

# 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<sub>p</sub>
- Opto-isolation: > 4000VACrms



## 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 16mm<sup>2</sup>.

## 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 (ZC)<br>B: Instant-on switching (IO) | 23: 230VACrms<br>40: 400VACrms<br>48: 480VACrms<br>60: 600VACrms | A: 20-280VAC / 22-48VDC<br>D: 3-32VDC*<br>*4 to 32VDC for 400, 480 and 600VAC types<br>*4 to 32VDC for RM1B types | 25: 25AACrms<br>50: 50AACrms<br>75: 75AACrms<br>100: 100AACrms |

## Selection Guide

| Rated operational voltage, Switching mode | Blocking voltage   | Control voltage              | Rated operational current with suitable heatsink |           |           |            |
|-------------------------------------------|--------------------|------------------------------|--------------------------------------------------|-----------|-----------|------------|
|                                           |                    |                              | 25A                                              | 50A       | 75A       | 100A       |
| 230VACrms, ZC                             | 650V <sub>p</sub>  | 3 - 32VDC                    | RM1A23D25                                        | RM1A23D50 | RM1A23D75 | RM1A23D100 |
|                                           |                    | 20 to 280VAC<br>22 to 48VDC  | RM1A23A25                                        | RM1A23A50 | RM1A23A75 | RM1A23A100 |
| 400VACrms, ZC                             | 800V <sub>p</sub>  | 4 - 32VDC                    | RM1A40D25                                        | RM1A40D50 | RM1A40D75 | RM1A40D100 |
|                                           |                    | 20 to 280VAC<br>22 to 48VDC  | RM1A40A25                                        | RM1A40A50 | RM1A40A75 | RM1A40A100 |
| 480VACrms, ZC                             | 1200V <sub>p</sub> | 4 - 32VDC                    | RM1A48D25                                        | RM1A48D50 | RM1A48D75 | RM1A48D100 |
|                                           |                    | 20 to 280 VAC<br>22 to 48VDC | RM1A48A25                                        | RM1A48A50 | RM1A48A75 | RM1A48A100 |
| 600VACrms, ZC                             | 1400V <sub>p</sub> | 4 - 32VDC                    | RM1A60D25                                        | RM1A60D50 | RM1A60D75 | RM1A60D100 |
|                                           |                    | 20 to 280VAC<br>22 to 48VDC  | RM1A60A25                                        | RM1A60A50 | RM1A60A75 | RM1A60A100 |

\* CCC is not applicable to models having Mexico as the country of origin

## Selection Guide

| Rated operational voltage,<br>Switching mode | Blocking voltage   | Control voltage            | Rated operational current with suitable heatsink |                  |                  |                   |
|----------------------------------------------|--------------------|----------------------------|--------------------------------------------------|------------------|------------------|-------------------|
|                                              |                    |                            | 25A                                              | 50A              | 75A              | 100A              |
| 230VACrms, IO                                | 650V <sub>p</sub>  | 4 - 32VDC                  | <b>RM1B23D25</b>                                 | <b>RM1B23D50</b> | <b>RM1B23D75</b> | <b>RM1B23D100</b> |
|                                              |                    | 20 - 280VAC/<br>22 - 48VDC | <b>RM1B23A25</b>                                 | <b>RM1B23A50</b> | <b>RM1B23A75</b> | <b>RM1B23A100</b> |
|                                              |                    |                            |                                                  |                  |                  |                   |
| 400VACrms, IO                                | 800V <sub>p</sub>  | 4 - 32VDC                  | <b>RM1B40D25</b>                                 | <b>RM1B40D50</b> | <b>RM1B40D75</b> | <b>RM1B40D100</b> |
| 480VACrms, IO                                | 1200V <sub>p</sub> | 4 - 32VDC                  | <b>RM1B48D25</b>                                 | <b>RM1B48D50</b> | <b>RM1B48D75</b> | <b>RM1B48D100</b> |
| 600VACrms, IO                                | 1400V <sub>p</sub> | 4 - 32VDC                  | <b>RM1B60D25</b>                                 | <b>RM1B60D50</b> | <b>RM1B60D75</b> | <b>RM1B60D100</b> |
|                                              |                    | 20 - 280VAC/<br>22 - 48VDC | <b>RM1B60A25</b>                                 | <b>RM1B60A50</b> | <b>RM1B60A75</b> | <b>RM1B60A100</b> |
|                                              |                    |                            |                                                  |                  |                  |                   |

