

---

**Connector, Interconnect, High Density**

---

**1. SCOPE**

## 1.1. Content

This specification defines performance, tests and quality requirements for TE Connectivity (TE) high density interconnect connector. These are box type receptacle and pin 2 piece connectors which provide a connection method on .100 inch centerline. Connectors are available in 2, 3 and 4 row configuration.

## 1.2. Qualification

When tests are performed on subject product line, procedures specified in 109 Series Test Specifications shall be used unless otherwise specified. All inspections shall be performed using 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, latest edition of the document applies. In the event of conflict between requirements of this specification and product drawing, product drawing shall take precedence. In the event of conflict between requirements of this specification and referenced documents, this specification shall take precedence.

## 2.1. TE Documents

- 109-1 General Requirements for Test Specifications
- 109-30 Contact Retention
- 109-35 Contact Engaging and Separating Force
- 501-48 Qualification Test Report

## 2.2. Military Standard

MIL-STD-275 Printed Wiring for Electronic Equipment

## 2.3. Industry Specifications and Standards

- EIA 364 Test Specifications as indicated in Table 1
- IEC 60512 Test Standards as indicated in Table 1

**3. REQUIREMENTS**

## 3.1. Design and Construction

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

## 3.2. Materials

- Terminal:
  - Receptacle: Beryllium copper or copper nickel silicon
  - Pin: Phosphor bronze or brass
- Housing: Thermoplastic, glass filled, UL 94V-0

3.3. Ratings

- Current: 3 amperes maximum per contact, 2.25 amperes continuous per contact at room ambient, with not more than 2 adjacent or opposing circuits carrying this current.
- Operating Temperature: -65° to 125°C for gold contacts

3.4. Performance and Test Description

Connectors shall be designed to meet electrical, mechanical and environmental performance requirements specified in Table 1.

3.5. Test Requirements and Procedures Summary

**Table 1**

<b>Test Description</b>	<b>Requirement</b>	<b>Procedure</b>
Examination of product.	Meets requirements of product drawing.	Visual, dimensional and functional per applicable inspection plan.
<b>ELECTRICAL</b>		
Termination resistance, specified current.	.015 ohms maximum initial. .020 ohms maximum final.	Measure potential drop of mated contacts assembled in housing using 3 amperes maximum Calculate resistance. See Figure 1. EIA 364-6B and IEC 60512-2-2.
Termination resistance, low level.	.015 ohms maximum initial. .020 ohms maximum final.	Subject mated contacts assembled in housing to 50 mv open circuit at 100 ma maximum. See Figure 1. EIA 364-23A and IEC 60512-2-1.
Dielectric withstanding voltage.	Test Voltage    Altitude (rms)            Feet 900        Sea Level 200        70,000 2 milliamperes maximum leakage current.	Tests between adjacent contacts of unmated connector and contacts to hardware. EIA 364-20B and IEC 60512-4-1.
Insulation resistance.	5000 megohms minimum initial.	Test between adjacent contacts of unmated connector and contacts to hardware. EIA 364-21C and IEC 60512-3-1.
<b>MECHANICAL</b>		
Vibration.	No discontinuities greater than 1 microsecond. No physical damage.	Subject wired and mated connectors to 15 G's 10-2000 Hz with 100 ma current applied. EIA 364-28D and IEC 60512-6-4.
Physical shock.	No discontinuities greater than 1 microsecond. No physical damage. Termination resistance, low level.	Subject wired and mated connector to 100 G's sawtooth shock pulses of 6 milliseconds duration. 3 mutually perpendicular planes, total 18 shocks. EIA 364-27B and IEC 60512-6-3.

Table 1

Test Description	Requirement	Procedure
Mating force.	1.9 ounces maximum average per contact.	Measure force necessary to mate connector assembly after 3 unmonitored cycles. Calculate force per contact. EIA 364-13B and IEC 60512-13-1.
Unmating force.	.4 ounces minimum average per contact.	Measure force necessary to unmate connector assembly. Calculate force per contact. EIA 364-13B and IEC 60512-13-1.
Contact retention.	Contacts shall not dislodge from its normal locking position.	Apply axial load of 3 pounds to individual contacts. TE Spec 109-30.
Contact engaging force.	4 ounces maximum per contact.	Measure force to engage using gage 2. See Figure 2. TE Spec 109-35.
Contact separating force.	.1 ounce minimum.	Size 3 times using gage 2, insert gage 1 and measure force to separate. See Figure 2. TE Spec 109-35.
Durability.	No physical damage. .020 ohms maximum termination resistance, low level. Contact separation force.	Mate and unmate pin and receptacle connectors for 250 cycles. EIA 364-9C and IEC 60512-9-1.
Resistance to soldering heat.	No physical damage.	Subject terminal posts mounted on printed circuit boards to solder bath at 260° ±5°C for 10 ±2 seconds. EIA 364-56A, IEC 60512-12-4 and IEC 60512-12-5.
Insertion force, ACTION PIN.	40 pounds maximum per pin.	Fully insert pin into printed wiring board hole.
Retention force, ACTION PIN.	Pin shall not dislodge from printed wiring board.	Apply an axial load of 10 pounds for 10 seconds.
Torque, ACTION PIN.	Pin shall not move or dislodge from printed wiring board.	Apply 2 inch ounces for 10 seconds in both directions.
<b>ENVIRONMENTAL</b>		
Thermal shock.	.020 ohms maximum termination resistance, low level.	Subject mated connectors to 5 cycles between -65° and 125°C. EIA 364-32C and IEC 60512-11-4.
Humidity-temperature cycling.	1000 megohms final insulation resistance.	Subject mated connectors to 10 humidity-temperature cycles between 25° and 65°C at 95% RH. EIA 364-31B, IEC 60512-11-3 and IEC 60512-11-12.

