



RG Series

Switch

RG Series

Concentrated Power

Carlo Gavazzi introduces the first solid state relay and contactor in the smallest DIN dimensions of 17.5mm. The RG series offers solutions in very compact dimensions saving considerable panel space. The design is in line with European CE marking directives, the RoHS directive and is also certified by various international agencies.

The power semiconductor design utilised in the RG series is a technological evolution with a combination of an innovative thermal efficient design and state of the art automated assembly process. Manufacturing of the RG series is in an ISO 9001:2008 facility which is also certified ISO 140001: 2004



The new generation of Solid State Switches

• A Benchmark in Mechanical Design

The design of the RG series caters for vibrations up to 2g (5g for some models) and impact resistance of 15/11 g/ms according to the Railway Standards IEC/50155 and EN/IEC 61373:1999. This ensures that the products functionality is not altered in applications where the solid state switch is used in harsh environments subjected to considerable vibrations.

The solid state relay series introduced hereafter, can be mounted on any heatsinking surface. Distance between SSR heatsink mounting holes respects same distance as for 'hockey puck' switches which allows for retrofitting.

• Conformance to Standards

Apart from certifications in accordance to US and Canadian requirements as per UL 508 and CSA C22.2 No. 14-10 standards respectively, the RG series conforms to the harmonised EN standards EN/IEC 60947-4-2 and EN/IEC 60947-4-3 covering resistive and slightly inductive load applications as well as motor switching. The design also conforms to the new solid state relay standard EN/IEC 62314. Third party independent certification is also attained through VDE Testing Laboratories. Additionally, some models are certified by Germanischer Lloyd for use in the marine industry.

Solutions for your needs

SSRs & Contactor Solutions – RGS, RGC, RGH series

This series encompasses 1-phase solid state switching solutions for resistive, slightly inductive as well as motor loads. Solutions are available with or without integrated heatsink. The RGS series presents the market with the slimmest 1-phase solid state relay in a DIN standard dimension of 17.5mm. Maximum ratings go up to 600VAC, 90AAC.

The RGC & RGH series provide solutions with integrated heatsink eliminating the need of calculations to determine heatsink sizing. Minimum rating @ 40°C is 20AAC in 17.5mm going up to 85AAC in 70mm.

The RGH series distinguishes itself with solutions having a blocking voltage of 1600Vp and high I²t making the RGH ideal for protection with MCBs.



DC Output Switching – RGS1D, RGC1D series

This series of 1-phase Solid State DC Switches is primarily intended for switching of strings in photovoltaic panels. Output voltage ratings range from 24 to 1000VDC with a peak blocking voltage of 1200Vp.

The RGS1D solid state relay is rated up to 25ADC whilst the RGC1D, which is an integrated heatsink solution in 17.5mm, is rated maximum 15ADC at a surrounding ambient temperature of 40°C.



Protection against excessive heating – RGC1..P series

Solid state switch Over-Temperature Protection is an optional feature available with the RGC series. Thyristor operation is continuously monitored and the unit switches off in case of overheating.

Alarm status is readily visible by a red LED on the front plate of the unit as well as an alarm signal output. The alarm condition resets itself automatically when the overheating condition is rectified.



Integrated Fuse Protection – RGC1F series

The RGC1F series is equipped with integrated protection by means of an onboard, easily accessible, semiconductor fuse. The RGC1FS is a more elaborate version that provides additional monitoring.

Apart from protection and switching, the RGC1FS is able to detect load, fuse and solid state switch fault such as shorted SSR, open circuit SSR, open fuse and heater loss. An alarm output is available for remote indication.



Load Current & Circuit Monitoring - RGS1S, RGC1S series

The RG Current Sensing series has integrated current monitoring permitting detection in load current variations. Partial load failure is detected when current flowing is <16.67% from set point. In this failure mode the unit remains operational but alarm signalling is available.