Note: For AC control, IO switching part numbers will be created on request

## General Specifications

|                                    | RM1.23...               | RM1.40...               | RM1.48...               | RM1.60...               |
|------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| <b>Operational voltage range</b>   |                         |                         |                         |                         |
| 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         |
| <b>Blocking voltage</b>            | 650V <sub>p</sub>       | 800V <sub>p</sub>       | 1200V <sub>p</sub>      | 1400V <sub>p</sub>      |
| <b>Zero voltage turn-on</b>        | ≤ 10V                   | ≤ 10V                   | ≤ 10V                   | ≤ 10V                   |
| <b>Operational frequency range</b> | 45 to 65Hz              | 45 to 65Hz              | 45 to 65Hz              | 45 to 65Hz              |
| <b>Power factor</b>                | > 0.5 @ 230VACrms       | > 0.5 @ 400VACrms       | > 0.5 @ 480VACrms       | > 0.5 @ 600VACrms       |
| <b>Approvals</b>                   | UR, cUR, CSA, CCC*, EAC | UR, cUR, CSA, CCC*, EAC | UR, cUR, CSA, CCC*, EAC | UR, cUR, CSA, CCC*, EAC |
| <b>CE-marking</b>                  | Yes                     | Yes                     | Yes                     | Yes **                  |
| <b>UKCA Marking</b>                | Yes                     | Yes                     | Yes                     | Yes **                  |
| <b>Isolation</b>                   |                         |                         |                         |                         |
| <b>Input to Output</b>             | 4000 Vrms               | 4000 Vrms               | 4000 Vrms               | 4000 Vrms               |
| <b>Input and Output to case</b>    | 4000 Vrms               | 4000 Vrms               | 4000 Vrms               | 4000 Vrms               |

\* CCC is not applicable to models having Mexico as the country of origin

\*\* Heatsink must be connected to ground

## Input Specifications

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

## Output Specifications

|                                                                       | RM1..25               | RM1..50                | RM1..75                | RM1..100               |
|-----------------------------------------------------------------------|-----------------------|------------------------|------------------------|------------------------|
| <b>Rated operational current</b><br>AC51 @ Ta=25°C<br>AC53a @ Ta=25°C | 25Arms<br>5Arms       | 50Arms<br>15Arms       | 75Arms<br>20Arms       | 100Arms<br>30Arms      |
| <b>Min. operational current</b>                                       | 150mA                 | 250mA                  | 400mA                  | 500mA                  |
| <b>Rep. overload current t=1 s</b>                                    | < 55AACrms            | < 125AACrms            | < 150AACrms            | < 200AACrms            |
| <b>Non-rep. surge current t=10 ms</b>                                 | 325A <sub>p</sub>     | 600A <sub>p</sub>      | 1150A <sub>p</sub>     | 1900A <sub>p</sub>     |
| <b>Off-state leakage current @<br/>rated voltage and frequency</b>    | < 3mArms              | < 3mArms               | < 3mArms               | < 3mArms               |
| <b>I<sup>2</sup>t for fusing t=10 ms</b>                              | < 525A <sup>2</sup> s | < 1800A <sup>2</sup> s | < 6600A <sup>2</sup> s | <18000A <sup>2</sup> s |
| <b>Critical dV/dt off-state min.</b>                                  | 1000V/μs              | 1000V/μs               | 1000V/μs               | 1000V/μs               |
| <b>Endurance testing acc. to UL508</b>                                | 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 |
|-----------------|--------|--------|--------|--------|
| <b>RM1..25</b>  | 1.5HP  | 3HP    | 3HP    | 5HP    |
| <b>RM1..50</b>  | 3HP    | 5HP    | 7.5HP  | 10HP   |
| <b>RM1..75</b>  | 5HP    | 10HP   | 10HP   | 15HP   |
| <b>RM1..100</b> | 7.5HP  | 15HP   | 20HP   | 25HP   |

\* with suitable heatsink

## Electromagnetic Compatibility

|                                                   |                                            |                                                     |                        |
|---------------------------------------------------|--------------------------------------------|-----------------------------------------------------|------------------------|
| <b>EMC Immunity</b>                               | EN 60947-4-3                               | <b>Radiated Radio Frequency Immunity</b>            | IEC/EN 61000-4-3       |
| <b>Electrostatic Discharge (ESD)</b>              |                                            | 10V/m, 80 - 1000 MHz                                | Performance Criteria 1 |
| <b>Immunity</b>                                   | 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                     | <b>Conducted Radio Frequency Immunity</b>           | IEC/EN 61000-4-6       |
| <b>Electrical Fast Transient (Burst) Immunity</b> | IEC/EN 61000-4-4                           | 10V/m, 0.15 - 80 MHz                                | Performance Criteria 1 |
| Output: 2kV, 5kHz                                 | Performance Criteria 1                     | <b>Voltage Dips Immunity</b>                        | IEC/EN 61000-4-11      |
| Input: 1kV, 5kHz                                  | Performance Criteria 1                     | 0% for 0.5, 1 cycle                                 | Performance Criteria 2 |
| <b>Electrical Surge Immunity</b>                  | IEC/EN 61000-4-5                           | 40% for 10 cycles                                   | Performance Criteria 2 |
| Output, line to line, 1kV                         | Performance Criteria 2                     | 70% for 25 cycles                                   | Performance Criteria 2 |
| Output, line to earth, 2kV                        | Performance Criteria 2                     | 80% for 250 cycles                                  | Performance Criteria 2 |
| Input, line to line, 1kV                          | Performance Criteria 2                     | <b>Voltage Interruptions Immunity</b>               | IEC/EN 61000-4-11      |
| Input, line to earth, 2kV                         | Performance Criteria 2                     | 0% for 5000ms                                       | Performance Criteria 2 |
| <b>EMC Emission</b>                               | EN 60947-4-3                               | <b>Radio Interference Field Emission (Radiated)</b> | IEC/EN 55011           |
| <b>Radio Interference</b>                         |                                            | 30 - 1000MHz                                        | Class B                |
| <b>Voltage Emission (Conducted)</b>               | IEC/EN 55011                               |                                                     |                        |
| 0.15 - 30MHz                                      | Class A (industrial) with external filters |                                                     |                        |

