



Bharat Bijlee

Motors for Crane & Hoist Duty



Range: 0.37kW - 400 kW

CCB1/C

Crane and Hoist Duty Motor

- Squirrel Cage Induction Motor
- Slip-ring Crane Duty Motor
- Cane Unloader Motor

Brake Motor

Introduction

Bharat Bijlee make Crane and Hoist duty motors are ideally suitable for short time and intermittent duties. These motors are specially designed for frequent starts/stops and reversals.

Major Applications

These motors are widely used in following application:

- Crane duty and Hoist duty application Including LT and CT drives
- Material handling
- Weirs and sluices
- 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: 325	Three-phase induction motors specification
IS: 4722	Rotating electrical machines
IS:1231	Dimensions of foot mounted A.C. induction motors
IS:2223	Dimensions of flange mounted A.C. Induction motors

CE Marks

All motors have CE marking on the nameplate.

ELECTRICAL FEATURES

Operating conditions

Supply conditions (Voltage & Frequency)

Voltage : $415V \pm 10\%$

Frequency : $50Hz \pm 5\%$

Combined Variation : $\pm 10\%$

Ambient

Motors are designed for ambient temperature $45^{\circ}C$.

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

Amb. Temp. $^{\circ}C$	Permissible output as % of rated value	Altitude above sea level m	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 $155^{\circ}C$) copper wires 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 clas $200^{\circ}C$) and all impregnated with VPI process

Thermal Protection (for Winding & Bearing)

PTC thermisters/ thermostats/ RTDs etc. can be embedded in stator winding on request.

In case of frame sizes 250M & 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.



MECHANICAL FEATURES

Enclosures: (Material & T box location)

Frame Size	Enclosure Materials	Terminal Box location	
		Standard	Options available
63-80	Aluminum	TOP	----
90S-112M	Aluminum	RHS	LHS
	Cast Iron	RHS	LHS TOP
132S-225M	Cast Iron	RHS	LHS TOP
250M-355	Cast Iron	TOP	RHS LHS

Degree Of Protection

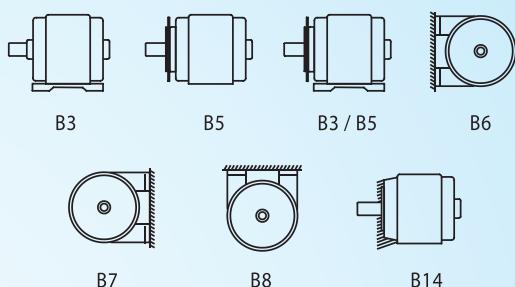
All motors have IP55 degree of protection as per IS:4691. Higher degree of protection such as IP56 and IP66 can be offered on Request. All flange mounted motors are additionally provided with oil tight shaft protection on driving end side.

Cooling

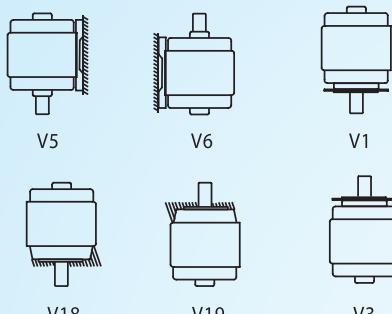
All motors are totally enclosed fan cooled (TEFC). The cooling is effected by self driven, bi-directional centrifugal fan protected by fan cover. The type of cooling is IC411 as per IS:6362-Motors with natural ventilation (TENV) or with forced cooling arrangement can be offered on request.

Mounting

Horizontal Mounting



Vertical Mounting



Bearing and Terminal Box details

Frame size	Bearing nos. C3 clearance		Terminal Box type / location	Terminals		No. & size of cable entries	Max. cond. cross Sec. area mm ²
	DE	NDE		No.	Size		
63	6201 2Z	6201 2Z					
71	6202 2Z	6202 2Z	gk030/ Top	3		1x 3/4"	4
80	6004 2Z	6004 2Z					
90S, 90L	6205 2Z	6205 2Z	gk130/RHS	3*			6
100L	6206 2Z	6206 2Z	gk230/ RHS	3*			
112M	6206 2Z	6206 2Z					
132S, 132M	6208 2Z	6208 2Z	gk330/ RHS	6	M5	2x1"	
160M, 160L	6309 2Z	6209 2Z					
180M, 180L	6310 2Z	6210 2Z	RHS	6	M6	2x1-1/2"	50
200L	6312	6312	TB225/ RHS	6	M8		70
225S, 225M	6313	6313					
250M	6315	6315					
280 S/M	2P	6316	6316	TB280/ Top	6 M10	2x2"	150
4, 6 & 8P		6317	6316				
315S, 315M				TB315/ Top	6 M12	2x2"	240
315L		6319	6319			2x 2-1/2"	
355L	6322	6322	TB355/Top	6	M16	2x3"	300

*3 Terminals upto and including 1.5 kW & 6 terminals for higher outputs.

Special Design Features

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

Types Of Duties

The various operating cycle of driven machines can be classified in to nine basic duties, ranging from S1 to S9. They are as follows:

S1	Continuous running duty
S2	Short time duty
S3	Intermittent periodic duty
S4	Intermittent duty with starting
S5	Intermittent duty with electric braking
S6	Continuous operation periodic duty
S7	Continuous operation periodic duty with electrical braking
S8	Continuous operation periodic duty with related loads/ speed variations
S9	Duty with non-periodic load and speed variation

- Duties S2, S3, S4 and S5 are explained with graphs;

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.

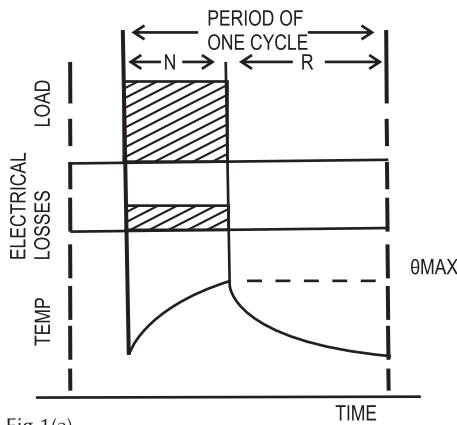


Fig 1(a)

N = Operation under rated conditions

R = At rest de-energised

θ_{MAX} = Maximum temperature attained during the duty cycle

B) S3- Intermittent Period Duty

This includes a period of operation at constant load and a de-energised 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.

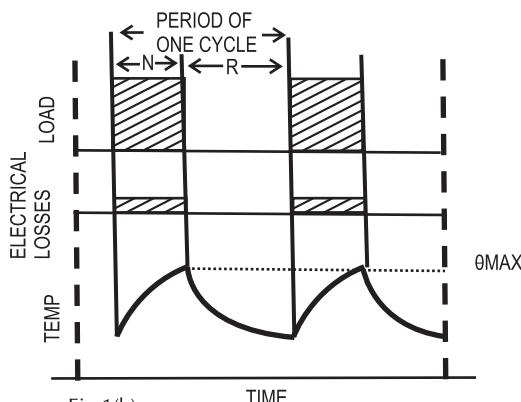


Fig 1(b)

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

C) S4 – Intermittent Duty with Starting

This includes a period of starting, a period of operation at constant load and a de-energised 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 starts/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.

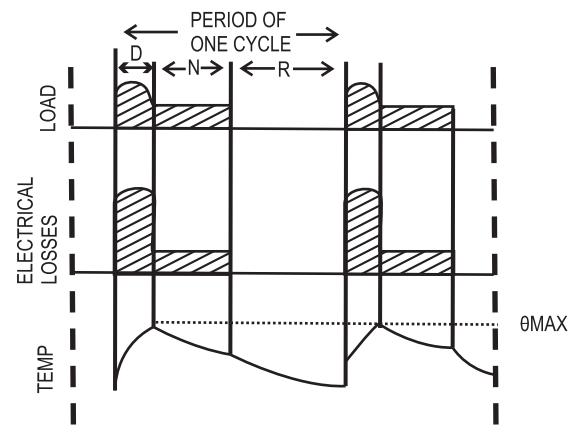


Fig 1(c)

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

Where D = Starting

D) S5- Intermittent Duty with Electrical Braking

This includes a period of starting, a period of operation at constant load, a period of electrical braking, and a de-energised 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 affect 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.

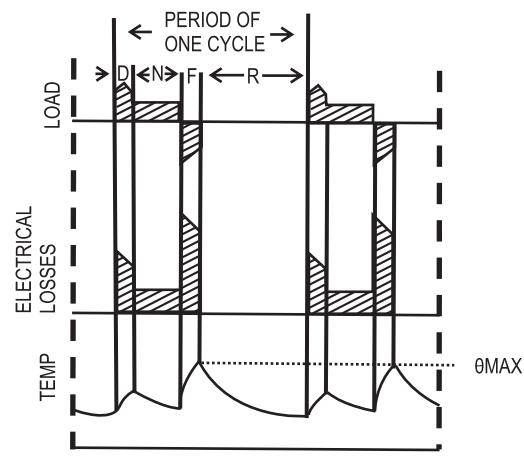


Fig 1(d)

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

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).

Selection Table 1: Examples of typical starting Duties

Starting Duties					Starting Class
Duty cycle	St/hr.	Jogs/hr.	Braking to stop/hr.	Complete plug reversal/hr.	No. of starts/hr Thermal Equivalent
S3	60	0	0	0	60
	40	80	0	0	
	20	80	20	0	
S4	150	0	0	0	150
	100	200	0	0	
S5	80	0	80	0	150
	65	130	65	0	
	30	160	30	30	
S4	300	0	0	0	300
	200	400	0	0	
S5	160	0	180	0	300
	130	260	130	0	
	60	320	60	60	

Refer above table 1 for examples of typical starting duties and selection of starting class. Table given here are for load Gd^2 equal to or less than rotor Gd^2 . For cases where load $Gd^2 >$ rotor Gd^2 the motor should be selected from the table with a higher no. of starts/hr. as per the formula No. of starts allowed = No. of starts as per table $\times 2 \times GD^2$ of rotor / (GD^2 of rotor + Gd^2 of load).

How to select Motors for Hoisting and similar duties

The formula to establish the rated output P_n in kW is:

$$P_n >= \frac{F \times V}{102 \times \text{eff}} \text{ kW}$$

Where

F = Maximum total load in Kg

V = Hoisting speed in mtrs/sec, and

eff = Overall mechanical efficiency of the driving unit.

For horizontal motion ensure that the rated output P_n of the motor is greater than the power necessary to move the equipment given by:

$$P_n >= \frac{M \times n}{974 \times \text{eff}} \text{ kW}$$

Where

M = Torque reqd. for movement in Kgm.

n = Motor r. p. m.

Inverter Applications

All crane duty motors are suitable for inverter feed supply. These motors are wound with dual coated winding wires and impregnated with VPI process.

Motors with Integral Brakes

These motors can be supplied with integral fail safe D.C. brake in frame sizes upto 132M, with built in rectifiers (so that no separate DC supply is required for brake part). For more details refer brake motors section of the catalogue (page 24 to 29).

Flame-proof Crane Duty Motors

These are also available on enquiry.

Enquiries

The following information should be included:

- a) Application
- b) Voltage / frequency with variations
- c) Ambient temperature and type of protection required
- d) Mounting
- e) No. of starts/stops per hour with duty and CDF
- f) Load Gd^2 referred to motor speed
- g) Load torque or torque/speed curve of driven equipment



MOTORS FOR CRANE & HOIST DUTY

SQUIRREL CAGE INDUCTION MOTORS



51

TEFC 3 Ph. Sq. Cage Induction Motors Crane & Hoist duty with DOL Starting Fr. 71 to 355L

Voltage : $415V \pm 10\%$
 Frequency : $50Hz \pm 5\%$
 Combined Variation : $\pm 10\%$

Ambient : $45^\circ C$
 Duty : S3/S4

ins. Class : F
 Temp. Rise : B
 Protection : IP55

Table-1 AA

1500 rpm (4-pole)

Frame size	Type Ref.	60 Starts / hr.						150 Starts / hr.						300 Starts / hr.						Speed KPM	With DOL Starting		Pullout Torque to Rated Torque Ratio	Rotor Gd ² Kgm ²	Net Wt. B3 Const. Kg			
		40 % CDF			60 % CDF			40 % CDF			60 % CDF			40 % CDF			60 % CDF				Starting current to Rated current Ratio	Starting Torque to Rated Torque Ratio						
		kW	Current Amps.	Torque kg.m	kW	Current Amps.	Torque kg.m	kW	Current Amps.	Torque kg.m	kW	Current Amps.	Torque kg.m	kW	Current Amps.	Torque kg.m	kW	Current Amps.	Torque kg.m		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	1.8	0.55	0.75	1.8	0.55	0.75	1.8	0.55	0.75	1.8	0.55	0.75	1.8	0.55	0.75	1.8	0.55	1340	4.5	2.30	2.75	0.0061	10			
80	MC080433	1.1	3.1	0.80	1.1	3.1	0.80	1.1	3.1	0.80	1.1	3.1	0.80	1.1	3.1	0.80	1.1	3.1	0.80	1365	5.0	2.30	2.80	0.0072	11			
90S	MC09S433	1.5	3.9	1.1	1.5	3.9	1.1	1.5	3.9	1.1	1.5	3.9	1.1	1.5	3.9	1.1	1.5	3.9	1.1	1385	5.0	2.25	2.75	0.0120	14			
90L	MC09L453	2.2	5	1.6	2.2	5	1.6	2.2	5	1.6	2.2	5	1.6	2.2	5	1.6	2.2	5	1.6	1380	4.8	2.30	2.80	0.0160	17			
100L	MC10L453	3.7	8	2.6	3.7	8	2.6	3.7	8	2.6	3.7	8	2.6	3.7	8	2.6	3.7	8	2.6	1380	6.0	2.30	3.00	0.0260	27			
112M	MC11M453	5.5	12.4	3.8	5.5	12.4	3.8	5.5	12.4	3.8	5.5	12.4	3.8	5.5	12.4	3.8	5.5	12.4	3.8	1400	6.0	2.50	2.80	0.058	35			
132S	MC13S453	7.5	14.8	5.2	7.5	14.8	5.2	7.5	14.8	5.2	7.5	14.8	5.2	7.5	14.8	5.2	7.5	14.8	5.2	1410	6.5	2.25	2.90	0.127	70			
132M	MC13M483	9.3	18.1	6.4	9.3	18.1	6.4	9.3	18.1	6.4	9.3	18.1	6.4	9.3	18.1	6.4	9.3	18.1	6.4	1420	6.5	2.30	2.90	0.141	84			
160M	MC16M4A3	11	22	7.4	11	22	7.4	11	22	7.4	11	22	7.4	11	22	7.4	11	22	7.4	1440	6.5	2.25	2.80	0.141	93			
160M	MC16M4C3	13.2	25	8.9	12.1	23	8.2	13.2	25	8.9	12.1	23	8.2	13.2	25	8.9	12.1	23	8.2	1440	6.5	2.25	2.80	0.177	103			
160M	MC16M4F3	15	30	10.1	15	30	10.1	15	30	10.1	15	30	10.1	15	30	10.1	13.8	27	9.3	13.8	27	9.3	1440	6.5	2.25	2.80	0.193	107
160L	MC16L4P3	18.5	36	12.5	18.5	36	12.5	18.5	36	12.5	18.5	36	12.5	17	33	11.5	17	33	11.5	1445	6.5	2.10	2.50	0.265	132			
180L	MC18L473	22	39	14.7	22	39	14.7	22	39	14.7	22	39	14.7	22	39	14.7	20	35.5	13.3	1460	6.5	2.40	2.60	0.540	188			
200L	MC20L433	30	52	19.9	30	52	19.9	30	52	19.9	30	52	19.9	28	49	18.6	26	45	17.3	1465	6.5	2.60	2.60	0.860	270			
225S	MC22S413	37	64	24.5	37	64	24.5	37	64	24.5	34	58.8	22.5	32	57	21.2	30	54	19.9	1470	6.5	2.50	2.60	1.32	328			
225M	MC22M433	45	78	29.8	45	78	29.8	45	78	29.8	40	69.3	26.5	37	66	24.5	34	61	22.5	1470	6.5	2.50	2.50	1.60	362			
250M	MC25M413	55	97	36.3	55	97	36.3	55	97	36.3	52	92.0	34.3	48	84	31.7	45	78	29.7	1475	6.5	2.50	2.60	2.83	475			
280S	MC28S413	75	130	49.4	75	130	49.4	75	130	49.4	70	121	46	67	116	44.1	65	112	42.8	1480	6.5	2.30	2.60	5.00	653			
280M	MC28M433	90	156	59.2	90	156	59.2	90	156	59.2	84	146	55.3	80	139	52.6	75	130	49.4	1480	6.5	2.30	2.60	6.00	713			
315S	MC31S413	110	190	72.1	110	190	72.1	110	190	72.1	102	176	67	95	164	62.3	90	155	59.0	1485	6.5	2.30	2.60	8.70	902			
315M	MC31M433	132	225	86.5	132	225	86.5	132	225	86.5	125	213	81.9	115	196	75.4	110	188	72.1	1486	6.5	2.30	2.60	10.20	1010			
315L	MC31L453	160	270	104.8	160	270	104.8	160	270	104.8	150	253	98.3	138	233	90.4	132	223	86.5	1487	6.5	2.30	2.60	12.20	1185			
315L	MC31L463	180	305	117.9	180	305	117.9	180	305	117.9	168	285	110.0	158	268	103.5	150	254	98.3	1487	6.5	2.30	2.60	13.40	1262			
315L	MC31L473	200	342	131.0	200	342	131.0	200	342	131.0	185	316	121.2	180	308	117.9	175	299	114.6	1487	6.5	2.30	2.60	14.60	1305			
355L	MC35L413	250	410	163.6	250	410	163.6	250	410	163.6	232	380	151.9	220	361	144.0	210	344	137.5	1488	6.5	2.25	2.60	23.30	1680			
355L	MC35L433	315	517	206.2	315	517	206.2	315	517	206.2	295	484	193.1	280	460	183.3	270	443	176.7	1488	6.5	2.25	2.60	32.70	1855			
355L	MC35L453	355	586	232.8	355	586	232.8	355	586	232.8	330	545	216.0	310	512	202.9	300	495	196.4	1488	6.5	2.20	2.50	38.20	2050			

