RJ
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Solid State Relays
SOLITRON MIDI - With Integrated Heatsink
Types RJ1A, RJ1B

- **AC semiconductor contactor**
- **Zero switching (RJ1A) or instant-on switching (RJ1B)**
- **Direct copper bonding (DCB) technology**
- **LED-indication**
- **Cage clamp output terminals**
- **2 input ranges: 4-32 VDC and 24-275 VAC/24-48VDC**
- **Operational ratings up to 75 AACrms and 600 VAC[1]**
- **Blocking voltage: Up to 1200 Vp**
- **Opto-isolation > 4000 VACrms**
- **Over-temperature safety option[2]**
- **Integrated fan option**
- **Option for UL508 listing[5]**

Product Description

The *SOLITRON* Midi is a single-phase Solid State Contactor designed to replace electro-mechanical contactors in industrial heating and motor applications, especially when switching is frequent. The product is ready to mount on DIN-rail or chassis and comes with integral heatsink. For current rating of 75AACrms (AC51) convection cooling is used. The standard housing dimensions enable straightforward replacement of alternative products and the terminal layout allows both contactor (E) and SSR (U) type connection. Cage clamp terminals are used to ensure secure load connection with cable up to 25mm^2.
An LED indicates the status of the control input. The superior heat-transfer efficiency combined with a robust power management system make this a high reliability product that can meet the most stringent functional requirements.

Ordering Key

RJ 1 A 60 D 50 E P

- **Solid State Relay**
- **Number of poles**
- **Switching mode**
- **Rated operational voltage**
- **Control voltage**
- **Rated operational current**
- **Terminal layout**
- **Options**

Type Selection

Switching mode	Rated operational voltage[1]	Control voltage	Rated operational current	Terminal layout	Options
A: Zero switching B: Instant-on switching[3]	23: 230 VACrms 60: 600 VACrms	D: 4-32 VDC A: 24-275 VAC/ 24-48 VDC	40: 40 AACrms 45: 45 AACrms 50: 50 AACrms 75: 75 AACrms[4]	U: SSR E: Contactor	P: Over-temp. protection[2] V: Integrated Varistor

Selection Guide

Rated operational voltage	Blocking voltage	Control voltage	Rated operational current 40A	45 A	50 A	75 A (FAN+OTP)[2]
230 VACrms	650 V_p	4 - 32VDC	**RJ1A23D40E** **RJ1A23D40U**	**RJ1A23D45E** **RJ1A23D45U**	**RJ1A23D50E** **RJ1A23D50U**	**RJ1A23D75EP**
		24 - 275VAC/ 24 - 48VDC	**RJ1A23A40E** **RJ1A23A40U**	**RJ1A23A45E** **RJ1A23A45U**	**RJ1A23A50E** **RJ1A23A50U**	**RJ1A23A75EP**
600 VACrms	1200 V_p	4 - 32VDC	**RJ1A60D40E** **RJ1A60D40U**	**RJ1A60D45E** **RJ1A60D45U**	**RJ1A60D50E** **RJ1A60D50U**	**RJ1A60D75EP**
		24 - 275VAC/ 24 - 48VDC	**RJ1A60A40E** **RJ1A60A40U**	**RJ1A60A45E** **RJ1A60A45U**	**RJ1A60A50E** **RJ1A60A50U**	**RJ1A60A75EP**

Notes

1 690 VACrms rated operational voltage available on request. Example: RJ1A69D45U

2 "P" suffix: Over-temperature protection (OTP), available with type "E" terminals only

3 Instant-on versions not available with AC control voltage

4 With integrated fan and over-temperature protection - fan will automatically switch on when necessary

5 "M" suffix available only on request. Product ending with"M" is UL listed with NMFT/ NMFT7 requirements for motor loads.

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Motor ratings (UL508)

Part number	110-120VAC HP	110-120VAC FLA	220-240VAC HP	220-240VAC FLA	440-480VAC HP	440-480VAC FLA	550-660VAC HP	550-660VAC FLA
RJ1.23..40..M	1/2	9.8A	2	12.0A	-	-	-	-
RJ1.60..40..M	1/2	9.8A	2	12.0A	3	5A	5	11.2A
RJ1.23..45..M	1	16A	2	12.0A	-	-	-	-
RJ1.60..45..M	1	16A	2	12.0A	5	11.0A	7 1/2	16.0A
RJ1.23..50..M	1	16A	2	12.0A	-	-	-	-
RJ1.60..50..M	1	16A	2	12.0A	5	11.0A	7 1/2	16.0A
RJ1.23..75..M	1 1/2	20A	3	17.0A	-	-	-	-
RJ1.60..75..M	1 1/2	20A	3	11.0A	5	11.0A	10	20.0A

General Specifications

	RJ1.23..	RJ1.60..
Operational voltage range	24 to 265 VAC	42 to 660 VAC
Blocking voltage	650 V_p	1200 V_p
Operational frequency range	45 to 65 Hz	45 to 65 Hz
Power factor	≥ 0.5 @ 230 VACrms	≥ 0.5 @ 600 VACrms
Integrated Varistor (RJ1.....V)	275V	680V
Over-temperature alarm		
I max	50mADC	50mADC
U max	50VDC	50VDC
Approvals	UL (E80573), cUL (E80573) , CSA (204075)	
CE-marking	Yes	
Pollution degree	2	
RoHS compliance	Yes	

Input Specifications

	RJ1A...D	RJ1B..D	RJ1A...A
Control voltage range	4 - 32 VDC	4.5 - 32 VDC	24-275 VAC/24 - 48 VDC
Pick-up voltage	3.8 VDC	4.25 VDC	22 VAC/DC
Reverse voltage	32 VDC	32 VDC	n/a
Drop-out voltage	1.2 VDC	1.0 VDC	6 VAC/DC
Maximum input current	12 mA	15 mA	17 mA
Response time pick-up	1/2 cycle	1 ms	1 cycle
Response time drop-out	1/2 cycle	1 cycle	1 cycle

Isolation

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

Output Specifications

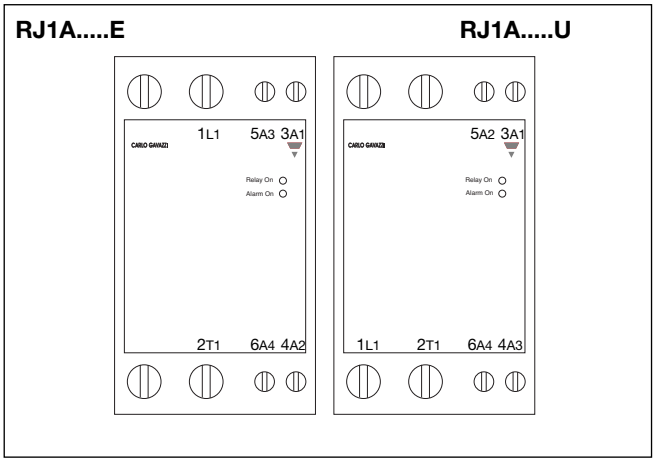
	RJ..40	RJ..45	RJ..50	RJ..75 (With integrated fan)
Rated operational current AC51 @Ta=25°C AC53a @Ta=25°C	 40 AACrms 15 AACrms	 45 AACrms 20 AACrms	 50 AACrms 30 AACrms	 75 AACrms 30 AACrms
Min. operational current	250 mAACrms	400 mAACrms	500mAACrms	500mAACrms
Rep. overload current t = 1s	< 125 AACrms	< 150 AACrms	<200 AACrms	<200 AACrms
Non rep. surge current Tj(init.) = 25°C and t = 10 ms	600 A_p	1150 A_p	1900 A_p	1900 A_p
Off-state leakage current @ rated voltage and frequency	< 3 mArms	< 3 mArms	< 3 mArms	< 3 mArms
I^2t for fusing t = 10 ms	1800 A^2s	6600 A^2s	18000 A^2s	18000 A^2s
On-state voltage drop @ rated current	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

Thermal Specifications

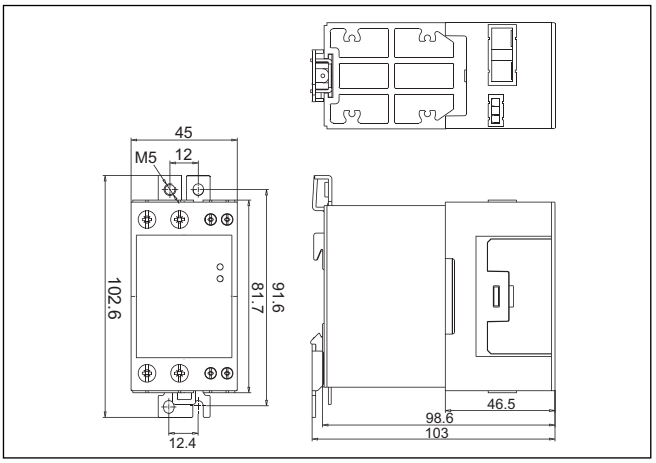
	RJ...D	RJ...A
Operating temperature	-30 to +70°C (-22 to +158°F)	-30 to +70°C (-22 to +158°F)
Storage temperature	-40 to +100°C (-40 to +176°F)	-40 to +100°C (-40 to +176°F)

Terminal Layout

RJ1A.....E **RJ1A.....U**



Dimensions



All dimensions in mm

Housing Specifications

Weight RJ MIDI RJ MIDI w. fan	 Approx. 430g Approx. 460g
Housing material	PBT Flame retardant
Control terminal A1, A2 Cable size Min Max	 1 x 0.5 mm^2 (1 x AWG20) 1 x 4.0 mm^2 (1 x AWG12) or 2 x 2.5 mm^2 (2 x AWG14)
Mounting torque max.	0.6 Nm with Pozidriv 0 bit
Control terminal screws	M3

Power terminal L1, T1 Cable size Min Max	 1 x 4 mm^2 (1 x AWG12) 1 x 25 mm^2 (1 x AWG3) or 2 x 10 mm^2 (2 x AWG6)
Mounting torque max.	2.5 Nm with Pozidriv 2 bit
Power terminal screws	M5

Solid State Relays
SOLITRON MIDI Multi-Function Analog Switching
Type RJ1P

- **AC semiconductor contactor**
- **Multi-function - 5 selectable modes of operation: Phase Angle, Distributed Full Cycle and Burst Control (1, 3 and 10s)**
- **Direct copper bonding (DCB) technology**
- **LED-indication for control and load status**
- **Operational ratings up to 50 AACrms and 600 VAC**
- **4-20mA or 0-10V control input**
- **Built-in varistor**
- **Blocking voltage: Up to 1200Vp**
- **Opto-isolation > 4000VACrms**
- **Cage clamp terminals**
- **IP20 protection**
- **Option for over-temperature protection with alarm output**

Product Description

The Solitron Midi Analog Switching is a single-phase SSR that provides proportional output power in relation to the control signal level applied. This microprocessor-based device provides for 5 different switching modes integrated into one package. A selector switch on the front of the device is used for the selection of the preferred mode of operation, i.e., either Phase Angle, Distributed Full Cycle or Burst Control. This multi-function selection makes this device ideal for the control of a variety of loads, including heaters and lamps. The control signal can be either 4 - 20mA or 0 - 10VDC. 4mA or 0V correspond to zero output power, whilst 20mA or 10VDC correspond to full output power.

The product is ready to mount on DIN-rail or chassis and comes with integral heatsink.

