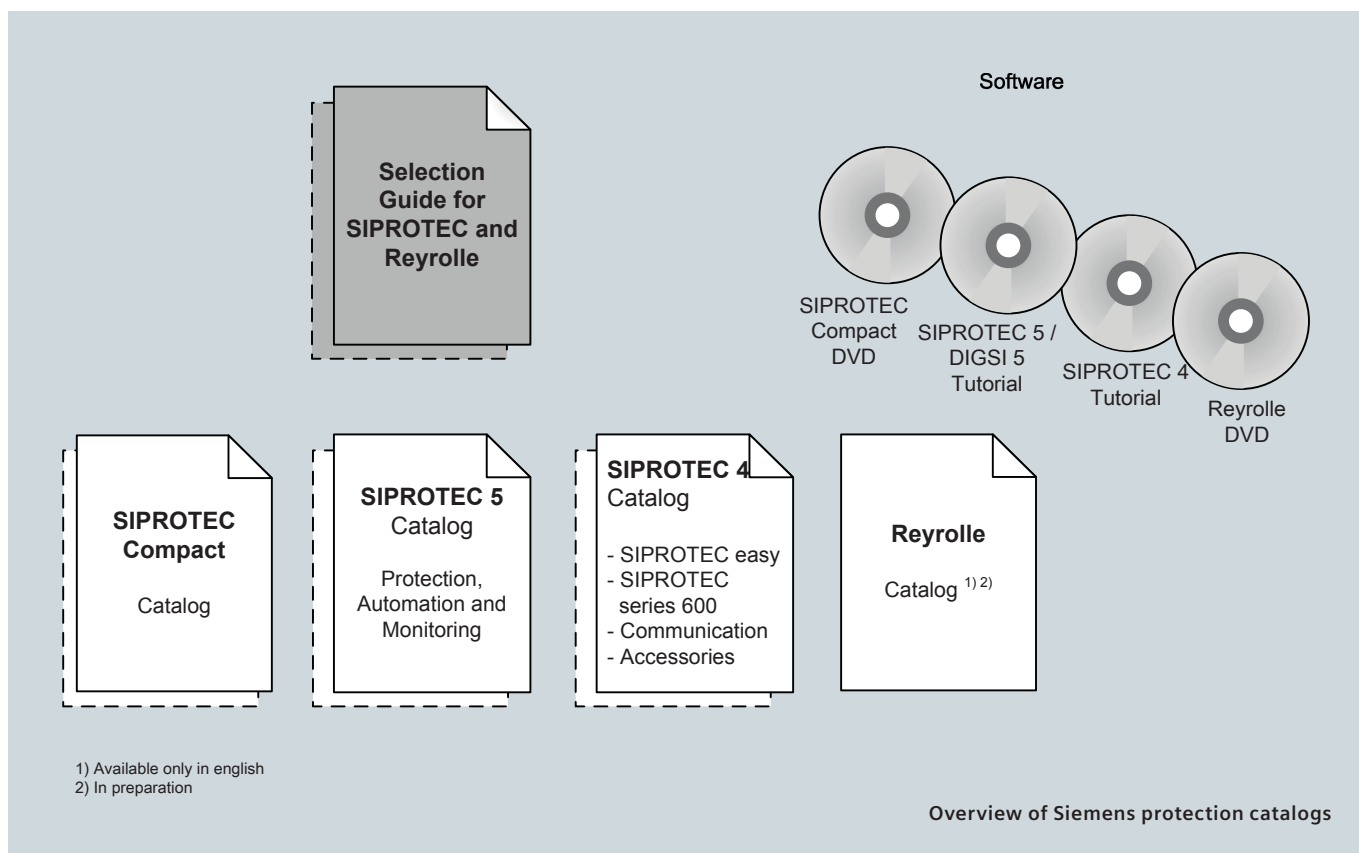




Siemens protection devices

Selection Guide for SIPROTEC



Protection selection guide:

The selection guide offers an overview of the device series of the Siemens protection devices, and a device selection table.

SIPROTEC Compact catalog:

The SIPROTEC Compact catalog describes the features of the SIPROTEC Compact series and presents the available devices and their application possibilities.

SIPROTEC 5 catalog:

The catalog describes the system features and the devices of SIPROTEC 5.

