

RZ3A



Industrial, 3-phase zero switching



Main features

- 3-phase Solid State Relay
- Zero switching
- Rated operational current: 3 x 25, 55 or 75 A
- Rated operational voltage: Up to 690 VAC
- Control voltage, 4-32 VDC or 24-275 VAC
- Integral snubber network
- Built-in varistor
- Over-temperature protection option with alarm output
- IP 10 back-of-hand protection
- LED indication of control input and over-temperature alarm status

Description

A Solid State Relay family designed to switch various loads such as heating elements, motors and transformers.

The relay is capable of switching high voltages up to 600 VACrms. The built-in varistor secures transient protection for heavy industrial applications.

For higher reliability and load cycle capability three semiconductor power units are soldered directly on to the direct copper bonded (DCB) substrate. AC- or DC-controlled versions are available. Built-in LED status indication for applied control voltage and overtemperature alarm (optional).

The series covers a range of load currents up to 75 AACrms.

Applications

Plastic extrusion machines, thermoforming machines, blow moulding machines, coffee machines, electrical ovens, vending machines, soldering ovens, dryers, climatic chambers, air handling units, plastic sealing machines, shrink tunnels, etc.

Main functions

- 3-pole switching AC solid state relay

References

Order code


 RZ3A

 Enter the code entering the corresponding option instead of

| Code | Option | Description | Notes |
|--------------------------|--------|--|------------------------------------|
| RZ | - | Solid State Relay | |
| 3 | - | Number of poles | |
| A | - | Switching mode: zero switching | |
| <input type="checkbox"/> | 40 | Rated operational voltage: 400 VACrms | |
| | 48 | Rated operational voltage: 480 VACrms | |
| | 60 | Rated operational voltage: 600 VACrms | |
| | 69 | Rated operational voltage: 690 VACrms | Available only with 75 A version |
| <input type="checkbox"/> | D | Control voltage: 4 - 32 VDC | |
| | A | Control voltage: 24-275 VAC / 24-50 VDC | |
| <input type="checkbox"/> | 25 | Rated operational current: 3 x 25 AACrms | |
| | 55 | Rated operational current: 3 x 55 AACrms | |
| | 75 | Rated operational current: 3 x 75 AACrms | |
| <input type="checkbox"/> | P | Over-temperature protection and alarm output | Not available with 690 VAC version |

Selection guide

| Rated operational voltage | Control voltage | Rated operational current | | |
|---------------------------|--------------------------|---------------------------|------------------|------------------|
| | | 3 x 25 A | 3 x 55 A | 3 x 75 A |
| 400 VACrms | 4-32 VDC | RZ3A40D25 | RZ3A40D55 | RZ3A40D75 |
| | 24-275 VAC/ 24-50 VDC | RZ3A40A25 | RZ3A40A55 | RZ3A40A75 |
| 480 VACrms | 4-32 VDC | RZ3A48D25 | RZ3A48D55 | RZ3A48D75 |
| | 24-275 VAC/ 24-50 VDC | RZ3A48A25 | RZ3A48A55 | RZ3A48A75 |
| 600 VACrms | 4-32 VDC | RZ3A60D25 | RZ3A60D55 | RZ3A60D75 |
| | 24-275 VAC/ 24-50 VDC | RZ3A60A25 | RZ3A60A55 | RZ3A60A75 |
| 690 VACrms | 4-32 VDC | - | - | RZ3A69D75 |
| | 24-275 VAC/ 24-50 VDC | - | - | RZ3A69A75 |

Notes

Over-temperature protection and alarm output: add suffix P to include over-temperature protection and alarm output. Example: RZ3A60D75P. Not available on 690VACrms versions.

