



ML Series Contactor & Thermal Overload Relay



LARSEN & TOUBRO LIMITED

It's all about Imagination™

Technical Data

Contactors



Type	ML 0	ML 1	ML 1.5	ML 2	ML 3	ML 4	ML 6	ML 10	ML 12
Cat. No.	SS90975	SS90851	SS91851	SS90701	SS90721	SS90910	SS90921	SS90935	SS91010
Conformance Standards	IS 13947-4 - 1, IEC 60947 - 4 - 1								
No. of poles	3	3	3	3	3	3	3	3	3
Thermal rating / Utilization category AC-1 : 3ϕ , 415V, 50Hz*	16 A	25 A	25 A	40 A	45 A	100 A	125 A	250 A	400 A
Insulation voltage , U _i (V)	500	500	500	500	500	660	660	660	660
Utilization Category AC-2	12 A	16 A	25 A	32 A	40 A	70 A	110 A	200 A	300 A
Utilization Category AC-3	5.6kW/7.5hp/12 A	7.5 kW/10hp/16 A	11 kW/15hp/25 A	15 kW/20hp/32 A	22 kW/30hp/40 A	37 kW/50hp/70 A	55 kW/75hp/110 A	110 kW/150hp/200 A	168 kW/225hp/300 A
Utilization Category AC-4	4.5kW/6hp/10 A	7.5 kW/10hp/16 A	9 kW/12.5hp/21 A	15 kW/20hp/32 A	22 kW/30hp/40 A	37 kW/50hp/70 A	45 kW/60hp/85 A	110 kW/150hp/200 A	140 kW/190hp/250 A
Operational Current I _e (AC-4 Utilization Category) For contact life of 300000 Operating cycles	6.3 A	10 A	13.5 A	17 A	22 A	35 A	46 A	90 A	112 A
I) Stator duty - 415V, 50Hz Duty factor (10 min. cycle duration)	15.5 A	24 A	37 A	48 A	60 A	95 A	165 A	250 A	375 A
	15.5 A	24 A	37 A	48 A	60 A	95 A	165 A	250 A	375 A
	12.5 A	20 A	30 A	40 A	50 A	75 A	135 A	206 A	310 A
	20%	36 A	56 A	72 A	90 A	157 A	270 A	370 A	560 A
	40%	23 A	36 A	56 A	72 A	157 A	270 A	370 A	560 A
	60%	19 A	30 A	44 A	60 A	118 A	206 A	310 A	465 A
II) Rotor duty - Delta connected Duty factor (10 min. cycle duration)	830 V	830 V	830 V	830 V	830 V	830 V	830 V	830 V	830 V
III) Max. Rotor Voltage (10 min. cycle duration)	415 V	415 V	415 V	415 V	415 V	415 V	415 V	415 V	415 V
Capacitor Switching - Delta connected, 415V, 50Hz *** Single Capacitor	500 V	500 V	500 V	500 V	500 V	500 V	500 V	500 V	500 V
Making Capacity at 457 V, Cos ϕ = 0.35, 50Hz	3 kVAR	8 kVAR	13 kVAR	20 kVAR	20 kVAR	50 kVAR	65 kVAR	125 kVAR	175 kVAR
Breaking Capacity at 457 V, Cos ϕ = 0.35, 50Hz	120 A	192 A	252 A	400 A	480 A	840 A	1200 A	2500 A	3000 A
	100 A	160 A	210 A	320 A	400 A	700 A	1000 A	2000 A	2500 A
	10 A	16 A	25 A	32 A	40 A	63 A	85 A	200 A	300 A
