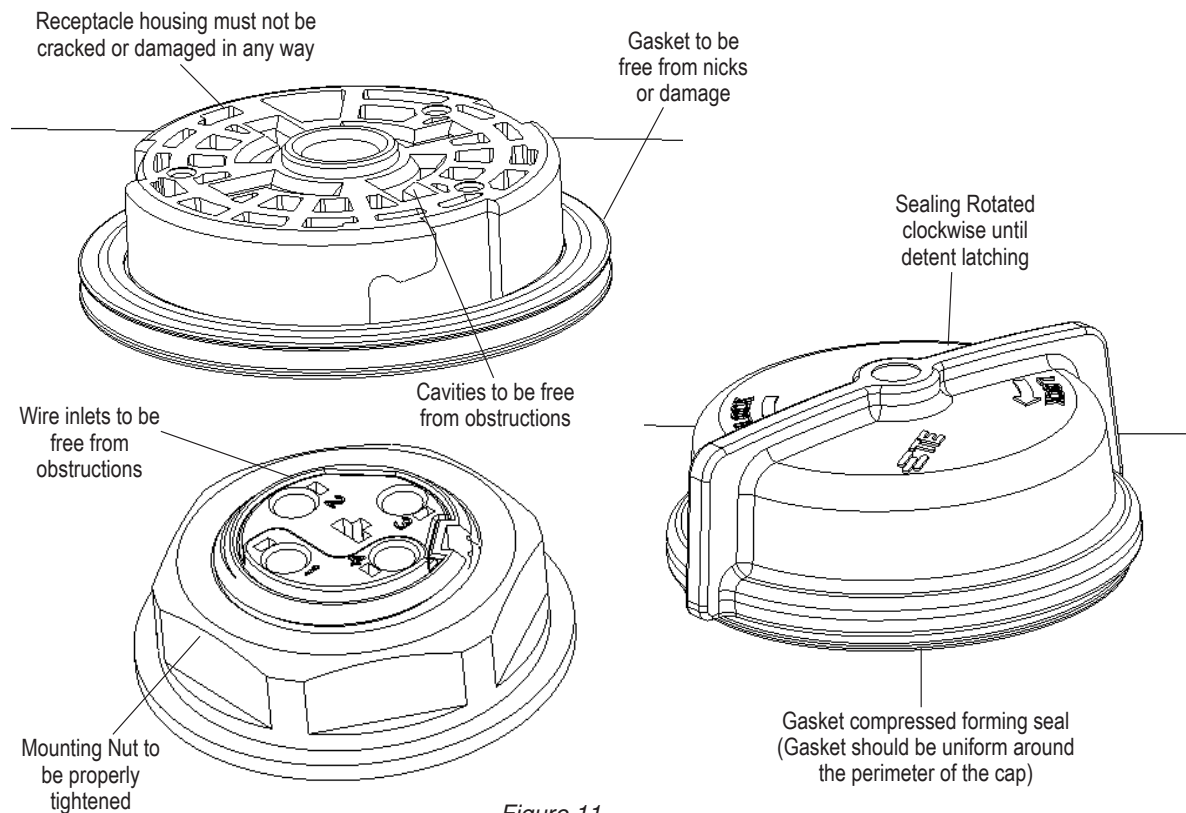


Figure 11



LUMAWISE Endurance S Connector Platform

DESIGN OBJECTIVES

The product combinations of a module base and dome assembly described in Test Groups D2, E2, G2, G3, J2, J3, and L have not fully been tested to ensure conformance to the requirements outlined below. TE Connectivity (TE) makes no representation or warranty, express or implied that the product will comply with these requirements. Further, TE may change these requirements based on results of additional testing and evaluation. Contact TE engineering for details.

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the TE connectivity LUMAWISE Endurance S connector platform for roadway and area lighting applications.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 1 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

1.3. Qualification Test Results

Successful qualification testing on the subject product line has not been completed. The Qualification Test Report number will be issued upon successful qualification testing.

2. APPLICABLE DOCUMENTS AND FORMS

The following documents and forms constitute a part of this specification to the extent specified herein. Unless otherwise indicated, the latest edition of the document applies.

2.1. TE Documents

- [114-133074](#): Application Specification
- [501-134069](#): Qualification Test Report (Test Groups A, B, C, D1, E1, F, G1, H, J1, and K)
- 501-TBD: Qualification Test Report (Test Groups D2, E2, G2, G3, J2, J3, and L)
- [109-197](#): Test Specification (TE Test Specification vs EIA and IEC Test Methods)

2.2. Industry Documents

- EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
- IEC-60512-11-6: Connectors for Electronic Equipment - Corrosion, salt mist
- IEC-60529: Degrees of Protection Provided by Enclosures (IP Code)
- IEC 62262: Degrees of Protection Provided by Enclosures Against External Mechanical Impacts

3. REQUIREMENTS

3.1. Design and Construction

Product shall be of the design, construction, materials and physical dimensions specified on the applicable product drawing.

3.2. Ratings

Voltage	Current	Temperature
30 volts DC	1.5A	-40 to 90°C

3.3. Test Requirements and Procedures Summary

Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

TEST DESCRIPTION	REQUIREMENT			PROCEDURE
Initial examination of product	Meets requirements of product drawing.			EIA-364-18. Visual and dimensional (C of C) inspection per product drawing.
Final examination of product	Meets visual requirements.			EIA-364-18. Visual inspection.
ELECTRICAL				
Low Level Contact Resistance (LLCR).	Δ25 milliohms maximum.			EIA-364-23. Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage. See Figure 4.
Insulation Resistance.	100 mega ohms minimum initial. 10 mega ohms minimum final.			EIA-364-21. 500 volts DC, 2 minute hold. Test between adjacent contacts of mated specimens.
Withstanding Voltage – Internal.	One minute hold with no breakdown or flashover.			EIA-364-20, Condition I. 1100 volts AC at sea level. Test performed between adjacent contacts of mated specimens.
Temperature Rise vs Current.	30°C maximum temperature rise at specified current (100% energized). Refer to section 3.2 for current value.			EIA-364-70, Method 1; Stabilize at a single current level until 3 readings at 5 minute intervals are within 1°C.
Withstand voltage – External.	One minute hold with no breakdown or flashover.			EIA-364-20, Condition I; 10,000 volts AC at sea level. Test performed between contacts and receptacle mounting plate of mated specimens.
MECHANICAL				
Random Vibration.	No discontinuities of 1 microsecond or longer duration. See Note (a).			EIA-364-28, Test Condition VII, Test Condition Letter E; Subject mated specimens to 20 to 500 Hz random levels at 4.9g. 90 minutes in each of 3 mutually perpendicular planes.
Mechanical Shock.	No discontinuities of 1 microsecond or longer duration. See Note (a).			EIA-364-27, Condition H; Subject mated specimens to 30 G's half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.
Wire Retention Force	Min Force	Wire Size	Stranding	EIA-364-8; Measure force necessary to remove wire from poke-in contact specimens at a maximum rate of 12.7 mm per minute.
	25N	16AWG/1.5mm ²	Solid	
	20N	18AWG/0.75mm ²	Solid	
	15N	18AWG/0.75mm ²	Tin Dipped Stranded	
	13N	20AWG/0.50mm ²	Solid, Tin Dipped Stranded	

Connector Mating/Un-Mating Torque	4.0 N-m maximum	EIA-364-13; With a 55.6N compression force applied to the PCB module or sealing cap, measure torque necessary to mate or un-mate a fully populated connector assembly.
Receptacle Mounting Torque Resistance	30 degree rotation maximum	EIA-364-13; With a 55.6N compression force applied to the PCB module or sealing cap, apply a 5.0 N-m torque to receptacle and mating part, then evaluate the amount of rotation the receptacle exhibits relative to the original mounting location.
Durability.	See Note (a)	EIA-364-9; Mate and un-mate specimens for 10 cycles at a maximum rate of 360 cycles per hour.
Impact	See Note (a)	IEC 62262; Based on dome or sealing cap part number, subject receptacle and mating part (module/dome assembly or sealing cap) to IK07(2 Joule) or IK09(10 Joule) impact per Figure 5a, 5b, and 5c.
ENVIRONMENTAL		
Thermal Shock.	See Note (a)	EIA-364-32; Subject mated specimens to 150 cycles between -40 and 90°C with 30 minute dwells at temperature extremes and 1 minute transition between temperatures.
Humidity/Temperature Cycling.	See Note (a)	EIA-364-31, Method IV; Subject mated specimens to 10 cycles (10 days) between 25 and 65°C at 80 to 100% RH
Temperature Life.	See Note (a)	EIA-364-17, Method A; Subject mated specimens to 100°C for 500 hours.
Temperature Life - IP	See Note (a)	EIA-364-17, Method A; Subject mated specimens to 90°C for 240 hours.
Humidity Freeze	See Note (a)	IEC 61215: 10.12.3; Subject mated specimens to 10 cycles between -40 and 90°C 85% RH
Ingress Protection (IP 6X)	No ingress of dust allowed within any sealed area of the connector.	IEC-60529, IP6X
Ingress Protection (IP X5)	No ingress of water allowed within any sealed area of the connector.	IEC-60529, IPX5
Ingress Protection (IP X6)	No ingress of water allowed within any sealed area of the connector.	IEC-60529, IPX6
Salt Spray	No ingress of salt spray allowed within any sealed area of the connector.	IEC 60512-11-6 Exposure time is 240 hours. Test receptacle mated to a sealing cap.

NOTE: (a) Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence shown in Figure 2.

Figure 1

3.4. Product Qualification and Requalification Test Sequence

TEST OR EXAMINATION	TEST GROUP (b)															
	A	B	C	D1	D2	D3	E	F	G1	G2	H	J1	J2	J3	K	L
	TEST SEQUENCE (c)															
Initial examination of product	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1
LLCR	2,6	2,5,7	2, 8													
Insulation Resistance			3,9													
Withstanding Voltage - Internal			4,10													
Temperature Rise vs Current		3														
Random Vibration	4															2
Mechanical Shock	5															3
Wire Retention Force								2								
Impact									2	2						
Mating Torque											2					
Un-Mating Torque											3					
Receptacle Mounting Torque Resistance															2	
Humidity Freeze												2	2	2		
Durability	3															
Thermal Shock			6													
Humidity/Temperature Cycling		4(d)	7													
Temperature Life		6														
Temperature Life – IP				2	2	2										
Ingress Protection (IP6X)				3					3			3				
Ingress Protection (IPX5)					3								3			
Ingress Protection (IPX6)						3				3				3		
Withstand Voltage - External			5, 11													
Salt Spray							2									
Final examination of product	7	8	12	4	4	4	3	3	4	4	4	4	4	4	3	4

NOTES

- (b) See paragraph 4.1.A
- (c) Numbers indicate sequence in which tests are performed.
- (d) Precondition with 2 durability cycles.

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1 Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. Minimum specimen quantities are shown in Figure 3.

Specimen Description	Test Group Quantity(Minimum)															
	A	B	C	D1	D2	D3	E	F	G1	G2	H	J1	J2	J3	K	L
2213858-1, receptacle	8	8	6	11	11	11	15	50	17	17	5	16	11	16	5	8
2213795-1, sealing cap				5	5	5	5		5	5		5	5	5	5	
2213837-1, 40mm base				3	3	3	5		6	6	5	3	3	3		4
1-2329013-1, 40mm short dome							5		3	3		3	3	3		
1-2329013-2, 40mm tall dome				3	3	3			3	3						4
2213831-1, 80mm base	8	8	6													4
1-2328823-1, 80mm short dome				3	3	3			3	3		8	5	8		
1-2328823-2, 80mm med. dome							5		0	0						
1-2328823-3, 80mm tall dome									3	3						4
2213831-2, 80mm vented base				3	3	3	5		6	6		5(a)	5	5(a)		
Module Wt. (45 g min.)	8															4
Module Wt. (20 g min.)																4
16AWG/1.5 mm ² Solid Copper Wire	16	16	24					40								16
18AWG/0.75 mm ² Solid Copper Wire								40								
20AWG/0.5 mm ² Solid Copper Wire	16	16						40								16
18AWG/0.75 mm ² Tin Dipped Stranded Copper Wire								40								
20AWG/0.5 mm ² Tin Dipped Stranded Copper Wire								40								

Figure 3

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 2.

4.2. Requalification Testing

If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

4.3. Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be implemented, and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

4.4. Quality Conformance Inspection

The applicable quality inspection plan shall specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.

