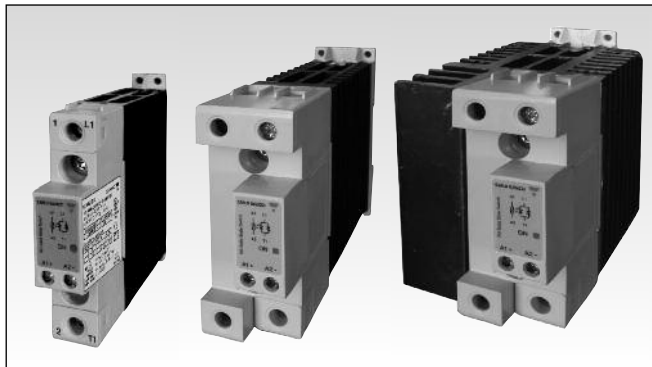




Solid State Relays Zero Switching Types RGC Solid State Contactor 'E' Connection



- Zero Crossing or Instant-On (Random) Switching
- Product Width ranging from 17.5mm up to 70mm
- Rated Operational voltage: Up to 600Vrms
- Rated Operational current: Up to 60Arms @ 40°C
- Up to 6600A²s for I²t and 1200Vp blocking voltage
- Control voltages: 3-32 VDC, 20-275 VAC (24-190 VDC)
- IP20 protection
- Design according to IEC60947-4-2, IEC60947-4-3, IEC62314, UL508, CSA 22-2 No. 14-10
- Integrated voltage transient protection with varistor
- RoHS compliant

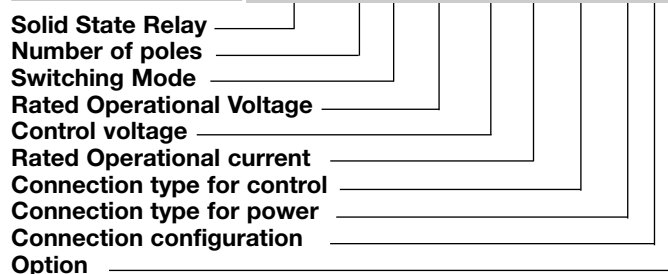
Product Description

This new range of solid state contactors presents a unique opportunity to maximize efficiency in panel space and is an evolution of solid state switches for which Carlo Gavazzi is very well known.

The nominal current ratings are at 40°C. The smallest width is 17.5mm and is rated at 20 AAC. Power and control terminals allow for safe looping of cables.

Voltage transient protection is standard across the output with a varistor. Specifications are stated at 25°C unless otherwise noted.

Ordering Key **RGC 1 A 60 A 30 K K E**



Ordering Key

1Phase SSR with heatsink	Rated Voltage	Control Voltage	Rated Current	Connection Control	Power	Connection Configuration
RGC1A: ZC	23: 230V +10% - 15%, 800Vp	D: 3 or 4-32VDC	20: 20AAC	K: Screw	K: Screw	E: Contactor
RGC1B: IO	60: 600V +10% -15%, 1200Vp	A: 20 - 275VAC, 24-190 VDC	30: 30AAC 40: 40AAC 60: 60AAC		G: Box Clamp	

Selection Guide (ZC= Zero Cross Switching, IO = Instant-On Switching)

Rated Output Voltage	Blocking Voltage	Connection Control/ Power	Control Voltage	Rated Operational Current @ 40°C	
				20 AAC	30 AAC
240 VAC, ZC	800Vp	Screw/ Screw	3 - 32 VDC	RGC1A23D20KKE	RGC1A23D30KKE
			20 - 275 VAC, 24-190 VDC	RGC1A23A20KKE	RGC1A23A30KKE
600 VAC, ZC	1200Vp	Screw/ Screw	4 - 32 VDC	RGC1A60D20KKE	RGC1A60D30KKE
			20 - 275VAC, 24-190 VDC	RGC1A60A20KKE	RGC1A60A30KKE
600 VAC, IO	1200Vp	Screw/ Screw	4 - 32 VDC	RGC1B60D20KKE	RGC1B60D30KKE

