SIEMENS



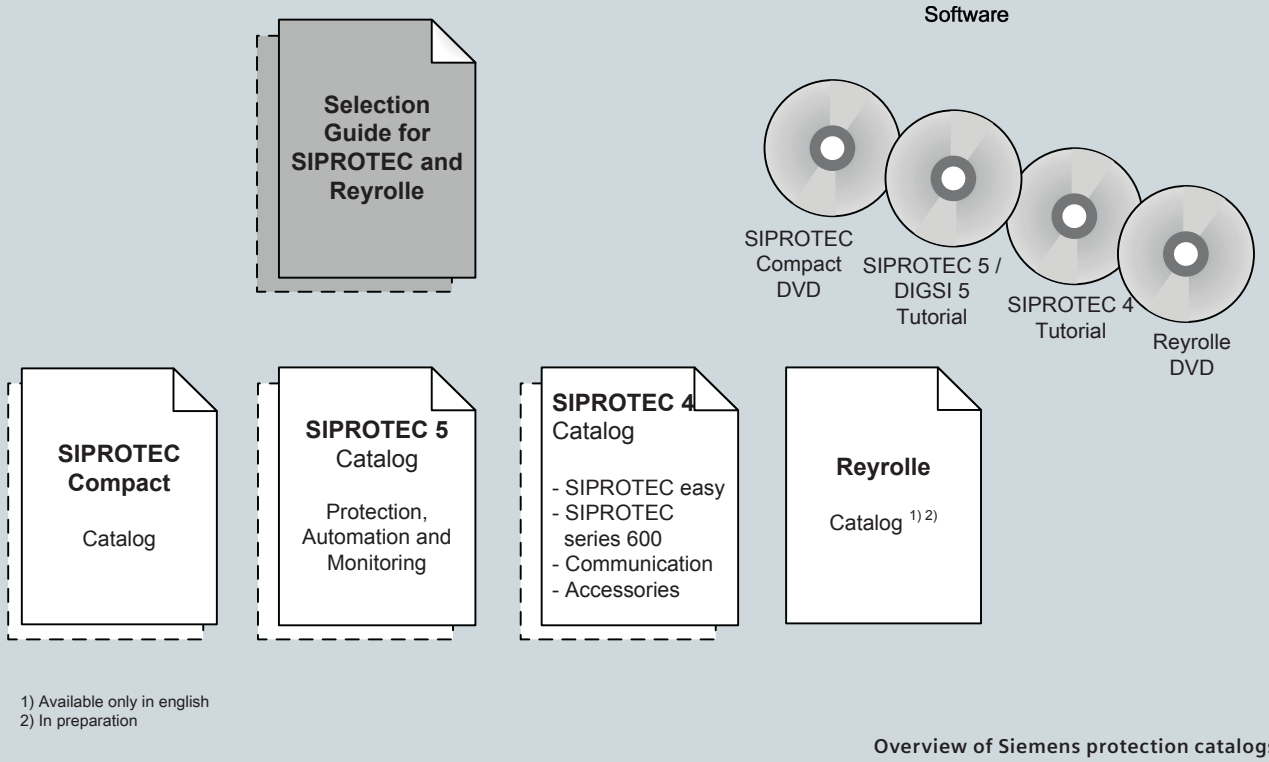
Siemens protection devices

Selection Guide for SIPROTEC and Reyrolle

Edition 4

siemens.com/protection

Overview of Siemens Protection Catalogs



Overview of Siemens protection catalogs

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 SIPRROTEC family for communication, auxiliary relays and test equipment are described.

Reyrolle catalog:

This catalog gives an overview of the reyrolle devices.

Selection Guide for SIPROTEC and Reyrolle

Edition 4

Invalid: Edition 3

www.siemens.com/protection

	Page
Protection Devices Series	
SIPROTEC and Reyrolle Relay Families	4
SIPROTEC 5	5
SIPROTEC Compact	6
SIPROTEC 4	7
SIPROTEC easy and SIPROTEC Compact (series 600)	8
Reyrolle	9
Overview, Relay Selection Table	
Part 1 Functions	10 to 18
Part 2 Functions (continued) Further Functions Hardware Feature	20 to 28
Part 3 Hardware Feature (continued) Communication	20 to 28
Legal Notice	
	39

MANAGEMENT SYSTEM CERTIFICATION
DNV·GL
ISO 9001 = ISO 14001
OHSAS 18001

The products and systems described in this catalog are manufactured and sold according to a certified management system (acc. to ISO 9001, ISO 14001 and BS OHSAS 18001).

Protection Devices

SIPROTEC and Reyrolle Relay Families

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.

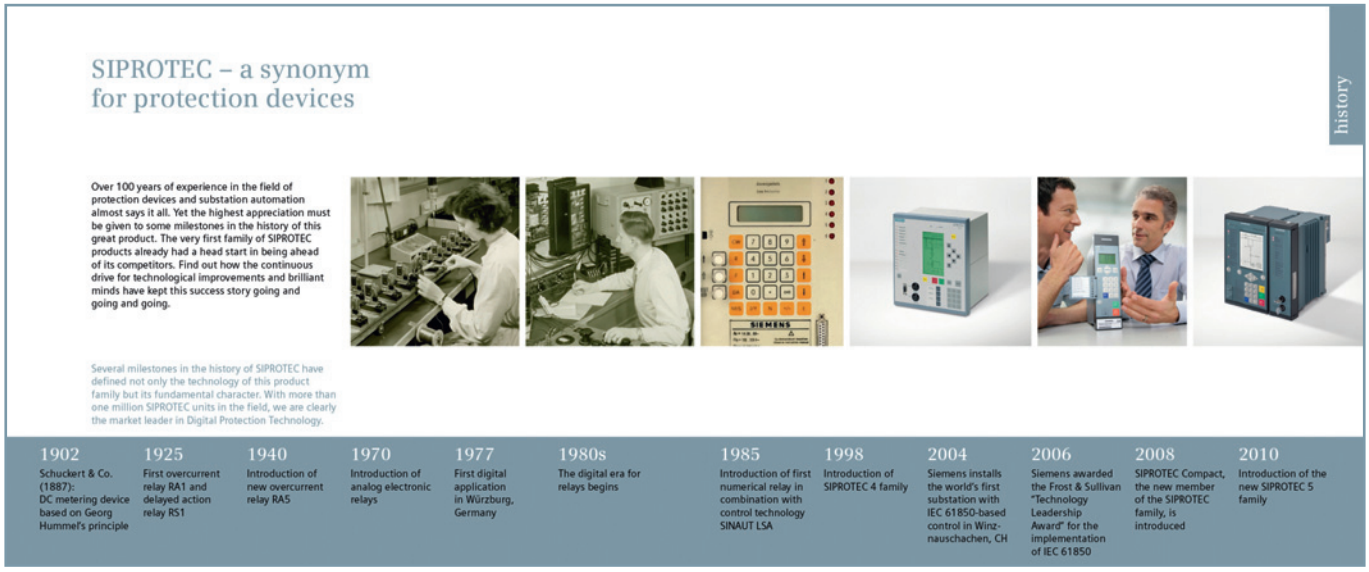


Fig. 2 SIPROTEC – Pioneer over generations

SIPROTEC 5 – the new benchmark for protection, automation and monitoring

The SIPROTEC 5 series is based on the long field experience of the SIPROTEC device series, and has been especially designed for the new requirements of modern high-voltage systems. For this purpose, SIPROTEC 5 is equipped with extensive functionalities and device types. With the holistic and consistent engineering tool DIGSI 5, a solution has also been provided for the increasingly complex processes, from the design via the engineering phase up to the test and operation phase.

Thanks to the high modularity of hardware and software, the functionality and hardware of the devices can be tailored to the requested application and adjusted to the continuously changing requirements throughout the entire life cycle.

Besides the reliable and selective protection and the complete automation function, SIPROTEC 5 offers an extensive database for operation and monitoring of modern power supply systems. Synchrophasors (PMU), power quality data and extensive operational equipment data are part of the scope of supply.

- Powerful protection functions guarantee the safety of the system operator's equipment and employees
- Individually configurable devices save money on initial investment as well as storage of spare parts, maintenance, expansion and adjustment of your equipment
- Arc protection, detection of transient ground fault and process bus simply integrable and retrofittable
- Clear and easy-to-use of devices and software thanks to user-friendly design
- Increase of reliability and quality of the engineering process
- High reliability due to consequent implementation of safety and security
- Powerful communication components guarantee safe and effective solutions
- Full compatibility between IEC 61850 Editions 1 and 2
- Integrated switch for low-cost and redundant optical and electrical Ethernet rings
- Ethernet redundancy protocols RSTP, PRP and HSR
- Efficient operating concepts by flexible engineering of IEC 61850 Edition 2
- Comprehensive database for monitoring of modern power grids
- Optimal smart automation platform for transmission grids based on integrated synchrophasor measurement units (PMU) and power quality functions.

The SIPROTEC 5 devices have a basic housing width of 1/3 x 19", and are flexibly expandable except of 7xx82.



Fig. 3 SIPROTEC 5 – modular hardware



Fig. 4 SIPROTEC 5 – rear view



Fig. 5 Application in the high-voltage system

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 4 – the proven, reliable and future-proof protection for all applications

SIPROTEC 4 represents a worldwide successful and proven device series with more than 1 million devices in field use.

