

# SIEMENS

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## SIPROTEC 7SA82

Distance protection relay

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

### Description

The SIPROTEC 7SA82 distance protection has been designed particularly for the cost-optimized and compact protection of lines in medium-voltage and high-voltage systems. With its flexibility and the powerful DIGSI 5 engineering tool, the SIPROTEC 7SA82 device offers future-oriented system solutions with high investment security and low operating costs.

Main function	Distance protection for medium-voltage and high voltage applications
Tripping	3-pole, minimum tripping time: 19 ms
Inputs and outputs	4 current transformers, 4 voltage transformers (optional), 11 or 23 binary inputs, 9 or 16 binary outputs
Hardware flexibility	Different hardware quantity structures for binary inputs and outputs are available in the 1/3 base module. Adding 1/6 expansion modules is not possible; available with large or small display
Housing width	1/3 x 19"

### Applications

- Detection and selective 3-pole tripping of short circuits in electrical equipment of star networks, lines with infeed at one or two ends, parallel lines and open or closed ring systems of all voltage levels
- Detection of ground faults in isolated or arc-suppression-coil-ground power systems in star, ring, or meshed arrangement
- Backup protection for differential protection devices of all kind for lines, transformers, generators, motors, and busbars
- Phasor Measurement Unit (PMU)



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### Functions

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

- Minimum tripping time: 19 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 isolated or arc-suppression-coil-ground systems using the following functions:  $3I_0>$ ,  $V_0>$ , fleeting contact,  $\cos/\sin\phi$ , harmonic, dir. detection of intermittent ground faults and admittance
- Adaptive power-swing blocking

# Compact and reliable

- Ground fault detection using the pulse location method
- Detection of current-transformer saturation for fast tripping with high accuracy
- Arc protection
- Automatic frequency relief for load shedding in case of underfrequency, taking account of changed infeed conditions due to decentralized power generation
- Power protection, configurable as active or reactive power protection
- Reactive power-undervoltage protection (QU protection)
- Detection of current and voltage signals up to the 50<sup>th</sup> harmonic with high accuracy for selected protection functions (such as thermal overload protection) and operational measured values
- Ground fault detection using the pulse location method
- 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)
- 2 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)
- Serial protection data communication via optical fibers, two-wire connections and communication networks (IEEE C37.94, and others), including automatic switchover between ring and chain topology
- Redundancy protocols PRP and HSR
- Cyber security to NERC CIP and BDWE Whitepaper requirements
- 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 easy tests and commissioning

## Benefits

- Compact and low-cost distance protection
- Safety due to powerful protection functions
- Data security and transparency over the entire lifecycle of the plant save time and money
- Purposeful and simple operation of the devices and software thanks to a user-friendly design
- Increased reliability and quality of the engineering process
- High safety due to a consistent implementation of safety and security
- Powerful communication components ensure safe and effective solutions
- Full compatibility between IEC 61850 Editions 1 and 2
- High investment security and low operating costs due to future-oriented system solution



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SIPROTEC 7SA82 Profile E7.5.docx  
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This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit ([www.openssl.org](http://www.openssl.org)) and cryptographic software written by Eric Young ([eay@cryptsoft.com](mailto:eay@cryptsoft.com)).