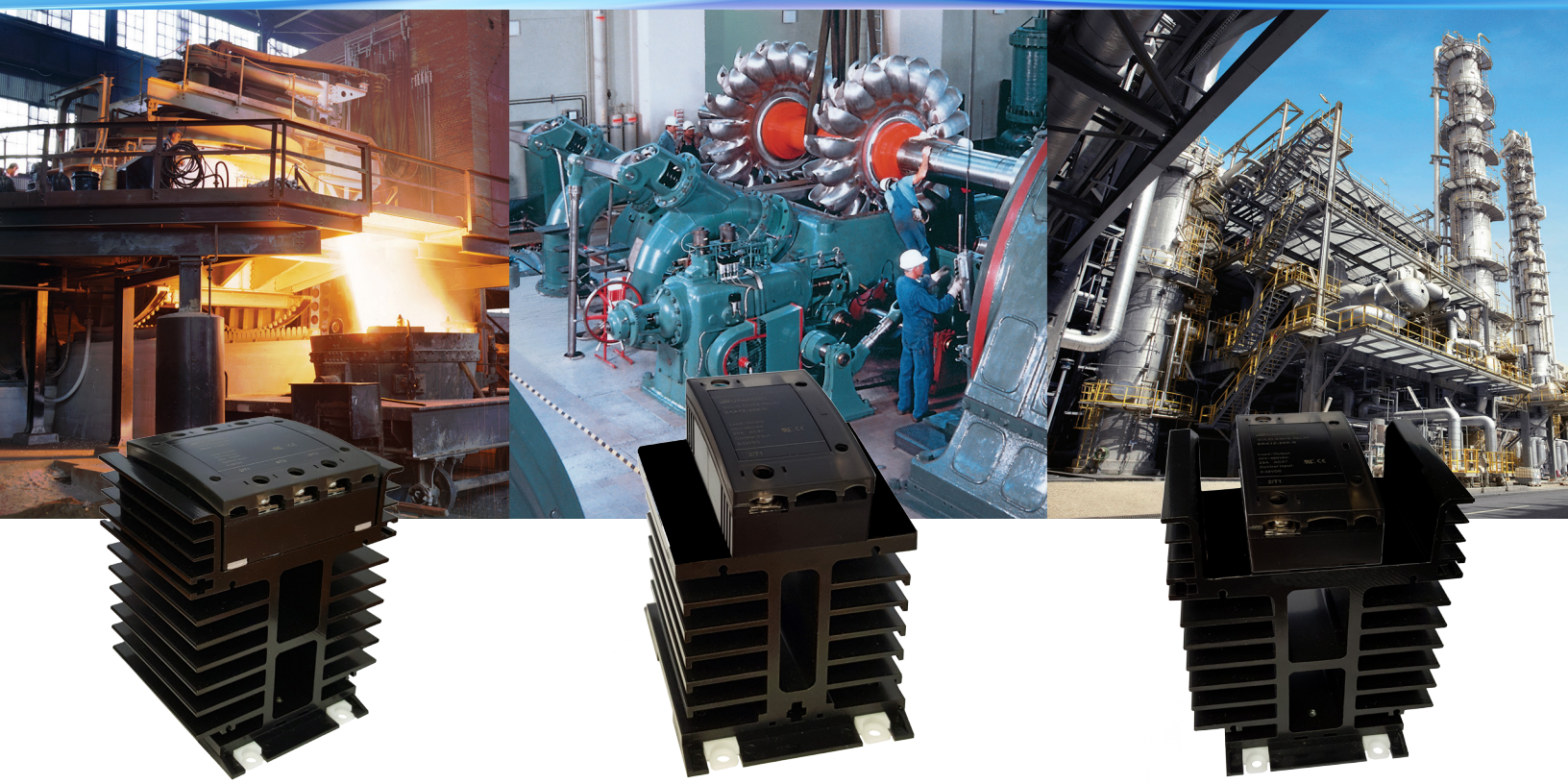
DURAKOOL

# Solid State Relays & Contactors

sales@aecsensors.com

DURAKOOL



## About American Electronics Components Incorporated

AEC founded as Durakool in 1935 is a leader in the design and manufacture of specialized highly engineered electrical and electronic components, primarily for automotive and industrial applications. Our product line includes position sensors, G-force sensors, acceleration switches, **Durakool** relays, push button switches, inclination sensors & switches and **HermaSeal** glass to metal seals. Our creative engineering team has extensive experience in harsh environmental packaging concepts. We use high-quality products and are positioned to support your most challenging applications.

The automotive, transportation, robot arm and industrial markets rely on AEC for sophisticated low-cost sensors and controls that enhance the safety and performance of their products. Through our disciplined approach, we have earned an excellent reputation for our technical innovation, agility, rapid response and high reliability. The AEC team has a "CAN DO" attitude and is ready to tackle your most challenging applications.

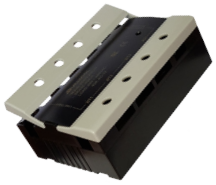
Please contact our Engineering Team at AEC, or your local Distributor, for further information and non standard items within our extensive product range.

To view Solid State Relay and Contactor information on-line please visit http://www.aecsensors.com/html/vmchk/Solid-State-Relays/View-all-products.html. For in depth information and datasheets on our full product range, please visit our website www.aecsensors.com.

## Controlling electricity for over 80 years!

American Electronic Components and Durakool

- Global production facilities
- Extensive product portfolio
- Reputation for high reliability
- ISO9001:2008 & ISO14001:2004 Registered



## Index of Contents

# SRA1 series
## single phase solid-state relays

- High load voltage - up to 480VAC.
- 4 - 32VDC or 90 - 250VAC control voltage.
- Zero cross-over or Random switching.
- LED control input indicator.
- Captive finger protection covers for terminals.
- Compatible heat sinks on Page 16

c UL us E325835 CE ROHS Compliant

| Output (load) | | |
|---|---|---|
| Load type | | SPST-NO (1 N/O) Resistive |
| Load current | | 10A, 20A, 25A, 30A, 40A, 60A or 80A |
| Load switching voltage | AC $V_{rms}$ | 24 ~ 240V, 40 ~ 480V |
| Maximum peak voltage | AC $V_{pk}$ | 900V |
| Minimum load current | | 0.1A |
| Inrush Current (max.) | 10ms | 20A: 240A / 25A: 300A / 30A: 380A |
| $I^2t$ | $A^2s$ | 20A: 288 / 25A: 450 / 30A: 660 / 40A: 880 / 60A: |
| | | 60A: 2100 / 80A: 4050 |
| Switch type | | Zero Cross (consult factory for Random) |
| **Input (control)** | | |
| Control voltage | V | DC: 4 ~ 32 or AC: 90 ~ 250 |
| Control current | mA | <20 |
| Turn-on voltage (min) | $V_{min}$ | DC: 3.5 / AC: 90V |
| Turn-on voltage (max) | $V_{max}$ | DC: 35 / AC: 250V |
| Turn-off voltage | V | DC: 1 / AC: 10 |
| | | |
| **General Data** | | |
| Dimensions | L x W x H | 60 x 45 x 27.5mm |
| Weight | | 98g |

### Ordering Code

| S | R | A | 1 | Z | - | 25 | L | - | A |
|---|---|---|---|---|---|---|---|---|---|

Switch Function

| | | |
|---|---|---|
| Z | - | Zero Crossover |
| R | - | Random |

Load Current Rating

| | | |
|---|---|---|
| 10 | - | 10A |
| 20 | - | 20A |
| 25 | - | 25A |
| 30 | - | 30A |
| 40 | - | 40A |
| 60 | - | 60A |
| 80 | - | 80A |

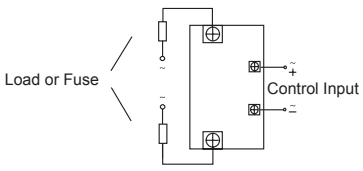
Load Voltage

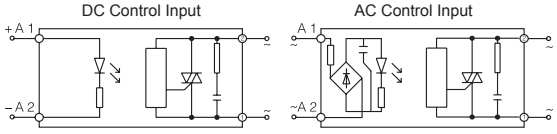
| | | |
|---|---|---|
| K | - | 40 to 480VAC |
| L | - | 24 to 240VAC |

