MOTORS DRIVES
Driven by Commitment

Low voltage motors
0.12 kW to 1000 kW
Frame 63 to 450

■ Industrial Motors ■ Hazardous Area Motors ■ Crane Duty Motors ■
■ Brake Motors ■ Roller Table Motors ■ Cooling Tower Motors ■ Encoder Motors ■

www.lhp.co.in

Laxmi Hydraulics Pvt. Ltd. is an ISO 9001 - 2008 company established in 1981 & today is one of the leading manufacturers of Induction Motors for various industrial applications like Machine tools, Textile, Air conditioning, Dairy equipments, Crane & hoist, Pollution control, Aqua-culture, Agriculture, Petrochemical, Fertilizers, Mines and Chemical industries. The range of products includes Standard Motors, Brake Motors, Crane & Hoist Duty Motors, Flame-Proof Motors, Dual Speed Motors, Roller Table Motors, Invertor grade motors to run with VFD's at various frequencies, Encoder Motors and other special motors as per the customer's specifications. At LHP, the quality of the product is an obvious dedicated effort of experienced and trained personnel and well-defined and documented procedures.

The secret of LHP's success lies in fulfilling customers' changing expectations and accepting new challenges for continuous improvements in products and services. LHP believes in adopting and harnessing the latest emerging technology and trends to meet the customer's requirements.

The customers are our driving force, support and inspiration, which motivates us to keep growing and striving for excellence.

With this firm footing, LHP is marching towards the goal of becoming a world-class manufacturer of induction motors.

Plant - A

Plant - B

Contents

Note : Due to continual improvements, the data given in this catalogue may get changed.

Applicable Standards

The motors manufactured conform to the following National standards and equivalent International standards.

National Standards	Title	IEC
IS : 325/IS/IEC-60034-1	Rotating electrical machines	IEC 60034-1
IS : 12824	Types of duty & classes of rating assigned to rotating electrical machines	IEC 60034-1
IS : 4889	Methods of determination of efficiency of rotating electrical machines	IEC 60034-2
IS/IEC 60034-5	Degree of protection provided by enclosure for rotating electrical machinery	IEC 60034-5
IS : 6362	Designation of methods of cooling of rotating electrical machines	IEC 60034-6
IS : 2253	Designation for types of construction & mounting arrangements of rotating electrical machines.	IEC 60034-7
IS / IEC : 60034-8	Terminal marking & direction of rotation for rotating electrical machinery	IEC 60034-8
IS : 12065	Permissible limits of noise levels for rotating electrical machines	IEC 60034-9
IS : 12075	Mechanical vibration of rotating electrical machines with shaft height 56 mm & higher measurement, evaluation & limits of vibration severity.	IEC 60034-14
IS : 1231	Dimensions of three phase foot mounted induction motors	IEC 60072-1
IS : 2223	Dimensions of flange mounted induction motors	IEC 60072-1
IS : 8223	Dimensions and output series for rotating electrical machines	IEC 60072-2
IS : 1271	Thermal evaluation and classification of electrical insulation	IEC 60034-11
IS/IEC-60079-0 IS/IEC-60079-1	Explosive atmospheres equipment protection by flame-proof enclosures "d"	IEC 60079-0 IEC 60079-1
IS/IEC : 60079-7	Explosive atmospheres : Equipment protection by increased safety "e"	IEC 60079-7
IS/IEC : 60079-15	Electrical apparatus for exclusive gas atmospheres : Construction, Test and marking of type of protection "nA" electrical apparatus	IEC 60079-15
IS : 12615	Energy Efficient Induction Motors - 3 Phase Squirrel Cage	IEC 60034-30

Standard Motors : Output Summary

Frame output summary for LHP Three Phase Induction Motor

Output (kW/HP)	Pole-wise Frame Size									
	Standard, Brake & Non-sparking Induction Motor				Crane Duty Motor		Flame Proof Motor			
	2 Pole	4 Pole	6 Pole	8 Pole	4 Pole	6 Pole	2 Pole	4 Pole	6 Pole	8 Pole
0.12/0.16	63	63	71	--	--	--	63	63	71	--
0.18/0.25	63	63	71	80	--	--	63	63	71	80
0.25/0.33	63	71	71	80	--	--	63	71	71	80
0.35/0.50	71	71	80	90S	71	71	71	71	80	90S
0.55/0.75	71	80	80	90L	71	80	71	80	80	90L
0.75/1.00	80	80	90S	100L	80	80	80	80	90S	100L
1.10/1.50	80	90S	90L	100L	80	90S	80	90S	90L	100L
1.50/2.00	90S	90L	100L	112M	90S	90L	90S	90L	100L	112M
2.20/3.00	90L	100L	112M	132S(112M)	90L	100L	90L	100L	112M	132S
3.70/5.00	100L	112M	132S	160M(132M)	100L	112M	100L	112M	132S	160M
5.50/7.50	132S(112M)	132S	132M	160M	112M	132S	132S	132S	132M	160M
7.50/10.00	132S	132M	160M	160L	132M	132M	132S	132M	160M	160L
9.30/12.50	(132M)	(160M)	(160L)	180L	(132M)	(160M)	(132M)	(160M)	(160L)	180L
11.00/15.00	160M	160M	160L	180L	160M	160M	160M	160M	160L	180L
15.00/20.00	160M	160L	180L	200L	160M	160L	160M	160L	180M	200L
18.50/25.00	160L	180M	200L	225S	160L	180L	160L	180M	200L	225S
22.00/30/00	180M	180L	200L	225M	180L	200L	180M	180L	200L	225M
30.00/40.00	200L	200L	225M	250M	200L	225M	200L	200L	225M	250M
37.00/50.00	200L	225S	250M	280S	225S	250M	200L	225S	250M	280S
45.00/60.00	225M	225M	280S	280M	225M	280S	225M	225M	280S	280M
55.00/75.00	250M	250M	280M	315M	250M	280M	250M	250M	280M	315S
75.00/100.00	280S	280S	315S	315M	280S	315S	280M	280S	315S	315M
90.00/120.00	280M	280M	315M	315L	280M	315M	280M	280M	315M	315L
110.00/150.00	315S	315S	315L	315L	315S	315M	315S	315S	315M	315L
125.00/170.00	315M	315M	315L	355L	315M	315L	315M	315M	--	--
132.00/180.00	(315M)	315M	355L	(355L)	315M	315L	(315M)	(315M)	(315L)	(315L)
150/200	315L	315L	355L	355L	315L	315L	(315L)	(315L)	(315L)	(315L)
160.00/215.00	315L	315L	355L	(355L)	315L	355L	(315L)	(315L)	--	--
180.00/240.00	315L	315L	355L	(355L)	315L	355L	(315L)	(315L)	--	--
200.00/270.00	315L	315L	355L	(355L)	315L	355L	--	--	--	--
225.00/300.00	355L	355L	355L	–	355L	355L	--	--	--	--
250.00/335.00	355L	355L	355L	**355L/K	355L	355L	–	–	–	–
280/375	355L	355L	355L/K	**355L/K	355L	355L	–	–	–	–
315.00/425.00	355L	355L	355L/K	**355L/K	355L	–	–	–	–	–
355/475	355L/K	355L	355L/K	400L	355L	–	–	–	–	–
400/535	355L/K	355L/K	355L/K	400L	–	–	–	–	–	–
450/600	355L/K	355L/K	400L	*400L	–	–	–	–	–	–
475/635	355L/K	355L/K	400L	450M	–	–	–	–	–	–
500/670	355L/K	355L/K	400L	450M	–	–	–	–	–	–
560/750	400L	400L	*400L	450M	–	–	–	–	–	–
630/845	*400L	400L	450M	450L	–	–	–	–	–	–
#710/950	--	*400L	450M	–	–	–	–	–	–	–
#800/1070	--	450M	450L	–	–	–	–	–	–	–
#900/1205	--	450M	–	–	–	–	–	–	–	–
#1000/1340	–	450L	–	–	–	–	–	–	–	–

Note : • Frame wise ratings are as per IS standards except those ratings in bracket. These are as per LHP standard. • * Class 'F' rise

• ** Class 90 rise • 355 kW 2 Pole, 400kW 4 Pole, 315kW 8 Pole & above ratings 40° Amb. 80k rise • Above 160kW frame sizes as per LHP standard

Vacuum pressure impregnation as a standard feature for every motor

Mechanical features for Standard IE1, IE2 & IE3 motors

Sr. No.	Features	Standard	Optional
1	Frames	Motor frames from 63 to 112 frame are made of Aluminum pressure die cast bodies & 132S to 355L frames are made of cast iron or M.S. fabricated.	Motors frames offered in Al. pressure die cast can be offered in cast iron also.
2	End Covers	63 to 112 frames are made of Aluminum pressure die cast. All covers are with integral bearing housing bores.	63 to 112 frames can be offered in cast iron also.
3	Flanges- D Type/C Type	63 to 112 frames flanges are in Aluminum PDC/GDC. All flanges are with integral bearing housing bores. 100 to 355L frames flanges are in CI or M.S. fabricated.	63 to 112 frames flanges can be offered in CI. Special flanges can be offered.
4	Terminal Box	Construction : 63 to 112 frame - Aluminum PDC/GDC 132 to 180 frame - Pressed sheet metal / Cast Iron 200 to 355 frame- Pressed sheet metal / Cast Iron	Terminal box with special material & special design can be offered on demand.
5	Cable Entry Position	All T. Boxes can be rotated in a step of 90° through 360° for desired direction of cable entry. As a standard assy. cable entry will be towards NDE (Fan cover side).	Any position as per customers requirement can be offered.
6	T.Box Position	Please see dimensional table for T.Box position.	As per customer's requirement.
7	Cable Gland	Cable Gland holes are metric threading. For sizes & no. of entries please refer to dimensional table.	Cable glands of other conduit threading like PG type/B.S. Cond. type can be offered.
8	Rotor	Entire range of motors is fitted with dynamically balanced aluminum die cast squirrel cage rotors.	Copper Rotor can be given on demand.
9	Balancing	Rotors are dynamically balanced with a half key in the shaft extension as per ISO:1940 Part II, Grade 2.5	As per customer's specific requirement.
10	Shaft	Motor shafts are made of Carbon Steel 40C8/45C8 as per IS:2073 OR as per BS 970 EN 8/EN8D and dimensions as per IS:1231 . All shafts have threaded center hole as per DIN-332 standard. Key & keyways on shaft are made as per IS:2048	Shaft with other material like AISI-400, AISI-300, En 24 with heat treatment can be offered. Speical keys & keyways can be offered.
11	Bearings	63 to 225M frame motors have double shielded deep groove ball bearing (single row). Pre-lubricated for life and 250 to 355L frames motors have open type deep groove ball Bearing on both end (See Table No. A) with re-greasing facility.	Angular Contact ball bearings, taper roller bearings, spherical roller bearings, cyl. roller bearings, Insulated bearings can be offered. In 63 to 225m frame open bearing can be given.
12	Lubrication	63 to 112 frame motors are with medium temp. pregreased, 132 to 225 frame motors are with high temperature pre-greased bearings. Online greasing arrangement is provided for motors in 250 and above frames. with high temperature grease.	Motors with re-greasing arrangement in 100 to 225 frame can be offered as per customer's requirement.
13	V Ring Seals	63 to 225 frame are with V ring seals.	Motors with oil seals can be offered.
14	Oil Seals	250 to 355L frame are with Oil Seal or felt	63 to 160 frame motor with oil seal can be given
15	Mounting Arrangement as per IS/IEC 60072-1 & IEC 60072-2	63 to 225 frames motors are suitable for both vertical and horizontal mounting arrangement Foot mounting motors are suitable for : B3, B6, B7, B8, V5 & V6 Flange (D Type Flange) Mounting motors : B5, VI, V3, B35, V15 & V36 Flange (C Type Flange) Mounting motors : B14, V18, V19, B34, V58 & V69 250 to 355L frame std. motors are suitable for horizontal mounting only (B3,B6,B37,B8,B5 & B35) (Refer 1.6)	For vertical mounting motors in 250 to 355L frame contact LHPL.
16	Degree of Protection	IP : 55 as per IS/IEC 60034-5 (for more details refer Annex-I	IP :44, IP : 54, IP : 56, IP57, IP:65, IP:66, IP67, IP68 can be given
17	Noise Level	Noise level of motors conform to IS:12065 specifications. (See Table No. B)	Motors with low noise level can be offered.

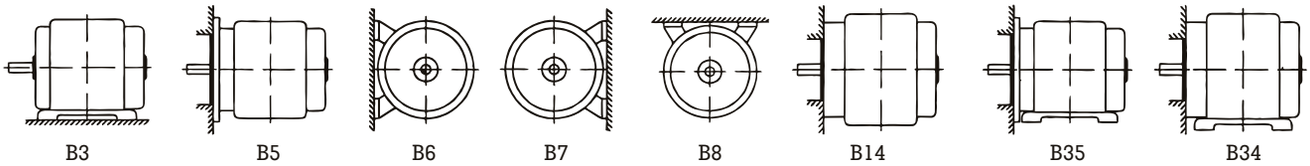
Mechanical features for Standard IE1, IE2 & IE3 motors

Table No.: 01

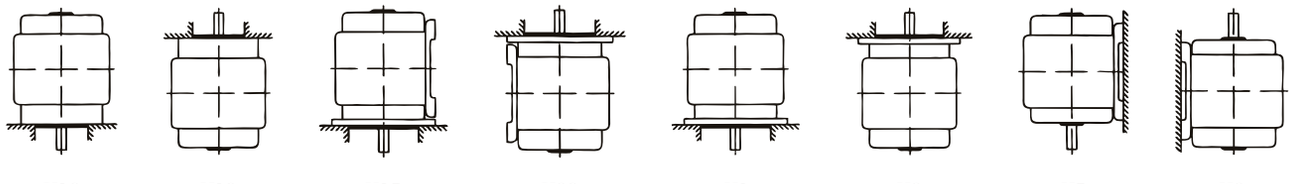
Sr. No.	Features	Standard		Optional
18	Vibration Level/Severity	Vibration levels are maintained as per normal class of IS : 12075. (See Table No. C)		Precision class of vibration can be offered as per customer's requirement.
19	Paint (a)	Flame-proof , Non-sparking and Increased safety	Anti Corrosive Epoxy Paint of RAL 7015 Slate Grey Shade.	Other types of Colors & Shades also can be given as per standards.
	(b)	Cooling Tower motors	Anti Corrosive Epoxy Paint Blue M & P	
	(c)	All other motors	Anti Corrosive Polyurethine Paint of RAL 7015 Slate Grey Shade.	
	(d)	All premium eff. IE3 motors		
20	Cooling	All motors are Totally Enclosed Fan Cooled (TEFC-IC411 as per IS:6362, IC4A1A1 as per IEC 60034-6). The cooling is effected by self driven, bi-directional centrifugal fan protected by fan cover. Following cooling types can be provided on demand. • Natural ventilation (TESC or TENV (IC410) • Forced cooling for frame sizes 71 and above (IC 416).		Any special cooling arrangements as per customer's requirement can be given.
21	Direction of Rotation	All motors are suitable for bi - directional rotation.		----------
22	Lifting arrangement	All motors with frame size 100 and above are provided with lifting hooks. When two or more hooks are provided, all hooks to be used simultaneously for lifting the motor.		----------
23	Packing	Motors up to 112 frame are packed in EPS and corrugated boxes. Wooden packing boxes or wooden pallets are provided for higher frame size, sea worthy / export packing case for home market (without fumigation certificate) is also available on request.		Any multiple product packing as per customer's requirement can be done.

1.4 Mounting Positions -

Horizontal Mounting



Vertical Mounting



Mechanical features for Standard IE1, IE2 & IE3 motors

Table No.: 02 Frame wise bearing sizes
(for non flame-proof motors)

Frame Size	Bearing No.	
	DE	NDE
63	6201 ZZ	6201 ZZ
71	6203 ZZ	6203 ZZ
80	6204 ZZ	6204 ZZ/6203 ZZ
90 S/L	6205 ZZ	6304/6205 ZZ
100 L	6206 ZZ	6206 ZZ
112 M	6306 ZZ	6206 ZZ
132 S/M	6308 ZZ C3	6208 ZZ C3
160 M/L	6309 ZZ C3	6209 ZZ C3
180 M	6310 ZZ C3	6210 ZZ C3
200 L	6312 ZZ C3	6312 ZZ C3
225 S/M	6313 ZZ C3	6313 ZZ C3/6312 ZZ 03
250 M	6314 C3	6214 C3
280 S/M	6318 C3	6316 C3
315 S/M/L	6319 C3	6219 C3
355 S/M/L	6322 C3	6322 C3
400M/L	6324	6322
450M/L	6326	6326

Table No.: 03 Limiting Mean Sound Power Level Lw in dB (A) for air-borne noise emitted by rotating electrical machines as per IS:12065.

Protection		IP	IP	IP	IP	IP	IP
Enclosure		55	55	55	55	55	55
Ratings in kW		Rated Speed (rev./min.)					
Above	Up to	960 & below	961-1320	1321-1900	1901-2360	2361-3150	3150-3750
--	1.1	76	79	80	83	84	88
1.1	2.2	79	80	83	87	89	91
2.2	5.5	82	84	87	92	93	95
5.5	11	85	88	91	96	97	100
11	22	89	93	96	98	101	103
22	37	91	95	97	100	103	105
37	55	92	97	99	103	105	107
55	110	96	101	104	105	107	109
110	220	100	104	106	108	110	112
220	630	102	106	109	111	112	114

Table No.: 04 Diameter of shaft extension run out of motors

Over	Up to	Normal	Precision Class
0	10	0.030	0.015
10	18	0.035	0.018
18	30	0.040	0.021
30	50	0.050	0.025
50	80	0.060	0.030
80	120	0.070	0.035

Concentricity of spigot diameter and perpendicularily of mounting surface of flange with respect to shaft

Flange No.	Spigot Dia.	Normal Class	Precision Class
F65	50	0.080	0.040
F75	60	0.080	0.040
F85	70	0.080	0.040
F100	80	0.080	0.040
0115	95	0.080	0.040
F130	110	0.100	0.050
F165	130	0.100	0.050
F215	180	0.100	0.050
F265	230	0.100	0.050
F300	250	0.125	0.063
F350	300	0.125	0.063
F400	350	0.125	0.063
F500	450	0.125	0.063
F600	550	0.160	0.080

Mechanical features for Standard IE1, IE2 & IE3 motors

Table No.: 05 Vibration Levels (Refer IS:12075)

Shaft center HT, H in mm	63 to 132		160 to 225		Above 225	
Range of speed	600 to 1500	Above 1500 & up to 3000	600 to 1500	Above 1500 & up to 3000	600 to 1500	Above 1500 & up to 3000
class of vibration severity	RMS value of vibration velocity, mm/s					
Normal	1.8	1.8	1.8	1.8	2.8	4.5
Precision A	0.71	0.71	0.71	1.12	--	--
Precision B	0.45	0.45	0.45	0.71	--	--
Precision C	0.28	0.28	0.28	0.45	--	--

	Vibration Severity											
Shaft center Ht, H in mm	63 to 132				160 to 225				Above 225			
Pole Speed, rpm	8 750	6 1000	4 1500	2 3000	8 750	6 1000	4 1500	2 3000	8 750	6 1000	4 1500	2 3000
Class of vibration serverity	RMS value of vibration displacement, Microns											
Normal	64	48	32	16	64	48	32	25	100	75	50	42
Precision A	24	18	12	6	24	18	2	10	--	--	--	--
Precision B	16	12	8	4	16	12	8	6	--	--	--	--
Precision C	10	8	5	2.5	10	8	5	4	--	--	--	--

Table No.: 06 Maximum Cable entry hole cable O.D. In (mm) accommodation in Terminal Box for Standard Motors (Non FLP)

Frame Size	Max. Cable Entry Hole Size (non-flp)	Suitable Cable O.D. Range	Recommended Cable size cross sec. Area in mm^2
63	M20, 1No.	DIA. 7.0 - 14.0	6
71	M20, 1No.	DIA. 7.0 - 14.0	
80	M20, 1No.	DIA. 7.0 - 14.0	
90	M20, 2Noa.	DIA. 7.0 - 14.0	16
100	M32, 1No. & M20 1No.	M20- DIA. 7.0 - 14.0	
		M32- DIA. 10.0 - 21.0	
112	M32, 1No. & M20 1No.	M20- DIA. 7.0 - 14.0	35
		M32- DIA. 10.0 - 21.0	
132	M25 (2Nos.)	DIA. 9.0 - 16.0	
160	M25 FOR M.S. BOX (2 Nos.) & M50 FOR C.I. BOX (2Nos.)	M25- DIA. 9.0 - 16.0	
		M50- DIA. 21.0 - 34.5	
180	M25 For M.S. Box (2 Nos.) & M50 FOR C.I. Box (2Nos.)	M25- DIA. 9.0 - 16.0	95
		M50- DIA. 21.0 - 34.5	
200	M63, 2Nos.	DIA.- 30.0 - 44.5	
225	M63, 2Nos.	DIA.- 30.0 - 44.5	
250	M50, 2Nos. & M63, 1No.	M50- DIA. 21.0 - 34.5	185
		M63- DIA. 30.0 - 44.5	
280	M50, 2Nos. & M63, 1No.	M50- DIA. 21.0 - 34.5	
		M63- DIA. 30.0 - 44.5	
315	M63, 2Nos. & M80, 1No.	M63- DIA. 30.0 - 44.5	
		M80- DIA. 42.0 - 57.0	
355	M80, 2Nos.	M80- DIA. 42.0 - 57.0	240
355L/K	M80, 2Nos.	M80- DIA. 42.0 - 57.0	300
400M/L	M80, 2Nos.	M80- DIA. 42.0 - 57.0	
450M/L	M80, 2Nos.	M80- DIA. 42.0 - 57.0	

Note : Customer should specify exact cable OD in mm to select proper cable entry

Permissible radial/axial load for Standard Motors

The radial load for a given motor depends on the type and size of pulley/pinion chosen and type of driven machine. Radial load can be calculated using the following formula.

$$p = \frac{\alpha \times 973 \times kW}{RPM \times D/2} + W$$

Where, α = Belt Factor — 2 for V belts, 3for flat belts

kW = Output of the motor in kW.
RPM = Speed of the motor in Rev./Min.
D = Dia. of pulley in meters.
W = Weight of the pulley in kg.

It is recommended that the mounting of pulley/pinion be such that the load acts at the middle of extension of the shaft. For radial loads other than those recommended in Table No. 06, customers are advised to consult LHP for maximum allowable loads.

Table No. - 07
Permissible Radial and Axial load on Motor
(At the center of extension (Std.) including weight of the pulley)

Frame Size	Synchronous RPM & Radial Load in Kg.				Permissible Axial Load in Kg.	Recommended Pulley Size Dia.x Width (D x W) in mm.
	3000	1500	1000	750		
63	30	30	30	30	10	52 x 30
71	35	35	35	35	12	60 x 40
80	50	60	60	60	20	100 x 50
90	55	55	65	75	25	125 x 60
100	70	80	80	100	35	150 x 80
112	95	110	110	110	40	200 x 100
132	150	175	200	210	50	225 x 125
160	260	300	325	350	70	275 x 140
180	325	350	400	400	80	315 x 160
200	425	500	575	575	100	355 x 200
225	450	600	650	650	100	400 x 200
250	600	800	900	900	110	400 x 200
280	650	1600	1800	1800	120	450 x 250
315	700	1800	1900	2000	130	500 x 280
355	600	2000	1500	1600	150	550 x 300
400	590	1200	1390	1540	350	Refer to LHP
450	Refer to LHP					

Electrical Features

Sr. No.	Features	Standard	Optional
1.	Supply voltage and frequency	415 ± 10% and 50 Hz ± 5% with combined variations of ± 10%	Voltage up to 690V AC and frequency from 5Hz to 120 Hz
2.	Winding and insulation class	Core material is of low loss magnetic silicon steel. Winding wound with polyester enameled copper wire and with F class insulating material and vacuum impregnated with class 155 (F) impregnating resins.	High grade steel and insulation class H can be given on request. And Epoxy Gel coat can be provided on winding.
3.	Rotor	Aluminum die cast rotor dynamically balanced with half key to have low vibration.	Copper brazed Rotors can be given on request.
4.	Starts	5 to 7 seconds for two consequent starts from cold condition.	Other requirement can be given on demand. Customer shall specify GD^2 of load speed, period of acceleration, speed torque curve of equipment and method of breaking.
5.	Duty	Continuous (S1)	Other duties S2 to S9 can be given on request
6.	Starting method	Up to 112 Frame - DOL Starting (3 Pin T. Block) From 132 & above Frame - Star Delta starting (6 pin T. Block) * However, motors above 112 Frame can be used for DOL starting by making suitable connection.	Up to 112 Frame - Start delta (6 pin T. Block)
7.	Earthing	Provided on frame and inside the terminal box	Can be given as per requirement.
8.	Overload	Withstood 160% of rated torque for 15 seconds.	Other requirement can be given on request.
9.	Service factor	1.0	Other service factor can be given on request
10.	Accessories	----	BTD, Thermistor/space heater, Thermotrip /Winding RTD'S can be given on request
11.	Overspeed	Designed to withstand 120% of rated torque speed	Other ranges can be offered on demand.
12.	Altitude	Designed for altitudes upto 1000 mtrs above MSL	Higher altitudes can also be offered on demand.

Permissible temperature rise :
Standard LHP motors are manufactured with class F insulation and temperature rise restricted to class B insulation.

Class of Insualtion	Max.permissible Temp. Limit °C	Max. Permissible Temp. rise for windings at Amb. Temp. in °C			
		40	45	50	60
B	130	80	75	70	60
F	155	105	100	95	85
H	180	125	120	115	105

Derating factors :
The rating of motor is reduced when ambt. temperature exceeds 50°C and/or the altitude of the site is more than 1000 meters above sea level.

Ambient temp. rise	% output of motor	Altitude above sea level meters	% output of motor
40°C	100%	1000	100%
45°C	100%	1500	95%
50°C	100%	2000	90%
55°C	85%	2500	84%
60°C	78%	3000	78%
65°C	70.5%	3500	75%
		4000	70%

Guidelines for Motors Protection fuse rating

The motors are to be provided with back up fuse protection of suitable ratings in addition to starters (D.O.L. or Star/Delta) being used to protect motors from overload and under voltage. The given below gives general guidelines for selection of fuse ratings.

Table No. - 08 Fuse Rating

D.O.L. Starting

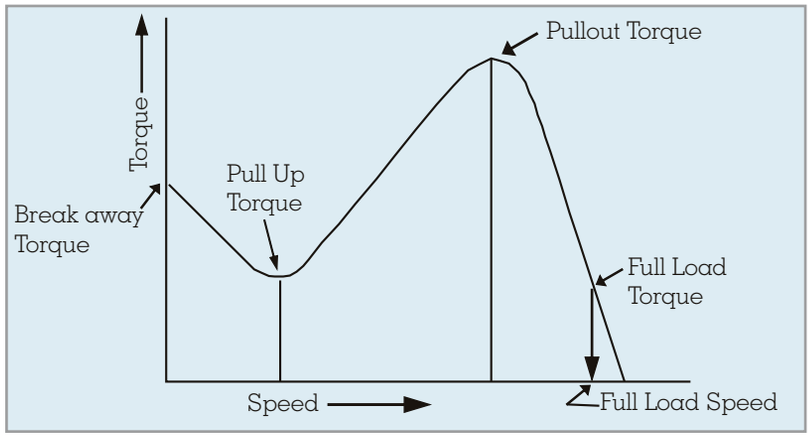
O/P Rating	KW	0.37	0.55	0.75	1.1	1.5	2.2	3.7	5.5	7.5	9.3	11	15	18.5	22	30	37	45	55	75	90
	HP	0.5	0.75	1	1.5	2	3	5	7.5	10	12.5	15	20	25	30	40	50	60	75	100	125
Average Value in AMPS		1	1.3	1.9	2.6	3.7	4.8	7.8	11.2	15	18	21	27	33	39	53	65	78	96	131	156
Fuse Rating		4	6	6	6	10	16	16	25	25	32/35	32/35	50	63	63	100	100	160	160	200	250
Bi-Metal Relay Range		0.5-1	1-2	1-2	1.5-3	2-4	3-6	6-12	6-12	10-16	18-24	18-24	16-32	24-45	24-45	32-63	50-90	50-90	70-110	90-135	140-170

Star-Delta Starting

O/P Rating	KW	2.2	3.7	5.5	7.5	9.3	11	15	18.5	22	30	37	45	55	75	90	110	132
	HP	3	5	7.5	10	12.5	15	20	25	30	40	50	60	75	100	125	150	180
Full Load Current																		
Line		4.8	7.8	11.2	15	18	21	27	33	39	53	65	78	96	131	156	185	220
Phase		2.8	4.5	6.5	9	11	12.7	16.8	20.2	23.2	30.6	37.5	46.4	54.5	74	88	107	127
Overload Relay		1.5-3	3-6	4-8	6-12	6-12	10-16	18-24	18.24	12.24	16-32	24-45	32-63	32.63	50-90	80-100	70-110	90-135
Range Fuse Rating		10	16	16	25	25	25	50	50	63	63	80	100	125	160	200	200	250

1. The abov eare recommended values for H.R.C. delayed action fuse for direct on line starting

Speed Torque Characteristics



If the voltage varies from its rated value within the permissible limits, the starting, pull-up and pull-out torques vary as the square of the voltage.

Starting time (Ta):

The time taken by the motor to achieve its rated speed with load connected. This Starting Time should be less than the Thermal Withstand Time of motor.

Calculation of Starting Time (Ta)

$$Ta = \frac{K \times \text{Total } GD^2}{\text{Output} \times (K1-K2)}$$

K = 24.66 for 2 pole motor
= 6.166 for 4 pole motor
= 2.74 for 6 pole motor
= 1.541 for 8 pole motor

Total GD^2 = Motor GD^2 + Load GD^2

Output in kW.

k1=starting torque/full load torque

k2=load torque x k3 / full load torque

k3=0.3 for fan & other centrifugal load
=1 for constant torque

Starting Time (Ta) varies inversely as square of voltage

TWT & tE Calculation for safe & hazardous area motors

Rate of temperature rise

$$= \frac{K \times Tstg \times kW\ Rating}{W \times S}$$

$$= \frac{0.75 \times 2 \times 75}{23.6 \times 0.893}$$

= 5.33812895 °C/Sec

Tstg = Starting Torque in PU of FLT
K = Constant
S = Specific heat of rotor conductor in Joules/kg/°C
W = Weight of rotor material in kg

Thermal withstand time (Hot)

$$= \frac{Max\ Allowable\ Rotor\ Temperature - Operating\ Temperature}{Rate\ of\ temp\ rise}$$

$$= \frac{200 - 110}{5.33812895} = 16.9\ Sec.$$

Committed values of thermal withstand time at rated voltage are

200	tE/T3<	17	Sec
300	tE/T2<	36	Sec
450	tE/T1<	64	Sec

TWT FOR STATOR

lstg x j x 0.0065 x 0.85

6.57 6.27 α b

αj^2b = 9.3756

Class = 200 For T3
210 tE/T3/T2/T1< 10 Sec

Ref. : IS/IEC 60079-7:2006

j = Starting current density in Amps /mm^2
α = Coefficient in $K/(A/mm^2)^2 * S$
b = 0.85 reduction factor which takes into account the heat dissipation from impregnated windings

What is VFD?

Background

Motors which are fed through VVVF drive supply are subjected to rapidly increasing voltage i.e.(high dv/dt). Due to coupling effect of the length of the supply cables coming from the drive, the peak voltage at the motor terminals can as high as 1170 V in case of 415V rates motors. i.e. (415x1.41x2=1170V) The rise of voltage is rapid and depends upon the switching frequencies of IGBT's. These are in the range of 100Hz to 16kHz. Due to the fast rise times of voltage, the voltage drop across 1st. coil from terminals is very high and it can be almost 90% of the total phase voltage.

Standard insulation scheme with "Special impregnation process" is suitable for VVVF drive application up to supply voltage of 500V.

In some application with VVVF drive where the supply voltage is greater than 500V, the winding has to be designed to withstand additional protection in insulation. This insulation system is called as "Special Insulation Scheme". However this execution is limited for voltage up to 690V only ,the peak voltage at the motor terminals can as high as 1900 V in case of 690V rates motors. i.e. (690x1.41x2=1900V)

What is a VFD?

A VFD is a variable frequency drive. It receives electrical energy from three phase or single phase ac supply. It converts the ac supply to a DC. Then through various switching techniques it inverts DC supply to a three phase variable frequency and variable voltage supply.

Load Characteristics

- When using a VFD-motor in an application it is necessary to know horsepower torque and speed characteristics of the load.
- Typically there are three types of loads
- constant torque: conveyor , cranes , positive displacement pump/fan/compressor are the example of constant torque application
- Variable torque: centrifugal pump , fan , blower, compressor are the example of variable torque application
- Constant HP: winders , unwinders , drilling machine & certain mixers are the example of variable torque application

*Advantages of application of VFD Motors

- Speed & Torque control: Stator winding of an induction motor develops a rotating magnetic field. The rotating field rotates at constant speed called synchronous speed given by 120x frequency / no.of poles This field induces currents in the rotor which produce torque and rotor speeds up close to synchronous speed. This field induces currents in the rotor which produce torque and rotor speeds up close to synchronous speed. As VFD changes frequency it changes synchronous speed, hence speed of the rotor
- Heavy load inertia starting (High GD^2) : Motor does not get heated up during starting. So there is no limit on number of starts and stops and also connected GD^2

What is VFD?

Load Characteristics

- High starting torque & low starting current requirement: The current setting of VFD is to be adjusted as per starting torque desired. For example if starting torque of 150% is desired the current setting is to be adjusted t0 150%.
- High efficiency at low speeds.
- High pf even at low speeds.
- Vfd motor replaces with advantage DC motors, and slip ring motors.

*Major Issues with VFD.

- It produces voltage spikes that may cause premature failure of windings.
- It produces harmonics that may spoil power quality.
- It produces a shaft current that erodes shafts and bearings.
- Motor heating at lower speeds of operation.

*How to overcome major issues with VFD ?

- To with stand voltage stresses insulation levels are improved by using dual coated enamel wires, by increasing thickness of insulation, by sealing electrical joints in the winding, by providing protective coating on overhang portion of winding.
- Harmonic effects are reduced by using suitable filters externally or inbuilt.
- Shaft currents are prevented by using insulated bearings in case of higher kW motors.
- If motor is run continuously at lower speeds and at rated torques either bigger frame is selected or independent cooling motor is provided.

Can Standard Motors be used on VFD?

- Yes, provided speed is not less than 60 % of rated speed or torque varies as square of speed as in case of fan loads. However, over all life of motor may get reduced to half.

Can Hazardous Area Motors be used on VFD?

- Yes, combined temperature rise test required on motor and VFD being used to determine temperature class of motor accordingly statutory approval to be obtained from customer to specify operation range & type of application.

Please refer LHP for such requirements.

Standard TEFC Motors

Foot Mounted (B3), 3 Phase Squirrel Cage Induction motors suitable for 415 V±10%, 50 Hz±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 50°C, Duty S1, LHP standard efficiency conforms to IS/IEC 60034-1.

Performance figures of Energy Efficient Sq. Cage Induction Motors - Two Pole

Rated Output		Frame Size	Rated Current Amps	Rated Speed RPM	Rated Torque kgm	Starting Current % of Rated Current	Starting Torque % of Rated Torque	Pull Out Torque % of Rated Torque	Efficiency %			Power Factor			Rotor GD^2 kgm^2	Approx. Net Weight kg AL/CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.18	0.25	63	0.58	2730	0.06	400	220	300	64.0	62.0	56.0	0.68	0.65	0.54	0.0009	6/10
0.25	0.33	63	0.70	2820	0.09	430	220	300	66.0	62.0	58.0	0.75	0.66	0.54	0.0009	6/10
0.25	0.33	71	0.65	2820	0.09	430	220	300	68.0	67.0	62.0	0.77	0.70	0.60	0.0015	8/14
0.37	0.5	71	0.95	2800	0.13	450	230	300	71.0	68.0	62.0	0.76	0.64	0.58	0.0015	8/14
0.55	0.75	71	1.31	2820	0.19	500	230	300	74.0	68.0	64.0	0.79	0.70	0.65	0.0021	8/14
0.75	1	80	1.65	2800	0.26	600	240	290	77.0	75.0	70.0	0.82	0.74	0.68	0.0036	12/18
1.1	1.5	80	2.40	2860	0.38	600	240	300	79.0	78.0	76.0	0.81	0.76	0.70	0.0036	12/18
1.5	2	90S	3.10	2860	0.51	600	240	300	80.0	79.0	76.0	0.84	0.81	0.75	0.0073	18/25
2.2	3	90L	4.40	2830	0.75	650	240	300	81.5	80.0	78.0	0.85	0.82	0.75	0.0089	18/25
3.7	5	100L	7.10	2880	1.25	600	220	300	84.5	83.0	78.0	0.85	0.81	0.74	0.022	27/38
5.5	7.5	112M	10.4	2900	1.85	650	220	280	86.0	85.0	82.0	0.86	0.82	0.78	0.028	40/50
5.5	7.5	132S	10.1	2900	1.84	650	200	250	86.0	86.0	83.0	0.89	0.85	0.78	0.052	55
7.5	10	132S	13.7	2900	2.52	650	200	250	87.0	87.0	85.0	0.88	0.84	0.76	0.068	58
9.3	12.5	132M	16.5	2920	3.13	650	210	280	88.0	87.0	84.0	0.89	0.85	0.79	0.08	65
11	15	160M	19.5	2920	3.67	650	200	280	89.0	88.0	86.0	0.88	0.87	0.82	0.17	82
15	20	160M	26.0	2940	4.97	650	200	280	89.5	89.0	87.5	0.90	0.88	0.85	0.22	105
18.5	25	160L	32.0	2930	6.15	650	200	280	90.0	90.0	88.0	0.89	0.87	0.84	0.28	125
22	30	180M	37.0	2940	7.29	650	230	300	91.0	90.0	88.0	0.91	0.88	0.82	0.42	184
30	40	200L	51.0	2930	9.97	650	220	300	91.5	91.5	90.0	0.90	0.88	0.86	0.64	240
37	50	200L	62.5	2955	12.2	650	250	300	92.5	92.0	90.0	0.89	0.88	0.86	0.75	270
45	60	225M	75.0	2950	14.9	650	200	250	92.5	92.0	90.0	0.90	0.88	0.86	0.91	295
55	75	250M	90.0	2960	18.1	650	210	270	93.3	92.7	91.0	0.91	0.90	0.86	1.80	595
75	100	280S	125	2970	24.6	650	190	270	93.6	93.3	92.0	0.89	0.86	0.77	6.63	725
90	120	280M	148	2970	29.5	650	190	270	94.0	93.5	91.5	0.90	0.86	0.78	8.18	775
110	150	315S	181	2980	35.95	650	180	270	94.0	94.0	93.0	0.90	0.87	0.77	11.55	1000
125	170	315M	205	2970	41.0	650	180	270	94.5	94.5	93.5	0.90	0.87	0.77	12.7	1150
132	180	315M	217	2970	43.3	650	180	270	94.5	94.5	93.0	0.90	0.87	0.78	13.9	1250
160	215	315L	258	2980	52.3	650	180	270	95.0	94.5	93.0	0.91	0.88	0.83	14.3	1400
180	240	315L	288	2980	58.8	650	180	270	95.0	94.5	93.0	0.92	0.90	0.88	16.0	1580
200	270	315L	322	2980	65.4	700	180	270	95.5	95.5	94.0	0.91	0.88	0.83	18.9	1650
250	335	355L	398	2982	81.7	700	160	280	95.5	95.0	94.0	0.92	0.89	0.84	23.4	2150
315	425	355L	502	2982	102.9	700	160	280	95.5	95.5	94.0	0.92	0.89	0.84	29.7	2150

Note

Applicable standard for testing IS:4029

Applicable standard for efficiency determination IS:4889

All performance figures are subject to as per IS/IEC 60034-1

Motors in frame 315 & above are suitable for 45°C ambient.

Vacuum pressure impregnation as a standard feature for every motor

LHP MOTORS DRIVES
Driven by Commitment

Standard TEFC Motors

Foot Mounted (B3), 3 Phase Squirrel Cage Induction motors suitable for 415 V±10%, 50 Hz±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 50°C, Duty S, LHP standard efficiency conforms to IS/IEC 60034-1.

