Hooded SL 156 Connectors, Gold

1. SCOPE

1.1. Content

This specification covers the performance, tests and quality requirements for the TE SL 156 hooded, dual wipe gold connector system. This system is used for wire to board interconnection and mates with .045 inch square or round posts.

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 11Oct96. Additional testing was completed on 10Jul09. The Qualification Test Report number for this testing is 501-357-1. 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. TE Connectivity (TE) Documents

- 109-1: Test Specification (General Requirements for Test Specifications)
- 109 Series: Test Specifications as indicated in Figure 1
- 109-151: Test Specification (Current Rating Verification)
- 114-1021: Application Specification (SL 156 Contacts and Housings)
- 501-357-1: Qualification Test Report (Hooded SL 156 Connectors, Gold)

2.2. Industry Document

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

2.3. Reference Document

109-197: Test Specification (Tyco Electronics 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
- Current: See Figure 4 for applicable current carrying capability. Maximum rated current that can be carried by this product is limited by maximum operating temperature of housings (105℃) and temperature rise of housings (30℃). Variables to b e considered for each application are: wire size, connector size, contact material, ambient temperature, and printed circuit board design.
- Temperature: -55 to 105℃

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 per Test Specification 109-1.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Examination of product.	Meets requirements of product drawing and Application Specification 114-1021.	Visual, dimensional and functional per applicable quality inspection plan.
ELECTRICAL		
Termination resistance.	3 milliohms maximum. ΔR 10 milliohms maximum.	TE Spec 109-6-1. Subject mated contacts assembled in housing to 50 millivolts maximum open circuit at 100 milliamperes maximum. See Figure 3.
Insulation resistance.	1000 megohms minimum.	TE Spec 109-28-4. Test between adjacent contacts of mated samples.
Dielectric withstanding voltage.	One minute hold with no breakdown or flashover.	TE Spec 109-29-1. 2000 volts AC at sea level. Test between adjacent contacts of mated samples.
Temperature rise vs current.	30℃ maximum temperatur e rise at specified current.	TE Spec 109-45-1. Measure temperature rise vs current. See Figure 4.
MECHANICAL		
Sinusoidal vibration.	No discontinuities of 1 microsecond or longer duration. See Note.	TE Spec 109-21-1. Subject mated samples to 10-55-10 Hz traversed in 1 minute with .06 inch maximum excursion. Two hours in each of 3 mutually perpendicular planes. See Figure 5.

Figure 1 (continued)

Test Description	Requirement	Procedure
Physical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	TE Spec 109-26-1. Subject mated samples to 50 G's half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks. See Figure 5.
Durability.	See Note.	TE Spec 109-27. Mate and unmate samples for 25 cycles at a maximum rate of 300 cycles per hour.
Mating force.	2 pounds maximum per standard gold .045 inch square contact. 3 pounds maximum per standard gold .045 inch round contact.	TE Spec 109-42, Condition A. Measure force necessary to mate samples at a maximum rate of .5 inch per minute.
Unmating force.	.25 pound minimum per standard gold .045 inch square and .045 inch round contact.	TE Spec 109-42, Condition A. Measure force necessary to unmate samples at a maximum rate of .5 inch per minute.
Crimp tensile.	Wire Size (AWG) / Crimp Tensile (lbs min) 24 / 10 22 / 15 20 / 25 18 / 35 16 / 40	EIA-364-8. Determine crimp tensile at a maximum rate of 1 inch per minute.
ENVIRONMENTAL		
Thermal shock.	See Note.	TE Spec 109-22. Subject mated samples to 5 cycles between -55 and 105℃.
Humidity/temperature cycling.	See Note.	TE Spec 109-23-3, Condition B. Subject mated samples to 10 cycles between 25 and 65℃ at 95% RH.
Temperature life.	See Note.	TE Spec 109-43. Subject mated samples to temperature life at 105℃ for 1000 hours.
Mixed flowing gas.	See Note.	TE Spec 109-85-2. Subject mated samples to environmental class II for 14 days.

NOTE *Shall meet visual requirements, show no physical damage and shall meet requirements of additional tests as specified in Test Sequence in Figure 2.*

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)			
	1	2	3	4
	Test Sequence (b)			
Examination of product	1,9	1,9	1,8	
Termination resistance	3,7	2,7		
Insulation resistance			2,6	
Dielectric withstanding voltage			3,7	
Temperature rise vs current		3,8		
Sinusoidal vibration	5	6(c)		
Physical shock	6			
Durability	4			
Mating force	2			
Unmating force	8			
Crimp tensile				1
Thermal shock			4	
Humidity/temperature cycling			5	
Temperature life		5		
Mixed flowing gas		4(d)		

NOTE

(a) See paragraph 4.1.A.
(b) Numbers indicate sequence in which tests are performed.
(c) Discontinuities shall not be measured. Energize at 18 ℃ level for 100% loadings per Test Specification 109-151.
(d) Precondition samples with 5 cycles durability.

