

Solid State Relays

Interface Relays



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Solid-state relays Terminal modules

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ABB Solid-state relays SIGMASWITCH®



Type Series R 100

General features

- Load side:
Thyristors for AC 3 + AC 4 up to 460 V AC and 10 A, AC 1 25 A with RC circuit and overvoltage protection
- Electrical isolation by means of inductive transformers between control and load circuit
- Instantaneous switch to prevent unwanted arcing-through of the thyristors
- Control circuit protected against reverse polarity
- Switch position indicator LED
- Screw mounting, snap-on mounting with adapter for 35 mm top-hat rail to EN DIN 50 022
- Integrated shock-hazard protection
- Electrical connection:
Screw or plug-in connection

Application

- Contactless and wear-free switching of ohmic and inductive AC and 3-phase loads

Type Series 111/311

General features

- Load side:
Single-phase devices:
Thyristors for AC 1 and AC 3 up to 660 V AC and 125 A, with or without internal RC circuit
3-phase devices:
Thyristors for AC 1 and AC 3 up to 530 V AC and 50 A, with internal RC circuit
- Electrical isolation by means of optocoupler between control circuit and load circuit
- Zero voltage switch, radio interference-suppressed
- Screw mounting, snap-on mounting with adapter for 35 mm top-hat rail to DIN EN 50 022
- Shock-hazard protection with additional terminal shroud
- Electrical connection:
Screw connection

Application

- Contactless and wear-free switching of AC and 3-phase loads up to cos PHI 0.5

Semiconductor three-phase contactors HDS

General features

- Load side:
HDS R2: Triacs for AC 1 / AC 3 up to 460 V AC and 3.4 A with internal overvoltage protection
HDS-50: Thyristors for AC 1 / AC 3 up to 530 V AC and 50 A, with internal RC circuit and overvoltage protection
- Electrical isolation by means of optocouplers between control circuit and load circuit
- Switch-position indication by LED
- Control circuit protected against reverse polarity
- Zero voltage switch, radio interference-suppressed
- Snap-on mounting for 35 mm top-hat rail to EN DIN 50 022
- Integrated shock-hazard protection
- Electrical connection: Screw connection
- **Integrated heat sink, ready-to-use**

Application

- Contactless and wear-free switching of ohmic and inductive AC and three-phase loads

SIGMASWITCH® Solid-state relays

Ordering details



R120/25

SST 072 98

Device series R 12x

Thyristor units for R loads and general loads $\cos. \varphi$ 0.5 - 1

- Modern connection system using box terminals
- LED status indicator

Type	Rated control circuit voltage U_c	Rated operating voltage U_e	Rated current I_e AC1	Order code	Price	Weight / piece kg	Pack. unit piece
R 120/25	3 ... 32 V DC	24 ... 280 V AC	25 A	1SAR 111 025 R 5102		0.090	1
R 122/50	4 ... 32 V DC	24 ... 660 V AC	50 A	1SAR 111 050 R 5107		0.090	1
R 122/90	4 ... 32 V DC	48 ... 660 V AC	90 A	1SAR 111 090 R 5107		0.090	1
R 122/125	4 ... 32 V DC	48 ... 660 V AC	125 A	1SAR 111 125 R 5107		0.090	1

Accessories for thyristor unit R 12x

Type	Order code	Price	Weight / piece kg	Pack. unit piece
Heat sink KK-120-1.4, 1.4 K/W ① ②	1SAR 118 014 R 0000		0.470	1

① Use heat transfer compound when mounting solid-state relays!

② Suitable for butt mounting, with clip for top-hat rail mounting



RD112

SST 560 92

Device Series Rdxxx; DC switches

Type	Rated control circuit voltage U_c	Rated operating voltage U_e max	Rated current I_e DC1	Order code	Price	Weight / piece kg	Pack. unit piece
RD 112	4 ... 32 V DC	100 V DC	12 A	1SAR 112 012 R 0210		0.100	1
RD 120	4 ... 32 V DC	100 V DC	20 A	1SAR 112 020 R 0210		0.100	1
RD 140	4 ... 32 V DC	100 V DC	40 A	1SAR 112 040 R 0210		0.100	1
RD 212	4 ... 32 V DC	200 V DC	12 A	1SAR 112 012 R 0211		0.100	1
RD 412	4 ... 32 V DC	400 V DC	12 A	1SAR 112 012 R 0212		0.100	1
RD 510	4 ... 32 V DC	500 V DC	10 A	1SAR 112 010 R 0213		0.100	1

SIGMASWITCH® Solid-state relays

Ordering details



R 111/25

SST 281 92 R



R 112/80

SST 004 96 R



R 1141

SST 280 92 R

Thyristor units for R loads and general loads (cos.φ 0.5-1).

with integrated RC circuit (R111/R115, R1041, R1042)

for ohmic and general loads with cos. φ 0.5 - 1

without integrated RC circuit (with increased surge current strength) R112 for ohmic loads

Type	Rated control circuit voltage U_c	Rated operating voltage U_e	Rated current I_e AC1	Order code	Price	Weight / piece kg	Packing unit piece
R 111/10	3... 32 V DC	24...280 V AC	10 A	GHV 111 0001 R 0001		0.100	1
R 111/25	3... 32 V DC	24...280 V AC	25 A	GHV 111 0001 R 0002		0.100	1
R 111/45	3... 32 V DC	24...280 V AC	50 A	GHV 111 0001 R 0003		0.100	1
R 111/08	3... 32 V DC	80...530 V AC	10 A	GHV 111 0002 R 0001		0.100	1
R 111/20	3... 32 V DC	80...530 V AC	25 A	GHV 111 0002 R 0003		0.100	1
R 111/40	3... 32 V DC	80...530 V AC	50 A	GHV 111 0002 R 0005		0.100	1
R 111/90	3... 32 V DC	80...530 V AC	90 A	GHV 111 0002 R 0006		0.200	1
R 111/120	3... 32 V DC	80...530 V AC	125 A	GHV 111 0002 R 0007		0.200	1
R 112/40	4... 32 V DC	80...660 V AC	50 A	GHV 112 0001 R 0003		0.100	1
R 112/80	4... 32 V DC	80...660 V AC	90 A	GHV 112 0001 R 0004		0.200	1
R 115/10	90...280 V AC	24...280 V AC	10 A	GHV 115 0001 R 0001		0.100	1
R 115/25	90...280 V AC	24...280 V AC	25 A	GHV 115 0001 R 0002		0.100	1
R 115/45	90...280 V AC	24...280 V AC	50 A	GHV 115 0001 R 0003		0.100	1
R 115/20	90...280 V AC	80...530 V AC	25 A	GHV 115 0002 R 0003		0.100	1
R 115/40	90...280 V AC	80...530 V AC	50 A	GHV 115 0002 R 0005		0.100	1

Triac units

R 1141	3... 32 V DC	24...280 V AC	10 A	GHV 114 0001 R 0001		0.100	1
R 1142	3... 32 V DC	24...280 V AC	25 A	GHV 114 0002 R 0001		0.100	1

Accessories for thyristor and triac units R111, R112, R115, R114.

Type	Order code	Price	Weight / piece kg	Packing unit piece
Quick-fastening plate	GHR 110 1105 R 0001		0.045	1
Terminal shroud	GHR 110 6605 P 0001		0.005	1
Heat sink with heat resistance 2.6 K/W ①	GHR 110 9401 P 0001		0.120	1
Heat sink with heat resistance 1.8 K/W ①	GHR 110 9401 P 0002		0.200	1
Heat sink with heat resistance 0.7 K/W ①	GHR 110 9404 P 0001		0.650	1
KK-R111-2.1 Heat sink 2.1 K/W ①②	GHR 110 9402 P 0001		0.290	1
KK-R111-1.5 Heat sink 1.5 K/W ①②	GHR 110 9405 P 0001		0.420	1
KK-R111-0.7 Heat sink 0.7 K/W ①②	GHR 110 9406 P 0001		1.020	1
KK-R111-0.5 Heat sink 0.5 K/W ①②	GHR 110 9407 P 0001		1.300	1
R 1591, protective circuit 230 V AC	GHR 159 0001 R 0002		0.020	1
R 1592, protective circuit 400 V AC	GHR 159 0002 R 0002		0.020	1
EMV - 100 EMC filter, single-phase	GHR 110 0000 R 0001		0.100	1
Heat-conductive foil TP01	GHR 110 9500 P 0001		0.001	1

① Use heat transfer compound when mounting solid-state relays!

② Suitable for butt mounting, with clip for top-hat rail mounting

SIGMASWITCH® Solid-state relays

Ordering details



Semiconductor types R100 / R300

Compact design with integrated heat sink, LED indication, integrated protective circuit
Mounting for DIN-rail or on mounting plate

Type	Rated control circuit voltage U_c	Rated operating voltage U_e	Rated current I_e AC1	Order code	Price	Weight / piece kg	Packing unit piece
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Semiconductor relay (triac), 1 phase, zero voltage switching, max. 12 A

R100.12	4-32 V DC	24-280 V AC	12 A	1SAR 114 012 R8202		0.250	1
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Semiconductor relay (thyristor), 1 phase, standard switching, max. 25 A R100.25 replace R102.43!

R100.25	4-32 V DC	48-660 V AC	25 A	1SAR 113 025 R8207		0.250	1
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Semiconductor relay (thyristor), 1 phase, zero voltage switching, max. 35 A, width: 45 mm

R100.35	4-32 V DC	48-660 V AC	35 A	1SAR 111 035 R8207		0.490	1
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"Self guard" Semiconductor relay (thyristor), with current monitor and indication for service, zero voltage switching, max. 35 A, width: 45 mm

R100.35 SG	4-32 V DC	48-660 V AC	35 A	1SAR 111 035 R9207		0.490	1
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Semiconductor relay (thyristor), 3 phase, zero voltage switching, max. 3 x 25 A, width: 90 mm

R300.25	4-32 V DC	48-660 V AC	3x25 A	1SAR 131 025 R8207		0.940	1
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HS 25	4 ... 32 V DC	12...280 V AC	25 A	GHV 111 0011 R 0002		0.260	1
HS 25	4 ... 32 V DC	45...530 V AC	25 A	GHV 111 0012 R 0003		0.260	1
HS 50	3 ... 32 V DC	80...530 V AC	50 A	GHV 111 0012 R 0005		0.520	1
HS 50-AC	90...280 V AC	80...530 V AC	50 A	GHV 115 0012 R 0005		0.520	1
HS 50-H	4 ... 32 V DC	80...660 V AC	50 A	GHV 112 0011 R 0003		0.520	1
HS 90/0.7	3 ... 32 V DC	80...530 V AC	90 A	GHV 111 0022 R 0006		1.120	1
HS 125/0.7	3 ... 32 V DC	80...530 V AC	125 A	GHV 111 0022 R 0007		1.120	1
HS 125/0.5	3 ... 32 V DC	80...530 V AC	125 A	GHV 111 0032 R 0007		1.400	1
HS 45	4 ... 32 V DC	48...660 V AC	45 A	1SAR 111 045 R 6107		0.260	1
HS 65	4 ... 32 V DC	48...660 V AC	65 A	1SAR 111 065 R 6107		0.260	1

HS 25 Compact semiconductor switch (25 A at 40 °C) with LED indicator for top-hat rail mounting

HS 50 Semiconductor relay, mounted ready-to-use on heat sink (1.5 K/W), complete with terminal shroud, thyristor and clip for top-hat rail mounting (28 A at 45 degrees C)

HS 90/0.7 Semiconductor relay, mounted ready-to-use on heat sink (0.7 K/W), complete with terminal shroud, varistor and clip for top-hat rail mounting (62 A at 45 degrees C)

HS 125/0.7 Semiconductor relay, mounted ready-to-use on heat sink (0.7 K/W), complete with terminal shroud, varistor and clip for top-hat rail mounting (62 A at 45 degrees C)

HS 125/0.5 Semiconductor relay, mounted ready-to-use on heat sink (0.5 K/W), complete with terminal shroud, varistor and clip for top-hat rail mounting (80 A at 45 degrees C)

HS 45 45 A at 25 degrees C ambient temperature, new design with status LED and box terminals

HS 65 65 A at 25 degrees C ambient temperature, new design with status LED and box terminals

SIGMASWITCH® Solid-state relays

Ordering details

Dimension diagrams



Thyristor units, 3-phase, for R loads (and general loads up to cos PHI 0.5 - 1)

R 311/20	3... 32 V DC	45 ... 530 V AC	25 A	GHV 311 0001 R 0001	0.450	1
R 311/40	3... 32 V DC	45 ... 530 V AC	50 A	GHV 311 0001 R 0002	0.450	1
R 315/40	90...280 V AC	45 ... 530 V AC	50 A	GHV 315 0001 R 0002	0.450	1

HDS semiconductor three-phase contactors (mounted ready-to-use, suitable for butt mounting)

HDS R2	17... 32 V DC	400 V AC	3.4 A	GHR 302 0004 R 0001	0.270	1
HDS-50	3... 32 V DC	45 ... 530 V AC	50 A	GHV 311 0011 R 0002	1.500	1
HDS-50-AC	90...280 V AC	45 ... 530 V AC	50 A	GHV 315 0011 R 0002	1.500	1

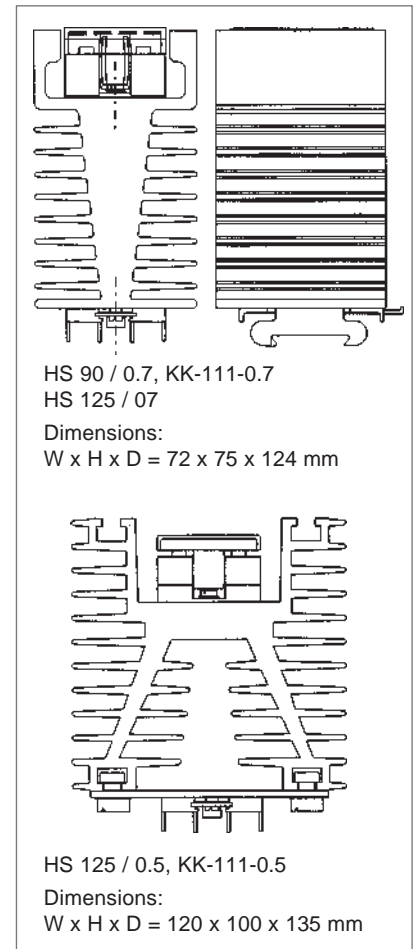
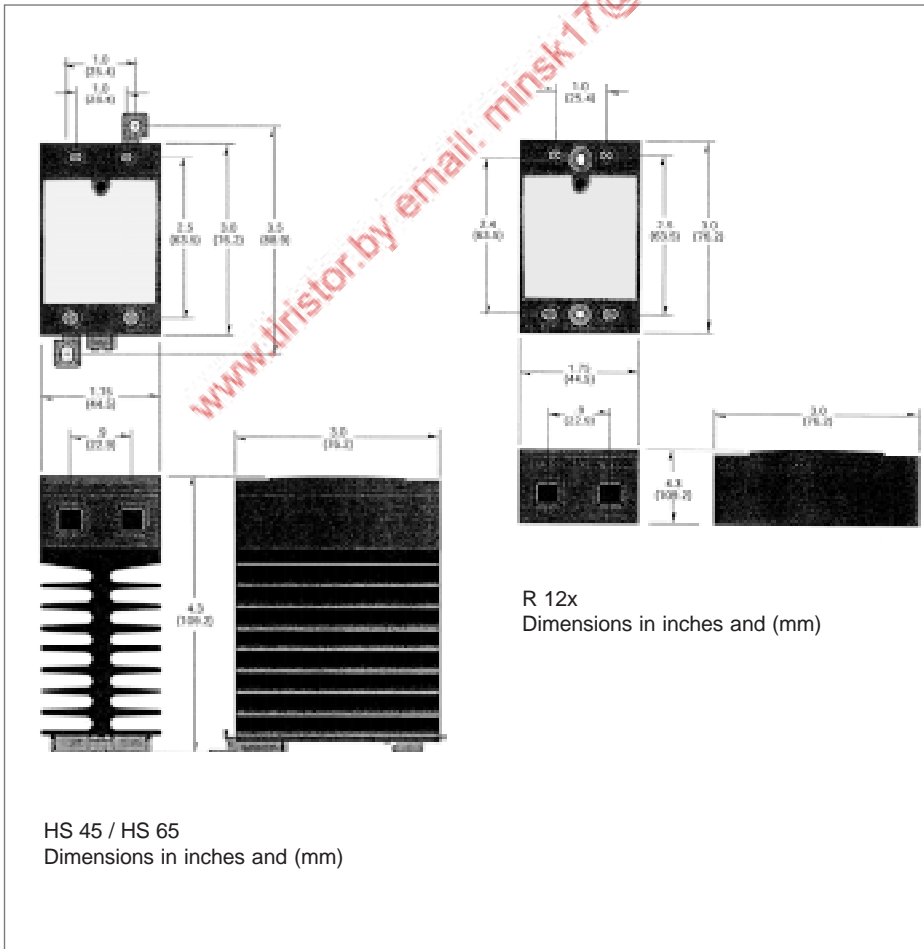
HDS-50 semiconductor relay R311/40, mounted ready-to-use on heat sink (0.8 K/W), complete with terminal shroud, varistors and clip for top-hat rail mounting (3 x 24 A at 45°C)

Accessories for 3-phase thyristor units R311

Type	Order code	Price	Weight / piece kg	Pack. unit piece
Quick-fixing plate	GHR 310 1105 R 0001		0.050	1
Terminal shroud	GHR 310 6605 P 0001		0.050	1
Heat sink with heat resistance 0.8 K/W ①	GHR 310 9401 P 0001		1.000	1
EMV - 300 EMC filter three-phase	GHR 310 0000 R 0001		0.100	1
Heat conductive foil TP03	GHR 310 9500 P 0001		0.005	1

① Use heat transfer compound when mounting solid-state relays!

