SIEMENS

SIPROTEC 7UT86

Transformer Differential Protection

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Description

The SIPROTEC 7UT86 transformer differential protection has been designed specifically for the protection of three-winding transformers (3 sides). It is the main protection for the transformer and contains many other protection and monitoring functions. The additional protection functions can also be used as backup protection for subsequent protected objects (such as cables, lines, shunt reactor). In this process, you are also supported by the modular expandability of the hardware. The device supports all SIPROTEC 5 system characteristics. With its modular structure, flexibility and the powerful DIGSI 5 engineering tool, SIPROTEC 7UT86 offers future-oriented solutions for protection, control, automation, monitoring and PQ basic.

SIPROTEC 7UT86 Transformer Differential Protection (1/2 device = standard variant P1)

Main function	1 differential protection function (standard) with additional stabilization; up to 3 ground fault differential protection functions. For auto transformer applications, two differential protection functions can be processed in an auto transformer function group. Interoperability of SIPROTEC 4 and SIPROTEC 5 line protection devices when using the line differential protection function in the 7UT85, 86, 87
Usable measuring points	7 x 3-phase current measuring points, 7 x 1-phase current measuring points, 7 x 3-phase and 7 x 1-phase voltage measuring points, expandable to 4 sides
Inputs and outputs	2 predefined standard variants with 12 current transformers, 4 voltage transformers, 11 to 23 binary inputs, 18 to 34 binary outputs
Hardware flexibility	Flexibly adjustable and expandable I/O quantity structure within the scope of the SIPROTEC 5 modular system
Housing width	1/2 × 19" - 2/1 × 19"

Applications

- Protection of special transformers (phase shifter, FACTS and converter transformers, arc furnace transformers, HVDC transformers)

- As backup protection for motor and generator differential protection applications

- For the protection of short cables and lines

- Voltage control for two- and three-winding transformers with parallel control

- As additional line protection function such as distance and line differential protection

Functions

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

- Transformer differential protection for three-winding transformers with versatile, additional protection functions; expandable to 4 sides

- Transformer differential protection for phase-angle regulating transformers of the single core type and special transformers

- Universal usability of the permissible measuring points

- Applicable from average up to extra high voltage

- Protection of standard power transformers, auto transformers, short lines, cables, shunt reactors and motors

- Typical properties of a transformer differential protection such as flexible adaptation to the transformer vector group, control of inrush and overexcitation processes, safe behavior in case of currenttransformer saturation with different degrees of saturation

Modular and flexible

- Adaptive adaptation of the operate curve to the transformer tap position

- Increased sensitivity with near-neutral-point ground faults through a separate restricted ground fault protection

- Point-on-wave switching

- Additional current and voltage inputs can be supplements for standard protection functions, such as overcurrent, voltage frequency, etc.

- Dynamic Voltage Control (DVC) to adapt the voltage target value via a power direction dependent characteristic curve with strong infeed of regenerative energies

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

- Arc protection

- Voltage controller function ANSI 90V for two-winding transformers, three-winding transformers and grid coupling transformers with parallel control (master/follower, circulating reactive current minimization)

- Up to 4 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 sharing (IEEE 802.1Q - VLAN)

- Reliable data transmission via PRP and HSR redundancy protocols

- Extensive cybersecurity functionality, such as role-based access control (RBAC), protocolling security-related events, signed firmware or authenticated network access IEEE 802.1X

- Simple, quick and secure access to the device via a standard Web browser to display all information and diagnostic data, as well as vector diagrams, single-line and device display pages

- Secure serial protection data communication, also over great distances and all available physical media (optical fiber, two-wire connections and communication networks)

- PQ-Basic: voltage unbalance; voltage changes: overvoltage, dip, interruption; TDD, THD and Harmonics

- Detection operational measured variables and protection function measured values for the evaluation of the systems, to support commissioning, and to analyze faults

- Frequency tracked protection functions over a wide frequency range (10 Hz to 90 Hz) and the option to assign the protection functions in a single device to different frequency tracking groups.

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

- 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

- Purposeful and easy handling of devices and software thanks to a user-friendly design

- Highest availability even under extreme environmental conditions by standard coating of the modules

- Cybersecurity in accordance with NERC CIP and BDEW Whitepaper requirements

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