

Solid State Relays Industrial, 1-Phase ZS (IO) w. LED and Built-in Varistor Types RM 23, RM 40, RM 48, RM 60



- Zero switching (RM1A) or instant-on switching (RM1B) AC Solid State Relay
- Direct copper bonding (DCB) technology
- LED indication
- Built-in varistor
- Clip-on IP 20 protection cover
- Self-lifting terminals
- Housing free of moulding mass
- 2 input ranges: 3-32* VDC and 20-280VAC/22-48VDC
- Operational ratings: Up to 100AACrms and 600VACrms
- Blocking voltage: Up to 1400V_p
- Opto-isolation: > 4000VACrms
- CE, RoHS compliant
- cURus, CSA, CCC

Product Description

The industrial, 1-phase relay with antiparallel thyristor output is the most widely used industrial SSR due to its multiple application possibilities. The relay can be used for resistive, inductive and capacitive loads. The zero switching relay switches ON when the sinusoidal curve crosses zero and switches OFF when the current crosses zero. The instant-on relay

with DC control input can be used for phase control. The built-in varistor secures transient protection for the heavy industrial applications, and the LED indicates the status of the control input. The clip-on cover is securing touch protection to IP 20. Protected output terminals can handle cables up to 16mm².

Ordering Key

RM 1 A 23 D 25

- Solid State Relay
- Number of poles
- Switching mode
- Rated operational voltage
- Control voltage
- Rated operational current

Type Selection

Switching mode	Rated operational voltage	Control voltage	Rated operational current
A: Zero Switching B: Instant-on switching (DC Control only)	23: 230VACrms 40: 400VACrms 48: 480VACrms 60: 600VACrms	A: 20-280VAC/22-48VDC D: 3-32VDC* <small>*4 to 32VDC for 400, 480 and 600VAC types *4 to 32VDC for RM1B types</small>	25: 25AACrms 50: 50AACrms 75: 75AACrms 100: 100AACrms

Selection Guide

Rated operational voltage	Blocking voltage	Control voltage	Rated operational current			
			25A	50A	75A	100A
230VACrms	650V _p	3 - 32VDC	RM1A23D25	RM1A23D50	RM1A23D75	RM1A23D100
		20 to 280VAC 22 to 48VDC	RM1A23A25	RM1A23A50	RM1A23A75	RM1A23A100
400VACrms	850V _p	4 - 32VDC	RM1A40D25	RM1A40D50	RM1A40D75	RM1A40D100
		20 to 280VAC 22 to 48VDC	RM1A40A25	RM1A40A50	RM1A40A75	RM1A40A100
480VACrms	1200V _p	4 - 32VDC	RM1A48D25	RM1A48D50	RM1A48D75	RM1A48D100
		20 to 280 VAC 22 to 48VDC	RM1A48A25	RM1A48A50	RM1A48A75	RM1A48A100
600VACrms	1400V _p	4 - 32VDC	RM1A60D25	RM1A60D50	RM1A60D75	RM1A60D100
		20 to 280VAC 22 to 48VDC	RM1A60A25	RM1A60A50	RM1A60A75	RM1A60A100

General Specifications

	RM1.23...	RM1.40...	RM1.48...	RM1.60...
Operational voltage range				
RM1A...	24 to 265VACrms	42 to 440VACrms	42 to 530VACrms	42 to 660VACrms
RM1B...	42 to 265VACrms	42 to 440VACrms	42 to 530VACrms	42 to 660VACrms
Blocking voltage	≥ 650V _p	≥ 850V _p	≥ 1200V _p	≥ 1400V _p
Zero voltage turn-on	≤ 10V	≤ 10V	≤ 10V	≤ 10V
Operational frequency range	45 to 65Hz	45 to 65Hz	45 to 65Hz	45 to 65Hz
Power factor	> 0.5 @ 230VACrms	> 0.5 @ 400VACrms	> 0.5 @ 480VACrms	> 0.5 @ 600VACrms
Approvals	UR, cUR, CSA, CCC	UR, cUR, CSA, CCC	UR, cUR, CSA, CCC	UR, cUR, CSA, CCC
CE-marking	Yes	Yes	Yes	Yes *
Isolation				
Input to Output	4000 Vrms	4000 Vrms	4000 Vrms	4000 Vrms
input and Output to case	4000 Vrms	4000 Vrms	4000 Vrms	4000 Vrms