Due to the homogenous system platform, the unique engineering program DIGSI 4 and the great field experience, the SIPROTEC 4 device family has gained the highest appreciation of users all over the world. Today, SIPROTEC 4 is considered the standard for numerical protection systems in all fields of application.

SIPROTEC 4 provides suitable devices for all applications from power generation and transmission up to distribution and industrial systems.

SIPROTEC 4 is a milestone in protection systems. The SIPROTEC 4 device series implements the integration of protection, control, measuring and automation functions optimally in one device. In many fields of application, all tasks of the secondary systems can be performed with one single device. The open and future-proof concept of SIPROTEC 4 has been ensured for the entire device series with the implementation of IEC 61850.

- Proven protection functions guarantee the safety of the systems operator's equipment and employees
- Comfortable engineering and evaluation via DIGSI 4
- Simple creation of automation solutions by means of the integrated CFC
- Targeted and easy operation of devices and software thanks to user-friendly design
- Powerful communication components guarantee safe and effective solutions
- Maximum experience worldwide in the use of SIPROTEC 4 and in the implementation of IEC 61850 projects
- Future-proof due to exchangeable communication interfaces and integrated CFC
- Integrated switch for low-cost and redundant optical and electrical Ethernet rings
- Ethernet redundancy protocols RSTP, PRP and HSR.



Fig. 9 SIPROTEC 4



Fig. 10 SIPROTEC 4 rear view



Fig. 11 SIPROTEC 4 in power plant application

Protection Devices

SIPROTEC easy, SIPROTEC Compact (series 600)

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)

Reyrolle – Withdrawable solutions for distribution grids

Reyrolle has been synonymous with electrical protection devices in the sectors of sub-transmission, distribution and industrial applications for decades. Historically, Reyrolle relays, initially sold mainly in traditional markets, are now sold worldwide as part of the Siemens protection network.

Since its foundation, Reyrolle has been an innovation driver in product development – based on a strong focus on market, customer and technology. Worldwide established brand names such as "Solkor" and "Argus" demonstrate this. But there is more: A wide range of Reyrolle products has determined technological firsts in the market.

The comprehensive range of Reyrolle products provides the total protection requirements of distribution markets – ranging from overcurrent protection via transformer protection and voltage control to a full spectrum of auxiliary and trip relays. The portfolio includes many famous products such as "Argus", "Duobias", "Solkor", "Rho", etc.

To serve specific needs in industrial applications, a range of proven products such as "Argus overcurrent", "Solkor line differential" and "Rho motor protection devices" is offered.

Through successive generations, Reyrolle numerical products have been developed to increase value to system operators. This increase in value is the result of consistent development:

- Ease-of-use as a principle – our withdrawable product solutions allow flexible, easy operation through high user friendliness.
- One size fits all – the 4U housing height and the latest generation of numerical products features 1A/5A CT Input, and some models are provided with universal DC supplies.
- Learn once, know all – the new product generation provides a similar look and feel as earlier products. If Reyrolle numerical devices have been previously used, there is a high consistency in both programming and interrogation.
- With Reydisp Evolution, a comprehensive software support toolkit for relay setting, fault interrogation and general system information is provided. It is backward-compatible with all previous Reyrolle numerical devices.



Fig. 14 Front view Argus 7SR210



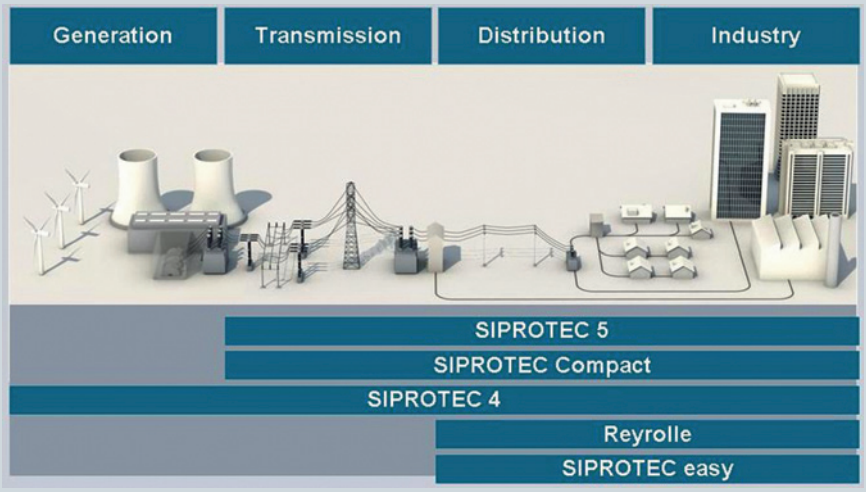
Fig. 15 Rear view Argus 7SR210

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	
	Main functions / Distinguishing features Classification → 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 Differntial 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

■ = 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

			Distance protection							Line differential protection		
		Device series	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5
												
ANSI	**Function**	**Abbr.**	**7SA82**	**7SA86**	**7SA87**	**7SA522**	**7SA61**	**7SA63**	**7SA64**	**7SD82**	**7SD86**	**7SD87**
	Functions											
	Protection functions for 3-pole tripping	3-pole	■	■	■	■	■	■	■	■	■	■
	Protection functions for 1-pole tripping	1-pole	–	–	■	●	●	●	●	–	–	■
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	$V0<,>_{(3.Harm.)}$	–	–	–	–	–	–	–	–	–	–
	Undervoltage-controlled reactive power protection	Q>/V<	●	●	●	●	●	●	●	●	●	●
32	Directional power supervision	P<>, Q<>	●	●	●	■	■	■	■	●	●	●
37	Undercurrent protection, underpower	I<, P<	●	●	●	●	●	●	●	●	●	●
38	Temperature supervision	θ>	●	●	●	●	●	●	●	●	●	●
40	Underexcitation protection	$1/X_D$	–	–	–	–	–	–	–	–	–	–
46	Unbalanced-load protection	I2>	●	●	●	–	–	–	–	●	●	●
46	Negative-sequence system overcurrent protection	I2>, I2/I1>	●	●	●	–	–	–	–	●	●	●
47	Phase-sequence-voltage supervision	LA, LB, LC	■	■	■	■	■	■	■	■	■	■
47	Overvoltage protection, negative-sequence system	V2>	●	●	●	●	●	●	●	●	●	●
48	Starting-time supervision	I^2_{start}	–	–	–	–	–	–	–	–	–	–
49	Thermal overload protection	θ>, I^2t	●	●	●	–	●	■	■	●	●	●
49H	Hot spot calculation	θ_h>, I^2t	–	–	–	–	–	–	–	–	–	–
50/50N	Definite time-overcurrent protection	I>	■	■	■	■	■	■	■	■	■	■
SOTF	Instantaneous tripping at switch onto fault		■	■	■	■	■	■	■	■	■	■
	Arc-protection		●	●	●	–	–	–	–	●	●	●
50Ns	Sensitive ground-current protection	I_{Ns}>	●	●	●	●	●	●	●	●	●	●
	Intermittent ground-fault protection	Iie>	●	●	●	●	●	●	●	●	●	●
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 φ	■ 2)	■ 2)	■ 2)	■ 2)	■ 2)	■ 2)	■ 2)	■ 2)	■ 2)	■ 2)
59	Overvoltage protection	V>	●	●	●	●	●	●	●	●	●	●
	Peak overvoltage protection, 3-phase, for capacitors	V> cap.	–	–	–	–	–	–	–	–	–	–
59N	Overvoltage protection, zero-sequence system	V0>	●	●	●	●	●	●	●	●	●	●
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>, $I_P \angle$ (V,I)	●	●	●	■ 2)	■ 2)	■ 2)	■ 2)	●	●	●
67N	Directional time-overcurrent protection for ground-faults	I_N>, $I_{NP} \angle$ (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	W0p,tr>	●	●	●	–	–	–	–	●	●	●
	Directional intermittent ground fault protection	Iie dir>	–	–	–	–	–	–	–	–	–	–

Overview, Relay Selection Table

■ = 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

			Line differential protection						Combined line differential and distance protection			High impedance protection	
		Device series	SIPROTEC Compact	SIPROTEC 4	SIPROTEC 4	SIPROTEC 600er	Reyrolle	Reyrolle	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	Reyrolle	Reyrolle
													
