

# Solid State Relays Zero Switching Types Solid State Contactor



- Product Width ranging from 17.5mm up to 70mm
- Rated Operational voltage: Up to 600VAC
- Rated Operational current: Up to 85AAC @ 40°C
- **Line & Load accepts:** 10-18 AWG (20 & 30A units)  
3-10 AWG (40, 60 & 85A units)
- Up to 6600A<sup>2</sup>s for I<sup>2</sup>t and 1200Vp blocking voltage
- Control voltages: 3-32 VDC, 20-275 VAC (24-190 VDC)  
IP20 protection
- Design according to EN/IE60947-4-2, EN/IEC60947-4-3, EN/IEC62314, UL508, CSA 22-2 No. 14-10
- Integrated voltage transient protection with varistor
- RoHS compliant
- Short circuit current rating: 100kA
- VDE approval
- Germanischer Lloyd approval<sup>1</sup>

## Product Description

This new range of solid state contactors presents an unique opportunity to maximize efficiency in panel space and is an evolution of solid state switches. The nominal current ratings are at 40°C. The smallest width is 17.5mm and is rated at 20 AAC. Power and control terminals allow for safe looping of cables.

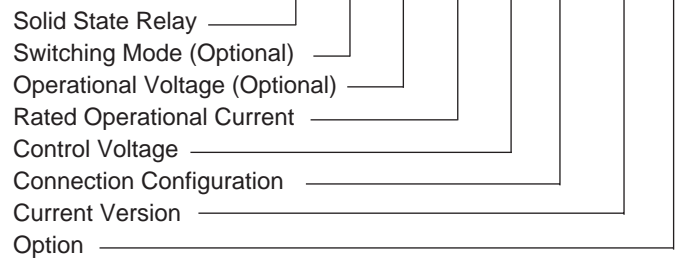
Voltage transient protection is standard across the output with a varistor. Specifications are stated at 25°C unless otherwise noted.

1. Germanischer Lloyd approval applicable only to models SS20A.-1, SS20D.-1, SS30A.-1 and SS30D.-1.

## Ordering Key

## Ordering Key

**SS D L 40 D U -1 P**



## Selection Guide (zc = Zero Cross Switching, IO = Instant-On Switching, OTP = Over Temperature Protection)

Rated Output Voltage	Blocking Voltage	Connection Control/Power	Control Voltage	Rated Operational Current @ 40°C		
				20 AAC	30 AAC	30 AAC
230 VAC, ZC	800Vp	Screw/Box Clamp	3 - 32 VDC	SSL20DU-1	SSL30DU-1	-
		Screw <sup>3</sup> /Screw	3 - 32 VDC <sup>4</sup>	SSL20DE-1	SSL30DE-1	SSL30DE-1P
		Screw/Box Clamp	20 - 275 VAC, 24 - 190 VDC	SSL20AU-1	SSL30AU-1	-
		Screw/Screw	20 - 275 VAC, 24 - 190 VDC	SSL20AE-1	SSL30AE-1	-
600 VAC, ZC	1200Vp	Screw/Box Clamp	4 - 32 VDC	SS20DU-1	SS30DU-1	-
		Screw/Screw	4 - 32 VDC	SS20DE-1	SS30DE-1	SS30DE-1P
		Screw/Box Clamp	20 - 275 VAC, 24 - 190 VDC	SS20AU-1	SS30AU-1	-
		Screw/Screw	20 - 275 VAC, 24 - 190 VDC	SS20AE-1	SS30AE-1	-
600 VAC, IO	1200Vp	Screw/Box Clamp	4 - 32 VDC	SSD20DU-1	SSD30DU-1	-
		Screw/Screw	4 - 32 VDC	SSD20DE-1	SSD30DE-1	-

Rated Output Voltage	Blocking Voltage	Connection Control/Power	Control Voltage	Rated Operational Current @ 40°C			
				40 AAC	40 AAC + OTP	60 AAC	60 AAC + OTP
230 VAC, ZC	800Vp	Screw/Box Clamp	3 - 32 VDC	SSL40D.-1	-	SSL60D.-1	-
		Screw/Box Clamp	20 - 275 VAC, 24 - 190 VDC	SSL40A.-1	-	SSL60A.-1	-
600 VAC, ZC	1200Vp	Screw <sup>3</sup> /Box Clamp	4 - 32 VDC <sup>4</sup>	SS40D.-1	SS40D.-1P	SS60D.-1	SS60DU-1P
		Screw <sup>3</sup> /Box Clamp	20 - 275 VAC, 24 - 190 VDC	SS40A.-1	SS40A.-1P	SS60A.-1	SS60AU-1P
600 VAC, IO	1200Vp	Screw/Box Clamp	4 - 32 VDC	SSD40D.-1	-	SSD60D.-1	-

Rated Output Voltage	Blocking Voltage	Connection Control/Power	Control Voltage	Rated Operational Current @ 40°C
				85 AAC - fan + OTP
230 VAC, ZC	800Vp	Box Clamp/Box Clamp	5 - 32 VDC	SSL90D.-1P
600 VAC, ZC	1200Vp	Box Clamp/Box Clamp	5 - 32 VDC	SS90D.-1P
		Box Clamp/Box Clamp	20 - 275 VAC, 24 - 190 VDC	SS90A.-1P
600 VAC, IO	1200Vp	Box Clamp/Box Clamp	5 - 32 VDC	SSD90D.-1P

4. DC Control Voltage range for SS...DU-1P is 5- 32 VDC



## Output Voltage Specifications

	SSL...-1 (230 VAC)	SS...-1 (600 VAC)
Operational Voltage Range	24 - 240 VAC, +10%, -15% on max	42 - 600 VAC, +10%, -15% on max
Blocking Voltage	800Vp	1200Vp
Internal Varistor	275V	625V

## General Specifications

Latching Voltage (across L1-T1)	20V	Over-Voltage Category	III (fixed installations)
Operational Frequency range	45 to 65Hz	Isolation	
Power Factor	> 0.5 @ Vrated	Input to Output SS...-1	4000 Vrms
Finger Protection	IP20	SS...D.-1P	2500 Vrms
Control Input Status	Continuously ON Green LED, when control input is applied	SS...A.-1P	4000 Vrms
Pollution Degree	2 (non-conductive pollution with possibilities of condensation)	Input and Output to case SS...-1	4000 Vrms
		SS...D.-1P	4000 Vrms
		SS...A.-1P	4000 Vrms
		Input to fan/ Alarm Output SS...AU-1P	2500 Vrms

## Output Specifications (@ 25°C unless otherwise specified)

	SS.20..-1	SS.30..-1	SS.40..-1	SS.60..-1	SS.90..-1P
Rated operational current <sup>5</sup> AC-51 rating @ Ta=25°C	20 AAC	30 AAC	47.4 AAC	70.4 AAC	85 AAC
AC-51 rating @ Ta=40°C	20 AAC	30 AAC	40 AAC	60 AAC	85 AAC
AC-53a rating @ Ta=40°C	5 AAC	8 AAC	13 AAC	14.8 AAC	18 AAC
Number of motor starts (x:6, Tx:6s, F:50%) at 40°C <sup>6</sup>	30	30	30	30	30
Min. operational current	150 mAAC	250 mAAC	400 mAAC	400 mAAC	400 mAAC
Rep. overload current- (Motor Rating) PF= 0.4 - 0.5 UL508: T <sub>AMB</sub> =40°C, t <sub>ON</sub> =1s, t <sub>OFF</sub> =9s, 50 cycles	60 AAC	84 AAC	126 AAC	144 AAC	168 AAC
Maximum transient surge current (I <sub>ON</sub> )	325 Ap	600 Ap	800 Ap	800 Ap	1150 Ap
Maximum off-state leakage current	3 mA	3 mA	3 mA	3 mA	3 mA
I <sup>2</sup> t (10ms) Minimum	525 A <sup>2</sup> S	1800 A <sup>2</sup> S	3200 A <sup>2</sup> S	3200 A <sup>2</sup> S	6600 A <sup>2</sup> S
Critical dv/dt (@ Tj init = 25°C)	1000 V/us	1000 V/us	1000 V/us	1000 V/us	1000 V/us

5. See derating curves

6. Overload current profile definition: x: multiple of AC53a rating, Tx: duration of current surge, F: duty cycle

## Overtemperature alarm specifications for SS...U-1P

	SS...D.-1P	SS...A.-1P
Output type	PNP open collector	Potential Free
Normal state	Closed	Closed
Maximum current rating	50 mADC	50 mADC
Rated voltage (EN61131-2: 2003) <sup>7,8</sup> , U <sub>a</sub>	24 VDC -15%, +20%	24 VDC -15%, +20%
Rated voltage, U <sub>s</sub>	SS.90D.-1P 24 VDC ± 10%	N/A
Fan rating, U <sub>f</sub>	SS.90D.-1P N/A	24 VDC ±10 %, 50 mA nominal
Alarm voltage drop	Typical Maximum 2.8 VDC 4 VDC	1.8 VDC 3.5 VDC
Visual Indication	Continuous Red LED	Continuous Red LED
Reverse polarity protection	24 VDC	24 VDC

7: DC supply for alarm signal should be supplied from a Class 2 power source

8: Maximum voltage to be applied between 11+ and 12- (U<sub>a</sub>) terminals should be 35 VDC maximum with reference to A2-

