

Solid State Relays

System Monitoring Relays (Sense Relay)

Type RA.... ..S



- System (line and load) monitoring relay
- Zero switching
- Rated operational current: 25, 50 and 110 AACrms
- Rated operational voltage: 120, 230, 400 and 480 VACrms
- High surge current capability
- Alarm output signal
- LED indication for alarm and supply



Product Description

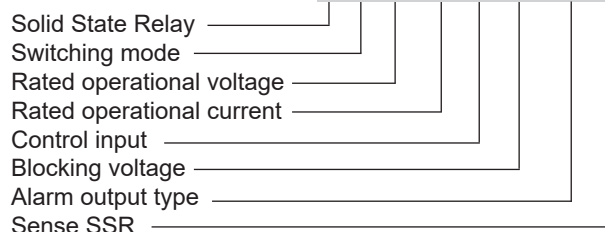
The system monitoring solid state relay (sense relay) provides an alarm output in the event of a circuit failure. Internal circuits monitor:

- line voltage/line current
- correct functioning of the SSR
- SSR input status

The relay is designed for applications where immediate fault detection is required. A red LED indicates an alarm, a green LED indicates DC control supply OK (half LED light intensity) resp. relay switched ON (full LED light intensity).

Ordering Key

RA 23 25 H 06 NO S



Type Selection

| Switching mode | Rated operational voltage | Rated operational current input | Control voltage | Blocking voltage | Alarm output |
|-------------------|--|---|-----------------|--|--|
| A: Zero switching | 12: 120 VACrms 23: 230 VACrms 40: 400 VACrms 48: 480 VACrms | 25: 25 AACrms 50: 50 AACrms 110: 110 AACrms | H: Active high | 06: 650 Vp 10: 1000 Vp 12: 1200 Vp | NO: NPN, NO NC: NPN, NC PO: PNP, NO PC: PNP, NC |

Selection Guide

| Rated op. voltage | Control input type | Alarm output | Rated operational current | | |
|-------------------|--------------------|--|---------------------------|----------------|-----------------|
| | | | 25 AACrms | 50 AACrms | 110 AACrms |
| 120 VACrms | Active high | NPN, NO NPN, NC PNP, NO PNP, NC | RA 1225 H06NOS | RA 1250 H06NOS | RA 12110 H06NOS |
| | | | RA 1225 H06NCS | RA 1250 H06NCS | RA 12110 H06NCS |
| | | | RA 1225 H06POS | RA 1250 H06POS | RA 12110 H06POS |
| | | | RA 1225 H06PCS | RA 1250 H06PCS | RA 12110 H06PCS |
| 230 VACrms | Active high | NPN, NO NPN, NC PNP, NO PNP, NC | RA 2325 H06NOS | RA 2350 H06NOS | RA 23110 H06NOS |
| | | | RA 2325 H06NCS | RA 2350 H06NCS | RA 23110 H06NCS |
| | | | RA 2325 H06POS | RA 2350 H06POS | RA 23110 H06POS |
| | | | RA 2325 H06PCS | RA 2350 H06PCS | RA 23110 H06PCS |
| 400 VACrms | Active high | NPN, NO NPN, NC PNP, NO PNP, NC | RA 4025 H10NOS | RA 4050 H10NOS | RA 40110 H10NOS |
| | | | RA 4025 H10NCS | RA 4050 H10NCS | RA 40110 H10NCS |
| | | | RA 4025 H10POS | RA 4050 H10POS | RA 40110 H10POS |
| | | | RA 4025 H10PCS | RA 4050 H10PCS | RA 40110 H10PCS |
| 480 VACrms | Active high | NPN, NO NPN, NC PNP, NO PNP, NC | RA 4825 H12NOS | RA 4850 H12NOS | RA 48110 H12NOS |
| | | | RA 4825 H12NCS | RA 4850 H12NCS | RA 48110 H12NCS |
| | | | RA 4825 H12POS | RA 4850 H12POS | RA 48110 H12POS |
| | | | RA 4825 H12PCS | RA 4850 H12PCS | RA 48110 H12PCS |