Dimension diagrams



Solid-state relays, R 100/R 300

Technical data

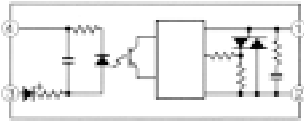
Output data	Unit	R100.12	R100.25	R100.35	R300.25
Contact element		TRIAC	Thyristoren	Thyristoren	Thyristoren
Operating voltage range U_e (V_{eff} max)	V AC	24-280	48-660	48-660	48-660
Periodic peak off-state voltage (V_{Spitze})	V ss	600	1200	1000 ¹⁾	1200
Thermal continuous current	A	12	25	35	3x 25
Operating frequency	Hz	47-80	47-80	47-80	47-80
Max. off-state leakage current (at V_{max} and $T=25^\circ\text{C}$)	mA	15	20	4	20 per phase
Minimal load current	mA eff	50	100	100	100 per phase
Max. surge current I_{TSM} ($t=20\text{ms}$)	A	100	750	750	500
Max. overcurrent ($t=1\text{s}$)	A	30	145	145	145
Max. load integral $\int i^2 dt$ ($t=10\text{ms}$)	A ² s	312	1250	1260	1260
Conducting-stage voltage at I_{max} and $T=25^\circ\text{C}$ (V_{peak})	V	1,6	1,6	1,6	1,6
Permissible rate of voltage rise du/dt $\cos \varphi$ (nullspannungsschaltend)	V/ μs	200	500	500	500
Thermal resistance			Quick-act. switching	>0,5-1	>0,5-1
Rth barrier junction/ambient air	$^\circ\text{C/W}$	4,9	2,5	3,78	1
Suppressor circuit (RC-filter, varistor)		yes	yes	yes	yes
Input data					
Control voltage	V DC	4-32	4-32	4-32	4-32
Conducting-stage voltage	V DC	1	1	1	1
Input impedance	k Ω	3	3	3	3
Input current max. (bei V_{max})	mA	12	12	12	10
Turn-on time	ms	0,5 max. period	<100 μs	0,5 max. period	0,5 max. period
Turn-off time	ms	0,5 max. period	0,5 max. period	0,5 max. period	0,5 max. period
General data					
Weight	g	250	250	490	940
Max. wire range					
Input terminals	mm ²	2	2	2	2
Output terminals	mm ²	2	2	5,6	2
Operating temperature range	$^\circ\text{C}$			-20 up to +80	
Storage temperature range	$^\circ\text{C}$			-40 up to +100	
Test voltage	V			4000	
Electric strength	V			2500	
Capacitance	pF			8	
Material casing base				Self-extinguishing (UL 94 V0) Aluminium	

1) Peak voltage 1200 V, relay protected up to 1100 V +/- 10 %

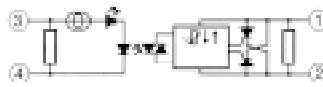
Solid-state relays, R 100/R 300

Technical data

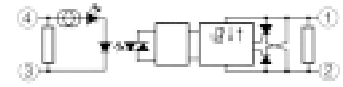
Block diagrams



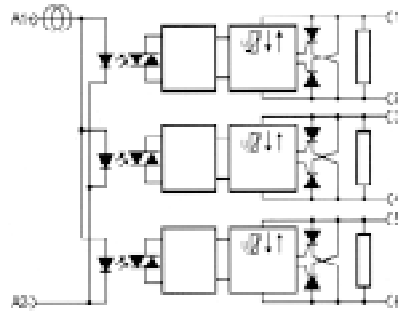
R100.12 (TRIAC)



R 100.35
(Thyristors, quick-action switching)

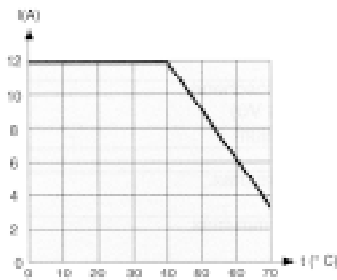


R 100.25
(Thyristors, no-voltage switching)

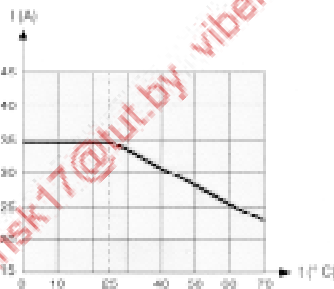


R 300.25
(Thyristors, no-voltage switching)

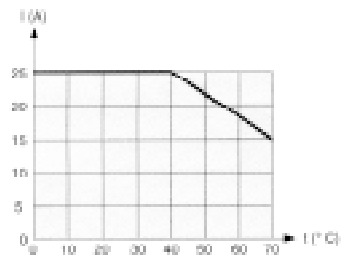
Reduction Curves



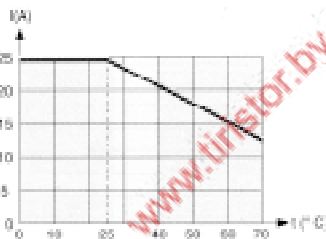
R 100.12 (TRIAC)



R 100.25

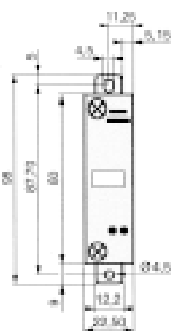


R 100.35-SG

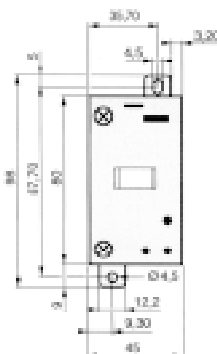


R 300.25

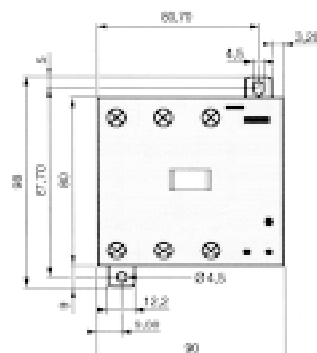
Dimension diagrams



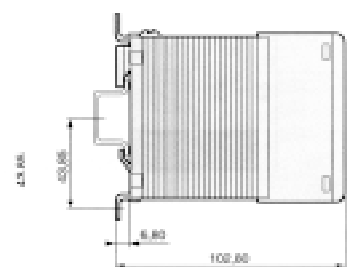
R 100.12
R 100.25



R 100.35-SG



R 300.25



R 100/R 300

Solid-state relays, R 111/115 / HS-50, R 12x, HS 25

Technical data

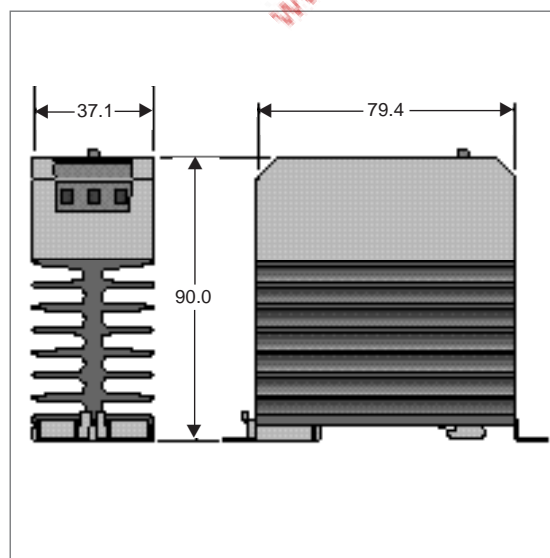
Dimension diagrams

Output data	Unit	HS 25	R111/10 R115/10	R111/25 R115/25	R111/45 R115/45	R111/08	R111/20 R115/20	R111/40 H S-50	R120/25	R122/50	R122/90	R122/125
Rated operating voltage U_o	V AC	230 / 240	230 / 240			400 / 480			230/240	600	600	600
Operating voltage range	V AC	12 ... 280	24 ... 280			80 ... 530			24 ...280	48 ...660	48 ...660	48 ...660
Periodic peak off-state voltage	V pp	600	650			1200			600	1200	1200	1200
Operating frequency	Hz	47 ... 63	47 ... 63			47 ... 63			47 ... 63	47 ... 63	47 ... 63	47 ... 63
Thermal cont. current I_o (AC 1)	A	30	10	25	50	10	25	50	25	50	90	125
Minimum load current	mA AC	150	40	40	40	40	40	40	15	15	15	15
Max. surge current I_{TSM} (t = 20 ms)	A AC	625 (16.6 ms)	160	250	600	160	250	600	250	625	1200	1200
Max. overcurrent (t = 1 s)	A AC		50	80	175	50	80	175	-	-	-	-
Max. voltage drop	V AC	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.6	1.6	1.6	1.6
Max. load integral $\int i^2 dt$ (t = 10 ms)	A ² s	1620 (8.3 ms)	130	310	1800	130	310	1800	260	1620	6000	12700
Leakage current in OFF state	mA	0.1	10	10	10	10	10	10	10	10	10	10
Perm. rate of voltage rise du/dt	V/μs	500	500	500	500	500	500	500	500	500	500	500
Perm. rate of current rise di/dt	A/μs	100	100	100	100	100	100	100	100	100	100	100
Thermal resistance	°C/W		2	1.25	0.65	2	1.25	0.65	1.02	0.63	0.29	0.22
Max. heat loss	W	48	16	40	80	16	40	80	-	-	-	-
RC circuit	Ω+μF		33+0.033			47+0.022						

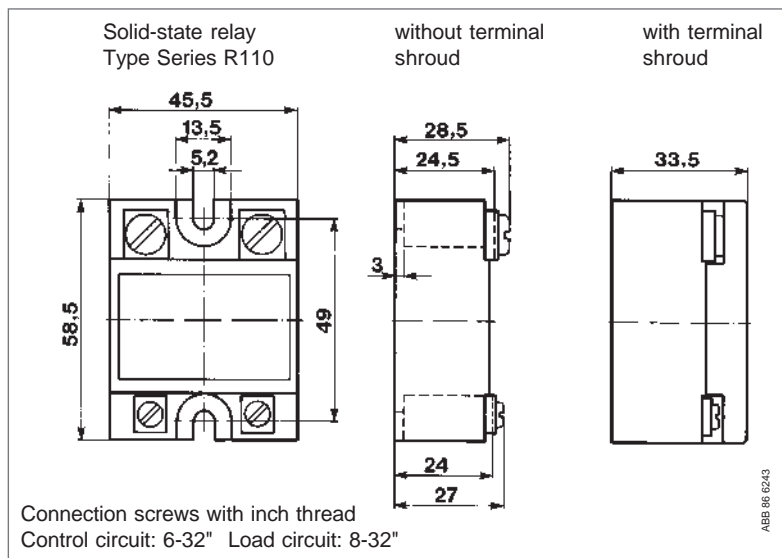
Input data		HS	Series R111	Series R115	Series R12x
Control voltage	V	4...32 V DC	3 ... 32 V DC	90 ... 280 V AC	3...32 V DC 4...32 V DC
Dielectric strength	V	-32 V DC	-32 V DC	310 V AC	-32 V AC
Minimum voltage for signal "1"	V	≥4 V DC	≥3 V DC	≥90 V AC	≥4 V DC
Max. voltage for signal "0"	V	≤1 V DC	≤1 V DC	≤10 V DC	≤1 V DC
Input impedance	kΩ		≥1.5	≥44	
Input current	mA	Typ. 5 mA (5 V DC)	≤3 mA (5 VDC) ≤16 mA (24 V AC)	≤3 mA (110 V AC) ≤6 mA (240 V AC)	Max. 30 mA Typical 17 mA
Turn-on time f = 50 Hz	ms		≤10	≤20	≤10
Turn-off time f = 50 Hz	ms		≤10	≤20	≤10
Test voltage	kV		4000 V		
Coupling capacitance I/O	pF		<8		<8
Creepage distance I/O	mm		>8		-
Ambient temperature range	°C		-30 ... +80		-40 ... +80
Storage temperature range	°C		-40 ... +100		-40 ... +80
Utilisation categories (DIN 40040)			Humidity: F	Shock and vibration: V	Climate: Z

Dimension diagrams (Dimensions in mm)

Dimension diagram HS-25



Dimension diagram R111 / R112 / R115 / R 100 / RDxxx



Solid-state relays

Type Series R 111 / R 112 / R 1100

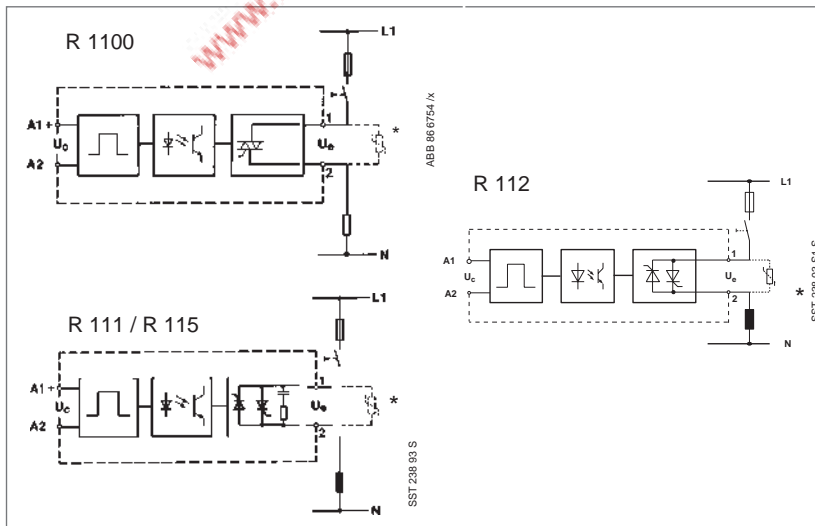
Technical data

Output data	Unit	R111/90	R111/120	R112/40	R112/80	R1141	R1142
Rated operating voltage U_o	V AC	400/480		530/600		230/ 240	
Operating voltage range	V AC	80...530		80...660		24...280	
Periodic peak off-state voltage	V _{pp}	1200		1200		650	
Operating frequency	Hz	47 - 63		47 - 63		47 - 63	
Thermal continuous current I_o (AC 1)	A	90	125	50	90	10	25
Minimum load current	mA AC	40	40	40	40	40	40
Max. surge current I_{TSM} (t = 20 ms)	A AC	1200	1750	625	1200	90	250
Max. overcurrent (t = 1 s)	A AC	360	360	175	360	30	80
Max. voltage drop	V AC	1.7	1.7	1.7	1.7	1.6	1.6
Max. load integral $\int i^2 dt$ (t = 10 ms)	A ² s	6000	12700	1620	6000	40	310
Leakage current in OFF state	mA	10	10	5	5	10	10
Permissible rate of voltage rise du/dt	V/μs	500	500	500	500	250	500
Permissible rate of current rise di/dt	A/μs	50	50	50	50	10	100
Thermal resistance	°C/W	0.28	0.25	0.63	0.28	2.1	1.40
Max. heat loss	W	98	160	55	98	16	40
RC circuit	Ω+μF	47 + 0.022	47 + 0.022	-	-	33 + 0.033	33 + 0.033

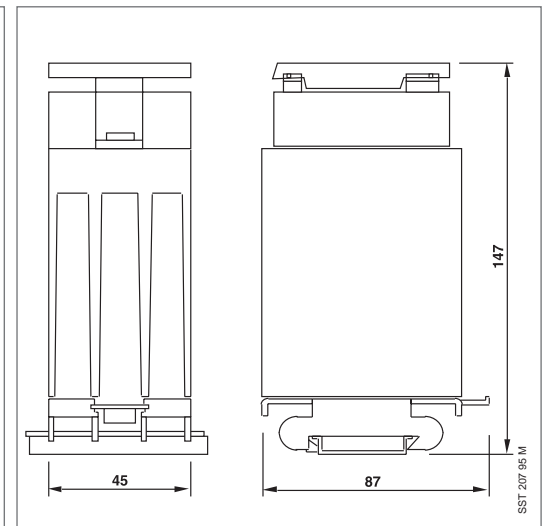
Input data				
Control voltage	V DC	3...32 V DC (R112: 4...32 V DC)		
Dielectric strength	V DC	-32 V DC		
Minimum voltage for signal "1"	V DC	≥3 V DC (R112: ≥24 V DC)		
Max. voltage for signal "0"	V DC	≤ 1 V DC		
Input impedance	kΩ	≥1.5		
Input current	mA	≤ 4 mA (5 V DC), ≤ 17 mA (24 V DC) (R112: ≤ 25 mA)		
Turn-on time f = 50 Hz	ms	≤ 10		
Turn-off time f = 50 Hz	ms	≤ 10		
Test voltage	kV	Input-output: 4; input-baseplate: 2.5; output baseplate: 2.5		
Coupling capacitance I/O	pF	< 8pF		
Creepage distance I/O	mm	> 8		
Ambient temperature range		-30...+ 80 °C		
Storage temperature range		-40...+ 100 °C		
Utilisation categories (DIN 40040)		Humidity: F,	Shock and vibration: V,	Climate: Z

Basic circuit diagrams R112, R111/115, R1100

Wiring diagram



Dimension diagram HS-50



* Recommended protective circuit in installations with high peak interference voltages (already integrated in the case of HS-50)

Heat sink GHR 110 9405 P 0001
Dimensions in mm

Solid-state relays, R 311, 3-phase

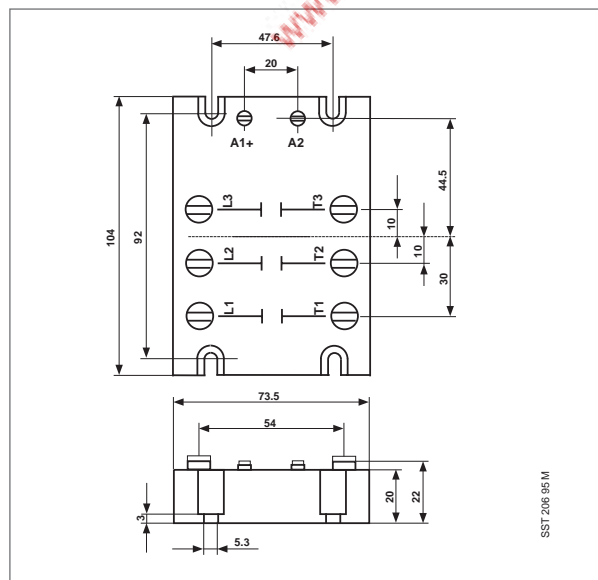
Semiconductor three-phase contactor HDS-50

Technical data

Output data	Unit	R 311/20	R 311/40 HDS-50	R 315/40 HDS-50-AC
Rated operating voltage U_e	V AC		400/480	
Operating voltage range	V AC		45 ... 530	
Periodic peak off-state voltage	V _{pp}		1200	
Operating frequency	Hz		25 - 65	
Thermal continuous current I_e (AC 1)	A	25	50	50
Minimum load current	mA AC	50	50	50
Max. surge current I_{TSM} (t = 20 ms)	A AC	300	500	500
Max. overcurrent (t = 1 s)	A AC	80	175	175
Max. voltage drop	V AC	1.6	1.6	1.6
Max. load integral $\int i^2 dt$ (t = 10 ms)	A ² s	450	1250	1250
Leakage current in OFF state	mA	10	10	10
Permissible rate of voltage rise du/dt	V/μs	500	500	500
Permissible rate of current rise di/dt	A/μs	50	50	50
Thermal resistance	°C/W	1.4	0.65	0.65
Max. heat loss	W	105	170	170
RC circuit	Ω+μF	47 + 0.022	47 + 0.022	47 + 0.022
Input data				
Control voltage	V DC	3 ... 32 V DC		90 ... 280 V AC
Dielectric strength	V DC	- 32 V DC		310 V AC
Minimum voltage for signal "1"	V DC	≥ 3 V DC		≥ 90 V AC
Max. voltage for signal "0"	V DC	≤ 1 V DC		≤ 10 V AC
Input impedance	kΩ	≥ 1.5		≥ 44
Input current	mA	≤ 4 mA (5 V DC), ≤ 17 mA (24 V DC)		≤ 3 mA (110 V AC), ≤ 6 mA (240 V AC)
Turn-on time f = 50 Hz	ms	≤ 10		≤ 20
Turn-off time f = 50 Hz	ms	≤ 10		≤ 20
Test voltage	kV	Input-output: 4; input-baseplate: 2.5; output baseplate: 2.5		
Coupling capacitance I/O	pF	< 8pF		
Creepage distance I/O	mm	> 8		
Ambient temperature range		- 30 ... + 80 °C		
Storage temperature range		- 40 ... + 100 °C		
Utilisation categories (DIN 40040)		Humidity: F,	Shock and vibration: V,	Climate: Z

