Solid State Relays
Industrial, Rear Integrated Heatsink
3-Phase w LED
Types RJ2A, RJ3A

CARLO GAVAZZI

MIDI

POWER

- AC Semiconductor contactor
- Two and three pole switching types
- Direct copper bonding (DCB) technology
- LED indication
- Integrated over-voltage protection
- Housing free of moulding mass
- 2 Input ranges: 5 – 32 VDC and 24-275VAC/24-190VDC
- Operational ratings: up to 3x32AAC, 600VAC
- Blocking voltage: Up to 1200V_p
- Opto-isolation > 4000 VAC$_{rms}$

Product Description

This product is designed in such a way as to replace electro-mechanical contactors, especially when switching is frequent. It has an integrated heatsink and over-voltage protection. The heatsink is moved to the back for optimal space saving in the panel and easy wire mounting at the front of the relay.

The relay with antiparallel thyristor output is the most widely used industrial SSR due to its multiple application possibilities and robust construction. This relay can be used for resistive and inductive loads.

The zero switching relay switches ON when the sinusoidal curve crosses zero and switches OFF when the current crosses zero. A green and a red LED give status of the control input and alarm respectively.

Ordering Key

RJ 3 A 60 D 32 E P

Solid state relay
Number of switching poles
Switching mode
Rated operational voltage
Control voltage
Rated operational current
Terminal Layout
Options

Type selection

Switching poles	Switching mode	Rated operational voltage	Control voltage	Rated operational current	
RJ2: 2 poles	A: Zero switching	22: 220 VACrms	D: 5 - 32 VDC	20: 3 x 20 AAC$_{rms}$	(RJ3A)
RJ3: 3 poles		60: 600 VACrms	A: 24 - 275 VAC/	25: 3 x 25 AAC$_{rms}$	(RJ2A/RJ3A)
			24 - 190 VDC	32: 3 x 32 AAC$_{rms}$	(RJ2A/RJ3A)

Selection Guide

Rated operational voltage	Control voltage	Rated operational current				
		2-Pole switching/1-Pole direct		3-Pole switching		
		3x25A (MIDI)	3x32A (POWER)	3x20A (MIDI)	3x25A (POWER)	3x32A (MIDI)[4]
220 VACrms	5 - 32 VDC	RJ2A22D25	RJ2A22D32	RJ3A22D20	RJ3A22D25	RJ3A22D32EP
	24 - 275 VAC/ 24 - 190 VDC	RJ2A22A25E	RJ2A22A32E	RJ3A22A20E	RJ3A22A25E	RJ3A22A32EP
600 VACrms	5 - 32 VDC	RJ2A60D25	RJ2A60D32	RJ3A60D20	RJ3A60D25	RJ3A60D32EP
	24 - 275 VAC/ 24 - 190 VDC	RJ2A60A25E	RJ2A60A32E	RJ3A60A20E	RJ3A60A25E	RJ3A60A32EP

Options

Model Type	Alarm LED indication	Alarm connections	Fan supply input
DC control	No	No	No
DC control + OTP	Yes	Yes	No
DC control + OTP + Fan	Yes	Yes	Yes
AC control	No	No	No
AC control + OTP	Yes	Yes	No
AC control + OTP + Fan	Yes	No	Yes

Notes
1 Basic models with DC control input (without over-temperature protection or fan) have both U-type and E-type terminal connections
2 All models with over-temperature protection option (suffix "P") or AC control input are only available with type "E" terminals
3 Fan switching is internally controlled. Fan requires an external supply connected to the fan supply input(s)
4 With integrated fan and over-temperature protection - fan will automatically switch on when necessary

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General Specifications

	RJ..22..	RJ..60..
Operational voltage range	24 - 280 VAC	48 - 660 VAC
Blocking voltage	650 V_p	1200 V_p
Operational frequency range	45 - 65 Hz	45 - 65 Hz
Power factor	≥ 0.5 @ 230 VACrms	≥ 0.5 @ 600 VACrms
Internal Varistor	Yes	Yes
Approvals	UL, cUL, CSA	UL, cUL, CSA
CE-marking	Yes	Yes
Pollution degree	2	2

