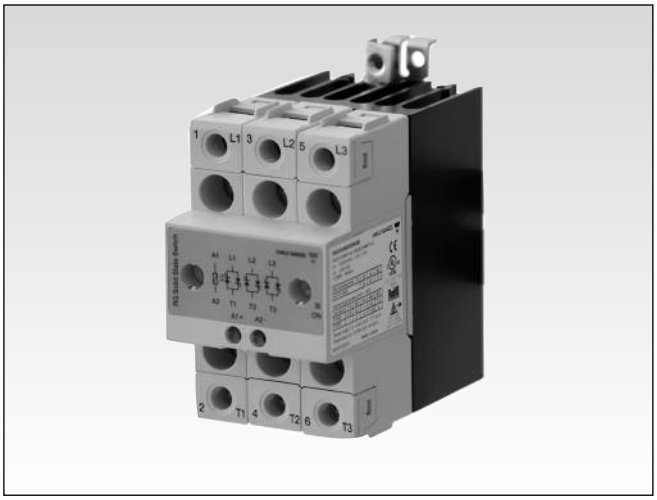
Solid State Relays
3-Phase with Integrated Heatsink
Types RGC2, RGC3



- **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 15,000A²s for I²t**
- **Motor ratings up to 11kW @ 400VAC, 25HP @ 600VAC**
- **Integrated varistor protection on output**
- **Optional monitoring for SSR and load malfunction (RGC..M)[1]**
- **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

- **Solid state relay**
- **Number of switched poles**
- **Switching mode**
- **Rated operational voltage**
- **Control voltage**
- **Rated operational current**
- **Connection type for control**
- **Connection type for power**
- **Connection configuration**
- **External supply**
- **Integrated fan**
- **Monitoring features**

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

SSR with heatsink	Rated voltage (Ue)[4], Blocking voltage	Control voltage[5] (Uc)	Rated current/ pole @40°C[2]	Connection control	Connection power	Connection configuration	External supply (Us)	Features
RGC2A: 2-pole switching + 1-pole direct, ZC[3]	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[1] (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..A.. is limited to 20-275VAC only

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Selection Guide: RGC2

Rated output voltage, Ue	Control voltage, Uc	Features	External supply, Us	Connection control / power	Rated operational current @ 40°C (I^2t value)		
					25 AAC /pole (1,800A²s)	40 AAC /pole (6,600A²s)	75 AAC /pole (15,000A²s)
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, Ue	Control voltage, Uc	Features	External supply, Us	Connection control / power	Rated operational current @ 40°C (I^2t value)		
					25 AAC /pole (1,800A²s)	40 AAC /pole (6,600A²s)	75 AAC /pole (15,000A²s)
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, Ue	Control voltage, Uc	Features	External supply, Us	Connection control / power	Rated operational current @ 40°C (I^2t value)				
					20 AAC /pole (1,800A²s)	25 AAC /pole (1,800A²s)	30 AAC /pole (6,600A²s)	40 AAC /pole (6,600A²s)	65 AAC /pole (15,000A²s)
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, Ue	Control voltage, Uc	Features	External supply, Us	Connection control / power	Rated operational current @ 40°C (I^2t value)			
					20 AAC /pole (1,800A²s)	25 AAC /pole (1,800A²s)	30 AAC /pole (6,600A²s)	65 AAC /pole (15,000A²s)
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

Specifications are subject to change without notice (03.06.2013)

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 **(RGC..F)**	Red, flashing[6]
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..22	RGC..60
Operational voltage range, Ue	**RGC**	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[7]			
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[8] (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_{ON}=1s, t_{OFF}=9s, 50 cycles	61 AAC	107 AAC	154 AAC
Maximum transient surge current (I_{TSM}), t=10ms	600 Ap	1150 Ap	1750 Ap
I^2t for fusing (t=10ms) Minimum	1800 A^2s	6600 A^2s	15000 A^2s
Critical dv/dt (@ Tj 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[7]					
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[8] (x: 6, Tx:6s, F:50%) @ 40°C	30	30	30	30	30
Minimum operational current	250mAAC	250mAAC	400mAAC	400mAAC	500mAAC
RGC..F, M	1.2AAC	1.2AAC	1.2AAC	1.2AAC	1.2AAC
Maximum Off-state leakage current	5mAAC	5mAAC	5mAAC	5mAAC	5mAAC
Rep. overload current (Motor rating) UL508: Ta=40°C, t_{ON}=1s, t_{OFF}=9s, 50 cycles	61 AAC	84 AAC	107 AAC	107 AAC	154 AAC
Maximum transient surge current (I_{TSM}), t=10ms	600 Ap	600 Ap	1150 Ap	1150 Ap	1750 Ap
I^2t for fusing (t=10ms) Minimum	1800 A^2s	1800 A^2s	6600 A^2s	6600 A^2s	15000 A^2s
Critical dv/dt (@ Tj 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
RGC2..25	1½HP / 1.1kW	3HP / 3.0kW	5HP / 5.5kW	7½HP / 5.5kW	10HP / 9.0kW
RGC2..40	3HP / 1.5kW	5HP / 4.0kW	10HP / 7.5kW	10HP / 9.0kW	15HP / 11.0kW
RGC2..75	5HP / 3.0kW	10HP / 7.5kW	15HP / 11.0kW	20HP / 15.0kW	25HP / 22.0kW
RGC3..20	1HP / 0.75kW	3HP / 2.2kW	5HP / 4.0kW	7½HP / 5.5kW	10HP / 7.5kW
RGC3..25	2HP / 1.1kW	3HP / 2.2kW	7½HP / 4.0kW	10HP / 5.5kW	10HP / 7.5kW
RGC3..30	2HP / 1.5kW	5HP / 3.0kW	10HP / 5.5kW	10HP / 7.5kW	15HP / 11.0kW
RGC3..40	2HP / 1.5kW	5HP / 4.0kW	10HP / 7.5kW	10HP / 9.0kW	15HP / 11.0kW
RGC3..65	3HP / 3.0kW	10HP / 5.5kW	15HP / 11.0kW	20HP / 15.0kW	25HP / 20.0kW

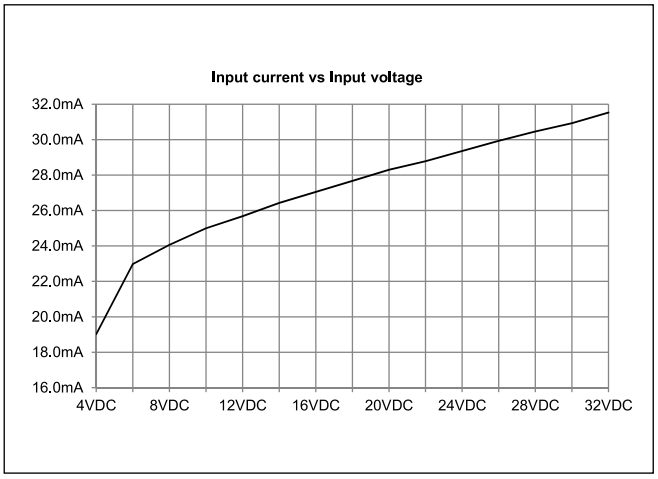
Control Specifications (A1, A2)

	RG..D..	RG..A..
Control voltage range, Uc	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

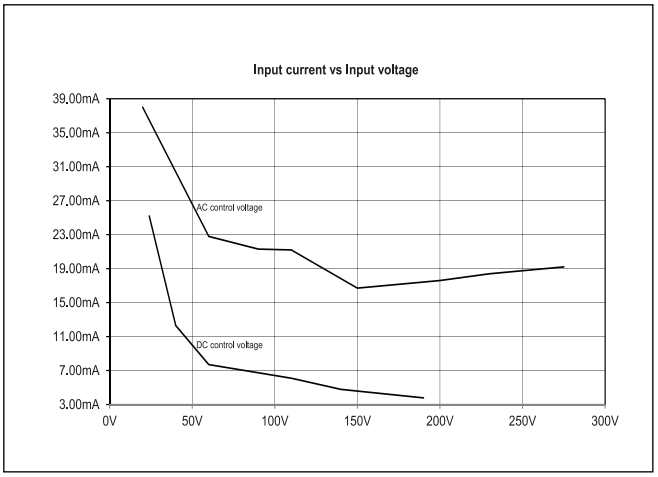
Control Specifications (A1, A2) for RGC..F, RGC..M

	RG..**D**..D.. RG..**D**..A..	RG..**A**..A..
Control voltage range, Uc	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

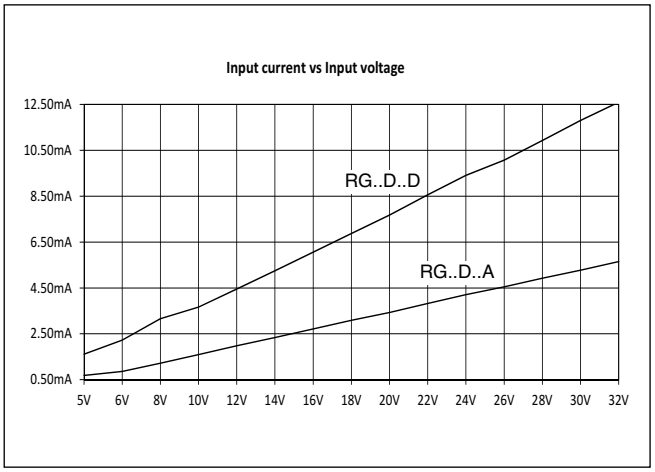
RG..D



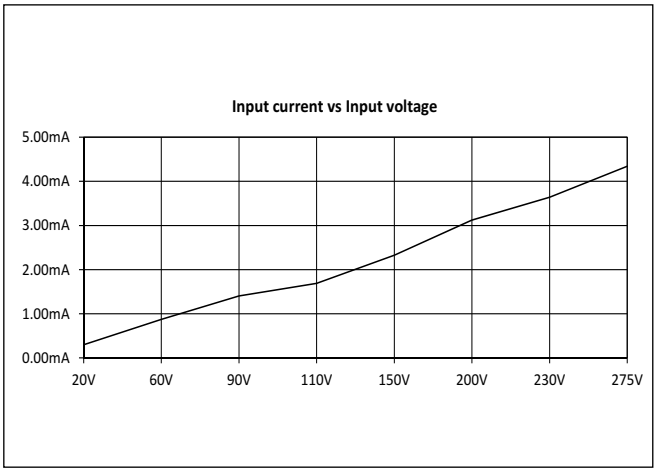
RG..A



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



RG..A..A..

