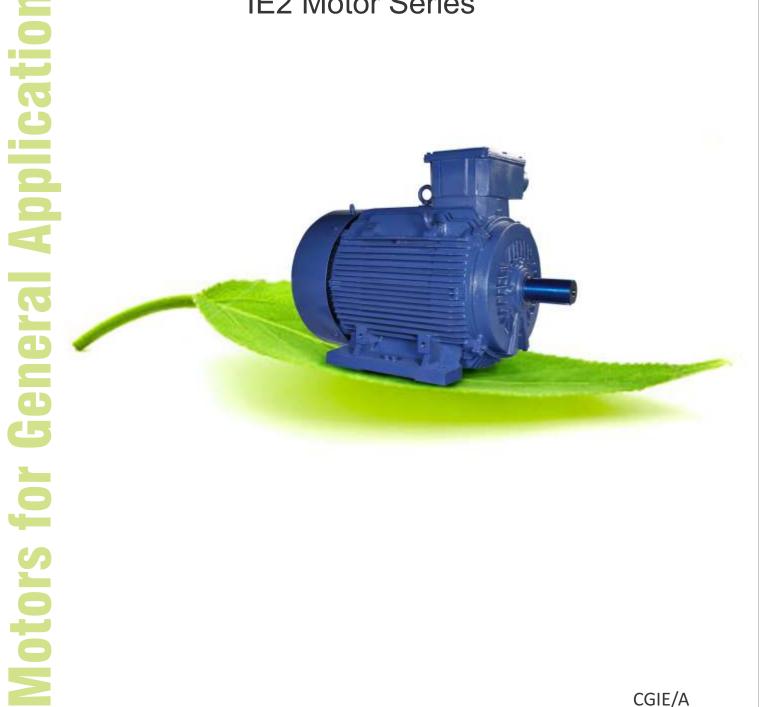


IE2 Motor Series





Introduction

Global warming is a reality and world over people are working towards reduction in carbon foot print.

Electric motor applications, in Indian industry, consume about seventy percent of the generated electrical energy. Improving efficiency of the motor is therefore a major concern in energy-efficiency efforts.

Electric motors with improved efficiency, in combination with frequency converters can save about 7% of the total worldwide electrical energy. Roughly one quarter to one third of these savings come from the improved efficiency of the motor.

A need was felt amongst users, consultants and manufacturers in India to revise existing BIS standard IS 12615:2004 to harmonize with the international standards. This will lead us to be in line with international code of standards and practices. This will also result in having uniform test procedures to facilitate the end user to compare the performance and energy efficiency of motors.

Motors from 0.37kW to 375kW make up the vast majority (approximately 90%) of installed motor population and are covered by the standard IS 12615:2011. This fulfills the need of the manufacturers to design motor for a global market. This standard defines four efficiency classes for nominal frequency 50Hz.

Salient features of BIS standard IS 12615:2011 (second revision)

This standard is primarily based on IEC 60034-30:2008 issued by the International Electrotechnical Commission except that additional performance parameters other than efficiency values have also been included.

The efficiency levels in IS 12615:2011 are based on test methods specified in IS 15999 (Part 2/sec 1):2011 / IEC 60034-2-1:2007. The standard specifies methods used to determine losses and efficiency, with the objective to calculate efficiency values more accurately.

New IE efficiency classes are as given below

| Efficiency Class | Description | |
|------------------|---------------------|--------------------|
| IE1 | Standard efficiency | Comparable to eff2 |
| IE2 | High efficiency | Comparable to eff1 |
| IE3 | Premium | Premium |
| IE4 | Super premium | Super premium |

As per the standard, efficiency class of IE4 is under consideration and would be incorporated later. The standard IS 12615:2011 covers low voltage, AC three phase squirrel cage, single speed induction motors for

• Rated voltage <= 1000V

- Rated frequency 50Hz
- Rated output between 0.37kW to 375kW
- 2P, 4P & 6P
- Rated on the basis of continuous duty (S1) or intermittent periodic duty (S3) with 80% or higher cyclic duration factor
- Capable of operating direct on line
- Rated for ambient temperature of 40 deg centigrade & altitude not exceeding 1000m
- Degree of protection IP44 or superior
- Method of cooling IC 411
- Fixing dimensions as per IS 1231 & IS 2223
- Determination of total losses with PLL determination from residual losses

This standard does not cover

- 8P motors
- Pole changing motors (multispeed motors)
- Motors made exclusively for converter duty application
- Motors completely integrated into the machine. (for example, pumps, compressors that cannot be tested separately from the machine)
- Crane & hoist duty motors

Highlights

- Efficiency values of different manufacturers are comparable only if they are measured by the same method as per IS 15999 (Part 2/sec 1):2011/IEC 60034-2-1:2007.
- IE Class efficiencies are subject to tolerance as per IEC 60034-1
- For conditions of limitations on grid supply (e.g. limiting starting current, high tolerances of voltage and/or frequency), it may not be possible to achieve the same IE efficiency class.

- Energy efficient cage-induction motors are typically built with more active material to achieve higher efficiency and hence the starting performance of these motors differ somewhat from motors with a lower efficiency. The locked rotor current increases approximately by 10 to 15 percent for increase in each level of efficiency for the same output power. For replacing existing motors, this should be checked by the user with manufacturer for proper sizing of the protective devices.
- Old efficiency levels were Eff2 and Eff1 (as per CEMEP). For calculation of these efficiencies, fixed stray load losses (0.5% of motor output) were assumed. Now IS 12615:2011 refers to IS 15999 (Part 2/sec 1):2011 / IEC 60034-2-1:2007 for calculation of efficiency. This calculation is based on the new methods of stray load loss measurement specified in the standard. The effect is in the reduction of efficiency as compared to the earlier values.

