Contact Retention

1. SCOPE

1.1. Content

This test is conducted to determine the ability of a connector to withstand forces tending to displace contacts from their proper location within the connector housing. These forces may be the result of:

- Loads on wire connected to the contact.
- Forces required to restrict contact "push through" during assembly of removable type contacts into the connector housing.
- Forces induced on contacts during connector mating and unmating.
- Dynamic forces produced by vibration and/or shock during normal use of the connector.
- Forces relating to bundling strains on the wires.

1.2. Applicable Documents

The contents of this specification are in compliance with the latest editions of EIA-364-29 and IEC 60512-15-1.

1.3. Specification number indicated in Figure 1 shall be specified in the referencing document.

Specification Number	Type of Test	EIA Method	IEC Method
109-30-1	Constant Force	X	None
109-30-2		None	X

Figure 1

1.4. Safety Considerations

| The test contained in this specification may be inherently hazardous. Tyco Electronics disclaims any and all responsibility for any injury or damage to third parties that may occur during or as a result of performing this test or using this specification. It is the responsibility of the user of this test to establish appropriate safety and health practices and to determine the applicability of regulatory limitations before its use.

2. TEST EQUIPMENT

- A device shall be used to produce a constant force in the specified direction. It is recommended that a "dead weight" fixture be used to avoid pulsation of the force. A suitable universal testing machine, capable of producing a non-pulsating force, may be used.
- A method of holding the specimen without damage or disturbing the retention geometry of the parts being tested.
- A method of ensuring that the applied load is within 1% of the specified requirement.
- A means of measuring the displacement of the contacts under test, so that the readings will be in the middle 50% of the scale, where practicable, with a nominal full scale accuracy of ± 2%.

©2008 Tyco Electronics Corporation
Harrisburg, PA
All International Rights Reserved.

* Trademark
| Indicates change

3. TEST SPECIMENS

3.1. Description

A test specimen shall consist of a plug or receptacle housing with the contacts installed. The referencing document shall specify all requirements of this test, see paragraph 5.2.

3.2. Preparation

A. The referencing document shall specify whether the test is to be performed on terminated or unterminated contacts, and whether the force is to be applied by pushing directly on the contacts, or by pulling on the wire terminated by the contacts.

B. If the test is to be performed by pulling on a terminated wire, the published tensile strength of the wire shall be at least 200% of the force to be applied for the test. All hardware which could influence the contact retention characteristics shall be removed.

C. If the contact retention is to be tested from the wire side of the connector, the contacts shall have the wires cut flush or the contacts replaced as specified in the referencing document. Simulated contacts that duplicate the retention feature geometry may be used in lieu of actual contacts to facilitate testing.

3.3. Mounting

The unmated specimen shall be mounted in a position to ensure the axial alignment of the contacts with the applied force. If mounting hardware is required, it shall not influence the measured retention force nor the displacement measurements.

4. TEST PROCEDURE

4.1. 109-30-1 (complies with EIA-364-29)

A. Select 20% of the contacts, but no fewer than 6 contacts of each size. At least 1 contact shall be near the periphery, and 1 near the center of the connector.

B. Determine the direction (axially) in which the test shall be conducted from the referencing document. Establish the reference (zero displacement) position of the contact. The contact may be lightly preloaded to 13.3 N [3 lb] maximum to ensure proper seating.

C. Measure the dimensional position of the contact relative to its reference point or plane in the connector, and record the value.

D. Unless otherwise specified, apply a gradually increasing axial load to the test specimen at a rate of approximately 4.4 N/sec [1 lb/sec] until the specified force is reached and maintained for 6 ± 1 second during which the measurement of displacement shall be made, or the load gradually removed and the displacement measured as specified in the referencing document.

4.2. 109-30-2 (complies with IEC 60512-15-1)

A. Select 20% of the contacts, but not less than 6 contacts, at random for the test. At least 1 contact shall be near the periphery, and 1 near the center of the connector. For components having 6 contacts or less, all contacts shall be used.

B. A specified axial force shall be applied to the contact in both directions consecutively. This force shall be reached by gradual increase at a rate not to exceed 10 N/sec [2.25 lb/sec] until the specified value is reached. This maximum value shall be maintained for 10 seconds.

C. After the contact is seated on the retention member, the contact movement shall be measured. The allowable axial displacement of the contacts in relation to the insert, while the force is applied and after the force is removed, shall be stated in the referencing document.

5. DOCUMENTATION

5.1. Test documentation shall contain the following:

- Title of test
- Specimen description
- Test equipment and fixturing descriptions, numbers and diagrams
- Detailed test procedure
- Values and observations:
  - Force applied
  - Visual observations
  - Contact location before, during and after application of the specified force if required by the referencing document
  - Calculated displacement of the contacts, see paragraph 4.1.A.
  - Strip charts or plots (if applicable)
  - Name of operator and date of test

5.2. The following shall be specified in the referencing document:

- Number of specimen connectors
- Number of contact positions to be tested in each connector
- Specified force
- Axial direction in which the force is to be applied and whether 2 directions are required (EIA only)
- Specimen preparation details
- If required, maximum allowable contact displacement
  - During application of specified force
  - After removal of specified force
- Conditions, if other than standard laboratory conditions
- Special requirements or precautions, if any