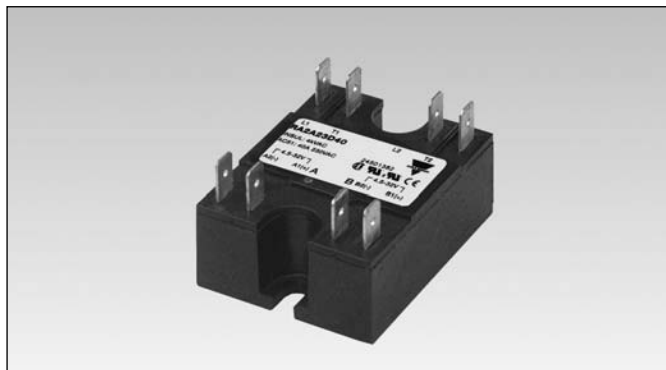


# Solid State Relays Industrial, 2-Pole ZS Type RA2A



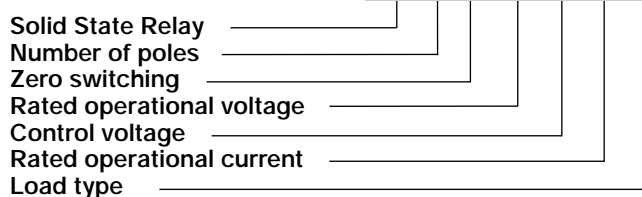
- 2-Pole AC Solid State Relay
- Zero switching
- For resistive and inductive AC loads
- Direct copper bonding (DCB) technology
- LED indication
- Rated operational current: 2 x 25 and 2 x 40AACrms
- Rated operational voltage: 230 - 600VACrms
- Input range: 4.5 - 32VDC
- Non-repetitive peak voltage: Up to 1200Vp
- Opto-isolation: 4000VACrms

## Product Description

This 2-pole industrial relay minimises the space requirements in a control cabinet without compromising performance. By applying an input voltage on control A, the corresponding output semiconductor is activated at the first zero crossing of the line voltage. The same applies to control B. LEDs indicate the control status of each pole. The optimised design is free of moulding mass to reduce internal mechanical stress. The RA2A..M types have been specially customised for demanding inductive loads.

## Ordering Key

**RA 2 A 48 D 25 M**



## Type Selection

Switching mode	Rated operational voltage	Rated operational current	Control voltage	Non-rep. voltage	Load type
A: Zero switching	23: 230VACrms 40: 400VACrms 48: 480VACrms 60: 600VACrms	25: 2 x 25AACrms 40: 2 x 40AACrms	D: 4.5 - 32VDC	23: 650V <sub>p</sub> 40: 850V <sub>p</sub> 48: 1200V <sub>p</sub> 60: 1200V <sub>p</sub>	M: Inductive

## Selection Guide

Rated operational voltage	Non-rep. voltage	Control voltage	Rated operational current	
			2 x 25AACrms	2 x 40AACrms
230VACrms	650V <sub>p</sub>	4.5 - 32VDC	RA2A23D25	RA2A23D40
400VACrms	850V <sub>p</sub>	4.5 - 32VDC	RA2A40D25	RA2A40D40
480VACrms	1200V <sub>p</sub>	4.5 - 32VDC	RA2A40D25M	RA2A40D40M
600VACrms	1200V <sub>p</sub>	4.5 - 32VDC	RA2A48D25	RA2A48D40
			RA2A48D25M	RA2A48D40M
			RA2A60D25	RA2A60D40
			RA2A60D25M	RA2A60D40M

## Input Specifications

Control voltage range	4.5 - 32VDC
Pick-up voltage	4.25VDC
Drop-out voltage	2VDC
Input current per pole @ max. input voltage	≤10mA
Response time pick-up @ 50 Hz	≤10ms
Response time drop-out @ 50 Hz	≤10ms

## Housing Specifications

Weight	Approx. 85g
Housing material	Noryl GFN 1, black
Base plate	Aluminium, nickel-plated
25, 40A	Copper, nickel-plated
40A (M type)	
FASTON Terminal size	6.3mm