SIPROTEC 4, SIPROTEC series 600, SIPROTEC easy, communication and accessories:

This catalog describes the features of the device series SIPROTEC 4, SIPROTEC series 600 and SIPROTEC easy, as well as their devices. In further chapters, the accessories of the complete SIPROTEC family for communication, auxiliary relays and test equipment are described.

Reyrolle catalog:

This catalog gives an overview of the reyrolle devices.

Solutions for today's and future power supply systems – for more than 100 years

With the two brands SIPROTEC and REYROLLE, Siemens is the world market leader in digital protection technology. Profit from the experience out of an installed base of more than 1 million devices and 400,000 with IEC 61850.

SIPROTEC has established itself on the energy market for decades as a powerful and complete system family of numerical protection relays and bay controllers from Siemens.

SIPROTEC protection relays from Siemens can be consistently used throughout all applications in medium and high voltage. With SIPROTEC, operators have their systems firmly and safely under control, and have the basis to implement cost-efficient solutions for all duties in modern, intelligent and “smart” grids. Users can combine the units of the different SIPROTEC device series at will for solving manifold duties – because SIPROTEC stands for continuity, openness and future-proof design.

As the innovation driver and trendsetter in the field of protection systems for 100 years, Siemens helps system operators to design their grids in an intelligent, ecological, reliable and efficient way, and to operate them economically. As a pioneer, Siemens has decisively influenced the development of numerical protection systems (fig. 2). The first application went into operation in Würzburg, Germany, in 1977. Consistent integration of protection and control functions for all SIPROTEC devices was the innovation step in the 90ies. After release of the communication standard IEC 61850 in the year 2004, Siemens was the first manufacturer worldwide to put a system with this communication standard into operation.

How can system operators benefit from this experience?

- Proven and complete applications
- Easy integration into your system
- Highest quality of hardware and software



Fig. 1 Siemens protection family







- Excellent operator friendliness of devices and tools
- Easy data exchange between applications
- Extraordinary consistency between product- and systemengineering
- Reduced complexity by easy operation
- Siemens as a reliable, worldwide operating partner

Reyrolle

The products of the long-standing British manufacturer Reyrolle are considered especially powerful and reliable by many markets. With the latest numerical products, Reyrolle – as a part of Siemens – shows that the development is being pushed forward, and that new innovations are continuously being developed further for the users' benefit. In this way, Reyrolle completes the offerings for protection devices, particularly in Great Britain and the Commonwealth countries.

SIPROTEC – a synonym for protection devices

Over 100 years of experience in the field of protection devices and substation automation almost says it all. Yet the highest appreciation must be given to some milestones in the history of this great product. The very first family of SIPROTEC products already had a head start in being ahead of its competitors. Find out how the continuous drive for technological improvements and brilliant minds have kept this success story going and going.

Several milestones in the history of SIPROTEC have defined not only the technology of this product family but its fundamental character. With more than one million SIPROTEC units in the field, we are clearly the market leader in Digital Protection Technology.

1902	1925	1940	1970	1977	1980s	1985	1998	2004	2006	2008	2010
Schuckert & Co. (1887): DC metering device based on Georg Hummel's principle	First overcurrent relay RA1 and delayed action relay RS1	Introduction of new overcurrent relay RAS	Introduction of analog electronic relays	First digital application in Würzburg, Germany	The digital era for relays begins	Introduction of first numerical relay in combination with control technology SINAUT LSA	Introduction of SIPROTEC 4 family	Siemens installs the world's first substation with IEC 61850-based control in Winznausachsen, CH	Siemens awarded the Frost & Sullivan "Technology Leadership Award" for the implementation of IEC 61850	SIPROTEC Compact, the new member of the SIPROTEC family, is introduced	Introduction of the new SIPROTEC 5 family

history

Fig. 2 SIPROTEC – Pioneer over generations

SIPROTEC Compact

SIPROTEC Compact – Maximum protection-minimum space

Reliable and flexible protection for energy distribution and industrial systems with minimum space requirements. The devices of the SIPROTEC Compact family offer an extensive variety of functions in a compact and thus space-saving 1/6 x 19" housing. The devices can be used as main protection in medium-voltage applications or as back-up protection in high-voltage systems.

