

# 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 VAC<sup>1</sup>
- Rated operational current: up to 90 AAC
- Up to 18000 A<sup>2</sup>s for I<sup>2</sup>t
- Control voltages: 3-32 VDC, 20-275 VAC (24-190 VDC)
- Design according to IEC/EN60947-4-2, IEC/EN60947-4-3, IEC/EN62314, UL508, CSA22.2 No. 14-13
- Integrated voltage transient protection with varistor
- 100kA short circuit current rating according to UL508
- Option for DIN mounting (RGS...DIN)



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

## 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.

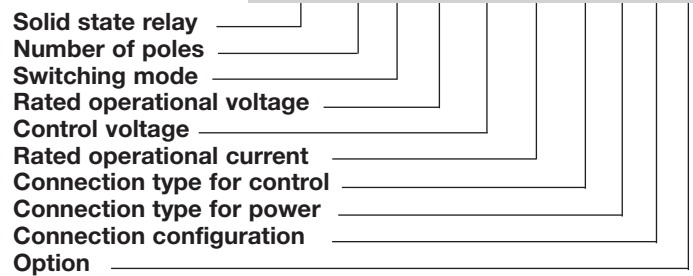
Output connections are via a screw connection, having a captivated washer allowing for safe looping or via box clamp which can handle cables up to 25 mm<sup>2</sup> (AWG3). Input con-

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

Options with integrated heat-sink are available in RGC ranges. **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)

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

\* ZC: Zero cross switching

\*\*IO: Instant-On switching

## Selection Guide - RGS..

Rated voltage, Blocking voltage, Switching mode	Control voltage	Connection control/ power	Max. rated operational current (I <sup>2</sup> t value)				
			25 AAC (525 A <sup>2</sup> s)	50 AAC (1800 A <sup>2</sup> s)	75 AAC (3200 A <sup>2</sup> s)	90 AAC (6600 A <sup>2</sup> s)	90 AAC (18000 A <sup>2</sup> 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)<sup>2</sup>

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

2: 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)<sup>3</sup>

Rated voltage, Blocking voltage, Switching mode	Control voltage	Connection control/ power	Rated operational current @ 40°C (I <sup>2</sup> t value)		
			10 AAC (525 A <sup>2</sup> s)	12 AAC (1800 A <sup>2</sup> s)	12 AAC (6600 A <sup>2</sup> 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	-

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	Max. rated operational current (I <sup>2</sup> t value)		
			25 AAC (525 A <sup>2</sup> s)	50 AAC (1800 A <sup>2</sup> s)	75 AAC (3200 A <sup>2</sup> 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 <sup>4</sup> , +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	-

4: 690 VAC refers to the line to line voltage

## General Specifications

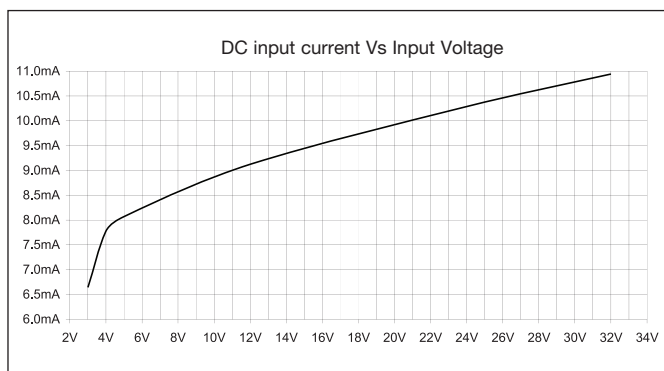
Latching voltage (across L1-T1)	20V	Pollution degree	2 (non-conductive pollution with possibilities of condensation)
Operational frequency range	45 to 65Hz	Rated impulse withstand	6 kV (1.2/50µs) for voltage, Uimp
Power factor	> 0.5 @ Vrated	Overvoltage Category	III (fixed installations)
CE marking	Yes	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

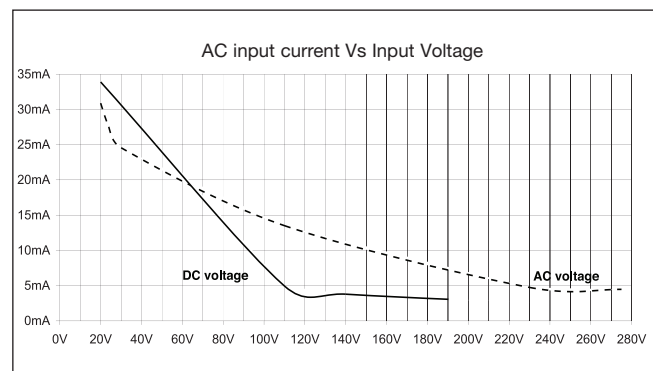
		RGS..D..	RGS..A..
Control voltage range <sup>5</sup>	RGS..23..	3 - 32 VDC	20 - 275 VAC, 24 (-10%) - 190 VDC
	RGS..6x..	4 - 32 VDC	20 - 275 VAC, 24 (-10%) - 190 VDC
Pick-up voltage	RGS..23..	3.0 VDC	20 VAC/DC
	RGS..6x..	3.8 VDC	
Drop-out voltage	RGS..23..	1 VDC	5 VAC/DC
	RGS..6x..	1 VDC	
Maximum reverse 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