General Specifications

| | RA12...06..S | RA23...06..S | RA40...10..S | RA48...12..S |
|-----------------------------|--------------------|--------------------|--------------------|--------------------|
| Operational voltage range | 60 to 140 VACrms | 170 to 250 VACrms | 150 to 440 VACrms | 180 to 530 VAC |
| Blocking voltage | 650 Vp | 650 Vp | 1000 Vp | 1200 Vp |
| Zero voltage turn-on | ≤ 15 V | ≤ 15 V | ≤ 15 V | ≤ 15 V |
| Operational frequency range | 45 to 65 Hz | 45 to 65 Hz | 45 to 65 Hz | 45 to 65 Hz |
| Power factor cos φ | ≥ 0.5 @ 120 VACrms | ≥ 0.5 @ 230 VACrms | ≥ 0.5 @ 400 VACrms | ≥ 0.5 @ 480 VACrms |
| CE marking | Yes | Yes | Yes | Yes |
| Compliance | UR, CSA, EAC | UR, CSA, EAC | UR, CSA, EAC | UR, CSA, EAC |

Control Specifications

| | |
|--------------------------------|--------------|
| Supply voltage range | 20 to 32 VDC |
| Supply current @ 24 VDC | ≤ 40 mADC |
| Response time pick-up @ 50 Hz | ≤ 10 ms |
| Response time drop-out @ 50 Hz | ≤ 10 ms |
| Active high control input | |
| Pick-up voltage | Typ. 7 VDC |
| Drop-out voltage | Typ. 6.8 VDC |
| Input current (Vc = 32 V) | ≤ 4 mA |

Alarm Specifications

| | |
|---------------------------|-------------|
| PNP Alarm output NO | |
| No alarm condition | 0 VDC |
| Alarm voltage @ 100 mA | Vcc - 2 VDC |
| Max. alarm output current | ≤ 100 mA |
| PNP Alarm output NC | |
| No alarm condition | Vcc - 2 VDC |
| Alarm voltage @ 100 mA | 0 VDC |
| Max. alarm output current | ≤ 100 mA |
| NPN Alarm output NO | |
| No alarm condition | ≤ 32 VDC |
| Alarm voltage @ 100 mA | 2 VDC |
| Max. alarm output current | ≤ 100 mA |
| NPN Alarm output NC | |
| No alarm condition | 2 VDC |
| Alarm voltage @ 100 mA | ≤ 32 VDC |
| Max. alarm output current | ≤ 100 mA |

Output Specifications

| | RA..25.06..S | RA..50.06..S | RA..110.12..S |
|---|------------------------|-------------------------|--------------------------|
| Rated operational current AC 51 | ≤ 25 Arms | ≤ 50 Arms | ≤ 110 Arms |
| AC 53a | 5 Arms | 15 Arms | 30 Arms |
| Min. operational load current | ≤ 200 mA | ≤ 250 mA | ≤ 500 mA |
| Non-rep. surge current t=10 ms | ≤ 325 Ap | ≤ 600 Ap | ≤ 1900 Ap |
| Off-state leakage current @ rated voltage and frequency | ≤ 6 mA | ≤ 6 mA | ≤ 6 mA |
| I ² t for fusing t=10 ms | ≤ 525 A ² s | ≤ 1800 A ² s | ≤ 18000 A ² s |
| Critical dv/dt | ≥ 500 V/μs | ≥ 500 V/μs | ≥ 500 V/μs |

Sense Specifications

| | RA12...06..S | RA23...06..S | RA40...10..S | RA48...12..S |
|--|----------------|----------------|----------------|----------------|
| Current | | | | |
| Sensed load current | ≥ 50 mA | ≥ 50 mA | ≥ 50 mA | ≥ 50 mA |
| Non-sensed leakage current | ≤ 20 mA | ≤ 20 mA | ≤ 20 mA | ≤ 20 mA |
| Voltage | | | | |
| Sensed line voltage | ≥ 60 Vrms | ≥ 120 Vrms | ≥ 150 Vrms | ≥ 180 Vrms |
| Non-sensed line voltage | ≤ 30 Vrms | ≤ 50 Vrms | ≤ 80 Vrms | ≤ 100 Vrms |
| Timing | | | | |
| Response time from fault to alarm output | ≤ 100 ms | ≤ 100 ms | ≤ 100 ms | ≤ 100 ms |
| Short-circuit of semiconductor | Will be sensed | Will be sensed | Will be sensed | Will be sensed |

