

SUPERNOVA™

LTS SERIES

3 PHASE TEFC CAGE MOTORS





3 PHASE TEFC CAGE MOTORS

About Larsen & Toubro

Larsen and Toubro is a technology-driven USD 7 billion company that infuses engineering with imagination. The Company offers a wide range of advanced solutions, in the field of Engineering, Construction, Electrical & Electronics, Machinery and Information Technology.

L&T Electrical Standard Products, which form a part of the Electrical & Electronics business, is India's largest manufacturer of low voltage switchgear and has the scale sophistication and range to meet global benchmarks.

L&T Electricals have found acceptance not only in India but also over 40 countries across the globe.

Environment & Community

The Company has a comprehensive Quality, Environment and Safety system. The manufacturing facilities conform to ISO 14001 (Environment Management System) & OSHAS 18001 by BVQI.

Switchgear Design and Development Center

SDDC is the primary constituent supporting the Electrical and Electronics division's leadership, through its proven excellence in product design.

Distribution

L&T's Electrical Standard Products Division is one of the largest distribution networks in the industry. These products are available through a network of more than 700 authorised stockists.

Training & After-Sales Service

L&T's Electrical & Electronics training centers at Pune, Lucknow and Coonoor have state-of-the-art training facilities with well equipped workshops and testing systems. Over 75,000 participants have benefited from these programmes.

The Company has over 40 branch offices across the country and a network of over 100 service centres to deliver after-sales service to the customers.

For us it's "Imagineering"

Reliability is always a need. The need provokes **imagination** of the human mind to deliver strength and elegance. Powered with strong **engineering** and streamlined design, L&T introduces complete range of low tension AC motors suitable for various market segments namely Industry, OEM, Energy & Infrastructure, Buildings and Agriculture. These power packed motors with innovative manufacturing techniques enable high performance, energy efficiency and sustainability.

LTS SERIES OF 3 PHASE TEFC CAGE MOTORS

SALIENT FEATURES OF LTS SERIES



MEETING EXPECTATIONS

A customer's expectations from a standard squirrel cage induction motor is to have a rated output

- At 50°C ambient
- For $415 \pm 10\%$, $50\text{Hz} \pm 5\%$ & combined variation of $\pm 10\%$

EXCEEDING EXPECTATIONS

- LTS motors can deliver 10% extra output (service factor 1.1) at rated supply conditions for ambient of 40 deg. C
- LTS motors are suitable for use on inverters (VFD) for all Fan, Pump & Blower applications for voltages less than 500 volts at ambient 50 deg. C
- LTS series is suitable for inverters (VFD) with constant torque application till 50% of the rated speed of motor for voltages less than 500 volts at ambient 50 deg. C
- LTS motors are suitable to operate at 55 deg. C ambient temperature at rated supply condition and deliver rated output

*Temperature rise of class 'F' is utilised for all above conditions.



3 PHASE TEFC CAGE MOTORS

BASIC FEATURES

“LTS” Motors Range

LTS series Motors are 3 phase, TEFC Squirrel Cage Induction Motors. These motors are available from frame size LTS 63 to LTS 315 having output ranging from 0.18KW to 200KW with 2,4,6,8 poles. Please refer to us for higher pole requirements.

Voltage & Frequency

LTS motors are suitable for operation on 3 phase at $415V \pm 10\%$ and $50Hz \pm 5\%$ supply and combined variation of $\pm 10\%$. Please refer to us for motors with different voltage and frequency combinations.

Stator & Rotor Construction

Motors are available in Aluminium housing from frame 63 to 132. Motors are available in Cast Iron housing from frame from 112 to 315. All motors in cast iron housing are with integral feet. The complete range of motors are with high pressure aluminum die cast rotors.



Enclosure

All motors shall have IP55 degree of protection which gives complete protection from dust & jets of water sprayed from all sides.

Cooling

All “LTS series” motors are provided with shaft mounted fans for efficient cooling. Type of cooling is IC411 as per IS 4632.

Duty

All “LTS series” motors are operational for **S1** continuous duty.

External Conditions: Ambient, Altitude & Humidity

All Motors are designed for an ambient of 50°C and maximum operational altitude of 1000 meters above mean sea level. The motors are designed for a relative humidity of upto 85%.

Insulation System & Temperature Rise

All motors are provided with class F insulation and temperature rise restricted to class B.

The winding temperature rise based on resistance method for various classes of insulation at 50° ambient temperature is as under (as per IS 12802):

Class B	-	70°C	(Add 10°C for Hot spot)
Class F	-	95°C	(Add 10°C for Hot spot)
Class H	-	115°C	(Add 15°C for Hot spot)

Mounting Arrangement

The standard motors are foot mounted (B3). Motors can also be offered in the following mountings with various configurations as under:

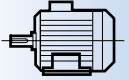
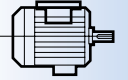
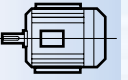
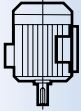
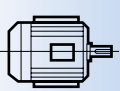
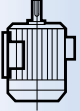
Foot : B3, B6, B7, B8, V5, V6

Flange (D) : B5, V1, V3, B35, V15 & V36

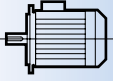
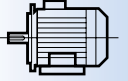
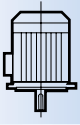
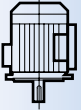
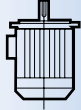
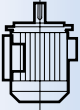
Face(C) : B14, B34

MOUNTING ARRANGEMENTS

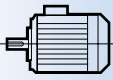
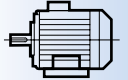
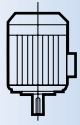
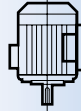
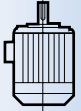
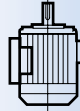
Foot mounted motors all frame sizes

IM 1001 (IM B3) - Horizontal shaft - Feet on floor		IM 1071 (IM B8) - Horizontal shaft - Feet on top		IM 1051 (IM B6) - Horizontal shaft - Wall mounted with feet on left hand side when viewed from drive end	
IM 1011 (IM V5) - Vertical shaft facing down - Feet on wall		IM 1061 (IM B7) - Horizontal shaft - Wall mounted with feet on right hand side when viewed from drive end		IM 1031 (IM V6) - Vertical shaft facing up - Feet on wall	

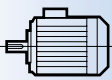
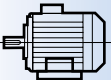
(FF) flange mounted motors all frame sizes (except IM 3001 limited to frame size 225)

IM 3001 (IM B5) - Horizontal shaft		IM 2001 (IM B35) - Horizontal shaft - Feet on floor		IM 3011 (IM V1) - Vertical shaft facing down	
IM 2011 (IM V15) - Vertical shaft facing down - Feet on wall		IM 3031 (IM V3) - Vertical shaft facing up		IM 2031 (IM V36) - Vertical shaft facing up - Feet on wall	

(FT) face mounted motors all frame sizes ≤ 132 mm

IM 3601 (IM B14) - Horizontal shaft		IM 2101 (IM B34) - Horizontal shaft - Feet on floor		IM 3611 (IM V18) - Vertical shaft facing down	
IM 2111 (IM V58) - Vertical shaft facing down - Feet on wall		IM 3631 (IM V19) - Vertical shaft facing up		IM 2131 (IM V69) - Vertical shaft facing up - Feet on wall	

Motor without drive end shield is important: the protection(IP) specified on the IM B9 & IM B15 motor plates is provided to the customer when the motor is assembled.