CARLO GAVAZZI compatible components

| Purpose | Component name/code | Notes |
|-------------|---------------------|----------------------|
| Heatsinks | RHS | Heatsinks and fans |
| Thermal pad | RZHT | Packing qty. 10 pcs. |

Further reading

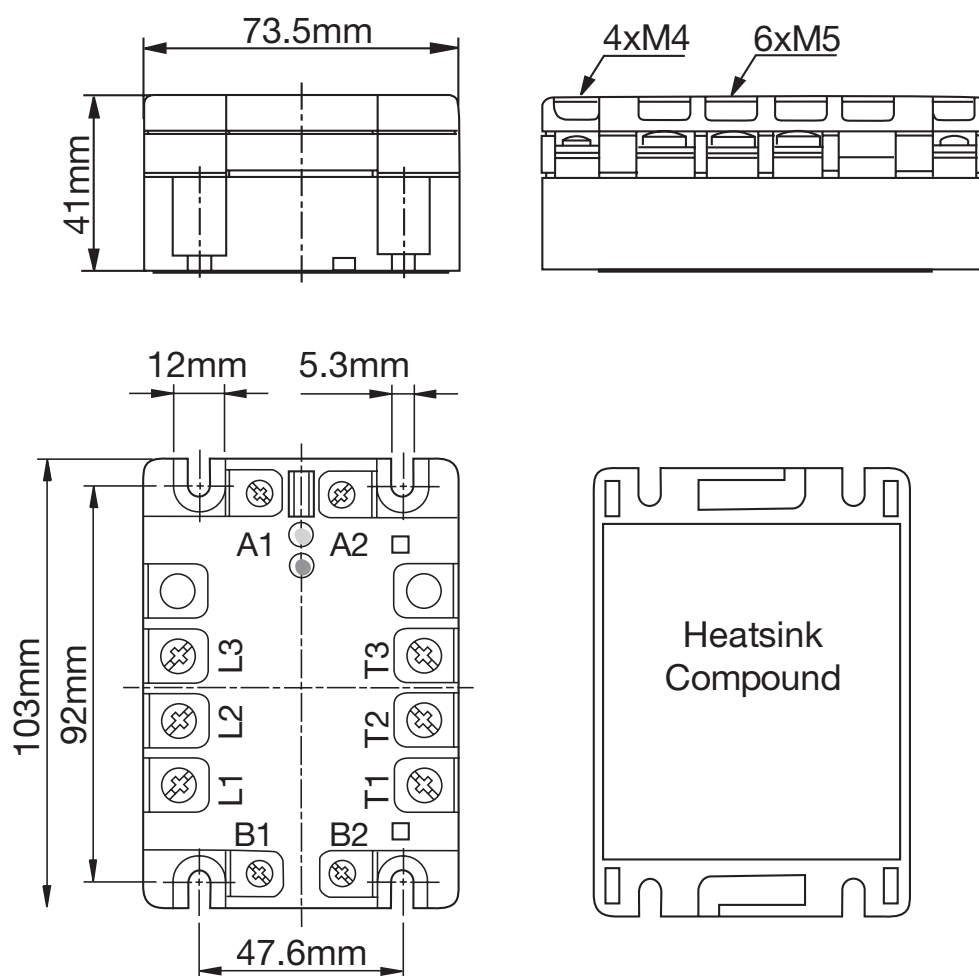
| Information | Where to find it |
|-------------------------------|---|
| Online heatsink selector tool | https://gavazziautomation.com/nsc/HQ/EN/solid_state_relays |

Features

General

| | |
|--------------------------------|--|
| Material | Noryl |
| Potting compound | Polyurethane |
| Weight | Approx. 380 g |
| Rated isolation voltage | Input to output: 4000 VACrms Output to case: 4000 VACrms |
| Pollution degree | 3 |
| Base plate | 25, 55A: aluminum, nickel-plated 75A: copper, nickel-plated |

Dimensions



- Relay On LED
- Over-temperature Alarm Trip LED (suffix "P" option)

