

# Solid State Relays 3-Phase with Integrated Heatsink Types RGC2, RGC3



- 2-pole & 3-pole AC switching solid state contactors
- Product width up to 70mm
- Rated operational voltage: up to 600VAC
- Rated operational current: up to 75AAC
- Control voltages: 5-32VDC, 20-275VAC (24-190 VDC)
- Up to 15,000A<sup>2</sup>s for I<sup>2</sup>t
- Motor ratings up to 11kW @ 400VAC, 25HP @ 600VAC
- Integrated varistor protection on output
- Optional monitoring for SSR and load malfunction (RGC..M)<sup>1</sup>
- EMR alarm output and auxiliary output (RGC..M)
- Controlled fan operation for versions with integrated fan
- UL, cUL Listing
- 100kA Short Circuit Current Rating according to UL508
- DIN or panel mount
- RoHS compliant

1: RGC..M is suitable only for resistive loads

## Product Description

This product is intended to replace mechanical contactors especially when switching is frequent. The smallest product width in the RGC2, RGC3 range is 54mm (3xDIN) and goes up to 70mm.

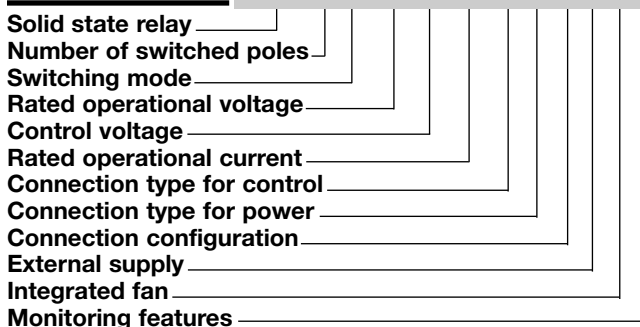
2-pole and 3-pole switching options are available. Switch ON occurs at the voltage zero cross and switch OFF occurs at the current zero cross. Apart from resistive and slightly inductive loads, the RGC is certified for motor switching with associated motor ratings. Varistors are integrated for output overvoltage protection. A green LED gives indication of control voltage presence.

Fan operation is controlled for the versions which have an integrated fan.

Detection of SSR overheat, mains loss, SSR malfunction and load loss is possible with the RGC..M versions. An EMR alarm output is available for remote signaling. An additional feature with the RGC..M is the electronic auxiliary output. The RGC..M has additional LEDs for load status and alarm status indication.

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

## Ordering Key **RGC 3 A 60 D 65 G G E D F M**



## Ordering Key (refer to page 2 for available part nos.)

SSR with heatsink	Rated voltage (Ue) <sup>4</sup> , Blocking voltage	Control voltage <sup>5</sup> (Uc)	Rated current/pole @40°C <sup>2</sup>	Connection control	Connection power	Connection configuration	External supply (Us)	Features
RGC2A: 2-pole switching + 1-pole direct, ZC <sup>3</sup>	22: 42-242VAC, 800Vp	D: 5 - 32VDC	20: 20AAC 25: 25AAC 30: 30AAC 40: 40AAC	K: Screw G: Box Clamp	K: Screw G: Box Clamp	E: Contactor	D: 24VDC A: 90-250VAC	F: Integrated fan with over temperature protection (OTP) & EMR alarm output
RGC3A: 3-pole switching, ZC	60: 42-660VAC, 1200Vp	A: 20-275VAC, 24-190VDC	65: 65AAC 75: 75AAC					M: Monitoring for Mains loss, Load loss, SSR short circuit, open circuit and over-temperature with EMR alarm output and auxiliary output <sup>1</sup> (suitable only for resistive loads)

2. Refer to Current Derating curves

3. ZC= Zero Cross Switching

4. Operating voltage for RGC..M starts from 90VAC

5. AC control range for RGC..A.. is limited to 20-275VAC only

## Selection Guide: RGC2

Rated output voltage, U <sub>e</sub>	Control voltage, U <sub>c</sub>	Features	External supply, U <sub>s</sub>	Connection control / power	Rated operational current @ 40°C (I <sup>2</sup> t value)		
					25 AAC /pole (1,800A <sup>2</sup> s)	40 AAC /pole (6,600A <sup>2</sup> s)	75 AAC /pole (15,000A <sup>2</sup> s)
220VAC ZC	5-32VDC	-	-	Screw/Screw	RGC2A22D25KKE	-	-
	20-275VAC, 24-190VDC	-	-	Screw/Screw	RGC2A22A25KKE	-	-
600VAC ZC	5-32VDC	-	-	Screw/Screw	RGC2A60D25KKE	-	-
		-	-	Screw/Box	-	RGC2A60D40KGE	-
	OTP	24VDC	Box/Box	-	-	RGC2A60D75GGEDF	
	OTP	90-250VAC	Box/Box	-	-	RGC2A60D75GGEAF	
	20-275VAC, 24-190VDC	-	-	Screw/Screw	RGC2A60A25KKE	-	-
		-	-	Screw/Box	-	RGC2A60A40KGE	-
	20-275VAC	OTP	90-250VAC	Box/Box	-	-	RGC2A60A75GGEAF

## Selection Guide: RGC2..M

Rated output voltage, U <sub>e</sub>	Control voltage, U <sub>c</sub>	Features	External supply, U <sub>s</sub>	Connection control / power	Rated operational current @ 40°C (I <sup>2</sup> t value)		
					25 AAC /pole (1,800A <sup>2</sup> s)	40 AAC /pole (6,600A <sup>2</sup> s)	75 AAC /pole (15,000A <sup>2</sup> s)
600VAC, ZC	5-32VDC	Monitoring	24VDC	Box/Screw	RGC2A60D25GKEDM	-	-
		Monitoring	24VDC	Box/Box	-	RGC2A60D40GGEDM	RGC2A60D75GGEDFM
		Monitoring	90-250VAC	Box/Screw	RGC2A60D25GKEAM	-	-
		Monitoring	90-250VAC	Box/Box	-	RGC2A60D40GGEAM	RGC2A60D75GGEAFM
	20-275VAC	Monitoring	90-250VAC	Box/Screw	RGC2A60A25GKEAM	-	-
		Monitoring	90-250VAC	Box/Box	-	RGC2A60A40GGEAM	RGC2A60A75GGEAFM

## Selection Guide: RGC3

Rated output voltage, U <sub>e</sub>	Control voltage, U <sub>c</sub>	Features	External supply, U <sub>s</sub>	Connection control / power	Rated operational current @ 40°C (I <sup>2</sup> t value)				
					20 AAC /pole (1,800A <sup>2</sup> s)	25 AAC /pole (1,800A <sup>2</sup> s)	30 AAC /pole (6,600A <sup>2</sup> s)	40 AAC /pole (6,600A <sup>2</sup> s)	65 AAC /pole (15,000A <sup>2</sup> s)
220VAC, ZC	5-32VDC	-	-	Screw/ Screw	RGC3A22D20KKE	-	-	-	-
	20-275VAC 24-190VDC	-	-	Screw/ Screw	RGC3A22A20KKE	-	-	-	-
600VAC, ZC	5-32VDC	-	-	Screw/ Screw	RGC3A60D20KKE	RGC3A60D25KKE	-	-	-
		-	-	Screw/Box	-	-	RGC3A60D30KGE	-	-
	OTP	24VDC	Box/Box	-	-	-	RGC3A60D40GGEDF	RGC3A60D65GGEDF	
	OTP	90-250VAC	Box/Box	-	-	-	-	RGC3A60D65GGEAF	
	20-275VAC 24-190VDC	-	-	Screw/ Screw	RGC3A60A20KKE	RGC3A60A25KKE	-	-	-
		-	-	Screw/Box	-	-	RGC3A60A30KGE	-	-
20-275VAC	OTP	90-250VAC	Box/Box	-	-	-	RGC3A60A40GGEAF	RGC3A60A65GGEAF	

## Selection Guide: RGC3..M

Rated output voltage, U <sub>e</sub>	Control voltage, U <sub>c</sub>	Features	External supply, U <sub>s</sub>	Connection control / power	Rated operational current @ 40°C (I <sup>2</sup> t value)			
					20 AAC /pole (1,800A <sup>2</sup> s)	25 AAC /pole (1,800A <sup>2</sup> s)	30 AAC /pole (6,600A <sup>2</sup> s)	65 AAC /pole (15,000A <sup>2</sup> s)
600VAC, ZC	5-32VDC	Monitoring	24VDC	Box/Screw	RGC3A60D20GKEDM	RGC3A60D25GKEDM	-	-
		Monitoring	24VDC	Box/Box	-	-	RGC3A60D30GGEDM	RGC3A60D65GGEDFM
		Monitoring	90-250VAC	Box/Screw	RGC3A60D20GKEAM	RGC3A60D25GKEAM	-	-
		Monitoring	90-250VAC	Box/Box	-	-	RGC3A60D30GGEAM	RGC3A60D65GGEAFM
	20-275VAC	Monitoring	90-250VAC	Box/Screw	RGC3A60A20GKEAM	RGC3A60A25GKEAM	-	-
Monitoring		90-250VAC	Box/Box	-	-	RGC3A60A30GGEAM	RGC3A60A65GGEAFM	

## General Specifications

		RGC	RGC..M
Latching voltage (across each pole L-T)		<20V	<20V
Operational frequency range		45 to 65Hz	45 to 65Hz
Power factor		>0.5 at rated voltage	>0.5 at rated voltage
CE marking		Yes	Yes
Touch protection		IP20	IP20
LED status indication			
	Control ON	Green, full intensity	Green, full intensity
	Supply ON		Green, half intensity
	Load ON		Yellow, full intensity
	Alarm ON	Red, full intensity ( <b>RGC..F</b> )	Red, flashing <sup>6</sup>
Pollution degree		2 (non-conductive pollution with possibilities of condensation)	2 (non-conductive pollution with possibilities of condensation)
Over-voltage category		III (fixed installations)	III (fixed installations)
Isolation			
	Input & Output to Case	4000Vrms	4000Vrms
	Input to Output	4000Vrms	2500Vrms

6: Refer to Red LED Alarm Indications

## Output Voltage Specifications

		RGC	RGC..22	RGC..60
Operational voltage range, U <sub>e</sub>			42-220VAC, -15%/+10% on max	42-600VAC, -15%/+10% on max
		RGC..M	90-220VAC, -15%/+10% on max	90-600VAC, -15%/+10% on max
Blocking voltage			800Vp	1200Vp
Internal varistors (across each pole)			275V	625V

## Output Specifications: RGC2

	RGC2..25	RGC2..40	RGC2..75
Rated operational current per pole <sup>7</sup>			
AC-51 @ Ta=25°C	32 AAC	50 AAC	85 AAC
AC-51 @ Ta=40°C	27 AAC	40 AAC	75 AAC
AC-53a @ Ta=40°C	11.5 AAC	16.5 AAC	28 AAC
No. of motor starts <sup>8</sup>			
(x: 6, Tx:6s, F:50%) @ 40°C	30	30	30
Minimum operational current	250 mAAC	400 mAAC	500 mAAC
RGC..F, M	1.2AAC	1.2AAC	1.2AAC
Maximum off-state leakage current	5 mAAC	5 mAAC	5 mAAC
Rep. overload current			
(Motor rating) UL508: Ta=40°C, t <sub>ON</sub> =1s, t <sub>OFF</sub> =9s, 50 cycles	61 AAC	107 AAC	154 AAC
Maximum transient surge current			
(I <sub>TSM</sub> ), t=10ms	600 Ap	1150 Ap	1750 Ap
I <sup>2</sup> t for fusing (t=10ms) Minimum	1800 A <sup>2</sup> s	6600 A <sup>2</sup> s	15000 A <sup>2</sup> s
Critical dv/dt (@ T <sub>j</sub> init = 40°C)	1000 V/us	1000 V/us	1000 V/us

7: Refer to Derating Curves

8: Overload cycle definition, x: multiple of AC-53a, Tx: duration of current surge, F: duty cycle

## Output Specifications: RGC3

	RGC3..20	RGC3..25	RGC3..30	RGC3..40	RGC3..65
Rated operational current per pole <sup>7</sup>					
AC-51 @ Ta=25°C	25 AAC	32 AAC	37 AAC	42 AAC	71 AAC
AC-51 @ Ta=40°C	20 AAC	28 AAC	30 AAC	42 AAC	66 AAC
AC-53a @ Ta=40°C	10 AAC	11 AAC	14 AAC	17 AAC	25 AAC
No. of motor starts <sup>8</sup> (x: 6, Tx:6s, F:50%) @ 40°C	30	30	30	30	30
Minimum operational current RGC..F, M	250mAAC 1.2AAC	250mAAC 1.2AAC	400mAAC 1.2AAC	400mAAC 1.2AAC	500mAAC 1.2AAC
Maximum Off-state leakage current	5mAAC	5mAAC	5mAAC	5mAAC	5mAAC
Rep. overload current (Motor rating) UL508: Ta=40°C, t <sub>ON</sub> =1s, t <sub>OFF</sub> =9s, 50 cycles	61 AAC	84 AAC	107 AAC	107 AAC	154 AAC
Maximum transient surge current (I <sub>TSM</sub> ), t=10ms	600 Ap	600 Ap	1150 Ap	1150 Ap	1750 Ap
I <sup>2</sup> t for fusing (t=10ms) Minimum	1800 A <sup>2</sup> s	1800 A <sup>2</sup> s	6600 A <sup>2</sup> s	6600 A <sup>2</sup> s	15000 A <sup>2</sup> s
Critical dv/dt (@ T <sub>j</sub> init = 40°C)	1000 V/us	1000 V/us	1000 V/us	1000 V/us	1000 V/us

7: Refer to Current Derating curves

8: Overload cycle definition, x: multiple of AC-53a, Tx: duration of current surge, F: duty cycle

## Motor Ratings: HP (UL508) / kW (EN/IEC 60947-4-2) @ 40°C

	115VAC	230VAC	400VAC	480VAC	600VAC
<b>RGC2..25</b>	1½HP / 1.1kW	3HP / 3.0kW	5HP / 5.5kW	7½HP / 5.5kW	10HP / 9.0kW
<b>RGC2..40</b>	3HP / 1.5kW	5HP / 4.0kW	10HP / 7.5kW	10HP / 9.0kW	15HP / 11.0kW
<b>RGC2..75</b>	5HP / 3.0kW	10HP / 7.5kW	15HP / 11.0kW	20HP / 15.0kW	25HP / 22.0kW
<b>RGC3..20</b>	1HP / 0.75kW	3HP / 2.2kW	5HP / 4.0kW	7½HP / 5.5kW	10HP / 7.5kW
<b>RGC3..25</b>	2HP / 1.1kW	3HP / 2.2kW	7½HP / 4.0kW	10HP / 5.5kW	10HP / 7.5kW
<b>RGC3..30</b>	2HP / 1.5kW	5HP / 3.0kW	10HP / 5.5kW	10HP / 7.5kW	15HP / 11.0kW
<b>RGC3..40</b>	2HP / 1.5kW	5HP / 4.0kW	10HP / 7.5kW	10HP / 9.0kW	15HP / 11.0kW
<b>RGC3..65</b>	3HP / 3.0kW	10HP / 5.5kW	15HP / 11.0kW	20HP / 15.0kW	25HP / 20.0kW

