# SLIPRING CRANE DUTY INDUCTION MOTORS

**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 class 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 Size | Enclosure Materials | Terminals Box Location | |
|---|---|---|---|
| | | Standards | Options Available |
| 100 to 160 | Cast Iron | Top | ---- |

**Degree of Protection**

All motors have IP55 degree of protection as per IS/IEC 60034-5. Higher degree of protection such as IP 56, IP 65 and IP 66 can be offered on request. All flange mounted motors are additionally provided with oil tight shaft protection on driving end side.

**Note:** For more details, refer to annexure II on page no. 121.

**Mounting**

Standard mounting is B3. In case B5 mounting is required, please refer to our sales office.

**Additional Mechanical Features**

The Slipring's 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. Terminals 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 performance table of Slipring motors.

For reduced load, the rotor current reduces and is given by rated current × (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:

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

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 with 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.

## Performance table for 6-Pole motors

### TEFC 3 Phase Slipring Induction Motors Crane & Hoist Duty Fr. 100L To 160L

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

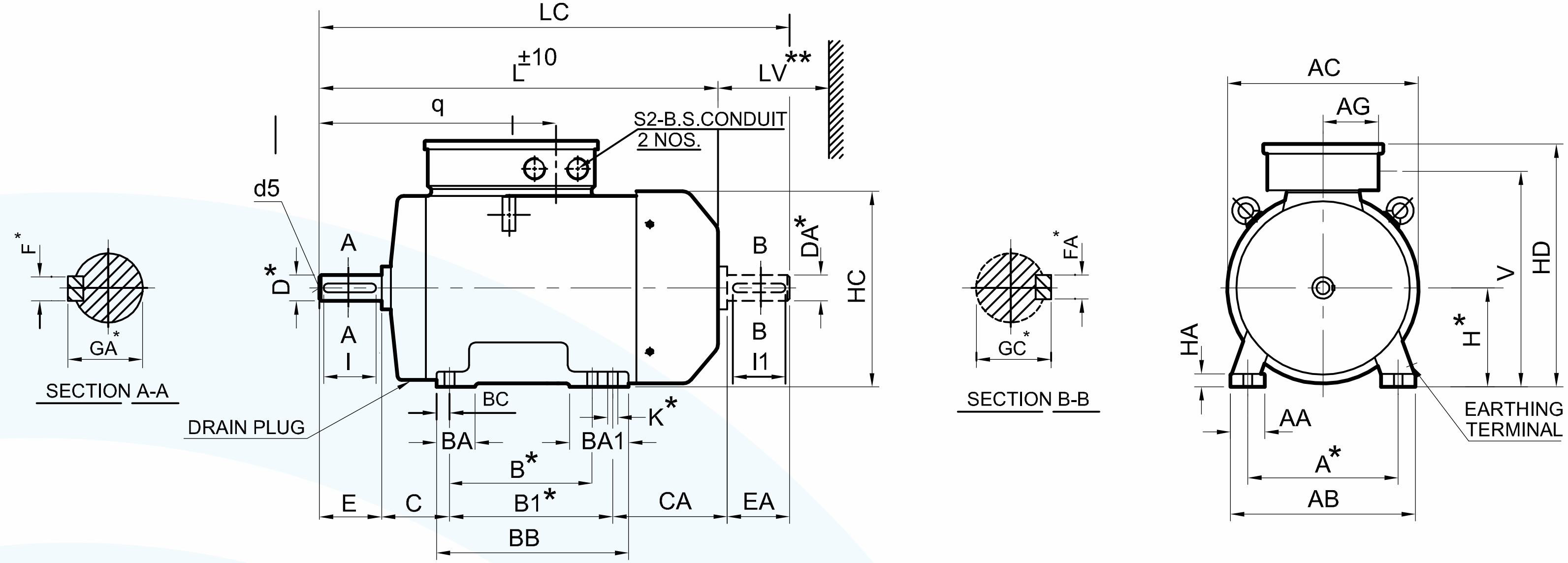
Ambient : 45°C
Duty : S3/S4/S5

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

### 1000 rpm ( 6-Pole)

| | Frame Size IEC | Type Ref. B3 Construction | 25%CDF | | | | | 40 % CDF | | | | | 60 % CDF | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | kW | Rated RPM | Pullout Torque to Rated Torque Ratio | Line Amps Sator | Line Amps Rotor | kW | Rated RPM | Pullout Torque to Rated Torque Ratio | Line Amps Sator | Line Amps Rotor | kW | Rated RPM | Pullout Torque to Rated Torque Ratio | Line Amps Sator | Line Amps Rotor | Rotor O.C.V. | GD² Rotor | kgm² Load | Wt. of motor kg. |
| 60 stars per hour | 100L | MP10L613 | 1.3 | 800 | 1.75 | 3.8 | 17 | 1.1 | 850 | 2.2 | 3.5 | 13 | 1 | 870 | 2.50 | 3.4 | 12 | 65 | 0.034 | 0.09 | 37 |
| | 100L | MP10L623 | 1.9 | 785 | 2.00 | 5.4 | 18.5 | 1.5 | 870 | 2.8 | 5 | 13 | 1.3 | 890 | 3.30 | 4.7 | 11 | 80 | 0.038 | 0.10 | 40 |
| | 112M | MP11M623 | 2.6 | 820 | 2.20 | 9.8 | 22.5 | 2.4 | 840 | 2.2 | 6.4 | 20.5 | 2.1 | 870 | 2.70 | 6 | 17.1 | 90 | 0.068 | 0.17 | 58 |
| | 112M | MP11M643 | 3.8 | 830 | 2.00 | 9.6 | 23.5 | 3.3 | 850 | 2.3 | 8.6 | 20.5 | 2.8 | 880 | 2.80 | 8.2 | 17 | 115 | 0.076 | 0.19 | 61 |