Energy Efficient Induction Motors

(Three phase squirrel cage induction motors)

Bharat Bijlee has introduced a complete range of IE2 High efficiency motors

Product Range

| Туре | Frame Size | kW range |
|--------------------------|------------|--------------|
| 2H - IE2 High efficiency | 71 TO 355L | 0.37 TO 355* |

Standards

All motors comply with following Indian & International standards

National/International Standards

| IS : 325 | Three Phase Induction motors specifications. | | | |
|--|--|--|--|--|
| IS/IEC 60034-1 | Rotating electric machines: Part 1 Rating and Performance | | | |
| IS:900 | Code of practice for installation & maintenance of induction motors. | | | |
| S:1231 | Dimensions of foot mounted A.C Induction motors | | | |
| IS : 2223 | Dimensions of Flange mounted A.C Induction motors | | | |
| IS 15999 part 2 section 1 /IEC 60034-2-1 | Rotating Electrical Machines - Standard Methods for determining losses and efficiency from tests | | | |
| IS /IEC 60034-5 | Degree of protection provided by the integral design of Rotating Electrical Machines (IP code) : classification | | | |
| IS : 6362 / IEC 60034-6 | Designation of methods of cooling for Rotating Electrical Machines | | | |
| IS:12065/ IEC60034-14 | Permissible Limits of noise level for Rotating Electrical Machines | | | |
| IS:12075 | Mechanical Vibration of Rotating Electrical Machines | | | |
| IS:12615:2011 | Energy Efficient Induction Motors Three phase Squirrel Cage. | | | |
| IEC 60072 | Dimension & Output rating of Rotating Electrical machines. | | | |

*Note : Motors above 355kW & up to 1250kW are available in frame size 355, 400 & 450 with double ventilated cooling system. Please contact our Sales.

CE MARK

All motors have CE mark on the nameplate

ELECTRICAL FEATURES

| Supply Conditions (Voltage & Frequency) | | | | | | |
|---|---|-------------|--|--|--|--|
| Voltage | : | 415 V ± 10% | | | | |
| Frequncy | : | 50Hz ± 5% | | | | |
| Combined variation | : | ± 10% | | | | |

Ambient

Motors are designed for ambient temperature of 50° C

Altitude

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

Re-rating factors

The re-rating applicable under different conditions of supply voltage, frequency, ambient & altitude are obtained by multiplying following factors.

Variation in supply Voltage & Frequency

| Voltage Variation % | Frequency Variation % | Combined Voltage & Frequency Variation % | Permissible output as % of rated value |
|------------------------|--------------------------|---|---|
| ± 10 | ± 5 | ± 10 | 100 |
| ± 12.5 | ± 5 | ± 12.5 | 95 |
| ± 15 | ± 5 | ± 15 | 90 |







| Amb. Temp. °C | Permissible output as % of rated value | | Altitude above sea level m | Permissible output as % of rated value |
|------------------|--|--|----------------------------------|--|
| <30 | 107 | | 1000 | 100 |
| 00.45 | 100 | | 1500 | 97 |
| 30-45 | 103 | | 2000 | 94 |
| 50 | 100 | | 2500 | 90 |
| 55 | 96 | | 3000 | 86 |
| | 30 | | 3500 | 82 |
| 60 | 92 | | 4000 | 77 |

Method of starting

Our motors are suitable for following method of starting

| kW rating | Method of starting | No. of leads |
|-------------------------|---------------------|--------------|
| Upto & including 1.5 kW | DOL | 6 |
| | 415V - Star | |
| | 240V - Delta | |
| Above 1.5 kW | DOL or Star / Delta | 6 |

All Bharat Bijlee motors are suitable for inverter duty application. (Refer page 5)

Starting Time and Duty Cycle

Motors are designed for continuous (S1) Duty. Other type of duty (S2 to S9) can be offered on request. The motors can safely withstand 3 consecutive starts from cold condition & 2 consecutive starts from hot conditions. In applications where more severe starting conditions are encountered, a special enquiry should be made e.g.

- Drives with high inertia e.g flywheel drives, eccentric presses, large fans etc.
- Drives involving intermittent duty of motors with frequent starts e.g. rolling mills, centrifuges and conveyor motors, etc.

The enquiry should be accompanied with following information.

- GD² and relevant speed of driven equipment
- Duty cycle/sequence of operation/no. starts/hours
- Speed-Torque diagram of driven equipment
- Method of braking (Electrical or Mechanical)

Insulation and Endurance

The Motors are provided with class F insulation scheme with temperature rise limited to class B. These motors can be used either at ambient temperature of 55° C or overloaded continuously by 10% (service factor = 1.1). The temperature rise will be still within limits of class F.

The slot insulation consists of Nomex-polyster-Nomex (NPN). All insulation materials used are adequately resistant to the action of microbes and fungi.

Winding & Insulation for Inverter Duty Motors

- The stators are wound with polysteremide coated with polyamide-imide top coat, (dual coated) wires as per IS 13730 : part 13, grade -II thermal class 200 copper wires.
- Vacuum Pressure Impregnation (VPI) is provided to windings.

Depending on the voltage wave rise time (dv/dt) and the

maximum peak to peak voltage at the motor terminals, suitable insulation schemes are provided.

On customer's demand, insulated bearings are offered from frame size 132 and onwards on the NDE side of the motor.

Options

Motors with class 'H' insulation can be offered on request.

Thermal Protection (For Winding & Bearing)

PTC Thermisters / thermostats. RTD 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 on the body and one terminal is provided in the terminal box.

Anti-condensation Method

In order to avoid condensation of water inside the motors, they can be heated up by connecting a 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 of the methods indicated in IS : 900 for heating stator winding could be adopted.

Motors can also be offered with built in space heaters in frame size 90 and above.

