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

- 35 mm 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 powerswitch 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 35 mm for the whole range and covers up to 600 VAC and 40 AAC.
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	60: 600 VAC	D: 4.5 - 32 VDC	20: 20 AAC 30: 30 AAC 40: 40 AAC	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
600 VAC	Fuse Only	4.5 -32 VDC	RGC1FA60D20GGE	RGC1FA60D30GGE	RGC1FA60D40GGE
600 VAC	Fuse + Sensing	4.5 -32 VDC	RGC1FS60D20GGE	RGC1FS60D30GGE	RGC1FS60D40GGE

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Output Voltage Specifications

Operational Voltage Range (+10%, -15% on max)	42-600 VAC
Blocking Voltage	1200 Vp
Internal Varistor	625 V

General Specifications

Latching voltage (across L1-T1)	≤20 V
Operational frequency range	45 to 65 Hz
Power factor	0.5 at rated voltage
Touch Protection	IP20
LEDs RGC1FS RGC1FS	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)	50 mADC, 35 VDC

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 (IEC60947-4-2 / 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/µs	1000 V/µs	1000 V/µs

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

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

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

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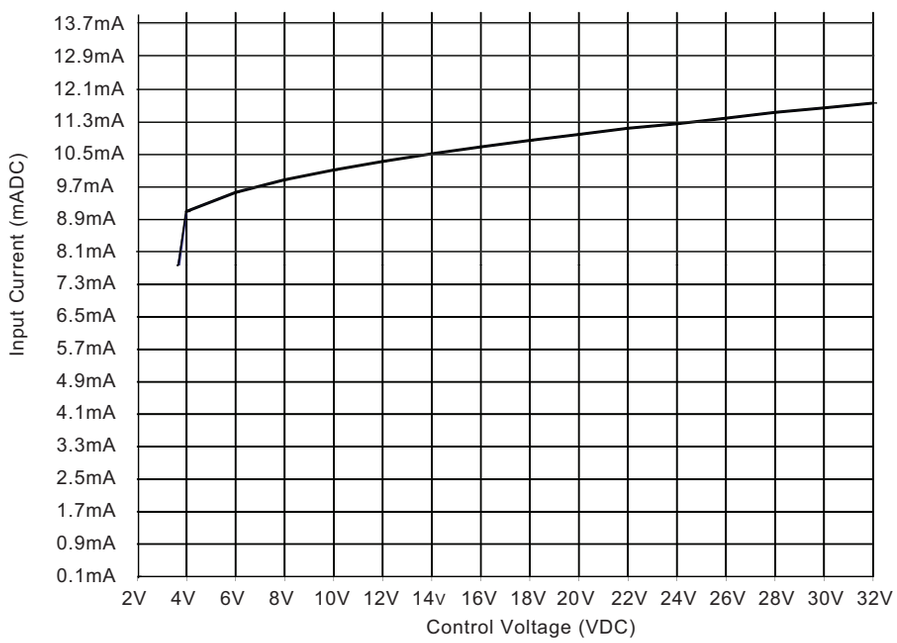
Control Input Specifications

