

Solid State Relays Industrial, 1-Phase, 17.5mm with built-in varistor 'E' type connection Types RGS..E, RGS..EDIN



- Zero cross or Instant on switching AC solid state relay
- Rated operational voltage: up to 759 VAC¹
- Rated operational current: up to 90 AAC
- Up to 18000 A²s for I²t
- Control voltages: 3-32 VDC, 20-275 VAC (24-190 VDC)
- Integrated overvoltage protection with varistor
- Design according to IEC/EN60947-4-2, IEC/EN60947-4-3, IEC/EN62314, UL508, CSA22.2 No. 14-13
- Conformance to railway standards
- 100kA short circuit current rating according to UL508
- Option for DIN mounting (RGS...DIN)



Product Description

Aim of this solid state switching device is to switch heater loads and motor loads frequently. The range offers solutions up to 90 AAC in 17.5 mm width.

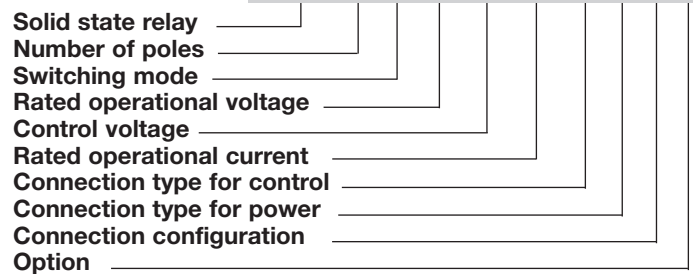
Output connections are via a screw connection, having a captivated washer allowing for safe looping or via box clamp which can handle cables up to 25 mm² (AWG3). Input

connection is provided either via a screw connection having a captivated washer or via a pluggable spring loaded input.

Options with integrated heatsink are available in the RGC range. The RGS...DIN provides an option for DIN mounting of the RGS series with a rating of 10 AAC @ 40°C.

Specifications are at a surrounding temperature of 25°C unless otherwise specified.

Ordering Key **RGS 1 A 60 D 90 K K E**



Ordering Key (refer to page 2 for available part numbers)

1-Phase SSR with no heatsink	Rated voltage	Control voltage	Rated current, Blocking voltage	Connection control	Connection power	Connection configuration	Options
RGS1A: ZC²	23: 230 VAC +10% - 15%	D: 3 or 4-32 VDC A: 20 - 275 VAC, 24-190 VDC	25: 25 A, 1200 Vp 50: 50 A, 1200 Vp 51: 50 A, 1600 Vp 75: 75 A, 1200 Vp 90: 90 A, 1200 Vp 91: 90 A, 1600 Vp 92: 90 A, 1200 Vp, high I ² t	K: Screw M: Pluggable spring-loaded	K: Screw G: Box clamp	E: Contactor	HT: Thermal pad H51: Heatsink RHS37A DIN: DIN rail mount X40: Bulk packaging of 40 pcs.
RGS1B: IO³	60: 600 VAC +10% -15% 69: 690 VAC ¹ +10% -15%						

1: 690 VAC version is CE marked only and does not have an integrated varistor

2: ZC: Zero cross switching

3: IO: Instant-On switching

* Applicable only for 50 A models

Selection Guide - RGS..

Rated voltage, Blocking voltage, Switching mode	Control voltage	Connection control/ power	Max. rated operational current (I ² t value)				
			25 AAC (525 A ² s)	50 AAC (1800 A ² s)	75 AAC (3200 A ² s)	90 AAC (6600 A ² s)	90 AAC (18000 A ² s)
230V, 800Vp ZC	3-32VDC	Screw/Screw	RGS1A23D25KKE	RGS1A23D50KKE	-	-	-
		Spring/Screw	RGS1A23D25MKE	RGS1A23D50MKE	-	-	-
600V, 1200Vp ZC	20-275VAC, 24-190VDC	Screw/Screw	RGS1A23A25KKE	RGS1A23A50KKE	-	-	-
		Spring/Screw	RGS1A23A25MKE	RGS1A23A50MKE	-	-	-
	4-32VDC	Screw/Screw	RGS1A60D25KKE	RGS1A60D50KKE	RGS1A60D75KKE	RGS1A60D90KKE	RGS1A60D92KKE
		Screw/Box	-	RGS1A60D50KGE	-	-	RGS1A60D92KGE
20-275VAC, 24-190VDC	Spring/Screw	RGS1A60D25MKE	RGS1A60D50MKE	-	RGS1A60D90MKE	RGS1A60D92MKE	
	Spring/Box	-	RGS1A60D50MGE	-	-	RGS1A60D92MGE	
600V, 1600Vp ZC	4-32VDC	Screw/Screw	-	RGS1A60D51KKE	-	RGS1A60D91KKE	-
		Screw/Screw	-	RGS1A60A51KKE	-	RGS1A60A91KKE	-
	20-275VAC, 24-190VDC	Screw/Screw	-	-	-	RGS1A69D91KKE	-
690V, 1600Vp ZC	20-275VAC, 24-190VDC	Screw/Screw	-	-	-	RGS1A69A91KKE	-
		Screw/Screw	-	-	-	RGS1B60D90KKE	-
600V, 1200Vp IO	4-32VDC	Screw/Screw	-	RGS1B60D50KKE	-	RGS1B60D90KKE	-

Selection Guide - RGS..HT (RGS with attached Thermal Pad)⁴

Rated voltage, Blocking voltage, Switching mode	Control voltage	Connection control/ power	Max. rated operational current (I ² t value)		
			50 AAC (1800 A ² s)	90 AAC (6600 A ² s)	90 AAC (18000 A ² s)
230V, 800Vp ZC	3-32VDC	Screw/Screw	RGS1A23D50KKEHT	-	-
		Spring/Screw	RGS1A23D50MKEHT	-	-
600V, 1200Vp ZC	4-32VDC	Screw/Screw	RGS1A60D50KKEHT	RGS1A60D90KKEHT	RGS1A60D92KKEHT
		Screw/Box	RGS1A60D50KGEHT	-	RGS1A60D92KGEHT
	Spring/Screw	RGS1A60D50MKEHT	RGS1A60D90MKEHT	RGS1A60D92MKEHT	
	Spring/Box	RGS1A60D50MGEHT	-	RGS1A60D92MGEHT	

4: The thermal pad with suffix 'HT' is available with any RGS part no. upon request. The above part numbers are some examples of RGS selection with attached thermal pad

Selection Guide - RGS..DIN (RGS for DIN Rail mounting)⁵

Rated voltage, Blocking voltage, Switching mode	Control voltage	Connection control/ power	Rated operational current @ 40°C (I ² t value)		
			10 AAC (525 A ² s)	12 AAC (1800 A ² s)	12 AAC (6600 A ² s)
230V, 600Vp ZC	3-32VDC	Screw/Screw	RGS1A23D25KKEDIN	RGS1A23D50KKEDIN	-
		Screw/Screw	RGS1A23A25KKEDIN	RGS1A23A50KKEDIN	-
600V, 1200Vp ZC	4-32VDC	Screw/Screw	RGS1A60D25KKEDIN	RGS1A60D50KKEDIN	RGS1A60D90KKEDIN
		Screw/Screw	RGS1A60A25KKEDIN	RGS1A60A50KKEDIN	-

5: Any of the available RGS part numbers can be factory mounted upon request to the RGS1DIN accessory. The above are some examples. Refer to 'Accessories' section for further details.

Selection Guide - RGS..X40 (RGS bulk packaging of 40 pcs.)

