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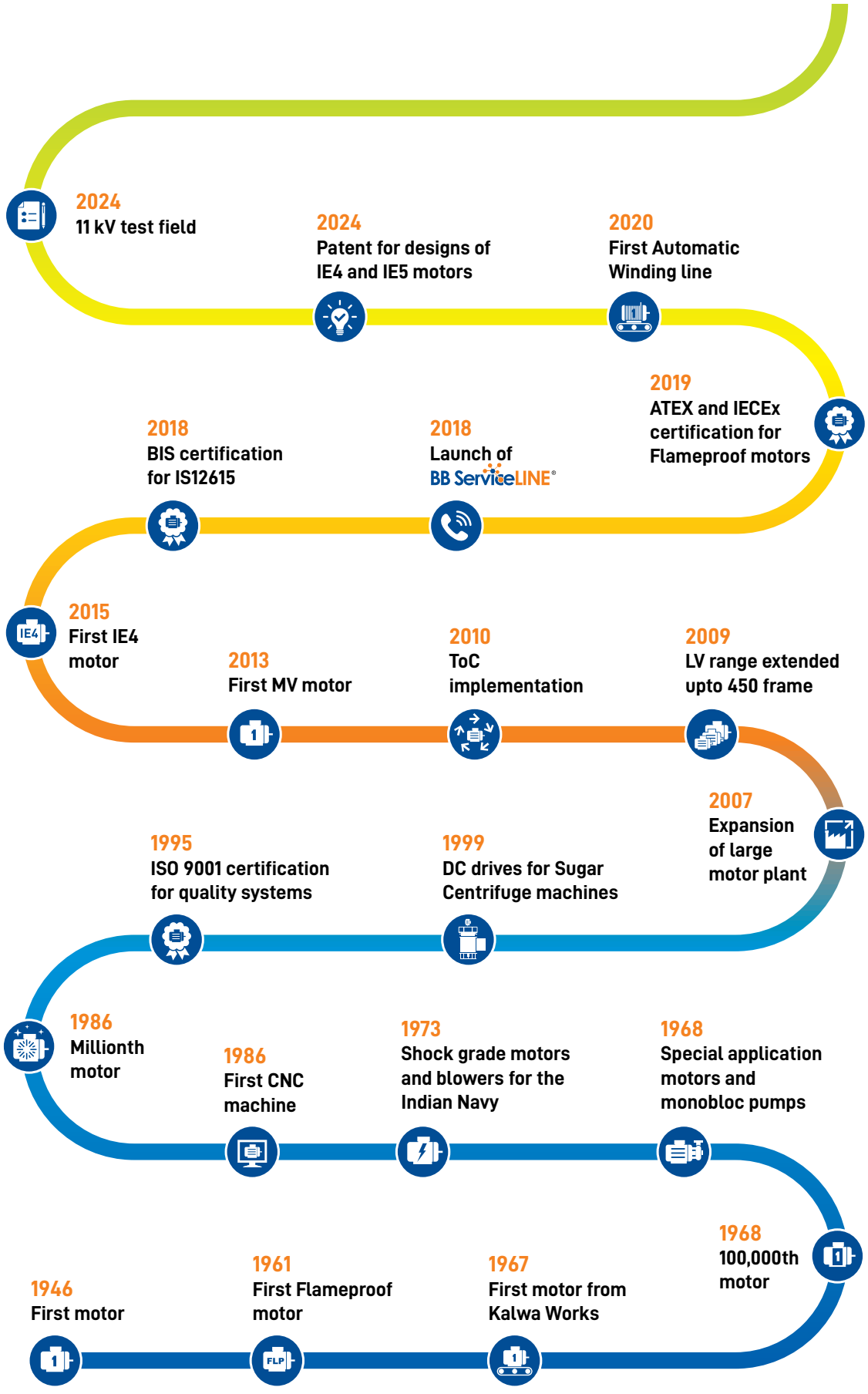
Bharat Bijlee

Crane & Hoist Duty Motors

Reliable | Long-Lasting

JANUARY 2025

BHARAT BIJLEE MOTORS: MILESTONES



CONTENT

CRANE AND HOIST DUTY MOTORS

TECHNICAL INFORMATION

Our Crane & Hoist Duty motors are suitable for short time and intermittent duties. These motors are specially designed for frequent starts/stops and reversals.

Major Applications

- Crane duty and Hoist duty application including LT & CT drives
- Material Handling
- Weirs, sluices (dam gates)
- Lift duty
- Auxiliary motors in rolling mills

Product Range

Frame Size	kW Range
71 to 355L	0.37 to 400

Standards

In general these motors conform to following standards

IS/IEC 60034-1 "Rotating Electrical Machines - Part 1 Rating & Performance"	Three Phase Induction Motors specification
IS : 1231	Dimensions of foot mounted A.C Induction motors
IS : 2223	Dimensions of flange mounted A.C Induction motors

ELECTRICAL FEATURES

Operating Conditions

Supply Conditions (Voltage & Frequency)

Voltage : 415V ± 10%

Frequency : 50Hz ± 5%

Combined Variation : ± 10%

*Other voltage / Frequency on request.

Ambient

Motors are designed for ambient temperature of 45° C.

Altitude

Motors are designed for altitude up to 1000m above mean sea level.

Re-rating Factors

The re-rating applicable under different conditions of ambient and altitude are obtained by multiplying following factors.

Variation in Ambient & Altitude

Table 1

Amb. Temp. (°C)	Permissible output as % of rated value	Altitude above sea level (meters)	Permissible output as % of rated value
⩽ 30	107	1000	100
30-45	100	1500	97
50	96	2000	94
55	92	2500	90
60	87	3000	86
		3500	82
		4000	77

Insulation

The motors are provided with class F insulation scheme with temperature rise limited to class B limits.

Winding

The stators are wound with modified polyester enamel covered (Temp class 155°C) copper wires as per IS 13730:3 and impregnated with class F varnish. However motors wound with dual coated copper wires and VPI can be provided on request. All motors in 315S frame & above are wound with dual coated winding wire (thermal class 200°C) as per IS 13730:13 and are impregnated with VPI process.

Thermal Protection (for Winding & Bearing)

PTC thermistors / thermostats/ RTDs etc. can be embedded in stator winding on request. In case of frame sizes 250M and above bearing temperature detectors (BTD) can be supplied on request.

Earthing Terminals

Two earthing terminals are provided, one on the body and other in the terminal box.

Anti- condensation Method

In order to avoid condensation of water inside the motors they can be heated up by connecting voltage 4% to 10% of rated voltage to the motor terminals. Adequate heating is obtained with current equal to 20-25% of rated motor current. Alternatively any method as indicated in IS: 900 for heating the stator winding could be adopted. Motors can also be offered with built in space heaters in frame sizes 90S and above.

TECHNICAL INFORMATION

MECHANICAL FEATURES

Enclosures: (Material & T Box Location)

Frame Size	Std Crane Duty MC Series		
	Enclosure Material	Terminal Box Location	
		Std TB Position	Option Available
71, 80	Aluminium	TOP	–
90S to 132M	Aluminium	TOP	–
	Cast Iron	RHS	TOP & LHS
160M to 225M	Cast Iron	RHS	TOP & LHS
250M to 335L	Cast Iron	TOP	RHS & LHS

Frame Size	IE2 Crane Duty 2C Series		
	Enclosure Material	Terminal Box Location	
		Std TB Position	Option Available
71	Aluminium	TOP	–
80 to 132	Cast Iron as standard	TOP	LHS & RHS
	Aluminium: as optional	TOP	–
160 and above	Cast Iron	TOP	LHS & RHS

Degree of Protection

All motors have IP55 degree of protection as per IS:4691. Higher degree of protection such as IP56, IP66 can be offered on request. All flange mounted motors are additionally provided with oil tight shaft protection on driving end side.

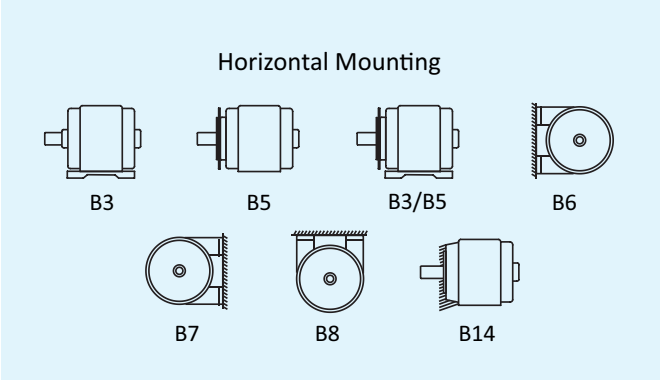
Cooling

All motors are totally enclosed Fan Cooled (TEFC). The cooling is effected by self driven, bi-directional centrifugal fan protected by fan cover. The type of cooling is IC411 as per IS: 6362. Motors with natural ventilation (TENV) or with forced cooing arrangement can be offered on request. Minimum cooling distance as indicated in GA Drawing has to be provided for effective cooling of the motor.

Type of Construction

Standards motors are designed for foot mounting (B3). Motors up to frame 355 are also suitable for B6, B7, B8, V5 and V6 mounting. Motors can be supplied in Flange mounting (B5). Flange mounted motors up to frame 355 are also suitable for V1 and V3 mounting.

Mounting



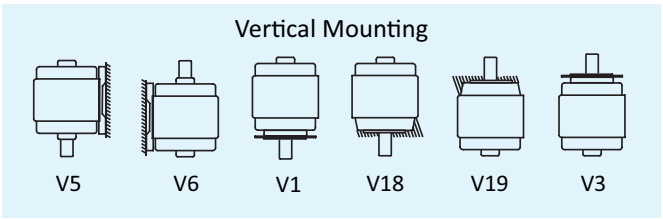


Table 3

Frame Size	Bearing Nos. C3 clearance		Terminal Box Type/ Location	Terminal		No. & size of Cable entries	Max cond. Cross Sec. area (mm)
	DE	NDE		No.	Size		
71	6202 2Z	6202 2Z	gk030/ TOP	3	M4	1×3/4"	4
80	6004 2Z	6004 2Z					
90S, 90L	6205 2Z	6205 2Z	gk130/ TOP	3*			6
100L	6206 2Z	6205 2Z	gk230/ TOP	3*		2 × 1"	10
112M	6206 2Z	6205 2Z		6			
132S, 132M	6208 2Z	6208 2Z	gk330/ TOP	6	M5		
160M, 160L	6309 2Z	6209 2Z	gk330/ RHS				16
180M, 180L	6310 2Z	6210 2Z	gk430/ RHS	6	M6	2 × 1 1/2"	50
200L	6312 2Z	6212 2Z	TB225/ RHS	6	M8	2 × 2"	70
225S, 225M	6313	6213					
250M	6315	6215	TB280/ Top	6	M10		150
280 S/M 2P	6316	6316					
280 S/M 4, 6 & 8P	6317	6316					
315S, 315M	6319	6319	TB315/ Top	6	M12	2 × 2"	240
315L						2 × 2 1/2"	
355L	6322	6322	TB355/ Top	6	M16	2 × 3"	300

*3 Terminals up to and including 1.5kW and 6 terminals for higher outputs

Special Design Features

- Increased air gap between stator and rotor
- Special rotor design

Types of Duties

The various operating cycles of driven machines can be classified into nine basic duties, ranging from S1 to S8. They are as follows:

Table 4

S1	Continuous duty
S2	Short time duty
S3	Intermittent periodic duty
S4	Intermittent periodic duty with starting
S5	Intermittent periodic duty with starting and electric braking
S6	Continuous duty with Intermittent periodic loading
S7	Continuous duty with starting and electric braking
S8	Continuous duty with periodic speed changes

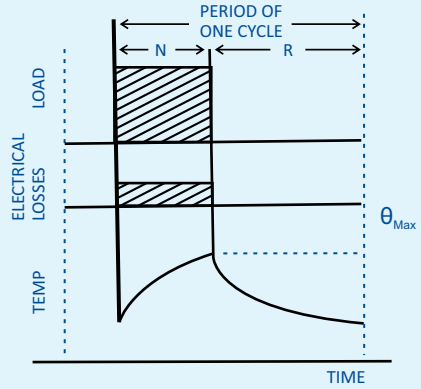
Duties S2, S3, S4 and S5 explained with graphs

TECHNICAL INFORMATION

A) S2-Short Time Duty

This includes a period of operation at constant load which are too short to attain thermal equilibrium, followed by rest period of sufficient duration to reestablish equality of temperature with cooling medium in one cycle.

Fig 1 (a)



N = Operation under rated conditions.

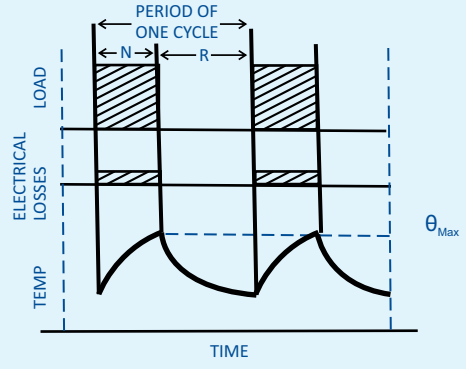
R = At rest de-energized

θ_{Max} = Maximum temperature attained during the duty cycle.

B) S3- Intermittent Periodic Duty

This includes a period of operation at constant load and a de-energized period, which are too short to attain thermal equilibrium during one cycle. The starting current does not significantly affect the temperature rise for this type of duty.

Fig 1 (b)

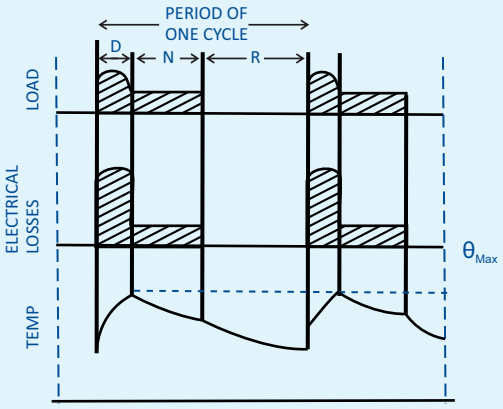


Cyclic duration factor = $\frac{N}{N + R}$

C) S4- Intermittent Periodic Duty with Starting

This includes a period of starting, a period of operation at constant load and a de-energized period, which is too short to attain thermal equilibrium during one cycle. The starting affects temperature rise, as load GD² is higher than rotor GD² and/ or no. of start/hour is high, for this type of duty. The motor is stopped after switching off either by natural deceleration, or by a mechanical brake, without additional heating of the windings

Fig 1 (c)



Cyclic duration factor = $\frac{D + N}{D + N + R}$

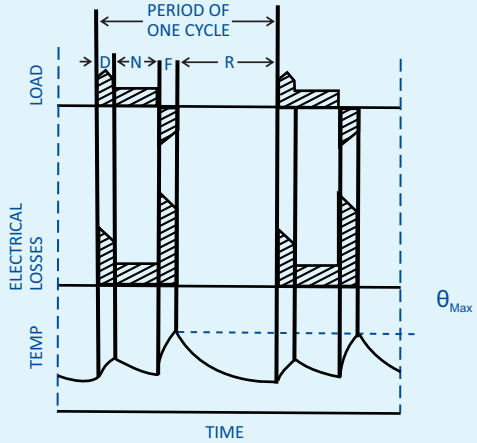
Where D = Starting

D) S5- Intermittent Periodic Duty with Starting and Electrical Braking

This includes a period of starting, a period of operation at constant load, a period of electrical braking, and de-energized period which are too short to attain thermal equilibrium during one duty cycle. It is understood that the starting affect temperature rise, as in (c) above, and the stopping also affects temperature rise as braking is carried out electrically.