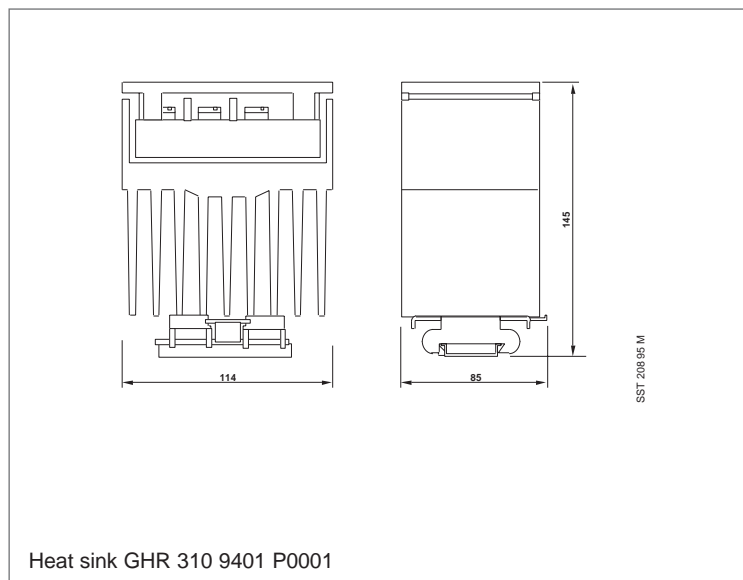
Dimension diagram R 311 /315

Dimensions in mm



Dimension diagram HDS-50 / HDS-50-AC

Dimensions in mm

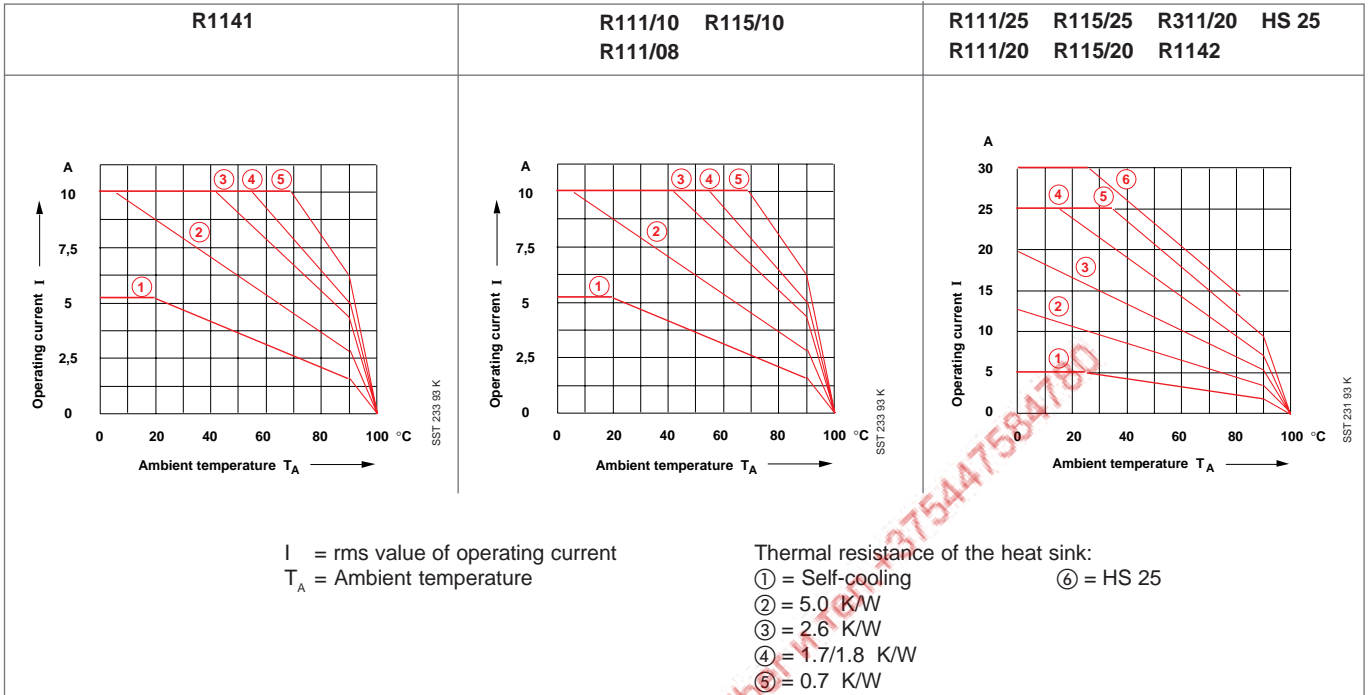


Heat sink GHR 310 9401 P0001

Solid-state relays

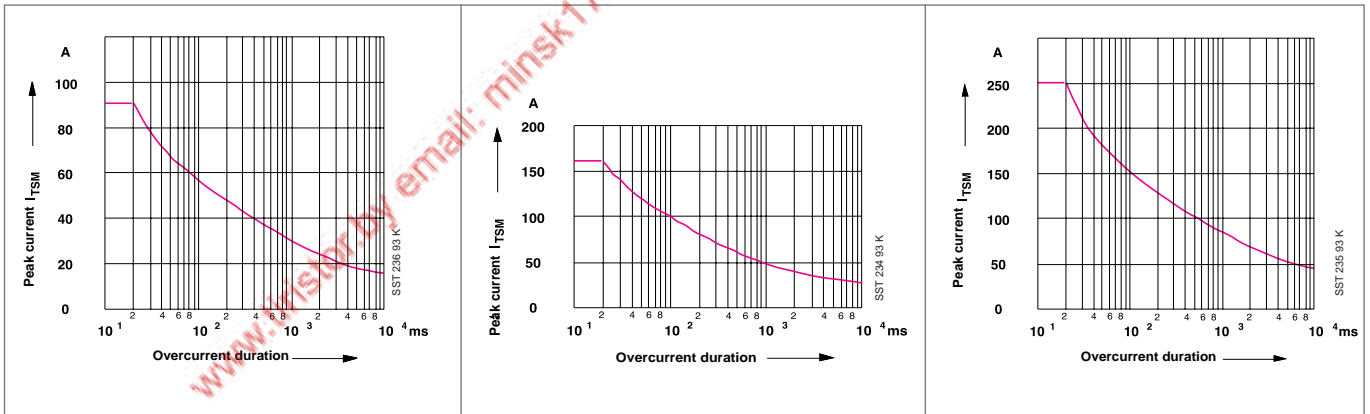
Derating curves, Limiting overload characteristics Dimension diagrams

Derating curves



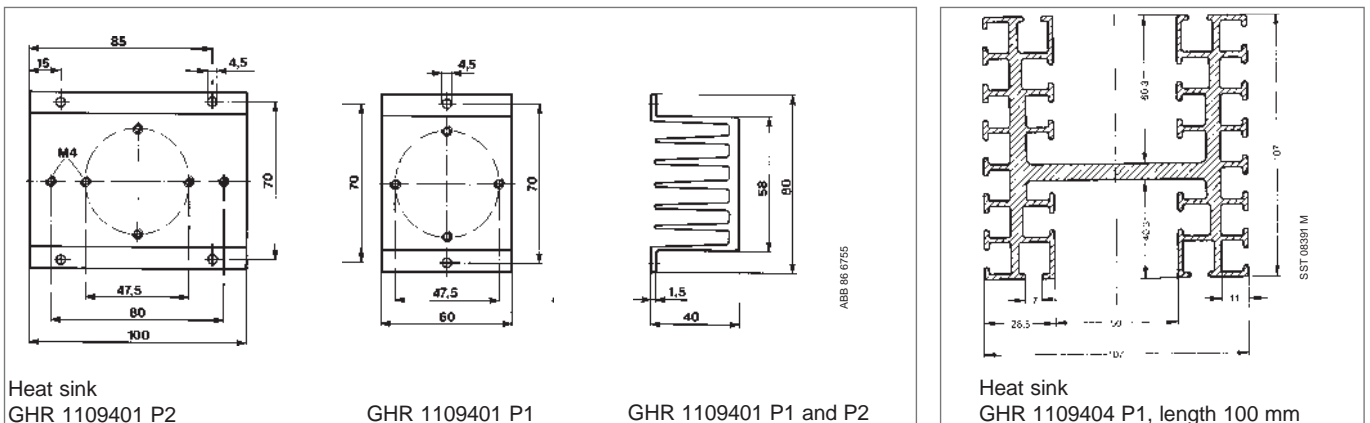
Limiting overload characteristics

A surge current near to the max. surge current influences the expected service life of the unit and is therefore permissible only in exceptional cases, e.g. in the event of a short-circuit or malfunction.
 Periodic surge currents may not exceed approx. 50 % of the max. surge current.



Dimension diagrams

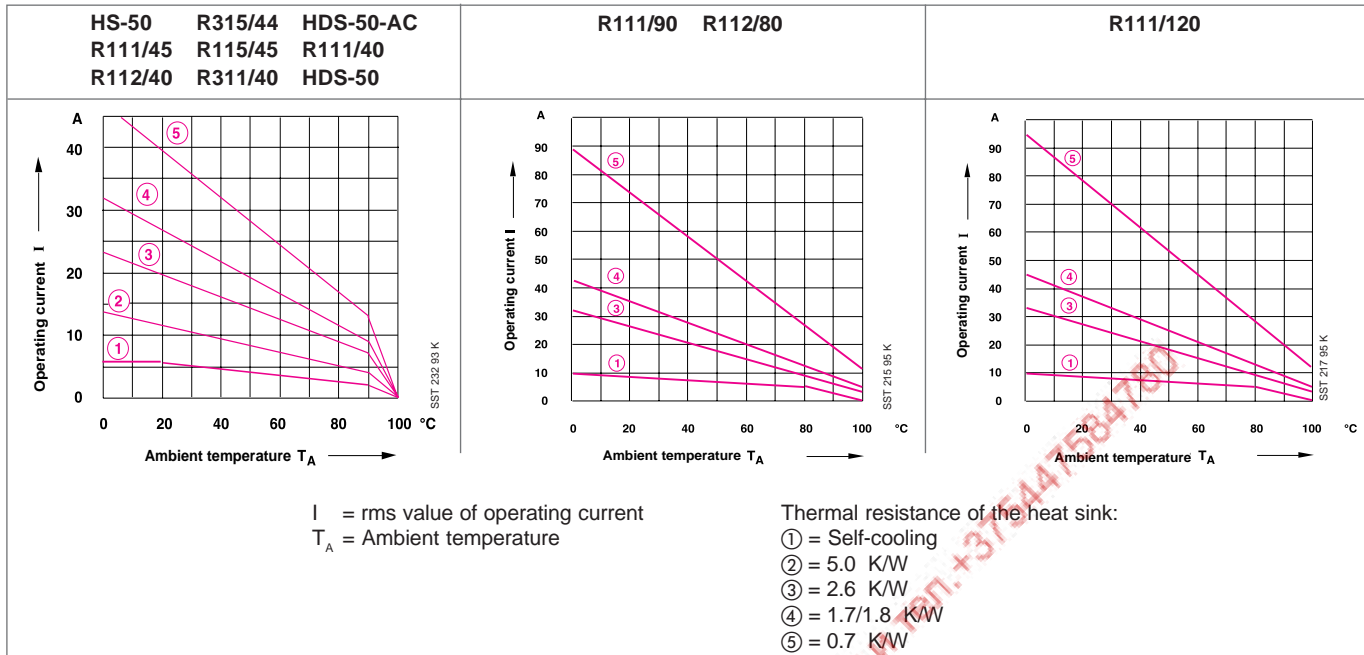
Dimensions in mm



Solid-state relays, R 1100

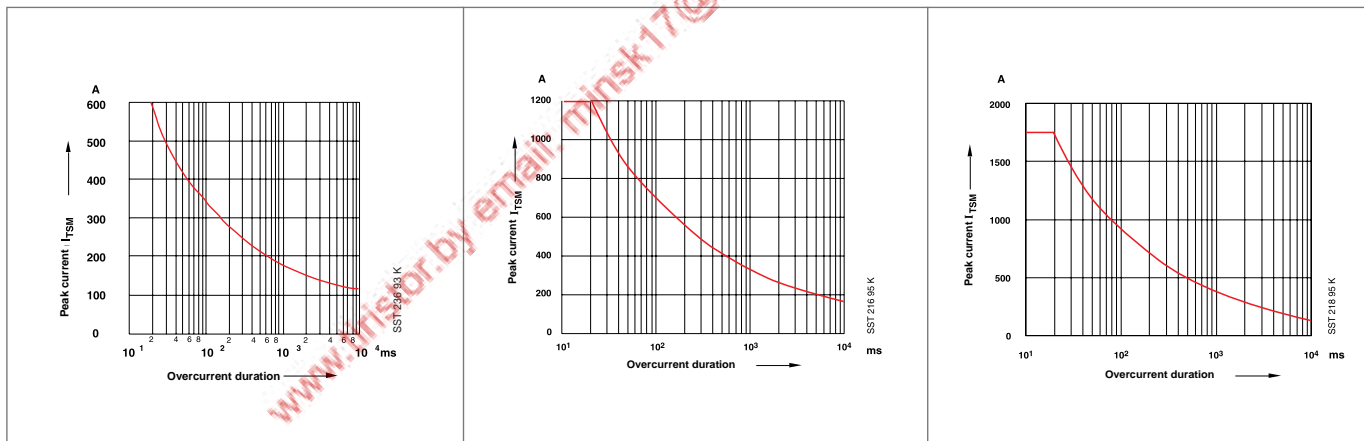
Derating curves, Limiting overload characteristics Dimension diagrams

Derating curves



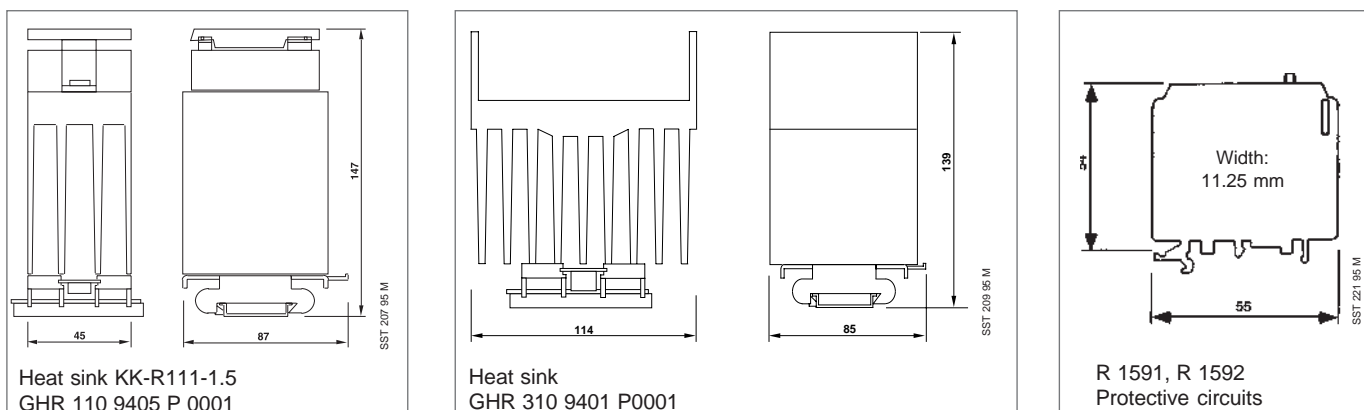
Limiting overload characteristics

A surge current near to the max. surge current influences the expected service life of the unit and is therefore permissible only in exceptional cases, e.g. in the event of a short-circuit or malfunction. Periodic surge currents may not exceed approx. 50 % of the max. surge current.



Dimension diagrams

Dimensions in mm (height including top-hat rail)

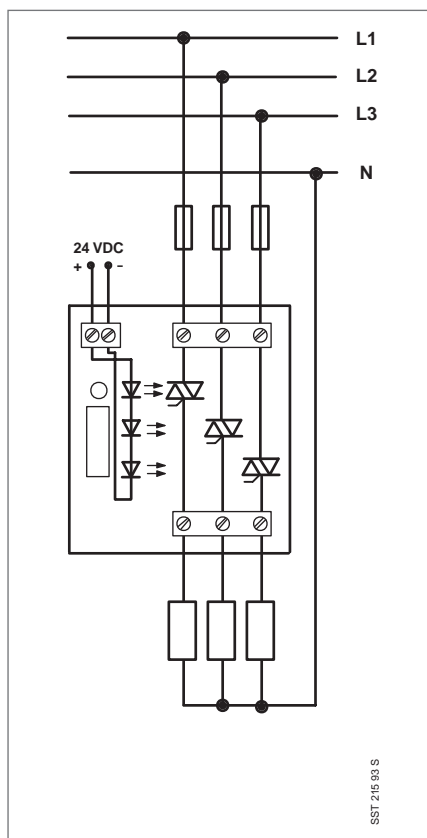


Semiconductor three-phase contactor HDS R2

Technical data

Dimensions

Wiring diagram



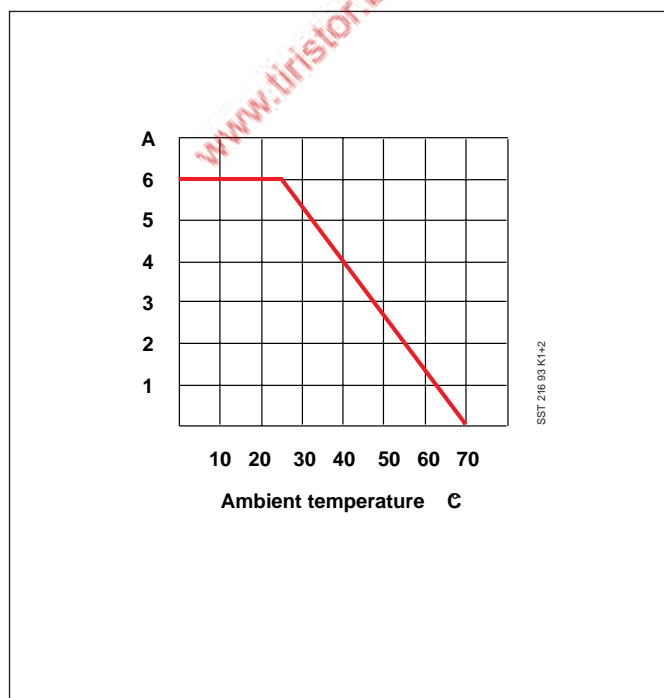
Type		HDS R2
Rated operating voltage U_e	V AC	230 / 400
Operating voltage range	V AC	24...460
Peak off-state voltage AC	V	800
Max. operating current I_e (AC3)	A	3.4
Thermal continuous current (AC1)	A	3.4
Switching capacity ③	kW	1.5
Max. surge current (10 ms) I_{TSM}	A	120
Max. load integral $\int i^2 dt$ ②	A ² s	72
Max. voltage drop U_T	V _{rms}	2
Max. residual current I_{DRM}	mA	1.7
Minimum load current I_H	mA	10
Permissible rate of current rise di/dt	A/ μ s	100
Permissible rate of voltage rise du/dt	V/ μ s	200
Control voltage U_c	V D	24
High-signal	V DC	17...32
Low-signal	V DC	≤ 8
Control current	mA	16
Input impedance	k Ω	1.5
On delay	ms	≤ 10
Off delay	ms	≤ 10
Test voltage		
Input-output / heat sink	kV _{rms}	2.5
Input-output	kV _{rms}	4
Operating temperature range	$^{\circ}$ C	-20...+55
Storage temperature range	$^{\circ}$ C	-25...+85

① At $T_a = 45^{\circ}$ C

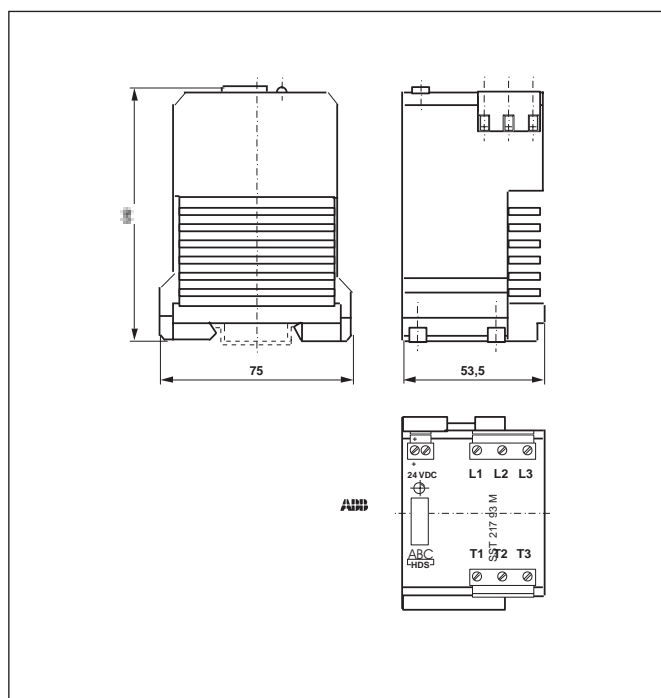
② Pulse duration 10 ms, $T_{vj} = 125^{\circ}$ C.