## Input Specifications

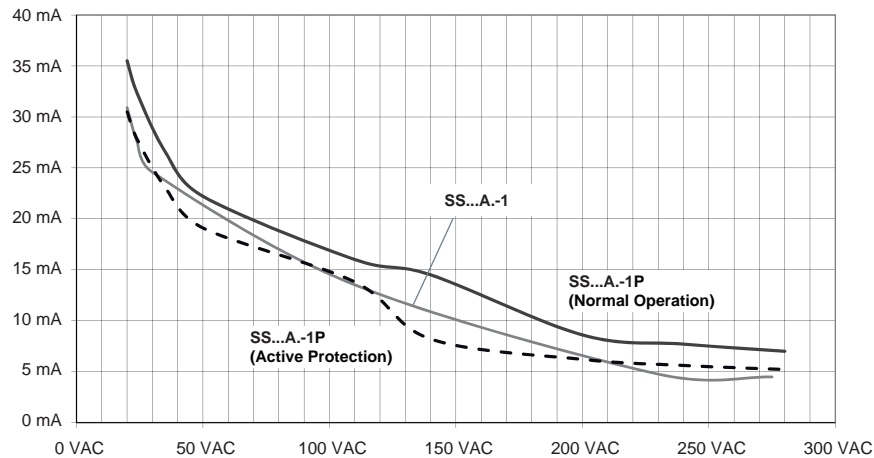
		SS...D.-1 <sup>9</sup>	SS...A.-1
Control voltage range <sup>10</sup>	SSL.....-1 (230V)	3 - 32 VDC	20 - 275 VAC, 24 (-10%) - 190 VDC
	SS.....-1 (600V)	4 - 32 VDC	20-275 VAC, 24 (-10%) - 190 VDC
	SSL.....-1P	5- 32 VDC	20-275 VAC, 24 (-10%) - 190 VDC
Pick-up voltage	SSL.....-1	3.0 VDC	20 VAC/DC
	SS.....-1	3.8 VDC	
	SS.....-1P	5 VDC	20 VAC / 24 VDC
Drop-out voltage		1 VDC	5 VAC/DC
Maximum Reverse voltage		32 VDC	-
Response time pick-up ZC (SS.....-1)		0.5 cycle + 500µs @ 24VDC	2 cycles @ 230VAC/110VDC
Response time pick-up IO (SSD.....-1)		350 µs @ 24 VDC	N/A
Response time drop-out		0.5 cycle + 500µs @ 24VDC	0.5 cycle + 40ms @ 230VAC/ 110VDC
Input current @ 40°C		See diagrams below	See diagrams below

9. DC control to be supplied by class 2 power source

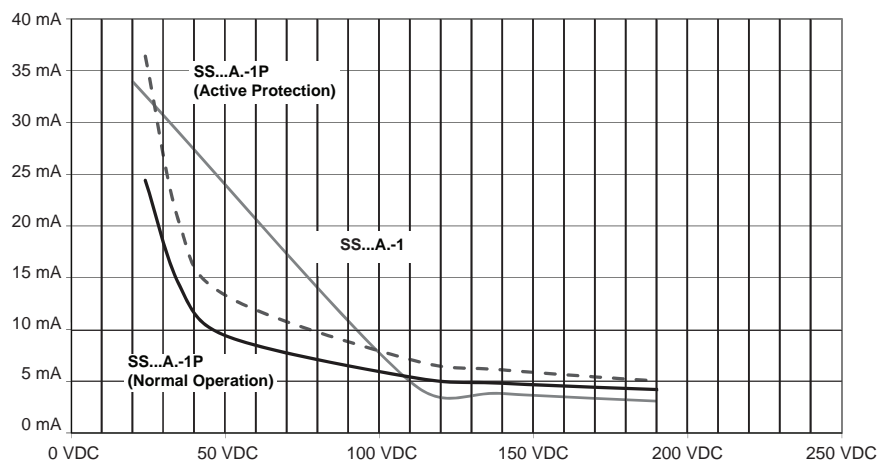
10. For GL approved models control range for SSL.....-1 is 4-32VDC and for SS.....-1 5-32VDC

SS..A...

SS...A.-1: Input Current vs. Input Voltage

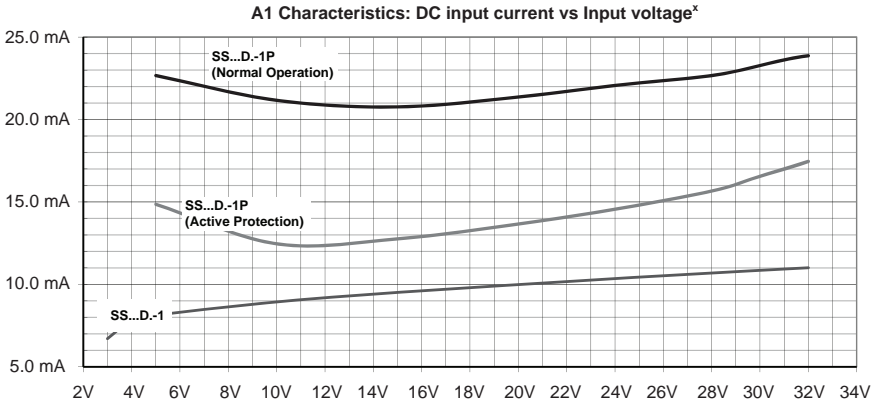


SS..A.-1: Input Current vs. Input Voltage

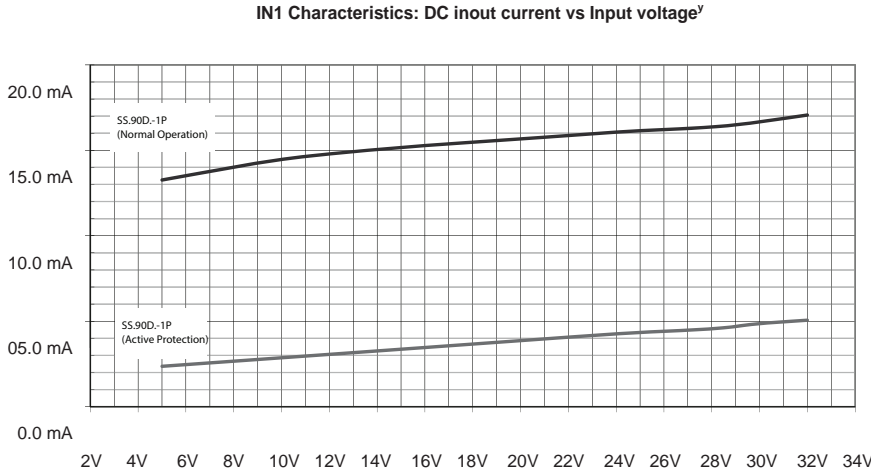


## Input Specifications (cont.)

SS..D.-1



x: Input currents for SS.20D.-1, SS.30D.-1, SS.40D.-1, SS.60D.-1

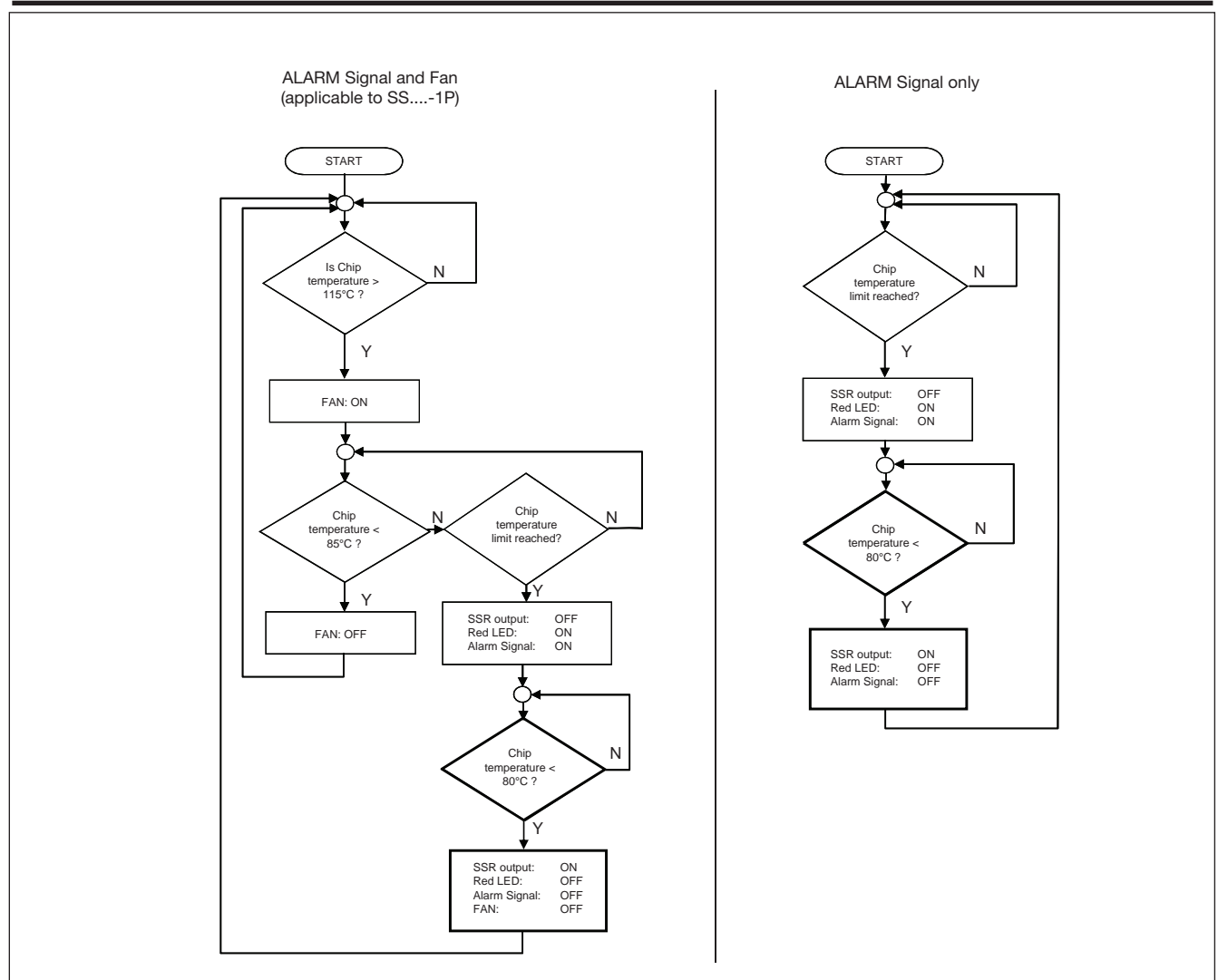


y: Input currents valid only for SS.90D.-1P

## Motor Ratings: HP (UL508) / kW (IEC60947-4-2) @ 40°C

	115 VAC	230 VAC	400 VAC	480 VAC	600 VAC
SS.20...-1	HP / 0.18 kW	1 HP / 0.37 kW	2 HP / 0.75 kW	3 HP / 1.1 kW	3 HP / 1.5 kW
SS.30...-1	¾ HP / 0.37 kW	2 HP / 1.1 kW	3 HP / 1.5 kW	5 HP / 2.2 kW	5 HP / 3.7 kW
SS.40...-1	1 HP / 0.56 kW	3 HP / 1.5 kW	5 HP / 2.2 kW	5 HP / 3.7 kW	7½ HP / 4 kW
SS.60...-1	1½ HP / 0.56 kW	3 HP / 1.5 kW	5 HP / 3 kW	7½ HP / 4 kW	10 HP / 4 kW
SS.90...-1P	2 HP / 0.75 kW	5 HP / 1.5 kW	7½ HP / 3 kW	10 HP / 4 kW	15 HP / 5.5 kW

