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Solid State Relays
1-Phase with Heatsink and Integrated Fuse
Type RGC1F

- **35mm product width**
- **Solid state contactor with integrated fuse**
- **AC zero cross switching**
- **Operational voltage: up to 600 VAC**
- **Rated load currents of 20 AAC, 30 AAC and 40 AAC**
- **Control voltage: 4.5 - 32 VDC**
- **Integrated voltage transient protection with varistor**
- **Detection of SSR and load mulfunction (RGC1FS)**
- **Alarm output signal (RGC1FS)**
- **100 kA short circuit current rating**

Product Description

This solid state contactor includes three functions in one housing: power switching, short circuit protection by semicondcutor 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

- **Solid state relay**
- **Number of poles**
- **Integrated fuse**
- **Switching mode**
- **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 configuration
RGC1	F	A: Zero cross switching + fuse + fuse holder	23: 230VAC 60: 600VAC	D: 3 or 4.5 - 32VDC	20: 20AAC 30: 30AAC 40: 40AAC	G: Box Clamp	E: Contactor
		S: Zero cross switching + fuse + fuse holder + system monitoring					

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

Rated output voltage	Options	Control voltage	Rated operational current at 40°C		
			20 AAC	**30 AAC**	**40 AAC**
230VAC	Fuse Only	3 -32VDC	RGC1FA23D20GGE	RGC1FA23D30GGE	RGC1FA23D40GGE
600VAC	Fuse Only	4.5 -32VDC	RGC1FA60D20GGE	RGC1FA60D30GGE	RGC1FA60D40GGE
230VAC	Fuse +Sensing	3 - 32VDC	RGC1FS23D20GGE	RGC1FS23D30GGE	RGC1FS23D40GGE
600VAC	Fuse +Sensing	4.5 -32VDC	RGC1FS60D20GGE	RGC1FS60D30GGE	RGC1FS60D40GGE

Output Voltage Specifications

	RGC1F..23	RGC1F..60
Operational Voltage Range (+10%, -15% on max)	24-240 VAC	42-600 VAC
Blocking Voltage	800 Vp	1200 Vp
Internal Varistor	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
Touch Protection	IP20
LEDs RG1CFS RG1CFS	Control ON: Green, full intensity Supply ON: Green, half intensity Fault: RED
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 (A1+, A2- for RGC1FS)

Rated supply voltage, U_s[1]	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 (OUT for RGC1FS)

Type	PNP open Collector Normally closed
Rating (@ 40°C)	50mADC, 35VDC

Output Specifications

	RGC1F..20	RGC1F..30	RGC1F..40
Rated operational current AC-51 rating @ Ta=40°C (IEC60947-4-3 / UL508) [2]	20 AAC	30 AAC	40 AAC
AC-53a rating @ Ta=40°C (IEC60947-4-3 / UL508)	4.7 AAC	6 AAC	8 AAC
Number of motor starts (x:6, Tx:6s, F:50%) at 40°C [2,3]	30	30	30
Min. operational current	0.2 A	0.2 A	0.2 A
I^2t of integrated fuse @ 690V (size: 14 x 51mm)	740 A^2s	1400 A^2s	3100 A^2s
Critical dv/dt (@ Tj init = 40°C)	1000 V/us	1000 V/us	1000 V/us

Motor Ratings: HP (UL508) / kW (EN/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

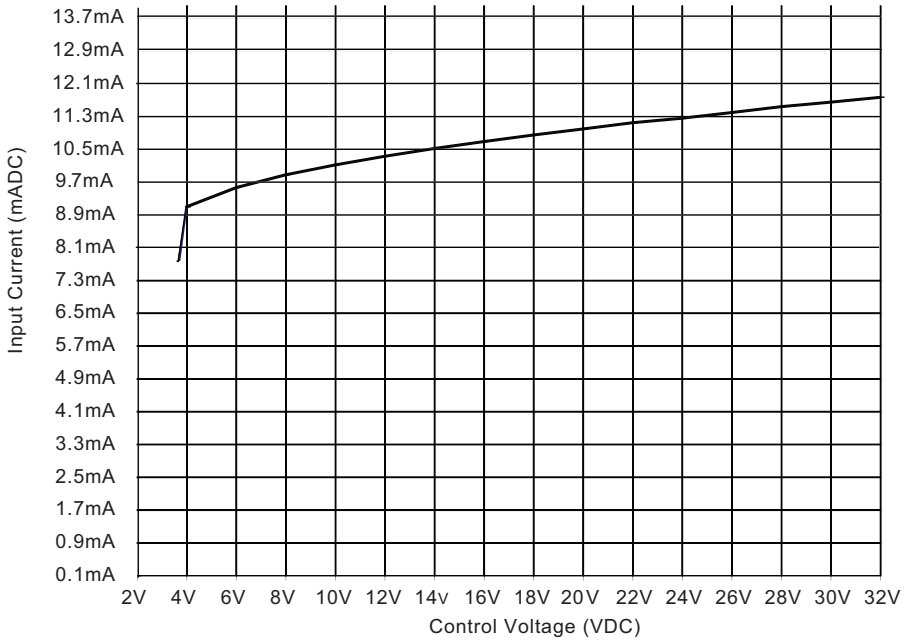
1: DC voltage to be supplied by a Class 2 power source
2: Refer to Derating curves
3: x: multiple of AC-53a current rating, Tx: duration of current surge, F: duty cycle

