

Description

The Reyrolle 5 is designed for the electricity networks of the future with enhanced communications and cyber security while maintaining a user-friendly interface and easy product management.

The Reyrolle 7SR51 overcurrent device includes a wide range of protection functions and IEC 61850 Ethernet communications as standard. To further minimize the product variants the power supply and the binary inputs cover the full operating range with configurable binary input thresholds.

The large LCD, tactile pushbuttons and programmable LEDs provide a user-friendly product interface and the relay element is withdrawable for easy replacement.



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Inputs and outputs	Current inputs – 4 or 5 Voltage inputs – 0 or 4 Binary inputs (max) – 39 Binary outputs (max) incl. healthy contact – 20 Arc flash detector inputs (AFD) – 0 or 3 High speed binary outputs (HSBO) – 0 or 3 Temperature sensor inputs (TSI) – 0 or 8
Communication	Standard front USB port (for configuration using Reydisp Manager 2, a PC based software tool) rear RS485, 2 x RJ45 electrical ports or optional optical Ethernet connections
Housing	Size 6, 8, or 12 with withdrawable design
Display	Backlit 128 x 128 LCD with text and graphical display capabilities suitable for single line mimic diagrams

Benefits

- Compact design and low product life-cycle cost
- Reliable operation due to powerful, proven protection algorithms
- IEC 61850 Edition 1 & 2 with HSR, PRP and RSTP operation for increased availability
- Simple product ordering
- Combined 1 A and 5 A current transformer inputs
- 28 programmable tri-color LEDs for clear indications
- User selectable languages: English, French, German, Portuguese, Spanish, Turkish
- Conformal coating ordering option

Functions

Standard Functionality

- 37/37G Undercurrent protection – phase/earth
- 46 Negative sequence overcurrent protection
- 46BC Broken conductor detection
- 49 Thermal overload protection
- 49TS Temperature sensor supervision³

- 50/50G/50N Instantaneous overcurrent/earth fault
- 50AFD Arc flash detection⁴
- 50BF Circuit-breaker failure protection – 3-pole
- 50GHS High speed earth fault – measured
- 50GI Intermittent earth fault
- 50GS Instantaneous sensitive earth fault – measured
- 50HS High speed overcurrent – phase
- 50SOTF Switch onto fault
- 51/51G/51N Time delayed overcurrent/earth fault
- 51CL Cold load overcurrent – phase
- 51GS Time-delayed sensitive earth fault – measured
- 52 Circuit-breaker control
- 60CTS CT supervision
- 74CC/74TC Close-circuit and trip-circuit supervision
- 79 Automatic reclosing
- 81HB2 Inrush current detection
- 86 Lockout
- 87GH Restricted earth fault protection – high-impedance
- 87NL Restricted earth fault protection - low-impedance

Additional Functionality – Devices with VT Inputs

- 21FL Fault locator
- 21LB Load blinder
- 25 Synchrocheck – synchronization function
- 27/27Vx Undervoltage protection
- 32 Power protection
- 47 Sequence overvoltage protection
- 51V Voltage-dependent overcurrent – phase
- 55 Power factor
- 59/59Vx Overvoltage protection
- 59N Neutral voltage displacement
- 60VTS VT supervision
- 67/67G/67GI/67GS/67N Directional – phase/earth fault

³ An external interface unit is required where optional TSI module not fitted.

⁴ Requires external components

Devices and Application

Overcurrent Protection – Reyrolle 7SR51

- 78VS Voltage vector shift
- 81 Frequency protection – "f>" or "f<"
- 81R Frequency protection – "df/dt"

Monitoring Functions

- Primary, secondary, and phase sequence, current & voltage
- Frequency, power, energy and fault location
- Fault data, event and waveform records

Applications

- Overcurrent and earth fault protection for medium voltage substations
- Backup protection for other main protection devices e.g. on lines, transformers, generators, motors, and busbars
- 5 CT model to provide measured standby earth fault for protection of transformer earthing resistors in addition to high-impedance earth fault protection

