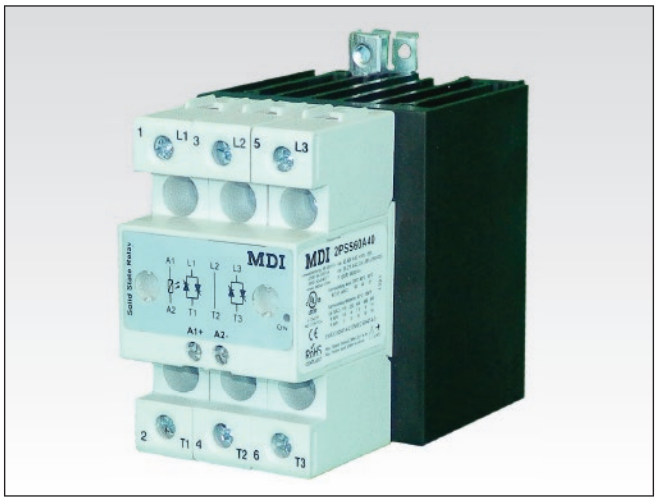
Solid State Relays
3-Phase with Integrated Heatsink
Types 2PSS, 3PSS



- 2-pole & 3-pole AC switching solid state contactors
- Product width up to 2.84" (72 mm)
- Rated operational voltage: up to 600 VAC
- Rated operational current: up to 75 AAC
- Control voltages: 5-32 VDC, 20-275 VAC (24-190 VDC)
- Up to 15,000A^{2}s for I^{2}t
- Motor ratings up to 11 kW @ 400 VAC, 25 HP @ 600 VAC
- Integrated varistor protection on output
- Optional monitoring for SSR and load malfunction (.PSS..-.M)[1]
- EMR alarm output and auxiliary output (.PSS..-.M)
- Controlled fan operation for versions with integrated fan
- UL, cUL Listing
- 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

- **Number of poles**
- **Solid state relay**
- **Rated operational voltage**
- **Control voltage**
- **Rated operational current**
- **Fan voltage**
- **External supply**
- **Integrated fan**
- **Monitoring features**

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

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

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Selection Guide: 2PSS

Rated output voltage, Ue	Control voltage, Uc	Features	External supply, Us	Connection control / power	Rated operational current @ 40°C (I^2t value) 25 AAC / pole (1,800 A^2s)	40 AAC / pole (6,600 A^2s)	75 AAC / pole (15,000 A^2s)
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^2t value) 25 AAC / pole (1,800 A^2s)	40 AAC / pole (6,600 A^2s)	75 AAC / pole (15,000 A^2s)
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^2t value) 20 AAC / pole (1,800 A^2s)	25 AAC / pole (1,00 A^2s)	30 AAC / pole (6,600 A^2s)	40 AAC / pole (6,600 A^2s)	65 AAC / pole (15,000 A^2s)
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^2t value) 20 AAC / pole (1,800 A^2s)	25 AAC / pole (1,800 A^2s)	30 AAC / pole (6,600 A^2s)	65 AAC / pole (15,000 A^2s)
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

	.PSS	.PSS...-...M
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	Green, full intensity	Green, full intensity
Supply ON		Green, half intensity
Load ON		Yellow, full intensity
Alarm ON	Red, full intensity **(.PSS...-..F)**	Red, flashing[6]
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	4000 Vrms	4000 Vrms
Input to Output	4000 Vrms	2500 Vrms

6: Refer to Red LED Alarm Indications

Output Voltage Specifications

		.PSS22...	.PSS60...
Operational voltage range, Ue	**.PSS**	42-220 VAC -15% / +10% on max	42-600 VAC -15% / +10% on max
	.PSS..-...M	90-220 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

	2PSS...25	2PSS...40	2PSS...75
Rated operational current per pole[7]			
AC-51 @ Ta=25°C	32 AAC	50 AAC	85 AAC
AC-51 @ Ta=40°C	27 AAC	40 AAC	75 AAC
AC-53a @ Ta=40°C	11.5 AAC	16.5 AAC	28 AAC
No. of motor starts[8] (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_{ON}=1s, t_{OFF}=9s, 50 cycles	61 AAC	107 AAC	154 AAC
Maximum transient surge current (I_{TSM}), t=10ms	600 Ap	1150 Ap	1750 Ap
I^2t for fusing (t=10ms) Minimum	1800 A^2s	6600 A^2s	15000 A^2s
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

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Output Specifications: 3PSS

	3PSS...20	3PSS...25	3PSS...30	3PSS...40	3PSS...65
Rated operational current per pole[7]					
AC-51 @ Ta=25°C	25 AAC	32 AAC	37 AAC	42 AAC	71 AAC
AC-51 @ Ta=40°C	20 AAC	28 AAC	30 AAC	42 AAC	66 AAC
AC-53a @ Ta=40°C	10 AAC	11 AAC	14 AAC	17 AAC	25 AAC
No. of motor starts[8]					
(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_{ON}=1s, t_{OFF}=9s, 50 cycles	61 AAC	84 AAC	107 AAC	107 AAC	154 AAC
Maximum transient surge current (I_{TSM}), t=10ms	600 Ap	600 Ap	1150 Ap	1150 Ap	1750 Ap
I^2t for fusing (t=10ms) Minimum	1800 A^2s	1800 A^2s	6600 A^2s	6600 A^2s	15000 A^2s
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

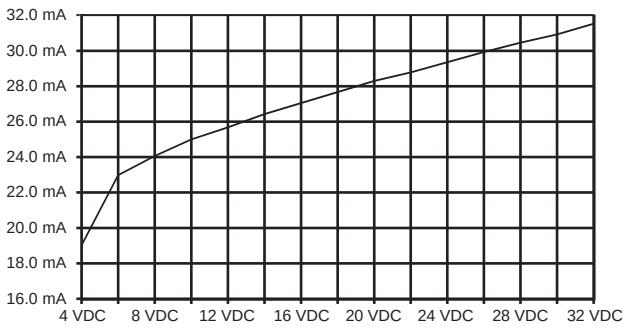
Control Specifications (A1, A2)

	.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

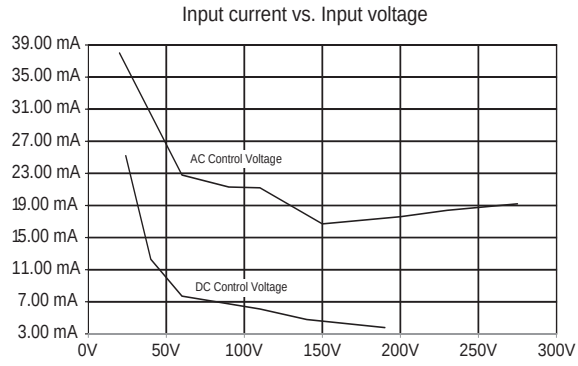
Control Specifications (A1, A2) for .PSS...-...F, .PSS...-...M

	.PSS...D-24D. .PSS..D-120..	.PSS..A-120..
Control voltage range, Uc	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

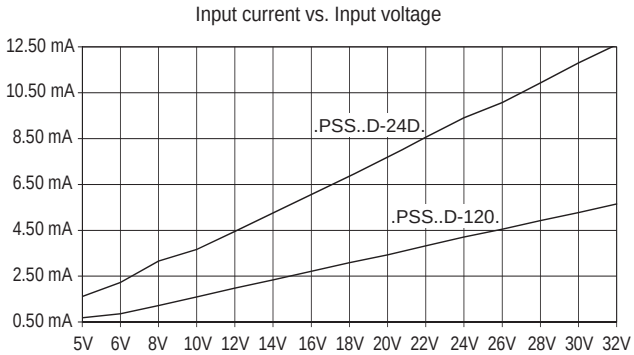
.PSS..D..



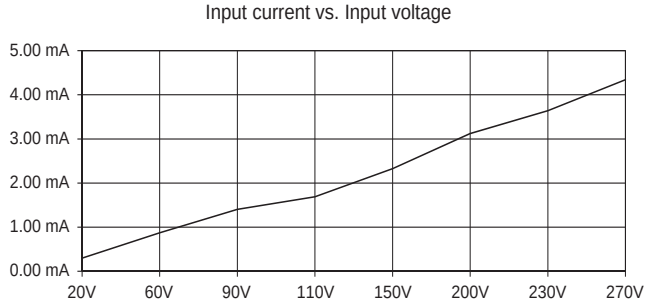
.PSS..A..



.PSS..D..-24D. .PSS..D..-120.



.PSS..A..-120.



Supply Specifications (Us)

	.PSS..D-24D.	.PSS..D-120. .PSS..A-120.
Supply voltage range, Us	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

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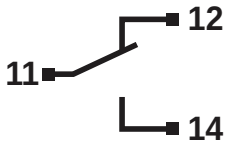
Alarm Specifications (12, 14, 11)

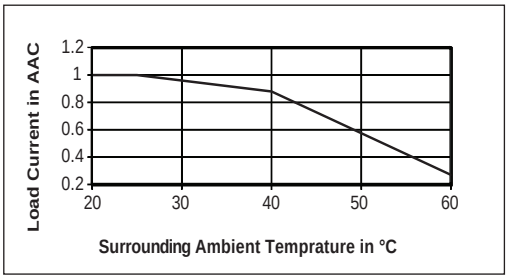
Output type	.PSS..D-...F .PSS..D-...M
	EMR, 1 Form C (SPDT) Normally closed (12-11) Normally open (14-11)
Contact rating	2A @ 250 VAC / 30 VDC
Isolation between open contacts	1000 VAC