	10 A	16 A	25 A	32 A	40 A	63 A	85 A	200 A	300 A
	10 A	16 A	25 A	32 A	40 A	63 A	85 A	200 A	300 A
	10 A	16 A	25 A	32 A	40 A	63 A	85 A	200 A	300 A
	10 A	16 A	25 A	32 A	40 A	63 A	85 A	200 A	300 A
	7 A	7.5 A	7.5 A	32 A	40 A	63 A	85 A	200 A	300 A
Mechanical life : No of operating cycles	15 x 10 ⁶	15 x 10 ⁶	15 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶	10 x 10 ⁶
	3000	3000	3000	2000	2000	2000	2000	2000	2000
	3000	3000	3000	2000	2000	2000	2000	2000	2000
Max. Frequency of operation : Operating cycles/hr	750	750	750	750	750	750	750	750	750
	750	750	750	750	750	750	750	750	750
	250	250	250	250	250	250	250	250	250
Service temperature	-20°C to +55°C*	-20°C to +55°C	-20°C to +55°C	-20°C to +55°C	-20°C to +55°C	-20°C to +55°C	-20°C to +55°C	-20°C to +55°C	-20°C to +55°C
Main terminal capacity	2 x 10	2 x 10	2 x 10	2 x 25	2 x 25	-	-	-	-
	16	16	16	50	50	50	95	240	240
	16	16	16	50	50	50	95	240	240
Auxiliary Contacts	2 NO + 2 NC								
No. of built in auxiliary contacts	2 NO + 2 NC								
Operating Sequence	2 NO + 2 NC								
Thermal Rating at 415 V, 50Hz	16 A	16 A	16 A	16 A	16 A	16 A	16 A	16 A	16 A
Aux. Terminal Capacity : Wires up to (in mm ²)	2 x 2.5	2 x 2.5	2 x 2.5	2 x 2.5	2 x 2.5	2 x 2.5	2 x 2.5	2 x 2.5	2 x 2.5
AC -15 Rating at 415 V, 50Hz	4 A	4 A	4 A	4 A	4 A	4 A	4 A	4 A	4 A
Making Capacity at 415 V, Cos ϕ = 0.35, 50Hz	80 A	80 A	80 A	80 A	80 A	80 A	80 A	80 A	80 A
Breaking Capacity at 415 V, Cos ϕ = 0.35 ϕ , 50Hz	70 A	70 A	70 A	70 A	70 A	70 A	70 A	70 A	70 A
Coil	12, 24, 42, 110, 220/230, 240/250 320, 360, 380, 415/440, 525								
Voltages Available for 50Hz operation , U _c (V)	42, 110, 220, 240 320, 360, 380, 415/440, 525								
Pick - up	60	60	60	120	120	450	450	1450	1450
Cos ϕ	0.8	0.8	0.8	0.4	0.4	0.3	0.3	0.25	0.25
VA	15	15	15	20	20	50	50	85	85
Watts	5	5	5	8.5	8.5	17	17	27	27
Limits of operation	75 - 110	75 - 110	75 - 110	75 - 110	75 - 110	75 - 110	75 - 110	75 - 110	75 - 110
Typical closing delay in msec	65 - 15	65 - 15	65 - 15	65 - 15	65 - 15	65 - 15	65 - 15	65 - 15	65 - 15
Typical opening delay in msec	5 - 35	5 - 35	5 - 35	10 - 35	10 - 35	10 - 35	10 - 35	15 - 45	15 - 45
Weight (unpacked) in kg.	0.5	0.5	0.5	0.95	0.95	2.9	3	9.0	9.2