Rated voltage, Blocking voltage, Switching mode	Control voltage	Connection control/ power	Max. rated operational current (I ² t value)		
			25 AAC (525 A ² s)	50 AAC (1800 A ² s)	75 AAC (3200 A ² s)
230V, 600Vp, ZC	3-32VDC	Screw/Screw	RGS1A23D25KKEX40	-	-
600V, 1200Vp, ZC	4-32VDC	Screw/Screw	-	RGS1A60D50KKEX40	RGS1A60D75KKEX40

Output Voltage Specifications

		RGS..23..	RGS..60..	RGS..69..
Operational voltage range		24-240 VAC, +10%, -15% on max	42-600 VAC, +10% -15% on max	42-690 VAC ⁶ , +10% -15% on max
Blocking voltage	RGS..25/50/75/90/92	800Vp	1200 Vp	-
	RGS..51/91	-	1600 Vp	1600 Vp
Internal varistor	RGS..25/50/75/90/92	275V	625V	-
	RGS..51/91	-	680V	-

6: 690 VAC refers to the line to line voltage

General Specifications

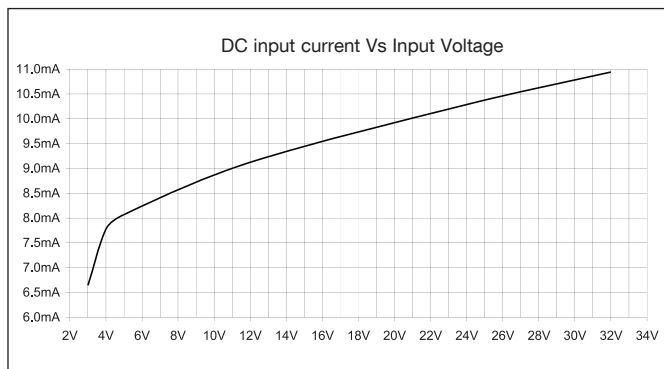
Latching voltage (across L1-T1)	20V	Pollution degree	2 (non-conductive pollution with possibilities of condensation)
Operational frequency range	45 to 65Hz	Rated impulse withstand	6 kV (1.2/50µs) for voltage, Uimp
Power factor	> 0.5 @ Vrated	Overvoltage Category	III (fixed installations)
CE marking	Yes	Isolation	
Touch protection	IP20	Input to Output	4000Vrms
Control input status	continuously ON Green LED, when control input is applied	Input & Output to Case	4000Vrms

Input Specifications

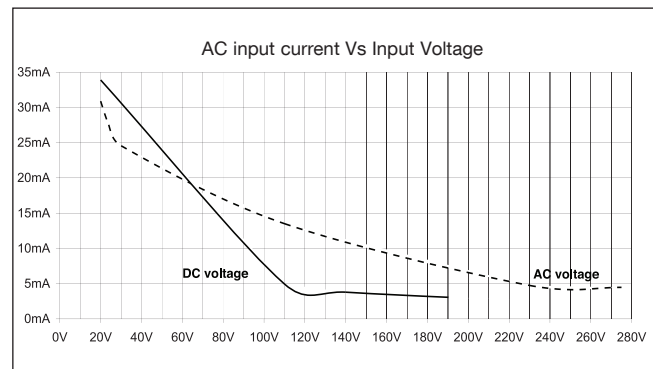
		RGS..D..	RGS..A..
Control voltage range ⁷	RGS..23..	3 - 32 VDC	20 - 275 VAC, 24 (-10%) - 190 VDC
	RGS..6x..	4 - 32 VDC	20 - 275 VAC, 24 (-10%) - 190 VDC
Pick-up voltage	RGS..23..	3.0 VDC	20 VAC/DC
	RGS..6x..	3.8 VDC	
Drop-out voltage	RGS..23..	1 VDC	5 VAC/DC
	RGS..6x..	1 VDC	
Maximum reverse voltage		32 VDC	-
Response time pick-up (RGS1A..)		0.5 cycle + 500 µs @ 24VDC	2 cycles @ 230 VAC/110 VDC
Response time pick-up (RGS1B..)		350 µs @ 24 VDC	N/A
Response time drop-out		0.5 cycle + 500µs @ 24VDC	0.5 cycle + 40 ms @ 230 VAC/ 110 VDC
Input current @ 40°C		See diagrams below	See diagrams below

7: DC control to be supplied by a Class 2 power source according to UL1310

RG..D..



RG..A..



Motor Ratings⁸: HP (UL 508) / kW (EN/IEC 60947-4-2) @ 40°C

	115 VAC	230 VAC	400 VAC	480 VAC	600 VAC	690 VAC
RGS..25	1/2HP / 0.18kW	1 1/2HP / 0.37kW	3HP / 0.75kW	3HP / 1.1kW	5HP / 1.5kW	- / 1.5kW
RGS..50/51	1HP / 0.37kW	3HP / 1.1kW	5HP / 1.5kW	5HP / 2.2kW	7 1/2HP / 3.7kW	- / 3.7kW
RGS..75	1 1/2HP / 0.56kW	3HP / 1.5kW	5HP / 3kW	7 1/2HP / 4kW	10HP / 4kW	- / 4kW
RGS..90/91/92	2HP / 0.75kW	5HP / 2.2kW	7 1/2HP / 4kW	10HP / 4kW	15HP / 5.5kW	- / 5.5kW

8: Refer to Heatsink Selection Table

Output Specifications

	RGS..25..	RGS..50/51..	RGS..75..	RGS..90/91..	RGS..92..
Rated operational current AC-51 rating @ Ta=40°C (IEC60947-4-3/UL508) ⁸	25 AAC	50 AAC	75 AAC	90 AAC	90AAC
AC-53a rating @ Ta=40°C (IEC60947-4-2/ UL508)	5 AAC	10 AAC	14.8 AAC	18 AAC	18AAC
Number of motor starts per hour (x:6, Tx:6s, F:50%) at 40°C ^{8,9}	30	30	30	30	30
Min. operational current	150 mAAC	250 mAAC	400 mAAC	400 mAAC	500 mAAC
Rep. overload current - (Motor rating) PF = 0.4-0.5 UL508: T _{AMB} =40°C, t _{ON} =1s, t _{OFF} =9s, 50 cycles	67 AAC	107 AAC	126 AAC	168 AAC	168 AAC
Maximum transient surge current (I _{TSM}), t=10ms	325 Ap	600 Ap	800 Ap	1150 Ap	1900 Ap
Maximum off-state leakage current @ rated voltage	3 mAAC	3 mAAC	3 mAAC	3 mAAC	3 mAAC
I ² t for fusing (t=10ms), Minimum	525 A ² s	1800A ² s	3200A ² s	6600A ² s	18000A ² s
Critical dv/dt (@ Tj init = 40°C)	1000 V/us	1000 V/us	1000 V/us	1000 V/us	1000 V/us

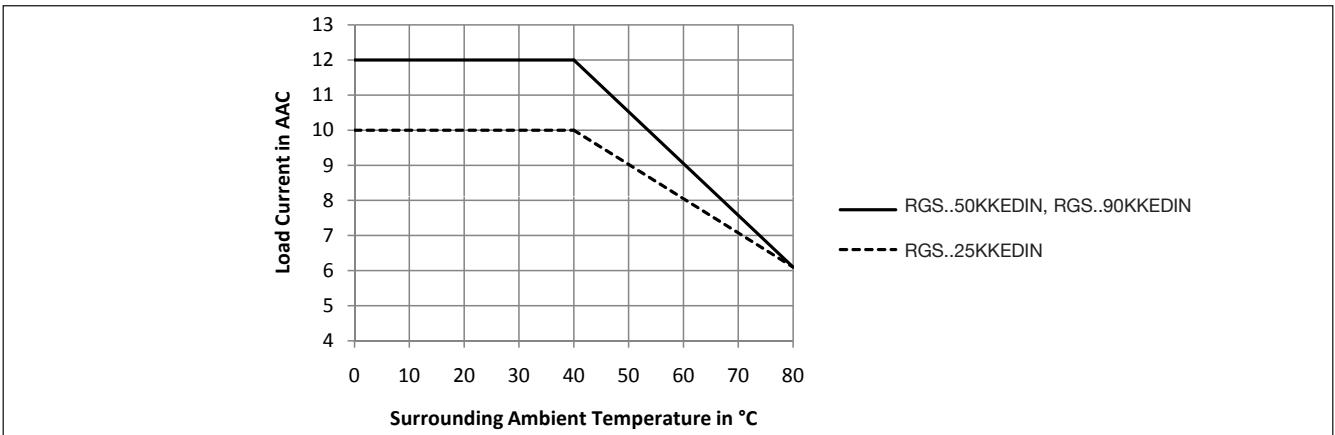
9 Overload profile for AC-53a: Ie: AC-53a: x-Tx: F-S,
where Ie = nominal current (AC-53a AAC), x = overload current factor, Tx = duration of overload current (s), F = duty cycle (%), S = number of starts per hour.
Example; 5A: AC-53a: 6 - 6 : 50 - 30 = max. 30 starts for the RGS..25 with an overload profile of 30A for 6 seconds with a duty cycle of 50%

