



RG series: 1-phase solid state switching solutions

Switches

RG series

A new generation of solid state switches

The RG series is the latest addition to the range of Solid State Relays (SSRs) and Solid State Contactors (SSCs) offered by Carlo Gavazzi. With this series, Carlo Gavazzi continues to distinguish itself as a leader in Solid State Switching by introducing the first SSR and SSC in the smallest DIN dimension of 17.5mm.

The RG series adapts an innovative thermal efficient design which translates to compact solutions available throughout the RG range. Panel space savings up to 25% is possible with RG solid state relays. The wire bonding technology used for the output chip assembly reduces thermal and mechanical stress providing a longer lifetime for the solid state switch.

Manufacturing of the RG series is done in an ISO9001 facility which is also certified for ISO14001.



Enhanced reliability and panel space optimisation

Solid state relays: RGS1 series

These solutions do not have an integrated heatsink. The size and design of the heatsink, if required, is determined by the end user for the specific application where the SSR is to be used.

Carlo Gavazzi offers a range of heatsinks suitable for DIN, panel or thru wall mounting. Our Heatsink Selector Tool is available in our website: www.gavazziautomation.com and can be used for the selection of the most appropriate Carlo Gavazzi heatsink for the intended application.

Solid state contactors: RGC1, RGH1 series

These are out of the box ready to use solutions that have a factory mounted heatsink. Each product variant has a current derating curve that gives the maximum operational current at a specific working temperature.

Such solutions eliminate the need for the end user to calculate the heatsinking required for the correct operation of the solid state switch.

Additionally, these solutions are not approved as components and hence bear the UL listed mark instead of the UR mark.



Benefits

Long lifetime, less maintenance costs

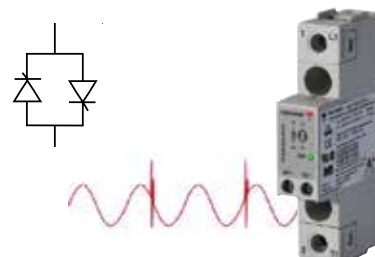
Thermal stress on the semiconductor is eliminated with the introduction of wire bonding. SSR lifetime is increased by 2 to 3 times as compared to other SSRs using only die solder technology



Low downtime

The switching of AC loads in the RG range is done with **back-to-back thyristors** which are well known for their superior specifications compared to other switching components.

The **integrated varistor** across the output of the solid state switch provides adequate protection against uncontrolled overvoltages. There is no need to connect this externally for conformance to the surge immunity test according to EN 61000-4-5



Easy and fast installation

- Integrated heatsink with the RGC series
- Pluggable spring connectors for the input terminals
- Box clamp variants provide robust connections for easy and fast connection of power cables up to 25mm² / AWG3



Space saving

The slimmest product in the range has a product width of only **17.5mm** giving a 25% space saving per SSR compared to the 22.5mm solutions.

Short circuit protection with MCBs

The I_t specification in the RG range goes up to **18,000A²s** in only 17.5mm product width. The RG with 18,000A²s is the ideal solution when protection of the SSR against short circuits with economic, easily accessible, Miniature Circuit Breakers is desired.



High UL fault current rating for panels

Industrial Control Panels designed according to UL508A need to have a short circuit current rating (SCCR) marking based on the lowest SCCR of the components used inside the panel. With **100kArms** SCCR for the RG series, Carlo Gavazzi SSRs are no limitation to panel builders needing a high SCCR marking on their panels.



UL 508A
Industrial
Control Panel

RG series

A complete product offering

Space saving solid state switching solutions for AC loads

RGS1 series

- 17.5mm product width
- Zero cross or Instant on
- Ratings up to 660 VAC, 90 AAC
- Blocking voltage up to 1600Vp
- 18,000 A²s for MCB protection
- AC or DC control

RGC1 series, RGH1 series

- Integrated heatsink
- Zero cross or Instant on (RGC1)
- Ratings up to 660 VAC, 85 AAC
- Blocking voltage 1200Vp, 1600Vp (RGH1)
- 18,000 A²s for MCB protection
- AC or DC control
- Optional overtemperature protection

1000 VDC switching solutions in 17.5mm product width

RGS1D series

- Ratings up to 1000 VDC, 25 ADC
- DC control

RGC1D series

- Integrated heatsink
- Ratings up to 1000 VDC, 15 ADC
- DC control

Fit and forget - Integrated fuse protection and system monitoring

RGC1FA series

- Integrated heatsink
- Onboard semiconductor fuse
- Zero cross
- Ratings up to 660 VAC, 40 AAC
- DC control

RGC1FS series

- Integrated heatsink
- Onboard semiconductor fuse
- Monitoring for open fuse, heater loss, SSR malfunction
- Zero cross
- Ratings up to 660 VAC, 40 AAC
- DC control

Monitor changes in heater characteristics with the RG current sensing

RGS1S series

- 1/6 partial load failure
- Loadloss, Mainsloss, overtemperature and SSR malfunction detection
- Zero cross
- Ratings up to 660 VAC, 90 AAC
- DC control

RGC1S series

- Integrated heatsink
- 1/6 partial load failure
- Loadloss, Mainsloss, overtemperature and SSR malfunction detection
- Zero cross
- Ratings up to 660 VAC, 85 AAC
- DC control

Power control with analog input solid state switches

RGS1P..AA, RGS1P..V series

- Phase angle, full cycle, advanced full cycle or soft start switching
- Ratings up to 660 VAC, 90 AAC
- 4-20mA, 0-10V, 1-5V, 0-5V, pot input

RGC1P..AA, RGC1P..V series

- Integrated heatsink
- Phase angle, full cycle, advanced full cycle or soft start switching
- Ratings up to 660 VAC, 63 AAC
- 4-20mA, 0-10V, 1-5V, 0-5V, pot input

Soft starting solution for SWIR heaters

RGS1P..K series

- Soft start switching
- Ratings up to 660 VAC, 90 AAC
- 24 VDC control

RGC1P..K series

- Integrated heatsink
- Soft start switching
- Ratings up to 660 VAC, 63 AAC
- 24 VDC control



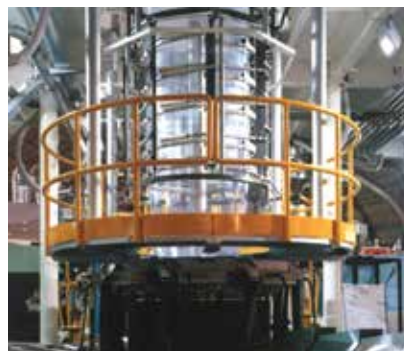
Applications

Plastic & Rubber

- Extrusion machines
- Blow moulding equipment
- Auxiliary equipment
- Plastic injection machines
- Film blow moulding
- Thermoforming