ANSI	**Function**	**Abbr.**	**7SD80**	**7SD610**	**7SD5**	**7SD60**	**7PG2111**	**7SR18** [1]	**7SL82**	**7SL86**	**7SL87**	**7SR23**	**7PG23**
	Functions												
	Protection functions for 3-pole tripping	3-pole	■	■	■	■	■	■	■	■	■	■	■
	Protection functions for 1-pole tripping	1-pole	–	●	●	–	–	–	–	–	■	■	–
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	$V0<,>_{(3.Harm.)}$	–	–	–	–	–	–	–	–	–	–	–
	Undervoltage-controlled reactive power protection	Q>/V<	–	–	–	–	–	–	●	●	●	–	–
32	Directional power supervision	P<>, Q<>	–	●	■	–	–	–	●	●	●	–	–
37	Undercurrent protection, underpower	I<, P<	–	–	–	–	–	■	●	●	●	–	–
38	Temperature supervision	θ>	–	–	–	–	–	–	●	●	●	–	–
40	Underexcitation protection	$1/X_D$	–	–	–	–	–	–	–	–	–	–	–
46	Unbalanced-load protection	I2>	–	–	–	–	–	■	●	●	●	–	–
46	Negative-sequence system overcurrent protection	I2>, I2/I1>	–	–	–	–	–	●	●	●	●	–	–
47	Phase-sequence-voltage supervision	LA, LB, LC	–	■	■	–	–	●	■	■	■	–	–
47	Overvoltage protection, negative-sequence system	V2>	●	●	●	–	–	●	●	●	●	–	–
48	Starting-time supervision	I^2_{start}	–	–	–	–	–	–	–	–	–	–	–
49	Thermal overload protection	θ>, I^2t	■	■	■	–	–	■	●	●	●	–	–
49H	Hot spot calculation	θ_h>, I^2t	–	–	–	–	–	–	–	–	–	–	–
50 / 50N	Definite time-overcurrent protection	I>	■	■	■	●	●	■	■	■	■	–	–
SOTF	Instantaneous tripping at switch onto fault		■	■	■	–	–	■	■	■	■	–	–
	Arc-protection		–	–	–	–	–	■	●	●	●	–	–
50Ns	Sensitive ground-current protection	I_{Ns}>	–	–	●	–	–	●	●	●	●	■	■
	Intermittent ground-fault protection	Iie>	–	–	–	–	–	–	●	●	●	–	–
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 φ	–	■ [2]	■ [2]	–	–	–	■ [2]	■ [2]	■ [2]	–	–
59	Overvoltage protection	V>	●	●	●	–	–	●	●	●	●	–	–
	Peak overvoltage protection, 3-phase, for capacitors	V> cap.	–	–	–	–	–	–	–	–	–	–	–
59N	Overvoltage protection, zero-sequence system	V0>	●	●	●	–	–	●	●	●	●	–	–
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>, $I_P \angle$ (V,I)	●	●	–	–	–	●	●	●	●	–	–
67N	Directional time-overcurrent protection for ground-faults	I_N>, $I_{NP} \angle$ (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	W0p,tr>	–	–	–	–	–	–	●	●	●	–	–
	Directional intermittent ground fault protection	Iie dir>	–	–	–	–	–	–	–	–	–	–	–

Overview, Relay Selection Table

■ = 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

			Overcurrent and feeder protection													
		Device series	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	SIPROTEC Compact	SIPROTEC Compact	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4	SIPROTEC easy	SIPROTEC easy	SIPROTEC 600er	SIPROTEC 600er
																
ANSI	**Function**	**Abbr.**	**7SJ82**	**7SJ85**	**7SJ86**	**7SJ80**	**7SJ81**	**7SJ61**	**7SJ62**	**7SJ63**	**7SJ64**	**7SJ66**	**7SJ45**	**7SJ46**	**7SJ600**	**7SJ602**
	Functions															
	Protection functions for 3-pole tripping	3-pole	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Protection functions for 1-pole tripping	1-pole	–	–	–	–	–	–	–	–	–	–	–	–	–	–
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	$V0<,>_{(3.Harm.)}$	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Undervoltage-controlled reactive power protection	Q>/V<	●	●	●	●	–	–	●	–	●	●	–	–	–	–
32	Directional power supervision	P<>, Q<>	●	●	●	●	●	–	●	–	●	●	–	–	–	–
37	Undercurrent protection, underpower	I<, P<	■	■	■	■	■	■	■	■ 2)	■	■	–	–	–	■
38	Temperature supervision	θ>	●	●	●	–	–	●	●	●	●	●	–	–	–	●
40	Underexcitation protection	$1/X_D$	–	–	–	–	–	–	–	–	–	–	–	–	–	–
46	Unbalanced-load protection	I2>	■	■	■	■	■	■	■	■	■	■	–	–	■	■
46	Negative-sequence system overcurrent protection	I2>, I2/I1>	■	■	■	■	■	■	■	■	■	■	–	–	■	■
47	Phase-sequence-voltage supervision	LA, LB, LC	■	■	■	●	●	■	■	■	■	■	–	–	–	–
47	Overvoltage protection, negative-sequence system	V2>	●	●	●	●	●	–	●	●	●	●	–	–	–	–
48	Starting-time supervision	I^2_{start}	–	–	–	–	–	●	●	●	●	●	–	–	–	–
49	Thermal overload protection	θ>, I^2t	■	■	■	■	■	■	■	■	■	■	–	–	■	■
49H	Hot spot calculation	θ_h>, I^2t	–	–	–	–	–	–	–	–	–	–	–	–	–	–
50 / 50N	Definite time-overcurrent protection	I>	■	■	■	■	■	■	■	■	■	■	■	■	■	■
SOTF	Instantaneous tripping at switch onto fault		■	■	■	■	■	■	■	■	■	■	–	–	■	■
	Arc-protection		●	●	●	–	–	–	–	–	–	–	–	–	–	–
50Ns	Sensitive ground-current protection	I_{Ns}>	■	■	■	●	●	●	●	●	●	●	–	–	–	●
	Intermittent ground-fault protection	Iie>	●	●	●	■	–	●	●	–	●	●	–	–	–	–
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 φ	■ 2)	■ 2)	■ 2)	●	●	–	●	■ 2)	●	●	–	–	–	–
59	Overvoltage protection	V>	●	●	●	●	●	–	●	●	●	●	–	–	–	–
	Peak overvoltage protection, 3-phase, for capacitors	V> cap.	●	●	–	–	–	–	–	–	–	–	–	–	–	–
59N	Overvoltage protection, zero-sequence system	V0>	●	●	●	●	●	–	●	●	●	●	–	–	–	●
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>, $I_P \angle$ (V,I)	●	●	●	●	●	–	●	●	●	●	–	–	–	–
67N	Directional time-overcurrent protection for ground-faults	I_N>, $I_{NP} \angle$ (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	W0p,tr>	●	●	●	–	–	–	–	–	–	–	–	–	–	–
	Directional intermittent ground fault protection	Iie dir>	●	●	–	●	–	–	●	–	●	●	–	–	–	–

Overview, Relay Selection Table

■ = 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

			Overcurrent and feeder protection						Feeder Automation		Generator and motor protection				
		Device series	Reyrolle	Reyrolle	Reyrolle	Reyrolle	Reyrolle	Reyrolle	SIPROTEC Compact	Reyrolle	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	SIPROTEC Compact	SIPROTEC Compact
															
ANSI	**Function**	**Abbr.**	**7SR11**	**7SR12**	**7SR45** [1]	**7SR191**	**7SR210**	**7SR220**	**7SC80**	**7SR224**	**7SK82**	**7SK85**	**7UM85** [1]	**7SK80**	**7SK81**
	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	$V0<,>_{(3.Harm.)}$	–	–	–	–	–	–	–	–	–	–	●	–	–
	Undervoltage-controlled reactive power protection	Q>/V<	–	–	–	–	–	–	–	–	●	●	●	–	–
32	Directional power supervision	P<>, Q<>	–	–	–	–	–	–	●	–	●	●	●	●	●
37	Undercurrent protection, underpower	I<, P<	■	■	–	■	■	■	■	–	■	■	●	■	■
38	Temperature supervision	θ>	–	–	–	–	–	–	–	–	●	●	●	■	■
40	Underexcitation protection	$1/X_D$	–	–	–	–	–	–	–	–	–	–	●	–	–
46	Unbalanced-load protection	I2>	■	■	–	–	■	■	■	■	■	■	■	■	■
46	Negative-sequence system overcurrent protection	I2>, I2/I1>	■	■	–	–	■	■	■	■	■	■	■	■	■
47	Phase-sequence-voltage supervision	LA, LB, LC	–	■	–	–	–	■	●	■	■	■	■	●	●
47	Overvoltage protection, negative-sequence system	V2>	–	■	–	–	–	■	●	■	●	●	●	●	●
48	Starting-time supervision	I^2_{start}	–	–	–	–	–	–	–	–	■	■	■	■	■
49	Thermal overload protection	θ>, I^2t	■	■	–	■	■	■	■	■	■	■	■	■	■
49H	Hot spot calculation	θ_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	Iie>	–	–	–	–	–	–	–	–	● [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 φ	–	–	–	–	–	–	●	–	■ [2]	■ [2]	■ [2]	●	●
59	Overvoltage protection	V>	–	■	–	●	–	■	●	■	●	●	■	●	●
	Peak overvoltage protection, 3-phase, for capacitors	V> cap.	–	–	–	■	–	–	–	–	–	–	–	–	–
59N	Overvoltage protection, zero-sequence system	V0>	–	■	–	●	–	■	●	■	●	●	■	●	●
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>,$I_P \angle$ (V,I)	–	■	–	●	–	■	●	■	●	●	■	–	–
67N	Directional time-overcurrent protection for ground-faults	I_N>, $I_{NP} \angle$ (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	W0p,tr>	–	–	–	–	–	–	–	–	●	●	–	–	–
	Directional intermittent ground fault protection	Iie dir>	–	–	–	–	–	–	–	–	●	●	–	●	–

Overview, Relay Selection Table

■ = 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

			Generator and motor protection			Transformer protection							
		Device series	SIPROTEC 4	SIPROTEC 4	Reyrolle	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4	Reyrolle
													