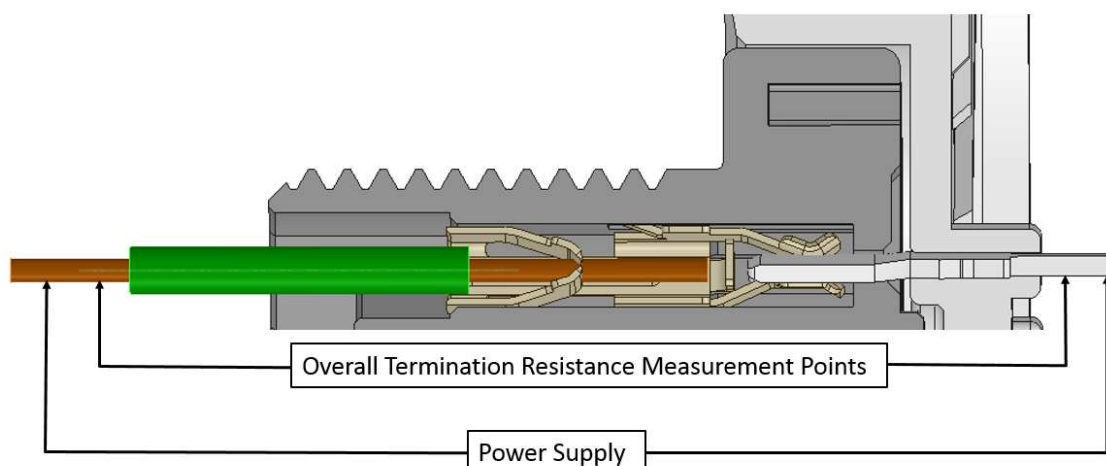


Figure 4
LLCR Measurement Points

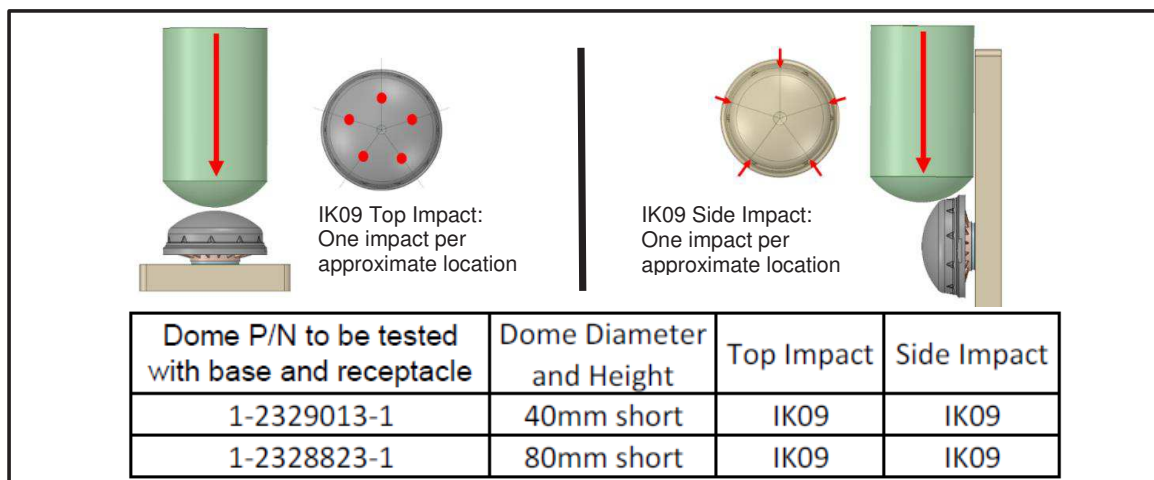


Figure 5a

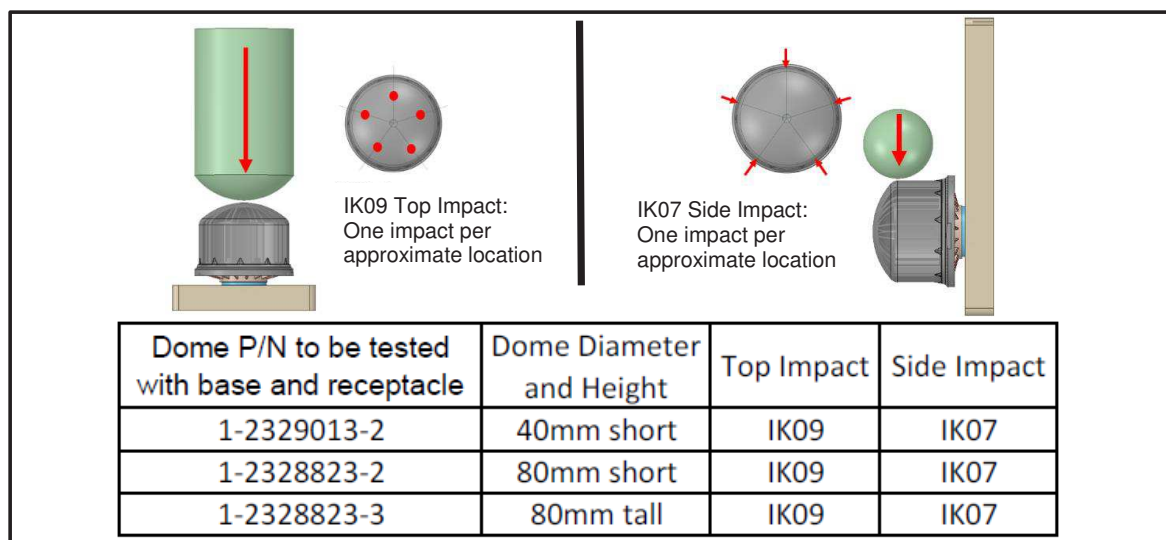


Figure 5b

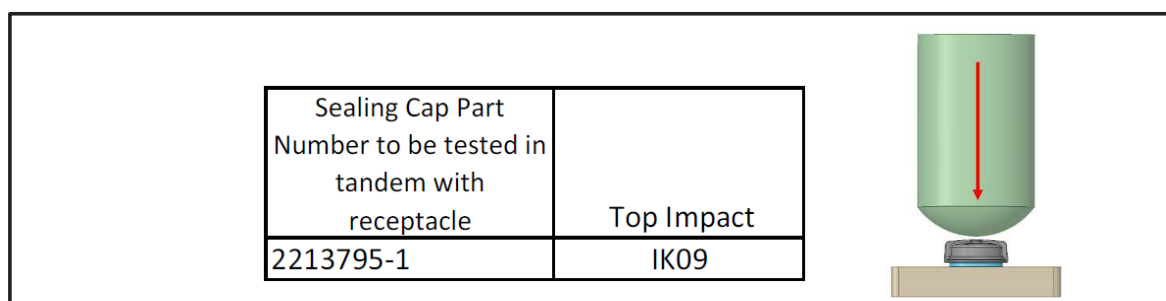


Figure 5c



**LUMAWISE* Endurance S Connector Platform Qualification
Testing**

1. INTRODUCTION

1.1 Purpose

Testing was performed on the TE Connectivity LUMAWISE Endurance S Connector Platform to determine its conformance to the requirements of Product Specification 108-133073, Rev. A.

1.2 Scope

This report covers the electrical, mechanical and environmental performance of the LUMAWISE Endurance S Connector Platform. Testing was performed at the Harrisburg Electrical Components Test Laboratory between January 10, 2017 and June 2, 2017. Documentation for this testing is on file at HECTL under EA20170003T, EA2017063T, EA20170176T, EA20170199T and EA20170309T.

1.3 Conclusion

All specimens from all test groups met the electrical, mechanical and environmental performance requirements as specified in Product Specification 108-133073, Rev. A. See Section 2 of this report for detailed results.

1.4 Product Description

The TE Connectivity LUMAWISE Endurance S Connector Platform system is used for roadway and area lighting applications.

1.5 Test Specimens

The test specimens were representative of normal production lots, and the following part numbers were used for test:

Table 1 – Qualification Test Specimens

Test Group	Test Set	Quantity	Part Number	Description
A	1	4	2213858-1, Rev 3	Receptacle Assembly, LUMAWISE Endurance S with 16 AWG Solid Wire
		4	2213831-1, Rev 3	80mm Module PCB Assembly, LUMAWISE Endurance S with 20 AWG Stranded Wire
	2	4	2213858-1, Rev 3	Receptacle Assembly, LUMAWISE Endurance S With 20 AWG Solid Wire
		4	2213831-1, Rev 3	80mm Module PCB Assembly, LUMAWISE Endurance S with 20 AWG Stranded Wire
B	3	4	2213858-1, Rev 3	Receptacle Assembly, LUMAWISE Endurance S with UL1007-16 AWG, Solid Wire
		4	2213831-1, Rev 3	80mm Module PCB Assembly, LUMAWISE Endurance S with 20 AWG Stranded Wire
	4	4	2213858-1, Rev 3	Receptacle Assembly, LUMAWISE Endurance S with UL1007-20 AWG, Solid Wire
		4	2213831-1, Rev 3	80mm Module PCB Assembly, LUMAWISE Endurance S with 20 AWG Stranded Wire
C	5	6	2213858-1, Rev 3	Receptacle Assembly, LUMAWISE Endurance S with UL1007-16 AWG, Solid Wire
		6	2213837-1, Rev 3	40mm Module PCB Assembly, LUMAWISE Endurance S with 20 AWG Stranded Wire
D	6	5	2213858-1, Rev 3	Receptacle Assembly, LUMAWISE Endurance S with Sealing Gasket 2213830-1, Rev 6
		5	2213795-1, Rev 11	Sealing Cap, LUMAWISE Endurance S
		5	AN-1304-A	Sealed Enclosure, Flat Lid
	7	5	2213858-1, Rev 3	Receptacle Assembly, LUMAWISE Endurance S with Sealing Gasket 2213830-1, Rev 8
		5	2213795-1, Rev 11	Sealing Cap, LUMAWISE Endurance S
		5	AN-1304-A	Sealed Enclosure, Flat Lid
E	8	5	2213858-1, Rev 3	Receptacle Assembly, LUMAWISE Endurance S with Sealing Gasket 2213830-1, Rev 8
		5	2213795-1, Rev 11	Sealing Cap, LUMAWISE Endurance S
F	9	10	2213858-1, Rev 3	Receptacle Assembly, LUMAWISE Endurance S with UL1007-16 AWG, Solid Wire
	10	10	2213858-1, Rev 3	Receptacle Assembly, LUMAWISE Endurance S with UL1007-18 AWG, Solid Wire
	11	10	2213858-1, Rev 3	Receptacle Assembly, LUMAWISE Endurance S with UL1007-20 AWG, Solid Wire
	12	10	2213858-1, Rev 3	Receptacle Assembly, LUMAWISE Endurance S with UL1007-18 AWG, Tin Dipped Stranded Wire
	13	10	2213858-1, Rev 3	Receptacle Assembly, LUMAWISE Endurance S with UL1007-20 AWG, Tin Dipped Stranded Wire
G	14	5	2213858-1, Rev 3	Receptacle Assembly, LUMAWISE Endurance S] with Sealing Gasket 2213830-1, Rev 6
		5	2213795-1, Rev 11	Sealing Cap, LUMAWISE Endurance S
		5	AN-1304-A	Sealed Enclosure, Flat Lid
	15	5	2213858-1, Rev 3	Receptacle Assembly, LUMAWISE Endurance S] with Sealing Gasket 2213830-1, Rev 6
		5	2213795-1, Rev 11	Sealing Cap, LUMAWISE Endurance S
		5	AN-1304-A	Sealed Enclosure, Flat Lid

Table 1 – Qualification Test Specimens (continued)

Test Group	Test Set	Quantity	Part Number	Description
H	16	5	2213858-1, Rev 3	Receptacle Assembly, LUMAWISE Endurance S with Sealing Gasket 2213830-1, Rev 8
		5	2213837-1, Rev 3	40mm Module Assembly, SR- 20.2mm ID hole
		5	AN-1304-A	Flat Mounting Lid, Bud Industries Enclosure
J	17	5	2213858-1, Rev 3	Receptacle Assembly, LUMAWISE Endurance S] with Sealing Gasket 2213830-1, Rev 6
		5	2213795-1, Rev 11	Sealing Cap, LUMAWISE Endurance S
		5	AN-1304-A	Sealed Enclosure, Flat Lid
	18	5	2213858-1, Rev 3	Receptacle Assembly, LUMAWISE Endurance S] with Sealing Gasket 2213830-1, Rev 8
		5	2213795-1, Rev 11	Sealing Cap, LUMAWISE Endurance S
		5	AN-1304-A	Sealed Enclosure, Flat Lid
K	19	5	2213858-1, Rev 3	Receptacle Assembly, LUMAWISE Endurance S with Sealing Gasket 2213830-1, Rev 8
		5	2213837-1, Rev 3	40mm Module Assembly, SR- 20.2mm ID hole
		5	AN-1304-A	Flat Mounting Lid, Bud Industries Enclosure