Input Specifications

	RJ..D..	RJ..A..
Control voltage range	5 - 32 VDC	24-275 VAC/ 24-190 VDC
Pick-up voltage	4.7 VDC	22 VAC/ VDC
Reverse voltage	32 VDC	N/A
Drop-out voltage	1.2 VDC	6 VAC/ 6VDC
Maximum input current	24 mA	15mA
Response time pick-up	<1 cycle	<1 cycle
Response time drop-out	<1 cycle	<1 cycle

Output Specifications

	2-Pole switching/1-Pole direct		3-Pole switching		
	RJ2A..25 (MIDI)	RJ2A..32 (POWER)	RJ3A..20 (MIDI)	RJ3A..25 (POWER)	RJ3A..32 (MIDI)*
Rated operational current					
AC51 @Ta=25°C	3 x 25 A	3 x 32 A	3 x 20 A	3 x 25 A	3 x 32 A
AC53a @Ta=25°C	3 x 15 A	3 x 15 A	3 x 15 A	3 x 15 A	3 x 15 A
Min. opertional current	250mA	250mA	250 mA	250mA	250mA
Rep. overload current t=1s	<125 A	<125 A	<125 A	<125 A	<125 A
Non rep. surge current Tj(init.)= 25°C and t=10ms	600 Apk	600 Apk	600 Apk	600 Apk	600 Apk
Off-state leakage current @ rated voltage & frequency	< 3 mA	< 3 mA	< 3 mA	< 3 mA	< 3 mA
I²t for fusing (t = 10 ms)	1800 A²s	1800 A²s	1800 A²s	1800 A²s	1800 A²s
On-state voltage drop @ rated current	1.6 Vrms	1.6 Vrms	1.6 Vrms	1.6 Vrms	1.6 Vrms
Critical dV/dt off-state	500 V/μs	500 V/μs	500 V/μs	500 V/μs	500 V/μs

* With integrated fan and over-temperature protection

Housing Specifications

| Weight	
MIDI	Approx. 380 g
MIDI + FAN	Approx. 415 g
POWER	Approx. 680 g
Housing material	PBT, Flame Retardant
Conductors	
Size	0.5...4.0 mm² (AWG 20...12)
	0.5...2x2.5 mm² (AWG 20...2x14)
Mounting torque max.	0.6 Nm with Posidrive 0 bit
Terminal screws	M3
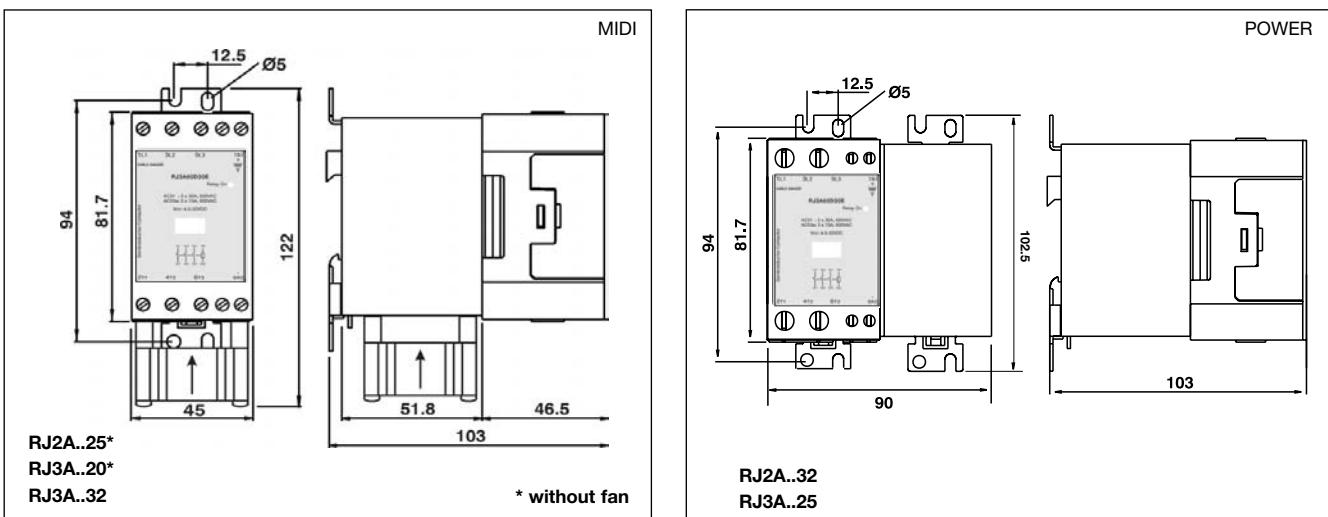
Thermal Specifications