This feature ensures consistent process control since load condition is continuously monitored. Apart from partial load failure detection, the RGC1S and RGS1S monitor for SSR over temperature, heater loss, mains supply loss and shorted SSR. Alarm condition is visible through a red LED and also an alarm output signal.



RG Series

Options

SSR or Contactor Configuration

The output power terminals can be either in a contactor configuration, the 'E' types or in a solid state relay configuration, the 'U' types.

This helps the installer to organise cabling in the desired way and make retro-fitting more easy. The connection configuration is designated by the letter 'E' or 'U' at the end of the part number.



Spring-loaded Input Terminal

The spring-loaded terminal for the control connection enables faster cable installation. The control terminal is also pluggable and this also provides the possibility of connecting printed circuit boards directly into the control terminal of the product.



Accessories for RGS



Thermal Pad: RGHT

Thermal interface between SSR and heatsink is necessary for adequate thermal dissipation. The thermal pad is an alternative to the thermal paste process. The RGHT is a pack of 10 thermal pads sized to fit the RGS footprint having adhesive on one side. This can be pre-mounted from the factory when adding suffix 'HT' to the RGS part number when ordering.



Spring Plugs: RGM25

The RG...M.E versions have the possibility of pluggable spring connections. A plug is provided with each SSR with model RG...M.E. The RGM25 is a bag consisting of 10 such connectors.



Heatsink: RHS37A

The RGC & RGH series come equipped with integrated heatsink. The RHS37A heatsink has very small dimensions and allows for any RGS model to be mounted on this heatsink when space is an issue. For having RGS pre-mounted from factory it is necessary to add suffix 'H51' to the RGS part number when ordering.

Applications

HVAC

The RG design does not include any moving parts or contacts. The power semiconductors switch on and off according to the logic signal received from the temperature controller. In contrast with conventional SSRs, RG can switch up to 20AAC continuously in a width of only 17.5mm.

Benefits:

- Reduction of panel space makes it easier for fitting and also retrofitting of SSR
- Silent operation



Food and Beverage

RG series is RoHS compliant and does not include any mercury. It can operate in a relative non-condensing humidity of 95%. There is no contacts and no arcing involved as in the case of mechanical contactors. The 17.5mm width makes it possible for use in small coffee machines/ovens.

Benefits:

- Long operating lifetime
- Environmental friendly
- Promotes health safety in food & beverage environments



Plastic and Rubber

The RG Series is completely solid state and if operated within the limits, it will survive long operating lifetime and includes integrated protection against transients. The product is qualified and tested above the EMC norms and is 100% tested at production stage in automated equipment.

Benefits:

- High Process and machine reliability
- Reduced maintenance and downtime costs



Slimline RG

RGS, RGC, RGH Series

This new range of solid state switches is designed in a modular fashion offering great flexibility in adapting solutions for the various installation needs. Various configurations are available within the three range of families; the RGS, RGC and RGH series.

The RGS is a family of solid state switches intended for panel mounting. In most cases an external heatsink is required and the user has the flexibility to design own heatsink and adapt panel design accordingly.

The RGC series offers solutions ready for use as the switch is equipped with an integrated heatsink. Various ratings, specified at 40°C, are available. The RGH series is based on the RGC series but offers higher specifications of blocking voltage and I²t values versus its RGC counterparts.



AC Output Solid State Switches

• RGS Series

- Ratings up to 600VAC, 90AAC in 17.5mm width
- Zero Cross or Instant On (Random) Switching
- DC & AC control ranges: 3-32VDC & 20-275VAC (24-190VDC)
- Control green LED indication
- Integrated varistor
- Motor Ratings according to UL508
- 100kArms SCCR
- E type or U type configuration
- Control spring loaded plug available