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

### RG..D..



### RG..A..



## Motor Ratings<sup>6</sup>: 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

6: 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>6</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 per hour (x:6, Tx:6s, F:50%) at 40°C <sup>6,7</sup>	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 <sub>AMB</sub> =40°C, t <sub>ON</sub> =1s, t <sub>OFF</sub> =9s, 50 cycles	67 AAC	107 AAC	126 AAC	168 AAC	168 AAC
Maximum transient surge current (I <sub>TSM</sub> ), 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 <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 (@ Tj init = 40°C)	1000 V/us	1000 V/us	1000 V/us	1000 V/us	1000 V/us

7 Overload profile for AC-53a:

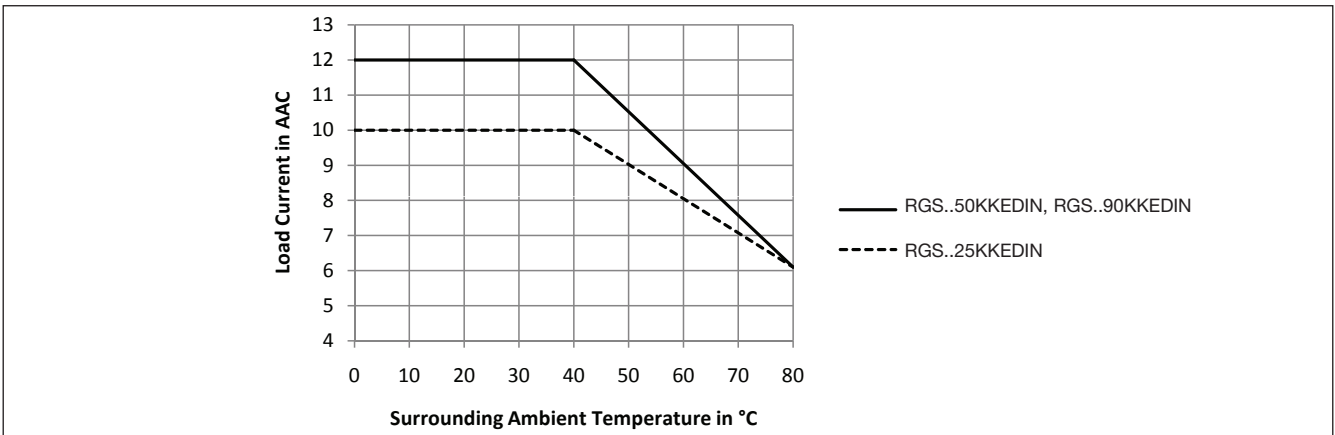
le: AC-53a: x-Tx: F-S, where le = nominal current (AC-53a AAC), x = overload current factor, Tx = duration of overload current (s), F = duty cycle (%), S = number of starts per hour. Example: 5A: AC-53a: 6 - 6 : 50 - 30 = max. 30 starts for the RGS..25 with an overload profile of 30A for 6 seconds with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

## Output Specifications for RGS..DIN

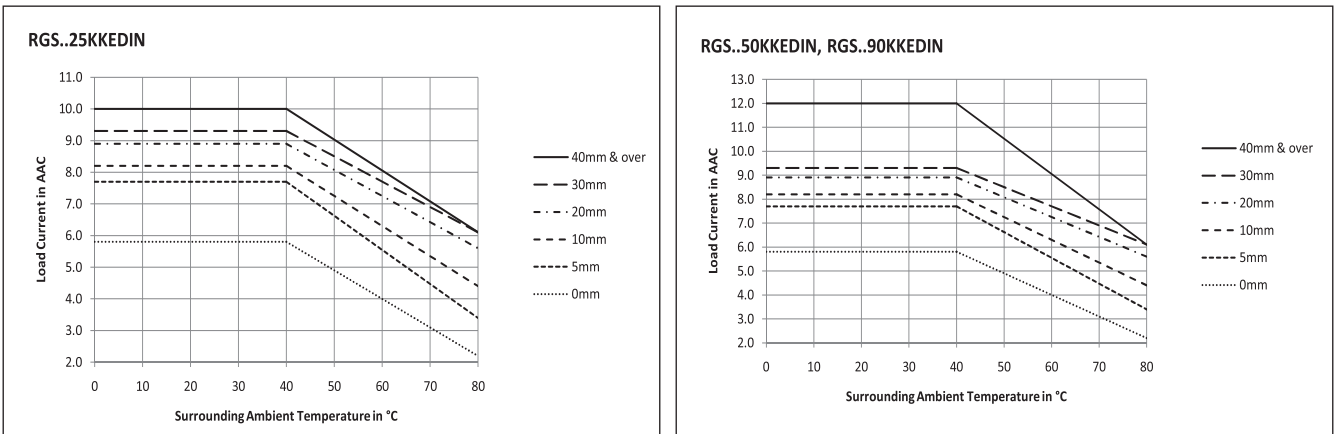
	RGS..25..DIN	RGS..50..DIN	RGS..90..DIN
Rated operational current <sup>8</sup> AC-51 rating @ Ta = 40°C	10 AAC	12 AAC	12 AAC
AC-53a rating @ Ta =40°C	5 AAC	5 AAC	5 AAC
Number of motor starts per hour (x:6, Tx:6s, F:50%) at 40°C <sup>7</sup>	30	30	30
Min. operational current	150 mA	250 mA	400 mA
Maximum transient surge current I <sub>TSM</sub> , t=10ms	325 Ap	600 Ap	1150 Ap
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 (@ Tj init = 40°C)	1000 V/us	1000 V/us	1000 V/us