Rated Output Voltage	Blocking Voltage	Connection Control/ Power	Control Voltage	Rated Operational Current @ 40°C	
				40 AAC	60 AAC
240 VAC, ZC	800Vp	Screw/ Box Clamp	3 - 32 VDC	RGC1A23D40KGE	RGC1A23D60KGE
			20 - 275 VAC, 24-190 VDC	RGC1A23A40KGE	RGC1A23A60KGE
600 VAC, ZC	1200Vp	Screw/ Box Clamp	4 - 32 VDC	RGC1A60D40KGE	RGC1A60D60KGE
			20 - 275VAC, 24-190 VDC	RGC1A60A40KGE	RGC1A60A60KGE
600 VAC, IO	1200Vp	Screw/ Box Clamp	4 - 32 VDC	RGC1B60D40KGE	RGC1B60D60KGE

Output Voltage Specifications

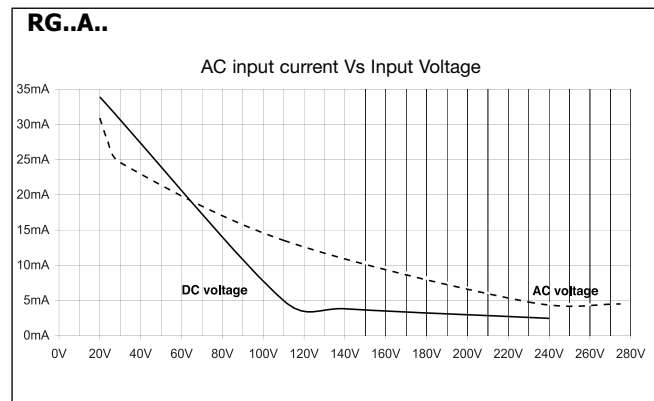
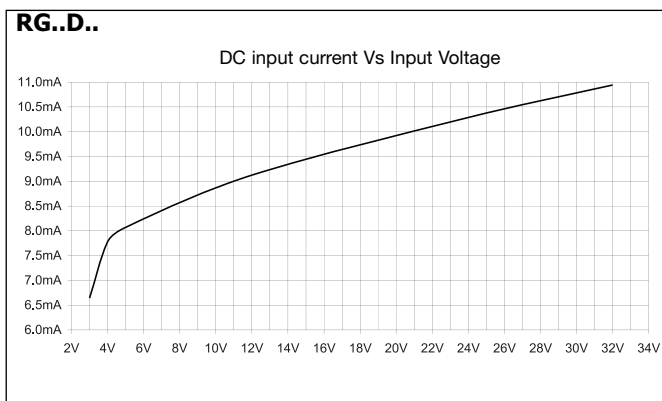
	RGC..23..	RGC..60..
Operational Voltage Range	24-240 VAC, +10%, -15% on max	42-600 VAC, +10% -15% on max
Blocking Voltage	800Vp	1200 Vp
Internal Varistor	275V	625V

General Specifications

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

Input specifications

		RGC..D.. ¹	RGC..A..
Control voltage range	RGC..23..	3 - 32 VDC	20 - 275 VAC, 24 (-10%) - 190 VDC
	RGC..60..	4 - 32 VDC	20-275 VAC, 24 (-10%) - 190 VDC
Pick-up voltage	RGC..23..	3.0 VDC	20 VAC/DC
	RGC..60..	3.8 VDC	
Drop-out voltage	RGC..23..	1.2 VDC	5 VAC/DC
	RGC..60..	1.2 VDC	
Maximum Reverse voltage		32 VDC	-
Response time pick-up ZC (RGC1A..)		0.5 cycle + 500µs @ 24VDC	1 cycle @ 230VAC/110VDC
Response time pick-up IO (RGC1B..)		350µs @ 24 VDC	N/A
Response time drop-out		0.5 cycle + 500µs @ 24VDC	0.5 cycle + 40ms
Input current @ 40°C		See diagrams below	See diagrams below



