

Solid State Relays

Industrial, 1-Phase Analog Switching

Type RM1E

- AC Solid State Relay
- Analog switching (phase-angle control) for resistive and slightly inductive load applications
- 4 to 20mA control current
- Rated operational current: 25, 50 and 100 AACrms
- Rated operational voltage: Up to 600 VACrms
- Variable intensity LED-indication according to input current
- Integral snubber network



Product Description

The analog switching relay works in accordance with the phase angle control principle, i.e. the output switching point in the AC sine wave depends on the control current. 4 mA corresponds to no switching and 20 mA corresponds

to full sine wave (near linear power response). The relay switches off every time the output current crosses zero, and switches ON in accordance with the applied control current.

Ordering Key

RM 1E 40 AA 50

Solid State Relay
 Number of Poles
 Switching mode
 Rated operational voltage
 4 to 20 mA control current
 Rated operational current

Type Selection

Switching mode	Rated operational voltage	Rated operational current	Control current	Non-rep. peak voltage
E: Analog switching	230 VAC* 400 VAC 480 VAC 600 VAC**	25: 25 A 50: 50 A 100: 100 A	AA: 4 - 20 mA	23 : 600 V _p 40 : 850 V _p 48 : 1200 V _p 60 : 1400 V _p

* Also suitable for 110 VAC
 ** Also suitable for 480 VAC

Selection Guide

Rated operational voltage	Non-rep. voltage	Control current	Rated operational current		
			25 A	50 A	100 A
230 VAC	600 V _p	4 - 20 mA	RM1E23AA25	RM1E23AA50	RM1E23AA100
400 VAC	850 V _p	4 - 20 mA	RM1E40AA25	RM1E40AA50	RM1E40AA100
480 VAC	1200 V _p	4 - 20 mA	RM1E48AA25	RM1E48AA50	RM1E48AA100
600 VAC	1400 V _p	4 - 20 mA	RM1E60AA25	RM1E60AA50	RM1E60AA100

General Specifications

	RM 1E 23AA..	RM 1E40 AA..	RM 1E48 AA..	RM 1E60 AA..
Operational voltage range	90 to 280 VAC	340 to 460 VAC	90 to 550 VAC	410 to 660 VAC
Non-rep. peak voltage	600 V _p	850 V _p	1200 V _p	1400 V _p
Operational frequency range	45 to 65 Hz	45 to 65 Hz	45 to 65 Hz	45 to 65 Hz
Power factor	> 0.75	> 0.75	> 0.75	> 0.75

Output Specifications

	RM1E..AA25	RM1E..AA50	RM1E..AA100
Rated operational current AC51 Ta=25 ° C AC53a Ta=25 ° C	25 A 5 A	50 A 15 A	100 A 20 A
Minimum operational current	150 mA	150 mA	150 mA
Rep. overload current t=1s	55 A _p	125 A _p	150 A _p
Non-rep. surge current t=10ms	300 A _p	600 A _p	1150 A _p
Off-state leakage current	< 3 mA	< 3 mA	< 3 mA
I _{zt} for fusing t= 1-10 ms	450 A _{2s}	1680 A _{2s}	6600 A _{2s}
Critical di/dt @50hz	≥ 100 A/μ s	≥ 100 A/μ s	≥ 100 A/μ s
Critical dV/dt off-state min.	1000 V/μ s	1000 V/μ s	1000 V/μ s

Input Specifications

Control current range	4-20 mA
Pick up current	4.2 mA
Drop out current	4.1 mA
Response time (input to output)	15ms
Voltage drop	<10 VDC @ 20 mA
Dynamic impedance	≥ 330 Ω
Allowable input current (max.)	≤ 50 mA
Reverse polarity protected	Yes

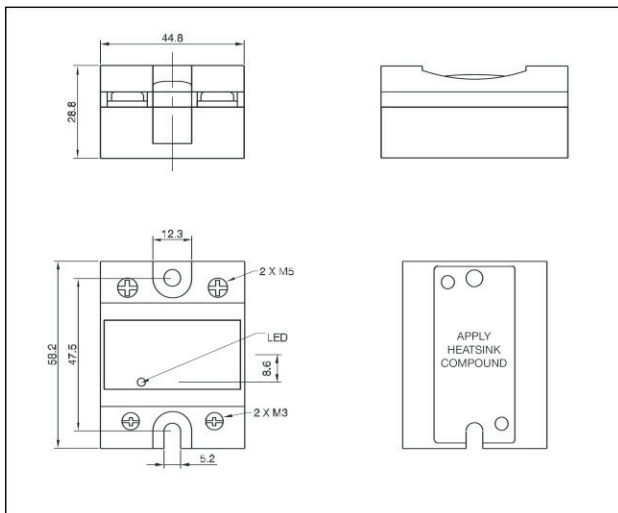
Thermal Specifications

Operating temperature	-20° to +70° C (-18° to +158° F)
Storage temperature	-20° to +100°C (-4° to +212° F)
Junction temperature	125° C (257° F)

Insulation

Rated insulation voltage	
Input to output	≥ 4000 Vrms
Output to case	≥ 4000 Vrms

Dimensions

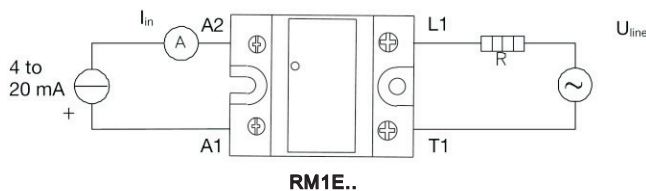


Housing Specifications

Weight	
25 A, 50 A	Approx. 60 g
100 A	Approx. 100 g
Housing material	Noryl, black
Baseplate	
25 A, 50 A	Aluminium
100 A	Copper, nickel-plated
Relay	
Mounting screws	M5
Mounting torque	1.5-2.0 Nm
Control terminal	
Mounting screws	M3x 9mm
Mounting torque	0.5 Nm
Power terminal	
Mounting screws	M5x 9mm
Mounting torque	2.4 Nm

Applications

This relay is suitable for control of heaters, lighting and slightly inductive loads such as small fans. The relay can also be used for soft turn-on of high-power incandescent lamps.