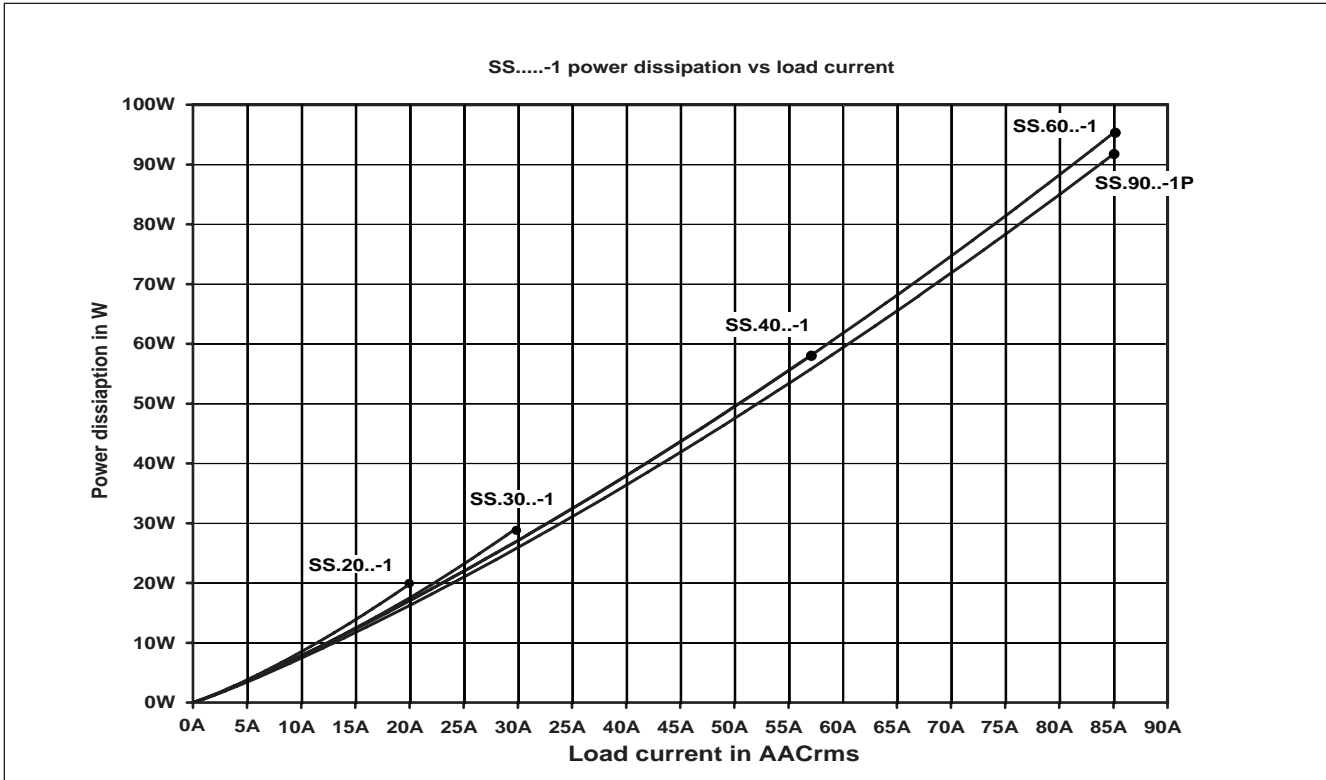
## Detailed Over Temperature Alarm Procedure (for SS....-1P)



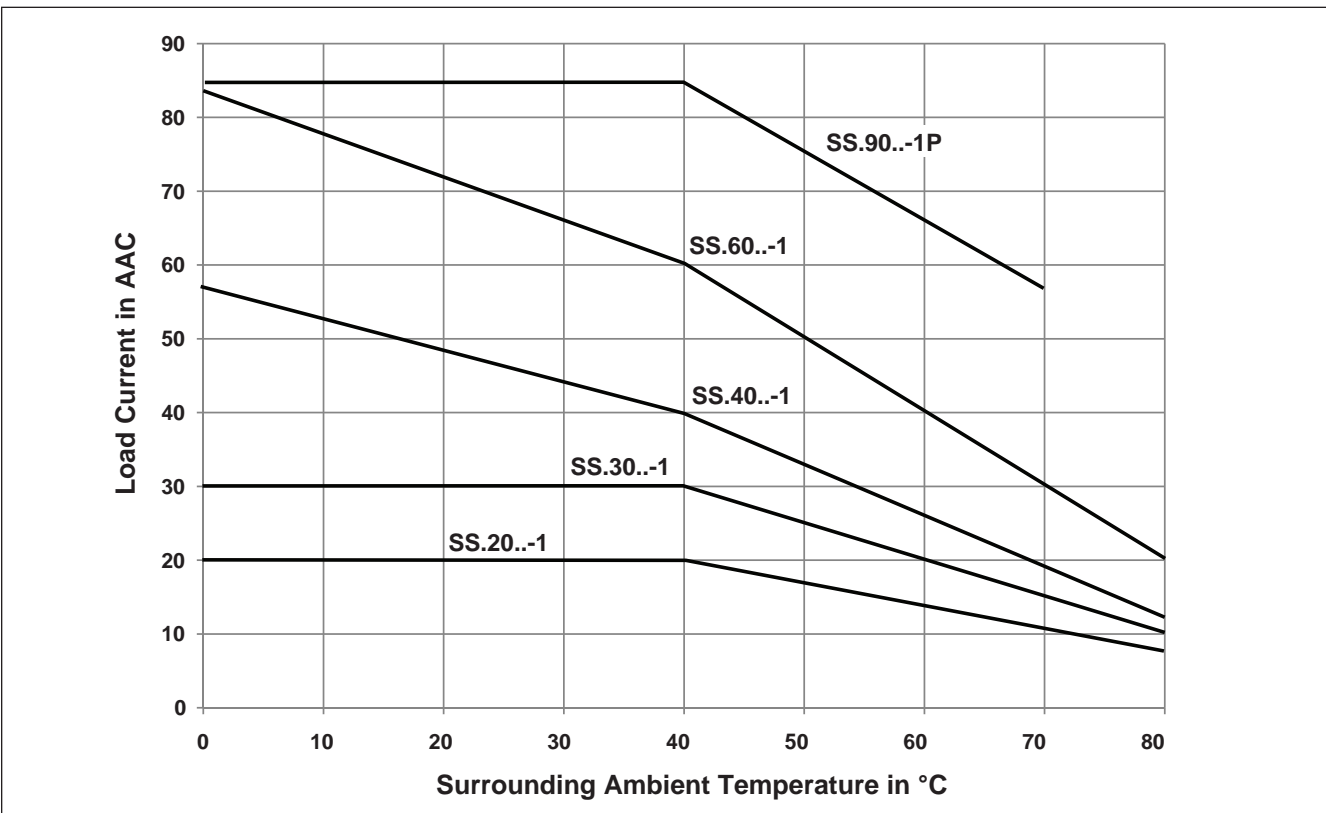
### CAUTION

- Alarm condition resets whenever the voltage signal is removed from terminal A1 (+)
- In the case of SS90...-1P, if the voltage signal is not applied across A1 (+) and A2 (-) terminals, the overtemperature detection functionality is lost (including fan operation and alarm signalling)
- In the case of SS90A.-1P it is necessary to supply IN2 and IN3 with 24 VDC for fan operation.
- Alarm procedure for SS90A.-1P follows 'Alarm signal only' flow since fan is continuously operating.
- Alarm condition automatically resets ONLY when power semiconductor temperature < 80°C
- Temperatures indicated are typical figures.

## Output Power Dissipation



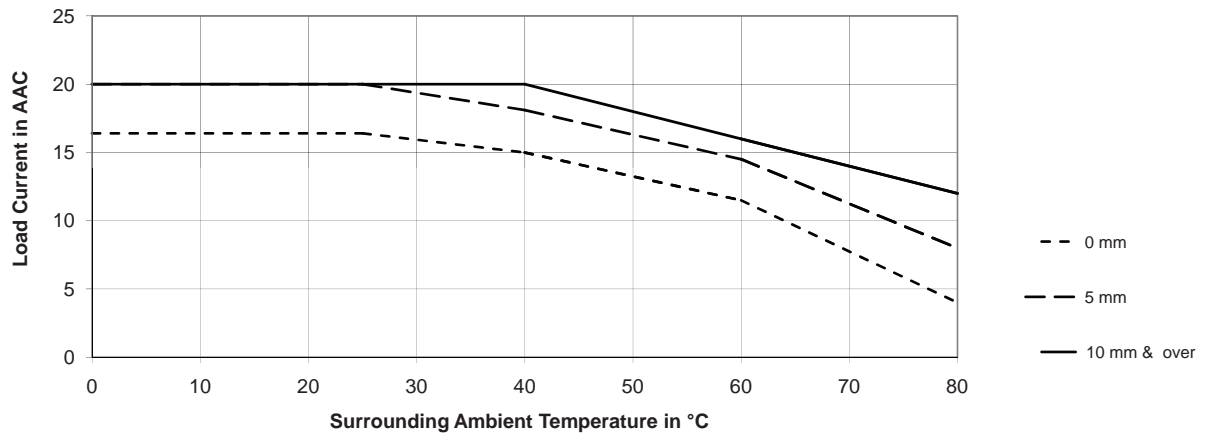
## Current Derating (UL508)



