

3TS Capacitor duty contactors

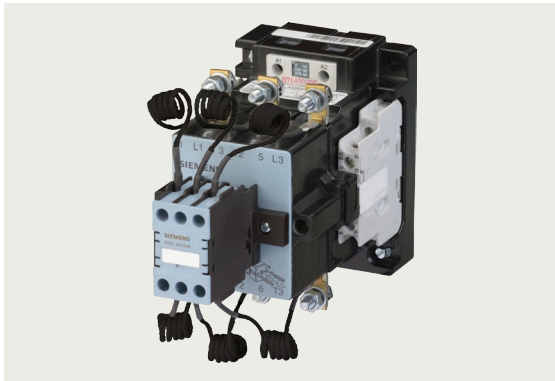
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Overview:

For more than 125 years, Siemens has been developing and manufacturing industrial control products. We offer a wide product range which caters to fulfill the demand of our esteemed customers with satisfactory performance level and improved reliability. This range of capacitor duty contactors provides a reliable and economical solution for capacitor switching applications.

Capacitor Duty Contactor



Range:

- 5kvar - 50kvar

Features:

- Delatching operating principle
- SIGUT Termination technique
- Finger touch proof terminals⁵
- Compact Dimensions
- DIN / Screw mounting

Benefits:

- Reliable switching of capacitor banks
- Ease of wiring (can obviate use of lugs)
- Operator Safety
- Space saving
- Flexible mounting

Standards:

- IEC 60947-4-1

Approbations:

- CE marking

Operating Principle:

In Low Voltage industrial installations, capacitors are mainly used for reactive power correction (raising the power factor). When these capacitors

are energized, overcurrents of high amplitude and high frequencies (3 to 15 kHz) occur during the transient period (~1 ms).

The amplitude of these current peaks, also known as "inrush current peaks", depends on the following factors:

- The network inductances.
- The transformer power and short-circuit voltage.
- Type of power factor correction: fixed or automatic.
- Harmonics present in the system.

The in-rush current of such high magnitudes is undesirable and it is likely to weld main contacts of any standard contactor. Therefore, contactor for capacitor bank switching must be designed to withstand :

- Permanent current that can reach 1.5 time the nominal current of capacitor bank.
- Short but high peak current on pole closing.

Hence, capacitor duty switching device requires careful selection. It is always recommended to use dedicated capacitor duty switching contactor for switching capacitor bank, which optimizes the switchgear cost & enhances the equipment life.

Siemens 3TS capacitor duty contactor works on mechanical delatching operating principle, which ensures reliable switching of capacitors as per AC-6b utilization category.

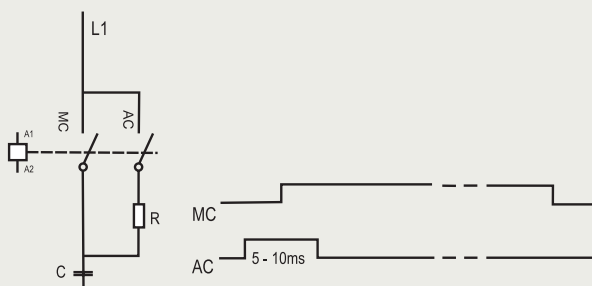
Delatching operating principle:

The front-mounted block mechanism of the 3TS capacitor duty contactors ensures:

- early making of the auxiliary contacts "AC" with respect to the main contacts "MC"
- automatic return to the open position of the auxiliary contacts after the main contacts are closed.

When the coil is energized, the early making auxiliary contacts connect the capacitor to the network via the set of 3 resistors. The damping resistors attenuate the first current peak and the second inrush current when the main contacts begin to make. Once the main contacts are in the closed position, the auxiliary contacts automatically break.

When the coil is de-energized, the main contacts break ensuring the breaking of the capacitive current. The contactor can then begin a new cycle.




