RGS1S

1-pole Solid State Relays with Current Sensing



Description

This slim RG design is capable of detecting various failure modes occuring to the heaters and also to the product itself. Failures which can be detected include partial load failure, heater loss, open circuit SSR, short circuit SSR and SSR over temperature. A normally closed, potential free alarm, opens in the event of a system or power semiconductor fault.

A load current setpint has to be TEACHed to the SSR either locally by the TEACH button on the front of the device or remotely through the provided terminal.

This product is available either with integrated heatsink (RGC1S series) and also without heatsink (RGS1S series). The minimum product width is 22.5mm. The control and auxiliary terminals are double box clamps to facilitate safe looping whilst the power terminals are either screw terminals or box clamps depending on the model selected.

Specifications are at a surrounding temperature of 25°C unless otherwise specified.

Benefits

- **Panel space savings.** The slimmest product in the range accomodates up to 90 AAC in a width of only 22.5 mm.
- **Less maintenance costs.** Wire bonding technology reduces thermal and mechanical stresses of the output chips resulting in a larger number of operational cycles compared to other assembly technologies.
- **Low machine downtime.** Integrated overvoltage protection prevents the solid state relay from breaking down due to uncontrolled transients that may occur on the lines.
- **Cost effective protection co-ordination**. The high I^2t specification permits easy Type 2 protection co-ordination with B-type Minitaure Circuit Breakers.
- **Fast wiring**. Power connections for models rated > 30 A are equipped with terminals that can handle cables up to 25 mm^2 / AWG3 cables.
- **Accommodates UL508A requirements for Industrial Control Panels.** All models carry a 100 kArms Short Circuit Current Rating.
- **Protection against SSR overheat.** Integrated over temperature protection protects the RGS1S output from getting damaged in case of overheating.

Applications

Injection moulding, PET blow moulding, Blow moulding, Blow film extrusion, Thermoforming, Food packaging machines, Wrapping and sealing machines.

Main features

- Partial load failure detection
- Zero cross switching with ratings up to 660 VACrms & 90 AACrms
- Local or remote current setpoint
- Alarm signal output for SSR or load circuit malfunction

Order code

RGS1S60D ☐ G ☐ E P ☐

Enter the code option instead of ☐. Refer to the selection guide section for valid part numbers.

Code	Option	Description	Comments
R	-	Solid State Relay (RG)	
G	-		
S	-	Without integrated heatsink	
1	-	1-pole switching	
S	-	Current sensing	
60	-	Rated voltage: 42 - 660 VAC, 1200 Vp	
D	-	Control input: 4 - 32 VDC	
☐	30	Rated current: 30 AAC (1800 A²s)	
	31	Rated current: 10 AAC (6600 A²s)	Available only as RGS1S..31..DIN
	92	Rated current: 90 AAC (18000 A²s)	
G	-	Box clamp connection for control terminals	
☐	K	Screw connection for power terminals	
	G	Box clamp connection for power terminals	
E	-	Contactor configuration	
P	-	Over temperature protection	
☐	HT	Pre-attached thermal pad	Optional
	DIN	Pre-attached DIN accessory (RGS1DIN) for DIN rail mount	Optional

Selection guide - RGS1S

Rated voltage, Blocking voltage	Connection Control / Power	Control voltage	Configuration	Maximun rated operational current	
				30 AAC (1800 A²s)	90 AAC (18000 A²s)
				Product width	
				22.5 mm	22.5 mm
600 VAC, 1200 Vp	Box clamp / Screw	4 - 32 VDC	E	RGS1S60D30GKEP	-
	Box clamp / Box clamp	4 - 32 VDC	E	-	RGS1S60D92GGEP

Selection guide - RGS1S..DIN

Rated voltage, Blocking voltage	Connection Control / Power	Control voltage	Config-uration	Rated operational current
				10 AAC (6600 A²s)
				Product width
				22.5 mm
600 VAC, 1200 Vp	Box clamp / Screw	4 - 32 VDC	E	RGS1S60D31GKEPDIN

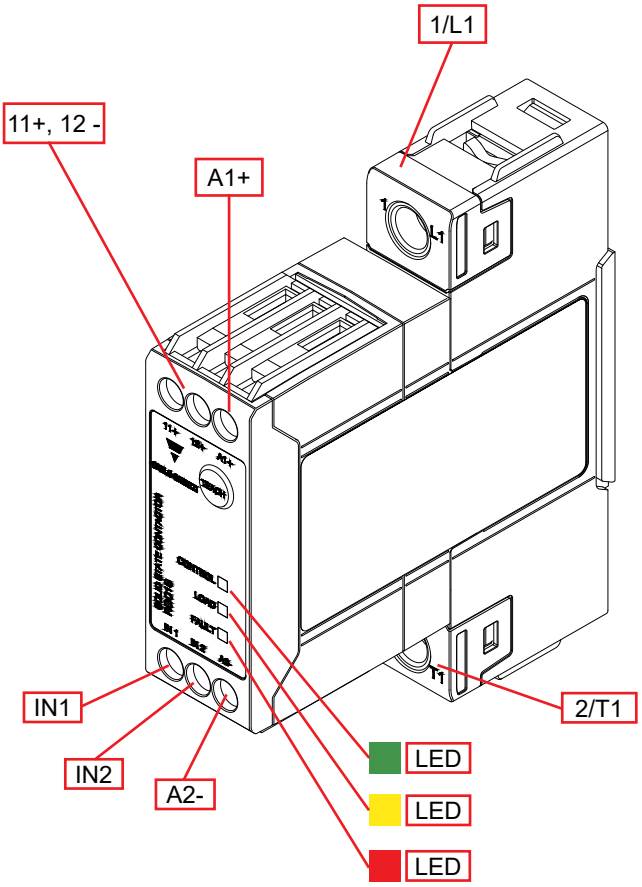
Carlo Gavazzi compatible components

Description	Component code	Notes
Screw kits	SRWKITM5X30MM	- RGS screw kit for mounting solid state relay to heatsink - Screw type: Torx T20, size M5 x 30 mm - Packing quantity: 20 pcs
Thermal pads	RGHT	Pack of 10 RGS thermal pads with size 34.6 x 14mm
RGS DIN clip	RGS1DIN	DIN clip accessory for mounting RGS on DIN rail
Heatsinks	RHS	Heatsink and accessories

Carlo Gavazzi further reading

Information	Where to find it	Notes
Datasheet	https://gavazziautomation.com/images/PIM/DATASHEET/ENG/SSR_Accessories.pdf	Heatsink and Accesories range overview
Datasheet	https://gavazziautomation.com/images/PIM/DATASHEET/ENG/SSR_RGC1S.pdf	Solid State Contactor, RGC1S (Current sensing relay with integrated heatsink)
	https://www.gavazziautomation.com/en-global/products/solid-state-relays/heatsink-selector-tool	Online Heatsink selector tool

Structure



Element	Component	Function
1/L1	Power connection	Mains connection
2/T1	Power connection	Load connection
A1 +	Supply connection	External supply connection
A2 -	Ground connection	Ground connection for both the external supply and control voltage
11+, 12 -	Alarm connection	Alarm output signal, normally closed
IN1	Remote TEACH signal	Terminal for external supply for TEACH function
IN2	Control voltage	Connection for control voltage
Green LED	Control indicator	Indicates presence of control ON
Yellow LED	Load indicator	Indicates presence of load voltage
Red LED	Fault indicator	Indicates presence of a fault

Features

General data

Material	PA66 or PA6 (UL94 V0), RAL7035 Glow wire ignition temperature and Glow wire flammability index conform to EN 60335-1 requirements	
Mounting	Panel mount DIN rail mount (RGS1S.. DIN)	
Touch Protection	IP20	
Overvoltage Category	III, 6 kV (1.2/50 µs) rated impulse withstand voltage	
Isolation	Input to Output IN1, IN2, A1+, A2- to L1, T1	2500 Vrms
	Alarm to Output 11+, 12- to L1 , T1	2500 Vrms
	Alarm to Input 11+, 12- to A1+, A2-, IN1, IN2	500 Vrms
	Input & Output to Case	4000 Vrms
LED status indication[1]	Supply ON Control ON	Green half intensity Green full intensity
	Load ON	Yellow
	Fault	Red [1]
Weight	RGS1S...GKEP: RGS1S...GGEP: RGS1S...GKEPDIN:	approx. 163 g approx. 172 g approx. 215 g

