



Quality I Trust



Direct - On - Line Motor Starter

Type MK1

Motor protection starts with a starter that has all the features that guarantee reliability. These features are built into L&T's MK1 - the most wanted starter in India today.

L&T's MK-1 is manufactured at L&T's modern factories at Ahmednagar and Mumbai where quality systems are ISO-9001 certified by BVQI - one of the world's leading accredited agencies.

Contactors

The contactor in the MK 1 starter is designed for exceptional endurance. The coil is tropicalised and subjected to rigorous tests for continuity, pick-up and drop-off. It also acts as undervoltage release disconnecting the supply to motor when voltage is low.

Each starter or contactor can be fitted with two auxiliary contact blocks of 1NO + 1NC each for indicating lamps, sequence interlocks and other pilot circuits.

Thermal Overload Relay

the thermal overload relay in a motor starter protects the motor against overloads and resulting burnouts. The MK 1 relay can be manually reset by just pressing the STOP button. The relays are ambient temperature compensated for operation between 5°C and 60°C.

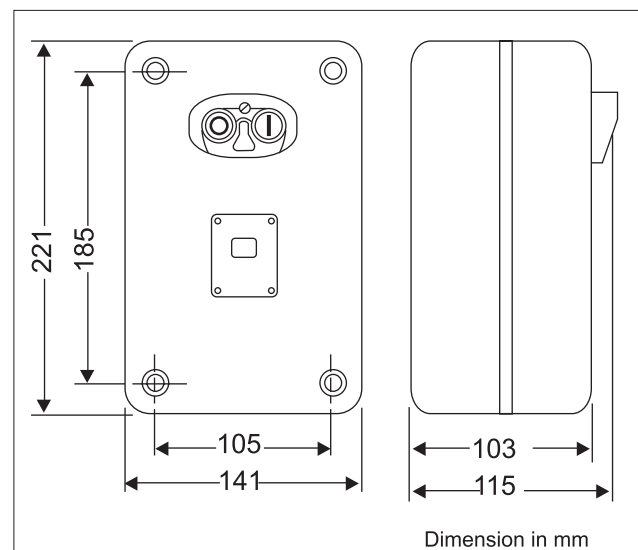
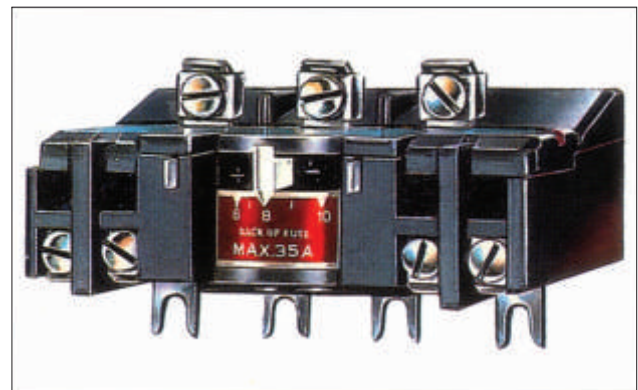
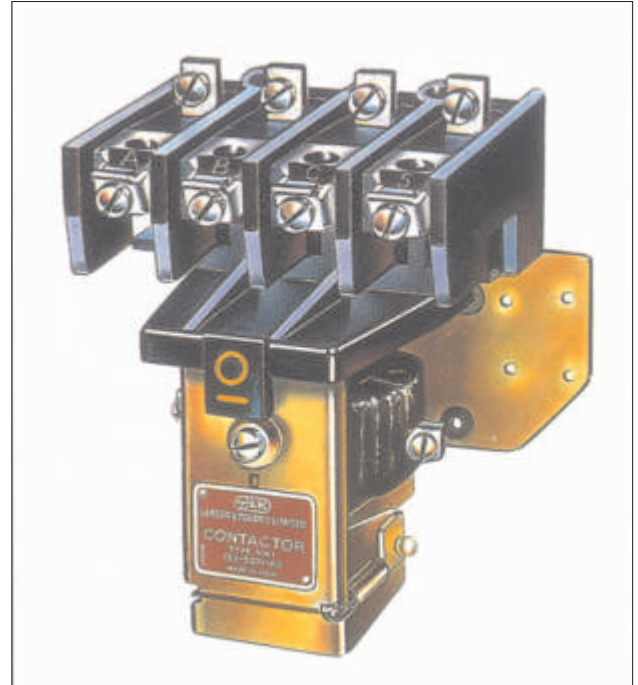
You can select from a wide range of relays with easily adjustable current settings. All overload relays are individually tested on an automated test bench to ensure foolproof operation.