* Heatsink must be connected to ground

Input Specifications

	RM1...D..	RM1...A..
Control voltage range		
RM1A23...	3 - 32VDC	20 - 280VAC, 22 - 48VDC
RM1A40... RM1A48... RM1A60...	4 - 32VDC	20 - 280VAC, 22 - 48VDC
RM1B...	4 - 32VDC	-
Pick-up voltage @ Ta = 25°C		
RM1A23...	2.5VDC	18VAC/DC
RM1A40... RM1A48... RM1A60...	3.5VDC	18VAC/DC
RM1B ...	3.5VDC	-
Reverse voltage	32VDC	-
Drop out voltage	1.2VDC	6VAC/DC
Input current @ max input voltage		
RM1A	≤12 mA	≤ 20mA
RM1B	≤15 mA	-
Response time pick-up		
RM1A	1/2 cycle	12ms
RM1B	0.1ms	-
Response time drop-out	1/2 cycle	40ms

Output Specifications

	RM1....25	RM....50	RM1....75	RM1....100
Rated operational current				
AC51 @ Ta=25°C	25Arms	50Arms	75Arms	100Arms
AC53a @ Ta=25°C	5Arms	15Arms	20Arms	30Arms
Min. operational current	150mA	250mA	400mA	500mA
Rep. overload current t=1 s	< 55AACrms	< 125AACrms	< 150AACrms	< 200AACrms
Non-rep. surge current t=10 ms	325A _p	600A _p	1150A _p	1900A _p
Off-state leakage current @ rated voltage and frequency	< 3mArms	< 3mArms	< 3mArms	< 3mArms
I²t for fusing t=10 ms	< 525A ² s	< 1800A ² s	< 6600A ² s	< 18000A ² s
On-state voltage drop @ rated current	1.6Vrms	1.6Vrms	1.6Vrms	1.6Vrms
Critical dV/dt off-state min.	1000V/μs	1000V/μs	1000V/μs	1000V/μs
Endurance testing acc. to UL508	100,000 cycles	100,000 cycles	100,000 cycles	6,000 cycles

Note: UL requirement for General Use Endurance testing is 6,000 cycles



Motor Ratings*: HP (UL508)

	230VAC	400VAC	480VAC	600VAC
RM1..25	1.5HP	3HP	3HP	5HP
RM1..50	3HP	5HP	7.5HP	10HP
RM1..75	5HP	10HP	10HP	15HP
RM1..100	7.5HP	15HP	20HP	25HP

* with suitable heatsink

Electromagnetic Compatibility

EMC Immunity	IEC/EN 61000-6-2	Radiated Radio Frequency Immunity	IEC/EN 61000-4-3
Electrostatic Discharge (ESD)		10V/m, 80 - 1000 MHz	Performance Criteria 1
Immunity	IEC/EN 61000-4-2	10V/m, 1.4 - 2.0GHz	Performance Criteria 1
Air discharge, 8kV	Performance Criteria 2	3 V/m, 2.0 - 2.7GHz	Performance Criteria 1
Contact, 4kV	Performance Criteria 2	Conducted Radio Frequency Immunity	IEC/EN 61000-4-6
Electrical Fast Transient (Burst) Immunity	IEC/EN 61000-4-4	10V/m, 0.15 - 80 MHz	Performance Criteria 1
Output: 2kV, 5kHz	Performance Criteria 1	Voltage Dips Immunity	IEC/EN 61000-4-11
Input: 1kV, 5kHz	Performance Criteria 1	0% for 10ms	Performance Criteria 2
Electrical Surge Immunity	IEC/EN 61000-4-5	70% for 500ms	Performance Criteria 2
Output, line to line, 1kV	Performance Criteria 2	Voltage Interruptions Immunity	IEC/EN 61000-4-11
Output, line to earth, 2kV	Performance Criteria 2	0% for 5000ms	Performance Criteria 2
Input, line to line, 1kV (RM1..D..)	Performance Criteria 2		
Input, line to earth, 2kV (RM1..D..)	Performance Criteria 2		
Input, line to line, 500V ¹ (RM1..A..)	Performance Criteria 2		
Input, line to earth, 500V ¹ (RM1..A..)	Performance Criteria 2		
EMC Emission	IEC/EN 61000-6-4	Radio Interference Field Emission (Radiated)	IEC/EN 55011
Radio Interference		30 - 1000MHz	Class B
Voltage Emission (Conducted)	IEC/EN 55011		
0.15 - 30MHz	Class A (industrial) with filters IEC/EN 60947-4-3 Class A (no filtering needed up to 75AAC)		

