



3-Position Sealed Beam Connector

1. SCOPE

1.1. Content

This specification defines performance, tests, and quality requirements for 3-Position Sealed Beam Connectors for the part numbers specified in Figure 1:

	Part Number	Product Description
Receptacle Contact	900318-2	.312 Series, Positive Lock Receptacle Flag (R)
	900319-2	.312 Series, Positive Lock Receptacle Flag (L)
Receptacle Housing	353752-2	.312 Head Lamp Connector (Compact Type)

Figure 1

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.

2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

2.1. TE Connectivity (TE) Documents

- 109-1 General Requirements for Testing
- 501-143030 Qualification Test Report
- 114-5220 Application Specification

2.2. Industry Documents

- EIA-364 Electrical Connector/Socket Test Procedures Including Environmental Classifications

2.3. Reference Documents

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

3. REQUIREMENTS

3.1. Design and Construction

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

3.2. Materials

Materials used in the construction of this product shall be as specified on the applicable product drawing.

- A. Contact: Pre-tinned brass strip. Refer to TE product drawing for details.
- B. Housing: PBT nylon resin. Refer to TE product drawing for details.

3.3. Ratings

Voltage: 250V
 Current: 7A for 18AWG wire
 4A for 20AWG wire
 Temperature: -30°C to +130°C

3.4. Performance and Test Description

Product is designed to meet the electrical, mechanical, and environmental performance requirements specified in Figure 2. Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Examination of Product	Meet requirements of product drawing and TE specification 1114-5220 After testing, there shall be no corrosive influence on the performance and no physical damage.	EIA-364-18 Visually and tactically inspect the appearance of product connector for evidence of cracks, breakage, damage, rattling and loosening of parts, rust, fusion and deformation that are detrimental to connector functions.
Electrical		
Termination Resistance (Low Level Contact Resistance)	Initial: 3 mΩ (milliohms) maximum Final: 10 mΩ (milliohms) maximum	EIA-364-23 Subject mated pair of connector and tab contacts to 20 ± 5 mV. Open circuit at 10 ± 0.5 mA. Subtract the resistance of the wire from measurement. Connection per Figure 3 below.
Insulation Resistance	100 MΩ (mega ohm) minimum	EIA-364-21 Apply 500V DC and hold for 2 minutes. Test between adjacent contacts and between the contacts and the ground.
Dielectric Withstanding Voltage	No insulation breakdown shall occur. 1-minute hold without a creep discharge or flashover. Current Leakage: 3 mA (milliamp) maximum	EIA-364-20, Condition 1 Hold at 1000V AC for 1 minute. Test between adjacent contacts and between the contacts and ground.
Current Leakage	3 mA (milliamp) maximum	After exposure conditioning under humidity atmosphere, the sample connector shall be tested by applying test current at 14V DC to the circuit at room temperature.

Figure 2 (continued)

