

# Solid State Relays 3-Phase with Integrated Heatsink Types 2 & 3 Pole



- 2-pole & 3-pole AC switching solid state contactors
- Product width from 2.13" (54mm) to 2.84" (72 mm)
- Rated operational voltage: 42 to 600 VAC
- Rated operational current: up to 75 AAC
- Control voltages: 5-32 VDC or 20-275 VAC (24-190 VDC)
- **Line & Load accepts:** 10-14 AWG (20 & 25 units)  
3-14 AWG (30, 40, 65 & 75 units)
- Up to 15,000A<sup>2</sup>s for I<sup>2</sup>t
- Latching Voltage ≤20V
- Operational Frequency range 45-65 Hz
- Power Factor >0.5 @ rated voltage
- Blocking Voltage 1200Vp
- Internal Varistor 625V
- UL Listed, UL508, & cUL Listed (E 354129)
- Motor ratings up to 11 kW @ 400 VAC, 25 HP @ 600 VAC
- Controlled fan operation for versions with integrated fan
- 100 kA Short Circuit Current Rating according to UL 508
- DIN or panel mount
- RoHS compliant
- 1: .PSS...-...M is suitable only for resistive loads

## Product Description

This product is intended to replace mechanical contactors especially when switching is frequent. The smallest product width in the 2PSS, 3PSS range is 2.13" (54mm) (3xDIN) and goes up to 2.84" (72 mm).

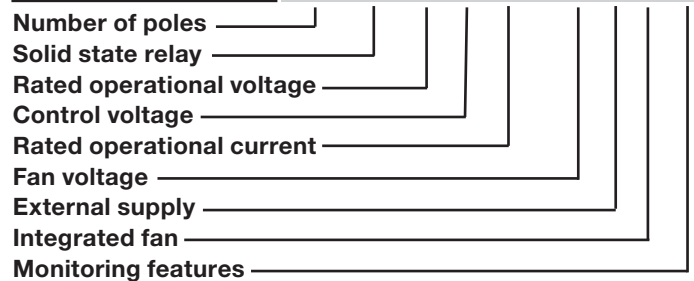
2-pole and 3-pole switching options are available. Switch ON occurs at the voltage zero cross and switch OFF occurs at the current zero cross. Apart from resistive and slightly inductive loads, the .PSS is certified for motor switching with associated motor ratings. Varistors are integrated for output overvoltage protection. A green LED gives indication of control voltage presence. Fan operation is controlled for the versions which have an integrated fan.

Detection of SSR overheat, mains loss, SSR malfunction and load loss is possible with the .PSS...-...M versions. An EMR alarm output is available for remote signaling. An additional feature with the .PSS...-...M is the electronic auxiliary output. The .PSS...-...M has additional LEDs for load status and alarm status indication.

Specifications are at a surrounding temperature of 25°C unless otherwise specified.

## Ordering Key

**2P SS 60 A 65 - 24 D F M**



## Ordering Key (refer to page 2 for available part nos.)

SSR with heatsink	Rated voltage (Ue) <sup>4</sup> , Blocking voltage	Control voltage <sup>5</sup> (Uc)	Rated current / pole @ 40°C <sup>2</sup>	Fan Voltage	External supply (Us)	Features
<b>2PSS:</b> 2-pole switching + 1-pole direct, ZC <sup>3</sup>	<b>22:</b> 42-242 VAC, 800Vp	D: 5-32 VDC	<b>2PSS</b> 25: 25 AAC 40: 40 AAC 75: 75 AAC	<b>24:</b> 24 VDC	<b>D:</b> 24 VDC	<b>F:</b> Integrated fan with over temperature protection (OTP) & EMR alarm output
<b>3PSS:</b> 3-pole switching, ZC	<b>60:</b> 42-660 VAC, 1200 Vp	A: 20-275 VAC, 24-190 VDC	<b>3PSS</b> 20: 20 AAC 25: 25 AAC 30: 30 AAC 40: 40 AAC 65: 65 AAC	<b>120:</b> 120 VAC	<b>(blank):</b> 90-250 VAC	<b>M:</b> Monitoring for Mains loss, Load loss, SSR short circuit, open circuit and overtemperature with EMR alarm output and auxiliary output <sup>1</sup> (suitable only for resistive loads)

2. Refer to Current Derating curves  
3. ZC= Zero Cross Switching  
4. Operating voltage for .PSS...-...M starts from 90 VAC  
5. AC control range for .PSS..A.-120. is limited to 20-275 VAC only



## Selection Guide: 2PSS

Rated output voltage, Ue	Control voltage, Uc	Features	External supply, Us	Connection control / power	Rated operational current @ 40°C (I <sup>2</sup> t value)		
					25 AAC / pole (1,800 A <sup>2</sup> s)	40 AAC / pole (6,600 A <sup>2</sup> s)	75 AAC / pole (15,000 A <sup>2</sup> s)
220 VAC ZC	5-32 VDC	-	-	Screw / Screw	2PSS22D25	-	-
	20-275 VAC, 24-190 VDC	-	-	Screw / Screw	2PSS22A25	-	-
600 VAC ZC	5-32 VDC	-	-	Screw / Screw	2PSS60D25	-	-
		-	-	Screw / Box	-	2PSS60D40	-
	OTP	24 VDC	Box / Box	-	-	2PSS60D75-24DF	
	OTP	90-250 VAC	Box / Box	-	-	2PSS60D75-120F	
	20-275 VAC, 24-190 VDC	-	-	Screw / Screw	2PSS60A25	-	-
		-	-	Screw / Box	-	2PSS60A40	-
20-275 VAC	OTP	90-250 VAC	Box / Box	-	-	2PSS60A75-120F	

## Selection Guide: 2PSS...-...M

Rated output voltage, Ue	Control voltage, Uc	Features	External supply, Us	Connection control / power	Rated operational current @ 40°C (I <sup>2</sup> t value)		
					25 AAC / pole (1,800 A <sup>2</sup> s)	40 AAC / pole (6,600 A <sup>2</sup> s)	75 AAC / pole (15,000 A <sup>2</sup> s)
600 VAC ZC	5-32 VDC	Monitoring	24 VDC	Box / Screw	2PSS60D25-24DM	-	-
		Monitoring	24 VDC	Box / Box	-	2PSS60D40-24DM	2PSS60D75-24DFM
		Monitoring	90-250 VAC	Box / Screw	2PSS60D25-120M	-	-
		Monitoring	90-250 VAC	Box / Box	-	2PSS60D40-120M	2PSS60D75-120FM
	20-275 VAC	Monitoring	90-250 VAC	Box / Screw	2PSS60A25-120M	-	-
		Monitoring	90-250 VAC	Box / Box	-	2PSS60A40-120M	2PSS60A75-120FM

## Selection Guide: 3PSS

Rated output voltage, Ue	Control voltage, Uc	Features	External supply, Us	Connection control / power	Rated operational current @ 40°C (I <sup>2</sup> t value)				
					20 AAC / pole (1,800 A <sup>2</sup> s)	25 AAC / pole (1,00 A <sup>2</sup> s)	30 AAC / pole (6,600 A <sup>2</sup> s)	40 AAC / pole (6,600 A <sup>2</sup> s)	65 AAC / pole (15,000 A <sup>2</sup> s)
220 VAC ZC	5-32 VDC	-	-	Screw / Screw	3PSS22D20	-	-	-	-
	20-275 VAC, 24-190 VDC	-	-	Screw / Screw	3PSS22A20	-	-	-	-
600 VAC ZC	5-32 VDC	-	-	Screw / Screw	3PSS60D20	3PSS60D25	-	-	-
		-	-	Screw / Box	-	-	3PSS60D30	-	-
	OTP	24 VDC	Box / Box	-	-	-	3PSS60D40-24DF	3PSS60D65-24DF	
	OTP	90-250 VAC	Box / Box	-	-	-	-	3PSS60D65-120F	
	20-275 VAC, 24-190 VDC	-	-	Screw / Screw	3PSS60A20	3PSS60A25	-	-	-
		-	-	Screw / Box	-	-	3PSS60A30	-	-
20-275 VAC	OTP	90-250 VAC	Box / Box	-	-	-	3PSS60D40-120F	3PSS60A65-120F	

## Selection Guide: 3PSS...-...M

Rated output voltage, Ue	Control voltage, Uc	Features	External supply, Us	Connection control / power	Rated operational current @ 40°C (I <sup>2</sup> t value)			
					20 AAC / pole (1,800 A <sup>2</sup> s)	25 AAC / pole (1,800 A <sup>2</sup> s)	30 AAC / pole (6,600 A <sup>2</sup> s)	65 AAC / pole (15,000 A <sup>2</sup> s)
600 VAC ZC	5-32 VDC	Monitoring	24 VDC	Box / Screw	3PSS60D20-24DM	3PSS60D25-24DM	-	-
		Monitoring	24 VDC	Box / Box	-	-	3PSS60D30-24DM	3PSS60D65-24DFM
		Monitoring	90-250 VAC	Box / Screw	3PSS60D20-120M	3PSS60D25-120M	-	-
		Monitoring	90-250 VAC	Box / Box	-	-	3PSS60D30-120M	3PSS60D65-120FM
	20-275 VAC	Monitoring	90-250 VAC	Box / Screw	3SS60A05-120M	3PSS60A25-120M	-	-
		Monitoring	90-250 VAC	Box / Box	-	-	3PSS60A30-120M	3PSS60A65-120FM



## General Specifications

		<b>.PSS</b>	<b>.PSS...-...M</b>
Latching voltage (across each pole L-T)		<20V	<20V
Operational frequency range		45 to 65Hz	45 to 65Hz
Power factor		>0.5 at rated voltage	>0.5 at rated voltage
CE marking		Yes	Yes
Touch protection		IP20	IP20
LED status indication	Control ON Supply ON Load ON Alarm ON	Green, full intensity  Red, full intensity ( <b>.PSS...-..F</b> )	Green, full intensity Green, half intensity Yellow, full intensity Red, flashing <sup>6</sup>
Pollution degree		2 (non-conductive pollution with possibilities of condensation)	2 (non-conductive pollution with possibilities of condensation)
Over-voltage category		III (fixed installations)	III (fixed installations)
Isolation	Input & Output to Case Input to Output	4000 Vrms 4000 Vrms	4000 Vrms 2500 Vrms

6: Refer to Red LED Alarm Indications

## Output Voltage Specifications

		<b>.PSS22...</b>	<b>.PSS60...</b>
Operational voltage range, U <sub>e</sub>	<b>.PSS</b> <b>.PSS...-...M</b>	42-220 VAC -15% / +10% on max 90-220 VAC -15% / +10% on max	42-600 VAC -15% / +10% on max 90-600 VAC -15% / +10% on max
Blocking voltage		800 Vp	1200 Vp
Internal varistors (across each pole)		275 V	625 V

## Output Specifications: 2PSS

	<b>2PSS...25</b>	<b>2PSS...40</b>	<b>2PSS...75</b>
Rated operational current per pole <sup>7</sup> AC-51 @ Ta=25°C AC-51 @ Ta=40°C AC-53a @ Ta=40°C	32 AAC 27 AAC 11.5 AAC	50 AAC 40 AAC 16.5 AAC	85 AAC 75 AAC 28 AAC
No. of motor starts <sup>8</sup> (x: 6, Tx: 6s, F: 50%) @ 40°C	30	30	30
Minimum operational current	250 mA	400 mA	500 mA
Rep. overload current (Motor rating) UL 508: Ta=40°C, t <sub>ON</sub> =1s, t <sub>OFF</sub> =9s, 50 cycles	61 AAC	107 AAC	154 AAC
Maximum transient surge current (I <sub>TSM</sub> ), t=10ms	600 Ap	1150 Ap	1750 Ap
I <sup>2</sup> t for fusing (t=10ms) Minimum	1800 A <sup>2</sup> s	6600 A <sup>2</sup> s	15000 A <sup>2</sup> s
Critical dv/dt (@ Tj init = 40°C)	1000 V/us	1000 V/us	1000 V/us

7: Refer to Derating Curves

8: Overload cycle definition, x: multiple of AC-53a, Tx: duration of current surge, F: duty cycle



## Output Specifications: 3PSS

	3PSS...20	3PSS...25	3PSS...30	3PSS...40	3PSS...65
Rated operational current per pole <sup>7</sup> AC-51 @ Ta=25°C AC-51 @ Ta=40°C AC-53a @ Ta=40°C	25 AAC 20 AAC 10 AAC	32 AAC 28 AAC 11 AAC	37 AAC 30 AAC 14 AAC	42 AAC 42 AAC 17 AAC	71 AAC 66 AAC 25 AAC
No. of motor starts <sup>8</sup> (x: 6, Tx: 6s, F: 50%) @ 40°C	30	30	30	30	30
Minimum operational current	250 mA	250 mA	400 mA	400 mA	500 mA
Rep. overload current (Motor rating) UL 508: Ta=40°C, t <sub>ON</sub> =1s, t <sub>OFF</sub> =9s, 50 cycles	61 AAC	84 AAC	107 AAC	107 AAC	154 AAC
Maximum transient surge current (I <sub>TSM</sub> ), t=10ms	600 Ap	600 Ap	1150 Ap	1150 Ap	1750 Ap
I <sup>2</sup> t for fusing (t=10ms) Minimum	1800 A <sup>2</sup> s	1800 A <sup>2</sup> s	6600 A <sup>2</sup> s	6600 A <sup>2</sup> s	15000 A <sup>2</sup> s
Critical dv/dt (@ Tj init = 40°C)	1000 V/us	1000 V/us	1000 V/us	1000 V/us	1000 V/us