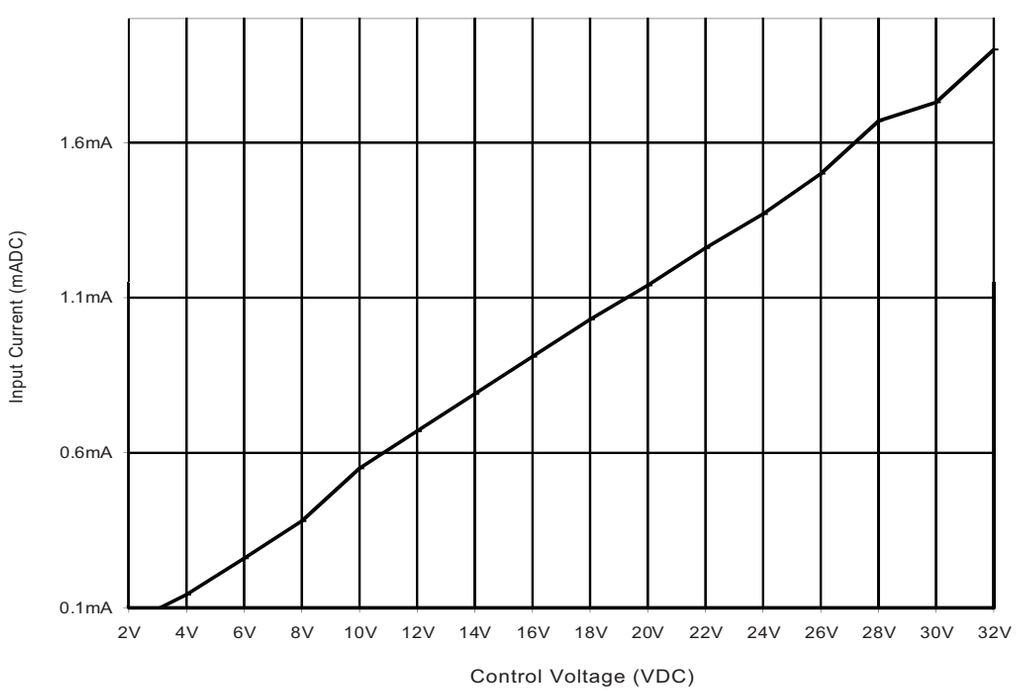
Control voltage range, U_C	
RGC1FA	
A1+, A2	4.5 - 32 VDC
RGC1FS	
IN, A2	4.5 - 32 VDC
Pick-up voltage	4 VDC

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

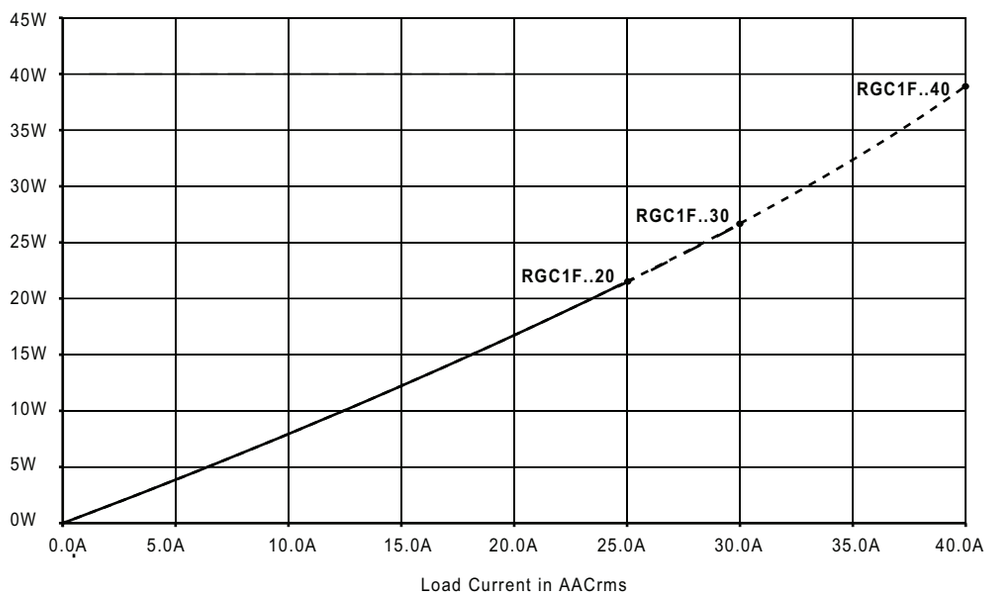
RGC1FA... (A1+, A2-)



