

SIEMENS



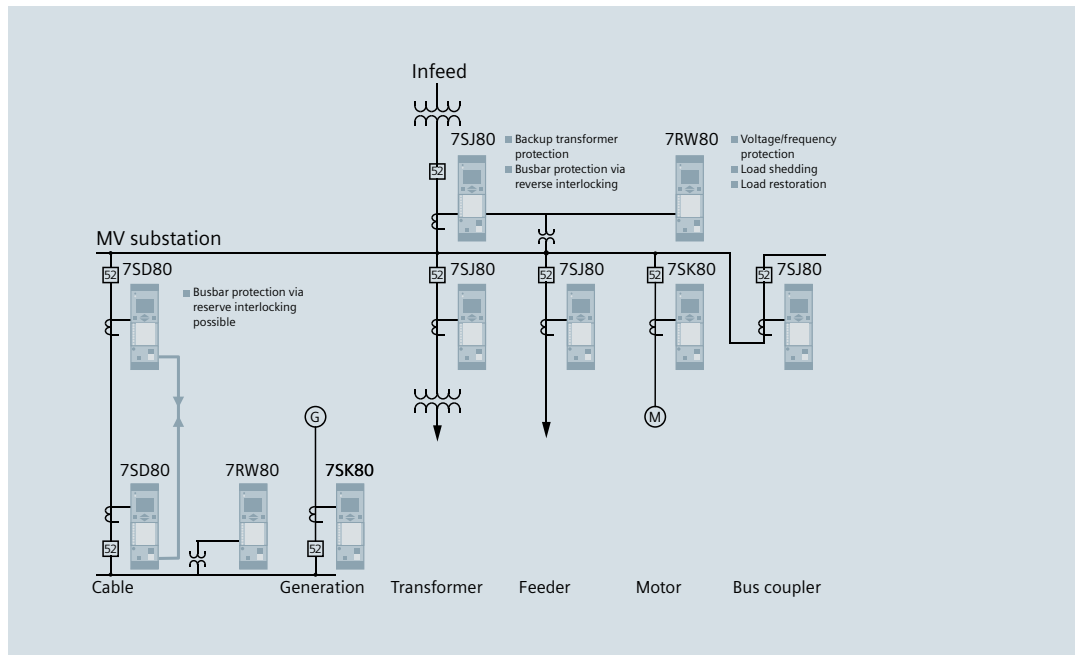
www.siemens.com/siprotec

Perfect protection – smallest space

The SIPROTEC Compact device range redefines protection technology

Answers for infrastructure and cities.

SIPROTEC Compact is the ideal solution for almost every protection application



Simple yet comprehensive, safe, and reliable

Perfectly suited for protection in distribution systems and industry, with minimal space requirement
SIPROTEC Compact devices provide a comprehensive range of functions in a surprisingly compact and space-saving housing.

Whether as main or as backup protection, a single SIPROTEC Compact device provides protection functionality for every conceivable fault. And it can do even more – it supports the control, automation, and monitoring functions in the substation.

Simple to operate and highly flexible
The proven concept behind the SIPROTEC Compact range of devices allows efficient and safe operation. The devices can be parameterized completely with the DIGSI 4 parameterization tool. The six-line display and eight LEDs indicate all operating states. The new freely programmable function keys can be integrated in the application by the user. With the programmable logic (CFC) and

flexible protection functions the device can be adapted to meet the individual requirements in terms of protection for a broad range of applications. Exchangeable communications interfaces will meet future standards, thereby providing security of investment.

The comprehensive experience of the market leader in a single device
The SIPROTEC Compact range stands for the cumulative experience of millions of successfully operating Siemens systems. They are based on the SIPROTEC 4 range, which has been used in countless systems and applications worldwide to date.

