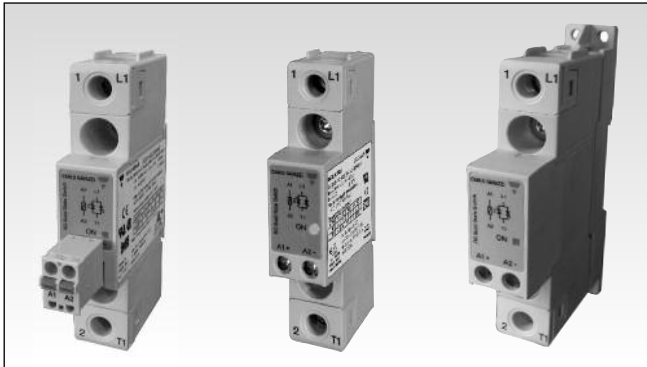


# Solid State Relays Industrial, 1-Phase, 17.5mm with built-in varistor Types RGS..E, RGS..EDIN

CARLO GAVAZZI



- Zero cross switching AC solid state relay
- Rated Operational voltage: Up to 600Vrms
- Rated Operational current: Up to 90Arms
- Up to 18000A<sup>2</sup>s for I<sup>2</sup>t
- Control voltages: 3-32 VDC, 20-275 VAC (24-190VDC)
- Design according to IEC/EN60947-4-2, IEC/EN60947-4-3, IEC/EN62314, UL508, CSA22.2 No. 14-10
- Integrated voltage transient protection with varistor
- RoHS compliant
- 100kA short circuit current rating according to UL508
- VDE approval
- Option for DIN mounting (RGS...DIN)

## Product Description

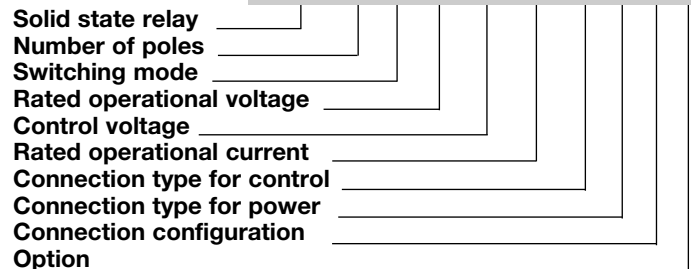
Aim of this solid state switching device is to switch heater loads and motor loads frequently. The range offers solutions up to 90AAC in 17.5mm width. Output connections are via a screw connection, having a captivated washer allowing for safe looping or via box clamp which can handle cables up to 25mm<sup>2</sup> (AWG3). Input connection is provided either via a

screw connection having a captivated washer or via a pluggable spring loaded input. Other options with integrated heatsink are available in RGC ranges.

The RGS...DIN provides an option for DIN mounting of the RGS series. Minimum AC51 rating @ 40°C is 10AAC.

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

## Ordering Key **RGS 1 A 60 D 75 K K E**



## Ordering Key (Refer to page 2 for available part numbers)

1Phase SSR with no heatsink	Rated voltage	Control voltage	Rated current	Connection control	Connection power	Connection configuration	Options
<b>RGS1A: ZC*</b>	23: 230V +10% - 15%	D: 3 or 4-32VDC A: 20 - 275VAC,	25: 25A, 1200Vp 50: 50A, 1200Vp 51: 50A, 1600Vp 75: 75A, 1200Vp 90: 90A, 1200Vp 91: 90A, 1600Vp 92: 90A, 1200Vp, high I <sup>2</sup> 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.
<b>RGS1B: IO**</b>	60: 600V +10% -15%	24-190 VDC					

\* ZC: Zero cross switching

\*\*IO: Instant-On switching

## Selection Guide - RGS..

Rated voltage, Blocking voltage, Switching mode	Control voltage	Connection Control/ Power	Rated operational current (I <sup>2</sup> t value)				
			25 AAC (525A <sup>2</sup> s)	50 AAC (1800A <sup>2</sup> s)	75 AAC (3200A <sup>2</sup> s)	90 AAC (6600A <sup>2</sup> s)	90 AAC (18000A <sup>2</sup> s)
230V, 800Vp ZC	3-32VDC	Screw/Screw Spring/Screw	RGS1A23D25KKE RGS1A23D25MKE	RGS1A23D50KKE RGS1A23D50MKE	RGS1A23D75KKE -	- -	- -
	20-275VAC, 24-190VDC	Screw/Screw Spring/Screw	RGS1A23A25KKE RGS1A23A25MKE	RGS1A23A50KKE RGS1A23A50MKE	RGS1A23A75KKE -	- -	- -
600V, 1200Vp ZC	4-32VDC	Screw/Screw Screw/Box Spring/Screw Spring/Box	RGS1A60D25KKE - RGS1A60D25MKE -	RGS1A60D50KKE RGS1A60D50KGE RGS1A60D50MKE -	RGS1A60D75KKE - -	RGS1A60D90KKE - RGS1A60D90MKE -	RGS1A60D92KKE RGS1A60D92KGE RGS1A60D92MKE -
	20-275VAC, 24-190VDC	Screw/Screw Screw/Box Spring/Screw	RGS1A60A25KKE - RGS1A60A25MKE	RGS1A60A50KKE RGS1A60A50KGE RGS1A60A50MKE	RGS1A60A75KKE - -	RGS1A60A90KKE - RGS1A60A90MKE	RGS1A60A92KKE RGS1A60A92KGE RGS1A60A92MKE
600V, 1600Vp ZC	4-32VDC	Screw/Screw	-	RGS1A60D51KKE	-	RGS1A60D91KKE	-
	20-275VAC, 24-190VDC	Screw/Screw	-	RGS1A60A51KKE	-	RGS1A60A91KKE	-
600V, 1200Vp IO	4-32VDC	Screw/Screw	RGS1B60D25KKE	RGS1B60D50KKE	RGS1B60D75KKE	RGS1B60D90KKE	-

## Selection Guide - RGS..HT (RGS with attached Thermal Pad)<sup>1</sup>

Rated voltage, Blocking voltage, Switching mode	Control voltage	Connection Control/ Power	Rated operational current (I <sup>2</sup> t value)		
			50 AAC (1800A <sup>2</sup> s)	90 AAC (6600A <sup>2</sup> s)	90 AAC (18000A <sup>2</sup> 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

1: 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..H51 (RGS mounted on heatsink RHS37A)<sup>2</sup>

Rated voltage, Blocking voltage, Switching mode	Control voltage	Connection Control/ Power	Rated operational current (I <sup>2</sup> t value)		
			30 AAC (18000A <sup>2</sup> s)		
600V, 1200Vp ZC	4-32VDC	Screw/Screw	RGS1A60D92KKEH51		
		Screw/Box	RGS1A60D92KGEH51		
		Spring/Screw	RGS1A60D92MKEH51		
		Spring/Box	RGS1A60D92MGEH51		

2: Any of the available RGS part numbers can be factory mounted upon request on RHS37A. The above part numbers are some examples of RGS with factory mounted heatsink.