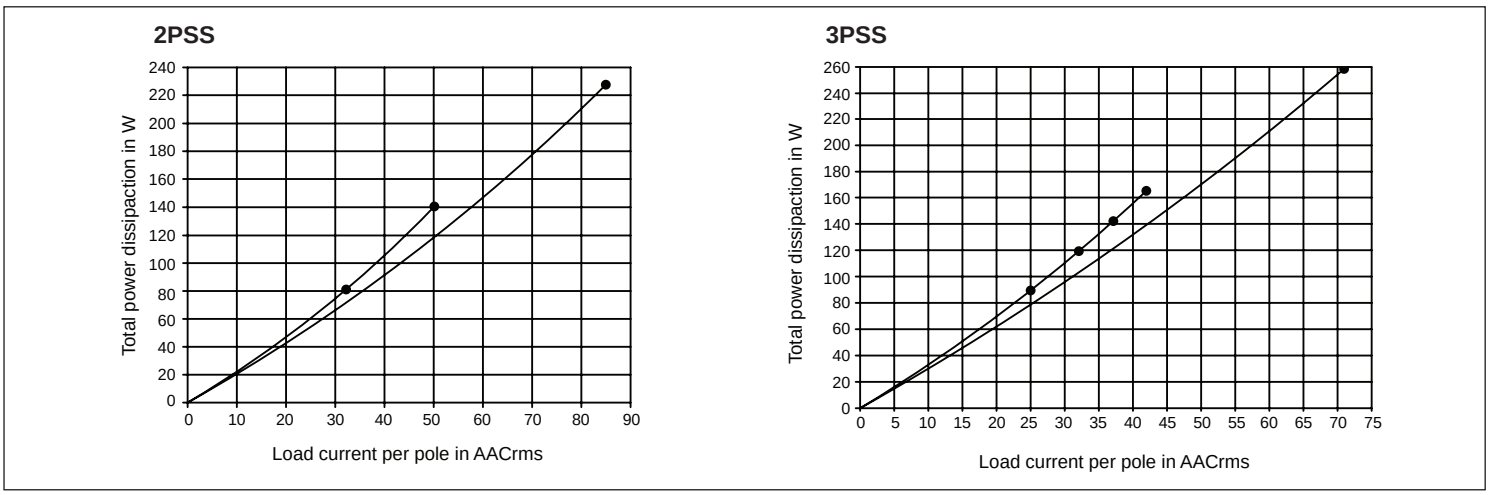
Auxiliary Output Specifications (22, 24, 21)

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

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

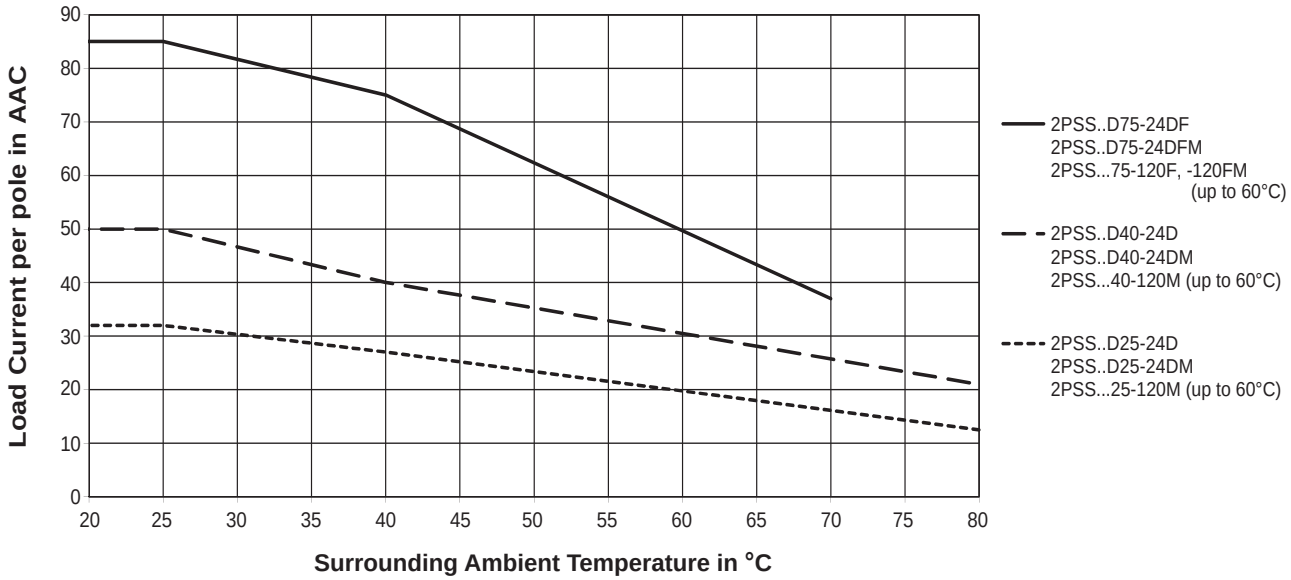


Output Power Dissipation

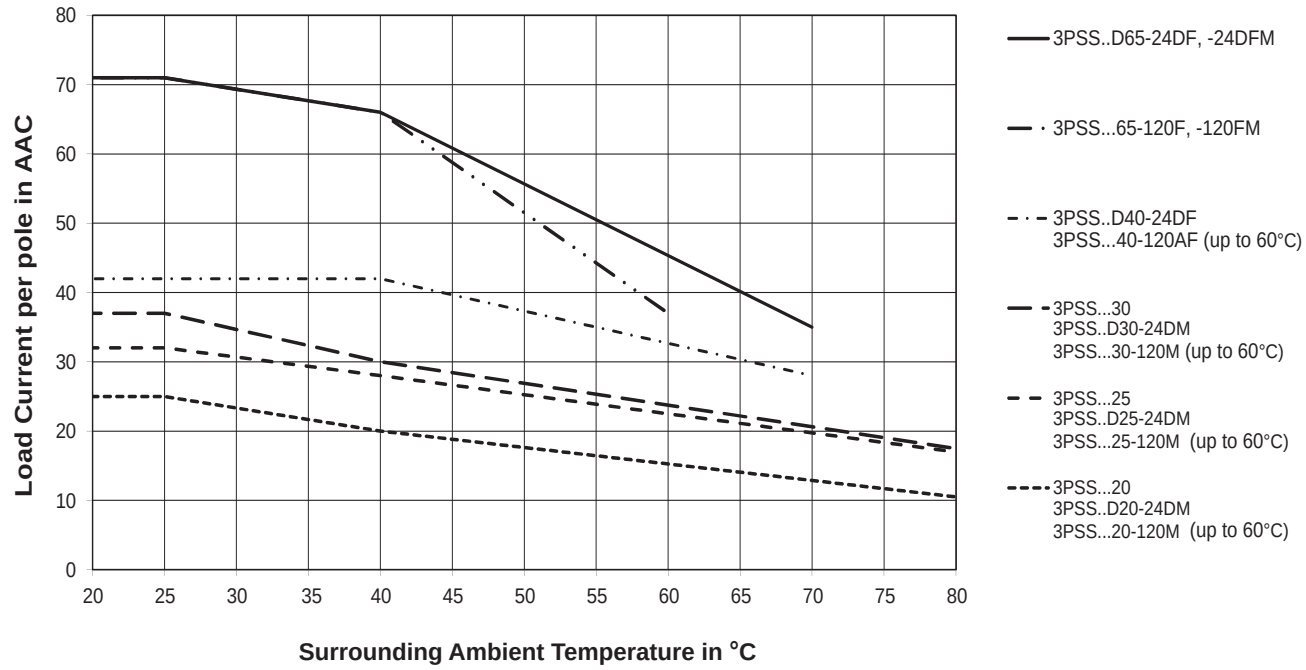


Current Derating

2PSS



3PSS



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Agency Approvals and Conformance

Conformance	EN/IEC 60947-4-2 EN/IEC 60947-4-3
Agency Approvals	UL listed (E172877), UL508 cUL Listed (E172877), C22.2 No.14-10
Short Circuit Current rating	100kArms, UL508

Electromagnetic Compatibility

EMC immunity	EN/IEC 60947-4-2
Electrostatic discharge (ESD) immunity	EN/IEC 61000-4-2
Air discharge, 8 kV	Performance Criteria 2
Contact, 4 kV	Performance Criteria 2
Electrical fast transient (Burst) immunity	EN/IEC 61000-4-4
Output: 2 kV, 5 kHz	Performance Criteria 1
Input: 1 kV, 5 kHz	Performance Criteria 1
Signal: 1 kV, 5 kHz .PSS...-..M	Performance Criteria 1
Electrical surge immunity	EN/IEC 61000-4-5
Output, line to line, 1 kV	Performance Criteria 1
Output, line to earth, 2 kV	Performance Criteria 1
Input, line to earth, 1 kV (A1, A2)	Performance Criteria 2
Signal, line to line, 500 V (Us, 21, 22, 24) .PSS..D..-24D	Performance Criteria 1
Signal, line to earth, 500 V (Us, 21, 22, 24) .PSS..D..-24D	Performance Criteria 1
Signal, line to earth, 1 kV (Us, 21, 22, 24)	
.PSS..D..-120.	Performance Criteria 1
.PSS..A..-120.	Performance Criteria 1
11, 12, 14, line to line, 1 kV	Performance Criteria 1
11, 12, 14, line to earth, 2 kV	Performance Criteria 1

Radiated radio frequency immunity	EN/IEC 61000-4-3
10 V/m, 80 - 1000 MHz	Performance Criteria 1
10 V/m, 1.4 - 2.0 GHz	Performance Criteria 1
10 V/m, 2.0 - 2.7 GHz	Performance Criteria 1
Conducted radio frequency immunity	EN/IEC 61000-4-6
10 V/m, 0.15 - 80 MHz	Performance Criteria 1
Voltage dips immunity	EN/IEC 61000-4-11
0% for 0.5 / 1cycle	Performance Criteria 2
40% for 10 cycles	Performance Criteria 2
70% for 250 cycles	Performance Criteria 2
Voltage interruptions immunity	EN/IEC 61000-4-11
0% for 5000 ms	Performance Criteria 2

EMC emission	EN/IEC 61000-6-4
Radio interference voltage emission (conducted)	EN/IEC 55011
0.15-30 MHz	Class A (Industrial) with filters - see filter information

Radio interference field emission (radiated)	EN/IEC 55011
30-1000 MHz	Class A (Industrial)