Push Button

The 'START-STOP' push buttons are designed for convenient operation. The stop push can be latched in the OFF position to prevent accidental starting.

Remote Control

MK 1 contactors and starters can be remotely controlled by push button stations, float switches, pressure switches, thermostats or any other auxiliary circuit.



TECHNICAL DATA

MAIN CONTACTS

No. of contacts	4
Nominal rating at 50Hz	15A at 500 V
Motor hp/kW at 415V, 50Hz for AC3	7.5/5.5

SPARES KIT

Cat. No	SS 90983
Contents	4 moving contacts 4 fixed contacts front 4 fixed contacts rear Spring & guides

TERMINAL SIZE

Wires up to	6 mm ²
-------------	-------------------

ALSO AVAILABLE AS A SPARE:

Single moving contact Ss91009
Spare Kit with Hardware - SS92845

COIL CONSUMPTION

During closing	57 VA
When closed	13VA(6W)

SEPARATE AUXILIARY CONTACT BLOCK (1NO + 1NC)

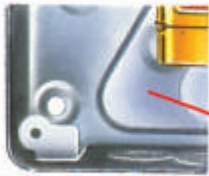
OTHER DETAILS

max. number of full starts	30 per hour
Mechanical life	10 million operations
Contact life	More than 5 million operations for 11A, AC3 duty
Making capacity at 50Hz	88A at 0.3 pf at 457V
Breaking capacity at 50Hz	88A at 0.3 pf at 457V
Weight (unpacked) in kg	2.20 SS. Encl. 1.00 Unenclosed

Cat. No.	SS 90120
Rating at 50Hz	2A at 500V
Terminal size - wires up to	2X2.5 mm ²
No. of blocks that can be fitted after tapping the holes provided for the same of the contactor	2

For CAT. Nos. of the other coil voltages and spares, please refer to our price list.

UNIQUE FEATURES



ENCLOSURE
is dust, moisture and vermin proof with cord packing in the cover.

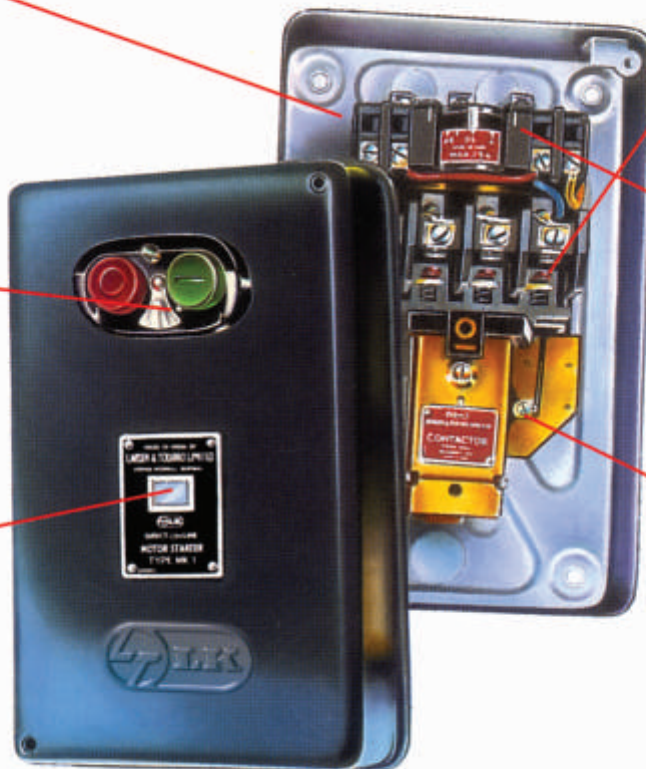


LATCH
To prevent accidental starting; this latch keeps stop button pressed when required.



WINDOW
Fool-proof ON/OFF indicator is visible through this window.

L&T's MK 1 comes to you with improved packaging it is warped in a polythene bag to prevent ingress of dust and water



CONTACT SYSTEM
Tested for millions of operations without failure. Robust silver tipped contacts. Double break, bounce-free design

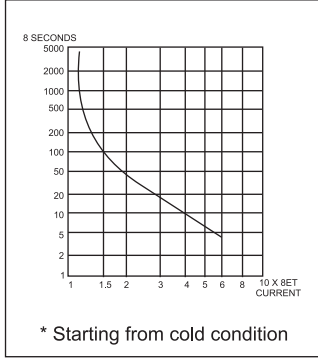


THERMAL RELAY UNIT
has accurately calibrated bimetallic elements with ambient temperature compensator for overload protection.