* Please connect inductance in series for capacitor switching
 ** Upto 4 Nos. Add on auxiliary contact blocks (each 1NO + 1NC) can be mounted.
 *** Upto 2 Nos. Add on auxiliary contact blocks (each 1NO + 1NC) can be mounted.

Thermal Overload Relay



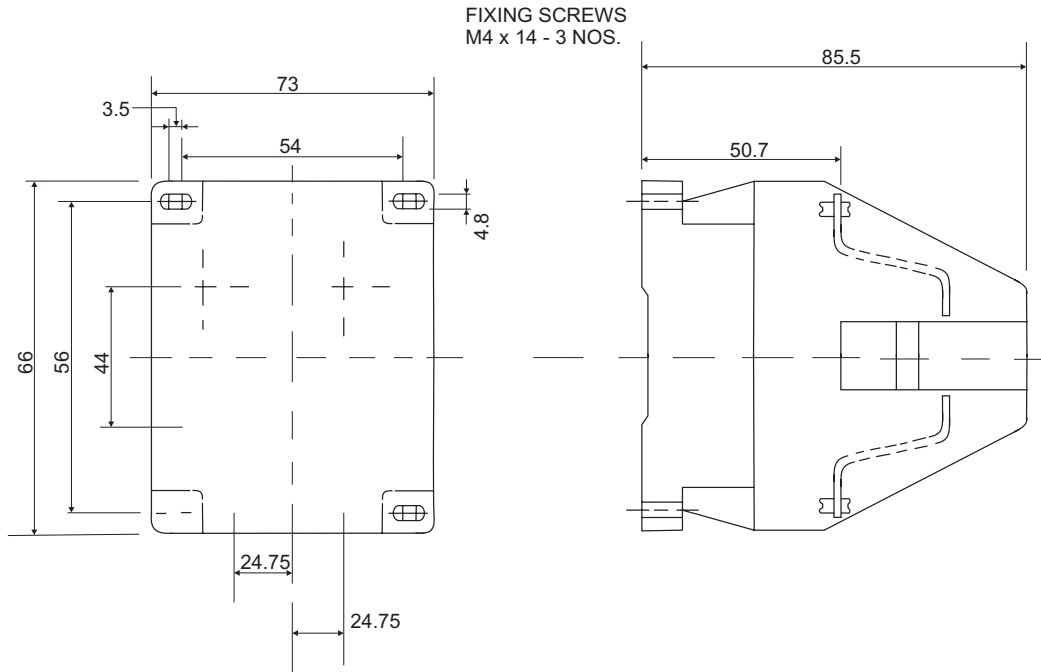
Type		ML 0 / 1 / 1.5	ML 2 / 3
Cat. No.		SS91858	SS91859
Ratings			
Rated insulation voltage (Ui)	V	500	500
Rated impulse strength (Uimp)	KV	6	6
Service temperature	°C	-5 to + 55	-5 to + 55
Rated thermal current I _m at 415V, 50Hz	A	6	6
Rated operational current for AC-15 utilization category at 50Hz (A)	24V	6	6
	110V	5	5
	220V	3	3
	380/415V	2	2
	500V	2	2
Built in contacts		1 Start	1 Start
		1 Off / Reset	1 Off / Reset
		1 Alarm (NO)	1 Alarm (NO)
Tripping class (A)		10	10
Max. Frequency of operation	Op.cycles/hr	30	30
Main Terminal capacity	Lug(mm ²)	16	50
Aux. Terminal capacity	Wires(mm ²)	2 x 2.5	2 x 2.5

Accessories & Spares

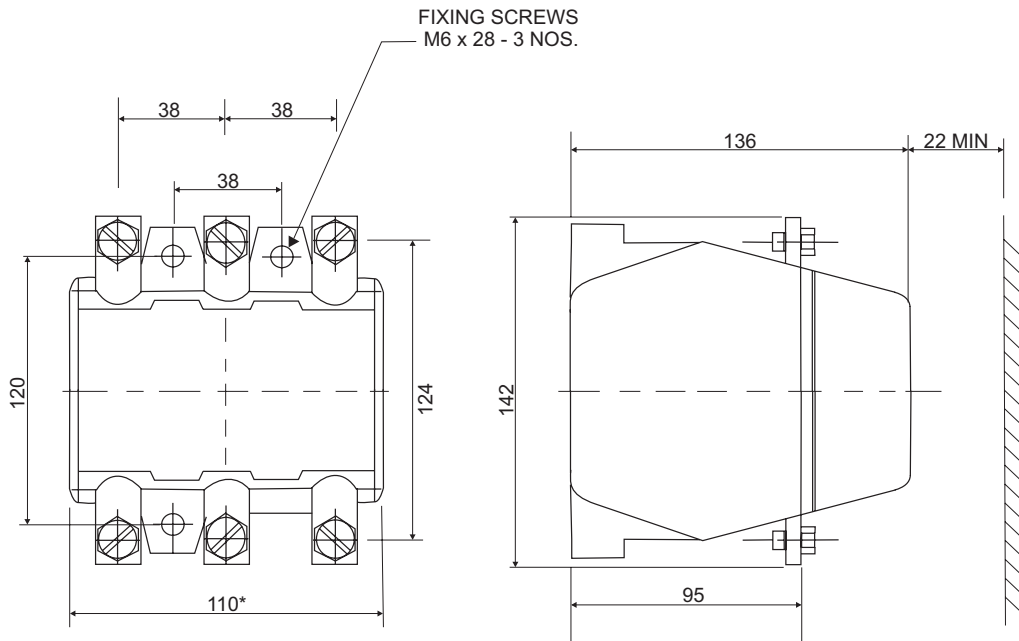
CONTACTOR TYPE	AUX.ADD ON BLOCK	MECHANICAL INTERLOCK KIT	SPARE COIL	SPARE KIT
ML 0	Not available	Not available	SS90873	SS90978
ML 1				SS90896
ML 1.5				SS91467
ML 2	Not available	SS91694	SS90545	SS90544
ML 3				SS90848
ML 4	Cat. No. SS91494	SS91675	SS91258	SS91660
ML 6				SS91670
ML 10	Cat. No. SS91474	SS91017	SS91011	SS90936
ML 12				SS91127