Performance

Mains supply

| | RZ3A40.. | RZ3A48.. | RZ3A60.. | RZ3A69.. |
|-----------------------------|-------------|------------|------------|------------|
| Operational voltage range | 24-440 VAC | 42-530 VAC | 42-660 VAC | 42-750 VAC |
| Operational frequency range | 45 to 65 Hz | | | |
| Blocking voltage | 800 Vp | 1200 Vp | 1600 Vp | 1600 Vp |
| Overvoltage category | III | | | |

Outputs

| | RZ3A..25.. | RZ3A..55.. | RZ3A..75.. |
|--|----------------------|-----------------------|-----------------------|
| Rated operational current AC 51 @ $T_a = 25^\circ\text{C}$ AC 53a @ $T_a = 25^\circ\text{C}$ | 25 Arms 5 Arms | 55 Arms 15 Arms | 75 Arms 20 Arms |
| Min. operational load current | 150 mArms | 250 mArms | 400 mArms |
| Rep. overload current $t=1$ s | 37 Arms | < 125 Arms | < 150 Arms |
| Non-rep. surge current $t=10$ ms | 325 Ap | 600 Ap | 1150 Ap |
| Off-state leakage current | < 3 mArms | | |
| I ² t for fusing $t=10$ ms | 525 A ² s | 1800 A ² s | 6600 A ² s |
| Critical dV/dt off state min. | ≥ 500 V/μs | | |
| On-state voltage drop | < 1.6 Vrms | | |

Inputs

| | RZ3A..D.. | RZ3A..A.. |
|--|-----------|----------------------|
| Control voltage | 4-32 VDC | 24-275 VAC/24-50 VDC |
| Pick-up voltage | 3.8 VDC | 18 VAC/20 VDC |
| Drop-out voltage | 1.2 VDC | 9 VAC/DC |
| Input current | ≤ 23 mA | ≤ 15 mA |
| Response time pick-up Power output = 50 Hz | 10 ms | 20 ms |
| Response time drop-out Power output = 50 Hz | 10 ms | 30 ms |

Thermal data

| | |
|-----------------------|-----------------------------------|
| Operating temperature | -30° to +80°C (-22° to +176° F) |
| Storage temperature | -40° to +100°C (-40° to + 212° F) |
| Junction temperature | +125°C (+ 257°F) |

Compatibility and conformity

| | |
|------------|--|
| Approvals* |      |
|------------|--|

| Electromagnetic compatibility (EMC) - immunity | |
|--|---|
| Electrostatic discharge (ESD) | EN 61000-4-2 8 kV air discharge, 4 kV contact (PC2) |
| Radiated radio frequency | EN 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 61000-4-4 Output: 2 kV, 5 kHz (PC1) Input: 1 kV, 5 kHz (PC1) |
| Conducted radio frequency | EN 61000-4-6 10V/m, from 0.15 to 80 MHz (PC1) |
| Electrical surge | EN 61000-4-5 Output, line to line: 1 kV (PC1) Output, line to earth: 2 kV (PC1) Input, line to earth: 1 kV (PC1) |
| Voltage dips | EN 61000-4-11 0% for 0.5, 1 cycle (PC2) 40% for 10 cycles (PC2) 70% for 25 cycles (PC2) |
| Voltage Interruptions | EN 61000-4-11 0% for 5000ms (PC2) |

| Electromagnetic compatibility (EMC) - emissions | |
|---|--|
| Radio interference field emission (radiated) | EN 55011 Class A: from 30 to 1000 MHz |
| Radio interference voltage emissions (conducted) | From 0.15 to 30 MHz EN 55011 Class A (industrial) with filters |