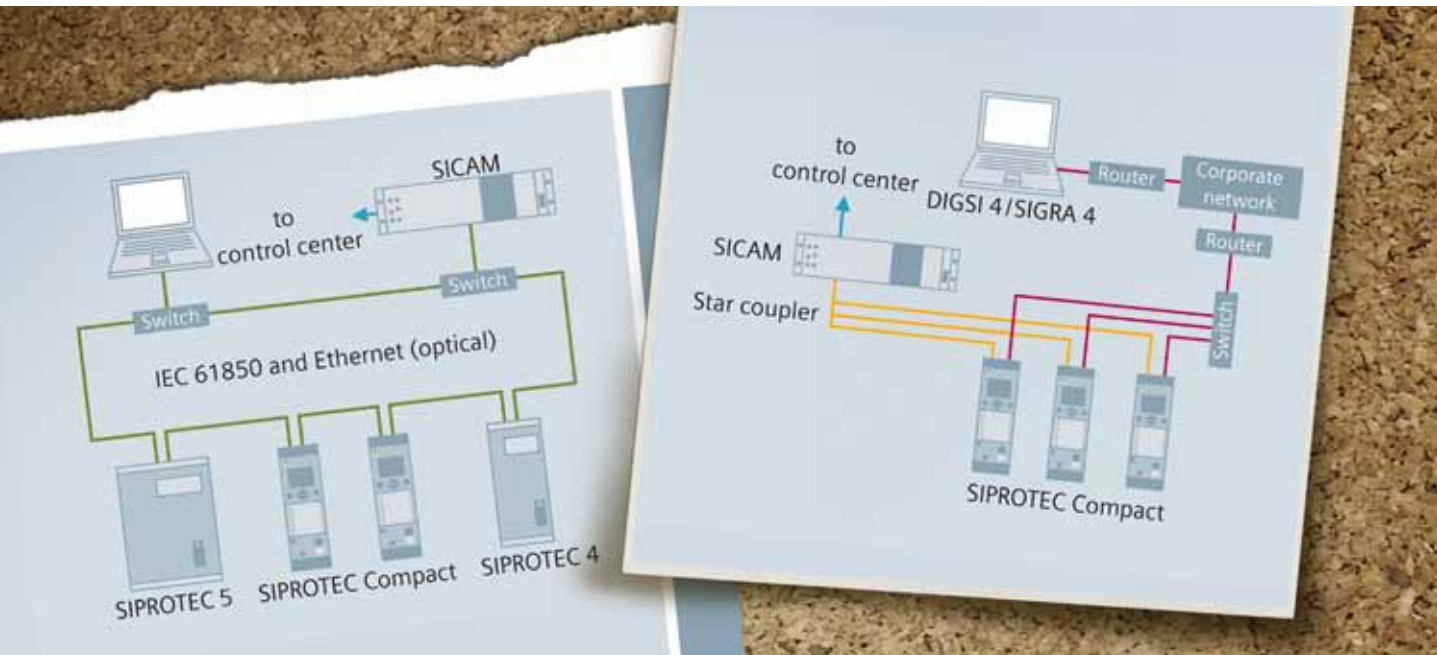
Cutting-edge hardware
Pluggable terminal blocks make the installation and retrofitting of all voltage and current connections a breeze. No special tools are required, and settings and adaptations are done via software parameters.



SIPROTEC Compact at a glance: the SIPROTEC Compact device range

- Compact design
- Simple installation without special tools
- Six-line display
- Eight freely assignable LEDs
- Nine freely parameterizable function keys
- Pluggable current and voltage terminal blocks
- Front-mounted USB interface
- Battery can be exchanged from the front panel
- Two interfaces for remote access
- Programmable logic (CFC) and flexible protection functions
- Binary input voltage threshold adjustable with DIGSI
- Current transformer-rated secondary current (1 A / 5 A) adjustable with DIGSI





