

# TECHNICAL REPORT

Mnemonics and designations of symbols for measuring relays, instruments and related device

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IEC TR 62711:2011

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## MNEMONICS AND DESIGNATIONS OF SYMBOLS FOR MEASURING RELAYS, INSTRUMENTS AND RELATED DEVICE

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The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
3/1029A/DTR	3/1041/RVC

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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## MNEMONICS AND DESIGNATIONS OF SYMBOLS FOR MEASURING RELAYS, INSTRUMENTS AND RELATED DEVICE

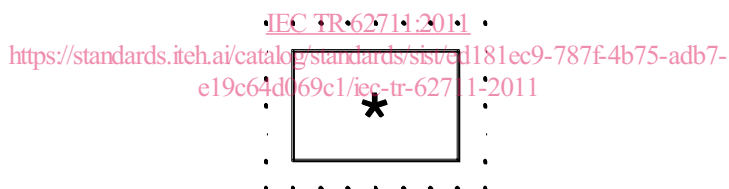
### 1 Scope

This Technical Report provides recommendations for consistent use of mnemonics and qualifying symbols to be applied to symbols representing devices used in systems for monitoring, protection, switching, and controlling of apparatus in electrical substations, generating stations, power utilization and conversion facilities, and equipment designed for automatic protection of power systems. The recommendations are intended for designers, manufacturers and engineers of such systems.

For symbols of measuring relay and measuring instrument, it is intended to serve two purposes, namely:

- Give a review of standardized designations (as defined in this report);
- Limit the range of possible variants (after final standardization and introduction in IEC 60617).

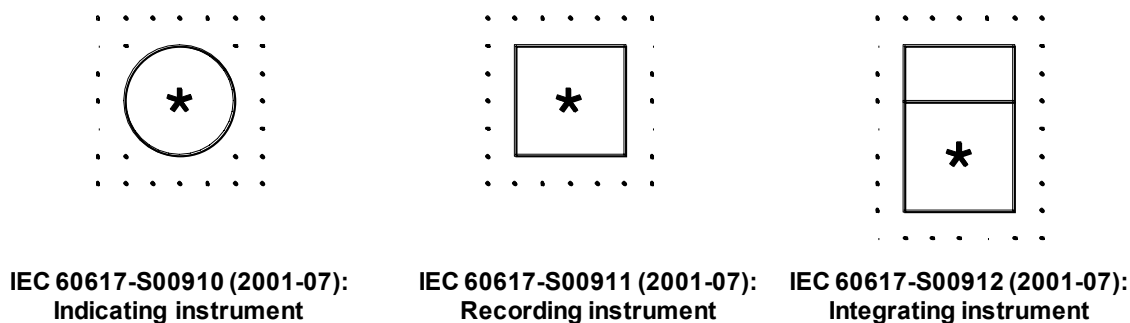
Symbols for measuring relays are symbols in which the functional behaviour of an element, mostly because of its complexity, is described by qualifying symbols e.g. IEC 60617-S00328 (2001-07), IEC 60617-S00337 (2001-07), particularly by referring to supporting documentation; the relevant rules and explanations are to be found in IEC 60617 in the application notes associated with the symbols, e.g. IEC 60617-S00327 (2001-07) (A00091 through A00094).



**IEC 60617-S00327 (2001-07):**  
Measuring relay

**Figure 1 – The general symbol for a measuring relay in IEC 60617**

Symbols for indicating, recording or integrating instruments are symbols in which the functional behaviour of an element is fully described by standardized means. The relevant rules and explanations are to be found in IEC 60617 in the application notes associated with the symbols IEC 60617-S00910 (2001-07), IEC 60617-S00911 (2001-07) and IEC 60617-S00912 (A00144 through A00147).



**Figure 2 – The general symbols for a measuring instrument in IEC 60617**

## 2 Normative references

The following referenced documents are indispensable for the application 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.