We also supply motors for special types of duties, on enquiry including multi-speed motors with squirrel cage rotors.

Fig 1 (d)



Cyclic duration factor = $\frac{D + N + F}{D + N + F + R}$

Where F = Electric breaking

The common Cyclic Duration Factors (CDF) for the above duties are 25%, 40% and 60%. We also supply, on enquiry, motors for other CDF's. The CDF calculations are shown in figures 1(a), 1(b), 1(c), 1(d).

Bharat Bijlee

STANDARD CRANE AND HOIST DUTY MOTORS WITH DOL STARTING

a. Performance table for 4-Pole motors TEFC 3 Phase Squirrel Cage Induction Motors Crane & Hoist duty with DOL Starting Fr. 71 to 355L

Voltage: 415V ± 10%
Frequency: 50Hz ± 5%
Combined Variation: ± 10%
Duty: S3 / S4

1500 rpm (4 Pole)

Ambient: 45°C
Insulation Class: F
Temperature: B
Protection: IP55

Frame size IEC	Type Ref. B3 Construction	60 Starts/ hr.						150 Starts/ hr.						300 Starts/ hr.						Rated Speed RPM	With DOL starting		Pullout Torque to Rated Torque Ratio	Rotor GD² kgm²	Net Weight B3 constr. kg
		40% CDF			60% CDF			40% CDF			60% CDF			40% CDF			60% CDF								
		kW	Rated Current Amps.	Rated Torque kg-m	kW	Rated Current Amps.	Rated Torque kg-m	kW	Rated Current Amps.	Rated Torque kg-m	kW	Rated Current Amps.	Rated Torque kg-m	kW	Rated Current Amps.	Rated Torque kg-m	kW	Rated Current Amps.	Rated Torque kg-m		Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio			
71	MC071433	0.55	1.56	0.41	0.55	1.56	0.41	0.55	1.56	0.41	0.55	1.56	0.41	0.55	1.56	0.41	0.55	1.56	0.41	1310	3.7	2.25	2.75	0.0033	7
80	MC080413	0.75	1.78	0.55	0.75	1.78	0.55	0.75	1.78	0.55	0.75	1.78	0.55	0.75	1.78	0.55	0.75	1.78	0.55	1340	4.5	2.30	2.75	0.0061	10
80	MC080433	1.1	2.84	0.78	1.1	2.84	0.78	1.1	2.84	0.78	1.1	2.84	0.78	1.1	2.84	0.78	1.1	2.84	0.78	1365	5.0	2.30	2.80	0.0072	11
90S	MC09S433	1.5	3.66	1.04	1.5	3.66	1.04	1.5	3.66	1.04	1.5	3.66	1.04	1.5	3.66	1.04	1.5	3.66	1.04	1410	4.5	2.25	2.75	0.0097	14
90L	MC09L453	2.2	5.30	1.53	2.2	5.30	1.53	2.2	5.30	1.53	2.2	5.30	1.53	2.2	5.30	1.53	2.2	5.30	1.53	1405	4.8	2.30	2.80	0.0130	17
100L	MC10L453	3.7	7.95	2.56	3.7	7.95	2.56	3.7	7.95	2.56	3.7	7.95	2.56	3.7	7.95	2.56	3.7	7.95	2.56	1410	6.0	2.30	3.00	0.0210	24
112M	MC11M453	5.5	12.4	3.77	5.5	12.4	3.77	5.5	12.4	3.77	5.5	12.4	3.77	5.5	12.4	3.77	5.5	12.4	3.77	1420	6.0	2.30	2.80	0.049	32
132S	MC13S4G3	7.5	14.6	5.07	7.5	14.6	5.07	7.5	14.6	5.07	7.5	14.6	5.07	7.5	14.6	5.07	7.5	14.6	5.07	1440	6.5	2.25	2.90	0.103	48
132M	MC13M4P3	9.3	18.1	6.25	9.3	18.1	6.25	9.3	18.1	6.25	9.3	18.1	6.25	9.3	18.1	6.25	9.3	18.1	6.25	1450	6.5	2.30	2.90	0.125	57
160M	MC16M4A3	11	21.2	7.44	11	21.2	7.44	11	21.2	7.44	11	21.2	7.44	11	21.2	7.44	11	21.2	7.44	1440	6.5	2.25	2.80	0.141	93
160M	MC16M4C3	13.2	25.4	8.90	12.1	23.3	8.2	13.2	25.4	8.90	12.1	23.3	8.20	13.2	25.4	8.90	12.1	23.3	8.20	1440	6.5	2.25	2.80	0.187	99
160M	MC16M4F3	15	30.7	10.1	15	30.7	10.1	15	30.7	10.1	15	30.7	10.1	13.8	28.2	9.30	13.8	28.2	9.30	1440	6.5	2.25	2.80	0.210	105
160L	MC16L4P3	18.5	36.1	12.5	18.5	36.1	12.5	18.5	36.1	12.5	18.5	36.1	12.5	17	33.1	11.5	17	33.1	11.5	1445	6.5	2.10	2.50	0.275	125
180L	MC18L473	22	39.5	14.7	22	39.5	14.7	22	39.5	14.7	22	39.5	14.7	22	39.5	14.7	20	35.9	13.3	1460	6.5	2.40	2.60	0.540	188
200L	MC20L433	30	52.1	19.9	30	52.1	19.9	30	52.1	19.9	30	52.1	19.9	28	48.6	18.6	26	45.1	17.2	1470	6.5	2.50	2.90	1.26	248
225S	MC22S413	37	65.9	24.5	37	65.9	24.4	37	65.9	24.4	34	60.5	22.4	32	57.0	21.1	30	53.4	19.8	1478	6.0	2.50	2.70	1.76	286
225M	MC22M433	45	79.0	29.7	45	79	29.7	45	79.0	29.7	40	70.0	26.4	37	65.0	24.4	34	60.0	22.4	1478	6.0	2.50	2.90	2.08	317
250M	MC25M413	55	94.3	36.3	55	94.3	36.3	55	94.3	36.3	52	89.2	34.3	48	82.3	31.7	45	77.2	29.7	1475	6.5	2.50	2.60	2.83	475
280S	MC28S413	75	129	49.2	75	129	49.2	75	129	49.2	70	120	45.9	67	115	43.9	65	112	42.6	1485	6.0	2.10	2.80	5.00	653
280M	MC28M433	90	154	59.0	90	154	59.0	90	154	59.0	84	143	55.1	80	137	52.5	75	128	49.2	1485	6.0	2.10	2.80	6.00	713
315S	MC31S413	110	183	72.1	110	183	72.1	110	183	72.1	102	169	66.9	95	158	62.3	90	149	59.0	1485	6.0	2.20	2.50	8.70	902
315M	MC31M433	132	216	86.5	132	216	86.5	132	216	86.5	125	205	81.9	115	188	75.4	110	180	72.1	1486	6.0	2.20	2.50	10.2	965
315L	MC31L453	160	261	105	160	261	105	160	261	105	150	245	98.3	138	225	90.4	132	215	86.5	1487	6.0	2.20	2.50	12.2	1145
315L	MC31L463	180	294	118	180	294	118	180	294	118	168	274	110	158	258	103	150	245	98.3	1487	6.0	2.20	2.50	13.4	1225
315L	MC31L473	200	326	131	200	326	131	200	326	131	185	302	121	180	294	118	175	286	114.6	1487	6.5	2.00	2.30	14.6	1290
355L	MC35L413	250	410	164	250	410	164	250	410	164	232	380	152	220	361	144	210	344	138	1488	6.5	2.25	2.60	23.3	1680
355L	MC35L433	315	517	206	315	517	206	315	517	206	295	484	193	280	460	183	270	443	177	1488	6.5	2.25	2.60	32.7	1855
355L	MC35L453	355	586	233	355	586	233	355	586	232	330	545	216	310	512	203	300	495	196	1488	6.5	2.20	2.50	37.9	2186

Note: 1. Above ratings are suitable for S3, S4 (intermittent) duties and not for S1 (continuous) duty

2. For thermal test of motor,
   - Motors will be run on S2 - 60 min duty at nameplate rating and temperature rise will be limited to F class.
   - Motors will be run on S2 - 30 min duty at nameplate rating and temperature rise will be limited to B class.

STANDARD CRANE AND HOIST DUTY MOTORS WITH DOL STARTING

a. Performance table for 6-Pole motors TEFC 3 Phase Squirrel Cage Induction Motors Crane & Hoist duty with DOL Starting Fr. 71 to 355L

Voltage: 415V ± 10%
Frequency: 50Hz ± 5%
Combined Variation: ± 10%
Duty: S3 / S4

1000 rpm (6 Pole)

Ambient: 45°C
Insulation Class: F
Temperature: B
Protection: IP55

Frame size IEC	Type Ref. B3 Construction	150 Starts/ hr.						300 Starts/ hr.						Rated Speed RPM	With DOL starting		Pullout Torque to Rated Torque Ratio	Rotor GD² kgm²	Net Weight B3 constr. kg
		40% CDF			60% CDF			40% CDF			60% CDF								
		kW	Rated Current Amps.	Rated Torque kg-m	kW	Rated Current Amps.	Rated Torque kg-m	kW	Rated Current Amps.	Rated Torque kg-m	kW	Rated Current Amps.	Rated Torque kg-m		Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio			
71	MC071633	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	0.0033	7
80	MC080613	0.55	2.00	0.65	0.55	2.0	0.65	0.55	2.0	0.65	0.55	2.00	0.65	830	3.5	1.90	2.20	0.0054	10
80	MC080633	0.75	2.70	0.85	0.75	2.7	0.85	0.75	2.7	0.85	0.75	2.70	0.85	860	3.5	2.25	2.50	0.0078	11
90L	MC09L6A3	1.1	3.00	1.19	1.1	3.0	1.19	1.1	3	1.19	1.1	3.00	1.19	900	4.0	2.30	2.60	0.0155	17
90L	MC09L653	1.5	4.20	1.62	1.5	4.2	1.62	1.5	4.2	1.62	1.5	4.20	1.62	900	4.0	2.30	2.75	0.1550	17
100L	MC10L653	2.2	6.46	2.33	2.2	6.5	2.33	2.2	6.5	2.33	2.2	6.50	2.33	920	4.5	2.25	2.75	0.029	27
112M	MC11M653	3.7	9.16	3.92	3.7	9.1	3.92	3.7	9.1	3.92	3.7	9.10	3.92	920	5.0	2.25	2.75	0.065	33
132S	MC13S6G3	5.5	13.5	5.73	5.5	13.5	5.73	5.5	13.5	5.73	5.5	13.5	5.73	935	5.5	2.30	2.75	0.130	52
132M	MC13M6T3	7.5	18.8	7.69	7.5	18.8	7.69	6.5	16.3	6.66	6.5	16.3	6.66	950	5.5	2.30	2.75	0.193	81
160M	MC16M633	9.3	20.3	9.69	8	18.0	8.33	9.3	20.3	9.69	8	18.0	8.33	935	6.0	2.30	2.75	0.276	102
160L	MC16L663	11	24.0	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	119
160L	MC16L673	13	29.0	13.5	12	27.0	12.5	13	29	13.5	12	27.0	12.5	935	6.0	2.25	2.75	0.40	129
180L	MC18L633	17	34.9	17.2	16	33.0	16.2	16	33	16.2	15	31.0	15.2	960	6.0	2.30	2.60	0.82	184
200L	MC20L633	22	41.2	22.0	20	38.0	20.0	20	38	20.0	18.5	35.1	18.5	975	6.5	2.30	2.80	1.21	219
225M	MC22M623	30	54.2	29.8	28	51.0	27.8	28	51	27.8	26	47.7	25.8	980	6.0	2.50	2.70	2.59	315
250M	MC25M603	37	64.7	37.0	34	60.0	34.0	34	60.2	34.0	30	53.1	30.0	975	6.0	2.30	2.50	3.51	458
280S	MC28S613	45	80.4	44.6	40	73.0	39.6	40	70.2	39.6	37	65.0	36.7	983	6.0	2.20	2.50	4.68	580
280M	MC28M633	52	91.0	51.7	48	86.0	47.7	48	85.5	47.7	45	80.0	44.7	980	6.0	2.30	2.30	6.18	640
315S	MC31S613	70	123	69.2	65	114	64.3	65	115	64.3	60	106	59.3	985	6.0	2.30	2.30	9.64	836
315M	MC31M633	85	147	84.1	80	142	79.1	80	142	79.1	75	133	74.2	985	6.0	2.40	2.50	11.4	900
315M	MC31M653	102	178	101	95	166	93.7	95	166	93.7	90	157	88.7	988	6.0	2.30	2.50	14.8	1021
315L	MC31L673	125	217	123	120	208	118	120	208	118.3	110	191	108.4	988	6.0	2.30	2.50	17.3	1175
315L	MC31L693	150	258	148	142	246	140	142	246	140.0	132	229	130.1	988	6.0	2.30	2.50	21.5	1231
355L	MC35L6A3	168	294	165	160	280	157	160	280	157.4	150	263	147.6	990	6.0	2.20	2.50	28.7	1670
355L	MC35L613	185	326	182	175	308	172	175	308	172.2	160	282	157.4	990	6.0	2.20	2.50	28.7	1670
355L	MC35L633	235	414	231	225	396	221	225	396	221.4	210	370	206.6	990	6.0	2.20	2.50	35.5	1780
355L	MC35L653	280	493	276	265	466	261	265	466	260.7	240	422	236.1	990	6.0	2.20	2.50	43.3	2000

Note: 1. Above ratings are suitable for S3, S4 (intermittent) duties and not for S1 (continuous) duty

2. For thermal test of motor,
   - Motors will be run on S2 - 60 min duty at nameplate rating and temperature rise will be limited to F class.
   - Motors will be run on S2 - 30 min duty at nameplate rating and temperature rise will be limited to B class.