Delatching operating principle

AC = auxiliary contacts; MC = main contacts

\$ upto 30kvar

Technical specifications



Type		3TS21	3TS11	3TS22	3TS12	3TS13	3TS14	3TS15	3TS25	3TS27	3TS17
Size		1		2		3				4	
Dimensions (H x D x W)		H x D x W		H x D x W		H x D x W				H x D x W	
including auxiliary switches and connecting cables		H x D x W		H x D x W		H x D x W				H x D x W	
• Screw-type terminals	mm	115 x 125 x 45		115 x 136 x 45		120 x 148 x 55				117x177x90	
General technical specifications											
Conformance to		IEC-60947-4-1									
Approvals		CE									
Degree of protection acc. to IEC 60529	IP	IP 20		IP 20		IP20 for Aux block IP00 contactor				IP 00	
Storage temperature	°C	-25 to +55									
Operating temperature	°C	-25 to +40									
Altitude of site (without technical restrictions)	m	2000									
Type of mounting		DIN / Screw								Screw	
Main Circuit											
Rated insulation voltage Ui V 690	V	690									
Rated operational voltage Ue V 415 / 440	V	415 / 440									
Rated operational Current Ie (Harmonic & Safety factor excluded)	A	7	9.7	13.9	17.4	22.3	27.8	34.8	41.7	55.6	69.6
Impulse withstand voltage Uimp	kV	6									
Rated frequency	Hz	50									
Capacitor rating at rated power (utilization category AC-6b) 415/440 V, 50Hz	kvar	5	7	10	12.5	16	20	25	30	40	50
Max. switching frequency	Cycles per hour	180								100	
Coil operating range		0.85 to 1.1Us									
Auxiliary contacts mounted		1 NO		1NO+1NC						2 NO + 2 NC	
Auxiliary contacts mountable		1NO or 1NC								-	
"Short-circuit protection device for contactors With Fuse - Operational class gG - Type 1 co-ordination (3NA7)"	A	20	20	32	32	50	50	63	80	100	125
Connecting characteristics											
Main conductors		Screw terminals									
Terminal screw size		M3.5		M4						M6	
Screw head type		Slotted Cheese Head								Hex Head	
Tightening torque	Recommended	N-m		0.8 to 1.4		1 to 1.5		2.5 to 3		4 to 6	
Conductor cross-section											
	Solid	mm ²		1 x (1 to 2.5)		1 x (2.5 to 6)		1 x (1 to 16)			
	Finely stranded with end sleeve	mm ²		1 x (0.75 to 2.5)		1 x (1.5 to 4)		1 x (1.5 to 16)			
	Finely stranded	mm ²		-		-		1 x (1.5 to 16)			
	Finely stranded with pin end connector	mm ²		1 x (0.75 to 2.5)		1 x (1.5 to 4)		1 x (1.5 to 16)			
	Finely stranded with ring type lug	mm ²		-						1 x35, 2 x 16	
	Busbar (max width)	mm		-						12	
Auxiliary conductors (built-in auxiliary terminals + coil terminals)		Screw terminals									
Screw head type		Slotted Cheese Head									
Tightening torque	Recommended	N-m		0.8 to 1.4							
Conductor cross-section											
	Solid	mm ²		2 x (0.5 to 1, 1 to 2.5), 1 x 4							
	Finely stranded with end sleeve	mm ²		2 x (0.75 to 2.5)							
	Finely stranded with pin end connector	mm ²		2 x (0.75 to 2.5)							

