ASSOCIATION CONNECTING
ELECTRONICS INDUSTRIES

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Number	
3.1	
Subject	
Contact Resistance, Connectors	
Date	Revision
7/75	**A**
Originating Task Group	
N/A	

IPC-TM-650
TEST METHODS MANUAL

1.0 Scope

1.1 To evaluate the contact resistance of electrical contacts at rated current.

2.0 Reference Documents

2.1 Information in this section is intended to parallel the test method described in EIA-RS-364/TP-06.

3.0 Test Specimen

3.1 The mated contacts of a connector mounted and, when required, terminated in its normal manner or a mated pair of individual contacts.

NOTE: When mated contact pairs, not requiring housings, are tested, they shall be rigidly mounted in a fixture to provide mechanical stability and to insure proper mating and orientation.

3.2 For contacts having a wire-hole, crimp or other termination, a 3-foot length of continuous wire may be used for heat dissipation. The wire size shall be specified in the individual contact or connector specification.

3.3 Voltage connections may be attached permanently by soldering, crimping, or other suitable method.

3.4 Unless otherwise specified in the individual contact or connector specification, the test sample shall not be cleaned by any means prior to the test nor shall any lubricants or other coatings be applied.

4.0 Apparatus

4.1 Voltmeter (10000 ohms per volt or greater) The meter accuracy shall be such that the voltage value is measured accurately within 5 percent.

4.2 Ammeter The meter accuracy shall be such that the current value is measured accurately within 5 percent.

4.3 Power supply capable of delivering the required test current.

5.0 Procedure

5.1 The contact resistance test shall be conducted using a circuit as shown in Figure 1.

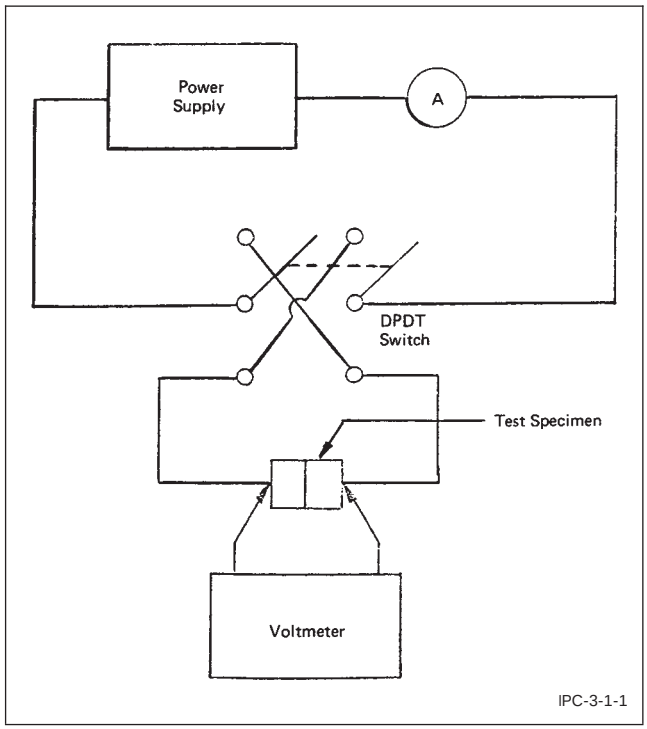

Figure 1 Test Set-up

5.2 The current through the test sample shall be increased to the value specified in the individual contact or connector specification and shall be maintained until temperature stabilization of the test sample at that current is attained. Temperature stability may be indicated by voltage drop stability.

5.3 The voltage drop across each pair of mated contacts shall be measured with the voltmeter probes (or permanent connection) positioned as follows:

A. Wire-Hole — On the contact with 1/8 inch of insulator.

B. Wrap-Post — On the wrap-post adjacent to the outer turn of wire.

C. Crimp — On the wire (piercing the insulation) within 1/8 inch of insulator.

D. Solder Tab — On the printed wiring traces as close to the termination as practicable.

E. Press-Fit — On the pad of the plated-through hole as close to the termination as practicable.

If the pad of the printed wiring board constitutes one-half of the mated contact pair, the voltmeter probe shall be positioned on the pad immediately adjacent to, but not touching, the mating contact (not inside the insulator).

NOTE: In case of an environment resistant (sealed) connector, the voltmeter probes shall be positioned as close to the sealing grommets as practicable.

5.4 The contact resistance shall be calculated by dividing the voltage drop reading by the current reading. The value thus obtained for each contact shall not exceed the maximum allowable contact resistance as defined in the individual contact or connector specification.

5.5 For voltage drops less than 1.0 millivolt, the voltage drop across each pair of mated contacts with the current successively in both directions through the test specimen shall be measured. The contact resistance shall be calculated, in each the forward and reverse directions, by dividing the voltage drop reading by the current reading. The average of the two resistance values thus obtained for each contact shall not exceed the maximum allowable contact resistance as defined in the individual contact for connector specification.

6.0 ***Notes***

6.1 Acceptance criteria shall be established as the maximum level at which stable electrical contact is maintained. This resistance is an inherent characteristic of any given connector contact design and is (when the connector is properly applied) well below that resistance level required for circuit function.