



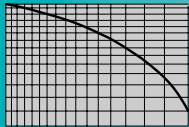
PCB RELAYS ***FOR PROFESSIONAL*** ***APPLICATIONS***

ELESTA



We endeavour to use environmentally safe materials and environmentally sound manufacturing methods whenever technologically feasible.

Accordingly, we select and apply suitable means and materials for production. For packing material, in the vast majority of cases we employ environment-friendly rail mount packages or CFC (chlorofluorocarbon) free polystyrene wrappings.







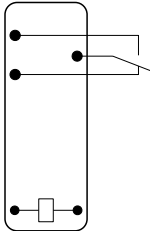
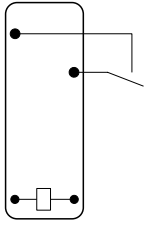
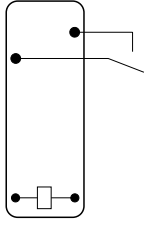
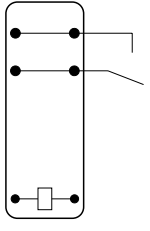
In this catalogue, we have included diagrams in order for you to gain a clearer picture of applied technical data and thus a better perspective on our products. Due to space constraints, we were unable to include some threshold values and attributes of relays in the respective diagrams; if you have any questions on specifications, we will gladly provide in-depth information.








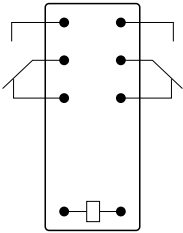
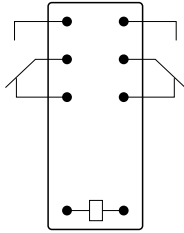
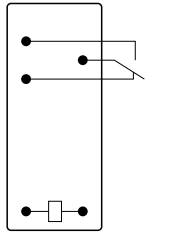
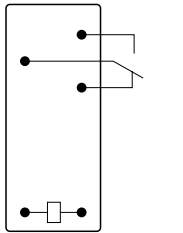
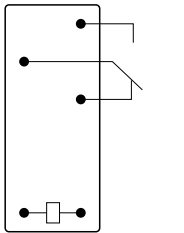
All statements made in this catalogue are believed to be true and are not legally binding.





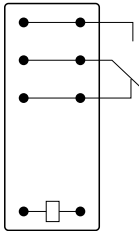
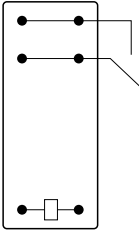
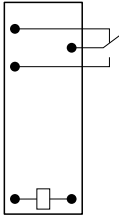
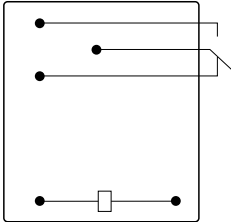
We reserve the right to make technical alterations.






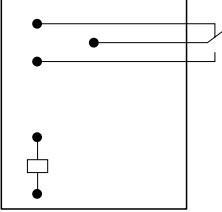
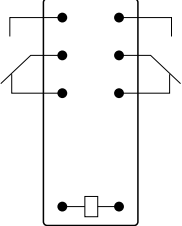
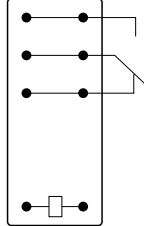
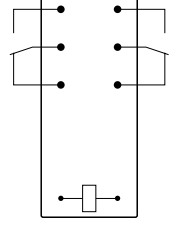
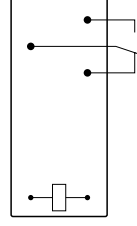
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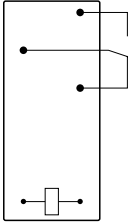
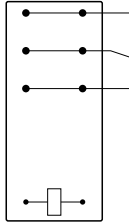
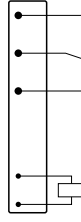
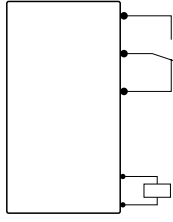
Range	SGR xx1			
Types of relays	SGR 451	SGR 431	SGR 441	SGR 631
				
Diagrams (View from above)				
General data				
Dimensions (LxWxH) mm	30,2 x 10,2 x 15,4	28,6 x 10,2 x 15,4	28,6 x 10,2 x 15,4	28,6 x 10,2 x 15,4
Ambient temperature °C	-40 bis +85	-40 bis +85	-40 bis +85	-40 bis +85
Protection category	IP 40	IP 40	IP 40	IP 40
Contact data				
No. of contacts	1 CO	1 NO	1 NO	1 NO
Contact material	AgCdO	AgCdO	AgCdO	AgCdO
Rated current A	10	10	10	16
Inrush current (20 ms) A	20	20	20	20
Rated switching capacity	250 VAC 10 A AC1 2500 VA	250 VAC 10 A AC1 2500 VA	250 VAC 10 A AC1 2500 VA	250 VAC 16 A AC1 4000 VA
Electrical life operations	50.000	100.000	100.000	50.000
Coil data				
Standard voltages VDC	3-5-6-9-12-18-24-36-48-60-110	3-5-6-9-12-18-24-36-48-60-110	3-5-6-9-12-18-24-36-48-60-110	6-9-12-18-24-36-48-60
Power consumption typically mW	250	250	250	400
Pick-up voltage at 20°C	approx. 0,7 x U _{nom.}	approx. 0,7 x U _{nom.}	approx. 0,7 x U _{nom.}	approx. 0,7 x U _{nom.}
Options (on request)				
Contact material	AgSnO ₂ , AgNi, ...+AU	AgSnO ₂ , AgNi, ...+AU	AgSnO ₂ , AgNi, ...+AU	
Sealed model	•	•	•	•
Washproof model				
Sensitive coil				
Heavy current model				
High temperature model		•	•	
Remanence model	•	•		
NO contact only				
NC contact only		SGR 411		
Catalogue page	12	14	16	18

SGR xx2

SGR 282	SGR 282Z	SGR 362	SGR 462	SGR 562
				
				
30,0 x 12,5 x 25,3	30,0 x 12,5 x 25,3	30,0 x 12,5 x 25,3	30,0 x 12,5 x 25,3	30,0 x 12,5 x 25,3
-40 bis +70	-40 bis +70	-40 bis +70	-40 bis +70	-40 bis +70
IP 42	IP 42	IP 42	IP 42	IP 42
2 CO	2 CO - forc. guided	1 CO	1 CO	1 CO
AgCuNi	AgCuNi	AgCuNi	AgCuNi	AgCdO
8	4	8	8	16
30	15	30	30	50
250 VAC 8 A AC1 2000 VA	250 VAC 4 A AC1 1000 VA	250 VAC 8 A AC1 2000 VA	250 VAC 8 A AC1 2000 VA	250 VAC 16 A AC1 4000 VA
120.000	100.000	120.000	120.000	200.000
6-12-24-48-60-110	6-12-24-48-60-110	6-12-24-48-60-110	6-12-24-48-60-110	6-12-24-48-60-110
500	1000	500	500	500
approx. 0,75 x U _{nom.}	approx. 0,75 x U _{nom.}	approx. 0,75 x U _{nom.}	approx. 0,75 x U _{nom.}	approx. 0,75 x U _{nom.}
AgSnO ₂ , ...+AU	...+AU			
•	•	•	•	•
•	•	•	•	•
SGR 242		SGR 342	SGR 442	SGR 542
SGR 222		SGR 322	SGR 422	SGR 522
24	26	28	30	32

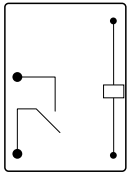
Range	SGR xx2			
Types of relays	SGR 662	SGR 642H	SGR 762	SGR 862
				
Diagrams (View from above)				
General data				
Dimensions (LxWxH) mm	30,0 x 12,5 x 25,3	30,0 x 12,5 x 25,3	28,0 x 10,3 x 24,5	29,1 x 25,8 x 12,5
Ambient temperature °C	-40 bis +70	-40 bis +70	-40 bis +70	-40 bis +70
Protection category	IP 42	IP 42	IP 40	IP 42
Contact data				
No. of contacts	1 CO	1 NO	1 CO	1 CO
Contact material	AgCdO	AgSnO ₂	AgCu ₃	AgSnO ₂
Rated current A	16	16	8	16
Inrush current (20 ms) A	50	150	16	50
Rated switching capacity	250 VAC 16 A AC1 4000 VA	250 VAC 16 A AC1 4000 VA	250 VAC 8 A AC1 2000 VA	250 VAC 16 A AC1 4000 VA
Electrical life operations	200.000	200.000	150.000	100.000
Coil data				
Standard voltages VDC	6-12-24-48-60-110	6-12-24-48-60-110	6-12-24-48-60-110	6-12-24-48-60-110
Power consumption typically mW	500	500	500	500
Pick-up voltage at 20°C	approx. 0,75 x U _{nom.}	approx. 0,75 x U _{nom.}	approx. 0,7 x U _{nom.}	approx. 0,75 x U _{nom.}
Options (on request)				
Contact material	AgSnO ₂ , AgCuNi		AgCdO	AgCdO
Sealed model	•	•		
Washproof model	•	•		•
Sensitive coil				•
Heavy current model		•		
High temperature model				
Remanence model				
NO contact only	SGR 642			SGR 842
NC contact only	SGR 622			
Catalogue page	34	36	38	40

SGR xx2			SGR xx3	
SGR 962	SGR 282T	SGR 662T	SGR 283	SGR 463
				
				
28,0 x 24,4 x 10,3	30,0 x 12,5 x 26,5	30,0 x 12,5 x 26,5	29,0 x 12,7 x 15,7	29,0 x 12,7 x 15,7
-40 bis +70	-40 bis +70	-40 bis +70	-40 bis +85	-40 bis +85
IP 40	IP 40	IP 40	IP 40	IP 40
1 CO	2 CO	1 CO	2 CO	1 CO
AgCu3	AgCuNi	AgCdO	AgNi	AgNi
8	8	16	8	12
16	30	50	15	50
250 VAC 8 A AC1 2000 VA	250 VAC 8 A AC1 2000 VA	250 VAC 16 A AC1 4000 VA	250 VAC 8 A AC1 2000 VA	250 VAC 12 A AC1 3000 VA
150.000	120.000	200.000	50.000	100.000
6-12-24-48-60-110	6-12-24-48-60-110	6-12-24-48-60-110	5-6-9-12-18-24-36-48-60-110	5-6-9-12-18-24-36-48-60-110
500	500	500	400	400
approx. 0,7 x U _{nom.}	approx. 0,75 x U _{nom.}	approx. 0,75 x U _{nom.}	approx. 0,7 x U _{nom.}	approx. 0,7 x U _{nom.}
AgCdO			AgSnO ₂ , ...+AU	AgSnO ₂ , ...+AU
			•	•
			SGR 243	SGR 443
				SGR 423
42	44 / 50	44 / 50	52	54

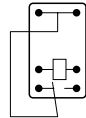
Range	SGR xx3		SGR xx4	
Types of relays	SGR 563	SGR 663	SGR 364	SGR 864
				
Diagrams (View from above)				
General data				
Dimensions (LxWxH) mm	29,0 x 12,7 x 15,7	29,0 x 12,7 x 15,7	28,0 x 5,0 x 15,0	28,0 x 15,5 x 5,0
Ambient temperature °C	-40 bis +85	-40 bis +85	-40 bis +85	-40 bis +85
Protection category	IP 40	IP 40	IP 40	IP 40
Contact data				
No. of contacts	1 CO	1 CO	1 CO	1 CO
Contact material	AgSnO ₂	AgNi	AgNi	AgNi
Rated current A	12	16	6	6
Inrush current (20 ms) A	50	50	30	30
Rated switching capacity	250 VAC 12 A AC1 3000 VA	250 VAC 16 A AC1 4000 VA	250 VAC 6 A AC1 1500 VA	250 VAC 6 A AC1 1500 VA
Electrical life operations	100.000	50.000	30.000	30.000
Coil data				
Standard voltages VDC	5-6-9-12-18-24-36-48-60-110	5-6-9-12-18-24-36-48-60-110	5-6-9-12-18-24-36-48-60	5-6-9-12-18-24-36-48-60
Power consumption typically mW	400	400	170 - 200	170 - 200
Pick-up voltage at 20°C	approx. 0,7 x U _{nom.}	approx. 0,7 x U _{nom.}	approx. 0,7 x U _{nom.}	approx. 0,7 x U _{nom.}
Options (on request)				
Contact material		AgSnO ₂ , ...+AU	AgSnO ₂ , ...+AU	AgSnO ₂ , ...+AU
Sealed model	•	•	•	•
Washproof model				
Sensitive coil				
Heavy current model				
High temperature model				
Remanence model				
NO contact only	SGR 543	SGR 643	SGR 344	SGR 844
NC contact only	SGR 523	SGR 623	SGR 324	SGR 824
Catalogue page	56	58	66	68

SPECIAL RELAYS

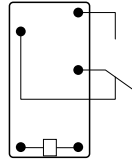
SGR 14



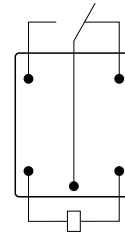
SGR 46G ... 1C E



SGR 66G ... 1C E



SGR 6GH ... 1C



22,2 x 16,0 x 10,9

-40 bis +70

12,5 x 7,5 x 10

-30 bis +70

IP 67

20,5 x 10,6 x 15,3

-40 bis +70

19,2 x 15,4 x 14,8

-40 bis +70

1 NO

AgCdO

10

16

125 VAC 10 A AC1 1250 VA

100.000

1 CO

AgPd+Au

0,5

125 VAC 0,5 A AC1 62,5 VA

100.000

1 CO

AgCdO

5 (AK) / 3 (RK)

10

250 VAC 5 A AC1 1250 VA (AK)

100.000

1 CO

AgCdO

10

15

250 VAC 7 A AC1 1750 VA

100.000

5-6-9-12-18-24-48

200

approx. 0,8 x U_{nom.}

1,5-3-5-6-9-12-24

150

approx. 0,8 x U_{nom.}

3-5-6-12-18-24

200

approx. 0,75 x U_{nom.}

5-6-9-12-18-24-48

500

approx. 0,75 x U_{nom.}

AgSnO₂ (1A)

• (16 A)

SGR 66G ... 1A E

SGR 6GH ... 1A ASO

72

74

76

78

ACCESSORIES

PCB mounting socket



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SGR xx2: Page 46

SGR xx3: Page 60



SGR xx4: Page 70

Socket with screw terminals



SGR xx1: Page 21

SGR xx2: Page 47/48

SGR xx3: Page 61/62

Interface relays 282 T/662 T



Page 50

TYPE CODE FOR:

ELESTA-PCB relays SGR xx1–SGR xx4

Example: Elesta PCB relay SGR xx2, grid 5.0 mm, 2 change over contacts, sealed, 012 VDC, gold-plated contacts

SGR 2 8 2 V 012 VDC +AU

Series designation

Type

- 2 = Grid 5.0 mm two separate contacts
- 3 = Grid < 3.5 mm to 8 A
- 4 = Grid 3.5 mm to 10 A
- 4 = Grid 3.2/5.0 mm to 10 A (Miniature-SGR xx1)
- 5 = Grid 5.0 mm to 16 A
- 6 = Grid 5.0 mm to 16 A (Double pins)
- 7 = Grid < 3.5 mm to 8 A (another terminal layout)
- 8 = horizontal model to 16 A
- 9 = horizontal model to 8 A

Contact arrangement

- 1 = Normally closed contact (Miniature-SGR xx1)
- 2 = Normally closed contact
- 3 = Normally open contact (Miniature-SGR xx1)
- 4 = Normally open contact
- 5 = Change over contact (Miniature-SGR xx1)
- 6 = Change over contact
- 8 = 2 change over contacts (two separate contacts)

Range

- 1 = SGR xx1
- 2 = SGR xx2
- 3 = SGR xx3
- 4 = SGR xx4

Special contact material

- (Nil) = Standard contact material
- ACN = AgCuNi
- AN = AgNi
- ASO = AgSnO₂
- ACO = AgCdO
- +AU = Gold-plated contacts (addition)

Coil voltage

Three-digit code for coil voltage
f. e. 012 = 12 VDC

Models

- C = High temperature model
- E = Sensitive coil
- H = Heavy current model
- I = Deviation from the standard rated current
- O = Washproof
- R = Remanence model
- V = Sealed
- S = Special model
- T = with pushbutton
- Z = with forcibly guided contacts

ELESTA special relays for further applications

Example: Elesta PCB relay SGR 14, 012VDC, 1 normally open contact, heavy current model, sealed

SGR 66G 012 1 A HV ASO

Series designation

Range

Coil voltage

Three-digit code for coil voltage
f. e. 012 = 12 VDC

Number of contacts

Special contact material

- (Nil) = Standard contact material
- AN = AgNi
- ASO = AgSnO₂
- ACO = AgCdO
- +AU = Gold-plated contacts (addition)

Models

- E = Sensitive coil
- H = Heavy current model
- V = Sealed
- S = Special model
- X = SMD model

Contact arrangement

- A = Normally closed contact
- B = Normally open contact
- C = Change over contact



SGR xx1 – PCB RELAYS

The trend towards miniaturization continues, requiring ever smaller relays with high switching capacity. With the SGR xx1 product family, we have increased the scope of the development engineer many times over. SGR xx1 PCB relays combine maximum sensitivity with minimal self-heating in an extremely compact package. The coil extending the entire length of the relay produces very favorable field conditions. However, the critical factor for operation is the coil's low operating power which places less demand both on the power supply and IC driver outputs, thereby helping to minimize the heating of end products.

Features

- ▶ Extensive standard range with many options
- ▶ Up to 16 A switching current
- ▶ Immersion proof with ventilation option
- ▶ Special type in 125° C ambient temperature
- ▶ High switching capacity in extremely compact package
- ▶ Only approx. 250 mW coil operating power
- ▶ Creepage distance and airgaps ≥ 8 mm
- ▶ Coil-contact test voltage 4000 V_{eff}
- ▶ Low-outgassing plastics
- ▶ Inline packaging for processing on pick-and-place equipment

Applications

- ▶ Control equipment
- ▶ Programmable time switches
- ▶ Heating and air-conditioning systems
- ▶ Programmable controllers
- ▶ Time-delay relays
- ▶ Interfacing devices
- ▶ Domestic appliances
- ▶ Office machines



SGR-PCB RELAYS 451

No. of contacts: **1 CO**
 Rated current: **10 A**
 Inrush current: **20 A**

Order description

SGR 451 ...VDC

Contact data

Contact material	AgCdO
Type of contact	Single contact
Rated switching capacity	250 VAC 10A AC1 2500 VA
Max. switching voltage	400 VAC
Electrical life	approx. 50.000 operations 250 VAC 10 A
Contact resistance	< 50 mΩ

Coil data

Nominal voltages	3-5-6-9-12-18-24-36-48-60-110 VDC
Pick-up voltage	approx. 0,7 x Nominal voltage (at 20 °C)
Power consumption	typically 250 mW

Options

Contact material AgSnO₂ / AgNi / ...+AU
 SGR 451 ...VDC ASO
 SGR 451 ...VDC AN
 SGR 451 ...VDC ...+AU
 Sealed IP 67
 SGR 451V ...VDC ...
 Light current model
 SGR 451I ...VDC
 Remanence model
 SGR 451R ...VDC

General data

Mechanical life	30 x 10 ⁶ Operations
Max. switching frequency	450 Operations/h
Operate time	typically 8 ms
Release time	typically 5 ms
Bounce time	typically 3 ms
Vibration resistance	10 g (10-55 Hz)
Test voltage coil-contact	4.000 V _{eff}
Test voltage contact open	1.000 V _{eff}
Weight	11,5 g
Ambient temperature	-40°C - +85°C (125°C)
Temperature of soldering bath	270°C / 5 s
Protection category	IP 40

Accessories

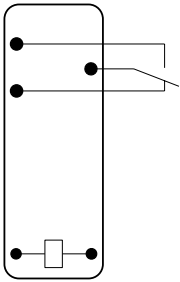
PCB mounting socket
 ZVR 005

Tests, regulations

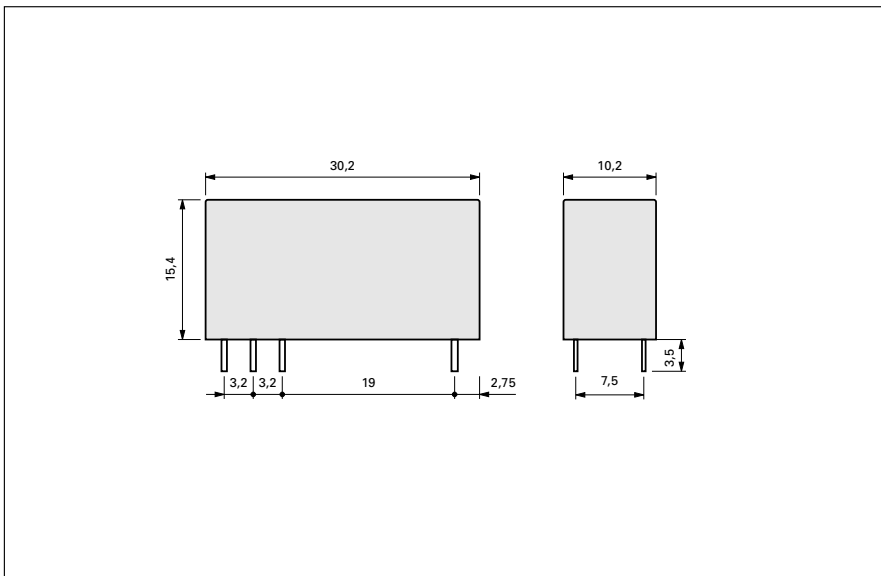
Approvals	on request
Insulation group	C/250
Creeping and leakage distance	10 mm

Diagram

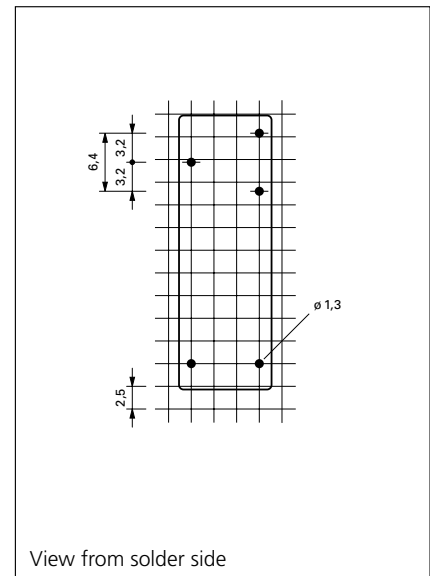
View from above



Dimensions drawing (mm)

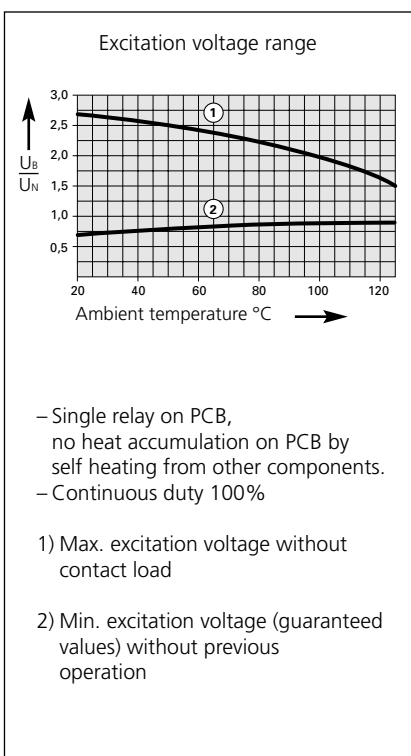


Drilling pattern (mm)



View from solder side

Coil data



Standard coil for direct current (other voltages on request)

Nominal voltage VDC	Min. pick-up voltage at 20°C	Drop-out voltage at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
3	2,2	0,3	73,17	41	10
5	3,5	0,5	45,45	110	10
6	4,2	0,6	40,00	150	10
9	6,5	0,9	25,00	360	10
12	8,4	1,2	18,18	660	10
18	13,0	1,8	12,86	1.400	15
24	16,8	2,4	10,91	2.200	15
36	25,2	3,6	7,74	4.650	15
48	33,6	4,8	6,00	8.000	15
60	42,0	6,0	4,29	14.000	15
110	77,0	11,0	4,07	27.000	15



SGR-PCB RELAYS 431-411

No. of contacts: **1 NO or 1 NC**
 Rated current: **10 A**
 Inrush current: **20 A**

Order description

SGR 431 ...VDC
 SGR 411 ...VDC

Contact data

Contact material	AgCdO
Type of contact	Single contact
Rated switching capacity	250 VAC 10A AC1 2500 VA
Max. switching voltage	400 VAC
Electrical life	approx. 100.000 operations 250 VAC 10 A
Contact resistance	< 50 mΩ

Coil data

Nominal voltages	3-5-6-9-12-18-24-36-48-60-110 VDC
Pick-up voltage	approx. 0,7 x Nominal voltage (at 20 °C)
Power consumption	typically 250 mW

Options

Contact material AgSnO₂ / AgNi / ...+AU
 SGR 431/411 ...VDC ASO
 SGR 431/411 ...VDC AN
 SGR 431/411 ...VDC ...+AU
 Sealed IP 67
 SGR 431/411V ...VDC ...
 Light current model
 SGR 431/411I ...VDC
 High temperature model T=125°C
 SGR 431/411C ...VDC
 Remanence model
 SGR 431/411R ...VDC

General data

Mechanical life	30 x 10 ⁶ Operations
Max. switching frequency	450 Operations/h
Operate time	typically 8 ms
Release time	typically 5 ms
Bounce time	typically 3 ms
Vibration resistance	10 g (10-55 Hz)
Test voltage coil-contact	4.000 V _{eff}
Test voltage contact open	1.000 V _{eff}
Weight	11,5 g
Ambient temperature	-40°C - +85°C (125°C)
Temperature of soldering bath	270°C / 5 s
Protection category	IP 40

Accessories

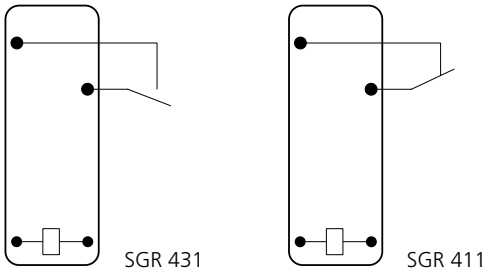
PCB mounting socket
 ZVR 004

Tests, regulations

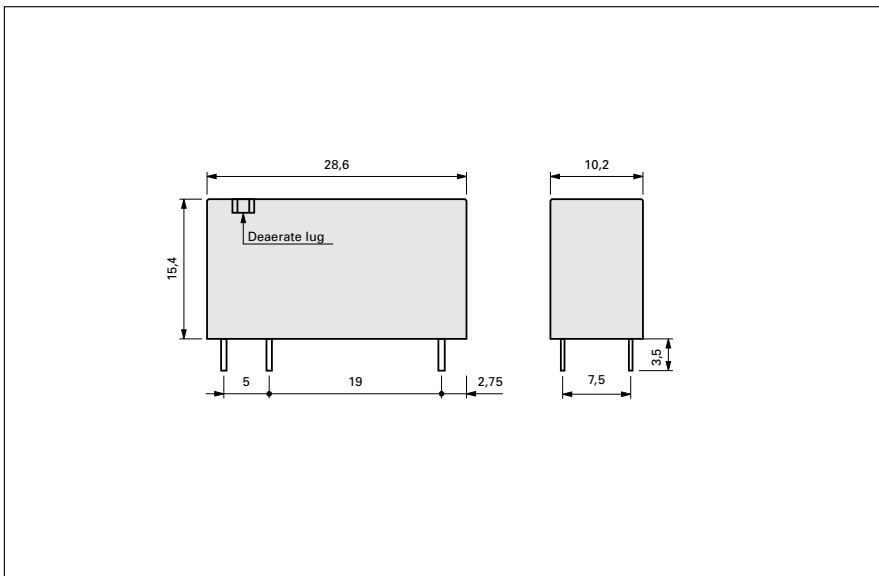
Approvals	on request
Insulation group	C/250
Creeping and leakage distance	10 mm

Diagrams

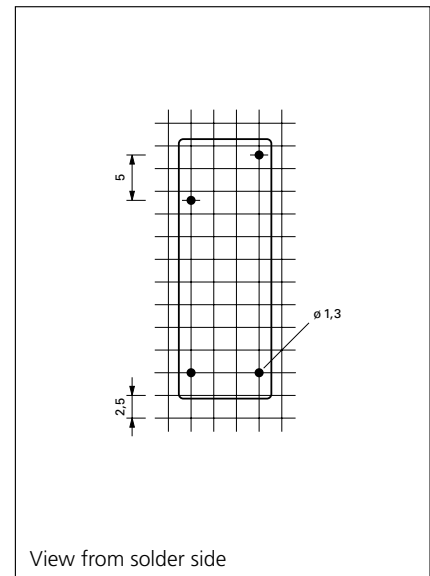
View from above



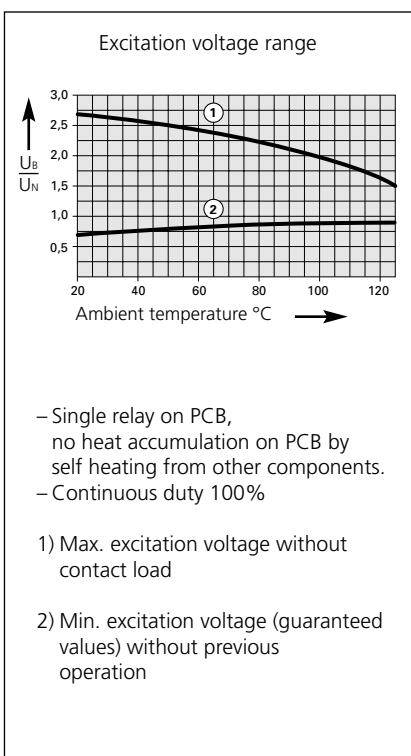
Dimensions drawing (mm)



Drilling pattern (mm)



Coil data



Standard coil for direct current (other voltages on request)

Nominal voltage VDC	Min. pick-up voltage at 20°C	Drop-out voltage at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
3	2,2	0,3	73,17	41	10
5	3,5	0,5	45,45	110	10
6	4,2	0,6	40,00	150	10
9	6,5	0,9	25,00	360	10
12	8,4	1,2	18,18	660	10
18	13,0	1,8	12,86	1.400	15
24	16,8	2,4	10,91	2.200	15
36	25,2	3,6	7,74	4.650	15
48	33,6	4,8	6,00	8.000	15
60	42,0	6,0	4,29	14.000	15
110	77,0	11,0	4,07	27.000	15



SGR-PCB RELAYS 441

No. of contacts: **1 NO**
 Rated current: **10 A**
 Inrush current: **20 A**

Order description

SGR 441 ...VDC

Contact data

Contact material	AgCdO
Type of contact	Single contact
Rated switching capacity	250 VAC 10A AC1 2500 VA
Max. switching voltage	400 VAC
Electrical life	approx. 100.000 operations 250 VAC 10 A
Contact resistance	< 50 mΩ

Coil data

Nominal voltages	3-5-6-9-12-18-24-36-48-60-110 VDC
Pick-up voltage	approx. 0,7 x Nominal voltage (at 20 °C)
Power consumption	typically 250 mW

Options

Contact material AgSnO₂ / AgNi / ...+AU
 SGR 441 ...VDC ASO
 SGR 441 ...VDC AN
 SGR 441 ...VDC ...+AU
 Sealed IP 67
 SGR 441V ...VDC ...
 High temperature model T=125°C
 SGR 441C ...VDC

General data

Mechanical life	30 x 10 ⁶ Operations
Max. switching frequency	450 Operations/h
Operate time	typically 8 ms
Release time	typically 5 ms
Bounce time	typically 3 ms
Vibration resistance	10 g (10-55 Hz)
Test voltage coil-contact	4.000 V _{eff}
Test voltage contact open	1.000 V _{eff}
Weight	11,5 g
Ambient temperature	-40°C - +85°C (125°C)
Temperature of soldering bath	270°C / 5 s
Protection category	IP 40

Accessories

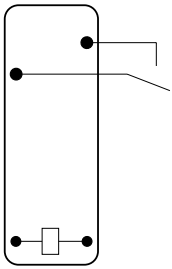
PCB mounting socket
 ZGR 003
 Socket with screw terminals
 ZGE 006

Tests, regulations

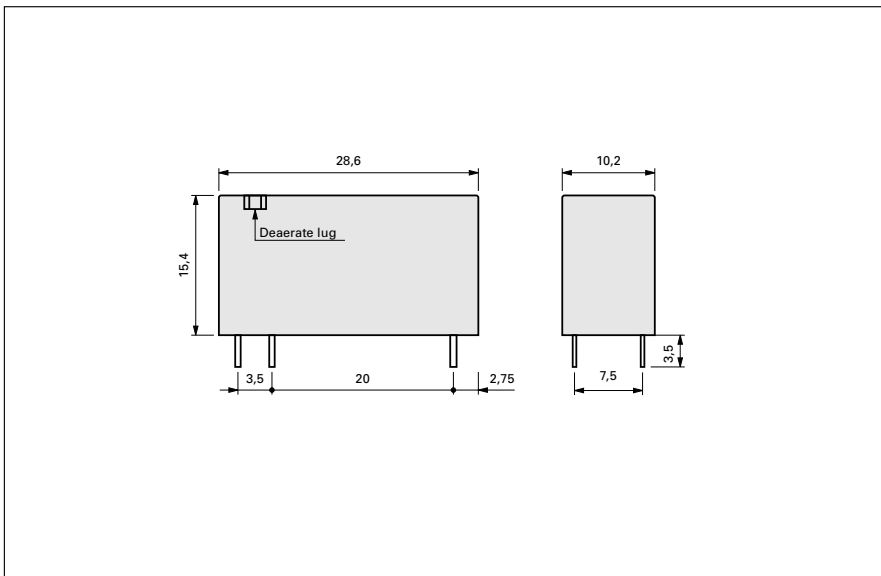
Approvals	on request
Insulation group	C/250
Creeping and leakage distance	10 mm

Diagram

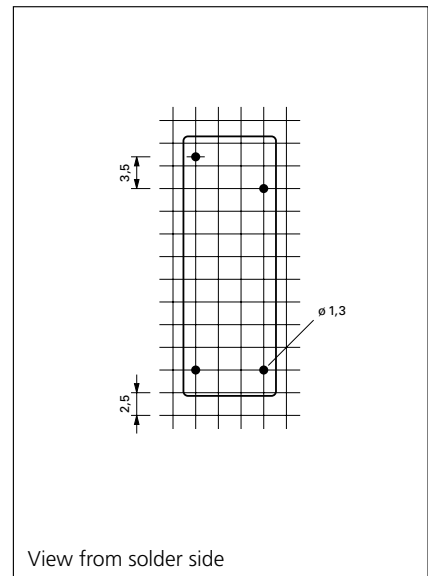
View from above



Dimensions drawing (mm)

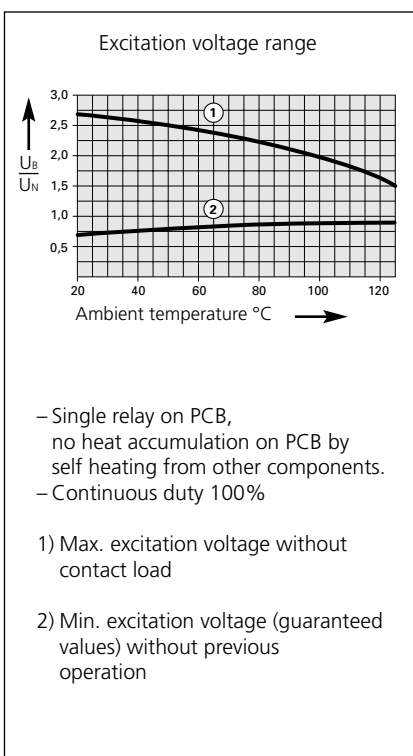


Drilling pattern (mm)



View from solder side

Coil data



Standard coil for direct current (other voltages on request)

Nominal voltage VDC	Min. pick-up voltage at 20°C	Drop-out voltage at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
3	2,2	0,3	73,17	41	10
5	3,5	0,5	45,45	110	10
6	4,2	0,6	40,00	150	10
9	6,5	0,9	25,00	360	10
12	8,4	1,2	18,18	660	10
18	13,0	1,8	12,86	1.400	15
24	16,8	2,4	10,91	2.200	15
36	25,2	3,6	7,74	4.650	15
48	33,6	4,8	6,00	8.000	15
60	42,0	6,0	4,29	14.000	15
110	77,0	11,0	4,07	27.000	15



SGR-PCB RELAYS 631

No. of contacts: **1 NO**
 Rated current: **16 A**
 Inrush current: **20 A**

Order description

SGR 631 ...VDC

Contact data

Contact material	AgCdO
Type of contact	Single contact
Rated switching capacity	250 VAC 16A AC1 4000 VA
Max. switching voltage	400 VAC
Electrical life	approx. 50.000 operations 250 VAC 16 A
Contact resistance	< 50 mΩ

Coil data

Nominal voltages	6-9-12-18-24-36-48-60 VDC
Pick-up voltage	approx. 0,7 x Nominal voltage (at 20 °C)
Power consumption	typically 400 mW

Options

Sealed IP 67
 SGR 631V ...VDC ...