Output Specifications for RGS..DIN

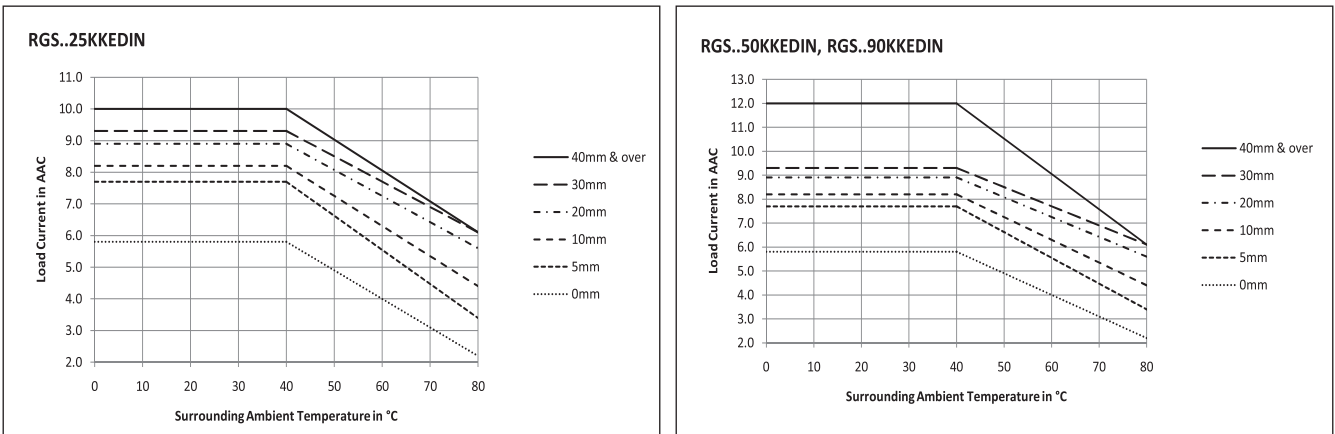
	RGS..25..DIN	RGS..50..DIN	RGS..90..DIN
Rated operational current ¹⁰ AC-51 rating @ Ta = 40°C	10 AAC	12 AAC	12 AAC
AC-53a rating @ Ta =40°C	5 AAC	5 AAC	5 AAC
Number of motor starts per hour (x:6, Tx:6s, F:50%) at 40°C ⁹	30	30	30
Min. operational current	150 mA	250 mA	400 mA
Maximum transient surge current I _{TSM} , t=10ms	325 Ap	600 Ap	1150 Ap
Maximum off-state leakage current @ rated voltage	3 mAAC	3 mAAC	3 mAAC
I ² t for fusing (t=10ms), Minimum	525 A ² s	1800 A ² s	6600 A ² s
Critical dv/dt (@ Tj init = 40°C)	1000 V/us	1000 V/us	1000 V/us

10: Refer to Derating Curves for RGS...DIN

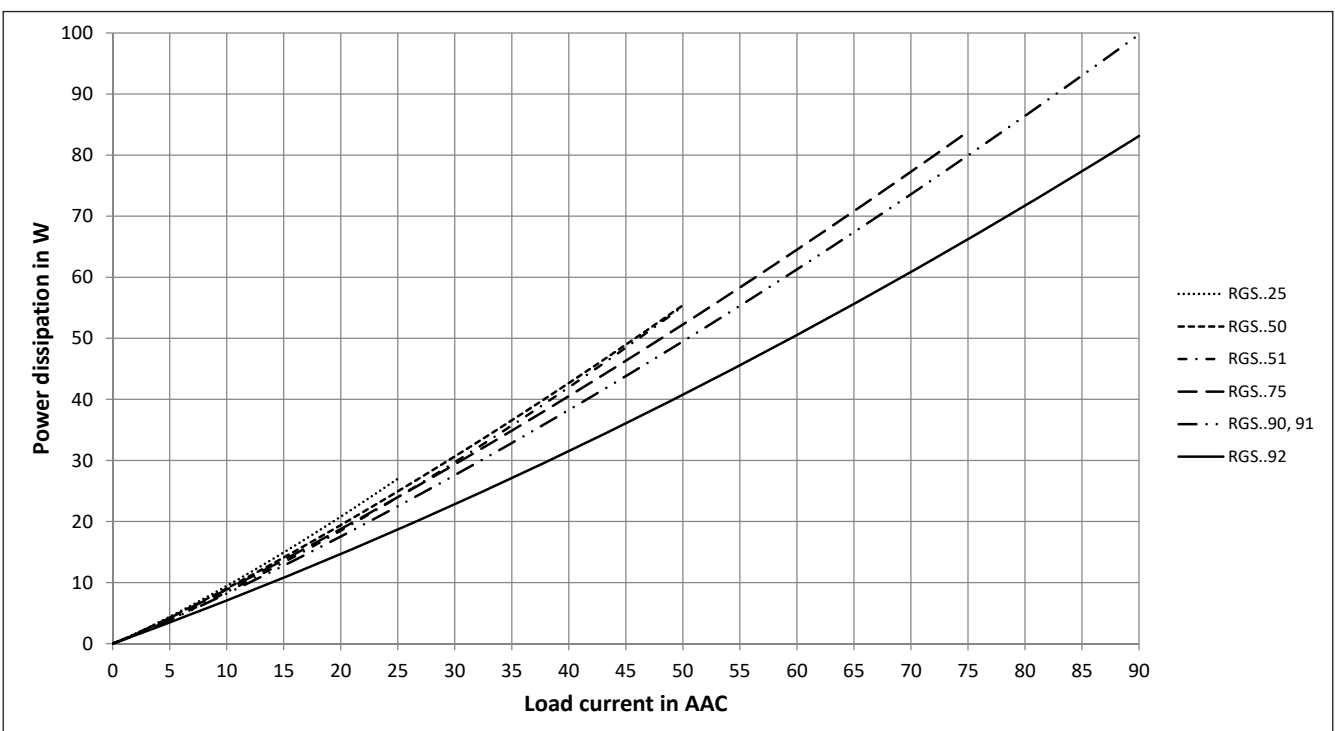
Derating Curves for RGS...DIN



Derating vs. Spacing Curves for RGS...DIN



Output Power Dissipation





Heatsink Selection

RGS1...25

Load current [A]	Thermal resistance [°C/W]						
	20	30	40	50	60	70	80
25.0	3.11	2.72	2.33	1.94	1.55	1.17	0.78
22.5	3.55	3.10	2.66	2.22	1.77	1.33	0.89
20.0	4.10	3.59	3.08	2.56	2.05	1.54	1.03
17.5	4.83	4.23	3.63	3.02	2.42	1.81	1.21
15.0	5.83	5.10	4.37	3.64	2.91	2.18	1.46
12.5	7.24	6.34	5.43	4.53	3.62	2.72	1.81
10.0	9.43	8.25	7.07	5.89	4.71	3.54	2.36
7.5	13.17	11.53	9.88	8.23	6.59	4.94	3.29
5.0	---	18.35	15.73	13.11	10.49	7.86	5.24
2.5	---	---	---	---	---	17.21	11.47

T_A
Ambient temp [°C]

RGS1...5x

Load current [A]	Thermal resistance [°C/W]						
	20	30	40	50	60	70	80
50.0	1.45	1.28	1.06	0.87	0.68	0.49	0.30
45.0	1.72	1.50	1.29	1.07	0.85	0.64	0.42
40.0	2.00	1.75	1.50	1.25	1.00	0.75	0.50
35.0	2.35	2.06	1.76	1.47	1.18	0.88	0.59
30.0	2.83	2.48	2.13	1.77	1.42	1.06	0.71
25.0	3.52	3.08	2.64	2.20	1.76	1.32	0.88
20.0	4.58	4.01	3.44	2.86	2.29	1.72	1.15
15.0	6.40	5.60	4.80	4.00	3.20	2.40	1.60
10.0	10.19	8.92	7.64	6.37	5.10	3.82	2.55
5.0	---	19.51	16.72	13.94	11.15	8.36	5.57

T_A
Ambient temp [°C]

Maximum junction temperature	125°C
Heatsink temperature	100°C
Junction to case thermal resistance, Rthjc	<0.45 °C/W
Case to heatsink thermal resistance, Rthcs ¹¹	< 0.25 °C/W

Maximum junction temperature	125°C
Heatsink temperature	100°C
Junction to case thermal resistance, Rthjc	<0.3 °C/W
Case to heatsink thermal resistance, Rthcs ¹¹	< 0.25 °C/W

RGS1...75

Load current [A]	Thermal resistance [°C/W]						
	20	30	40	50	60	70	80
75.0	0.80	0.68	0.55	0.43	0.30	0.18	0.06
67.5	0.99	0.84	0.70	0.56	0.42	0.28	0.14
60.0	1.22	1.06	0.89	0.73	0.56	0.40	0.24
52.5	1.53	1.33	1.14	0.95	0.76	0.56	0.37
45.0	1.86	1.63	1.40	1.16	0.93	0.70	0.47
37.5	2.32	2.03	1.74	1.45	1.16	0.87	0.58
30.0	3.01	2.64	2.26	1.88	1.51	1.13	0.75
22.5	4.21	3.68	3.16	2.63	2.10	1.58	1.05
15.0	6.68	5.85	5.01	4.18	3.34	2.51	1.67
7.5	14.53	12.71	10.89	9.08	7.26	5.45	3.63

T_A
Ambient temp [°C]