③ At $\cos \varphi = 0.75$; device is not suitable for reversing circuits!

Derating curve



Remarks



Selection table for solid-state relays / heat sinks

Dimension diagrams

Single-phase solid-state relays for general loads (cos. Phi 0.5-1)

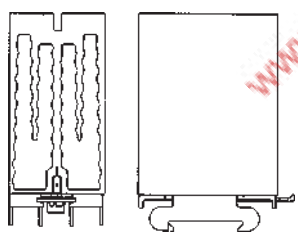
Type	Remarks	Max. thermal continuous current without/with heat sink, at ambient temperature									
		Self-cooling		KK 2.1 K/W		KK1.5 K/W		KK0.7 K/W		KK 0.5 K/W	
		25 °C	45 °C	25 °C	45 °C	25 °C	45 °C	25 °C	45 °C	25 °C	45 °C
R 111/10	Zero voltage switch	5 A	4 A	8 A	6 A	10 A	8 A	10 A	10 A	10 A	10 A
R 111/08	Zero voltage switch	5 A	4 A	8 A	6 A	10 A	8 A	10 A	10 A	10 A	10 A
R 115/10	Zero voltage switch. AC-operation	5 A	4 A	8 A	6 A	10 A	8 A	10 A	10 A	10 A	10 A
R 1141	Zero voltage switch, triac	5 A	4 A	8 A	6 A	10 A	8 A	10 A	10 A	10 A	10 A
R 111/25	Zero voltage switch	5 A	4 A	16 A	13 A	22 A	18 A	25 A	23 A	25 A	25 A
R 111/20	Zero voltage switch	5 A	4 A	16 A	13 A	22 A	18 A	25 A	23 A	25 A	25 A
R 115/25	Zero voltage switch. AC-operation	5 A	4 A	16 A	13 A	22 A	18 A	25 A	23 A	25 A	25 A
R 115/20	Zero voltage switch. AC-operation	5 A	4 A	16 A	13 A	22 A	18 A	25 A	23 A	25 A	25 A
R 120/25	Zero voltage switch, <i>new design</i>	10 A	8 A			25 A	25 A				
R 1142	Zero voltage switch, triac	5 A	4 A	16 A	13 A	22 A	18 A	25 A	23 A	25 A	25 A
R 111/45	Zero voltage switch	6 A	4 A	18 A	16 A	32 A	28 A	45 A	37 A	50 A	50 A
R 111/40	Zero voltage switch	6 A	4 A	18 A	16 A	32 A	28 A	45 A	37 A	50 A	50 A
R 112/40	Zero voltage switch, R-loads	6 A	4 A	18 A	16 A	32 A	28 A	45 A	37 A	50 A	50 A
R 115/45	Zero voltage switch. AC-operation	6 A	4 A	18 A	16 A	32 A	28 A	45 A	37 A	50 A	50 A
R 115/40	Zero voltage switch. AC-operation	6 A	4 A	18 A	16 A	32 A	28 A	45 A	37 A	50 A	50 A
R 122/50	Zero voltage switch, <i>new design</i>	10 A	8 A			40 A	35 A				
R 111/90	Zero voltage switch	8 A	7 A	25 A	20 A	35 A	30 A	71 A	62 A	90 A	77 A
R 112/80	Zero voltage switch, R-loads	8 A	7 A	25 A	20 A	35 A	30 A	71 A	62 A	90 A	77 A
R 122/90	Zero voltage switch, <i>new design</i>	10 A	8 A			45 A	40 A				
R 111/120	Zero voltage switch	8 A	7 A	25 A	20 A	35 A	30 A	71 A	62 A	95 A	80 A
R 122/125	Zero voltage switch, <i>new design</i>	10 A	8 A			50 A	45 A				

3-phase solid-state relays for general loads (cos-Phi 0.5-1)

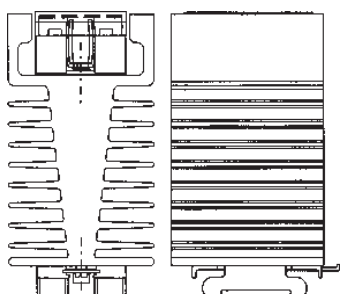
Type	Remarks	Max. thermal continuous current per phase, without/with heat sink, at ambient temperature			
		Self-cooling		KK 0.8 K/W	
		25 °C	45 °C	25 °C	45 °C
R 311/20	Zero voltage switch	5 A	4 A	22 A	18 A
R 311/40	Zero voltage switch	6 A	4 A	28 A	24 A
R 315/40	Zero voltage switch. AC-operation	6 A	4 A	28 A	24 A

Dimensions

Dimensions in mm

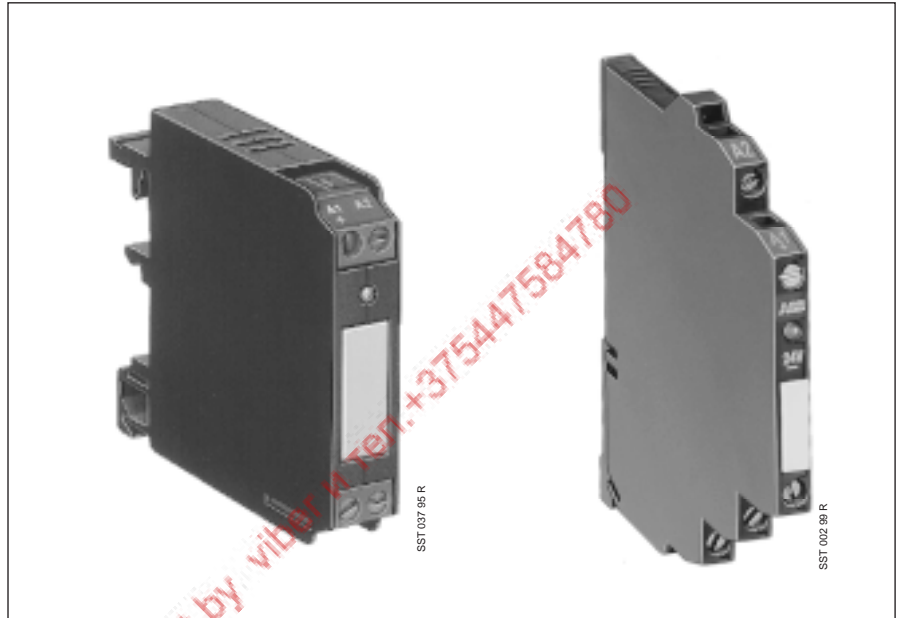


Type	Dimensions		
	B	T	H
KK-R111-2.1	51	65	65
KK-111-1.5	45	65	97
KK-R120-1.4	45	77	97



Type	Dimensions		
	B	T	H
KK-R120-1.4 with mounted solid-state relay R12x	45	77.5	114

Terminal modules



Interface relays are electromechanical and electronic input and output modules for electrical isolation, level adaptation, interference suppression or signal amplification between control system and process.

Housing material: alphamide

Snap-on mounting on 35mm top-hat rail or mounting on C-rails (only series R1500/R1600)

Status indication by LED

Rated insulation voltage U_i : 250/380V AC (Group C)

Conductor connection single-core or stranded, max 2x1.5mm²

Installation position: any

Enclosure: Housing IP40, terminals IP20

Electrical isolation by optocoupler or relay

Temperature range: Operational: -20 ... + 55 °C

Storage: -40 ... + 80 °C

Type Series R 1000

- Housing width: 6.2 mm
- Electromechanical: 1 NO, 1 changeover

- Electronic: R1084 Transistor, 100 mA
R1062 TRIAC, 0.5 A
R1064 Transistor, 1 A
R1048 MOSFET, 2 A,
Short-circuit-proof

Type Series R1500/R1600

- Housing width: 11.25 mm
- Electromechanical: 1 NO, 1 NC, 2 NO,
2 NC, 1 ch., 2 ch.

- Electronic: R1584/R1585
Transistor, 100 mA
R1552, R1662 TRIAC
R1664 Transistor, 3 A
R1647/R1648 MOSFET,
Short-circuit-proof

Approvals and Certifications

UL



R1000
R1500/R1600

Applied for
Awarded

CSA



Applied for
Awarded

GL



In preparation
Awarded

SIGMA® terminal modules

Type Series R 1500 S / R 1600

Ordering details



Input modules

Type	Rated contr. circuit voltage U_c	Rated operating voltage U_e	Rated current I_e max.	Order code Product No. (add the code number for connection type to order code if necessary)	Price	Weight / piece kg	Pack. unit piece
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Input stage (transistor) + protective circuit

R 1584	24 V DC	24 V DC	100mA	GHR 158 0004 R 0002		0.020	1/10
R 1585	230 V AC/DC	24 V DC	100mA	GHR 158 0005 R 0002		0.020	1/10

Input relay, 1 NO contact (contact material Ag Au 5µ)

R 1571	24 V AC/DC	230 V AC/DC*	3 A	GHR 157 4001 R 0002		0.020	1/10
	230 V AC/DC	230 V AC/DC*	3 A	GHR 157 4051 R 0002		0.020	1/10

Input relay, 1 NC contact (contact material Ag Au 5µ)

R 1571	24 V AC/DC	230 V AC/DC*	3 A	GHR 157 4101 R 0002		0.020	1/10
	230 V AC/DC	230 V AC/DC*	3 A	GHR 157 4151 R 0002		0.020	1/10

*DC rated switching capacity, see Technical data

3-channel interface relay (1 changeover contact, 1 changeover contact, 2 NO contacts)

R 1530	24 V DC and 230 V AC	230 V AC/DC*	6 A	GHR 153 0001 R 0001		0.1	1
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Output modules

Output relay, 1 NO contact

R 1561	24 V DC	230 V AC/DC*	5 A	GHR 156 1001 R 0002		0.020	1/10
R 1561+RC	24 V DC	230 V AC/DC*	5 A	GHR 156 0001 R 0002		0.022	1/10
R 1561	24 V AC/DC	230 V AC/DC*	5 A	GHR 156 9001 R 0002		0.020	1/10
Univ. current	60 V AC/DC			GHR 156 9021 R 0002		0.020	1/10
	110 V AC/DC			GHR 156 9041 R 0002		0.020	1/10
	230 V AC/DC			GHR 156 0051 R 0002		0.020	1/10
R 1561 Low Power	24V DC	230 V AC/DC*	5 A	GHR 156 8001 R 0002		0.020	1/10

Output relay, 1 NC contact

R 1561	24 V DC	230 V AC/DC*	5 A	GHR 156 1111 R 0002		0.020	1/10
R 1561+RC	24 V DC	230 V AC/DC*	5 A	GHR 156 0111 R 0002		0.020	1/10
R 1561	24 V AC/DC	230 V AC/DC*	5 A	GHR 156 9101 R 0002		0.020	1/10
Univ. current	60 V AC/DC			GHR 156 9121 R 0002		0.020	1/10
	110 V AC/DC			GHR 156 9141 R 0002		0.020	1/10
	230 V AC/DC			GHR 156 0101 R 0002		0.020	1/10

Connection type:

Control side	Load side
Screw	Screw $\frac{2}{4}$
Plug	Screw $\frac{4}{4}$

Output relay, 2 NO contacts, 2 NC contacts or 1 changeover contact

R 1551 2S	24 V DC	230 V AC/DC*	4 A	GHR 155 1201 R 0002		0.050	1
R 1551 2Ö	24 V DC	230 V AC/DC*	4 A	GHR 155 1301 R 0002		0.050	1
R 1551 1W	24 V DC	230 V AC/DC*	6 A	GHR 155 1501 R 0002		0.050	1

Output relay, 1 or 2 changeover contacts, universal current

R 1541 1W	24 V DC/AC	230 V AC/DC*	4 A	GHR 154 1501 R 0002		0.050	1
R 1541 1W	230 V DC/AC	230 V AC/DC*	4 A	GHR 154 1601 R 0002		0.050	1
R 1542 2W	24 V DC/AC	230 V AC/DC*	2 A	GHR 154 2501 R 0002		0.050	1
R 1542 2W	230 V DC/AC	230 V AC/DC*	2 A	GHR 154 2601 R 0002		0.050	1

*DC rated switching capacity, see Technical data

Output stage (triac)

R 1552	230 V AC	400 V AC	1 A	GHR 155 2052 R 0002		0.020	1
R 1662	24 V DC	230 V AC	3 A	GHR 166 0002 R 0002		0.048	1

Output relay (Mosfet) short-circuit-proof output

R 1647	24 V DC	24 V DC	4 A	GHR 164 0007 R 0002		0.048	1
R 1648	24 V DC	60 V DC	3 A	GHR 164 0008 R 0002		0.048	1

Output relay (transistor)

R 1664	24 V DC	60 V DC	3 A	GHR 166 0004 R 0002		0.048	1
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Protective circuits for protecting electronic relay (RC + varistor)

R 1591	-	230 V AC ①	-	GHR 159 0001 R 0002		0.020	1/10
R 1592	-	400 V AC ②	-	GHR 159 0002 R 0002		0.020	1/10

① Max: 280 V AC, residual current 7 mA

② Max: 440 V AC, residual current 12 mA

SIGMA® terminal modules - compact design

Type series R 1000, overall width 6.2mm

Ordering details



SST 002 99



SST 002 99

- Overall width only: 6.2mm
- Same space requirement as a standard terminal block
- Electrical isolation by means of relay or optocoupler
- Simplification of wiring through plug-in potential jumpers for A2 and ground of the switching output in addition to the screw connections
- Status indication by LED
- Ultra-modern product technology, latest design
- Certifications for worldwide use have been applied for or are in preparation (UL, CSA, GL)

Type	Rated control circuit voltage U_c	Rated operating voltage U_e	Rated current I_e max.	Order code	Price	Weight / piece kg	Pack. unit piece
R 1061 electromechanical interface relay, 1 NO contact							
R 1061	24V AC/DC	230V AC/DC	3 A	GHR 106 9001 R0001			1/10
R 1061	115V AC/DC	230V AC/DC	3 A	GHR 106 9041 R0001			1/10
R 1061	230V AC/DC	230V AC/DC	3 A	GHR 106 9051 R0001			1/10
R 1041 electromechanical interface relay, 1 changeover contact							
R 1041	24V AC/DC	230V AC/DC	3 A	GHR 104 1501 R0001			1/10
R 1041	115V AC/DC	230V AC/DC	3 A	GHR 104 1701 R0001			1/10
R 1041	230V AC/DC	230V AC/DC	3 A	GHR 104 1601 R0001			1/10
R 1084 electronic interface relay with transistor output and electrical isolation by optocoupler							
R 1084	24V DC	5-50V DC	100 mA	GHR 108 0004 R0001			1/10
R 1064 electronic interface relay with transistor output and electrical isolation by optocoupler							
R 1064	24V DC	5-50V DC	1 A	GHR 106 0004 R0001			1/10
R 1062 electronic interface relay with TRIAC output and electrical isolation by optocoupler							
R 1062	24V DC	12-250V AC	0.5 A	GHR 106 0002 R0001			1/10
R 1048 short-circuit-proof electronic interface relay with MOSFET output and electrical isolation by optocoupler							
R 1048	24V DC	5-50V DC	2 A	GHR 104 0008 R0001			1/10
Plug-in potential jumpers							
P-1010	10-pin potential jumper			GHR 100 0010 R0001			1/10
P-1024	24-pin potential jumper			GHR 100 0024 R0001			1/10

SIGMA® Terminal module R 1530

Multi-channel interface relay in special design

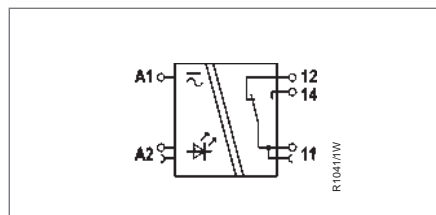
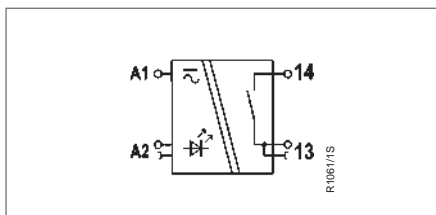
- Two independent output channels for signal amplification (ohmic: 6 A AC)
- One checkback channel (1 ch.)
- Overall width: 27 mm

Type	Rated control circuit voltage U_c	Rated operating voltage U_e	Rated current I_e max.	Order code	Price	Weight / piece kg	Pack. unit piece
R 1530 3-channel, electromechanical interface relay (1 ch. contact, 1 ch. contact, 2 NO contacts)							
R 1530	24V DC + 230V AC	230V AC/DC	6 A	GHR 153 0001 R0001		0.100	1
R 1530	115V AC	230V AC/DC	6 A	GHR 153 0002 R0001		0.100	1
R 1530 3-channel, electromechanical interface relay (1 ch. contact, 1 ch. contact, 2 NC contacts)							
R 1530	115V AC	230V AC/DC	6 A	GHR 153 0002 R0011		0.100	1

SIGMA® terminal modules - compact design, Type R 1041, R 1061

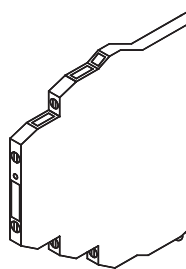
Technical data

Relay stages Type R 1061/1041 are suitable for "protective separation" in accordance with VDE 0106, Part 101 up to 250 V, installation category 2, pollution degree 3. They are used preferably in the output stages of electronic control systems.
Insulation group: VDE 0110 Gr. C 250 V AC



