RM1C

1-pole solid state relay, peak switching

Main features

- Ideal for switching of transformers and other highly inductive loads
- Direct copper bonding (DCB) technology
- Back to Back thyristor output
- Blocking voltage up to 1400Vp
- LED for control presence indication
- Opto isolation: 4000 VACrms
- Clip-on IP20 protection cover
- Self lifting terminals

Description

The peak switching SSR is primarily used for transformer applications. By applying DC control voltage, the output semiconductor is activated at the peak of the line voltage. The semiconductor switches OFF, when load current crosses zero, upon removal of the control voltage. The LED indicates when the output is activated.

Applications

Ideal for transformer switching or switching of highly inductive loads.

Main functions

- 1-pole, AC peak switching
- Rated output voltage up to 660 VAC
- Rated output current up to 100 AAC
- 4.25-32 VDC control voltage range

Order code

RM1C □ D □

Enter the code option instead of □. Refer to the Selection guide section for valid part numbers.

Code	Option	Description	Comments
RM	-	Solid state relay	
1	-	1-pole switching	
C	-	Peak switching	
□	40	Rated operational voltage: 100-440 VAC	
	60	Rated operational voltage: 340-660 VAC	
D	-	Control voltage: 4.25-32 VDC	
□	25	Rated operational current: 25 AAC	
	50	Rated operational current: 50 AAC	
	100	Rated operational current: 100 AAC	

Selection guide

Rated voltage	Blocking voltage	Control voltage	Maximum rated operational current		
			25 AAC (525 A²s)	50 AAC (1800 A²s)	100 AAC (18000 A²s)
400 VAC	850 Vp	4.25-32 VDC	RM1C40D25	RM1C40D50	RM1C40D100
600 VAC	1400 Vp	4.25-32 VDC	RM1C60D25	RM1C60D50	RM1C60D100

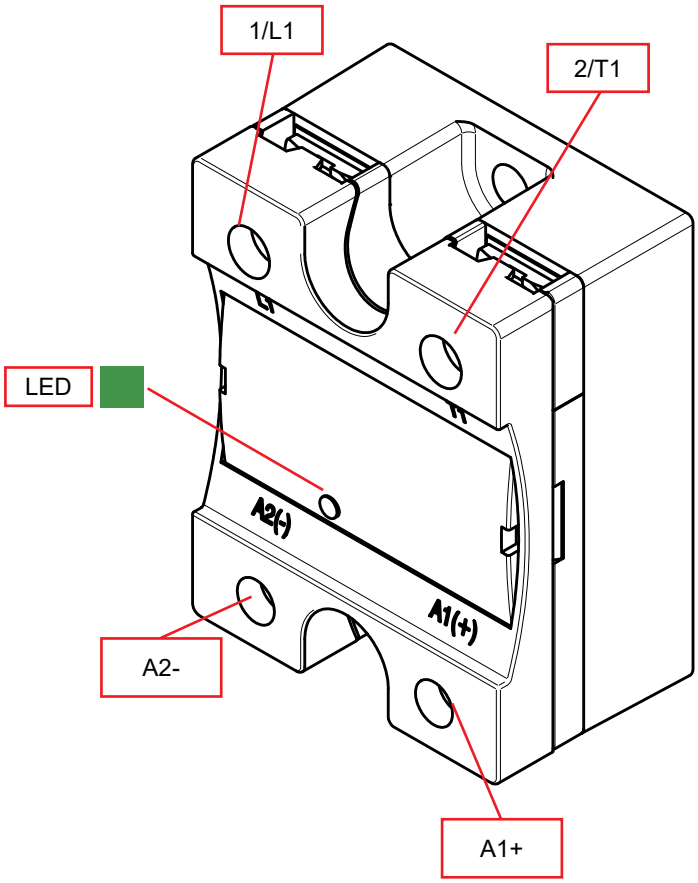
Carlo Gavazzi compatible components

Description	Component code	Notes
FASTON terminals	RM48F*, RM63F*	- Faston tabs, F0 = flat 0°, F4 = angled 45°, pack size: 20 pieces
Fork terminals	RM635FK, RM635FKP	- Terminal adaptors for 35mm² cable, pack size: 10 pieces
Thermal pads	KK071CUT	- Graphite thermal pad with adhesive on one side, pack size: 50 pieces
Touch safety cover	RMIP20	- IP20 protection degree, pack size: 20 pieces
Heatsinks	RHS	- Heatsink and accessories
Mounting screws kit	SRWKITM5X10MM	- M5 x 10 mm with captivated washer, pack size: 20 pieces
Varistors	RV0x	- Varistors for overvoltage protection, varistor diameter 20mm