Ordering Key

RJ 1 P 48 V 50 E P PO

- **Solid State Relay**
- **Number of poles**
- **Switching mode (Proportional)**
- **Rated operational voltage**
- **Control input type**
- **Rated operational current**
- **Terminal layout**
- **Over-temperature protection**
- **Alarm output type**

Type Selection

Switching mode	Rated operational voltage	Control input	Rated operational current	Terminal layout	Protection	Alarm output type
P: Proportional Output	23: 230VACrms 48: 480VACrms 60: 600VACrms	V: 0 - 10VDC I: 4 - 20mA	30: 30AACrms 50: 50AACrms	E: Contactor	P: Over-temperature protection	PO: *1 NO: *2

*1 PNP, Normally Open

*2 NPN, Normally Open

Selection Guide

Rated operational voltage	Blocking voltage	Control input	Supply voltage	Alarm output type	Rated operational current 30 A	50 A
230VACrms	650Vp	0-10VDC	24VAC/DC	-	**RJ1P23V30E**	**RJ1P23V50E**
				PO	**RJ1P23V30EPPO**	**RJ1P23V50EPPO**
		4-20mA		-	**RJ1P23I30E**	**RJ1P23I50E**
				PO	**RJ1P23I30EPPO**	**RJ1P23I50EPPO**
480VACrms	1200Vp	0-10VDC	24VAC/DC	-	**RJ1P48V30E**	**RJ1P48V50E**
				PO	**RJ1P48V30EPPO**	**RJ1P48V50EPPO**
		4-20mA		-	**RJ1P48I30E**	**RJ1P48I50E**
				PO	**RJ1P48I30EPPO**	**RJ1P48I50EPPO**
600VACrms	1200Vp	0-10VDC	24VAC/DC	-	**RJ1P60V30E**	**RJ1P60V50E**
		4-20mA		-	**RJ1P60I30E**	**RJ1P60I50E**

Note: Alarm Output: EPNO (NPN, normally open) and 600V types available only on request

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General Specifications

	RJ1P23...	RJ1P48...	RJ1P60...
Operational voltage range	90 to 265VAC	200 to 550VAC	410 to 660VAC
Blocking voltage	650V_p	1200V_p	1200V_p
Operational frequency range	45 to 65Hz	45 to 65Hz	45 to 65Hz
Output power	0 to 99%	0 to 99%	0 to 99%
Power factor	≥ 0.9 @ 230VACrms	≥ 0.9 @ 480VACrms	≥ 0.9 @ 600VACrms
Load status indication	Red LED	Red LED	Red LED
Output power resolution			
MODE 1 Phase Angle	1/300 @ 50Hz, 1/300 @ 60Hz		
MODE 2 Full Cycle	1/64 @ 50Hz, 1/64 @ 60Hz		
MODE 3 Burst with 1s period	1/50 @ 50Hz, 1/60 @ 60Hz		
MODE 4 Burst with 3s period	1/150 @ 50Hz, 1/180 @ 60Hz		
MODE 5 Burst with 10s period	1/500 @ 50Hz, 1/600 @ 60Hz		
Approvals	UL, cUL*		
CE-marking	Yes		

* Approvals pending for RJ1P...P.O models

Input Specifications

Current controlled input	RJ1P..I...
Control current range	4 - 20mA
Max. allowable input current	50mA
Pick up current	4.2mA
Drop out current	3.9mA
Control status indication	Green LED
Reverse polarity protected	Yes
Voltage drop	10VDC @ 20mA

Voltage controlled input	RJ1P..V...
Supply voltage range, Vss	20 - 28VAC/DC
Supply current	18mA @ 24VDC 23mA @ 24VAC
Control voltage range, Vcc	0 - 10VDC
Control input current	0.1mA @ 10VDC
Reverse polarity protected	Yes
Pick up voltage	0.5VDC
Drop out voltage	0.05VDC
Control status indication	Green LED

Note: the use of twisted pair cable for the control input is recommended

Output Specifications

	RJ1P...30	RJ1P...50
Rated operational current AC51 @Ta=25°C	30AACrms	50AACrms
Min. operational current	150mAACrms	500mAACrms
Rep. overload current t=1 s (Tj init.=25°C)	< 55AACrms	< 200AACrms
Non-rep. surge current t=10 ms (Tj init.=25°C)	325A_p	1900A_p
Off-state leakage current, @ rated voltage and frequency	< 3 mArms	< 3 mArms
I^2t for fusing t=10 ms	525A^2s	18000A^2s
On-state voltage drop @ rated current	1.6Vrms	1.6Vrms
Critical dV/dt off-state	1000V/µs	1000V/µs

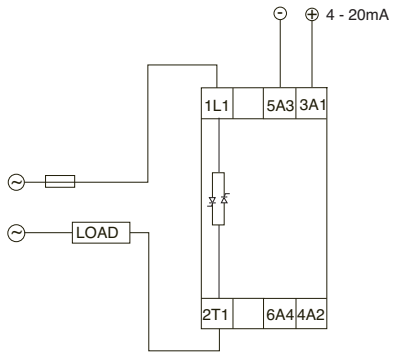
Isolation

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

Thermal Specifications

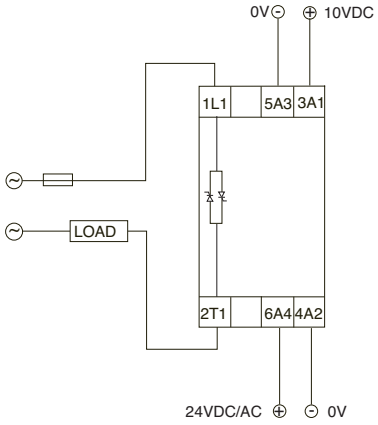
Operating temperature	-20 to +70°C (-4 to +158 °F)
Storage temperature	-40 to +100°C (-40 to +212 °F)

Connection Examples



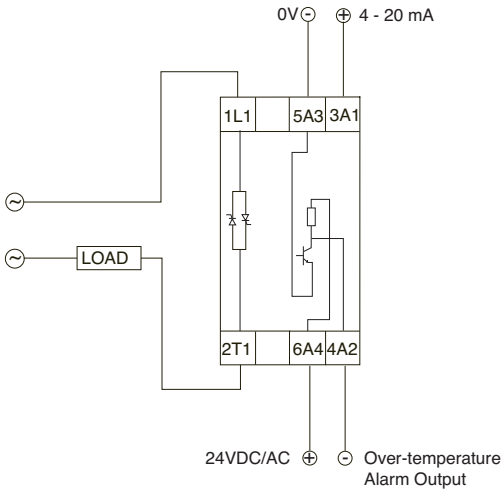
3A1 - 5A3: Control input current

Example: RJ1P48I..E



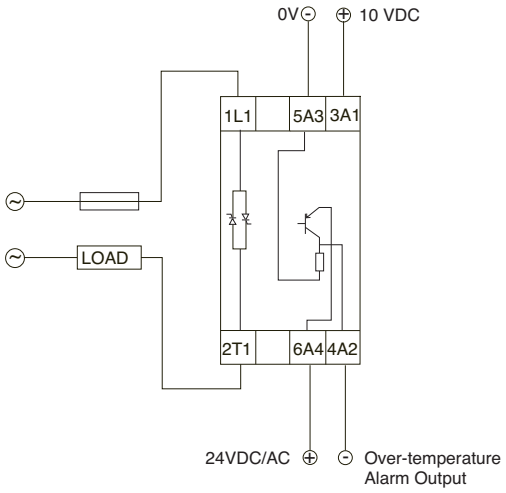
3A1 - 5A3: Control input voltage, Vcc
4A2 - 6A4: Supply input voltage, Vss

Example: RJ1P48V..E



3A1 - 5A3 : Control Input Current Ic (4-20mA)
6A4 : Supply Voltage Vss (24VDC)
4A2 : Alarm output, NPN Normally Open

Example: RJ1P48I..PNO



3A1 - 5A3 : Control Input Voltage Vcc (0-10V)
6A4 : Supply Voltage Vss (24VAC/ DC)
4A2 : Alarm output, PNP Normally Open

Example: RJ1P48I..EPPO

Note: For the RJ1P..V..E, it is possible to have the ground terminals of the supply and control power supplies used commoned. In the case, this common ground is connected either to terminal A2 or terminal A3. This is only applicable when a 24 VDC supply voltage is used. There should be no external direct link from Terminal A2 to Terminal A3.

Alarm Specifications

Output current	≤ 50 mADC
Output voltage	
NPN	1V
PNP (Voltage version)	Vcc - 1 - 82 io
PNP (Current version)	Vcc - 3 (0.50 mA)
No. of outputs in parallel	≤ 50

Operation

MODE 1: The Phase Angle switching mode works in accordance with the phase angle control principle, i.e. the output switching point in the AC sine wave depends on the signal level applied at the input. The relay switches off everytime the output current crosses zero.

MODE 2: The Distributed mode provides a number of full cycles, evenly distributed over a fixed period of 1.28s @ 50Hz (1.07s @ 60Hz), depending on the control input.

MODE 3, 4, 5: The Burst Switching mode generates a number of full cycles, depending on the control input over fixed periods of 1s, 3s or 10s for MODES 3, 4 and 5 respectively.

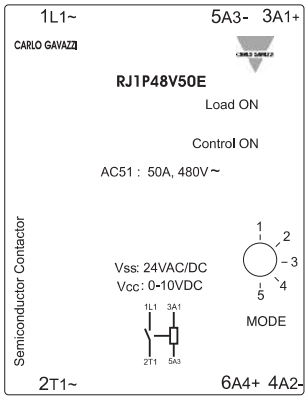
Modes 2, 3, 4 and **5** use the zero switching principle, thus ensuring a reduced level of radiated and wire-conducted noise. The Distributed and Burst Switching modes are not recommended for light control due to light-flickering.

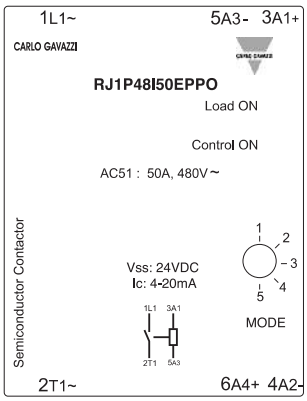
LED INDICATION
The top RED LED indicates the load status. It goes ON whenever the load is activated, and in the RJ1P…P..O models this led is used to indicate an over temperature alarm. The Green LED gives indication of the status of the control input.

Upon application of control current (for the RJ1P..I..) to terminals A1 – A3, the Green LED will be dimly lit, with its intensity increasing with an increase in control current.

For the RJ1P..V.. the Green LED will be ON (flickering) upon application of the supply voltage to terminals A3 – A4. In RJ1P..VE only, terminals A3 and A2 are shorted. Once a control voltage is applied to terminals A1 – A3, the Green LED will be fully ON, if greater than a threshold voltage (approx 0.5V). Note that the first time the device (voltage control version) is to be activated, the mains voltage has to be present for the Green LED to indicate the control status.