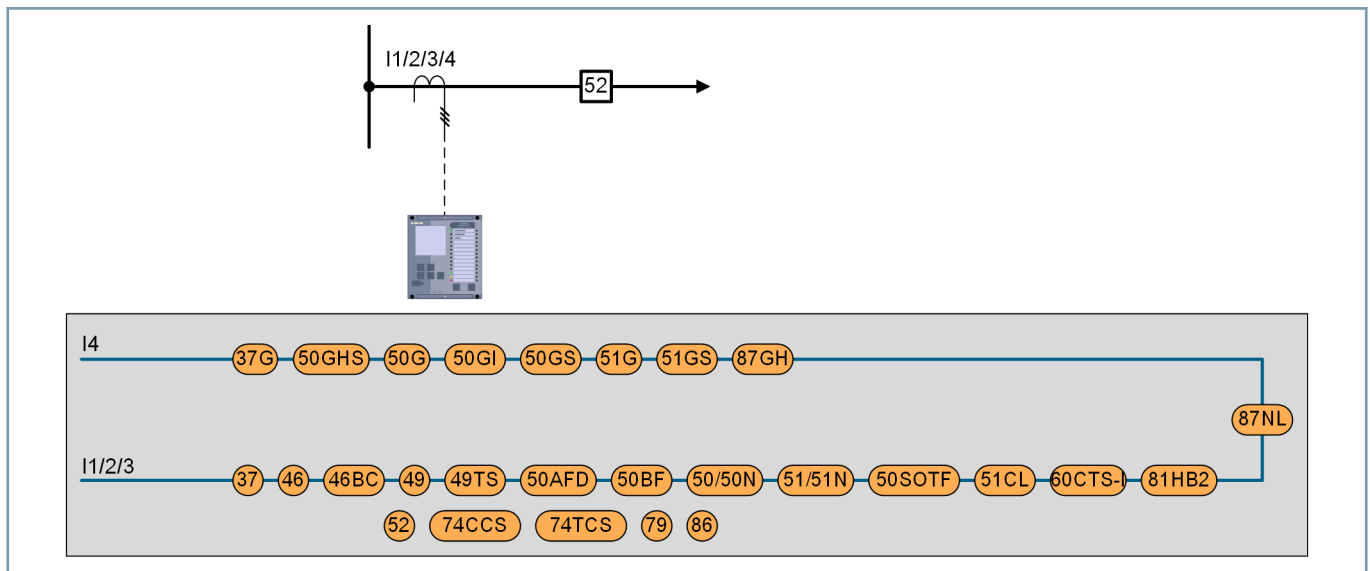
- Selectable directional overcurrent and earth fault elements for interconnected systems
- Measured and calculated earth fault protection elements provide a flexible solution when both earth fault and sensitive earth fault current detection is required
- Detection of earth faults in all networks including isolated and compensated networks
- High speed overcurrent elements for use with arc fault detectors to provide high speed fault detection and tripping
- Blocked overcurrent schemes using hardwiring or configurable IEC 61850 elements
- Configurable automatic reclosing to restore power flow after transient network faults

