Product Announcement

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SIPROTEC Compact 7SD80

Line differential protection for all star point grounding methods

Description

The line differential protection device 7SD80 of the SIPROTEC Compact Series is designed for selective line protection and is suitable for solid, low and high resistance as well as resonance earthed or isolated networks.

The implemented differential protection algorithms provide a high stability for external faults and have low CT requirements. Parameterization and testing of the differential protection is very easy.

If the 7SD80 has been selected with voltage measurement inputs (order option) it is possible to use the integrated overcurrent protection as directional protection (one inverse-time and two definite-time overcurrent).

Each of the overcurrent protection stages can be individually set as emergency- or backup-function.

This provides the possibility to integrate the 7SD80 relays via reverse interlocking into a simple bus bar protection scheme and even in case of a communication loss it is ensured that the line is still protected with directional overcurrent backup-function.

Special Features

- Binary input threshold adjustable with DIGSI (3 Stages)
- Nominal secondary CT value (1A/5A) adjustable with DIGSI
- USB-Port on the face plate
- Two different and independent differential protection algorithms for phase-phase-faults and phase–earth-faults
- Easy parameterization and verifiability of differential protection
- The primary CT nominal currents may differ by a factor of up to 4
- Low CT requirements
- Two integrated interfaces for exchanging differential protection data (fiber optic and/or twisted-pair copper wires)
- Integrated monitoring and supervision functions of protection data interface communication during commissioning and normal operation
- Integrated nondirectional and directional overcurrent protection.
  no voltage measurement inputs:
    – one nondirectional inverse-time overcurrent and
    – three nondirectional definite-time overcurrent stages
  with voltage measurement inputs:
    – one directional inverse-time overcurrent,
    – two directional definite-time overcurrent and
    – one nondirectional definite-time overcurrent stage
- Transmission of circuit-breaker tripping and up to 16 additional binary signals to the remote device

Function overview

Protection functions

- Line differential protection phase (87L)
- 3I0 line differential protection (87N L)
- Ground-fault differential protection for isolated/resonance-earthed networks (87Ns L)
- Definite/inverse time-overcurrent protection (50 TD, 50N TD, 51, 51N)
- Directional definite/inverse time-overcurrent protection (67, 67N)
- Breaker-failure protection (50BF)
- Trip-circuit supervision (74 TC)
- Lockout (86)
- CB intertripping function (85 DT)
- External trip initiation
- Under-/overvoltage protection (27/59)
- Under-/overfrequency protection (81 U/O)
- Automatic reclosure function (79)
- Flexible protection function for current, voltage, power, cos φ, frequency
- Overload protection (49)

Control functions/ programmable logic

- Control commands for CB, disconnect switches, earth switches
- Control via keyboard, binary inputs, DIGSI 4 or protocol interface
- User-defined PLC logic with CFC (e.g. interlocking)

Communication Interfaces

- System/service interface
    – IEC 61850
    – IEC 60870-5-103
    – Profibus DP
    – DNP 3.0
    – MODBUS RTU
    – DIGSI RS232/RS485
- USB front interface for DIGSI
- Protection Data Interface
    – FO (up to 24 km)
    – Copper Wires (up to 20km)

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Order-information MLFB

Line Differential Protection 7SD80											
MLFB-position:	6	7 – 8	9	10	11	12 –	13	14	15	16	
Order-No.: 7SD80	I I I	I I I I I I	I I	F I I I –	L 0 I						

Housing 1/6 19'', Measurement Inputs, BI/BO, Protection Data Interface — 6

4 x I, 3 BI, 5 BO (2 Form C/ 2 changeover cnts.), 1 live-status contact, Protection Data Interface FO for mono- (24km) and multimode (4km), LC-Duplex connector	1
4 x I, 7 BI, 8 BO (2 Form C/ 2 changeover cnts.), 1 live-status contact, Protection Data Interface FO for mono- (24km) and multimode (4km), LC-Duplex connector	2
4 x I, 5 BI, 8 BO (2 Form C/ 2 changeover cnts.), 1 live-status contact, Protection Data Interface, 2 wires copper, twisted	3
4 x I, 3 x V, 3 BI, 5 BO (2 Form C/ 2 changeover cnts.), 1 live-status contact, Protection Data Interface FO for mono- (24km) and multimode (4km), LC-Duplex connector	5
4 x I, 3 x V, 7 BI, 8 BO (2 Form C/ 2 changeover cnts.), 1 live-status contact, Protection Data Interface FO for mono- (24km) and multimode (4km), LC-Duplex connector	6
4 x I, 3 x V, 5 BI, 8 BO (2 Form C/ 2 changeover cnts.), 1 live-status contact, Protection Data Interface, 2 wires copper, twisted	7

Current Inputs, default setting (Bold), 4th current Input — 7

Iph = **1A** / 5A, Ie =**1A** / 5A	1
Iph = **1A** / 5A, Ies (sensitive) = **0,001 to 1,6A** / 0,005 to 8A	2