## Selection Guide - RGS..DIN (RGS for DIN Rail mounting)<sup>3</sup>

Rated voltage, Blocking voltage, Switching mode	Control voltage	Connection Control/ Power	Rated operational current (I <sup>2</sup> t value)		
			10 AAC (525A <sup>2</sup> s)	12 AAC (1800A <sup>2</sup> s)	12 AAC (6600A <sup>2</sup> s)
230V, 600Vp ZC	3-32VDC	Screw/Screw	RGS1A23D25KKEDIN	RGS1A23D50KKEDIN	-
	20-275VAC, 24-190VDC	Screw/Screw	RGS1A23A25KKEDIN	RGS1A23A50KKEDIN	-
600V, 1200Vp ZC	4-32VDC	Screw/Screw	RGS1A60D25KKEDIN	RGS1A60D50KKEDIN	RGS1A60D90KKEDIN
	20-275VAC, 24-190VDC	Screw/Screw	RGS1A60A25KKEDIN	RGS1A60A50KKEDIN	-

3: 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	Rated operational current (I <sup>2</sup> t value)	
			25 AAC (525A <sup>2</sup> s)	50 AAC (1800A <sup>2</sup> s)
230V, 600Vp	3-32VDC	Screw/Screw	RGS1A23D25KKE40	-
600V, 1200Vp	4-32VDC	Screw/Screw	-	RGS1A60D50KKE40

## Output Voltage Specifications

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

## General Specifications

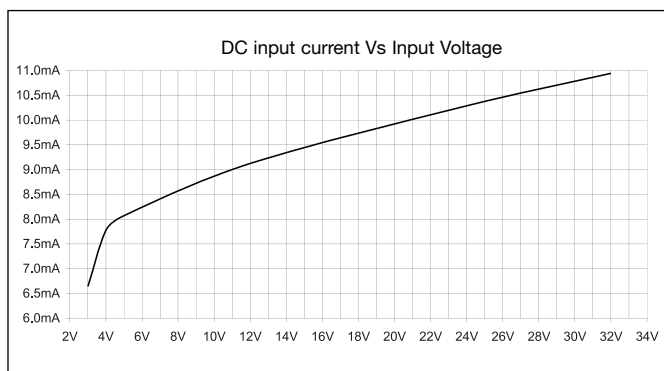
Latching voltage (across L1-T1)	20V	Pollution degree	2 (non-conductive pollution with possibilities of condensation)
Operational frequency range	45 to 65Hz	Over-voltage category	III (fixed installations)
Power factor	> 0.5 @ Vrated	Isolation	
CE marking	Yes	Input to Output	4000Vrms
Touch protection	IP20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

## Input Specifications (@ 25°C unless otherwise specified)

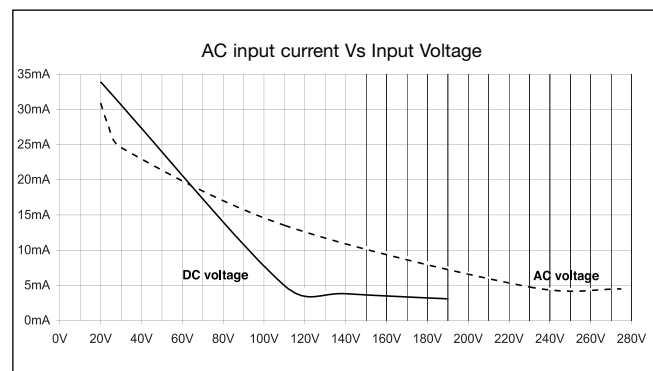
		RGS..D..	RGS..A..
Control voltage range <sup>4</sup>	RGS..23..	3 - 32 VDC	20 - 275 VAC, 24 (-10%) - 190 VDC
	RGS..60..	4 - 32 VDC	20 - 275 VAC, 24 (-10%) - 190 VDC
Pick-up voltage	RGS..23.. RGS..60..	3.0 VDC 3.8 VDC	20 VAC/DC
Drop-out voltage	RGS..23.. RGS..60..	1 VDC 1 VDC	5 VAC/DC
Maximum Reverse voltage		32 VDC	-
Response time pick-up ZC (RGS1A..)		0.5 cycle + 500µs @ 24VDC	2 cycles @ 230VAC/110VDC
Response time pick-up IO (RGS1B..)		350µs @ 24 VDC	N/A
Response time drop-out		0.5 cycle + 500µs @ 24VDC	0.5 cycle + 40ms @ 230 VAC/ 110 VDC
Input current @ 40°C		See diagrams below	See diagrams below

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

### RG..D..



### RG..A..



## Motor Ratings<sup>5</sup>: HP (UL508) / kW (EN/IEC60947-4-2) @ 40°C

	115 VAC	230 VAC	400 VAC	480 VAC	600 VAC
RGS..25	½HP / 0.18kW	1-½HP / 0.37kW	3HP / 0.75kW	3HP / 1.1kW	5HP / 1.5kW
RGS..50/51	1HP / 0.37kW	3HP / 1.1kW	5HP / 1.5kW	5HP / 2.2kW	7-½HP / 3.7kW
RGS..75	1-½HP / 0.56kW	3HP / 1.5kW	5HP / 3kW	7-½HP / 4kW	10HP / 4kW
RGS..90/91/92	2HP / 0.75kW	5HP / 2.2kW	7-½HP / 4kW	10HP / 4kW	15HP / 5.5kW

5: 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) <sup>5</sup>	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 (x:6, Tx:6s, F:50%)at 40°C <sup>5, 6</sup>	30	30	30	30	30
Min. operational current	150 mAAC	250 mAAC	400 mAAC	400 mAAC	500 mAAC
Rep. overload current - UL508: T <sub>AMB</sub> =40°C, t <sub>ON</sub> =1s, t <sub>OFF</sub> =9s, 50cycles	67 AAC	107 AAC	126 AAC	168 AAC	168 AAC
Maximum Transient Surge Current (I <sub>TSM</sub> ), t=10ms	325Ap	600Ap	800Ap	1150Ap	1900Ap
Maximum Off-state leakage current @ rated voltage	3 mAAC	3 mAAC	3 mAAC	3 mAAC	3 mAAC
I <sup>2</sup> t for fusing (t=10ms) Minimum	525 A <sup>2</sup> s	1800A <sup>2</sup> s	3200A <sup>2</sup> s	6600A <sup>2</sup> s	18000A <sup>2</sup> s
Critical dv/dt (@ T <sub>j</sub> init = 40°C)	1000V/us	1000V/us	1000V/us	1000V/us	1000V/us

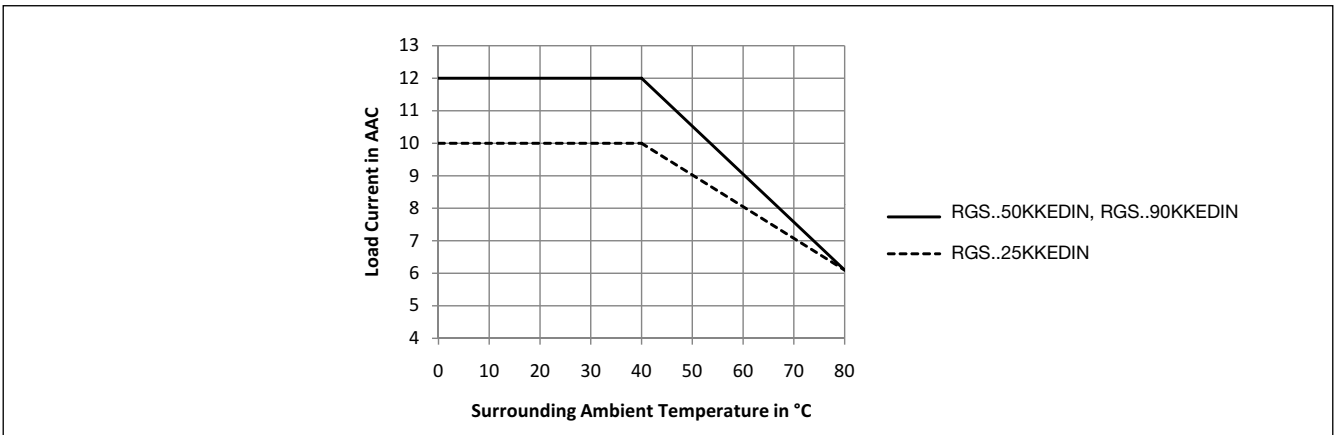
6 x: multiple of AC-53a current rating, Tx: duration of current surge, F: duty cycle.