Bharat Bijlee

STANDARD CRANE AND HOIST DUTY MOTORS WITH DOL STARTING

a. Performance table for 8-Pole motors TEFC 3 Phase Squirrel Cage Induction Motors Crane & Hoist Duty with DOL Starting Fr. 90S to 355L

Voltage: 415V ± 10%
Frequency: 50Hz ± 5%
Combined Variation: ± 10%
Duty: S3 / S4

750 rpm (8 Pole)

Ambient: 45°C
Insulation Class: F
Temperature: B
Protection: IP55

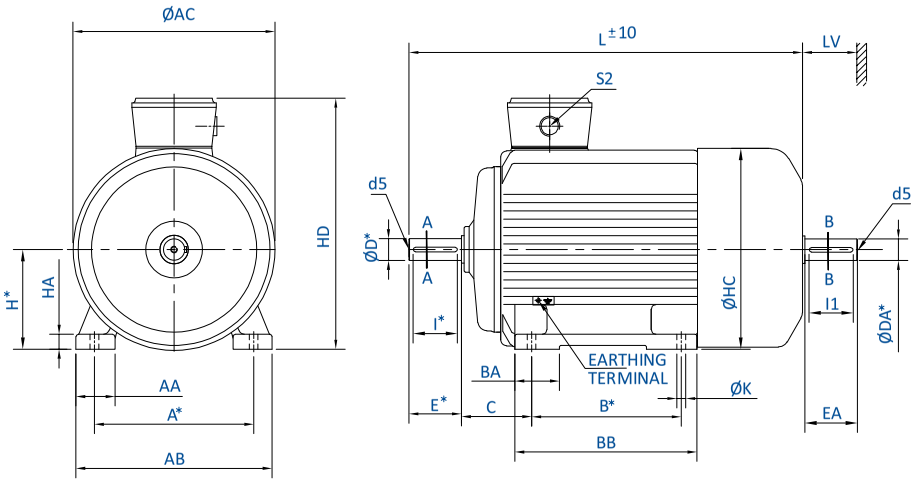
Frame size IEC	Type Ref. B3 Construction	150 Starts/ hr.						300 Starts/ hr.						Rated Speed RPM	With DOL starting		Pullout Torque to Rated Torque Ratio	Rotor GD² kgm²	Net Weight B3 constr. kg
		40% CDF			60% CDF			40% CDF			60% CDF								
		kW	Rated Current Amps.	Rated Torque kg-m	kW	Rated Current Amps.	Rated Torque kg-m	kW	Rated Current Amps.	Rated Torque kg-m	kW	Rated Current Amps.	Rated Torque kg-m		Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio			
90S	MC09S8A3	0.37	1.43	0.51	0.37	1.43	0.51	0.37	1.43	0.51	0.37	1.43	0.51	700	3.0	2.00	2.30	0.0097	12
90S	MC09S813	0.55	2.13	0.79	0.45	1.76	0.64	0.55	2.15	0.79	0.45	1.76	0.64	680	3.0	1.80	2.10	0.0097	12
90L	MC09L853	0.75	2.76	1.07	0.75	2.76	1.07	0.75	2.76	1.07	0.65	2.39	0.93	680	3.0	2.00	2.40	0.0129	14
100L	MC10L813	1.1	3.40	1.60	1.1	3.4	1.6	1.1	3.40	1.6	0.9	2.78	1.30	655	3.5	1.80	2.00	0.0216	18
100L	MC10L833	1.5	4.95	2.10	1.5	4.95	2.1	1.5	4.95	2.1	1.1	3.63	1.60	680	3.5	2.00	2.30	0.0271	20
112M	MC11M833	2.2	6.45	2.98	2.2	6.45	2.98	2.2	6.45	2.98	1.5	4.40	2.03	718	3.0	2.10	2.80	0.0600	33
132S	MC13S8G3	3.7	8.83	5.15	3.7	8.83	5.15	3.7	8.83	5.15	3	7.16	4.17	700	4.0	2.00	2.30	0.133	69
160M	MC16M833	5.5	12.0	7.50	5.5	12.0	7.5	5.5	12.0	7.5	4.5	9.82	6.2	710	5.0	2.10	2.40	0.299	106
160L	MC16L873	7.5	16.0	10.3	6.5	13.9	8.9	6.5	13.9	8.9	6	12.8	8.2	710	5.5	2.25	2.40	0.40	119
180M	MC18M813	9.3	19.8	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	2.50	0.62	177
180L	MC18L833	11	22.4	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	2.50	0.72	182
200L	MC20L833	15	33.1	20.0	13	28.7	17.3	13	28.7	17.3	11	24.3	14.6	732	5.5	2.20	2.80	1.30	232
225S	MC22S813	18.5	38.1	24.6	17	35.0	22.6	17	35.0	22.6	15	30.9	19.9	733	5.5	2.25	2.50	2.17	277
225M	MC22M833	22	43.8	29.2	20	39.9	26.6	20	39.9	26.6	18.5	36.9	24.6	733	5.5	2.25	2.50	2.59	306
250M	MC25M813	30	55.9	40.0	26	48.5	34.7	26	48.5	34.7	22	41.1	29.4	730	5.5	2.25	2.50	3.25	498
280S	MC28S823	37	70.8	49.4	34	65.2	45.4	34	65.0	45.4	30	57.6	40.0	730	5.5	2.25	2.40	6.18	615
280M	MC28M853	45	86.1	60.0	40	76.4	53.4	40	76	53.4	37	71	49.4	730	5.5	2.25	2.40	6.86	665
315S	MC31S813	55	108	72.9	50	98.2	66.3	50	98	66.3	45	88	59.6	735	6.0	2.25	2.40	9.60	836
315M	MC31M833	75	147	99.4	67	132	88.8	67	132	88.8	60	118	79.5	735	6.0	2.25	2.40	11.4	900
315M	MC31M853	90	174	119.3	80	156	106.0	80	156	106.0	75	146	99.4	735	6.0	2.25	2.40	14.8	1021
315L	MC31L873	110	211	145.8	100	195	132.5	100	195	132.5	90	175	119.3	735	6.0	2.25	2.40	17.3	1228
315L	MC31L893	132	253	174.9	125	243	165.6	125	244	165.6	115	224	152.4	735	6.0	2.25	2.40	21.5	1375
355L	MC35L813	160	300	210.6	150	281	197.4	150	281	197.4	140	263	184.3	740	5.5	1.80	2.50	28.7	1670
355L	MC35L8B3	180	337	236.9	170	318	223.8	170	318	223.8	155	290	204.0	740	6.0	2.20	2.40	35.5	1780
355L	MC35L833	185	347	243.5	175	328	230.3	175	328	230.3	160	300	210.6	740	6.0	2.00	2.30	35.5	1780
355L	MC35L853	210	394	276.4	200	375	263.2	200	375	263.2	180	338	236.9	740	6.0	2.00	2.30	41.5	1880

Note: 1. Above ratings are suitable for S3, S4 (intermittent) duties and not for S1 (continuous) duty

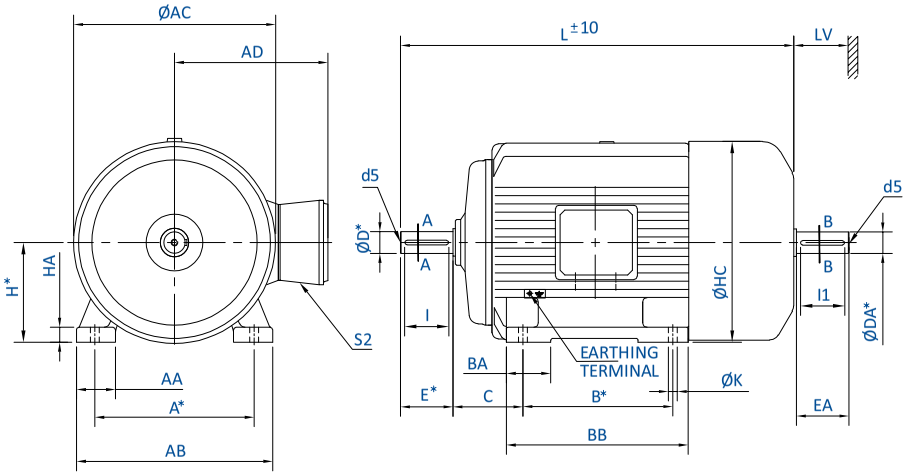
2. For thermal test of motor,
   - Motors will be run on S2 - 60 min duty at nameplate rating and temperature rise will be limited to F class.
   - Motors will be run on S2 - 30 min duty at nameplate rating and temperature rise will be limited to B class.

STANDARD CRANE AND HOIST DUTY MOTORS WITH DOL STARTING

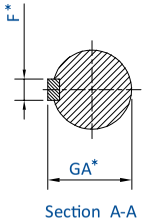
b. Dimensional Drawing: Crane & Hoist Duty Motors Type MC Foot Mounted (IM B3/IM1001) Motors

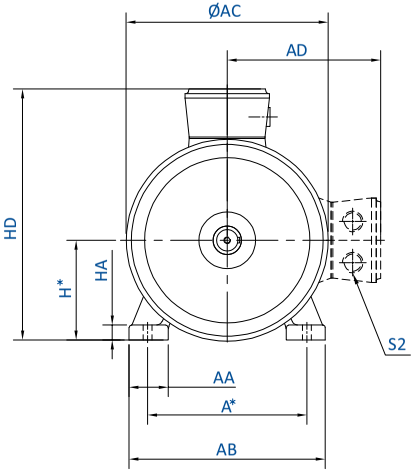


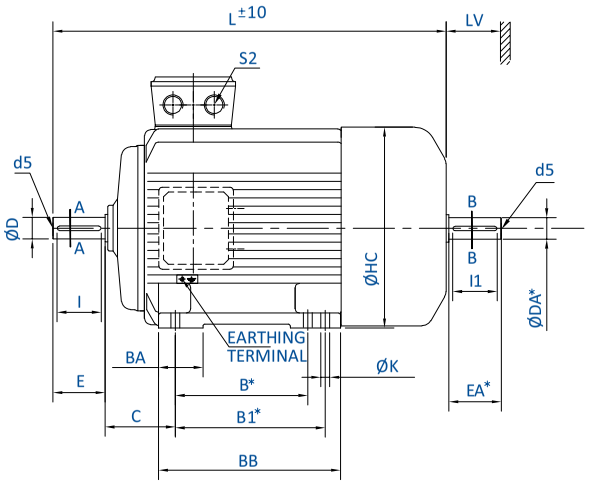
FRAME SIZE 71 TO 80

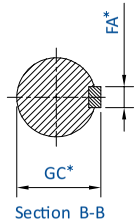


FRAME SIZE 160 TO 180









FRAME SIZE 90S TO 132M
FRAME SIZE 200L TO 355L

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STANDARD CRANE AND HOIST DUTY MOTORS WITH DOL STARTING

b. Dimensional Drawing: Crane & Hoist Duty Motors Type MC Foot Mounted (IM B3/IM1001) Motors

		FIXING						GENERAL										T. BOX	SHAFT					
IEC Fr. Size	Pole	A*	B*	B1*	C	H*	K*	AB	BB	AA	BA	HA	HD	AD	L	LV	AC	S2 B.S.C.	D DA*	E EA	F* FA*	GA* GC*	I I1	d5
71	4 & 6	112	90	–	45	71	7	135	110	31	30	7	195	121	235	30	140	3/4"	14	30	5	16	25	M5
80	4 & 6	124	100	–	50	80	10	150	124	31	35	9	214	135	267		157	3/4"	19	40	6	21.5	35	M6
90S	4, 6 & 8	200	100	–	56	90	10	168	140	34	31.5	12	230	150	302	35	174	3/4"	24	50	8	27	45	M8
90L	4, 6 & 8		125						140						327									
100L	4, 6 & 8	160	140	–	63	100	12	190	174	43.5	36	12	257	262	366	40	195	1"	28	60	8	31	55	M10
112M	4, 6 & 8	190	140	–	70	112	12	220	174	47	36	12	282	170	388	45	220	1"	28	60	8	31	55	M10
132S	4, 6 & 8	216	140	–	89	132	12	256	180	64	50	17	328	206	459	50	260	1"	38	80	10	41	70	M12
132M	4, 6		178						218		54				497									
160M	4, 6 & 8	254	210	–	108	160	15	310	250	58	70	20	383	226	585	60	316	1"	42	110	12	45	105	M16
160L	4, 6 & 8		254						294						629									
180M	4, 6 & 8	279	241	–	121	180	15	344	281	65	70	26	451	265	717	70	354	1 1/2"	48	110	14	51.5	100	M16
180L	4, 6 & 8		279						319															
200L	4, 6 & 8	316	305	–	133	200	19	398	355	85	85	32	525	325	825	80	407	Ø52	55	110	16	59	100	M20
225S	4, 6 & 8	356	286		149	225	19	436	351	85	85	34	570	345	825	90	461	Ø52	60	140	18	64	130	M20
225M	4, 6 & 8			311											865									
250M	4, 6 & 8	406	349	–	168	250	24	506	425	100	115	42	665	415	914	100	489	2"	65	140	18	69	130	M20
280S/M	4, 6 & 8	457	368	419	190	280	24	540	490	100	110	42	725	445	1010	115	544	2"	75	140	20	79.5	130	M20
315S/M	4, 6 & 8	508	406	457	216	315	28	625	540	100	115	45	834	519	1167	130	610	2"	80	170	22	85.5	160	M20
315L	4, 6 & 8		508	–					593	120	120				1332			2 1/2"	80	170	22	85.5	160	
355L	4, 6 & 8	610	630	–	254	355	28	710	770	110	170	45	939	584	1491	145	685	3"	95	170	25	100	160	M24

TABLE A

Dimension	Tolerance		Specification
A, B	±0.75		
H	-0.5	UPTO 280	IS : 1231
	-1	OVER 280	
K	+0.360	7, 10Ø	
	+0.430	12, 10Ø	
	+0.520	19, 24, 28Ø	

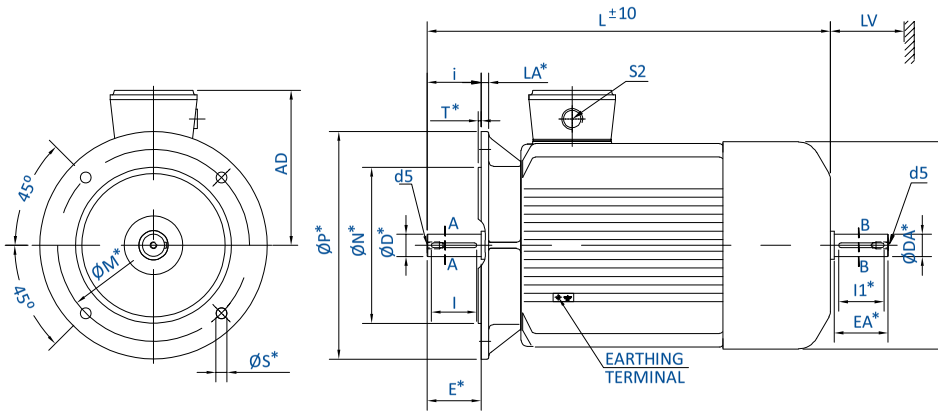
Dimension	Tolerance		Specification
D, DA	j6	11, 14, 19, 24, 28Ø	IS : 1231
	k6	38, 42, 48Ø	
	m6	55, 60, 65, 75, 80Ø	
GA, GC, F, FA			IS : 2048
d5 (centering)			IS : 2540

Notes:
- Key / Key way fit: h9 / N9
- Double shaft extension can be provided with shaft dimension identical to D.E. shaft.
- Also suitable for B6, B7, B8, V5 and V6 mounting as per IS 2253.
- Motor in frame size 200M/L and 225 S/M are with open key shaft.
- T. Box material will be AL for 71 to 132 Frame.
- T. Box material will be CI for 160 to 180L Frame and 250 to 355L Frame.
- T. Box material will be M.S. for 200 to 225 Frame.