Benefits

- Trouble free operation over a large number of cycles
- Panel space optimisation with the RG small footprint
- UL listing facilitates equipment certification process
- 100kA short circuit current rating enables high fault rating for UL508A panels



Food & Beverage

- Electrical ovens
- Vending machines
- Fryers
- Coffee machines
- Griddles

Benefits

- Reliable operation in humid environments of 95% @ 40°C
- Conformance to legislation for restricted substances (RoHS)
- Glow wire flammability ratings for plastics conform to EN 60335 requirements



HVAC

- Air duct heaters
- Air handling units
- Dehumidifiers
- Underfloor heating

Benefits

- Long lifetime with a fully solid state solution
- Power control with an analog input fed directly to the RGC
- No annoying clicking sound (unlike with mechanical solutions)
- Energy efficiency with RGC1P phase angle mode for speed control of AC fans



Packaging & Wrapping

- Sealing process
- Sterilisation
- Shrink wrapping

Benefits

- Low downtime, less maintenance costs with integrated overvoltage protection
- Fast to install
- 18,000 A²s facilitates short circuit protection coordination



Semiconductor

- Soldering machines
- Drying

Benefits

- Long operating lifetime
- Space saving with the RG slim solutions
- Fault diagnostics with optional load and system monitoring
- Energy efficiency with power control solutions



Slimline RG

RGS series

In most cases, when utilising a solid state relay, a heatsink is required for heat dissipation. The size and shape of the heatsink is dictated by the specific application and is not always to be fitted in standard sized industrial control panels.

The RGS series does not have integrated heatsink and hence allows end users to design and adapt their own heatsinking solutions. Different heatsinks on which the RGS can be fitted are available from Carlo Gavazzi. Our Heatsink Selector Tool is available in our website: www.gavazziautomation.com

All variants in the RGS series are available in a platform with a product width of 17.5mm.



AC output solid state relays

RGS series

- 17.5 mm product width
- Ratings up to 660VAC, 90AAC
- Zero cross or Instant ON (Random) switching
- I² t up to 18,000A²s
- Control range: 4-32VDC, 20-275VAC (24-190VDC)
- Integrated varistor across output
- Motor ratings up to 4kW (400VAC), 15HP (600VAC)
- 100k Arms short circuit current rating acc. to UL508
- E' type or 'U' type configuration
- Box clamps for 25mm² / AWG 3 power cables
- Spring loaded control plug option

Mounting of RGS



Identical mounting hole spacing specifications



Applications



DIN mounting

RGS1 solid state relay can be DIN mounted by means of the RGS1DIN accessory. RGS1 rating up to 12AAC @ 40°C (104°F) when mounted on RGS1DIN



RGS Power Pack

A pack with maximum 11 RGS1.. on heatsink with integrated overheat protection. Rating per SSR goes up to 30AAC @ 40°C (104°F)



Thermal pads

An alternative to thermal paste: RGHT is a pack of 10 thermal pads. Suffix 'HT', hence RGS...HT, for factory mounted thermal pad



Heatsinks

A number of heatsinks are available for mounting the RGS on different heatsinks than those offered in the RGC series. The smallest heatsink in the range is a low profile 17.5mm heatsink, the RHS37A

Selection guide

'E' type configurations

Rated voltage, Blocking voltage, Switching mode	Connection Control/ power	Control voltage	25AAC (525A ² s) 17.5mm	50AAC (1800A ² s) 17.5mm	75AAC (3200A ² s) 17.5mm	90AAC (6600A ² s) 17.5mm	90AAC (18000A ² s) 17.5mm
230VAC, 800Vp ZC	x / Screw	3 - 32VDC	RGS1A23D25xKE	RGS1A23D50xKE	RGS1A23D75KKE	-	-
		20 - 275VAC (24 - 190VDC)	RGS1A23A25xKE	RGS1A23A50xKE	RGS1A23A75KKE	-	-
600VAC, 1200Vp ZC	x / Screw	4 - 32VDC	RGS1A60D25xKE	RGS1A60D50xKE	RGS1A60D75KKE	RGS1A60D90xKE	RGS1A60D92xKE
		20 - 275VAC (24 - 190VDC)	RGS1A60A25xKE	RGS1A60A50xKE	RGS1A60A75KKE	RGS1A60A90xKE	RGS1A60A92xKE
	x / Box	4 - 32VDC	-	RGS1A60D50xGE	-	-	RGS1A60D92xGE
		20 - 275VAC (24 - 190VDC)	-	RGS1A60A50KGE	-	-	RGS1A60A92KGE
600VAC, 1600Vp ZC	Screw / Screw	4 - 32VDC	-	RGS1A60D51KKE	-	RGS1A60D91KKE	-
		20 - 275VAC (24 - 190VDC)	-	RGS1A60A51KKE	-	RGS1A60A91KKE	-
600VAC, 1200Vp IO	Screw / Screw	4 - 32VDC	RGS1B60D25KKE	RGS1B60D50KKE	RGS1B60D75KKE	RGS1A60D90KKE	-

'U' type configurations

Rated voltage, Blocking voltage, Switching mode	Connection Control/ power	Control voltage	20AAC (525A ² s) 17.5mm	30AAC (1800A ² s) 17.5mm	-	-	-
230VAC, 800Vp ZC	Screw / Box	3 - 32VDC	RGS1A23D20KGU	RGS1A23D30KGU	-	-	-
		20 - 275VAC (24 - 190VDC)	RGS1A23A20KGU	RGS1A23A30KGU	-	-	-
600VAC, 1200Vp ZC	Screw / Box	4 - 32VDC	RGS1A60D20KGU	RGS1A60D30KGU	-	-	-
		20 - 275VAC (24 - 190VDC)	RGS1A60A20KGU	RGS1A60A30KGU	-	-	-
600VAC, 1200Vp IO	Screw / Box	4 - 32VDC	RGS1B60D20KGU	RGS1B60D30KGU	-	-	-

x = control connection type, x = 'K' for screw, x = 'M' for spring

ZC = Zero Cross Switching, IO = Instant On Switching

Further details are available on online datasheets at www.gavazziautomation.com

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Slimline RG

RGC and RGH series

Unlike the RGS series, the RGC and RGH have integrated heatsink and hence are referred to as ready to use solutions since end users do not need to calculate and mount the solid state switch on an additional heatsink.

Because of this, each variant in the RGC and RGH series has an associated current rating at a specific working ambient temperature that is determined by the size of the heatsink of that particular model. The physical sizes and hence ratings in the RGC and RGH series are dictated by the size of the heatsink.

The smallest product in the RGC and RGH range is a product with 17.5mm width and associated rating goes up to 25AAC @ 40°C. Product width in the RGC, RGH range goes up to 70mm extending the series to a maximum rating of 85AAC @ 40°C.