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Sample Selection

Samples shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. Test group 1 shall consist of: 5, 6 position standard samples with .045 inch square posts; and 5, 6 position standard samples with .045 inch round posts. All samples shall be terminated to the maximum wire size and mounted on printed circuit boards. Test group 2 shall consist of: 3, 10 position standard samples terminated to 24 AWG wire and mounted on printed circuit boards; and 3, 10 position standard samples terminated to 18 AWG wire and mounted on printed circuit boards. Test group 3 shall consist of 5, 10 position standard samples terminated to 18 AWG wire and mounted on printed circuit boards. Test group 4 shall consist of 15 contacts per wire size.

B. Test Sequence

Qualification inspection shall be verified by testing samples 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

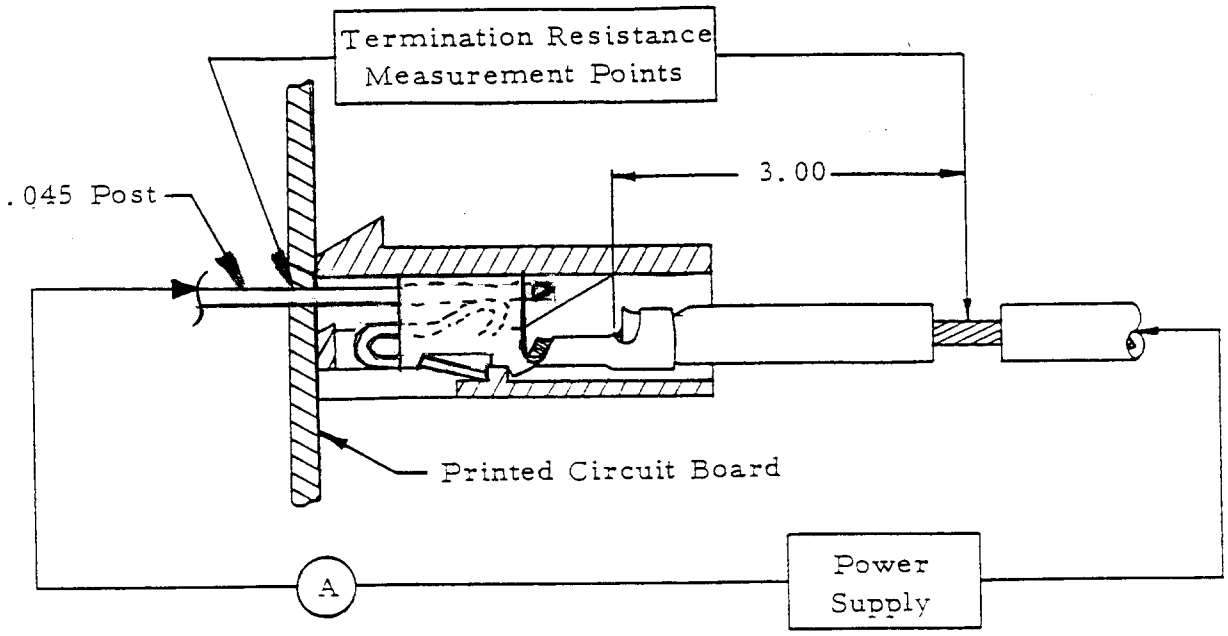
Acceptance is based on verification that the product meets the requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing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

4.4. Quality Conformance Inspection

The applicable quality inspection plan will 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.

4.5. Certification

This product has been recognized under the Component Recognition Program of Underwriters Laboratories Inc., Electrical File Number E-28476 and certified by Canadian Standards Association File Number LR-16455.



NOTE *Termination resistance equals millivolts divided by test current less resistance of 3 inches of wire.*