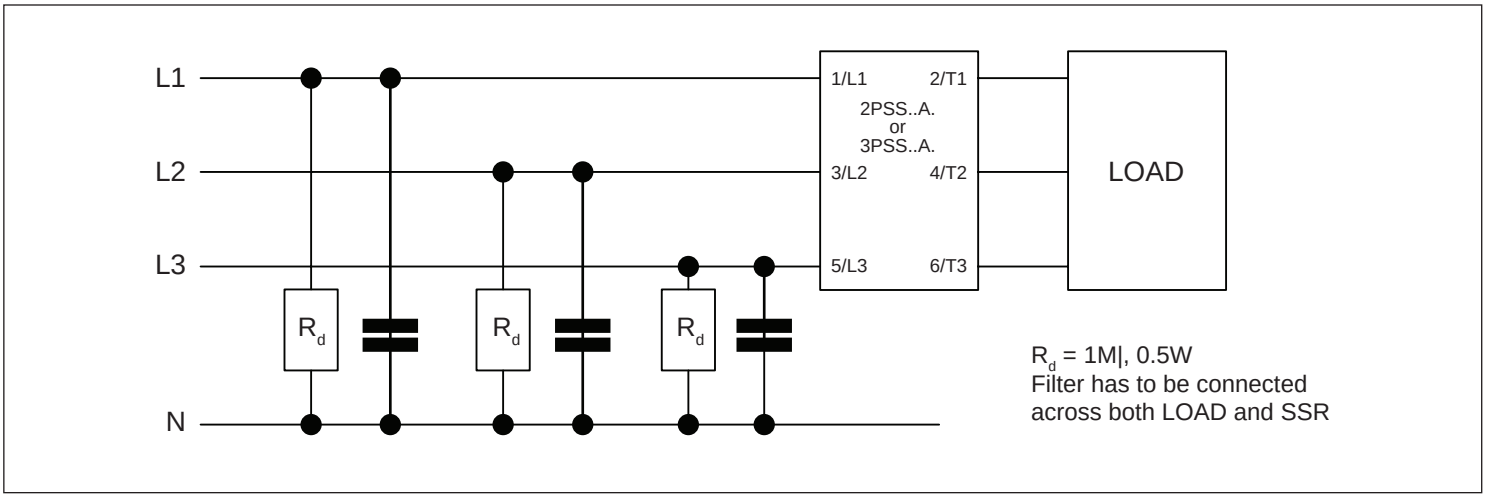
Note:
• Control input lines must be installed together to maintain products susceptibility to Radio Frequency Interference.
• Use of AC solid state relays may according to the application and the load current, cause conducted radio interferences. Use of mains filters may be necessary for cases where 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 impedence 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, degredation 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

Operating temperature	
	-40°C to +80°C (-40°F to +176°F)
.PSS....-24DF, -24DFM	-40°C to +70°C (-40°F to +158°F)
.PSS....- 120M, -120AF, -120AFM	-40°C to +60°C (-40°F to +140°F)
Storage temperature	-40°C to +100°C (-40°F to +212°F)
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 (for plastic)	UL 94 V0
Installation altitude	0 - 1000m. Above 1000m derate linearly by 1% of FLC per 100m up to maximum of 2000m
Weight	
2PSS...25, 3PSS...20 (M)	Approx. 600g (680g)
2PSS...40, 3PSS...25, 3PSS...30 (M)	Approx. 850g (920g)
3PSS...40	Approx. 740g
2PSS...75, 3PSS...65	Approx. 980g

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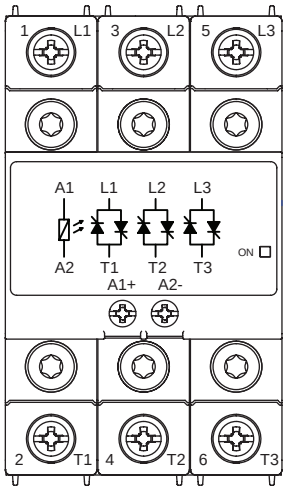
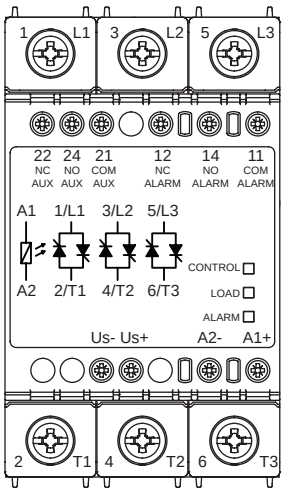
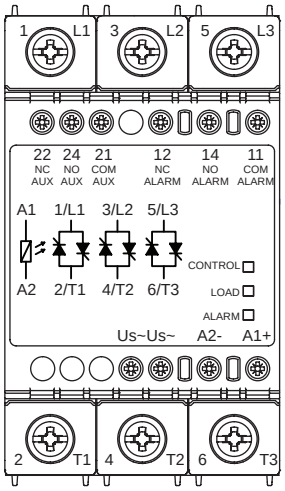
Terminal Layout



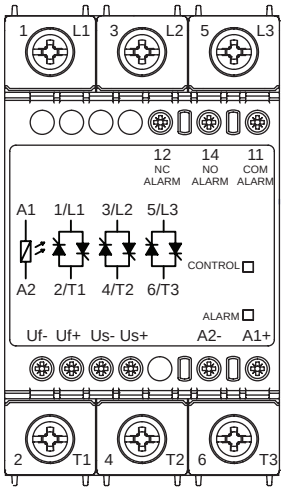
2PSS..25, 2PSS..40
3PSS..20-.., 3PSS..40, 3PSS..30



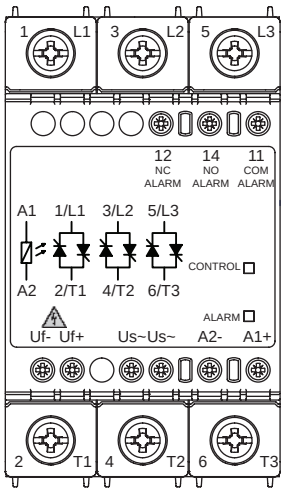
2PSS..25-24DM, 2PSS..40-24DM
3PSS..20-24DM, 3PSS..25-24DM,
3PSS..30-24DM



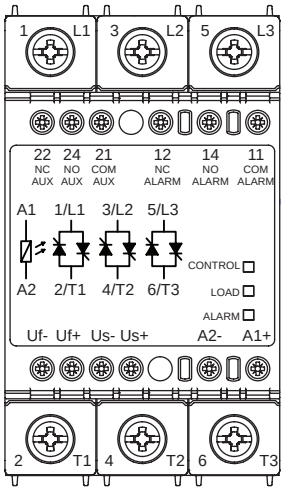
2PSS..25-120M, 2PSS..40-120M
3PSS..20-120M, 3PSS..25-120M,
3PSS..30-120M



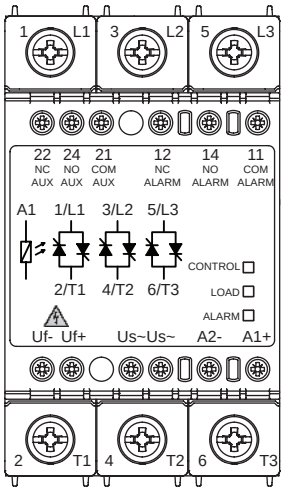
2PSS..75-24DF
3PSS..40-24DF, 3PSS..65-24DF



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



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



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

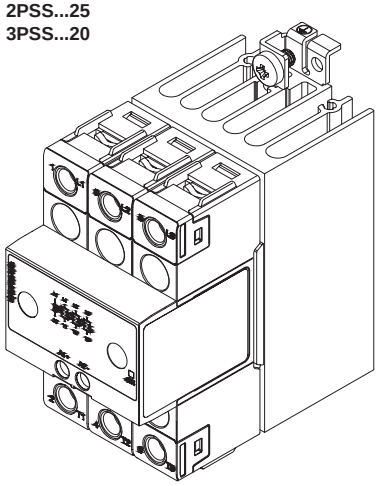
Terminals labelling:

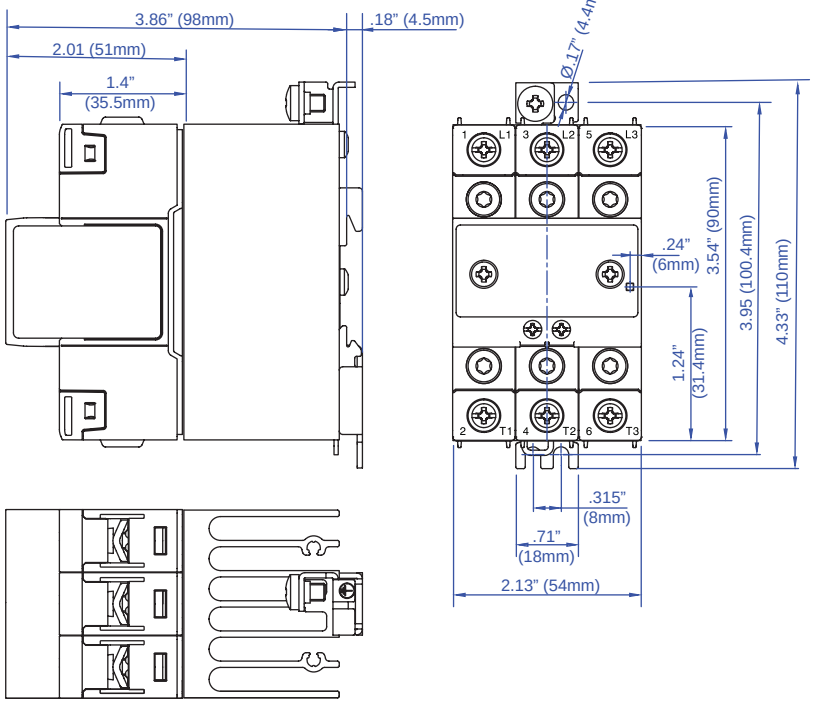
1/L1, 2/L2, 3/L3:	Line connections
2/T1, 4/T2, 6/T3:	Load connections
A1(+):	Positive control signal
A2(-):	Control ground
Us(+):	External supply positive signal
Us(-):	External supply ground
Us(~):	AC external supply
Uf(+):	Fan supply positive signal (no connection required by end user)
Uf(-):	Fan supply 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.