Operating Temperature	-30 to +70°C (-22 to +158°F)
Storage temperature	-40 to +80°C (-40 to +178°F)

Isolation
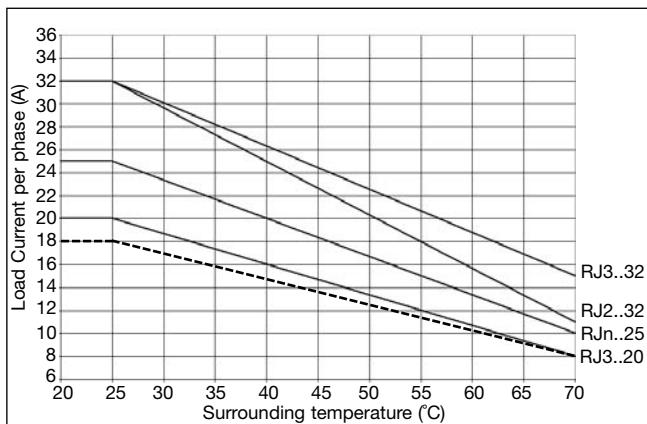
Rated isolation voltage	
Input to output	≥ 4000 VACrms
Output to case	≥ 4000 VACrms

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Dimensions

MIDI

RJ2A..25*
RJ3A..20*
RJ3A..32