Terminal Layout





Transfer characteristics

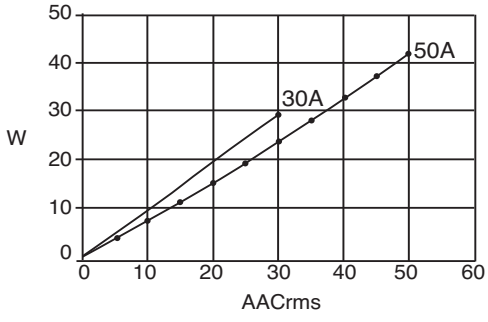
Output power as a function of control input

Control Current (mA)	Control Voltage (VDC)	Output Power (%)
4	0	0
8	2.5	25
12	5	50
16	7.5	75
20	10	99

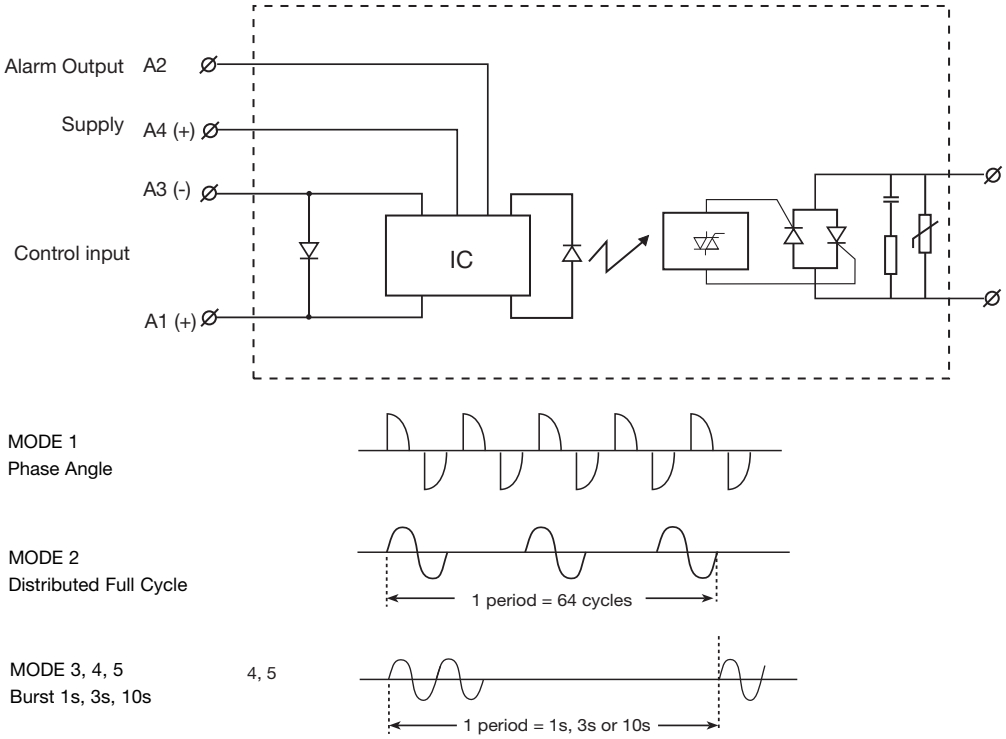
Mode Selection

MODE 1	Phase Angle Switching
MODE 2	Distributed Control
MODE 3	Burst Switching (1 sec. period)
MODE 4	Burst Switching (3 sec. period)
MODE 5	Burst Switching (10 sec. period)

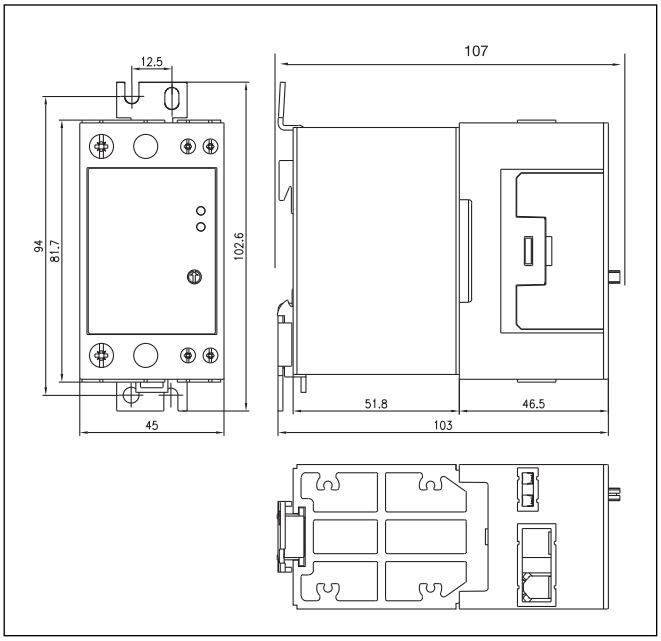
Dissipation Curve



Functional Diagram



Dimensions

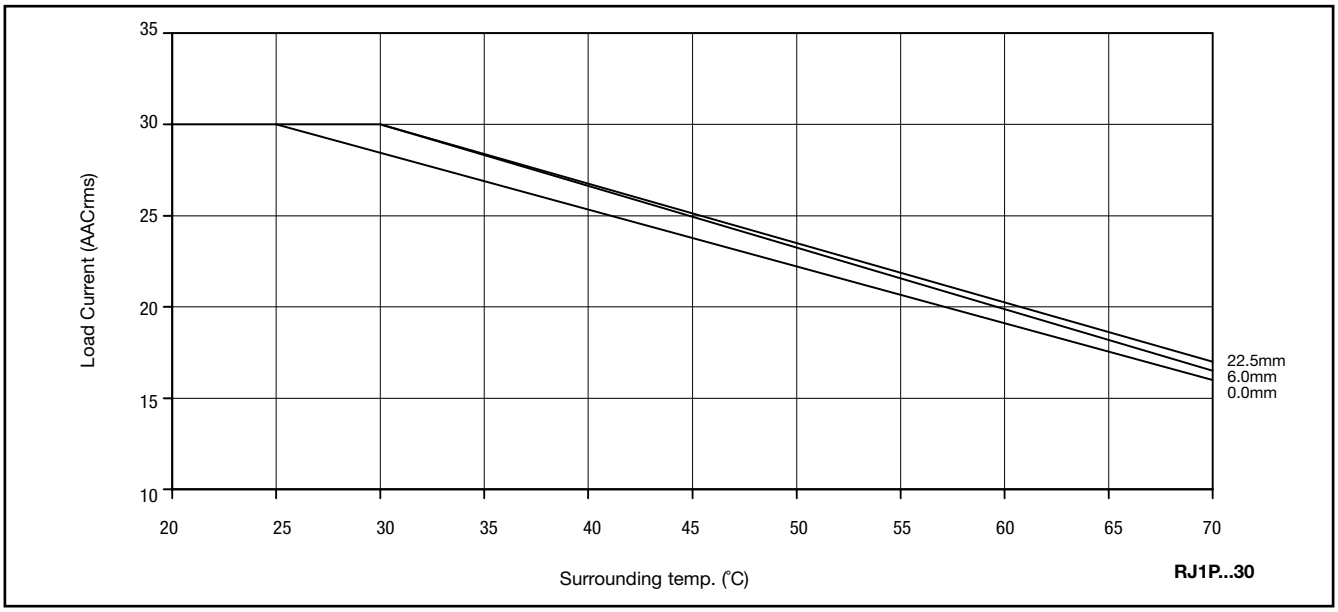


All dimensions in mm.

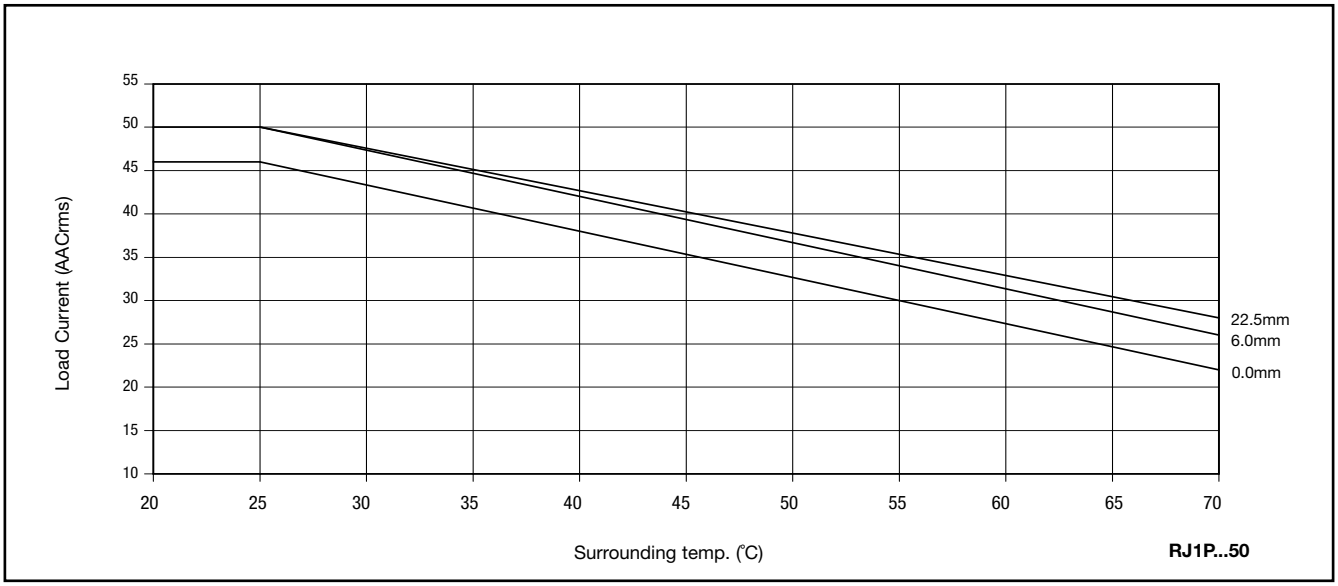
Housing Specifications

Weight	Approx. 430 g
Housing material	PBT Flame retardant
Control terminal cable size	
Min	1 x 0.5 mm² (1 x AWG20)
Max	1 x 4.0 mm² (1 x AWG12) or 2 x 2.5 mm² (2 x AWG14)
Mounting torque max.	0.6 Nm Posidriv 0 bit
Control terminal screw	M3
Power terminal cable size	
Min	1 x 4 mm² (1 x AWG12)
Max	1 x 25 mm² (1 x AWG3) or 2 x 10 mm² (2 x AWG6)
Mounting torque max.	2.5 Nm Posidriv 2 bit
Power terminal screw	M5

Derating vs. Spacing Curves



RJ1P...30

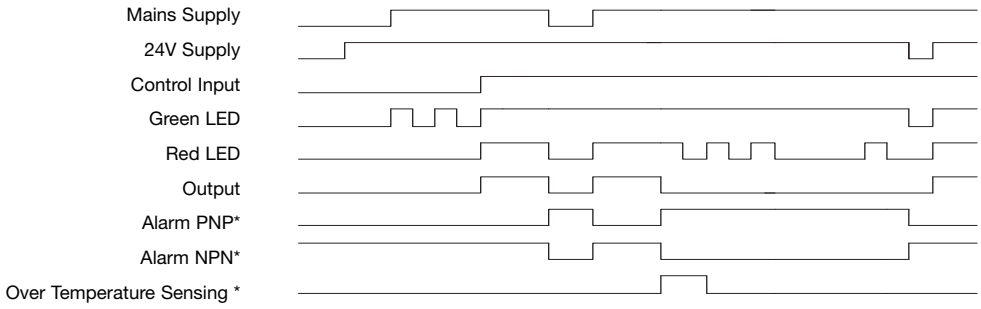


RJ1P...50

Note: Based on 100% output power

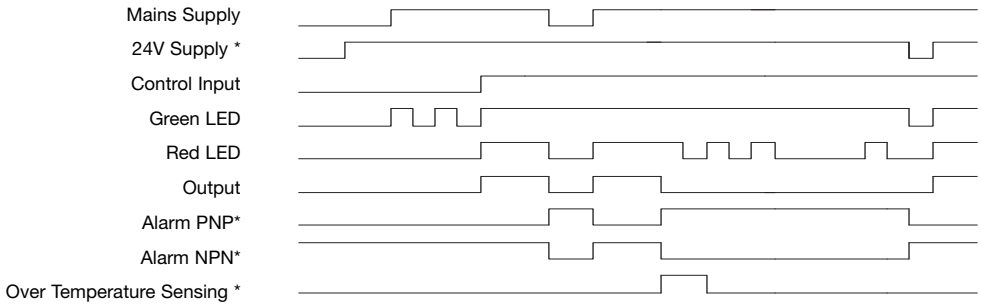
Functional Diagram

RJ1P..V..E..



* Applicable to RJ1P...P..O models only

RJ1P..I..E..