IM 9101 (IM B9) - Threaded tie rods - Horizontal shaft		IM 1201 (IM B15) - Feet and threaded tie rods - Horizontal shaft	
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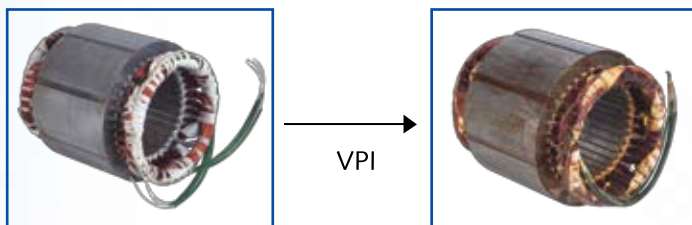


3 PHASE TEFC CAGE MOTORS

Winding & Impregnation System

Vacuum Pressure impregnation (VPI) is used for all motors with a polyesterimide Class H resin for the best electro-mechanical protection of the windings.

Motors are provided with dual coated winding conductor suitable for high temperature withstanding capability of 200°C.



Fans

Fans are made of plastic from frame 63-160 and aluminum from 180-315 whereas fan covers for all ranges are made from steel sheets.

Paint

Motors are provided with paint shade RAL 7016 which is suitable for tropical conditions.

Motors with special/customised paints are available on request.

BEARING DATA

Frame	Poles	DE Bearing	NDE bearing
63	2,4,6	6202 C3 ZZ	6202 C3 ZZ
71	2,4,6	6203 C3 ZZ	6203 C3 ZZ
80	2,4,6	6204 C3 ZZ	6204 C3 ZZ
90	2,4,6	6205 C3 ZZ	6205 C3 ZZ
100	2,4,6	6206 C3 ZZ	6206 C3 ZZ
112	2,4,6	6306 C3 ZZ	6306 C3 ZZ
132	2,4,6	6208 C3 ZZ	6208 C3 ZZ
160	2,4,6	6209 C3 ZZ	6209 C3 ZZ
180	2,4,6	6210 C3 ZZ	6210 C3 ZZ
200	2,4,6	6212 C3 ZZ	6212 C3 ZZ
225	2,4,6	6213 C3 ZZ	6213 C3 ZZ
250	2,4,6	6215 C3 ZZ	6215 C3 ZZ
280	2	6315 C3	6315 C3
280	4,6	6317 C3	6317 C3
315	2	6315 C3	6315 C3
315	4,6	6318 C3	6318 C3

Bearings & Lubrication

All motors upto 250 frame have pre-lubricated bearing as a standard feature.

Frame 280 and above are equipped with re-greasable bearings and all motors are lubricated with requisite amounts of lithium base grease.



GOVERNING STANDARDS

INDIAN STANDARDS

- IS 325 : Three phase Induction motors.
- IS 1231: Dimensions of three phase foot mounted AC Induction motors.
- IS 2223: Dimensions of Flange mounted AC Induction motors.
- IS 2253: Designation for type of construction & mounting arrangements of rotating machines.
- IS 4029: Guide for testing three phase Induction motors.
- IS 4691: Degree of protection of electrical rotating machines.
- IS 4722: Rotating electric machines.
- IS 4889: Methods of determination of efficiency of rotating electrical machines.
- IS 6362: Designation of methods for cooling of rotating electrical machines.
- IS 8789: Values of performance characteristics for three phase Induction motors.
- IS 12065: Permissible limits of noise levels for rotating electrical machines.
- IS 12075: Mechanical vibration of rotating electrical machines.
- IS 12615: Energy efficient Induction motors – Three phase squirrel cage.

INTERNATIONAL STANDARDS

- IEC 34-1: Recommendation for rotating electrical machines.
- IEC 72-1: Recommendation, Dimensions & output rating of electrical machines for foot mounting.
- IEC 72-2: Recommendation of the dimensions and output rating of electrical motors for flange mounting.



Terminal Arrangements

All motors are provided with a spacious terminal box made of Aluminium. The terminal boxes provided on top are standard. They can be rotated in steps of 90 degree for all frames. They have IP55 protection. Motors upto frame 90 are provided with 3 leads in the terminal box and the motor is with star connection. All motors frame 100 and above are provided with 6 leads in the terminal box for flexibility of star/delta starting.