Carlo Gavazzi further reading

Information	Where to find it	Notes
Datasheet	https://gavazziautomation.com/images/PIM/DATASHEET/ENG/SSR_Accessories.pdf	Solid state relay Accessories (including Heatsinks)
	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+, A2-	Control connection	Terminals for control voltage
LED	ON indicator	Indicates presence of control voltage

Features

General data

Material	Noryl, black	
Mounting	Panel mount	
Touch Protection	IP20	
Baseplate	25 A, 50 A 100 A	Aluminium Copper, nickel-plated
Overvoltage Category	III, 6 kV (1.2/50 µs) rated impulse withstand voltage	
Isolation	Input and Output to case Input to Output	4000 Vrms 4000 Vrms
Weight	25 A, 50 A 100 A	approx. 60g approx. 100g

Performance

Output specifications

	RM1C..25	RM1C..50	RM1C..100
Max. operational current[1]: AC-51	25 AAC	50 AAC	100 AAC
Max. operational current[1]: AC-56a	10 AAC	20 AAC	30 AAC
Operational frequency range	45 to 65 Hz		
Leakage current @ rated voltage	< 3 mAAC		
Minimum operational current	150 mAAC	250 mAAC	500 mAAC
Repetitive overload current t=1 s	< 55 AAC	< 125 AAC	< 200 AAC
Non-repetitive surge current (I_{TSM}), t=10 ms	325 Ap	600 Ap	1900 Ap
I^2t for fusing (t=10 ms), minimum	525 A^2s	1800 A^2s	18000 A^2s
Critical dV/dt (@Tj init = 40°C)	1000 V/µs		

1: with appropriate heatsink. Refer to Heatsink selection section for further details.

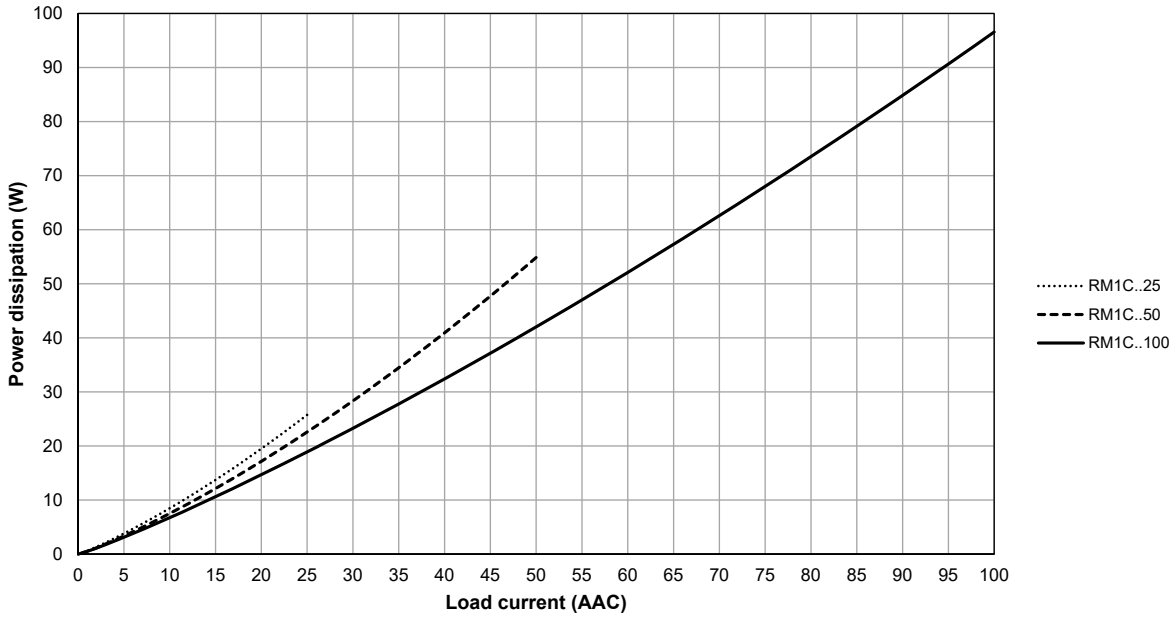
Output voltage specifications

	RM1C40D..	RM1C60D..
Operational voltage range	100 to 440 VACrms	340 to 660 VACrms
Blocking voltage	850 Vp	1400 Vp

