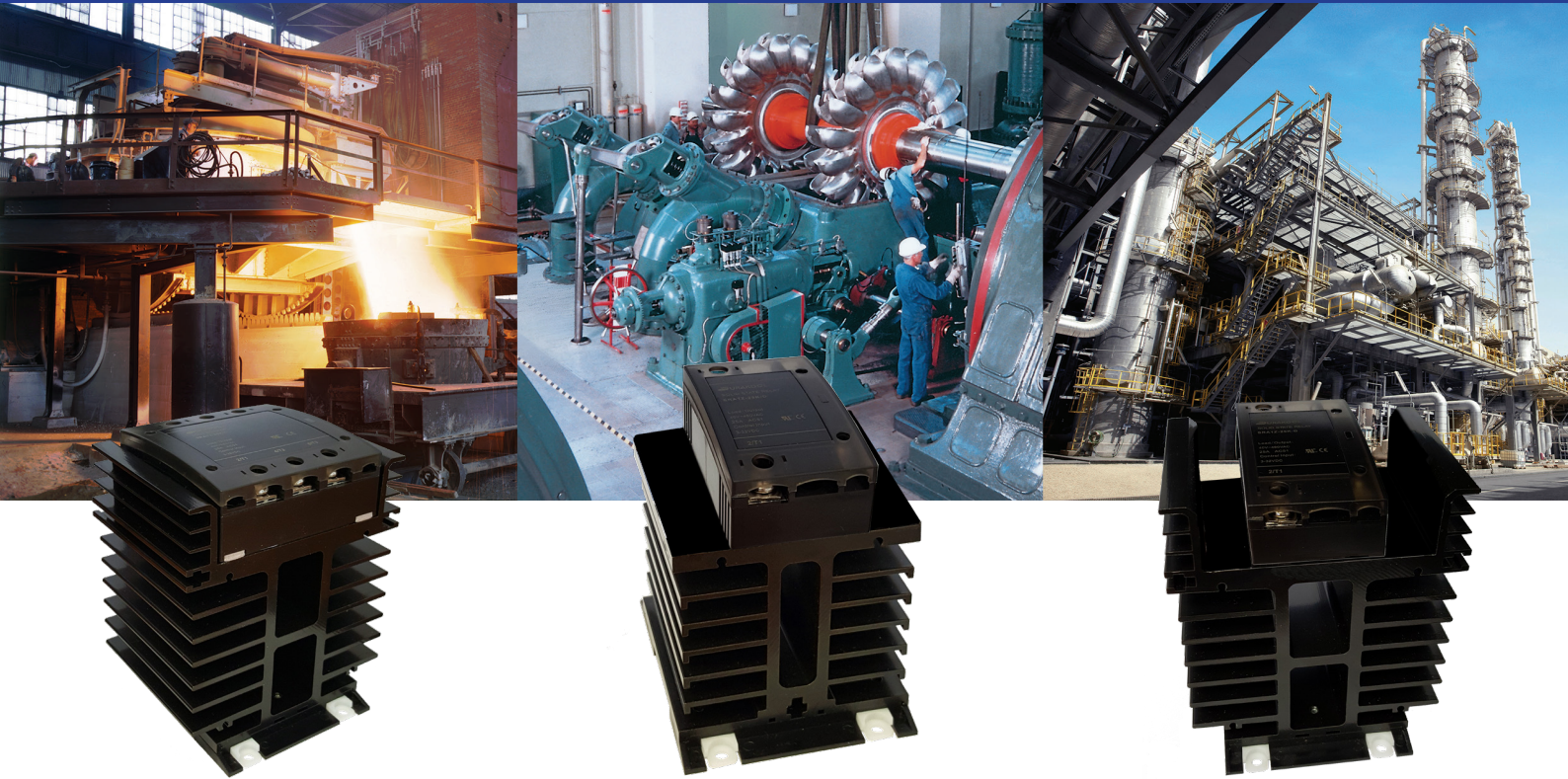


# Solid State Relays & Contactors





## About Durakool

Durakool, a Solid State Group Brand, has a long history, some 90 years in the manufacturing of specialised, highly engineered, electrical and electronic components, primarily for automotive and industrial applications.

Durakool's engineering team provides partners with technical consultation based upon extensive application knowledge and experience. Through many years of development and innovation, they understand that quality is paramount and pursue a policy of continuous improvement.

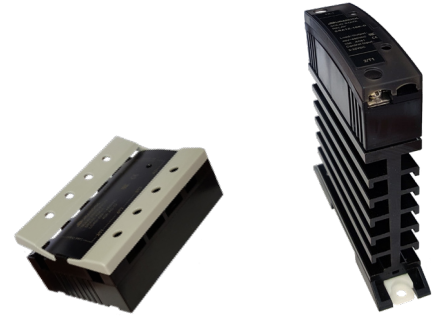
Durakool continues to innovate and develop relays and contactors to meet existing and forthcoming requirements within many industries. New products are introduced on a regular basis as we seek to exceed customer expectations. Durakool is using novel techniques to reduce package size whilst meeting increasing demands for higher voltage and higher current switching.

'We believe in developing long term relationships with our customers to provide highest quality products & services, exceeding our partner's needs. We work as a key member of our partners' operations from concept to delivery and beyond.'

## Controlling electricity for over 90 years!

### Durakool

- ▲ Global production facilities
- ▲ Extensive product portfolio
- ▲ Reputation for high reliability
- ▲ ISO9001:2015 & ISO14001:2015 Registered



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- High load voltage - up to 480VAC
- 4 - 32VDC or 90 - 250VAC control voltage
- Zero crossover switching
- LED control input indicator
- Integrated heatsink
- DIN rail or chassis mounting



### 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 $V_{pt}$	900V
Minimum load current	0.1A	
Inrush current (max.)	10ms	10A: 120A / 15A: 160A
$I^2t$	$A^2s$	10A: 72A <sup>2</sup> s / 15A: 128A <sup>2</sup> s
Switch type	Zero crossover (consult factory for Random)	

### Input (control)

Control voltage	VDC	4 ~ 32
Control current	mA	<20
Turn-on voltage (min.)	$V_{min}$	DC: 3.5V
Turn-on voltage (max.)	$V_{max}$	DC: 35V
Turn-off voltage	V	DC: 2

### Environmental

Dimensions	L x W x H	100 x 24 x 107mm
Weight	approx.	228g

#### Note:

All SSR's should be protected by fast acting "semiconductor" fuses.

Circuit breakers and normal fuses are not quick enough to protect the SSR in the event of a current surge or spike.

It is recommended that load power is kept to no more than 70% of the SSR's rating to avoid unexpected issues in the event of variations in the load and ambient temperature.

Transfer Pads and Heatsinks for Durakool SSR relays can be found on pages 16 - 18.

### Ordering Code

S D A 1 Z - 1 0 K - D

#### Series

#### Switching

Z: Zero Crossover

#### Load current

10: 10A

15: 15A

#### Load voltage

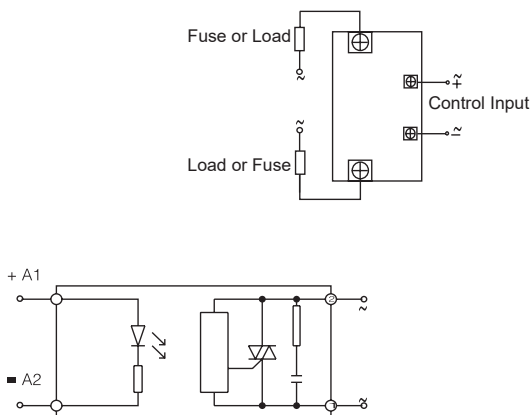
K: 40 to 480VAC

#### Control voltage input

D: 4 ~ 32VDC

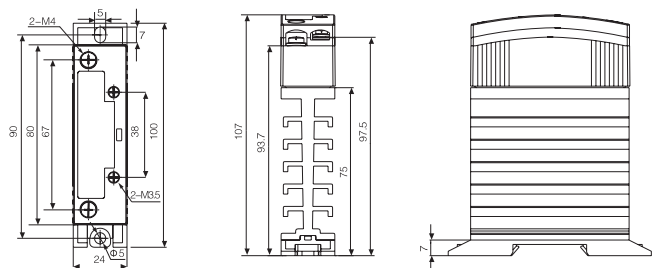
### Schematic

Fig. 1



### Dimensions mm

Fig. 2





- High load voltage - up to 480VAC
- 4 - 32VDC or 90 - 250VAC control voltage
- Single phase, zero crossover switching
- LED control input indicator
- Integrated heatsink
- DIN rail or chassis mounting



### 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 $V_{pt}$	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 crossover (consult factory for Random)	

### Input (control)

Control voltage	VDC	DC: 4 ~ 32VDC / AC: 90 ~ 250VAC
Control current	mA	<20
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

### Environmental

Dimensions	L x W x H	100 x 48 x 107mm
Weight	approx.	440g

#### Note:

All SSR's should be protected by fast acting "semiconductor" fuses.