AC output solid state contactors

RGC series

- 1200Vp blocking voltage; I_{T1} up to 18,000A²s
- Current ratings at 40°C (104°F) up to 85AAC
- Operational voltage up to 660VAC
- Zero cross or Instant ON (Random) switching
- Control range: 4-32VDC, 20-275VAC (24-190VDC)
- Integrated varistor across output
- Motor ratings up to 4.4kW (400VAC), 15HP (600VAC)
- 100k Arms short circuit current rating acc. to UL508
- 'E' type or 'U' type configuration
- Spring loaded control plug option
- Optional overtemperature protection

RGH series

- 1600Vp blocking voltage; I_{T1} up to 6,600A²s
- Current ratings at 40°C (104°F) up to 60AAC
- Operational voltage up to 690VAC**
- Zero cross switching
- Control range: 4-32VDC, 20-275VAC (24-190VDC)
- Integrated varistor across output**
- Motor ratings up to 4.4kW (400VAC), 15HP (600VAC)
- 100k Arms short circuit current rating acc. to UL508
- 'E' type or 'U' type configuration
- Spring loaded control plug option



* GL applies only to RGC..15, RGC..20, RGC..25, RGC..30

** 690V version CE marking only and no varistor

Selection guide

'E' type configurations

Rated voltage, Blocking voltage, Switching mode	Control voltage	Power connection: Screw 'K'			Power connection: Box 'G'			
		20AAC (525A ² s) 17.5mm - Short	25AAC (1800A ² s) 17.5mm - Short	30AAC (1800A ² s) 22.5mm	40AAC (3200A ² s) 35mm	43AAC (18000A ² s) 35mm	60AAC (3200A ² s) 70mm	65AAC (18000A ² s) 70mm
230VAC, 800Vp ZC	3 - 32VDC	RGCI A23D15xKE	RGCI A23D25xKE	RGCI A23D30xKE	RGCI A23D40xGE	RGCI A23D42xGE	RGCI A23D60xGE	RGCI A23D62xGE
	20 - 275VAC (24 - 190VDC)	RGCI A23A15xKE	RGCI A23A25xKE	RGCI A23A30xKE	RGCI A23A40xGE	RGCI A23A42xGE	RGCI A23A60xGE	RGCI A23A62xGE
600VAC, 1200Vp ZC	4 - 32VDC	RGCI A60D15xKE	RGCI A60D25xKE	RGCI A60D30xKE	RGCI A60D40xGE	RGCI A60D42xGE	RGCI A60D60xGE	RGCI A60D62xGE
	20 - 275VAC (24 - 190VDC)	RGCI A60A15xKE	RGCI A60A25xKE	RGCI A60A30xKE	RGCI A60A40xGE	RGCI A60A42xGE	RGCI A60A60xGE	RGCI A60A62xGE
600VAC, 1200Vp IO	4 - 32VDC	RGCI B60D15xKE	RGCI B60D25xKE	RGCI B60D30xKE	RGCI B60D40xGE	RGCI B60D42xGE	RGCI B60D60xGE	RGCI B60D62xGE

Rated voltage, Blocking voltage, Switching mode	Control voltage	Power connection: Screw 'K'			Power connection: Box 'G'			
		23AAC (6600A ² s) 17.5mm - Short	23AAC (1800A ² s) 17.5mm - Short	30AAC (6600A ² s) 22.5mm	40AAC (1800A ² s) 35mm	40AAC (6600A ² s) 35mm	60AAC (6600A ² s) 70mm	65AAC (18000A ² s) 70mm
600VAC, 1600Vp ZC	3 - 32VDC	RGHI A60D15xKE	RGHI A60D20xKE	RGHI A60D31xKE	RGHI A60D40KGE	RGHI A60D41xGE	RGHI A60D60KGE	-
	20 - 275VAC (24 - 190VDC)	RGHI A60A15xKE	RGHI A60A20xKE	RGHI A60A31xKE	RGHI A60A40KGE	RGHI A60A41xGE	RGHI A60A60KGE	-

'U' type configurations

Rated voltage, Blocking voltage, Switching mode	Control voltage	Power connection: Box 'G'			Power connection: Box 'G'			
		20AAC (525A ² s) 17.5mm - Short	25AAC (1800A ² s) 17.5mm - Short	30AAC (1800A ² s) 22.5mm	40AAC (3200A ² s) 35mm	43AAC (18000A ² ss) 35mm	60AAC (3200A ² s) 70mm	65AAC (18000A ² s) 70mm
230VAC, 800Vp ZC	3 - 32VDC	RGCI A23D15KGU	RGCI A23D25KGU	RGCI A23D30KGU	RGCI A23D40KGU	RGCI A23D42KGU	RGCI A23D60KGU	RGCI A23D62KGU
	20 - 275VAC (24 - 190VDC)	RGCI A23A15KGU	RGCI A23A25KGU	RGCI A23A30KGU	RGCI A23A40KGU	RGCI A23A42KGU	RGCI A23A60KGU	RGCI A23A62KGU
600VAC, 1200Vp ZC	4 - 32VDC	RGCI A60D15KGU	RGCI A60D25KGU	RGCI A60D30KGU	RGCI A60D40KGU	RGCI A60D42KGU	RGCI A60D60KGU	RGCI A60D62KGU
	20 - 275VAC (24 - 190VDC)	RGCI A60D15KGU	RGCI A60A25KGU	RGCI A60A30KGU	RGCI A60A40KGU	RGCI A60A42KGU	RGCI A60A60KGU	RGCI A60A62KGU
600VAC, 1200Vp IO	4 - 32VDC	RGCI A60D15KGU	RGCI B60D25KGU	RGCI B60D30KGU	RGCI B60D40KGU	RGCI B60D42KGU	RGCI B60D60KGU	RGCI B60D62KGU

Rated voltage, Blocking voltage, Switching mode	Control voltage	Power connection: Screw 'G'			Power connection: Screw 'G'			
		23AAC (1800A ² s) 17.5mm - Short	25AAC (1800A ² s) 17.5mm - Short	30AAC (6600A ² s) 22.5mm	40AAC (1800A ² s) 35mm	40AAC (6600A ² s) 35mm	60AAC (6600A ² s) 70mm	65AAC (18000A ² s) 70mm
600VAC, 1600Vp ZC	3 - 32VDC	-	-	-	-	RGHI A60D41 KGU	RGHI A60D60KGU	-
	20 - 275VAC (24 - 190VDC)	-	-	-	-	RGHI A60A41 KGU	RGHI A60A60KGU	-

Integrated over temperature protection

Rated voltage, Blocking voltage, Switching mode	Control voltage	Config.	23AAC (525A ² s) 22.5mm	25AAC (1800A ² s) 22.5mm short	30AAC (1800A ² s) 22.5mm			
600VAC, 1200Vp ZC	5 - 32VDC	E - type	RGCI A60D20GKEP	RGCI A60D25GKEP	RGCI A60D30GKEP			
	20 - 275VAC (24 - 190VDC)	E - type	RGCI A60A20GKEP	RGCI A60A25GKEP	RGCI A60A30GKEP			