Control Input Specifications

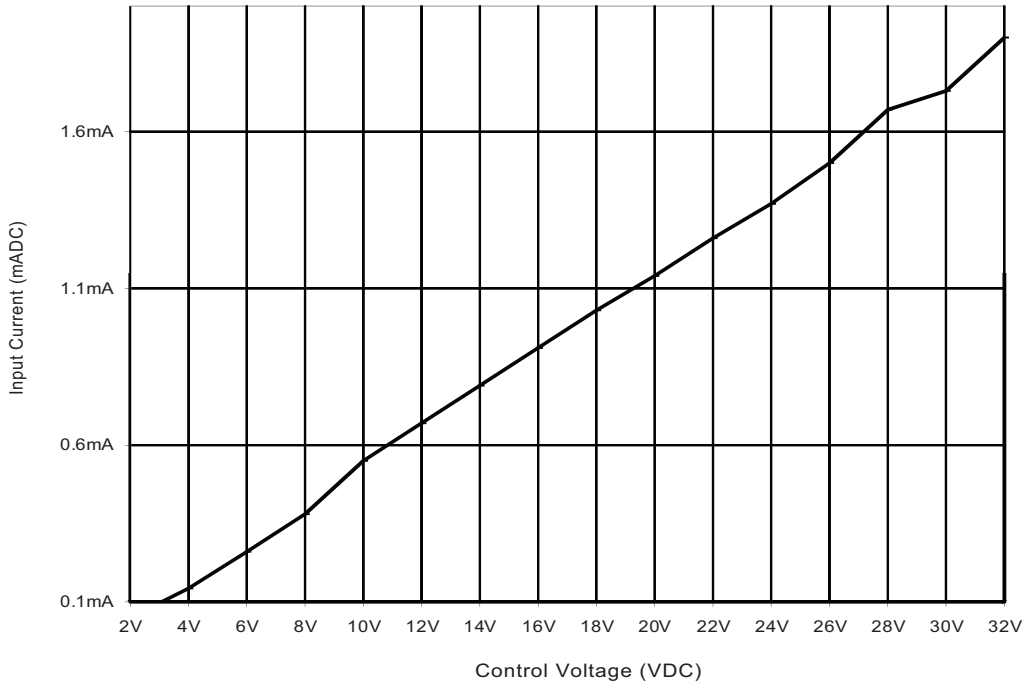
Control voltage range, U_C[1]	
RGC1FA	
A1+, A2 for RGC1FA23..	3 - 32VDC
A1+, A2 for RGC1FA60..	4.5 - 32VDC
RGC1FS	
IN, A2 for RGC1FS23..	3 - 32VDC
IN, A2 for RGC1FS60..	4.5 - 32VDC
Pick-up voltage	
RGC1F..23	3 VDC
RGC1F..60	4 VDC

Drop-out voltage	1.0 VDC
Response time pick-up	0.5 cycle
Response time drop-out	0.5 cycle
Max reverse voltage	32 VDC
Input current	See diagram below

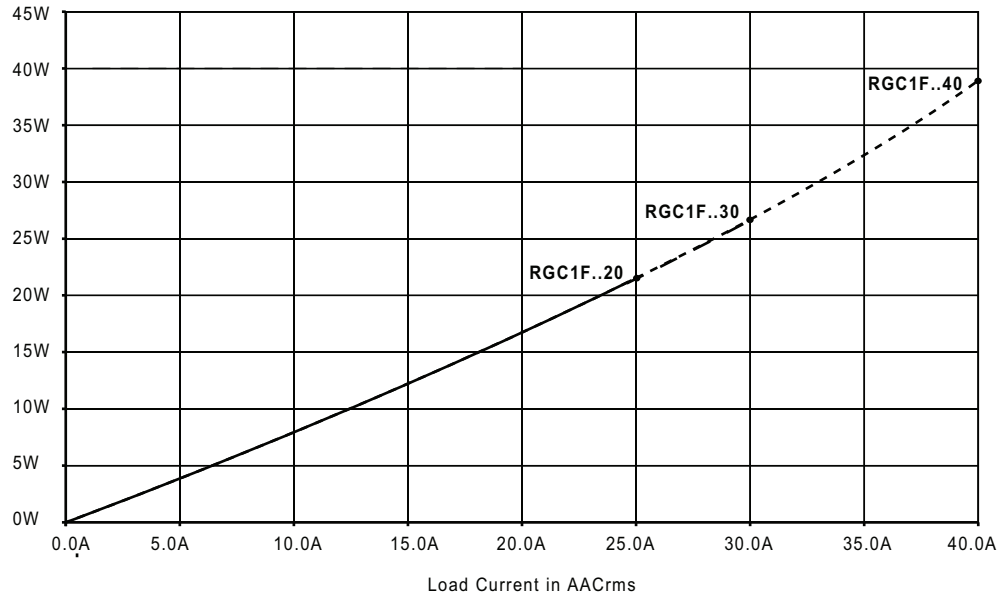
RGC1FA... (A1+, A2-)