## Control Specifications (A1, A2)

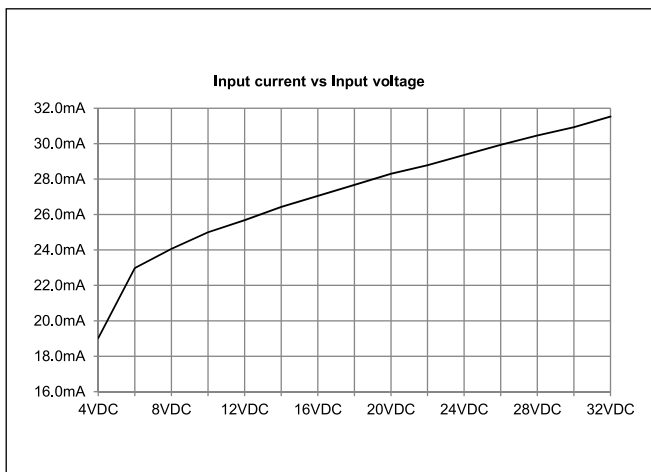
	RG..D..	RG..A..
Control voltage range, U <sub>c</sub>	5 - 32 VDC	20-275 VAC, 24 (-10%) -190 VDC
Pick-up voltage	4.8 VDC	20 VAC/DC
Drop-out voltage	1.0 VDC	5 VAC/DC
Maximum reverse voltage	32 VDC	-
Maximum response time	0.5 cycle + 500us @ 24 VDC	2 cycles @ 230VAC/110VDC
Input current @ 40°C	see diagrams below	see diagrams below



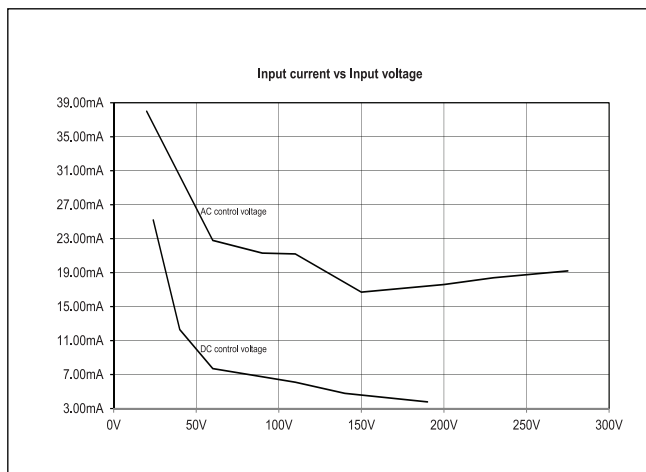
## Control Specifications (A1, A2) for RGC..F, RGC..M

	RG..D..D.. RG..D..A..	RG..A..A..
Control voltage range, U <sub>c</sub>	5 - 32VDC	20-275VAC
Pick-up voltage	4.8VDC	20VAC
Drop-out voltage	1.0VDC	5VAC
Maximum reverse voltage	32VDC	-
Maximum response time	1 cycle + 500us @ 24VDC	5 cycles @ 230VAC
Input current @ 40°C	see diagrams below	see diagrams below

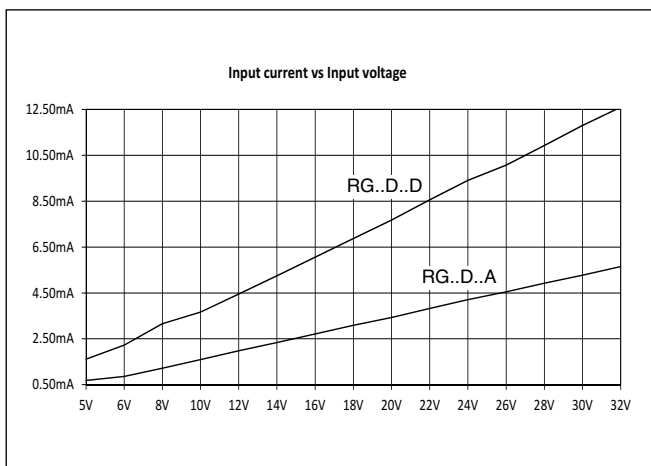
**RG..D**



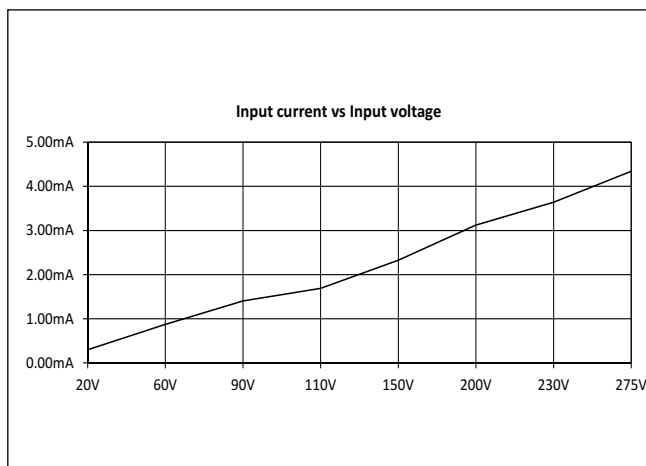
**RG..A**



**RG..D..D., RG..D..A..**



**RG..A..A..**

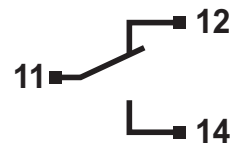


## Supply Specifications (Us)

	RG..D..D..	RG..D..A.. RG..A..A..
Supply voltage range, U <sub>s</sub>	24VDC, -15% / +20%	90-250VAC
Reverse protection	Yes	n/a
Surge protection	Integrated transil	External varistor for surge protection
Max. supply current	no fan, RG..M with fan, RG..FM	60mA 80mA
	80mA 150mA	

## Alarm Specifications (12, 14, 11)

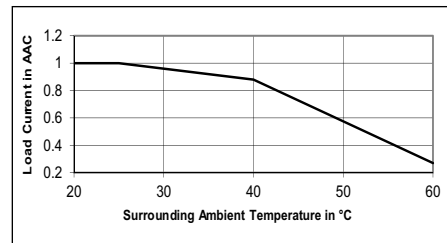
	<b>RG..F</b> <b>RG..M</b>
Output type	EMR, 1 Form C (SPDT) Normally closed (12-11) Normally open (14-11)
Contact rating	2A @ 250VAC / 30VDC
Isolation between open contacts	1000VAC



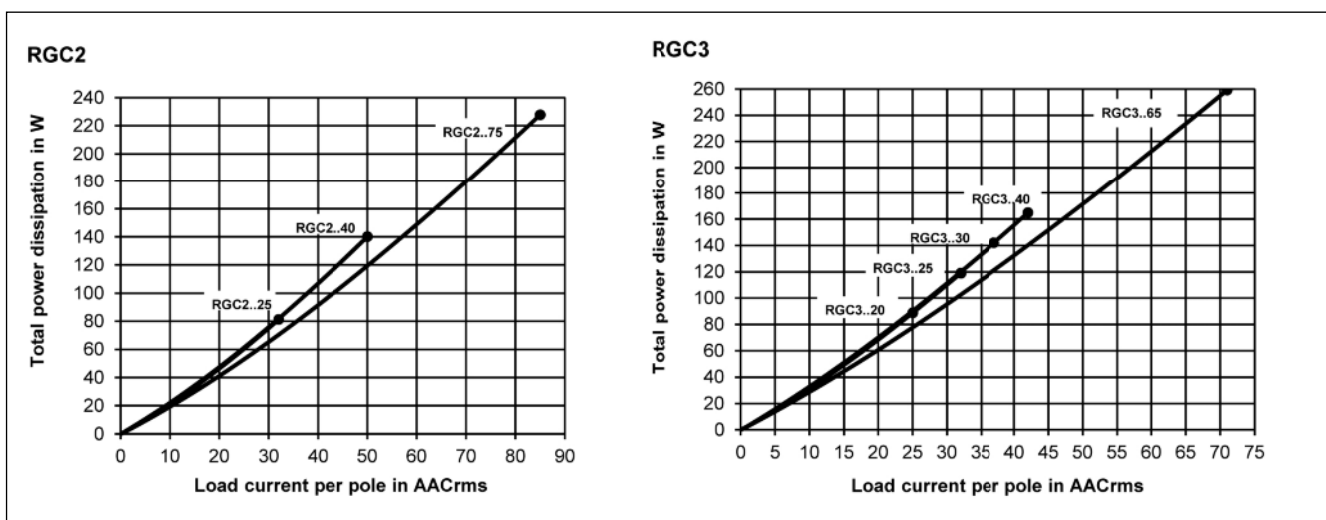
## Auxiliary Output Specifications (22, 24, 21)

	<b>RG..D..D..</b> <b>RG..D..A..</b>	<b>RG..A..A..</b>
Output type	PNP darlington, Normally closed (22-21) NPN darlington, Normally open (24-21)	Triac, Normally closed (22-21) Triac, Normally open (24-21)
Rated voltage	24VDC +/-20%	90-250VAC
On-state voltage drop Typical	4VDC	< 2VAC
Blocking voltage	-	800Vp
Maximum current rating	50mADC	1AAC @ 25°C <sup>9</sup>
Delay from SSR output switching to auxiliary output	5 cycles	5 cycles

9: Refer to Derating Curve for Auxiliary Output rating @ higher operating temperature

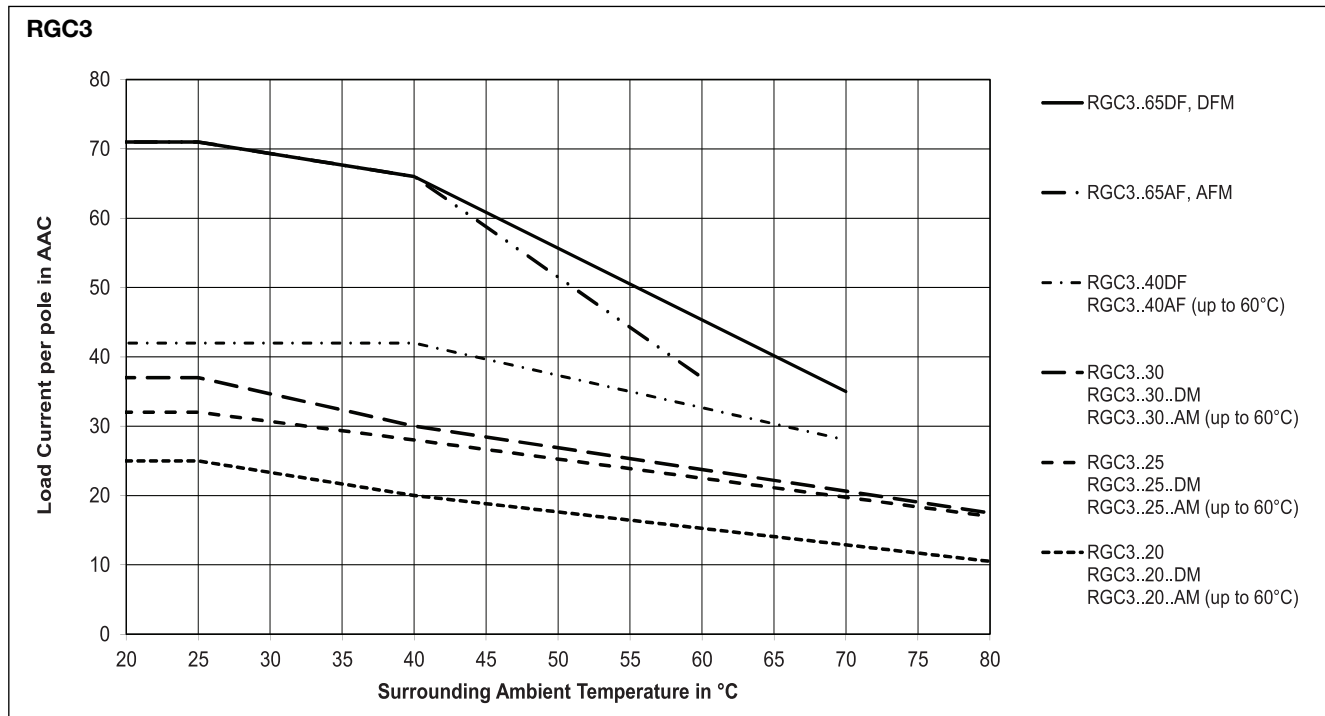
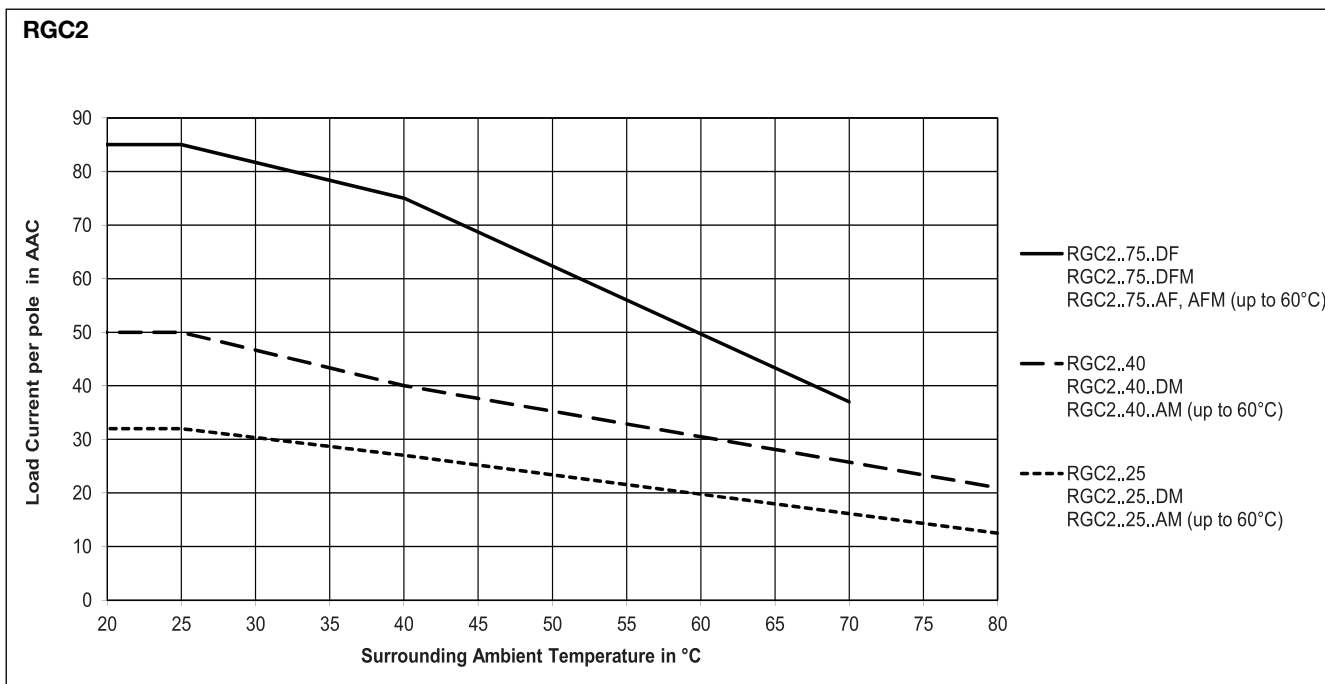


