

Solid State Relays

Interface Relays



Solid-state relays

Terminal modules

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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



RD112

SST 900 92

Device series R 12x

Thyristor units for R loads and general loads cos. ϕ 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

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 201 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 ① ②	GHR 110 9402 P 0001		0.290	1
KK-R111-1.5 Heat sink 1.5 K/W ① ②	GHR 110 9405 P 0001		0.420	1
KK-R111-0.7 Heat sink 0.7 K/W ① ②	GHR 110 9406 P 0001		1.020	1
KK-R111-0.5 Heat sink 0.5 K/W ① ②	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!

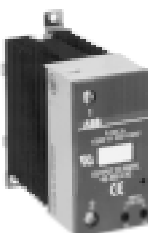
② Suitable for butt mounting, with clip for top-hat rail mounting

SIGMASWITCH® Solid-state relays

Ordering details



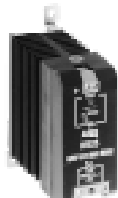
R100.12



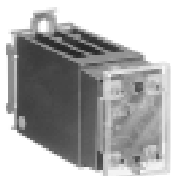
R100.35



R300.25



HS 25



HS 50



HS 65

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)

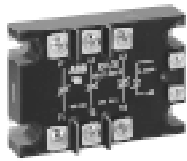
HS 45 45 A at 25 degrees C ambient temperature, new design with status LED and box terminals

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



R 311/20



HDS-R2



HDS-50

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

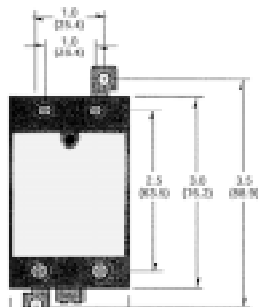
HDS-50 semiconductor relay R311/40, mounted ready-to-use on heat sink (0.8 K/W), complete with terminal shroud, varistors and clip for top-hat rail mounting (3 x 24 A at 45°C)

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

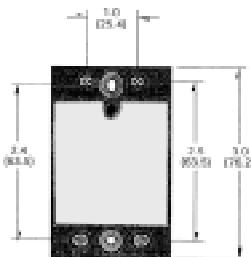
① Use heat transfer compound when mounting solid-state relays!

Dimension diagrams



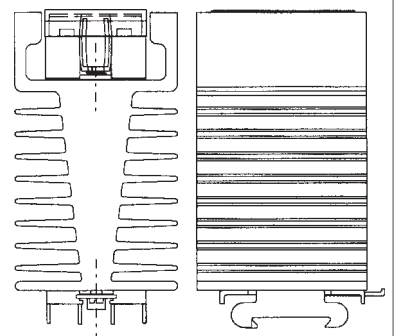
HS 45 / HS 65

Dimensions in inches and (mm)



R 12x

Dimensions in inches and (mm)

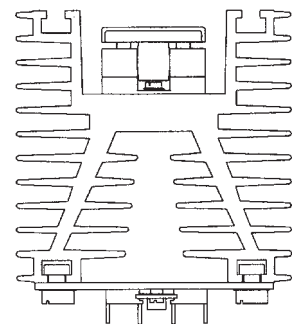


HS 90 / 0.7, KK-111-0.7

HS 125 / 07

Dimensions:

W x H x D = 72 x 75 x 124 mm



HS 125 / 0.5, KK-111-0.5

Dimensions:

W x H x D = 120 x 100 x 135 mm

Solid-state relays, R 100/R 300

Technical data

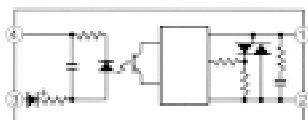
Output data	Unit	R100.12	R100.25	R100.35	R300.25
Contact element		TRIAC	Thyristoren	Thyristoren	Thyristoren
Operating voltage range U_e (V_{eff} max)	V AC	24-280	48-660	48-660	48-660
Periodic peak off-state voltage (V_{Spitze})	V ss	600	1200	1000 ¹⁾	1200
Thermal continuous current	A	12	25	35	3x 25
Operating 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	V/ μs	200	500	500	500
$\cos \phi$ (nullspannungsschaltend)		>0,5-1	Quick-act. switching	>0,5-1	>0,5-1
Thermal resistance					
R_{th} 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			Self-extinguishing (UL 94 V0)		
base			Aluminium		

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

Solid-state relays, R 100/R 300

Technical data

Block diagrams



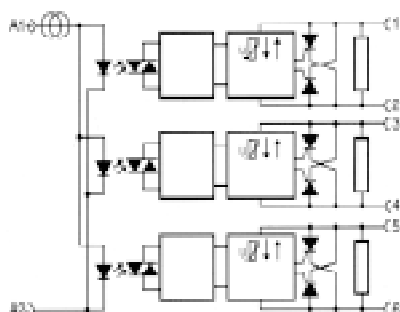
R100.12 (TRIAC)



R 100.35
(Thyristors, quick-action switching)

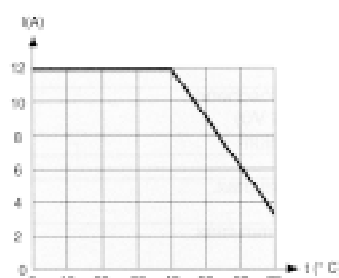


R 100.25
(Thyristors, no-voltage switching)

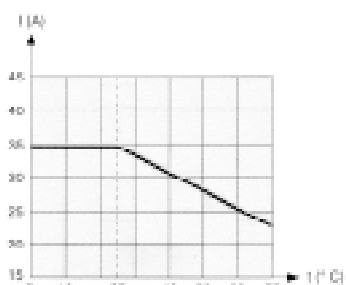


R 300.25
(Thyristors, no-voltage switching)

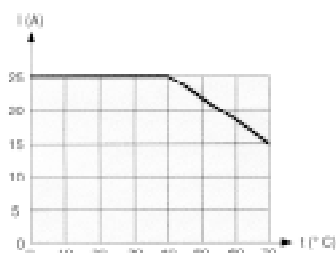
Reduction Curves



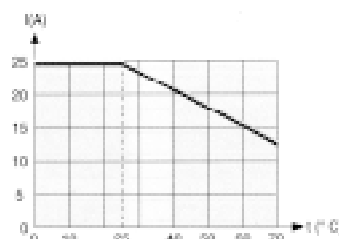
R 100.12 (TRIAC)



