

Power Contactors 3TF

For more than 110 years, Siemens has been developing and manufacturing industrial control products. We offer a wide product range which fulfills the demands of our customers regarding performance and reliability. Our aim is to make industrial operation easier ensuring flexible mounting, modular construction and high functionality. With 3TF contactors Siemens has been offering a tried tested trusted solution to control, switch and protect your motors upto 250kW.

Applications

3TF power contactors are suitable for switching and controlling squirrel cage and slip-ring motors as well as other AC loads, such as solenoids, capacitors, lighting loads, heating loads and transformer loads.

Standards

Contactors conform to IS/IEC 60947-4-1. They also carry the CE mark.

Coordinated feeder

Contactors and bi-relays have been tested for type-2 coordination at $I_q = 50kA$, 415V AC, 50Hz as per IS/IEC 60947-4-1, for both fuse protected as well as fuseless motor feeders.

Range

Air break contactors are available from 9 A to 475A in 3 pole version.

Also available in 2 pole AC version from 45A to 400A.

Benefits and features

Flexibility

- Choice of Auxiliary contacts

Contactor	Aux. contacts on basic unit	Permissible add-on contact blocks
9A / 12A	1 NO	Upto 4NO or 4NC
9A / 12A	1 NC	Upto 4NO or 2NC
16A/22A	-	Upto 4NO or 4NC
32A/38A	-	Upto 4NO or 4NC
45A to 475A	2NO+2NC	2 x (1NO+1NC)

The customer can order desired number of contacts thereby reducing the cost.

- Choice of mounting

Contactor can be mounted on 35mm DIN and they are also suitable for screw mounting (9-38A – DIN / Screw mounting and 45-475A – Screw mounting).



- Choice of coil voltages

AC 50Hz coil code: 3TF30 to 3TF56

Coil voltage (V)	24	42	110	230	415
Code	B0	D0	F0	P0	R0

Wide band AC 50 Hz coil code: 3TF30 to 3TF35

Coil voltage (V)	70-140	150-280	260-460
Code	W110	W220	W415

AC 50/60 Hz coil code: 3TF57

Coil voltage (V)	110-132	220-240	380-460
Code	F7	M7	Q7

DC coil code: 3TF30 to 3TF57

Coil voltage (V)	24	42	48	110	220	250 ⁺
Code	B4	D4	W4	F4	M4	N4

⁺ For 3TF3 only

(Other coil voltages are also available.)