* without fan

All dimensions in mm

POWER

RJ2A..32
RJ3A..25
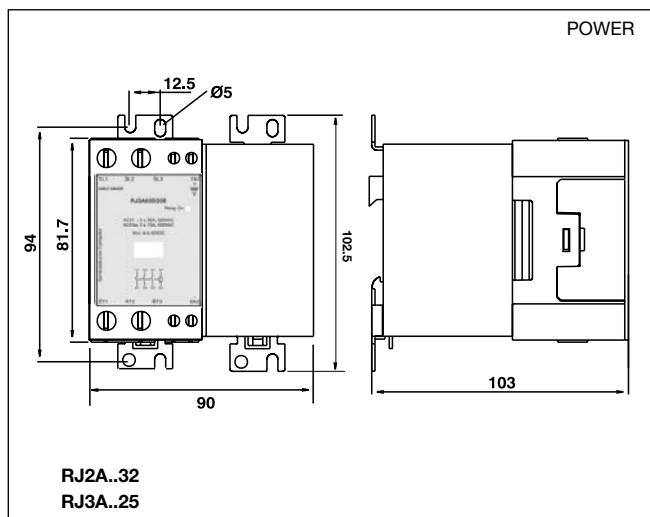
All dimensions in mm

Derating Curve
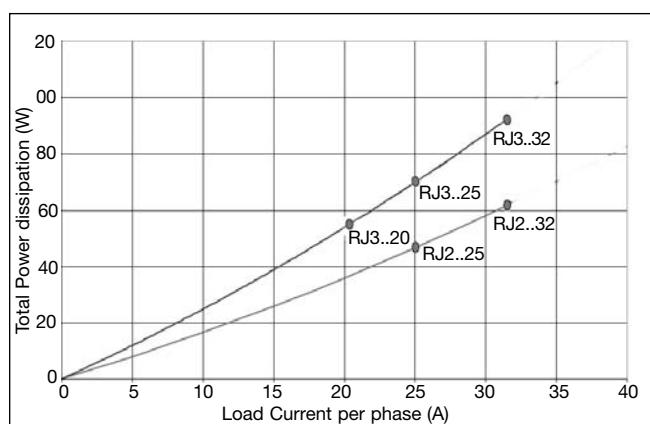
Note: dotted line indicates UL rating for RJ3...20
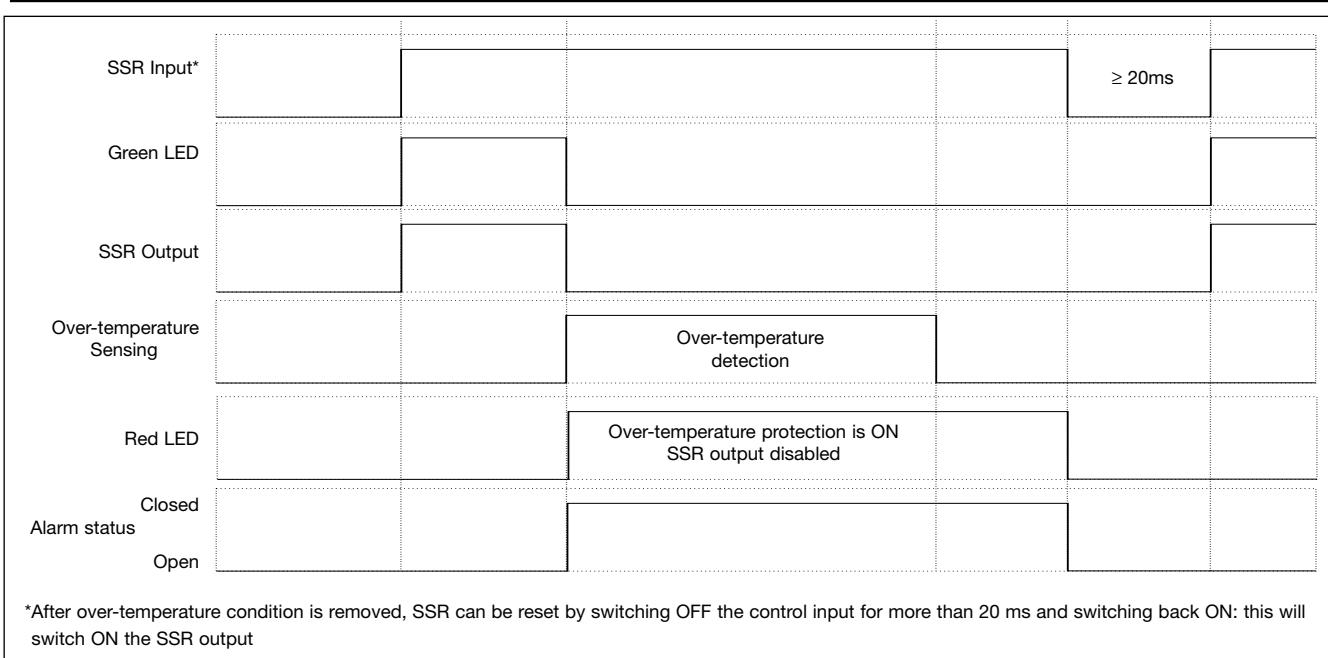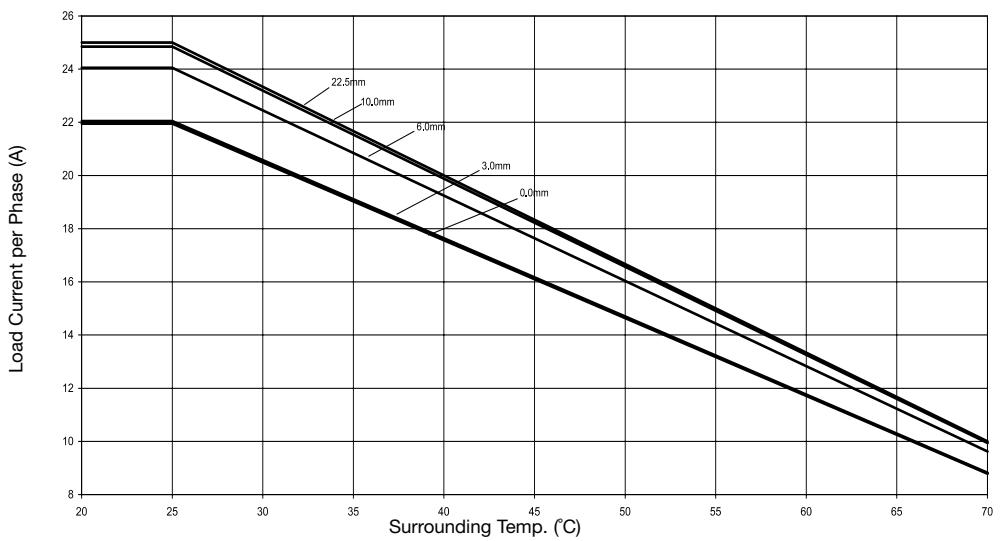
Dissipation Curve