* Applicable to RJ1P...P..O models only

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

- **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 RJ3: 3 poles	A: Zero switching	22: 220 VACrms 60: 600 VACrms	D: 5 - 32 VDC A: 24 - 275 VAC/ 24 - 190 VDC	20: 3 x 20 AAC_{rms} 25: 3 x 25 AAC_{rms} 32: 3 x 32 AAC_{rms}	(RJ3A) (RJ2A/RJ3A) (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

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 AC53a @Ta=25°C	 3 x 25 A 3 x 15 A	 3 x 32 A 3 x 15 A	 3 x 20 A 3 x 15 A	 3 x 25 A 3 x 15 A	 3 x 32 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
I^2t for fusing (t = 10 ms)	1800 A^2s	1800 A^2s	1800 A^2s	1800 A^2s	1800 A^2s
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 mm^2 (AWG 20...12) 0.5...2x2.5 mm^2 (AWG 20...2x14)
Mounting torque max.	0.6 Nm with Posidrive 0 bit
Terminal screws	M3

Thermal Specifications

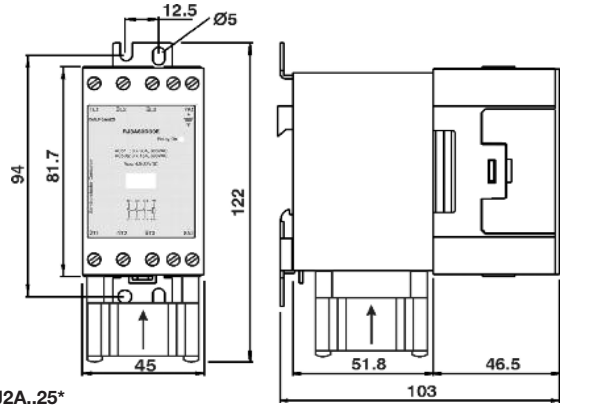
Operating Temperature	-30 to +70°C (-22 to +158°F)
Storage temperature	-40 to +80°C (-40 to +178°F)

Isolation

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

Dimensions

MIDI

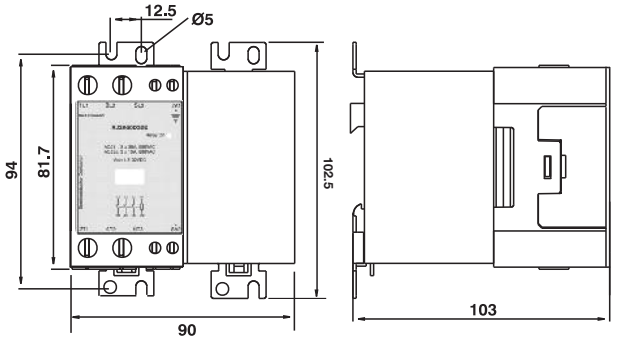


RJ2A..25*
RJ3A..20*
RJ3A..32

*** without fan**

All dimensions in mm

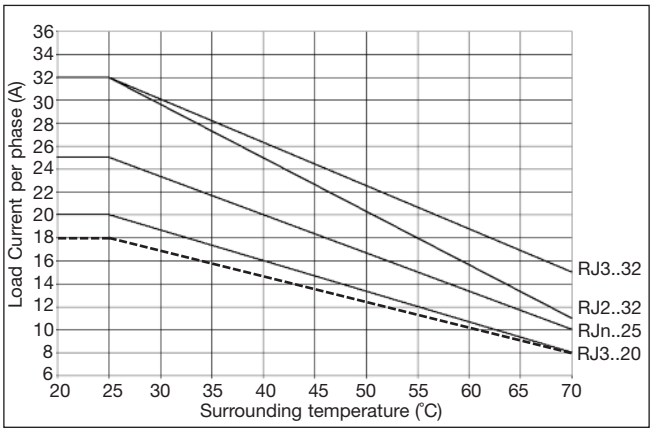
POWER



RJ2A..32
RJ3A..25

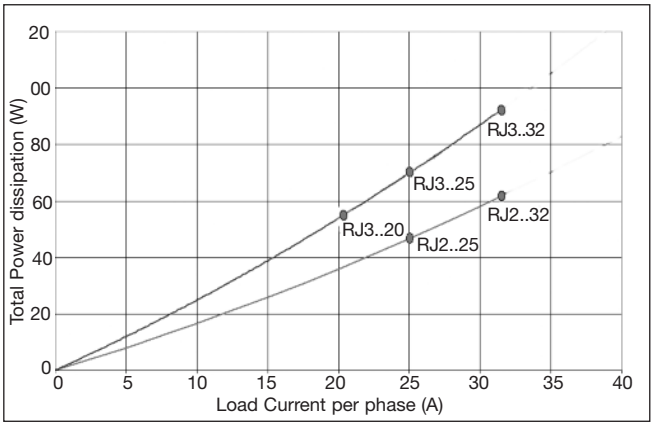
All dimensions in mm

Derating Curve

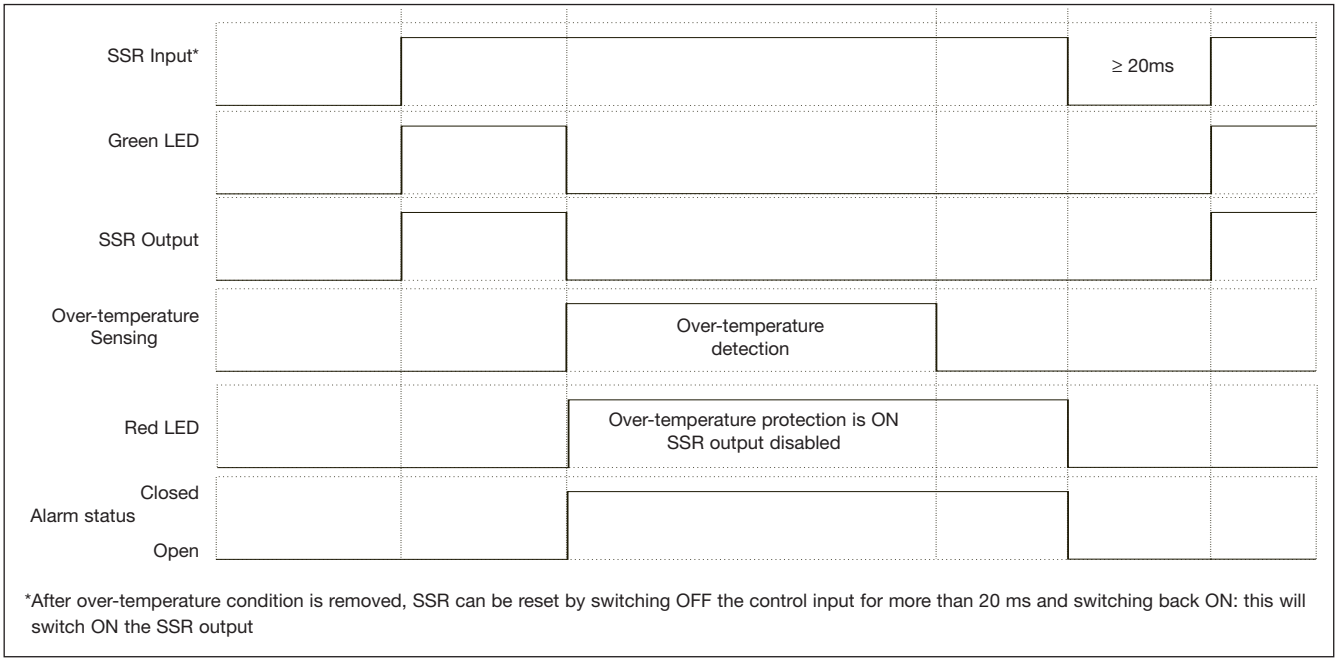


Note: dotted line indicates UL rating for RJ3...20

Dissipation Curve



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



*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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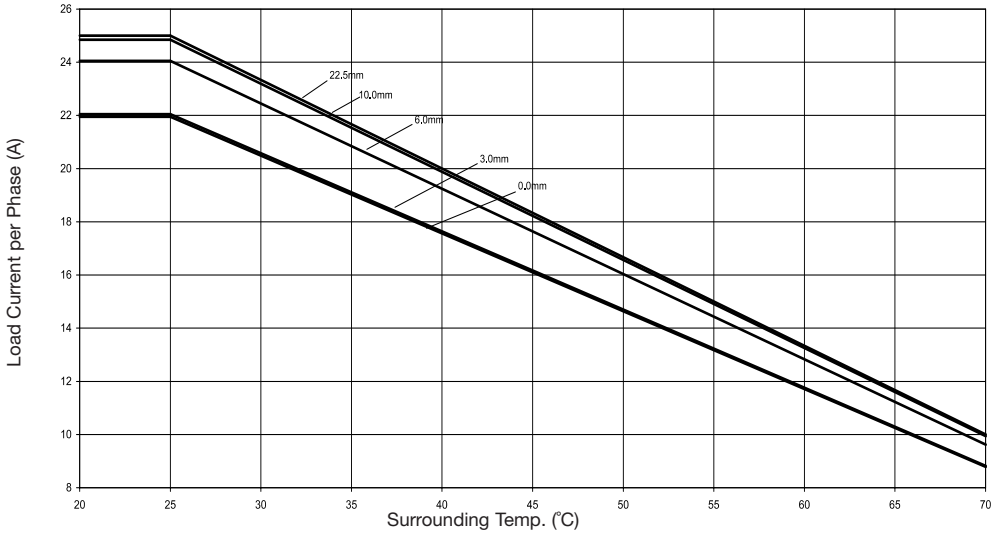
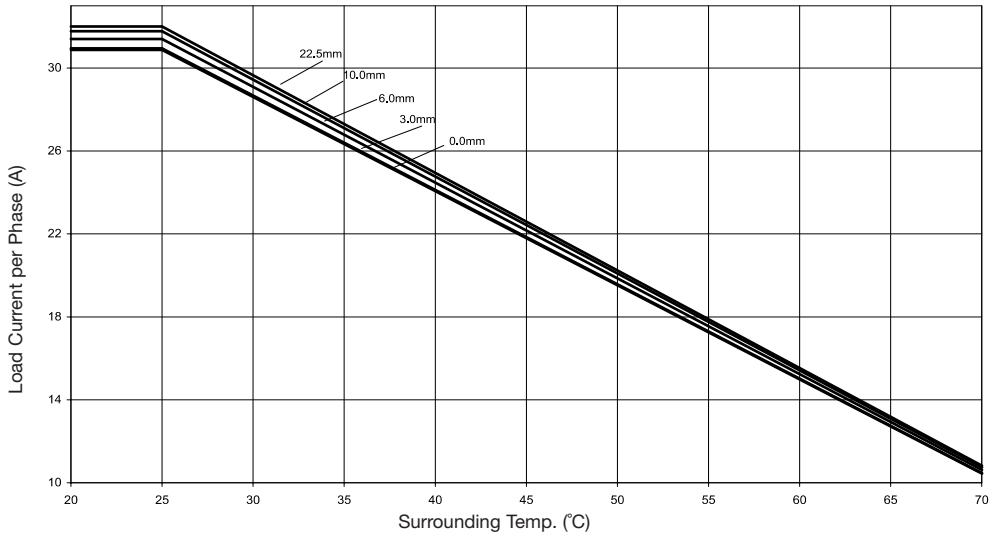
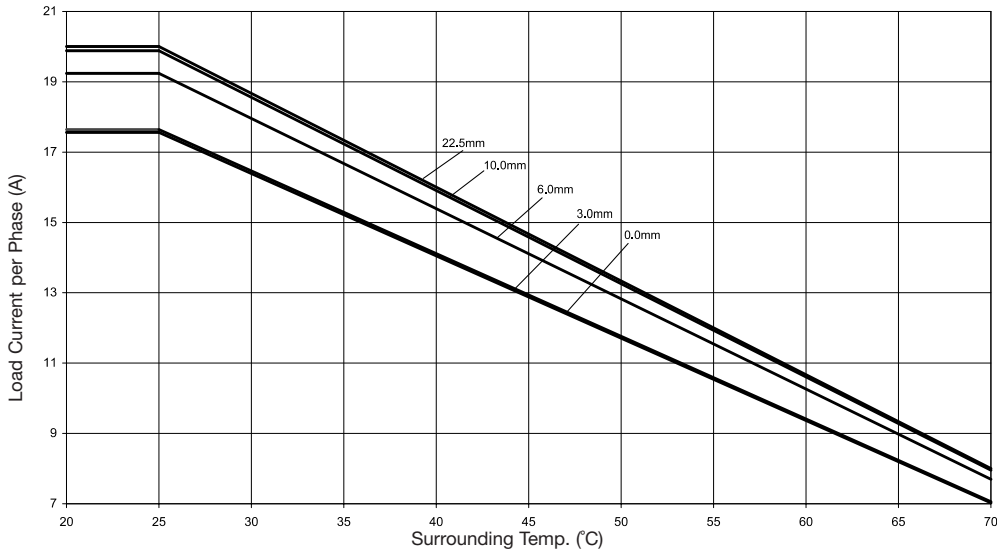
Derating vs. Spacing Curves



