

## SIPROTEC 4 7SD61 Differential Protection Relay for Two Line Ends

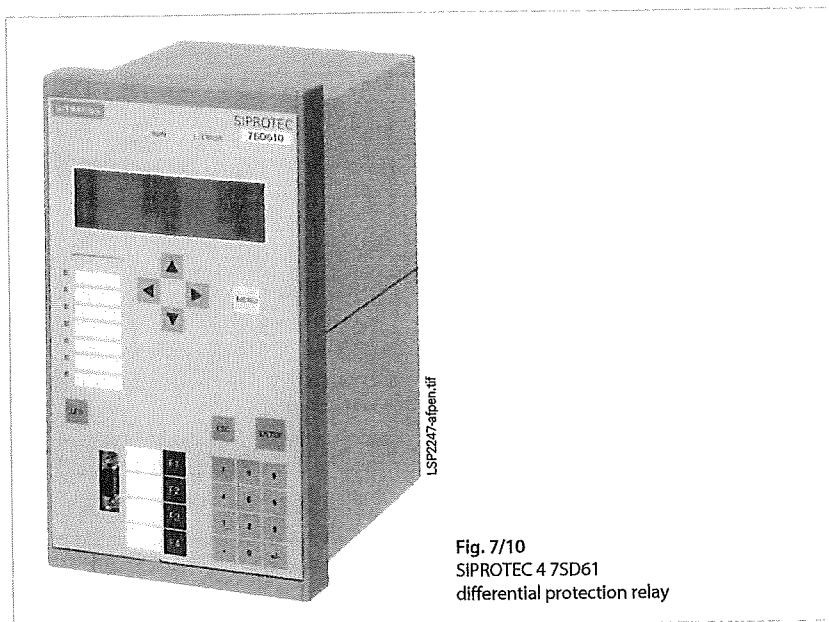


Fig. 7/10  
SIPROTEC 4 7SD61  
differential protection relay

### Description

The 7SD61 relay is a differential protection relay suitable for all types of applications and incorporating all those functions required for differential protection of lines, cables, transformers and busbars. Transformers and compensation coils within the differential protection zone are protected by means of integrated functions, which were previously to be found only in transformer differential protection. It is also well-suited for complex applications such as series and parallel compensation of lines and cables.

It is designed to provide protection for all voltage levels and types of networks; two line ends may lie within the protection zone. The relay features very high-speed and phase-selective short-circuit measurement. The unit is thus suitable for single-phase and three-phase fault clearance.

Digital data communication for differential current measurement is effected via fiber-optic cables, networks, pilot wires or ISDN connections, so that the line ends can be quite far apart. The serial protection data interface of the relay can flexibly be adapted to the requirements of all existing communication media. If the communication method is changed, flexible retrofitting of communication modules to the existing configuration is possible. Thanks to special product characteristics, the relay is particularly suitable for use in conjunction with digital communication networks. The units measure the delay time in the communication network and adaptively match their measurements accordingly. The units can be operated through pilot wires or twisted telephone pairs at typical distances of 15 km by means of a special converter.

### Function overview

#### Application

- Differential protection for universal use with power lines and cables on all voltage levels (87L)
- Two line ends capability
- Suitable for transformers in protected zones (87T)
- Well-suited for serial compensated lines

#### Protection functions

- Differential protection with phase-segregated measurement
- Sensitive measuring stage for high-resistance faults
- Phase overcurrent protection (50, 50N, 51, 51N)
- Phase-selective intertripping (85)
- Overload protection (49)
- Auto-reclosure single/three-pole (79)

#### Control functions

- Command and inputs for ctrl. of CB and disconnectors (isolators)

#### Monitoring functions

- Self-supervision of the relay
- Trip circuit supervision (74TC)
- 8 oscillographic fault records
- CT-secondary current supervision
- Event logging / fault logging
- Switching statistics

#### Front design

- User-friendly local operation
- PC front port for convenient relay setting
- Function keys and 8 LEDs f. local alarm

#### Communication interfaces

- 1 serial protection data interface
- System interface
  - IEC 60870-5-103 protocol
  - PROFIBUS-DP and DNP 3.0
- Service / modem interface (rear)
- Time synchronization via IRIG-B, DCF77 or system interface

#### Features

- Browser-based commissioning tool
- Tripping time 15 ms
- Direct connection to digital communication networks