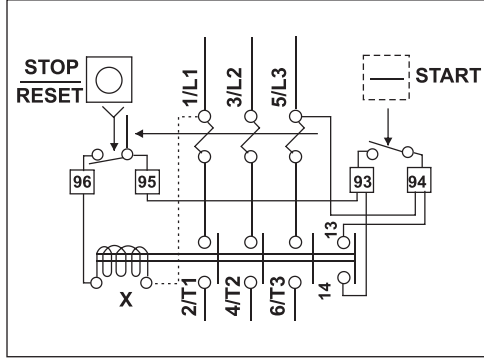


SOLENOID COIL
Machine wound, taped; vacuum impregnated and backed; also tested for inter-turn short circuit and subjected to a 4000 Volts impulse test.

Tripping Curve*



Wiring Diagram



Relay Selection

Cat. No.	Motor Rating 240V - 1 PHASE			Motor Rating 415V - 3 PHASE			Relay Range	Back-up Type HF Fuse
	HP	kW	In, A	HP	kW	In, A	Amps.	Rating
				0.05	0.037	0.085	0.15 - 0.25	2A
				0.1	0.074	0.17	0.25 - 0.4	2A
				0.125	0.09	0.4	0.25 - 0.4	2A
				0.15	0.11	1.45	0.4 - 0.65	2A
				0.2	0.15	0.57	0.4 - 0.65	2A
				0.25	0.19	0.7	0.4 - 0.65	2A
				0.25	0.19	0.7	0.6 - 1.0	4A
	0.125	0.11		0.25	0.37	1.2	1.0 - 1.6	6A
				0.5	0.55	1.6	1.0 - 1.6	6A
	0.25	0.12	2	0.75	0.55	1.6	1.5 - 2.6	6A
				1	0.75	1.8	1.5 - 2.5	6A
SS 96210	0.5	0.4	3.6	1.25	0.92	2.1	2.5 - 4.0	10A
				1.5	1.1	2.6	2.5 - 4.0	10A
				1.75	1.3	3	2.5 - 4.0	10A
				2	1.5	3.5	2.5 - 4.0	10A
	0.75	0.55		2.5	1.8	4.8	4 - 6.5	16A
				3	2.2	5	4 - 6.5	16A
				4	3	6.2	4 - 6.5	16A
				4	3	6.2	6 - 10	16A
	1	0.75	7.5	5	3.7	7.5	6 - 10	20A
	1.25	0.9	8	6	4.5	9	6 - 10	25A
	1.75	2.33					9 - 4	25A
	2	1.5	9.5	7.5	5.5	11	9 - 14	25A
SS 96211	2	1.5	9.5	7.5	5.5	11	11 - 18	25A
SS 96228	2	1.5	9.5	7.5	5.5	11	13 - 22	32A

NOTE: Amp rating of back-up fuse refers to the recommended, HF type H.R.C. cartridge fuse.

Other Motor Starters Available

Type	For motors up to	
	kW	hp
DOL		
MU1/MB1	7.5	10
MU2/MB2	11.0	15
ML2	15.0	20
ML3	22.5	30
STAR-DELTA		
MK1	11	15
MU1/MB1	11	15
MU2/MB2	22.5	30
ML2	26	35
ML3	37	50
ML4	55	75
ML6	90	125
ML 10	185	250
ML 12	300	400

Product improvement is a continuous process. For the latest information and special applications, please contact our office.



Electrical Standard Products
 Electrical & Electronics Division
 Larsen & Toubro Limited
 Powai Campus, Mumbai 400 072
 Tel : 022-67052720
 Fax : 022-67051746
 email : eb-g-esp@LNTEBG.com
 Website : www.LNTEBG.com



SPARES



MU Contactor



MU1 / MU2 Relay



MU Contact Bridge



Spare Kit



MU Coil



Timer ST100

Component	Type	Cat. No.	Std. Pkg. (Nos.)
MU1 Contactor	MU1 110 V	CS94007A000	10
	MU1 240 V	CS94007B000	10
	MU1 360 V	CS94007C000	10
	MU1 415 V	CS94007D000	10
MU2 Contactor	MU2 110 V	CS94008A000	10
	MU2 240 V	CS94008B000	10
	MU2 360 V	CS94008C000	10
	MU2 415 V	CS94008D000	10

MU1 Relay	4-6.5A	SS9655700TO	1
	6-10A	SS9655700VO	1
MU2 Relay	9-14A	SS9597900AO	1
	13-21A	SS9597900CO	1
	20-32A	SS9597900EO	1
	28-42A	SS9597900FO	1

