International Standard

ISO 10924-1

# Road vehicles — Circuit breakers —

## Part 1: Definitions and general test requirements

*Véhicules routiers — Coupe-circuits —*

*Partie 1: Définitions et exigences d'essais générales*

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# Contents

Page

**Foreword** ..... **v**

**1 Scope** ..... **1**

**2 Normative references** ..... **1**

**3 Terms and definitions** ..... **2**

**4 Marking, labelling and colour coding** ..... **5**

**5 Tests and requirements** ..... **5**

5.1 General ..... 5
5.1.1 General test conditions ..... 5
5.1.2 General performance requirements ..... 6
5.2 Voltage drop ..... 7
5.2.1 Purpose ..... 7
5.2.2 Test ..... 7
5.2.3 Requirement ..... 7
5.3 Maximum housing temperature ..... 7
5.3.1 Purpose ..... 7
5.3.2 Test ..... 7
5.3.3 Requirement ..... 7
5.4 Environmental conditions ..... 7
5.4.1 Purpose ..... 7
5.4.2 Mechanical loads ..... 7
5.4.3 Climatic loads ..... 8
5.4.4 Chemical loads ..... 8
5.5 Operating time rating ..... 8
5.5.1 Purpose ..... 8
5.5.2 Test ..... 8
5.5.3 Requirement ..... 8
5.6 Current steps ..... 8
5.6.1 Purpose ..... 8
5.6.2 Test ..... 9
5.6.3 Requirement ..... 9
5.7 No current trip and reset temperature ..... 9
5.7.1 Purpose ..... 9
5.7.2 Test ..... 9
5.7.3 Requirement ..... 9
5.8 Absolute breaking capacity ..... 9
5.8.1 Purpose ..... 9
5.8.2 Test ..... 9
5.8.3 Requirement ..... 10
5.9 Breaking capacity ..... 10
5.9.1 Purpose ..... 10
5.9.2 Test ..... 10
5.9.3 Requirement ..... 11
5.10 Strength of terminals ..... 12
5.10.1 Purpose ..... 12
5.10.2 Test ..... 12
5.10.3 Requirement ..... 12
5.11 Endurance ..... 12
5.11.1 Purpose ..... 12
5.11.2 Test ..... 12
5.11.3 Requirement ..... 13
5.12 Dielectric strength ..... 13
5.12.1 Purpose ..... 13
5.12.2 Test ..... 13
5.12.3 Requirement ..... 13

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**Annex A** (normative) **Cycling profiles** ..... **14**
**Annex B** (normative) **Test circuit** ..... **17**
**Annex C** (informative) **Temperature rise test** ..... **19**

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# Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 32, *Electrical and electronic components and general system aspects*.

This third edition cancels and replaces the second edition (ISO 10924-1:2016), which has been technically revised.

The main changes are as follows:

— in Clause 3 definition of insulation resistance was added;

— in Table 1 more details at the tolerances of measurement values were added;

— in Table 2 the test voltage of the DC power supply $u_t$ was added;

— in 5.8.2 and 5.8.3 the test and requirements for absolute breaking capacity were clarified;

— in 5.9.2 and 5.9.3 the test and requirements for breaking capacity were clarified;

— in 5.11.3 the requirements for endurance were clarified;

— in Annex B Figure B.2 was added;

— Annex C the temperature rise test was added.

A list of all parts in the ISO 10924 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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# Road vehicles — Circuit breakers —

# Part 1:
# Definitions and general test requirements

## 1 Scope

This document defines terms and specifies general test requirements for circuit breakers for use in road vehicles with a nominal voltage of 12 V (DC), 24 V (DC), 48 V (DC) and 450 V (DC).

This document is intended to be used in conjunction with ISO 10924-2, ISO 10924-3, ISO 10924-4 and ISO 10924-5. The numbering of its clauses corresponds to that of the document whose requirements are applicable, except where modified by requirements particular to this document.

This document is not applicable to circuit breaker holders (electrical centres or fuse-holders) used in vehicles.

## 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.

ISO 6722-1[1)], *Road vehicles — 60 V and 600 V single-core cables — Part 1: Dimensions, test methods and requirements for copper conductor cables*

ISO 8820-1, *Road vehicles — Fuse-links — Part 1: Definitions and general test requirements*

ISO 8820-3, *Road vehicles — Fuse-links — Part 3: Fuse-links with tabs (blade type) Type C (medium), Type E (high current) and Type F (miniature)*

ISO 10924-2, *Road vehicles — Circuit breakers — Part 2: Guidance for users*

ISO 10924-3:2025, *Road vehicles — Circuit breakers — Part 3: Miniature circuit breakers with tabs (Blade type), Form CB11*

ISO 10924-4:2025, *Road vehicles — Circuit breakers — Part 4: Medium circuit breakers with tabs (Blade type), Form CB15*

ISO 10924-5:2025, *Road vehicles — Circuit breakers — Part 5: Circuit breakers with bolt with rated voltage of 450 V*

ISO 16750-1, *Road vehicles — Environmental conditions and testing for electrical and electronic equipment — Part 1: General*

ISO 16750-3, *Road vehicles — Environmental conditions and testing for electrical and electronic equipment — Part 3: Mechanical loads*

ISO 16750-4, *Road vehicles — Environmental conditions and testing for electrical and electronic equipment — Part 4: Climatic loads*

ISO 16750-5, *Road vehicles — Environmental conditions and testing for electrical and electronic equipment — Part 5: Chemical loads*

1) Withdrawn standard.

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IEC 60068-2–70, *Environmental testing — Part 2: Tests — Test Xb: Abrasion of markings and letterings caused by rubbing of fingers and hands*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 16750-1, ISO 8820-1 and the following apply.

ISO and IEC maintain terminology 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**
**absolute breaking capacity**
value of prospective breaking current that a *circuit breaker* (3.3) is capable of breaking at least once at $U_{Smax}$ under prescribed conditions of use and behaviour

**3.2**
**breaking capacity**
$I_B$
value of prospective breaking current a *circuit breaker* (3.3) is capable of breaking several times at $U_{Smax}$ under prescribed conditions of use and behaviour

**3.3**
**circuit breaker**
overcurrent protection device that mechanically interrupts the circuit reversibly, responsive to electric current

Note 1 to entry: The test fixture for the circuit breaker may be identical to the test fixture as described in ISO 8820-3. However, some circuit breaker designs do not require a separate test fixture as the cables are directly connected to the circuit breaker *terminals* (3.4.2).

**3.4**
**Circuit breaker components**

**3.4.1**
**housing**
electrically non-conductive mechanical support for conductive and non-conductive parts of the *circuit breaker* (3.3)

**3.4.2**
**terminal**
part of the *circuit breaker* (3.3) which makes the electrical connection in the electrical circuit

**3.4.3**
**time-delayed element**
active part that acts depending on the current and causes the reversible interruption of the circuit in the case of an overcurrent

**3.5**
**Circuit breaker features**

**3.5.1**
**reset mechanism**
provides a user interface in a manual reset *circuit breaker* (3.3) for resetting the device after an overcurrent condition

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