RGS1...9x

Load current [A]	Thermal resistance [°C/W]						
	20	30	40	50	60	70	80
90.0	0.62	0.52	0.41	0.31	0.21	0.11	0.01
81.0	0.77	0.66	0.54	0.42	0.31	0.19	0.07
72.0	0.97	0.83	0.70	0.56	0.43	0.29	0.16
63.0	1.23	1.07	0.91	0.75	0.59	0.43	0.27
54.0	1.55	1.35	1.16	0.97	0.77	0.58	0.39
45.0	1.93	1.69	1.45	1.21	0.97	0.73	0.48
36.0	2.53	2.21	1.89	1.58	1.26	0.95	0.63
27.0	3.55	3.11	2.66	2.22	1.77	1.33	0.89
18.0	5.67	4.97	4.26	3.55	2.84	2.13	1.42
9.0	12.46	10.90	9.34	7.79	6.23	4.67	3.11

T_A
Ambient temp [°C]

Maximum junction temperature	125°C
Heatsink temperature	100°C
Junction to case thermal resistance, Rthjc	<0.25 °C/W
Case to heatsink thermal resistance, Rthcs ¹¹	< 0.25 °C/W

Maximum junction temperature	125°C
Heatsink temperature	100°C
Junction to case thermal resistance, Rthjc	<0.20 °C/W
Case to heatsink thermal resistance, Rthcs ¹¹	< 0.25 °C/W

11: Thermal resistance case to heatsink valves are applicable upon application of a fine layer of silicon based thermal paste HTS02S from Electrolube between SSR and heatsink.

Heatsink Selection for RGS...HT

RGS1...25..HT

Load current [A]	Thermal resistance [°C/W]							T _A
	20	30	40	50	60	70	80	
25.0	2.73	2.34	1.95	1.56	1.18	0.79	0.40	
22.5	3.30	2.86	2.42	1.97	1.53	1.09	0.64	
20.0	4.04	3.52	3.01	2.50	1.98	1.47	0.96	
17.5	4.83	4.23	3.63	3.02	2.42	1.81	1.21	
15.0	5.83	5.10	4.37	3.64	2.91	2.18	1.46	
12.5	7.24	6.34	5.43	4.53	3.62	2.72	1.81	
10.0	9.43	8.25	7.07	5.89	4.71	3.54	2.36	
7.5	13.17	11.53	9.88	8.23	6.59	4.94	3.29	
5.0	---	18.35	15.73	13.11	10.49	7.86	5.24	
2.5	---	---	---	---	---	17.21	11.47	

Maximum junction temperature	125°C
Heatsink temperature	100°C
Junction to case thermal resistance, Rthjc	<0.45 °C/W
Case to heatsink thermal resistance, Rthcs	< 0.9 °C/W

RGS1...5x..HT

Load current [A]	Thermal resistance [°C/W]							T _A
	20	30	40	50	60	70	80	
50.0	0.84	0.65	0.46	0.27	0.08	---	---	
45.0	1.12	0.90	0.69	0.47	0.25	0.04	---	
40.0	1.47	1.22	0.97	0.72	0.47	0.22	---	
35.0	1.94	1.64	1.35	1.06	0.76	0.47	0.17	
30.0	2.57	2.22	1.86	1.51	1.15	0.80	0.44	
25.0	3.48	3.03	2.59	2.15	1.71	1.27	0.83	
20.0	4.58	4.01	3.44	2.86	2.29	1.72	1.15	
15.0	6.40	5.60	4.80	4.00	3.20	2.40	1.60	
10.0	10.19	8.92	7.64	6.37	5.10	3.82	2.55	
5.0	---	19.51	16.72	13.94	11.15	8.36	5.57	

Maximum junction temperature	125°C
Heatsink temperature	100°C
Junction to case thermal resistance, Rthjc	<0.3 °C/W
Case to heatsink thermal resistance, Rthcs	< 0.85 °C/W

RGS1...75..HT

Load current [A]	Thermal resistance [°C/W]							T _A
	20	30	40	50	60	70	80	
75.0	0.25	0.13	0.00	---	---	---	---	
67.5	0.44	0.29	0.15	0.01	---	---	---	
60.0	0.67	0.51	0.34	0.18	0.01	---	---	
52.5	0.98	0.78	0.59	0.40	0.21	0.01	---	
45.0	1.39	1.16	0.93	0.70	0.46	0.23	---	
37.5	1.99	1.70	1.41	1.12	0.83	0.54	0.25	
30.0	2.91	2.53	2.15	1.78	1.40	1.02	0.65	
22.5	4.21	3.68	3.16	2.63	2.10	1.58	1.05	
15.0	6.68	5.85	5.01	4.18	3.34	2.51	1.67	
7.5	14.53	12.71	10.89	9.08	7.26	5.45	3.63	

Maximum junction temperature	125°C
Heatsink temperature	100°C
Junction to case thermal resistance, Rthjc	<0.25 °C/W
Case to heatsink thermal resistance, Rthcs	< 0.80 °C/W

RGS1...9x..HT

Load current [A]	Thermal resistance [°C/W]							T _A
	20	30	40	50	60	70	80	
90.0	0.07	---	---	---	---	---	---	
81.0	0.22	0.11	---	---	---	---	---	
72.0	0.42	0.28	0.15	0.01	---	---	---	
63.0	0.68	0.52	0.36	0.20	0.04	---	---	
54.0	1.03	0.84	0.65	0.45	0.26	0.06	---	
45.0	1.54	1.30	1.05	0.81	0.57	0.33	0.09	
36.0	2.32	2.00	1.69	1.37	1.05	0.74	0.42	
27.0	3.55	3.11	2.66	2.22	1.77	1.33	0.89	
18.0	5.67	4.97	4.26	3.55	2.84	2.13	1.42	
9.0	12.46	10.90	9.34	7.79	6.23	4.67	3.11	

Maximum junction temperature	125°C
Heatsink temperature	100°C
Junction to case thermal resistance, Rthjc	<0.20 °C/W
Case to heatsink thermal resistance, Rthcs	< 0.80 °C/W



Agency Approvals and Conformance

Conformance	IEC/EN 62314 IEC/EN 60947-4-2 IEC/EN 60947-4-3	Agency Approvals	UL508 Recognised (E172877) CSA 22.2 No.14-13 (204075) VDE 0660-109
		Short circuit current rating	100kA, UL508



Electromagnetic Compatibility

EMC Immunity	EN 60947-4-3	Radiated Radio Frequency Immunity	IEC/EN 61000-4-3
Electrostatic Discharge (ESD) Immunity	IEC/EN 61000-4-2	10V/m, 80 - 1000 MHz	Performance Criteria 1
Air discharge, 8kV	Performance Criteria 1	10V/m, 1.4 - 2.0GHz	Performance Criteria 1
Contact, 4kV	Performance Criteria 1	3 V/m, 2.0 - 2.7GHz	Performance Criteria 1
Electrical Fast Transient (Burst) Immunity	IEC/EN 61000-4-4	Conducted Radio Frequency Immunity	IEC/EN 61000-4-6
Output: 2kV, 5kHz	Performance Criteria 1	10V/m, 0.15 - 80 MHz	Performance Criteria 1
Input: 1kV, 5kHz	Performance Criteria 1	Voltage Dips Immunity	IEC/EN 61000-4-11
Electrical Surge Immunity¹²	IEC/EN 61000-4-5	0% for 0.5, 1 cycle	Performance Criteria 2
Output, line to line, 1kV	Performance Criteria 1	40% for 10 cycles	Performance Criteria 2
Output, line to earth, 2kV	Performance Criteria 1	70% for 25 cycles	Performance Criteria 2
Input, line to line, 1kV	Performance Criteria 2	80% for 250 cycles	Performance Criteria 2
Input, line to earth, 2kV	Performance Criteria 2	Voltage Interruptions Immunity	IEC/EN 61000-4-11
		0% for 5000ms	Performance Criteria 2
EMC Emission	EN 60947-4-3	Radio Interference	
Radio Interference		Field Emission (Radiated)	IEC/EN 55011
Voltage Emission (Conducted)	IEC/EN 55011	30 - 1000MHz	Class A (industrial)
0.15 - 30MHz	Class A (industrial) with filters - see filter information		

12: An external varistor, S20K750, needs to be connected across the mains supply for the RGS1A69.. models