MU Contactor Spares

Type	Cat. No.	Std. Pkg. (Nos.)
MU contact bridge	CS949940000	10
MU1 single contact	CS949950000	1
MU2 single contact	CS949960000	1
MU-Add ON Block - 1NO + 1NC (LHS)	SS940720000	10
MU-Add ON Block - 1NC (LHS)	SS940740000	10

Spares For MU / MB

Component	Type	Cat. No.	Std. Pkg. (Nos.)
Spare Kit	MU1	CS940100000	1
	MU2	CS940110000	1
MU Coils	110 V	CS94009A000	10
	240 V	CS94009B000	10
	360 V	CS94009C000	10
	415 V	CS94009D000	10

Component	Type	Cat. No.	Std. Pkg. (Nos.)
Spare Relay Extension Knob (Pack of 20 Nos.)	MU1	CS943360000	1
	MU2	CS943370000	1
Spare Housing	MU1	CS949980000	10
	MU2	CS949990000	10

Description	Cat. No.	Std. Pkg. (Nos.)
Electronic Star-Delta Timer Type ST100 160-500 V for 3-30 sec.	ST803280000	1



MU Starters

MU FASD / SASD



Features of MU Starters

- Suitable to work efficiently even at 180 V to 415 V
- "Relay tripping mechanism" protects water pump from overload
- Bigger terminals for ease of termination
- Reliable operation & performance under adverse field condition viz. Hot & humid environment, supply voltage-unbalance etc.
- Enclosures providing protection against dust, humidity & insects

Technical Details for MU FASD / SASD Starters

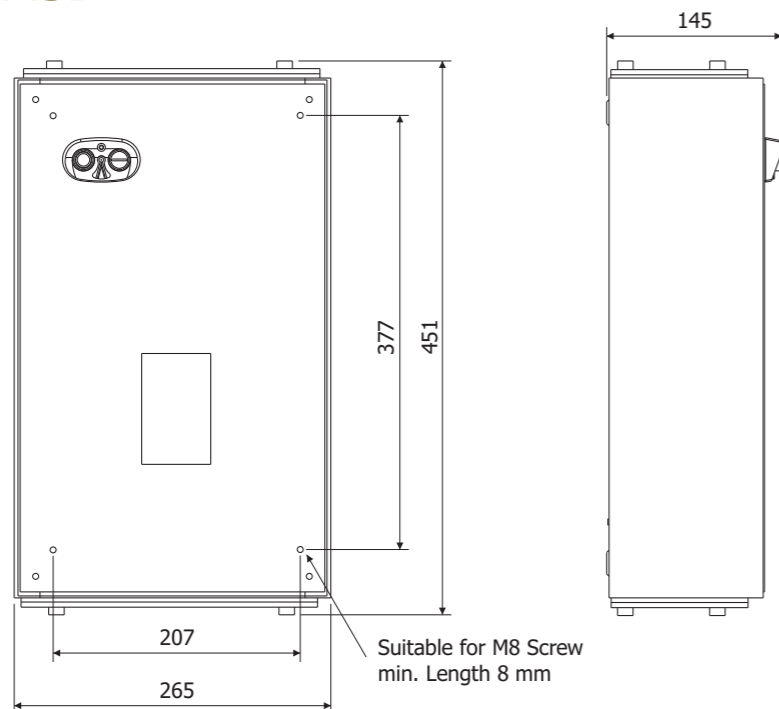
Rating	upto 30 HP, 415 V, 3Ø
Contactors	MU1 / MU2
Overload Relay	MU2
Coil Voltage	415 V, 360 V
Pick-up Voltage	50% to +110% Uc
Drop-off Voltage	25% to 35% Uc
Rated Insulation Voltage	690 V
Rated Operational Voltage	415 V AC
Service Temperature	-5°C to 55°C
Conformity to Standard	IS/IEC 60947-4-1
Terminal Capacity	10 sq. mm with Lug
Degree of Protection	IP54
No. of full Start	30 per Hour
Back-up Operation	Type 2 with HF fuses