Rated voltage, Blocking voltage, Switching mode	Control voltage	Config.	40AAC (3200A ² s) 35mm	43AAC (18000A ² s) 35mm	60AAC (3200A ² s) 70mm	65AAC (18000A ² s) 70mm	85AAC (6600A ² s) 70mm + fan	85AAC (18000A ² s) 70mm + fan
600VAC, 1200Vp ZC	5 - 32VDC	E - type	RGCI A60D40GGEP	RGCI A60D42GGEP	RGCI A60D60GGEP	RGCI A60D62GGEP	RGCI A60D90GGEP	RGCI A60D92GGEP
	20 - 275VAC (24 - 190VDC)	E - type	RGCI A60D40GGUP	-	RGCI A60D60GGUP	-	RGCI A60D90GGUP	-
		U - type	RGCI A60A40GGEP	RGCI A60A42GGEP	RGCI A60A60GGEP	RGCI A60A62GGEP	RGCI A60A90GGEP	RGCI A60A92GGEP
		U - type	RGCI A60A40GGUP	-	RGCI A60A60GGUP	-	RGCI A60A90GGUP	-

x = control connection type, x = 'K' for screw, x = 'M' for spring

ZC = Zero Cross Switching, IO = Instant On Switching

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Current sensing

RGC1S and RGS1S series

The RG Current Sensing (CS) series is able to detect variations in the load current thanks to its integrated current measurement. The load current to be used as a reference is set and recorded through a TEACH procedure which can be done either locally or remotely.

During operation, the actual load current is compared to the set point and if a deviation $>16.67\%$ ($1/6$) is observed an alarm is issued to signal a partial load failure. This feature allows 6 loads to be connected to one solid state switch and have a detection of load failure in case only one of the loads fail.

Upon issue of the partial load failure alarm, the output of the solid state switch is not inhibited and so the remaining loads connected to the RGC1S or RGS1S can be switched as dictated by the specific process.



Plug and play

RGC1S series

- Integrated heatsink
- Partial load failure detection 1/6
- Ratings up to 660VAC, 85AAC @ 40°C (104°F)
- t^2 up to 18,000A²s
- 4-32VDC control voltage range
- Integrated varistor for overvoltage protection
- 100k Arms short circuit current rating acc. to UL508



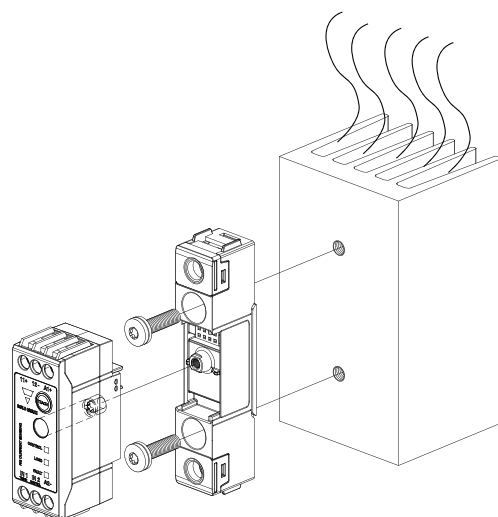
RGS1S series

- Product width 22.5mm, heatsink not integrated
- Partial load failure detection 1/6
- Ratings up to 660VAC, 90AAC, 18,000A²s
- 4-32VDC control voltage range
- Integrated varistor for overvoltage protection
- 100k Arms short circuit current rating acc. to UL508

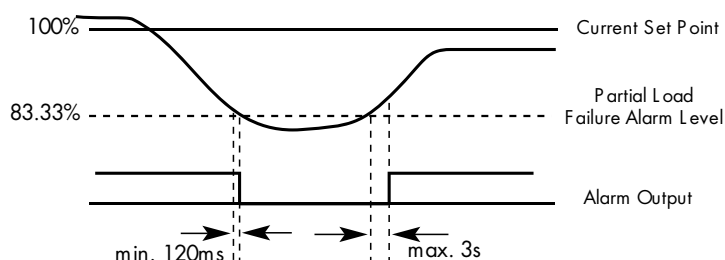
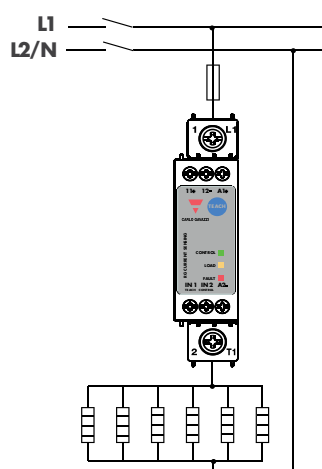


Switches

Mounting of the RGS1S on a heatsink

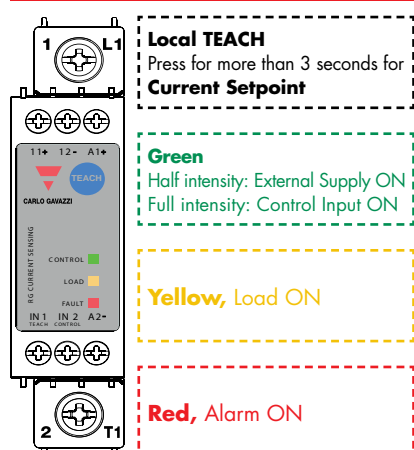


Partial load failure detection



With the RGC1S, RGS1S it is possible to detect a load failure even when multiple loads are connected to one SSR. A maximum of 6 loads can be connected to the RGC1S or RGS1S. In case of a failure of 1 heater, whereby current will deviate from setpoint by 1/6 (16.67%), a partial load failure alarm is issued. The other 5 heaters will continue to be controlled as required by the specific process in the presence of a partial load failure alarm

User interface



Visual alarm indication

Locked TEACH	1 flash	
Open SSR / Open heater	2 flashes	
SSR Overtemperature	3 flashes	
SSR short circuit	4 flashes	
No TEACH setpoint	50%	
Partial load failure	100%	

Selection guide

RGC1S series (integrated heatsink)

Rated voltage, Blocking voltage, Switching mode	23AAC (525A ² s) 22.5mm	25AAC (1800A ² s) 22.5mm - Short	25AAC (18000A ² s) 22.5mm - Short	30AAC (1800A ² s) 22.5mm	30AAC (6600A ² s) 22.5mm	43AAC (18000A ² s) 35mm	65AAC (18000A ² s) 70mm	85AAC (18000A ² s) 70mm + fan
600VAC, 1200Vp ZC	RGC1S60D20GKEP -	RGC1S60D25GKEP -	RGC1S60D26GKEP -	RGC1S60D30GKEP -	RGC1S60D31GKEP -	RGC1S60D41GGEP RGC1S60D41GGUP	RGC1S60D61GGEP RGC1S60D61GGUP	RGC1S60D90GGEP -