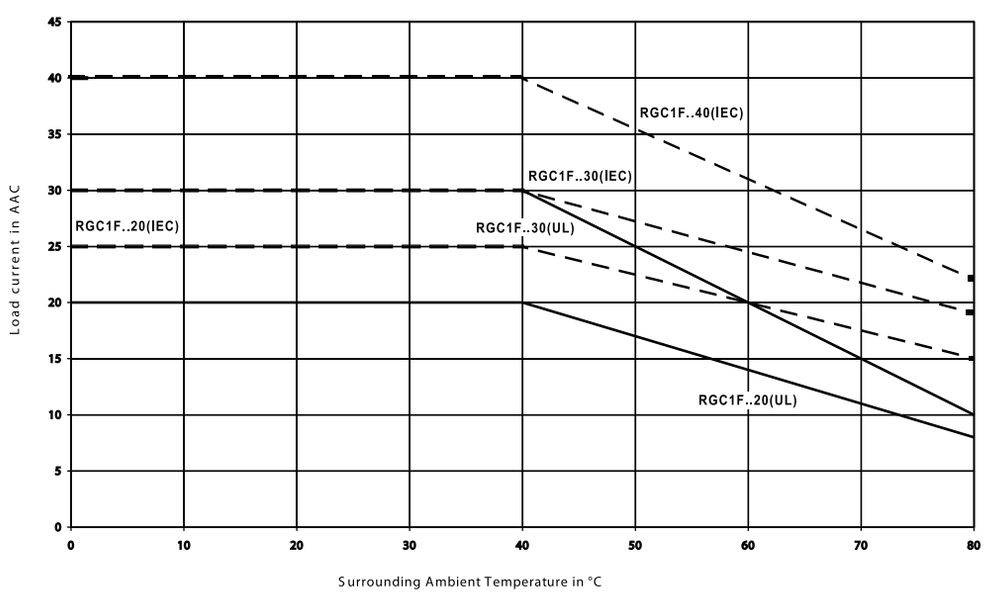
RGC1FS... (IN, A2-)



Output Power Dissipation

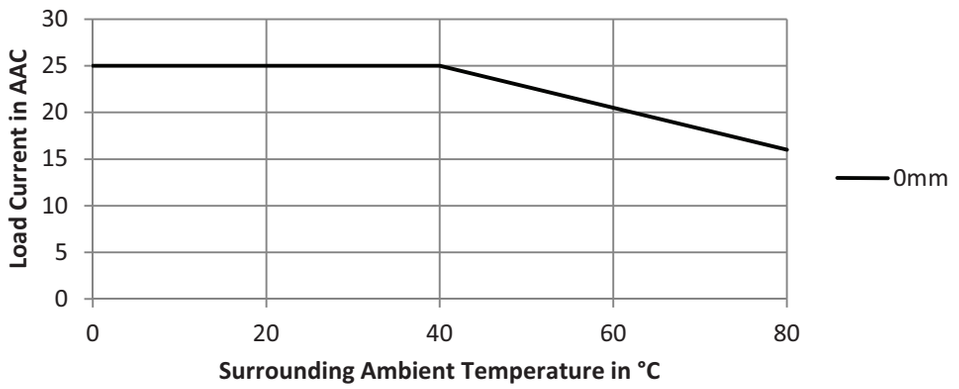


Current Derating (UL 508/ EN/IEC 60947-4-2/-3)