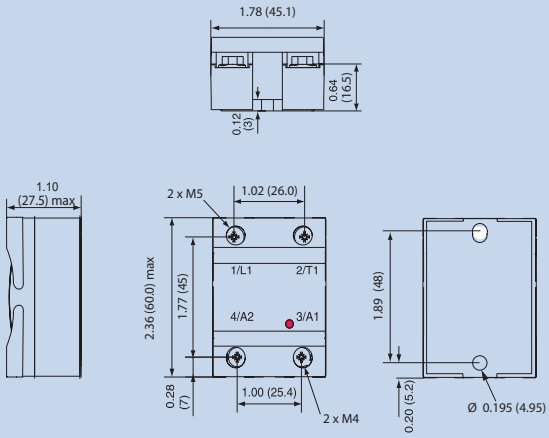
Control Voltage Input

| | | |
|---|---|---|
| A | - | 90 to 250VAC |
| D | - | 4 to 32VDC |

Schematics

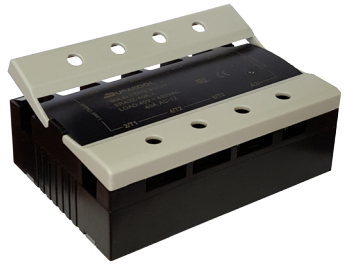



Dimensions in mm

# SRA3 series
## three phase solid-state relays



- High load voltage - up to 480VAC.
- 4 - 32VDC or 90 - 250VAC control voltage.
- Zero cross-over or Random switching.
- LED control input indicator.
- Captive finger protection covers for terminals.
- Compatible heat sinks on Page 17

c UL us E325835 CE ROHS Compliant

| Output (load) | | |
|---|---|---|
| Load type | | 3PST-NO (3 N/O) Resistive |
| Load current | | 10A, 20A, 25A, 30A, 40A, 60A or 80A |
| Load switching voltage | AC $V_{rms}$ | 24 ~ 240V, 40 ~ 480V |
| Maximum peak voltage | AC $V_{pk}$ | 900V |
| Minimum load current | | 0.1A |
| Inrush Current (max.) | 10ms | 20A: 240A / 25A: 300A / 30A: 380A |
| $I^2t$ | $A^2s$ | 20A: 288 / 25A: 450 / 30A: 660 / 40A: 880 / 60A: |
| | | 60A: 2100 / 80A: 4050 |
| Switch type | | Zero Cross (consult factory for Random) |
| **Input (control)** | | |
| Control voltage | V | DC: 4 ~ 32 or AC: 90 ~ 250 |
| Control current | mA | <20 |
| Turn-on voltage (min) | $V_{min}$ | DC: 3.5 / AC: 90 |
| Turn-on voltage (max) | $V_{max}$ | DC:35 / AC: 250 |
| Turn-off voltage | V | DC: 1 / AC: 10 |
| | | |
| **General Data** | | |
| Dimensions | L x W x H | 106 x 75 x 38mm |
| Weight | | various 365g (10A) ~ 500g (80A) |

### Ordering Code

| S | R | A | 3 | Z | - | 25 | K | - | D |
|---|---|---|---|---|---|---|---|---|---|

Switch Function

| | | |
|---|---|---|
| Z | - | Zero Crossover |
| R | - | Random |

Load Current Rating

| | | |
|---|---|---|
| 10 | - | 10A |
| 20 | - | 20A |
| 25 | - | 25A |
| 30 | - | 30A |
| 40 | - | 40A |
| 60 | - | 60A |
| 80 | - | 80A |

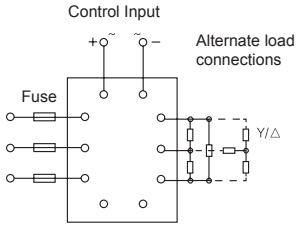
Load Voltage

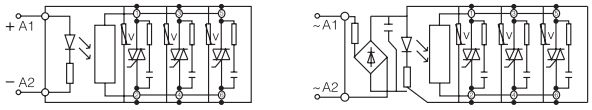
| | | |
|---|---|---|
| K | - | 40 to 480VAC |
| L | - | 24 to 240VAC |

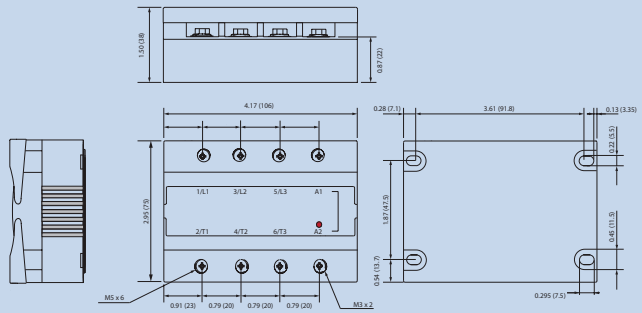
Control Voltage Input

| | | |
|---|---|---|
| A | - | 90 to 250VAC |
| D | - | 4 to 32VDC |

Schematics



Dimensions in mm

# SRA2 series
## dual solid-state relays

- 2 x SSR's in single package.
- High load voltage - up to 480VAC.
- 4 - 32VDC control voltage.
- Zero cross-over switching.
- 2 x LED control input indicators.

CE ROHS Compliant ✓

| Output (load) | | |
|---|---|---|
| Load type | | 2 x SPST-NO (1 N/O) Resistive |
| Load current | | 10A, 15A, 20A, 25A, 30A, 40A |
| Load switching voltage | AC $V_{rms}$ | 24 ~ 240V, 40 ~ 480V |
| Maximum peak voltage | AC $V_{pk}$ | 900V |
| Minimum load current | | 0.1A |
| Inrush Current (max.) | 10ms | 20A: 240A / 25A: 300A / 30A: 380A / 40A: 450A |
| $I^2t$ | $A^2s$ | 20A: 288 / 25A: 450 / 30A: 660 / 40A: 880 |
| Switch type | | Zero Cross |
| **Input (control)** | | |
| Control voltage | V DC | 4 ~ 32 |
| Control current | mA | <20 |
| Turn-on voltage (min) | V $DC_{min}$ | 3.5 |
| Turn-on voltage (max) | V $DC_{max}$ | 35 |
| Turn-off voltage | V DC | 1 |
| **General Data** | | |
| Dimensions | L x W x H | 57 x 44 x 30.3mm |
| Weight | | approx. 98g |

### Ordering Code

| S | R | A | 2 | Z | - | 25 | K | - | D |
|---|---|---|---|---|---|---|---|---|---|

Switch Function

| Z | - | Zero Crossover |
|---|---|---|

Load Current Rating

| 10 | - | 10A |
|---|---|---|
| 15 | - | 15A |
| 20 | - | 20A |
| 25 | - | 25A |
| 30 | - | 30A |
| 40 | - | 40A |

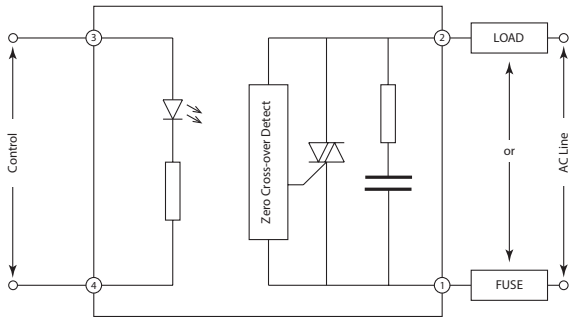
Load Voltage

| K | - | 40 to 480V |
|---|---|---|
| L | - | 24 to 240VAC |

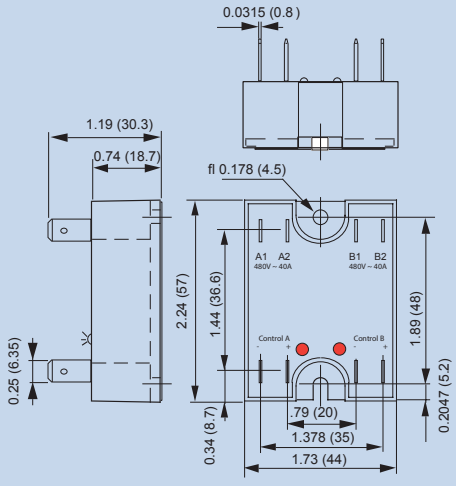
Control Voltage Input

| D | - | 4 to 32VDC |
|---|---|---|

Schematics




DC Control x 2




Dimensions in mm

# SDA1 - 10 -15

## DIN rail 10A, 15A solid-state relays

- High load voltage - up to 480VAC.
- 4 ~ 32VDC control input voltage.
- Single Phase, Zero cross-over switching.
- LED control input indicator.
- Integrated heatsink.
- DIN rail or chassis mounting.