Input data	R 1061 (1 NO) Univ. current			R 1041 (1 ch.) Univ. current		
Rated control circuit voltage U_c for "ON" for "OFF"	24 V AC/DC 19.2 ... 30 V 0 ... 4 V	230 V AC/DC 90 ... 125 V 0 ... 10 V	24 V AC/DC 185 ... 255 V 0 ... 25 V	230 V AC/DC 19.2 ... 125 V 0 ... 4 V	24 V AC/DC 90 ... 125 V 0 ... 10 V	230 V AC/DC 185 ... 255 V 0 ... 25 V
Current consumption at $U_{c, rated}$	approx. 15 mA	approx. 5 mA	approx. 5 mA	approx. 15 mA	approx. 5 mA	approx. 5 mA
Polarity reversal-protected (Input / Output)	Yes	Yes	Yes	Yes	Yes	Yes
Oversvoltage suppression	Yes	Yes	Yes	Yes	Yes	Yes
Input impedance						
Maximum switching frequency	10 Hz	10 Hz	10 Hz	10 Hz	10 Hz	10 Hz

Output data	R 1061 (1 NO) Univ. current		R 1041 (1 ch.) Univ. current		R 1041 (1 ch.) Univ. current	
Contact material	AgSnO ₂	AgSnO ₂	AgSnO ₂	AgSnO ₂	AgSnO ₂	AgSnO ₂
Rated operating voltage U_e	250 V AC/AC	250 V AC/AC	250 V AC/AC	250 V AC/AC	250 V AC/AC	250 V AC/AC
Permissible voltage range for AC for DC	12 V ... 380 V 12 V ... 300 V	12 V ... 380 V 12 V ... 300 V	12 V ... 380 V 12 V ... 300 V	12 V ... 380 V 12 V ... 300 V		
Max. switching current AC 12	6 A	6 A	6 A	6 A	6 A	6 A
Operating current AC 15 at 220 V DC 13 at 24 V	3 A 1 A	3 A 1 A	3 A 1 A	3 A 1 A	3 A 1 A	3 A 1 A
Rated switching capacity for AC for DC	1500 VA 120 W	1500 VA 120 W	1500 VA 120 W	1500 VA 120 W	1500 VA 120 W	1500 VA 120 W
On delay t_E	10 ms	10 ms	10 ms	10 ms	10 ms	10 ms
Off delay t_A	15 ms	15 ms	15 ms	15 ms	15 ms	15 ms
Ambient temperature	-20...+50 °C	-20...+50 °C	-20...+50 °C	-20...+50 °C	-20...+50 °C	-20...+50 °C
Service life: mechanical > 20 Mio electrical at 220 V AC/3 A 24 V DC/4 A	> 20 Million	> 20 Million	> 20 Million	> 20 Million	> 20 Million	
Electrical isolation / Relay	Yes	Yes	Yes	Yes	Yes	Yes
Test voltage Input / output	4 kV	4 kV	4 kV	4 kV	4 kV	4 kV
Creepage distance Input / output	> 8 mm	> 8 mm	> 8 mm	> 8 mm		
Accessories:	Potential jumpers P-1010, P-1024					



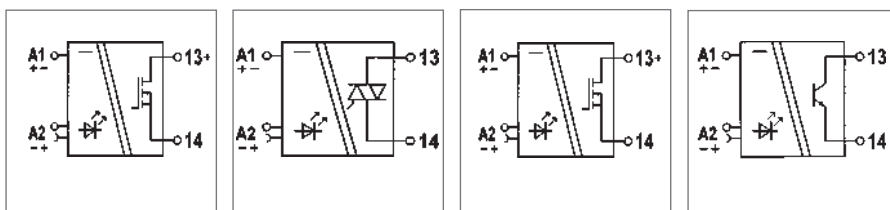
Dimensions (in mm)
Width = 6.5
Height = 85
Depth = 81

MBGE

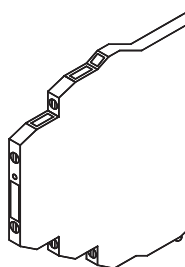
SIGMA® terminal modules - compact design

Type series R 1048, R 1062, R 1064, R 1084

Technical data



Input data	R 1048	R 1062	R 1064	R 1084
Switching element	FET	TRIAC	Transistor	Transistor
Rated control circuit voltage U_c for "ON" for "OFF"	24 V DC 10 ... 45 V DC 0 ... 4 V DC	24 V DC 10 ... 45 V DC 0 ... 4 V DC	24 V DC 10 ... 45 V DC 0 ... 4 V DC	24 V DC 10 ... 45 V DC 0 ... 4 V DC
Current consumption at $U_{c, rated}$	ca 5 mA	ca 5 mA	ca 5 mA	ca 5 mA
Polarity reversal-protected (Input / Output)	Yes	Yes	Yes	Yes
Input impedance				
Maximum switching frequency	10 Hz	20 Hz	10 Hz	50 Hz
Protective circuit	Varistor	Varistor	Varistor	Varistor
Output data				
Rated operating voltage U_o max.	48 V DC	230 V AC	48 V DC	48 V DC
Permissible voltage range for AC for DC	- 5 ... 50 V DC	12 ... 250 V AC -	- 5 ... 50 V DC	- 5 ... 50 V DC
Switching current min.	1 mA	0.1 mA	1 mA	0.1 mA
Rated continuous current I_u (at 45°C)	2 A	0.5 A	1 A	0.1 A
On delay t_E	< 5 ms	< 5 ms	< 1 ms	< 5 ms
Off delay t_A	10 ms	15 ms	5 ms	5 ms
Short-circuit-proof	Yes	No	No	No
Service life	Virtually unlimited	Virtually unlimited	Virtually unlimited	Virtually unlimited
Electrical isolation	Yes	Yes	Yes	Yes
Test voltage Input / output	2.5 kV	2.5 kV	2.5 kV	2.5 kV
Ambient temperature, operation	-20 °C ... 60 °C	-20 °C ... 60 °C	-20 °C ... 60 °C	-20 °C ... 60 °C



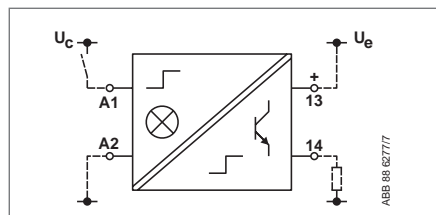
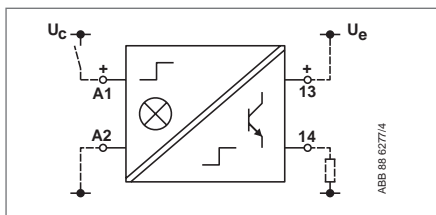
Dimensions (in mm)
Width = 6.5
Height = 85
Depth = 81

MEGE

Input stages Type R1584 and R1585

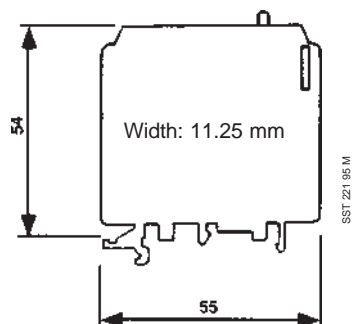
Technical data

The input stages R 1584 and R 1585 are used for electrically isolated connection of DC (R1584) or AC (R1585) voltage signals to an electronic controller.



Input data	R1584	R1585
Rated control circuit voltage U_c	24 V DC	230 V AC/DC
for „ON“	17... 32 V DC	180... 280 V AC/DC
for „OFF“	0... 2 V DC	0... 10 V AC/DC
Operating frequency	–	47... 63 Hz
Current consumption bei $U_{C Rated}$	< 20 mA	< 6.5 mA
Polarity reversal-protected	up to 200 V	yes
Input impedance	1 kΩ	44 kΩ
Maximum switching frequency	100 Hz	20 Hz

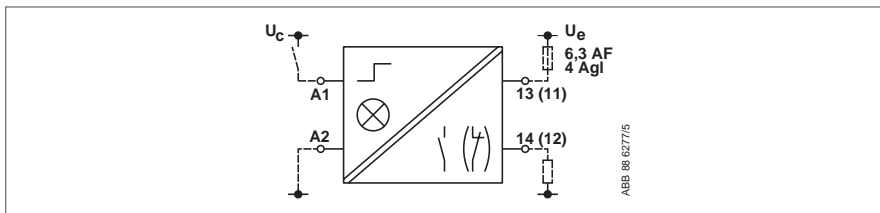
Output data		
Switching element		transistor
Overvoltage protection		Suppressor diode
Rated operating voltage U_o		24 V DC
Permissible voltage range for DC		3... 30 V
Rated continuous current I_o		100 mA
Voltage drop in ON state		0.4 V
Leakage current in OFF state		0.1 mA
in the case of $U_o = 30 V DC$		
On delay t_E	5 ms	< 20 ms
Off delay t_A	5 ms	< 40 ms
Bounce time		–
Electrical isolation		Optocoupler
Test voltage input / output		4 kV
Creepage distance input / output		8 mm



Input relay Type R1571

Technical data

The input relays R1571 are used for electrical isolation of electrical circuits. They contain an electromechanical relay. The gold-plated relay contacts allow switching of low voltages and currents (analogue measurement values) and increase the contact stability for signal inputs in electronic controls.



Input data	R1571	
Rated control circuit voltage U_c	24 V AC/DC	230 V AC/DC
for „ON“	20... 29 V DC	176... 250 V AC/DC
for „OFF“	0... 2 V DC	0... 8 V AC/DC
Current consumption at $U_{c \text{ Rated}}$	< 20 mA	< 5 mA
Polarity reversal-protected	yes	yes
Overtoltage suppression	yes	yes
Input impedance	1.3 k Ω	50 k Ω
Maximum switching frequency	20 Hz	
Output data		
Contact material	Ag AU 5 μ	
Rated operating voltage U_e	230 V AC	
Permissible voltage range	for AC	20 mV... 250 V
	for DC	20 mV... 300 V
Max. switching current	5 A (20 mA) ②	
Rated continious current I_U	3 A (5 mA) ②	
Rated switching capacity ① for AC	750 VA ③	
	for DC up to 30 V	90 W
	for DC up to 250 V	45 W
On delay t_E	10 ms	
Off delay t_A	10 ms	
Bounce time	< 3ms	
Service life:		
mechanical	> 10 ⁷	
electrical at 220 V AC/3 A ①	>7 x 10 ⁵	
24 V DC/4 A ①	> 10 ⁶	
Electrical isolation	Relay	
Test voltage input/output	4 kV	
Creepage distance input/output	> 8 mm	

① In the case of ohmic load

② The gold plating is preserved up to this current

③ The gold plating is damaged above this switching capacity value

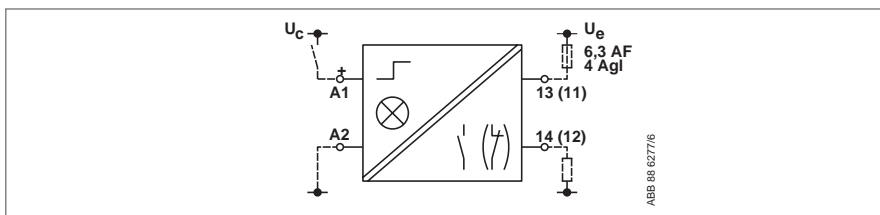
See Page 26
for dimension diagram

Output relay Type R1561, DC version

Technical data

The output relay R1561 electromagnetically converts low voltage signals to floating output commands.

A version with output contacts connected to an RC network is available for damping inductive breaking voltages.



Input data	R1561 Low power	R1561 without protective circuit	R1561 with protective circuit
Rated control circuit voltage U_c for „ON“		24 V DC	17... 32 V DC
for „OFF“		0... 2 V DC	
Current consumption bei $U_{c Rated}$	≤ 10 mA	< 20 mA	
Polarity reversal-protected		up to 200 V	
Overvoltage suppression		Free-wheeling diode	
Input impedance		800 Ω	
Maximum switching frequency		20 Hz	
Output data			
Contact material		Ag Cdo	
Protective circuit comprising RC network			0.047 μ F + 100 Ω
Residual current			4 mA
Rated operating voltage U_e		230 V AC	
Permissible voltage range	for AC	12 ② V... 250 V	
	for DC	12 ② V... 300 V	
Max. switching current		10 A	
Rated continuous current I_U		6 A	
Operating current	AC 15 at 220 V	3 A (3 A, B 300 V)③	
	DC 13 at 24 V	0.1 A	
Rated switching capacity ① for AC		1500 VA	
	for DC up to 30 V	90 W	
	for DC up to 250 V	45 W	
On delay t_E		10 ms	
Off delay t_A		10 ms	
Bounce time		< 3ms	
Service life:			
mechanical		> 10 ⁷	
electrical at 220 V AC/3 A ①		> 7 x 10 ⁵	
24 V DC/4 A ①		> 10 ⁶	
Electrical isolation		Relay	
Test voltage input / output		4 kV	
Creepage distance input / output		> 8 mm	

- ① with resistive load
 ② Switching capacity > 0.2 W bei 12V
 ③ UL values

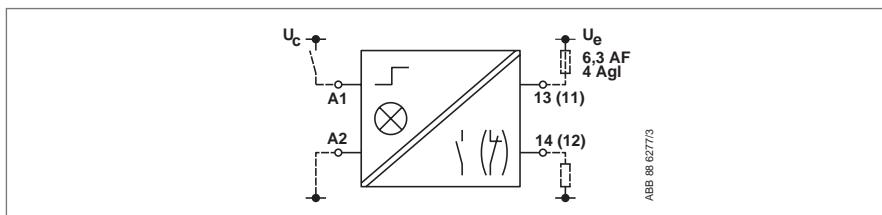
See Page 26
for dimension diagram

Output relay Type R1561

(universal current version)

Technical data

The universal current relay R1561 can be controlled as required with DC or AC voltage. The relays are available for the most common control voltages.



Input data	R1561			
Rated control circuit voltage U_c	24 V AC/DC	60 V AC/DC	110 V AC/DC	230 V AC/DC
for „ON“	20... 29 V AC/DC	40... 72 V AC/DC	88... 130 V AC/DC	176... 250 V AC/DC
for „OFF“	0... 2 V	0... 2 V	0... 4 V	0... 8 V
Current consumption at $U_{c, Rated}$	< 20 mA	< 10 mA	< 5 mA	< 5 mA
Polarity reversal-protected			yes	
Overvoltagesuppression			yes	
Input impedance	800 Ω	7.5 k Ω	25 k Ω	50k Ω
Maximum switching frequency			20 Hz	

Output data		
Contact material		Ag Cdo
Rated operating voltage U_e		230 V AC
Permissible voltage range	for AC	12 V... 250 V ②
	for DC	12 V... 300 V ②
Max. switching current		10 A
Rated continuous current I_u		6 A
Operating current	AC 15 at 220 V	3 A
	DC 13 at 24 V	0.1 A
Rated switching capacity ① for AC		1500 VA
	for DC up to 30 V	90 W
	for DC up to 250 V	45 W
On delay t_E		10 ms
Off delay t_A		10 ms
Bounce time		< 3 ms
Service life:		
mechanical		> 10 ⁷
electrical at	220 V AC/3 A ①	> 7 x 10 ⁵
	24 V DC/4 A ①	> 10 ⁶
Electrical isolation		Relay
Test voltage input / output		4 kV
Creepage distance input / output		> 8 mm

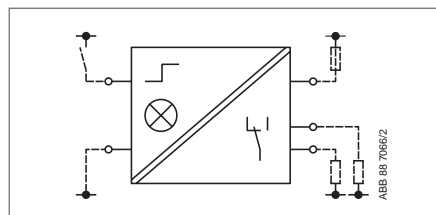
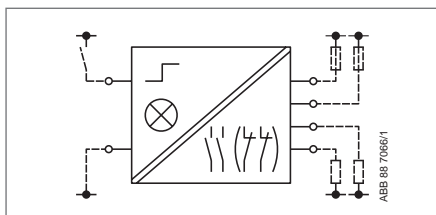
① For ohmic load
② Switching capacity > 0.2 W

See Page 26
for dimension diagram

Output relay Type R1551

Technical data

The relay stages, Type R1551, are used preferably in the output levels of electronic controllers.



Input data	R1551 (2 NO; 2 NC)	R1551 (1 W)
Rated control circuit voltage U_c for „ON“ for „OFF“	24 V DC 17... 32 V DC 0... 2 V	
Current consumption at $U_{C \text{ Rated}}$	< 35 mA	< 20 mA
Polarity reversal-protected	up to 200 V	
Overvoltage suppression	Free-wheeling diode	
Input impedance	800 Ω	1.3 Ω
Maximum switching frequency	20 Hz	
Output data		
Contact material	Ag Cdo	
Rated operating voltage U_e	230 V AC	
Permissible voltage range for AC for DC	12 ② V... 250 V 12 ② V... 300 V	12 ② V... 250 V 12 ② V... 300 V
Max. switching current	5 A	10 A
Rated continuous current I_u	4 A	6 A
Operating current AC 15 at 220 V DC 13 at 24 V	2 A 1 A	3 A 1 A
Rated switching capacity① for AC for DC up to 30 V for DC up to 250 V	660 VA 60 W 45 W	1500 VA 90 W 45 W
On delay t_E	10 ms	
Off delay t_A	10 ms	
Bounce time	5 ms	
Service life: mechanical electrical at 220 V AC/3 A① 24 V DC/4 A①	> 10 ⁷ > 5 x 10 ⁵ > 10 ⁶	> 10 ⁷ > 7 x 10 ⁵ > 10 ⁶
Electrical isolation	Relay	
Test voltage input / output	4 kV	
Creepage distance input / output	> 8 mm	

① For ohmic load

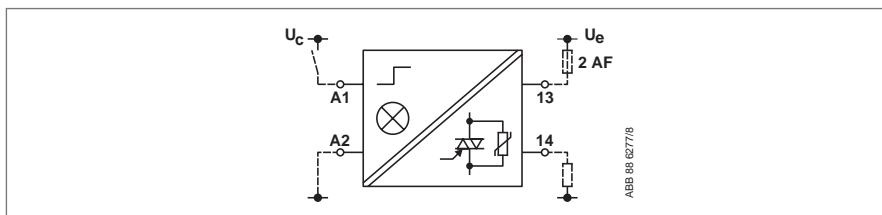
② Switching capacity > 0.2 W

See Page 26
for dimension diagram

Output stage Type R1552

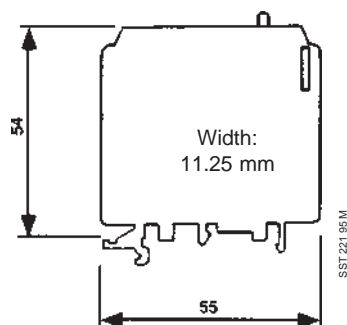
Technical data

The hybrid relay, Type R1552, has a triac as the switching element. Control and electrical isolation are performed by a Reed relay. This version allows inductive loads to be switched. There is no need for a protective circuit since the output semiconductor is protected by a varistor.



