

Solid-State Contactors

3RF24 solid-state contactors, three-phase

Technical specifications

Order No.	3RF24 ..-1BB..		3RF24 ..-2BB..
General data			
Ambient temperature:			
• During operation, derating from 40 °C	°C	-25 ... +60	
• During storage	°C	-55 ... +80	
Installation altitude	m	0 ... 1000; Derating over 1000 m on request	
Shock resistance acc. to IEC 60068-2-27	g/ms	15/11	
Vibration resistance acc. to IEC 60068-2-6	g	2	
Degree of protection		IP20	
Insulation strength at 50/60 Hz (main/control circuit to floor)	V rms	4000	
Electromagnetic compatibility (EMC)			
• Emitted interference acc. to IEC 60947-4-3		Class A for industrial applications ¹⁾	
- Conducted interference voltage		Class A for industrial applications	
- Emitted, high-frequency interference voltage			
• Interference immunity			
- Electrostatic discharge acc. to IEC 61000-4-2 (corresponds to degree of severity 3)	kV	Contact discharge 4; air discharge 8; behavior criterion 2	
- Induced RF fields acc. to IEC 61000-4-6	MHz	0,15 ... 80; 140 dBµV; behavior criterion 1	
- Burst acc. to IEC 61000-4-4	kV	2/5 kHz; behavior criterion 1	
- Surge acc. to IEC 61000-4-5	kV	Conductor – ground 2; conductor – conductor 1; behavior criterion 2	
Connection type		Screw terminals	Spring-loaded terminals
Main contact connection			
• Conductor cross-section			
- Solid	mm ²	2 x (1.5 ... 2.5) ²⁾ , 2 x (2.5 ... 6) ²⁾	2x (0.5 ... 2.5)
- Finely stranded with end sleeve	mm ²	2 x (1 ... 2.5) ²⁾ , 2 x (2.5 ... 6) ²⁾ , 1 x 10	2x (0.5 ... 1.5)
- Finely stranded without end sleeve	mm ²	--	2x (0.5 ... 2.5)
- Solid or stranded, AWG conductors		2 x (AWG 14 ... 10)	2 x (AWG 18 ... 14)
• Stripped length	mm	10	10
• Terminal screw		M4	--
- Tightening torque	NM lb. in	2 ... 2.5 18 ... 22	
Connection, auxiliary/control contacts			
• Conductor cross-section			
- With/without end sleeve	mm AWG	1 x (0.5 ... 2.5), 2 x (0.5 ... 1.0) AWG 20 ... 12	0.5 ... 2.5 AWG 20 ... 12
• Stripped length	mm	7	10
• Terminal screw		M3	--
- Tightening torque, (Ø 3.5, PZ 1)	NM lb. in	0.5 ... 0.6 4.5 ... 5.3	
Permissible mounting positions			

1) These products were built as Class A devices. The use of these devices in residential areas could result in lead in radio interference. In this case, the user may be required to introduce additional interference suppression measures.

2) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

Solid-State Switching Devices for Switching Motors

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Order No.	Fuse-free design with circuit-breaker CLASS 10					
	Rated operational current I_{AC-53} ¹⁾ acc. to IEC 60947-4-2			Power loss at I_{AC-53}	Short-circuit protection with coordination type "1" at an operational voltage of U_e up to 440 V	
	at 40°C	UL/CSA, at 50 °C	at 60°C	at 40°C	Motor starter protectors/circuit- breakers	I_q
	A	A	A	W	Type	kA
Main circuits						
3RF24 05-.BB..	5.2	4.6	4.2	10	3RV1 021-1GA10	50
3RF24 10-.BB..	9.2	8.4	7.6	16	3RV1 021-1JA10	20
3RF24 12-.BB..	12.5	11.5	10.5	22	3RV1 021-1KA10	5
3RF24 16-.BB..	16	14	12.5	28	3RV1 021-4AA10	5

Order No.	Design with fuse with directly connected 3RB20 overload relay				Minimum load current	Max. leakage current	Rated impulse withstand current I_{tsm}	I^2t value
	Rated operational current I_{AC-53} ¹⁾ acc. to IEC 60947-4-2			Power loss at I_{AC-53}				
	at 40°C	UL/CSA, at 50 °C	at 60°C	at 40°C	A	A	A	A ² s
Main circuits								
3RF24 05-.BB.4	4	3.6	3.2	7	0.5	10	200	200
3RF24 05-.BB.6							600	1800
3RF24 10-.BB..	7.8	7	6.2	13	0.5	10	600	1800
3RF24 12-.BB.4	9.5	8.5	7.6	16	0.5	10	1200	7200
3RF24 12-.BB.6							1150	6600
3RF24 16-.BB..	11	10	9	18	0.5	10	1150	6600