Note: Derating factors of motor ratings for higher ambient temperatures are given on page no. 1

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Voltage : $415V \pm 10\%$
 Frequency : $50Hz \pm 5\%$
 Combined Variation : $\pm 10\%$

Ambient : $45^\circ C$
 Duty : S3/S4

ins. Class : F
 Temp. Rise : B
 Protection : IP55

Table-1 BB

1000 rpm (6-pole)

Frame size IEC	Type Ref. B3 Construction	150 Starts / hr.						300 Starts / hr.						Speed KPM	With DOL Starting		Pullout Torque to Rated Torque Ratio	Rotor Gd ² Kgm ²	Net Wt. B3 Const. Kg	
		40 % CDF			60 % CDF			40 % CDF			60 % CDF				Starting current to Rated current Ratio	Starting Torque to Rated Torque Ratio				
		kW	Current Amps.	Torque kg.m	kW	Current Amps.	Torque kg.m	kW	Current Amps.	Torque kg.m	kW	Current Amps.	Torque kg.m							
71	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	0.0038	7	
80	MC080613	0.55	2	0.65	0.55	2	0.65	0.55	2	0.65	0.55	2	0.65	830	3.5	1.90	2.20	0.0060	10	
80	MC080633	0.75	2.7	0.85	0.75	2.7	0.85	0.75	2.7	0.85	0.75	2.7	0.85	860	3.5	2.25	2.50	0.0084	11	
90L	MC09L6A3	1.1	3	1.2	1.1	3	1.2	1.1	3	1.2	1.1	3	1.2	900	4.0	2.30	2.60	0.0160	17	
90L	MC09L653	1.5	4.2	1.6	1.5	4.2	1.6	1.5	4.2	1.6	1.5	4.2	1.62	900	4.0	2.30	2.75	0.0160	17	
100L	MC10L653	2.2	6.5	2.3	2.2	6.5	2.3	2.2	6.5	2.3	2.2	6.5	2.3	920	4.5	2.25	2.75	0.029	27	
112M	MC11M653	3.7	9.1	3.9	3.7	9.1	3.9	3.7	9.1	3.9	3.7	9.1	3.92	920	5.0	2.25	2.75	0.065	33	
132S	MC13S653	5.5	13.5	5.8	5.5	13.5	5.8	5.5	13.5	5.8	5.5	13.5	5.8	925	5.5	2.30	2.75	0.153	73	
132M	MC13M693	7.5	18.8	7.9	7.5	18.8	7.9	6.5	16.3	6.8	6.5	16.3	6.8	925	5.5	2.30	2.75	0.193	81	
160M	MC16M633	9.3	21	9.7	8	18	8.3	9.3	21	9.7	8	18.1	8.3	935	6.0	2.30	2.75	0.276	103	
160L	MC16L663	11	24	11.5	10.2	22.3	10.6	11	24	11.5	10.2	22.3	10.6	935	6.0	2.30	2.75	0.34	113	
160L	MC16L673	13	29	13.5	12	27	12.5	13	29	13.5	12	27	12.5	935	6.0	2.25	2.75	0.40	123	
180L	MC18L633	17	35	17.2	16	33	16.2	16	33	16.2	15	31	15.2	960	6.0	2.30	2.60	0.82	190	
200L	MC20L633	22	42	22.1	20	38	20.1	20	38	20.1	18.5	35.1	18.6	970	6.0	2.30	2.50	1.20	254	
225M	MC22M623	30	55	30.1	28	51	30.1	28	51.3	28.1	26	47.7	26.1	970	6.0	2.30	2.50	2.10	336	
250M	MC25M603	37	66	37.0	34	60	34.0	34	60.2	34.0	30	53.1	30.0	975	6.0	2.30	2.50	3.51	458	
280S	MC28S613	45	82	45.0	40	73	40.0	40	70.2	40.0	37	65.0	37.0	975	6.0	2.30	2.50	5.11	573	
280M	MC28M633	52	93	51.7	48	86	47.7	48	85.5	47.7	45	80	44.7	980	6.0	2.30	2.50	6.16	620	
315S	MC31S613	70	123	69.2	65	114	64.3	65	114	64.3	60	106	59.3	985	6.0	2.30	2.50	10.7	830	
315M	MC31M633	85	151	84.1	80	142	79.1	80	142	79.1	75	133	74.2	985	6.0	2.30	2.50	12.4	912	
315M	MC31M653	102	178	100.6	95	166	93.7	95	166	93.7	90	157	88.7	988	6.0	2.30	2.50	15.5	1010	
315L	MC31L673	125	217	123.2	120	208	118.3	120	208	118.3	110	190.8	108.4	988	6.0	2.30	2.50	18.0	1175	
315L	MA31L693	150	260	147.9	142	246	140.0	142	246	140.0	132	228.5	130.1	988	6.0	2.30	2.50	21.5	1231	
355L	MC35L6A3	168	294	165.3	160	280	157.4	160	280	157.4	150	263	147.6	990	6.0	2.20	2.50	28.7	1670	
355L	MC35L613	185	326	182.0	175	308	172.2	175	308	172.2	160	282	157.4	990	6.0	2.20	2.50	28.7	1670	
355L	MC35L633	235	414	231.2	225	396	221.4	225	396	221.4	210	370	206.6	990	6.0	2.20	2.50	35.5	1780	
355L	MC35L653	280	493	275.5	265	466	260.7	265	466	260.7	240	422	236.1	990	6.0	2.20	2.50	43.3	2000	

Note: Derating factors of motor ratings for higher ambient temperatures are given on page no. 1

MOTORS FOR CRANE & HOIST DUTY

SQUIRREL CAGE INDUCTION MOTORS



TEFC 3 Ph. Sq. Cage Induction Motors Crane & Hoist duty with DOL Starting Fr. 71 to 355L

Voltage : $415V \pm 10\%$
 Frequency : $50Hz \pm 5\%$
 Combined Variation : $\pm 10\%$

Ambient : $45^\circ C$
 Duty : S3/S4

ins. Class : F
 Temp. Rise : B
 Protection : IP55

Table-1 CC

750 rpm (8-pole)

Frame size IEC	Type Ref. B3 Construction	150 Starts / hr.						300 Starts / hr.						Speed KPM	With DOL Starting		Pullout Torque to Rated Torque Ratio	Rotor Gd ² Kgm ²	Net Wt. B3 Const. Kg	
		40 % CDF			60 % CDF			40 % CDF			60 % CDF				Starting current to Rated current Ratio	Starting Torque to Rated Torque Ratio				
		kW	Current Amps.	Torque kg.m	kW	Current Amps.	Torque kg.m	kW	Current Amps.	Torque kg.m	kW	Current Amps.	Torque kg.m							
90S	MC09S8A3	0.37	1.43	0.5	0.37	1.43	0.5	0.37	1.43	0.5	0.37	1.43	0.5	700	3.0	2.00	2.30	0.011	13	
90S	MC09S813	0.55	2.15	0.8	0.45	1.76	0.6	0.55	2.15	0.8	0.45	1.76	0.6	680	3.0	1.80	2.10	0.011	13	
90L	MC09L853	0.75	2.76	1.1	0.75	2.76	1.1	0.75	2.76	1.1	0.65	2.39	0.9	680	3.0	2.00	2.40	0.014	14	
100L	MC10L813	1.1	3.4	1.6	1.1	3.4	1.6	1.1	3.4	1.6	0.9	2.78	1.3	655	3.5	1.80	2.00	0.023	18	
100L	MC10L833	1.5	4.95	2.1	1.5	4.95	2.1	1.5	4.95	2.1	1.1	3.63	1.6	680	3.5	2.00	2.30	0.027	22	
112M	MC11M833	2.2	6.80	3.1	2.2	6.80	3.1	2.2	6.8	3.1	1.5	4.64	2.1	700	4.0	2.00	2.30	0.06	32	
132S	MC13S853	3.7	8.8	5.1	3.7	8.8	5.1	3.7	8.8	5.1	3	7.14	4.1	710	4.0	2.00	2.30	0.133	78	
160M	MC16M833	5.5	12	7.5	5.5	12	7.5	5.5	12	7.5	4.5	9.82	6.2	710	5.0	2.10	2.40	0.299	106	
160L	MC16L873	7.5	16	10.3	6.5	13.9	8.9	6.5	13.9	8.9	6	12.8	8.2	710	5.5	2.25	2.50	0.40	119	
180M	MC18M813	9.3	20	12.8	8.5	18.5	11.7	8.5	18.5	11.7	7.5	16.5	10.3	710	5.5	2.25	2.50	0.62	177	
180L	MC18L833	11	23	15.1	9.3	19.4	12.8	9.3	19.4	12.8	8.5	17.8	11.7	710	5.5	2.25	2.50	0.72	182	
200L	MC20L833	15	28.8	20.3	13	25.0	17.6	13	25	17.6	11	21.1	14.9	720	5.5	2.30	2.30	1.32	282	
225S	MC22S813	18.5	37.5	25.0	17	34.5	23.0	17	34.5	23.0	15	30.4	20.3	720	5.5	2.25	2.50	1.95	329	
225M	MC22M833	22	44.5	29.8	20	40.5	27.1	20	40.5	27.1	18.5	37.4	25.0	720	5.5	2.25	2.50	2.41	369	
250M	MC25M813	30	56	40.0	26	48.5	34.7	26	48.5	34.7	22	41.1	29.4	730	5.5	2.30	2.50	3.72	472	
280S	MC28S823	37	71	49.4	34	65.2	45.4	34	65.2	45.4	30	57.6	40.0	730	5.5	2.25	2.40	5.83	615	
280M	MC28M853	45	86	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	10.7	833	
315M	MC31M833	75	148	99.4	67	132.2	88.8	67	132	88.8	60	118	79.5	735	6.0	2.25	2.40	12.4	912	
315M	MC31M853	90	175	119.3	80	155.6	106.0	80	156	106.0	75	146	99.4	735	6.0	2.25	2.40	15.5	1010	
315L	MC31L873	110	214	145.8	100	195	132.5	100	195	132.5	90	175	119.3	735	6.0	2.25	2.40	18.0	1170	
315L	MC31L893	132	257	174.9	125	243	165.6	125	243	165.6	115	224	152.4	735	6.0	2.25	2.40	21.5	1340	
355L	MC35L813	160	300	210.6	150	281.3	197.4	150	281	197.4	140	263	184.3	740	6.0	2.00	2.30	28.7	1670	
355L	MC35L8B3	180	337	236.9	170	318.3	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	328.1	230.3	175	328	230.3	160	300	210.6	740	6.0	2.00	2.3	35.5	1780	
355L	MC35L853	210	394	276.4	200	375.1	263.2	200	375	263.2	180	338	236.9	740	6.0	2.00	2.3	35.5	1780	

Note: Derating factors of motor ratings for higher ambient temperatures are given on page no. 1

MOTORS FOR CRANE & HOIST DUTY

SQUIRREL CAGE INDUCTION MOTORS



TEFC 3 Ph. Sq. Cage Induction Motors Crane & Hoist duty with Inverter (VVVF) Drive Fr. 71 to 355L

Voltage : 415V ± 10%
 Frequency : 50Hz ± 5%
 Combined Variation : ± 10%

Ambient : 45°C
 Duty : S3/S4

ins. Class : F
 Temp. Rise : B
 Protection : IP55

Table-2 AA

1500 rpm (4-pole)