| | 132M | MP13M613 | 4.8 | 860 | 2.10 | 12.5 | 32.5 | 4 | 890 | 2.6 | 11 | 26 | 3.4 | 910 | 3.00 | 9.7 | 21 | 110 | 0.153 | 0.38 | 90 |
| | 132M | MP13M663 | 6.6 | 870 | 1.90 | 16 | 35 | 5.5 | 895 | 2.5 | 13.3 | 26.5 | 4.8 | 915 | 2.90 | 12.4 | 23 | 140 | 0.180 | 0.45 | 94 |
| | 160L | MP16L613 | 8 | 900 | 2.00 | 18.1 | 33 | 7 | 920 | 2.1 | 15.8 | 31.3 | 6.5 | 930 | 2.50 | 14.7 | 27.2 | 165 | 0.310 | 0.77 | 129 |
| | 160L | MP16L653 | 11.5 | 890 | 1.60 | 25.3 | 46.2 | 10 | 915 | 1.8 | 21 | 28 | 9 | 920 | 2.10 | 19.8 | 25.2 | 240 | 0.378 | 0.94 | 139 |
| 150 stars per hour | 100L | MP10L613 | 1.3 | 800 | 1.75 | 3.8 | 17 | 1.1 | 850 | 2.2 | 3.5 | 13 | 1 | 870 | 2.50 | 3.4 | 12 | 65 | 0.034 | 0.09 | 37 |
| | 100L | MP10L623 | 1.8 | 810 | 2.20 | 5.3 | 17 | 1.5 | 870 | 2.8 | 5 | 13 | 1.3 | 890 | 3.30 | 4.7 | 11 | 80 | 0.038 | 0.10 | 40 |
| | 112M | MP11M623 | 2.6 | 820 | 2.00 | 6.8 | 22.5 | 2.3 | 850 | 2.4 | 6.2 | 19.5 | 2 | 875 | 2.80 | 5.9 | 16 | 90 | 0.068 | 0.17 | 58 |
| | 112M | MP11M643 | 3.8 | 830 | 2.00 | 9.6 | 23.5 | 3.2 | 855 | 2.4 | 8.5 | 20 | 2.7 | 885 | 3.00 | 8.1 | 16.5 | 115 | 0.076 | 0.19 | 61 |
| | 132M | MP13M613 | 4.5 | 865 | 2.20 | 11.9 | 30 | 3.7 | 895 | 2.8 | 10.4 | 23.5 | 3.2 | 915 | 3.30 | 9.4 | 19.5 | 110 | 0.153 | 0.38 | 90 |
| | 132M | MP13M663 | 6.5 | 870 | 2.00 | 15.1 | 34 | 5.4 | 895 | 2.7 | 13.2 | 25 | 4.6 | 920 | 3.00 | 12 | 22 | 140 | 0.180 | 0.45 | 94 |
| | 160M | MP16M613 | 8 | 900 | 2.00 | 18.1 | 33 | 7 | 920 | 2.3 | 15.8 | 29 | 6 | 930 | 2.70 | 13.4 | 25 | 165 | 0.310 | 0.77 | 129 |
| | 160L | MP16L653 | 10.5 | 900 | 1.80 | 23.1 | 29.4 | 9.5 | 915 | 1.9 | 21 | 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 | 1.1 | 850 | 2.2 | 3.5 | 13 | 0.9 | 890 | 2.80 | 3.3 | 10.5 | 65 | 0.034 | 0.09 | 37 |
| | 100L | MP10L623 | 1.8 | 810 | 2.20 | 5.3 | 17 | 1.5 | 870 | 2.8 | 5 | 13 | 1.3 | 890 | 3.30 | 4.7 | 11 | 80 | 0.038 | 0.10 | 40 |
| | 112M | MP11M623 | 2.6 | 820 | 2.00 | 6.8 | 22.5 | 2.3 | 850 | 2.4 | 6.2 | 19.5 | 1.9 | 880 | 3.00 | 5.7 | 15 | 90 | 0.068 | 0.17 | 58 |
| | 112M | MP11M643 | 3.6 | 840 | 2.10 | 9.2 | 22 | 3 | 870 | 2.6 | 8.3 | 18.5 | 2.6 | 890 | 3.10 | 8 | 16 | 115 | 0.076 | 0.19 | 61 |
| | 132M | MP13M613 | 4 | 890 | 2.60 | 11 | 26 | 3.4 | 905 | 3.0 | 9.7 | 21 | 3 | 920 | 3.50 | 9 | 18 | 110 | 0.153 | 0.38 | 90 |
| | 132M | MP13M663 | 6.1 | 875 | 2.20 | 14.6 | 30 | 5.1 | 900 | 2.7 | 12.5 | 24 | 4.4 | 930 | 3.20 | 11.5 | 20.5 | 140 | 0.180 | 0.45 | 94 |
| | 160M | MP16M613 | 6.7 | 920 | 2.40 | 15.2 | 28 | 5.5 | 940 | 2.9 | 12.3 | 23 | 5 | 945 | 3.20 | 11.2 | 21 | 165 | 0.310 | 0.77 | 129 |
| | 160L | MP16L653 | 9 | 920 | 2.10 | 19.8 | 25.2 | 8 | 935 | 2.4 | 17.4 | 22.6 | 7.5 | 940 | 2.50 | 16.5 | 21 | 240 | 0.378 | 0.94 | 139 |

