



**LUMAWISE* Endurance N Tool-less Rotatable Dimming
Receptacle Qualification Testing**

1. INTRODUCTION

1.1 Purpose

Testing was performed on the TE Connectivity LUMAWISE Endurance N Tool-Less Rotatable Dimming Receptacle to determine its conformance to the requirements of TE Product Specification 108-133114, Rev. A2.

1.2 Scope

This report covers the electrical, mechanical and environmental performance of the TE Connectivity LUMAWISE Endurance N Tool-Less Rotatable Dimming Receptacle. Testing was performed at the Harrisburg Electrical Components Test Laboratory (HECTL) between September 6, 2018 and October 16, 2018. Documentation is on file and maintained at the TE Harrisburg Electrical Components Test Laboratory under EA20180339T.

1.3 Conclusion

The TE Connectivity LUMAWISE Endurance N Tool-Less Rotatable Dimming Receptacle specimens listed in paragraph 1.4 met all electrical, mechanical and environmental performance requirements of TE Product Specification 108-133114, Rev. A2. Refer to paragraph 2 for detailed test results.

1.4 Product Description

The LUMAWISE Endurance N Tool-less Rotatable Dimming Receptacle is used in dimmable roadway and area lighting applications. For most test purposes, the TE Connectivity ANSI C136.41-2013 Dimming Light Controller Base will be mated to LUMAWISE Endurance N Tool-less Rotatable Dimming Receptacle.

1.5 Test Specimens

Specimens identified with the following part numbers were used for this test program (Refer to Table 1).

Table 1 – Specimen Identification

Test Group	Test Set	Quantity	Part Number	Description
A	1	6	2332966-4, Rev A	Tool-less Rotatable Receptacle, 7 Position
		6	2332473-1, Rev A	Mounting Gasket
		6	2314786-1, Rev 7	Enhanced Photo Control Base, 7 Position
B	2	6	2332966-4, Rev A	Tool-less Rotatable Receptacle, 7 Position
C	3	3	2332966-4, Rev A	Tool-less Rotatable Receptacle, 7 Position
		3	2213871-2, Rev A	Photo Control Base, 7 Position, 81mm diameter
		3	1-2306130-1, Rev A	Photo Control Dome, 81mm diameter
D	4	3	2332966-4, Rev A	Tool-less Rotatable Receptacle, 7 Position
		3	2213871-2, Rev A	Photo Control Base, 7 Position, 81mm diameter
		3	1-2306130-1, Rev A	Photo Control Dome, 81mm diameter
E	5	3	2332966-4, Rev A	Tool-less Rotatable Receptacle, 7 Position
		3	2213871-2, Rev A	Photo Control Base, 7 Position, 81mm diameter
		3	1-2306130-1, Rev A	Photo Control Dome, 81mm diameter

1.6 Qualification Test Sequence

The specimens listed in Table 1 were subjected to the test sequences outlined below in Table 2.

Table 2 – Test Sequence

Test or Examination	Test Group				
	A	B	C	D	E
	Test Set				
	1	2	3	4	5
	Test Sequence (a)				
Initial Examination of Product	1	1	1	1	1
Low Level Contact Resistance - LLCR	2,6		2,4		
Insulation Resistance		2,7			
Dielectric Withstanding Voltage		3,6			
Vibration	4				
Mechanical Shock	5				
Durability	3				
Salt Spray			3		
Thermal Shock		4			
Humidity		5			
Temperature Life - IP				2	2
Immersion Protection 5X - Dust				3	
Immersion Protection X5 - Jet Spray					3
Final Examination of Product	7	8	5	4	4

NOTE

(a) Numbers indicate the sequence in which tests are performed

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 Low Level Contact Resistance – LLCR (Groups A & C)

All specimens had final measurements that were less than the 30 milliohm maximum Delta R requirement specified in TE Product Specification 108-133114, Rev. A2. See Table 3 for an LLCR summary.

Table 3 – LLCR Summary (milliohms)

	Initial	After Mechanical Shock	Initial	After Salt Spray
ID >	Group A		Group C	
	Actual	Delta	Actual	Delta
Signal Contacts				
MIN	48.35	-4.23	49.73	-0.97
MAX	56.19	3.67	57.84	-0.12
AVG	52.42	0.60	53.36	-0.34
STDEV	2.41	1.52	2.56	0.24
N	24	24	12	12
Power Contacts				
MIN	39.63	-0.04	39.97	-0.23
MAX	43.24	0.40	43.37	0.02
AVG	41.19	0.18	41.47	-0.10
STDEV	1.23	0.13	1.35	0.10
N	18	18	9	9

2.3 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 25 times.

2.4 Vibration (Group A)

No apparent physical damage detrimental to product performance was observed and no discontinuities of one microsecond or greater occurred during testing.

2.5 Mechanical Shock (Group A)

No apparent physical damage detrimental to product performance was observed and no discontinuities of one microsecond or greater occurred during testing.

2.6 Insulation Resistance (Group B)

All specimens had initial and final measurements that were greater than the 500 megaohm minimum requirement specified in TE Product Specification 108-133114, Rev. A2.

2.7 Dielectric Withstanding Voltage (Group B)

None of the specimens exhibited breakdown, flashover or exceeded 5 milliamperes leakage current with 2500 volts AC applied for one minute as specified in TE Product Specification 108-133114, Rev. A2.

2.8 Thermal Shock (Group B)

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

2.9 Humidity (Group B)

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

2.10 Salt Spray (Group C)

None of the specimens showed any signs of salt spray ingress within any sealed area of the connector and all specimens met the subsequent LLCR requirements.