General data

Mechanical life	30 x 10 ⁶ Operations
Max. switching frequency	450 Operations/h
Operate time	typically 8 ms
Release time	typically 5 ms
Bounce time	typically 3 ms
Vibration resistance	10 g (10-55 Hz)
Test voltage coil-contact	4.000 V _{eff}
Test voltage contact open	1.000 V _{eff}
Weight	11,5 g
Ambient temperature	-40°C - +85°C
Temperature of soldering bath	270°C / 5 s
Protection category	IP 40

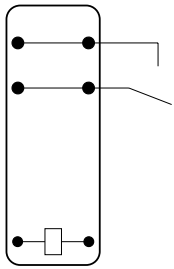
Accessories

Tests, regulations

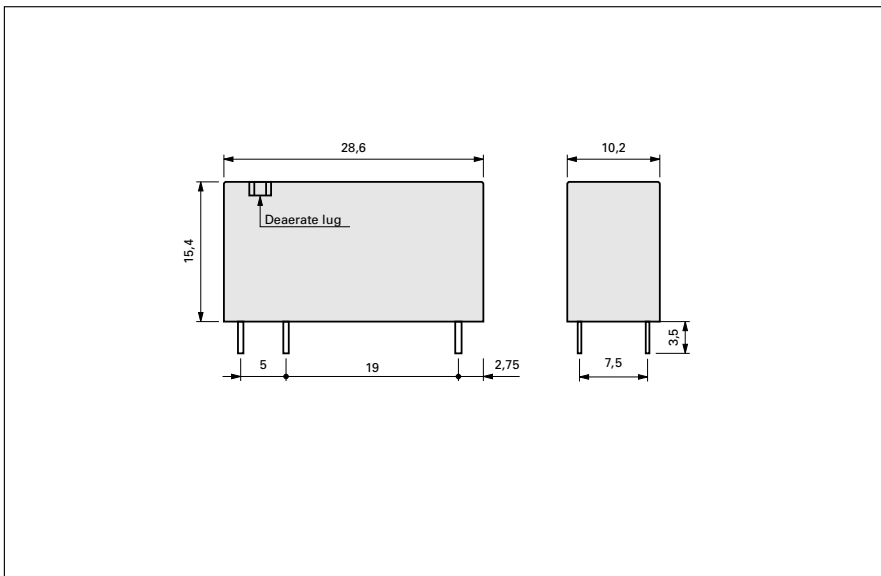
Approvals	on request
Insulation group	C/250
Creeping and leakage distance	10 mm

Diagram

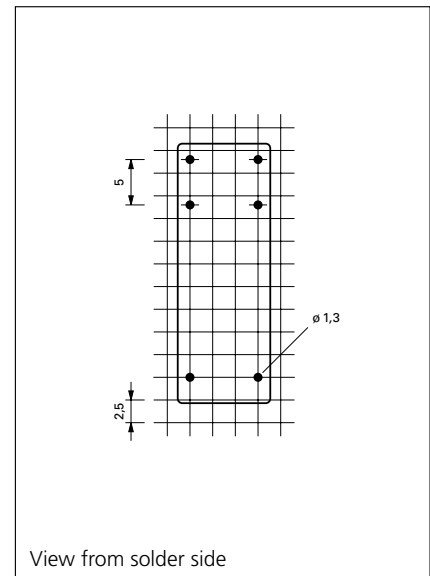
View from above



Dimensions drawing (mm)

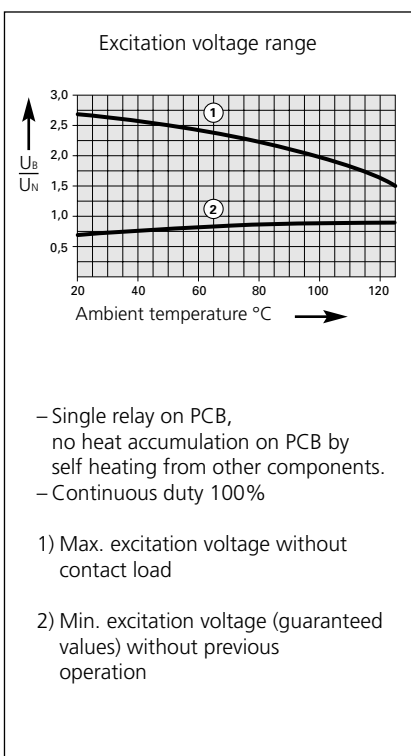


Drilling pattern (mm)



View from solder side

Coil data



Standard coil for direct current (other voltages on request)

Nominal voltage VDC	Min. pick-up voltage at 20°C	Drop-out voltage at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
6	4,2	0,5	146,34	41	10
9	6,5	0,7	60,00	150	10
12	8,4	1,0	33,33	360	10
18	13,0	1,4	27,27	660	10
24	16,8	1,9	17,14	1.400	15
36	25,2	2,9	16,36	2.200	15
48	33,6	3,8	10,32	4.650	15
60	42,0	6,0	7,50	8.000	15



SGR xx1 – PCB mounting socket and accessories

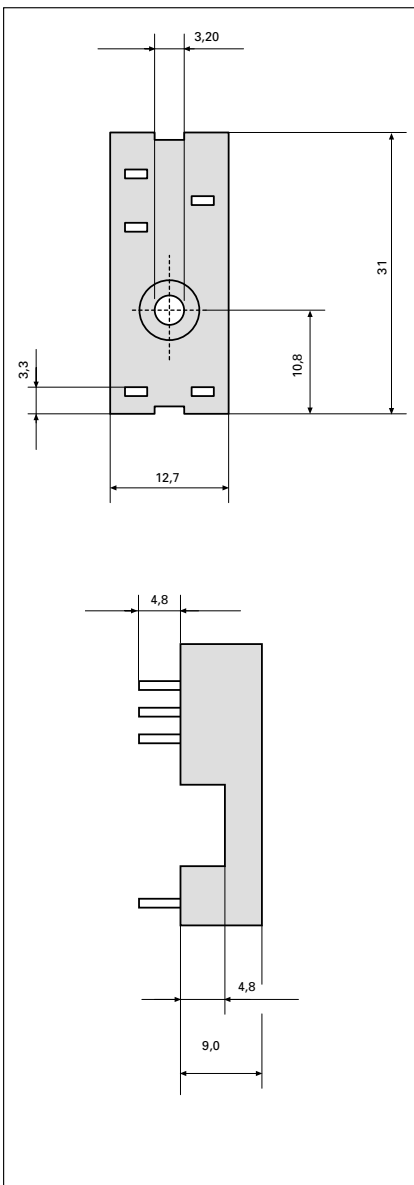
Accessories

ZVR 003
Retaining clip

Type of sockets

	ZVR 004	ZVR 005	ZGR 003
Fits to relay	SGR 431, 411	SGR 451	SGR 441
Pin layout	5,0 mm	3,2 mm	3,5 mm

Dimensions drawing (mm)



General data

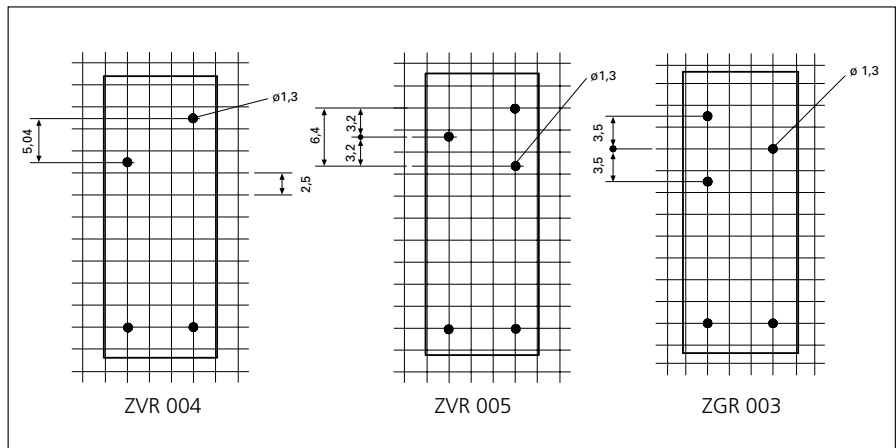
Nominal data	300 VAC 12 A
Test voltage	> 5.000 V _{eff}
Contact springs material	CuSn6 tin plated
Mounting	solder pin
Creeping resistance	CTI 250
Weight	approx. 7 g
Mounting position	any
Ambient temperature	-40°C - +85°C
No. of pins	ZVR 004 4pin ZVR 005 5pin ZGR 003 5pin
Protection category	IP 30

Tests, regulations

Approvals	UL, CSA
Insulation group	VDE 0110 / group C 250 VAC

Drilling patterns (mm)

View from solder side



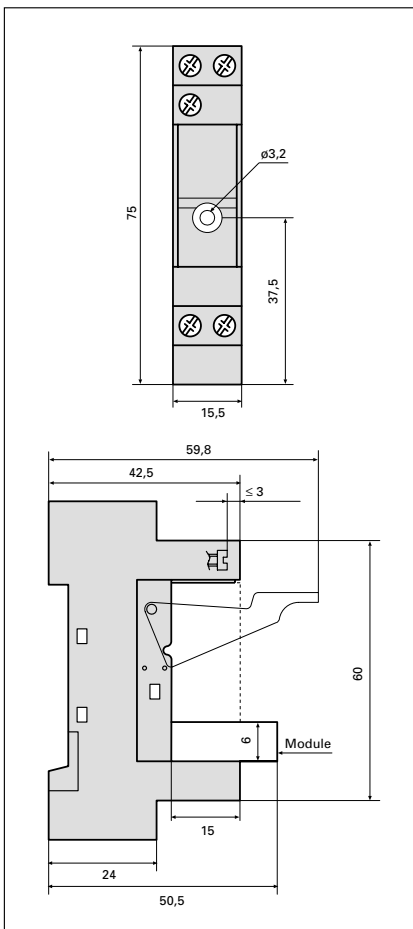


SGR xx1 – sockets with screw terminals and accessories

Accessories

- ZVR 006
- Retaining clip
- ZGE 011
- Label plate
- ZAE 011 - ZAE ...
- Modules (see next page)

Dimensions drawing (mm)



Type of socket

ZGE 006

Fits to relay

SGR 441

Pin layout

3,5 mm

General data

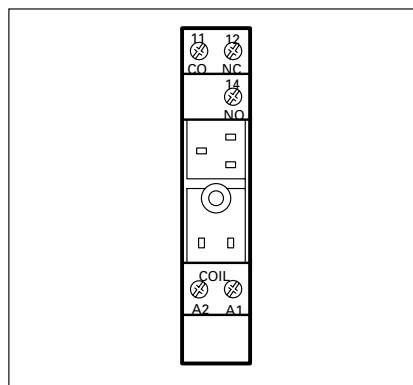
Nominal data	300 VAC 12 A
Test voltage	> 3.000 V _{eff}
Contact springs material	CuZn33 tin plated
Nominal torque on screws	0,8 Nm
Max. torque on screws	0,8 Nm
Terminals	combi screw M3 + Philips Gr.1
Max. wire section	2 x 2,5 mm ² compact wire 2 x 1,5 mm ² with cable end
Mounting	DIN rail 35 mm, EN 50022, central screw 1 x M3
Creeping resistance	CTI 250
Weight	approx. 39 g
Mounting position	any
Ambient temperature	-25°C - +85°C
No. of pins	ZGE 006 5pin
Terminals numbering	DIN EN 50011
Protection category	IP 20

Tests, regulations

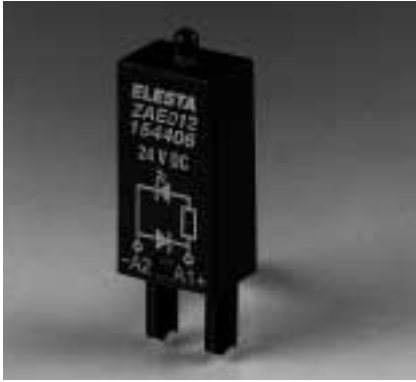
Approvals	UL, CSA
Insulation group	VDE 0110 / group C 250 VAC

Diagram

View from above



Using DC modules + must be connected to A1!



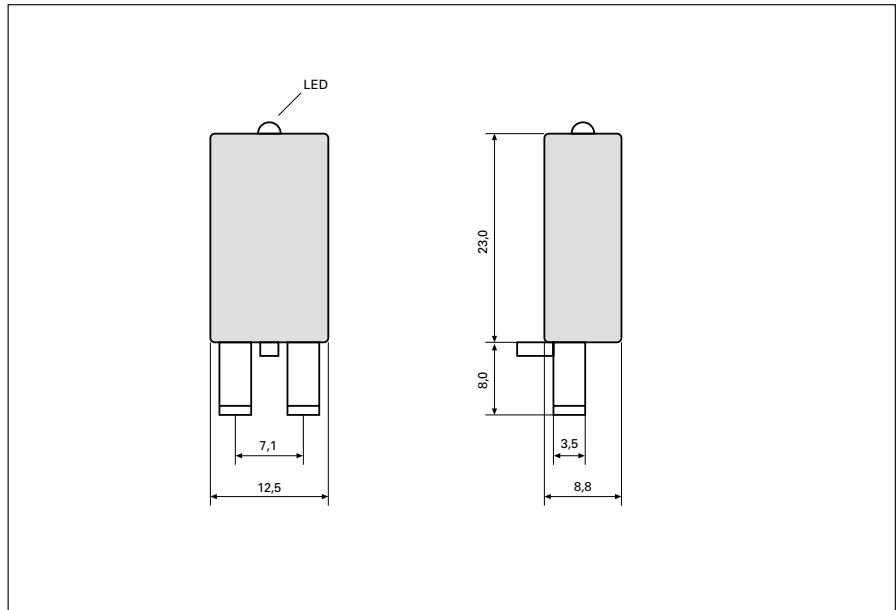
Modules for sockets with screw terminals

About the colour of the LED's:

According to EN 60073 the colour RED is used to indicate an alert or a dangerous situation.

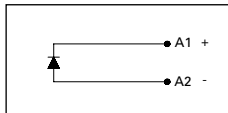
GREEN shows normal condition or a save situation. Therefore our modules with an LED indicator are available in red or green.

Dimensions drawing (mm)



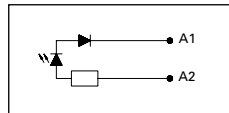
Diagrams

ZAE 011



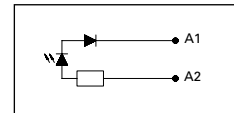
Diode 6-230 VDC

ZAE 023 (LED red) / 223 (LED green)



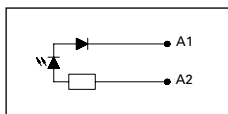
LED 6-24 VDC

ZAE 024 (LED red) / 224 (LED green)



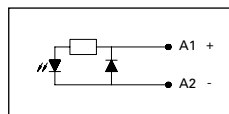
LED 24-60 VDC

ZAE 019 (LED red) / 219 (LED green)



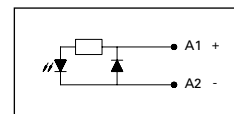
LED 110-230 VDC

ZAE 012 (LED red) / 212 (LED green)



LED + Chopper diode 6-24 VDC

ZAE 020 (LED red) / 220 (LED green)



LED + Chopper diode 24-60 VDC



SGR xx2 – PCB RELAYS

The relays of the SGR family provide maximum safety and reliability even in the most demanding long-term applications. These high-quality relays are injection moulded for utmost durability. The secret to the success of ELESTA relays is precisely this process: The assembled set of contacts and the coil, tested several times over, are encapsulated in fibre glass reinforced polyamid.

The coil and contacts are thus well insulated and form a rigid unit. The injection molding also provides a hermetically sealed, solder bath resistant base. The contact assembly consists of just two movable parts – an actuator arm and yoke, whereby the actuator arm is mounted on the far end of the relay. This facilitates a creeping and leakage distance of > 14 mm between the coil and contact, which no other compatible relay can match.

Features

- ▶ Wide range of standard products with many options
- ▶ Solder bath resistant versions
- ▶ Short bouncing times
- ▶ Greater contact over travel
- ▶ The dense base of the relay is well-suited for assembly-line soldering
- ▶ Rail mount package for pick and place machines

Applications

- ▶ General control and measuring components
- ▶ Machinery
- ▶ Control systems
- ▶ Time delay relays
- ▶ Miniature machines
- ▶ Household devices



SGR-PCB RELAYS 282

No. of contacts: **2 CO, 2 NO or 2 NC**
 Rated current: **8 A**
 Inrush current: **30 A**

Order description

SGR 282 ...VDC
 SGR 242 ...VDC
 SGR 222 ...VDC

Contact data

Contact material	AgCuNi
Type of contact	Single contact
Rated switching capacity	250 VAC 8A AC1 2000 VA 440 VAC 3A AC15
Max. switching voltage	440 VAC
Electrical life	approx. 120.000 operations 250 VAC 8 A
Contact resistance	50 mΩ

Coil data

Nominal voltages	6-12-24-48-60-110 VDC
Pick-up voltage	approx. 0,75 x Nominal voltage (at 20 °C)
Power consumption	typically 500 mW

Options

Contact material AgSnO₂ / ...+AU
 SGR 2x2 ...VDC ASO
 SGR 2x2 ...VDC +AU
 Washproof IP 54
 SGR 2x2 O ...VDC ...
 Sealed IP 67
 SGR 2x2 V ...VDC ...
 Manual actuation
 SGR 282 T ...VDC

General data

Mechanical life	> 50 x 10 ⁶ Operations
Max. switching frequency	360 Operations/h
Operate time	typically 8 ms
Release time	typically 3 ms
Bounce time	typically AK: 0,5 ms / RK: 5 ms
Vibration resistance	AK: 10 g, RK: 1,5 g (10-55 Hz)
Test voltage coil-contact	5.000 V _{eff} (typically 6.000 V _{eff})
Test voltage contact sets	2.500 V _{eff}
Test voltage contact open	1.000 V _{eff}
Weight	approx. 20 g
Ambient temperature	-40°C - +70°C
Temperature of soldering bath	270°C / 5 s
Protection category	IP 42

Accessories

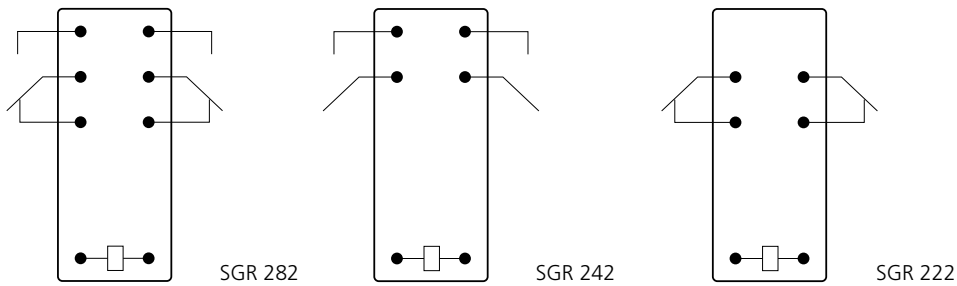
PCB mounting socket
 ZGR 001
 Socket with screw terminals
 ZGE 007
 ZGE 107
 Modules
 ZAE ...

Tests, regulations

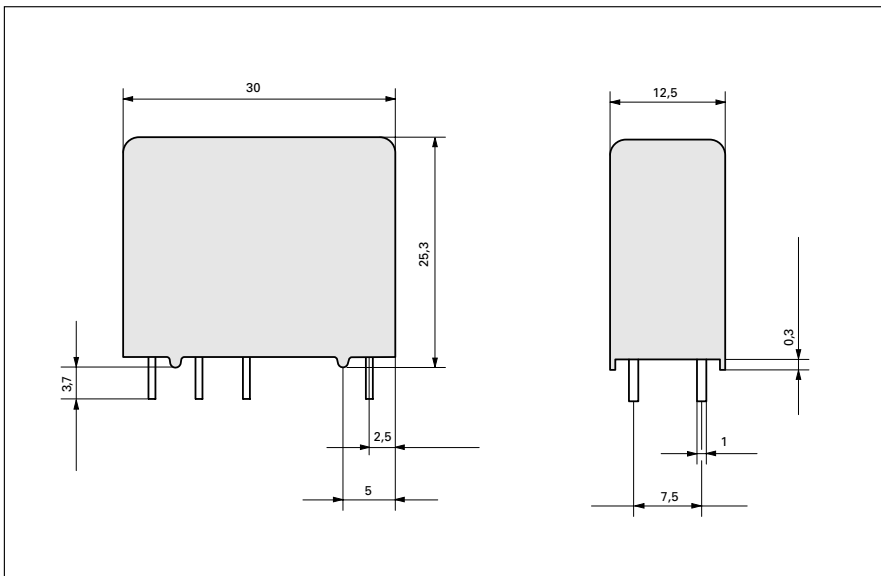
Approvals	on request
Insulation group	C/250
Creeping and leakage distance	> 14 mm

Diagrams

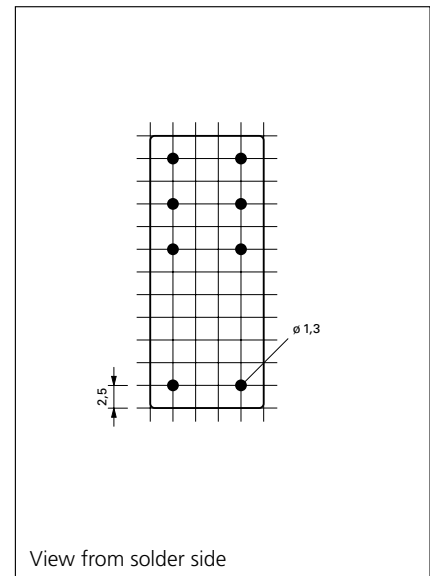
View from above



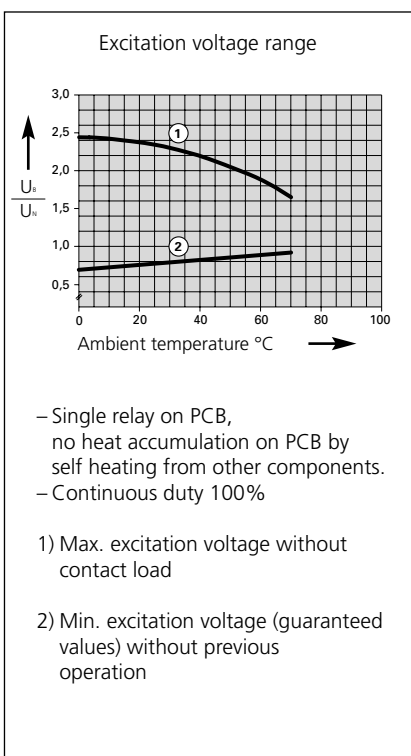
Dimensions drawing (mm)



Drilling pattern (mm)



Coil data



Standard coil for direct current (other voltages on request)

Nominal voltage VDC	Min. pick-up voltage at 20°C	Drop-out voltage at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
6	4,5	0,3	85,70	70	10
12	9,0	0,6	44,40	270	10
24	18,0	1,2	21,80	1.100	10
48	36,0	2,4	10,90	4.400	13
60	45,0	3,0	8,75	6.850	15
110	82,5	5,5	5,50	20.000	15



SGR-PCB RELAYS 282Z – with forcibly guided contacts

No. of contacts: **2 CO**
 Rated current: **4 A**
 Inrush current: **15 A**

Order description

SGR 282Z ...VDC

Contact data

Contact material	AgCuNi
Type of contact	Single contact
Rated switching capacity	250 VAC 4A AC1 1000 VA
Electrical life	approx. 100.000 operations 250 VAC 4 A
Contact resistance	100 mΩ

Coil data

Nominal voltages	6-12-24-48-60-110 VDC
Pick-up voltage	approx. 0,75 x Nominal voltage (at 20 °C)
Power consumption	typically 1 W

Options

Contact material ...+AU
 SGR 282Z ...VDC +AU
 Washproof IP 54
 SGR 282ZO ...VDC
 Sealed IP 67
 SGR 282ZV ...VDC

General data

Mechanical life	> 50 x 10 ⁶ Operations
Max. switching frequency	360 Operations/h
Operate time	typically 12 ms
Release time	typically 5 ms
Bounce time	typically NO: 4 ms / NC: 8 ms
Vibration resistance	NO: 10 g, NC: 1,5 g (10-55 Hz)
Test voltage coil-contact	4.000 V _{eff}
Test voltage contact sets	2.500 V _{eff}
Test voltage contact open	1.500 V _{eff}
Weight	approx. 20 g
Ambient temperature	-40°C - +70°C
Temperature of soldering bath	270°C / 5 s
Protection category	IP 42

Accessories

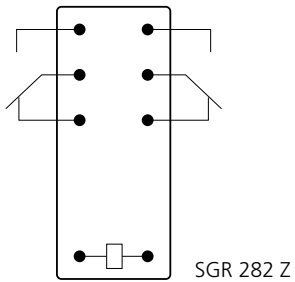
PCB mounting socket
 ZGR 001

Tests, regulations

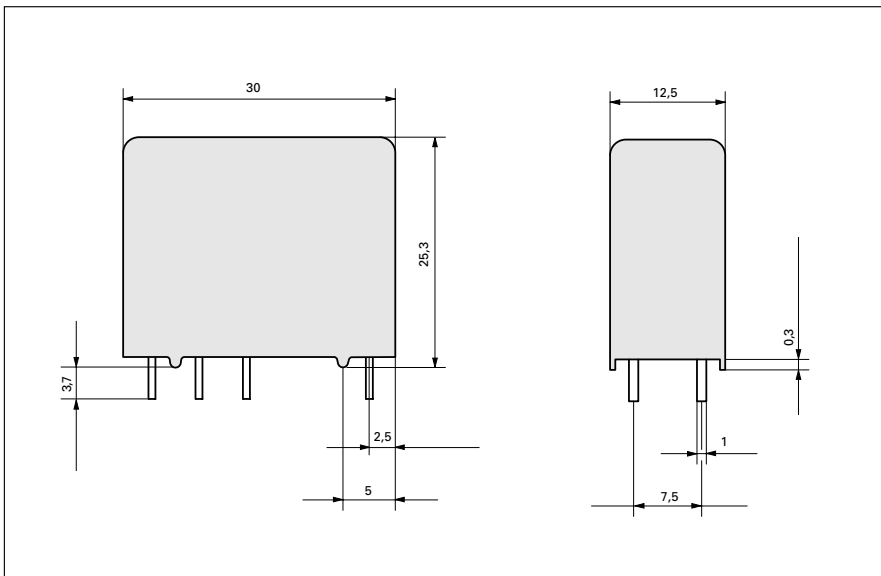
Approvals	on request
Insulation group	C/250
Creeping and leakage distance	> 14 mm

Diagram

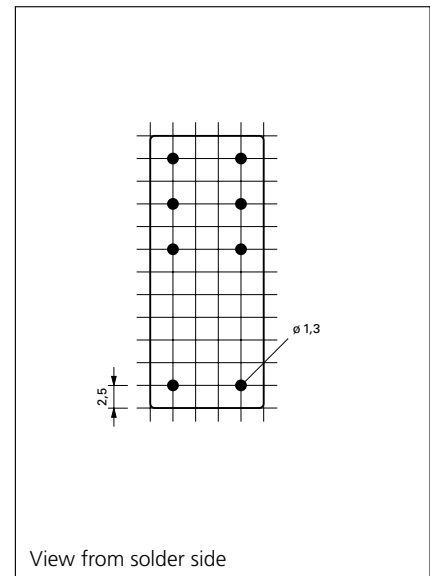
View from above



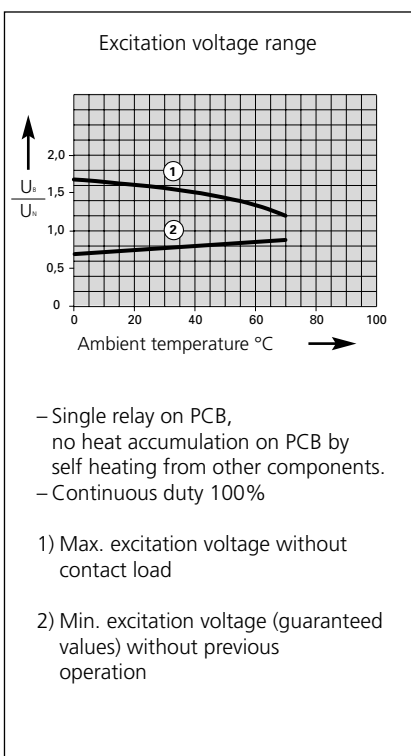
Dimensions drawing (mm)



Drilling pattern (mm)



Coil data



Standard coil for direct current (other voltages on request)

Nominal voltage VDC	Min. pick-up voltage at 20°C	Drop-out voltage at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
6	4,5	0,3	166,00	36	10
12	9,0	0,6	85,70	140	10
24	18,0	1,2	33,30	720	10
48	36,0	2,4	20,80	2.300	10
60	45,0	3,0	13,60	4.400	13
110	82,5	5,5	11,00	10.000	15



SGR-PCB RELAYS 362

No. of contacts: **1 CO, 1 NO or 1 NC**
 Rated current: **8 A**
 Inrush current: **30 A**

Order description

SGR 362 ...VDC
 SGR 342 ...VDC
 SGR 322 ...VDC

Contact data

Contact material	AgCuNi
Type of contact	Single contact
Rated switching capacity	250 VAC 8A AC1 2000 VA 440 VAC 3A AC15
Max. switching voltage	440 VAC
Electrical life	approx. 120.000 operations 250 VAC 8 A
Contact resistance	50 mΩ

Coil data

Nominal voltages	6-12-24-48-60-110 VDC
Pick-up voltage	approx. 0,75 x Nominal voltage (at 20 °C)
Power consumption	typically 500 mW / 240 mW*

Options

Contact material
 on request
 Washproof IP 54
 SGR 3x2 O ...VDC
 Sealed IP 67
 SGR 3x2 V ...VDC
 Sensitive coil*
 SGR 3x2 E ...VDC

General data

Mechanical life	> 50 x 10 ⁶ Operations
Max. switching frequency	360 Operations/h
Operate time	typically 8 ms
Release time	typically 3 ms
Bounce time	typically NO: 0,5 ms / NC: 5 ms
Vibration resistance	NO: 10 g, NC: 1,5 g (10-55 Hz)
Test voltage coil-contact	5.000 V _{eff} (typically 6.000 V _{eff})
Test voltage contact open	1.000 V _{eff}
Weight	approx. 20 g
Ambient temperature	-40°C - +70°C
Temperature of soldering bath	270°C / 5 s
Protection category	IP 42

Accessories

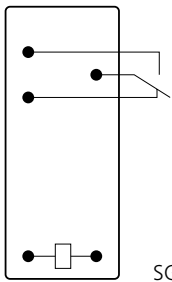
PCB mounting socket
 ZGR 002
 Socket with screw terminals
 ZGE 005
 Modules
 ZAE ...