## Output Specifications for RGS..DIN

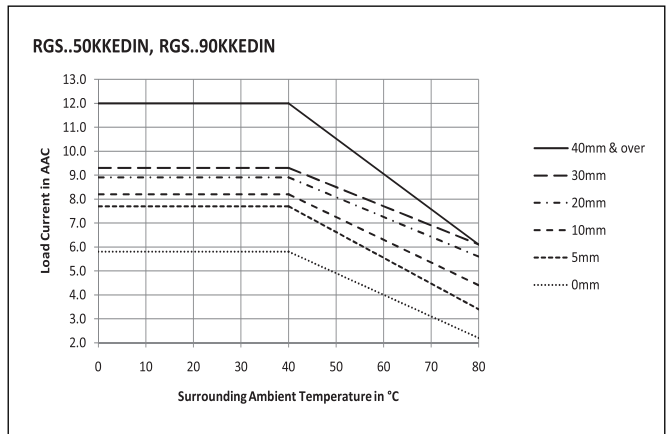
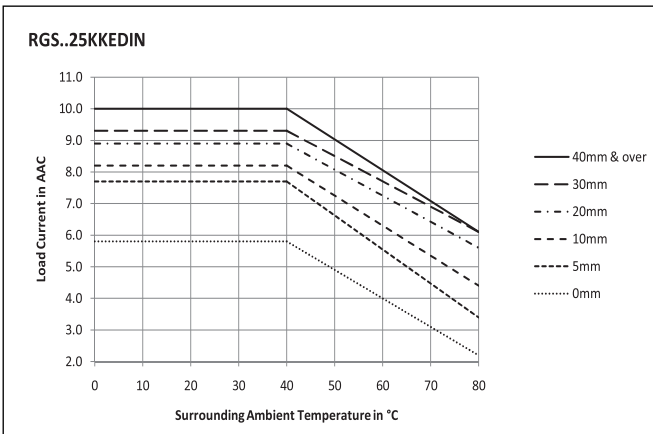
	RGS..25..DIN	RGS..50..DIN	RGS..90..DIN
Rated operational current <sup>7</sup> AC-51 rating @ Ta = 40°C	10 AAC	12 AAC	12 AAC
AC-53a rating @ Ta=40°C	5 AAC	5 AAC	5 AAC
Number of motor starts (x:6, Tx:6s, F:50%) at 40°C <sup>6</sup>	30	30	30
Min. operational current	150 mA	250 mA	400 mA
Maximum transient surge current I <sub>TSM</sub> , t=10ms	325Ap	600Ap	1150Ap
Maximum Off-state leakage current @ rated voltage	3 mAAC	3 mAAC	3 mAAC
I <sup>2</sup> t for fusing (t=10ms) Minimum	525 A <sup>2</sup> s	1800 A <sup>2</sup> s	6600 A <sup>2</sup> s
Critical dv/dt (@ T <sub>j</sub> init = 40°C)	1000V/us	1000V/us	1000V/us

7: Refer to Derating Curves

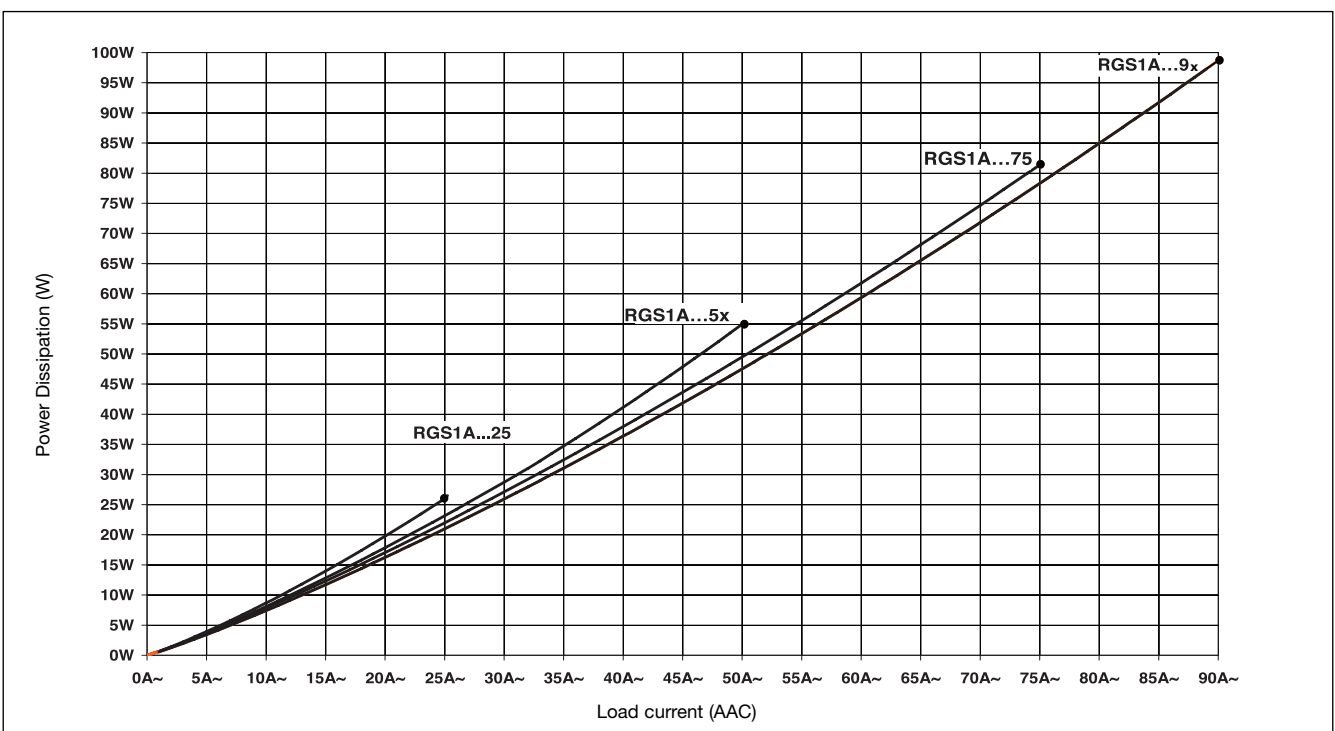
## Derating Curves for RGS...DIN



## Derating vs. Spacing Curves for RGS...DIN



## Output Power Dissipation



## Electromagnetic Compatibility

<b>EMC Immunity</b>	IEC/EN 61000-6-2	<b>Radiated Radio Frequency</b>	
<b>Electrostatic Discharge (ESD)</b>		<b>Immunity</b>	IEC/EN 61000-4-3
<b>Immunity</b>	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
<b>Electrical Fast Transient</b>		<b>Conducted Radio Frequency</b>	IEC/EN 61000-4-6
<b>(Burst) Immunity</b>	IEC/EN 61000-4-4	<b>Immunity</b>	Performance Criteria 1
Output: 2kV, 5kHz	Performance Criteria 1	10V/m, 0.15 - 80 MHz	Performance Criteria 1
Input: 1kV, 5kHz	Performance Criteria 1	<b>Voltage Dips Immunity</b>	IEC/EN 61000-4-11
<b>Electrical Surge Immunity</b>	IEC/EN 61000-4-5	0% for 10ms/20ms	Performance Criteria 2
Output, line to line, 1kV	Performance Criteria 1	40% for 200ms	Performance Criteria 2
Output, line to earth, 2kV	Performance Criteria 1	70% for 500ms	Performance Criteria 2
Input, line to line, 1kV	Performance Criteria 2	<b>Voltage Interruptions Immunity</b>	IEC/EN 61000-4-11
Input, line to earth, 2kV	Performance Criteria 2	0% for 5000ms	Performance Criteria 2
<b>EMC Emission</b>	IEC/EN 61000-6-4	<b>Field Emission (Radiated)</b>	IEC/EN 55011
<b>Radio Interference</b>		<b>30 - 1000MHz</b>	Class A (industrial)
<b>Voltage Emission (Conducted)</b>	IEC/EN 55011		
<b>0.15 - 30MHz</b>	Class A (industrial) with filters - see filter information		
	IEC/EN 60947-4-2, 60947-4-3		
	Class A (no filtering needed)		