Frame size IEC	Type Ref. B3 Construction	150 Starts / hr.						300 Starts / hr.						Speed KPM	With DOL Starting		Pullout Torque to Rated Torque Ratio	Rotor Gd ² Kgm ²	Net Wt. B3 Const. Kg	
		40 % CDF			60 % CDF			40 % CDF			60 % CDF				Starting current to Rated current Ratio	Starting Torque to Rated Torque Ratio				
		kW	Current Amps.	Torque kg.m	kW	Current Amps.	Torque kg.m	kW	Current Amps.	Torque kg.m	kW	Current Amps.	Torque kg.m							
71	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	1310	3.7	2.25	2.75	0.0033	7	
80	MC080413	0.75	1.8	0.55	0.75	1.8	0.55	0.75	1.8	0.55	0.75	1.8	0.55	1340	4.5	2.30	2.75	0.0061	10	
80	MC080433	1.1	3.1	0.80	1.1	3.1	0.80	1.1	3.1	0.80	1.1	3.1	0.80	1365	5.0	2.30	2.80	0.0072	11	
90S	MC09S433	1.5	3.9	1.1	1.5	3.9	1.1	1.5	3.9	1.1	1.5	3.9	1.1	1385	5.0	2.25	2.75	0.0120	14	
90L	MC09L453	2.2	5	1.6	2.2	5	1.6	2.2	5	1.6	2.2	5	1.6	1380	4.8	2.30	2.80	0.0160	17	
100L	MC10L453	3.7	8	2.6	3.7	8	2.6	3.7	8	2.6	3.7	8	2.6	1380	6.0	2.30	3.00	0.0260	27	
112M	MC11M453	5.5	12.4	3.8	5.5	12.4	3.8	5.5	12.4	3.8	5.5	12.4	3.8	1400	6.0	2.50	2.80	0.058	35	
132S	MC13S453	7.5	14.8	5.2	7.5	14.8	5.2	7.5	14.8	5.2	7.5	14.8	5.2	1410	6.5	2.25	2.90	0.127	70	
132M	MC13M483	9.3	18.1	6.4	9.3	18.1	6.4	9.3	18.1	6.4	9.3	18.1	6.4	1420	6.5	2.30	2.90	0.141	84	
160M	MC16M4A3	11	22	7.4	11	22	7.4	11	22	7.4	11	22	7.4	1440	6.5	2.25	2.80	0.141	93	
160M	MC16M4C3	13	25	8.8	13	25	8.8	13	25	8.8	13	25	8.8	1440	6.5	2.25	2.80	0.177	103	
160M	MC16M4F3	15	30	10.1	15	30	10.1	13.8	27	9.3	13.8	27	9.3	1440	6.5	2.25	2.80	0.193	107	
160L	MC16L4P3	18.5	36	12.5	18.5	36	12.5	17	33	11.5	17	33	11.5	1445	6.5	2.10	2.50	0.265	132	
180M	MC18M433	22	41	14.8	20.5	38	13.8	22	41	14.8	20.5	38	13.8	1450	6.5	2.25	2.50	0.460	160	
180L	MC18L473	26	46	17.5	24	42.5	16.1	24	42.5	16.1	22	39	14.8	1450	6.5	2.25	2.50	0.540	188	
200L	MC20L433	35	62	23.4	33	59	22.1	33	59	22.1	31	56	20.8	1455	6.5	2.30	2.60	0.860	270	
225S	MC22S413	43	77	28.7	41	74.0	27.4	41	74	27.4	39	72	26.0	1460	6.5	2.30	2.60	1.32	328	
225M	MC22M433	53	96	35.4	50	91.0	33.4	50	91	33.4	48	88	32.0	1460	6.5	2.30	2.50	1.60	362	
250M	MC25M413	64	113	42.6	61	108	40.6	61	108	40.6	58	103	38.6	1465	6.5	2.30	2.60	2.83	475	
280S	MC28S413	88	152	58.3	85	147	56.3	85	146	56.3	82	141	54.3	1470	6.5	2.30	2.60	5.00	653	
280M	MC28M453	110	190	72.9	102	177	67.6	102	177	67.6	97	169	64.3	1470	6.5	2.30	2.60	6.35	730	
315S	MC31S413	132	228	87	125	216	82.5	125	216	82.5	120	208	79.2	1475	6.5	2.30	2.60	8.70	902	
315M	MC31M433	160	274	105.7	150	256	99.1	150	256	99.1	145	248	95.7	1475	6.5	2.30	2.60	10.20	1010	
315L	MC31L453	185	317	121.8	178	305	117.1	178	305	117.1	170	292	111.9	1480	6.5	2.30	2.60	12.20	1185	
315L	MC31L463	205	350	134.9	192	328	126.4	192	328	126.4	180	307	118.5	1480	6.5	2.30	2.60	13.40	1262	
315L	MC31L473	230	390	151.4	210	356	138.2	210	356	138.2	200	340	131.6	1480	6.5	2.30	2.60	14.60	1305	
355L	MC35L413	285	480	186.9	270	455	177.1	270	455	177.1	260	438	170.5	1485	6.5	2.25	2.60	23.30	1680	
355L	MC35L433	350	590	229.6	335	565	219.7	335	565	219.7	315	531	206.6	1485	6.5	2.25	2.60	32.70	1855	
355L	MC35L453	400	660	262.4	380	630	249.2	380	630	249.2	355	588	232.8	1485	6.5	2.20	2.50	38.20	2050	

Note: Derating factors of motor ratings for higher ambient temperatures are given on page no. 1

MOTORS FOR CRANE & HOIST DUTY

SQUIRREL CAGE INDUCTION MOTORS



6

TEFC 3 Ph. Sq. Cage Induction Motors Crane & Hoist duty with inverter (VVVF) Drive Fr. 71 to 355L

Voltage : 415V ± 10%
 Frequency : 50Hz ± 5%
 Combined Variation : ± 10%

Ambient : 45°C
 Duty : S3/S4

ins. Class : F
 Temp. Rise : B
 Protection : IP55

Table-2 BB

1000 rpm (6-pole)

Frame size	Type Ref.	150 Starts / hr.						300 Starts / hr.						Speed KPM	With DOL Starting		Pullout Torque to Rated Torque Ratio	Rotor Gd ² Kgm ²	Net Wt. B3 Const. Kg	
		40 % CDF			60 % CDF			40 % CDF			60 % CDF				Starting current to Rated current Ratio	Starting Torque to Rated Torque Ratio				
		kW	Current Amps.	Torque kg.m	kW	Current Amps.	Torque kg.m	kW	Current Amps.	Torque kg.m	kW	Current Amps.	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	0.0038	7	
80	MC080613	0.55	2	0.65	0.55	2	0.65	0.55	2	0.65	0.55	2	0.65	830	3.5	1.90	2.20	0.0060	10	
80	MC080633	0.75	2.7	0.85	0.75	2.7	0.85	0.75	2.7	0.85	0.75	2.7	0.85	860	3.5	2.25	2.50	0.0084	11	
90L	MC09L6A3	1.1	3	1.2	1.1	3	1.2	1.1	3	1.2	1.1	3	1.2	900	4.0	2.30	2.60	0.0160	17	
90L	MC09L653	1.5	4.2	1.6	1.5	4.2	1.6	1.5	4.2	1.6	1.5	4.2	1.62	900	4.0	2.30	2.75	0.0160	17	
100L	MC10L653	2.2	6.5	2.3	2.2	6.5	2.3	2.2	6.5	2.3	2.2	6.5	2.3	920	4.5	2.25	2.75	0.029	27	
112M	MC11M653	3.7	9.1	3.9	3.7	9.1	3.9	3.7	9.1	3.9	3.7	9.1	3.92	920	5.0	2.25	2.75	0.065	33	
132S	MC13S653	5.5	13.5	5.8	5.5	13.5	5.8	5.5	13.5	5.8	5.5	13.5	5.8	925	5.5	2.30	2.75	0.153	73	
132M	MC13M693	7.5	18.8	7.9	6.8	17.0	7.2	7.5	18.8	7.9	6.8	17.0	7.2	925	5.5	2.30	2.75	0.193	81	
160M	MC16M633	9.3	21	9.7	8	18.1	8.3	9.3	21	9.7	8	18.1	8.3	935	6.0	2.30	2.60	0.276	103	
160L	MC16L663	11	24	11.5	10.2	22.3	10.6	11	24	11.5	10.2	22.3	10.6	935	6.0	2.30	2.60	0.34	113	
160L	MC16L673	13	29	13.5	12	27	12.5	13	29	13.5	12	27	12.5	935	6.0	2.25	2.60	0.40	123	
180L	MC18L613	18	37	18.7	16.7	35	17.3	18	37	18.7	16.7	35	17.3	940	6.0	2.30	2.60	0.68	175	
180L	MC18L633	21	43	21.8	19	39	19.7	21	43	21.8	19	39	19.7	940	6.0	2.30	2.60	0.82	190	
200L	MC20L633	26	50	26.7	24	47	24.6	24	47	24.6	22	43.0	22.6	950	6.0	2.30	2.50	1.20	254	
225M	MC22M623	34.5	64	35.0	32	60	32.5	32	60	32.5	30	57.0	30.4	960	6.0	2.30	2.50	2.10	336	
225M	MC22M643	39	73	39.6	35	66	35.5	35	66	35.5	33	63.0	33.5	960	6.0	2.30	2.50	2.42	360	
250M	MC25M633	46	83	46.0	42	76.0	42.4	42	76	42.4	40	73.0	40.4	965	6.0	2.30	2.50	3.72	528	
280S	MC28S613	52	93	52.2	49	88.0	49.2	49	88	49.2	45	81.0	45.2	970	6.0	2.30	2.50	5.11	573	
280M	MC28M633	65	117.0	65.3	61	110.0	61.3	61	110	61.3	58	105.0	58.2	970	6.0	2.30	2.50	6.16	620	
315S	MC31S613	90	158.0	89.4	85	150	84.5	85	149.6	84.5	80	142.0	79.5	980	6.0	2.30	2.50	10.7	830	
315M	MC31M633	105	184.0	104.4	100	175.0	99.4	100	175	99.4	95	166.0	94.4	980	6.0	2.30	2.50	12.4	912	
315M	MC31M653	125	219	124.2	120	210	119.3	120	210	119.3	115	201.0	114.3	980	6.0	2.30	2.50	15.5	1010	
315L	MC31L673	150	263.0	148.8	142	249	140.8	142	249	140.8	136	138.0	134.9	982	6.0	2.30	2.50	18.0	1175	
315L	MC31L693	180	316.0	178.5	170	300	168.6	170	300	168.6	160	282.0	158.7	982	6.0	2.30	2.50	21.5	1231	
355L	MC35L613	220	383.0	217.5	210	366	207.7	210	366	207.7	200	349.0	197.8	985	6.0	2.20	2.50	28.7	1670	
355L	MC35L633	275	479.0	271.9	262	456	259.1	262	456	259.1	250	435.0	247.2	985	6.0	2.20	2.50	35.5	1780	
355L	MC35L653	325	566.0	321.4	310	540	306.5	310	540	306.5	300	523.0	296.6	985	6.0	2.20	2.50	43.3	2000	

Note: Derating factors of motor ratings for higher ambient temperatures are given on page no. 1

MOTORS FOR CRANE & HOIST DUTY

SQUIRREL CAGE INDUCTION MOTORS



TEFC 3 Ph. Sq. Cage Induction Motors Crane & Hoist duty with inverter (VVVF) Drive Fr. 90S to 355L

Voltage : 415V ± 10%
 Frequency : 50Hz ± 5%
 Combined Variation : ± 10%

Ambient : 45°C
 Duty : S3/S4

ins. Class : F
 Temp. Rise : B
 Protection : IP55

Table-2 CC

750 rpm (8-pole)

Frame size IEC	Type Ref. B3 Construction	150 Starts / hr.						300 Starts / hr.						Speed KPM	With DOL Starting		Pullout Torque to Rated Torque Ratio	Rotor Gd ² Kgm ²	Net Wt. B3 Const. Kg	
		40 % CDF			60 % CDF			40 % CDF			60 % CDF				Starting current to Rated current Ratio	Starting Torque to Rated Torque Ratio				
		kW	Current Amps.	Torque kg.m	kW	Current Amps.	Torque kg.m	kW	Current Amps.	Torque kg.m	kW	Current Amps.	Torque kg.m		Starting current to Rated current Ratio	Starting Torque to Rated Torque Ratio				
90S	MC09S8A3	0.37	1.43	0.5	0.37	1.43	0.5	0.37	1.43	0.5	0.37	1.43	0.5	700	3.0	2.00	2.30	0.011	13	
90S	MC09S813	0.55	2.15	0.8	0.45	1.76	0.6	0.55	2.15	0.8	0.45	1.76	0.6	680	3.0	1.80	2.10	0.011	13	
90L	MC09L853	0.75	2.76	1.1	0.75	2.76	1.1	0.75	2.76	1.1	0.65	2.39	0.9	680	3.0	2.00	2.40	0.014	14	
100L	MC10L813	1.1	3.4	1.6	1.1	3.4	1.6	1.1	3.4	1.6	0.9	2.78	1.3	655	3.5	1.80	2.00	0.023	18	
100L	MC10L833	1.5	4.95	2.1	1.5	4.95	2.1	1.5	4.95	2.1	1.1	3.63	1.6	680	3.5	2.00	2.30	0.027	22	
112M	MC11M833	2.2	6.80	3.1	2.2	6.80	3.1	2.2	6.8	3.1	1.5	4.64	2.1	700	4.0	2.00	2.30	0.06	32	
132S	MC13S853	3.7	8.8	5.1	3.7	8.8	5.1	3.7	8.8	5.1	3	7.14	4.1	710	4.0	2.00	2.30	0.133	78	
160M	MC16M833	6	13	8.2	5.5	12	7.5	5.5	12	7.5	5	11.00	6.9	710	5.0	2.10	2.40	0.299	106	
160M	MC16M853	7	15.5	9.6	6.5	14.4	8.9	6.5	14.4	8.9	6	13.30	8.2	710	5.0	2.10	2.40	0.344	110	
160L	MC16L873	8.3	18.5	11.4	7.8	17.4	10.7	7.8	17.4	10.7	7	15.6	9.6	710	5.5	2.00	2.30	0.40	119	
180M	MC18M813	10.6	22.5	14.5	10	21.0	13.7	10	21	13.7	9.3	20	12.8	710	5.5	2.10	2.50	0.62	177	
180L	MC18L833	12.5	26.5	17.1	11.5	24.5	15.8	11.5	24.5	15.8	11	23.4	15.1	710	5.5	2.10	2.50	0.72	182	
200L	MC20L833	17	28.8	35.0	16	33.0	21.8	16	33	21.8	15	31	20.4	715	5.5	2.20	2.50	1.32	282	
225S	MC22S813	20.5	41.5	27.7	19.4	39.3	26.2	19.4	39.3	26.2	18.5	37.5	25.0	720	5.5	2.10	2.20	1.95	329	
225M	MC22M833	24.5	50.0	33.1	23	47.0	31.1	23	47	31.1	22	45	29.8	720	5.5	2.10	2.20	2.41	369	
250M	MC25M813	34	67	45.7	32	63.0	43.0	32	63	43.0	30	59	40.3	725	5.5	2.20	2.50	3.72	472	
280S	MC28S823	42	82	56.0	39	76.0	52.0	39	76	52.0	37	72	49.4	730	5.5	2.20	2.20	5.83	615	
280M	MC28M853	52	101	69.4	48	93.0	64.0	48	93	64.0	45	87.5	60.0	730	5.5	2.20	2.20	6.86	665	
315S	MC31S813	62	120	82.2	58	113.0	76.9	58	113	76.9	55	107	72.9	735	6.0	2.10	2.40	10.7	833	
315M	MC31M833	85	165	112.6	80	155	106.0	80	155	106.0	75	145	99.4	735	6.0	2.10	2.40	12.4	912	
315M	MC31M853	100	193	132.5	95	184	125.9	95	184	125.9	90	175	119.3	735	6.0	2.10	2.40	15.5	1010	
315L	MC31L873	122	234	161.7	116	222	153.7	116	222	153.7	110	211	145.8	735	6.0	2.10	2.40	18.0	1170	
315L	MC31L893	145	278	192.1	138	265	182.9	138	265	182.9	132	254	174.9	735	6.0	2.10	2.40	21.5	1340	
355L	MC35L813	175	332.0	230.3	168	319.0	221.1	168	319	221.1	160	304	210.6	740	6.0	2.10	2.40	28.7	1670	
355L	MC35L833	220	417.0	289.6	210	398.0	276.4	210	398	276.4	200	380	263.2	740	6.0	2.00	2.30	35.5	1780	
355L	MC35L853	250	480.0	329.1	235	452.0	309.3	235	452	309.3	225	433	296.1	740	6.0	2.20	2.40	43.3	2000	

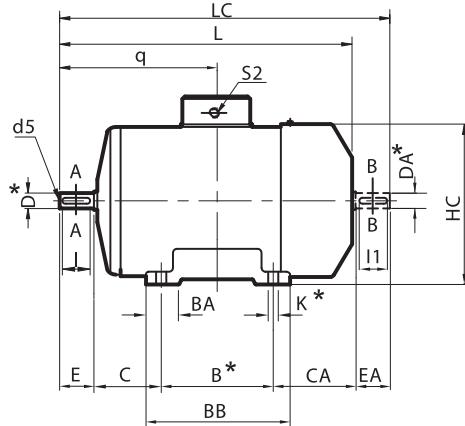
Note: Derating factors of motor ratings for higher ambient temperatures are given on page no. 1

