

# 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	
<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	Available only for A and D input

### 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	<b>RZ3A40D25</b>	<b>RZ3A40D55</b>	<b>RZ3A40D75</b>
	24-275 VAC/24-50 VDC	<b>RZ3A40A25</b>	<b>RZ3A40A55</b>	<b>RZ3A40A75</b>
480 VACrms	4-32 VDC	<b>RZ3A48D25</b>	<b>RZ3A48D55</b>	<b>RZ3A48D75</b>
	24-275 VAC/24-50 VDC	<b>RZ3A48A25</b>	<b>RZ3A48A55</b>	<b>RZ3A48A75</b>
600 VACrms	4-32 VDC	<b>RZ3A60D25</b>	<b>RZ3A60D55</b>	<b>RZ3A60D75</b>
	24-275 VAC/24-50 VDC	<b>RZ3A60A25</b>	<b>RZ3A60A55</b>	<b>RZ3A60A75</b>
690 VACrms	4-32 VDC	-	-	<b>RZ3A69D75</b>
	24-275 VAC/24-50 VDC	-	-	<b>RZ3A69A75</b>

### 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**

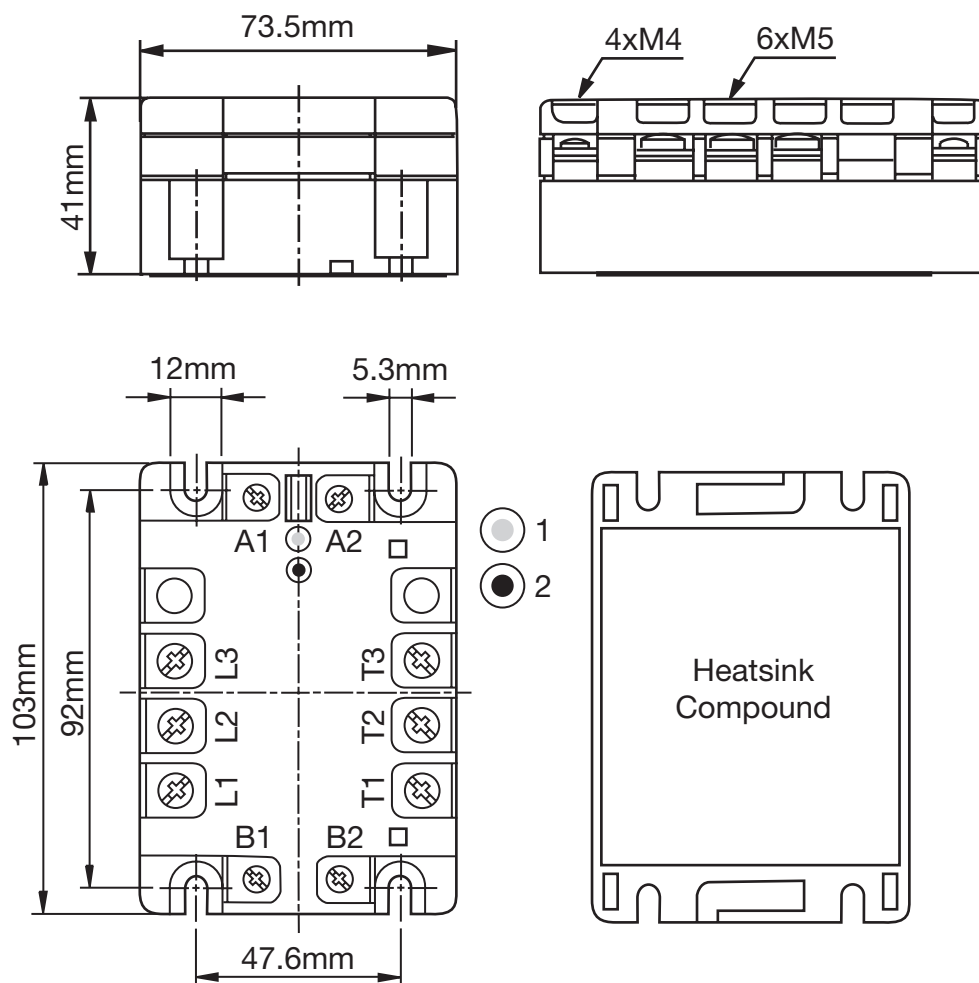
Information	Where to find it
Online heatsink selector tool	<a href="http://www.productselection.net/heatsink/heatsinkSelector.php?LANG=UK">http://www.productselection.net/heatsink/heatsinkSelector.php?LANG=UK</a>