Circuit breakers and normal fuses are not quick enough to protect the SSR in the event of a current surge or spike.

It is recommended that load power is kept to no more than 70% of the SSR's rating to avoid unexpected issues in the event of variations in the load and ambient temperature.

Transfer Pads and Heatsinks for Durakool SSR relays can be found on pages 16 - 18.

### Ordering Code

S D A 1 Z - 2 5 K - A

#### Series

#### Switching

Z: Zero Crossover

#### Load current

20: 20A

25: 25A

30: 30A

#### Load voltage

K: 40 to 480VAC

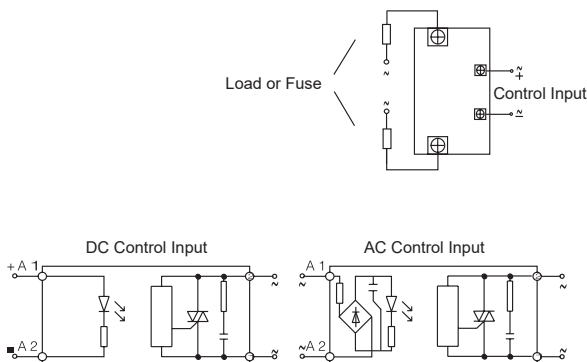
#### Control voltage input

A: 90 ~ 250VAC

D: 4 ~ 32VDC

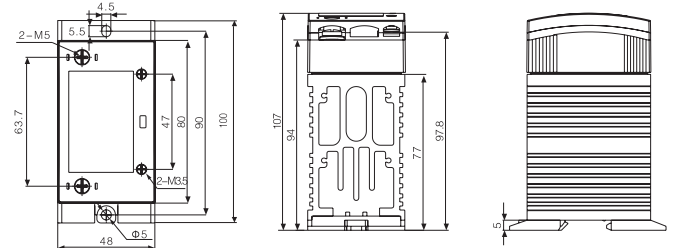
### Schematic

Fig. 1



### Dimensions mm

Fig. 2





- High load voltage - up to 480VAC
- 4 - 32VDC or 90 - 250VAC control voltage
- Single phase, zero crossover switching
- LED control input indicator
- Integrated heatsink
- DIN rail or chassis mounting



### 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 $V_{pt}$	900V
Minimum load current	0.1A	
Inrush current (max.)	10ms	450A
$I^2t$	A <sup>2</sup> s	880
Switch type	Zero crossover (consult factory for Random)	

### Input (control)

Control voltage	VDC	DC: 4 ~ 32VDC / AC: 90 ~ 250VAC
Control current	mA	<20
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

### Environmental

Dimensions	L x W x H	100 x 48 x 107mm
Weight	approx.	940g

#### Note:

All SSR's should be protected by fast acting "semiconductor" fuses.

Circuit breakers and normal fuses are not quick enough to protect the SSR in the event of a current surge or spike.

It is recommended that load power is kept to no more than 70% of the SSR's rating to avoid unexpected issues in the event of variations in the load and ambient temperature.

Transfer Pads and Heatsinks for Durakool SSR relays can be found on pages 16 - 18.

### Ordering Code

S D A 1 Z - 4 0 K - D

#### Series

#### Switching

Z: Zero Crossover

#### Load current

40: 40A

#### Load voltage

K: 40 to 480VAC

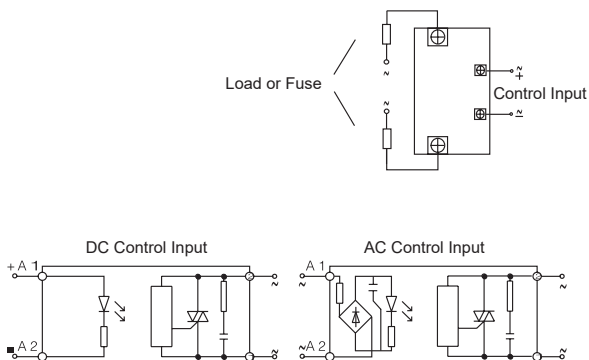
#### Control voltage input

A: 90 ~ 250VAC

D: 4 ~ 32VDC

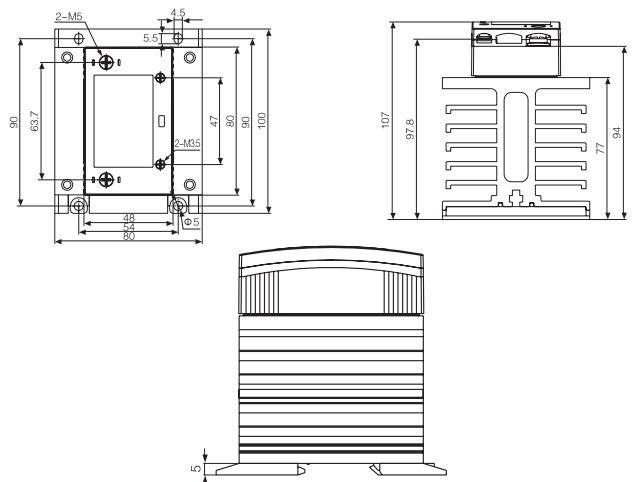
### Schematic

Fig. 1



### Dimensions mm

Fig. 2





- High load voltage - up to 480VAC
- 4 - 32VDC or 90 - 250VAC control voltage
- Single phase, zero crossover switching
- LED control input indicator
- Integrated heatsink
- DIN rail or chassis mounting



### 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 $V_{pt}$	900V
Minimum load current	0.1A	
Inrush current (max.)	10ms	60A: 650A / 80A: 900A
$I^2t$	A <sup>2</sup> s	60A: 2100 / 80A: 4050
Switch type	Zero crossover (consult factory for Random)	

### Input (control)

Control voltage	VDC	DC: 4 ~ 32VDC / AC: 90 ~ 250VAC
Control current	mA	<20
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

### Environmental

Dimensions	L x W x H	100 x 110 x 127mm
Weight	approx.	940g

#### Note:

All SSR's should be protected by fast acting "semiconductor" fuses.

Circuit breakers and normal fuses are not quick enough to protect the SSR in the event of a current surge or spike.

It is recommended that load power is kept to no more than 70% of the SSR's rating to avoid unexpected issues in the event of variations in the load and ambient temperature.

Transfer Pads and Heatsinks for Durakool SSR relays can be found on pages 16 - 18.