Tests, regulations

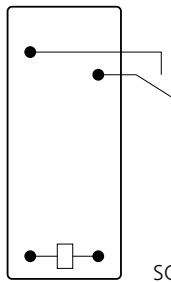
Approvals	on request
Insulation group	C/250
Creeping and leakage distance	> 14 mm

Diagrams

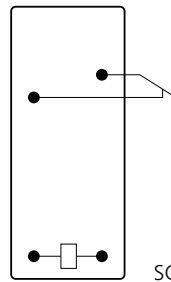
View from above



SGR 362

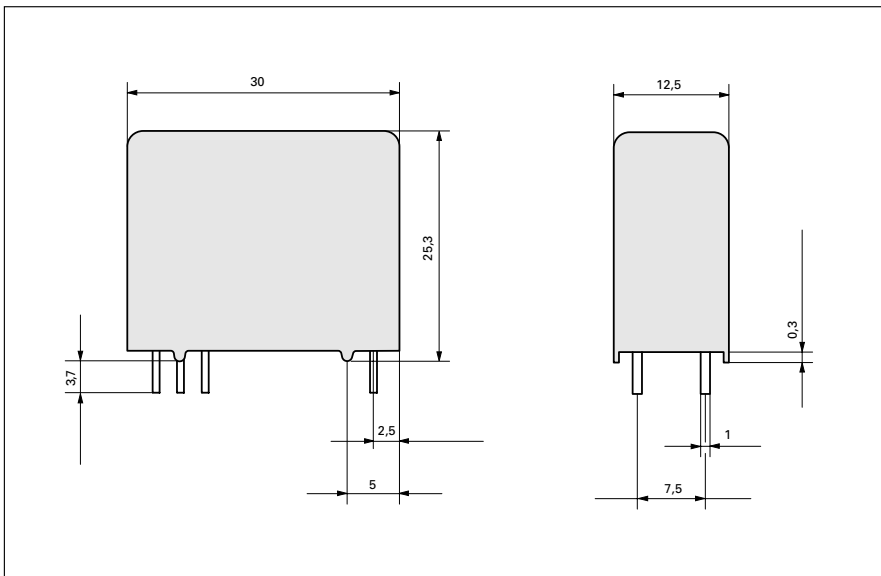


SGR 342

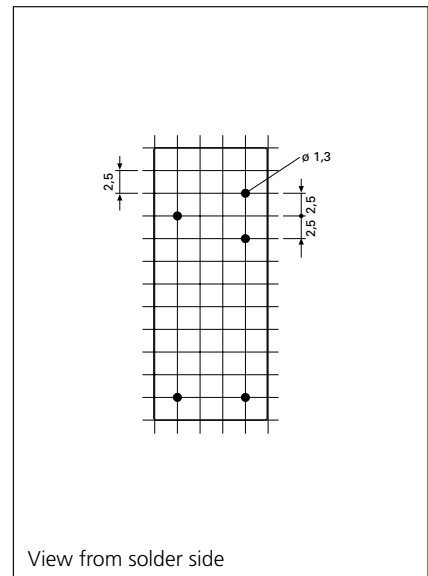


SGR 322

Dimensions drawing (mm)

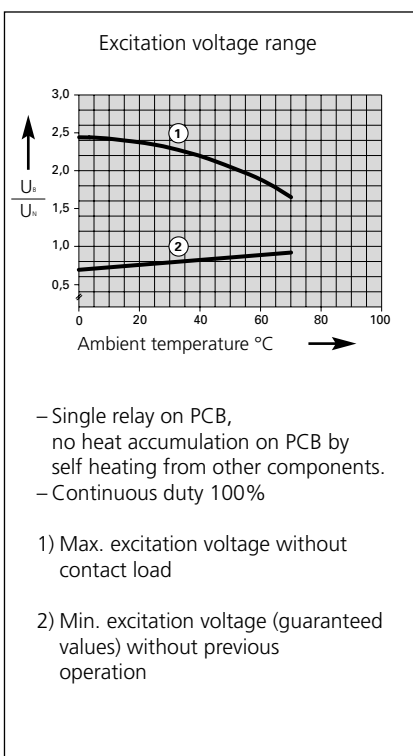


Drilling pattern (mm)



View from solder side

Coil data



Standard coil for direct current (other voltages on request)

Nominal voltage VDC	Min. pick-up voltage at 20°C	Drop-out voltage at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
6	4,5	0,3	85,70	70	10
12	9,0	0,6	44,40	270	10
24	18,0	1,2	21,80	1.100	10
48	36,0	2,4	10,90	4.400	13
60	45,0	3,0	8,75	6.850	15
110	82,5	5,5	5,50	20.000	15

Sensitive coil

6	4,50	0,3	37,50	160	10
12	9,00	0,6	16,60	720	10
24	18,00	1,2	10,40	2.300	10
48	36,00	2,4	4,80	10.000	15
60	45,00	3,0	4,00	15.000	15



SGR-PCB RELAYS 462

No. of contacts: **1 CO, 1 NO or 1 NC**
 Rated current: **8 A**
 Inrush current: **30 A**

Order description

SGR 462 ...VDC
 SGR 442 ...VDC
 SGR 422 ...VDC

Contact data

Contact material	AgCuNi
Type of contact	Single contact
Rated switching capacity	250 VAC 8A AC1 2000 VA 440 VAC 3A AC15
Max. switching voltage	440 VAC
Electrical life	approx. 120.000 operations 250 VAC 8 A
Contact resistance	50 mΩ

Coil data

Nominal voltages	6-12-24-48-60-110 VDC
Pick-up voltage	approx. 0,75 x Nominal voltage (at 20 °C)
Power consumption	typically 500 mW / 240 mW*

Options

Contact material
 on request
 Washproof IP 54
 SGR 4x2 O ...VDC
 Sealed IP 67
 SGR 4x2 V ...VDC
 Sensitive coil*
 SGR 4x2 E ...VDC

General data

Mechanical life	> 50 x 10 ⁶ Operations
Max. switching frequency	360 Operations/h
Operate time	typically 8 ms
Release time	typically 3 ms
Bounce time	typically NO: 0,5 ms / NC: 5 ms
Vibration resistance	NO: 10 g, NC: 1,5 g (10-55 Hz)
Test voltage coil-contact	5.000 V _{eff} (typically 6.000 V _{eff})
Test voltage contact open	1.000 V _{eff}
Weight	approx. 20 g
Ambient temperature	-40°C - +70°C
Temperature of soldering bath	270°C / 5 s
Protection category	IP 42

Accessories

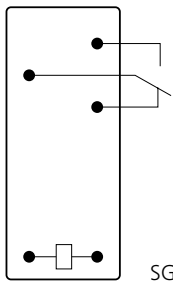
PCB mounting socket
 ZGR 003
 Socket with screw terminals
 ZGE 006
 Modules
 ZAE ...

Tests, regulations

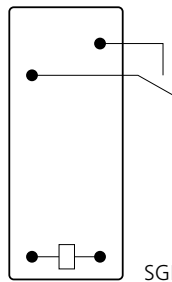
Approvals	on request
Insulation group	C/250
Creeping and leakage distance	> 14 mm

Diagrams

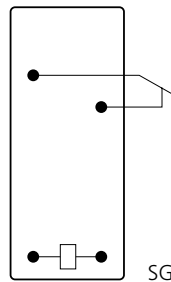
View from above



SGR 462

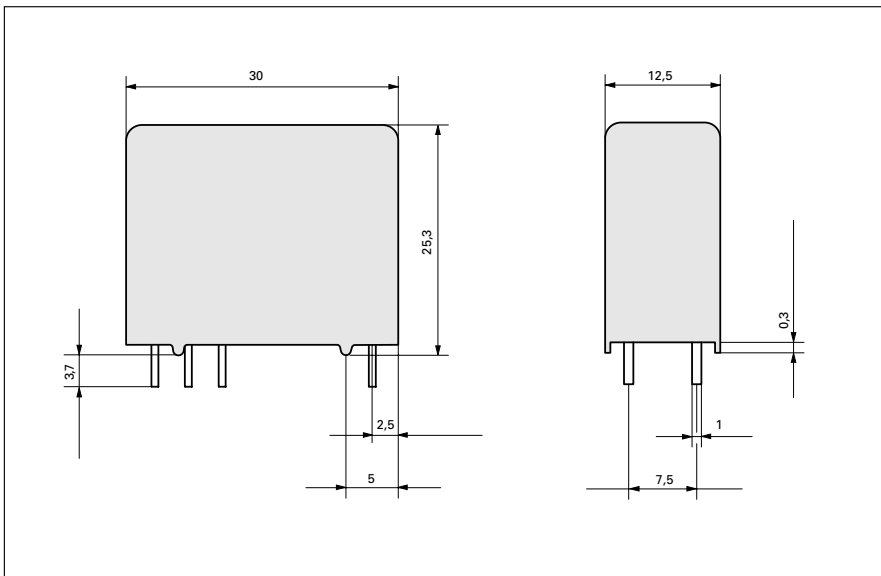


SGR 442

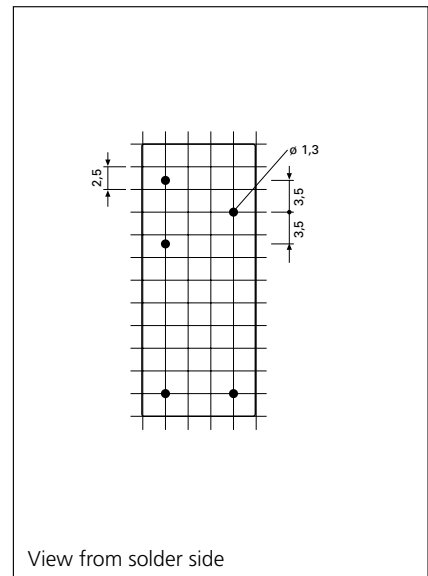


SGR 422

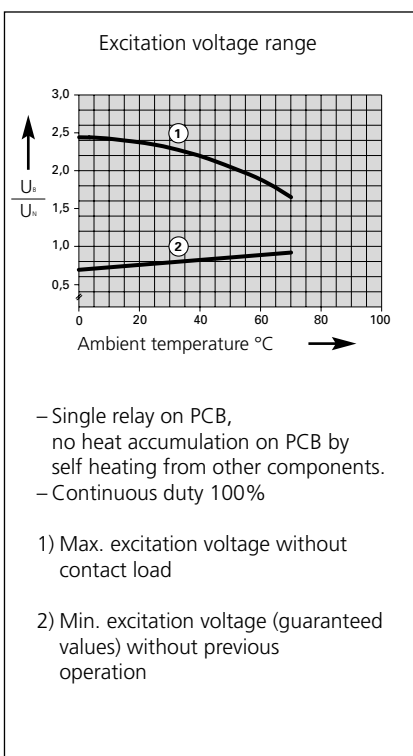
Dimensions drawing (mm)



Drilling pattern (mm)



Coil data



Standard coil for direct current (other voltages on request)

Nominal voltage VDC	Min. pick-up voltage at 20°C	Drop-out voltage at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
6	4,5	0,3	85,70	70	10
12	9,0	0,6	44,40	270	10
24	18,0	1,2	21,80	1.100	10
48	36,0	2,4	10,90	4.400	13
60	45,0	3,0	8,75	6.850	15
110	82,5	5,5	5,50	20.000	15

Sensitive coil

6	4,50	0,3	37,50	160	10
12	9,00	0,6	16,60	720	10
24	18,00	1,2	10,40	2.300	10
48	36,00	2,4	4,80	10.000	15
60	45,00	3,0	4,00	15.000	15



SGR-PCB RELAYS 562

No. of contacts: **1 CO, 1 NO or 1 NC**
 Rated current: **16 A**
 Inrush current: **50 A**

Order description

SGR 562 ...VDC
 SGR 542 ...VDC
 SGR 522 ...VDC

Contact data

Contact material	AgCdO
Type of contact	Parallel contact
Rated switching capacity	250 VAC 16A AC1 4000 VA 440 VAC 6A AC15
Max. switching voltage	440 VAC
Electrical life	approx. 200.000 operations 250 VAC 16 A
Contact resistance	50 mΩ

Coil data

Nominal voltages	6-12-24-48-60-110 VDC
Pick-up voltage	approx. 0,75 x Nominal voltage (at 20 °C)
Power consumption	typically 500 mW

Options

Contact material
 on request
 Washproof IP 54
 SGR 5x2 O ...VDC
 Sealed IP 67
 SGR 5x2 V ...VDC

General data

Mechanical life	> 50 x 10 ⁶ Operations
Max. switching frequency	360 Operations/h
Operate time	typically 8 ms
Release time	typically 3 ms
Bounce time	typically NO: 0,5 ms / NC: 5 ms
Vibration resistance	NO: 10 g, NC: 1,5 g (10-55 Hz)
Test voltage coil-contact	5.000 V _{eff} (typically 6.000 V _{eff})
Test voltage contact open	1.000 V _{eff}
Weight	approx. 20 g
Ambient temperature	-40°C - +70°C
Temperature of soldering bath	270°C / 5 s
Protection category	IP 42

Accessories

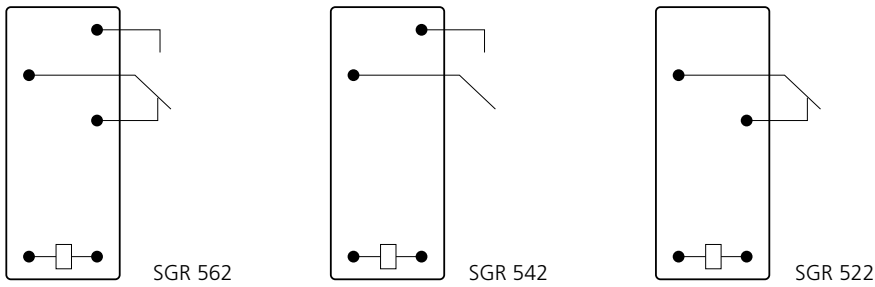
PCB mounting socket
 ZGR 001
 Socket with screw terminals
 ZGE 007
 ZGE 107
 Modules
 ZAE ...

Tests, regulations

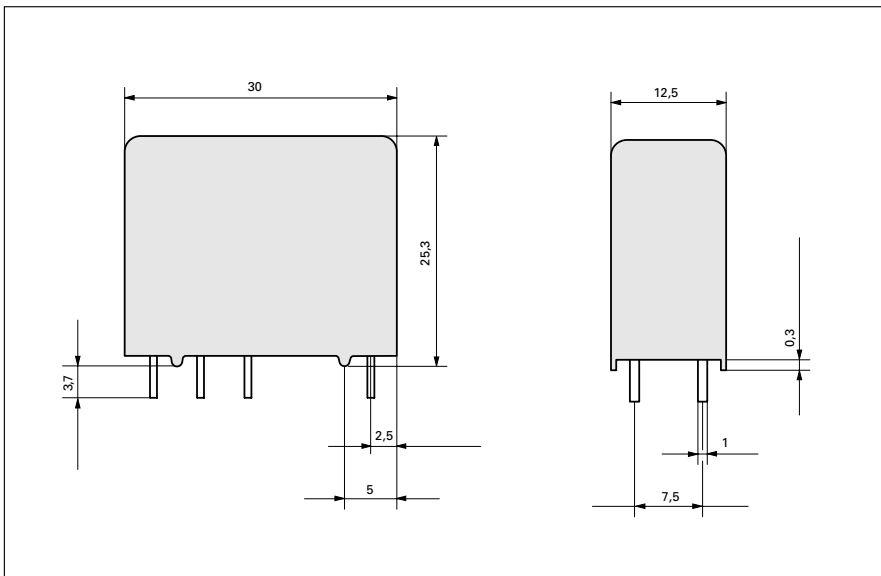
Approvals	on request
Insulation group	C/250
Creeping and leakage distance	> 14 mm

Diagrams

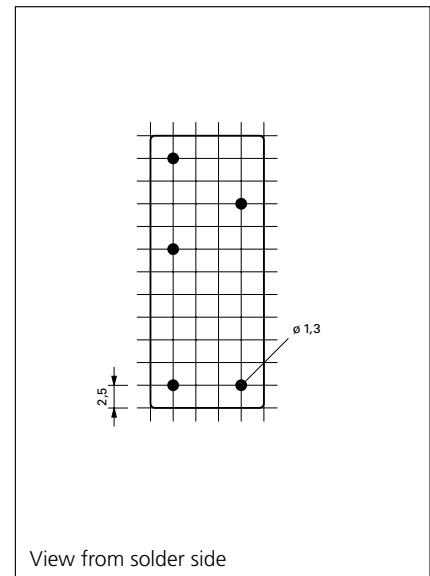
View from above



Dimensions drawing (mm)

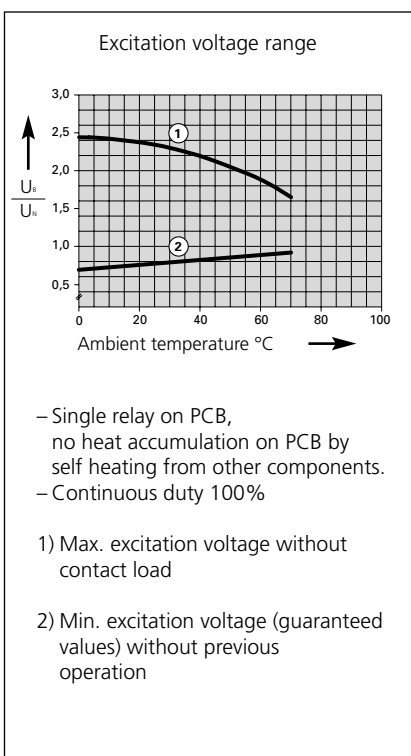


Drilling pattern (mm)



View from solder side

Coil data



Standard coil for direct current (other voltages on request)

Nominal voltage VDC	Min. pick-up voltage at 20°C	Drop-out voltage at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
6	4,5	0,3	85,70	70	10
12	9,0	0,6	44,40	270	10
24	18,0	1,2	21,80	1.100	10
48	36,0	2,4	10,90	4.400	13
60	45,0	3,0	8,75	6.850	15
110	82,5	5,5	5,50	20.000	15



SGR-PCB RELAYS 662

No. of contacts: **1 CO, 1 NO or 1 NC**
 Rated current: **16 A**
 Inrush current: **50 A**

Order description

SGR 662 ...VDC
 SGR 642 ...VDC
 SGR 622 ...VDC

Contact data

Contact material	AgCdO
Type of contact	Parallel contact
Rated switching capacity	250 VAC 16A AC1 4000 VA 440 VAC 6A AC15
Max. switching voltage	440 VAC
Electrical life	approx. 200.000 operations 250 VAC 16 A
Contact resistance	50 mΩ

Coil data

Nominal voltages	6-12-24-48-60-110 VDC
Pick-up voltage	approx. 0,75 x Nominal voltage (at 20 °C)
Power consumption	typically 500 mW

Options

Contact material AgSnO₂ / AgCuNi
 SGR 6x2 ...VDC ASO
 SGR 6x2 ...VDC ACN
 Washproof IP 54
 SGR 6x2 O ...VDC
 Sealed IP 67
 SGR 6x2 V ...VDC
 Heavy current model
 SGR 642 H ...VDC
 Manual actuation
 SGR 662 T ...VDC

General data

Mechanical life	> 50 x 10 ⁶ Operations
Max. switching frequency	360 Operations/h
Operate time	typically 8 ms
Release time	typically 3 ms
Bounce time	typically NO: 0,5 ms / NC: 5 ms
Vibration resistance	NO: 10 g, NC: 1,5 g (10-55 Hz)
Test voltage coil-contact	5.000 V _{eff} (typically 6.000 V _{eff})
Test voltage contact open	1.000 V _{eff}
Weight	approx. 20 g
Ambient temperature	-40°C - +70°C
Temperature of soldering bath	270°C / 5 s
Protection category	IP 42

Accessories

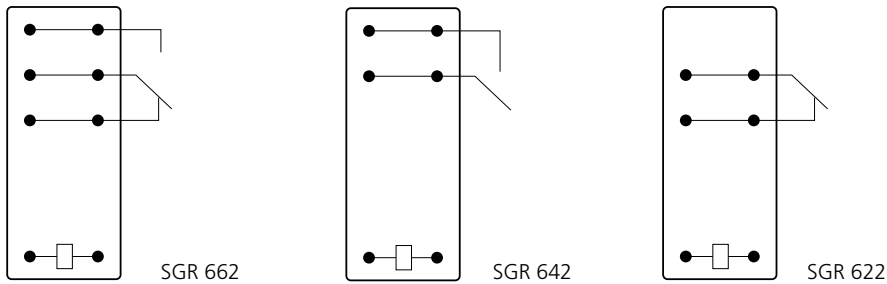
PCB mounting socket
 ZGR 001
 Socket with screw terminals
 ZGE 007
 ZGE 107
 Modules
 ZAE ...

Tests, regulations

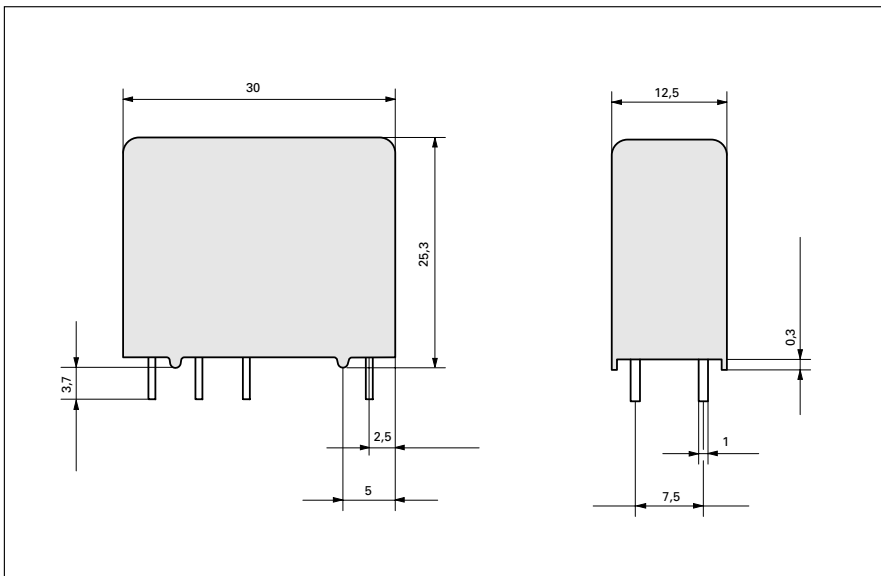
Approvals	on request
Insulation group	C/250
Creeping and leakage distance	> 14 mm

Diagrams

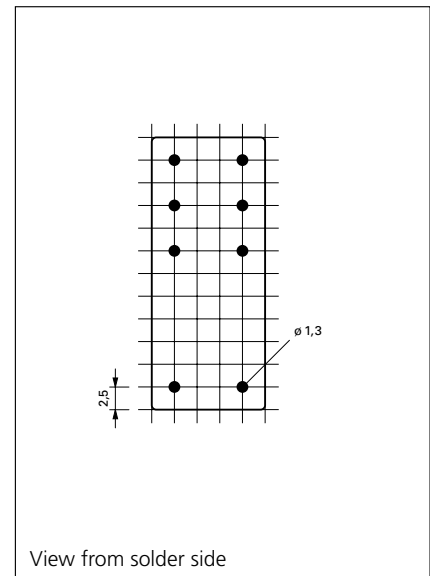
View from above



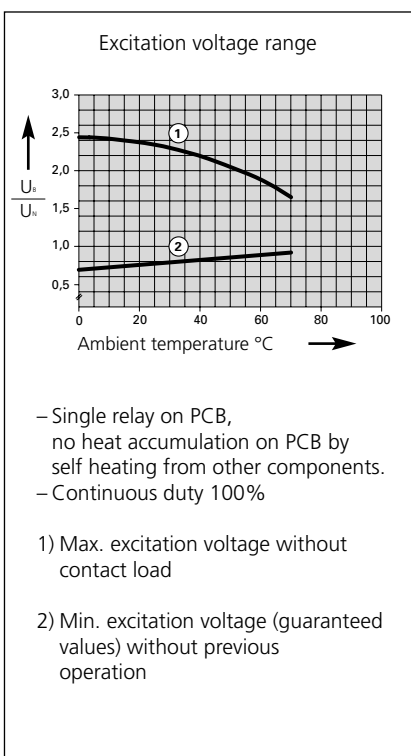
Dimensions drawing (mm)



Drilling pattern (mm)



Coil data



Standard coil for direct current (other voltages on request)

Nominal voltage VDC	Min. pick-up voltage at 20°C	Drop-out voltage at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
6	4,5	0,3	85,70	70	10
12	9,0	0,6	44,40	270	10
24	18,0	1,2	21,80	1.100	10
48	36,0	2,4	10,90	4.400	13
60	45,0	3,0	8,75	6.850	15
110	82,5	5,5	5,50	20.000	15



SGR-PCB RELAYS 642 H

Special relay suitable for switching lighting loads

No. of contacts: **1 NO**
 Rated current: **16 A**
 Inrush current: **150 A**

Order description

SGR 642H ...VDC

Contact data

Contact material	AgSnO ₂
Type of contact	Parallel contact
Rated switching capacity	250 VAC 16A AC1 4000 VA 440 VAC 6A AC15
Max. switching voltage	440 VAC
Electrical life	approx. 200.000 operations 250 VAC 16 A
Contact resistance	50 mΩ

Coil data

Nominal voltages	6-12-24-48-60-110 VDC
Pick-up voltage	approx. 0,75 x Nominal voltage (at 20 °C)
Power consumption	typically 500 mW

Options

Washproof IP 54
 SGR 6x2HO ...VDC
 Sealed IP 67
 SGR 6x2HV ...VDC

General data

Mechanical life	> 50 x 10 ⁶ Operations
Max. switching frequency	360 Operations/h
Operate time	typically 8 ms
Release time	typically 3 ms
Bounce time	typically NO: 0,5 ms
Vibration resistance	NO: 10 g (10-55 Hz)
Test voltage coil-contact	5.000 V _{eff} (typically 6.000 V _{eff})
Test voltage contact open	1.000 V _{eff}
Weight	approx. 20 g
Ambient temperature	-40°C - +70°C
Temperature of soldering bath	270°C / 5 s
Protection category	IP 42

Accessories

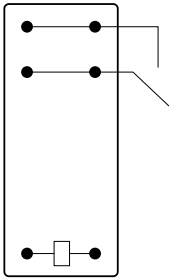
PCB mounting socket
 ZGR 001
 Socket with screw terminals
 ZGE 007
 ZGE 107
 Modules
 ZAE ...

Tests, regulations

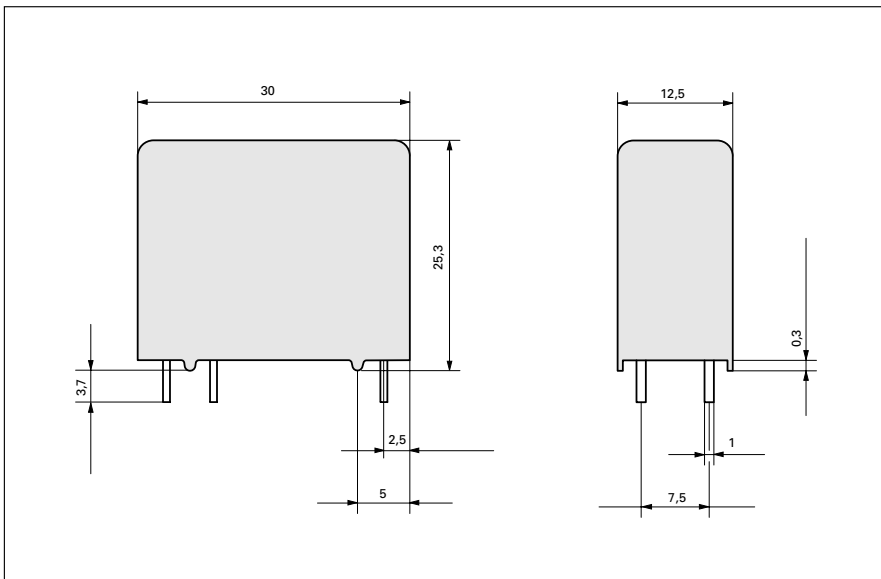
Approvals	on request
Insulation group	C/250
Creeping and leakage distance	> 14 mm

Diagram

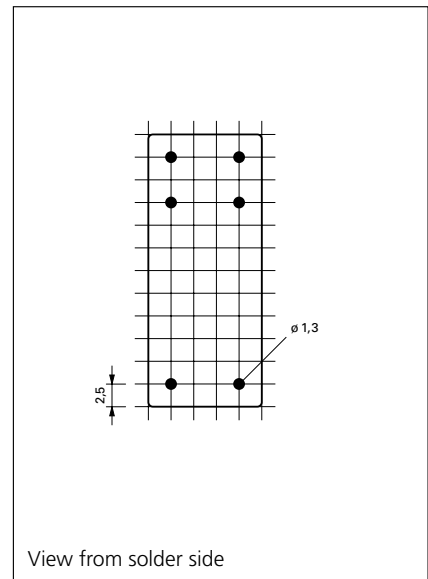
View from above



Dimensions drawing (mm)

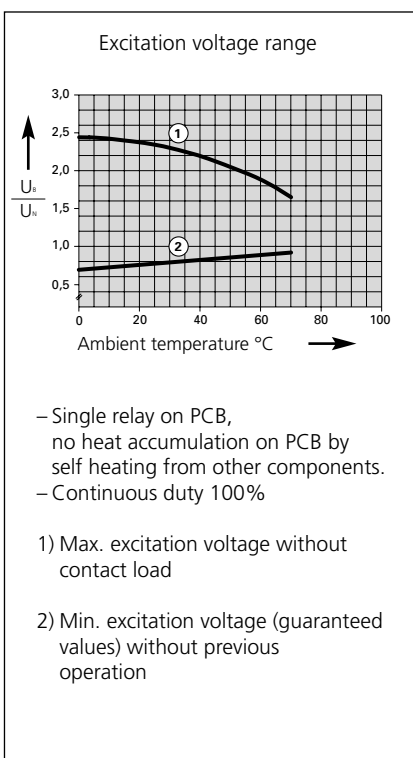


Drilling pattern (mm)



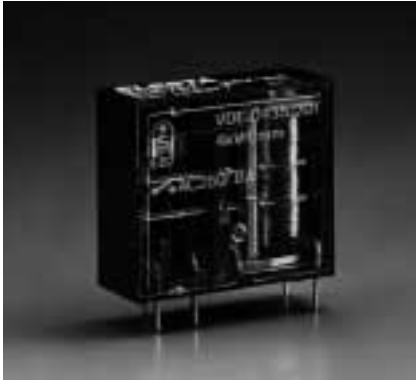
View from solder side

Coil data



Standard coil for direct current (other voltages on request)

Nominal voltage VDC	Min. pick-up voltage at 20°C	Drop-out voltage at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
6	4,5	0,3	85,70	70	10
12	9,0	0,6	44,40	270	10
24	18,0	1,2	21,80	1.100	10
48	36,0	2,4	10,90	4.400	13
60	45,0	3,0	8,75	6.850	15
110	82,5	5,5	5,50	20.000	15



SGR-PCB RELAYS 762

No. of contacts: **1 CO**
 Rated current: **8 A**
 Inrush current: **16 A**

Order description

SGR 762 ...VDC

Contact data

Contact material	AgCu ₃
Type of contact	Single contact
Rated switching capacity	250 VAC 8A AC1 2000 VA
Max. switching voltage	250 VAC
Electrical life	approx. 150.000 operations 250 VAC 8 A
Contact resistance	50 mΩ

Coil data

Nominal voltages	6-12-24-48-60-110 VDC
Pick-up voltage	approx. 0,7 x Nominal voltage (at 20 °C)
Power consumption	typically 500 mW

Options

Contact material AgCdO
 SGR 762 ...VDC ACO

General data

Mechanical life	> 30 x 10 ⁶ Operations
Max. switching frequency	360 Operations/h
Operate time	typically 8 ms
Release time	typically 4 ms
Bounce time	typically NO: 0,5 ms / NC: 5 ms
Vibration resistance	NO: 10 g, NC: 1,5 g (10-55 Hz)
Test voltage coil-contact	4.000 V _{eff}
Test voltage contact open	1.000 V _{eff}
Weight	approx. 20 g
Ambient temperature	-40°C - +70°C
Temperature of soldering bath	270°C / 5 s
Protection category	IP 40

Accessories

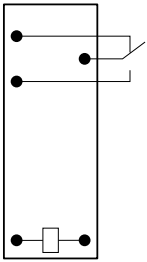
PCB mounting socket
 ZGR 002
 Socket with screw terminals
 ZGE 005
 Modules
 ZAE ...