IEC 60617, *Graphical symbols for diagrams*

ISO/IEC 81714-1, *Design of graphical symbols for use in the technical documentation of products – Part 1: Basic rules*

## 3 Terms and definitions

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

### 3.1

#### protection relay

measuring relay which, either solely or in combination with other relays, is a constituent of a protection equipment

[IEC 60050-448:1995, 448-11-02]

## 4 Measuring relay symbols

Power systems are extremely complicated electrical networks that are geographically spread over very large areas. The power systems are so complex that a complete conventional diagram showing all the connections is impractical. There is some concise way of communicating the basic arrangement of power system components. This is done by using diagrams with universally accepted symbols in IEC 60617.

When measuring relay symbols are required, pick the general symbol IEC 60617-S00327 (2001-07) (see Figure 1), and then combine it with one or more appropriate supplementary symbols.

Some devices, especially newer devices, may not have universally accepted symbols. These devices could be represented in a number of ways, usually a matter of personal choice. In such instances, the symbol is usually accompanied by a verbal description.

When an appropriate symbol does not exist, either the general symbol IEC 60617-S00327 (2001-07) should be applied, or a symbol may be constructed following the rules of IEC 60617 and ISO/IEC 81714-1.

## 5 Measuring instruments

When measuring instrument symbols are required, pick the general symbols from among IEC 60617-S00910 (2001-07), IEC 60617-S00911 (2001-07) and IEC 60617-S00912 (2001-07) according to the function, that is, indicating, recording and integrating (see Figure 1). Then the asterisk within the symbol is replaced with the letter symbol or the graphical symbol.

The replacing symbol is related to the information displayed by the instrument regardless of the means used to obtain the information.



## 6 Mnemonics and designations for measuring relays and instruments

### 6.1 Overview

Where in Tables 1 to 19 below the letter “M” is shown in the second column, this means that the designation concerned may be used in measuring relay symbols. A letter “I” in the second column means that the designation concerned may be in indicating instrument symbols. A letter “R” in the second column means that the designation concerned may be in recording instrument symbols. A letter “G” in the second column means that the designation concerned may be in integrating instrument symbols. In these tables, the English descriptions appear in the fourth column, because in many cases designations are derived from terms in English.

### 6.2 Measuring relays

Tables 1 to 18 present the mnemonics and designations for measuring relays.

**Table 1 – Measuring relays – Prefix**

MNEMONICS DESIGNATION	M//R/G	NAMES	DESCRIPTIONS	GRAPHICAL SYMBOLS
O	-	over	Actuating when the characteristic quantity is higher than the setting value.	> IEC 60617-S0 0108(2001-07)
U	-	under	Actuating when the characteristic quantity is lower than the setting value.	< IEC 60617-S0 0109(2001-07)
B	-	band	Actuating when the characteristic quantity is either higher than a given high setting or lower than a given low setting.	> < IEC 60617-S0 0110(2001-07)
R	-	reverse	Actuating when the characteristic quantity is contrary or opposite to what has been mentioned.	N/A
H	-	high or high speed	Actuating at high speed or other high level of a measured value or indicating signal.	N/A

**Table 2 – Measuring relays – Suffix**

MNEMONICS DESIGNATION	M//R/G	NAMES	DESCRIPTIONS	GRAPHICAL SYMBOLS
B	-	balance	Relay which operates by comparing the magnitudes of two similar input quantities.  NOTE The balance may be affected by counteracting electromagnetic forces on a common armature, or by counteracting magnetomotive forces in a common magnetic circuit, or by similar means, such as springs, levers, etc.	N/A
V	-	with voltage restraint	Method of restraining the operation of a relay by means of a voltage input which opposes the typical response of the relay to other inputs.	N/A
NOTE With regard to suffixes, designation variables as described in IEC 60909-0 and IEC 60909-3 may be used as a suffix.				