SIPROTEC Compact provides suitable devices for many applications in energy distribution, such as the protection of feeders, lines or motors. Moreover, it also performs tasks such as system decoupling, load shedding, load restoration, as well as voltage and frequency protection.

The SIPROTEC Compact series is based on millions of operational experience with SIPROTEC 4 and a further-developed, compact hardware, in which many customer suggestions were integrated. This offers maximum reliability combined with excellent functionality and flexibility.

- Simple installation by means of pluggable current and voltage terminal blocks
- Thresholds adjustable via software (3 stages guarantee a safe and reliable recording of input signals)
- Easy adjustment of secondary current transformer values (1 A/5 A) to primary transformers via DIGSI 4
- Quick operations at the device by means of 9 freely programmable function keys
- Clear overview with six-line display
- Easy service due to buffer battery replaceable at the front side
- Use of standard cables via USB port at the front
- Integration in the communication network by means of two further communication interfaces
- Integrated switch for low-cost and redundant optical Ethernet rings
- Ethernet redundancy protocols RSTP, PRP and HSR for highest availability
- Reduction of wiring between devices by means of cross-communication via Ethernet (IEC 61850 GOOSE)
- Time synchronization to the millisecond via Ethernet with SNTP for targeted fault evaluation
- Adjustable to the protection requirements by means of "flexible protection functions"
- Comfortable engineering and evaluation via DIGSI 4.



Fig. 6 SIPROTEC Compact



Fig. 7 SIPROTEC Compact – rear view



Fig. 8 Feeder Protection SIPROTEC 7SC80 with HMI

SIPROTEC easy

SIPROTEC easy are CT power supplied numerical overcurrent protection relays, which can be used as line and transformer protection (back-up protection) in electrical power supply systems with single-ended supply. They offer definite-time and inverse-time overcurrent protection functions according to IEC and ANSI. The comfortable operation via DIP switch is self-explanatory and simple.

- Two-stage overcurrent-time protection
- Saving the auxiliary power supply by operation via integrated current transformer supply
- Cost-efficient due to the use of instrument transformers with low ratings
- Tripping via pulse output (DC 24 V/0.1 Ws) or tripping relay output
- Simple, self-explanatory parameterization and operation via DIP switch directly at the device
- Easy installation due to compact assembly on DIN rail.



Fig. 12 SIPROTEC easy

SIPROTEC Compact (series 600)

The devices of this series are compact, numerical protection devices for application in medium-voltage or industrial power supply systems. The corresponding device types are available for the different applications such as overcurrent-time protection, line differential protection, transient earth-fault relay or busbar protection.

- Space-saving due to compact design
- Reliable process connections by means of solid terminal blocks
- Effective fault evaluation by means of integrated fault recording and SIGRA 4
- Communication interface
- Operable and evaluable via DIGSI 4
- Different device types available for directional and non-directional applications.



Fig. 13 SIPROTEC Compact (series 600)

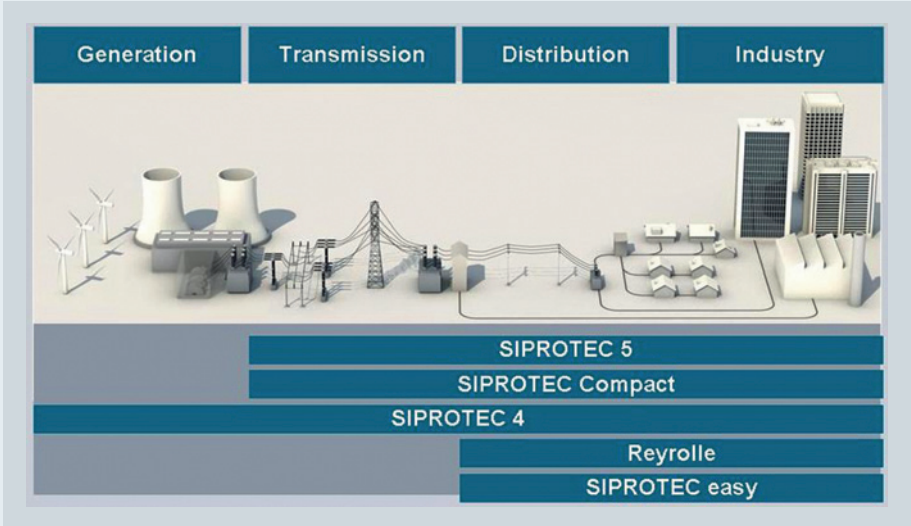
Overview, Relay Selection Table

Functions



Part 1

Siemens Protection Portfolio for all areas of application



Definition of device types based on designation

The devices are easily identified with the aid of a five-digit abbreviation code. The first digit (6 or 7) stands for the classification. The two letters describe the functionality and the last two digits identify typical properties.