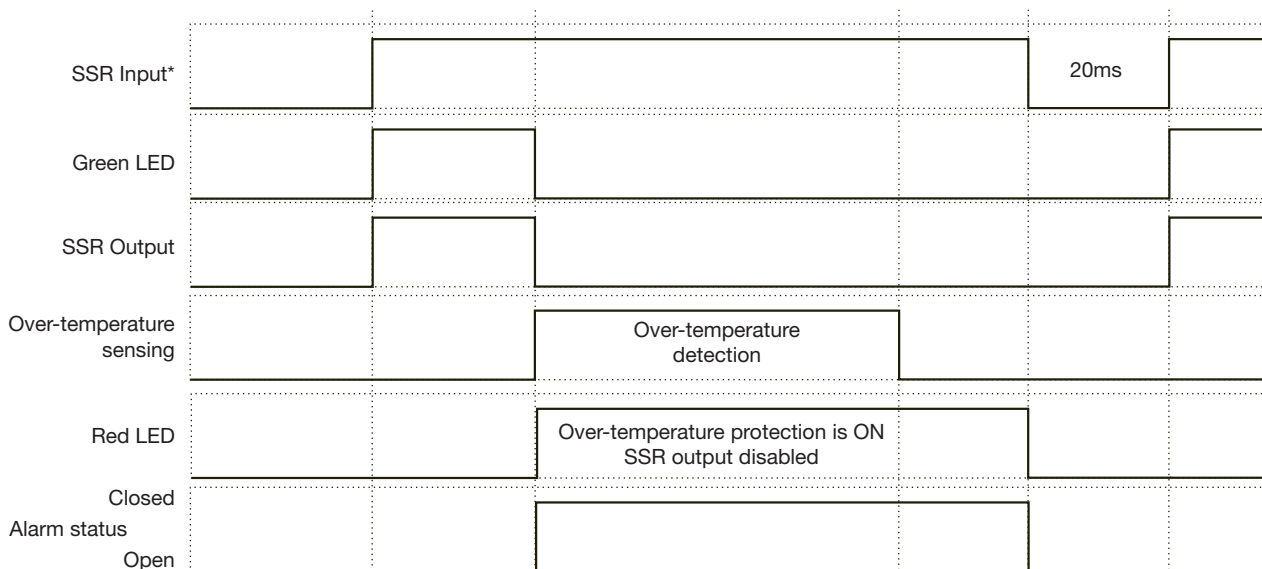
*UR, cUR and CSA not applicable for RZ3A69..

CSA approval for 75 A models (RZ3A..75..) is limited to 65 A @ 40°C.

Note:

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

Over-temperature protection (option: ...P)



*After over-temperature condition is removed, SSR can be reset by switching OFF the control input for more than 20 ms and switching back ON: this will switch ON the SSR output

Heatsink selection

Thermal resistance [$^{\circ}\text{C}/\text{W}$] of RZ3..25

| Load current [A] | Ambient temp. [$^{\circ}\text{C}$] | | | | | | | Power dissipation [W] |
|------------------|--------------------------------------|-------|------|------|------|------|------|-----------------------|
| | 20 | 30 | 40 | 50 | 60 | 70 | 80 | |
| 25.0 | 0.44 | 0.34 | 0.23 | 0.12 | 0.01 | - | - | 92 |
| 22.5 | 0.62 | 0.49 | 0.37 | 0.24 | 0.12 | - | - | 80 |
| 20.0 | 0.84 | 0.69 | 0.54 | 0.40 | 0.25 | 0.10 | - | 68 |
| 17.5 | 1.12 | 0.95 | 0.78 | 0.60 | 0.43 | 0.25 | 0.08 | 58 |
| 15.0 | 1.51 | 1.30 | 1.09 | 0.88 | 0.67 | 0.46 | 0.25 | 47 |
| 12.5 | 2.06 | 1.80 | 1.54 | 1.27 | 1.01 | 0.75 | 0.48 | 38 |
| 10.0 | 2.75 | 2.40 | 2.06 | 1.72 | 1.37 | 1.03 | 0.69 | 29 |
| 7.5 | 3.83 | 3.35 | 2.87 | 2.39 | 1.91 | 1.43 | 0.96 | 21 |
| 5.0 | 6.01 | 5.26 | 4.51 | 3.76 | 3.01 | 2.25 | 1.50 | 13 |
| 2.5 | 12.62 | 11.04 | 9.46 | 7.89 | 6.31 | 4.73 | 3.15 | 6 |