Input data	R1552
Rated control circuit voltage U_c	230 V AC
for „ON“	155... 240 V AC
for „OFF“	0... 33 V AC
Current consumption at $U_{c rated}$	< 10 mA
Switch-on peak max.	< 100 mA
Line length max.	100 m
Output data	
Switching element	Triac
Overvoltage protection	Varistor
Rated operating voltage U_e	400 V AC
Operating frequency	47... 63 Hz
Permissible voltage range for AC	24... 420 V
Rated continuous current I_U ($T_u = 55\text{ }^\circ\text{C}/45\text{ }^\circ\text{C}$) ①	0.8 A/1A
Rated switching capacity ① for AC 15/AC 3	220 V AC / 0.6 A
Max. overcurrent (10 ms)	50 A
Voltage drop	2.4 V
Leakage current in Off state at $U_{e Rated}$	50 μ A
Minimum load current	50 mA
Limit load integral $\int i^2 dt$ ($t = 10\text{ ms}$)	13 A ² s
On delay t_E	< 30 ms ($f = 50\text{ Hz}$)
Off delay t_A	< 90 ms ($f = 50\text{ Hz}$)
Test voltage input / output	2 kV _{rms}
Service life mechanical	> 10 ⁹

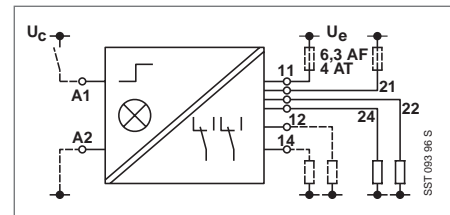
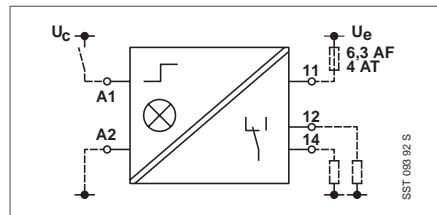
① Units installed with lateral clearance



Output relay Type R 1541 / 1542

Technical data

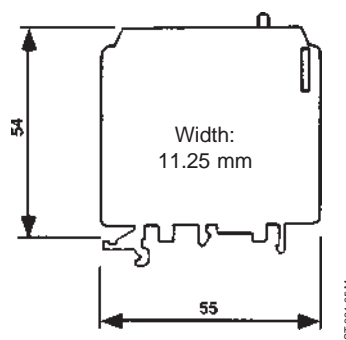
The relay stages, Type R 1541/1542, are suitable for "safety separation", as defined by VDE 0106, Part 101 up to 250 V, installation category 2, pollution severity 3. They are used preferably in the output levels of electronic controllers.



Input data	R 1541 (1 W) universal current		R 1542 (2 W) universal current	
Rated control circuit voltage U_c for „ON“ for „OFF“	24 V DC/AC 17 ... 32 V 0 ... 2 V	230 V DC/AC 176 ... 250 V 0 ... 8 V	24 V DC/AC 17 ... 32 V 0 ... 2 V	230 V DC/AC 176 ... 250 V 0 ... 8 V
Current consumption at $U_{c, Rated}$	< 30 mA	< 5 mA	< 20 mA	< 5 mA
Polarity reversal-protected (input / output)	yes	yes	yes	yes
Overvoltage suppression	yes	yes	yes	yes
Input impedance	800 Ω	50 k Ω	24 Ω	50 k Ω
Maximum switching frequency	20 Hz	20 Hz	20 Hz	20 Hz
Output data				
Contact material	AgCdO	AgCdO	Ag/Au	Ag/Au
Rated operating voltage U_e	230 V AC	230 V AC	230 V AC	230 V AC
Permissible voltage range for AC for DC	12 V ... 380 V ② 12 V ... 300 V ②	12 V ... 380 V ② 12 V ... 300 V	12 V ... 380 V ② 12 V ... 300 V ②	12 V ... 380 V ② 12 V ... 300 V ②
Max. switching current	12 A	12 A	5 A	5 A
Rated continuous current I_u	6 A	6 A	2 A	2 A
Operating current AC 15 at 220 V DC 13 at 24 V	4 A 1 A	4 A 1 A	2 A 0.5 A	2 A 0.5 A
Rated switching capacity ① for AC for DC to 30 V for DC to 250 V	1500 VA 90 W 45 W	1500 VA 90 W 45 W	250 VA 15 W 7 W	250 VA 15 W 7 W
On delay t_E	10 ms	10 ms	5 ms	5 ms
Off delay t_A	10 ms	10 ms	3 ms	3 ms
Bounce time	5 ms	5 ms	3 ms	3 ms
Service life mechanical electrical at 220 V AC/3 A ① 24 V DC/4 A ①	> 10 ⁷ > 7x10 ⁵ > 10 ⁶	> 10 ⁷ > 7x10 ⁵ > 10 ⁶	> 10 ⁷	> 10 ⁷
Electrical isolation / Relay	yes	yes	yes	yes
Test voltage input / output	4 kV	4 kV	1.5 kV	1.5 kV
Creepage distance input / output	> 8 mm	> 8 mm	> 8 mm	> 8 mm

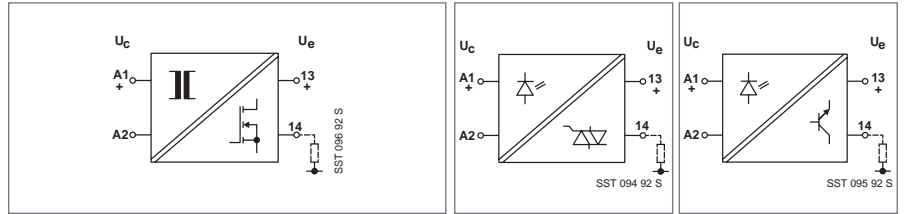
① For ohmic load

② Switching capacity > 0.2 W



Output relay Type Series R 1600

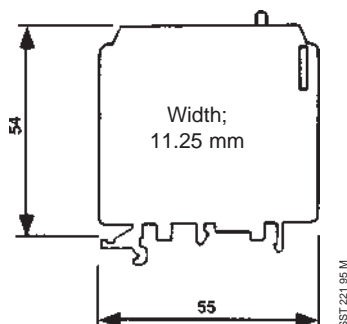
Technical data



Input data	R 1647	R 1648	R 1662	R 1664
Rated control circuit voltage U_c	24 V DC	24 V DC	24 V DC	24 V DC
for „ON“	17 ... 32 V DC	17 ... 32 V DC	17 ... 32 V DC	17 ... 32 V DC
for „OFF“	0 ... 2 V DC	0 ... 2 V DC	0 ... 2 V DC	0 ... 2 V DC
Current consumption at $U_{c, Rated}$	30 mA	30 mA	8 mA	8 mA
Polarity reversal-protected (input / output)	yes	yes	yes	yes
Input impedance	1.7 k Ω	1.7 k Ω	3.0 k Ω	3.0 k Ω
Maximum switching frequency	50 / s	50 / s	> 1 / s	> 3 / s ①

Output data				
Contact material	-	-	-	-
Rated operating voltage U_e	24 V DC	60 V DC	230 V AC	60 V DC
Permissible voltage range for AC	-	-	10 - 264 V	-
for DC	5 - 33 V	5 - 72 V	-	12 - 72 V
Min. switching current	10 mA	10 mA	10 mA	10 mA
Rated continuous current I_u (at 45°C)	4 A	3 A	3 A	3 A
On delay t_E	< 4 ms	< 4 ms	10 ms	< 10 ms
Off delay t_A	< 8 ms	< 8 ms	10 ms	< 10 ms
Short-circuit-proof	yes	yes	nein	nein
Service life	virtually unlimited	virtually unlimited	virtually unlimited	virtually unlimited
Electrical isolation / relay	yes	yes	yes	yes
Test voltage input / output	4 kV	4 kV	4 kV	4 kV

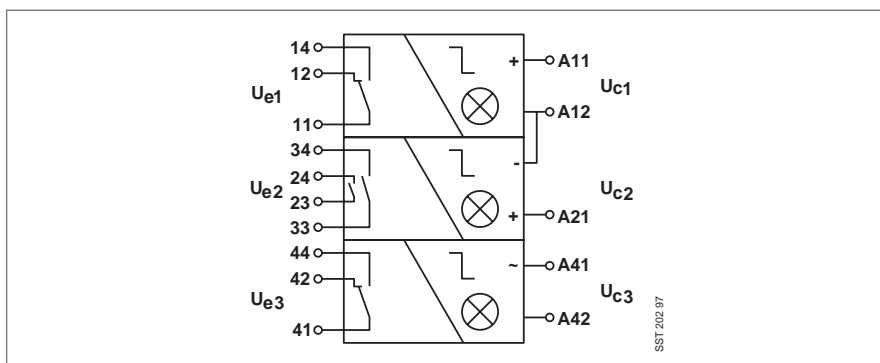
① for output current max. (3 A DC)



3-channel interface relay Type R 1530

Technical data

3-channel interface relay for decoupling output signals and check-back signals between control system, PLC and process.



Input data	Relay 1, 2	Relay 3
Rated control circuit voltage U_c	24 V DC	230 V AC / DC
Current consumption at U_c	20 mA, 30 mA	20 mA
Polarity reversal-protected	yes	yes
Operate/release time	6 / 2 ms, 8 / 12 ms	6 / 2 ms
Switching frequency DC safety separation, no stationary arc	1 / s	1 / s
Switching frequency	20 / s, 10 / s	20 / s

Output data	
Output U_{e1}	1 changeover contact
Output U_{e2}	2 NO contacts
Output U_{e3}	1 changeover contact
Rated operating voltage U_e	250 V AC / DC
Max. switching current AC	6 A
Max. switching current DC	0.4 A
Rated breaking/making capacity AC	1500 VA
Rated breaking/making capacity DC up to 30 V	240 W

General data	
Electrical isolation	Relay
Test voltage I/O	> 4 kV
Relay creepage distance I/O	> 8 mm
Mechanical service life	30 x 10 ⁶
Electrical service life	Load-dependent
Function/fault indicator	LED yellow / LED red
Ambient temperature	- 40 ... + 60 °C
Dimensions (W x H x D)	27 x 90 x 96 mm

23	24	33	34
A12	42	44	41
O Fault O Relay 1 O Relay 2			
A11	A21	A41	A42
11	14	12	

ABB Semiconductor contactors, Solid-state relays

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NEW

range
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Semiconductor contactor R100.xx and R300.xx Solid-state relays R111, R12x and R31x

Benefits and advantages



2CDC 305 027 F0004

R100.xx and R300.xx range

- **Compact design**
- **Zero voltage or instantaneous tripping**
- **LED display**
- **Protected against electric shock**
- **Integrated heat sink**
- **Ready for use**
- **Mounting on 35 mm DIN rail or screw mounting on plate**

Properties

- Rated operating current range 20 A, 30 A and 45 A
- DC control
- Single-pole, three-pole
- Switching by thyristors
- Peak inverse voltage 1200 V
- Insulation voltage > 4000 V
- Connecting terminals for 2 x 2.5 mm² or 1 x 4 mm²

Special properties

- The semiconductor relay R100.45-SG is internally protected against overload with overload signaling via signaling output.
- Cables with a conductor cross section up to 1 x 25 mm² can be connected to the output terminals of the semiconductor relays R100.45 and R100.45-SG.

Application

- Contactless and wear-free switching of ohmic and inductive 1-phase and 3-phase AC loads with high switching frequency.

Approvals

	R100.xx	R300.xx	R111	R12x	R31x
	■	■	■	■	■
	■	■			■
	■	□	■	■	□

Marks

	■	■		■	■
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2CDC 305 028 F0004

R111, R12x and R31x range

- **Standard design**
- **Zero voltage tripping, radio interference suppressed**
- **LED display**
- **Screw mounting or snap-on mounting with adapter for 35 mm DIN rail according to DIN EN 50022**

Properties

- R111 and R12x range - load side:
Thyristors for AC-51 and AC-53 up to 690 V AC and 100 A
- R31x - load side:
Alternistor for AC-51 and AC-53 up to 660 V AC and 75 A with internal RC circuit and overvoltage protection
- Electrical isolation by means of optocoupler between control circuit and load circuit
- R111 range with additional terminal cover
- Control side protected against reversed polarity

Special properties of R31x range

- Screw mounting

Application

- Contactless and wear-free switching of 1-phase and 3-phase AC loads up to a power factor of $\cos \varphi = 0.5$.

Semiconductor contactor R100.xx and R300.xx range

Ordering details



R100.20

2CDC 301 006 F 0003



R100.30-ZS

2CDC 301 007 F 0003



R100.45

2CDC 301 008 F 0003



R300.20

2CDC 301 005 F0004



R300.25

2CDC 301 005 F0005

R100.xx range

- Compact design
- Zero voltage or instantaneous switching
- Rated operational voltage V_e 42-660 V AC
- Single-phase
- LED for status indication
- Current ranges: 20 A, 30 A, 45 A (thyristors)
- Integrated heat sink, ready for use
- Mounting on 35 mm DIN rail or screw mounting on plate
- Cage terminal with integrated protection against electric shock (touch proof)

Type	Rated control circuit voltage V_c	Rated operational current I_e	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg/lb
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Zero voltage switching, width: 22.5 mm

R100.20	4-32 V DC	20 A	1SAR 111 020 R8607	1		0.25/0.55
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Instantaneous switching, width: 22.5 mm

R100.30-IO	4-32 V DC	30 A	1SAR 113 030 R8607	1		0.25/0.55
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Zero voltage switching, width: 22.5 mm

R100.30-ZS	4-32 V DC	30 A	1SAR 111 030 R8607	1		0.25/0.55
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Zero voltage switching, width: 45 mm

R100.45	4-32 V DC	45 A	1SAR 111 045 R8607	1		0.49/1.08
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Zero voltage switching, width: 45 mm, with integrated overtemperature protection and signalling output

R100.45-SG	4-32 V DC	45 A	1SAR 111 045 R9607	1		0.49/1.08
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R300.xx range

- Compact design
- Zero voltage switching
- Rated operational voltage V_e 40-660 V AC
- Three-phase
- LED for status indication
- Current ranges: 3 x 20 A, 3 x 25 A (thyristors)
- Integrated heat sink, ready for use
- Mounting on 35 mm DIN rail or screw mounting on plate
- Cage terminal with integrated protection against electric shock (touch proof)

Type	Rated control circuit voltage V_c	Rated operational current I_e	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg/lb
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Zero voltage switching, width: 45 mm

R300.20	4.5-32 V DC	3x20 A	1SAR 131 020 R8207	1		0.38/0.84
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Zero voltage switching, width: 90 mm

R300.25	4.5-32 V DC	3x25 A	1SAR 131 030 R8207	1		0.68/0.15
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Solid-state relays

R111, R12x and R31x range

Ordering details



R111/45

2CDC 301 001 F 0003



R111/20

2CDC 301 002 F 0003



R120/25

2CDC 301 004 F 0003



R 126/25

1SAR 111 025 F 4609



R122/50

2CDC 301 005 F 0003



R 315/55

2CDC 301 031 F0004

range completed

R111 range

- Standard design
- Single-phase
- Zero voltage switching
- Cost-saving

Type	Rated control circuit voltage V_c	Rated operational current I_o	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg/lb
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Rated operational voltage V_o : 24-280 V AC

R111/25	3-32 V DC	25 A	1SAR 111 025 R0102	1		0.11/0.24
R111/45	3-32 V DC	50 A	1SAR 111 050 R0102	1		0.11/0.24

Rated operational voltage V_o : 42-530 V AC

R111/20	3-32 V DC	25 A	1SAR 111 025 R0106	1		0.11/0.24
R111/40	3-32 V DC	50 A	1SAR 111 050 R0106	1		0.11/0.24
R111/90	3-32 V DC	90 A	1SAR 111 090 R0106	1		0.11/0.24

R12x range

- Standard design with protection against electric shock (touch proof)
- Zero voltage switching
- Single-phase
- LED for status indication
- Same basis dimensions and drilling distances as for the standard series (easy interchangeability)

Type	Rated control circuit voltage V_c	Rated operational current I_o	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg/lb
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Rated operational voltage V_o : 24-265 V AC

R120/25	3-32 V DC	25 A	1SAR 111 025 R4609	1		0.06/0.13
R120/50	3-32 V DC	50 A	1SAR 111 050 R4609	1		0.06/0.13

Rated operational voltage V_o : 42-530 V AC

R121/25	4-32 V DC	25 A	1SAR 111 025 R4606	1		0.06/0.13
R121/50	4-32 V DC	50 A	1SAR 111 050 R4606	1		0.06/0.13
R121/75	4-32 V DC	75 A	1SAR 111 075 R4606	1		0.10/0.22
R121/100	4-32 V DC	100 A	1SAR 111 100 R4606	1		0.10/0.22
R126/25	24-265 V AC / 24-48 V DC	25 A	1SAR 111 025 R4707	1		0.06/0.13
R126/50	24-265 V AC / 24-48 V DC	50 A	1SAR 111 050 R4707	1		0.06/0.13
R126/75	24-265 V AC / 24-48 V DC	75 A	1SAR 111 075 R4707	1		0.10/0.22
R126/100	24-265 V AC / 24-48 V DC	100 A	1SAR 111 100 R4707	1		0.10/0.22

Rated operational voltage V_o : 42-660 V AC

R122/50	4-32 V DC	50 A	1SAR 111 050 R4607	1		0.06/0.13
R122/75	4-32 V DC	75 A	1SAR 111 075 R4607	1		0.10/0.22
R122/100	4-32 V DC	100 A	1SAR 111 100 R4607	1		0.10/0.22

R31x range

- Standard design
- Zero voltage switching
- Rated operational voltage V_o 12-660 V AC
- LED for status indication
- Three-phase
- Integrated protection against electric shock (no additional terminal cover necessary)
- Same basis dimensions and drilling distances as for the standard series (easy interchangeability)

Type	Rated control circuit voltage V_c	Rated operational current I_o	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg/lb
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R311/25	4-32 V DC	25 A	1SAR 131 025 R4814	1		0.38/0.84
R311/55	4-32 V DC	55 A	1SAR 131 055 R4814	1		0.38/0.84
R311/75	4-32 V DC	75 A	1SAR 131 075 R4814	1		0.38/0.84
R315/25	24-275 V AC, 24-50 V DC	25 A	1SAR 131 025 R4914	1		0.38/0.84
R315/55	24-275 V AC, 24-50 V DC	55 A	1SAR 131 055 R4914	1		0.38/0.84
R315/75	24-275 V AC, 24-50 V DC	75 A	1SAR 131 075 R4914	1		0.38/0.84

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Solid-state relays - Accessories

Heat sink KK

Ordering details



KK-2,6

2CDC301 011 F 0003



KK-R111-1,5

2CDC301 013 F 0003



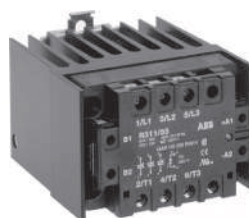
KK-R111-0,7

2CDC-301 014 F 0003



HS 75/0,5

1SAR 110 100 F3606



HDS 50/0,8

1SVC 110 000 F0609

Heat sink for single-phase solid-state relays R111, R120, R121, R122, R126

Type	Description	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg/lb
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For screw mounting on mounting plate

KK-2,6	Heat sink 2,6 K/W ¹⁾	GHR 110 9401 P0001	1		0.12/0.26
KK-1,8	Heat sink 1,8 K/W ¹⁾	GHR 110 9401 P0002	1		0.20/0.44
KK-0,7	Heat sink 0,7 K/W ¹⁾	GHR 110 9404 P0001	1		0.65/1.43

For DIN rail mounting

KK-R111-2,1	Heat sink 2,1 K/W ¹⁾	GHR 110 9402 P0001	1		0.29/0.64
KK-R111-1,5	Heat sink 1,5 K/W ¹⁾	GHR 110 9405 P0001	1		0.42/2.20
KK-R111-0,7	Heat sink 0,7 K/W ¹⁾	GHR 110 9406 P0001	1		1.02/2.20
KK-R111-0,5	Heat sink 0,5 K/W ¹⁾	GHR 110 9407 P0001	1		1.30/2.86

Heat sink for three-phase solid-state relays R311, R315

For DIN rail mounting

KK-R311-0,8	Heat sink 0,8 K/W ¹⁾	GHR 310 9401 P0001	1		1,00/2.20
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Further accessories

	Terminal cover for R111, R115	GHR 110 6605 P0001	1		0.05/0.11
	Rapid-fastening plate for R1xx	GHR 110 1105 R0001	1		0.045/0.01
	fastening plate for R31x	GHR 310 1105 R0001	1		0.05/0.11
EMV - 100	EMC filter for single-phase solid-state relays	GHR 110 0000 R0001	1		0.10/0.22
EMV - 300	EMC filter for three-phase solid-state relays	GHR 310 0000 R0001	1		0.10/0.22
TP-01	Heat transfer foil for single-phase relays	GHR 110 9500 P0001	1		0.001/0.002
TP-03	Heat transfer foil for three-phase relays	GHR 310 9500 P0001	1		0.005/0.011

¹⁾ Use heat transfer paste or heat transfer foil TP-01 or TP-03 when mounting solid-state relays.