7: Refer to Derating Curves

8: Overload cycle definition, x: multiple of AC-53a, Tx: duration of current surge, F: duty cycle

## Motor Ratings: HP (UL 508) / kW (EN/IEC 60947-4-2) @ 40°C

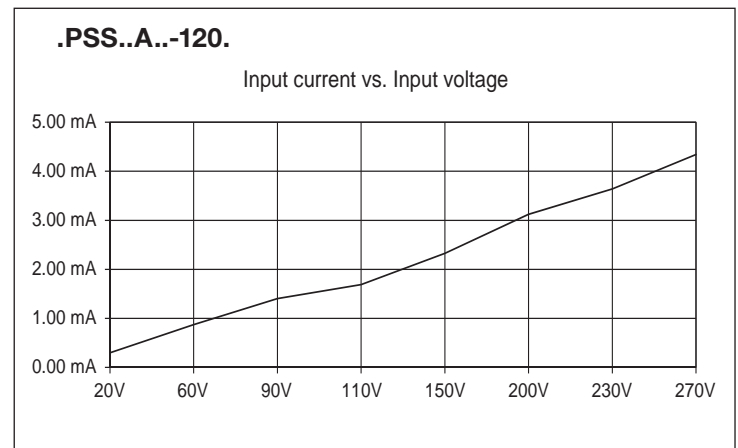
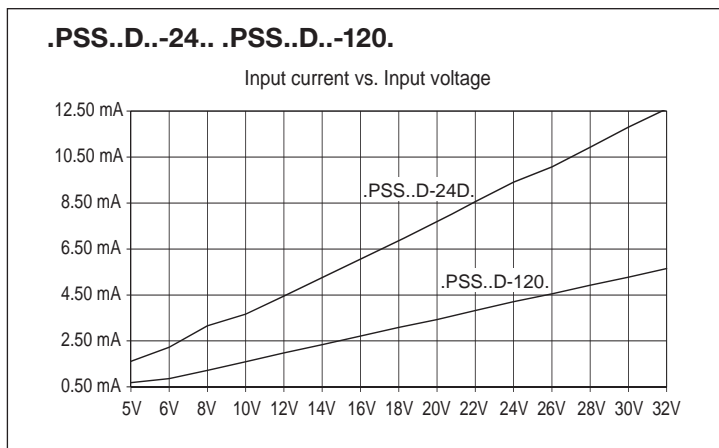
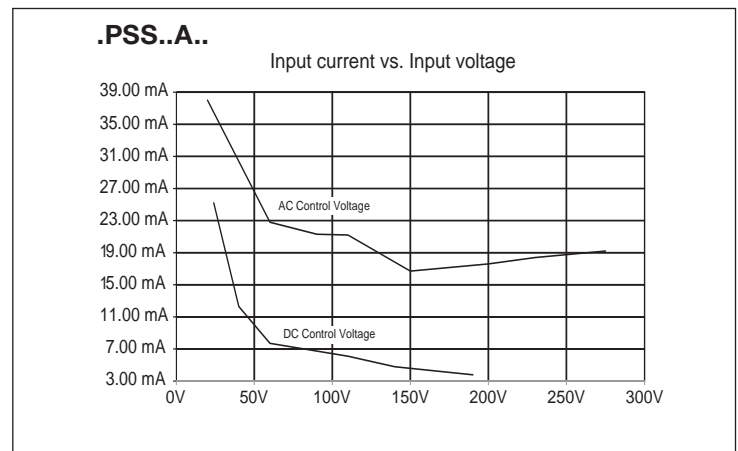
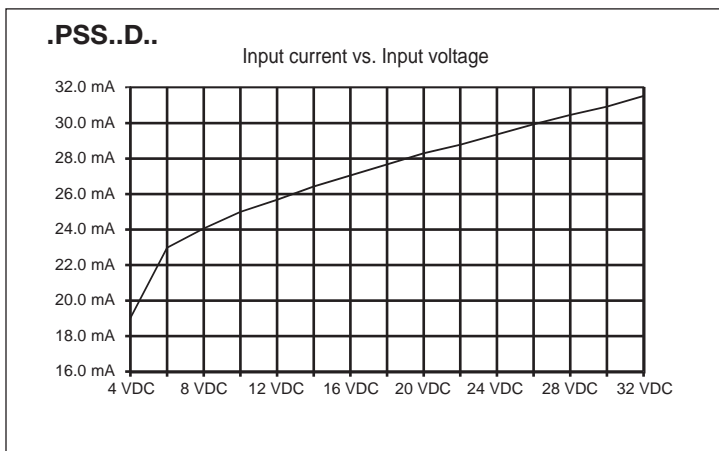
	115 VAC	230 VAC	400 VAC	480 VAC	600 VAC
2PSS...25	1½ HP / 1.1 kW	3 HP / 3.0 kW	5 HP / 5.5 kW	7½ HP / 5.5 kW	10 HP / 9.0 kW
2PSS...40	3 HP / 1.5 kW	5 HP / 4.0 kW	10 HP / 7.5 kW	10 HP / 9.0 kW	15 HP / 11.0 kW
2PSS...75	5 HP / 3.0 kW	10 HP / 7.5 kW	15 HP / 11.0 kW	20 HP / 15.0 kW	25 HP / 22.0 kW
3PSS...20	1 HP / 0.75 kW	3 HP / 2.2 kW	5 HP / 4.0 kW	7½ HP / 5.5 kW	10 HP / 7.5 kW
3PSS...25	2 HP / 1.1 kW	3 HP / 2.2 kW	7½ HP / 4.0 kW	10 HP / 5.5 kW	10 HP / 7.5 kW
3PSS...30	2 HP / 1.5 kW	5 HP / 3.0 kW	10 HP / 5.5 kW	10 HP / 7.5 kW	15 HP / 11.0 kW
3PSS...40	2 HP / 1.5 kW	5 HP / 4.0 kW	10 HP / 7.5 kW	10 HP / 9.0 kW	15 HP / 11.0 kW
3PSS...65	3 HP / 3.0 kW	10 HP / 5.5 kW	15 HP / 11.0 kW	20 HP / 15.0 kW	25 HP / 20.0 kW

## Control Specifications (A1, A2)

	.PSS...D	.PSS...A
Control voltage range, Uc	5 - 32 VDC	20-275 VAC, 24 (-10%) -190 VDC
Pick-up voltage	4.8 VDC	20 VAC/DC
Drop-out voltage	1.0 VDC	5 VAC/DC
Maximum reverse voltage	32 VDC	-
Maximum response time	0.5 cycle + 500 us @ 24 VDC	2 cycles @ 230 VAC / 110 VDC
Input current @ 40°C	See diagrams below	See diagrams below

## Control Specifications (A1, A2) for .PSS...-...F, .PSS...-...M

	.PSS...D-24D. .PSS..D-120..	.PSS..A-120..
Control voltage range, U <sub>c</sub>	5 - 32 VDC	20-275 VAC
Pick-up voltage	4.8 VDC	20 VAC
Drop-out voltage	1.0 VDC	5 VAC
Maximum reverse voltage	32 VDC	-
Maximum response time	1 cycle + 500 us @ 24 VDC	5 cycles @ 230 VAC
Input current @ 40°C	See diagrams below	See diagrams below



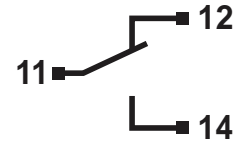
## Supply Specifications (Us)

	.PSS..D-24D.	.PSS..D-120. .PSS..A-120.
Supply voltage range, U <sub>s</sub>	24 VDC, -15% / +20%	90-250 VAC
Reverse protection	Yes	N/A
Surge protection	Integrated transil	External varistor for surge protection
Max. supply current		
No fan, .PSS..-M	60 mA	60 mA
With fan, .PSS..-FM	150 mA	80 mA



## Alarm Specifications (12, 14, 11)

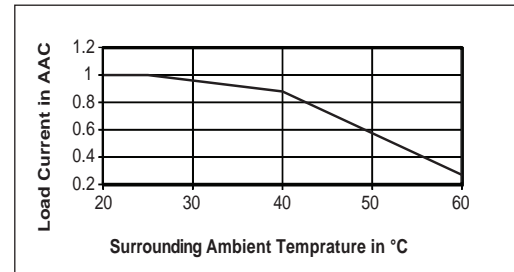
Output type	.PSS..D-...F
	.PSS..D-...M
Contact rating	EMR, 1 Form C (SPDT)
	Normally closed (12-11) Normally open (14-11)
Isolation between open contacts	2A @ 250 VAC / 30 VDC
	1000 VAC



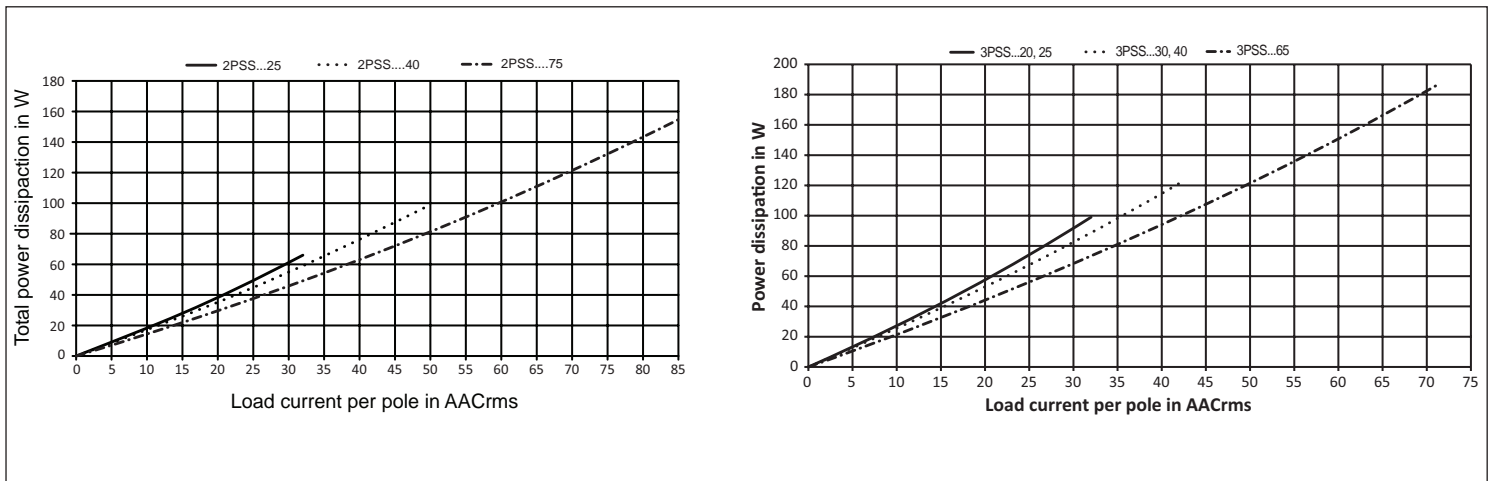
## Auxiliary Output Specifications (22, 24, 21)

Output type	.PSS..D-24D.	.PSS..A-120.
	.PSS..D-120.	
Rated voltage	PNP darlington, Normally closed (22-21)	Triac, Normally closed (22-21)
	NPN darlington, Normally open (24-21)	Triac, Normally open (24-21)
On-state voltage drop Typical	24 VDC +/- 20%	90-250 VAC
Blocking voltage	4 VDC	< 2 VAC
Maximum current rating	-	800 Vp
Delay from SSR output switching to auxiliary output	50 mA DC	1 AAC @ 25°C <sup>9</sup>
	7 cycles	7 cycles

