

Solid State Relays contactor with Integrated Fuse Type RGC1F



- Solid State Contactor with integrated fuse
- Zero Cross Switching
- Operational voltage: 230 VAC and 600 VAC
- 35mm width
- Control voltage: 4 - 32 VDC
- Heater Break and SSR short circuit detection option
- Rated Load Currents of 20 AAC, 30 AAC and 40 AAC
- Alarm Signal Output
- 100 kA short circuit current rating

Product Description

This solid state contactor includes three functions in one housing: power switching, short circuit protection by semiconductor fuse and system monitoring. RGC1FA is the version including the power-switch and the fuse version with a fuse while the RGC1FS includes also the monitoring function which detects load, fuse and SSR faults.

The front panel can be opened for easy access of the fuse and the fuse holder accepts fuses from a wide range of manufacturers. Alarms (in RGC1FS) are indicated by a red LED on the front and a signal which is normally closed. Product width is 35mm for the whole range and covers up to 600VAC and 40AAC. Specifications stated at 25°C unless specified.

Ordering Key **RGC 1 F A 60 D 30 GG E**

RG Solid State Contactor
 Number of Poles _____
 Integrated Fuse _____
 Type _____
 Rated Operational Voltage _____
 Control voltage _____
 Rated Operational current _____
 Connection type for control and power _____
 Output Connection configuration _____

Ordering Key

Type	Integrated Fuse	Mode	Rated Voltage	Control Voltage	Rated Current	Connection Control/ Power	Connection config.
RGC1	F	A: Fuse + fuse holder S: Fuse + fuse holder + system monitoring	23: 230VAC 60: 600 VAC	D: 3 or 4.5 - 32VDC	2: 20A 3: 30A 4: 40A	G: clamp	E: contactor

Warning

- Risk of electric shock
- Do not open fuse panel when the product is in operation
- Switch off the panel before doing any maintenance on the product. Panel should be closed before restarting operation.
- Failure to follow these instructions may result in serious injury (or worse) and/or equipment damage



Selection Guide

Voltage Range	Options	Control Voltage	Rated operational current		
			20 Arms	30 Arms	40 Arms
230Vrms	Fuse Only	3 -32VDC	RGC1FA23D20GGE	RGC1FA23D30GGE	RGC1FA23D40GGE
600Vrms	Fuse Only	4.5 -32VDC	RGC1FA60D20GGE	RGC1FA60D30GGE	RGC1FA60D40GGE
24 to 240Vrms	Fuse +Sensing	3 - 32VDC	RGC1FS23D20GGE	RGC1FS23D30GGE	RGC1FS23D40GGE
42 to 600Vrms	Fuse +Sensing	3 - 32VDC	RGC1FS60D20GGE	RGC1FS60D30GGE	RGC1FS60D40GGE

Output Voltage Specifications

	RGC1FA23..	RGC1FA60..	RGC1FS23..	RGC1FS60..
Operational Voltage Range (+10%, -15% on max)	24-240 VAC	42-600 VAC	24-240 VAC	42-600 VAC
Blocking Voltage	1200 Vp	1200 Vp	1200 Vp	1200 Vp
Internal Varistor	275 V	625 V	275 V	625 V

General Specifications

Latching voltage (across L1-T1)	≤20V
Operational frequency range	45 to 65Hz
Power factor	0.5 at rated voltage
Finger Protection	IP20
LEDs	Control ON: Green, full intensity Supply ON: Green, half intensity (RG1CFS only) Fault: RED (RG1CFS only)
Pollution degree	2 (non-conductive pollution with possibilities of condensation)
Over-voltage category	III (fixed installations)
Isolation Input to Output Input & Output to Case	4000Vrms 4000Vrms

Supply specifications ^{1, 2}

Rated supply voltage	24 VDC -15%, +20% according to EN61131-2:2003
Max input current	80 mA during normal conditions 20 mA during Alarm conditions

Alarm Output Specifications (RGC1FS)

Type Open	Collector PNP Normally closed
Rating (@ 40°C)	50mADC, 35VDC
Alarm output onstate voltage ⁴	TBD