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




| IEC Fr. size | Pole | A* | B* | B1* | C | H* | K* | AB | BB | AA | BA | BA1 | BC | HA | HC | HD | L | LC | CA | AC | LV** | V | q | AG | S2 B.S.C. | D,DA* | E EA | F* FA* | GA* GC* | l l1 | d5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | FIXING | | | | | | GENERAL | | | | | | | | | | | | | | TERMINAL BOX | | | | SHAFT | | | | | |
| 100L | 4 , 6 | 160 | 140 | — | 63 | 100 | 12 | 200 | 176 | 54 | 50 | — | 18 | 14 | 198 | 252 | 488 | 570 | 247 | 195 | 40 | 210 | 295 | 61 | 3/4" | 28 | 60 | 8 | 31 | 55 | M10 |
| 112M | 4 , 6 | 190 | 140 | — | 70 | 112 | 12 | 230 | 176 | 62 | 50 | — | 18 | 15 | 222 | 281 | 537 | 620 | 290 | 220 | 45 | 230 | 316 | 63 | 3/4" | 28 | 60 | 8 | 31 | 55 | M10 |
| 132S/M | 4 , 6 | 216 | 140 | 178 | 89 | 132 | 12 | 256 | 218 | 64 | 54 | — | 20 | 17 | 262 | 317 | 612 | 715 | 288 | 260 | 50 | 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 | 20 | 318 | 366 | 730 | 866 | 287 | 316 | 60 | 315 | 434 | 88 | 1" | 42 | 110 | 12 | 45 | 105 | M16 |

### TABLE A

| Dimension | Tolerance | | Specification |
|---|---|---|---|
| A,B | ±0.75 | | IS : 1231 |
| H | -0.5 | | IS : 1231 |
| K | +0.430 | 12,15Ø | IS : 1231 |

| Dimension | Tolerance | | Specification |
|---|---|---|---|
| D,DA | j6 | 28Ø | IS : 1231 |
| D,DA | k6 | 38,42Ø | IS : 1231 |
| GA,GC,F,FA | | | IS : 2048 |
| d5(centering) | | | IS : 2540 |

*Refer TABLE A for tolerances

- 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

**Minimum distance for efficient cooling of motor to be maintained by user

All dimensions are in mm unless otherwise specified.
CAT-P-1016-3-1