Input specifications

Control voltage	4.25-32 VDC
Pick-up voltage	4.25 VDC
Drop-out voltage	1.0 VDC
Max. input current	20 mA
Response time pick-up	< 40 ms
Response time drop-out	< 10 ms

Output power dissipation



Heatsink selection

Thermal resistance [°C/W] of RM1C..25

Load current [A]	Surrounding ambient temperature [°C]					
	20	30	40	50	60	70
25.0	2.70	2.34	1.98	1.61	1.25	0.89
22.5	3.10	2.69	2.28	1.86	1.45	1.04
20.0	3.61	3.13	2.65	2.18	1.70	1.23
17.5	4.26	3.70	3.14	2.59	2.03	1.47
15.0	5.14	4.47	3.80	3.14	2.47	1.80
12.5	6.38	5.56	4.73	3.91	3.09	2.27
10.0	8.25	7.19	6.14	5.08	4.02	2.97
7.5	11.4	9.94	8.49	7.04	5.59	4.14
5.0	17.7	15.4	13.2	11.0	8.74	6.51
2.5	nh	nh	nh	nh	18.2	13.6

Thermal resistance [°C/W] of RM1C..50

Load current [A]	Surrounding ambient temperature [°C]					
	20	30	40	50	60	70
50.0	1.03	0.86	0.70	0.53	0.37	0.20
45.0	1.27	1.09	0.90	0.71	0.52	0.33
40.0	1.54	1.32	1.10	0.89	0.67	0.45
35.0	1.85	1.59	1.34	1.08	0.82	0.57
30.0	2.26	1.95	1.65	1.34	1.03	0.72
25.0	2.85	2.47	2.08	1.70	1.32	0.94
20.0	3.73	3.24	2.75	2.26	1.77	1.27
15.0	5.22	4.54	3.86	3.19	2.51	1.83
10.0	8.21	7.16	6.11	5.05	4.00	2.95
5.0	17.2	15.0	12.9	10.7	8.51	6.33

Thermal resistance [°C/W] of RM1C60..50

Load current [A]	Surrounding ambient temperature [°C]					
	20	30	40	50	60	70
50.0	0.99	0.81	0.63	0.44	0.26	0.08
45.0	1.28	1.07	0.86	0.65	0.44	0.23
40.0	1.64	1.40	1.15	0.91	0.67	0.42
35.0	2.11	1.82	1.54	1.25	0.96	0.67
30.0	2.60	2.25	1.90	1.55	1.20	0.85
25.0	3.30	2.86	2.43	1.99	1.55	1.11
20.0	4.36	3.79	3.22	2.65	2.08	1.51
15.0	6.1	5.4	4.6	3.77	2.97	2.18
10.0	9.76	8.52	7.3	6.0	4.8	3.54
5.0	nh	nh	15.47	12.85	10.24	7.6

Thermal resistance [°C/W] of RM1C..100

Load current [A]	Surrounding ambient temperature [°C]					
	20	30	40	50	60	70
100.0	0.54	0.45	0.36	0.27	0.18	0.09
90.0	0.68	0.58	0.47	0.37	0.27	0.17
80.0	0.86	0.74	0.62	0.50	0.38	0.26
70.0	1.08	0.94	0.80	0.66	0.52	0.38
60.0	1.37	1.20	1.03	0.85	0.68	0.51
50.0	1.70	1.49	1.28	1.06	0.85	0.64
40.0	2.21	1.93	1.66	1.38	1.10	0.83
30.0	3.06	2.68	2.30	1.91	1.53	1.15
20.0	4.78	4.18	3.59	2.99	2.39	1.76
10.0	9.98	8.79	7.49	6.24	4.99	3.74

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

Thermal data

	RM1C..25	RM1C..50	RM1C60..50	RM1C..100
Max. junction temperature	125°C	125°C	125°C	125°C
Max. heatsink temperature	100°C	100°C	100°C	100°C
Junction to case thermal resistance, R_{thjc}	≤ 0.80°C	≤ 0.50°C	≤ 0.72°C	≤ 0.30°C
Case to heatsink thermal resistance, R_{thcs} [2]	≤ 0.20°C	≤ 0.20°C	≤ 0.20°C	≤ 0.10°C