Output specifications

	RGC1F20..	RGC1F30..	RGC1F40..
Rated operational current AC-51 rating @ Ta=40°C	20 AAC	30 AAC	40 AAC
AC-53a rating @ Ta=40°C	4.7 A	6 A	8 A
Number of starts (x:6, Tx:6s, F:50%) at 40°C ⁴	30	30	30
Min. operational current	0.2 A	0.2 A	0.2 A
I ² t of integrated fuse @ 690V (size: 14 x 51)	740 A ² s	1400 A ² s	3100 A ² s
Critical dv/dt	1000 V/us	1000 V/us	1000 V/us

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

	115 VAC	230 VAC	400 VAC	480 VAC	600 VAC
RGC1F..20	1/6HP / 0.18kW	1/3HP / 0.37kW	3/4HP / 0.75kW	1HP / 1.1kW	1-1/2HP / 1.1kW
RGC1F..30	1/4HP / 0.25kW	1/2HP / 0.56kW	1HP / 1.1kW	2HP / 1.5kW	2HP / 1.5kW
RGC1F..40	0.37kW	0.75kW	1.5kW	1.5kW	2.2kW

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

2: Power supply specification for RGC1FS across A1, A2 terminals

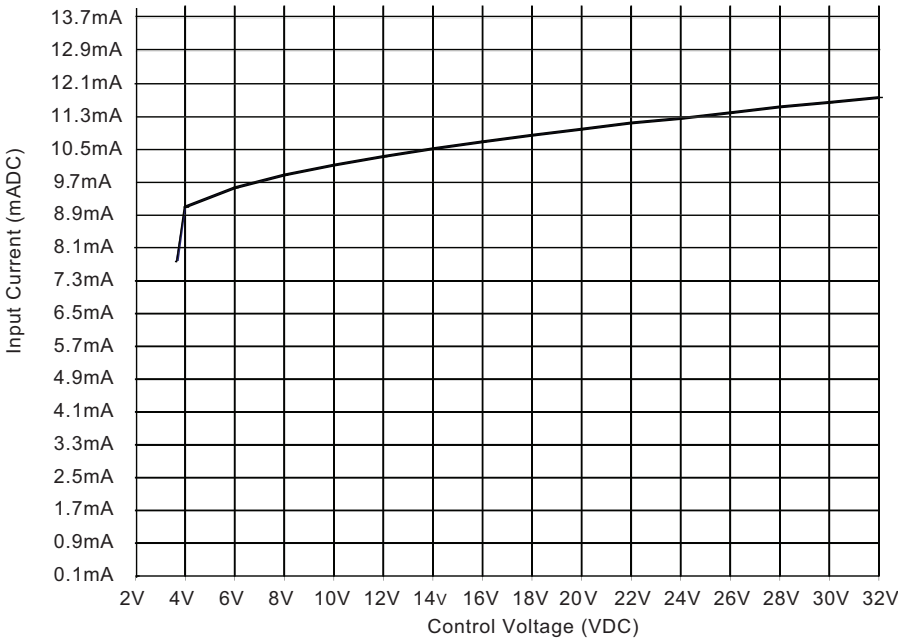
3: Control input specification for RGC1FA across A1, A2 terminals and for RGC1FS across terminals IN, A2

4: The alarm will open in the case when the power supply is removed.