Performance figures of Energy Efficient Sq. Cage Induction Motors - Four Pole

Rated Output		Frame Size	Rated Current Amps	Rated Speed RPM	Rated Torque kgm	Starting Current % of Rated Current	Starting Torque % of Rated Torque	Pull Out Torque % of Rated Torque	Efficiency %			Power Factor			Rotor GD^2 kgm^2	Approx. Net Weight kg AL/CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.12	0.16	63	0.40	1340	0.09	300	200	280	58.0	54.0	45.0	0.72	0.65	0.50	0.0014	6/10
0.18	0.25	63	0.58	1370	0.13	310	210	280	64.0	60.0	52.0	0.69	0.63	0.50	0.0014	4/10
0.25	0.33	71	0.70	1400	0.17	450	200	260	68.0	67.0	60.0	0.73	0.65	0.55	0.0034	8/14
0.37	0.5	71	1.05	1410	0.26	450	200	260	71.0	70.0	65.0	0.69	0.61	0.50	0.0034	8/14
0.55	0.75	80	1.40	1420	0.38	430	200	250	74.0	73.0	70.0	0.74	0.63	0.52	0.0077	8/14
0.75	1	80	1.75	1410	0.52	450	200	240	77.0	76.0	72.0	0.78	0.72	0.58	0.0086	10/16
1.1	1.5	90S	2.50	1410	0.76	550	200	260	78.0	74.0	73.0	0.79	0.71	0.58	0.014	17/24
1.5	2	90L	3.35	1410	1.04	550	200	250	79.0	78.0	75.0	0.79	0.73	0.60	0.015	18/25
2.2	3	100L	4.80	1430	1.50	590	200	250	82.0	81.0	79.0	0.78	0.72	0.60	0.029	35/47
3	4	100L	6.20	1420	2.06	550	200	250	82.5	82.0	80.0	0.82	0.78	0.70	0.038	35/57
3.7	5	112M	7.40	1430	2.52	580	200	250	85.0	85.0	83.0	0.82	0.80	0.65	0.057	40/66
5.5	7.5	132S	10.5	1450	3.69	600	200	260	86.0	85.0	83.0	0.85	0.80	0.67	0.093	62
7.5	10	132M	14.5	1450	5.04	600	200	250	87.0	86.0	84.0	0.83	0.77	0.65	0.12	75
9.3	12.5	160M	17.5	1450	6.25	600	200	250	88.0	88.0	87.0	0.84	0.79	0.70	0.17	105
11	15	160M	21.0	1450	7.39	500	200	250	89.0	89.0	86.0	0.82	0.80	0.74	0.20	125
15	20	160L	27.8	1465	9.97	600	220	270	90.0	90.0	88.0	0.84	0.82	0.76	0.26	152
18.5	25	180M	33.2	1465	12.3	600	250	270	91.1	91.1	90.0	0.85	0.82	0,72	0.66	175
22	30	180L	40.0	1465	14.6	600	250	270	91.8	91.5	90.0	0.83	0.82	0.78	0.84	210
30	40	200L	52.0	1465	19.9	600	250	270	92.0	92.0	90.0	0.87	0.85	0.78	1.19	247
37	50	225S	65.0	1465	24.6	600	230	280	92.5	92.5	91.3	0.86	0.84	0.78	1.46	255
45	60	225M	77.0	1470	29.8	600	200	250	93.0	93.0	91.0	0.88	0.85	0.80	1.71	310
55	75	250M	94.0	1475	36.3	600	200	250	93.5	93.5	92.0	0.87	0.85	0.80	3.20	625
75	100	280S	125	1480	49.4	600	200	250	94.0	94.0	92.5	0.89	0.88	0.83	7.21	720
90	120	280M	150	1480	59.2	600	190	240	94.5	94.5	92.6	0.88	0.83	0.81	8.25	775
110	150	315S	189	1485	72.1	600	190	240	94.5	94.5	92.0	0.86	0.83	0.78	11.6	1000
132	180	315M	220	1485	86.6	600	200	250	94.8	94.8	94.0	0.88	0.84	0.78	14.0	1225
160	215	315L	270	1490	104.6	600	200	250	95.3	95.2	94.0	0.87	0.82	0.76	27.9	1400
180	240	315L	302	1490	117.7	600	200	250	95.3	92.2	94.0	0.87	0.83	0.75	29.3	1650
200	270	315L	339	1490	130.7	600	200	250	95.5	95.5	94.0	0.86	0.82	0.74	30.7	1800
225	300	355L	378	1490	147.1	650	180	230	95.5	95.5	94.0	0.87	0.84	0.79	34.1	2000
250	335	355L	413	1490	163.4	650	160	230	95.6	95.6	94.5	0.88	0.86	0.80	38.1	2100
315	425	355L	520	1490	205.9	650	170	230	96.0	95.8	94.4	0.88	0.86	0.80	48.3	2150

Note

Applicable standard for testing IS:4029

Applicable standard for efficiency determination IS:4889

All performance figures are subject to as per IS/IEC 60034-1

Motors in frame 315 & above are suitable for 45°C ambient.

Vacuum pressure impregnation as a standard feature for every motor

LHP MOTORS DRIVES
Driven by Commitment

Standard TEFC Motors

Foot Mounted (B3), 3 Phase Squirrel Cage Induction motors suitable for 415 V±10%, 50 Hz±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 50°C, Duty S1, LHP standard efficiency conforms to IS/IEC 60034-1.

Performance figures of Energy Efficient Sq. Cage Induction Motors - Six Pole

Rated Output		Frame Size	Rated Current Amps	Rated Speed RPM	Rated Torque kgm	Starting Current % of Rated Current	Starting Torque % of Rated Torque	Pull Out Torque % of Rated Torque	Efficiency %			Power Factor			Rotor GD^2 kgm^2	Approx. Net Weight kg AL/CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.18	0.25	71	0.68	915	0.19	350	185	230	60.0	58.0	55.0	0.61	0.58	0.48	0.0044	7/10
0.25	0.33	71	0.90	920	0.26	300	190	240	61.0	59.0	52.0	0.63	0.50	0.40	0.0044	7/10
0.37	0.5	80	1.10	915	0.39	300	190	240	68.0	66.0	63.0	0.69	0.62	0.55	0.007	10/16
0.55	0.75	80	1.60	915	0.59	320	190	250	69.0	68.0	66.0	0.69	0.62	0.53	0.0093	12/18
0.75	1	90S	2.05	955	0.76	400	200	260	73.0	70.0	69.0	0.70	0.66	0.60	0.016	16/26
1.1	1.5	90L	2.85	940	1.14	400	200	260	76.0	76.0	74.0	0.71	0.65	0.58	0.02	25/35
1.5	2	100L	3.75	950	1.54	450	190	250	78.0	77.0	74.0	0.71	0.66	0.58	0.032	33/45
2.2	3	112M	5.20	945	2.27	400	190	250	80.0	80.0	75.0	0.74	0.70	0.62	0.072	35/47
3.7	5	132S	8.00	960	3.75	500	190	250	85.0	84.0	82.0	0.76	0.65	0.50	0.13	62
5.5	7.5	132M	11.5	960	5.58	600	200	250	85.0	84.0	81.0	0.78	0.72	0.68	0.17	75
7.5	10	160M	14.5	965	7.57	575	190	250	87.5	87.0	85.0	0.82	0.78	0.70	0.43	81
9.3	12.5	160L	18.0	970	9.34	600	200	250	87.5	87.0	85.0	0.82	0.80	0.72	0.58	135
11	15	160L	21.0	970	11.0	600	200	250	88.0	87.5	86.0	0.83	0.78	0.70	0.66	144
15	20	180L	28.0	965	15.1	600	210	260	90.0	90.0	88.0	0.83	0.80	0.70	1.03	187
18.5	25	200L	34.0	970	18.6	600	230	260	91.0	91.0	90.0	0.83	0.80	0.74	1.43	233
22	30	200L	40.0	970	22.1	600	220	270	91.3	91.3	89.0	0.84	0.82	0.72	1.57	245
30	40	225M	53.0	980	29.8	600	250	280	91.8	91.5	90.0	0.86	0.83	0.76	2.30	310
37	50	250M	66.0	980	36.8	600	190	240	92.5	92.5	91.0	0.84	0.80	0.74	3.60	625
45	60	280S	80.0	982	44.6	600	260	300	93.0	93.0	91.0	0.84	0.82	0.73	8.01	720
55	75	280M	97.0	982	54.6	600	260	300	93.5	93.0	92.0	0.84	0.81	0.73	9.89	805
75	100	315S	130	985	74.2	600	200	250	94.0	94.0	92.5	0.85	0.82	0.74	14.12	1000
90	120	315M	157	990	88.5	600	200	250	94.2	94.2	92.0	0.85	0.82	0.70	17.00	1180
110	150	315L	191	990	108.2	600	200	250	94.5	94.5	92.5	0.85	0.82	0.72	18.98	1300
132	180	315L	226	990	129.9	600	200	250	94.8	94.5	93.0	0.86	0.84	0.75	29.94	1400
200	270	355L	343	990	196.8	650	190	230	95.0	94.0	91.0	0.85	0.81	0.72	37.50	2150

Note

Applicable standard for testing IS:4029

Applicable standard for efficiency determination IS:4889

All performance figures are subject to as per IS/IEC 60034-1

Motors in frame 315 & above are suitable for 45°C ambient.

Vacuum pressure impregnation as a standard feature for every motor

Standard TEFC SC Motors

LHP MOTORS DRIVES
Driven by Commitment

Foot Mounted (B3), 3 Phase Squirrel Cage Induction motors suitable for 415 V±10%, 50 Hz±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 50°C, Duty S1, LHP standard efficiency conforms to IS/IEC 60034-1.

Performance figures of Energy Efficient Sq. Cage Induction Motors - Eight Pole

Rated Output		Frame Size	Rated Current Amps	Rated Speed RPM	Rated Torque kgm	Starting Current % of Rated Current	Starting Torque % of Rated Torque	Pull Out Torque % of Rated Torque	Efficiency %			Power Factor			Rotor GD^2 kgm^2	Approx. Net Weight kg AL/CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.18	0.25	80	0.90	675	0.26	200	180	240	55.0	48.0	44.0	0.51	0.50	0.45	0.0089	10/16
0.25	0.33	80	1.15	660	0.37	250	180	230	56.0	52.0	45.0	0.54	0.50	0.38	0.0089	10/16
0.37	0.5	90S	1.40	690	0.52	300	170	250	64.0	63.0	58.0	0.58	0.48	0.40	0.0158	18/26
0.55	0.75	90L	1.85	700	0.77	350	190	230	68.0	66.0	62.0	0.61	0.50	0.42	0.0196	0
0.75	1	100L	2.40	700	1.04	350	170	250	70.0	69.0	64.0	0.62	0.50	0.42	0.032	32/44
1.1	1.5	100L	3.30	705	1.52	350	190	230	74.0	72.5	70.0	0.63	0.50	0.40	0.042	37/50
1.5	2	112M	4.20	710	2.06	400	170	230	77.0	77.0	75.0	0.65	0.60	0.50	0.067	43/55
2.2	3	132S	5.50	710	3.02	450	180	230	78.0	78.0	76.0	0.71	0.64	0.50	0.12	75
3.7	5	132M	8.20	720	5.01	500	240	270	83.0	83.0	81.0	0.76	0.68	0.60	0.2	82
3.7	5	160M	8.20	720	5.01	500	190	230	82.0	82.0	80.0	0.77	0.72	0.62	0.37	85
5.5	7.5	160M	12.0	725	7.39	500	190	230	85.0	85.0	83.0	0.75	0.70	0.60	0.46	100
7.5	10	160L	16.0	725	10.1	500	200	240	85.0	85.0	83.0	0.77	0.72	0.65	0.57	125
9.3	12.5	180L	20.5	730	12.4	500	180	230	86.0	86.0	84.0	0.73	0.70	0.60	0.64	187
11	15	180L	23.0	730	14.7	600	190	240	87.0	87.0	85.0	0.77	0.72	0.62	1.29	200
15	20	200L	33.0	735	19.9	600	220	270	88.5	88.5	86.0	0.72	0.65	0.54	1.7	258
18.5	25	225S	37.0	730	24.7	500	220	270	89.0	89.0	87.0	0.78	0.76	0.70	2.3	345
22	30	225M	43.0	730	29.4	500	210	260	89.0	89.0	87.0	0.80	0.78	0.75	2.6	375
30	40	250M	58.0	735	39.8	600	200	260	91.0	90.5	88.5	0.79	0.70	0.60	4.4	465
37	50	280S	72.0	735	49.0	600	240	280	91.5	92.0	89.5	0.78	0.76	0.70	8.01	600
45	60	280M	91.0	730	60.0	600	210	240	92.0	92.0	90.5	0.75	0.71	0.63	9.89	720
55	75	315S	105	740	72.4	550	200	240	93.0	93.0	91.5	0.78	0.76	0.68	14.12	900
75	100	315M	142	742	98.5	550	160	210	93.5	93.5	92.0	0.79	0.77	0.70	18.98	950
90	120	315L	171	742	118	600	160	210	94.0	94.0	92.0	0.78	0.74	0.66	29.94	1130
110	150	315L	210	740	145	600	180	240	94.0	94.0	92.0	0.78	0.74	0.66	29.94	1130
132	180	315L	250	740	174	600	200	260	94.8	94.5	93.0	0.78	0.78	0.68	33.28	1130
200	270	355L	403	745	261	600	185	200	94.5	94.5	93.0	0.73	0.66	0.56	37.5	2150
160	215	355L	315	990	157	650	180	215	93.8	93.3	92.4	0.75	0.70	0.56	30.0	2100
200	270	355L	370	990	197	650	180	215	94.0	93.4	92.5	0.80	0.75	0.62	37.5	2625
250	335	355L	463	990	246	650	170	210	94.0	93.4	92.5	0.80	0.75	0.62	46.9	3285
315	425	355L	583	990	310	650	170	210	94.0	93.4	92.5	0.80	0.75	0.62	59.1	4135

Note

Applicable standard for testing IS:4029

Applicable standard for efficiency determination IS:4889

All performance figures are subject to as per IS/IEC 60034-1

Motors in frame 315 & above are suitable for 45°C ambient.

Vacuum pressure impregnation as a standard feature for every motor

LHP MOTORS DRIVES
Driven by Commitment

Standard TEFC SC Motors - IE1

Foot Mounted (B3), 3 Phase Squirrel Cage Induction motors suitable for 415 V±10%, 50 Hz±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 50°C, Duty S1, Efficiency IE1, conforms to IS:12615-2011/IEC 60034-30-2008.

Performance Table for 2 Pole Motors

Rated Output		Frame Size	Rated Current Amps	Rated Speed RPM	Rated Torque kgm	Starting Current % of Rated Current	Starting Torque % of Rated Torque	Pull Out Torque % of Rated Torque	Efficiency %			Power Factor			Rotor GD^2 kgm^2	Approx. Net Weight kg AL/CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.18	0.25	63	0.58	2730	0.06	400	240	310	64	62	56	0.68	0.65	0.54	0.0009	6/10
0.25	0.33	63	0.7	2820	0.09	430	220	300	66	62	58	0.75	0.66	0.54	0.0009	6/10
0.25	0.33	71	0.65	2820	0.09	430	220	320	68	67	62	0.77	0.70	0.60	0.0015	8/14
0.37	0.5	71	1.2	2790	0.13	600	245	285	66.1	65.6	64.1	0.65	0.58	0.50	0.0015	6.2/10
0.55	0.75	71	1.6	2790	0.19	600	220	290	69.1	68.5	65.5	0.69	0.60	0.53	0.0021	6.2/10
0.75	1	80	1.8	2850	0.26	600	280	295	72.1	71.6	70	0.80	0.75	0.64	0.0036	7.2/11
1.1	1.5	80	2.7	2850	0.38	600	280	285	75	74.5	73.2	0.75	0.72	0.61	0.0036	10.5/16
1.5	2	90S	3.4	2850	0.51	600	250	290	77.2	76.8	74.6	0.80	0.74	0.64	0.0073	13/21
2.2	3	90L	4.8	2860	0.75	650	260	290	79.7	79.1	76.3	0.80	0.75	0.62	0.0089	17/25
3.7	5	100L	7.2	2890	1.2	650	210	250	82.7	82	80.5	0.86	0.82	0.72	0.022	27/38
5.5	7.5	132S	11	2900	1.8	650	250	300	84.7	84	82.5	0.82	0.75	0.68	0.052	63
7.5	10	132S	14.5	2910	2.5	650	230	280	86	85.5	84	0.84	0.80	0.68	0.068	67
9.3	12.5	160M	18	2870	3.2	650	200	240	86.9	86.4	84.2	0.83	0.76	0.69	0.08	77
11	15	160M	21	2920	3.7	650	200	240	87.6	87	85	0.83	0.77	0.68	0.17	81
15	20	160M	28	2940	5	650	240	280	88.7	88.2	86.5	0.84	0.80	0.70	0.22	105
18.5	25	160L	33	2930	6.1	650	200	240	89.3	88.8	86.2	0.87	0.82	0.75	0.28	125
22	30	180M	39	2940	7.3	650	250	290	89.9	89.3	87.5	0.87	0.82	0.75	0.42	182
30	40	200L	54	2920	10	650	220	264	90.7	90	88.4	0.85	0.78	0.71	0.64	237
37	50	200L	64	2950	12.2	650	240	290	91.2	90.7	88.5	0.88	0.84	0.75	0.75	265
45	60	225M	80	2955	14.8	650	250	290	91.7	91.2	88.8	0.85	0.78	0.71	0.91	295
55	75	250M	95	2960	18.1	650	240	285	92.1	91.6	89.4	0.87	0.80	0.72	1.80	595
75	100	280S	130	2975	24.6	650	180	210	92.7	92.2	90	0.87	0.80	0.72	6.6	720
90	120	280M	150	2975	29.5	650	170	205	93	92.4	90.4	0.90	0.84	0.77	8.2	770
110	150	315S	185	2980	36	650	180	215	93.3	92.7	90.7	0.89	0.83	0.76	11.6	1100
125	170	315M	209	2980	40.9	650	185	220	93.4	93	90.8	0.89	0.83	0.76	12.7	1170
132	180	315M	220	2980	43.1	650	165	200	93.5	93.1	91	0.89	0.83	0.76	13.9	1250
160	215	315L	265	2980	52.3	650	180	200	93.8	93.4	91.4	0.90	0.84	0.77	14.3	1350
180	240	315L	300	2980	58.8	650	175	210	93.9	93.4	91.5	0.89	0.83	0.76	16	1395
200	270	315L	340	2983	65.3	650	175	210	94	93.5	91.7	0.87	0.80	0.72	18.9	1455
250	335	355L	425	2983	81.6	650	170	210	94	93.5	91.7	0.87	0.80	0.72	23.4	2605
315	425	355L	536	2983	102.9	650	170	210	94	93.5	91.7	0.87	0.80	0.72	29.7	2685

Note

Frames 63-112 are with aluminum body
Frames 132-355 are with CI body
Frames 63-112 can be offered with CI body at extra cost
Frames 63-80 are with terminal box on the Top
Frames 90-180 are with terminal box on RHS
Frames 200-355 are with terminal box on Top
All frames can be offered with terminal box on Top/LHS/RHS on request
For rating beyond 315kW refer to LHP sales office
Motors in frame 315 & above and 9.3 kW, 2 Pole in 132M frame are suitable for 45°C ambient.
Performance of all 8 pole motors & ratings below 0.37 kW shall be as per LHP catalogue, since these are not covered in IS 12615-2011.

Vacuum pressure impregnation as a standard feature for every motor

LHP MOTORS DRIVES
Driven by Commitment

Standard TEFC SC Motors - IE1

Foot Mounted (B3), 3 Phase Squirrel Cage Induction motors suitable for 415 V±10%, 50 Hz±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 50°C, Duty S1, Efficiency IE1, conforms to IS:12615-2011/IEC 60034-30-2008.

Performance Table for 4 Pole Motors

Rated Output		Frame Size	Rated Current Amps	Rated Speed RPM	Rated Torque kgm	Starting Current % of Rated Current	Starting Torque % of Rated Torque	Pull out Torque % of Rated Torque	Efficiency %			Power Factor			Rotor GD^2 kgm^2	Approx. Net Weight kg AL/CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.12	0.16	63	0.4	1340	0.09	300	200	280	58	50	45	0.72	0.65	0.50	0.0014	6/10
0.18	0.25	63	0.58	1370	0.13	310	210	280	64	60	52	0.69	0.63	0.50	0.0014	6/10
0.25	0.33	71	0.7	1400	0.17	450	200	260	68	67	60	0.73	0.65	0.55	0.0034	8/14
0.37	0.5	71	1.2	1410	0.26	550	270	290	65.1	64.5	63	0.66	0.60	0.50	0.0034	7.3/10
0.55	0.75	80	1.6	1410	0.38	550	200	240	69.1	68.5	67	0.69	0.62	0.54	0.0077	10/15
0.75	1	80	2	1395	0.52	550	220	270	72.1	71.5	70	0.72	0.67	0.55	0.0086	11/16
1.1	1.5	90S	2.7	1410	0.76	550	210	250	75	74.4	72.8	0.76	0.72	0.64	0.014	13/21
1.5	2	90L	3.6	1415	1	550	200	240	77.2	76.5	75	0.75	0.70	0.62	0.015	17/25
2.2	3	100L	5.1	1420	1.5	650	200	240	79.7	79.1	77.2	0.75	0.70	0.58	0.029	21/34
3	4	100L	6.8	1420	2.1	650	200	240	81.5	81	79.4	0.75	0.70	0.58	0.038	25/38
3.7	5	112M	7.8	1430	2.5	650	230	270	82.7	82	80.5	0.80	0.74	0.64	0.057	35/47
5.5	7.5	132S	11.4	1440	3.7	650	200	250	84.7	84.2	82.6	0.79	0.74	0.63	0.093	61
7.5	10	132M	15.4	1450	5	650	180	220	86	85.5	84	0.79	0.74	0.63	0.12	74
9.3	12.5	160M	19	1450	6.2	650	180	220	87	86.2	84.2	0.78	0.73	0.62	0.17	110
11	15	160M	22	1455	7.4	650	200	240	87.6	87	85.4	0.79	0.74	0.63	0.20	138
15	20	160L	30	1460	10	650	260	290	88.7	88.2	86.5	0.78	0.73	0.62	0.26	158
18.5	25	180M	35	1470	12.3	650	260	295	89.3	88.7	86.7	0.82	0.77	0.65	0.66	170
22	30	180L	41	1470	14.6	650	260	290	89.9	89.4	87.6	0.83	0.78	0.66	0.84	210
30	40	200L	54	1475	19.8	650	260	290	90.7	90.2	88	0.85	0.80	0.70	1.2	244
37	50	225S	67	1470	24.5	650	230	280	91.2	90.7	89.5	0.84	0.79	0.68	1.5	255
45	60	225M	84	1480	29.6	650	160	200	91.7	91	89.8	0.81	0.76	0.65	1.7	308
55	75	250M	98	1490	36	650	160	200	92.1	91.5	90.7	0.85	0.79	0.68	3.2	625
75	100	280S	134	1485	49.2	650	190	230	92.7	92	90.2	0.84	0.79	0.68	7.2	720
90	120	280M	164	1485	59	650	175	210	93	92.5	90.6	0.82	0.77	0.66	8.3	770
110	150	315S	204	1488	72	650	170	210	93.3	92.8	90.9	0.80	0.75	0.65	11.6	1150
125	170	315M	234	1488	81.8	650	170	210	93.4	92.9	91	0.80	0.73	0.65	12.6	1200
132	180	315M	245	1490	86.3	650	170	210	93.5	93	91.1	0.80	0.75	0.67	14	1225
160	215	315L	288	1490	104.6	650	170	210	93.8	93.3	92.4	0.82	0.77	0.67	27.9	1400
200	270	315L	348	1490	130.7	650	170	210	94	93.5	92.6	0.85	0.80	0.68	30.7	1510
250	335	355L	435	1490	163.4	650	170	210	94	93.5	92.6	0.85	0.80	0.68	38.1	2650
315	425	355L	548	1490	205.9	650	160	200	94	93.5	92.6	0.85	0.80	0.68	48.3	2700

Note

Frames 63-112 are with aluminum body
Frames 132-355 are with CI body
Frames 63-112 can be offered with CI body at extra cost
Frames 63-80 are with terminal box on the Top
Frames 90-180 are with terminal box on RHS
Frames 200-355 are with terminal box on Top
All frames can be offered with terminal box on Top/LHS/RHS on request
For rating beyond 315kW refer to LHP sales office
Motors in frame 315 & above and 9.3 kW, 2 Pole in 132M frame are suitable for 45°C ambient.
Performance of all 8 pole motors & ratings below 0.37 kW shall be as per LHP catalogue, since these are not covered in IS 12615-2011.

Vacuum pressure impregnation as a standard feature for every motor

LHP MOTORS DRIVES
Driven by Commitment

Standard TEFC SC Motors - IE1

Foot Mounted (B3), 3 Phase Squirrel Cage Induction motors suitable for 415 V±10%, 50 Hz±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 50°C, Duty S1, Efficiency IE1, conforms to IS:12615-2011/IEC 60034-30-2008.

Performance Table for 6 Pole Motors

Rated Output		Frame Size	Rated Current Amps	Rated Speed RPM	Rated Torque kgm	Starting Current % of Rated Current	Starting Torque % of Rated Torque	Pull out Torque % of Rated Torque	Efficiency %			Power Factor			Rotor GD^2 kgm^2	Approx. Net Weight kg Al/CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.12	0.16	71	0.48	890	0.13	350	190	240	58	55	50	0.60	0.57	0.46	0.0041	7/10
0.18	0.25	71	0.68	915	0.19	350	185	230	60	58	55	0.61	0.58	0.48	0.0044	7/10
0.25	0.33	71	0.9	920	0.26	300	190	240	61	59	52	0.63	0.50	0.40	0.0044	7/10
0.37	0.5	80	1.4	910	0.40	550	180	215	63	62.5	60.4	0.58	0.54	0.46	0.007	10/14
0.55	0.75	80	1.9	900	0.60	550	160	200	67	66.4	64.5	0.60	0.55	0.48	0.0093	11/16
0.75	1	90S	2.3	920	0.79	550	175	210	70	66.5	64.8	0.65	0.60	0.50	0.016	14/22
1.1	1.5	90L	3.2	940	1.1	550	200	240	72.9	72.3	70.4	0.66	0.61	0.51	0.02	19/27
1.5	2	100L	3.8	935	1.6	550	175	210	75.2	75	73.2	0.73	0.68	0.60	0.032	25/33
2.2	3	112M	5.5	955	2.2	650	170	205	77.7	77.2	75	0.72	0.67	0.55	0.072	37/49
3.7	5	132S	8.7	960	3.8	650	200	240	80.9	80.4	77.7	0.73	0.68	0.56	0.13	62
5.5	7.5	132M	12.7	970	5.5	650	210	205	83.1	82.5	80.4	0.73	0.68	0.56	0.17	75
7.5	10	160M	16.7	965	7.6	650	195	235	84.7	84.2	82.2	0.74	0.69	0.57	0.43	81
9.3	12.5	160L	19	975	9.3	650	200	240	85.6	85	83	0.80	0.75	0.64	0.58	134
11	15	160L	22	970	11	650	190	230	86.4	86	83.8	0.81	0.75	0.65	0.66	144
15	20	180L	29	970	15.1	650	220	260	87.7	87.2	85.2	0.82	0.76	0.67	1	187
18.5	25	200L	35	980	18.4	650	215	260	88.6	88.1	85.8	0.83	0.78	0.70	1.4	233
22	30	200L	44	975	22	650	210	250	89.2	88.5	86.2	0.78	0.73	0.61	1.6	245
30	40	225M	59	980	29.8	650	210	250	90.2	89.7	86.6	0.78	0.73	0.61	2.3	310
37	50	250M	72	980	36.8	650	210	250	90.8	90.3	87	0.79	0.74	0.62	3.6	625
45	60	280S	87	985	44.5	650	200	240	91.4	91	89.1	0.79	0.74	0.62	8	720
55	75	280M	107	985	54.4	650	200	240	91.9	91.2	89.7	0.78	0.73	0.61	9.9	805
75	100	315S	145	988	73.9	650	195	235	92.6	92.1	90	0.78	0.73	0.61	14.1	1000
90	120	315M	175	988	88.7	650	190	230	92.9	92.4	90.3	0.77	0.72	0.60	17	1180
110	150	315M	214	989	108.3	650	190	230	93.3	92.7	90.6	0.77	0.72	0.60	19	1290
125	170	315M	245	989	123.1	650	185	220	93.4	92.8	90.7	0.76	0.71	0.58	20	1400
132	180	315L	257	990	129.9	650	180	215	93.5	92.9	90.8	0.76	0.71	0.58	29.9	1420
160	215	355L	315	990	157.4	650	180	215	93.8	93.3	92.4	0.75	0.70	0.56	30	2100
200	270	355L	370	990	196.8	650	180	215	94	93.4	92.5	0.80	0.75	0.62	37.5	2625
250	335	355L	463	990	246	650	170	210	94	93.4	92.5	0.80	0.75	0.62	46.9	3285
315	425	355L	583	990	309.9	650	170	210	94	93.4	92.5	0.80	0.75	0.62	59.1	4135

Note

Frames 63-112 are with aluminum body
Frames 132-355 are with CI body
Frames 63-112 can be offered with CI body at extra cost
Frames 63-80 are with terminal box on the Top
Frames 90-180 are with terminal box on RHS
Frames 200-355 are with terminal box on Top
All frames can be offered with terminal box on Top/LHS/RHS on request
For rating beyond 315kW refer to LHP sales office
Motors in frame 315 & above and 9.3 kW, 2 Pole in 132M frame are suitable for 45°C ambient.
Performance of all 8 pole motors & ratings below 0.37 kW shall be as per LHP catalogue, since these are not covered in IS 12615-2011.

Vacuum pressure impregnation as a standard feature for every motor

High Efficiency TEFC SC Motors - IE2

Foot Mounted (B3), 3 Phase Squirrel Cage Induction motors suitable for 415 V±10%, 50 Hz±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 50°C, Duty S1, Efficiency IE2, conforms to IS:12615-2011/IEC 60034-30-2008.

Performance Table for 2 Pole Motors

Output		Frame	Rated Current Amps.	Rated Speed RPM	Rated Torque Kgm.	Starting Current % of Rtd Current	Starting Torque % of Rtd Torque	Pull out Torque % of Rtd Torque	Efficiency			Power Factor			Rotor GD^2 Kgm^2	Approx Net weight (Kg) AL/CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.37	0.5	71	0.95	2770	0.13	650	200	250	72.2	71.7	70.5	0.75	0.70	0.58	0.0015	7/11
0.55	0.75	71	1.27	2780	0.19	650	200	250	74.8	74	73.2	0.81	0.76	0.60	0.0021	8/12
0.75	1	80	1.75	2790	0.26	650	190	240	77.4	76.6	75	0.77	0.72	0.64	0.0036	11/17
1.1	1.5	80	2.5	2800	0.38	650	200	250	79.6	79	77.8	0.77	0.71	0.63	0.0036	11/17
1.5	2	90S	3.3	2875	0.51	650	230	280	81.3	80.8	78.6	0.78	0.74	0.67	0.0073	15/24
2.2	3	90L	4.4	2885	0.74	700	230	280	83.2	82.6	80.6	0.84	0.80	0.65	0.0089	19/28
3.7	5	100L	7.0	2905	1.2	700	250	295	85.5	85	83	0.86	0.80	0.72	0.022	30/43
5.5	7.5	132S	10.2	2910	1.8	700	170	210	87	86.7	85	0.86	0.82	0.68	0.052	69
7.5	10	132S	13.5	2930	2.5	700	170	220	88.1	87.3	85.5	0.88	0.82	0.74	0.068	76
9.3	12.5	160M	16.6	2935	3.1	700	190	240	88.9	88.2	86.2	0.88	0.83	0.75	0.08	86
11	15	160M	19	2940	3.6	700	230	280	89.4	88.8	87	0.90	0.85	0.76	0.17	131
15	20	160M	25.5	2940	5	700	170	220	90.3	89.8	88.2	0.91	0.86	0.76	0.22	150
18.5	25	160L	32	2940	6.1	700	210	260	90.9	90.5	88.5	0.88	0.84	0.73	0.28	157
22	30	180M	37	2940	7.3	700	245	290	91.3	91	89	0.91	0.86	0.76	0.42	191
30	40	200L	51	2950	9.9	700	240	295	92	91.6	90	0.89	0.84	0.74	0.64	281
37	50	200L	62	2955	12.2	700	250	290	92.5	92	90.2	0.90	0.85	0.75	0.75	308
45	60	225M	75	2960	14.8	700	220	270	92.9	92.3	90.7	0.90	0.86	0.77	0.91	416
55	75	250M	91	2965	18.1	700	170	220	93.2	92.6	91	0.90	0.86	0.76	1.8	654
75	100	280S	126	2965	24.6	700	180	230	93.8	93	91.3	0.88	0.81	0.70	6.63	773
90	120	280M	148	2970	29.5	700	180	230	94.1	93.5	91.6	0.90	0.85	0.76	8.18	815
110	150	315S	183	2980	36	700	180	230	94.3	93.9	92	0.89	0.85	0.76	11.55	1210
125	170	315M	208	2980	40.9	700	180	230	94.5	94	92.2	0.88	0.82	0.68	12.7	1287
132	180	315M	218	2980	43.1	700	190	230	94.6	94.1	92.4	0.89	0.84	0.70	13.89	1375
160	215	315L	263	2980	52.3	700	180	230	94.8	94.4	92.6	0.89	0.84	0.72	14.3	1485
180	240	315L	296	2980	58.8	700	180	230	94.9	94.5	92.7	0.89	0.83	0.73	15.96	1534
200	270	315L	325	2980	65.4	700	180	230	95	94.5	92.7	0.90	0.84	0.76	18.87	1640
250	335	355L	410	2982	81.7	700	170	220	95	94.5	92.7	0.89	0.84	0.75	23.40	2865
315	425	355L	517	2982	102.9	700	170	220	95	94.6	92.8	0.89	0.84	0.75	29.70	2953

Note

Frames 63-112 are with aluminum body

Frames 132-355 are with CI body

Frames 63-112 can be offered with CI body at extra cost

Frames 63-80 are with terminal box on the Top

Frames 90-180 are with terminal box on RHS

Frames 200-355 are with terminal box on Top

All frames can be offered with terminal box on Top/LHS/RHS on request

For rating beyond 315kW refer to LHP sales office

Motors in frame 315 & above and 9.3 kW, 2 Pole in 132M frame are suitable for 45°C ambient.

Performance of all 8 pole motors & ratings below 0.37 kW shall be as per LHP catalogue, since these are not covered in IS 12615-2011.

Vacuum pressure impregnation as a standard feature for every motor

High Efficiency TEFC SC Motors - IE2

Foot Mounted (B3), 3 Phase Squirrel Cage Induction motors suitable for 415 V±10%, 50 Hz±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 50°C, Duty S1, Efficiency IE2, conforms to IS:12615-2011/IEC 60034-30-2008.

Performance Table for 4 Pole Motors

Output		Frame	Rated Current Amps.	Rated Speed RPM	Rated Torque Kgm.	Starting Current % of Rtd Current	Starting Torque % of Rtd Torque	Peak Torque % of Rtd Torque	Efficiency			Power Factor			Rotor GD^2 Kgm^2	Approx Net weight (Kg) AL/CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.37	0.50	71	1	1400	0.26	600	250	290	70.1	69.5	65	0.73	0.70	0.62	0.0034	8/11
0.55	0.75	80	1.4	1400	0.38	600	240	290	75.1	74.7	72	0.73	0.68	0.60	0.0077	11/17
0.75	1	80	1.8	1410	0.52	600	240	280	79.6	79.2	75.8	0.73	0.68	0.60	0.0086	12/18
1.1	1.5	90S	2.4	1420	0.75	600	250	290	81.4	81	78.5	0.78	0.73	0.62	0.014	14/24
1.5	2	90L	3.2	1430	1.02	600	250	295	82.8	82.3	79.5	0.79	0.74	0.62	0.015	18/28
2.2	3	100L	5	1430	1.50	700	250	290	84.3	84	81.5	0.73	0.68	0.60	0.03	23/37
3	4	100L	6.3	1430	2.04	700	240	290	85.5	85	82.4	0.77	0.70	0.60	0.04	27/42
3.7	5	112M	7.6	1445	2.49	700	250	290	86.3	85.5	82.4	0.78	0.72	0.61	0.06	38/52
5.5	7.5	132S	10.5	1450	3.69	700	190	240	87.7	87.1	84.8	0.83	0.79	0.71	0.09	71
7.5	10	132M	14.5	1450	5.04	700	210	260	88.7	88.2	86.3	0.81	0.77	0.62	0.12	84
9.3	12.5	160M	17	1455	6.23	700	220	270	89.3	89	87.2	0.85	0.81	0.73	0.17	119
11	15	160M	20	1460	7.34	700	220	270	89.8	89.4	87.6	0.85	0.81	0.72	0.20	140
15	20	160L	27	1460	10.01	700	200	240	90.6	90.1	88.2	0.85	0.81	0.72	0.26	160
18.5	25	180M	33	1460	12.34	700	200	250	91.2	90.8	89.2	0.86	0.82	0.74	0.66	190
22	30	180L	40	1460	14.68	700	250	295	91.6	91.2	89.6	0.84	0.80	0.71	0.84	231
30	40	200L	52	1465	19.95	700	170	220	92.3	92	90.4	0.87	0.83	0.70	1.19	268
37	50	225S	65	1475	24.43	700	190	240	92.7	92.3	90.7	0.85	0.81	0.73	1.46	290
45	60	225M	76	1480	29.61	700	220	270	93.1	92.6	91	0.88	0.84	0.76	1.71	368
55	75	250M	95	1480	36.20	700	180	220	93.5	93	91.2	0.86	0.82	0.72	3.20	687
75	100	280S	132	1480	49.36	700	190	230	94	93.5	92	0.84	0.80	0.71	7.21	765
90	120	280M	157	1480	59.23	700	200	250	94.2	93.8	92.4	0.85	0.80	0.72	8.25	824
110	150	315S	190	1490	71.91	700	220	270	94.5	94	92.5	0.85	0.81	0.72	11.62	1265
125	170	315M	210	1485	81.99	700	200	240	94.6	94.2	92.6	0.88	0.82	0.74	12.60	1320
132	180	315M	220	1485	86.58	700	200	240	94.7	94.2	92.7	0.88	0.80	0.72	13.98	1347
160	215	315L	271	1485	104.94	700	180	230	94.9	94.5	92.8	0.87	0.83	0.71	27.88	1540
200	270	315L	343	1485	131.18	700	180	230	95.1	94.6	93	0.85	0.82	0.76	30.74	1650
250	335	355L	430	1488	163.64	700	180	230	95.1	94.6	93	0.85	0.81	0.75	38.10	2915
315	425	355L	540	1488	206.19	700	180	220	95.1	94.6	93	0.85	0.80	0.74	48.30	3673

Note

Frames 63-112 are with aluminum body

Frames 132-355 are with CI body

Frames 63-112 can be offered with CI body at extra cost

Frames 63-80 are with terminal box on the Top

Frames 90-180 are with terminal box on RHS

Frames 200-355 are with terminal box on Top

All frames can be offered with terminal box on Top/LHS/RHS on request

For rating beyond 315kW refer to LHP sales office

Motors in frame 315 & above and 9.3 kW, 2 Pole in 132M frame are suitable for 45°C ambient.

Performance of all 8 pole motors & ratings below 0.37 kW shall be as per LHP catalogue, since these are not covered in IS 12615-2011.

Vacuum pressure impregnation as a standard feature for every motor

High Efficiency TEFC SC Motors - IE2

Foot Mounted (B3), 3 Phase Squirrel Cage Induction motors suitable for 415 V±10%, 50 Hz±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 50°C, Duty S1, Efficiency IE2, conforms to IS:12615-2011/IEC 60034-30-2008.

Performance Table for 6 Pole Motors

Output		Frame	Rated Current Amps.	Rated Speed RPM	Rated Torque Kgm.	Starting Current % of Rtd Current	Starting Torque % of Rtd Torque	Peak Torque % of Rtd Torque	Efficiency			Power Factor			Rotor GD^2 Kgm^2	Approx Net weight (Kg) AL/CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.37	0.5	80	1.2	900	0.40	600	220	260	69	68.5	66.5	0.62	0.55	0.42	0.007	11/15
0.55	0.75	80	1.5	900	0.60	600	200	250	72.9	72.4	70	0.70	0.66	0.54	0.009	13/18
0.75	1	90S	2.2	910	0.80	600	200	250	75.9	75.4	72.5	0.62	0.57	0.45	0.016	16/18
1.1	1.5	90L	3	910	1.2	600	200	250	78.1	77.5	75	0.65	0.60	0.50	0.020	20/28
1.5	2	100L	3.7	915	1.6	600	180	230	79.8	79.3	77.2	0.71	0.66	0.53	0.032	21/38
2.2	3	112M	5.3	940	2.3	700	180	230	81.8	81.4	78.5	0.71	0.66	0.55	0.072	40/52
3.7	5	132S	8.4	950	3.8	700	190	240	84.3	83.8	80.6	0.73	0.68	0.57	0.1	75
5.5	7.5	132M	12.5	960	5.6	700	190	240	86	85.4	82.6	0.71	0.65	0.54	0.2	80
7.5	10	160M	15.5	965	7.6	700	180	230	87.2	86.7	83.5	0.77	0.71	0.60	0.4	121
9.3	12.5	160L	17.7	965	9.4	700	180	230	88	87.5	84.8	0.83	0.78	0.65	0.6	146
11	15	160L	21.6	970	11	700	180	230	88.7	88.2	85.3	0.80	0.76	0.64	0.7	158
15	20	180L	30	970	15.1	700	170	220	89.7	89	86	0.78	0.73	0.62	1	210
18.5	25	200L	36	970	18.6	700	170	220	90.4	90	87.6	0.79	0.75	0.63	1.4	276
22	30	200L	43	975	22	700	185	230	90.9	90.4	88	0.79	0.75	0.63	1.6	280
30	40	225M	54	980	29.8	700	220	260	91.7	91	88.5	0.84	0.80	0.68	2.3	409
37	50	250M	67	980	36.8	700	200	240	92.2	91.6	88.7	0.83	0.77	0.65	3.6	688
45	60	280S	82	985	44.5	700	200	240	92.7	92	89.2	0.82	0.75	0.61	8	792
55	75	280M	98	985	54.4	700	200	240	93.1	92.5	90	0.84	0.77	0.65	9.9	886
75	100	315S	136	988	73.9	700	210	250	93.7	93	91.4	0.82	0.78	0.66	14.1	1084
90	120	315M	161	988	88.7	700	210	250	94	93.4	91.7	0.83	0.77	0.65	17	1252
110	150	315M	195	988	108.4	700	210	250	94.3	93.7	91.8	0.83	0.77	0.61	19	1315
125	170	315M	220	990	123	700	210	250	94.4	94	92.4	0.84	0.78	0.67	21.6	1540
132	180	315L	235	990	129.9	700	210	250	94.6	94.1	92.7	0.83	0.77	0.65	29.9	1560
160	215	355L	295	990	157.4	700	210	250	94.8	94.3	90	0.80	0.74	0.60	36.2	2310
200	270	355L	358	990	196.8	700	210	250	95	94.5	91.1	0.82	0.80	0.68	37.5	2888
250	335	355L	450	992	245.5	700	200	250	95	94.5	91.1	0.81	0.76	0.66	47	3613

Note

Frames 63-112 are with aluminum body

Frames 132-355 are with CI body

Frames 63-112 can be offered with CI body at extra cost

Frames 63-80 are with terminal box on the Top

Frames 90-180 are with terminal box on RHS

Frames 200-355 are with terminal box on Top

All frames can be offered with terminal box on Top/LHS/RHS on request

For rating beyond 315kW refer to LHP sales office

Motors in frame 315 & above and 9.3 kW, 2 Pole in 132M frame are suitable for 45°C ambient.

