

---

**Standard LGH Connectors,  
Series 1/2I, 1/2LI, 1I, 1LI, 2I, 3I and 4I**

---

**DESIGN OBJECTIVES**

The product described in this document has not been fully tested to ensure conformance to the requirements outlined below. Therefore Tyco Electronics makes no representation or warranty, express or implied, that the product will comply with these requirements. Further, Tyco Electronics may change these requirements based on the results of additional testing and evaluation. Contact Tyco Electronics Engineering for further details.

---

**1. SCOPE**

1.1. Content

This specification covers performance, tests and quality requirements for the Tyco Electronics LGH standard high voltage 1/2I, 1/2LI, 1I, 1LI, 2I, 3I and 4I series molded end leads and receptacles. These leads and receptacles are designed for commercial, industrial and military type applications requiring operation over wide environments.

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. Tyco Electronics Documents

- 109 Series: Test Specifications as indicated in Figure 1
- 109-197: Test Specification (AMP Test Specifications vs EIA and IEC Test Methods)
- 114- : Application Specification
- 501- : Qualification Test Report

2.2. Commercial Standard

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

2.3. Military Standard

MIL-STD-202: Test Methods For Electronic And Electrical Component Parts

**3. REQUIREMENTS**

3.1. Design and Construction

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

PRELIMINARY

3.2. Materials

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

3.3. Ratings

- Voltage:
  - 1/2I: 10 kilovolts
  - 1/2LI: 15 kilovolts
  - 1I: 20 kilovolts
  - 1LI: 25 kilovolts
  - 2I: 30 kilovolts
  - 3I: 40 kilovolts
  - 4I: 50 kilovolts
- Temperature: -55 to 125°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 per EIA-364.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure																
Initial examination of product.	Meets requirements of product drawing.	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.																
<b>ELECTRICAL</b>																		
Contact resistance.	100 milliohms maximum.	EIA-364-6. Measure potential drop of mated specimens at 1 ampere maximum. Calculate resistance. See Figure 3.																
Insulation resistance.	5000 megohms minimum.	EIA-364-21. Test between contacts of mated lead connector assemblies and ground.																
Withstanding voltage.	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Series</th> <th>Test Voltage (kvDC)</th> </tr> </thead> <tbody> <tr><td>1/2I</td><td>15</td></tr> <tr><td>1/2LI</td><td>23</td></tr> <tr><td>1I</td><td>30</td></tr> <tr><td>1LI</td><td>38</td></tr> <tr><td>2I</td><td>45</td></tr> <tr><td>3I</td><td>55</td></tr> <tr><td>4I</td><td>60</td></tr> </tbody> </table> <p>5 microamperes maximum leakage current. 3 minute hold.</p>	Series	Test Voltage (kvDC)	1/2I	15	1/2LI	23	1I	30	1LI	38	2I	45	3I	55	4I	60	EIA-364-20, Condition I. Test between contacts of mated lead connector assemblies and ground.
Series	Test Voltage (kvDC)																	
1/2I	15																	
1/2LI	23																	
1I	30																	
1LI	38																	
2I	45																	
3I	55																	
4I	60																	

Figure 1 (cont)

DESIGN OBJECTIVES 07 Mar 11

Test Description	Requirement	Procedure
<b>MECHANICAL</b>		
Vibration, sinusoidal.	No discontinuities of 10 microseconds or longer duration. See Note.	EIA-364-28, Test Condition I. Subject mated specimens to 10-55-10 Hz traversed in 1 minute with 1.5 mm [.06 in] maximum total excursion. 2 hours in each of 3 mutually perpendicular planes.
Mechanical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27, Method H. Subject mated specimens to 30 G's half-sine shock pulses of 11 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.
Durability.	See Note.	EIA-364-9. Mate and unmate gold plated specimens for 500 cycles and tin plated specimens for 50 cycles at a maximum rate of 500 cycles per hour.
Contact engaging force.	20 ounces maximum.	AMP Spec 109-35. Measure force necessary to engage using gage 2 to a depth of .19 inch for 1/2I and 1/2LI and .25 inch for 1I, 1LI, 2I, 3I and 4I. See Figure 4.
Contact separating force.	3 ounces minimum.	AMP Spec 109-35. Size 3 times using gage 2. Then insert gage 1 to depth of .19 inch for 1/2I and 1/2LI and .25 inch for 1I, 1LI, 2I, 3I and 4I and measure force necessary to separate. See Figure 4.
<b>ENVIRONMENTAL</b>		
Thermal shock.	See Note.	EIA-364-32. Subject specimens to 5 cycles between -55 and 125°C.
Humidity, steady state.	See Note.	EIA-364-31, Method II, Condition A. Subject specimens to 40°C and 90 to 95% RH for 96 hours.
Temperature life.	See Note.	EIA-364-17, Method A, Test Condition 5, Test Time Condition A. Subject mated specimens to 125°C for 96 hours.

**DESIGN OBJECTIVES 07 Mar 11**

**DESIGN OBJECTIVES**

Figure 1 (cont)

Test Description	Requirement	Procedure
Barometric pressure, temperature cycling.	See Note.	MIL-STD 202, Method 105C, Condition C.
Hermetic seal.	Leakage rate less than $1 \times 10^{-8}$ cc He/sec. See Note.	MIL-STD 202, Method 112C, Condition C.

**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(c)
	Test Sequence (b)	
Initial examination of product	1,19	1,18
Contact resistance	4,8	5,9
Insulation resistance	2	3
Withstanding voltage	3,11,15	4,13,17
Vibration	9	10
Mechanical shock	10	11
Durability	7	8
Contact engaging force	5,17	6
Contact separating force	6,18	7
Thermal shock	14	15
Humidity, steady state	12	14
Temperature life	16	
Barometric pressure, temperature cycling	13(d)	
Hermetic seal		2,12,16
Final examination of product	19	18

**NOTE**

- (a) See paragraph 4.1.A.
- (b) Numbers indicate sequence in which tests are performed.
- (c) This test group is applicable to hermetic seal type receptacles only.
- (d) HiPot is performed at each temperature extreme and reduced barometric pressure, 70000 feet.

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 group 1 shall consist of 28 lead assemblies and receptacles; 4 each from 1/2I, 1/2LI, LI, 1LI, 2I, 3I and 4I series. Test group 2 shall consist of 14 hermetic seal type receptacles; 2 each from 1/2I, 1/2LI, LI, 1LI, 2I, 3I and 4I series.

###### 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.

DESIGN OBJECTIVES 07 MAR 11

DESIGN OBJECTIVES



Figure 3  
Contact Resistance Measurement Points



Gage Number	A Dimension	B Dimension
	.0165 +.0001/-.0000	Maximum flat
	.0635 +.0000/-.0001	.015

**NOTE**

- (a) Contact: Size 16
- (b) Material: Tungsten carbide

Figure 4  
Engaging & Separating Gage