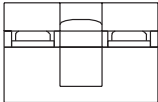
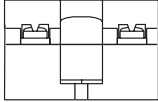
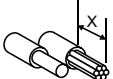
## Notes:

- 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.
- The control terminals A1, A2 (RM1..A) shall be supplied by a secondary circuit where power is limited by a transformer, rectifier, voltage divider, or similar device that derives power from a primary circuit, and where the short-circuit limit between conductors of the secondary circuit or between conductors and ground is 1500 VA or less. The short-circuit volt ampere limit is the product of the open circuit voltage and the short circuit ampere.
- 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.

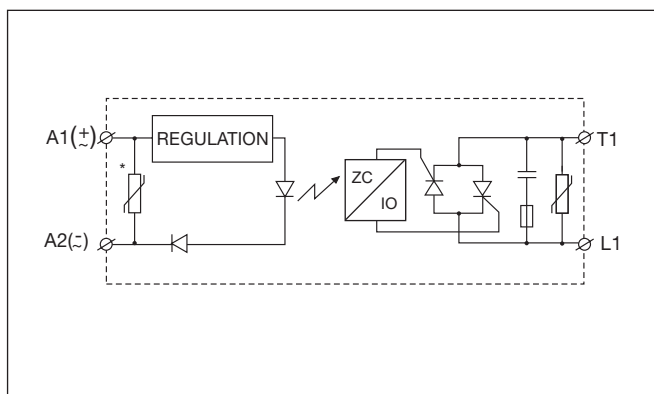
## Housing Specifications

|                                           |                                    |                                                    |                 |
|-------------------------------------------|------------------------------------|----------------------------------------------------|-----------------|
| <b>Weight</b><br>25A, 50A<br>75A, 100A    | Approx. 60g<br>Approx. 100g        | <b>Relay</b><br>Mounting screws<br>Mounting torque | M5<br>1.5-2.0Nm |
| <b>Baseplate</b><br>25A, 50A<br>75A, 100A | Aluminium<br>Copper, nickel-plated |                                                    |                 |
| <b>Potting compound</b>                   | None                               |                                                    |                 |

## Connection Specifications

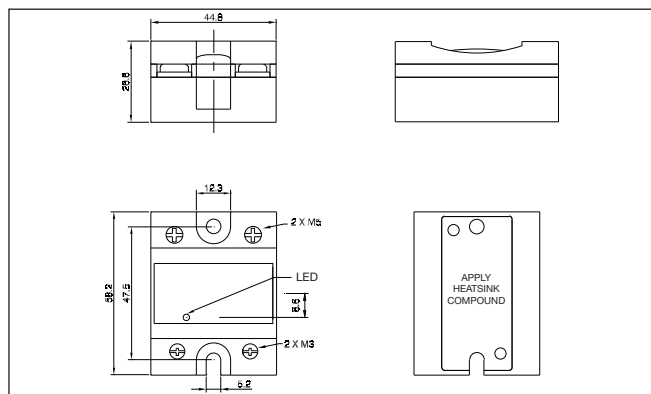
| Connection terminals                      | L1, T1                                                                              | A1, A2                                                                                           |
|-------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|                                           |  |             |
| Stripping length (X)                      | 12 mm                                                                               | 8 mm                                                                                             |
| Connection Type                           | M5 screw with captivated washer                                                     | M3 screw with captivated washer                                                                  |
| Rigid (solid & stranded)<br>UR rated data |  |                                                                                                  |
|                                           | 1x 2.5 - 6.0 mm <sup>2</sup><br>1x 14 - 10 AWG                                      | 2x 2.5 - 6.0 mm <sup>2</sup><br>2x 14 - 10 AWG                                                   |
| Flexible with end sleeve                  |  |                                                                                                  |
|                                           | 1x 1.0 - 4.0 mm <sup>2</sup><br>1x 18 - 12 AWG                                      | 2x 1.0 - 2.5 mm <sup>2</sup><br>2x 2.5 - 4.0 mm <sup>2</sup><br>2x 18 - 14 AWG<br>2x 14 - 12 AWG |
| Flexible without end sleeve               |  |                                                                                                  |
|                                           | 1x 1.0 - 6.0 mm <sup>2</sup><br>1x 18 - 10 AWG                                      | 2x 1.0 - 2.5 mm <sup>2</sup><br>2x 2.5 - 6.0 mm <sup>2</sup><br>2x 18 - 14 AWG<br>2x 14 - 10 AWG |
| Torque specification                      |  |                                                                                                  |
|                                           | Pozidrive 2<br>2.4 Nm (21.2 lb-in)                                                  | Pozidrive 1<br>0.5 Nm (4.4 lb-in)                                                                |
| Aperture for termination lug              | 12 mm                                                                               | 7.5 mm                                                                                           |