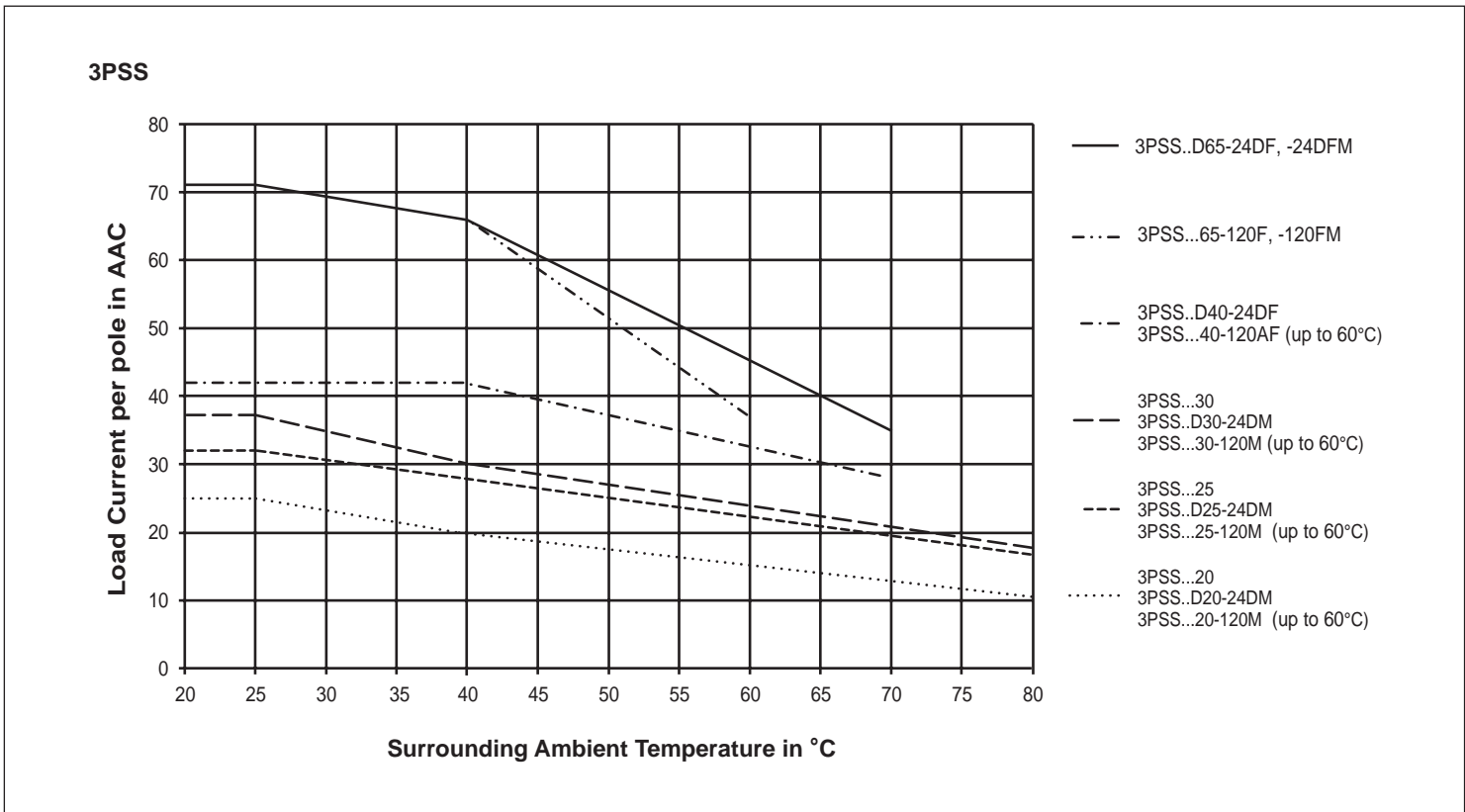
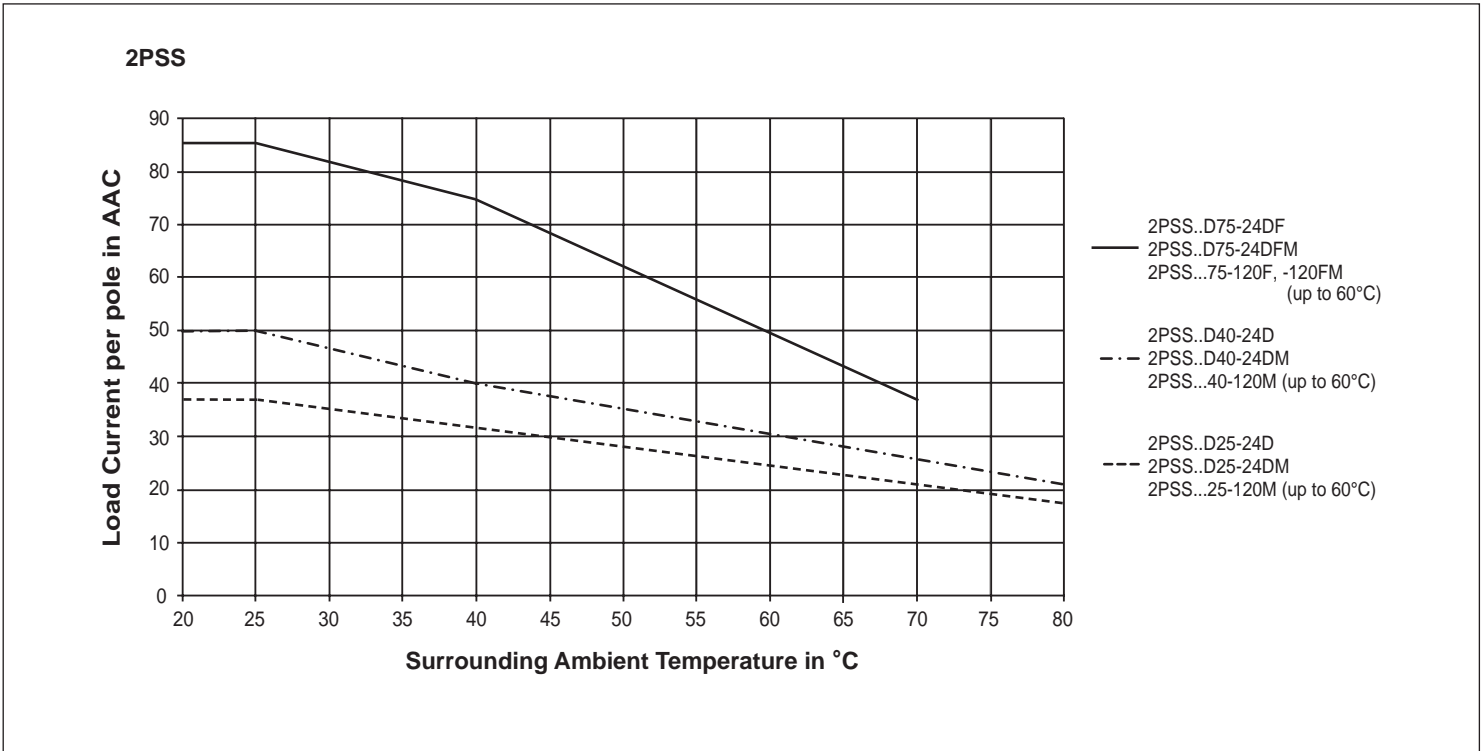
9: Refer to Derating Curve for Auxiliary Output rating @ higher operating temperature



## Output Power Dissipation



## Current Derating





## Agency Approvals and Conformance

Conformance

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

Agency Approvals

UL listed (E354129), UL508  
cULus Listed (E354129),  
C22.2 No.14-10



Short Circuit Current rating

100kArms, UL508

## Electromagnetic Compatibility

<b>EMC immunity</b>	EN/IEC 60947-4-2	<b>Radiated radio frequency immunity</b>	EN/IEC 61000-4-3
<b>Electrostatic discharge (ESD) immunity</b> Air discharge, 8 kV Contact, 4 kV	EN/IEC 61000-4-2 Performance Criteria 2 Performance Criteria 2	10 V/m, 80 - 1000 MHz 10 V/m, 1.4 - 2.0 GHz 10 V/m, 2.0 - 2.7 GHz	Performance Criteria 1 Performance Criteria 1 Performance Criteria 1
<b>Electrical fast transient (Burst) immunity</b> Output: 2 kV, 5 kHz Input: 1 kV, 5 kHz Signal: 1 kV, 5 kHz .PSS...-..M	EN/IEC 61000-4-4 Performance Criteria 1 Performance Criteria 1 Performance Criteria 1	<b>Conducted radio frequency immunity</b> 10 V/m, 0.15 - 80 MHz	EN/IEC 61000-4-6 Performance Criteria 1
<b>Electrical surge immunity</b> Output, line to line, 1 kV Output, line to earth, 2 kV Input, line to earth, 1 kV (A1, A2) Signal, line to line, 500 V (Us, 21, 22, 24) .PSS..D..-24D Signal, line to earth, 500 V (Us, 21, 22, 24) .PSS..D..-24D Signal, line to earth, 1 kV (Us, 21, 22, 24) .PSS..D..-120. .PSS..A..-120. 11, 12, 14, line to line, 1 kV 11, 12, 14, line to earth, 2 kV	EN/IEC 61000-4-5 Performance Criteria 1 Performance Criteria 1 Performance Criteria 2 Performance Criteria 1 Performance Criteria 1 Performance Criteria 1 Performance Criteria 1 Performance Criteria 1 Performance Criteria 1 Performance Criteria 1	<b>Voltage dips immunity</b> 0% for 0.5 / 1cycle 40% for 10 cycles 70% for 250 cycles	EN/IEC 61000-4-11 Performance Criteria 2 Performance Criteria 2 Performance Criteria 2
<b>EMC emission</b>	EN/IEC 61000-6-4	<b>Voltage interruptions immunity</b> 0% for 5000 ms	EN/IEC 61000-4-11 Performance Criteria 2
<b>Radio interference voltage emission (conducted)</b> 0.15-30 MHz	EN/IEC 55011 Class A (Industrial) with filters - see filter information	<b>Radio interference field emission (radiated)</b> 30-1000 MHz	EN/IEC 55011 Class A (Industrial)

Note:

- 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.
- This product has been designed for Class A equipment. Use of this product in domestic environments may cause radio interference, in which case the user may be required to employ additional mitigation methods.
- Surge tests on .PSS...A, .PSS...A-120. models were carried out with the signal line impedance network. In case the line impedance is less than 40Ω, it is suggested that AC supply is provided through a secondary circuit where the short circuit limit between conductors and ground is 1500VA or less.

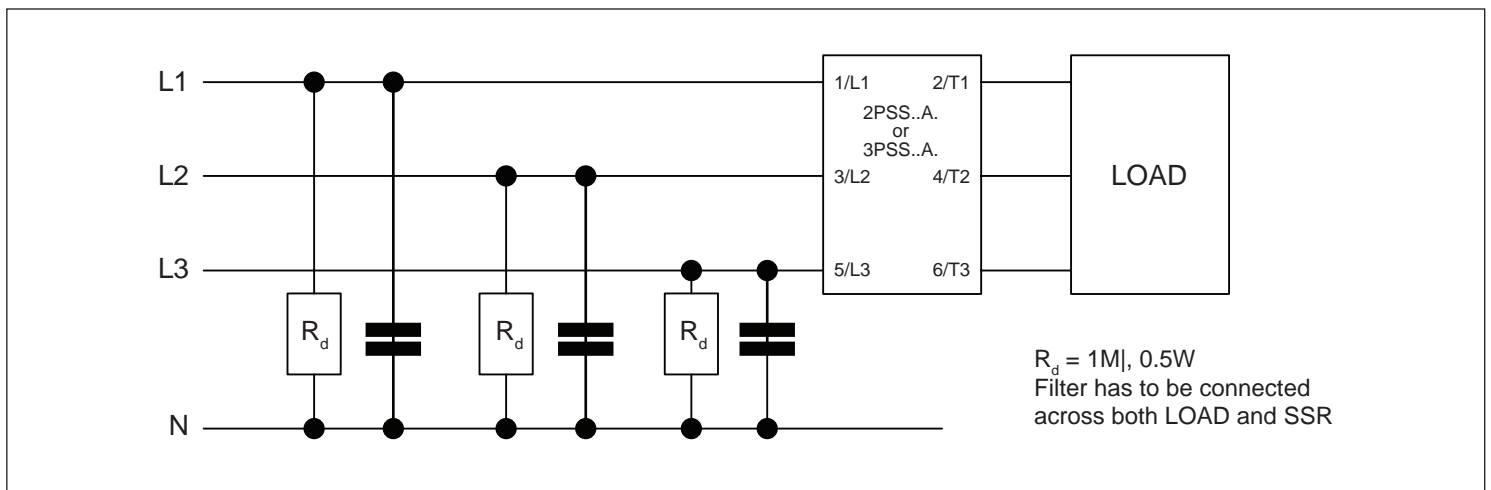
- Performance Criteria 1 (Performance Criteria A): No degradation of performance or loss of function is allowed when the product is operated as intended.
- Performance Criteria 2 (Performance Criteria B): During the test, degradation of performance or partial loss of function is allowed. However, when the test is complete the product should return operating as intended by itself.
- Performance Criteria 3 (Performance Criteria C): Temporary loss of function is allowed, provided the function can be restored by manual operation of the control.