Fig. 1: 63-90 frames, 3 terminals, Aluminium terminal box

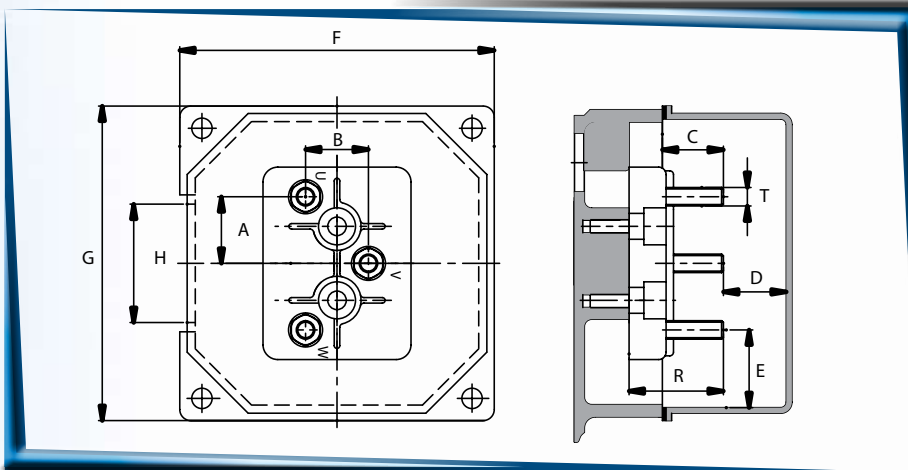


Fig. 2: 100-112 frames, 6 terminals, Aluminium terminal box

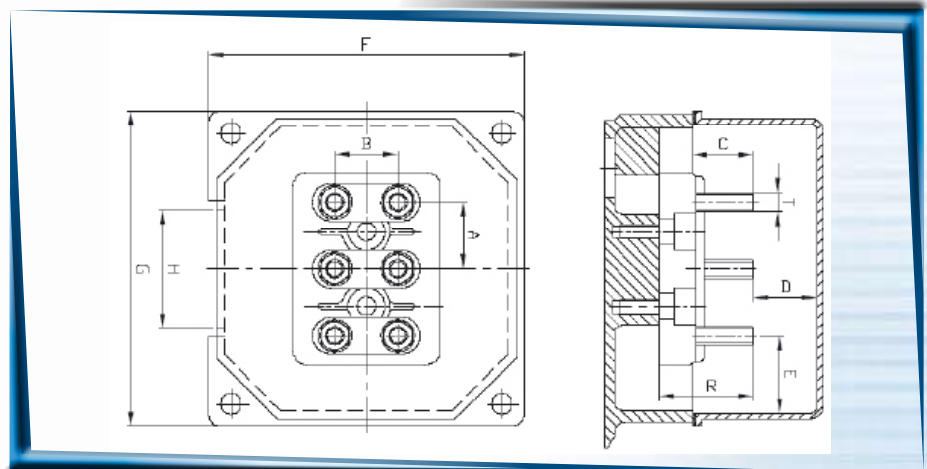


Fig. 3: 132-160 frames, 6 terminals, Aluminium terminal box

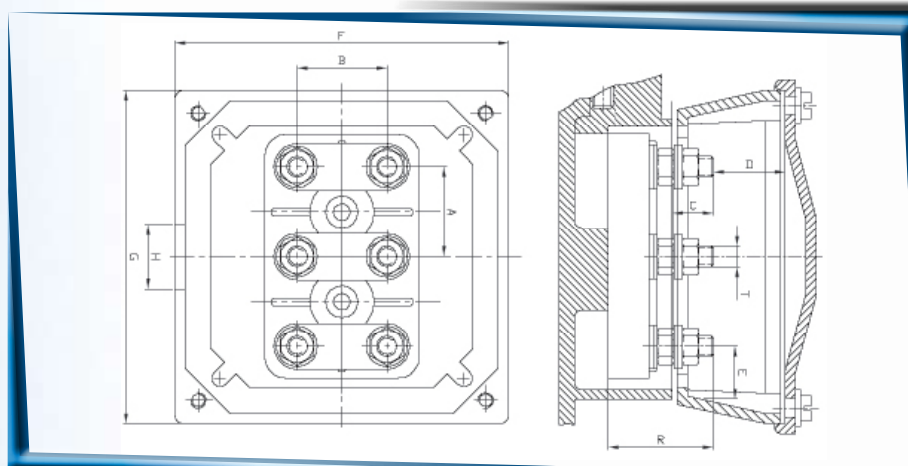


Fig. 4: 180-200 frames, 6 terminals, Cast Iron terminal box

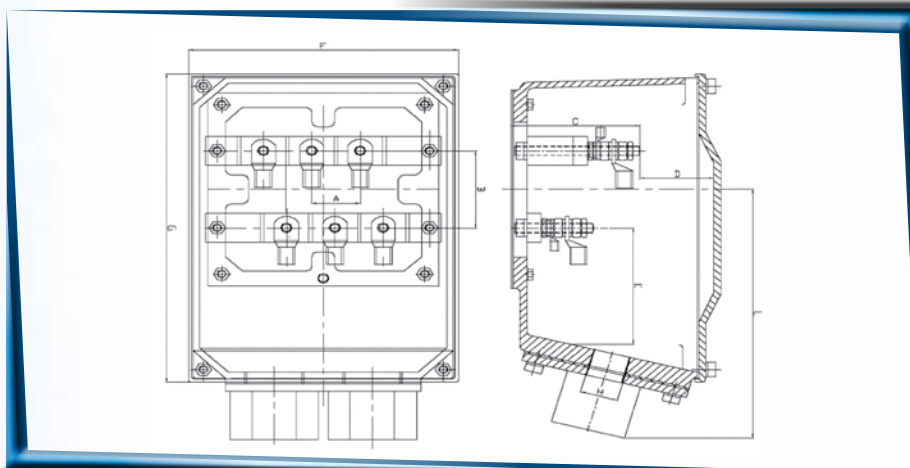
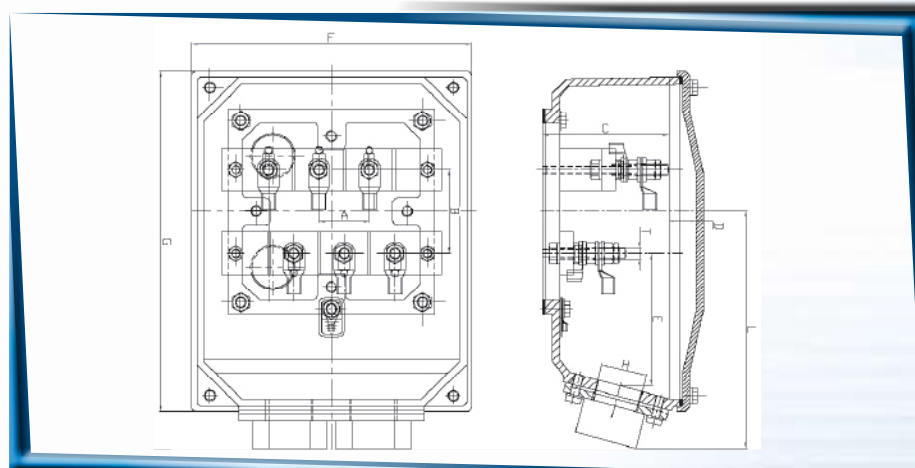


Fig. 5: 225-315 frames, 6 Terminal Fabricated Terminal Box



TERMINAL BOX DIMENSIONS

Frame	T	A	B	C	D	E	F	G	H	L	R
IE 63	M5	17	17	14	23	10	72	72	M20	---	25
IE 71	M5	17	17	16	18	21	72	72	M20	---	25
IE 80	M5	17	17	15	28	14	85	85	M20	---	25
IE 90	M5	17	17	16	18	19	85	85	M20	---	25
IE 100	M5	17	17	16	23	15	85	85	M25	---	27
IE 112	M5	17	17	16	23	15	85	85	M25	---	27
IE 132	M6	25	25	24	27	15	116	116	M25	---	30
IE 160	M8	35	35	16	28	23	130	130	M32	---	41
IE 180	M8	36	60	90	20	95	240	194	M32	180	48
IE 200	M8	36	60	90	20	95	240	194	M32	180	48
IE 225	M10	42	80	112	64	121	312	226	M32	250	62
IE 250	M10	42	80	112	64	121	312	226	M32	250	62
IE 280	M12	58	104	105	60	179	313	335	M32	260	85
IE 315	M12	58	104	105	60	179	313	335	M32	260	85

For connection diagrams and the terminal connections refer page no. 14.



3 PHASE TEFC CAGE MOTORS

SELECTION & ORDERING DATA

PERFORMANCE FIGURES FOR EFF2 MOTORS

415 Volts, 50Hz, IP55, IC411, 50 Deg. C Amb, Ins. Class'F', Temp. Rise Class'B', Alt 1000m, Duty S1

2POLE=3000 RPM

Frame	kW	hp	EFF [%]	Current [A]	Cos ϕ [pu]	Speed [rpm]	TORQUE			Starting current [pu]	Gd ² kgm ²
							Rated [Kg m]	Starting [pu]	Pullout [pu]		
63	0.18	0.25	60.0	0.53	0.80	2760	0.06	2.0	2.5	5.0	0.0006
63	0.25	0.33	61.0	0.72	0.80	2760	0.09	2.0	2.5	5.0	0.0008
71	0.37	0.50	67.0	0.92	0.84	2800	0.13	2.4	2.7	5.0	0.0014
71	0.55	0.75	70.0	1.30	0.85	2800	0.19	2.4	2.7	5.4	0.0018
80	0.75	1.00	73.0	1.64	0.87	2810	0.26	2.0	2.5	5.4	0.0027
80	1.10	1.50	76.2	2.3	0.87	2820	0.38	2.0	2.6	5.6	0.0036
90S	1.50	2.00	78.5	3.0	0.89	2850	0.51	1.9	2.6	5.6	0.006
90L	2.20	3.00	81.0	4.3	0.89	2855	0.75	1.9	2.7	5.8	0.007
100L	3.70	5.00	84.0	7.0	0.88	2860	1.26	1.9	3.1	6.0	0.015
132S	5.50	7.50	85.7	10.4	0.86	2880	1.86	2.0	2.8	6.0	0.041
132S	7.50	10.0	87.0	13.5	0.88	2890	2.53	2.0	3.0	6.0	0.054
160M	9.30	12.5	87.7	16.2	0.90	2930	3.09	2.1	2.8	6.0	0.130
160M	11.0	15.0	88.4	19.1	0.90	2930	3.65	2.2	2.9	6.0	0.133
160M	15.0	20.0	89.4	25.5	0.90	2930	4.98	2.0	2.7	6.0	0.184
160L*	18.5	25.0	90.0	31.5	0.90	2930	6.14	2.0	2.7	6.0	0.220
180M*	22.0	30.0	90.5	37.0	0.90	2900	7.38	2.1	2.9	6.0	0.297
200L	30.0	40.0	91.4	50.0	0.90	2935	9.95	2.0	2.5	6.0	0.510
200L	37.0	50.0	92.0	60.9	0.90	2940	12.25	2.0	2.5	6.0	0.640
225M	45.0	60.0	92.5	74.0	0.90	2955	14.82	2.0	2.7	6.0	1.070
250M	55.0	75.0	93.0	89.5	0.90	2960	18.08	1.9	2.2	6.0	1.440
280S	75.0	100.0	93.6	124.0	0.90	2970	24.57	2.0	2.3	6.0	2.480
280M	90.0	120.0	93.9	148.0	0.90	2970	29.48	2.0	2.2	6.0	2.960
315S	110.0	150.0	94.0	181.0	0.9	2980	35.92	1.7	2.5	7.0	5.80
315M	132.0	180.0	94.5	216.0	0.9	2980	43.10	1.7	2.5	7.0	6.98
315L	160.0	215.0	94.8	261.0	0.9	2980	52.24	1.7	2.5	7.0	8.46