ANSI	**Function**	**Abbr.**	**7UM61**	**7UM62**	**7SR17**	**7UT82**	**7UT85**	**7UT86**	**7UT87**	**7UT612**	**7UT613**	**7UT63**	**7SR242**
	Functions												
	Protection functions for 3-pole tripping	3-pole	■	■	■	■	■	■	■	■	■	■	■
	Protection functions for 1-pole tripping	1-pole	–	–	–	–	–	–	–	–	–	–	●
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	V0<,>(3.Harm.)	–	●	–	–	–	–	–	–	–	–	–
	Undervoltage-controlled reactive power protection	Q>/V<	–	–	–	–	●	●	●	–	–	–	–
32	Directional power supervision	P<>, Q<>	■	■	●	–	●	●	●	–	●	●	–
37	Undercurrent protection, underpower	I<, P<	●	●	■	–	–	–	–	–	–	–	●
38	Temperature supervision	θ>	●	●	●	●	●	●	●	●	●	●	–
40	Underexcitation protection	$1/X_D$	●	●	–	–	–	–	–	–	–	–	–
46	Unbalanced-load protection	I2>	●	●	■	●	●	●	●	●	●	●	■
46	Negative-sequence system overcurrent protection	I2>, I2/I1>	■	■	■	●	●	●	●	●	●	●	■
47	Phase-sequence-voltage supervision	LA, LB, LC	■	■	●	■	■	■	■	■	■	■	–
47	Overvoltage protection, negative-sequence system	V2>	●	●	–	–	●	●	●	–	●	●	–
48	Starting-time supervision	I^2_{start}	●	●	■	–	–	–	–	–	–	–	–
49	Thermal overload protection	θ>, I^2t	■	■	■	■	■	■	■	■	■	■	●
49H	Hot spot calculation	θ_h>, I^2t	–	–	–	●	●	●	●	–	–	–	–
50 / 50N	Definite time-overcurrent protection	I>	■	■	■	■	■	■	■	■	■	■	●
SOTF	Instantaneous tripping at switch onto fault		■	■	–	■	■	■	■	■	■	■	–
	Arc-protection		–	–	–	●	●	●	●	–	–	–	–
50Ns	Sensitive ground-current protection	I_{Ns}>	■	■	■	●	●	●	●	–	–	–	–
	Intermittent ground-fault protection	Iie>	–	–	–	–	–	–	–	–	–	–	–
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 φ	●	●	●	●	●	●	●	■	■	■	–
59	Overvoltage protection	V>	■	■	●	–	●	●	●	–	●	●	●
	Peak overvoltage protection, 3-phase, for capacitors	V> cap.	–	–	–	–	–	–	–	–	–	–	–
59N	Overvoltage protection, zero-sequence system	V0>	■	■	●	–	●	●	●	–	●	●	–
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>,$I_P \angle$ (V,I)	■	■	●	●	●	●	●	–	–	–	–
67N	Directional time-overcurrent protection for ground-faults	I_N>, $I_{NP} \angle$ (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	W0p,tr>	–	–	–	–	–	–	–	–	–	–	–
	Directional intermittent ground fault protection	Iie dir>	–	–	–	●	●	●	●	–	–	–	–

Overview, Relay Selection Table

■ = 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

			Busbar protection			Bay controller				
		Device series	SIPROTEC 5	SIPROTEC 4	SIPROTEC 600er	SIPROTEC 5	SIPROTEC 5	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4
										
ANSI	**Function**	**Abbr.**	**7SS85**	**7SS52**	**7SS60**	**6MD85**	**6MD86**	**6MD61**	**6MD63**	**6MD66**
	Functions									
	Protection functions for 3-pole tripping	3-pole	■	■	■	●	●	–	–	–
	Protection functions for 1-pole tripping	1-pole	●	–	■	–	–	–	–	–
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	$V0<,>_{(3.Harm.)}$	–	–	–	–	–	–	–	–
	Undervoltage-controlled reactive power protection	Q>/V<	–	–	–	–	–	–	–	–
32	Directional power supervision	P<>, Q<>	–	–	–	●	●	–	–	–
37	Undercurrent protection, underpower	I<, P<	–	–	–	–	–	–	–	–
38	Temperature supervision	θ>	–	–	–	■	■	–	–	–
40	Underexcitation protection	$1/X_D$	–	–	–	–	–	–	–	–
46	Unbalanced-load protection	I2>	–	–	–	●	●	–	–	–
46	Negative-sequence system overcurrent protection	I2>, I2/I1>	–	–	–	●	●	–	–	–
47	Phase-sequence-voltage supervision	LA, LB, LC	–	–	–	–	–	–	–	–
47	Overvoltage protection, negative-sequence system	V2>	●	–	–	–	–	–	–	–
48	Starting-time supervision	I^2_{start}	–	–	–	–	–	–	–	–
49	Thermal overload protection	θ>, I^2t	–	–	–	■	■	–	–	–
49H	Hot spot calculation	θ_h>, I^2t	–	–	–	–	–	–	–	–
50/50N	Definite time-overcurrent protection	I>	● 1)	●	–	●	■	–	–	–
SOTF	Instantaneous tripping at switch onto fault		–	–	–	–	–	–	–	–
	Arc-protection		–	–	–	●	●	–	–	–
50Ns	Sensitive ground-current protection	I_{Ns}>	–	–	–	–	–	–	–	–
	Intermittent ground-fault protection	Iie>	–	–	–	–	–	–	–	–
50BF	Circuit-breaker failure protection	CBFP	●	■	–	–	●	–	–	●
50RS	Circuit-breaker restrike protection	CBRS	–	–	–	–	–	–	–	–
51/51N	Inverse time-overcurrent protection	I_P, I_{Np}	● 1)	●	–	–	–	–	–	–
50L	Load-jam protection	$I>_L$	–	–	–	–	–	–	–	–
51C	Cold load pickup		–	–	–	–	–	–	–	–
51V	Voltage dependent overcurrent protection	t=f(I)+V<	–	–	–	–	–	–	–	–
55	Power factor	cos φ	–	–	–	–	–	–	–	–
59	Overvoltage protection	V>	●	–	–	●	●	–	–	–
	Peak overvoltage protection, 3-phase, for capacitors	V> cap.	–	–	–	–	–	–	–	–
59N	Overvoltage protection, zero-sequence system	V0>	●	–	–	–	–	–	–	–
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>,$I_P \angle$ (V,I)	–	–	–	–	–	–	–	–
67N	Directional time-overcurrent protection for ground-faults	I_N>, $I_{NP} \angle$ (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	W0p,tr>	–	–	–	–	–	–	–	–
	Directional intermittent ground fault protection	Iie dir>	–	–	–	–	–	–	–	–

Overview, Relay Selection Table

■ = 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

			Breaker management		Synchronizing		High speed Busbar transfer	Voltage and frequency protection			Fault Recorder
		Device series	SIPROTEC 5	SIPROTEC 4	SIPROTEC 4	Reyrolle	SIPROTEC 4	SIPROTEC Compact	SIPROTEC 600er	Reyrolle	SIPROTEC 5
											
ANSI	**Function**	**Abbr.**	**7VK87**	**7VK61**	**7VE6**	**7SR157**	**7VU683**	**7RW80**	**7RW60**	**7SR158**	**7KE85**
	Functions										
	Protection functions for 3-pole tripping	3-pole	■	■	●	■	–	■	■	■	–
	Protection functions for 1-pole tripping	1-pole	■	■	–	–	–	–	–	–	–
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	$V0<,>_{(3.Harm.)}$	–	–	–	–	–	–	–	–	–
	Undervoltage-controlled reactive power protection	Q>/V<	–	–	–	–	–	–	–	–	–
32	Directional power supervision	P<>, Q<>	●	–	–	–	–	–	–	–	–
37	Undercurrent protection, underpower	I<, P<	–	–	–	–	–	–	–	–	–
38	Temperature supervision	θ>	–	–	–	–	–	–	–	–	–
40	Underexcitation protection	$1/X_D$	–	–	–	–	–	–	–	–	–
46	Unbalanced-load protection	I2>	–	–	–	–	–	–	–	–	–
46	Negative-sequence system overcurrent protection	I2>, I2/I1>	–	–	–	–	–	–	–	–	–
47	Phase-sequence-voltage supervision	LA, LB, LC	–	–	–	■	–	■	■	■	–
47	Overvoltage protection, negative-sequence system	V2>	●	●	–	–	–	■	–	–	–
48	Starting-time supervision	I^2_{start}	–	–	–	–	–	–	–	–	–
49	Thermal overload protection	θ>, I^2t	–	–	–	–	–	–	–	–	–
49H	Hot spot calculation	θ_h>, I^2t	–	–	–	–	–	–	–	–	–
50/50N	Definite time-overcurrent protection	I>	●	●	–	–	■	–	–	–	–
SOTF	Instantaneous tripping at switch onto fault		■	■	■	–	–	■	–	–	–
	Arc-protection		●	–	–	–	–	–	–	–	–
50Ns	Sensitive ground-current protection	I_{Ns}>	●	–	–	–	–	–	–	–	–
	Intermittent ground-fault protection	Iie>	–	–	–	–	–	–	–	–	–
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 φ	■ 2)	–	–	–	–	–	–	–	–
59	Overvoltage protection	V>	●	●	●	■	–	■	■	■	–
	Peak overvoltage protection, 3-phase, for capacitors	V> cap.	–	–	–	–	–	–	–	–	–
59N	Overvoltage protection, zero-sequence system	V0>	●	●	–	■	–	■	–	■	–
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>,$I_P \angle$ (V,I)	●	–	–	–	–	–	–	–	–
67N	Directional time-overcurrent protection for ground-faults	I_N>, $I_{NP} \angle$ (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	W0p,tr>	■ 1)	–	–	–	–	–	–	–	–
	Directional intermittent ground fault protection	Iie dir>	–	–	–	–	–	–	–	–	–

