LUMAWISE Endurance N Enhanced Base

1. SCOPE

1.1. The Enhanced Base is suitable for control of luminaires using the ANSI/NEMA C136-style photocontrol receptacle. The Enhanced Base offers zero-cross switching to manage the high-inrush current of LED luminaires and supports other lighting technologies. The wide-range AC voltage input, multiple output DC voltages and control signal capabilities of the Enhanced Base also make it well suited to Smart City and Smart Grid applications:

- Street and roadway lighting control
- Commercial & campus outdoor lighting management
- Smart City control networks
- Smart Grid to Smart Cities bridging

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

- 114-133085: Application Specification
- 501-TBD: Qualification Test Report (TBD)

2.2. Industry Documents

Standard	Description
UL773	Standard for Plug-In Locking Type Photocontrols for Use with Area Lighting
ANSI C136.10	Locking-Type Photocontrol Devices and Mating Receptacles—Physical and Electrical Interchangeability and Testing
ANSI C136.31	Luminaire Vibration
ANSI C136.41	For Roadway and Area Lighting Equipment—Dimming Control Between an External Locking Type Photocontrol and Ballast or Driver
UL 508	Standard for Industrial Control Equipment – with respect to the relay being tested for lighting applications
FCC Title 47, Part 15	Radio Frequency Devices
JEDEC JS-001-2014	Joint JEDEC/ESDA Standard For Electrostatic Discharge Sensitivity Test - Human Body Model (HBM) - Component Level
IEC 60529	Degrees of protection provided by enclosures (IP Code)
EIA-364	Electrical Connector/Socket Test Procedures Including Environmental Classifications

2.3. Reference Document

- 109-197 Test Specification (TE Test Specification vs EIA and IEC Test Methods)

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

Power Contacts: 300VAC, 15A (resistive load)
Signal Contacts: 30VDC, 1.5A
Operating Temperature: -40 to +85°C
Storage Temperature: -40 to 105°C
Operating Humidity: 15 to 96% Non-Condensing

Power supply outputs

Dimming	Nominal	Min	Max
Dimming (24VDC)	24VDC	21.6VDC	26.4VDC
Communication (5VDC)	5VDC	4.5VDC	5.5VDC
Auxiliary	3.3VDC	3VDC	3.6VDC

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 and Application Specification. Also, verify the continuity of the pass thru connections ALT_B, ALT_O, Dim+, Dim-.	EIA-364-18. Visual and dimensional (C of C) inspection per product drawing.
Final examination of product.	Meets visual requirements. Also, verify the continuity of the pass thru connections ALT_B, ALT_O, Dim+, Dim-.	EIA-364-18. Visual inspection.
ELECTRICAL		
Functionality Verification Test #1 Tare Loss Test #2 Regulation Test #3 Energy Metering Test #4 Zero Cross Test #5 Failure State upon Power Loss	Defined in Figure 4	See Figures 3, 4, and 5 in Section 4 of this document
Hi Pot Testing (Dielectric Withstanding Voltage)	One minute hold with no breakdown or flashover.	UL 773, Section 32 3000 volts AC (rms) at sea level. Short AC Connections (J53, J54, J60) together. Short all 7 pins of J61 together. Short all 3 pins of J62 together. Connect group J61 & J62 and apply Hi Pot between group the AC connections and the J61/62 Connect AC pins & J62 and apply Hi Pot between AC Pins/J62 and J61
Relay Drive Control Voltage	Fail Mode Open: < 0.6 VDC: relay closed > 2.0 VDC: relay open Fail Mode Closed: < 0.6 VDC: relay open > 2.0 VDC: relay closed	Apply voltage across J61.3 and J61.2 (Relay_CNTRL) and measure continuity from Load J60 to Neutral J54
Relay Cycle Life	10k cycles, 5A 277VAC, 85°C (electronic ballast)	UL508
Conducted/Radiated Emissions	FCC Part 15 Limits	FCC
Transient Protection	1.2/50 uS - 8/20 us combination wave test for 6kV/3kA	ANSI C136.10 Section 7.1
ESD Testing		JS-001-2014, Class 2

Test Description	Requirement	Procedure
MECHANICAL		
Vibration	Samples to be tested powered off. Monitor continuity of J53 (line) to J60 (load). Fail On Samples should be shorted from J53 to J60. Fail Off Samples should be open from J53 to J60. No change in state for 1 microsecond or longer.	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 shall be 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 shall be traversed at a rate of one octave/minute. This cycle shall be repeated for 1h in each of 3 mutually perpendicular directions, so that the motion shall be applied for a total period of 3 hours
Mechanical shock.	Samples to be tested powered off. Monitor continuity of J53 (line) to J60 (load). Fail On Samples should be shorted from J53 to J60. Fail Off Samples should be open from J53 to J60. No change in state for 1 microsecond or longer.	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.
ENVIRONMENTAL		
Thermal shock.	Samples to be tested powered off and mated to 2213362-2 receptacle.	EIA-364-32, Test Condition I. Subject unmated specimens to 250 cycles between -40 and 105°C with 60 minute dwells at temperature extremes and 1 minute transition between temperatures.
Humidity	Samples to be tested powered under load condition D in Figure 3 and mated to 2213362-2 receptacle.	UL 773, Section 23. Subject mated Light Controller Base and receptacle to 96% non-condensing humidity for 168 hours at a temperature of 50ºC.
Temperature life.	Samples to be tested powered off and mated to 2213362-2 receptacle.	EIA-364-17, Method A, Test Condition 4, Test Time Condition B. Subject mated specimens to 85°C for 500 hours.
Shelf Aging	Conditioning only - Must meet subsequent test requirements	Subject Enhanced Base with cap installed to 65+/-3º for 240 hrs.
Immersion Protection	Must meet IP66 (half of sample set tested IPx6 and 2nd half of sample set tested IP6x)	IEC 60529 Subject Enhanced Base only with cover installed to the IP66 (water spray) requirements.