Type		3RF24 ...-BB.4	3RF24 ...-BB.6
Main circuits			
Controlled phases		Two-phase	Two-phase
Rated operational voltage U_e	V	48 ... 460	48 ... 600
• Operating range	V	40 ... 506	40 ... 660
• Rated frequency	Hz	50/60 ± 10 %	50/60 ± 10 %
Rated insulation voltage U_i	V	600	600
Rated impulse withstand voltage U_{imp}	kV	6	6
Blocking voltage	V	1200	1600
Rage of voltage rise	V/µs	1000	1000

Type		3RF24 ...-BB0.	3RF24 ...-BB5.
Control circuits			
Method of operation		DC operation	AC operation
Rated control supply voltage U_s	V	24 DC acc. to EN 61131-2	190 ... 253
Rated frequency of the control supply voltage	Hz	--	50/60 ± 10 %
Actuating voltage, max.	V	30	253
Typical actuating current	mA	20	15
Response voltage	V	15	180
Drop-out voltage	V	5	< 40
Operating times			
• ON-delay	ms	1	5
• OFF-delay	ms	1 + max. one half-wave	30 + max. one half-wave

1) Values for direct mounting of the contactor on the circuit-breaker on request.

Solid-State Switching Devices for Switching Motors

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Fused version with solid-state semiconductor protection (similar to type of coordination "2")¹⁾

The semiconductor protection for the 3RF24 switchgear can be used with different protection devices. Siemens recommends the use of special SITOP semiconductor fuses. The table below lists the maximum permissible fuses for each 3RF24 control gear.

If a fuse is used with a higher rated current than specified, semiconductor protection is no longer guaranteed. However, smaller fuses with a lower rated current up to a lower rated current of the load can only be used after the behavior of the existing load alternation has been tested.

Order No.	Full area fuse gR	Semiconductor fuses aR				Cable and line protection fuse				DIAZED
		LV HRC design	Cylindrical design			LV HRC design	Cylindrical design			
		SITOR 3NE8	10 x 38 mm SITOR 3NC1	14 x 51 mm SITOR 3NC1	22 x 58 mm SITOR 3NC2	gG 3NA3	10 x 38 mm gG 3NW6	14 x 51 mm gG 3NW6	22 x 58 mm gG 3NW6	
	LV HRC design SITOR 3NE1									Quick 5SB1

Operational voltage U_e up to 506 V

3RF24 05-BB.4	3NE1 813-0	3NE8 015-1	3NC 1 020	3NC 1 415	3NC2 220	3NA3 801-6	3NW6 001-1	3NW6 101-1	--	5SB1 71
3RF24 10-BB.4	3NE1 802-0	3NE8 020-1	3NC 1 032	3NC 1 450	3NC2 263	3NA3 805-6	3NW6 005-1	3NW6 105-1	3NW6 205-1	5SB3 11
3RF24 12-BB.4	3NE1 818-0	3NE8 021-1	3NC 1 032	3NC 1 450	3NC2 280	3NA3 810-6	3NW6 010-1	3NW6 116-1	3NW6 210-1	5SB3 21
3RF24 16-BB.4	3NE1 818-0	3NE8 022-1	3NC 1 032	3NC 1 450	3NC2 280	3NA3 812-6	3NW6 010-1	3NW6 116-1	3NW6 210-1	5SB3 22

Operational voltage U_e up to 660 V

3RF24 05-BB.6	3NE1 813-0	3NE8 015-1	3NC 1 016	3NC 1 420	3NC2 220	3NA3 801-6	--	--	--	--
3RF24 10-BB.6	3NE1 803-0	3NE8 018-1	3NC 1 032	3NC 1 450	3NC2 250	3NA3 805-6	--	--	--	--
3RF24 12-BB.6	3NE1 817-0	3NE8 021-1	3NC 1 032	3NC 1 450	3NC2 280	3NA3 810-6	--	--	--	--
3RF24 16-BB.6	3NE1 817-0	3NE8 022-1	3NC 1 032	3NC 1 450	3NC2 200	3NA3 812-6	--	--	--	--

Suitable fuse holders, fuse bases and control gear can be found in Catalog LV 1, chapter 19.

¹⁾ Type of coordination "2" according to EN 60947-4-1:
In the event of a short-circuit, the control gear in the load feeder must not endanger persons or the installation. They must be suitable for further operation. For fused configurations, the protection device must be replaced.