Communication

- IEC 60870-5-103, Modbus TCP, DNP3 TCP, Modbus RTU, DNP3, IEC 61850

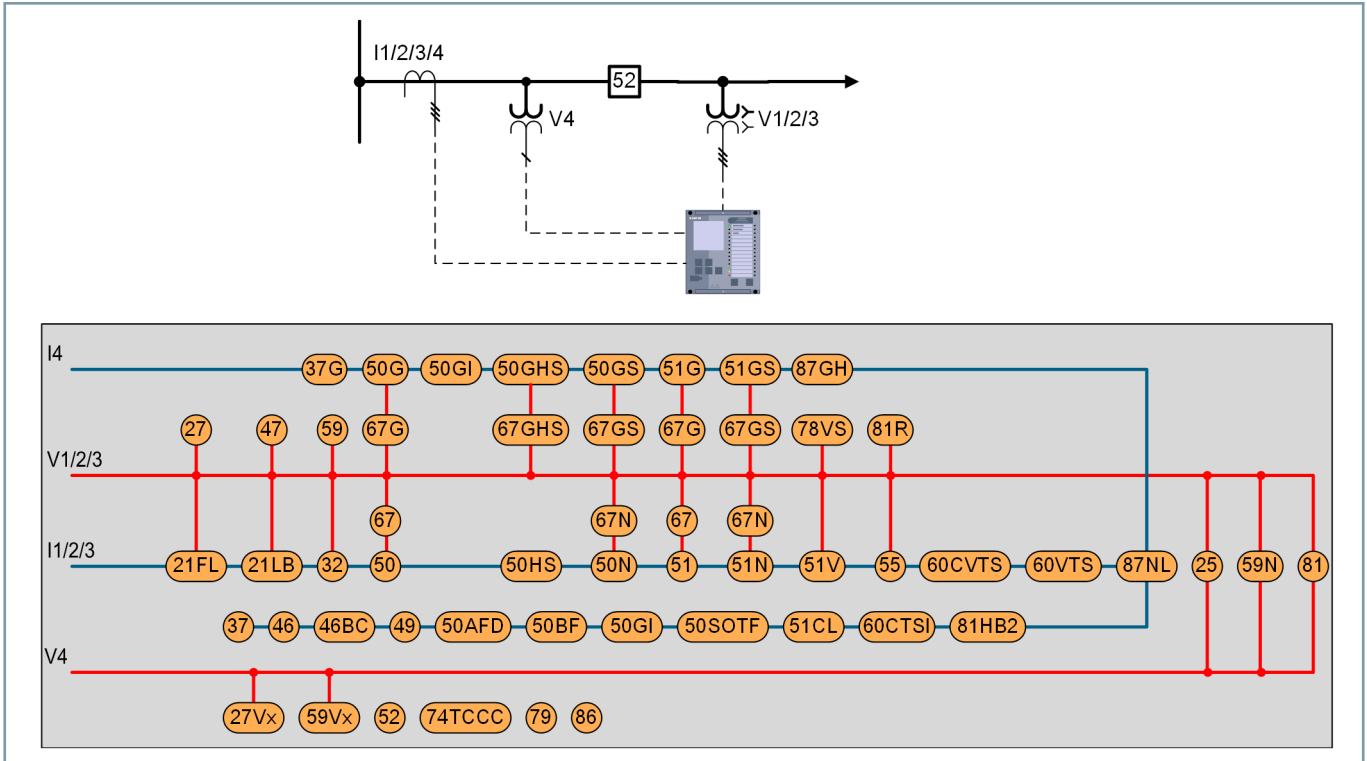
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Application Templates



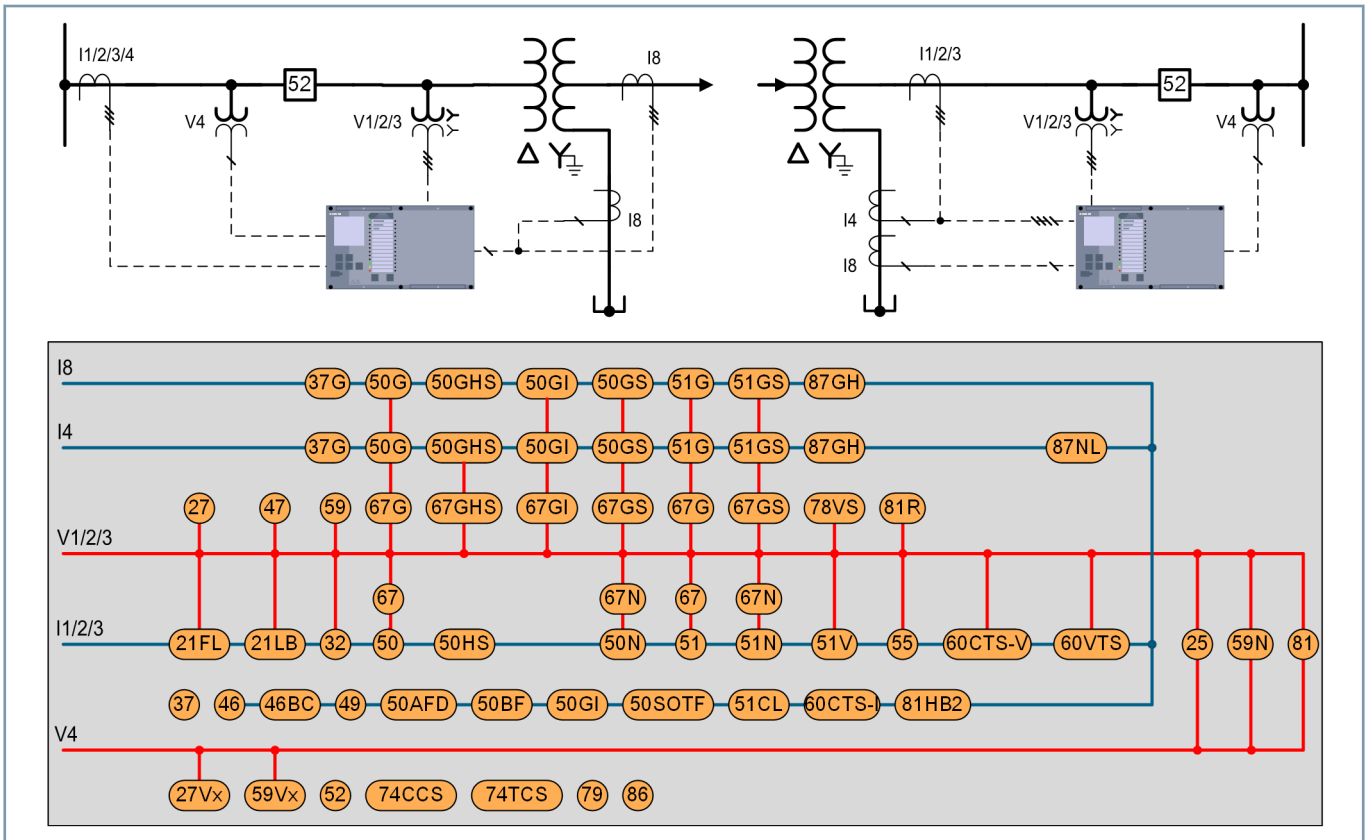
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Figure 2.4/1 Function Diagram: 7SR5110 OCEF Protection