MECHANICAL FEATURES

Enclosures: (Material & Terminal box location)

Motors are offered with following enclosure

| Frame Size | Enclosure | Terminals Box Location | | |
|-------------|-----------|------------------------|------------------|--|
| | Materials | Standards | Option Available | |
| 63-80 | Aluminum | ТОР | | |
| 90S-112M | Aluminum | TOP | | |
| | Cast Iron | RHS | TOP & LHS | |
| 132S & 132M | Aluminum | ТОР | - | |
| 132S-225M | Cast Iron | RHS | TOP & LHS | |
| 250M-355L | Cast Iron | ТОР | RHS & LHS | |

All foot mounted motors are with integral feet construction. All motors up to 280 frame are with integral bearing covers and motors in frame 315 and above are with separate bearing covers.

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 as per IS 6362 / IEC 60034-6. Forced cooing arrangement can be provided for frame 132S and above.

Table 2

| Cooling Type | Cooling Code | |
|---------------|--------------|-----------|
| TEFC | IC 411 | Standard |
| TENV | IC 410 | On Demand |
| FORCED COOLED | IC 416 | On Demand |

Degree Protection

All motors have IP55 degree of protection as per IS/IEC 60034-5. Higher degree of protection such as IP56, IP66 can be provided on request. All flanged motors are additionally provided with oil tight shaft protection on driving end side.



| | | | ng nos. earance | Terminals | Tern | ninals | No. & | Max. Cond. |
|------|--------------|---------|--------------------|------------------------|------|--------|-----------------------------|-----------------------------|
| Fram | e Size | DE | NDE | Box Type / Location | No. | Size | size of cable entries | Cross Sec. area mm |
| 6 | 53 | 6201 2Z | 6201 2Z | | | | | |
| 7 | /1 | 6202 2Z | 6202 2Z | gk030/ | 6 | | | 4 |
| 8 | 30 | 6004 2Z | 6004 2Z | Тор | | M4 | 1×3/4" | |
| 905 | ,90L | 6205 2Z | 6205 2Z | gk130/Top | 6 | 1014 | | 6 |
| 10 |)0L | 6206 2Z | 6205 2Z | gk230/ | 6 | | | |
| 11 | 2M | 6206 2Z | 6205 2Z | Тор | 0 | | 2×1" | 10 |
| 132S | ,132M | 6208 2Z | 6208 2Z | gk330/Top | 6 | M5 | 2~1 | |
| 160N | 1,160L | 6309 2Z | 6209 2Z | gk330/RHS | 0 | | | 16 |
| 180N | 1,180L | 6310 2Z | 6210 2Z | gK430/ RHS | 6 | M6 | 2× 1-1/2" | 50 |
| 20 | 00L | 6312 | 6212 | ТВ | 6 | M8 | | 70 |
| 2255 | 5, 225 | 6313 | 6213 | 225/RHS | | | | 70 |
| 25 | 0M | 6315 | 6215 | TB280/ | 6 | | 2 × 2" | |
| 280 | 2P | 6316 | 6316 | Тор | 0 | M10 | | 150 |
| S/M | 4, 6 & 8P | 6317 | 6316 | юр | | | | 150 |
| 315 | S/M | | | | | M12 | | |
| | | 6319 | 6319 | TB315/ Top | 6 | | 2 × 2" | 240 |
| 31 | 15L | 6319 | 6319 | | | | 2 × 2 1/2" | |
| 35 | 55L | 6322 | 6322 | TB355/Top | 6 | M16 | 2 × 3" | 300 |

Bearing & Terminals Box Details

Note: L10 bearing life is 50,000 hours for directly coupled loads through flexible couplings only

Roller Bearing and Insulated Bearing

Alternatively motors with insulated bearing on NDE side can be offered from frame size 1325 & above on request at extra price.

Motors can also be offered with cylindrical roller bearing (NU) on DE side for frame sizes 132S and above at extra price.

Grease

Sealed for life bearing (2Z) are filled with grease Unirex N3-of ESSO. Others are filled with LGMT3 of SKF make. Special high temperature grease can be provided on request.

On line Re-Greasing

On line re-greasing arrangement is provided in frame sizes 225S and above. For frame size 180M, 180L and 200L it can be provided on request.

Rotor

Entire range of motors is fitted with dynamically balanced aluminum pressure die cast squirrel cage rotors.

Shaft

All motors are provided with single shaft extension in accordance with IS: 1231. The Shaft material is C40 (EN8) Steel. However any special shaft extension and / or special shaft material e.g. EN24 or stainless steel grades are also provided on request.

Balancing & Vibration

Rotors are dynamically balanced with a half key in the shaft extension. Vibration grade is 'reduced grade' conforming to IS: 12075. Other grades as per IS 12075 or IEC 60034-14 can be provided on request.

Noise Level

Motors are designed for noise level well below the limits specified in IS: 12065

Paint

All motors are painted with acrylic paint in Blue colour, RAL shade No. 5000. Motors used in corrosive atmosphere are painted with Epoxy base paint. Any other shade or material (e.g. polyurethane paint) can be offered on request.

Packing

Motors up to 132M frame are packed in thermacol / corrugated boxes. Wooden packing boxes are provided for higher frame size. Export worthy packing is also available on request.





Bharat Bijlee IE2 motors suitable to run with VFDs

Bharat Bijlee offers the entire range of motors suitable to run with VFDs.

Motors are suitable for :

- Constant torque application like crane, hoist, reciprocating compressor etc.
- Variable torque application like centrifugal pump, fan, blowers etc.
- Constant power application like metal cutting lathes, wire winding machines etc. and are custom built to suit customer's requirements.

Motors for constant torque application suitable for speed range of 1:10, 1:5, 1:2 etc can be provided. Depending on the speed range, motors can be offered with forced cooling (IC416) or in higher frame sizes 132S and above. **Please check with our sales office, for motors to be operated above 1.5 times the synchronous speed.**

PWM, IGBT devices operate at very high frequencies (2 kHz to 15 kHz) and have very short rises times leading to high dv/dt.