Overall Dimensions

ML 0/1/1.5 Contactor (Without shroud)



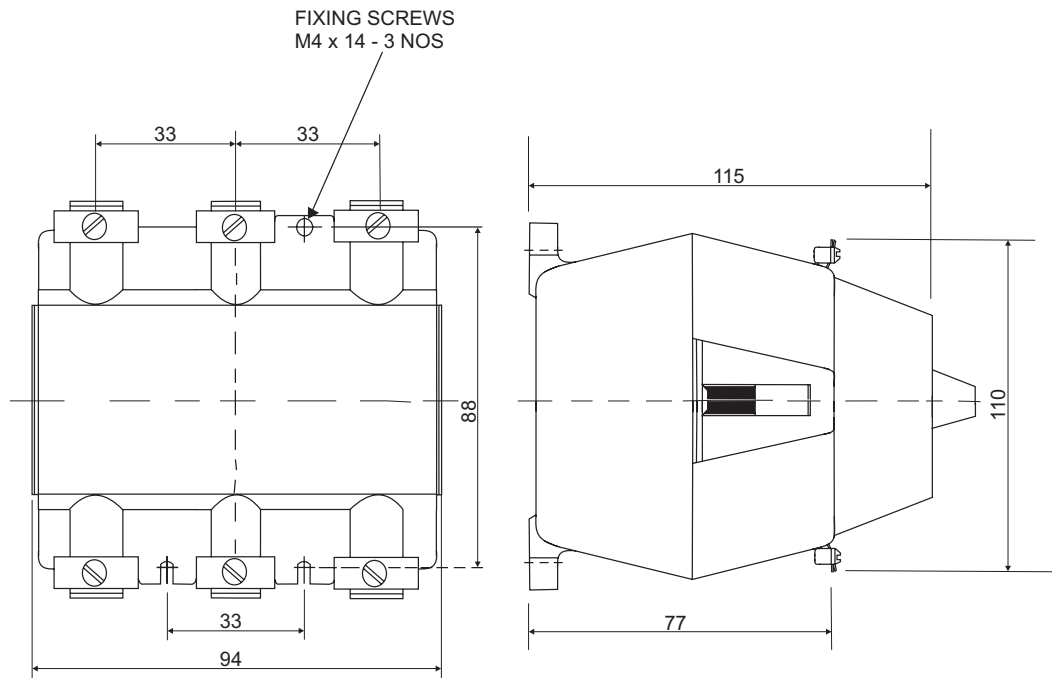
ML 4 Contactor



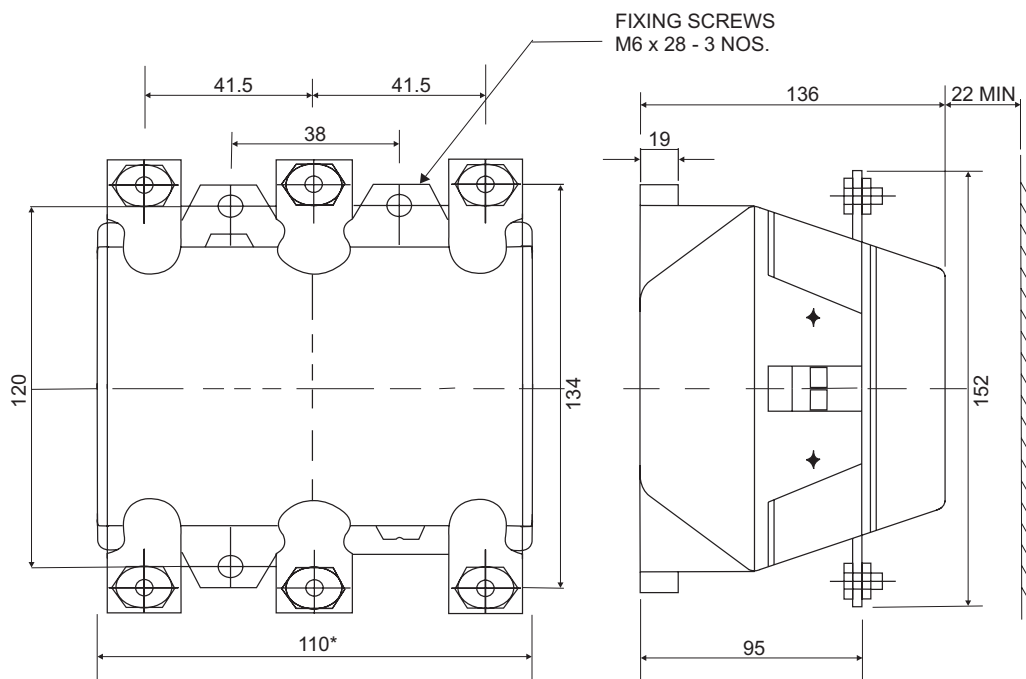
*Provide 12 mm extra for each Add-on block