Over-temperature Protection (Option: ...P)

|	
SSR Input*	≥ 20ms
Green LED	
SSR Output	
Over-temperature Sensing	Over-temperature detection
Red LED	Over-temperature protection is ON SSR output disabled
Alarm status — Closed / Open	

*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

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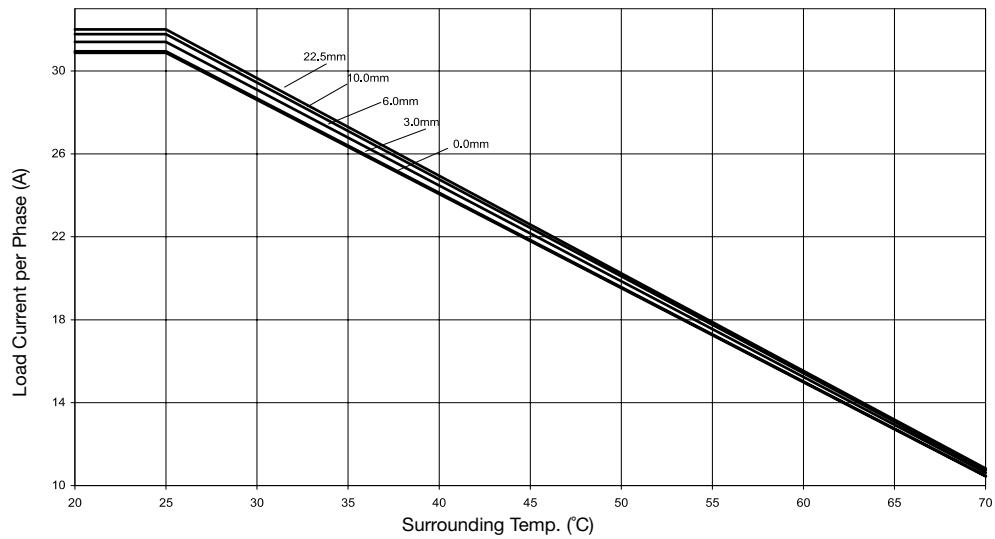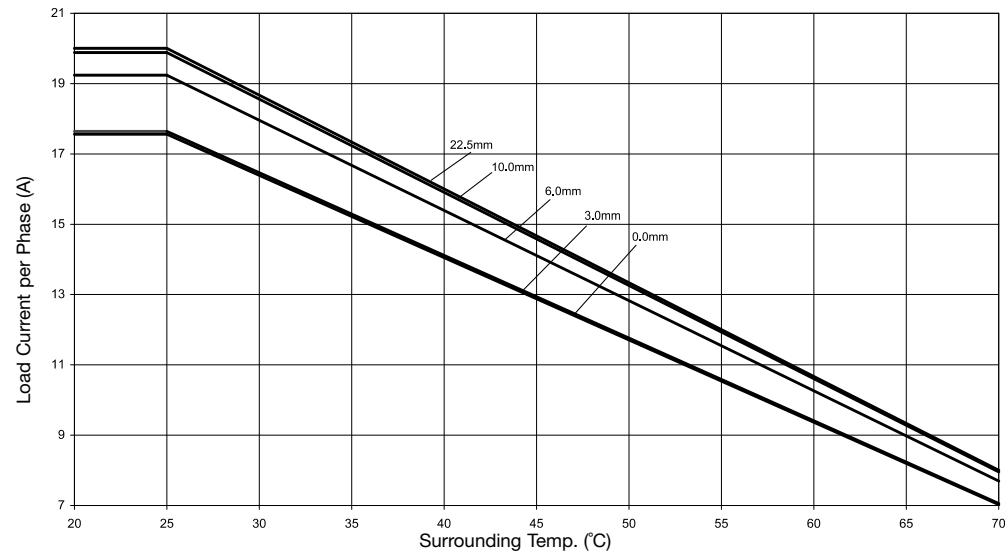
Derating vs. Spacing Curves