cULus E325835 CE ROHS Compliant ✓

| Output (load) | | |
|---|---|---|
| Load type | | SPST-NO (1 N/O) Resistive |
| Load current | | 10A, 15A |
| Load switching voltage | AC $V_{rms}$ | 40 ~ 480V |
| Maximum peak voltage | AC $V_{pk}$ | 900V |
| Minimum load current | | 0.1A |
| Inrush Current (max.) | 10ms | 10A: 120A / 15A: 160A |
| $I^2t$ | | 10A: $72A^2s$ / 15A: $128A^2s$ |
| Switch type | | Zero Cross (Consult factory for Random) |
| **Input (control)** | | |
| Control voltage | V DC | 4 ~ 32 |
| Control current | mA | < 20mA |
| Turn-on voltage (min) | V $DC_{min}$ | 3.5 |
| Turn-on voltage (max) | V $DC_{max}$ | 35 |
| Turn-off voltage | V DC | 2 |
| **General Data** | | |
| Dimensions | L x W x H | 100 x 24 x 107mm |
| Weight | | approx. 228g |

Ordering Code

| S | D | A | 1 | Z | - | 10 | K | - | D |
|---|---|---|---|---|---|---|---|---|---|

Switch Function

| | | |
|---|---|---|
| Z | - | Zero Crossover |
| R | - | Random |

Load Current Rating

| | | |
|---|---|---|
| 10 | - | 10A |
| 15 | - | 15A |

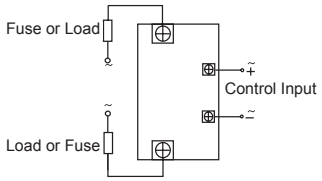
Load Voltage

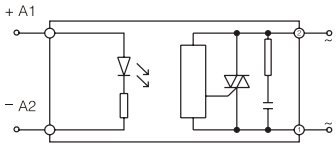
| | | |
|---|---|---|
| K | - | 40 to 480VAC |

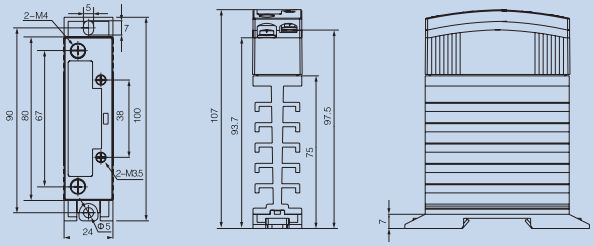
Control Voltage Input

| | | |
|---|---|---|
| D | - | 4 to 32VDC |

Schematics




Dimensions in mm

# SDA1 - 20 - 25 - 30

## DIN rail 20A, 25A, 30A solid-state relays

- High load voltage - up to 480VAC
- 4 ~ 32VDC or 90 ~ 250VAC control voltage
- Single Phase, Zero cross-over switching
- LED control input indicator
- Integrated heatsink
- DIN rail or chassis mounting

c UL us E325835 CE ROHS Compliant ✓

| Output (load) | | |
|---|---|---|
| Load type | | SPST-NO (1 N/O) Resistive |
| Load current | | 20A, 25A, 30A |
| Load switching voltage | AC $V_{rms}$ | 40 ~ 480V |
| Maximum peak voltage | AC $V_{pk}$ | 900V |
| Minimum load current | | 0.1A |
| Inrush Current (max.) | 10ms | 20A: 240A / 25A: 300A / 30A: 380A |
| $I^2t$ | $A^2s$ | 20A: 288 / 25A: 450 / 30A: 660 |
| Switch type | | Zero Cross (Consult factory for Random) |
| **Input (control)** | | |
| Control voltage | V | DC: 4 ~ 32DC / AC: 90 ~ 250AC |
| Control current | mA | < 20mA |
| Turn-on voltage (min) | $V_{min}$ | DC: 3.5VDC / AC: 80VAC |
| Turn-on voltage (max) | $V_{max}$ | DC: 35VDC / AC: 280VAC |
| Turn-off voltage | V | DC: 2VDC / AC: 40VAC |
| **General Data** | | |
| Dimensions | L x W x H | 100 x 48 x 107mm |
| Weight | | approx. 440g |

### Ordering Code

| S | D | A | 1 | Z | - | 25 | K | - | A |
|---|---|---|---|---|---|---|---|---|---|

Switch Function

| | | |
|---|---|---|
| Z | - | Zero Crossover |
| R | - | Random |

Load Current Rating

| | | |
|---|---|---|
| 20 | - | 20A |
| 25 | - | 25A |
| 30 | - | 30A |

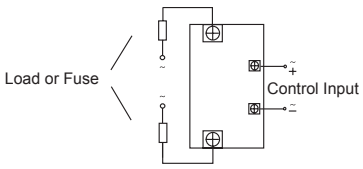
Load Voltage

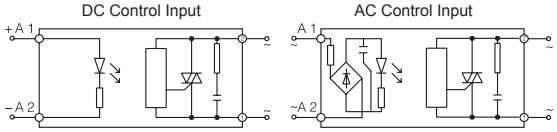
| | | |
|---|---|---|
| K | - | 40 to 480VAC |

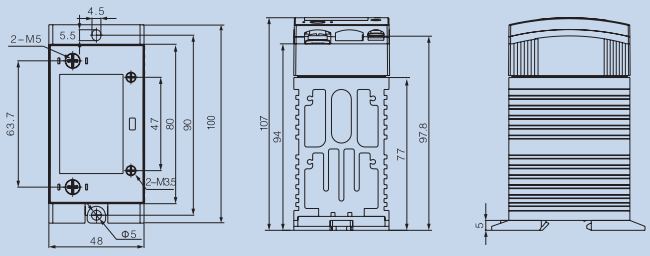
Control Voltage Input

| | | |
|---|---|---|
| A | - | 90 to 250VAC |
| D | - | 4 to 32VDC |

Schematics




Dimensions in mm

# SDA1 - 40

## DIN rail 40A solid-state relays

- High load voltage - up to 480VAC.
- 4 ~ 32VDC or 90 ~ 250VAC control voltage.
- Single Phase, Zero cross-over switching.
- LED control input indicator.
- Integrated heatsink.
- DIN rail or chassis mounting.

cULus E325835 CE ROHS Compliant ✓

| Output (load) | | |
|---|---|---|
| Load type | | SPST-NO (1 N/O) Resistive |
| Load current | | 40A |
| Load switching voltage | AC $V_{rms}$ | 40 ~ 480V |
| Maximum peak voltage | AC $V_{pk}$ | 900V |
| Minimum load current | | 0.1A |
| Inrush Current (max.) | 10ms | 450A |
| $I^2t$ | $A^2s$ | 880 |
| Switch type | | Zero Cross (Consult factory for Random) |
| **Input (control)** | | |
| Control voltage | V | DC: 4 ~ 32DC / AC: 90 ~ 250AC |
| Control current | mA | < 20mA |
| Turn-on voltage (min) | $V_{min}$ | DC: 3.5VDC / AC: 80VAC |
| Turn-on voltage (max) | $V_{max}$ | DC: 35VDC / AC: 280VAC |
| Turn-off voltage | V | DC: 2VDC / AC: 40VAC |
| **General Data** | | |
| Dimensions | L x W x H | 100 x 80 x 107mm |
| Weight | | approx. 940g |

### Ordering Code

| S | D | A | 1 | Z | - | 40 | K | - | D |
|---|---|---|---|---|---|---|---|---|---|

Switch Function

| | | |
|---|---|---|
| Z | - | Zero Crossover |
| R | - | Random |

Load Current Rating

| | | |
|---|---|---|
| 40 | - | 40A |

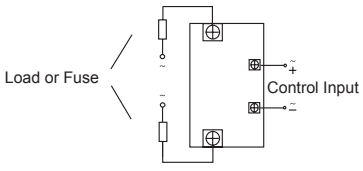
Load Voltage

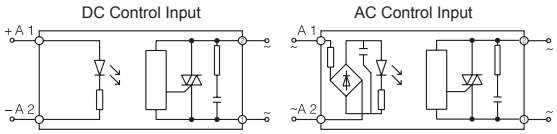
| | | |
|---|---|---|
| K | - | 40 to 480VAC |

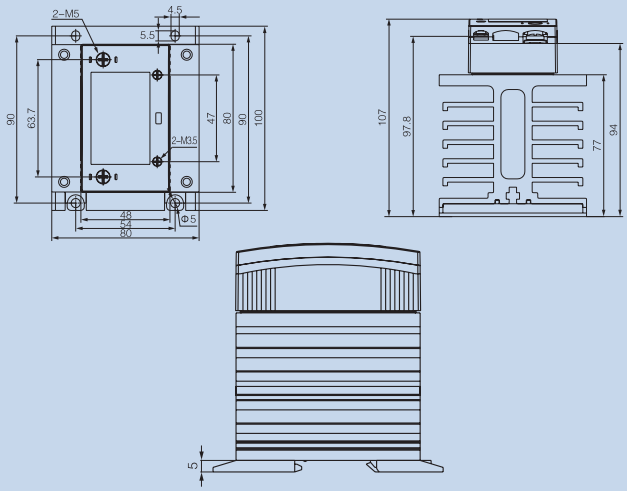
Control Voltage Input

| | | |
|---|---|---|
| A | - | 90 to 250VAC |
| D | - | 4 to 32VDC |

Schematics




Dimensions in mm

# SDA1 - 60 - 80

## DIN rail 60 & 80A solid-state relays

- High load voltage - up to 480VAC.
- 4 ~ 32VDC or 90 ~ 250VAC control voltage.
- Single Phase, Zero cross-over switching.
- LED control input indicator.
- Integrated heatsink.
- DIN rail or chassis mounting.