MOTORS FOR CRANE & HOIST DUTY

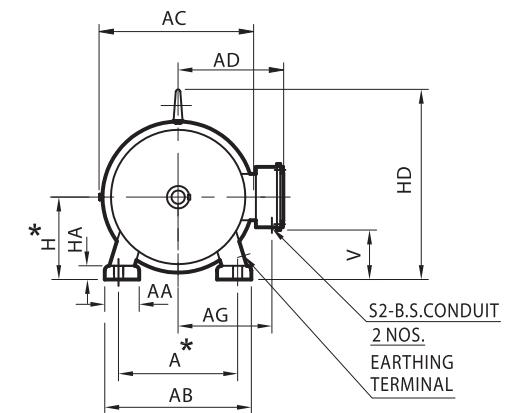
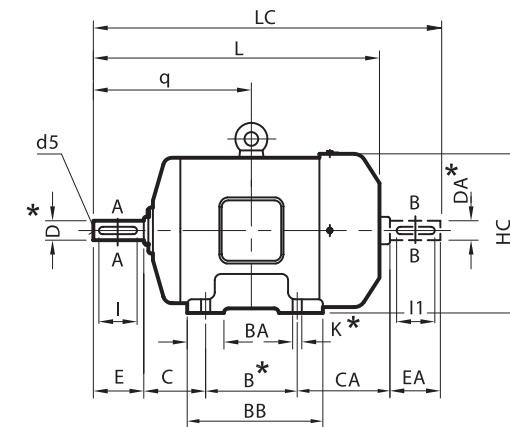
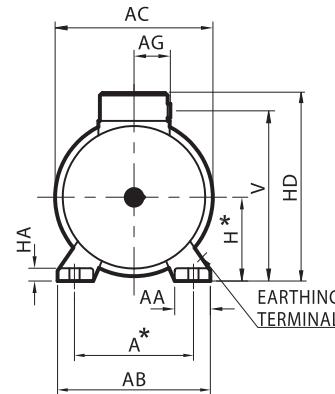
DIMENSIONAL DRAWING

CE

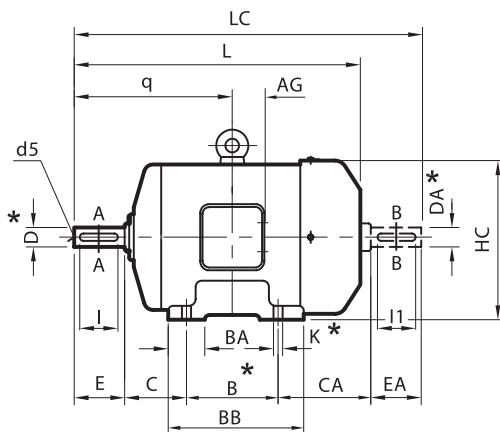
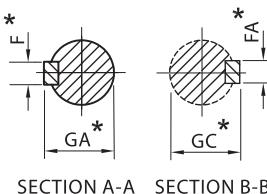
Crane and Hoist Duty Motors Type MC Foot Mounted (B3) TEFC series Frame 63-355L



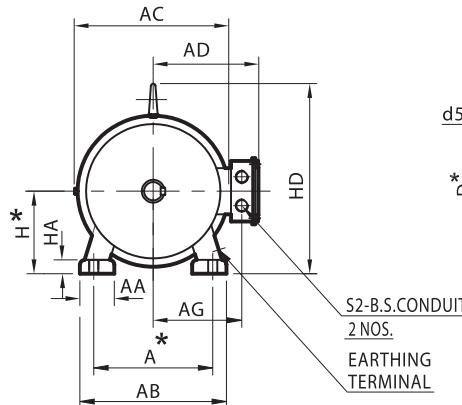
FRAME SIZE 63 TO 80



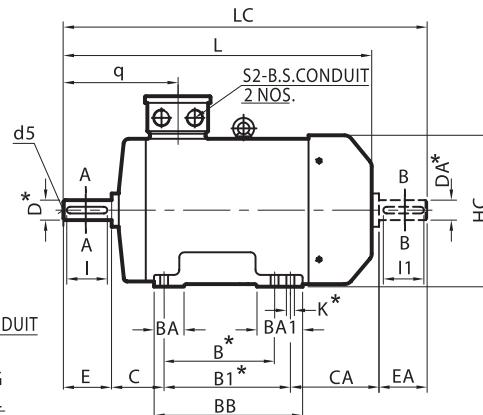
FRAME SIZE 90S TO 180L



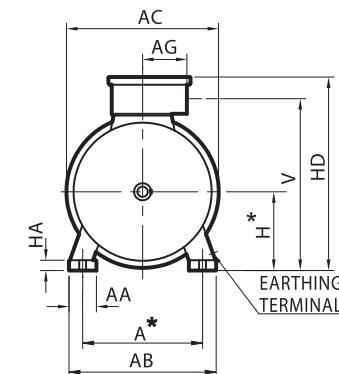
FRAME SIZE 200L TO 225M



*Refer TABLE A for tolerances



FRAME SIZE 250M TO 355L



MOTORS FOR CRANE & HOIST DUTY

DIMENSIONAL DETAILS

CE

Crane and Hoist Duty Motors Type MC Foot Mounted (B3) TEFC Series Frame 63-355L

IEC Fr. Size	Pole	FIXING					GENERAL										TERMINAL BOX					SHAFT									
		A*	B*	B1*	C	H*	K*	AB	BB	AA	BA	BA1	HA	HC	HD	AD	L	LC	CA	AC	V	q	AG	S2 B.S.C.	D,DA*	E EA	F* FA*	GA* GC*	I I1	d5	
63	2 & 4	100	80	—	40	63	7	126	100	28	30	—	7	125	179	—	206	241	75	124	149	104	40	3/4"	11	23	4	12.5	18	M4	
71	2,4 & 6	112	90	—	45	71	7	135	110	31	30	—	7	141	195	—	234	278	83	140	166	122	40	3/4"	14	30	5	16	25	M5	
80	2,4 & 6	125	100	—	50	80	10	150	124	31	35	—	9	159	214	—	267	324	94	17	185	142	40	3/4"	19	40	6	21.5	35	M6	
90S	2,4,6 & 8	140	100	—	56	90	10	168	125 150	34	31.5	—	12	177	(1)	140	302	374	118	174	38	156 169	109	3/4"	24	50	8	27	45	M8	
90L	2,4,6 & 8		125	—	—	—	—	—		—	—	—	—	—	—		327	399	—	—											
100L	2,4,6 & 8	160	140	—	63	100	12	190	174	43.5	36	—	12	198	235	162	366	448	125	195	44	193	125	1"	28	60	8	31	55	M10	
112M	4,6 & 8	190	140	—	70	112	12	220	174	47	36	—	12	222	260	170	388	471	141	220	56	200	137	1"	28	60	8	31	55	M10	
132S	2	216	140	—	89	132	12	256	180	50 64	—	17	262	308	206	464	567	178	239	260	99	258	167	1"	38	80	10	41	70	M12	
132M	2		178	—	—	—	—	—	449							552	163														
160M	2	254	210	—	108	160	15	310	250	58 294	70	—	20	318	366	226	605	741	203	323	316	98	345	186	1"	42	110	12	45	105	M16
160L	2		254	—	—	—	—	—	585								721	183													
180M	2,4,6 & 8	279	241	—	121	180	15	344	281	65 319	70	—	26	357	412	265	679	799	217	354	352	216	1 1/2"	48	110	14	51.5	100	M16		
180L	2,4,6 & 8	279	279	—	—	—	—	—	717								838	218													
200L	2	318	305	—	133	200	19	398	355	85 85	85	—	32	397	462	312	795	920	262	394	396	249	2"	55	110	16	59	100	M20		
225S	4,6 & 8	356	286	—	149	225	19	436	336								817	966	221	432.5	450	—	415	273	2"	60	140	18	64	130	M20
225M	2		311	—	—	—	—	—	837								956	276													
250M	2	406	349	—	168	250	24	506	425	100	115	—	42	495	665	—	914	1065	268	489	578	352	205	2"	60	140	18	64	130	M20	
280S/M	2		457	368	419	190	280	24	540	490	100	110	149	42	552	725	—	1010	1160	271	544	638	360	205	2"	65	140	18	69	130	M20
315S/M	2	508	406	457	216	315	28	625	540	100	115	155	45	620	830	—	1137	1293	340	610	728	386	218	2"	65	140	18	69	130	M20	
315L	2		508	—	—	—	—	—	593								120	120	454	416	386	2 1/2"	80	170	22	85.5	160	130	M20		
355L	2	610	630	—	254	355	28	710	770	110	170	—	45	693	939	—	1461	1622	458	305	434 464	658	850	3"	75	140	20	79.5	130	M24	
	4,6 & 8		610	630	—	—	—	—	1491								1682	—													

TABLE A

Dimension	Tolerance		Specification	Dimension	Tolerance		Specification
A, B	±0.75		IS : 1231	D, DA	j6	11, 14, 19, 24, 28Ø	IS : 1231
H	-0.5	UPTO 280			k6	38, 42, 48Ø	
	-1.0	OVER 280			m6	55, 60, 65, 75, 80, 95Ø	
K	+0.360	7,10Ø		GA, GC, F, FA			IS : 2048
	+0.430	12,15Ø		d5 (centering)			IS : 2540
	+0.520	19,24,28Ø					

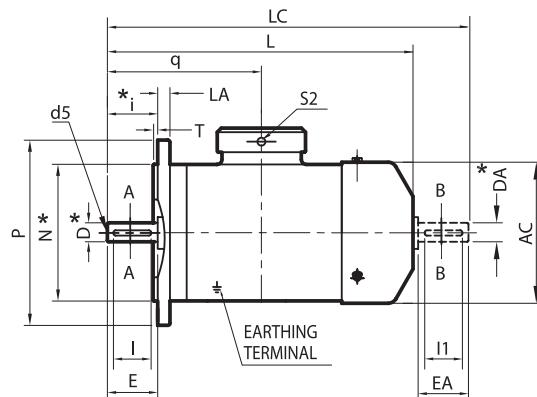
(1) Without Eye bolt

- Key / key way fit : h9 /N9
- Double Shaft extension can be provided with shaft dimension identical to D.E. shaft
- For 225 S/M 4,6 & 8 pole Non Drive shaft extension will be limited to 55 mm dia.
- For 280 S/M 4,6 & 8 pole Non Drive shaft extension will be limited to 65 mm dia.
- Also suitable for B6,B7B8,V5 & V6 mounting as per IS 2253

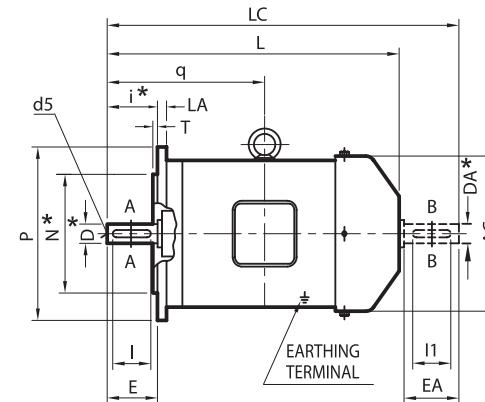
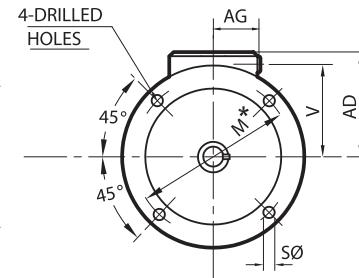
All Dimensions are in mm unless otherwise specified.

CAT-C-6335-3-2

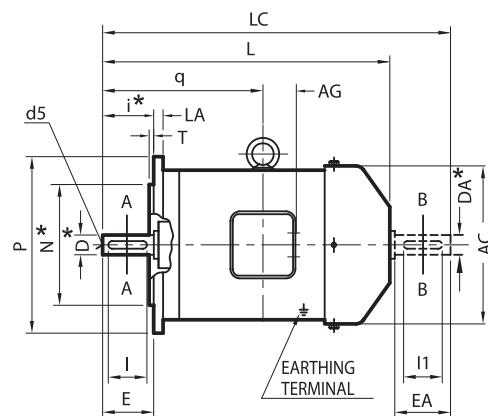
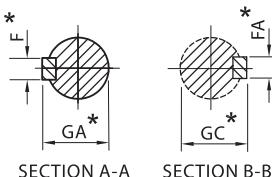
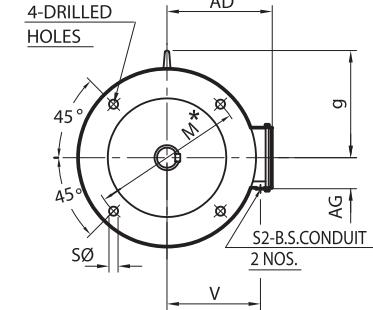
Crane and Hoist Duty Motors Type MC Flange Mounted (B5) TEFC series Frame 63-355L



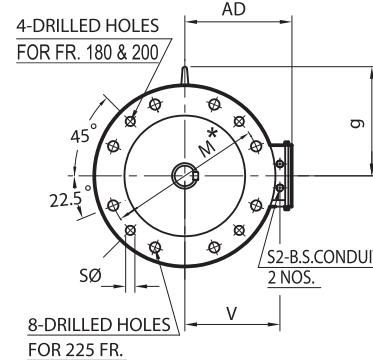
FRAME SIZE 63 TO 80



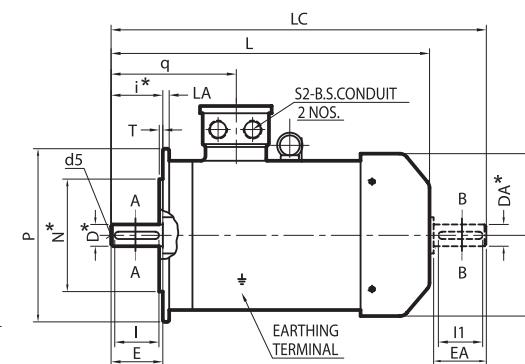
FRAME SIZE 90S TO 180L



FRAME SIZE 200L TO 225M



*Refer TABLE A for tolerances



FRAME SIZE 250M TO 355L

MOTORS FOR CRANE & HOIST DUTY

DIMENSIONAL DETAILS



Crane and Hoist Duty Motors Type MC Flange Mounted (B5) TEFC Series Frame 63-355L