Thermal resistance [°C/W] of RZ3 ..55

| Load current [A] | Ambient temp. [°C] | | | | | | | Power dissipation [W] |
|------------------|--------------------|------|------|------|------|------|------|-----------------------|
| | 20 | 30 | 40 | 50 | 60 | 70 | 80 | |
| 55.0 | 0.29 | 0.23 | 0.17 | 0.11 | 0.05 | - | - | 164 |
| 50.0 | 0.36 | 0.29 | 0.22 | 0.16 | 0.09 | 0.02 | - | 148 |
| 45.0 | 0.44 | 0.36 | 0.29 | 0.21 | 0.14 | 0.06 | - | 133 |
| 40.0 | 0.54 | 0.46 | 0.37 | 0.29 | 0.20 | 0.12 | 0.03 | 118 |
| 35.0 | 0.67 | 0.58 | 0.48 | 0.38 | 0.28 | 0.19 | 0.09 | 103 |
| 30.0 | 0.85 | 0.74 | 0.62 | 0.51 | 0.39 | 0.28 | 0.16 | 87 |
| 25.0 | 1.10 | 0.96 | 0.82 | 0.68 | 0.55 | 0.41 | 0.27 | 73 |
| 20.0 | 1.38 | 1.21 | 1.04 | 0.87 | 0.69 | 0.52 | 0.35 | 58 |
| 15.0 | 1.85 | 1.62 | 1.39 | 1.16 | 0.93 | 0.70 | 0.46 | 43 |
| 10.0 | 2.80 | 2.45 | 2.10 | 1.75 | 1.40 | 1.05 | 0.70 | 29 |
| 5.0 | 5.62 | 4.92 | 4.21 | 3.51 | 2.81 | 2.11 | 1.40 | 14 |
| 2.5 | 11.26 | 9.85 | 8.45 | 7.04 | 5.63 | 4.22 | 2.82 | 7 |


Thermal resistance [°C/W] of RZ3 ..75

| Load current [A] | Ambient temp. [°C] | | | | | | | Power dissipation [W] |
|------------------|--------------------|------|------|------|------|------|------|-----------------------|
| | 20 | 30 | 40 | 50 | 60 | 70 | 80 | |
| 75.0 | 0.27 | 0.22 | 0.17 | 0.12 | 0.07 | 0.02 | - | 201 |
| 70.0 | 0.32 | 0.27 | 0.21 | 0.16 | 0.10 | 0.05 | - | 184 |
| 65.0 | 0.38 | 0.32 | 0.26 | 0.20 | 0.14 | 0.08 | 0.02 | 167 |
| 60.0 | 0.44 | 0.38 | 0.31 | 0.25 | 0.18 | 0.11 | 0.05 | 151 |
| 55.0 | 0.52 | 0.45 | 0.38 | 0.30 | 0.23 | 0.16 | 0.08 | 136 |
| 50.0 | 0.62 | 0.54 | 0.45 | 0.37 | 0.29 | 0.21 | 0.12 | 121 |
| 45.0 | 0.74 | 0.64 | 0.55 | 0.46 | 0.36 | 0.27 | 0.17 | 106 |
| 40.0 | 0.87 | 0.76 | 0.65 | 0.54 | 0.43 | 0.32 | 0.22 | 92 |
| 35.0 | 1.01 | 0.89 | 0.76 | 0.63 | 0.51 | 0.38 | 0.25 | 79 |
| 30.0 | 1.21 | 1.06 | 0.91 | 0.76 | 0.60 | 0.45 | 0.30 | 66 |
| 25.0 | 1.49 | 1.30 | 1.11 | 0.93 | 0.74 | 0.56 | 0.37 | 54 |
| 20.0 | 1.90 | 1.67 | 1.43 | 1.19 | 0.95 | 0.71 | 0.48 | 42 |
| 15.0 | 2.60 | 2.28 | 1.95 | 1.63 | 1.30 | 0.98 | 0.65 | 31 |
| 10.0 | 4.01 | 3.51 | 3.01 | 2.51 | 2.01 | 1.50 | 1.00 | 20 |
| 5.0 | 8.24 | 7.21 | 6.18 | 5.15 | 4.12 | 3.09 | 2.06 | 10 |