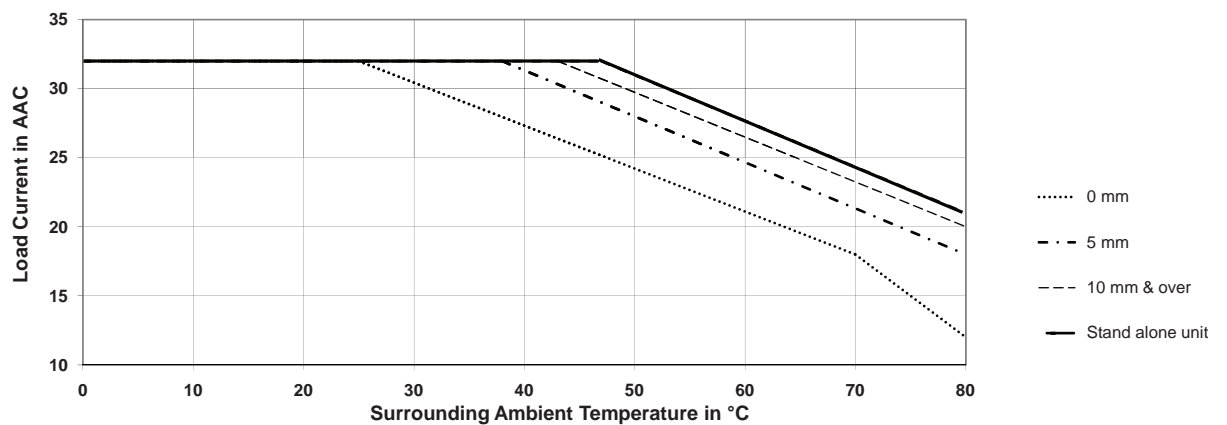
SS.....-1P models max. operating temperature is + 70°C

## Derating vs. Spacing Curves

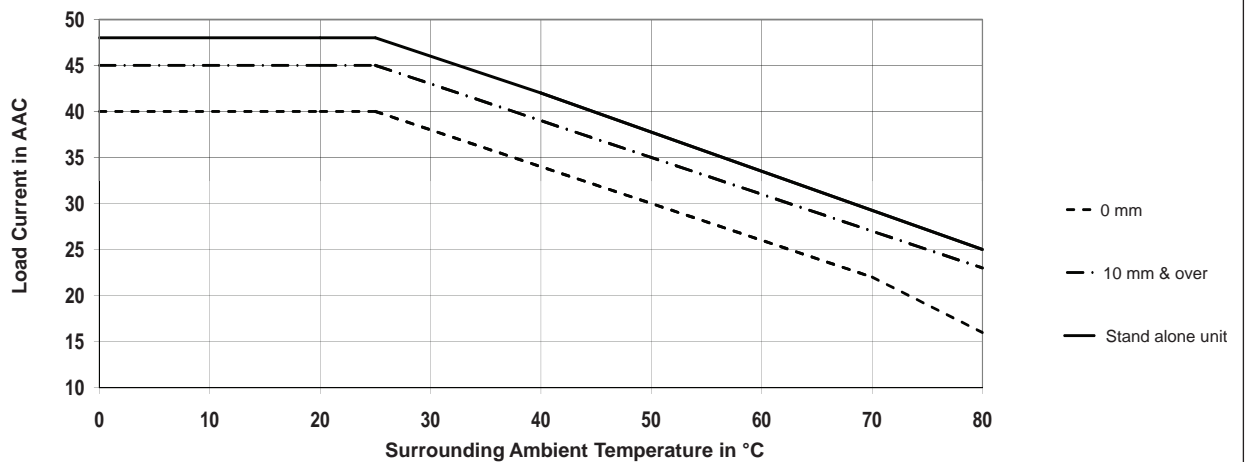
SS.20.-1



SS.30.-1

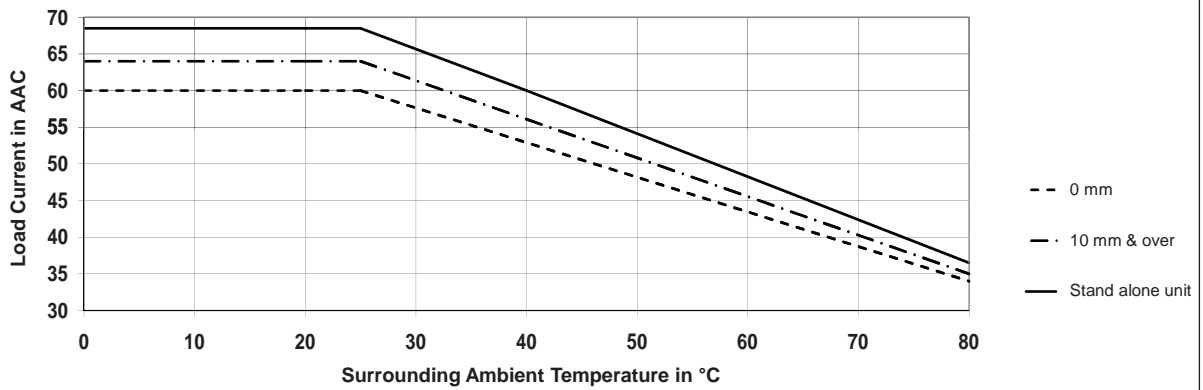


SS.40.-1

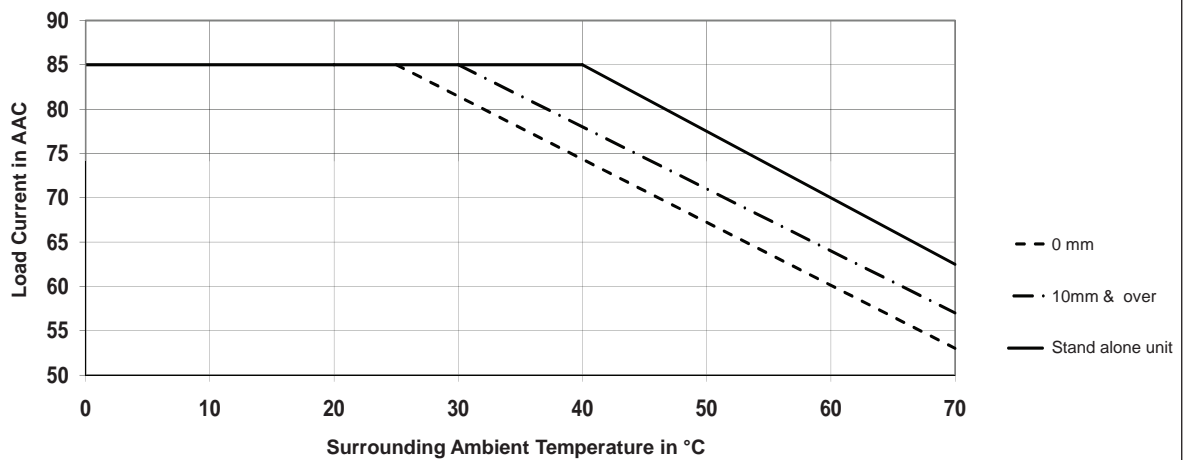


## Derating vs. Spacing Curves (cont.)

SS.60..-1



SS.90..-1P





## Agency Approvals and Conformances

### Conformance



IEC/EN 62314  
IEC/EN 60947-4-2  
IEC/EN 60947-4-3

### Agency Approvals

UL508 Listed (E354129)  
cUL Listed (E354129)

### Short Circuit Current Rating

100kA, UL508

## Electromagnetic Compatibility

<b>EMC Immunity</b>	IEC/EN 61000-6-2	<b>Electrical Surge Immunity (for SS...U-1P)</b>	IEC/EN 61000-4-5
<b>Electrostatic Discharge (ESD) Immunity</b> Air discharge, 8kV Contact, 4kV	IEC/EN 61000-4-2 Performance Criteria 1 Performance Criteria 1	Output, line to line, 1kV Output, line to earth, 2kV DC lines, line to line, 500V DC lines, line to earth, 500V Signal lines, line to earth, 1kV	Performance Criteria 1 Performance Criteria 1 Performance Criteria 2 Performance Criteria 2 Performance Criteria 2
<b>Electrical Fast Transient (Burst) Immunity</b> Output: 2kV, 5kHz Input: 1kV, 5kHz	IEC/EN 61000-4-4 Performance Criteria 1 Performance Criteria 1	<b>Radiated Radio Frequency Immunity</b> 10V/m, 80 - 1000 MHz 10V/m, 1.4 - 2 GHz 3V/m, 2 - 2.7 GHz	IEC/EN 61000-4-3 Performance Criteria 1 Performance Criteria 1 Performance Criteria 1
<b>Electrical Surge Immunity (for SS...U-1)</b> Output, line to line, 1kV Output, line to earth, 2kV Input, line to line, 1kV Input, line to earth, 2kV	IEC/EN 61000-4-5 Performance Criteria 1 Performance Criteria 1 Performance Criteria 2 Performance Criteria 2	<b>Conducted Radio Frequency Immunity</b> 10V/m, 0.15 - 80 MHz	IEC/EN 61000-4-6 Performance Criteria 1
<b>EMC Emission</b>	IEC/EN 61000-6-4	<b>Voltage Dips Immunity</b> 0%for 10ms/20ms, 40% for 200ms 70%for 500ms	IEC/EN 61000-4-11 Performance Criteria 2 Performance Criteria 2 Performance Criteria 2
<b>Radio Interference</b>	IEC/EN 55011	<b>Voltage Interruptions Immunity</b> 0% for 5000ms	IEC/EN 61000-4-11 Performance Criteria 2
<b>Voltage Emission (Conducted)</b> 0.15 - 30MHz	IEC/EN 55011 Class A (industrial) with filters - see filter information IEC/EN 60947-4-2, 60947-4-3 Class A (no filtering needed)	<b>Radio Interference</b> <b>Field Emission (Radiated)</b> 30 - 1000MHz	IEC/EN 55011 Class A (industrial)

## Environmental Specifications

Operating Temperature <sup>11</sup>	-40°C to 80°C (-40°F to +176°F)
Storage Temperature	-40°C to 100°C (-40°F to +212°F)
RoHS (2002/95/EC)	Compliant
Impact resistance (EN50155, EN61373)	15/11 g/ms
Vibration resistance (2-100Hz, IEC60068-2-26, EN50155, EN61373)	2g per axis
Relative humidity	95% non-condensing @ 40°C
UL flammability rating (housing)	UL 94 V0