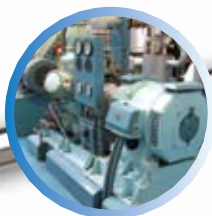
*Temperature rise limited to Class 'F'

PERFORMANCE FIGURES FOR EFF2 MOTORS

415 Volts, 50Hz, IP55, IC411, 50 Deg. C Amb, Ins. Class 'F', Temp. Rise Class 'B', Alt 1000m, Duty S1

4 POLE=1500 RPM

Frame	kW	hp	EFF [%]	Current [A]	Cos ϕ [pu]	Speed [rpm]	TORQUE			Starting current [pu]	Gd ² kgm ²
							Rated [Kg m]	Starting [pu]	Pullout [pu]		
63	0.12	0.16	55.0	0.46	0.66	1376	0.08	2.5	2.6	3.3	0.0009
63	0.18	0.25	57.0	0.66	0.63	1363	0.13	2.4	2.5	3.5	0.0012
71	0.25	0.33	64.0	0.85	0.65	1370	0.18	2.2	2.4	3.3	0.0023
71	0.37	0.50	66.0	1.20	0.65	1370	0.26	2.3	2.4	3.3	0.0030
80	0.55	0.75	70.0	1.50	0.74	1380	0.39	2.0	2.0	3.8	0.0044
80	0.75	1.00	73.0	1.95	0.73	1390	0.53	1.9	2.0	3.3	0.0059
90S	1.10	1.50	76.5	2.7	0.75	1400	0.76	1.9	2.6	4.6	0.0090
90L	1.50	2.00	78.5	3.7	0.74	1405	1.04	2.0	2.8	4.9	0.0130
100L	2.20	3.00	81.0	4.8	0.80	1410	1.52	1.8	2.7	5.0	0.0240
112M	3.70	5.00	84.0	7.6	0.83	1435	2.51	2.0	2.5	5.6	0.0490
132S	5.50	7.50	86.0	11.0	0.82	1440	3.72	2.0	3.0	5.7	0.094
132M	7.50	10.0	87.0	14.7	0.83	1450	5.03	2.0	3.1	5.8	0.128
160M	9.30	12.5	88.0	17.5	0.84	1450	6.24	1.8	2.9	5.7	0.248
160M	11.0	15.0	89.0	20.5	0.84	1455	7.36	1.9	2.9	5.8	0.250
160L	15.0	20.0	90.0	28.0	0.83	1465	9.96	1.9	3.0	5.9	0.336
180M	18.5	25.0	90.0	36.0	0.80	1470	12.25	1.8	2.7	5.8	0.515
180L	22.0	30.0	91.0	41.5	0.81	1474	14.52	1.8	2.7	6.0	0.618
200L	30.0	40.0	92.0	52.0	0.87	1472	19.83	2.1	2.9	6.0	1.110
225S	37.0	50.0	92.0	65.0	0.86	1472	24.46	2.1	2.5	6.0	1.440
225M	45.0	60.0	92.5	79.5	0.87	1472	29.75	2.2	2.6	6.0	1.740
250M	55.0	75.0	93.0	93.5	0.88	1480	36.16	1.9	2.7	6.0	3.070
280S	75.0	100.0	93.7	128.0	0.87	1485	49.14	2.0	2.5	6.0	4.79
280M	90.0	120.0	93.9	153.0	0.87	1485	58.97	1.9	2.4	6.0	5.75
315S	110.0	150.0	94.4	183.0	0.89	1485	72.07	1.8	2.6	6.0	10.00
315M	132.0	180.0	94.7	218.0	0.89	1485	86.49	1.8	2.6	6.0	10.70





3 PHASE TEFC CAGE MOTORS

PERFORMANCE FIGURES FOR EFF2 MOTORS

415 Volts, 50Hz, IP55, IC411, 50 Deg. C Amb, Ins. Class'F', Temp. Rise Class'B', Alt 1000m, Duty S1

6 POLE=1000 RPM

Frame	kW	hp	EFF [%]	Current [A]	Cos ϕ [pu]	Speed [rpm]	TORQUE			Starting current [pu]	Gd ² kgm ²
							Rated [Kg m]	Starting [pu]	Pullout [pu]		
80	0.37	0.50	65.0	1.20	0.67	930	0.39	2.0	2.4	3.7	0.0088
80	0.55	0.75	68.0	1.65	0.68	930	0.58	2.0	2.4	3.7	0.011
90S	0.75	1.00	71.0	2.10	0.70	935	0.78	1.9	2.1	3.5	0.015
90L	1.10	1.50	74.0	3.00	0.70	940	1.14	1.9	2.3	3.6	0.020
100L	1.50	2.00	76.0	3.95	0.70	938	1.56	2.2	2.2	3.9	0.042
112M	2.20	3.00	79.0	5.00	0.77	950	2.25	1.8	2.3	4.3	0.075
132S	3.70	5.00	82.5	8.00	0.78	960	3.75	1.8	2.3	4.2	0.154
132M	5.50	7.50	84.5	11.5	0.80	955	5.60	1.8	2.0	3.7	0.184
160M	7.50	10.0	86.0	15.0	0.80	970	7.52	1.8	2.8	5.3	0.377
160L	11.0	15.0	87.5	22.0	0.80	970	11.03	1.8	2.8	5.3	0.514
180M	15.0	20.0	88.5	31.1	0.76	980	14.89	1.8	3.4	6.0	0.867
200L	18.5	25.0	89.5	36.5	0.80	980	18.37	1.8	2.8	6.0	1.38
200L	22.0	30.0	90.0	42.5	0.80	980	21.84	1.8	2.9	6.0	1.59
225M	30.0	40.0	91.0	56.6	0.81	985	29.63	1.9	2.0	6.0	3.07
250M	37.0	50.0	91.5	67.0	0.81	985	36.55	1.8	2.1	6.0	5.68
280S	45.0	60.0	92.0	84.0	0.81	990	44.23	1.9	2.2	6.0	5.88
280M	55.0	75.0	92.5	102.0	0.81	990	54.06	1.9	2.2	6.0	7.10
315S	75.0	100.0	93.0	132	0.85	990	73.71	1.8	2.6	6.0	17.90
315M	90.0	120.0	93.5	158	0.85	990	88.45	1.8	2.6	6.0	22.00
315M	110.0	50.0	93.5	193	0.85	990	108.1	1.8	2.6	6.0	26.85