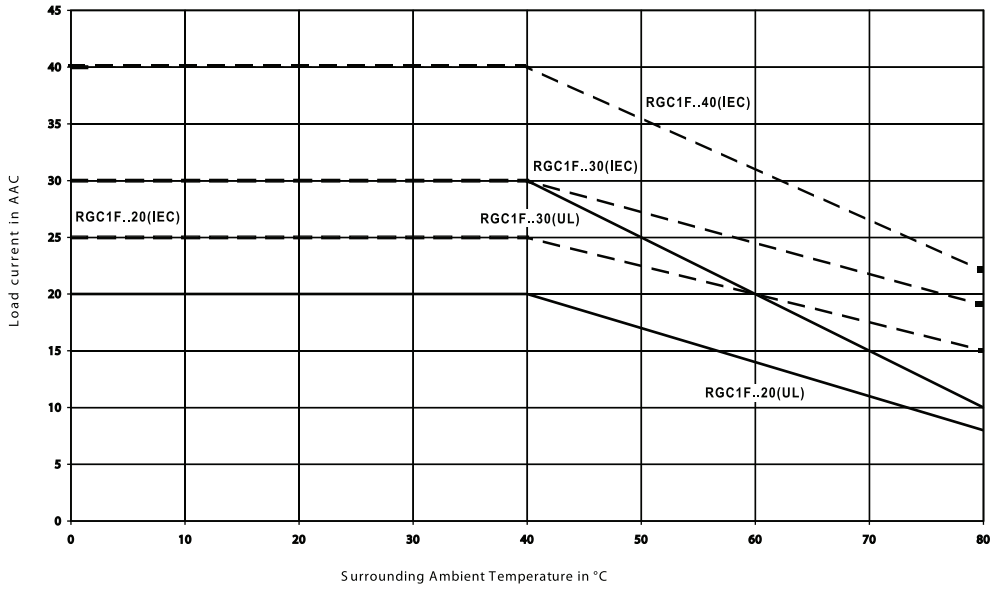
RGC1FS... (IN, A2-)



Output Power Dissipation

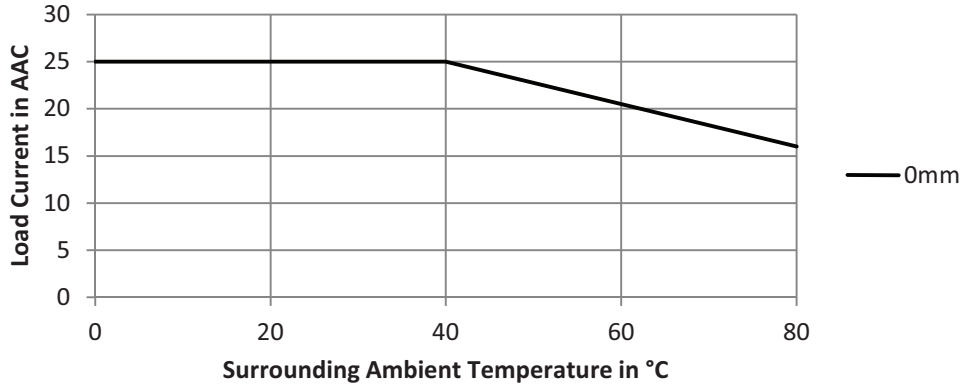


Current Derating (UL 508/ EN/IEC 60947-4-2/-3)

