

# SIEMENS

Ingenuity for life

## SIPROTEC 7SD86

Combined line differential and distance protection

[www.siemens.com/siprotec](http://www.siemens.com/siprotec)

### Description

The SIPROTEC 7SD86 line differential protection has specifically been designed for the protection of lines. With its modular structure, flexibility and the powerful DIGSI 5 engineering tool, the SIPROTEC 7SD86 device offers future-oriented system solutions with high investment security and low operating costs.

Main function	Differential protection
Tripping	3-pole, minimum tripping time: 9 ms
Inputs and outputs	12 predefined standard variants with 4/4 or 8/8 current transformers/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 inch to 2/1 × 19 inch

### Applications

- Line protection for all voltage levels with 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



SIPROTEC 5 Device with Expansion Module

- Detection of ground faults in isolated or arc-suppression-coilground power systems in star, ring, or meshed arrangement
- Protection data communication over different distances and physical media, such as optical fiber, two-wire connections, and communication networks
- Phasor Measurement Unit (PMU)

### Functions

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

- Minimum tripping time: 9 ms
- 6 independent measuring loops (6-system distance protection)
- Several distance-protection functions can be selected: Classic, reactance method (RMD), impedance protection for transformers
- Directional backup protection and various additional functions
- Detection of ground faults of any type in

# Communicative and modular

compensated or isolated electrical power systems using the following functions: 3I0>, VO>, fleeting contact,  $\cos \phi$ ,  $\sin \phi$ , harmonic, dir.

- Detection of intermittent ground faults and admittance
- Ground fault detection using the pulse detection method
- Adaptive power-swing blocking, out-of-step protection
- Detection of current-transformer saturation for fast tripping with high accuracy
- Arc protection
- Automatic frequency relief for underfrequency load shedding, taking changed infeed conditions due to decentralized power generation into consideration
- Power protection, configurable as active or reactive power protection
- Directional reactive power undervoltage protection (QU 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
- 3-pole automatic reclosing function
- Control, synchrocheck and switchgear interlocking protection
- Graphical logic editor to create powerful automation functions in the device
- Single-line representation in small or large display
- Integrated electrical Ethernet RJ45 for DIGSI 5 and IEC 61850 (reporting and GOOSE)
- Up to 4 optional pluggable communication modules, usable for different and redundant protocols

(IEC 61850, IEC 60870-5-103, IEC 60870-5-104, Modbus TCP, DNP3 serial and TCP, PROFINET IO)

- Reliable data transmission via PRP and HSR redundancy protocols
- Extensive cyber security functionality, such as role-based access control (RBAC), protocolling security-related events or signed firmware
- Simple, quick and secure access to device data via a standard Web browser - without additional software
- Phasor measurement unit (PMU) for synchrophasor measured values and IEEE C37.118 protocol
- Time synchronization using IEEE 1588
- Powerful fault recording (buffer for a max. record time of 80 sec. at 8 kHz or 320 sec. at 2 kHz)
- Auxiliary functions for simple tests and commissioning
- Flexibly adjustable I/O quantity structure within the scope of the SIPROTEC 5 modular system

## Benefits

- Safety due to powerful protection functions
- Data security and transparency over the entire lifecycle of the plant, saving time and money
- Increased reliability and quality of the engineering process
- Cyber security in accordance with NERC CIP and BDEW Whitepaper requirements
- Highest availability even under extreme environmental conditions by "conformal coating" of electronic boards
- Full compatibility between IEC 61850 Editions 1 and 2
- High investment security and low operating costs due to future-oriented system solutions



## Siemens AG

Energy Management Division  
Freyeslebenstraße 1  
91058 Erlangen, Germany

SIPROTEC 7SD86 Profile E7.8.docx  
Printed in Germany | © 09.18 Siemens AG

E-Mail: [support.energy@siemens.com](mailto:support.energy@siemens.com)  
Tel: +49 180 524 70 00

For all products using security features of OpenSSL, the following shall apply:

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit ([www.openssl.org](http://www.openssl.org)), cryptographic software written by Eric Young ([eay@cryptsoft.com](mailto:eay@cryptsoft.com)) and software developed by Bodo Moeller.