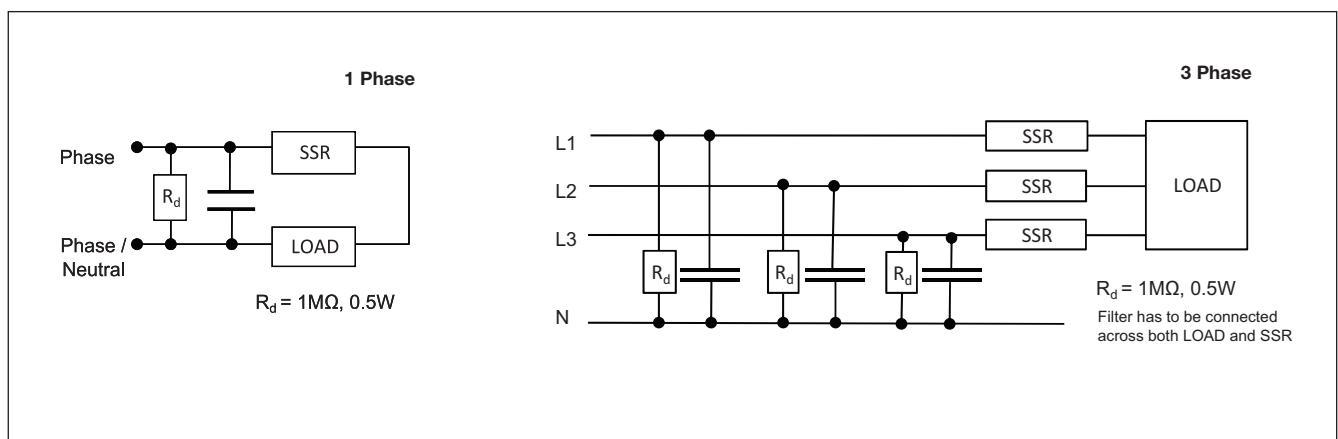
Notes:

- Control input lines must be installed together to maintain products' susceptibility to Radio Frequency interference. Use of AC solid state relays may, according to the application and the load current, cause conducted radio interferences. Use of mains filters may be necessary for cases where the user must meet E.M.C requirements. The capacitor values given in the filtering specification tables should be taken only as indications, the filter attenuation will depend on the final application.
- Performance Criteria 1: No degradation of performance or loss of function is allowed when the product is operated as intended.
- Performance Criteria 2: During the test, degradation of performance or partial loss of function is allowed. However when the test is complete the product should return operating as intended by itself.
- Performance Criteria 3: Temporary loss of function is allowed, provided the function can be restored by manual operation of the controls.

Filtering - IEC/EN 55011 Class A compliance (for class B compliance contact us)

Part Number	Suggested filter for compliance	Maximum Heater current
RGS1.23..25	100 nF / 275 V / X1	25 A
RGS1.23..50	220 nF / 275 V / X1 330 nF / 275 V / X1	30 A 35 A
RGS1.60..25	150 nF / 760 V / X1 220 nF / 760 V / X1	25 A 30 A
RGS1.60..50	330 nF / 760 V / X1	30 A
RGS1.60..51	220 nF / 760 V / X1	30 A
RGS1.60..75	220 nF / 760 V / X1 330 nF / 760 V / X1	30 A 45 A
RGS1.60..90/91/92	220 nF / 760 V / X1 330 nF / 760 V / X1 680 nF / 760 V / X1	30 A 45 A 65 A

Filter Connection Diagram



Additional Conformance to Railway Standards

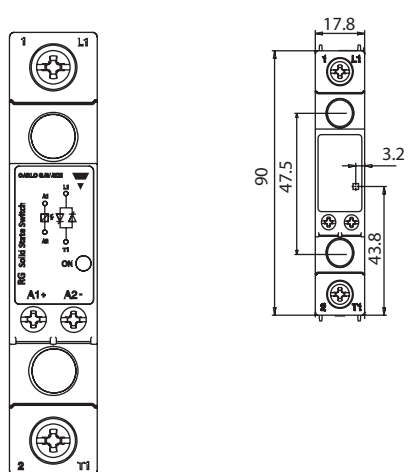
Applicable to variants	RGS..	Additional EMC conformance	according to EN 50121-3-2
Additional conformance specific to Railway applications	EN 50155 EN 45545-2 EN 50121-3-2	Radiated radio frequency Immunity	IEC/EN 61000-4-3 Performance Criteria 1 Performance Criteria 1 Performance Criteria 1 Performance Criteria 1
Hazardous level conformance according to EN 45545-2	HL1, HL2 for requirement R23 HL1 for requirement R22	20V/m, 80 MHz - 1 GHz 10V/m, 1.4 - 2 GHz 5V/m, 2 - 2.7 GHz 3V/m, 5.1 - 6 GHz	IEC/EN 61000-4-30 Pass
Operating temperature class according to EN 50155	OT3 (-25 °C to +70 °C)	Power Quality Measurement	
Vibration and shock	EN 61373 Category 1, Class B	50 Hz - 2 kHz, <8% THD	

Environmental Specifications

Operating temperature	-40°C to 80°C (-40°F to +176°F)	UL flammability rating (housing)	UL 94 V0 Glow wire ignition temperature and Glow wire flammability index conform to EN 60335-1 requirements
Storage temperature	-40°C to 100°C (-40°F to +212°F)		
EU RoHS compliant	Yes		
China RoHS compliant	Refer to Environmental Information (page 17)	Installation altitude	0-1000m. Above 1000m derate linearly by 1% of FLC per 100m up to a maximum of 2000m
Impact resistance (EN 50155, EN 61373)	15/11 g/ms		
Vibration resistance (2-100Hz, IEC60068-2-6, EN 50155, EN 61373)	5g per axis		
Relative humidity	95% non-condensing @ 40°C	Weight	approx. 103g approx. 155g

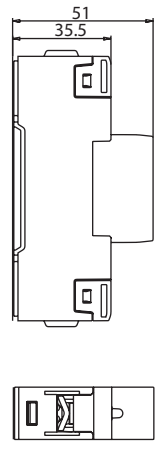
Terminal Layout and Dimensions

RGS...KKE, RGS...KGE



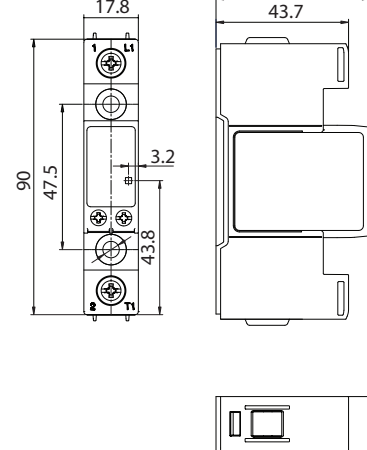
Dimensions: 90mm height, 47.5mm width, 17.8mm terminal spacing, 43.8mm terminal offset, 3.2mm terminal diameter.

RGS..KKE



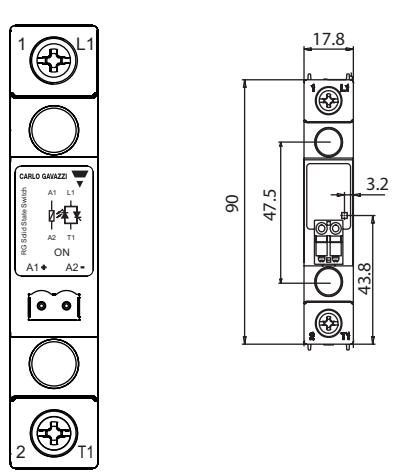
Dimensions: 51mm total width, 35.5mm mounting hole offset.

RGS..KGE



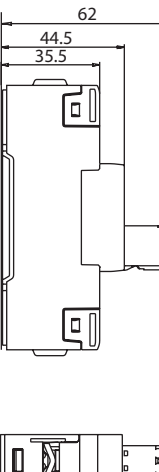
Dimensions: 90mm height, 47.5mm width, 17.8mm terminal spacing, 43.8mm terminal offset, 3.2mm terminal diameter.

RGS...MKE, RGS...MGE



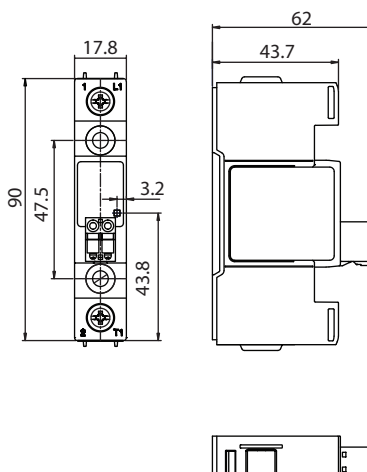
Dimensions: 90mm height, 47.5mm width, 17.8mm terminal spacing, 43.8mm terminal offset, 3.2mm terminal diameter.

RGS..MKE



Dimensions: 62mm total width, 44.5mm mounting hole offset, 35.5mm mounting hole offset.