IEC Fr. Size	Pole	FIXING				GENERAL						TERMINAL BOX				SHAFT							
		P	N*	M*	i*	S	T	LA	AD	AC	L	LC	g	V	q	AG	S2 B.S.C.	D,DA*	E EA	F* FA	GA* GC*	I I1	d5
63	2 & 4	140	95	115	23	10	3	9	116	124	225	260	-	86	122	40	3/4"	11	23	4	12.5	18	M4
71	2, 4 & 6	160	110	130	30	10	3.5	9	124	140	261	305	-	95	147	40	3/4"	14	30	5	16	25	M5
80	2, 4 & 6	200	130	165	40	12	3.5	10	134	157	267	324	-	105	142	40	3/4"	19	40	6	21.5	35	M6
90S	2, 4, 6, & 8	200	130	165	50	12	3.5	10	140	174	302	374	①	109	156	52	3/4"	24	50	8	27	45	M8
90L	2, 4, 6, & 8										327	399			169								
100L	2, 4, 6 & 8	250	180	215	60	15	4	11	162	195	366	448	135	125	193	56	1"	28	60	8	31	55	M10
112M	4, 6 & 8	250	180	215	60	15	4	11	170	220	388	471	148	137	200	56	1"	28	60	8	31	55	M10
132S	2	300	230	265	80	15	4	12	206	260	464	567	176	167	239	63	1"	38	80	10	41	70	M12
	4, 6 & 8										449	552			258								
132M	2	350	250	300	110	19	5	13	226	316	502	605	206	186	323	63	1"	42	110	12	45	105	M16
	4 & 6										487	590			345								
160M	2	350	250	300	110	19	5	13	226	316	605	741	206	186	323	63	1"	42	110	12	45	105	M16
	4, 6 & 8										585	721			345								
160L	2	400	300	350	110	19	5	13	265	354	649	785	232	216	352	97	1 1/2"	48	110	14	51.5	100	M16
	4, 6 & 8										629	765			371								
180M	2, 4, 6 & 8	350	250	300	110	19	5	13	265	354	679	799	232	216	352	97	1 1/2"	48	110	14	51.5	100	M16
	2, 4, 6 & 8										717	838			371								
200L	2	400	300	350	110	19	5	15	312	394	795	920	262	249	369	172	2"	55	110	16	59	100	M20
	4, 6 & 8										772	897			345								
225S	4, 6 & 8	450	350	400	140	19	5	16	337	450	817	966	284	273	432.5	172	2"	60	140	18	64	130	M20
	2										837	956			415								
225M	4, 6 & 8	450	350	400	110	19	5	16	337	450	842	991	416	445	445	218	2 1/2"	60	140	18	64	130	M20
	2										1302	1458			386								
250M	2	550	450	500	140	19	5	18	415	489	914	1065	328	352	205	205	2"	60	140	18	64	130	M20
	4, 6 & 8										1332	1518			416								
280S/M	2	550	450	500	140	19	5	18	445	544	1010	1160	358	360	205	205	2"	65	140	18	69	130	M20
	4, 6 & 8										1137	1293	413	386	218	2 1/2"	80	170	22	85.5	160	M20	
315S/M	2	660	550	600	140	24	6	22	515	610	1167	1353			386								
	4, 6 & 8										1302	1458			416								
315L	2	660	550	600	170	24	6	25	584	690	1461	1622	495	434	305	3"	75	140	20	79.5	130	M20	
	4, 6 & 8										1491	1682			464								

TABLE A

Dimension	Tolerance Specification		IS : 2223	Dimension	Tolerance		IS : 1231	Specification
N	j6	UPTO 450		D, DA	j6	11, 14, 19, 24, 28Ø		m6
M	±0.3	UPTO 265		k6	38, 42, 48Ø	GA, GC, F, FA	d5 (centering)	
I	±1.0	UPTO 85		m6	55, 60, 65, 75, 80, 95Ø	IS : 2540		

① Without Eye bolt

- Key / key way fit : h9 /N9
- 8 Nos. Fixing Holes from 225 S/M frame onwards
- Double Shaft extension can be provided with shaft dimension identical to D.E. shaft
- For 225 S/M 4,6 & 8 pole Non Drive shaft extension will be limited to 55 mm dia.
- For 280 S/M 4,6 & 8 pole Non Drive shaft extension will be limited to 65 mm dia.
- Also suitable for V1 & V3 mounting as per IS 2253

All Dimensions are in mm unless otherwise specified.

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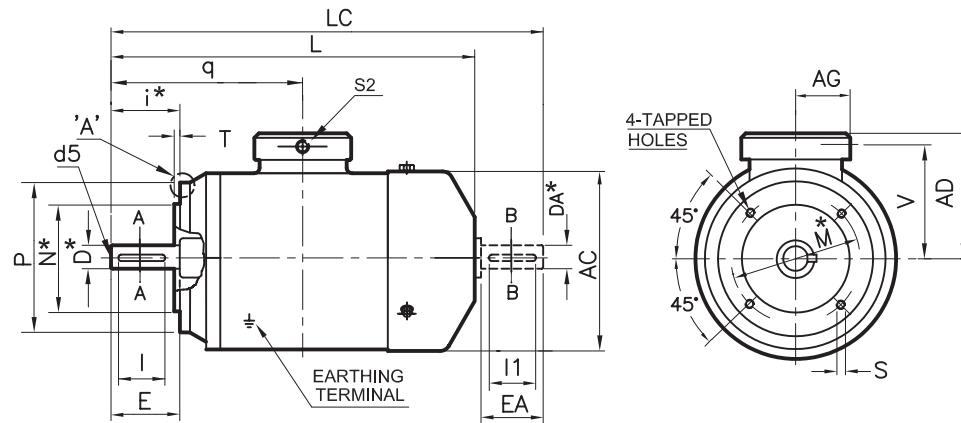
MOTORS FOR CRANE & HOIST DUTY

DIMENSIONAL DRAWING

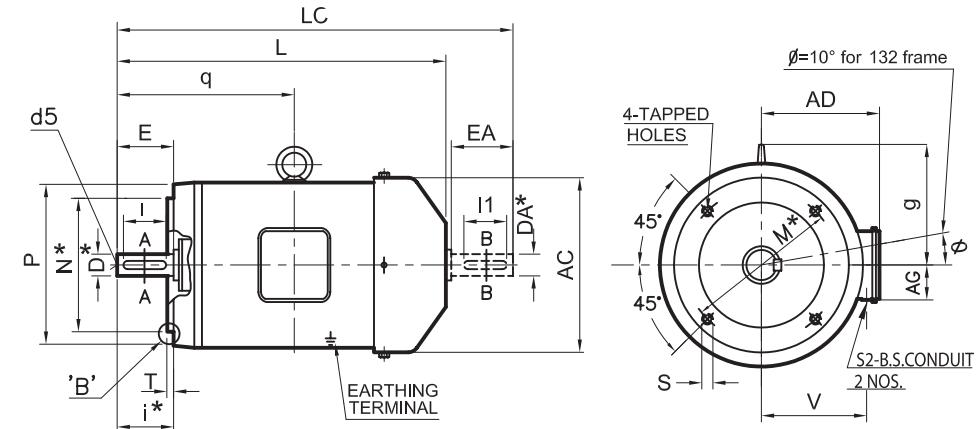
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Crane and Hoist Duty Motors Type MC Face Mounted (B14) TEFC Series Frame 63-132M

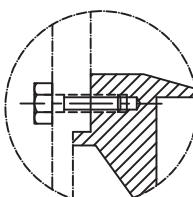


FRAME SIZE 63 TO 80



FRAME SIZE 90S TO 132M

*Refer Table A
For Tolerances



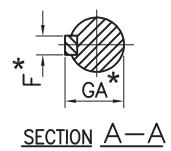
ENLARGEMENT
OF CIRCLE 'A'

IEC Fr. Size	Pole	FIXING				GENERAL				TERMINAL BOX				SHAFT								
		P	N*	M*	i*	S	T	AD	AC	L	LC	g	V	q	AG	S2 B.S.C.	D,DA*	E EA	F* FA*	GA* GC*	I	I1
63	2 & 4	90	60	75	23	M5X10	2.5	116	124	206	241	-	86	104	40	3/4"	11	23	4	12.5	18	M4
71	2,4 & 6	105	70	85	30	M6X10	2.5	124	140	234	278	-	95	122	40	3/4"	14	30	5	16	25	M5
80	2,4 & 6	120	80	100	40	M6X13	3	134	157	267	324	-	105	142	40	3/4"	19	40	6	21.5	35	M6
90S	2,4,6 & 8	140	95	115	50	M8X12	3	140	174	302	374	①	109	156	52	3/4"	24	50	8	27	45	M8
90L	2,4,6 & 8									327	399			169								
100L	2,4,6,8 & 8	160	110	130	60	M8X12	3.5	162	195	366	448	135	125	193	56	1"	28	60	8	31	55	M10
112M	4,6 & 8	160	110	130	60	M8x12	3.5	170	220	388	471	148	137	200	56	1"	28	60	8	31	55	M10
132S	2	250	180	215	80	M12X20	4	206	260	464	567	176	167	239	63	1"	38	80	10	41	70	M12
	4 & 6									449	552			258								
	2									502	605											
132M	4 & 6									487	590											

TABLE A

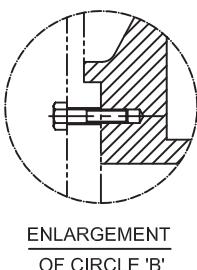
Dimension	Tolerance	Specification
N	j6	is : 2223
M	+0.3	
I	±1	

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



SECTION A-A

- ① Without Eye bolt
- Also suitable for V19 & V18 mounting as per IS 2253
- Key / key way fit : h9 / N9
- Double Shaft extension can be provided with shaft dimension identical to D.E. shaft.



SECTION B-B

Application

Slipring induction motors are used for systems specifying limitations on starting current, for high inertia drives and for frequent starting. The motors are eminently suitable for high mechanical and electrical stresses encountered under heavy duty conditions such as excavating machines, stone crushers, main and auxiliary drives in rolling mills etc. These motors are well suited for smooth starting by using the resistance bank. These motors can also be used for variable speed drives, particularly for short periods and within a small speed range.

Insulation

The motors are provided with F insulation scheme with temperature rise for stator windings limited to class B limits and rotor winding limited to class F limits.

Enclosures : (Material & T-Box Location)

Frame sizes	Enclosure Materials	Terminal Box Location	
		Standard	Options Available
100L-160L	Cast Iron	Top	---

Degree of Protection

All motor have IP55 degree of protection as per IS:4691. Higher degree of protection such as IP 56, IP 65, IP 66 can be offered on request. All flange mounted motors are additionally provided with oil tight shaft protection on driving and side.

Additional Mechanical Features

The sliprings at the drive end are accessible through hinged brushes on the top after opening the T. Box cover. The brush block assembly can hence easily be replaced as a whole unit without dismantling the motor. The terminal box of the motor, contains 3 terminals for stator and 3 for rotor and 2 cable entries.

Starting and Speed Control

The maximum torque (which is approx. the pull-out torque) can be obtained for starting by correct selection of the resistance of the controller. By appropriately switching the resistance as the motor picks up speed, the mean torque during starting can be as high as 2.25 times the rated full load torque.

The values of rated current and voltage required for selecting the starting resistors are listed in the Tables 2A &2B (page 14 & 15).

For reduced load, the rotor current reduces and is given by rated current x (reduced load/rated load)

The rotor current while starting is proportional to the

motor torque and determines the size of the starting resistance.

Fine speed variation is possible by inserting resistance in the rotor circuit calculated per phase as:

$$R_c = \frac{V_r \times (N_s - N)}{3 \times I_r \times N_s \times M} - R_r$$

Where V_r , I_r and R_r are the open circuit voltage, rated current and resistance of the rotor, M_n and M are the rated and required torque values, and N_s and N are the synchronous and required speed respectively.

Since the cooling is reduced at lower speed, torque and output must be reduced as per the following table, otherwise a larger motor should be selected.

Speed %	100	90	80	70	60	50
Torque %	100	96	91	85	80	72
Output %	100	86	73	60	48	36

At lower speeds the torque speed characteristic is such that the speed varies inversely as the load. Below 50% rated speed, satisfactory operating characteristics may not be obtained even if the load torque remains constant.

If sufficiently ventilated by using a separate fan etc. the motor can provide the full load torque at reduced speed.



MOTORS FOR CRANE & HOIST DUTY

SLIPRING INDUCTION MOTORS



17

TEFC 3 Ph. Slip-ring Induction Motors Crane & Hoist Duty Fr. 100L To 160L

Voltage : 415V \pm 10%
 Frequency : 50Hz \pm 5%
 Combined Variation : \pm 10%

Ambient : 45°C
 Duty : S3/S4/S5

Ins. Class Stator/Rotor : F/F
 Temp. Rise Stator/Rotor: B/F
 Protection : IP55

Table-2 A

1500 rpm (4-pole)

	Frame size IEC	Type Ref. B3 Construction	25% CDF				40% CDF				60% CDF										
			kW	RPM	Pullout Torque to Rated Torque Ratio	Line Amps	kW	RPM	Pullout Torque to Rated Torque Ratio	Line Amps	kW	RPM	Pullout Torque to Rated Torque Ratio	Line Amps	Stator	Rotor	Rotor O.C.V.	Gd ² Rotor	Kgm ² Load	Wt. Of motor Kg.	
60 stars per hour	100L	MP10L413	1.8	1200	1.85	4.7	23.5	1.5	1280	2.3	4.0	18	1.3	1320	2.8	3.7	14.5	70	0.03	0.08	37
	100L	MP10L433	2.5	1200	1.85	6.6	26.0	2.5	1200	1.85	6.6	26	2.2	1255	2.2	5.7	21.0	85	0.035	0.09	40
	112M	MP11M413	4.1	1200	2.0	10.5	32.0	3.6	1290	2.4	9.3	25.8	3.1	1325	2.9	8.2	20.7	110	0.48	0.12	58
	112M	MP11M433	5.0	1300	2.2	11.2	27.2	4.0	1340	2.7	9.7	20.9	3.6	1370	3.3	8.6	18.7	140	0.056	0.14	61
	132M	MP13M413	6.0	1300	2.0	14.7	33.0	5.7	1310	2.1	13.4	31.3	5.0	1350	2.4	11.4	27.2	130	0.090	0.22	90
	132M	MP13M463	8.3	1365	2.0	18.5	32.3	7.5	1375	2.2	17	29.0	6.4	1410	2.6	14.6	23.7	180	0.14	0.35	94
150 stars per hour	100L	MP10L413	1.7	1240	2.0	4.5	21.5	1.4	1300	2.6	3.9	16.5	1.3	1320	2.8	3.7	14.5	70	0.03	0.08	37
	100L	MP10L433	2.5	1200	1.85	6.6	26.0	2.4	1220	2.0	6.3	24.0	2.1	1265	2.3	5.4	20.0	85	0.035	0.09	40
	112M	MP11M413	4.1	1200	2.0	10.5	32.0	3.5	1295	2.5	9.0	24.5	3.0	1330	3.0	8.1	20.0	110	0.048	0.12	58
	112M	MP11M433	4.7	1315	2.4	10.6	24.6	4.0	1350	2.9	9.4	19.5	3.5	1375	3.4	8.4	18.5	140	0.056	0.14	61
	132M	MP13M413	6.0	1300	2.0	14.7	33.0	5.4	1325	2.2	12.3	29.4	4.7	1365	2.6	10.8	25.6	130	0.09	0.22	90
	132M	MP13M463	7.2	1390	2.3	16.2	27.5	6.3	1415	2.7	14.4	23.3	5.6	1420	3.0	13.4	20.3	180	0.14	0.35	94
300 stars per hour	100L	MP10L413	1.6	1260	2.2	4.3	20.0	1.3	1320	2.8	3.7	14.5	1.2	1340	3.1	3.6	13.5	70	0.03	0.08	37
	100L	MP10L433	2.5	1200	1.85	6.6	26.0	2.3	1240	2.1	6.0	22.5	2.6	1280	2.5	5.1	18.5	85	0.035	0.09	40
	112M	MP11M413	3.9	1250	2.2	9.9	29.4	3.3	1310	2.7	8.5	22.0	2.8	1345	3.3	7.8	18.3	110	0.048	0.12	58
	112M	MP11M433	4.1	1345	2.8	9.6	20.2	3.5	1375	3.4	8.4	18.5	3.2	1385	3.7	8.2	16.7	140	0.056	0.14	61
	132M	MP13M413	5.5	1320	2.2	12.5	30.0	4.8	1360	2.6	11.0	26.1	4.3	1390	2.9	9.9	23.0	130	0.09	0.22	90
	132M	MP13M463	5.5	1420	3.1	13.2	20.0	5.0	1430	3.4	10.9	18.2	4.5	1435	3.8	10.3	16.4	180	0.14	0.35	94