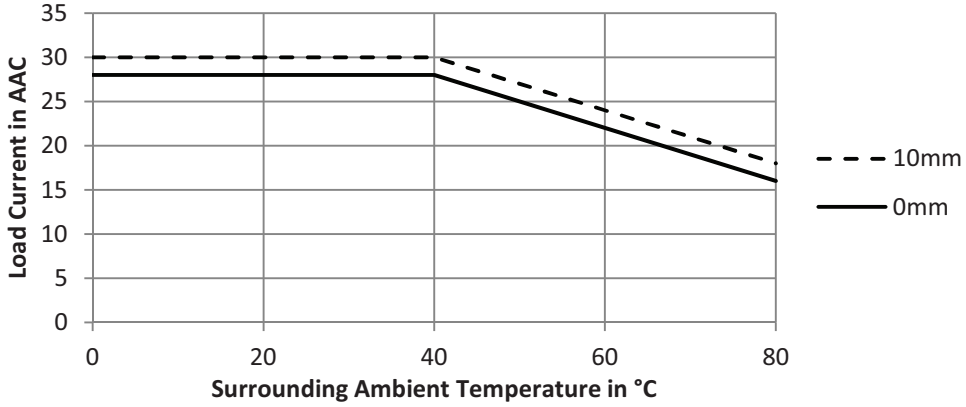


Derating vs. Spacing Curves

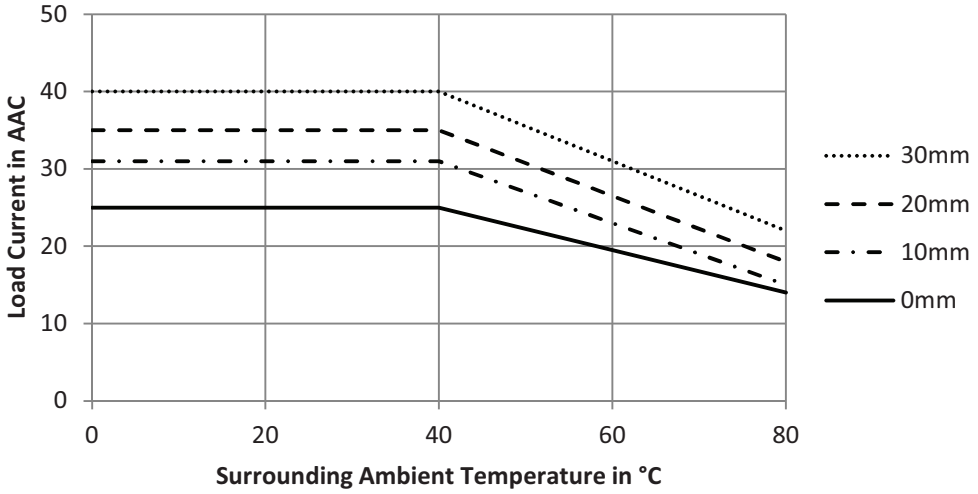
RGC1F..20



RGC1F..30



RGC1F..40



Agency Approvals and Conformances

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

Agency Approvals	
RGC1F..20, 30	cULus listed (UL 508), E172877
Short circuit current rating	100kA (UL508)

Electromagnetic Compatibility

EMC Immunity	IEC/EN 61000-6-2
Electrostatic Discharge (ESD)	
Immunity	IEC/EN 61000-4-2
Air discharge, 8kV	Performance Criteria 2
Contact, 4kV	Performance Criteria 2
Electrical Fast Transient	
(Burst) Immunity	IEC/EN 61000-4-4
Output: 4kV, 5kHz	Performance Criteria 2
Input: 1kV, 5kHz	Performance Criteria 2
Electrical Surge Immunity	IEC/EN 61000-4-5
Output, line to line, 1kV	Performance Criteria 1
Output, line to earth, 2kV	Performance Criteria 1
Signal, line to line, 1kV	Performance Criteria 2
Signal, line to earth, 2kV	Performance Criteria 2

Radiated Radio Frequency	
Immunity	IEC/EN 61000-4-3
10V/m, 80 - 1000 MHz	Performance Criteria 1
10V/m, 1.4 - 2.0GHz	Performance Criteria 1
3V/m, 2.0 - 2.7GHz	Performance Criteria 1
Conducted Radio Frequency Immunity	IEC/EN 61000-4-6
10V/m, 0.15 - 80 MHz	Performance criteria 1
Voltage Dips Immunity	IEC/EN 61000-4-11
0% for 0.5/ 1 cycle,	
70% for 25 cycles	Performance Criteria 2
40% for 10 cycles	Performance Criteria 2
Voltage Interruptions Immunity	IEC/EN 61000-4-11
0% for 5000ms	Performance Criteria 2

EMC Emission	**IEC/EN 61000-6-4**
Radio Interference Voltage	
Emission (Conducted)	IEC/EN 55011
0.15 - 30MHz	Class A (industrial)

Radio Interference Field	
Emission (Radiated)	IEC/EN 55011
30 - 1000MHz	Class B (light industry)

Note:

- Control input lines must be installed together to maintain products' susceptability 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.