Longer cable lengths also contribute to higher voltages at the motors terminals due to standing wave phenomenon. These stress the insulation of the motors. Bharat Bijlee motors are provided with special impregnation system /vacuum pressure impregnation and dual coated winding wire to take care of these stresses. This insulation conforms to the requirements given in IEC 60034-18-41. For voltage higher than 500 V, refer to our sales office.

All the motors are provided with six terminals in the terminal box. Shaft induced voltage occurs due to the use of VFD. This causes flow of currents through bearing which can lead to premature bearing failure. Insulated bearings can be provided in frames from 132S onwards on request.

In closed loop system operations, speed feedback is obtained through encoder mounted on the shaft of the motors. We provide encoder mounting arrangements on Non Drive End side shaft of the motors on request.

For further details and technical offer, please refer to our Sales office in your area.





Payback Calculations:

Effect of additional stray load losses for efficiency determination as per IS 12615-2011

The new standard follows IS 15999 / IEC 60034-2-1 for arriving at the stray load losses. These losses can vary from 2.5% in small motors to 0.5% in higher ratings up to 1MW. The earlier standard IS 12615-2004 used for eff1 motors assumed stray losses as 0.5% of output. Hence the efficiency values tested by the earlier standard would be 0.5% to 1.5% higher than the new standard for the same motor.

Example is as given below

| Rating 4 Pole | Eff1 specified in IS 12615-2004 (%) | IE2 specified in IS 12615-2011 (%) | Reduction in efficiency from eff1 Due to additional stray losses (%) |
|---------------|--|---------------------------------------|---|
| 11kW | 91.0 | 89.8 | 1.2 |
| 55kW | 94.2 | 93.5 | 0.7 |

When comparing eff1 motor & IE2 motor, it is necessary to note the difference in testing methods. The standard has reduced the efficiency value to take care of this. At first glance a customer would feel that an IE2 motor is inferior to an Eff1 motor though both might be identical.

Hence for any comparison, it is necessary to use the same method of loss calculation. The worked out example shown below gives the energy savings per year (for 8000 hours running) of a Bharat Bijlee IE2 motor (normalized for 0.5% stray loss) over a Bharat Bijlee standard IS 325 motor

| 0 | BBL IS325 Catalogue (eff%) | | Input Power (kW) | Additional Stray losses (kW) | Nomalized IE2 Eff with 0.5% Stray losses assumed | IS 325 losses (kW) | IE2 losses (kW) | Saving (kW) | Saving in kW/Year @8000 Hrs running |
|----|----------------------------------|------|----------------------|------------------------------------|--|-----------------------|--------------------|----------------|--|
| 11 | 89.0 | 89.8 | 12.249 | 0.187(0.2424- 0.0550) | 91.2 | 1.360 | 1.062 | 0.298 | 2380 |
| 55 | 93.8 | 93.5 | 58.824 | 0.684 (0.959- 0.275) | 94.6 | 3.636 | 3.140 | 0.496 | 3968 |



| ations: |
|----------|
| Calcula |
| Saving (|
| Energy 3 |

Table shown below gives the energy savings per year (for 8000 hours running) of a Bharat Bijlee IE2 motor (normalized for 0.5% stray loss) over a Bharat Bijlee standard IS 325 motor