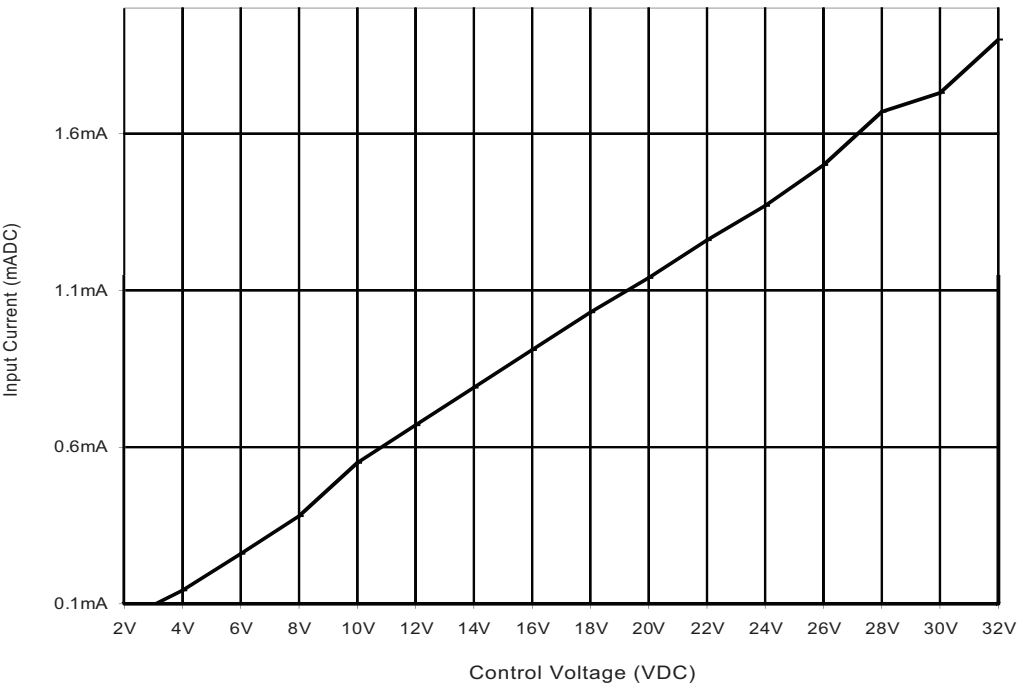
Control Input Specifications ^{1, 3}

Control voltage range	3 - 32 VDC (RGC1Fx23) 4.5 - 32 VDC (RGC1Fx60)	Max Response time pick-up	0.5 cycle
Pick-up voltage	3 VDC (RGC1Fx23) 4 VDC (RGC1Fx60)	Min Response time drop-out	0.5 cycle
Drop-out voltage	1.0 VDC	Max reverse voltage	32 VDC
		Input current	See diagram below

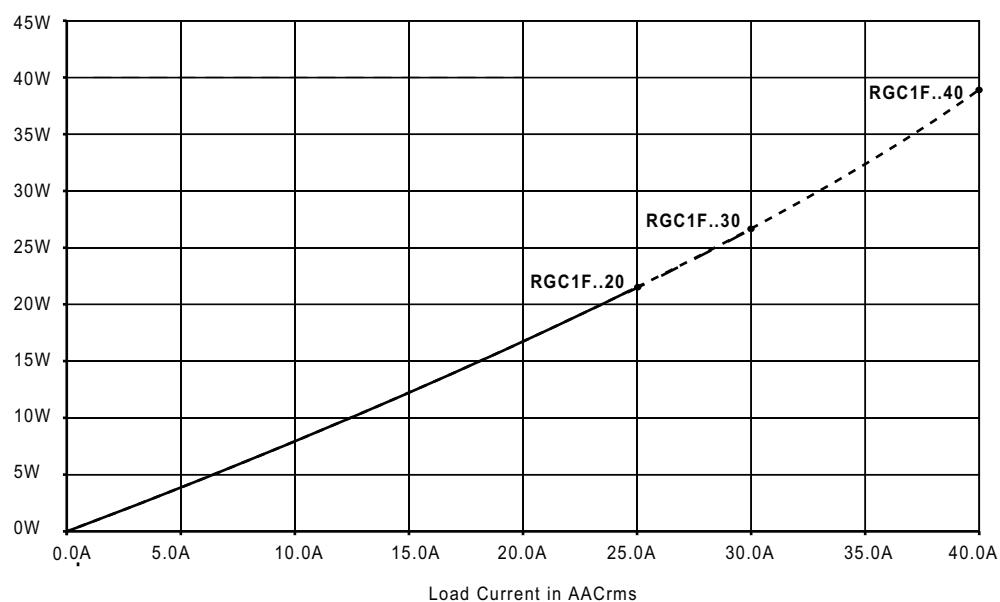
RGC1FA...