RGS1S series (no heatsink)

Rated voltage, Blocking voltage, Switching mode	23AAC (525A ² s) 22.5mm	30AAC (1800A ² s) 22.5mm	30AAC (6600A ² s) 22.5mm	65AAC (18000A ² s) 35mm	90AAC (18000A ² s) 22.5mm	-	-	-
600VAC, 1200Vp ZC	RGS1S60D20GKEP -	RGS1S60D30GKEP -	RGS1S60D31GKEP -	- RGS1S60D61GGUP	RGS1S60D92GGEP -	-	-	-

GK = box clamps for control terminals, screws for power terminals | GG = box clamps for control terminals, box clamps for power terminals
Further details are available on online datasheets at www.gavazziautomation.com

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Integrated fuse

RGC1F series

The RGC1F is a series of solid state contactors which integrate protection by means of an on-board semiconductor fuse. The fuse is easily accessible through the front panel of the device. The series consists of two versions, the RGC1FA and the RGC1FS.

The RGC1FA is a version including just the solid state switch and the integrated fuse for protection of the SSR in case of short circuit conditions.

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The RGC1FS is a more sophisticated version that apart from the integrated fuse provides also additional monitoring for load status, fuse failure, and SSR malfunction. Alarm status is visible by means of an LED and is also available through an alarm output for remote signalling.



Fit and forget

RGC1F series

- Integrated heatsink
- 35mm product width
- Zero cross switching
- Ratings up to 660VAC, 40AAC @ 40°C (104°F)
- 4.5-32VDC control voltage range
- Integrated varistor for overvoltage protection
- 100k Arms short circuit current rating acc. to UL508
- Monitoring for load and SSR malfunction (RGC1FS)

The RGC1FS series: 4 functions at 1 go

Switch

Solid state switch with integrated heatsink

Protection

Integrated fuse holder and fast acting semiconductor fuse for protection against short circuit currents up to 100kArms

Monitoring

Monitoring and detection of open fuse, load loss, solid state switch malfunction

Alarm

Visual indication through a red LED on the front facia and normally closed alarm output



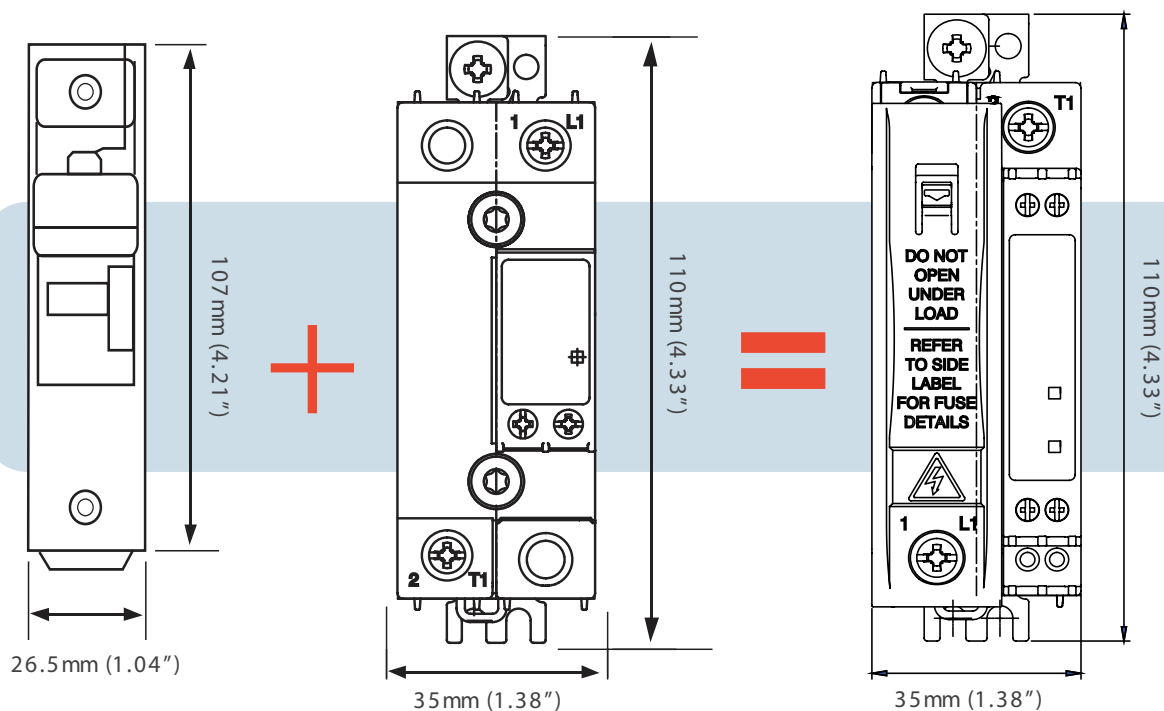
RGC1F..40 not UL approved

Space saving with integrated solutions

Fuse and fuse holder

40A Solid State Contactor:
RGC1A60D40KGE

40A Solid State Contactor with integrated
fuse in 35mm product width:
RGC1FA60D40GGE



Easy accessible fuse



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

Selection guide

Options	Rated voltage, Blocking voltage	Control voltage	20AAC 35mm	30AAC 35mm	40AAC 35mm
Fuse	230VAC, 800Vp	3 - 32VDC	RGC1FA23D20GGE	RGC1FA23D30GGE	RGC1FA23D40GGE
Fuse	600VAC, 1200Vp	4.5 - 32VDC	RGC1FA60D20GGE	RGC1FA60D30GGE	RGC1FA60D40GGE
Fuse + Monitoring	230VAC, 800Vp	3 - 32VDC	RGC1FS23D20GGE	RGC1FS23D30GGE	RGC1FS23D40GGE
Fuse + Monitoring	600VAC, 1200Vp	4.5 - 32VDC	RGC1FS60D20GGE	RGC1FS60D30GGE	RGC1FS60D40GGE

Further details are available on online datasheets at www.gavazziautomation.com

CARLO GAVAZZI Automation Components. Specifications are subject to change without notice. Illustrations are for example only.

Proportional controllers

RGC1P and RGS1P series

In a number of applications, the output signal from measuring and monitoring devices is an analog signal that needs to be converted to a digital signal to switch a 'common' solid state relay. This can be costly, occupies additional space in the panel and takes a longer time to install.

With the RG proportional controllers there is no need for this conversion since they can be controlled directly with an analog signal. Based on the analog input signal, the RG controller calculates the output power needed by the process and controls the load accordingly.