1. Refer to Alarm management

Performance

Output specifications

	RGS1S..30	RGS1S..92	RGS1S..31..DIN
Operational voltage range	42 - 600 VAC +10% -15% on max		
Blocking voltage	1200 Vp		
Max. operational current[2]: AC-51	30 AAC	90 AAC	10 AAC
Minimum TEACH Current	1.2 AAC	5 AAC	1.2 AAC
Minimum partial load current	0.2 AAC	0.83 AAC	0.2 AAC
Detectable partial load failure	>16.67% from current setpoint for more than 120 ms		
Operational frequency range	45 to 65 Hz		
Output protection	Integrated varistor		
Leakage current @ rated voltage	<3 mAAC		
Repetitive overload current UL508: Ta = 40°C, t_{ON} = 1 s, t_{OFF} = 9 s, 50 cycles, PF = 0.9	84 AAC	168 AAC	n/a
Non-repetitive surge current (I_{TSM}), t = 10 ms	600 Ap	1900 Ap	1150 Ap
I^2t for fusing (t = 10 ms), minimum	1800 A^2s	18000 A^2s	6600 A^2s
Power factor	>0.9 at rated voltage		
Critical dV/dt (@Tj init = 40°C)	1000 V/µs		

2. Refer to Heatsink selection tables

Supply specifications (A1+, A2-)

Supply voltage range (Us)	24 VDC -15%, +20%
Reverse protection	Yes
Max. supply current	50 mA

Control specifications (IN2)

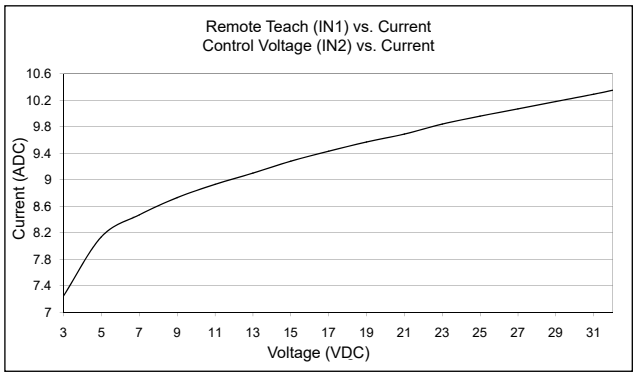
Control voltage range[3,4]	4 - 32 VDC
Pick-up voltage	3.8 VDC
Drop-out voltage	1 VDC
Maximum reverse voltage	32 VDC
Input current	refer to chart
Max. response time pick-up	0.5 cycle + 500µs @ 24VDC
Min. response time drop-out	0.5 cycle + 500µs @ 24VDC

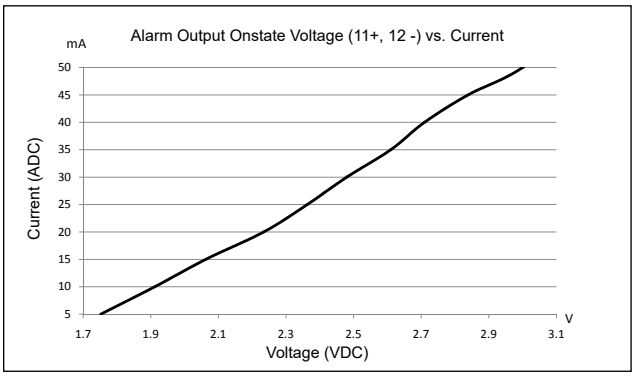
Remote TEACH (IN1)

Control voltage range[3]	4 - 32 VDC
Input current	refer to chart
Reverse protection	Yes

Alarm specifications (11+, 12-)

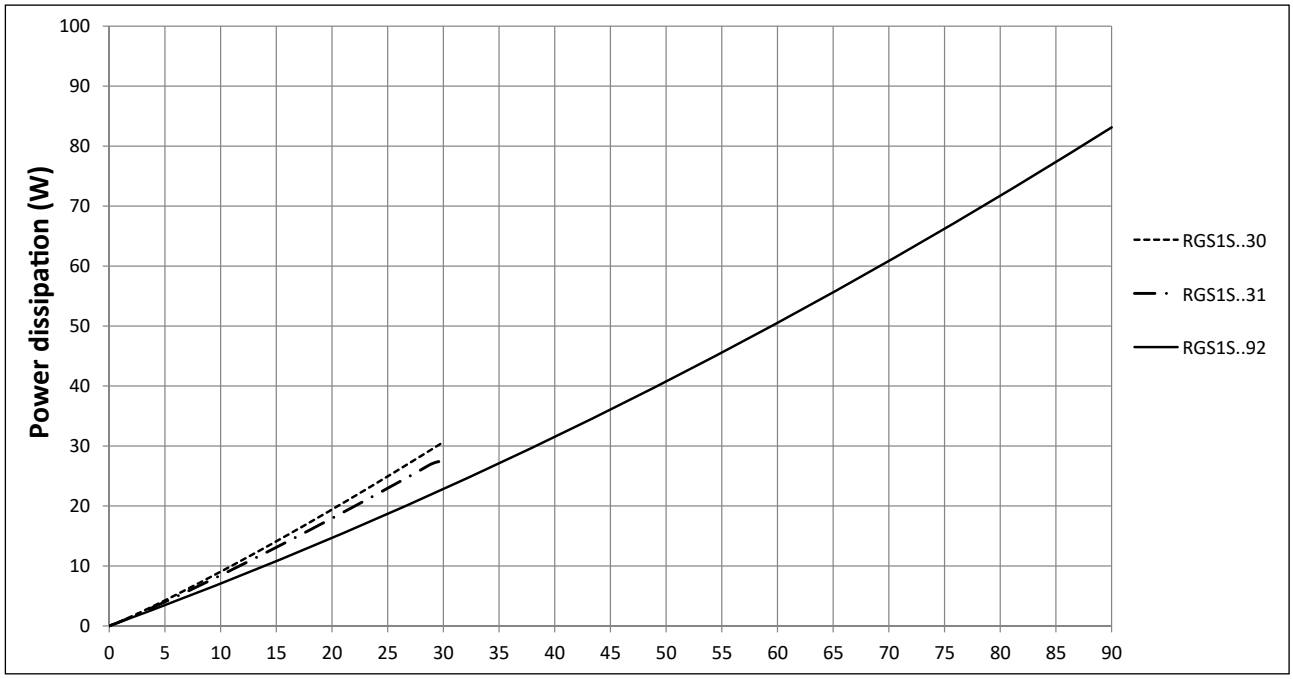
Output type	PNP Open Collector
Normal state[5]	Normally Closed
Maximum rating	35 VDC, 50 ADC
Visual Indication	Red LED[6]
Alarm output onstate voltage	refer to chart