Technical data

Contactor	Size	0			1		2				
		Type	3TF30	3TF31	3TF32	3TF33	3TF34	3TF35			
Permissible ambient temperature	Storage Service	°C	-55 to +80								
		°C	-25 to +55								
Maximum operating voltage		V	690								
Rated insulation voltage U_i (At Pollution Degree 3) ¹⁾		V	690								
Rated impulse strength U_{imp}		kV	8								
Mechanical endurance (make/break operations)	AC	Cycles	15 x 10 ⁶				10 x 10 ⁶				
	DC	Cycles	15 x 10 ⁶				10 x 10 ⁶				
Rating of contactors for AC loads											
AC-1 duty, switching resistive load											
Rated operational current I_e	at 40°C upto 690V at 55°C upto 690V	A	21		32		65				
		A	20		30		55				
Ratings of three-phase loads p.f.=1 at 55°C	at 415V 500V 690V	kW	13		19.7		36				
		kW	17		26		47.5				
		kW	22		34.		62.7				
AC-2 and AC-3 duty											
Rated operational current $I_e^{2)}$	upto 415V 500V 690V	A	9	12	16	22	32	38			
		A	9	12	16	17	32	38			
		A	6.6	8.8	12.2	12.2	27	27.			
Nominal rating of slipping or squirrel-cage motors at 50/60 Hz.	at 415V 500V 690V	kW	4	5.5	7.5	11	15	18.5			
		kW	5.5	7.5	10	11	21	25			
		kW	5.5	7.5	11	11	23	23.			
AC-4 duty (contact endurance approx. 2x10 ⁵ make-break operations at $I_e=6I_e$)											
Rated operational current I_e	upto 690V	A	3.3	4.3	7.7	8.5	15.6	18.5			
Rating of squirrel-cage motors at 50/60Hz.	at 415V 500V	kW	1.54	2.1	3.5	4	8.2	9.8			
		kW	1.7	2.5	4.6	5.2	9.8	11.8			
Max. permitted rated operational current $I_e/AC-4 = I_e/AC-3$ upto 500V. Ref. life curve for the life.	690V	kW	2.54	3.45	6	6.6	13	15.5			
Used as stator contactor (upto 690V) (AC-2 duty)											
Stator currents I_{es}	20%	A	20	20	25(46*)		85				
On-load factor (ED) ³⁾ with intermittent duty	40%	A	20	20	25(37*)		67				
	60%	A	20	20	25(33*)		60				
	80%	A	20	20	25(30*)		55				
* Applicable up to 500V											
Used as rotor contactor (upto 690V) (AC-2 duty)											
Rotor current I_{er}	20%	A	31		73		125				
On-load factor (ED) ³⁾ with intermittent duty	40%	A	31		58		106				
	60%	A	31		52		95				
	80%	A	31		47		87				
Locked rotor voltage U_{er}	Starting	V	1320		1320		1320				
	Plugging / Control	V	660		660		660				
AC-6b duty, switching low-inductance individual three-phase capacitors											
at 50/60Hz ⁴⁾ (we also offer special capacitor duty contactors)	415V	kVAR	4		7.5		16.7				
	500V	kVAR	4		7.5		16.7				
	690V	kVAR	4		7.5		16.7				
Thermal loading	10 s current	A	90	96	130	176	400	400			
Power loss per current path at $I_e/AC-3$		W	0.6	1.1	1	1.6	2	2.5			
Rating of contactors for DC loads											
DC-1 duty, switching resistive load ($L/R < 1mS$)											
Rated operational current I_e (at 55°C)											
Number of current paths in series connection	at 24V 110V 220V 440V	A	1 2 3			1 2 3			1 2 3		
			20	20	20	30	30	30	55	55	55
			2.1	12	20	4.5	30	30	6	55	55
			0.8	1.6	20	1	5	30	1	6	45
			0.6	0.8	1.3	0.4	1	2.9	0.4	1.1	2.9
DC-3 and DC-5 duty, shunt & series motors ($L/R < 15mS$)											
Rated operational current I_e (at 55°C)											
Number of current paths in series connection	at 24V 110V 220V 440V	A	1 2 3			1 2 3			1 2 3		
			20	20	20	20	30	30	20	55	55
			0.15	0.35	20	0.75	7	30	0.75	7	55
			-	-	1.75	0.2	1	3.5	0.2	1	3.5
			-	-	0.2	0.09	0.27	0.6	0.1	0.27	0.6

1) As per IEC 60947-1

2) Ratings at 1000V AC - upon enquiry.

3) On-load factor (ED) in % = $\frac{\text{on time} \times 100}{\text{cycle time}}$

Max. switching freq. z = 50 per hour. Ratings at higher frequency upon enquiry.

3			4		6		8		10		12			
3TF46	3TF47	3TF47.7	3TF48	3TF49	3TF50	3TF51	3TF52	3TF53	3TF54	3TF55	3TF56	3TF57		
			-55 to +80 -25 to +55											
1000			1000											
1000			1000											
8			8											
10 x 10 ⁶ 3 x 10 ⁶			10 x 10 ⁶ 3 x 10 ⁶											
90 80	100 90	100 90	120 100	120 100	170 160		230 210	240 220	325 300	325 300	425 400	600 550		
52 67 91	52 67 91	52 67 91	66 86 114	66 86 114	105 138 183		132 173 228	138 181 240	195 260 340	195 260 340	262 345 457	381 476 657		
45 45 45	63 63 63	70 70 70	75 75 75	85 85 75	110 110 110	140 140 110	170 170 170	205 205 170	250 250 250	300 300 250	400 400 400	475 475 400		
22 30 40	30 41.4 57.2	37 46 60.1	42 50.7 70	45 59 70	55 76.3 105	75 98 105	90 118 163	110 145 163	132 178 245	160 210 245	200 284 392	250 329 392		
24 13.1 15.8	28 15.3 18.4	31 16.9 20.4	34 18.6 22.4	42 23 27	54 29.5 35.5	68 38 46	75 42 50	96 54 65	110 63 76	125 72 86	150 88 107	150 88 107		
21.8	25.4	28.2	30.9	38	49	63	69	90	105	119	147	147		
123 98 87 80	138 110 98 90	138 110 98 90	154 122 109 100		246 195 174 160		323 256 229 210	339 268 240 220	462 367 327 300		617 490 436 400	800 670 600 550		
150 150 138 126	219 174 155 142	219 174 155 142	243 193 172 158		389 309 275 253		510 405 361 332	535 425 378 348	729 579 516 474		972 772 688 632	1336 1061 946 869		
1500 750	1500 750	1500 750	2000 1000		2000 1000		2000 1000	2000 1000	2000 1000		2000 1000	2000 1000		
30 35 30			50 62.5 50		60 80 60		100 130 100		150 190 150		200 265 200			
360 3.5	500 6	500 6	800 7.5	800 10	880 10	1140 14	1360 14	1640 20	2500 16	2500 23	3400 40	4200 40		
1 80 6 1.2 0.48	2 80 80 7 1.2	3 80 80 80 3	1 100 12 2.5 0.8	2 100 100 13 2.4	3 100 100 100 6	1 160 18 3.4 0.8	2 160 160 20 3.2	3 160 160 160 11.5	1 200 18 3.4 0.8	2 200 200 200 3.2	3 200 200 200 11.5	1 300 33 3.8 0.9	2 300 300 300 4	3 300 300 300 11
1 5 0.75 0.2 0.1	2 80 12.5 1.1 0.27	3 80 80 3.5 0.6	1 6 1.25 0.35 0.15	2 100 100 1.75 0.42	3 100 100 4 0.8	1 160 2.5 0.6 0.17	2 160 160 2.5 2.5 0.65	3 160 160 160 1.4	1 200 2.5 0.6 0.17	2 200 200 200 0.65	3 200 200 200 1.4	1 300 3 0.6 0.18	2 300 300 2.5 0.65	3 300 300 300 1.4