11. Operating temperature range for RGC..P (overtemperature protection) is -30°C to 70°C (-22°F to 158°F)

12. Applicable to models SS.20.U-1 and SS.30.U-1

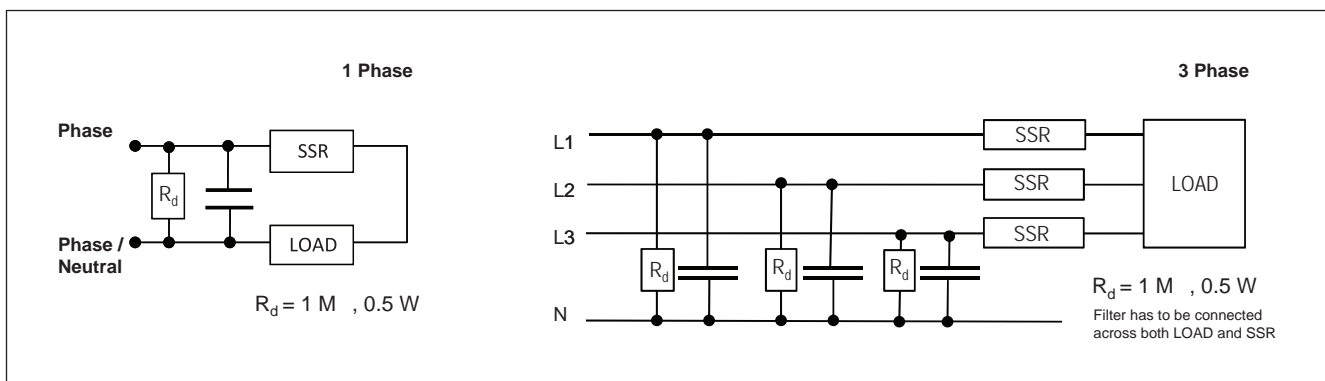
## Filtering - EN / IEC 55011 Class A compliance (for class B compliance contact us)

Part Number	Suggested filter for compliance	Maximum Heater current
SSL20..-1	68 nF / 275 V / X1	20A
SSL30..-1	220 nF / 275 V / X1	30A
SSL40..-1	220 nF / 275 V / X1 330 nF / 275 V / X1	30A 45A
SSL60..-1	220 nF / 275 V / X1 330 nF / 275 V / X1	30A 45A
SSL90..-1P	330 nF / 275 V / X1 470 nF / 275 V / X1	35A 65A
SS20..-1	100 nF / 760 V / X1	20A
SS30..-1	220 nF / 760 V / X1	30A
SS40..-1	220 nF / 760 V / X1 330 nF / 760 V / X1	25A 45A
SS60..-1	220 nF / 760 V / X1 330 nF / 760 V / X1	25A 45A
SS90..-1P	330 nF / 760 V / X1 470 nF / 760 V / X1	40A 65A

### Notes:

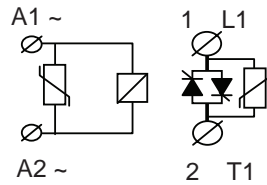
- Control input lines must be installed together to maintain products' susceptibility to Radio Frequency interference.
- Use of AC solid state relays may, according to the application and the load current, cause conducted radio interferences. Use of mains filters may be necessary for cases where the user must meet E.M.C requirements. The capacitor values given inside the filtering specification tables should be taken only as indications, the filter attenuation will depend on the final application.
- Performance Criteria 1: No degradation of performance or loss of function is allowed when the product is operated as intended.
- Performance Criteria 2: During the test, degradation of performance or partial loss of function is allowed. However when the test is complete the product should return operating as intended by itself.
- Performance Criteria 3: Temporary loss of function is allowed, provided the function can be restored by manual operation of the controls.

## Filter Connection Diagrams



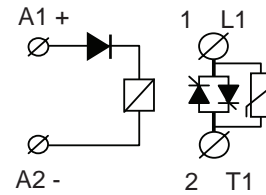
## Connection Diagram (No OTP)

AC Controlled



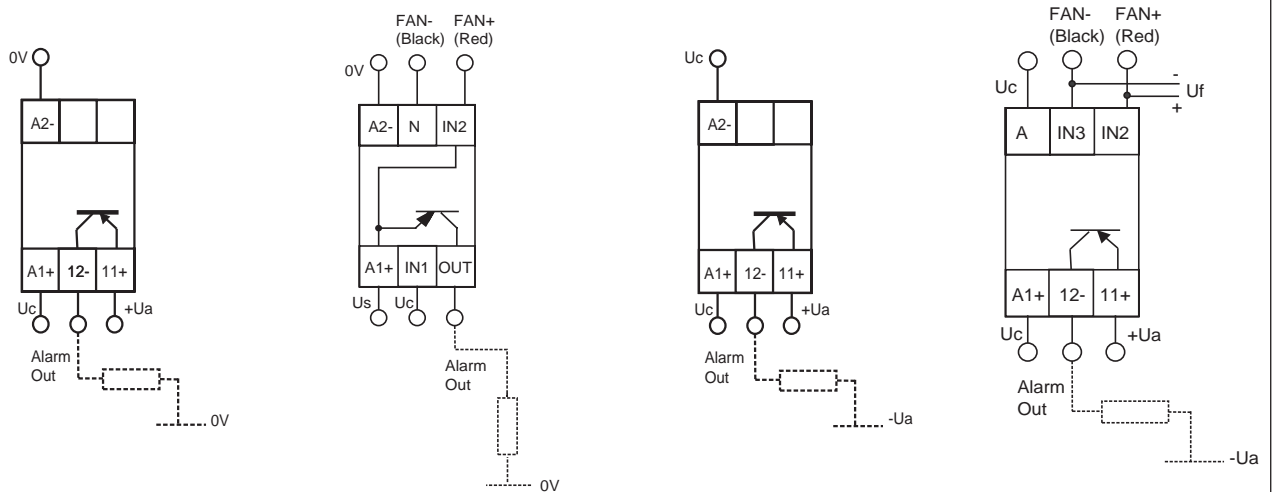
In AC controlled types only (SS...A..U-1) a varistor is placed across A1 / A2 terminals.

DC Controlled



In DC controlled types only (SS...D.U-1) a diode is placed in series with the control circuit for protection against reverse biased connection.

## Connection Diagram (with OTP)



**SS.30DE-1P**  
**SS.40D.-1P**  
**SS.60D.-1P**

Uc: 5 - 32 VDC  
Ua: max. 35 VDC  
Alarm Output: max. 50 mA

**SS.90D.-1P**

Uc: 5 - 32 VDC  
Us: 24 VDC  
Alarm Output: max. 50 mA

**SS.40A.-1P**  
**SS.60A.-1P**

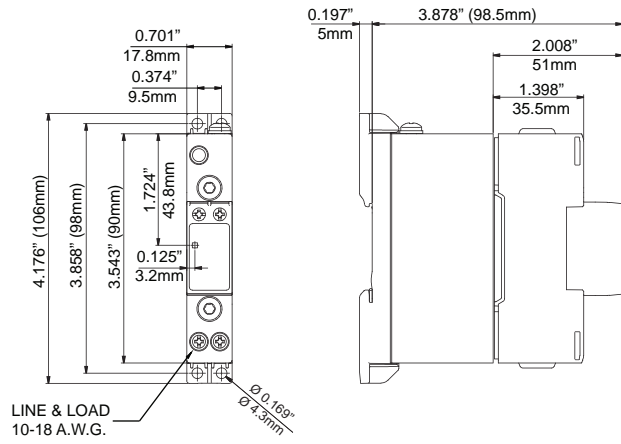
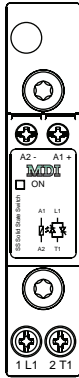
Uc: 24 - 275 VAC  
24 - 190 VDC  
Ua: max. 35 VDC  
Alarm Output: max. 50 mA

**SS.90A.-1P**

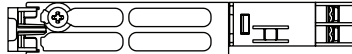
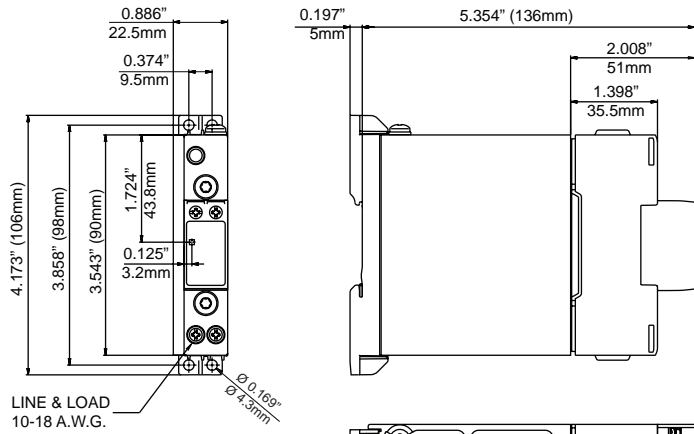
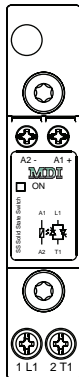
Uc: 24 - 275 VAC  
24 - 190 VDC  
Ua: max. 35 VDC  
Alarm Output: max. 50 mA  
Uf: 24 VDC

## Terminal Layout and Dimensions "U" Connection

SS.20.U-1



SS.30.U-1

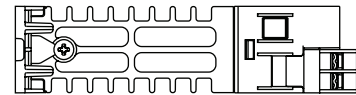
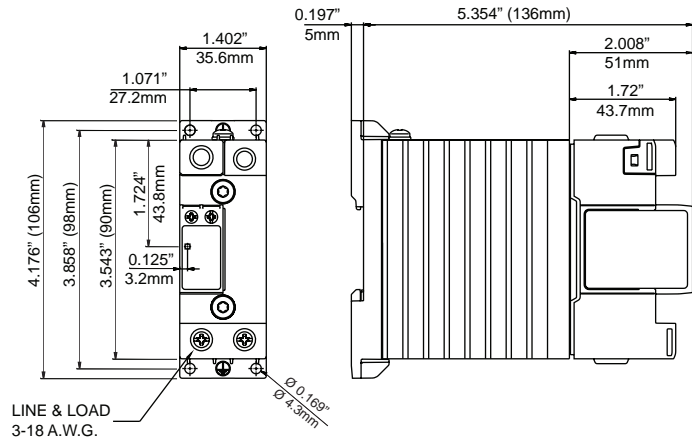
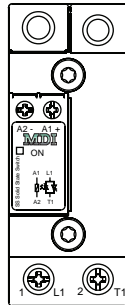


1/L1: Supply connection  
 2/T1: Load connection  
 A1 (+): Positive control signal  
 A2 (-): Control ground