Rated auxiliary voltage — 8

DC 24V / 48V	1
DC 60V / 110V / 125V / 220V / 250V, AC 115 V, AC 230 V	5

Unit Version — 9

Surface mounting housing, screw-type terminals	B
Flush mounting housing, screw-type terminals	E

Region specific default- and language settings — 10

Region DE, IEC, language German (changeable), standard face plate	A
Region World, IEC/ANSI, language English (changeable), standard face plate	B
Region US, ANSI, language US - English (changeable), US face plate	C

Port B (bottom of the device) — 11

Without / No further port	0			
IEC60870-5-103 or DIGSI4/modem or Time Sync Port, electrical RS232	1			
IEC60870-5-103 or DIGSI4/modem or Time Sync Port, electrical R485	2			
IEC60870-5-103 or DIGSI4/modem, optical 820nm, ST connector	3			
Profibus DP Slave, electrical RS485	9	L	0	A
Profibus DP Slave, optical, double ring, ST connector	9	L	0	B
Modbus, electrical RS485	9	L	0	D
Modbus, optical 820nm, ST connector	9	L	0	E
DNP 3.0, electrical RS485	9	L	0	G
DNP 3.0, optical 820nm, ST connector	9	L	0	H
IEC 60870-5-103, redundant, electrical RS485, RJ45 connector	9	L	0	P
IEC61850, 100Mbit Ethernet, 2 electrical ports, RJ45 connector	9	L	0	R
IEC61850, 100Mbit Ethernet, 2 optical ports, LC-duplex- connector	9	L	0	S

Additional communication interfaces at port A (bottom of the device) — 12

none [1]	0
Redundant FO Protection Data Interface to the 2 wire copper interface Protection Data Interface FO for mono- (24km) and multimode cable (4km), LC-Duplex connector [2]	7

Functionality — 13 14 15 16

MLFB - Code 13, 14, 15, 16 for functional options:	Function-packages

[1] The FO interface is equipped if MLFB position 6 = 1, 2, 5 or 6
[2] Only possible it MLFB position 6= 3 or 7

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Line differential protection 7SD80												
MLFB-position:		6	7	- 8	9	10	11	12	- 13	14	15	16
Order-No.:	7SD80									F		

Measurement/ Fault Recorder	12
with fault recorder	1
with fault recorder and average values min/max values	3

Protection functions — 15

ANSI-No.	Basic function:	
87L, 87N L	Line differential protection (phase comparison and 3I0 differential protection[1])	
	Inrush-current detection	
50TD, 51	Definite/Inverse time-overcurrent protection phase I>, I>>, I>>>, I_P	
50N TD, 51N	Definite/Inverse time-overcurrent protection ground $I_E>$, $I_E>>$, $I_E>>>$, I_{EP}	
49	Overload protection	
74 TC	Trip-circuit supervision	
50 BF	Circuit-breaker failure protection	
86	Lockout	A
85 DT	Circuit-breaker intertripping function (trip of the remote circuit breaker)	
	External trip initiation	
	Parameter changeover (parameter group change)	
	Monitoring and supervision function	
	Circuit-breaker test	
	Control of circuit breaker	
	Flexible protection function with current, voltage [2], power [2], cos φ [2], frequency [2]	
27/59	Under-/Overvoltage protection U<, U> [2]	
81O7U	Under-/Overfrequency protection f<, f> [2]	
	Basic function + **directional time-overcurrent protection** [3]	
67	Directional definite/inverse time-overcurrent protection phase ∠ (V, I) I>, I>>, I_P	B
67N	Directional definite/inverse time-overcurrent protection ground ∠ (V, I) $I_E>$, $I_E>>$, I_{EP}	
	Basic function + **ground-fault differential protection for isolated/resonance-earthed networks** [3,4]	
87Ns L	Ground-fault differential protection for isolated/resonance-earthed networks	C
	Basic function + **directional time-overcurrent protection +** **ground-fault differential protection for isolated/resonance-earthed networks** [3,4]	
67	Directional definite/inverse time-overcurrent protection phase ∠ (V, I) I>, I>>, I_P	
67N	Directional definite/inverse time-overcurrent protection ground ∠ (V, I) $I_E>$, $I_E>>$, I_{EP}	E
87Ns L	Ground-fault differential protection for isolated/resonance-earthed networks	

	Additional functions	16
	without	0
	Transmission of 16 binary signals via the Protection Data Interface	1
79	automatic reclosure function (AR)	2
79	Transmission of 16 binary signals via the Protection Data Interface and automatic reclosure function (AR)	5

[1] MLFB position 7 = 1 required (Iph = 1A / 5A, Ie =1A / 5A)
[2] Function available if MLFB position 6 = 5, 6 or 7 (voltage transformer inputs)
[3] MLFB position 6 = 5, 6 oder 7 required (voltage transformer inputs)
[4] MLFB position 7 = 2 required (Iph = 1A / 5A, Iee (sensitive) = 0,001 to 1,6A / 0,005 to 8A)

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