Environmental Specifications

Operating Temperature	-30°C to 80°C (-22°F to 176°F)
Storage Temperature	-40°C to 100°C (-40°F to 212°F)
RoHS (2002/95/EC)	Compliant
Impact resistance (EN50155, EN61373)	15/11 g/ms

Vibration resistance (2-100Hz, EN50155, EN61373)	2g per axis
Relative humidity	95% non-condensing @ 40°C
UL flammability rating (housing)	UL 94 V0

Connection Specifications

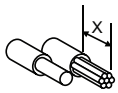
POWER CONNECTIONS: **2/T1** **1/L1**

Use 75°C copper (Cu) conductors


Stripping Length (X) 11mm 8mm

Torque specifications UL: 2.5Nm (22 lb-in)

	M5, Pozidriv2 IEC: 2.5 - 3.0Nm (22 - 26.6lb-in)	M4, Pozidriv2 IEC: 2.0 - 2.5Nm (17.7 - 22lb-in)
Rigid (Solid& Stranded)	1 x 2.5..25mm²	1 x 2.5..10mm²
UL/CSA rated data	1 x 14..3 AWG	1 x 14..8 AWG
	1 x 14..10 AWG	1 x 14..10 AWG
Flexible with end sleeve	1 x 2.5..16mm²	1 x 2.5..6mm²
	1 x 14..6 AWG	1 x 14..10AWG
Flexible without end sleeve	1 x 4..25mm²	1 x 4..10mm²
	1 x 12..3 AWG	1 x 12..8AWG



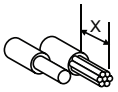

CONTROL & AUXILIARY CONNECTIONS: A1(+), A2(-), IN, OUT

Use 60/75°C copper (Cu) conductors

Stripping Length (X) 6mm

Torque specifications UL: 0.5Nm (4.4lb-in)
IEC: 0.4- 0.5Nm (3.5 - 4.4lb-in)


Rigid (Solid& Stranded) 1 x 0.5..2.5mm²
UL/CSA rated data 1 x 18..12 AWG

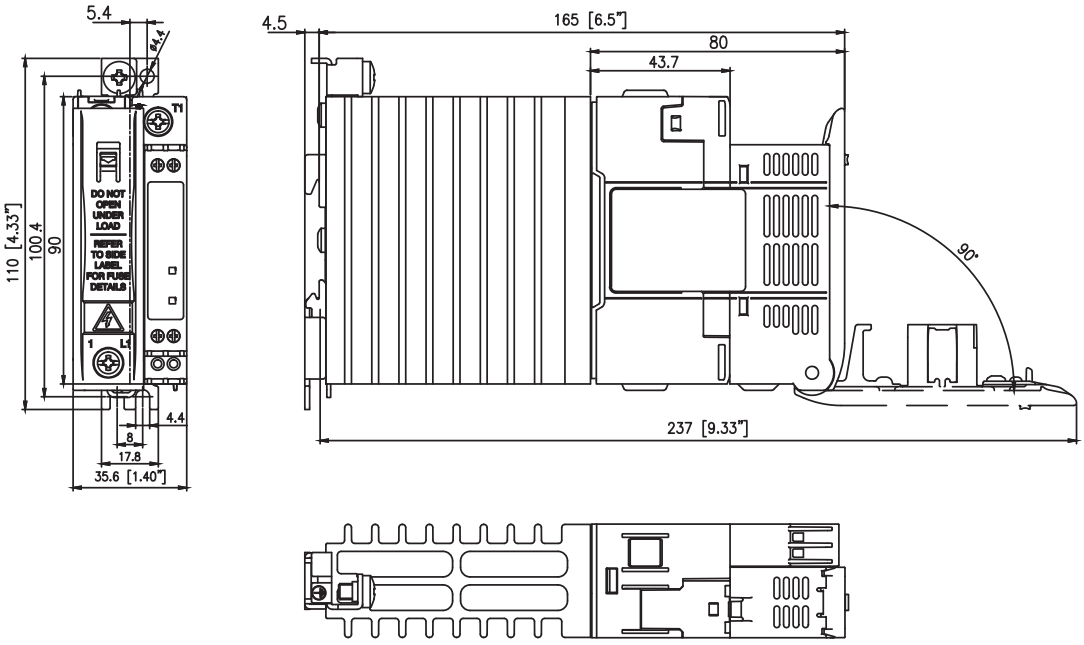


Flexible without end sleeve 1 x 0.5..2.5mm²
1 x 18..12AWG

Protective Earth Connection M5, 1.5Nm (13.3 in-lb)

Note: M5 PE screw not provided with SSR. PE connection required when product is intended to be used in Class 1 applications according to EN/IEC 61140.