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

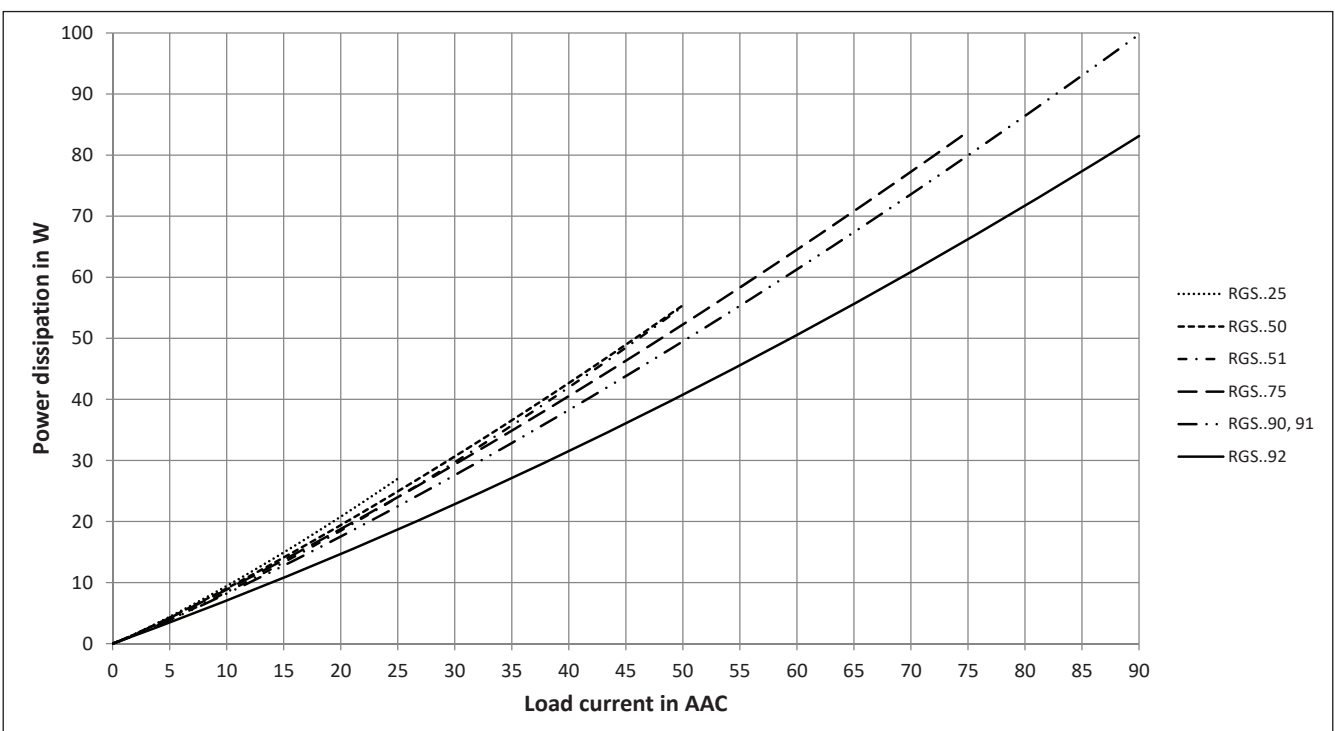
## Derating Curves for RGS...DIN



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



## Output Power Dissipation



## Electromagnetic Compatibility

<b>EMC Immunity</b>	EN 60947-4-3	<b>Radiated Radio Frequency Immunity</b>	IEC/EN 61000-4-3
<b>Electrostatic Discharge (ESD) 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 (Burst) Immunity</b>	IEC/EN 61000-4-4	<b>Conducted Radio Frequency Immunity</b>	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	<b>Voltage Dips Immunity</b>	IEC/EN 61000-4-11
<b>Electrical Surge Immunity<sup>9</sup></b>	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	<b>Voltage Interruptions Immunity</b>	IEC/EN 61000-4-11
		0% for 5000ms	Performance Criteria 2
