



In keeping with the mission to deliver the best, Larsen & Toubro understands the requirements of the RoHS directive. The directive restricts the use of hazardous substances in electrical and electronic equipment and bans electrical equipment containing more than permitted levels of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBS) and polybrominated diphenyl ether (PBDE) flame retardants.

Benefits of using Capacitor Duty Contactors:

Since switching of capacitor banks involves high transient inrush currents, the size of the contactor required to switch these high currents becomes higher. Hence, current limiting inductors are used in series to attenuate this inrush current. This increases the system cost and panel space.

A typical case below illustrates the magnitude of transient inrush current for switching of a capacitor bank. For a 12.5 kVAr capacitor bank:

Rated current of 12.5 kVAr 415V Capacitor = 18A
 Peak Inrush current without Damping Resistors = 1200A

Capacitor Duty Contactors are designed to limit this high transient inrush current by introducing damping resistors with early make auxiliary contacts. The current limiting due to damping resistors protects the APFC system from harmful effects of the capacitor charging inrush current.

Peak Inrush current with Damping Resistors = 260A

It is observed that peak inrush current with damping resistors is one fifth of that without damping resistors. As the contactor is now required to switch the rated capacitor current, the size of the contactor required is smaller. Thus the system cost and panel space are significantly lower when Capacitor Duty Contactors are used.

MO C Capacitor Duty Contactors:

MO C Capacitor Duty Contactors are designed for switching 3 phase, single or multi-step capacitor bank. In conventional capacitor switching contactors, early make auxiliary contacts used for insertion of damping resistors used to remain in the circuit continuously. During current breaking these auxiliary contacts would also carry and break the currents due to higher arc resistance in the main pole during arcing. This current breaking by auxiliary contacts at higher transient recovery voltage causes unreliable product performance and premature product failures.

MO C range of capacitor switching contactors have patented mechanism which disconnects the early make auxiliary contacts after the main contacts are closed. This completely eliminates the possibility of auxiliary contacts carrying and breaking the currents during breaking operation. This enhances the product switching performance and improves the product life.

Features and benefits of MO C Capacitor Duty Contactors

Feature	Customer Benefits
De-latching auxiliary contacts	Improved switching performance
	Reduced losses in auxiliary contacts
Dual contact gap for auxiliary contacts	Higher electrical life
	Enhanced product safety
Encapsulated resistor assembly	No flash over between phases
	Ease of wiring
Separate termination of damping resistors	Enhanced operational reliability
	Improved switching performance
Wide and chatter-free operating band	Higher electrical life
	Higher product reliability

- Available for capacitor range from 8.5 - 80 kVAr
- Modular design saving precious panel space
- De-Latching auxiliary contacts
- Separate termination of damping resistors
- Encapsulated resistor assembly ensuring safety



Type Designation				MO C8.5	MO C12.5	MO C15
Catalogue No.	Built in Aux Contacts	1 NO		CS96320	CS96321	CS90019
		1 NC		CS96337	CS96338	CS90020
Conformance to Standards						
Rated Operational Current I (AC - 6b) 3 phase delta connected capacitor bank at 415V, 50Hz		I_e	A	12	18	21
Short Circuit Protection						
kVAr Rating	230VAC		kVAr	5.0	7.5	8.5
	415VAC		kVAr	8.5	12.5	15
Max. Operational Voltage		U_e	V	415	415	415
Rated Insulation Voltage		U_i	V	690	690	690
Rated Impulse Withstand Voltage		U_{imp}	kV	8	8	8
Degree of Protection						
Main Terminal Capacity	Solid Conductor		mm ²	2 x 10	2 x 10	2 x 10
	Stranded Conductor		mm ²	2 x 10	2 x 10	2 x 10
	Finely Stranded Conductor		mm ²	2 x 6	2 x 6	2 x 6
Coil Operating Band	Pick-up	% U_C	V	75 - 110	75 - 110	75 - 110
	Drop-off	% U_C	V	35 - 65	35 - 65	35 - 65
Coil Consumption	Pick-up		VA	77	77	77
			VA	9	9	9
	Hold-on		W	2.8	2.8	2.8
Life (Operating cycles)		Mechanical	Million	10	10	10
		Electrical	Million	0.2	0.2	0.2
Max. Operating Frequency		Operations / Hr		240	240	240
Operating Sequence	Making					
	Breaking					
Overall Dimensions	Height	H	mm	83.5	83.5	83.5
	Width	W	mm	45	45	45
	Depth	D	mm	133.5	133.5	133.5
	Mounting Dimensions			mm	35 x 60 - 65 - 70	35 x 60 - 65 - 70

* Accessories and Spares same as that of MO contactor.

Note: Contact replacement is not permitted in MO C contactors



MO C20	MO C25	MO C33.5	MO C50	MO C70	MO C80
CS90021	CS96322	CS96323	CS96324	CS96325	CS96326
CS90022	CS96339	CS96340	CS96341	CS96342	CS96343
IS/IEC 60947-4-1, IEC 60947-4-1, EN 60947-4-1					
28	35	50	70	95	110
gG type fuses rated at 1.5 - 2 I _n					
11	14.5	20	30	40	45
20	25	33.5	50	70	80
415	415	415	415	415	415
690	690	1000	1000	1000	1000
8	8	8	8	8	8
IP20					
2 x 10	2 x 10	-	-	-	-
2 x 10	2 x 10	2 x 35	2 x 35	2 x 70	2 x 70
2 x 6	2 x 6	2 x 25	2 x 25	2 x 50	2 x 50
75 - 110	75 - 110	75 - 110	75 - 110	75 - 110	75 - 110
35 - 65	35 - 65	35 - 65	35 - 65	35 - 65	35 - 65
77	77	144	144	240	240
9	9	15	15	25	25
2.8	2.8	5	5	6.5	6.5
10	10	10	10	10	10
0.2	0.2	0.2	0.2	0.2	0.2
240	240	240	240	240	240
Early Make / Main					
Main Contacts Break					
83.5	83.5	123.5	123.5	135	135
45	45	55	55	70	70
133.5	133.5	163.0	163.0	175.0	175.0
30 x 60 - 65 - 70	35 x 60 - 65 - 70	45 x 100 - 105	45 x 100 - 105	60 x 115 - 120	60 x 115 - 120