NOTE
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

Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)						
	1	2	3	4	5	6	7
	Test Sequence (b)						
Initial examination of product	1	1	1	1	1	1	1
Hi Pot	5	5	6				
Functionality Verification	2,6	2,6	2,5	2,5	2,5	2,5	2,4
Relay Drive Control Voltage				3,6			
Relay Cycle Life				5			
Conducted/Radiated Emissions						3	
Transient Protection							3
ESD						4	
Vibration	3						
Mechanical shock	4						
Thermal shock			3				
Humidity		3	4				
Temperature life		4					
Shelf Aging					3		
Immersion Protection IP66					5		
Final examination of product	7	7	7	7	6	6	5

NOTE

(a) Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. Test groups 1 thru 5 shall consist of a minimum of one each of the six part numbers listed in Figure 4 along with ANSI C136.41-2013 Receptacles TE p/n 2213362-2. Test groups 6 & 7 consist of a minimum of one sample of p/n 2314786-1 to represent all variations of the enhanced base along with ANSI C136.41-2013 Receptacle TE p/n 2213362-2.

(b) Numbers indicate sequence in which tests are performed.

Figure 2

4. FUNCTIONALITY VERIFICATION REQUIREMENTS

4.1. To verify the Enhanced Base Sample functionality before and after the test sequences listed in Figure 2, the test samples must pass the Functionality Verification tests summarized in Figure 4 with the Load Conditions specified in Figure 3.

Load Condition	Relay Output Load Across J60 to J53	Comms Output Load Across J62.1 to J62.2	Aux Output Load Across J62.3 to J62.2	Dim Output Load Across J61.1 to J61.2
A	Open (no load)	Min Load 1kΩ, 5.0mA	Min Load 560Ω, 5.9mA	Min Load 10kΩ, 2.4mA
B	Open (no load)	50% Load 10Ω, 500mA	50% Load 13Ω, 254mA	50% Load 960Ω, 24mA
C	Open (no load)	100% Load 5Ω, 1A	100% Load 6.6Ω, 500mA	100% Load 480Ω, 50mA
D	Full Load 8Ω, 15A	100% Load 5Ω, 1A	100% Load 6.6Ω, 500mA	100% Load 480Ω, 50mA
E	10W, 1440Ω, 83mA	100% Load 5Ω, 1A	100% Load 6.6Ω, 500mA	100% Load 480Ω, 50mA
F	100W, Incandescent Lamp	100% Load 5Ω, 1A	100% Load 6.6Ω, 500mA	100% Load 480Ω, 50mA

Figure 3, Load Conditions

Part Number	Test #1 Tare Loss spec limits Measure Real Power of Input J53 to J54, Load Condition A	
2314786-1	120V/60Hz < 1.5W	277V/60Hz < 2.5W
2314786-2		
1-2314786-1	120V/50Hz < 1.5W	277V/50Hz < 2.5W
1-2314786-2		
2-2314786-1	120V/60Hz < 1.5W	277V/60Hz < 2.5W
2-2314786-2		

Figure 4a, Functionality Verification Test Specifications (continued)

Part Number	Test #2 Regulation Spec Limits					
	Input J53 to J54 = 90VAC			Input J53 to J54 = 300VAC		
	Load Condition A	Load Condition B	Load Condition C	Load Condition A	Load Condition B	Load Condition C
2314786-1	Input freq = 60Hz, Outputs: Com = 5V+/-0.5V, Aux = 3.3V +/- .3V, Dimming = 24V+/-2.4V					
2314786-2						
1-2314786-1	Input freq = 50Hz, Outputs: Com = 5V+/-0.5V, Aux = 3.3V +/- .3V, Dimming = 24V+/-2.4V					
1-2314786-2						
2-2314786-1	Input freq = 60Hz, Outputs: Com = 5V+/-0.5V, Aux = 3.3V +/- .3V, Dimming = 24V+/-2.4V					
2-2314786-2						