cULus E325835 CE ROHS Compliant ✓

| Output (load) | | |
|---|---|---|
| Load type | | SPST-NO (1 N/O) Resistive |
| Load current | | 60A, 80A |
| Load switching voltage | AC $V_{rms}$ | 40 ~ 480V |
| Maximum peak voltage | AC $V_{pk}$ | 900V |
| Minimum load current | | 0.1A |
| Inrush Current (max.) | 10ms | 60A: 650A / 80A: 900A |
| $I^2t$ | $A^2s$ | 60A: 2100 / 80A: 4050 |
| Switch type | | Zero Cross (Consult factory for Random) |
| **Input (control)** | | |
| Control voltage | V | DC: 4 ~ 32DC / AC: 90 ~ 250AC |
| Control current | mA | < 20mA |
| Turn-on voltage (min) | $V_{min}$ | DC: 3.5VDC / AC: 80VAC |
| Turn-on voltage (max) | $V_{max}$ | DC: 35VDC / AC: 280VAC |
| Turn-off voltage | V | DC: 2VDC / AC: 40VAC |
| **General Data** | | |
| Dimensions | L x W x H | 100 x 110 x 127mm |
| Weight | | approx. 940g |

### Ordering Code

| S | D | A | 1 | Z | - | 60 | K | - | D |
|---|---|---|---|---|---|---|---|---|---|

Switch Function

| | | |
|---|---|---|
| Z | - | Zero Crossover |
| R | - | Random |

Load Current Rating

| | | |
|---|---|---|
| 60 | - | 60A |
| 80 | - | 80A |

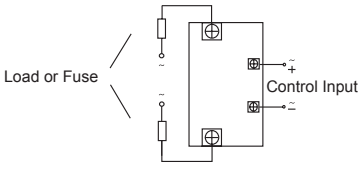
Load Voltage

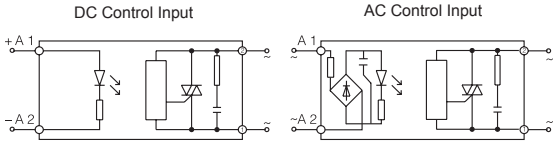
| | | |
|---|---|---|
| K | - | 40 to 480VAC |

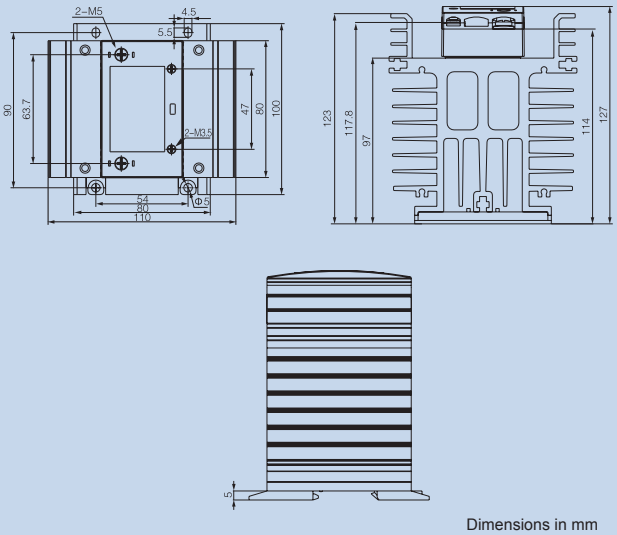
Control Voltage Input

| | | |
|---|---|---|
| A | - | 90 to 250VAC |
| D | - | 4 to 32VDC |

Schematics




Dimensions in mm


American Electronic Components Inc., Tel: Toll free [USA] 888-847-6552 +1-574-295-6330 sales@aecsensors.com www.aecsensors.com

# SDB1 - 60 - 80

## DIN rail 60 & 80A solid-state relays

- Enhanced load voltage - up to 660VAC with high power dual SCR output.
- 4 ~ 32VDC or 90 ~ 250VAC control voltage.
- Single Phase, Zero cross-over switching.
- LED control input indicator.
- Integrated heatsink.
- DIN rail or chassis mounting.

cULus E325835 CE ROHS Compliant ✓

| Output (load) | | |
|---|---|---|
| Load type | | SPST-NO (1 N/O) Resistive |
| Load current | | 60A, 80A |
| Load switching voltage | AC $V_{rms}$ | 60 ~ 660V |
| Maximum peak voltage | AC $V_{pk}$ | 900V |
| Minimum load current | | 0.1A |
| Inrush Current (max.) | 10ms | 60A: 720A / 80A: 1000A |
| $I^2t$ | $A^2s$ | 60A: 2600 / 80A: 5000 |
| Switch type | | Zero Cross (Consult factory for Random) |
| **Input (control)** | | |
| Control voltage | V | DC: 4 ~ 32DC / AC: 90 ~ 250AC |
| Control current | mA | < 20mA |
| Turn-on voltage (min) | $V_{min}$ | DC: 3.5VDC / AC: 80VAC |
| Turn-on voltage (max) | $V_{max}$ | DC: 35VDC / AC: 280VAC |
| Turn-off voltage | V | DC: 2VDC / AC: 40VAC |
| **General Data** | | |
| Dimensions | L x W x H | 100 x 110 x 127mm |
| Weight | | approx. 940g |

### Ordering Code

| S | D | A | 1 | Z | - | 60 | U | - | D |
|---|---|---|---|---|---|---|---|---|---|

Switch Function

| | | |
|---|---|---|
| Z | - | Zero Crossover |
| R | - | Random |

Load Current Rating

| | | |
|---|---|---|
| 60 | - | 60A |
| 80 | - | 80A |

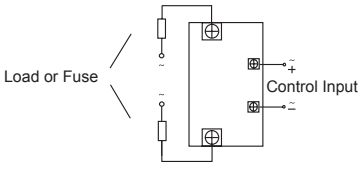
Load Voltage

| | | |
|---|---|---|
| K | - | 40 to 480VAC |

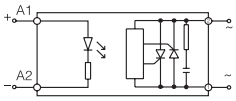
Control Voltage Input

| | | |
|---|---|---|
| A | - | 90 to 250VAC |
| D | - | 4 to 32VDC |

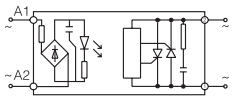
Schematics

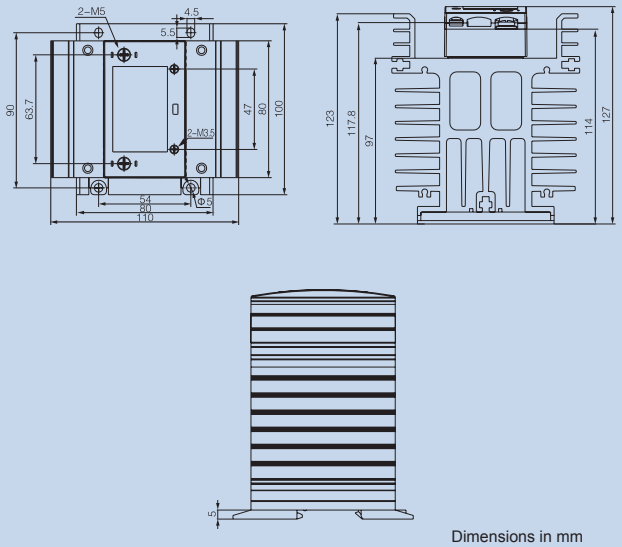



DC Control Input




AC Control Input




Dimensions in mm

# SDA3 - 10 - 15

## DIN rail 10 & 15A solid-state contactors

- High load voltage - up to 480VAC.
- 4 ~ 32VDC or 90 ~ 250VAC control voltage.
- Three Phase, Zero cross-over switching.
- LED control input indicator.
- Integrated heatsink.
- DIN rail or chassis mounting.