R 100.25

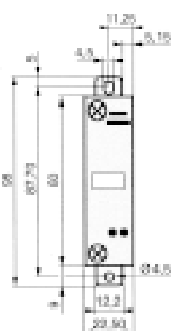


R 100.35-SG

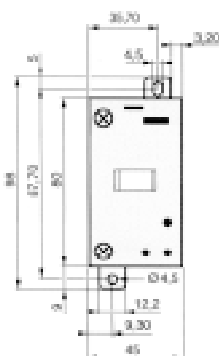


R 300.25

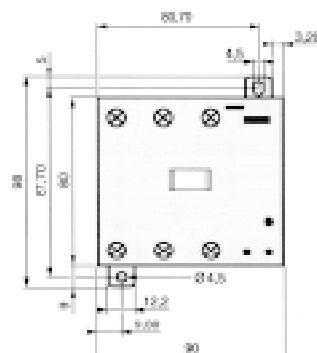
Dimension diagrams



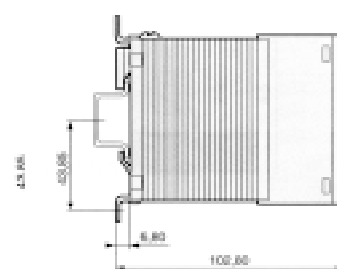
R 100.12
R 100.25



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

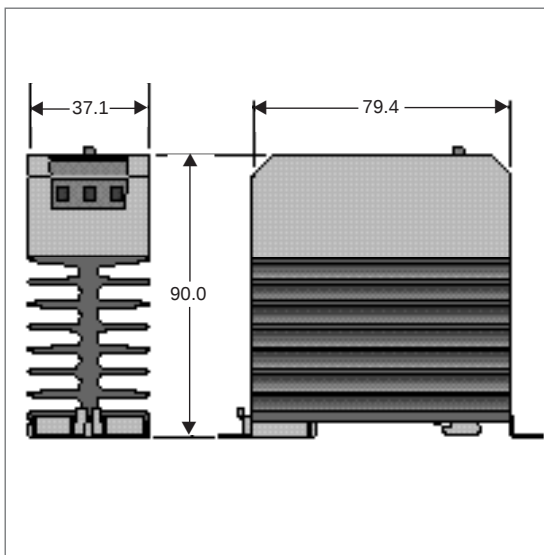
Dimension diagrams

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_e	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_e (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						

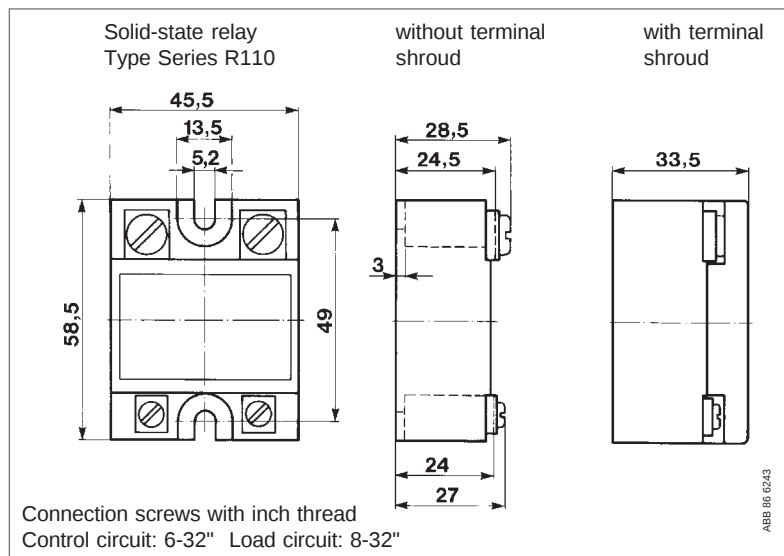
Input data		HS	Series R111	Series R115	Series R12x
Control voltage	V	4...32 V DC	3 ... 32 V DC	90 ... 280 V AC	3...32 V DC
Dielectric strength	V	-32 V DC	-32 V DC	310 V AC	-32 V AC
Minimum voltage for signal "1"	V	≥4 V DC	≥3 V DC	≥90 V AC	≥4 V DC
Max. voltage for signal "0"	V	≤1 V DC	≤1 V DC	≤10 V DC	≤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

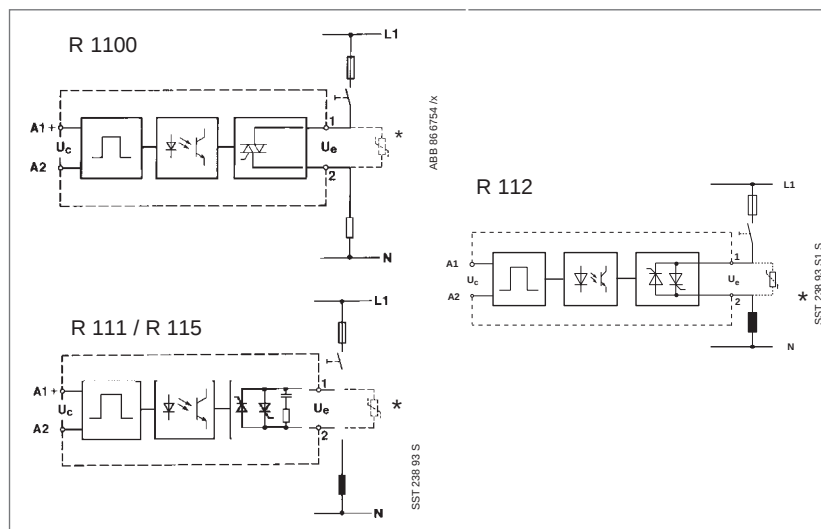
Technical data

Output data	Unit	R111/90	R111/120	R112/40	R112/80	R1141	R1142
Rated operating voltage U_e	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_e (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