Figure 3
Termination Resistance Measurement Points

FINAL SINGLE CIRCUIT BASE CURVE
MAXIMUM WIRE SIZE

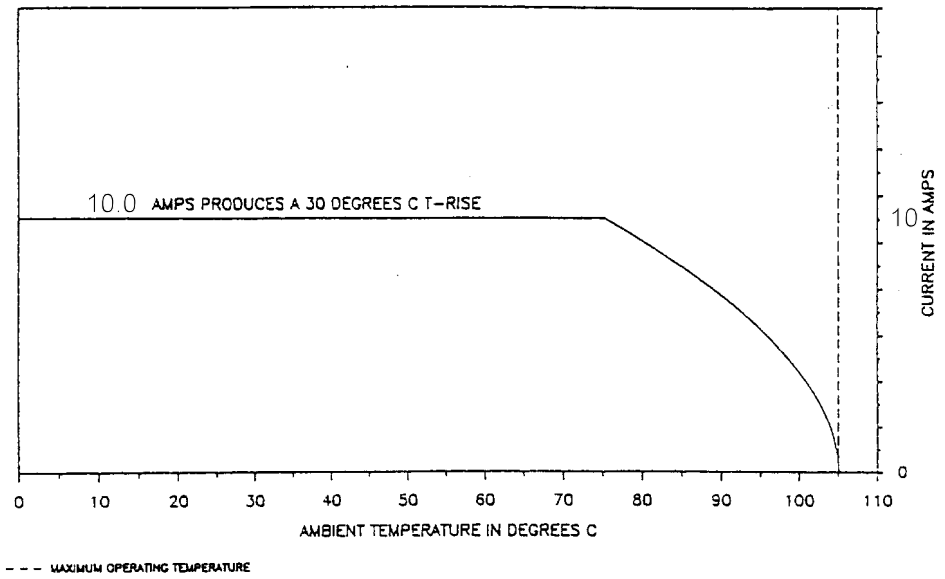


Figure 4A
Current Carrying Capability

Percent Connector Loading (10 Position In-Line Gold)	Wire Size AWG			
	24	22	20	18
Single Contact	0.561	0.706	0.851	1
25	0.510	0.643	0.776	0.909
50	0.458	0.578	0.698	0.817
75	0.404	0.509	0.615	0.720
100	0.349	0.440	0.531	0.622

NOTE

To determine acceptable current carrying capacity for percentage connector loading and wire gage indicated, use the Multiplication Factor (F) from the above chart and multiply it times the Base rated Current for a single circuit at maximum ambient operating temperature as shown in Figure 4A.

Figure 4B
Current Rating

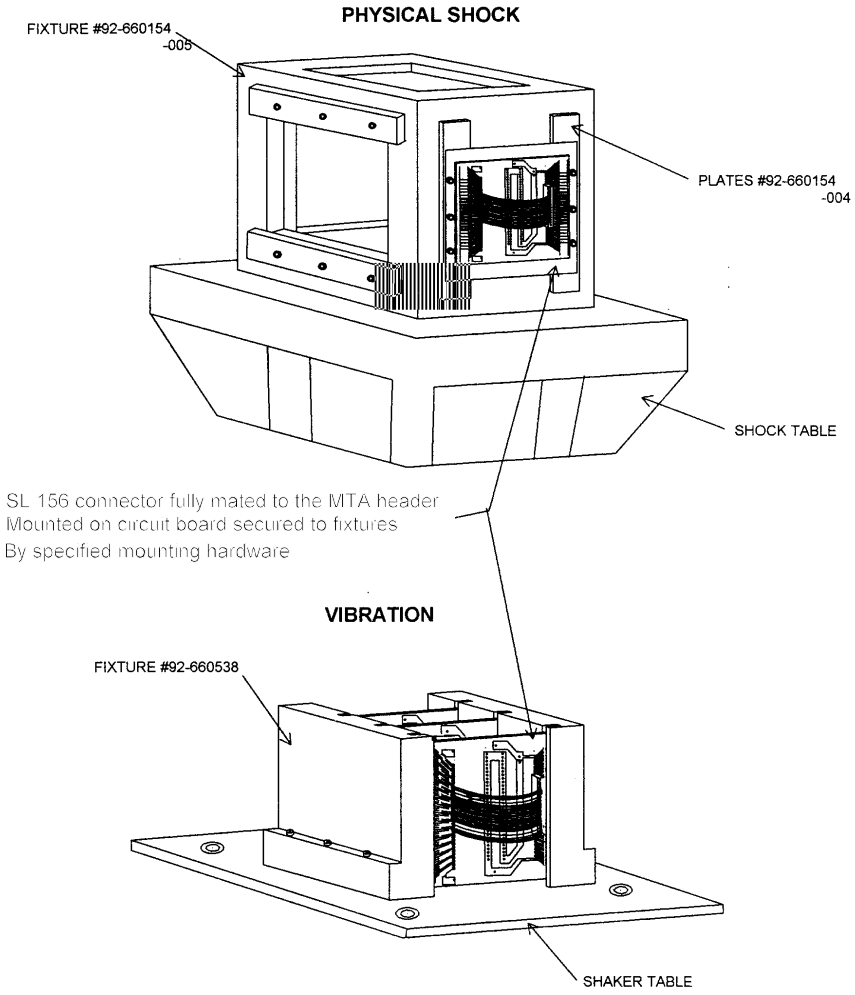


Figure 5
Vibration & Physical Shock Mounting Fixture
(Use For Reference Only)