The RG proportional controller is equipped with user selectable switching modes to address different application such as speed control of AC fans, light dimming, very fine temperature control and reduction of visual flickering associated with short wave infrared heaters.



Analog input, power control solutions

Features

- Selectable switching modes
- 4-20mA, 0-10V, 0-5V, 1-5V or external pot input
- Integrated heatsink (RGC1P)
- Operational voltage up to 660VAC
- Current rating up to 63AAC (RGC1P), 90AAC (RGS1P)
- Integrated output overvoltage protection
- 18,000A²s for MCB protection coordination
- LED indication for control and load status
- 100k A short circuit current rating acc. to UL508

Benefits

Energy saving

Switching the load for less than a half mains cycle makes it possible to regulate speed of AC fans and to maintain a temperature closer to set point leading to potential savings in consumed energy

Inventory reduction

Multifunction controller that integrates various switching modes in one unit

Easy to use

Switching mode is easily selectable with a selector knob. Tamper proof covers, RGTMP, are available

Less down time, lower maintenance costs

RG controllers adopt integrated output overvoltage protection, high surge current capability and process technology that reduces thermo-mechanical stresses on output chips extending the controller lifetime

CE, cULus for RGC1P
CE, UR, CSA for RGS1P

Switches

CARLO GAVAZZI Automation Components. Specifications are subject to change without notice. Illustrations are for example only.

A compact, easy to use solid state solution for power control

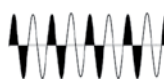
Switching modes for the RGC1P, RGS1P



Mode 1: Phase angle switching

low resolution by firing at any point within a mains half cycle.

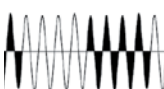
Ideal for: Speed control of AC fans, light dimming, fine heater control (such as infrared heaters)



Mode 2: 1x Full cycle switching

1 mains full cycle resolution, less noisy than Mode 1.

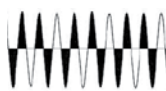
Ideal for: Heater control of standard heater elements, long and medium wave infrared heaters



Mode 3: 4x Full cycle switching

4 or 16 mains full cycle resolution, heater lifetime expectancy less than Modes 1 and 2, less noisy than Mode 2.

Ideal for: Control of standard heater elements and heater elements with a low thermal inertia



Mode 5: Advanced full cycle switching

non firing in mains half cycles, firing in mains full cycle at >50% input to reduce visual flickering of lamps.

Ideal for: Short and medium wave infrared heaters



Mode 6: Mode 4 with a soft start

Soft start on power up of Mode 4 and when non firing is >5sec to reduce peak inrush currents.

Ideal for: Heater elements which change resistance with time and temperature



Mode 7: Mode 5 with a soft start

Soft start on power up of Mode 5 and when non firing is >5sec to reduce peak inrush currents.

Ideal for: Short and medium wave infrared heaters

Selection guide

RGC1P..AA.., RGC1P..V.. (integrated heatsink)

Control input	Output voltage	Supply voltage	15AAC (1800A ² s) 35mm	30AAC (1800A ² s) 35mm	43AAC (18000A ² s) 35mm	50AAC (3200A ² s) 70mm	63AAC (18000A ² s) 70mm
4-20mA	85 - 265VAC	-	RGC1P23AA12E	RGC1P23AA30E	RGC1P23AA42E	RGC1P23AA50E	RGC1P23AA62E
	190 - 550VAC	-	RGC1P48AA12E	RGC1P48AA30E	RGC1P48AA42E	RGC1P48AA50E	RGC1P48AA62E
	410 - 660VAC	-	-	RGC1P60AA30E	RGC1P60AA42E	-	RGC1P60AA62E
0-10V 0-5V 1-5V External port	85 - 265VAC	24VDC/VAC	RGC1P23V12ED	RGC1P23V30ED	RGC1P23V42ED	RGC1P23V50ED	RGC1P23V62ED
		90 - 250VAC	RGC1P23V12EA	RGC1P23V30EA	RGC1P23V42EA	-	RGC1P23V62EA
	190 - 550VAC	24VDC/VAC	RGC1P48V12ED	RGC1P48V30ED	RGC1P48V42ED	RGC1P48V50ED	RGC1P48V62ED
		90 - 250VAC	RGC1P48V12EA	RGC1P48V30EA	RGC1P48V42EA	-	RGC1P48V62EA
	410 - 660VAC	24VDC/VAC	-	RGC1P60V30ED	RGC1P60V42ED	-	RGC1P60V62ED
		90 - 250VAC	-	RGC1P60V30EA	RGC1P60V42EA	-	RGC1P60V62EA

RGS1P..AA.., RGS1P..V.. (no heatsink)

Control input	Output voltage	Supply voltage	50AAC (1800A ² s) 35mm	90AAC (18000A ² s) 35mm	-	-	-
4-20mA	85 - 265VAC	-	RGS1P23AA50E	RGS1P23AA92E	-	-	-
	190 - 550VAC	-	RGS1P48AA50E	RGS1P48AA92E	-	-	-
	410 - 660VAC	-	RGS1P60AA50E	RGS1P60AA92E	-	-	-
0-10V 0-5V 1-5V External port	85 - 265VAC	24VDC/VAC	RGS1P23V50ED	RGS1P23V92ED	-	-	-
		90 - 250VAC	RGS1P23V50EA	RGS1P23V92EA	-	-	-
	190 - 550VAC	24VDC/VAC	RGS1P48V50ED	RGS1P48V92ED	-	-	-
		90 - 250VAC	RGS1P48V50EA	RGS1P48V92EA	-	-	-
	410 - 660VAC	24VDC/VAC	RGS1P60V50ED	RGS1P60V92ED	-	-	-
		90 - 250VAC	RGS1P60V50EA	RGS1P60V92EA	-	-	-

Soft starters

RGC1P..K and RGS1P..K series

Short wave infrared (SWIR) heaters are nowadays used in a wide range of different applications due to their efficiency in reaching high temperatures in a very short time and hence have the advantage of being more energy efficient over other type of heaters.

The main issue with SWIR is that they exhibit a high cold to hot resistance ratio which results in a very high inrush current on start up from a cold condition. Because of this inrush current, solid state relays have to be over-engineered to handle the surge current. Upstream protection may also trip unnecessarily on start up.

The RGC1P, RGS1P..K variants have been designed to tackle these issues. Upon starting from a cold condition a soft start is performed in order to apply the voltage and current to the load smoothly. This reduces the inrush current when SWIR heaters are switched on from a cold state.