1.6 Qualification Test Sequence

Table 2 - Test Sequence

Test or Examination	Test Sets						
	1 & 2	3 & 4	5	6	7	8	9 - 13
	Test Groups						
	A	B	C	D (c)		E	F
	Test Sequence (a)						
Initial Examination of Product	1	1	1	1	1	1	1
LLCR	2, 6	2,5,7	2,8				
Insulation Resistance			3,9				
Withstanding Voltage - Internal			4,10				
Temperature Rise vs Current		3					
Random Vibration	4						
Mechanical Shock	5						
Wire Retention Force							2
Durability	3						
Thermal Shock			6				
Humidity/Temperature Cycling		4(b)	7				
Temperature Life		6					
Temperature Life – IP				2	2		
Ingress Protection IP6X (Dust)				3			
Ingress Protection IPX5 (H2O)					3		
Ingress Protection IPX6 (H2O)					4		
Withstanding Voltage - External			5,11				
Salt Spray						2	
Final Examination of Product	7	8	12	4	5	3	3

Table 2 - Test Sequence (continued)

Test or Examination	Test Sets					
	14	15	16	17	18	19
	Test Groups					
	G (c)		H	J (c)		K
	Test Sequence (a)					
Initial Examination of Product	1	1	1	1	1	1
Impact	2	2				
Mating Torque			2			
Un-Mating Torque			3			
Humidity Freeze				2	2	
Ingress Protection IP6X (Dust)	3			3		
Ingress Protection IPX5 (H ₂ O)					3	
Ingress Protection IPX6 (H ₂ O)		3			4	
Receptacle Mounting Torque Resistance						2
Final Examination of Product	4	4	4	4	5	3

NOTES

- The numbers indicate sequence in which tests were performed.
- Precondition with 2 durability cycles
- Groups D, G and J: (5) specimens subjected to IP6X dust exposure and (5) specimens subjected to IPX5 and and/or IPX6 jet spray exposure

1.7 Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:

Temperature:	15°C to 35°C
Relative Humidity	20% to 80%

2. SUMMARY OF TESTING

2.1 Initial Examination of Product (All Groups)

All specimens submitted for testing were representative of normal production lots. A Certificate of Conformance was issued by Product Assurance. Where specified, specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2 LLCR (Groups A, B and C)

All specimens had measurements that met the 25 milliohm maximum Delta R requirement specified in Product Specification 108-133073, Rev. A. See Tables 3, 4 and 5 for LLCR summaries for Groups A, B and C, respectively.

Table 3 – Group A LLCR Summary

	Initial	After Mechanical Shock
	Actual R	Delta R
Test Set 1 - 16 AWG		
MIN	19.08	-0.23
MAX	19.71	0.46
AVG	19.37	0.1
STDEV	0.20	0.17
Test Set 2 - 20 AWG		
MIN	22.32	-0.19
MAX	25.91	1.82
AVG	24.52	0.64
STDEV	1.27	0.68
DATA PTS	16	

Table 4 – Group B LLCR Summary (milliohms)

	Initial	After Temp/Hum	After Temp Life
	Actual R	Delta R	Delta R
Test Set 3 - 16 AWG			
MIN	18.46	-0.45	-0.36
MAX	19.42	0.59	8.95
AVG	19.11	0.02	2.06
STDEV	0.22	0.31	2.53
Test Set 4 - 20 AWG			
MIN	21.16	-3.36	-1.82
MAX	25.43	1.84	6.96
AVG	24.23	-0.08	1.54
STDEV	1.32	1.35	2.28
DATA PTS	16		

Table 5 – Group C LLCR Summary (milliohms)

	Initial	After Temp/Hum
	Actual R	Delta R
Test Set 5 - 16 AWG		
MIN	16.77	-2.22
MAX	19.33	3.97
AVG	18.92	0.77
STDEV	0.67	1.19
DATA PTS	24	

2.3 Insulation Resistance (Group C)

All specimens met the initial 100 megaohm and final 10 megaohm minimum requirements specified in Product Specification 108-133073, Rev. A.



2.4 Withstanding Voltage – Internal (Group C)

With an 1100 volts AC potential applied between adjacent contacts of mated specimens for one minute, none of the specimens exhibited breakdown, flashover or exceeded 5 milliamperes leakage current.

2.5 Temperature Rise vs. Current (Group B)

All 16 AWG and 20 AWG specimens met the maximum 30°C temperature rise requirement when energized with the specified 1.5 amperes.

2.6 Random Vibration (Group A)

No apparent physical damage or discontinuities of one microsecond or greater occurred during testing.

2.7 Mechanical Shock (Group A)

No apparent physical damage or discontinuities of one microsecond or greater occurred during testing.

2.8 Wire Retention Force (Group F)

All specimens from all test sets met the minimum requirements specified in Product Specification 108-133073, Rev. A. See Table 6 for a wire retention force summary.

Table 6 – Group F Wire Retention Summary (N)

	Test Set 9 16 AWG Solid Wire	Test Set 10 18 AWG Solid Wire	Test Set 12 18 AWG Tin Dipped Stranded Wire	Test Set 11 20 AWG Solid Wire	Test Set 13 20 AWG Tin Dipped Stranded Wire
MIN	28.24	21.87	16.17	13.24	15.37
MAX	67.44	36.22	72.66	32.03	55.96
AVG	40.69	28.04	33.34	18.51	30.48
STDEV	9.47	3.79	11.99	3.38	10.80
REQ.	25 N	20 N	15 N	13 N	
DATA PTS	40				

2.9 Impact (Group G)

No physical damage detrimental to product performance was visible due to impact testing.

2.10 Connector Mating Torque (Group H)

All specimens met the 4.0 N-m maximum requirement specified in Product Specification 108-133073, Rev. A. See Table 7 for all mating torque force data.

2.11 Connector Un-Mating Torque (Group H)

All specimens met the 4.0 N-m maximum requirement specified in Product Specification 108-133073, Rev. A. See Table 7 for all un-mating torque force data.

Table 7 – Mating and Un-Mating Torque Force (N-m)

	Mating Torque	Unmating Torque
MIN	2.81	2.30
MAX	3.86	2.57
AVG	3.11	2.44
STDEV	0.43	0.12
REQ.	4.0 N-m	
DATA PTS	5	

2.12 Receptacle Mounting Torque Resistance (Group K)

All specimens met the maximum 30 degree rotation requirement, relative to the original mounting location with an applied torque of 5.0 N-m, as specified in Product Specification 108-133073, Rev. A. See Table 8 for all rotation measurement data.

Table 8 – Rotation Measurement Data (Degrees)

	Rotation Degrees	Applied Torque Nm
MIN	2.85	5.01
MAX	3.85	5.12
AVG	3.34	5.07
STDEV	0.42	0.05
REQ.	30°	5.0 N-m
DATA PTS	5	

2.13 Humidity Freeze (Group J)

No evidence of physical damage detrimental to product performance was visible as a result of exposure to humidity freeze exposure.

2.14 Durability (Group A)

No evidence of physical damage detrimental to product performance was observed as a result of the specimens being mated and un-mated 10 times.

2.15 Thermal Shock (Groups B and C)

None of the specimens showed any signs of physical damage detrimental to product performance after being subjected to thermal shock.

2.16 Humidity/Temperature Cycling (Groups B and C)

None of the specimens showed any signs of physical damage detrimental to product performance after being subjected to humidity/temperature cycling.

2.17 Temperature Life (Group B)

None of the specimens showed any signs of physical damage detrimental to product performance after being subjected to temperature life.



2.18 Temperature Life – IP (Group D)

No evidence of physical damage detrimental to product performance was visible as a result of exposure to temperature life.

2.19 Ingress Protection IP65 (Groups D and J)

No evidence of dust ingress was visible due to exposure to IP6X testing. None of the specimens exhibited ingress of water due to exposure to IPX5 testing.

2.20 Ingress Protection IP66 (Groups D, G and J)

No evidence of dust ingress was visible due to exposure to IP6X testing. None of the specimens exhibited ingress of water due to exposure to IPX6 testing.

2.21 Withstanding Voltage – External (Group C)

With a 10,000 volts AC potential applied between all contacts and the receptacle mounting plate of mated specimens for one minute, none of the specimens exhibited breakdown, flashover or exceeded 5 milliamperes leakage current.

2.22 Salt Spray (Group E)

None of the specimens showed any signs of salt spray ingress within any sealed area of the connector.

2.23 Final Examination of Product (All Groups)

Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

3. TEST METHODS

3.1. Initial Examination of Product (All Groups)

A C of C was issued stating that all specimens in this test package were produced, inspected, and accepted as conforming to product drawing requirements, and were manufactured using the same core manufacturing processes and technologies as production parts.

3.2 LLCR (Groups A, B and C)

The specimens were measured using a four terminal measurement method at 100 milliamperes maximum and 20 millivolts maximum open circuit voltage. An unknown amount of wire bulk resistance was included in the measurements. See Figure 1 for an image of the measurement setup and probe locations. All testing was conducted in accordance with EIA-364-23C with the exception that the measurement points were at the ends of the terminated conductors.

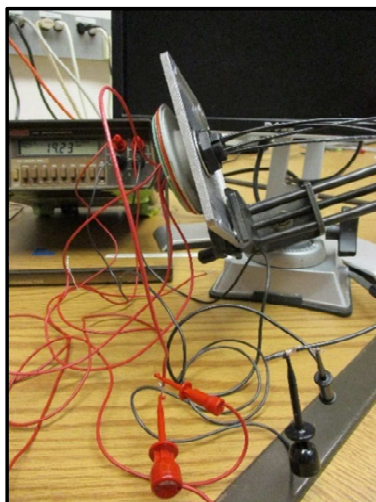


Figure 1 – LLCR Setup

3.3 Insulation Resistance (Group C)

A test potential of 500 volts DC was applied between adjacent contacts of mated specimens for a period of 2 minutes prior to taking measurements. Testing was conducted in accordance with EIA-364-21E. See Figure 2 for test setup.

3.4 Withstanding Voltage – Internal (Group C)

A test potential of 1100 volts AC was applied between adjacent contacts of mated specimens for a period of 1 minute at a ramp rate of 500 volts per second. Testing was conducted in accordance with EIA-364-20E, Condition I. Leakage current was set to 5 mA maximum. See Figure 2 for test setup.

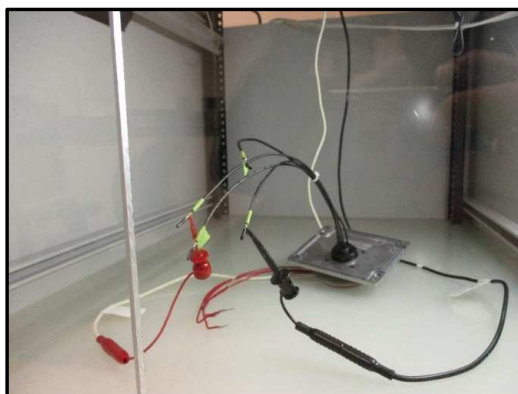


Figure 2 – Typical Insulation Resistance and Withstanding Voltage – Internal Setup

3.5 Temperature Rise vs. Current (Group B)

Infrared temperature measurement point, i.e. PCB tail area, was painted with flat black paint, used as an emissivity correction coating. The emissivity correction coating has a known value which is 0.95. Raising and knowing the emittance value allows for accurate temperature measurements. The infrared camera was used with the standard optics (50 mm lens) to image the test specimens.

ExamInIR thermal imaging processing system was used for data analysis. The area tool software feature was used to determine maximum temperature of the exposed contacts. The area tool software feature allows a shape, which can be sized, to be placed on an area of interest. The pixels inside the shape are analyzed giving minimum, maximum, average, and standard deviation measurements of the target temperature.

Mated test specimens were connected in series and then placed in the temperature rise enclosure. Measurements were taken after temperature stabilization at each current level. Refer to Figure 3 for an image of the typical test setup. Testing was performed in accordance with EIA-364-70C, Method 1.