• RGC and RGH Series

- Ratings up to 600VAC, 20AAC in 17.5mm, 30AAC in 22.5mm, 40AAC in 35mm, 60AAC in 70mm up to 85AAC in 70mm
- Zero Cross or Instant On (Random) Switching
- DC & AC control ranges: 3-32VDC & 20-275VAC (24-190VDC)
- Control green LED indication
- Integrated varistor
- Motor Ratings according to UL508
- 100kArms SCCR
- E type or U type configuration
- Control spring loaded plug available
- Optional Over Temperature Protection by adding suffix 'P'
- 1600Vp blocking voltage and 6600A²s as I²t for RGH series



GL approval is applicable to RGC models up to 30A

Slimline RG

RGC1D, RGS1D Series



A photovoltaic installation is a long-term investment with a determined pay-back time. This can only be sustained if downtimes are kept to a minimum through the use of reliable equipment. For this reason, Carlo Gavazzi offers 1-phase Solid State DC Switches which provide a longer operating lifetime when compared to electromechanical solutions. This is in addition to the monitoring and smart control systems as well as surge protectors that Carlo Gavazzi offers.*

RGC1D and RGS1D can switch a string of photovoltaic panels. This is done through an IGBT power semiconductor which is protected by an integrated free-wheeling diode. Operational temperature covers maximum 80°C

* Ask for more information about EOS - Array Control Systems and L-Guard Series of Surge protectors from a Carlo Gavazzi representative.*



RGS1D – Solid State Relay

- Current ratings include 15ADC and 25ADC
- Output Voltage rating 24-1000VDC (600VDC for UL), 1200V blocking voltage
- Control voltage: 4.5–32 VDC

RGC1D – Solid State Contactor

- Solid State assembly solution for DIN mounting
- Current rating is 15ADC @ 40°C
- Output Voltage rating 24–1000VDC (600VDC for UL), 1200V blocking voltage
- Control voltage: 4.5–32 VDC



DC Output Solid State Switches

• Repeatable and Reliable

There are no mechanical contacts in the construction. Hence no contact arcing degradation and no voltage transients are produced during switching. The products are completely solid state and this contributes to a better pay back by eliminating the need for frequent replacements.

• Space Saving Design

All products have a width of only 17.5mm and this promotes compact control panel designs. RGC1D has this dimension throughout its whole depth including the heatsink. Alternatively RGS1D units can be mounted close together onto one heatsink sized for the total current being switched.

• Fast Switching and Efficient Heat Dissipation

Due to the combination of IGBT technology, direct copper bonding and the latest technology for power semiconductor assembly, this series of DC Solid State switches can boast of efficient heat dissipation as well as fast switching response times.

• Remote Switching

With a Solid State Relay or Contactor, strings of photovoltaic panels can be switched remotely in a flexible manner either for energy optimization purposes in smart string control systems or for preventive maintenance purposes.



Note: cULus is available for RGC1D only. UR and CSA are available for RGS1D only.

