SIEMENS

SIPROTEC 7SA86

Distance protection

Description

The SIPROTEC 7SA86 distance protection has been designed specifically for the protection of lines. With its modular structure, flexibility and the high-performance DIGSI 5 engineering tool, the SIPROTEC 7SA86 device offers future-oriented solutions for protection, control, automation, monitoring, and Power Quality – Basic.

Main function	Distance Protection Interoperability of SIPROTEC 4 and SIPROTEC 5 line protection devices
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 quantity structure	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

- Detection and selective 3-pole tripping of short circuits in electrical equipment of star networks, lines with infeed at one or 2 ends, parallel lines, and open-circuited or closed ring systems of all voltage levels

- Detection of ground faults in isolated or arc-suppression-coilground systems in star, ring, or meshed arrangement

- 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

- Backup protection for differential protection devices of all kind for lines, transformers, generators, motors, and busbars

- Phasor Measurement Unit (PMU)

SIPROTEC 5 Device with Expansion Module

- Detection and recording of power-quality data in the mediumvoltage and subordinate low-voltage power system

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 compensated or isolated electrical power systems using the following functions: 3I0>, V0>, transient ground fault, cos ϕ, sin ϕ, dir. detection of intermittent ground faults, harmonic detection, and admittance measurement

- 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

- Fault locator plus for accurate fault location with inhomogenous line sections and targeted automatic overhead line section reclosing (AREC)

- 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

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

- 3-pole automatic reclosing function

- Control, synchrocheck, and switchgear interlocking protection

- Graphical logic editor to create high-performance automation functions in the device

- Single-line representation in the small or large display

- 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 (IEC 61850-8-1, IEC 61850-9-2 Client, IEC 60870-5-103, IEC 60870-5-104, Modbus TCP, DNP3 serial and TCP, PROFINET IO, PROFINET IO S2 redundancy)

- Virtual network partitioning (IEEE 802.1Q - VLAN)

- Serial protection communication via optical fibers, two-wire connections, and communication networks (IEEE C37.94 and others), including automatic switchover between ring feeder 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

- Phasor Measurement Unit (PMU) for synchrophasor measured values and IEEE C37.118 protocol

- 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

- Flexibly adjustable I/O quantity structure within the scope of the SIPROTEC 5 modular system

Benefits

- 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

- Full compatibility between IEC 61850 Editions 1, 2.0, and 2.1