Selection and ordering data

Capacitor duty contactor - 3TS

For switching capacitor banks with AC coils

Capacitor kvar 415V, 3ph, 50Hz	Built-in aux. contacts	Type ¹⁾	Std. pkg. (nos.)	Built-in aux. contacts	Type ¹⁾	Std. pkg. (nos.)
5 kvar	1 NO	3TS2110-0A..5-8K†	1			
7 kvar	1 NO	3TS1110-0A..5-8K†	1			
10 kvar	–	3TS2200-0A..5-8K†	1	1NO+1NC	3TS2211-0A..5-8K	1
12.5 kvar	–	3TS1200-0A..5-8K†	1	1NO+1NC	3TS1211-0A..5-8K	1
16 kvar	–	3TS1300-0A..5-8K†	1	1NO+1NC	3TS1311-0A..5-8K	1
20 kvar	–	3TS1400-0A..5-8K†	1	1NO+1NC	3TS1411-0A..5-8K	1
25 kvar	–	3TS1500-0A..5-8K†	1	1NO+1NC	3TS1511-0A..5-8K	1
30 kvar	–	3TS2500-0A..5-8K†	1	1NO+1NC	3TS2511-0A..5-8K	1
40 kvar	2 NO + 2 NC	3TS2722-0A..5-8K	1			
50 kvar	2 NO + 2 NC	3TS1722-0A..5-8K	1			

† Facility to add one contact block of 1NO / 1NC

Spares for capacitor duty contactor - 3TS

Pre-charge resistor + Contact block kit

Contactor kvar	Description	Type	Std. pkg. (nos.)
10 kvar	Pre-charge resistor + early making contact block kit + main contacts kit	3TS9762-0SX15-8K	1
12.5 kvar		3TS9762-0SX15-8K	1
16 kvar		3TS9763-0SX15-8K	1
20 kvar		3TS9764-0SX15-8K	1
25 kvar		3TS9765-0SX15-8K	1
30 kvar		3TS9765-0SX15-8K	1
40 kvar		3TS9767-0SX15-8K	1
50 kvar		3TS9767-0SX15-8K	1

Spare coils

Contactor kvar	Description	Type ¹⁾	Std. pkg. (nos.)
5 kvar	AC 50Hz coil	3TY74030A..	1
7 kvar			
10 kvar			
12.5 kvar		3TY74430A..	1
16 kvar			
20 kvar			
25 kvar		3TY74630A..	1
30 kvar			
40 kvar			
50 kvar			

Note: Pre-charge resistor + early making contact block kit + main contacts should be replaced simultaneously

Accessories for capacitor duty contactor - 3TS

Auxiliary contact blocks

For contactor	Description	Type	Std. pkg. (nos.)
3TS21 / 3TS11 / 3TS22 / 3TS12 / 3TS13 / 3TS14 / 3TS15 / 3TS25	1NO	3TX4 010-2A	10
	1NC	3TX4 001-2A	10