Overview of the main functions

	Classification →	Main functions 6 or 7	XX	Distinguishing features YY
XX				Main functions
SIPROTEC devices				
KE				Fault recorder
MD				Bay Controller
RW				Voltage and Frequency Protection
SA				Distance Protection
SC				Feeder Protection
SD				Line Differential Protection
SJ				Overcurrent Protection
SK				Motor protection
SL				Line Differential and Distance Protection
SS				Busbar Protection
UM				Generator Protection
UT				Transformer Protection
VK				Breaker Manangement
VU				High Speed Busbar
Reyrolle devices				
SG				Numerical Protection
SR				New Numerical protection
PG				Electromechanical protection

Overview, Relay Selection Table

ANSI	Function	Abbr.	Overcurrent and feeder protection						Feeder Automation		Generator and motor protection				
			Reyrolle	Reyrolle	Reyrolle	Reyrolle	Reyrolle	Reyrolle	SIPROTEC Compact	Reyrolle	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	SIPROTEC Compact	SIPROTEC Compact
	■ = basic ● = optional (additional price) - = not available														
	1) in preparation 2) via CFC 3) = IO number of a standard variant (increased configuration available using the SIPROTEC 5 system)/number of current and voltage inputs up to 24 (total) 4) = number of one unit 7SS60. Total number is depending on system configuration														
	Functions														
	Protection functions for 3-pole tripping	3-pole	■	■	■	■	■	■	■	■	■	■	■	■	■
	Protection functions for 1-pole tripping	1-pole	-	-	-	-	-	-	1)	●	-	-	-	-	-
14	Locked rotor protection	$I > + V <$	-	-	-	-	-	-	-	-	■	■	●	■	■
21	Distance protection	Z <	-	-	-	-	-	-	-	-	-	-	-	-	-
21T	Impedance protection for transformers	Z <	-	-	-	-	-	-	-	-	-	-	-	-	-
24	Overexcitation protection	V/f	-	-	-	-	-	-	-	-	●	●	●	-	-
25	Synchrocheck, synchronizing function	Sync	-	-	-	-	-	●	●	●	●	●	●	-	-
27	Undervoltage protection	V <	-	■	-	●	-	■	●	■	●	●	-	●	●
27TN/59TN	Stator ground fault 3rd harmonics	$V_{0<, >(3.Harm.)}$	-	-	-	-	-	-	-	-	-	-	●	-	-
	Undervoltage-controlled reactive power protection	$Q > V <$	-	-	-	-	-	-	-	-	●	●	●	-	-
32	Directional power supervision	$P <, Q <$	-	-	-	-	-	-	●	-	●	●	●	●	●
37	Undercurrent protection, underpower	$I <, P <$	■	■	-	■	■	■	■	-	■	■	●	■	■
38	Temperature supervision	$\theta >$	-	-	-	-	-	-	-	-	●	●	●	■	■
40	Underexcitation protection	$1/X_D$	-	-	-	-	-	-	-	-	-	-	●	-	-
46	Unbalanced-load protection	$I_2 >$	■	■	-	-	■	■	■	■	■	■	■	■	■
46	Negative-sequence system overcurrent protection	$I_2 >, I_2/I_1 >$	■	■	-	-	■	■	■	■	■	■	■	■	■