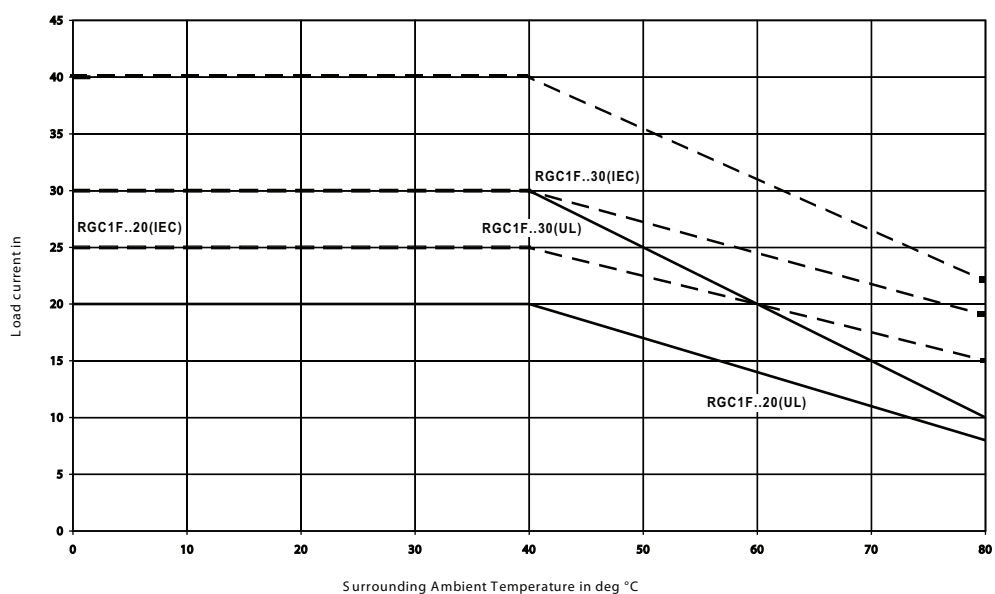
RGC1FS...



Output Power Dissipation



Current Derating (UL 508/ IEC)



Agency Approvals and Conformances

Low Voltage Directive (CE marking)	IEC/EN 62314	Agency Approvals RGC1Fx..20, 30 Short circuit current rating	cULus listed (UL 508) 100kA (UL508)
	IEC/EN 60947-4-2		
	IEC/EN 60947-4-3		

Electromagnetic Compatibility

EMC Immunity	IEC/EN 61000-6-3	Radiated Radio Frequency Immunity	
Electrostatic Discharge (ESD) Immunity			
Air discharge, 8kV	IEC/EN 61000-4-2 Performance Criteria 2	10V/m, 80 - 1000 MHz	IEC/EN 61000-4-3 Performance Criteria 1
Contact, 4kV	Performance Criteria 2	10V/m, 1.4 - 2.0GHz	Performance Criteria 1
		10V/m, 2.0 - 2.7GHz	Performance Criteria 1
Electrical Fast Transient (Burst) Immunity		Conducted Radio Frequency Immunity	IEC/EN 61000-4-6
Output: 4kV, 5kHz	IEC/EN 61000-4-4 Performance Criteria 2	10V/m, 0.15 - 80 MHz	Performance criteria 1
Input: 1kV, 5kHz	Performance Criteria 2	Voltage Dips Immunity	IEC/EN 61000-4-11
		0% for 0.5/ 1 cycle,	
Electrical Surge Immunity	IEC/EN 61000-4-5	70% for 25 cycles	Performance Criteria 2
Output, line to line, 1kV	Performance Criteria 1	40% for 10 cycles	Performance Criteria 2
Output, line to earth, 2kV	Performance Criteria 1	Voltage Interruptions Immunity	IEC/EN 61000-4-11
AC signal, line to line, 1kV	Performance Criteria 2	0% for 5000ms	Performance Criteria 2
AC signal, line to earth, 2kV	Performance Criteria 2		
EMC Emission	(EN/IEC 61000-6-1)	Radio Interference field emission (Conducted)	
Radio Interference Voltage Emission (Radiated)		IEC/EN 55011	
0.15 - 30MHz	IEC/EN 55011 Class B (light industry)	30 - 1000MHz	IEC/EN 55011 Class A (industrial)

Environmental Specifications

Operating Temperature	-30°C to 70°C	Vibration resistance (2-100Hz, EN50155, EN61373)	2g
Storage Temperature	-40°C to 100°C	Relative humidity	95% non-condensing @ 40°C
RoHS (2002/95/EC)	Compliant	UL flammability rating (housing)	UL 94 V0
Impact resistance EN50155, EN61373	15/11 g/ms		