### Radio Interference

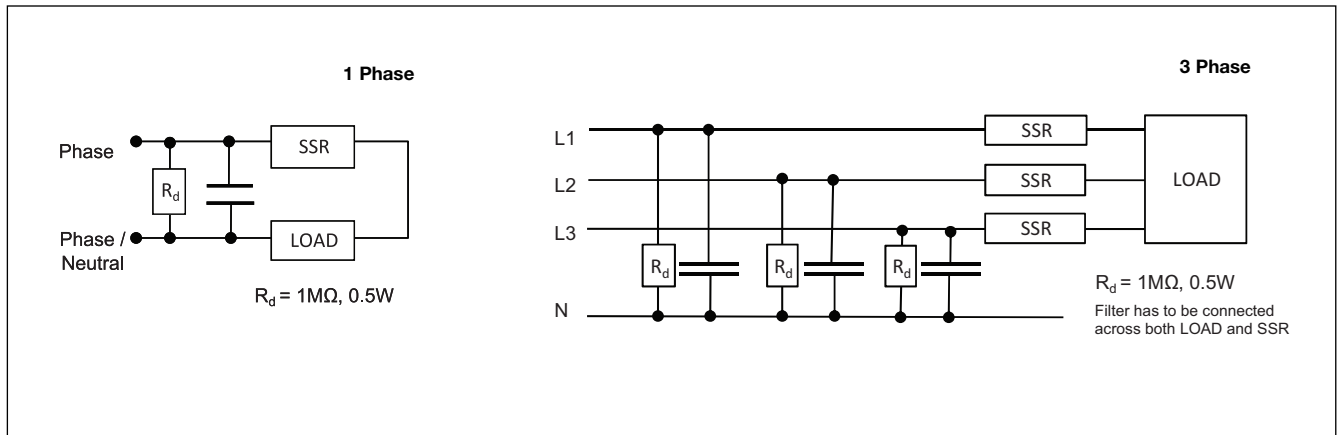
## Filtering - IEC/EN 55011 Class A compliance (for class B compliance contact us)

Part Number	Suggested filter for compliance	Maximum Heater current
RGS1A23..25	100 nF / 275 V / X1	25 A
RGS1A23..50	220 nF / 275 V / X1	30 A
	330 nF / 275 V / X1	35 A
RGS1A23..51	150 nF / 275 V / X1	20 A
	220 nF / 275 V / X1	35 A
RGS1A23..75	330 nF / 275 V / X1	35 A
RGS1A23..90/91/92	330 nF / 275 V / X1	35 A
RGS1A60..25	150 nF / 760 V / X1	25 A
	220 nF / 760 V / X1	30 A
RGS1A60..50	330 nF / 760 V / X1	30 A
RGS1A60..51	220 nF / 760 V / X1	30 A
RGS1A60..75	220 nF / 760 V / X1	30 A
RGS1A60..90/91/92	220 nF / 760 V / X1	30 A

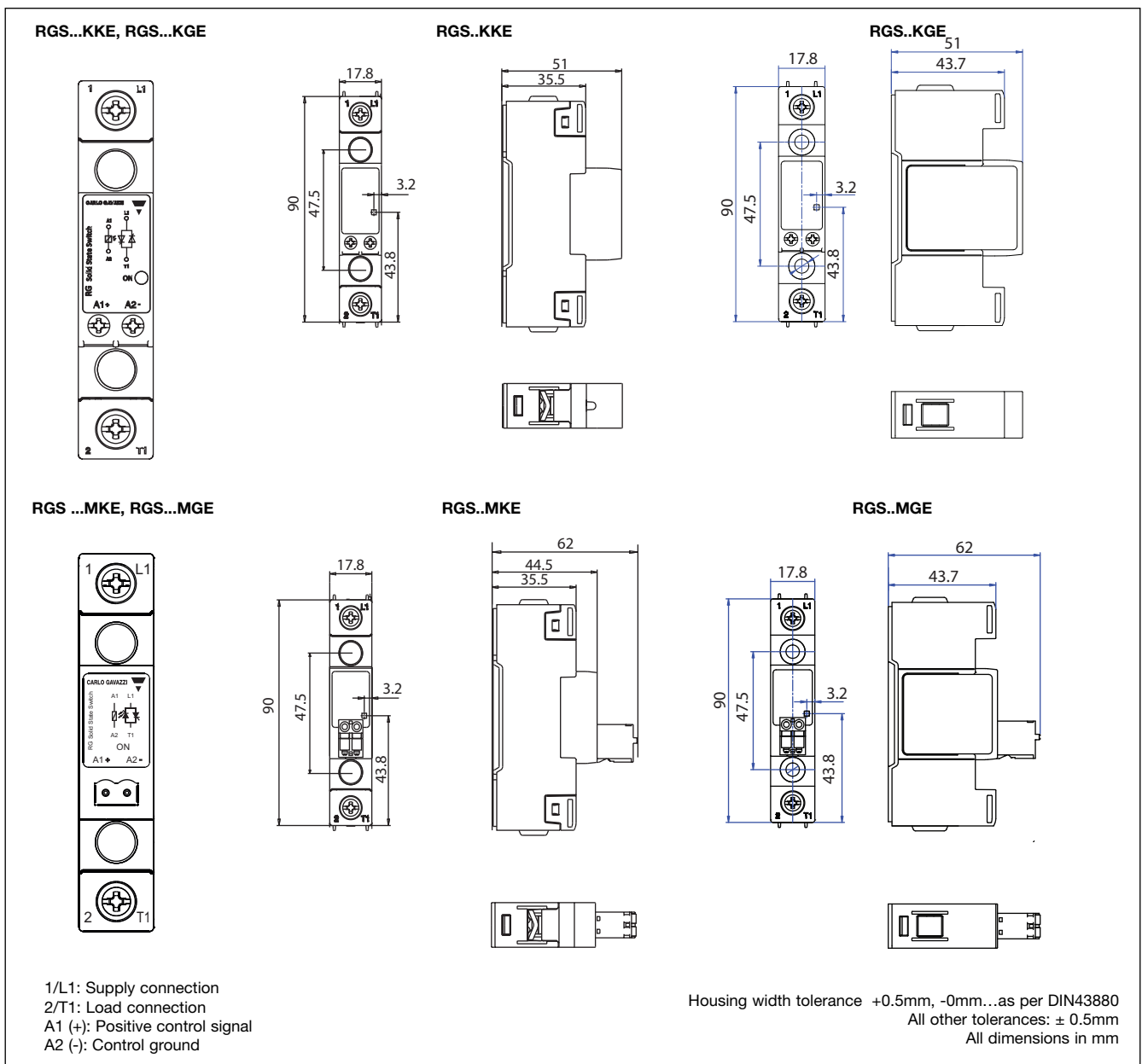
### Note:

- 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 inside the filtering specification tables should be taken only as indications, the filter attenuation will depend on the final application. DC input type require surge suppression for full compliance to EN55011.
- 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.