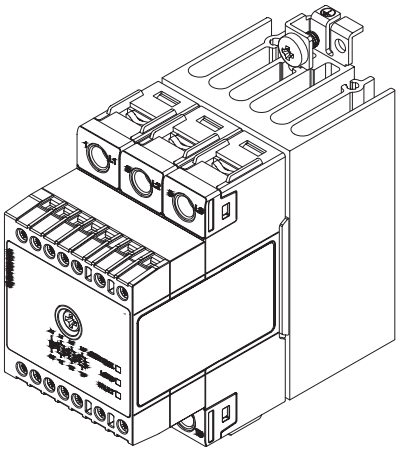
Dimensions

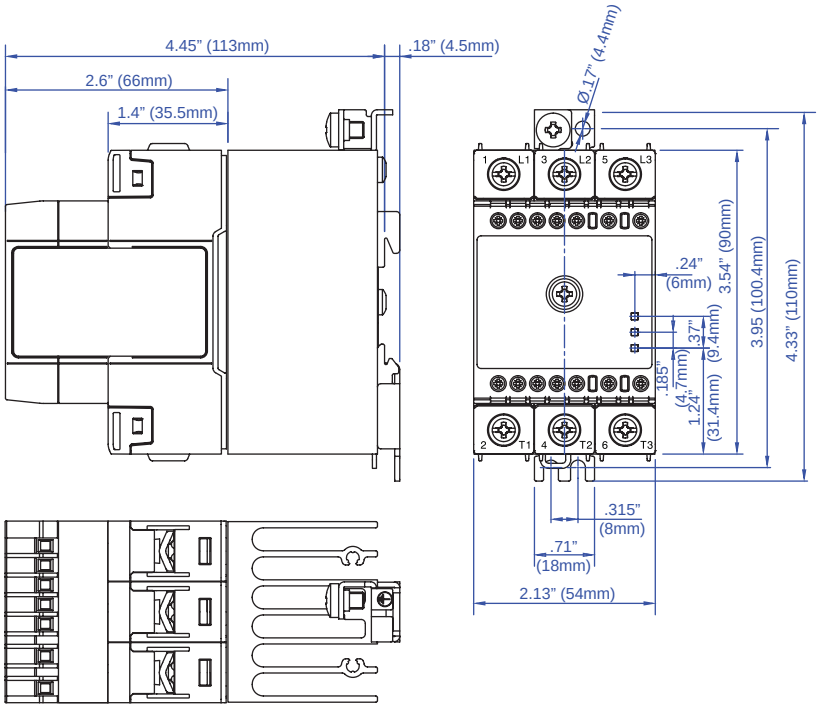
2PSS...25
3PSS...20





2PSS...25-...M
3PSS...20-...M



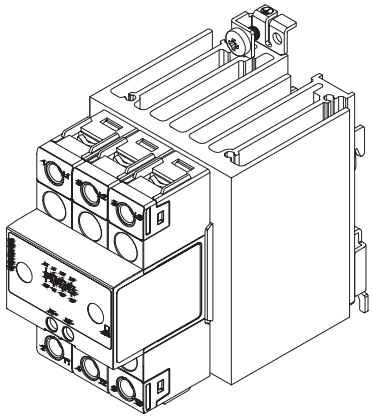


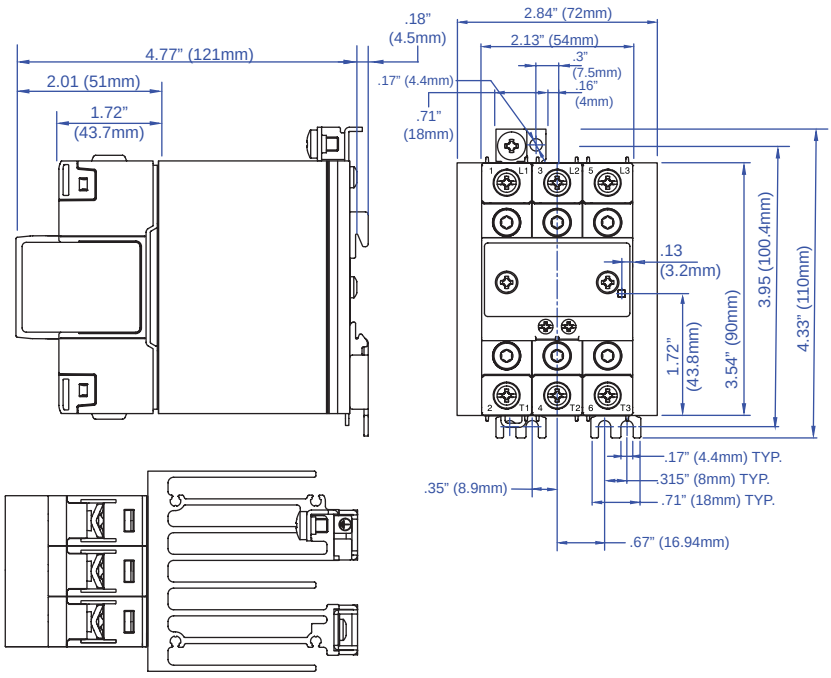
Dimensions in mm. Housing width tolerance +.02" (0.5mm), -0 as per DIN43880.
All other tolerances ±.02" (0.5mm)

MDI

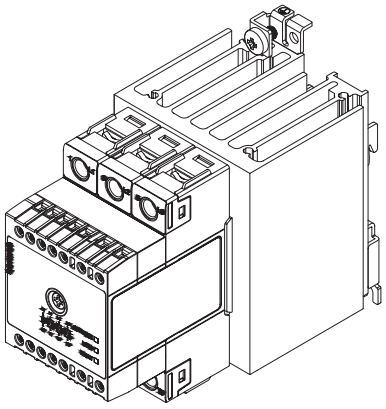
Dimensions

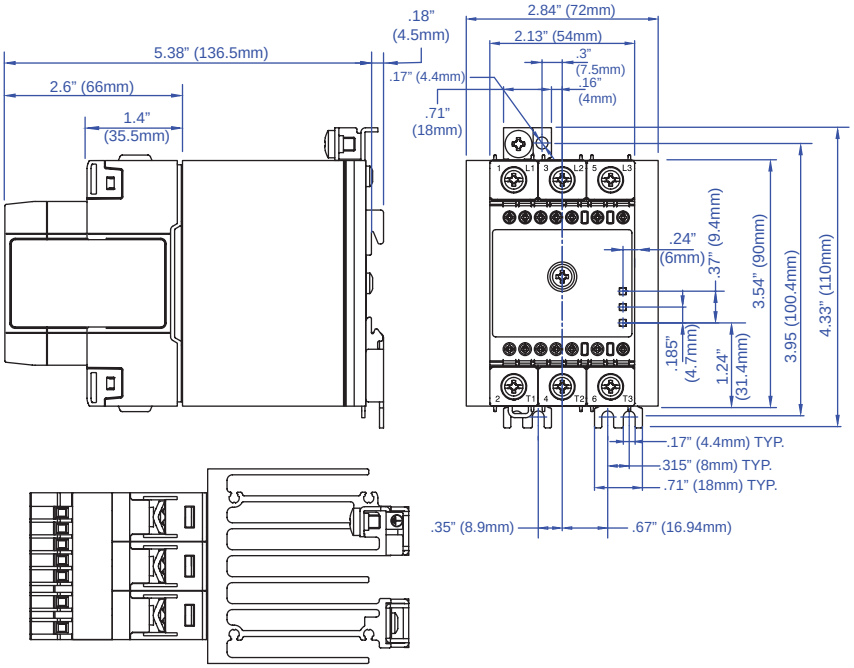
3PSS...25





3PSS...25-...M

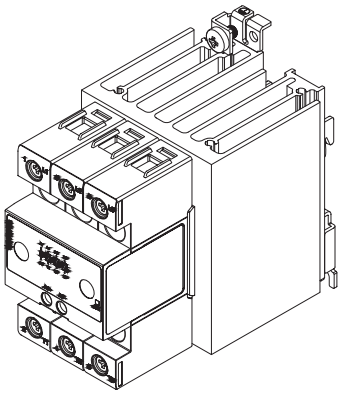


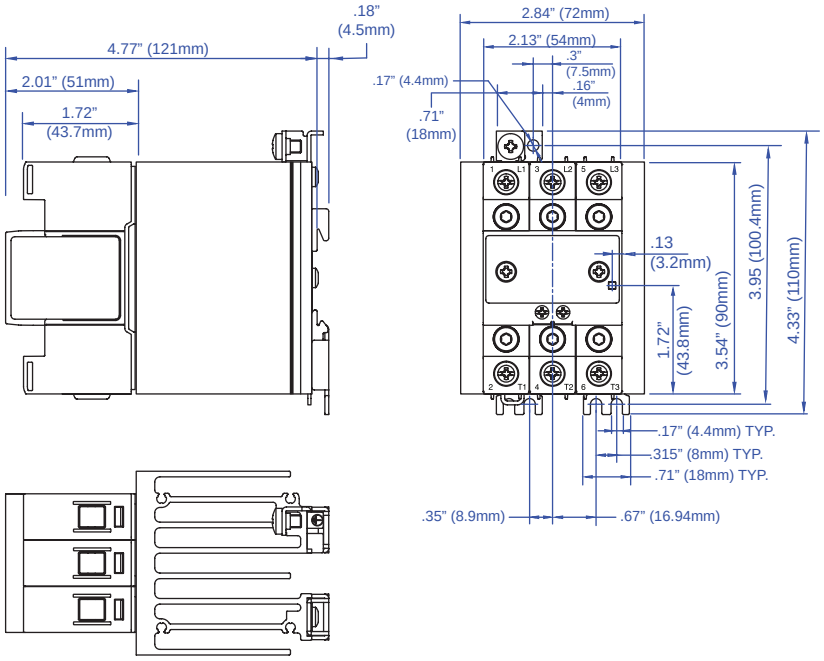


Dimensions in mm. Housing width tolerance +.02" (0.5mm), -0 as per DIN43880.
All other tolerances ±.02" (0.5mm)