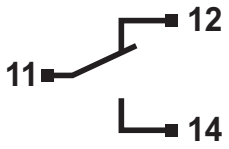


Supply Specifications (Us)

	RG..D..**D**..	RG..D..**A**.. RG..A..**A**..
Supply voltage range, Us	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	80mA	60mA
with fan, RG..FM	150mA	80mA

Alarm Specifications (12, 14, 11)

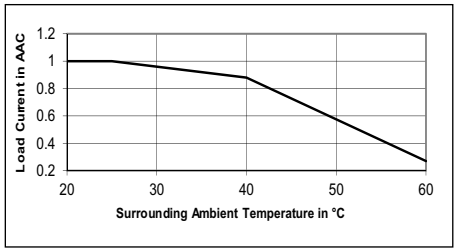
	RG..F RG..M
Output type	EMR, 1 Form C (SPDT) Normally closed (12-11) Normally open (14-11)
Contact rating	2A @ 250VAC / 30VDC
Isolation between open contacts	1000VAC



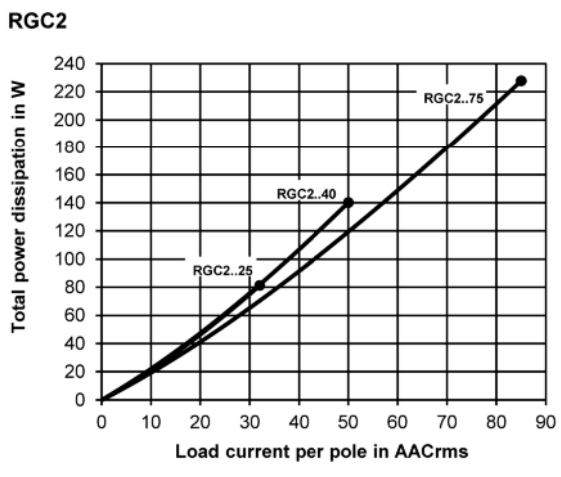
Auxiliary Output Specifications (22, 24, 21)

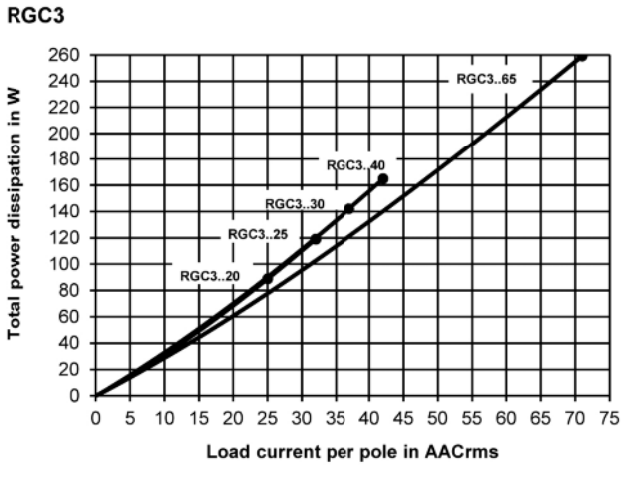
Output type	RG..**D**..D.. RG..**D**..A..	RG..**A**..A..
	PNP darlington, Normally closed (22-21) NPN darlington, Normally open (24-21)	Triac, Normally closed (22-21) Triac, Normally open (24-21)
Rated voltage	24VDC +/-20%	90-250VAC
On-state voltage drop Typical	4VDC	< 2VAC
Blocking voltage	-	800Vp
Maximum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

