SLOVENSKI STANDARD
SIST EN 50289-1-2:2023

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Komunikacijski kabli - Specifikacije za preskusne metode - 1-2. del: Električne preskusne metode - Odpornost DC

Communication cables - Specifications for test methods - Part 1-2: Electrical test methods - DC resistance

Kommunikationskabel - Spezifikation für Prüfverfahren - Teil 1-2: Elektrische Prüfverfahren - Gleichstromwiderstand

Câbles de communication - Spécifications des méthodes d'essais - Partie 1-2: Méthodes d'essais électriques - Résistance continue

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English Version

Communication cables - Specifications for test methods - Part 1-2: Electrical test methods - DC resistance

Câbles de communication - Spécifications des méthodes d'essais - Partie 1-2: Méthodes d'essais électriques - Résistance continue

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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European foreword

This document (EN 50289-1-2:2023) has been prepared by CLC/TC 46X, Communication cables.

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2023-10-14
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2026-04-14

This document supersedes EN 50289-1-2:2001 and all of its amendments and corrigenda (if any).

EN 50289-1-2:2023 includes the following significant technical change with respect to EN 50289-1-2:2001:

— The determination of the resistance unbalance between pairs has been added.

This document is read in conjunction with EN 50289-1-1, which contains essential provisions for its application.

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1 Scope

This document details the test methods to determine the DC resistance characteristics of the conductors of cables used in analogue and digital communication systems. These characteristics are described by the conductor resistance, loop resistance and resistance unbalance.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50290-1-2, *Communication cables - Part 1-2: Definitions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 50290-1-2 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
resistance
electrical DC resistance of a conductor or a screen

Note 1 to entry: In a finished twisted pair additional resistance due to the twisting of the conductors is included

3.2
loop resistance
resistance which specifies the electrical DC resistance of the two conductors including the additional resistance caused by the twisting of any

3.3
resistance unbalance
difference in resistance of the conductors within a pair or one side of a quad or between pairs or quads

Note 1 to entry: Resistance unbalance is expressed as a percentage (%).

4 Test method

4.1 Equipment

The resistance shall be measured by means of equipment capable of measuring accurately to within ± 0,5 % of the values to be determined.

4.2 Test sample

The length of the cable under test (CUT) shall be known to within an accuracy better than ≤ 1 %. Both ends of the CUT shall be prepared, such that the current flows through all elements of the circuit under test and that the contact resistance can be neglected with respect to the result.

4.3 Procedure

For the evaluation of the conductor resistance and the resistance unbalance both ends of the test sample shall be connected to the terminals of the measuring device. To determine the value of the loop resistance,

each pair/side of a quad or inner/outer conductor shall be measured from one end, with the other end short-circuited. Alternatively, the loop resistance can be determined by the addition of the two individual conductor values.

The current density shall not exceed 1 A/mm^2 of conductor to avoid any significant increase of temperature during the test.

The ambient temperature shall be recorded.

5 Expression of test results

5.1 Expression

The test results should be normalized to the reference length N.

$$R = \frac{Rm}{L} \times N \quad (\Omega/N) \tag{1}$$

where

R = resistance of reference length at measuring temperature;

Rm = measured resistance value of the CUT in Ω;

L = length of sample in m;

N = reference length in m.

The resistance unbalance between conductors of pair or in the same side of a quad is

$$Rub = \frac{R\,\max - R\,\min}{R\,\max + R\,\min} \times 100\ \% \tag{2}$$

where

Rub = resistance unbalance;

$Rmax$ = resistance in ohms (Ω) for the conductor with the higher resistance value;

$Rmin$ = resistance in ohms (Ω) for the conductor with the lower resistance value.

The resistance unbalance between pairs or sides of quads is given by

$$\Delta RP_{i,k} = \frac{\left| R_{\max i} \cdot R_{\min i} \times \left(R_{\max k} + R_{\min k} \right) - R_{\max k} \cdot R_{\min k} \times \left(R_{\max i} + R_{\min i} \right) \right|}{R_{\max i} \cdot R_{\min i} \times \left(R_{\max k} + R_{\min k} \right) + R_{\max k} \cdot R_{\min k} \times \left(R_{\max i} + R_{\min i} \right)} \tag{3}$$

where

ΔRP is the pair resistance unbalance (%);

$Rmax$ is the resistance for the pair with the higher resistance value (Ω);

$Rmin$ is the resistance for the pair with the lower resistance value (Ω);

i,k $i \neq k$ where i = 1 to n and k = 1 to n for n = number of pairs.