### Ordering Code

S D A 1 Z - 6 0 K - D

#### Series

#### Switching

Z: Zero Crossover

#### Load current

60: 60A

80: 80A

#### Load voltage

K: 40 to 480VAC

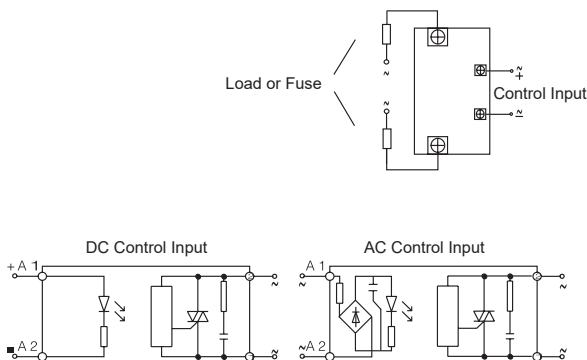
#### Control voltage input

A: 90 ~ 250VAC

D: 4 ~ 32VDC

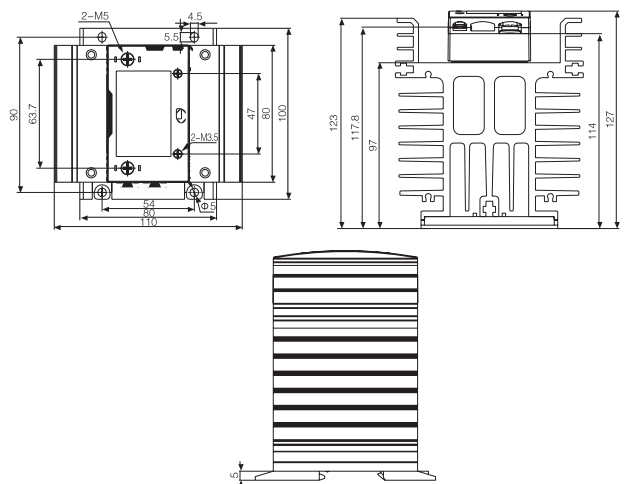
### Schematic

Fig. 1



### Dimensions mm

Fig. 2





- High load voltage - up to 480VAC
- 4 - 32VDC or 90 - 250VAC control voltage
- Three phase, zero crossover switching
- LED control input indicator
- Integrated heatsink
- DIN rail or chassis mounting

### 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 $V_{pt}$	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 crossover (consult factory for Random)	

### Input (control)

Control voltage	VDC	DC: 4 ~ 32VDC / AC: 90 ~ 250VAC
Control current	mA	<25
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

### Environmental

Dimensions	L x W x H	100 x 110 x 80mm
Weight	approx.	672g

#### Note:

All SSR's should be protected by fast acting "semiconductor" fuses.

Circuit breakers and normal fuses are not quick enough to protect the SSR in the event of a current surge or spike.

It is recommended that load power is kept to no more than 70% of the SSR's rating to avoid unexpected issues in the event of variations in the load and ambient temperature.

Transfer Pads and Heatsinks for Durakool SSR relays can be found on pages 16 - 18.



### Ordering Code

S D A 3 Z - 1 0 K - D

#### Series

#### Switching

Z: Zero Crossover

#### Load current

10: 10A

15: 15A

#### Load voltage

K: 40 to 480VAC

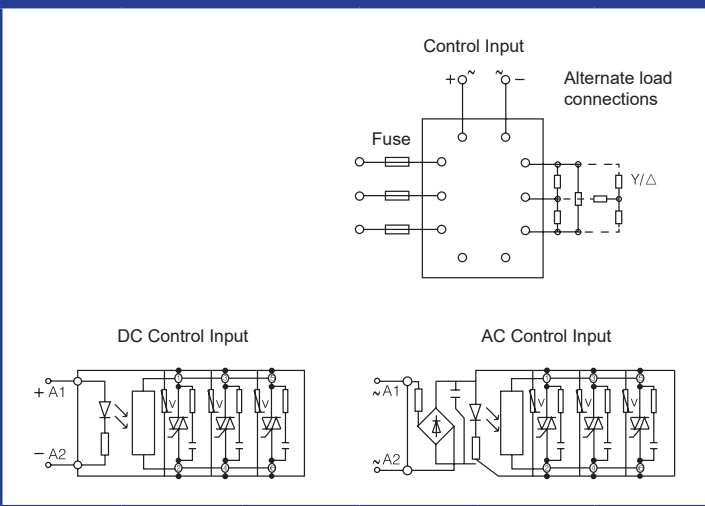
#### Control voltage input

A: 90 ~ 250VAC

D: 4 ~ 32VDC

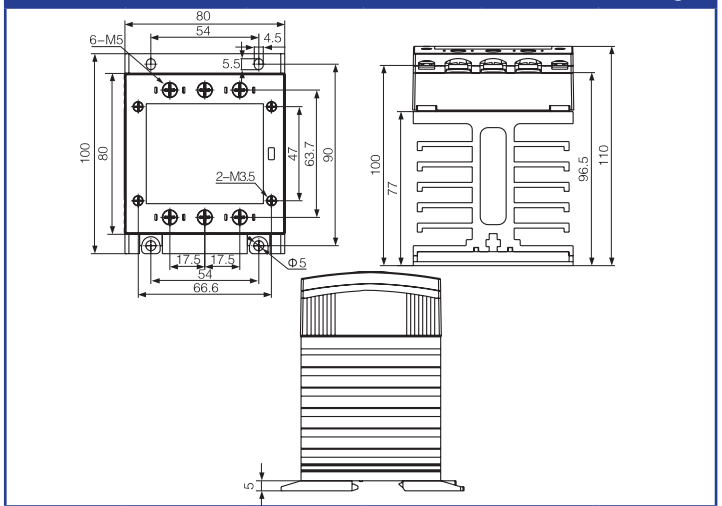
### Schematic

Fig. 1

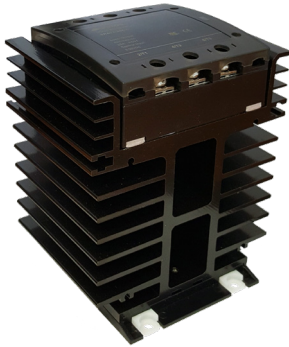


### Dimensions mm

Fig. 2







- High load voltage - up to 480VAC
- 4 - 32VDC or 90 - 250VAC control voltage
- Three phase, zero crossover switching
- LED control input indicator
- Integrated heatsink
- DIN rail or chassis mounting



### 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 $V_{pt}$	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
Switch type	Zero crossover (consult factory for Random)	

### Input (control)

Control voltage	VDC	DC: 4 ~ 32VDC / AC: 90 ~ 250VAC
Control current	mA	<20
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

### Environmental

Dimensions	L x W x H	100 x 110 x 130mm
Weight	approx.	982g

#### Note:

All SSR's should be protected by fast acting "semiconductor" fuses.

Circuit breakers and normal fuses are not quick enough to protect the SSR in the event of a current surge or spike.

It is recommended that load power is kept to no more than 70% of the SSR's rating to avoid unexpected issues in the event of variations in the load and ambient temperature.

Transfer Pads and Heatsinks for Durakool SSR relays can be found on pages 16 - 18.

### Ordering Code

S D A 3 Z - 2 5 K - A

#### Series

#### Switching

Z: Zero Crossover

#### Load current

20: 20A

25: 25A

30: 30A

#### Load voltage

K: 40 to 480VAC

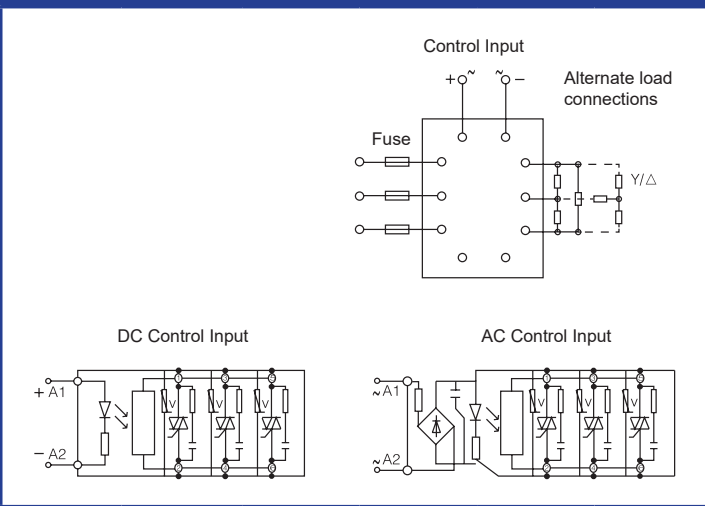
#### Control voltage input

A: 90 ~ 250VAC

D: 4 ~ 32VDC

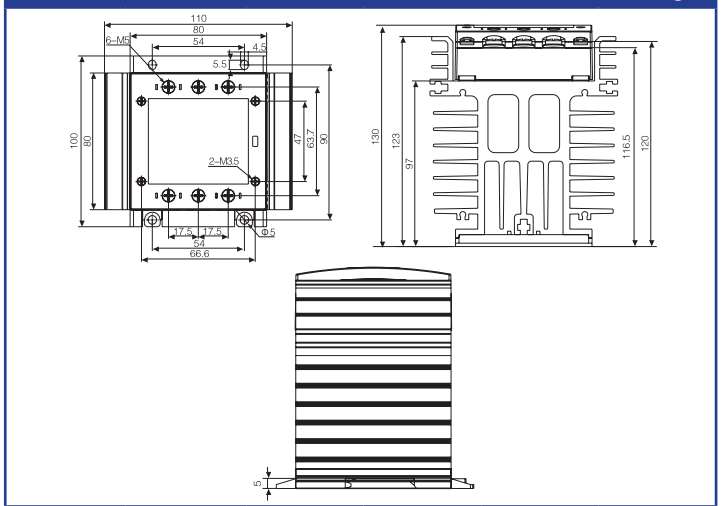
### Schematic

Fig. 1



### Dimensions mm

Fig. 2





- High load voltage - up to 480VAC
- 4 - 32VDC or 90 - 250VAC control voltage
- Three phase, zero crossover switching
- LED control input indicator
- Integrated heatsink, complete with fan
- DIN rail or chassis mounting