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



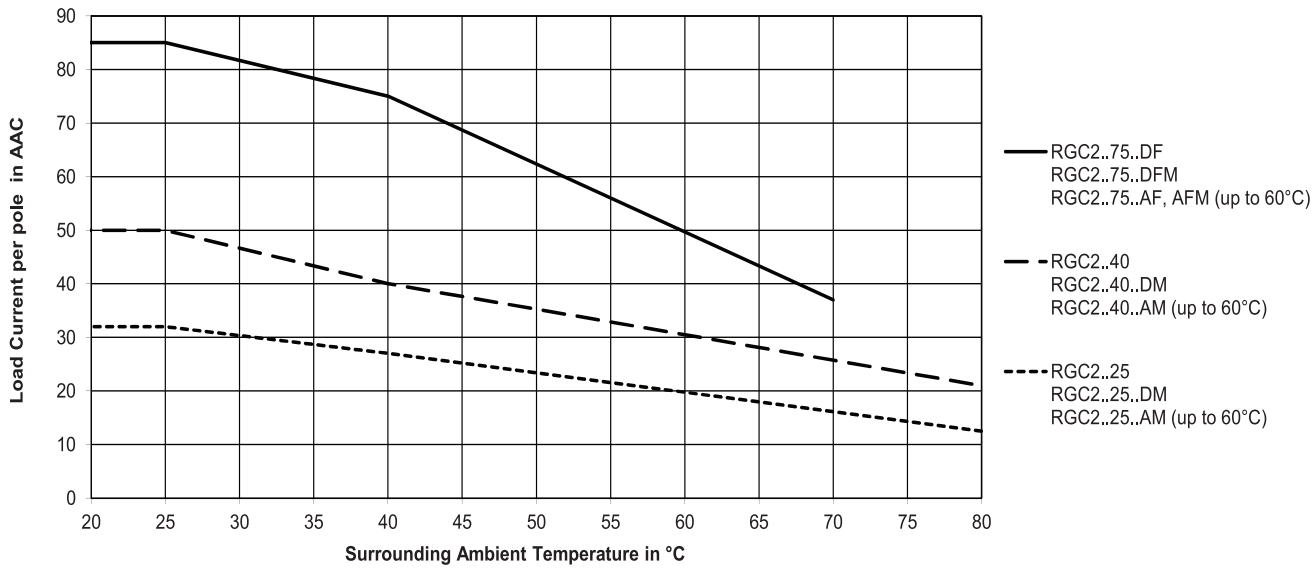
Output Power Dissipation



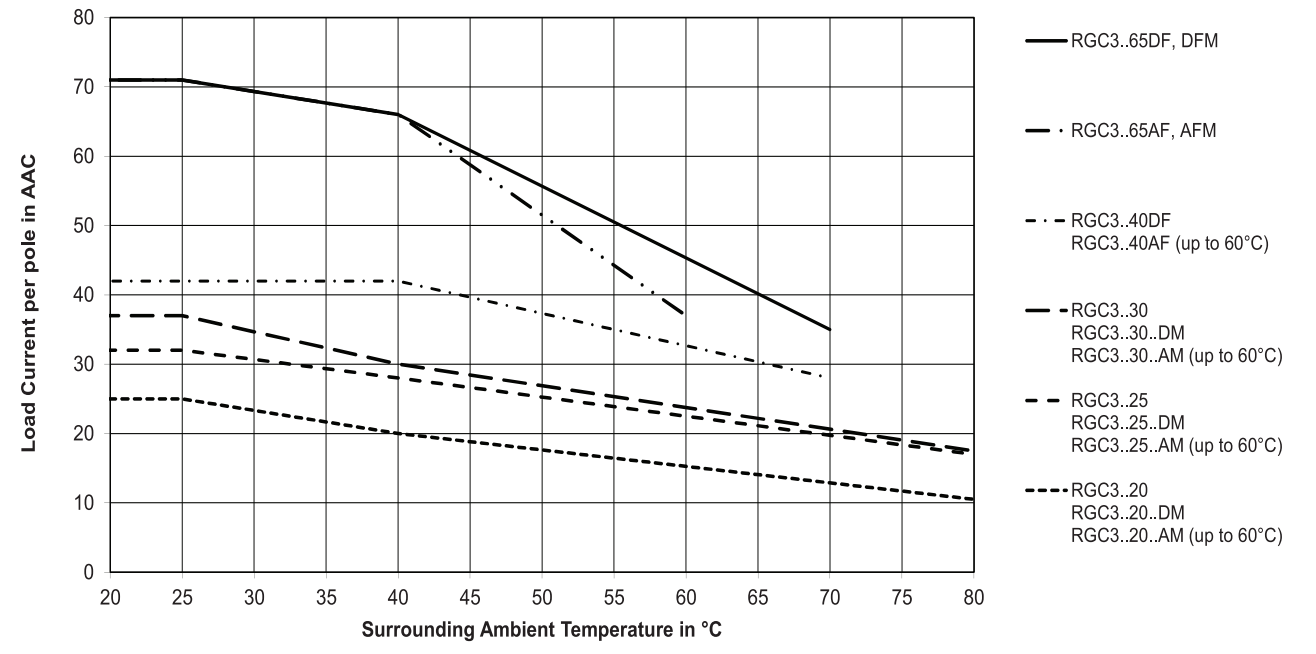


Current Derating

RGC2

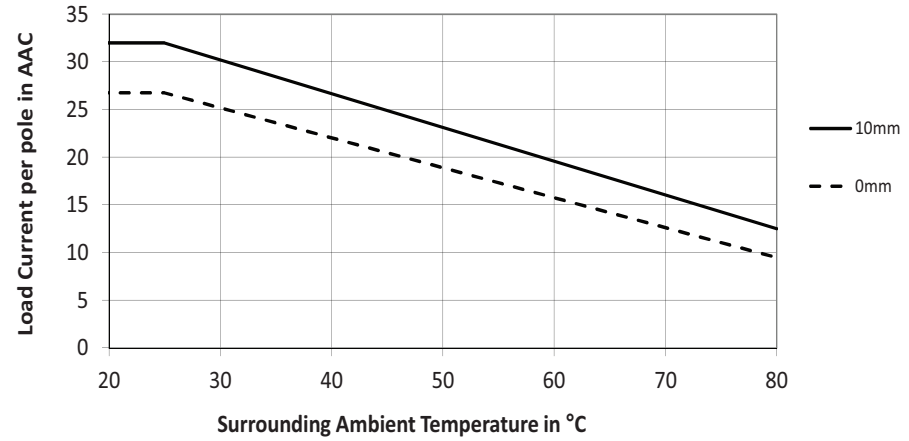


RGC3

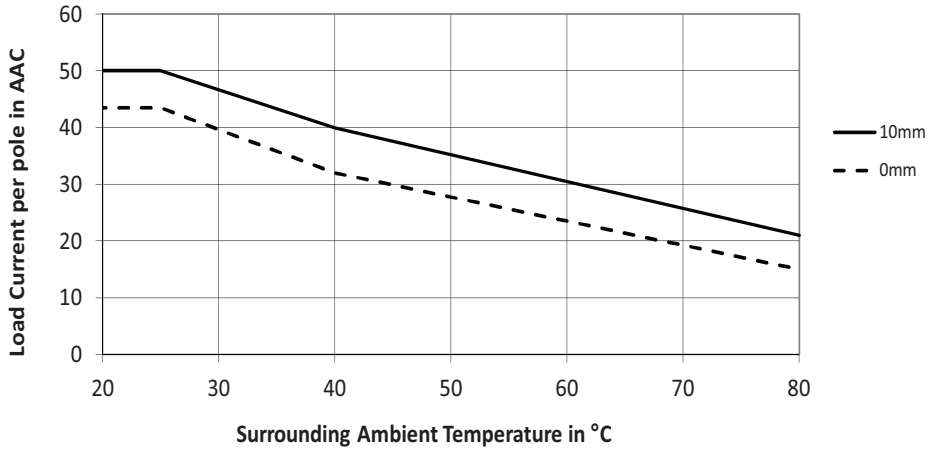


Derating Vs. Spacing Curves

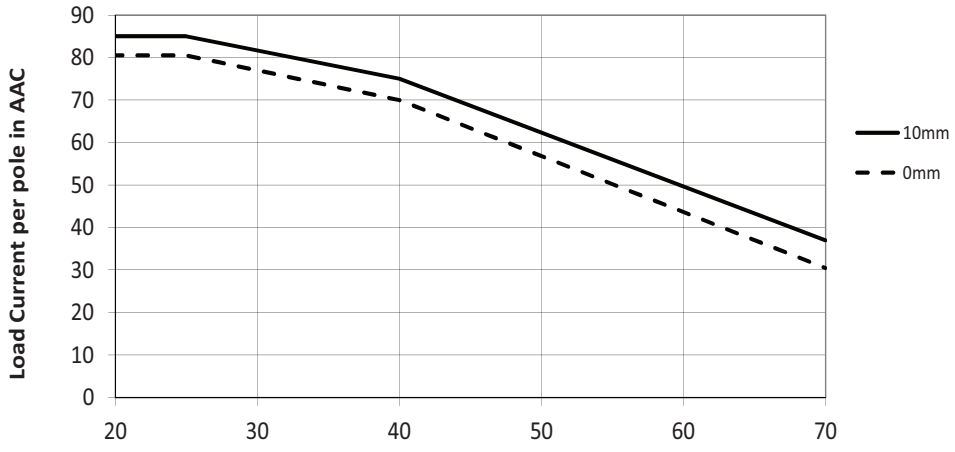
RGC2..25



RGC2..40

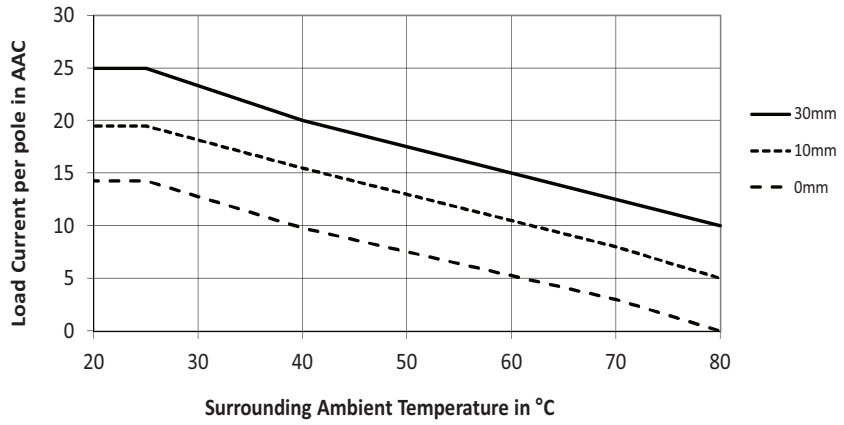


RGC2..75

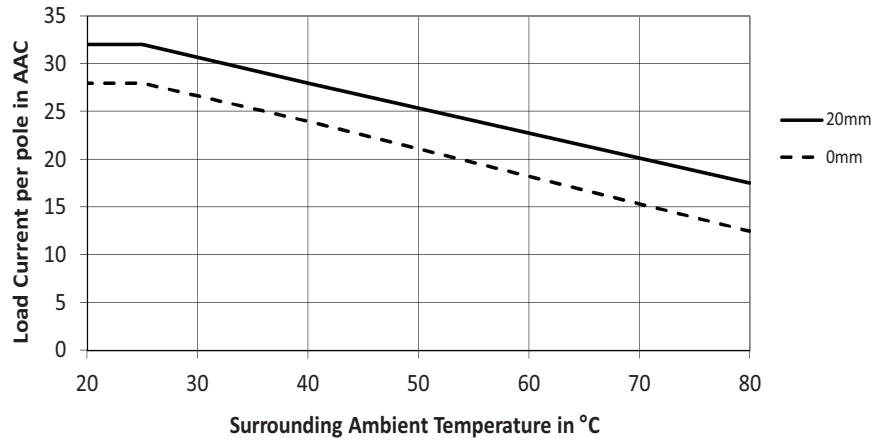


Derating Vs. Spacing Curves - cont.

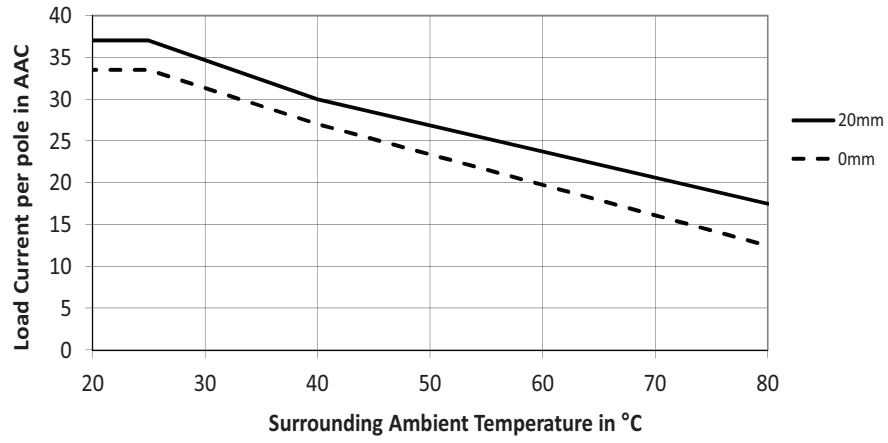
RGC3..20



RGC3..25

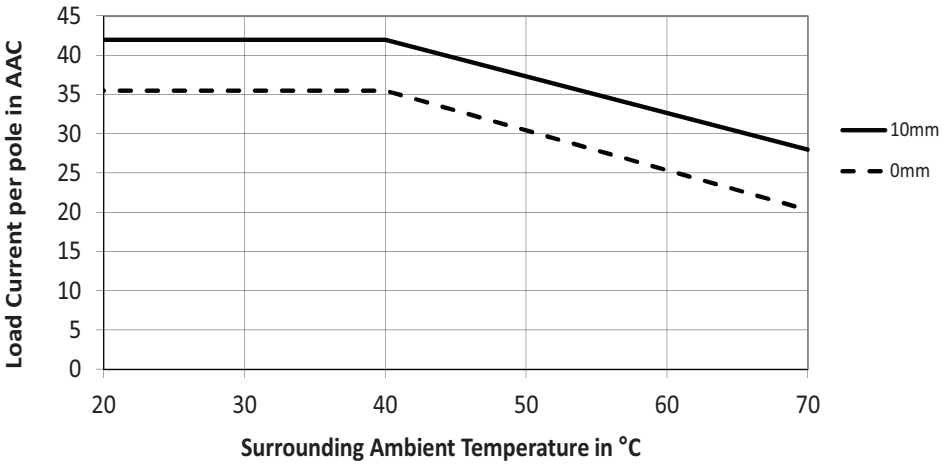


RGC3..30

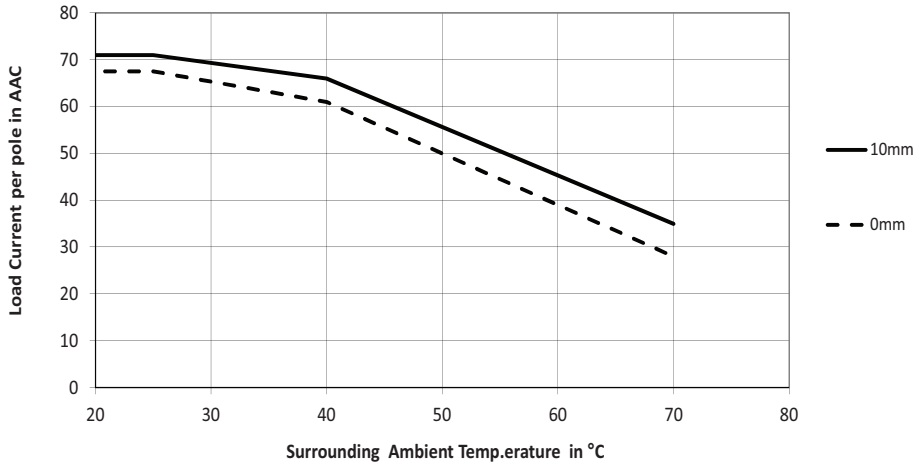


Derating Vs. Spacing Curves - cont.

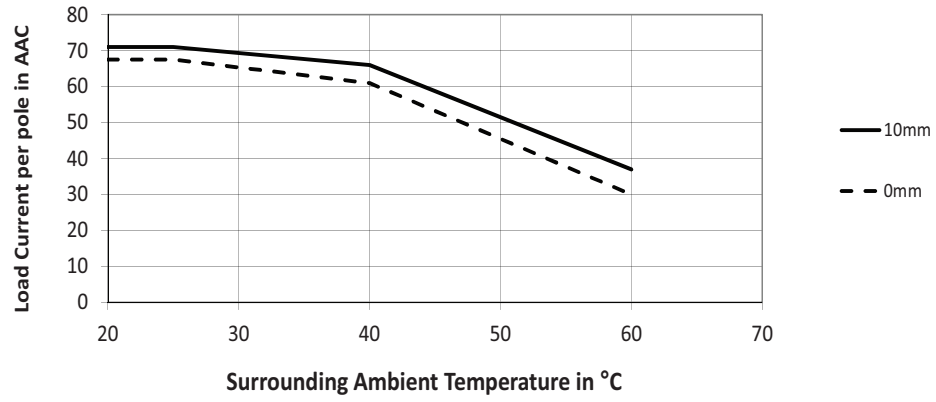
RGC3..40



RGC3..65DF, DFM



RGC3..65AF, AFM



Agency Approvals and Conformance

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

Electromagnetic Compatibility

EMC immunity	EN/IEC 61000-6-2
Electrostatic discharge (ESD) immunity	EN/IEC 61000-4-2
Air discharge, 8kV	Performance Criteria 2
Contact, 4kV	Performance Criteria 2
Electrical fast transient (Burst) immunity	EN/IEC 61000-4-4
Output: 2kV, 5kHz	Performance Criteria 1
Input: 1kV, 5kHz	Performance Criteria 1
Signal: 1kV, 5kHz RGC..M	Performance Criteria 1
Electrical surge immunity	EN/IEC 61000-4-5
Output, line to line, 1kV	Performance Criteria 1
Output, line to earth, 2kV	Performance Criteria 1
Input, line to earth, 1kV (A1, A2)	Performance Criteria 2
Signal, line to line, 500V (Us, 21, 22, 24) RGC..D..D	Performance Criteria 1
Signal, line to earth, 500V (Us, 21, 22, 24) RGC..D..D	Performance Criteria 1
Signal, line to earth, 1kV (Us, 21, 22, 24) RGC..D..A	Performance Criteria 1
RGC..A..A	Performance Criteria 1
11, 12, 14, line to line, 1kV	Performance Criteria 1
11, 12, 14, line to earth, 2kV	Performance Criteria 1

Radiated radio frequency immunity	EN/IEC 61000-4-3
10V/m, 80 - 1000MHz	Performance Criteria 1
10V/m, 1.4 - 2.0GHz	Performance Criteria 1
10V/m, 2.0 - 2.7GHz	Performance Criteria 1
Conducted radio frequence immunity	EN/IEC 61000-4-6
10V/m, 0.15 - 80MHz	Performance Criteria1
Voltage dips immunity	EN/IEC 61000-4-11
0% for 0.5/1cycle	Performance Criteria 2
40% for 10 cycles	Performance Criteria 2
70% for 250 cycles	Performance Criteria 2
Voltage interruptions immunity	EN/IEC 61000-4-11
0% for 5000ms	Performance Criteria 2

EMC emission	EN/IEC 61000-6-4
Radio interference voltage emission (conducted)	EN/IEC 55011
0.15-30MHz	Class A (Industrial) with filters - see filter information

Radio interference field emission (radiated)	EN/IEC 55011
30-1000MHz	Class A (Industrial)