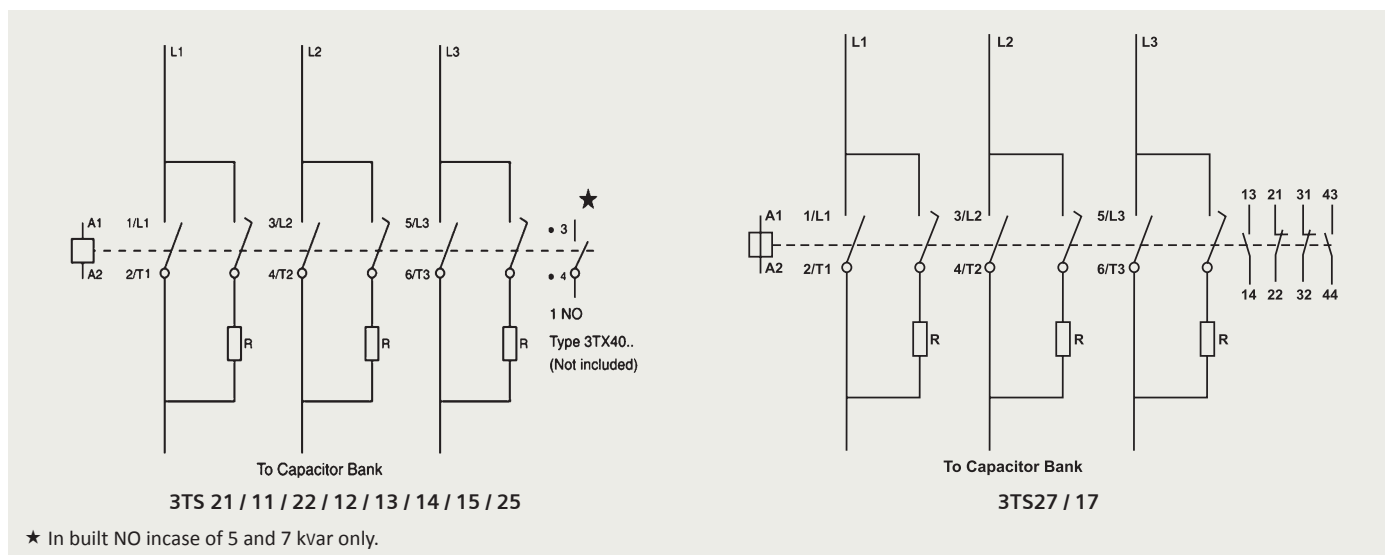
Spare auxiliary contact block

For contactor	Description	Type	Std. pkg. (nos.)
3TS27 / 3TS17	Built-in, 1NO+1NC Left/ Right	3TY7 561-1AA00-8K	1

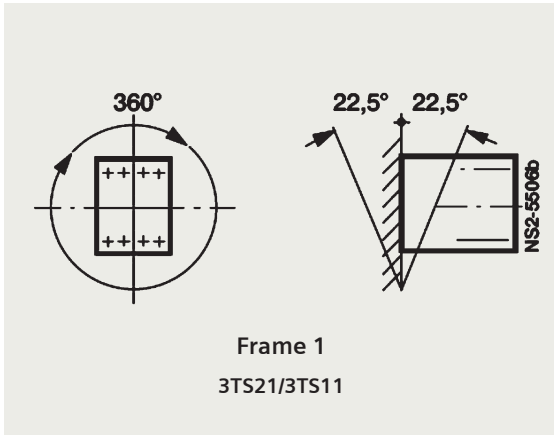
1) AC 50Hz coil code - Please enter coil codes from table below

	For 3TS contactors		
Code	F0	P0	R0
Coil voltage (V)	110	230	415

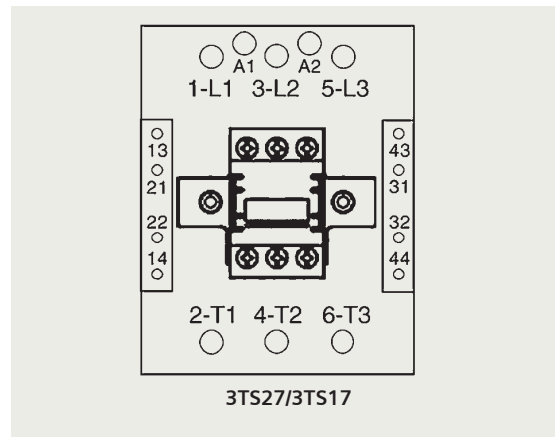
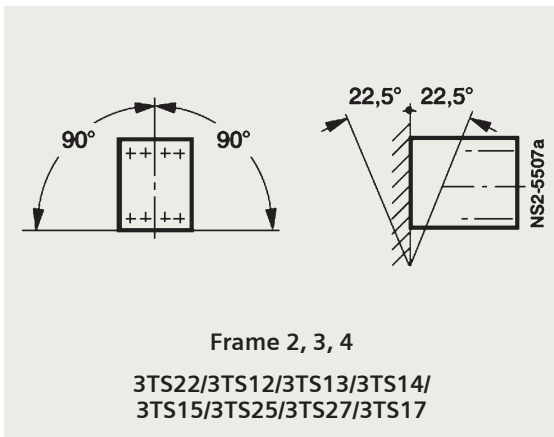
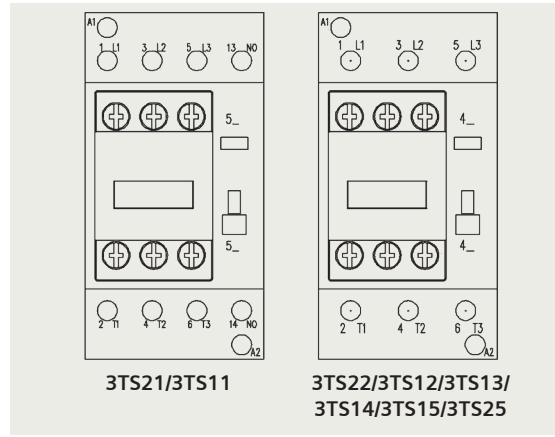
Circuit diagram