Overall Dimensions

ML 2/3 Contactor



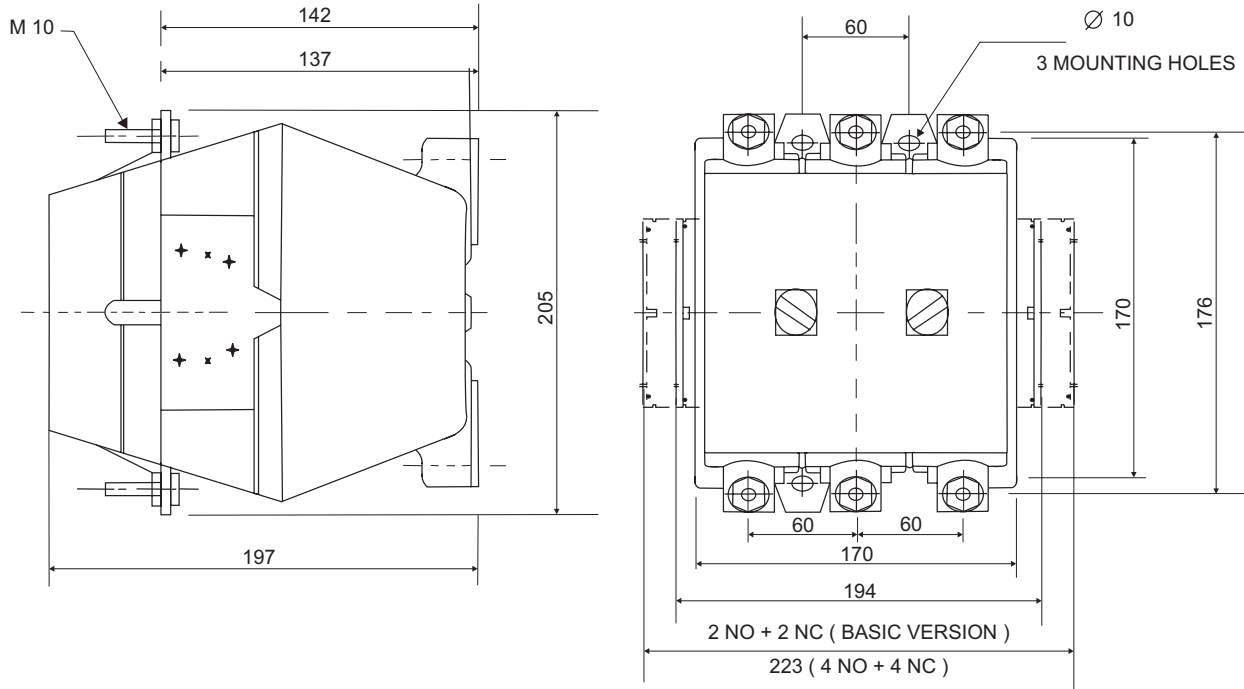
ML 6 Contactor



*Provide 12 mm extra for each Add-on block

Overall Dimensions

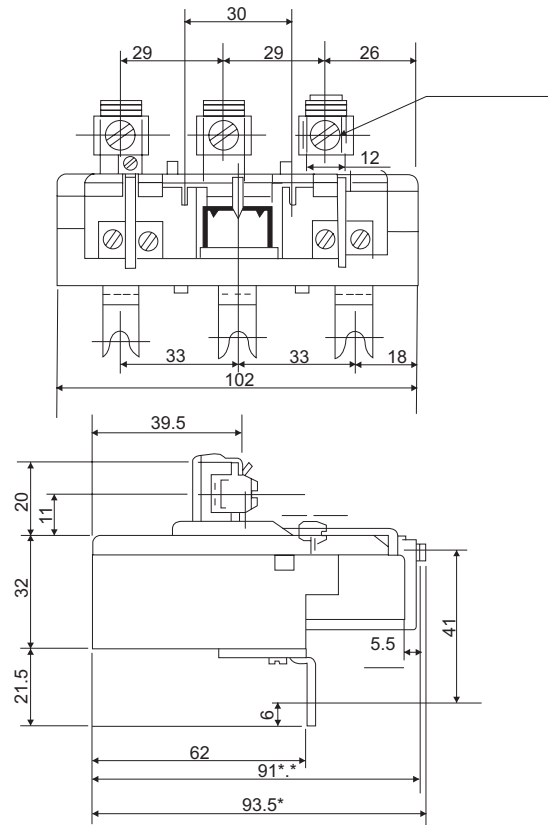
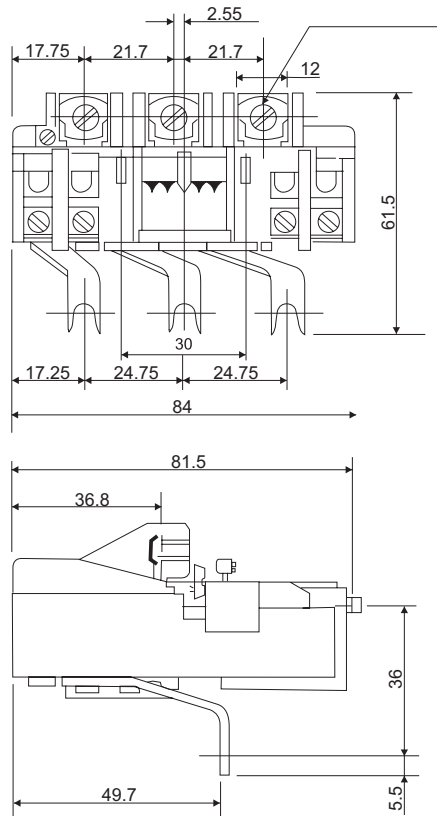
ML 10 / 12 Contactor



ML 0/1/1.5

Thermal Overload Relay

ML 2/3



TERMINAL SCREWS M4

TERMINAL SCREWS M4

For selection and product demonstration, please contact any of our branch offices listed below:

REGISTERED OFFICE AND HEAD OFFICE

L&T House, Ballard Estate
P. O. Box 278
Mumbai 400 001
Tel: 022-67525656
Fax: 022-67525858
Website: www.Larsentoubro.com

ELECTRICAL STANDARD PRODUCTS (ESP)

501, Sakar Complex
Opp. Gandhigram Rly. Station
Ashram Road
Ahmedabad 380 009
Tel: 079-55304007-11, 55304000/1
Fax: 079-26580491
e-mail: esp-ahm@Lntebg.com

38, Cubbon Road, Post Box 5098
Bangalore 560 001
Tel: 080-25020100 / 325
Fax: 080-25580525
e-mail: esp-blr@Lntebg.com

131/1, Zone II
Maharana Pratap Nagar
Bhopal 462 011
Tel: 0755-4233907 / 8 / 9
Fax: 0755-2769264
e-mail: esp-bho@Lntebg.com

Plot No. 559, Annapurna Complex
Lewis Road
Bhubaneswar 751 014
Tel: 0674-2537301, 2436696
Fax: 0674-2537309
e-mail: esp-bbi@Lntebg.com

SCO 32, Sector 26-D
Madhya Marg, P. O. Box 14
Chandigarh 160 026
Tel: 0172-2790750 / 151
Fax: 0172-2792764
e-mail: esp-chd@Lntebg.com

10, Club House Road
Chennai 600 002
Tel: 044-28462072 / 4
Fax: 044-28462102
e-mail: esp-maa@Lntebg.com