<b>EMC Emission</b>	EN 60947-4-3	<b>Radio Interference</b>	
<b>Radio Interference</b>		<b>Field Emission (Radiated)</b>	IEC/EN 55011
<b>Voltage Emission (Conducted)</b>	IEC/EN 55011	<b>30 - 1000MHz</b>	Class A (industrial)
<b>0.15 - 30MHz</b>	Class A (industrial) with filters - see filter information		

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

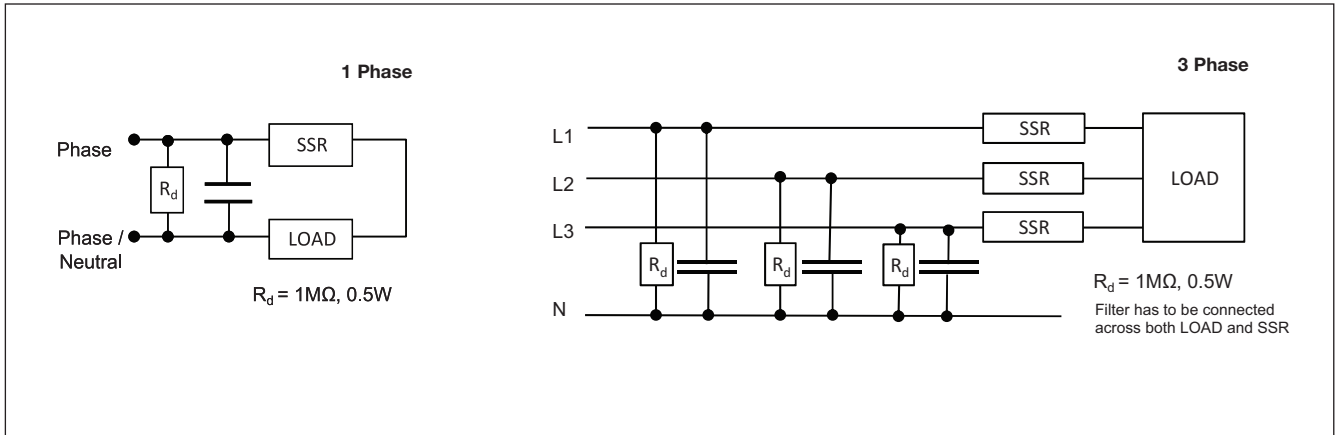
## Filtering - IEC/EN 55011 Class A compliance (for class B compliance contact us)

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	30 A
	330 nF / 275 V / X1	35 A
RGS1.60..25	150 nF / 760 V / X1	25 A
	220 nF / 760 V / X1	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	30 A
	330 nF / 760 V / X1	45 A
RGS1.60..90/91/92	220 nF / 760 V / X1	30 A
	330 nF / 760 V / X1	45 A
	680 nF / 760 V / X1	65 A