A strong communicator

Much more than a protection device

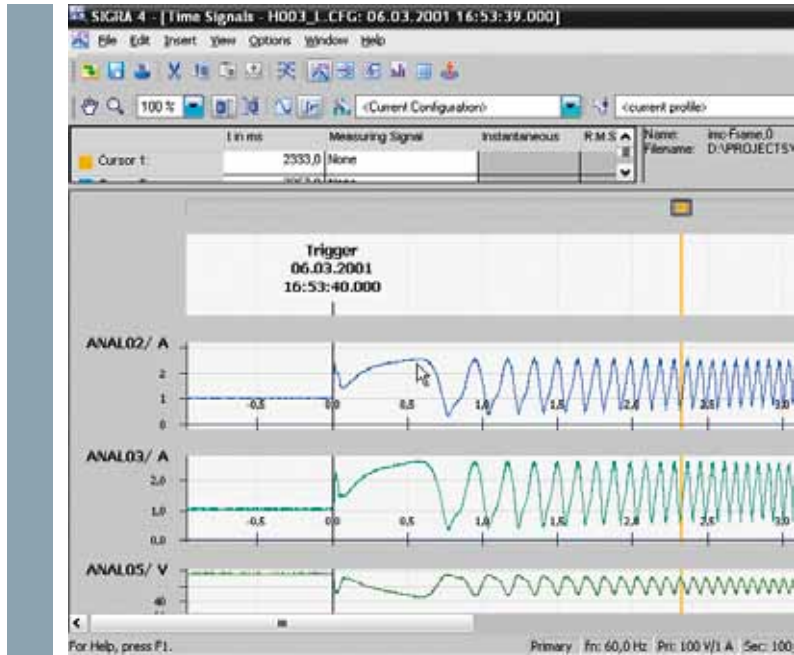
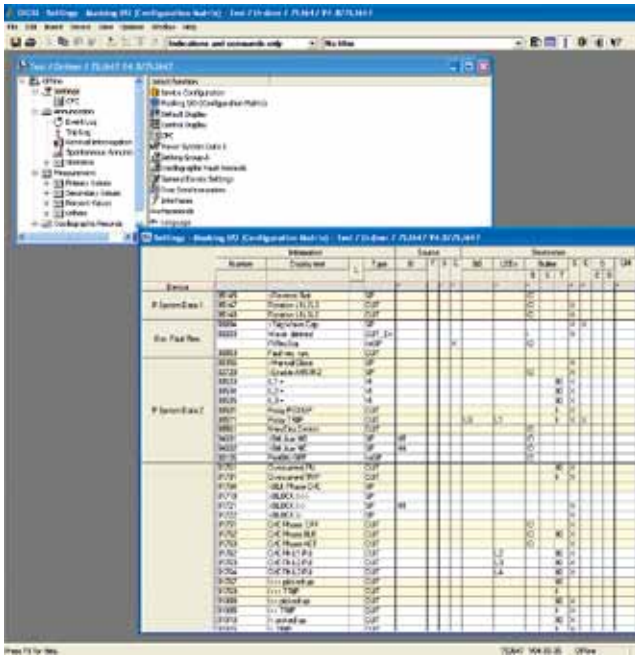
In addition to protection functions, SIPROTEC Compact devices also support control, monitoring, and automation processes. The comprehensive range of features along with communications interfaces ensure that the devices can be fully integrated in the centralized control, supporting control, and service communication. In addition, it provides for connections to be made with other devices, for example via an optical loop according to IEC 61850 with other SIPROTEC 4 devices.

Communications interfaces:

- Interface:
 - IEC 61850 Edition 1 and 2
 - IEC 60870-5-103
 - PROFIBUS DP
 - DNP 3.0
 - DNP TCP
 - MODBUS RTU
 - PROFINET
- Ethernet interface for DIGSI 4 or for optical protection interfaces for differential protection
- Front-mounted USB interface

Features of Ethernet interface for IEC 61850, DNP3 TCP, and PROFINET:

- Integrated switch for cost-effective and redundant optical ring structures
- Redundancy protocols RSTP, PRP, and HSR for highest availability
- Peer-to-peer communication between devices via Ethernet (IEC 61850 GOOSE)
- Millisecond-precise synchronization via Ethernet with SNTP
- Optional optical IEC 61850 loop configuration of SIPROTEC 4, SIPROTEC 5, and SIPROTEC Compact devices
- Ethernet services that can be deactivated
- Parallel operation of DNP3 TCP and IEC 61850 as well as PROFINET and IEC 61850