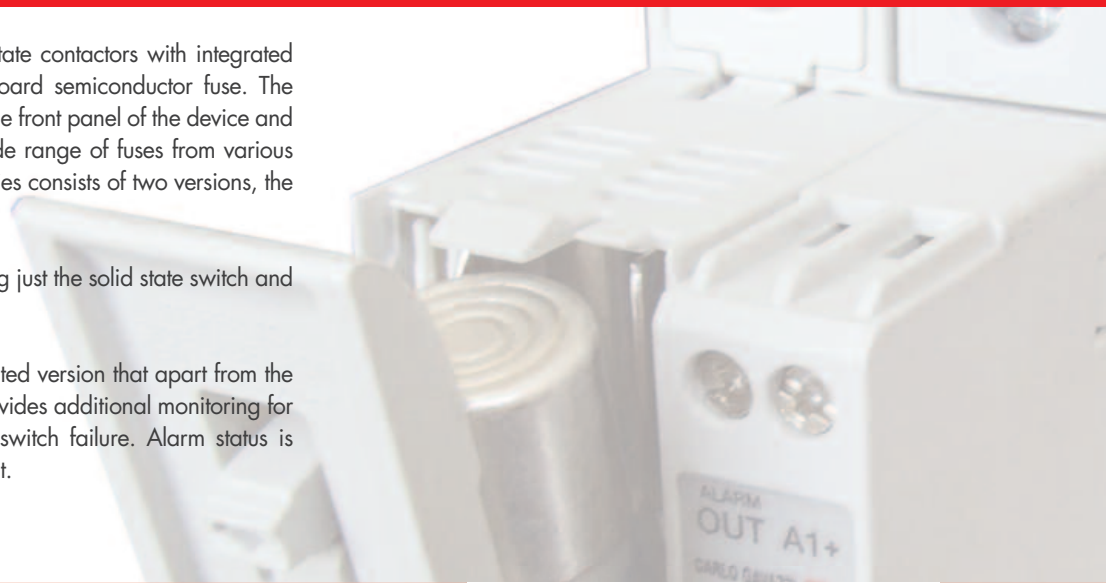
RGC1F

Integrated Fuse Protection

The RGC1F is a series of solid state contactors with integrated protection by means of an on-board semiconductor fuse. The fuse is easily accessible through the front panel of the device and fuse holders utilised accept a wide range of fuses from various renowned manufacturers. The series consists of two versions, the RGC1FA and the RGC1FS.

The RGC1FA is a version including just the solid state switch and the fuse.

The RGC1FS is a more sophisticated version that apart from the fuse and the solid state switch provides additional monitoring for load presence, fuse failure and switch failure. Alarm status is available through an alarm output.



Features

- 35mm product width
- Zero cross switching
- Maximum output voltage up to 600VAC
- Current ratings 20AAC, 30AAC, 40AAC @ 40°C
- DC control range: 4 – 32VDC
- Integrated varistor across output for overvoltage protection
- 100kArms short circuit current rating
- Load loss, open fuse, open SSR & shorted SSR detection with RGC1FS



Fit and Forget

Four features provided in 1 Solid State Switch

- **Switch**
Solid state switch with integrated heatsink
- **Protection**
Integrated fuse holder and fast acting semiconductor fuse for protection against short circuits up to 100kArms
- **Monitoring**
Monitoring and Detection of open fuse, load loss, open solid state switch and shorted solid state switch
- **Alarm**
Visual indication through a red LED on the front plate and a normally closed, open collector, alarm output for remote signalling

Added Benefits

- **Higher Installation Efficiency**
Integrated solutions like the RGC1F give rise to reduction in installation times leading to potential cost savings. Related connection procedures between protection circuit and solid state switch are eliminated as the solution provided is ready for use with the only remaining power connections being the mains supply and the load.
- **Less Panel Space**
All features associated with this series are fitted in a product with a width dimension of 35mm. This enables more economic utilisation of panel space or alternatively a reduction in panel dimensions.
- **Procuring & Stock Keeping**
Since all features are provided within one unit provided by one single supplier it is possible for purchasing departments to reduce the list of the different components that need to be acquired and stocked.



The RG Current Sensing (CS) features integrated current measurement allowing for monitoring of load current variations. The solid state switch is TEACHed on the load current to be used as a reference either remotely or locally through a TEACH button on the front panel.

The RG CS compares the actual load versus the set point and in case of deviation $>16.67\%$ raises an alarm. Apart from the partial load failure detection, the RG CS monitors for other fault conditions; switch over temperature, heater loss, switch short or open circuit. An alarm output signal is present in any fault condition. A red LED provides a visual indication. The description of the fault is readily available through the flashing sequence of this LED.



Note: cULus is available for RGC1S series only. UR and CSA apply for the RGS1S series.