## Functional Diagram



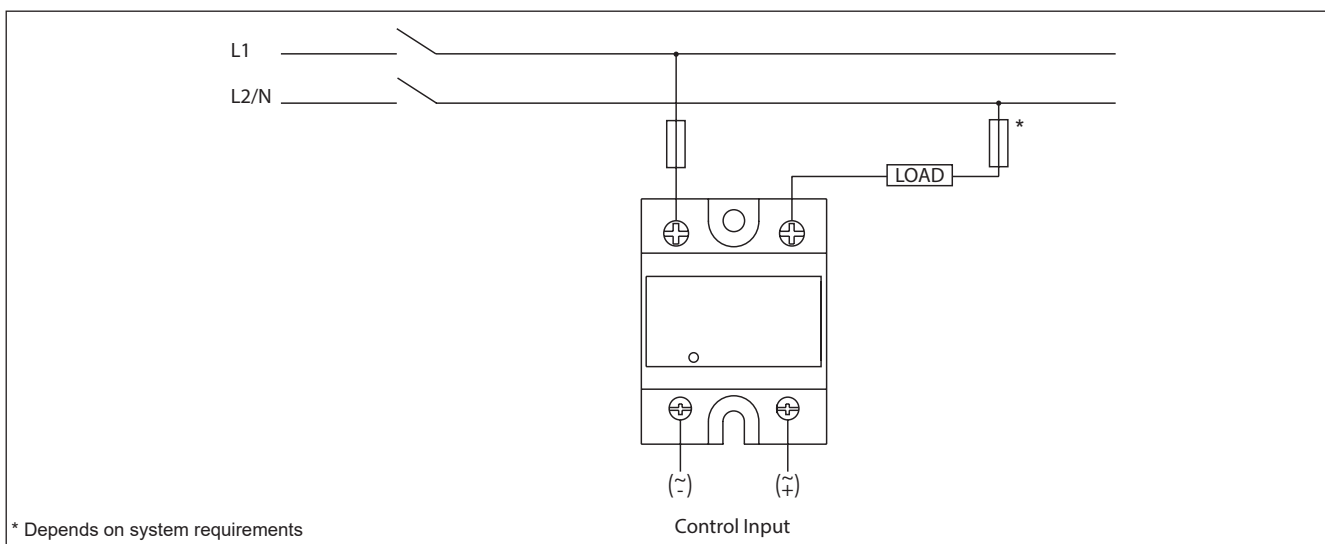
\* Varistor across input applies to AC control versions only.