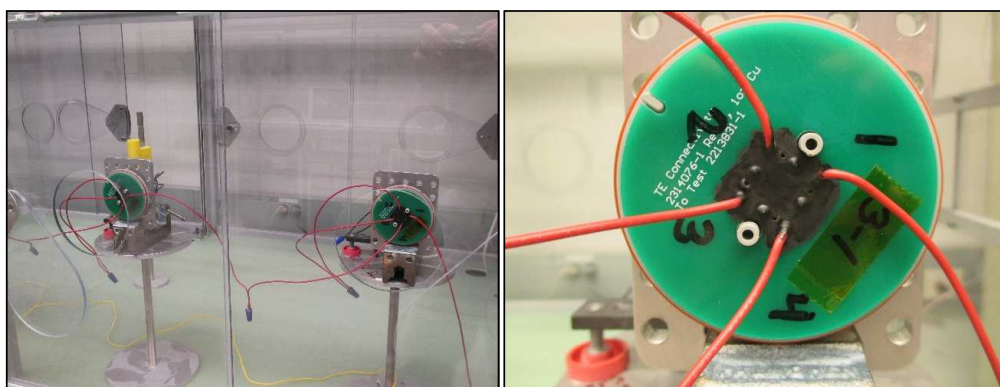


Figure 3 – Typical Temperature Rise vs. Current Test Setup

3.6 Random Vibration (Group A)

The parameters of this test condition are specified by a random vibration spectrum with excitation frequency bounds of 20 and 500 Hertz (Hz). The spectrum remains flat at 0.05 G²/Hz from 20 Hz to the upper bound frequency of 500 Hz. The root-mean square amplitude of the excitation was 4.9 GRMS. The test specimens were subjected to this test for 90 minutes in each of the three mutually perpendicular axes, for a total test time of 270 minutes per test specimen. The test specimens were monitored for discontinuities of 1 microsecond or greater using an energizing current of 100 milliamperes. Testing was conducted in accordance with EIA 364-28F, Condition VII, Level E. See Figure 4 for the vibration setup.



Figure 4 – Vibration Test Setup – X, Y and Z Axis

3.7 Mechanical Shock (Group A)

The parameters of this test condition are a half-sine waveform with an acceleration amplitude of 30 gravity units (g's peak) and a duration of 11 milliseconds. Three shocks in each direction were applied along the three mutually perpendicular axes of the test specimens, for a total of eighteen shocks. The test specimens were monitored for discontinuities of 1 microsecond or greater using an energizing current of 100 milliamperes. Testing was conducted in accordance with EIA 364-27C, Condition H. See Figure 5 for the mechanical shock setup.

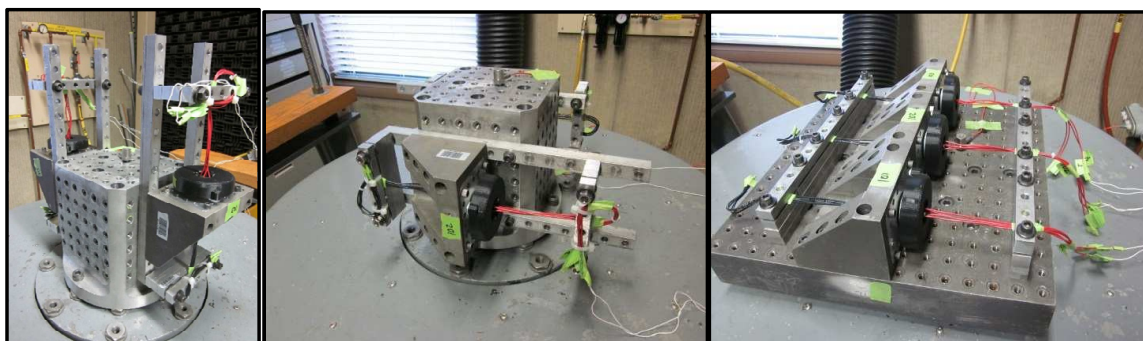


Figure 5 – Mechanical Shock Test Setup– X, Y and Z Axis

3.8 Wire Retention Force (Group F)

Prior to testing all 4 circuits of the receptacle, connectors were loaded with UL1007 solid or tin-dipped, stranded wire provided by the test requestor. The wire was held in a pneumatic jaw that was attached to the load cell and crosshead of the tensile/compression machine. The receptacle connectors were held in a slotted plate fixture that was secured to a full floating table. The floating table was attached to the base of the tensile/compression machine. The crosshead was moved in an upward direction at a maximum rate of 12.7 mm per minute until the wire was completely removed from the receptacle connector. The tensile/compression machine was setup to hold the required load for 3 seconds prior to completely removing the wire. Maximum force prior to complete removal of the wire was picked as the wire retention force. All testing was conducted in accordance with EIA-364-8C with the exception that the forces required to remove the wires from the poke-in contacts were measured instead of crimp tensile force. See Figure 6 for an image of the test setup.



Figure 6 – Wire Retention Force Setup

3.9 Impact (Group G)

A sealing cap was secured on the receptacle supplied mounted to a BUD Industries AN-1304 enclosure. A requester supplied support fixture (Figure 7) was placed inside the enclosure to prevent the enclosure from collapsing during impact. Five 10J impacts were applied to each specimen by dropping a 5 kg mass (Figure 8) a distance of 200 mm. Refer to Figure 9 for an image of the test setup. Testing was performed in accordance with IEC 62262, First Edition, dated 2002-02.



Figure 7 – Support Fixture



Figure 8 – 5 kg Mass



Figure 9 – Typical Impact Test Setup

3.10 Connector Mating Torque (Group H)

The receptacle was supplied mounted to a BUD Industries AN-1304 enclosure. The enclosure was clamped to a plate attached to a torque load cell. The torque load cell was clamped to the base of the tensile/compression machine. A customer supplied fixture was attached to a rotational table used to apply the torque to the specimens. The rotational table was attached to the moveable crosshead of the tensile/compression machine. A module assembly was placed onto the receptacle and aligned with the fixture. The crosshead was then lowered at a rate of 0.5 in/min until a compression force of 55.6 N was achieved. The module assembly was then rotated and mated in a clockwise direction in reference to the receptacle and the peak torque force was recorded. Following the mating torque testing the crosshead of the tensile/compression machine was not moved and the specimens were rotated and unmated in the counter clockwise direction with the peak torque force value recorded. Testing was performed in accordance with EIA-364-13E. Refer to Figure 10 for images of the typical test setup.

3.11 Connector Unmating Torque (Group H)

The testing method was identical to the mating force torque method with the exception that the specimens were rotated and unmated in the counter clockwise direction with the peak torque force value recorded. Refer to Figure 10 for images of the typical test setup.



Figure 10 – Typical Mating and Un-Mating Torque Force Setup

3.12 Receptacle Mounting Torque Resistance (Group K)

The receptacle was supplied mounted to a BUD Industries AN-1304 enclosure. The enclosure was clamped to a plate attached to a torque load cell. The torque load cell was clamped to the base of the tensile/compression machine. A customer supplied fixture was attached to a rotational table used to torque the specimens. The rotational table was attached to the moveable crosshead of the tensile/compression machine. A sealing cap was placed onto the receptacle and aligned with the fixture. The crosshead was then lowered at a rate of 0.5 in/min until a compression force of 55.6 N was achieved. The sealing cap was then rotated and mated in a clockwise direction until a peak torque force of 5 N-m was achieved. The receptacle specimens and mounting plates were then inspected and measured for movement from the original mounting location with a smartscope. Prior to testing, reference lines were applied to the sealing cap and mounting plate of each specimen and the difference between the two reference lines after applying the 5 N-m torque force was measured and recorded in degrees. Testing was performed in accordance with EIA-364-13E. Refer to Figure 11 for images of the typical test setup. Refer to Figure 12 for a typical photo showing the reference lines applied to the sealing cap and mounting plate.



Figure 11 – Typical Receptacle Mounting Torque Test Setup



Figure 12 – Typical Specimen Sealing Cap and Mounting Plate Reference Lines

3.13 Humidity Freeze (Group J)

Receptacle specimens with sealing caps installed and mounted to a flat plate were subjected to 10 cycles between -40°C and 90°C at 85% relative humidity. Refer to Figure 13 for an illustration of the chamber profile. Testing was performed in accordance with IEC 61215, Second Edition, dated 2005-04.

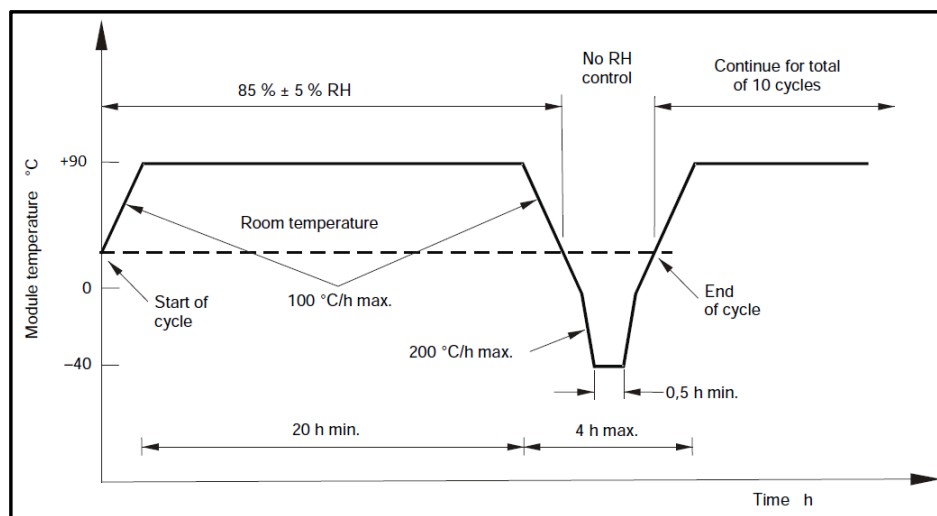


Figure 13 – Typical Humidity Freeze Chamber Profile

3.14 Durability (Group A)

The specimens were manually mated and unmated for 10 cycles at a maximum rate of 360 cycles per hour as specified in Product Specification 108-133073, Rev A. All testing was conducted in accordance with EIA-364-9C.

3.15 Thermal Shock (Groups B and C)

The mated specimens were subjected to 150 cycles between -40 and 90°C with 30 minute dwells at temperature extremes and 1 minute transition between temperatures. Testing was conducted in accordance with EIA-364-32G.

3.16 Humidity/Temperature Cycling (Groups B and C)

The mated specimens were subjected to 10 cycles (10 days) between 25 and 65°C at 80 to 100% RH. Testing was conducted in accordance with EIA-364-31E, Method IV.

3.17 Temperature Life (Group B)

The mated specimens were subjected to 100°C for 500 hours in an air-circulating oven. Testing was conducted in accordance with EIA-364-17C, Method A.

3.18 Temperature Life – IP (Group D)

Receptacle specimens with sealing caps installed and mounted to a flat plate were subjected to 90°C for a duration of 240 hours. Testing was performed in accordance with EIA-364-17C, Method A.

3.19 Ingress Protection IP65 (Groups D and J)

Specimens were subjected to IP-6X testing in accordance with test specification IEC-60529 Edition 2.2, 2013-08. A sealing cap was secured on the receptacle that was supplied mounted to a BUD Industries AN-1304 enclosure. A hole was drilled in each enclosure and a 1/8" OD tube was inserted and sealed with a silicone sealant. The tubing was connected to a vacuum manifold. A vacuum was applied through the tubing not exceeding 2 KPa. The amount of talcum powder used was 2 kg per cubic meter of the test chamber volume. The dust chamber was designed to maintain the talcum powder in suspension during the exposure. Specimens were exposed for a period of 8 hours. Refer to Figure 14 for an image of the typical test setup.

Specimens were subjected to IPX5 testing in accordance with test specification IEC-60529 Edition 2.2, 2013-08. A sealing cap was secured on the receptacle that was supplied mounted to a BUD Industries AN-1304 enclosure. Each specimen was tested independently by placing it in an enclosure and spraying it with water. The size of the nozzle was 6.3mm and the delivery rate was 12.5 liters/minute $\pm 5\%$. The distance from the nozzle to the test specimen was 2.5-3.0 meters. The water spray was applied to the enclosure from all practicable directions for a period of 3 minutes. Upon completion, the outside of each specimen was dried using paper towels. The sealing cap was then removed and inspected for water intrusion. The box was then opened and inspected for any evidence of water intrusion. Refer to Figure 15 for an image of the typical test setup.



Figure 14 – Typical IP6X Test Setup



Figure 15 – Typical Ingress Protection IPX5 and IPX6 Test Setup

3.20 Ingress Protection IP66 (Groups D, G and J)

The dust testing portion was conducted identical to the method described in paragraph 3.19. See Figure 14. The water jet spray testing portion was conducted identical to the method described in paragraph 3.19 with the exception that the size of the nozzle was 12.5 mm and the delivery rate was 100 liters/minute $\pm 5\%$. See Figure 15.

3.21 Withstanding Voltage – External (Group C)

A test potential of 10,000 volts AC was applied between all contacts and receptacle mounting plate of mated specimens for a period of 1 minute at a ramp rate of 500 volts per second. Leakage current was set to 5 mA maximum. Testing was conducted in accordance with EIA-364-20E, Condition I. See Figure 16 for test setup.