| | Saving in kWh/Year @8000 Hrs running | | 122 | 122 429 | 122 429 434 | 122 429 434 550 | 122 429 434 550 850 | 122 429 434 550 850 895 | 122 122 429 434 550 850 850 895 334 | 122 429 434 550 850 895 895 334 1462 | 122 429 434 550 850 895 895 334 1462 1462 | 122 429 434 550 850 850 895 334 1462 473 1307 | 122 429 434 550 850 850 895 334 1462 473 1307 1726 | 122 429 434 550 850 895 334 1462 473 1307 1307 1307 1489 | 122 429 434 550 850 895 334 1462 473 1307 1726 1489 1206 | 122 429 434 550 850 895 895 334 1462 176 1726 1307 1726 1489 1206 1989 | 122 429 429 550 850 895 895 334 473 1307 1726 1462 1726 1489 1726 1726 1989 3080 | 122 429 434 550 850 850 895 895 334 473 1307 1726 1462 473 1307 1726 1489 1206 1289 3080 2940 2940 | 122 429 434 550 850 850 895 334 473 1307 1726 1307 1726 1307 1726 1307 1307 1308 2940 2940 2940 | 122 429 434 550 850 850 895 334 473 1307 1726 1307 1726 1307 1726 1307 1307 1320 3080 3080 3323 3323 | 122 429 434 550 850 850 895 334 1462 473 1307 1726 1307 1726 1307 1206 1307 1206 1307 3423 3423 |
|--------|---|------|------|--------------|----------------------|------------------------------|--------------------------------------|--|---|--|--|--|--|--|--|--|--|---|---|--|---|
| 6 Pole | Normalized IE2 Eff with 0.5% Stray losses | | 70.0 | 70.0 74.0 | 70.0 74.0 77.1 | 70.0 74.0 77.1 79.8 | 70.0 74.0 77.1 79.8 81.4 | 70.0 74.0 77.1 79.8 81.4 83.4 | 70.0 74.0 77.1 79.8 81.4 83.4 85.8 | 70.0 74.0 77.1 79.8 81.4 83.4 83.4 83.4 83.5 83.5 | 70.0 74.0 77.1 77.1 79.8 81.4 83.4 85.8 85.8 87.5 88.6 | 70.0 74.0 77.1 79.8 81.4 83.4 83.4 85.8 87.5 87.5 89.4 | 70.0 74.0 77.1 79.8 81.4 83.4 83.4 85.8 87.5 88.6 88.6 89.4 90.1 | 70.0 74.0 77.1 79.8 81.4 83.4 85.8 87.5 88.6 88.6 89.4 89.4 90.1 91.0 | 70.0 74.0 77.1 79.8 81.4 83.4 83.4 83.4 83.4 83.4 83.4 83.4 83 | 70.0 74.0 77.1 79.8 81.4 83.4 83.4 83.4 83.4 83.6 83.6 83.6 83.6 83.6 83.6 87.5 83.6 80.1 90.1 91.0 91.7 92.1 | 70.0 74.0 77.1 79.8 81.4 83.4 83.4 83.4 83.4 83.4 83.6 83.4 83.6 83.4 83.6 83.6 83.6 83.6 81.0 91.0 91.0 91.7 92.9 | 70.0 74.0 77.1 79.8 81.4 83.4 83.4 83.4 83.4 83.4 83.4 90.1 91.7 91.7 92.9 92.9 92.9 93.4 | 70.0 74.0 77.1 77.1 79.8 81.4 83.4 83.4 83.4 83.4 83.4 83.4 83.4 91.0 91.0 91.0 91.7 92.9 92.9 92.9 93.4 | 70.0 74.0 77.1 79.8 81.4 85.8 87.5 88.6 88.6 89.4 90.1 91.7 91.7 91.7 91.7 92.9 93.4 93.8 93.4 93.8 | 70.0 74.0 77.1 79.8 81.4 83.4 85.8 87.5 90.1 91.0 92.1 92.3 93.4 93.8 94.2 |
| 9 | IE2 Catalogue (Eff%) | 5 | 69 | 69 72.9 | 69 72.9 75.9 | 69 72.9 75.9 78.1 | 69 72.9 75.9 78.1 79.8 | 69 72.9 75.9 78.1 79.8 81.8 | 69 72.9 75.9 78.1 79.8 81.8 84.3 | 69 72.9 75.9 78.1 79.8 81.8 84.3 86 | 69 72.9 75.9 78.1 79.8 81.8 84.3 86 87.2 | 69 72.9 75.9 79.8 81.8 84.3 84.3 86 87.2 88 88 | 69 72.9 75.9 79.8 81.8 84.3 84.3 86 87.2 88 88.7 88.7 | 69 72.9 75.9 78.1 79.8 81.8 81.8 84.3 84.3 84.3 86 87.2 88 88.7 88.7 89.7 | 69 72.9 75.9 78.1 79.8 81.8 84.3 84.3 84.3 84.3 84.3 84.3 84.3 88.7 88.7 88.7 88.7 89.7 90.4 | 69 72.9 75.9 88.1 84.3 84.3 84.3 84.3 84.3 84.3 84.3 88.7 88.7 88.7 88.7 88.7 89.7 90.4 90.9 | 69 72.9 75.9 75.9 75.9 78.1 79.8 81.8 84.3 84.3 84.3 84.3 86 87.2 88.7 88.7 88.7 89.7 90.9 90.9 | 69 72.9 75.9 75.9 79.8 81.8 84.3 84.3 87.2 88.7 88.7 88.7 88.7 88.7 90.4 90.9 91.7 92.2 | 69 72.9 75.9 75.9 79.8 81.8 84.3 84.3 84.3 84.3 88.7 88.7 88.7 88.7 88.7 90.9 90.9 91.7 92.7 | 69 72.9 75.9 75.9 79.8 84.3 84.3 84.3 84.3 84.3 84.3 84.3 84.3 84.3 84.3 84.3 84.3 87.2 88.7 88.7 88.7 88.7 88.7 88.7 90.4 90.4 91.7 92.2 93.1 | 72:9 72:9 72:9 79.8 84.3 84.3 84.3 84.3 84.3 88.7 88.7 88.7 88.7 88.7 88.7 88.7 89.7 90.4 91.7 91.7 92.2 92.2 92.7 92.7 92.7 92.7 92.7 92 |
| | BBL IS325 Catalogue (Eff%) | 68 | | 69 | 69 73 | 69 73 76 | 69 73 76 77 | 69 73 76 77 80 | 69 73 76 77 80 85 | 69 73 76 77 80 85 85 | 69 73 76 77 80 85 85 88 | 69 73 76 77 80 85 85 88 88 | 69 73 76 77 80 85 85 88 88 88.5 | 69 73 76 77 80 85 85 88 88 88 88 88 88 88 88 88 88 88 | 69 73 76 77 80 85 85 88 88 88 88 88 88 88 88 88 88 88 | 69 73 76 77 80 85 85 88 88 88 88 88 88 88 88 88 90 91.2 | 69 77 77 80 85 85 88 88 88 88 88 88 88 88 90 91.2 91.8 | 69 77 76 77 80 80 85 88 88 88 88 88 88 88 88 90 91 91.2 91.2 92.5 | 69 73 76 77 80 85 85 88 88 88 88 88 88 88 88 90 91 91.2 91.2 91.2 91.2 91.3 92.5 | 69 73 76 77 80 85 85 88 88 88 88 88 88 88 88 88 88 90 91.2 91.2 91.2 91.2 91.3 93.5 | 69 73 76 77 80 85 85 88 88 88 88 88 88 88 88 88 91 91.2 91.2 91.2 91.2 91.3 91.3 93.5 93.5 |
