
G13 Style SMT End Cap Connector Assembly

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the Tyco Electronics G13 style Surface Mount (SMT) End Cap Connector Assembly designed to interface an LED string on a PCB to a standard G13 style fluorescent socket to retrofit into fixtures designed for T8 or T12 fluorescent tubes.

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. Successful qualification testing on the subject product line was completed on 14Apr10. The Qualification Test Report number for this testing is 501-729. This documentation is on file at and available from Engineering Practices and Standards (EPS).

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. Tyco Electronics Documents

- 109 Series: Test Specifications as indicated in Figure 1
- 114-13255: Application Specification (G13 Style Surface Mount Technology (SMT) End Cap Connector Assembly and Cover)
- 501-729: Qualification Test Report (G13 Style SMT End Cap Connector Assembly)

2.2. Industry Documents

- EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
- NEMA ANSLG C81.61: Electrical Lamp Bases Specifications for Bases (Caps) for Electric Lamps
- NEMA ANSLG C81.62: Electric Lamp Holders
- J-STD-002: Solderability Tests for Component Leads, Terminations, Lugs, Terminals and Wires

2.3. Reference Document

109-197: Test Specification (AMP 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.

3.3. Ratings

- Voltage:
 - 250 volts AC rms
 - 250 volts DC
- Current: 2 amperes maximum
- Temperature: -40 to 120°C

3.4. Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Initial examination of product.	Meets requirements of product drawing and Application Specification 114-13255.	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).	45 milliohms maximum initial. ΔR 10 milliohms maximum.	EIA-364-23. Subject specimens mated to a NEMA ANSLG C81.62 standard lamp holder to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage.
Insulation resistance.	1 megohm minimum.	EIA-364-21. 500 volts DC, 2 minute hold. Test between adjacent contacts of unmated specimens.
Withstanding voltage.	One minute hold with no breakdown or flashover.	EIA-364-20, Condition I. 1500 volts AC at sea level. Test between adjacent contacts of unmated specimens.
Temperature rise vs current.	30°C maximum temperature rise at specified current.	EIA-364-70, Method 1. Stabilize specimens mated to a NEMA ANSLG C81.62 standard lamp holder at a single current level until 3 readings at 5 minute intervals are within 1°C. Energize 100% of the circuit.

Figure 1 (continued)

Test Description	Requirement	Procedure
MECHANICAL		
Solderability.	Solderable area shall have a minimum of 95% solder coverage.	J-STD-002. SMT connector component only.
Resistance to reflow soldering heat.	Housing shall be free of deformation and fusion. Soldered area shall form filets. See Note.	AMP Spec 109-201, Condition B. SMT connector component only.
Random vibration.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28, Test Condition VII, Condition Letter D. Subject mated specimens to 3.10 G's rms between 20 to 500 Hz. Fifteen minutes in each of 3 mutually perpendicular planes.
Mechanical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	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.
Durability.	See Note.	EIA-364-9. Mate and unmate specimens for 10 cycles at a maximum rate of 500 cycles per hour.
Gaging.	One pound-force maximum.	NEMA ANSLG C81.61, Std Sheet 1-406-2. See Figure 3.
Pin strength.	7 pound-force-inch and 14 pounds at a distance of .180 inch from the face.	NEMA ANSLG C81.61, Std Sheet 1-406-2. See Figure 4.
Contact retention.	25 pounds minimum.	EIA-364-29, Method C. Apply axial force to contacts in a direction that would displace them from their proper location. Apply force to failure.
ENVIRONMENTAL		
Thermal shock.	See Note.	EIA-364-32, Test Condition VII. Subject mated specimens to 25 cycles between -40 and 105°C with 30 minute dwells at temperature extremes and 1 minute transition between temperatures.
Humidity/temperature cycling.	See Note.	EIA-364-31, Method III. Subject mated specimens to 10 cycles (10 days) between 25 and 65°C at 80 to 100% RH.

Figure 1 (continued)

Test Description	Requirement	Procedure
Temperature life.	See Note.	EIA-364-17, Method A, Test Condition 4. Subject mated specimens to 105°C for 548 hours.