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Figure 2.4/2 Function Diagram: 7SR5111 DOC/DEF Protection



[dw_7SR5_7SR5121_functiendiagram_3_en_US]

Figure 2.4/3 Function Diagram: 7SR5121 DOC/DEF Protection

Devices and Application

Overcurrent Protection – Reyrolle 7SR51

Functions, Application Templates

ANSI	Functions	7SR5110	7SR5111	7SR5121
21FL	Fault locator	–	■	■
21LB	Load blinder	–	■	■
25	Synchrocheck – synchronization function	–	■	■
27	Undervoltage protection – 3-phase	–	■	■
27Vx	Undervoltage protection – Vx	–	■	■
32	Power protection	–	■	■
37	Undercurrent protection – phase	■	■	■
37G	Undercurrent earth fault – measured	■	■	■
46	Negative sequence overcurrent protection	■	■	■
46BC	Broken conductor detection	■	■	■
47	Sequence overvoltage protection	–	■	■
49	Thermal overload protection	■	■	■
49TS	Temperature sensor supervision ⁵	■	■	■
50	Instantaneous overcurrent – phase	■	■	■
50AFD	Arc flash detection ⁶	■	■	■
50BF	Circuit-breaker failure protection – 3-pole	■	■	■
50G	Instantaneous earth fault – measured	■	■	■
50GHS	High speed earth fault – measured	■	■	■
50GI	Intermittent earth fault	■	■	■
50GS	Instantaneous sensitive earth fault – measured	■	■	■
50HS	High speed overcurrent – phase	■	■	■
50N	Instantaneous earth fault – calculated	■	■	■
50SOTF	Switch onto fault	■	■	■
51	Time-delayed overcurrent – phase	■	■	■
51CL	Cold load overcurrent – phase	■	■	■
51G	Time delayed earth fault – measured	■	■	■
51GS	Time-delayed sensitive earth fault – measured	■	■	■
51N	Time-delayed earth fault – calculated	■	■	■
51V	Voltage-dependent overcurrent – phase	–	■	■
52	Circuit-breaker control	■	■	■
55	Power factor	–	■	■
59	Overvoltage protection – 3-phase	–	■	■
59N	Neutral voltage displacement	–	■	■
59Vx	Overvoltage protection – Vx	–	■	■
60CTS-I	CT supervision – current reference	■	■	■
60CTS-V	CT supervision – voltage reference	–	■	■
60VTS	VT supervision	–	■	■
67	Directional overcurrent – phase	–	■	■
67G	Directional earth fault – measured	–	■	■
67GI	Directional Intermittent Earth Fault	–	■	■
67GS	Directional sensitive earth fault – measured	–	■	■
67N	Directional earth fault – calculated	–	■	■
74CC	Close-circuit supervision	■	■	■
74TC	Trip-circuit supervision	■	■	■
78VS	Voltage vector shift	–	■	■
79	Automatic reclosing	■	■	■
81	Frequency protection – "f>" or "f<"	–	■	■
81HB2	Inrush current detection	■	■	■