## Filter Connection Diagram

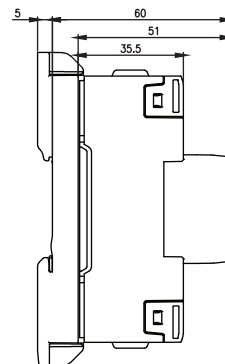
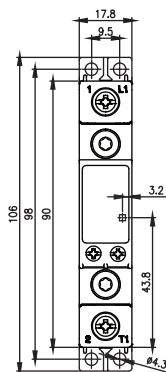
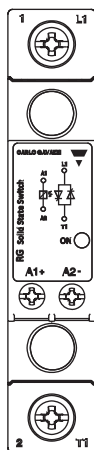


## Terminal Layout and Dimensions

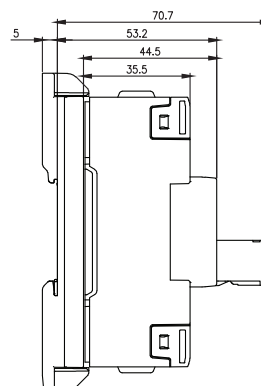
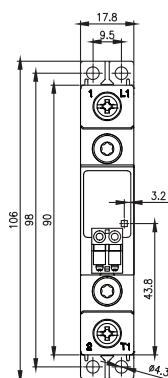
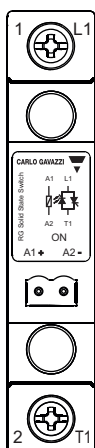


## Terminal Layout and Dimensions (cont.)

### RGS....KKEDIN



### RGS ....MKEDIN



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

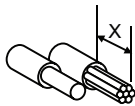





Housing width tolerance +0.5mm, -0mm...as per DIN43880  
 All other tolerances: ± 0.5mm  
 All dimensions in mm



## Connection Specifications


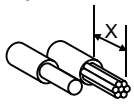


### POWER CONNECTIONS: 1/L1, 2/T1

Use 75°C copper (Cu) conductors

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

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



Use 60/75°C copper (Cu) conductors

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

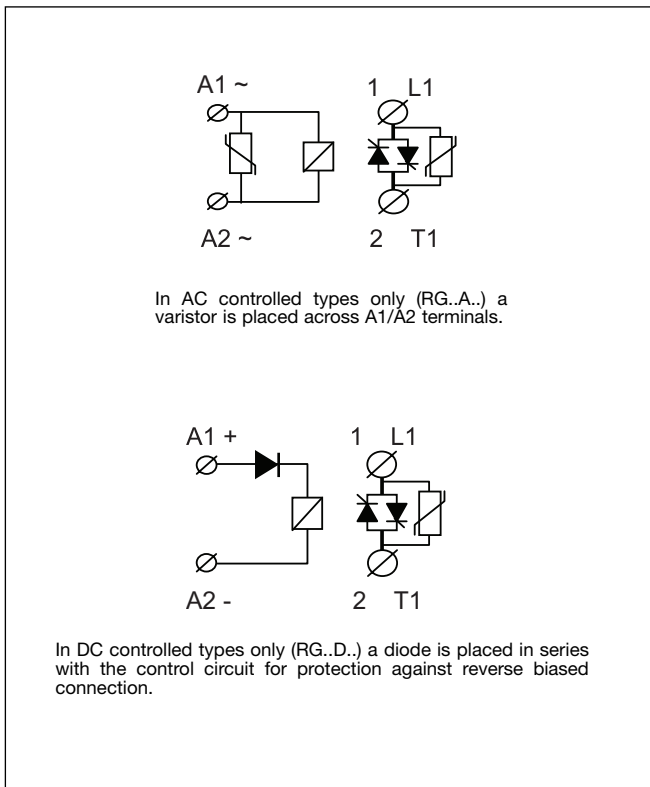
## Environmental Specifications

Operating Temperature	-40°C to 80°C (-40°F to +176°F)	Relative humidity	95% non-condensing @ 40°C
Storage Temperature	-40°C to 100°C (-40°F to +212°F)	UL flammability rating (housing)	UL 94 V0
RoHS (2002/95/EC)	Compliant	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	Weight	approx. 103g approx. 155g approx. 260g
Vibration resistance (2-100Hz, IEC60068-2-26, EN 50155, EN 61373)	5g per axis 2g per axis (RGS..H51)	RGS...DIN RGS...H51	

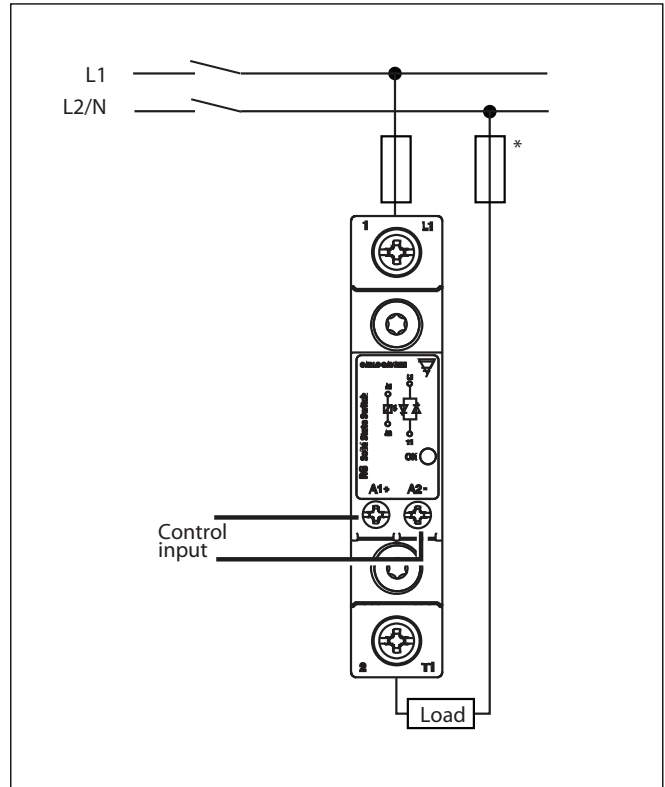
## Agency Approvals and Conformance

<b>Conformance</b>	IEC/EN 62314 IEC/EN 60947-4-2 IEC/EN 60947-4-3	<b>Agency Approvals</b>	UL508 Recognised (E172877) CSA 22.2 No.14-10 (204075) VDE (0660-109)
   		Short circuit current rating	100kA, UL508

## Functional Diagram



## Connection Diagram



## Heatsink Selection

### RGS1...25

Load current [A]	Thermal resistance [K/W]							Power dissipation [W]
	20	30	40	50	60	70	80	
25.0	3.11	2.72	2.33	1.94	1.55	1.17	0.78	25.7
22.5	3.55	3.10	2.66	2.22	1.77	1.33	0.89	22.6
20.0	4.10	3.59	3.08	2.56	2.05	1.54	1.03	19.5
17.5	4.83	4.23	3.63	3.02	2.42	1.81	1.21	16.6
15.0	5.83	5.10	4.37	3.64	2.91	2.18	1.46	13.7
12.5	7.24	6.34	5.43	4.53	3.62	2.72	1.81	11.0
10.0	9.43	8.25	7.07	5.89	4.71	3.54	2.36	8.5
7.5	13.17	11.53	9.88	8.23	6.59	4.94	3.29	6.1
5.0	---	18.35	15.73	13.11	10.49	7.86	5.24	3.8
2.5	---	---	---	---	---	17.21	11.47	1.7

T<sub>A</sub>  
Ambient temp [°C]

### RGS1...5x

Load current [A]	Thermal resistance [K/W]							Power dissipation [W]
	20	30	40	50	60	70	80	
50.0	1.45	1.28	1.06	0.87	0.68	0.49	0.30	52.8
45.0	1.72	1.50	1.29	1.07	0.85	0.64	0.42	46.3
40.0	2.00	1.75	1.50	1.25	1.00	0.75	0.50	40.0
35.0	2.35	2.06	1.76	1.47	1.18	0.88	0.59	34.0
30.0	2.83	2.48	2.13	1.77	1.42	1.06	0.71	28.2
25.0	3.52	3.08	2.64	2.20	1.76	1.32	0.88	22.7
20.0	4.58	4.01	3.44	2.86	2.29	1.72	1.15	17.5
15.0	6.40	5.60	4.80	4.00	3.20	2.40	1.60	12.5
10.0	10.19	8.92	7.64	6.37	5.10	3.82	2.55	7.8
5.0	---	19.51	16.72	13.94	11.15	8.36	5.57	3.6

T<sub>A</sub>  
Ambient temp [°C]

Maximum junction temperature	125°C
Heatsink temperature	100°C
Junction to case thermal resistance, R <sub>thjc</sub>	<0.45 K/W
Case to heatsink thermal resistance, R <sub>thcs</sub> <sup>8</sup>	< 0.25 K/W