## Features

### General

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

### Dimensions



1. Relay On LED
2. 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	850 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		
$I^2t$ for fusing $t=10$ ms	525 A <sup>2</sup> s	1800 A <sup>2</sup> s	6600 A <sup>2</sup> s
Critical dV/dt off state min.	$\geq 500$ V/ $\mu\text{s}$		
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	$\leq 23$ mA	$\leq 15$ 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	   
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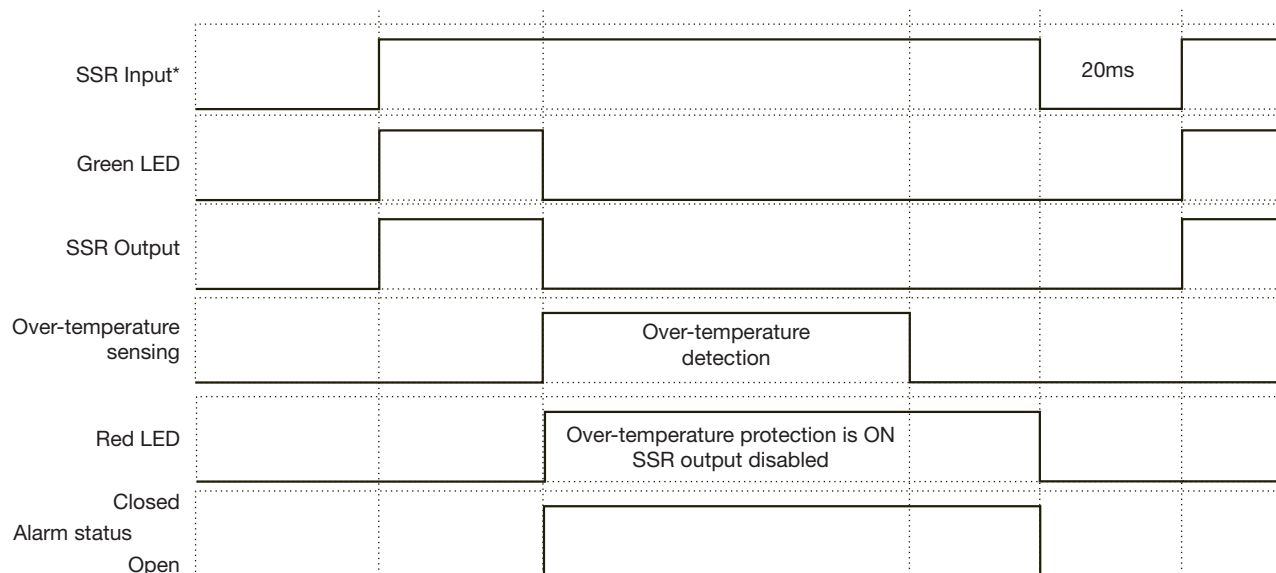
Electromagnetic compatibility (EMC) - immunity	
<b>Electrostatic discharge (ESD)</b>	EN 61000-4-2 8 kV air discharge, 4 kV contact (PC2)
<b>Radiated radio frequency</b>	EN 61000-4-3 10 V/m, from 80 MHz to 1 GHz (PC1) 10 V/m, from 1.4 to 2 GHz (PC1) 3 V/m, from 2 to 2.7 GHz (PC1)
<b>Electrical fast transient (burst)</b>	EN 61000-4-4 Output: 2 kV, 5 kHz (PC1) Input: 1 kV, 5 kHz (PC1)
<b>Conducted radio frequency</b>	EN 61000-4-6 10V/m, from 0.15 to 80 MHz (PC1)
<b>Electrical surge</b>	EN 61000-4-5 Output, line to line: 1 kV (PC1) Output, line to earth: 2 kV (PC1) Input, line to earth: 2 kV (PC1)
<b>Voltage dips</b>	EN 61000-4-11 0% for 0.5, 1 cycle (PC2) 40% for 10 cycles (PC2) 70% for 25 cycles (PC2)
<b>Voltage Interruptions</b>	EN 61000-4-11 0% for 5000ms (PC2)