## Dimensions



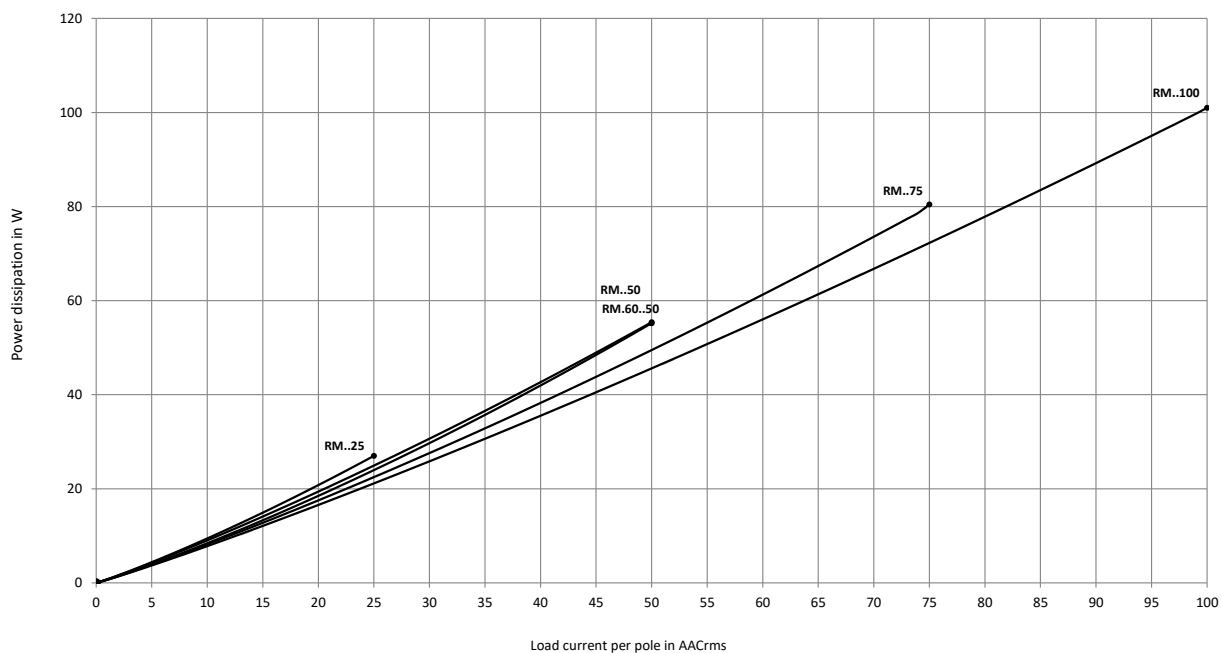
All dimensions in mm

## Connection Diagram



\* Depends on system requirements

## Output Power Dissipation



## Heatsink Dimensions (load current versus ambient temperature)

### RM..25

| Load current [A] | Thermal resistance [°C/W] |      |      |      |      |      |
|------------------|---------------------------|------|------|------|------|------|
|                  | 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              | -                         | -    | -    | -    | 18.2 | 13.6 |

Ambient temp. [°C]

### RM..50

| Load current [A] | Thermal resistance [°C/W] |      |      |      |      |      |
|------------------|---------------------------|------|------|------|------|------|
|                  | 20                        | 30   | 40   | 50   | 60   | 70   |
| 50.0             | 1.03                      | 0.86 | 0.70 | 0.53 | 0.37 | 0.20 |
| 45.0             | 1.27                      | 1.32 | 0.90 | 0.71 | 0.52 | 0.33 |
| 40.0             | 1.54                      | 1.59 | 1.10 | 0.89 | 0.67 | 0.45 |
| 35.0             | 1.85                      | 1.95 | 1.34 | 1.08 | 0.82 | 0.57 |
| 30.0             | 2.26                      | 2.47 | 1.65 | 1.34 | 1.03 | 0.72 |
| 25.0             | 2.85                      | 3.24 | 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 |

Ambient temp. [°C]

|                                                       |        |      |
|-------------------------------------------------------|--------|------|
| Junction to ambient thermal resistance, $R_{th\ j-a}$ | < 20.0 | °C/W |
| Junction to case thermal resistance, $R_{th\ j-c}$    | < 0.80 | °C/W |
| Case to heatsink thermal resistance, $R_{th\ c-s}^2$  | < 0.20 | °C/W |
| Maximum allowable case temperature                    | 100    | °C   |
| Maximum allowable junction temperature                | 125    | °C   |

|                                                       |        |      |
|-------------------------------------------------------|--------|------|
| Junction to ambient thermal resistance, $R_{th\ j-a}$ | < 20.0 | °C/W |
| Junction to case thermal resistance, $R_{th\ j-c}$    | < 0.50 | °C/W |
| Case to heatsink thermal resistance, $R_{th\ c-s}^2$  | < 0.20 | °C/W |
| Maximum allowable case temperature                    | 100    | °C   |
| Maximum allowable junction temperature                | 125    | °C   |

### RM1.60..50

| Load current [A] | Thermal resistance [°C/W] |      |       |       |       |      |
|------------------|---------------------------|------|-------|-------|-------|------|
|                  | 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              | --                        | --   | 15.47 | 12.85 | 10.24 | 7.6  |

Ambient temp. [°C]

### RM..75

| Load current [A] | Thermal resistance [°C/W] |       |       |      |      |      |
|------------------|---------------------------|-------|-------|------|------|------|
|                  | 20                        | 30    | 40    | 50   | 60   | 70   |
| 75.0             | 0.91                      | 0.78  | 0.65  | 0.52 | 0.39 | 0.26 |
| 67.5             | 1.10                      | 0.96  | 0.81  | 0.66 | 0.51 | 0.36 |
| 60.0             | 1.34                      | 1.17  | 1.00  | 0.83 | 0.66 | 0.49 |
| 52.5             | 1.60                      | 1.40  | 1.20  | 1.00 | 0.80 | 0.60 |
| 45.0             | 1.93                      | 1.68  | 1.44  | 1.20 | 0.96 | 0.72 |
| 37.5             | 2.38                      | 2.08  | 1.78  | 1.49 | 1.19 | 0.89 |
| 30.0             | 3.06                      | 2.68  | 2.30  | 1.91 | 1.53 | 1.15 |
| 22.5             | 4.21                      | 3.68  | 3.16  | 2.63 | 2.10 | 1.58 |
| 15.0             | 6.51                      | 5.70  | 4.88  | 4.07 | 3.26 | 2.44 |
| 7.5              | 13.5                      | 11.77 | 10.09 | 8.41 | 6.73 | 5.04 |