Figure 16 – Typical Withstanding Voltage – External Setup

3.22 Salt Spray (Group E)

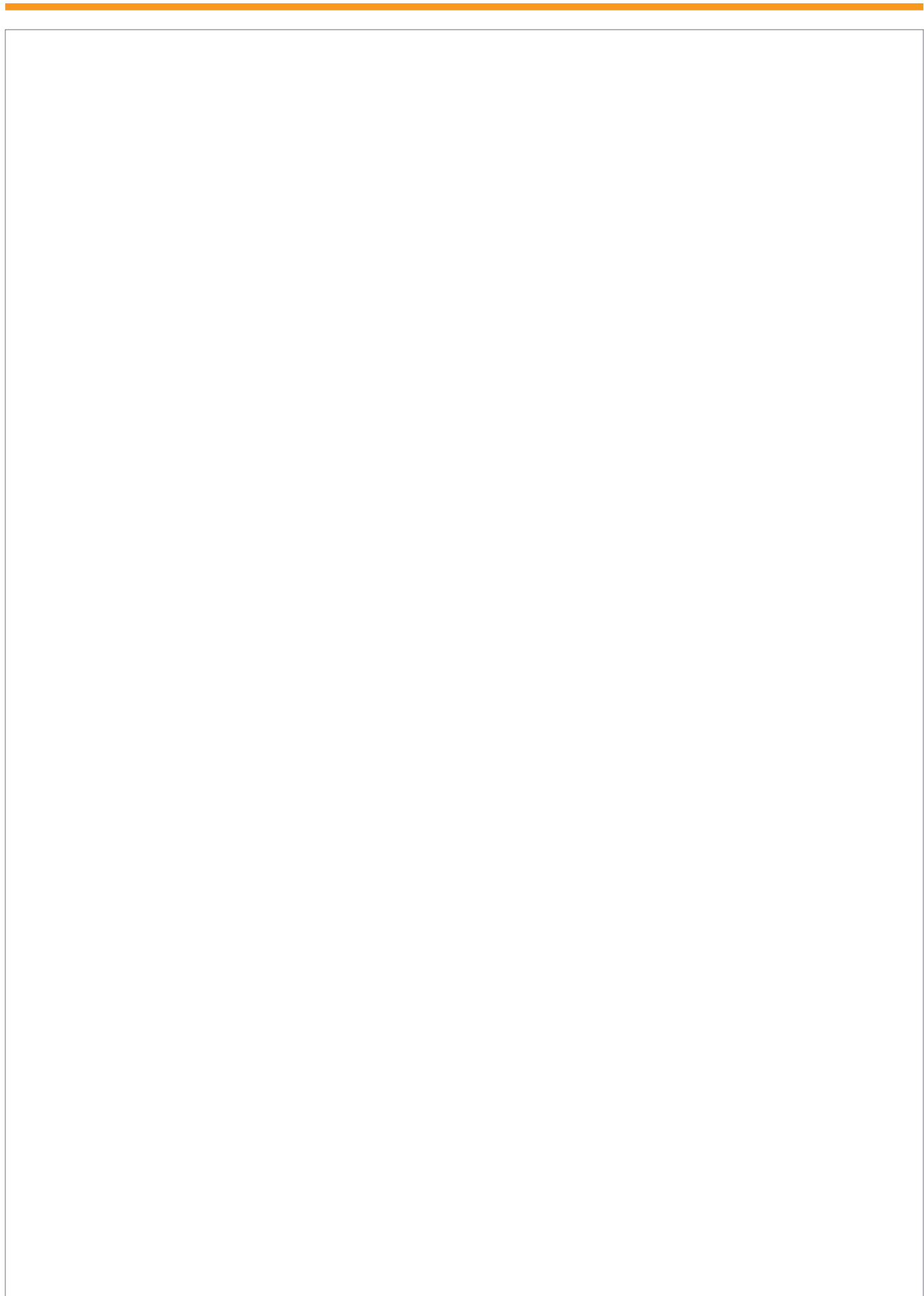
The specimens were placed in the chamber on horizontal racks with the caps facing upwards. The chamber was operated for a total of 240 hrs. Upon completion of the test the specimens were dried (as removed/no rinsing) at room ambient conditions. The specimens were lightly brushed with a toothbrush in order to remove excess salt deposits on the outside of the enclosure box. Testing was conducted in accordance with IEC 60512-11-6. The chamber operating parameters were as follows:

Salt Fog Chamber Operating Parameters:

- Chamber Temperature: 35°C.
- Aeration Tower temperature: 48°C.
- 5% Brine Solution Purity: Sodium Chloride with no more than .3% impurities.
- Aeration Tower Pressure: 15 PSI.
- Brine Solution pH Range: 6.5 to 7.2.
- Specific Gravity Range: 1.031 to 1.037.
- Collection rate: .5 to 3ml per hour.

3.23 Final Examination of Product (All Groups)

The specimens were visually examined without magnification for physical damage or defects that would affect product performance. The examination was conducted per EIA-364-18B.



UL- EU CERTIFICATE

Certificate No. UL-EU-01303-A3

Page 1/3

Date of Issue 2018-10-04

Certificate Holder TYCO Electronics Corp
2901 Fulling Mill Rd
Middletown, PA 17057-3170 USA

Manufacturer TYCO Electronics Corp
2901 Fulling Mill Rd
Middletown, PA 17057-3170 USA

Certified Product Model Connector System
X-2213795-X, X-2213831-X, X-2213837-X, X-2213858-X, X-2328823-X, X-2329013-X
Trademark See Page 2



Rated Voltage / Frequency [X-2213858-X, X-2213831-X, X-2213837-X]: 30V AC/DC
50/60 Hz, 1.5A

[X-2213795-X]: N/A (Sealing Cap)

[X-2328823-X, X-2329013-X]: N/A (Plastic Domes)

Rated Current / Power See Rated Voltage / Frequency

Insulation Class -

Degree of protection (IP) 66

Tested acc. to EN 61984:2009

Test Report No. 4787709142 issued on 2018-09-25

Additional See Page 2

Expire date 2027-04-16

Certification Manager
Jan-Erik Storgaard
UL International Demko A/S
Borupvang 5A
2750 Ballerup
Denmark

This is to certify that representative sample(s) of the Product described herein ("Certified Product") have been investigated and found in compliance with the Standard(s) indicated on this Certificate, in accordance with the UL-EU Requirements. The designated Certificate holder is entitled to use the UL-EU Mark for the Certified Product manufactured at the production site(s) identified above, in accordance with the UL-EU Mark Service Agreement, including without limitation the UL-EU Mark Testing and Certification Services Service Terms. Only those Products bearing the UL-EU Mark for Europe should be considered as being covered by UL's UL-EU Mark Service. This Certificate shall remain valid through the expiration date, unless terminated earlier in accordance with the Service Agreement including without limitation if the Standard(s) identified on this Certificate is amended or withdrawn prior the expiration date.

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Appendix UL-EU CERTIFICATE

Certificate No. UL-EU-01303-A3
Page 2/3
Date of Issue 2018-10-04

Model Details:

X-2213795-X, X-2213831-X, X-2213837-X, X-2213858-X, X-2328823-X, X-2329013-X

X is a suffix/prefix for aesthetic differences that do not affect ratings or attributes shown in test report: characteristic features

Additional Information:

This Certificate replaces earlier issued UL-EU Certificate No. UL-EU-01303-A2-M1 due to:

1. Addition of Dome Models X-2328823-X (80 mm) and X-2329013-X (40 mm) to be used on Module Base (80mm) X-2213831-X & Module Base (40mm) X-2213837-X respectively to create an enclosure.
2. Addition of new Factory
3. Addition of marking plate and Rating.

Certification Body
UL International Demko A/S
Borupvang 5A
2750 Ballerup
Denmark

This is to certify that representative sample(s) of the Product described herein ("Certified Product") have been investigated and found in compliance with the Standard(s) indicated on this Certificate, in accordance with the UL-EU Requirements. The designated Certificate holder is entitled to use the UL-EU Mark for the Certified Product manufactured at the production site(s) identified above, in accordance with the UL-EU Mark Service Agreement, including without limitation the UL-EU Mark Testing and Certification Services Service Terms. Only those Products bearing the UL-EU Mark for Europe should be considered as being covered by UL's UL-EU Mark Service. This Certificate shall remain valid through the expiration date, unless terminated earlier in accordance with the Service Agreement including without limitation if the Standard(s) identified on this Certificate is amended or withdrawn prior the expiration date.



Appendix UL-EU CERTIFICATE

Certificate No. UL-EU-01303-A3
Page 3/3
Date of Issue 2018-10-04

Certification Mark UL-EU Mark

The UL-EU Mark, as displayed below, shall appear on certified products only. Minimum size is not specified, as long as the Mark is legible. The following is suggested.



The minimum height of the registered trademark symbol ® shall be 1 mm. When the overall diameter of the UL-EU Mark is less than 9.5 mm, the trademark symbol may be omitted if it is not legible to the naked eye.

The UL-EU Mark may appear on a label, nameplate, or may be cast, stamped or molded into the product. When appearing on a label or nameplate, the Manufacturer's name or trademark along with a model number are also required on that same label or nameplate. If cast, stamped or molded, the Manufacturer's name or trademark and model number shall also appear elsewhere on the product.

All content shall be in accordance with the details provided on this UL-EU Certificate.

PROCUREMENT

The Production site may reproduce the Mark or obtain it from a UL authorized supplier. The list of UL authorized suppliers can be found on UL's online directory at www.ul.com

Certification Body
UL International Demko A/S
Borupyang 5A
2750 Ballerup
Denmark

This is to certify that representative sample(s) of the Product described herein ("Certified Product") have been investigated and found in compliance with the Standard(s) indicated on this Certificate, in accordance with the UL-EU Requirements. The designated Certificate holder is entitled to use the UL-EU Mark for the Certified Product manufactured at the production site(s) identified above, in accordance with the UL-EU Mark Service Agreement, including without limitation the UL-EU Mark Testing and Certification Services Service Terms. Only those Products bearing the UL-EU Mark for Europe should be considered as being covered by UL's UL-EU Mark Service. This Certificate shall remain valid through the expiration date, unless terminated earlier in accordance with the Service Agreement including without limitation if the Standard(s) identified on this Certificate is amended or withdrawn prior the expiration date.



DESCRIPTION

PRODUCT COVERED:

USR,CNR: Component - Photocontrol LUMAWISE Endurance S Connector Platform, Receptacle, Cat. No. 2213858 preceded by prefix 0 through 9 and followed by suffix 0 through 9.

USR,CNR: Component - Photocontrol LUMAWISE Endurance S Connector Platform, Sealing Cap, Cat. No. 2213795 preceded by prefix 0 through 9 and followed by suffix 0 through 9.

USR,CNR: Component - Photocontrol LUMAWISE Endurance S Connector Platform, Module Base (80 mm), Cat. No. 2213831 preceded by prefix 0 through 9 and followed by suffix 0 through 9.

USR,CNR: Component - Photocontrol LUMAWISE Endurance S Connector Platform, Module Base (40 mm), Cat. No. 2213837 preceded by prefix 0 through 9 and followed by suffix 0 through 9.

USR,CNR: Component - Photocontrol LUMAWISE Endurance S Connector Platform, Dome (80 mm), Cat. No. 2328823 preceded by prefix 0 through 9 and followed by suffix 0 through 9.

USR,CNR: Component - Photocontrol LUMAWISE Endurance S Connector Platform, Dome (40 mm), Cat. No. 2329013 preceded by prefix 0 through 9 and followed by suffix 0 through 9.

Note:

USR: Indicates United States Standards, Recognized Component.

CNR: Indicates Canadian National Standards, Recognized Component.

GENERAL:

These devices are Component Receptacle, Sealing Cap, 40 mm Module Base, 80 mm Module **Base, 40 mm dome, 80 mm dome** for use with Photocontrol units in area lighting applications of special purpose configuration.

The final suitability is to be determined in the end product application.

The USR investigation indicates products investigated to the requirements contained in the Standard for Plug-In, Locking Type Photo-controls for Use with Area Lighting, UL 773.

The CNR investigation indicates products investigated to the requirements contained in the Standard for Industrial Locking Type, Special Use Attachment Plugs, Receptacles and Connectors, CSA C22.2 182.2.

RATINGS:

- *Photocontrol Receptacle, Cat. No. 2213858: 30Vac/dc, 2 Amp.
- * Photocontrol Sealing Cap, Cat. No. 2213795: N/A
- * Photocontrol Module Base (80 mm), Cat. No. 2213831: 30Vac/dc, 2 Amp.
- *Photocontrol Module Base (40 mm), Cat. No. 2213837: 30Vac/dc, 2 Amp.

MODEL SIMILARITIES/DIFFERENCES/COMMENTS:

Model No.	Description	Comment
*2213858	Receptacle, rated 30Vac/dc, 2 Amp	See Ill. 1
*2213795	Sealing Cap	See Ill. 2
*2213831	Module Base (80 mm), rated 30Vac/dc, 2 Amp	See Ill. 3
*2213837	Module Base (40 mm), rated 30Vac/dc, 2 Amp	See Ill. 4

Additional prefix 0-9 and suffix 0-9 indicate non-safety critical changes.