Semiconductor contactors

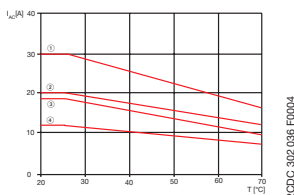
R100.xx range

Technical data

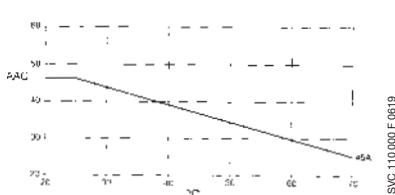
Type	R100.20	R100.30-IO	R100.30-ZS	R100.45	R100.45-SG
Output circuit					
Switching element	Thyristor				
Rated operational voltage V_e (V_{effmax})	42-660 V AC				
Period. peak inverse voltage (V_{peak})	1200 V_{pp}				
Rated operational current at $T_a = 25^\circ C$	AC-51	20 A AC	30 A AC	45 A AC	
	AC-53a	5 A AC	15 A AC	20 A AC	
Operating frequency	45-65 Hz				
Max. off-state leakage current (at V_{max} and $T = 25^\circ C$)	< 3 mA_{rms}				
Minimum load current	350 mA	150 mA	150 mA		150 mA
Max. surge current I_{TSM} ($t = 10$ ms)	250 A	400 A	1150 A		1150 A
Max. overcurrent ($t = 1$ s)	< 35 A AC	< 125 A AC		< 125 A AC	
Max. load integral $\int i^2 dt$ ($t = 10$ ms)	310 A^2s	1800 A^2s	6600 A^2s		6600 A^2s
Conducting state voltage at I_{max} and $T = 25^\circ C$ (V_{peak})	1.6 V_{rms}				
Critical current gradient di/dt	≥ 10 A/ μs	≥ 100 A/ μs		≥ 150 A/ μs	
Permissible commutating voltage gradient du/dt	500 V/ μs				
Permissible static voltage gradient du/dt	500 V/ μs				
Input circuit					
Rated control circuit voltage	4-32 V DC	4-32 V DC	4-32 V DC	4-32 V DC	4-32 V DC
Make voltage	3.8 V DC	3.8 V DC	4.25 V DC	4.25 V DC	3.8 V DC
Inverse polarity voltage	32 V DC				
Break voltage	1.2 V DC	1.2 V DC	1 V DC	1 V DC	1.2 V DC
Input current (at V_{max})	12 mA	12 mA	15 mA	15 mA	12 mA
Turn-on time max.	1 period	1 ms	1 period	1 period	1 period
Turn-off time max.	1 period				
General data					
Power factor ($\cos \varphi$)	≥ 0.5 (at 600 V AC)				
Operating temperature	-30...+80 $^\circ C$				
Storage temperature	-40...+100 $^\circ C$				
Barrier-layer temperature	125 $^\circ C$				
Proof voltage	4000 V				
Dielectric strength	4000 V				
Wire size	input terminals	max. 2 x 2.5 mm^2 / 1 x 4 mm^2			
	output terminals	2 x 2.5 mm^2 / 1 x 4 mm^2 or 1 x 25 mm^2 (R100.45)			

Load limit curves

Operational current at ambient temperature



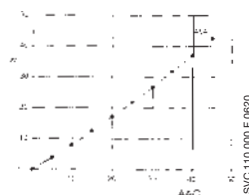
R100.20 / R100.30



R100.45



R100.20 / R100.30



R100.45

Semiconductor contactors

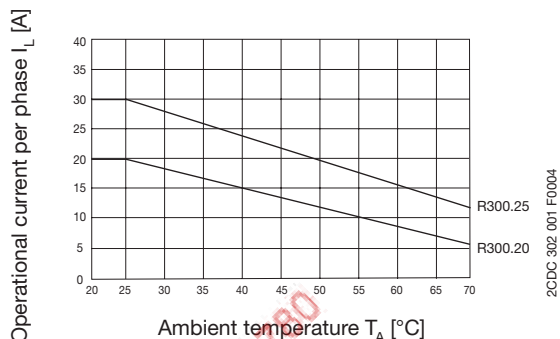
R300.xx range

Technical data

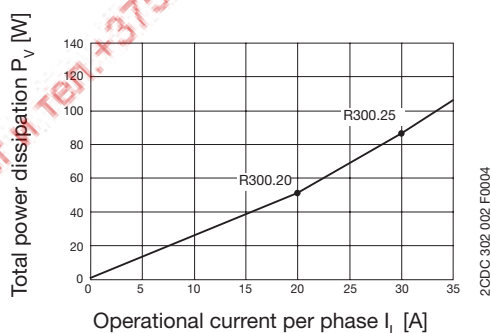
Type	R300.20	R300.25
Output circuit		
Switching element	Thyristor	
Rated operational voltage	40-660 V AC	
Period. peak inverses voltage (V_{peak})	1200 V _{pp}	
Rated operational current at Ta = 25 °C	AC-51	3x20 A
	AC-53a	3x15 A
Operating frequency	45-65 Hz	
Max. off-state leakage current (at V _{rms} and operational frequency)	< 3 mA	
Minimum load current	150 mA	
Max. surge current (T = 25 °C, t = 10 ms)	600 Apk	
Max. overcurrent (t = 1 s)	< 125 A	
Max. load integral $\int i^2 dt$ (t = 10 ms)	1800 A ² s	
Conducting state voltage at I _{rms}	1.6 V _{rms}	
Critical current gradient di/dt	≥ 100 A/μs	
Permissible commutating voltage gradient du/dt	500 V/μs	
Permissible static voltage gradient du/dt	500 V/μs	
Input circuit		
Rated control circuit voltage	5-32 V DC	
Make voltage	4.7 V DC	
Inverse polarity voltage	-32 V DC	
Break voltage	1.2 V DC	
Maximum input current	24 mA	
Turn-on time	< 1 period	
Turn-off time	< 1 period	
General data		
Power factor (cos φ)	≥ 0.5 (at 600 V AC)	
Operating temperature	-30...+70 °C	
Storage temperature	-40...+80 °C	
Rated insulation voltage	Input to output	≥ 4000 V _{rms} AC
	Output to case	≥ 4000 V _{rms} AC
Conductor cross section	rigid	0.5-4.0 mm ² (20-12 AWG)
	stranded with wire end ferrules	0.5-2x2.5 mm ² (20-2x12 AWG)
Approvals	UL, cULus CSA (pending)	

Load limit curves

Derating curve



Dissipation curve



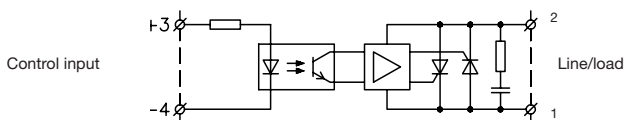
Solid-state relays

R111 range

Technical data

Type	R111/25	R111/45	R111/20	R111/40	R111/90
Output circuit					
Switching element	Thyristor				
Rated operational voltage V_e (V_{effmax})	24-280 V AC		42-530 V AC		
Period. peak inverse voltage (V_{peak})	650 V_{pp}		1200 V_{pp}		
Rated operational current	AC-51	25 A_{rms}	50 A_{rms}	25 A_{rms}	50 A_{rms}
	AC-53a	5 A_{rms}	15 A_{rms}	5 A_{rms}	15 A_{rms}
Operating frequency	45-65 Hz				
Max. off-state leakage current (at V_{max} and $T = 25\text{ }^\circ\text{C}$)	3 mA				
Minimum load current	20 mA_{rms}				
Max. surge current I_{TSM} ($t = 20$ ms)	250 A	600 A	250 A	600 A	1000 A
Max. overcurrent ($t = 1$ s)	55 A	125 A	55 A	125 A	150 A
Max. load integral $\int i^2 dt$ ($t = 10$ ms)	310 A^2s	1800 A^2s	310 A^2s	1800 A^2s	5000 A^2s
Conducting state voltage at I_{max} and $T = 25\text{ }^\circ\text{C}$ (V_{peak})	1.6 V				
Permissible voltage gradient du/dt	500 $V/\mu s$				
Critical current gradient di/dt	100 A/s				
Thermal resistance barrier/base max.	1.25 K/W	0.65 K/W	1.25 K/W	0.65 K/W	0.3 K/W
Thermal resistance barrier/ambient max.	12 K/W				
Input circuit					
Rated control circuit voltage	3-32 V DC				
Make voltage	3 V DC				
Break voltage	1 V DC				
Input impedance	1.5 $k\Omega$				
Max. input current (at V_{max})	22 mA				
Turn-on time max.	0.5 period				
Turn-off time max.	0.5 period				
Input circuit					
Power factor ($\cos \varphi$)	0.5-1 ¹⁾				
Operating temperature	-20...+70 $^\circ\text{C}$				
Barrier-layer temp.	125 $^\circ\text{C}$				
Storage temperature	-40...+100 $^\circ\text{C}$				
Proof voltage	4000 V				
Dielectric strength	4000 V				

Circuit diagram R111



¹⁾ If the limit values are observed, the solid-state relays are suitable for switching inductive loads.

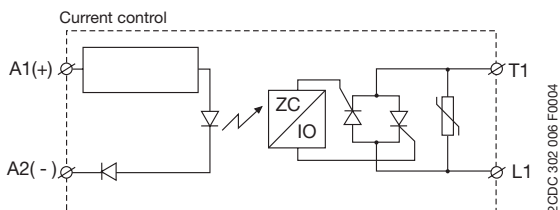
Solid-state relays

R12x range

Technical data

Type	R120/25	R120/50	R121/25 R126/25	R121/50 R126/50	R121/75 R126/75	R121/100 R126/100	R122/50	R122/75	R122/100	
Output circuit										
Switching element	Thyristor									
Rated operational voltage V_e (V_{rms} max)	24-265 V AC		42-530 V AC				42-660 V AC			
Period. peak inverse voltage (V_{peak})	650 V_{pp}		1200 V_{pp}				1600 V_{pp}			
Rated operational current	AC-51	25 A_{rms}	50 A_{rms}	25 A_{rms}	50 A_{rms}	75 A_{rms}	100 A_{rms}	50 A_{rms}	75 A_{rms}	100 A_{rms}
	AC-53a	5 A_{rms}	15 A_{rms}	5 A_{rms}	15 A_{rms}	20 A_{rms}	30 A_{rms}	15 A_{rms}	20 A_{rms}	30 A_{rms}
Operating frequency	45-65 Hz									
Max. off-state leakage current (at V_{max} and $T = 25^\circ C$)	3 mA									
Minimum load current	150 mA_{rms}									
Max. surge current I_{TSM} ($t = 10$ ms)	250 A	600 A	250 A	600 A	1000 A	1500 A	600 A	1000 A	1500 A	
Max. overcurrent ($t = 1$ s)	55 A	125 A	55 A	125 A	150 A	200 A	125 A	150 A	200 A	
Max. load integral $\int i^2 dt$ ($t = 10$ ms)	310 A^2s	1800 A^2s	310 A^2s	1800 A^2s	6600 A^2s	18000 A^2s	1800 A^2s	6600 A^2s	18000 A^2s	
Conducting state voltage at I_{max} and $T = 25^\circ C$ (V_{peak})	1.6 V									
Permissible voltage gradient du/dt	500 V/ μs									
Critical current gradient di/dt	100 A/s									
Thermal resistance barrier/base max.	0.8 K/W	0.5 K/W	0.8 K/W	0.5 K/W	0.2 K/W	0.2 K/W	0.5 K/W	0.2 K/W	0.2 K/W	
Thermal resistance barrier/ambient max.	20 K/W		20 K/W				15 K/W	20 K/W		15 kW
Type	R120		R121		R122		R126			
Output circuit										
Rated control circuit voltage	3-32 V DC		4-32 V DC		4-32 V DC		24-265 V AC / 24-48 V DC			
Make voltage			3.75 V DC				22 V AC/DC			
Break voltage			1 V DC				6 V AC/DC			
Input impedance			1.5 k Ω				44 k Ω			
Max. input current (at V_{max})			10 mA				5 mA			
Max. turn-on time	< 0.5 period	for all DC supplied types								
	< 1 period	for all AC supplied types								
Max. turn-off time	< 0.5 period	for all DC supplied types								
	< 2 periods	for all AC supplied types								
Type	R12x									
General data										
Power factor ($\cos \varphi$)	0.5-1 ¹⁾									
Operating temperature	-20...+70 $^\circ C$									
Barrier-layer temp.	125 $^\circ C$									
Storage temperature	-40...+100 $^\circ C$									
Proof voltage	4000 V									
Dielectric strength	4000 V									

Circuit diagram R12x



¹⁾ If the limit values are observed, the solid-state relays are suitable for switching inductive loads.

Solid-state relays

R31x range

Technical data

Type	R311/25	R311/55	R311/75	R315/25	R315/55	R315/75
Output circuit						
Switching element	Alternistor					
Rated operational voltage V_e	42-660 V AC					
Period. peak inverse voltage (V_{peak})	1200 V _{pp}					
Rated operational current at $T_a = 25^\circ\text{C}$	AC-51	25 A _{rms}	55 A _{rms}	75 A _{rms}	25 A _{rms}	55 A _{rms}
	AC-53a	5 A _{rms}	15 A _{rms}	20 A _{rms}	5 A _{rms}	20 A _{rms}
Operating frequency	45-65 Hz					
Max. off-state leakage current (at V_{max} and $T_a = 25^\circ\text{C}$)	< 3 mA					
Minimum load current	150 mA _{rms}					
Max. surge current I_{TSM} (t = 10 ms)	230 As	600 As	1000 As	230 As	600 As	1000 As
Max. overcurrent (t = 1 s)	37 A	< 125 A	< 150 A	37 A	< 125 A	< 150 A
Max. load integral \int (t = 10 ms)	265 A ² s	1800 A ² s	6600 A ² s	265 A ² s	1800 A ² s	6600 A ² s
Conducting state voltage	$\leq 1.6 V_{rms}$					
Permissible voltage gradient du/dt	$\geq 500 \text{ V}/\mu\text{s}$					
Critical current gradient di/dt at 50 Hz	$\geq 100 \text{ A}/\mu\text{s}$					
Input circuit (all data at $T_a = 25^\circ\text{C}$)						
Rated control circuit voltage	4-32 V DC			24-275 V AC, 24-50 V DC		
Make voltage	3.8 V DC			18 V AC, 20 V DC		
Break voltage	1.2 V DC			9 V AC		
Max. input current (at V_{max})	$\leq 23 \text{ mA}$			$\leq 15 \text{ mA}$		
Turn-on time delay (at 50 Hz)	10 ms			20 ms		
Turn-off time delay (at 50 Hz)	10 ms			30 ms		
General data						
Temperature range	operation		-30...+80 °C			
	storage		-40...+100 °C			
Barrier-layer temperature	$\leq \pm 125^\circ\text{C}$					
Degree of protection	IP 10					
Wire size	control circuit		2 x 2.5 mm ² (2 x 14 AWG)			
	load circuit		2 x 6 mm ² (2 x 8 AWG)			
Torque	control circuit		$\leq 0.5 \text{ Nm}$			
	load circuit		2.5 Nm			
Isolation data						
Rated isolation voltage solid-state relay - enclosure	$\geq 400 \text{ V AC}_{rms}$					
Test voltage	4000 V					
Dielectric strenght	4000 V					
Overvoltage category	III					
Protection class	2					

Solid-state relays

Heat sink dimensioning for solid-state relays

Procedure for choosing a solid-state relay

Choosing the suitable solid-state relay is easy to do, if the following 4 questions are answered.

1. How much is the maximum operational current?
2. Which control circuit voltage is used?
3. Which operational voltage is required?
4. Is the device operated continuously or in duty cycles?

Knowing these data you can easily choose a suitable relay by means of the technical data specified in this catalog.

Procedure for choosing a suitable heat sink

After having selected the relay, a heat sink suitable for the specific application has to be chosen. For this, the following two questions are of importance.

1. How much is the maximum operational current?
2. How much is the ambient temperature during operation?

If you know the ambient temperature during operation, you can determine the thermal resistance between the bottom of the solid-state relay and the environment using a matrix as it is shown below. The respective matrixes for the other relays are shown on the following pages. Knowing the thermal resistance and the technical data of the heat sink, you can then choose a suitable heat sink.

operational current [A]	thermal resistance [K/W]						power dissipation [W]
	20	30	40	50	60	70	
50,0	1,03	0,86	0,70	0,53	0,37	0,20	61
45,0	1,27	1,09	0,90	0,71	0,52	0,33	53
40,0	1,54	1,32	1,10	0,89	0,67	0,45	46
35,0	1,85	1,59	1,34	1,08	0,82	0,57	39
30,0	2,26	1,95	1,65	1,34	1,03	0,72	33
25,0	2,85	2,47	2,08	1,70	1,32	0,94	26
20,0	3,73	3,24	2,75	2,26	1,77	1,27	20
15,0	5,22	4,54	3,86	3,19	2,51	1,83	15
10,0	8,21	7,16	6,11	5,05	4,00	2,95	10
5,0	17,2	15,0	12,9	10,7	8,51	6,33	5

T_a ambient temperature [°C]

2CDC 302 009 F0004

The selection of the heat sink directly affects the warming of the relay.

$$\text{Relay temperature } T = \text{ambient temperature} + (\text{dissipation} * \text{thermal resistance})$$

The calculated value for the relay temperature should not exceed 100 °C. Otherwise, danger of fire as well as danger of damage to the device exist.

Example

Choosing the solid-state relay:

1. The maximum operational current is 30 A
2. A control circuit voltage of 230 V AC is used
3. The operational voltage is 400 V AC
4. The relay shall be used at continuous operation

→ Possible relays:

R 126/50 - R 126/75 - R 126/100

Chosen relay:

R 126/50

Choosing the heat sink:

1. The maximum operational current is 30 A
2. The ambient temperature during operation is 40 °C

The thermal resistance can be determined using the operational current-ambient temperature matrix.

The Y axis of the diagram shows the operational current, the X axis shows the ambient temperature in °C. The thermal resistance can be read at the cross-point of the operational current with the ambient temperature. In our example the thermal resistance is 1.65 K/W (kelvin/watt).