## Output Power Dissipation



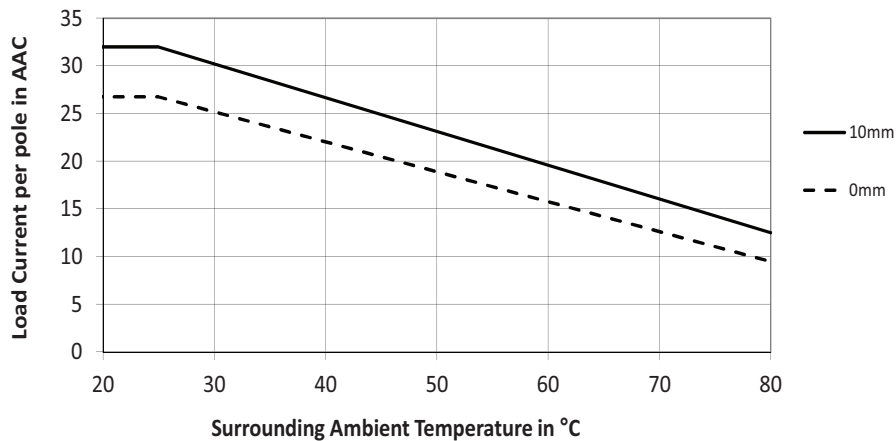


## Current Derating

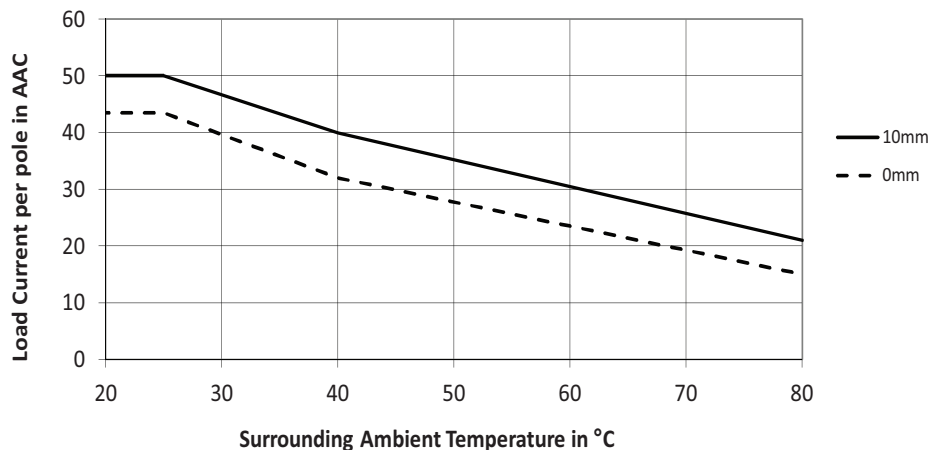


## Derating Vs. Spacing Curves

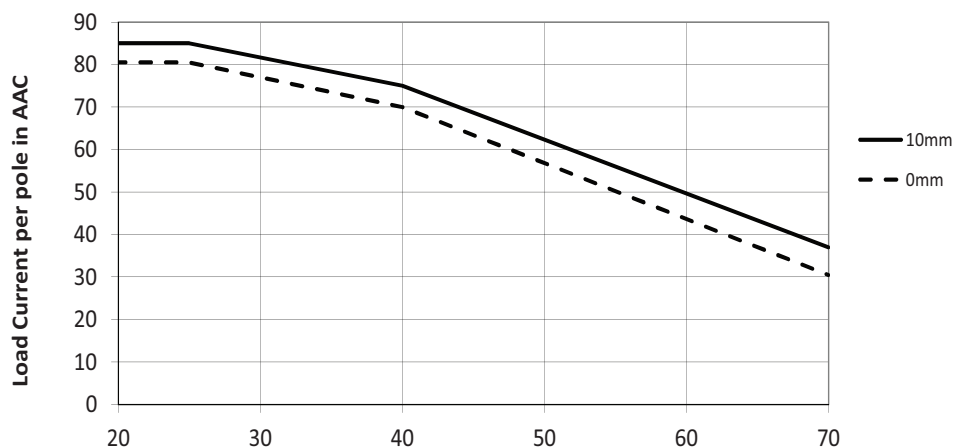
RGC2..25



RGC2..40



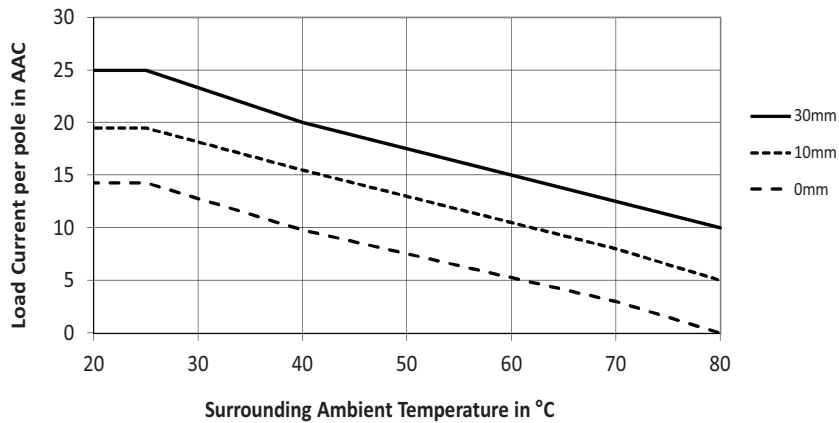
RGC2..75



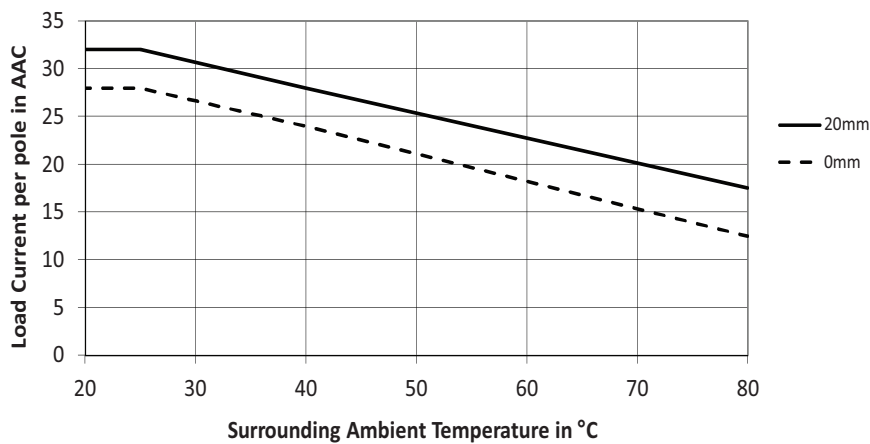


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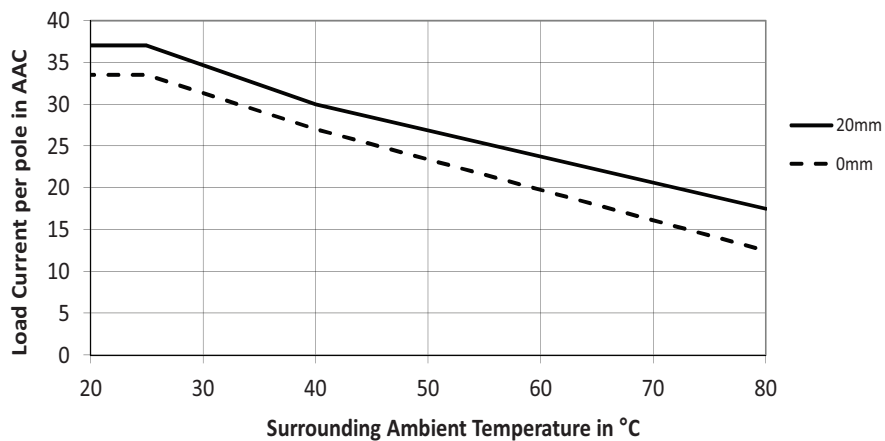
RGC3..20



RGC3..25

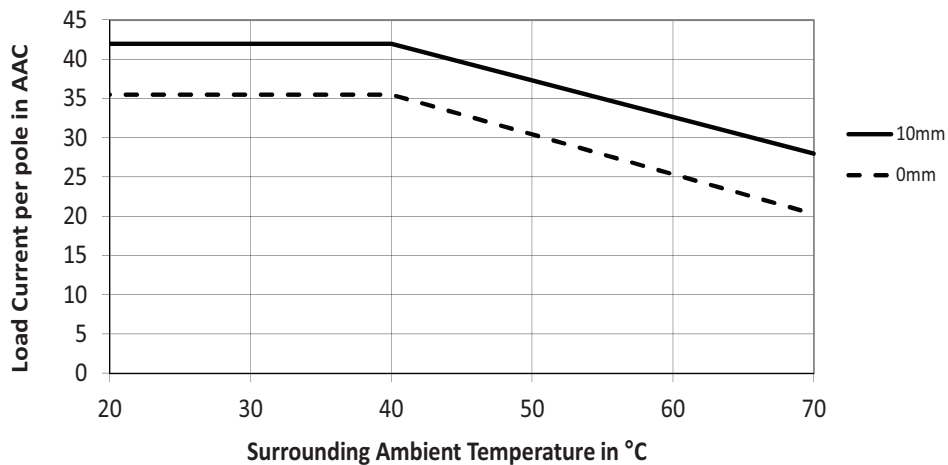


RGC3..30

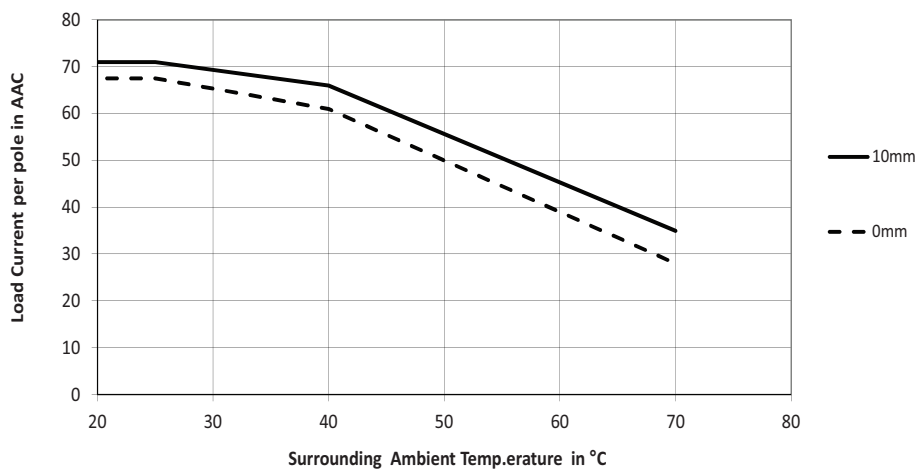


## Derating Vs. Spacing Curves - cont.

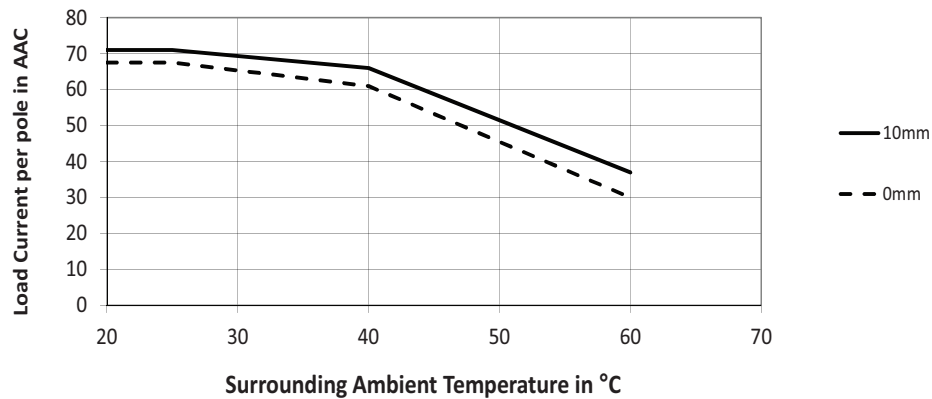
RGC3..40



RGC3..65DF, DFM



RGC3..65AF, AFM



## Agency Approvals and Conformance

<b>Conformance</b>	EN/IEC 60947-4-2 EN/IEC 60947-4-3	<b>Agency Approvals</b>	UL listed (E172877), UL508 cUL Listed (E172877), C22.2 No.14-10
		<b>Short Circuit Current rating</b>	100kArms, UL508



## Electromagnetic Compatibility

<b>EMC immunity</b>	EN/IEC 61000-6-2	<b>Radiated radio frequency immunity</b>	EN/IEC 61000-4-3 Performance Criteria 1 Performance Criteria 1 Performance Criteria 1
<b>Electrostatic discharge (ESD) immunity</b> Air discharge, 8kV Contact, 4kV	EN/IEC 61000-4-2 Performance Criteria 2 Performance Criteria 2	10V/m, 80 - 1000MHz 10V/m, 1.4 - 2.0GHz 10V/m, 2.0 - 2.7GHz	
<b>Electrical fast transient (Burst) immunity</b> Output: 2kV, 5kHz Input: 1kV, 5kHz Signal: 1kV, 5kHz RGC..M	EN/IEC 61000-4-4 Performance Criteria 1 Performance Criteria 1 Performance Criteria 1	<b>Conducted radio frequency immunity</b> 10V/m, 0.15 - 80MHz	EN/IEC 61000-4-6 Performance Criteria 1
<b>Electrical surge immunity</b> Output, line to line, 1kV Output, line to earth, 2kV Input, line to earth, 1kV (A1, A2) Signal, line to line, 500V (Us, 21, 22, 24) RGC..D.D Signal, line to earth, 500V (Us, 21, 22, 24) RGC..D.D Signal, line to earth, 1kV (Us, 21, 22, 24) RGC..D.A RGC..A.A 11, 12, 14, line to line, 1kV 11, 12, 14, line to earth, 2kV	EN/IEC 61000-4-5 Performance Criteria 1 Performance Criteria 1 Performance Criteria 2 Performance Criteria 1 Performance Criteria 1 Performance Criteria 1 Performance Criteria 1 Performance Criteria 1 Performance Criteria 1 Performance Criteria 1	<b>Voltage dips immunity</b> 0% for 0.5/1cycle 40% for 10 cycles 70% for 250 cycles	EN/IEC 61000-4-11 Performance Criteria 2 Performance Criteria 2 Performance Criteria 2
<b>EMC emission</b>	EN/IEC 61000-6-4	<b>Radio interference field emission (radiated)</b> 30-1000MHz	EN/IEC 61000-4-11 Performance Criteria 2
<b>Radio interference voltage emission (conducted)</b> 0.15-30MHz	EN/IEC 55011 Class A (Industrial) with filters - see filter information		EN/IEC 55011 Class A (Industrial)