Intuitive user interface with really easy operation

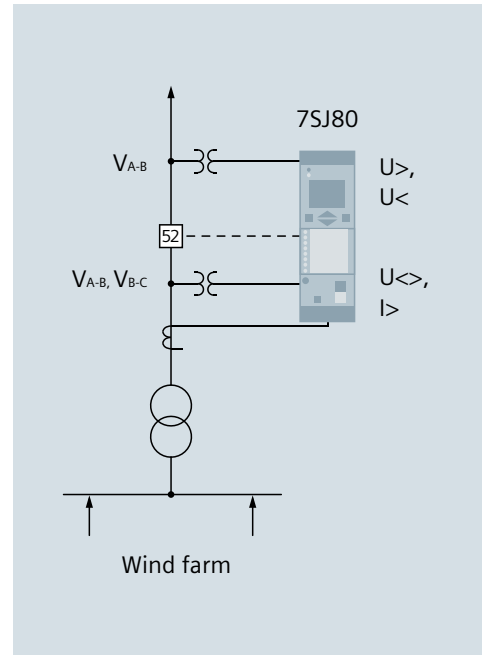
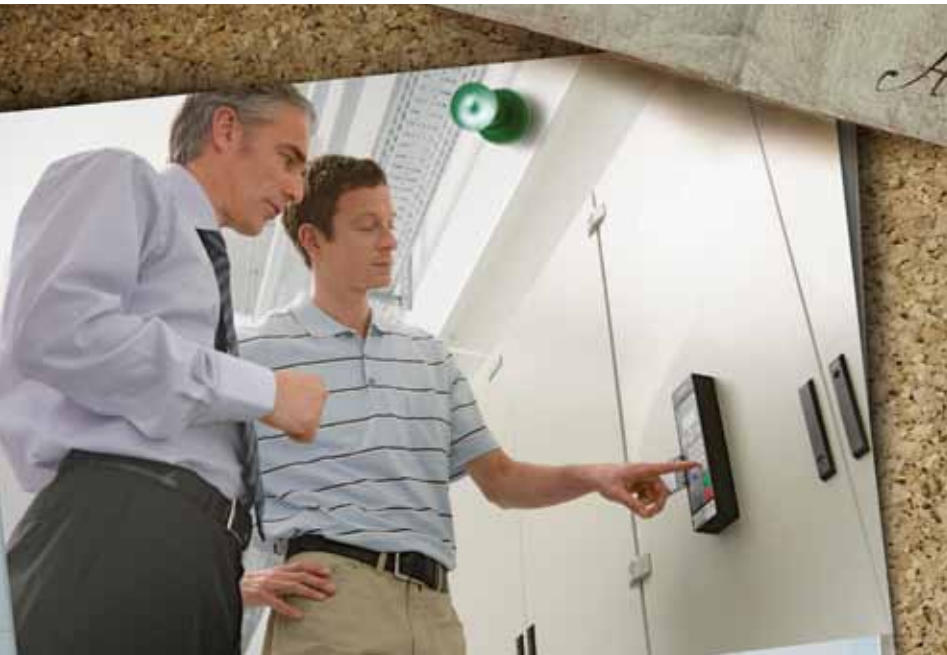
DIGSI 4 is the application software on the user's PC for the interface with SIPROTEC devices providing all the related functionality. DIGSI 4 is specifically developed for industrial and utility applications, making the parameterization and evaluation of SIPROTEC devices really easy.

The PC software is downward-compatible and provides a user-friendly and intuitive user interface. The interface allows tasks to be carried out simply and conveniently, from the parameterization and commissioning of devices to the analysis and documentation of system disturbances. A powerful analysis tool supports quick fault-finding and also provides important information for maintenance cycles.

For a broad range of users, DIGSI 4 has already become an established name in the business.

DIGSI 4 at a glance:

- Mapping of all substation topology types
- Import and export of parameter sets
- Flexible and intuitive application of user-defined logic with a logic editor (CFC) – no prior programming knowledge is necessary
- Precise fault analysis and visualization using SIGRA
- Routing of inputs and outputs with a visually clear matrix (no dialog boxes)
- Intelligent plausibility checks avoid wrong inputs and settings
- Test and diagnostics functions
- Direct interface with the device via a serial interface or from remote via modem
- Integrated IEC 61850 station configurator