Alarm output specifications

| | |
|-----------------------------|--------|
| Collector - emitter voltage | 35 VDC |
| Emitter - collector voltage | 6 VDC |
| Collector current | 50 mA |
| Delay time on reset | 20 ms |

Environmental specifications

| | |
|-------------------|---|
| 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: Indicates that said hazardous substance contained in homogeneous materials for 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: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。

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

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] |
| RZ3A..25 | 65 | 30 | CC | 600 |
| RZ3A..55 | | 50 | J | |
| RZ3A..75 | | 30 | CC | |
| | | 70 | J | |

| Protection co-ordination Type 2 for fuses | | | | | | |
|---|---|-------------------------|-------------------------|----------------|------------------|---------------|
| Part No. | Prospective short circuit current [kArms] | Ferraz Shawmut (Mersen) | | | | |
| | | Max fuse size [A] | Part number | Fuse size (mm) | Fuse holder type | Voltage [VAC] |
| RZ3A..25 | 65 | 25 | 6.9 gRB 10-25 | 10.3 x 38 | CMS10 3P | 400 |
| | | 20 | 6.9 gRB 10-20 | 10.3 x 38 | CMS10 3P | 600 |
| 50 | | 6.9xx CP gRC 14 x 51/50 | 14 x 51 | CMS14 3P | 400 | |
| | | 6.9xx CP gRC 22 x 58/50 | 22 x 58 | CMS22 3P | 600 | |
| RZ3A..55 | | 63 | 6.9xx CP gRC 14 x 58/63 | 22 x 58 | CMS22 3P | 400 |
| | | | 6.9xx CP gRC 22 x 58/63 | 22 x 58 | CMS22 3P | 600 |
| RZ3A..75 | | 63 | 6.9xx CP gRC 14 x 58/63 | 22 x 58 | CMS22 3P | 400 |
| | | | 6.9xx CP gRC 22 x 58/63 | 22 x 58 | CMS22 3P | 600 |

| 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 [mm ²] | Minimum length of Cu wire conductor [m] ¹ |
| RZ3A..25 | S203 - Z4 (4 A) S203 - Z6 UC (6 A) | S203 - B2 (2 A) S203 - B2 (2 A) | 1.0 | 21.0 |
| | | | 1.0 | 21.0 |
| | | | 1.5 | 31.5 |
| RZ3A..55 | S203 - Z10 (10 A) | S203 - B4 (4 A) | 1.0 | 7.6 |
| | | | 1.5 | 11.4 |
| | | | 2.5 | 19.0 |
| | S203 - Z16 (16 A) | S203 - B6 (6 A) | 1.0 | 5.2 |
| | | | 1.5 | 7.8 |
| | | | 2.5 | 13.0 |
| | | | 4.0 | 20.8 |
| | S203 - Z20 (20 A) | S203 - B10 (10A) | 1.5 | 12.6 |
| | | | 2.5 | 21.0 |
| | S203 - Z25 (25 A) | S203 - B13 (13 A) | 2.5 | 25.0 |
| | | | 4.0 | 40.0 |
| | RZ3A..75 | S203 - Z20 (20 A) | S203 - B10 (10 A) | 1.5 |
| 2.5 | | | | 7.0 |
| 4.0 | | | | 11.2 |
| S203 - Z32 (32 A) | | S203 - B16 (16 A) | 2.5 | 13 |
| | | | 4.0 | 20.8 |
| | | | 6.0 | 31.2 |

1. 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.