RJ2...25



RJ2...32



RJ3...20

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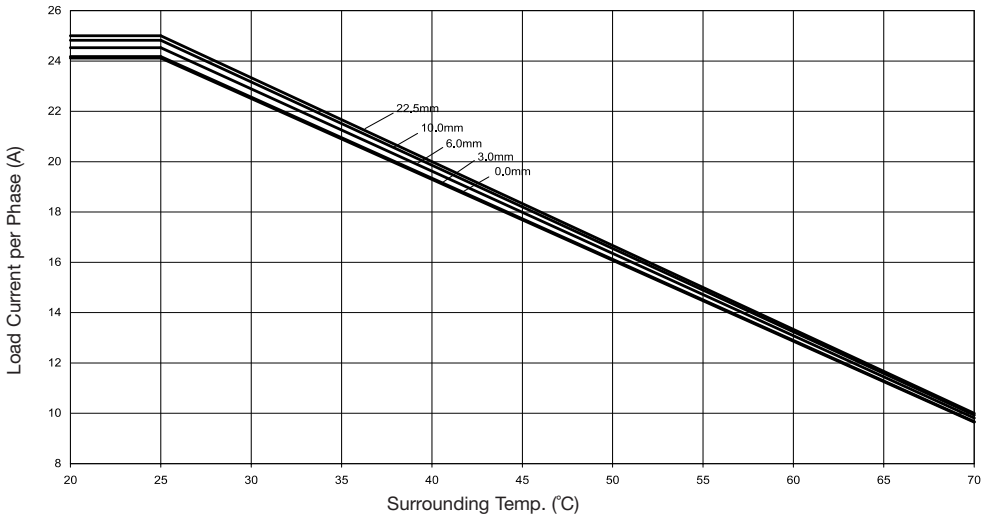
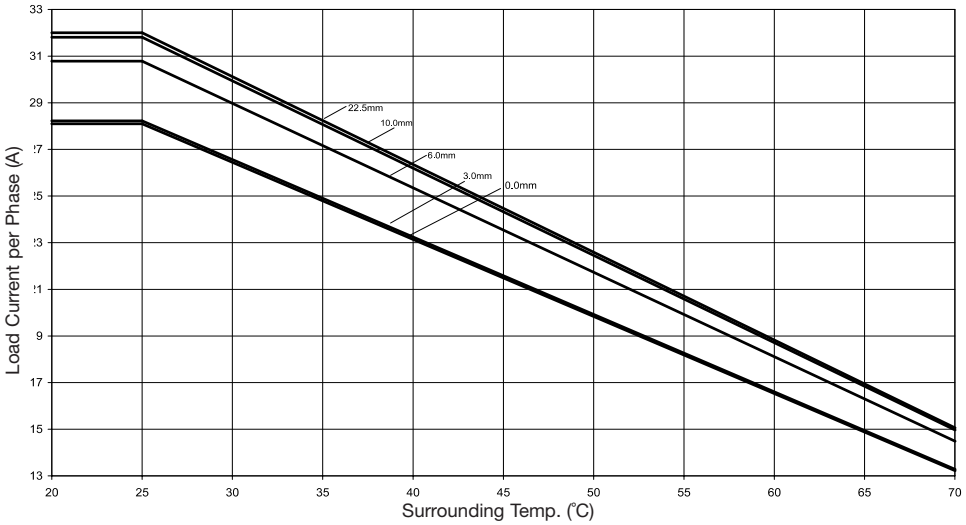
Derating vs. Spacing Curves (cont.)

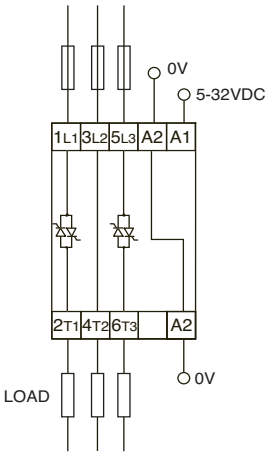


RJ3...25

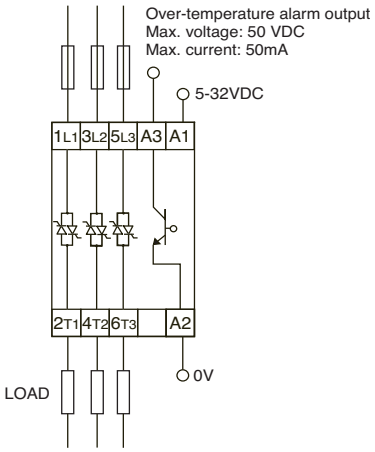


RJ3...32EP

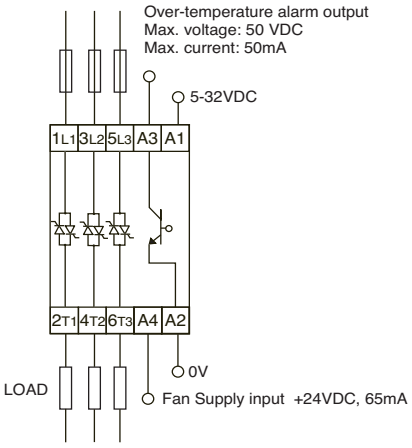
Connection Examples



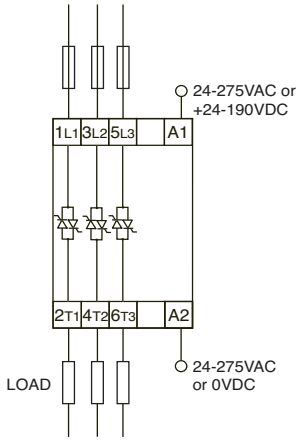
DC Control Input
Example: RJ2A60D25



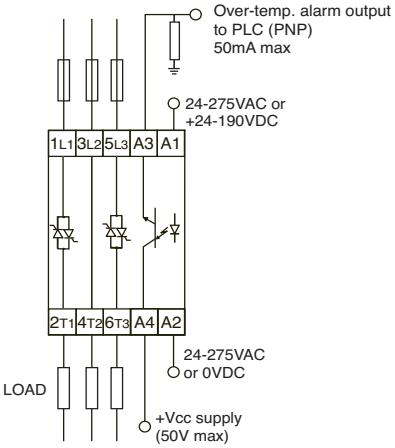
DC Control Input +
over-temperature protection
Example: RJ3A60D20EP



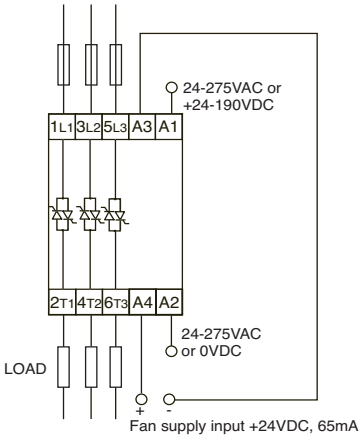
DC Control Input + Fan +
over-temperature protection
Example: RJ3A60D32EP



AC Control Input
Example: RJ3A22A20E



AC Control Input +
over-temperature protection
Example: RJ2A22A25EP

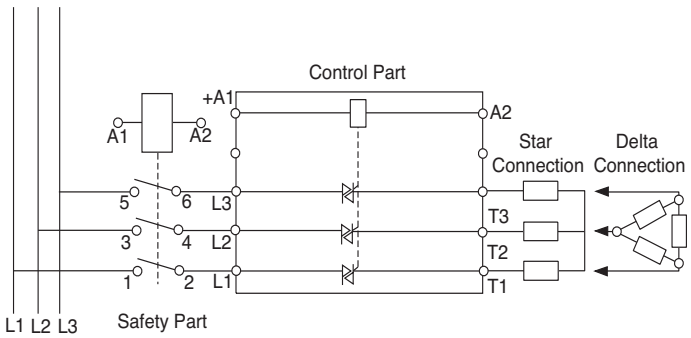


AC Control Input + fan +
over-temperature protection
Example: RJ3A22A32EP

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.



Solid State Relays
SOLITRON MIDI Current Sensing
Type RJCS, RJCSR

- **AC semiconductor contactor**
- **Integrated current monitoring**
- **Zero switching**
- **Direct copper bonding (DCB) technology**
- **LED-indication**
- **Cage clamp output terminals**
- **4-32 VDC control input**
- **Operational ratings up to 50 AACrms and 600 VAC**
- **Local and remote alarm status**
- **Set-point adjustable**
- **Time delay adjustable**
- **Local and remote setup**

Product Description

The SOLITRON Midi Current Sensing is a compact, single-phase SSR that is sensitive to variations in load conditions in industrial heating applications. This microprocessor-based device is ideal for detection of partial load failure and to ensure the highest process quality. Current sensing is integrated inside to eliminate the need to install an external current transformer. A membrane "button" on the front is used to effect a simple "teach in" of the current setpoint. Alarm delay time is set by a potentiometer. A drop in setpoint current of more than 13% will trigger an open collector alarm.
Up to 50 alarm outputs can be connected in parallel to a standard PLC input. Typical conditions that can be detected are heater break or open-circuit, blown fuse, semiconductor short-circuit and faulty power connection. Device over-temperature protection is integrated as a standard feature.
The product is ready to mount on DIN-rail or chassis and comes with integral heatsink. The standard housing dimensions enable straightforward replacement of alternative products.

Ordering Key

RJ CS R 1 A 60 D 50 E P NO

- **Solid State Relay**
- **Current Sensing**
- **Autoranging (option)**
- **Number of poles**
- **Switching mode**
- **Rated operational voltage**
- **Control voltage**
- **Rated operational current**
- **Terminal layout**
- **Over-temperature protection**
- **Alarm output type**

Type Selection

Options	Switching mode	Rated operational voltage	Control voltage	Rated operational current	Terminal layout	Protection	Alarm output type
R:Autoranging	A: Zero switching	23: 230 VACrms 60: 600 VACrms	D: 4 - 32 VDC	30: 30 AACrms 50: 50 AACrms	E: Contactor	P: Over-temp. protection	NO: NPN, Normally open PO: PNP, Normally open

Selection Guide

Options	Rated operational voltage	Blocking voltage	Control voltage	Supply voltage	Alarm output type	Rated operational current 30 A	50A
-	230 VACrms	650 Vp	4 - 32 VDC	24 VDC	NPN, NO	-	**RJCS1A23D50EPNO**
					PNP, NO	-	**RJCS1A23D50EPPO**
	600 VACrms	1200 Vp	4 - 32 VDC	24 VDC	NPN, NO	-	**RJCS1A60D50EPNO**
					PNP NO	-	**RJCS1A60D50EPPO**
Auto-ranging	230 VACrms	650 Vp	4 - 32 VDC	24 VDC	NPN, NO	**RJCSR1A23D30EPNO**	**RJCSR1A23D50EPNO**
					PNP, NO	**RJCSR1A23D30EPPO**	**RJCSR1A23D50EPPO**
	600 VACrms	1200 Vp	4 - 32 VDC	24 VDC	NPN, NO	**RJCSR1A60D30EPNO**	**RJCSR1A60D50EPNO**
					PNP NO	**RJCSR1A60D30EPPO**	**RJCSR1A60D50EPPO**

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General Specifications

	RJCS.1.23..	RJCS.1.60..
Operational voltage range	24 to 265 VAC	42 to 660 VAC
Blocking voltage	650 V_p	1200 V_p
Operational frequency range	45 to 65 Hz	45 to 65 Hz
Power factor	≥ 0.5 @ 230 VACrms	≥ 0.5 @ 600 VACrms
Approvals	UL, cUL	
CE-marking	Yes	
Supply status indication	Green LED, half intensity	
Control status indication	Green LED	
Over-temperature alarm trip indication	Red LED, intermittent	
Alarm indication (excpect for over-temperature trip)	Red LED	

Input Specifications

Control voltage range	4 - 32 VDC
Pick-up voltage	3.8 VDC
Reverse voltage A1-A4, A2-A4	32 VDC
Drop-out voltage	1.2 VDC
Maximum control input current	1.5 mA
Response time pick-up	≤ 1/2 cycle
Response time drop-out	≤ 1/2 cycle