Ambient temp. [°C]

|                                                       |        |      |
|-------------------------------------------------------|--------|------|
| Junction to ambient thermal resistance, $R_{th\ j-a}$ | < 20.0 | °C/W |
| Junction to case thermal resistance, $R_{th\ j-c}$    | < 0.72 | °C/W |
| Case to heatsink thermal resistance, $R_{th\ c-s}^2$  | < 0.10 | °C/W |
| Maximum allowable heatsink temperature                | 100    | °C   |
| Maximum allowable junction temperature                | 125    | °C   |

|                                                       |        |      |
|-------------------------------------------------------|--------|------|
| Junction to ambient thermal resistance, $R_{th\ j-a}$ | < 20.0 | °C/W |
| Junction to case thermal resistance, $R_{th\ j-c}$    | < 0.35 | °C/W |
| Case to heatsink thermal resistance, $R_{th\ c-s}^2$  | < 0.10 | °C/W |
| Maximum allowable heatsink temperature                | 100    | °C   |
| Maximum allowable junction temperature                | 125    | °C   |

## Heatsink Dimensions (load current versus ambient temperature) (cont.)

### RM..100

| Load current [A] | Thermal resistance [°C/W] |      |      |      |      |      |
|------------------|---------------------------|------|------|------|------|------|
|                  | 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 | 1.79 |
| 10.0             | 9.98                      | 8.73 | 7.49 | 6.24 | 4.99 | 3.74 |

Ambient temp. [°C]

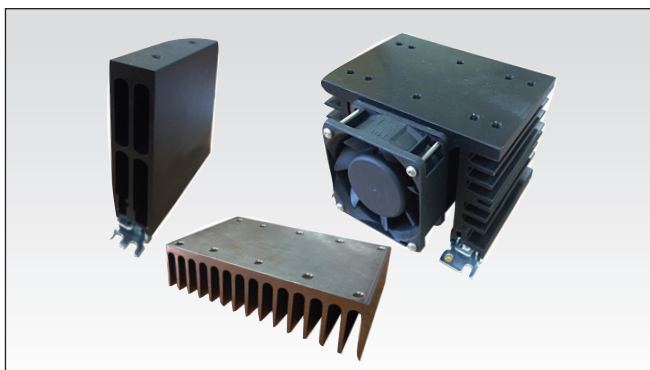
|                                                       |        |      |
|-------------------------------------------------------|--------|------|
| Junction to ambient thermal resistance, $R_{th\ j-a}$ | < 20.0 | °C/W |
| Junction to case thermal resistance, $R_{th\ j-c}$    | < 0.30 | °C/W |
| Case to heatsink thermal resistance, $R_{th\ c-s}^2$  | < 0.10 | °C/W |
| Maximum allowable heatsink temperature                | 100    | °C   |
| Maximum allowable junction temperature                | 125    | °C   |

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

## 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    |

## Heatsink Selection



### Ordering Key

**RHS..**

- Heatsinks and fans
- 5.40°C/W to 0.12°C/W thermal resistance
- DIN, panel or thru wall mounting
- Single or multiple SSR mounting

Heatsink Range Overview:

[http://www.gavazziautomation.com/images/PIM/DATASHEET/ENG/SSR\\_Accessories.pdf](http://www.gavazziautomation.com/images/PIM/DATASHEET/ENG/SSR_Accessories.pdf)

Heatsink Selector Tool:

<http://www.gavazziautomation.com/en-global/products/solid-state-relays/heatsink-selector-tool>

Specifications are subject to change without notice (01.05.2025)

## 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 of 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 65,000A rms Symmetrical Amperes, 600Volts maximum when protected by fuses. Tests at 65,000A were performed with Class J, fast acting: please refer to the table below for maximum allowed ampere rating of the fuse. Use fuses only.

### Co-ordination type 1 (UL508)

| Part No.   | Prospective short circuit current [kArms] | Max. fuse size [A] | Class/ Model         | Voltage [VAC] |
|------------|-------------------------------------------|--------------------|----------------------|---------------|
| RM1..25..  | 65                                        | 30                 | J or CC              | 600           |
| RM1..50..  | 65                                        | 30<br>20           | J<br>HSJ20 (Mersen*) | 600<br>600    |
| RM1..75..  | 65                                        | 80<br>60           | J<br>HSJ60 (Mersen*) | 600<br>600    |
| RM1..100.. | 65                                        | 80<br>60           | J<br>HSJ60 (Mersen*) | 600<br>600    |

