

7SD511/512 Current comparison protection relay (Version V3) for overhead lines and cables

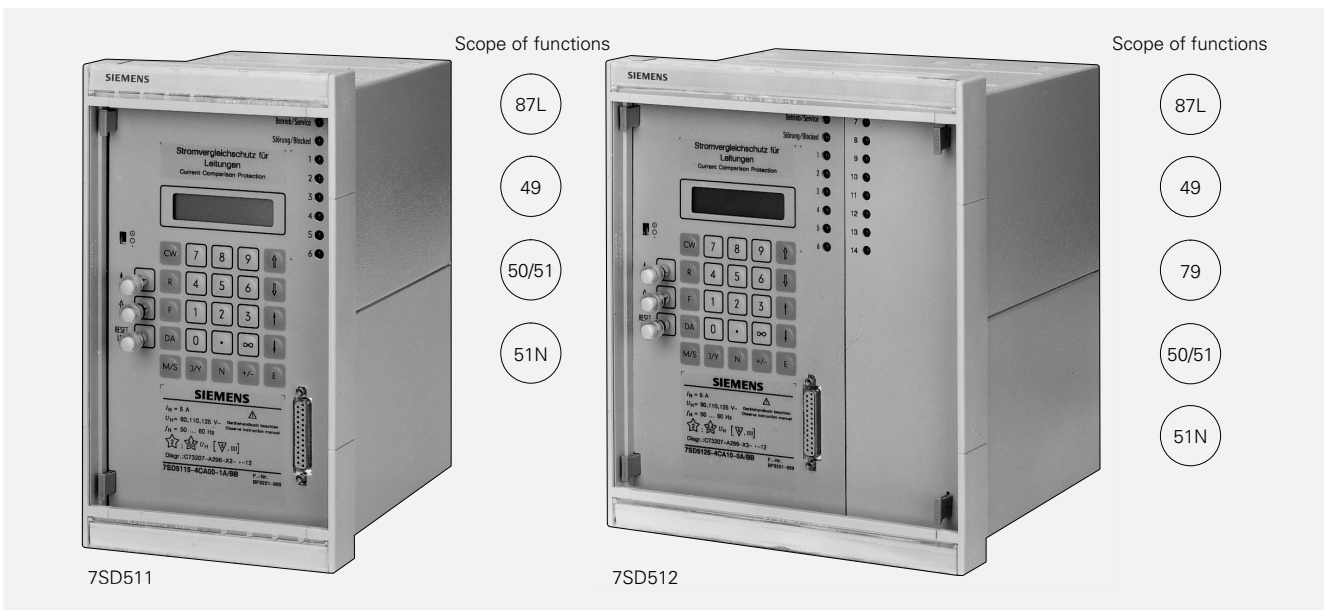


Fig. 1
7SD51 current comparison protection

Application

The 7SD511/512 current comparison protection units are for fast and selective short-circuit protection of cables and overhead lines of all voltage levels. The combination of dynamic and steady-state measurement makes the current comparison protection sensitive to internal high-resistant faults and extremely stable during short-circuit through currents. Neither the treatment of the network neutrals nor the load current has an influence on the short-circuit sensitivity. The digital transmission of protection data normally occurs via fibre optics. The integrated optical interfaces facilitate a direct connection up to 30 km. In addition an isolated V.24 interface (RS 232C) permits the connection to a powerful optoamplifier or a PCM transmission unit. The protection also includes an integrated thermal replica for monitoring the current-induced heat losses and the data transmission and an emergency overcurrent protection. In addition the 7SD512 has an automatic-reclosure function. The devices can interface with conventional switchgear systems or alternatively be integrated in the modern substation control system SINAUT LSA.

Construction

The units are of compact design and include all components for the measured value formation and evaluation, operator panel and display field, alarm and trip outputs, binary input option, serial interfaces and auxiliary voltage DC/DC converter.

The device can be supplied in three case variations. The model for panel surface mounting is supplied with two-tier terminals accessible from the front. The variants for panel flush mounting or cubicle mounting have rear connection terminals and are available with or without glass cover.

Mode of operation

The 7SD51 current comparison protection units have fully digital measurement processing from the scanning and digitisation of measured values to the trip decisions for the circuit-breakers.

Digital measurement methods largely suppress the influence of high-frequency transients, transient DC components, and differing current transformer saturation levels.

Features

- Selective short-circuit protection for cables and overhead lines
- Overload protection with thermal characteristic
- Digital transmission of protection data via fibre optics or serial based communication networks
- Circuit-breaker intertripping and remote trip signal transfer. Four remote signals
- Marshallable binary inputs. LEDs alarm and trip relays
- Operational current measurement of local and remote CT's current
- Up to eight fault records
- Commissioning aids
- Monitoring the protection data transmission. Measuring of delay-time and automatic correction of delay-time available.
- Emergency overcurrent-time protection in case of loss of the data transmission.
- Integrated single and three-pole auto-reclose function for 7SD512
- Substation control interface (Siemens specific) or according IEC 60870-5-103 interface (standard of the Association of German Power Utilities) to substation control system.

Differential Relays

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Serial interfaces

The unit includes three serial interfaces. The operator interface at the front is suitable for connection of a personal computer with WINDOWS capability. An operator program DIGSI is available for convenient and clear relay setting, analysis of fault recordings and event recordings as well as for commissioning.

The substation control interface is available as an 820 nm fibre optic interface for connection to either the substation control system or to a central protection data unit (protocol either acc. to Siemens specifications or – as an option – acc. to IEC 60870-5-103).

The interface to the remote line end is designed as a fibre optic interface for the high security transmission of information via fibre optic cable (protocol according to DIN 19 244 with Hamming distance $d = 4$). As integrated optic transmitter a 820 nm or 1300 nm interface is available. Optionally, an isolated V.24 interface (RS 232C) permits connection to a powerful optoelectric converter or PCM transmission units with 14.4/19.2 kbaud asynchronous data inputs and outputs.

Settings

All setting parameters can be input via the integrated operator panel and display field or via a PC under user control. The parameters are written into non-volatile memories so that the settings are secure even during interruption of the supply voltage.

Self monitoring

Hardware and software are continuously monitored and any irregularities are immediately detected and alarmed. Thus, the security, reliability and availability are significantly improved.