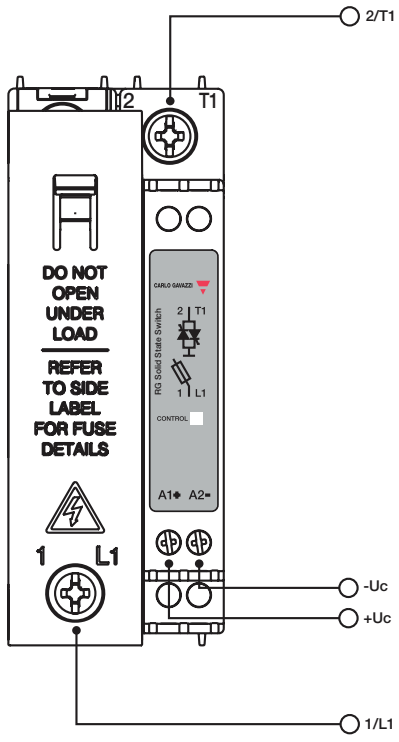
Dimensions



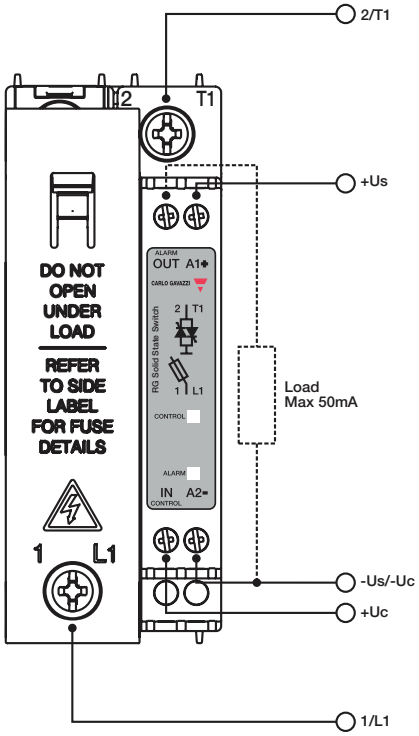
Note: fuse is included in product

* Housing width tolerance +0.5mm, -0mm…as per DIN43880
All other tolerances: ± 0.5mm
All dimensions in mm

Terminal Markings and Connection Diagrams



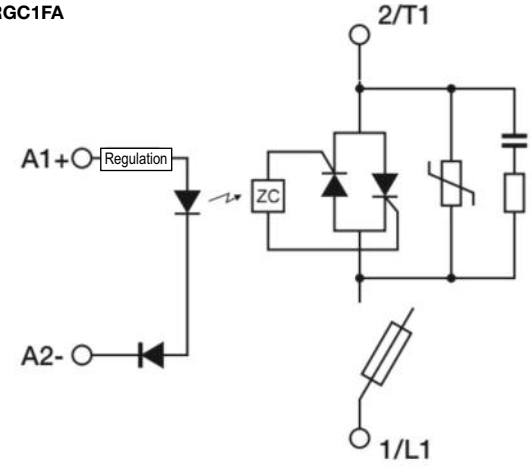
RGC1FA
1/L1 : Line voltage connection
2/T1: Load connection
A1(+): Positive control signal, +Us
A2(-): Ground connection, - Us



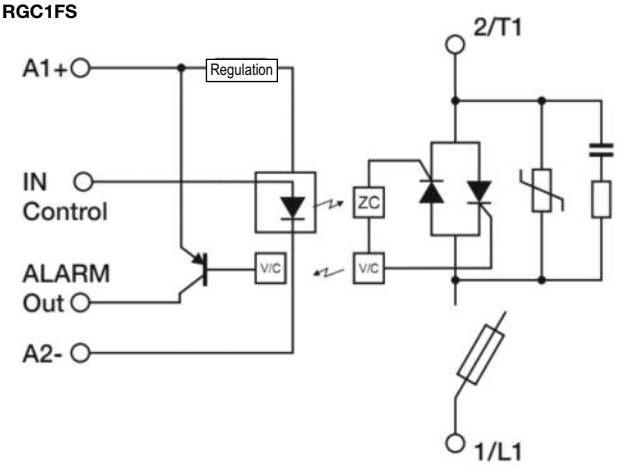
RGC1FS
1/L1 : Line voltage connection
2/T1: Load connection
A1(+): + 24VDC supply signal, +Us
A2(-): Ground connection, -Us / - Uc
OUT: Alarm output
IN : Control input, +Uc