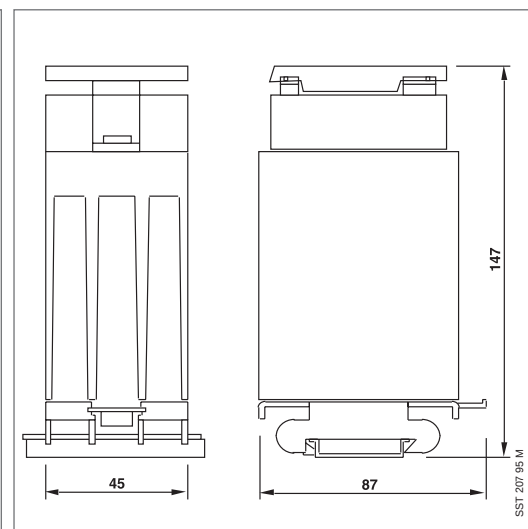
Input data		
Control voltage	V DC	3...32 V DC (R112: 4...32 V DC)
Dielectric strength	V DC	−32 V DC
Minimum voltage for signal "1"	V DC	≥3 V DC (R112: ≥24 V DC)
Max. voltage for signal "0"	V DC	≤ 1 V DC
Input impedance	kΩ	≥1.5
Input current	mA	≤ 4 mA (5 V DC), ≤ 17 mA (24 V DC) (R112: ≤ 25 mA)
Turn-on 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

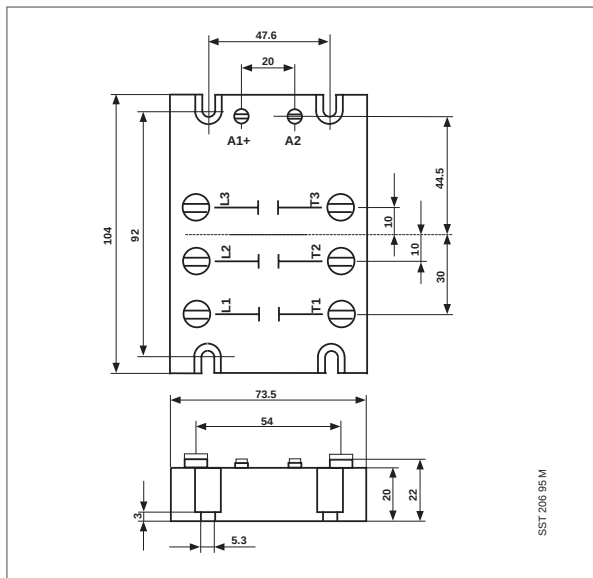
Semiconductor three-phase contactor HDS-50

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 ∫ 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	