### 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 $V_{pt}$ 900V
Minimum load current	0.1A
Inrush current (max.)	10ms 450A
$I^2t$	A <sup>2</sup> s 880
Switch type	Zero crossover (consult factory for Random)

### Input (control)

Control voltage	VDC DC: 4 ~ 32DC / AC: 90 ~ 250AC
Control current	mA <20
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

### Environmental

Dimensions	L x W x H	125 x 110 x 130mm
Weight	approx.	1300g

#### Note:

All SSR's should be protected by fast acting "semiconductor" fuses.

Circuit breakers and normal fuses are not quick enough to protect the SSR in the event of a current surge or spike.

It is recommended that load power is kept to no more than 70% of the SSR's rating to avoid unexpected issues in the event of variations in the load and ambient temperature.

Transfer Pads and Heatsinks for Durakool SSR relays can be found on pages 16 - 18.



### Ordering Code

S D A 3 Z - 4 0 K - D

#### Series

#### Switching

Z: Zero Crossover

#### Load current

40: 40A

#### Load voltage

K: 40 to 480VAC

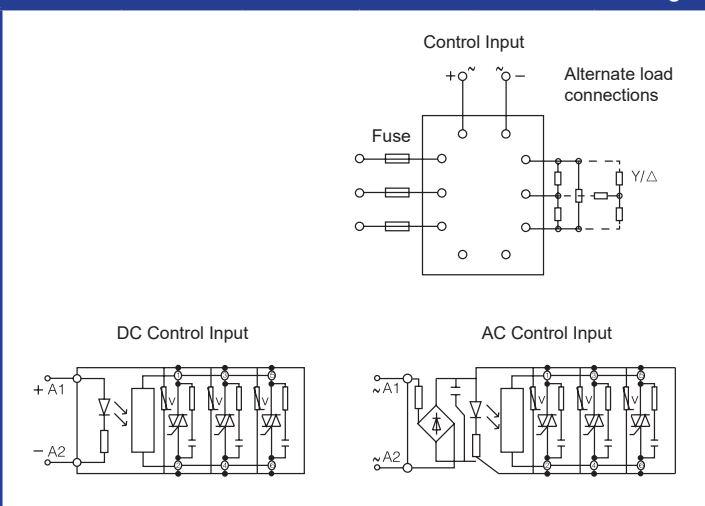
#### Control voltage input

A: 90 ~ 250VAC

D: 4 ~ 32VDC

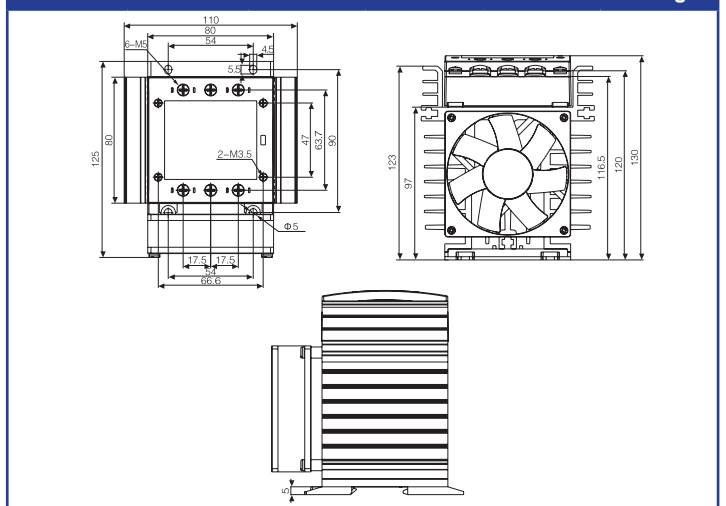
### Schematic

Fig. 1



### Dimensions mm

Fig. 2





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



### 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 $V_{pt}$	900V
Minimum load current	0.1A	
Inrush current (max.)	10ms	60A: 720A / 80A: 1000A
$I^2t$	A <sup>2</sup> s	60A: 2600 / 80A: 5000
Switch type	Zero crossover (consult factory for Random)	

### Input (control)

Control voltage	VDC	DC: 4 ~ 32VDC / AC: 90 ~ 250VAC
Control current	mA	<20
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

### Environmental

Dimensions	L x W x H	100 x 110 x 127mm
Weight	approx.	940g

#### Note:

All SSR's should be protected by fast acting "semiconductor" fuses.

Circuit breakers and normal fuses are not quick enough to protect the SSR in the event of a current surge or spike.

It is recommended that load power is kept to no more than 70% of the SSR's rating to avoid unexpected issues in the event of variations in the load and ambient temperature.

Transfer Pads and Heatsinks for Durakool SSR relays can be found on pages 16 - 18.

### Ordering Code

S D B 1 Z - 6 0 U - D

#### Series

#### Switching

Z: Zero Crossover

#### Load current

60: 60A

80: 80A

#### Load voltage

U: 60 to 660VAC

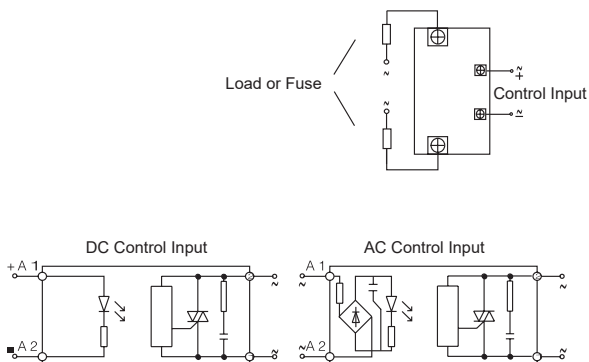
#### Control voltage input

A: 90 ~ 250VAC

D: 4 ~ 32VDC

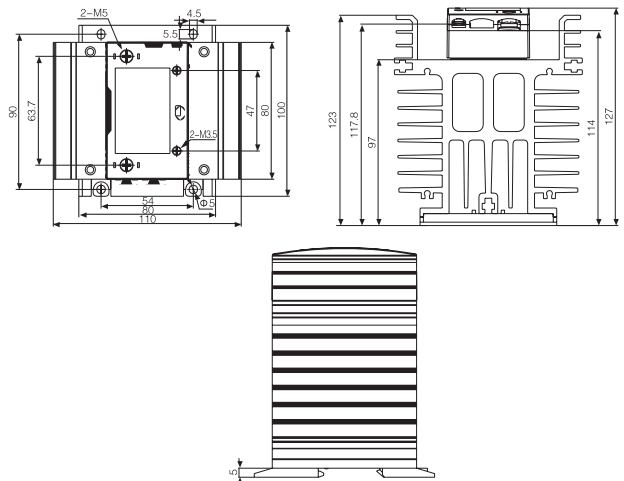
### Schematic

Fig. 1



### Dimensions mm

Fig. 2





- 10 ~ 80 Amps, 480VAC max
- Single phase, zero crossover switching
- DC & AC control input options
- LED control input indicator
- Integral terminal protection covers



### 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 $V_{pt}$	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: 2100 / 80A: 4050
Switch type	Zero crossover (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

### Environmental

Dimensions	L x W x H	60 x 45.1 x 28mm
Weight	approx.	98g

#### Note:

All SSR's should be protected by fast acting "semiconductor" fuses.