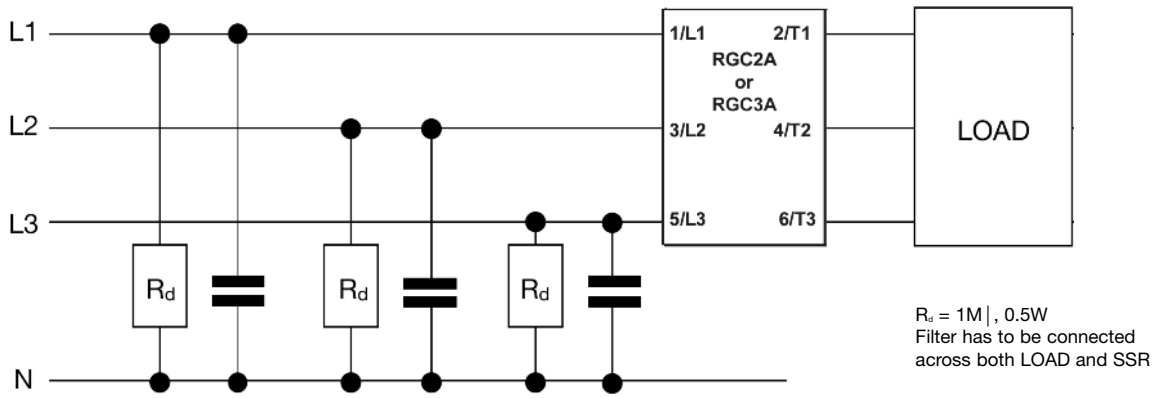
Note:
- Control input lines must be installed together to maintain products susceptibility to Radio Frequency Interference.
- Use of AC solid state relays may according to the application and the load current, cause conducted radio interferences. Use of mains filters may be necessary for cases where 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 impedence 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, degredation 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

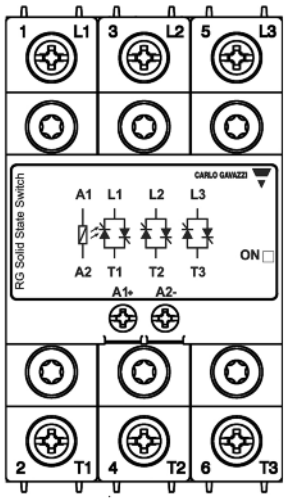


Environmental Specifications

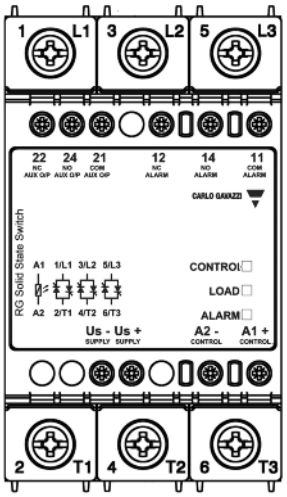
Operating temperature	
RGC...DF, DFM	-40°C to +80°C (-40°F to +176°F)
RGC...AM, AF, AFM	-40°C to +70°C (-40°F to +158°F)
	-40°C to +60°C (-40°F to +140°F)
Storage temperature	-40°C to +100°C (-40°F to +212°F)
Impact resistance (EN50155, EN61373)	15/11 g/ms
Vibration resistance (2-100Hz, IEC60068-2-26, EN50155, EN61373)	2g per axis
Relative humidity	95% non condensing @ 40°C

UL flammability rating (for plastic)	UL 94 V0
Installation altitude	0 - 1000m. Above 1000m derate linearly by 1% of FLC per 100m up to maximum of 2000m
Weight	
RGC2..25, RGC3..20 (M)	approx. 600g (680g)
RGC2..40, RGC3..25, RGC3..30 (M)	approx. 850g (920g)
RGC3..40	approx. 740g
RGC2..75, RGC3..65	approx. 980g

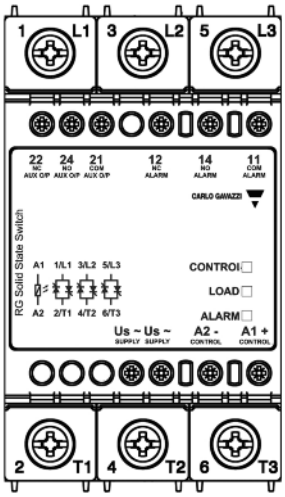
Terminal Layout



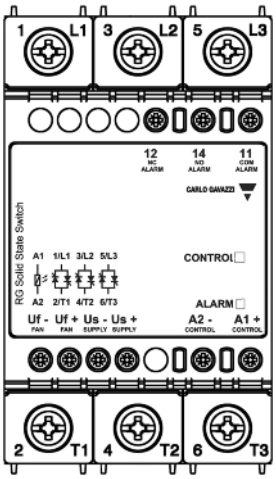
RGC2..25, RGC2..40
RGC3..20.., RGC3..25, RGC3..30



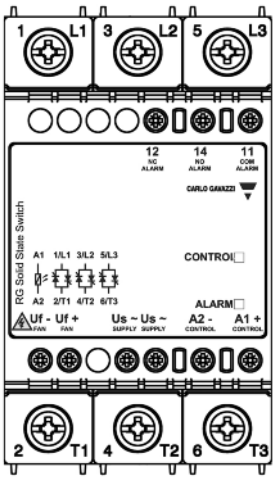
RGC2..25..DM, RGC2..40..DM
RGC3..20..DM, RGC3..25..DM, RGC3..30..DM



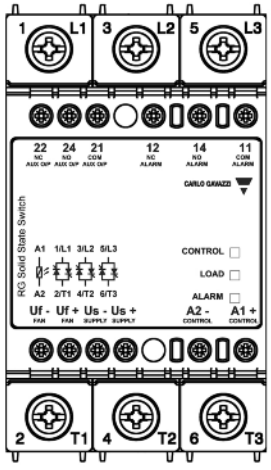
RGC2..25..AM, RGC2..40..AM
RGC3..20..AM, RGC3..25..AM, RGC3..30..AM



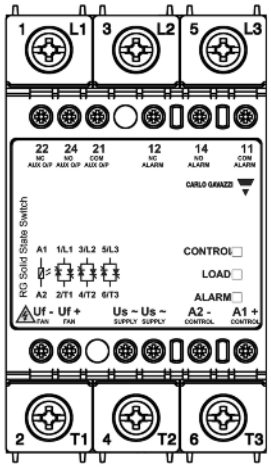
RGC2..75..DF
RGC3..40..DF, RGC3..65..DF



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



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



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

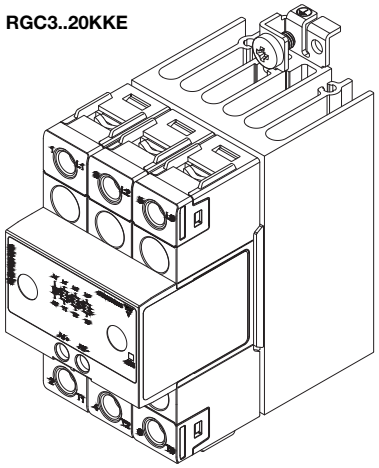
Terminals labelling:

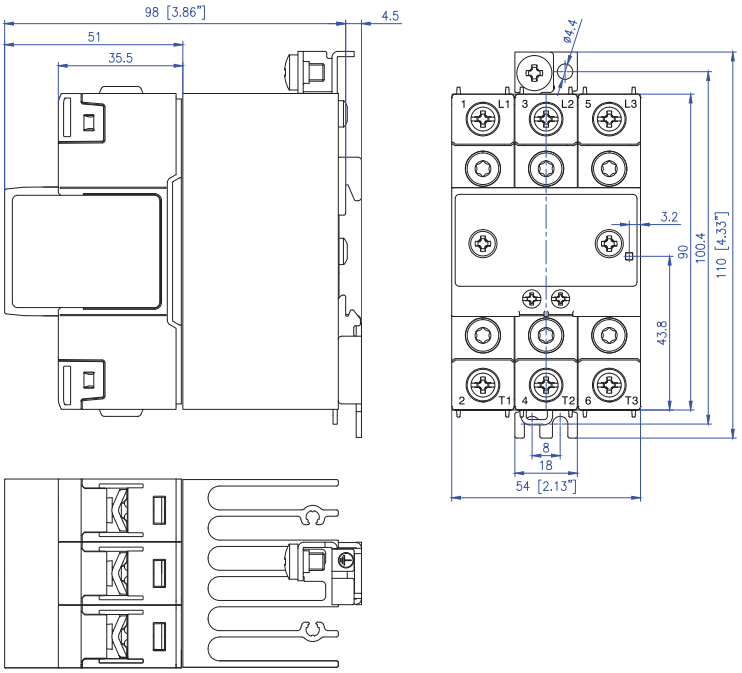
1/L1, 2/L2, 3/L3:	Line connections
2/T1, 4/T2, 6/T3:	Load connections
A1(+):	Positive control signal
A2(-):	Control ground
Us(+):	External supply positive signal
Us(-):	External supply ground
Us(~):	AC external supply
Uf(+):	Fan supply positive signal (no connection required by end user)
Uf(-):	Fan supply 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.