1: DC control to be supplied by a Class 2 power source

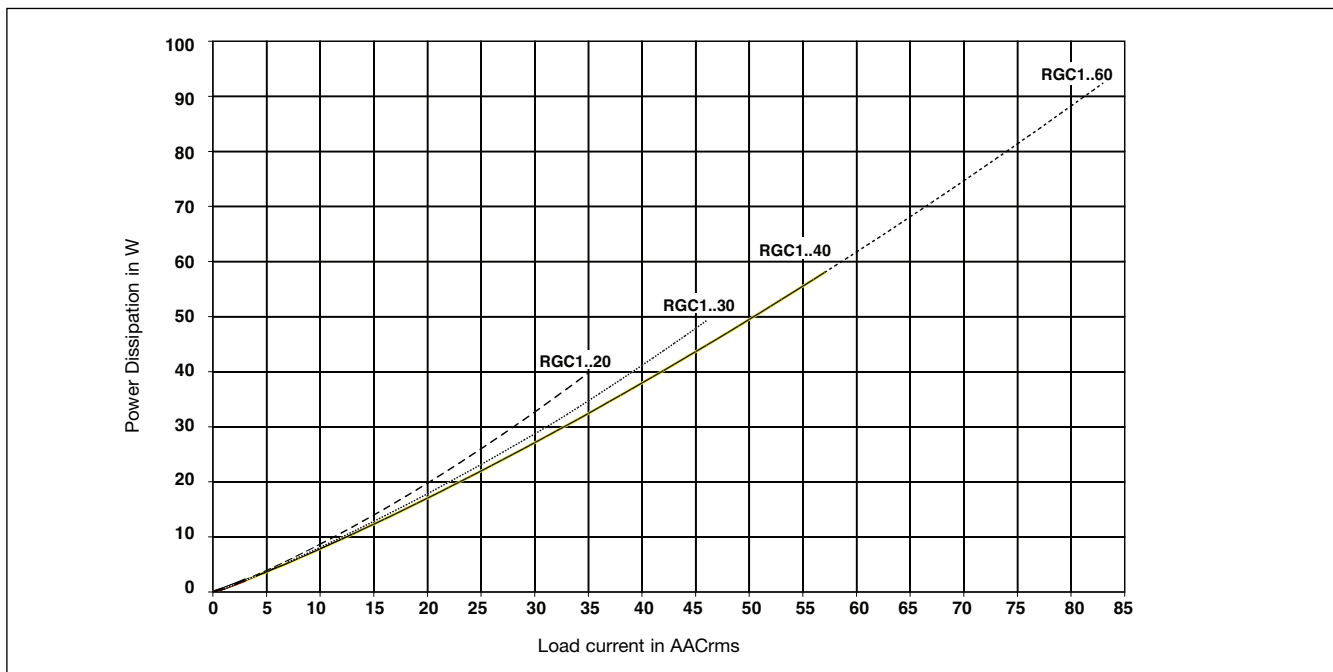
Motor Ratings: HP (UL508) / kW (IEC60947-4-2) @ 40°C

	115 VAC	230 VAC	400 VAC	480 VAC	600 VAC
RGC..20	½HP / 0.18kW	1-½HP / 0.37kW	2HP / 0.75kW	3HP / 1.1kW	3HP / 1.5kW
RGC..30	¾HP / 0.37kW	2HP / 1.1kW	3HP / 1.5kW	5HP / 2.2kW	5HP / 3.7kW
RGC..40	1HP / 0.56kW	3HP / 1.5kW	5HP / 2.2kW	5HP / 3.7kW	7-½HP / 4kW
RGC..60	1-½HP / 0.56kW	3HP / 1.5kW	5HP / 3kW	7-½HP / 4kW	10HP / 4kW

Output specifications (@ 25°C unless otherwise specified)