47	Phase-sequence-voltage supervision	LA, LB, LC	-	■	-	-	-	■	●	■	■	■	■	●	●
47	Overvoltage protection, negative-sequence system	$V_2 >$	-	■	-	-	-	■	●	■	●	●	●	●	●
48	Starting-time supervision	I_{start}^2	-	-	-	-	-	-	-	-	■	■	■	■	■
49	Thermal overload protection	$\theta >, I^2t$	■	■	-	■	■	■	■	■	■	■	■	■	■
49H	Hot spot calculation	$\theta_{H >, I^2t$	-	-	-	-	-	-	-	-	-	-	-	-	-
50/50N	Definite time-overcurrent protection	$I >$	■	■	■	■	■	■	■	■	■	■	■	■	■
SOTF	Instantaneous tripping at switch onto fault		■	■	■	-	■	■	■	■	■	■	●	■	■
	Arc-protection		■ 1)	■ 1)	-	-	■	■	-	-	●	●	●	-	-
50Ns	Sensitive ground-current protection	$I_{Ns >$	●	●	-	-	■	■	■	■	■	■	●	●	●
	Intermittent ground-fault protection	$I_{ie >$	-	-	-	-	-	-	-	-	● 1)	● 1)	● 1)	■	-
50BF	Circuit-breaker failure protection	CBFP	■	■	-	■	■	■	■	■	●	●	●	■	■
50RS	Circuit-breaker restrike protection	CBRS	-	-	-	-	-	-	-	-	●	●	-	-	-
51/51N	Inverse time-overcurrent protection	I_p, I_{NP}	■	■	■	■	■	■	■	■	■	■	■	■	■
50L	Load-jam protection	$I >_L$	-	-	-	-	-	-	-	-	■	■	●	■	■
51C	Cold load pickup		■	■	-	■	■	■	■	■	■	■	●	■	■
51V	Voltage dependent overcurrent protection	$t=f(I)+V <$	-	■	-	-	-	■	●	■	●	●	●	●	-
55	Power factor	$\cos \phi$	-	-	-	-	-	-	●	-	■ 2)	■ 2)	■ 2)	●	●
59	Overvoltage protection	$V >$	-	■	-	●	-	■	●	■	●	●	■	●	●
	Peak overvoltage protection, 3-phase, for capacitors	$V >_{cap.}$	-	-	-	-	-	-	-	-	-	-	-	-	-
59N	Overvoltage protection, zero-sequence system	$V_0 >$	-	■	-	●	-	■	●	■	●	●	■	●	●
59R, 27R	Rate-of-voltage-change protection	dV/dt	-	-	-	-	-	-	●	-	-	-	-	●	-
60C	Current-unbalance protection for capacitor banks	$I_{unbal >$	-	-	-	-	■	-	-	-	-	-	-	-	-
60FL	Measuring-voltage failure detection		-	-	-	-	-	-	●	-	■	■	■	●	●
64	Sensitive ground-fault protection (machine)		-	-	-	-	-	-	-	-	-	-	-	-	-
66	Restart inhibit	I^2t	-	-	-	-	-	-	-	-	■	■	●	■	■
67	Directional time-overcurrent protection, phase	$I >, I_p < (V, I)$	-	■	-	●	-	■	●	■	●	●	■	-	-
67N	Directional time-overcurrent protection for ground-faults	$I_{N >, I_{NP} < (V, I)$	-	■	-	●	-	■	●	■	●	●	●	●	●
67Ns	Dir. sensitive ground-fault detection for systems with resonant or isolated neutral	$I_{Ns >, < (V, I)$	-	■	-	-	-	-	●	-	●	●	●	●	●
67Ns	Transient ground-fault function, for transient and permanent ground faults in resonant-grounded or isolated networks	$W_{0p, tr >$	-	-	-	-	-	-	-	-	●	●	-	-	-
	Directional intermittent ground fault protection	$I_{ie dir >$	-	-	-	-	-	-	-	-	●	●	-	●	-