## 3.6. Connector Tests and Sequences – Table 2

Table 2

Test or Examination	Test Group (a)			
	1	2	3	4
	Test Sequence (b)			
Examination of product	1,20	1,19	1,13	1,7
Termination resistance, specified current	6,16	6,15		6
Termination resistance, low level	5,9,15	5,9,14		
Dielectric withstanding voltage			7,10	
Insulation resistance			8,11	
Vibration	13			
Physical shock	14			
Mating force	4,11,17	4,10,16	5	
Unmating force	7,12,18	7,11,17	6	
Contact retention			12	
Contact engaging force	2	2	3	
Contact Separating force (d)	3,10,19	3,12,18	4	
Durability	8			
Resistance to soldering heat (c)			2	
Insertion force, ACTION PIN				2
Retention force, ACTION PIN				4
Torque, ACTION PIN				3
Thermal shock		8		
Humidity-temperature cycling		13	9	

- NOTE**
- (a) See paragraph 4.1.A.
  - (b) Numbers indicate sequence in which tests are performed.
  - (c) This test is not applicable to ACTION PIN connectors.
  - (d) Sizing contacts three times is required only before the initial test.

## 4. QUALITY ASSURANCE PROVISIONS

## 4.1. Qualification Testing

## A. Sample Selection

Connector housings and contacts shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. Test groups 1, 2 and 3 shall each consist of 3 connectors of the greatest number of position of each type offered. Two additional specimens shall be selected from least number of positions offered and tested with group 2. Test group 4 shall consist of 20 contacts.

## B. Test Sequence

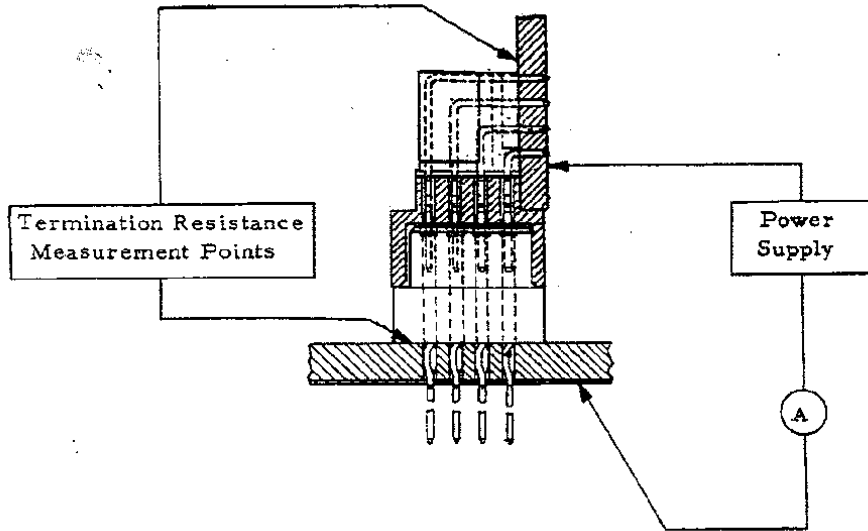
Qualification inspection shall be verified by testing samples as specified in Table 1.

## C. Acceptance

1. All samples tested in accordance with this specification shall meet the stated tolerance limit.
2. 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.

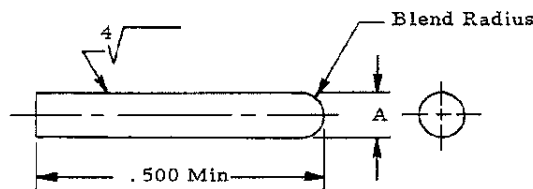
4.2. Quality Conformance Inspection

The applicable inspection plan will specify sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with applicable product drawing and this specification.



Termination Resistance Measurement Points

Figure 1



- Note:
- (1) Tolerance:  $\pm .005$  as applicable, unless otherwise specified.
  - (2) Material: Tool steel
  - (3) Heat Treat: Rockwell C 50-55
  - (4) Gage Surface: Shall be clean of contaminants or lubricants

Gage Number	A
1	.0250 <sup>+.0001</sup> <sub>-.0000</sub>
2	.0260 <sup>+0.000</sup> <sub>-.0001</sub>

Figure 2  
Gage Insertion and Extraction