### Co-ordination type 2 (IEC/EN60947-4-3)

| Part No.                             | Prospective short circuit current [kArms] | Max. fuse size [A] | Brand   | Model                  | Size      |
|--------------------------------------|-------------------------------------------|--------------------|---------|------------------------|-----------|
| RM1.xx.25.. (xx = 23, 40 or 48)      | 10                                        | 25                 | Mersen* | 6.9 gRB 10-25          | 10.3 x 38 |
| RM1.60.25..                          | 10                                        | 20                 | Mersen* | 6.9 gRB 10-20          | 10.3 x 38 |
| RM1.xx.50.. (xx = 23 or 40)          | 10                                        | 50                 | Mersen* | 6.9zz CP gRC 14x51/50  | 14 x 51   |
| RM1.xx.50.. (xx = 48 or 60)          | 10                                        | 50                 | Mersen* | 6.9zz CP gRC 22x58/50  | 22 x 58   |
| RM1.xx.75.. (xx = 23, 40, 48 or 60)  | 10                                        | 63                 | Mersen* | 6.9zz CP gRC 22x58/63  | 22 x 58   |
| RM1.xx.100.. (xx = 23, 40, 48 or 60) | 10                                        | 100                | Mersen* | 6.9zz CP gRC 22x58/100 | 22 x 58   |

zz = 00, without fuse trip indication

zz = 21, with fuse trip indication

\* Formerly Ferraz Shawmut

## Type 2 Protection with Miniature 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 [mm <sup>2</sup> ] | Minimum length of Cu wire conductor [m]* |
|------------------------|-----------------------------------------------------|-----------------------------------------------------|----------------------------------------------|------------------------------------------|
| <b>RM1..25..</b>       | <b>1-pole</b>                                       |                                                     |                                              |                                          |
|                        | S201-Z4 (4A)                                        | S201-B2 (2A)                                        | 1.0                                          | 21.0                                     |
|                        | S201-Z6 UC (6A)                                     | S201-B2 (2A)                                        | 1.0                                          | 21.0                                     |
|                        |                                                     |                                                     | 1.5                                          | 31.5                                     |
| <b>RM1..50..</b>       | <b>1-pole</b>                                       |                                                     |                                              |                                          |
|                        | S201-Z10 (10A)                                      | S201-B4 (4A)                                        | 1.0                                          | 7.6                                      |
|                        |                                                     |                                                     | 1.5                                          | 11.4                                     |
|                        |                                                     |                                                     | 2.5                                          | 19.0                                     |
|                        | S201-Z16 (16A)                                      | S201-B6 (6A)                                        | 1.0                                          | 5.2                                      |
|                        |                                                     |                                                     | 1.5                                          | 7.8                                      |
|                        |                                                     |                                                     | 2.5                                          | 13.0                                     |
|                        |                                                     |                                                     | 4.0                                          | 20.8                                     |
|                        | S201-Z20 (20A)                                      | S201-B10 (10A)                                      | 1.5                                          | 12.6                                     |
|                        |                                                     |                                                     | 2.5                                          | 21.0                                     |
|                        | S201-Z25 (25A)                                      | S201-B13 (13A)                                      | 2.5                                          | 25.0                                     |
|                        |                                                     |                                                     | 4.0                                          | 40.0                                     |
|                        | <b>2-pole</b>                                       |                                                     |                                              |                                          |
|                        | S202-Z25 (25A)                                      | S202-B13 (13A)                                      | 2.5                                          | 19.0                                     |
|                        |                                                     |                                                     | 4.0                                          | 30.4                                     |
| <b>RM1..75..</b>       | <b>1-pole</b>                                       |                                                     |                                              |                                          |
|                        | S201-Z20 (20A)                                      | S201-B10 (10A)                                      | 1.5                                          | 4.2                                      |
|                        |                                                     |                                                     | 2.5                                          | 7.0                                      |
|                        |                                                     |                                                     | 4.0                                          | 11.2                                     |
|                        | S201-Z32 (32A)                                      | S201-B16 (16A)                                      | 2.5                                          | 13.0                                     |
|                        |                                                     |                                                     | 4.0                                          | 20.8                                     |
|                        |                                                     |                                                     | 6.0                                          | 31.2                                     |
|                        | <b>2-pole</b>                                       |                                                     |                                              |                                          |
|                        | S202-Z20 (20A)                                      | S202-B10 (10A)                                      | 1.5                                          | 1.8                                      |
|                        |                                                     |                                                     | 2.5                                          | 3.0                                      |
|                        |                                                     |                                                     | 4.0                                          | 4.8                                      |
|                        | S202-Z32 (32A)                                      | S202-B16 (16A)                                      | 2.5                                          | 5.0                                      |
|                        |                                                     |                                                     | 4.0                                          | 8.0                                      |
|                        |                                                     |                                                     | 6.0                                          | 12.0                                     |
|                        |                                                     |                                                     | 10.0                                         | 20.0                                     |
|                        | S202-Z50 (50A)                                      | S202-B25 (25A)                                      | 4.0                                          | 14.8                                     |
|                        |                                                     |                                                     | 6.0                                          | 22.2                                     |
|                        |                                                     |                                                     | 10.0                                         | 37.0                                     |
| <b>RM1..100..</b>      | <b>1-pole</b>                                       |                                                     |                                              |                                          |
|                        | S201-Z50 (50A)                                      | S201-B25 (25A)                                      | 4.0                                          | 4.8                                      |
|                        |                                                     |                                                     | 6.0                                          | 7.2                                      |
|                        |                                                     |                                                     | 10.0                                         | 12.0                                     |
|                        |                                                     |                                                     | 16.0                                         | 19.2                                     |
|                        | S201-Z63 (63A)                                      | S201-B32 (32A)                                      | 6.0                                          | 7.2                                      |
|                        |                                                     |                                                     | 10.0                                         | 12.0                                     |
|                        |                                                     |                                                     | 16.0                                         | 19.2                                     |

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

Note: A prospective current of 6kA and a 230/400V power supply system 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.