cULus E325835 CE ROHS Compliant ✓

| Output (load) | | |
|---|---|---|
| Load type | | 3PST-NO (3 N/O) Resistive |
| Load current | | 10A, 15A |
| Load switching voltage | AC $V_{rms}$ | 40 ~ 480V |
| Maximum peak voltage | AC $V_{pk}$ | 900V |
| Minimum load current | | 0.1A |
| Inrush Current (max.) | 10ms | 10A: 120A / 15A: 160A |
| $I^2t$ | $A^2s$ | 10A: 72 / 15A: 128 |
| Switch type | | Zero Cross (Consult factory for Random) |
| **Input (control)** | | |
| Control voltage | V | DC: 4 ~ 32DC / AC: 90 ~ 250AC |
| Control current | mA | < 25mA |
| Turn-on voltage (min) | $V_{min}$ | DC: 3.5VDC / AC: 80VAC |
| Turn-on voltage (max) | $V_{max}$ | DC: 35VDC / AC: 280VAC |
| Turn-off voltage | V | DC: 2VDC / AC: 40VAC |
| **General Data** | | |
| Dimensions | L x W x H | 100 x 110 x 80mm |
| Weight | | approx. 672g |

### Ordering Code

| S | D | A | 3 | Z | - | 10 | K | - | D |
|---|---|---|---|---|---|---|---|---|---|

Switch Function

| | | |
|---|---|---|
| Z | - | Zero Crossover |
| R | - | Random |

Load Current Rating

| | | |
|---|---|---|
| 10 | - | 10A |
| 15 | - | 15A |

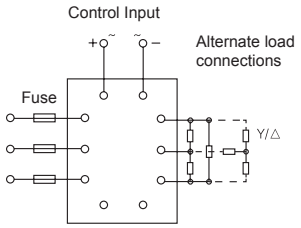
Load Voltage

| | | |
|---|---|---|
| K | - | 40 to 480VAC |

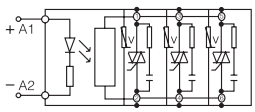
Control Voltage Input

| | | |
|---|---|---|
| A | - | 90 to 250VAC |
| D | - | 4 to 32VDC |

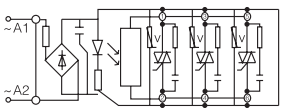
Schematics

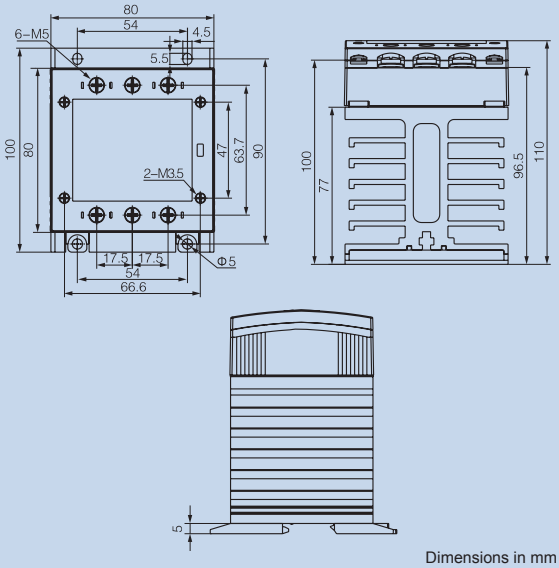



DC Control Input




AC Control Input

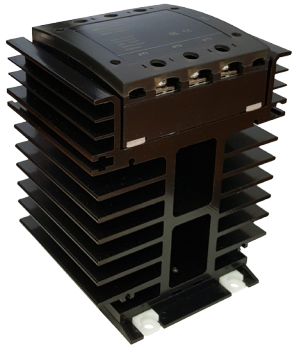



Dimensions in mm

# SDA3 - 20 - 25 - 30

## DIN rail 20, 25 & 30A solid-state contactors



- High load voltage - up to 480VAC.
- 4 ~ 32VDC or 90 ~ 250VAC control voltage.
- Three Phase, Zero cross-over switching.
- LED control input indicator.
- Integrated heatsink.
- DIN rail or chassis mounting.

cULus E325835 CE ROHS Compliant ✓

| Output (load) | | |
|---|---|---|
| Load type | | 3PST-NO (3 N/O) Resistive |
| Load current | | 20A, 25A, 30A |
| Load switching voltage | AC $V_{rms}$ | 40 ~ 480V |
| Maximum peak voltage | AC $V_{pk}$ | 900V |
| Minimum load current | | 0.1A |
| Inrush Current (max.) | 10ms | 20A: 240A / 25A: 300A / 30A: 380A |
| $I^2t$ | $A^2s$ | 20A: 288 / 25A: 450 / 30A: $A^2s$ |
| Switch type | | Zero Cross (Consult factory for Random) |
| **Input (control)** | | |
| Control voltage | V | DC: 4 ~ 32DC / AC: 90 ~ 250AC |
| Control current | mA | < 20mA |
| Turn-on voltage (min) | $V_{min}$ | DC: 3.5VDC / AC: 80VAC |
| Turn-on voltage (max) | $V_{max}$ | DC: 35VDC / AC: 280VAC |
| Turn-off voltage | V | DC: 2VDC / AC: 40VAC |
| **General Data** | | |
| Dimensions | L x W x H | 100 x 110 x 130mm |
| Weight | | approx. 982g |

### Ordering Code

| S | D | A | 3 | Z | - | 25 | K | - | A |
|---|---|---|---|---|---|---|---|---|---|

Switch Function

| | | |
|---|---|---|
| Z | - | Zero Crossover |
| R | - | Random |

Load Current Rating

| | | |
|---|---|---|
| 20 | - | 20A |
| 25 | - | 25A |
| 30 | - | 30A |

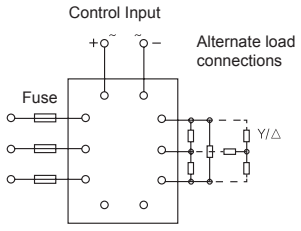
Load Voltage

| | | |
|---|---|---|
| K | - | 40 to 480VAC |

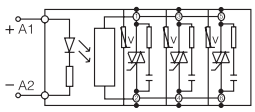
Control Voltage Input

| | | |
|---|---|---|
| A | - | 90 to 250VAC |
| D | - | 4 to 32VDC |

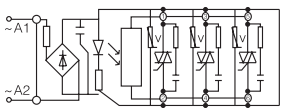
Schematics

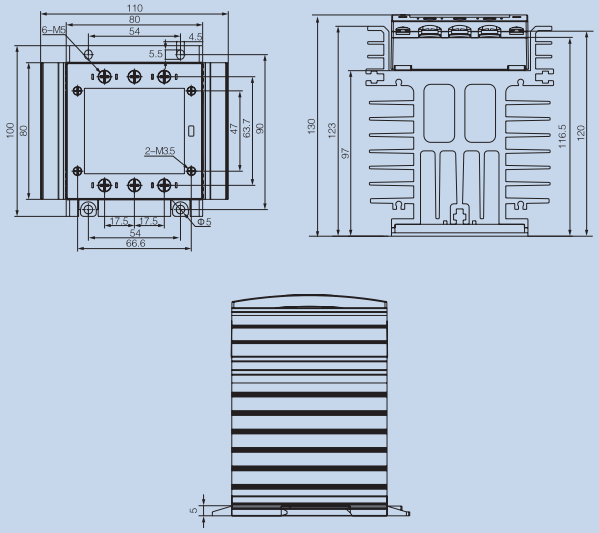



DC Control Input




AC Control Input




Dimensions in mm

# SDA3 - 40

## DIN rail 40A solid-state contactors

- High load voltage - up to 480VAC.
- 4 ~ 32VDC or 90 ~ 250VAC control voltage.
- Three Phase, Zero cross-over switching.
- LED control input indicator.
- Integrated heatsink, complete with fan.
- DIN rail or chassis mounting.

cULus E325835 CE ROHS Compliant ✓

| Output (load) | | |
|---|---|---|
| Load type | | 3PST-NO (3 N/O) Resistive |
| Load current | | 40A |
| Load switching voltage | AC $V_{rms}$ | 40 ~ 480V |
| Maximum peak voltage | AC $V_{pk}$ | 900V |
| Minimum load current | | 0.1A |
| Inrush Current (max.) | 10ms | 450A |
| $I^2t$ | $A^2s$ | 880 |
| Switch type | | Zero Cross (Consult factory for Random) |
| **Input (control)** | | |
| Control voltage | V | DC: 4 ~ 32DC / AC: 90 ~ 250AC |
| Control current | mA | < 20mA |
| Turn-on voltage (min) | $V_{min}$ | DC: 3.5VDC / AC: 80VAC |
| Turn-on voltage (max) | $V_{max}$ | DC: 35VDC / AC: 280VAC |
| Turn-off voltage | V | DC: 2VDC / AC: 40VAC |
| **General Data** | | |
| Dimensions | L x W x H | 125 x 110 x 130mm |
| Weight | | approx. 1300g |