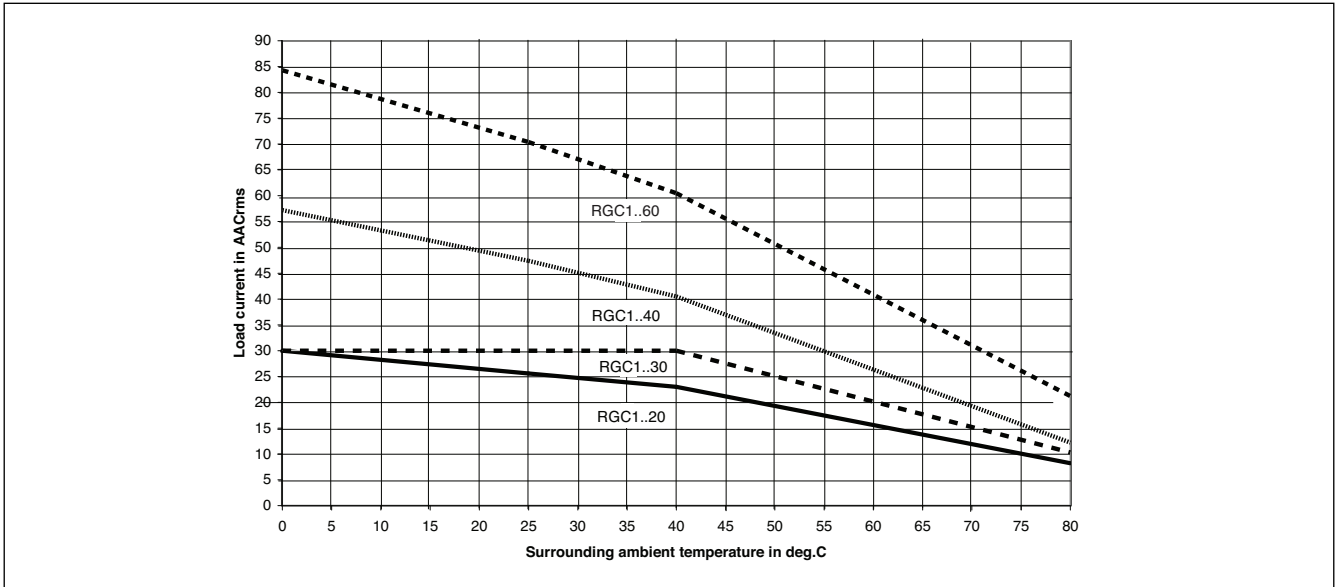
	RGC..20..	RGC..30..	RGC..40..	RGC..60..
Rated operational current AC-51 rating @ Ta=40°C	20 AAC	30 AAC	40 AAC	60 AAC
AC-53a rating @ Ta=40°C	5 AAC	8 AAC	13 AAC	14.8 AAC
Number of motor starts (x:6, Tx:6s, F:50%) at 40°C ²	30	30	30	30
Min. operational current	150 mAAC	250 mAAC	400 mAAC	400 mAAC
Rep. overload current - (Motor Rating) PF = 0.4 - 0.5 UL508: T _{AMB} =40°C, t _{ON} =1s, t _{OFF} =9s, 50cycles	60 AAC	84 AAC	126 AAC	144 AAC
Maximum transient surge current (I _{TSM})	325 Ap	600 Ap	800Ap	800Ap
Maximum off-state leakage current	3 mA	3 mA	3 mA	3 mA
I ² t (10ms) Minimum	525 A ² s	1800 A ² s	3200A ² s	3200A ² s
Critical dv/dt (@ T _j init = 25°C)	1000 V/us	1000 V/us	1000 V/us	1000 V/us

Output Power Dissipation



- 2 Overload current profile definition:
x: multiple of AC53a rating, Tx: duration of current surge, F: duty cycle.

Current Derating



Agency Approvals and Conformances

Conformance	IEC/EN 62314 IEC/EN 60947-4-2 IEC/EN 60947-4-3	Agency Approvals	UL508 Listed (E172877) CUL Listed (E172877) VDE (pending)
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Electromagnetic Compatibility

EMC Immunity	IEC/EN 61000-6-2	Radiated Radio Frequency Immunity	IEC/EN 61000-4-3
Electrostatic Discharge (ESD)		10V/m, 80 - 1000 MHz	Performance Criteria 1
Immunity	IEC/EN 61000-4-2	10V/m, 1.0 - 2.7GHz	Performance Criteria 1
Air discharge, 8kV	Performance Criteria 1	Conducted Radio Frequency Immunity	IEC/EN 61000-4-6
Contact, 4kV	Performance Criteria 1	10V/m, 0.15 - 80 MHz	Performance criteria 1
Electrical Fast Transient (Burst) Immunity	IEC/EN 61000-4-4	Voltage Dips Immunity	IEC/EN 61000-4-11
Output: 2kV, 5kHz	Performance Criteria 1	0% for 10ms/20ms,	Performance Criteria 2
Input: 3kV, 5kHz	Performance Criteria 1	40% for 200ms	Performance Criteria 2
Electrical Surge Immunity	IEC/EN 61000-4-5	70% for 500ms	Performance Criteria 2
Output, line to line, 1kV	Performance Criteria 1	Voltage Interruptions Immunity	IEC/EN 61000-4-11
Output, line to earth, 2kV	Performance Criteria 1	0% for 5000ms	Performance Criteria 2
AC signal, line to line, 1kV	Performance Criteria 2		
AC signal, line to earth, 2kV	Performance Criteria 2		
DC signal, line to earth, 1kV	Performance Criteria 2		
EMC Emission	(EN/IEC 61000-6-4)	Radio Interference	
Radio Interference		Field Emission (Radiated)	IEC/EN 55011
Voltage Emission (Conducted)	IEC/EN 55011	30 - 1000MHz	Class A (industrial)
0.15 - 30MHz	Class A (industrial) with filters - see filter information		
	IEC/EN 60947-4-2, 60947-4-3		
	Class A (no filtering needed)		