Performance of all 8 pole motors & ratings below 0.37 kW shall be as per LHP catalogue, since these are not covered in IS 12615-2011.

Vacuum pressure impregnation as a standard feature for every motor

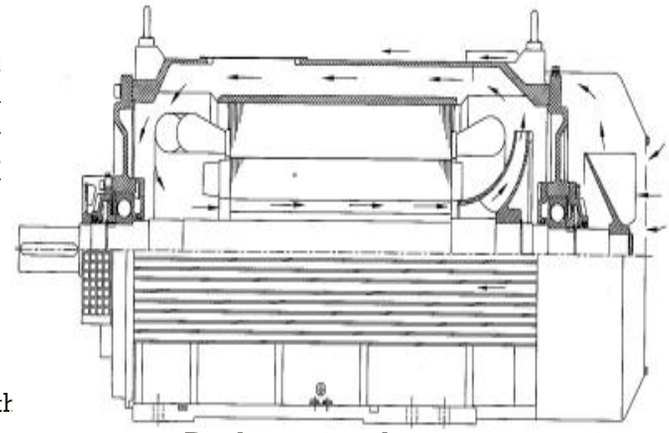
LHP MOTORS DRIVES
Driven by Commitment

High Efficiency TEFC SC Large Motors(with DCCA) - IE2

Foot Mounted (B3), 3 Phase Squirrel Cage Induction motors suitable for 415 V±10% (upto 630kW),690 V±10% (710kW & above), 50 Hz±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B & F, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 50°C, Duty S1, Efficiency IE2, conforms to IS:12615-2011/IEC 60034-30-2008.

Technology :
DCCA is a combination of TEFC & CACA(Closed Air-Circulated Air) ventilation system in the large Induction motors. Here both internal as well as external circuits fluid media are Air. To control temperature rise with in the specified limit of class B/90K/F, this ventilation system is very useful, for large rating of 415V/690V upto 1200kW.

Applications: Conveyers, Mill, Compressor, Fan etc.



Dual circuit cooling arrangement

The advantages of this technology are:
- Lower temperature rise of the winding
- Reduced temperature gradient between DE and NDE sides of th
- Enchanced insulation life
- Increased motor reliability
- Reduced in motor size and as a result,higher outputs can be drawn From the same motor.

Voltage : 415V ±10% (up to 630kW) , 690V±10% (710 kW & above)
Frequency : 50Hz ±5%
Ambient : 50°C CV: ±10%
Duty : S1
Ins. Class : F or H
Temp. Rise : B /F

2 Pole - up to 630 kW
4 Pole – up to 1000 kW
6 Pole - up to 800 kW
8 Pole – up to 630 kW

Performance Table for 2 Pole/3000 RPM Motors

Rated Output		Frame size IEC	LHP Type Ref.B3 Construction	Operating characteristics at rated output									With DOL Starting		Pullout Torque to Rated Torque Ratio	Rotor GD^2 Kgm^2	Net Weight B3 Construction kg.
kW	HP			Speed RPM	Current Amps.	Rated Torque Kg.m	Power Factor			% Efficiency			Starting Current to Rated Current Raio	Starting Torque to Rated Torque Ratio			
							FL	3/4L	1/2L	FL	3/4L	1/2L					
355	475	355L/K	L235K2WC3	2980	580	116	0.89	0.87	0.82	95.6	94.6	93.1	6.5	1.7	2.5	23.30	2040
400	536	355L/K	L235K2DD3	2980	653	131	0.89	0.87	0.82	95.7	94.7	93.2	6.5	1.7	2.5	26.00	2160
450	603	355L/K	L235K2LD3	2981	727	147	0.90	0.88	0.83	95.7	94.7	93.2	6.5	1.7	2.5	28.60	2280
475	636	355L/K	L235K2HE3	2982	766	155	0.90	0.88	0.83	95.8	94.8	93.3	6.5	1.8	2.5	31.30	2380
500	670	355L/K	L235K2UD3	2982	807	163	0.90	0.88	0.83	95.8	94.8	93.3	6.5	1.8	2.5	31.30	2380
560	750	400L	L240L2SD3	2985	923	183	0.88	0.85	0.79	95.9	94.9	93.4	7.0	1.7	2.5	51.30	2880
*630	845	400L	L240L2YD3	2985	1037	206	0.88	0.85	0.79	96.0	95.0	93.5	7.0	1.7	2.5	57.30	3260

Performance Table for 4 Pole/1500 RPM Motors

Rated Output		Frame size IEC	LHP Type Ref.B3 Construction	Operating characteristics at rated output									With DOL Starting		Pullout Torque to Rated Torque Ratio	Rotor GD^2 Kgm^2	Net Weight B3 Construction kg.
kW	HP			Speed RPM	Current Amps.	Rated Torque Kg.m	Power Factor			% Efficiency			Starting Current to Rated Current Raio	Starting Torque to Rated Torque Ratio			
							FL	3/4L	1/2L	FL	3/4L	1/2L					
400	536	355L/K	L235K4ED3	1488	677	262	0.86	0.83	0.73	95.6	94.6	93.1	6.5	2.1	2.5	30.60	2160
450	603	355L/K	L235K4MD3	1488	761	295	0.86	0.83	0.73	95.6	94.6	93.1	6.5	2.1	2.5	33.70	2270
500	670	355L/K	L235K4VD3	1488	835	327	0.87	0.84	0.74	95.7	94.7	93.2	6.5	2.1	2.4	36.80	2380
560	750	400L	L240L4SD3	1492	925	366	0.88	0.85	0.78	95.7	94.7	93.2	6.8	2.0	2.5	63.00	2810
630	845	400L	L240L4YD3	1492	1041	411	0.88	0.85	0.78	95.7	94.7	93.2	6.8	2.0	2.5	70.50	3000
*710	952	400L	L240L4YD3	1492	705	463	0.88	0.85	0.78	95.7	94.7	93.2	6.8	2.0	2.5	70.50	3000
800	1072	450M	L245M4AE3	1492	795	522	0.88	0.84	0.76	95.7	94.7	93.2	6.8	2.1	2.5	120.0	4300
900	1206	450M	L245M4CE3	1492	894	588	0.88	0.84	0.76	95.7	94.7	93.2	6.8	2.1	2.5	132.0	4500
1000	1340	450L	L245L4GE3	1492	994	653	0.88	0.84	0.76	95.7	94.7	93.2	6.8	2.1	2.5	160.0	5650

High Efficiency TEFC SC Large Motors(with DCCA) - IE2

Foot Mounted (B3), 3 Phase Squirrel Cage Induction motors suitable for 415 V±10% (upto 630kW),690 V±10% (710kW & above), 50 Hz±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B & F, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 50°C, Duty S1, Efficiency IE2, conforms to IS:12615-2011/IEC 60034-30-2008.

Performance Table for 6 Pole/1000 RPM Motors

Rated Output		Frame size IEC	LHP Type Ref.B3 Construction	Operating characteristics at rated output									With DOL Starting		Pullout Torque to Rated Torque Ratio	Rotor GD^2 Kgm^2	Net Weight B3 Construction kg.
kW	HP			Speed RPM	Current Amps.	Rated Torque Kg.m	Power Factor			% Efficiency			Starting Current to Rated Current Raio	Starting Torque to Rated Torque Ratio			
							FL	3/4L	1/2L	FL	3/4L	1/2L					
315	422	355L/K	L235K6HD3	992	547	309	0.84	0.80	0.70	95.3	94.3	92.8	6.5	2.0	2.5	56.90	1980
355	475	355L/K	L235K6TD3	992	617	349	0.84	0.80	0.70	95.3	94.3	92.8	6.5	2.0	2.5	66.00	2280
400	536	355L/K	L235K6YD3	992	694	393	0.84	0.80	0.70	95.4	94.4	92.9	6.5	2.0	2.5	69.70	2410
450	603	400L	L240L6VD3	991	772	442	0.85	0.80	0.70	95.4	94.4	92.9	6.5	1.9	2.5	77.00	2810
500	670	400L	L240L6ZD3	991	858	491	0.85	0.80	0.70	95.4	94.4	92.9	6.5	1.9	2.5	86.00	3000
*560	750	400L	L240L6ZD3	991	961	550	0.85	0.80	0.70	95.4	94.4	92.9	6.5	1.9	2.5	86.00	3000
630	845	450M	L245M6IE3	992	1094	619	0.84	0.79	0.70	95.4	94.4	92.9	6.5	1.9	2.5	180.0	4300
710	952	450M	L245M6CE3	992	741	697	0.84	0.79	0.70	95.4	94.4	92.9	6.5	1.9	2.5	200.0	4400
800	1072	450L	L245M6GE3	993	835	785	0.84	0.79	0.70	95.4	94.4	92.9	6.5	1.9	2.5	236.0	5600

Performance Table for 8 Pole/750 RPM Motors

Rated Output		Frame size IEC	LHP Type Ref.B3 Construction	Operating characteristics at rated output									With DOL Starting		Pullout Torque to Rated Torque Ratio	Rotor GD^2 Kgm^2	Net Weight B3 Construction kg.
kW	HP			Speed RPM	Current Amps.	Rated Torque Kg.m	Power Factor			% Efficiency			Starting Current to Rated Current Raio	Starting Torque to Rated Torque Ratio			
							FL	3/4L	1/2L	FL	3/4L	1/2L					
**250	335	355L/K	L235K8QD3	741	457	329	0.80	0.75	0.68	94.0	93.0	91.5	6.1	1.8	2.2	66.00	2280
315	422	355L/K	L235K8YD3	741	574	414	0.80	0.75	0.68	94.6	93.6	92.1	6.1	1.8	2.2	69.70	2410
355	475	400L	L240L8LD3	740	660	467	0.78	0.74	0.68	95.0	94.0	92.5	5.5	1.8	2.2	77.00	2810
400	536	400L	L240L8AE3	740	743	526	0.78	0.74	0.68	95.4	94.4	92.9	5.5	1.8	2.2	86.00	3000
*450	603	400L	L240L8AE3	740	835	592	0.78	0.74	0.68	95.8	94.8	93.3	5.5	1.8	2.2	86.00	3000
500	670	450M	L245M8IE3	742	929	656	0.78	0.76	0.70	96.1	95.1	93.6	6.5	1.8	2.5	180.0	4300
560	750	450M	L245M8CE3	742	1039	735	0.78	0.76	0.70	96.5	95.5	94.0	6.5	1.8	2.5	200.0	4400
630	845	450L	L245M8FE3	742	1168	827	0.78	0.76	0.70	97.0	96.0	94.5	6.5	1.8	2.5	236.0	5600

Note

Efficiency class 'IE2' will be punched on the nameplates as per IEC: 60034-30-1 for ratings upto 1000 kW for 2,4,6, Pole.

All performance values are subjected to tolerance as per IS:325 / IEC 60034-1.

Higher ratings can be offered on request in 4,6, and 8 polarity.

*Temperature rise limited to class F.

**Temperature rise limited to 90°C

Premium Efficiency "Supremo Series" TEFC Motors - IE3

LHP MOTORS DRIVES
Driven by Commitment

Performance Table for 2 Pole Motors

Foot Mounted (B3), 3 Phase Squirrel Cage Induction motors suitable for 415 V±10%, 50 Hz±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 50°C, Duty S1, Efficiency IE3, conforms to IS:12615-2011/IEC 60034-30-2008.

Output		Frame	Rated Current Amps.	Rated Speed RPM	Rated Torque Kgm.	Starting Current % of Rtd Current	Starting Torque % of Rtd Torque	Peak Torque % of Rtd Torque	Efficiency			Power Factor			Rotor GD^2 Kgm sq	Approx Net weight (Kg) CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.37	0.5	71	0.90	2850	0.13	700	200	250	75.5	75	72	0.76	0.70	0.62	0.0015	★ ★
0.55	0.75	71	1.25	2770	0.19	700	270	295	78.1	77.6	75	0.78	0.74	0.65	0.0021	★ ★
0.75	1	80	1.5	2885	0.25	700	200	250	80.7	79.5	76	0.86	0.82	0.70	0.0036	★ ★
1.1	1.5	80	2	2900	0.37	700	225	275	82.7	81.5	75.8	0.93	0.77	0.65	0.0036	★ ★
1.5	2	90S	3	2900	0.50	700	250	290	84.2	83	80.3	0.83	0.80	0.68	0.0073	★ ★
2.2	3	90L	4.1	2905	0.74	770	275	295	85.9	84.5	82.2	0.87	0.80	0.70	0.0089	★ ★
3	4	100L	5.5	2930	1	770	280	295	87	86.5	84	0.87	0.82	0.70	0.022	★ ★
3.7	5	100L	7	2910	1.24	770	250	290	87.8	86.7	84.5	0.84	0.82	0.71	0.022	★ ★
5.5	7.5	132S	10	2930	1.83	770	150	200	89.2	88.5	86	0.88	0.82	0.70	0.052	★ ★
7.5	10	132S	13	2930	2.49	770	250	290	90.1	89.1	87.2	0.88	0.82	0.70	0.068	★ ★
9.3	12.5	160M	16	2930	3.09	770	215	280	90.8	90.1	87.6	0.89	0.83	0.71	0.08	★ ★
11	15	160M	18	2945	3.64	770	250	290	91.2	90.5	88	0.92	0.86	0.75	0.17	★ ★
15	20	160M	25	2940	4.97	770	250	295	91.9	91.2	89.5	0.89	0.84	0.80	0.22	★ ★
18.5	25	160L	31	2930	6.15	770	250	290	92.4	91.7	89.9	0.90	0.84	0.79	0.28	★ ★
22	30	180M	36	2945	7.28	770	175	225	92.7	92	90.3	0.91	0.86	0.76	0.42	★ ★
30	40	200L	49	2950	9.91	770	250	280	93.3	92.6	91.5	0.91	0.86	0.76	0.64	★ ★
45	60	225M	73	2965	14.78	770	220	250	94	93.2	92.3	0.91	0.85	0.78	0.91	★ ★
55	75	250M	85	2970	18.04	770	200	240	94.3	93.6	92.7	0.95	0.90	0.78	1.80	★ ★
75	100	280S	121	2975	24.55	770	195	255	94.7	94	93.2	0.91	0.82	0.77	6.63	★ ★
90	120	280M	144	2975	29.47	770	190	240	95	94.3	93.3	0.92	0.84	0.78	8.18	★ ★
110	150	315S	172	2980	35.95	770	195	250	95.2	94.5	93.8	0.93	0.85	0.79	11.55	★ ★
125	170	315M	190	2980	40.86	770	190	245	95.3	94.7	94	0.96	0.90	0.78	12.70	★ ★
132	180	315M	205	2980	43.14	770	180	235	95.4	94.9	94.1	0.94	0.90	0.78	13.89	★ ★
160	215	315L	250	2985	52.21	770	185	240	95.6	95	94.3	0.93	0.87	0.80	14.30	★ ★
180	240	315L	282	2985	58.73	770	195	250	95.7	95.1	94.4	0.93	0.87	0.80	15.96	★ ★
200	270	315L	310	2987	65.22	770	200	260	95.8	95.1	94.5	0.94	0.88	0.80	18.87	★ ★
250	335	315L	390	2988	81.49	770	165	215	95.8	95.2	94.5	0.93	0.86	0.79	23.40	★ ★
315	425	355L	500	2988	102.68	770	160	210	95.8	95.2	94.5	0.91	0.86	0.80	29.70	★ ★

Note

Frames 63-112 are with aluminum body
Frames 132-355 are with CI body
Frames 63-112 can be offered with CI body at extra cost
Frames 63-80 are with terminal box on the Top
Frames 90-180 are with terminal box on RHS
Frames 200-355 are with terminal box on Top

★ ★ Please contact LHP.

All frames can be offered with terminal box on Top/LHS/RHS on request
For rating beyond 315kW refer to LHP sales office
Motors in frame 315 & above and 9.3 kW, 2 Pole in 132M frame are suitable for 45°C ambient.
Performance of all 8 pole motors & ratings below 0.37 kW shall be as per LHP catalogue, since these are not covered in IS 12615-2011.

Vacuum pressure impregnation as a standard feature for every motor

LHP MOTORS DRIVES
Driven by Commitment

Premium Efficiency "Supremo Series" TEFC Motors - IE3

Foot Mounted (B3), 3 Phase Squirrel Cage Induction motors suitable for 415 V±10%, 50 Hz±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 50°C, Duty S1, Efficiency IE3, conforms to IS:12615-2011/IEC 60034-30-2008.

Performance Table for 4 Pole Motors

Output		Frame	Rated Current Amps.	Rated Speed RPM	Rated Torque Kgm.	Starting Current % of Rtd Current	Starting Torque % of Rtd Torque	Pull out Torque % of Rtd Torque	Efficiency			Power Factor			Rotor GD^2 Kgm^2	Approx Net weight (Kg) CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.37	0.5	71	1	1440	0.25	650	245	300	73	72	70.8	0.71	0.61	0.52	0.0034	★ ★
0.55	0.75	80	1.2	1440	0.37	650	245	300	78	77.1	76	0.82	0.76	0.65	0.0077	★ ★
0.75	1	80	1.6	1450	0.50	650	235	295	82.5	81.7	80.8	0.79	0.70	0.66	0.0086	★ ★
1.1	1.5	90S	2.1	1450	0.74	650	235	295	84.1	83.8	83	0.87	0.85	0.76	0.014	★ ★
1.5	2	90L	3	1450	1.01	650	240	300	85.3	84	83.7	0.82	0.77	0.66	0.015	★ ★
2.2	3	100L	4.3	1450	1.48	750	235	295	86.7	85.9	85	0.82	0.67	0.58	0.03	★ ★
3	4	100L	6	1455	2.01	750	245	295	87.7	86.6	85.5	0.79	0.70	0.60	0.04	★ ★
3.7	5	112M	7	1460	2.47	750	245	300	88.4	87.6	86.8	0.80	0.75	0.62	0.06	★ ★
5.5	7.5	132S	10	1460	3.67	750	235	295	89.6	88.8	87.9	0.85	0.78	0.70	0.09	★ ★
7.5	10	132M	15	1460	5	750	195	255	90.4	89.6	88.8	0.77	0.71	0.62	0.12	★ ★
9.3	12.5	160M	16.4	1470	6.16	750	225	290	90.9	90	89.1	0.87	0.82	0.75	0.17	★ ★
11	15	160M	18.5	1470	7.29	750	215	280	91.4	90.7	89.5	0.91	0.85	0.80	0.20	★ ★
15	20	160L	25.5	1475	9.91	750	220	286	92.1	91.2	90.4	0.89	0.74	0.66	0.26	★ ★
18.5	25	180M	31	1475	12.22	750	220	286	92.6	91.6	90.7	0.90	0.86	0.78	0.66	★ ★
22	30	180L	38.2	1478	14.50	750	215	280	93	92.1	91	0.86	0.82	0.77	0.84	★ ★
30	40	200L	49	1480	19.74	750	235	300	93.6	92.8	92	0.91	0.85	0.80	1.19	★ ★
37	50	225S	63	1480	24.35	750	225	290	93.9	93	92.1	0.87	0.85	0.76	1.46	★ ★
45	60	225M	74.4	1480	29.61	750	225	290	94.2	93.4	92.5	0.89	0.79	0.70	1.71	★ ★
55	75	250M	92.5	1482	36.15	750	215	280	94.6	93.6	92.7	0.87	0.85	0.76	3.20	★ ★
75	100	280S	132	1485	49.19	770	215	280	95	94	93.2	0.83	0.75	0.66	7.21	★ ★
90	120	280M	160	1485	59.03	770	220	286	95.2	94.2	93.5	0.82	0.78	0.70	8.25	★ ★
110	150	315S	190	1488	72	770	200	260	95.4	94.6	93.7	0.84	0.80	0.72	11.62	★ ★
125	170	315M	213	1488	81.82	770	195	254	95.5	94.7	93.8	0.85	0.81	0.74	12.60	★ ★
132	180	315M	225	1490	86.29	770	195	254	95.6	94.8	93.9	0.85	0.71	0.62	13.98	★ ★
160	215	315L	269	1490	104.59	770	215	280	95.8	95	94.2	0.86	0.72	0.63	27.88	★ ★
200	270	315L	337	1490	130.74	770	200	260	96	95.2	94.4	0.86	0.72	0.65	30.74	★ ★
250	335	355L	432	1490	163.42	770	205	265	96	95.2	94.4	0.84	0.80	0.72	38.10	★ ★

Note

Frames 63-112 are with aluminum body
Frames 132-355 are with CI body
Frames 63-112 can be offered with CI body at extra cost
Frames 63-80 are with terminal box on the Top
Frames 90-180 are with terminal box on RHS
Frames 200-355 are with terminal box on Top

All frames can be offered with terminal box on Top/LHS/RHS on request
For rating beyond 315kW refer to LHP sales office
Motors in frame 315 & above and 9.3 kW, 2 Pole in 132M frame are suitable for 45°C ambient.
Performance of all 8 pole motors & ratings below 0.37 kW shall be as per LHP catalogue, since these are not covered in IS 12615-2011.

★ ★ Please contact LHP.

Vacuum pressure impregnation as a standard feature for every motor

Premium Efficiency "Supremo Series" TEFC Motors - IE3

Foot Mounted (B3), 3 Phase Squirrel Cage Induction motors suitable for 415 V±10%, 50 Hz±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 50°C, Duty S1, Efficiency IE3, conforms to IS:12615-2011/IEC 60034-30-2008.

Performance Table for 6 Pole Motors

Output		Frame	Rated Current Amps.	Rated Speed RPM	Rated Torque Kgm.	Starting Current % of Rtd Current	Starting Torque % of Rtd Torque	Pull out Torque % of Rtd Torque	Efficiency			Power Factor			Rotor GD^2 Kgm^2	Approx Net weight (Kg) CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.37	0.5	80	1.1	910	0.40	650	190	230	71.9	71	69	0.65	0.60	0.50	0.007	★ ★
0.55	0.75	80	1.4	940	0.57	650	195	250	75.9	74.8	73.5	0.72	0.66	0.57	0.0093	★ ★
0.75	1	90S	1.9	930	0.79	650	195	250	78.9	78	77	0.70	0.72	0.65	0.016	★ ★
1.1	1.5	90L	2.8	940	1.14	650	200	260	81	79.8	78.9	0.67	0.60	0.52	0.020	★ ★
1.5	2	100L	3.5	940	1.55	650	200	260	82.5	81.3	80.1	0.72	0.66	0.60	0.032	★ ★
2.2	3	112M	5	960	2.23	750	190	240	84.3	83.6	82.8	0.73	0.67	0.60	0.072	★ ★
3.7	5	132S	7.8	970	3.72	750	195	245	86.5	85.8	85	0.76	0.70	0.62	0.13	★ ★
5.5	7.5	132M	11.6	975	5.49	750	190	240	88	87.3	86.6	0.75	0.70	0.63	0.17	★ ★
7.5	10	160M	14.3	980	7.45	750	215	280	89.1	88.4	87.6	0.82	0.75	0.69	0.43	★ ★
9.3	12.5	160L	17.2	975	9.29	750	210	273	90	89.2	88.4	0.84	0.76	0.69	0.58	★ ★
11	15	160L	20	975	10.99	750	195	254	90.3	89.6	88.8	0.85	0.80	0.72	0.66	★ ★
15	20	180L	28	980	14.91	750	220	286	91.2	90.5	89.7	0.82	0.75	0.67	1.03	★ ★
18.5	25	200L	31	980	18.39	750	210	273	91.7	91	90.2	0.91	0.84	0.75	1.43	★ ★
22	30	200L	39	985	21.75	750	220	286	92.2	91.5	90.8	0.85	0.80	0.73	1.57	★ ★
30	40	225M	53	970	30.12	750	250	290	92.9	92.1	91.3	0.85	0.79	0.70	2.30	★ ★
37	50	250M	63	985	36.59	750	220	286	93.3	92.7	92	0.88	0.81	0.74	3.60	★ ★
45	60	280S	79.5	985	44.50	750	225	290	93.7	93	92.2	0.84	0.78	0.70	8.01	★ ★
55	75	280M	95	985	54.39	750	215	280	94.1	93.6	92.8	0.86	0.80	0.73	9.89	★ ★
75	100	315S	128	987	74.01	770	215	280	94.6	93.8	93.1	0.86	0.80	0.73	14.12	★ ★
90	120	315M	155	987	88.81	770	195	255	94.9	94.2	93.5	0.85	0.79	0.71	17	★ ★
110	150	315M	189	988	108.44	770	200	260	95.1	94.5	93.7	0.85	0.78	0.70	18.98	★ ★
125	170	315M	210	988	123.23	770	200	260	95.2	94.6	93.8	0.87	0.80	0.71	21.60	★ ★
132	180	315L	224	990	129.87	770	195	255	95.4	94.8	94	0.86	0.80	0.72	29.94	★ ★
160	215	355L	290	990	157.41	770	195	255	95.6	95	94.1	0.80	0.74	0.67	33.70	★ ★
200	270	355L	340	990	196.77	770	200	260	95.8	95.1	94.2	0.85	0.76	0.68	37.50	★ ★

Note

Frames 63-112 are with aluminum body
Frames 132-355 are with CI body
Frames 63-112 can be offered with CI body at extra cost
Frames 63-80 are with terminal box on the Top
Frames 90-180 are with terminal box on RHS
Frames 200-355 are with terminal box on Top

All frames can be offered with terminal box on Top/LHS/RHS on request
For rating beyond 315kW refer to LHP sales office
Motors in frame 315 & above and 9.3 kW, 2 Pole in 132M frame are suitable for 45°C ambient.
Performance of all 8 pole motors & ratings below 0.37 kW shall be as per LHP catalogue, since these are not covered in IS 12615-2011.

★ ★ Please contact LHP.

Vacuum pressure impregnation as a standard feature for every motor

Maximum lead Gd^2 for variable torque application motor suitability as per below table.

2				4				6				8			
KW	Frame Size	Max GD^2 kgm^2	Max load GD^2 kgm^2	KW	Frame Size	Max GD^2 kgm^2	Max load GD^2 kgm^2	KW	Frame Size	Max GD^2 kgm^2	Max load GD^2 kgm^2	KW	Frame Size	Max GD^2 kgm^2	Max load GD^2 kgm^2
1.1	90	0.007	0.28	0.75	90	0.012	0.38	0.55	90	0.011	3.35	0.37	90	0.015	4
1.5	90	0.008	0.38	1.1	90	0.015	0.56	0.75	90	0.015	4.52	0.55	100	0.020	4.58
2.2	100	0.026	0.40	1.5	100	0.02	0.23	1.1	100	0.026	6.08	0.75	100	0.026	4.78
3.7	132	0.044	1.84	2.2	100	0.026	2.55	1.5	100	0.026	6.64	1.1	112	0.044	7
5.5	132	0.052	1.55	3.7	132	0.06	4.20	2.2	132	0.060	10.5	1.5	132	0.060	11.5
7.5	132	0.072	1.60	5.5	132	0.088	7.86	3.7	132	0.088	11.7	2.2	132	0.108	14.6
9.3	160	0.116	7.00	7.5	160	0.167	6.10	5.5	160	0.288	21.4	3.7	160	0.288	28.8
11	160	0.128	5.02	9.3	160	0.028	6.00	7.5	160	0.326	33.7	5.5	160	0.372	37.5
15	160	0.152	5.12	11	160	0.252	9.19	9.3	160	0.372	37.4	7.5	180	0.640	56
18.5	180	0.240	12.0	15	180	0.400	37.0	11	180	0.640	39.0	9.3	180	1.680	71
22	200	0.600	14.0	18.5	180	0.480	43.0	15	200	1.260	82.0	11	200	1.680	86
30	200	0.720	30.0	22	200	1.000	57.0	18.5	200	1.600	127	15	200	1.780	118
37	225	1.240	37.0	30	200	1.160	77.0	22	225	2.840	150	18.5	225	3.320	205
45	225	1.360	45.0	37	225	1.440	152	30	225	3.320	206	22	225	3.600	239
55	250	2.240	53.0	45	225	1.680	185	37	250	5.680	305	30	250	6.900	441
75	280	3.280	63.0	55	250	2.800	263	45	280	7.920	435	37	280	7.640	541
90	280	3.800	75.0	75	280	4.440	321	55	280	10.20	531	45	280	7.820	659
110	315	7.500	65.0	90	280	5.320	286	75	315	17.90	551	55	315	22.70	777
132	315	8.700	79.0	110	315	14.00	193	90	315	21.00	778	75	355	26.30	1064
160	355	14.60	91.0	132	315	16.40	304	110	355	33.00	944	90	355	44.60	1264
200	355	17.20	115	160	355	29.40	335	132	355	36.00	1067	110	355	50.60	1538
				200	355	34.90	421	160	355	45.80	1291	132	355	55.60	1850
				250	355	38.00	497								

Thermal withstand time

Standard TEFC Motors operation at rated voltage and frequency

Pole	2		4		6		8	
Frame	Hot (Sec)	Cold (Sec)	Hot (Sec)	Cold (Sec)	Hot (Sec)	Cold (Sec)	Hot (Sec)	Cold (Sec)
63	10	20	15	30	10	20	15	30
71	10	20	10	20	10	20	15	30
80	10	20	10	20	10	20	15	30
90	10	20	10	20	10	20	15	30
100	8	16	8	16	10	20	10	20
112	8	16	8	16	10	20	10	20
132	8	16	8	16	10	20	10	20
160	10	22	10	22	10	22	10	22
180	10	22	10	22	10	22	10	22
200	12	27	12	27	12	27	12	27
225	12	27	12	27	12	27	12	27
250	12	27	12	27	12	27	12	27
280	15	33	15	33	15	33	15	33
315	15	33	15	33	15	33	15	33
355	15	33	15	33	15	33	15	33

Note

Cold - Ambient Temp. 50°C

Hot - Maximum permissible Temp. 120°C

Limiting Temperature - Upto 185°C for Class "B" Insulation

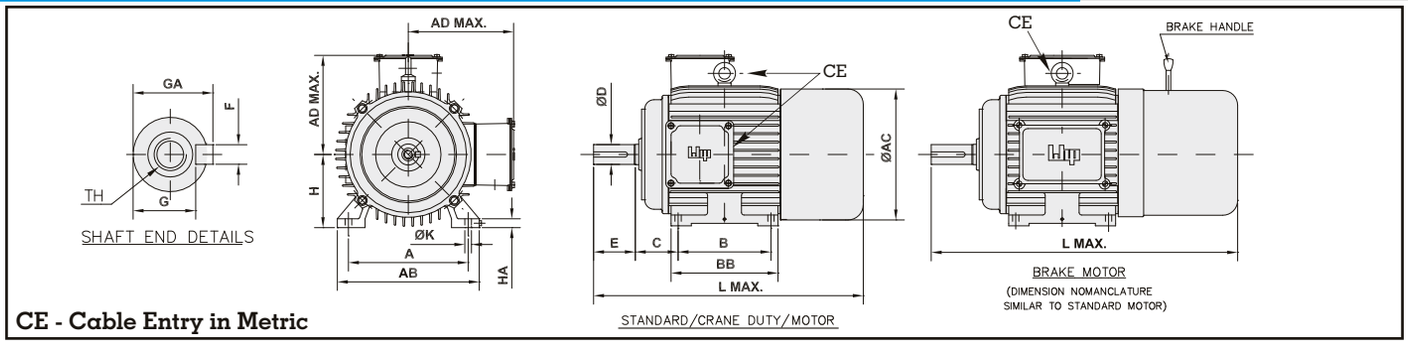
- Upto 210°C for Class "F" Insulation

Heating Time Constant & Cooling Time Constant

Pole	2		4		6		8	
Frame	Th (min)	Tc (min)	Th (min)	Tc (min)	Th (min)	Tc (min)	Th (min)	Tc (min)
63	42	125	63	188	42	125	63	188
71	42	125	42	125	42	125	63	188
80	42	125	42	125	42	125	63	188
90	42	125	42	125	42	125	63	188
100	33	100	33	100	42	125	42	125
112	33	100	33	100	42	125	42	125
132	33	100	33	100	42	125	42	125
160	42	125	42	125	42	125	42	125
180	42	125	42	125	42	125	42	125
200	50	150	50	150	50	150	50	150
225	50	150	50	150	50	150	50	150
250	50	150	50	150	50	150	50	150
280	63	188	63	188	63	188	63	188
315	63	188	63	188	63	188	63	188
355	63	188	63	188	63	188	63	188

General arrangement Drawing/Dimensions - Foot Mounted (B3)

Standard, Brake & Crane & Hoist Duty Motors as per IS : 1231



CE - Cable Entry in Metric

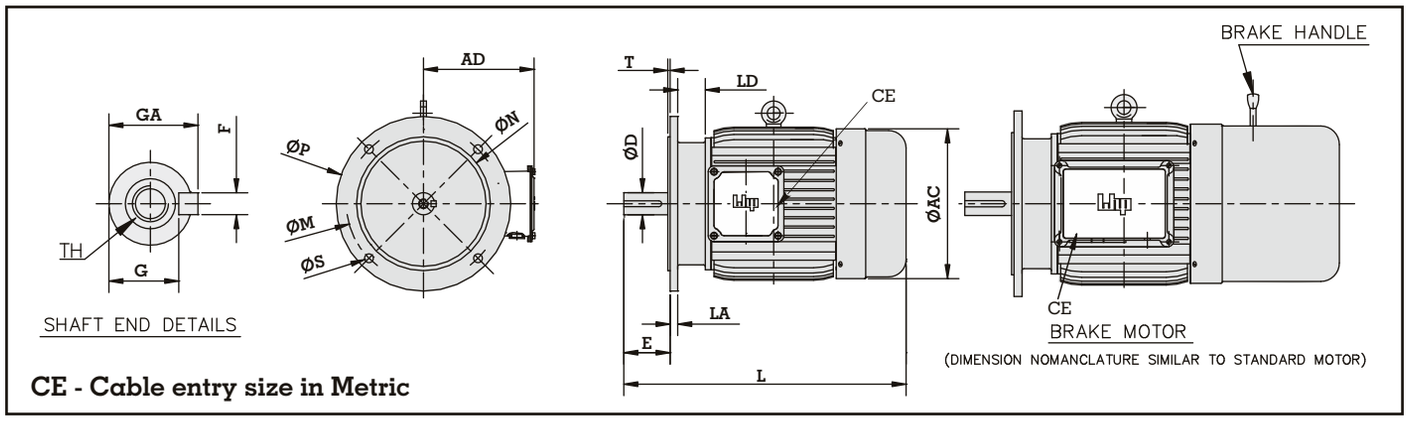
Table No. - 09

Frame Size	CONT.	H	C	A	AB	HA	ØK	B	BB	AD MAX	ØAC	ØD	E	F	G	GA	TH	L MAX			CE X Nos.	For Brake Motor				For 1Ø Motor		T.Box Position
																		IE 1	IE 2	IE 3		AD	L			AD	L	
																							IE1	IE2	IE3			
63	CI	63	40	100	120	8	7	80	97	110	116	11j6	23	4	8.5	12.5	M5	223	223	--	M20-1	--	--	--	--	--	--	RHS
63	AL PDC	63	40	100	118	8	7	80	97	105	116	11j6	23	4	8.5	12.5	M5	223	223	--	M20-1	106	276	--	--	--	--	TOP
71	CI	71	45	112	132	9	7	90	112	110	140	14j6	30	5	11.0	16.0	M5	255	270	270	M20-1	129	329	340	340	--	--	RHS
71	AL PDC	71	45	112	133	9	7	90	110	115	140	14j6	30	5	11.0	16.0	M5	253	270	270	M20-1	129	329	340	340	119	302	TOP
80	CI	80	50	125	151	10	10	100	124	120	158	19j6	40	6	15.5	21.5	M6	286	285	290	M20-1	135	380	375	380	--	--	RHS
80	AL PDC	80	50	125	153	12	10	100	124	130	158	19j6	40	6	15.5	21.5	M6	278	297	297	M20-1	151	380	390	390	114	347	TOP
90S	CI	90	56	140	170	10	10	100	120	158	178	24j6	50	8	20.0	27.0	M8	346	344	356	M20-1	145	432	430	440	--	--	RHS
90S	AL PDC	90	56	140	170	14	10	100	125	138	178	24j6	50	8	20.0	27.0	M8	341	348	356	M20-1	--	--	435	440	--	--	RHS
90L	CI	90	56	140	170	10	10	125	163	158	178	24j6	50	8	20.0	27.0	M8	370	364	364	M20-1	145	452	450	440	159	386	RHS
90L	AL PDC	90	56	140	170	13	10	125	146	140	178	24j6	50	8	20.0	27.0	M8	356	348	356	M20-1	165	427	435	440	--	--	RHS
100L	CI	100	63	160	200	13	12	140	170	175	208	28j6	60	8	24.0	31.0	M10	389	405	405	M20-1	162	495	510	510	152	429	RHS
100L	AL PDC	100	63	160	195	15	12	140	172	175	208	28j6	60	8	24.0	31.0	M10	403	405	405	M20-1	162	495	510	510	--	--	RHS
112M	CI	112	70	190	230	15	12	140	170	185	224	28j6	60	8	24.0	31.0	M10	405	405	420	M20-1	175	511	510	525	--	--	RHS
112M	AL PDC	112	70	190	225	12	12	140	172	179	214	28j6	60	8	24.0	31.0	M10	448	460	460	M20-1	179	580	600	600	--	--	RHS
132S	CI	132	89	216	256	16	12	140	167	205	257	38k6	80	10	33.0	41.0	M12	463	483	483	M20-2	185	585	615	615	--	--	RHS
132M	CI	132	89	216	256	16	12	178	205	205	257	38k6	80	10	33.0	41.0	M12	500	500	500	M20-2	185	629	630	630	--	--	RHS
132M(N)	CI	132	89	216	256	16	12	178	245	205	257	38k6	80	10	33.0	41.0	M12	525	525	525	M20-2	185	655	655	655	--	--	RHS
160M	CI	160	108	254	304	26	15	210	260	260	312	42k6	110	12	37.0	45.0	M16	623	630	672	M25-2	245	760	770	812	--	--	RHS
160L	CI	160	108	254	310	26	15	254	304	260	312	42k6	110	12	37.0	45.0	M16	670	675	675	M25-2	245	803	815	815	--	--	RHS
180M	CI	180	121	279	340	26	15	241	318	256	357	48k6	110	14	42.5	51.5	M16	685	705	725	M25-2	256	842	890	895	--	--	RHS
180L	CI	180	121	279	340	26	15	279	318	256	357	48k6	110	14	42.5	51.5	M16	725	725	750	M25-2	256	842	890	895	--	--	RHS
200L	CI	200	133	318	385	35	19	305	350	313	380	55m6	110	16	49.0	59.0	M20	800	800	850	M50-2	313	963	1020	1020	--	--	TOP
225S(2P)	CI	225	149	356	430	30	19	286	350	340	448	55m6	110	16	49.0	59.0	M20	800	800	800	M50-2	--	--	--	--	--	--	TOP
225S(4,6,8 P)	CI	225	149	356	430	30	19	286	350	340	448	60m6	140	18	53.0	64.0	M20	840	825	825	M50-2	--	--	--	--	--	--	TOP
225M(2P)	CI	225	149	356	440	35	19	311	370	340	448	55m6	110	16	49.0	59.0	M20	910	890	890	M50-2	--	--	--	--	--	--	TOP
225M(4,6,8 P)	CI	225	149	356	440	35	19	311	370	340	448	60m6	140	18	53.0	64.0	M20	890	870	870	M50-2	--	--	--	--	--	--	TOP
250M (2P)	CI	250	168	406	500	43	24	349	425	412	510	60m6	140	18	53.0	64.0	M20	1000	1000	1000	M50-2	--	--	--	--	--	--	TOP
250M (4,6,8 P)	CI	250	168	406	500	43	24	349	425	412	510	65m6	140	18	58.0	69.0	M20	1015	1015	1015	M50-2	--	--	—	—	--	--	TOP
280S (2P)	CI	280	190	457	540	43	24	368	490	442	566	65m6	140	18	58.0	69.0	M20	1075	1088	1200	M50-2	--	--	--	--	--	--	TOP
280S(4,6,8 P)	CI	280	190	457	540	43	24	368	490	442	566	75m6	140	20	67.5	79.5	M20	1033	1088	1200	M50-2	--	--	--	--	--	--	TOP
280M (2 P)	CI	280	190	457	540	43	24	419	490	442	566	65m6	140	18	58.0	69.0	M20	1075	1088	1200	M50-2	--	--	--	--	--	--	TOP
280M (4,6,8 P)	CI	280	190	457	540	43	24	419	490	442	566	75m6	140	20	67.5	79.5	M20	1037	1088	1200	M50-2	--	--	--	--	--	--	TOP
315S (2 P)	CI	315	216	508	620	50	28	406	546	524	658	65m6	140	18	58.0	69.0	M20	1155	1270	1300	M50-2	--	--	--	--	--	--	TOP
315S (4,6,8 P)	CI	315	216	508	620	50	28	406	546	524	658	80m6	170	22	71.0	85.0	M20	1185	1270	1300	M50-2	--	--	--	--	--	--	TOP
315M (2 P)	CI	315	216	508	620	50	28	457	640	524	658	65m6	140	18	58.0	69.0	M20	1320	1320	1320	M50-2	--	--	--	--	--	--	TOP
315M (4,6,8 P)	CI	315	216	508	620	50	28	457	640	524	658	80m6	170	22	71.0	85.0	M20	1350	1270	1300	M50-2	--	--	--	--	--	--	TOP
315L (2 P)	CI	315	216	508	620	50	28	508	640	524	658	65m6	140	18	58.0	69.0	M20	1320	1320	1320	M50-2	--	--	--	--	--	--	TOP
315L (4,6,8 P)	CI	315	216	508	620	50	28	508	640	524	658	80m6	170	22	71.0	85.0	M20	1350	1350	1350	M50-2	--	--	--	--	--	--	TOP
355S (2 P)	CI	355	254	610	730	51	28	500	780	626	745	80m6	170	22	71.0	85.0	M20	1580	1580	1580	M63-2	--	--	--	--	--	--	TOP
355S (4,6,8 P)	CI	355	254	610	730	51	28	500	780	626	745	100m6	210	28	90.0	106.0	M24	1620	1620	1620	M63-2	--	--	--	--	--	--	TOP
355M (2P)	CI	355	254	610	730	51	28	560	780	626	745	80m6	170	22	71.0	85.0	M20	1580	1580	1580	M63-2	--	--	--	--	--	--	TOP
355M (4,6,8 P)	CI	355	254	610	730	51	28	560	780	626	745	100m6	210	28	90.0	106.0	M24	1620	1620	1620	M63-2	--	--	--	--	--	--	TOP
355L (2 P)	CI	355	254	610	730	51	28	630	780	626	745	80m6	170	22	71.0	85.0	M20	1580	1580	1580	M63-2	--	--	--	--	--	--	TOP
355L (4,6,8 P)	CI	355	254	610	730	51	28	630	780	626	745	100m6	210	28	90.0	106.0	M24	1620	1620	1620	M63-2	--	--	--	--	--	--	TOP

Note : For Standard Motor refer dimensions of IE1 Motor.