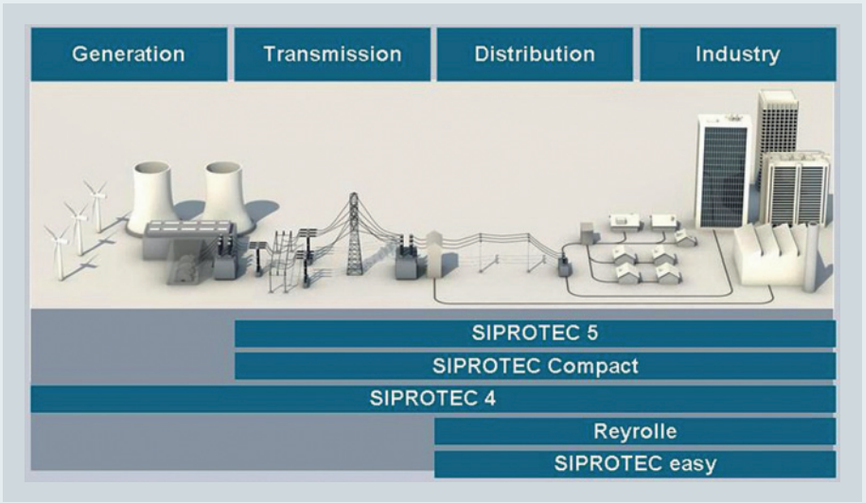
Relay Selection Table to be continued on the following pages



Functions (continued)
Further fuctions
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	
	Main functions ↓ / Distinguishing features ↓ — Classification → 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 Differntial 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

■ = 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

			Distance protection							Line differential protection		
		Device series	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5
												
ANSI	**Function**	**Abbr.**	**7SA82**	**7SA86**	**7SA87**	**7SA522**	**7SA61**	**7SA63**	**7SA64**	**7SD82**	**7SD86**	**7SD87**
	Functions											
68	Power-swing blocking	ΔZ/Δt	●	●	●	●	●	●	●	–	–	–
74TC	Trip-circuit supervision	TCS	■	■	■	■	■	■	■	■	■	■
78	Out-of-step protection	ΔZ/Δt	●	●	●	●	●	●	●	–	–	–
79	Automatic reclosing	AR	●	●	●	●	●	●	●	●	●	●
81	Frequency protection	f<, f>	●	●	●	●	●	●	●	●	●	●
81R	Rate-of-frequency-change protection	df/dt	●	●	●	–	–	–	–	●	●	●
	Vector-jump protection	$\Delta\varphi_U$>	–	–	–	–	–	–	–	–	–	–
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	ΣIx, I²t, 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		8	8	8	4	4	4	4	8	8	8
	Changeover of setting group		■	■	■	■	■	■	■	■	■	■
	Circuit breaker test		■	■	■	■	■	■	■	■	■	■

Overview, Relay Selection Table

■ = 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

			Line differential protection						Combined line differential and distance protection			High impedance protection	
		Device series	SIPROTEC Compact	SIPROTEC 4	SIPROTEC 4	SIPROTEC 600er	Reyrolle	Reyrolle	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	Reyrolle	Reyrolle
													
ANSI	**Function**	**Abbr.**	**7SD80**	**7SD610**	**7SD5**	**7SD60**	**7PG2111**	**7SR18 1)**	**7SL82**	**7SL86**	**7SL87**	**7SR23**	**7PG23**
	Functions												
68	Power-swing blocking	ΔZ/Δt	–	–	●	–	–	–	●	●	●	–	–
74TC	Trip-circuit supervision	TCS	■	■	■	–	–	■	■	■	■	■	–
78	Out-of-step protection	ΔZ/Δt	–	–	●	–	–	–	●	●	●	–	–
79	Automatic reclosing	AR	●	●	●	–	–	●	●	●	●	–	–
81	Frequency protection	f<, f>	●	●	●	–	–	●	●	●	●	–	–
81R	Rate-of-frequency-change protection	df/dt	●	–	–	–	–	–	●	●	●	–	–
	Vector-jump protection	$\Delta\varphi_U$>	–	–	–	–	–	–	–	–	–	–	–
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	ΣIx, 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	4	–	–	4	8	8	8	8	–
	Changeover of setting group		■	■	■	–	–	■	■	■	■	■	–
	Circuit breaker test		■	■	■	–	–	–	■	■	■	–	–

Overview, Relay Selection Table

■ = 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

			Overcurrent and feeder protection													
		Device series	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	SIPROTEC Compact	SIPROTEC Compact	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4	SIPROTEC easy	SIPROTEC easy	SIPROTEC 600er	SIPROTEC 600er
																
ANSI	**Function**	**Abbr.**	**7SJ82**	**7SJ85**	**7SJ86**	**7SJ80**	**7SJ81**	**7SJ61**	**7SJ62**	**7SJ63**	**7SJ64**	**7SJ66**	**7SJ45**	**7SJ46**	**7SJ600**	**7SJ602**
	Functions															
68	Power-swing blocking	ΔZ/Δt	–	–	–	–	–	–	–	–	–	–	–	–	–	–
74TC	Trip-circuit supervision	TCS	■	■	■	■	■	■	■	■	■	■	–	–	■	■
78	Out-of-step protection	ΔZ/Δt	–	–	–	–	–	–	–	–	–	–	–	–	–	–
79	Automatic reclosing	AR	●	●	●	●	●	●	●	●	●	●	–	–	●	●
81	Frequency protection	f<, f>	●	●	●	●	●	–	●	●	●	●	–	–	–	–
81R	Rate-of-frequency-change protection	df/dt	●	●	●	●	●	–	●	–	●	●	–	–	–	–
	Vector-jump protection	$\Delta\varphi_U$>	–	–	–	–	–	–	–	–	–	–	–	–	–	–
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	ΣIx, I²t, 2P	■	■	■	–	–	–	–	–	–	–	–	–	–	–
	Logic editor		■	■	■	■	■	■	■	■	■	■	–	–	–	–
	Inrush-current detection		■	■	■	■	■	■	■	■	■	■	–	–	–	–
	External trip initiation		■	■	■	■	■	■	■	■ 2)	■	■	–	–	■	■
	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		8	8	8	4	4	4	4	4	4	4	1	1	1	1
	Changeover of setting group		■	■	■	■	■	■	■	■	■	■	–	–	■	■
	Circuit breaker test		■	■	■	–	–	–	–	–	–	–	–	–	–	–

Overview, Relay Selection Table

■ = 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

			Overcurrent and feeder protection						Feeder Automation		Generator and motor protection				
		Device series	Reyrolle	Reyrolle	Reyrolle	Reyrolle	Reyrolle	Reyrolle	SIPROTEC Compact	Reyrolle	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	SIPROTEC Compact	SIPROTEC Compact
															
ANSI	**Function**	**Abbr.**	**7SR11**	**7SR12**	**7SR45** [1]	**7SR191**	**7SR210**	**7SR220**	**7SC80**	**7SR224**	**7SK82**	**7SK85**	**7UM85** [1]	**7SK80**	**7SK81**
	Functions														
68	Power-swing blocking	ΔZ/Δt	–	–	–	–	–	–	–	–	–	–	–	–	–
74TC	Trip-circuit supervision	TCS	■	■	–	■	■	■	■	■	■	■	■	■	■
78	Out-of-step protection	ΔZ/Δt	–	–	–	–	–	–	–	–	–	–	●	–	–
79	Automatic reclosing	AR	●	●	–	–	●	●	●	■	●	●	–	–	–
81	Frequency protection	f<, f>	–	■	–	–	–	■	●	■	●	●	■	●	●
81R	Rate-of-frequency-change protection	df/dt	–	–	–	●	–	–	●	–	●	●	●	●	●
	Vector-jump protection	$\Delta\varphi_U$>	–	–	–	–	–	–	–	–	–	–	●	–	–
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	–	–	–	–	–	●	●	● [1]	●	●	–	–	–
PMU	Synchrophasor measurement	PMU	–	–	–	–	–	–	–	–	●	●	●	–	–
	Further Functions														
	Measured values		■	■	■	■	■	■	■	■	■	■	■	■	■
	Switching-statistic counters		■	■	–	■	■	■	■	■	■	■	■	■	■
	Circuit breaker wear monitoring	Σlx, I²t, 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	4	4
	Changeover of setting group		■	■	–	■	■	■	■	■	■	■	■	■	■
	Circuit breaker test		–	–	–	–	–	–	–	–	■	■	■	–	–

Overview, Relay Selection Table

■ = 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

			Generator and motor protection			Transformer protection							
		Device series	SIPROTEC 4	SIPROTEC 4	Reyrolle	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4	Reyrolle
													