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 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)					
	1	2	3	4	5	6
	Test Sequence (b)					
Initial examination of product	1	1	1	1	1	1
LLCR	3,7	2,7				
Insulation resistance			2,6			
Withstanding voltage			3,7			
Temperature rise vs current		3,8				
Solderability					2	
Resistance to reflow soldering heat				2		
Random vibration	5	6				
Mechanical shock	6					
Durability	4					
Gaging	2					
Pin strength	8					
Contact retention						2
Thermal shock			4			
Humidity/temperature cycling		4	5			
Temperature life		5				
Final examination of product	9	9	8	3	3	

NOTE

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

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. Test groups 1, 2, 4 and 5 shall each consist of 5 specimens soldered to FR-4 printed circuit boards. Test groups 3 and 6 shall each consist of 15 specimens soldered to FR-4 printed circuit boards.

B. Test Sequence

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

4.2. Requalification Testing

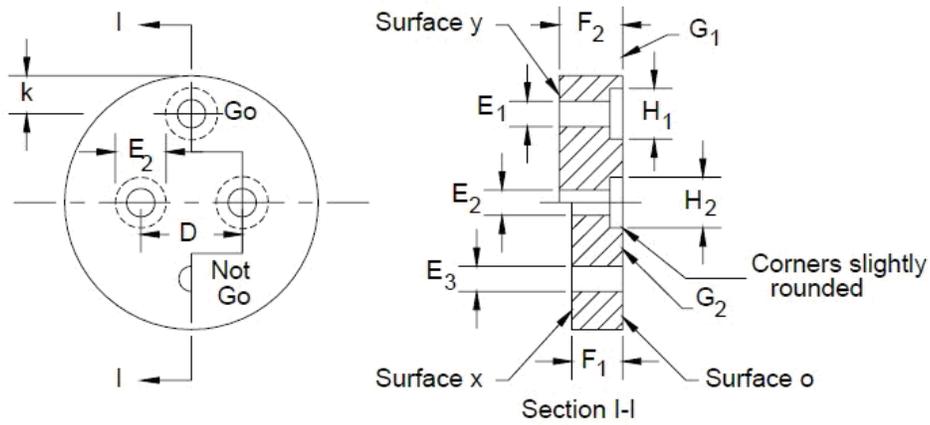
If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

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

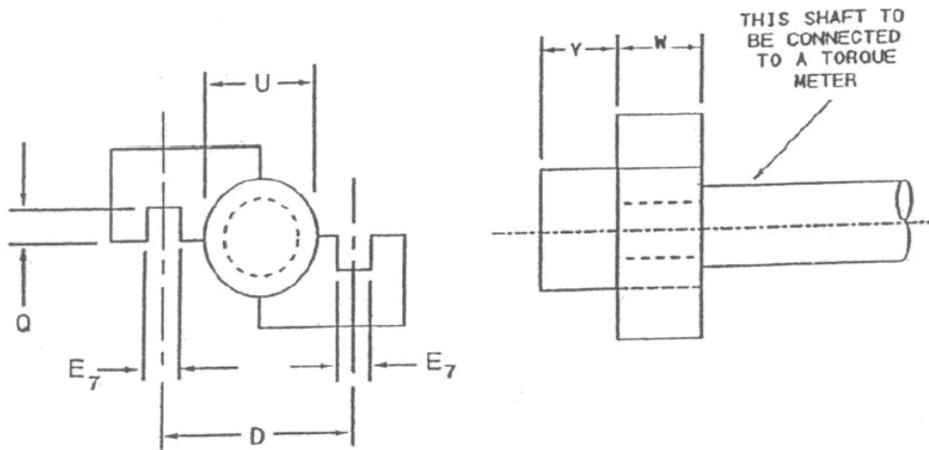
4.4. Quality Conformance Inspection

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.



Reference	Dimension (inches)	Tolerance (inches)	Metric Equivalent (millimeters)
D	.187	±.0002	4.75
E ₁	.105	+.0004	2.67
E ₂	.110	+.0004	2.79
E ₃	.090	-.0004	2.29
F ₁	.260	-.001	6.60
F ₂	.300	+.001	7.62
G ₁	.034	+.005	0.86
G ₂	.039	±.005	1.0
H ₁	.130	+.005	3.30
H ₂	.157	±.005	4.0
k	.118	maximum	3

Figure 3
End Cap Test Gage



Reference	Dimension (inches)	Tolerance (inches)	Metric Equivalent (millimeters)
D	.187	±.001	4.75
E ₇	.120	±.005	3.05
Q	.050	±.005	1.27
U	.031	±.010	0.79
V	.180	±.002	4.57
W	.025	±.010	6.35

For a base design where the space between pins is on a plane different than the base face plane, adjustments to the V and/or U dimensions may be necessary.

Figure 4
Pin Strength Test Gage