RGS..MGE



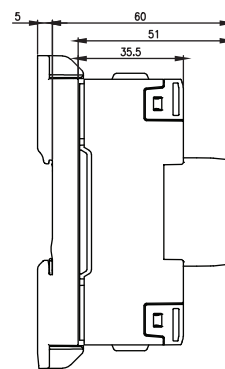
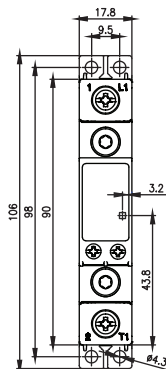
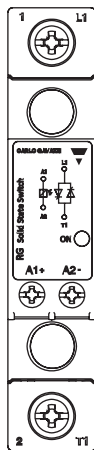
Dimensions: 90mm height, 47.5mm width, 17.8mm terminal spacing, 43.8mm terminal offset, 3.2mm terminal diameter.

1/L1: Supply connection
 2/T1: Load connection
 A1 (+): Positive control signal
 A2 (-): Control ground

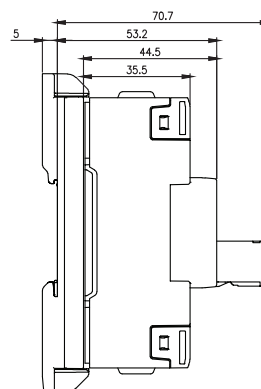
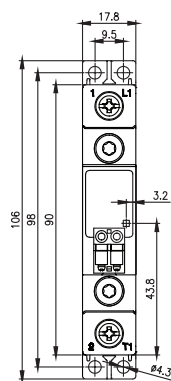
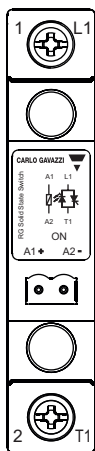
Housing width tolerance +0.5mm, -0mm...as per DIN43880
 All other tolerances: ± 0.5mm
 All dimensions in mm

Terminal Layout and Dimensions (cont.)

RGS....KKEDIN



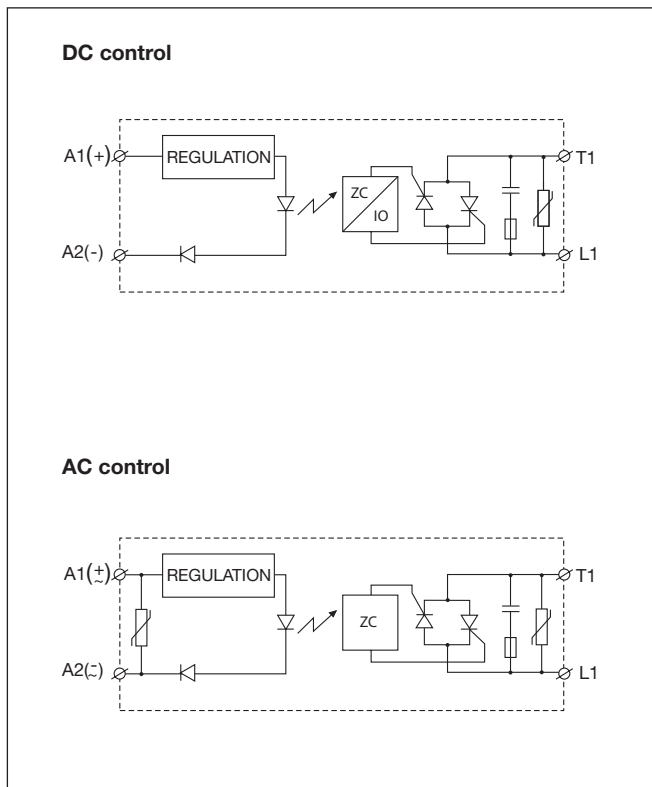
RGSMKEDIN



- 1/L1: Supply connection
- 2/T1: Load connection
- A1 (+): Positive control signal
- A2 (-): Control ground

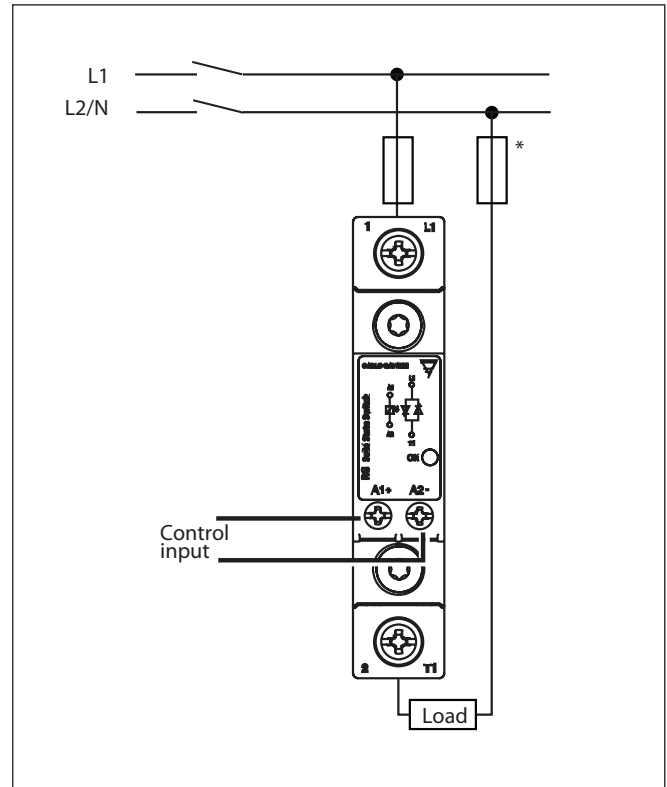
Housing width tolerance +0.5mm, -0mm...as per DIN43880
 All other tolerances: ± 0.5mm
 All dimensions in mm

Functional Diagram



Note: Varistor on output is not included in the RGS1A69... models

Connection Diagram

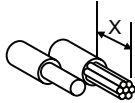







* depends on system requirements

Connection Specifications


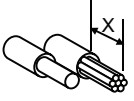



POWER CONNECTIONS: 1/L1, 2 /T1

Use 75°C copper (Cu) conductors

		RGS...KKE ; RGS...MKE	RGS...KGE ; RGS...MGE
Stripping Length (X)		12mm	11mm
Connection type		M4 screw with captivated washer	M5 screw with box clamp
Rigid (Solid & Stranded) UL/ CSA rated data		 2 x 2.5..6 mm ² 2 x 14.. 10 AWG	 1 x 2.5..6 mm ² 1 x 14.. 10 AWG
Flexible with end sleeve		2 x 1.0 ... 2.5mm ² 2 x 2.5..4mm ² 2 x 18.. 14 AWG 2 x 14.. 12 AWG	1 x 2.5..16mm ² 1 x 14.. 6 AWG
Flexible without end sleeve		2 x 1.0 ... 2.5mm ² 2 x 2.5.. 6mm ² 2 x 18.. 14 AWG 2 x 14.. 10 AWG	1 x 4.. 25mm ² 1 x 12.. 3 AWG
Torque specifications		Pozidriv 2 UL: 2Nm (17.7lb-in) IEC: 1.5 - 2.0Nm (13.3 - 17.7lb-in)	Pozidriv 2 UL: 2.5Nm (22lb-in) IEC: 2.5 - 3.0Nm (22-26.6lb-in)
Aperture for termination lug		12.3mm	N/A

CONTROL CONNECTIONS: A1(+), A2(-)

Use 60/75°C copper (Cu) conductors

		RGS...KKE, RGS...KGE	RGS...MKE, RGS...MGE
Torque specifications		M3, Pozidriv 1 UL: 0.5Nm (4.4lb-in) IEC: 0.5 - 0.6Nm (4.4 - 5.3lb-in)	
Stripping Length (X)		8mm	12 - 13mm
Rigid (Solid & Stranded) UL/ CSA rated data		 2 x 0.5..2.5mm ² 2 x 18..12 AWG	 1 x 0.5..2.5mm ² 1 x 24...12 AWG
Flexible with end sleeve		2 x 0.5..2.5mm ² 2 x 18..12AWG	1 x 0.5..2.5mm ² 1 x 18..12AWG