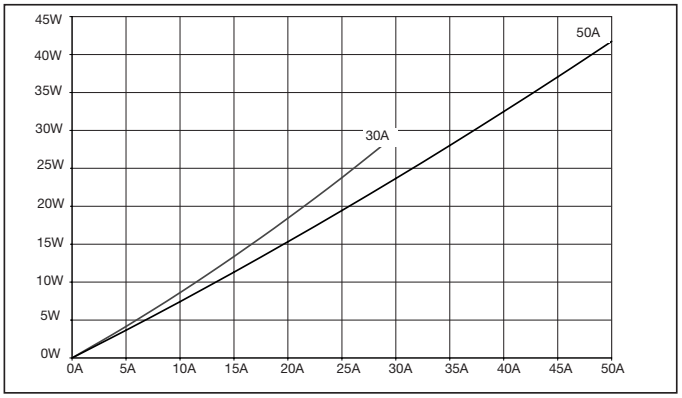
Supply Specifications

Power supply voltage, Vcc	24 VDC ± 15%
Max. supply current	22 mA (per device)
Max. PLC current @ 24VDC during normal conditions	275 µA (per device)

Alarm Specifications

Output current, i_o	≤50 mADC
Output voltage	
NPN	1 + 0.15i_o
PNP	Vcc - 1 - 0.15i_o
No. of outputs in parallel	≤50

Dissipation Curve



Housing Specifications

Weight	Approx. 450 g
Housing material	PBT Flame retardant
Control terminal cable size	
Min	1 x 0.5 mm² (1 x AWG20)
Max	1 x 4.0 mm² (1 x AWG12) or 2 x 2.5 mm² (2 x AWG14)
Mounting torque max.	0.6 Nm Posidriv 0 bit
Control terminal screws	M3
Power terminal cable size	
Min	1 x 4 mm² (1 x AWG12)
Max	1 x 25 mm² (1 x AWG3) or 2 x 10 mm² (2 x AWG6)
Mounting torque max.	2.5 Nm Posidriv 2 bit
Power terminal screws	M5

Thermal Specifications

Operating temperature	-20 to +70°C (-4 to +158 °F)
Storage temperature	-40 to +80°C (-40 to +176 °F)

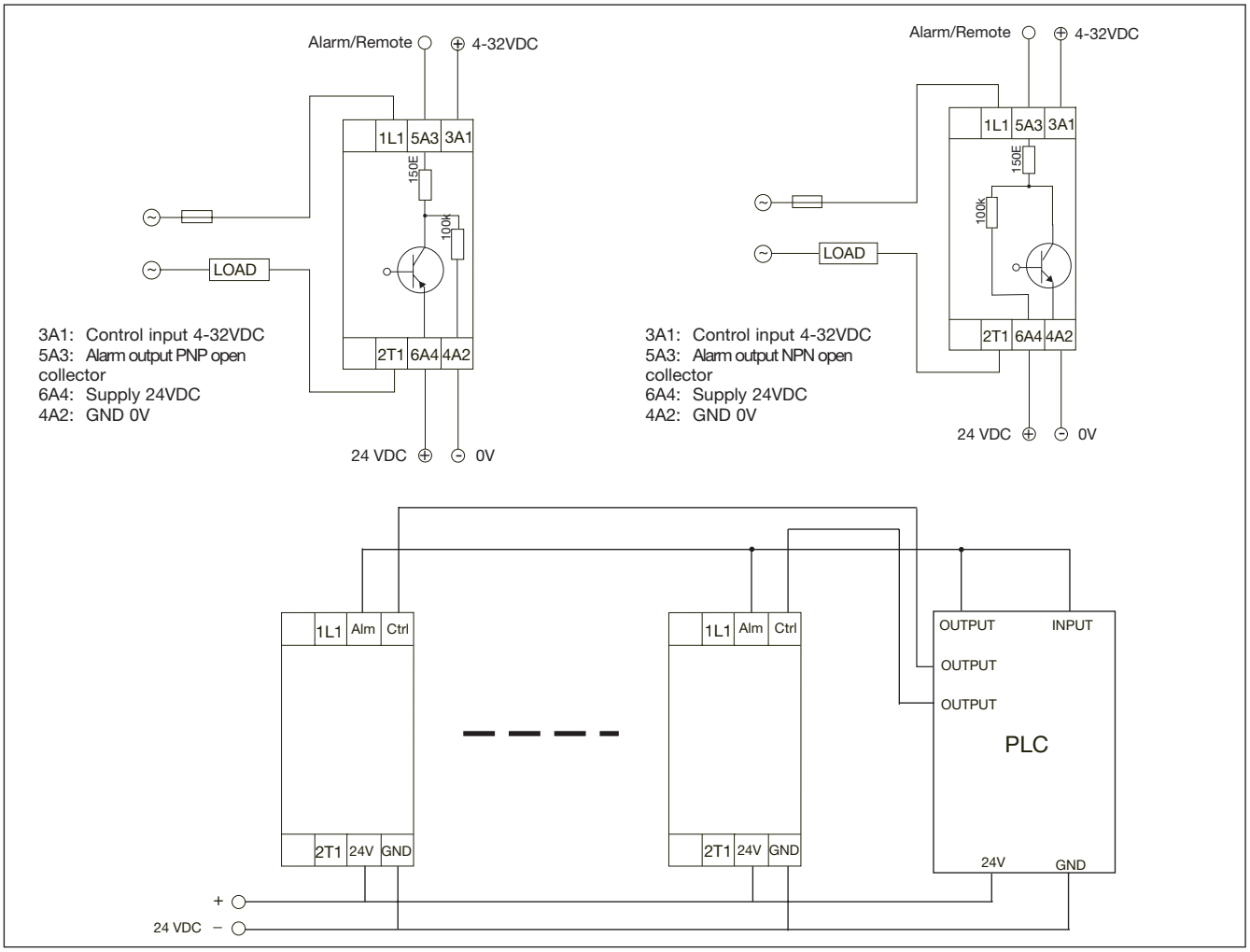
Isolation

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

Output Specifications

		RJCS.1...30	RJCS.1...50
Rated operational current AC51 @Ta=25ºC		30 AACrms	50 AACrms
Measuring range	RJCS1A... RJCSR1A...	- 0.3 - 30 AACrms	8 - 50 ACrms 0.5 - 50 AACrms
Min. TEACH current	RJCS1A... RJCSR1A...	- 0.3 AACrms	8 AACrms 0.5 AACrms
Min. partial load current	RJCS1A... RJCSR1A...	- 0.05 AACrms	1.3 AACrms 0.083 AACrms
Non rep. surge current (t=10ms)		600 Ap	1900 Ap
Off-state leakage current @rated voltage and frequency		< 5 mArms	< 5 mArms
I^2t for fusing (t = 10 ms)		1800 A^2s	18000 A^2s
On-state voltage drop @ rated current		1.6 Vrms	1.6 Vrms
Critical dV/dt off-state		1000 V/µs	1000 V/µs

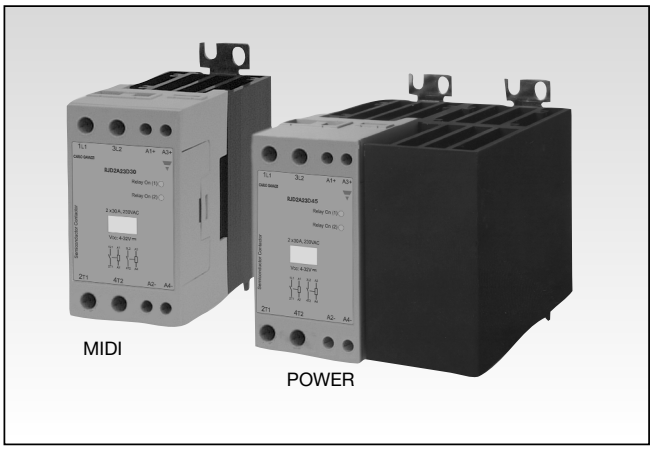
Connection Examples



Notes:

1. Control input (terminal A1) and 24VDC supply (terminal A3) must have common ground
2. RJCSc ... and PLC should be sourced from the same 24VDC supply
3. RJCSc ... PO and RJCSc ...NO should not be connected to the same alarm line
4. It is recommended that up to 6 identical loads are connected in parallel

Solid State Relays
2 Independently Switched Poles
Integrated Heatsink
Type RJD2A - Duo



- **2 in 1 semiconductor contactor**
- **Two control inputs - two independently switched poles**
- **Direct copper bonding (DCB) technology**
- **LED-indication for each pole**
- **Housing free of moulding mass**
- **Cage clamp output terminals**
- **Input range: 4-32 VDC**
- **Operational ratings: up to 2x45 AAC and 600 VAC**
- **Blocking voltage: up to 1200 Vp**
- **Opto-isolation > 4000 VACrms**

Product Description

This product is designed in such a way as to replace electro-mechanical contactors in industrial heating and motor applications, especially when switching is frequent. This product is ready to mount on DIN-rail or chassis and comes with integral heatsink. Cage clamp terminals are used to ensure secure load connection with cable up to 25mm^2.

The RJD2A series consists of two switching poles which are independently controlled. Green LEDs indicate the status of each control input. The relay will switch on when the sinosodial curve crosses zero and switches off when the current crosses zero.

Ordering Key

RJ D 2 A 60 D 30 E

- **Solid State Relay**
- **Two-in-one(Duo)**
- **Number of switching poles**
- **Switching mode**
- **Rated operational voltage**
- **Control voltage**
- **Rated operational current**
- **Terminal layout**

Type Selection

Switching mode	Rated operational voltage	Control voltage	Rated operational current
A: Zero switching	23: 230 VACrms 60: 600 VACrms	D: 4-32VDC	30: 2x30 AACrms (Midi) 45: 2x45 AACrms (Power)

Selection Guide

Rated operational voltage	Control voltage	Rated operational current 2x30A (Midi)	2x45A (Power)
230VACrms	4-32VDC	**RJD2A23D30E**	**RJD2A23D45E**
600VACrms	4-32VDC	**RJD2A60D30E**	**RJD2A60D45E**

General Specifications

	RJD2A23...	RJD2A60...
Operational voltage range	24 to 280 VAC	42 to 660 VAC
Blocking voltage	650 V_p	1200 V_p
Operational frequency range	45 to 65 Hz	45 to 65 Hz
Power factor	≥ 0.5 @ 230 VACrms	≥ 0.5 @ 600 VACrms
Approvals	UL, cUL	UL, cUL
CE-marking	Yes	Yes
Pollution degree	2	2

Output Specifications

	RJD2A...30 (Midi)	RJD2A...45 (Power)
Rated operational current AC51 @Ta=25°C AC53a @Ta=25°C	 2x30AACrms 2x30AACrms	 2x45AACrms 2x30AACrms
Min. operational current	500 mAACrms	500 mAACrms
Rep. overload current t = 1s	< 200 AACrms	< 200 AACrms
Non rep. surge current Tj(init.) = 25°C and t = 10 ms	1900 Ap	1900 Ap
Off-state leakage current @ rated voltage and frequency	< 3 mArms	< 3 mArms
I^2t for fusing t = 10 ms	18000 A^2s	18000 A^2s
On-state voltage drop @ rated current	1.6 Vrms	1.6 Vrms
Critical dv/dt commutating	500 V/µs	500 V/µs
Critical dV/dt off-state	500 V/µs	500 V/µs

Housing Specifications

Weight	Approx. 480g (MIDI) Approx. 800g (Power)
Housing material	PBT Flame Retardant
Control terminal cable size Min Max Tightening torque max.	 1 x 0.5 mm^2 (1 x AWG 20) 1 x 4.0 mm^2 (1 x AWG 12) or 2 x 2.5 mm^2 (2 x AWG 14) 0.6 Nm with Posidrive 0 bit
Control terminal screw	M3
Power terminal cable size Min Max Tightening torque max.	 1 x 4 mm^2 (1 x AWG 12) 1 x 25 mm^2 (1 x AWG 3) or 2 x 10 mm^2 (2 x AWG 6) 2.5 Nm with Posidrive 2 bit
Power terminal screw	M5