Features

- With or without integrated heatsink (RGC1S, RGS1S respectively)
- 22.5mm width for max. 30AAC up to 85AAC in 70mm @ 40°C
- Up to 6,600A²s for protection by MCB
- Zero cross switching
- Maximum output voltage up to 600VAC
- DC control range of 4 – 32VDC
- Integrated varistor for overvoltage protection
- LEDs for Control, Load and Alarm status indication
- Alarm output signal for switch or load malfunction



Plug and Play

Added Benefits

• Easy setup

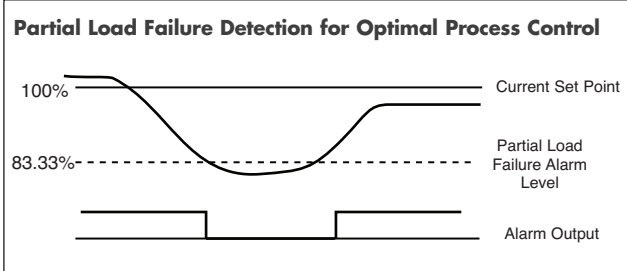
The RG CS provides a simple, ready to use solution eliminating the need of additional external components for current monitoring. There is no need to pass power cables through holes. This eliminates potential difficulties in alignment and avoids any limitations in the cross sectional area of cables that might be used.

• Self Taught

There is no need to calculate the current flowing through the RG CS and adjust settings accordingly to have a reference set point. This is simply done through a TEACH button or remote signal which when pressed or applied triggers the RG CS to self TEACH on the load current.

• Connectivity

The RG CS in a 35mm footprint (rating $>30AAC$) has box clamp power terminals capable of handling 25mm² cables. Cables can be fitted in the clamp and secured, thus reducing installation times. The control terminals are double box clamps allowing for safe looping.



The alarm output, which is normally closed, opens as soon as current deviates from current set point by $>16.67\%$. The RG CS does not switch off the output when this alarm is raised but operates in accordance to demand. The alarm output self recovers when monitored load current deviation versus set point is $<16.67\%$. A consistent temperature control process is thus guaranteed. This alarm indication of a possibly faulty heater or heater malfunction advises of needed intervention without affecting the ongoing process.

Slimline RG

RG Series

Selection Guide - RGS1..E

Rated Output Voltage	Blocking Voltage	Connection Control/ Power	Control Voltage	Rated Operational Current @ 40 °C			
				25 AAC	50 AAC	75 AAC	90 AAC
230 VAC, ZC	800Vp	x / Screw	3-32 VDC	RGS1A23D25xKE	RGS1A23D50xKE	RGS1A23D75KKE	-
		x / Screw	20-275 VAC, 24-190 VDC	RGS1A23A25xKE	RGS1A23A50xKE	RGS1A23A75KKE	-
600 VAC, ZC	1200Vp	x / Screw	4-32 VDC	RGS1A60D25xKE	RGS1A60D50xKE	RGS1A60D75xKE	RGS1A60D90xKE
		x / Screw	20-275 VAC, 24-190 VDC	RGS1A60A25xKE	RGS1A60A50xKE	RGS1A60A75xKE	RGS1A60A90xKE
	1600Vp	Screw/Screw	4-32 VDC	-	RGS1A60D51KKE	RGS1A60D71KKE	RGS1A60D91KKE
		Screw/Screw	20-275 VAC, 24-190 VDC	-	RGS1A60A51KKE	RGS1A60A71KKE	RGS1A60A91KKE
600 VAC, IO	1200Vp	Screw/Screw	4-32 VDC	RGS1B60D25KKE	RGS1B60D50KKE	RGS1B60D75KKE	RGS1B60D90KKE