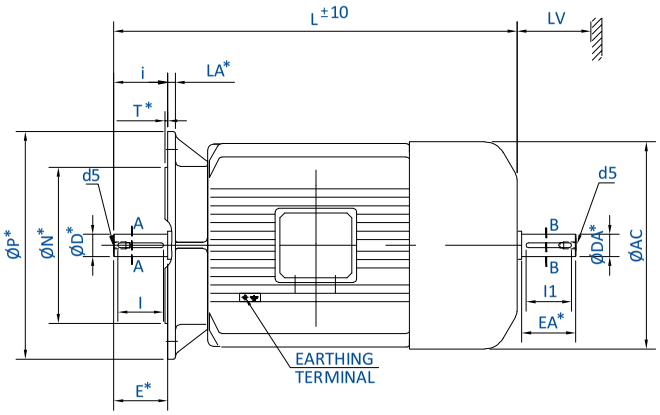
All dimensions are in mm unless otherwise specified

STANDARD CRANE AND HOIST DUTY MOTORS WITH DOL STARTING

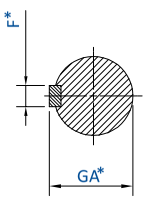
b. Dimensional Drawing: Crane & Hoist Duty Motors Type MC Flange Mounted (IM B5/IM1001) Motors

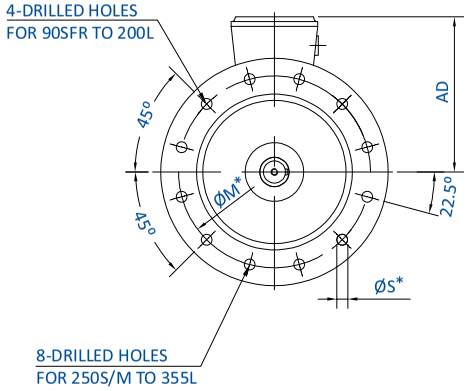


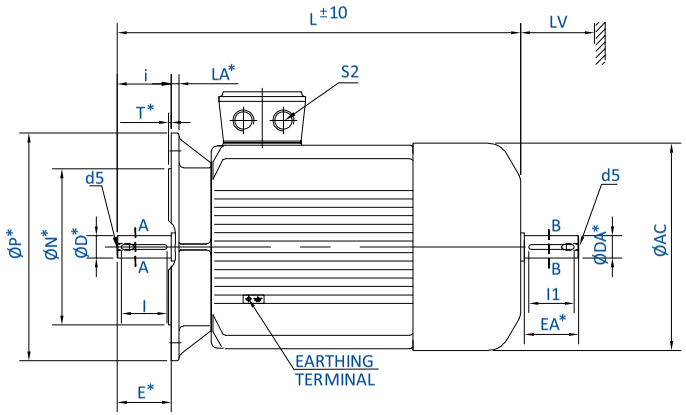
FRAME SIZE 71 TO 80



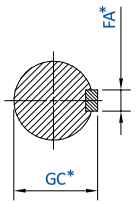
FRAME SIZE 160 TO 180







FRAME SIZE 90S TO 132M
FRAME SIZE 200L TO 355L



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STANDARD CRANE AND HOIST DUTY MOTORS WITH DOL STARTING

b. Dimensional Drawing: Crane & Hoist Duty Motors Type MC Flange Mounted (IM B5/IM1001) Motors

		FIXING					GENERAL						T. BOX	SHAFT					
IEC Fr. Size	Pole	P	N*	M*	i*	S	T	LA	AD	AC	L	LV	S2 B.S.C.	D DA*	E EA	F* FA*	GA* GC*	I I1	d5
71	4 & 6	160	110	130	30	10	3.5	9	124	140	261	30	3/4"	14	30	5	16	25	M5
80	4 & 6	200	130	165	40	12	3.5	10	134	157	267		3/4"	19	40	6	21.5	35	M6
90S	4, 6 & 8	200	130	165	50	12	3.5	10	140	174	302	35	3/4"	24	50	8	27	45	M8
90L	4, 6 & 8										327								
100L	4, 6 & 8	250	180	215	60	15	4	11	160	195	366	40	1"	28	60	8	31	55	M10
112M	4, 6 & 8	250	180	215	60	15	4	11	170	220	388	45	1"	28	60	8	31	55	M10
132S	4, 6 & 8	300	230	265	80	15	4	12	206	260	459	50	1"	38	80	10	41	70	M12
132M	4, & 6										497								
160M	4, 6 & 8	350	250	300	110	19	5	13	226	316	585	60	1"	42	110	12	45	105	M16
160L	4, 6 & 8										629								
180M	4, 6 & 8	350	250	300	110	19	5	13	265	354	679	70	1 1/2"	48	110	14	51.5	100	M16
180L	4, 6 & 8										717								
200L	4, 6 & 8	400	300	350	110	19	5	15	325	407	825	80	Ø52	55	110	16	59	97	M20
225S	4	450	350	400	140	19	5	17.5	345	461	825	90	Ø52	60	140	18	64	130	M20
225M	4, 6 & 8										865								
250M	4, 6 & 8	550	450	500	140	19	5	18	415	489	914	100	2"	65	140	18	69	130	M20
280S/M	4, 6 & 8	550	450	500	140	19	5	18	445	544	914	115	2"	75	140	20	79.5	130	M20
315S/M	4, 6 & 8	660	550	600	170	24	6	22	515	606	1167	130	2"	80	170	22	85.5	160	M20
315L	4, 6 & 8										1332		2 1/2"	80	170	22	85.5	160	
355L	4, 6 & 8	800	680	740	170	24	6	25	584	690	1491	145	3"	95	170	25	100	160	M24

TABLE A

Dimension	Tolerance		Specification
N	j6	UPTO 450	IS : 2223
	js6	OVER 450	
M	±0.3	UPTO 265	
	±0.5	OVER 265	
i	±1	UPTO 85	
	±1.5	OVER 85	

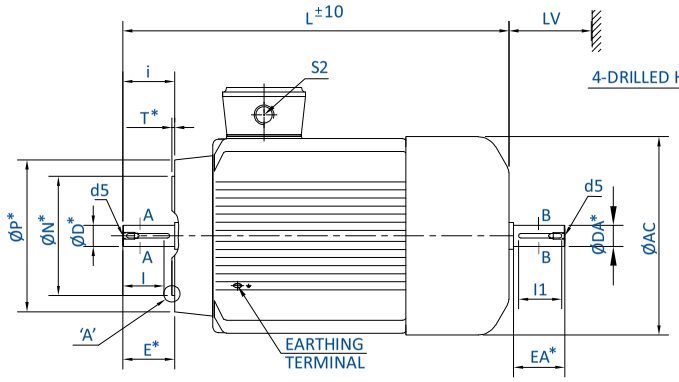
Dimension	Tolerance		Specification
D, DA	j6	11, 14, 19, 24, 28Ø	IS : 1231
	k6	38, 42, 48Ø	
	m6	55, 60, 65, 75, 80, 95Ø	
GA, GC, F, FA			IS : 2048
d5 (centering)			IS : 2540

All dimensions are in mm unless otherwise specified

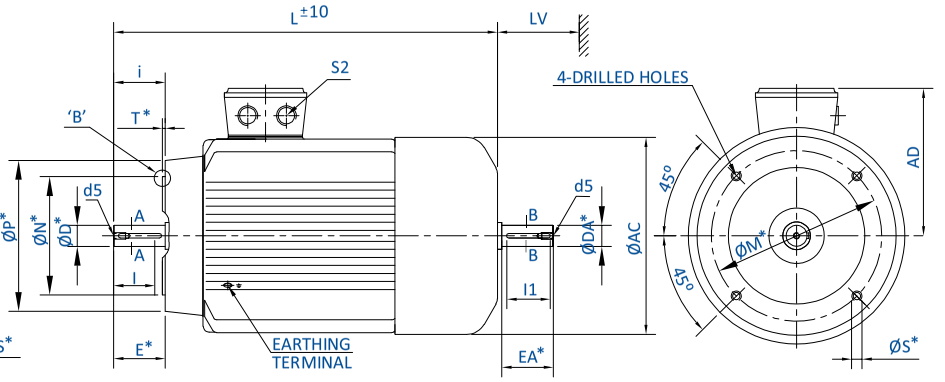
Notes:
- Key / Key way fit: h9 / N9
- 8 Nos. Fixing Holes from 225S/M frame onwards
- Double shaft extension can be provided with shaft dimension identical to D.E. shaft.
- Also suitable for V1 and V3 mounting as per IS 2253.
- Motor in frame size 200M/L and 225 S/M are with open key shaft.
- T. Box material will be AL for 71 to 132 Frame.
- T. Box material will be CI for 160 to 180L Frame and 250 to 355L Frame.
- T. Box material will be M.S. for 200 to 225 Frame.

STANDARD CRANE AND HOIST DUTY MOTORS WITH DOL STARTING

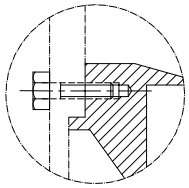
b. Dimensional Drawing: Crane & Hoist Duty Motors Type MC Flange Mounted (IM B14/IM3601) Motors



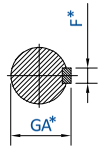
FRAME SIZE 63 TO 80



FRAME SIZE 90S TO 132M

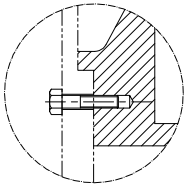


ENLARGEMENT OF CIRCLE 'A'

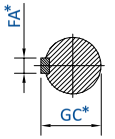


Section A-A

		FIXING					GENERAL					T. BOX	SHAFT					
IEC Fr. Size	Pole	P	N*	M*	i*	S	T	AD	AC	L	LV	S2 B.S.C.	D DA*	E EA	F* FA*	GA* GC*	I I1	d5
71	4 & 6	105	70	85	30	M6X10	2.5	124	140	234	30	3/4"	14	30	5	16	25	M5
80	4 & 8	120	80	100	40	M6X13	3	134	157	267	30	3/4"	19	40	6	21.5	35	M6
90S	4, 6 & 8	140	95	115	50	M8X12	3	140	174	302	35	3/4"	24	50	8	27	45	M8
90L	4, 6 & 8									327								
100L	4, 6 & 8	160	110	130	60	M8X12	3.5	161	195	366	40	1"	28	60	6	31	55	M10
112M	4, 6 & 8	160	110	130	60	M8X12	3.5	170	220	388	45	1"	28	60	8	31	55	M10
132S	4, 6 & 8	250	180	215	80	M12X20	4	206	260	459	50	1"	38	80	10	41	70	M12
132M	4 & 6									497								



ENLARGEMENT OF CIRCLE 'B'



Section B-B

TABLE A

Dimension	Tolerance	Specification
N	j6	IS : 2223
M	±0.3	
i	±1	

Dimension	Tolerance		Specification
D, DA	j6	11, 14, 19, 24, 28Ø	IS : 1231
	k6	38Ø	
GA, GC, F, FA			IS : 2048
d5 (centering)			IS : 2540

Notes:
- Also suitable for B14, V19 and V18 mounting as per IS 2253
- Key / Key way fit: h9 / N9
- Double shaft extension can be provided with shaft dimension identical to DE shaft.
- T. Box material will be AL for 71 to 132 Frame.

All dimensions are in mm unless otherwise specified

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IE2 CRANE AND HOIST DUTY MOTORS WITH DOL STARTING

a. Performance table for 4-Pole motors TEFC 3 Phase Squirrel Cage Induction Motors Crane & Hoist duty with DOL Starting Fr. 71 to 355L

Efficiency class: IE2
Voltage: 415V±10%
Frequency: 50Hz±5%
Combined Variation: ±10%
Duty: S3 / S4

1500 rpm (4-Pole) IE2 DOL

Altitude: ≤ 1000 m
Ambient: 50 °C
Insulation Class: F
Temperature Rise: B
Protection: IP55

Equivalent S1 kW	Frame Size	Type Reference	150 Starts / Hour															Rotor GD²	Net Wt. B3 Const. Kg
			40 % CDF							60 % CDF									
			kW	Rated Current Amps.	Rated Torque Kg.m	Speed in RPM	Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio	kW	Rated Current Amps.	Rated Torque Kg.m	Speed in RPM	Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio	kgm²	
0.37	71	2C071433	0.55	1.52	0.39	1365	3.50	2.00	2.20	0.45	1.40	0.32	1390	4.00	2.40	2.90	0.0031	8
0.55	80	2C080433	0.72	1.68	0.50	1405	5.00	2.70	2.80	0.62	1.54	0.43	1420	5.00	3.10	3.30	0.0066	15
0.75	80	2C080453	1.00	2.27	0.70	1390	5.00	2.50	2.60	0.88	2.12	0.61	1410	5.00	2.90	3.00	0.0073	16
1.1	90S	2C09S423	1.40	3.12	0.97	1400	5.00	2.00	2.40	1.20	2.62	0.83	1410	5.00	2.20	2.60	0.0097	20
1.5	90L	2C09L4E3	2.00	4.11	1.40	1390	5.00	2.10	2.50	1.70	3.61	1.17	1410	5.50	2.50	3.00	0.0149	24
2.2	100L	2C10L473	2.90	6.36	1.98	1425	5.50	2.40	2.80	2.50	5.23	1.71	1428	5.50	2.40	2.80	0.0211	34
2.2	100L	2C10L4B3	4.00	8.23	2.82	1380	5.00	2.00	2.40	3.50	7.23	2.44	1400	5.00	2.20	2.60	0.0245	35
3.7	112M	2C11M473	4.40	8.57	2.98	1440	6.00	2.10	2.80	3.90	7.78	2.63	1445	6.50	2.30	3.00	0.0494	45
3.7	112M	2C11M4A3	4.70	9.18	3.18	1440	6.00	2.10	2.80	4.10	8.07	2.76	1445	6.50	2.20	2.90	0.0494	45
5.5	132S	2C13S4K3	6.90	13.6	4.63	1450	6.00	2.20	2.80	6.00	11.5	4.03	1450	6.00	2.20	2.80	0.1026	66
7.5	132M	2C13M4T3	9.50	18.4	6.43	1440	5..5	2.50	3.10	8.20	16.4	5.51	1450	6.00	3.00	3.60	0.1254	78
9.3	132M	2C13M4H3	11.9	22.2	8.05	1440	6.00	2.50	3.00	10.30	18.7	6.94	1445	6.50	2.80	3.50	0.1570	92
9.3	160M	2C16M4C3	13.2	25.1	8.90	1445	5.00	1.80	2.20	11.0	21.2	7.36	1455	6.00	2.10	2.40	0.187	99
11.0	160M	2C16M4K3	14.6	27.0	9.77	1455	6.00	1.80	2.30	12.5	23.5	8.31	1465	6.50	2.10	2.60	0.224	109
15.0	160L	2C16L4T3	20.0	37.1	13.4	1455	6.00	1.90	2.40	17.5	33.1	11.7	1460	7.00	2.10	2.60	0.293	132
18.5	180M	2C18M473	23.0	42.8	15.3	1460	6.00	2.20	2.30	20.0	37.2	13.3	1465	6.00	2.20	2.30	0.467	168
22.0	180L	2C18L483	28.0	51.3	18.7	1460	6.00	2.20	2.30	24.0	44.3	16.0	1465	6.00	2.20	2.30	0.532	187
28.0	200L	2C20L453	37.0	64.2	24.5	1470	6.50	2.20	2.70	32.0	55.5	21.2	1470	6.50	2.20	2.70	1.26	248

Note: 1) All performance values are subject to IS/IEC 60034-1 tolerances, unless otherwise specified.
2) Motors in frame size 71 are in Aluminum construction. Frame size 80 & above are in Cast Iron construction.