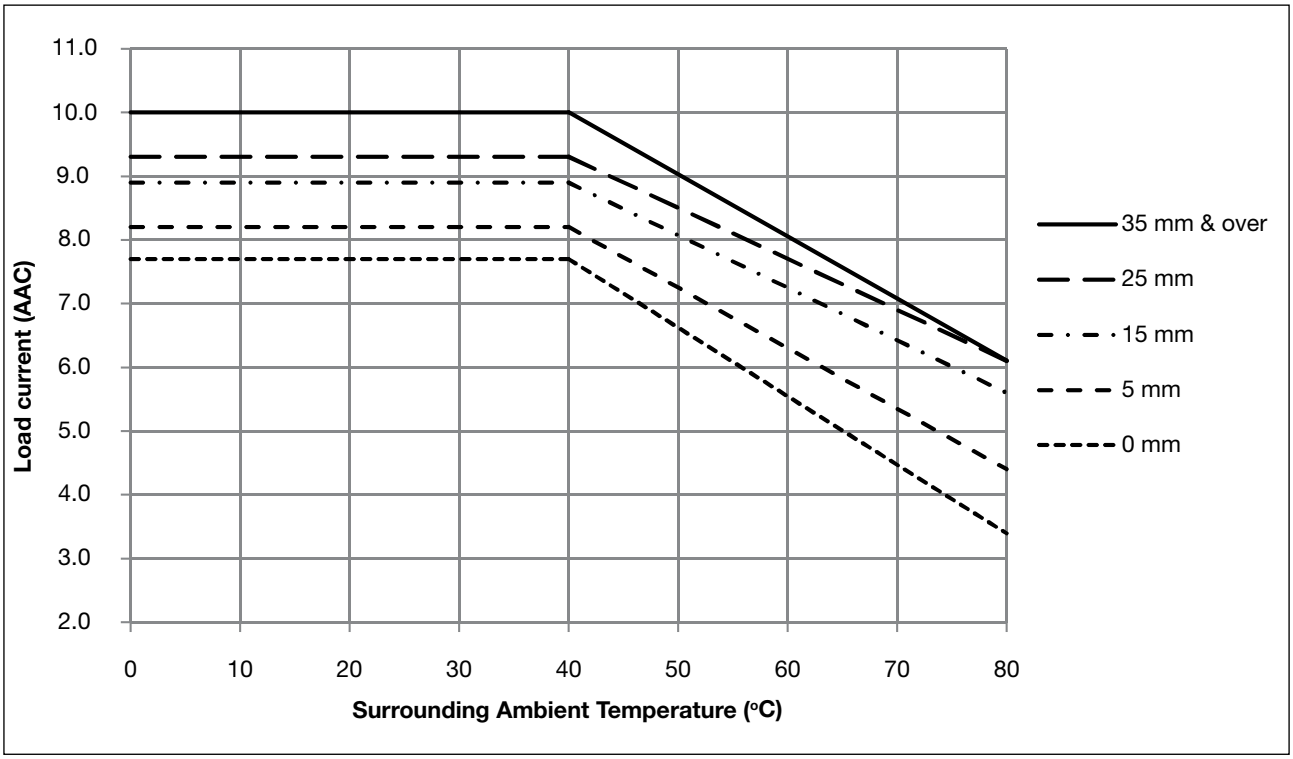


3: DC control to be supplied by a Class 2 power source
4: A partial load failure will not be detected if the ON time is less than 120ms
5: The alarm will open when the supply voltage (A1, A2) is removed
6. Refer to Alarm management

Output power dissipation



Current derating (RGS1S + RGS1DIN)



Heatsink selection for RGS1S

Thermal resistance [°C/W] of RGS1S..30

Load current [A]	Surrounding ambient temperature [°C]					
	20	30	40	50	60	70
32.0	3.58	3.05	2.55	2.09	1.65	1.24
29.0	4.26	3.62	3.03	2.48	1.97	1.49
25.5	5.36	4.53	3.78	3.09	2.45	1.87
22.5	6.75	5.66	4.69	3.82	3.03	2.31
19.0	9.37	7.72	6.31	5.09	4.02	3.06
16.0	13.5	10.8	8.68	6.88	5.36	4.06
13.0	nh	17.4	13.2	10.1	7.71	5.73
9.5	nh	nh	nh	nh	14.2	9.97
6.5	nh	nh	nh	nh	nh	nh
3.2	nh	nh	nh	nh	nh	nh

Thermal resistance [°C/W] of RGS1S..92

Load current [A]	Surrounding ambient temperature [°C]					
	20	30	40	50	60	70
90.0	0.66	0.53	0.41	0.30	0.18	0.07
81.0	0.84	0.69	0.55	0.41	0.28	0.15
72.0	1.07	0.90	0.73	0.57	0.41	0.22
63.0	1.39	1.18	0.97	0.77	0.58	0.39
54.0	1.86	1.58	1.31	1.06	0.81	0.58
45.0	2.58	2.19	1.83	1.49	1.17	0.86
36.0	3.85	3.25	2.71	2.21	1.75	1.32
27.0	6.63	5.48	4.49	3.62	2.85	2.17
18.0	17.2	12.9	9.91	7.58	5.75	4.27
9.0	nh	nh	nh	nh	nh	16.9

Heatsink selection for RGS1S..HT

Thermal resistance [°C/W] of RGS1S..30..HT

Load current [A]	Surrounding ambient temperature [°C]					
	20	30	40	50	60	70
32.0	2.98	2.45	1.95	1.49	1.05	0.64
29.0	3.66	3.02	2.43	1.88	1.37	0.89
25.5	4.76	3.93	3.18	2.49	1.85	1.27
22.5	6.15	5.06	4.09	3.22	2.43	1.71
19.0	8.77	7.12	5.71	4.49	3.42	2.46
16.0	12.9	10.2	8.08	6.28	4.76	3.46
13.0	nh	16.8	12.6	9.56	7.11	5.13
9.5	nh	nh	nh	19.8	13.6	9.37
6.5	nh	nh	nh	nh	nh	nh
3.2	nh	nh	nh	nh	nh	nh

Thermal resistance [°C/W] of RGS1S..92..HT

Load current [A]	Surrounding ambient temperature [°C]					
	20	30	40	50	60	70
90.0	0.11	-	-	-	-	-
81.0	0.29	0.14	-	-	-	-
72.0	0.52	0.35	0.18	0.02	-	-
63.0	0.84	0.63	0.42	0.22	0.03	-
54.0	1.31	1.03	0.76	0.51	0.26	0.03
45.0	2.03	1.64	1.28	0.94	0.62	0.31
36.0	3.30	2.70	2.16	1.66	1.20	0.77
27.0	6.08	4.93	3.94	3.07	2.30	1.62
18.0	16.7	12.4	9.36	7.03	5.20	3.72
9.0	nh	nh	nh	nh	nh	16.3

'nh' means no heatsink necessary. The SSR should still be tightened to a surface to ensure optimal thermal dissipation

Thermal data

	RGS1S..30	RGS1S..92	RGS1S..30..HT	RGS1S..92..HT
Max. junction temperature	125°C	125°C	125°C	125°C
Heatsink temperature	100°C	100°C	100°C	100°C
Junction to case thermal resistance, R_{thjc}	<0.3°C/W	< 0.2°C/W	<0.3°C/W	<0.20°C/W
Case to heatsink thermal resistance, R_{thcs} [7]	<0.25°C/W	<0.25°C/W	-	-
Case to heatsink thermal resistance (RGS..HT), R_{thcs_HT} [8]	-	-	<0.85°C/W	<0.80°C/W

7. Case to heatsink thermal resistance values indicated are applicable upon application of a fine layer of silicon based thermal paste HTS02S from electrolube between SSR and heatsink or mounting surface.
8. Thermal resistance case to heatsink values for RGS..HT are applicable for the RGHT thermal pad.

Compatibility and conformance

Approvals	
Standards compliance	LVD: EN 60947-4-3 EMCD: EN 60947-4-3 cURus: UL508 Recognized (E172877), NMFT2, NMFT8 CSA: C22.2 No. 14, (204075)
UL short circuit current rating	100k Arms (refer to short circuit current section, Type 1 – UL508)

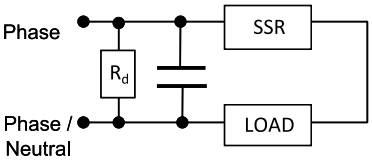
Electromagnetic compatibility (EMC) - Immunity	
Electrostatic discharge (ESD)	EN/IEC 61000-4-2 8 kV air discharge, 4 kV contact (PC1)
Radiated radio frequency	EN/IEC 61000-4-3 10 V/m, from 80 MHz to 1 GHz (PC1) 10 V/m, from 1.4 to 2 GHz (PC1) 3 V/m, from 2 to 2.7 GHz (PC1)
Electrical fast transient (burst)	EN/IEC 61000-4-4 Output: 2 kV, 5 kHz (PC2) Input: 1kV, 5kHz (PC1)
Conducted radio frequency	EN/IEC 61000-4-6 10 V/m, from 0.15 to 80 MHz (PC1)
Electrical surge	EN/IEC 61000-4-5 Output, line to line: 1 kV (PC2) Output, line to earth: 2 kV (PC2) DC lines, line to line, 500V (PC2) DC lines, line to earth, 500V (PC2) Signal lines, line to earth, 1kV (PC2)
Voltage dips	EN/IEC 61000-4-11 0% for 0.5, 1 cycle (PC2) 40% for 10 cycles (PC2) 70% for 25 cycles (PC2) 80% for 250 cycles (PC2)
Voltage interruptions	EN/IEC 61000-4-11 0% for 5000 ms (PC2)

Electromagnetic compatibility (EMC) - Emissions	
Radio interference field emission (radiated)	EN/IEC 55011 Class A: from 30 to 1000 MHz
Radio interference voltage emissions (conducted)	EN/IEC 55011 Class A: from 0.15 to 30 MHz (External filter may be required - refer to Filtering section)

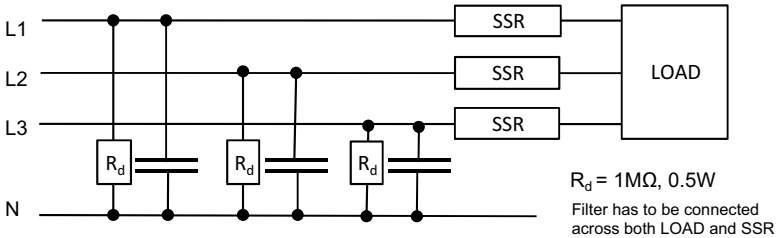
Note:

- 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 (PC1): No degradation of performance or loss of function is allowed when the product is operated as intended.
- Performance Criteria 2 (PC2): 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 (PC3): Temporary loss of function is allowed, provided the function can be restored by manual operation of the controls.