Ordering Details for MU FASD / SASD Starters

Starter Type	Suitable for Pump/Motor 3Ø, 415 V, 50 Hz	Relay Range (A)	Cat. No.		Std. Pkg. (Nos.)
			Coil Voltage 360 V	Coil Voltage 415 V	
MU1 FASD (with MU relay)	12.5 HP	9 - 14	SS95890COAO	SS95890DOAO	1
	15 HP	13 - 21	SS95890COCO	SS95890DOCO	1
MU2 FASD (with MU relay)	20 HP	13 - 21	SS95892COCO	SS95892DOCO	1
	30 HP	20 - 32	SS95892COEO	SS95892DOEO	1
MU1 SASD (with MU relay)	12.5 HP	9 - 14	SS95891COAO	SS95891DOAO	1
	15 HP	13 - 21	SS95891COCO	SS95891DOCO	1
MU2 SASD (with MU relay)	20 HP	13 - 21	SS95893COCO	SS95893DOCO	1
	30 HP	20 - 32	SS95893COEO	SS95893DOEO	1

MU FASD / SASD

Overall Dimensions



Note: All Dimensions are in mm

MU DOL



Applications of MU starters

- DOL Starters-Available upto 15 HP
- Star-delta starters - Available upto 30 HP
- Types : Fully-Automatic / Semi-Automatic

Ordering Details for MU DOL Starters

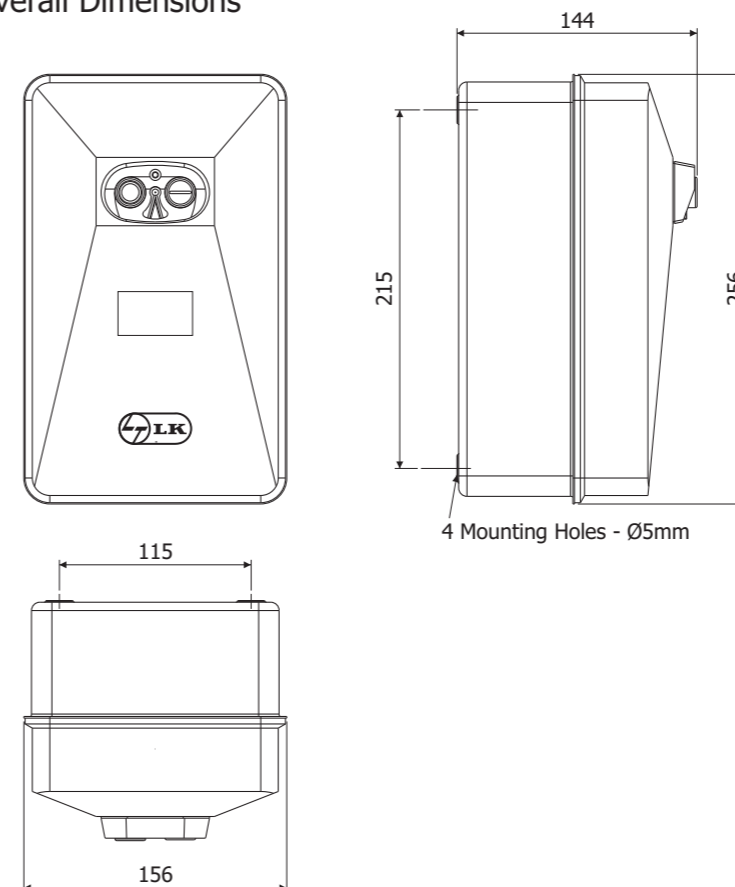
Starter Type	Suitable for Pump/Motor 3Ø, 415V, 50 Hz	Relay Range (A)	Cat. No.		Std. Pkg. (Nos.)
			Coil Voltage 360 V	Coil Voltage 415 V	
MU1 DOL (with MU relay)	7.5 HP	9 - 14	SS95647COAO	SS95647DOAO	10
	10 HP	13 - 21	SS95647COCO	SS95647DOCO	10
MU2 DOL (with MU relay)	12.5 HP	13 - 21	SS95648COCO	SS95648DOCO	10
	15 HP	20 - 32	SS95648COEO	SS95648DOEO	10

Technical Details for MU DOL Starters

Rating	upto 15 HP, 415 V, 3Ø
Contactors	MU1 / MU2
Overload Relay	MU2
Coil Voltage	415 V, 360 V
Pick-up Voltage	50% to 110% Uc
Drop-off Voltage	25% to 35% Uc
Rated Insulation Voltage	690 V
Rated Operational Voltage	415 V AC
Service Temperature	-5°C to 55°C
Conformity to Standard	IS/IEC 60947-4-1
Terminal Capacity	10 sq. mm with Lug
Degree of Protection	IP54
No. of full Start	30 per Hour
Back-up Operation	Type 2 with HF fuses

MU DOL Starter

Overall Dimensions



Note: All Dimensions are in mm