## Selection and ordering data

Description	Order No.	Order code
7SD61 differential protection relay for two line ends with 4-line display, housing width 1/3", 7 LEDs	7SD610□-□□□□□-□□□□ □□□	
Measurement input		see next page
$I_{\text{phase}} = 1 \text{ A}^{1)}$ , $I_{\text{E}} = 1 \text{ A}$ (min. = 0.05 A)	1	
$I_{\text{phase}} = 5 \text{ A}^{1)}$ , $I_{\text{E}} = 5 \text{ A}$ (min. = 0.25 A)	5	
Rated auxiliary voltage (converters, binary inputs)		
24, 48 V DC, binary input threshold 17 V <sup>3)</sup>	2	
60, 125 V DC <sup>2)</sup> , binary input threshold 17 V <sup>3)</sup>	4	
110, 250 V DC <sup>2)</sup> , 115 V AC, binary input threshold 73 V <sup>3)</sup>	5	
Unit design/number of binary inputs and outputs		
For panel flush mounting, screw-type terminals 1/3 x 19"/7 BI, 6 BO	B	
For panel surface mounting, 2-tier terminals, 1/3 x 19"/7 BI, 6 BO	F	
For panel flush mounting, plug-in terminals, 1/3 x 19"/7 BI, 6 BO	K	
Region-specific default settings / language settings		
Region DE, language: German (selectable)	A	
Region World, language: English (GB) (selectable)	B	
Region US, language: English (USA) (selectable)	C	
Region FR, language: French (selectable) <sup>4)</sup>	D	
Region World, language: Spanish (selectable) <sup>4)</sup>	E	
System interfaces; functions and hardware		
No system interface	0	
IEC 60870-5-103 protocol, electrical RS232	1	
IEC 60870-5-103 protocol, electrical RS485	2	
IEC 60870-5-103 protocol, optical 820 nm, ST connector	3	
PROFIBUS-DP Slave, electrical RS485	9	L O A
PROFIBUS-DP Slave, 820 nm optical, double ring, ST connector <sup>2)</sup>	9	L O B
DNP 3.0, electrical RS485	9	L O G
DNP 3.0, 820 nm optical, ST connector <sup>2)</sup>	9	L O H
DIGSI/modem interface rear of unit and protection data interface	9	M □ □
DIGSI / modem interface (rear side of unit)		
DIGSI 4, electrical RS232	1	
DIGSI 4, electrical RS485	2	
Protection data interface		
Optical 820 nm, 2 ST connectors, FO length up to 1.5 km for direct connection or via communication networks	A	
Optical 820 nm, 2 ST connectors, FO length up to 3.5 km for direct connection via multi-mode fiber	B	
Optical 1300 nm, 2 ST connectors, FO length up to 10 km for direct connection via mono-mode fiber	C	
Optical 1300 nm, 2 FC connectors, FO length up to 35 km for direct connection via mono-mode fiber	D	
New FO options <sup>5)</sup>		
Optical 1300 nm, LC-Duplex connector, FO cable length up to 25 km <sup>6)</sup> for direct connection via mono-mode FO cable	G	
Optical 1300 nm, LC-Duplex connector, FO cable length up to 60 km <sup>6)</sup> for direct connection via mono-mode FO cable	H	
Optical 1550 nm, LC-Duplex connector, FO cable length up to 100 km <sup>6)</sup> for direct connection via mono-mode FO cable	J	

1) Rated current can be selected by means of jumpers.

2) Transition between the two auxiliary voltage ranges can be selected by means of jumpers.

3) The binary input thresholds can be selected in two stages by means of jumpers.

4) On request.

5) Available with next firmware version.

6) For surface-mounting housing applications, please select option A (820 nm, 1.5 km) together with an external repeater (see "Accessories" for Order No.).

## Selection and ordering data

## Description

7SD61 differential protection relay for two line ends  
with 4-line display, housing width 1/3", 7 LEDs

## Order No.

7SD610□-□□□□-□□□□

## Functions 1

Tripping only 3-pole, without auto-reclosure

0

Tripping only 3-pole, with auto-reclosure

1

Tripping 1 and 3-pole, without auto-reclosure

2

Tripping 1 and 3-pole, with auto-reclosure

3

## Backup protection function

With emergency/backup overcurrent-time protection

B

With emergency/backup overcurrent-time protection, with breaker failure protection

C

## Additional functions 1

Without additional functions

A

With transformer extensions (transformer in protection zone)

E

With 4 remote commands

J

With 4 remote commands/transformer extensions (transformer in protection zone)