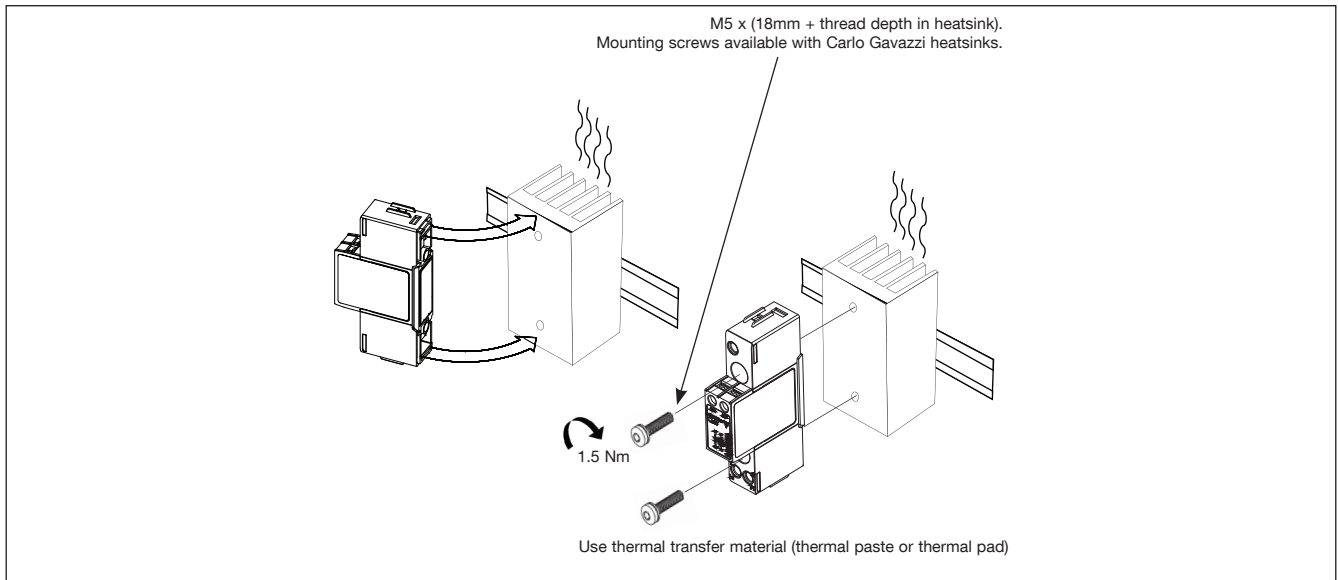
Mounting Instructions

Thermal stress will reduce the lifetime of the SSR. Therefore it is necessary to select the appropriate heatsinks, taking into account the surrounding temperature, load current and the duty cycle.

A fine layer of thermally conductive silicone paste must be evenly applied to the back of the SSR. RGS should be mounted on the heatsink with two M5 x 30mm screws (**SRWKITM5X30MM**).

Gradually tighten each screw (alternating between the two) until both are tightened with a torque of 0.75 Nm. Then tighten both screws to their final mounting torque of 1.5 Nm.

In case of a thermal pad attached to the back of the SSR, no thermal paste is required. The RGS is gradually tightened (alternating between the 2 screws) to a maximum torque of 1.5Nm.



Short Circuit Protection

Protection Co-ordination, Type 1 vs Type 2:

Type 1 protection implies that after a short circuit, the device under test will no longer be in a functioning state. In type 2 co-ordination the device under test will still be functional after the short circuit. In both cases, however the short circuit has to be interrupted. The fuse between enclosure and supply shall not open. The door or cover of the enclosure shall not be blown open. There shall be no damage to conductors of terminals and the conductors shall not separate from terminals. There shall be no breakage or cracking of insulating bases to the extent that the integrity of the mounting of live parts is impaired. Discharge of parts or any risk of fire shall not occur.

The product variants listed in the table hereunder are suitable for use on a circuit capable of delivering not more than 100,000A rms Symmetrical Amperes, 600Volts maximum when protected by fuses. Tests at 100,000A were performed with Class J, fast acting; please refer to the table below for maximum allowed ampere rating of the fuse. Use fuses only.

Co-ordination type 1 (UL 508)

Part No.	Prospective short circuit current [kArms]	Max. fuse size [A]	Class	Voltage [VAC]
RGS..25	100	30	J or CC	max. 600
RGS..50	100	30	J or CC	max. 600
RGS..51	100	30	J or CC	max. 600
RGS..75	100	30	J or CC	max. 600
RGS..90 / 91	100	30	J or CC	max. 600
RGS..92	100	80	J	max. 600

Co-ordination type 2 (IEC/EN 60947-4-2/ -4-3)

Part No.	Prospective short circuit current [kArms]	Ferraz Shawmut (Mersen)		Siba		Voltage [VAC]
		Max fuse size [A]	Part number	Max fuse size [A]	Part number	
RGS..25	10	40	6.6xx CP URD 22x58 /40	32	50 142 06.32	max. 660
	100	40	6.6xx CP URD 22x58 /40	32	50 142 06.32	max. 660
RGS..50	10	80	6.621 CP URQ 27x60 /80	50	50 142 06.50	max. 660
	10	70	A70QS70-4	50	50 142 06.50	max. 660
	100	80	6.621 CP URQ 27x60 /80	50	50 142 06.50	max. 660
	100	70	A70QS70-4	50	50 142 06.50	max. 660
RGS..51	10	80	6.621 CP URQ 27x60 /80	-	-	max. 660
	10	70	A70QS70-4	-	-	max. 660
	100	80	6.621 CP URQ 27x60 /80	-	-	max. 660
	100	70	A70QS70-4	-	-	max. 660
RGS..75	10	100	6.621 CP URQ 27x60 /100	80	50 194 20.80	max. 660
	10	100	A70QS100-4	80	50 194 20.80	max. 660
	100	100	6.621 CP URQ 27x60 /100	80	50 194 20.80	max. 660
	100	100	A70QS100-4	80	50 194 20.80	max. 660
RGS..90 / 91	10	125	6.621 CP URQ 27x60 /125	100	50 194 20.100	max. 660
	10	125	A70QS125-4	100	50 194 20.100	max. 660
	100	125	6.621 CP URQ 27x60 /125	100	50 194 20.100	max. 660
	100	125	A70QS125-4	100	50 194 20.100	max. 660
RGS..92	10	125	6.621 CP URD 22x58 /125	125	50 194 20.125	max. 660
	10	125	A70QS125-4	125	50 194 20.125	max. 660
	100	125	6.621 CP URD 22x58 /125	125	50 194 20.125	max. 660
	100	125	A70QS125-4	125	50 194 20.125	max. 660
RGS1A69..91	100	-	-	100	50 197 20.100	max. 759

Type 2 Protection with Miniature Circuit Breakers (M. C. B.s)

Solid State Relay type	ABB Model no. for Z - type M. C. B. (rated current)	ABB Model no. for B - type M. C. B. (rated current)	Wire cross sectional area [mm ²]	Minimum length of Cu wire conductor [m] ¹³	
RGS..25 (525 A ² s)	1-pole S201 - Z4 (4A) S201 - Z6 UC (6A)	S201 - B2 (2A) S201 - B2 (2A)	1.0	21.0	
			1.0	21.0	
			1.5	31.5	
RGS..50 RGS..51 (1800 A ² s)	1-pole S201 - Z10 (10A)	S201-B4 (4A)	1.0	7.6	
			1.5	11.4	
			2.5	19.0	
	S201 - Z16 (16A)	S201-B6 (6A)	1.0	5.2	
			1.5	7.8	
			2.5	13.0	
	S201 - Z20 (20A)	S201-B10 (10A)	4.0	20.8	
			1.5	12.6	
			2.5	21.0	
	S201 - Z25 (25A)	S201-B13 (13A)	2.5	25.0	
			4.0	40.0	
			2-pole S202 - Z25 (25A)	S202-B13 (13A)	2.5
			4.0	30.4	
RGS..75 (3200 A ² s)	1-pole S201 - Z25 (25A)	S201-B13 (13A)	2.5	7.0	
			4.0	11.2	
			6.0	16.8	
RGS...90 RGS...91 (6600 A ² s)	1-pole S201 - Z20 (20A)	S201-B10 (10A)	1.5	4.2	
			2.5	7.0	
			4.0	11.2	
	S201 - Z32 (32A)	S201-B16 (16A)	2.5	13.0	
			4.0	20.8	
			6.0	31.2	
	2-pole S202 - Z20 (20A)	S202-B10 (10A)	1.5	1.8	
			2.5	3.0	
			4.0	4.8	
	S202 - Z32 (32A)	S202-B16 (16A)	2.5	5.0	
			4.0	8.0	
			6.0	12.0	
			10.0	20.0	
S202 - Z50 (50A)	S202-B25 (25A)	4.0	14.8		
		6.0	22.2		
		10.0	37.0		
RGS...92 (18000 A ² s)	1-pole S201 - Z32 (32A)	S201-B16 (16A)	2.5	3.0	
			4.0	4.8	
			6.0	7.2	
	S201 - Z50 (50A)	S201-B25 (25A)	4.0	4.8	
			6.0	7.2	
			10.0	12.0	
				16.0	19.2
	S201 - Z63 (63A)	S201-B32 (32A)	6.0	7.2	
			10.0	12.0	
16.0			19.2		

13. Between MCB and Load (including return path which goes back to the mains).

Note: A prospective current of 6kA and a 230/400V power supply system is assumed for the above suggested specifications. For cables with different cross section than those mentioned above please consult Carlo Gavazzi's Technical Support Group.