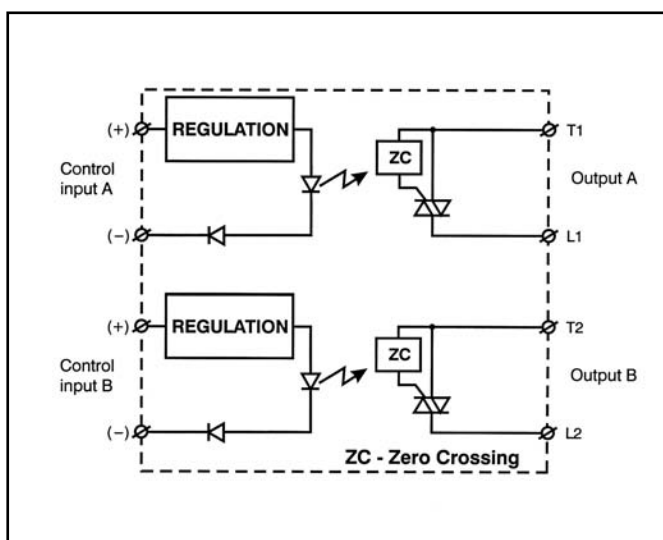
## General Specifications

	RA2A23...	RA2A40...	RA2A48...	RA2A60...
Operational voltage range	24 to 265VACrms	42 to 440VACrms	42 to 530VACrms	42 to 660VACrms
Non-rep. peak voltage	650V <sub>p</sub>	850V <sub>p</sub>	1200V <sub>p</sub>	1200V <sub>p</sub>
Rated insulation input -output/output - heatsink	4kV	4kV	4kV	4kV
Operational frequency range	45 to 65Hz	45 to 65Hz	45 to 65Hz	45 to 65Hz
LED ON indication (x2)	Yes (green)	Yes (green)	Yes (green)	Yes (green)
Power factor				
RA2A	≥ 0.95 @ 230VAC	≥ 0.95 @ 400VAC	≥ 0.95 @ 480VAC	≥ 0.95 @ 600VAC
RA2A..M	≥ 0.50 @ 230VAC	≥ 0.50 @ 400VAC	≥ 0.50 @ 480VAC	≥ 0.50 @ 600VAC
Zero voltage turn-on	< 15V	< 15V	< 15V	< 15V
Approvals	UL, cUL, CSA	UL, cUL, CSA	UL, cUL, CSA	UL, cUL, CSA
CE-marking	Yes	Yes	Yes	Yes
Conformance	VDE	VDE	VDE	VDE

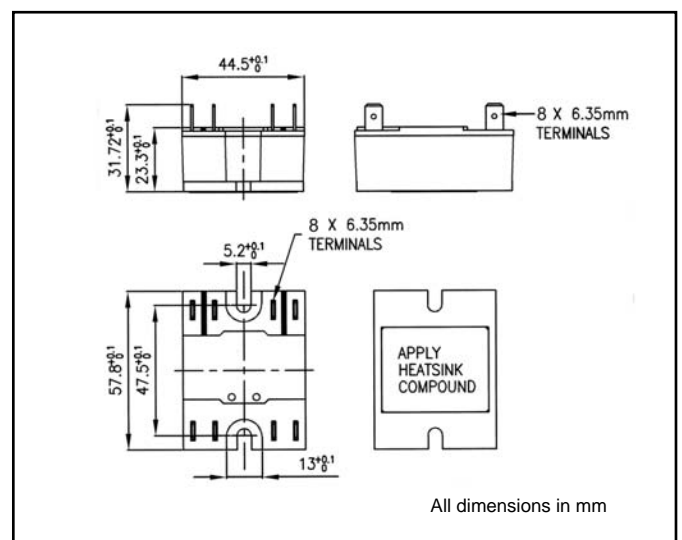
## Output Specifications

	RA2A...25	RA2A...40	RA2A..D25M	RA2A..D40M
Rated operational current AC 51 AC 53a	2 x 25AACrms -	2 x 40AACrms -	2 x 25AACrms 2 x 5AACrms	2 x 40AACrms 2 x 15AACrms
Minimum operational current	150mA	150mA	150mA	150mA
Non-rep. surge current t=10 ms	300A <sub>p</sub>	390A <sub>p</sub>	300A <sub>p</sub>	580A <sub>p</sub>
Off-state leakage current	< 3mA	< 3mA	< 3mA	< 3mA
I <sup>2</sup> t for fusing t=1-10 ms	450A <sup>2</sup> s	760A <sup>2</sup> s	450A <sup>2</sup> s	1680A <sup>2</sup> s
On-state voltage drop @ rated current	≤ 1.6Vrms	≤ 1.6Vrms	≤ 1.6Vrms	≤ 1.6Vrms
Critical dV/dt off-state min.	500V/μs	500V/μs	500V/μs	500V/μs
Zero crossing detection	Yes	Yes	Yes	Yes

## Functional Diagram



## Dimensions





## Heatsink Dimensions (load current versus ambient temperature)

RA 2....25/25M

Load current [A]	Thermal resistance [K/W]						Power dissipation [W]
	20	30	40	50	60	70	
50	1.11	0.94	0.78	0.62	0.46	0.29	62
45	1.36	1.17	0.99	0.80	0.61	0.43	54
40	1.68	1.47	1.25	1.03	0.81	0.60	46
35	2.06	1.80	1.54	1.29	1.03	0.77	39
30	2.5	2.2	1.87	1.56	1.25	0.94	32
25	3.1	2.7	2.3	1.9	1.6	1.17	26
20	4.0	3.5	3.0	2.5	2.0	1.52	20
15	6	5	4	3.5	2.8	2.1	14
10	9	8	7	6	4	3.3	9
5	18	16	14	12	9	7	4