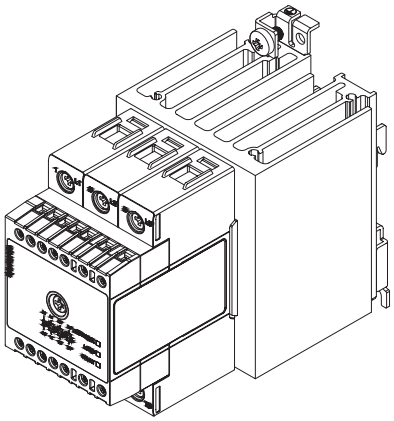
Dimensions

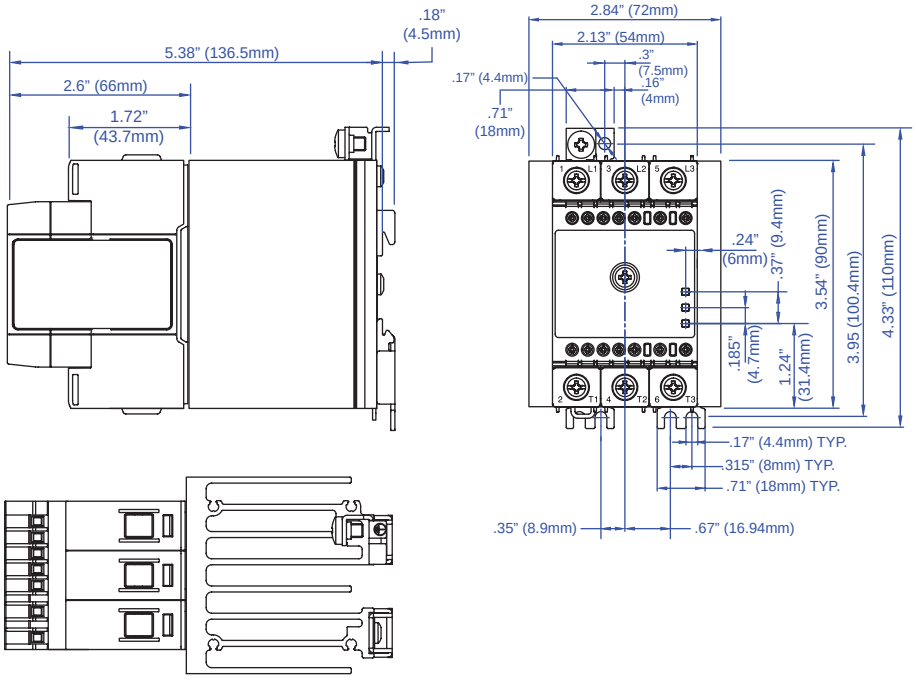
2PSS...40
3PSS...30





2PSS...40-...M
3PSS...30-...M



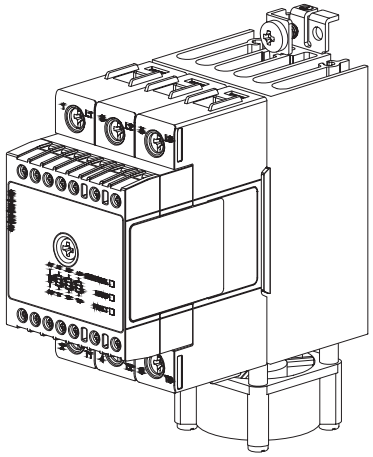


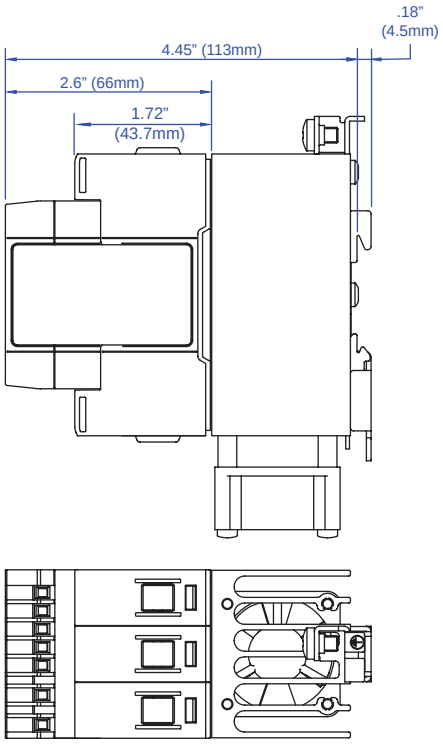
Dimensions in mm. Housing width tolerance +.02" (0.5mm), -0 as per DIN43880.
All other tolerances ±.02" (0.5mm)

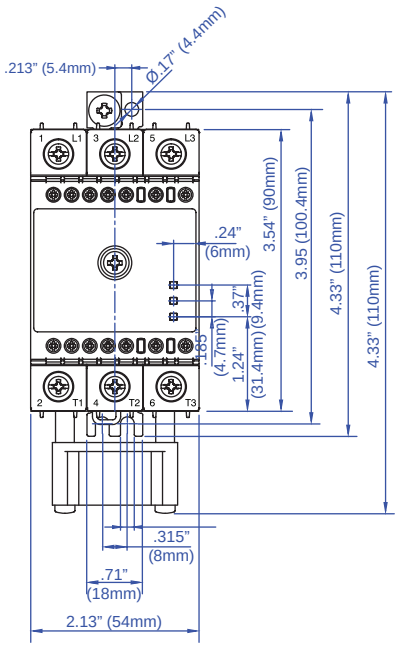
MDI

Dimensions

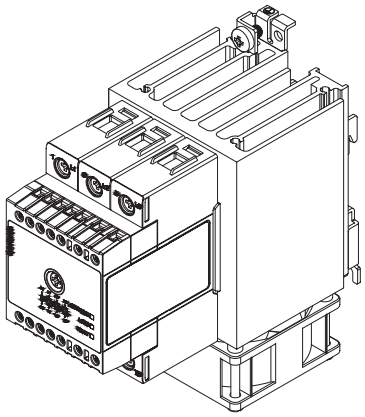
3PSS...40-...M

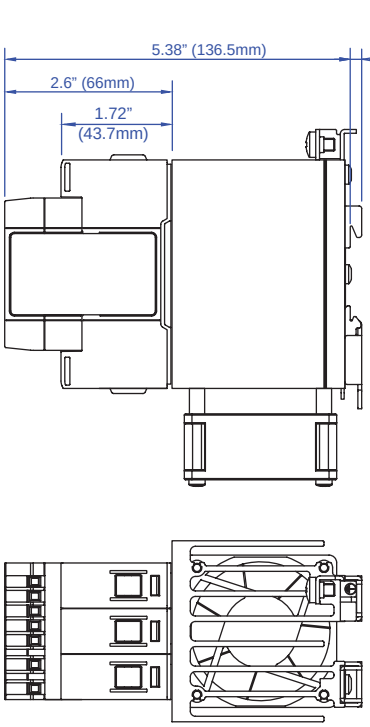


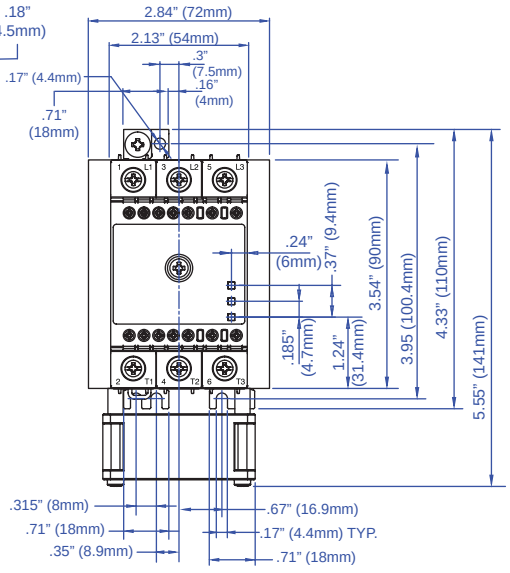




2PSS...75-...M
3PSS...65-...M

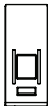
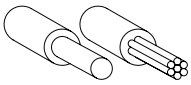
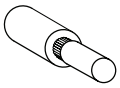
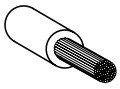
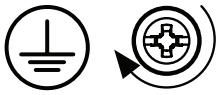


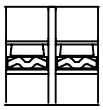
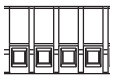
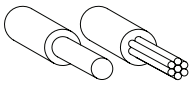
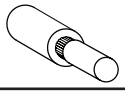




Dimensions in mm. Housing width tolerance +.02" (0.5mm), -0 as per DIN43880.
All other tolerances ±.02" (0.5mm)

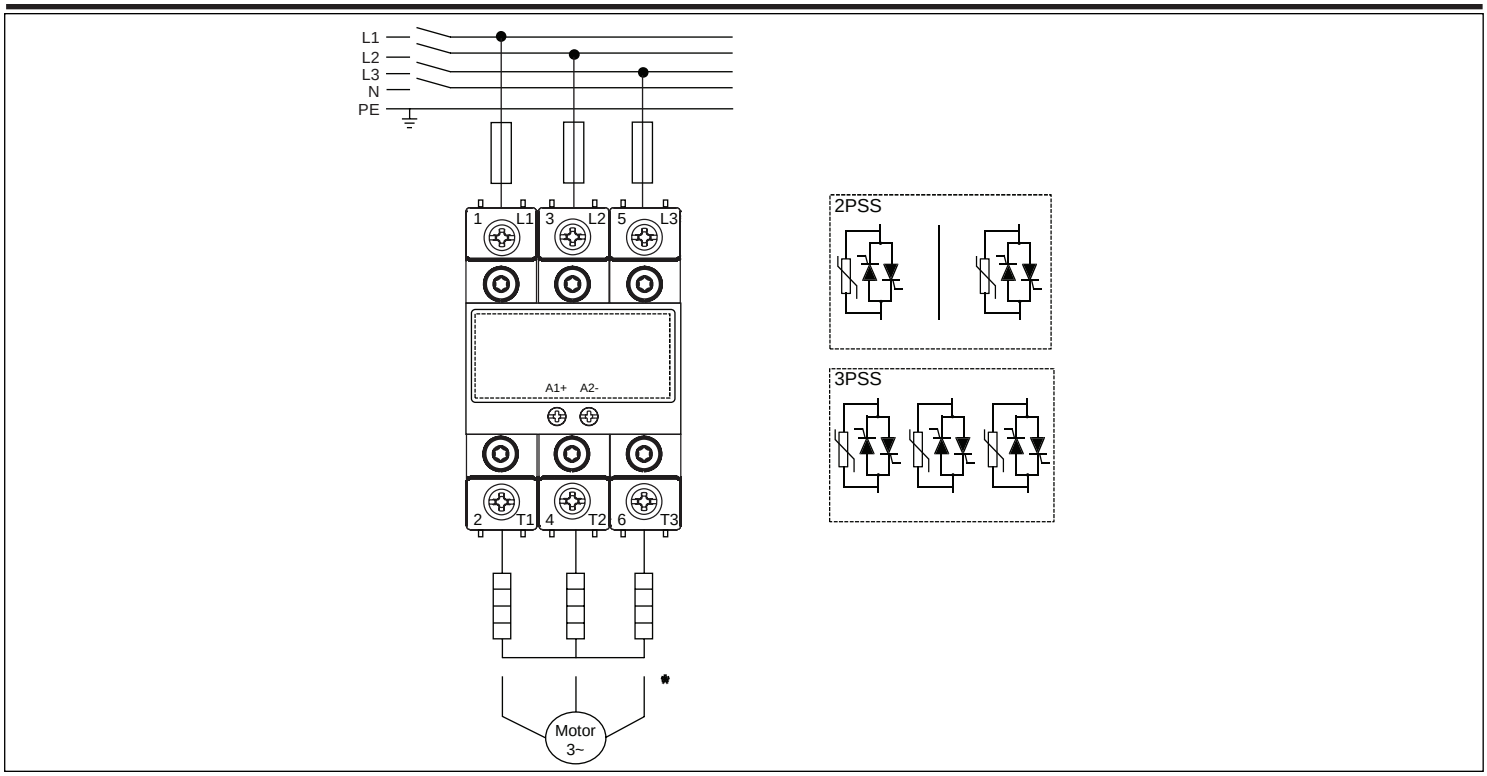
Connection Specifications

Power Connections	**1/L1, 3/L2, 5/L3, 2/T1, 4/T2, 6/T3**	
Use 75°C copper (Cu) conductors	 **.PSS...20** **.PSS...20-..M** **.PSS...25** **.PSS...25-..M**	 **.PSS...30** **.PSS...30-..M** **.PSS...40** **.PSS...40-..M** **.PSS...65-...** **.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 mm² 2x 14-10 AWG	1x 2.5-25 mm² 1x 14-3 AWG
Flexible With end sleeve 	2x 1.0-2.5 mm² 2x 2.5-4.0 mm² 2x 18-14 AWG 2x 14-12 AWG	1x 2.5-16 mm² 1x 14-6 AWG
Flexible With-out end sleeve 	2x 1.0-2.5 mm² 2x 2.5-6.0 mm² 2x 18-14 AWG 2x 14-10 AWG	1x 4.0-25 mm² 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...30** **.PSS...25** **.PSS...40**	 **.PSS...20-...** **.PSS...25-..M** **.PSS...30-..M** **.PSS...40-..M** **.PSS...65-...** **.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 mm² 2x 18-12 AWG	1x 1.0-2.5 mm² 1x 18-12 AWG
Flexible With end sleeve 	2x 0.5-2.5 mm² 2x 18-12 AWG	1x 0.5-16 mm² 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