Maximum junction temperature	125°C
Heatsink temperature	100°C
Junction to case thermal resistance, R <sub>thjc</sub>	<0.3 K/W
Case to heatsink thermal resistance, R <sub>thcs</sub> <sup>8</sup>	< 0.25 K/W

## Heatsink Selection (cont.)

### RGS1...75

Load current [A]	Thermal resistance [K/W]							Power dissipation [W]
	20	30	40	50	60	70	80	
75.0	0.80	0.68	0.55	0.43	0.30	0.18	0.06	80.7
67.5	0.99	0.84	0.70	0.56	0.42	0.28	0.14	70.7
60.0	1.22	1.06	0.89	0.73	0.56	0.40	0.24	61.0
52.5	1.53	1.33	1.14	0.95	0.76	0.56	0.37	51.8
45.0	1.86	1.63	1.40	1.16	0.93	0.70	0.47	42.9
37.5	2.32	2.03	1.74	1.45	1.16	0.87	0.58	34.5
30.0	3.01	2.64	2.26	1.88	1.51	1.13	0.75	26.5
22.5	4.21	3.68	3.16	2.63	2.10	1.58	1.05	19.0
15.0	6.68	5.85	5.01	4.18	3.34	2.51	1.67	12.0
7.5	14.53	12.71	10.89	9.08	7.26	5.45	3.63	5.5

Ambient temp [°C]

### RGS1...9x

Load current [A]	Thermal resistance [K/W]							Power dissipation [W]
	20	30	40	50	60	70	80	
90.0	0.62	0.52	0.41	0.31	0.21	0.11	0.01	98.4
81.0	0.77	0.66	0.54	0.42	0.31	0.19	0.07	85.9
72.0	0.97	0.83	0.70	0.56	0.43	0.29	0.16	74.0
63.0	1.23	1.07	0.91	0.75	0.59	0.43	0.27	62.5
54.0	1.55	1.35	1.16	0.97	0.77	0.58	0.39	51.7
45.0	1.93	1.69	1.45	1.21	0.97	0.73	0.48	41.4
36.0	2.53	2.21	1.89	1.58	1.26	0.95	0.63	31.6
27.0	3.55	3.11	2.66	2.22	1.77	1.33	0.89	22.5
18.0	5.67	4.97	4.26	3.55	2.84	2.13	1.42	14.1
9.0	12.46	10.90	9.34	7.79	6.23	4.67	3.11	6.4

Ambient temp [°C]

Maximum junction temperature	125°C
Heatsink temperature	100°C
Junction to case thermal resistance, Rthjc	<0.25 K/W
Case to heatsink thermal resistance, Rthcs <sup>8</sup>	< 0.25 K/W

Maximum junction temperature	125°C
Heatsink temperature	100°C
Junction to case thermal resistance, Rthjc	<0.20 K/W
Case to heatsink thermal resistance, Rthcs <sup>8</sup>	< 0.25 K/W

8: 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.

## 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. Gradually tighten each screw (alternating between the two)

until both are tightened with a torque of 0.75Nm. Then tighten both screws to their final mounting torque of 1.5Nm.

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



# Heatsink Selection for RGS...HT

## RGS1...25..HT

Load current [A]	Thermal resistance [K/W]							Power dissipation [W]
	20	30	40	50	60	70	80	
25.0	2.73	2.34	1.95	1.56	1.18	0.79	0.40	25.7
22.5	3.30	2.86	2.42	1.97	1.53	1.09	0.64	22.6
20.0	4.04	3.52	3.01	2.50	1.98	1.47	0.96	19.5
17.5	4.83	4.23	3.63	3.02	2.42	1.81	1.21	16.6
15.0	5.83	5.10	4.37	3.64	2.91	2.18	1.46	13.7
12.5	7.24	6.34	5.43	4.53	3.62	2.72	1.81	11.0
10.0	9.43	8.25	7.07	5.89	4.71	3.54	2.36	8.5
7.5	13.17	11.53	9.88	8.23	6.59	4.94	3.29	6.1
5.0	---	18.35	15.73	13.11	10.49	7.86	5.24	3.8
2.5	---	---	---	---	---	17.21	11.47	1.7

Ambient temp [°C]

## RGS1...5x..HT

Load current [A]	Thermal resistance [K/W]							Power dissipation [W]
	20	30	40	50	60	70	80	
50.0	0.84	0.65	0.46	0.27	0.08	---	---	52.8
45.0	1.12	0.90	0.69	0.47	0.25	0.04	---	46.3
40.0	1.47	1.22	0.97	0.72	0.47	0.22	---	40.0
35.0	1.94	1.64	1.35	1.06	0.76	0.47	0.17	34.0
30.0	2.57	2.22	1.86	1.51	1.15	0.80	0.44	28.2
25.0	3.48	3.03	2.59	2.15	1.71	1.27	0.83	22.7
20.0	4.58	4.01	3.44	2.86	2.29	1.72	1.15	17.5
15.0	6.40	5.60	4.80	4.00	3.20	2.40	1.60	12.5
10.0	10.19	8.92	7.64	6.37	5.10	3.82	2.55	7.8
5.0	---	19.51	16.72	13.94	11.15	8.36	5.57	3.6

Ambient temp [°C]

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

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

## RGS1...75..HT

Load current [A]	Thermal resistance [K/W]							Power dissipation [W]
	20	30	40	50	60	70	80	
75.0	0.25	0.13	0.00	---	---	---	---	80.7
67.5	0.44	0.29	0.15	0.01	---	---	---	70.7
60.0	0.67	0.51	0.34	0.18	0.01	---	---	61.0
52.5	0.98	0.78	0.59	0.40	0.21	0.01	---	51.8
45.0	1.39	1.16	0.93	0.70	0.46	0.23	---	42.9
37.5	1.99	1.70	1.41	1.12	0.83	0.54	0.25	34.5
30.0	2.91	2.53	2.15	1.78	1.40	1.02	0.65	26.5
22.5	4.21	3.68	3.16	2.63	2.10	1.58	1.05	19.0
15.0	6.68	5.85	5.01	4.18	3.34	2.51	1.67	12.0
7.5	14.53	12.71	10.89	9.08	7.26	5.45	3.63	5.5

Ambient temp [°C]

## RGS1...9x..HT

Load current [A]	Thermal resistance [K/W]							Power dissipation [W]
	20	30	40	50	60	70	80	
90.0	0.07	---	---	---	---	---	---	98.4
81.0	0.22	0.11	---	---	---	---	---	85.9
72.0	0.42	0.28	0.15	0.01	---	---	---	74.0
63.0	0.68	0.52	0.36	0.20	0.04	---	---	62.5
54.0	1.03	0.84	0.65	0.45	0.26	0.06	---	51.7
45.0	1.54	1.30	1.05	0.81	0.57	0.33	0.09	41.4
36.0	2.32	2.00	1.69	1.37	1.05	0.74	0.42	31.6
27.0	3.55	3.11	2.66	2.22	1.77	1.33	0.89	22.5
18.0	5.67	4.97	4.26	3.55	2.84	2.13	1.42	14.1
9.0	12.46	10.90	9.34	7.79	6.23	4.67	3.11	6.4

Ambient temp [°C]

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

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

## 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 or 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.

Class CC fuses are represented by tests performed on Class J fuses.