PERFORMANCE FIGURES FOR EFF2 MOTORS

415 Volts, 50Hz, IP55, IC411, 50 Deg. C Amb, Ins. Class'F', Temp. Rise Class'B', Alt 1000m, Duty S1

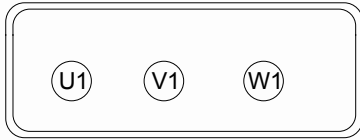
8 POLE=750 RPM

Frame	kW	hp	EFF [%]	Current [A]	Cos ϕ [pu]	Speed [rpm]	TORQUE			Starting current [pu]	Gd ² kgm ²
							Rated [Kg m]	Starting [pu]	Pullout [pu]		
80	0.18	0.25	57.2	0.71	0.62	695	0.25	1.8	2.3	3.0	0.0088
80	0.25	0.33	61.5	0.91	0.62	695	0.35	1.8	2.3	3.0	0.0114
90S	0.37	0.50	62.0	1.35	0.61	700	0.51	1.9	2.0	3.0	0.0152
90L	0.55	0.75	67.0	1.90	0.61	700	0.77	1.9	2.0	3.0	0.0202
100L	0.75	1.00	70.0	2.45	0.60	700	1.0	1.9	2.4	3.4	0.0312
100L	1.10	1.50	72.0	3.30	0.65	700	1.5	1.8	2.1	3.2	0.0416
112M	1.50	2.00	74.0	4.35	0.65	710	2.1	1.8	2.3	3.5	0.0755
132S	2.20	3.00	77.0	5.8	0.69	715	3.0	1.8	2.0	3.3	0.102
160M	3.70	5.0	80.0	8.7	0.74	722	5.0	1.8	2.5	4.2	0.322
160M	5.5	7.5	82.5	12.4	0.75	722	7.4	1.8	2.5	4.2	0.425
160L	7.5	10.0	84.0	16.3	0.76	722	10.1	1.8	2.5	4.3	0.579
180L	11.0	15.0	86.0	23.7	0.75	730	14.7	1.7	2.6	5.0	1.07
200L	15.0	20.0	87.0	30.8	0.78	730	20.0	1.7	2.2	5.0	1.59
225S	18.5	25.0	88.0	37.5	0.78	735	24.5	1.7	2.3	5.0	2.54
225M	22.0	30.0	88.5	44.5	0.78	735	29.2	1.7	2.3	5.0	3.07
250M	30.0	40.0	90.0	59.5	0.78	740	39.5	1.6	2.3	5.0	5.68
280S	37.0	50.0	90.5	71.0	0.80	739	48.8	1.9	2.5	6.0	7.80
280M	45.0	60.0	91.0	86.0	0.80	740	59.2	1.9	2.5	6.0	9.20
315S	55	75	91.5	106	0.79	740	72.4	1.9	2.3	6.0	17.9
315M	75	100	92.5	143	0.79	740	98.7	1.8	2.3	6.0	22.0
315L	90	120	93.0	171	0.79	740	119	1.8	2.3	6.0	26.85
315L	110	150	93.5	208	0.79	740	145	1.8	2.3	6.0	32.8



TERMINAL BOX CONNECTIONS

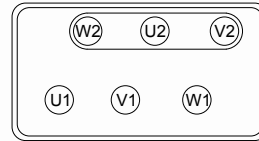
Y Connection



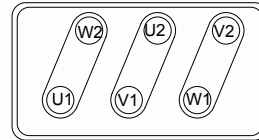
3 terminal, Frame 63 - 90 is star connected

TERMINAL CONNECTIONS

Y Connection



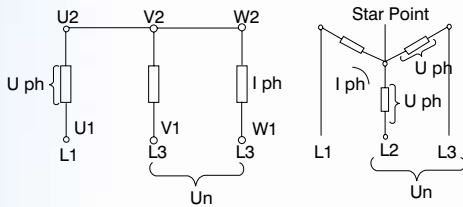
D Connection



6 terminal,
Frame 100 - 315

CONNECTING DIAGRAMS

Y or Star connection



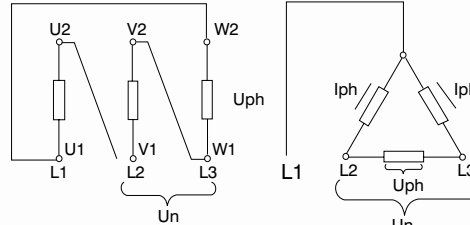
Connecting together the W2, U2, V2 terminals (star point) and connecting to the mains the U1, V1, W1 terminals a star connection is obtained.

The phase current I_{ph} and phase voltage U_{ph} are as follows :

$$I_{ph} = I_n$$

$$U_{ph} = U_n / \sqrt{3}$$

Δ or Delta connection



Connecting the end of each winding to the beginning of the next winding a delta connection is obtained. The phase current I_{ph} and the phase voltage U_{ph} are as follows:

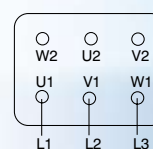
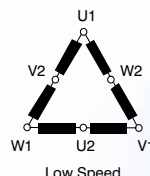
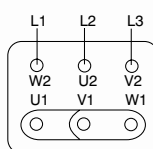
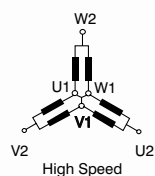
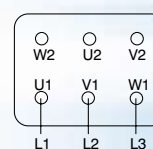
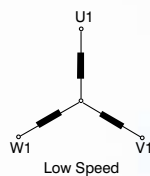
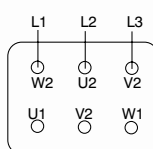
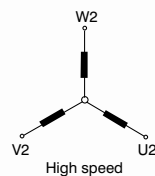
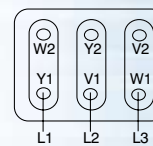
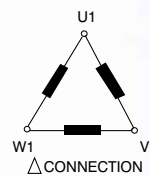
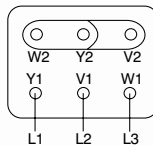
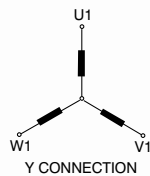
$$I_{ph} = I_n / \sqrt{3}$$

$$U_{ph} = U_n$$

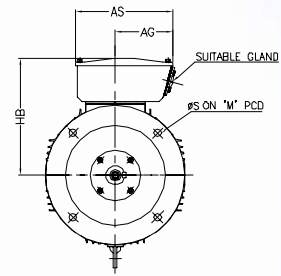
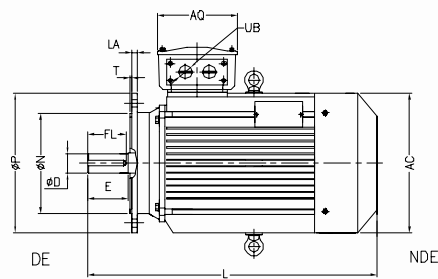
Where : I_n : the line current
 U_n : the line voltage

Star-Delta starting

The star delta starting is an easy way to reduce the starting current but the starting torque also gets reduced. Motors can be started with the star method only when the supply voltage corresponds to the rated voltage of the motors in the delta connection.



Dimensions: Flange Mounted (B5) Motors



B5-"B" TYPE FLANGE MOUNTED



SHAFT EXTENSION DETAILS.