Filter connection diagram



R_d = 1MΩ, 0.5W



R_d = 1MΩ, 0.5W

Filter has to be connected across both LOAD and SSR

1 Phase

Filtering

Part number	Suggested filter for EN 55011 Class A compliance	Maximum heater current
RGS1S60D30GKEP	220 nF / 760V / X1	30 AAC
RGS1S60D92GGEP	680 nF / 760V / X1	65 AAC
RGC1S60D31GKEPDIN	220 nF / 760V / X1	10 AAC

Environmental specifications

Operating temperature	-25°C to 70°C (-13˚F to +158˚F)
Storage temperature	-40°C to +100°C (-40°F to +212°F)
Relative humidity	95% non-condensing @ 40°C
Pollution degree	2
Installation altitude	0-1000 m. Above 1000 m derate linearly by 1% of FLC per 100 m up to a maximum of 2000 m
Vibration resistance	2g / axis (2-100Hz, IEC 60068-2-6, EN 50155, EN 61373)
Impact resistance	15/11 g/ms (EN50155, EN61373)
EU RoHS compliant	Yes
China RoHS	

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(VI))	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.

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(VI))	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。

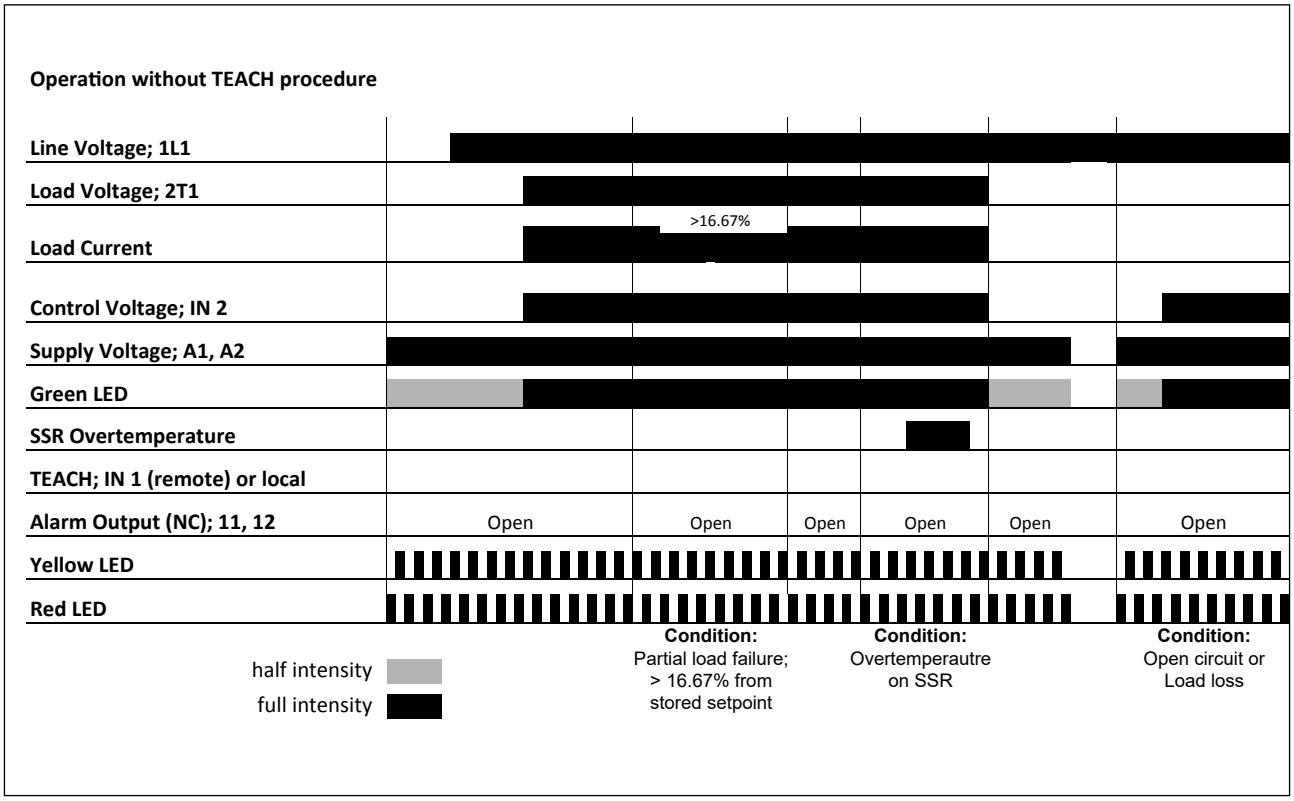
X: 此零件某种材料中含有的该有害物高于GB/T 26572的限定。

Mode of operation

Introduction:

The RGS1S must have a stored current setpoint to operate as a Solid State Relay with a Sensing function. The current setpoint is the nominal operating current that is expected through the SSR when all heater loads are functioning properly. The SSR is shipped without having a stored setpoint. This current setpoint is to be stored upon a TEACH procedure as explained below. The wrong setpoint is stored if heater loads are faulty or mains supply voltage is not close to operating voltage during the TEACH procedure.

Caution: In case of a brand new RGS1S (i.e. an RGS1S that does not have a stored current set point), a TEACH procedure on no load (i.e., no load connected to the RGS1S load terminal 2/T1) will result in a stored current set point of 0A.

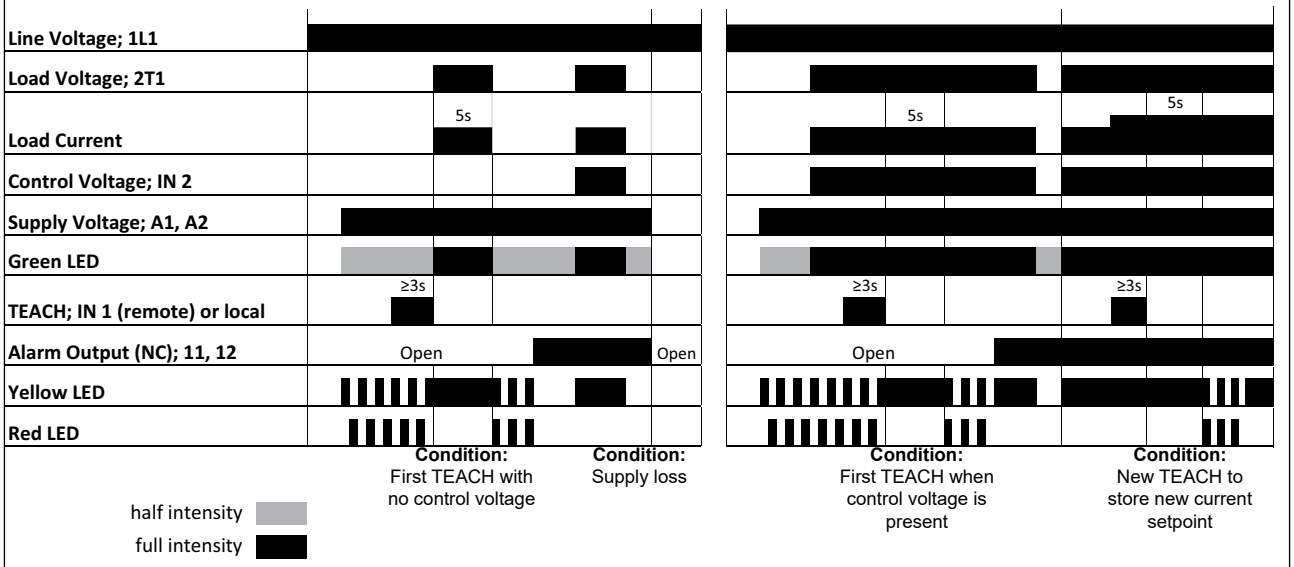


Upon application of supply voltage, the yellow and red LED will flash continuously in sequence (i.e., scroll) indicating that the device has no current setpoint stored. The green LED is ON at half intensity indicating the presence of supply voltage. As soon as control voltage is applied the green LED will be ON at full intensity. The alarm output, which is normally closed, is open to indicate that the SSR has no stored setpoint.