Tests, regulations

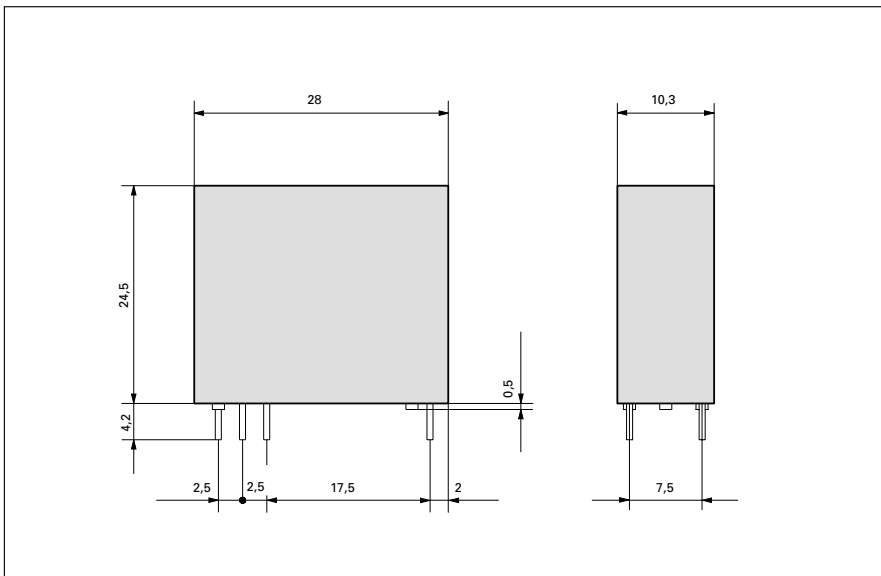
Approvals	on request
Insulation group	C/250
Creeping and leakage distance	8 mm

Diagram

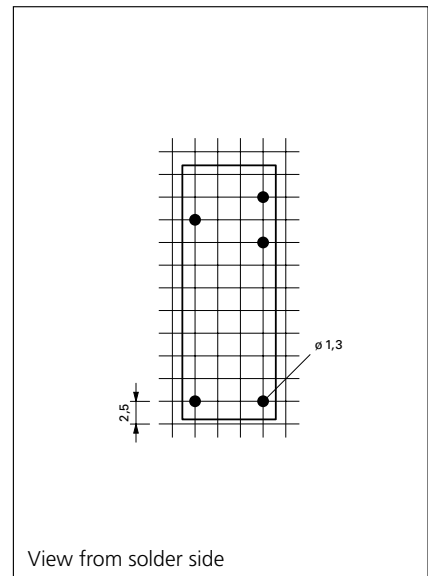
View from above



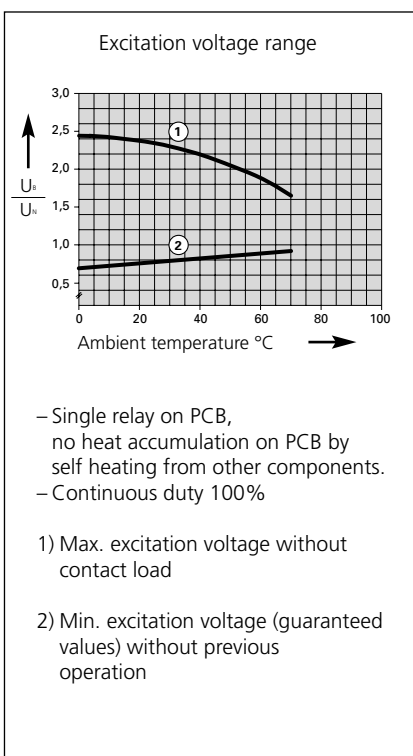
Dimensions drawing (mm)



Drilling pattern (mm)



Coil data



Standard coil for direct current (other voltages on request)

Nominal voltage VDC	Min. pick-up voltage at 20°C	Drop-out voltage at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
6	4,1	0,3	75,00	80	10
12	8,5	0,6	36,30	330	10
24	16,8	1,2	20,00	1.200	10
48	33,0	2,4	10,20	4.700	13
60	41,0	3,0	8,30	7.200	15
110	74,0	5,5	8,10	13.500	15



SGR-PCB RELAYS 862

SGR 842 – Special relay suitable for switching lighting loads
Inrush current: 130 A

No. of contacts: **1 CO or 1 NO**
Rated current: **16 A**
Inrush current: **50 A / 130 A**

Order description

SGR 862 ...VDC
SGR 842 ...VDC

Contact data

Contact material	AgSnO ₂
Type of contact	Single contact
Rated switching capacity	250 VAC 16A AC1 4000 VA 440 VAC 6A AC15
Max. switching voltage	440 VAC
Electrical life	approx. 100.000 operations 250 VAC 16 A
Contact resistance	50 mΩ

Coil data

Nominal voltages	6-12-24-48-60-110 VDC
Pick-up voltage	approx. 0,75 x Nominal voltage (at 20 °C)
Power consumption	typically 500 mW

Options

Contact material AgCdO
SGR 8x2 ...VDC ACO
Washproof IP 54
on request
Sealed IP 67
on request
Sensitive coil
on request

General data

Mechanical life	> 50 x 10 ⁶ Operations
Max. switching frequency	360 Operations/h
Operate time	typically 8 ms
Release time	typically 3 ms
Bounce time	typically NO: 0,5 ms / NC: 5 ms
Vibration resistance	NO: 10 g, NC: 1,5 g (10-55 Hz)
Test voltage coil-contact	5.000 V _{eff} (typically 6.000 V _{eff})
Test voltage contact open	1.000 V _{eff}
Weight	approx. 20 g
Ambient temperature	-40°C - +70°C
Temperature of soldering bath	270°C / 5 s
Protection category	IP 42

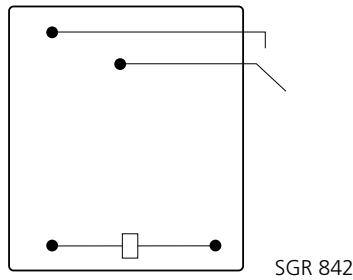
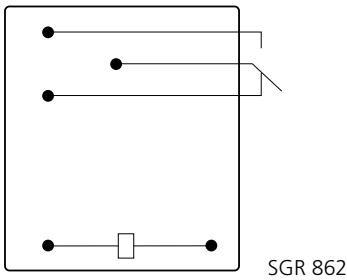
Accessories

Tests, regulations

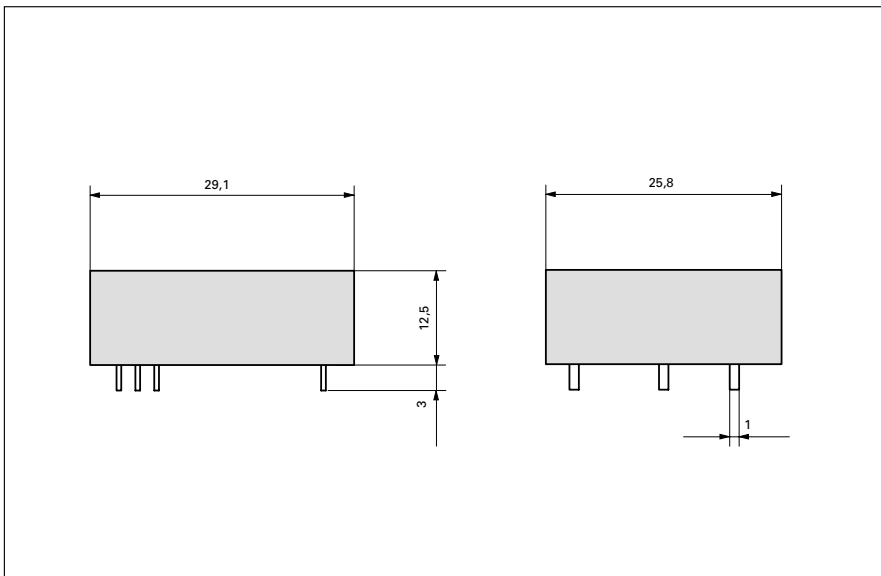
Approvals	on request
Insulation group	C/250
Creeping and leakage distance	> 14 mm

Diagrams

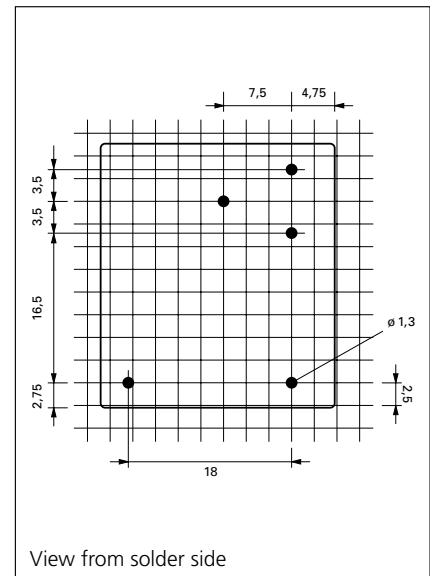
View from above



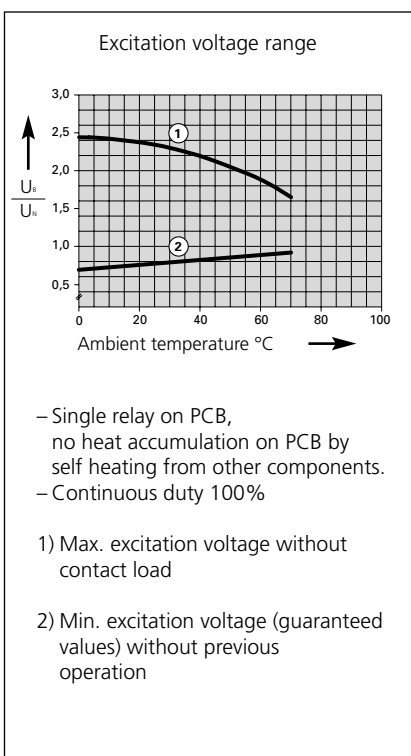
Dimensions drawing (mm)



Drilling pattern (mm)

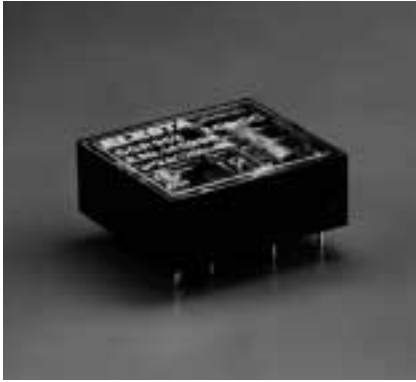


Coil data



Standard coil for direct current (other voltages on request)

Nominal voltage VDC	Min. pick-up voltage at 20°C	Drop-out voltage at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
6	4,5	0,3	85,70	70	10
12	9,0	0,6	44,40	270	10
24	18,0	1,2	21,80	1.100	10
48	36,0	2,4	10,90	4.400	13
60	45,0	3,0	8,75	6.850	15
110	82,5	5,5	5,50	20.000	15



SGR-PCB RELAYS 962

No. of contacts: **1 CO**
 Rated current: **8 A**
 Inrush current: **16 A**

Order description

SGR 962 ...VDC

Contact data

Contact material	AgCu ₃
Type of contact	Single contact
Rated switching capacity	250 VAC 8A AC1 2000 VA
Max. switching voltage	250 VAC
Electrical life	approx. 150.000 operations 250 VAC 8 A
Contact resistance	50 mΩ

Coil data

Nominal voltages	6-12-24-48-60-110 VDC
Pick-up voltage	approx. 0,7 x Nominal voltage (at 20 °C)
Power consumption	typically 500 mW

Options

Contact material AgCdO
 SGR 962 ...VDC ACO

General data

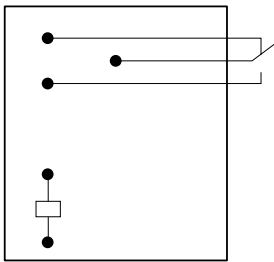
Mechanical life	> 30 x 10 ⁶ Operations
Max. switching frequency	360 Operations/h
Operate time	typically 8 ms
Release time	typically 4 ms
Bounce time	typically NO: 0,5 ms / NC: 5 ms
Vibration resistance	NO: 10 g, NC: 1,5 g (10-55 Hz)
Test voltage coil-contact	4.000 V _{eff}
Test voltage contact open	1.000 V _{eff}
Weight	approx. 20 g
Ambient temperature	-40°C - +70°C
Temperature of soldering bath	270°C / 5 s
Protection category	IP 40

Tests, regulations

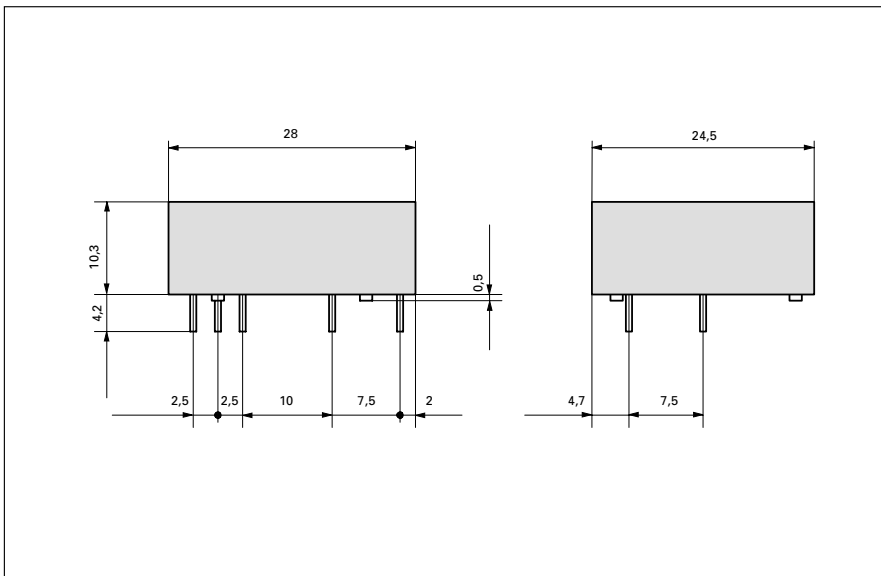
Approvals	on request
Insulation group	C/250
Creeping and leakage distance	8 mm

Diagram

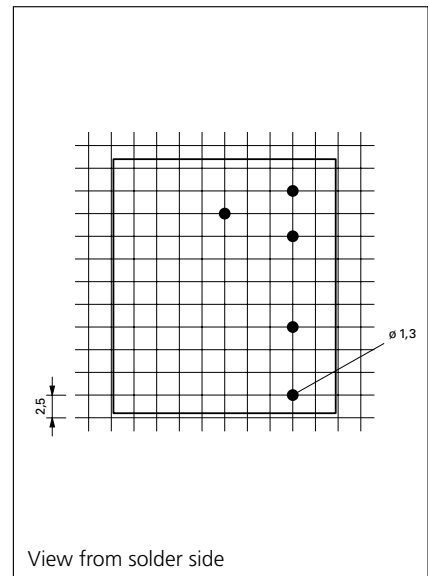
View from above



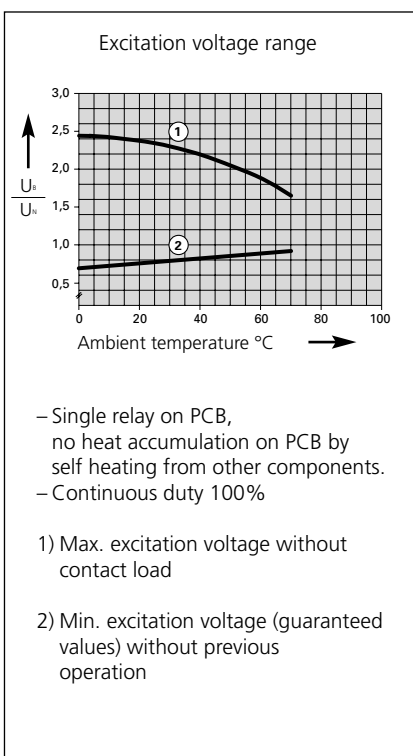
Dimensions drawing (mm)



Drilling pattern (mm)



Coil data



Standard coil for direct current (other voltages on request)

Nominal voltage VDC	Min. pick-up voltage at 20°C	Drop-out voltage at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
6	4,1	0,3	75,00	80	10
12	8,5	0,6	36,30	330	10
24	16,8	1,2	20,00	1.200	10
48	33,0	2,4	10,20	4.700	13
60	41,0	3,0	8,30	7.200	15
110	74,0	5,5	8,10	13.500	15



SGR-Relais 282T/662T

with integrated pushbutton

No. of contacts:	2 CO resp. 1 NO
Rated current:	8 A resp. 16 A
Inrush current:	30 A resp. 50 A
Manual actuation:	integrated pushbutton

Order description

SGR 282T ...VDC

SGR 662T ...VDC

Contact data

Contact material	AgCuNi resp. AgCdO
Type of contact	Single- resp. Parallel contact
Rated switching capacity	250 VAC 8/16A AC1 2000/4000 VA 440 VAC 3/6A AC15
Max. switching voltage	440 VAC
Electrical life	approx. 120.000 operations 250 VAC 8 A resp. approx. 200.000 operations 250 VAC 16A
Contact resistance	50 mΩ

Coil data

Nominal voltages	6-12-24-48-60-110 VDC
Pick-up voltage	approx. 0,75 x Nominal voltage (at 20 °C)
Power consumption	typically 500 mW

Options

Accessories

PCB mounting socket

ZGR 001

Socket with screw terminals

ZGE 007

ZGF 107

Modules

ZAE ...

General data

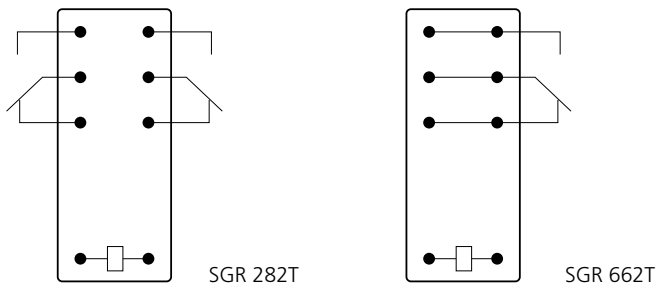
Mechanical life	> 50 x 10 ⁶ Operations
Max. switching frequency	360 Operations/h
Operate time	typically 8 ms
Release time	typically 3 ms
Bounce time	typically NO: 0,5 ms / NC: 5 ms
Vibration resistance	NO: 10 g, NC: 1,5 g (10-55 Hz)
Test voltage coil-contact	5.000 V _{eff} (typically 6.000 V _{eff})
Test voltage contact sets	2.500 V _{eff} / --
Test voltage contact open	1.000 V _{eff}
Weight	approx. 20 g
Ambient temperature	-40°C - +70°C
Temperature of soldering bath	270°C / 5 s
Protection category	IP 40

Tests, regulations

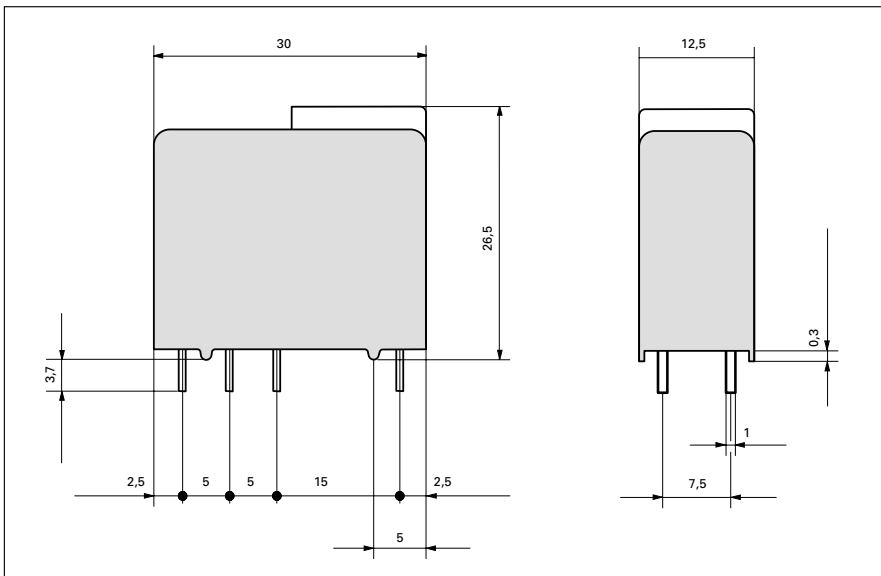
Approvals	on request
Insulation group	C/250
Creeping and leakage distance	> 14 mm

Diagrams

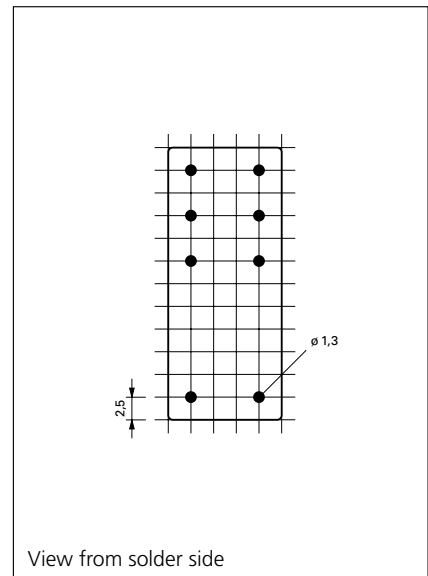
View from above



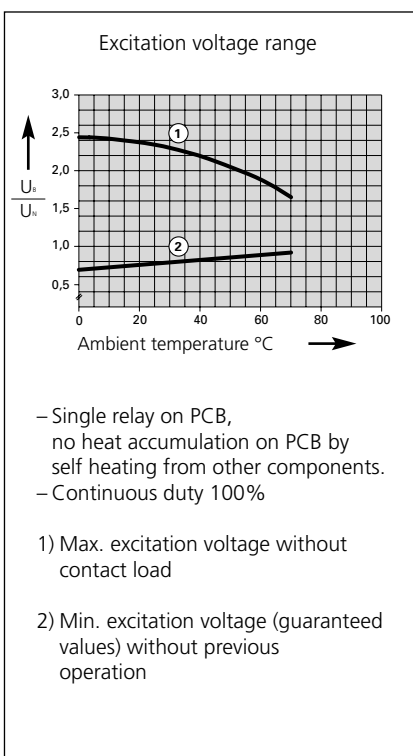
Dimensions drawing (mm)



Drilling pattern (mm)



Coil data



Standard coil for direct current (other voltages on request)

Nominal voltage VDC	Min. pick-up voltage at 20°C	Drop-out voltage at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
6	4,5	0,3	85,70	70	10
12	9,0	0,6	44,40	270	10
24	18,0	1,2	21,80	1.100	10
48	36,0	2,4	10,90	4.400	13
60	45,0	3,0	8,75	6.850	15
110	82,5	5,5	5,50	20.000	15

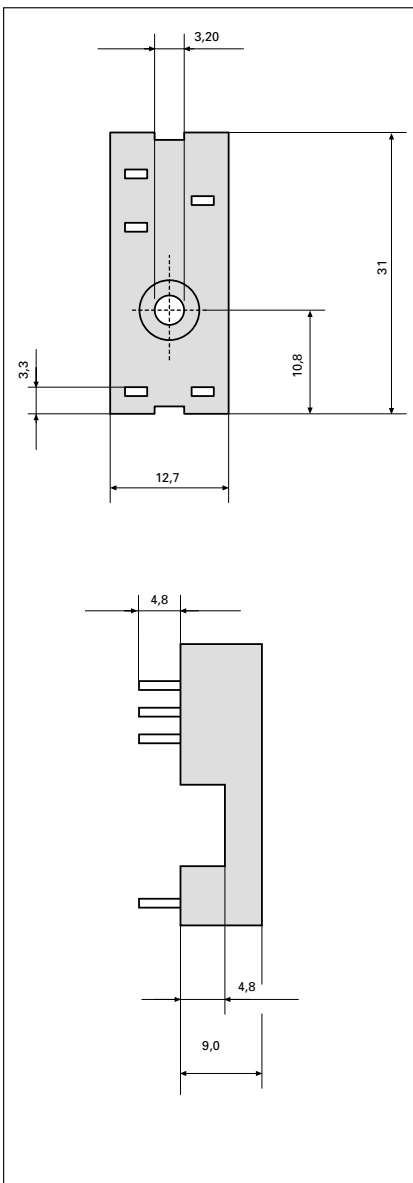


SGR xx2 – PCB mounting socket and accessories

Accessories

ZGR 014
Retaining clip

Dimensions drawing (mm)



Type of sockets

	ZGR 001	ZGR 002	ZGR 003
Fits to relay	SGR 282, 242, 222 SGR 562, 542, 522 SGR 662, 642, 622	SGR 362, 342, 322 SGR 762	SGR 462, 442, 422
Pin layout	5,0 mm	2,5 mm	3,5 mm

General data

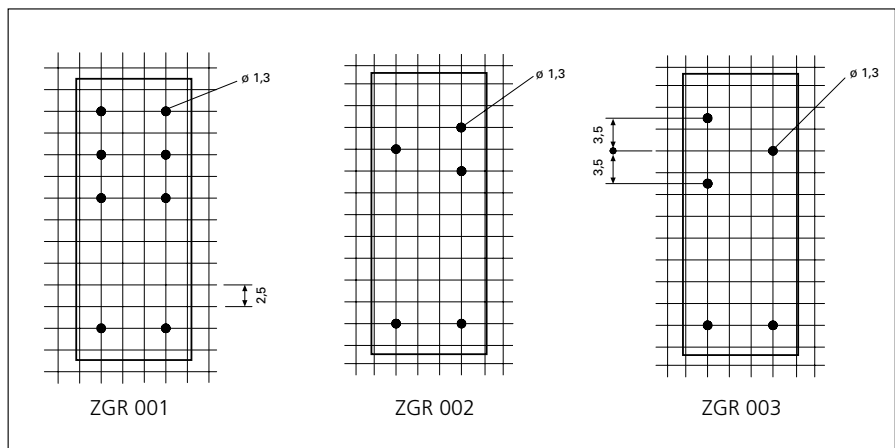
Nominal data	300 VAC 12 A
Test voltage	> 5.000 V _{eff}
Contact springs material	CuSn6 tin plated
Mounting	solder pin
Creeping resistance	CTI 250
Weight	approx. 7 g
Mounting position	any
Ambient temperature	-40°C - +85°C
No. of pins	ZGR 001 8pin ZGR 002 5pin ZGR 003 5pin
Protection category	IP 30

Tests, regulations

Approvals	UL, CSA
Insulation group	VDE 0110 / group C 250 VAC

Drilling patterns (mm)

View from solder side



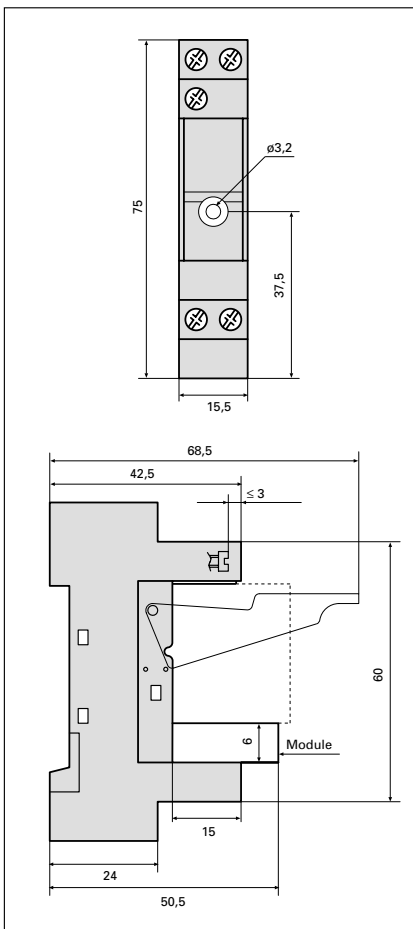


SGR xx2 – sockets with screw terminals and accessories

Accessories

- ZGE 010
- Retaining clip
- ZGE 011
- Label plate
- ZAE 011 - ZAE ...
- Modules (see page 49)

Dimensions drawing (mm)



Type of sockets	ZGE 005	ZGE 006	ZGE 007
Fits to relay	SGR 362, 342, 322 SGR 762	SGR 462, 442, 422	SGR 282, 242, 222 SGR 562, 542, 522 SGR 662, 642, 622
Pin layout	2,5 mm	3,5 mm	5,0 mm

General data

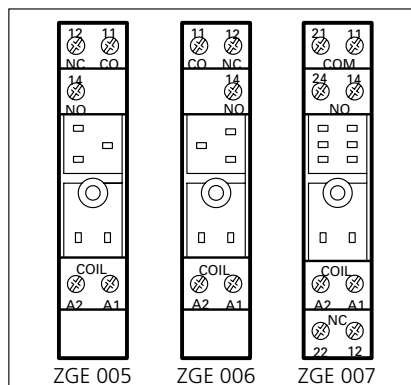
Nominal data	300 VAC 12 A
Test voltage	> 3.000 V _{eff}
Contact springs material	CuZn33 tin plated
Nominal torque on screws	0,8 Nm
Max. torque on screws	0,8 Nm
Terminals	combi screw M3 + Philips Gr.1
Max. wire section	2 x 2,5 mm ² compact wire 2 x 1,5 mm ² with cable end
Mounting	DIN rail 35 mm, EN 50022, central screw 1 x M3
Creeping resistance	CTI 250
Weight	approx. 39 g
Mounting position	any
Ambient temperature	-25°C - +85°C
No. of pins	ZGE 005 5pin ZGE 006 5pin ZGE 007 8pin
Terminals numbering	DIN EN 50011
Protection category	IP 20

Tests, regulations

Approvals	UL, CSA
Insulation group	VDE 0110 / group C 250 VAC

Diagrams

View from above



Using DC modules + must be connected to A1!