ANSI	**Function**	**Abbr.**	**7UM61**	**7UM62**	**7SR17**	**7UT82**	**7UT85**	**7UT86**	**7UT87**	**7UT612**	**7UT613**	**7UT63**	**7SR242**
	Functions												
68	Power-swing blocking	ΔZ/Δt	–	●	–	–	–	–	–	–	–	–	–
74TC	Trip-circuit supervision	TCS	■	■	■	■	■	■	■	●	■	■	■
78	Out-of-step protection	ΔZ/Δt	–	●	–	–	–	–	–	–	–	–	–
79	Automatic reclosing	AR	–	–	–	–	–	–	–	–	–	–	–
81	Frequency protection	f<, f>	■	■	–	–	●	●	●	–	●	●	●
81R	Rate-of-frequency-change protection	df/dt	●	●	–	–	●	●	●	–	–	–	–
	Vector-jump protection	$\Delta\varphi_U$>	●	●	–	–	–	–	–	–	–	–	–
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	ΣIx, I²t, 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		2	2	4	8	8	8	8	4	4	4	8
	Changeover of setting group		■	■	■	■	■	■	■	■	■	■	■
	Circuit breaker test		■	–	–	■	■	■	■	–	–	–	–

Overview, Relay Selection Table

■ = 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

			Busbar protection			Bay controller				
		Device series	SIPROTEC 5	SIPROTEC 4	SIPROTEC 600er	SIPROTEC 5	SIPROTEC 5	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4
										
ANSI	**Function**	**Abbr.**	**7SS85**	**7SS52**	**7SS60**	**6MD85**	**6MD86**	**6MD61**	**6MD63**	**6MD66**
	Functions									
68	Power-swing blocking	ΔZ/Δt	–	–	–	–	–	–	–	–
74TC	Trip-circuit supervision	TCS	■	–	–	■	■	–	–	–
78	Out-of-step protection	ΔZ/Δt	–	–	–	–	–	–	–	–
79	Automatic reclosing	AR	–	–	–	–	●	–	–	●
81	Frequency protection	f<, f>	●	–	–	●	●	–	–	–
81R	Rate-of-frequency-change protection	df/dt	●	–	–	–	–	–	–	–
	Vector-jump protection	$\Delta\varphi_U$>	–	–	–	–	–	–	–	–
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	ΣIx, I²t, 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		8	1	1	8	8	4	4	4
	Changeover of setting group		■	–	–	■	■	■	■	■
	Circuit breaker test		■	–	–	■	■	–	–	–

Overview, Relay Selection Table

■ = 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

			Breaker management		Synchronizing		High speed Busbar transfer	Voltage and frequency protection			Fault Recorder
		Device series	SIPROTEC 5	SIPROTEC 4	SIPROTEC 4	Reyrolle	SIPROTEC 4	SIPROTEC Compact	SIPROTEC 600er	Reyrolle	SIPROTEC 5
											
ANSI	**Function**	**Abbr.**	**7VK87**	**7VK61**	**7VE6**	**7SR157**	**7VU683**	**7RW80**	**7RW60**	**7SR158**	**7KE85**
	Functions										
68	Power-swing blocking	ΔZ/Δt	–	–	–	–	–	–	–	–	–
74TC	Trip-circuit supervision	TCS	■	■	■	■	–	■	■	■	–
78	Out-of-step protection	ΔZ/Δt	–	–	–	–	–	–	–	–	–
79	Automatic reclosing	AR	■	■	–	–	–	–	–	–	–
81	Frequency protection	f<, f>	●	–	●	■	–	■	■	■	–
81R	Rate-of-frequency-change protection	df/dt	–	–	●	■	–	■	■	■	–
	Vector-jump protection	$\Delta\varphi_U$>	–	–	●	–	–	●	–	–	–
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	ΣIx, I²t, 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	–	–	–	–	–	–	–	–	● 1)
PQR	Power Quality Recorder "Power quality recorder (class S)"	PQR	–	–	–	–	–	–	–	–	● 1)
SOER	Sequence-of-events recorder	SOER	–	–	–	–	–	–	–	–	■
ExTrFct	Extended trigger functions	ExTrFct	–	–	–	–	–	–	–	–	●
	Monitoring and supervision		■	■	■	■	■	■	■	■	–
	Protection interface, serial		●	–	–	–	–	–	–	–	–
	No. Setting groups		8	4	4	4	4	4	1	4	–
	Changeover of setting group		■	■	■	■	■	■	–	■	■
	Circuit breaker test		■	–	–	–	–	–	–	–	–

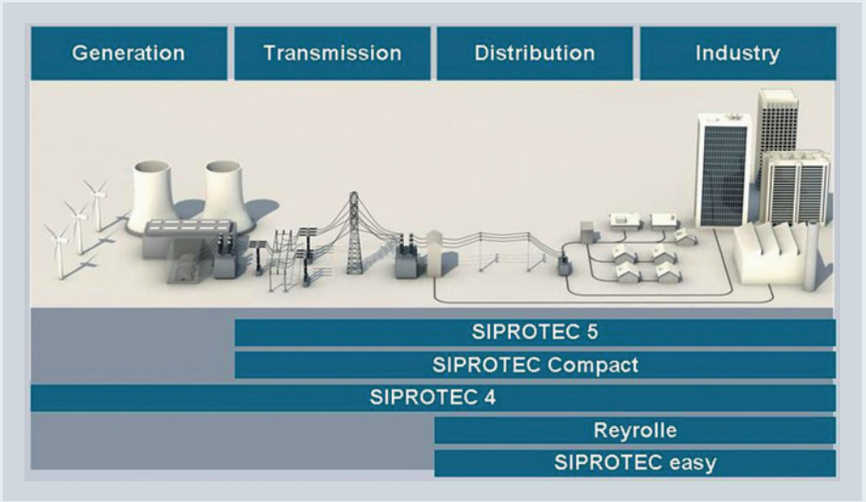
Relay Selection Table to be continued on the following pages



Hardware Feature (continued) Communication

Part 3

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	Main functions ↓ XX · Distinguishing features ↓ YY Classification → 6 or 7
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 Differntial 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

■ = 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

			Distance protection							Line differential protection		
		Device series	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5
												
ANSI	**Function**	**Abbr.**	**7SA82**	**7SA86**	**7SA87**	**7SA522**	**7SA61**	**7SA63**	**7SA64**	**7SD82**	**7SD86**	**7SD87**
	Hardware Feature											
	Hardware quantity structure expandable	I/O	–	■	■	–	–	–	–	–	■	■
	Binary Inputs (max)		11/23	31 3)	31 3)	24	33	33	33	11/23	31 3)	31 3)
	Binary Outputs (max) incl. Life contact		9/16	46 3)	46 3)	44	34	34	34	9/16	46 3)	46 3)
	Internal RTD Inputs (max)		–	–	–	–	–	–	–	–	–	–
	Transducer inputs (0-20mA) (max)		8	12	12	–	–	–	–	8	12	12
	Analog measured value outputs (0-20mA) (max)		–	–	–	–	2	2	2	–	–	–
	Current Inputs (max)		4	8 3)	8 3)	4	4	4	4	4	8 3)	8 3)
	Voltage Inputs (max)		4	8 3)	8 3)	4	4	4	4	4	8 3)	8 3)
	Low Power CT Inputs		–	–	–	–	–	–	–	–	–	–
	Low Power VT Inputs		–	–	–	–	–	–	–	–	–	–
	Case (x19")		1/3	1/3–2/1	1/3–2/1	1/2; 1/1	1/3–1/1	1/2; 1/1	1/2; 1/1	1/3	1/3–2/1	1/3–2/1
	Size (xE)		–	–	–	–	–	–	–	–	–	–
	Small Display (lines)		8	8	8	4	4	–	–	8	8	8
	Large, graphical Display (Pixel)		320x240	320x240	320x240	–	–	240x120	240x120	320x240	320x240	320x240
	Push Buttons		9	9	9	4	4	4	4	9	9	9
	Key Switch		–	●	●	■	–	■	■	–	●	●
	LEDs (max)		16	82	82	16	9/16	16	16	16	82	82
	Pluggable terminal blocks		■	■	■	–	–	–	–	■	■	■
	PSU Variants		DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-125 DC 110-250/ AC 115-230	DC 24-48; DC 60-125 DC 110-250/ AC 115-230	DC 24-48; DC 60-125 DC 110-250/ AC 115-230	DC 24-48; DC 60-125 DC 110-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230
	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		●	●	●	●	●	●	●	●	●	●
	RSTP (Ethernet ring redundancy)		●	●	●	●	●	●	●	●	●	●
	PRP V1 (Parallel Redundancy Protocol)		●	●	●	●	●	●	●	●	●	●
	HSR (High available Seamless Ring configuration)		●	●	●	●	●	●	●	●	●	●
	Further Ethernet protocols on Ethernet modules		●	■	■	●	●	●	●	●	■	■
	Time Synchronisation		■	■	■	■	■	■	■	■	■	■
	IEEE 1588 C37.238 profile (PSRC - profile)		●	●	●	–	–	–	–	●	●	●
	Timesync. via integrated GPS module		–	–	–	–	–	–	–	–	–	–

Overview, Relay Selection Table

■ = 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

			Line differential protection						Combined line differential and distance protection			High impedance protection	
		Device series	SIPROTEC Compact	SIPROTEC 4	SIPROTEC 4	SIPROTEC 600er	Reyrolle	Reyrolle	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	Reyrolle	Reyrolle
													