Connection Diagrams

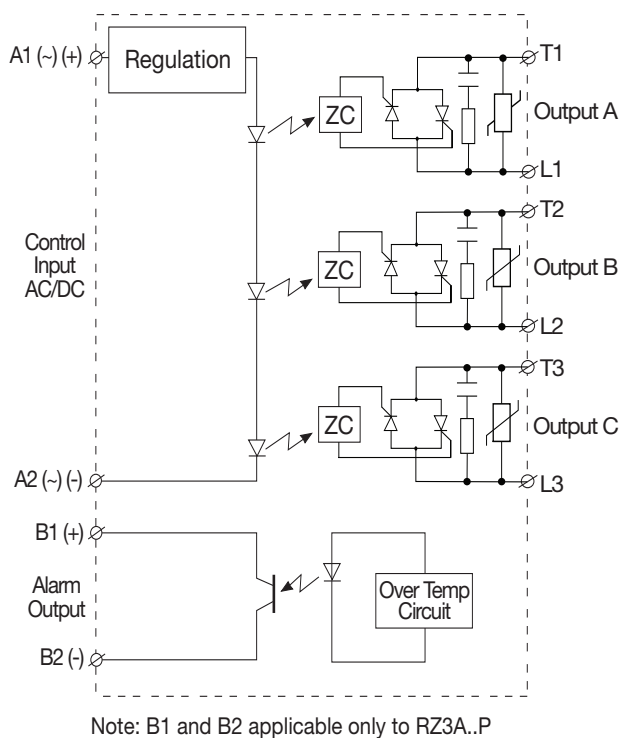


Fig. 1 Terminal wiring

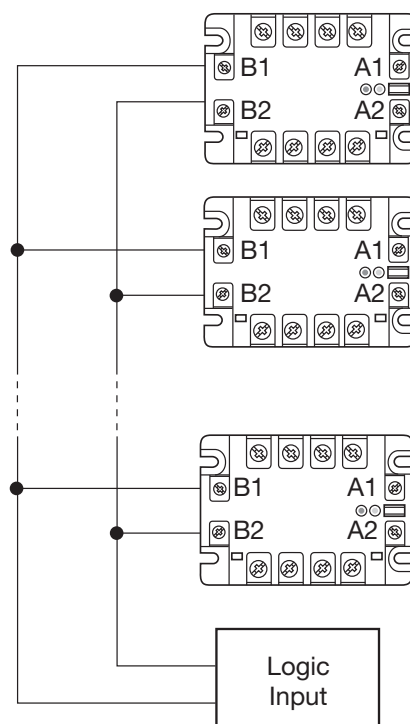
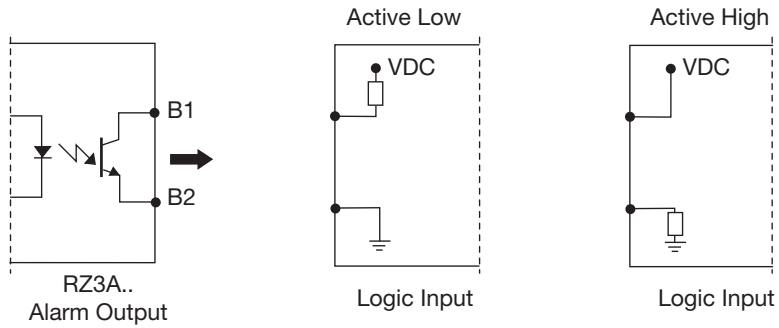


Fig. 2 Common alarm wiring

Connection specifications

| | |
|-------------------------|--|
| Relay | |
| Mounting screws | M5 |
| Mounting torque | ≤ 1.5 Nm |
| Control terminal | |
| Mounting screws | M4 |
| Mounting torque | ≤ 0.5 Nm |
| Wire size | Max: 2 x 2.5 mm ² (AWG14) Min: 2 x 1 mm ² |
| Power terminal | |
| Mounting screws | M5 |
| Mounting torque | 2.5 Nm |
| Wire size | Max: 2 x 6 mm ² (AWG8) Min: 2 x 1 mm ² |

▶ Alarm output connection



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