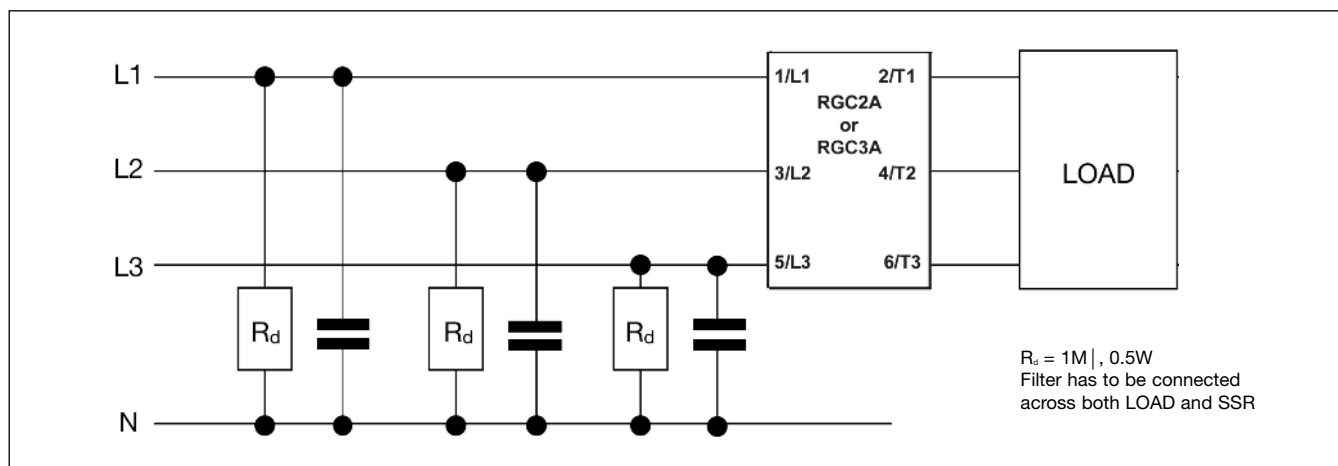
### Note:

- 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.
  - This product has been designed for Class A equipment. Use of this product in domestic environments may cause radio interference, in which case the user may be required to employ additional mitigation methods.
  - Surge tests on RGC..A, RGC..A..A.. models were carried out with the signal line impedance network. In case the line impedance is less than 40Ω, it is suggested that AC supply is provided through a secondary circuit where the short circuit limit between conductors and ground is 1500VA or less.
- Performance Criteria 1 (Performance Criteria A): No degradation of performance or loss of function is allowed when the product is operated as intended.  
- Performance Criteria 2 (Performance Criteria B): 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 (Performance Criteria C): Temporary loss of function is allowed, provided the function can be restored by manual operation of the control.

## Filtering - EN/IEC 55011 Class A Compliance

Part Number	Suggested filter for compliance	Maximum heater current
RGC2A22..25	220nF / 275V /X1	25AAC
RGC2A60..25	220nF / 760V /X1	25AAC
RGC2A60..40	330nF / 760V /X1	40AAC
RGC2A60..75	470nF / 760V /X1	65AAC
RGC3A22..20	220nF / 275V /X1	25AAC
RGC3A60..20	220nF / 760V /X1	25AAC
RGC3A60..25	330nF / 760V /X1	25AAC
RGC3A60..30	470nF / 760V /X1	30AAC
RGC3A60..40	470nF / 760V /X1	40AAC
RGC3A60..65	470nF / 760V /X1	65AAC

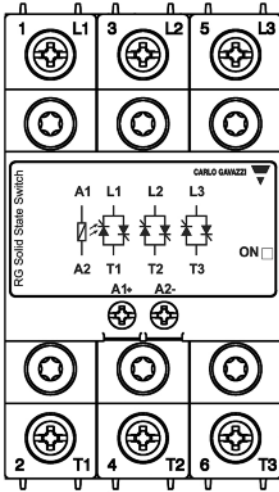
## Filter Connection Diagrams



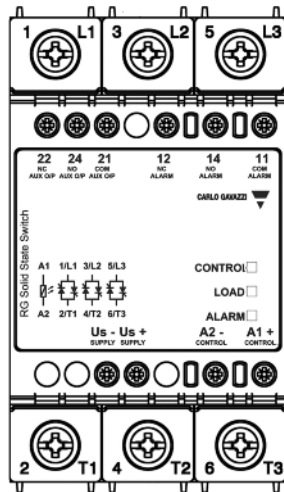
## Environmental Specifications

<b>Operating temperature</b>	-40°C to +80°C (-40°F to +176°F)	<b>UL flammability rating</b> (for plastic)	UL 94 V0
RGC...DF, DFM	-40°C to +70°C (-40°F to +158°F)	<b>Installation altitude</b>	0 - 1000m. Above 1000m derate linearly by 1% of FLC per 100m up to maximum of 2000m
RGC...AM, AF, AFM	-40°C to +60°C (-40°F to +140°F)	<b>Weight</b>	
<b>Storage temperature</b>	-40°C to +100°C (-40°F to +212°F)	RGC2..25, RGC3..20 (M)	approx. 600g (680g)
<b>Impact resistance</b> (EN50155, EN61373)	15/11 g/ms	RGC2..40, RGC3..25, RGC3..30 (M)	approx. 850g (920g)
<b>Vibration resistance</b> (2-100Hz, IEC60068-2-26, EN50155, EN61373)	2g per axis	RGC3..40	approx. 740g
<b>Relative humidity</b>	95% non condensing @ 40°C	RGC2..75, RGC3..65	approx. 980g

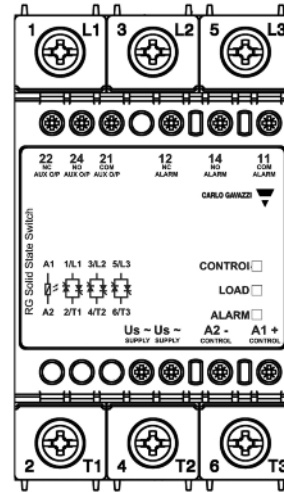
# Terminal Layout



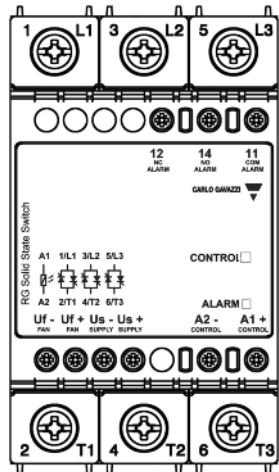
RGC2..25, RGC2..40  
RGC3..20, RGC3..25, RGC3..30



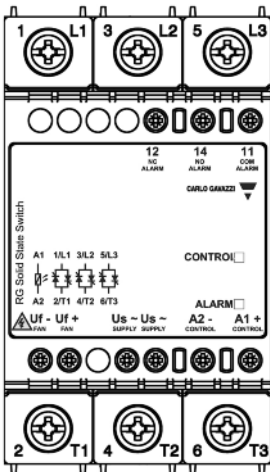
RGC2..25..DM, RGC2..40..DM  
RGC3..20..DM, RGC3..25..DM, RGC3..30..DM



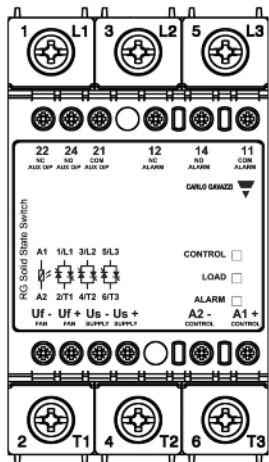
RGC2..25..AM, RGC2..40..AM  
RGC3..20..AM, RGC3..25..AM, RGC3..30..AM



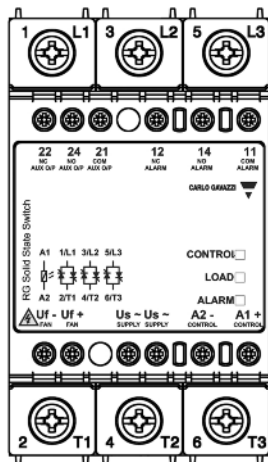
RGC2..75..DF  
RGC3..40..DF, RGC3..65..DF



RGC2..75..AF  
RGC3..40..AF, RGC3..65..AF



RGC2..75..DFM  
RGC3..65..DFM



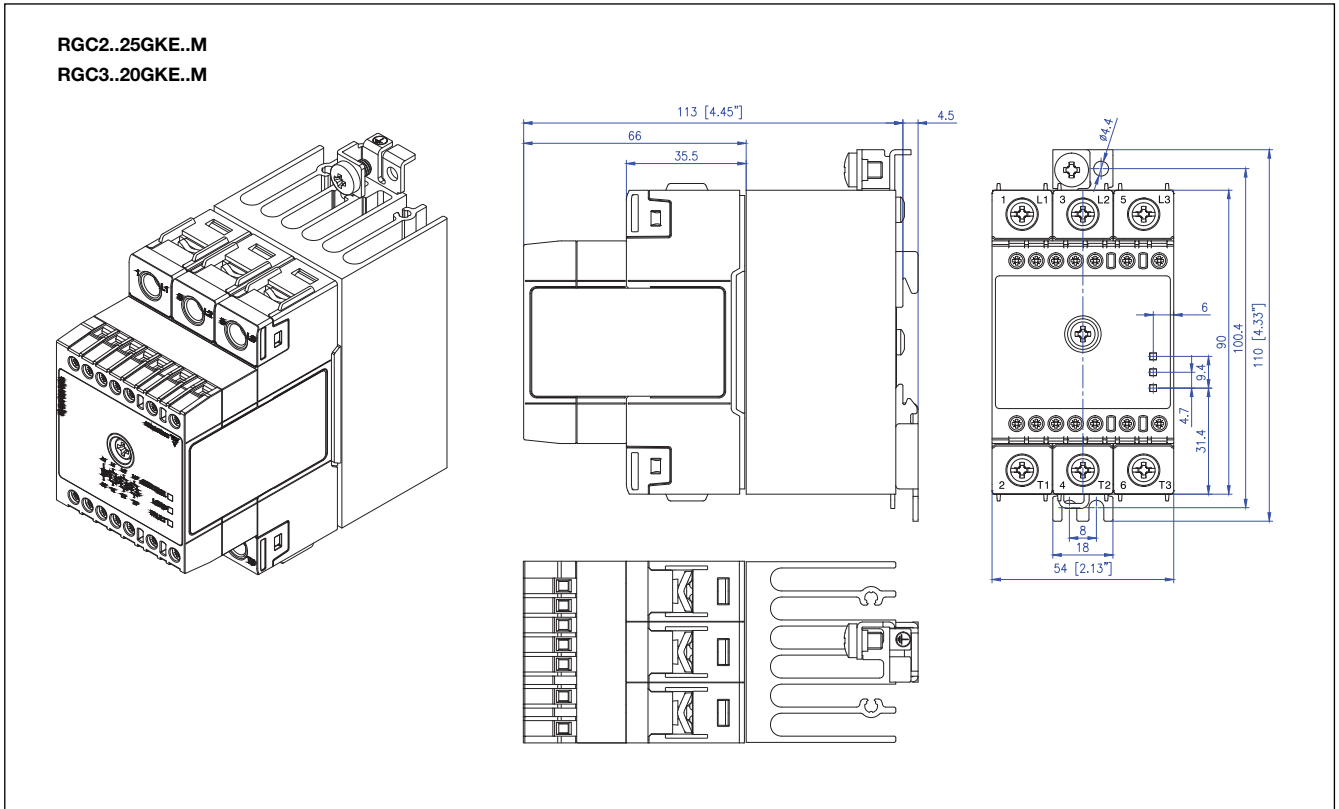
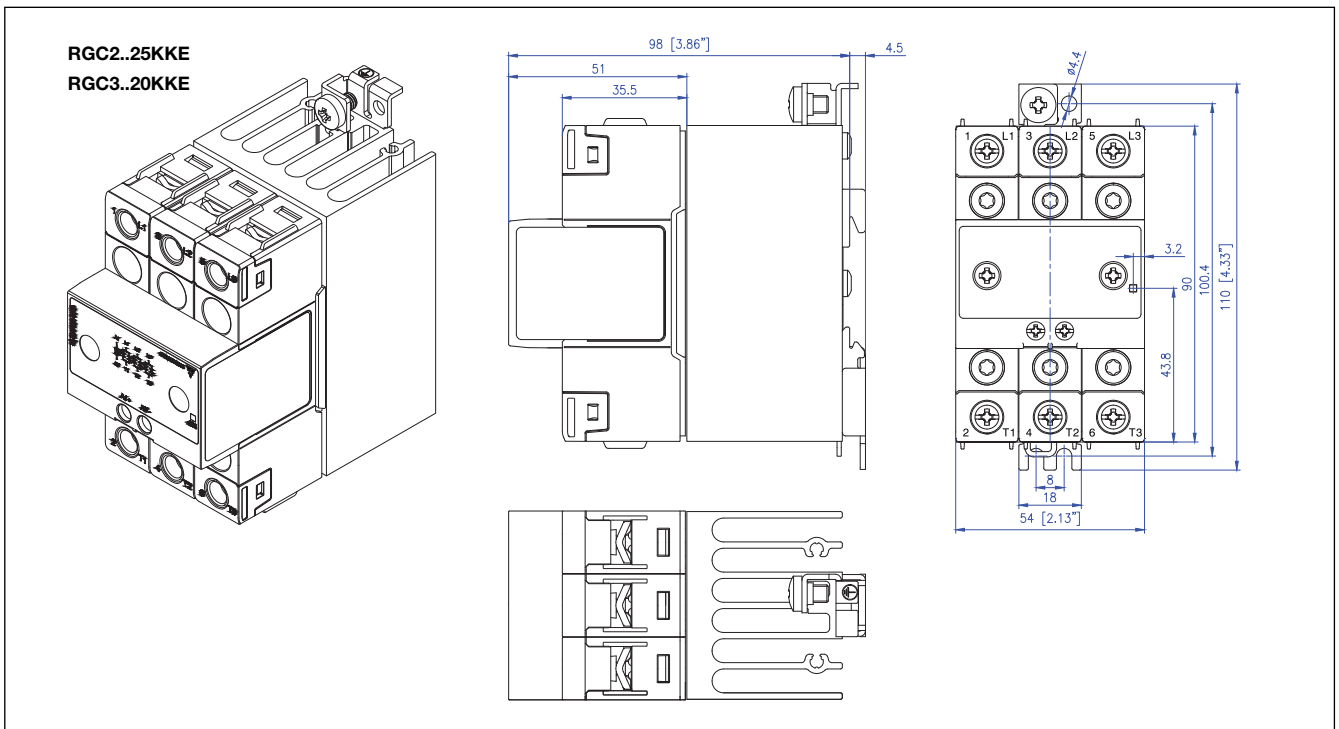
RGC2..75..AFM  
RGC3..65..AFM