Solid state relays with a soft starting feature

Features

- Soft start on power up or when non firing period is >5 seconds
- Soft start time settable to max. 5 seconds
- Integrated heatsink (RGC1P)
- Operational voltage up to 660VAC
- Max. current rating 63AAC (RGC1P), 90AAC (RGS1P)
- Control voltage 24VDC
- Integrated output overvoltage protection
- 18,000A²s for MCB protection coordination
- LED indication for control and load status
- 100kA short circuit current rating acc. to UL508

Benefits

Extended heater lifetime

Eliminating the peak inrush current which can be as high as 15x I_n extends the heater lifetime

Trouble free startup

No peak inrush current exhibited with RGC1P..K, RGS1P..K. Upstream protection does not trip unnecessarily on start up. There is no need to overengineer on the protection and the solid state relay

Low downtime, less maintenance costs

Ensured with integrated output overvoltage protection, high surge current capability and process technology that reduces thermal and mechanical stresses on output chips extending the controller lifetime



Enjoy the benefits of SWIR heaters without the problematics of inrush currents



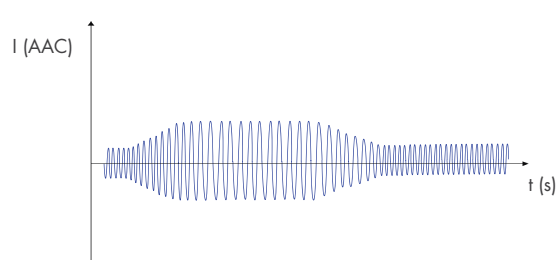
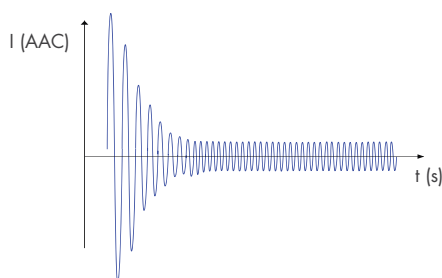
SWIR are used when lower power consumption and faster process cycles are needed.

SWIR resistance is however affected by changes in temperature. This results in a very high inrush current upon starting which can be a nuisance. The RGC1P..K and RGS1P..K are intended to reduce this inrush current by performing a soft start when starting from a cold state.

Extending SWIR heater lifetime

Starting SWIR with a 'common' solid state relay

Using soft starting for switching on SWIR from a cold state

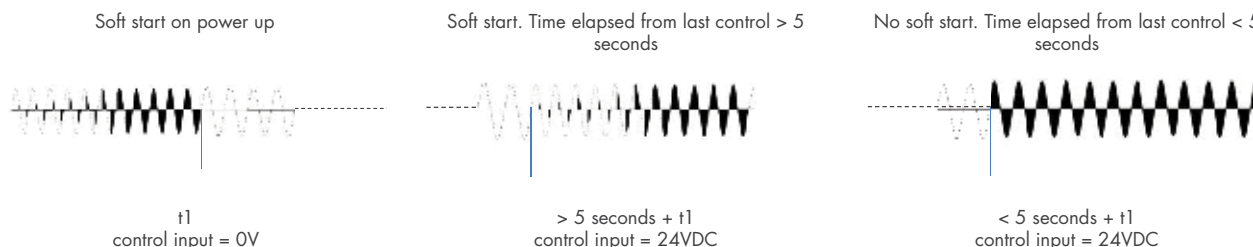


Inrush current of SWIR can be as high as **15x** the nominal current The RGC1P..K, RGS1P..K can reduce the inrush current by **> 60%**

Soft starting only when the SWIR is in a cold state

The cause of the inrush current associated with SWIR is due to the very low resistance of such heaters when in a cold state. When the SWIR is in a hot condition the resistance is stable and no inrush current is exhibited.

For this reason, the RGC1P..K and RGS1P..K do not exhibit a soft start every time a control voltage is applied but only on startup and when control signal has been missing for the previous 5 seconds.



Selection guide

RGC1P..K.. (integrated heatsink)

Control voltage	Output voltage	Supply voltage	30AAC (1800A ² s) 35mm	43AAC (18000A ² s) 35mm	63AAC (18000A ² s) 70mm
24VDC	85 - 265VAC	24VDC/AC	RGC1P23K30ED	RGC1P23K42ED	RGC1P23K62ED
	190 - 550VAC	24VDC/AC	RGC1P48K30ED	RGC1P48K42ED	RGC1P48K62ED
	410 - 660VAC	24VDC/AC	RGC1P60K30ED	RGC1P60K42ED	RGC1P60K62ED

RGS1P..K.. (no heatsink)

Control voltage	Output voltage	Supply voltage	50 AAC (1800A ² s) 35mm	90 AAC (18000A ² s) 35mm	-
24VDC	85 - 265VAC	24VDC/AC	RGS1P23K50ED	RGS1P23K92ED	-
	190 - 550VAC	24VDC/AC	RGS1P48K50ED	RGS1P48K92ED	-
	410 - 660VAC	24VDC/AC	RGS1P60K50ED	RGS1P60K92ED	-

Slim line RG

RGS1D and RGC1D series

Apart from switching of AC loads, the RG series caters also for switching of DC loads with the RGS1D and RGC1D series.

The RGC1D is offered with integrated heatsink whilst the RGS1D is suitable for panel mounting or for mounting on heatsinks which are specific to the particular application in which the solid state relay is to be used.

Switching is done through an IGBT power semiconductor which is protected by an integrated free-wheeling diode. Ratings extend to 1000VDC, 25ADC. Maximum operational temperature goes up to +80°C (+176°F).



DC output solid state switches

RGS1D series

- Without integrated heatsink
- Product width 17.5mm
- Ratings up to 1000VDC, 25ADC
- 4.5 - 32VDC control voltage range



RGC1D series

- Integrated heatsink
- Product width 17.5mm
- Ratings up to 1000VDC, 15ADC @ T_A 40°C
- 4.5 - 32VDC control voltage range



Repeatable and reliable

The RG solutions are fully solid state. Lifetime is not compromised by contact arcing. The need for frequent replacements is hence eliminated

Efficient heat dissipation

This series of DC switching solid state switches boasts of high thermal efficiency thanks to the power assembly processes adopted in the RG series

Space saving

Product width of the RGS1D and RGC1D is only 17.5mm. This enables compact control panel designs

Applications

Switching of photovoltaic strings

The 1000VDC rating makes the RGS1D and the RGC1D the ideal solid state switch for the switching of strings in photovoltaic panels. A photovoltaic installation is a long term investment that can only be sustained by a using reliable equipment which ensures minimum downtimes. Unlike electromechanical solutions, the RG series is a fully solid state solution offering a much longer lifetime. Carlo Gavazzi product offering covers also monitoring and smart control systems as well as surge protectors for such applications.

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



Ambient heating in train cabins

In train applications it is common to have DC voltages which can go well over 600VDC. The 1000VDC operational voltage associated with the RGS1D and RGC1D enables this solid state switch to be used to control DC loads used for ambient heating in such applications. Working temperature requirements are covered by the wide operating range of the RGC1D, RGS1D.



