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Capacitor Duty Contactor

C&S electric

CE

We touch your electricity everyday!

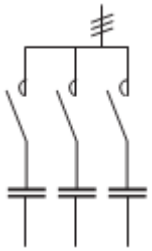
Capacitor Transient And Steady Conditions Understanding

In Low Voltage industrial installations, capacitors are mainly used for reactive energy 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 to 2 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.
- The type of power factor correction.

There are 2 types of power factor correction: fixed or automatic.

Fixed power factor correction consists of inserting a capacitor bank, in parallel on the network. The bank is normally energized by a fuse or MCCB that simultaneously supplies all the capacitors (a single step). The inrush current peak, in the case of fixed correction, can reach 30 times the nominal current of the capacitor bank.	An automatic power factor correction system, on the other hand, consists of several capacitor banks of identical or different ratings (several steps), energized separately according to the value of the power factor to be corrected. An electronic device automatically determines the power of the steps to be energized and activates the relevant contactors. The inrush current peak, in the case of automatic correction, depends on the power of the steps already on duty, and can reach 100 times the nominal current of the step to be energized.
	

The in-rush current of such high magnitudes is undesirable and it is likely to weld main poles of any standard contactor.

In steady condition, the presence of harmonics and the network's voltage tolerance lead to a current, estimated to be 1.3 times the nominal current In of the capacitor, permanently circulating in the circuit. Taking into account the manufacturing tolerances, the exact power of a capacitor can reach 1.15 times its nominal power. Standard IEC 60831-1 Edition 2002 specifies that the capacitor must therefore have a maximum thermal current IT of:

IT = 1.3 x 1.15 x In = 1.5 x In

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.

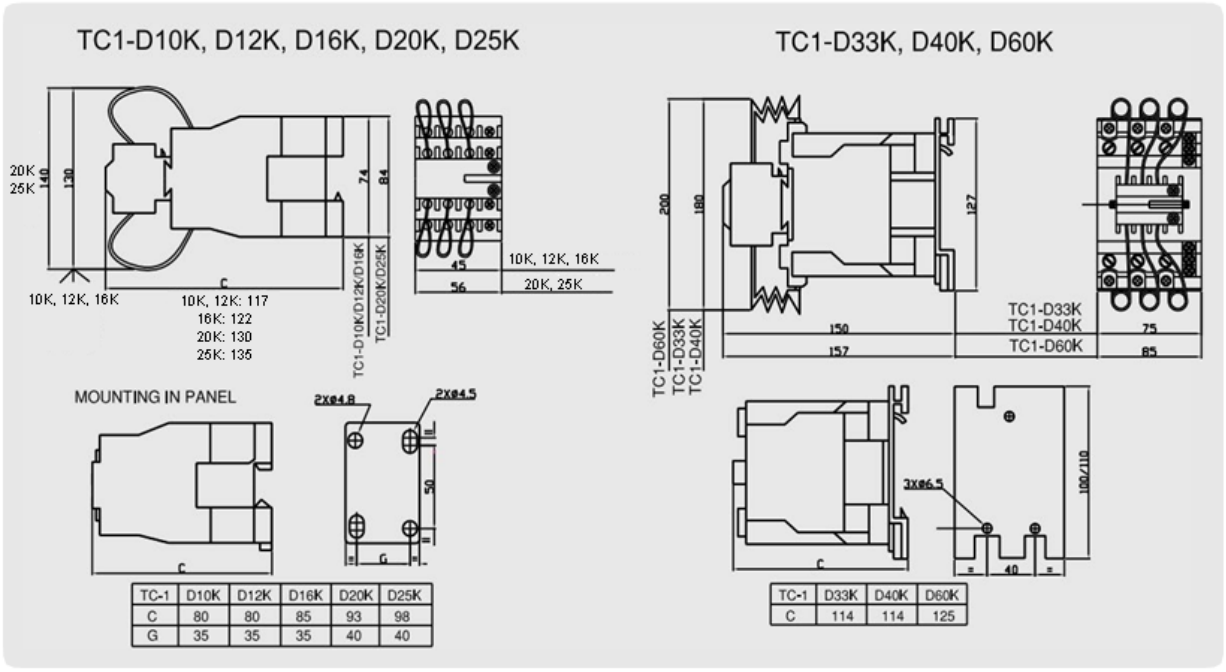
Product Features and Benefits

- Excellent damping of in-rush current
- Reduced watt loss during 'on' condition, saves energy
- Decrease short current and extend the life of the capacitor
- High electrical life
- Low maintenance & down – time
- Power quality improvement
- Optimized solution cost

Frame Size	KVar ratings at 400V / 440V, 50/60 Hz	Auxiliary contacts		Reference
	$\theta < 55^0$c (*)	NO	NC	Coil 220Vac
Frame 1	10	1	1	TC1D10K11
		0	2	TC1D10K02
	16	1	1	TC1D16K11
		0	2	TC1D16K02
Frame 2	20	1	1	TC1D20K11
		0	2	TC1D20K02
	25	1	1	TC1D25K11
		0	2	TC1D25K02
Frame 3	33	1	2	TC1D33K12
	40	1	2	TC1D40K12
	50	1	2	TC1D50K12
	60	1	2	TC1D60K12

** Average temperature over a 24-hour period*

Dimension


TC1-D10K, D12K, D16K, D20K, D25K
20K
25K
140
130
74
84
10K, 12K, 16K
C
10K, 12K: 117
16K: 122
20K: 130
25K: 135
TC1-D10K/D12K/D16K
TC1-D20K/D25K
45
56
10K, 12K, 16K
20K, 25K
MOUNTING IN PANEL
2xø4.8
2xø4.5
50
G
C
TC-1 D10K D12K D16K D20K D25K
C 80 80 85 93 98
G 35 35 35 40 40
TC1-D33K, D40K, D60K
200
180
127
150
157
TC1-D60K
TC1-D33K
TC1-D40K
TC1-D33K
TC1-D40K
TC1-D60K
75
85
3xø6.5
100/110
40
C
TC-1 D33K D40K D60K
C 114 114 125