If mains supply is present upon application of control voltage the SSR will switch ON despite having no stored current setpoint. However, even though the SSR switches ON, the Sensing features associated with the RGS1S are disabled as shown in the above operations diagram. The Sensing features will be enabled ONLY once the TEACH procedure explained below is completed. For SSR to switch ON upon application of control voltage, supply voltage has to be present across terminals A1, A2.

Mode of operation (cont.)

The TEACH procedure



The TEACH procedure can be performed either locally or remotely. For local TEACH, the front 'TEACH' button on the SSR has to be pressed for at least 3 seconds (but less than 5 seconds). Remote TEACH can be performed by applying a high signal on terminal IN 1 for a duration of at least 3 seconds (but less than 5 seconds).

If the TEACH button is pressed for more than 5 seconds or the remote TEACH signal is longer than 5 seconds, the TEACH procedure is not performed.

Supply voltage has to be present across terminals A1, A2 for the TEACH function to be performed and SSR to operate

TEACH in the absence of a control signal

It is possible to TEACH the SSR without the presence of a control signal. In case of no previous stored setpoint (factory default), red and yellow LED will flash accordingly indicating this. The TEACH function will start as soon as the push button is released. The SSR will switch fully ON for 5 seconds (yellow LED ON during these 5 seconds) at the end of which, a load current setpoint is recorded. If TEACH procedure is successful the yellow and red LED will blink together for three times to indicate a successful setpoint measurement. The alarm output across terminals 11, 12 closes indicating a normal situation.

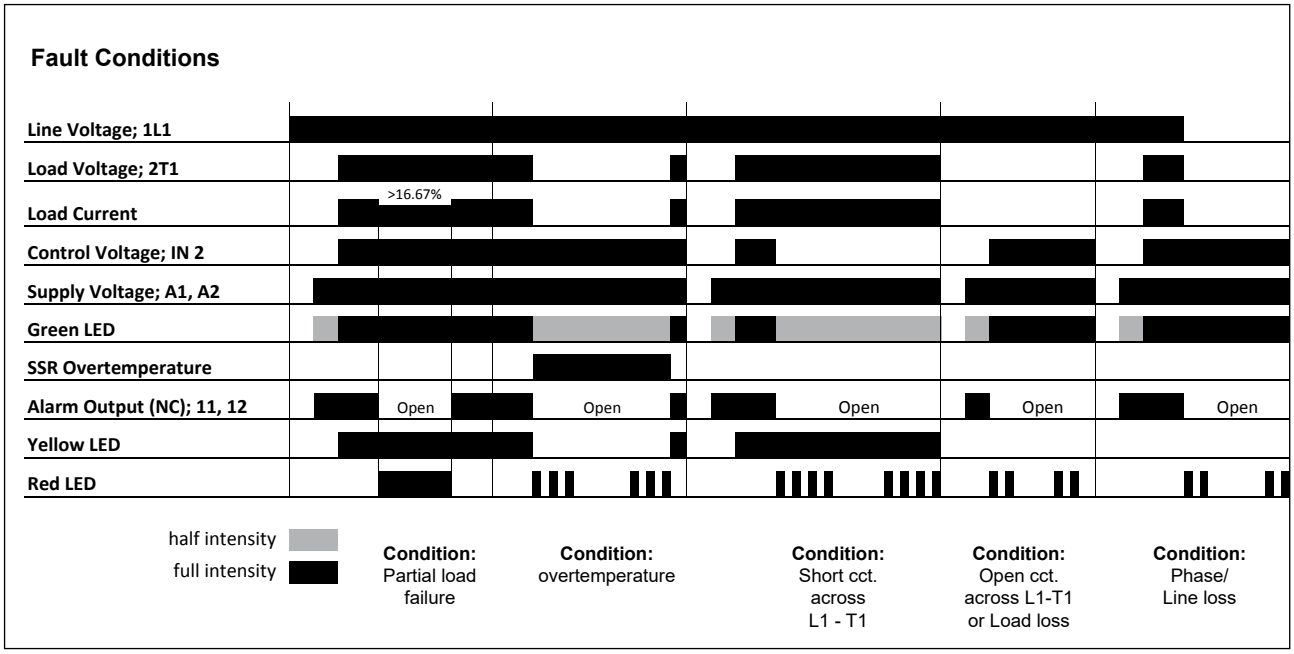
In case of an unsuccessful TEACH, the red & yellow LED will scroll continously indicating that no current setpoint is stored. If load current does not stabilise during the 5 seconds TEACH sequence, it will not be possible to store setpoint. Another attempt to do a TEACH may be done until setpoint is recorded.

TEACH when control signal is present

In this case the TEACH procedure is identical to the TEACH procedure when there is no control signal. During the 5 seconds TEACH the status of the load switching will not be distinguished from unTEACHed state since load was ON before TEACH. Load remains ON as long as control voltage is present.

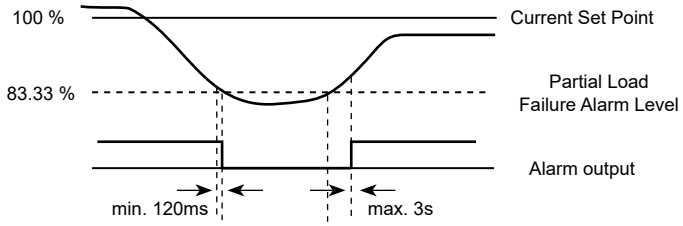
If SSR is in a LOCKed position (see below) it will not be possible to perform a new TEACH. SSR has to be unLOCKed first.

Mode of operation (cont.)



Partial Load Failure

This occurs when the load current decreases by more than 16.67% as compared to the stored setpoint. During this failure mode the SSR remains ON but alarm output opens to indicate an alarm condition. The red LED is continuously ON during this condition. If current rises back to normal levels the alarm indications switch to the normal state.



Over Temperature

If the SSR derating curve is exceeded during normal operation, an over-temperature condition is detected and the SSR output switches OFF. A visual alarm is indicated by the red blinking LED (3 flashes - see details in ALARM LED INDICATIONS) and alarm signal opens. The alarm resets automatically when the overtemperature condition is no longer present.

SSR Short Circuit

This condition is detected in the absence of a control signal and load current (in the region of 800mA and over) still flowing through the SSR. A visual indication is given by the red blinking LED (4 flashes - see details in ALARM LED INDICATIONS) and open alarm across terminals 11, 12. The yellow LED stays ON even though the green LED is at halfintensity (i.e. absence of control input voltage) to indicate status of load.

SSR Open Circuit / Heater Loss / Line Loss

SSR output remains OFF even after application of the control voltage on terminal IN 2. A visual indication is given by the red blinking LED (2 flashes - see details in ALARM LED INDICATIONS) and open alarm across terminals 11, 12.

Alarm auto reset

In all alarm conditions described above, the alarm LED and signal output from terminals 11, 12 reset automatically to the normal condition as soon as the alarm condition is no longer present. There is no need for an alarm reset.

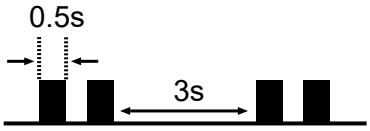
Other functions: TEACH LOCK/UNLOCK

The device can be locked to prevent undesirable local TEACH. This can be done by sending a pulse with a duration between 1s and 1.5s to the remote TEACH terminal IN 1. To TEACH a LOCKed unit, a pulse with duration between 1s and 1.5s has to be applied first to terminal IN 1, before performing the TEACH.The initial condition of the unit after every power up (through A1, A2 terminals) is UNLOCKed.

LED indicators

CONTROL	Green	Half intensity: Full intensity: OFF:	Supply ON, Control OFF Supply ON, Control ON Supply OFF, Control OFF
LOAD	Yellow	ON OFF	Load ON Load OFF
ALARM	Red	ON:	Fully ON or flashing when alarm condition is present. Refer to Alarm Management section
		OFF:	No alarm condition

Alarm management

Alarm condition present	• The state of the Red LED of the RGS1S is ON with a specific flashing rate • Alarm output operates	
Alarm types	**No. of flashes**	**Description of fault**
	100% ON	Partial Load Failure
	50% ON	No TEACH setpoint
	1	Locked TEACH
	2	Open SSR / Heater
	3	SSR Overtemperature
	4	SSR Short Circuit
Flashing rate		

Short circuit protection

Protection Co-ordination, Type 1 vs Type 2:

Type 1 protection implies that after a short circuit, the device under test will no longer be in a functioning state. In type 2 co-ordination the device under test will still be functional after the short circuit. In both cases, however the short circuit has to be interrupted. The fuse between enclosure and supply shall not open. The door or cover of the enclosure shall not be blown open. There shall be no damage to conductors or terminals and the conductors shall not separate from terminals. There shall be no breakage or cracking of insulating bases to the extent that the integrity of the mounting of live parts is impaired. Discharge of parts or any risk of fire shall not occur.