IE2 CRANE AND HOIST DUTY MOTORS WITH DOL STARTING

a. Performance table for 4-Pole motors TEFC 3 Phase Squirrel Cage Induction Motors Crane & Hoist duty with DOL Starting Fr. 71 to 355L

Efficiency class: IE2
Voltage: 415V±10%
Frequency: 50Hz±5%
Combined Variation: ±10%
Duty: S3 / S4

1500 rpm (4-Pole) IE2 DOL

Altitude: ≤ 1000 m
Ambient: 50 °C
Insulation Class: F
Temperature Rise: B
Protection: IP55

Equivalent S1 kW	Frame Size	Type Reference	300 Starts / Hour															Rotor GD² kgm²	Net Wt. B3 Const. Kg
			40 % CDF							60 % CDF									
			kW	Rated Current Amps.	Rated Torque Kg.m	Speed in RPM	Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio	kW	Rated Current Amps.	Rated Torque Kg.m	Speed in RPM	Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio		
0.37	71	2C071433	0.45	1.40	0.32	1390	4.00	2.40	2.90	0.45	1.4	0.32	1390	4.00	2.40	2.90	0.0031	8
0.55	80	2C080433	0.63	1.57	0.43	1420	5.00	3.10	3.30	0.56	1.37	0.38	1420	5.00	2.80	3.00	0.0066	15
0.75	80	2C080453	0.93	2.15	0.65	1400	5.00	2.70	2.80	0.81	2.0	0.56	1415	5.50	3.20	3.30	0.0073	16
1.1	90S	2C09S423	1.20	2.62	0.83	1410	5.00	2.20	2.60	1.10	2.41	0.75	1425	5.50	2.30	2.70	0.0097	20
1.5	90L	2C09L4E3	1.70	3.61	1.17	1410	5.50	2.50	3.00	1.60	3.45	1.11	1410	5..5	2.50	2.80	0.0149	24
2.2	100L	2C10L473	2.60	5.45	1.77	1428	5.50	2.40	2.80	2.30	4.7	1.57	1428	5.50	2.40	2.80	0.0211	34
2.2	100L	2C10L4B3	3.60	7.46	2.50	1400	5.00	2.20	2.60	3.20	6.5	2.21	1410	5.00	2.20	2.60	0.0245	35
3.7	112M	2C11M473	3.70	7.36	2.49	1445	6.00	2.60	3.00	3.40	6.8	2.28	1450	6.50	2.50	3.00	0.0494	45
3.7	112M	2C11M4A3	3.90	7.78	2.63	1445	6.50	2.30	3.00	3.60	7.1	2.42	1450	6.50	2.30	2.80	0.0494	45
5.5	132S	2C13S4K3	5.90	11.5	3.95	1455	6.00	2.20	2.80	5.30	10.1	3.55	1455	6.00	2.20	2.80	0.1026	66
7.5	132M	2C13M4T3	9.60	18.6	6.49	1440	5.50	2.50	3.10	8.20	16.4	5.51	1450	6.00	3.00	3.60	0.1254	78
9.3	132M	2C13M4H3	10.30	18.7	6.94	1445	6.50	2.80	3.50	9.20	16.9	6.18	1450	7.00	3.00	3.60	0.1570	92
9.3	160M	2C16M4C3	11.0	21.2	7.36	1455	6.00	2.10	2.40	10.3	20.3	6.87	1460	6.50	2.20	2.60	0.187	99
11.0	160M	2C16M4K3	12.8	24.1	8.54	1460	6.50	2.00	2.50	11.4	21.4	7.58	1465	6.50	2.10	2.60	0.224	109
15.0	160L	2C16L4T3	18.3	34.2	12.2	1460	6.50	2.00	2.50	16.1	30.9	10.7	1465	7.00	2.30	2.80	0.293	132
18.5	180M	2C18M473	20.0	37.2	13.3	1465	6.00	2.20	2.30	18.0	32.9	12.0	1465	6.00	2.60	2.90	0.467	168
22.0	180L	2C18L483	24.0	44.3	16.0	1465	6.00	2.20	2.30	21.0	38.2	14.0	1465	6.50	2.60	2.90	0.532	187
28.0	200L	2C20L453	32.0	55.5	21.2	1470	6.50	2.20	2.70	29.0	50.3	19.2	1470	6.50	2.30	2.80	1.26	248

Note: 1) All performance values are subject to IS/IEC 60034-1 tolerances, unless otherwise specified.
2) Motors in frame size 71 are in Aluminum construction. Frame size 80 & above are in Cast Iron construction.

Bharat Bijlee

IE2 CRANE AND HOIST DUTY MOTORS WITH DOL STARTING

a. Performance table for 6-Pole motors TEFC 3 Phase Squirrel Cage Induction Motors Crane & Hoist duty with DOL Starting Fr. 71 to 355L

Efficiency class: IE2
Voltage: 415V±10%
Frequency: 50Hz±5%
Combined Variation: ±10%
Duty: S3 / S4

1000 rpm (6-Pole) IE2 DOL

Altitude: ≤ 1000 m
Ambient: 50 °C
Insulation Class: F
Temperature Rise: B
Protection: IP55

Equivalent S1 kW	Frame Size	Type Reference	150 Starts / Hour															Rotor GD² kgm²	Net Wt. B3 Const. Kg
			40 % CDF							60 % CDF									
			kW	Rated Current Amps.	Rated Torque Kg.m	Speed in RPM	Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio	kW	Rated Current Amps.	Rated Torque Kg.m	Speed in RPM	Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio		
0.25	71	2C071633	0.37	1.20	0.43	830	2.50	1.70	1.80	0.25	0.78	0.28	860	2.60	1.80	1.90	0.0033	7.2
0.37	80.0	2C080613	0.50	1.55	0.55	880	3.00	1.70	1.70	0.45	1.42	0.49	890	3.00	1.80	1.80	0.0054	13
0.55	80.0	2C080633	0.75	2.10	0.82	890	3.00	2.00	2.10	0.60	1.81	0.64	920	4.00	2.70	2.80	0.0078	15
0.75	090L	2C09L6A3	1.00	2.65	1.05	925	4.00	2.10	2.60	0.93	2.47	0.98	920	4.00	2.20	2.70	0.0155	24
1.10	090L	2C09L653	1.50	3.86	1.63	895	3.50	1.80	2.10	1.30	3.47	1.39	910	3.50	2.00	2.30	0.0155	24
1.50	100L	2C10L6B3	2.20	6.33	2.34	915	3.50	2.00	2.50	1.80	5.61	1.86	945	4.00	2.50	2.90	0.0275	35
2.20	112M	2C11M653	2.90	7.44	2.99	945	5.50	2.00	2.40	2.50	5.91	2.56	950	6.00	2.00	2.40	0.0609	45
2.20	112M	2C11M6B3	3.90	9.25	4.04	940	5.00	1.80	2.00	3.40	7.88	3.50	945	5.00	1.80	2.00	0.0691	49
3.70	132S	2C13S6G3	5.50	12.2	5.64	950	5.00	1.70	2.20	4.2	9.27	4.26	960	5.50	2.00	2.50	0.1093	67
5.50	132M	2C13M6T3	7.40	16.6	7.55	955	5.00	2.00	2.50	6.4	14.7	6.49	960	5.50	2.20	2.70	0.1518	80
7.50	160M	2C16M633	9.80	21.8	9.94	960	5.00	2.00	2.10	8.5	18.7	8.62	960	5.00	2.00	2.10	0.217	97
9.30	160L	2C16L663	12.2	25.8	12.5	950	5.50	2.10	2.20	10.5	21.8	10.60	965	6.00	2.20	2.30	0.289	115
11.0	160L	2C16L673	14.5	30.3	14.9	950	5.50	2.10	2.20	12.5	26.0	12.68	960	6.00	2.10	2.20	0.319	120
15.0	180L	2C18L633	20.0	39.1	20.0	975	5.50	2.20	2.40	17.3	32.5	17.37	970	5.00	2.00	2.20	0.740	183
18.5	200L	2C20L633	23.0	42.6	23.0	975	6.00	2.10	2.30	20.0	36.3	19.9	980	6.50	2.20	2.40	1.21	219
22.0	200L	2C20L653	28.0	50.4	28.0	975	6.00	2.00	2.20	24.0	44.1	23.9	980	6.50	2.30	2.50	1.49	243
30.0	225M	2C22M643	30	52.9	29.8	980	6.00	2.50	2.70	28.0	50.7	27.7	985	6.50	2.60	2.80	2.59	315

Note: 1) All performance values are subject to IS/IEC 60034-1 tolerances, unless otherwise specified.
2) Motors in frame size 71 are in Aluminum construction. Frame size 80 & above are in Cast Iron construction.

IE2 CRANE AND HOIST DUTY MOTORS WITH DOL STARTING

a. Performance table for 6-Pole motors TEFC 3 Phase Squirrel Cage Induction Motors Crane & Hoist duty with DOL Starting Fr. 71 to 355L

Efficiency class: IE2
Voltage: 415V±10%
Frequency: 50Hz±5%
Combined Variation: ±10%
Duty: S3 / S4

1000 rpm (6-Pole) IE2 DOL

Altitude: ≤ 1000 m
Ambient: 50 °C
Insulation Class: F
Temperature Rise: B
Protection: IP55

Equivalent S1 kW	Frame Size	Type Reference	300 Starts / Hour														Rotor GD² kgm²	Net Wt. B3 Const. Kg
			40 % CDF							60 % CDF								
			kW	Rated Current Amps.	Rated Torque Kg.m	Speed in RPM	Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio	kW	Rated Current Amps.	Rated Torque Kg.m	Speed in RPM	Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio		
0.25	71	2C071633	0.25	0.78	0.28	860	2.60	1.80	1.90	0.25	0.78	0.28	860	2.60	1.80	1.90	0.0033	7.2
0.37	80.0	2C080613	0.45	1.42	0.49	890	3.00	1.80	1.80	0.37	1.06	0.40	910	3.00	2.00	2.20	0.0054	13
0.55	80.0	2C080633	0.60	1.81	0.64	920	4.00	2.70	2.80	0.55	1.45	0.59	910	3.50	2.10	2.30	0.0078	15
0.75	090L	2C09L6A3	0.93	2.47	0.98	920	4.00	2.20	2.70	0.85	2.31	0.89	930	4.50	2.40	2.90	0.0155	24
1.10	090L	2C09L653	1.4	3.65	1.52	900	3.50	1.90	2.20	1.2	3.27	1.27	920	3.50	2.20	2.50	0.0155	24
1.50	100L	2C10L6B3	2.0	5.65	2.09	930	3.50	2.20	2.60	1.7	5.31	1.75	945	4.00	2.60	3.00	0.0275	35
2.20	112M	2C11M653	2.5	5.91	2.56	950	6.00	2.00	2.40	2.2	4.99	2.24	955	5.50	2.10	2.50	0.0609	45
2.20	112M	2C11M6B3	3.4	7.88	3.50	945	5.00	1.80	2.00	3.0	7.34	3.06	955	6.00	2.10	2.30	0.0691	49
3.70	132S	2C13S6G3	4.7	10.0	4.79	955	5.00	1.80	2.30	3.8	8.04	3.86	960	5.50	2.00	2.50	0.1093	67
5.50	132M	2C13M6T3	6.7	15.6	6.80	960	5.50	2.20	2.70	5.9	13.9	5.99	960	6.00	2.40	2.80	0.1518	80
7.50	160M	2C16M633	8.5	18.7	8.62	960	5.00	2.00	2.10	7.6	17.1	7.63	970	5.50	2.20	2.30	0.217	97
9.30	160L	2C16L663	10.7	22.3	10.86	960	6.00	2.20	2.30	9.5	19.9	9.54	970	6.50	2.40	2.50	0.289	115
11.0	160L	2C16L673	12.6	26.2	12.78	960	6.00	2.10	2.20	11.2	22.9	11.36	960	6.00	2.10	2.20	0.319	120
15.0	180L	2C18L633	17.8	33.9	17.87	970	5.50	2.10	2.30	15.7	29.4	15.68	975	5.50	2.10	2.30	0.740	183
18.5	200L	2C20L633	19.7	35.4	19.6	978	6.00	2.10	2.30	17.8	32.3	17.7	980	6.50	2.30	2.60	1.21	219
22.0	200L	2C20L653	24.0	44.1	23.9	980	6.50	2.30	2.50	22.0	40.1	21.9	980	6.00	2.50	2.90	1.49	243
30.0	225M	2C22M643	28.0	50.7	27.7	985	6.50	2.60	2.80	26.0	47.9	25.7	985	6.50	2.60	2.80	2.59	315

Note: 1) All performance values are subject to IS/IEC 60034-1 tolerances, unless otherwise specified.
2) Motors in frame size 71 are in Aluminum construction. Frame size 80 & above are in Cast Iron construction.

TECHNICAL INFORMATION: IE2 CRANE DUTY WITH VFD SUPPLY

VFD Crane Duty Motors

The growing need for energy saving and accurate control has resulted in increased demand for VFD operated Crane Duty Motors. It has advantage over traditional Slipring Motor on speed range with low maintenance leading to reduced life cycle cost. Current control of VFD driven motors are better than Standard TEFC SCR Motors. Crane / Hoist Duty Motors call for constant torque application and the speed range varies from 10% to 100% of the synchronous speed.

Bharat Bijlee Inverter Duty Crane and Hoist Motors are provided with special insulation system suitable to withstand voltage spikes when run on VFD. The selection of frame size for various duty type and starts shall be as per the selection table enclosed.

These motors have following special features:

- Dual Coated Winding Wire
- Vacuum Pressure Impregnation

For selection of motors suitable to work with VFD supply, please contact Airoli Works.

Note: For more details, refer to page 6, 7, 8, 9, 10 and 11 of Industrial Motors Technical Information section.

Standard Features:

Voltage: 220 to 690 Volts

Frequency: 50 / 60 Hz

Ambient: 45^{0}C

Altitude: 1000 meters above mean sea level.

Insulation: Class F with temperature rise limited to B

Our motors are suitable for the following IGBT Drive output -

- High Frequency in the range of 3kHz – 6kHz
- Voltage rise time > 0.1 sec
- Voltage spikes up to 1600V and rise time of 0.1 sec
- THD < 3%

Our motors from 315 frame and above are inherently suitable for VFD operation.

Optional: Insulated bearing (recommended for 250 frame onwards) Thermister /RTD / BTD.

Motors with Integral & External Brakes

(i) Integral Brake Motors: Frames 71 to 132

(ii) External Brake Motors : Frames 71 to 200L

Brake Type : 190V DC, Failsafe Type, Normally ON with in built rectifier.

Flame-proof Crane Duty Motors

Motors suitable for intermittent duty operation can be offered in frame sizes MJ80, MJ 90, MJ 100, MJ 112 and MJ 132 for enquiry please refer to our sales office.

Enquiries

When making an enquiry or placing an order for crane duty motor, please furnish the following information. This will enable us to supply most suitable motor for your cranes and hoists.