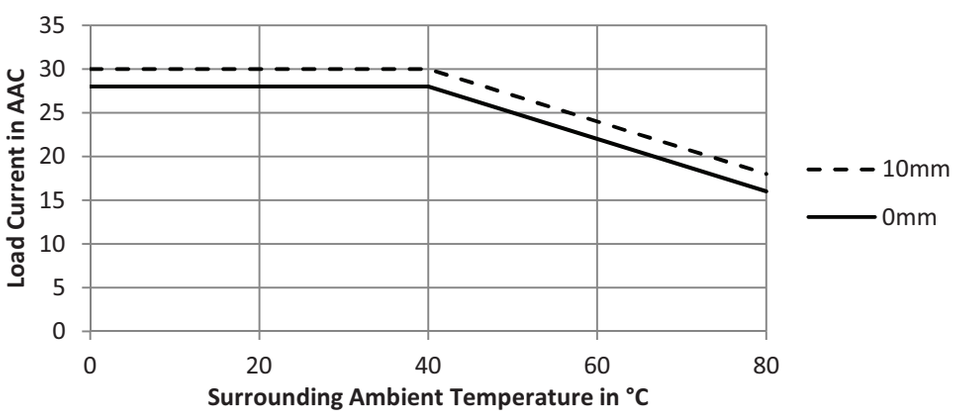


Derating vs. Spacing Curves

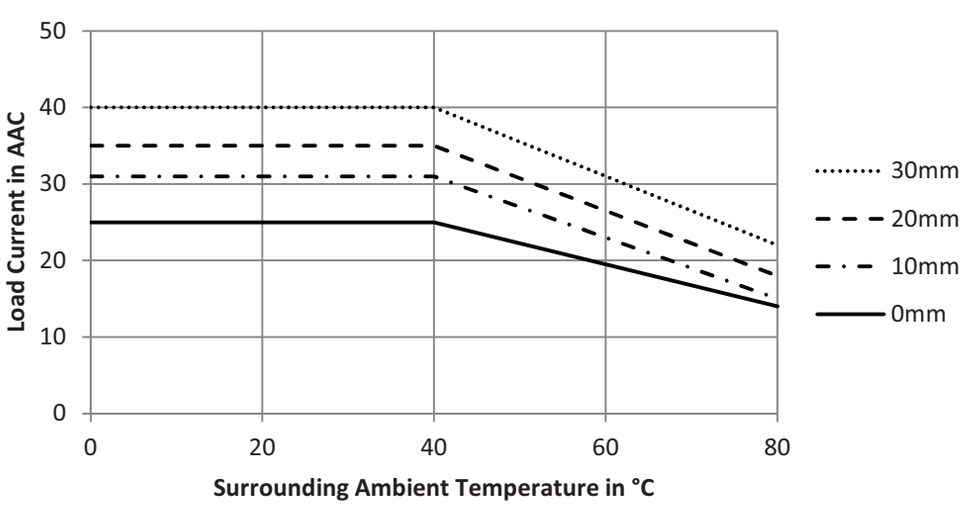
RGC1F..20



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	100 kA (UL508)

Electromagnetic Compatibility

EMC Immunity	EN 60947-4-3
Electrostatic Discharge (ESD) Immunity	IEC/EN 61000-4-2
Air discharge, 8 kV	Performance Criteria 2
Contact, 4 kV	Performance Criteria 2
Electrical Fast Transient (Burst) Immunity	IEC/EN 61000-4-4
Output: 4 kV, 5 kHz	Performance Criteria 2
Input: 1 kV, 5 kHz	Performance Criteria 2
Electrical Surge Immunity	IEC/EN 61000-4-5
Output, line to line, 1 kV	Performance Criteria 1
Output, line to earth, 2 kV	Performance Criteria 1
Signal, line to line, 1 kV	Performance Criteria 2
Signal, line to earth, 2 kV	Performance Criteria 2

EMC Emission	EN 60947-4-3
Radio Interference Voltage Emission (Conducted)	IEC/EN 55011
0.15 - 30 MHz	Class A (industrial)

Radiated Radio Frequency Immunity	IEC/EN 61000-4-3
10V/m, 80 - 1000 MHz	Performance Criteria 1
10V/m, 1.4 - 2.0 GHz	Performance Criteria 1
3V/m, 2.0 - 2.7 GHz	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	Performance Criteria 2
40% for 10 cycles	Performance Criteria 2
70% for 25 cycles	Performance Criteria 2
80% for 250 cycles	Performance Criteria 2
Voltage Interruptions Immunity	IEC/EN 61000-4-11
0% for 5000 ms	Performance Criteria 2

Radio Interference Field Emission (Radiated)	IEC/EN 55011
30 - 1000 MHz	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)
EU RoHS compliant	Yes
China RoHS compliant	Refer to Environmental Information (page 11)
Impact resistance (EN50155, EN61373)	15/11 g/ms

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

Connection Specifications

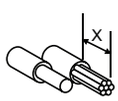
POWER CONNECTIONS: **2/T1** **1/L1**

Use 75°C copper (Cu) conductors

Stripping Length (X) 11 mm 8 mm

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..25 mm²	1 x 2.5..10 mm²
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..16 mm²	1 x 2.5..6 mm²
	1 x 14..6 AWG	1 x 14..10AWG
Flexible without end sleeve	1 x 4..25 mm²	1 x 4..10 mm²
	1 x 12..3 AWG	1 x 12..8AWG



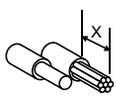
CONTROL & AUXILIARY CONNECTIONS: A1(+), A2(-), IN, OUT