N

## Additional functions 2

Without additional functions

0

With external GPS synchronization of the differential protection

1

## Accessories

Description	Order No.
<i>Opto-electric communication converter (connection to communication network)</i> Converter to interface to X21 or G703.1 or RS422 synchronous communication interfaces. Connection via FO cable for 62.5 / 125 µm or 50 / 120 µm and 820 nm wavelength (multi-mode FO cable) with ST connector, max. distance 1.5 km Electrical connection via X21/RS422 or G703.1 interface	7XV5662-0AA00
<i>Opto-electric communication converter (connection to pilot wire)</i> Converter to interface to a pilot wire or twisted telephone pair (typical 15 km length) Connection via FO cable for 62.5/125 µm or 50 / 120 µm and 820 nm wavelength (multi-mode FO cable) with ST connector; max. distance 1.5 km, screw-type terminals to pilot wire	7XV5662-0AC00
<i>Opto-electric communication converter (ISDN connection)</i> Converter to interface to an ISDN telephone line. Connection via FO cable for 62.5/125 µm or 50 / 120 µm and 820 nm wavelength (multi-mode FO cable) with ST connector, max. distance 1.5 km	7XV5662-0AB00
<i>Additional interface modules</i> Protection data interface mod. opt. 820 nm, multi-mode FO cable, ST connector, 1.5 km Protection data interface mod. opt. 820 nm, multi-mode FO cable, ST connector, 3.5 km Protection data interface mod. opt. 1300 nm, mono-mode FO cable, ST connector, 10 km Protection data interface mod. opt. 1300 nm, mono-mode FO cable, FC connector, 35 km	C53207-A351-D651-1 C53207-A351-D652-1 C53207-A351-D653-1 C53207-A351-D654-1
<i>New modules<sup>1)</sup></i> Protection data interface mod. opt. 1300 nm, mono-mode FO cable, LC-Duplex connector, 25 km Protection data interface mod. opt. 1300 nm, mono-mode FO cable, LC-Duplex connector, 60 km Protection data interface mod. opt. 1550 nm, mono-mode FO cable, LC-Duplex connector, 100 km	C53207-A322-B115-3 C53207-A322-B116-3 C53207-A322-B117-3
<i>New optical repeaters<sup>2)</sup></i> Serial repeater (2-channel), opt. 1300 nm, mono-mode FO cable, LC-Duplex connector, 25 km Serial repeater (2-channel), opt. 1300 nm, mono-mode FO cable, LC-Duplex connector, 60 km Serial repeater (2-channel), opt. 1550 nm, mono-mode FO cable, LC-Duplex connector, 100 km	7XV5461-0BG00 7XV5461-0BH00 7XV5461-0BJ00
<i>Time synchronizing unit with GPS output</i> GPS 1 sec pulse and time telegram IRIG B/DCF 77	7XV5664-0AA00
<i>Isolation transformer (20 kV) for pilot wire communication</i>	7XR9516
<i>Voltage transformer miniature circuit-breaker</i> Rated current 1.6 A; thermal overload release 1.6 A; overcurrent trip 6 A	3RV1611-1AG14

1) Available approx. 10/2004.

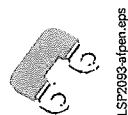
2) Available approx. 6/2004.

## Accessories

Description	Order No.
<b>DIGSI 4</b> Software for configuration and operation of Siemens protection units running under MS Windows (version Windows 95 and higher) device templates, Comtrade Viewer, electronic manual included as well as "Getting started" manual on paper, connecting cables (copper)	
<b>Basis</b> Full version with license for 10 computers, on CD-ROM (authorization by serial number)	7XS5400-0AA00
<b>Demo</b> Demo version on CD-ROM	7XS5401-0AA00
<b>Professional</b> Complete version: DIGSI 4 Basis and additionally SIGRA (fault record analysis), CFC Editor (logic editor), Display Editor (editor for default and control displays) and DIGSI 4 Remote (remote operation)	7XS5402-0AA00
<b>SIGRA</b> (generally contained in DIGSI Professional, but can be ordered additionally) Software for graphic visualization, analysis and evaluation of fault records. Can also be used for fault records of devices of other manufacturers (Comtrade format). Running under MS Windows 95/98/ME/NT/2000/XP Professional. Incl. templates, electronic manual with license for 10 PCs. Authorization by serial number. On CD-ROM.	7XS5410-0AA00
<b>Connecting cable</b> Cable between PC/notebook (9-pin connector) and protection unit (9-pin connector) (contained in DIGSI 4, but can be ordered additionally)	7XV5100-4
<b>Manual for 7SD61</b> English	C53000-G1176-C145-1



Fig. 7/32 Mounting rail for 19" rack

Fig. 7/33  
2-pin connectorFig. 7/34  
3-pin connectorFig. 7/35  
Short-circuit link  
for current contactsFig. 7/36  
Short-circuit link  
for voltage contacts/  
indications contacts

Description	Order No.	Size of package	Supplier	Fig.
Connector	2-pin	1	Siemens	7/33
	3-pin	1	Siemens	7/34
Crimp connector	CI2 0.5 to 1 mm <sup>2</sup>	4000	AMP <sup>1)</sup>	
		1	AMP <sup>1)</sup>	
	CI2 1 to 2.5 mm <sup>2</sup>	4000	AMP <sup>1)</sup>	
		1	AMP <sup>1)</sup>	
Crimping tool	Type III+ 0.75 to 1.5 mm <sup>2</sup>	4000	AMP <sup>1)</sup>	
		1	AMP <sup>1)</sup>	
	For Type III+ and matching female	1	AMP <sup>1)</sup>	
	For CI2 and matching female	1	AMP <sup>1)</sup>	
19" mounting rail	C73165-A63-D200-1	1	Siemens	7/32
Short-circuit links	For current terminals	1	Siemens	7/35
	For other terminals	1	Siemens	7/36
Safety cover for terminals	Large	1	Siemens	
	Small	1	Siemens	

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