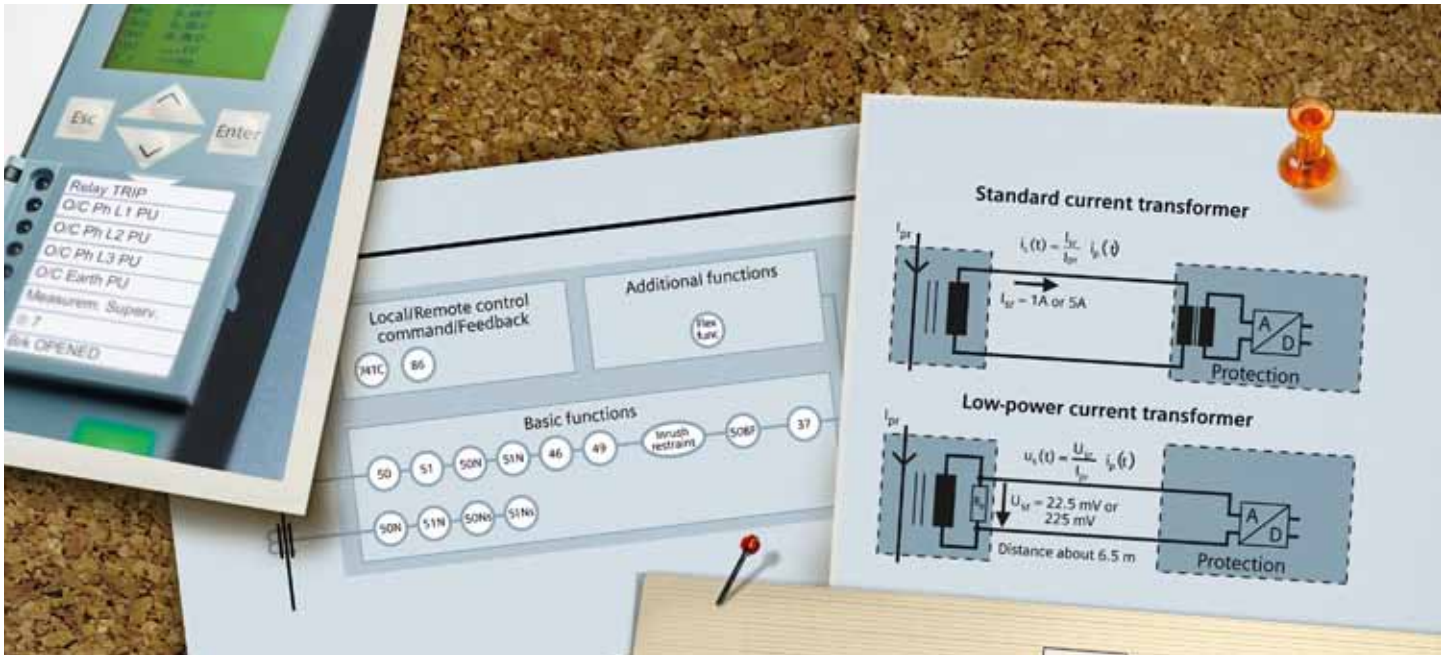


Time-overcurrent protection 7SJ80

The SIPROTEC Compact 7SJ80 can be used for the line protection of high and medium-voltage networks that have a solid, resistance, isolated, or compensated neutral grounding. The 7SJ80 can be used as a backup protection device for transformer differential relays.

Highlights:

- Multifunction protection in a compact housing
- Flexible protection functions for the utmost adaptability
- Ideally suited to energy distribution and industrial networks
- Undervoltage-controlled reactive power protection for system decoupling, e.g. renewable generation



Time-overcurrent protection 7SJ81 for connecting to low-power current transformers

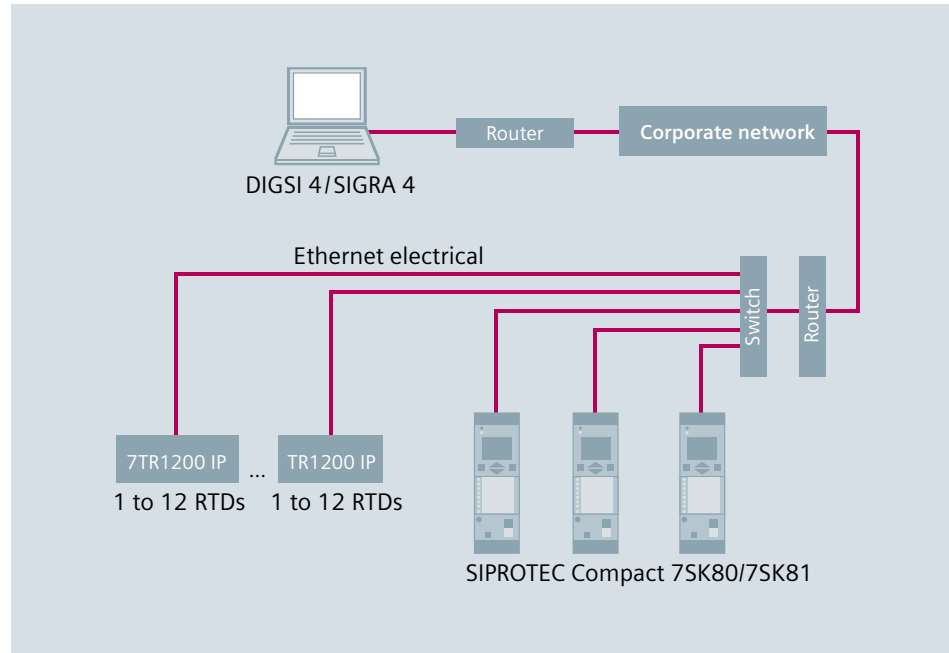
SIPROTEC Compact 7SJ81 makes the advantages of low-power current transformers available.