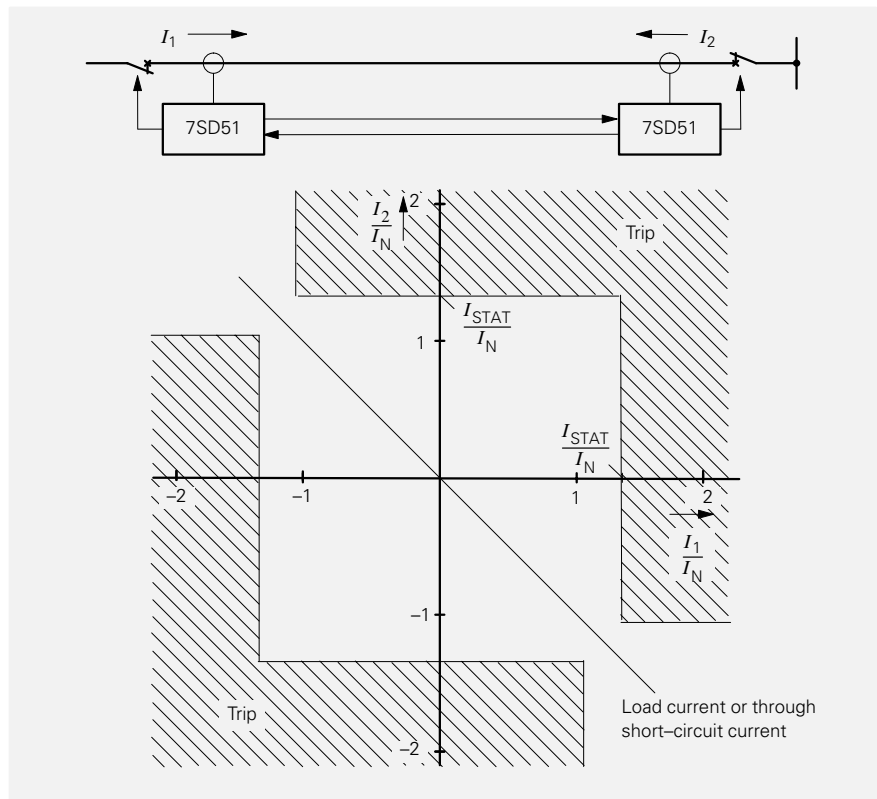


Fig. 2 Steady-state tripping characteristic

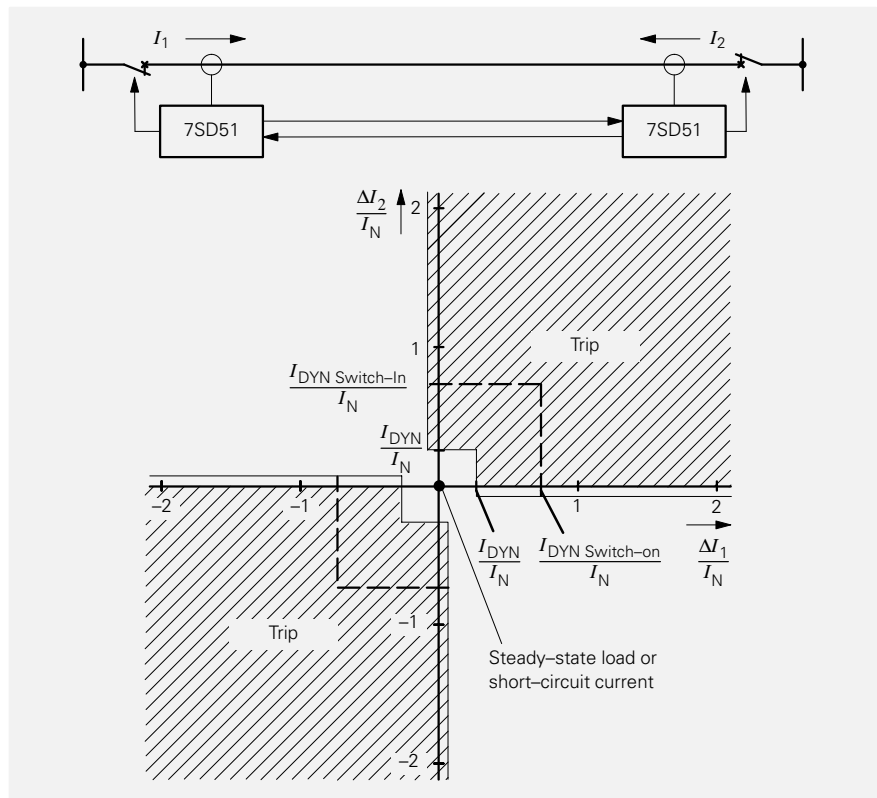


Fig. 3 Dynamic tripping characteristic

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Current comparison protection for cables and overhead lines

The 7SD511/512 current comparison protection units have the following features:

- Measurements are performed separately for each phase; thus, the trip sensitivity is independent of the type of fault
- Dynamic measurement method with high sensitivity below rated current enables the recognition and disconnection of high-ohmic short-circuits even with large through load currents (as per Fig. 3).
- Steady-state measurement method with tripping characteristic (as per Fig. 2).
- When the line is switched in, the dynamic tripping characteristic can be rendered less sensitive for four cycles via a setting value $I_{\text{DYN SWITCH-IN}}$ (as per Fig. 3).
- Insensitive to DC current components and transformation errors of current transformers
- Insensitive to high-frequency transient events
- High stability during external faults even with different current transformer saturation levels.

Digital transmission of protection data to the remote line end via fibre optics

The data required for the current comparison principle are cyclically exchanged in duplex mode in the form of frames between the protection units. The frames are secured with a hamming distance sufficient for fibre transmission and communication networks.

The data transfer has the following advantages:

- Insensitive to electromagnetic interference
- Extra isolation not required (isolating transformers as required for transmission of analog protection data are not necessary)
- Supervision of the entire transmission path between the protection units without additional equipment.
- Especially for communication-network-applications the automatic delay measurement and the correction of this delay in the differential-trip decision is included in the relay.

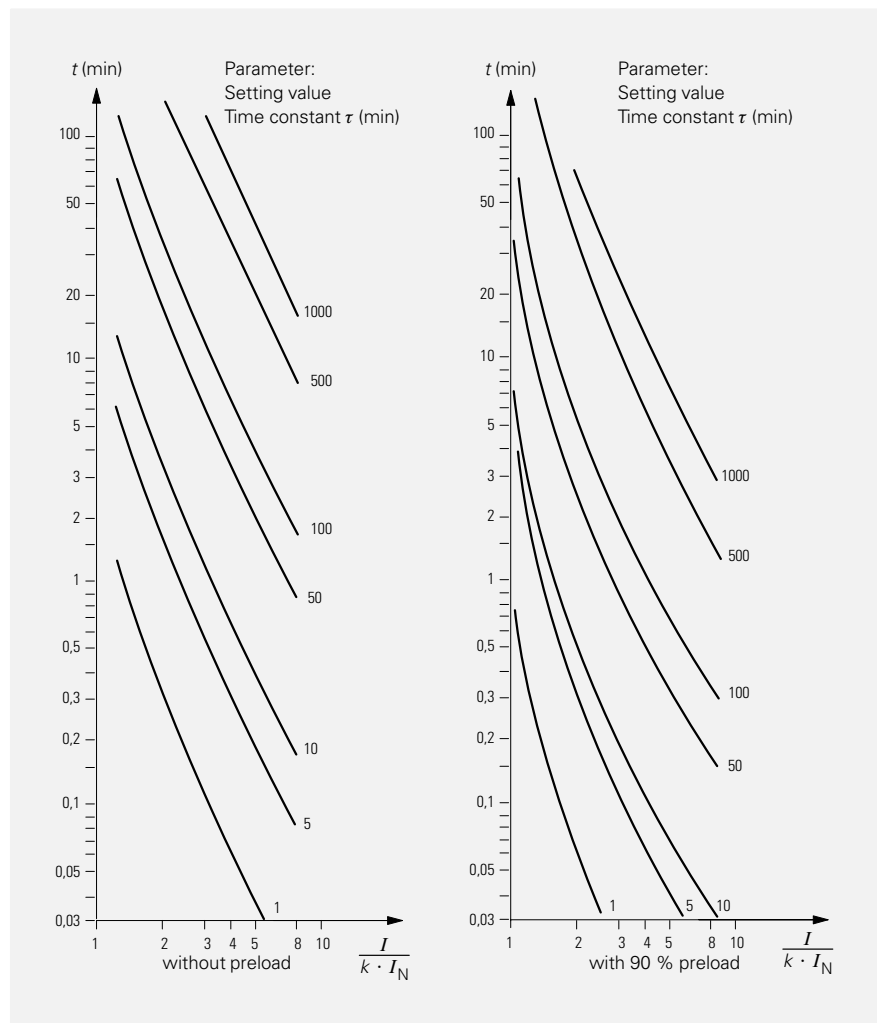


Fig. 4 Trip time characteristics of the overload protection function

Circuit-breaker intertripping and remote trip signal transfer

If weak input conditions at the opposite line end are present, then that circuit-breaker can be disconnected via the same protection data transfer channel. A remote trip signal can also be transferred to the remote line end from, for example, a circuit-breaker back-up protection or a transformer differential protection via a binary input.