### Ordering Code

| S | D | A | 3 | Z | - | 40 | K | - | D |
|---|---|---|---|---|---|---|---|---|---|

Switch Function

| | | |
|---|---|---|
| Z | - | Zero Crossover |
| R | - | Random |

Load Current Rating

| | | |
|---|---|---|
| 40 | - | 40A |

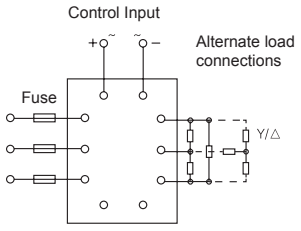
Load Voltage

| | | |
|---|---|---|
| K | - | 40 to 480VAC |

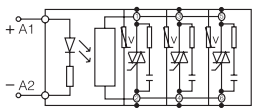
Control Voltage Input

| | | |
|---|---|---|
| A | - | 90 to 250VAC |
| D | - | 4 to 32VDC |

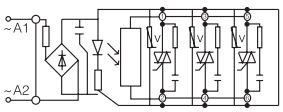
Schematics

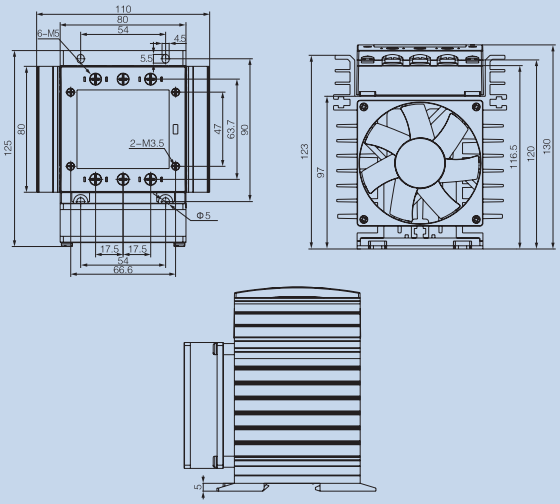



DC Control Input




AC Control Input

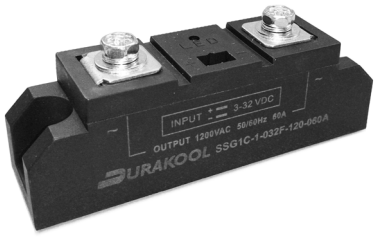



Dimensions in mm


American Electronic Components Inc., Tel: Toll free [USA] 888-847-6552 +1-574-295-6330 sales@aecsensors.com www.aecsensors.com

# SSG1C series
## high power solid-state relays




- High current - up to 350A.
- High load voltage - up to 1200VAC.
- 3 to 32VDC control voltage.
- Zero cross-over switching.
- Compact case sizes.
- Heat sinks available

CE ROHS Compliant ✓

| Output (load) | | |
|---|---|---|
| Load type | Resistive | SPST-NO (1 N/O) |
| Load current | | 60A ~ 150A , 200A ~ 350A |
| Load switching voltage | AC $V_{rms}$ | 60 ~ 1200V |
| Maximum peak voltage | AC $V_{pk}$ | 1600V |
| $I^2t$ $A^2s$ | | 60A: 3200 / 80A: 5000 / 100A: 7200 / 120A: 11250<br>150A: 20000 / 200A: 31250 / 250A: 45000<br>300A: 61250 / 350A: 80000 |
| **Input (control)** | | |
| Control voltage | V DC | 3 ~14 or 3 ~ 32 |
| Control current | mA | 5 ~ 25mA |
| Turn-on voltage (min) | V $DC_{min}$ | 3 |
| Turn-on voltage (max) | V $DC_{max}$ | 35 |
| Turn-off voltage | V DC | 1 |
| **General Data** | | |
| Dimensions | L x W x H | |
| | small case | 94 x 25 x 36.2mm |
| | large case | 94 x 34 x 43mm |
| Weight | small case | approx. 135g |
| | large case | approx. 235g |

### Ordering Code

| S | S | G | 1 | C | - | 0 | 3 | 2 | F | - | 1 | 2 | 0 | - | 0 | 6 | 0 | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Input control voltage**

| | | | |
|---|---|---|---|
| 014 | - | 3 to 14VDC | |
| 032 | - | 3 to 32V DC | |

**Case sealing**

| | | | |
|---|---|---|---|
| F | - | fully sealed | |

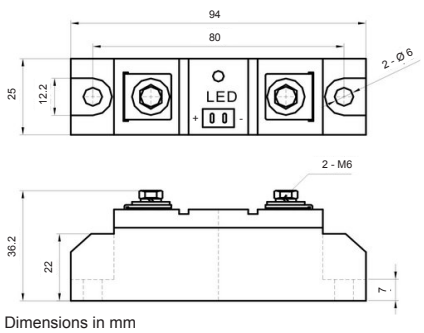
**Output (load) voltage**

| | | | |
|---|---|---|---|
| 120 | - | 60 ~ 1200V AC | |

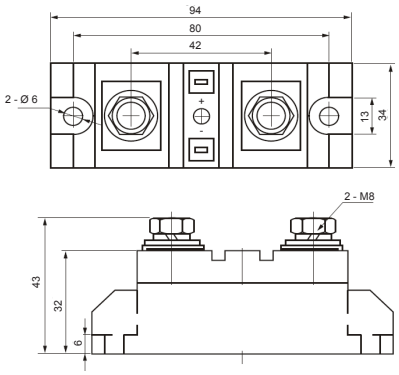
**Load current**

| | | | |
|---|---|---|---|
| 060 | - | 60A | small case size |
| 080 | - | 80A | |
| 100 | - | 100A | |
| 120 | - | 120A | |
| 150 | - | 150A | |
| 200 | - | 200A | large case size |
| 300 | - | 300A | |
| 350 | - | 350A | |

Small Case

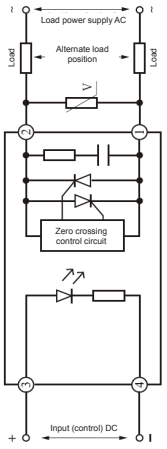



Large Case




Dimensions in mm

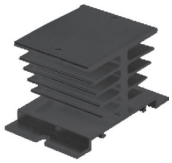
Schematic

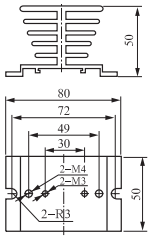


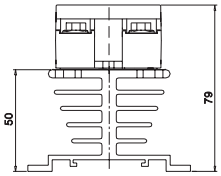
**Recommended Durakool heat sinks**

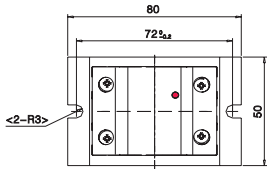
| SSR Series | SRA1*-10*-* | SRA1*-25*-* | SRA1*-60*-* | SRA1*-80*-* |
|---|---|---|---|---|
| | SRA1*-15*-* | SRA1*-30*-* | | |
| | SRA1*-20*-* | SRA1*-40*-* | | |
| Current rating | <20A | <40A | <60A | <80A |
| Heat Sink | DHS01 | DHS02 | DHS03 | DHS04 |
| Heat Sink Rating °C/W | 2.19 | 1.49 | 1.35 | 1.07 |