Circuit breakers and normal fuses are not quick enough to protect the SSR in the event of a current surge or spike.

It is recommended that load power is kept to no more than 70% of the SSR's rating to avoid unexpected issues in the event of variations in the load and ambient temperature. These SSR's are designed to be used with a suitable heat sink.

Transfer Pads and Heatsinks for Durakool SSR relays can be found on pages 16 - 18.

### Ordering Code

S R A 1 Z - 2 5 L - A

#### Series

#### Switching

Z: Zero Crossover

#### Load current

10: 10A  
20: 20A  
25: 25A  
30: 30A  
40: 40A  
60: 60A  
80: 80A

#### Load voltage

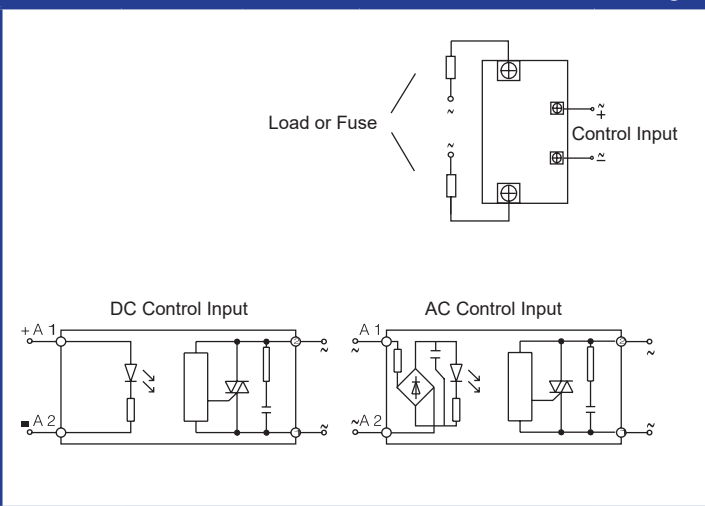
K: 40 to 480VAC  
L: 24 to 240VAC

#### Control voltage input

A: AC  
D: DC

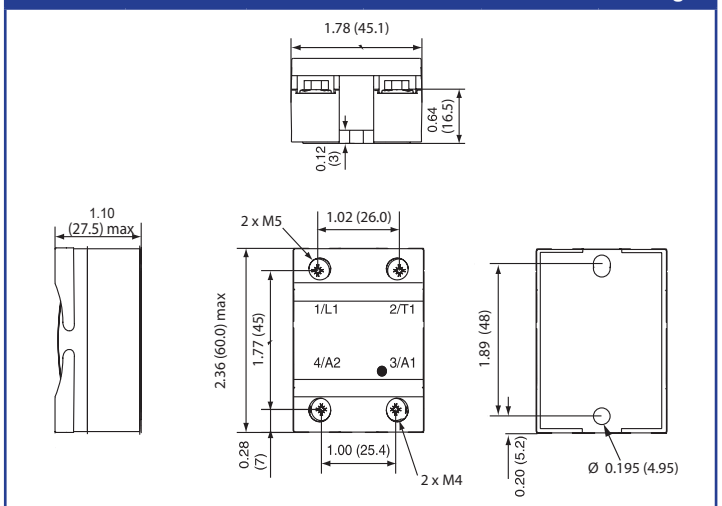
### Schematic

Fig. 1



### Dimensions in mm

Fig. 2





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



### 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, 24 ~ 480V
Maximum peak voltage	AC $V_{pt}$	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 crossover	

### Input (control)

Control voltage	VDC	4 ~ 32
Control current	mA	<20
Turn-on voltage (min.)	$V_{min}$	DC: 3.5
Turn-on voltage (max.)	$V_{max}$	DC: 35
Turn-off voltage	V	DC: 1

### Environmental

Dimensions	L x W x H	57 x 44 x 30.3mm
Weight	approx.	98g

#### Note:

All SSR's should be protected by fast acting "semiconductor" fuses.

Circuit breakers and normal fuses are not quick enough to protect the SSR in the event of a current surge or spike.

It is recommended that load power is kept to no more than 70% of the SSR's rating to avoid unexpected issues in the event of variations in the load and ambient temperature. These SSR's are designed to be used with a suitable heat sink.

Transfer Pads and Heatsinks for Durakool SSR relays can be found on pages 16 - 18.

### Ordering Code

S R A 2 Z - 2 5 K - D

#### Series

#### Switching

Z: Zero Crossover

#### Load current

10: 10A  
20: 20A  
15: 15A  
25: 25A  
30: 30A  
40: 40A

#### Load voltage

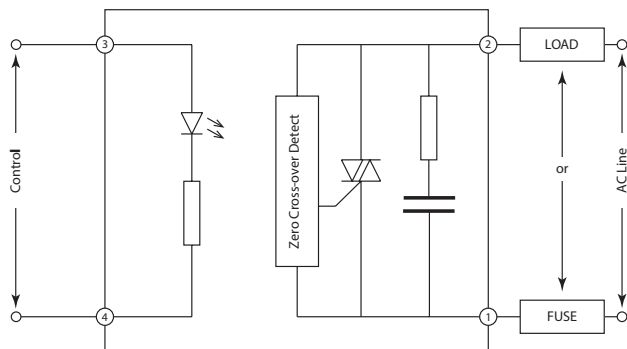
K: 24 to 480VAC  
L: 24 to 240VAC

#### Control voltage input

D: 4 ~ 32VDC

### Schematic

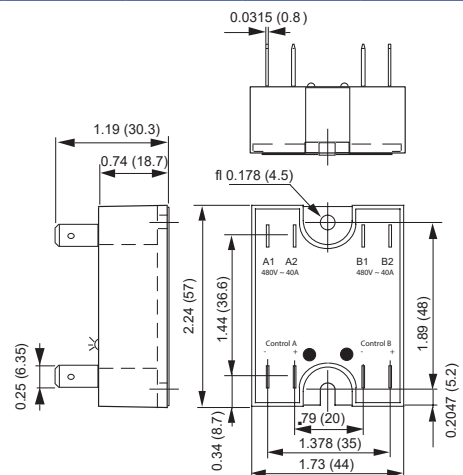
Fig. 1



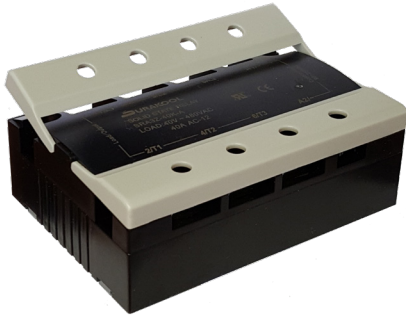
DC Control x 2

### Dimensions in mm

Fig. 2







- High load voltage - up to 480VAC
- 4 - 32VDC or 90 - 250VAC control voltage
- Zero crossover switching
- LED control input indicator
- Captive finger protection covers for terminals



### 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 $V_{pt}$	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: 2100 / 80A: 4050
Switch type	Zero crossover (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

### Environmental

Dimensions	L x W x H	106 x 75 x 38mm
Weight	approx.	Various 365g (10A) ~ 500g (80A)

#### Note:

All SSR's should be protected by fast acting "semiconductor" fuses.

Circuit breakers and normal fuses are not quick enough to protect the SSR in the event of a current surge or spike.

It is recommended that load power is kept to no more than 70% of the SSR's rating to avoid unexpected issues in the event of variations in the load and ambient temperature. These SSR's are designed to be used with a suitable heat sink.

Transfer Pads and Heatsinks for Durakool SSR relays can be found on pages 16 - 18.