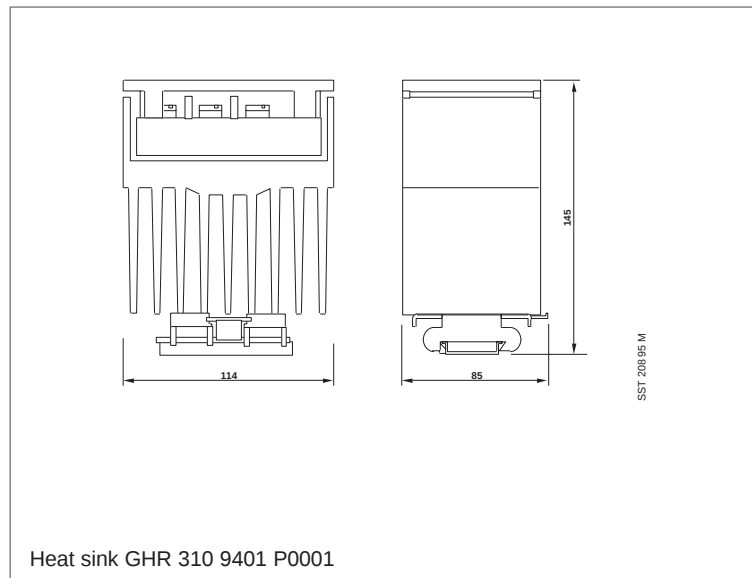
Dimension diagram R 311 /315

Dimensions in mm



Dimension diagram HDS-50 / HDS-50-AC

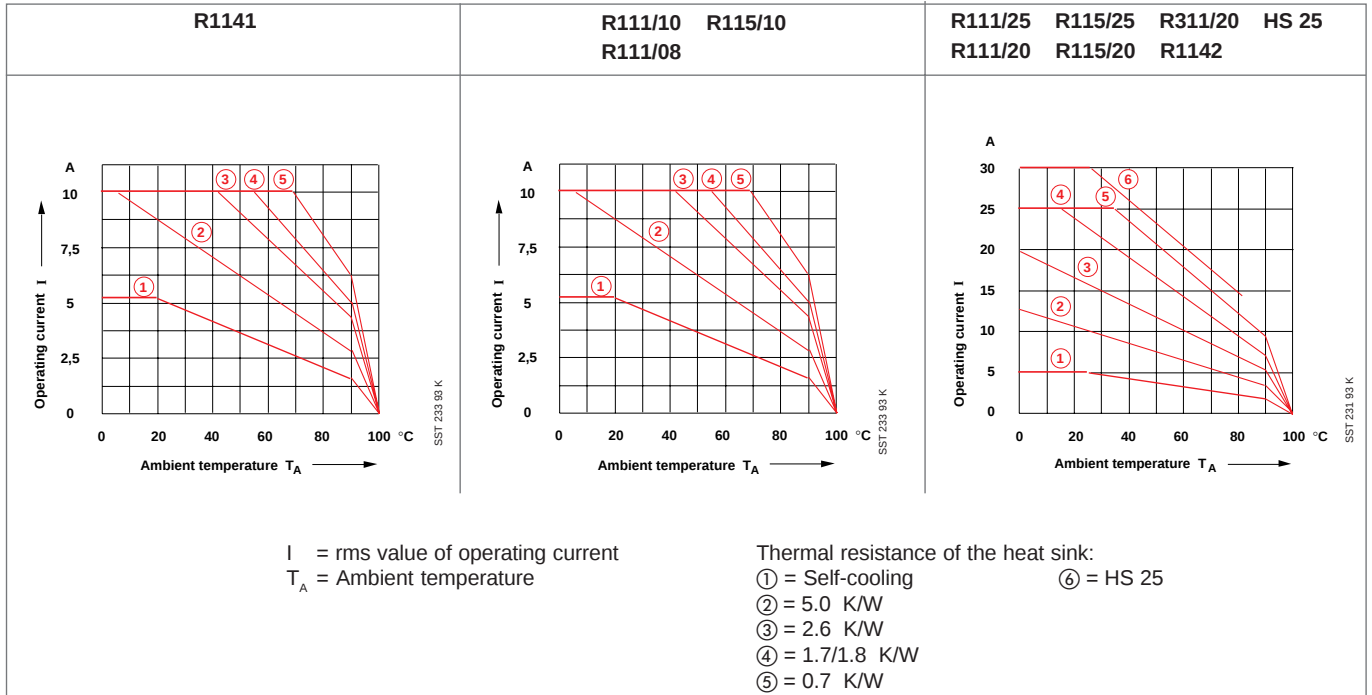
Dimensions in mm



Solid-state relays

Derating curves, Limiting overload characteristics Dimension diagrams

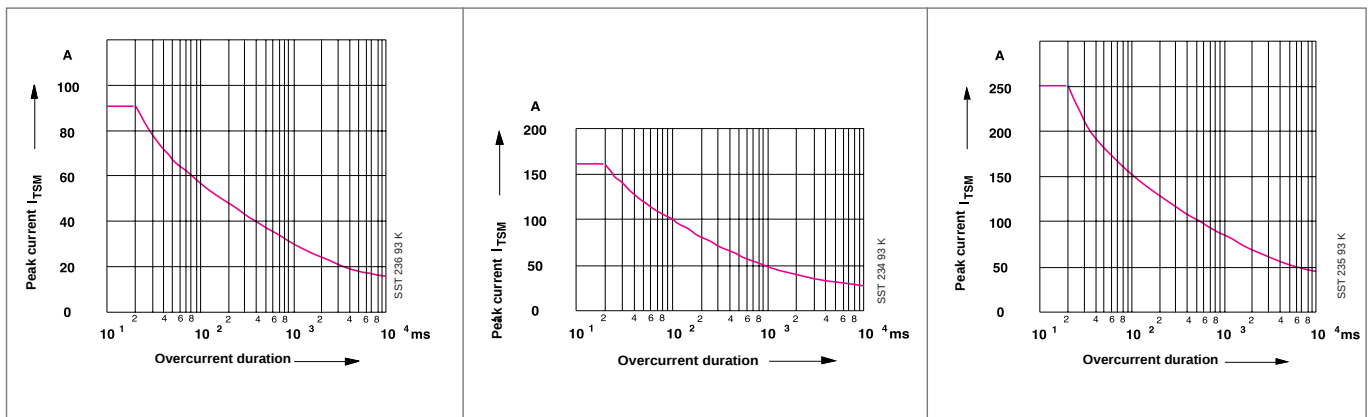
Derating curves



Limiting overload characteristics

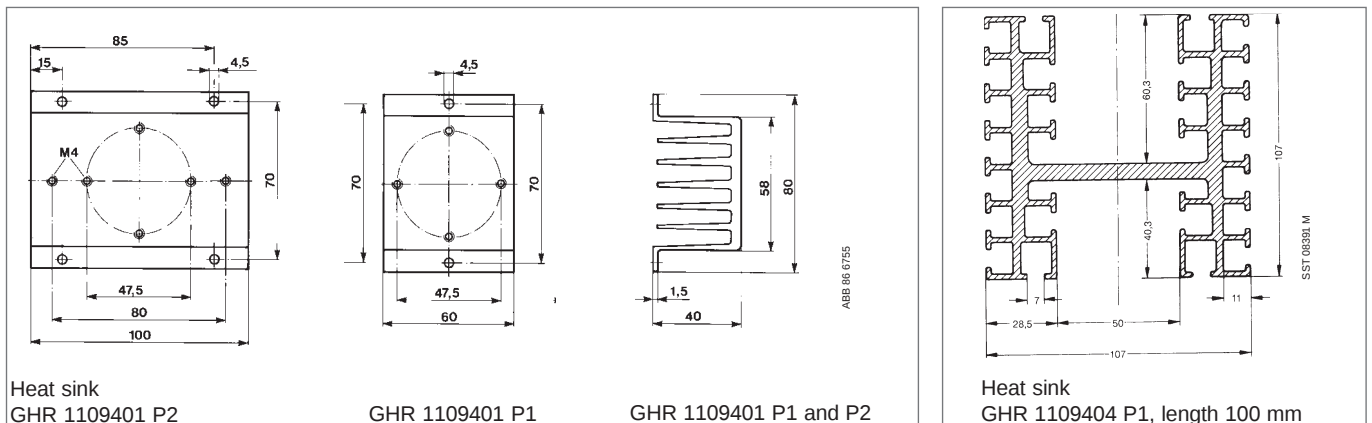
A surge current near to the max. surge current influences the expected service life of the unit and is therefore permissible only in exceptional cases, e.g. in the event of a short-circuit or malfunction.

Periodic surge currents may not exceed approx. 50 % of the max. surge current.