Selection guide

Model	Output voltage	Control voltage	Connection control / power	15ADC 17.5mm	25ADC 17.5mm
No heatsink	24 - 1000VDC	4.5 - 32VDC	Screw / Screw	RGS1D1000D15KKE	RGS1D1000D25KKE
With integrated heatsink	24 - 1000VDC	4.5 - 32VDC	Screw / Screw	RGC1D1000D15KKE	-

OUR SALES NETWORK IN EUROPE

AUSTRIA

Carlo Gavazzi GmbH
Ketzergrasse 374,
A-1230 Wien
Tel: +43 1 888 4112
Fax: +43 1 889 10 53
office@carlogavazzi.at

BELGIUM

Carlo Gavazzi NV/SA
Mechelsesteenweg 311,
B-1800 Vilvoorde
Tel: +32 2 257 4120
Fax: +32 2 257 41 25
sales@carlogavazzi.be

DENMARK

Carlo Gavazzi Handel A/S
Over Hadstenvej 40,
DK-8370 Hadsten
Tel: +45 89 60 6100
Fax: +45 86 98 15 30
handel@gavazzi.dk

FINLAND

Carlo Gavazzi OY AB
Petaksentie 2-4,
FI-00630 Helsinki
Tel: +358 9 756 2000
Fax: +358 9 756 20010
myynti@gavazzi.fi

FRANCE

Carlo Gavazzi Sarl
Zac de Paris Nord II, 69, rue de la Belle Etoile,
F-95956 Roissy CDG Cedex
Tel: +33 1 49 38 98 60
Fax: +33 1 48 63 27 43
french.team@carlogavazzi.fr

GERMANY

Carlo Gavazzi GmbH
Pfnorstr. 10-14
D-64293 Darmstadt
Tel: +49 6151 81000
Fax: +49 6151 81 00 40
info@gavazzi.de

GREAT BRITAIN

Carlo Gavazzi UK Ltd
4.4 Frimley Business Park,
Frimley, Camberley, Surrey GU16 7SG
Tel: +44 1 276 854 110
Fax: +44 1 276 682 140
sales@carlogavazzi.co.uk

ITALY

Carlo Gavazzi SpA
Via Milano 13,
I-20020 Lainate
Tel: +39 02 931 761
Fax: +39 02 931 763 01
info@gavazziacbu.it

NETHERLANDS

Carlo Gavazzi BV
Wijkmeerweg 23,
NL-1948 NT Beverwijk
Tel: +31 251 22 9345
Fax: +31 251 22 60 55
info@carlogavazzi.nl

NORWAY

Carlo Gavazzi AS
Melkeveien 13,
N-3919 Porsgrunn
Tel: +47 35 93 0800
Fax: +47 35 93 08 01
post@gavazzi.no

PORTUGAL

Carlo Gavazzi Lda
Rua dos Jerónimos 38-B,
P-1400-212 Lisboa
Tel: +351 21 361 7060
Fax: +351 21 362 13 73
carlogavazzi@carlogavazzi.pt

SPAIN

Carlo Gavazzi SA
Avda. Iparraguirre, 80-82,
E-48940 Leioa (Bizkaia)
Tel: +34 94 480 4037
Fax: +34 94 431 6081
gavazzi@gavazzi.es

SWEDEN

Carlo Gavazzi AB
V:a Kyrkogatan 1,
S-652 24 Karlstad
Tel: +46 54 85 1125
Fax: +46 54 85 11 77
info@carlogavazzi.se

SWITZERLAND

Carlo Gavazzi AG
Verkauf Schweiz/Vente Suisse
Sumpfstrasse 3,
CH-6312 Steinhausen
Tel: +41 41 747 4535
Fax: +41 41 740 45 40
info@carlogavazzi.ch

OUR SALES NETWORK IN THE AMERICAS

USA

Carlo Gavazzi Inc.
750 Hastings Lane,
Buffalo Grove, IL 60089, USA
Tel: +1 847 465 6100
Fax: +1 847 465 7373
sales@carlogavazzi.com

CANADA

Carlo Gavazzi Inc.
2660 Meadowvale Boulevard,
Mississauga, ON L5N 6M6, Canada
Tel: +1 905 542 0979
Fax: +1 905 542 22 48
gavazzi@carlogavazzi.com

MEXICO

Carlo Gavazzi Mexico S.A. de C.V.
Calle La Montaña no. 28, Fracc. Los Pastores
Naucalpan de Juárez, EDOMEX CP 53340
Tel & Fax: +52.55.5373.7042
mexicosales@carlogavazzi.com

BRAZIL

Carlo Gavazzi Automação Ltda.
Av. Francisco Matarazzo, 1752
Conj 2108 - Barra Funda - São Paulo/SP
Tel: +55 11 3052 0832
Fax: +55 11 3057 1753
info@carlogavazzi.com.br

OUR SALES NETWORK IN ASIA AND PACIFIC

SINGAPORE

Carlo Gavazzi Automation
Singapore Pte. Ltd.
61 Tai Seng Avenue
#05-06 UE Print Media Hub
Singapore 534167
Tel: +65 67 466 990
Fax: +65 67 461 980
info@carlogavazzi.com.sg

MALAYSIA

Carlo Gavazzi Automation
(M) SDN. BHD.
D12-06-G, Block D12,
Pusat Perdagangan Dana 1,
Jalan PJU 1A/46, 47301 Petaling Jaya,
Selangor, Malaysia.
Tel: +60 3 7842 7299
Fax: +60 3 7842 7399
sales@gavazzi-asia.com

CHINA

Carlo Gavazzi Automation
(China) Co. Ltd.
Unit 2308, 23/F.,
News Building, Block 1, 1002
Middle Shennan Zhong Road,
Shenzhen, China
Tel: +86 755 83699500
Fax: +86 755 83699300
sales@carlogavazzi.cn

HONG KONG

Carlo Gavazzi Automation
Hong Kong Ltd.
Unit 3 12/F Crown Industrial Bldg.,
106 How Ming St., Kwun Tong,
Kowloon, Hong Kong
Tel: +852 23041228
Fax: +852 23443689

OUR COMPETENCE CENTRES AND PRODUCTION SITES

DENMARK

Carlo Gavazzi Industri A/S
Hadsten

MALTA

Carlo Gavazzi Ltd
Zejtun

ITALY

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LITHUANIA

Uab Carlo Gavazzi Industri Kaunas
Kaunas

CHINA

Carlo Gavazzi Automation (Kunshan) Co., Ltd.
Kunshan

HEADQUARTERS

Carlo Gavazzi Automation SpA
Via Milano, 13
I-20020 - Lainate (MI) - ITALY
Tel: +39 02 931 761
info@gavazziautomation.com



CARLO GAVAZZI
Automation Components

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www.gavazziautomation.com