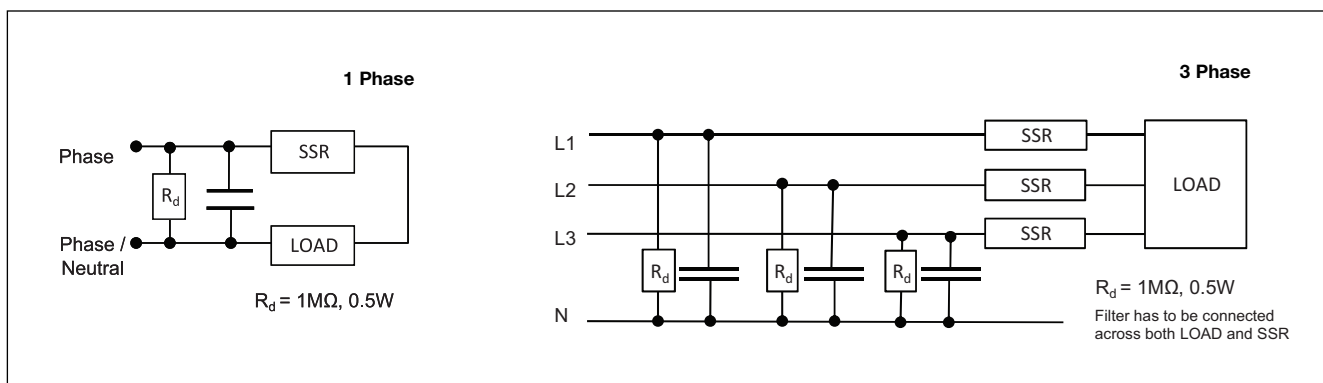
Filtering - EN / IEC 55011 Class A compliance (for class B compliance contact us)

Part Number	Suggested filter for compliance	Maximum Heater current
RGC1A23..20	68 nF / 275 V / X1	20A
RGC1A23..30	220 nF / 275 V / X1	30A
RGC1A23..40	330 nF / 275 V / X1	40A
RGC1A23..60	470 nF / 275 V / X1	60A
RGC1A60..20	100 nF / 760 V / X1	20A
RGC1A60..30	330 nF / 760 V / X1	30A
RGC1A60..40	330 nF / 760 V / X1	40A
RGC1A60..60	470 nF / 760 V / X1	60A

Note:

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

Filter Connection Diagrams

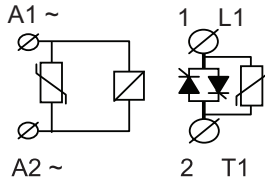


Environmental Specifications

Operating Temperature	-40°C to 80°C (-40°F to +176°F)
Storage Temperature	-40°C to 100°C (-40°F to +212°F)
RoHS (2002/95/EC)	Compliant
Impact resistance (IEC60068-2-27)	15/11 g/ms
Vibration resistance (2-100Hz, IEC60068-2-26, EN50155)	2g
Relative humidity	95% non-condensing @ 40°C
UL flammability rating (housing)	UL 94 V0