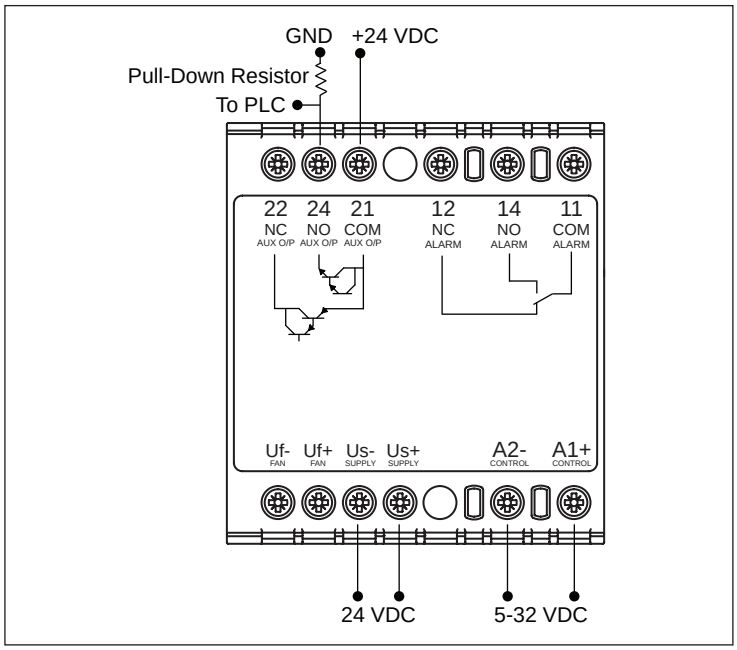


* Not suitable for .PSS...-...M versions.
Not suitable for 4-wire, 3-phase systems

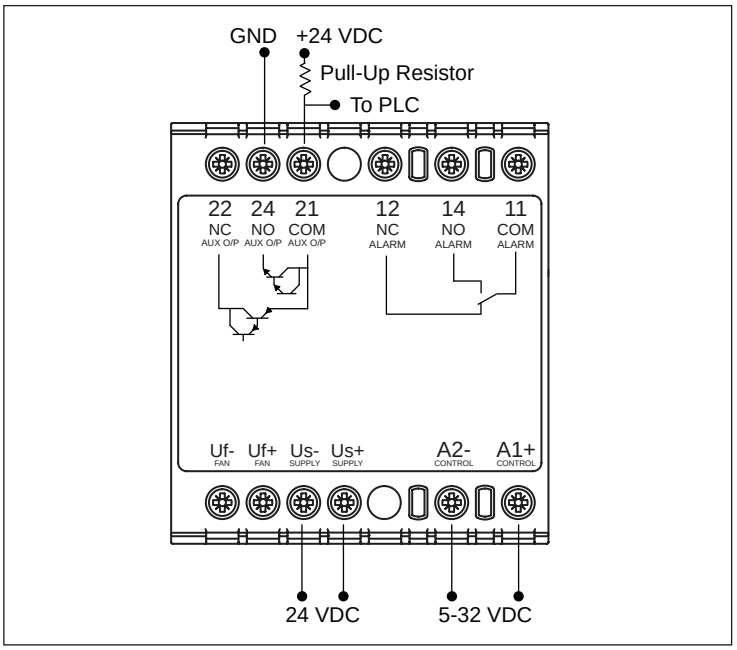
Connection Configuration for Auxiliary Output

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)



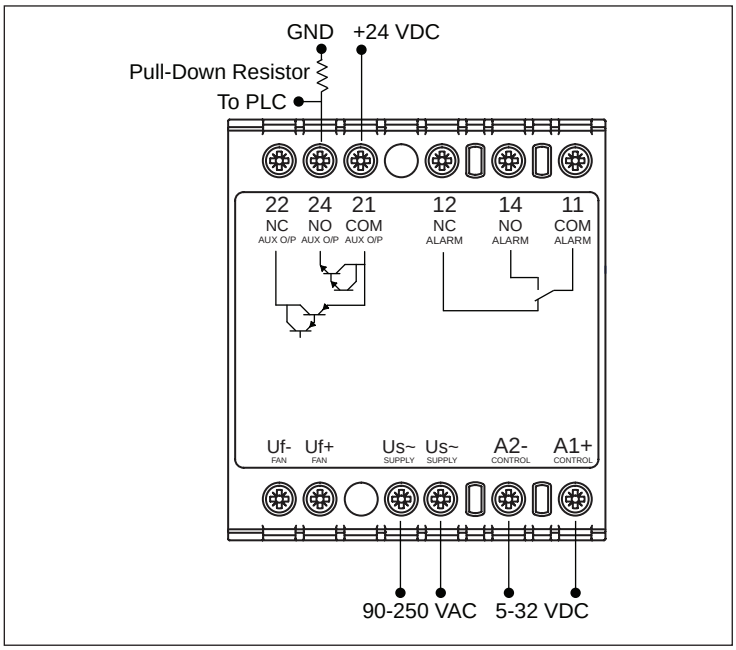
Connection of normally open auxiliary output (24-21) in a 'pnp' style



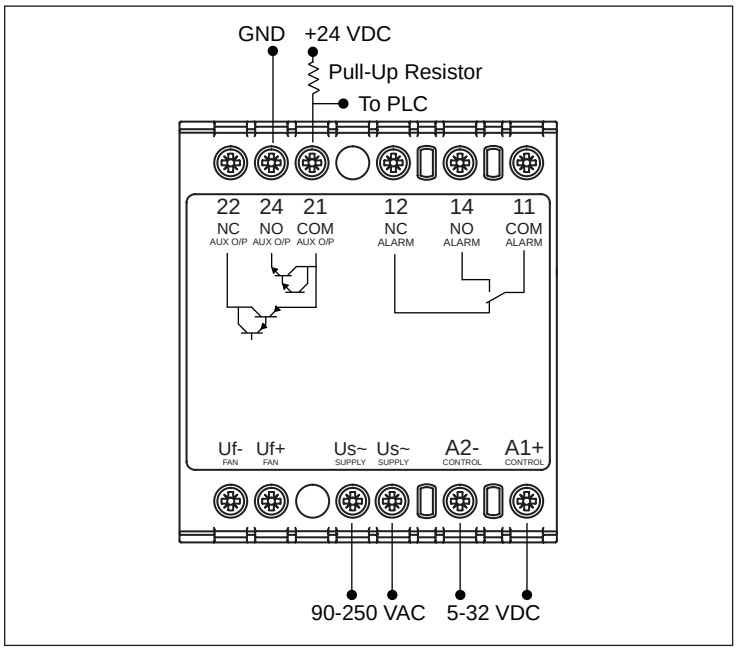
Connection of normally open auxiliary output (24-21) in an 'npn' style

Connection Configuration for Auxiliary Output

Versions: .PSS..D..-120M, .PSS..D..-120FM
Auxiliary output signal 24 VDC, 50 mA; DC control, Uc (5-32 VDC); AC external supply, Us (90-250 VAC)

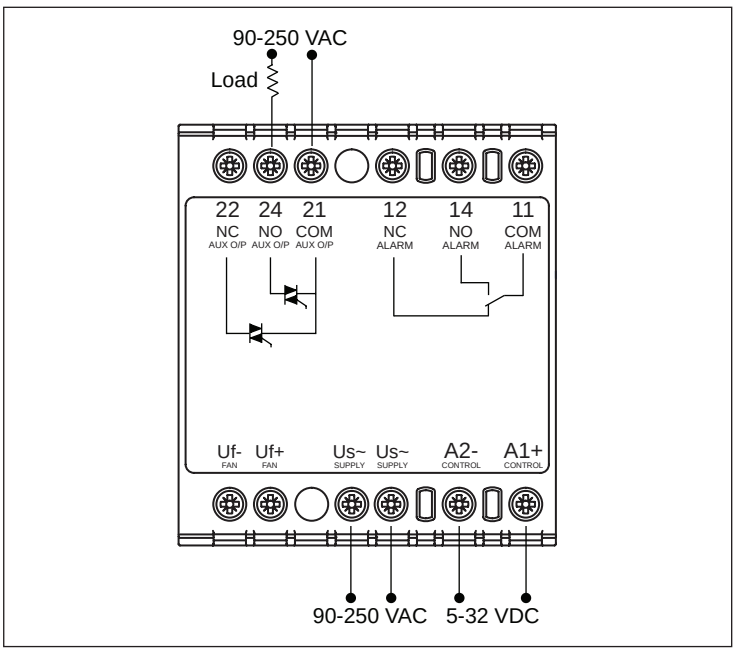


Connection of normally open auxiliary output (24-21) in a 'pnp' style



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, Uc (2-275 VAC); AC external supply, Us (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 choosen and configured accordingly.