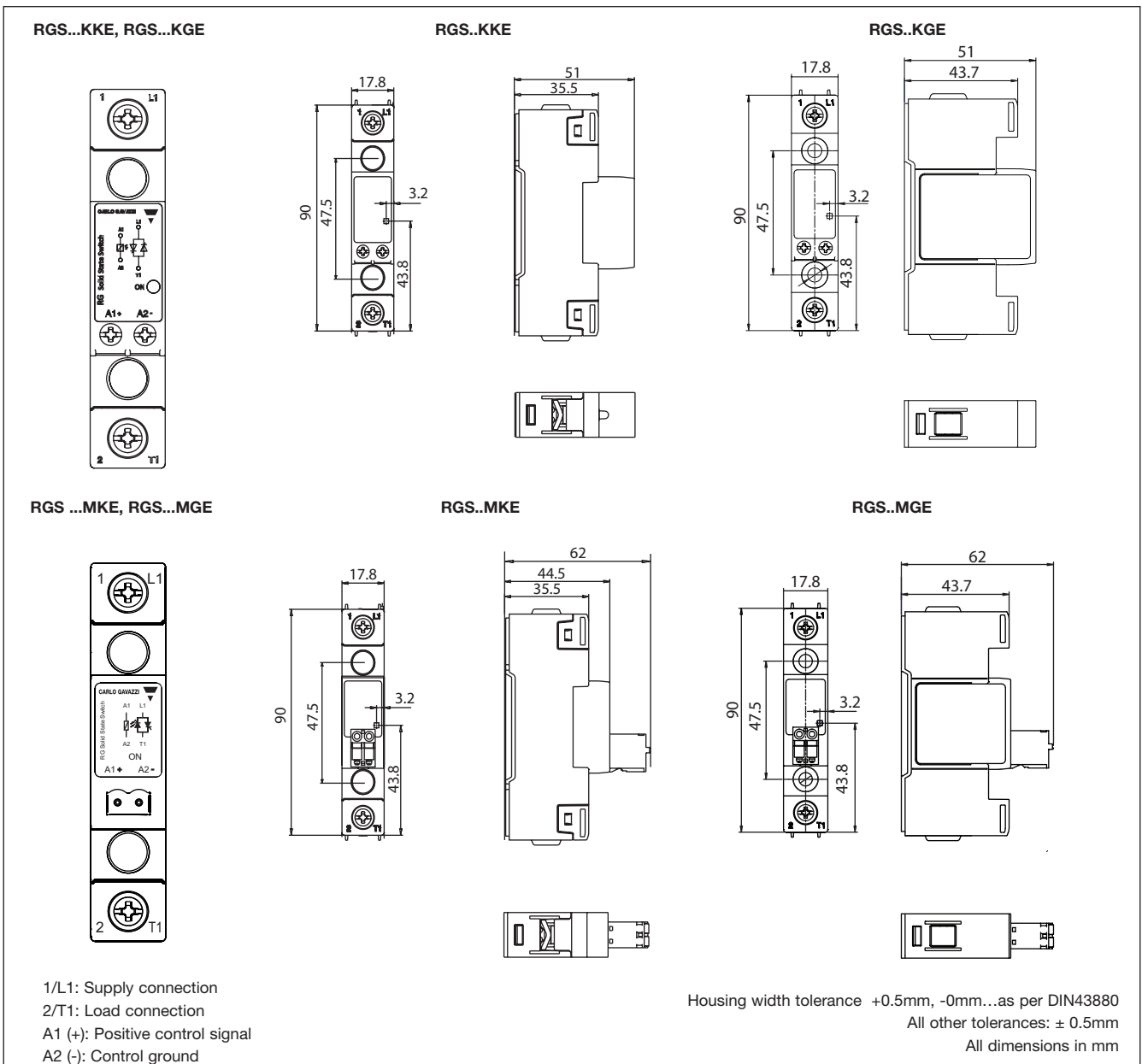
Note:

- 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.
- 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

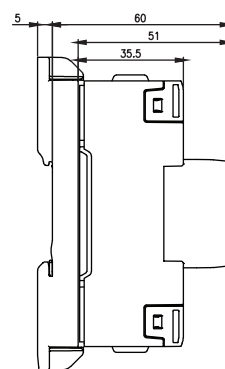
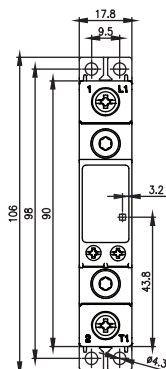
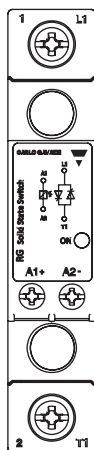


## Terminal Layout and Dimensions

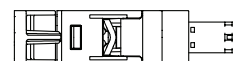
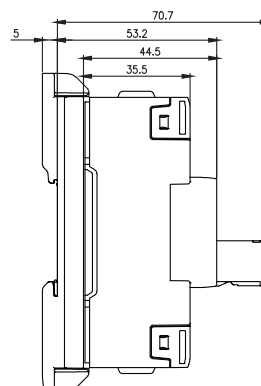
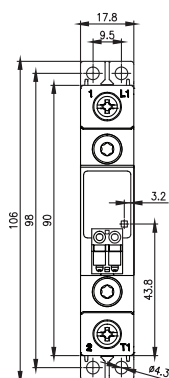
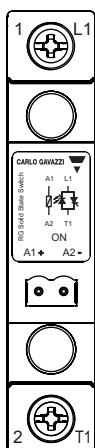


## Terminal Layout and Dimensions (cont.)

### 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

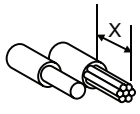






All dimensions in mm



## Connection Specifications


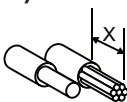



### POWER CONNECTIONS: 1/L1, 2/T1

Use 75°C copper (Cu) conductors

	RGS...KKE ; RGS...MKE	RGS...KGE ; RGS...MGE
<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/ CSA 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
<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 2.5..25mm <sup>2</sup> 1 x 14...3 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 2.5..16mm <sup>2</sup> 1 x 14.. 6 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...KKE, RGS...KGE	RGS...MKE, RGS...MGE
<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/ CSA 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 0.2...2.5mm <sup>2</sup> 1 x 24...12 AWG