ANSI	**Function**	**Abbr.**	**7SD80**	**7SD610**	**7SD5**	**7SD60**	**7PG2111**	**7SR18 1)**	**7SL82**	**7SL86**	**7SL87**	**7SR23**	**7PG23**
	Hardware Feature												
	Hardware quantity structure expandable	I/O	–	–	–	–	–	■	–	■	■	■	–
	Binary Inputs (max)		3/7	7	24	3	–	6	11/23	31 3)	31 3)	19	–
	Binary Outputs (max) incl. Life contact		6/9	6	33	6	3	8	9/16	46 3)	46 3)	16	3
	Internal RTD Inputs (max)		●	●	●	–	–	–	–	–	–	–	–
	Transducer inputs (0-20mA) (max)		●	●	●	–	–	–	8	12	12	–	–
	Analog measured value outputs (0-20mA) (max)		●	●	●	–	–	–	–	–	–	–	–
	Current Inputs (max)		4	4	4	1	3	4	4	8 3)	8 3)	4	1
	Voltage Inputs (max)		3	4	4	0	–	3	4	8 3)	8 3)	–	–
	Low Power CT Inputs		–	–	–	–	–	–	–	–	–	–	–
	Low Power VT Inputs		–	–	–	–	–	–	–	–	–	–	–
	Case (x19")		1/6	1/3	1/2; 1/1	1/6	–	–	1/3	1/3–2/1	1/3–2/1	–	–
	Size (xE)		–	–	–	–	E6	E6	–	–	–	E6, E8	E3
	Small Display (lines)		6	4	4	2	–	4	8	8	8	4	–
	Large, graphical Display (Pixel)		–	–	–	–	–	–	320x240	320x240	320x240	–	–
	Push Buttons		9	4	4	–	–	11	9	9	9	5	–
	Key Switch		–	–	–	–	–	–	–	●	●	–	–
	LEDs (max)		10	9	16	6	18	10	16	82	82	19	–
	Pluggable terminal blocks		■	–	–	–	–	–	■	■	■	–	–
	PSU Variants		DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-125 DC 110-250/ AC 115-230	DC 24-48; DC 60-125 DC 110-250/ AC 115-230	–	–	DC 24-60; DV 88-250	DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 30-250	–
	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		●	●	●	–	–	●	●	●	●	–	–
	RSTP (Ethernet ring redundancy)		●	●	●	–	–	●	●	●	●	–	–
	PRP V1 (Parallel Redundancy Protocol)		●	●	●	–	–	●	●	●	●	–	–
	HSR (High available Seamless Ring configuration)		●	●	●	–	–	●	●	●	●	–	–
	Further Ethernet protocols on Ethernet modules		●	●	●	–	–	–	■	■	■	–	–
	Time Synchronisation		●	●	●	●	–	■	■	■	■	■	–
	IEEE 1588 C37.238 profile (PSRC - profile)		–	–	–	–	–	–	●	●	●	–	–
	Timesync. via integrated GPS module		–	–	–	–	–	–	–	–	–	–	–

Overview, Relay Selection Table

■ = 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

			Overcurrent and feeder protection													
		Device series	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	SIPROTEC Compact	SIPROTEC Compact	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4	SIPROTEC easy	SIPROTEC easy	SIPROTEC 600er	SIPROTEC 600er
																
ANSI	**Function**	**Abbr.**	**7SJ82**	**7SJ85**	**7SJ86**	**7SJ80**	**7SJ81**	**7SJ61**	**7SJ62**	**7SJ63**	**7SJ64**	**7SJ66**	**7SJ45**	**7SJ46**	**7SJ600**	**7SJ602**
	Hardware Feature															
	Hardware quantity structure expandable	I/O	–	■	■	–	–	–	–	–	–	–	–	–	–	–
	Binary Inputs (max)		11/23	59 3)	23 3)	3/7/11 1)	3/7	3/8/11	8/11	37	48	36	–	–	3	3
	Binary Outputs (max) incl. Life contact		9/16	33 3)	24 3)	6/9/6 1)	6/9	5/9/7	9/7	19	26	24	1	3	4	5
	Internal RTD Inputs (max)		–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Transducer inputs (0-20mA) (max)		8	12	12	–	–	–	–	2	–	–	–	–	–	–
	Analog measured value outputs (0-20mA) (max)		–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Current Inputs (max)		4	4 3)	4 3)	4	–	4	4	4	4	4	3	3	3	4/3
	Voltage Inputs (max)		4	4 3)	4 3)	0/3	–	–	3/4	3	4	4	–	–	–	0/1
	Low Power CT Inputs		–	–	–	–	4	–	–	–	–	–	–	–	–	–
	Low Power VT Inputs		–	–	–	–	0/3	–	–	–	–	–	–	–	–	–
	Case (x19")		1/3	1/3–2/1	1/3–2/1	1/6	1/6	1/3; 1/2	1/3; 1/3	1/2; 1/1	1/3–1/1	1/3; 1/2	–	–	1/6	1/6
	Size (xE)		–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Small Display (lines)		8	8	8	6	6	4	4	–	–	8	–	–	2	2
	Large, graphical Display (Pixel)		320x240	320x240	320x240	–	–	240x120	240x120	240x120	240x120	240x128	–	–	–	–
	Push Buttons		9	9	9	9	9	4	4	4	4	4	0	0	0	0
	Key Switch		–	●	●	–	–	–	–	■	■	–	–	–	–	–
	LEDs (max)		16	82	82	10	10	9	9	16	16	16	2	6	6	6
	Pluggable terminal blocks		■	■	■	■	■	–	–	–	–	–	–	–	–	–
	PSU Variants		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	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	110 to 250 V DC, 115 to 230 V AC	–	DC 24-250/ AC 60-230	DC24-48; DC60-125 DC110-250/ AC115-230	DC24-48; DC60-125 DC110-250/ 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		●	●	●	●	●	●	●	●	●	–	–	–	–	–
	RSTP (Ethernet ring redundancy)		●	●	●	●	●	●	●	●	●	–	–	–	–	–
	PRP V1 (Parallel Redundancy Protocol)		●	●	●	●	●	●	●	●	●	–	–	–	–	–
	HSR (High available Seamless Ring configuration)		●	●	●	●	●	●	●	●	●	–	–	–	–	–
	Further Ethernet protocols on Ethernet modules		●	●	●	●	●	●	●	●	●	●	–	–	–	–
	Time Synchronisation		■	■	■	●	●	■	■	■	■	■	–	–	–	–
	IEEE 1588 C37.238 profile (PSRC - profile)		●	●	●	–	–	–	–	–	–	–	–	–	–	–
	Timesync. via integrated GPS module		–	–	–	–	–	–	–	–	–	–	–	–	–	–

Overview, Relay Selection Table

■ = 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

			Overcurrent and feeder protection						Feeder Automation		Generator and motor protection				
		Device series	Reyrolle	Reyrolle	Reyrolle	Reyrolle	Reyrolle	Reyrolle	SIPROTEC Compact	Reyrolle	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	SIPROTEC Compact	SIPROTEC Compact
															
ANSI	**Function**	**Abbr.**	**7SR11**	**7SR12**	**7SR45** [1]	**7SR191**	**7SR210**	**7SR220**	**7SC80**	**7SR224**	**7SK82**	**7SK85**	**7UM85** [1]	**7SK80**	**7SK81**
	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		–	–	–	–	–	–	●	–	–	–	–	–	–

Overview, Relay Selection Table

■ = 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

			Generator and motor protection			Transformer protection							
		Device series	SIPROTEC 4	SIPROTEC 4	Reyrolle	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	SIPROTEC 5	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4	Reyrolle
													
ANSI	**Function**	**Abbr.**	**7UM61**	**7UM62**	**7SR17**	**7UT82**	**7UT85**	**7UT86**	**7UT87**	**7UT612**	**7UT613**	**7UT63**	**7SR242**
	Hardware Feature												
	Hardware quantity structure expandable	I/O	–	–	■	–	■	■	■	–	–	–	■
	Binary Inputs (max)		15	15	6	7 3)	19 3)	23 3)	27 3)	3	5	29	19
	Binary Outputs (max) incl. Life contact		20	21	8	7 3)	23 3)	34 3)	38 3)	5	9	25	14
	Internal RTD Inputs (max)		–	–	–	–	–	–	–	–	–	–	–
	Transducer inputs (0-20mA) (max)		–	–	–	8	12	12	12	–	–	–	–
	Analog measured value outputs (0-20mA) (max)		–	4	–	–	–	–	–	–	–	–	–
	Current Inputs (max)		4	8	4	8 3)	8 3)	12 3)	20 3)	7	11	14	8
	Voltage Inputs (max)		4	4	3	0 3)	0 3)	4 3)	4 3)	–	4	0/4	1
	Low Power CT Inputs		–	–	–	–	–	–	–	–	–	–	–
	Low Power VT Inputs		–	–	–	–	–	–	–	–	–	–	–
	Case (x19")		1/3; 1/2	1/2; 1/1	–	1/3	1/3–2/1	1/3–2/1	1/3–2/1	1/3	1/2	1/1	–
	Size (xE)		–	–	E4	–	–	–	–	–	–	–	E8, E10
	Small Display (lines)		4	4	4	8	8	8	8	4	4	–	4
	Large, graphical Display (Pixel)		–	240x120	–	320x240	320x240	320x240	320x240	–	–	240x120	–
	Push Buttons		4	4	5	9	9	9	9	4	4	4	5
	Key Switch		–	–	–	–	●	●	●	–	–	■	–
	LEDs (max)		9	9/16	10	16	82	82	82	9	16	16	27
	Pluggable terminal blocks		–	–	–	■	■	■	■	–	–	–	–
	PSU Variants		DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 24-60; DC 88-250/ 115 V	DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 30-250
	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)	●	●	●	●	●	●	●	–
	RSTP (Ethernet ring redundancy)		●	●	● 1)	●	●	●	●	●	●	●	–
	PRP V1 (Parallel Redundancy Protocol)		●	●	● 1)	●	●	●	●	●	●	●	–
	HSR (High available Seamless Ring configuration)		●	●	● 1)	●	●	●	●	●	●	●	–
	Further Ethernet protocols on Ethernet modules		●	●	–	●	●	●	●	●	●	●	–
	Time Synchronisation		■	■	■	■	■	■	■	■	■	■	■
	IEEE 1588 C37.238 profile (PSRC - profile)		–	–	–	●	●	●	●	–	–	–	–
	Timesync. via integrated GPS module		–	–	–	–	–	–	–	–	–	–	–