## Filtering - EN/IEC 55011 Class A Compliance

Part Number	Suggested filter for compliance	Maximum heater current
2PSS22.25	220 nF / 275V / X1	25 AAC
2PSS60.25	220 nF / 760V / X1	25 AAC
2PSS60.40	330 nF / 760V / X1	40 AAC
2PSS60.75	470 nF / 760V / X1	65 AAC
3PSS22.20	220 nF / 275V / X1	25 AAC
3PSS60.20	220 nF / 760V / X1	25 AAC
3PSS60.25	330 nF / 760V / X1	25 AAC
3PSS60.30	470 nF / 760V / X1	30 AAC
3PSS60.40	470 nF / 760V / X1	40 AAC
3PSS60.65	470 nF / 760V / X1	65 AAC

## Filter Connection Diagrams

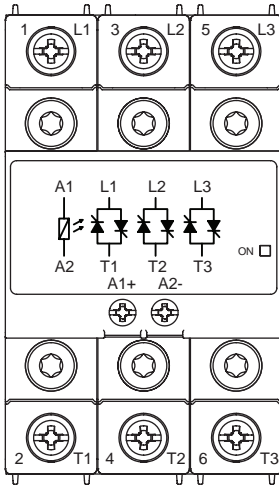


## Environmental Specifications

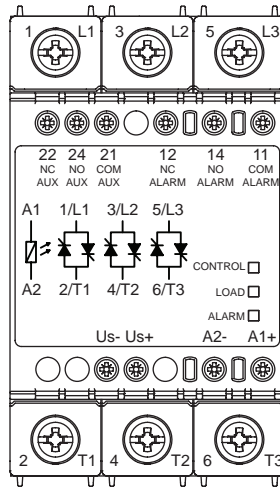
<b>Operating temperature</b>	-40°C to +80°C (-40°F to +176°F)	<b>UL flammability rating</b> (for plastic)	UL 94 V0
.PSS....-24DF, -24DFM	-40°C to +70°C (-40°F to +158°F)	<b>Installation altitude</b>	0 - 1000m. Above 1000m derate linearly by 1% of FLC per 100m up to maximum of 2000m
.PSS....- 120M, -120AF, -120AFM	-40°C to +60°C (-40°F to +140°F)	<b>Weight</b>	Approx. 600g (680g)
<b>Storage temperature</b>	-40°C to +100°C (-40°F to +212°F)	2PSS...25, 3PSS...20 (M)	Approx. 850g (920g)
<b>Impact resistance</b> (EN50155, EN61373)	15/11 g/ms	2PSS...40, 3PSS...25, 3PSS...30 (M)	Approx. 740g
<b>Vibration resistance</b> (2-100Hz, IEC60068-2-26, EN50155, EN61373)	2g per axis	3PSS...40	Approx. 980g
<b>Relative humidity</b>	95% non condensing @ 40°C	2PSS...75, 3PSS...65	

# MDI

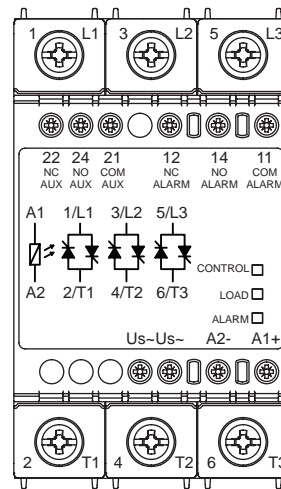
## Terminal Layout



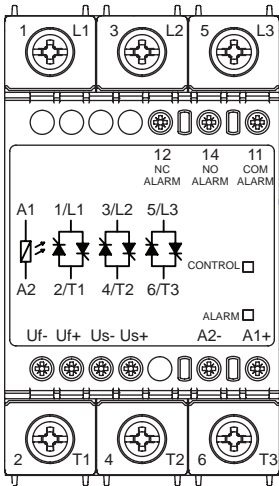
2PSS..25, 2PSS..40  
3PSS..20..., 3PSS..40, 3PSS..30



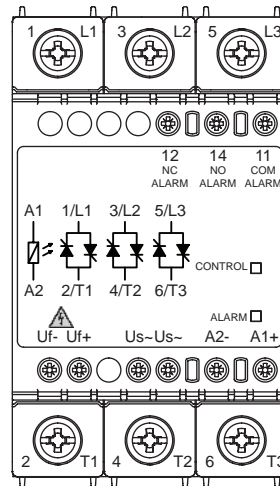
2PSS..25-24DM, 2PSS..40-24DM  
3PSS..20-24DM, 3PSS..25-24DM,  
3PSS..30-24DM



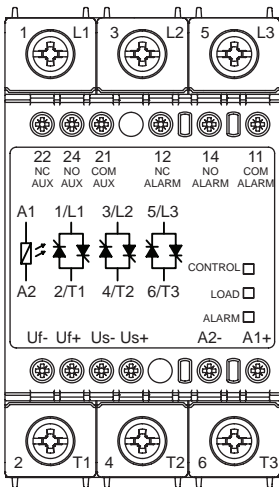
2PSS..25-120M, 2PSS..40-120M  
3PSS..20-120M, 3PSS..25-120M,  
3PSS..30-120M



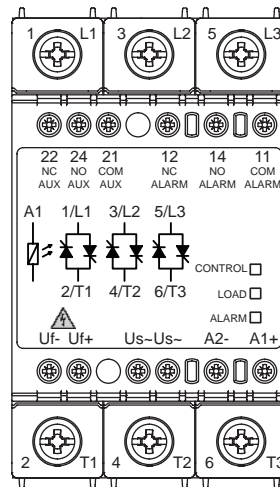
2PSS..75-24DF  
3PSS..40-24DF, 3PSS..65-24DF



2PSS..75-120F  
3PSS..40-120F, 3PSS..65-120F



2PSS..75-24DFM  
3PSS..65-24DFM



2PSS..75-120FM  
3PSS..65-120FM

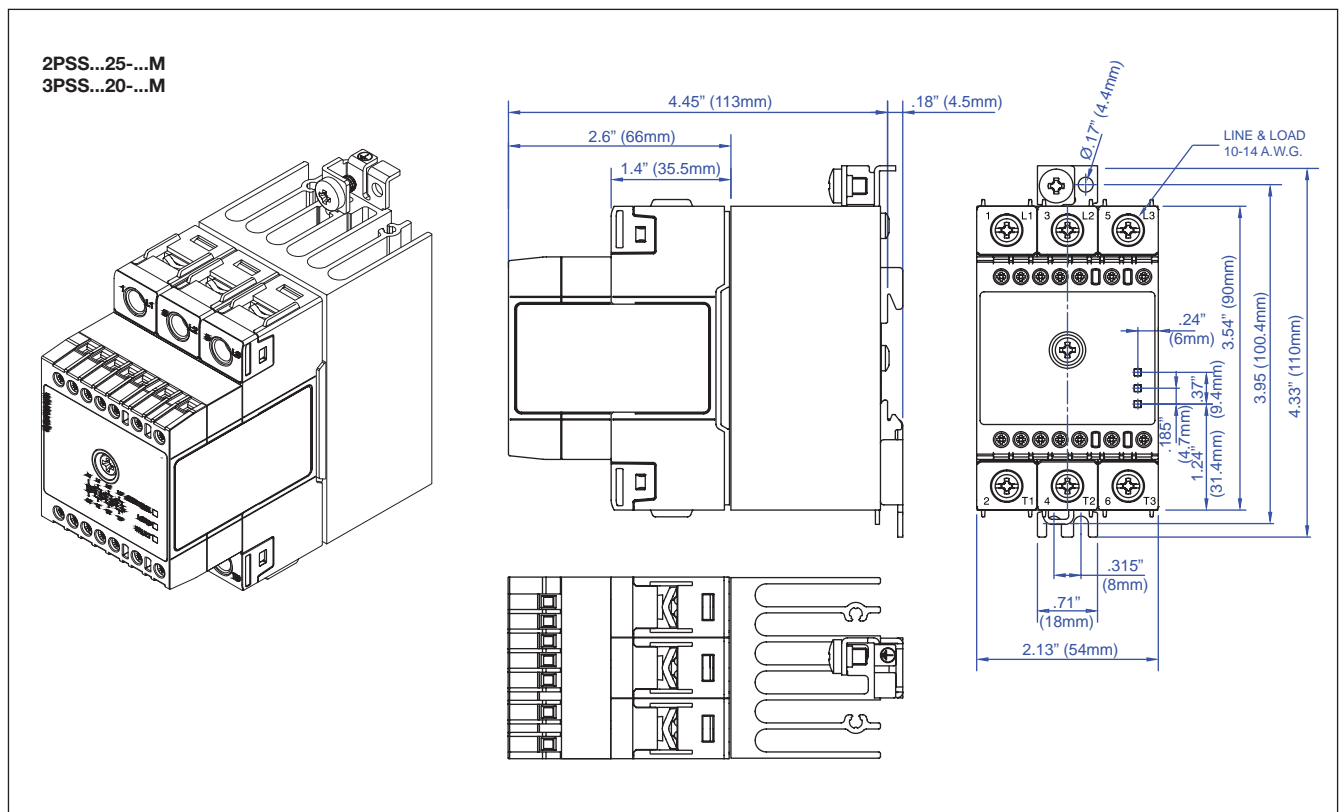
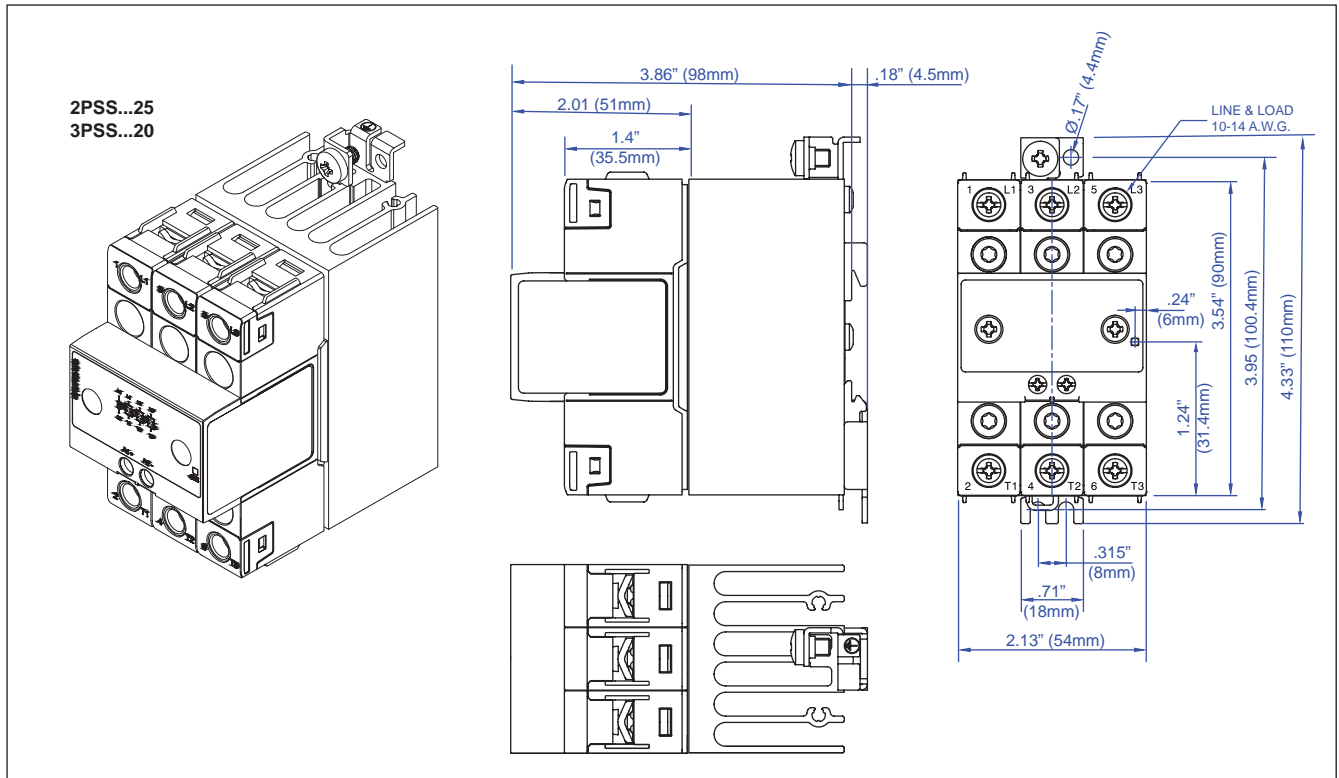
### Terminals labelling:

- 1/L1, 2/L2, 3/L3: Line connections
- 2/T1, 4/T2, 6/T3: Load connections
- A1(+): Positive control signal
- A2(-): Control ground
- Us(+): External supply positive signal
- Us(-): External supply ground
- Us(~): AC external supply
- Uf(+): Fan supply positive signal  
(no connection required by end user)
- Uf(-): Fan supply ground  
(no connection required by end user)
- 12: Alarm EMR, normally closed
- 14: Alarm EMR, normally open
- 11: Alarm EMR, common terminal
- 22: Auxiliary output, normally closed
- 24: Auxiliary output, normally open
- 21: Auxiliary output, common terminal



Connections to Uf+, Uf- are provided readily terminated by manufacturer. However, in case of needed user intervention on terminals Uf+, Uf- for the .PSS..A.-120AF and .PSS..A.-120AFM models, the mains supply has to be turned off first to avoid risk of electrical shock.