## 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	Installation altitude	0-1000m. Above 1000m derate linearly by 1% of FLC per 100m up to a maximum of 2000m
China RoHS compliant	Refer to Environmental Information (page 16)		
Impact resistance (EN 50155, EN 61373)	15/11 g/ms	Weight	approx. 103g approx. 155g
Vibration resistance (2-100Hz, IEC60068-2-6, EN 50155, EN 61373)	5g per axis		
Relative humidity	95% non-condensing @ 40°C	RGS...DIN	



## Agency Approvals and Conformance

Conformance

IEC/EN 62314  
IEC/EN 60947-4-2  
IEC/EN 60947-4-3

Agency Approvals

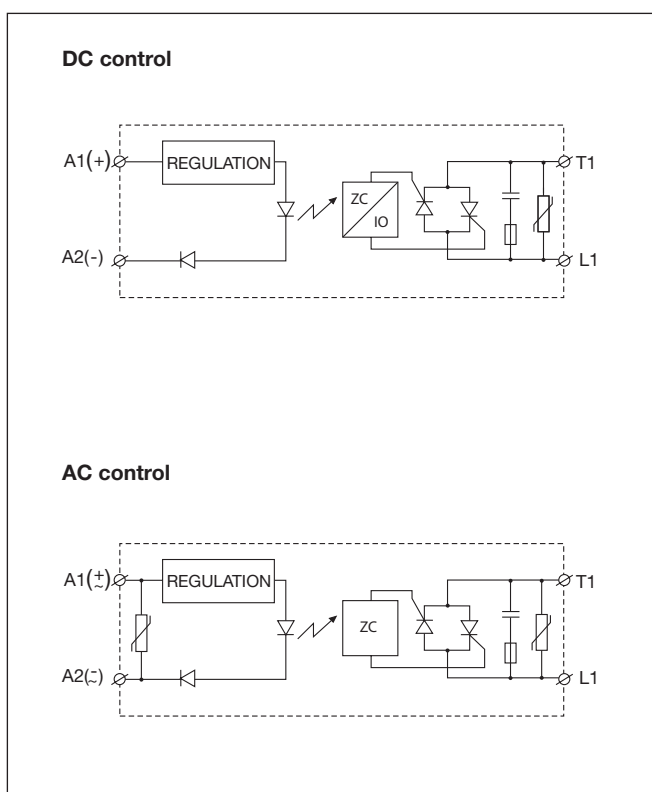
UL508 Recognised (E172877)  
CSA 22.2 No.14-13 (204075)  
VDE 0660-109

Short circuit current rating

100kA, UL508

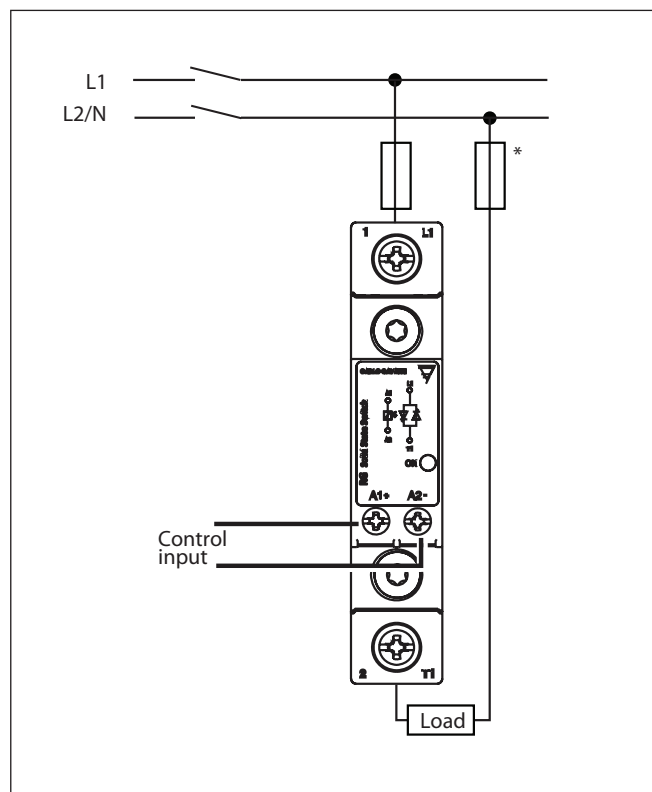


## Functional Diagram



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

## Connection Diagram



\* depends on system requirements

# 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<sub>A</sub>  
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<sub>A</sub>  
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 <sup>10</sup>	< 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 <sup>10</sup>	< 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<sub>A</sub>  
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<sub>A</sub>  
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 <sup>10</sup>	< 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 <sup>10</sup>	< 0.25 °C/W

10: 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 <sub>A</sub>
	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 <sub>A</sub>
	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 <sub>A</sub>
	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 <sub>A</sub>
	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