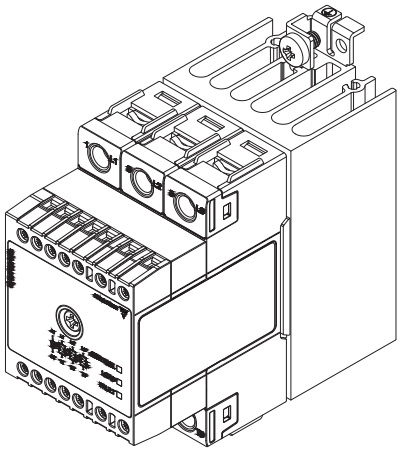
Dimensions

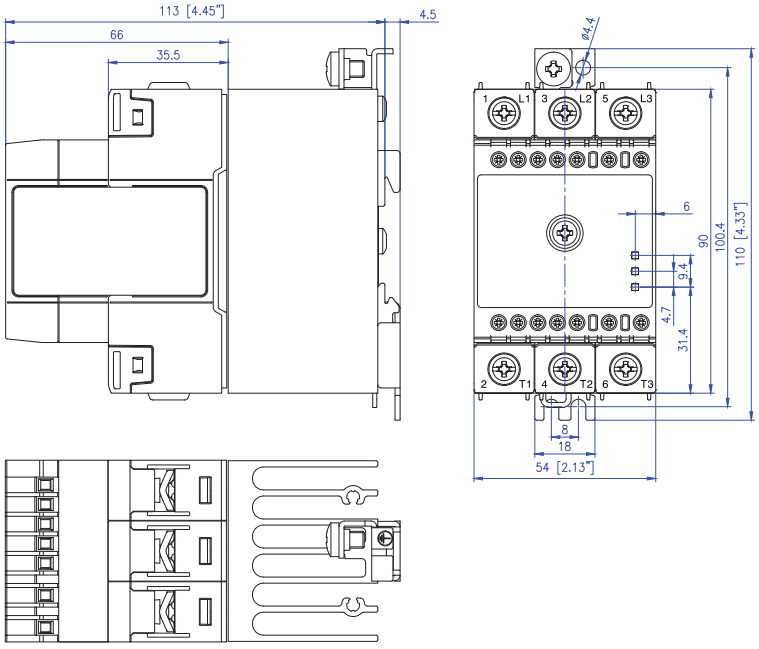
RGC2..25KKE
RGC3..20KKE





RGC2..25GKE..M
RGC3..20GKE..M

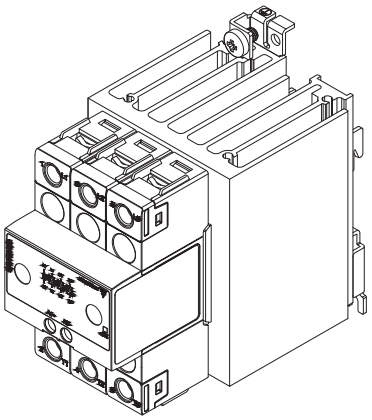


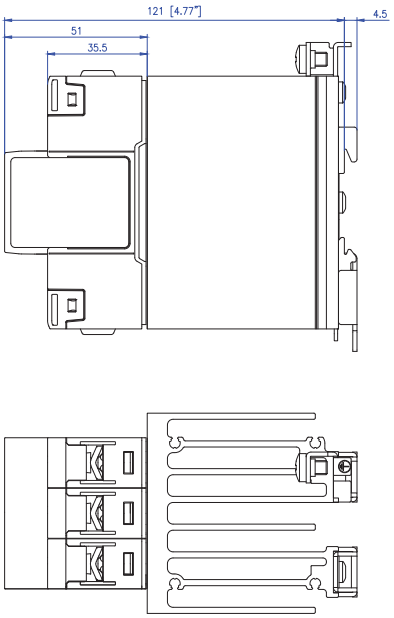


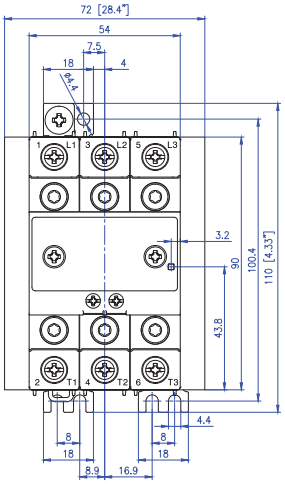
Dimensions in mm. Housing width tolerance +0.5mm, -0mm as per DIN43880.
All other tolerances ±0.5mm

Dimensions

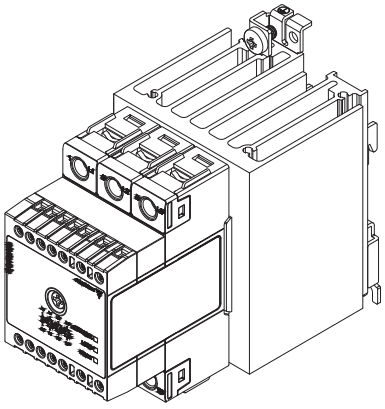
RGC3..25KKE

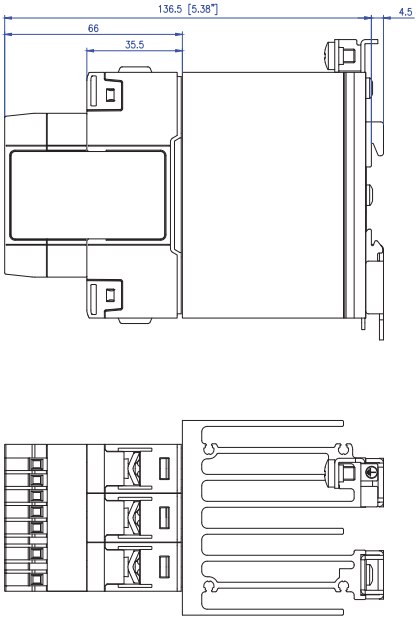


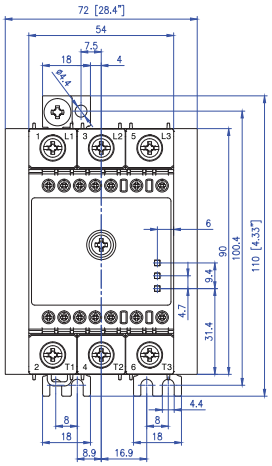




RGC3..25GKE..M



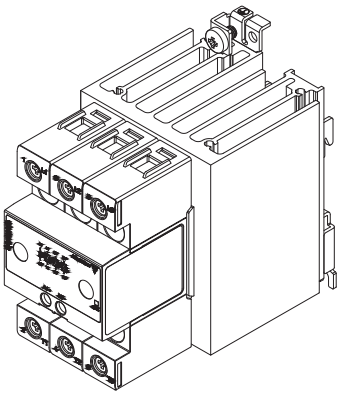


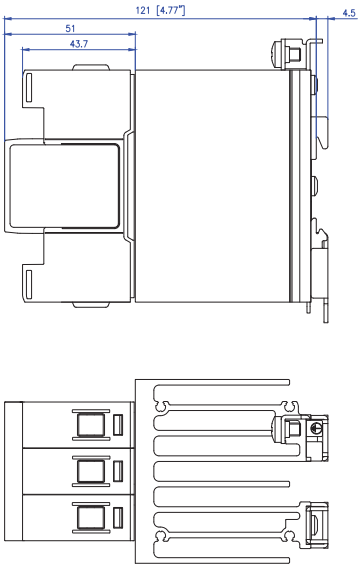


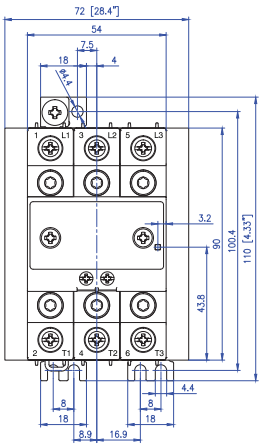
Dimensions in mm. Housing width tolerance +0.5mm, -0mm as per DIN43880.
All other tolerances ±0.5mm

Dimensions

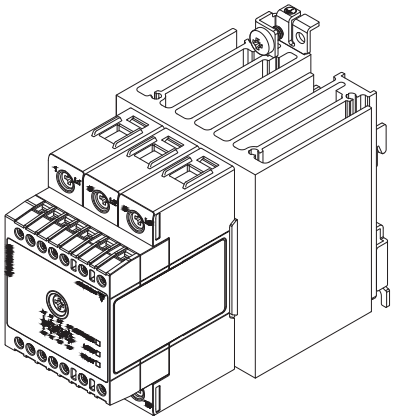
RGC2..40KGE
RGC3..30KGE

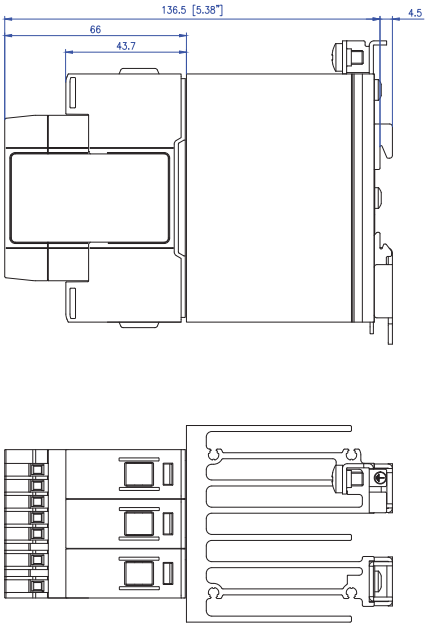


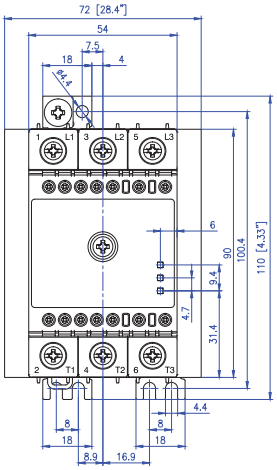




RGC2..40GGE..M
RGC3..30GGE..M



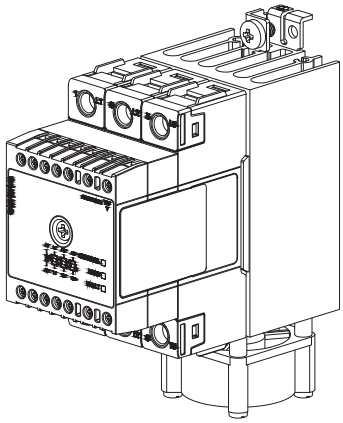


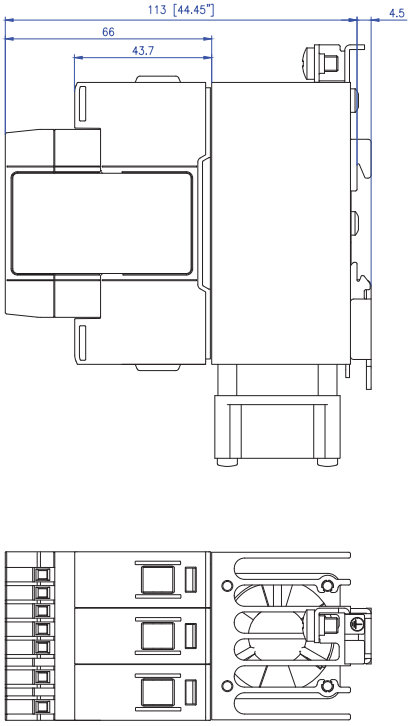


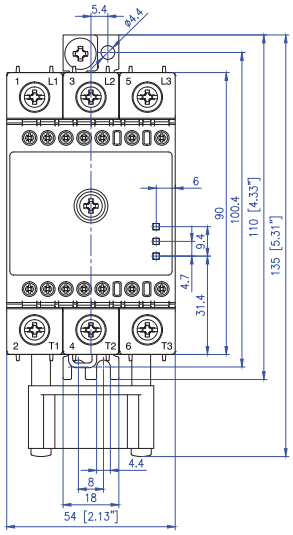
Dimensions in mm. Housing width tolerance +0.5mm, -0mm as per DIN43880.
All other tolerances ±0.5mm