Dimension diagrams

Dimensions in mm

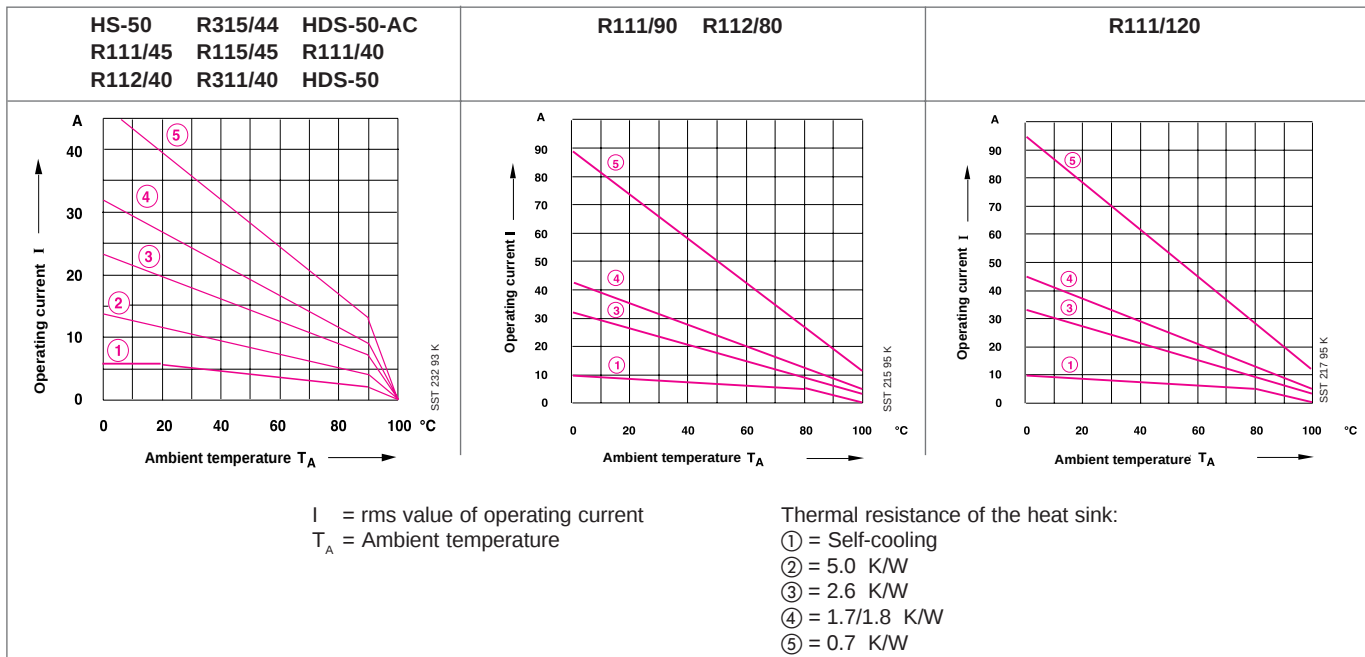


Solid-state relays, R 1100

Derating curves, Limiting overload characteristics

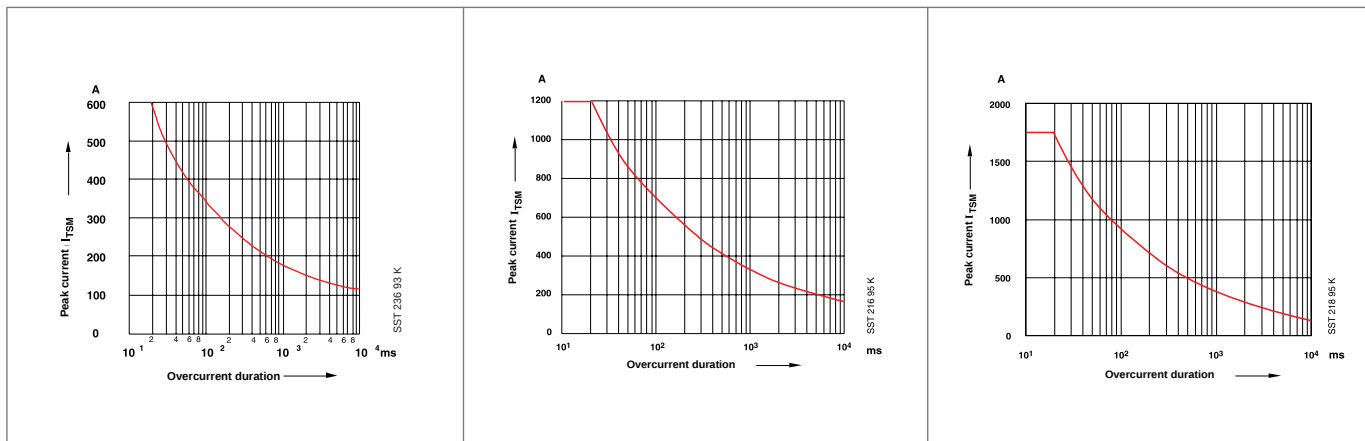
Dimension diagrams

Derating curves



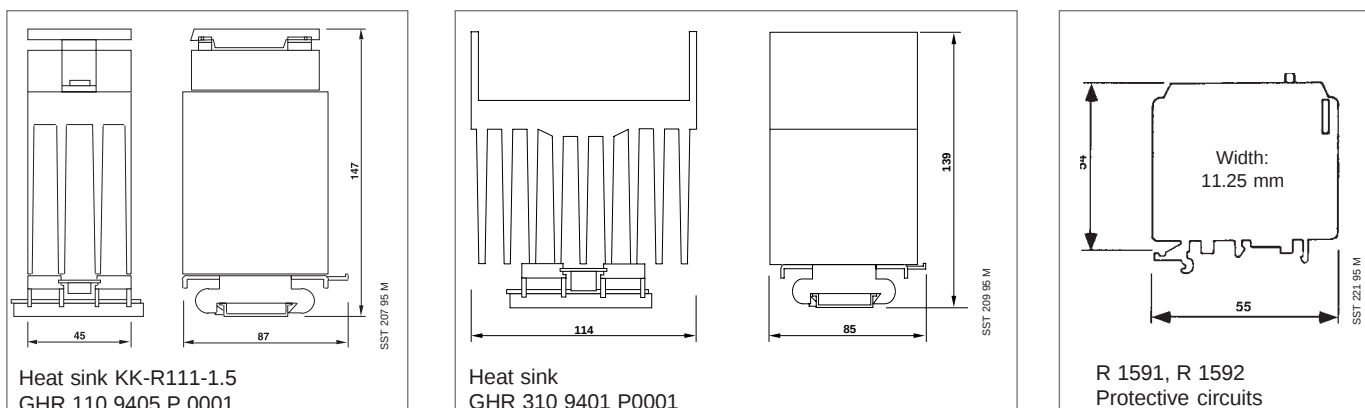
Limiting overload characteristics

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)