1) TOLERANCES

$\phi D = \phi 11$ TO $\phi 28$ —ISO j6
 $\phi D = \phi 38$ TO $\phi 48$ —ISO k6
 $\phi D = \phi 55$ TO $\phi 65$ —ISO m6
 F —ISO h9
 h — $+0.0/-0.5$
 N — ISO j6

ALL DIMENSIONS ARE IN mm.
 PROTECTION—: IP 55
 COOLING —: IC 411

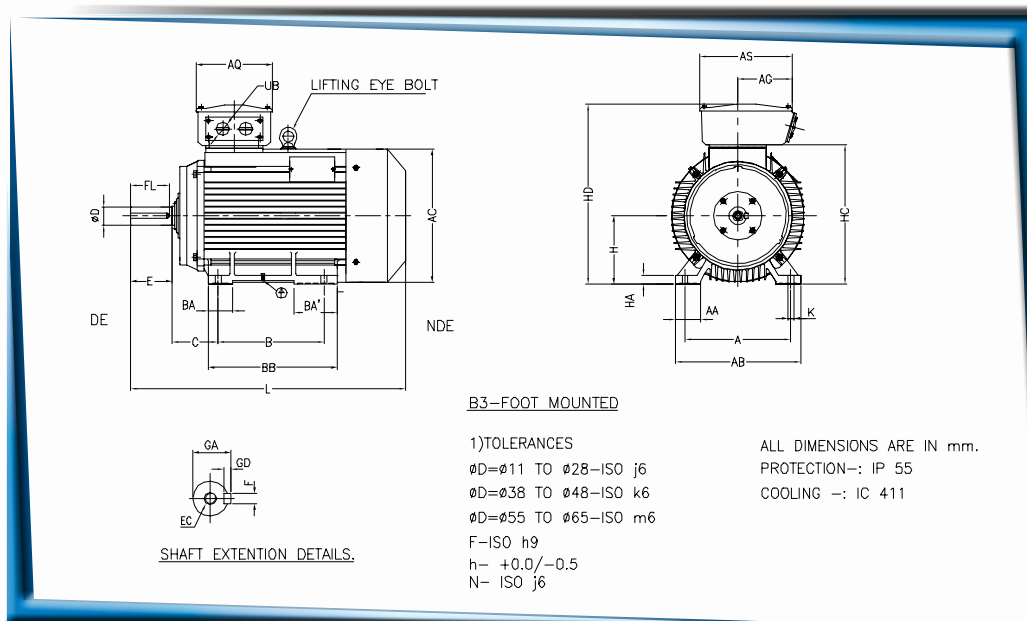
B5-"B" TYPE FLANGE MOUNTED

Frame	AC	AQ	AS	AG	$\phi D^{1)}$	E	FL	F ¹⁾	GD	GA	HB	L	M	$\phi N^{1)}$	ϕP	ϕS	T	LA	EC	UB
63	126	95	95	48	11	23	18	4	4	13	110	215	115	95	140	10	3	7	M4	1XPg11
71	140	95	95	48	14	30	25	5	5	16	118	238	130	110	160	10	4	7	M4	1XPg11
80	160	95	95	48	19	40	34	6	6	22	127	281	165	130	200	12	4	9	M5	1XPg11
90S	177	95	95	48	24	50	40	8	7	27	137	333	165	130	200	12	4	9	M6	1XPg11
90L	177	95	95	48	24	50	40	8	7	27	137	333	165	130	200	12	4	9	M6	1XPg11
100L	200	95	95	48	28	60	50	8	7	31	147	376	215	180	250	15	4	12	M8	1XPg11
112M	224	117	117	59	28	60	50	8	7	31	176	397	215	180	250	15	4	12	M8	2x25
132S	264	117	117	59	38	80	60	10	8	41	196	500	265	230	300	15	4	12	M8	2x25
132M	264	117	117	59	38	80	60	10	8	41	196	500	265	230	300	15	4	12	M8	2x25
160M	320	140	140	70	42	110	100	12	8	45	220	654	300	250	350	19	5	13	M16	2x32
160L	320	140	140	70	42	110	100	12	8	45	220	654	300	250	350	19	5	13	M16	2x32
180M	355	204	250	145	48	110	103	14	9	52	295	690	300	250	350	19	5	13	M16	2x32
180L	355	204	250	145	48	110	103	14	9	52	295	690	300	250	350	19	5	13	M16	2x32
200L	400	204	250	145	55	110	105	16	10	59	320	770	350	300	400	19	5	15	M20	2x32
225M (2P)	450	234	320	205	55	110	105	16	10	59	404	825	400	350	450	19	5	16	M20	2x32
225S (4P&8P)	450	234	320	205	60	140	135	18	11	64	404	855	400	350	450	19	5	16	M20	2x32
225M (4,6,8P)	450	234	320	205	60	140	135	18	11	64	404	855	400	350	450	19	5	16	M20	2x32
250M (2P)	500	234	320	205	60	140	135	18	11	64	429	940	500	450	550	19	5	18	M20	2x32
250M (4,6,8P)	500	234	320	205	65	140	135	18	11	69	429	940	500	450	550	19	5	18	M20	2x32
280S (4,6,8P)	546	314	336	202	75	140	130	22	14	80	435	1023	500	450	550	19	5	22	M20	2x36
280M(4,6,8P)	546	314	336	202	75	140	130	22	14	80	435	1060	500	450	550	19	5	22	M20	2x36
280S (2P)	546	314	336	202	65	140	130	18	11	69	435	1023	500	450	550	19	5	22	M20	2x36
280M(2P)	546	314	336	202	65	140	130	18	11	69	435	1060	500	450	550	19	5	22	M20	2x36
315S(4,6,8P)	645	314	336	202	80	170	150	22	14	85	555	1300	600	550	660	24	6	22	M24	2x36
315M(4,6,8P)	645	314	336	202	80	170	150	22	14	85	555	1350	600	550	660	24	6	22	M24	2x36
315L(4,6,8P)	645	314	336	202	80	170	150	22	14	85	555	1380	600	550	660	24	6	22	M24	2x36
315S(2P)	645	314	336	202	65	140	130	18	11	69	555	1300	600	550	660	24	6	22	M20	2x36
315M(2P)	645	314	336	202	65	140	130	18	11	69	555	1350	600	550	660	24	6	22	M20	2x36
315L(2P)	645	314	336	202	65	140	130	18	11	69	555	1380	600	550	660	24	6	22	M20	2x36

ALL DIMENSIONS ARE IN "MM"