Current Cycling	<p>No corrosive influence on the performance and no physical damage. Terminal resistance:10 milliohm Max.</p>	<p>EIA-364-55 Subject mated connectors to 200 cycles with 45 minutes on and 15 minutes off per cycle in a draft-free test chamber. Current levels shall be set as specified below. Measurements of the termination resistance shall be taken at the completion of the 50th, 100th, 150th, and 200th cycle.</p> <table border="1" data-bbox="1003 401 1429 537"> <thead> <tr> <th>Wire Size [mm²]</th> <th>Test Current [A]</th> </tr> </thead> <tbody> <tr> <td>0.5</td> <td>8.25</td> </tr> <tr> <td>0.85</td> <td>11.25</td> </tr> </tbody> </table>	Wire Size [mm ²]	Test Current [A]	0.5	8.25	0.85	11.25
Wire Size [mm ²]	Test Current [A]							
0.5	8.25							
0.85	11.25							
Temperature Rise	<p>No corrosive influence on the performance and no physical damage. Max. temperature change:30 °C</p> <table border="1" data-bbox="553 646 954 783"> <thead> <tr> <th>Wire Size [mm²]</th> <th>Test Current [A]</th> </tr> </thead> <tbody> <tr> <td>0.5</td> <td>8.25</td> </tr> <tr> <td>0.85</td> <td>11.25</td> </tr> </tbody> </table>	Wire Size [mm ²]	Test Current [A]	0.5	8.25	0.85	11.25	<p>EIA-364-70, Method 1 Measure the temperature rise above ambient created by the energizing current. Measurement must be taken at a place where there is no influence from air convection. Contacts to be assembled in housing with all circuits connected. The thermocouple is to be attached to the contact in the center circuit. Stabilize at a single current level until 3 readings at 5 minute intervals are within 1°C.</p>
Wire Size [mm ²]	Test Current [A]							
0.5	8.25							
0.85	11.25							
Mechanical								
Connector Mating Force	59 N (maximum)	<p>EIA-364-13 Operation Speed: 100 mm/min Measure the force required to mate connectors.</p>						
Connector Unmating Force	49 N (minimum)	<p>EIA-364-13 Operation Speed: 100 mm/min Measure the force required to mate connectors without the locking mechanisms.</p>						
Contact Retention Force	59 N (minimum)	<p>EIA-364-29 Operation Speed: 100 mm/min Apply an axial pull force to the crimped wire while the housing is secured. Wire must be 100 mm (minimum) length. Contact retention force is determined when the contact is dislodged from the housing cavity.</p>						
Contact Locking Retention Force	98 N (minimum)	<p>EIA-364-29 Operation Speed: 100 mm/min Apply an axial pull force to the crimped wire while the housing is secure. The contact-loaded connector shall be mated with tab contacts with the locking mechanism set in effect. Contact locking retention force is determined when the connector is unmated with or without breakage of locking mechanism.</p>						
Crimp Tensile Strength	<table border="1" data-bbox="553 1696 954 1850"> <thead> <tr> <th>Wire Size [mm²]</th> <th>Tensile Strength [N] (minimum)</th> </tr> </thead> <tbody> <tr> <td>0.5</td> <td>88</td> </tr> <tr> <td>0.85</td> <td>127</td> </tr> </tbody> </table>	Wire Size [mm ²]	Tensile Strength [N] (minimum)	0.5	88	0.85	127	<p>EIA-364-08 Operation Speed: 100 mm/min Apply an axial pull force to the crimped wire. Contact to be secured on the tester. Wire must be 100 mm (minimum) length.</p>
Wire Size [mm ²]	Tensile Strength [N] (minimum)							
0.5	88							
0.85	127							
Random Vibration	No electrical discontinuity greater than 1 μs shall occur.	EIA-364-28						

	No physical damage.	Subject mated specimens to 4.5G's (44 m/s ²) RMS between 20 and 500 Hz. Apply fifteen minutes in the X and Y axes. See Figure 4 for set-up specifications.
Mechanical Shock	No corrosive influence on the performance and no physical damage.	EIA-364-27 Method H Subject mated connector to drops of 3.2 mm in stroke at a rate of 12.5 Hz/hr. The vibrating table is supported by spring tension of 265 – 314 N at the edge of the vibration table. 1A at open circuit voltage of 12V applied electrical load.
Environmental		
Heat Resistibility/Heat Temperature Aging	No corrosive influence on the performance and no physical damage.	Subject connect to 100 ± 1°C for 120 hours. Sample shall be reconditioned at room temperature before measurements are recorded.
Cold Resistibility/Low Temperature Aging	No corrosive influence on the performance and no physical damage.	EIA-364-59 Subject connect to -30 ± 5°C for 120 hours. Sample shall be reconditioned at room temperature before measurements are recorded.
Thermal Shock	No corrosive influence on the performance and no physical damage.	EIA-364-32 Subject mated specimens to 100 cycles between -30 ± 5°C and 100 ± 1°C with 1 hour dwell time at temperature extremes and 5 minute (maximum) transition between temperatures. Samples shall be reconditioned at room temperature before measurements are recorded.
Humidity	No corrosive influence on the performance and no physical damage.	EIA-364-31 Subject mated specimens to test chamber at 100 ± 5°C with 90-95% R.H. for 96 hours. A test voltage of 14V DC shall be applied for the duration of the humidity test. Measurements to be recorded after specimens are held at ambient temperature and humidity.
Dust Bombardment	No corrosive influence on the performance and no physical damage.	EIA-364-91
Salt Spray	No corrosive influence on the performance and no physical damage.	EIA-364-26 Subject mated connectors to 5±1% salt concentration, 1.0268 – 1.0413 in specification gravity, 6.5 – 7.2 in pH hydrogen exponent, sprayed by air pressure of 68.6 – 177 KPa for 24 hours at 35±5°C. A test voltage of 14V DC shall be applied for the duration of the humidity test. After test duration, the sample connector shall be exposed to a humidity test chamber at 80±5°C with 90-95% R.H. for 24 hours.



NOTE

Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the product qualification and re-qualification test sequence given in Figure 2.