2. Thermal resistance case to heatsink values are applicable upon application of a fine layer of silicon based thermal paste HTS02S from Electrolube between SSR and heatsink

Compatibility and conformance

Approvals	
Standards compliance	LVD: EN 60947-4-3 EMCD: EN 60947-4-3 cURus: UL508 Recognized (E80573), NRNT2, NRNT8 CSA: C22.2 No.14, (204075)
UL short circuit current rating	65k Arms (refer to short circuit current section, Type 1 – UL508)

Note: Heatsink must be connected to ground for 600V types

Electromagnetic compatibility (EMC) - Immunity	
Electrostatic discharge (ESD)	EN/IEC 61000-4-2 8 kV air discharge, 4 kV contact (PC2)
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: 1 kV, 5 kHz (PC2)
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: 1 kV (PC2) Output, line to earth: 2 kV (PC2 with external varistor) Input, line to line: 1 kV (PC2) Input, line to earth: 2 kV (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 B: 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)

Note:

- 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.
- Control input lines must be installed together to maintain products' susceptibility to Radio Frequency interference.
- 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.

Environmental specifications

Operating temperature	-30°C to +80°C (-22°F to +176°F)
Storage temperature	-40°C to +100°C (-40°F to +212°F)
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
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.

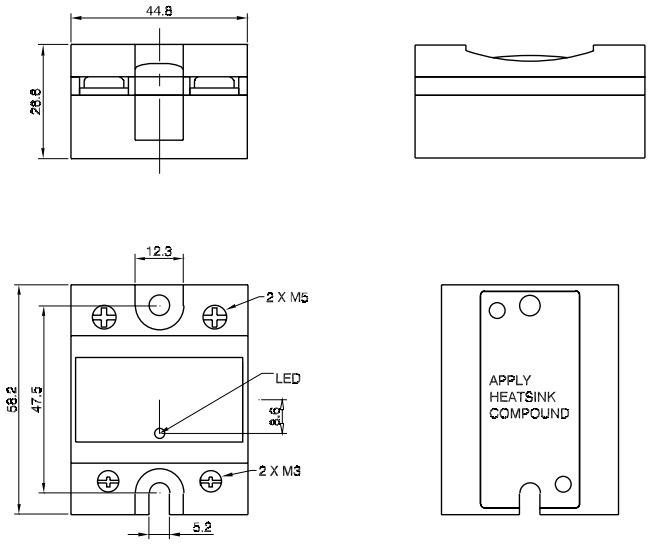
这份申明根据中华人民共和国电子工业标准
SJ/T11364-2014：标注在电子电气产品中限定使用的有害物质