Selection Guide - RGS1..U

Rated Output Voltage	Blocking Voltage	Connection Control/ Power	Control Voltage	Rated Operational Current @ 40 °C	
				20 AAC	30 AAC
230 VAC, ZC	800Vp	Screw / Box Clamp	3-32 VDC	RGS1A23D20KGU	RGS1A23D30KGU
		Screw / Box Clamp	20-275 VAC, 24-190 VDC	RGS1A23A20KGU	RGS1A23A30KGU
600 VAC, ZC	1200Vp	Screw / Box Clamp	4-32 VDC	RGS1A60D20KGU	RGS1A60D30KGU
		Screw / Box Clamp	20-275 VAC, 24-190 VDC	RGS1A60A20KGU	RGS1A60A30KGU
600 VAC, IO	1200Vp	Screw / Box Clamp	4-32 VDC	RGS1B60D20KGU	RGS1B60D30KGU

Selection Guide - RGC1F

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

Selection Guide - RGC1D, RGS1D

Mounting Type	Output Voltage Range	Control Voltage	Current Rating @ 40 °C	
			15 ADC	25 ADC
Panel mount (Solid State Relay)	24 - 1000 VDC	4.5 - 32 VDC	RGS1D1000D15KKE	RGS1D1000D25KKE
DIN-rail (Solid State Contactor)	24 - 1000 VDC	4.5 - 32 VDC	RGC1D1000D15KKE	-

Selection Guide - RGH1

Rated Output Voltage	Blocking Voltage	Connection Control/ Power	Control Voltage	Connection Type	Rated Operational Current @ 40 °C (I ² t value in brackets)			
					20 AAC (6600 A ² s)	23 AAC (1800 A ² s)	23 AAC (6600 A ² s)	30 AAC (6600 A ² s)
600VAC, ZC	1600Vp	x/Screw	4-32 VDC	E-type	RGH1A60D15xKE	RGH1A60D20xKE	RGH1A60D21xKE	RGH1A60D31xKE
			20 - 275 VAC, 24-190 VDC	E-type	RGH1A60A15xKE	RGH1A60A20xKE	RGH1A60A21xKE	RGH1A60A31xKE
600VAC, ZC	1600Vp	x/Box clamp	4-32 VDC	E-type	RGH1A60D40KGE	RGH1A60D41xGE	RGH1A60D60KGE	
			20 - 275 VAC, 24-190 VDC	E-type	RGH1A60A40KGE	RGH1A60A41xGE	RGH1A60A60KGE	
		Screw/Box clamp	4-32 VDC	U-type	-	RGH1A60D41KGU	RGH1A60D60KGU	
			20 - 275 VAC, 24-190 VDC	U-type	-	RGH1A60A41KGU	RGH1A60A60KGU	

x represents the control connection type, x = K for screw control terminals, x = M for spring pluggable control terminal

Note: ZC = Zero Cross Switching, IO = Instant ON Switching

Selection Guide - RGC1

Rated Output Voltage	Blocking Voltage	Rated Operational Current @ 40°C	Control Voltage	E-type Control/ Power Screw/ Screw	E-type Control/ Power Spring/ Screw	E-type Control/ Power Screw/ Box Clamp	E-type Control/ Power Spring/ Box Clamp	U-type Control/ Power Screw/ Box Clamp
230VAC, ZC	800Vp	20 AAC	x	RGC1A23x15KKE	RGC1A23x15MKE	-	-	RGC1A23x15KGU
		23 AAC	x	RGC1A23x20KKE	RGC1A23x20MKE	-	-	RGC1A23x20KGU
		30 AAC	x	RGC1A23x30KKE	RGC1A23x30MKE	-	-	RGC1A23x30KGU
		40 AAC	x	-	-	RGC1A23x40KGE	RGC1A23x40MGE	RGC1A23x40KGU
		60 AAC	x	-	-	RGC1A23x60KGE	-	RGC1A23x60KGU
600VAC, ZC	1200Vp	20 AAC	x	RGC1A60x15KKE	RGC1A60x15MKE	-	-	RGC1A60x15KGU
		23 AAC	x	RGC1A60x20KKE	RGC1A60x20MKE	-	-	RGC1A60x20KGU
		30 AAC	x	RGC1A60x30KKE	RGC1A60x30MKE	-	-	RGC1A60x30KGU
		40 AAC	x	-	-	RGC1A60x40KGE	RGC1A60x40MGE	RGC1A60x40KGU
		60 AAC	x	-	-	RGC1A60x60KGE	-	RGC1A60x60KGU
600VAC, IO	1200Vp	20 AAC	x	RGC1B60x15KKE	-	-	-	RGC1B60x15KGU
		23 AAC	x	RGC1B60x20KKE	-	-	-	RGC1B60x20KGU
		30 AAC	x	RGC1B60x30KKE	-	-	-	RGC1B60x30KGU
		40 AAC	x	-	-	RGC1B60x40KGE	-	RGC1B60x40KGU
		60 AAC	x	-	-	RGC1B60x60KGE	-	RGC1B60x60KGU