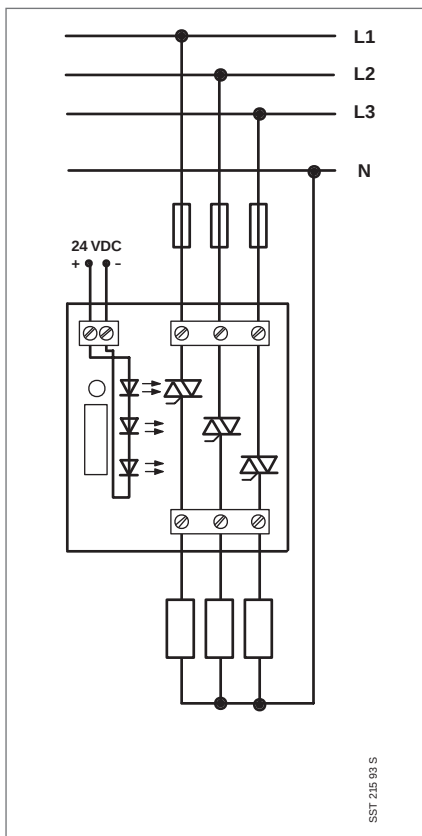


Semiconductor three-phase contactor HDS R2

Technical data

Dimensions

Wiring diagram



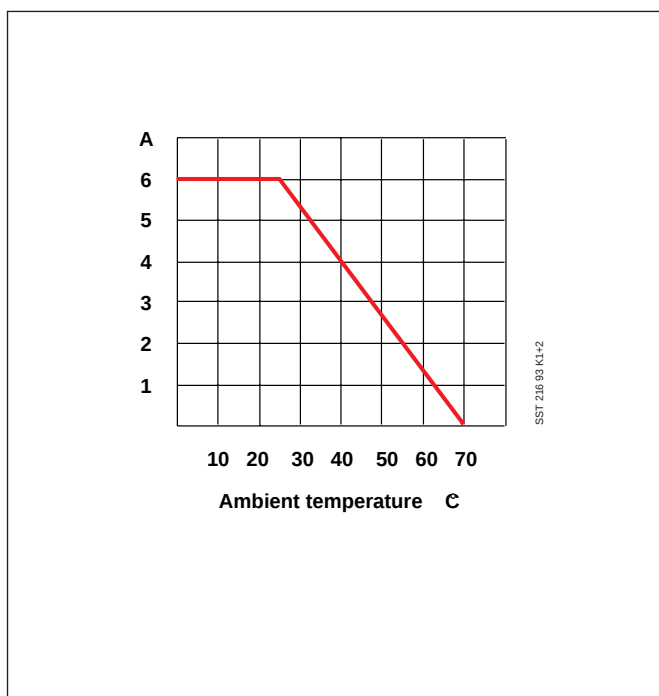
Type		HDS R2
Rated operating voltage U_e	V AC	230 / 400
Operating voltage range	V AC	24...460
Peak off-state voltage AC	V	800
Max. operating current I_e (AC3)	A	3.4
Thermal continuous current (AC1)	A	3.4
Switching capacity ③	kW	1.5
Max. surge current (10 ms) I_{TSM}	A	120
Max. load integral $\int i^2 dt$ 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	°C	-20...+55
Storage temperature range	°C	-25...+85

① At $T_u = 45$ °C

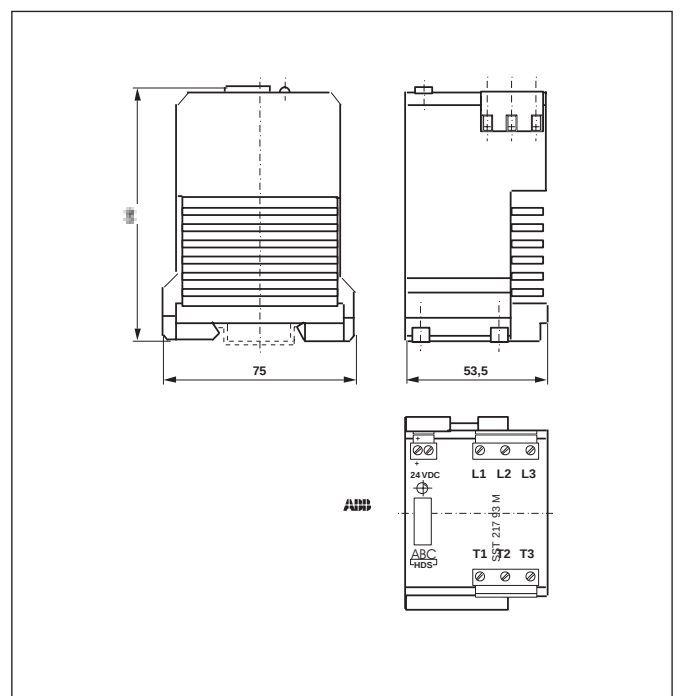
② Pulse duration 10 ms, $T_{vj} = 125$ °C.

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

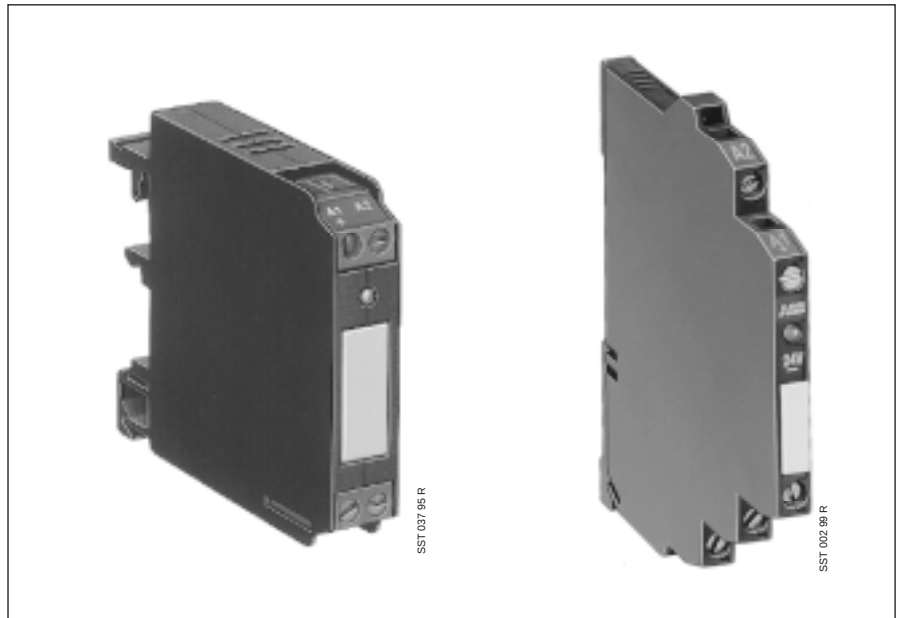
Type	Dimensions		
	B	T	H
KK-R111-2.1	51	65	65
KK-111-1.5	45	65	97
KK-R120-1.4	45	77	97

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

Notes

This image shows a full page of blank graph paper. The background is a very light gray, and it is covered by a precise grid of thin red lines. These lines intersect at regular intervals to form a series of small, identical squares across the entire surface of the page. There are no margins, text, or other markings present.