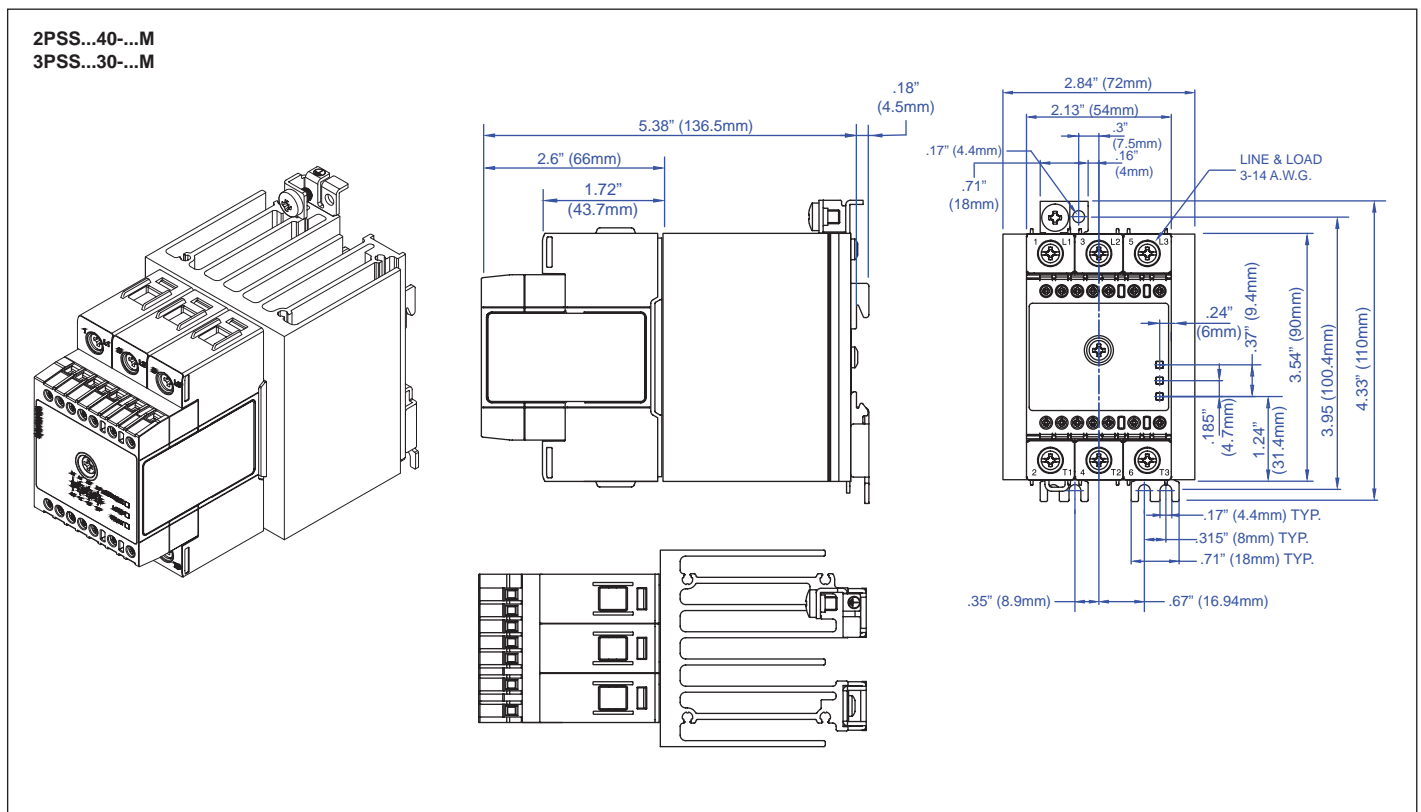
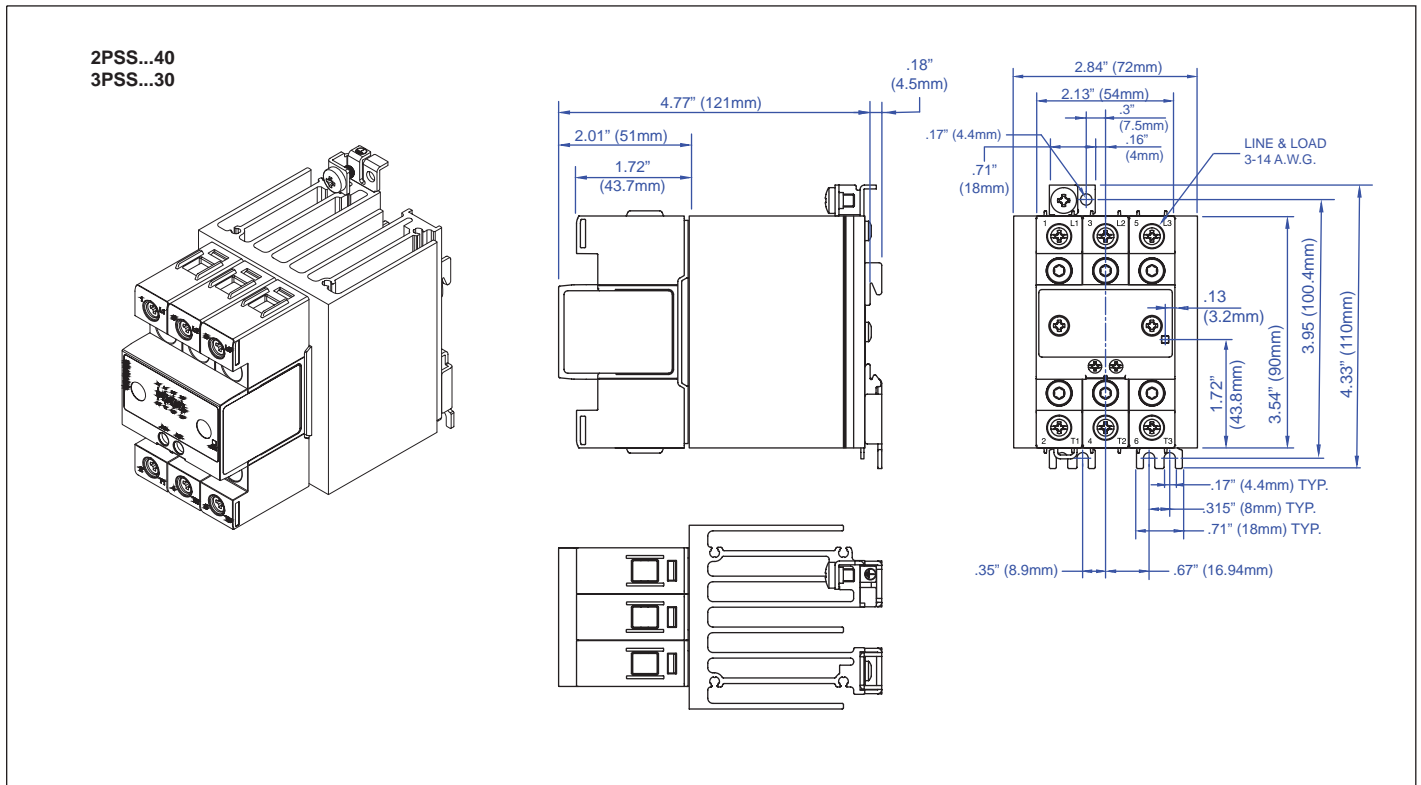
## Dimensions



Dimensions in mm. Housing width tolerance +.02" (0.5mm), -0 as per DIN43880.  
All other tolerances  $\pm .02$ " (0.5mm)



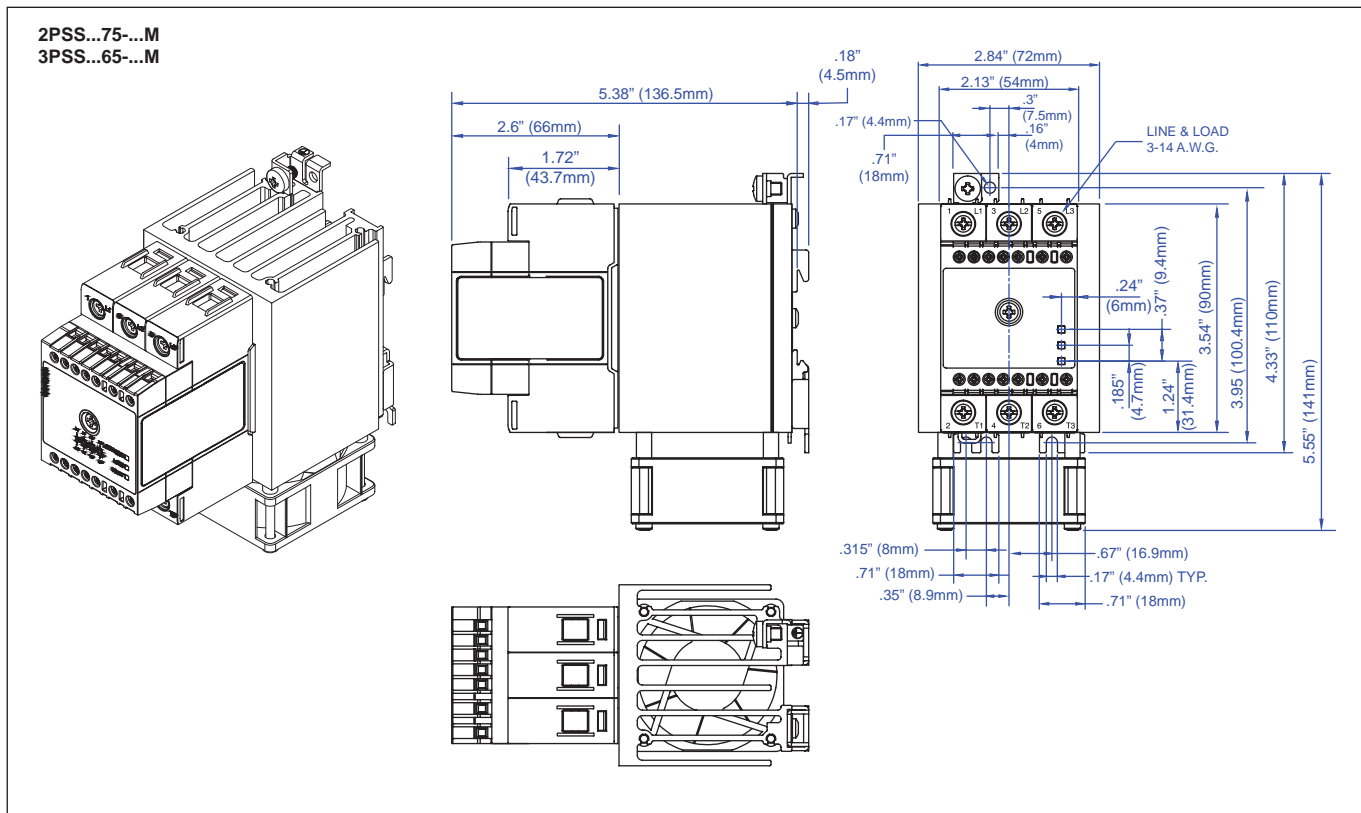
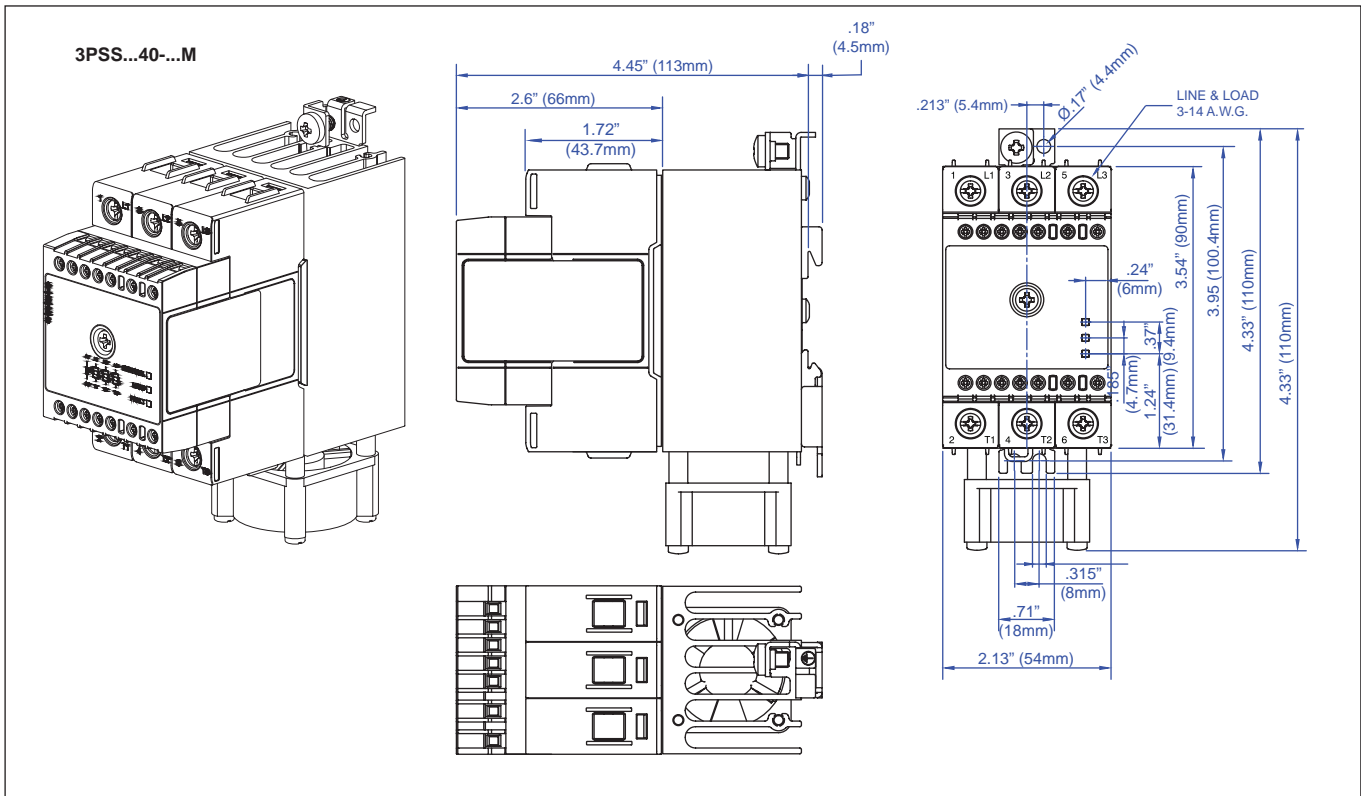
## Dimensions



Dimensions in mm. Housing width tolerance +.02" (0.5mm), -0 as per DIN43880.  
All other tolerances ±.02" (0.5mm)

# MDI

## Dimensions



Dimensions in mm. Housing width tolerance  $+0.02"$  (0.5mm),  $-0$  as per DIN43880.  
All other tolerances  $\pm 0.02"$  (0.5mm)

## Connection Specifications

### Power Connections

1/L1, 3/L2, 5/L3, 2/T1, 4/T2, 6/T3

Use 75°C copper (Cu) conductors



.PSS...20  
.PSS...25

.PSS...20-..M  
.PSS...25-..M



.PSS...30  
.PSS...40  
.PSS...65-...