Thermal Specifications

| | RA..25.06..S | RA..50.06..S | RA..110.12..S |
|-------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| Operating temperature | -20°C to +70°C (-4°F to +158°F) | -20°C to +70°C (-4°F to +158°F) | -20°C to +70°C (-4°F to +158°F) |
| Storage temperature | -40°C to +100°C (-40°F to +212°C) | -40°C to +100°C (-40°F to +212°C) | -40°C to +100°C (-40°F to +212°C) |
| Junction temperature | ≤ 125°C (257°F) | ≤ 125°C (257°F) | ≤ 125°C (257°F) |
| R _{th} junction to case | ≤ 1.25 °C/W | ≤ 0.65 °C/W | ≤ 0.30 °C/W |
| R _{th} junction to ambient | ≤ 12 °C/W | ≤ 12 °C/W | ≤ 12 °C/W |

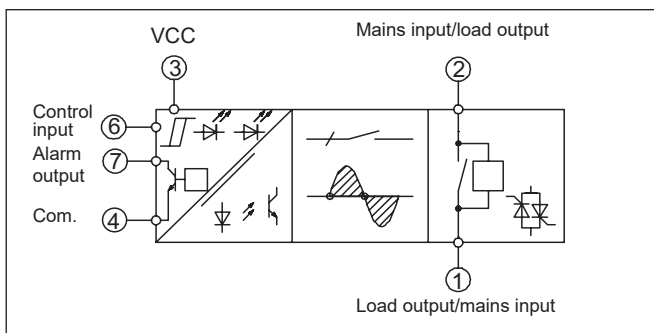
Environmental Specifications

| | |
|----------------------|---|
| Pollution degree | 2 (non-conductive pollution with possibilities of condensation) |
| EU RoHS compliant | Yes |
| China RoHS compliant | Refer to Environmental Information (Page 6) |

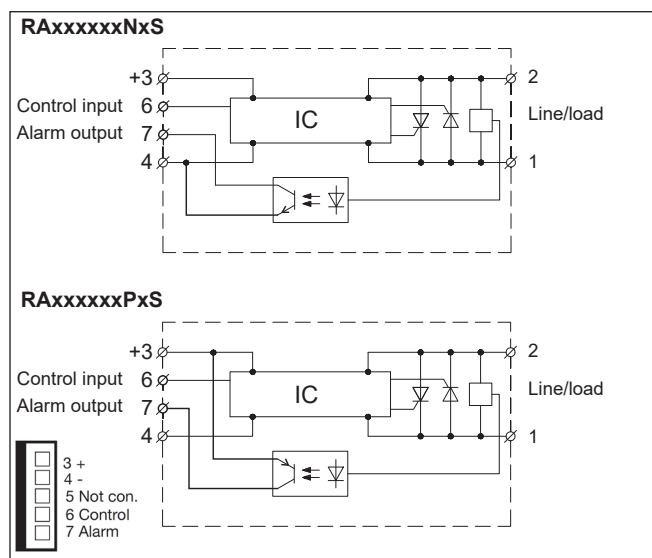
Isolation

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

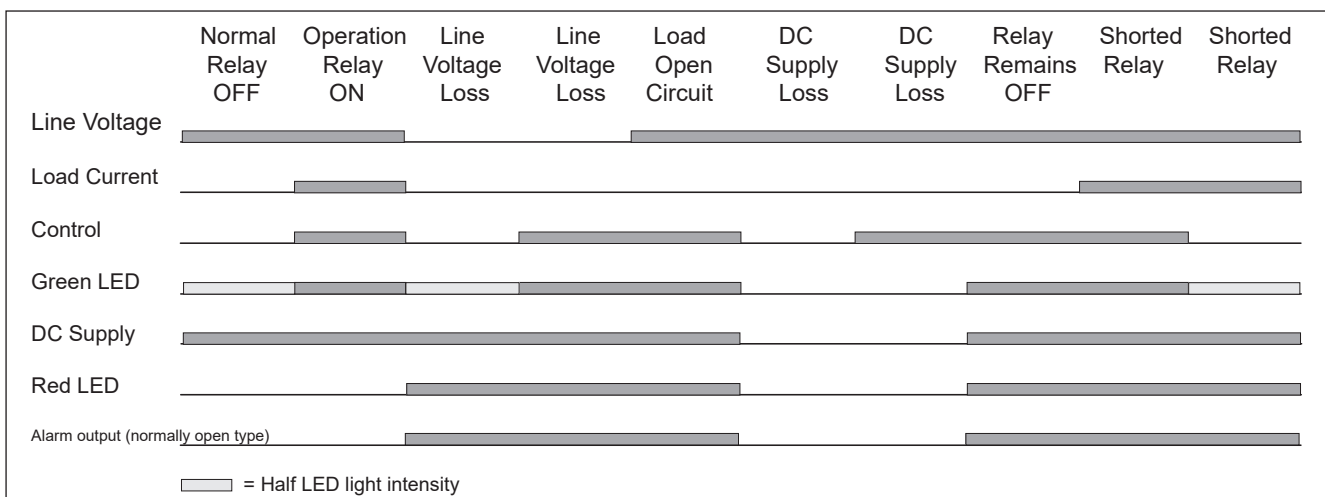
Functional Diagram



Wiring Diagrams



Operation Diagram



Heatsink Dimensions (load current versus ambient temperature)