67, Appuswamy Road
Post Bag 7156
Opp. Nirjala College
Coimbatore 641 045
Tel: 0422-2588120, 2588123
Fax: 0422-2588148
e-mail: esp-cbe@Lntebg.com

L&T House
Group MIG - 5
Padmanabhpur
Durg 491 001
Tel: 0788-2200105, 2322809
Fax: 0788-2210161

A1/11, Astronauts Avenue
Bidhan Nagar
Durgapur 713 212
Tel: 0343-2536891 / 952
Fax: 0343-2536493
e-mail: esp-dgp@Lntebg.com

(Faridabad Switchgear Works)
12/4, Delhi-Mathura Road
Faridabad 121 003
Tel: 0129-2277543, 2275314
Fax: 0129-2275405
e-mail: esp-fbd@Lntebg.com

Milanpur Road, Bamuni Maidan
Guwahati 781 021
Tel: 0361-2550565
Fax: 0361-2551308
e-mail: esp-gau@Lntebg.com

5-10-173, Fateh Maidan Road
P. O. Box 12
Hyderabad 500 004
Tel: 040-23296468
Fax: 040-23242356
e-mail: esp-hyd@Lntebg.com

D-24, Prithvi Raj Road
C-Scheme
Jaipur 302 001
Tel: 0141-2341385/386
Fax: 0141-2373280
e-mail: esp-jai@Lntebg.com

Akashdeep Plaza, 2nd Floor
P. O. Golmuri
Jamshedpur 831 003
Jharkhand
Tel: 0657-2433673
Fax: 0657-2341250
e-mail: esp-jam@Lntebg.com

Skybright Bldg.
M.G. Road
Ravipuram Junction
Ernakulam
Kochi 682 016
Tel: 0484-2358513, 2358761
Fax: 0484-2358982
e-mail: esp-cok@Lntebg.com

3-B, Shakespeare Sarani
Kolkata 700 071
Tel: 033-44002301/2/3/4/5, 44002572
Fax: 033-22822589
e-mail: esp-ccu@Lntebg.com

A28, Indira Nagar
Faizabad Road
Lucknow 226 016
Uttar Pradesh
Tel: 0522-4040905 / 902 / 903
Fax: 0522-2311671
e-mail: esp-Lko@Lntebg.com

Plot No. 518
4th Main Road
K.K. Nagar
Madurai 625 020
Tel: 0452-2537404/303
Fax: 0452-2537552
e-mail: esp-mdu@Lntebg.com

North Wing, Level II,
Gate 7, Powai
Mumbai 400 072
Tel: 022-67052287 / 2661 / 2737
Fax: 022-67051112
e-mail: esp-bom@Lntebg.com

8B, Farmland, Ramdaspath
Behind Hotel Radhika
Nagpur 440 010
Tel: 0712-2420641 / 24
Fax: 0712-2420619
e-mail: esp-ngp@Lntebg.com

32, Shivaji Marg, P.O. Box 6223
New Delhi 110 015
Tel: 011-41419500 / 1, 41419515
Fax: 011-41419600
e-mail: esp-del@Lntebg.com

L&T House, P.O. Box 119
191/1, Dhole Patil Road
Pune 411 001
Tel: 020-26135048, 26135611
Fax: 020-26129586, 26124910
e-mail: esp-pnq@Lntebg.com

3rd Floor, Vishwakarma Chambers
Majura Gate, Ring Road
Surat 395 002
Tel: 0261-2473726
Fax: 0261-2477078
e-mail: esp-sur@Lntebg.com

Radhadaya Complex
Old Padra Road
Near Charotar Society
Vadodara 390 015
Tel: 0265-6613610/11/12
Fax: 0265-2336184
e-mail: esp-bar@Lntebg.com

48-8-16, Dwarakanagar
Visakhapatnam 530 016
Tel: 0891-2755493, 2704928
Fax: 0891-2746075
e-mail: esp-viz@Lntebg.com

Product improvement is a continuous process. For the latest information and special applications, please contact any of our offices listed here.



Electrical Standard Products
Larsen & Toubro Limited
Powai Campus, Mumbai 400 072
Tel: 022-6705 0505
Fax: 022-67051324 / 1746
E-mail: esp@LNTEBG.com
Website: www.LNTEBG.com