Relay Selection Table
to be continued
on the following pages



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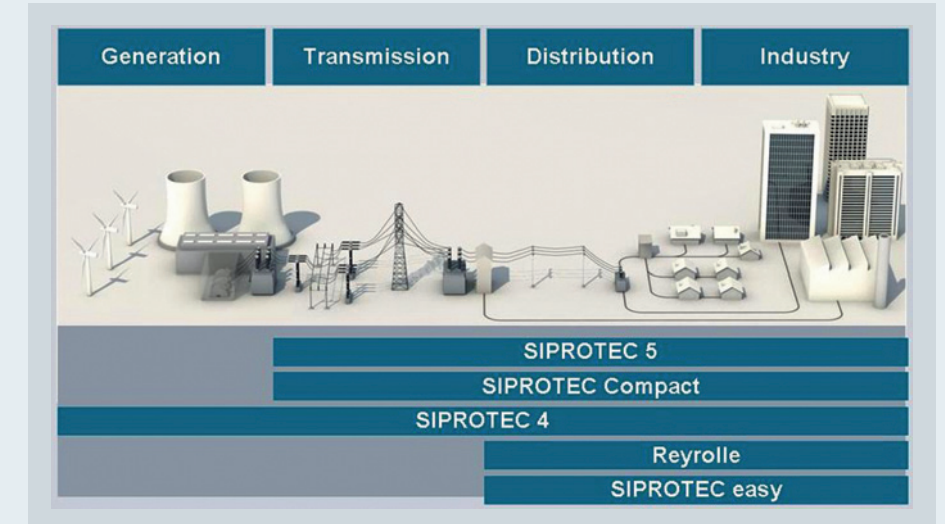
Functions (continued)

Further functions

Hardware Feature

Part 2

Siemens Protection Portfolio for all areas of application



Definition of device types based on designation

The devices are easily identified with the aid of a five-digit abbreviation code. The first digit (6 or 7) stands for the classification. The two letters describe the functionality and the last two digits identify typical properties.














Overview of the main functions

Classification	Main functions		Distinguishing features	
	6 or 7	XX	YY	
XX	Main functions			
SIPROTEC devices				
KE	Fault recorder			
MD	Bay Controller			
RW	Voltage and Frequency Protection			
SA	Distance Protection			
SC	Feeder Protection			
SD	Line Differential Protection			
SJ	Overcurrent Protection			
SK	Motor protection			
SL	Line Differential and Distance Protection			
SS	Busbar Protection			
UM	Generator Protection			
UT	Transformer Protection			
VK	Breaker Manangement			
VU	High Speed Busbar			
Reyrolle devices				
SG	Numerical Protection			
SR	New Numerical protection			
PG	Electromechanical protection			