T<sub>A</sub>  
Ambient temp. [°C]

RA 2....40

Load current [A]	Thermal resistance [K/W]						Power dissipation [W]
	20	30	40	50	60	70	
80	0.68	0.56	0.44	0.32	0.19	0.07	82
72	0.87	0.73	0.59	0.45	0.31	0.17	72
64	1.10	0.94	0.78	0.62	0.45	0.29	62
56	1.41	1.22	1.03	0.83	0.64	0.45	52
48	1.8	1.6	1.36	1.13	0.90	0.67	43
40	2.3	2.0	1.7	1.4	1.1	0.86	35
32	3.0	2.6	2.2	1.9	1.5	1.11	27
24	4	4	3	2.6	2.0	1.5	20
16	6	6	5	4	3	2.4	13
8	13	12	10	8	7	5	6

T<sub>A</sub>  
Ambient temp. [°C]

RA 2....40M

Load current [A]	Thermal resistance [K/W]						Power dissipation [W]
	20	30	40	50	60	70	
100	0.41	0.32	0.23	0.13	0.04	-	108
90	0.55	0.44	0.34	0.23	0.13	0.02	95
80	0.72	0.60	0.48	0.35	0.23	0.11	82
70	0.95	0.80	0.66	0.52	0.37	0.23	70
60	1.25	1.08	0.90	0.73	0.56	0.39	58
50	1.7	1.5	1.25	1.04	0.83	0.61	47
40	2.2	1.9	1.6	1.4	1.1	0.82	36
30	3	2.7	2.3	1.9	1.5	1.14	26
20	5	4	4	2.9	2.3	1.8	17
10	10	9	7	6	5	3.6	8
5	20	17	15	12	10	7	4

T<sub>A</sub>  
Ambient temp. [°C]

## Heatsink Selection

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

Note: Add the currents of both poles and compare with datasheets for proper heatsink. Each pole can handle up to the maximum current specified. Example: Each pole of the RA2A23D25 can handle a maximum of 25 A.

## Insulation

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

## Accessories

Heatsinks  
DIN rail adapter  
Varistors  
Fuses

For further information refer to "General Accessories".

## Applications

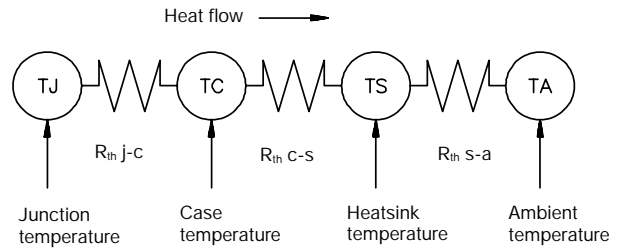
This relay is designed for use in applications in which it is exposed to high surge conditions. Care must be taken to ensure proper heatsinking when the relay is to be used at high sustained currents. Adequate electrical connection between relay terminals and cable must be ensured.

### Thermal characteristics

The thermal design of Solid State Relays is very important.

It is essential that the user makes sure that cooling is adequate and that the maximum junction temperature of the relay is not exceeded.

If the heatsink is placed in a small closed room, control panel or the like, the power dissipation can cause the ambient temperature to rise. The heatsink is to be calculated on the basis of the ambient temperature and the increase in temperature.



Thermal resistance:  
 $R_{th\ j-c}$  = junction to case

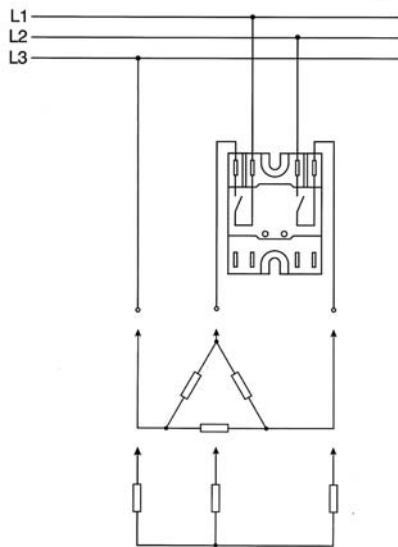
$R_{th\ c-s}$  = case to heatsink  
 $R_{th\ s-a}$  = heatsink to ambient

## Thermal Specifications

	RA2A...25.	RA2A...40	RA2A...40M
Operating temperature	-20° to 70°C	-20° to 70°C	-20° to 70°C
Storage temperature	-20° to 80°C	-20° to 80°C	-20° to 80°C
Junction temperature	≤ 125°C	≤ 125°C	≤ 125°C
$R_{th}$ junction to case			
1 pole	1K/W	1K/W	0.92K/W
2 pole	0.5K/W	0.5K/W	0.46K/W
$R_{th}$ junction to ambient	≤ 20K/W	≤ 20K/W	≤ 20K/W

## Applications

A single two pole relay in a three phase application. Star and Delta (Economy switch)



A two pole relay and a single pole relay connected on a three phase application. Delta, star and star with a neutral point.