MOTORS FOR CRANE & HOIST DUTY

SLIPRING INDUCTION MOTORS



TEFC 3 Ph. Slip-ring Induction Motors Crane & Hoist Duty Fr. 100L To 160L

Voltage : $415V \pm 10\%$
 Frequency : $50Hz \pm 5\%$
 Combined Variation : $\pm 10\%$

Ambient : $45^\circ C$
 Duty : S3/S4/S5

Ins. Class Stator/Rotor : F/F
 Temp. Rise Stator/Rotor : B/F
 Protection : IP55

Table-2 B

1000 rpm (6-pole)

	Frame size IEC	Type Ref. B3 Construction	25% CDF					40% CDF					60% CDF								
			kW	RPM	Pullout Torque to Rated Torque Ratio	Line Amps		kW	RPM	Pullout Torque to Rated Torque Ratio	Line Amps		kW	RPM	Pullout Torque to Rated Torque Ratio	Line Amps		Stator O.C.V.	Rotor Gd ² Rotor	Kgm ² Load	Wt. Of motor Kg.
						Stator	Rotor				Stator	Rotor				Stator	Rotor				
60 stars per hour	100L	MP10L613	1.3	800	1.75	3.8	17.0	1.1	850	2.2	3.5	13.0	1.0	870	2.5	3.4	12.0	65	0.034	0.09	37
	100L	MP10L623	1.9	785	2.0	5.4	18.5	1.5	870	2.8	5.0	13.0	1.3	890	3.3	4.7	11.0	80	0.038	0.1	40
	112M	MP11M623	2.6	820	2.2	9.8	22.5	2.4	840	2.2	6.4	20.5	2.1	870	2.7	6.0	17.1	90	0.068	0.17	58
	112M	MP11M643	3.8	830	2.0	9.6	23.5	3.3	850	2.3	8.6	20.5	2.8	880	2.8	8.2	17.0	115	0.076	0.19	61
	132M	MP13M613	4.8	860	2.1	12.5	32.5	4.0	890	2.6	11.0	26.0	3.4	910	3.0	9.7	21.0	110	0.153	0.38	90
	132M	MP13M663	6.6	870	1.9	16	35.0	5.5	895	2.5	13.3	26.5	4.8	915	2.9	12.4	23.0	140	0.18	0.45	94
	160L	MP16L613	8.0	900	2.0	18.1	33.0	7.0	920	2.1	15.8	31.3	6.5	930	2.5	14.7	27.2	165	0.31	0.77	129
	160L	MP16L653	11.5	890	1.6	25.3	46.2	10.0	915	1.8	21.0	28	9.0	920	2.1	19.8	25.2	240	0.378	0.94	139
150 stars per hour	100L	MP10L613	1.3	800	1.75	3.8	17.0	1.1	850	2.2	3.5	13.0	1.0	870	2.5	3.4	12.0	65	0.034	0.09	37
	100L	MP10L623	1.8	810	2.2	5.3	17.0	1.5	870	2.8	5.0	13.0	1.3	890	3.3	4.7	11.0	80	0.038	0.1	40
	112M	MP11M623	2.6	820	2.0	6.8	22.5	2.3	850	2.4	6.2	19.5	2.0	875	2.8	5.9	16.0	90	0.068	0.17	58
	112M	MP11M643	3.8	830	2.0	9.6	23.5	3.2	855	2.4	8.5	20.0	2.7	885	3.0	8.1	16.5	115	0.076	0.19	61
	132M	MP13M613	4.5	865	2.2	11.9	30.0	3.7	895	2.8	10.4	23.5	3.2	915	3.3	9.4	19.5	110	0.153	0.38	90
	132M	MP13M663	6.5	870	2.0	15.1	34.0	5.4	895	2.7	13.2	25.0	4.6	920	3.0	12.0	22.0	140	0.18	0.45	94
	160M	MP16M613	8.0	900	2.0	18.1	33.0	7.0	920	2.3	15.8	29	6.0	930	2.7	13.4	25	165	0.31	0.77	129
	160L	MP16L653	10.5	900	1.8	23.1	29.4	9.5	915	1.9	21.0	28	8.6	930	2.25	18.5	24	240	0.378	0.94	139
300 stars per hour	100L	MP10L613	1.3	800	1.75	3.8	17.0	1.1	850	2.2	3.5	13.0	0.9	890	2.8	3.3	10.5	65	0.034	0.09	37
	100L	MP10L623	1.8	810	2.2	5.3	17.0	1.5	870	2.8	5.0	13.0	1.3	890	3.3	4.7	11.0	80	0.038	0.1	40
	112M	MP11M623	2.6	820	2.0	6.8	22.5	2.3	850	2.4	6.2	19.5	1.9	880	3.0	5.7	15.0	90	0.068	0.17	58
	112M	MP11M643	3.6	840	2.1	9.2	22.0	3.0	870	2.6	8.3	18.5	2.6	890	3.1	8.0	16.0	115	0.076	0.19	61
	132M	MP13M613	4.0	890	2.6	11.0	26.0	3.4	905	3.0	9.7	21.0	3.0	920	3.5	9.0	18.0	110	0.153	0.38	90
	132M	MP13M663	6.1	875	2.2	14.6	30.0	5.1	900	2.7	12.5	24.0	4.4	930	3.2	11.5	20.5	140	0.18	0.45	94
	160M	MP16M613	6.7	920	2.4	15.2	28.0	5.5	940	2.9	12.3	23	5.0	945	3.2	11.2	21	165	0.31	0.77	129
	160L	MP16L653	9.0	920	2.1	19.8	25.2	8.0	935	2.4	17.4	22.6	7.5	940	2.5	16.5	21	240	0.378	0.94	139

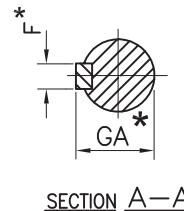
MOTORS FOR CRANE & HOIST DUTY

DIMENSIONAL DETAILS

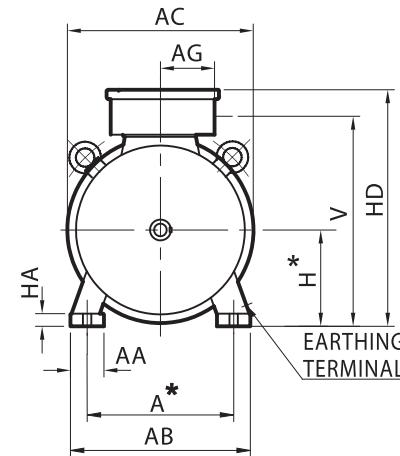
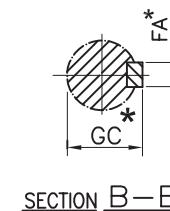
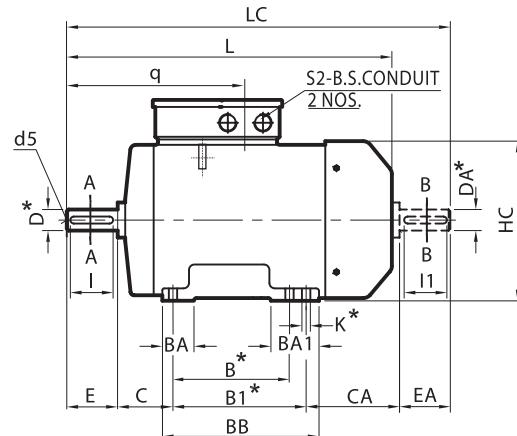
CE

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Slip Ring Motor Type MP Foot Mounted (B3) TEFC Frame 100L-160 M/L



*Refer Table A
For Tolerances



IEC Fr. Size	Pole	FIXING					GENERAL												TERMINAL BOX				SHAFT						
		A*	B*	B1*	C	H*	K*	AB	BB	AA	BA	BA1	HA	HC	HD	L	LC	CA	AC	V	q	AG	S2 B.S.C.	D,DA*	E EA	F* FA	GA* GC*	I I1	d5
100L	4, 6	160	140	-	63	100	12	200	176	54	50	-	14	198	252	488	570	247	195	210	295	61	3/4"	28	60	8	31	55	M10
112M	4, 6	190	140	-	70	112	12	230	176	62	50	-	15	222	281	537	620	290	220	230	316	63	3/4"	28	60	8	31	55	M10
132M	4, 6	216	178	-	89	132	12	256	218	64	54	-	17	262	317	612	715	288	260	266	364	74	3/4"	38	80	10	41	70	M12
160M/L	4, 6	254	210	254	105	160	15	314	294	60	70	115	20	318	366	730	866	287	316	315	434	88	1"	42	110	12	45	105	M16

TABLE A

Dimension	Tolerance		Specification	Dimension	Tolerance		Specification
A,B	± 0.75			D, DA	J6	28Ø	IS : 1231
H	-0.5		IS : 1231		K6	38,42Ø	
K	$+0.430$			GA, GC, F, FA			IS : 2048
				d5(centering)			IS : 2540

- 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 & V6 mounting as per IS 2253

All Dimensions are in mm unless otherwise specified.

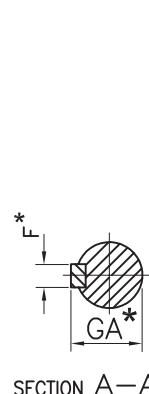
CAT-P-1016-3-1

MOTORS FOR CRANE & HOIST DUTY

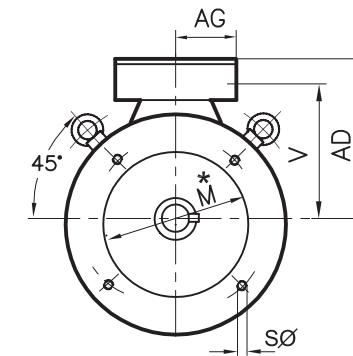
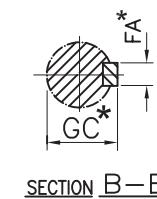
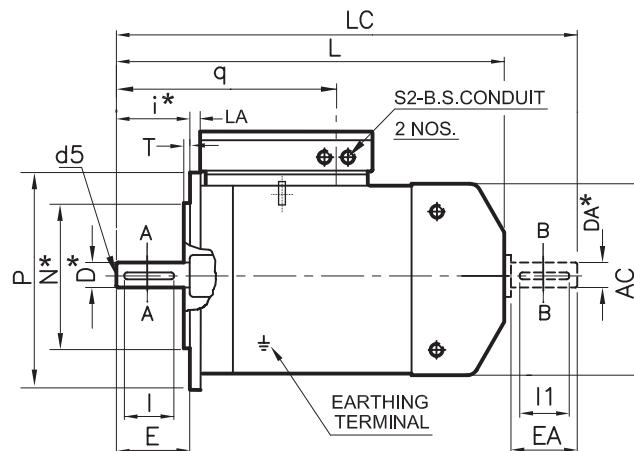
DIMENSIONAL DETAILS

CE

Slip Ring Motor Type MP Flange Mounted (B3) TEFC Frame 100L-160 M/L



*Refer Table A
For Tolerances



IEC Fr. Size	Pole	P	N*	M*	i*	FIXING		GENERAL						TERMINAL BOX		SHAFT						
						S	T	LA	AD	AC	L	LC	V	q	AG	S2 B.S.C.	D,DA*	E	EA	F*	FA*	GA*
100L	4, 6	250	180	215	60	15	4	11	152	195	488	570	110	295	61	3/4"	28	60	8	31	55	M10
112M	4, 6	250	180	215	60	15	4	11	169	220	537	620	118	316	63	3/4"	28	60	8	31	55	M10
132M	4, 6	300	230	265	80	15	4	12	185	560	612	715	134	364	74	3/4"	38	80	10	41	70	M12
160M/L	4, 6	350	250	300	110	19	5	13	206	316	730	866	155	434	88	1"	42	110	12	45	105	M16

TABLE A

Dimension	Tolerance	Specification	Dimension	Tolerance		Specification
N	j6	IS : 2223	D, DA	j6	28Ø	IS : 1231
M	±0.5			K6	38,42Ø	
i	±1.5		GA, GC, F, FA			IS : 2048
			d5(centering)			IS : 2540

- Key / key way fit : h9 / N9
- Double Shaft extension can be provided with shaft dimension identical to D. E. shaft
- Also suitable for V1 & V3 mounting as per IS 2253

All Dimensions are in mm unless otherwise specified.

CAT-P-1016-5-1

Introduction

Bharat Bijlee has developed a special series of cane unloader motors for unloading cane at sugar mills.

These motors are designed after thorough study of the cane unloader application in sugar mills.

Application

These motors are primarily crane duty motors suitable for very high no. of switching per hour. These motors can be used for lifting applications where high switching frequencies lead to overheating and burnouts. These motors are developed with specially designed sq. cage rotor and readily replaces slip ring induction motors.

Salient Features:

- **Very high no of switching:** These motors are suitable for very high no. of switching ie. 900 starts/stop per hour which includes inching and plugging.
- **Special winding & impregnation:** The stators are wound with Dual Coated(DC) winding wires as per IS 13730 part 13 and winding is impregnated with VPI process. This improves the thermal withstand capacity of the motor.
- **Robust construction:** Shaft material is given special heat treatment to withstand high intermittent load. These motors have special squirrel cage die cast rotors which ensure minimum maintenance and trouble free operation.
- **Forced cooling:** This ensures continuous cooling of the motor.
- **Built in thermal protection :** Built in thermal protection is provided by embedding thermostats in the winding. This ensures protection of the motor against failure due to excessive heating caused by severe starting duty, single phasing, overloading, low voltage etc.
- **Compact design :** Compact in size as the auxiliary fan motor used for forced cooling is an integral part of the main motor.

Product Range

Frame size	kW range
160L to 225M	11 to 30

ELECTRICAL FEATURES :

Operating Conditions

Supply Condition (Voltage, Frequency & Duty)

Voltage	: $415V \pm 10\%$
Frequency	: $50Hz \pm 5\%$
Combined Variation	: $\pm 10\%$
Duty	: S5,50% CDF, 900 Switching per hour.

Ambient

Motors are designed for ambient temperature 45°C

Altitude

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

Insulation

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

MECHANICAL FEATURES:

Construction:

TEFC Horizontal foot mounting (B3) as per IS 1231
TEFC Horizontal flange mounting (B5) as per IS 2223

Terminal Box Location

As standard practice terminal box will be located on RHS when viewed from DE side. However motors can be offered with T box location on LHS when viewed from DE side or top on request.