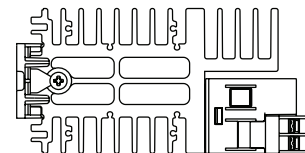
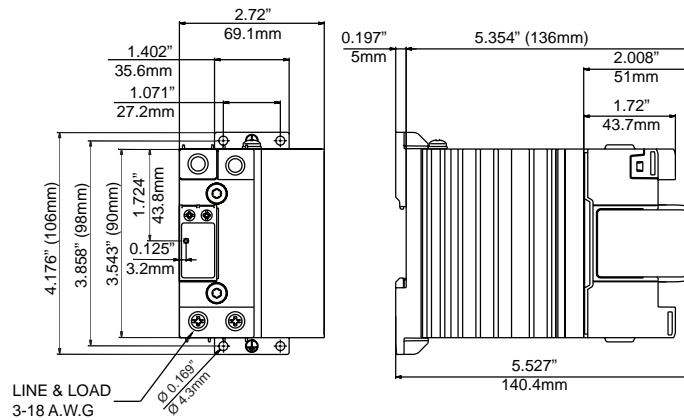
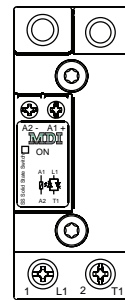
\* Housing width tolerance +0.02" (0.5mm), -0 as per DIN43880

## Terminal Layout and Dimensions "U" Connection (cont.)

SS.40.U-1



SS.60.U-1

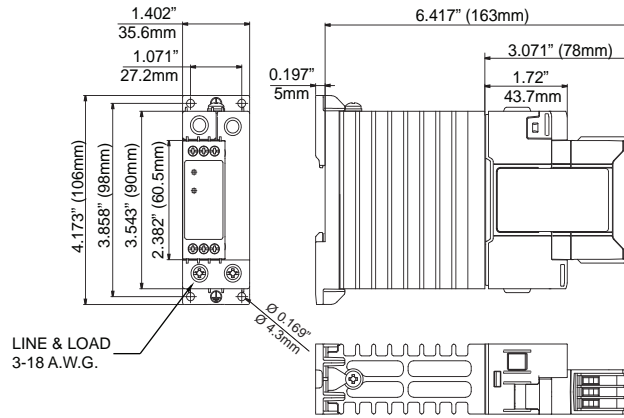
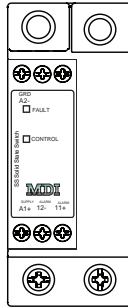


1/L1: Supply connection  
2/T1: Load connection  
A1 (+): Positive control signal  
A2 (-): Control ground

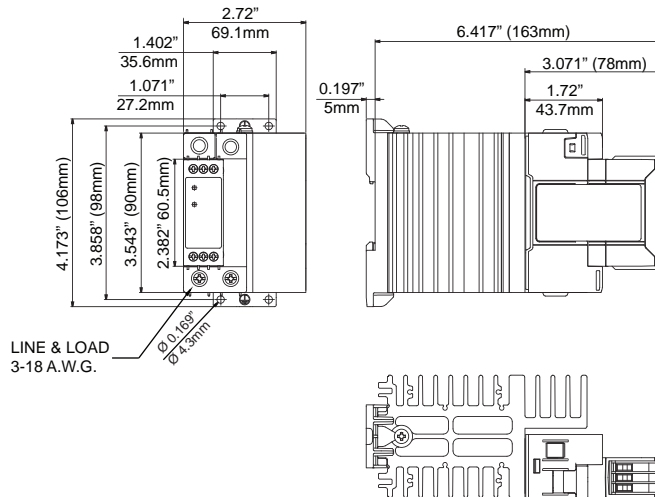
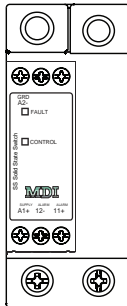
\* Housing width tolerance +0.02" (0.5mm), -0 as per DIN43880

## Terminal Layout and Dimensions "U" Connection (cont.)

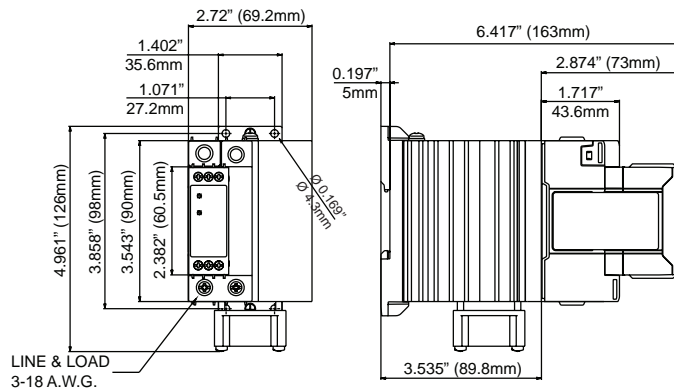
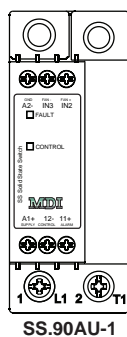
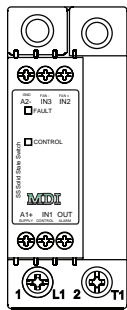
SS.40.U-1P



SS.60.U-1P



SS.90.U-1P

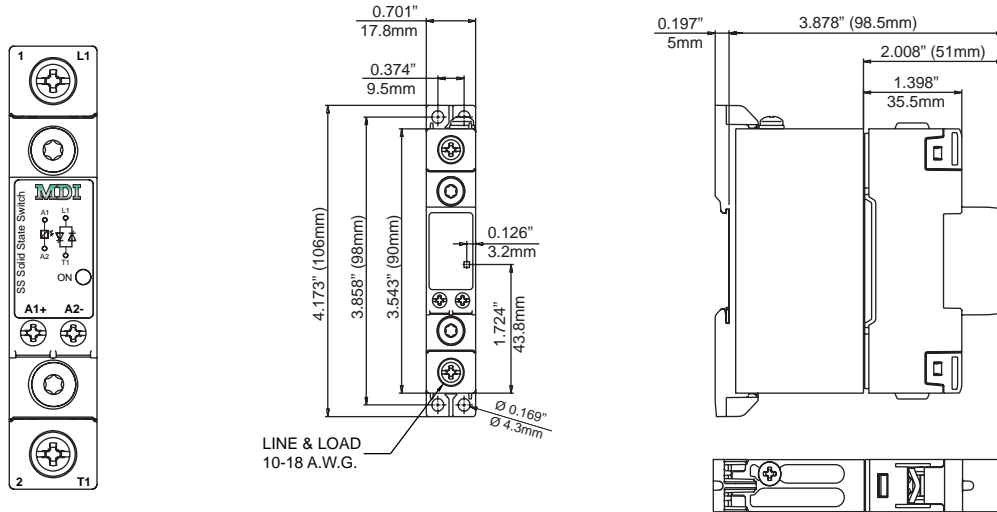


- 1/L1: Supply connection
- 2/T1: Load connection
- A1 (+): Positive control signal  
(Positive supply in case of SS.90DU-1P)
- A2 (-): Control ground
- IN1: Control signal (only for SS.90DU-1P)
- IN2: Fan + supply (only for SS.90AU-1P)
- IN3: Fan - supply (only for SS.90AU-1P)
- 11 + : Alarm output (+)
- OUT, 12 - : Alarm output (-)

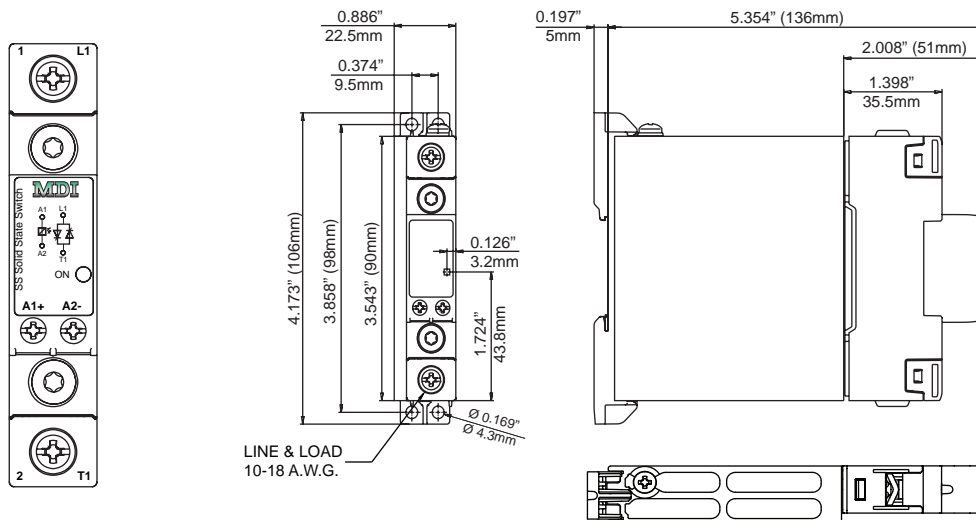
\* Housing width tolerance +0.02" (0.5mm), -0 as per DIN43880