Figure 4b, Functionality Verification Test Specifications

Part Number	Test #3 Energy Metering	Test #4 Zero Cross	Test #5 Failure State upon Power Loss
	Input J53 to J54 = 120VAC	Observe Output J60-J54	
	Load Condition D	Load Condition E	Load Condition F
2314786-1	Input Freq = 60Hz, Voltage J16.3 to J16.4 = 33.4mV to 41.7mV	Input Freq - 60Hz, Turn Off at 0 deg +0 / - 2mS	Output J60 -J53 On (shorted) after Power Down
2314786-2			Output J60 -J53 Off (open) after Power Down
1-2314786-1	Input Freq = 50Hz, Voltage J16.3 to J16.4 = 33.4mV to 41.7mV	Input Freq - 50Hz, Turn Off at 0 deg +0 / - 2mS	Output J60 -J53 On (shorted) after Power Down
1-2314786-2			Output J60 -J53 Off (open) after Power Down
2-2314786-1	Input Freq = 60Hz, Voltage J16.3 to J16.4 = 33.4mV to 41.7mV	n/a	Output J60 -J53 On (shorted) after Power Down
2-2314786-2			Output J60 -J53 Off (open) after Power Down

Figure 4c, Functionality Verification Test Specifications (continued)

4.2. The Enhanced Base connections are shown in Figure 5.

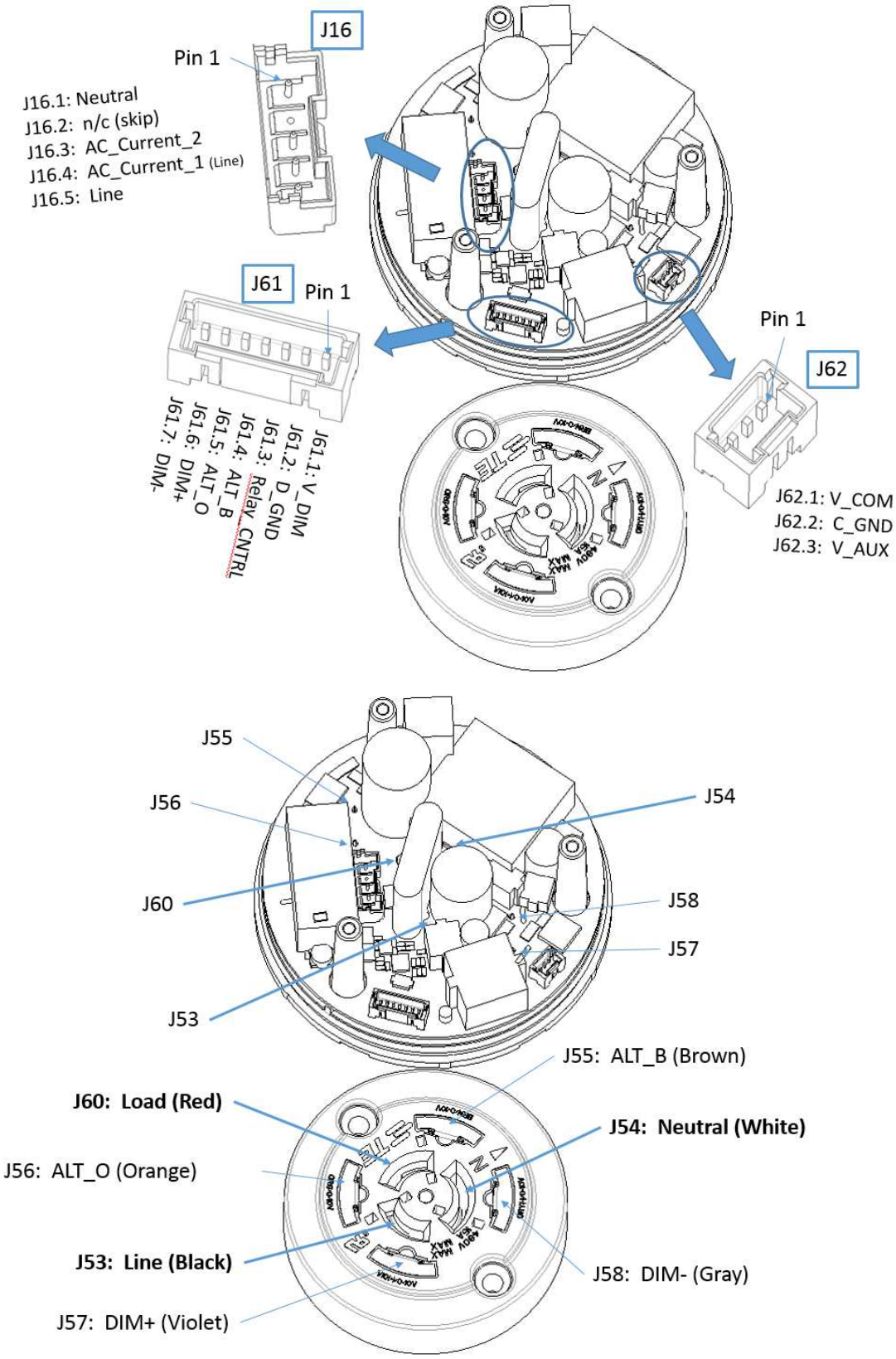

Figure 5, Enhanced Base Connections

5. QUALITY ASSURANCE PROVISIONS

5.1. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production.

5.2. 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.

5.3. 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 taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

5.4. 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.