### Terminals labelling:

- 1/L1, 2/L2, 3/L3: Line connections
- 2/T1, 4/T2, 6/T3: Load connections
- A1(+): Positive control signal
- A2(-): Control ground
- Us(+): External supply positive signal
- Us(-): External supply ground
- Us(~): AC external supply
- Uf(+): Fan supply positive signal  
(no connection required by end user)
- Uf(-): Fan supply ground  
(no connection required by end user)
- 12: Alarm EMR, normally closed
- 14: Alarm EMR, normally open
- 11: Alarm EMR, common terminal
- 22: Auxiliary output, normally closed
- 24: Auxiliary output, normally open
- 21: Auxiliary output, common terminal

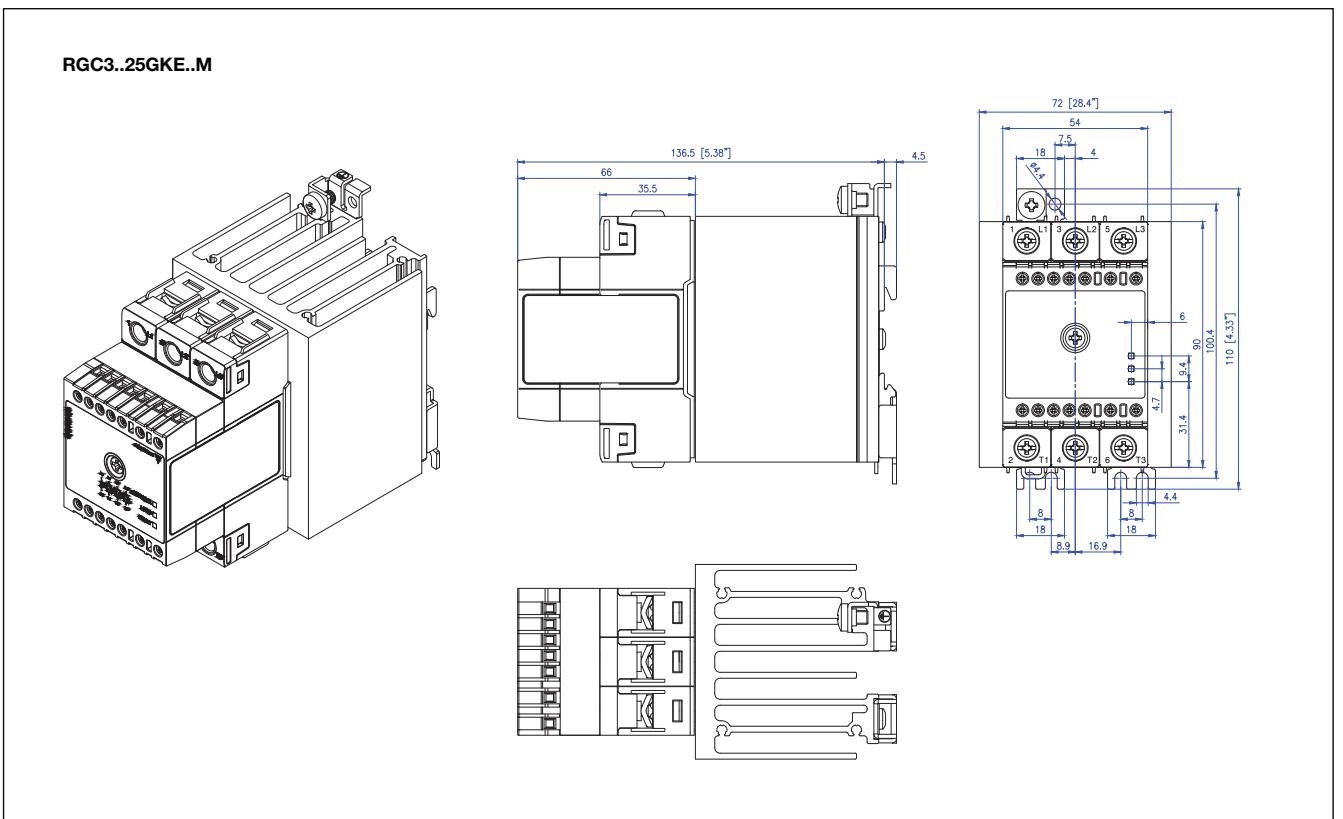
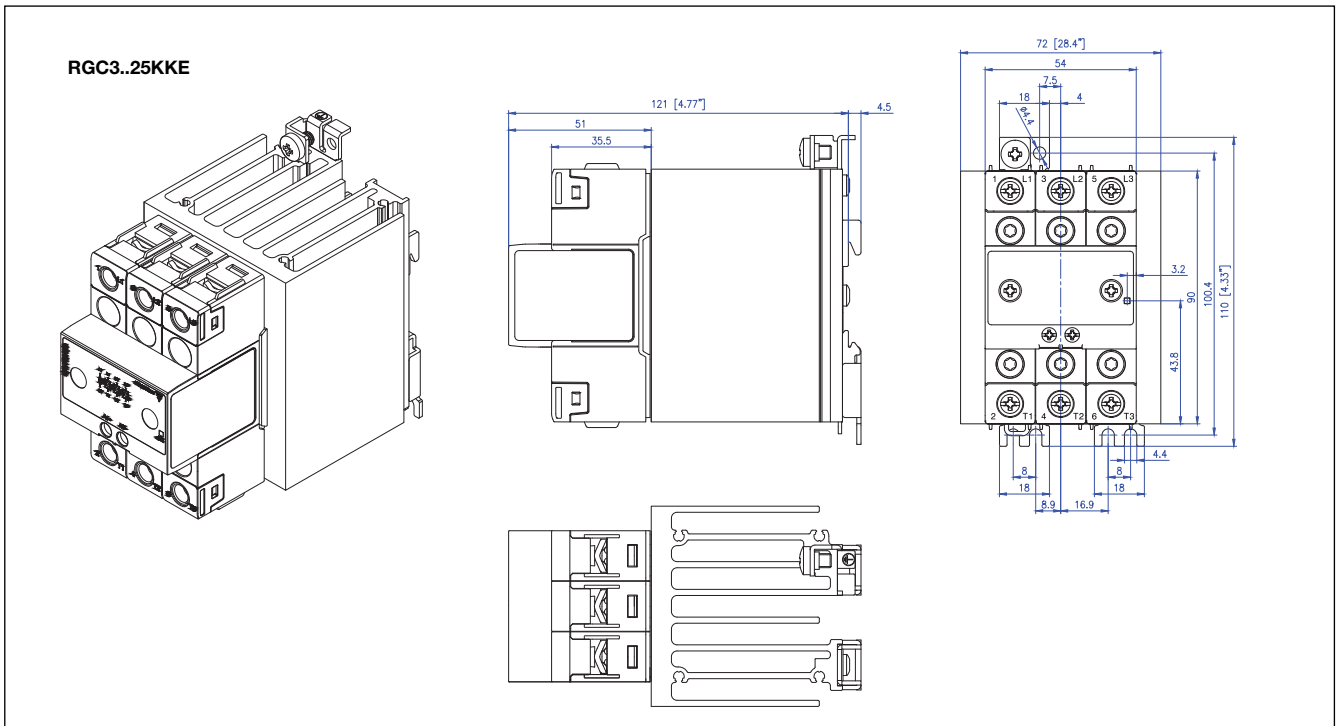
Connections to Uf+, Uf- are provided readily terminated by manufacturer. However, in case of needed user intervention on terminals Uf+, Uf- for the RGC..A..AF and RGC..A..AFM models, the mains supply has to be turned off first to avoid risk of electrical shock.

## Dimensions



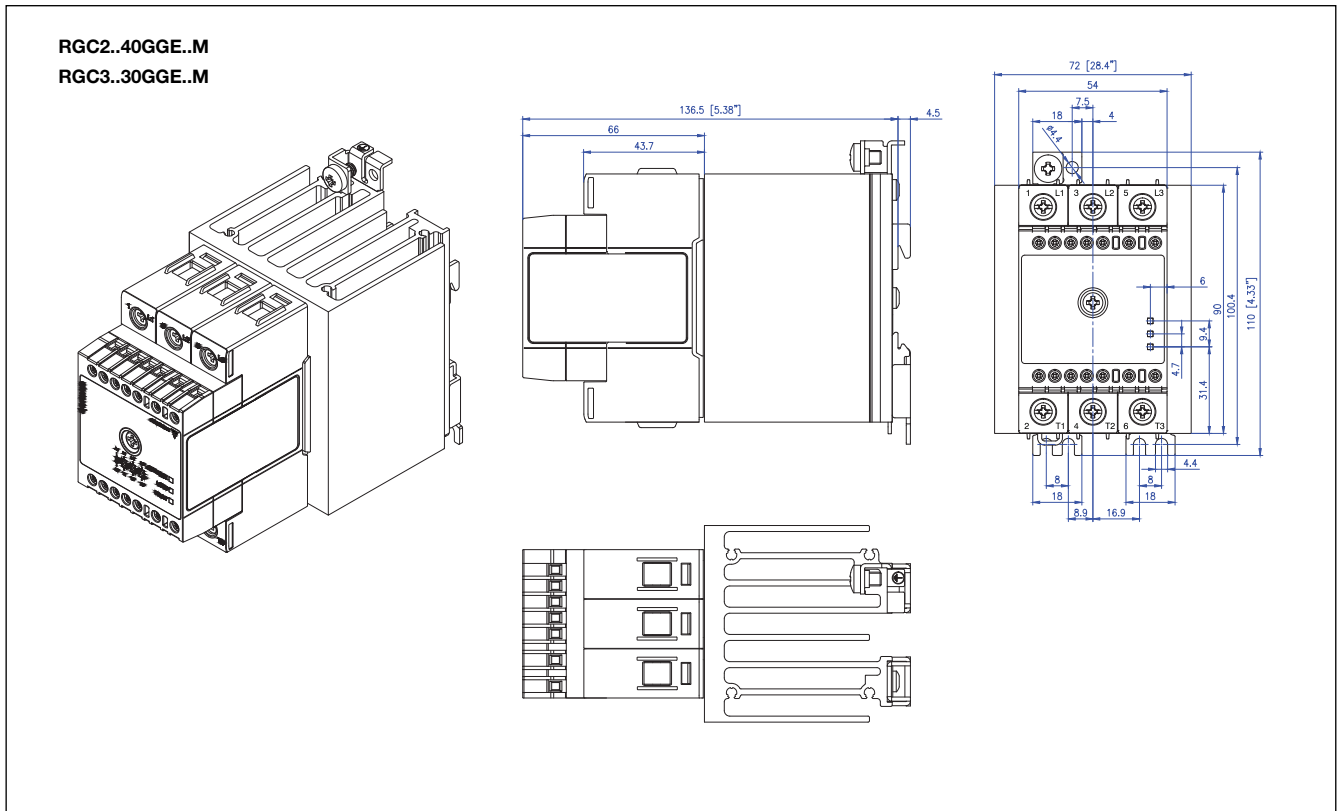
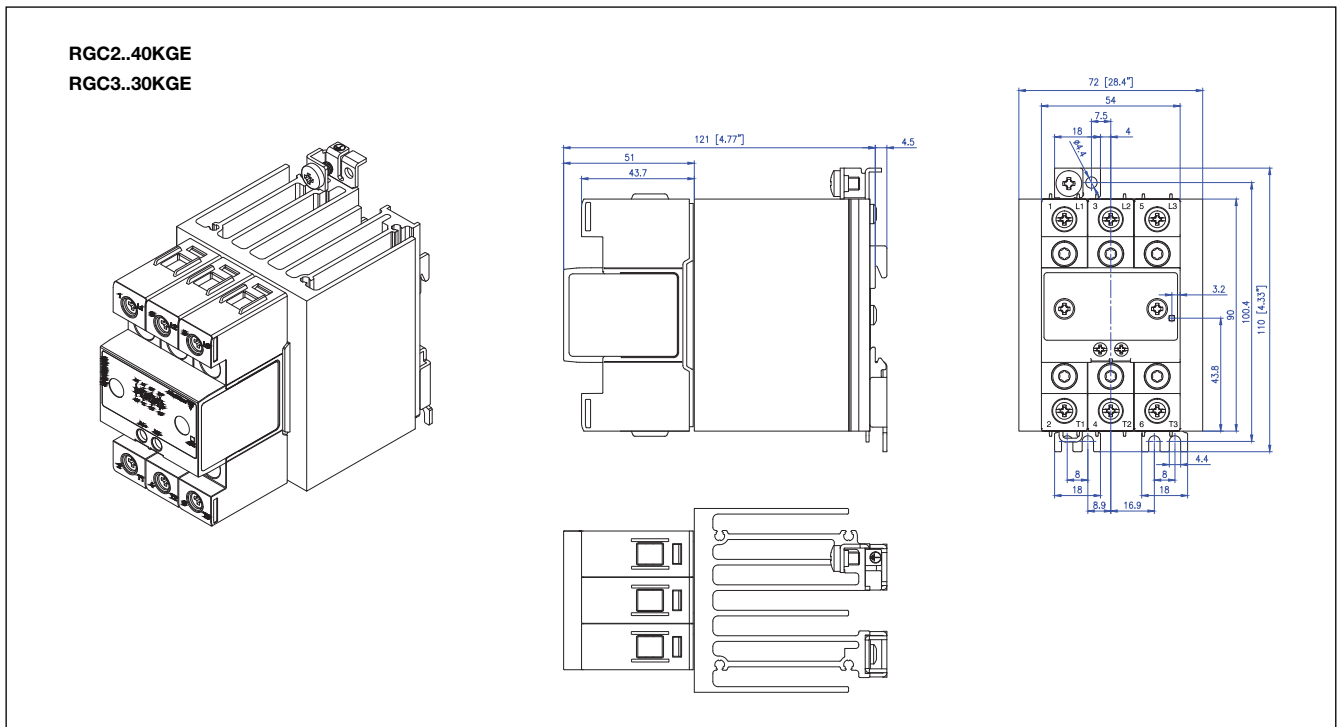
Dimensions in mm. Housing width tolerance +0.5mm, -0mm as per DIN43880.  
All other tolerances  $\pm 0.5$ mm