⁵ An external interface unit is required where optional TSI module not fitted.

⁶ Requires external components

ANSI	Functions	7SR5110	7SR5111	7SR5121
81R	Frequency protection – "df/dt"	–	■	■
86	Lockout	■	■	■
87GH	Restricted earth fault protection – high-impedance	■	■	■
87NL	Restricted earth fault protection - low-impedance	■	■	■
	Measured values	■	■	■
	Switching-statistic counters	■	■	■
	Circuit-breaker wear monitoring	■	■	■
	Logic editor	■	■	■
	External trip initiation	■	■	■
	Control	■	■	■
	Fault recording of analog and binary signals	■	■	■
	Sequence of events recorder	5000	5000	5000
	Security log	2048	2048	2048
	Monitoring and supervision	■	■	■
	Setting groups	4	4	4
	Changeover of setting group	■	■	■
	Binary inputs (max)	38	39	37
	Arc flash detector inputs (AFD)	0 or 3	0 or 3	0 or 3
	Temperature sensor inputs (TSI)	0 or 8	0 or 8	0 or 8
	Binary outputs (max) incl. healthy contact	18	20	18
	High speed binary outputs (HSBO)	0 or 3	0 or 3	0 or 3
	Current inputs	4	4	5
	Voltage inputs	0	4	4
	Size	6, 8, or 12	6, 8, or 12	8 or 12
	LCD resolution	128x128		
	Push buttons	7	7	7
	LEDs	28	28	28
	Power supply unit rated voltages	DC 24 to 250 V AC 100 to 230 V		
	Front user interface	■	■	■
	User selectable languages: English, French, German, Portuguese, Spanish, Turkish	■	■	■
	IEC 60870-5-103	■	■	■
	IEC 61850	■	■	■
	Modbus RTU	■	■	■
	Modbus TCP	■	■	■
	SNMP v3	■	■	■
	DNP3	■	■	■
	DNP3 TCP	■	■	■
	Time synchronization: Binary input, DNP3, Modbus RTU, DNP TCP, Modbus TCP, SNTP, IEEE 1588 PTP	■	■	■

Table 2.4/1 Reyrolle 7SR51 – Functions and Application Templates










NOTE

■ - Basic

Devices and Application

Overcurrent Protection – Reyrolle 7SR51

Standard Variants

Standard Variants for 7SR511		
7SR5110-1AA	3/8, 8 BI, 6 BO, 4 I Housing width 3/8 x 19" (size 6), housing height 4U 8 binary inputs 6 binary outputs (1 break, 2 changeover, 3 make) 4 current transformer inputs Communication: USB, RS485, 2 x Ethernet	
7SR5110-1AD	3/8, 8 BI, 9 BO (inc. 3 HSBO), 4 I, 3 AFD Housing width 3/8 x 19" (size 6), housing height 4U 8 binary inputs 9 binary outputs (1 break, 2 changeover, 6 make) 4 current transformer inputs Communication: USB, RS485, 2 x Ethernet	
7SR5110-2AA	3/8, 13 BI, 8 BO, 4 I Housing width 3/8 x 19" (size 6), housing height 4U 13 binary inputs 8 binary outputs (1 break, 2 changeover, 5 make) 4 current transformer inputs Communication: USB, RS485, 2 x Ethernet	
7SR5110-2AD	3/8, 13 BI, 11 BO (inc. 3 HSBO), 4 I, 3 AFD Housing width 3/8 x 19" (size 6), housing height 4U 13 binary inputs 11 binary outputs (1 break, 2 changeover, 8 make) 4 current transformer inputs Communication: USB, RS485, 2 x Ethernet	
7SR5110-2AF	3/8, 13 BI, 8 BO, 4 I, 8 TSI Housing width 3/8 x 19" (size 6), housing height 4U 13 binary inputs 8 binary outputs (1 break, 2 changeover, 5 make) 4 current transformer inputs Communication: USB, RS485, 2 x Ethernet	
7SR5110-3AA	1/2, 18 BI, 10 BO, 4 I Housing width 1/2 x 19" (size 8), housing height 4U 18 binary inputs 10 binary outputs (1 break, 2 changeover, 7 make) 4 current transformer inputs Communication: USB, RS485, 2 x Ethernet	
7SR5110-3AD	1/2, 18 BI, 13 BO (inc. 3 HSBO), 4 I, 3 AFD Housing width 1/2 x 19" (size 8), housing height 4U 18 binary inputs 13 binary outputs (1 break, 2 changeover, 10 make) 4 current transformer inputs Communication: USB, RS485, 2 x Ethernet	