DHS01

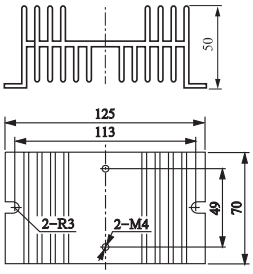


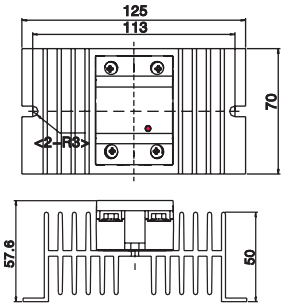


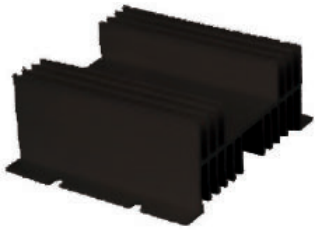



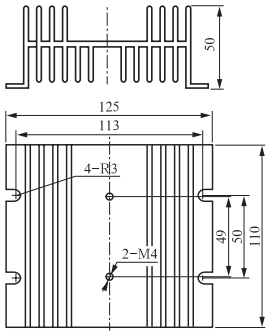

DHS02

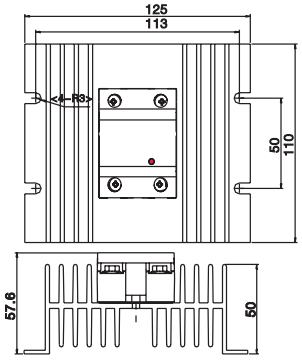


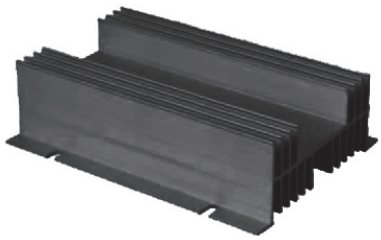

DHS03

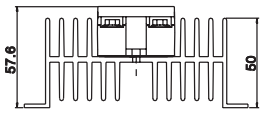


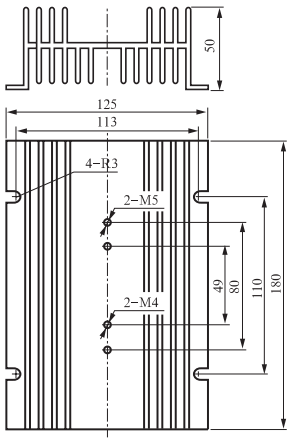


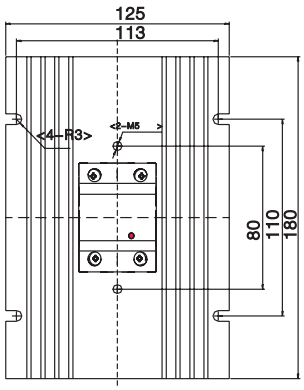




DHS04





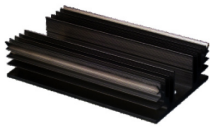



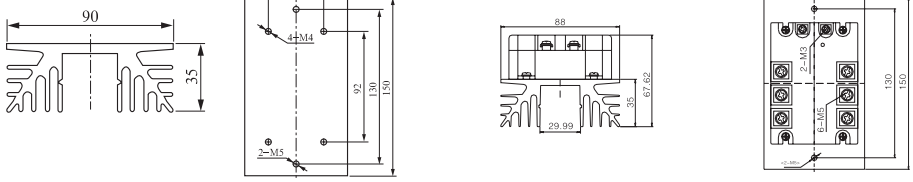



### Recommended Durakool heat sinks

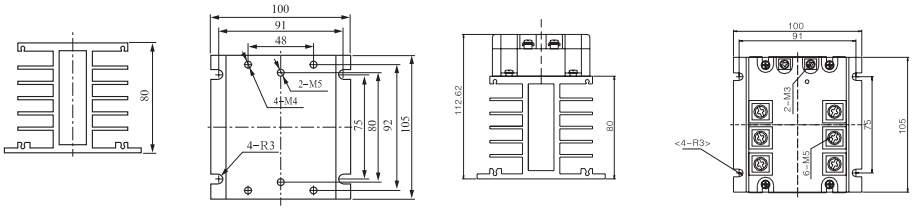
| SSR Series | SRA3*-10*-* | SRA3*-25*-* | SRA3*-40*-* | SRA3*-60*-* |
|---|---|---|---|---|
| | SRA3*-20*-* | SRA3*-30*-* | | SRA3*-80*-* |
| Current rating | ≤ 20A | ≤ 30A | ≤ 40A | ≤ 80A |
| Heat Sink | DHS05 | DHS06 | DHS07 | DHS08 (or DHS09) |
| Heat Sink Rating °C/W | 0.93 | 0.65 | 0.48 | 0.44 (0.39) |

DHS05

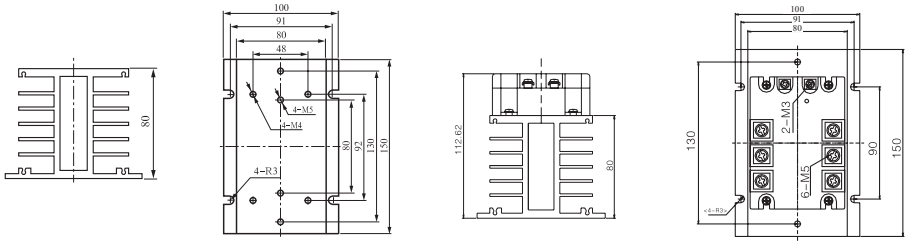




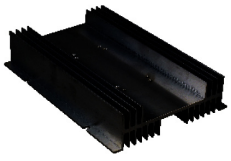

DHS06

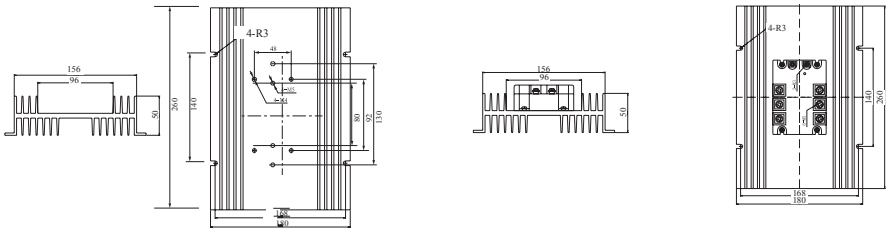



DHS07

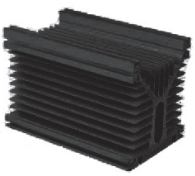


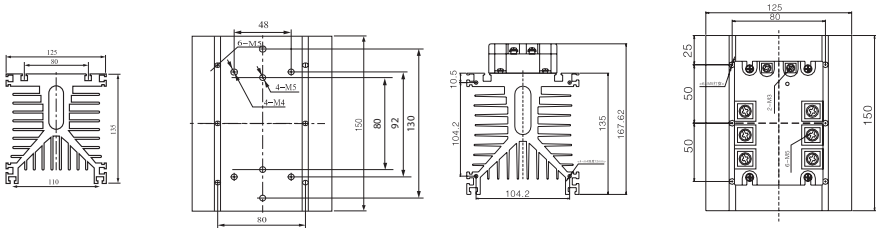

DHS08





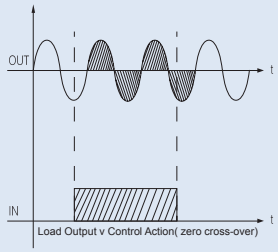

DHS09





| General data: | |
|---|---|
| Operating time | approx. ½ cycle of load frequency + ≤1ms |
| Release time | approx. ½ cycle of load frequency + ≤1ms |

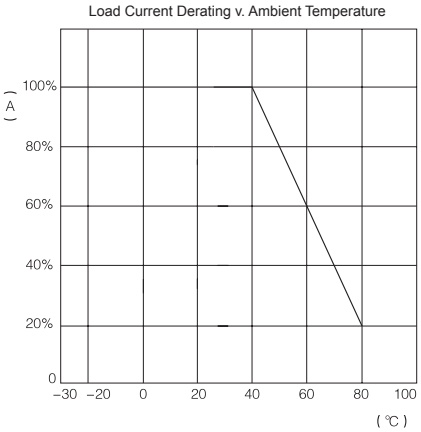
Load Output v. Input Control Action (zero-crossover)




| | |
|---|---|
| On voltage drop | 1.6VAC |
| Leakage current (Off) | ≤10mA |
| Insulation resistance | ≤500MΩ at 500VDC, 50%RH |
| Dielectric strength | ≥2500VAC |
| Ambient Temp | -30° to +80°C with derating (no icing) |
| Relative Humidity | 45 ~ 85RH |

SDA1 and SDA 3 Solid-State Contactors
Derating Curves

Load Current Derating v. Ambient Temperature




## Heat sinks and mounting considerations

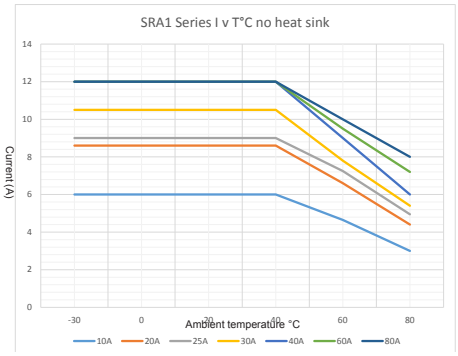
The SDA & SDB series of solid-state relays & contactors have integral heat sinks. However, due consideration must be given to cooling air flow over the heat sink to ensure reliable opeartion and avoid premature failure. If used in an enclosed cabinet, providing vents or forced air ventilation may be neccessary. They should be mounted with at least 25mm (1") between separate SDA & SDB units. It is not recommended to mount SSR's touching against each other and care should be taken when mounting multiple units on the same DIN rail to avoid overheating of the middle SSR's.