In addition up to four binary input events are signalled at the remote with closed/open contacts.

Thermal overload protection

A built-in overload protection with an alarm stage is provided for the thermal protection of cables.

The trip time characteristics (Fig. 4) are exponential functions according to IEC 60255-8 and consider the current-initiated heat losses from the operational currents as well as the simultaneous cooling effect of the coolant. The preload is thus considered in the trip times for overloads.

An adjustable alarm stage can initiate an alarm before tripping is initiated.

Overcurrent–time protection as emergency function

Immediately after loss of data transmission to the remote line end both relays can work as overcurrent–time protection relays, alternatively in definite–time or inverse time overcurrent protection mode. Both the definite–time and the inverse time overcurrent protection modes have two levels of operation, i. e. apart from the overcurrent level ($I>$) a high–set element ($I>>$) is also provided. In both, the definite–time and the inverse time overcurrent protection modes, the high–set element has a definite–time overcurrent characteristic. As soon as the data transmission works again the current comparison protection is automatically switched on.

Auto–reclose function

The relay 7SD512 has an auto–reclose (AR) facility. The range of functions include:

- Three–pole AR for all fault types
- Single–pole AR for single–phase faults, no reclose for multi–phase faults
- Single–pole AR for single–phase faults and three–pole AR for multi–phase faults
- Multi–shot AR
- Integration with external AR equipment with communication via binary (contact) inputs and outputs
- Control by an external protection scheme.

Fault recording

The digital measured values for the phase and earth currents are stored before fault inception and after fault inception. This data can be transferred either to the coordinated substation control system SINAUT LSA or to a PC for analysis. If the IEC 60870–5–103 standard interface is used, up to 8 fault recordings can be stored. The data memory is organized as a circular buffer with a maximum length of 5 s (at $f_N = 50$ Hz). The oldest fault recordings are overwritten by the most recent. A fault recording can also be started via a binary input or, as an aid to commissioning, via the integrated operator panel or PC. The recording duration can then be parameterized.

Indications

The 7SD511/512 units provide detailed data for the analysis of faults and checking states during operation. The following indication memories are backed up against power failure.

- Fault indications
The last three fault logs can be called. If a fault occurs again, the oldest fault is overwritten.
- Operational indications
All indications and states that occur are stored in the circular buffer. Moreover there is an operational analog value display. This is an LC display on which any two operational analog values can be displayed.

Marshalling of command and alarm/event relays, LEDs and binary inputs

All input/output relays and indicating LEDs may be functionally allocated according to the user's requirements.

Commissioning

Due to the digital signal transmission to the remote line end, commissioning effort is reduced by measurement and indication of:

- Load currents of the local and remote station
- Transfer time of signals from one station to the other (delay time measurement)
- Phase sequence of the local station
- Phase allocation of the conductors between the stations
- Test mode, that can be activated by a binary input signal. This mode allows the testing of the local relay without effecting the remote relay.

This enables the current transformer connections, the polarity of the current transformers, phase sequence and phase allocation to be tested from the one end.

Via binary input a test–mode can be activated. For this, the remote station is informed that local tests are running. Thus, an unwanted OFF–command is prevented when during local tests differential values are received.

Real time clock, Battery buffered annunciations

The VDEW add–on (VDEW is the Association of German Power Utilities) contains a battery–backed quartz clock that can be synchronized for each binary input. Moreover, the operational and fault indications and the LED display are stored in a non–volatile memory.

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Technical data

Input circuits	Rated current I_N Rated frequency f_N can be parameterized Overload capacity of current inputs, thermal <table style="display: inline-table; vertical-align: middle;"> <tr> <td>continuous</td> <td>10 s</td> </tr> <tr> <td>1 s</td> <td>dynamic; half-cycle</td> </tr> </table> Power consumption of current inputs <table style="display: inline-table; vertical-align: middle;"> <tr> <td>at $I_N = 1$ A</td> <td>at $I_N = 5$ A</td> </tr> </table>	continuous	10 s	1 s	dynamic; half-cycle	at $I_N = 1$ A	at $I_N = 5$ A	1 or 5 A 50 or 60 Hz 4 x I_N 30 x I_N 100 x I_N 250 x I_N <0.1 VA <0.5 VA
continuous	10 s							
1 s	dynamic; half-cycle							
at $I_N = 1$ A	at $I_N = 5$ A							
Auxiliary DC voltage	Rated auxiliary voltage V_{aux} Permissible rated auxiliary voltage ranges Max. perm. ripple content at rated auxiliary voltage Power consumption <table style="display: inline-table; vertical-align: middle;"> <tr> <td>quiescent</td> <td>energized</td> </tr> </table> Stored-energy time at $V_{aux} \geq 110$ V	quiescent	energized	24, 48 V or 60, 110, 125 V or 220, 250 V 19 to 56 V 48 to 144 V 176 to 288 V ≤ 12 % approx. 9 W approx. 10.5 W ≥ 50 ms				
quiescent	energized							
Binary inputs	Marshallable 7SD511/512 DC operating voltage Current input	5/11 24 to 250 V approx. 2.5 mA						
Alarm contacts	Number of alarm relays 7SD511/512 Contacts per relay Switching capacity Make/Break Switching voltage Permissible current	marshallable 4/10 see connection diagrams 20 W/VA 250 V AC/DC 1 A						
Trip contacts	Number of trip relays 7SD511/512 Contacts per relay Switching capacity <table style="display: inline-table; vertical-align: middle;"> <tr> <td>Make</td> <td>Break</td> </tr> </table> Switching voltage Permissible current	Make	Break	marshallable 2/5 see connection diagrams 1 000 W/VA 30 W/VA 250 V AC/DC 5 A 0.5 s 30 A				
Make	Break							
LED displays	Ready for operation Fault indication Marshallable LEDs 7SD511/512	green red red 1 1 6/14						
Construction of unit	Casing, dimensions Weight, terminals panel flush mounting/cubicle mounting panel surface mounting Degree of protection according to EN 60 529	7XP20, see dimension drawings approx. 6.5 kg, see connection diagrams approx. 8 kg, 30 terminals IP 51						
CE-conformity, standards	This product is in conformity with the directives of the Council of the European Communities on the approximation of the laws of the Member States relating to the electromagnetic compatibility (EMC Council Directive 89/336/EEC) and concerning electrical equipment for use within specified voltage limits (low voltage directive 73/23/EEC). The product conforms with the international standard IEC 60255 and the national standard DIN 57 435 part 303 (corresponding to VDE 0435 part 303). The relay is designed for use in an industrial environment, for installation in standard relay rooms and compartments so that with proper installation electro-magnetic compatibility (EMC) is ensured.	Conformity is proved by tests performed by Siemens AG in line with article 10 of the Council Directives in accordance with the generic standards EN 50081 and EN 50082 for the EMC directive 89/336/EEC and standard 60255-6 for the low voltage directive.						
Insulation tests IEC 60255-5, DIN VDE 0435 part 303	High voltage test (routine test), except d.c. voltage supply input High voltage test (routine test), only d.c. voltage supply input Impulse voltage test (type test), all circuits, class III	2 kV (rms), 50 Hz 2,8 kV DC 5 kV (peak), 1.2/50 μ s, 0.5 J, 3 positive and 3 negative shots at intervals of 5 s						
Climatic stress tests	permissible ambient temperature <table style="display: inline-table; vertical-align: middle;"> <tr> <td>during service</td> <td>during storage</td> <td>during transport</td> </tr> </table> permissible humidity	during service	during storage	during transport	-5 to +55 °C -25 to +55 °C -25 to +70 °C mean value per year ≤ 75 % relative humidity, on 30 days per year up to 95 % relative humidity, condensation not permissible			
during service	during storage	during transport						