## Dimensions



Dimensions in mm. Housing width tolerance +0.5mm, -0mm as per DIN43880.  
All other tolerances  $\pm 0.5$ mm

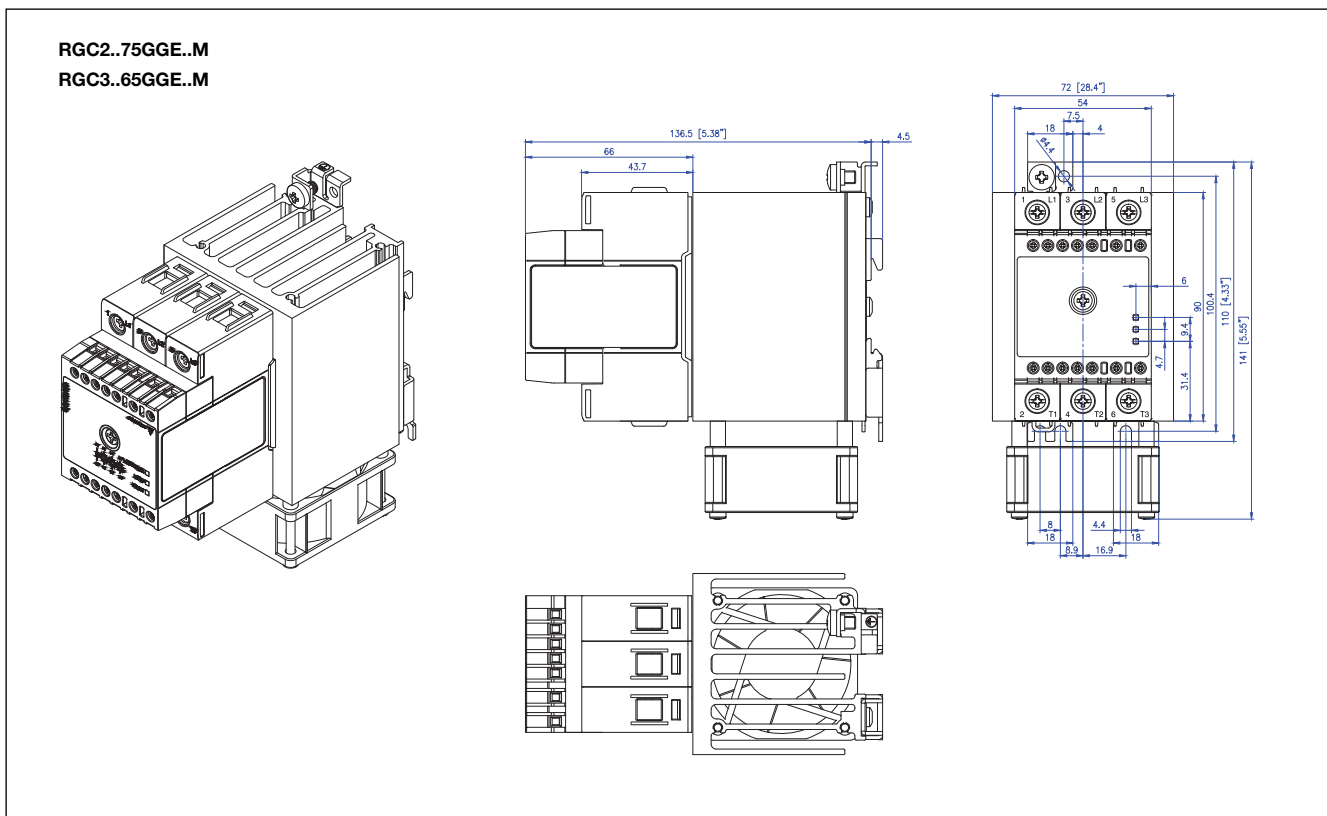
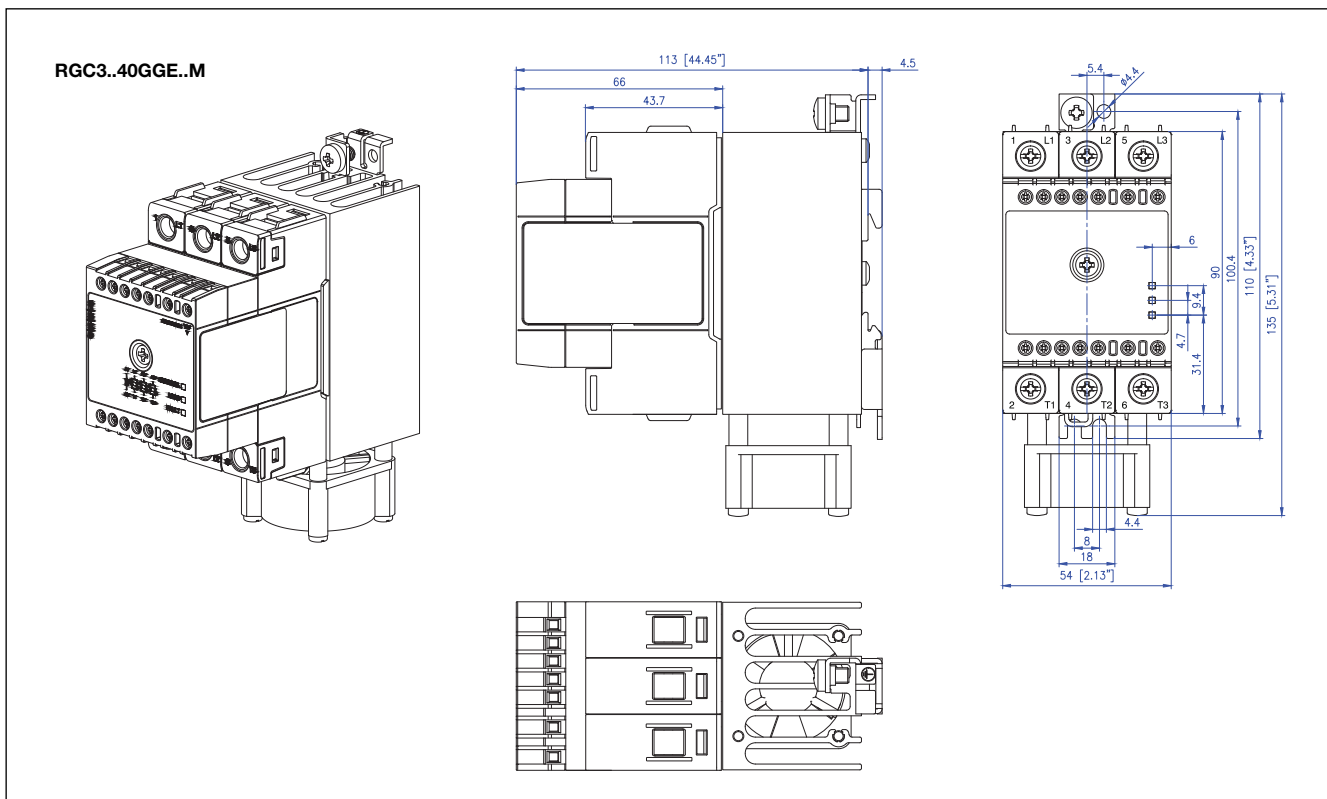
## Dimensions



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




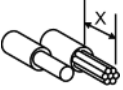







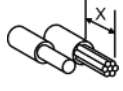




# Dimensions

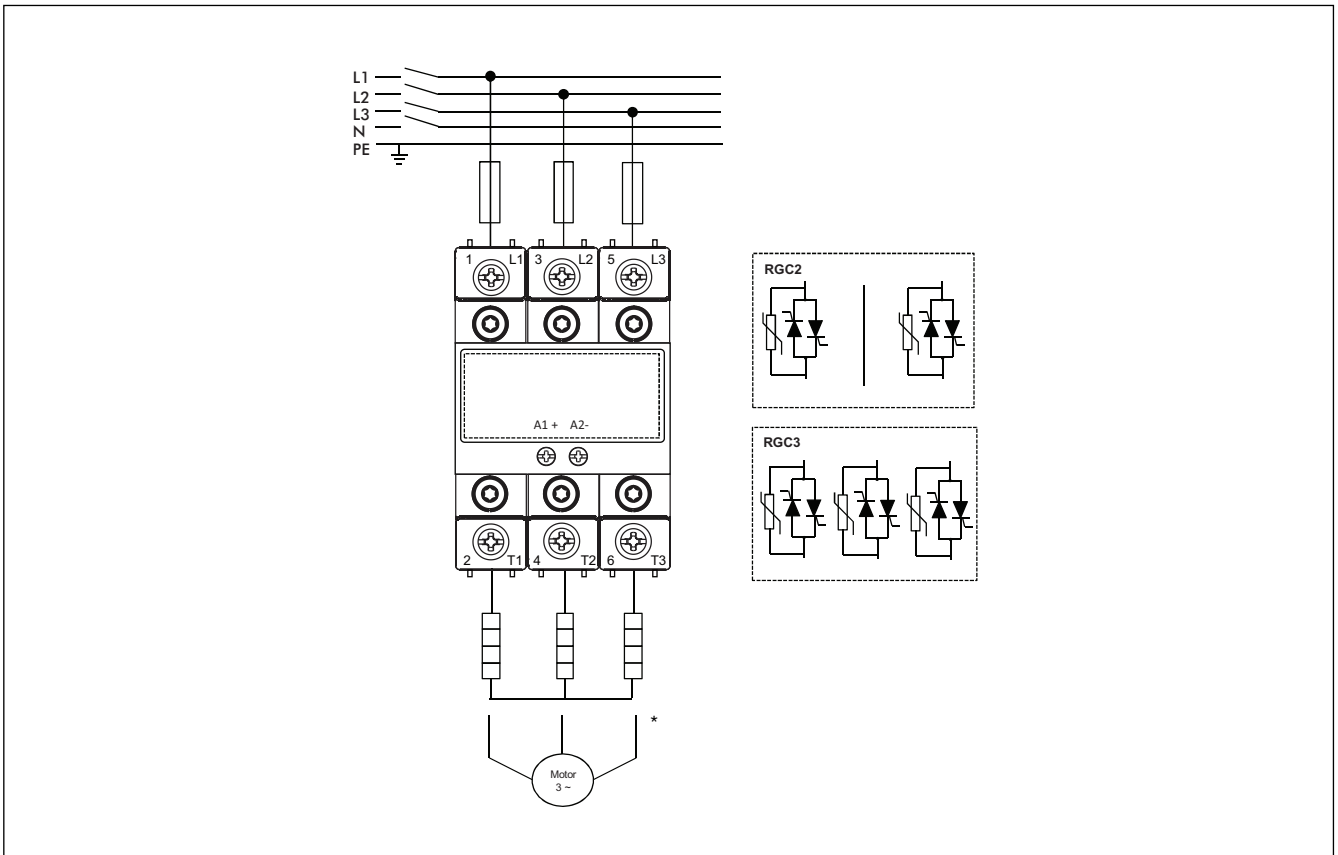


Dimensions in mm. Housing width tolerance +0.5mm, -0mm as per DIN43880.  
All other tolerances ±0.5mm

## Connection Specifications

<b>POWER CONNECTIONS</b>		<b>1/L1, 3/L2, 5/L3, 2/T1, 4/T2, 6/T3</b>		
Use 75°C copper (Cu) conductors		<b>RG..KKE, RG..GKE</b>		<b>RG..GGE, RG..GGE</b>
				
Stripping length (X)		12mm		11mm
Connection type		M4 screw with captivated washer		M5 screw with box clamp
Rigid (solid & stranded) UL/cUL rated data		2x 2.5 - 6.0 mm <sup>2</sup> 2x 14 - 10 AWG	1x 2.5 - 6.0 mm <sup>2</sup> 1x 14 - 10 AWG	1x 2.5 - 25 mm <sup>2</sup> 1x 14 - 3 AWG
Flexible with end sleeve		2x 1.0 - 2.5 mm <sup>2</sup> 2x 2.5 - 4.0 mm <sup>2</sup> 2x 18 - 14 AWG 2x 14 - 12 AWG	1x 1.0 - 4.0 mm <sup>2</sup> 1x 18 - 12 AWG	1x 2.5 - 16 mm <sup>2</sup> 1x 14 - 6 AWG
Flexible without end sleeve		2x 1.0 - 2.5 mm <sup>2</sup> 2x 2.5 - 6.0 mm <sup>2</sup> 2x 18 - 14 AWG 2x 14 - 10 AWG	1x 1.0 - 6.0 mm <sup>2</sup> 1x 18 - 10 AWG	1x 4.0 - 25 mm <sup>2</sup> 1x 12 - 3 AWG
Torque specification		Pozidriv 2 UL: 2Nm (17.7 lb-in) IEC: 1.5-2.0Nm (13.3-17.7 lb-in)		Pozidriv 2 UL: 2.5Nm (22 lb-in) IEC: 2.0-2.5Nm (17.7-22 lb-in)
Aperture for termination lug		12.3mm		n/a
Protective Earth (PE) connection		M5, 1.5Nm (13.3 lb-in)		
		Not provided with SSR. PE connection required when product is intended to be used in Class 1 applications according to EN/IEC 61140		
<b>CONTROL CONNECTIONS</b>		<b>A1, A2</b>		<b>A1, A2, Us, Uf, 11, 12, 14, 21, 22, 24</b>
Use 75°C copper (Cu) conductors		<b>RG..KKE, RG..KGE</b>		<b>RG..GKE, RG..GGE</b>
				
Stripping length (X)		8mm		8 mm
Connection type		M3 screw with captivated washer		M3 screw with box clamp
Rigid (solid & stranded) UL/cUL rated data		2x 0.5 - 2.5 mm <sup>2</sup> 2x 18 - 12 AWG	1x 0.5 - 2.5 mm <sup>2</sup> 1x 18 - 12 AWG	1x 1.0 - 2.5 mm <sup>2</sup> 1x 18 - 12 AWG
Flexible with end sleeve		2x 0.5 - 2.5 mm <sup>2</sup> 2x 18 - 12 AWG	1x 0.5 - 2.5 mm <sup>2</sup> 1x 18 - 12 AWG	1x 0.5 - 2.5 mm <sup>2</sup> 1x 20 - 12 AWG
Torque specification		Pozidriv 1 UL: 0.5Nm (4.4 lb-in) IEC: 0.4-0.5Nm (3.5-4.4 lb-in)		Pozidriv 1 UL: 0.5Nm (4.4 lb-in) IEC: 0.4-0.5Nm (3.5-4.4 lb-in)

## Connection Diagram

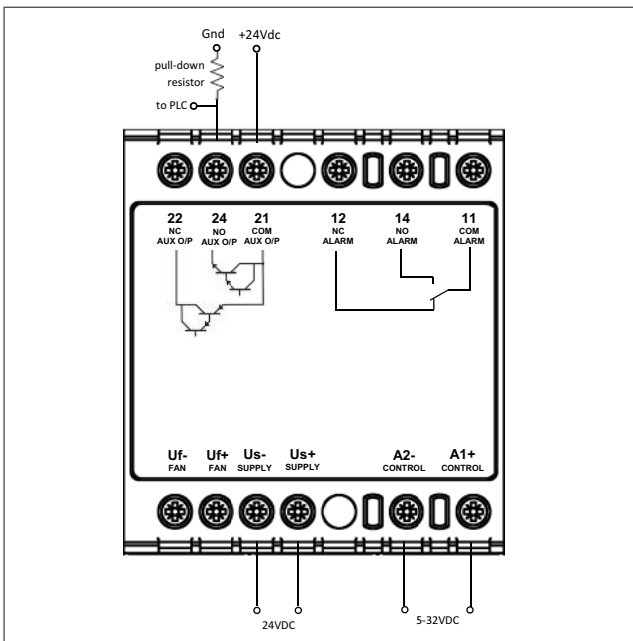


\* Not suitable for RGC..M versions.  
 Not suitable for 4-wire, 3-phase systems.