Transfer Characteristics

Output power as a function of control input (4 to 20mA)

I in [mA]	P out [%]
4	0
6	13
8	25
10	38
12	50
14	63
16	75
18	88
20	99

Heatsink Dimensions (load current versus ambient temperature)

RM1E..25

Load current [A]	Thermal resistance [K/W]						Power dissipation [W]	TA
	20	30	40	50	60	70		
25.0	3.23	2.80	2.37	1.94	1.51	1.09	23	
22.5	3.70	3.21	2.73	2.24	1.75	1.26	21	
20.0	4.30	3.74	3.17	2.61	2.05	1.49	18	
17.5	5.07	4.41	3.76	3.10	2.44	1.78	15	
15.0	6.12	5.33	4.54	3.75	2.96	2.17	13	
12.5	7.58	6.61	5.64	4.66	3.69	2.72	10	
10.0	9.80	8.55	7.30	6.05	4.80	3.55	8	
7.5	13.5	11.80	10.09	8.37	6.66	4.94	6	
5.0	-	18.3	15.7	13.04	10.39	7.74	4	
2.5	-	-	-	-	-	7	2	

RM1E..50

Load current [A]	Thermal resistance [K/W]						Power dissipation [W]	TA
	20	30	40	50	60	70		
50.0	1.25	1.07	0.88	0.70	0.52	0.34	61	
45.0	1.46	1.25	1.04	0.84	0.63	0.42	53	
40.0	1.73	1.49	1.25	1.01	0.77	0.52	46	
35.0	2.08	1.80	1.51	1.23	0.94	0.66	39	
30.0	2.56	2.22	1.87	1.53	1.18	0.84	33	
25.0	3.24	2.81	2.38	1.95	1.52	1.09	26	
20.0	4.26	3.71	3.15	2.59	2.03	1.47	20	
15.0	5.99	5.22	4.45	3.67	2.90	2.12	15	
10.0	9.49	8.27	7.06	5.85	4.64	3.43	10	
5.0	-	17.5	15.0	12.4	9.91	7.39	5	

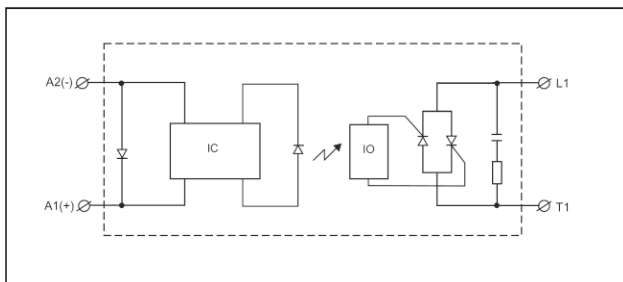
RM1E..100

Load current [A]	Thermal resistance [K/W]						Power dissipation [W]	TA
	20	30	40	50	60	70		
100.0	0.60	0.52	0.43	0.34	0.26	0.17	177	
90.0	0.74	0.64	0.54	0.44	0.34	0.24	101	
80.0	0.91	0.79	0.68	0.56	0.45	0.33	87	
70.0	1.09	0.96	0.82	0.68	0.55	0.41	73	
60.0	1.33	1.16	1.00	0.83	0.66	0.50	60	
50.0	1.66	1.45	1.24	1.04	0.83	0.62	48	
40.0	2.16	1.89	1.62	1.35	1.08	0.81	37	
30.0	3.01	2.64	2.26	1.88	1.51	1.13	27	
20.0	4.73	4.14	3.55	2.96	2.37	1.78	17	
10.0	9.94	8.70	7.45	6.21	4.97	3.73	8	

Heatsink Selection

Heatsink (see Accessories)	Thermal resistance	...for power ... dissipation
No heatsink required--- N/A		
RHS 300	5.00 K/W	> 0 W
RHS 100	3.00 K/W	> 25 W
RHS 45C	2.70 K/W	> 60 W
RHS 45B	2.00 K/W	> 60 W
RHS 90A	1.35 K/W	> 60 W
RHS 45A plus fan	1.25 K/W	> 0 W
RHS 45B plus fan	1.20 K/W	> 0 W
RHS 112A	1.10 K/W	> 100 W
RHS 301	0.80 K/W	> 70 W
RHS 90A plus fan	0.45 K/W	> 0 W
RHS 112A plus fan	0.40 K/W	> 0 W
RHS 301 plus fan	0.25 K/W	> 0 W
Consult your distribution	> 0.25 K/W	N/A
Infinite heatsink -No solution	- - -	N/A

Functional Diagram



Note: For power dissipation values smaller than those shown above, please refer to the corresponding heatsink curve in the SSR Accessories Section is referred to.