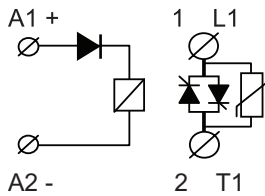
Connection Diagram

AC Controlled



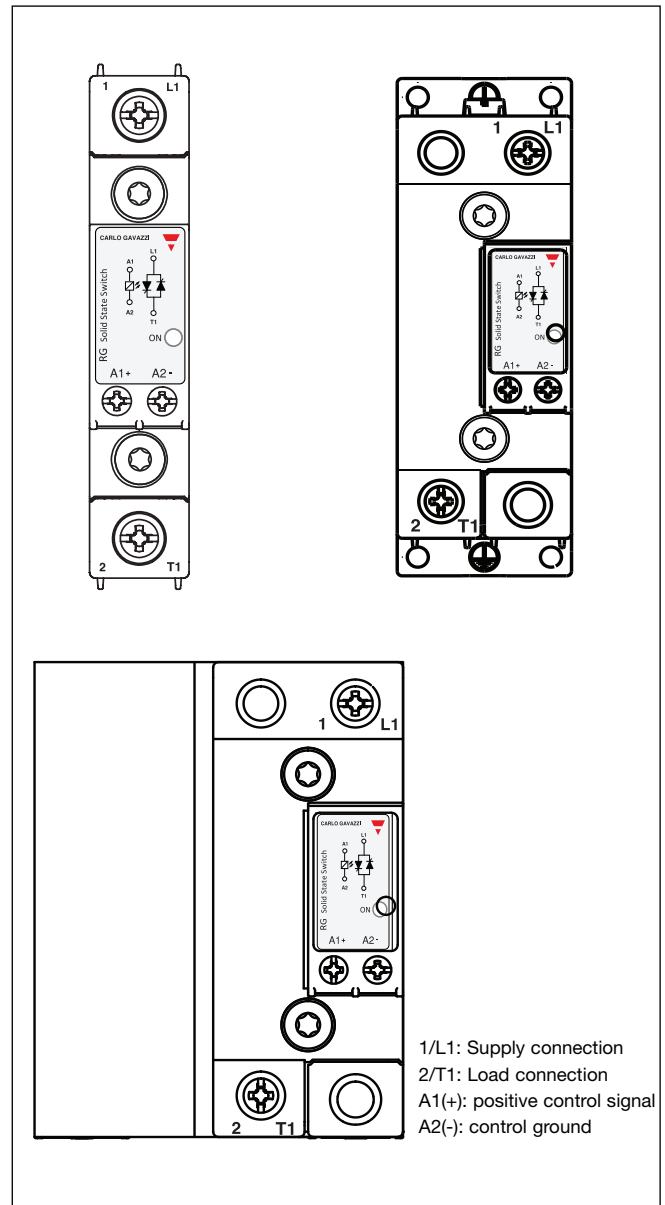
In AC controlled types only (RG..A..) a varistor is placed across A1/A2 terminals.