RJ2...25

RJ2...32

RJ3...20

Specifications are subject to change without notice (28.02.2007)
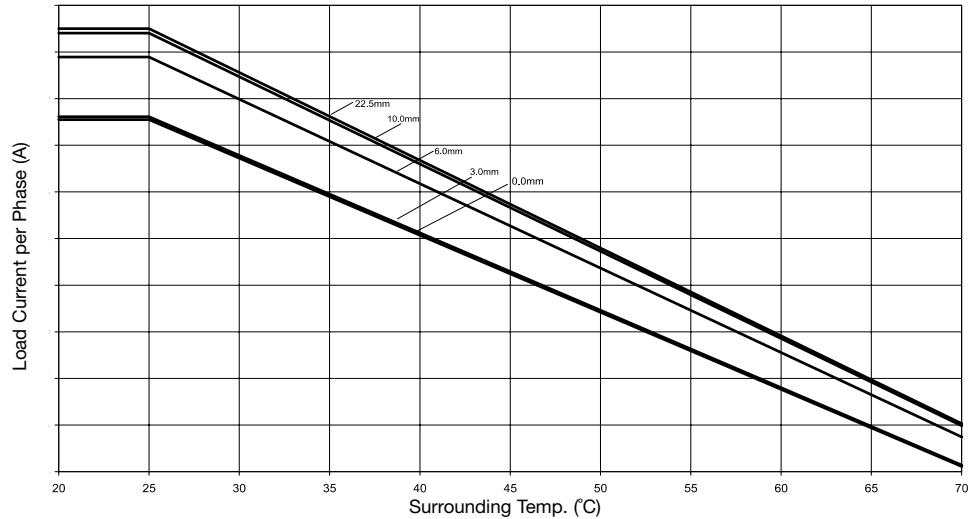
Derating vs. Spacing Curves (cont.)