Differential Relays

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Technical data

<p>Mechanical stress tests IEC 60255-21-1, IEC 60068-2</p>	<p>permissible mechanical stress during service</p> <p>during transport</p>	<p>10 to 60 Hz, 0,035 mm amplitude 60 to 500 Hz, 0,5 g acceleration</p> <p>5 to 8 Hz, 7.5 mm amplitude 8 to 500 Hz, 2 g acceleration</p>
<p>EMC-tests; immunity (type test) Standards: IEC 60255-6, IEC 60255-22 (international product standard) EN 50082-2 (generic standard) VDE 0435 part 303 (German product standard)</p>	<p>High frequency test with 1 MHz interference IEC 60255-22-1, class III and VDE 0435 part 303, class III</p> <p>Electrostatic discharge IEC 60255-22-2, class III and IEC 61000-4-2, class III</p> <p>Radio-frequency electromagnetic field, non-modulated report IEC 60255-22-3, class III</p> <p>Radio-frequency electromagnetic field, amplitude modulated IEC 61000-4-3, class III</p> <p>Radio-frequency electromagnetic field, puls modulated ENV 50204, class III</p> <p>Fast transients IEC 60255-22-4 class III, IEC 61000-4-4 class III</p> <p>Conducted disturbances induced by radio-frequency fields, amplitude modulated IEC 61000-4-6, class III</p> <p>Power frequency magnetic field IEC 61000-4-8, class IV IEC 60255-6</p>	<p>2.5 kV (peak), 1 MHz, $\tau = 15 \mu\text{s}$, 400 shots/s, duration 2 s</p> <p>4/6 kV contact discharge, 8 kV air discharge, both polarities, 150 pF, $R_1 = 330 \Omega$</p> <p>10 V/m, 27 to 500 MHz</p> <p>10 V/m, 80 to 1000 MHz, AM 80 %, 1 kHz,</p> <p>10 V/m, 900 MHz, repetition frequency 200 Hz, duty cycle 50 %</p> <p>2 kV, 5/50 ns, 5 kHz, burst length = 15 ms, repetition rate 300 ms, both polarities, $R_1 = 50 \Omega$, duration 1 min</p> <p>10 V, 150 kHz to 80 MHz, AM 80 %, 1 kHz,</p> <p>30 A/m, continuous, 300 A/m for 3 s, 50 Hz 0.5 mT, 50 Hz</p>
<p>EMC-tests; emission (type test) Standard: EN 50081-2 (European generic standard for use in industrial environment)</p>	<p>Conducted interference voltage, auxiliary voltage CISPR 11, EN 55011 and DIN VDE 0875 part 11</p> <p>Interference field strength CISPR 11, EN 55011 and VDE 0875 part 11</p>	<p>150 kHz to 30 MHz, group 1 class A</p> <p>30 to 1000 MHz, group 1 class A</p>
<p>Serial interfaces</p>	<p>Operator RS232 interface</p> <p>Substation control interface</p> <p style="padding-left: 40px;">Protocol</p> <p style="padding-left: 40px;">Safety</p> <p style="padding-left: 40px;">Speed</p> <p style="padding-left: 40px;">Method</p> <p style="padding-left: 40px;">Connection fibre optic</p> <p style="padding-left: 80px;">optical wave length</p> <p style="padding-left: 80px;">permissible attenuation</p> <p style="padding-left: 80px;">distance</p> <p>Interface to remote relay (serial interface for diff. protection)</p> <p style="padding-left: 40px;">Telegram format</p> <p style="padding-left: 40px;">Safety</p> <p style="padding-left: 40px;">Speed</p> <p style="padding-left: 40px;">Method</p> <p style="padding-left: 40px;">Connection electrical</p> <p style="padding-left: 80px;">distance</p> <p style="padding-left: 40px;">Connection fibre optic 820 nm interface</p> <p style="padding-left: 80px;">optical wave length</p> <p style="padding-left: 80px;">permissible attenuation</p> <p style="padding-left: 80px;">distance</p> <p style="padding-left: 40px;">Connection fibre optic 1300 nm interface</p> <p style="padding-left: 80px;">optical wave length</p> <p style="padding-left: 80px;">permissible attenuation</p> <p style="padding-left: 80px;">distance</p> <p>In the models for panel flush mounting and cubicle mounting with electrical interface isolated supply voltages for connection of an electro-optical converter are connected to terminals</p>	<p>at the front, not isolated, suitable for connection of a PC</p> <p>potential-free, suitable for coupling to a central data unit</p> <p>Siemens specific acc. to DIN 19 244 or protocol acc. to IEC 60870-5-103 (standard)</p> <p>Hamming distance $d = 4$</p> <p>4800, 9600 or 19200 baud</p> <p>asynchronous without flow control</p> <p>two integrated FSMA plug connectors for fibre optic connection</p> <p>820 nm</p> <p>max. 8 dB with glass fibre 62.5/125 μm</p> <p>approx. 1.5 to 2 km</p> <p>potential-free</p> <p>according DIN 19 244/IEC 60870-5</p> <p>Hamming distance $d = 4$</p> <p>14.4 / 19.2 kBaud</p> <p>asynchronous without flow control, 8E1 or 8N1 data frame</p> <p>similar to V.24/V.28 acc. to CCITT or RS232C acc. to EIA, 2 kV isolated</p> <p>max. 1000 m, (suitable only for coupling between 7SD511/512 and fibre optic transmission unit, e.g. PCM30 modem)</p> <p>two integrated FSMA plug connectors for fibre optic connection</p> <p>820 nm</p> <p>max. 8 dB with glass fibre 62.5/125 μm</p> <p>typ. 1.5 km</p> <p>two integrated FC plug connectors for fibre optic connection</p> <p>1300 nm</p> <p>typ. 21.5 dB with glass fibre 9/125 μm</p> <p>max. 30 km with 9/125 μm singlemode-fibre</p> <p>+12 V (max. 100 mA)</p> <p>-12 V (max. 25 mA)</p>

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Technical data (continued)