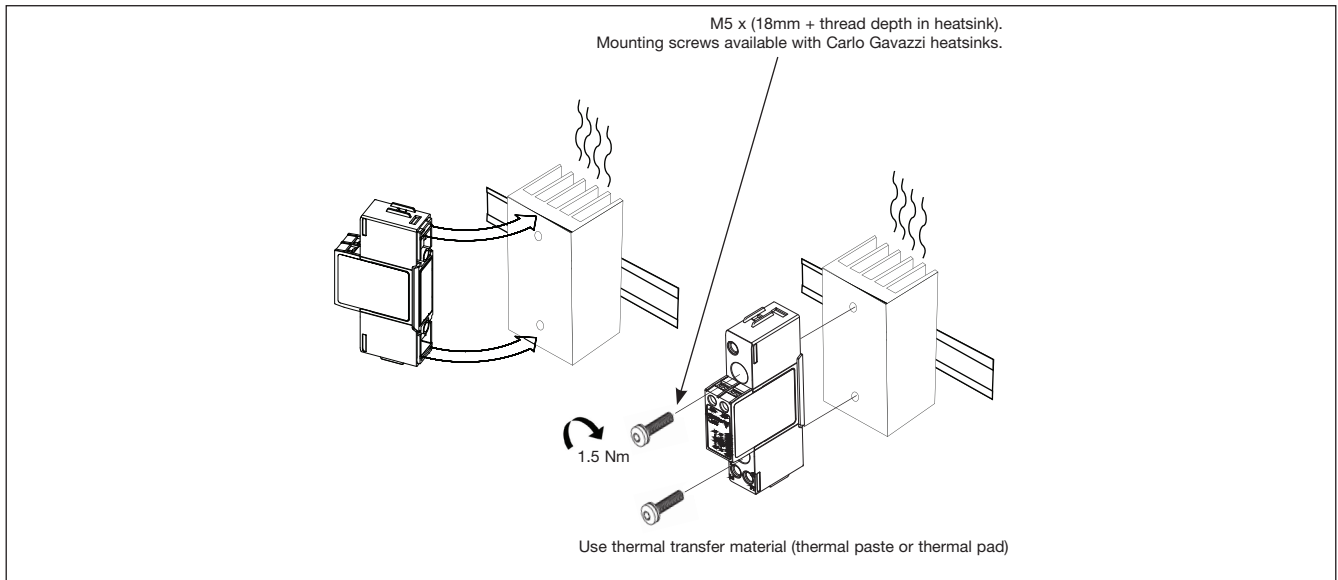
## Mounting Instructions

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 (altering 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		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 <sup>2</sup> ]	Minimum length of Cu wire conductor [m] <sup>12</sup>	
<b>RGS..25</b> (525 A <sup>2</sup> s)	<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> (1800 A <sup>2</sup> s)	<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	
	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	
			<b>2-pole</b> S202 - Z25 (25A)	S202-B13 (13A)	2.5
			4.0	30.4	
<b>RGS..75</b> (3200 A <sup>2</sup> s)	<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> (6600 A <sup>2</sup> s)	<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> (18000 A <sup>2</sup> s)	<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		

12. 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>O: Indicates that said hazardous substance contained in homogeneous materials fot 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>O: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