### Co-ordination type 1 (UL508)

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 / 51	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		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. 600
	100	40	6.6xx CP URD 22x58 /40	32	50 142 06.32	max. 600
RGS..50	10	80	6.621 CP URQ 27x60 /80	50	50 142 06.50	max. 600
	10	70	A70QS70-4	50	50 142 06.50	max. 600
	100	80	6.621 CP URQ 27x60 /80	50	50 142 06.50	max. 600
	100	70	A70QS70-4	50	50 142 06.50	max. 600
RGS..51	10	80	6.621 CP URQ 27x60 /80	-	-	max. 600
	10	70	A70QS70-4	-	-	max. 600
	100	80	6.621 CP URQ 27x60 /80	-	-	max. 600
	100	70	A70QS70-4	-	-	max. 600
RGS..75	10	100	6.621 CP URQ 27x60 /100	80	50 194 20.80	max. 600
	10	100	A70QS100-4	80	50 194 20.80	max. 600
	100	100	6.621 CP URQ 27x60 /100	80	50 194 20.80	max. 600
	100	100	A70QS100-4	80	50 194 20.80	max. 600
RGS..90 / 91	10	125	6.621 CP URQ 27x60 /125	100	50 194 20.100	max. 600
	10	125	A70QS125-4	100	50 194 20.100	max. 600
	100	125	6.621 CP URQ 27x60 /125	100	50 194 20.100	max. 600
	100	125	A70QS125-4	100	50 194 20.100	max. 600
RGS..92	10	125	6.621 CP URD 22x58 /125	125	50 194 20.125	max. 600
	10	125	A70QS125-4	125	50 194 20.125	max. 600
	100	125	6.621 CP URD 22x58 /125	125	50 194 20.125	max. 600
	100	125	A70QS125-4	125	50 194 20.125	max. 600

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

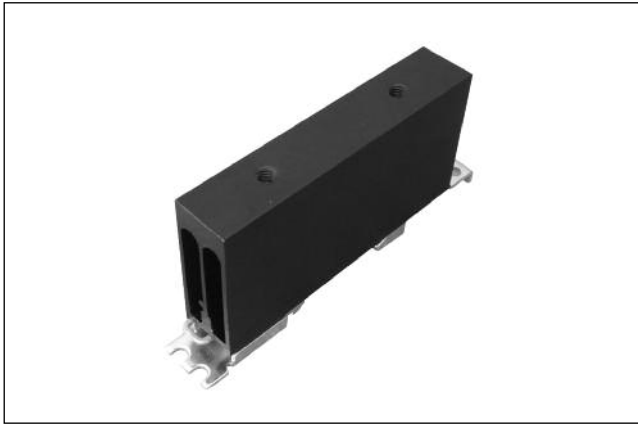
Solid State Relay type	ABB Model no. for Z - type M. C. B. (rated current)	ABB Model no. for B - type M. C. B. (rated current)	Wire cross sectional area [mm <sup>2</sup> ]	Minimum length of Cu wire conductor [m] <sup>9</sup>	
<b>RGS..25</b>	<b>1-pole</b> S201 - Z4 (4A) S201 - Z6 UC (6A)	S201 - B2 (2A) S201 - B2 (2A)	1.0	21.0	
			1.0	21.0	
			1.5	31.5	
<b>RGS..50</b> <b>RGS..51</b>	<b>1-pole</b> 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	
			4.0	20.8	
	S201 - Z20 (20A)	S201-B10 (10A)	1.5	12.6	
			2.5	21.0	
	S201 - Z25 (25A)	S201-B13 (13A)	2.5	25.0	
			4.0	40.0	
			<b>2-pole</b> S202 - Z25 (25A)	S202-B13 (13A)	2.5
				4.0	30.4
	<b>RGS..75</b>	<b>1-pole</b> S201 - Z25 (25A)	S201-B13 (13A)	2.5	7.0
				4.0	11.2
6.0				16.8	
<b>RGS...90,</b> <b>RGS...91</b>	<b>1-pole</b> 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	
	<b>2-pole</b> 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		
<b>RGS...92</b>	<b>1-pole</b> 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	

9. 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.

## Accessories

### Heatsink RHS37A



### Ordering Key

Heatsink with  
DIN rail clip

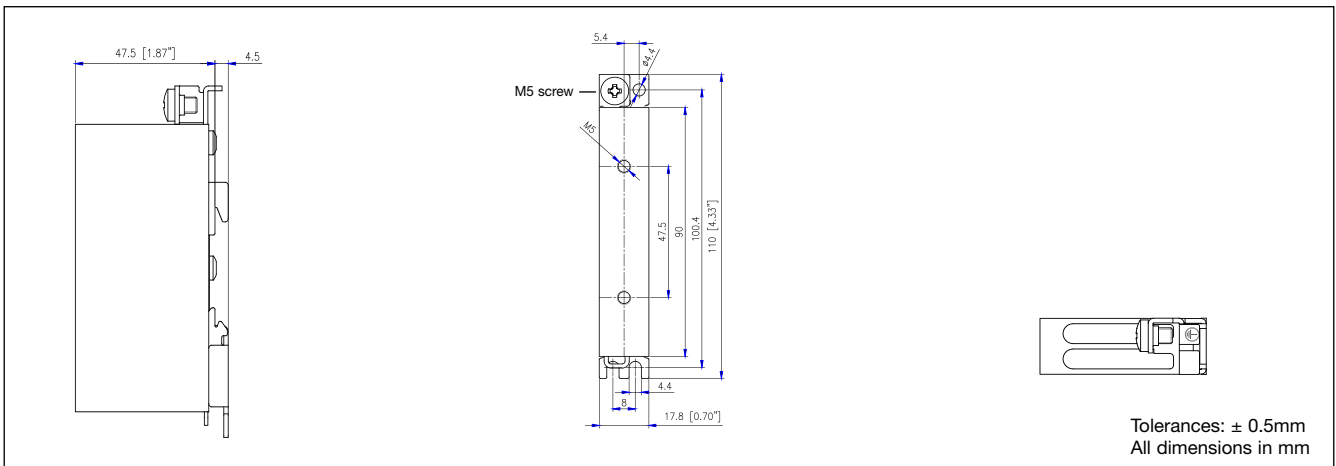
**RHS37A**

Factory mounted  
heatsink to RGS

**RGS...H51**

Refer to 'RHS37A' datasheet for further details

### RHS37A Dimensions

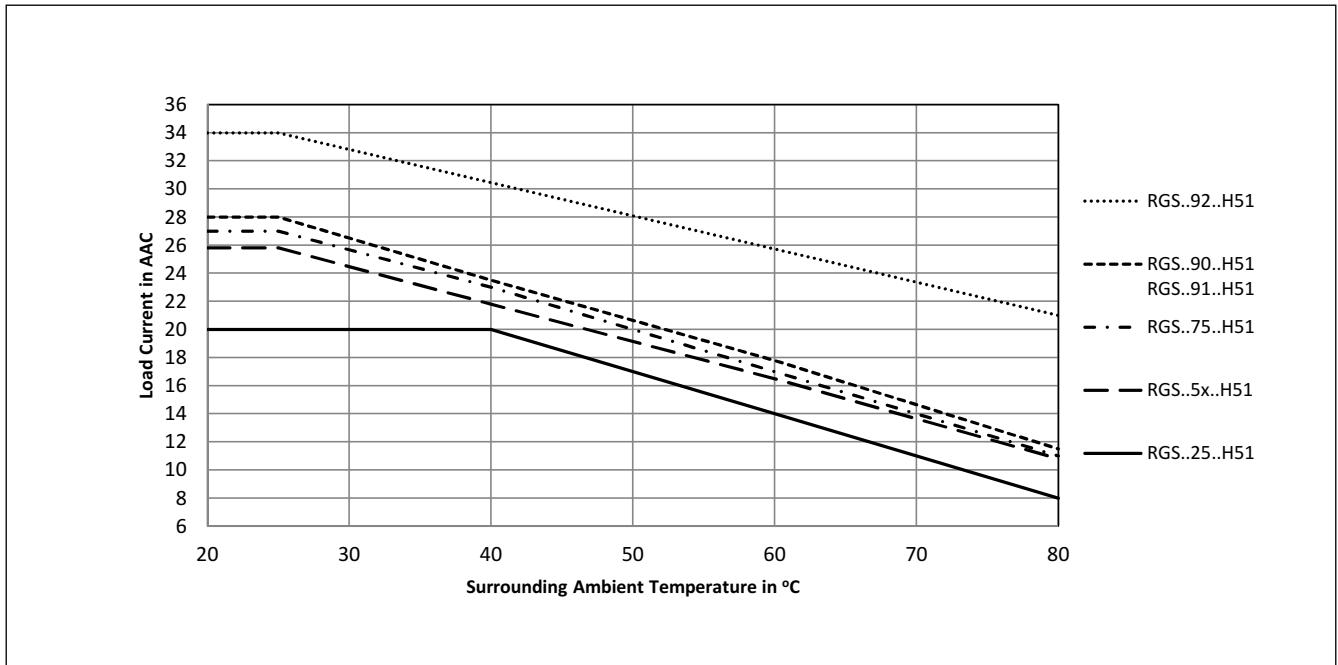


Note: M5 PE screw not provided with SSR. Maximum mounting torque 1.5Nm (13.3 in-lb).  
PE connection required when product is intended to be used in Class 1 applications according to EN/IEC 61140.