x represents the control voltage type; x = D for 3-32VDC, 4-32VDC for 600V versions; x = A for 20-275VAC, 24-190VDC

Selection Guide - RGC1..P

Rated Output Voltage	Blocking Voltage	Rated Operational Current @ 40°C	Control Voltage	E-type Control/ Power Box Clamp/ Screw	E-type Control/ Power Box Clamp/ Box Clamp	U-type Control/ Power Box Clamp/ Box Clamp
230VAC, ZC	800Vp	23 AAC	5-32VDC	RGC1A23D20GKEP	-	-
		30 AAC	5-32VDC	RGC1A23D30GKEP	-	-
		85 AAC	5-32VDC	-	RGC1A23D90GGEP	RGC1A23D90GGUP
600VAC, ZC	1200Vp	23 AAC	y	RGC1A60y20GKEP	-	-
		30 AAC	y	RGC1A60y30GKEP	-	-
		40 AAC	y	-	RGC1A60y40GGEP	RGC1A60y40GGUP
		60 AAC	y	-	RGC1A60y60GGEP	RGC1A60y60GGUP
		85 AAC	y	-	RGC1A60y90GGEP	RGC1A60y90GGUP

y represents the control voltage type; y = D for 5-32VDC; y = A for 20-275VAC, 24-190VDC

Selection Guide - RGC1S

Rated Output Voltage	Blocking Voltage	Rated Operational Current @ 40°C	Control Voltage	E-type Control/ Power Box Clamp/ Screw	E-type Control/ Power Box Clamp/ Box Clamp	U-type Control/ Power Box Clamp/ Box Clamp
600VAC, ZC	1200Vp	23 AAC	4 - 32VDC	RGC1S60D20GKEP	-	-
		30 AAC	4 - 32VDC	RGC1S60D30GKEP	-	-
		30 AAC, high I ² t	4 - 32VDC	RGC1S60D31GKEP	-	-
		40 AAC, high I ² t	4 - 32VDC	-	RGC1S60D41GGEP	RGC1S60D41GGUP
		60 AAC, high I ² t	4 - 32VDC	-	RGC1S60D61GGEP	RGC1S60D61GGUP
		85 AAC	4 - 32VDC	-	RGC1S60D90GGEP	-

Selection Guide - RGS1S

Rated Output Voltage	Blocking Voltage	Rated Operational Current @ 40°C	Control Voltage	E-type Control/ Power Box Clamp/ Screw	E-type Control/ Power Box Clamp/ Box Clamp	U-type Control/ Power Box Clamp/ Box Clamp
600VAC, ZC	1200Vp	23 AAC	4 - 32VDC	RGS1S60D20GKEP	-	-
		30 AAC	4 - 32VDC	RGS1S60D30GKEP	-	-
		30 AAC, high I ² t	4 - 32VDC	RGS1S60D31GKEP	-	-
		60 AAC, high I ² t	4 - 32VDC	-	RGS1S60D61GGEP	RGS1S60D61GGUP

Note: ZC = Zero Cross switching, IO = Instant On switching