Connection Specifications

POWER CONNECTIONS:

2/T1

1/L1

Use 75°C copper (Cu) conductors

Stripping length (X) = 8mm



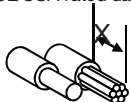
Torque Specifications



2.5 Nm (17.7 in-lb) 2.5 Nm (17.7 in-lb)
M5, Pozidriv 2 M4, Pozidriv 2

Rigid (Solid & Stranded)

UL/CSA rated data



1 x 2.5..25mm² 1 x 2.5..10mm²
1 x 14..4 AWG 1 x 14..8 AWG

Flexible with end sleeve



1 x 2.5..16mm² 1 x 2.5..6mm²
1 x 14..6 AWG 1 x 14..10 AWG

Flexible without end sleeve



1 x 4..25mm² 1 x 4..10mm²
1 x 12..4 AWG 1 x 12..8 AWG

CONTROL & AUXILIARY CONNECTIONS: A1(+), A2(-), IN, OUT

Use 60/75°C copper (Cu) conductors

Stripping length (X) = 6mm

Torque Specifications

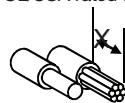


0.5 Nm (4.4 in-lb)
M3, Philips 1



Rigid (Solid & Stranded)

UL/CSA rated data



1 x 0.5..2.5 mm²
1 x 18..12 AWG

Flexible without end sleeve



1 x 0.5..2.5 mm²
1 x 18..12 AWG

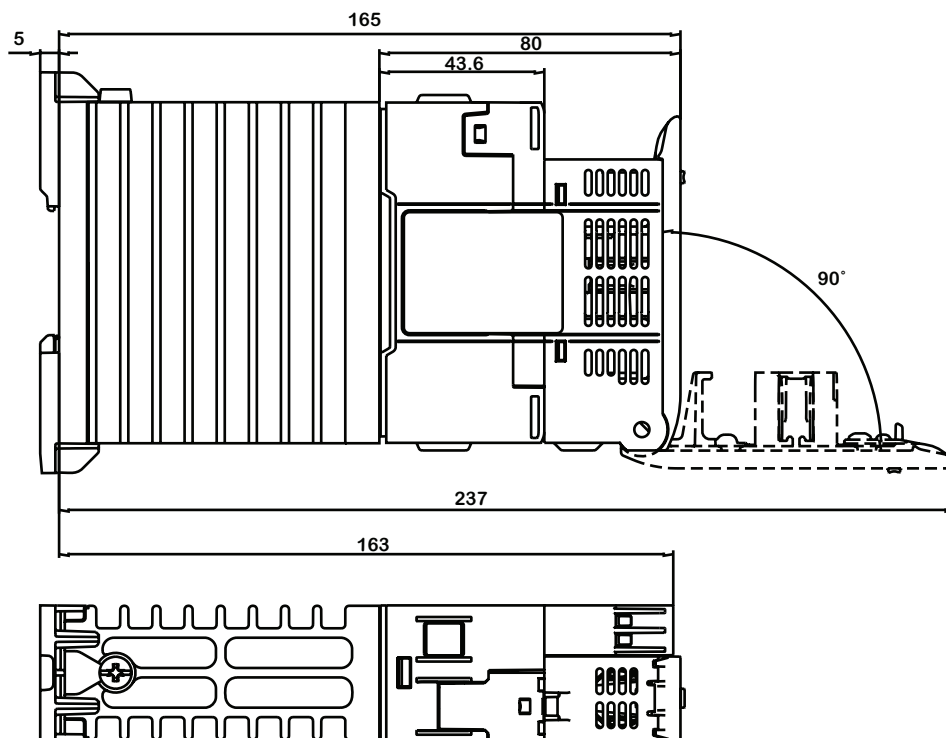
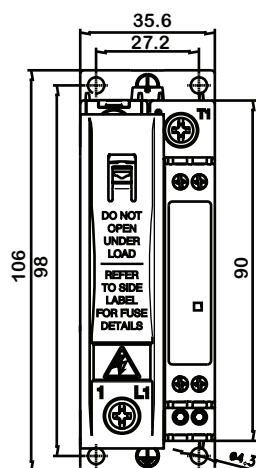
Protective Earth Connection



M5, 2.5 Nm (17.7 in-lb)

According to EN 61140, clause 5.2.2.1, "exposed-conductive parts and any protective screen, shall be connected to the protective-equipotential- bonding system."