Schematic Diagrams

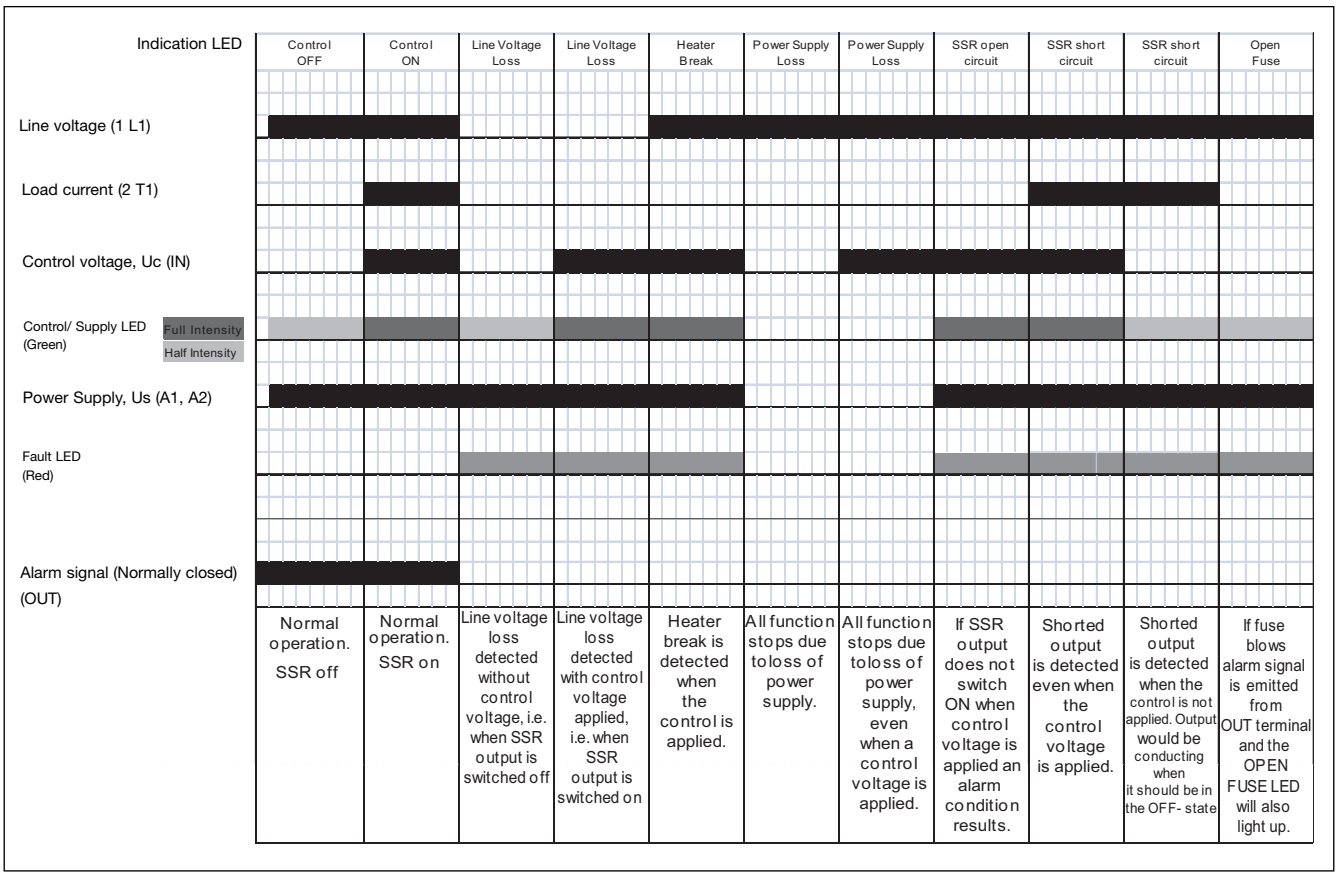
RGC1FA



RGC1FS



Function Diagram: RGC1FS



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 LED.
- 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. fuse size [A]	Class	Current [kA]	Voltage [VAC]
RGC1F..20	30	J or CC	100	Max. 600 VAC
RGC1F..30	30	J or CC	100	Max. 600 VAC

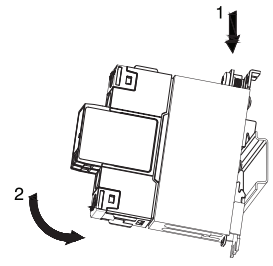
For UL applications an external Class J fuse shall be installed. Tests with Class J fuses are representive of Class CC fuses.

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.

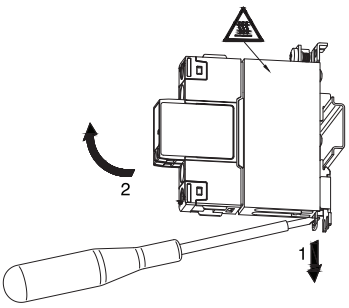
Co-ordination type 2 - Semiconductor fuses (integrated)

Part No.	Max. fuse size [A]	Type (Siba)	Type (Cooper Bussman)	Current [kA]	Voltage [VAC]
RGC1F..20	25	50 124 34. 25	FWP-25A14F	100	Max. 600
RGC1F..30	30	50 124 34. 30	FWP-30A14F	100	Max. 600
RGC1F..40	40	50 124 34. 40	FWP-40A14F	100	Max. 600