2.11 Temperature Life – IP (Group D & E)

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

2.12 Immersion Protection 5X – Dust (Group D)

No evidence of dust ingress was visible within any sealed area of the connector due to exposure to IP5X testing.

2.13 Immersion Protection X5 - Jet Spray (Group E)

None of the specimens exhibited ingress of water within any sealed area of the connector due to exposure to IPX5 testing.

2.14 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 Certificate of Conformance 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. Specimens were visually examined in accordance with EIA-364-18B.

3.2 Low Level Contact Resistance – LLCR (Groups A & C)

The specimens were measured using a four terminal measurement method at 100 milliamperes maximum and 20 millivolts maximum open circuit voltage. 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.

3.3 Durability (Group A)

The specimens were manually mated and unmated for 25 cycles at a maximum rate of 120 cycles per hour as specified in TE Product Specification 108-133114, Rev. A2. All testing was conducted in accordance with EIA-364-9D.

3.4 Vibration (Group A)

The test specimens were subjected to a sinusoidal vibration test as stated in TE Connectivity Specification 108-133114, Rev. A2. The test specimens were subjected to a simple harmonic motion having an amplitude of either 0.250 in double amplitude (maximum total excursion) or 3.5 g peak, whichever is less. The vibration frequency was varied logarithmically between the approximate limits of 5 Hz and 55 Hz. The entire frequency range of 5 Hz to 55 Hz and return to 5 Hz was traversed at a rate of one octave/minute. This cycle was repeated for one hour in each of three mutually perpendicular directions, so that the motion was applied for a total period of 3 hours. Lead wires coming out of bottom of specimens were secured to vibration table approximately 76.2 mm (3 inches) from rear of the connector. The test specimens were monitored for discontinuities of 1 microsecond or greater using an energizing current of 100 milliamperes.

3.5 Mechanical Shock (Group A)

The test specimens were subjected to a mechanical shock test as stated in TE Connectivity Specification 108-133114, Rev. A2, in accordance with specification EIA-364-27C, Test Condition H. 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. Lead wires coming out of bottom of specimens were secured to shock table approximately 76.2 mm (3 inches) from rear of the connector. The test specimens were monitored for discontinuities of 1 microsecond or greater using an energizing current of 100 milliamperes.

3.6 Insulation Resistance (Group B)

A test potential of 500 volts DC was applied between adjacent power contacts; between power and signal contacts; and between all contacts and grounded mounting plate of unmated dimming receptacle specimens for a period of 2 minutes prior to taking measurements. Testing was conducted in accordance with EIA-364-21E.

3.7 Dielectric Withstanding Voltage (Group B)

A test potential of 2500 volts AC was applied between power contacts; between signal contacts; between power and signal contacts; and between power contacts and grounded mounting plate of unmated dimming receptacle specimens for a period of 1 minute at a ramp rate of 500 volts per second. Testing was conducted in accordance with UL 773, Section 32, 5th Edition, Dated March 18, 2016. Leakage current was set to 5 mA maximum. Final measurements were taken within 10 minutes from removal of the humidity test chamber.

3.8 Thermal Shock (Group B)

Unmated dimming receptacle specimens were subjected to 25 cycles between -40 and 65°C with 30 minute dwells at temperature extremes and 1 minute transition between temperatures. Testing was conducted in accordance with EIA-364-32G, Method A.

3.9 Humidity (Group B)

Unmated dimming receptacle specimens were subjected to 96% noncondensing humidity for 168 hours at a temperature of 50°C. Testing was conducted in accordance with UL 773, Section 23, 5th Edition, Dated March 18, 2016.

3.10 Salt Spray (Group C)

Mated specimens were subjected to 240 hours of salt spray exposure in accordance with IEC 60512-11-6, First Edition 2002-02. The specimens were placed in the chamber on horizontal racks mounted in fixtures (sealed boxes) with the receptacles facing upward.

3.11 Temperature Life – IP (Group D & E)

The mated specimens were subjected to 65°C for 240 hours in an air circulating oven, in accordance with EIA-364-17C, Method A.

3.12 Immersion Protection 5X – Dust (Group D)

The mated specimens were subjected to a dust test in accordance with IP5X paragraph 13.4 of IEC 60529, Edition 2.2 2013-08. Specimens were prepared for IP5X testing by drilling a hole in the side of the enclosure box, then inserting a vacuum line and sealing the line with silicone. The light controller base was mated to the receptacle during testing. The specimens were placed into the talcum dust chamber and the vacuum lines were attached to the vacuum manifold. A vacuum was applied to the specimens through the vacuum lines at a pressure not exceeding 2.0 kPa, maintained for the entire test. The specimens were exposed for a total duration of 8 hours. Following exposure, the specimens were allowed to rest in the dust chamber for a minimum of one hour. The specimens were then removed for inspection.

3.13 Immersion Protection X5 - Jet Spray (Group E)

The mated specimens were subjected to a water immersion test in accordance with IPX5 paragraph 14.2.5 of IEC 60529, Edition 2.2 2013-08. The specimens were sprayed from all directions with a stream of water from a standard test nozzle with an internal diameter of 6.3 mm positioned 2.5 to 3 meters above the test specimen for 3 minutes. The water delivery rate was 12.5 liters per minute $\pm 5\%$. After testing, specimens were patted dry and disassembled to inspect for water ingress into the enclosure.

3.14 Final Examination of Product (All Groups)

Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed. Testing was performed in accordance with EIA-364-18B.