### Ordering Code

S R A 3 Z - 2 5 K - D

#### Series

#### Switching

Z: Zero Crossover

#### Load current

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

#### Load voltage

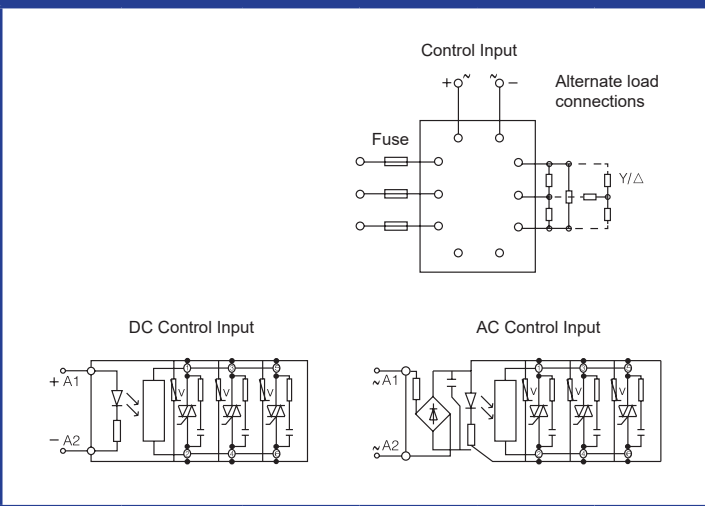
- K: 40 to 480VAC
- L: 24 to 240VAC

#### Control voltage input

- A: AC
- D: DC

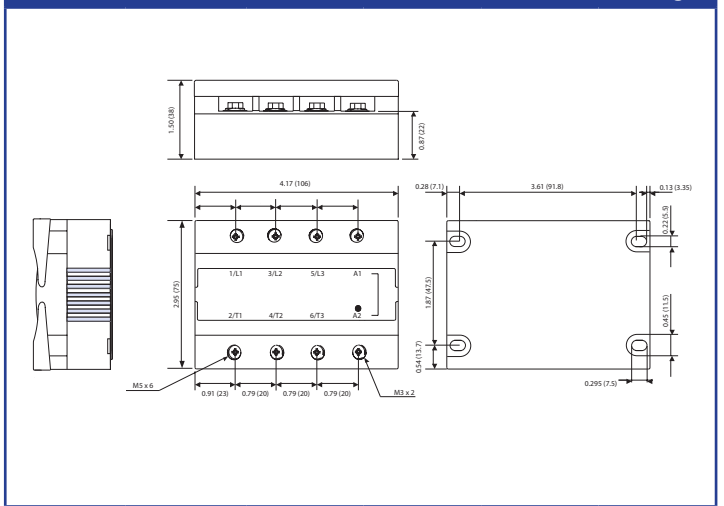
### Schematic

Fig. 1



### Dimensions mm

Fig. 2





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



### Output (Load)

Load type	SPST-NO (1 N/O) Resistive	
Load current	60A ~ 150A, 200A ~ 350A	
Load switching voltage	AC $V_{rms}$	60 ~ 1200V
Maximum peak voltage	AC $V_{pt}$	1600V
$I^2t$	A <sup>2</sup> s	60A: 3200 / 80A: 5000 / 100A: 7200 / 120A: 11250 /
		150A: 20000 / 200A: 31250 / 250A: 45000 /
		300A: 61250 / 350A: 80000

### Input (control)

Control voltage	V	DC: 3 ~ 14 or 3 ~ 32
Control current	mA	5 ~ 25
Turn-on voltage (min.)	$V_{min}$	DC: 3
Turn-on voltage (max.)	$V_{max}$	DC: 35
Turn-off voltage	V	DC: 1

### Environmental

Dimensions L x W x H	small case	94 x 25 x 36.2mm
	large case	94 x 34 x 43mm
Weight approx.	small case	135g
	large case	235g

Note:

All SSR's should be protected by fast acting "semiconductor" fuses.

Circuit breakers and normal fuses are not quick enough to protect the SSR in the event of a current surge or spike.

It is recommended that load power is kept to no more than 70% of the SSR's rating to avoid unexpected issues in the event of variations in the load and ambient temperature. These SSR's are designed to be used with a suitable heat sink.

Transfer Pads and Heatsinks for Durakool SSR relays can be found on pages 16 - 18.

### Ordering Code

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

Series

Input control voltage

014: 3 ~ 14

032: 3 ~ 32

Case sealing

F: Fully sealed

Output (load) voltage

120: 60 ~ 1200VAC

Load current

060: 60A

080: 80A

100: 100A small case size

120: 120A

150: 150A

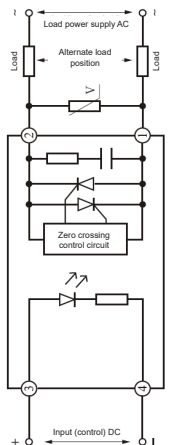
200: 200A

300: 300A large case size

350: 350A

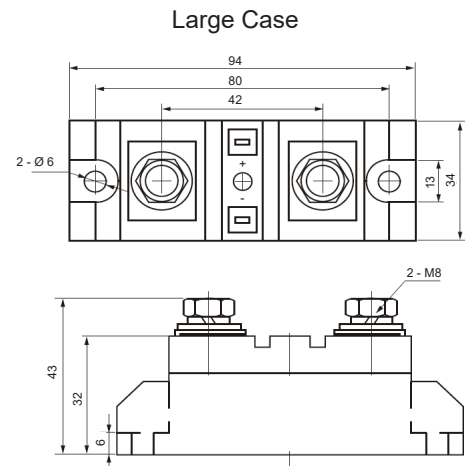
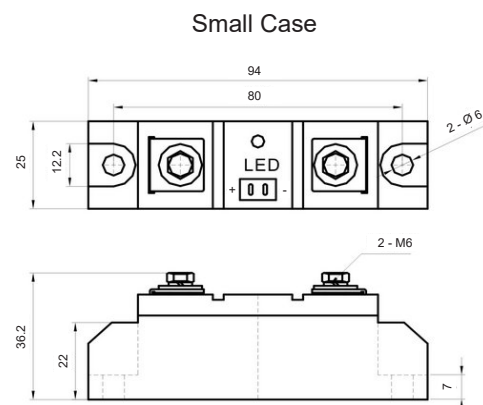
### Schematic

Fig. 1



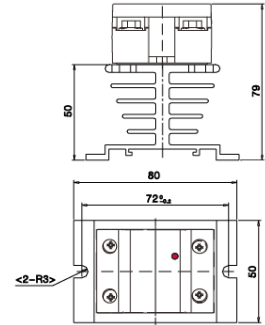
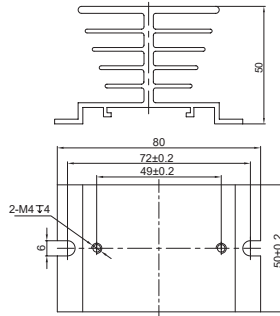
### Dimensions mm

Fig. 2

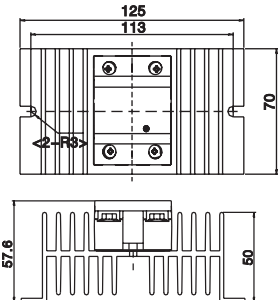
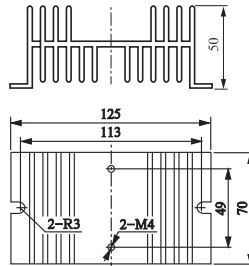
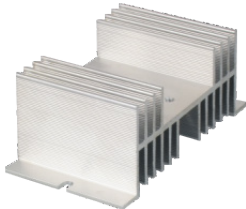


Recommended heat sinks				Table 1
SSR Series	SRA1*-10*-*	SRA1*-25*-*	SRA1*-60*-*	SRA1*-80*-*
	SRA1*-15*-*	SRA1*-30*-*		
	SRA1*-20*-*	SRA1*-40*-*		
Current Rating	<20A	<40A	<60A	<80A
Heat Sink	DHS01	DHS02	DHS03	DHS04
Heat Sink Rating °C/W	2.19	1.49	1.35	1.07

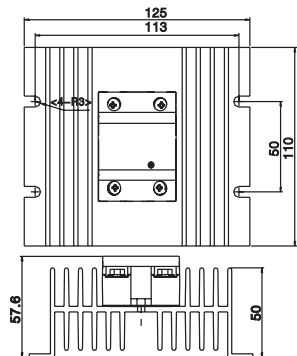
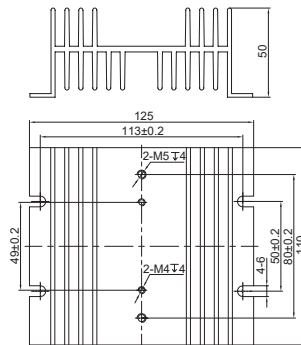
DHS01