Current comparison protection	<p>Setting ranges Steady-state trip setting I_{STAT}/I_N Dynamic trip setting I_{DYN}/I_N Dynamic trip setting $I_{DYN\ SWITCH-ON}/I_N$</p> <p>Times Operating time (two-side-infeed) at $I = 4 \times$ setting value I_{DYN} at $I = 10 \times$ setting value I_{DYN} Additional delay of trip signal Min. trip signal time</p> <p>Reset value I/I_N Tolerance of trip characteristic (steady-state, single-side infeed) Frequency range $f_N = 50$ Hz $f_N = 60$ Hz</p>	<p>0.5 to 4 (in steps of 0.01) 0.2 to 1 (in steps of 0.01) 0.2 to 4 (in steps of 0.01)</p> <p>approx. 23 to 33 ms approx. 16 to 26 ms 0 to 0.05 s (in steps of 0.01 s) 0.05 to 1 s (in steps of 0.01s)</p> <p>approx. 0.05 ± 5 % of specified value</p> <p>45 to 55 Hz 55 to 65 Hz</p>
Overload protection	<p>Setting ranges Factor k acc. to IEC 60255.8 Time constant τ Temperature alarm stage $\theta_{alarm}/\theta_{trip}$, trip temperature Current alarm stage I_{alarm}</p> <p>Trip time characteristic</p> <p>Reset ratios</p> <p>Tolerances</p>	<p>1 to 5 (steps 0.01) 1 to 999.9 min (steps 0.1 min) 50 to 100 % $I_{alarm} \geq I_{max} = k \cdot I_N$</p> $t = \tau \ln \frac{I^2 - I_{pre}^2}{I^2 - (k \cdot I_N)^2}$ <p>θ/θ_{alarm} approx. 0.99 θ/θ_{trip} approx. 0.99 I/I_{alarm} approx. 0.99 Class 10 % acc. to IEC</p>
<p>Setting ranges Definite-time overcurrent protection</p> <p>IDMT overcurrent protection</p>	<p>Overcurrent phase $I >$ or earth $I_E >$ High set current phase $I \gg$ or earth $I_E \gg$</p> <p>Delay times</p> <p>Tolerances Current pick-up value Time Reset time</p> <p>Overcurrent phase $I >$ or earth $I_E >$ High set current phase $I \gg$ (DMT) or earth $I_E \gg$ (DMT)</p> <p>Time multiplier t_p Pick-up value Characteristics according to IEC 60255-4, paragraph 3.5.2 or BS 142 Linear current range</p> <p>Tolerances Pick-up value Time</p>	<p>$I/I_N = 0.1$ to 15 or 0.1 to 4 respectively $I/I_N = 0.1$ to 15 or 0.1 to 10 respectively</p> <p>0 to 60 s or infinity</p> <p>± 5 % of set value ± 1 % or ± 10 ms approx. 30 ms</p> <p>$I_p/I_N = 0.1$ to 4 $I/I_N = 0.1$ to 15 or 0.1 to 10 respectively 0.05 to 3.2 s $1.1 \times I_p$ normal inverse, very inverse, extremely inverse $20 \times I_N$</p> <p>± 5 % ≤ 5 % for $2 \leq (I/I_p) \leq 20$ and $t_p = 1$</p>
Load monitoring	<p>Operational currents Measurement range Tolerance</p> <p>Overload protection values Conductor temperature Measurement range Tolerance</p>	<p>$I_{L1}; I_{L2}; I_{L3}; I_E$ 0 to 240 % I_N ≤ 2 % of rated value</p> <p>θ/θ_{trip} calculated 0 to 240 % ≤ 3 % referred to θ_{trip}</p>
Fault event recording	<p>Fault events</p>	<p>storage of the last three fault events</p>
Fault recording	<p>Phase currents (instantaneous values) Resolution of instantaneous values</p> <p>Retention time Starts recording on</p>	<p>$\dot{I}_{L1}; \dot{I}_{L2}; \dot{I}_{L3}; \dot{I}_E$ 1.66 at $f_N = 50$ Hz 1.39 at $f_N = 60$ Hz</p> <p>max. 8 in 19 s recording buffer Energizing, PC/LSA operation, tripping, binary input</p>

Differential Relays

7SD511/512 Current comparison protection relay (Version V3) for overhead lines and cables

Selection and ordering data

7SD511/512 current comparison protection relay	Order No. 7SD51 □ □ - □ □ A □ □ - □ □ A 0
Auto-reclose function without auto-reclose function (AR) with single and three-pole auto-reclose function (AR)	↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ 1 2
Rated current for 50/60 Hz AC 1 A 5 A	1 5
Auxiliary voltage supply 24, 48 V DC 60, 110, 125 V DC 220, 250 V DC	2 4 5
Construction for panel surface mounting for panel flush mounting or cubicle mounting for panel flush mounting or cubicle mounting, without glass cover	B C E
Country-specific presetting/language German/English/Spanish presetting	0
With real-time clock, with non-volatile memory, software version V3	2
Interface for protection data transmission to the remote station wired, 2 kV isolated interface, V.24 (RS 232C) Fibre optic interface, 820 nm (maximum length 1.5 to 2 km) Fibre optic interface, 1300 nm (maximum length 30 km)	0 1 2
System interface/substation control interface without with fibre optic interface, 820 nm (maximum length 1.5 to 2 km)	A C

Accessories

Opto → electrical converter (fibre-optic to asynchronous RS232) Constriction for wall mounting and top hat mounting	Bestell-Nr. 7XV5652-0AA00
Optical 820 nm/1300 nm converter 820 nm/1300 nm converter for hat rail mounting in EG90 housing. FSMA connectors for multimode side (820 nm). ST connector for singlemode fibre(1300 nm side). Max. distance 14 km (9 dB).	7XV5451-0AA00

Operation software¹⁾

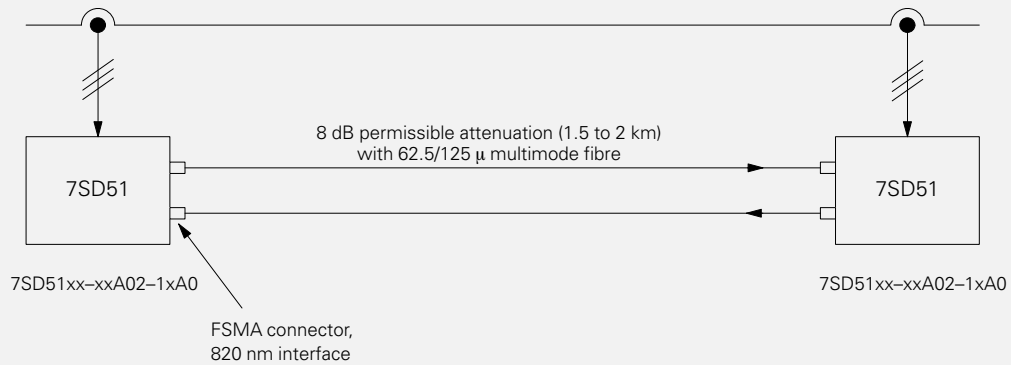
DIGSI program (suitable for all protection relays 7UM..., 7UT..., 7SJ..., 7SA..., ...)	German English	7XS5020-0AA00 7XS5020-1AA00
Test version:	German English	7XS5021-0AA00 7XS5021-1AA00
Connecting cables for protection relays (25-pin) – PC (9-pin); (other variations supplied on request)		7XV5100-2