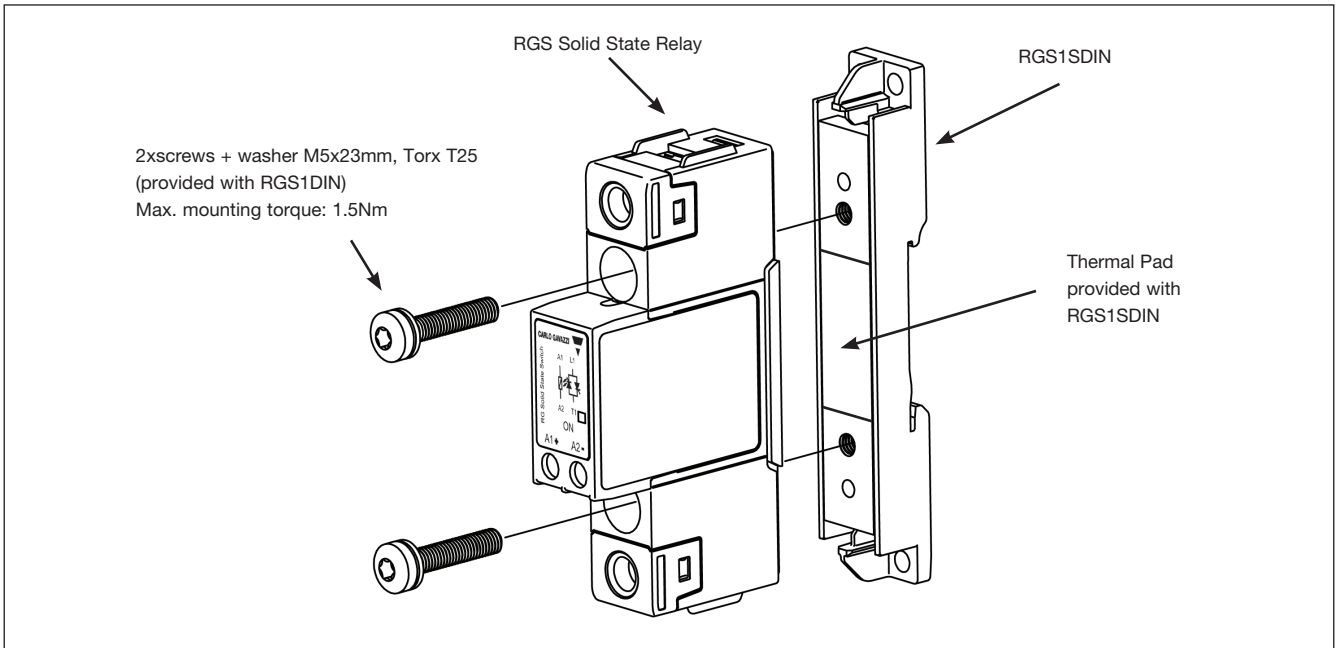
**RGS...DIN**

DIN clip accessory

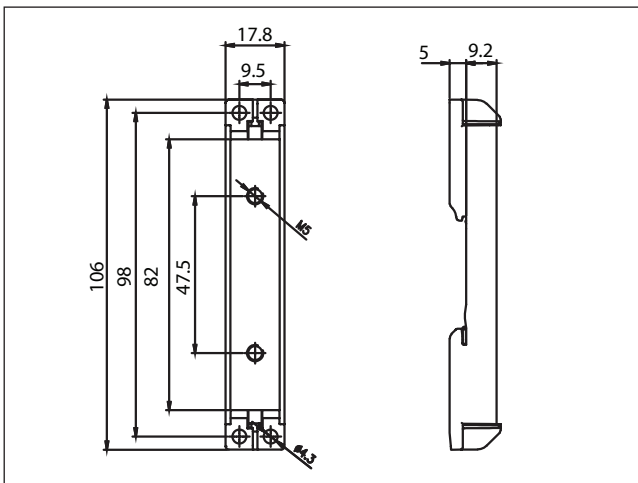
**RGS1DIN**

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.

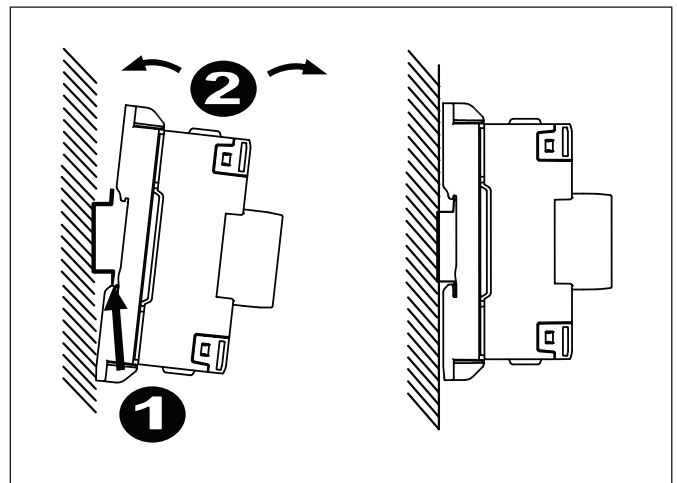
### Mounting Instructions for RGS1DIN to RGS



### RGS1DIN Dimensions

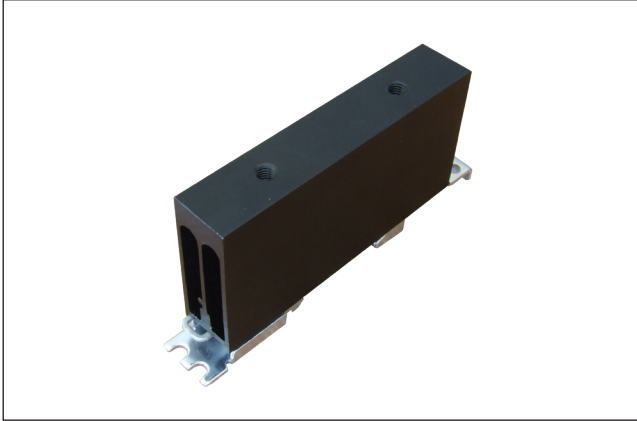


### Installation Instructions



## Accessories (cont.)

### Heatsinks



#### Ordering Key

**RHS..**

 RGS mounted on  
heatsink

**RGS..H..**

#### Heatsink Range Overview:

[http://www.productselection.net/PDF/UK/ssr\\_accessories.pdf](http://www.productselection.net/PDF/UK/ssr_accessories.pdf)

#### Heatsink Selector Tool:

<http://www.productselection.net/heatsink/heatsinkselector.php?LANG=UK>

### 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.)

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### 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...