1. Details of Crane:

a. Class of crane

b. Type of crane

c. Tonnage of crane

d. Operating speed

e. Type of motion: hoisting, traveling or traversing

2. Electrical Features:

a. Motor Outpt (kW) and Polarity

b. Supply voltage and frequency with variations

c. Type of Rotor: Squirrel Cage / Slipring

d. Class of Insulation and ambient temperature

e. Method of starting

f. Requirement of starting torque, pull out torque, starting current

g. Load torque of the driven equipment

h. In case of Slipring motors rotor voltage and rotor current is to be specified

3. Operational Details:

a. Duty type: S2, S3, S4 or S5

b. Duty cycle details preferably with a sketch if different from S2, S3, S4 or S5.

c. No. of starts per hour

d. Method of braking: plugging, DC injection/mechanical brake

e. No. of reversals per hour

f. Cyclic duration factor (CDF)

g. Load inertia referred to motor speed (GD^{2})

4. Mechanical Features:

a. Enclosure

b. Degree of protection

c. Mounting

d. Fixing dimensions (If Bharat Bijlee standard motor fixing dimensions are not applicable, please let us know your specific requirements, preferably with a drawing)

e. Shaft extension: Requirement of shaft extension if any, needs to be mentioned

f. Any other relevant data

IE2 CRANE AND HOIST DUTY MOTORS WITH VFD STARTING

a. Performance table for 6-Pole motors TEFC 3 Phase Squirrel Cage Induction Motors Crane & Hoist duty with DOL Starting Fr. 71 to 355L

Efficiency class: IE2
Voltage: 415V±10%
Frequency: 50Hz±5%
Combined Variation: ±10%
Duty: S3 / S4

1500 rpm (4-Pole) IE2 VFD

Altitude: ≤ 1000 m
Ambient: 50 °C
Insulation Class: F
Temperature Rise: B
Protection: IP55

Equivalent S1 kW	Frame Size	Type Reference	150 Starts / Hour														Rotor GD² kgm²	Net Wt. B3 Const. Kg
			40 % CDF							60 % CDF								
			kW	Rated Current Amps.	Rated Torque Kg.m	Speed in RPM	Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio	kW	Rated Current Amps.	Rated Torque Kg.m	Speed in RPM	Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio		
0.37	71	2C071433	0.55	1.52	0.39	1365	3.50	2.00	2.40	0.45	1.4	0.32	1390	4.00	2.40	2.90	0.0031	8
0.55	80	2C080433	0.85	1.89	0.60	1380	4.50	2.20	2.40	0.70	1.63	0.48	1410	5.00	2.80	3.00	0.0066	15
0.75	80	2C080453	1.20	2.67	0.86	1360	4.00	2.00	2.20	1.00	2.28	0.70	1390	5.00	2.20	2.40	0.0073	16
1.1	90S	2C09S423	1.70	3.68	1.20	1380	4.50	1.70	2.10	1.40	3.12	0.97	1400	5.00	2.00	2.40	0.0097	20
1.5	90L	2C09L4E3	2.30	4.79	1.61	1390	5.00	2.10	2.50	1.90	3.88	1.32	1400	5.00	2.20	2.60	0.0149	26
2.2	100L	2C10L473	3.40	7.15	2.35	1410	5.00	2.10	2.60	2.80	6.21	1.91	1428	5.50	2.50	3.00	0.0211	34
2.2	100L	2C10L4B3	4.60	9.38	3.29	1360	4.50	1.70	2.00	3.80	7.84	2.66	1390	4.50	2.00	2.50	0.0245	34
3.7	112M	2C11M473	5.60	10.60	3.84	1420	5.00	1.70	2.30	4.60	8.88	3.12	1435	5.50	2.00	2.80	0.0494	45
3.7	112M	2C11M4A3	6.00	11.69	4.12	1420	5.00	1.60	2.30	5.00	9.50	3.41	1430	5.50	1.90	2.60	0.0494	45
5.5	132S	2C13S4K3	8.40	16.2	5.69	1438	5.50	1.80	2.50	7.00	14.0	4.70	1450	6.00	2.20	2.80	0.1026	66
7.5	132M	2C13M4T3	11.5	21.7	7.84	1428	5.00	2.10	2.80	9.50	18.4	6.43	1440	5.50	2.60	3.20	0.1254	78
9.3	132M	2C13M4H3	14.3	26.5	9.77	1425	5.50	2.20	2.80	11.8	21.7	8.01	1435	5.50	2.40	3.00	0.1570	92
9.3	160M	2C16M4C3	14.8	28.1	9.98	1445	5.00	1.70	2.10	12.2	23.1	8.20	1450	5.50	1.90	2.30	0.187	99
11.0	160M	2C16M4K3	16.0	29.3	10.75	1450	5.50	1.70	2.20	13.4	24.9	8.94	1460	6.00	2.00	2.50	0.224	109
15.0	160L	2C16L4T3	22.0	40.9	14.7	1455	6.00	1.90	2.30	18.6	34.8	12.4	1460	6.50	2.00	2.50	0.293	132
18.5	180M	2C18M473	26.0	47.4	17.4	1455	5.50	2.00	2.10	22.0	41.0	14.7	1460	6.00	2.30	2.40	0.467	168
22.0	180L	2C18L483	32.0	58.2	21.4	1455	5.00	2.00	2.10	27.0	50.0	18.0	1460	6.00	2.30	2.40	0.532	187
30.0	200L	2C20L453	43.0	74.4	28.7	1460	6.00	2.00	2.50	36.0	62.4	23.9	1470	7.00	2.30	2.80	1.26	248
37.0	225S	2C22S433	50.0	87.7	33.1	1472	5.50	2.00	2.20	43.0	77.8	28.4	1475	6.00	2.20	2.40	1.76	286
45.0	225M	2C22M453	62.0	109	41.1	1470	5.50	2.20	2.40	53.0	92.3	35.1	1470	6.00	2.30	2.50	2.08	317

Notes: 1) All performance values are subject to IS/IEC 60034-1 tolerances, unless otherwise specified.
2) Motors in frame size 71 are in Aluminum construction. Frame size 80 and above are in Cast Iron construction.
3) Motors are designed with an insulation system suitable for withstanding voltage of 1.56 kV (peak phase to phase) and rise time > = 0.5 micro sec.
4) The customer / his system integrator have to ensure that the voltage at motor terminals shall not exceed above limit by properly selecting cable length and using suitable filters / choke.
5) Switching frequency should not exceed 3-4 kHz

Bharat Bijlee

IE2 CRANE AND HOIST DUTY MOTORS WITH VFD STARTING

a. Performance table for 4-Pole motors TEFC 3 Phase Squirrel Cage Induction Motors Crane & Hoist duty with DOL Starting Fr. 71 to 355L

Efficiency class: IE2
Voltage: 415V±10%
Frequency: 50Hz±5%
Combined Variation: ±10%
Duty: S3 / S4

1500 rpm (4-Pole) IE2 VFD

Altitude: ≤ 1000 m
Ambient: 50 °C
Insulation Class: F
Temperature Rise: B
Protection: IP55

Equivalent S1 kW	Frame Size	Type Reference	300 Starts / Hour														Rotor GD²	Net Wt. B3 Const. Kg
			40 % CDF							60 % CDF								
			kW	Rated Current Amps.	Rated Torque Kg.m	Speed in RPM	Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio	kW	Rated Current Amps.	Rated Torque Kg.m	Speed in RPM	Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio	kgm²	
0.37	71	2C071433	0.45	1.40	0.32	1390	4.00	2.40	2.90	0.45	1.40	0.32	1390	4.00	2.40	2.90	0.0031	8
0.55	80	2C080433	0.85	1.91	0.60	1380	4.50	2.20	2.40	0.70	1.63	0.48	1410	5.00	2.80	3.00	0.0066	15
0.75	80	2C080453	1.10	2.51	0.79	1360	4.00	2.00	2.20	1.00	2.28	0.70	1390	5.00	2.20	2.40	0.0073	16
1.1	90S	2C09S423	1.60	3.45	1.13	1380	4.50	1.70	2.10	1.40	3.12	0.97	1400	5.00	2.00	2.40	0.0097	20
1.5	90L	2C09L4E3	2.30	4.79	1.61	1390	5.00	2.10	2.50	1.90	3.88	1.32	1400	5.00	2.20	2.60	0.0149	26
2.2	100L	2C10L473	3.30	6.94	2.28	1410	5.00	2.10	2.60	2.80	6.13	1.91	1428	5.50	2.50	3.00	0.0211	34
2.2	100L	2C10L4B3	4.60	9.38	3.29	1360	4.50	1.70	2.00	3.80	7.84	2.66	1390	4.50	2.00	2.50	0.0245	34
3.7	112M	2C11M473	5.40	10.46	3.72	1415	5.00	1.80	2.40	4.50	8.71	3.05	1435	5.50	2.00	2.80	0.0494	45
3.7	112M	2C11M4A3	5.80	11.24	3.95	1430	5.50	1.70	2.50	4.90	9.41	3.34	1430	5.00	2.00	2.80	0.0494	45
5.5	132S	2C13S4K3	8.20	15.9	5.55	1440	5.50	1.90	2.50	7.00	14.0	4.70	1450	6.00	2.20	2.80	0.1026	66
7.5	132M	2C13M4T3	11.2	20.5	7.63	1430	5.50	2.00	2.70	9.30	18.0	6.29	1440	5.50	2.60	3.20	0.1254	78
9.3	132M	2C13M4H3	13.9	26.2	9.43	1435	5.50	2.20	2.80	11.6	21.3	7.87	1435	6.00	2.40	3.00	0.1570	92
9.3	160M	2C16M4C3	14.0	26.5	9.44	1445	5.50	1.80	2.20	11.9	22.2	7.99	1450	5.50	2.00	2.40	0.187	99
11.0	160M	2C16M4K3	14.9	27.6	10.01	1450	5.50	1.80	2.30	12.7	23.9	8.47	1460	6.50	2.10	2.60	0.224	109
15.0	160L	2C16L4T3	21.0	39.3	14.0	1460	7.00	2.10	2.60	17.9	33.5	11.9	1460	6.50	2.00	2.50	0.293	132
18.5	180M	2C18M473	24.0	43.6	16.1	1455	5.50	2.00	2.10	21.0	39.1	14.0	1460	6.00	2.30	2.40	0.467	168
22.0	180L	2C18L483	30.0	54.4	20.0	1460	5.50	2.10	2.20	26.0	48.7	17.3	1460	6.00	2.40	2.50	0.532	187
30.0	200L	2C20L453	40.0	69.0	26.6	1465	6.50	2.10	2.60	34.0	58.9	22.5	1473	7.00	2.50	2.90	1.26	248
37.0	225S	2C22S433	45.0	80.6	29.7	1475	6.00	2.20	2.40	39.0	69.7	25.7	1478	6.50	2.20	2.40	1.76	286
45.0	225M	2C22M453	55.0	97.1	36.3	1475	6.00	2.30	2.50	48.0	83.5	31.7	1475	6.50	2.40	2.60	2.08	317

Notes: 1) All performance values are subject to IS/IEC 60034-1 tolerances, unless otherwise specified.
2) Motors in frame size 71 are in Aluminum construction. Frame size 80 and above are in Cast Iron construction.
3) Motors are designed with an insulation system suitable for withstanding voltage of 1.56 kV (peak phase to phase) and rise time > = 0.5 micro sec.
4) The customer / his system integrator have to ensure that the voltage at motor terminals shall not exceed above limit by properly selecting cable length and using suitable filters / choke.
5) Switching frequency should not exceed 3-4 kHz

IE2 CRANE AND HOIST DUTY MOTORS WITH VFD STARTING

a. Performance table for 6-Pole motors TEFC 3 Phase Squirrel Cage Induction Motors Crane & Hoist duty with DOL Starting Fr. 71 to 355L

Efficiency class: IE2
Voltage: 415V±10%
Frequency: 50Hz±5%
Combined Variation: ±10%
Duty: S3 / S4

1000 rpm (6-Pole) IE2 VFD

Altitude: ≤ 1000 m
Ambient: 50 °C
Insulation Class: F
Temperature Rise: B
Protection: IP55

Equivalent S1 kW	Frame Size	Type Reference	150 Starts / Hour														Rotor GD² kgm²	Net Wt. B3 Const. Kg
			40 % CDF							60 % CDF								
			kW	Rated Current Amps.	Rated Torque Kg.m	Speed in RPM	Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio	kW	Rated Current Amps.	Rated Torque Kg.m	Speed in RPM	Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio		
0.25	71	2C071633	0.37	1.20	0.43	830	2.50	1.70	1.80	0.25	0.78	0.28	860	2.60	1.80	1.90	0.0033	7.2
0.37	80.0	2C080613	0.50	1.55	0.55	880	3.00	1.70	1.70	0.45	1.42	0.49	890	3.00	1.80	1.80	0.0054	13
0.55	80.0	2C080633	0.80	2.08	0.88	885	3.50	2.00	2.10	0.65	1.96	0.70	910	4.00	2.50	2.60	0.0078	15
0.75	090L	2C09L6A3	1.20	2.98	1.30	900	3.50	1.80	2.30	1.10	2.86	1.18	910	3.50	2.00	2.50	0.0155	24
1.1	090L	2C09L653	1.60	4.25	1.75	890	3.00	1.80	2.10	1.40	3.65	1.52	900	3.50	1.90	2.20	0.0155	24
1.5	100L	2C10L6B3	2.30	6.55	2.46	910	3.50	2.00	2.50	1.90	5.59	1.97	938	3.50	2.30	2.70	0.0275	35
2.2	112M	2C11M653	3.40	8.30	3.54	935	5.00	1.70	2.10	2.80	7.30	2.89	945	5.50	2.00	2.40	0.0609	45
2.2	112M	2C11M6B3	4.20	9.68	4.35	940	5.00	1.60	1.90	3.70	8.86	3.81	945	5.00	1.80	2.20	0.0691	49
3.7	132S	2C13S6G3	5.70	12.6	5.87	945	4.50	1.80	2.30	4.70	10.0	4.79	955	5.00	1.80	2.30	0.1093	67
5.5	132M	2C13M6T3	8.50	18.8	8.76	945	5.00	1.70	2.20	7.00	16.2	7.14	955	5.00	2.10	2.60	0.1518	80
7.5	160M	2C16M633	10.7	23.9	10.9	955	5.00	2.00	2.10	9.00	20.5	9.13	960	5.00	2.20	2.30	0.217	97
9.3	160L	2C16L663	13.4	28.1	13.8	945	5.00	2.00	2.10	11.2	23.4	11.4	958	6.00	2.10	2.20	0.289	115
11.0	160L	2C16L673	15.8	33.0	16.1	955	5.50	2.20	2.30	13.3	27.7	13.6	955	5.50	2.00	2.10	0.319	120
15.0	180L	2C18L633	22	42.1	22.1	970	5.00	2.00	2.20	18.3	35.8	18.3	975	5.50	2.30	2.50	0.740	183
18.5	200L	2C20L633	26	46.7	26.1	972	5.50	1.90	2.20	22	40.3	22.0	975	5.50	2.00	2.30	1.21	219
22.0	200L	2C20L653	31	55.2	31.1	972	5.50	1.80	2.00	26	47.2	25.9	978	6.50	2.10	2.30	1.49	243
30.0	225M	2C22M643	41	72.2	40.8	978	6.00	2.30	2.50	35	61.5	34.8	980	6.50	2.40	2.60	2.59	315