Dimensions

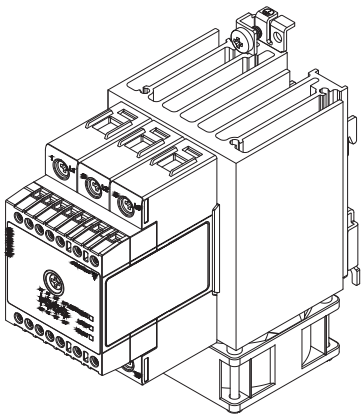
RGC3..40GGE..M

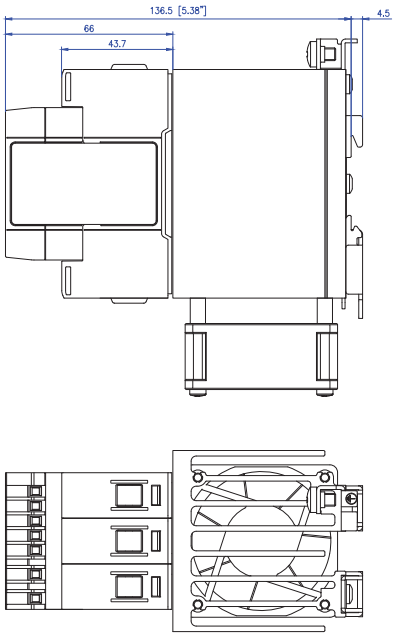


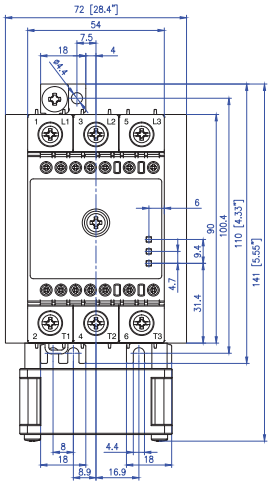




RGC2..75GGE..M
RGC3..65GGE..M

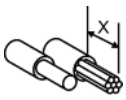


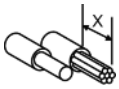




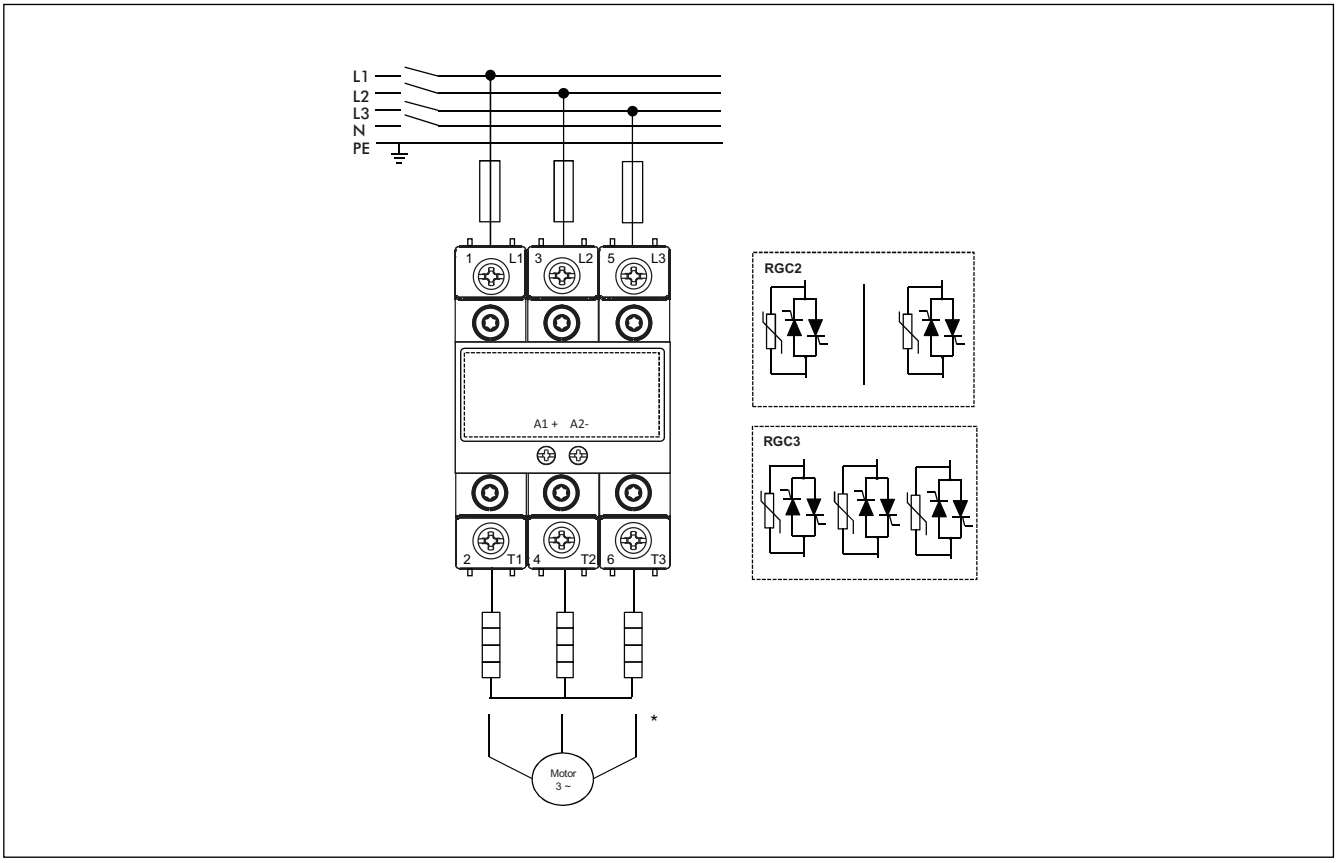
Dimensions in mm. Housing width tolerance +0.5mm, -0mm as per DIN43880.
All other tolerances ±0.5mm

Connection Specifications

POWER CONNECTIONS Use 75°C copper (Cu) conductors		**1/L1, 3/L2, 5/L3, 2/T1, 4/T2, 6/T3**		
		RG..KKE, RG..GKE		**RG..KGE, RG..GGE**
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 mm² 2x 14 - 10 AWG	1x 2.5 - 6.0 mm² 1x 14 - 10 AWG	1x 2.5 - 25 mm² 1x 14 - 3 AWG
Flexible with end sleeve		2x 1.0 - 2.5 mm² 2x 2.5 - 4.0 mm² 2x 18 - 14 AWG 2x 14 - 12 AWG	1x 1.0 - 4.0 mm² 1x 18 - 12 AWG	1x 2.5 - 16 mm² 1x 14 - 6 AWG
Flexible without end sleeve		2x 1.0 - 2.5 mm² 2x 2.5 - 6.0 mm² 2x 18 - 14 AWG 2x 14 - 10 AWG	1x 1.0 - 6.0 mm² 1x 18 - 10 AWG	1x 4.0 - 25 mm² 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		

CONTROL CONNECTIONS Use 75°C copper (Cu) conductors		**A1, A2**		**A1, A2, Us, Uf, 11, 12, 14, 21, 22, 24**
		RG..KKE, RG..KGE		**RG..GKE, RG..GGE**
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 mm² 2x 18 - 12 AWG	1x 0.5 - 2.5 mm² 1x 18 - 12 AWG	1x 1.0 - 2.5 mm² 1x 18 - 12 AWG
Flexible with end sleeve		2x 0.5 - 2.5 mm² 2x 18 - 12 AWG	1x 0.5 - 2.5 mm² 1x 18 - 12 AWG	1x 0.5 - 2.5 mm² 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)

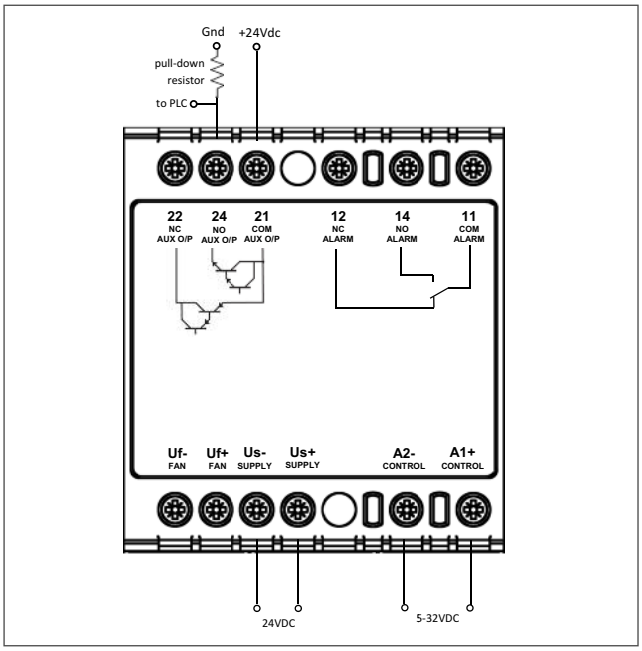
Connection Diagram



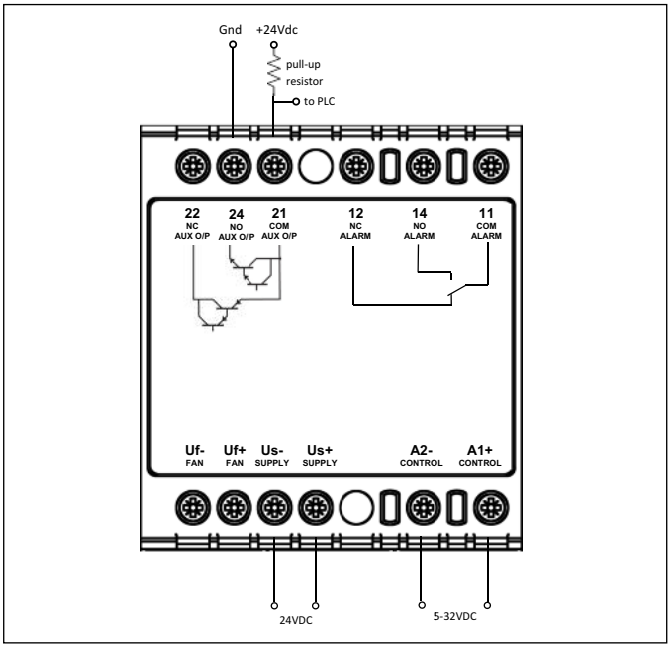
* Not suitable for RGC..M versions.
Not suitable for 4-wire, 3-phase systems.

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)



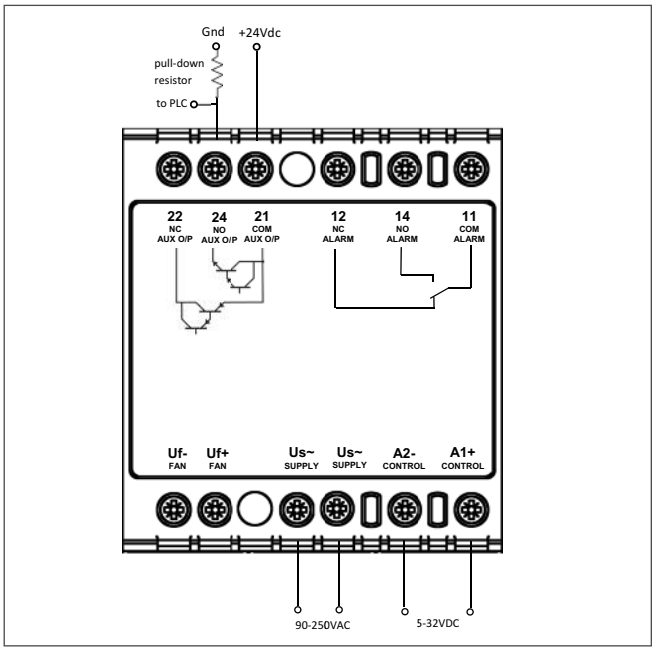
Connection of normally open auxiliary output (24-21) in a ‘pnp’ style



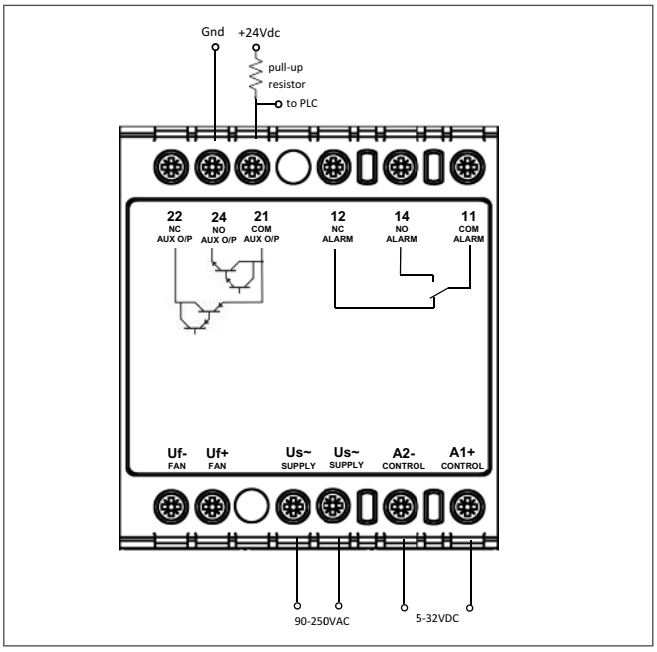
Connection of normally open auxiliary output (24-21) in an ‘npn’ style