General arrangement Drawing/Dimensions - Flange Mounted (B5)

Standard, Brake & Crane & Hoist Duty Motors (B-5 Mounting) as per IS:2223



CE - Cable entry size in Metric

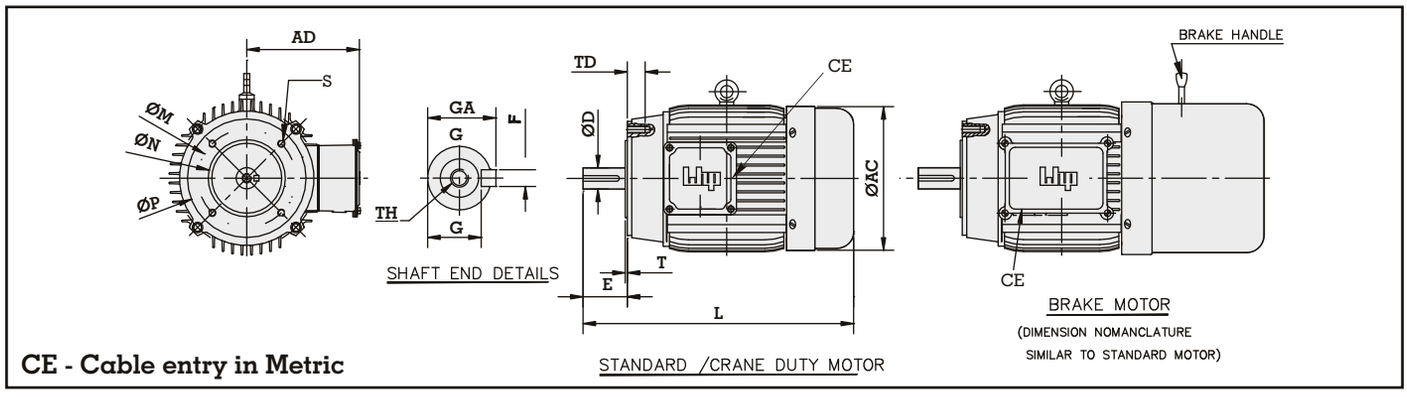
Table No. - 10

Frame Size	Cont.	Flange No.	ØM ±0.3	j6 ØN	ØP	ØS X NO.	T	LA	LD	AD MAX	ØAC	ØD	E	F	G	GA	TH	L MAX			CE X Nos.	For Brake Motor				For Single Phase Motor	
																						AD	L Max				
																		IE1	IE2	IE3		Max	IE1	IE2	IE3	AD	L
63	CI	F115B	115	95	140	10 X 4	3	10	10	110	116	11j6	23	4	8.5	12.5	M5	223	245	--	M20-1	121	276	--	--	---	---
63	AL.PDC	F115B	115	95	140	10 X 4	3	10	10	105	116	11j6	23	4	8.5	12.5	M5	223	245	--	M20-1	117	276	--	--	---	---
71	CI	F130B	130	110	160	10 X 4	3.5	10	10	110	140	14j6	30	5	11	16	M5	255	275	315	M20-1	129	325	330	370	---	---
71	AL.PDC	F130B	130	110	160	10 X 4	3.5	10	20	115	140	14j6	30	5	11	16	M5	255	270	310	M20-1	125	325	325	365	119	302
80	CI	F165B	165	130	200	12 X 4	3.5	11	16	120	158	19j6	40	6	15.5	21.5	M6	285	285	325	M20-1	127	380	375	415	----	---
80	AL.PDC	F165B	165	130	200	12 X 4	3.5	11	16	130	158	19j6	40	6	15.5	21.5	M6	272	280	320	M20-1	146	380	370	410	114	348
90S	CI	F165B	165	130	200	12 X 4	3.5	11	22	160	178	24j6	50	8	20	27	M8	320	365	405	M20-1	152	435	450	490	---	---
90S	AL.PDC	F165B	165	130	200	12 X 4	3.5	11	22	138	178	24j6	50	8	20	27	M8	343	360	400	M20-1	160	426	430	470	---	---
90L	CI	F165B	165	130	200	12 X 4	3.5	11	22	160	178	24j6	50	8	20	27	M8	370	385	425	M20-1	152	456	470	510	152	395
90L	AL.PDC	F165B	165	130	200	12 X 4	3.5	11	22	160	178	24j6	50	8	20	27	M8	355	360	400	M20-1	164	424	450	490	---	---
100L	CI	F215B	215	180	250	15 X 4	4	12	20	160	208	28j6	60	8	24	31	M10	405	405	445	M20-1	158	497	490	530	152	435
100L	AL.PDC	F215B	215	180	250	15 X 4	4	12	22	175	208	28j6	60	8	24	31	M10	395	400	440	M20-1	162	497	490	530	---	---
112M	CI	F215B	215	180	250	15 X 4	4	12	23	185	225	28j6	60	8	24	31	M10	405	425	485	M20-1	189	510	520	580	---	---
112M	AL.PDC	F215B	215	180	250	15 X 4	4	12	18	180	215	28j6	60	8	24	31	M10	430	425	485	M20-1	179	553	545	605	---	---
132S	CI	F265B	265	230	300	15 X 4	4	13	47	205	260	38k6	80	10	33	41	M12	460	485	545	M20-2	202	585	615	675	---	---
132M	CI	F265B	265	230	300	15 X 4	4	13	47	205	260	38k6	80	10	33	41	M12	500	525	585	M20-2	202	629	630	690	---	---
132M (N)	CI	F265B	265	230	300	15 X 4	4	13	47	205	260	38k6	80	10	33	41	M12	525	545	605	M20-2	202	655	655	715	---	---
160M	CI	F300B	300	250	350	19 X 4	5	14	54	260	312	42k6	110	12	37	45	M16	620	650	710	M25-2	245	760	--	--	---	---
160L	CI	F300B	300	250	350	19 X 4	5	14	54	260	312	42k6	110	12	37	45	M16	660	710	810	M25-2	245	803	--	--	---	---
180M/L	CI	F300B	300	250	350	19 X 4	5	14	72	255	360	48k6	110	14	42.5	51.5	M16	720	725	825	M25-2	835	725	--	--	---	---
200L	CI	F350B	350	300	400	19 X 4	5	16	71	340	382	55m6	110	16	49	59	M20	780	800	900	M50-2	--	--	--	--	---	---
225S/M (2P)	CI	F400B	400	350	450	19 X 8	5	16	71	340	448	55m6	110	16	49	59	M20	910	890	890	M50-2	--	--	--	--	---	---
225S/M (4,6,8P)	CI	F400B	400	350	450	19 X 8	5	16	71	340	448	60m6	140	18	53	64	M20	890	870	870	M50-2	--	--	--	--	---	---
250M (2P)	CI	F500B	500	450	550	19 X 8	5	19	65	410	510	60m6	140	18	53	64	M20	1000	1000	1000	M50-2	--	--		--	---	---
250M (4,6,8P)	CI	F500B	500	450	550	19 X 8	5	19	65	410	510	65m6	140	18	58	69	M20	1015	1015	1015	M50-2	--	--	--	--	---	---
280S/M (2P)	CI	F500B	500	450	550	19 X 8	5	22	50	430	566	65m6	140	18	58	69	M20	1075	1090	1190	M50-2	--	--	--	--	---	---
280S/M (4,6,8P)	CI	F500B	500	450	550	19 X 8	5	22	50	430	566	75m6	140	20	67.5	79.5	M20	1045	1055	1155	M50-2	--	--	--	--	---	---
315S/M/L (2P)	CI	F600B	600	550	660	24 X 8	6	22	50	520	658	65m6	140	18	58	69	M20	1275	1275	1400	M50-2	--	--	--	--	---	---
315S/M/L (4,6,8P)	CI	F600B	600	550	660	24 X 8	6	22	50	520	658	80m6	170	22	71	85	M20	1305	1305	1390	M50-2	--	--	--	--	---	---
355S/M/L (2P)	CI	F740B	740	680	800	24 X 8	6	25	45	625	745	80m6	170	22	71	85	M20	1580	1600	1730	M63-2	--	--	--	--	---	---
355S/M/L (4,6,8P)	CI	F740B	740	680	800	24 X 8	6	25	45	625	745	100m6	210	28	90	106	M24	1620	1620	1750	M63-2	--	--	--	--	---	---

Note : For Standard Motor refer dimensions of IE1 Motor.

General arrangement Drawing/Dimensions - Face Mounted (B14)

Standard, Brake & Crane & Hoist Duty Motors as per IS : 2223



CE - Cable entry in Metric

Table No. - 11

Frame Size	Cont.	Flange No.	ØM ± 0.3	ØN j6	ØP	S	TD	T	AD MAX	ØAC	ØD	E	F	G	GA	TH	L MAX			CE X Nos.	For Brake Motor				For 1Ø Motor	
																						L				
																	IE1	IE2	IE3		AD	IE1	IE2	IE3	AD	L
63	CI	F75C	75	60	90	M5	6	2.5	110	116	11j6	23	4	8.5	12.5	M5	223	--	--	M20-1	121	276	--	--	--	--
63	AL.PDC	F75C	75	60	90	M5	6	2.5	105	116	11j6	23	4	8.5	12.5	M5	223	--	--	M20-1	117	276	--	--	--	--
71	CI	F85C	85	70	105	M6	8	2.5	110	140	14j6	30	5	11	16	M5	255	275	315	M20-1	129	325	330	370	--	--
71	AL.PDC	F85C	85	70	107	M6	8	2.5	115	140	14j6	30	5	11	16	M5	253	270	310	M20-1	125	325	325	365	119	302
80	CI	F100C	100	80	120	M6	8	3	120	158	19j6	40	6	15.5	21.5	M6	285	285	325	M20-1	127	380	375	415	--	--
80	AL.PDC	F100C	100	80	120	M6	8	3	130	158	19j6	40	6	15.5	21.5	M6	278	280	320	M20-1	146	380	370	410	--	--
90S	CI	F115C	115	95	140	M8	10	3	160	178	24j6	50	8	20	27	M8	320	365	405	M20-1	152	435	450	490	--	--
90S	AL.PDC	F115C	115	95	140	M8	10	3	140	178	24j6	50	8	20	27	M8	340	360	400	M20-1	160	426	430	470	--	--
90L	CI	F115C	115	95	140	M8	10	3	160	178	24j6	50	8	20	27	M8	345	395	435	M20-1	152	454	470	510	152	395
90L	AL.PDC	F115C	115	95	140	M8	10	3	140	178	24j6	50	8	20	27	M8	355	360	400	M20-1	164	424	450	490	--	--
100L	CI	F130C	130	110	160	M8	10	3.5	160	208	28j6	60	8	24	31	M10	405	405	445	M20-1	158	510	490	530	152	435
100L	AL.PDC	F130C	130	110	160	M8	10	3.5	180	208	28j6	60	8	24	31	M10	395	400	440	M20-1	162	495	490	530	--	--
112M	CI	F130C	130	110	160	M8	10	3.5	185	225	28j6	60	8	24	31	M10	405	410	470	M20-1	171	510	520	580	--	--
112M	AL.PDC	F130C	130	110	160	M8	10	3.5	180	215	28j6	60	8	24	31	M10	430	430	490	M20-1	179	562	545	605	--	--
132S	CI	F165C	165	130	196	M12	14	3.5	205	260	38k6	80	10	33	41	M12	460	483	543	M20-2	205	585	615	675	--	--
132M	CI	F165C	165	130	196	M12	14	3.5	205	260	38k6	80	10	33	41	M12	500	500	560	M20-2	205	629	630	690	--	--
132M(N)	CI	F165C	165	130	196	M12	14	3.5	205	260	38k6	80	10	33	41	M12	525	525	585	M20-2	205	655	655	715	--	--

Note : For Standard Motor refer dimensions of IE1 Motor.

Hazardous Area Motors - General Technical Information

Hazardous Areas

Hazardous areas are defined as areas where explosive atmosphere is present, or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of equipment.

The decision as to whether an area is hazardous as per the relevant regulations and specifications rests entirely with the user, or in case of doubt, with the competent inspecting authority.

IS 5572:2009 classifies the hazardous areas into three zones, depending on the frequency and duration for which dangerous concentrations are likely to be present.

Classification of Hazardous Areas (Gases and Vapours) and selection of Electrical Equipment.

Classification of these zones and selection of electrical equipment is as under.

Table No. 12

Zone	Classification of area as per ref. std.IS 5572:2009	Selection of electrical equipment based on ref. std. IS 5571:2009
Zone '0'	An area in which Hazardous atmosphere is continuously present	Generally, use of electrical equipment is to be avoided. But when this is not practicable, intrinsically safe or pressurized electrical equipment to be used.
Zone '1'	Hazardous atmosphere is likely to be present under normal operating conditions.	For this area, electrical equipment used, must be in flame proof enclosure type Ex(d) conforming to IS/IEC 60079-1.
Zone '2'	In this area hazardous atmosphere is likely to be present only under abnormal operating conditions and for a short period.	Apparatus with type of protection Ex (e) in accordance with IS/IEC 60079-7 may be used without any special enclosure. Apparatus having type of protection Ex (nA) in accordance with IS/IEC 60079-15 are also permitted for use.

Table No. 13 - Reference Standards

All motors comply with following standards, viz:

IS/IEC 60079-0	Electrical apparatus for Explosive gas atmosphere-part O general requirements.
IS/IEC 60079-1	Explosive atmosphere Equipment protection by flame proof enclosures "d"
IS/IEC 60079-7	Explosive atmosphere Equipment protection by increased safety "e"
IS/IEC 60079-15	Electrical apparatus for Explosive gas atmospheres - construction, test and marking of type of protection "n"
IS 5572	Classification of Hazardous areas (other than mining) having flammable gases and vapors for electrical installations.
IS 5571	Guide for selection and installation of electrical equipment for hazardous areas (other than mines)
IS 325	Three Phase induction motor specifications. (For standard TEFC SCR Motors)
IS 12615	Energy Efficient Induction Motors - Three Phase Squirrel Cage (For IE2 Series Motors)
IS 4029	Guide for testing three phase induction motors (For Standard TEFC SCR Motors)
IS 4889	Methods of determination of efficiency of rotating electric machines (For Standard TEFC SCR Motors)
IS 15999 - (Part2/Sec1)	Standard Methods for determining Losses and Efficiency from Tests. (For IE2 Series Motors)
IS/IEC 60034-1	Rotating Electrical Machines-Rating & Performance
IS/IEC 60034-5	Degree of protection provided by the integral design of Rotating Electrical Machines (IP code) : classification
IS 6362 / IEC 60034-6	Designation of method of cooling for Rotating Electrical Machines/Method of cooling (IC code)
IS 12065 / IEC 60034-9	Permissible limits of noise level for Rotating Electrical Machines
IS 12075	Mechanical Vibration of Rotating Electrical Machines

Hazardous Area Motors - General Technical Information

LHP is having three types of Hazardous Area Motors in full range : -

1. Flame-proof Motors (Ex 'd'),
2. Non-sparking Motors (Ex 'nA')
3. Increased Safety Motors (Ex 'e')

Salient Features

1. LHP Flame - Proof motors are suitable for GAS GROUP I. IIA, IIB and IIC applications.
2. Ambient temperature 45°C & Temperature class "T3".
3. Motors are designed for continuous operation in explosive or inflammable atmosphere in coal mines. Chemical, Petrochemical Industries, fertilizers & pharmaceutical industries.
4. Flame-Proof motors comply with IS/IEC 60079- 0 &1 specifications and rating performance as per IS : 325 / IEC : 60034-1
5. Motors are suitable for horizontal & vertical mounting as per IS : 1231 & IS : 2223 & IEC 60072-2
6. Motor frames & end shields are made of grey cast iron with sturdy design & have high strength to prevent propagation of internal explosion due to the inflammable gas, present in open atmosphere.
7. All fasteners used are provided with shrouds around their heads to prevent from opening easily i.e. Tamper-proof and to maintain the graphs as specified. Also they are of a high tensile material.
8. Motors terminals studs are of brass suitable for D.O.L. Starting up to 3HP (3 terminals) & above 3HP Star / Delta starting provision is made (6 terminals). The insulating material of Terminal Studs is made up of Dough Molding compound or better.
9. Motors with mining application (gas group - I) are provided with cable entries either with compound filling sealing box or with Flameproof wiping type cable glands or with FLP Plug & Socket as required.
10. Flame-Proof double compression cable glands suitable for armoured or unarmoured Copper or Alluminium cables can be given.
11. All motors are with top terminal box as standard feature however, RHS & LHS T.box can be given as per customer's demand.

Approvals / Certifications

I.Authorised and Govt. approved testing laboratories

A. Flame - Proof motors carry the BIS mark (IS/IEC60079- 0&1) and are tested by ERTL- Kolkata, CIMFR- Danbad & Karandikar Test Lab., Mumbai.

B. Approval certifications of following are taken based on the test report issued by ERTL Kolkata & CIMFR, Danbad, KLPL Mumbai.

II.Govt. approving Authorities

1. Petroleum & Explosives Safety Organisation (PESO), Nagpur.
2. Directorate General of Mines Safety (DGMS), Dhanbad.

Note -

LHP is in the process of IEC Ex / CE ATEX certification for complete range of Ex 'd' Flame-Proof & Ex'nA' Non-sparking motors. The certification is awaited. Please contact LHP for further details.

Hazardous Area Motors - General Technical Information

Temperature Class and limiting temperature with regard to gas ignition :

Temp. Class as required by the area classification	Ignition Temp. 0C		Allowable temp. Classes of eqpt.
	Above	Upto & Inclg.	
T1	450	-	T1-T6
T2	300	450	T2-T6
T3	200	300	T3-T6
T4	135	200	T4-T6
T5	100	135	T5-T6
T6	85	100	T6

- The maximum surface temperature under the worst operating condition must not exceed the ignition temperature of gas.
- The maximum surface temperature refers to that surface which is coming in contact with the explosive gas. In case of Flame Proof Ex (d) motors, this refers to external surface temperature.

Classification of Hazardous Gases

Hazardous gases have been classified in IS/IEC 60079-1 and are associated only with flame proof enclosures. List of hazardous gases, their group specification and ignition temperatures have been specified in IS/IEC 60079-20. Some of the gases are listed in the following table.

Group	Temperature classes					
	T1	T2	T3	T4	T5	T6
I	**Methane (Firedamp)**					
IIA	Acetic acid, Acetone, Ammonia Benzole, Butanone, Benzene Butonone, Carbon monoxide Ethane, Ethyl acetate, Ethyl chloride Methane, Methanol, Methyl acetate, Methyl alcohol, Naphtalene, Propane Toluene, Xylene	Acetic anhydride, I amyl acetate,N butane, N butyl alcohol Amylic alcohol, Butyl alcohol Cyclohexanon, Ethyl alcohol Iso butylic alcohol, Liquified gas Natural gas, Propyl acetate	Cyclohexane, Cecano Diesel fuels, Gasoline Heating oil, Heptane Hexane, Jet fuels Pentane, Petroleum	Acetaldehyde Ether		
IIB	Coke-oven gas Water gas (carburetted)	1, 3 Butadiene ethylene	Hydrogen Sulphide	Ethyl Ether		
IIC	Hydrogen	Acetylene				Carbon Disulphide Ethyl Nitrate

Hazardous Area Motors - General Technical Information

Table No. 14 - Frame wise Bearing sizes

Frame	Bearing No.	
Size	DE	NDE
63	6201 ZZ	6201 ZZ
71	6203 ZZ	6203 ZZ
80	6204 ZZ	6204 ZZ
90S/L	6205 ZZ	6205 ZZ
100L	6206 ZZ	6206 ZZ
112M	6306 ZZ	6206 ZZ
132S/M	6308 ZZ C3	6208 ZZ C3
160M/L	6309 ZZ C3	6309 ZZ C3
180M/L	6310 ZZ C3	6310 ZZ C3
200L	6312 ZZ C3	6312 ZZ C3
225S/M	6313 ZZ C3	6313 ZZ C3
250M	6314 C3	6314 C3
280S/M	6318 C3	6415 C3
315S/M/L	6319 C3	6319 C3

Table No. 15 - Maximum Cable entry hole cable O.D. In (mm) accommodation in Terminal Box for Flame-proof Motors

Frame Size	Max. Cable Entry Hole Size (FLP)	Suitable Cable O.D. Range (FLP)	Recommended Cable size cross sec. Area in mm^2
63	M25, 1No. or M20, 2 Nos.	M25-DAI. 22.5 - 25.5	6
		M20- DIA. 18.5 - 19.5	
71	M25, 1No. or M20, 2 Nos.	M25-DAI. 22.5 - 25.5	
		M20- DIA. 18.5 - 19.5	
80	M25, 2Nos.	DIA. 22.5 - 25.5	
90	M25, 2Nos.	DIA. 22.5 - 25.5	16
100	M25, 2Nos.	DIA. 22.5 - 25.5	
112	M40, 2Nos.	DIA. 26 - 29	35
132	M40, 2Nos.	DIA. 26 - 29	
160	M40, 2Nos.	DIA. 26 - 29	
180	M50, 2Nos.	DIA. 45.5 - 51	95
200	M50, 2Nos.	DIA. 45.5 - 51	
225	M50, 2Nos.	DIA. 45.5 - 51	
250	M63, 2Nos. or M80, 1No.	M63- DIA. 51.9 - 59	185
		M80- DIA. 65.5 - 77	
280	M63, 2Nos. or M80, 1No.	M63- DIA. 51.9 - 59	
		M80- DIA. 65.5 - 77	
315	M63, 2Nos. or M80, 1No.	M63- DIA. 51.9 - 59	
		M80- DIA. 65.5 - 77	

Note : Customer should specify exact cable OD in mm to select proper cable entry.

LHP MOTORS DRIVES
Driven by Commitment

Flame Proof IE1 Motors

Foot Mounted (B3), 3 Phase Squirrel Cage TEFC Induction Motors suitable for 415V±10%, 50HZ±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 45°C, Duty S1, Efficiency IE1, conforms to IS/IEC 60079-1:2007/IS12615 : 2011,IEC 60034-30-2008, Gas Group IIA/IIB, Temp. class T3.

Performance Table for 2 Pole Motors

Rated Output		Frame Size	Rated Current Amps	Rated Speed RPM	Rated Torque kgm	Starting Current % of Rated Current	Starting Torque % of Rated Torque	Pull Out Torque % of Rated Torque	Efficiency %			Power Factor			Rotor GD^2 kgm^2	Approx. Net Weight kg CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.18	0.25	63	0.58	2730	0.06	400	240	310	64.0	62.0	56.0	0.68	0.65	0.54	0.0009	13
0.18	0.25	71	0.58	2730	0.06	400	240	310	64.0	62.0	56.0	0.68	0.65	0.54	0.0009	16
0.25	0.33	71	0.65	2820	0.09	430	220	320	68.0	67.0	62.0	0.77	0.70	0.60	0.0015	16
0.37	0.50	71	1.2	2790	0.13	600	245	285	66.1	65.6	64.1	0.65	0.58	0.50	0.0015	17
0.37	0.50	80	1.2	2790	0.13	600	245	285	66.1	65.6	64.1	0.65	0.58	0.50	0.0015	21
0.55	0.75	71	1.6	2790	0.19	600	220	290	69.1	68.5	65.5	0.69	0.60	0.53	0.0021	17
0.75	1.0	80	1.8	2850	0.26	600	280	295	72.1	71.6	70.0	0.80	0.75	0.64	0.0036	23
1.1	1.5	80	2.7	2850	0.38	600	280	285	75.0	74.5	73.2	0.75	0.72	0.61	0.0036	25
1.5	2.0	90S	3.4	2850	0.51	600	250	290	77.2	76.8	74.6	0.80	0.74	0.64	0.0073	43
2.2	3.0	90L	4.8	2860	0.75	650	260	290	79.7	79.1	76.3	0.80	0.75	0.62	0.0089	45
3.7	5.0	100L	7.2	2890	1.2	650	210	250	82.7	82.0	80.5	0.86	0.82	0.72	0.022	59
5.5	7.5	132S	11.0	2900	1.8	650	250	300	84.7	84.0	82.5	0.82	0.75	0.68	0.052	104
7.5	10.0	132S	14.5	2910	2.5	650	230	280	86.0	85.5	84.0	0.84	0.80	0.68	0.068	114
9.3	12.5	132M	17	2900	3.1	650	200	240	87.7	87.1	85.4	0.87	0.82	0.71	0.08	118
11	15	160M	21	2920	3.7	650	200	240	87.6	87.0	85.0	0.83	0.77	0.68	0.17	123
15	20	160M	28	2940	5.0	650	240	280	88.7	88.2	86.5	0.84	0.80	0.70	0.22	158
18.5	25	160L	33	2930	6.1	650	200	240	89.3	88.8	86.2	0.87	0.82	0.75	0.28	180
22	30	180M	39	2940	7.3	650	250	290	89.9	89.3	87.5	0.87	0.82	0.75	0.42	280
30	40	200L	54	2920	10.0	650	220	264	90.7	90.0	88.4	0.85	0.78	0.71	0.64	330
37	50	200L	64	2950	12.2	650	240	290	91.2	90.7	88.5	0.88	0.84	0.75	0.75	350
45	60	225M	80	2955	14.8	650	250	290	91.7	91.2	88.8	0.85	0.78	0.71	0.91	430
55	75	250M	95	2960	18.1	650	240	285	92.1	91.6	89.4	0.87	0.80	0.72	1.8	520
75	100	280S	130	2975	24.6	650	180	215	92.7	92.2	90.0	0.87	0.80	0.72	6.6	750
90	120	280M	150	2975	29.5	650	170	205	93.0	92.4	90.4	0.90	0.84	0.77	8.2	800
110	150	315S	185	2980	36.0	650	180	215	93.3	92.7	90.7	0.89	0.83	0.76	11.6	1070
125	170	315M	209	2980	40.9	650	185	220	93.4	93.0	90.8	0.89	0.83	0.76	12.7	1150
132	180	315M	220	2980	43.1	650	165	200	93.5	93.1	91.0	0.89	0.83	0.76	13.9	1200
150	200	315L	250	2980	49.0	650	180	200	93.7	93.3	91.3	0.89	0.82	0.76	14.3	1290
160	215	315L	265	2980	52.3	650	180	200	93.8	93.4	91.4	0.90	0.84	0.77	14.3	1380
180	240	315L	300	2980	58.8	650	175	210	93.9	93.4	91.5	0.89	0.83	0.76	16.0	1480
200	270	315L	340	2983	65.3	650	175	210	94.0	93.5	91.7	0.87	0.80	0.72	18.9	1560

Note

Frames 63-80 are with T. Box on Top

Frames 90-180 are with T. Box on RHS

Frames 200-315 are with T. Box on Top

All frames can be offered with T.Box on Top / LHS / RHS on request.

For rating beyond 200 kW refer to LHP Sales Office.

Performance of all 8 pole motors & ratings below 0.37 kW shall be as per LHP catalogue, since these are not covered in IS 12615-2011.

For Gas Group IIC refer to LHP sales office.

Flame Proof IE1 Motors

Foot Mounted (B3), 3 Phase Squirrel Cage TEFC Induction Motors suitable for 415V±10%, 50HZ±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 45°C, Duty S1, Efficiency IE1, conforms to IS/IEC 60079-1:2007/IS12615 : 2011,IEC 60034-30-2008, Gas Group IIA/IIB, Temp. class T3.

Performance Table for 4 Pole Motors

Rated Output		Frame Size	Rated Current Amps	Rated Speed RPM	Rated Torque kgm	Starting Current % of Rated Current	Starting Torque % of Rated Torque	Pull Out Torque % of Rated Torque	Efficiency %			Power Factor			Rotor GD^2 kgm^2	Approx. Net Weight kg CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.18	0.25	63	0.58	1370	0.13	310	210	280	64.0	60.0	52.0	0.69	0.63	0.50	0.0014	13
0.18	0.25	71	0.7	1400	0.17	450	200	260	64.0	60.0	52.0	0.69	0.63	0.50	0.0034	16
0.25	0.33	71	0.7	1400	0.17	450	200	260	68.0	67.0	60.0	0.73	0.65	0.55	0.0034	16
0.37	0.5	71	1.2	1410	0.26	550	270	290	65.1	64.5	63.0	0.66	0.60	0.50	0.0034	17
0.55	0.75	80	1.6	1410	0.38	550	200	240	69.1	68.5	67.0	0.69	0.62	0.54	0.0077	23
0.75	1.0	80	2	1395	0.52	550	220	270	72.1	71.5	70.0	0.72	0.67	0.55	0.0086	25
1.1	1.5	90S	2.7	1410	0.76	550	210	250	75.0	74.4	72.8	0.76	0.72	0.64	0.014	43
1.5	2.0	90L	3.6	1415	1.0	550	200	240	77.2	76.5	75.0	0.75	0.70	0.62	0.015	47
2.2	3.0	100L	5.1	1420	1.5	650	200	240	79.7	79.1	77.2	0.75	0.70	0.58	0.029	63
3.7	5.0	112M	7.8	1430	2.5	650	230	270	82.7	82.0	80.5	0.80	0.74	0.64	0.057	83
5.5	7.5	132S	11.4	1440	3.7	650	200	250	84.7	84.2	82.6	0.79	0.74	0.63	0.093	110
7.5	10	132M	15.4	1450	5.0	650	180	220	86.0	85.5	84.0	0.79	0.74	0.63	0.12	118
9.3	12.5	160M	19	1450	6.2	650	180	220	87.0	86.2	84.2	0.78	0.73	0.62	0.17	150
11	15	160M	22	1455	7.4	650	200	240	87.6	87.0	85.4	0.79	0.74	0.63	0.20	160
15	20	160L	30	1460	10.0	650	260	290	88.7	88.2	86.5	0.78	0.73	0.62	0.26	177
18.5	25	180M	35	1470	12.3	650	260	295	89.3	88.7	86.7	0.82	0.77	0.65	0.66	265
22	30	180L	41	1470	14.6	650	260	290	89.9	89.4	87.6	0.83	0.78	0.66	0.84	285
30	40	200L	44	1475	19.8	650	260	290	90.7	90.2	88.0	0.85	0.80	0.70	1.2	330
37	50	225S	67	1470	24.5	650	230	280	91.2	90.7	89.5	0.84	0.79	0.68	1.5	390
45	60	225M	84	1480	29.6	650	160	200	91.7	91.0	89.8	0.81	0.76	0.65	1.7	438
55	75	250M	98	1490	36.0	650	160	200	92.1	91.5	90.7	0.85	0.79	0.68	3.2	600
75	100	280S	134	1485	49.2	650	190	230	92.7	92.0	90.2	0.84	0.79	0.68	7.2	840
90	120	280M	164	1485	59.0	650	175	210	93.0	92.5	90.6	0.82	0.77	0.66	8.3	860
110	150	315S	204	1488	72.0	650	170	210	93.3	92.8	90.9	0.80	0.75	0.65	11.6	1325
125	170	315M	234	1488	81.8	650	170	210	93.4	92.9	91.0	0.80	0.73	0.65	12.6	1398
132	180	315M	245	1490	86.3	650	170	210	93.5	93.0	91.1	0.80	0.75	0.67	14.0	1460
150	200	315L	275	1490	98.1	650	170	210	93.7	93.2	92.3	0.81	0.75	0.66	27.9	1490
160	215	315L	288	1490	104.6	650	170	210	93.8	93.3	92.4	0.82	0.77	0.67	27.9	1540
180	240	315L	321	1490	117.7	650	170	210	93.9	93.4	92.5	0.83	0.79	0.66	30.7	1585
200	270	315L	348	1490	130.7	650	170	210	94.0	93.5	92.6	0.85	0.80	0.68	30.7	1610

Note

Frames 63-80 are with T. Box on Top

Frames 90-180 are with T. Box on RHS

Frames 200-315 are with T. Box on Top

All frames can be offered with T.Box on Top / LHS / RHS on request.

For rating beyond 200 kW refer to LHP Sales Office.

Performance of all 8 pole motors & ratings below 0.37 kW shall be as per LHP catalogue, since these are not covered in IS 12615-2011.

For Gas Group IIC refer to LHP sales office.

LHP MOTORS DRIVES
Driven by Commitment

Flame Proof IE1 Motors

Foot Mounted (B3), 3 Phase Squirrel Cage TEFC Induction Motors suitable for 415V±10%, 50HZ±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 45°C, Duty S1, Efficiency IE1, conforms to IS/IEC 60079-1:2007/IS12615 : 2011,IEC 60034-30-2008, Gas Group IIA/IIB, Temp. class T3.

Performance Table for 6 Pole Motors

Rated Output		Frame Size	Rated Current Amps	Rated Speed RPM	Rated Torque kgm	Starting Current % of Rated Current	Starting Torque % of Rated Torque	Pull Out Torque % of Rated Torque	Efficiency %			Power Factor			Rotor GD^2 kgm^2	Approx. Net Weight kg CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.37	0.5	80	1.4	910	0.40	550	180	215	63.0	62.5	60.4	0.58	0.54	0.46	0.007	17
0.55	0.75	80	1.9	900	0.60	550	160	200	67.0	66.4	64.5	0.60	0.55	0.48	0.0093	20
0.75	1	90S	2.3	920	0.79	550	175	210	70.0	66.5	64.8	0.65	0.60	0.50	0.016	48
1.1	1.5	90L	3.2	940	1.1	550	200	240	72.9	72.3	70.4	0.66	0.61	0.51	0.02	51
1.5	2	100L	3.8	935	1.6	550	175	210	75.2	75.0	73.2	0.73	0.68	0.60	0.032	53
2.2	3	112M	5.5	955	2.2	650	170	205	77.7	77.2	75.0	0.72	0.67	0.55	0.072	83
3.7	5	132S	8.7	960	3.8	650	200	240	80.9	80.4	77.7	0.73	0.68	0.56	0.13	112
5.5	7.5	132M	12.7	970	5.5	650	210	205	83.1	82.5	80.4	0.73	0.68	0.56	0.17	117
7.5	10	160M	16.7	965	7.6	650	195	235	84.7	84.2	82.2	0.74	0.69	0.57	0.43	158
9.3	12.5	160L	19	975	9.3	650	200	240	85.6	85.0	83.0	0.80	0.75	0.64	0.58	175
11	15	160L	22	970	11.0	650	190	230	86.4	86.0	83.8	0.81	0.75	0.65	0.66	188
15	20	180L	29	970	15.1	650	220	260	87.7	87.2	85.2	0.82	0.76	0.67	1.0	285
18.5	25	200L	35	980	18.4	650	215	260	88.6	88.1	85.8	0.83	0.78	0.70	1.4	320
22	30	200L	44	975	22.0	650	210	250	89.2	88.5	86.2	0.78	0.73	0.61	1.6	345
30	40	225M	59	980	29.8	650	210	250	90.2	89.7	86.6	0.78	0.73	0.61	2.3	430
37	50	250M	72	980	36.8	650	210	250	90.8	90.3	87.0	0.79	0.74	0.62	3.6	615
45	60	280S	87	985	44.5	650	200	240	91.4	91.0	89.1	0.79	0.74	0.62	8.0	880
55	75	280M	107	985	54.4	650	200	240	91.9	91.2	89.7	0.78	0.73	0.61	9.9	940
75	100	315S	145	988	73.9	650	195	235	92.6	92.1	90.0	0.78	0.73	0.61	14.1	1180
90	120	315M	175	988	88.7	650	190	230	92.9	92.4	90.3	0.77	0.72	0.60	17.0	1340
110	150	315M	214	989	108.3	650	190	230	93.3	92.7	90.6	0.77	0.72	0.60	19.0	1400
125	170	315M	245	989	123.1	650	185	220	93.4	92.8	90.7	0.76	0.71	0.58	20.0	1450
132	180	315L	257	990	129.9	650	180	215	93.5	92.9	90.8	0.76	0.71	0.58	29.9	1490
150	200	315L	297	990	147.6	650	180	215	93.7	93.2	92.3	0.75	0.70	0.57	34.0	1580

Note

Frames 63-80 are with T. Box on Top

Frames 90-180 are with T. Box on RHS

Frames 200-315 are with T. Box on Top

All frames can be offered with T.Box on Top / LHS / RHS on request.

For rating beyond 200 kW refer to LHP Sales Office.

Performance of all 8 pole motors & ratings below 0.37 kW shall be as per LHP catalogue, since these are not covered in IS 12615-2011.

For Gas Group IIC refer to LHP sales office.

Flame Proof IE2 Motors

Foot Mounted (B3), 3 Phase Squirrel Cage TEFC Induction Motors suitable for 415V±10%, 50HZ±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 45°C, Duty S1, Efficiency IE2, conforms to IS/IEC 60079-1:2007/IS12615 : 2011,IEC 60034-30-2008, Gas Group IIA/IIB, Temp. class T3.

Performance Table for 2 Pole Motors

Rated Output		Frame Size	Rated Current Amps	Rated Speed RPM	Rated Torque kgm	Starting Current % of Rated Current	Starting Torque % of Rated Torque	Pull Out Torque % of Rated Torque	Efficiency %			Power Factor			Rotor GD^2 kgm^2	Approx. Net Weight kg CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.37	0.5	71	0.95	2770	0.13	650	200	250	72.2	71.7	70.5	0.75	0.70	0.58	0.0015	20
0.37	0.75	80	0.95	2770	0.13	650	200	250	72.2	71.7	70.5	0.75	0.70	0.58	0.0015	25
0.55	0.75	71	1.27	2780	0.19	650	200	250	74.8	74.0	73.2	0.81	0.76	0.60	0.0021	24
0.75	1.0	80	1.75	2790	0.26	650	190	240	77.4	76.6	75.0	0.77	0.72	0.64	0.0036	25
1.1	1.5	80	2.5	2800	0.38	650	200	250	79.6	79.0	77.8	0.77	0.71	0.63	0.0036	38
1.5	2.0	90S	3.3	2875	0.51	650	230	280	81.3	80.8	78.6	0.78	0.74	0.67	0.0073	46
2.2	3.0	90L	4.4	2885	0.74	700	230	280	83.2	82.6	80.6	0.84	0.80	0.65	0.0089	48
3.7	5.0	100L	7.0	2905	1.2	700	250	295	85.5	85.0	83.0	0.86	0.80	0.72	0.022	62
5.5	7.5	132S	10.2	2910	1.8	700	170	210	87.0	86.7	85.0	0.86	0.82	0.68	0.052	120
7.5	10.0	132S	13.5	2930	2.5	700	170	220	88.1	87.3	85.5	0.88	0.82	0.74	0.068	130
11.0	15	160M	19.0	2940	3.6	700	230	280	89.4	88.8	87.0	0.90	0.85	0.76	0.17	155
15.0	20	160M	25.5	2940	5.0	700	170	220	90.3	89.8	88.2	0.91	0.86	0.76	0.22	170
18.5	25	160L	32	2940	6.1	700	210	260	90.9	90.5	88.5	0.88	0.84	0.73	0.28	178
22	30	180M	37	2940	7.3	700	245	290	91.3	91.0	89.0	0.91	0.86	0.76	0.42	335
30	40	200L	51	2950	9.9	700	240	295	92.0	91.6	90.0	0.89	0.84	0.74	0.64	370
37	50	200L	62	2955	12.2	700	250	290	92.5	92.0	90.2	0.90	0.85	0.75	0.75	398
45	60	225M	75	2960	14.8	700	220	270	92.9	92.3	90.7	0.90	0.86	0.77	0.91	485
55	75	250M	91	2965	18.1	700	170	220	93.2	92.6	91.0	0.90	0.86	0.76	1.8	585
75	100	280S	126	2965	24.6	700	180	230	93.8	93.0	91.3	0.88	0.81	0.70	6.63	820
90	120	280M	148	2970	29.5	700	180	230	94.1	93.5	91.6	0.90	0.85	0.76	8.18	890
110	150	315S	183	2980	36.0	700	180	230	94.3	93.9	92.0	0.89	0.85	0.76	11.55	1120
125	170	315M	208	2980	40.9	700	180	230	94.5	94.0	92.2	0.88	0.82	0.68	12.7	1290
132	180	315M	218	2980	43.1	700	190	230	94.6	94.1	92.4	0.89	0.84	0.70	13.89	1350
150	200	315L	250	2980	49.0	700	180	230	94.7	94.3	92.5	0.88	0.83	0.71	14.3	1470
160	215	315L	263	2980	52.3	700	180	230	94.8	94.4	92.6	0.89	0.84	0.72	14.3	1520
180	240	315L	296	2980	58.8	700	180	230	94.9	94.5	92.7	0.89	0.83	0.73	15.96	1670
200	270	315L	325	2980	65.4	700	180	230	95.0	94.5	92.7	0.90	0.84	0.76	18.87	1740

Note

Frames 71-80 are with T. Box on Top

Frames 90-180 are with T. Box on RHS

Frames 200-315 are with T. Box on Top

All frames can be offered with T.Box on Top / LHS / RHS on request.

For Gas Group IIC refer to LHP sales office.

Flame Proof IE2 Motors

Foot Mounted (B3), 3 Phase Squirrel Cage TEFC Induction Motors suitable for 415V±10%, 50HZ±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 45°C, Duty S1, Efficiency IE2, conforms to IS/IEC 60079-1:2007/IS12615 : 2011,IEC 60034-30-2008, Gas Group IIA/IIB, Temp. class T3.