4) Ratings for capacitor - banks in parallel - upon enquiry. Minimum inductance of 6µH required between parallel connected capacitors.

Power Contactors Technical Data

Contactor	Size		0		1		2		3		
	Type		3TF30	3TF31	3TF32	3TF33	3TF34	3TF35	3TF46	3TF47	3TF47 7
Switching frequency z (Contactors without overload relay)	No load AC DC at AC-1 at AC-2 at AC-3 at AC-4	Operation									
		Cycles/hr	10,000	10,000	5000	5000	5000	5000	5000	5000	5000
		Cycles/hr	1,500	1,500	1,500	1,500	1,500	1,500	1,000	1,000	1,000
		Cycles/hr	2,000	2,000	1,500	1,500	1,200	1,200	1,000	1,000	1,000
		Cycles/hr	1,000	1,000	750	750	750	600	600	400	400
		Cycles/hr	1,000	1,000	750	750	750	600	1200 ⁵⁾	1000	1000
		Cycles/hr	250	250	250	250	200	400	300	300	
Coil ratings (cold coil 1.0 x Us)	Supply frequency	Hz	50		50		50		50		
	AC operation 50Hz	Closing p.f. Closed p.f.	VA 0.79 VA 0.29		68 0.82 10 0.29		101 0.83 12.1 0.28		183 0.6 17 0.29		
DC operation	Closing Closed	W W		6.2 6.2		11.7 11.7		400 2.1			
Coil voltage tolerance	Operation AC/DC at 24V DC		0.8 to 1.1 x Us 0.8 to 1.2 x Us		0.8 to 1.1 x Us						
Operating times at 1 x Us ⁶⁾											
AC operation	Closing Opening	ms ms	10-25 4-18		10 - 25 5 - 20		13 - 32 5 - 10		17 - 30 5 - 25		
DC operation	Closing Opening	ms ms	30-70 12-20		40 - 80 10 - 20		58 -107 13 - 17		22 - 40 105 - 115		
Auxiliary contacts											
Rated thermal current $I_m =$ rated operational current I_e / AC-12		A	10				10				
Rated operational current I_e / AC-15/AC-14 at rated operational voltage U_e upto 125V		A	10				10				
220V		A	10				6				
415V		A	5.5				3.6				
500V		A	4				2.5				
Rated operational current I_e / DC12 at rated operational voltage U_e upto 48V		A	10				10				
110V		A	2.1				3.2				
220V		A	0.8				0.9				
440V		A	0.6				0.33				
Rated operational current I_e / DC13 at rated operational voltage U_e upto 24V		A	10				10				
48V		A	5				5				
110V		A	0.9				1.14				
220V		A	0.45				0.48				
440V		A	0.25				0.13				
Conductor cross-sections											
Main conductor											
Solid	mm ²		2 x (0.5 to 1, 1 to 2.5), 1x4		2 x (2.5 to 6)		1 to 16		2 x (6 to 16)		
Finely stranded with end sleeve	mm ²		2 x (0.75 to 2.5)		2 x (1.5 to 4)		1 x (5 to 16, 2.5 to 10)		1 x (10 to 35), 2 x (10 to 25)		
Pin end connector	mm ²		1 x (1 to 2.5)		1 x (1 to 6)		2 x (1 to 6)		-		
Solid or stranded	AWG		2 x (18 to 12)		2 x (14 to 10)		2 x (14 to 6)		2 x (10 to 1/10)		
Tightening torque	Nm		0.8 to 1.4		1 to 1.5		2.5 to 3.0		4 to 6		
Finely stranded with cable lug	mm ²								10 to 35		
Terminal bar (max. width)	mm								12		
Solid or stranded	AWG								7 to 1/0		
Tightening torque	Nm								4 to 6		
Auxiliary conductor											
Solid	mm ²		2 x (0.5 to 1, 1 to 2.5), 1 x 4				2 x (0.5 to 1, 1 to 2.5), 1				
Finely stranded with end sleeve	mm ²		2 x (0.75 to 2.5)				2 x (0.75 to 2.5)				
Pin end connector	mm ²		1 x (1 to 2.5)				1 x (1 to 2.5)				
Solid or stranded	AWG		2 x (18 to 12)				2 x (18 to 12)				
Tightening torque	Nm		0.8 to 1.4				0.8 to 1.4				
Short-circuit protection											
Main circuit (Fuse type 3NA3)	Co-ordination Type - 1 Type - 2	A A	35 25	35 25	63 32	63 32	80 80	80 80	160 125	160 125	160 160
Auxiliary circuits		A A	16 6, if overload relay auxiliary contacts are in the contactor coil circuit								

