

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

**Railway applications – Direct current signalling monostable relays of type N and type C**

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**Applications ferroviaires – Relais monostables de signalisation en courant continu de type N et de type C**

IEC 62912:2015  
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IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

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## RAILWAY APPLICATIONS – DIRECT CURRENT SIGNALLING MONOSTABLE RELAYS OF TYPE N AND TYPE C

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This standard is derived from EN 50578.

The text of this standard is based on the following documents:

FDIS	Report on voting
9/2039/FDIS	9/2061/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

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## INTRODUCTION

This International Standard gives a set of generic and specific requirements for direct current signalling relays.

This International Standard introduces a set of recommendations and requirements for signalling relay characteristics, construction, magnetic system, contacts and insulation. Requirements are coordinated with current international standards on all-or-nothing relays.

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# RAILWAY APPLICATIONS – DIRECT CURRENT SIGNALLING MONOSTABLE RELAYS OF TYPE N AND TYPE C

## 1 Scope

This International Standard gives requirements for direct current relays intended for safety-related applications in railway signalling installations.

This International Standard is applicable to monostable relays of type N and type C.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60664-1, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 61810-3:2015, *Electromechanical elementary relays – Part 3: Relays with forcibly guided (mechanically linked) contacts*

IEC 62497-1, *Railway applications – Insulation coordination – Part 1: Basic requirements – Clearances and creepage distances for all electrical and electronic equipment*

IEC 62498-3: 2010, *Railway applications – Environmental conditions for equipment – Part 3: Equipment for signalling and telecommunications*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1

#### **all-or-nothing relay**

electrical relay, which is intended to be energised by a quantity, the value of which is either within its operative range or effectively zero

Note 1 to entry: "All-or-nothing relays" include both "elementary relays" and "time relays".

[SOURCE: IEC 60050-444:2002, 444-01-02]

### 3.2

#### **armature**

moveable part of a relay that controls contact members

### 3.3

#### **bistable relay**

electrical relay which, having responded to an energising quantity and having changed its condition, remains in that condition after the quantity has been removed; a further appropriate energisation is required to make it change its condition



[SOURCE: IEC 60050-444:2002, 444-01-08]

### 3.4

#### **bounce time**

for a contact which is closing/opening its circuit, time interval between the instant when the contact circuit first closes/opens and the instant when the circuit is finally closed/opened

[SOURCE: IEC 60050-444:2002, 444-05-04]

### 3.5

#### **break contact <for elementary relays>**

contact which is open when the relay is in its operate condition and which is closed when the relay is in its release condition

[SOURCE: IEC 60050-444:2002, 444-04-18]

### 3.6

#### **change-over contact**

combination of two contact circuits with three contact members, one of which is common to the two contact circuits; such that when one of these contact circuits is open, the other is closed

[SOURCE: IEC 60050-444:2002, 444-04-19]

### 3.7

#### **contact gap**

gap between the contact points when the contact circuit is open

[SOURCE: IEC 60050-444:2002, 444-04-09]  
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### 3.8

#### **contact member <for elementary relays>**

conductive part designed to co-act with another to close or open the output circuit

[SOURCE: IEC 60050-444:2002, 444-04-05]

### 3.9

#### **contact force**

force which two contact members exert against each other at their contact points in the closed position

[SOURCE: IEC 60050-444:2002, 444-04-10]

### 3.10

#### **contact point**

part of a contact member at which the contact circuit closes or opens

[SOURCE: IEC 60050-444:2002, 444-04-06]

### 3.11

#### **contact wipe**

relative rubbing movement of contact points after they have touched

[SOURCE: IEC 60050-444:2002, 444-04-12]

**3.12****drop-away current**

maximum current through the coil that, starting from the nominal current value, produces the opening of all the make contacts

**3.13****electromechanical relay**

electrical relay in which the intended response results mainly from the movement of mechanical elements

[SOURCE: IEC 60050-444:2002, 444-01-04]

**3.14****elementary relay**

all-or-nothing relay which operates and releases without any intentional time delay

[SOURCE: IEC 60050-444:2002, 444-01-03]

**3.15****make contact <for elementary relays>**

contact which is closed when the relay is in its operate condition and which is opened when the relay is in its release condition

[SOURCE: IEC 60050-444:2002, 444-04-17]

**3.16****monostable relay**

electrical relay which, having responded to an energising quantity and having changed its condition, returns to its previous condition when that quantity is removed

[SOURCE: IEC 60050-444:2002, 444-01-07]

**3.17****nominal current**

current passing through the coil of the relay when the coil is supplied with nominal voltage

**3.18****operate condition <for elementary relays>**

for a monostable relay, specified condition of the relay when it is energised by the specified energising quantity and has responded to that quantity; for a bistable relay, the condition other than the release condition as declared by the manufacturer