ENGINEERING CONSIDERATIONS (NOT FOR UL REPRESENTATIVE USE):

Use - For use only in or with complete equipment where the acceptability of the combination is determined by UL LLC.

Conditions of Acceptability - In order to be judged acceptable as a component of electrical equipment, the following conditions should be met.

1. These devices are special purpose receptacle, sealing cap and module bases intended to be built into complete equipment. The electrical and mechanical suitability of the mounting means shall be determined in the end use.
2. These devices are specialty blade configurations only intended for use with the mating blade devices.
3. The operating temperature of these devices should not exceed the temperature ratings of the insulating materials. The maximum temperature ratings of the materials are as follows:

* Model No.	Description	Material Employed	RTI, Elec, C
2213858	Receptacle	1573551(TE Raw Material PN)	130 C
2213795	Sealing Cap	702996(TE Raw Material PN)	120 C
* 2213831	Module Base (80 mm)	702996(TE Raw Material PN)	125 C
* 2213837	Module Base (40 mm)	702996(TE Raw Material PN)	125 C
* 2328823	Dome (80 mm)	2136720(TE Raw Material PN)	130 C
		2136608(TE Raw Material PN)	125 C
2329013	Dome (40 mm)	2136720(TE Raw Material PN)	130 C
		2136608(TE Raw Material PN)	125 C

4. These devices employ UV (f1) rated insulating materials.
5. These devices are factory assembled with No. 16, 18 or 20 AWG lead wires with 105 C min. rated wire.
6. These devices should be used only where they will not interrupt the current and used within their ratings. The need to repeat end product electrical testing shall be considered in the end product investigation.
7. The need to repeat environmental testing based on mounting or mounting surface shall be considered in the end product investigation.
8. The gaskets/o-rings were evaluated to the requirements of UL 773 and CSA No. 182.2 only. The need for further evaluation in the end product shall be determined. The gaskets were subjected to a 70 hr conditioning at 100C.
9. The following tests were performed on Model 2213858-1, Receptacle and 2213831-1, Model 2213795-1, Sealing Cap mounted on a simulated enclosure: Rain Tightness Test, Exposure to Humid Atmospheres, Exposure to Low Temperature, Mold Stress Relief, Resistance to Impact and Dielectric Voltage Withstand Test.
10. The following tests were performed on Model 2213858-1, Receptacle, 2213831-1, Module Base (80 mm) at a rating of 30Vac/dc, 2 Amps mounted on a simulated enclosure: Exposure to Humid Atmospheres, Mold Stress Relief, Normal Temperature Test, and Dielectric Voltage Withstand Test.
11. Tests conducted on the Model 221381-1, Module Base (80 mm) were considered representative of Model 2213837-1, Module Base (40 mm).



Ref. Certif. No.

US-29611-A3-ULIEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE)
CB SCHEME**CB TEST CERTIFICATE**

Product

Connector System

Name and address of the applicant

TYCO Electronics Corp
2901 Fulling Mill Rd
Middletown, PA 17057-3170 USA

Name and address of the manufacturer

TYCO Electronics Corp
2901 Fulling Mill Rd
Middletown, PA 17057-3170 USA

Ratings and principal characteristics

[X-2213858-X, X-2213831-X, X-2213837-X]: 30V AC/DC 50/60
Hz, 1.5A
[X-2213795-X]: N/A (Sealing Cap)
[X-2328823-X, X-2329013-X]: N/A (Plastic Domes)

Trademark (if any)



Type of Customer's Testing Facility (CTF) Stage used

Model / Type Ref.

X-2213858-X, X-2213795-X, X-2213831-X, X-2213837-X,
X-2328823-X, X-2329013-X
See Page 2Additional information (if necessary may also be
reported on page 2)Technical modification
☐ Additional Information on page 2A sample of the product was tested and found
to be in conformity with

IEC 61984:2008

As shown in the Test Report Ref. No. which forms part
of this Certificate

4787709142 issued on 2018-09-25

This CB Test Certificate is issued by the National Certification Body



- ☐ UL (US), 333 Pfingsten Rd IL 60062, Northbrook, USA
- ☐ UL (Demko), Borupvang 5A DK-2750 Ballerup, DENMARK
- ☐ UL (JP), Marunouchi Trust Tower Main Building 6F, 1-8-3 Marunouchi, Chiyoda-ku, Tokyo 100-0005, JAPAN
- ☐ UL (CA), 7 Underwriters Road, Toronto, M1R 3B4 Ontario, CANADA

For full legal entity names see www.ul.com/ncbnamesDate: 2018-10-04
Original Issue Date: 2017-04-17

Signature:

Jolanta M. Wroblewska



Ref. Certif. No.

US-29611-A3-UL

Model Details:

X-2213795-X, X-2213831-X, X-2213837-X, X-2213858-X, X-2328823-X, X-2329013-X

X is a suffix/prefix for aesthetic differences that do not affect ratings or attributes shown in test report: characteristic features

Additional Information:

Additionally evaluated to EN 61984:2009.

The original report was modified to include the following technical changes/additions:

1. Addition of Dome Models X-2328823-X (80 mm) and X-2329013-X (40 mm) to be used on Module Base (80mm) X-2213831-X & Module Base (40mm) X-2213837-X respectively to create an enclosure.
2. Addition of new Factory
3. Addition of marking plate and Rating.

Additional information (if necessary)



UL (US), 333 Pfingsten Rd IL 60062, Northbrook, USA

UL (Demko), Borupvang 5A DK-2750 Ballerup, DENMARK

UL (JP), Marunouchi Trust Tower Main Building 6F, 1-8-3 Marunouchi, Chiyoda-ku, Tokyo 100-0005, JAPAN

UL (CA), 7 Underwriters Road, Toronto, M1R 3B4 Ontario, CANADA

For full legal entity names see www.ul.com/ncbnames

Date: 2018-10-04

Original Issue Date: 2017-04-17

Signature:

Jolanta M. Wroblewska



Test Report issued under the responsibility of:



TEST REPORT
IEC 61984
Connectors – Safety requirements and tests

Report Number	4787709142
Date of issue	04-13-2017 - Amendment No. 1: 04-21-2017 – Amendment No. 2: 07/27/2017 – Correction No. 1: 08-28-2017 – Amendment No. 3: 09/25/2018
Total number of pages	19
Name of Testing Laboratory preparing the Report	UL Northbrook Office
Applicant's name	Tyco Electronics Corp
Address	2901 Fulling Mill Rd Middletown, PA 17057-3170 USA
Test specification:	
Standard	IEC 61984:2008
Test procedure	CB Scheme
Non-standard test method	N/A
Test Report Form No.	IEC61984C
Test Report Form(s) Originator	VDE Prüf- und Zertifizierungsinstitut GmbH
Master TRF	Dated 2017-06
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If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.	
This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.	
General disclaimer:	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.	

Test item description..... :	Connector System	
Trade Mark..... :		
Manufacturer	Tyco Electronics Corp 2901 Fulling Mill Rd Middletown, PA 17057-3170 USA	
Model/Type reference	X-2213858-X, X-2213795-X, X-2213831-X, X-2213837-X, X-2328823-X, X-2329013-X X is a suffix/prefix for aesthetic differences that do not affect ratings or attributes shown in TABLE: characteristic features	
Ratings	[X-2213858-X, X-2213831-X, X-2213837-X]: 30V AC/DC 50/60 Hz, 1.5A [X-2213795-X]: N/A (Sealing Cap) [X-2328823-X, X-2329013-X]: N/A (Plastic Domes)	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒	CB Testing Laboratory:	
Testing location/ address	UL Northbrook Office 333 Pfingsten Rd Northbrook, IL 60062 USA	
Tested by (name, function, signature)..... :	Zainab Osman Project Handler	
Approved by (name, function, signature) .. :	Kathleen King Reviewer	
☐	Testing procedure: CTF Stage 1:	
Testing location/ address		
Tested by (name, function, signature)..... :		
Approved by (name, function, signature) .. :		
☐	Testing procedure: CTF Stage 2:	
Testing location/ address		
Tested by (name + signature)		
Witnessed by (name, function, signature) .. :		

TRF No. IEC61984C

Approved by (name, function, signature) ..:		
☐	Testing procedure: CTF Stage 3:	
☐	Testing procedure: CTF Stage 4:	
Testing location/ address		
Tested by (name, function, signature).....:		
Witnessed by (name, function, signature) ..:		
Approved by (name, function, signature) ..:		
Supervised by (name, function, signature) :		

List of Attachments (including a total number of pages in each attachment):

Page 16: Pictures of Dome X-2329013-X (1 page)

Page 17 & 18: Dimensional drawing of Dome Model X-2328823-X (2 pages)

Page 19: Dimensional drawing of Dome Model X-2329013-X (1 page)

Summary of testing:**Tests performed (name of test and test clause):**

Degree of Protection IP Code, IEC 61984 7.3.6.3 & 7.3.7

Testing location:UL Northbrook Office
333 Pfingsten Rd
Northbrook, IL 60062 USA**Summary of compliance with National Differences (List of countries addressed):**

N/A

☒ The product fulfils the requirements of IEC 61984 ed2 and with EN 61984:2009



EU Declaration of Conformity (DoC)

We, the undersigned, declare sole responsibility that the product to which this declaration relates is in conformity with essential and other relevant requirements given below.

PRIMARY DIRECTIVE CONFORMANCE THAT IS BEING DECLARED:

LOW VOLTAGE DIRECTIVE 2014/35/EU

COMPANY NAME, FULL POSTAL ADDRESS (INCLUDE COUNTRY OF ORIGIN AS THE ADDRESS):
Tyco Electronics Corp., a TE Connectivity Company 2900 Fulling Mill Road Middletown, Pennsylvania, 17057 USA

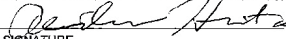
PRODUCT NAME OR DESCRIPTION OF PRODUCT:	TRADE NAME, TYPE OR MODEL:
LUMAWISE Endurance S Receptacle	2213858

DIRECTIVES AND STANDARDS BEING DECLARED AS CONFORMING, POSSIBLY DECLARED AS ESSENTIAL BY THE PRIMARY DIRECTIVE:
2014/35/EU - Low Voltage (LVD) (50 - 1000 V AC and 75 - 1500 V DC)
2011/65/EU - Restriction of the use of certain hazardous substances (RoHS2)
UL-773 - Plug-In Locking Type Photocontrols for Use with Area Lighting
IEC 61984 (CONNECTORS - SAFETY REQUIREMENTS AND TESTS)
IEC 60529 (DEGREE OF PROTECTION IP CODE)

TECHNICAL FILE HELD BY:	Donald Decker
-------------------------	---------------

PLACE AND DATE OF ISSUE OF THIS DoC:	PLACE: Middletown, Pennsylvania, USA	DATE: 5/4/17
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SIGNED BY OR ON BEHALF OF THE MANUFACTURER:

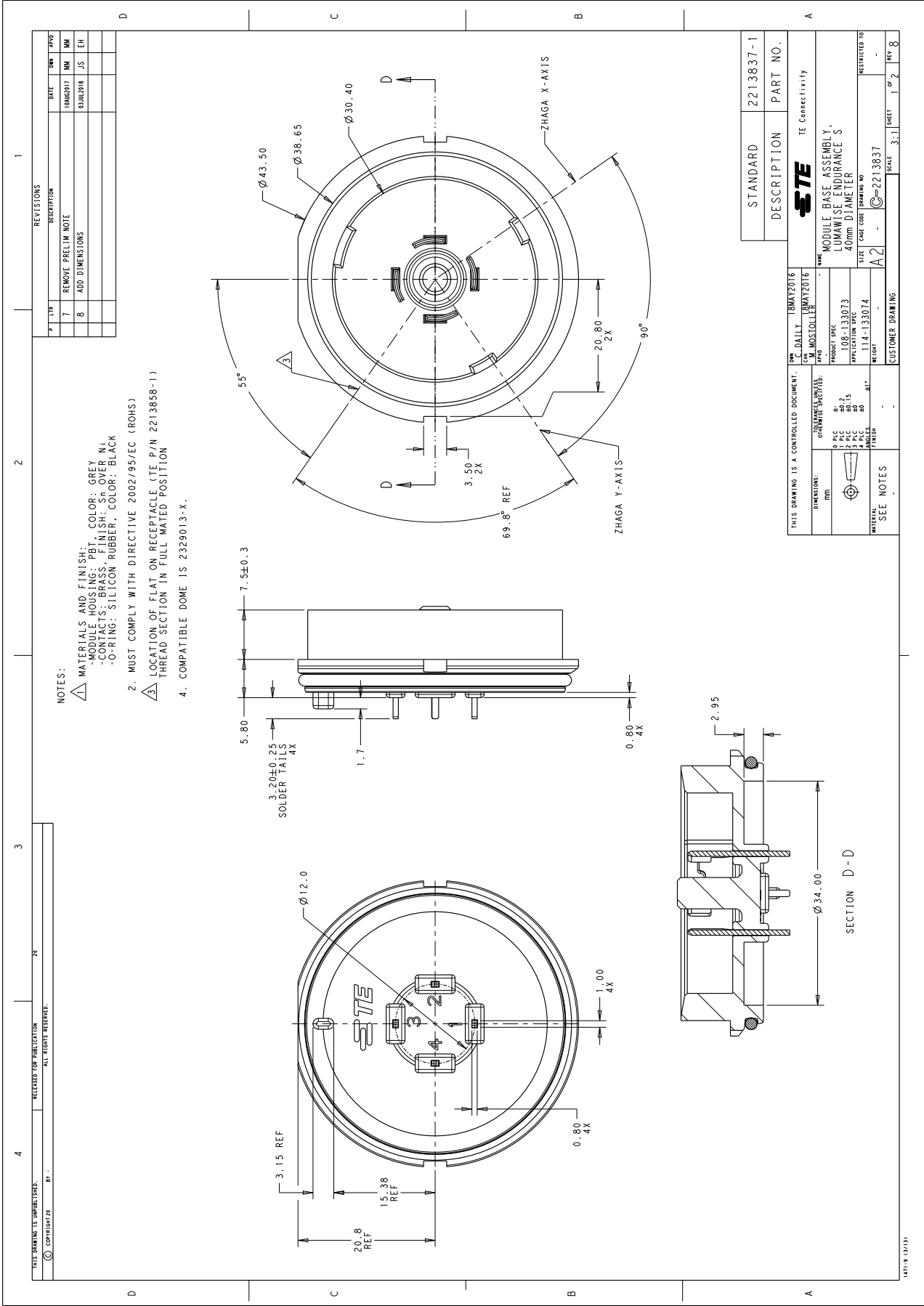
	Product Manager	5/4/17
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5452 (02/15)
Ref: TEC-1047

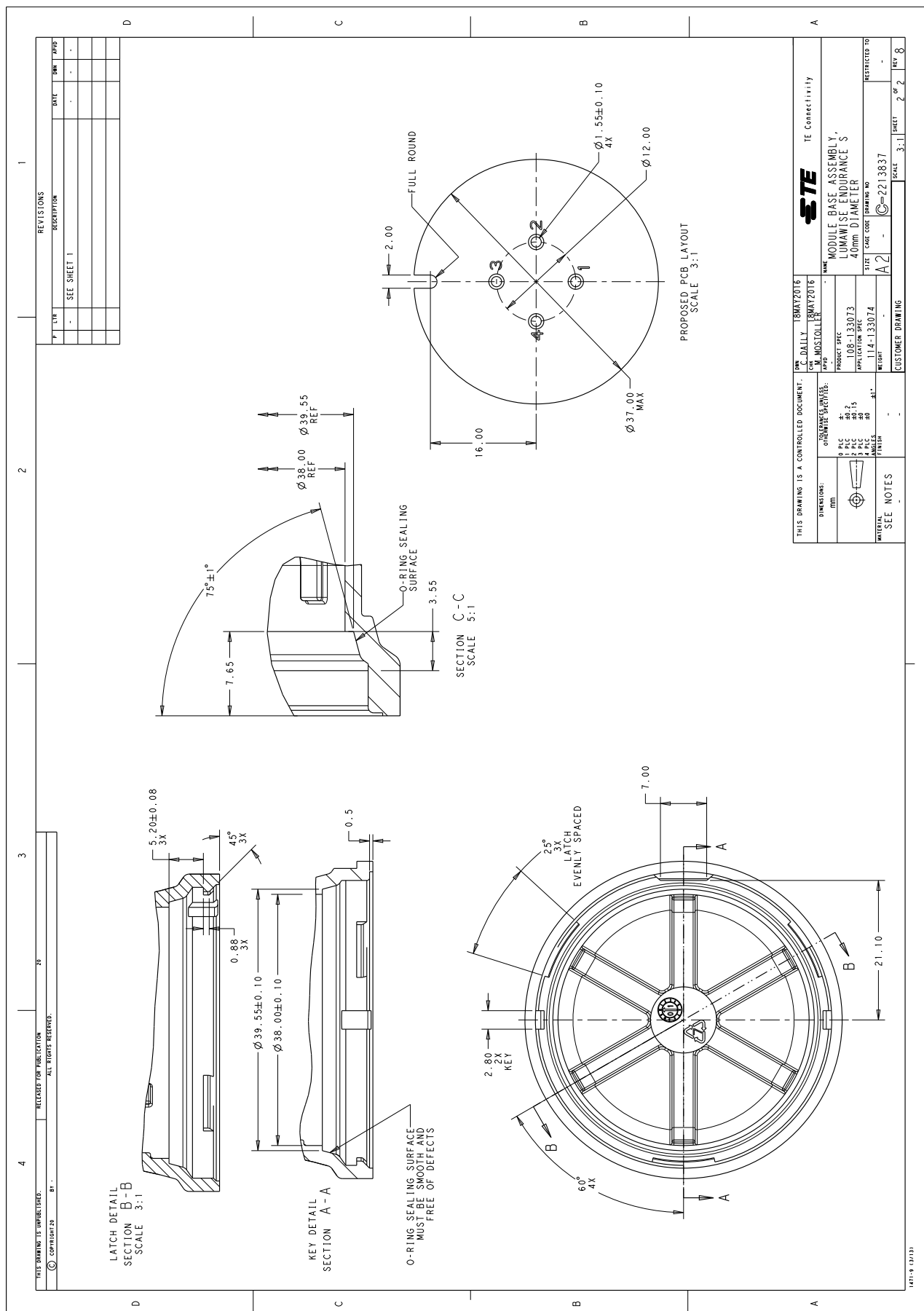
CE Requirement	TE Document	Storage Location
General Product Description	TE Customer drawing 2213362	DM-TEC
Design/Production Drawings	TE Product drawing 2213362 (proprietary)	DM-TEC
Detailed technical data for essential aspects	Product Specification (108-32059)	DM-TEC
Risk assessment	Failure Mode Effects Analysis (FMEA)	DM-TEC
List of applicable standards used		EU Declaration of Conformity (sheet 1)
Calculations/results of safety/performance testing	TE Qualification Test Report (501-134036)	DM-TEC
Inspection Reports	First Article Sample Report (FASR)	DM-TEC
Production/process controls used to manufacture the product	Quality Inspection Plan (QIP)	DM-TEC
User manual, operation specification	Product, Application specifications and instruction sheets (108, 114, 408 series)	DM-TEC







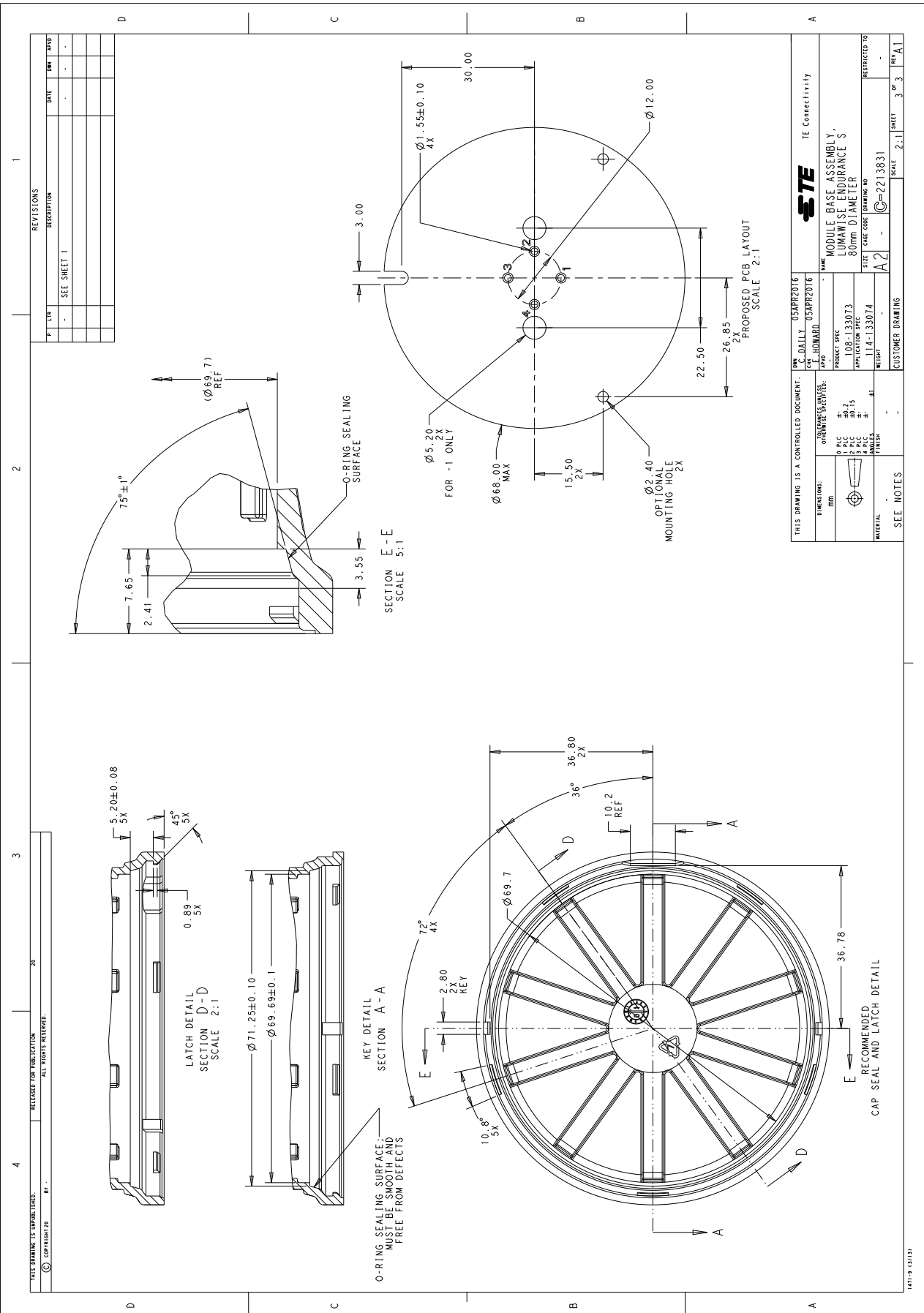
14715 (01/21)











1471-9 (3/13)



Lumawise endurance S

Introduction



- Designed specifically for LED light sources and drivers in outdoor luminaires
- Comprised of IP65 and IP66 rated receptacle assembly, sealing cap, domes and two bases sized in 40mm and 80mm diameters
- Provides a complete electrical interface between the receptacle and associated sensor modules
- Easy installation due to simple push-and-twist lock feature which does not require any tools and can be completed using one hand
- Receptacle assembly accepts a twist-to-lock, pluggable sensor module
- Provides DC power to the module and a DALI 2.0 or derivative two-wire bus for communication and data transfer
- 4th connection is not specified in Zhaga book 18 industry standard
- Flexible mounting position, upwards, downwards and sideways facing

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Lumawise endurance S

Target markets and applications



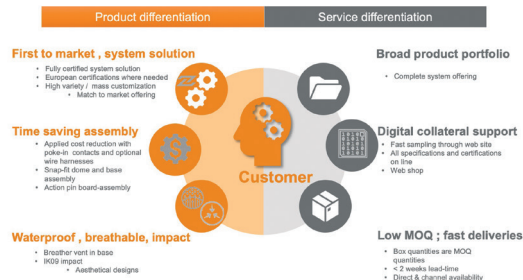
- Target markets are streetlighting control – and city management systems
- Target applications are street- and area lighting; outdoor luminaires; photo controls; Control management systems; motion detection modules; city-management control modules

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Lumawise endurance S

Value proposition



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Lumawise endurance S

Key Product Benefits



- IP65 & IP66 rated for upward, downward or side facing locations.
- IK09 impact resistant* dome-base combination and sealing cap.
- Scalable solution for sensor; available in 40mm and 80mm sensor base
- Snap-fit dome assembly
- 2 dome heights for 40 mm (low-24,3mm; high-39,3mm)
- 3 dome heights for 80mm base (low-33,4mm; mid-43,4mm; high-58,4mm)
- All domes available in dark-smoke or transparent color
- 4 position receptacle with pole in connections
- Receptacle accepts 16-20 AWG & 20-24 AWG solid and/or stranded wire
- Voltage rating 30Vdc / Current rating 1,5Amp.