Figure 2 (end)

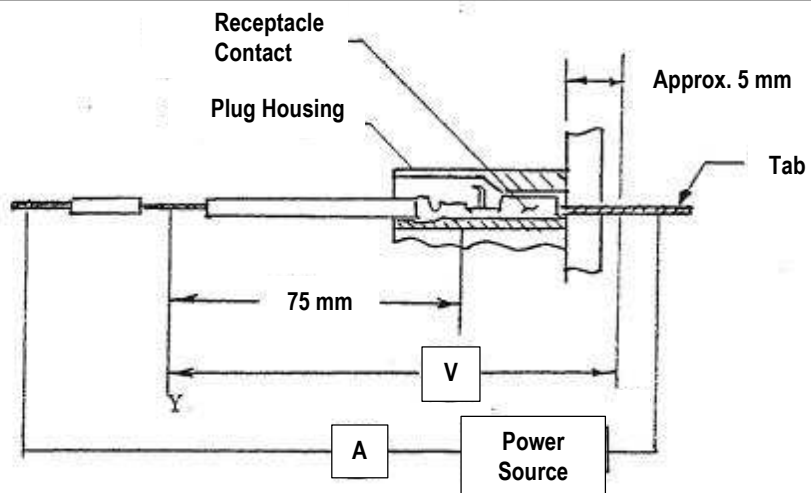


Figure 3

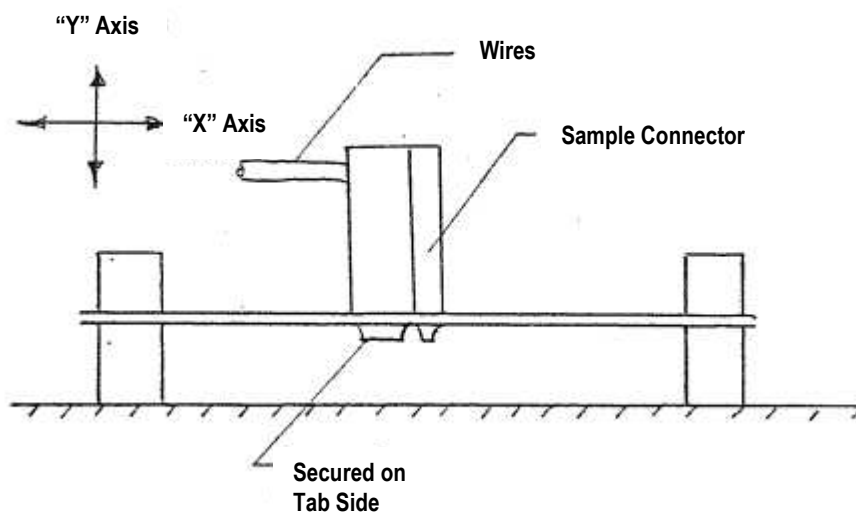


Figure 4

3.6. Product Qualification and Re-Qualification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)					
	1	2	3	4	5	6
	TEST SEQUENCE (b)					
Visual Examination	1					
Termination Resistance (Low Level)				2,5,9,13	1,3,6	
Termination Resistance		1,3,5	1,3,5			
Insulation Resistance	2					
Dielectric Withstanding Voltage	3					
Current Leakage					5	
Current Cycling		4				
Temperature Rise			4			
Connector Mating Force				1,7,11		
Connector Unmating Force				3,6,10		
Contact Retention Force	4					
Contact Locking Retention Force		6				
Crimp Tensile Strength						1
Random Vibration		2				
Mechanical Shock			2			
Heat Resistibility/Heat Temperature Aging				4		
Cold Resistibility/Low Temperature Aging				8		
Thermal Shock					2	
Humidity					4	
Salt Spray				12		



NOTE

- (a) See paragraph 4.1.A.
- (b) Numbers indicate sequence in which tests are performed.

Figure 5

4. QUALITY ASSURANCE PROVISIONS

4.1. Test Conditions

Unless otherwise specified, all the tests shall be performed in any combination of the following test conditions shown in Figure 6:

Temperature	15 – 35°C
Relative Humidity	45 – 75%
Atmospheric Pressure	86.6 – 106.6 KPa (650 – 800 mmHg)

Figure 6

4.2. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable instruction sheets and shall be selected at random from current production. Test groups 1 – 5 shall consist of a minimum of two (2) specimens; test group 6 shall consist of a minimum of ten (10) specimens.

The following wire sizes in Figure 7 shall be used for termination:

Wire Size [mm ²]	Number of Strands	Diameter of Individual Strand	Cross-sectional Area [mm ²]	Insulation Diameter [mm]
0.5	7	0.32	0.56	2.2
0.85	11	0.32	0.88	2.4

Figure 7

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 5.

4.3. Re-Qualification Testing

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

4.4. Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 2. 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 re-submitted for qualification. Testing to confirm corrective action is required before re-submittal.

4.5. 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.