The product variants listed in the table hereunder are suitable for use on a circuit capable of delivering not more than 100,000A Symmetrical Amperes, 600Volts maximum when protected by fuses. Tests at 100,000Arms were performed with Class J fuses, fast acting; please refer to the tables below for maximum ratings.Tests with Class J fuses are representative of Class CC fuses.

Protection co-ordination Type 1 according to UL 508				
Part No.	**Prospective short circuit current [kArms]**	**Max fuse size [A]**	**Class**	**Voltage [VAC]**
RGS1S60D30GKEP	100	30	J or CC	Max. 600
RGS1S60D31GKEP		30	J or CC	
RGS1S60D92GGEP		80	J	

Protection co-ordination Type 2 (IEC/EN 60947-4-2/ -4-3)						
Part No.	**Prospective short circuit current [kArms]**	**Ferraz Shawmut (Mersen)**		**Siba**		**Max. voltage [VAC]**
		Max fuse size [A]	**Part number**	**Max fuse size [A]**	**Part number**	
RGS1S..30, RGS1S..31	10	40	6.9xx CP GRC 22 x 58 / 40	32	50 142 06.32	600
	100					
RGS1S..92	10	100	6.9xx CP GRC 22x58 /100	100	50 194 20.100	
			A70QS100-4			
	100	100	6.9xx CP GRC 22x58 /100			
			A70QS100-4			

xx = 00, without fuse trip indication, xx= 21, with fuse trip indication

Protection co-ordination Type 2 with Minature Circuit Breakers (M.C.B.s)				
Solid State Relay type	**ABB Model no. for Z - type M. C. B. (rated current)**	**ABB Model no. for B - type M. C. B. (rated current)**	**Wire cross sectional area [mm²]**	**Minimum length of Cu wire conductor [m][9]**
RGS1S..30 (1800 A²s)	S201 - Z10 (10A)	S201-B4 (4A)	1.0 1.5 2.5	7.6 11.4 19.0
	S201 - Z16 (16A)	S201 - B6 (6 A)	1.0 1.5 2.5 4.0	5.2 7.8 13.0 20.8
	S201 - Z20 (20 A)	S201 - B10 (10 A)	1.5 2.5	12.6 21.0
	S201 - Z25 (25 A)	S201 - B13 (13 A)	2.5 4.0	25.0 40.0
	S202 - Z25 (25 A)	S202 - B13 (13 A)	2.5 4.0	19.0 30.4
RGS1S..31 (6600 A²s)	S201 - Z20 (20 A)	S201 - B10 (10 A)	1.5 2.5 4.0	4.2 7.0 11.2
	S201 - Z32 (32 A)	S201 - B16 (16 A)	2.0 4.0 6.0	13.0 20.8 31.2
	S202 - Z20 (20 A)	S202 - B10 (10 A)	1.5 2.5 4.0	1.8 3.0 4.8
	S202 - Z32 (32 A)	S202 - B16 (16 A)	2.5 4.0 6.0 10.0	5.0 8.0 12.0 20.0
	S202 - Z50 (50 A)	S202 - B25 (25 A)	4.0 6.0 10.0	14.8 22.2 37.0
RGS1S..92 (18000 A²s)	S201 - Z10 (32 A)	S201 - B16 (16 A)	2.5 4.0 6.0	3.0 4.8 7.2
	S201 - Z16 (50 A)	S201 - B25 (25A)	4.0 6.0 10.0 16.0	4.8 7.2 12.0 19.2
	S201 - Z20 (63 A)	S201 - B32 (32 A)	6.0 10.0 16.0	7.2 12.0 19.2

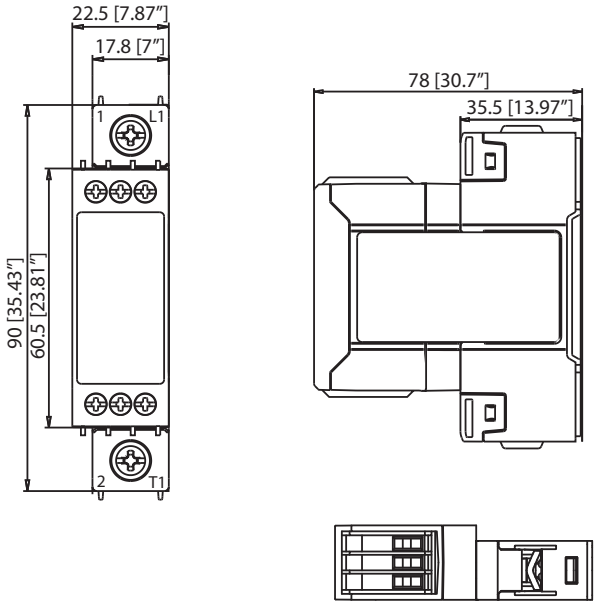
9. Between MCB and Load (including return path which goes back to the mains)

Note: A prospective current of 6 kA and a 230 / 400 V power supply is assumed for the above suggested specifications. For cables with different cross section than those mentioned above please consult Carlo Gavazzi's Technical Support Group.

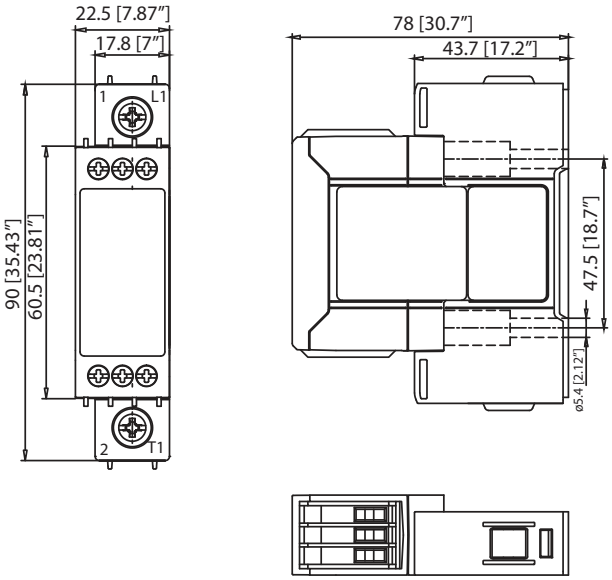
S201 models refer to 1-pole M.C.B., S202 models refer to 2-poles M.C.B.

Dimensions

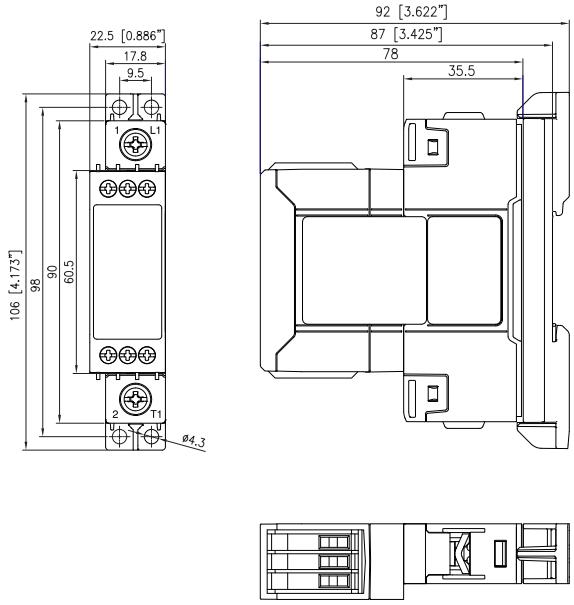
RGS...GKEP



RGS...GGEP



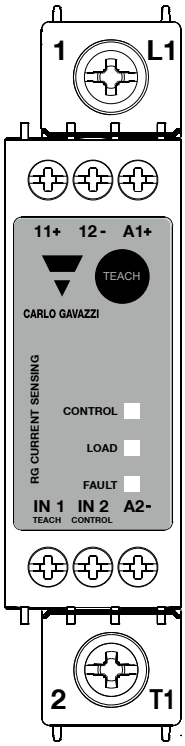
RGS...GKEPDIN



Housing width tolerance +0.5mm, -0mm as per DIN 43880. All other tolerances +/- 0.5mm.
Dimensions in mm.