Electromagnetic compatibility (EMC) - emissions	
<b>Radio interference field emission (radiated)</b>	EN 55011 Class A: from 30 to 1000 MHz
<b>Radio interference voltage emissions (conducted)</b>	From 0.15 to 30 MHz EN 55011 Class A (industrial) with filters EN 60947-4-3 Class A (no filtering needed)

### 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 [K/W] of RZ3..25

Load current [A]	Ambient temp. [°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 [K/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 [K/W] of RZ3 ..75

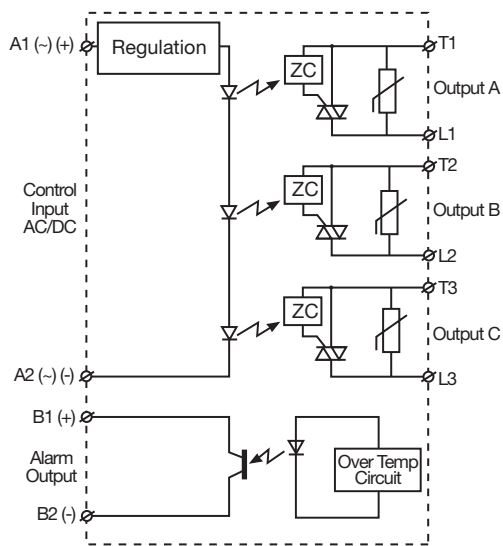
Load current [A]	Ambient temp. [°C]							Power dissipation [W]
	20	30	40	50	60	70	80	
75.0	0.27	0.22	0.17	0.12	0.07	0.02	-	201
70.0	0.32	0.27	0.21	0.16	0.10	0.05	-	184
65.0	0.38	0.32	0.26	0.20	0.14	0.08	0.02	167
60.0	0.44	0.38	0.31	0.25	0.18	0.11	0.05	151
55.0	0.52	0.45	0.38	0.30	0.23	0.16	0.08	136
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

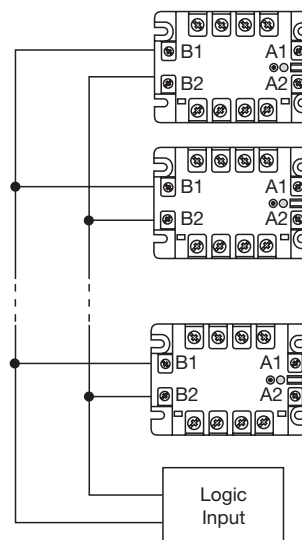
Collector - emitter voltage	35 VDC
Emitter - collector voltage	6 VDC
Collector current	50 mA
Delay time on reset	20 ms



## Connection Diagrams



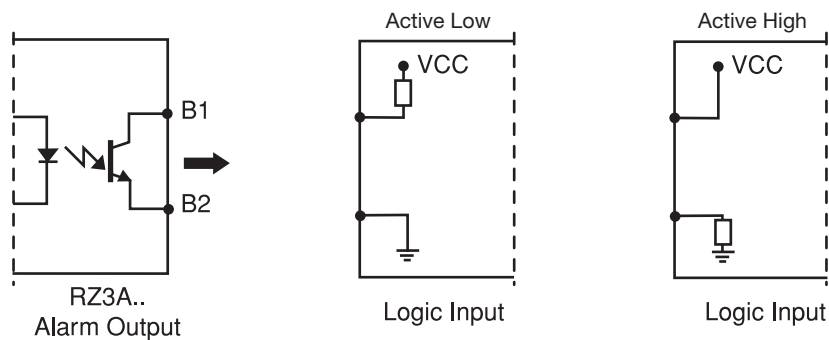
**Fig. 1** Terminal wiring



**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 <sup>2</sup> (AWG14) Min: 2 x 1 mm <sup>2</sup>
Power terminal	
Mounting screws	M5
Mounting torque	2.5 Nm
Wire size	Max: 2 x 6 mm <sup>2</sup> (AWG8) Min: 2 x 1 mm <sup>2</sup>

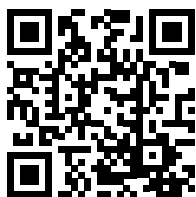
**Alarm output connection**

Forward voltage  $\leq 35$  VDC

Reverse voltage  $\leq 6$  VDC

Through current  $\leq 50$  mA

Alarm reset: interrupt control input for more than 20ms



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