



ENERGY AUTOMATION PRODUCTS

Line differential protection relay **SIPROTEC 7SD87**

[siemens.com/7SD87](https://www.siemens.com/7SD87)

The SIPROTEC 7SD87 differential protection device is suitable for the selective protection of overhead lines and cables with single-ended 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 sensitive 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 arc-suppression-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

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 switchover between ring and chain topology
- Reliable data transmission via PRP and HSR redundancy protocols
- Extensive cybersecurity functionality, such as role-based access control (RBAC), logging of security-related 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 device 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

Siemens AG
Smart Infrastructure
Electrification & Automation
Mozartstrasse 31c,
91052 Erlangen, Germany


Siemens Industry Inc.
3617 Parkway Lane
Peachtree Corners, GA 30092
United States

© Siemens 2025

Subject to changes and errors. The information given in this document only contains general descriptions and/or performance features which may not always specifically reflect those described, or which may undergo modification in the course of further development of the products. The requested performance features are binding only when they are expressly agreed upon in the concluded contract. The following applies to all products that include IT security functions of OpenSSL: This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (www.openssl.org). This product includes cryptographic software written by Eric Young (eay@cryptsoft.com).

 PRO Tips - SIPROTEC 5

 SIPROTEC 5 Configurator

 Online Shop - Industry Mall