Input Specifications

Control voltage range	4 - 32 VDC
Pick-up voltage	3.8 VDC
Reverse voltage	32 VDC
Drop-out voltage	1 VDC
Maximum input current	15 mA
Response time pick-up	1 cycle
Response time drop-out	1 cycle

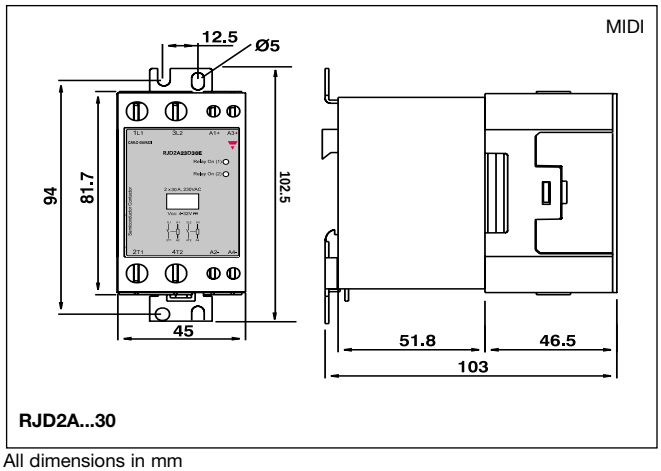
Thermal Specifications

Operating temperature	-30 to +70°C
Storage temperature	-40 to +100°C

Isolation

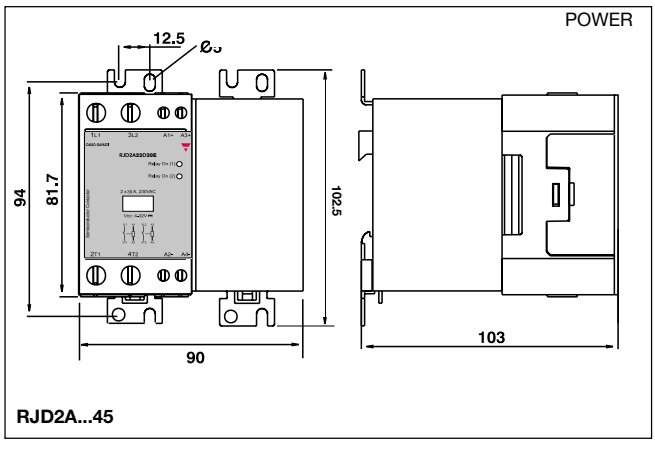
Rated isolation voltage Input to output Output to case	 ≥ 4000 VACrms ≥ 4000 VACrms

Dimensions



RJD2A...30

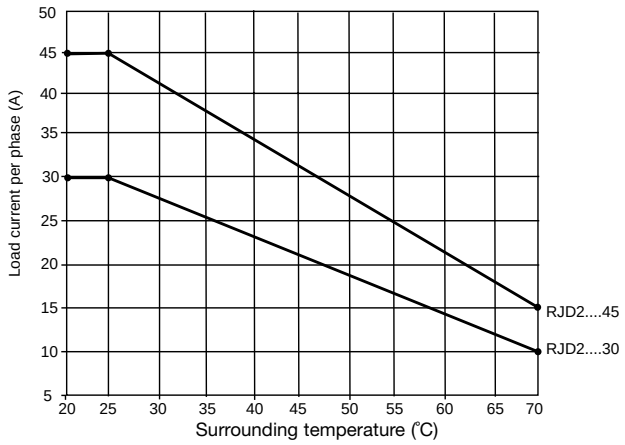
All dimensions in mm



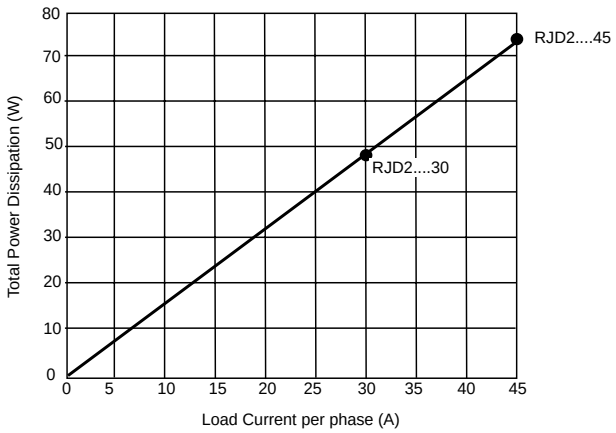
RJD2A...45

All dimensions in mm

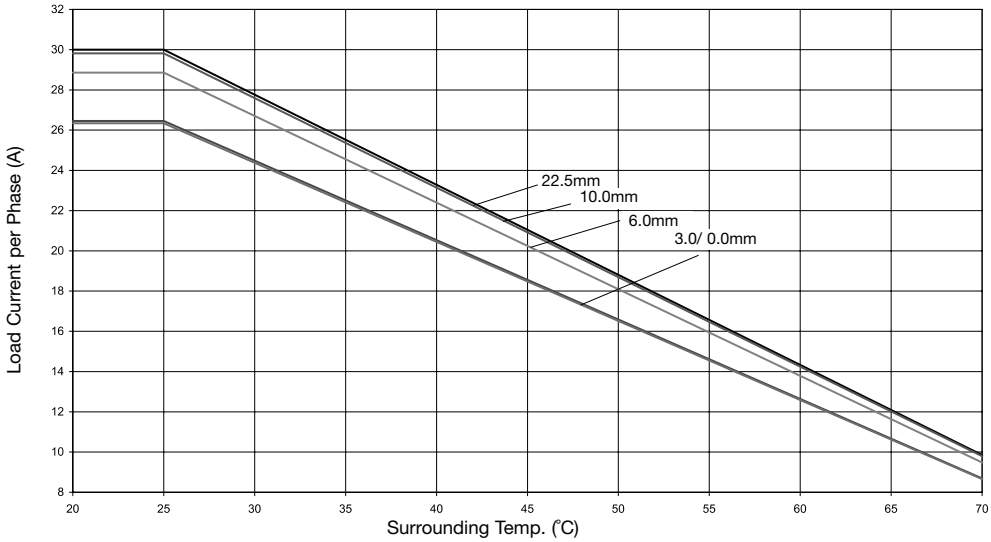
Derating Curve



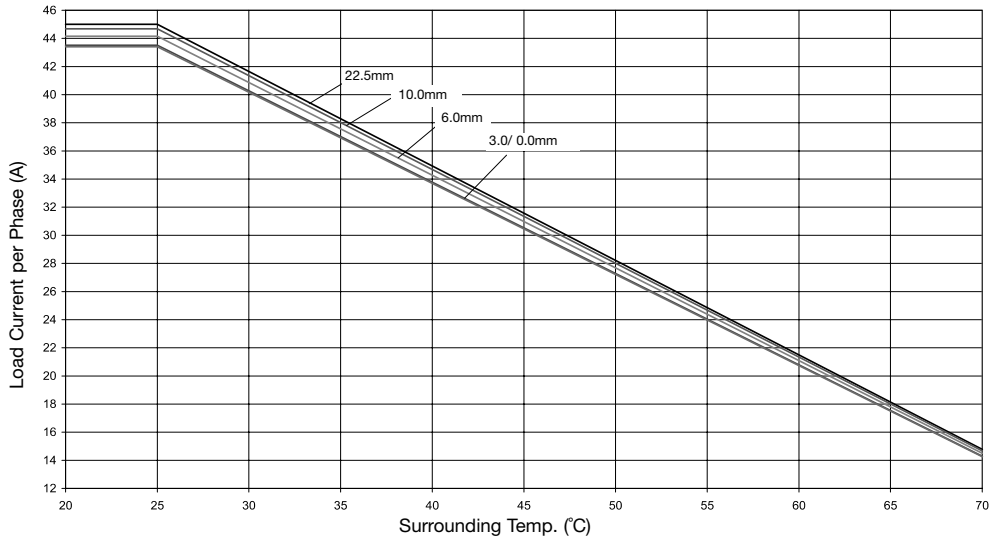
Dissipation Curve



Derating vs. Spacing Curves

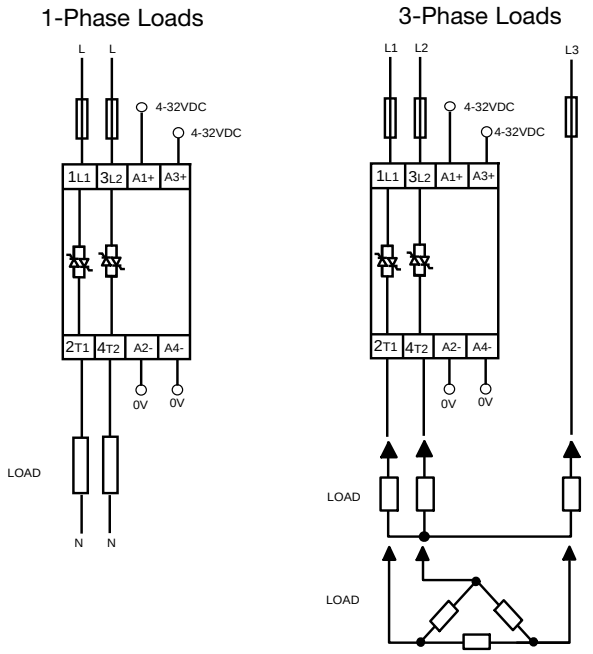


RJD2...30



RJD2...45

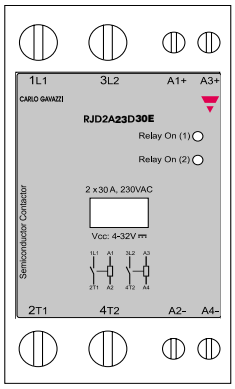
Connection example



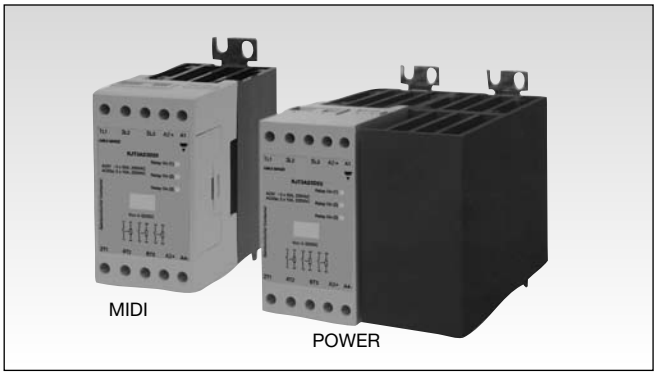
• Application of DC voltage across terminals A1-A2 will activate pole L1-T1. The top green LED indicates the status of the control input across terminals A1-A2.

• Application of DC voltage across terminals A3-A4 will activate pole L2-T2. The bottom green LED indicates the status of the input voltage across terminals A3-A4.

Terminal Layout



Solid State Relays
3 Independently Switched Poles
Integrated heatsink
Type RJT3A - Trio



- **3 in 1 semiconductor contactor**
- **Three control inputs - three independently switched poles**
- **Direct copper bonding (DCB) technology**
- **LED indication for each pole**
- **Housing free of moulding mass**
- **Input range: 4 – 32 VDC**
- **Operational ratings: up to 3x25AAC, 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 can be used for resistive and inductive loads.
RJT3A comes with 3 independently controlled poles, with three LEDs to indicate status of each control input.
Each zero switching relay switches ON when the sinusoidal curve crosses zero and switches OFF when the current crosses zero.