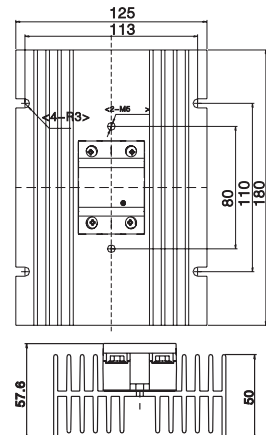
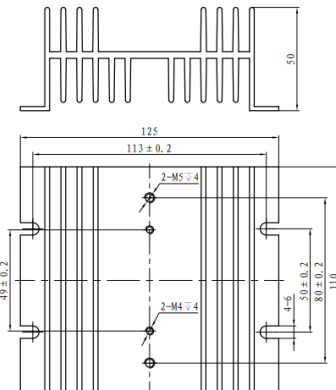
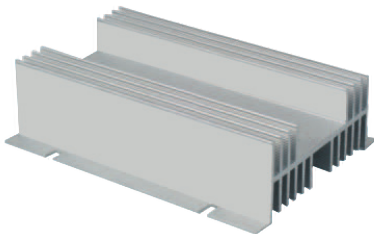
DHS02



DHS03

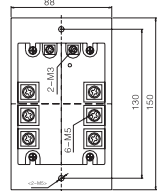
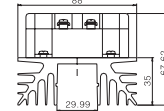
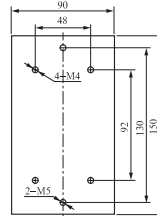
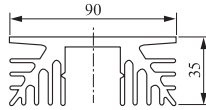


DHS04

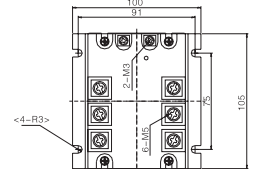
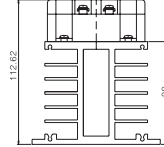
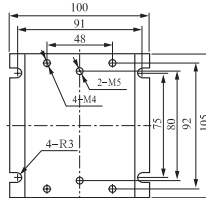
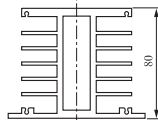


Recommended heat sinks				Table 1
SSR Series	SRA3*-10*-*	SRA3*-25*-*	SRA3*-40*-*	SRA3*-60*-*
	SRA3*-20*-*	SRA3*-30*-*		SRA3*-80*-*
Current Rating	≤ 20A	≤ 40A	≤ 40A	≤ 80A
Heat Sink	DHS05	DHS06	DHS07	DHS08 (or DHS09)
Heat Sink Rating °C/W	0.93	0.65	0.48	0.44 (0.39)

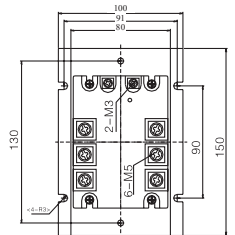
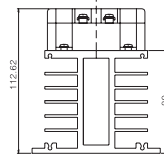
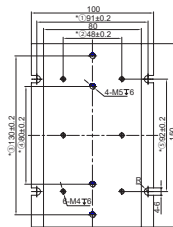
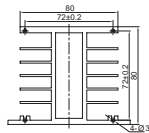
DHS05



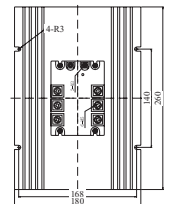
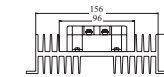
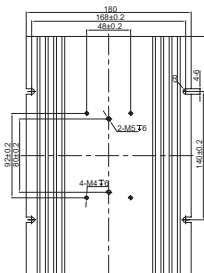
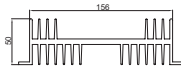
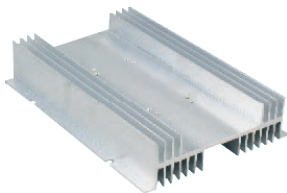
DHS06



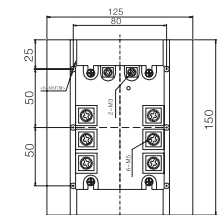
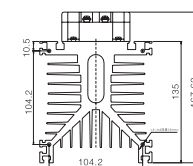
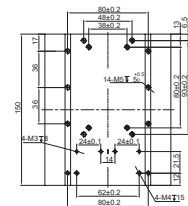
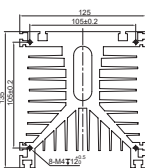
DHS07

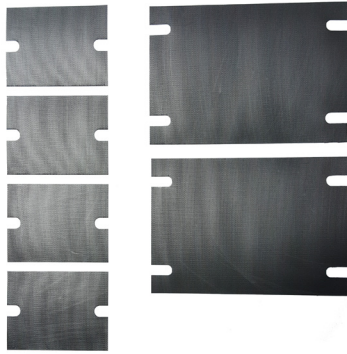


DHS08



DHS09





- Easy to use
- Designed for use with Durakool SSRs
- Clean alternative to thermal grease
- Eliminates contamination concerns
- Creates air-free interface
- Fibreglass re-inforced for strength
- RoHS Compliant

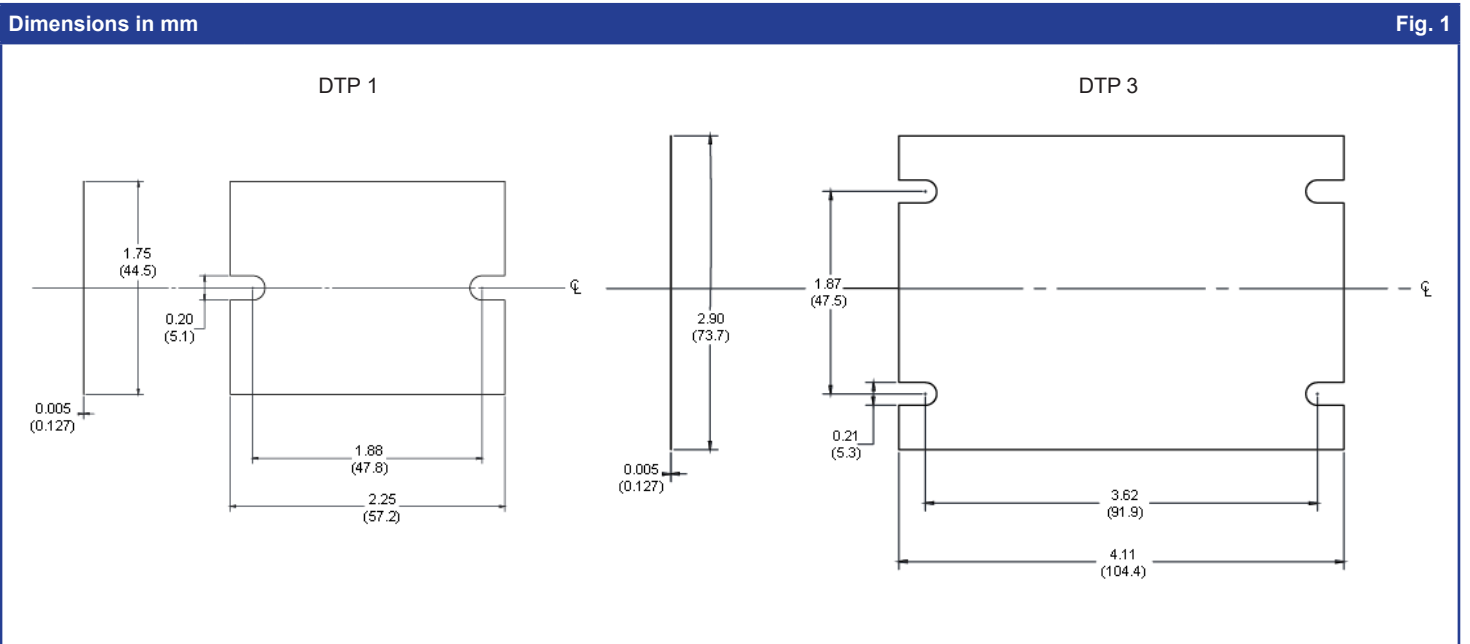
When clamped between the heat sink and the solid-state relay, the heat transfer pad conforms to the surface textures creating an air free interface between the heat generating SSR and the heat sink.