Consequently, the required heat sink must have a value of at least 1.65 K/W. Here it has to be observed that the quality of the heat sink increases with a reduction of the temperature/power ratio which means that a heat sink with a ratio of 0.5 K/W provides better heat dissipation than a heat sink with a ratio of 1.5 K/W.

The power dissipation can be read from the right column of the matrix. In our example it is 33 W.

Knowing the thermal resistance, you can now choose a suitable heat sink using the technical data.

Example 1: Heat sink KK-R111-2,1

$$T = 40 \text{ °C} + (33 \text{ W} + 2.1 \text{ K/W}) = 40 \text{ °C} + 69.3 \text{ °C} = 109.3 \text{ °C} \quad \text{Too hot!}$$

Example 2: Heat sink KK-R111-1,5

$$T = 40 \text{ °C} + (33 \text{ W} + 1.5 \text{ K/W}) = 40 \text{ °C} + 49.5 \text{ °C} = 89.5 \text{ °C} \quad \text{OK!}$$

Example 3: Heat sink KK-R111-0,5

$$T = 40 \text{ °C} + (33 \text{ W} + 0.5 \text{ K/W}) = 40 \text{ °C} + 16.5 \text{ °C} = 56.5 \text{ °C} \quad \text{OK!}$$

Due to reasons of space and costs, example 2 is the most commonly used case.

The calculated values apply for continuous duty; during cycling the heating is lower depending on the duty cycle.

Solid-state relays

Operational currents related to the ambient temperature, heat sink dimensioning

R111 range

operational current I_b [A]	thermal resistance [K/W]	power dissipation P_v [W]
25	2 1.7 1.4 1 0.71 0.40	32
22.5	2.5 2.1 1.8 1.4 1 0.66	27
20	3.1 2.7 2.3 1.9 1.4 1	23
17.5	4. 3.5 3 2.5 2 1.4	20
15	4.9 4.3 3.7 3.1 2.5 1.9	16
12.5	6.2 5.4 4.6 3.9 3.1 2.3	13
10	8.1 7.1 6.1 5.1 4 3	10
7.5	11.3 9.9 8.5 7.1 5.6 4.2	7
5	- 15.6 13.3 11.1 8.9 6.7	5
2.5	- - - - 18.7 14	2
	20 30 40 50 60 70	

R111/20 - R111/25

operational current I_b [A]	thermal resistance [K/W]	power dissipation P_v [W]
50	0.92 0.76 0.60 0.45 0.29 -	63
45	1.2 0.99 0.80 0.62 0.44 0.26	55
40	1.5 1.3 1.1 0.85 0.63 0.42	47
35	1.9 1.6 1.4 1.1 0.89 0.63	40
30	2.4 2.1 1.8 1.5 1.2 0.91	33
25	3 2.7 2.3 1.9 1.5 1.1	26
20	3.9 3.5 3 2.5 2 1.5	20
15	5.5 4.8 4.1 3.4 2.7 2.1	15
10	8.6 7.5 6.4 5.4 4.3 3.2	9
5	17.9 15.6 13.4 11.2 8.9 6.7	4
	20 30 40 50 60 70	

R111/40 - R111/45

operational current I_b [A]	thermal resistance [K/W]	power dissipation P_v [W]
90	0.63 0.53 0.42 0.32 - -	97
80	0.81 0.69 0.57 0.45 0.33 -	84
70	1 0.89 0.75 0.61 0.47 0.33	71
60	1.3 1.2 1 0.83 0.66 0.49	59
50	1.7 1.5 1.3 1.1 0.85 0.64	47
40	2.2 1.9 1.7 1.4 1.1 0.83	36
30	3.1 2.7 2.3 1.9 1.5 1.2	26
20	4.8 4.2 3.6 3 2.4 1.8	17
10	10 8.8 7.5 6.3 5 3.8	8
	20 30 40 50 60 70	

R111/90

R12x range

operational current I_b [A]	thermal resistance [K/W]	power dissipation P_v [W]
25.0	2.70 2.34 1.98 1.61 1.25 0.89	28
22.5	3.10 2.69 2.28 1.86 1.45 1.04	24
20.0	3.61 3.13 2.65 2.18 1.70 1.23	21
17.5	4.26 3.70 3.14 2.59 2.03 1.47	18
15.0	5.14 4.47 3.80 3.14 2.47 1.80	15
12.5	6.38 5.56 4.73 3.91 3.09 2.27	12
10.0	8.25 7.19 6.14 5.08 4.02 2.97	9
7.5	11.4 9.94 8.49 7.04 5.59 4.14	7
5.0	17.7 15.4 13.2 11.0 8.74 6.51	4
2.5	- - - - 18.2 13.6	2
	20 30 40 50 60 70	

R120/25 - R121/25 - R126/25

operational current I_b [A]	thermal resistance [K/W]	power dissipation P_v [W]
50.0	1.03 0.86 0.70 0.53 0.37 0.20	61
45.0	1.27 1.09 0.90 0.71 0.52 0.33	53
40.0	1.54 1.32 1.10 0.89 0.67 0.45	46
35.0	1.85 1.59 1.34 1.08 0.82 0.57	39
30.0	2.26 1.95 1.65 1.34 1.03 0.72	33
25.0	2.85 2.47 2.08 1.70 1.32 0.94	26
20.0	3.73 3.24 2.75 2.26 1.77 1.27	20
15.0	5.22 4.54 3.86 3.19 2.51 1.83	15
10.0	8.21 7.16 6.11 5.05 4.00 2.95	10
5.0	17.2 15.0 12.9 10.7 8.51 6.33	5
	20 30 40 50 60 70	

R120/50 - R121/50 - R122/50 - R126/50

operational current I_b [A]	thermal resistance [K/W]	power dissipation P_v [W]
75.0	0.91 0.78 0.65 0.52 0.39 0.26	77
67.5	1.10 0.96 0.81 0.66 0.51 0.36	68
60.0	1.34 1.17 1.00 0.83 0.66 0.49	59
52.5	1.60 1.40 1.20 1.00 0.80 0.60	50
45.0	1.93 1.68 1.44 1.20 0.96 0.72	42
37.5	2.38 2.08 1.78 1.49 1.19 0.89	34
30.0	3.06 2.68 2.30 1.91 1.53 1.15	26
22.5	4.21 3.68 3.16 2.63 2.10 1.58	19
15.0	6.51 5.70 4.88 4.07 3.26 2.44	12
7.5	13.5 11.77 10.09 8.41 6.73 5.04	6
	20 30 40 50 60 70	

R121/75 - R122/75 - R126/75

operational current I_b [A]	thermal resistance [K/W]	power dissipation P_v [W]
100.0	0.54 0.45 0.36 0.27 0.18 0.09	111
90.0	0.68 0.58 0.47 0.37 0.27 0.17	97
80.0	0.86 0.74 0.62 0.50 0.38 0.26	84
70.0	1.08 0.94 0.80 0.66 0.52 0.38	71
60.0	1.37 1.20 1.03 0.85 0.68 0.51	59
50.0	1.70 1.49 1.28 1.06 0.85 0.64	47
40.0	2.21 1.93 1.66 1.38 1.10 0.83	36
30.0	3.06 2.68 2.30 1.91 1.53 1.15	26
20.0	4.78 4.18 3.59 2.99 2.39 1.79	17
10.0	9.98 8.73 7.49 6.24 4.99 3.74	8
	20 30 40 50 60 70	

R121/100 - R122/100 - R126/100

R31x range

operational current I_b [A]	thermal resistance [K/W]	power dissipation P_v [W]
25.0	0.44 0.34 0.23 0.12 0.01 -- --	92
22.5	0.62 0.49 0.37 0.24 0.12 -- --	80
20.0	0.84 0.69 0.54 0.40 0.25 0.10 --	68
17.5	1.12 0.95 0.78 0.60 0.43 0.25 0.08	58
15.0	1.51 1.30 1.09 0.88 0.67 0.46 0.25	47
12.5	2.06 1.80 1.54 1.27 1.01 0.75 0.48	38
10.0	2.75 2.40 2.06 1.72 1.37 1.03 0.69	29
7.5	3.83 3.35 2.87 2.39 1.91 1.43 0.96	21
5.0	6.01 5.26 4.51 3.76 3.01 2.25 1.50	13
2.5	12.62 11.04 9.46 7.89 6.31 4.73 3.15	6
	20 30 40 50 60 70 80	

R311/25 - R315/25

operational current I_b [A]	thermal resistance [K/W]	power dissipation P_v [W]
55.0	0.29 0.23 0.17 0.11 0.05 -- --	164
50.0	0.36 0.29 0.22 0.16 0.09 0.02 --	148
45.0	0.44 0.36 0.29 0.21 0.14 0.06 --	133
40.0	0.54 0.46 0.37 0.29 0.20 0.12 0.03	118
35.0	0.67 0.58 0.48 0.38 0.28 0.19 0.09	103
30.0	0.85 0.74 0.62 0.51 0.39 0.28 0.16	87
25.0	1.10 0.96 0.82 0.68 0.55 0.41 0.27	73
20.0	1.38 1.21 1.04 0.87 0.69 0.52 0.35	58
15.0	1.85 1.62 1.39 1.16 0.93 0.70 0.46	43
10.0	2.80 2.45 2.10 1.75 1.40 1.05 0.70	29
5.0	5.62 4.92 4.21 3.51 2.81 2.11 1.40	14
2.5	11.26 9.85 8.45 7.04 5.63 4.22 2.82	7
	20 30 40 50 60 70 80	

R311/55 - R315/55

operational current I_b [A]	thermal resistance [K/W]	power dissipation P_v [W]
75.0	0.27 0.22 0.17 0.12 0.07 0.02 --	201
70.0	0.32 0.27 0.21 0.16 0.10 0.05 --	184
65.0	0.38 0.32 0.26 0.20 0.14 0.08 0.02	167
60.0	0.44 0.38 0.31 0.25 0.18 0.11 0.05	151
55.0	0.52 0.45 0.38 0.30 0.23 0.16 0.08	136
50.0	0.62 0.54 0.45 0.37 0.29 0.21 0.12	121
45.0	0.74 0.64 0.55 0.46 0.36 0.27 0.17	106
40.0	0.87 0.76 0.65 0.54 0.43 0.32 0.22	92
35.0	1.01 0.89 0.76 0.63 0.51 0.38 0.25	79
30.0	1.21 1.06 0.91 0.76 0.60 0.45 0.30	66
25.0	1.49 1.30 1.11 0.93 0.74 0.56 0.37	54
20.0	1.90 1.67 1.43 1.19 0.95 0.71 0.48	42
15.0	2.60 2.28 1.95 1.53 1.20 0.98 0.65	31
10.0	4.01 3.51 3.01 2.51 2.01 1.50 1.00	20
5.0	8.24 7.21 6.18 5.15 4.12 3.09 2.08	10
	20 30 40 50 60 70 80	

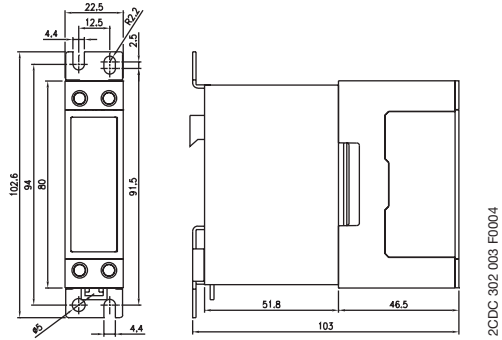
R311/75 - R315/75

Semiconductor contactor R100.xx and R300.xx Solid-state relays R111, R12x and R31x Dimensional drawings

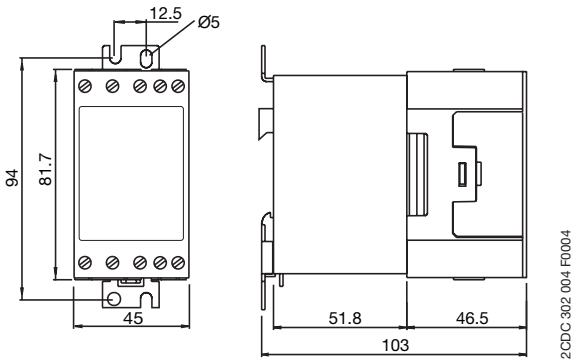
Dimensional drawings

Dimensions in mm

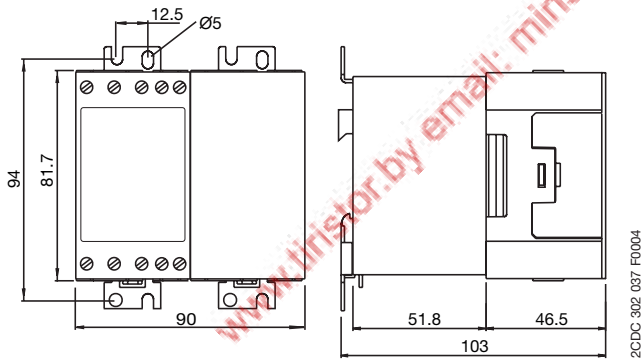
Semiconductor contactors



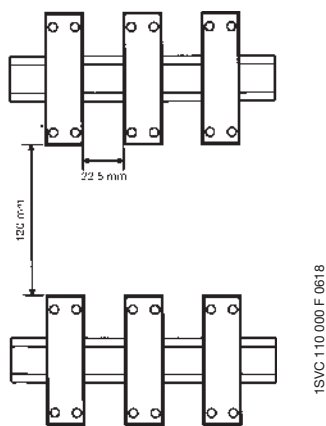
R100.20, R100.30



R100.45, R100.45-SG
R300.20

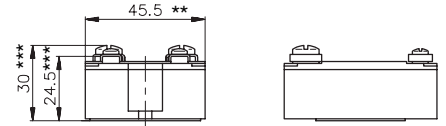


R300.25

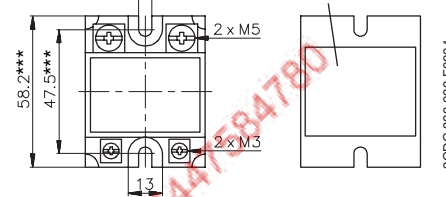


DIN rail mounting for R100.xx

Solid-state relays

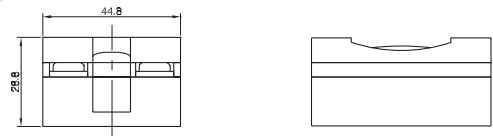


Use heat transfer compound!

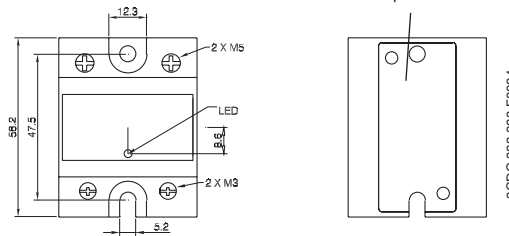


** = ±0.4 mm
*** = ±0.5 mm

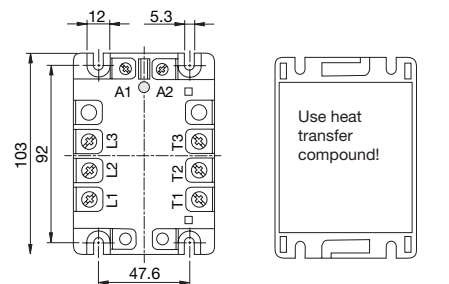
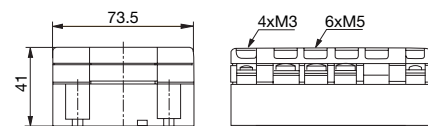
R111



Use heat transfer compound!



R120, R121, R122, R126



Use heat transfer compound!

R311, R315

Solid-state relays - Accessories

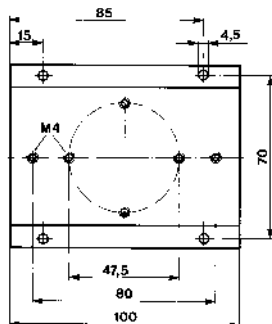
Heat sinks KK

Dimensional drawings

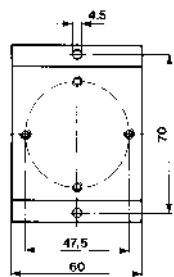
Dimensional drawings

Dimensions in mm

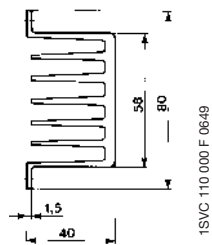
Heat sinks for screw mounting on a mounting plate for solid-state relays R111



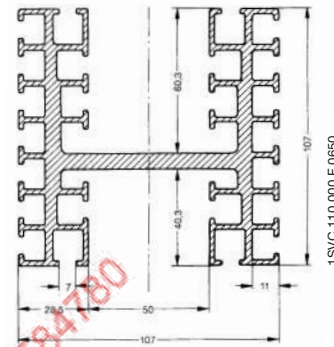
KK-1,8



KK-2,6



KK-1,8 / KK-2,6

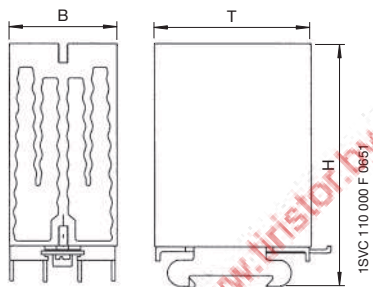


KK-0,7 (length 100 mm)

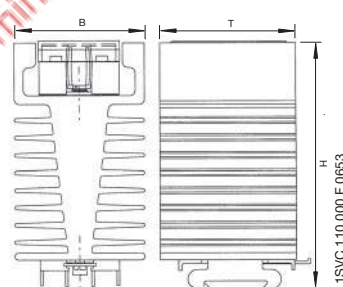
Heat sinks for DIN rail mounting

Dimensions, heat sink only

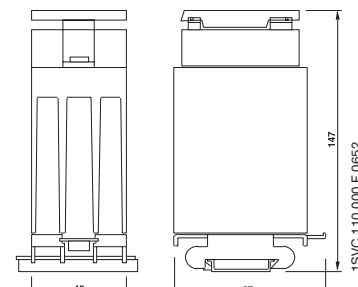
Type	W	D	H
KK-R111-2,1	51	65	65
KK-R111-1,5	45	65	97
KK-R111-0,7	72	75	136
KK-R111-0,5	120	100	136
KK-R311-0,8	114	75	130



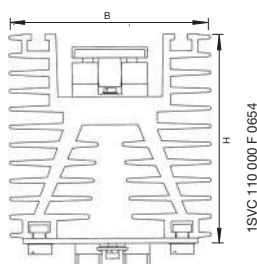
KK-R111-2,1



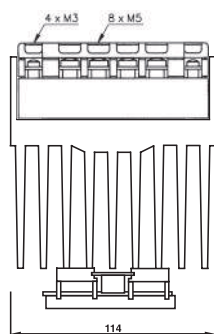
HS 50/0,7 - HS 75/0,7
HS100-0,7 - KK-R111-0,7



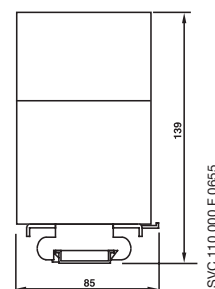
HS 50/1,5 - HS 50-AC/1,5
HS 50-H/1,5 - HS 75/1,5
KK-R111-1,5



HS 100-0,5 - HS 75/0,5
HS 90/0,5-AC - KK-R111-



HDS 50/0,8 - HDS 50-AC/0,8
KK-R311-0,8



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