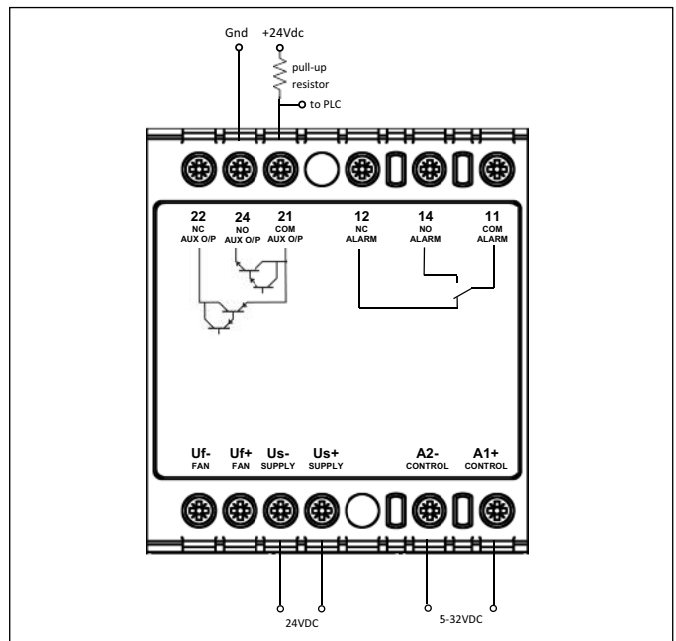
## Connection Configuration for Auxiliary Output

Versions: RGC..D..DM, RGC..D..DFM

Auxiliary output signal 24VDC, 50mA; DC control, Uc (5-32VDC); DC external supply, Us (24VDC)



Connection of normally open auxiliary output (24-21) in a 'pnp' style

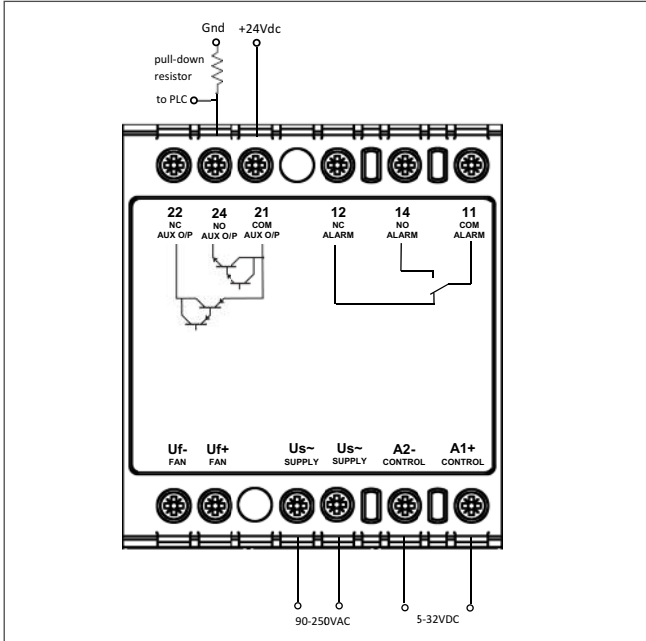


Connection of normally open auxiliary output (24-21) in an 'npn' style

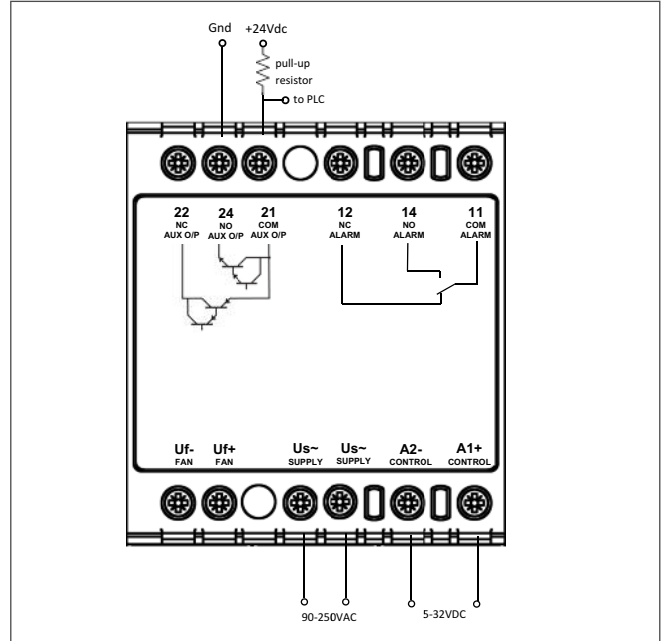
## Conection Configuration for Auxiliary Output

**Versions: RGC..D..AM, RGC..D..AFM**

Auxiliary output signal 24VDC, 50mA; DC control, U<sub>c</sub> (5-32VDC); AC external supply, U<sub>s</sub> (90-250VAC)



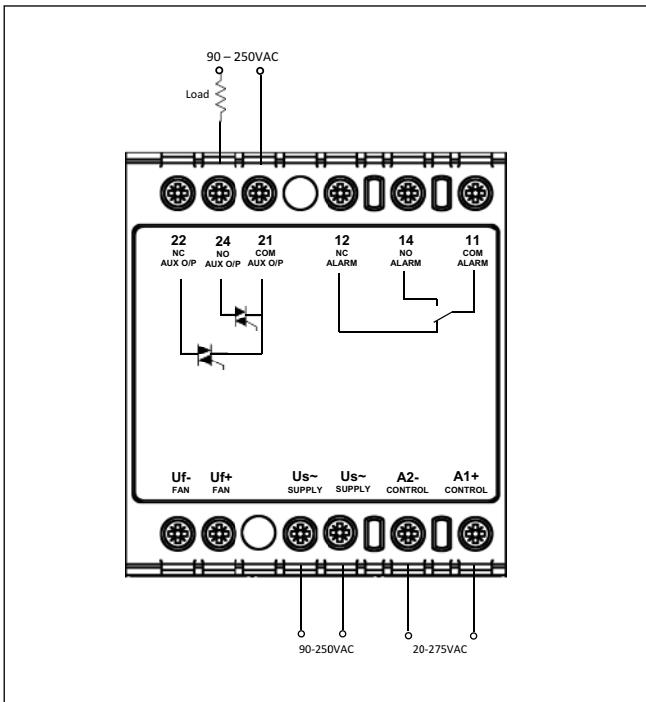
Connection of normally open auxiliary output (24-21) in a 'pnp' style



Connection of normally open auxiliary output (24-21) in an 'npn' style

**Versions: RGC..A..AM, RGC..A..AFM**

Auxiliary output signal 90-250VAC, max. 1A @ 25°C; AC control, U<sub>c</sub> (20-275VAC); AC external supply, U<sub>s</sub> (90-250VAC)



Connection of normally open auxiliary output (24-21) to an AC load

Note: In relation to the auxiliary output terminals 22, 24, 21; it is not possible to connect all 3 terminals to the auxiliary circuit. Preference shall be given to either a normally open (24-21) or normally closed (22-21) contact. The respective terminations shall be chosen and configured accordingly.





## RGC..M Mode of Operation (continued)

### Load Loss:

Detection of load loss is possible both with control voltage ON and control voltage OFF. This alarm is issued in the absence of a load termination or an open load on terminals T1, T2 and/or T3 exceeding 120ms. Upon detection of this alarm, the SSR output is switched OFF. This alarm type is indicated by 3 flashes of the red LED. The fault condition is automatically restored once the fault is cleared. As long as the load loss condition is present and an alarm is issued accordingly, other alarm conditions occurring when load loss is still present are ignored. For example, if a mains loss occurs during a load loss alarm condition, such an alarm is not indicated until the load loss is cleared. Only once the load loss is cleared, the mains loss alarm is issued if still present.

	Supply Voltage (Us) Loss	Normal Operation SSR OFF	Normal Operation SSR ON	Load Loss condition (> 120ms) during control ON	Control OFF during Load Loss status	Load restored	Normal Operation SSR ON
<u>Mains Supply (L1, L2, L3)</u>	█						
<u>Load Supply (T1, T2, T3)</u>			█				█
<u>Load Current</u>			█				█
<u>Auxiliary Output, NO (21-24)</u>			█				█
<u>Auxiliary Output, NC (21-22)</u>	█			█			
<u>Supply Voltage (Us)</u>		█					
<u>Control Voltage (A1, A2)</u>	█		█				█
<u>Green LED (Control &amp; Supply)</u>		█	█		█		█
<u>Yellow LED (Load status)</u>			█				█
<u>Red LED (Alarm LED)</u>				▬▬▬ ▬▬▬ ▬▬▬			
<u>Alarm Output, NO (11-14)</u>				█			
<u>Alarm Output, NC (11-12)</u>	█					█	

The load loss alarm is not restored automatically in the case of the loads having delta connection. The external supply, Us needs to be re-setted (switched OFF and back ON) to clear the alarm signal.

## RGC..M Mode of Operation (continued)

### SSR Short Circuit:

This condition is detected when the SSR output remains ON for more than 250ms without control voltage. Upon this alarm, an attempt is made to switch OFF the SSR output but this may not be possible in case of a damaged SSR output(s). Alarm indication is given by 3 flashes of the red LED (same as the load loss alarm indication). In case of a self recovery, the SSR will automatically reset.

During an SSR short circuit condition, the SSR output is ON unintentionally. In this case the auxiliary output does not work in synchronisation with the SSR output.

	Normal Operation SSR OFF	Normal Operation SSR ON	SSR short circuit condition during control OFF (>250ms)
<u>Mains Supply (L1, L2, L3)</u>	■	■	■
<u>Load Supply (T1, T2, T3)</u>		■	■
<u>Load Current</u>		■	■
<u>Auxiliary Output, NO (21-24)</u>		■	
<u>Auxiliary Output, NC (21-22)</u>	■		■
<u>Supply Voltage (Us)</u>	■	■	■
<u>Control Voltage (A1, A2)</u>		■	
<u>Green LED (Control &amp; Supply)</u>	■	■	■
<u>Yellow LED (Load status)</u>		■	
<u>Red LED (Alarm LED)</u>			■ ■ ■     ■ ■ ■
<u>Alarm Output, NO (11-14)</u>			■
<u>Alarm Output, NC (11-12)</u>	■	■	



## RGC..M Mode of Operation (continued)

### SSR Open Circuit:

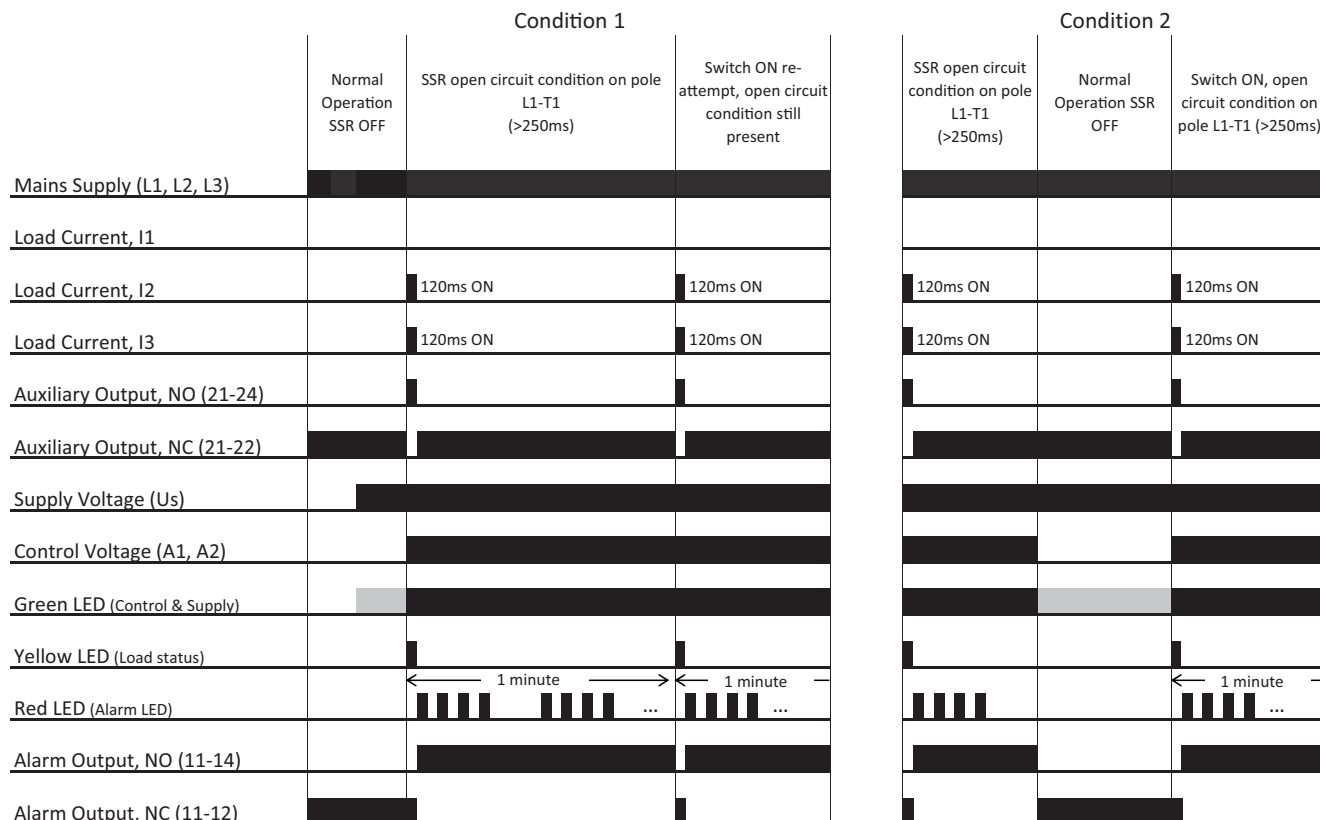
This alarm is issued when either one of the poles or all 3 poles do not switch ON within 250ms when control voltage is applied. This alarm type is identified by 4 flashes of the red LED.