Ordering Key

RJ T 3 A 60 D 25

- **Solid state relay**
- **Three-in-one (Trio)**
- **Number of switching 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	23: 230 VACrms 60: 600 VACrms	D: 4 - 32 VDC	20: 3 x 20 AAC_{rms} (MIDI) 25: 3 x 25 AAC_{rms} (POWER)

Selection Guide

Rated operational voltage	Control voltage	Rated operational current 3 x 20 (MIDI)	3 x 25 (POWER)
230 VACrms	4-32VDC	**RJT3A23D20**	**RJT3A23D25**
600 VACrms	4-32VDC	**RJT3A60D20**	**RJT3A60D25**

General Specifications

	RJT3A23...	RJT3A60...
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
Approvals	UL, cUL	UL, cUL
CE-marking	Yes	Yes
Pollution degree	2	2

Output Specifications

	RJT3A...20 (MIDI)	RJT3A...25 (POWER)
Rated operational current AC51 @Ta=25°C AC53a @Ta=25°C	 3 x 20 A 3 x 15 A	 3 x 25 A 3 x 15 A
Min. opertional current	250 mA	250 mA
Rep. overload current t=1s	<125 A	<125 A
Non rep. surge current Tj(init.)= 25°C and t=10ms	 600 Apk	 600 Apk
Off-state leakage current @ rated voltage & frequency	< 3 mA	< 3 mA
I^2t for fusing (t = 10 ms)	1800 A^2s	1800 A^2s
On-state voltage drop @ rated current	1.6 Vrms	1.6 Vrms
Critical dV/dt off-state	500 V/µs	500 V/µs

Input Specifications

Control voltage range	4 - 32 VDC
Pick-up voltage	3.8 VDC
Reverse voltage	32 VDC
Drop-out voltage	1 VDC
Maximum input current	12 mA
Response time pick-up	<1 cycle
Response time drop-out	<1 cycle

Housing Specifications

Weight	
MIDI	Approx. 380 g
POWER	Approx. 680 g
Housing material	PBT, Flame retardant
Conductors	
Size	0.5...4.0 mm^2 (AWG 20...12) 2 x 0.5...2.5 mm^2 (2 x AWG 20...14)
Tightening torque max.	0.6 Nm with Posidrive 0 bit
Terminal screws	M3

Thermal Specifications

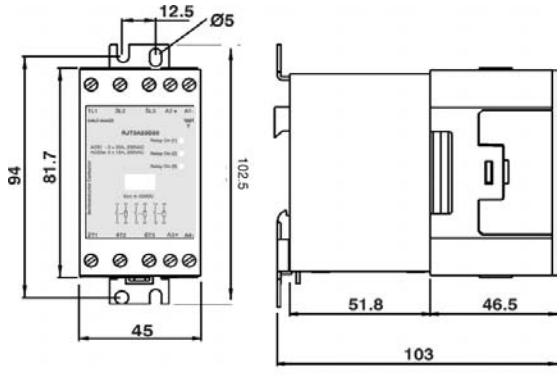
Operating Temperature	-30 to +70°C (-22 to + 158°F)
Storage temperature	-40 to +80°C (-40 to +170°F)

Isolation

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

Dimensions

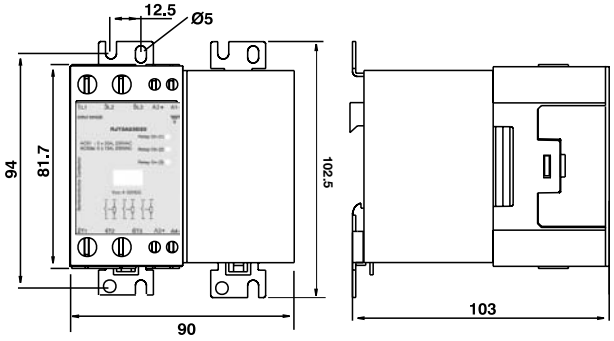
MIDI



RJT3A..20

All dimensions in mm

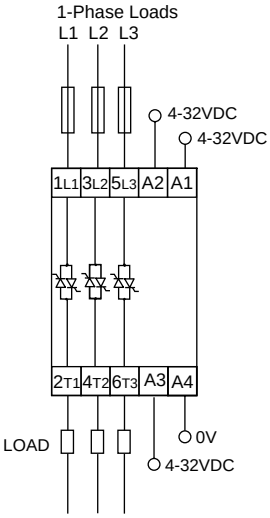
POWER

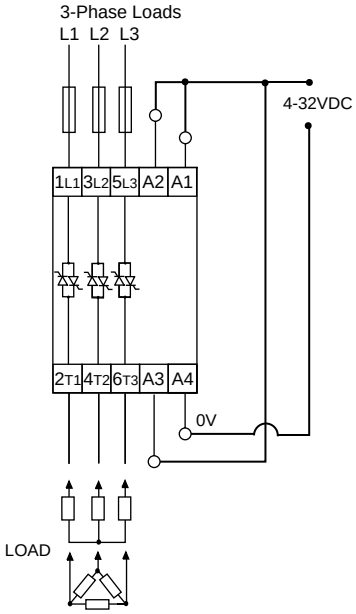


RJT3A..25

All dimensions in mm

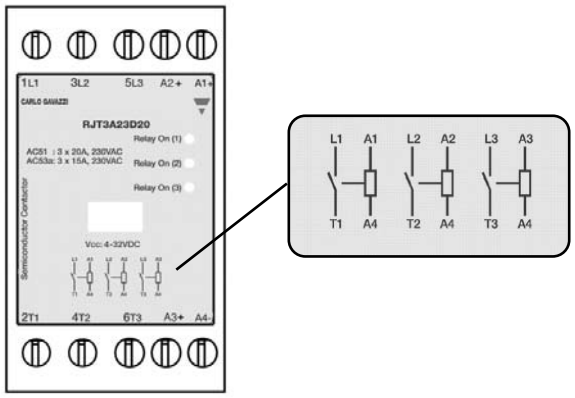
Connection Examples



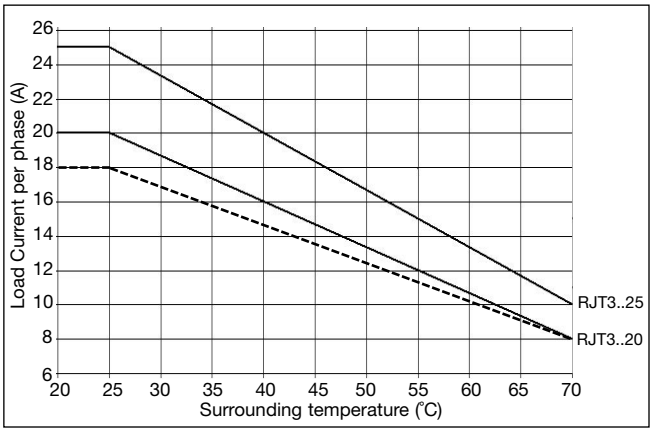


- Application of DC voltage across terminals A1-A4 will activate pole L1-T1. The top green LED indicates the status of the control input across terminals A1-A4.
- Application of DC voltage across terminals A2-A4 will activate pole L2-T2. The middle green LED indicates the status of the input voltage across terminals A2-A4.
- Application of DC voltage across A3-A4 will activate pole L3-T3. The bottom green LED indicates the status of the input voltage across terminals A3-A4.
- For 3-Phase control, A1, A2 and A3 can be connected together to switch all three poles simultaneously.

Terminal Layout

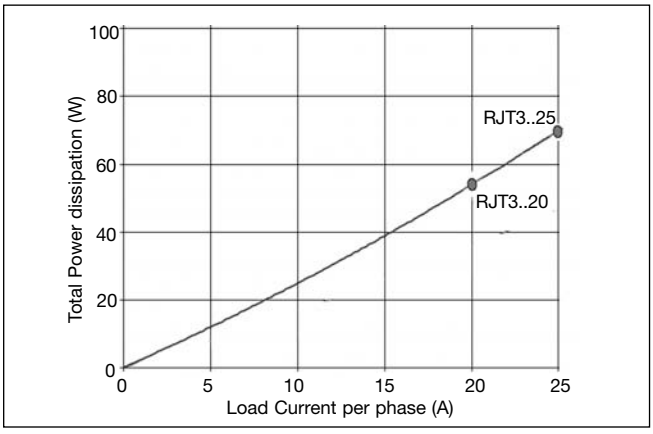


Derating Curve (100% duty on 3 Poles)

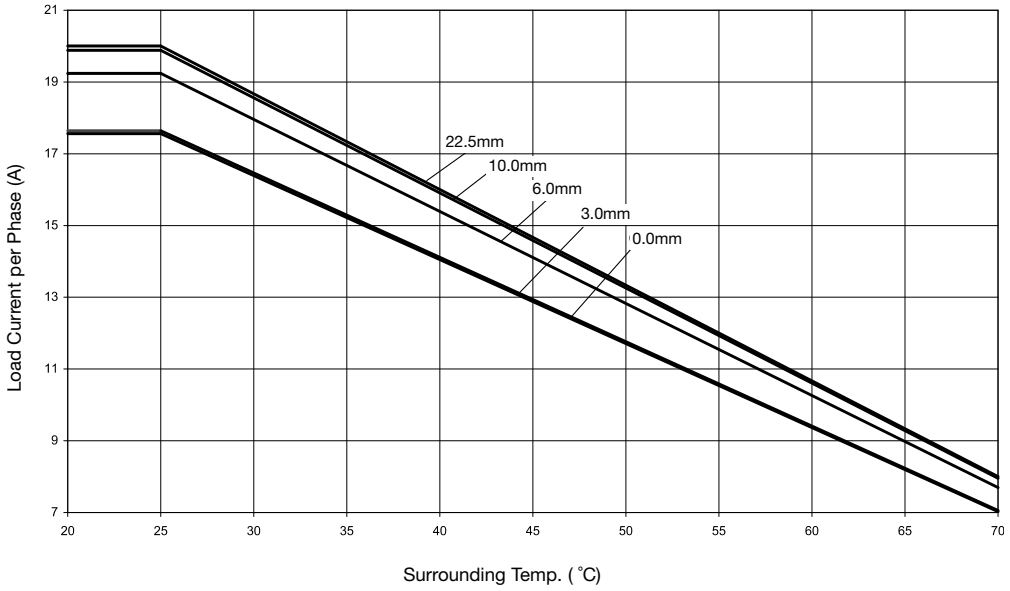


* Note: dotted line indicates UL rating for RJT3..20

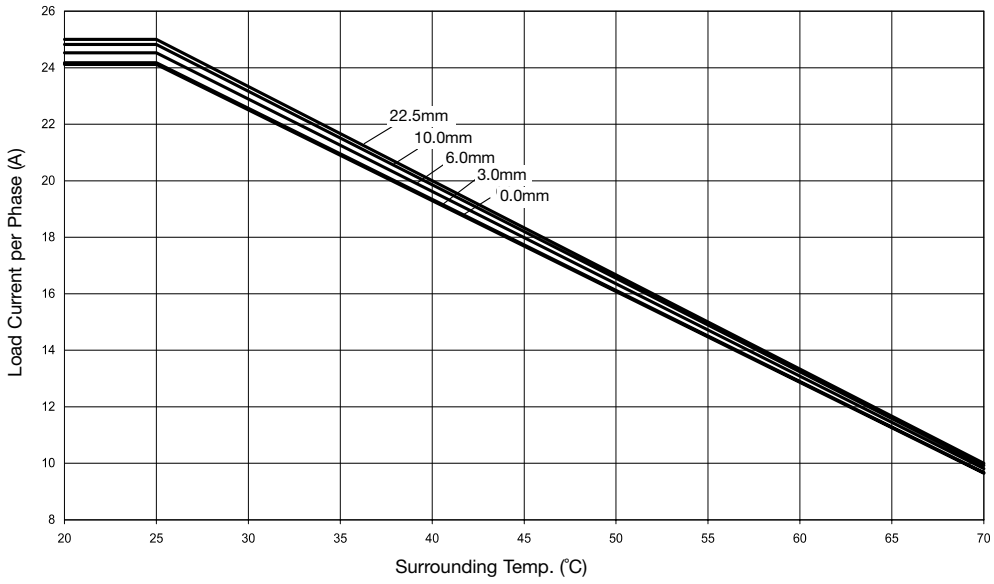
Dissipation Curve (100% duty on 3 Poles)



Derating vs. Spacing Curves



RJT3...20



RJT3...25

Note: Assuming 100% duty on 3 poles

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