**Accessories (cont.)**

**Derating Curves (RGS assembled to heatsink RHS37A)**





**Accessories (cont.)**

**RG DIN Clip**



**Ordering Key**

DIN clip mounted to RGS

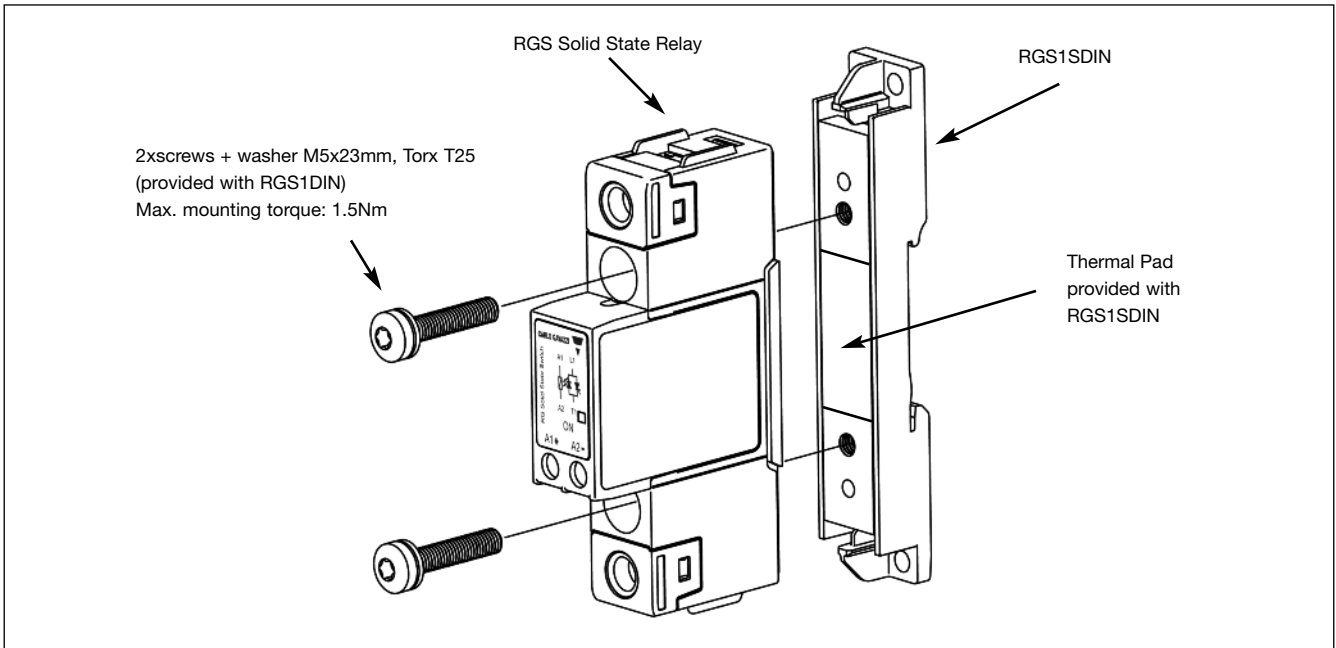
**RGS....DIN**

DIN clip accessory

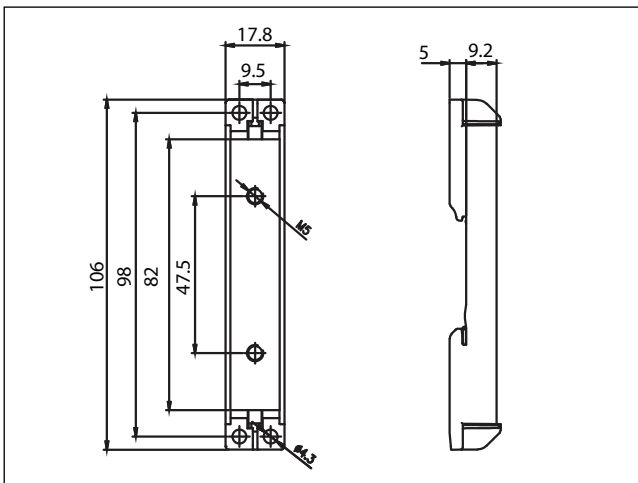
**RGS1DIN**

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 10AAC. Refer to 'Current Derating' section. Gradually tighten the SSR, alternating between the 2 screws, to a maximum torque of 1.5Nm.

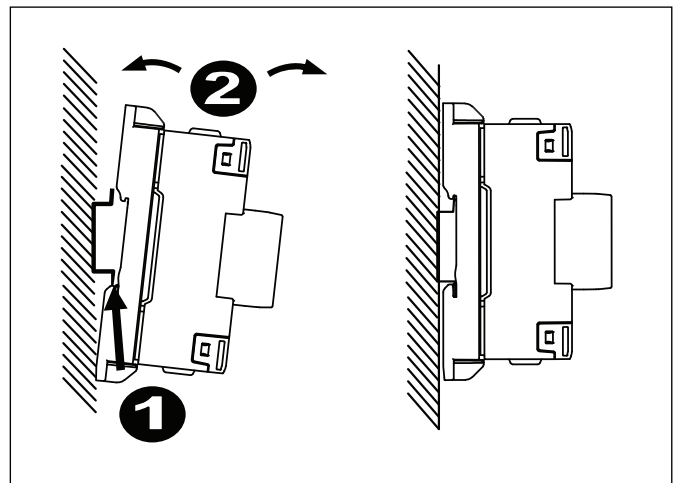
**Mounting Instructions for RGS1DIN to RGS**



**RGS1DIN Dimensions**



**Installation Instructions**



## Accessories

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### Thermal Pads



#### Ordering Key

Thermal pad  
mounted on RGS

**RGS...HT**

Pack of 10 thermal pads  
size 34.6 x 14mm

**RGHT**

### Control Plugs



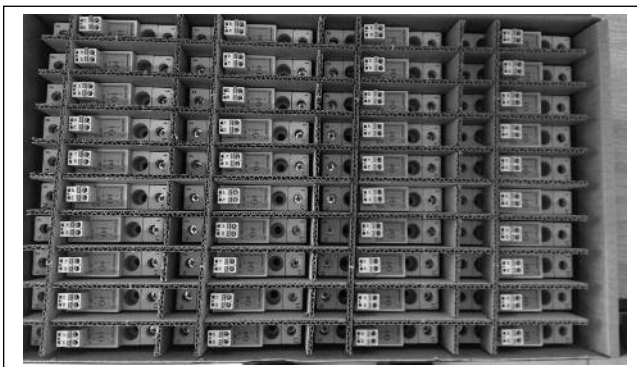
#### Ordering Key

Pack of 10 spring  
loaded control plugs

**RGM25**

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

### Packaging



#### Ordering Key

Bulk packaging of  
40 pcs. RGS...

**RGS...X40**