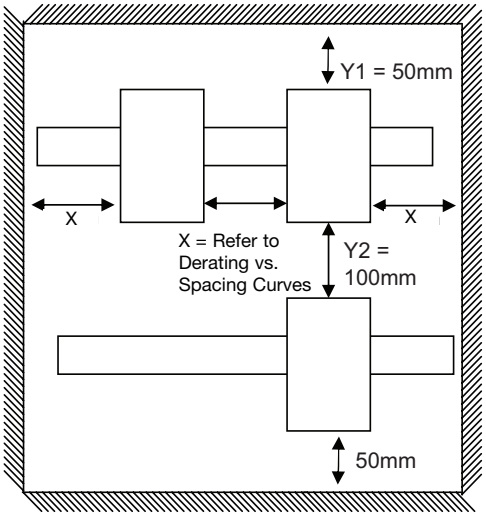
Installation Instructions



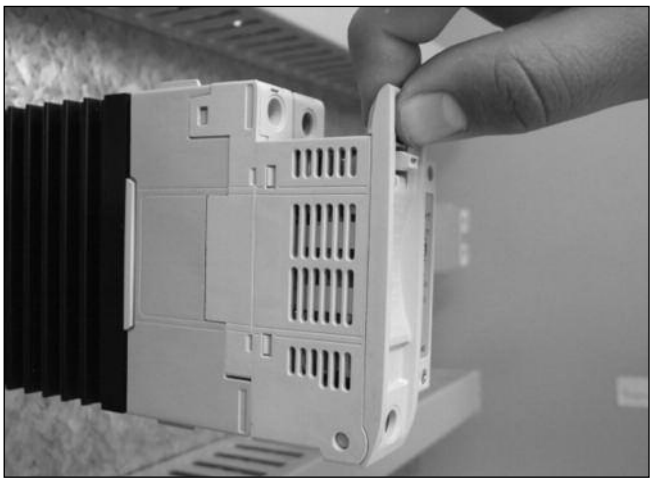
Mounting on DIN rail



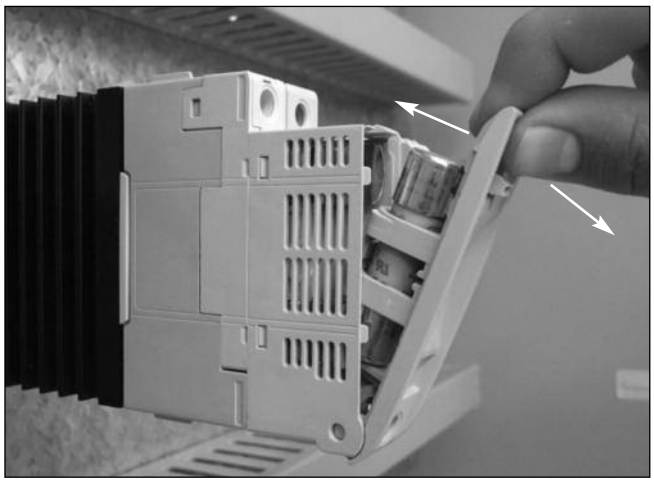
Dismounting from DIN rail



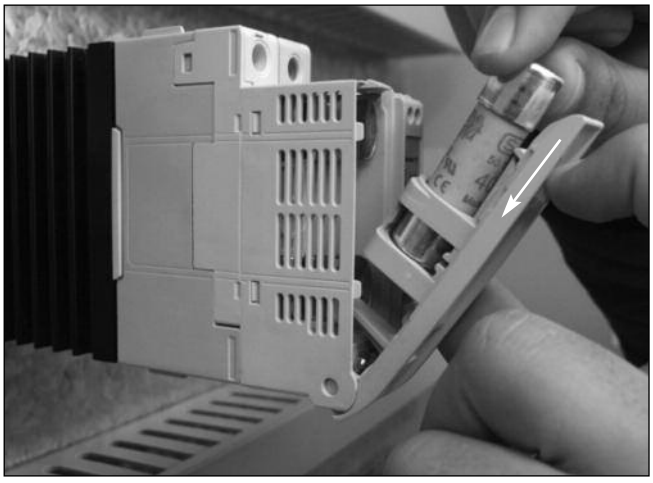
Fuse Changing Instructions



1. Preperation 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

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Product	Code	Reference	Product link
Selected parameters SYSTEM DIN-rail Mount CURRENT RATING CATEGORY 11 - 25 AAC RATED VOLTAGE 230 VAC OUTPUT SWITCHING MODE Zero Cross NUMBER OF POLES 1 CONTROL DC - DIGITAL POWER CONNECTION Box Clamp MODEL Solid State Contactor with Integrated Fuse Others CURRENT RATING 20 AAC at 40°C (104°F) CONTROL INPUT 3 - 32 VDC PRODUCT WIDTH 35mm	RGC1FS23D20GGE		Buy on EAN