# **SIEMENS**



# **ENERGY AUTOMATION PRODUCTS**

# Line differential protection relay SIPROTEC 7SD87

#### siemens.com/7SD87

The SIPROTEC 7SD87 differential protection device is suitable for the selective protection of overhead lines and cables with singleended and multi-ended infeed of all lengths with up to 6 ends. Transformers and compensating coils in the protection range are also possible. With its modular structure, flexibility and the high-performance DIGSI 5 engineering tool, this device offers future-oriented solutions for protection, control, automation, monitoring and Power Quality – Basic.



### Vorteile

- Compact and cost-effective line differential protection
- Safety due to powerful protection functions
- Purposeful and easy handling of devices and software thanks to a user-friendly design
- Cybersecurity in accordance with NERC CIP and BDEW Whitepaper requirements
- Highest availability even under extreme environmental conditions by standard coating of the modules

# Highlights



Full compatibility between IEC 61850 Edition 1, 2.0, and 2.1



DIGSI 5 permits all functions to be configured and combined as required



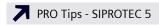
PQ – Basic: Voltage unbalance; voltage changes: overvoltage, dip, interruption; TDD, THD, and harmonics

### **Protection functions**

- Differential protection with adaptive algorithm for maximum sensitivity and stability even with the most different transformer errors, current-transformer saturation, and capacitive charging currents
- Negative-sequence system differential protection (ANSI 87LQ) for higher sensitivity for all unbalanced faults, such as phase-phase faults
- Ground current differential protection (ANSI 87LN) to be sensitiv even when a high balanced power flows
- Directional backup protection and various additional functions
- Ground-fault detection using the pulse detection method
- Detection of current-transformer saturation
- Fault locator plus for accurate fault location with in-homogenous line sections and targeted automatic overhead-line section reclosing (AREC)
- Arc protection
- Detection of current and voltage signals up to the 50th harmonic with high accuracy for selected protection functions (such as thermal overload protection) and operational measured values
- 1-pole automatic reclosing function with secondary arc detection (SAD)
- Point-on-wave switching
- Graphical logic editor to create high-performance automation functions in the device
- Single-line representation in the small or large display
- Time synchronization using IEEE 1588
- High-performance fault recording (buffer for a max. record time of 80 s at 8 kHz or 320 s at 2 kHz)
- Auxiliary functions for simple tests and commissioning

# **Applications**

- Line protection for all voltage levels with 1-pole and 3-pole tripping
- Phase-selective protection of overhead lines and cables with single-ended and multi-ended infeed of all lengths with up to 6 line ends
- Also used in switchgear with breaker-and-a-half layout
- Transformers and compensating coils in the protection zone
- Detection of ground faults in isolated or arcsuppression-coil ground power systems in star, ring, or meshed arrangement
- Phasor Measurement Unit (PMU)
- Detection and recording of power quality data in the medium-voltage and low-voltage power system



**▼** SIPROTEC 5 Configurator

Online Shop - Industry Mall

Main function	Differential protection Interoperability of SIPROTEC 4 and SIPROTEC 5 line protection devices
Tripping	1-pole and 3-pole, min. tripping time: 9ms
Inputs and outputs	12 predefined standard variants with 4/4 or 8/8 current/voltage transformers, 5 to 31 binary inputs, 8 to 46 binary outputs
Hardware flexibility	Flexibly adjustable I/O quantity structure within the scope of the SIPROTEC 5 modular system
Housing width	1/3 × 19 inches to 2/1 × 19 inches

# **Communication and cybersecurity functions**

- Fixed integrated electrical Ethernet RJ45 interface for DIGSI 5 and IEC 61850 (reporting and GOOSE)
- Up to 4 optional, pluggable communication modules, usable for different and redundant protocols
- Serial protection communication via optical fibers, two-wire connections, and communication networks (IEEE C37.94 and others), including automatic swit-chover between ring and chain topology
- Reliable data transmission via PRP and HSR redun-dancy protocols
- Extensive cybersecurity functionality, such as rolebased access control (RBAC), logging of securityrelated events, signed firmware, or authenticated IEEE 802.1X network access
- Simple, fast, and secure access to the device via a standard Web browser to display all information and diagnostic data, vector diagrams, single-line and de-vice display pages
- Serial protection communication with SIPROTEC 5 and SIPROTEC 4 devices over different distances and physical media, such as optical fiber, two-wire connections, and communication networks
- Protection interface via IP-based communication protocol supported

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