Performance Table for 4 Pole Motors

Rated Output		Frame Size	Rated Current Amps	Rated Speed RPM	Rated Torque kgm	Starting Current % of Rated Current	Starting Torque % of Rated Torque	Pull Out Torque % of Rated Torque	Efficiency %			Power Factor			Rotor GD^2 kgm^2	Approx. Net Weight kg CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.37	0.50	71	1.0	1400	0.26	600	250	290	70.1	69.5	65.0	0.73	0.70	0.62	0.0034	20
0.37	0.50	80	1.0	1400	0.26	600	250	290	70.1	69.5	65.0	0.73	0.70	0.62	0.0034	24
0.55	0.75	80	1.4	1400	0.38	600	240	290	75.1	74.7	72.0	0.73	0.68	0.60	0.0077	26
0.75	1.0	80	1.8	1410	0.52	600	240	280	79.6	79.2	75.8	0.73	0.68	0.60	0.0086	27
1.1	1.5	90S	2.4	1420	0.75	600	250	290	81.4	81.0	78.5	0.78	0.73	0.62	0.014	46
1.5	2.0	90L	3.2	1430	1.02	600	250	295	82.8	82.3	79.5	0.79	0.74	0.62	0.015	50
2.2	3.0	100L	5.0	1430	1.50	700	250	290	84.3	84.0	81.5	0.73	0.68	0.60	0.03	66
3.7	5.0	112M	7.6	1445	2.49	700	250	290	86.3	85.5	82.4	0.78	0.72	0.61	0.06	88
5.5	7.5	132S	10.5	1450	3.69	700	190	240	87.7	87.1	84.8	0.83	0.79	0.71	0.09	120
7.5	10.0	132M	14.5	1450	5.04	700	210	260	88.7	88.2	86.3	0.81	0.77	0.62	0.12	130
11	15	160M	20	1460	7.34	700	220	270	89.8	89.4	87.6	0.85	0.81	0.72	0.20	178
15	20	160L	27	1460	10.0	700	200	240	90.6	90.1	88.2	0.85	0.81	0.72	0.26	195
18.5	25	180M	33	1460	12.3	700	200	250	91.2	90.8	89.2	0.86	0.82	0.74	0.66	286
22	30	180L	40	1460	14.7	700	250	295	91.6	91.2	89.6	0.84	0.80	0.71	0.84	320
30	40	200L	52	1465	19.9	700	170	220	92.3	92.0	90.4	0.87	0.83	0.70	1.19	365
37	50	225S	65	1475	24.4	700	190	240	92.7	92.3	90.7	0.85	0.81	0.73	1.46	450
45	60	225M	76	1480	29.6	700	220	270	93.1	92.6	91.0	0.88	0.84	0.76	1.71	510
55	75	250M	95	1480	36.2	700	180	220	93.5	93.0	91.2	0.86	0.82	0.72	3.20	680
75	100	280S	132	1480	49.4	700	190	230	94.0	93.5	92.0	0.84	0.80	0.71	7.21	940
90	120	280M	157	1480	59.2	700	200	250	94.2	93.8	92.4	0.85	0.80	0.72	8.25	960
110	150	315S	190	1490	71.9	700	220	270	94.5	94.0	92.5	0.85	0.81	0.72	11.62	1430
125	170	315M	210	1485	82.0	700	200	240	94.6	94.2	92.6	0.88	0.82	0.74	12.60	1515
132	180	315M	220	1485	86.6	700	200	240	94.7	94.2	92.7	0.88	0.80	0.72	13.98	1580
150	200	315L	253	1485	98.4	700	180	230	94.9	94.4	92.7	0.87	0.82	0.70	27.88	1650
160	215	315L	271	1485	104.9	700	180	230	94.9	94.5	92.8	0.87	0.83	0.71	27.88	1710
180	240	315L	306	1485	118.1	700	180	230	95.1	94.5	92.9	0.86	0.81	0.75	28.50	1840
200	270	315L	343	1485	131.2	700	180	230	95.1	94.6	93.0	0.85	0.82	0.76	30.74	1900

Note

Frames 71-80 are with T. Box on Top

Frames 90-180 are with T. Box on RHS

Frames 200-315 are with T. Box on Top

All frames can be offered with T.Box on Top / LHS / RHS on request.

For Gas Group IIC refer to LHP sales office.

Flame Proof IE2 Motors

Foot Mounted (B3), 3 Phase Squirrel Cage TEFC Induction Motors suitable for 415V±10%, 50HZ±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 45°C, Duty S1, Efficiency IE2, conforms to IS/IEC 60079-1:2007/IS12615 : 2011,IEC 60034-30-2008, Gas Group IIA/IIB, Temp. class T3.

Performance Table for 6 Pole Motors

Rated Output		Frame Size	Rated Current Amps	Rated Speed RPM	Rated Torque kgm	Starting Current % of Rated Current	Starting Torque % of Rated Torque	Pull Out Torque % of Rated Torque	Efficiency %			Power Factor			Rotor GD^2 kgm^2	Approx. Net Weight kg CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.37	0.5	80	1.2	900	0.40	600	220	260	69.0	68.5	66.5	0.62	0.55	0.42	0.007	18
0.55	0.75	80	1.5	900	0.60	600	200	250	72.9	72.4	70.0	0.70	0.66	0.54	0.009	22
0.75	1.0	90S	2.2	910	0.80	600	200	250	75.9	75.4	72.5	0.62	0.57	0.45	0.016	50
1.1	1.5	90L	3.0	910	1.2	600	200	250	78.1	77.5	75.0	0.65	0.60	0.50	0.020	53
1.5	2.0	100L	3.7	915	1.6	600	180	230	79.8	79.3	77.2	0.71	0.66	0.53	0.032	55
2.2	3.0	112M	5.3	940	2.3	700	180	230	81.8	81.4	78.5	0.71	0.66	0.55	0.072	86
3.7	5.0	132S	8.4	950	3.8	700	190	240	84.3	83.8	80.6	0.73	0.68	0.57	0.1	116
5.5	7.5	132M	12.5	960	5.6	700	190	240	86.0	85.4	82.6	0.71	0.65	0.54	0.2	122
7.5	10.0	160M	15.5	965	7.6	700	180	230	87.2	86.7	83.5	0.77	0.71	0.60	0.4	170
11.0	15	160L	21.6	970	11.0	700	180	230	88.7	88.2	85.3	0.80	0.76	0.64	0.7	200
15.0	20	180L	30	970	15.1	700	170	220	89.7	89.0	86.0	0.78	0.73	0.62	1.0	300
18.5	25	200L	36	970	18.6	700	170	220	90.4	90.0	87.6	0.79	0.75	0.63	1.4	380
22	30	200L	43	975	22.0	700	185	230	90.9	90.4	88.0	0.79	0.75	0.63	1.6	410
30	40	225M	54	980	29.8	700	220	260	91.7	91.0	88.5	0.84	0.80	0.68	2.3	500
37	50	250M	67	980	36.8	700	200	240	92.2	91.6	88.7	0.83	0.77	0.65	3.6	710
45	60	280S	82	985	44.5	700	200	240	92.7	92.0	89.2	0.82	0.75	0.61	8.0	970
55	75	280M	98	985	54.4	700	200	240	93.1	92.5	90.0	0.84	0.77	0.65	9.9	1290
75	100	315S	136	988	73.9	700	210	250	93.7	93.0	91.4	0.82	0.78	0.66	14.1	1360
90	120	315M	161	988	88.7	700	210	250	94.0	93.4	91.7	0.83	0.77	0.65	17.0	1455
110	150	315M	195	988	108.4	700	210	250	94.3	93.7	91.8	0.83	0.77	0.61	19.0	1540
125	170	315M	220	990	123.0	700	210	250	94.4	94.0	92.4	0.84	0.78	0.67	21.6	1600
132	180	315L	235	990	129.9	700	210	250	94.6	94.1	92.7	0.83	0.77	0.65	29.9	1650
150	200	315L	279	990	177.1	700	210	250	94.7	94.2	89.9	0.79	0.72	0.59	33.3	1780

Note

Frames 71-80 are with T. Box on Top

Frames 90-180 are with T. Box on RHS

Frames 200-315 are with T. Box on Top

All frames can be offered with T.Box on Top / LHS / RHS on request.

For Gas Group IIC refer to LHP sales office.

Flame Proof IE3 Motors

Foot Mounted (B3), 3 Phase Squirrel Cage TEFC Induction Motors suitable for 415V±10%, 50HZ±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 45°C, Duty S1, Efficiency IE3, conforms to IS/IEC 60079-1:2007/IS12615 : 2011,IEC 60034-30-2008, Gas Group IIA/IIB, Temp. class T3.

Performance Table for 2 Pole Motors

Rated Output		Frame Size	Rated Current Amps	Rated Speed RPM	Rated Torque kgm	Starting Current % of Rated Current	Starting Torque % of Rated Torque	Pull Out Torque % of Rated Torque	Efficiency %			Power Factor			Rotor GD^2 kgm^2	Approx. Net Weight kg CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.37	0.50	71	0.90	2850	0.13	700	200	250	75.5	75.0	72.0	0.76	0.70	0.62	0.0015	★★
0.55	0.75	71	1.25	2770	0.19	700	270	295	78.1	77.6	75.0	0.78	0.74	0.65	0.0021	★★
0.75	1.0	90S	1.50	2885	0.25	700	200	250	80.7	79.5	76.0	0.86	0.82	0.70	0.0036	★★
1.1	1.5	90S	2.00	2900	0.37	700	225	275	82.7	81.5	75.8	0.93	0.77	0.65	0.0036	★★
1.5	2.0	90S	3.00	2900	0.50	700	250	290	84.2	83.0	80.3	0.83	0.80	0.68	0.0073	★★
2.2	3.0	90L	4.10	2905	0.74	770	275	295	85.9	84.5	82.2	0.87	0.80	0.70	0.0089	★★
3.7	5.0	100L	7.00	2910	1.24	770	250	290	87.8	86.7	84.5	0.84	0.82	0.71	0.022	★★
5.5	7.5	132S	9.80	2930	1.83	770	150	200	89.2	88.5	86.0	0.88	0.82	0.70	0.052	★★
7.5	10	132M	13.1	2930	2.49	770	250	290	90.1	89.1	87.2	0.88	0.82	0.70	0.068	★★
11	15	160M	18.3	2945	3.64	770	250	290	91.2	90.5	88.0	0.92	0.86	0.75	0.17	★★
15	20	160M	25.4	2940	4.97	770	250	295	91.9	91.2	89.5	0.89	0.84	0.80	0.22	★★
18.5	25	160L	31.1	2930	6.15	770	250	290	92.4	91.7	89.9	0.90	0.84	0.79	0.28	★★
22	30	180M	36.2	2945	7.28	770	175	225	92.7	92.0	90.3	0.91	0.86	0.76	0.42	★★
30	40	225S	49.0	2950	9.91	770	250	280	93.3	92.6	91.5	0.91	0.86	0.76	0.64	★★
37	60	225M	60.4	2955	12.2	770	220	250	93.7	93.1	92.1	0.91	0.85	0.76	0.78	★★
45	60	250M	73.0	2965	14.8	770	220	250	94.0	93.2	92.3	0.91	0.85	0.78	1.47	★★
55	75	250M	85.0	2970	18.0	770	200	240	94.3	93.6	92.7	0.95	0.90	0.78	1.80	★★
75	100	280S	121	2975	24.6	770	195	255	94.7	94.0	93.2	0.91	0.82	0.77	6.63	★★
90	120	280M	144	2975	29.5	770	190	240	95.0	94.3	93.3	0.92	0.84	0.78	8.18	★★
110	150	315S	172	2980	36.0	770	195	250	95.2	94.5	93.8	0.93	0.85	0.79	11.55	★★
125	170	315M	190	2980	40.9	770	190	245	95.3	94.7	94.0	0.96	0.90	0.78	12.70	★★
132	180	315M	205	2980	43.1	770	180	235	95.4	94.9	94.1	0.94	0.90	0.78	13.89	★★
150	200	315L	238	2983	49.0	770	185	240	95.5	94.9	94.2	0.92	0.85	0.78	13.40	★★
160	215	315L	250	2985	52.2	770	185	240	95.6	95.0	94.3	0.93	0.87	0.80	14.30	★★

Note

Frames 71-80 are with T. Box on Top

Frames 90-180 are with T. Box on RHS

Frames 200-315 are with T. Box on Top

All frames can be offered with T.Box on Top / LHS / RHS on request.

For higher ratings up to 200 kW refer to LHP Sales Office

For Gas Group IIC refer to LHP sales office.

** Please contact LHPL.

Flame Proof IE3 Motors

Foot Mounted (B3), 3 Phase Squirrel Cage TEFC Induction Motors suitable for 415V±10%, 50HZ±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 45°C, Duty S1, Efficiency IE3, conforms to IS/IEC 60079-1:2007/IS12615 : 2011,IEC 60034-30-2008, Gas Group IIA/IIB, Temp. class T3.

Performance Table for 4 Pole Motors

Rated Output		Frame Size	Rated Current Amps	Rated Speed RPM	Rated Torque kgm	Starting Current % of Rated Current	Starting Torque % of Rated Torque	Pull Out Torque % of Rated Torque	Efficiency %			Power Factor			Rotor GD^2 kgm^2	Approx. Net Weight kg CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.37	0.50	71	1.00	1440	0.25	650	245	300	73.0	72.0	70.8	0.71	0.61	0.52	0.0034	★★
0.55	0.75	80	1.20	1440	0.37	650	245	300	78.0	77.1	76.0	0.82	0.76	0.65	0.0077	★★
0.75	1.0	90S	1.60	1450	0.50	650	235	295	82.5	81.7	80.8	0.79	0.70	0.66	0.014	★★
1.1	1.5	90S	2.10	1450	0.74	650	235	295	84.1	83.8	83.0	0.87	0.85	0.76	0.014	★★
1.5	2.0	90L	3.00	1450	1.01	650	240	300	85.3	84.0	83.7	0.82	0.77	0.66	0.015	★★
2.2	3.0	100L	4.30	1450	1.48	750	235	295	86.7	85.9	85.0	0.82	0.67	0.58	0.03	★★
3.7	5	112M	7.30	1460	2.47	750	245	300	88.4	87.6	86.8	0.80	0.75	0.62	0.06	★★
5.5	7.5	132S	10.0	1460	3.67	750	235	295	89.6	88.8	87.9	0.85	0.78	0.70	0.09	★★
7.5	10	132M	15.0	1460	5.00	750	195	255	90.4	89.6	88.8	0.77	0.71	0.62	0.12	★★
11	15	160M	18.5	1470	7.29	750	215	280	91.4	90.7	89.5	0.91	0.85	0.80	0.20	★★
15	20	160L	25.5	1475	9.91	750	220	286	92.1	91.2	90.4	0.89	0.74	0.66	0.26	★★
18.5	25	180M	31.0	1475	12.22	750	220	286	92.6	91.6	90.7	0.90	0.86	0.78	0.66	★★
22	30	180L	38.2	1478	14.50	750	215	280	93.0	92.1	91.0	0.86	0.82	0.77	0.84	★★
30	40	225S	49.0	1480	19.74	750	235	300	93.6	92.8	92.0	0.91	0.85	0.80	1.18	★★
37	50	250M	63.0	1480	24.35	750	225	290	93.9	93.0	92.1	0.87	0.85	0.76	2.20	★★
45	60	250M	74.4	1480	29.61	750	225	290	94.2	93.4	92.5	0.89	0.79	0.70	2.70	★★
55	75	250M	92.5	1482	36.15	750	215	280	94.6	93.6	92.7	0.87	0.85	0.76	3.20	★★
75	100	280S	132	1485	49.19	770	215	280	95.0	94.0	93.2	0.83	0.75	0.66	7.21	★★
90	120	280M	160	1485	59.03	770	220	286	95.2	94.2	93.5	0.82	0.78	0.70	8.25	★★
110	150	315S	190	1488	72.00	770	200	260	95.4	94.6	93.7	0.84	0.80	0.72	11.62	★★
125	170	315M	213	1488	81.82	770	195	254	95.5	94.7	93.8	0.85	0.81	0.74	12.60	★★
132	180	315M	225	1490	86.29	770	195	254	95.6	94.8	93.9	0.85	0.71	0.62	13.98	★★

Note

Frames 71-80 are with T. Box on Top

Frames 90-180 are with T. Box on RHS

Frames 200-315 are with T. Box on Top

All frames can be offered with T.Box on Top / LHS / RHS on request.

For higher ratings up to 200 kW refer to LHP Sales Office

For Gas Group IIC refer to LHP sales office.

** Please contact LHPL.

Flame Proof IE3 Motors

Foot Mounted (B3), 3 Phase Squirrel Cage TEFC Induction Motors suitable for 415V±10%, 50HZ±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 45°C, Duty S1, Efficiency IE3, conforms to IS/IEC 60079-1:2007/IS12615 : 2011,IEC 60034-30-2008, Gas Group IIA/IIB, Temp. class T3.

Performance Table for 6 Pole Motors

Rated Output		Frame Size	Rated Current Amps	Rated Speed RPM	Rated Torque kgm	Starting Current % of Rated Current	Starting Torque % of Rated Torque	Pull Out Torque % of Rated Torque	Efficiency %			Power Factor			Rotor GD^2 kgm^2	Approx. Net Weight kg CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.37	0.5	90S	1.10	910	0.40	650	190	230	71.9	71.0	69.0	0.65	0.60	0.50	0.0078	★★
0.55	0.75	90S	1.40	940	0.57	650	195	250	75.9	74.8	73.5	0.72	0.66	0.57	0.010	★★
0.75	1	90S	1.90	930	0.79	650	195	250	78.9	78.0	77.0	0.70	0.72	0.65	0.016	★★
1.1	1.5	100L	2.80	940	1.14	650	200	260	81.0	79.8	78.9	0.67	0.60	0.52	0.023	★★
1.5	2	100L	3.50	940	1.55	650	200	260	82.5	81.3	80.1	0.72	0.66	0.60	0.032	★★
2.2	3	112M	5.00	960	2.23	750	190	240	84.3	83.6	82.8	0.73	0.67	0.60	0.072	★★
3.7	5	132S	7.80	970	3.72	750	195	245	86.5	85.8	85.0	0.76	0.70	0.62	0.13	★★
5.5	7.5	132M	11.6	975	5.49	750	190	240	88.0	87.3	86.6	0.75	0.70	0.63	0.17	★★
7.5	10	160M	14.3	980	7.45	750	215	280	89.1	88.4	87.6	0.82	0.75	0.69	0.43	★★
11	15	160L	20.0	975	10.99	750	195	254	90.3	89.6	88.8	0.85	0.80	0.72	0.66	★★
15	20	180L	28.0	980	14.91	750	220	286	91.2	90.5	89.7	0.82	0.75	0.67	1.03	★★
18.5	25	200L	31.0	980	18.39	750	210	273	91.7	91.0	90.2	0.91	0.84	0.75	1.43	★★
22	30	225M	39.0	985	21.75	750	220	286	92.2	91.5	90.8	0.85	0.80	0.73	1.70	★★
30	40	250M	53.0	970	30.12	750	250	290	92.9	92.1	91.3	0.85	0.79	0.70	2.00	★★
37	50	250M	63.0	985	36.59	750	220	286	93.3	92.7	92.0	0.88	0.81	0.74	2.92	★★
45	60	280S	79.5	985	44.50	750	225	290	93.7	93.0	92.2	0.84	0.78	0.70	8.01	★★
55	75	280M	95.0	985	54.39	750	215	280	94.1	93.6	92.8	0.86	0.80	0.73	9.89	★★
75	100	315S	128	987	74.01	770	215	280	94.6	93.8	93.1	0.86	0.80	0.73	14.12	★★
90	120	315M	155	987	88.81	770	195	255	94.9	94.2	93.5	0.85	0.79	0.71	17.00	★★
110	150	315M	189	988	108.44	770	200	260	95.1	94.5	93.7	0.85	0.78	0.70	18.98	★★
125	170	315L	210	988	123.23	770	200	260	95.2	94.6	93.8	0.87	0.80	0.71	21.60	★★
132	180	315L	224	990	129.87	770	195	255	95.4	94.8	94.0	0.86	0.80	0.72	29.94	★★

Note

Frames 71-80 are with T. Box on Top

Frames 90-180 are with T. Box on RHS

Frames 200-315 are with T. Box on Top

All frames can be offered with T.Box on Top / LHS / RHS on request.

For higher ratings up to 200 kW refer to LHP Sales Office

For Gas Group IIC refer to LHP sales office.

** Please contact LHPL.

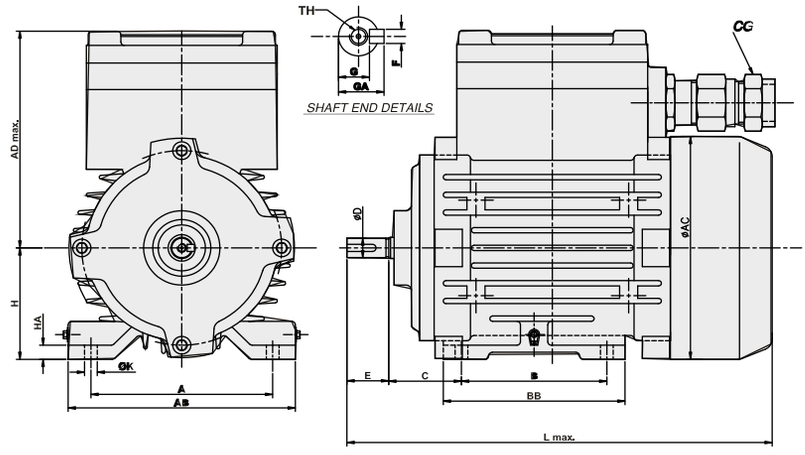
Dimensions of Foot Mounted Flame - Proof Motor (B3 MOUNTING As per IS : 1231)

Table No. 16

Frame Size	H 0.5	C	A	AB	HA	ØK	B	BB	AD MAX	AD* MAX	ØAC	ØD	E	F	G	GA	TH	L MAX IE1/IE2/IE3	L MAX For Brake Motor IE1/IE2/IE3	CG (METRIC) X NOS.
63	63	40	100	125	10	7	80	100	125	125	130	11j6	23	4	8.5	12.5	M5	250	350	M20 X 1
71	71	45	112	140	10	7	90	115	135	135	145	14j6	30	5	11.0	16.0	M5	285	372	M20 X 1
80	80	50	125	165	10	10	100	140	145	145	180	19j6	40	6	15.5	21.5	M6	310	415	M20 X 1
90S	90	56	140	180	12	10	100	170	247	243	192	24j6	50	8	20.0	27.0	M8	380	517	M20 X 1
90L	90	56	140	180	12	10	125	170	247	243	192	24j6	50	8	20.0	27.0	M8	380	517	M20 X 1
100L	100	63	160	208	13	12	140	188	262	258	217	28j6	60	8	24.0	31.0	M10	440	551	M20 X 1
112M	112	70	190	240	15	12	140	190	278	274	240	28j6	60	8	24.0	31.0	M10	465	588	M25 X 1
132S	132	89	216	265	16	12	140	240	285	295	272	38k6	80	10	33.0	41.0	M12	600	750	M25 X 2
132M	132	89	216	265	16	12	178	240	285	295	272	38k6	80	10	33.0	41.0	M12	600	750	M25 X 2
160M	160	108	254	314	18	15	210	314	319	320	316	42k6	110	12	37.0	45.0	M16	708	877	M40 X 2
160L	160	108	254	314	18	15	254	314	319	320	316	42k6	110	12	37.0	45.0	M16	708	877	M40 X 2
180M	180	121	279	340	26	15	241	340	415	360	358	48k6	110	14	42.5	51.5	M16	735	925	M40 X 2
180L	180	121	279	340	26	15	279	340	415	360	358	48k6	110	14	42.5	51.5	M16	735	925	M40 X 2
200L	200	133	318	390	25	19	305	380	415	415	381	55m6	110	16	49.0	59.0	M20	815	--	M40 X 2
225S (2P)	225	149	356	440	32	19	286	375	445		448	55m6	110	16	49.0	59.0	M20	860	--	M40 X 2
225S (4,6&8P)	225	149	356	440	32	19	286	375	445		448	60m6	140	18	53.0	64.0	M20	900	--	M40 X 2
225M (2P)	225	149	356	440	32	19	311	375	445		448	55m6	110	16	49.0	59.0	M20	860	--	M40 X 2
225M (4,6&8P)	225	149	356	440	32	19	311	375	445		448	60m6	140	18	53.0	64.0	M20	900	--	M40 X 2
250M (2P)	250	168	406	500	35	24	349	425	530	525	510	60m6	140	18	53.0	64.0	M20	1015	--	M50 X 2
250M (4,6&8P)	250	168	406	500	35	24	349	425	530	525	510	65m6	140	18	58.0	69.0	M20	1025	--	M50 X 2
280S (2P)	280	190	457	540	40	24	368	490	580		566	65m6	140	18	58.0	69.0	M20	1120	--	M50 X 2
280S (4,6&8P)	280	190	457	540	40	24	368	490	580		566	75m6	140	20	67.5	79.5	M20	1065	--	M50 X 2
280M (2P)	280	190	457	540	40	24	419	490	580		566	65m6	140	18	58.0	69.0	M20	1120	--	M50 X 2
280M (4,6&8P)	280	190	457	540	40	24	419	490	580		566	75m6	140	20	67.5	79.5	M20	1065	--	M50 X 2
315S (2P)	315	216	508	620	50	28	406	640	602		658	65m6	140	18	58.0	69.0	M20	1330	--	M50 X 2
315S (4,6&8P)	315	216	508	620	50	28	406	640	602		658	80m6	170	22	71.0	85.0	M20	1360	--	M50 X 2
315M (2P)	315	216	508	620	50	28	457	640	602		658	65m6	140	18	58.0	69.0	M20	1330	--	M50 X 2
315M (4,6&8P)	315	216	508	620	50	28	457	640	602		658	80m6	170	22	71.0	85.0	M20	1360	--	M50 X 2
315 (2P)	315	216	508	620	50	28	508	640	602		658	65m6	140	18	58.0	69.0	M20	1330	--	M50 X 2
315L (4,6&8P)	315	216	508	620	50	28	508	640	602		658	80m6	170	22	71.0	85.0	M20	1360	--	M50 X 2

* MARKED DIMENSION IS FOR GAS GROUP IIC APPLICATION MOTOR & OTHER DIMENSIONS ARE SAME AS ABOVE.
Note : Cable Gland size may be changed according to cable size as per customer requirement.

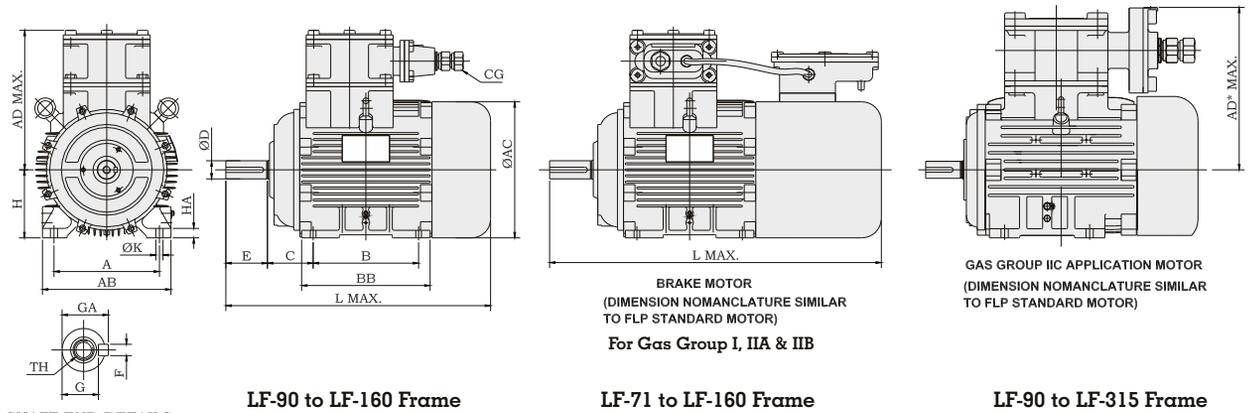
Note : Refer Table No. 16



LF 63 To 80 Frame Std. B3
Gas Group IIA, IIB & IIC

Dimensions of Foot Mounted Flame-Proof Motors (B-3 Mounting) as per IS : 1231

Note : Refer Table No. 16

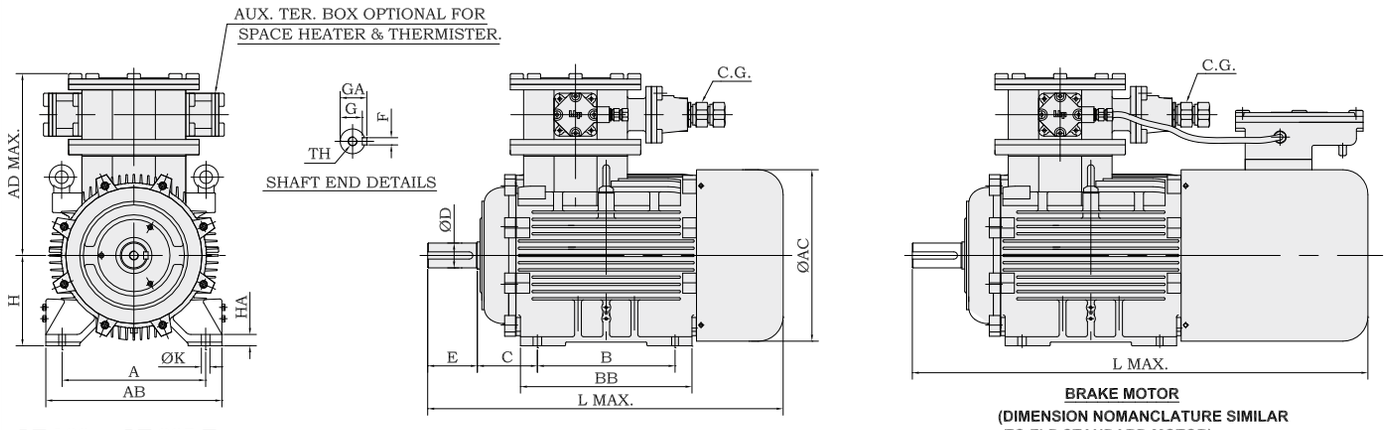


LF-90 to LF-160 Frame Gas Group I/IIA/IIB

LF-71 to LF-160 Frame Gas Group IIA/IIB

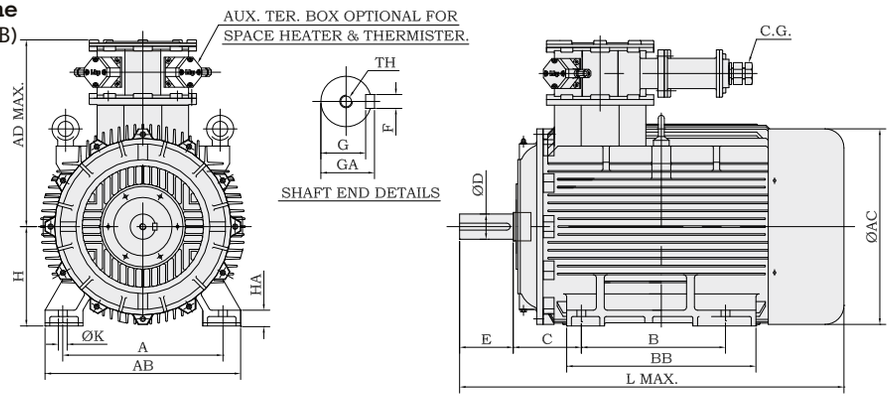
LF-90 to LF-315 Frame Gas Group IIC

Note : Refer Table No. 16



LF-180 to LF-225 Frame Gas Group I/IIA/IIB

LF-250 to LF-315 Frame
(For Gas Group I,IIA & IIB)



Note : Refer Table No. 16

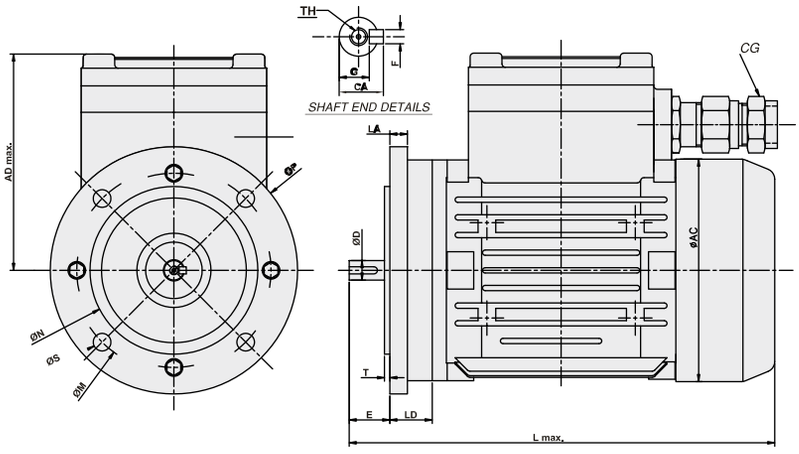
18.0 Dimensions For Flange Mounted Motors (B5 Mounting) as per IS-2223

Table No. 17

Frame Size	Flange No.	ØM ±0.3	ØN j6	ØP MIN	ØS X NO.	T	LA	LD	AD MAX	AD* MAX	ØAC	ØD	E	F	G	GA	TH	L MAX IE1/IE2/IE3	BRAKE MOTOR L MAX IE1/IE2/IE3	CG (METRIC) X NOS
63	F115B	115	95	140	10X4	3	10	–	125	125	130	11j6	23	4	8.5	12.5	M5	250	350	M20 X 1
71	F130B	130	110	160	10X4	3.5	10	19	135	135	145	14j6	30	5	11	16	M5	285	372	M20 X 1
80	F165B	165	130	200	12X4	3.5	10	16	145	145	180	19j6	40	6	15.5	21.5	M6	310	415	M20 X 1
90S/L	F165B	165	130	200	12X4	3.5	10	21	247	243	192	24j6	50	8	20	27	M8	380	517	M20 X 1
100L	F215B	215	180	250	15X4	4	11	23	262	258	217	28j6	60	8	24	31	M10	440	551	M20 X 1
112M	F215B	215	180	250	15X4	4	11	27	278	274	240	28j6	60	8	24	31	M10	465	588	M25 X 1
132S/M	F265B	265	230	300	15X4	4	12	34	295	291	272	38k6	80	10	33	41	M12	590	750	M25 X 2
160M/L	F300B	300	250	350	19X4	5	13	35	319	320	316	42k6	110	12	37	45	M16	708	877	M40 X 2
180M/L	F300B	300	250	350	19X4	5	13	55	415	360	358	48k6	110	14	42.5	51.5	M16	735	925	M40 X 2
200L	F350B	350	300	400	19X4	5	16	52	415	415	381	55m6	110	16	49	59	M20	800	---	M40 X 2
225S/M (2P)	F400B	400	350	450	19X8	5	16	48	445		448	55m6	110	16	49	59	M20	860	---	M40 X 2
225S/M (4,6&8P)	F400B	400	350	450	19X8	5	16	48	445		448	60m6	140	18	53	64	M20	900	---	M40 X 2
250M (2P)	F500B	500	450	550	19X8	5	22	55	540	525	510	60m6	140	18	53	64	M20	1025	---	M50 X 2
250M (4,6&8P)	F500B	500	450	550	19X8	5	22	55	540	525	510	65m6	140	18	58	69	M20	1050	---	M50 X 2
280S/M (2P)	F500B	500	450	550	19X8	5	22	50	558		566	65m6	140	18	58	69	M20	1120	---	M50 X 2
280S/M/L (4,6&8P)	F500B	500	450	550	19X8	5	22	50	558		566	75m6	140	20	67.5	79.5	M20	1145	---	M50 X 2
315S/M/L (2P)	F600B	600	550	660	24X8	6	22	45	602		658	65m6	140	18	58	69	M20	1310	---	M50 X 2
315S/M/L (4,6&8P)	F600B	600	550	660	24X8	6	22	45	602		680	80m6	170	22	71	85	M20	1310	---	M50 X 2

* MARKED DIMENSION IS FOR GAS GROUP IIC APPLICATION MOTOR & OTHER DIMENSIONS ARE SAME AS ABOVE.
Note : Cable Gland size may be changed according to cable size as per customer requirement.

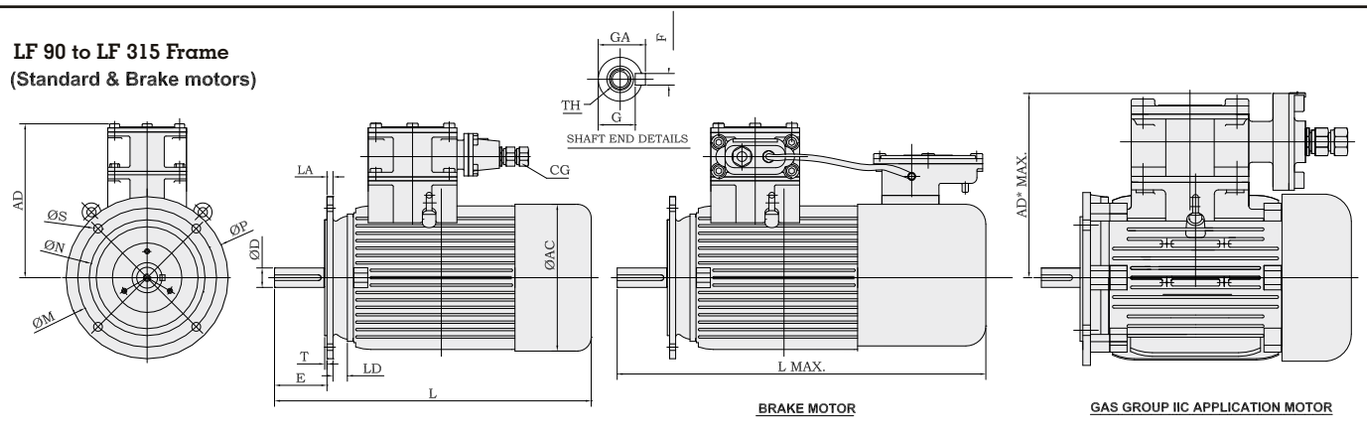
LF-63 to LF-80 Frame (IIA, IIB & IIC)



Note : Refer Table No. 17

18.0 Dimensions of Flange Mounted Flame-Proof Motors (B-5 Mounting) as per IS:2223

LF 90 to LF 315 Frame
(Standard & Brake motors)



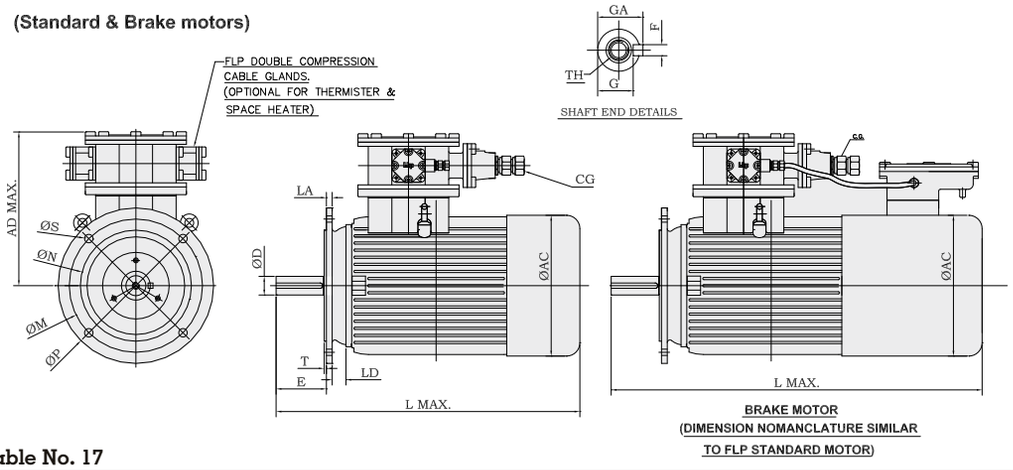
Note : Refer Table No. 17

LF-90 to LF-160 Frame
For Gas Group IIA & IIB

BRAKE MOTOR
(DIMENSION NOMANCLATURE SIMILAR TO FLP STANDARD MOTOR)
LF-71 to LF-160 Frame

GAS GROUP IIC APPLICATION MOTOR
(DIMENSION NOMANCLATURE SIMILAR TO FLP STANDARD MOTOR)
LF-90 to LF-315 Frame

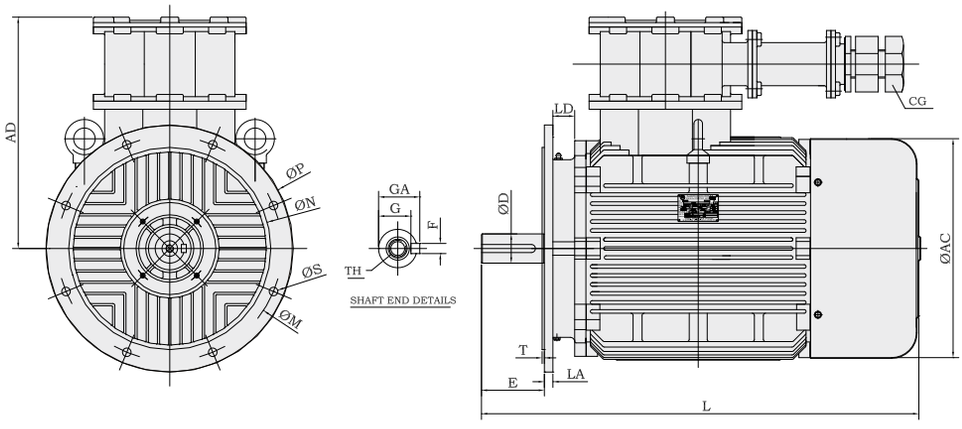
(Standard & Brake motors)



BRAKE MOTOR
(DIMENSION NOMANCLATURE SIMILAR TO FLP STANDARD MOTOR)

Note : Refer Table No. 17

LF-250 to LF-315 Frame
For Gas Group IIA & IIB



Note : Refer Table No. 17

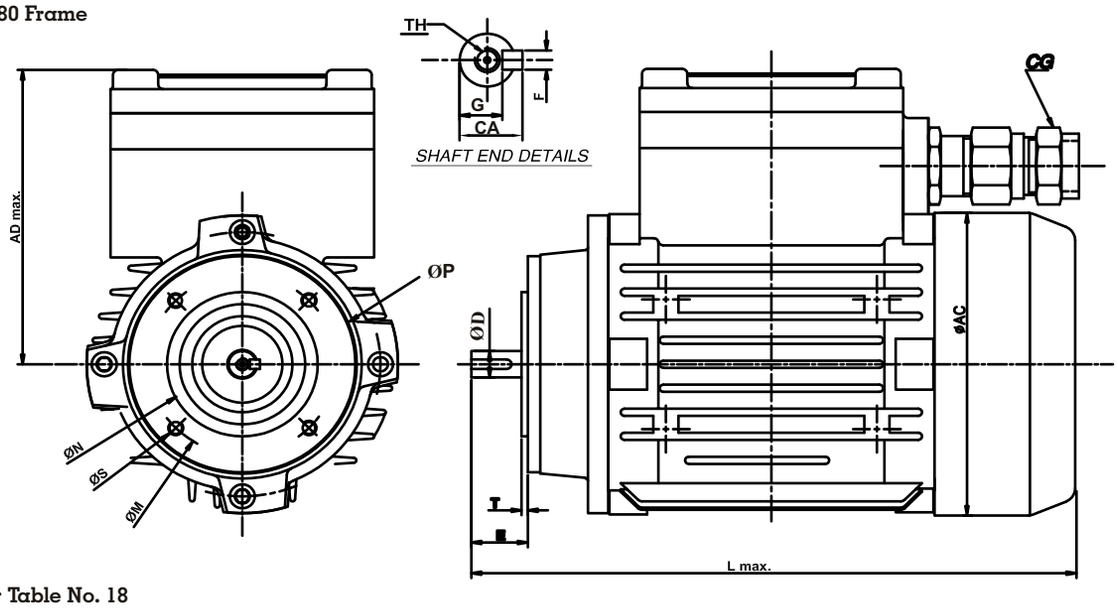
19.0 Dimensions of Face Mounted Flame-Proof Motors (B-14 Mounting) as per IS : 2223

Table No.18

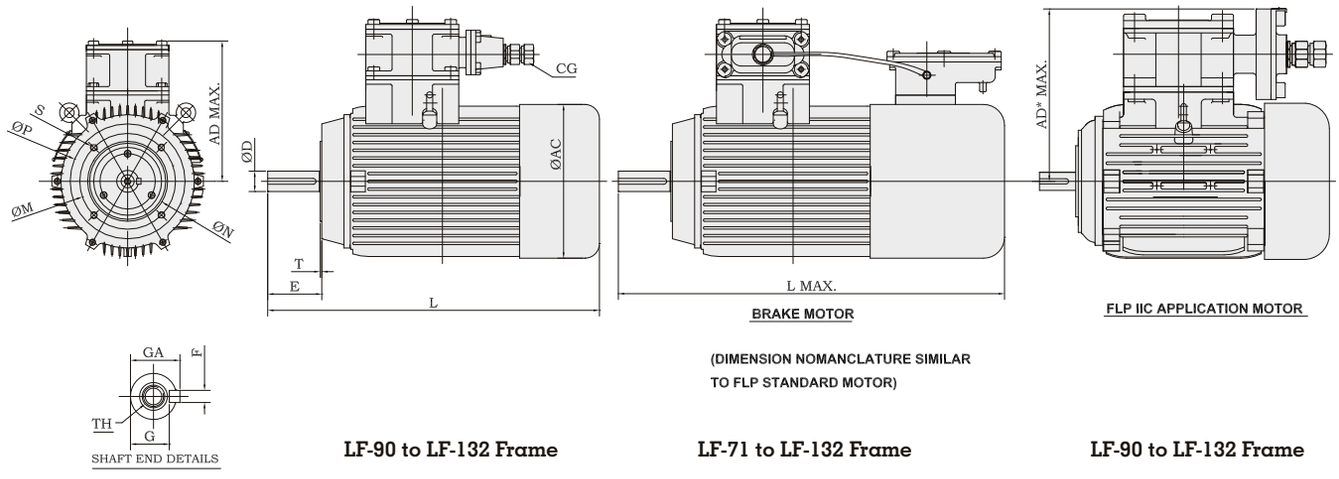
Frame Size	Flange No.	ØM 0.3	ØN j6	ØP MIN	S	T	AD MAX	AD* MAX	ØAC	OD	E	F	G	GA	TH	L MAX IE1/IE2/IE3	BRAKE MOTOR L MAX IE1/IE2/IE3	CG (METRIC) X NO.S
63	F75C	75	60	90	M5	2.5	125	125	130	11j6	23	4	8.5	12.5	M5	250	350	M20 X 1
71	F85C	85	70	105	M6	2.5	135	135	145	14j6	30	5	11	16	M5	285	375	M20 X 1
80	F100C	100	80	120	M6	3	145	145	180	19j6	40	6	15.5	21.5	M6	310	420	M20 X 1
90S/L	F115C	115	95	140	M8	3.5	247	243	192	24j6	50	8	20	27	M8	380	527	M20 X 1
100L	F130C	130	110	160	M8	3.5	259	258	217	28j6	60	8	24	31	M10	440	550	M20 X 1
112M	F130C	130	110	160	M8	3.5	278	274	240	28j6	60	8	24	31	M10	465	590	M25 X 1
132S/M	F165C	165	130	200	M12	3.5	295	291	272	38k6	80	10	33	41	M12	590	745	M25 X 2

* Marked dimension is for Gas Group IIC Application Motor & other dimensions are same as above.
Note : Cable Gland size may be changed according to cable size as per customer requirement.