| | Saving in kWh/Year @8000 Hrs running | 37 | | 212 | 212 413 | 212 413 695 | 212 413 695 797 | 212 413 695 797 984 | 212 413 695 797 984 1137 | 212 413 695 797 984 1137 1137 | 212 413 695 984 1137 1137 1137 2417 2417 | 212 413 695 797 984 1137 1137 1137 1840 2417 2417 2538 | 212 413 695 695 797 984 1137 1137 1137 1137 2417 2417 2417 2380 | 212 413 695 984 1137 1137 1137 1137 2417 2417 2538 2538 2538 | 212 413 695 984 1137 1840 2847 2417 2417 2538 2380 2538 2380 2520 2289 | 212 413 695 984 1137 1840 28417 2417 2417 2538 2380 2520 2520 2289 2215 | 212 413 695 797 984 1137 1137 1137 1137 28417 2417 2417 2417 2538 2380 2538 2520 2520 2520 2528 2289 2289 | 212 413 695 984 1137 1840 28417 2417 2417 2417 2417 2520 2538 2538 2520 2520 2520 2520 2289 2289 2215 2215 2215 2215 | 212 413 695 984 1137 1840 28417 28417 28417 28417 28417 28417 28417 28417 28417 28417 28380 25389 2520 2520 2520 2520 2520 2520 2520 252 | 212 413 695 695 984 1137 984 1137 1840 2417 2417 2417 2417 2538 2538 2538 2538 2520 2520 2520 2520 2520 2520 2520 252 | 212 413 695 984 1137 984 1137 1840 2840 2417 2538 2417 2538 2538 2538 2538 2520 2520 2520 2520 2520 2520 2520 252 |
| ale | Normalized IE2 Eff with 0.5% Stray (losses | 71.6 | | 76.7 | 76.7 81.3 | 76.7 81.3 83.1 | 76.7 81.3 83.1 84.5 | 76.7 81.3 83.1 84.5 84.5 85.9 | 76.7 81.3 83.1 84.5 85.9 87.9 | 76.7 81.3 83.1 84.5 85.9 87.9 87.9 87.9 | 76.7 81.3 81.3 83.1 84.5 84.5 85.9 87.9 87.9 89.2 89.2 | 76.7 81.3 81.3 83.1 84.5 84.5 85.9 87.9 87.9 89.2 90.2 90.7 | 76.7 81.3 81.3 83.1 84.5 85.9 87.9 87.9 87.9 87.9 87.9 87.9 87.9 87 | 76.7 81.3 81.3 83.1 84.5 85.9 87.9 87.9 87.9 87.9 90.2 91.2 91.2 | 76.7 81.3 81.3 83.1 84.5 87.9 87.9 87.9 87.9 90.2 90.7 91.2 91.2 | 76.7 81.3 81.3 83.1 84.5 84.5 84.5 87.9 87.9 87.9 87.9 90.7 90.7 91.2 91.9 92.5 92.5 | 76.7 81.3 81.3 81.3 81.3 83.1 83.1 83.1 83.1 83.1 84.5 84.5 87.9 87.9 87.9 87.9 87.9 90.2 90.2 91.2 92.5 92.9 93.5 | 76.7 81.3 81.3 83.1 84.5 84.5 84.5 87.9 87.9 89.2 90.7 91.2 91.2 91.2 91.9 91.5 93.5 93.5 | 76.7 81.3 81.3 81.3 81.3 81.3 81.3 81.3 81.3 81.3 81.3 81.3 81.3 81.3 81.3 81.5 82.9 90.2 90.2 91.9 91.9 91.9 91.9 91.9 91.9 91.9 91.9 91.9 91.9 91.9 | 76.7 81.3 81.3 81.3 83.1 84.5 89.2 90.2 90.2 91.2 91.2 91.9 91.9 92.9 92.9 92.9 92 | 76.7 81.3 81.3 83.1 84.5 85.9 87.9 87.9 87.9 87.9 90.7 91.2 91.2 91.2 91.2 91.2 91.2 91.9 91.9 |
| 4 Pole | LE2 Catalogue (Eff%) (Eff%) | 70.1 | 75 1 | 1.0.1 | 1.5.7 | 79.6 | 79.6 81.4 82.8 | 79.6 79.6 81.4 82.8 84.3 | 79.6 79.6 81.4 82.8 84.3 86.3 | 79.6 79.6 81.4 82.8 84.3 86.3 86.3 87.7 | 79.6 79.6 81.4 82.8 84.3 86.3 87.7 88.7 | 79.6 81.4 82.8 84.3 86.3 86.3 87.7 88.7 89.3 | 79.6 81.4 81.4 82.8 84.3 84.3 86.3 87.7 88.7 89.3 89.3 89.3 | 79.6 81.4 81.4 82.8 84.3 84.3 84.3 86.3 87.7 88.7 88.7 89.3 89.3 89.3 80.6 | 79.6 81.4 81.4 82.8 84.3 84.3 84.3 84.3 87.7 88.7 88.7 89.3 89.3 89.3 89.8 89.8 | 79.6 81.4 81.4 82.8 82.8 84.3 84.3 84.3 87.7 87.7 88.7 89.3 89.3 89.8 89.8 90.6 91.2 | 79.6 81.4 81.4 82.8 84.3 84.3 87.7 88.7 88.7 88.7 88.7 89.3 89.3 89.3 89.3 91.6 91.2 91.2 91.2 | 79.6 81.4 81.4 82.8 84.3 84.3 84.3 84.3 87.7 88.7 88.7 88.7 88.7 89.3 89.3 89.3 89.3 89.3 91.6 91.6 92.3 | 79.6 81.4 81.4 82.8 82.8 84.3 84.3 84.3 87.7 88.7 88.7 88.7 89.3 89.3 89.3 91.6 91.2 91.6 91.2 92.3 92.3 | 79.6 81.4 81.4 82.8 84.3 84.3 84.3 84.3 87.7 88.7 88.7 89.3 89.3 89.3 89.3 89.3 91.6 91.6 91.6 91.6 91.6 93.1 93.1 | 79.6 81.4 81.4 82.8 84.3 84.3 84.3 84.3 84.3 87.7 88.7 89.3 89.3 89.3 89.3 89.3 89.3 91.6 91.6 91.6 91.6 91.6 91.6 91.6 93.5 93.5 93.5 |
| | BBL IS325 Catalogue ((Eff%) | 71 | 74 | | 77 | 77 78 | 77 78 80 | 77 78 80 82 | 77 78 80 82 85 | 77 78 80 82 85 86 | 77 78 80 82 85 85 87 | 77 78 80 82 82 85 86 88 88 | 77 78 80 82 85 85 87 88 89 89 | 77 78 80 82 85 85 87 88 88 88 89 90.2 | 77 78 80 82 85 85 86 87 87 88 88 88 88 89 91.2 | 77 78 80 82 85 85 86 87 87 87 88 88 89 89 91.2 91.2 | 77 78 80 82 85 85 85 86 87 87 87 88 88 89 89 90.2 91.2 91.2 91.3 | 77 78 80 82 85 85 87 87 87 87 87 87 87 87 87 87 87 87 87 | 77 78 80 82 85 85 85 86 87 87 87 87 87 87 87 87 87 87 87 87 87 | 77 78 80 82 85 85 85 86 87 88 88 88 88 88 89 91.2 91.2 91.2 91.3 93.2 93.2 | 77 78 80 82 85 85 86 87 87 87 87 87 89 89 91.2 91.2 91.2 91.2 91.3 91.3 93.8 93.8 |