Use 60/75°C copper (Cu) conductors

Stripping Length (X) 6 mm

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

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

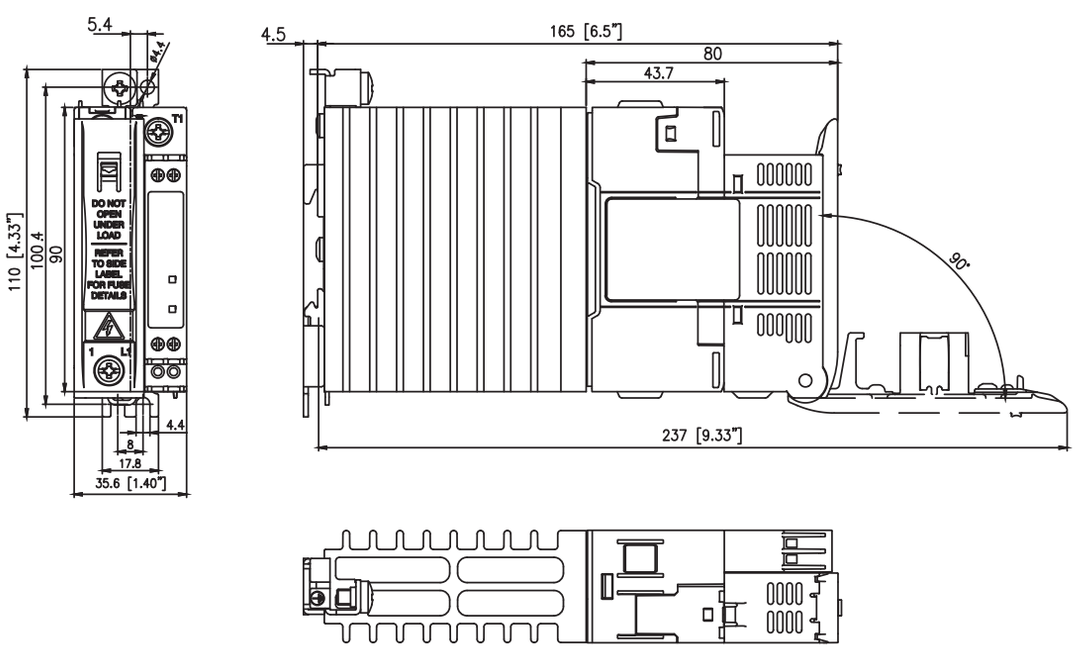


Flexible without end sleeve 1 x 0.5..2.5 mm²
1 x 18..12AWG

Protective Earth Connection M5, 1.5 Nm (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.