DC Controlled

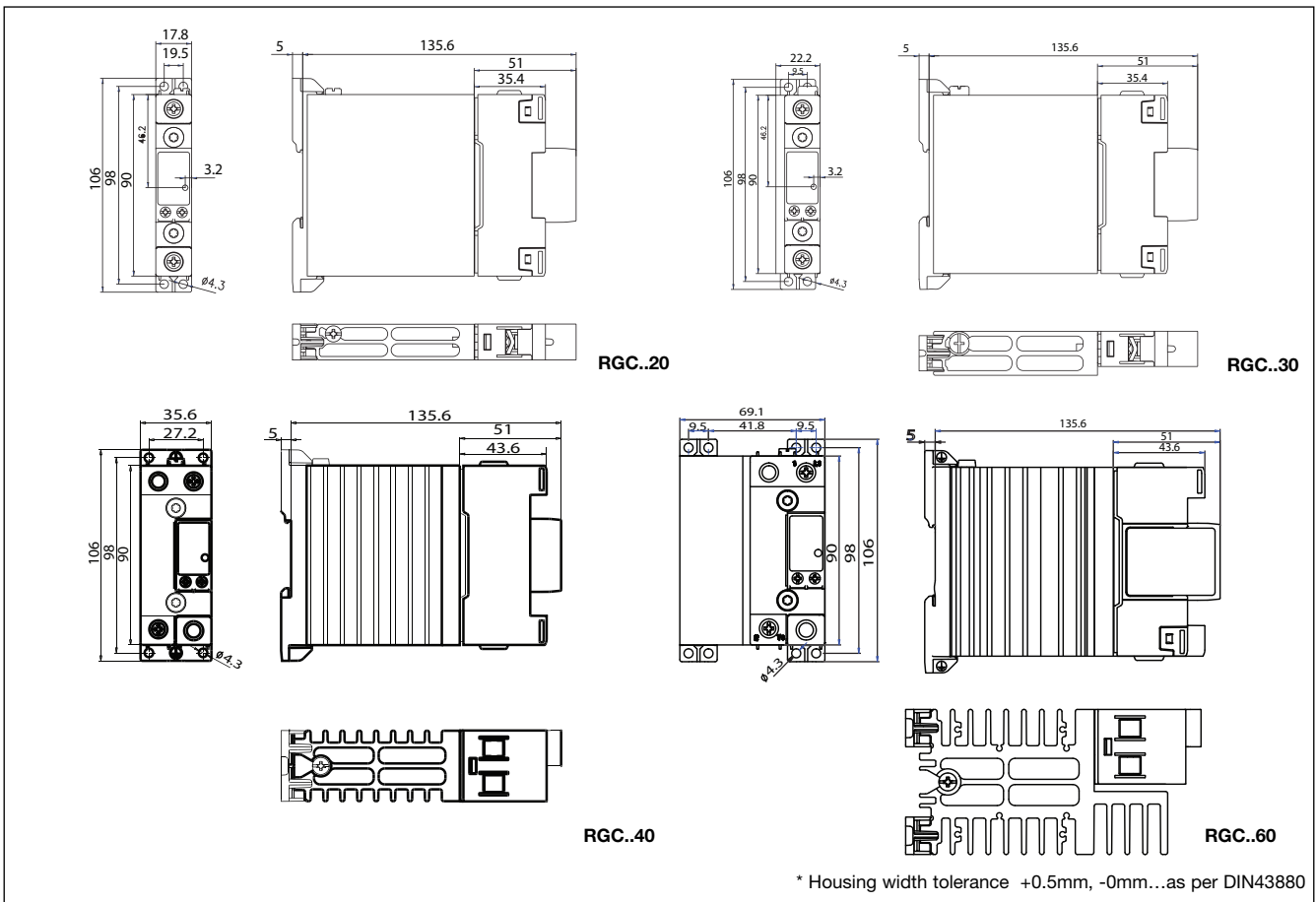


In DC controlled types only (RG..D..) a diode is placed in series with the control circuit for protection against reverse biased connection.

Terminal Layout



Dimensions





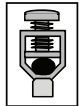

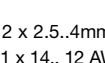
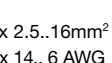

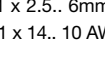
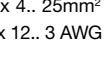
* Housing width tolerance +0.5mm, -0mm...as per DIN43880

All dimensions in mm

Connection Specifications


POWER CONNECTIONS: 1/L1, 2 /T2

Use 75°C copper (Cu) conductors

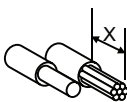
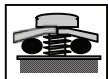

	RGC..20_K; RGC..30_K		RGC..4_G; RGC..6_G	
Stripping Length (X)	12mm		11mm	
Connection type	M4 screw with captivated washer		M5 screw with box clamp	
Rigid (Solid & Stranded) UL/ CSA rated data	 2 x 2.5..6 mm ² 2 x 14.. 10 AWG	 2 x 2.5..6 mm ² 1 x 14.. 10 AWG	 1 x 6..25mm ² 1 x 10...3 AWG	
Flexible with end sleeve	 2 x 2.5..4mm ² 2 x 14.. 12 AWG	 2 x 2.5..4mm ² 1 x 14.. 12 AWG	 1 x 2.5..16mm ² 1 x 14.. 6 AWG	
Flexible without end sleeve	 2 x 2.5.. 6mm ² 2 x 14.. 10 AWG	 1 x 2.5.. 6mm ² 1 x 14.. 10 AWG	 1 x 4.. 25mm ² 1 x 12.. 3 AWG	
Torque specifications	2 Nm (17.7 in-lb). M4, Pozidriv 2		2.5 Nm (22 in-lb). M5, Pozidriv 2	
Aperture for termination lug	12.3mm		N/A	

CONTROL CONNECTIONS: A1(+), A2(-) - RGC..K..