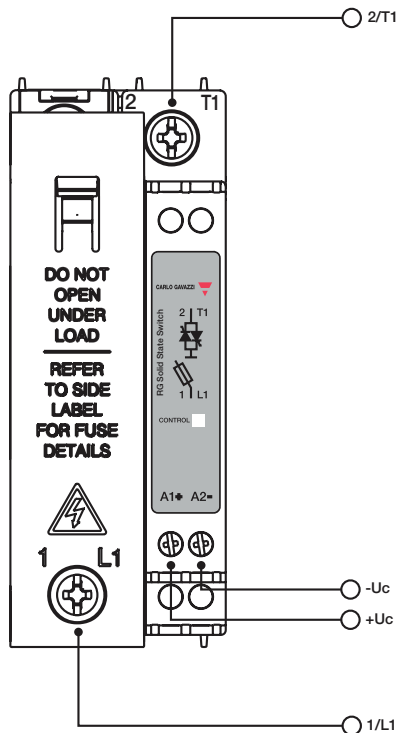
Dimensions



Note: fuse is included in product

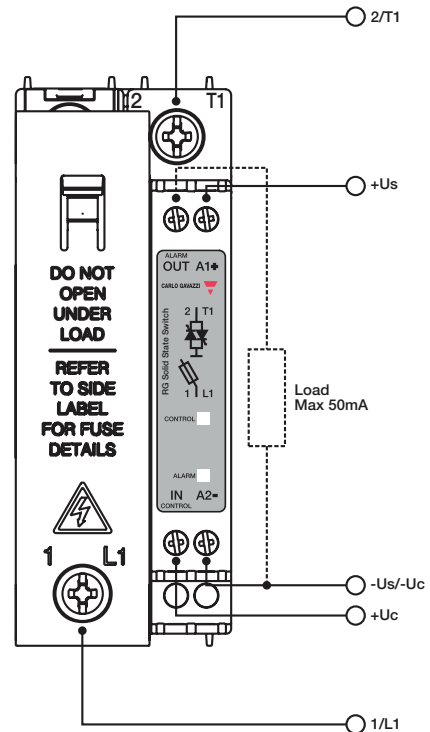
* Housing width tolerance +0.5mm, -0mm...as per DIN43880
All dimensions in mm

Terminal Markings and Connection Diagrams



RGC1FA

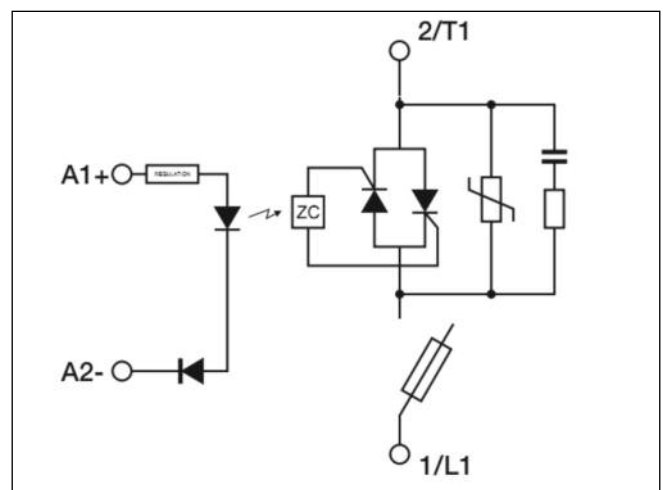
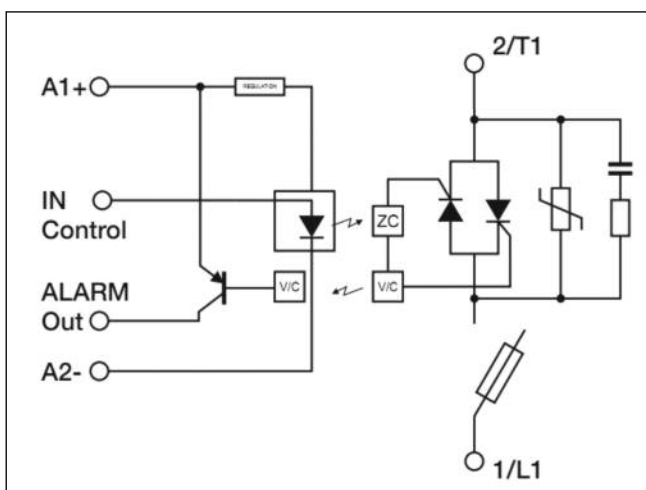
1/L1 (on RGC) : Line voltage connection
 2/T1: Load connection
 A1(+): + 24VDC control
 A2(-): ground connection