DIMENSIONAL DRAWINGS

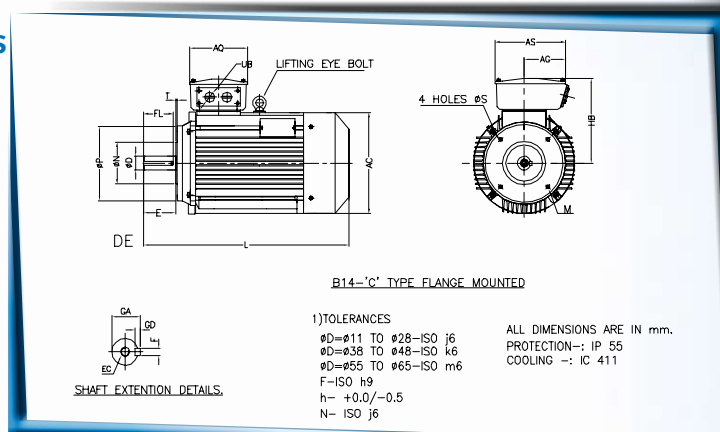
Dimensions: Foot Mounted (B3) Motors



B3-FOOT MOUNTED																										
Frame	A	AA	AB	AC	AQ	AS	AG	B	BB	BA	BA'	C	φD ¹⁾	E	FL	F ¹⁾	GD	GA	H ¹⁾	HA	HC	HD	K	L	EC	UB
63	100	28	122	126	95	95	48	80	104	20	20	40	11	23	18	4	4	13	63	8	126	173	7	215	M4	1XPc11
71	112	30	137	140	95	95	48	90v	113	25	25	45	14	30	25	5	5	16	71	8	142	189	7	238	M4	1XPc11
80	125	35	156	160	95	95	48	100	135	35	35	50	19	40	34	6	6	22	80	10	160	207	10	281	M5	1XPc11
90S	140	35	170	177	95	95	48	100	155	30	55	56	24	50	40	8	7	27	90	10	180	227	10	333	M6	1XPc11
90L	140	35	170	177	95	95	48	125	155	30	55	56	24	50	40	8	7	27	90	10	180	227	10	333	M6	1XPc11
100L	160	40	196	200	95	95	48	140	176	36	36	63	28	60	50	8	7	31	100	10	200	247	12	376	M8	1XPc11
112M	190	47	226	224	117	117	59	140	176	36	36	70	28	60	50	8	7	31	112	12	224	288	12	397	M8	2x25
132S	216	55	260	264	117	117	59	140	214	36	74	89	38	80	60	10	8	41	132	12	266	328	12	500	M8	2x25
132M	216	55	260	264	117	117	59	178	214	36	74	89	38	80	60	10	8	41	132	12	266	328	12	500	M8	2x25
160M	254	56	307	320	140	140	70	210	300	45	90	108	42	110	100	12	8	45	160	16	324	380	15	654	M16	2x32
160L	254	56	307	320	140	140	70	254	300	45	90	108	42	110	100	12	8	45	160	16	324	380	15	654	M16	2x32
180M	279	66	330	355	204	250	145	241	330	63	105	121	48	110	103	14	9	52	180	22	359	475	15	690	M16	2x32
180L	279	66	330	355	204	250	145	279	330	63	105	121	48	110	103	14	9	52	180	22	359	475	15	690	M16	2x32
200L	318	80	398	400	204	250	145	305	355	85	85	133	55	110	105	16	10	59	200	25	399	520	19	770	M20	2x32
225M (2P)	356	80	436	450	234	320	205	311	366	100	100	149	55	110	105	16	10	59	225	25	448	629	19	825	M20	2x32
225S (4P&8P)	356	80	436	450	234	320	205	286	366	100	100	149	60	140	135	18	11	64	225	25	448	629	19	855	M20	2x32
225M (4,6,8P)	356	80	436	450	234	320	205	311	366	100	100	149	60	140	135	18	11	64	225	25	448	629	19	855	M20	2x32
250M (2P)	406	100	506	500	234	320	205	349	425	115	115	168	60	140	135	18	11	64	250	32	498	679	24	940	M20	2x32
250M (4,6,8P)	406	100	506	500	234	320	205	349	425	115	115	168	65	140	135	18	11	69	250	32	498	679	24	940	M20	2x32
280S (4,6,8P)	457	124	548	546	314	336	202	368	439	100	151	190	75	140	130	22	14	80	280	40	535	740	24	1023	M20	2x36
280M(4,6,8P)	457	124	548	546	314	336	202	419	490	100	151	190	75	140	130	22	14	80	280	40	535	740	24	1060	M20	2x36
280S (2P)	457	124	548	546	314	336	202	368	439	100	151	190	65	140	130	18	11	69	280	40	535	740	24	1023	M20	2x36
280M(2P)	457	124	548	546	314	336	202	419	490	100	151	190	65	140	130	18	11	69	280	40	535	740	24	1060	M20	2x36
315S(4,6,8P)	508	131	618	645	314	336	202	406	527	125	176	216	80	170	150	22	14	85	315	50	690	890	28	1300	M24	2x36
315M(4,6,8P)	508	131	618	645	314	336	202	457	578	125	176	216	80	170	150	22	14	85	315	50	690	890	28	1350	M24	2x36
315L(4,6,8P)	508	131	618	645	314	336	202	508	578	125	176	216	80	170	150	22	14	85	315	50	690	890	28	1380	M24	2x36
315S(2P)	508	131	618	645	314	336	202	406	527	125	176	216	65	140	130	18	11	69	315	50	690	890	28	1300	M20	2x36
315M(2P)	508	131	618	645	314	336	202	457	578	125	176	216	65	140	130	18	11	69	315	50	690	890	28	1350	M20	2x36
315L(2P)	508	131	618	645	314	336	202	508	578	125	176	216	65	140	130	18	11	69	315	50	690	890	28	1380	M20	2x36

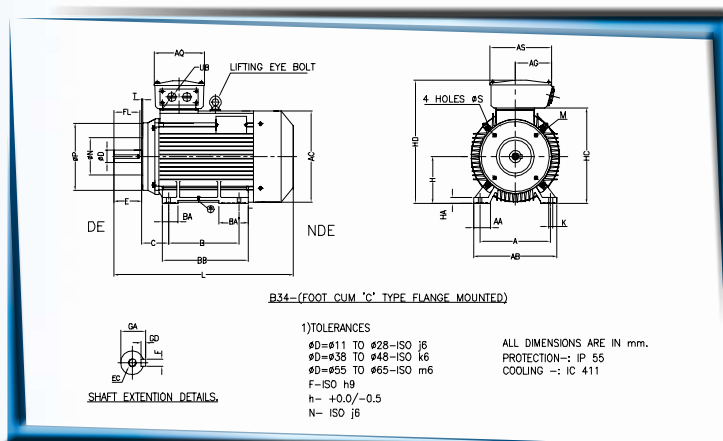
ALL DIMENSIONS ARE IN "MM"

Dimensions: Face Mounted (B14) Motors



B14-"C" FLANGE MOUNTED

Frame	AC	AQ	AS	AG	ϕD	E	FL	F ¹⁾	GD	GA	HB	K	L	M	ϕN ¹⁾	ϕP	ϕS	T	EC	UB
63	126	95	95	48	11	23	18	4	4	13	110	7	215	75	60	90	M5	3	M4	1XPg11
71	140	95	95	48	14	30	25	5	5	16	118	7	238	85	70	105	M6	3	M4	1XPg11
80	160	95	95	48	19	40	34	6	6	22	127	10	281	100	80	120	M6	3	M5	1XPg11
90S	177	95	95	48	24	50	40	8	7	27	137	10	333	115	95	140	M8	3	M6	1XPg11
90L	177	95	95	48	24	50	40	8	7	27	137	10	333	115	95	140	M8	3	M6	1XPg11
100L	200	95	95	48	28	60	50	8	7	31	147	12	376	130	110	160	M8	4	M8	1XPg11
112M	224	117	117	59	28	60	50	8	7	31	176	12	397	130	110	160	M8	4	M8	2X25
132S	264	117	117	59	38	80	60	10	8	41	196	12	500	165	130	200	M12	4	M8	2X25
132M	264	117	117	59	38	80	60	10	8	41	196	12	500	165	130	200	M12	4	M8	2X25



Dimensions: Foot cum Face Mounted (B34) Motors

B34- FOOT CUM "C" TYPE																																	
Frame	A	AA	AB	AC	AQ	AS	AG	B	BB	BA	BA'	C	φD	E	FL	F ¹⁾	GD	GA	H ¹⁾	HA	HB	HC	HD	K	L	M	φN ¹⁾	φP	φS	T	EC	UB	
63	100	28	122	126	95	95	48	80	104	20	20	40	11	23	18	4	4	13	63	8	110	126	173	7	215	75	60	90	M5	3	M4	1XPg11	
71	112	30	137	140	95	95	48	90	113	25	25	45	14	30	25	5	5	16	71	8	118	142	189	7	238	85	70	105	M6	3	M4	1XPg11	
80	125	35	156	160	95	95	48	100	135	35	35	50	19	40	34	6	6	22	80	10	127	160	207	10	281	100	80	120	M6	3	M5	1XPg11	
90S	140	35	170	177	95	95	48	100	155	30	55	56	24	50	40	8	7	27	90	10	137	180	227	10	333	115	95	140	M8	3	M6	1XPg11	
90L	140	35	170	177	95	95	48	125	155	30	55	56	24	50	40	8	7	27	90	10	137	180	227	10	333	115	95	140	M8	3	M6	1XPg11	
100L	160	40	196	200	95	95	48	140	176	36	36	63	28	60	50	8	7	31	100	10	147	200	247	12	376	130	110	160	M8	4	M8	1XPg11	
112M	190	47	226	224	117	117	59	140	176	36	36	70	28	60	50	8	7	31	112	12	176	224	288	12	397	130	110	160	M8	4	M8	2X25	
132S	216	55	260	264	117	117	59	140	214	36	74	89	38	80	60	10	8	41	132	12	196	266	328	12	500	165	130	200	M12	4	M8	2X25	
132M	216	55	260	264	117	117	59	178	214	36	74	89	38	80	60	10	8	41	132	12	196	266	328	12	500	165	130	200	M12	4	M8	2X25	