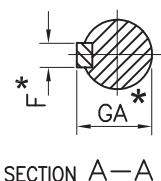
Rated Output		Frame size IEC	Type Ref. B3 Construction	Operating Characteristicse at rated output			Starting Current to rated current Ratio	Starting torque to rated torque Ratio	Pullout torque to rated torque Ratio	Rotor Gd2 Kgm2	Net Weight B3 Constru. Kg
				Speed RPM	Current Amps.	Rated Torque Kg.m					
kW	HP										
11	15	160L	MF16L673	965	21.6	11.1	5.5	2.25	2.30	0.4	140
15	20	180M	MF18L613	940	29	15.5	5.5	2.25	2.30	0.68	190
18.5	25	180L	MF18L633	950	36.9	19.0	5.5	2.25	2.30	0.82	220
22	30	200L	MF20L633	955	43	22.4	5.5	2.25	2.30	1.2	260
30	40	225M	MF22M653	975	54	30.0	5.5	2.25	2.30	2.42	395

MOTORS FOR CRANE & HOIST DUTY

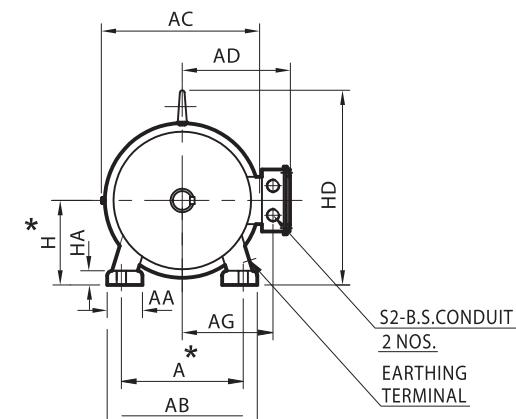
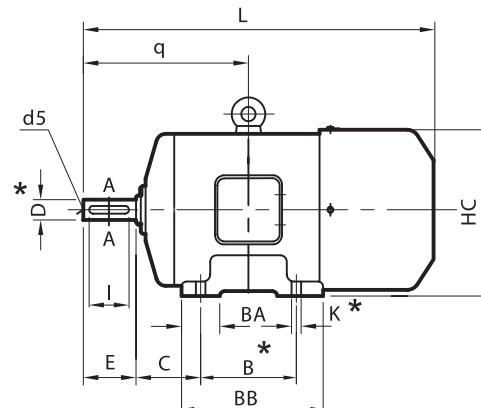
DIMENSIONAL DETAILS

CE

Cane Unloader Motor Type MF Foot Mounted (B3) TEFC Frame 160L-225M



*Refer Table A
For Tolerances



IEC Fr. Size	Pole	FIXING				GENERAL										T. BOX			SHAFT																			
		A*	B*	C	H*	K*	AB	BB	AA	BA	HA	HC	HD	AD	L	AC	q	AG	S2 B.S.C.	D*	E	F*	GA*	I	d5													
160L	2 4,6 & 8	254	254	108	160	15	310	294	58	70	20	318	366	246	799	316	345	204	1"	42	110	12	45	105	M16													
															779																							
180M	2,4,6 & 8	279	241	121	180	15	344	281	65	70	26	357	412	280	884	354	352	225	1 1/2"	48	110	14	51.5	100	M16													
180L	2,4,6 & 8														922																							
200L	2 4,6 & 8	318	305	133	200	19	398	355	85	85	32	397	462	312	988	394	396	249	2"	55	110	16	59	100	M20													
															965																							
225S	4,6 & 8	356	286	149	225	19	436	336	85	85	34	450	509	337	1017	450	433	273	2"	60	140	18	64	130	M20													
225M	2 4,6 & 8														1032																							
															1037																							

TABLE A

Dimension	Tolerance		Specification	Dimension	Tolerance		Specification	
A,B	± 0.75		IS : 1231	D	K6	42, 48Ø	IS : 1231	
H	-0.5				M6	55, 60Ø		
K	+0.430	12,15Ø		GA,F		IS : 2540		
	+0.520	19Ø		d5(centring)		IS : 2540		

- Online re-greasing arrangement is provided in frame size 225S & 225M.
- For Frame Size 180M, 180L and 200L it can be provided on request.
- Also suitable for B6,B7,B8,V5 & V6 mounting as per IS 2253
- Key / key way fit : h9 / N9

All Dimensions are in mm unless otherwise specified.

CAT-F-1622-3-1

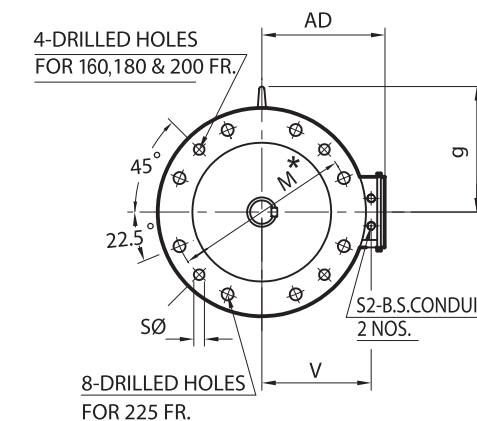
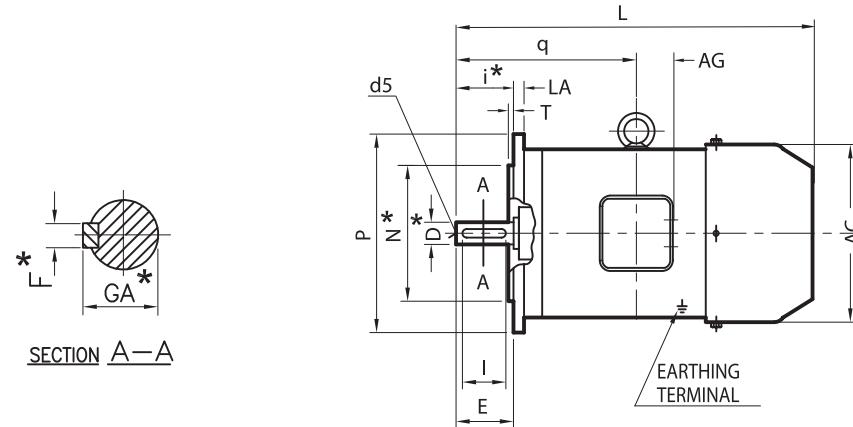
MOTORS FOR CRANE & HOIST DUTY

DIMENSIONAL DETAILS

CE

23

Cane Uploader Motor Type MF Flange Mounted (B5) TEFC Frame 160L-225M



*Refer Table A
For Tolerances

IEC Fr. Size	Pole	FIXING				GENERAL						TERMINAL BOX				SHAFT						
		P	N*	M*	i*	S	T	LA	AD	AC	L	g	V	q	AG	S2 B.S.C.	D*	E	F*	GA*	I	d5
160L	2	350	250	300	110	19	5	13	246	316	799	206	204	345	63	1"	42	110	12	45	105	M16
	4,6 & 8										799											
180M	2,4,6 & 8	350	250	300	110	19	5	13	280	354	884	232	225	352	97	1 1/2"	48	110	14	51.5	100	M16
	2,4,6 & 8										922											
200L	2	400	300	350	110	19	5	15	312	394	988	262	249	396	172	2"	55	110	16	59	100	M20
	4,6 & 8										965											
225S	4,6 & 8	450	350	400	140	19	5	16	337	450	1017	284	273	433	172	2"	60	140	18	64	130	M20
	2				110						1032			415			55	110	16	59	100	
	4,6 & 8				140						1037			445			60	140	18	64	130	

TABLE A

Dimension	Tolerance	Specification	Dimension	Tolerance	Specification	
N	j6	UPTO 450	D,DA	k6	42, 28Ø	IS : 1231
M	±0.5	OVER 256		m6	55, 60Ø	
i	±1.5	OVER 85	GA,F		IS : 2048	
			d5(centring)		IS : 2540	

- Online re-greasing arrangement is provided in frame size 225S & 225M.
- For Frame Size 180M, 180L and 200L it can be provided on request.
- Also suitable for V1 & V3 mounting as per IS 2253
- Key / key way fit : h9 / N9

All Dimensions are in mm unless otherwise specified.

CAT-F-1622-5-1

Brake motors are offered for various applications requiring almost instantaneous stopping of driven load. These motors are offered in frame size 71 to 132M. Their operation is of 'fail safe' type, i.e., the brake is applied when power to the motor is switched off, or, if power failure occurs.

Enclosures : (Material & T-Box location)

Frame sizes	Enclosure Materials	Terminal Box Location	
		Standard	Options Available
71-80	Aluminum	Top	---
90S-132M	Cast Iron	RHS	LHS
			TOP

Construction

A Brake motor is an integral combination of an A.C. induction motor and a disc type, fail safe, electromagnetic brake unit. It consists of following:

- i) A.C. induction motor.
- ii) Encapsulated brake coil housed in the non driving side end-cover.
- iii) Brake liner attached to the armature disc at its interface with the cooling fan.
- iv) Cooling fan.
- V) The rectifier unit is provided inside the terminal box. It converts A.C. supply into D.C. supply for the brake coil.

Operation

Under no power condition brake springs keep the brake liner pressed against the cooling fan. This prevents rotor shaft rotation, because, the fan is keyed to it. When power is switched on, the brake coil gets energized through the Rectifier unit. It instantly attracts the armature disc by overcoming the spring force. This action results in releasing of the fan allowing the rotor to rotate freely.

When the power fails or when it is switched off, the brake coil gets de-energised. This results in the springs pressing the brake liner against cooling fan, i.e. returning armature disc to its original position. This causes almost instantaneous braking of rotor. Fail safe condition is thus ensured.

For applications, where total load stopping time is not very critical, A.C. side interruption can be used.

However for applications where faster braking is required, D.C. side interruption should be used. An additional contactor interlocked with main contactor should be used.

Special Features

- a) Being simple and rugged in construction, these motors need very little maintenance.
- b) No separate DC supply is necessary for brake coil energisation, because a rectifier unit is provided. The rectifier is open type and fixed between the two terminals inside the terminal box. Being open type, it ensures good heat dissipation and is very easy to replace. Varistor is provided across the DC terminals to protect the brake coil and rectifier against line and switching surges.
- c) Special brake liner is used, which ensures that, the braking torque value remains quite stable throughout the use. Compensation for liner wear is easily done by advancing the position of the fan by tightening the castle nut at the non-drive end. The design of brake motor facilitates a very easy replacement of armature disc and brake liner assembly.
- d) Since the fan serves as a braking surface (unlike some other designs), it also serves to cool the brake coil and the motor. These brake motors being fan-cooled are available in smaller frame size than other brake motors which are surface cooled. Therefore, these motors are more compact and economical for a given application.
- e) For crane and hoist duty application brake motors are offered with special rotors. These rotors are specially suited for S3 and S4 duty normally encountered in crane and hoist applications.
- f) Mechanical manual release of the brake as an optional feature is available from 90S to 132M frames. In case of power failure, the brake can be released manually with a lever.
- g) The working of the rectifier unit has been successfully type tested for one million operations.

Bearing Details

Frame Size	Bearing Nos C3 Clearance	
	DE	NDE
71	6202 2Z	6203 2Z
80	6004 2Z	6204 2Z
90S, 90L	6205 2Z	6305 2Z
100L	6206 2Z	6307 2Z
112M	6206 2Z	6308 2Z
132S, 132M	6208 2Z	6308 2Z

Applications

Brake Motors are used for numerous applications. A few of them are listed below:

- Textile Machinery
- Machine Tools
- Printing Machine
- Cranes and Hoists
- Material Handling Equipments
- Leather Processing Machines
- Geared Motors
- Cable Reeling Drums
- Rolling Mills

Enquiry Details:

When placing an enquiry kindly furnish the following information.

1. Application details
2. Output and speed
3. Duty cycle with number of starts/stop per hour

4. Ambient temperature and special environmental factors likely to affect the motor, if any

5. Method of mounting

6. Load GD² referred to motor shaft *

7. Braking torque required*

8. Maximum permissible stopping time

9. Any other special features required

* These are inter-related parameters and related by following formulas

$$\text{Total Stopping time } Ts = \frac{GD^2 \times N}{375 \times T} + tapp$$

where

T = braking torque in kgm

GD² = load GD² + rotor GD²

N = Speed of rotation in r.p.m.

Tapp = brake application time
(to be obtained from Table 3)



Table 3
Dc Brake Motors:

Voltage	: 415V +/- 10%	Ambient	: 50°C	Ins. Class	: F
Frequency	: 50Hz +/- 5%	Duty	: S1	Temp. Rise	: B
Combined Variation	: +/-10%			Protection	: IP55

Performance Table - For Brake Part

Frame size	Outputs (kW)				* Brake release time (milisecs)	** Brake application time (milisecs)		Braking torque (kgm)
	2P	4P	6P	8P		AC side interruption	DC side interruption	
71	0.37	0.25	0.25	-	50	135	25	0.5
	0.55	0.37	-	-	50	135	25	0.5
80	0.75	0.55	0.37	-	55	225	45	1.0
	1.10	0.75	0.55	-	55	225	45	1.0
90S	1.50	1.10	0.75	0.37	100	260	50	2.0
90L	2.20	1.15	1.10	0.55	100	260	50	2.0
100L	3.70	2.20	1.50	0.75	135	270	50	4.0
	-	-		1.10	135	270	50	4.0
112M	-	3.70	2.20	1.50	145	290	60	5.0
132S	5.50,7.5	5.50	3.70	2.20	145	270	60	5.0
132M	9.3	7.50	5.50	-	145	270	60	5.0

1. Other braking torque values upto 40% higher can be given for special applications.

2. Other outputs can be offered on request where feasible.

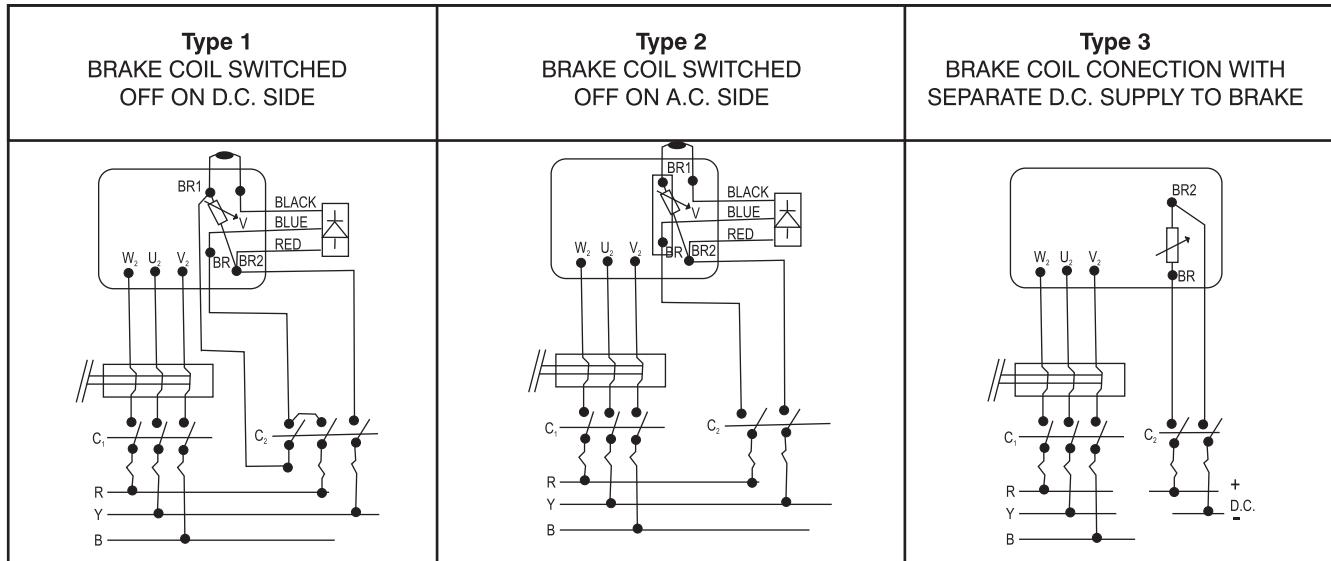
* Brake release time: The time interval between the instant supply to the brake coil is switched on, to the instant the brake is released.

** Brake application time: The time interval between the instant supply to the brake coil is interrupted to the instant the brake is applied.

The value depends on whether the circuit is interrupted on AC side or DC side.

• For performance details of motor part, please refer standard Motor Catalogue-CGA1/E or latest revision.

Brake Coil Connections:



THE MOTOR MUST NEVER BE SWITCHED ON UNLESS THE BRAKE IS ENERGISED AND THE BRAKE SHOULD NEVER BE DE-ENERGISED WHEN THE MOTOR IS ON, THE INTERLOCKING OF TWO CONTACTS IS ABSOLUTELY NECESSARY.