RGC1FS

1/L1 (on RGC) : Line voltage connection
 2/T1: Load connection
 A1(+): + 24VDC control
 A2(-): ground connection
 OUT: alarm output
 IN : Control Input

Schematic Diagrams



Function Diagram

Indication LED	Control OFF	Control ON	Line Voltage Loss	Line Voltage Loss	Heater Break	Power Supply Loss	Power Supply Loss	SSR open circuit	SSR short circuit	SSR short circuit	Open Fuse
Line Voltage (1L1)											
Load Current (2T1)											
Control Voltage (IN Vc)											
Control / Supply LED											
Green											
Power Supply (A1 A2)											
Fault LED (Red)											
Alarm Signal (Normally closed) (OUT)											
	Normal operation. SSR off	Normal operation. SSR on	Line voltage loss detected without control voltage, i.e. when SSR output is switched off	Line voltage loss detected with control voltage applied, i.e. when SSR output is switched on	Heater break is detected when the control is applied.	All function stops due to loss of power supply.	All function stops due to loss of power supply, even when a control voltage is applied.	If SSR output does not switch ON when control voltage is applied an alarm condition results.	Shorted output is detected even when the control voltage is applied.	Shorted output is detected when the control is not applied. Output would be conducting when it should be in the OFF- state	If fuse blows alarm signal is emitted from OUT terminal and the OPEN FUSE LED will also light up.

Note:

- Half light intensity Green LED to indicate application of power supply. Full brightness to indicate presence of control input.
- Faults indicated by a continuous lighting RED LEDs.
- Auto-reset function. The alarm signal turns OFF and SSR proceeds normal operation when alarm condition is no longer present.

Co-ordination type 1 (UL508)

Part No.	Max. size [A]	Class	Current [kA]	Voltage [VAC]
RGC1F.20	30	J	100	Max. 600 VAC
RGC1F.30	30	J	100	Max. 600 VAC

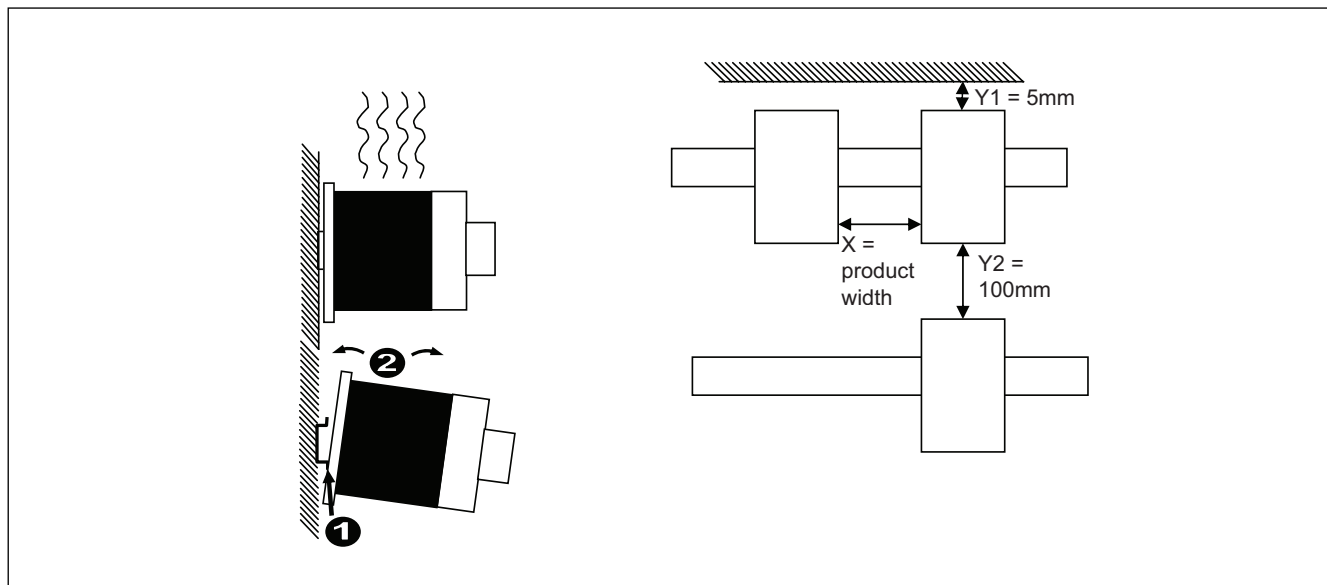
Co-ordination type 2 - semiconductor fuses