| | Saving in kW/Year @8000 Hrs running | 157 | 188 | 200 | 701 | 201 303 | 201 303 412 | 201 303 412 570 | 201 303 412 570 805 | 201 203 303 412 412 570 805 1426 | 201 303 412 570 805 1426 1944 | 201 303 412 570 805 805 1944 1944 2056 | 201 303 570 570 805 1426 1944 2056 1927 | 201 303 570 570 805 1426 1944 2056 1927 3101 | 201 303 570 570 805 1944 1944 2056 1927 3101 2989 | 201 303 412 570 805 805 1426 1944 2056 1927 3101 2989 2190 | 201 303 412 570 805 805 805 805 805 805 1944 1944 2056 1927 3101 2989 2190 2190 | 201 303 370 570 805 1426 1944 1944 2056 1944 2056 1927 3101 2989 2190 2190 2190 | 201 203 303 570 570 805 805 805 1944 1927 1927 3101 2989 2190 2190 2190 2143 2143 | 201 201 303 412 570 805 1426 1944 2056 1944 2056 1927 3101 2989 2989 2989 2190 2143 2143 2143 | 201 303 570 570 805 1426 1944 2056 1927 3101 2989 2989 2989 2989 2989 2143 2143 2143 2143 2549 |
| U | Normalized IE2 Eff with 0.5% Stray (6 losses | 73.8 | 76.4 | 70.0 | 2.01 | 81.2 | 81.2 82.9 | 81.2 82.9 84.8 | 81.2 82.9 84.8 87.0 | 81.2 81.2 82.9 84.8 87.0 88.5 | 81.2 81.2 82.9 84.8 87.0 88.5 88.5 89.5 | 81.2 81.2 82.9 84.8 84.8 87.0 88.5 89.5 89.5 89.5 80.2 | 81.2 81.2 82.9 84.8 87.0 88.5 89.5 90.2 90.2 | 7.2.0 81.2 82.9 84.8 84.8 84.8 83.5 89.5 90.2 91.6 | 7.2.0 81.2 82.9 84.8 84.8 84.8 84.8 83.5 83.5 83.5 90.2 90.8 91.6 91.6 | 81.2 81.2 82.9 84.8 84.8 84.8 84.8 84.5 83.5 83.5 90.2 90.8 91.6 92.6 | 81.2 81.2 82.9 84.8 84.8 87.0 88.5 90.2 90.2 90.8 91.6 92.2 92.6 92.2 92.6 | 73.0 81.2 82.9 84.8 84.8 87.0 90.2 90.2 90.2 91.6 92.2 93.2 93.2 | 7.9.0 81.2 81.2 82.9 84.8 84.8 87.0 88.5 89.5 90.2 90.2 91.6 91.6 91.6 92.2 93.2 93.7 94.0 | 7.9.0 81.2 81.2 82.9 84.8 84.8 84.8 87.0 87.0 90.2 90.2 91.6 91.6 92.6 93.7 94.0 94.3 | 7.9.0 81.2 81.2 82.9 84.8 84.8 87.0 87.0 84.8 90.2 90.2 91.6 91.6 92.6 92.6 93.7 94.0 94.3 94.8 |
| 2 POIE | IE2 Catalogue 0 (Eff%) | 72.2 | 74.8 | 77.4 | | 79.6 | 79.6 81.3 | 79.6 81.3 83.2 | 79.6 81.3 83.2 85.5 | 79.6 81.3 83.2 85.5 87 | 79.6 81.3 83.2 85.5 87 88.1 | 79.6 81.3 83.2 83.2 85.5 87 88.1 88.1 88.8 | 79.6 81.3 83.2 85.5 85.5 87 88.1 88.1 88.8 89.4 | 79.6 81.3 83.2 85.5 85.5 87 88.1 88.1 88.8 89.4 80.3 | 79.6 81.3 83.2 85.5 85.5 87 87 88.1 88.1 88.8 89.4 90.3 90.3 | 79.6 81.3 83.2 83.2 85.5 87 87 88.1 88.1 88.8 88.8 89.4 90.3 91.3 | 79.6 81.3 81.3 81.3 83.2 83.2 83.2 87 87 87 88.1 88.8 88.1 89.4 90.3 90.3 91.3 91.3 92 | 79.6 81.3 81.3 83.2 85.5 83.2 83.4 88.4 88.4 88.8 88.4 90.3 90.3 91.3 92.5 | 79.6 81.3 81.3 85.5 85.5 85.5 85.5 85.5 85.5 85.5 87 88.1 88.8 88.8 88.4 89.4 90.3 90.3 91.3 92.5 92.5 92.5 | 79.6 81.3 81.3 81.3 83.2 85.5 85.5 85.5 85.5 85.5 85.4 88.1 88.1 88.8 89.4 90.3 90.3 91.3 91.3 92.5 92.5 93.2 93.2 | 79.6 81.3 81.3 81.3 83.2 83.2 85.5 85.5 85.5 85.5 85.4 88.1 88.8 88.1 88.8 89.4 90.3 90.3 90.3 91.3 91.3 92.5 92.9 93.2 93.2 |
| | BBL IS325 Catalogue C (Eff%) | 71 | 74 | 77 | _ | 79 | 79 80.6 | 79 80.6 82.5 | 79 80.6 82.5 85 | 79 80.6 82.5 85 86 | 79 80.6 82.5 85 86 87 87 | 79 80.6 82.5 85 86 87 88 88 | 79 80.6 82.5 85 85 87 87 88 88 89 | 79 80.6 82.5 85 85 86 87 88 88 89.5 | 79 80.6 82.5 85 85 86 87 87 88 88 89.5 89.5 | 79 80.6 82.5 85 85 86 87 87 87 88 89 89.5 90.5 | 79 79 80.6 80.6 81.5 82.5 85 87 86 87 87 88 89 89 89.5 90.5 91.5 92.6 | 79 79 80.6 80.6 81.5 82.5 85 85 86 87 87 83 88 83 89.5 89.5 90.5 91.5 93 93 | 79 79 80.6 80.6 80.5 82.5 85 85 86 87 87 87 87 87 87 87 87 87 87 87 87 87 87 87 87 87 87 87 87 87 88 89 89 89 89 89 90.5 91.5 93.5 93.5 | 79 79 80.6 80.6 82.5 82.5 82.5 82.5 85 85 86 87 87 88 89.5 89.5 90.5 90.5 91.5 91.5 93.5 93.5 | 79 79 80.6 80.6 82.5 82.5 82.5 82.5 85 85 86 87 87 88 89.5 89.5 90.5 90.5 91.5 91.5 93.5 93.3 93.3 93.3 |
| | Rating B kW | 0.37 | 0.55 | 0.75 | | 1.1 | 1.1 1.5 | 1.1 1.5 2.2 | 1.1 1.5 2.2 3.7 | 1.1 1.5 2.2 3.7 5.5 | 1.1 1.5 2.2 3.7 5.5 7.5 | 1.1 1.5 2.2 3.7 5.5 9.3 | 1.1 1.5 2.2 3.7 5.5 7.5 9.3 9.3 | 1.1 1.5 1.5 2.2 3.7 5.5 5.5 7.5 9.3 9.3 11 11 | 1.1 1.5 1.5 2.2 3.7 5.5 7.5 7.5 9.3 11 11 18.5 | 1.1 1.5 1.5 2.2 3.7 5.5 7.5 9.3 11 11 11 18.5 22 | 1.1 1.5 2.2 2.2 3.7 5.5 7.5 9.3 9.3 9.3 11 11 11 13.5 30 30 | 1.1 1.5 2.2 2.2 3.7 5.5 7.5 9.3 9.3 11 11 11 11 18.5 22 33 37 | 1.1 1.5 1.5 2.2 3.7 5.5 5.5 7.5 9.3 9.3 11 11 11 15 18.5 22 30 37 37 | 1.1 1.5 1.5 2.2 2.2 3.7 5.5 5.5 9.3 11 11 15 18.5 22 30 37 45 55 | 1.1 1.5 1.5 2.2 3.7 5.5 7.5 9.3 11 11 11 11 11 11 18.5 22 22 30 37 45 55 55 |