* For higher surge voltage levels a varistor should be connected across the control terminals.

Notes:

- Control input lines must be installed together to maintain products' susceptibility to Radio Frequency interference.
- Performance Criteria 1: No degradation of performance or loss of function is allowed when the product is operated as intended.
- Performance Criteria 2: 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: Temporary loss of function is allowed, provided the function can be restored by manual operation of the controls.

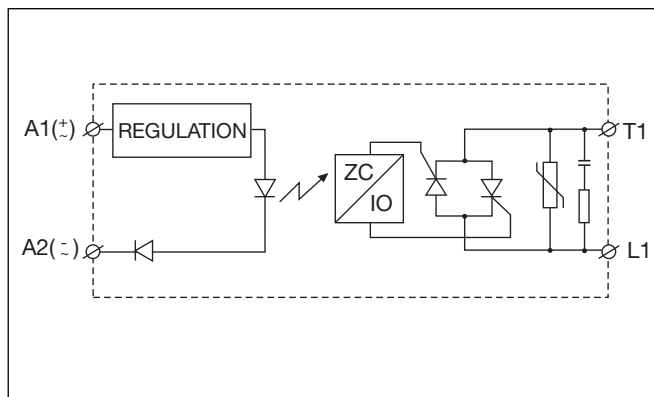
Thermal Specifications

	RM1....25	RM1....50	RM1.60.50	RM1....75	RM1....100
Operating temperature range	-20° to 70°C	-20° to 70°C	-20° to 70°C	-20° to 70°C	-20° to 70°C
Storage temperature range	-40° to 100°C	-40° to 100°C	-40° to 100°C	-40° to 100°C	-40° to 100°C
Junction temperature	≤ 125°C	≤ 125°C	≤ 125°C	≤ 125°C	≤ 125°C
R _{th} junction to case	≤ 0.80°C/W	≤ 0.50°C/W	≤ 0.72°C/W	≤ 0.35°C/W	≤ 0.30°C/W
R _{th} junction to ambient	≤ 20.0°C/W	≤ 20.0°C/W	≤ 20.0°C/W	≤ 20.0°C/W	≤ 20.0°C/W

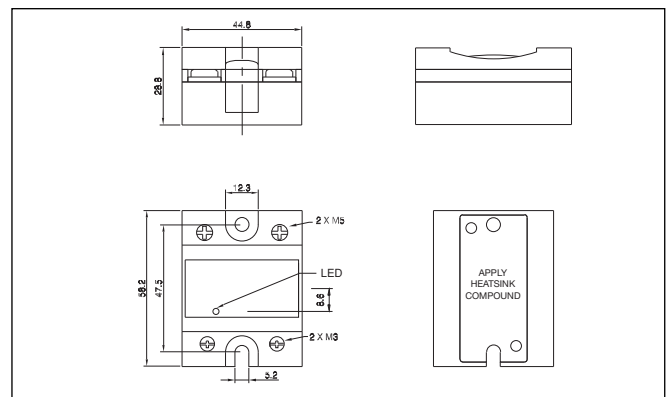
Housing Specifications

Weight 25A, 50A 75A, 100A	Approx. 60g Approx. 100g	Relay Mounting screws Mounting torque	M5 1.5-2.0Nm
Baseplate 25A, 50A 75A, 100A	Aluminium Copper, nickel-plated	Control terminal Mounting screws Mounting torque	M3 x 9 0.5Nm
Potting compound	None	Power terminal Mounting screws Mounting torque	M5 x 9 2.4Nm

Functional Diagram



Dimensions



All dimensions in mm

Connection Diagram

