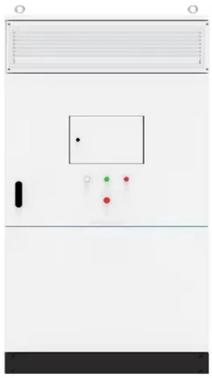
Technical Requirements for Measurement Relay Protection



Overview

This document covers the main technologies in use today; other emerging technologies present specific EMC and safety issues but the philosophy in this document will be applied.

Key Takeaways

Measurement and relay protection systems are designed to detect, isolate, and mitigate faults in electrical networks, adhering to international standards such as IEC 60255 for functional performance.

Key Components and Functions

Protection relays are devices that monitor electrical parameters and initiate circuit breaker operations to isolate faults. They integrate measurement, protection, and control functions, including overcurrent, earth fault, voltage, and directional protection, often following ANSI/IEEE standard functions. Modern relays also support fault recording, telemetry, automatic paralleling, and power quality monitoring.



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Measurement inputs typically include: Current analog inputs (50/60 Hz) from current transformers (CTs)Voltage analog inputs (50/60 Hz) from voltage transformers (VTs)Digital inputs for status monitoring and control signals Technical Ratings and StandardsProtection relays must comply with IEC 60255 series standards, which define functional requirements, testing methodologies, and performance metrics for measuring relays and protection functions. Key specifications include: Operating voltage: e.g., 24 V DC (range 15–35 V) with polarity protection Selectivity: Ensures only the closest circuit breaker to a fault trips, minimizing system-wide outages Sensitivity and stability: Relays must detect fault currents accurately while remaining stable under normal load conditions Speed: Fast operation is critical to prevent equipment damage and maintain system stability Reliability: High operational reliability is required for both primary and backup protection Communication and IntegrationModern relays support digital communication protocols such as IEC 61850, enabling integration with digital substations, Ethernet station buses, and GOOSE messaging for interlocking and automation.

This allows remote monitoring, control, and coordination across the network.

Applications

Protection and measurement relays are used in: Medium voltage distribution substations for automatic fault location and isolation High voltage transmission systems for distance, busbar, transformer, and generator protection Industrial and commercial power systems for motor, feeder, and system integrity protection BenefitsMinimized outage impact through selective tripping Enhanced safety for personnel and equipmentCompliance with international standards ensures interoperability and reliabilitySupport for smart grid and digital substation technologies In summary, technical specifications for measurement and relay protection encompass accurate current and voltage measurement, fast and selective fault detection, compliance with IEC 60255 standards, and integration with modern digital communication protocols, ensuring reliable and safe operation of electrical power systems.

Article Content

IEC 60255 1xx: Protection relay functional standards for all

The International Electrotechnical Commission (IEC) is currently working on a new series of standards that covers the functional requirements of measuring relays and related equipment used

EN IEC 60255-1:2023

These test requirements represent the electromagnetic compatibility immunity requirements and have been selected so as to ensure an adequate level of immunity for measuring

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IEC 60255-1:2022

This document covers the main technologies in use today; other emerging technologies present specific EMC and safety issues but the philosophy in this document will be applied. This second edition

IEC 60255-1:2022 Measuring relays and protection equipment

This standard specifies the common performance and safety criteria to ensure the reliability and consistency of measuring relays and protection equipment.

GB/T 14598.2-2025: Measuring relays and (PDF English)

The purpose is to specify measuring relays and protection devices and the General rules and requirements for power system protection schemes consisting of these devices such as control,

Measuring relays and protection equipment

Standardisation of measuring relays and protection equipment used in various fields of electrical engineering. The BEC (Belgian Electrotechnical Committee npo) is a neutral and independent

BS EN IEC 60255-26:2025 Measuring relays and protection

These test requirements represent the electromagnetic compatibility immunity requirements and have been selected so as to ensure an adequate level of immunity for measuring

IEEE Std C37.90 -2005, IEEE Standard for Relays and Relay Systems ...

This standard specifies standard service conditions, standard ratings, performance requirements, and testing requirements for relays and relay systems used to protect and control power apparatus.

IEC 60255-1 Ed. 2.0 b:2022

This document covers the main technologies in use today; other emerging technologies present specific EMC and safety issues but the philosophy in this document will be applied. This second edition

SIPROTEC Protection Relays | Siemens

Explore products From multiple engineering tools for protection to configuration software, power quality measurement solutions and protection

Water Cube Instrument Transformer Reference Case

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This project followed strict State Grid requirements and international substation equipment standards. DYH (Dalian No.1 Instrument Transformer Co., Ltd.), founded in 1972, supplied instrument ...

Power System Protective Relays: Principles & Practices

Abstract: Protective relays and devices have been developed over 100 years ago to provide “last line” of defense for the electrical systems. They are intended to quickly identify a fault and isolate it so the

A very inspiring day today at the Megger Power Protection ...

In particular, I presented IEC TS 60255-216-1:2025, published in August 2025: “Measuring relays and protection equipment – Part 216-1: Digital interface – General requirements and tests for ...

IEC 60255 1xx: Protection relay functional standards for all

IEC/IEEE 60255-118-1:2018, Synchrophasor for power systems - measurements IEC 60255-181:2019, Functional requirements for frequency protection Work on the following standards is

IEC 60255-1:2022

IEC 60255-1:2022 specifies common rules and requirements applicable to measuring relays and protection equipment, including any combination of equipment to form a distributed protection

(PDF) IEC 60255 1xx: Protection relay functional ...

The new protection relay functional standards are designated as the IEC 60255-1xx series. The standardisation of various test methodologies and measurement metrics promises benefits for

Protection Relay Testing and Commissioning

Digital and numerical protection relays use software for relay protection and measurement functions. This software must be properly tested to make sure that the protection relay follows all specifications

IEEE Power Systems Relays Standards Collection: VuSpecTM

IEEE Power Systems Relays Standards Collection: VuSpecTM This VuSpec includes 47 active IEEE standards, guides, recommended practices in the Power Systems Relays family. Power System

Related Video Reference

This video was associated with the source search result. Verify technical details against current product documentation and project requirements.

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This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

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