MDI

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

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

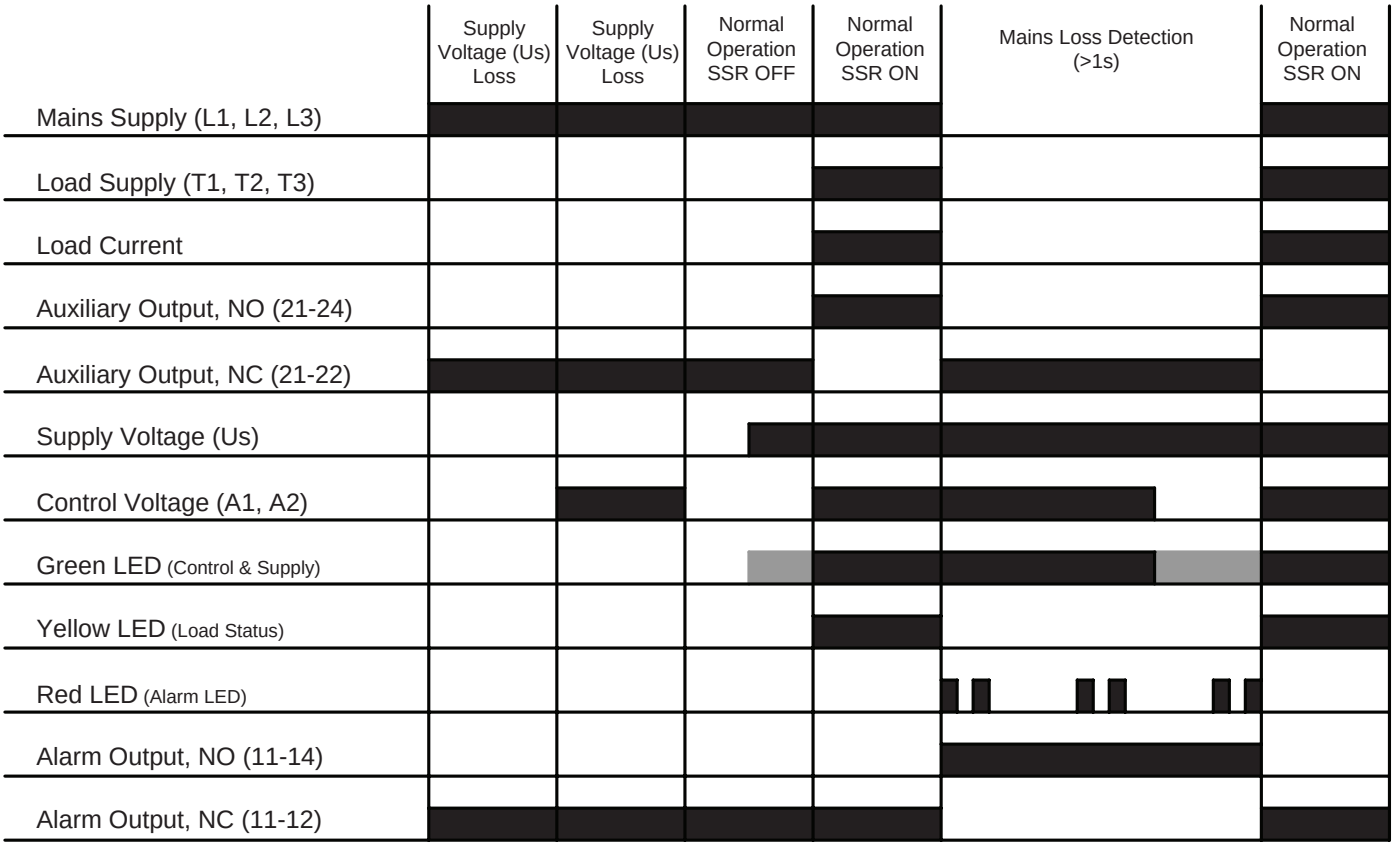
The 'M' suffix versions integrate monitoring circuitry that can detect the status of the Mains, Load, and Solid State Relay (SSR) status. The fault conditions that can be detected with the .PSS...-..M include:
- Mains loss
- Load loss
- SSR open circuit
- SSR short circuit
- SSR over temperature

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:

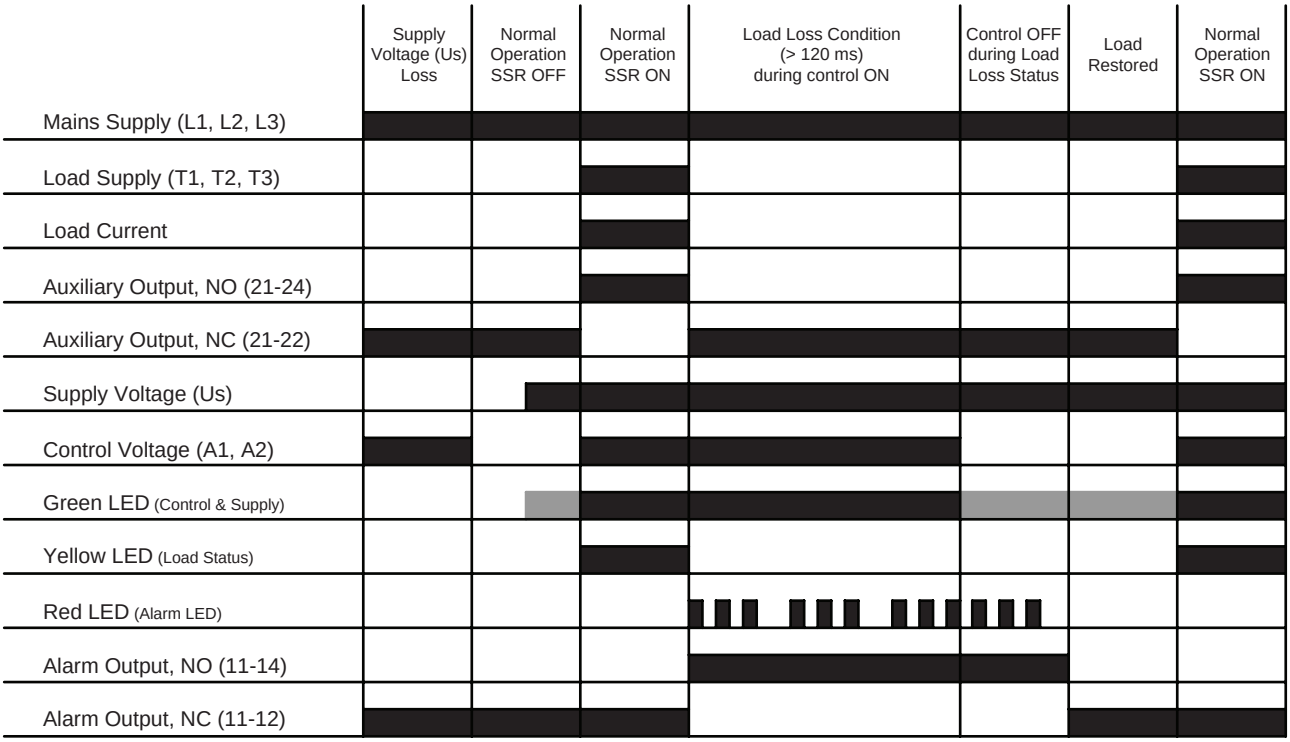
The mains loss alarm is issued if the mains voltage is missing from either terminals L1, L2 or L3 for more than 1 second. This alarm type is indicated by 2 flashes of the red LED. The alarm resets automatically once the mains voltage is restored and is present on terminals L1, L2 and/or L3 for more than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



.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 occuring 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.



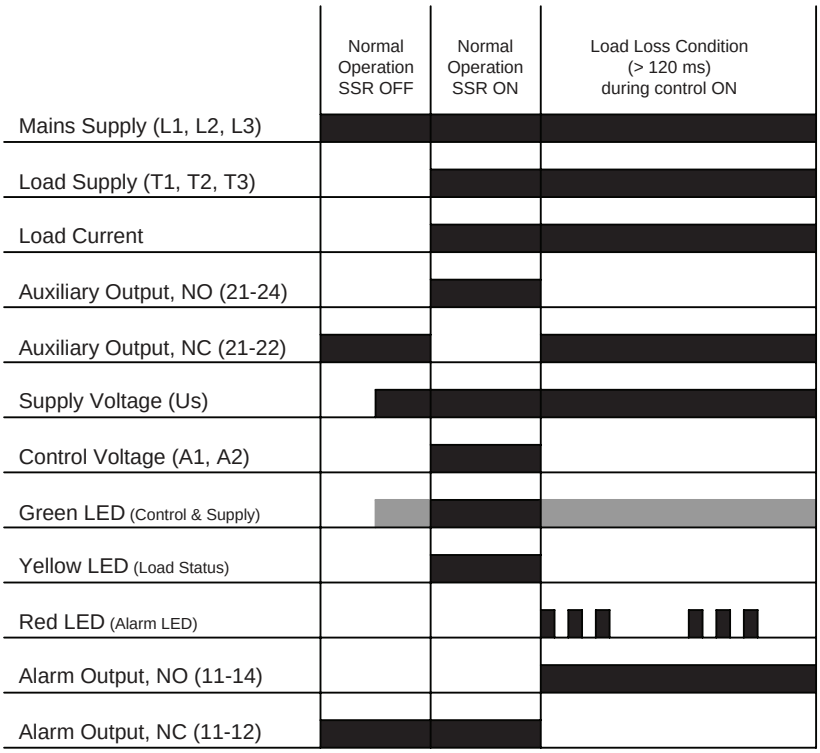
The load loss alarm is not restored automatically in the case of the loads having delta connection. The external supply, Us needs to be re-setted (switched OFF and back ON) to clear the alarm signal.

.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.