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7SR5110-3AF	1/2, 18 BI, 10 BO, 4 I, 8 TSI Housing width 1/2 x 19" (size 8), housing height 4U 18 binary inputs 10 binary outputs (1 break, 2 changeover, 7 make) 4 current transformer inputs Communication: USB, RS485, 2 x Ethernet	
7SR5110-4AA	1/2, 23 BI, 12 BO, 4 I Housing width 1/2 x 19" (size 8), housing height 4U 23 binary inputs 12 binary outputs (1 break, 2 changeover, 9 make) 4 current transformer inputs Communication: USB, RS485, 2 x Ethernet	
7SR5110-4AA	3/4, 23 BI, 12 BO, 4 I Housing width 3/4 x 19" (size 12), housing height 4U 23 binary inputs 12 binary outputs (1 break, 2 changeover, 9 make) 4 current transformer inputs Communication: USB, RS485, 2 x Ethernet	
7SR5110-4AD	1/2, 23 BI, 15 BO (inc. 3 HSBO), 4 I, 3 AFD Housing width 1/2 x 19" (size 8), housing height 4U 23 binary inputs 15 binary outputs (1 break, 2 changeover, 12 make) 4 current transformer inputs Communication: USB, RS485, 2 x Ethernet	
7SR5110-4AF	1/2, 23 BI, 12 BO, 4 I, 8 TSI Housing width 1/2 x 19" (size 8), housing height 4U 23 binary inputs 12 binary outputs (1 break, 2 changeover, 9 make) 4 current transformer inputs Communication: USB, RS485, 2 x Ethernet	
7SR5110-7AA	3/4, 38 BI, 18 BO, 4 I Housing width 3/4 x 19" (size 12), housing height 4U 38 binary inputs 18 binary outputs (1 break, 2 changeover, 15 make) 4 current transformer inputs Communication: USB, RS485, 2 x Ethernet	
7SR5111-1AA	3/8, 9 BI, 8 BO, 4 I, 4 V Housing width 3/8 x 19" (size 6), housing height 4U 9 binary inputs 8 binary outputs (1 break, 2 changeover, 5 make) 4 current transformer inputs 4 voltage transformer inputs Communication: USB, RS485, 2 x Ethernet	