LF-63 to LF-80 Frame



Note : Refer Table No. 18



LF-90 to LF-132 Frame | **LF-71 to LF-132 Frame** | **LF-90 to LF-132 Frame**

Note : Refer Below Table No. 18

A. Table No. 19 - Design and constructional features :

No.	Parameters	Standard Features	Optional Features
1	Construction : Motor Frame, End Shields, Flanges, Bearing cover	The components of these motors are made of cast Iron Aluminum having sufficient strength and dimensional stability.	The components fabricated from steel with necessary re-inforcement
2	Winding	Motors are designed with F class insulation & temp. rise is limited to the values specified in IS/IEC 600 79-15 Windings are impregnated with insulating varnish & baked. Overhang of the winding is treated with epoxy gel coat to give mechanical, electrical and thermal stability and strength	H class but temp. rise will be limited to B, F class with special insulating varnish/ impregnating resign with tropical & fungicidal treatment
3	Rotor	Rotors are made of die cast Aluminum with squirrel cage construction.	Copper die cast of brazed rotors
4	Output Rating / Poles	Please refer to table - 1	As per customers requirement
5	Eye bolts	Eye bolts are made of forged steel	S.S. / Alloy steel
6	Shaft	Shafts are made of carbon steel (40C8 grade IS 2073/EN-8 BS:970)	Shaft with other material like S.S./Alloy steel etc.
7	Shaft extension	Motors are supplied with standard extension on drive end as per IS : 1231 / IS : 2223 (Pls refer table 3,4,5)	Motors with both side extension / special extension.
8	Terminal box Assembly	Terminal box & cover are made of cast iron Aluminum T. Box can be rotated through 360^0 in steps of 90^0. Clearance & creepage distances are maintained as per IS / IEC : 60079-15 & IS : 6381. Terminal studs & its accessories are made from brass / s.s. and are nicket plated. Terminal blocks are made from DMC / Epoxy or HD Compressed type-II of IS : 3513 Part-I or P-120 grade Bakelite & are non-hygroscopic. Cable lugs of terminal connections are anti-loosening & are non-loosening & anti-vibration type.	Fabricated from steel. positions like LH. & RH. & Top. - T. studs & its accessories in special material T. blocks in porcelain or special insulating material.
9	Cable Entry	Cable entry will be in metric. For size & number of entries please refer table.	Other entries in BSC & PG type threads with other entry sizes/nos. The clearance & creepage distances
10	Dimensions	Mounting dimensions of motor frame, flangers & shafts are as per IS : 1231 / IS : 2223 (Pl. Refer Table 3,4,5)	Special dimensions with special flanges / frames.
11	Bearings	Motors are designed with single row double shielded deep groove ball bearings and are pre-greased with high temp. grease for life up to 225 frame. For 250 to 315 frame bearing are provided with greasing arrangement Bearing life is 40,000 Hrs.	Motors with other type of bearings (angular contact ball bearings, cylindrical/taper roller bearing etc.) Motors with online greasing arrangement.
12	Mounting & Mounting Position	Motors are offered with foot mounting, flange mounting with B type flange & flange mounting with C type flange mounting. Motors are suitable for horizontal (B3, B5, B6, B7, B8) & vertical (V1, V3, V5, V6, V18, V19) mounting position as per IS : 2253	Motors with special foot/flange for horizontal & vertical mounting
13	Fan	Fan is made from Cast iron / M. S.	Any special material as per requirement.
14	Fan cover	Fan cover is made of M.S. sheet metal pressed / welded.	Made from fabricated steel, S.S.
15	Supply voltage & frequency	Motors are designed for 415V 10% with 50HZ 5% supply	Other on request upto 660V
16	Performance	Performance of motors as mentioned in corresponding tables	Special requirement if any.
17	Duty	S1 (continuous)	Other duties - S1 to S9
18	Method of Starting	Motor up to 5 HP are suitable to DOL starting Motors above 5 HP are suitable for Star Delta connection	As per customer's requirement
19	Method of Cooling	Standard motors are Totally Enclosed Fan Cooled (TEFC)	Totally Enclosed Naturally Cooled (TENC) / Air Over Motors (AOM) or forced cooled with auxiliary blower

Non-sparking Motors Ex'nA' (IE1, IE2, IE3)

Design and constructional features :

No.	Parameters	Standard Features	Optional Features
20	Surface Temp.	The surface temp. is limited to Lan T3 Temp clan (200°C) (Temp. calss T3) under normal operating condition to prevent thermal ignition in surrounding explosive atmosphere.	Other temp. class on request.
21	Noise & Vibration	Motors are with noise level maintained as per IS : 12065 & vibration level of normal class as per IS : 12075.	Motors with low noise level & precision class of vibration.
22	Protection	IP : 55 for Motor enclosure & T. Box	Superior protection as per IS : 4691.
23	Environment Condition	Amb. Temp. 45°C, Relative Humidity : 95% max.	Any special environment condition.
24	Space heater	On request.	Space heater & Thermistor provided with separate T Box for connection
25	Hardware	All hardware (fasteners0 are Zinc plated to prevent from corrosion.	Special hardware with special Material, grade, type & plating.
26	Drain hole	Drain hole with plug screw on end shields to remove condensate water for motor 180 & above frames.	-
27	Paint	Motors are painted with one coat of primer followed by two coasts of anti-corrosive paint.	Motors with special paint & shade.

Specifications	
1 Output Range	: 0.12/315 kW (0.16/425 HP)
2 Poles	: 2,4,6 & 8
3 Standard Specifications	
Voltage	: 415 V ± 10%
Frequency	: 50 Hz ±5%
Phase	: 3
Insulation Class	: F
Mounting	: Foot, Flange & face mounted
Ambient Temp.	: 45°C
Efficiency	: Std/IE1/IE2/IE3
Protection	: IP-55
Duty	: S1
Method of cooling	: TEFC
Mounting position	: B3, B5, B14, B34, B35 V1, V3, V5, V6, V18 & V19
Dimensions	: As per IS: 1231/IS-2223
Performance	: As per IS-325, IS/IEC 60034-1
Reference Standards	: IS/IEC 60079-15 (Ex 'nA')
Certification	: Tested by ERTL Kolkata Approved by PESO, Nagpur
Application	: Suitable for zone-2 classification of hazardous area

B. Performance Table for Non-sparking (IE1, IE2, IE2) motors
Please refer standard Motor (IE1, IE2, IE3) performance tables.
C. General arrangement - drawing & dimensions
Please refer Page Number 33,34,35.

	Non-sparking (Type-'nA')							
	Pole-wise frame sizes							
Output (kW/HP)	2 Pole	4 Pole	6 Pole	8 Pole	2 Pole	4 Pole	6 Pole	8 Pole
0.12/0.16	71	71	71	-	63	63	71	71
0.18/0.25	71	71	71	80	63	63	71	80
0.25/0.33	71	71	71	80	63	71	71	80
0.37/0.50	71	71	80	90S	71	71	80	90S
0.55/0.75	71	80	80	90L	71	80	80	90L
0.75/1.00	80	80	90S	100L	80	80	90S	100L
1.10/1.50	80	90S	90L	100L	80	90S	90L	100L
1.50/2.00	90S	90L	100L	112M	90S	90L	100L	112M
2.20/3.00	90L	100L	112M	132S	90L	100L	112M	132S
3.70/5.0	100L	112M	132S	160M	100L	112M	132S	160M
5.50/7.50	132S	132S	132M	160M	132S	132S	132M	160M
7.50/10.00	132S	132M	160M	160L	132S	132M	160M	160L
9.30/12.50	132M	160M	160L	180M	132M	160M	160L	180M
11.00/15.00	160M	160M	160L	180L	160M	160M	160L	180L
15.00/20.00	160M	160L	200L	200L	160M	160L	200L	200L
18.50/25.00	160L	180M	200L	225S	160L	180M	200L	225S
22 / 30	180L	180L	225M	225M	180L	180L	225M	225M
30 / 40	200L	200L	225M	250M	200L	200L	225M	250M
37 / 50	225S	225S	250M	280S	200L	225S	250M	280S
45 / 60	250M	225M	280S	280M	225M	225M	280S	280M
55 / 75	250M	250M	280M	315S	250M	250M	280M	315S
75 / 100	280S	280S	315S	315S	280S	280S	315S	315S
90 /120	280M	280M	315M	315M	280M	280M	315M	315M
110 / 150	315S	315S	315M	315M	315S	315S	315M	315M
125 / 170	315M	315M	-	-	315M	315M	-	-
132 / 180	315M	315M	315L	315L	315M	315M	315L	315L
160 / 215	315L	315L	315L	315L	315L	315L	315L	315L
180 / 250	315L	315L	-	-	315L	315L	-	355L
200 / 270	315L	315L	-	-	315L	315L	355L	355L
235/300					355L	355L	355L	-
250/335					355L	355L	355L	-
315/425					355L	355L	-	-

Increased Safety Motors (Ex'e') - IE2

Foot Mounted (B3), 3 Phase Squirrel Cage TEFC Induction Motors suitable for 415V±10%, 50HZ±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 45°C, Duty S1, Efficiency IE2, conforms to IS/IEC 60079-7:2006/IS12615 : 2011,IEC 60034-30-2008, Gas Group IIA/IIB, Temp. class T3.

Performance Table for 2 Pole Motors

Rated Output		Frame Size	Rated Current Amps	Rated Speed RPM	Rated Torque kgm	Starting Current % of Rated Current	Starting Torque % of Rated Torque	Pull Out Torque % of Rated Torque	Efficiency %			Power Factor			Rotor GD^2 kgm^2	Approx. Net Weight kg AL/CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.37	0.5	71	0.95	2770	0.13	650	200	250	72.2	71.7	70.5	0.75	0.70	0.58	0.0015	7/11
0.37	0.75	80	0.95	2770	0.13	650	200	250	72.2	71.7	70.5	0.75	0.70	0.58	0.0015	11/17
0.55	0.75	71	1.27	2780	0.19	650	200	250	74.8	74.0	73.2	0.81	0.76	0.60	0.0021	8/12
0.75	1.0	80	1.75	2790	0.26	650	190	240	77.4	76.6	75.0	0.77	0.72	0.64	0.0036	11/17
1.1	1.5	80	2.5	2800	0.38	650	200	250	79.6	79.0	77.8	0.77	0.71	0.63	0.0036	11/17
1.5	2.0	90S	3.3	2875	0.51	650	230	280	81.3	80.8	78.6	0.78	0.74	0.67	0.0073	15/24
2.2	3.0	90L	4.4	2885	0.74	700	230	280	83.2	82.6	80.6	0.84	0.80	0.65	0.0089	19/28
3.7	5.0	100L	7.0	2905	1.2	700	250	295	85.5	85.0	83.0	0.86	0.80	0.72	0.022	30/43
5.5	7.5	132S	10.2	2910	1.8	700	170	210	87.0	86.7	85.0	0.86	0.82	0.68	0.052	69
7.5	10.0	132S	13.5	2930	2.5	700	170	220	88.1	87.3	85.5	0.88	0.82	0.74	0.068	76
11.0	15	160M	19.0	2940	3.6	700	230	280	89.4	88.8	87.0	0.90	0.85	0.76	0.17	131
15.0	20	160M	25.5	2940	5.0	700	170	220	90.3	89.8	88.2	0.91	0.86	0.76	0.22	150
18.5	25	160L	32	2940	6.1	700	210	260	90.9	90.5	88.5	0.88	0.84	0.73	0.28	157
22	30	180M	37	2940	7.3	700	245	290	91.3	91.0	89.0	0.91	0.86	0.76	0.42	191
30	40	200L	51	2950	9.9	700	240	295	92.0	91.6	90.0	0.89	0.84	0.74	0.64	281
37	50	200L	62	2955	12.2	700	250	290	92.5	92.0	90.2	0.90	0.85	0.75	0.75	308
45	60	225M	75	2960	14.8	700	220	270	92.9	92.3	90.7	0.90	0.86	0.77	0.91	416
55	75	250M	91	2965	18.1	700	170	220	93.2	92.6	91.0	0.90	0.86	0.76	1.8	654
75	100	280S	126	2965	24.6	700	180	230	93.8	93.0	91.3	0.88	0.81	0.70	6.63	773
90	120	280M	148	2970	29.5	700	180	230	94.1	93.5	91.6	0.90	0.85	0.76	8.18	815
110	150	315S	183	2980	36.0	700	180	230	94.3	93.9	92.0	0.89	0.85	0.76	11.55	1210
125	170	315M	208	2980	40.9	700	180	230	94.5	94.0	92.2	0.88	0.82	0.68	12.7	1287
132	180	315M	218	2980	43.1	700	190	230	94.6	94.1	92.4	0.89	0.84	0.70	13.89	1375
150	200	315L	250	2980	49.0	700	180	230	94.7	94.3	92.5	0.88	0.83	0.71	14.3	1485
160	215	315L	263	2980	52.3	700	180	230	94.8	94.4	92.6	0.89	0.84	0.72	14.3	1485
180	240	315L	296	2980	58.8	700	180	230	94.9	94.5	92.7	0.89	0.83	0.73	15.96	1534
200	270	315L	325	2980	65.4	700	180	230	95.0	94.5	92.7	0.90	0.84	0.76	18.87	1640

Note

Frames 71-80 are with T. Box on Top

Frames 90-180 are with T. Box on RHS

Frames 200-315 are with T. Box on Top

All frames can be offered with T.Box on Top / LHS / RHS on request.

For higher ratings up to 200 kW refer to LHP Sales Office

For Gas Group IIC refer to LHP sales office.

Increased Safety Motors (Ex'e') - IE2

Foot Mounted (B3), 3 Phase Squirrel Cage TEFC Induction Motors suitable for 415V±10%, 50HZ±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 45°C, Duty S1, Efficiency IE2, conforms to IS/IEC 60079-7:2006/IS12615 : 2011,IEC 60034-30-2008, Gas Group IIA/IIB, Temp. class T3.

Performance Table for 4 Pole Motors

Rated Output		Frame Size	Rated Current Amps	Rated Speed RPM	Rated Torque kgm	Starting Current % of Rated Current	Starting Torque % of Rated Torque	Pull Out Torque % of Rated Torque	Efficiency %			Power Factor			Rotor GD^2 kgm^2	Approx. Net Weight kg AL/CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.37	0.50	71	1.0	1400	0.26	600	250	290	70.1	69.5	65.0	0.73	0.70	0.62	0.0034	8/11
0.37	0.50	80	1.0	1400	0.26	600	250	290	70.1	69.5	65.0	0.73	0.70	0.62	0.0034	12/18
0.55	0.75	80	1.4	1400	0.38	600	240	290	75.1	74.7	72.0	0.73	0.68	0.60	0.0077	11/17
0.75	1.0	80	1.8	1410	0.52	600	240	280	79.6	79.2	75.8	0.73	0.68	0.60	0.0086	12/18
1.1	1.5	90S	2.4	1420	0.75	600	250	290	81.4	81.0	78.5	0.78	0.73	0.62	0.014	14/24
1.5	2.0	90L	3.2	1430	1.02	600	250	295	82.8	82.3	79.5	0.79	0.74	0.62	0.015	18/28
2.2	3.0	100L	5.0	1430	1.50	700	250	290	84.3	84.0	81.5	0.73	0.68	0.60	0.03	23/37
3.7	5.0	112M	7.6	1445	2.49	700	250	290	86.3	85.5	82.4	0.78	0.72	0.61	0.06	38/52
5.5	7.5	132S	10.5	1450	3.69	700	190	240	87.7	87.1	84.8	0.83	0.79	0.71	0.09	71
7.5	10.0	132M	14.5	1450	5.04	700	210	260	88.7	88.2	86.3	0.81	0.77	0.62	0.12	84
11	15	160M	20	1460	7.34	700	220	270	89.8	89.4	87.6	0.85	0.81	0.72	0.20	123
15	20	160L	27	1460	10.0	700	200	240	90.6	90.1	88.2	0.85	0.81	0.72	0.26	151
18.5	25	180M	33	1460	12.3	700	200	250	91.2	90.8	89.2	0.86	0.82	0.74	0.66	190
22	30	180L	40	1460	14.7	700	250	295	91.6	91.2	89.6	0.84	0.80	0.71	0.84	231
30	40	200L	52	1465	19.9	700	170	220	92.3	92.0	90.4	0.87	0.83	0.70	1.19	268
37	50	225S	65	1475	24.4	700	190	240	92.7	92.3	90.7	0.85	0.81	0.73	1.46	290
45	60	225M	76	1480	29.6	700	220	270	93.1	92.6	91.0	0.88	0.84	0.76	1.71	368
55	75	250M	95	1480	36.2	700	180	220	93.5	93.0	91.2	0.86	0.82	0.72	3.20	687
75	100	280S	132	1480	49.4	700	190	230	94.0	93.5	92.0	0.84	0.80	0.71	7.21	765
90	120	280M	157	1480	59.2	700	200	250	94.2	93.8	92.4	0.85	0.80	0.72	8.25	824
110	150	315S	190	1490	71.9	700	220	270	94.5	94.0	92.5	0.85	0.81	0.72	11.62	1265
125	170	315M	210	1485	82.0	700	200	240	94.6	94.2	92.6	0.88	0.82	0.74	12.60	1320
132	180	315M	220	1485	86.6	700	200	240	94.7	94.2	92.7	0.88	0.80	0.72	13.98	1347
150	200	315L	253	1485	98.4	700	180	230	94.9	94.4	92.7	0.87	0.82	0.70	27.88	1540
160	215	315L	271	1485	104.9	700	180	230	94.9	94.5	92.8	0.87	0.83	0.71	27.88	1540
180	240	315L	306	1485	118.1	700	180	230	95.1	94.5	92.9	0.86	0.81	0.75	28.50	1600
200	270	315L	343	1485	131.2	700	180	230	95.1	94.6	93.0	0.85	0.82	0.76	30.74	1650

Note

Frames 71-80 are with T. Box on Top

Frames 90-180 are with T. Box on RHS

Frames 200-315 are with T. Box on Top

All frames can be offered with T.Box on Top / LHS / RHS on request.

For higher ratings up to 200 kW refer to LHP Sales Office

For Gas Group IIC refer to LHP sales office.

Increased Safety Motors (Ex'e') - IE2

Performance Table for 6 Pole Motors

Foot Mounted (B3), 3 Phase Squirrel Cage TEFC Induction Motors suitable for 415V±10%, 50HZ±5%, Combined variation ±10%, Insulation class F with temperature rise limited to class B, Degree of protection IP55, Altitude upto 1000 mtrs above m.s.l., Ambient 45°C, Duty S1, Efficiency IE2, conforms to IS/IEC 60079-7:2006/IS12615 : 2011,IEC 60034-30-2008, Gas Group IIA/IIB, Temp. class T3.

Rated Output		Frame Size	Rated Current Amps	Rated Speed RPM	Rated Torque kgm	Starting Current % of Rated Current	Starting Torque % of Rated Torque	Pull Out Torque % of Rated Torque	Efficiency %			Power Factor			Rotor GD^2 kgm^2	Approx. Net Weight kg AL/CI
kW	HP								FL	3/4L	1/2L	FL	3/4L	1/2L		
0.37	0.5	80	1.2	900	0.40	600	220	260	69.0	68.5	66.5	0.62	0.55	0.42	0.007	11/15
0.55	0.75	80	1.5	900	0.60	600	200	250	72.9	72.4	70.0	0.70	0.66	0.54	0.009	13/18
0.75	1.0	90S	2.2	910	0.80	600	200	250	75.9	75.4	72.5	0.62	0.57	0.45	0.016	16/18
1.1	1.5	90L	3.0	910	1.2	600	200	250	78.1	77.5	75.0	0.65	0.60	0.50	0.020	20/28
1.5	2.0	100L	3.7	915	1.6	600	180	230	79.8	79.3	77.2	0.71	0.66	0.53	0.032	21/38
2.2	3.0	112M	5.3	940	2.3	700	180	230	81.8	81.4	78.5	0.71	0.66	0.55	0.072	43/47
3.7	5.0	132S	8.4	950	3.8	700	190	240	84.3	83.8	80.6	0.73	0.68	0.57	0.1	75
5.5	7.5	132M	12.5	960	5.6	700	190	240	86.0	85.4	82.6	0.71	0.65	0.54	0.2	80
7.5	10.0	160M	15.5	965	7.6	700	180	230	87.2	86.7	83.5	0.77	0.71	0.60	0.4	121
11.0	15	160L	21.6	970	11.0	700	180	230	88.7	88.2	85.3	0.80	0.76	0.64	0.7	158
15.0	20	180L	30	970	15.1	700	170	220	89.7	89.0	86.0	0.78	0.73	0.62	1.0	210
18.5	25	200L	36	970	18.6	700	170	220	90.4	90.0	87.6	0.79	0.75	0.63	1.4	276
22	30	200L	43	975	22.0	700	185	230	90.9	90.4	88.0	0.79	0.75	0.63	1.6	280
30	40	225M	54	980	29.8	700	220	260	91.7	91.0	88.5	0.84	0.80	0.68	2.3	409
37	50	250M	67	980	36.8	700	200	240	92.2	91.6	88.7	0.83	0.77	0.65	3.6	688
45	60	280S	82	985	44.5	700	200	240	92.7	92.0	89.2	0.82	0.75	0.61	8.0	792
55	75	280M	98	985	54.4	700	200	240	93.1	92.5	90.0	0.84	0.77	0.65	9.9	886
75	100	315S	136	988	73.9	700	210	250	93.7	93.0	91.4	0.82	0.78	0.66	14.1	1084
90	120	315M	161	988	88.7	700	210	250	94.0	93.4	91.7	0.83	0.77	0.65	17.0	1252
110	150	315M	195	988	108.4	700	210	250	94.3	93.7	91.8	0.83	0.77	0.61	19.0	1315
125	170	315M	220	990	123.0	700	210	250	94.4	94.0	92.4	0.84	0.78	0.67	21.6	1540
132	180	315L	235	990	129.9	700	210	250	94.6	94.1	92.7	0.83	0.77	0.65	29.9	1560
150	200	315L	279	990	177.1	700	210	250	94.7	94.2	89.9	0.79	0.72	0.59	33.3	1650

Note

Frames 71-80 are with T. Box on Top

Frames 90-180 are with T. Box on RHS

Frames 200-315 are with T. Box on Top

All frames can be offered with T.Box on Top / LHS / RHS on request.

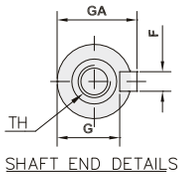
For higher ratings up to 200 kW refer to LHP Sales Office

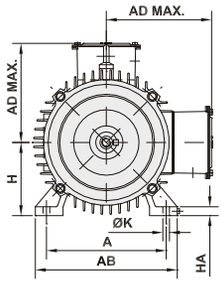
For Gas Group IIC refer to LHP sales office.

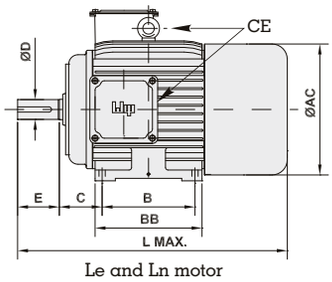
General arrangement Drawing/Dimensions - Foot Mounted (B3)

Non-sparking and Increased Safety Motors as per IS : 1231

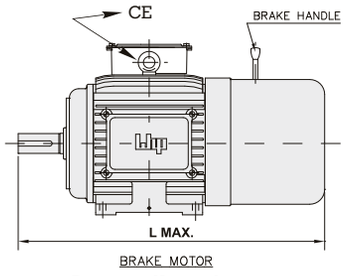
Refer Table No. 20







Le and Ln motor



Dimension Nomanclature
Similar to Le and Ln motor

CE - Cable Entry in Metric

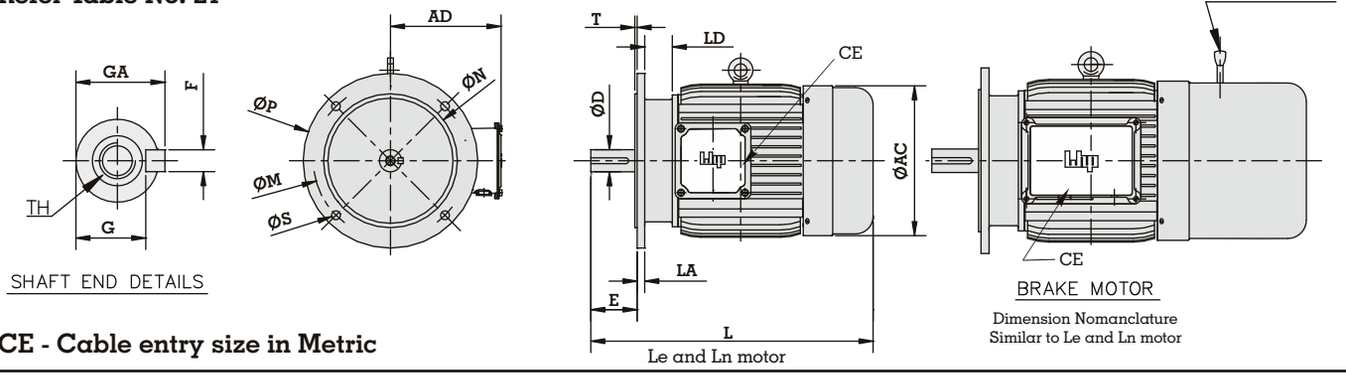
Table No. 20

Frame Size	CONT.	H	C	A	AB	HA	ØK	B	BB	AD MAX	ØAC	ØD	E	F	G	GA	TH	L MAX			CE X Nos.	T.Box Position
																		IE 1	IE 2	IE 3		
63	CI	63	40	100	120	8	7	80	97	136	116	11j6	23	4	8.5	12.5	M5	223	223	--	M20-1	RHS
63	AL PDC	63	40	100	118	8	7	80	97	130	116	11j6	23	4	8.5	12.5	M5	223	223	--	M20-1	TOP
71	CI	71	45	112	132	9	7	90	112	142	140	14j6	30	5	11.0	16.0	M5	255	270	270	M20-1	RHS
71	AL PDC	71	45	112	133	9	7	90	110	140	140	14j6	30	5	11.0	16.0	M5	253	270	270	M20-1	TOP
80	CI	80	50	125	151	10	10	100	124	146	158	19j6	40	6	15.5	21.5	M6	285	285	290	M20-1	RHS
80	AL PDC	80	50	125	153	12	10	100	124	130	158	19j6	40	6	15.5	21.5	M6	278	297	290	M20-1	TOP
90S	CI	90	56	140	170	10	10	100	120	142	178	24j6	50	8	20.0	27.0	M8	321	344	356	M20-1	RHS
90S	AL PDC	90	56	140	170	14	10	100	125	142	178	24j6	50	8	20.0	27.0	M8	346	348	356	M20-1	RHS
90L	CI	90	56	140	170	10	10	125	163	146	178	24j6	50	8	20.0	27.0	M8	370	364	356	M20-1	RHS
90L	AL PDC	90	56	140	170	13	10	125	146	145	178	24j6	50	8	20.0	27.0	M8	356	348	356	M20-1	RHS
100L	CI	100	63	160	200	13	12	140	170	160	208	28j6	60	8	24.0	31.0	M10	390	405	405	M20-1	RHS
100L	AL PDC	100	63	160	195	15	12	140	172	175	208	28j6	60	8	24.0	31.0	M10	403	405	405	M20-1	RHS
112M	CI	112	70	190	230	15	12	140	170	190	224	28j6	60	8	24.0	31.0	M10	405	405	420	M20-1	RHS
112M	AL PDC	112	70	225	225	12	12	140	172	190	214	28j6	60	8	24.0	31.0	M10	448	460	460	M20-1	RHS
132S	CI	132	89	216	256	16	12	140	167	205	257	38k6	80	10	33.0	41.0	M12	463	483	483	M20-2	RHS
132M	CI	132	89	216	256	16	12	178	205	205	257	38k6	80	10	33.0	41.0	M12	500	500	500	M20-2	RHS
132M(N)	CI	132	89	216	256	16	12	178	245	205	257	38k6	80	10	33.0	41.0	M12	525	525	525	M20-2	RHS
160M	CI	160	108	254	304	26	15	210	260	260	312	42k6	110	12	37.0	45.0	M16	623	630	672	M25-2	RHS
160L	CI	160	108	254	310	26	15	254	304	260	312	42k6	110	12	37.0	45.0	M16	670	675	675	M25-2	RHS
180M	CI	180	121	279	340	26	15	241	318	320	357	48k6	110	14	42.5	51.5	M16	685	705	725	M25-2	RHS
180L	CI	180	121	279	340	26	15	279	318	320	357	48k6	110	14	42.5	51.5	M16	725	725	750	M25-2	RHS
200L	CI	200	133	318	385	35	19	305	350	350	380	55m6	110	16	49.0	59.0	M20	800	800	850	M50-2	TOP
225S(2P)	CI	225	149	356	430	30	19	286	350	340	448	55m6	110	16	49.0	59.0	M20	800	800	800	M50-2	TOP
225S(4,6,8 P)	CI	225	149	356	430	30	19	286	350	340	448	60m6	140	18	53.0	64.0	M20	840	825	825	M50-2	TOP
225M(2P)	CI	225	149	356	440	35	19	311	370	340	448	55m6	110	16	49.0	59.0	M20	910	890	890	M50-2	TOP
225M(4,6,8 P)	CI	225	149	356	440	35	19	311	370	340	448	60m6	140	18	53.0	64.0	M20	890	870	870	M50-2	TOP
250M (2P)	CI	250	168	406	500	43	24	349	425	420	510	60m6	140	18	53.0	64.0	M20	1000	1000	1000	M50-2	TOP
250M (4,6,8 P)	CI	250	168	406	500	43	24	349	425	420	510	65m6	140	18	58.0	69.0	M20	1015	1015	1015	M50-2	TOP
280S (2P)	CI	280	190	457	540	43	24	368	490	450	566	65m6	140	18	58.0	69.0	M20	1075	1088	1200	M50-2	TOP
280S(4,6,8 P)	CI	280	190	457	540	43	24	368	490	450	566	75m6	140	20	67.5	79.5	M20	1033	1088	1200	M50-2	TOP
280M (2 P)	CI	280	190	457	540	43	24	419	490	450	566	65m6	140	18	58.0	69.0	M20	1075	1088	1200	M50-2	TOP
280M (4,6,8 P)	CI	280	190	457	540	43	24	419	490	450	566	75m6	140	20	67.5	79.5	M20	1037	1088	1200	M50-2	TOP
315S (2 P)	CI	315	216	508	620	50	28	406	546	530	658	65m6	140	18	58.0	69.0	M20	1155	1270	1300	M50-2	TOP
315S (4,6,8 P)	CI	315	216	508	620	50	28	406	546	530	658	80m6	170	22	71.0	85.0	M20	1185	1185	1300	M50-2	TOP
315M (2 P)	CI	315	216	508	620	50	28	457	640	530	658	65m6	140	18	58.0	69.0	M20	1320	1320	1300	M50-2	TOP
315M (4,6,8 P)	CI	315	216	508	620	50	28	457	640	530	658	80m6	170	22	71.0	85.0	M20	1350	1350	1300	M50-2	TOP
315L (2 P)	CI	315	216	508	620	50	28	508	640	530	658	65m6	140	18	58.0	69.0	M20	1320	1350	1350	M50-2	TOP
315L (4,6,8 P)	CI	315	216	508	620	50	28	508	600	530	658	80m6	170	22	71.0	85.0	M20	1350	1350	1350	M50-2	TOP
355S (2 P)	CI	355	254	610	730	51	28	500	780	626	745	80m6	170	22	71.0	85.0	M20	1580	1580	1580	M63-2	TOP
355S (4,6,8 P)	CI	355	254	610	730	51	28	500	780	626	745	100m6	210	28	90.0	106.0	M24	1620	1620	1620	M63-2	TOP
355M (2P)	CI	355	254	610	730	51	28	560	780	626	745	80m6	170	22	71.0	85.0	M20	1580	1580	1580	M63-2	TOP
355M (4,6,8 P)	CI	355	254	610	730	51	28	560	780	626	745	100m6	210	28	90.0	106.0	M24	1620	1620	1620	M63-2	TOP
355L (2 P)	CI	355	254	610	730	51	28	630	780	626	745	80m6	170	22	71.0	85.0	M20	1580	1580	1580	M63-2	TOP
355L (4,6,8 P)	CI	355	254	610	730	51	28	630	780	626	745	100m6	210	28	90.0	106.0	M24	1620	1620	1620	M63-2	TOP

General arrangement Drawing/Dimensions - Flange Mounted (B5)

Non-sparking and Increased Safety Motors as per IS:2223

Refer Table No. 21



CE - Cable entry size in Metric

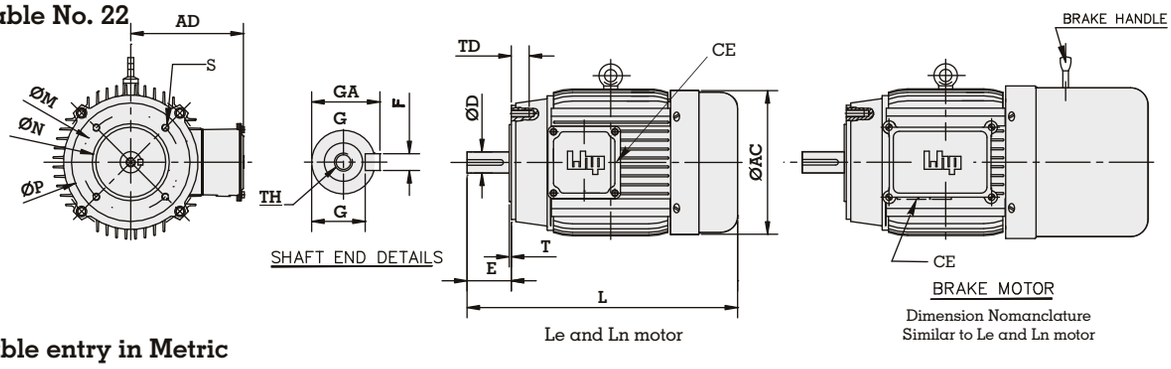
Table No. - 21

Frame Size	Cont.	Flange No.	ØM ±0.3	j6 ØN	ØP	ØS X NO.	T	LA	LD	AD MAX	ØAC	ØD	E	F	G	GA	TH	L MAX			CE X Nos.
																		IE1	IE2	IE3	
63	CI	F115B	115	95	140	10 X 4	3	10	10	136	116	11j6	23	4	8.5	12.5	M5	223	245	--	M20-1
63	AL.PDC	F115B	115	95	140	10 X 4	3	10	10	130	116	11j6	23	4	8.5	12.5	M5	223	245	--	M20-1
71	CI	F130B	130	110	160	10 X 4	3.5	10	10	142	140	14j6	30	5	11	16	M5	255	275	315	M20-1
71	AL.PDC	F130B	130	110	160	10 X 4	3.5	10	20	140	140	14j6	30	5	11	16	M5	255	270	310	M20-1
80	CI	F165B	165	130	200	12 X 4	3.5	11	16	146	158	19j6	40	6	15.5	21.5	M6	285	285	325	M20-1
80	AL.PDC	F165B	165	130	200	12 X 4	3.5	11	16	130	158	19j6	40	6	15.5	21.5	M6	272	280	320	M20-1
90S	CI	F165B	165	130	200	12 X 4	3.5	11	22	142	178	24j6	50	8	20	27	M8	320	365	405	M20-1
90S	AL.PDC	F165B	165	130	200	12 X 4	3.5	11	22	142	178	24j6	50	8	20	27	M8	343	360	400	M20-1
90L	CI	F165B	165	130	200	12 X 4	3.5	11	22	146	178	24j6	50	8	20	27	M8	370	385	425	M20-1
90L	AL.PDC	F165B	165	130	200	12 X 4	3.5	11	22	145	178	24j6	50	8	20	27	M8	355	360	400	M20-1
100L	CI	F215B	215	180	250	15 X 4	4	12	20	160	208	28j6	60	8	24	31	M10	405	405	445	M20-1
100L	AL.PDC	F215B	215	180	250	15 X 4	4	12	22	175	208	28j6	60	8	24	31	M10	395	400	440	M20-1
112M	CI	F215B	215	180	250	15 X 4	4	12	23	190	225	28j6	60	8	24	31	M10	405	425	485	M20-1
112M	AL.PDC	F215B	215	180	250	15 X 4	4	12	18	190	215	28j6	60	8	24	31	M10	430	425	485	M20-1
132S	CI	F265B	265	230	300	15 X 4	4	13	47	205	260	38k6	80	10	33	41	M12	460	485	545	M20-2
132M	CI	F265B	265	230	300	15 X 4	4	13	47	205	260	38k6	80	10	33	41	M12	500	525	585	M20-2
132M (N)	CI	F265B	265	230	300	15 X 4	4	13	47	205	260	38k6	80	10	33	41	M12	525	545	605	M20-2
160M	CI	F300B	300	250	350	19 X 4	5	14	54	260	312	42k6	110	12	37	45	M16	620	650	710	M25-2
160L	CI	F300B	300	250	350	19 X 4	5	14	54	260	312	42k6	110	12	37	45	M16	660	710	810	M25-2
180M/L	CI	F300B	300	250	350	19 X 4	5	14	72	320	360	48k6	110	14	42.5	51.5	M16	720	725	825	M25-2
200L	CI	F350B	350	300	400	19 X 4	5	16	71	350	382	55m6	110	16	49	59	M20	780	800	900	M50-2
225S/M (2P)	CI	F400B	400	350	450	19 X 8	5	16	71	340	448	55m6	110	16	49	59	M20	910	890	890	M50-2
225S/M (4,6,8P)	CI	F400B	400	350	450	19 X 8	5	16	71	340	448	60m6	140	18	53	64	M20	890	870	870	M50-2
250M (2P)	CI	F500B	500	450	550	19 X 8	5	19	65	420	510	60m6	140	18	53	64	M20	1000	1000	1000	M50-2
250M (4,6,8P)	CI	F500B	500	450	550	19 X 8	5	19	65	420	510	65m6	140	18	58	69	M20	1015	1015	1015	M50-2
280S/M (2P)	CI	F500B	500	450	550	19 X 8	5	22	50	450	566	65m6	140	18	58	69	M20	1075	1090	1190	M50-2
280S/M (4,6,8P)	CI	F500B	500	450	550	19 X 8	5	22	50	450	566	75m6	140	20	67.5	79.5	M20	1045	1055	1155	M50-2
315S/M/L (2P)	CI	F600B	600	550	660	24 X 8	6	22	50	530	658	65m6	140	18	58	69	M20	1245	1270	1400	M50-2
315S/M/L (4,6,8P)	CI	F600B	600	550	660	24 X 8	6	22	50	530	658	80m6	170	22	71	85	M20	1305	1260	1390	M50-2
355S/M/L (2P)	CI	F740B	740	680	800	24 X 8	6	25	45	626	745	80m6	170	22	71	85	M20	1580	1580	1580	M50-2
355S/M/L (4,6,8P)	CI	F740B	740	680	800	24 X 8	6	25	45	626	745	100m6	210	28	90	106	M24	1620	1620	1620	M50-2