The device provides four low-power current transformer inputs along with the required protection and control functions. Three low-power voltage transformer inputs are available as an option.

Since low-power current transformers cover a very broad range of primary nominal current while operating almost without saturation, cost-efficient and safe system solutions can be created.

Highlights

- Savings in terms of spares and logistics because only a few low-power current transformer types cover the complete range of conventional transformers while providing protection and measurement CT functionality
- High operational safety, since low-power current transformers can be operated with short circuit and open circuit on the secondary side
- Minimal device size of the transformer core, making it ideal for compact switchgear systems in energy distribution and industrial applications
- Linear and almost no saturation up to short-circuit current
- Reduction of current transformer types thanks to a high dynamic range and a high precision level
- In the event of an increase in branch nominal current there is no need for replacement of CT thanks to high linear transmission range



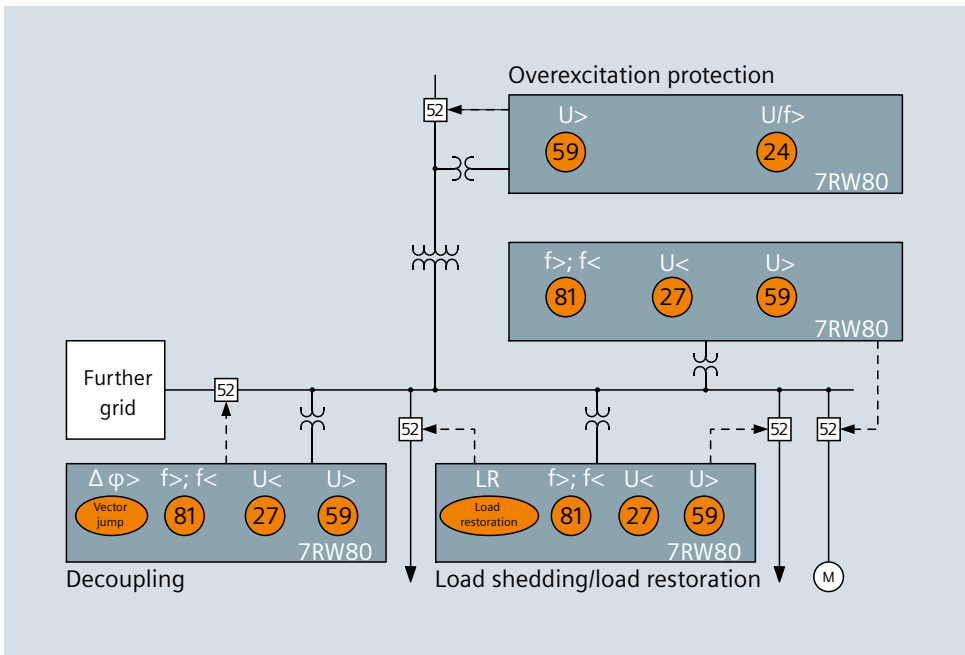
Motor protection 7SK80 and 7SK81

The SIPROTEC Compact 7SK80 and 7SK81 devices are multifunctional motor protection devices which have been developed for the protection of asynchronous motors. The 7SK80 and 7SK81 can be used as a backup protection for transformer differential relays.

SIPROTEC Compact 7SK81 makes the advantages of low-power current transformers available for motor protection. Optionally, three low-power voltage transformer inputs for 7SK81 are available.