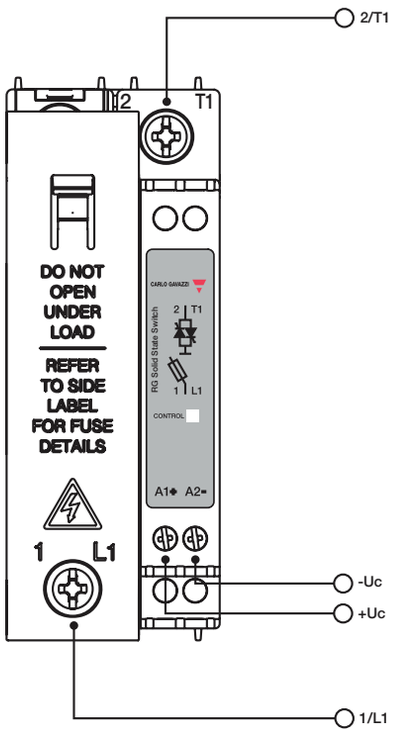
Dimensions



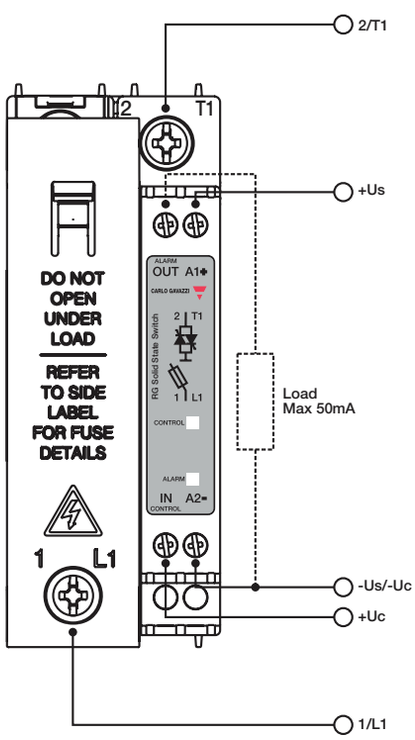
Note: fuse is included in product

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

Terminal Markings and Connection Diagrams

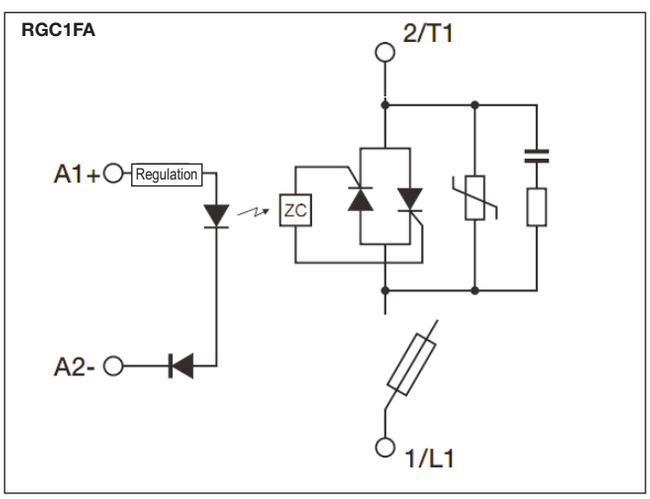


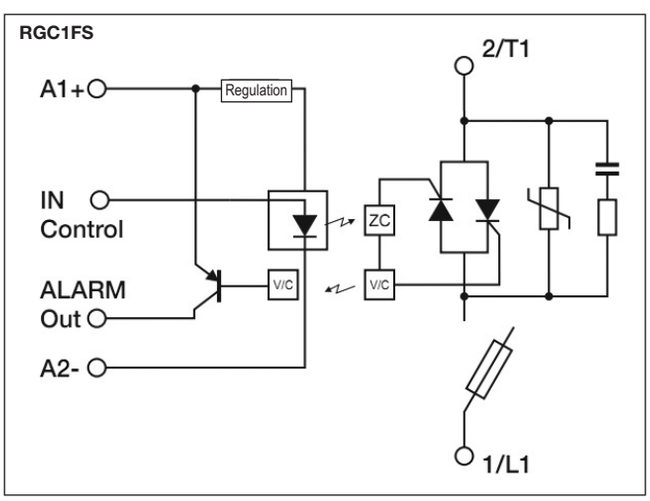
RGC1FA
1/L1 : Line voltage connection
2/T1: Load connection
A1(+): Positive control signal, +Us
A2(-): Ground connection, - Us