Terminal interface

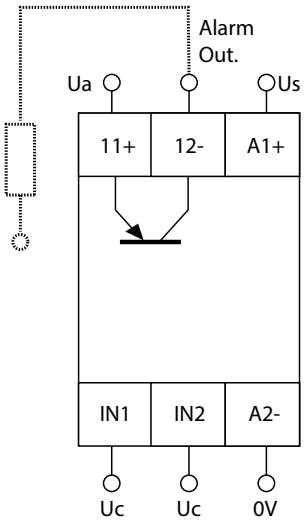
RG...30GKEP
RG...31GKEP
RG...92GGEP



1 L1 : Line connection
2 T1 : Load connection
11+ : Alarm supply
12- : Alarm output
A1+ : Supply voltage
A2- : Ground connection
IN 1 : Remote TEACH signal
IN 2 : Control voltage

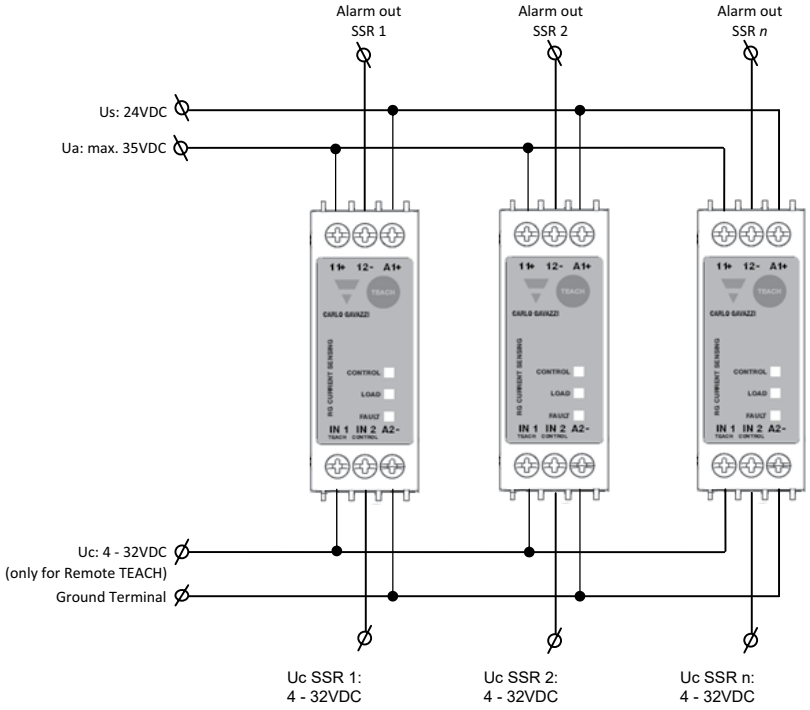
Note:
- Local TEACH by pressing front button for more than 3 seconds but less than 5 seconds

Terminal interface

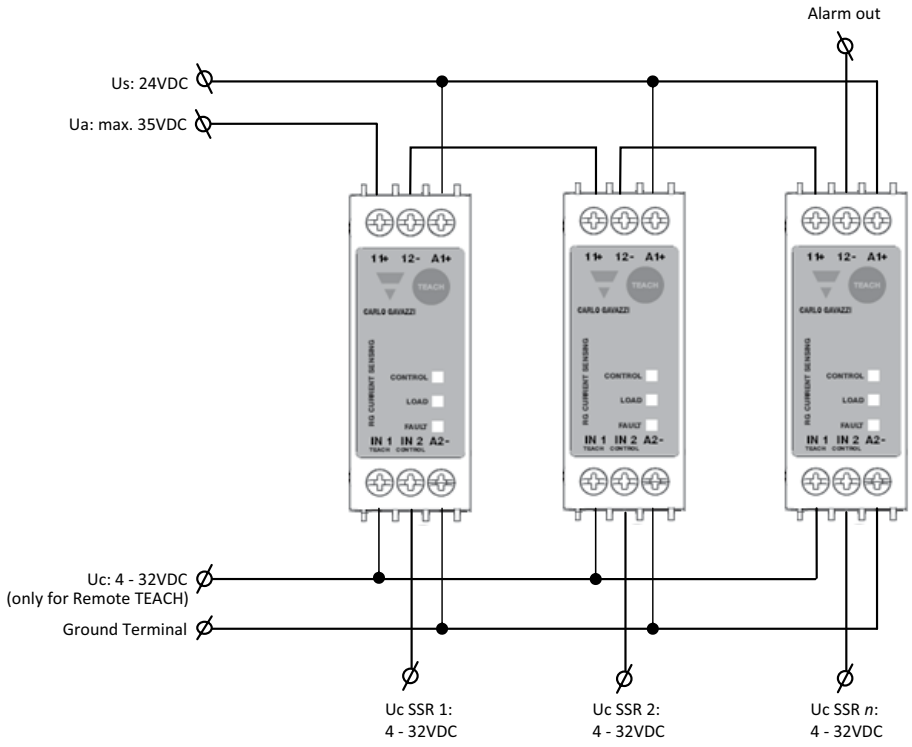


Uc: 4 - 32 VDC
Us: 24 VDC
Ua: max. 35 VDC
Alarm Output: max. 50 mA

Connection diagram for separate alarm outputs



Connection diagram for series alarm outputs



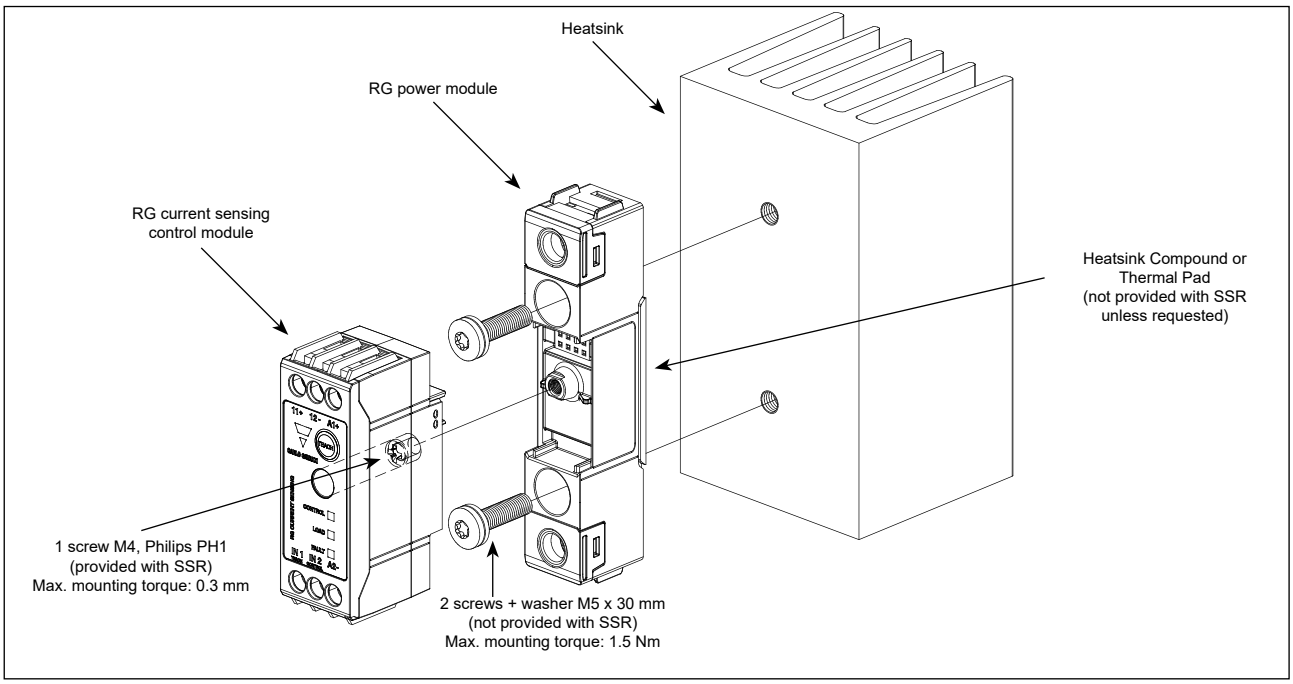
Mounting instructions

Thermal stress will reduce the lifetime of the SSR. Therefore it is necessary to select the appropriate heatsinks, taking into account the surrounding temperature, load current and the duty cycle.