ALL DIMENSIONS ARE IN "MM"



3 PHASE TEFC CAGE MOTORS

PACKING WEIGHT & DIMENSIONS

All LTS motors are provided with **Corrugated carton packing for frames till 132**. Beyond 132 size frame, motors are **provided in robust wooden packing**. The packing weight & dimensions are as indicated in the table below:

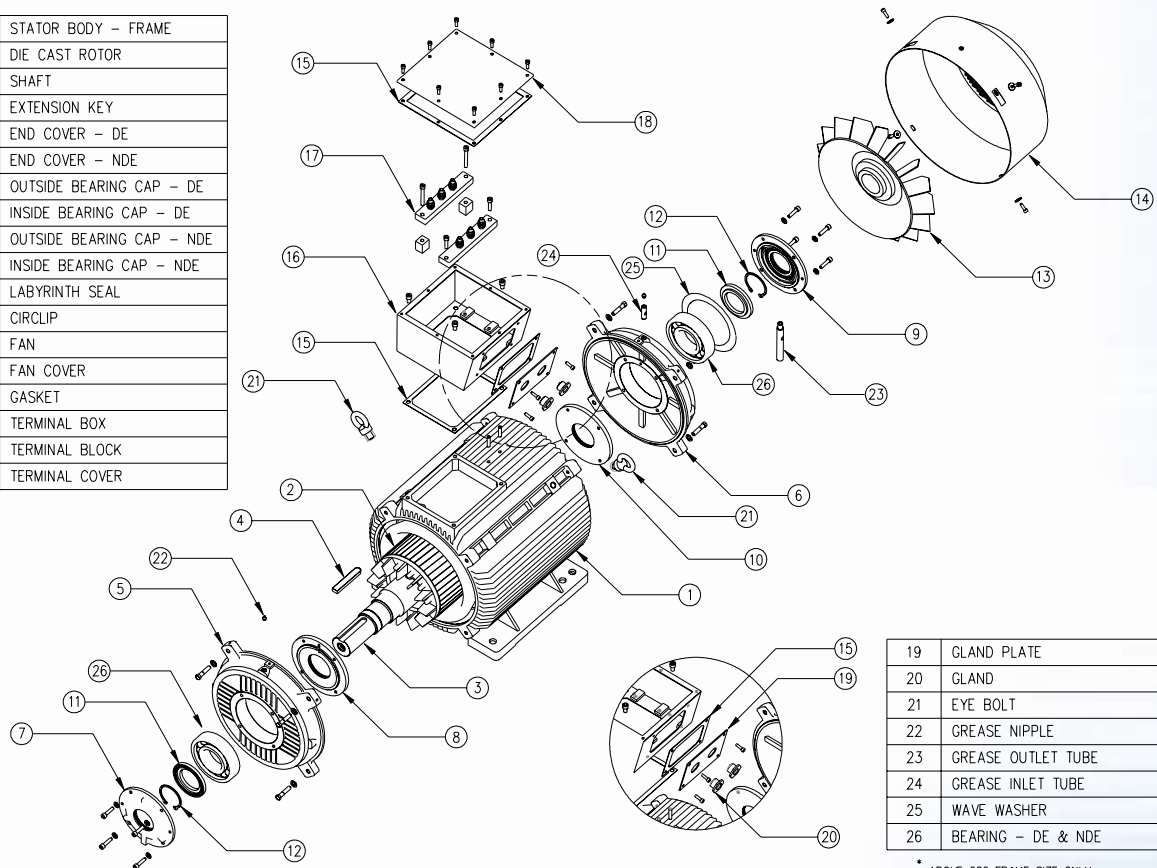
Frame	Length in mm	Width in mm	Height in mm	Net Wt.(Kg)	Gross Wt.(Kg)
63	230	160	200	4.5	5
71	250	180	220	6.5	7
80	290	220	250	10	11
90S	360	220	260	13	14
90L	360	220	260	15	16
100L	432	305	330	21	22
112M	457	330	356	30	45
132S	559	356	406	42	55
132M	559	356	406	53	65
160M	711	381	432	135	160
160L	711	381	432	148	160
180	810	455	575	212	230
200	890	500	620	293	320
225	975	550	730	366	400
250	1065	600	780	500	550
280S	1123	650	790	667	710
280M	1174	650	790	685	735
315S	1220	718	910	900	960
315M	1300	718	910	960	1020
315L	1330	718	910	1000	1070

NAME PLATE

 LARSEN & TOUBRO					
3-phase Induction Motor - TEFC					
KW :		EFF% :		FRAME:	
Sno: XXXXXX					
Amb. 50°C		IP55	Ins.Class: F		
			DE		
			NDE		
V	Hz	RPM	A	PF	DUTY
Connection:		Ref: IS.325,IS.12615,IEC.34-1			MADE IN INDIA

EXPLODED VIEW & PART LIST

1	STATOR BODY - FRAME
2	DIE CAST ROTOR
3	SHAFT
4	EXTENSION KEY
5	END COVER - DE
6	END COVER - NDE
7	OUTSIDE BEARING CAP - DE
8	INSIDE BEARING CAP - DE
9	OUTSIDE BEARING CAP - NDE
10	INSIDE BEARING CAP - NDE
* 11	LABYRINTH SEAL
12	CIRCLIP
13	FAN
14	FAN COVER
15	GASKET
16	TERMINAL BOX
17	TERMINAL BLOCK
18	TERMINAL COVER



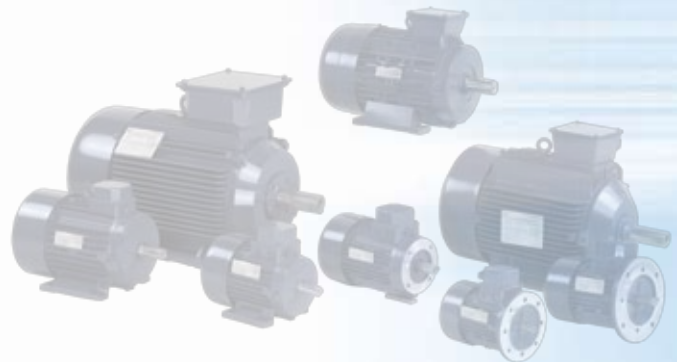
19	GLAND PLATE
20	GLAND
21	EYE BOLT
22	GREASE NIPPLE
23	GREASE OUTLET TUBE
24	GREASE INLET TUBE
25	WAVE WASHER
26	BEARING - DE & NDE

* ABOVE 280 FRAME SIZE ONLY

OPTIONAL FEATURES

The following special features/accessories can be provided for motors on request:

- Non standard voltage &/or frequency
- PTC thermistors
- RTD PT 100
- Space Heaters
- Epoxy coatings on winding overhangs
- Non standard payment shade
- Epoxy based paint
- Non standard shaft extension
- Standard double shaft extension
- Insulated bearings
- Terminal box on RHS/LHS (seen from Driving side)
- Construction in IM B35



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



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