General data	
Color	Dark Grey/Black
Thickness	0.005" / 0.127mm
Adhesive	One side, pressure sensitive
Thermal Impedance	0.48°C in <sup>2</sup> /W @ 50psi <sup>1</sup>
Dielectric Breakdown	Non-insulating
Volume Resistivity	10 <sup>2</sup> Ohm
Operating Temperature Range	-60°C to 180°C / -76°F to 356°F
Suggested Clamping Pressure	10 to 200psi

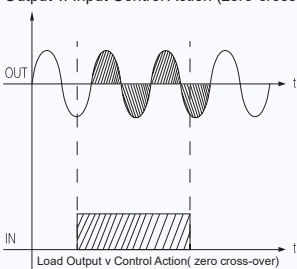
<sup>1</sup> Actual application performance will depend upon surface roughness, flatness and pressure applied.

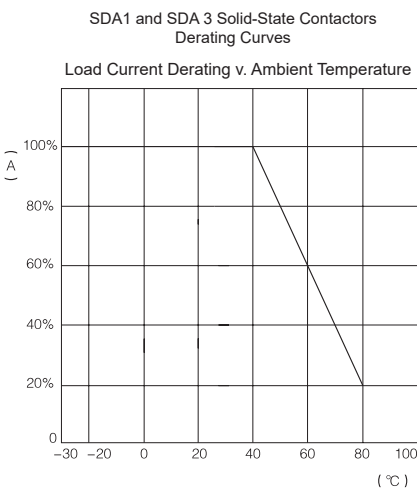
**Installation:** Ensure that both mating surfaces are clean, dust and grease free. Carefully remove protective backing from the thermal pad and apply pad to the base of the solid-state relay. Ensure that any air bubbles are eliminated and that there are no bumps or ridges. Ensure there are no dust or dirt particules on the heat sink and apply solid-state relay, with the pad, to the heat sink and bolt down firmly.

**NB:** Failure to remove the backing will compromise the performance and may cause the SSR to fail.





General data:	
Operating time	approx. ½ cycle of load frequency + ≤1ms
Release time	approx. ½ cycle of load frequency + ≤1ms
<p>Load Output v. Input Control Action (zero-crossover)</p> 	
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



### Heat sinks and mounting considerations

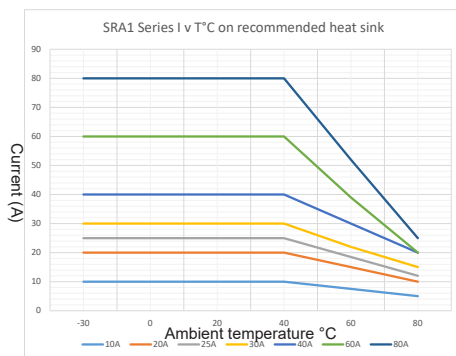
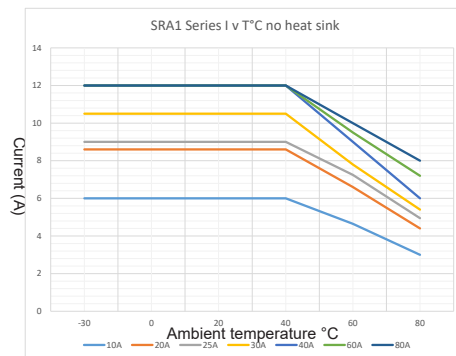
The SDA & SDB series of solid-state relays & contactors have integral heat sinks. However, due consideration must be given to cooling air flow over the heat sink to ensure reliable operation and avoid premature failure. If used in an enclosed cabinet, providing vents or forced air ventilation may be necessary. 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.

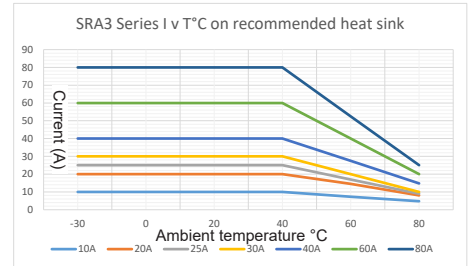
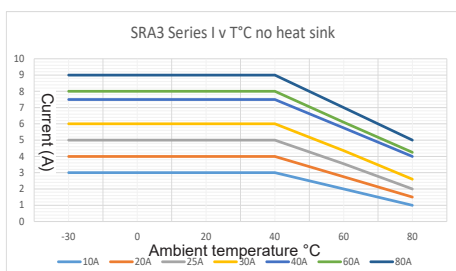
The larger SDA3 Contactors are provided with a cooling fan already attached. It is important that air flow to this fan is clean and unimpeded. Dust build up on the fan or the heat sink will degrade performance of the solid-state contactor.

The SRA1 & SRA3 series of panel mount SSR's are designed to be mounted on individual heat sinks, wherever possible. Referring 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 compound 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 70% 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 a 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 SSR'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<sup>2</sup>t 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<sup>2</sup>t value. **The fuse I<sup>2</sup>t value must be selected such that it is less than the I<sup>2</sup>t 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!

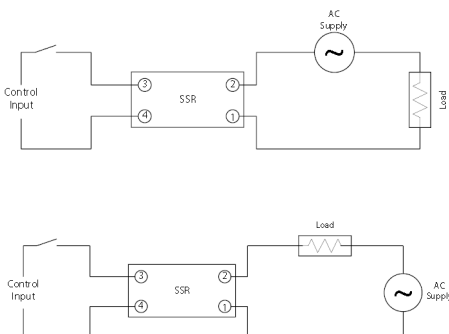
Occasionally, problems can occur when controlling loads where the voltage and current are out of phase and a sudden voltage rise occurs during turn-off. In these circumstances, the SSR may fail to turn-off. Likewise, when controlling loads with voltage and current out of phase with a zero crossover type, 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.

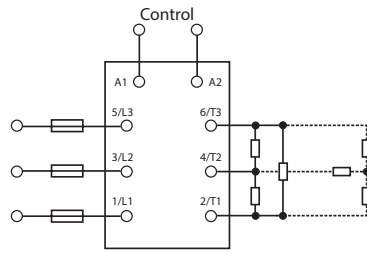
### Load Considerations

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

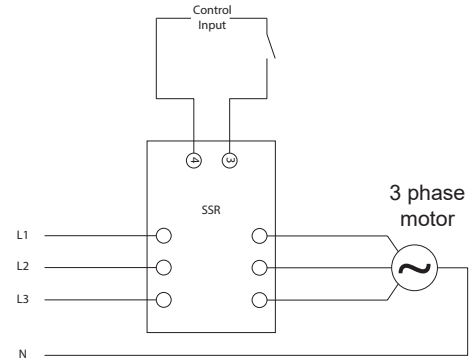
Tungsten or halogen lamps have a high inrush current at turn on, which can be 7 or 8 times the steady current, sometimes even more for zero crossover SSR's rising to 9 to 12 times (in the worst case) for random turn on SSR's. When choosing an SSR to switch these loads, due consideration should be taken 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.

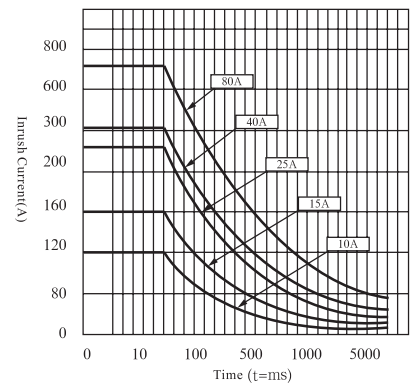
When choosing a SSR to switch a motor load, calculations must take into account the initial inrush current which can be as much as 5 or 7 times the normal operating current. Thought must also be given to the fact that the motor may stall which could result in a current equal or greater than the LRA value.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



The logo for DURAKOOL, featuring a stylized white 'D' followed by the word 'URAKOOL' in a bold, italicized, sans-serif font. A registered trademark symbol (®) is located at the end of the word. The background of the entire page is a dynamic, abstract composition of blue and white light trails that create a sense of motion and depth, resembling a stylized 'X' or a series of intersecting paths.

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