RJ3...25

RJ3...32EP

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Connection Examples

Over-temperature alarm output
Max. voltage: 50 VDC
Max. current: 50mA

5-32VDC

0V

1L1 3L2 5L3 A2 A1

2T1 4T2 6T3 A2

LOAD

0V
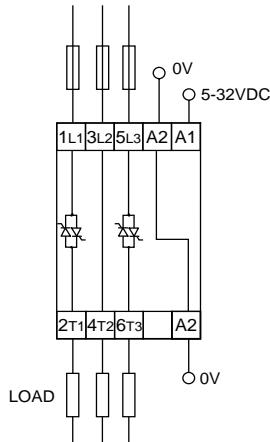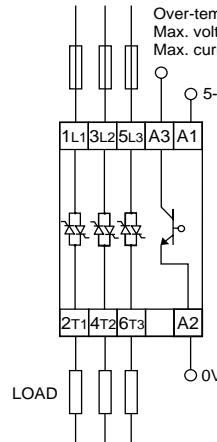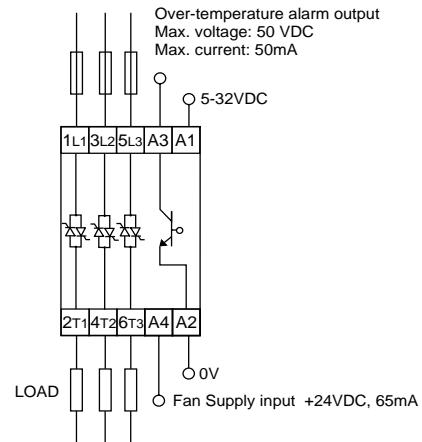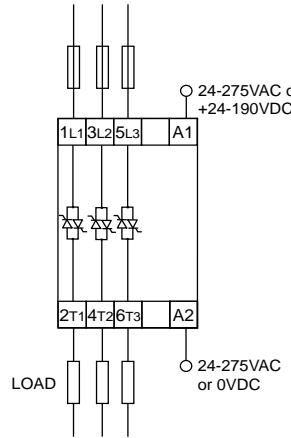
DC Control Input
Example: RJ2A60D25
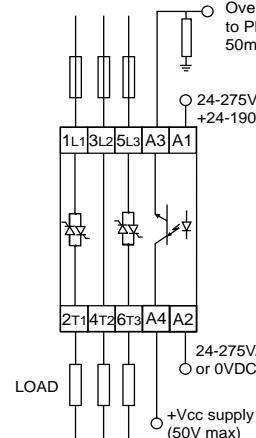
Over-temperature alarm output
Max. voltage: 50 VDC
Max. current: 50mA

5-32VDC

1L1 3L2 5L3 A3 A1

2T1 4T2 6T3 A2

LOAD

0V

**DC Control Input +
over-temperature protection**
Example: RJ3A60D20EP

Over-temperature alarm output
Max. voltage: 50 VDC
Max. current: 50mA

5-32VDC

1L1 3L2 5L3 A3 A1

2T1 4T2 6T3 A4 A2

LOAD

0V

Fan Supply input +24VDC, 65mA

**DC Control Input + Fan +
over-temperature protection**
Example: RJ3A60D32EP

24-275VAC or
+24-190VDC

1L1 3L2 5L3 A1

2T1 4T2 6T3 A2

LOAD

24-275VAC
or 0VDC
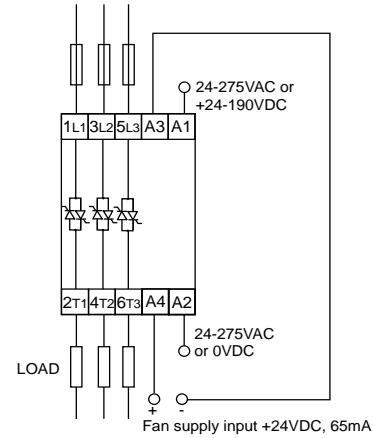
AC Control Input
Example: RJ3A22A20E

Over-temp. alarm output
to PLC (PNP)
50mA max

24-275VAC or
+24-190VDC

1L1 3L2 5L3 A3 A1

2T1 4T2 6T3 A4 A2

LOAD

24-275VAC
or 0VDC

+Vcc supply
(50V max)

**AC Control Input +
over-temperature protection**
Example: RJ2A22A25EP

24-275VAC or
+24-190VDC

1L1 3L2 5L3 A3 A1

2T1 4T2 6T3 A4 A2

LOAD

24-275VAC
or 0VDC

+ -
Fan supply input +24VDC, 65mA

**AC Control Input + fan +
over-temperature protection**
Example: RJ3A22A32EP

Applications

Safety

When using a semiconductor contactor, the electric configuration is split into a safety part and a control part. In the safety part the isolation of the load from the mains is assured by inserting switchgear that provides galvanic isolation from the power supply. A contactor or isolator can be mounted in series with the Solid State Relay to achieve this isolation. The contactor can be a very economical type as the switching is done by the Solid State Relay.

Control Part

+A1
A1   A2   A2

Star   Delta
Connection Connection

5 6 L3   T3
3 4 L2   T2
1 2 L1   T1

L1 L2 L3   Safety Part

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