Conection Configuration for Auxiliary Output

Versions: RGC..D..AM, RGC..D..AFM
Auxiliary output signal 24VDC, 50mA; DC control, Uc (5-32VDC); AC external supply, Us (90-250VAC)

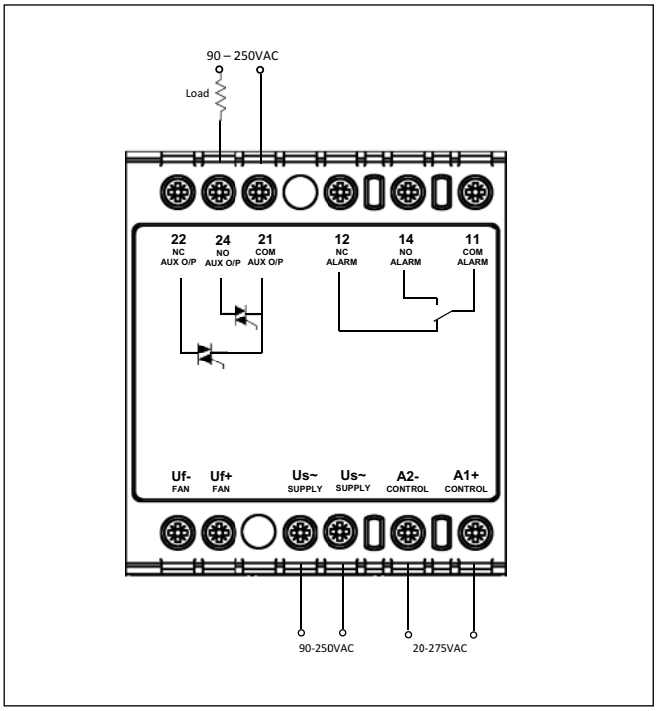


Connection of normally open auxiliary output (24-21) in a 'pnp' style



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, Uc (20-275VAC); AC external supply, Us (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 choosen and configured accordingly.

RGC..M Mode of Operation

The RGC..M versions are suitable only for use with resistive loads.

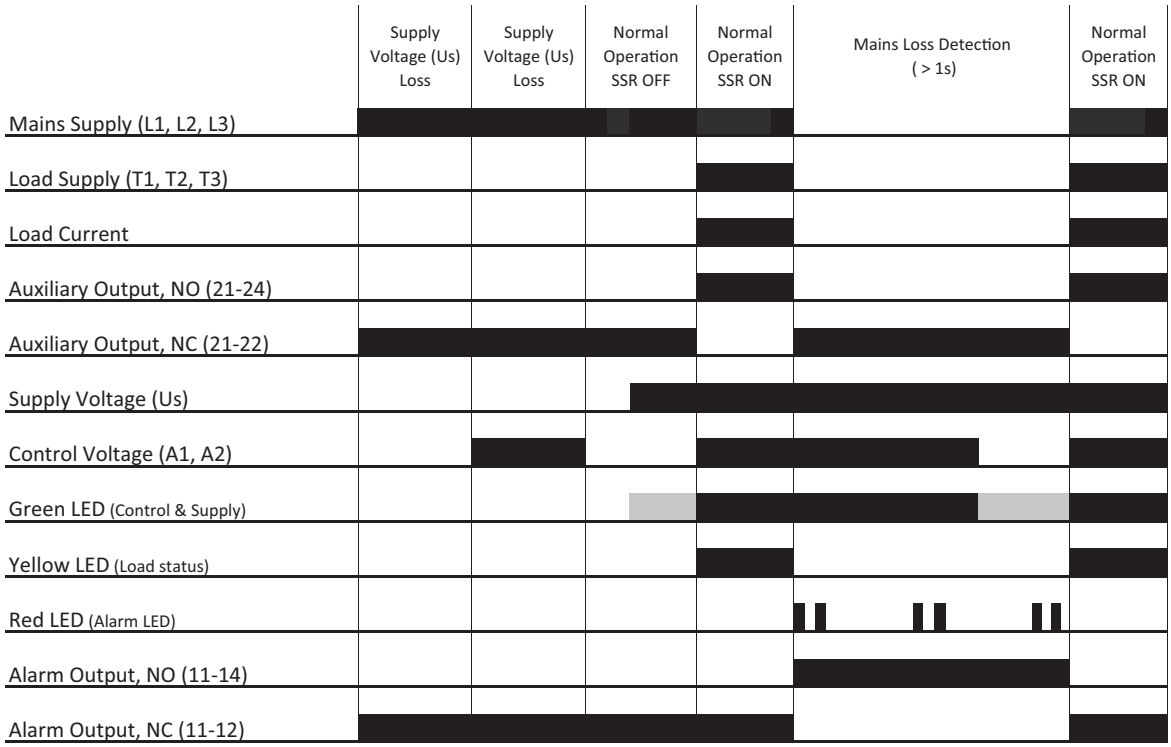
The 'M' suffix versions integrate monitoring circuitry that can detect the status of the Mains, Load, and Solid State Relay (SSR) status. The fault conditions that can be detected with the RGC..M include:
- Mains loss
- Load loss
- SSR open circuit
- SSR short circuit
- SSR over temperature

An external supply, 24VDC or 90-250VAC, selectable through part no. configuration, is required for the operation of the RGC..M models. In the case of a fault condition, an EMR alarm output is available through terminals 11, 12, 14 for remote indication. Alarm visual indication is provided by a flashing red LED. The flash rate of the red LED gives an indication of the type of alarm condition detected.

The RGC..M is also equipped with an auxiliary output which operates in synchronisation with the output of the SSR. This electronic auxiliary output with normally open or normally closed user selectable contacts is available through terminals 21, 22, 24. A yellow LED gives indication of the SSR output status.

Mains Loss:

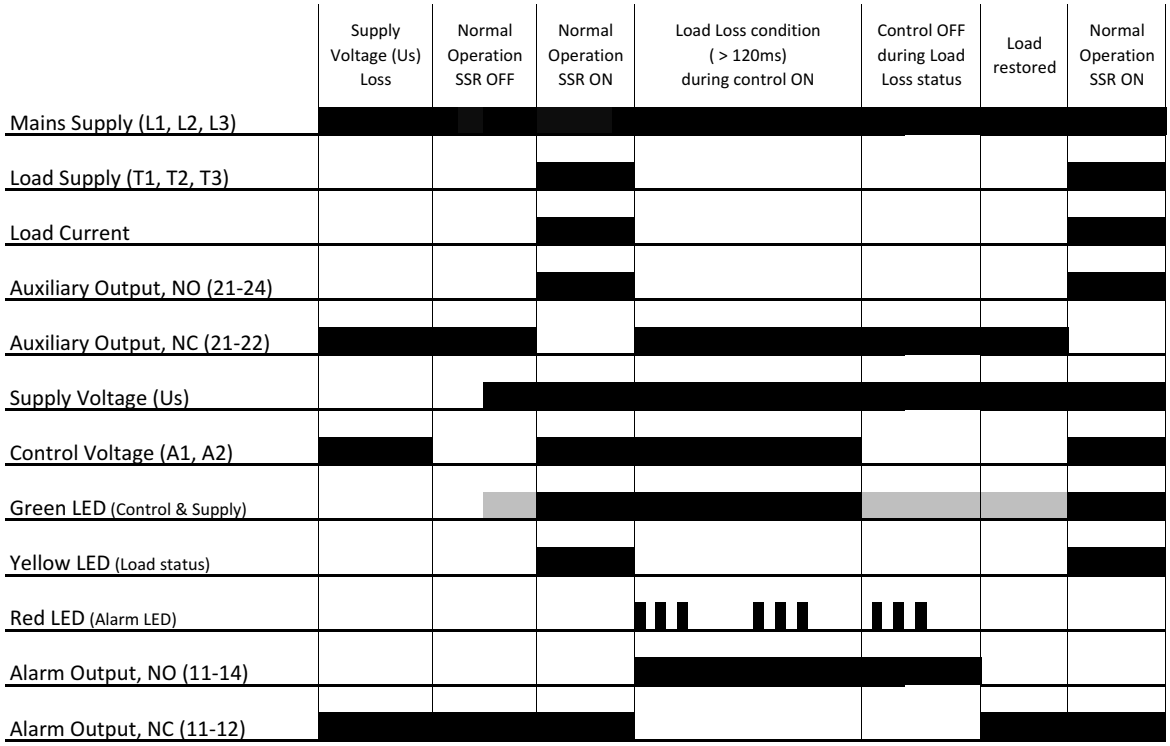
The mains loss alarm is issued if the mains voltage is missing from either terminals L1, L2 or L3 for more than 1 second. This alarm type is indicated by 2 flashes of the red LED. The alarm resets automatically once the mains voltage is restored and is present on terminals L1, L2 and/or L3 for more than 1 second.



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 occuring 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.



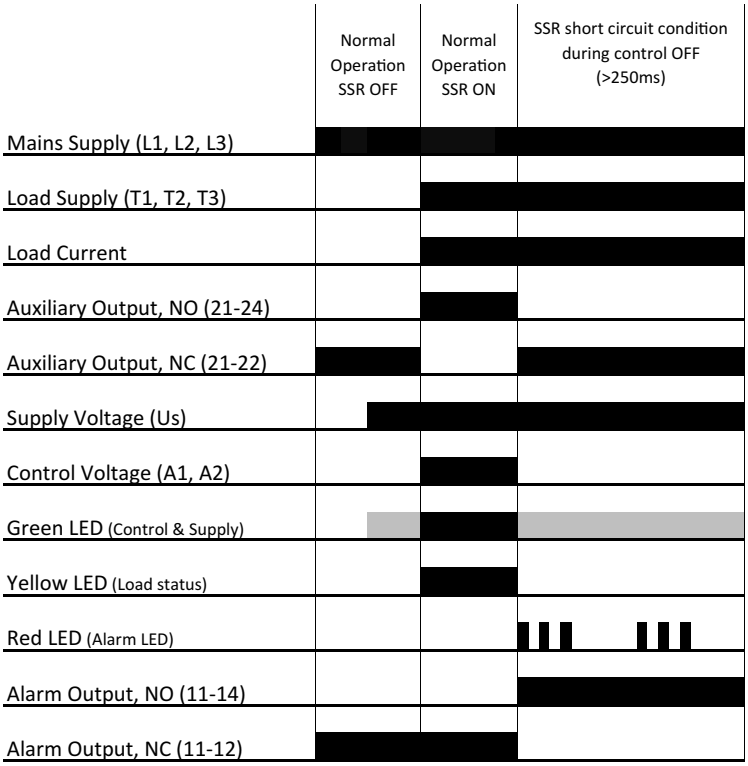
The load loss alarm is not restored automatically in the case of the loads having delta connection. The external supply, Us needs to be re-setted (switched OFF and back ON) to clear the alarm signal.