Overview, Relay Selection Table

■ = 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

			Busbar protection			Bay controller				
		Device series	SIPROTEC 5	SIPROTEC 4	SIPROTEC 600er	SIPROTEC 5	SIPROTEC 5	SIPROTEC 4	SIPROTEC 4	SIPROTEC 4
										
ANSI	**Function**	**Abbr.**	**7SS85**	**7SS52**	**7SS60**	**6MD85**	**6MD86**	**6MD61**	**6MD63**	**6MD66**
	Hardware Feature									
	Hardware quantity structure expandable	I/O	■	■	■	■	■	–	–	–
	Binary Inputs (max)		15[3]	972	3 [4]	59 [3]	443 [3]	80	37	65
	Binary Outputs (max) incl. Life contact		15[3]	370	2 [4]	33 [3]	80 [3]	54	21	45
	Internal RTD Inputs (max)		–	–	–	–	–	–	–	–
	Transducer inputs (0-20mA) (max)		12	–	–	12	12	2	2	2
	Analog measured value outputs (0-20mA) (max)		–	–	–	–	–	–	–	–
	Current Inputs (max)		60	192	1 [4]	4 [3]	8 [3]	4	4	3
	Voltage Inputs (max)		8	–	–	4 [3]	8 [3]	3	3	4
	Low Power CT Inputs		–	–	–	–	–	–	–	–
	Low Power VT Inputs		–	–	–	–	–	–	–	–
	Case (x19")		1/2-1/1; 2x1/1 [1] 1/1	1/3–1/1	1/6 [4]	1/3–2/1	1/3–2/1	1/2; 1/1	1/2; 1/1	1/1
	Size (xE)		–	–	–	–	–	–	–	–
	Small Display (lines)		8	4	2	8	8	–	–	–
	Large, graphical Display (Pixel)		320x240	–	–	320x240	320x240	240x120	240x120	240x120
	Push Buttons		9	196	0	9	9	4	4	4
	Key Switch		●	–	–	●	●	–	■	■
	LEDs (max)		82	898	6	82	82	16	16	16
	Pluggable terminal blocks		■	–	–	■	■	–	–	–
	PSU Variants		DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-125 DC 110-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230
	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		●	●	–	●	●	●	●	●
	RSTP (Ethernet ring redundancy)		●	●	–	●	●	●	●	●
	PRP V1 (Parallel Redundancy Protocol)		●	●	–	●	●	●	●	●
	HSR (High available Seamless Ring configuration)		●	●	–	●	●	●	●	●
	Further Ethernet protocols on Ethernet modules		●	●	–	●	●	●	●	●
	Time Synchronisation		■	■	–	■	■	■	■	■
	IEEE 1588 C37.238 profile (PSRC - profile)		●	–	–	●	●	–	–	–
	Timesync. via integrated GPS module		–	–	–	–	–	–	–	–

Overview, Relay Selection Table

■ = 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

			Breaker management		Synchronizing		High speed Busbar transfer	Voltage and frequency protection			Fault Recorder
		Device series	SIPROTEC 5	SIPROTEC 4	SIPROTEC 4	Reyrolle	SIPROTEC 4	SIPROTEC Compact	SIPROTEC 600er	Reyrolle	SIPROTEC 5
											
ANSI	**Function**	**Abbr.**	**7VK87**	**7VK61**	**7VE6**	**7SR157**	**7VU683**	**7RW80**	**7RW60**	**7SR158**	**7KE85**
	Hardware Feature										
	Hardware quantity structure expandable	I/O	■	–	–	–	–	–	–	–	■
	Binary Inputs (max)		31 3)	20	6/14	6	17	3/7	3	6	19 3)
	Binary Outputs (max) incl. Life contact		46 3)	19	10/18	8	19	6/9	6	8	15 3)
	Internal RTD Inputs (max)		–	–	–	–	–	–	–	–	–
	Transducer inputs (0-20mA) (max)		12	–	–	–	–	–	–	–	20
	Analog measured value outputs (0-20mA) (max)		–	–	4	–	–	–	–	–	–
	Current Inputs (max)		8 3)	4	–	–	8	–	–	–	12
	Voltage Inputs (max)		8 3)	4	6	3	8	3	2	3	16
	Low Power CT Inputs		–	–	–	–	–	–	–	–	–
	Low Power VT Inputs		–	–	–	–	–	–	–	–	–
	Case (x19")		1/3–2/1	1/3–1/2	1/3;1/2	–	1/1	1/6	1/6	–	1/3–2/1
	Size (xE)		–	–	–	E4	–	–	–	E4	–
	Small Display (lines)		8	4	4	4	–	6	2	4	8
	Large, graphical Display (Pixel)		320x240	–	240x120	–	240x120	–	–	–	320x240
	Push Buttons		9	4	4	5	4	9	0	5	9
	Key Switch		●	–	–	–	–	–	–	–	–
	LEDs (max)		82	9/16	9/16	10	16	10	6	10	82
	Pluggable terminal blocks		■	–	–	–	–	■	–	–	■
	PSU Variants		DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 24-60; DC 88-250/115V	DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-250/ AC 115-230	DC 24-48; DC 60-125 DC 110-250/ AC 115-230	DC 24-60; DC 88-250/115V	DC 24-48; DC 60-250/ AC 115-230
	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		●	●	●	–	●	●	–	–	●
	RSTP (Ethernet ring redundancy)		●	●	●	–	●	●	–	–	●
	PRP V1 (Parallel Redundancy Protocol)		●	●	●	–	●	●	–	–	●
	HSR (High available Seamless Ring configuration)		●	●	●	–	●	●	–	–	●
	Further Ethernet protocols on Ethernet modules		●	●	●	–	●	●	–	–	●
	Time Synchronisation		■	■	■	■	■	●	■	■	■
	IEEE 1588 C37.238 profile (PSRC - profile)		●	–	–	–	–	–	–	–	●
	Timesync. via integrated GPS module		–	–	–	–	–	–	–	–	–

Legal Notice

Indication of conformity

CE This product complies with the directive of the Council of the European Communities on harmonization of the laws of the Member States relating to electromagnetic compatibility (EMC Council Directive 2004/108/EC) and concerning electrical equipment for use within specified voltage limits (Low Voltage Directive 2006/95/EC).

This conformity has been proved by tests performed according to the Council Directive in accordance with the generic standards EN 61000-6-2 and EN 61000-6-4 (for EMC directive) and with the standard EN 60255-27 (for Low Voltage Directive) by Siemens AG.

The device is designed and manufactured for application in an industrial environment.

The product conforms with the international standards of IEC 60255 and the German standard VDE 0435.

Disclaimer of liability

This document has been subjected to rigorous technical review before being published. It is revised at regular intervals, and any modifications and amendments are included in the subsequent issues. The content of this document has been compiled for information purposes only. Although Siemens AG has made best efforts to keep the document as precise and up-to-date as possible, Siemens AG shall not assume any liability for defects and damage which result through use of the information contained herein.

This content does not form part of a contract or of business relations; nor does it change these. All obligations of Siemens AG are stated in the relevant contractual agreements.

Siemens AG reserves the right to revise this document from time to time.

Document version: 04

Release status: 03.2015

Copyright

Copyright © Siemens AG 2015. All rights reserved.

The disclosure, duplication, distribution and editing of this document, or utilization and communication of the content are not permitted, unless authorized in writing. All rights, including rights created by patent grant or registration of a utility model or a design, are reserved.

Registered trademarks

SIPROTEC and DIGSI are registered trademarks of Siemens AG. Any unauthorized use is illegal. All other designations in this document can be trademarks whose use by third parties for their own purposes can infringe the rights of the owner.

Notes

Published by and copyright © 2015:
Siemens AG
Energy Management
Humboldtstr. 59
90459 Nuremberg, Germany

Printed on elementary chlorine-free bleached paper.

All rights reserved.
If not stated otherwise on the individual pages of this catalog, we reserve the right to include modifications, especially regarding the stated values, dimensions and weights. Drawings are not binding.

All product designations used are trademarks or product names of Siemens AG or other suppliers.
If not stated otherwise, all dimensions in this catalog are given in mm.

Subject to change without prior notice.
The information in this document contains general descriptions of the technical options available, which may not apply in all cases. The required technical options should therefore be specified in the contract.

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

siemens.com/protection

For more information, please contact
our Customer Support Center.
Tel.: +49 180 524 84 37
Fax: +49 180 524 24 71
(Charges depending on provider)
E-mail: support.energy@siemens.com
www.siemens.com/protection

Article No. IC1000-K4456-A101-A4-7600
Printed in Germany
KG 0315 1.0 42 En
140000 / 66561 WÜ