[SOURCE: IEC 60050-444:2002, 444-02-02]

**3.19****pick-up current <compression>**

minimum current through the coil that, starting from a null value, is necessary to move the armature from the release position to the operate position and apply the specified contact force, closing all the make contacts

**3.20****pick-up current <service value>**

minimum current through the coil that, starting from a null value, is able to move the armature closing all the make contacts

### 3.21

#### **relay with forcibly guided contacts**

#### **relay with forcibly guided mechanically linked contacts**

elementary relay with at least one make contact and at least one break contact and including mechanical measures to prevent any make contact(s) and any break contact(s) being in the closed position simultaneously

[SOURCE: IEC 61810-3:2015, 3.3]

### 3.22

#### **release condition <for elementary relays>**

for a monostable relay, specified condition of the relay when it is not energised; for a bistable relay, one of the conditions, as declared by the manufacturer

[SOURCE: IEC 60050-444:2002, 444-02-01]

## 4 Classification

The requirements of the various categories of signalling relays required to guarantee installation with the degree of reliability and safety desirable for operating purposes, depend on the functions to be fulfilled by the relays and the type of circuit with which they are to be used.

Bearing in mind these characteristics, a distinction may be made between the following types of signalling relays:

- Type N (non-proved relays)

Relays themselves fulfilling all the safety conditions without the aid of other relays or without control of operations in the circuit.

- Type C (proved relays)

Relays for which the safety conditions are guaranteed by control of operations in the circuit.

## 5 Essential requirements of the relays and their construction

### 5.1 Generic requirements for signalling relays

#### 5.1.1 Forcibly guided (mechanically linked) contacts

Signalling relays shall be equipped with forcibly guided (mechanically linked) contacts. The forcibly guided (mechanically linked) contacts shall be designed in such a way that it is ensured by mechanical means that make and break contacts can never be in the closed position simultaneously.

If one of the make contacts is closed, none of the break contacts is closed. If one of the break contacts remains closed, none of the make contacts closes (assuming that nominal power conditions apply – see also 5.6.2). Operation of forcibly guided (linked) contacts means that if, for example, any given make contact fails to open and the relay is de-energised, none of the break contacts closes. The same principle applies to the failure-to-open of a break contact with energisation of the relay, i.e. in this case, no make contact shall close (IEC 61810-3).

#### 5.1.2 Forcibly guided (mechanically linked) operation

The efficiency of forcibly guided (mechanically linked) contact operation shall be maintained as long as the relay operates, even when beyond the specified endurance. This applies both to loaded and unloaded contacts. Forcibly guided (mechanically linked) operation shall be

maintained even if individual parts of the relay fail. Under such circumstances, it is irrelevant whether this failure is due to wear or breakage.

Use of change-over contacts is permitted for signalling relays in safety-relevant circuits.

## 5.2 Specific requirements

### 5.2.1 Relays of type N

**5.2.1.1** These shall be characterised by their non-weldable make contact points, through the use of a suitable contact point material (for example, silver-carbon for which there is no risk of welding above a certain percentage of carbon), or by the introduction of special constructional conditions preventing risks of welding of the contact points (for example, fusing, contacts in series).

**5.2.1.2** The relays shall open the make contacts by falling of the armature under its own weight, when the current is interrupted in the coil.

NOTE The relays that open the make contacts by only the force of return springs when the current is interrupted in the coil are not included in this subclause.

**5.2.1.3** The relays may also be equipped with return springs. These return springs shall only be used to increase the contact force of break contacts and ensure that the required time parameters for the armature to fall are met. They shall not be used for the opening of the make contacts.

### 5.2.2 Relays of type C

This type of relay shall be that the falling of the armature of the relay is proved during operation; for this reason, no special qualities of non-weldability are required for the material that contact points are made of.

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## 5.3 Mechanical construction of the signalling relays

### 5.3.1 Connecting devices

The connecting devices for relays of the plug-in type (or groups of connectable relays) shall be constructed so that it is not possible for any errors in assembly or connection to occur (e.g. protection against coding errors).

### 5.3.2 Materials and arrangement

Sufficient space shall be left between the moving parts of the relays and the detachable case or cover of the relay (or group of relays), to avoid interfering with its operation.

The material, the shape, arrangement and control of the contacts shall be chosen to guarantee normal and safe operation specified in environmental conditions including transport.

## 5.4 Environmental conditions

### 5.4.1 General

The relays shall comply to IEC 62498-3 regarding environmental conditions. Environmental conditions not covered by IEC 62498-3 shall be agreed between the manufacturer and the user.

### 5.4.2 Vibrations and shocks

In addition to the compliance to IEC 62498-3, for type N relays the following requirement applies. When in the normal position, a relay shall still function correctly when subjected to