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



R 1584

SST 268 92 R



R 1561

SST 268 92 R



R 1564

SST 268 92 R

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	24V DC	230 V AC/DC*	5 A	GHR 156 8001 R 0002		0.020	1/10
Low Power							

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 2
Plug	Screw 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

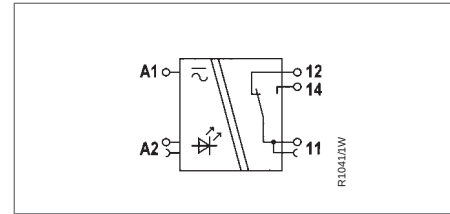
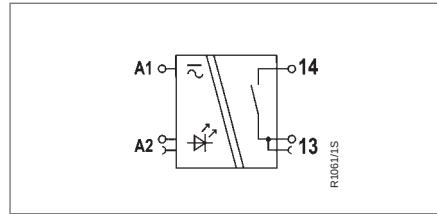
- Two independent output channels for signal amplification (ohmic: 6 A AC)
- One checkback channel (1 ch.)
- Overall width: 27 mm

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

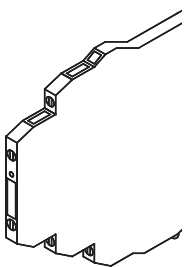
Technical data

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
Overvoltage 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						
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					



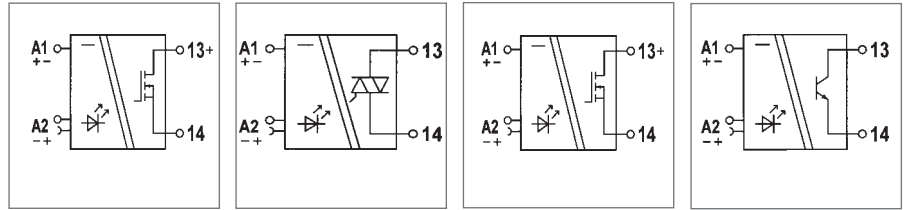
Dimensions (in mm)
Width = 6.5
Height = 85
Depth = 81

MBGE

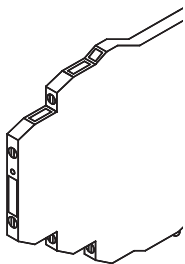
SIGMA® terminal modules - compact design

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 $U_{c \text{ rated}}$	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_e 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



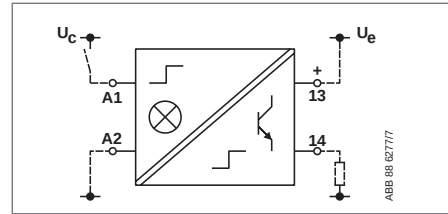
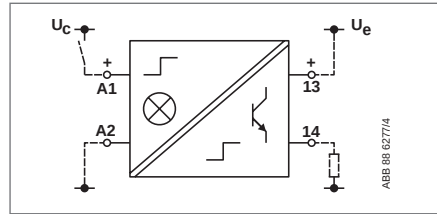
Dimensions (in mm)
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Height = 85
Depth = 81

MEGE

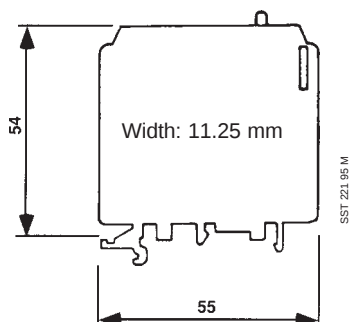
Input stages Type R1584 and R1585

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.



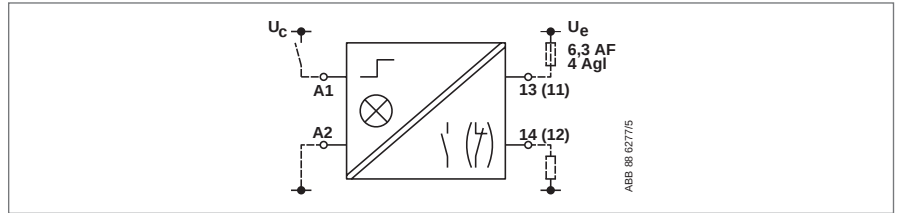
Input data	R1584	R1585
Rated control circuit voltage U_c	24 V DC	230 V AC/DC
for „ON“	17... 32 V DC	180... 280 V AC/DC
for „OFF“	0... 2 V DC	0... 10 V AC/DC
Operating frequency	—	47... 63 Hz
Current consumption bei $U_{C \text{ Rated}}$	< 20 mA	< 6.5 mA
Polarity reversal-protected	up to 200 V	yes
Input impedance	1 k Ω	44 k Ω
Maximum switching frequency	100 Hz	20 Hz
Output data		
Switching element	transistor	
Overvoltage protection	Suppressor diode	
Rated operating voltage U_e	24 V DC	
Permissible voltage range for DC	3... 30 V	
Rated continuous current I_U	100 mA	
Voltage drop in ON state	0.4 V	
Leakage current in OFF state	0.1 mA	
in the case of $U_p = 30 \text{ V DC}$		
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
Overvoltage 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 continuous 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

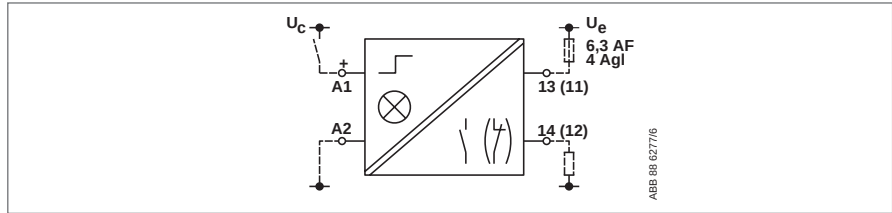
See Page 26
for dimension diagram

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 μF + 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 continious 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

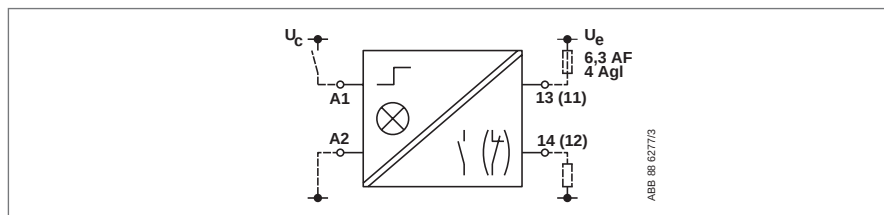
See Page 26
for dimension diagram

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			
Overvoltage suppression	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

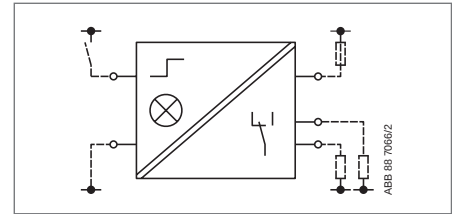
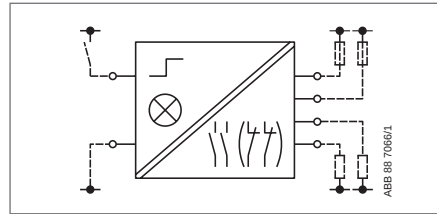
- ① For ohmic load
② Switching capacity > 0.2 W