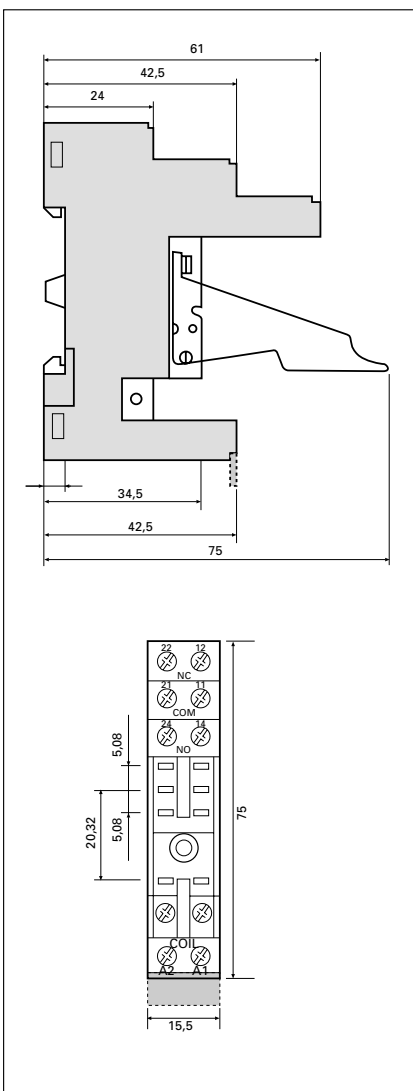
SGR xx2 – sockets with screw terminals and accessories

„Protective separation according to VDE 0106“ between coil and contacts

Accessories

ZGE 010
Retaining clip
ZGE 011
Label plate
ZAE 011 - ZAE ...
Modules (see next page)

Dimensions drawing (mm)



Type of sockets

Type of sockets	ZGE 107
Fits to relay	SGR 282, 242, 222 SGR 562, 542, 522 SGR 662, 642, 622
Pin layout	5,0 mm

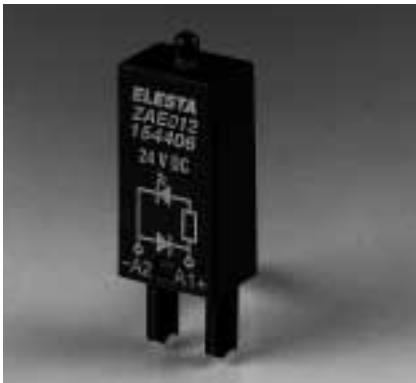
General data

Nominal data	300 VAC 12 A
Test voltage	> 3.000 V _{eff}
Contact springs material	CuZn33 tin plated
Nominal torque on screws	0,8 Nm
Max. torque on screws	0,8 Nm
Terminals	combi screw M3 + Philips Gr.1
Max. wire section	2 x 2,5 mm ² compact wire 2 x 1,5 mm ² with cable end
Mounting	DIN rail 35 mm, EN 50022, central screw 1 x M3
Creeping resistance	CTI 250
Weight	approx. 39 g
Mounting position	any
Ambient temperature	-25°C - +85°C
No. of pins	ZGE 107 8pin
Terminals numbering	DIN EN 50011
Protection category	IP 20

Tests, regulations

Approvals	UL, CSA
Insulation group	VDE 0110 / group C 250 VAC

Using DC modules + must be connected to A1!



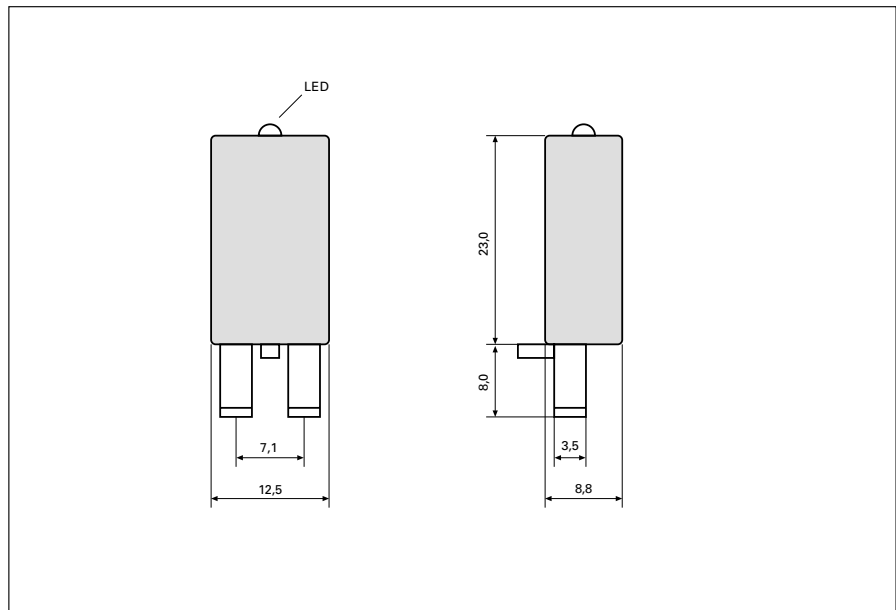
Modules for sockets with screw terminals

About the colour of the LED's:

According to EN 60073 the colour RED is used to indicate an alert or a dangerous situation.

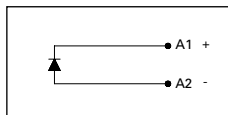
GREEN shows normal condition or a save situation. Therefore our modules with an LED indicator are available in red or green.

Dimensions drawing (mm)



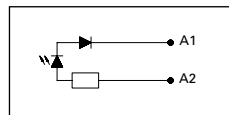
Diagrams

ZAE 011



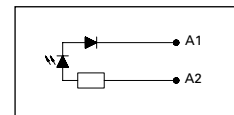
Diode 6-230 VDC

ZAE 023 (LED red) / 223 (LED green)



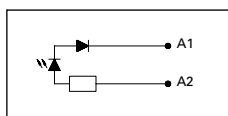
LED 6-24 VDC

ZAE 024 (LED red) / 224 (LED green)



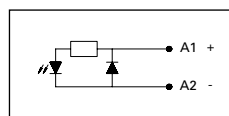
LED 24-60 VDC

ZAE 019 (LED red) / 219 (LED green)



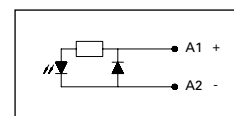
LED 110-230 VDC

ZAE 012 (LED red) / 212 (LED green)



LED + Chopper diode 6-24 VDC

ZAE 020 (LED red) / 220 (LED green)



LED + Chopper diode 24-60 VDC



SGR Interface Relays 282 T/662T

with integrated pushbutton and socket with screw terminals

„Protective separation according to VDE 0106“
between coil and contacts

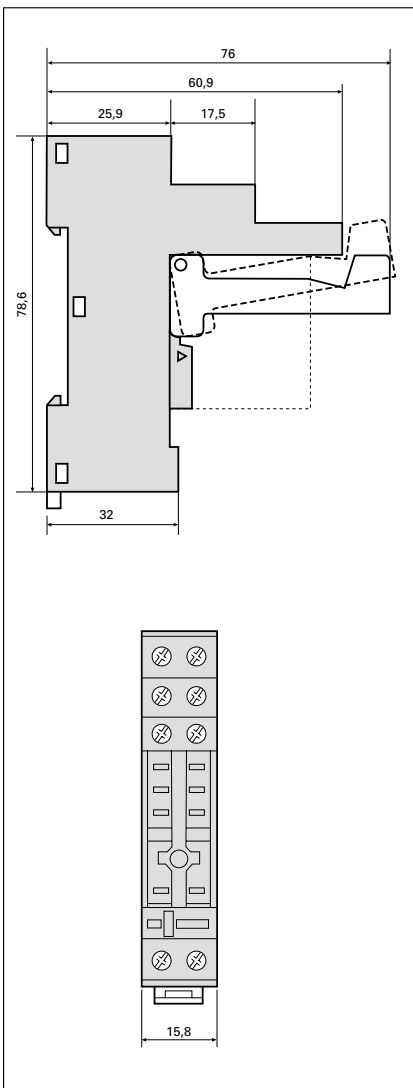
Accessories

Modules
on request

Type of relays

Type of relays	Coupling Relay SGR 282T	Coupling Relay SGR 662T
Relay	SGR 282T	SGR 662T
Socket with screw terminals	ZGF 107	ZGF 107
Retaining clip	ZGF 110	ZGF 110

Dimensions drawing (mm)

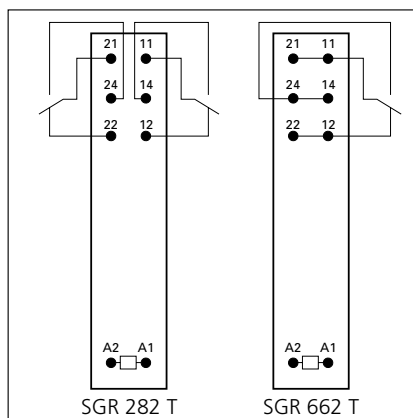


General data

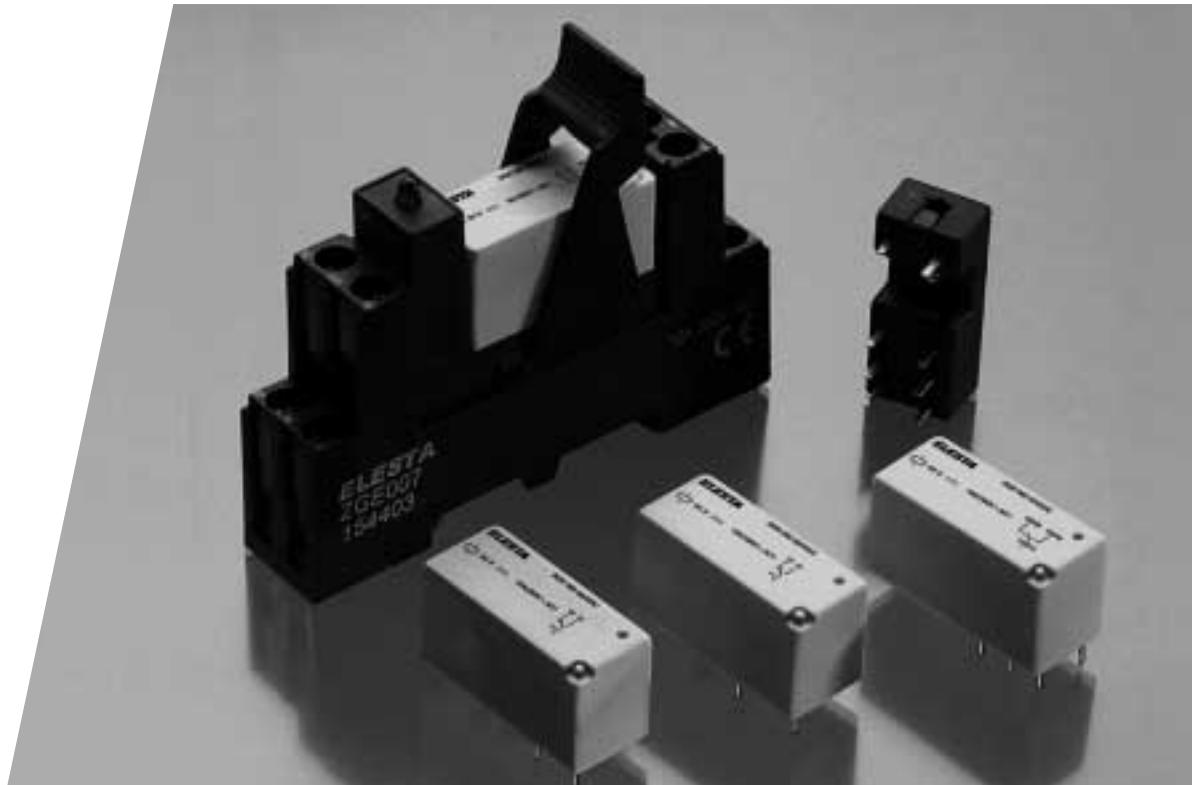
No. of contacts	2 WK resp. 1 WK
Rated switching capacity	250 VAC 8/16 A 2000/4000 VA
Switching voltage	250 VAC
Nominal voltage of coil	6-12-24-48-60-110 VDC
Manual actuation	integrated pushbutton
Max. wire section	2 x 2,5 mm ² compact wire 2 x 1,5 mm ² with cable end
Mounting	DIN rail 35 mm, EN 50022, central screw 1 x M3
Test voltage	4.000 V _{eff}
Creeping resistance	CTI 250
Weight	approx. 65 g
Mounting position	any
Ambient temperature	-25°C - +70°C
Terminals numbering	DIN EN 50011
Protection category	IP 20

Diagrams

View from above



Using DC modules + must be connected to A1!



SGR xx3 – PCB RELAYS

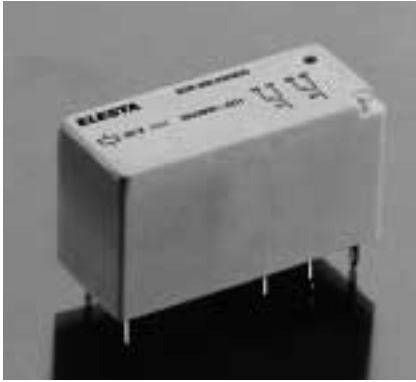
To meet our customers' requirements for space saving without performance penalties, Elesta offers the successor relays for the SGR 2x2, 4x2, 5x2, 6x2 series in a low-profile design (only 15.7 mm). The coil power dissipation has been reduced without changing the PCB grid pattern. Our customers can therefore use the new Elesta xx3 relays where space is at a premium in terms of profile height. Elesta has taken particular care to ensure that the relay pins meet the particular length and stability requirements for soldering the relays into circuit boards or inserting them in relay sockets, thereby guaranteeing reliable electrical contact.

Features

- ▶ Low-profile (only 15.7 mm)
- ▶ Optionally 1 or 2 contacts
- ▶ Standard pitch grid
- ▶ 1 x 12/16 or 2 x 8 amps
- ▶ Reduced coil power dissipation
- ▶ Combinable with sockets for DIN rail mounting

Applications

- ▶ Instrumentation and control engineering
- ▶ Switchgear and control systems



SGR-PCB RELAYS 283

No. of contacts: **2 CO or 2 NO**
 Rated current: **8 A**
 Inrush current: **15 A**

Order description

SGR 283 ...VDC
 SGR 243 ...VDC

Contact data

Contact material	AgNi
Type of contact	Single contact
Rated switching capacity	250 VAC 8A AC1 2000 VA
Max. switching voltage	400 VAC
Electrical life	approx. 50.000 operations 250 VAC 8 A
Contact resistance	< 50 mΩ

Coil data

Nominal voltages	5-6-9-12-18-24--36-48-60-110 VDC
Pick-up voltage	approx. 0,7 x Nominal voltage (at 20 °C)
Power consumption	typically 400 mW

Options

Contact material AgSnO₂ / ...+AU
 SGR 2x3 ...VDC ASO
 SGR 2x3 ...VDC +AU
 Sealed IP 67
 SGR 2x3V ...VDC ...

General data

Mechanical life	30 x 10 ⁶ Operations
Max. switching frequency	350 Operations/h
Operate time	typically 8 ms
Release time	typically 4 ms
Bounce time	typically 2 ms
Vibration resistance	10 g (10-55 Hz)
Test voltage coil-contact	5.000 V _{eff}
Test voltage contact sets	2.000 V _{eff}
Test voltage contact open	1.000 V _{eff}
Weight	11,5 g
Ambient temperature	-40°C - +85°C
Temperature of soldering bath	270°C / 5 s
Protection category	IP 40

Accessories

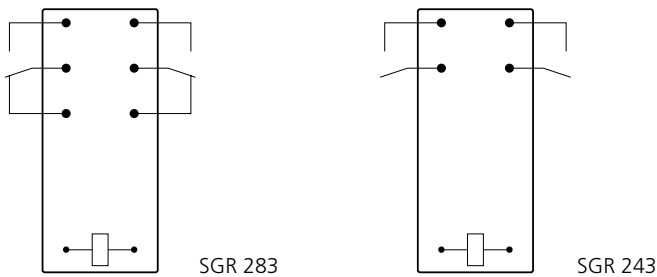
PCB mounting socket
 ZGR 001
 Socket with screw terminals
 ZGE 007
 ZGE 107
 Modules
 ZAE ...

Tests, regulations

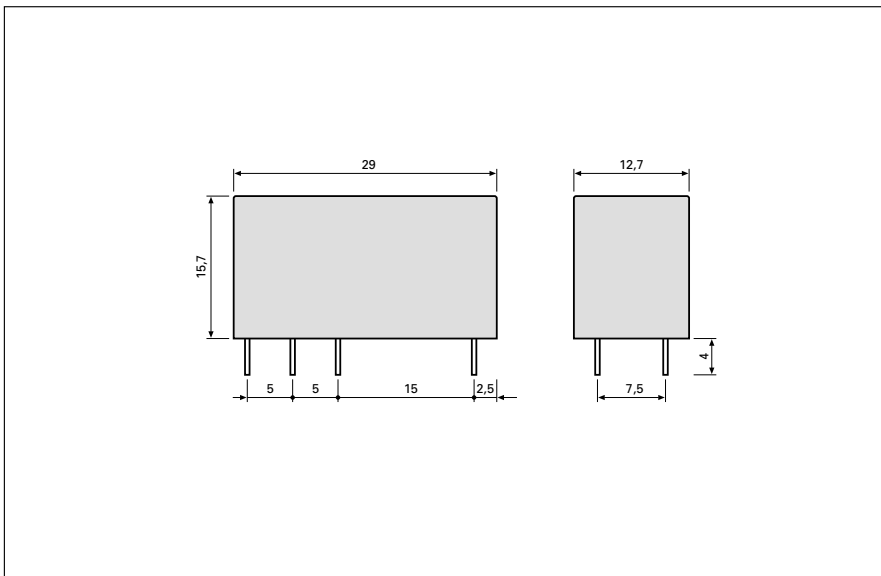
Approvals	on request
Insulation group	C/250
Creeping and leakage distance	10 mm

Diagrams

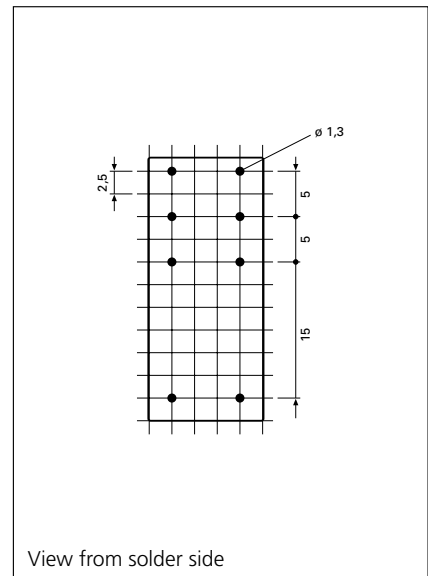
View from above



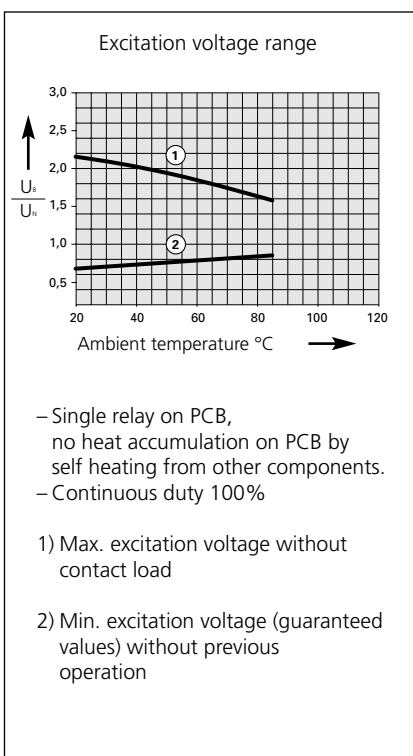
Dimensions drawing (mm)



Drilling pattern (mm)

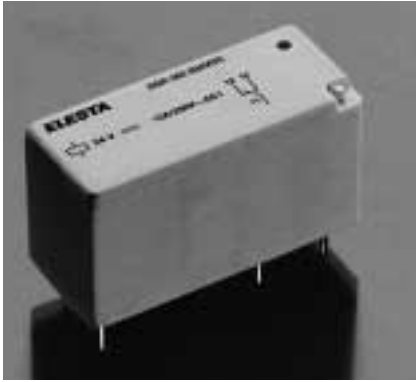


Coil data



Standard coil for direct current (other voltages on request)

Nominal spannung VDC	Min. pick-up voltage at 20°C	Drop-out spannung at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
5	3,5	0,4	80,65	62	10
6	4,2	0,5	66,67	90	10
9	6,3	0,7	45,00	200	10
12	8,4	1,0	33,33	360	10
18	12,6	1,4	22,22	810	15
24	16,8	1,9	16,67	1.440	15
36	25,2	2,9	11,08	3.250	15
48	33,6	3,8	8,33	5.760	15
60	42,0	4,8	6,67	9.000	15
110	77,0	8,8	4,55	24.200	15



SGR-PCB RELAYS 463

No. of contacts: **1 CO, 1 NO or 1 NC**
 Rated current: **12 A**
 Inrush current: **50 A**

Order description

SGR 463 ...VDC
 SGR 443 ...VDC
 SGR 423 ...VDC

Contact data

Contact material	AgNi
Type of contact	Single contact
Rated switching capacity	250 VAC 12A AC1 3000 VA
Max. switching voltage	400 VAC
Electrical life	approx. 100.000 operations 250 VAC 12 A
Contact resistance	< 50 mΩ

Coil data

Nominal voltages	5-6-9-12-18-24--36-48-60-110 VDC
Pick-up voltage	approx. 0,7 x Nominal voltage (at 20 °C)
Power consumption	typically 400 mW

Options

Contact material AgSnO₂ / ...+AU
 SGR 4x3 ...VDC ASO
 SGR 4x3 ...VDC +AU
 Sealed IP 67
 SGR 4x3V ...VDC ...

General data

Mechanical life	30 x 10 ⁶ Operations
Max. switching frequency	350 Operations/h
Operate time	typically 8 ms
Release time	typically 4 ms
Bounce time	typically 2 ms
Vibration resistance	10 g (10-55 Hz)
Test voltage coil-contact	5.000 V _{eff}
Test voltage contact open	1.000 V _{eff}
Weight	11,5 g
Ambient temperature	-40°C - +85°C
Temperature of soldering bath	270°C / 5 s
Protection category	IP 40

Accessories

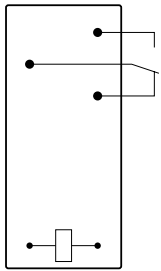
PCB mounting socket
 ZGR 003
 Socket with screw terminals
 ZGE 006
 Modules
 ZAE ...

Tests, regulations

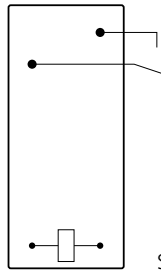
Approvals	on request
Insulation group	C/250
Creeping and leakage distance	10 mm

Diagrams

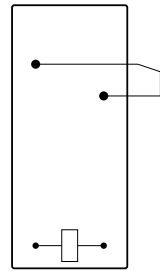
View from above



SGR 463

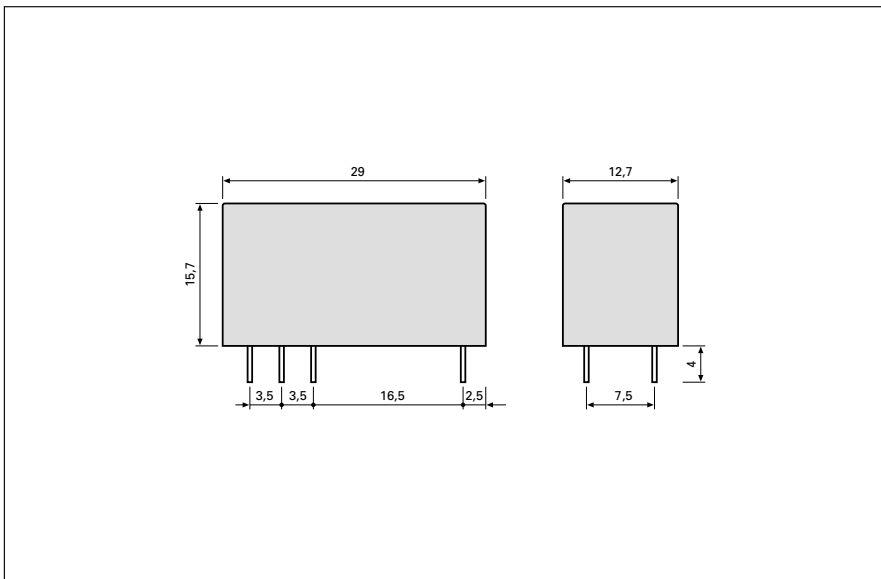


SGR 443

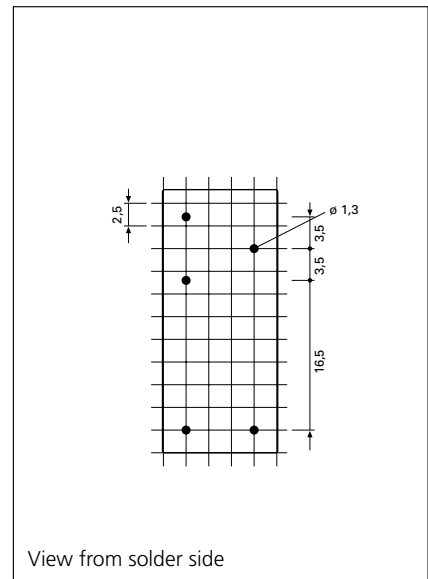


SGR 423

Dimensions drawing (mm)

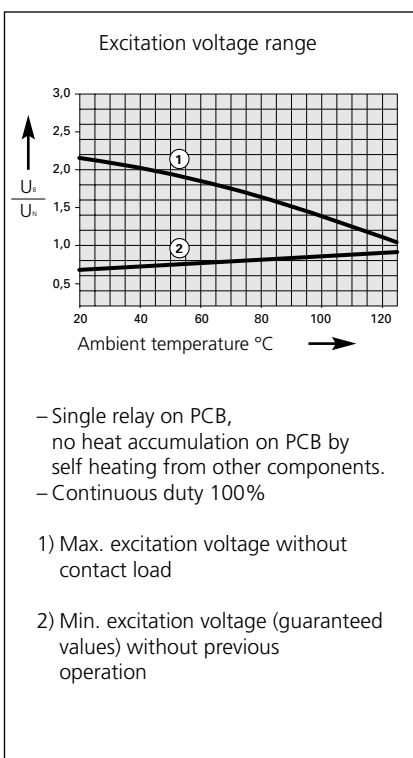


Drilling pattern (mm)



View from solder side

Coil data



Standard coil for direct current (other voltages on request)

Nominal spannung VDC	Min. pick-up voltage at 20°C	Drop-out spannung at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
5	3,5	0,4	80,65	62	10
6	4,2	0,5	66,67	90	10
9	6,3	0,7	45,00	200	10
12	8,4	1,0	33,33	360	10
18	12,6	1,4	22,22	810	15
24	16,8	1,9	16,67	1.440	15
36	25,2	2,9	11,08	3.250	15
48	33,6	3,8	8,33	5.760	15
60	42,0	4,8	6,67	9.000	15
110	77,0	8,8	4,55	24.200	15



SGR-PCB RELAYS 563

No. of contacts: **1 CO, 1 NO or 1 NC**
 Rated current: **12 A**
 Inrush current: **50 A**

Order description

SGR 563 ...VDC
 SGR 543 ...VDC
 SGR 523 ...VDC

Contact data

Contact material	AgSnO ₂
Type of contact	Single contact
Rated switching capacity	250 VAC 12A AC1 3000 VA
Max. switching voltage	400 VAC
Electrical life	approx. 100.000 operations 250 VAC 12 A
Contact resistance	< 50 mΩ

Coil data

Nominal voltages	5-6-9-12-18-24--36-48-60-110 VDC
Pick-up voltage	approx. 0,7 x Nominal voltage (at 20 °C)
Power consumption	typically 400 mW

Options

Sealed IP 67
 SGR 5x3V ...VDC ...

General data

Mechanical life	30 x 10 ⁶ Operations
Max. switching frequency	350 Operations/h
Operate time	typically 8 ms
Release time	typically 4 ms
Bounce time	typically 2 ms
Vibration resistance	10 g (10-55 Hz)
Test voltage coil-contact	5.000 V _{eff}
Test voltage contact open	1.000 V _{eff}
Weight	11,5 g
Ambient temperature	-40°C - +85°C
Temperature of soldering bath	270°C / 5 s
Protection category	IP 40

Accessories

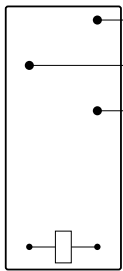
PCB mounting socket
 ZGR 001
 Socket with screw terminals
 ZGE 007
 ZGE 107
 Modules
 ZAE ...

Tests, regulations

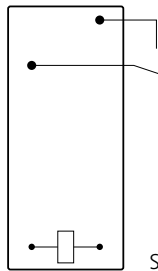
Approvals	on request
Insulation group	C/250
Creeping and leakage distance	10 mm

Diagrams

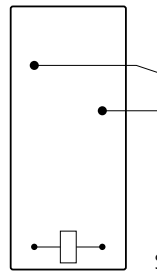
View from above



SGR 563

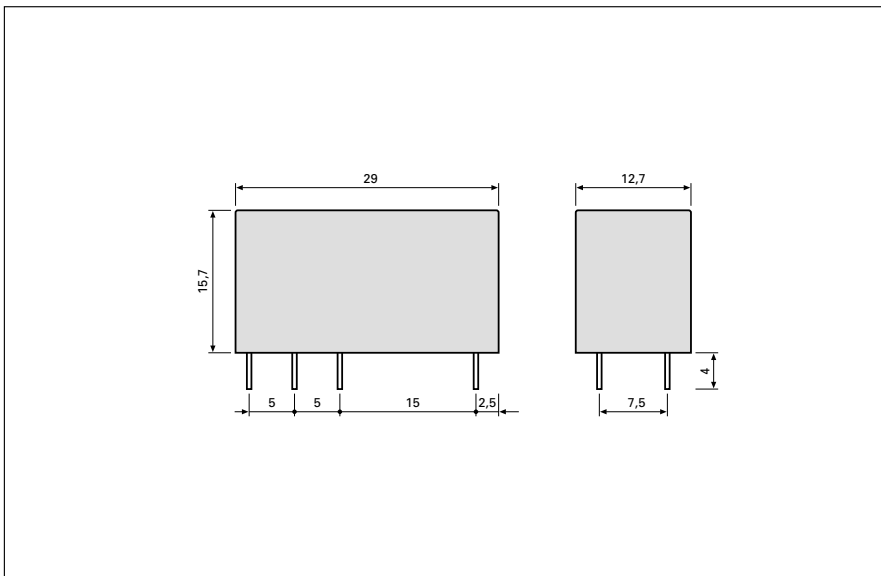


SGR 543

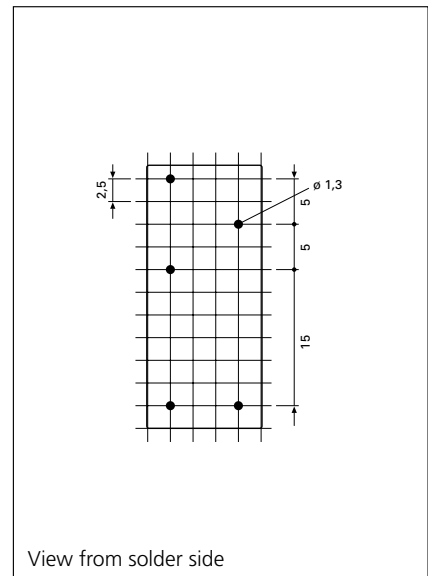


SGR 523

Dimensions drawing (mm)

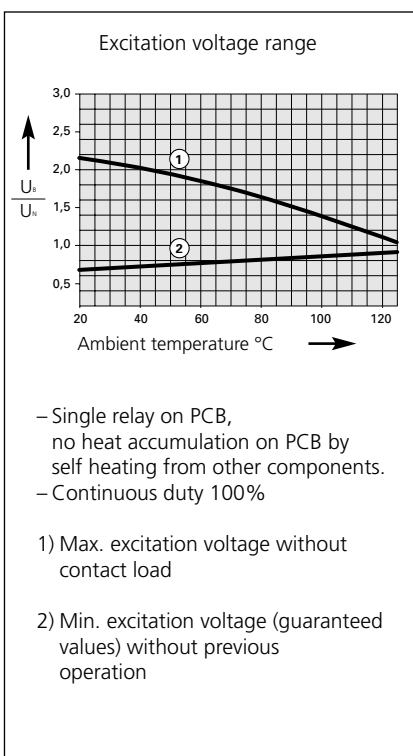


Drilling pattern (mm)



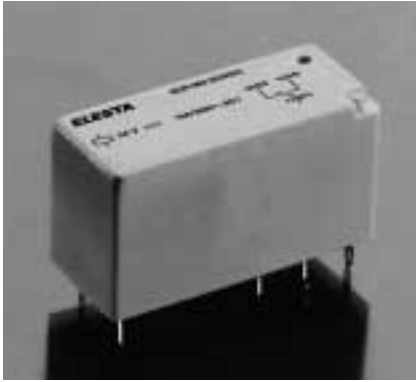
View from solder side

Coil data



Standard coil for direct current (other voltages on request)

Nominal spannung VDC	Min. pick-up voltage at 20°C	Drop-out spannung at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
5	3,5	0,4	80,65	62	10
6	4,2	0,5	66,67	90	10
9	6,3	0,7	45,00	200	10
12	8,4	1,0	33,33	360	10
18	12,6	1,4	22,22	810	15
24	16,8	1,9	16,67	1.440	15
36	25,2	2,9	11,08	3.250	15
48	33,6	3,8	8,33	5.760	15
60	42,0	4,8	6,67	9.000	15
110	77,0	8,8	4,55	24.200	15



SGR-PCB RELAYS 663

No. of contacts: **1 CO, 1 NO or 1 NC**
 Rated current: **16 A**
 Inrush current: **50 A**

Order description

SGR 663 ...VDC
 SGR 643 ...VDC
 SGR 623 ...VDC

Contact data

Contact material	AgNi
Type of contact	Single contact
Rated switching capacity	250 VAC 16A AC1 4000 VA
Max. switching voltage	400 VAC
Electrical life	approx. 50.000 operations 250 VAC 16 A
Contact resistance	< 50 mΩ

Coil data

Nominal voltages	5-6-9-12-18-24--36-48-60-110 VDC
Pick-up voltage	approx. 0,7 x Nominal voltage (at 20 °C)
Power consumption	typically 400 mW

Options

Contact material AgSnO₂ / ...+AU
 SGR 6x3 ...VDC ASO
 SGR 6x3 ...VDC +AU
 Sealed IP 67
 SGR 6x3V ...VDC ...