.PSS...30-..M  
.PSS...40-..M  
.PSS...75-...

Stripping length (X)

.43" (12 mm)

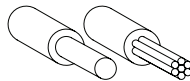
.47" (11 mm)

Connection type

M4 screw with captivated washer

M5 screw with box clamp

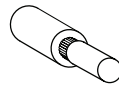
Rigid (solid & stranded)  
UL/cUL rated data



2x 2.5-6.0 mm<sup>2</sup>  
2x 14-10 AWG

1x 2.5-25 mm<sup>2</sup>  
1x 14-3 AWG

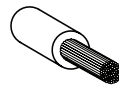
Flexible  
With end sleeve



2x 1.0-2.5 mm<sup>2</sup>  
2x 2.5-4.0 mm<sup>2</sup>  
2x 18-14 AWG  
2x 14-12 AWG

1x 2.5-16 mm<sup>2</sup>  
1x 14-6 AWG

Flexible  
With-out end sleeve



2x 1.0-2.5 mm<sup>2</sup>  
2x 2.5-6.0 mm<sup>2</sup>  
2x 18-14 AWG  
2x 14-10 AWG

1x 4.0-25 mm<sup>2</sup>  
1x 12-3 AWG

Torque specification



Pozidriv 2  
UL: 2 Nm (17.7 lb-in)  
IEC: 1.5-2.0 Nm (13.3-17.7 lb-in)

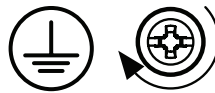
Pozidriv 2  
UL: 2.5 Nm (22 lb-in)  
IEC: 2.0-2.5 Nm (17.7-22 lb-in)

Aperture for termination lug

.48" (12.3 mm)

n/a

Protective Earth (PE)  
connection



M5, 1.5Nm (13.3 lb-in)

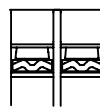
Not provided with SSR. PE connection required when product is intended to be used in Class 1 applications according to EN/IEC 61140

### Control Connections

A1, A2

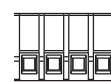
A1, A2, Us, Uf, 11, 12, 14, 21, 22, 24

Use 75°C copper (Cu) conductors



.PSS...20  
.PSS...25

.PSS...30  
.PSS...40



.PSS...20-...  
.PSS...30-..M  
.PSS...65-...

.PSS...25-..M  
.PSS...40-..M  
.PSS...75-...

Stripping length (X)

.32" (8 mm)

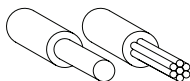
.32" (8 mm)

Connection type

M4 screw with captivated washer

M5 screw with box clamp

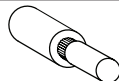
Rigid (solid & stranded)  
UL/cUL rated data



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

1x 1.0-2.5 mm<sup>2</sup>  
1x 18-12 AWG

Flexible  
With end sleeve



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

1x 0.5-16 mm<sup>2</sup>  
1x 14-6 AWG

Torque specification

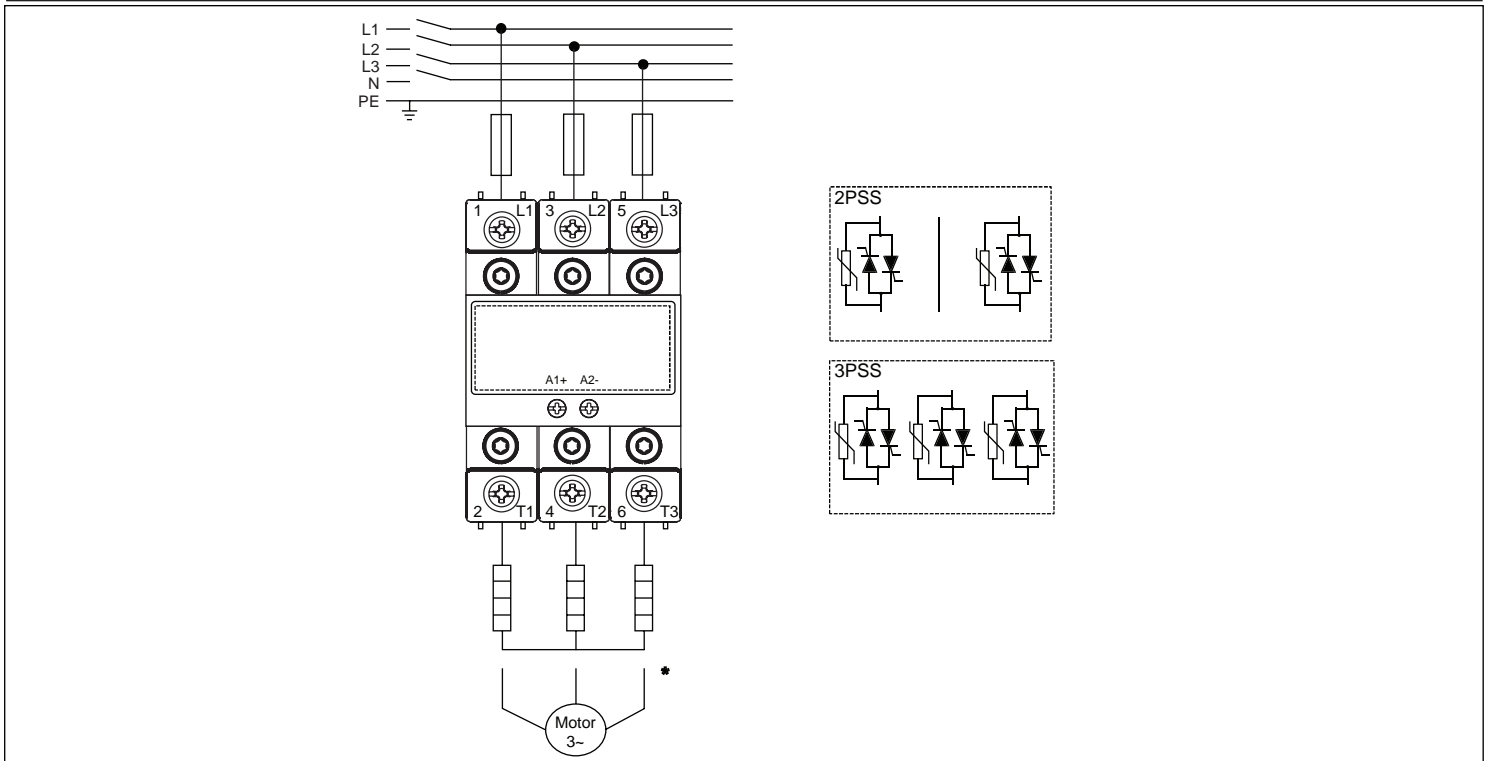


Pozidriv 1  
UL: 0.5 Nm (4.4 lb-in)  
IEC: 0.4-0.5 Nm (3.5-4.4 lb-in)

Pozidriv 1  
UL: 0.5 Nm (4.4 lb-in)  
IEC: 0.4-0.5 Nm (3.5-4.4 lb-in)

# MDI

## Connection Diagram

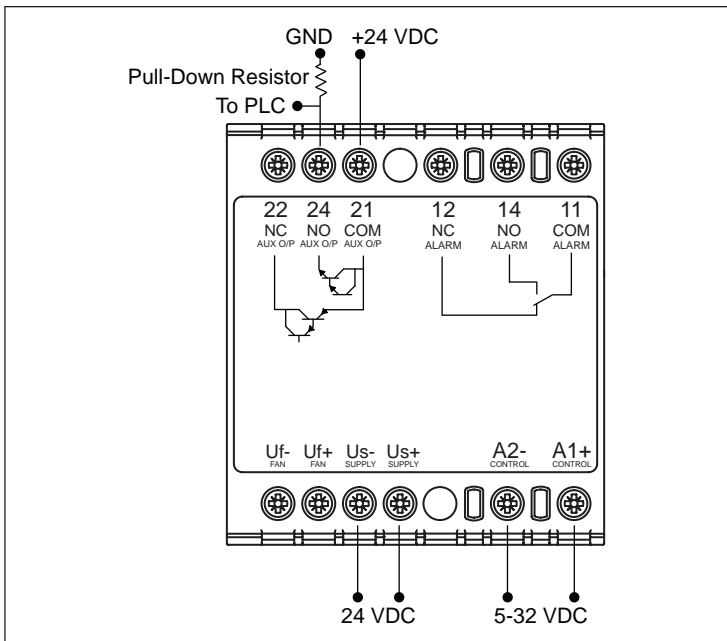


\* Not suitable for .PSS...M versions.  
Not suitable for 4-wire, 3-phase systems

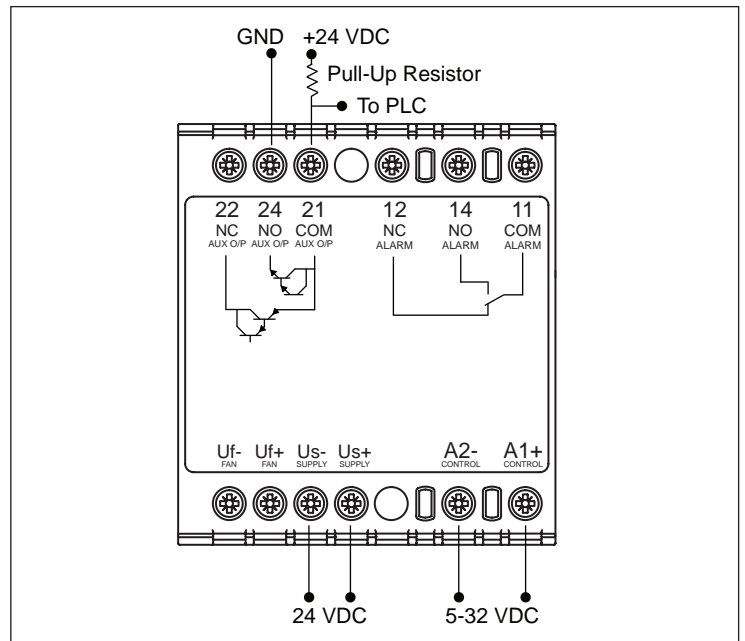
## Connection Configuration for Auxiliary Output

Versions: .PSS..D..-24DM, .PSS..D..-24DFM

Auxiliary output signal 24 VDC, 50 mA; DC control, Uc (5-32 VDC); DC external supply, Us (24 VDC)



Connection of normally open auxiliary output (24-21) in a 'pnp' style



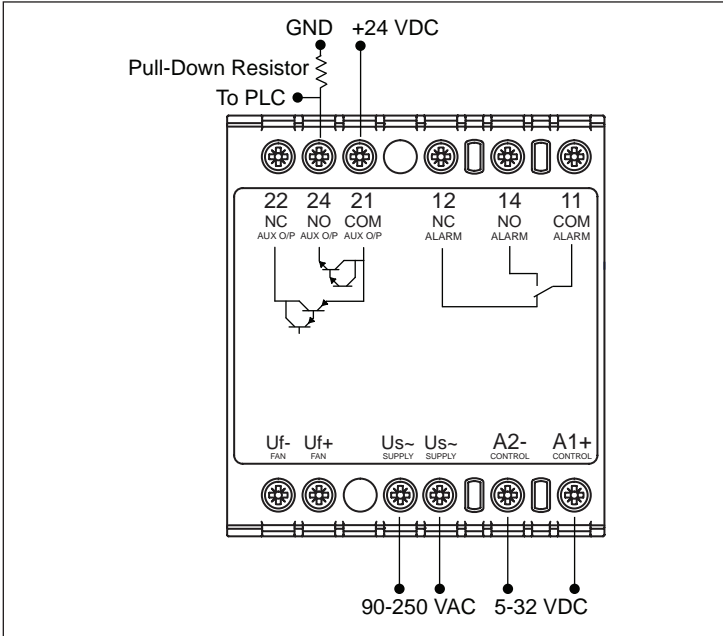
Connection of normally open auxiliary output (24-21) in an 'npn' style