## Terminal Layout and Dimensions "E" Connection

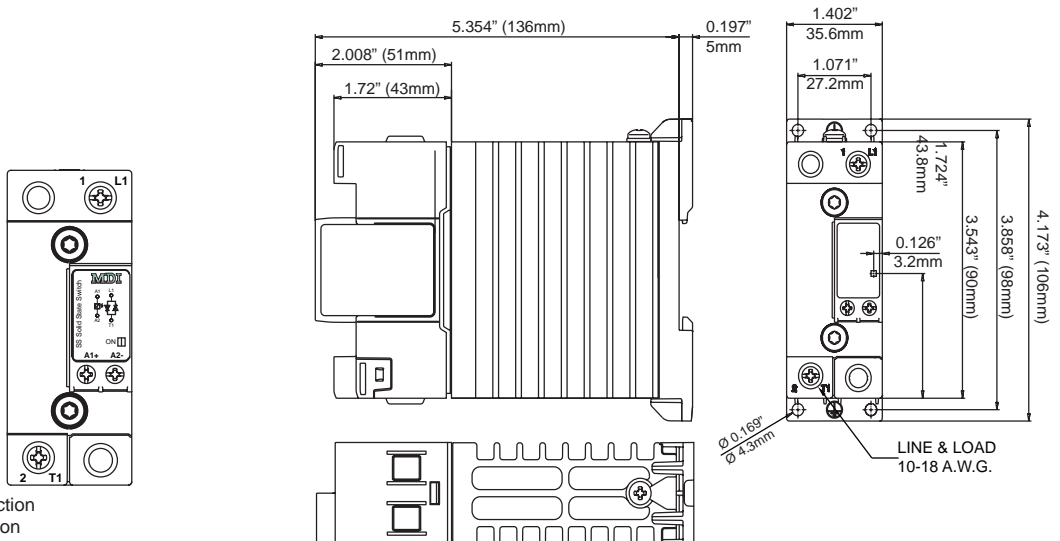
SS.20.E-1



SS.30.E-1



SS.40.E-1

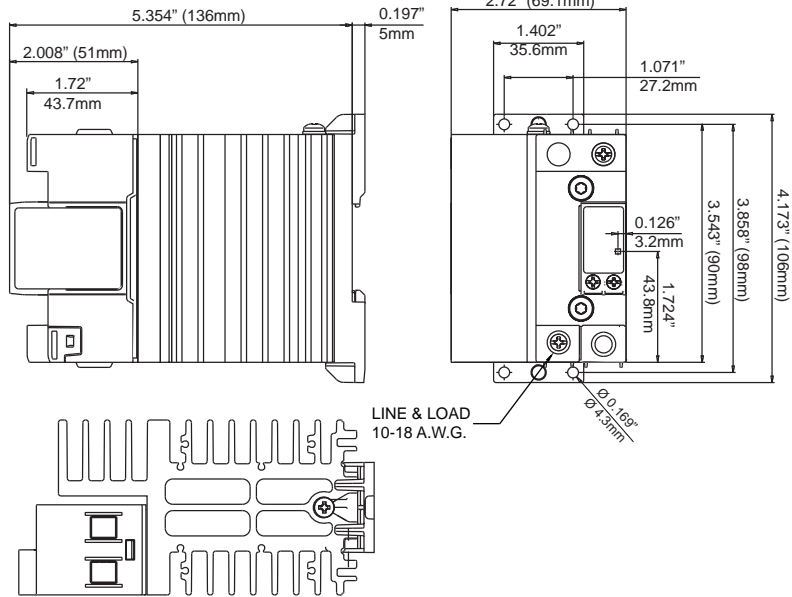
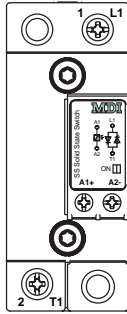


1/L1: Supply connection  
 2/T1: Load connection  
 A1 (+): Positive control signal  
 A2 (-): Control ground

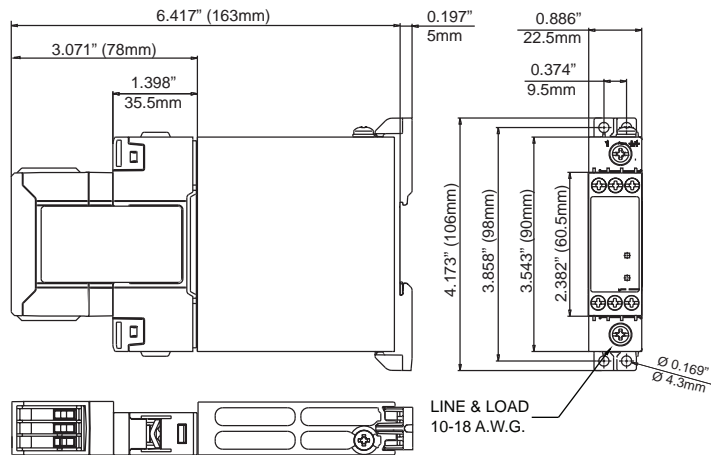
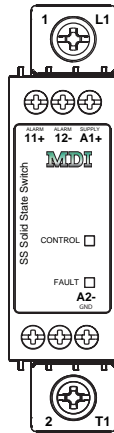
\* Housing width tolerance +0.02" (0.5mm), -0 as per DIN43880

## Terminal Layout and Dimensions "E" Connection (cont.)

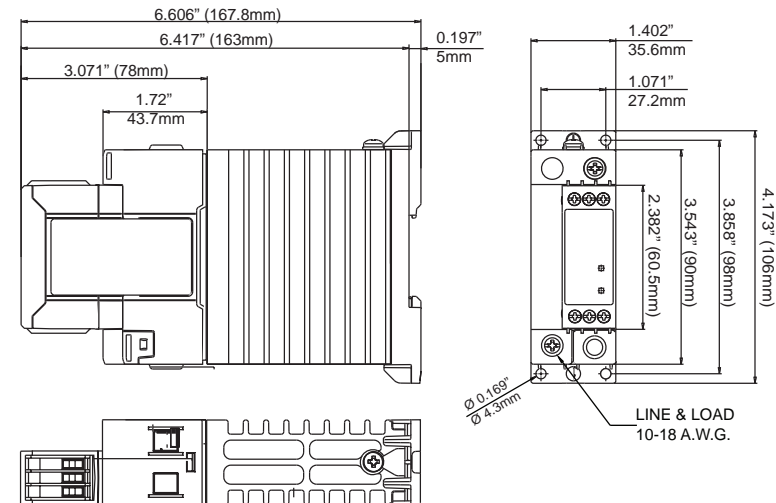
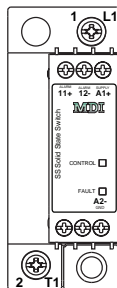
**SS.60.E-1**



**SS.30.E-1P**



**SS.40.E-1P**



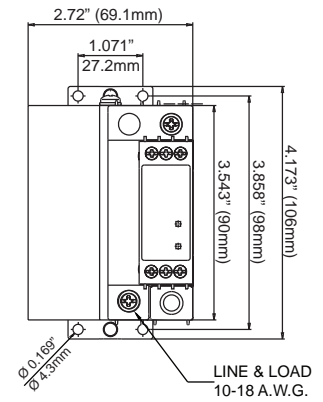
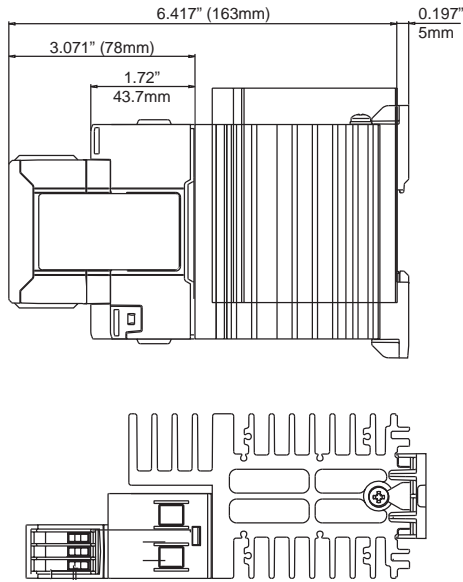
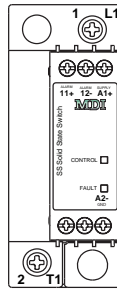
- 1/L1: Supply connection
- 2/T1: Load connection
- A1 (+): Positive control signal
- A2 (-): Control ground
- 11 +: Alarm output (+)
- OUT, 12 -: Alarm output (-)

\* Housing width tolerance +0.02" (0.5mm), -0 as per DIN43880

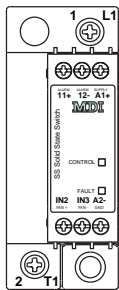


## Terminal Layout and Dimensions "E" Connection (cont.)

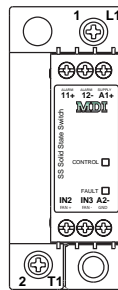
**SS.60.E-1P**



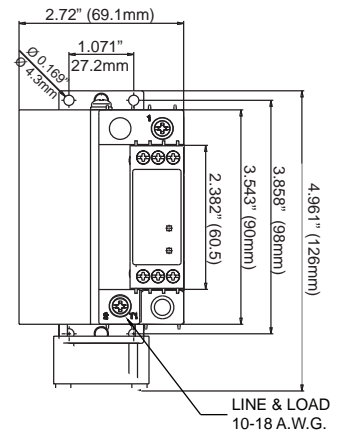
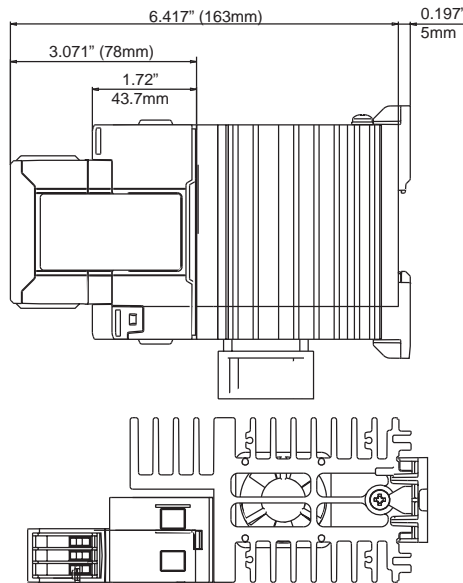
**SS.90.E-1P**



**SS.90DE-1P**



**SS.90AE-1P**




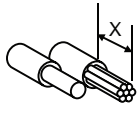







- 1/L1: Supply connection
- 2/T1: Load connection
- A1 (+): Positive control signal  
(Positive supply in case of SS.90DE-1P)
- A2 (-): Control ground
- IN1: Control signal (only for SS.90DE-1P)
- IN2: Fan + supply (only for SS90AE-1P)
- IN3: Fan - supply (only for SS90AE-1P)
- 11 + : Alarm output (+)
- OUT, 12 - : Alarm output (-)

\* Housing width tolerance +0.02" (0.5mm), -0 as per DIN43880

## Connection Specifications

POWER CONNECTIONS: 1/L1, 2/T1  
Use 75°C copper (Cu) conductors

	SS.20.E-1; SWS.30.E-1	SS.20.U-1 SS.30.U-1	SS.40..-1 SS.60..-1 SS.90..-1P
<b>Stripping Length (X)</b>	12mm	12mm	11mm
<b>Connection type</b>	M4 screw with captivated washer	M3.5 screw with box clamp	M5 screw with box clamp
<b>Rigid (Solid &amp; Stranded)</b> UL/ cUL rated data	 2 x 2.5 6mm <sup>2</sup> 2 x 14 10 AWG	 1 x 2.5 6mm <sup>2</sup> 1 x 14 10 AWG	 1 x 1 6mm <sup>2</sup> 1 x 18 10 AWG
<b>Flexible with end sleeve</b>	 2 x 1.0 2.5mm <sup>2</sup> 2 x 2.5 4mm <sup>2</sup> 2 x 18 14 AWG 2 x 14 12 AWG	 1 x 1.0 4mm <sup>2</sup> 1 x 18 12 AWG	 1 x 6 25mm <sup>2</sup> 1 x 10 3 AWG
<b>Flexible without end sleeve</b>	 2 x 1.0 2.5mm <sup>2</sup> 2 x 2.5 6mm <sup>2</sup> 2 x 18 14 AWG 2 x 14 10 AWG	 1 x 1.0 6mm <sup>2</sup> 1 x 18 10 AWG	 1 x 1 4mm <sup>2</sup> 1 x 18 12 AWG
<b>Aperture for termination lug</b>	12.3mm		N/A
<b>Torque specifications</b>	2 Nm (17.7 in-lb). M3.5, Pozidriv 2		2.5 Nm (22 in-lb). M5, Pozidriv 2

### Protective Earth Connection



SS.20.....: M4, 1.5Nm (13.3 in-lb)  
SS.30.....; SS.40.....; SS.60.....; SS.90.....P: M5, 1.5Nm (13.3 in-lb)

Note: Protective Earth connection must be connected whenever the product is intended to be used in Class 1 applications according to EN/IEC 61140.