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.



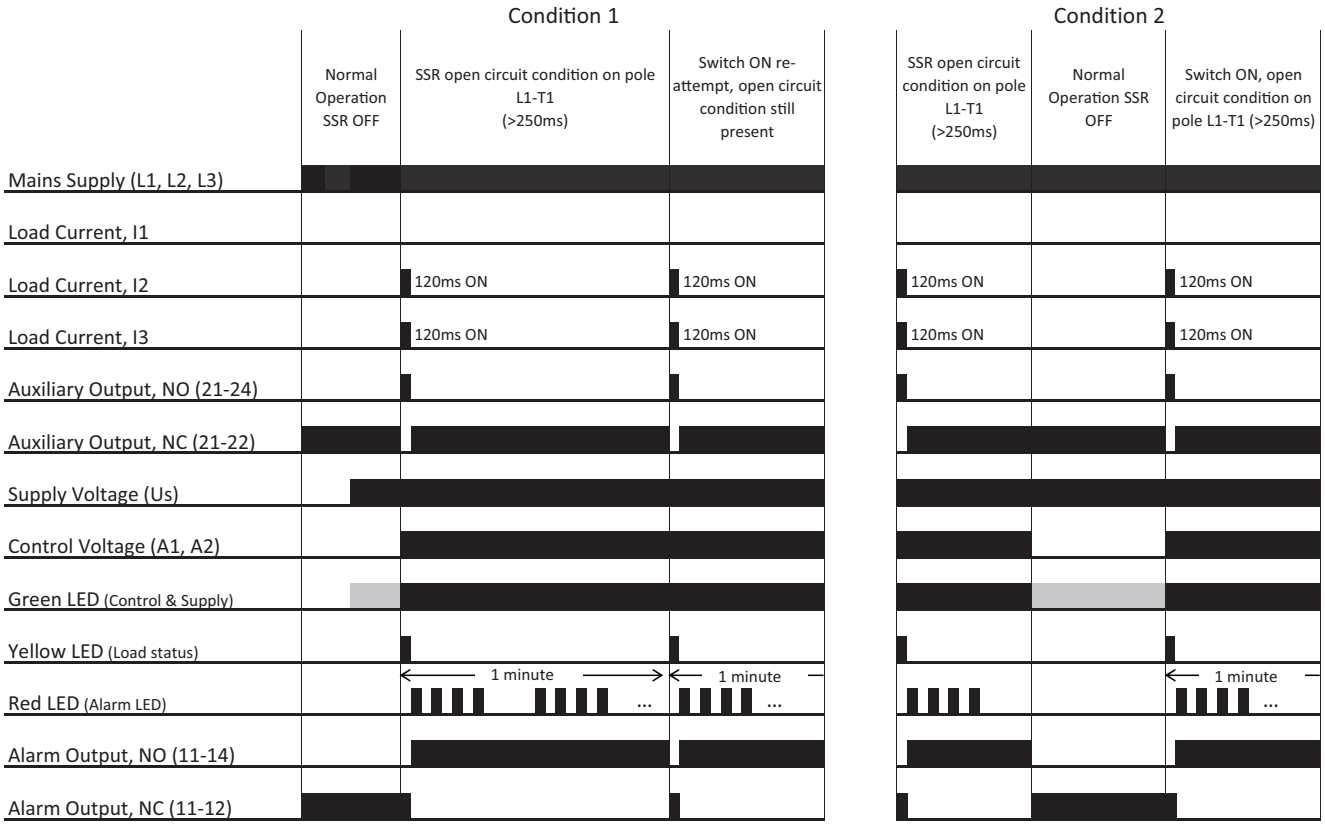
RGC..M Mode of Operation (continued)

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.

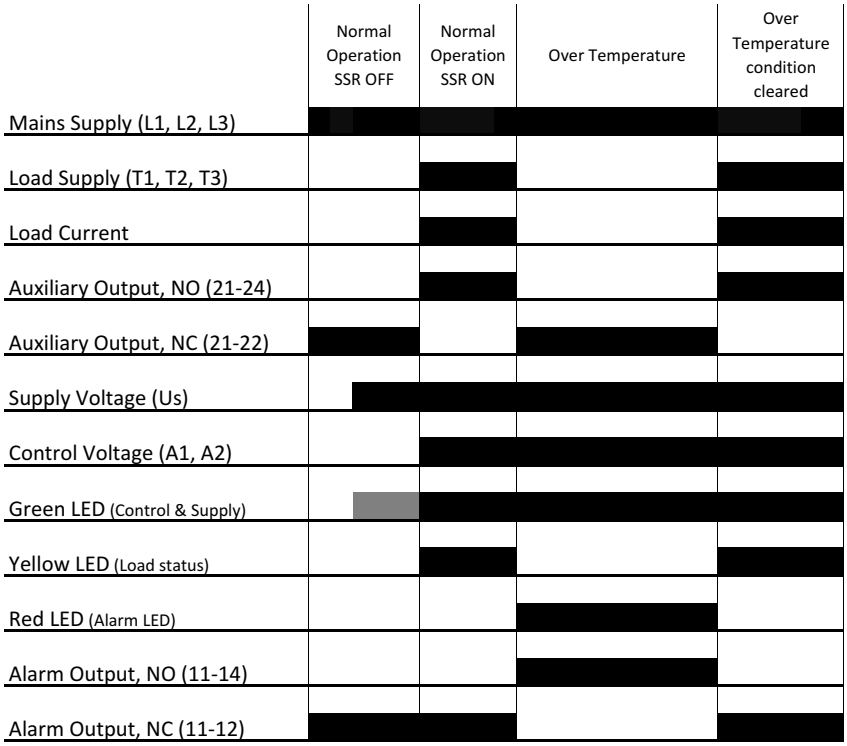
Example Condition 2:
Once the open circuit alarm is issued it remains present for 1 minute as long as control voltage is ON. If during this period the control voltage is switched OFF, the alarm is automatically cleared and the count indicated in Condition 1 is also set to 0. If control voltage is re-applied 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.



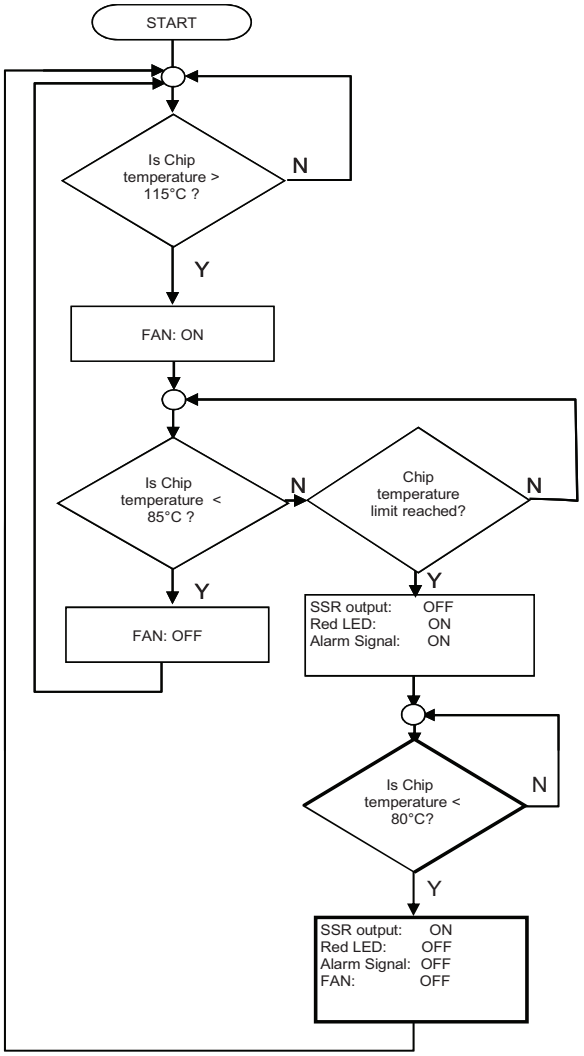
RGC..M Mode of Operation (continued)

SSR Over Temperature:

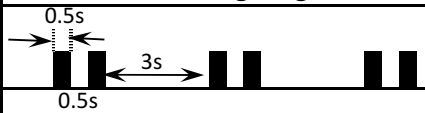
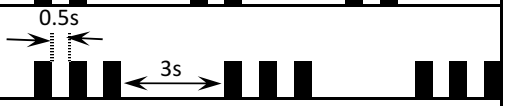
The SSR is equipped with internal temperature monitoring to prevent SSR damage in case of overheating conditions. Upon detection of such a condition the SSR output is switched OFF and an alarm is issued accordingly. This alarm is visually indicated by the red LED which is fully ON. Once the temperature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



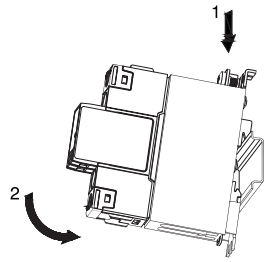
Fan operation for versions with integrated fan



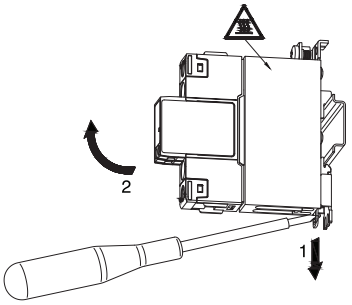
Red LED Alarm Indications

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

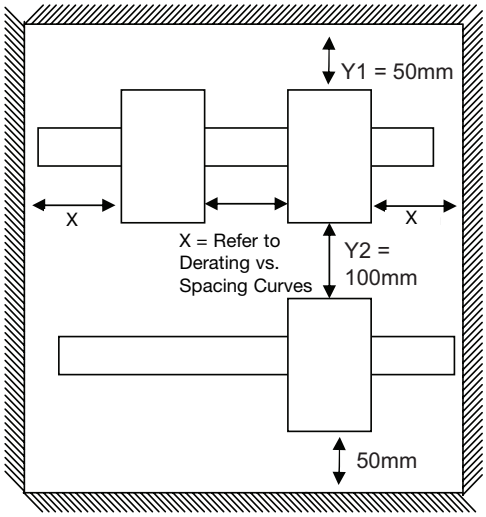
Installation Instructions



Mounting on DIN rail



Dismounting from DIN rail



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[10]	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[10]	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				
	40	660 URD 22x58/40			100	
	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				
	40	660 URD 22x58/40			100	
	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				

Specifications are subject to change without notice (03.06.2013)

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^2]	Minimum length of Cu wire conductor [m][11]
RGC2..25 **RGC3..20**	S201 - Z10 (10A)	S201 - B4 (4A)	1.0 1.5 2.5	7.6 11.4 19.0
	S201 - Z16 (16A)	S201 - B6 (6A)	1.0 1.5 2.5 4.0	5.2 7.8 13.0 10.8
	S201 - Z20 (20A)	S201 - B10 (10A)	1.5 2.5	12.6 21.0
	S201 - Z25 (25A)	S201 - B13 (13A)	2.5 4.0	25.0 40.0
RGC2..40 **RGC3..25** **RGC3..30** **RGC3..40**	S201 - Z20 (20A)	S201 - B10 (10A)	1.5 2.5 4.0	4.2 7.0 11.2
	S201 - Z32 (32A)	S201 - B16 (16A)	2.5 4.0 6.0	13 20.8 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