RA ..25S

| Load current [A] | Thermal resistance [°C/W] | | | | | | Power dissipation [W] |
|------------------|---------------------------|------|------|------|------|------|-----------------------|
| | 20 | 30 | 40 | 50 | 60 | 70 | |
| 25.0 | 2.00 | 1.70 | 1.4 | 1.00 | 0.71 | 0.40 | 31 |
| 22.5 | 2.50 | 2.10 | 1.80 | 1.40 | 1.00 | 0.66 | 27.9 |
| 20.0 | 3.10 | 2.70 | 2.30 | 1.90 | 1.4 | 1.00 | 24.8 |
| 17.5 | 4.00 | 3.50 | 3.00 | 2.50 | 2.00 | 1.40 | 21.7 |
| 15.0 | 4.90 | 4.30 | 3.70 | 3.10 | 2.50 | 1.90 | 18.6 |
| 12.5 | 6.2 | 5.40 | 4.60 | 3.90 | 3.10 | 2.30 | 15.5 |
| 10.0 | 8.10 | 7.10 | 6.10 | 5.10 | 4.00 | 3.00 | 12.4 |
| 7.5 | 11.30 | 9.90 | 8.50 | 7.10 | 5.60 | 4.20 | 9.3 |
| 5.0 | - | 15.6 | 13.3 | 11.1 | 8.9 | 6.7 | 6.2 |
| 2.5 | - | - | - | - | 18.7 | 14 | 3.1 |

Ambient temp. [°C] T_A

RA ..50S

| Load current [A] | Thermal resistance [°C/W] | | | | | | Power dissipation [W] |
|------------------|---------------------------|------|------|------|------|------|-----------------------|
| | 20 | 30 | 40 | 50 | 60 | 70 | |
| 50.0 | 0.92 | 0.76 | 0.60 | 0.45 | 0.29 | - | 63 |
| 45.0 | 1.2 | 0.99 | 0.80 | 0.62 | 0.44 | 0.26 | 55 |
| 40.0 | 1.5 | 1.3 | 1.1 | 0.85 | 0.63 | 0.42 | 47 |
| 35.0 | 1.9 | 1.6 | 1.4 | 1.1 | 0.89 | 0.63 | 40 |
| 30.0 | 2.4 | 2.1 | 1.8 | 1.5 | 1.2 | 0.91 | 33 |
| 25.0 | 3.0 | 2.7 | 2.3 | 1.9 | 1.5 | 1.10 | 26 |
| 20.0 | 3.9 | 3.5 | 3.0 | 2.5 | 2.0 | 1.5 | 20 |
| 15.0 | 5.5 | 4.8 | 4.1 | 3.4 | 2.7 | 2.1 | 15 |
| 10.0 | 8.6 | 7.5 | 6.4 | 5.4 | 4.3 | 3.2 | 9 |
| 5.0 | 17.9 | 15.6 | 13.4 | 11.2 | 8.9 | 6.7 | 5 |