**Table 3 – Measuring relays – General**



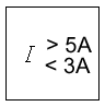
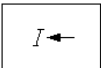
MNEMONICS DESIGNATION	M//R/G	NAMES	DESCRIPTIONS	GRAPHICAL SYMBOLS
D	M	<u>D</u> irectional relay	Relay that responds to the relative phase position of a current with respect to another current or voltage reference.  NOTE the above definition which applies basically to a single phase directional relay may be extended to cover a polyphase directional relay.	  IEC 60617-S0 0104 (2001-07)
Df	M	<u>D</u> ifferential relay	Measuring relay having two windings so connected in different parts of a circuit that the relay will operate if the difference between the currents in the two circuits exceeds a specified value.  (IEC 60050-811:1991, 811-31-16)	$I_d$  IEC 60617-S0 0331 (2001-07)
RDf	M	Ratio (Percentage) <u>D</u> ifferential relay	Differential relay which functions when the difference between two quantities of the same nature exceeds a fixed ratio (percentage) of the smaller quantity.	$I_d / I$  IEC 60617-S0 0332(2001-07)
G	M	<u>G</u> round relay, Earth fault relay	Relay which operates when a failure of insulation to earth is detected in the equipment or circuits protected.  (IEC 60050-811:1991, 811-31-15)	  IEC 60617-S0 0200(2001-07)
DG	M	<u>D</u> irectional <u>G</u> round relay	Directional relay used primarily to detect single-phase-to-ground faults, but also sensitive to double-phase-to-ground faults.  NOTE This type of relay is usually operated from the zero-sequence components of voltage and current, but is sometimes operated from negative-sequence quantities.	N/A
DfG	M	<u>D</u> ifferential <u>G</u> round relay	Differential relay used primarily to detect internal ground faults of generators.	N/A
S	M	<u>S</u> hort circuit relay	Device that operates with no intentional time delay when the current exceeds a preset value.	N/A
SG	M	<u>S</u> electing <u>G</u> round relay	Measuring relay that, by comparing the magnitudes of the zero sequence currents in two parallel lines, will identify a line having ground fault.	N/A
SS	M	<u>S</u> electing <u>S</u> hort-circuit relay	Measuring relay that, by comparing the magnitudes of the currents in two parallel lines, will identify a line having a short- circuit fault.	N/A
DS	M	<u>D</u> irectional <u>S</u> hort-circuit relay	Directional relay used primarily to detect short-circuit faults.	N/A
TT	M	<u>T</u> ransfer <u>T</u> rip relay	Form of remote trip in which a communication channel is used to transmit a trip signal from the relay location to a remote location.	N/A

Table 4 – Measuring relays – Current

MNEMONICS DESIGNATION	M//R/G	NAMES	DESCRIPTIONS	GRAPHICAL SYMBOLS
C	M	<u>C</u> urrent relay	Actuating when the current quantity is equal to a setting value.	N/A
BC	M	<u>B</u> and <u>C</u> urrent relay	Current relay with maximum and minimum setting.	 IEC 60617-S0 0345(2001-07)
CB	M	<u>C</u> urrent <u>B</u> alance relay	Balance relay that operates by comparing the magnitudes of two current inputs.	N/A
OC	M	<u>O</u> ver <u>C</u> urrent relay	Measuring relay which operates when the value of the current exceeds the setting (operating value) of the relay. (IEC 60050-811:1991, 811-31-12)	N/A
DCG	M	<u>D</u> irect <u>C</u> urrent <u>G</u> round relay	Device that functions when the d.c. input current exceeds a predetermined value, and in which the input current and operating time are inversely related through a substantial portion of the performance range.	N/A
OCG	M	<u>O</u> ver <u>C</u> urrent <u>G</u> round relay	Device that functions when the net (phasor sum) current flowing in the phase and neutral conductors or the total current flowing in the normal neutral to ground connection exceeds a predetermined value.	N/A
OCV	M	<u>O</u> ver <u>C</u> urrent relay with <u>V</u> oltage restraint	Overcurrent relay which is used primarily to protect a generator. The function of the voltage is to prevent or moderate over-current operation until the generator voltage is reduced by a fault.	N/A
DOC	M	<u>D</u> irectional <u>O</u> ver <u>C</u> urrent relay	Relay consisting of an overcurrent unit and a directional unit combined to operate jointly.	N/A
UC	M	<u>U</u> nder <u>C</u> urrent relay	Relay that operates when the current is less than a predetermined value.	N/A
RC	M	<u>R</u> everse <u>C</u> urrent relay	Relay that operates on a current flow in a direct-current circuit in a direction opposite to a predetermined reference direction.	 IEC 60617-S0 0339(2001-07)
CL	M	<u>C</u> urrent <u>L</u> imiting relay	Relay specifying a range of currents between the threshold current and the rated interrupting current within which current limitation occurs.	N/A