5) With AC coil. With DC coil: 1000 oprs/hr.
6) Including switching contactor.

7) Rated value of the control voltage.

4		6		8		10		12	
3TF48	3TF49	3TF50	3TF51	3TF52	3TF53	3TF54	3TF55	3TF56	3TF57
5000	5000	5000	5000	5000	5000	3000	3000	3000	2000
1,000	1,000	1000	1000	1000	1000	1000	1000	1000	1000
900	900	800	800	800	750	800	750	700	500
400	350	400	300	300	250	300	250	200	170
1000	850	1000	750	700	500	700	500	500	420
300	300	300	200	200	130	200	130	150	150
50		50		50		50		50	50/60 Lower ⁷⁾ Upper ⁷⁾
330		550		910		1430		2450	1136 1900
0.5		0.45		0.38		0.34		0.21	1 1
32		39		58		84		115	16 45
0.23		0.24		0.26		0.24		0.33	0.34 0.16
420		500		876 ⁶⁾		1216 ⁶⁾		1306 ⁶⁾	1110 ⁶⁾
2.7		2.7		11 ⁶⁾		13.3 ⁶⁾		14 ⁶⁾	24 ⁶⁾
0.8 to 1.1 x Us									
22 - 35		22 - 37		25 - 50		25 - 40		25 - 40	48 - 70
5 - 30		8 - 30		10 - 30		10 - 30		8 - 30	80 - 100
32 - 40		28 - 32		32 - 45		36 - 45		40 - 55	44 - 60
95 - 105		185 - 195		10 - 20		10 - 20		10 - 20	12 - 15
10				10				10	
10				10				10	
6				6				6	
3.6				3.6				3.6	
2.5				2.5				2.5	
10				10				10	
3.2				3.2				3.2	
0.9				0.9				0.9	
0.33				0.33				0.33	
10				10				10	
5				5				5	
1.14				1.14				1.14	
0.48				0.48				0.48	
0.13				0.13				0.13	
		16 to 70	35 to 95	35 to 95	50 to 240	50 to 240	50 to 240	50 to 240	50 to 240
		15	20	20	25	25	25	25	30
		3 to 2/0	10 to 14	10 to 14	14 to 24	14 to 24	14 to 24	14 to 24	14 to 24
		6 to 8							
2 x (0.5 to 1, 1 to 2.5), 1 x 4 2 x (0.75 to 2.5) 1 x (1 to 2.5)				2 x (0.5 to 1, 1 to 2.5) 2 x (0.75 to 2.5) 1 x (1 to 2.5)				2 x (0.5 to 1, 1 to 2.5) 2 x (0.75 to 2.5) 1 x (1 to 2.5)	
2 x (18 to 12) 0.8 to 1.4				2 x (18 to 12) 0.8 to 1.4				2 x (18 to 12) 0.8 to 1.4	
250	250	400	400	400	400	500	500	800	800
160	160	200	250	250	250	400	400	500	500

8) The opening time delay increases when the contactor coil is protected against voltage peaks. (e.g. Varistor: +2 to -5ms)