General data

Mechanical life	30 x 10 ⁶ Operations
Max. switching frequency	350 Operations/h
Operate time	typically 8 ms
Release time	typically 4 ms
Bounce time	typically 2 ms
Vibration resistance	10 g (10-55 Hz)
Test voltage coil-contact	5.000 V _{eff}
Test voltage contact open	1.000 V _{eff}
Weight	11,5 g
Ambient temperature	-40°C - +85°C
Temperature of soldering bath	270°C / 5 s
Protection category	IP 40

Accessories

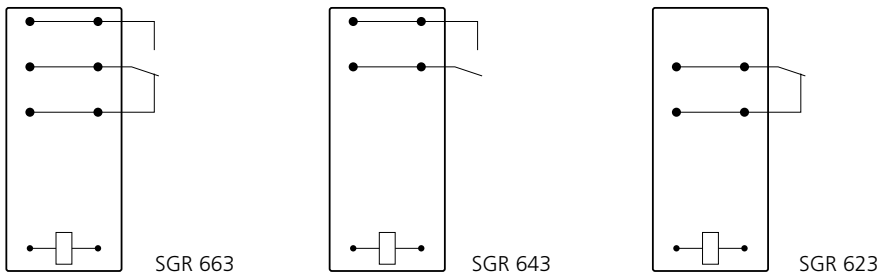
PCB mounting socket
 ZGR 001
 Socket with screw terminals
 ZGE 007
 ZGE 107
 Modules
 ZAE ...

Tests, regulations

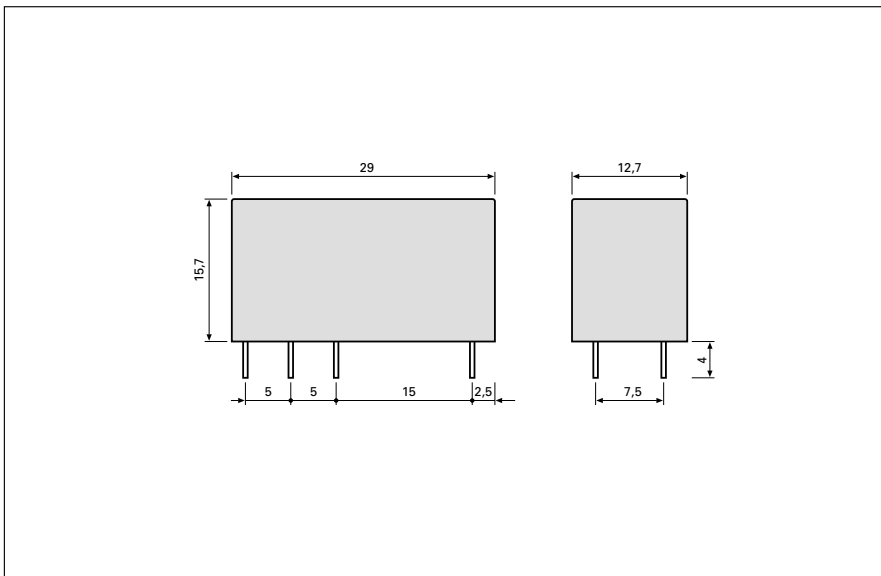
Approvals	on request
Insulation group	C/250
Creeping and leakage distance	10 mm

Diagrams

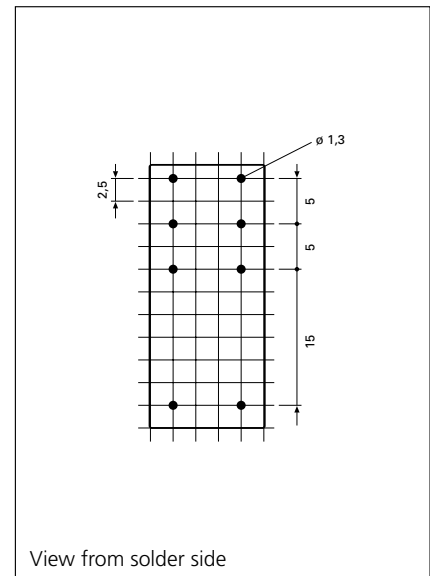
View from above



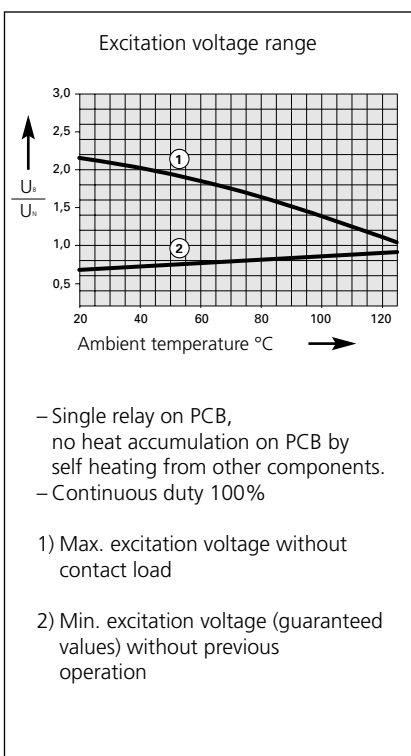
Dimensions drawing (mm)



Drilling pattern (mm)



Coil data



Standard coil for direct current (other voltages on request)

Nominal spannung VDC	Min. pick-up voltage at 20°C	Drop-out spannung at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
5	3,5	0,4	80,65	62	10
6	4,2	0,5	66,67	90	10
9	6,3	0,7	45,00	200	10
12	8,4	1,0	33,33	360	10
18	12,6	1,4	22,22	810	15
24	16,8	1,9	16,67	1.440	15
36	25,2	2,9	11,08	3.250	15
48	33,6	3,8	8,33	5.760	15
60	42,0	4,8	6,67	9.000	15
110	77,0	8,8	4,55	24.200	15

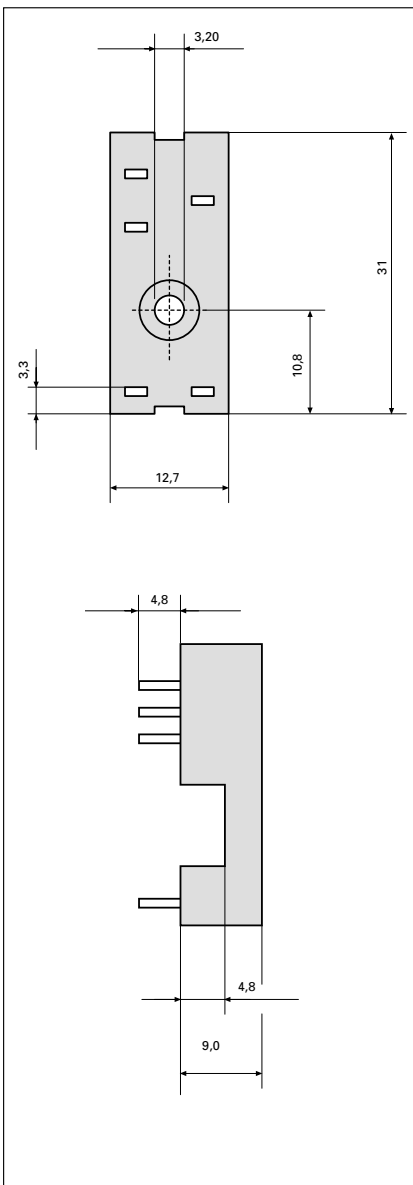


SGR xx3 – PCB mounting socket and Accessories

Accessories

ZVR 003
Retaining clip

Dimensions drawing (mm)



Type of sockets

Fits to relay

ZGR 001

SGR 283, 243
SGR 563, 543, 523
SGR 663, 643, 623

ZGR 003

SGR 463, 443, 423

Pin layout

5,0 mm

3,5 mm

General data

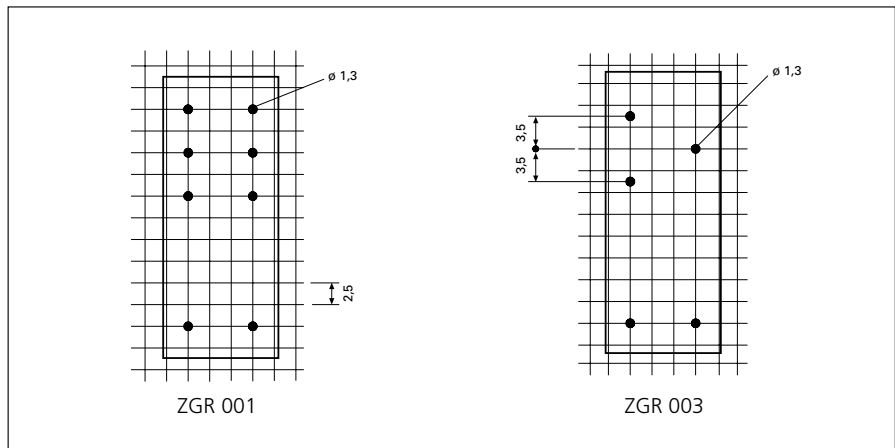
Nominal data	300 VAC 12 A
Test voltage	> 5.000 V _{eff}
Contact springs material	CuSn6 tin plated
Mounting	solder pin
Creeping resistance	CTI 250
Weight	approx. 7 g
Mounting position	any
Ambient temperature	-40°C - +85°C
No. of pins	ZGR 001 8pin ZGR 003 5pin
Protection category	IP 30

Tests, regulations

Approvals	UL, CSA
Insulation group	VDE 0110 / group C 250 VAC

Drilling patterns (mm)

View from solder side



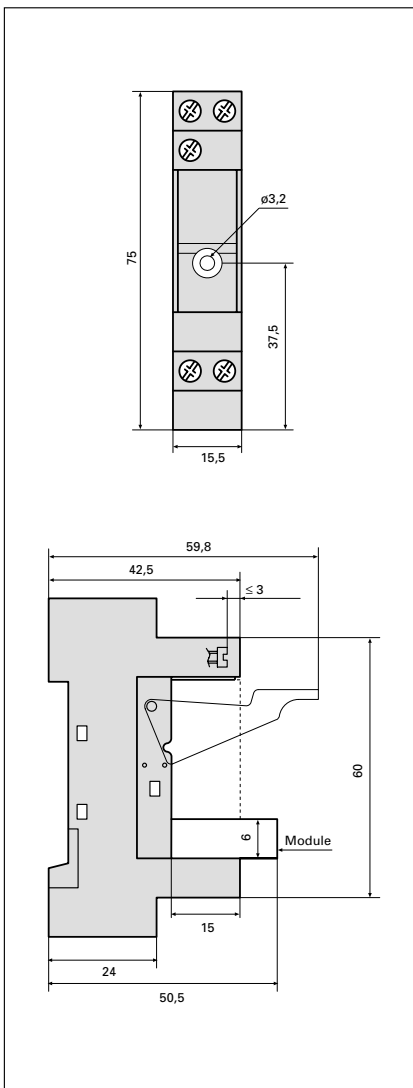


SGR xx3 – sockets with screw terminals and accessories

Accessories

- ZVR 006
- Retaining clip
- ZGE 011
- Label plate
- ZAE 011 - ZAE ...
- Modules (see page 63)

Dimensions drawing (mm)



Type of sockets

Fits to relay

ZGE 006

SGR 463, 443, 423

ZGE 007

SGR 283, 243
SGR 563, 543, 523
SGR 663, 643, 623

Pin layout

3,5 mm

5,0 mm

General data

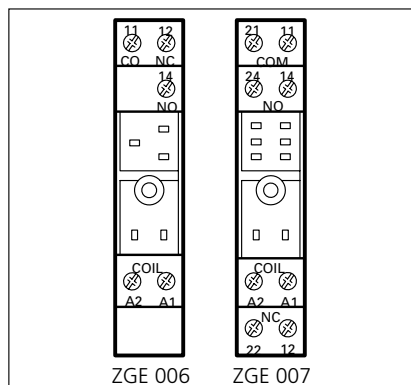
Nominal data	300 VAC 12 A
Test voltage	> 3.000 V _{eff}
Contact springs material	CuZn33 tin plated
Nominal torque on screws	0,8 Nm
Max. torque on screws	0,8 Nm
Terminals	combi screw M3 + Philips Gr.1
Max. wire section	2 x 2,5 mm ² compact wire 2 x 1,5 mm ² with cable end
Mounting	DIN rail 35 mm, EN 50022, central screw 1 x M3
Creeping resistance	CTI 250
Weight	approx. 39 g
Mounting position	any
Ambient temperature	-25°C - +85°C
No. of pins	ZGE 006 5pin / ZGE 007 8pin
Terminals numbering	DIN EN 50011
Protection category	IP 20

Tests, regulations

Approvals	UL, CSA
Insulation group	VDE 0110 / group C 250 VAC

Diagrams

View from above



Using DC modules + must be connected to A1!



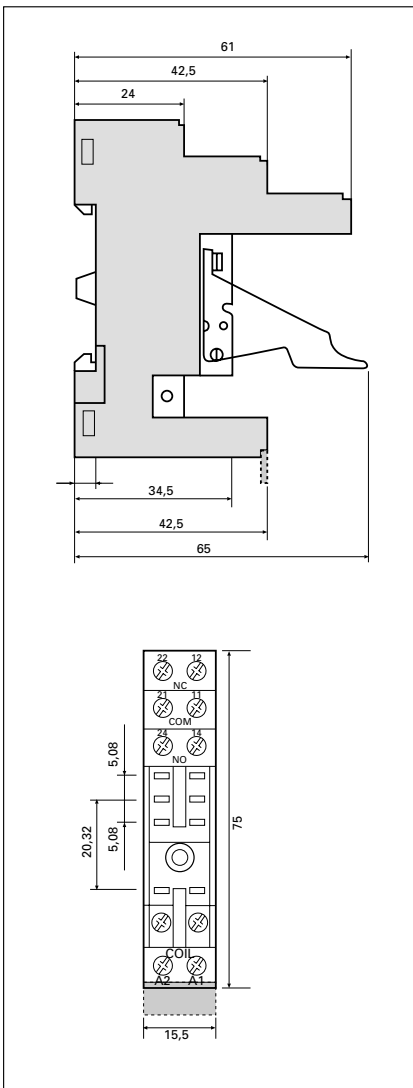
SGR xx3 – sockets with screw terminals and accessories

„Protective separation according to VDE 0106“ between coil and contacts

Accessories

ZVR 006
Retaining clip
ZGE 011
Label plate
ZAE 011 - ZAE ...
Modules (see next page)

Dimensions drawing (mm)



Type of socket

Type of socket	ZGE 107
Fits to relay	SGR 283, 243 SGR 563, 543, 523 SGR 663, 643, 623
Pin layout	5,0 mm

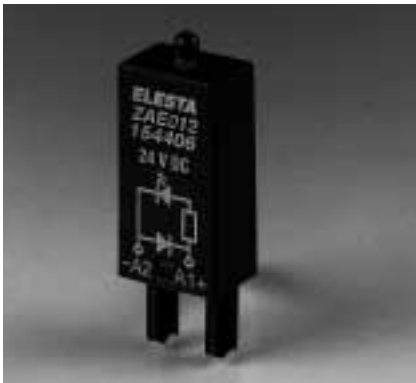
General data

Nominal data	300 VAC 12 A
Test voltage	> 3.000 V _{eff}
Contact springs material	CuZn33 tin plated
Nominal torque on screws	0,8 Nm
Max. torque on screws	0,8 Nm
Terminals	combi screw M3 + Philips Gr.1
Max. wire section	2 x 2,5 mm ² compact wire 2 x 1,5 mm ² with cable end
Mounting	DIN rail 35 mm, EN 50022, central screw 1 x M3
Creeping resistance	CTI 250
Weight	approx. 39 g
Mounting position	any
Ambient temperature	-25°C - +85°C
No. of pins	ZGE 107 8pin
Terminals numbering	DIN EN 50011
Protection category	IP 20

Tests, regulations

Approvals	UL, CSA
Insulation group	VDE 0110 / group C 250 VAC

Using DC modules + must be connected to A1!



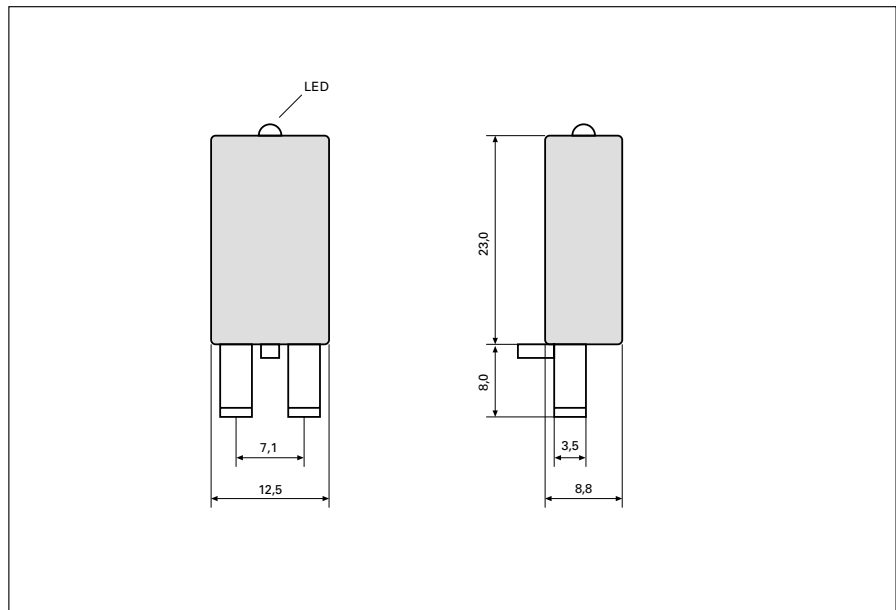
Modules for sockets with screw terminals

About the colour of the LED's:

According to EN 60073 the colour RED is used to indicate an alert or a dangerous situation.

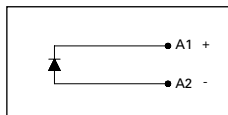
GREEN shows normal condition or a save situation. Therefore our modules with an LED indicator are available in red or green.

Dimensions drawing (mm)



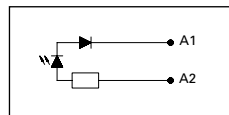
Diagrams (mm)

ZAE 011



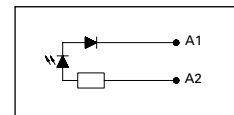
Diode 6-230 VDC

ZAE 023 (LED red) / 223 (LED green)



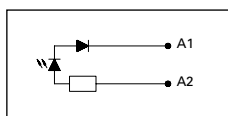
LED 6-24 VDC

ZAE 024 (LED red) / 224 (LED green)



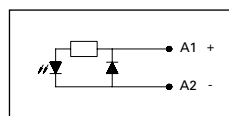
LED 24-60 VDC

ZAE 019 (LED red) / 219 (LED green)



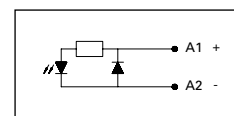
LED 110-230 VDC

ZAE 012 (LED red) / 212 (LED green)

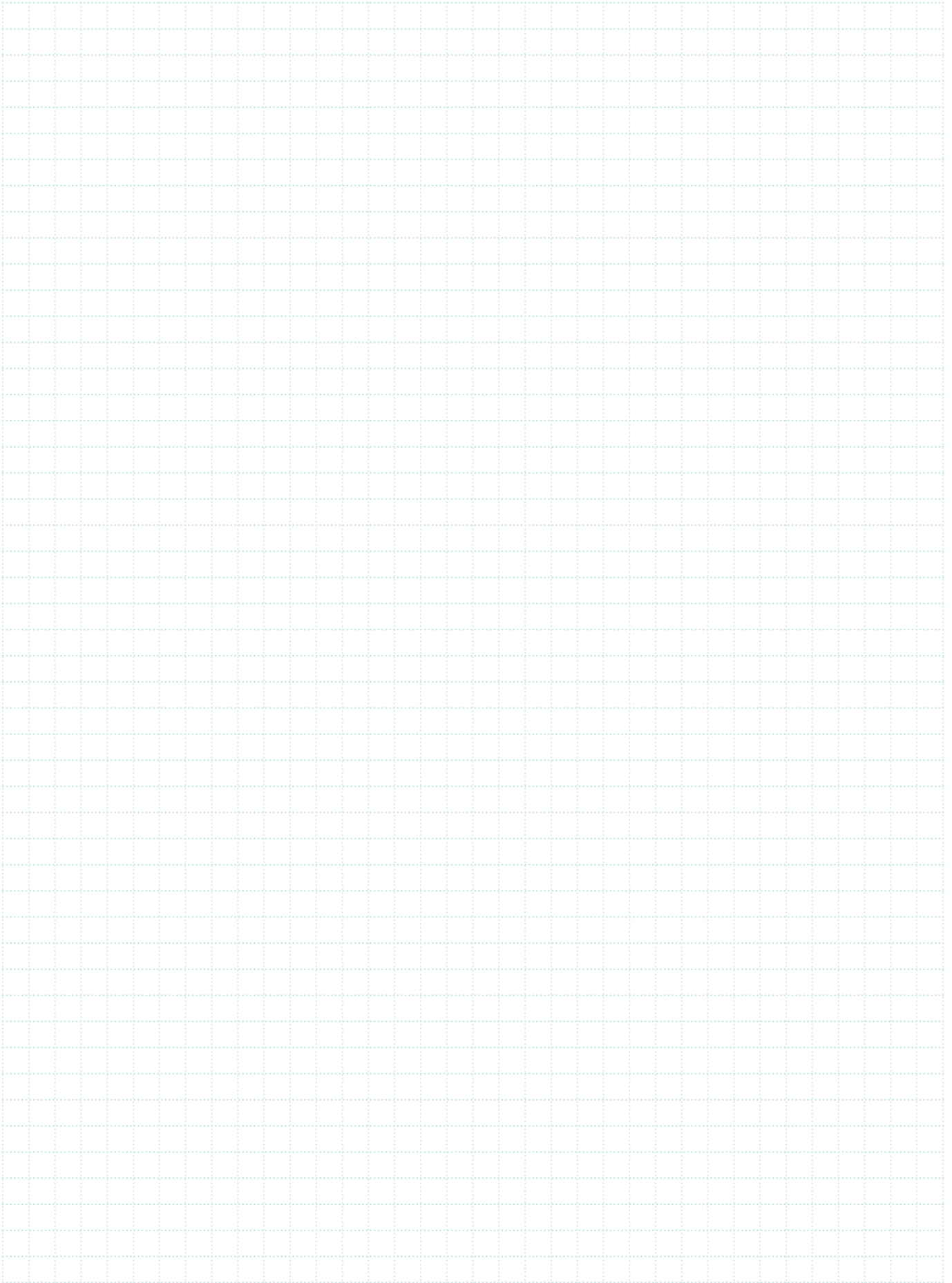


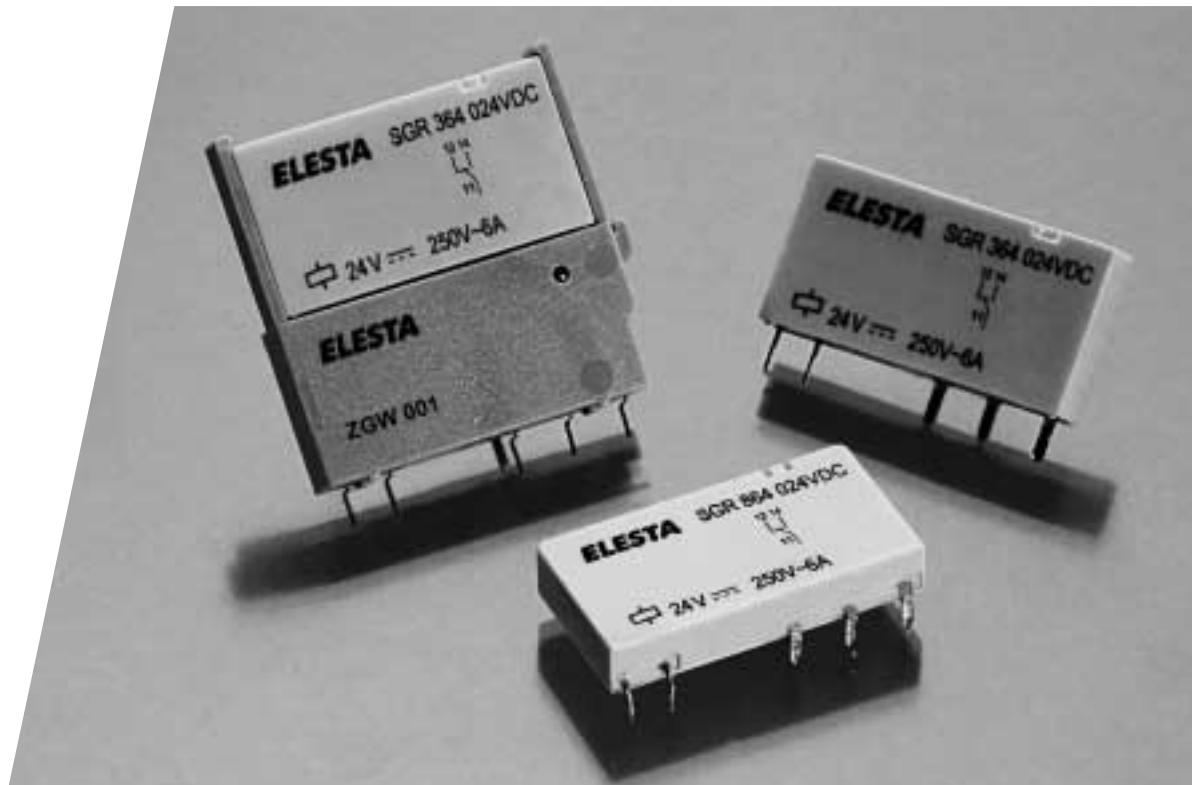
LED + Chopper diode 6-24 VDC

ZAE 020 (LED red) / 220 (LED green)



LED + Chopper diode 24-60 VDC





SGR xx4 – PCB RELAYS

The SGR xx4 high-current relay could also be called “the efficiency relay”, as it combines almost contradictory requirements in a single device: high switching capacities, tiny dimensions and minimal coil power dissipation. The very latest production technology makes this possible. Although measuring just 28x5x15 mm (LxWxH), the SGR xx4 with one changeover contact meets every requirement in terms of reliable disconnection when switching loads of up to 6A/250 VAC. With creepage distances and airgaps >8mm and a test voltage between control and load circuit of 4000 V_{eff}, the SGR xx4 is already a good performer. However, the low coil power dissipation of only 170 mW further underscores the exceptional efficiency of this high-current device.

Features

- ▶ Only 5 mm wide
- ▶ Creepage distances and airgaps > 8 mm
- ▶ Test voltage 4 KV
- ▶ Changeover, NO, NC contact
- ▶ Several contact materials
- ▶ Horizontal version

Applications

- ▶ Space-saving electronics



SGR-PCB RELAYS 364

No. of contacts: **1 CO, 1 NO or 1 NC**
 Rated current: **6 A**
 Inrush current: **30 A**

Order description

SGR 364 ...VDC
 SGR 344 ...VDC
 SGR 324 ...VDC

Contact data

Contact material	AgNi
Type of contact	Single contact
Rated switching capacity	250 VAC 6A AC1 1500 VA
Max. switching voltage	400 VAC
Electrical life	approx. 30.000 operations 250 VAC 6 A
Contact resistance	< 50 mΩ

Coil data

Nominal voltages	5-6-9-12-18-24-36-48-60 VDC
Pick-up voltage	approx. 0,7 x Nominal voltage (at 20 °C)
Power consumption	typically 170 - 200 mW

Options

Contact material AgSnO₂ / ...+AU
 SGR 3x4 ...VDC ASO
 SGR 3x4 ...VDC +AU
 Sealed IP 67
 SGR 3x4V ...VDC ...

General data

Mechanical life	30 x 10 ⁶ Operations
Max. switching frequency	350 Operations/h
Operate time	typically 6 ms
Release time	typically 4 ms
Bounce time	typically 2 ms
Vibration resistance	10 g-NO, 1 g-NC (10-55 Hz)
Test voltage coil-contact	4.000 V _{eff}
Test voltage contact open	1.000 V _{eff}
Weight	5 g
Ambient temperature	-40°C - +85°C
Temperature of soldering bath	270°C / 5 s
Protection category	IP 40

Accessories

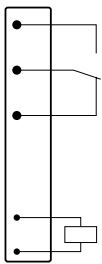
PCB mounting socket
 ZGW 001

Tests, regulations

Approvals	on request
Insulation group	C/250
Creeping and leakage distance	8 mm

Diagrams

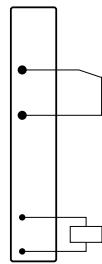
View from above



SGR 364

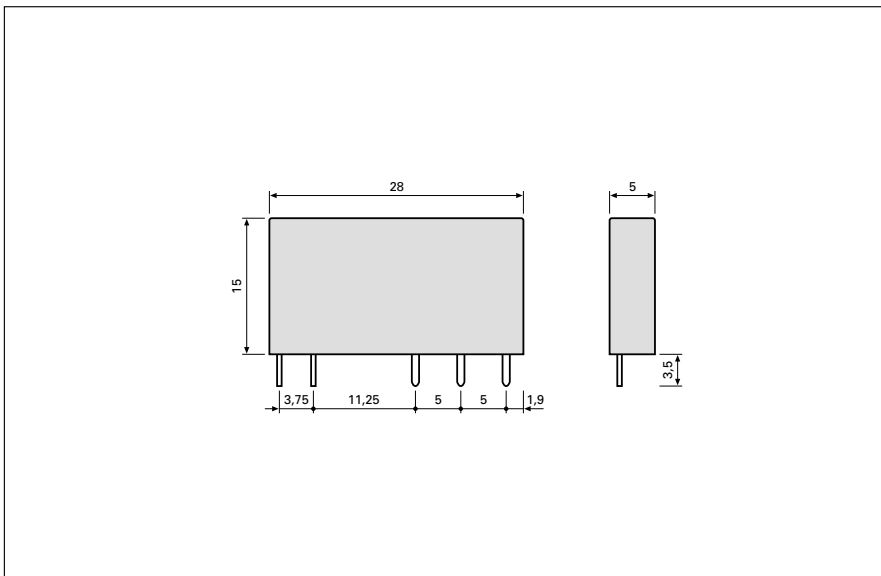


SGR 344

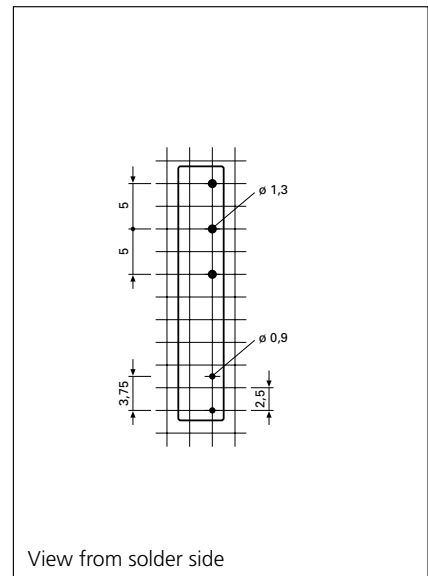


SGR 324

Dimensions drawing (mm)

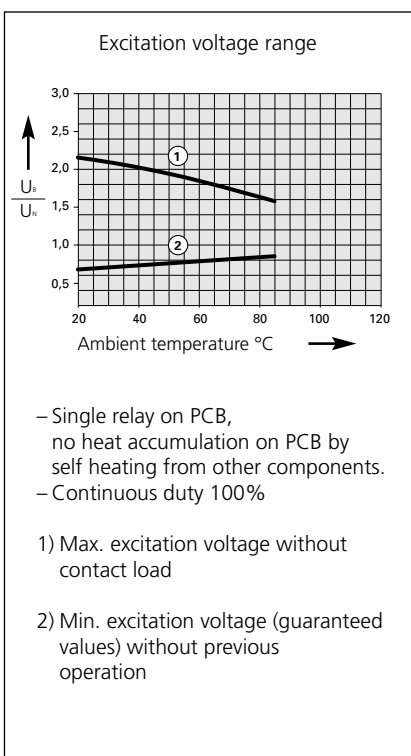


Drilling pattern (mm)



View from solder side

Coil data



Standard coil for direct current (other voltages on request)

Nominal spannung VDC	Min. pick-up voltage at 20°C	Drop-out spannung at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
5	3,5	0,25	38,46	130	10
6	4,2	0,30	31,58	190	10
9	6,3	0,45	21,43	420	10
12	8,4	0,60	14,29	840	15
18	12,6	0,90	10,00	1.800	15
24	16,8	1,20	7,16	3.350	15
36	25,2	1,80	5,14	7.000	15
48	33,6	2,40	3,90	12.300	15
60	42,0	3,00	3,05	19.700	15



SGR-PCB RELAYS 864

No. of contacts: **1 CO, 1 NO or 1 NC**
 Rated current: **6 A**
 Inrush current: **30 A**

Order description

SGR 864 ...VDC

SGR 844 ...VDC

SGR 824 ...VDC

Contact data

Contact material	AgNi
Type of contact	Single contact
Rated switching capacity	250 VAC 6A AC1 1500 VA
Max. switching voltage	400 VAC
Electrical life	approx. 30.000 operations 250 VAC 6 A
Contact resistance	< 50 mΩ

Coil data

Nominal voltages	5-6-9-12-18-24-36-48-60 VDC
Pick-up voltage	approx. 0,7 x Nominal voltage (at 20 °C)
Power consumption	typically 170 - 200 mW

Options

Contact material AgSnO₂ / ...+AU

SGR 8x4 ...VDC ASO

SGR 8x4 ...VDC +AU

Sealed IP 67

SGR 8x4V ...VDC ...