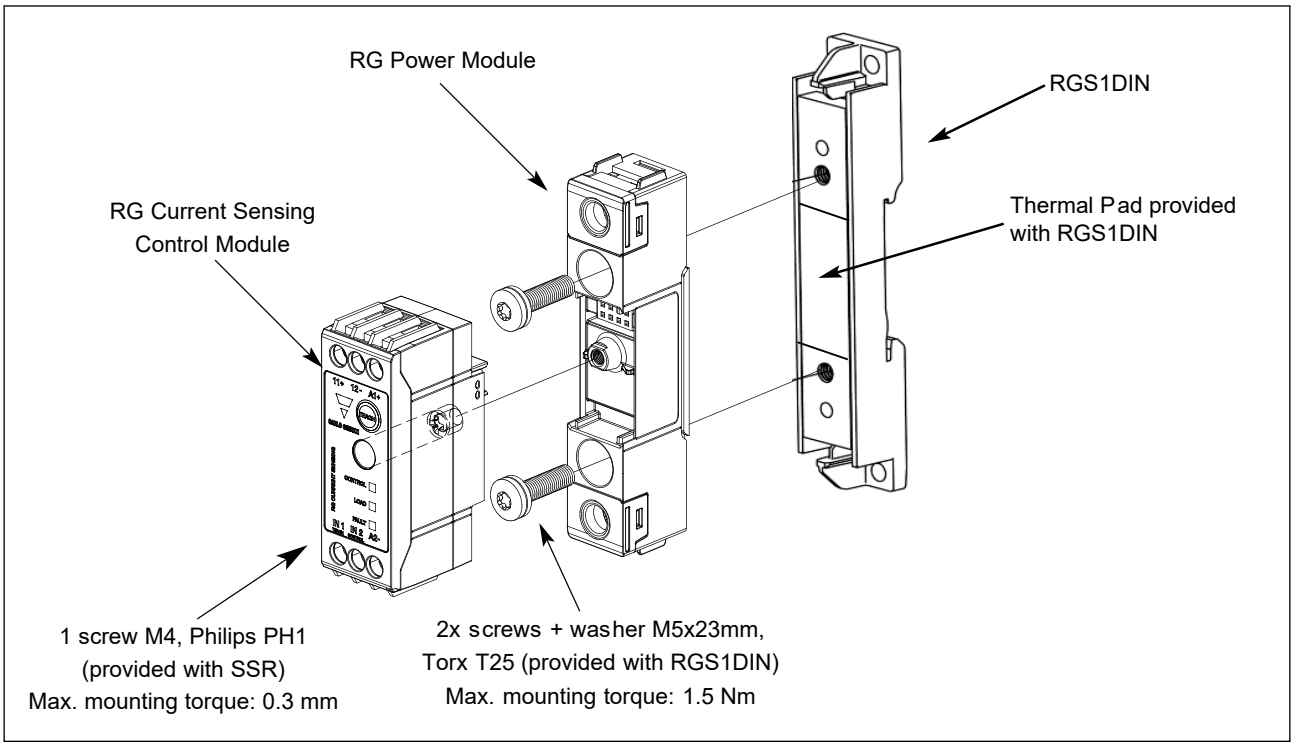
A small amount of thermally conductive silicone paste must be applied to the back of the SSR. The RG Power Module should be first mounted on the heatsink with two M5 screws. Gradually tighten each screw (alternating between the two) until both are tightened with a torque of 0.75Nm. Then tighten both screws to their final mounting torque of 1.5Nm.

In case of a thermal pad attached to the back of the SSR, no thermal paste is required. The RG Power Module is gradually tightened (alternating between the 2 screws) to a maximum torque of 1.5Nm.

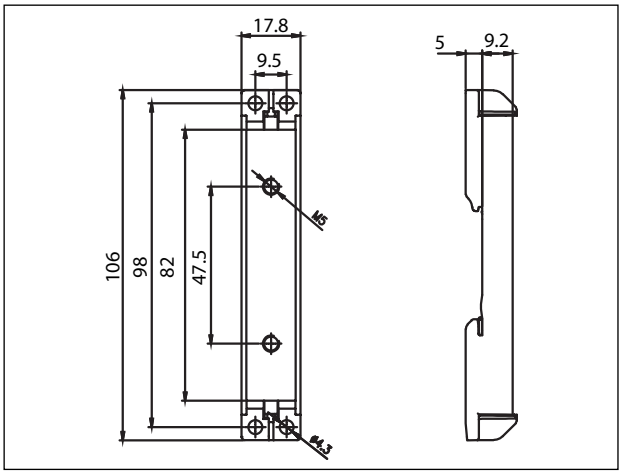
Once the power module is tightened to heatsink, the control module can be mounted on top of the power module and screwed with a torque of 0.3Nm to ensure good contact between the 2 units.

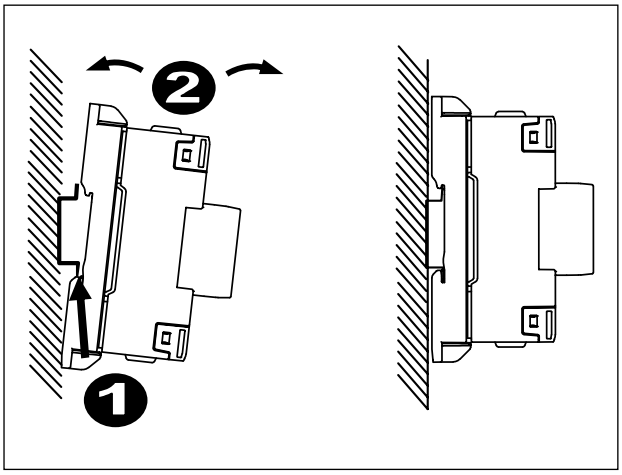


Mounting instructions for RGS1DIN to RGS

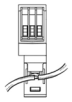


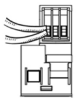
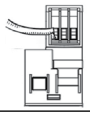
RGS1DIN dimensions and installation instructions





Connection Specifications

Power connections			
Terminals	1/L1, 2/T1		
Conductors	Use 75°C copper (Cu) conductors		
	RGS1S..30GKEP	RGS1S..31GKEP	RGS1S..92GGEP
			
Connection type	M4 screw with captivated washer		M5 screw with box clamp
Stripping length	12 mm		11 mm
Rigid (solid & stranded) UL/cUL rated data	2x 2.5 – 6.0 mm² 2x 14 – 10 AWG	1x 2.5 – 6.0 mm² 1x 14 – 10 AWG	1x 2.5 – 25.0 mm² 1x 14 – 3 AWG
Flexible with end sleeve	2x 1.0 – 2.5 mm² 2x 2.5 – 4.0 mm² 2x 18 – 14 AWG 2x 14 – 12 AWG	1x 1.0 – 4.0 mm² 1x 18 – 12 AWG	1x 2.5 – 16.0 mm² 1x 14 – 6 AWG
Flexible without end sleeve	2x 1.0 – 2.5 mm² 2x 2.5 – 6.0 mm² 2x 18 – 14 AWG 2x 14 – 10 AWG	1x 1.0 – 6.0 mm² 1x 18 –10 AWG	1x 4.0 – 25.0 mm² 1x 12 – 3 AWG
Torque specifications	Pozidriv 2 UL: 2.0 Nm (17.7 lb - in) IEC: 1.5 – 2.0 Nm (13.3 – 17.7 lb - in)		Pozidriv 2 UL: 2.5 Nm (22 lb - in) IEC: 2.5 – 3.0 Nm (22 – 26.6 lb - in)
Aperture for termination lug (fork or ring)	12.3 mm		n/a

Control connections		
Terminals	A1(+), A2(-), IN1, IN2, 11 (+), 12(-)	
Conductors	Use 60/75°C copper (Cu) conductors	
		
Connection type	M3 screw with box clamp	
Stripping length	6 mm	
Rigid (solid & stranded) UL/cUL rated data	2 x 1.0 – 2.5 mm² 2 x 18 – 14 AWG	1 x 1.0 – 2.5 mm² 1 x 18 – 14 AWG
Flexible with end sleeve	2 x 1.0 – 2.5 mm² 2 x 18 – 14 AWG	1 x 1.0 – 2.5 mm² 1 x 18 – 14AWG
Torque specification	Pozidriv 1 UL: 0.5 Nm (4.4 lb - in) IEC: 0.4 - 0.5 Nm (3.5 - 4.4 lb - in)	

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