Devices and Application

Overcurrent Protection – Reyrolle 7SR51

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<p>7SR5111-1AD</p>	<p>3/8, 9 BI, 11 BO (inc. 3 HSBO), 4 I, 4 V, 3 AFD</p> <p>Housing width 3/8 x 19" (size 6), housing height 4U</p> <p>9 binary inputs</p> <p>11 binary outputs (1 break, 2 changeover, 8 make)</p> <p>4 current transformer inputs</p> <p>4 voltage transformer inputs</p> <p>Communication: USB, RS485, 2 x Ethernet</p>	
<p>7SR5111-1AF</p>	<p>3/8, 9 BI, 8 BO, 4 I, 4 V, 8 TSI</p> <p>Housing width 3/8 x 19" (size 6), housing height 4U</p> <p>9 binary inputs</p> <p>8 binary outputs (1 break, 2 changeover, 5 make)</p> <p>4 current transformer inputs</p> <p>4 voltage transformer inputs</p> <p>Communication: USB, RS485, 2 x Ethernet</p>	
<p>7SR5111-2AA</p>	<p>1/2, 14 BI, 10 BO, 4 I, 4 V</p> <p>Housing width 1/2 x 19" (size 8), housing height 4U</p> <p>14 binary inputs</p> <p>10 binary outputs (1 break, 2 changeover, 7 make)</p> <p>4 current transformer inputs</p> <p>4 voltage transformer inputs</p> <p>Communication: USB, RS485, 2 x Ethernet</p>	
<p>7SR5111-2AA</p>	<p>3/4, 14 BI, 10 BO, 4 I, 4 V</p> <p>Housing width 3/4 x 19" (size 12), housing height 4U</p> <p>14 binary inputs</p> <p>10 binary outputs (1 break, 2 changeover, 7 make)</p> <p>4 current transformer inputs</p> <p>4 voltage transformer inputs</p> <p>Communication: USB, RS485, 2 x Ethernet</p>	
<p>7SR5111-3AA</p>	<p>1/2, 19 BI, 12 BO, 4 I, 4 V</p> <p>Housing width 1/2 x 19" (size 8), housing height 4U</p> <p>19 binary inputs</p> <p>12 binary outputs (1 break, 2 changeover, 9 make)</p> <p>4 current transformer inputs</p> <p>4 voltage transformer inputs</p> <p>Communication: USB, RS485, 2 x Ethernet</p>	
<p>7SR5111-3AA</p>	<p>3/4, 19 BI, 12 BO, 4 I, 4 V</p> <p>Housing width 3/4 x 19" (size 12), housing height 4U</p> <p>19 binary inputs</p> <p>12 binary outputs (1 break, 2 changeover, 9 make)</p> <p>4 current transformer inputs</p> <p>4 voltage transformer inputs</p> <p>Communication: USB, RS485, 2 x Ethernet</p>	
<p>7SR5111-3AD</p>	<p>1/2, 19 BI, 15 BO (inc. 3 HSBO), 4 I, 4 V, 3 AFD</p> <p>Housing width 1/2 x 19" (size 8), housing height 4U</p> <p>19 binary inputs</p> <p>15 binary outputs (1 break, 2 changeover, 12 make)</p> <p>4 current transformer inputs</p> <p>4 voltage transformer inputs</p> <p>Communication: USB, RS485, 2 x Ethernet</p>	

<p>7SR5111-3AD</p>	<p>3/4, 19 BI, 15 BO (inc. 3 HSBO), 4 I, 4 V, 3 AFD</p> <p>Housing width 3/4 x 19" (size 12), housing height 4U</p> <p>19 binary inputs</p> <p>15 binary outputs (1 break, 2 changeover, 12 make)</p> <p>4 current transformer inputs</p> <p>4 voltage transformer inputs</p> <p>Communication: USB, RS485, 2 x Ethernet</p>	
<p>7SR5111-3AF</p>	<p>1/2, 19 BI, 12 BO, 4 I, 4 V, 8 TSI</p> <p>Housing width 1/2 x 19" (size 8), housing height 4U</p> <p>19 binary inputs</p> <p>12 binary outputs (1 break, 2 changeover, 9 make)</p> <p>4 current transformer inputs</p> <p>4 voltage transformer inputs</p> <p>Communication: USB, RS485, 2 x Ethernet</p>	
<p>7SR5111-4AA</p>	<p>3/4, 24 BI, 14 BO, 4 I, 4 V</p> <p>Housing width 3/4 x 19" (size 12), housing height 4U</p> <p>24 binary inputs</p> <p>14 binary outputs (1 break, 2 changeover, 11 make)</p> <p>4 current transformer inputs</p> <p>4 voltage transformer inputs</p> <p>Communication: USB, RS485, 2 x Ethernet</p>	
<p>7SR5111-4AD</p>	<p>3/4, 24 BI, 17 BO (inc. 3 HSBO), 4 I, 4 V, 3 AFD</p> <p>Housing width 3/4 x 19" (size 12), housing height 4U</p> <p>24 binary inputs</p> <p>17 binary outputs (1 break, 2 changeover, 14 make)</p> <p>4 current transformer inputs</p> <p>4 voltage transformer inputs</p> <p>Communication: USB, RS485, 2 x Ethernet</p>	
<p>7SR5111-7AA</p>	<p>3/4, 39 BI, 20 BO, 4 I, 4 V</p> <p>Housing width 3/4 x 19" (size 12), housing height 4U</p> <p>39 binary inputs</p> <p>20 binary outputs (1 break, 2 changeover, 17 make)</p> <p>4 current transformer inputs</p> <p>4 voltage transformer inputs</p> <p>Communication: USB, RS485, 2 x Ethernet</p>	
<p>7SR5111-7AD</p>	<p>3/4, 39 BI, 23 BO (inc. 3 HSBO), 4 I, 4 V, 3 AFD</p> <p>Housing width 3/4 x 19" (size 12), housing height 4U</p> <p>39 binary inputs</p> <p>23 binary outputs (1 break, 2 changeover, 20 make)</p> <p>4 current transformer inputs</p> <p>4 voltage transformer inputs</p> <p>Communication: USB, RS485, 2 x Ethernet</p>	
<p>7SR5111-7AF</p>	<p>3/4, 39 BI, 20 BO, 4 I, 4 V, 8 TSI</p> <p>Housing width 3/4 x 19" (size 12), housing height 4U</p> <p>39 binary inputs</p> <p>20 binary outputs (1 break, 2 changeover, 17 make)</p> <p>4 current transformer inputs</p> <p>4 voltage transformer inputs</p> <p>Communication: USB, RS485, 2 x Ethernet</p>	

