ICS 29.120.70 SLOVENSKÁ TECHNICKÁ NORMA December 2021

STN	**Meracie relé a ochranné zariadenia Časť 187-1: Funkčné požiadavky na diferenciálnu ochranu Obmedzená a neobmedzená diferenciálna ochrana motorov, generátorov a transformátorov**	**STN EN IEC 60255-187-1** 35 3410

Measuring relays and protection equipment - Part 187-1: Functional requirements for differential protection - Restrained and unrestrained differential protection of motors, generators and transformers

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 11/21

Obsahuje: EN IEC 60255-187-1:2021, IEC 60255-187-1:2021

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NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 60255-187-1

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English Version

Measuring relays and protection equipment - Part 187-1: Functional requirements for differential protection - Restrained and unrestrained differential protection of motors, generators and transformers (IEC 60255-187-1:2021)

Relais de mesure et dispositifs de protection - Partie 187-1: Exigences fonctionnelles pour la protection différentielle - Protection différentielle avec et sans caractéristique de retenue des moteurs, générateurs et transformateurs (IEC 60255-187-1:2021)

Messrelais und Schutzeinrichtungen - Teil 187-1: Funktionsanforderungen für den stabilisierten und nicht stabilisierten Differentialschutz von Motoren, Generatoren und Transformatoren (IEC 60255-187-1:2021)

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 95/465/FDIS, future edition 1 of IEC 60255-187-1, prepared by IEC/TC 95 “Measuring relays and protection equipment” was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60255-187-1:2021.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2022-06-01
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2024-09-01

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Endorsement notice

The text of the International Standard IEC 60255-187-1:2021 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 61850 (series)	NOTE Harmonized as EN 61850 (series)
IEC 61850-7-4:2010	NOTE Harmonized as EN 61850-7-4:2010 (not modified)
IEC 61850-9-2	NOTE Harmonized as EN 61850-9-2

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60255-1	-	Measuring relays and protection equipment - Part 1: Common requirements	EN 60255-1	-
IEC 61850-8-1	-	Communication networks and systems for power utility automation - Part 8–1: Specific communication service mapping (SCSM) - Mappings to MMS (ISO 9506-1 and ISO 9506-2) and to ISO/IEC 8802-3	EN 61850-8-1	-
IEC 61869-2	-	Instrument transformers - Part 2: Additional requirements for current transformers	EN 61869-2	-
IEC 61869-9	-	Instrument transformers - Part 9: Digital interface for instrument transformers	EN IEC 61869-9	-

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NORME INTERNATIONALE

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INTERNATIONAL STANDARD

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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MEASURING RELAYS AND PROTECTION EQUIPMENT –

Part 187-1: Functional requirements for differential protection – Restrained and unrestrained differential protection of motors, generators and transformers

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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IEC 60255-187-1 has been prepared by IEC technical committee 95: Measuring relays and protection equipment. It is an International Standard.

This document, together with IEC 60255-187-2 and IEC 60255-187-3, cancels and replaces IEC 60255-13. This document constitutes a technical revision.

This document includes the following significant technical changes with respect to IEC 60255-13:

a) IEC 60255-13 has been significantly revised to follow the common structure of the functional standards for protection relays (IEC 60255-1xx series). IEC 60255-187-1 has been developed to address the restrained and unrestrained differential protection of motors, generators and transformers. The revisions include detailed description of the functions including the performance specification, testing and documentation requirements.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
95/465/FDIS	95/471/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

This International Standard contains attached files in COMTRADE file format. Configuration file: IEC 60255-187-1_External_Internal_YY0_50 Hz_4 kHz.CFG and data file: IEC 60255-187-1_External_Internal_YY0_50 Hz_4 kHz.DAT. These files are intended to be used as a complement and do not form an integral part of the document.

A list of all parts in the IEC 60255 series, published under the general title *Measuring relays and protection equipment*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

MEASURING RELAYS AND PROTECTION EQUIPMENT –

Part 187-1: Functional requirements for differential protection – Restrained and unrestrained differential protection of motors, generators and transformers

1 Scope

This part of IEC 60255 specifies the minimum requirements for functional and performance evaluation of (longitudinal) differential protection designed for the detection of faults in ac motors, generators and transformers. This document also defines how to document and publish performance test results.

This document covers the differential protection function whose operating characteristic can be defined on a bias-differential plane. It includes specification of the protection function, measurement characteristics, compensation of energizing quantities, additional restraint or blocking methods (for overexcitation and magnetizing inrush), starting and time delay characteristics. This document also covers unrestrained differential protection functions traditionally combined with the restrained (biased) differential element to form a single differential relay.

This document defines the influencing factors that affect the accuracy under steady state conditions and performance characteristics during dynamic conditions. The test methodologies for verifying performance characteristics and accuracy are also included in this document.

This document also includes current transformer requirements for the protection functions.

The differential protection functions covered by this document are as follows:

	IEEE/ANSI C37.2 function numbers	**IEC 61850-7-4 logical nodes**
Transformer differential	87T	PDIF
Motor differential	87M	PDIF
Generator differential	87G	PDIF
Restricted earth fault (ground differential)	87N	PDIF
Inrush restraint or inrush blocking		PHAR
Overexcitation restraint or overexcitation blocking		PHAR

This document does not specify the functional description of additional features often associated with biased differential relays such as current transformer (CT) supervision (CTS), switch onto fault (SOTF) and detection of geo-magnetically induced currents (GIC).

This document does not cover differential relays designed for bus bar protection (including high impedance differential protection and low impedance differential protection) or line protection. Additionally, this document does not explicitly cover generator incomplete longitudinal differential protection, generator split-phase transverse differential protection, self-balancing or magnetic balanced protection scheme, differential protection of phase-shifting transformers, directional restricted earth fault protection, railway transformers, convertor transformers and reactors. However, the principles covered by this document can be extended to provide guidance on these applications.

The general requirements for measuring relays and protection equipment are defined in IEC 60255-1.

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.

IEC 60255-1, *Measuring relays and protection equipment – Part 1: Common requirements*

IEC 61850-8-1, *Communication networks and systems for power utility automation – Part 8-1: Specific communication service mapping (SCSM) – Mappings to MMS (ISO 9506-1 and ISO 9506-2) and to ISO/IEC 8802-3*

IEC 61869-2, *Instrument transformers – Part 2: Additional requirements for current transformers*

IEC 61869-9, *Instrument transformers – Part 9: Digital interface for instrument*