General arrangement Drawing/Dimensions - Face Mounted (B14)

Non Sparking and Increased Safety Motors as per IS : 2223

Refer Table No. 22



CE - Cable entry in Metric

Table No. 22

Frame Size	Cont.	Flange No.	ØM ± 0.3	ØN j6	ØP	S	TD	T	AD MAX	ØAC	ØD	E	F	G	GA	TH	L MAX			CE X Nos.
																	IE1	IE2	IE3	
63	CI	F75C	75	60	90	M5	6	2.5	136	116	11j6	23	4	8.5	12.5	M5	223	--	--	M20-1
63	AL.PDC	F75C	75	60	90	M5	6	2.5	130	116	11j6	23	4	8.5	12.5	M5	223	--	--	M20-1
71	CI	F85C	85	70	105	M6	8	2.5	142	140	14j6	30	5	11	16	M5	255	275	315	M20-1
71	AL.PDC	F85C	85	70	107	M6	8	2.5	140	140	14j6	30	5	11	16	M5	253	270	310	M20-1
80	CI	F100C	100	80	120	M6	8	3	146	158	19j6	40	6	15.5	21.5	M6	285	285	325	M20-1
80	AL.PDC	F100C	100	80	120	M6	8	3	130	158	19j6	40	6	15.5	21.5	M6	278	280	320	M20-1
90S	CI	F115C	115	95	140	M8	10	3	142	178	24j6	50	8	20	27	M8	320	365	405	M20-1
90S	AL.PDC	F115C	115	95	140	M8	10	3	142	178	24j6	50	8	20	27	M8	340	360	400	M20-1
90L	CI	F115C	115	95	140	M8	10	3	146	178	24j6	50	8	20	27	M8	345	395	435	M20-1
90L	AL.PDC	F115C	115	95	140	M8	10	3	145	178	24j6	50	8	20	27	M8	355	360	400	M20-1
100L	CI	F130C	130	110	160	M8	10	3.5	160	208	28j6	60	8	24	31	M10	405	405	445	M20-1
100L	AL.PDC	F130C	130	110	160	M8	10	3.5	175	208	28j6	60	8	24	31	M10	395	400	440	M20-1
112M	CI	F130C	130	110	160	M8	10	3.5	190	225	28j6	60	8	24	31	M10	405	410	470	M20-1
112M	AL.PDC	F130C	130	110	160	M8	10	3.5	190	215	28j6	60	8	24	31	M10	430	430	490	M20-1
132S	CI	F165C	165	130	196	M12	14	3.5	205	260	38k6	80	10	33	41	M12	460	483	543	M20-2
132M	CI	F165C	165	130	196	M12	14	3.5	205	260	38k6	80	10	33	41	M12	500	500	560	M20-2
132M(N)	CI	F165C	165	130	196	M12	14	3.5	205	260	38k6	80	10	33	41	M12	525	525	585	M20-2

TEFC 3 Phase SC Induction Motors Crane & Hoist Duty with VFD Starting suitable for 415V± 10%, 50Hz ± 5%, Combined variation ± 10%, Insulation class F, Temperature rise class B, Degree of protection IP55, Ambient 45°C, Duty S3 & S4

Electrical Performance for VFD Starting - 4 Pole (1500 RPM)

Frame Size	60 Starts / hr.						150 Starts / hr.						300 Starts / hr.						Speed RPM	With DOL Starting				
	40% CDF			60% CDF			40% CDF			60% CDF			40% CDF			60% CDF				Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio	Rotor GD^2 kgm^2	Net. Approx Wt. B3 Const. Kg.
	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m						
71	0.37	1.0	0.28	0.34	0.9	0.28	0.37	1.0	0.28	0.34	0.9	0.28	0.34	0.9	0.28	0.31	0.8	0.28	1310	4.5	2	2.6	0.0034	12 (AL.)
71	0.55	1.56	0.4	0.55	1.56	0.4	0.55	1.56	0.4	0.55	1.56	0.4	0.55	1.56	0.4	0.55	1.56	0.4	1315	4.5	2	2.6	0.0034	14 (AL.)
80	0.75	1.8	0.6	0.68	1.6	0.6	0.75	1.8	0.6	0.68	1.6	0.6	0.68	1.6	0.6	0.62	1.5	0.6	1340	4.5	2	2.6	0.0061	16 (AL.)
80	1.1	3.1	0.8	1.1	3.1	0.80	1.1	3.1	0.8	1.1	3.1	0.8	1.1	3.1	0.8	1.1	3.1	0.8	1365	5.0	2.3	2.8	0.0072	19 (AL.)
90L	1.5	3.4	1.1	1.4	3.1	1.1	1.5	3.4	1.1	1.4	3.1	1.1	1.4	3.1	1.1	1.2	2.8	1.1	1385	5.6	1.9	2.4	0.0100	35 (AL.)
90L	2.2	5	1.6	2.2	5	1.6	2.2	5	1.6	2.2	5	1.6	2.2	5	1.6	2.2	5	1.6	1390	4.8	2.3	2.8	0.0160	42 (AL.)
100L	3	6.3	2.6	2.7	5.8	2.6	3	6.3	2.6	2.7	5.8	2.6	2.7	5.8	2.6	2.5	5.3	2.6	1390	5.9	2	2.5	0.0380	57 (AL.)
100L	3.7	8	2.6	3.7	8	2.6	3.7	8	2.6	3.7	8	2.6	3.7	8	2.6	3.7	8	2.6	1380	6.0	2.3	3.00	0.0260	65 (AL.)
112M	5.5	12.4	3.8	5.5	12.4	3.8	5.5	12.4	3.8	5.5	12.4	3.8	5.5	12.4	3.8	5.5	12.4	3.8	1400	6.0	2.5	2.8	0.058	72 (AL.)
132S	7.5	14.3	5.2	6.8	13	5.2	7.5	14.3	5.2	6.8	13	5.2	6.8	13	5.2	6.2	11.9	5.2	1410	6.5	2	2.5	0.12	75
132M	9.3	18.1	6.4	9.3	18.1	6.4	9.3	18.1	6.4	9.3	18.1	6.4	9.3	18.1	6.4	9.3	18.1	6.4	1420	6.5	2.3	2.9	0.143	95
160M	11	21.9	7.4	11	19.9	7.4	11	21.9	7.4	11	19.9	7.4	11	19.9	7.4	9.1	18.3	7.4	1440	6	2	2.5	0.2	110
160M	13	25	8.8	13	25	8.8	13	25	8.8	13	25	8.8	13	25	8.8	13	25	8.8	1440	6.5	2.25	2.8	0.177	117
160M	15	28.8	10.1	13.6	26.2	10.1	15	28.8	10.1	13.6	26.2	10.1	13.6	26.2	9.3	12.4	24	9.3	1440	6	2.5	2.7	0.26	128
160L	18.5	36	12.5	18.5	36	12.5	18.5	36	12.5	18.5	36	12.5	17	33	11.5	17	33	11.5	1445	6.5	2.1	2.5	0.265	132
180M	22	41	14.8	20.5	38	14.8	22	41	14.8	20.5	38	13.8	22	41	14.8	20.5	38	13.8	1450	6.5	2.25	2.5	0.460	200
180L	26	46	17.5	24	42.5	17.5	26	46	17.5	24	42.5	16.1	24	42.5	16.1	22	39	14.8	1450	6.5	2.25	2.5	0.54	225
200L	30	53.8	23.4	27.3	48.9	23.4	30	53.8	23.4	27.3	48.9	22.1	27.3	48.9	22.1	24.8	44.7	20.8	1455	6	2.5	2.7	1.19	247
200L	35	62	23.4	33	59	23.4	35	62	23.4	33	59	22.1	33	59	22.1	31	56	20.8	1455	6.5	2.3	2.6	0.86	252
225S	37	66	24.7	33.6	60	24.7	37	66	24.7	33.6	60	24.7	33.6	60	24.7	30.6	54.9	24.7	1460	6	2.3	2.8	1.46	255
225S	43	77	28.7	41	74.0	28.7	43	77	28.7	41	74.0	27.4	41	74	27.4	39	72	26.0	1460	6.5	2.3	2.6	1.32	280
225M	45	78	30.0	40.9	70.9	30.0	45	78	30.0	40.9	70.9	30	40.9	70.9	30	37.2	64.9	30	1460	6	2.3	2.8	1.71	310
225M	53	96	35.4	50	91,0	35.4	53	96	35.4	50	91,0	33,4	50	91	33.4	48	88	32	1460	6.5	2.3	2.5	1.6	350
250M	55	96	36.6	50	87.3	36.6	55	96	36.6	50	87.3	36.6	50	87.3	36.6	45.5	79.8	36.6	1465	6.5	2.3	2.6	3.2	625
250M	64	113	42.6	61	108	42.6	64	113	42.6	61	108	40.6	61	108	40.6	58	103	38.6	1465	6.5	2.3	2.6	2.83	680
280S	75	131.6	49.7	68.2	119.6	49.7	75	131.6	49.7	68.2	119.6	49.7	68.2	119.6	49.7	62	109.4	49.7	1470	6.5	2.3	2.6	7.21	720
280S	88	152	58.3	85	147	58.3	88	152	58.3	85	147	56.3	85	146	56.3	82	141	54.3	1470	6.5	2.3	2.6	5.00	750
280M	90	157.4	59.6	81.8	143.1	59.6	90	157.4	59.6	81.8	143.1	59.6	81.8	143.1	59.6	74.4	130.9	59.6	1470	6.5	2.3	2.6	8.25	775
280M	110	190	72.9	102	177	72.9	110	190	72.9	102	177	67.6	102	177	67.6	97	169	64.3	1470	6.5	2.3	2.6	6.35	820
315S	132	228	87.2	125	216	87.2	132	228	87	125	216	82.5	125	216	82.5	120	208	79.2	1475	6,5	2.3	2.6	8.7	1000
315M	160	274	105.7	150	256	105.7	160	274	105.7	150	256	99.1	150	256	99.1	145	248	95.7	1475	6.5	2.3	2.6	10.2	1225
315L	180	311.5	118.5	163.6	283.2	118.5	180	311.5	118.5	163.6	283.2	118.5	163.6	283.2	118.5	148.8	259	118.5	1480	6.5	2,30	2.6	29.3	1400
315L	185	317	121.8	178	305	121.8	185	317	121.8	178	305	117.1	178	305	117.1	170	292	111.9	1480	6.5	2,30	2.6	30	1650
315L	200	338.4	131.6	181.8	307.7	131.6	200	338.4	134.9	181.8	307.7	126.4	181.8	307.7	126.4	165.3	281.2	118.5	1480	6.5	2.3	2.6	31	1800
315L	205	350	134.9	192	328	134.9	205	350	134.9	192	328	126.4	192	328	126.4	180	307	118.5	1480	6.5	2.3	2.6	13.4	1805
315L	225	390	148.1	210	356	148.1	225	390	151.4	210	356	138.2	210	356	138.2	200	340	131.6	1480	6.5	2,30	2.6	14.6	1850
315L	230	390	151.4	210	356	151.4	230	390	151.4	210	356	138.2	210	356	138.2	200	340	131.6	1480	6.5	2,30	2.6	14.6	1865
355L	250	418.4	164.0	227.3	380.3	164.0	250	418.4	164	227.3	380.3	164	227.3	380.3	164	206.6	347.5	164	1485	6.5	1.8	2.3	38	2100
355L	285	480	186.9	270	455	186.9	285	480	186.9	270	455	177.1	270	455	177.1	260	438	170.5	1485	6.5	2.25	2.6	42	2120
355L	315	527.1	206.6	286.4	479.2	206.6	315	527.1	207	286.4	479.2	207	286.4	479.2	207	260.3	437.8	207	1485	6.5	1.8	2.3	48	2150
355L	350	590	229.6	335	565	229.6	350	590	229.6	335	565	219.7	335	565	219.7	315	531	206.6	1485	6.5	2.25	2.6	32.7	2200
355L	400	660	262.4	380	630	262.4	400	660	262.4	380	630	249.2	380	630	249.2	355	588	232.8	1485	6.5	2.2	2.5	38.2	2260

TEFC 3 Phase SC Induction Motors Crane & Hoist Duty with VFD Starting suitable for 415V± 10%, 50Hz ± 5%, Combined variation ± 10%, Insulation class F, Temperature rise class B, Degree of protection IP55, Ambient 45°C, Duty S3 & S4

Electrical Performance for VFD Starting - 6 Pole (1000 RPM)

Frame Size	60 Starts / hr.						150 Starts / hr.						300 Starts / hr.						Speed RPM	With DOL Starting				
	40% CDF			60% CDF			40% CDF			60% CDF			40% CDF			60% CDF				Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio	Rotor GD^2 kgm^2	Net. Approx Wt. B3 Const. Kg.
	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m						
71	0.25	0.9	0.27	0.2	0.8	0.27	0.25	0.9	0.27	0.2	0.8	0.27	0.2	0.8	0.27	0.2	0.8	0.27	890	3.4	1.9	2.4	0.0036	10 (AL.)
71	0.37	1.43	0.5	0.37	1.43	0.50	0.37	1.43	0.5	0.37	1.43	0.5	0.37	1.43	0.5	0.37	1.43	0.5	800	3.4	1.7	1.9	0.0038	14 (AL.)
80	0.55	1.8	0.6	0.5	1.6	0.60	0.55	1.8	0.6	0.5	1.6	0.6	0.5	1.6	0.6	0.5	1.5	0.6	830	3.2	1.9	2.6	0.0060	18 (AL.)
80	0.75	2.7	0.9	0.75	2.7	0.90	0.75	2.7	0.9	0.75	2.7	0.9	0.75	2.7	0.9	0.75	2.7	0.9	860	3.5	2.3	2.5	0.0084	25 (AL.)
90L	1.1	2.9	1.2	1	2.7	1.2	1.1	2.9	1.2	1	2.7	1.2	1	2.7	1.2	0.9	2.5	1.2	900	4.0	2.0	2.8	0.02	35 (AL.)
90L	1.5	4.2	1.6	1.5	4.2	1.6	1.5	4.2	1.6	1.5	4.2	1.6	1.5	4.2	1.6	1.5	4.2	1.6	900	4.0	2.3	2.75	0.0160	40 (AL.)
100L	2.2	6.5	2.3	2.2	6.5	2.3	2.2	6.5	2.3	2.2	6.5	2.3	2.2	6.5	2.3	2.2	6.5	2.3	920	4.5	2.3	2.75	0.029	45 (AL.)
112M	3.7	9.1	3.9	3.7	9.1	3.9	3.7	9.1	3.9	3.7	9.1	3.9	3.7	9.1	3.9	3.7	9.1	3.9	920	5.0	2.3	2.75	0.065	55 (AL.)
132S	5.5	11.5	5.8	5	10.5	5.8	5.5	11.5	5.8	5	10.5	5.8	5	10.5	5.8	4.5	9.6	5.8	925	5.5	2.3	2.75	0.17	62
132M	7.5	18.8	7.9	6.8	17	7.9	7.5	18.8	7.9	6.8	17	7.2	7.5	18.8	7.9	6.8	17	7.2	925	5.5	2.3	2.75	0.193	75
160M	9.3	21	9.7	8	18.1	9.7	9.3	21	9.7	8	18.1	8.3	9.3	21	9.7	8	18	8.3	935	6	2.3	2.6	0.28	81
160L	11	20.9	11.5	10	19	11.5	11	20.9	11.5	10	19	10.6	10	19	11.5	9.1	17.4	10.6	935	6	2.2	2.6	0.34	144
160L	13	29	13.5	12	27	13.5	13	29	13.5	12	27	12.5	13	29	13.5	12	27	12.5	935	6	2.25	2.6	0.4	165
180L	15	28.1	15.5	13.6	25.5	15.5	15	28.1	15.5	13.6	25.5	15.5	13.6	25.5	15.5	12.4	23.4	25.5	940	6	2.3	2.6	0.66	187
180L	18	37	18.7	16.7	35	18.7	18	37	18.7	16.7	35	17.3	18	37	18.7	16.7	35	17.3	940	6	2.3	2.6	0.68	200
180L	21	43	21.8	19	39	21.8	21	43	21.8	19	39	19.7	21	43	21.8	19	39	19.7	940	6	2.3	2.6	0.82	225
200L	22	41.5	22.6	20	37.7	22.6	22	41.5	22.6	20	37.7	22.6	20	37.7	22.6	18.2	34.6	22.6	950	6	2.3	2.5	1.15	245
200L	26	50	26.7	24	47	26.7	26	50	26.7	24	47	24.6	24	47	24.6	22	43	22.6	950	6	2.3	2.5	1.2	280
225M	30	54.7	30.4	27.3	49.7	30.4	30	54.7	30.4	27.3	49.7	30.4	27.3	49.7	30.4	24.8	45.5	30.4	960	6	2.1	2.5	2.3	310
225M	34.5	64	35	32	60	35	34.5	64	35	32	60	32.5	32	60	32.5	30	57	30.4	960	6	2.3	2.5	2.35	336
225M	39	73	39.6	35	66	39.6	39	73	39.6	35	66	35 5	35	66	35.5	33	63	33.5	960	6	2.3	2.5	2.42	360
250M	46	83	46	42	76	46	46	83	46	42	76	42.4	42	76	42.4	40	73	40.4	965	6	2.3	2.5	3.72	625
280S	52	93	52.2	49	88	52.2	52	93	52.2	49	88	49.2	49	88	49.2	45	81	45.2	970	6	2.3	2.5	5.11	720
280M	55	97.3	65.3	50	88.5	65.3	55	97.3	65.3	50	88.5	61.3	50	88.5	61.3	45.5	81	58.2	970	6	2	2.3	9.9	805
280M	65	117	65.3	61	110	65.3	65	117	65.3	61	110	61.3	61	110	61.3	58	105	58.2	970	6	2.3	2.5	6.16	900
315S	75	130.2	74.5	68.2	118.4	74.5	75	130.2	74.5	68.2	118.4	74.5	68.2	118.2	74.5	62	108.3	74.5	980	6.5	2.3	2.55	14.2	1000
315S	90	158	89.4	85	150	89.4	90	158	89.4	85	150	84.5	85	150	84.5	80	142	79.5	980	6	2.3	2.5	10.7	1050
315M	105	184	104.4	100	175	104.4	105	184	104.4	100	175	99.4	100	175	99.4	95	166	94.4	980	6	2.3	2.5	12.4	1180
315M	110	189.6	109.3	100	172.4	109.3	110	189.6	109.3	100	172.4	109.3	100	172.4	109.3	90.9	157.6	109.3	980	6.5	2.3	2.55	19	1300
315M	125	219	124.2	120	210	124.2	125	219	124.2	120	210	119.3	120	210	119.3	115	201	114.3	980	6	2.3	2.5	15.5	1350
315L	132	224.5	144.5	120	204.1	144.5	132	224.5	144.5	120	204.1	144.5	120	204.1	144.5	109.1	186.6	144.5	890	6.5	2.3	2.8	30	1400
315L	150	263	148.8	142	249	148.8	150	263	148.8	142	249	140.8	142	249	140.8	136	138	134.9	982	6	2.3	2.5	18	1525
315L	180	316	178.5	170	300	178.5	180	316	178.5	170	300	168.6	170	300	168.6	160	282	158.7	982	6	2.3	2.5	21.5	1850
355L	200	346.2	197.8	181.8	314.7	197.8	200	346.2	197.8	181.8	314.7	197.8	181.8	314.7	197.8	165.3	287.8	197.8	985	6.5	1.6	2	46.5	2170
355L	220	383	217.5	210	366	217.5	220	383	217.5	210	366	217.5	210	366	207.7	200	349	197.8	985	6	2.2	2.5	28.7	2250
355L	275	479	271.9	262	456	271.9	275	479	271.9	262	456	259.1	262	456	259.1	250	435	247.2	985	6	2.2	2.5	35.5	2350
355L	325	566	321.4	310	540	321.4	325	566	321.4	310	540	306.5	310	540	306.5	300	523	296	985	6	2.2	2.5	43.3	2500

TEFC 3 Phase SC Induction Motors Crane & Hoist Duty with VFD Starting suitable for 415V± 10%, 50Hz ± 5%, Combined variation ± 10%, Insulation class F, Temperature rise class B, Degree of protection IP55, Ambient 45°C, Duty S3 & S4

Electrical Performance for VFD Starting - 8 Pole (750 RPM)

Frame Size	60 Starts / hr.						150 Starts / hr.						300 Starts / hr.						Speed RPM	With DOL Starting				
	40% CDF			60% CDF			40% CDF			60% CDF			40% CDF			60% CDF				Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio	Rotor GD^2 kgm^2	Net. Approx Wt., B3 Const. Kg.
	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m						
80	0.25	1.1	0.36	0.2	1.0	0.36	0.25	1.1	0.36	0.2	1.0	0.36	0.2	1.0	0.36	0.2	1.0	0.36	680	2.5	1.80	2.50	0.009	18 (AL.)
90S	0.37	1.3	0.5	0.3	1.2	0.5	0.37	1.3	0.5	0.3	1.2	0.5	0.3	1.2	0.5	0.3	1.1	0.5	680	3.0	1.70	2.20	0.016	26 (AL.)
90S	0.55	2.15	0.8	0.45	1.8	0.6	0.55	2.15	0.8	0.45	1.8	0.6	0.55	2.15	0.8	0.45	1.76	0.6	680	3.0	1.80	2.10	0.011	30 (AL.)
90L	0.75	2.76	1.1	0.75	2.8	1.1	0.75	2.76	1.1	0.75	2.8	1.1	0.75	2.76	1.1	0.65	2.39	0.9	680	3.0	2.00	2.40	0.014	35 (AL.)
100L	1.1	2.9	1.6	1	2.7	1.6	1.1	2.9	1.6	1	2.7	1.6	1	2.7	1.6	0.9	2.5	1.3	690	3.5	1.90	2.50	0.042	50 (AL.)
100L	1.5	4.95	2.1	1.5	4.95	2.1	1.5	4.95	2.1	1.5	4.95	2.1	1.5	4.95	2.1	1.1	3.63	1.6	680	3.5	2.00	2.30	0.027	53 (AL.)
112M	2.2	6.8	3.1	2.2	6.8	3.1	2.2	6.8	3.1	2.2	6.8	3.1	2.2	6.8	3.1	1.5	4.64	2.1	700	4.0	2.00	2.30	0.060	55 (AL.)
132S	3.7	8.8	5.1	3.7	8.8	5.1	3.7	8.8	5.1	3.7	8.8	5.1	3.7	8.8	5.1	3	7.14	4.1	710	4.0	2.00	2.30	0.133	75
160M	5.5	11.6	7.5	5	10.5	7.5	5.5	11.6	7.5	5	10.5	7.5	5	10.5	7.5	4.2	9.7	6.9	710	5.0	2.00	2.60	0.460	100
160M	6	13	8.2	5.5	12	7.5	6	13	8.2	5.5	12	7.5	5.5	12	7.5	5	11	6.9	710	5.0	2.10	2.40	0.299	106
160M	7	15.5	9.6	6.5	14.4	8.9	7	15.5	9.6	6.5	14.4	8.9	6.5	14.4	8.9	6	13.3	8.2	710	5.0	2.10	2.40	0.344	120
160L	7.5	15.2	10.3	6.8	13.8	10.3	7.5	15.2	10.3	6.8	13.8	10.3	6.8	13.8	10.3	6.2	12.7	10.3	710	5.0	2.10	2.40	0.570	125
160L	8.3	18.5	11.4	7.8	17.4	10.7	8.3	18.5	11.4	7.8	17.4	10.7	7.8	17.4	10.7	7	15.6	9.6	710	5.5	2.00	2.30	0.400	150
180M	10.6	22.5	14.5	10	21	13.7	10.6	22.5	14.5	10	21	13.7	10	21	13.7	9.3	20	12.8	710	5.5	2.10	2.50	0.620	175
180L	11	22.1	15.1	10	20.1	15.1	11	22.1	15.1	10	20.1	15.1	10	20.1	15.1	9.1	18.5	15.1	710	5.5	2.10	2.50	1.290	200
180L	12.5	26.5	17.1	11.5	24.5	15.8	12.5	26.5	17.1	11.5	24.5	15.8	11.5	24.5	15.8	11	23.4	15.1	710	5.5	2.10	2.50	0.720	220
200L	15	29.1	20.4	13.6	26.4	20.4	15	29.1	20.4	13.6	26.4	20.4	13.6	26.4	20.4	12.4	24.3	20.4	715	5.5	2.10	2.50	1.700	258
200L	17	28.8	35	16	33	21.8	17	28.8	35	16	33	21.8	16	33	21.8	15	31	20.4	715	5,5	2.20	2.50	1.320	290
225S	18.5	35.4	25.0	16.8	32.2	25.0	18.5	35.4	25.0	16.8	32.2	25.0	16.8	32.2	25.0	15.3	29.5	25.0	720	5.5	2.10	2.20	2.300	345
225S	20.5	41.5	27.7	19.4	39.3	26.2	20.5	41.5	27.7	19.4	39.3	26.2	19.4	39.3	26.2	18.5	37.5	25	720	5,5	2.10	2.20	1.950	360
225M	22	42.1	29.8	20	38.3	29.8	22	42.1	29.8	20	38.3	29.8	20	38.3	29.8	18.2	35.1	29.8	720	5.5	2.00	2.60	2.600	375
225M	24.5	50	33.1	23	47	31.1	24.5	50	33.1	23	47	31.1	23	47	31.1	22	45	29.8	720	5,5	2.10	2.20	2.410	400
250M	30	56.8	40.3	27.3	51.7	40.3	30	56.8	40.3	27.3	51.7	40.3	27.3	51.7	40.3	24.8	47.4	40.3	725	5.5	2.00	2.60	4.400	465
250M	34	67	45.7	32	63	43	34	67	45.7	32	63	43	32	63	43	30	59	40.3	725	5.5	2.20	2.50	3.720	510
280S	37	70.6	49.4	33.6	64.2	49.4	37	70.6	49.4	33.6	64.2	49.4	33.6	64.2	49.4	30.6	58.9	49.4	730	5.5	2.10	2.60	8.000	600
280S	42	82	56	39	76	52	42	82	56	39	76	52	39	76	52	37	72	49.4	730	5.5	2.20	2.20	5.830	660
280M	45	89.8	59.6	40.9	81.6	59.6	45	89.8	59.6	40.9	81.6	59.6	40.9	81.6	59.6	37.2	75	59.6	735	5.5	2.10	2.40	9.900	720
280M	52	101	69.4	48	93	64	52	101	69.4	48	93	64	48	93	64	45	87.5	60	730	5.5	2.20	2.20	6.860	800
315S	55	105.1	72.9	50	95.5	72.9	55	105.1	72.9	50	95.5	72.9	50	95.5	72.9	45.5	87.6	72.9	735	6.0	2.10	2.40	14.200	900
315S	62	120	82.2	58	113	76.9	62	120	82.2	58	113	76.9	58	113	76.9	55	107	72.9	735	6.0	2.10	2.40	10.700	920
315M	75	165	99.4	80	155	106	75	165	112.6	80	155	106	80	155	106	75	145	99.4	735	6.0	2.10	2.40	12.400	950
315M	85	165	112.6	80	155	106	85	165	112.6	80	155	106	80	155	106	75	145	99.4	735	6.0	2.10	2.40	12.400	1000
315M	100	193	132.5	95	184	125.9	100	193	132.5	95	184	125.9	95	184	125.9	90	175	119.3	735	6.0	2 10	2.40	15.500	1050
315L	110	206.9	145.8	100	188.1	145.8	110	206.9	145.8	100	188.1	145.8	100	188.1	145.8	90.9	172.5	145.8	735	6.0	2.20	2.80	30.000	1130
315L	122	234	161.7	116	222	153.7	122	234	161.7	116	222	153.7	116	223	153.7	110	211	145.8	735	6.0	2.10	2.40	18.000	1150
315L	132	247	174.9	120	224.6	174.9	132	247	174.9	120	224.6	174.9	120	224.6	174.9	109	205.9	174.9	735	6.0	2.50	2.80	33.300	1190
315L	145	278	192.1	138	265	182.9	145	278	192.1	138	265	182.9	138	265	182.9	132	254	174.9	735	6.0	2.10	2.40	21.500	1340
355L	175	332	230.3	168	319	221.1	175	332	230.3	168	319	221.1	168	319	221.1	160	304	210.6	740	6.0	2.10	2.40	28.700	1670
355L	200	399.1	263.2	182	362.8	221.1	200	399.1	230.3	182	362.8	221.1	182	362.8	221.1	165	333.3	210.6	740	6.0	1.85	2.00	37.500	2150
355L	220	417	289.6	210	398	276.4	220	417	289.6	210	398	276.4	210	398	276.4	200	380	263.2	740	6.0	2.00	2.30	35.500	2200
355L	250	480	329.1	235	452	309.3	250	480	329.1	235	452	309.3	235	452	309.3	225	433	296.1	740	6.0	2.20	2.40	43.300	2275

TEFC 3 Phase SC Induction Motors Crane & Hoist Duty with DOL Starting suitable for 415V± 10%, 50Hz ± 5%, Combined variation ± 10%, Insulation class F, Temperature rise class B, Degree of protection IP55, Ambient 45°C, Duty S3 & S4

Electrical Performance for DOL Starting - 4 Pole (1500 RPM)

Frame Size	60 Starts / hr.						150 Starts / hr.						300 Starts / hr.						Speed RPM	With DOL Starting				
	40% CDF			60% CDF			40% CDF			60% CDF			40% CDF			60% CDF				Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio	Rotor GD^2 kgm^2	Net. Approx Wt., B3 Const. Kg.
	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m						
71	0.55	1.6	0.41	0.55	1.6	0.41	0.55	1.6	0.41	0.55	1.6	0.41	0.55	1.6	0.41	0.55	1.6	0.41	1310	3.7	2.25	2.75	0.0033	12 (AL.)
80	0.75	1.8	0.55	0.75	1.8	0.55	0.75	1.8	0.55	0.75	1.8	0.55	0.75	1.8	0.55	0.75	1.8	0.55	1340	4.5	2.3	2.75	0.0061	16 (AL.)
80	1.1	3.1	0.80	1.1	3.1	0.80	1.1	3.1	0.80	1.1	3.1	0.80	1.1	3.1	0.80	1.1	3.1	0.80	1365	5.0	2.30	2.80	0.0072	19 (AL.)
90S	1.5	3.9	1.1	1.5	3.9	1.1	1.5	3.9	1.1	1.5	3.9	1.1	1.5	3.9	1.1	1.5	3.9	1.1	1385	5.0	2.25	2.75	0.0120	35 (AL.)
90L	2.2	5	1.6	2.2	5	1.6	2.2	5	1.6	2.2	5	1.6	2.2	5	1.6	2.2	5	1.6	1380	4.8	2.30	2.80	0.0160	42 (AL.)
100L	3.7	8	2.6	3.7	8	2.6	3.7	8	2.6	3.7	8	2.6	3.7	8	2.6	3.7	8	2.6	1380	6.0	2.30	3.00	0.0260	57 (AL.)
112M	5.5	12.4	3.8	5.5	12.4	3.8	5.5	12.4	3.8	5.5	12.4	3.8	5.5	12.4	3.8	5.5	12.4	3.8	1400	6.0	2.50	2.80	0.058	72 (AL.)
132S	7.5	14.8	5.2	7.5	14.8	5.2	7.5	14.8	5.2	7.5	14.8	5.2	7.5	14.8	5.2	7.5	14.8	5.2	1410	6.5	2.25	2.90	0.127	75
132M	9.3	18.1	6.4	9.3	18.1	6.4	9.3	18.1	6.4	9.3	18.1	6.4	9.3	18.1	6.4	9.3	18.1	6.4	1420	6.5	2.30	2.90	0.141	95
160M	11	22	7.4	11	22	7.4	11	22	7.4	11	22	7.4	11	22	7.4	11	22	7.4	1440	6.5	2.25	2.80	0.141	110
160M	13.2	25	8.9	12.1	23	8.2	13.2	25	8.9	12.1	23	8.2	13.2	25	8.9	12.1	23	8.2	1440	6.5	2.25	2.80	0.177	117
160M	15	30	10.1	15	30	10.1	15	30	10.1	15	30	10.1	13.8	27	9.3	13.8	27	9.3	1440	6.5	2.25	2.80	0.193	128
160L	18.5	36	12.5	18.5	36	12.5	18.5	36	12.5	18.5	36	12.5	17	33	11.5	17	33	11.5	1445	6.5	2.10	2.50	0.265	132
180L	22	39	14.7	22	39	14.7	22	39	14.7	22	39	14.7	22	39	14.7	20	35.5	13.3	1460	6.5	2.40	2.60	0.540	225
200L	30	52	19.9	30	52	19.9	30	52	19.9	30	52	19.9	28	49	18.6	26	45	17.3	1465	6.5	2.6	2.6	0.860	247
225S	37	64	24.5	37	64	24.5	37	64	24.5	34	58.8	22.5	32	57	21.2	30	54	19.9	1470	6.5	2.5	2.6	1.32	255
225M	45	78	29.8	45	78	29.8	45	78	29.8	40	69.3	26.5	37	66	24.5	34	61	22.5	1470	6.5	2.5	2.5	1.60	310
250M	55	97	36.3	55	97	36.3	55	97	36.3	52	92	34.3	48	84	31.7	45	78	29.7	1475	6.5	2.5	2.6	2.83	625
280S	75	130	49.4	75	130	49.4	75	130	49.4	70	121	46	67	116	44 .1	65	112	42.8	1480	6.5	2.3	2.6	5.00	720
280M	90	156	59.2	90	156	59.2	90	156	59.2	84	146	55.3	80	139	52.6	75	130	49.4	1480	6.5	2.3	2.6	6.00	775
315S	110	190	72.1	110	190	72.1	110	190	72.1	102	176	67	95	164	62.3	90	155	59.0	1485	6.5	2.3	2.6	8.7	1000
315M	132	225	86.5	132	225	86.5	132	225	86.5	125	213	81.9	115	196	75.4	110	188	72 1	1486	6.5	2.3	2.6	10.2	1225
315L	160	270	104.8	160	270	104.8	160	270	104.8	150	253	98.3	138	233	90.4	132	223	86.5	1487	6.5	2.3	2.6	12.2	1400
315L	180	305	117.9	180	305	117.9	180	305	117.9	168	285	110.0	158	268	103.5	150	254	98.3	1487	6.5	2.3	2.6	13.4	1650
315L	200	342	131.0	200	342	131.0	200	342	131.0	185	316	121.2	180	308	117.9	175	299	114.6	1487	6.5	2.3	2.6	14.60	1800
355L	250	410	163.6	250	410	163.6	250	410	163.6	232	380	151.9	220	361	144.0	210	344	137.5	1488	6.5	2.25	2.6	23.3	2100
355L	315	517	206.2	315	517	206.2	315	517	206.2	295	284	193.1	280	460	183.3	270	443	176.7	1488	6.5	2.25	2.6	32.70	2120
355L	355	586	232.8	355	586	232.8	355	586	232.4	330	545	216.0	310	512	202.9	300	495	196.4	1488	6.5	2.2	2.5	38.20	2150

TEFC 3 Phase SC Induction Motors Crane & Hoist Duty with DOL Starting suitable for 415V± 10%, 50Hz ± 5%, Combined variation ± 10%, Insulation class F, Temperature rise class B, Degree of protection IP55, Ambient 45°C, Duty S3 & S4

Electrical Performance for DOL Starting - 6 Pole (1000 RPM)

Frame Size	60 Starts / hr.						150 Starts / hr.						300 Starts / hr.						Speed RPM	With DOL Starting				
	40% CDF			60% CDF			40% CDF			60% CDF			40% CDF			60% CDF				Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio	Rotor GD^2 kgm^2	Net. Approx Wt., B3 Const. Kg.
	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m						
71	0.37	1.43	0.45	0.37	1.43	0.45	0.37	1.43	0.45	0.37	1.43	0.45	0.37	1.43	0.45	0.37	1.43	0.45	800	3,0	1.70	1.90	0.0038	10 (AL.)
80	0.55	2	0.65	0.55	2	0.65	0.55	2	0.65	0.55	2	0.65	0.55	2	0.65	0.55	2	0.65	830	3.5	1.90	2.20	0.0060	18 (AL.)
80	0.75	2.7	0.85	0.75	2.7	0.85	0.75	2.7	0.85	0.75	2.7	0.85	0.75	2.7	0.85	0.75	2.7	0.85	860	3.5	2.25	2.50	0.0084	25 (AL.)
90L	1.1	3	1.2	1.1	3	1 2	1.1	3	1.2	1.1	3	1 2	1.1	3	1.2	1 1	3	1.2	900	4.0	2.30	2.60	0.0160	35 (AL.)
90L	1.5	4.2	1.6	1.5	4,2	1 6	1.5	4.2	1.6	1.5	4,2	1 6	1.5	4.2	1 6	1.5	4.2	1.62	900	4.0	2.30	2.75	0.0160	40 (AL.)
100L	2.2	6.5	2.3	2.2	6.5	2.3	2.2	6.5	2.3	2.2	6.5	2.3	2.2	6.5	2.3	2.2	6.5	2.3	920	4.5	2.25	2.75	0.029	45 (AL.)
112M	3.7	9.1	3.9	3 7	9.1	3.9	3.7	9.1	3.9	3 7	9.1	3.9	3.7	9.1	3.9	3.7	9.1	3.92	920	5.0	2.25	2.75	0.065	55 (AL.)
132S	5.5	13.5	5.8	5.5	13.5	5.8	5.5	13.5	5.8	5.5	13.5	5.8	5.5	13.5	5.8	5.5	13.5	5.8	925	5.5	2.30	2.75	0.153	75
132M	7.5	18.8	7.9	7.5	18.8	7.9	7.5	18.8	7.9	7.5	18.8	7.9	6.5	16.3	6.8	6.5	16.3	6.8	925	5.5	2.30	2.75	0.193	144
160M	9.3	21	9.7	8	18	8.3	9.3	21	9.7	8	18	8.3	9.3	21	9.7	8	18.1	8.3	935	6.0	2.30	2.75	0.276	165
160L	11	24	11.5	10.2	22.3	10.6	11	24	11.5	10.2	22.3	10.6	11	24	11.5	10.2	22.3	10.6	935	6.0	2.30	2.75	0.34	187
160L	13	29	13.5	12	27	12.5	13	29	13.5	12	27	12.5	13	29	13.5	12	27	12.5	935	6.0	2.25	2.75	0.40	200
180L	17	35	17.2	16	33	16.2	17	35	17.2	16	33	16.2	16	33	16.2	15	31	15.2	960	6.0	2.30	2.60	0.82	225
200L	22	42	22.1	20	38	20 1	22	42	22.1	20	38	20 1	20	38	20.1	18.5	35.1	18.6	970	6.0	2.30	2.50	1.2	310
225M	30	55	30.1	28	51	30.1	30	55	30.1	28	51	30.1	28	51.3	28.1	26	47.7	26.1	970	6.0	2.30	2.50	2.1	360
250M	37	66	37.0	34	60	34.0	37	66	37.0	34	60	34.0	34	60.2	34,0	30	53.1	30,0	975	6.0	2.30	2.50	3.51	805
280S	45	82	45.0	40	73	40.0	45	82	45.0	40	73	40.0	40	70.2	40.0	37	65.0	37	975	6.0	2.30	2.50	5.11	900
280M	52	93	51.7	48	86	47.7	52	93	51.7	48	86	47.7	48	85.5	47.7	45	80	44.7	980	6.0	2.30	2.50	6.16	1050
315S	70	123	69.2	65	114	64.3	70	123	69.2	65	114	64.3	65	115	64.3	60	106	59,3	985	6.0	2.30	2.50	10.7	1180
315M	85	151	84.1	80	142	79.1	85	151	84.1	80	142	79.1	80	142	79.1	75	133	74,2	985	6,0	2,30	2.50	12.4	1350
315M	102	178	100,6	95	166	93.7	102	178	100,6	95	166	93.7	95	166	93.7	90	157	88.7	988	6.0	2.30	2.50	15.5	1400
315L	125	217	123.2	120	208	118.3	125	217	123.2	120	208	118.3	120	208	118.3	110	190.8	108.4	988	6,0	2.30	2.50	18.0	1850
315L	150	260	147.9	142	246	140.0	150	260	147.9	142	246	140.0	142	246	140.0	132	228.5	130.1	988	6.0	2.30	2.50	21.5	2170
355L	168	294	165.3	160	280	157.4	168	294	165.3	160	280	157.4	160	280	157.4	150	263	147.6	990	6.0	2.20	2.50	28.7	2350
355L	185	326	182.0	175	308	172.2	185	326	182.0	175	308	172.2	175	308	172.2	160	282	157.4	990	6.0	2.20	2.50	28.7	2500
355L	235	414	231.2	225	396	221.4	235	414	231.2	225	396	221.4	225	396	221.4	210	370	206.6	990	6.0	2.20	2.50	35.5	2600
355L	280	493	275.5	265	466	260.7	280	493	275.5	265	466	260.7	265	466	260.7	240	422	236.1	990	6.0	2.20	2.50	43.3	2750