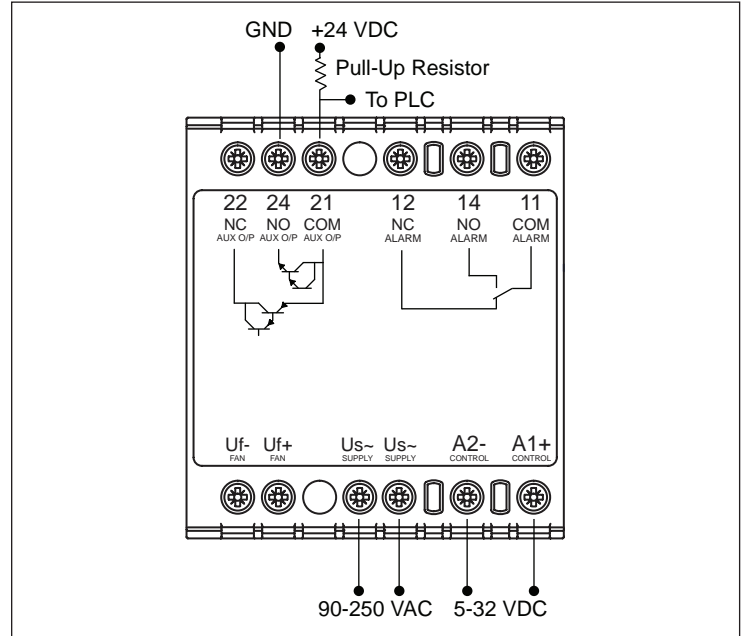
## Connection Configuration for Auxiliary Output

**Versions: .PSS..D..-120M, .PSS..D..-120FM**

Auxiliary output signal 24 VDC, 50 mA; DC control, U<sub>c</sub> (5-32 VDC); AC external supply, U<sub>s</sub> (90-250 VAC)



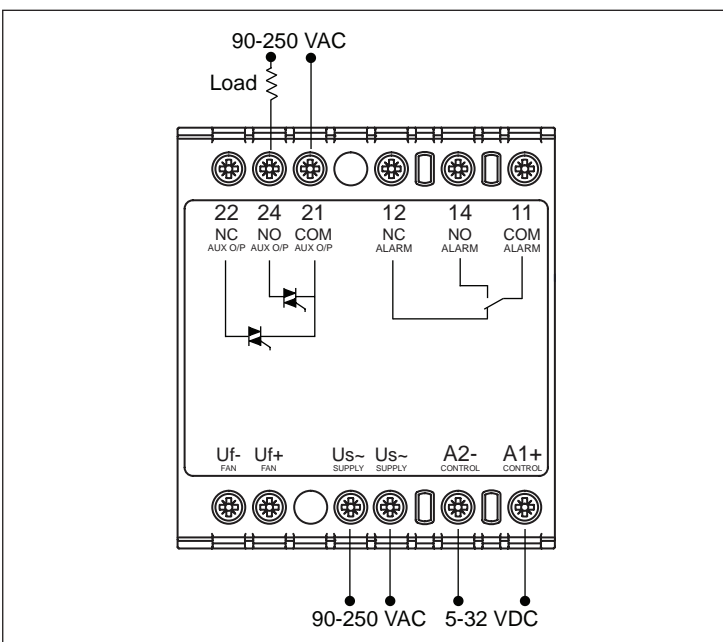
Connection of normally open auxiliary output (24-21) in a 'pnp' style



Connection of normally open auxiliary output (24-21) in a 'npn' style

**Versions: .PSS..A..-120M, .PSS..A..-120FM**

Auxiliary output signal 90-250 VAC, max. 1A @ 25°C; AC control, U<sub>c</sub> (2-275 VAC); AC external supply, U<sub>s</sub> (90-250 VAC)



Connection of normally open auxiliary output (24-21) to an AC load

**Note:** In relation to the auxiliary output terminals 22, 24, 21; it is not possible to connect all 3 terminals to the auxiliary circuit. Preference shall be given to either a normally open (24-21) or normally closed (22-21) contact. The respective terminations shall be chosen and configured accordingly.



## .PSS...-..M Mode of Operation

The .PSS....-..M versions are suitable only for use with resistive loads.

The 'M' suffix versions integrate monitoring circuitry that can detect the status of the Mains, Load, and Solid State Relay (SSR) status. The fault conditions that can be detected with the .PSS...-..M include:

- Mains loss
- Load loss
- SSR open circuit
- SSR short circuit
- SSR over temperature

An external supply, 24 VDC or 90-250 VAC, selectable through part no. configuration, is required for the operation of the .PSS...-..M models. In the case of a fault condition, an EMR alarm output is available through terminals 11, 12, 14 for remote indication. Alarm visual indication is provided by a flashing red LED. The flash rate of the red LED gives an indication of the type of alarm condition detected.

The .PSS...-..M is also equipped with an auxiliary output which operates in synchronisation with the output of the SSR. This electronic auxiliary output with normally open or normally closed user selectable contacts is available through terminals 21, 22, 24. A yellow LED gives indication of the SSR output status.

### Mains Loss:

The mains loss alarm is issued if the mains voltage is missing from either terminals L1, L2 or L3 for more than 1 second. This alarm type is indicated by 2 flashes of the red LED. The alarm resets automatically once the mains voltage is restored and is present on terminals L1, L2 and/or L3 for more than 1 second.

	Supply Voltage (Us) Loss	Supply Voltage (Us) Loss	Normal Operation SSR OFF	Normal Operation SSR ON	Mains Loss Detection (>1s)	Normal Operation SSR ON
Mains Supply (L1, L2, L3)	Red	Red	Red	Red		Red
Load Supply (T1, T2, T3)				Red		Red
Load Current				Red		Red
Auxiliary Output, NO (21-24)				Red		Red
Auxiliary Output, NC (21-22)	Red	Red	Red		Red	
Supply Voltage (Us)			Red	Red	Red	Red
Control Voltage (A1, A2)		Red		Red	Red	Red
Green LED (Control & Supply)			Green	Red	Red	Red
Yellow LED (Load Status)				Yellow		Yellow
Red LED (Alarm LED)					Flashes	
Alarm Output, NO (11-14)					Red	
Alarm Output, NC (11-12)	Red	Red	Red	Red		Red

## .PSS...-M Mode of Operation (continued)

### Load Loss:

Detection of load loss is possible both with control voltage ON and control voltage OFF. This alarm is issued in the absence of a load termination or an open load on terminals T1, T2 and/or T3 exceeding 120ms. Upon detection of this alarm, the SSR output is switched OFF. This alarm type is indicated by 3 flashes of the red LED. The fault condition is automatically restored once the fault is cleared. As long as the load loss condition is present and an alarm is issued accordingly, other alarm conditions occurring when load loss is still present are ignored. For example, if a mains loss occurs during a load loss alarm condition, such an alarm is not indicated until the load loss is cleared. Only once the load loss is cleared, the mains loss alarm is issued if still present.

	Supply Voltage (Us) Loss	Normal Operation SSR OFF	Normal Operation SSR ON	Load Loss Condition (> 120 ms) during control ON	Control OFF during Load Loss Status	Load Restored	Normal Operation SSR ON
Mains Supply (L1, L2, L3)	Red			Red			
Load Supply (T1, T2, T3)			Red				Red
Load Current			Red				Red
Auxiliary Output, NO (21-24)			Red				Red
Auxiliary Output, NC (21-22)	Red	Red		Red	Red	Red	
Supply Voltage (Us)		Red	Red	Red	Red	Red	Red
Control Voltage (A1, A2)	Red		Red	Red			Red
Green LED (Control & Supply)		Green	Red	Red	Green	Green	Red
Yellow LED (Load Status)			Yellow				Yellow
Red LED (Alarm LED)				Red	Red		
Alarm Output, NO (11-14)				Red	Red		
Alarm Output, NC (11-12)	Red	Red	Red			Red	Red

The load loss alarm is not restored automatically in the case of the loads having delta connection. The external supply, Us needs to be reset (switched OFF and back ON) to clear the alarm signal.



## .PSS...-..M Mode of Operation (continued)

### SSR Short Circuit:

This condition is detected when the SSR output remains ON for more than 120ms without control voltage. Upon this alarm, an attempt is made to switch OFF the SSR output but this may not be possible in case of a damaged SSR output(s). Alarm indication is given by 3 flashes of the red LED (same as the load loss alarm indication). In case of a self recovery, the SSR will automatically reset.

During an SSR short circuit condition, the SSR output is ON unintentionally. In this case the auxiliary output does not work in synchronisation with the SSR output.

	Normal Operation SSR OFF	Normal Operation SSR ON	Load Loss Condition (> 120 ms) during control ON
Mains Supply (L1, L2, L3)	Red bar	Red bar	Red bar
Load Supply (T1, T2, T3)		Red bar	Red bar
Load Current		Red bar	Red bar
Auxiliary Output, NO (21-24)		Red bar	
Auxiliary Output, NC (21-22)	Red bar		Red bar
Supply Voltage (Us)		Red bar	Red bar
Control Voltage (A1, A2)		Red bar	
Green LED (Control & Supply)		Red bar	Green bar
Yellow LED (Load Status)		Yellow bar	
Red LED (Alarm LED)			3 red pulses
Alarm Output, NO (11-14)			Red bar
Alarm Output, NC (11-12)	Red bar	Red bar	

## .PSS...-M Mode of Operation (continued)

### SSR Open Circuit:

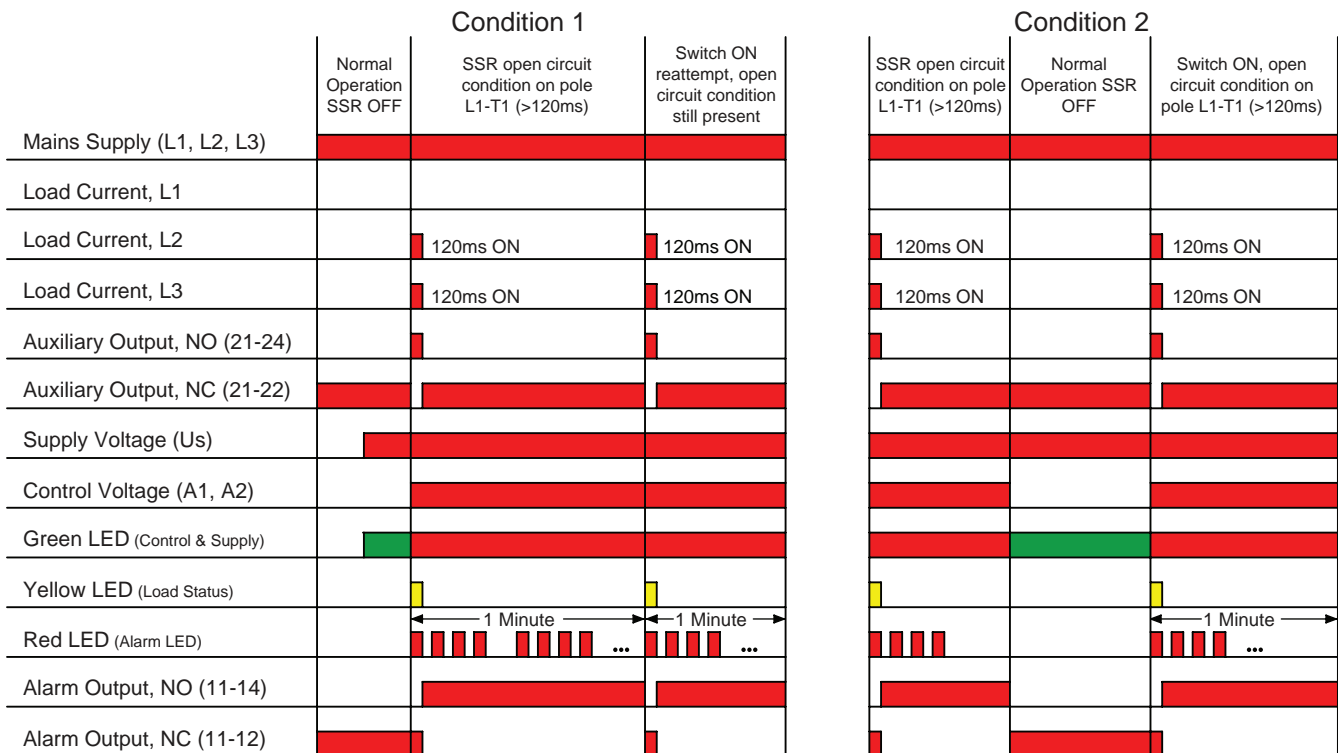
This alarm is issued when either one of the poles or all 3 poles do not switch ON within 120ms when control voltage is applied. This alarm type is identified by 4 flashes of the red LED.

#### Example Condition 1:

Once the open circuit alarm is issued it remains present for 1 minute as long as control voltage is ON. After 1 minute, an attempt to switch ON the SSR is made if control is ON. In case the open circuit condition is still present the alarm is issued again. In the case of an open circuit on only 1 pole the load will switch on 2 phases for 120ms until the open circuit condition on the damaged pole is detected. As soon as the open circuit condition is detected, an alarm is issued and the SSR output is switched OFF. This cycle will repeat for a count of 10 times as long as the control voltage is present. After 10 times no further switch re-attempts are made. It is necessary to reset the external supply (Us) to re-attempt a switch ON. In case failure persists device is to be returned to factory.