Notes: 1) All performance values are subject to IS/IEC 60034-1 tolerances, unless otherwise specified.
2) Motors in frame size 71 are in Aluminum construction. Frame size 80 and above are in Cast Iron construction.
3) Motors are designed with an insulation system suitable for withstanding voltage of 1.56 kV (peak phase to phase) and rise time > = 0.5 micro sec.
4) The customer / his system integrator have to ensure that the voltage at motor terminals shall not exceed above limit by properly selecting cable length and using suitable filters / choke.
5) Switching frequency should not exceed 3-4 kHz

Bharat Bijlee

IE2 CRANE AND HOIST DUTY MOTORS WITH VFD STARTING

a. Performance table for 6-Pole motors TEFC 3 Phase Squirrel Cage Induction Motors Crane & Hoist duty with DOL Starting Fr. 71 to 355L

Efficiency class: IE2
Voltage: 415V±10%
Frequency: 50Hz±5%
Combined Variation: ±10%
Duty: S3 / S4

1000 rpm (6-Pole) IE2 VFD

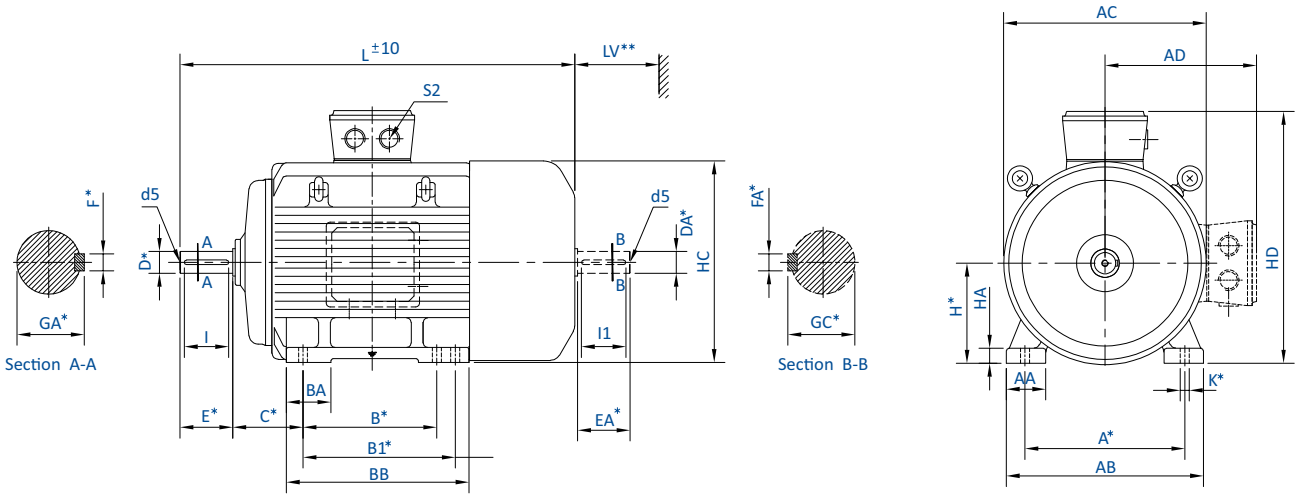
Altitude: ≤ 1000 m
Ambient: 50 °C
Insulation Class: F
Temperature Rise: B
Protection: IP55

Equivalent S1 kW	Frame Size	Type Reference	300 Starts / Hour															Rotor GD²	Net Wt. B3 Const. Kg
			40 % CDF							60 % CDF									
			kW	Rated Current Amps.	Rated Torque Kg.m	Speed in RPM	Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio	kW	Rated Current Amps.	Rated Torque Kg.m	Speed in RPM	Starting Current to Rated Current Ratio	Starting Torque to Rated Torque Ratio	Pullout Torque to Rated Torque Ratio	kgm²	
0.25	71	2C071633	0.25	0.78	0.28	860	2.60	1.80	1.90	0.25	0.78	0.28	860	2.60	1.80	1.90	0.0033	7.2
0.37	80.0	2C080613	0.45	1.42	0.49	890	3.00	1.80	1.80	0.37	1.06	0.40	910	3.00	2.00	2.20	0.0054	13
0.55	80.0	2C080633	0.80	2.08	0.88	885	3.50	2.00	2.10	0.65	1.96	0.70	910	4.00	2.50	2.60	0.0078	15
0.75	090L	2C09L6A3	1.1	2.86	1.18	910	3.50	2.00	2.50	0.93	2.47	0.98	920	4.00	2.20	2.70	0.0155	24
1.1	090L	2C09L653	1.6	4.25	1.75	890	3.00	1.80	2.10	1.40	3.65	1.52	900	3.50	1.90	2.20	0.0155	24
1.5	100L	2C10L6B3	2.3	6.55	2.46	910	3.50	2.00	2.50	1.90	5.59	1.97	938	3.50	2.30	2.70	0.0275	35
2.2	112M	2C11M653	3.3	8.17	3.42	940	5.00	1.70	2.10	2.70	7.15	2.78	945	5.50	2.00	2.40	0.0609	45
2.2	112M	2C11M6B3	3.9	9.25	4.04	940	5.00	1.80	2.00	3.40	7.88	3.50	945	5.00	1.80	2.00	0.0691	49
3.7	132S	2C13S6G3	5.5	12.3	5.64	950	5.00	1.70	2.20	4.60	9.81	4.69	955	5.00	1.80	2.30	0.1093	67
5.5	132M	2C13M6T3	8.3	18.6	8.55	945	5.00	1.80	2.30	6.90	16.2	7.04	955	5.00	2.10	2.60	0.1518	80
7.5	160M	2C16M633	9.9	22.3	10.0	960	5.00	2.00	2.10	8.50	18.7	8.62	960	5.00	2.00	2.10	0.217	97
9.3	160L	2C16L663	12.3	26.0	12.6	950	5.50	1.90	2.00	10.6	22.1	10.8	960	6.00	2.20	2.30	0.289	115
11.0	160L	2C16L673	14.6	30.5	14.9	955	5.50	2.10	2.20	12.6	26.2	12.8	960	6.00	2.10	2.20	0.319	120
15.0	180L	2C18L633	20.0	39.1	20.0	975	5.50	2.20	2.40	17.4	32.8	17.4	975	5.50	2.10	2.30	0.740	183
18.5	200L	2C20L633	24.0	44.1	24.0	975	5.50	2.00	2.30	20.0	36.3	19.9	980	6.50	2.20	2.40	1.21	219
22.0	200L	2C20L653	28.0	50.4	28.0	975	6.00	2.00	2.20	25.0	45.4	24.9	978	6.50	2.20	2.40	1.49	243
30.0	225M	2C22M643	36.0	63.4	35.8	980	6.50	2.30	2.50	32.0	56.4	31.8	980	6.50	2.30	2.50	2.59	315

Notes: 1) All performance values are subject to IS/IEC 60034-1 tolerances, unless otherwise specified.
2) Motors in frame size 71 are in Aluminum construction. Frame size 80 and above are in Cast Iron construction.
3) Motors are designed with an insulation system suitable for withstanding voltage of 1.56 kV (peak phase to phase) and rise time > = 0.5 micro sec.
4) The customer / his system integrator have to ensure that the voltage at motor terminals shall not exceed above limit by properly selecting cable length and using suitable filters / choke.
5) Switching frequency should not exceed 3-4 kHz

IE2 CRANE AND HOIST DUTY MOTORS WITH VFD STARTING

b. Dimensional Drawing: Efficiency values complying to IE2 efficiency class of is 12615 for crane duty application foot mounted (IM B3/IM1001) Motors



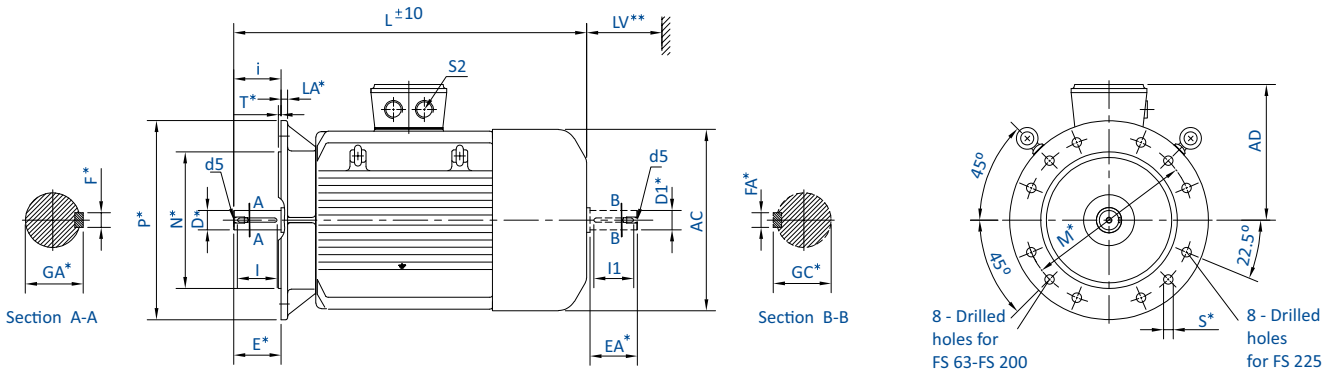
		FIXING					GENERAL											TERMINAL BOX	SHAFT					
IEC Fr. Size	Pole	A*	B*	B1*	C*	H*	K*	AB	BB	AA	BA	HA	AD	HD	L	LV**	AC	S2 BSC	D* DA*	E* EA*	F* FA*	GA* GC*	I I1	d5
71	4,6	112	90	—	45	71	7	135	110	31	30	7	121	206	235	30	140	1x 3/4"	14	30	5	16	25	M5
80	4,6	125	100	—	50	80	10	150	124	32	35	9	135	215	267	30	157	1x 3/4"	19	40	6	21.5	35	M6
90S	4	140	100	—	56	90	10	180	125	50	43	13	150	240	302	35	174	2x 3/4"	24	50	8	27	45	M8
90L	4		125						150						361									
	6														327									
100L	4(4.0kW),6	160	140	—	63	100	12	200	176	54	50	14	163	263	387	40	195	2x 1"	28	60	8	31	55	M10
	4(2.9kW)														366									
112M	4	190	140	—	70	112	12	230	176	62	51	15	175	287	388	45	220	2x 1"	28	60	8	31	55	M10
	6(2.9kW)																							
	6(3.9kW)														419									
132S	4	216	140	—	89	132	12	256	180	64	50	17	206	338	475	50	260	2x 1"	38	80	10	41	70	M12
	6														459									
132M	4		178						218		54				513									
	4(11.9kW)														556									
	4														497									
160M	4,6	254	210	—	108	160	15	310	250	58	70	20	225	385	585	60	316	2x 1"	42	110	12	45	105	M16
160L	4		254						294						679									
	6														629									
180M	4	279	241	—	121	180	15	344	281	65	70	26	271	451	698	70	354	2x 1.1/2"	48	110	14	51.5	100	M16
180L	4,6		279						319						717									
200M/L	4,6	318	267	305	133	200	18.5	385	345	75	80	25	325	525	825	80	407	2XØ52	55	110	16	59	97	M20
225S	4	356	286	—	149	225	18.5	436	351	85	65	25	545	570	825	90	461	2XØ52	60	140	18	64	126	M20
225M	4,6			311											865									

Notes: * This is a mandatory dimension for all standard motors
**Minimum distance for efficient cooling of motor to be maintained by user
1. All dimensions are in mm unless otherwise specified
2. Tolerances on mandatory dimensions are as per IS: 1231
3. Motors in frame size 71 are in Aluminum construction. Frame size 80 and above are in Cast Iron construction.
4. Motor in frame size 200M/L and 225 S/M are in with openkey way shaft.

Notes: 1. Eyebolt is not provided in motors of 71 frame
3. TB Position: To be read as: when viewed from DE side / when viewed parallel to the shaft / cable entry
(a) 71, 200 and 225 frame: Top/Towards Drive End/RHS when viewed from DE side
(b) 80 to 180 frame: Top/Center of body/RHS when viewed from DE side

IE2 CRANE AND HOIST DUTY MOTORS WITH VFD STARTING

b. Dimensional Drawing: Efficiency values complying to IE2 efficiency class of is 12615 for crane duty application flange mounted (IM B5/IM3001) Motors



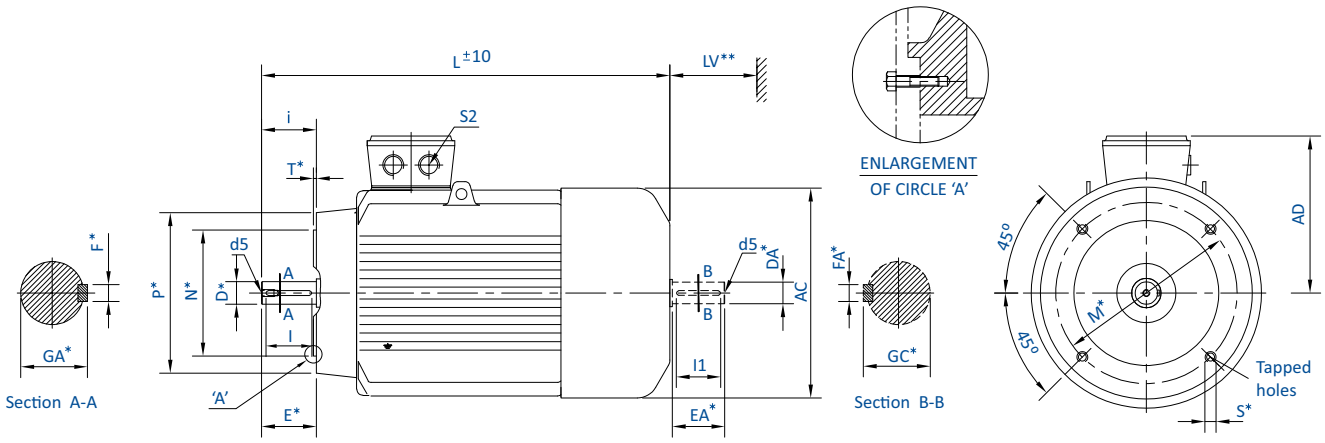
		FIXING					GENERAL						TERMINAL BOX	SHAFT					
IEC Fr. Size	Pole	P*	N*	M*	i	S*	T*	LA*	AD	L	LV**	AC	S2 BSC	D* DA*	E* EA*	F* FA*	GA* GC*	I I1	d5
71	4,6	160	110	130	30	10	3.5	9	121	262	30	140	1X3/4"	14	30	5	16	25	M5
80	4,6	200	130	165	40	12	3.5	10	135	267	30	157	1X3/4"	19	40	6	21.5	35	M6
90S	4	200	130	165	50	12	3.5	10	140	302	35	174	2X3/4"	24	50	8	27	45	M8
90L	4									361									
	6									327									
100L	4(4.0kW),6	250	180	215	60	15	4	11	163	387	40	195	2X1"	28	60	8	31	55	M10
	4(2.9kW)									366									
112M	4	250	180	215	60	15	4	11	175	388	45	220	2X1"	28	60	8	31	55	M10
	6(2.9kW)																		
	6(3.9kW)									419									
132S	4	300	230	265	80	15	4	12	206	475	50	260	2X1"	38	80	10	41	70	M12
	6									459									
132M	4									513									
	4(11.9kW)									556									
	6									497									
160M	4,6	350	250	300	110	19	5	13	225	585	60	316	2X1"	42	110	12	45	105	M16
160L	4									679									
	6									629									
180M	4	350	250	300	110	19	5	15	271	679	70	354	2X1"	48	110	14	51.5	100	M16
180L	4,6									717									
200M/L	4,6	400	300	350	110	19	5	15	325	825	80	407	2XØ52	55	110	16	59	97	M20
225S	4	450	350	400	140	19	5	17.5	345	825	90	461	2XØ52	60	140	18	64	126	M20
225M	4,6									865									

Notes: * This is a mandatory dimension for all standard motors
**Minimum distance for efficient cooling of motor to be maintained by user
1. All dimensions are in mm unless otherwise specified
2. Tolerances on mandatory dimensions are as per IS: 1231
3. Motors in frame size 71 are in Aluminum construction. Frame size 80 and above are in Cast Iron construction.
4. Motor in frame size 200M/L and 225 S/M are in with open key way shaft.