Note : For crane duty motor's dimensions refer Page No.,33,34,35

TEFC 3 Phase SC Induction Motors Crane & Hoist Duty with DOL Starting suitable for 415V± 10%, 50Hz ± 5%, Combined variation ± 10%, Insulation class F, Temperature rise class B, Degree of protection IP55, Ambient 45°C, Duty S3 & S4

Electrical Performance for DOL Starting - 8 Pole (750 RPM)

Frame Size	60 Starts / hr.						150 Starts / hr.						300 Starts / hr.						Speed RPM	With DOL Starting				
	40% CDF			60% CDF			40% CDF			60% CDF			40% CDF			60% CDF				Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio	Rotor GD^2 kgm^2	Net. Approx Wt., B3 Const. Kg.
	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m	kW	Current Amps	Torque Kg.m						
90S	0.37	1.43	0.5	0.37	1.43	0.5	0.37	1.43	0.5	0.37	1.43	0.5	0.37	1.43	0.5	0.37	1.43	0.5	700	3.0	2.00	2.3	0.011	26 (AL.)
90S	0.55	2.15	0.8	0.45	1.76	0.6	0.55	2.15	0.8	0.45	1.76	0.6	0.55	2.15	0.8	0.45	1.76	0.6	680	3.0	1.80	2.1	0.011	30 (AL.)
90L	0.75	2.76	1.1	0.75	2.76	1.1	0.75	2.76	1.1	0.75	2.76	1.1	0.75	2.76	1.1	0.65	2.39	0.9	680	3.0	2.00	2.4	0.014	35 (AL.)
100L	1.1	3.4	1.6	1.1	3.4	1.6	1.1	3.4	1.6	1.1	3.4	1.6	1.1	3.4	1.6	0.9	2.78	1.3	655	3.5	1.8	2.00	0.023	50 (AL.)
100L	1.5	4.95	2.1	1.5	4.95	2.1	1.5	4.95	2.1	1.5	4.95	2.1	1.5	4.95	2.1	1.1	3.63	1.6	680	3.5	2.00	2.3	0.027	53 (AL.)
112M	2.2	6.8	3.1	2.2	6.8	3.1	2.2	6.8	3.1	2.2	6.8	3.1	2.2	6.8	3.1	1.5	4.64	2.1	700	4.0	2.00	2.3	0.06	55 (AL.)
132S	3.7	8.8	5.1	3.7	8.8	5.1	3.7	8.8	5.1	3.7	8.8	5.1	3.7	8.8	5.1	3	7.14	4.1	710	4.0	2.00	2.3	0.133	75
160M	5.5	12	7.5	5.5	12	7.5	5.5	12	7.5	5.5	12	7.5	5.5	12	7.5	4.5	9.82	6.2	710	5.0	2.1	2.4	0.299	100
160L	7.5	16	10.3	6.5	13.9	8.9	7.5	16	10.3	6.5	13.9	8.9	6.5	13.9	8.9	6	12.8	8.2	710	5.5	2.25	2.5	0.4	125
180M	9.3	20	12.8	8.5	18.5	11.7	9.3	20	12.8	8.5	18.5	11.7	8.5	18.5	11.7	7.5	16.5	10.3	710	5.5	2.25	2.5	0.62	175
180L	11	23	15.1	9.3	19.4	12.8	11	23	15.1	9.3	19.4	12.8	9.3	19.5	12.8	8.5	17.8	11.7	710	5.5	2.25	2.5	0.72	200
200L	15	28.8	20.3	13	25.0	17.6	15	28.8	20.3	13	25.0	17.6	13	25	17.6	11	21.1	14.9	720	5.5	2.3	2.3	1.32	258
225S	18.5	37.5	25.0	17	34.5	23.0	18.5	37.5	25.0	17	34.5	23.0	17	34.5	23.0	15	30.4	20.3	720	5.5	2.25	2.5	1.95	345
225M	22	44.5	29.8	20	40.5	27.1	22	44.5	29.8	20	40.5	27.1	20	40.5	27.1	18.5	37.4	25.0	720	5.5	2.25	2.5	2.41	375
250M	30	56	40.0	26	48.5	34.7	30	56	40.0	26	48.5	34.7	26	48.5	34.7	22	41.1	29.4	730	5.5	2.3	2.5	3.72	465
280S	37	71	49.4	34	65.2	45.4	37	71	49.4	34	65.2	45.4	34	65	45.4	30	57.6	40.0	730	5.5	2.25	2.4	5.83	600
280M	45	86	60.0	40	76.4	53.4	45	86	60.0	40	76.4	53.4	40	76	53.4	37	71	49.4	730	5.5	2.25	2.4	6.86	720
31 5S	55	108	72.9	50	98.2	66.3	55	108	72.9	50	98.2	66.3	50	98	66.3	45	88	59.6	735	6.0	2.25	2.4	10.7	900
315M	75	148	99.4	67	132.2	88.8	75	148	99.4	67	132.2	88.8	67	132	88.8	60	118	79.5	735	6.0	2.25	2.4	12.4	950
315M	90	175	119.3	80	155.6	106	90	175	119.3	80	155.6	106	80	156	106	75	146	99.4	735	6.0	2.25	2.4	15.5	1000
315L	110	214	145.8	100	195	132.5	110	214	145.8	100	195	132.5	100	195	132.5	90	175	119.3	735	6.0	2.25	2.4	18.0	1130
315L	132	257	174.9	125	243	165.6	132	257	174.9	125	243	165.6	125	244	165.6	115	224	152.4	735	6.0	2.25	2.4	21.5	1150
355L	160	300	210.6	150	281.3	197.4	160	300	210.6	150	281.3	197.4	150	281	197.4	140	263	184.3	740	6.0	2.00	2.3	28.7	1670
355L	180	337	236.9	170	318.3	223.8	180	337	236.9	170	318.3	223.8	170	318	223.8	155	290	204.0	740	6.0	2.2	2.4	35.5	1670
355L	185	347	243.5	175	328.1	230.3	185	347	243.5	175	328.1	230.3	175	328	230.3	160	300	210.6	740	6.0	2.00	2.3	35.5	2150
355L	210	394	276.4	200	375.1	263.2	210	394	276.4	200	375.1	263.2	200	375	263.2	180	338	236.9	740	6.0	2.00	2.3	35.5	2200

Note : For crane duty motor's dimensions refer Page No.,33,34,35

Brake Selection Chart

2 Pole Brake Motor

KW	Frame Size	S.F. = 2	S.F. = 2.5	S.F. = 3
0.12	63	6	6	6
0.18	63	6	6	6
0.37	71	6	6	6
0.55	71	6	8	8
0.75	80	8	8	8
1.1	80	8	10	10
1.5	90S	10	10	10
2.2	90L	10	12	12
3.7	100L	12	12	14
5.5	132S	14	14	14
7.5	132S	14	14	16
9.3	132M	14	16	16
11	160M	16	16	18
15	160M	16	18	18
18.5	160L	18	18	20
22	180M	18	20	20
30	200L	20	20	25
37	200L	20	25	25
40	225M	25	25	31
55	250M	25	31	31
75	280S	31	31	40
90	280M	31	40	40

4 Pole Brake Motor

KW	Frame Size	S.F. = 2	S.F. = 2.5	S.F. = 3
0.12	63	6	6	6
0.18	63	6	6	6
0.37	71	8	8	8
0.55	80	8	10	10
0.75	80	10	10	10
1.1	90S	10	12	12
1.5	90L	12	12	12
2.2	100L	12	14	14
3.7	112M	14	14	16
5.5	132S	16	16	18
7.5	132M	16	18	18
9.3	160M	18	18	20
11	160M	18	20	20
15	160L	20	20	25
18.5	180M	20	25	25
22	180L	25	25	31
30	200L	25	31	31
37	225S	31	31	40
40	225M	31	40	40
55	250M	40	40	40
75	280S	40	40	50
90	280M	40	50	50

6 Pole Brake Motor

KW	Frame Size	S.F. = 2	S.F. = 2.5	S.F. = 3
0.12	71	6	6	6
0.18	71	6	8	8
0.37	80	8	10	10
0.55	80	10	10	10
0.75	90S	10	12	12
1.1	90L	12	12	12
1.5	100L	12	14	14
2.2	112M	14	14	16(FR132)
3.7	132S	16	16	18
5.5	132M	18	18	20(FR160)
7.5	160M	18	20	20
9.3	160L	20	20	25(FR180)
11	160L	20	25(FR180)	25(FR180)
15	180L	25	25	31
18.5	200L	25	31	31
22	200L	31	31	40(FR225)
30	225M	31	40	40
37	250M	40	40	40
40	280S	40	40	40
55	280M	40	50	50

*S.F. = Safety Factor

8 Pole Brake Motor

KW	Frame Size	S.F. = 2	S.F. = 2.5	S.F. = 3
0.18	80	8	8	8
0.37	90S	10	10	10
0.55	90L	10	12	12
0.75	100L	12	12	12
1.1	100L	12	14	14
1.5	112M	14	14	14
2.2	112M/132S	14	16(FR132)	16(FR132)
3.7	132M/160M	16	18	18
5.5	160M	18	20	20
7.5	160L	20	20	25(FR160)
9.3	180L	20	25	25
11	180L	25	25	31
15	200L	25	31	31

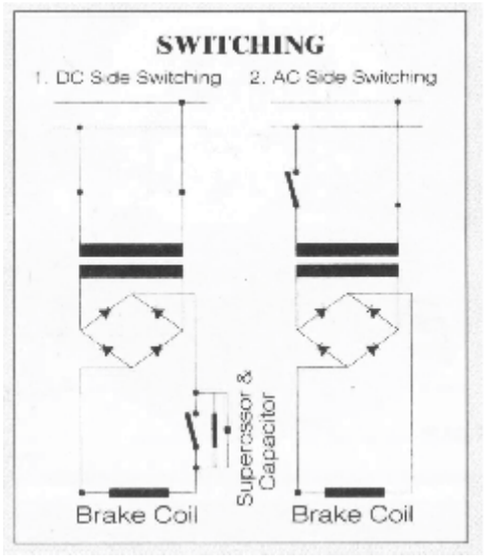
Note :-

1. S.F. 2 Brake to be selected for continuous duty (for light application)
2. S.F. 2.5 Brake to be selected for crane duty cross long travel application (for medium duty & intermittent application)
3. S.F. 3.0 Brake to be selected for crane duty hoisting / vertical lifting application (Heavy duty & intermittent application)
4. A.C. Brake can be given on demand.
5. Brakes above 255 frame can be given as per customer requirement.
6. Brakes are available with 24 VDC, 96 VDC & 190 VDC
7. Brakes are suitable for 50° C ambient.
8. Ambient above 60° C can be given on demand.
9. For dimensions of Brake Motor refer General Arrangement Drawing/ Dimensions Table for Std. and FLP motors.

Table No. 23 - For optimum performance we suggest to use following Rectifiers (Power supply)

Brake Coil Voltage	AC Input Voltage	Current Rating	Rectifier Type
190 VDC	41 5 VAC	1.5 Amp	EH 720 HHD
	230 VAC	1.5 Amp	EH 720 AD
96VDC	230 VAC	1.5 Amp	EH 720 CD
	110 VAC	1.5 Amp	EH 720 BD

All RECTIFIERS offered by us are with inbuilt DC switching protection circuit. Use of inferior quality & cheap Rectifiers may damage your costly brake coils.

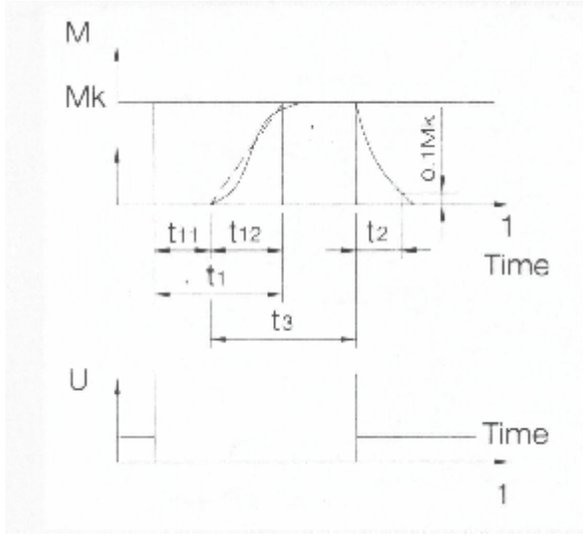


Switching

Brake coils are operated with DC voltage. Generally when braking time is not critical AC side switching is done. This method is often used with brake motors. Where brake is switched with motor contacts. Due to the inductance of the brake coil, engagement time can be 3-6 times longer than with DC switching. Therefore this arrangement is not suitable for hoist applications. For falling loads such as hoist, lift and cranes, also the high inertia loads, a brake motor to some extent regenerate the supply and hold off the brake. Here it is essential to switch on the DC side of the rectifier. DC side switching requires provision of universal spark suppressor and capacitor to protect the coil and switches against inductive voltages.

For normal rectifier converting AC to DC you can use separate universal spark suppressor and capacitor across the switch. Rectifier supplied by us are designed to include suppressor and capacitor suitable for DC switching.

Operating Times



t1 Engagement time
t2 Disengagement time
t11Delay time
t12 Rise time of brake torque
t3 Slipping time

Table No. 24

Brake Size	t11 ms	t12 ms	t1 ms	t2 ms
06	7	10	17	35
08	10	25	35	65
10	10	30	40	90
12	10	40	50	120
14	15	50	65	150
16	20	70	90	180
18	30	80	110	300
20	50	150	200	400
25	70	200	270	500

The engagement times are valid for switching on DC side. The table shows the delay during engagement t11, the rise time of brake torque t12 and the engagement time t1=t11+t12 Disengagement time is not influenced by DC or AC side switching. However it can be reduced by suitable excitation or over excitation.

For electrical performance please refer Page No.14 to 17.

Roller Table Motors

LHP Roller Table Motors are designed taking into consideration the experience of users in steel plants over the years.

Applications

- In steel plants for conveying steel billets for processing through roller mills
- Suitable for Geared Motors operating with VVVF source

Applicable Standards

IPSS - 1-03-007	Inter plant standard for steel industries
IPSS - 325 (IEC 34-1)	Specifications for 3 phase induction motors
IPSS -4691 (IEC 34-5)	Degrees of protection provided by enclosure for rotating electrical machinery

Range	Torque : 1Kgm - 35.5kgm
Pole	4/6/8
Mounting	Standard / Special as per IPSS specifications
Frame	Upto 355L
Voltage	415V AC or (upto 660V)
Frequency	50Hz
Stalled rotor withstand time	Up to 15 minutes max or as per customer requirement
Insulation	H Class
Duty	S3, S4, S1,S5,S6 & S7
Frame with circular fines disign	

• Roller table motors are special driving elements for the steel rolling mill industry. Particularly in case of working and conveying roller tables, these motors are subject to extremely hard electrical and mechanical requirements.

• This fact results from the very different modes of operation and cases of load with their variants such as continuous duty, intermittent duty and short-time duty as well as starting duty, electrical braking duty and reversing duty.

• The motors must be suitable to operate under overloads conditions e.g. blockings caused through jammed rolled material. LHP roller table motors have proved functional efficiency and operational reliability.

• Starting from these experiences, LHP has developed various variants of roller table motors adapted to the conditions of the modern drive engineering.

• Generally, the motors are delivered in a robust grey cast iron version. Motors are provided with horizontal / vertical cooling ribs and in case of the heavy type series they are provided with ribs arranged across the axial direction. The housings have a high mechanical resistance and a very good thermal capacity. Motors connection box can be executed on the top, right or left based on requirements. Even terminal box can be arranged at the non-driving side end shield.

• The design torque in Nm given at the motor shaft is calculated by

• $M = 9550 \times (p/n)$
where
P = design output in kW
n = speed in RPM

• All LHP motors shall be suitable for ambient temperatures from –35° C up to +40° C.

• Motors also can be offered for higher ambient temperature requirements.
Motors shall be suitable for temperature rise to class B/ class F/ class H insulation based on the requirements

• LHP can supply motors with higher locked rotor withstand time at cold or hot conditions based on applications.

• Motor shall have class F insulation as a standard and also can be supplied with class H insulation on request.

• Dual coat wires are used for roller table applications

• Winding joints are strengthen by applying RTV silicon sealant.

Roller Table Motors

• Motor have Vacuum pressure impregnation process with double dipping and baking process to ensure high grade of withstanding capacity.

• Motor frame : FG200 grade cast iron material as standard. MS fabricated construction

• End Shields : CI with FG200 grade or MS fabricated.

• Shaft : EN8 material.
EN24 with heat treatment can be given.

• Terminal box : CI or MS.

• Motor shall have aluminum pressure diecasting.

• Motors can be provided with

• Surface cooled Totally enclosed fan cooled Separately force cooled arrangement

• LHP roller table motors are equipped with antifriction Double Groove, C3 clearance ball bearings upto 200 frame and open type bearings with re-greasing arrangement for frames 225 and above.

• The bearings have a nominal service life of at least 20,000 hours for maximum permissible load conditions. For motors without additional axial loading, the nominal service life is 40,000 hours for direct coupling.

Lubrication :
Life time pre-lubricated for frames upto 200.
Re-greasing arrangement for frames 225 and above.

• Finish system

• Anticorrosive polyurethane paint. Epoxy pain can be provided.

• Standard color

• RAL 7015 Slate-grey

• Motors shall be suitable for below overload conditions:
1.5 times the rated current for 2 min.
1.6 times the rated torque for 15 Seconds

The following motor protection variants are available on request:
• Motor protection with PTC temperature sensors in the stator winding

• Bimetallic temperature sensors in the stator winding.

• Resistance temperature detectors (RTDs) for monitoring the winding or bearing temperature on request

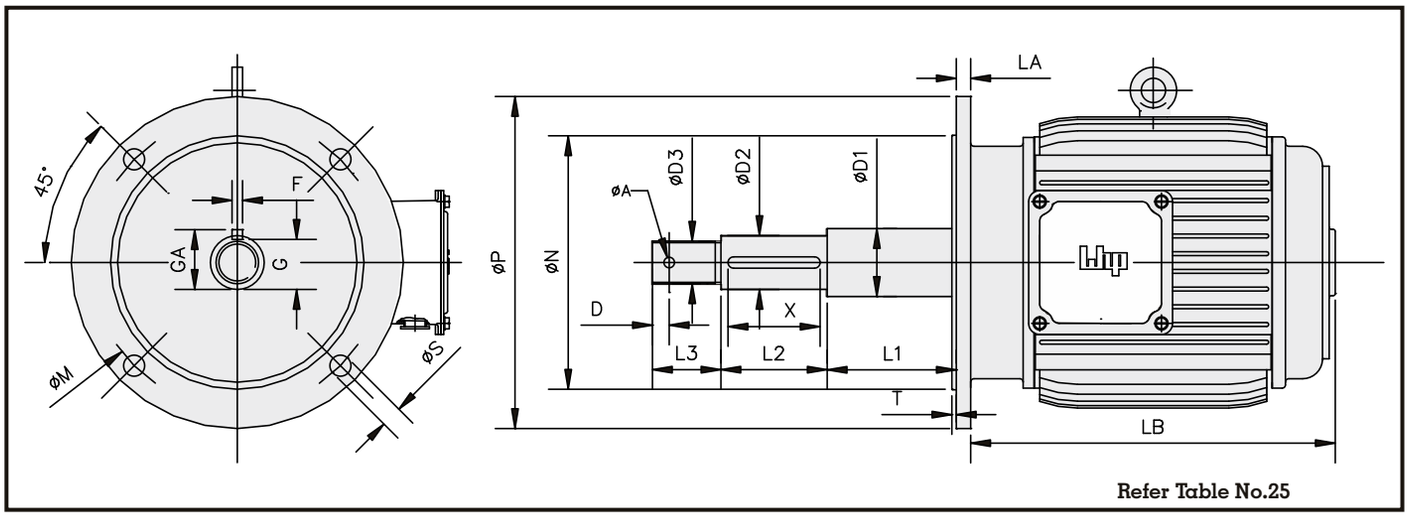
• Motors can be provided with space heaters on request.

Cooling Tower Motors

Range	Up to 270 HP (200 kw)
R.P.M.	1500, 1000, 750
Pole	4/6/8
Mounting	B5 / Shaft downward position V1
Frame	71 to 315 L
Protection	IP 55
Insulation	F Class
Voltage	415 V, 380 V or as per requirment
Frequency	50 Hz or 60 Hz
Duty	S1
Paint	With Anti corrosive Epoxy paint

Applicable Standards

IS - 4722	Specifications for rotating electrical machine
IS - 325 (IEC 34 - 1)	Specifications for 3 phase induction machine
IS - 4691 (IEC 34 - 5)	Degree of protection provided by enclosure for rotating electrical machines
IS - 4889 (IEC 34 - 2)	Method of determination of efficiency of rotating electrical machines
IS - 2223 (IEC 72 - 1)	Dimensions of 3 phase flange mounted induction motors



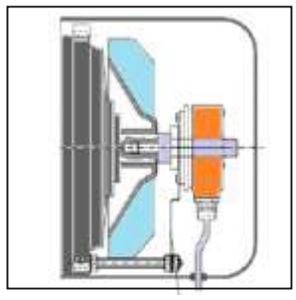
Refer Table No.25

Table No. - 25

Frame size	M	N	P	S X NO.	T	LA	LB	AD	F	G	GA	ØD1	L1	D2	L2	D3	L3	X	ØA	B
71	130	110	160	10X4	3.5	10	180	115	5	11	16	17	55	14^{j6}	25	M12	30	20	---	---
80	165	130	200	12X4	3.5	10	200	120	6	15.5	21.5	20	60	19^{j6}	50	M16	30	45	---	---
90S	165	130	200	12X4	3.5	12	235	160	8	24	31	30	60	28^{j6}	50	M24	50	45	5	8
90L	165	130	200	12X4	3.5	12	255	160	8	24	31	30	60	28^{j6}	50	M24	50	45	5	8
100L	215	180	250	15X4	4.0	12	270	155	8	24	31	30	60	28^{k6}	50	M24	50	45	5	8
112M	215	180	250	15X4	4.0	12	280	170	8	24	31	30	60	28^{k6}	50	M24	50	45	5	8
132S	265	230	300	15X4	4.0	12	310	210	10	33	41	40	90	38^{k6}	75	M30	50	65	5	8
132M	265	230	300	15X4	4.0	12	350	210	10	33	41	40	90	38^{k6}	75	M30	50	65	5	8
132M(N)	265	230	300	15X4	4.0	12	375	210	10	33	41	40	90	38^{k6}	75	M30	50	65	5	8
160M	300	250	350	19X4	5.0	13	420	233	12	37	45	45	90	42^{k6}	75	M30	50	70	5	8
160L	300	250	350	19X4	5.0	13	462	233	12	37	45	45	90	42^{k6}	75	M30	50	70	5	8
180M/L	300	250	350	19X4	5.0	13	520	256	14	42.5	51.5	50	100	48^{k6}	105	M30	50	90	5	8
200L	350	300	400	19X4	5.0	15	570	313	16	49	59	60	100	55^{m6}	105	M30	50	95	5	10
2255/M	400	350	450	19X8	5.0	16	605	370	18	53	64	65	100	60^{m6}	115	M30	50	100	5	10
250M	500	450	550	19X8	5.0	22	695	415	18	58	69	70	100	65^{m6}	115	M40	60	100	5	10
280S/M	500	450	550	19X8	5.0	22	785	430	20	67.5	79.5	90	120	75^{m6}	120	M40	60	100	5	10
315L	600	550	660	24X8	6.0	22	935	520	22	71	85	95	130	80^{m6}	120	M40	60	120	5	10

Encoder Motors

LHP Encoder motors serve applications where exact control of speed (RPM) direction of rotation, exact positioning are required . Hollow shaft encoders feature avoids misalignment and vibration problems during actual application which leads to increased reliability-



Applications :-

Examples - Conveyors, Windmills, Textiles, Packaging, Printing, Paper plants, Steel Plants, Machine Tools, automation, robotics. Encoder motors are vital for precise speed control, full torque availability at low speeds and positioning.

Motor Details

Range	Upto 315 Kw
Pole	2,4,6,8
Mounting	Foot (B3), Flange (B-5), Face (B-14), and combinations
Frame	63 to 355 L
Protection	IP 55
Ambient Temp.	50°C
Frequency range	100 to 60% of Rated Frequency.
Torque	upto 60% of Rated Frequency constant torque application.

Encoder Details

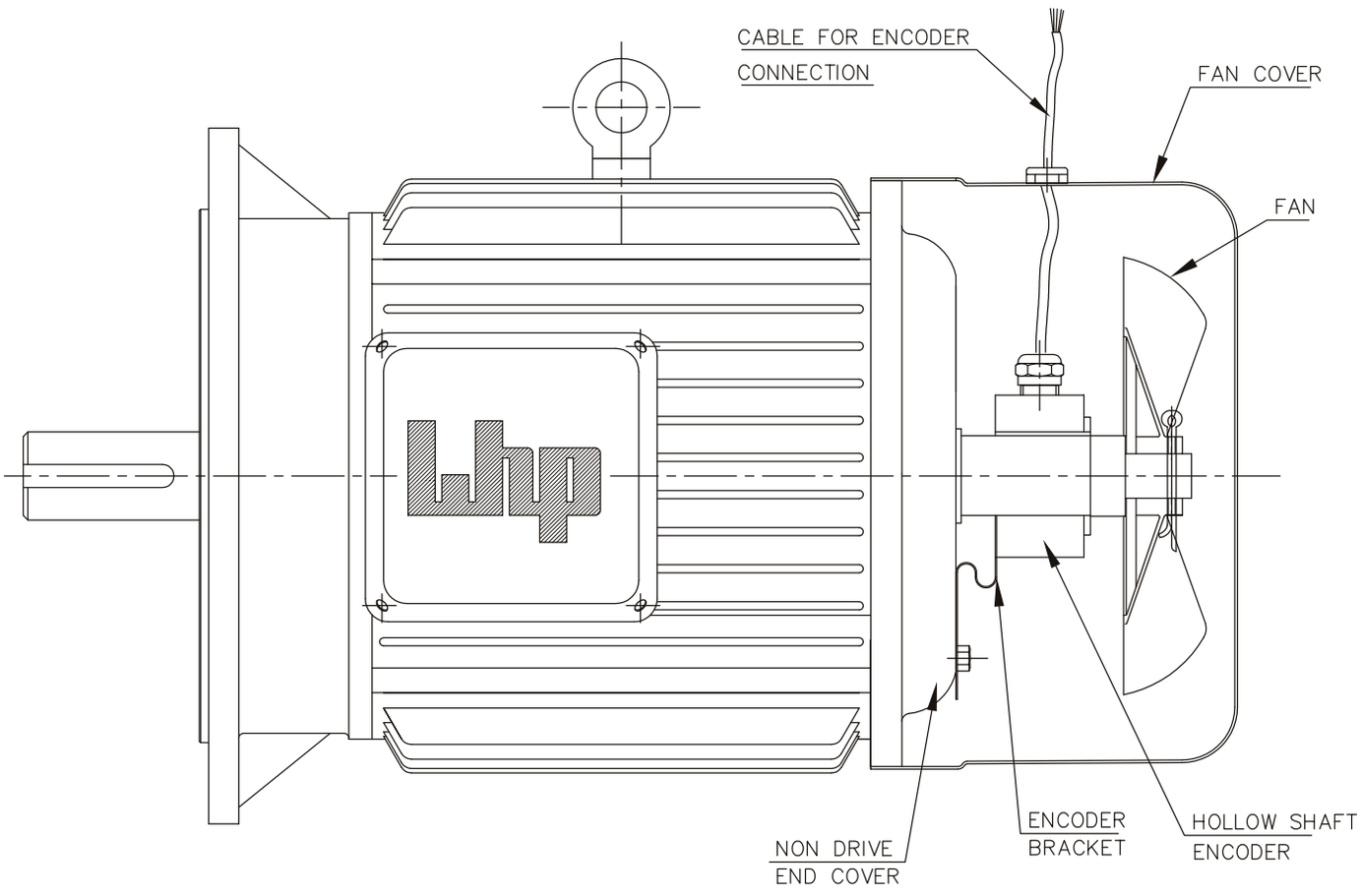
Type	Incremental with Hollow shaft
Max. Speed	6000 RPM
Operating Temperature	40 to 70 degrees C
Protection	IP 67
Type of connection	1m PVC Cable or Plug without mating connector
Resolution (PPR)	1024, 1500, 2000, 2048, 4096 and Max. Upto 5000
Out put	RS 422 / TTL / HTL
Input Voltage	5V or 10V - 30V

Salient features of Incremental encoders fitted to the LHP Motors

- ✓ The incremental encoders comes with a very sturdy bearing construction with its safety lock design.
- ✓ Very large interlocked bearings and large bearing span ensure critical stability with vibration and tolerance of installation errors.
- ✓ A solid die cast housing and radial shaft seal make the incremental encoder ideal for use along with motor in out door harsh applications.
- ✓ The encoders are integrated under the fan cowl.

General Drawing

MOTOR WITH HOLLOW SHAFT ENCODER



Note : For motor mounted with encoder, all dimensions will be as per Standard Induction Motor only except total length of motor. Total length will get increase depending on type of motor & encoder.

20.00 Tolerance on Performance Values & Dimensions

The electrical performance data (for Standard, Crane & Flame-Pfoof motors) namely current, power factor, efficiency, full load speed and torque at full load, starting torque & pull out torque are given in the table, These values are subjected to the following tolerances Beside these, values are given for information & guidance.

Electrical Parameters

i.	Efficiency (n) : a) By summation of losses : Motors up to 50 kW Motors above 50 kW b) By input-Output test	 -15 percent of (1-n) -10 percent of (1-n) -15 percent of (1-n)
ii.	Total losses applicable to motors above 50 kW*	+ 10 percent of the total losses
iii.	Power factor (Cos Ø)	-1/6 of (1 Cos Ø) Min. 0.02 and Max. 0.07
iv.	Slip at full load and at working temperature	± 20 percent of the guaranteed slip
v.	Breakaway starting current of squirrel cage Induction motors with short-circuit rotor and with any specified starting apparatus.	± 20 percent of the guaranteed starting current (no negative tolerance)
vi.	Breakaway torque	- 15 percent to + 25 percent of the guaranteed torque (+ 25 percent may be exceeded by agreement)
vii.	Pull out toque	-10 percent of the guaranteed torque except that after allowing for this tolerance, the torque shall be not less than 1.6 or 1.5 times the rated torque

Mechanical Parameters

Dimensions		**Talerance**
Flame size	63 to 250	0.0 to - 0.5 mm
(H)	280 to 355	0.0 to - 1.0 mm
Diameter Ø of shaft exiension : (i) 11 to 28 mm (ii) 32 to 48 mm (iii) 55 mm and over		 j6 k6 m6
Diameter N of Flange spigot :		j6 up to F 740 B
Key width		h9
Width of drive shaft keyway (normal keying)		N9
Key Height : (i) Square section (ii) Rectangular section		 h9 h1 1

Table No. - 26

Diameter of shaft extension run out of motoers

Over	Up to	Normal	Precision Class
0	10	0.030	0.015
10	18	0.035	0.018
18	30	0.040	0.021
30	50	0.050	0.025
50	80	0.060	0.030
80	120	0.070	0.035
Concentricity of spigot diameter and perpendicularily of mounting surface of flange with respect to shaft			
Flange No.	**Spigot Dia.**	**Normal Class**	**Precision Class**
F65	50	0.080	0.040
F75	60	0.080	0.040
F85	70	0.080	0.040
F100	80	0.080	0.040
0115	95	0.080	0.040
F130	110	0.100	0.050
F165	130	0.100	0.050
F215	180	0.100	0.050
F265	230	0.100	0.050
F300	250	0.125	0.063
F350	300	0.125	0.063
F400	350	0.125	0.063
F500	450	0.125	0.063
F600	550	0.160	0.080

Shipping Specifications

Table No. - 27

For Three Phase Standard Induction Motors

Fame Size	Type of Packing	L x B x HT. in mm (Max.)
63	Corrugated Box	245 x 180 x 195
71	Corrugated Box	280 x 195 x 220
80	Corrugated Box	230 x 250 x 250
90	Corrugated Box	425 x 250 x 305
100	Corrugated Box	480 x 320 x 295
112	Corrugated Box	650 x 395 x 480
132	Wooden Box	700 x 495 x 495
160	Wooden Box	875 x 650 x 610
180	Wooden Box	875 x 650 x 610
200225	Wooden Box	940 x 790 x 790
250	Wooden Box	1170 x 920 x 920
280	Wooden Box	1320 x 970 x 970
315	Wooden Box	1475 x 965 x 1095
355	Wooden Box	2020 x 1225 x 1310

For Three Phase Flame - Proof Motors

Fame Size	Type of Packing	L x B x HT. in mm (Max.)
80	Wooden Box	580 x 355 x 420
90	Wooden Box	650 x 395 x 480
100	Wooden Box	650 x 395 x 480
112	Wooden Box	700 x 495 x 585
132	Wooden Box	700 x 495 x 585
160	Wooden Box	940 x 790 x 790
180	Wooden Box	940 x 790 x 790
200	Wooden Box	940 x 790 x 790
225	Wooden Box	1070 x 940 x 790
250	Wooden Box	1475 x 965 x 1095
280	Wooden Box	1475 x 965 x 1095
315	Wooden Box	1475 x 965 x 1095

Note : For approximate gross weight of packed products, consider 10% for corrugated & 20% for wooden packing more weight than net weight which is given in individual product performance tables.

Product Range

Motor Type	Frame	Power (kW)	Picture
Standard Motors Single phase Three phase	 63 to 100 63 to 450	 0.18 to 1.5kW 0.12 to 1000kW	
IE2, IE3 & IE4 Motors	71 to 450	0.37 to 375kW	
*Brake Motors	63 to 250	0.12 to 55kW	
Crane & Hoist Duty Motors	71 to 355	0.37 to 315kW	
**Flame-proof Motors (Type Ex 'd')	63 to 315	0.18 to 500kW	
Flame-proof Motors IE2 & IE3 (Type Ex 'd')	71 to 315	Up to 500kW	
Non-sparking Motors Ex 'nA' (IE1, IE2 & IE3)	63 to 355	0.12 to 500kW	
Increased Safety Motors Ex 'e'(IE2)	71 to 355	0.37 to 500kW	
Inverter Duty Motors	63 to 450	0.12 to 1000kW	
Roller Table Motors	100 to 355		
Cooling Tower Motors	71 to 355		
Encoder Motors	63 to 450	0.12 to 1000kW	
Helical Gearmotors : L' Power Series	Power :0.12 to 180kW Speed :0.35 to 560RPM Torque:Up to 60000 Nm		

Textile (loom) Motors	**Marine Duty Motors**	**Railway Auxiliary Motors**	**Multi-speed Motors**
			
As per requirenments	As per requirenments	As per requirenments	As per requirenments

*Can also be offered in Flame-proof enclosure. **Can also be offered for Gas group IIC upto 250 frame.

Branch Offices

Ahmedabad
20, Devshrusthi -2, B/H Kena Bungalows,
Motera Road, Sabarmati,
Ahmedabad - 380005
Email: ahmedabad.gm@lhpmotor.com
Mobile: +91 9099694302

Chennai
Triveni Apartments, A-Block, No. 67,
Annamal Road,Co-operative Nagar,
Thiruverkadu, Chennai - 600077
Mobile No.: 09538033222
Email: chennai.gm@lhpmotor.com

Kochi
VI/867-C, {Seaport - Airport Road,
Near Focus Motors, Karivallimoola,
Thrikkakara E O., Kochi-682 021
Tel.:+91-484-2108377 Fax:2424354
Mobile:+91 94471 67723/984603 6852
Email:kochi.rmh@lhpmotor.com

Pune
310, 3rd Floor, G.O. Square, Block B,
Survey No.249/250, Nr.Mankar Chowk, Wakad, PUNE-411057
Mobile:+91 9011501791/ 9922458179
Email :pune.gm@lhpmotor.com
pune.bm@lhpmotor.com

Bangalore
No.475, 2nd Floor, R. K Tower, 1st Stage,
Thimmaiah Road of W. O. C Road,
Rajajinagar, Bangalore - 560 010
Tel.:+91 - 80 - 2338 7998/2330 3436
Mobile:+91 98440 51288/98451 98096
:+91 98440 56100
Email:bangalore.rmh@lhpmotor.com

Coimbatore
No. 39/1 - Post and
Telegraph Colony,
Narasimhanaickenpalayam,
Coimbatore-641031
Mobile: +91 8754888907
Email : coimbatore.bm@lhpmotor.com

Kolkatta
6, Goaltuli Lane,
Kolkata – 700013 (West Bengal)
Mobile:+91 9073361717
Email: kolkata.bm@lhpmotor.com

Secunderabad
5-4-104/6, 2nd floor, M. G. Road,
Ranigunj, Secundrabad - 500 003
Tel.:2754 0093/6632 7013,
Mobile:+91 9985702704
Email:
secunderabad.bm@lhpmotor.com

Bhilai
J-372, Surya Vihar, Junwani,
Bhilai - 490 020
Mobile :+91 95892 20880
Email : bhilai.gm@lhpmotor.com

Indore
313, Shree Shyam Heights,
"Shyam Kunj" Bicholi Mardana,
Indore – 452016 (M.P.)
Mobile :+91 8818884065
Email : indore.bm@lhpmotor.com

New Delhi
C-8, Greater Kailash, Enclave - n.
New Delhi-110 048
Tel.:+91-11-29227579
Mobile:+91 98188 77008
Email:delhi.gm@lhpmotor.com
delhi.bm@lhpmotor.com

Regional Sales & Service Network

Belgaum
Shop No. 10, Kssidc Techno Industrial
Complex, Khanapur Road,
Udyambag, Belgaum - 590 008
Tel.:+91-831-2440695
Mobile:+91 94480 67172
Email:belgaum.rmh@lhpmotor.com

Kolhapur
4, 3rd Floor, Bhaskar Plaza,
Shahupuri, Kolhapur - 416 001
Tel:+91 - 231 - 2666224/2666221
Mobile:+91 98230 28714
Email:kolhapur.rmh@lhpmotor.com

New Delhi
B-XI/59, Sector- 18, Rohini,
New Delhi-110 085
Tel.:2785 4019
Fax:+91-11-27859862
Mobile:+91 98109 14425
Email: delhi.rmh@lhpmotor.com

Vadodara
103, Maruti Complex,
Near Natubhai Centre, Gotri Road,
Vadodara - 390 007
Tel. :2396148/2398249/2390833 (R)
Mobile:+91 93762 21984
Email :vadodara.rmh@lhpmotor.com

Durg
13, Indira Market, Durg,
Chattisgarh-491 001
Tel.:+91-788-6531186
Fax:+91-788-4011342
Mobile:+91 93010 85532
Email :durg.rmh@lhpmotor.com

Kolkata
Udayan Industrial Estate
3, Pagladanga Road, Plot No. 19,
Kolkata-700 015
Tel.:4022 9499/4022 9404
Mobile:+91 98310 10649
Email:kolkata.rmh@lhpmotor.com

Ranchi
Magix Plaza, First Floor,
Opp. Gate No. 2, Ashok Nagar,
Ranchi - 834 002
Mobile:+91 9835147871/9431565538
Emau: ranchi.rmh@lhpmotor.com

Visakhapatnam
Door No. 9 -110, Plot No. 62,
Bhavani Nagar, Papayyaraju Palem,
Sujathanagar Post,
Visakhapatnam - 530 051
Tel.:+91-891-2515175
Mobile:+91 94407 47275
Email:
visakhapatnam.rmh@lhpmotor.com

Chennai
No. 15, 1st Floor. New Avadi Road,
Villivakkam, Chennai - 600 049
Tel.:2551 4954 (R)/4355 4231
Mobile:+91 90430 28947
Email:chennai.rmh@lhpmotor.com

Mumbai
22, Gyaneshwari Building,
Off Aarey Road, Peru Baug,
Goregaon (East), Mumbai - 400 063
Tel.:2927 0629/2927 0134
Fax:2927 0687
Mobile:+91 98700 41370
Email:mumbai.rmh@lhpmotor.com

Rourkeia
Shop No. 15, Nirmala Bhavan Market
Complex Madusudan Marg
Rourkeia, Orissa - 769 001
Tel.:+91-661-3290324(0)
+91 - 661 - 2480971 (R)
Mobile:+919437042724/9937052724
Emau:rourkela.rmh@lhpmotor.com

Faridabad
606, Zinnia Tower, Omaxe Green Valley, Gurukul Road,
Faridabad, Haryana - 121 003
Tel.:+91-129-2512007
Mobile:+91 98910 12246
Email:faridabad.rmh@lhpmotor.com

Nagpur
Khadgaon Village Road,
Amravati Road, Wadi, Nagpur
Tel.:+91-7104-221622
+91-7104-220444
+91-7104-220857
Mobile:+91 93250 81911/98221 30621
Email: nagpur.rmh@lhpmotor.com

Secunderabad
5-4-104/6, 2nd floor, M. G. Road,
Ranigunj, Secundrabad - 500 003
Tel.:2754 0093/6632 7013,
Mobile:+91 94404 11001
Email:secunderabad.rmh@lhpmotor.com

Laxmi Hydraulics Pvt. Ltd.
B-11 & B-16, MIDC, Chincholi, Solapur - 413 255 INDIA
Tel. : +91 - 217 - 2357001 (5 Lines)
Fax : +91 - 217 - 2357006
E-mail : lhpindia@lhpmotor.com
www.lhp.co.in

MKTG / WI-7204 / REV-02 / 01.10.2017 / Modern Printers