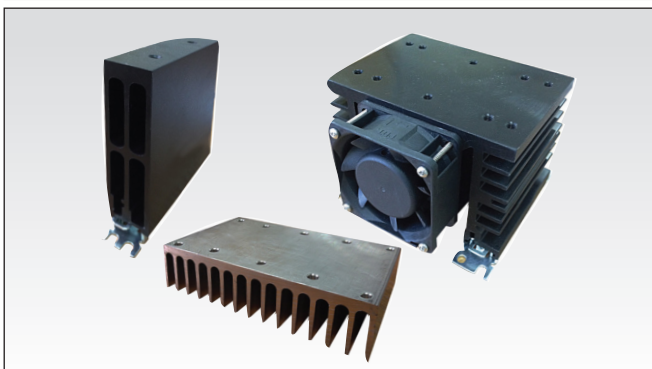
Ambient temp. [°C] T_A

RA ..110S

| Load current [A] | Thermal resistance [°C/W] | | | | | | Power dissipation [W] |
|------------------|---------------------------|------|------|------|------|------|-----------------------|
| | 20 | 30 | 40 | 50 | 60 | 70 | |
| 110 | 0.43 | 0.35 | 0.27 | - | - | - | 126 |
| 90 | 0.63 | 0.53 | 0.42 | 0.32 | - | - | 97 |
| 80 | 0.81 | 0.69 | 0.57 | 0.45 | 0.33 | - | 84 |
| 70 | 1.00 | 0.89 | 0.75 | 0.61 | 0.47 | 0.33 | 71 |
| 60 | 1.30 | 1.20 | 1.00 | 0.83 | 0.66 | 0.49 | 59 |
| 50 | 1.70 | 1.50 | 1.30 | 1.10 | 0.85 | 0.64 | 47 |
| 40 | 2.20 | 1.90 | 1.70 | 1.40 | 1.10 | 0.83 | 36 |
| 30 | 3.10 | 2.70 | 2.30 | 1.90 | 1.50 | 1.20 | 26 |
| 20 | 4.80 | 4.20 | 3.60 | 3.00 | 2.40 | 1.80 | 17 |
| 10 | 10.0 | 8.80 | 7.50 | 6.30 | 5.00 | 3.80 | 8 |

Ambient temp. [°C] T_A

Heatsink Selection



Heatsink Range Overview :

https://gavazziautomation.com/images/PIM/DATASHEET/ENG/SSR_Accessories.pdf

Heatsink Selector Tool :

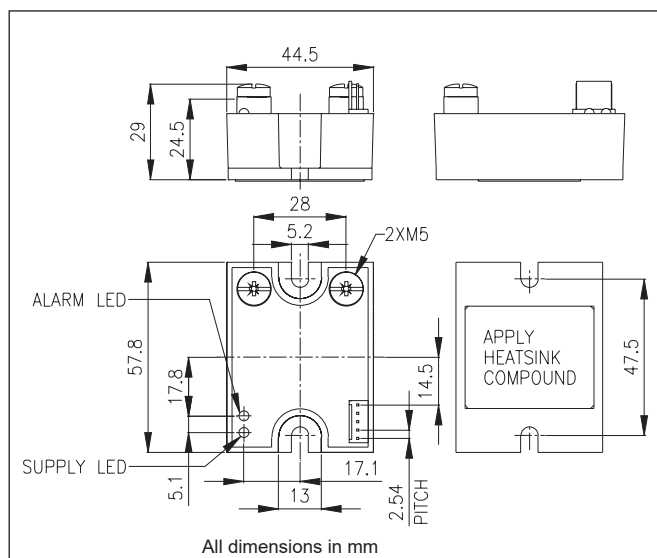
https://gavazziautomation.com/nsc/HQ/EN/solid_state_relays

Ordering Key

RHS..

- Heatsinks and fans
- 5.40°C/W to 0.12°C/W thermal resistance
- DIN, panel or thru wall mounting
- Single or multiple SSR mounting

Dimensions



Housing Specifications

| | |
|------------------------------|---|
| Weight | Approx. 100 g |
| Housing material | Noryl GFN 1, black |
| Base plate 25, 50 A 110 A | Aluminium, nickel-plated Copper, nickel-plated |
| Potting compound | Polyurethane |
| Relay | |
| Mounting screws | M5 |
| Mounting torque | ≤ 1.5 Nm |
| Power terminal | |
| Mounting screws | M3 x 6 |
| Mounting torque | ≤ 2.4 Nm |
| Control connector | 5 pole, centre distance 2.54 mm |

Accessories

Accessories can be ordered pre-assembled with Solid State Relays. These include Heatsinks, DIN rail adaptors, fuses, varistors and spacers.

For further information refer to Accessories datasheets at:
https://gavazziautomation.com/images/PIM/DATASHEET/ENG/SSR_Accessories.pdf

Ribbon Cable Selection



Environmental Information

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 | ○ | ○ | ○ | ○ | ○ |
| <p>O: Indicates that said hazardous substance contained in homogeneous materials for this part are below the limit requirement of GB/T 26572.</p> <p>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.</p> | | | | | | |

环境特性

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 | ○ | ○ | ○ | ○ | ○ |
| <p>O: 此零件所有材料中含有的该有害物低于GB/T 26572的限定。</p> <p>X: 此零件某种材料中含有的该有害物高于GB/T 26572的限定。</p> | | | | | | |



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[RA4025H10PCS](#) [RKD2A60D50P](#) [RK2A60D50P](#) [RK2A60D75P](#) [PVG612](#)