General data

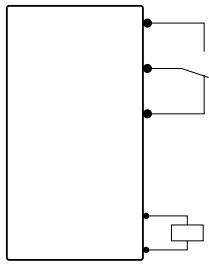
Mechanical life	30 x 10 ⁶ Operations
Max. switching frequency	350 Operations/h
Operate time	typically 6 ms
Release time	typically 4 ms
Bounce time	typically 2 ms
Vibration resistance	10 g-NO, 1 g-NC (10-55 Hz)
Test voltage coil-contact	4.000 V _{eff}
Test voltage contact open	1.000 V _{eff}
Weight	5 g
Ambient temperature	-40°C - +85°C
Temperature of soldering bath	270°C / 5 s
Protection category	IP 40

Tests, regulations

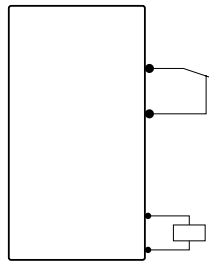
Approvals	on request
Insulation group	C/250
Creeping and leakage distance	8 mm

Diagrams

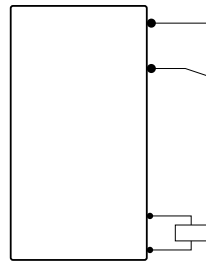
View from above



SGR 864

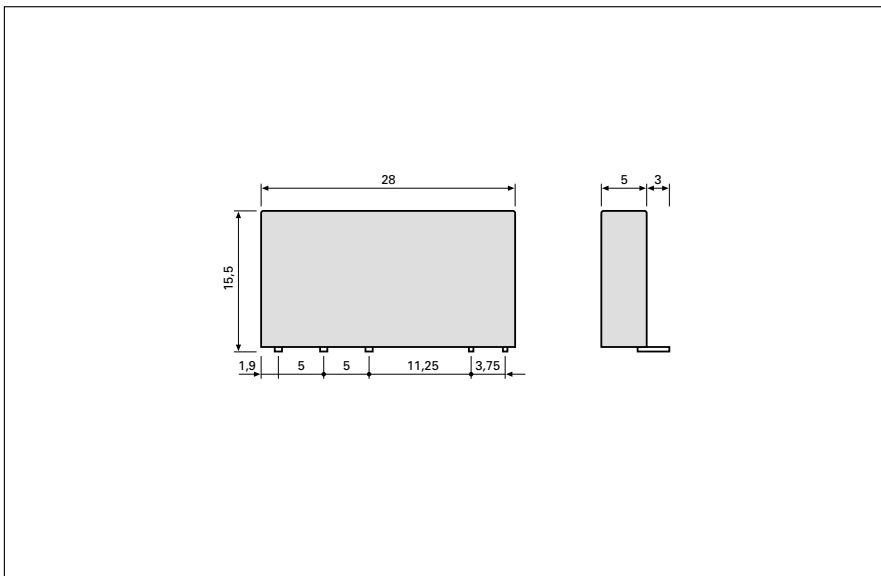


SGR 844

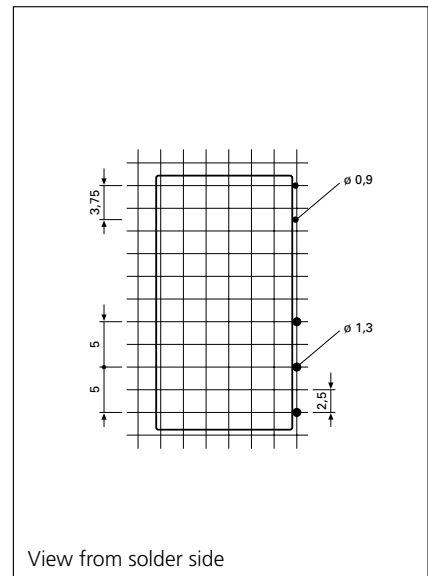


SGR 824

Dimensions drawing (mm)

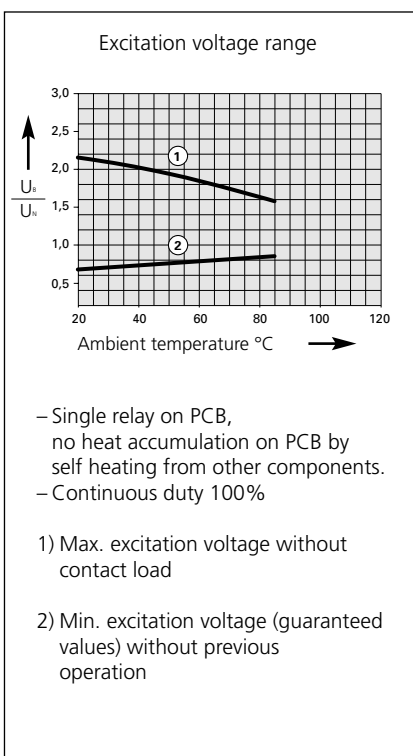


Drilling pattern (mm)



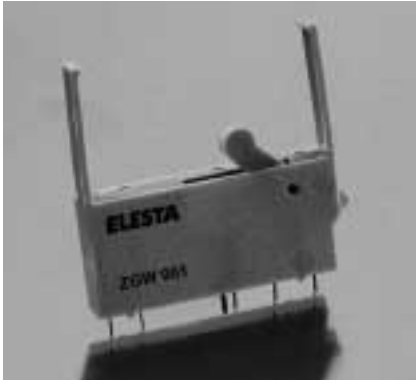
View from solder side

Coil data



Standard coil for direct current (other voltages on request)

Nominal spannung VDC	Min. pick-up voltage at 20°C	Drop-out spannung at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
5	3,5	0,25	38,46	130	10
6	4,2	0,30	31,58	190	10
9	6,3	0,45	21,43	420	10
12	8,4	0,60	14,29	840	15
18	12,6	0,90	10,00	1.800	15
24	16,8	1,20	7,16	3.350	15
36	25,2	1,80	5,14	7.000	15
48	33,6	2,40	3,90	12.300	15
60	42,0	3,00	3,05	19.700	15



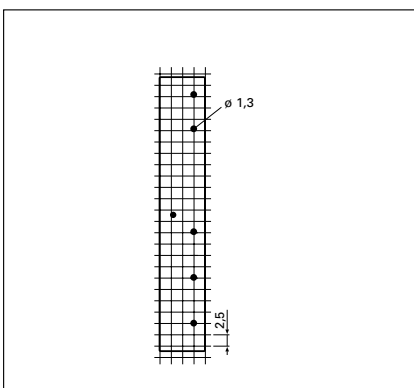
SGR 3x4 – PCB mounting socket

Type of socket	ZGW 001
Fits to relay	SGR 364, 344, 324
Pin layout	(1,25 mm)

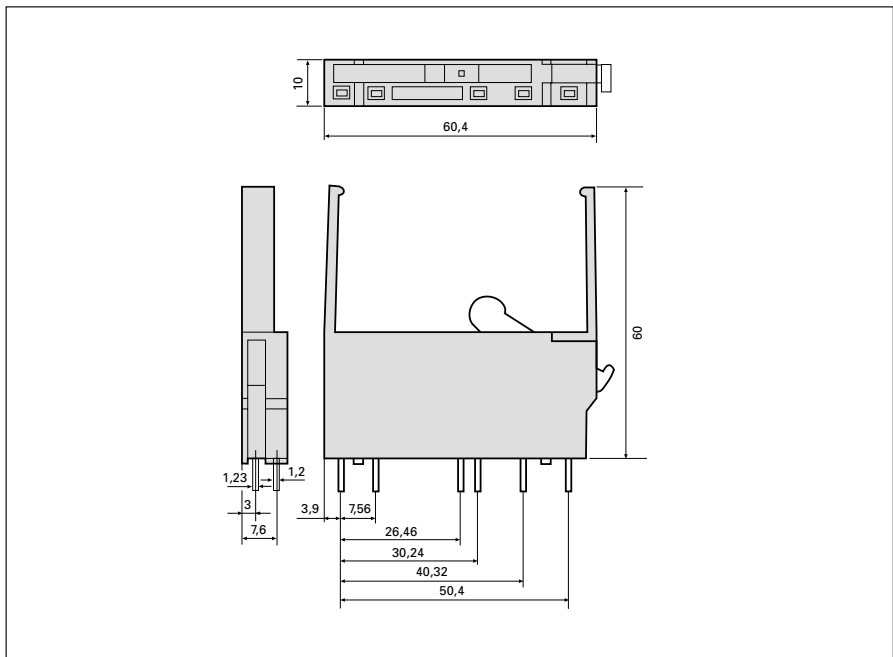
General data	
Nominal data	250 VAC 6 A
Test voltage (coil - contact)	4.000 V _{eff}
Contact springs material	CuSn6 plated
Mounting	solder pin
Creeping resistance	> CTI 125
Weight	approx. 1 g
Mounting position	standing
Ambient temperature	-25°C - +50°C
No. of pins	ZGW 001 5pin
Protection category	IP 20

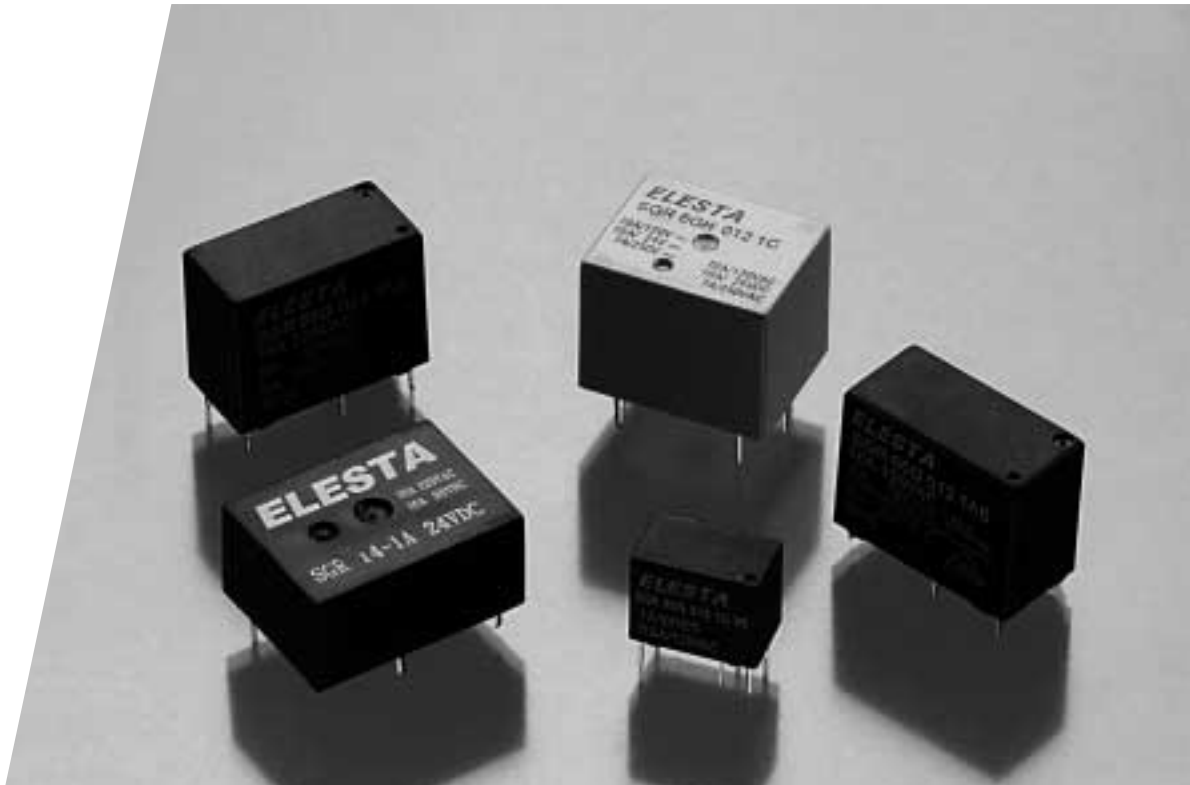
Drilling pattern (mm)

View from solder side



Dimensions drawing (mm)





PCB RELAYS FROM ELESTA

for other uses, geared particularly to international fields of application, can be found on the following pages. These relay variants are in some cases standard relays in other markets where they have been tried and tested a million times over. Optimized largescale production processes permit particularly favorable cost structures and therefore extremely competitive pricing. These internationally renowned relays allow our customers to offer their customers "familiar" electromechanical components worldwide.

Features

- ▶ Very small dimensions
- ▶ Low power consumption
- ▶ Inline packaging for processing on pick and place equipment
- ▶ A high degree of international awareness

Applications

- ▶ Selectively optimized, cost-effective solution for electrical switching tasks



SGR-PCB RELAYS 14

No. of contacts: **1 NO**
 Rated current: **10 A**
 Inrush current: **16 A**

Order description

SGR 14 ... 1A

Contact data

Contact material	AgCdO
Type of contact	Single contact
Rated switching capacity	125 VAC 10 A AC1 1250 VA 125 VAC 16 A AC1 2000 VA (H-Version)
Max. switching voltage	277 VAC / 30 VDC
Electrical life	approx. 100.000 operations 125 VAC 10 A
Contact resistance	50 mΩ

Coil data

Nominal voltages	5-6-9-12-18-24-48 VDC
Pick-up voltage	approx. 0,8 x Nominal voltage (at 20 °C)
Power consumption	typically 200 mW (48VDC: 400 mW)

Options

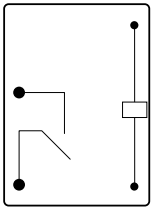
Heavy current model (125 VAC 16 A)
 SGR 14 ... 1A H
 Sealed IP 67
 SGR 14 ... 1A V
 Relays with change-over contact
 SGR 14 ... 1C

General data

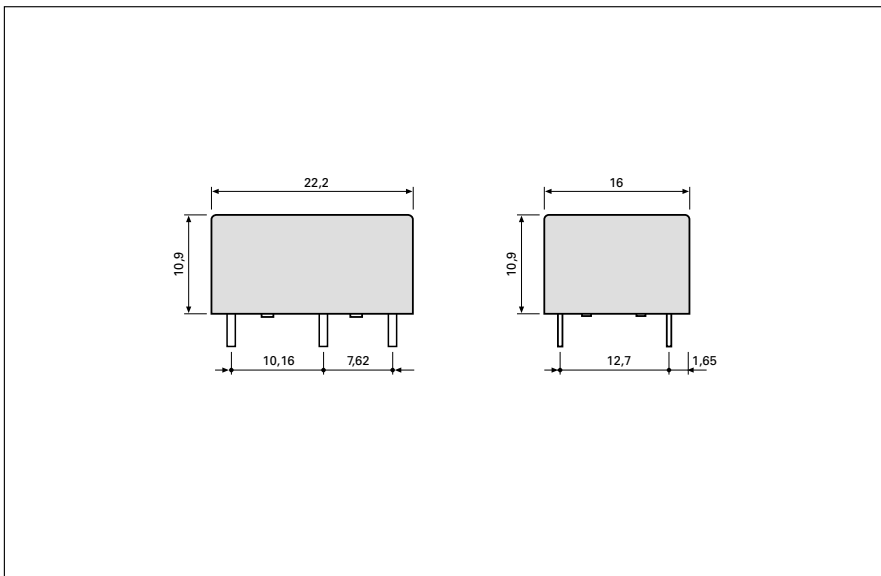
Mechanical life	10 x 10 ⁶ Operations
Operate time	typically 10 ms
Release time	typically 4 ms
Bounce time	typically 7 ms
Vibration resistance	10 g (10-55 Hz)
Test voltage coil-contact	1.500 V _{eff}
Test voltage contact open	1.050 V _{eff}
Weight	approx. 8 g
Ambient temperature	-40°C - +70°C
Temperature of soldering bath	260°C / 5 s

Diagram

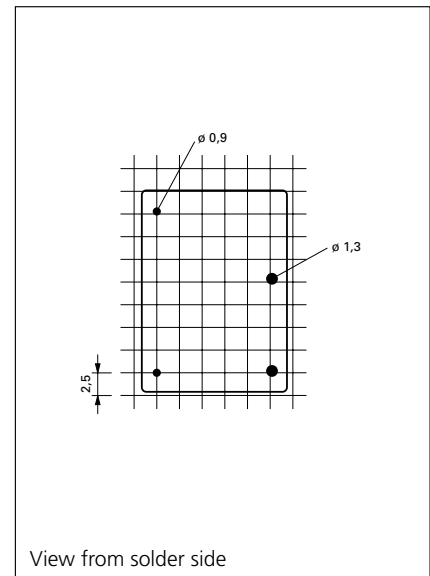
View from above



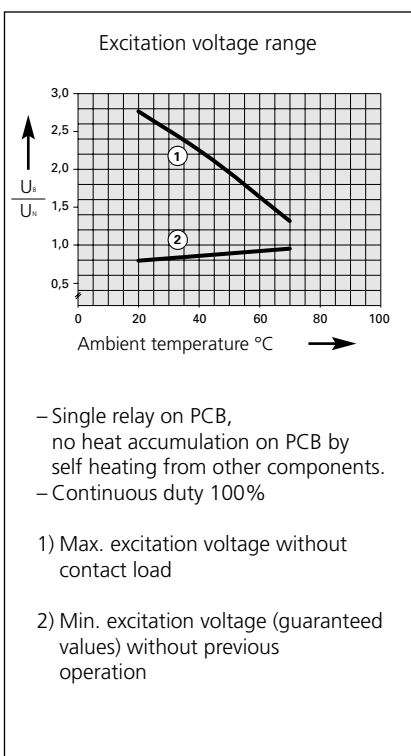
Dimensions drawing (mm)



Drilling pattern (mm)

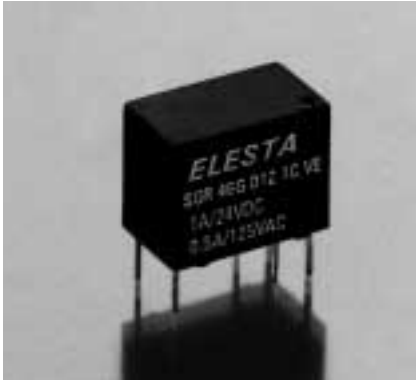


Coil data



Standard coil for direct current (other voltages on request)

Nominal spannung VDC	Min. pick-up voltage at 20°C	Drop-out spannung at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
5	4,00	0,25	40,00	125	10
6	4,80	0,30	33,30	180	10
9	7,20	0,45	22,20	405	10
12	9,60	0,60	16,70	720	10
18	14,40	0,90	11,10	1.620	10
24	19,20	1,20	8,30	2.880	10
48	38,40	2,40	8,30	5.760	10



SGR-PCB RELAYS 46G

No. of contacts: **1 CO**
 Rated current: **2 A**

Order description

SGR 46G ... 1C E

Contact data

Contact material	AgPd+Au
Type of contact	
Rated switching capacity	125 VAC 0,5A AC1 62,5 VA 30 VDC 1A 30 W
Max. switching voltage	125 VAC / 60 VDC
Electrical life	approx. 100.000 operations 125 VAC 0,5 A
Contact resistance	100 mΩ

Coil data

Nominal voltages	1,5-3-5-6-9-12-24 VDC
Pick-up voltage	approx. 0,8 x Nominal voltage (at 20 °C)
Power consumption	typically 150 mW / 200 mW*

Options

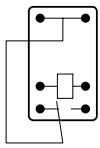
Model with standard coil*
 SGR 46G ... 1C
 SMD model
 SGR 46 ... 1C X

General data

Mechanical life	10 x 10 ⁶ Operations
Operate time	typically 5 ms
Release time	typically 5 ms
Bounce time	typically 5 ms
Vibration resistance	10 g (10-55 Hz)
Test voltage coil-contact	1.000 V _{eff}
Weight	2,2 g
Ambient temperature	-30°C - +70°C
Temperature of soldering bath	260°C / 5 s
Protection category	sealed

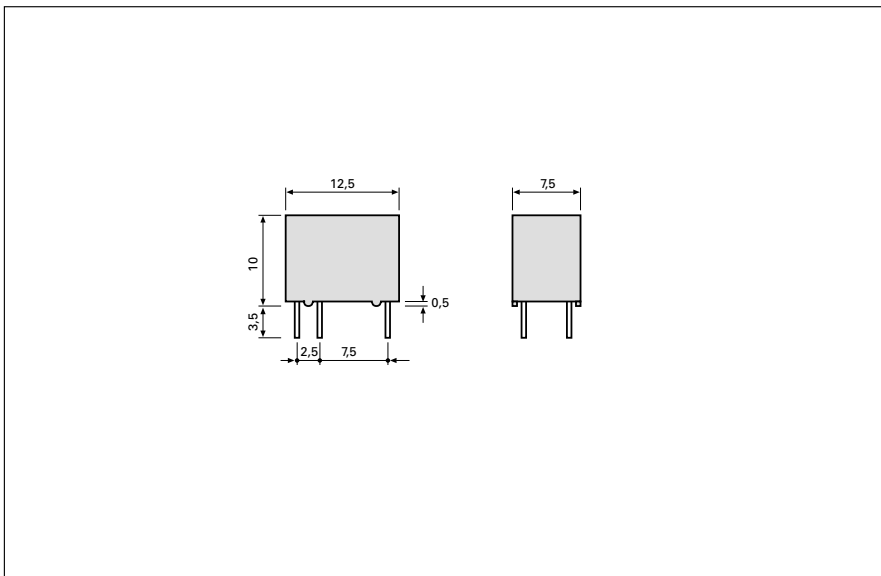
Diagram

View from above

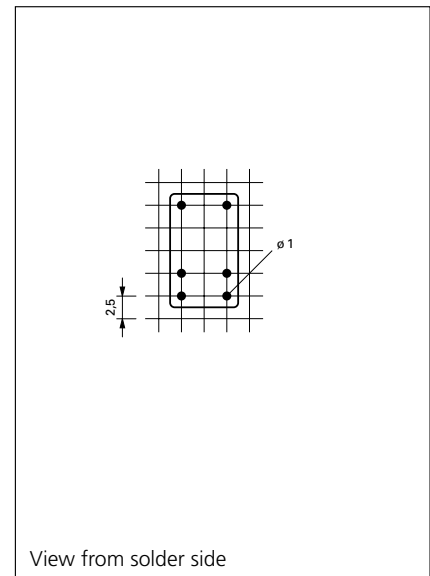


SGR 46G...1C E

Dimensions drawing (mm)

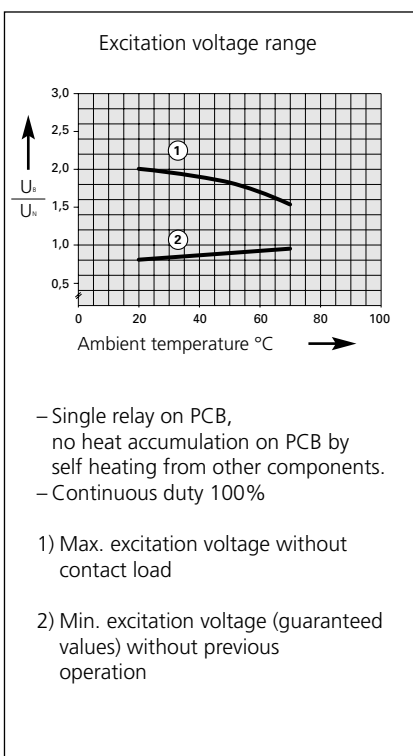


Drilling pattern (mm)



View from solder side

Coil data



Standard coil for direct current (other voltages on request)

Nominal spannung VDC	Min. pick-up voltage at 20°C	Drop-out spannung at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
1,5	1,20	0,15	100,00	15	10
3	2,40	0,30	50,00	60	10
5	4,00	0,50	29,90	167	10
6	4,80	0,60	25,00	240	10
9	7,20	0,90	16,70	540	10
12	9,60	1,20	12,50	960	10
24	19,20	2,40	6,25	3.840	15



SGR-PCB RELAYS 66G

No. of contacts: **1 CO or 1 NO**
 Rated current: **5 A**
 Inrush current: **10 A**

Order description

SGR 66G ... 1C E

SGR 66G ... 1A E

Contact data

Contact material	AgCdO
Type of contact	Single contact
Rated switching capacity	250 VAC 5A AC1 1250 VA (AK) 250 VAC 3A AC1 750 VA (RK)
Max. switching voltage	250 VAC / 30 VDC
Electrical life	approx. 100.000 operations 250 VAC 5 A
Contact resistance	100 mΩ

Coil data

Nominal voltages	3-5-6-9-12-18-24 VDC
Pick-up voltage	approx. 0,75 x Nominal voltage (at 20 °C)
Power consumption	typically 200 mW

Options

Sealed IP 67

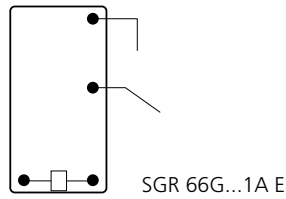
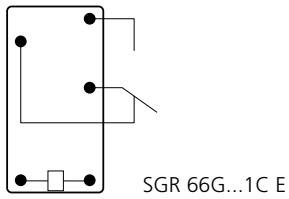
SGR 66G V

General data

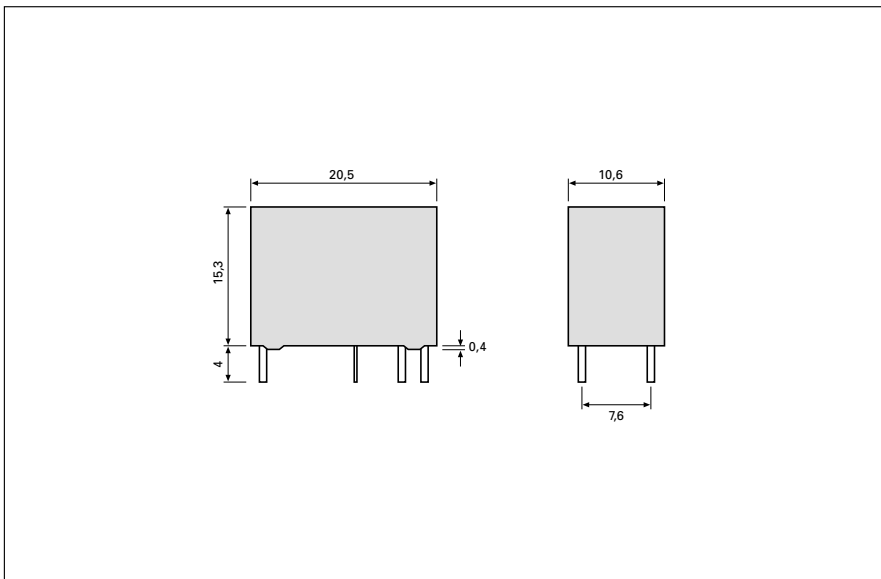
Mechanical life	10 x 10 ⁶ Operations
Operate time	typically 8 ms
Release time	typically 5 ms
Bounce time	typically 5 ms
Vibration resistance	10 g (10-55 Hz)
Test voltage coil-contact	4.000 V _{eff}
Test voltage contact open	1.000 V _{eff}
Weight	7 g
Ambient temperature	-40°C - +70°C
Temperature of soldering bath	260°C / 5 s

Diagrams

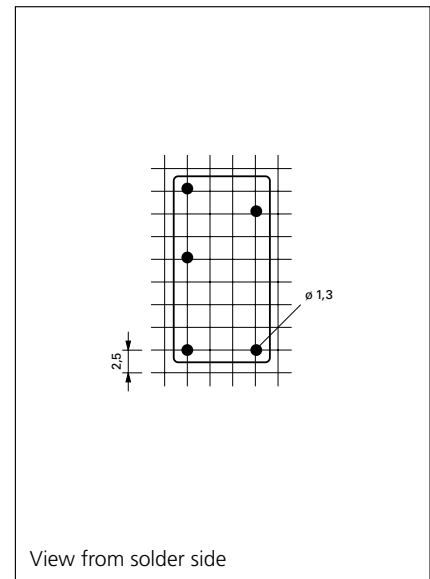
View from above



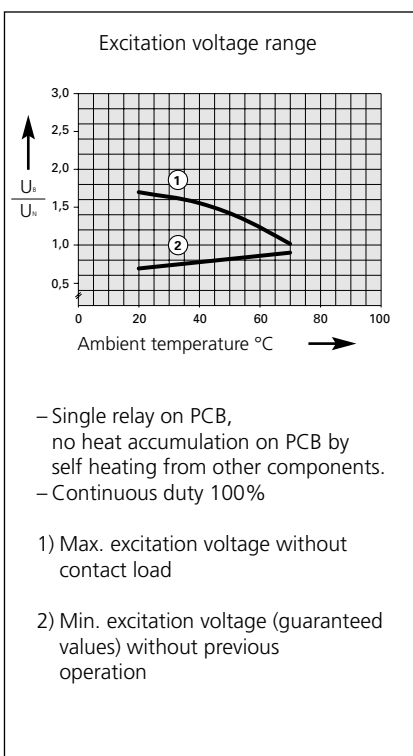
Dimensions drawing (mm)



Drilling pattern (mm)



Coil data



Standard coil for direct current (other voltages on request)

Nominal spannung VDC	Min. pick-up voltage at 20°C	Drop-out spannung at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
3	2,25	0,15	66,67	45	10
5	3,75	0,25	40,00	125	10
6	4,50	0,30	33,33	180	10
9	6,75	0,45	22,50	400	10
12	9,00	0,60	16,67	720	10
18	13,50	0,90	11,25	1.600	10
24	18,00	1,20	8,57	2.800	10



SGR-PCB RELAYS 6GH

No. of contacts: **1 CO or 1 NO**
 Rated current: **10 A**
 Inrush current: **15 A**

Order description

SGR 6GH ... 1C
 SGR 6GH ... 1A ASO

Contact data

Contact material	AgCdO
Type of contact	Single contact
Rated switching capacity	250 VAC 7A AC1 1750 VA (1C) 250 VAC 10A AC1 2500 VA (1A)
Max. switching voltage	250 VAC / 24 VDC
Electrical life	approx. 100.000 operations
Contact resistance	100 mΩ

Coil data

Nominal voltages	5-6-9-12-18-24-48 VDC
Pick-up voltage	approx. 0,75 x Nominal voltage (at 20 °C)
Power consumption	typically 360 mW (48VDC: 510 mW)

Options

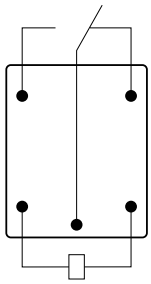
Contact material AgSnO₂
 SGR 6GH ... 1A ASO
 Sealed IP 67
 SGR 6GH V

General data

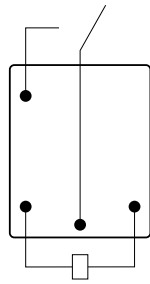
Mechanical life	10 x 10 ⁶ Operations
Operate time	typically 10 ms
Release time	typically 5 ms
Bounce time	typically 5 ms
Vibration resistance	10 g (10-55 Hz)
Test voltage coil-contact	1.500 V _{eff}
Test voltage contact open	750 V _{eff}
Weight	approx. 10 g
Ambient temperature	-40°C - +70°C
Temperature of soldering bath	260°C / 5 s