Documentation

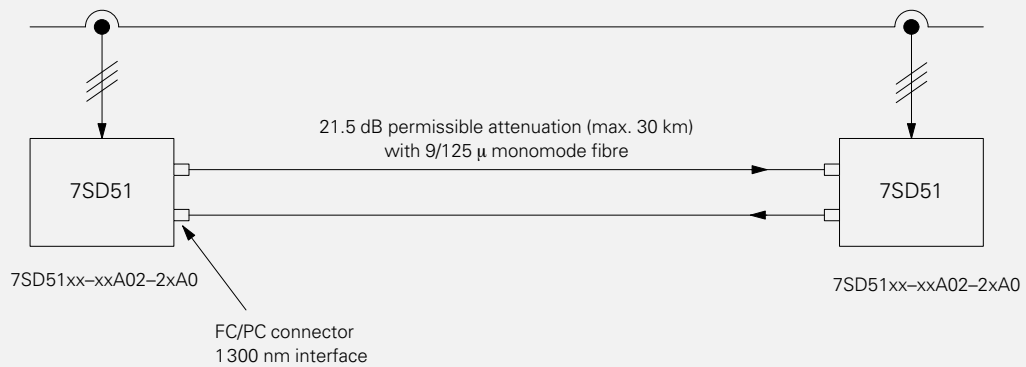
German: Katalogblatt: Stromvergleichsschutz 7SD511/512 (Version V3) für Leitungen und Kabel Handbuch: Stromvergleichsschutz 7SD511 (Version V3) für Leitungen und Kabel Stromvergleichsschutz 7SD512 (Version V3) für Leitungen und Kabel	E50001-K5722-A131-A3 C53000-G1100-C104-4 C53000-G1100-C105-3
English: Catalog: 7SD511/512 current comparison protection relay (Version V3) for overhead lines and cables Manual: 7SD511 current comparison protection relay (Version V3) for overhead lines and cables 7SD512 current comparison protection relay (Version V3) for overhead lines and cables	E50001-K5722-A131-A3-7600 C53000-G1176-C104-4 C53000-G1176-C105-3
Spanish: Catálogo: Protección por comparación de fases 7SD511/512 (version V3) para líneas y cables	E50001-K5722-A131-A2-7800

7SD511/512 Current comparison protection relay (Version V3) for overhead lines and cables

1. Direct optical link with fibre-cable and 820 nm optical interface



2. Direct optical link with fibre-cable and 1300 nm optical interface.



3. Recommended optical link to a communication device (e. c. PCM30, modem etc.)

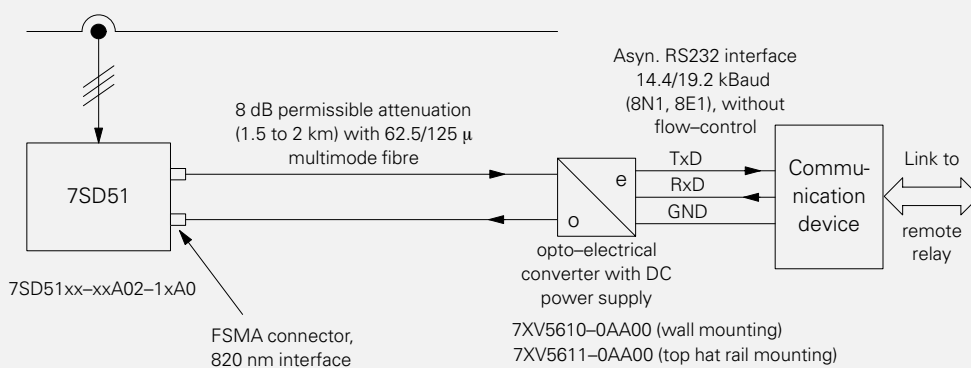
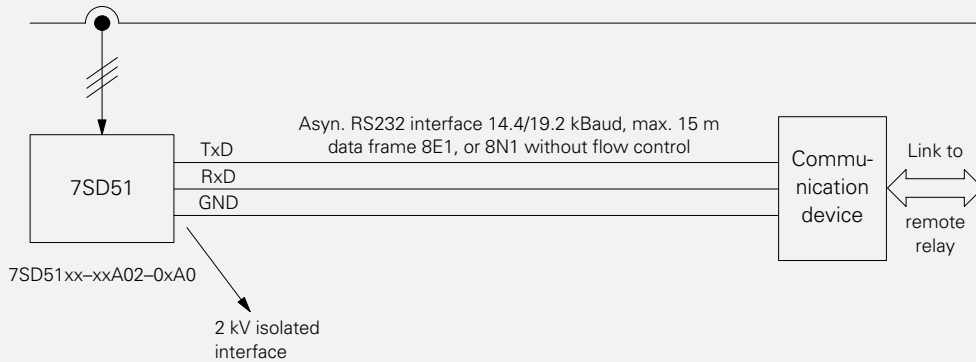


Fig. 5
Applications

Differential Relays

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4. Electrical link to a communication device/short distance



Note:

If communication device do not withstand EMC IEC 60255-1...5, application is not recommended, since communication device may be damaged due to EMC-stress.

5. Link to a 7VR50 device

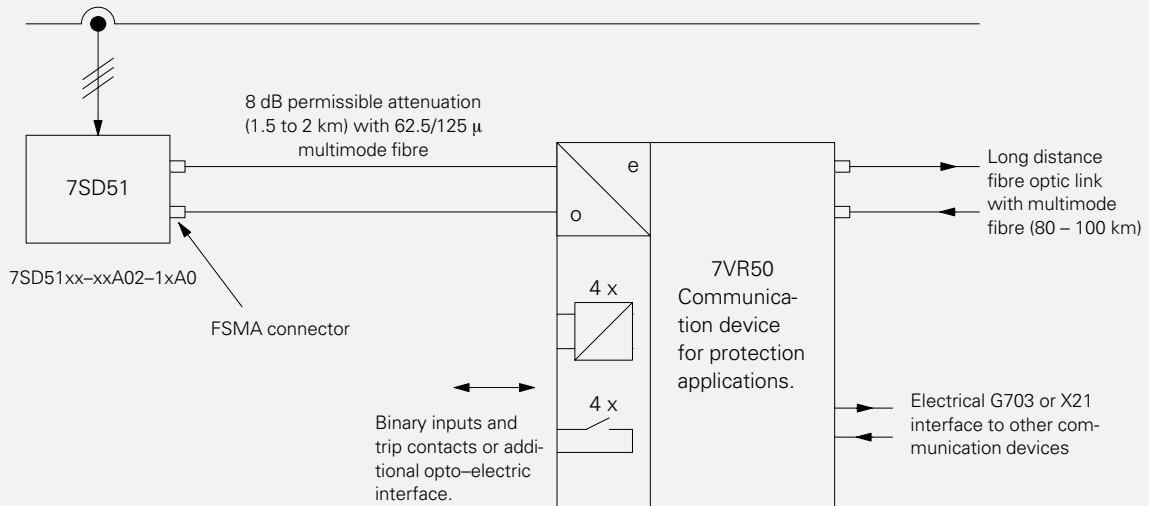


Fig. 6 Applications

7SD511/512 Current comparison protection relay (Version V3) for overhead lines and cables