# Environmental Information

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                                     |
| <p>O: Indicates that said hazardous substance contained in homogeneous materials fot this part are below the limit requirement of GB/T 26572.</p> <p>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.</p> |                                            |              |              |                              |                                |                                       |

# 环境特性

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            |
| <p>O:此零件所有材料中含有的该有害物低于GB/T 26572的限定。</p> <p>X: 此零件某种材料中含有的该有害物高于GB/T 26572的限定。</p> |            |        |        |              |             |              |



## FASTON terminals



- Faston tabs
- Tab dimensions according to DIN 46342 part 1
- Pure tin-plated brass

### Ordering Key

#### Screw mounted Faston terminals

**RM1A48D25** | **F 4**<sup>\*</sup>

RS, RM Solid State Relay

Faston terminals

Tab orientation

Input Tab width: 4.8mm

Output Tab width: 6.3mm

#### Faston terminals in packs of 20

**RM48**<sup>\*\*</sup> | **F4**<sup>\*</sup>

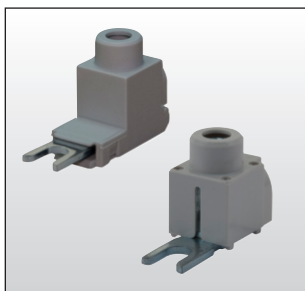
RS, RM Solid State Relay

Tab orientation

\* 0: Flat (0°)  
4: Angled (45°)

\*\* 48: 4.8mm faston for input  
63: 6.3mm faston for output

## Fork Terminals



- Terminal adaptors for 35mm<sup>2</sup> cable
- Type RM635FK
- Pack size: 10 pieces

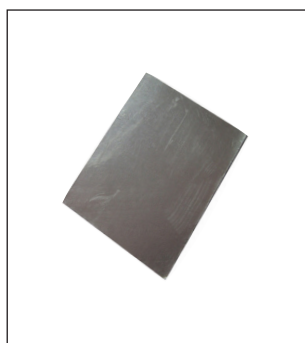
### Ordering Key

**RM635FK** | **P**

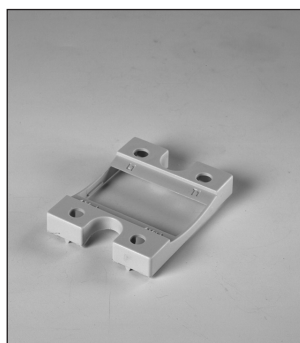
RM terminal adaptor

Touch protected (optional)

## Other Accessories



- Graphite thermal pad with adhesive on one side
- Type KK071CUT
- Dimensions: 35 x 43 x 0.25mm
- Packing quantity: 50pcs.



- Touch safety cover
- Type RMIP20
- IP20 protection degree
- Pack size: 20 pieces

All accessories can be ordered pre-assembled with Solid State Relays.  
Other accessories include DIN rail adaptors, fuses, varistors and spacers.

For further information refer to Accessories datasheets at:  
[http://www.gavazziautomation.com/images/PIM/DATASHEET/ENG/SSR\\_Accessories.pdf](http://www.gavazziautomation.com/images/PIM/DATASHEET/ENG/SSR_Accessories.pdf)

# Mouser Electronics

Authorized Distributor

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[RM1A40D50](#) [RM1A23D50](#) [RM1A23D75](#) [RM1A60D100](#) [RM1A60D75](#) [RM1A23A25](#) [RM1B23D25](#) [RM1B48D50](#)  
[RM1A23A100](#) [RM1A60A100](#) [RM1B60D100](#) [RM1A48D25](#) [RM1A40D25](#) [RM1A48D75](#) [RM1A23A50](#) [RM1A23D100](#)  
[RM1A40A25](#) [RM1A48A75](#) [RM1A48D50](#) [RM1A60A25](#) [RM1A60D25](#) [RM1A48A100](#) [RM1A48A25](#) [RM1A48A50](#)  
[RM1A60A75](#) [RM1A60D50](#) [RM1A23A75](#) [RM1A23D25](#) [RM1A48D100](#) [RM1B48D100](#) [RM1B60D50](#) [RM1A60A50](#)  
[RM1B23D50](#) [RM1A40D75](#) [RM1A60M100](#) [RM1A60M50](#) [RM1A40M50](#)