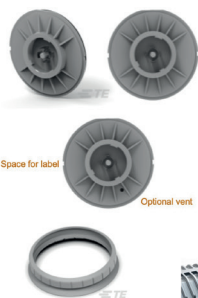
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*Top impact



Lumawise endurance S

Key Product Benefits



- 80 mm base with space for label
- Sealed contacts to restrict air/moisture between fixture and module
- O-ring for sealed connection with dome
- 80mm base design with sealed contacts and optional breather vent to exhaust potential moisture and to match internal pressure to outside pressure
- Aesthetic pleasing optional skirt available in 3 colors

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Lumawise endurance S

Key Product features

Electrical	Mechanical	Materials	Standards & specifications
Contact rating 1,5A- 30V	Mounting M20, 1,5 thread	PBT/PC receptacle	Zhaga book 18 certified
Meets 10kV common mode surge testing	Height above luminaire: 10mm	LSR gasket	EN61984;2009 certified
Hot pluggable	Receptacle 30mm dia	Poly Carbonate domes	UL1598
Pin1: 24VDC Pin 2: DALI- Pin 3: DALI+ Pin 4: NC	IP65 & IP66		
	IK09 rated domes		

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ATTESTATION OF CONFORMITY

Issued to: TE Connectivity Corporation
2901 Fulling Mill Road Mail Stop 140-08
Middletown, PA 17057
United States Of America

For the product: Zhaga Book 18 LEX-M, LEX-C and LEX-R modules

Trade name: TE

Type/Model: 2213831 (80mm module base), 2213837 (40mm base module), 2213795 (seal cap),
2213858 (receptacle)

Manufactured by: TE Connectivity Corporation
2901 Fulling Mill Road Mail Stop 140-08
Middletown, PA 17057
United States Of America

Subject: ZHAGA Book 18

Requirements: Zhaga Book 18:12017

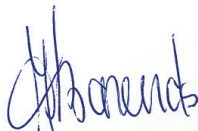
This Attestation is granted on account of an examination by DEKRA, the results of which are laid down in test reports 2227803.50/51/52/53.

The examination has been carried out on one single specimen or several specimens of the product, submitted by the manufacturer. The Attestation does not include an assessment of the manufacturer's production. Conformity of his production with the specimen tested by DEKRA is not the responsibility of DEKRA.

Arnhem, 14 March 2019

Number: 2227803.05

DEKRA Certification B.V.



H.R.M. Barends
Certification Manager

© Integral publication of this attestation and adjoining reports is allowed

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T +31 88 96 83000 F +31 88 96 83100 www.dekra-certification.com Company registration 09085396



*This Test Report Summary represents the "Test Certificate Template" defined and referenced in the Zhaga Testing Center Agreement.

TEST REPORT SUMMARY*

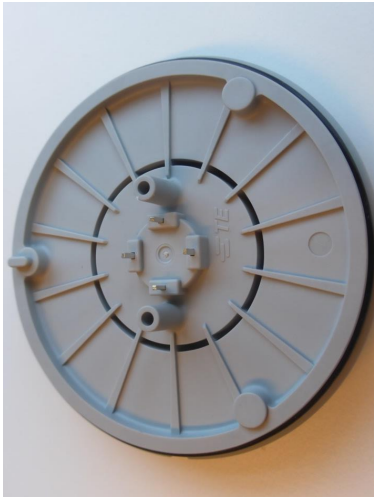
Test Certificate No.:	02-18-BA0001
Company Name:	TE connectivity
Product:	[] Luminaire Extension Module [X] Luminaire Extension Cap
Product Type No.:	2213795 (seal cap)
Brand Name(s):	TE (Sub-system Type No.) (Sub-system Brand Name)

Book No.:	Book 18
Book Version:	V 1.0

Tests Performed		Results (Pass/Fail/NA)
Mechanical Interface Tests		
7.1.1	Mechanical dimensions	Pass
7.1.2	LEX-M outer diameter	Pass
7.1.3	LEX-M mechanical stop features	Pass
7.1.4	LEX-M sealing surface	Pass

Reference No.:	2227803.03
Name/Title:	T. Drost – Project Handler
Issue Date:	2018-12-13
	H.J.H. te Lindert– Reviewer

*This Test Report Summary represents the "Test Certificate Template" defined and referenced in the Zhaga Testing Center Agreement.



*This Test Report Summary represents the "Test Certificate Template" defined and referenced in the Zhaga Testing Center Agreement.

TEST REPORT SUMMARY*

Test Certificate No.:	02-18-AA0001
Company Name:	TE connectivity
Product:	☒ Luminaire Extension Module ☐ Luminaire Extension Cap
Product Type No.:	2213831 (80mm module base)
Brand Name(s):	TE (Sub-system Type No.) (Sub-system Brand Name)

Book No.:	Book 18
Book Version:	V 1.0

Tests Performed		Results (Pass/Fail/NA)
Mechanical Interface Tests		
Luminaire Extension Module		
6.1.1	Mechanical dimensions	Pass
6.1.2	LEX-M outer diameter	Pass
6.1.3	LEX-M mechanical stop features	Pass
6.1.4	LEX-M sealing surface	Pass
6.1.5	LEX-M contact plating	Pass

Reference No.:	2227803.01
Name/Title:	T. Drost – Project Handler
Issue Date:	2018-12-13
	H.J.H. te Lindert – Reviewer

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*This Test Report Summary represents the "Test Certificate Template" defined and referenced in the Zhaga Testing Center Agreement.

TEST REPORT SUMMARY*

Test Certificate No.:	02-18-CA0001
Company Name:	TE connectivity
Product:	[] Luminaire Extension Module [] Luminaire Extension Cap
Product Type No.:	2213858
Brand Name(s):	TE (Sub-system Brand Name)

Book No.:	Book 18
Book Version:	V 1.0

Tests Performed		Results (Pass/Fail/NA)
Mechanical Interface Tests		
8.1.1	Mechanical dimensions	Pass
8.1.2	LEX-R mating & contact making	Pass
8.1.3	LEX-R mating & un-mating torque	Pass
8.1.4	LEX-R contact plating	Pass

Reference No.:	2227803.04
Name/Title:	T. Drost – Project Handler
Issue Date:	2018-12-13
	H.J.H. te Lindert – Reviewer

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*This Test Report Summary represents the "Test Certificate Template" defined and referenced in the Zhaga Testing Center Agreement.

TEST REPORT SUMMARY*

Test Certificate No.:	02-18-AA0002
Company Name:	TE connectivity
Product:	☒ Luminaire Extension Module ☐ Luminaire Extension Cap
Product Type No.:	2213837 (40 mm module base)
Brand Name(s):	TE (Sub-system Type No.) (Sub-system Brand Name)

Book No.:	Book 18
Book Version:	V 1.0

Tests Performed		Results (Pass/Fail/NA)
Mechanical Interface Tests		
Luminaire Extension Module		
6.1.1	Mechanical dimensions	Pass
6.1.2	LEX-M outer diameter	Pass
6.1.3	LEX-M mechanical stop features	Pass
6.1.4	LEX-M sealing surface	Pass
6.1.5	LEX-M contact plating	Pass

Reference No.:	2227803.02
Name/Title:	T. Drost – Project Handler
Issue Date:	2018-12-13
	H.J.H. te Lindert – Reviewer

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Smarter LED Street Lighting Applications

Jul 12, 2017 8:27 AM | by [Editorial Staff](#) | [NO COMMENTS](#)

Jonathan Catchpole, System Architect/Principal Engineer

TE Connectivity

LED Street Lighting is a technology and infrastructure with evolving demands. It is not only about bringing light to an area anymore, it is about anticipating tomorrow's needs for value added services. Until recently, designers have mostly only been able to select ANSI/NEMA standard product lines, simply because no specific alternative – or even European – standard existed. Now, working with leading industry partners, TE Connectivity has developed a new connectivity solution for LED street lighting, while at the same time creating a standard for European outdoor luminaires.

Over the past few years, engineers and system architects at TE Connectivity have applied their specific industry knowledge and expertise to gain input from leading suppliers and partners to create a vision of a new street lighting architecture. A key consideration was the potential of new architecture and new functionalities to help create value for developers, installers and users of outdoor lighting, whilst making the move from individually programmed street lighting to Central Management Systems (CMS).



The result is LUMAWISE Endurance S modules, a compact connectivity solution for street lighting with LED light sources. The system offers greater flexibility in luminaire design and street lighting architecture. A key benefit is that it is field upgradeable, which makes it possible to simply and quickly upgrade existing luminaires. Today streetlights are viewed as an underutilized asset. In the coming years, street lighting poles will be seen as more than fixtures for luminaires, but as outlets for electrical energy and be used for other purposes such as charging electric vehicles, operating WLAN routers and video cameras, as well as hosting sensors. Which is the application space for the LUMAWISE Endurance S connectivity platform. Providing manufacturers with a standard mechanical base to build electronics on to, coupled with a new DALI based architecture this new technology allows for an endless list of connected sensors to be developed. Already entering the market are the more traditional sensors such as photocells and central management systems. This is shortly followed by motion detection, but why stop there? Exchangeable modules could be developed for traffic counting, incident detection, pollution monitoring and for identifying free or occupied parking spaces.

Move Towards Central Management Systems

With an increased use of LED in outdoor applications, local authorities, councils and utility companies will have already reduced their energy consumption. To realize further savings comes a growing need for control of the LED. As a consequence, many luminaire operators are considering moving from streetlights with basic functionalities (photocells) to more flexible

Central Management Systems (CMS) that offer more control, better programming, and higher efficiencies. However, this decision to move to a CMS does not need to be made on day one. As LUMAWISE Endurance S modules is a pluggable system, a luminaire can be installed with a simple photocell or even with no control and later extra functionality can be added or replaced. Giving a streetlight a truly 20 years of useable life.

The LUMAWISE Endurance S modules consists of a standardized interface between the receptacle and module base or sealing cap. This uses an integrated single gasket that can accommodate and seal both luminaire and module using the same connection interface for either 40mm or 80mm diameter central management systems. This allows different modules to be exchanged and upgraded in only a few seconds, without having to electrically isolate the lighting pole.

Designed specifically for outdoor LED light sources and drivers, LUMAWISE Endurance S modules has been created as a standalone system and can be used in a complementary function as an auxiliary sensor module when additional functionality is required in ANSI/NEMA based fixtures.

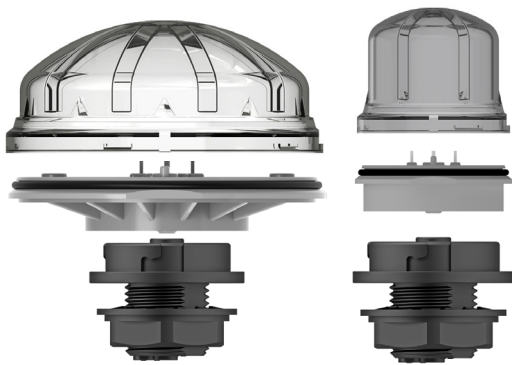
Installation is easy thanks to its simple push-and-twist lock feature which does not require any tools and can be completed using one hand. The LUMAWISE Endurance S modules can be mounted in any direction and offers improved sealing when compared to other systems. Modules can be exchanged and upgraded in only a few seconds without having to electrically isolate the lighting pole.

LUMAWISE Endurance S modules was developed with several partners to ensure a complete system is available, including application specific drivers and control nodes. The partners also collaborated with the Zhaga Consortium. This is a global lighting-industry organization that is standardising components of LED luminaires, including LED light engines, LED modules, LED arrays, holders, and electronic control gear (LED drivers) and connectivity fit systems. Having these standardized components helps to simplify LED luminaire design and manufacturing, and to accelerate the adoption of LED lighting solutions.

Zhaga describes a connectivity fit system for smart outdoor luminaires in what is called Book 18. This is Zhaga's most recent contribution to the rapidly-emerging world of smart lighting. Book 18 defines a standardized interface between an outdoor LED luminaire and a sensing/communication module that sits on the outside of the luminaire. The module connects to the LED driver and control system, and typically can provide sensory inputs while also communicating with other luminaires in a network.

The focus of developing this new Book 18 specification was to demonstrate the potential of new architecture and new functionalities which can create value for developers, installers and users of outdoor lighting. The standardized interface defined in Zhaga Book 18 enables the installation of future-proofed outdoor LED luminaires, which can be easily upgraded with smart communication and sensing capabilities. Zhaga member companies are already using the specification to develop products that will stimulate the market for smart outdoor LED luminaires.

The development process was relatively short: TE first started work on this in early 2016. Throughout the process, the product developers worked closely with the Zhaga Consortium, which is responsible for developing specifications that enable the interchangeability of LED light sources made by multiple different manufacturers. As a result, the new module now sets a new standard for European outdoor luminaires, providing an alternative or complementary solution to existing ANSI/NEMA product lines.



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1-1773915-3 03/2019