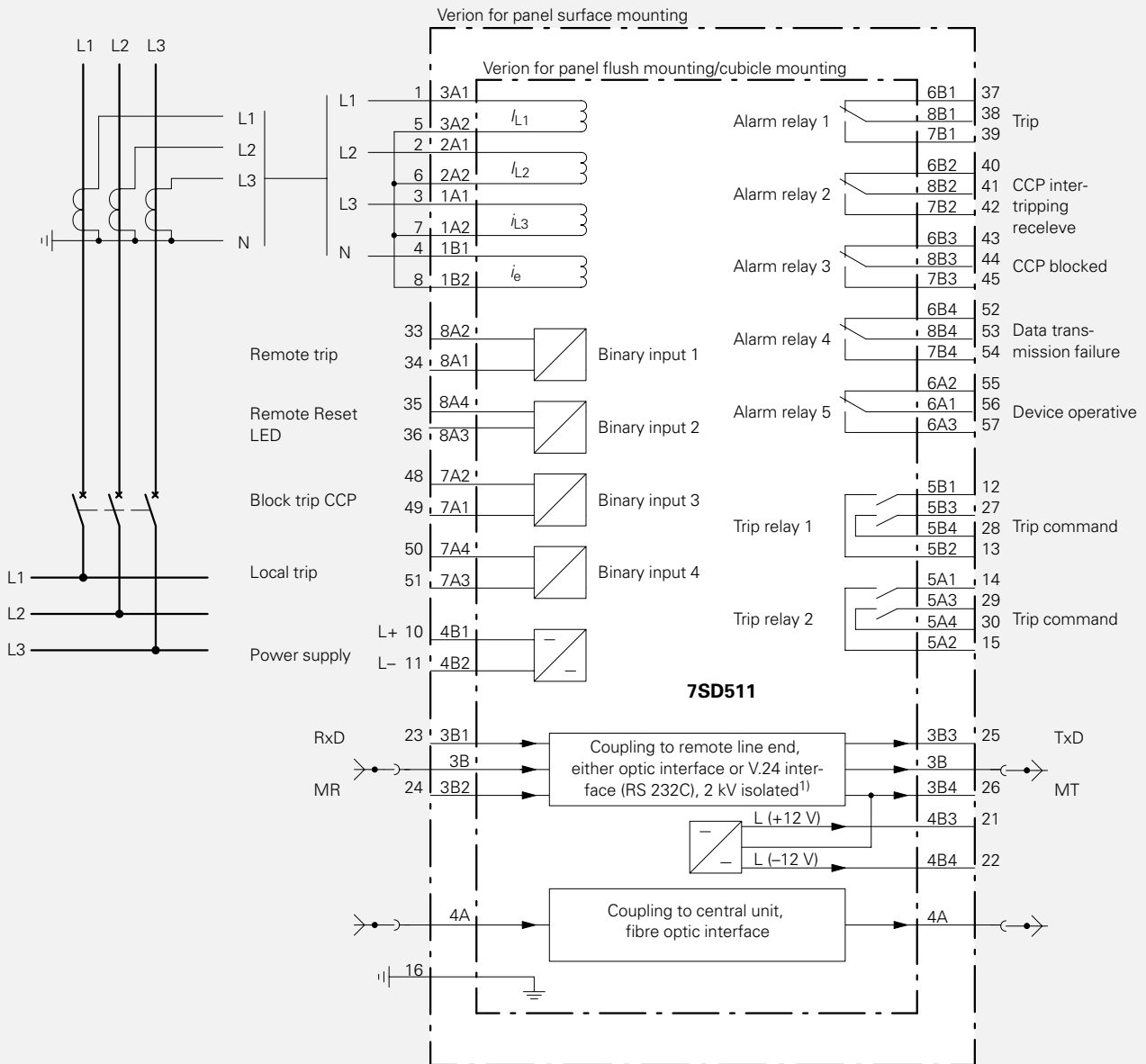


Fig. 7
Connection diagram for 7SD511 current comparison protection relay

Differential Relays

7SD511/512 Current comparison protection relay (Version V3) for overhead lines and cables