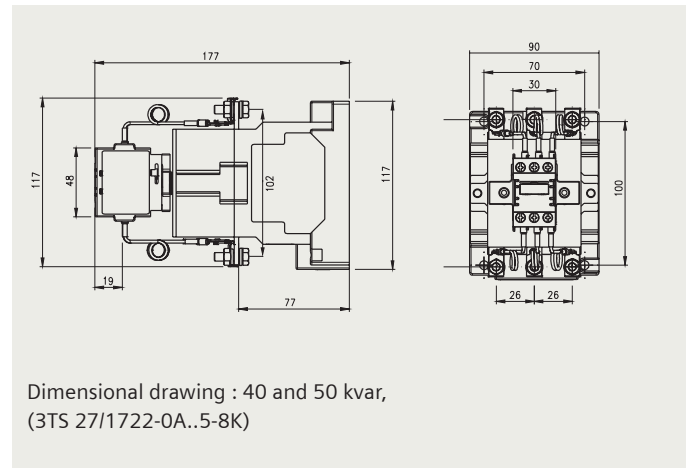
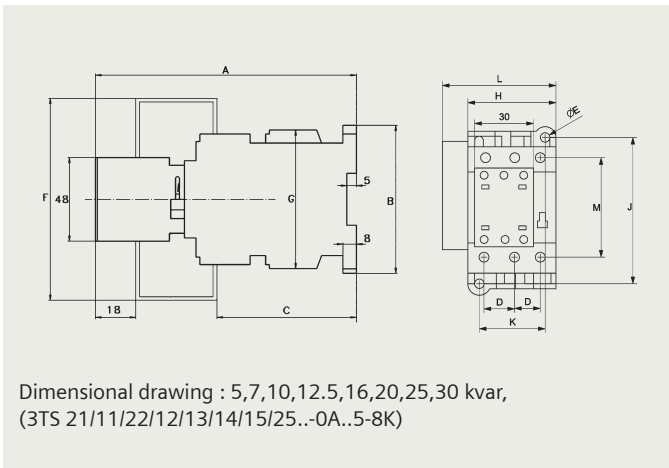
Mounting details



Terminal drawing



Dimensional drawing



Capacitor kVAr 415V, 3ph, 50Hz	Type	Built-in aux. contacts	A	B	C	D	F	G	H	J	K	L	Ø E	M	Term Screw
5,7 kvar	3TS21/3TS11	1NO	125	74	60	10	115	78	45	60	35	-	4.8	48	M3.5
10,12.5 kvar	3TS2200/3TS1200	-	136	85	70	14.5	115	85	45	75	35	-	4.8	51	M4
16,20,25,30 kvar	3TS1300/3TS1400/3TS1500/3TS2500	-	148	85	63	18	120	103	55	75	45	-	5	62.5	M4
10,12.5 kvar	3TS2211/3TS1211	1NO+1NC	136	85	70	14.5	115	85	45	75	35	58	4.8	51	M4
16,20,25,30 kvar	3TS1311/3TS1411/3TS1511/3TS2511	1NO+1NC	148	85	63	18	120	103	55	75	45	68	5	62.5	M4

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