#### Example Condition 2:

Once the open circuit alarm is issued it remains present for 1 minute as long as control voltage is ON. If during this period the control voltage is switched OFF, the alarm is automatically cleared and the count indicated in Condition 1 is also set to 0. If control voltage is re-applied and the open circuit condition is detected an alarm is issued accordingly. After 1 minute, an attempt to switch ON the SSR is made if control is still ON. This will continue for a count of 10 times as long as the control voltage is present. After 10 times no further switch re-attempts are made. It is necessary to reset the external supply (Us) to re-attempt a switch ON. In case failure persists device is to be returned to factory.





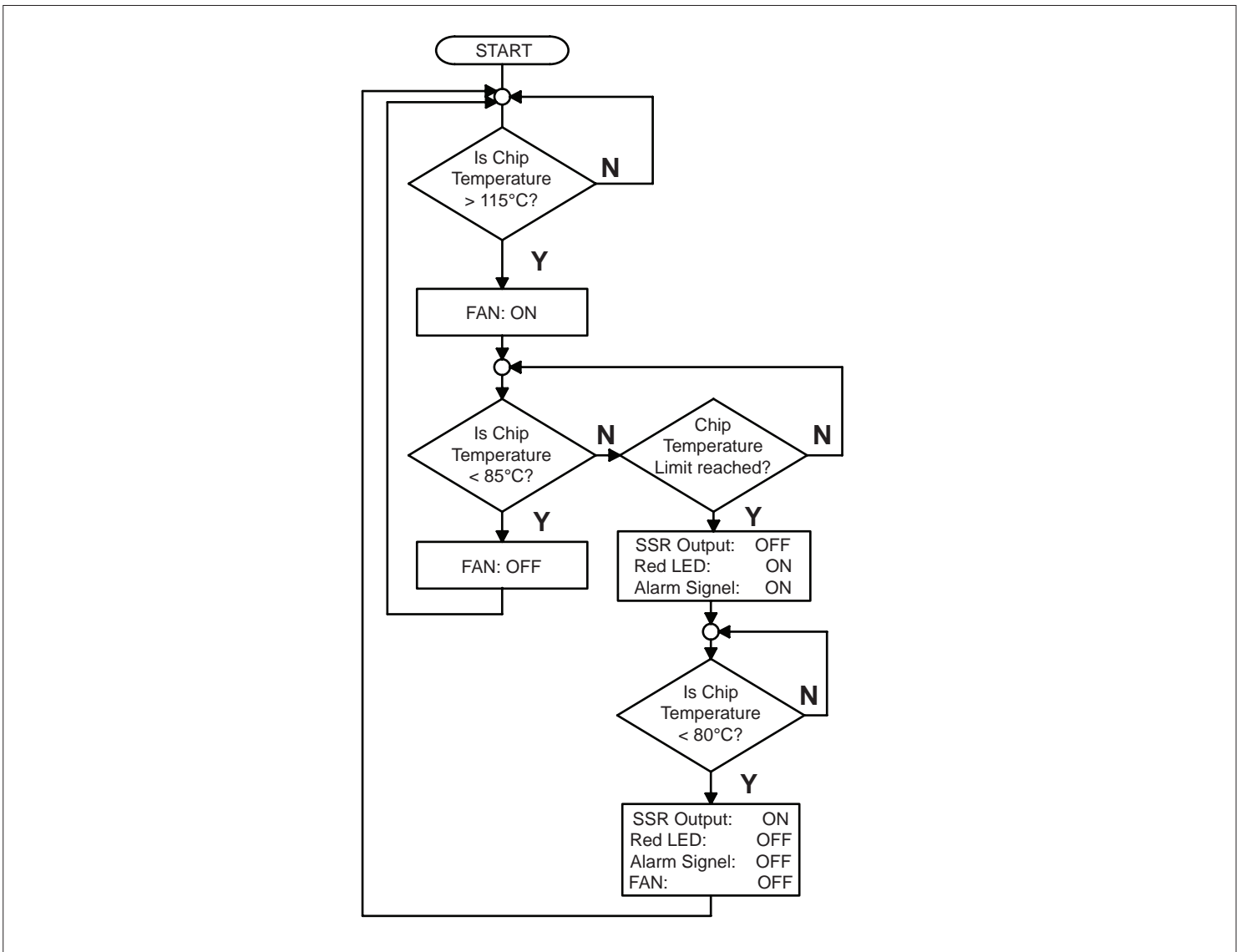
**.PSS...-..M Mode of Operation (continued)**

**SSR Over Temperature:**

The SSR is equipped with internal temperature monitoring to prevent SSR damage in case of overheating conditions. Upon detection of such a condition the SSR output is switched OFF and an alarm is issued accordingly. This alarm is visually indicated by the red LED which is fully ON. Once the temperature cools down, the alarm is cleared and if control is still ON an attempt to re-start the SSR is made.

	Normal Operation SSR OFF	Normal Operation SSR ON	Over Temperature	Over Temperature condition cleared
Mains Supply (L1, L2, L3)	Red	Red	Red	Red
Load Supply (T1, T2, T3)		Red		Red
Load Current		Red		Red
Auxiliary Output, NO (21-24)		Red		Red
Auxiliary Output, NC (21-22)	Red		Red	
Supply Voltage (Us)		Red	Red	Red
Control Voltage (A1, A2)		Red	Red	Red
Green LED (Control & Supply)		Green	Red	Red
Yellow LED (Load Status)		Yellow		Yellow
Red LED (Alarm LED)			Red	
Alarm Output, NO (11-14)			Red	
Alarm Output, NC (11-12)	Red	Red		Red

## Fan operation for versions with integrated fan

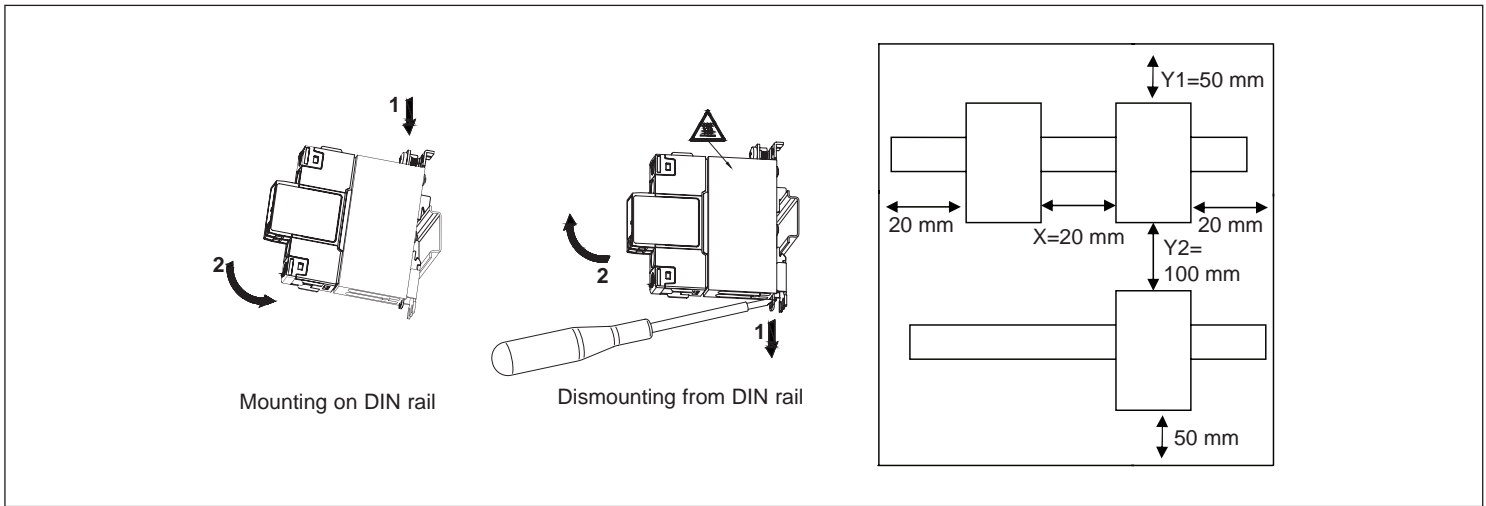


## Red LED Alarm Indications

Flashes	Description of Fault	Timing Diagram
2	Mains Loss	
3	Load Loss or SSR short circuit	
4	SSR open circuit	
100%	SSR over temperature	

# MDI

## Installation Instructions



## Short Circuit Protection

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

Type one 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 ms 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 tables below for maximum.

### Co-ordination type 1 (UL 508)

Part No.	Max. fuse size [A]	Class	Short circuit current [kArms]	Voltage [VAC]
2PSS...25	30	J	100	Max. 600
2PSS...40	40	J	100	Max. 600
2PSS...75	60 <sup>10</sup>	J	100	Max. 600
3PSS...20	30	J	100	Max. 600
3PSS...25	30	J	100	Max. 600
3PSS...30	40	J	100	Max. 600
3PSS...40	40	J	100	Max. 600
3PSS...65	60 <sup>10</sup>	J	100	Max. 600

10: Consult a MDI Inc. sales representative for use of 70A class J fuses



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

Suitable for motor load applications

Part No.	Ferraz Shawmut (Mersen)		Siba		Short circuit current [kArms]	Voltage [VAC]
	Max. fuse size [A]	Part number	Max. fuse size [A]	Part number		
2PSS...25	40	A70QS40-4	32	50 142 06 32	100	600
2PSS...40	60	A70QS60-4	63	50 194 20 63	100	600
2PSS...75	100	A70QS100-4	125	50 196 20 125	100	600
3PSS...20	40	A70QS40-4	32	50 142 06 32	100	600
3PSS...25	40	A70QS40-4	32	50 142 06 32	100	600
3PSS...30	40	A70QS40-4	40	50 194 20 40	100	600
3PSS...40	50	A70QS50-4	50	50 194 20 50	100	600
3PSS...65	100	A70QS100-4	125	50 196 20 125	100	600

Suitable for heater load applications

Part No.	Ferraz Shawmut (Mersen)		Siba		Short circuit current [kArms]	Voltage [VAC]
	Max. fuse size [A]	Part number	Max. fuse size [A]	Part number		
2PSS...25	40	660 URC 14x51/40	32	50 142 06 32	32	600
	40	6.9xx gRC URD 22x58/40			32	
	40	660 URD 22x58/40			32	
	40	A70QS40-4			32	
2PSS...40	63	6.9xx gRC URC 14x51/63	63	50 194 20 63	32	600
	63	6.9xx gRC URD 22x58/63			32	
	60	A70QS60-4			32	
2PSS...75	100	6.9xx gRC URD 22x58/100	125	50 196 20 125	32	600
	100	660 URQ 27x60/100			32	
	100	A70QS100-4			32	
2PSS...20	32	6.9xx gRC URC 14x51/32	32	50 142 06 32	32	600
	32	6.9xx gRC URD 22x58/32			32	
	40	A70QS40-4			32	
2PSS...25	40	660 URC 14x51/40	32	50 142 06 32	32	600
	40	6.9xx gRC URD 22x58/40			32	
	40	660 URD 22x58/40			32	
	40	A70QS40-4			32	
2PSS...30	40	6.9xx gRC URC 14x51/40	40	50 194 20 40	32	600
	40	6.9xx gRC URD 22x58/40			32	
	40	A70QS40-4			32	
2PSS...40	63	6.9xx gRC URC 14x51/63	50	50 194 20 50	32	600
	63	6.9xx gRC URD 22x58/63			32	
	50	A70QS50-4			32	
2PSS...75	100	6.9xx gRC URD 22x58/100	125	50 196 20 125	32	600
	90	660 URD 22x58/90			32	
	100	A70QS100-4			32	

# MDI

## Type 2 Protection Co-ordination with Miniature Circuit Breakers (M.C.Bs)

Solid State Relay Type	ABB Model no. for Z-type M. C. B. (rated current)	ABB 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>11</sup>
<b>2PSS...25</b> <b>3PSS...20</b>	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	10.8
	S201 - Z20 (20A)	S201 - B10 (10)	1.5	12.6
			2.5	21.0
	S201 - Z25 (25A)	S201 - B13 (13A)	2.5	25.0
			4.0	40.0
	<b>2PSS...40</b> <b>3PSS...25</b> <b>3PSS...30</b> <b>3PSS...40</b>	S201 - Z20 (20A)	S201 - B10 (10A)	1.5
2.5				7.0
4.0				11.2
S201 - Z32 (32A)		S201 - B16 (16A)	2.5	13
			4.0	20.8
			6.0	31.2
<b>2PSS...75</b> <b>3PSS...65</b>	tbd	tbd	tbd	tbd

11: Between MCB and Load (including return path which goes back to the mains if applicable)

Note: A prospective current of 6 kArms 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's Technical Support Group.

## Accessories

### Fan



#### Ordering Key

**PSSFAN60**

#### Fan Accessory

2PSS...75 & 3PSS...65

#### Ordering Key

**PSSFAN40**

#### Fan Accessory

3PSS...40