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
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	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
On delay t_E	10 ms	
Off delay t_A	10 ms	
Bounce time	5 ms	
Service life:		
mechanical	> 10^7	> 10^7
electrical at 220 V AC/3 A①	> 5×10^5	> 7×10^5
24 V DC/4 A①	> 10^6	> 10^6
Electrical isolation	Relay	
Test voltage input / output	4 kV	
Creepage distance input / output	> 8 mm	

① For ohmic load

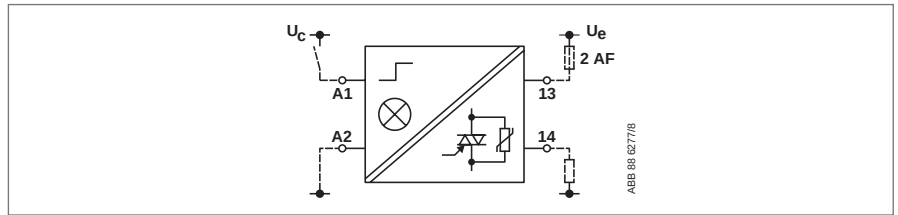
② Switching capacity > 0.2 W

See Page 26
for dimension diagram

Output stage Type R1552

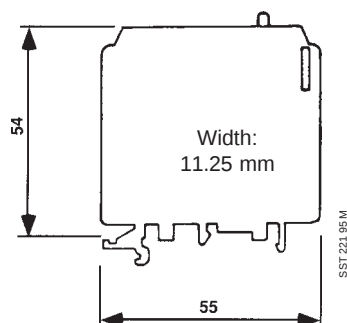
Technical data

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 $U_{c \text{ rated}}$		< 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 ($T_u = 55^\circ\text{C}/45^\circ\text{C}$) 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 $U_{e \text{ Rated}}$		50 μA
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

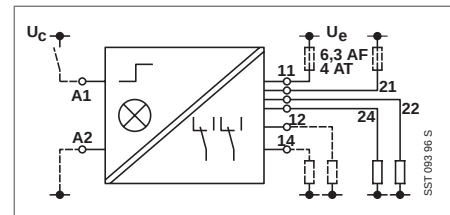
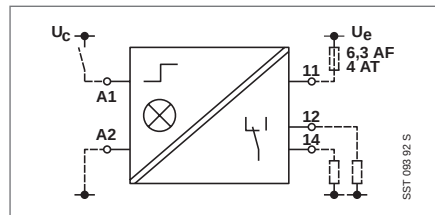
① Units installed with lateral clearance



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.

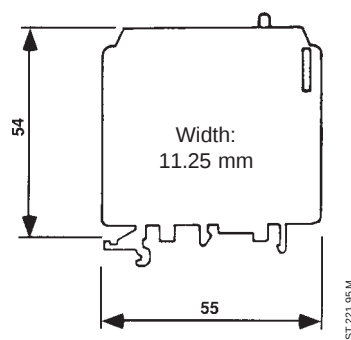


Input data	R 1541 (1 W) universal current		R 1542 (2 W) universal current	
Rated control circuit voltage U_c for „ON“ for „OFF“	24 V DC/AC 17 ... 32 V 0 ... 2 V	230 V DC/AC 176 ... 250 V 0 ... 8 V	24 V DC/AC 17 ... 32 V 0 ... 2 V	230 V DC/AC 176 ... 250 V 0 ... 8 V
Current consumption at $U_{c, Rated}$	< 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

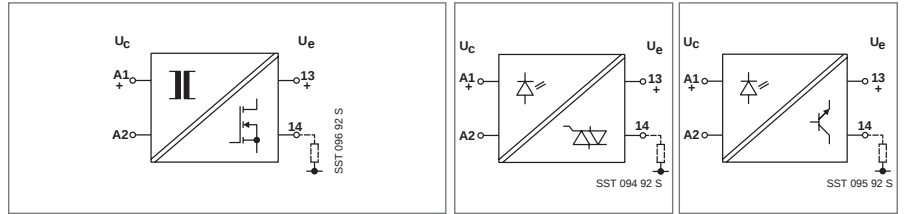
① For ohmic load

② Switching capacity > 0.2 W



Output relay Type Series R 1600

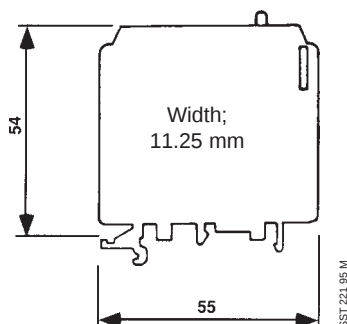
Technical data



Input data	R 1647	R 1648	R 1662	R 1664
Rated control circuit voltage U_c for „ON“ for „OFF“	24 V DC 17 ... 32 V DC 0 ... 2 V DC	24 V DC 17 ... 32 V DC 0 ... 2 V DC	24 V DC 17 ... 32 V DC 0 ... 2 V DC	24 V DC 17 ... 32 V DC 0 ... 2 V DC
Current consumption at $U_{c \text{ Rated}}$	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 for DC	- 5 - 33 V	- 5 - 72 V	10 - 264 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

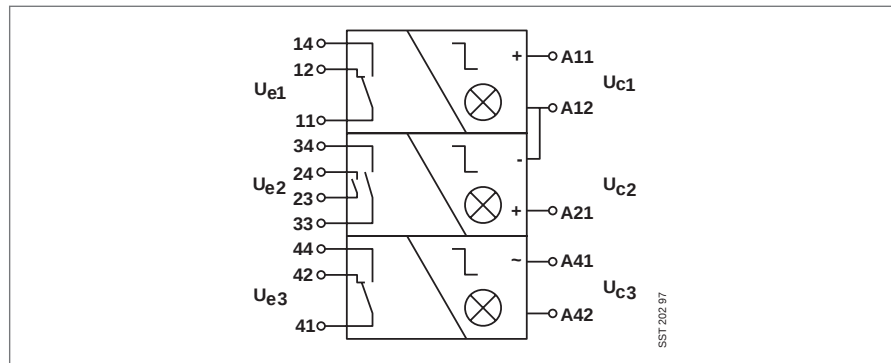
① for output current max. (3 A DC)



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	30×10^6
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	

Notes

This image shows a full page of graph paper. The background is a solid light blue color. Overlaid on this background is a precise grid of thin red lines. The grid consists of small, equal-sized squares that cover the entire area of the page, leaving no margins or unlined spaces. The lines are evenly spaced both horizontally and vertically, creating a continuous pattern of squares from edge to edge.



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