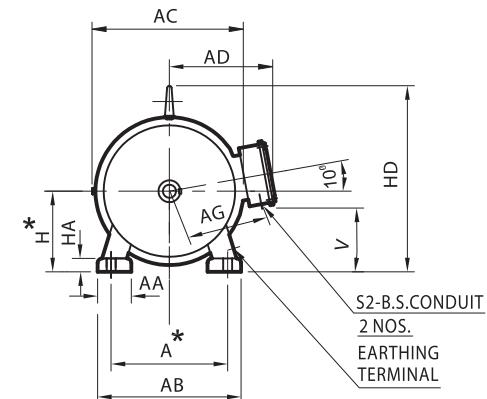
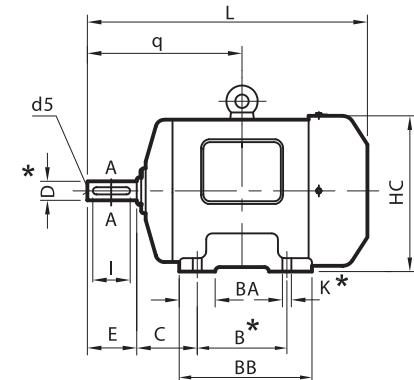
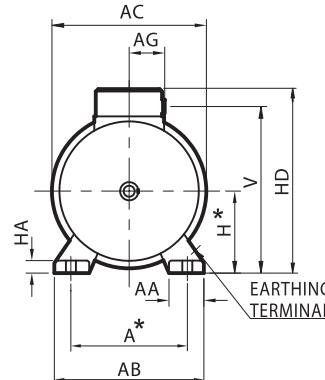
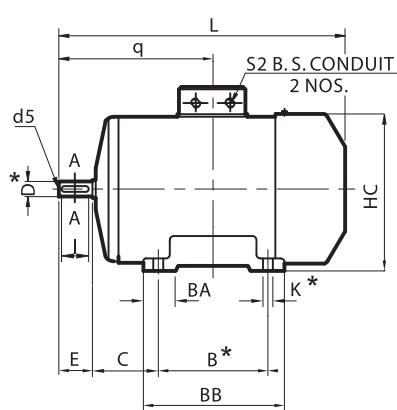
MOTORS FOR CRANE & HOIST DUTY

DIMENSIONAL DETAILS

CE

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Brake Motor Type MB Foot Mounted (B3) TEFC Series Frame 71-132M



*Refer TABLE A
for tolerances

FRAME SIZE 71 TO 80

FRAME SIZE 90S TO 132M

IEC Fr. Size	Pole	FIXING				GENERAL										TERMINAL BOX				SHAFT						
		A*	B*	C	H*	K*	AB	BB	AA	BA	HA	HC	HD	AD	L	AC	V	q	AG	S2 B.S.C.	D*	E	F*	GA*	I	d5
71	2,4 & 6	112	90	45	71	7	135	110	31	30	7	141	216	-	279	140	175	120	53	3/4"	14	30	5	16	25	M5
80	2,4 & 6	125	100	50	80	10	150	124	31	35	9	159	235	-	331	157	194	139	53	3/4"	19	40	6	21.5	35	M6
90S	2,4,6 & 8	140	100	56	90	10	180	130	50	43	13	177	①	172	355	174	59	156	124	3/4"	24	50	8	27	45	M8
90L	2,4,6 & 8		125		125	125	180									380	174	59	169	124	3/4"	24	50	8	27	45
100L	2,4,6 & 8	160	140	63	100	12	200	176	54	50	14	198	235	198	439	195	66	193	143	1"	28	60	8	31	55	M10
112M	4,6 & 8	190	140	70	112	12	230	176	62	51	15	222	260	210	456	220	80	200	156	1"	28	60	8	31	55	M10
132S	2,4,6 & 8	216	140	89	132	12	256	180	64	50	17	262	308	231	512	260	104	239	178	1"	38	80	10	41	70	M12
132M	2,4,6 & 8	216	178		132	12	256								218	54	550	550	258	178	1"	38	80	10	41	70

TABLE A

Dimension	Tolerance	Specification	Dimension	Tolerance	Specification
A, B	±0.75		D	j6	14,19, 24, 28Ø
H	-0.5			k6	38Ø
K	+0.360	7,10Ø	GA, F		IS : 2048
	+0.430	12Ø	d5(centring)		IS : 2540

① Without Eye bolt

- Key / key way fit : h9 / N9
- Also suitable for B6, B7, B8, V5 & V6 mounting as per IS 2253

All Dimensions are in mm unless otherwise specified.

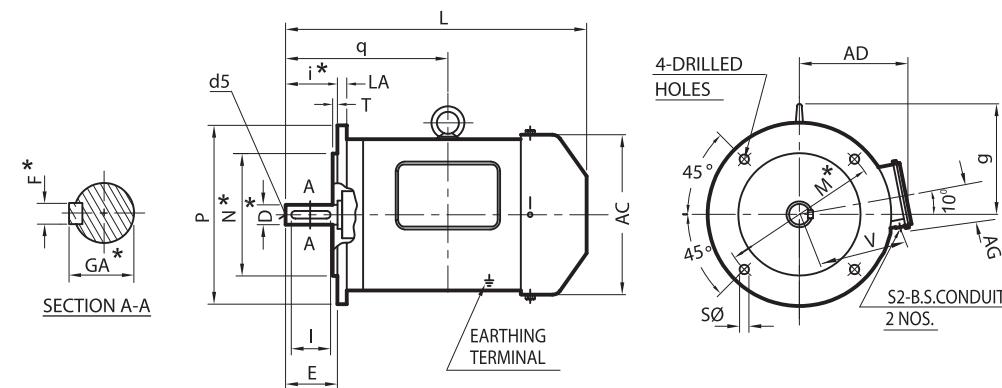
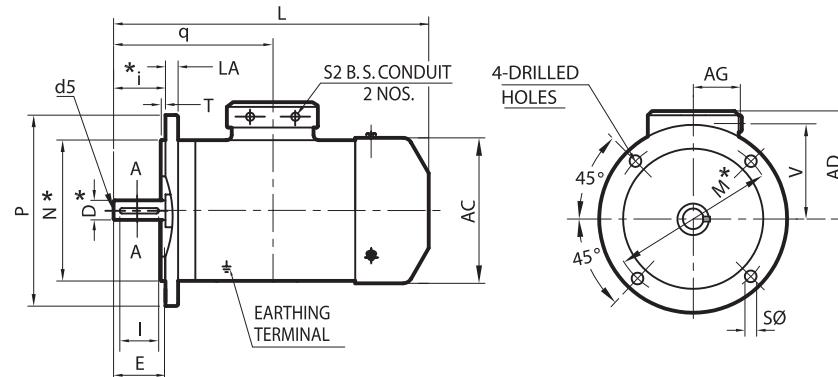
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MOTORS FOR CRANE & HOIST DUTY

DIMENSIONAL DETAILS

CE

Brake Motor Type MB Flange Mounted (B5) TEFC Series Frame 71-132M



*Refer TABLE A
for tolerances

FRAME SIZE 71 TO 80

FRAME SIZE 90S TO 132M

IEC Fr. Size	Pole	FIXING		GENERAL										TERMINAL BOX		SHAFT						
		P	N*	M*	i*	S	T	LA	AD	AC	L	g	V	q	AG	S2 B.S.C.	D*	E	F*	GA*	I	d5
71	2,4 & 6	160	110	130	30	10	3.5	9	145	140	306	-	104	147	53	3/4"	14	30	5	16	25	M5
80	2,4 & 6	200	130	165	40	12	3.5	10	155	157	331	-	114	139	53	3/4"	19	40	6	21.5	35	M6
90S	2,4,6 & 8	200	130	165	50	12	3.5	10	172	174	355	①	124	156	53	3/4"	24	50	8	27	45	M8
90L	2,4,6 & 8													169								
100L	2,4,6 & 8	250	180	215	60	15	4	11	198	195	439	135	143	193	60	1"	28	60	8	31	55	M10
112M	4,6 & 8	250	180	215	60	15	4	11	211	220	456	148	156	200	60	1"	28	60	8	31	55	M10
132S	2,4,6 & 8	300	230	265	80	15	4	12	232	260	512	176	178	239	60	1"	38	80	10	41	70	M12
132M	2,4,6 & 8													258								

TABLE A

Dimension	Tolerance	Specification	Dimension	Tolerance		Specification
N	j6	IS : 2223	D, DA	j6	14,19, 24, 28Ø	IS : 1231
M	±0.3			k6	38Ø	
I	±1		GA, F			IS : 2048
			d5(centering)			IS : 2540

① Without Eye bolt

- Also suitable for V19 & V18 mounting as per IS 2253
- Key / key way fit : h9 /N9

All Dimensions are in mm unless otherwise specified.

CAT-B-7113-5-1

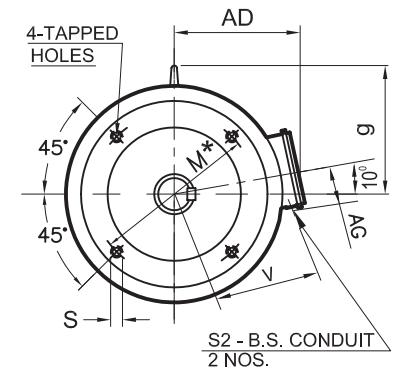
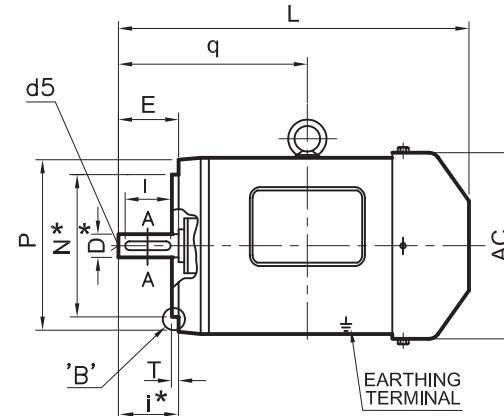
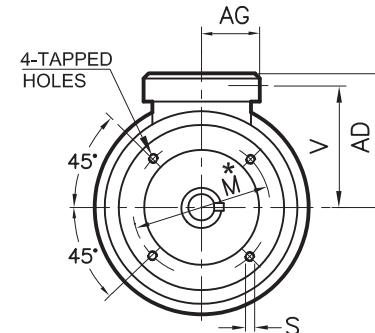
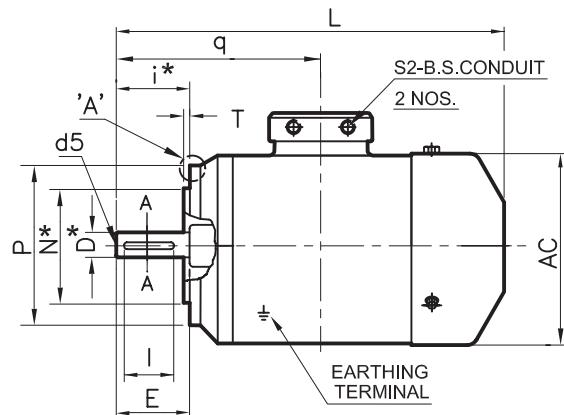
MOTORS FOR CRANE & HOIST DUTY

DIMENSIONAL DETAILS

CE

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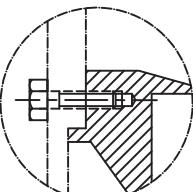
Brake Motor Type MB Face Mounted (B14) TEFC Series Frame 71-132M



FRAME SIZE 71 TO 80

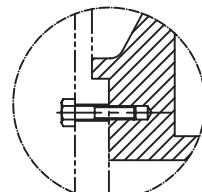
FRAME SIZE 90S TO 132M

SECTION A-A



ENLARGEMENT OF CIRCLE 'A'

IEC Fr. Size	FIXING					GENERAL					TERMINAL BOX				SHAFT						
	Pole	P	N*	M*	i*	S	T	AD	AC	L	g	V	q	AG	S2 B.S.C.	D*	E	F*	GA*	I	d5
71	2,4 & 6	105	70	85	30	M6X10	2.5	145	140	279	-	104	122	53	3/4"	14	30	5	16	25	M5
80	2,4 & 6	120	80	100	40	M6X13	3	155	157	331	-	114	139	53	3/4"	19	40	6	21.5	35	M6
90S	2,4,6 & 8	140	95	115	50	M8X12	3	172	174	355	①	124	156 169	53	3/4"	24	50	8	27	45	M8
90L	2,4,6 & 8	140	95	115	50	M8X12	3.5	172	174	380	①	124	156 169	53	3/4"	24	50	8	27	45	M8
100L	2,4,6 & 8	160	110	130	60	M8X12	3.5	198	195	439	135	143	193	60	1"	28	60	8	31	55	M10
112M	4,6 & 8	160	110	130	60	M8X12	3.5	211	220	456	148	156	200	60	1"	28	60	8	31	55	M10
132S	2,4,6 & 8	250	180	215	80	M12X20	4	232	260	512 550	176	178	239 258	60	1"	38	80	10	41	70	M12
132M	2,4,6 & 8	250	180	215	80	M12X20	4	232	260	512 550	176	178	239 258	60	1"	38	80	10	41	70	M12



ENLARGEMENT OF CIRCLE 'B'

*Refer TABLE A for tolerances

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

TABLE A

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

① Without Eye bolt

- Also suitable for V19 & V18 mounting as per IS 2253
- Key / key way fit : h9 /N9

All Dimensions are in mm unless otherwise specified.

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Special Design features offered

Electrical

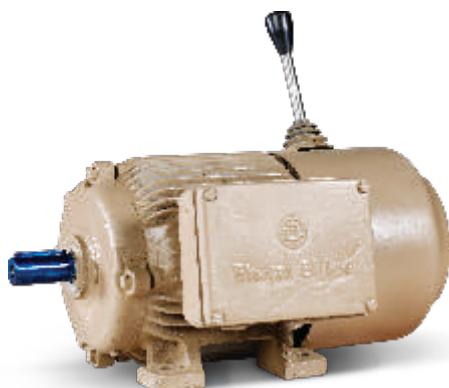
Non standard voltage	42 to 700V
Non standard frequency	50/60 Hz
Motors for wide variation	
Voltage variation	>10%
Frequency variation	>5%
Motors with higher ambient temperatures	>50°C
Dual speed motors	
Class H insulation scheme	
Motors with thermal protection	PTC Thermisters, Thermostat, RTD, BTD etc.
Space heaters	90 Frame onwards
Inverter duty motors	
Motors with service factors	
Motors for high inertia load	
Motors with flying leads	

Mechanical

Special mounting	Non standard mounting dimensions
C. I. Body	90S to 112M frame
Non Standard shaft material	e.g. EN 24
Non standard shaft extension dimension	
Non standard cable entries	
Cable spreader box	180 Frame onwards
Motors with cable glands	Single/Double compression
Motors with separate T. box for space heater, thermister	200L frame and above
Non standard bearing	e.g. Roller bearings on driving end side
Higher Degree of Protection than IP55	IP 56, IP 65, IP 66
Low vibration motors	Precision class vibration levels (A, B or C) as per IS:12075
Non standard paint type	e.g. Acid alkali proof epoxy paint
Non standard paint shade	
Special accessories like arrow plate, Aux. name plate etc.	
Forced cooling arrangement 132 frame onwards	
Surface cooled motors	
Motors for brake fitment	

Product range

Motor used in Hazardous area	
• Flame proof motors-Ex'd' (IS:2148)	Frame 80 to 315L
• Increased Safety-Ex'e' (IS:6381)	Frame 63 to 355L (ME/MI)
• Non sparking-Ex'n' (IS:8289, IS: 9628)	Frame 63 to 355L (MN/MS)
Ring frame motors	Frame 63L to 355L (MR)
Roller table motors	As per requirement
Railway motors (Auxiliary drives)	Frame 180M to 225M
Marine duty motors	



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