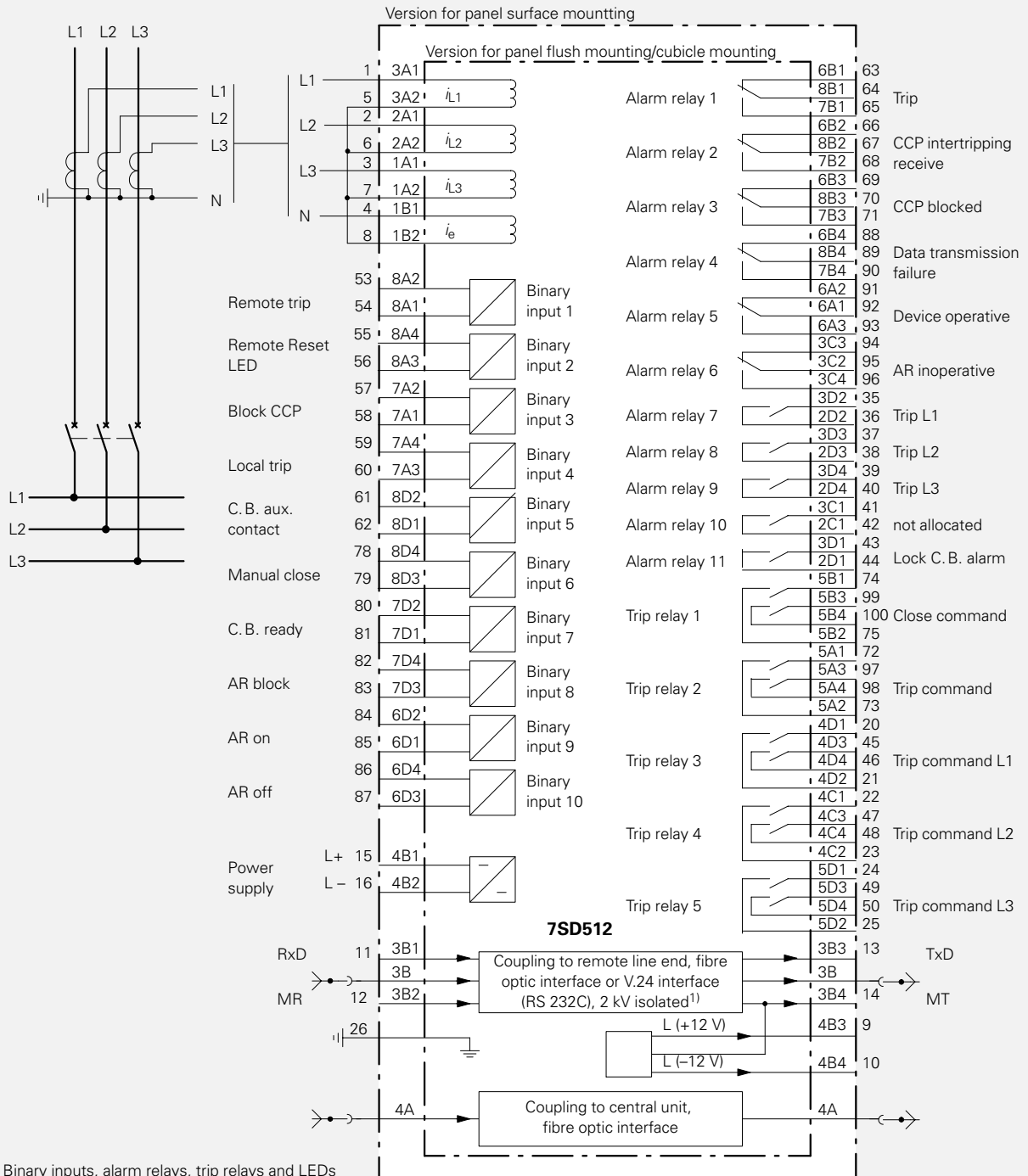


Fig. 8 Connection diagram for 7SD512 current comparison protection relay

Dimension drawings in mm

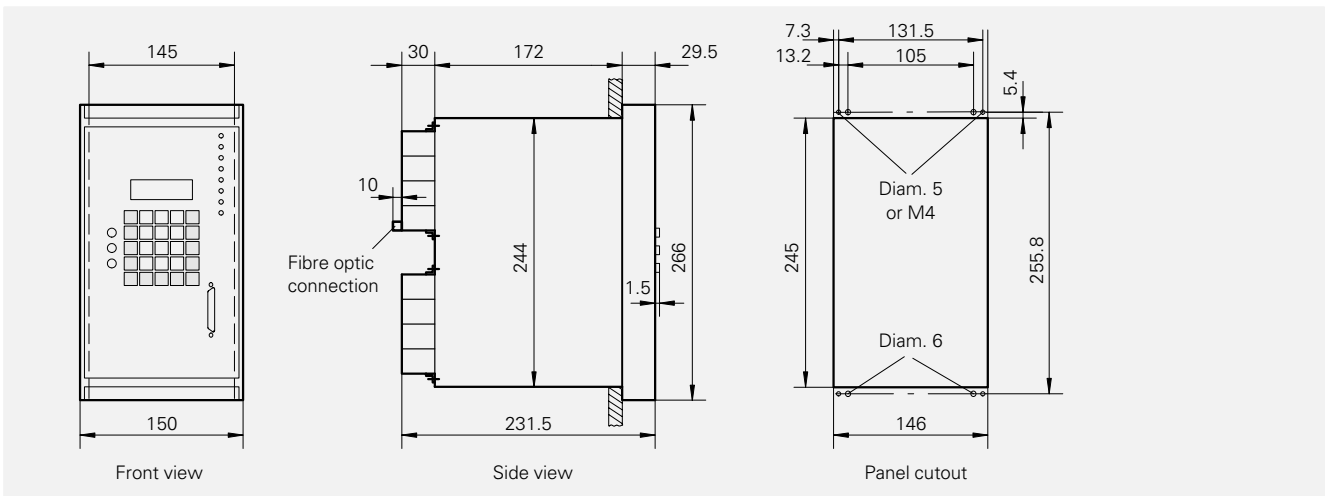


Fig. 9
7SD511 with housing 7XP2030-2 (for panel flush mounting or cubicle mounting)

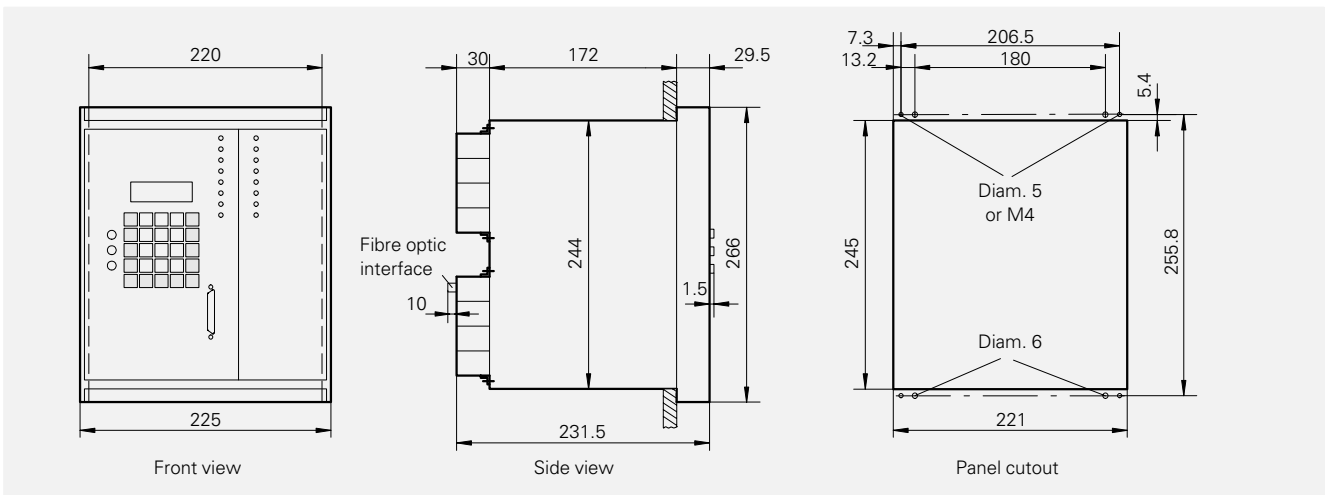


Fig. 10
7SD512 with housing 7XP2040-2 (for panel flush mounting or cubicle mounting)

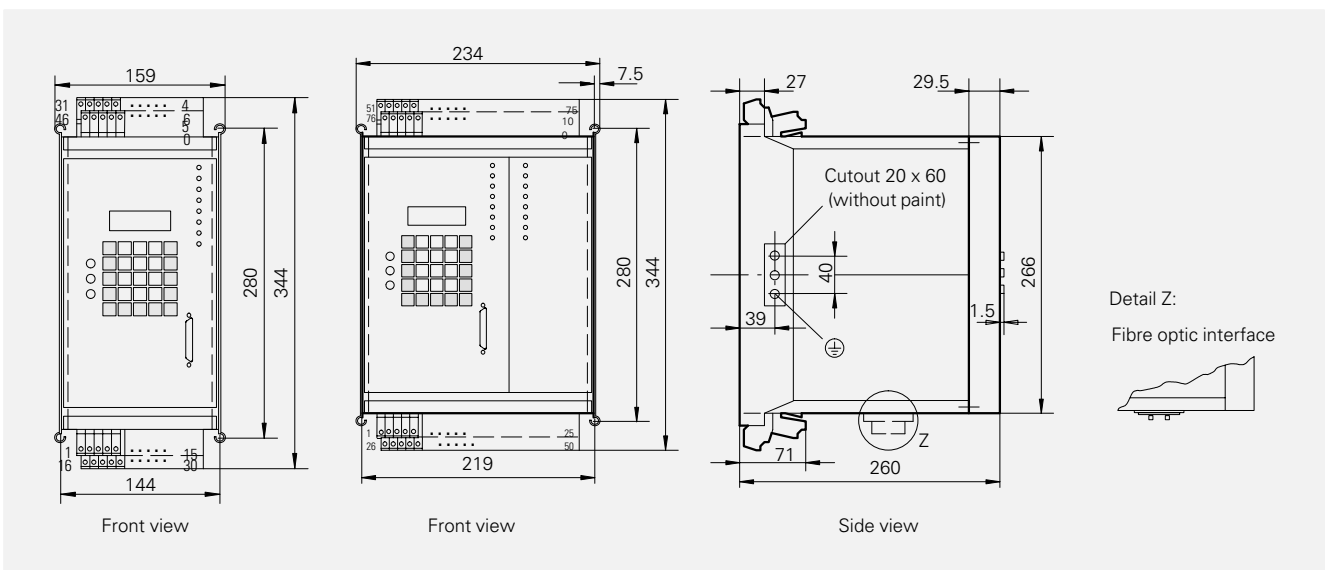


Fig. 11
7SD512 with housing 7XP2040-1 (for panel surface mounting)

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