भारतीय मानक

Indian Standard

IS/IEC 60512-2-1 : 2002

विद्युत उपकरणों के लिए संयोजक

भाग 2 परीक्षण और मापन

अनुभाग 1 विद्युत अविच्छिन्नता और संपर्क प्रतिरोध परीक्षण परीक्षण 2ए संपर्क प्रतिरोध मिलिवोल्ट लेवल पद्धति

Connectors for Electronic Equipment

Part 2 Tests and Measurements

Section 1 Electrical Continuity and Contact Resistance Tests–Test 2a: Contact Resistance Millivolt Level Method

ICS 31.220.10

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

September 2024 **Price Group 4**

NATIONAL FOREWORD

This Indian Standard which is identical to IEC 60512-2-1 : 2002 ‘Connectors for electronic equipment — Tests and measurements — Part 2: Electrical continuity and contact resistance tests, Section 1 Test 2a contact resistance — Millivolt level method’ issued by the International Electrotechnical Commission (IEC) was adopted by the Bureau of Indian Standards on the recommendation of the Electromechanical Components and Mechanical Structures for Electronic Equipment Sectional Committee and approval of the Electronics and Information Technology Division Council.

The other parts in this series are:

Part 1 Generic specification

Part 2 Electrical continuity and contact resistance tests

Part 3 Insulation test

Part 4 Voltage stress tests

The text of IEC standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are however not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words ‘International Standard’ appears referring to this standard, they shouldbe read as ‘Indian Standard’; and

b) Comma (,) has been used as a decimal marker while in Indian Standards, the currentpractice is to use a point (.) as the decimal marker.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be roundedoff in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The numberof significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CONNECTORS FOR ELECTRONIC EQUIPMENT

PART 2 TESTS AND MEASUREMENTS

SECTION 1 ELECTRICAL CONTINUITY AND CONTACT RESISTANCE TESTS –TEST 2A CONTACT RESISTANCE MILLIVOLT LEVEL METHOD

1 Scope and object

This part of IEC 60512, when required by the detail specification, is used for testing electromechanical components within the scope of IEC technical committee 48. This test may also be used for similar devices when specified in a detail specification.

The object of this test is to define a standard test method to measure the electrical resistance across a pair of mated contacts or a contact with a measuring gauge.

2 General measuring requirements

Measurements may be carried out with direct current or alternating current. For a.c. measurements, the frequency shall not exceed 2 kHz. In case of dispute, the d.c. measurements shall govern.

The accuracy of the measuring apparatus shall be such that the total error does not exceed 1 %.

3 Method of measurement

3.1 Measurement details

The contact resistance shall be derived normally from the voltage drop measured between the zones intended for connection of the wiring to the contacts at the points specified in the detail specification.

The contact shall not be operated while the measuring voltage is applied.

Care must be taken during the measurement to avoid exerting abnormal pressure on the contacts under test and to avoid movement of the test cables.

Where the connection points specified in the detail specification are not directly accessible, the resistance of the cable or wire used shall be subtracted from the measured value. The corrected value shall be recorded.

The contacts to be measured shall be chosen in accordance with the detail specification.

3.2 Test current and voltage

The test voltage shall not exceed 20 mV d.c. or peak voltage a.c. in order to prevent the breakdown of possible insulating films on the contacts.

The test current shall not exceed 100 mA, a.c. or d.c.

4 Measuring cycles

4.1 Measurement with direct current

One measuring cycle consists of:

a) application of the voltage;
b) measurement with current flowing in one direction;
c) measurement with current flowing in the opposite direction;
d) disconnection of the voltage source.

4.2 Measurement with alternating current

One measuring cycle consists of:

a) application of the voltage;
b) making the measurement;
c) disconnection of the voltage source.

NOTE Unless otherwise specified, the contact(s) made should not be disturbed between the end of the preceding test and the application of the voltage in this test.

5 Requirements

The value of the contact resistance shall not exceed, for any measurement, the value specified in the detail specification.

The contact resistance measurement with d.c. shall be the average of the two readings obtained with forward and reverse current.

Use of the following equation will ensure that the calculated resistance is always correct:

$$R = \frac{\left|V_{\mathrm{mf}} - V_{\mathrm{mr}}\right|}{\left|I_{\mathrm{f}}\right| + \left|I_{\mathrm{r}}\right|}$$

NOTE In the equation, the sign of the voltage measurements must be included.

where

R is the resistance;

V_{mf} is the measured forward voltage;

V_{mr} is the measured reverse voltage;

I_{f} is the forward current;

I_{r} is the reverse current.

NOTE Any deviation from the standard test procedure should be clearly indicated in the test report.

6 Details to be specified

When this test is required by the detail specification, the following details shall be specified:

a) the measuring points;
b) the number of contacts to be measured;
c) the permissible limits of contact resistance;
d) any deviation from the standard test method.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

This Indian Standard has been developed from Doc No.: LITD 03 (23495).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices:		*Telephones*
Central	: 601/A, Konnectus Tower -1, 6th Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002	2323 7617
Eastern	: 8th Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091	2367 0012 2320 9474
Northern	: Plot No. 4-A, Sector 27-B, Madhya Marg, Chandigarh 160019	265 9930
Southern	: C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113	2254 1442 2254 1216
Western	: Manakalya, 5th Floor/MTNL CETTM, Technology Street, Hiranandani Gardens, Powai Mumbai 400076	25700030 25702715

Branches : AHMEDABAD, BENGALURU, BHOPAL, BHUBANESHWAR, CHANDIGARH, CHENNAI, COIMBATORE, DEHRADUN, DELHI, FARIDABAD, GHAZIABAD, GUWAHATI, HARYANA (CHANDIGARH), HUBLI, HYDERABAD, JAIPUR, JAMMU, JAMSHEDPUR, KOCHI, KOLKATA, LUCKNOW, MADURAI, MUMBAI, NAGPUR, NOIDA, PARWANOO, PATNA, PUNE, RAIPUR, RAJKOT, SURAT, VIJAYAWADA.

Published by BIS, New Delhi