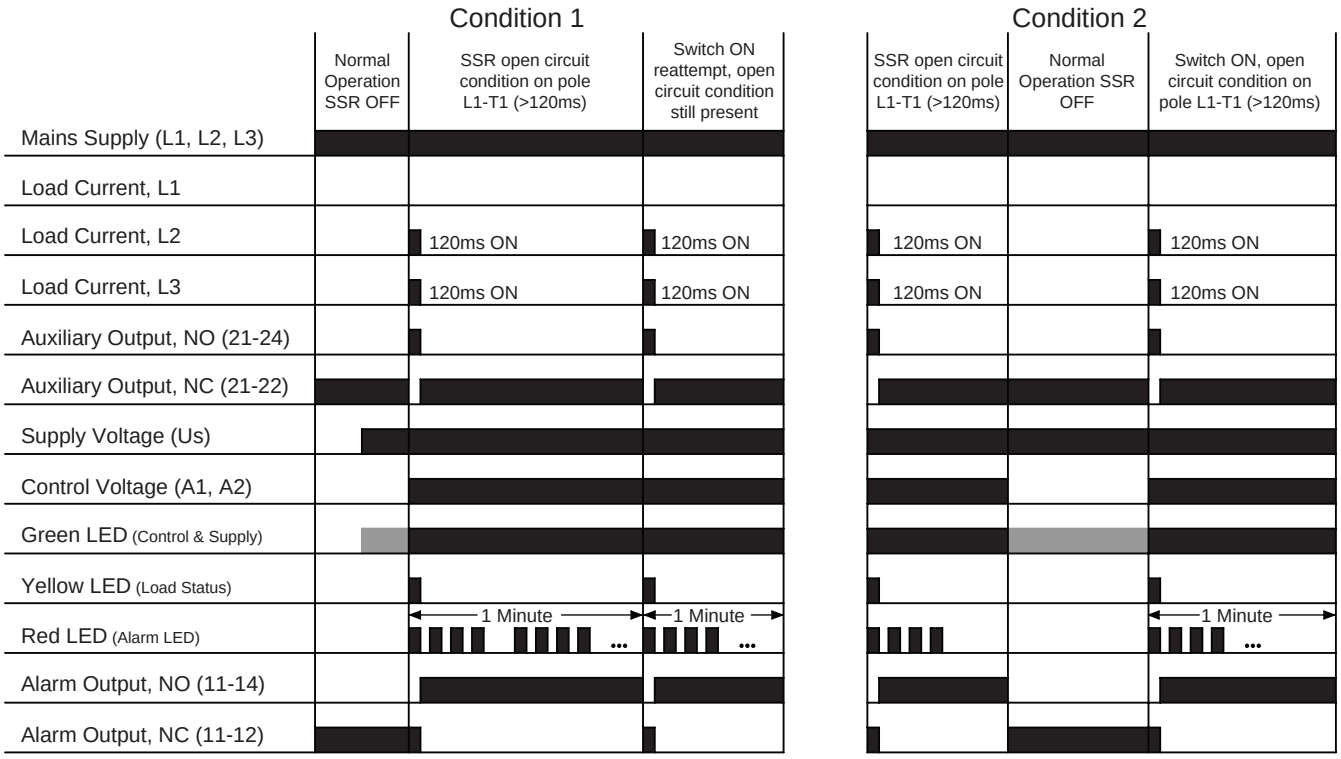
.PSS...-..M Mode of Operation (continued)

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.

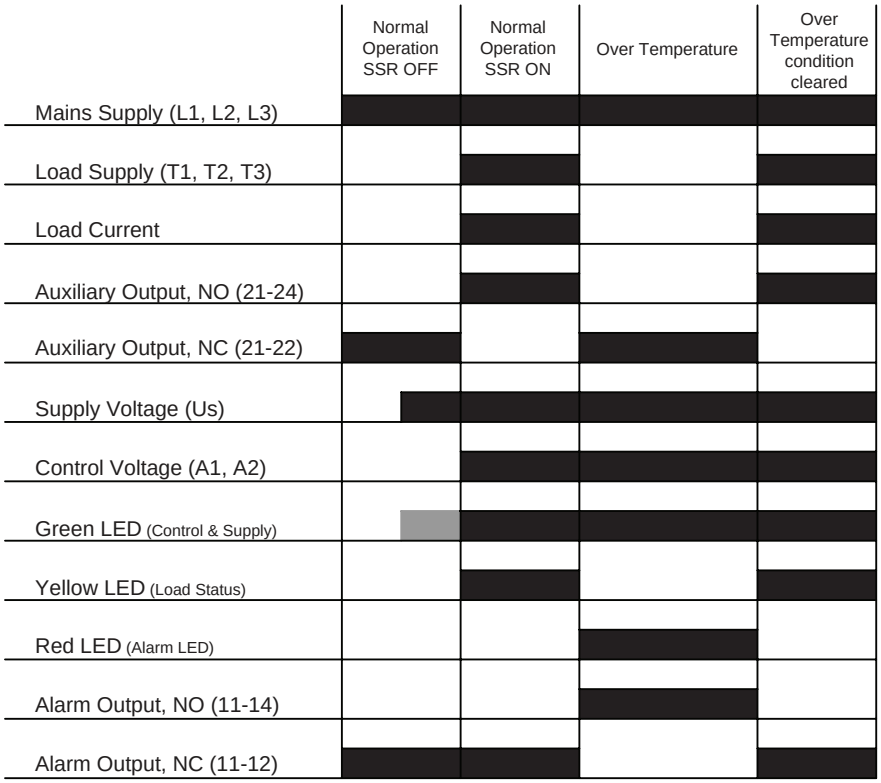
Example Condition 2:
Once the open circuit alarm is issued it remains present for 1 minute as long as control voltage is ON. If during this period the control voltage is switched OFF, the alarm is automatically cleared and the count indicated in Condition 1 is also set to 0. If control voltage is re-applied 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.



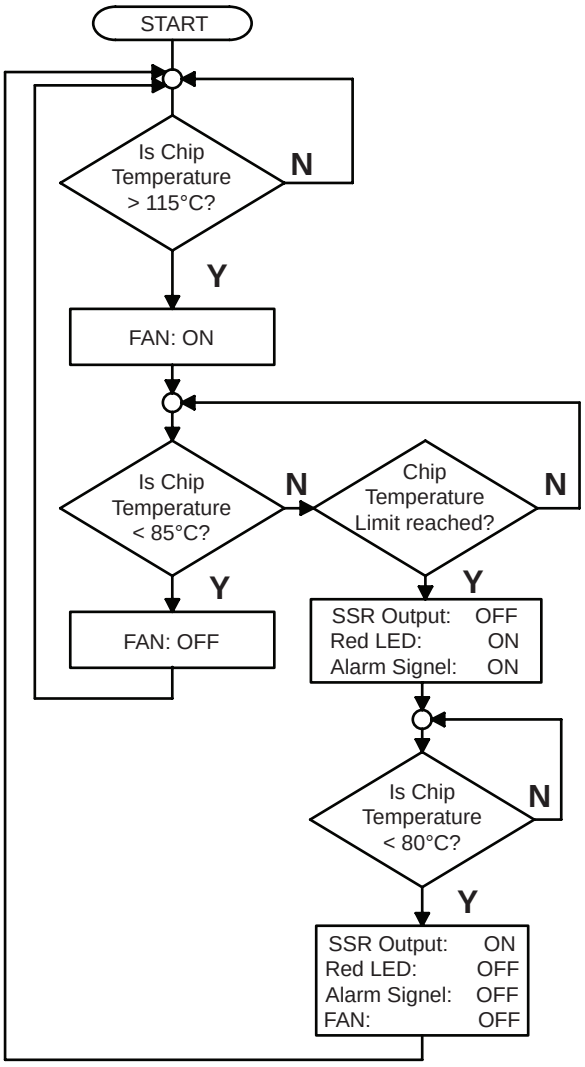
.PSS...-..M Mode of Operation (continued)

SSR Over Temperature:

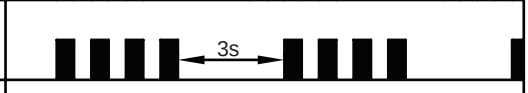
The SSR is equipped with internal temperature monitoring to prevent SSR damage in case of overheating conditions. Upon detection of such a condition the SSR output is switched OFF and an alarm is issued accordingly. This alarm is visually indicated by the red LED which is fully ON. Once the temperature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



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	

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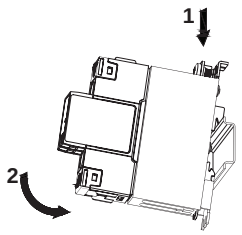
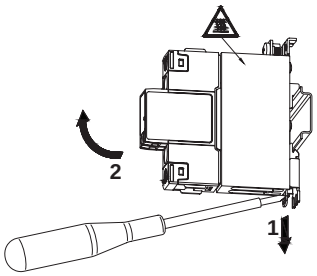
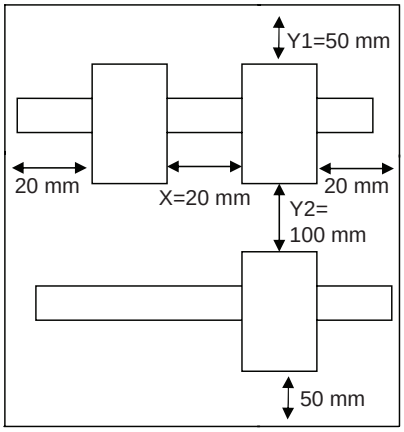
Installation Instructions



Mounting on DIN rail



Dismounting from DIN rail



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[10]	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[10]	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				
	40	660 URD 22x58/40			32	
	40	A70QS40-4				
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				
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				
2PSS...20	32	6.9xx gRC URC 14x51/32	32	50 142 06 32	32	600
	32	6.9xx gRC URC 14x51/32			32	
	40	A70QS40-4				
2PSS...25	40	660 URC 14x51/40	32	50 142 06 32	32	600
	40	6.9xx gRC URD 22x58/40				
	40	660 URD 22x58/40			32	
	40	A70QS40-4				
2PSS...30	40	6.9xx gRC URC 14x51/40	40	50 194 20 40	32	600
	40	6.9xx gRC URC 14x51/40			32	
	40	A70QS40-4				
2PSS...40	63	6.9xx gRC URC 14x51/63	50	50 194 20 50	32	600
	63	6.9xx gRC URC 22x58/63			32	
	50	A70QS50-4				
2PSS...75	100	6.9xx gRC URC 22x58/100	125	50 196 20 125	32	600
	90	660 URD 22x58/90			32	
	100	A70QS100-4				

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Type 2 Protection Coordination 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^2]	Minimum length of Cu wire conductor [m][11]
2PSS...25 **3PSS...20**	S201 - Z10 (10A)	S201 - B4 (4A)	1.0 1.5 2.5	7.6 11.4 19.0
	S201 - Z16 (16A)	S201 - B6 (6A)	1.0 1.5 2.5 4.0	5.2 7.8 13.0 10.8
	S201 - Z20 (20A)	S201 - B10 (10)	1.5 2.5	12.6 21.0
	S201 - Z25 (25A)	S201 - B13 (13A)	2.5 4.0	25.0 40.0
2PSS...40 **3PSS...25** **3PSS...30** **3PSS...40**	S201 - Z20 (20A)	S201 - B10 (10A)	1.5 2.5 4.0	4.2 7.0 11.2
	S201 - Z32 (32A)	S201 - B16 (16A)	2.5 4.0 6.0	13 20.8 31.2
2PSS...75 **3PSS...65**	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