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





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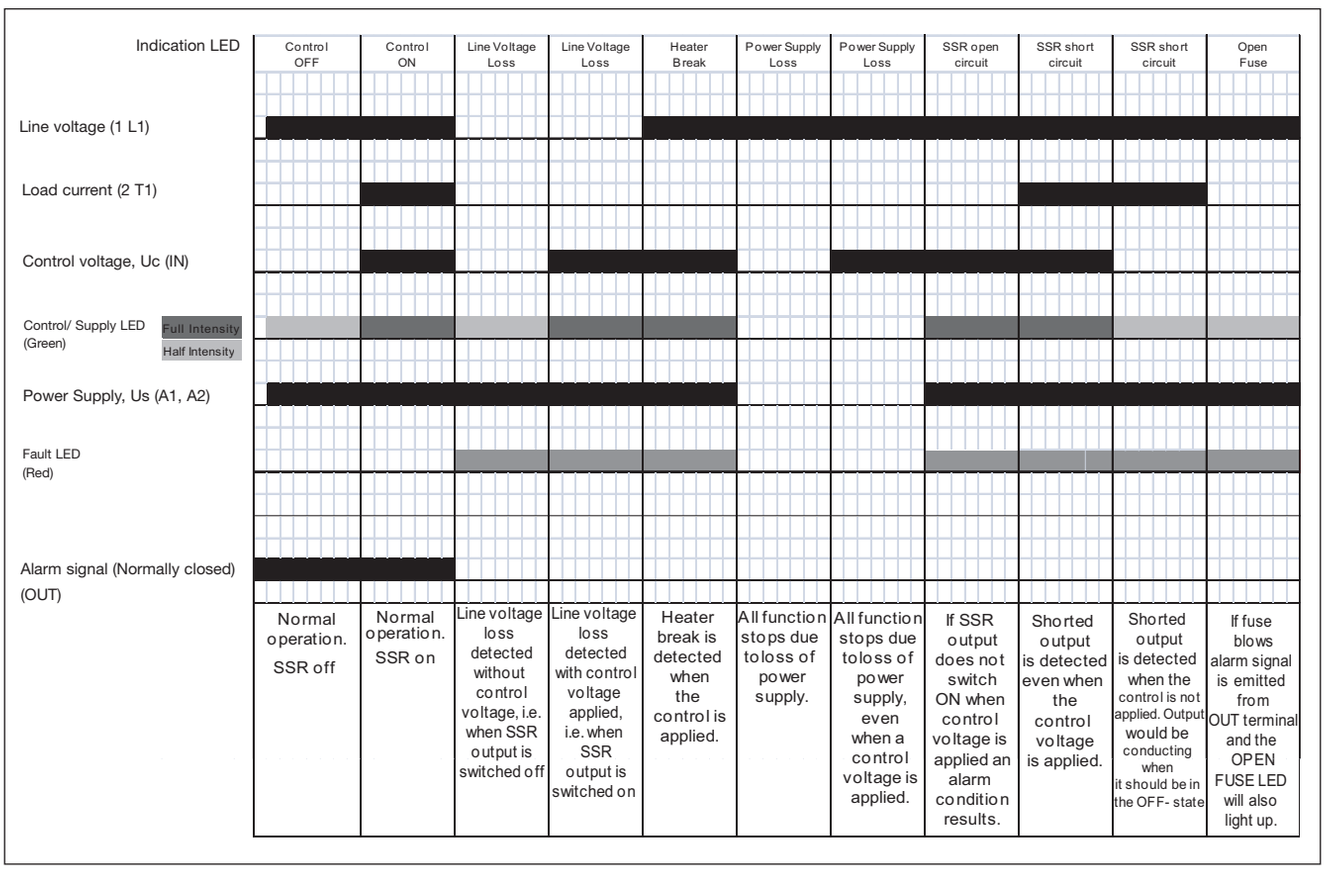
Function Diagram: RGC1FS



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

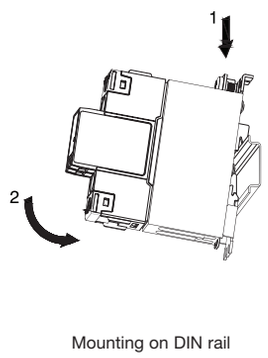
For UL applications an external Class J fuse shall be installed. Tests with Class J fuses are representive of Class CC fuses.

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.

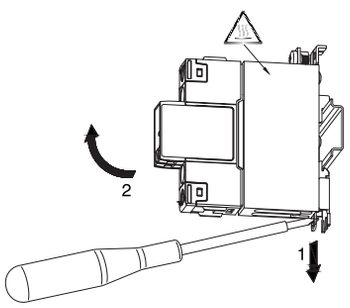
Co-ordination type 2 - Semiconductor fuses (integrated)