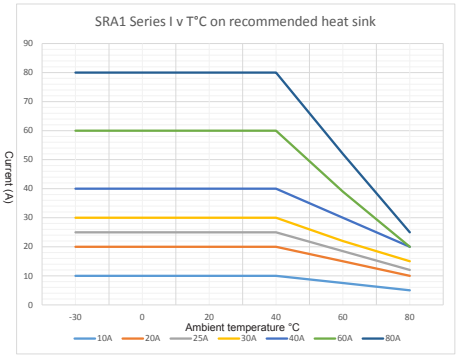
In order to maintain air flow, a space should be left above and below the heatsink to ensure free air movement. The recommended mounting is with the fins vertically aligned for optimum air flow.

The larger SDA3 Contactors are provided with a cooling fan already attached. It is important that air flow to this fan is clean and unimpeded. Dust build up on the fan or the heat sink will degrade performance of the solid-state contactor.

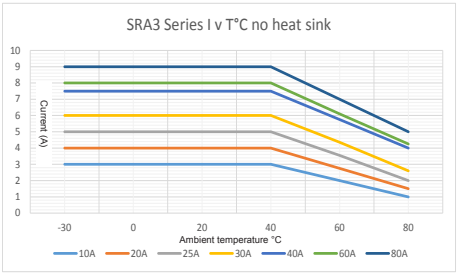
The SRA1 & SRA3 series of panel mount SSR's are designed to be mounted on individual heat sinks, wherever possible. Refering to the derating curves (below) it can be seen that operating these SSR's without a heat sink seriously reduces their current carrying capacity. To ensure a good thermal contact between the SSR and the heat sink, a thermal heatsink compound should be applied to the SSR. But it is important to use the compund sparingly as too much compound can be almost as bad as no compound. Alternatively, a thermally conductive mounting pad may be used between the SSR and the heat sink.

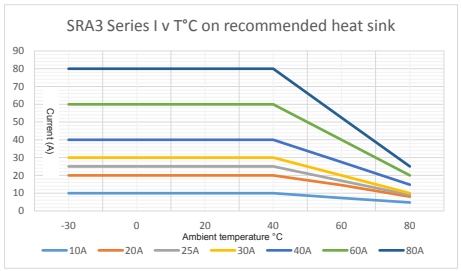
SRA1 series: Derating Curves




SRA3 series: Derating Curves




A good "rule of thumb" is to choose a SSR which is rated such that the load power is only 80% of the SSR's rating. This will provide a safety margin in the event of variations in the ambient conditions, or in the load itself, as it ages.

When choosing a suitable heat sink, refer to the data on Pages 16 &17 which shows the recommended heat sinks for the SRA1 & SRA3 series. The lower the °C/W rating the more heat it dissipates.

If the SSR is mounted on a flat panel, it is important that the relay is mounted on an unpainted surface and a good quality thermal compound is used. Maximum currents will be limited as shown in the graphs. Above these currents, a special heat sink will be required.

If it is anticipated that heat sink temperatures could rise to unacceptable levels, it is suggested that simple thermal switch should be mounted on the heat sink to enable the SSR to be turned off until the heat sink has cooled down. Or a different heat sink and SSR combination considered.

## Protection of SRR's - Fuse Selection

The solid-state semiconductor elements used in all SSR's and Solid-state contactors have very short thermal time constants. As a result, extreme current overloads such as a short circuit, or problems with load or line surges, even if applied for very short time periods may cause the SSR to fail permanently. Standard fuses and circuit breakers cannot react quick enough to prevent the SSR being damaged. It is important that correctly sized "Semiconductor" or "Ultra Fast Acting" fuses are used.

Reference to the data sheets for the SSR's and Solid-state Contactors will show an $I^2t$ value. This is the value for the maximum current vs. time that the switching semiconductor elements can tolerate. Semiconductor fuses are specified with a corresponding $I^2t$ value. **The fuse $I^2t$ value must be selected such that it is less than the $I^2t$ value for the SSR.**

General Safety Considerations

It must be noted that SSR's are not fully open circuit (off) when not operated. There is always a small leakage current which could possibly pose a safety concern. SSR's can also fail in such a manner that they are conducting even when supposed to be off. It is important that some alternative mechanical disconnect is available to turn the power off in the event of an emergency. Likewise, as mentioned previously, it is a good idea to have some form of heat monitoring for the heat sink such that the power is disconnected in the event of an over heat situation, as might occur if the SSR fails conducting. e.g a suitably sized electro-mechanical contactor in series with the SSR and operated by a bimetallic switch.

Always completely isolate an SSR or Solid-State Contactor and allow it to cool down before touching it. Remember that SSR's and heat sinks could easily be over 100°C when operating correctly. This will cause burns if touched. Be aware that touching a electrically live component is potentially fatal!

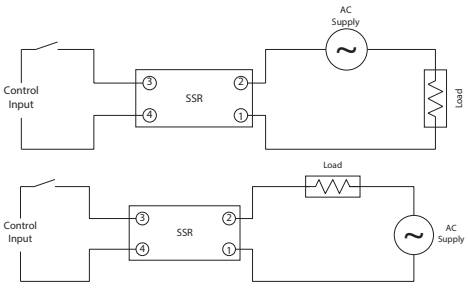
Occasionally, problems can occur when controlling loads where the voltage and current are out of phase and a sudden voltage rise occurs during turn-off. In these circumstances, the SSR may fail to turn-off. Likewise, when controlling loads with voltage and current out of phase with a zero crossover type, it is possible that the triac may not turn on regardless of the input state.

It is very important to have a mechanical form of disconnect in order to remove the load and control supply to the SSR in the event of an unexpected event or for routine maintenance.

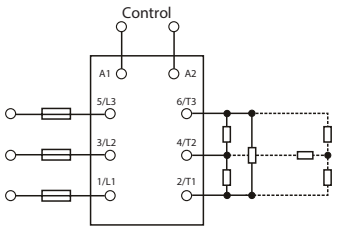
Load Considerations

The most common application for SSR's is controlling resistance heating elements for which they are well suited. Zero Cross-over Switching will greatly reduce electrical noise when switching.

Resistive Load - Single Phase




Resistive Load - 3 Phase




Load Connections. Δ or Y

Lamp Loads

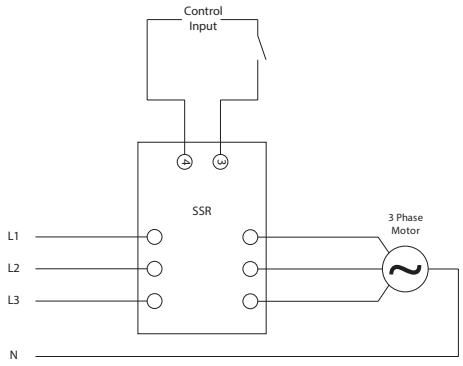
Tungsten or halogen lamps have a high inrush current at turn on, which can be 7 or 8 times the steady current, sometimes even more for zero crossover SSR's rising to 9 to 12 times (in the worst case) for random turn on SSR's. When choosing an SSR to switch these loads, due consideration should be taken to ensure that the inrush current does not exceed 50% of the SSR surge on current.

Motor Loads

Motors present a substantial inrush current as the motor tries to overcome the mechanical inertia imposed mostly by the load. The length of time of this start current is, in part, dependent upon the characteristics of the mechanical load (LRA or Locked Rotor Current). Once the motor is up to speed, the current drops back until it settles at a constant level. This is the Full Load Current or FLA).

Induction Motors can present a significant shift between voltage and current for each phase, where the phase current lags behind the phase voltage. In these applications, zero cross-over SSR's are not suitable. The zero cross-over function means that each phase will be turned on sequentially, instead of all at the same time. In some cases, it is even possible that the relay will fail to turn on. The solution is a random turn-on SSR which will switch power to all of its outputs with 100us of the input signal being applied. All three phases are therefore supplied to the motor simultaneously and phase shifts between voltage and current are no longer a problem.

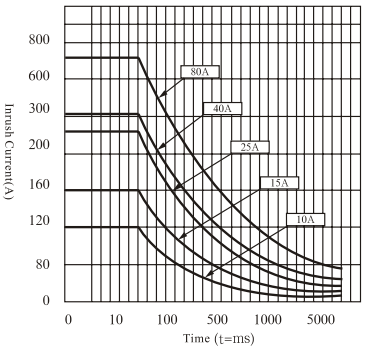
When choosing a SSR to switch a motor load, calculations must take into account the initial inrush current which can be as much as 5 or 7 times the normal operating current. Thought must also be given to the fact that the motor may stall which could result in a current equal or greater than the LRA value. Over current protection should be considered as well as choosing a suitably rated SSR.




Motor loads - Three Phase

The most common wiring arrangement for 3 phase induction motors is the "Y".

SRA1 & 3 series: Inrush Current v Time



American Electronic Components Inc., 1101 Lafayette Street, Elkhart, Indiana, IN46516
Tel: Toll free [USA] 888-847-6552  +1-574-295-6330  sales@aecsensors.com  www.aecsensors.com