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。

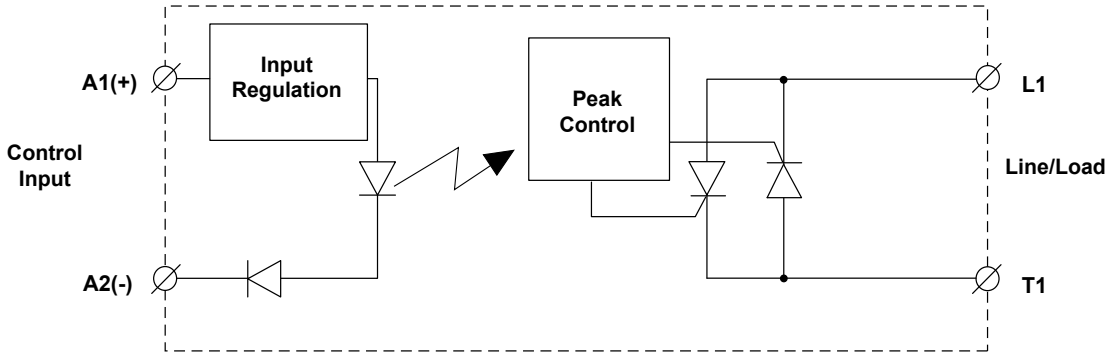
X: 此零件某种材料中含有的该有害物高于GB/T 26572的限定。

Dimensions



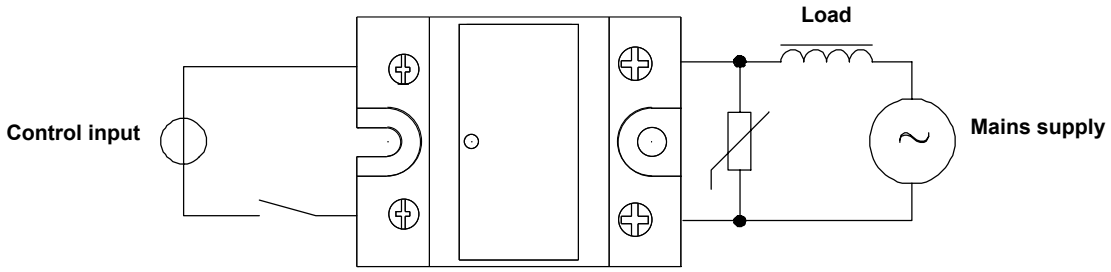
Dimensions in mm.

Functional diagram

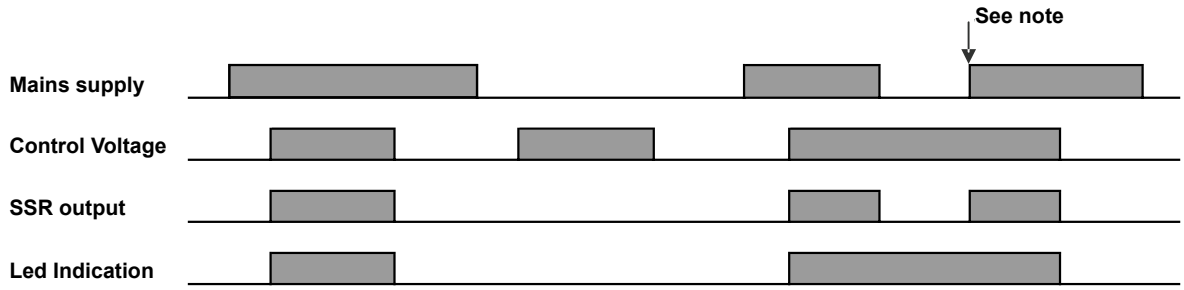


Connection diagram

Overvoltage protection
As transformers can have varying stray inductances and stray capacitances, it is always advisable to use external overvoltage protection.
Varistor diameter: ≤ 20 mm
Varistor voltage for RM1C40..: 460 VAC **(RV 05)**
Varistor voltage for RM1C60..: 680 VAC **(RV 07)**

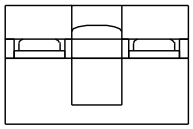
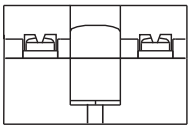


Operational diagram



Note: At this point (i.e., when switching of the mains is done rather than the control lines) peak switching does not occur but only instantaneous switching

Connection Specifications

	1/L1, 2/T1		A1+, A2-	
				
Mounting screws (SSR to heatsink)	M5, not provided with SSR (refer to **SRWKITM5X10MM** in the Compatible components section)			
Mounting torque (SSR to heatsink)	1.5 - 2.0 Nm (13.3 - 17.7 lb-in)			
Connection type	M5 screw with captivated washer		M3 screw with captivated washer	
Stripping length	12 mm		8 mm	
Rigid (solid & stranded) UL/CSA rated data	1x 2.5 – 6.0 mm² 1x 14 – 10 AWG	2x 2.5 – 6.0 mm² 2x 14 – 10 AWG	1x 0.5 – 2.5 mm² 1x 18 – 12 AWG	2x 0.5 - 2.5 mm² 2x 18 - 12 AWG
Flexible with end sleeve	1x 1.0 – 4.0 mm² 1x 18 – 12 AWG	2x 1.0 – 2.5 mm² 2x 2.5 – 4.0 mm² 2x 18 – 14 AWG 2x 14 – 12 AWG	1x 0.5 – 2.5 mm² 1x 18 – 12 AWG	2x 0.5 - 2.5 mm² 2x 18 - 12 AWG
Flexible without end sleeve	2x 1.0 – 6.0 mm² 2x 18 – 10 AWG	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	
Torque specifications	Pozidriv, PZ2 2.4 Nm (21.2 lb-in)		Pozidriv, PZ1 0.5 Nm (4.4 lb-in)	
Aperture for termination lug (fork or ring)	12 mm		7.5 mm	