Overview, Relay Selection Table

ANSI		Function		Abbr.		Overcurrent and feeder protection						Feeder Automation		Generator and motor protection				
						Device series						SIPROTEC Compact	Reyrolle	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	SIPROTEC Compact	SIPROTEC Compact
						Reyrolle	Reyrolle	Reyrolle	Reyrolle	Reyrolle	Reyrolle	SIPROTEC Compact	Reyrolle	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	SIPROTEC Compact	SIPROTEC Compact
						7SR11	7SR12	7SR45 ¹⁾	7SR191	7SR210	7SR220	7SC80	7SR224	7SK82	7SK85	7UM85 ¹⁾	7SK80	7SK81
		Functions																
68	Power-swing blocking	$\Delta Z/\Delta t$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74TC	Trip-circuit supervision	TCS	■	■	-	■	■	■	■	■	■	■	■	■	■	■	■	■
78	Out-of-step protection	$\Delta Z/\Delta t$	-	-	-	-	-	-	-	-	-	-	-	-	-	●	-	-
79	Automatic reclosing	AR	●	●	-	-	●	●	●	●	●	●	■	●	●	-	-	-
81	Frequency protection	$f <, f >$	-	■	-	-	-	-	-	■	●	●	■	●	●	■	●	●
81R	Rate-of-frequency-change protection	df/dt	-	-	-	-	●	-	-	-	●	-	●	●	●	●	●	●
	Vector-jump protection	$\Delta \phi_{U>}$	-	-	-	-	-	-	-	-	-	-	-	-	-	●	-	-
81LR	Load restoration	LR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	Teleprotection		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	Lockout		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
87	Differential protection	ΔI	-	-	-	-	-	-	-	-	-	-	-	●	●	●	-	-
87T	Differential protection, Phase angle regulating transformer (single core)	ΔI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
87T	Differential protection, Phase angle regulating transformer (two core)	ΔI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
87T	Differential protection, Special transformers	ΔI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
87C	Differential protection, capacitor bank	ΔI	-	-	-	-	■	-	-	-	-	-	-	-	-	-	-	-
87V	Voltage differential protection, capacitor bank		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
87N	Differential ground-fault protection	ΔI_N	●	●	-	-	■	■	■	■	■	■	■	-	-	●	-	-
	Broken-wire detection for differential protection		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
90V	Automatic voltage control 2 winding transformer		-	-	-	-	-	-	-	-	-	-	-	●	●	-	-	-
90V	Automatic voltage control 3 winding transformer		-	-	-	-	-	-	-	-	-	-	-	●	●	-	-	-
90V	Automatic voltage control grid coupling transformer		-	-	-	-	-	-	-	-	-	-	-	●	●	-	-	-
FL	Fault locator	FL	-	-	-	-	-	-	-	●	●	●	●	●	●	-	-	-
PMU	Synchrophasor measurement	PMU	-	-	-	-	-	-	-	-	-	-	-	●	●	●	-	-
		Further Functions																
	Measured values		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Switching-statistic counters		■	■	-	■	■	■	■	■	■	■	■	■	■	■	■	■
	Circuit breaker wear monitoring	$\Sigma I_x, I^2t, 2P$	■	■	-	■	■	■	■	■	■	■	■	■	■	■	-	-
	Logic editor		■	■	-	■	■	■	■	■	■	■	■	■	■	■	■	■
	Inrush-current detection		■	■	-	■	■	■	■	■	■	■	■	■	■	■	■	■
	External trip initiation		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Control		■	■	-	■	■	■	■	■	■	■	■	■	■	■	■	■
	High Speed busbar transfer function		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fault recording of analog and binary signals		■	■	-	■	■	■	■	■	■	■	■	■	■	■	■	■
	Extended fault recording		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FSR	Fast-scan recorder	FSR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SSR	Slow-scan recorder	SSR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CR	Continuous recorder	CR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TR	Trend recorder "Power quality recorder (class S)"	TR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PQR	Power Quality Recorder "Power quality recorder (class S)"	PQR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOER	Sequence-of-events recorder	SOER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ExTrFct	Extended trigger functions	ExTrFct	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Monitoring and supervision		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Protection interface, serial		-	-	-	-	-	-	-	-	-	-	-	●	●	●	-	-
	No. Setting groups		4	4	1	4	8	8	4	8	8	8	8	8	8	4	4	4
	Changeover of setting group		■	■	-	■	■	■	■	■	■	■	■	■	■	■	■	■
	Circuit breaker test		-	-	-	-	-	-	-	-	-	-	-	■	■	■	-	-

Overview, Relay Selection Table

ANSI	Function	Abbr.	Overcurrent and feeder protection						Feeder Automation		Generator and motor protection				
			Device series						SIPROTEC Compact	Reyrolle	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	SIPROTEC Compact	SIPROTEC Compact
			Reyrolle	Reyrolle	Reyrolle	Reyrolle	Reyrolle	Reyrolle	SIPROTEC Compact	Reyrolle	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	SIPROTEC Compact	SIPROTEC Compact
															