Diagrams

View from above

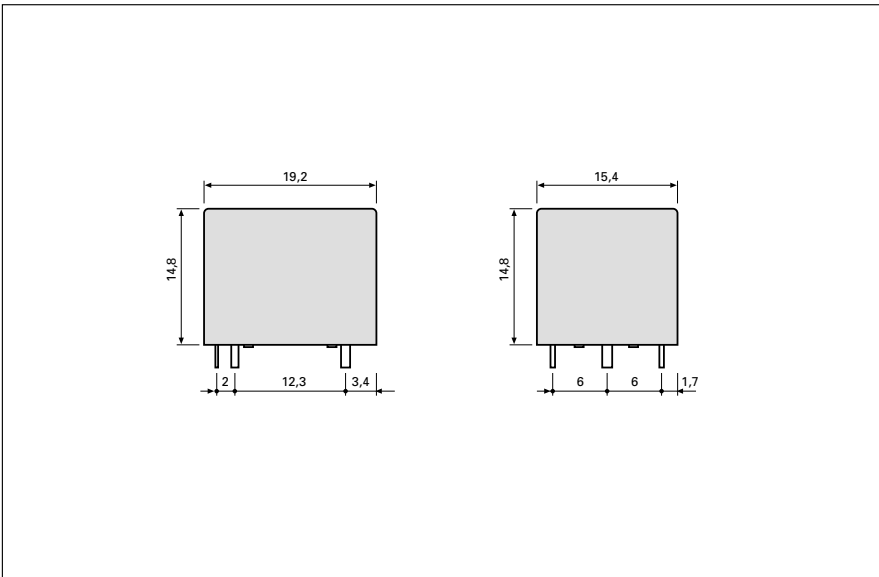


SGR 6GH...1C

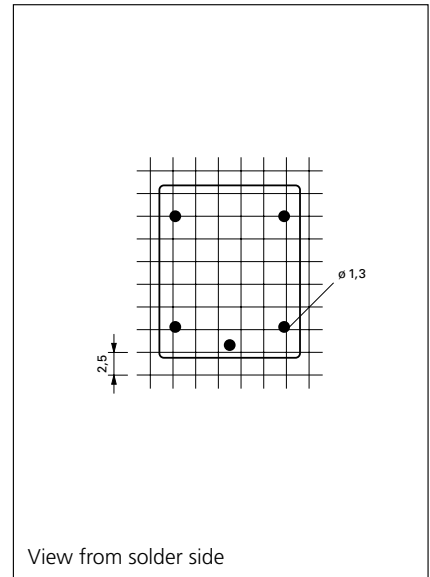


SGR 6GH...1A ASO

Dimensions drawing (mm)

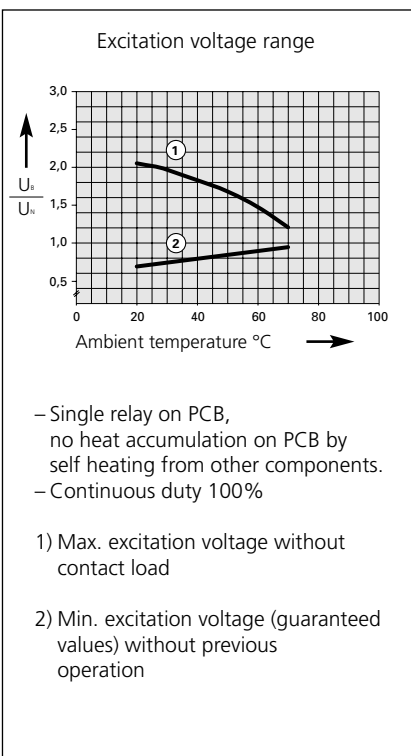


Drilling pattern (mm)



View from solder side

Coil data

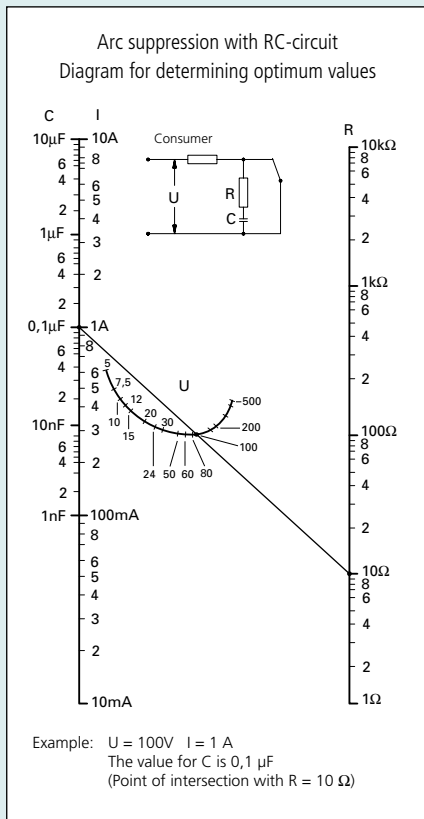
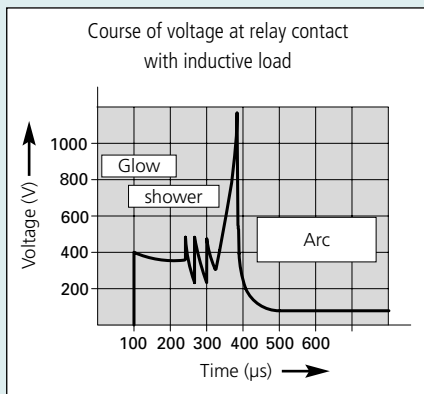


Standard coil for direct current (other voltages on request)

Nominal spannung VDC	Min. pick-up voltage at 20°C	Drop-out spannung at 20°C	Nominal current mA	Resistance Ohm at 20°C	Tolerance %
5	3,75	0,50	71,43	70	10
6	4,50	0,60	60,00	100	10
9	6,75	0,90	40,00	225	10
12	9,00	1,20	30,00	400	10
18	13,50	1,80	20,00	900	10
24	18,00	2,40	15,00	1.600	10
48	36,00	4,80	10,67	4.500	10

Arc extinguishing, arc suppression

If the upper limit of the arcing voltage – which depends on the switching current and contact material – is exceeded, the relay contact discharges current, leading to material degradation in the contacts. To ensure that contacts perform reliably over a long service life despite this unfavourable phenomenon, circuitry must be designed to include measures to suppress arcing for a given load.



Arc suppression realised with	Resistor	Varistor	RC-circuit
Diagram			
Course of current at load			
Course of voltage at load			
Course of voltage at switch			
Advantages		Relatively short release delay	Small overvoltage short release delay
Disadvantages	Relatively long release delay	Not for all applications	

Arc suppression realised with	Diode	Diode + resistor	Diode + Zener diode
Diagram			
Course of current at load			
Course of voltage at load			
Course of voltage at switch			
Advantages	Small overvoltage	Overvoltage and release delay depends on R	Small overvoltage, short release delay
Disadvantages	Release delay very long	Release delay long	

Approvals

Approvals are copyright protected marks of institutes charged with testing components. Once a product or process has been awarded the approval after testing and evaluation, the manufacturer may affix the corresponding certificate of approval to his product or facility.

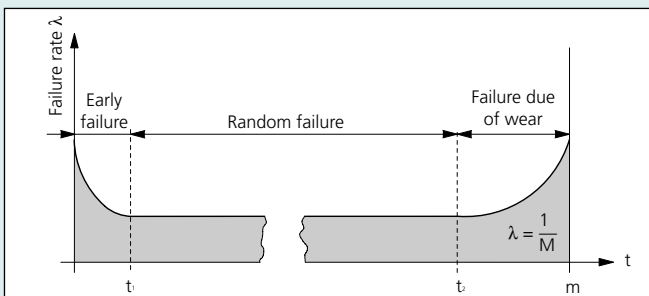
Automated soldering line proof

Automated soldering line proof relays are suitable for both automated and hand soldering. However, in flux and rinsing processes, the relays may not be immersed. Caution is also in order when cleaning agents are used. Here residue may damage the relays. These relays are often called „dust-proof“.

Bathtub curve

Common term for the curve that describes the expected failure rate of electronics with time. Initially high, it drops to near 0 for the majority of the system's lifetime and rises again as it wears out.

- Early failure:** Here the failure rate has a distinctly declining tendency.
- Random failure:** Within this range, the failure rate is constant; this range is generally described as its „service life“.
- Failure due to wear:** Here the failure rate increases as the component and material age.



Bounce

Bouncing occurs primarily when an electromechanical contact closes and the kinetic energy stored in the moving part of the contact is released, causing the part to bounce back and sever the contact. Usually this process, which is often called chatter, is repeated several times

at briefer intervals as the bouncing distance decreases. The subsequent contact tremor (oscillating contact force) is not considered as part of the bouncing process – it is actually part of the „dynamic contact resistance“ or decay phase

Bounce time

According to DIN 41215, bounce time is the time elapsed between the first to the last opening or closure (make or break) of a relay contact when a relay is switching from one status to the other. The pick-up and drop off phases are not included in the bounce time.

Burnoff

Burnoff is material degradation induced by switching contact arcing.

Constant current

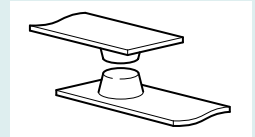
The value of the current which can be continuously applied to the relay contacts within the permissible temperature rise limit.

Contact type

– by type

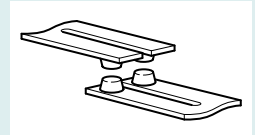
Single-Pole Single Throw

Switch with only one moving and one stationary contact. With this type of relay contact, a single pole contact is responsible for establishing electrical contact.



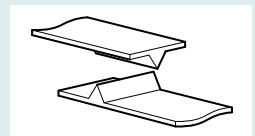
Double Pole Single Throw

A double pole consists of two contacts that operate in parallel. This enhances the contact reliability and is primarily used to switch low current and voltage circuits (dry circuits)



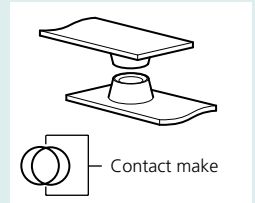
Cross contact

These rail-shaped contacts are perpendicular to each other – i.e. at a 90° angle – to form a cross.



Crown contact

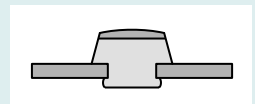
The ring of this type of contact closes at two slightly offset points. Through a relatively high amount of pressure on these points, the contact force is able to penetrate dust and debris. The contact is self-cleaning.



– by type of manufacture

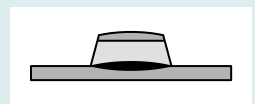
Riveted contact

The contact terminal is riveted to the contact carrier.



Welded contact

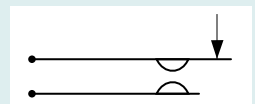
The contact terminal is welded to the contact carrier.



– by function (basic forms)

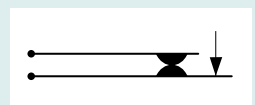
Normally open contact (N.O.)

The condition of this type of contact in its normal (unenergised) state. When the contact is energised, the circuit is opened.



Normally closed contact (N.C.)

The condition of this type of contact in its normal (unenergised) state. When the contact is energised, the circuit is closed.



Change-over contact

A switching contact whereby the normally closed contact breaks before the normally open contact makes.



Contact force

Contact force is the force that the contact components exert on each other in a closed state.

Contact springs

The majority of relays feature contact springs. These are subjected to mechanical, thermal and electric loads. It is essential that heat generated by flowing current and arcing does not unduly influence the performance of the spring.

Contact materials

Material	Description	Density [g/cm ³]	Melting point [°C]	Boiling point [°C]	Hardness		thermal conductance at 20°C [W/(K x m)]	electrical conductance [m/(Ω x mm ²)]	specific electrical resistance [(Ω x mm ²)/m]
					soft [HV]	hard [HV]			
AgNi0,15	Fine silver	10,5	960	2200	55	100	415	58	0,017
AgCuNi	Hard silver (Argodur)	10,4	940	2200	70	115	385	52	0,019
AgCu3	Hard silver	10,4	900- 938	2200	80	160	372	47,6 (soft) 43,4	0,021 (soft) 0,023
AgCd010	Silver cadmium oxide	10,2	961	2200 Ag-share	70	110	307	48	0,021
AgSnO ₂ 10P	Silver tin oxide	9,9	961	2200 Ag-share	70	110	*	49	0,020
W	Tungsten	19,3	3410	5930	—	—	130	18,18	0,055
Au...	Gold plating	*	*	*	*	*	*	*	*
AgNi10	Silver nickel 10	10,3	961	2200 Ag-share	50	90	350	54	0,018

Drop out current

Drop current is a peak current that flows through a relay and coil to de-energise it and break the circuit.

Electrical service life

The life of a relay when it is switched at the rated operating conditions (maximum switching frequency, contact resistance, make and break values, insulation resistance etc.) with the rated load applied to its contacts at a performance probability of 95%.

Creeping and leakage distance

Creeping and leakage distances are safety spaces or margins between all of the current carrying components as well as between current carrying and non-current carrying grounded components. These are generally defined as follows:

Leakage distance is the shortest direct distance between two points – i.e. the air gap.

Creeping distance is the shortest distance between two points along the surface of an insulation material. This distance between two points can be increased by incorporating channels or grooves in the design.

Electric strength

Electric strength or voltage stability describes the voltage which can be routed to two electrodes that are insulated from one another without causing a discharge.

Voltage stability depends on the following factors:

- Thickness and purity of the insulation material
- Loss angle of the insulation material
- Temperature and duration of the effect
- Humidity
- Array of the electrodes

Forcibly guided contacts

Contacts can be guided forcibly when they are connected mechanically so that the make and break contacts cannot be closed at the same time. For this type of setup, that contacts maintain a distance of at least 0.5 mm over the entire service life, even under flawed operating conditions.

Gold flashing

Gold flashing does not fully cover the contact (layer thickness less than 0.5 μm) and serves to protect a contact during storage. The layer is porous and thus the protective benefits of gold flashing is controversial. Gold flashing is irrelevant to the switching performance of a relay.

Hard gold plating

Hard gold plating is a layer that covers the basic material of a contact fully in a thickness of 2μm (4 – 6μm at ELESTA). It prevents corrosion of a contact and is used for switching small loads (dry circuits) where no or minimal arcing occurs.

Immersion proof / sealed

Immersion proof relays can be subjected to a rinsing process. In compliance with the manufacturer's stipulations, no cleaning agents may penetrate to the interior of the relay. Immersion proof relays also provide good protection against dust, particles and waste gas penetration.

Inrush current

The peak value of a current which a load requires when first being energised. It is essential to take the intensity and duration of inrush current into account for certain types of loads when capacitors or lamps be installed in the circuit. These will draw a substantially larger initial current than carry current.

Insulation resistance

Insulation resistance is the smallest amount of resistance offered by an insulating material. It is measured at 500V between insulated parts via ohm meter or galvanometer. If the contacts feature substantially better insulation from the coil or a grounded non-current-carrying part, then this is annotated in the relay table.

Load ratings

Relay contacts are generally rated for five different loads, which are listed under items a) through e).

The load rating g) is reserved for contactors. For the load rating f), there is no clear-cut dividing line between a relay and a contactor; in other words, the value is not defined exactly.

The following table defines the voltage and current limits for these seven load range ratings. In this case, the current values apply to the contact load on make and break rather than the thermal limiting value.

- a) Dry circuits
- b) Low level circuits
- c) Minimum current circuits (short arcs may occur here)
- d) Intermediate level circuits
- e) High level circuits (stable arcs are typical here)
- f) Low power contacts
- g) Power contacts

	Area of stable arcs		Area of short arcs		Upper limit is the melting voltage U_s	Upper limit is the softening voltage U_e
	$U > 300$ $< 1kV$	$U > 10V$ $< 300V$	$U < 10V$	$U < 10V$	$U < 300mV$	$U < 100mV$
$I < 10mA$					b	a
$I < 100mA$				c		
$I < 300mA$			d*			
$I < 10A$			e			
$I < 50A$		f				
$I > 50A$	g					

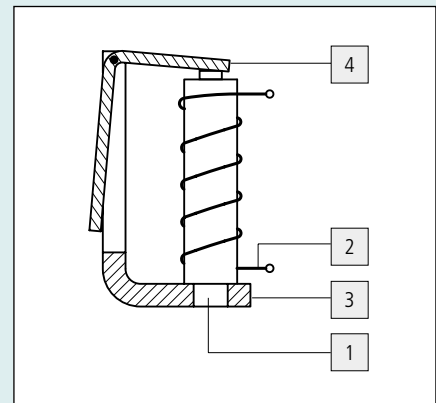
* $I = 50$ to 400 mA, $U = 28$ V direct current

Magnet system

A magnet system comprises all parts of a magnetic circuit that have a function in determining its flow.

It consists of a:

- 1) Coil core
- 2) Coil
- 3) Yoke
- 4) Actuator arm



Mechanical service life

The life of a relay in terms of its mechanical functions when it is operated at room temperature and at the maximum mechanical operating frequency without applying a load to its contacts while all specifications and operating prerequisites are met.

Monostable relays

A monostable relay is a two position relay. If it is equipped with a change over contact, the NC spring is closed in the unenergised state.

Mounting position

This describes the position that a relay must be mounted in to ensure flawless operation. All ELESTA relays can be mounted in any position.

Nominal value (nominal voltage, nominal current, nominal energising (make or break), nominal power)

Other relay-related specifications are assigned to the nominal value. For example, rise time is indicated for the nominal voltage rather than the pick-up voltage (make or break voltage). Generally, the nominal value is equivalent to the operating value. The effective values hold true for alternating voltage.

Operating voltage

The guaranteed range of input voltage in which a relay is designed to operate flawlessly.

The specification for the operating voltage normally refers to a temperature of 20°. Usually, it is depicted in a diagram as a nominal value with a maximum and minimum tolerance between the nominal coil voltage and the actual energising voltage. The value varies depending on the ambient temperature of the relay.

– Example:

Relay SGR 282 24 V DC

Ambient temperature $T = 40^{\circ}\text{C}$

Nominal coil voltage $U_N = 24\text{ V DC}$

To find out the maximum operating voltage $U_{B\text{max}}$ and the minimum operating voltage $U_{B\text{min}}$.

– Solution:

Based on the SGR 282 diagram, the following minimal and maximum operating voltages can be calculated:

$$U_{B\text{min}} = U_N \times (U_B/U_N)$$

$$U_{B\text{max}} = U_N \times (U_B/U_N)$$

Locate the abscissa value 40°C and from it, follow a vertical line until it intersects with the lower curve (2). The corresponding ordinate value is $U_B/U_N = 0.8$.

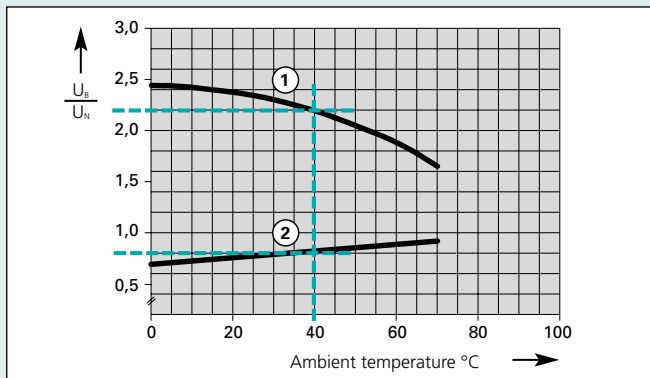
Multiply this value by the nominal voltage:

$$U_{B\text{min}} = 24\text{ V} \times 0.8 = 19.2\text{ V}$$

Locate the abscissa value 40°C and from it, follow a vertical line until it intersects with the upper curve (1). The corresponding ordinate value is $U_B/U_N = 2.2$.

Multiply this value by the nominal voltage:

$$U_{B\text{max}} = 24\text{ V} \times 2.2 = 52.8\text{ V}$$



Pick-up delay

Delay on make or break, wiper impulses, signalling functions and other impulse generators are often implemented via a timing function which delays the ON event upon initial application of power to the electronic timing device. Either the functions are integrated in the relay as a single component (timer relay) or as combination module featuring a relay and socket (time delay module STM).

Pick-up voltage

Lowest possible exciting voltage that will energise a relay. The specification for the pick-up voltage normally refers to a temperature of 20°C .

Protection according to DIN 40050 and IEC 144:

Parts must be encapsulated to protect people from being exposed to electrically charged components and electrical equipment from penetration by solids and water. The crucial degrees of protection are listed in the following table. These specifications do not indicate by what measure a component is gas-tight in terms of mechanical or thermal usage.

Protection classes

Diverse types of options are available to protect against shock-hazard voltages when using electrical devices. These options are grouped in protection classes. Devices rated at Protection Class 0 and 0I are not approved for use in Germany.

Protection Class I: Here shock-hazard protection is not just a matter of basic insulation. It stipulates an additional protective measure in which exposed, touchable components are connected to the ground of the hard-wired circuitry. If the basic insulation should fail, the parts are not subjected to dangerous electrical charges.

Protection Class II: Here shock-hazard protection is not just a matter of basic insulation, but also of an additional protective measure featuring double or reinforced insulation. This class does not stipulate a ground circuit, nor does it presume any other safety preconditions.

Protection Class III: Here protection against electrical shock is facilitated through safe extra-low voltage. Devices rated in this class do not generate voltages that exceed extra-low voltages.

Protective Separation

In industrial applications, the norms for control voltage circuits and circuits with 230 Volt mains power (Surge Voltage Category 3) call for a creeping and leakage distance of $\geq 5.5\text{ mm}$ between these circuits. In the market segments for office machines and household devices, the applicable standards dictate creeping and leakage distances of $\geq 8\text{ mm}$. For applications in explosion-proof rooms, $\geq 10\text{ mm}$ are mandatory. A creeping and leakage distance of $\geq 10\text{ mm}$ applies to the latest generation of relays that must comply with these norms. This stipulation inevitably influences the dimensions of the relays.

Pull in power

The pull in power describes the power in the coil to excite or energise a relay. The specification for the pull in power normally refers to a temperature of 20°C .

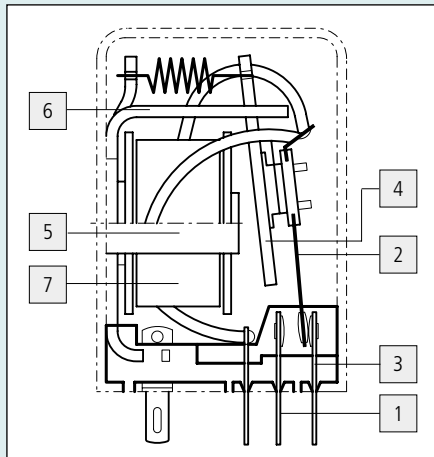
Remanence relays

These are relays that – due to the remanence of the iron core – remain actuated even when the requisite excitation does not take place or the energising level deviates substantially.

Relay design

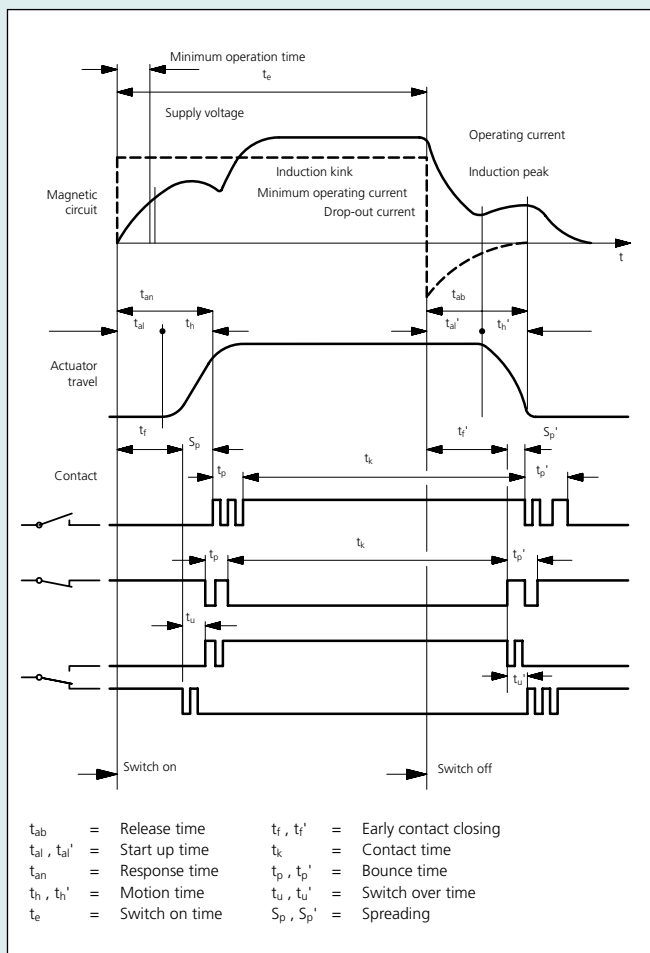
A relay is structured as follows:

- 1) Make contact (Normally open contact)
- 2) Break before make contact (Change-over contact)
- 3) Break contact (Normally closed contact)
- 4) Actuator arm
- 5) Coil core
- 6) Yoke
- 7) Relay coil



Relay times

Relay times describe the duration of a switching operation and depend on the type of relay. Generally, these values are specified as electrical and mechanical time constants at a given excitation.



Safety relays

Safety relays must meet special safety stipulations, for example in controls for power-driven presses (ZH1/457). Here forcibly guided contacts and a minimum distance of 0.5 mm between contacts are mandatory in case of failure or defects.

Sensitive coil

A sensitive coil is a relay coil that – in comparison to a standard coil in a relay component series – consumes less electrical power.

Shock resistance

Shock resistance describes an acceleration in g, the duration of which is stipulated in IEC 68-2-27 or NARM Std. RS401-A. The contact may not be interrupted for longer than 10 μ s, nor may any damage occur.

Soldering guidelines

All print relays and sockets are suitable for automated soldering lines. The temperature of soldering baths may not exceed 270 °C. The component may be immersed in a soldering bath for no longer than 5 seconds. To protect the environment, soldering materials that do not require rinsing should be used. Caution is in order when using watery solutions – if the relays are submerged in the solution, liquid can penetrate the relays and damage these.

Switching capacity as determined by current and voltage

The on and off spikes – also called peaks or surges – are primarily of interest in opening and closing electrical contacts. When an inductive electrical circuit is opened, often a substantially higher voltage than the one produced by the source of the current must be switched off. Conversely, often when capacitive circuit are closed, spikes occur that may destroy other components as well as arc weld the contacts.

Switching capacity as determined by current and voltage

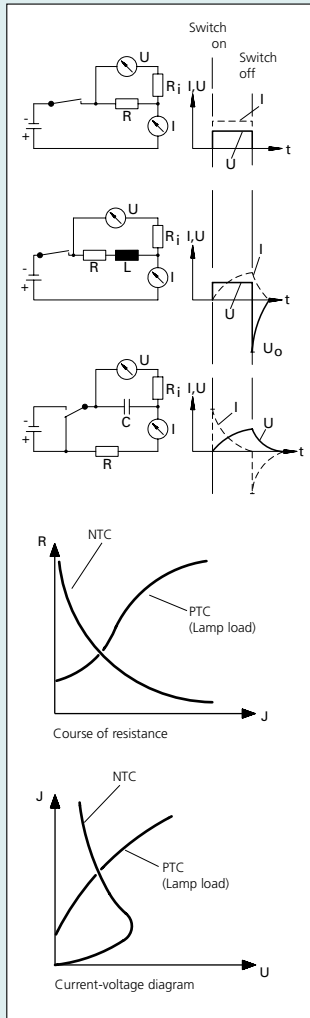
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a) For resistive loads (Resistance R): Current I and Voltage U immediately rise to operating level when the circuit is switched on and immediately fall when it is switched off.

b) For inductive loads (Inductivity L): The current $1 - \exp(-Rt/L)$ rises proportionally to the operating level and falls exponentially when the circuit is switched off. The voltage immediately rises to operating level and when the circuit is switched off, surges in the opposite direction and falls exponentially.

c) For capacitive loads (Capacitive C): A spike with exponential fall is generated when the circuit is switched on and off. When the circuit is closed, the spike only occurs when the capacitive circuit is unloaded. The voltage responds in a similar manner to the current in an inductive circuit.

d) and e) Thermistor lamp load: In a circuit equipped with thermistors that feature opposite attributes, in many cases the inrush current can be compensated.



Posistor lamp load: High inrush current occurs when posistors (iron-hydrogen resistor, heating coils, e.g. made of tungsten) of electrode tubes and resistance furnaces.

Sticking

Sticking in monostable relays means that the actuator armature does not return to the home position after the coil was excited. The reason for this can be either insufficient restoring force or a too great remanence in the iron core. This problem can be solved by installing a metal partition or dividing pin.

Time modules

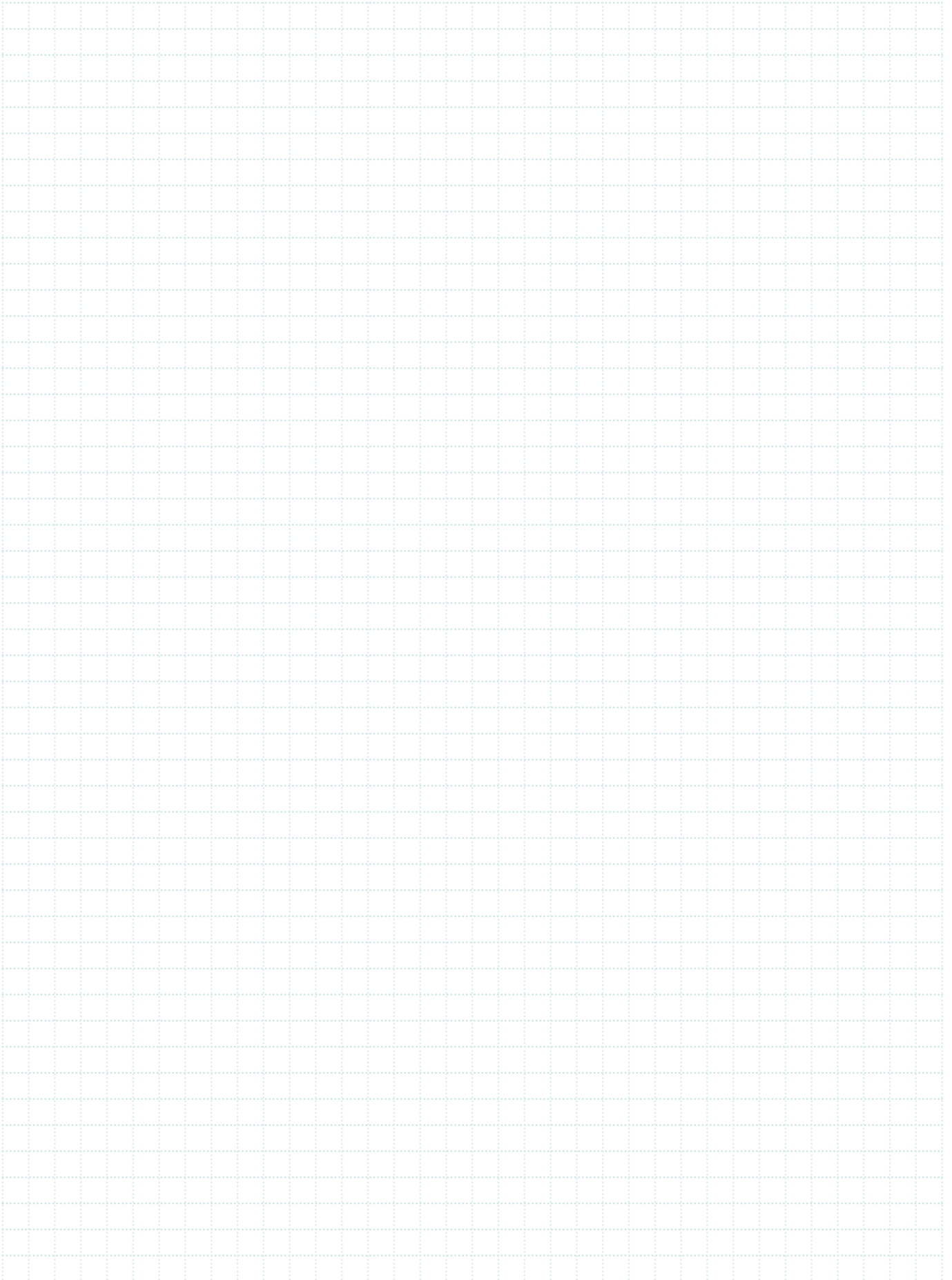
Time modules are programmable time components (STM), which in conjunction with an SKR 115 industry relay, execute simple time-based functions (e.g. flashing, make delays etc.).

Vibration resistance

Vibration resistance describes the capability of a component to withstand a sine shaped acceleration of a defined extent in predetermined frequency range without changing the switching status (longer than 10 μ s) and suffering any damage (IEC 68). For example, the specification 10/2000 indicates that a device or component is resistant to this type of acceleration of 10 g up to a frequency of 2000 Hz.

Washproof

Washproof may only be subjected to rinsing processes provided special conditions are met, for example the SGR print relays equipped with O-rings for this purpose.



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