Torque specifications

 0.5 Nm (4.4 in-lb)
M3, Pozidriv 1
Use 60/75°C copper (Cu) conductors
Stripping Length (X) = 8mm



Rigid (Solid & Stranded)

	 2 x 0.5..2.5mm ² 2 x 18..12 AWG	 1 x 0.5..2.5mm ² 1 x 18..12 AWG
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Flexible with end sleeve

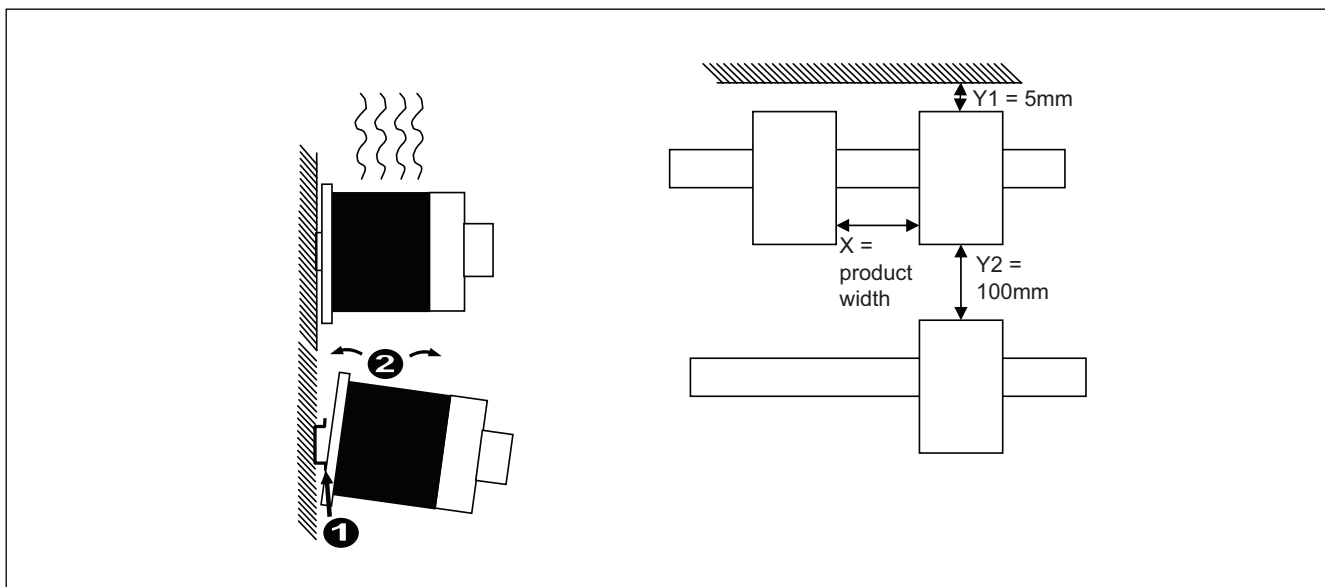
	2 x 0.5..2.5mm ² 2 x 18..12AWG	1 x 0.5..2.5mm ² 1 x 18..12AWG
--	--	--

Protective Earth Connection

  RGC..20: M4, 1.5Nm (13.3 in-lb)
RGC..30, 40, 60: M5, 1.5Nm (13.3 in-lb)

Note: Protective Earth connection must be connected whenever the product is intended to be used in Class 1 applications according to EN/IEC 61140.

Installation Instructions



Short Circuit Protection

Protection Co-ordination, Type 1 vs Type 2:

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

The product variants listed in the table hereunder are suitable for use on a circuit capable of delivering not more than 5,000 A rms Symmetrical Amperes, 600 Volts maximum when protected by fuses. Tests at 5,000 A were performed with RK5 fuses, time delay; please refer to the table below for maximum allowed ampere rating of the fuse. Use fuses only.

Co-ordination type 1 (UL508)

Part No.	Max. size [A]	Class	Current [kA]	Voltage [VAC]
RGC..20	30	RK5	5	Max. 600
RGC..30	30	RK5	5	Max. 600
RGC..40	30	RK5	5	Max. 600
RGC..60	30	RK5	5	Max. 600

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

Part No.	Max. size [A]	Ferraz Shawmut Part Number	Current [kA]	Voltage [VAC]
RGC..20	32	6.9xx CP URD 22x58/32,(xx=00 or 21)	5	Max. 600
RGC..30	40	A70QS40-4	5	Max. 600
RGC..40	70	A70QS70-4	5	Max. 600
RGC..60	90	A70QS90-4	5	Max. 600