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

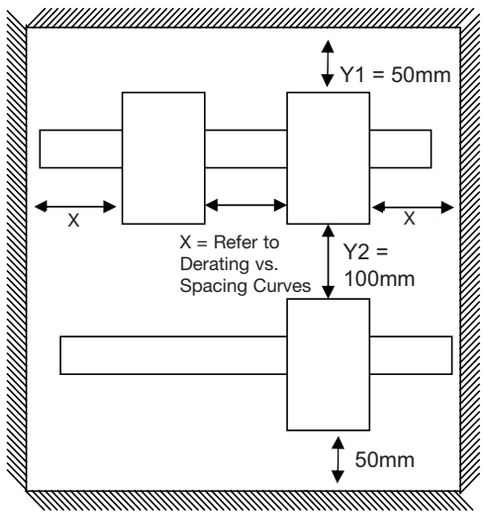
Installation Instructions



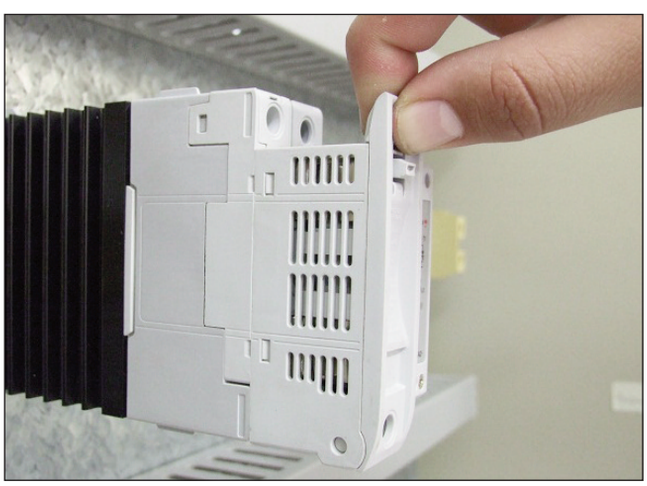
Mounting on DIN rail



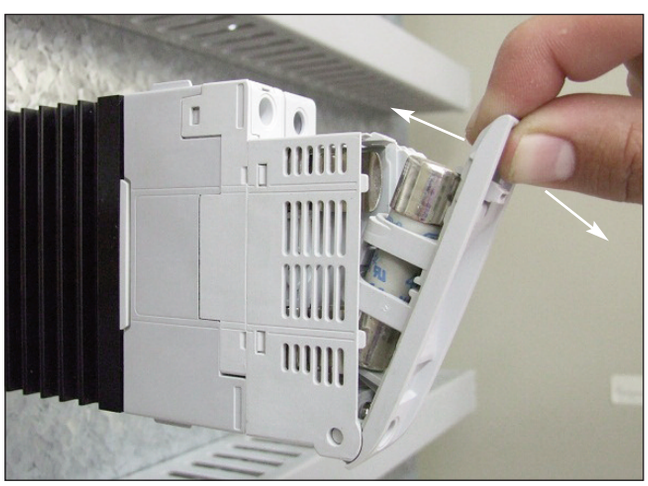
Dismounting from DIN rail



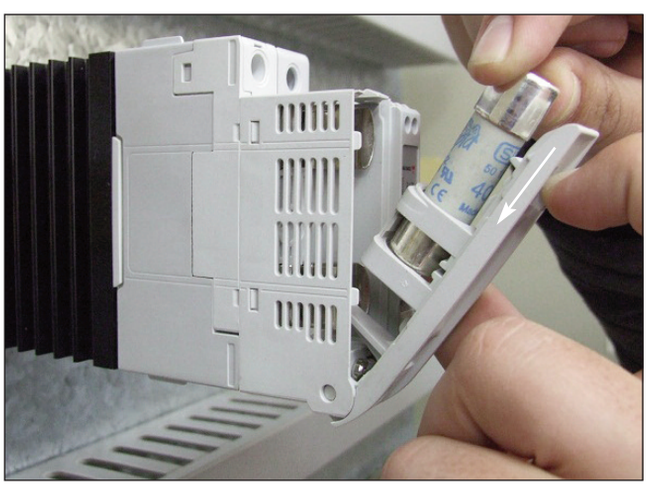
Fuse Changing Instructions



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

Environmental Information

The declaration in this section is prepared in compliance with People's Republic of China Electronic Industry Standard SJ/T11364-2014: Marking for the Restricted Use of Hazardous Substances in Electronic and Electrical Products.

Part Name	Toxic or Harardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(Vl))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Power Unit Assembly	x	O	O	O	O	O

O: Indicates that said hazardous substance contained in homogeneous materials fot this part are below the limit requirement of GB/T 26572.

X: Indicates that said hazardous substance contained in one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.

环境特性

这份申明根据中华人民共和国电子工业标准
SJ/T11364-2014：标注在电子电气产品中限定使用的有害物质

零件名称	有毒或有害物质与元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(Vl))	多溴化联苯 (PBB)	多溴联苯醚 (PBDE)
功率单元	x	O	O	O	O	O

O:此零件所有材料中含有的该有害物低于GB/T 26572的限定。

X: 此零件某种材料中含有的该有害物高于GB/T 26572的限定。