	Hardware Feature														
	Hardware quantity structure expandable	I/O	■	■	■	■	■	■	–	■	■	■	■	–	–
	Binary Inputs (max)		6	6	2	6	19	13	12	43	11/23	27 ³⁾	27 ³⁾	3/7	3/7
	Binary Outputs (max) incl. Life contact		8	8	2	8	16	14	9	30	9/16	17 ³⁾	17 ³⁾	6/9	6/9
	Internal RTD Inputs (max)		–	–	–	–	–	–	–	–	–	–	–	5	5
	Transducer inputs (0-20mA) (max)		–	–	–	–	–	–	–	–	8	12	12	–	–
	Analog measured value outputs (0-20mA) (max)		–	–	–	–	–	–	–	–	–	–	–	–	–
	Current Inputs (max)		4	4	4	4	4	5	4	4	4	4 ³⁾	4 ³⁾	4	–
	Voltage Inputs (max)		–	3	–	3	–	4	1/4	6	4	4 ³⁾	4 ³⁾	0/3	–
	Low Power CT Inputs		–	–	–	–	–	–	3	–	–	–	–	–	4
	Low Power VT Inputs		–	–	–	–	–	–	4	–	–	–	–	–	0/3
	Case (x19")		–	–	–	–	–	–	–	–	1/3	1/3–2/1	1/3–2/1	1/6	1/6
	Size (xE)		E4	E4	E4	E4	E6, E8	E6, E8	–	E10, E12	–	–	–	–	–
	Small Display (lines)		4	4	2	4	4	4	6	4	8	8	8	6	6
	Large, graphical Display (Pixel)		–	–	–	–	–	–	–	–	320x240	320x240	320x240	–	–
	Push Buttons		5	5	7	5	11	11	10	17	9	9	9	9	9
	Key Switch		–	–	–	–	–	–	–	–	–	●	●	–	–
	LEDs (max)		10	10	9	10	19	19	32	19	82	82	82	10	10
	Pluggable terminal blocks		–	–	–	–	–	–	■	–	■	■	■	■	■
	PSU Variants		DC 24-60; DV 88-250	DC 24-60; DV 88-250	–	DC 24-60; DC 88-250/ 115V	DC 30-250	DC 30-250	DC 24-48; DC 60-250/ AC115-232	DC 30-250	DC 24-48; DC 60-250/ AC115-230	DC 24-48; DC 60-250/ AC115-230	DC 24-48; DC 60-250/ AC115-230	DC 24-48; DC 60-250/ AC115-230	DC 24-48; DC 60-250/ AC115-230
	Communication														
	Front User Interface		■	■	■	■	■	■	■	■	■	■	■	■	■
	IEC 60870-5-101		–	–	–	–	–	–	–	●	–	–	–	–	–
	IEC 60870-5-103		■	■	–	■	■	■	–	■	●	●	●	●	●
	IEC 60870-5-104		–	–	–	–	–	–	■	–	●	●	●	●	–
	Profibus FMS, Slave		–	–	–	–	–	–	–	–	–	–	–	–	–
	Profibus DP, Slave		–	–	–	–	–	–	–	–	–	–	–	●	●
	MODBUS TCP		–	–	–	–	–	–	–	–	●	●	●	●	–
	MODBUS RTU SLAVE		■	■	–	■	■	■	–	■	–	–	–	●	●
	PROFINET I/O		–	–	–	–	–	–	■	–	–	–	–	●	–
	DNP3 serial		■	■	–	■	■	■	–	■	●	●	●	●	●
	DNP 3 TCP		–	–	–	–	–	–	■	–	●	●	●	●	–
	IEC 61850-8-1		–	–	–	–	●	●	■	●	●	●	●	●	●
	IEC 61850-9-2		–	–	–	–	–	–	–	–	–	●	●	–	–
	DIGSI		–	–	–	–	–	–	●	–	■	■	■	●	●
	RTD-unit connection		–	–	–	–	–	–	–	–	●	●	●	●	●
	20 mA unit connection		–	–	–	–	–	–	–	–	●	●	●	–	●
	Synchrophasor (IEEE C37.118)		–	–	–	–	–	–	–	–	●	●	●	–	–
	Redundancy Protocols		● ¹⁾	● ¹⁾	–	–	●	●	■	●	●	●	●	●	●
	RSTP (Ethernet ring redundancy)		● ¹⁾	● ¹⁾	–	–	●	●	■	●	●	●	●	●	●
	PRP V1 (Parallel Redundancy Protocol)		● ¹⁾	● ¹⁾	–	–	●	●	■	●	●	●	●	●	●
	HSR (High available Seamless Ring configuration)		● ¹⁾	● ¹⁾	–	–	●	●	■	●	●	●	●	●	●
	Further Ethernet protocols on Ethernet modules		–	–	–	–	–	–	■	–	●	●	●	●	●
	Time Synchronisation		■	■	–	■	■	■	■	■	■	■	■	■	■
	IEEE 1588 C37.238 profile (PSRC - profile)		–	–	–	–	–	–	–	–	●	●	●	–	–
	Timesync. via integrated GPS module		–	–	–	–	–	–	●	–	–	–	–	–	–

■ = basic
● = optional (additional price)
– = not available

1) in preparation
2) via CFC
3) = IO number of a standard variant (increased configuration available using the SIPROTEC 5 system)/number of current and voltage inputs up to 24 (total)
4) = number of one unit 7SS60. Total number is depending on system configuration

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For all products using security features of OpenSSL the following shall apply:
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(<http://www.openssl.org/>)
This product includes cryptographic software written by Eric Young (eay@cryptsoft.com)



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