Highlights:

- Highly compact motor protection relay
- Five integrated inputs for connecting temperature sensors (RTDs)
- Up to 12 temperature sensors (RTDs) can be connected via a serial-coupled thermobox
- Overload protection with thermal model and memory function
- Optimum protection of asynchronous motors of all sizes
- ATEX 100 – certification, protection of explosion-proved machines of increased-safety type “e” (7SK80)

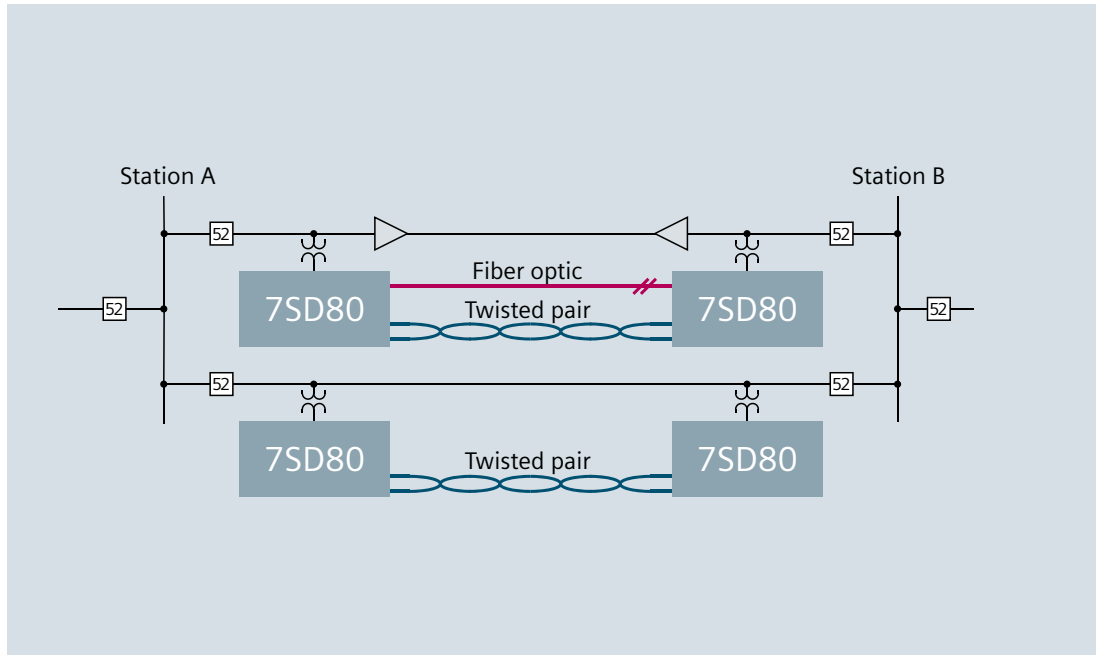


Voltage and frequency protection 7RW80

The SIPROTEC Compact 7RW80 has been designed especially for energy distribution applications, for use on transformers, and on electrical machines. It can detect deviations from the permitted voltage or frequency and provides overexcitation protection. The device can also be used for decoupling networks or for load shedding in the event of hazardous network breakdowns arising as a result of impermissibly high frequency drops. The integrated load connection function enables the network to be restored automatically, once the required network frequency has been reestablished.

Highlights:

- Ideally suitable for decentralized generation
- Network decoupling
- Load shedding
- Load restoration
- Undervoltage/overvoltage and underfrequency/overfrequency
- Protection/monitoring
- Undervoltage/overvoltage protection, underfrequency/overfrequency protection, and overexcitation protection for generators and transformers
- Vector surge



Line differential protection 7SD80

The SIPROTEC Compact 7SD80 line differential protection device is used for the selective protection of lines and cables with all types of neutral point grounding. For protection data exchange the differential protection uses the integrated two-wire and FO interfaces in the device. Therefore the 7SD80 can be adapted to existing fiber-optic or copper communication lines which makes it future-proof for new investments.

The integrated time-overcurrent protection can be directional or non-directional. This allows for the application of protection concepts such as reverse interlocking in meshed networks or emergency mode protection in the event of communication failure.

The 7SD80 is perfectly tailored for distances up to 24 km, ring structured grids, and as replacement for analog differential protection applications.