#### Example Condition 1:

Once the open circuit alarm is issued it remains present for 1 minute as long as control voltage is ON. After 1 minute, an attempt to switch ON the SSR is made if control is ON. In case the open circuit condition is still present the alarm is issued again. In the case of an open circuit on only 1 pole the load will switch on 2 phases for 250ms until the open circuit condition on the damaged pole is detected. As soon as the open circuit condition is detected, an alarm is issued and the SSR output is switched OFF. This cycle will repeat for a count of 10 times as long as the control voltage is present. After 10 times no further switch re-attempts are made. It is necessary to reset the external supply (Us) to re-attempt a switch ON. In case failure persists device is to be returned to factory.

#### Example Condition 2:

Once the open circuit alarm is issued it remains present for 1 minute as long as control voltage is ON. If during this period the control voltage is switched OFF, the alarm is automatically cleared and the count indicated in Condition 1 is also set to 0. If control voltage is re-applied and the open circuit condition is detected an alarm is issued accordingly. After 1 minute, an attempt to switch ON the SSR is made if control is still ON. This will continue for a count of 10 times as long as the control voltage is present. After 10 times no further switch re-attempts are made. It is necessary to reset the external supply (Us) to re-attempt a switch ON. In case failure persists device is to be returned to factory.







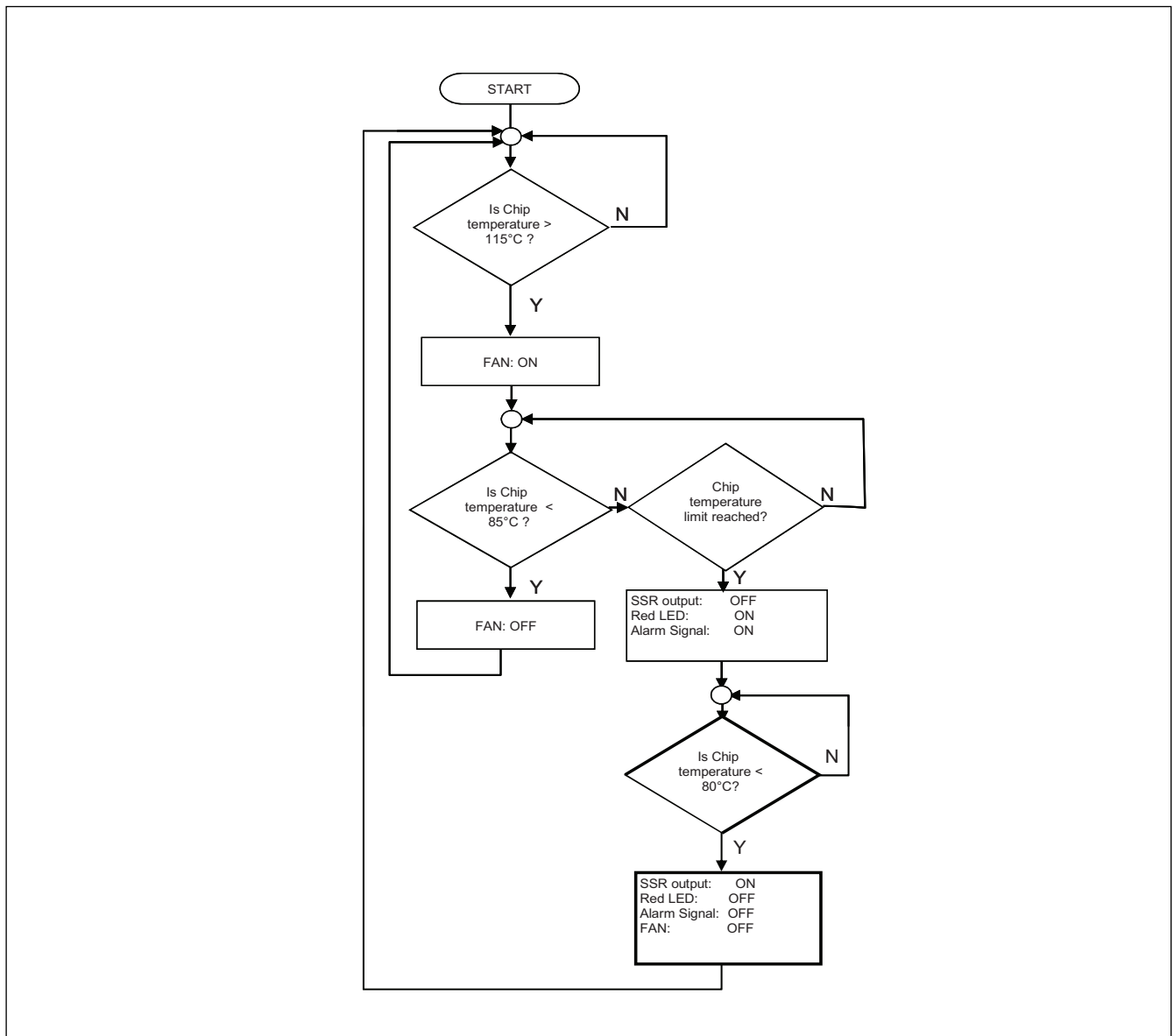
## RGC..M Mode of Operation (continued)

### SSR Over Temperature:


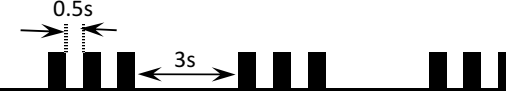
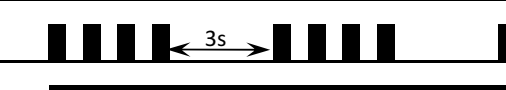
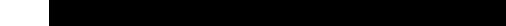
The SSR is equipped with internal temperature monitoring to prevent SSR damage in case of overheating conditions. Upon detection of such a condition the SSR output is switched OFF and an alarm is issued accordingly. This alarm is visually indicated by the red LED which is fully ON. Once the temperature cools down, the alarm is cleared and if control is still ON an attempt to re-start the SSR is made.

	Normal Operation SSR OFF	Normal Operation SSR ON	Over Temperature	Over Temperature condition cleared
<u>Mains Supply (L1, L2, L3)</u>	█	█	█	█
<u>Load Supply (T1, T2, T3)</u>	█	█	█	█
<u>Load Current</u>	█	█	█	█
<u>Auxiliary Output, NO (21-24)</u>	█	█	█	█
<u>Auxiliary Output, NC (21-22)</u>	█	█	█	█
<u>Supply Voltage (Us)</u>	█	█	█	█
<u>Control Voltage (A1, A2)</u>	█	█	█	█
<u>Green LED (Control &amp; Supply)</u>	█	█	█	█
<u>Yellow LED (Load status)</u>	█	█	█	█
<u>Red LED (Alarm LED)</u>	█	█	█	█
<u>Alarm Output, NO (11-14)</u>	█	█	█	█
<u>Alarm Output, NC (11-12)</u>	█	█	█	█

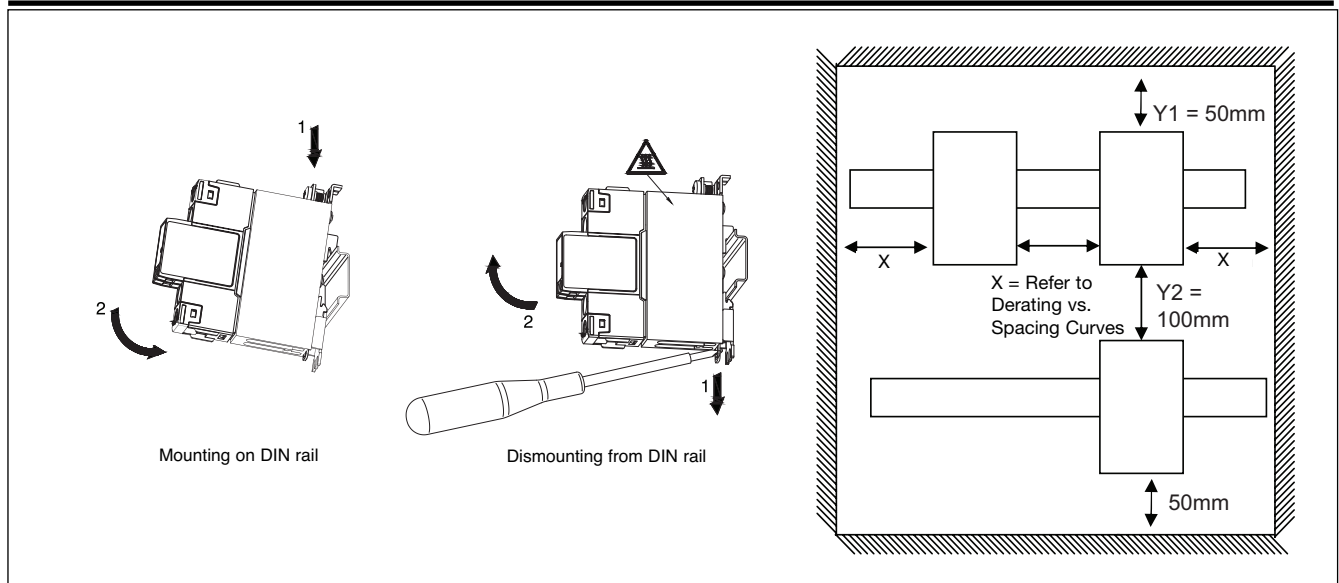
## Fan operation for versions with integrated fan



## Red LED Alarm Indications

Flashes	Description of Fault	Timing Diagram
2	Mains loss	
3	Load loss or SSR short circuit	
4	SSR open circuit	
100%	SSR over temperature	

## Installation Instructions



## Short Circuit Protection

### Protection Co-ordination, Type 1 vs Type 2:

Type one 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 ms Symmetrical Amperes. 600Volts maximum when protected by fuses. Tests at 100,000A were performed with Class J fuses, fast acting; please refer to the tables below for maximum.

### Co-ordination type 1 (UL508)

Part No.	Max. fuse size [A]	Class	Short circuit current [kArms]	Voltage [VAC]
RGC2..25	30	J	100	Max. 600
RGC2..40	40	J	100	Max. 600
RGC2..75	60 <sup>10</sup>	J	100	Max. 600
RGC3..20	30	J	100	Max. 600
RGC3..25	30	J	100	Max. 600
RGC3..30	40	J	100	Max. 600
RGC3..40	40	J	100	Max. 600
RGC3..65	60 <sup>10</sup>	J	100	Max. 600

10: Consult a Carlo Gavazzi sales representative for use of 70A class J fuses

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

Suitable for motor load applications

Part No.	Ferraz Shawmut (Mersen)		Siba		Short circuit current [kArms]	Voltage [VAC]
	Max. fuse size [A]	Part number	Max. fuse size [A]	Part Number		
RGC2..25	40	A70QS40-4	32	50 142 06 32	100	600
RGC2..40	60	A70QS60-4	63	50 194 20 63	100	600
RGC2..75	100	A70QS100-4	125	50 196 20 125	100	600
RGC3..20	40	A70QS40-4	32	50 142 06 32	100	600
RGC3..25	40	A70QS40-4	32	50 142 06 32	100	600
RGC3..30	40	A70QS40-4	40	50 194 20 40	100	600
RGC3..40	50	A70QS50-4	50	50 194 20 50	100	600
RGC3..65	100	A70QS100-4	125	50 196 20 125	100	600

Suitable for heater load applications

Part No.	Ferraz Shawmut (Mersen)		Siba		Short circuit current [kArms]	Voltage [VAC]
	Max. fuse size [A]	Part number	Max. fuse size [A]	Part Number		
RGC2..25	40	660 URC 14x51/40	32	50 142 06 32	10	600
	40	6.9xx gRC URD 22x58/40			100	
	40	660 URD 22x58/40				
	40	A70QS40-4				
RGC2..40	63	6.9xx gRC URC 14x51/63	63	50 194 20 63	10	600
	63	6.9xx gRC URD 22x58/63			100	
	60	A70QS60-4				
RGC2..75	100	6.9xx gRC URD 22x58/100	125	50 196 20 125	10	600
	100	660 URQ 27x60/100			100	
	100	A70QS100-4				
RGC3..20	32	6.9xx gRC URC 14x51/32	32	50 142 06 32	10	600
	32	6.9xx gRC URC 14x51/32			100	
	40	A70QS40-4				
RGC3..25	40	660 URC 14x51/40	32	50 142 06 32	10	600
	40	6.9xx gRC URD 22x58/40			100	
	40	660 URD 22x58/40				
	40	A70QS40-4				
RGC3..30	40	6.9xx gRC URC 14x51/40	40	50 194 20 40	10	600
	40	6.9xx gRC URC 14x51/40			100	
	40	A70QS40-4				
RGC3..40	63	6.9xx gRC URC 14x51/63	50	50 194 20 50	10	600
	63	6.9xx gRC URC 22x58/63			100	
	50	A70QS50-4				
RGC3..65	100	6.9xx gRC URC 22x58/100	125	50 196 20 125	10	600
	90	660 URD 22x58/90			100	
	100	A70QS100-4				

## Type 2 Protection Coordination with Miniature Circuit Breakers (M.C.Bs)

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>11</sup>
RGC2..25 RGC3..20	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	10.8
	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
	RGC2..40 RGC3..25 RGC3..30 RGC3..40	S201 - Z20 (20A)	S201 - B10 (10A)	1.5
2.5				7.0
4.0				11.2
S201 - Z32 (32A)		S201 - B16 (16A)	2.5	13
			4.0	20.8
			6.0	31.2
RGC2..75 RGC3..65	tbd	tbd	tbd	tbd

11: Between MCB and Load (including return path which goes back to the mains if applicable)

Note: A prospective current of 6kArms 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

### Fan



### Ordering Key

**RGC3FAN60**

Fan accessory  
for RGC2..75 and RGC3..65

### Ordering Key

**RGC3FAN40**

Fan accessory  
for RGC3..40