Part No.	Max. size [A]	Type (Siba)	Current [kA]	Current [kA]
RGC1F.20	25	50 124 34. 25	100	Max. 600
RGC1F.30	30	50 124 34. 30	100	Max. 600
RGC1F.40	40	50 124 34. 40	100	Max. 600

For UL applications an external Class J fuse shall be installed.

suitable for use on a circuit capable of delivering not more than 100,000 Arms symmetrical Amperes, 600 volts maximum when protected by fuses. Tests at 100,000 A were performed with class J fuses, fast acting: please refer to the table above for maximum allowed ampere rating of the fuse. Use fuses only.

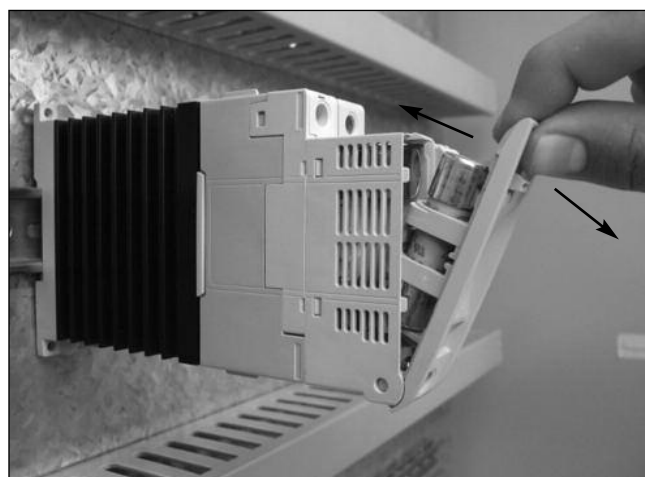
Installation Instructions



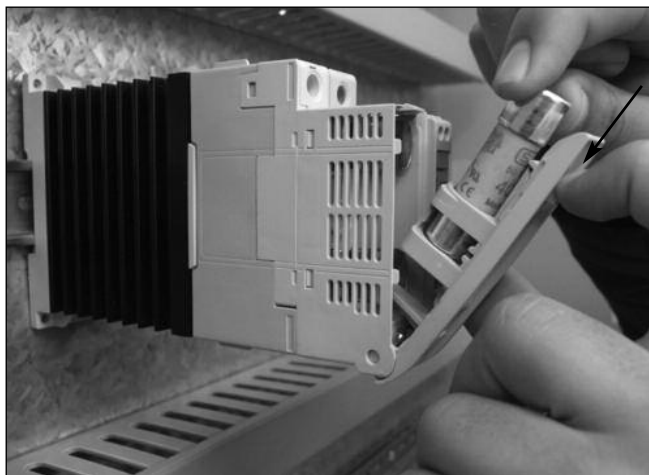
Fuse Changing Instructions



1. Preparation for opening fuse holder.



2. Opening or closing the fuse holder.



3. Removal or Insertion of fuse.



4. Pressing downwards the fuse-holding clip to insert or remove the fuse