### CONTROL CONNECTIONS: A1(+), A2(-)

Use 60/75°C copper (Cu) conductors

SS.20..-1; SS.30..-1; SS.40..-1; SS.60..-1;

**Torque specifications**



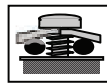
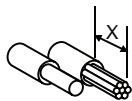
0.5 Nm (4.4 in-lb); M3, Pozidriv 1

**Stripping Length (X)**

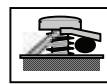
8mm

**Rigid (Solid & Stranded)**

UL/ cUL rated data



2 x 0.5 2.5mm<sup>2</sup>  
2 x 18 12 AWG



1 x 0.5 2.5mm<sup>2</sup>  
1 x 18 12 AWG

**Flexible with end sleeve**



2 x 0.5 2.5mm<sup>2</sup>  
2 x 18 12AWG

1 x 0.5 2.5mm<sup>2</sup>  
1 x 18 12AWG

### CONTROL CONNECTIONS: A1(+), A2(-), IN1, IN2, IN3, 11 (+), 12(-), OUT

Use 60/75°C copper (Cu) conductors

SS.30.E-1P; SS.40.E-1P; SS.60.E-1P; SS.90.E-1P

**Torque specifications**



SS.40.U-1P; SS.60.U-1P; SS.90.U-1P

0.5 Nm (4.4 in-lb); M3, Pozidriv 1

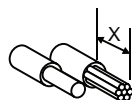
**Stripping Length (X)**

6mm

13mm

**Rigid (Solid & Stranded)**

UL/ cUL rated data



2 x 0.5 2.5mm<sup>2</sup>  
2 x 18 12 AWG



1 x 0.2 2.5mm<sup>2</sup>  
1 x 24 12 AWG

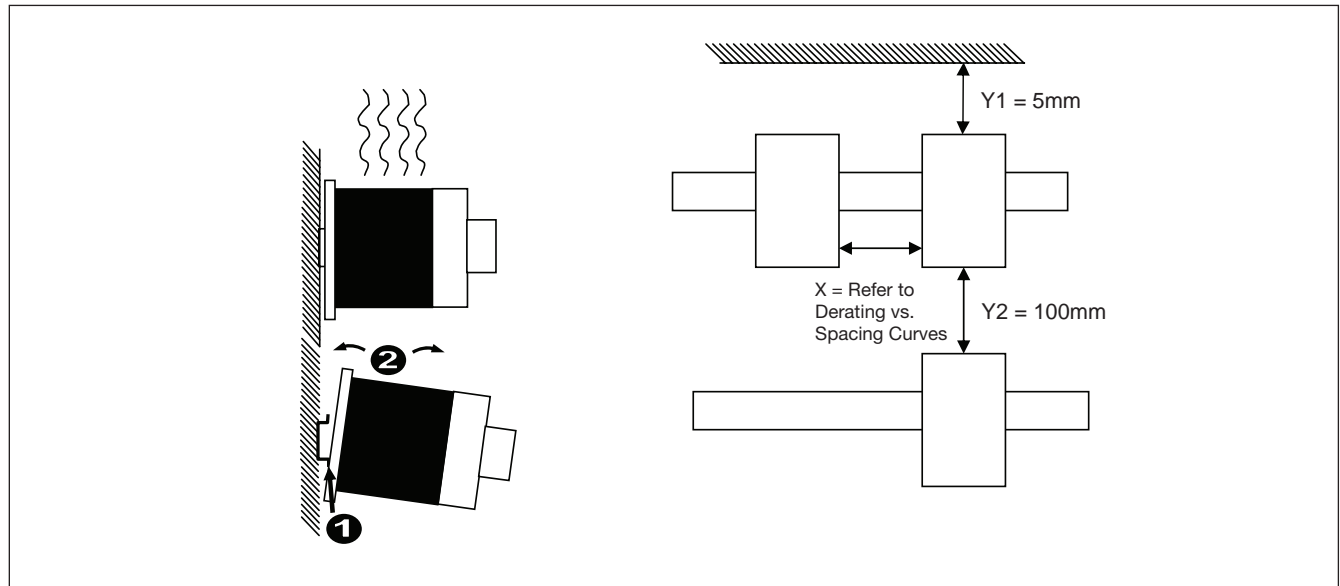
**Flexible with end sleeve**



2 x 0.5 2.5mm<sup>2</sup>  
2 x 18 12AWG

1 x 0.2 2.5mm<sup>2</sup>  
1 x 24 12AWG

## Installation Instructions



## Short Circuit Protection

### Protection Co-ordination, Type 1 vs Type 2:

Type 1 protection implies that after a short circuit, the device under test will no longer be in a functioning state. In type 2 co-ordination the device under test will still be functional after the short circuit. In both cases, however the short circuit has to be interrupted. The fuse between enclosure and supply shall not open. The door or cover of the enclosure shall not be blown open. There shall be no damage to conductors or terminals and the conductors shall not separate from terminals. There shall be no breakage or cracking of insulating bases to the extent that the integrity of the mounting of live parts is impaired. Discharge of parts or any risk of fire shall not occur.

The product variants listed in the table hereunder are suitable for use on a circuit capable of delivering not more than 100,000A rms Symmetrical Amperes, 600 Volts maximum when protected by fuses. Tests at 100,000A were performed with Class J fuses, fast acting; please refer to the table below for maximum allowed ampere rating of the fuse. Use fuses only.

### Co-ordination type 1 (UL508)

Part No.	Max. size [A]	Class	Current [kA]	Voltage [VAC]
SS.20..-1	30	J	100	Max. 600
SS.30..-1	30	J	100	Max. 600
SS.40..-1	40	J	100	Max. 600
SS.60..-1	40	J	100	Max. 600
SS.90..-1P	40	J	100	Max. 600

### Co-ordination type 2 (IEC EN 60947-4-2/ -4-3)

Part No.	Ferraz Shawmut		Siba		Current [kA]	Voltage [VAC]
	Max size [A]	Part number	Max size [A]	Part number		
SS.20..-1	32	6.9xx CP URD 22x58/32 (xx=00 or 21)	32	50 142 06.32	100	Max. 600
SS.20..-1	40	A70QS40-4	32	50 142 06.52	100	Max. 600
SS.40..-1	70	A70QS70-4	63	50 194 20.63	100	Max. 600
SS.60..-1	90	A70QS90-4	80	50 194 20.80	100	Max. 600
SS.90..-1P	100	A70QS1000-4	100	50 194 20.100	100	Max. 600



## Protection with Miniature Circuit Breakers

Solid State Relay type	Model no. for Z - type M. C. B. (rated current)	Model no. for B - type M. C. B. (rated current)	Wire cross sectional area [mm <sup>2</sup> ]	Minimum length of Cu wire conductor [m] <sup>13</sup>	
<b>SS.20...-1</b> (525A <sup>2</sup> s)	S201 - Z4 (4A) S201 - Z6 UC (6A)	S201 - B2 (2A)	1.0	21.0	
			1.0	21.0	
			1.5	31.5	
<b>SS.30...-1</b> (1,800A <sup>2</sup> s)	S201 - Z10 (10A)	S201-B4 (4A)	1.0	7.6	
			1.5	11.4	
			2.5	19.0	
	S201 - Z16 (16A)	S201-B6 (6A)	1.0	5.2	
			1.5	7.8	
			2.5	13.0	
			4.0	20.8	
	S201 - Z20 (20A)	S201-B10 (10A)	1.5	12.6	
			2.5	21.0	
	S201 - Z25 (25A)	S201-B13 (13A)	2.5	25.0	
			4.0	40.0	
	S202 - Z25 (25A)	S202-B13 (13A)	2.5	19.0	
			4.0	30.4	
	<b>SS.40...-1</b> (3,200A <sup>2</sup> s)	S201 - Z25 (25A)	S201-B13 (13A)	2.5	7.0
				4.0	11.2
6.0				16.8	
<b>SS.60...-1</b> (3,200A <sup>2</sup> s)	S201 - Z25 (25A)	S201-B13 (13A)	2.5	7.0	
			4.0	11.2	
			6.0	16.8	
<b>SS.90...-1P</b> (6,600A <sup>2</sup> s)	S201 - Z20 (20A)	S201-B10 (10A)	1.5	4.6	
			2.5	7.0	
			4.0	11.2	
	S202 - Z20 (20A)	S202-B10 (10A)	1.5	1.8	
			2.5	3.0	
			4.0	4.8	
	S201 - Z32 (32A)	S201-B16 (16A)	2.5	13.0	
			4.0	20.8	
			6.0	31.2	
	S202 - Z32 (32A)	S202-B16 (16A)	2.5	5.0	
			4.0	8.0	
			6.0	12.0	
			10.0	20.0	
	S202 - Z50 (50A)	S202-B25 (25A)	4.0	14.8	
			6.0	22.2	
			10.0	37.0	

13. between MCB and SSR Relay (including return path which goes back to the mains).

Note: A prospective current of 6kA and a 230/400V power supply system is assumed for the above suggested specifications. For cables with different cross section than those mentioned above please consult MDI Inc.