Environmental Information

The declaration in this section is prepared in compliance with People's Republic of China Electronic Industry Standard SJ/T11364-2014: Marking for the Restricted Use of Hazardous Substances in Electronic and Electrical Products.

Part Name	Toxic or Harardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Power Unit Assembly	x	○	○	○	○	○
<p>○: Indicates that said hazardous substance contained in homogeneous materials for this part are below the limit requirement of GB/T 26572.</p> <p>X: Indicates that said hazardous substance contained in one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.</p>						

环境特性

这份申明根据中华人民共和国电子工业标准 SJ/T11364-2014：标注在电子电气产品中限定使用的有害物质

零件名称	有毒或有害物质与元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴化联苯 (PBB)	多溴联苯醚 (PBDE)
功率单元	x	○	○	○	○	○
<p>○: 此零件所有材料中含有的该有害物低于GB/T 26572的限定。</p> <p>X: 此零件某种材料中含有的该有害物高于GB/T 26572的限定。</p>						



Accessories

RG DIN Clip



Ordering Key

DIN clip mounted to RGS

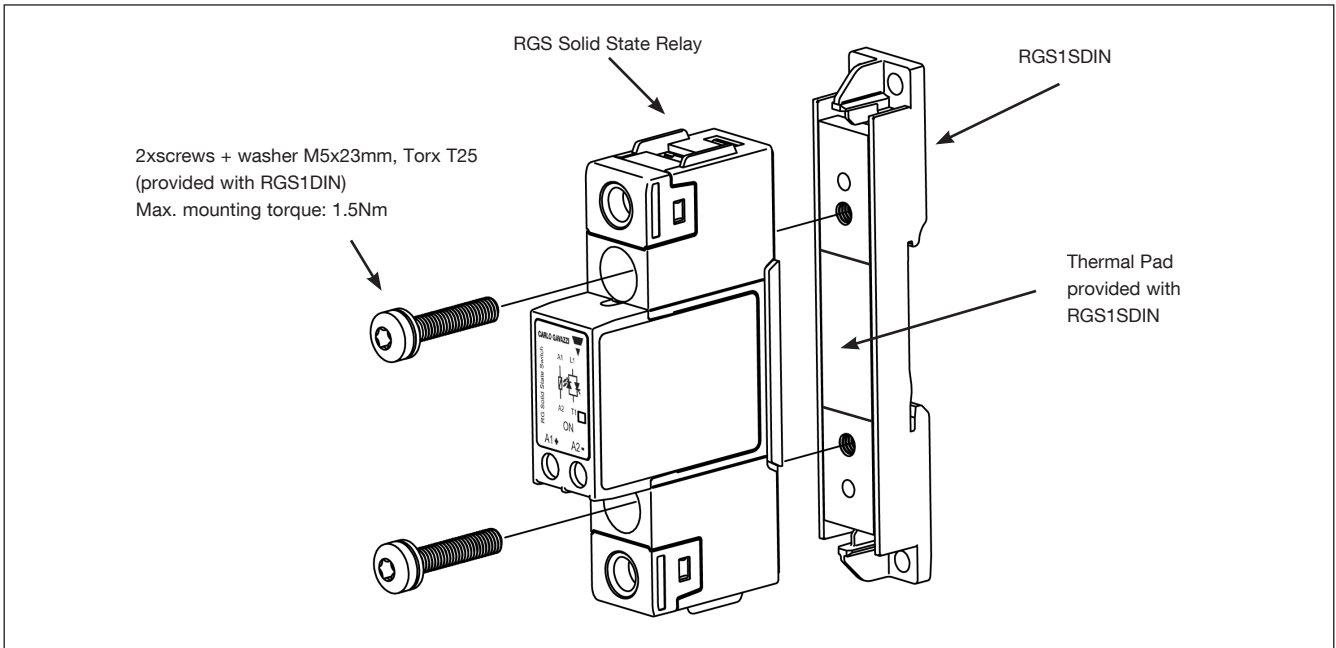
RGS...DIN

DIN clip accessory

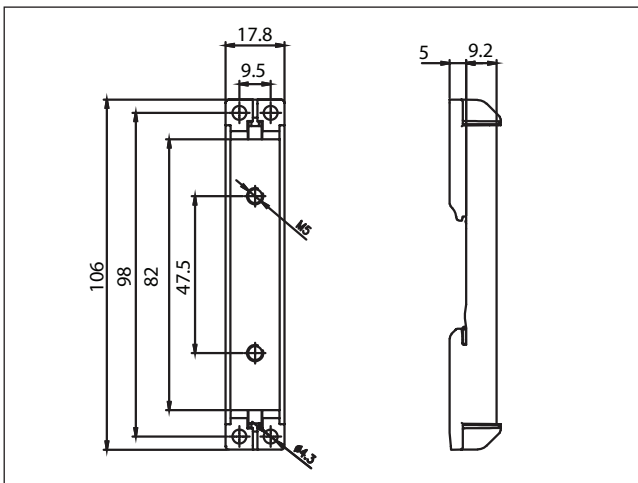
RGS1DIN

This DIN Clip accessory can be mounted to any RGS model and will enable the RGS to be DIN rail mount. Minimum current rating @ 40°C is 10 AAC. Refer to 'Current Derating' section. Gradually tighten the SSR, alternating between the 2 screws, to a maximum torque of 1.5Nm.

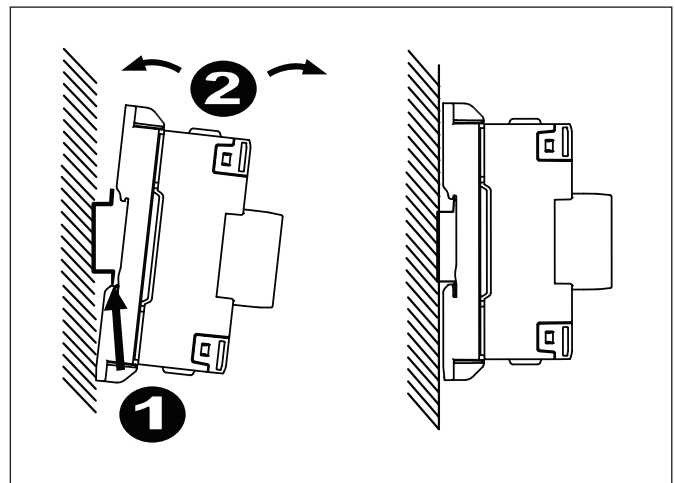
Mounting Instructions for RGS1DIN to RGS



RGS1DIN Dimensions

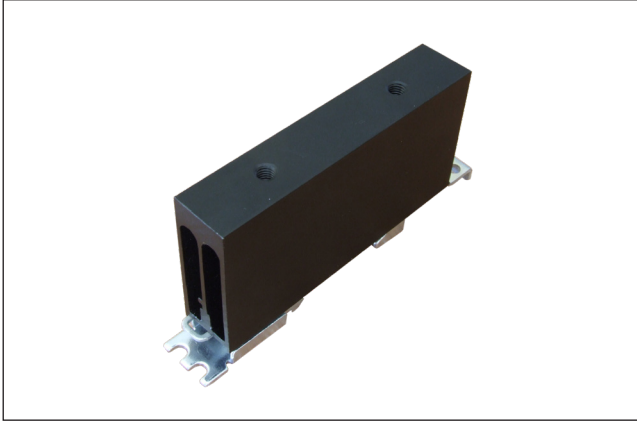


Installation Instructions



Accessories (cont.)

Heatsinks



Ordering Key

RHS..

 RGS mounted on
heatsink

RGS..H..

Heatsink Range Overview:

https://gavazziautomation.com/images/PIM/DATASHEET/ENG/SSR_Accessories.pdf

Heatsink Selector Tool:

https://gavazziautomation.com/nsc/hq/en/solid_state_relays

Thermal Pads



Ordering Key

 Thermal pad
mounted on RGS

RGS...HT

 Pack of 10 thermal pads
size 34.6 x 14mm

RGHT

Control Plugs



Ordering Key

RGM25

Pack of 10 spring loaded control plugs

* Refer to 'Connection Specifications' section for further details.

Accessories (cont.)

Screw Kits



Ordering Key **SRWKITM5X30MM**

- RGS Screw kit for mounting to heatsink
- Torx T20, size M5 x 30 mm
- Packing qty: 20 pcs

Packaging



Ordering Key **RGS...X40**

Bulk packaging of 40 pcs. RGS...