Devices and Application

Overcurrent Protection – Reyrolle 7SR51

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7SR5121-2AA	1/2, 17 BI, 10 BO, 5 I, 4 V Housing width 1/2 x 19" (size 8), housing height 4U 17 binary inputs 10 binary outputs (1 break, 2 changeover, 7 make) 5 current transformer inputs 4 voltage transformer inputs Communication: USB, RS485, 2 x Ethernet	
7SR5121-2AA	3/4, 17 BI, 10 BO, 5 I, 4 V Housing width 3/4 x 19" (size 12), housing height 4U 17 binary inputs 10 binary outputs (1 break, 2 changeover, 7 make) 5 current transformer inputs 4 voltage transformer inputs Communication: USB, RS485, 2 x Ethernet	
7SR5121-3AA	3/4, 22 BI, 12 BO, 5 I, 4 V Housing width 3/4 x 19" (size 12), housing height 4U 22 binary inputs 12 binary outputs (1 break, 2 changeover, 9 make) 5 current transformer inputs 4 voltage transformer inputs Communication: USB, RS485, 2 x Ethernet	
7SR5121-3AD	3/4, 22 BI, 15 BO (inc. 3 HSBO), 5 I, 4 V, 3 AFD Housing width 3/4 x 19" (size 12), housing height 4U 22 binary inputs 15 binary outputs (1 break, 2 changeover, 12 make) 5 current transformer inputs 4 voltage transformer inputs Communication: USB, RS485, 2 x Ethernet	
7SR5121-6AA	3/4, 37 BI, 18 BO, 5 I, 4 V Housing width 3/4 x 19" (size 12), housing height 4U 37 binary inputs 18 binary outputs (1 break, 2 changeover, 15 make) 5 current transformer inputs 4 voltage transformer inputs Communication: USB, RS485, 2 x Ethernet	
7SR5121-6AD	3/4, 37 BI, 21 BO (inc. 3 HSBO), 5 I, 4 V, 3 AFD Housing width 3/4 x 19" (size 12), housing height 4U 37 binary inputs 21 binary outputs (1 break, 2 changeover, 18 make) 5 current transformer inputs 4 voltage transformer inputs Communication: USB, RS485, 2 x Ethernet	


7SR5121-6AF	<p>3/4, 37 BI, 18 BO, 5 I, 4 V, 8 TSI</p> <p>Housing width 3/4 x 19" (size 12), housing height 4U</p> <p>37 binary inputs</p> <p>18 binary outputs (1 break, 2 changeover, 15 make)</p> <p>5 current transformer inputs</p> <p>4 voltage transformer inputs</p> <p>Communication: USB, RS485, 2 x Ethernet</p>	
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Table 2.4/2 Standard Variants for 7SR51

The technical data of the devices can be found in the hardware manual.