Notes: 1. Eyebolt is not provided in motors of 71 frame
3. TB Position: To be read as: when viewed from DE side / when viewed parallel to the shaft / cable entry
(a) 71, 200 and 225 frame: Top/Towards Drive End/RHS when viewed from DE side
b) 80 to 180 frame: Top/Center of body/RHS when viewed from DE side

IE2 CRANE AND HOIST DUTY MOTORS WITH VFD STARTING

b. Dimensional Drawing: Efficiency values complying to IE2 efficiency class of is 12615 for crane duty application face mounted (B14) Motors



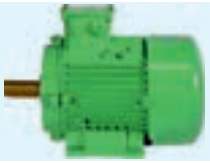
		FIXING					GENERAL					TERMINAL BOX	SHAFT					
IEC Fr. Size	Pole	P*	N*	M*	i	S*	T*	AD	L	LV**	AC	S2	D* DA*	E* EA*	F* FA*	GA* GC*	I I1	d5
71	4,6	105	70	85	30	M6X10	2.5	121	235	30	140	1X3/4"	14	30	5	16	25	M5
80	4,6	120	80	100	40	M6X13	3	135	267	30	157	1X3/4"	19	40	6	21.5	35	M6
90S	4	140	95	115	50	M8X12	3	140	302	35	174	2X3/4"	24	50	8	27	45	M8
90L	4								361									
	6								327									
100L	4(4.0kW),6	160	110	130	60	M8X12	3.5	163	387	40	195	2X1"	28	60	8	31	55	M10
	4(2.9kW)								366									
112M	4	160	110	130	60	M8X12	3.5	175	388	45	220	2X1"	28	60	8	31	55	M10
	6(2.9kW)								419									
	6(3.9kW)																	

Notes: * This is a mandatory dimension for all standard motors
**Minimum distance for efficient cooling of motor to be maintained by user
1. All dimensions are in mm unless otherwise specified
2. Tolerances on mandatory dimensions are as per IS: 1231
3. Motors in frame size 71 are in Aluminum construction. Frame size 80 and above are in Cast Iron construction.

Notes: 1. Eyebolt is not provided in motors of 71 frame
2. TB Position: To be read as: when viewed from DE side / when viewed parallel to the shaft / cable entry
(a) 71 frame: Top/Towards Drive End/RHS when viewed from DE side
(b) 80 to 180 frame: Top/Center of body/RHS when viewed from DE side
3. For the dimensional drawing of 132 frame, B14 mounting kindly contact our nearest sales office

LV MOTORS PRODUCT RANGE

Motors conform to relevant Indian Standards IS/IEC 60034 series
Voltage: 415V +/- 10%, Frequency: 50 Hz +/- 5%, Combined Variation: +/- 10%

Motor Type	Frame	Power (kW)	Polarity		Standard Technical Specifications
IE2 Motors IE3 Motors Large LT Motors (DCCA)	56 to 355 56 to 355 355 to 450	0.12 to 355 0.12 to 355 250 to 1250	2, 4, 6, 8 2, 4, 6, 8 2, 4, 6, 8		• Ambient: 50° C • Ambient for DCCA: 40° C • Inverter Grade Winding: For IE3 and DCCA • Duty: S1 • RTD & BTD: For DCCA motors • Mounting: B3, B5, B35, V1, B14 upto 132 Frame
IE4 Motors	112 to 225	1.5 to 45	4		• Ambient: 50° C • Inverter Duty Winding • Duty: S1 • VPI: With Class H solvent less Resin • Mounting: B3, B5, B35, V1
Standard Flame Proof Ex'd' Motors IE2 Flame Proof Ex'd' Motors IE3 Flame Proof Ex'd' Motors	80 to 315 80 to 355 80 to 355	0.37 to 200 0.37 to 315 0.37 to 315	2, 4, 6, 8 2, 4, 6, 8 2, 4, 6, 8		• Ambient: 45° C • Inverter Grade Winding: For IE3 Motors • Duty: S1 • Mounting: B3, B5, B35, V1
IE2 Increased Safety Ex ec Motors IE3 Increased Safety Ex ec Motors	63 to 355 63 to 355	0.12 to 355 0.12 to 355	2, 4, 6, 8 2, 4, 6, 8		• Ambient: 50° C • Duty: S1 • Mounting: B3, B5, B35, V1 (B14 upto 132 Frame)
Crane & Hoist Duty Motors	71 to 355	0.37 to 400	4, 6, 8		• Ambient: 45° C • Duty: S4 • Offered in DOL & Converter Fed Supply • Mounting: B3, B5, B35, V1 (B14 upto 132 Frame)
Brake Motors (With Integral DC Brake)	71 to 132	0.25 to 9.3	2, 4, 6, 8		• Ambient: 50° C • Duty: S1 • Mounting: B3, B5, B35 • Integral DC Brake
Brake Motors (With External Mounted Brake)	71 to 200	0.37 to 22	2, 4, 6, 8		• Ambient: 50° C • Duty: S1 • Mounting: B3, B5, B35 • External Mounted DC Brake/Arrangement
Slip Ring Motors	100 to 160	1.1 to 10	4, 6		• Ambient: 45° C • Duty: S3, S4, S5 • Mounting: B3
Textile Motors	100 to 160	1.1 to 15	4, 6, 8		• Ambient: 50° C • Duty: S1 • Mounting: B3, B5, B35
Cane Unloader Motors	160 to 225	11 to 30	6		• Ambient: 45° C • Start/Stop per Hour: upto 900 • Duty: S5, 50% CDF • Thermostat • Mounting: B3, B5, B35 • Forced Cooling • Shaft Material: En24

* Subject to confirmation from Bharat Bijlee

Insulation: Class 'F' with temperature rise limited to Class 'B', Rotation: Bi-directional Cooling: IC411, Degree of Protection: IP55, Altitude: Upto 1000m above MSL

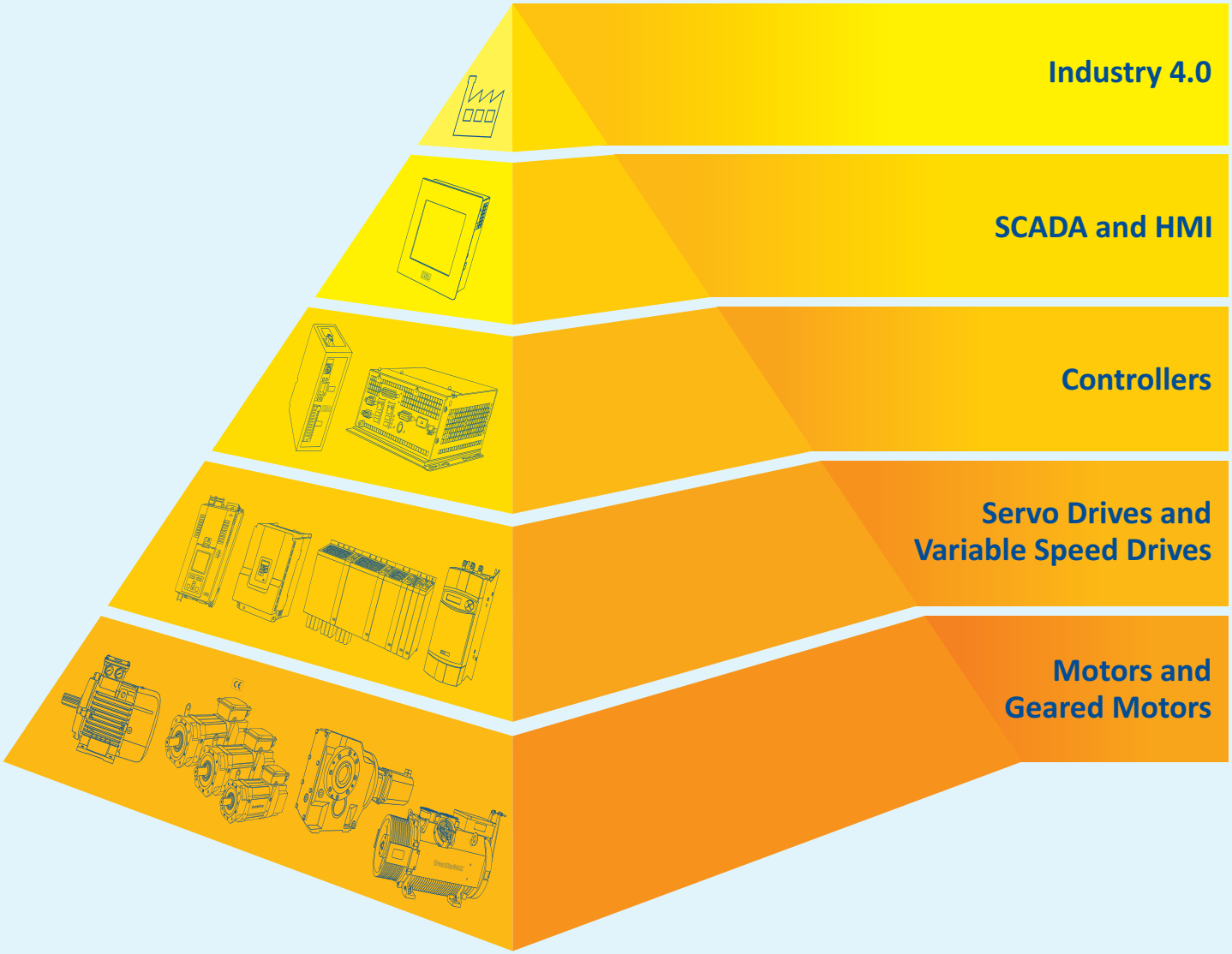
Optional Features		Applications
• Non Standard Voltage: upto 690V • Higher Polarity on request • Insulation: Class H • Space Heater: 90 Frame onwards • RTD & BTD: 250 Frame onwards • PTC Thermistor: 80 to 355L • Shaft Material: EN24* • Enclosure: IP56 / 65 / 66 • Forced Cooling: 132 to 450 Frame • Roller Bearing: 160 Frame onwards	• High Temperature Grease: Suitable up to 200° C • SS Hardware • Non standard shaft diameter/extension* • Non Standard Paint • Provision for Encoder Mounting • Low Vibration as per IS or IEC • Insulated Bearing: 132 Frame onwards • SPM Nipples Provision: Frame 250 onwards	Pump, Fan, Compressor, Packing Machinery, Coiler/De-coiler, Agro Equipment, Food Processing Equipment, Paper Machinery, Agitator, Dairy Equipment, Machine Tool, Air Conditioning, Material Handling, Plastic Machinery, Textile Machinery, Cooling Tower, Crusher, Material Handling
• Insulation: Class H • Space Heater: 90 Frame onwards • PTC Thermistor: 80 to 225 Frame • Shaft Material: EN24* • Enclosure: IP56 / 65 / 66 • Roller Bearing: 160 Frame onwards	• Non standard shaft diameter/extension* • Non Standard Paint • Provision for Encoder Mounting • Low Vibration as per IS or IEC	Fans, HVAC, Pumps, Textiles, Hydraulic Press

• Non Standard Voltage: 220 to 690V
• Intermittent Duty S3, S4: In 4, 6, 8 Pole*
• Insulation: Class H
• PTC Thermistor: 80 to 315 L
• Space Heater: 90 Frame onwards
• Roller Bearing: 160 Frame onwards
• Shaft Material: EN24*
• Enclosure: IP56 / 65 / 66
	• Insulated Bearing: 132 Frame onwards
	• Non standard shaft diameter/extension*
	• Motors for inverter duty application ; offered with
	  • Combined testing of motor and VFD or
	  • Motors fitted with PTC Thermistor
	• Test facility available for combined Testing with VFD
	• Non Standard Paint
	• Low Vibration as per IS or IEC
		Pump, Fan, Compressor, Material Handling, Agitator, LPG Bottling Plant, Pharma Machinery, Chemical Plant Machinery, Machinery for Mines

• Insulation: Class H • Shaft Material: EN24* • Enclosure: IP56 / 65 / 66 • Roller Bearing: 160 Frame onwards	• Insulated Bearing: 132 Frame onwards • Non standard shaft diameter/extension* • Motors for inverter duty application with combined testing of motor and VFD for temperature class certification • Test facility available for combined testing with VFD • Non Standard Paint • Low Vibration as per IS or IEC	Pump, Fan, Compressor, Material Handling, Agitator, Pharma Machinery
• Duty: S2, S3 and S5 • Non Standard Voltage: 380 to 460V • Insulation: Class H • Space Heater: 90 Frame onwards • BTD: 250 Frame and above • PTC Thermistor: 80 to 355 L • Roller Bearing: 160 Frame onwards • Shaft Material: EN24* • Enclosure: IP56 / 65 / 66	• Motors for Inverter Duty • Insulated Bearing: 132 Frame onwards • Non standard shaft diameter/extension* • Non Standard Paint • Low Vibration as per IS or IEC	Crane, Hoist, Lift, Material Handling, Car Stacker, Door Opening
• Duty: S2 and above • Non Standard Voltage: upto 460V • Motors for Inverter Duty • Manual Release Arrangement: For 90 to 132 Frame	• Non standard shaft diameter/extension* • Non Standard Paint	Crane, Hoist, Material Handling, Textile, Pharma to name a few
• Duty: S2 and above • Non Standard Voltage: upto 460V • Motors for Inverter Duty • Manual Release Arrangement	• Double Shaft Extension for Brake Arrangement • Non Standard Paint	Crane, Hoist, Material Handling, Textile, Pharma to name a few
• Mounting: B35 • Non standard shaft diameter and extension*	• Non Standard Paint	Crane, Hoist, Lift, Material Handling
• Non Standard Voltage: upto 500V • Insulation: Class H	• Motors for Inverter Duty • Non Standard Paint • Low Vibration as per IS	Ginning, Textile Machinery
• Insulation: Class H • PTC Thermistor	• Insulated Bearing: 132 Frame onwards • Non Standard Paint	Cane Loading-Unloading Machine

INDUSTRIAL AUTOMATION PYRAMID

ENABLING PRODUCTIVITY, PRECISION & ENERGY EFFICIENCY



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