Highlights:

- Differential protection for all types of network and neutral point grounding
- Safe recognition of faults in compensated and isolated networks
- Efficient protection concepts with powerful additional functions
- Optimal use of the existing infrastructure with different media for protection-data interface
 - Integrated two-wire interface up to 20 km
 - Integrated FO interface up to 24 km
 - Optional redundancy
 - Transfer of circuit-breaker inter-tripping and further binary signals to the opposite end
- Integrated commissioning tools for protection and communication

Functions at a glance

ANSI	Function	Abbr.	7SD80	7SJ80	7SJ81	7SK80	7SK81	7RW80
	Protection functions for 3-pole tripping	3-pole	x	x	x	x	x	x
14	Locked rotor protection	$I > + V <$				x	x	
FL	Fault locator	FL		o	o			
24	Overexcitation protection	V/f						o
25	Synchrocheck, synchronizing function	Sync		o				o
27	Undervoltage protection	$V <$	o	o	o	o	o	x
32	Directional power supervision	$P >, P <$		o	o	o	o	
37	Undercurrent, underpower	$I <, P <$		x	x	x	x	
38	Temperature supervision	$\Theta >$				x	x	
46	Unbalanced-load protection	$I_2 >$		x	x	x	x	
46	Negative-sequence system overcurrent protection	$I_2 >, I_2/I_1 >$		x	x	x	x	
47	Phase-sequence-voltage supervision	LA, LB, LC		o	o	o	o	x
48	Start-time supervision	I^2_{start}				x	x	
49	Thermal overload protection	Θ, I^2t	x	x	x	x	x	
50/50N	Definite time-overcurrent protection	$I >$	x	x	x	x	x	
50Ns	Sensitive ground-current protection	$I_{Ns} >$		o	o	o	o	
	Intermittent ground-fault protection	$I_{ie} >$		x		x		
50L	Load-jam protection	$I >_L$				x	x	
50BF	Circuit-breaker failure protection	CBFP	x	x	x	x	x	
51c	Cold load pickup			x	x	x	x	
51/51N	Inverse time-overcurrent protection	I_p, I_{Np}	x	x	x	x	x	
51V	Overcurrent protection, voltage-controlled	$t = f(I) + V <$		o		1		
55	Power factor	$\cos \varphi$		o	o	o	o	
59	Overvoltage protection	$V >$	o	o	o	o	o	x
59R, 27R	Rate-of-voltage-change protection	dV/dt		o		1		x
66	Restart inhibit	I^2t				x	x	
67	Directional time-overcurrent protection, phase	$I >, I_{p \angle} (V, I)$	o	o	o			
67N	Directional time-overcurrent protection for ground faults	$I_{N \angle}, I_{Np \angle} (V, I)$	o	o	o	o	o	
67Ns	Sensitive ground-fault detection for systems with resonant or isolated neutral	$I_{N \angle} < (V, I)$		o	o	o	o	
67Ns	Directional intermittent ground-fault protection	$I_{ie \text{ dir}} >$		x		x		
	Undervoltage-controlled reactive power protection	$Q > / V <$		x				
74TC	Trip-circuit supervision	TCS	x	x	x	x	x	x
79	Automatic reclosing	AR	o	o	o			
81	Frequency protection	$f <, f >$	o	o	o	o	o	x
81R	Rate-of-frequency-change protection	df/dt	o	o	o	o	o	x
	Vector-jump protection	$\Delta \varphi_{\omega} >$						o
81LR	Load restoration	LR						o
85	Teleprotection		x					
86	Lockout		x	x	x	x	x	x
87	Differential protection	ΔI	x					
87N	Differential ground-fault protection	ΔI_N	x	o				
	Broken-wire detection for differential protection		x					
	Further functions							
	Measured values		x	x	x	x	x	x
	Switching-statistic counters		x	x	x	x	x	x
	Logic editor		x	x	x	x	x	x
	Inrush-current detection		x	x	x	x	x	
	External trip initiation		x	x	x	x	x	x
	Control		x	x	x	x	x	x
	Fault recording of analog and binary signals		x	x	x	x	x	x
	Monitoring and supervision		x	x	x	x	x	x
	Protection interface, serial		x					
	No. setting groups		4	4	4	4	4	4

x: Standard function

o: Option

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