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| | | Net | Weight | B | Constn. Kg | 7 | 7 | 10 | 11 | 17 | 20 | 26 | 51 | 57 | 105 | 112 | 120 | 137 | 117 | 274 | 274 | 353 | 550 | 669 | 750 | 898 | 940 | 940 | 1100 | 1100 | 1390 | 1390 | 1680 | 1870 |
|--|---|--------------|-----------------|----------|--------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | | Rotor | GD ² | | kgm² | 0.0019 | 0.0019 | 0.0037 | 0.0051 | 0.0091 | 0.0113 | 0.0212 | 0.0820 | 0.0980 | 0.1500 | 0.171 | 0.203 | 0.268 | 0.34 | 0.61 | 0.61 | 1.13 | 2.60 | 3.01 | 3.42 | 5.0 | 5.0 | 5.0 | 6.2 | 6.2 | 7.7 | 7.7 | 12.0 | 14.7 |
| : F : B : : IP55 | | Pullout | Torque | to Rated | l orque Ratio | 3.0 | 3.0 | 2.8 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 2.8 | 3.0 | 2.8 | 3.0 | 2.7 | 2.6 | 2.5 | 2.5 | 2.7 | 2.8 | 2.8 | 2.5 | 2.6 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 |
| Ins. Class : F Temp. Rise : B Protection : IP55 | Starting | Starting | Torque | to Rated | lorque Ratio | 2.6 | 2.7 | 2.5 | 2.7 | 3.3 | 3.3 | 3.0 | 2.5 | 2.5 | 2.3 | 2.3 | 2.3 | 2.4 | 2.4 | 2.5 | 2.4 | 2.5 | 2.3 | 2.2 | 2.2 | 2.0 | 2.2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.6 | 1.6 |
| | With DOL Starting | Starting | Current | to Rated | Current Ratio | 5.0 | 5.0 | 5.0 | 6.0 | 6.5 | 6.5 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| o 355L uous) | | | | | 1/21 | 66.0 | 70.0 | 73.5 | 75.5 | 78.0 | 81.7 | 83.5 | 82.0 | 83.0 | 84.5 | 86.5 | 87.0 | 88.8 | 88.8 | 89.5 | 90.0 | 91.0 | 90.06 | 92.0 | 90.9 | 91.5 | 91.5 | 91.3 | 92.2 | 93.0 | 93.0 | 93.3 | 92.8 | 93.0 |
| ne size 71 to 355 : 50 °C : 51(Continuous) | | % Efficiency | | | 3/4L | 72.2 | 74.0 | 76.5 | 79.6 | 81.3 | 83.2 | 85.5 | 86.0 | 87.0 | 88.6 | 89.4 | 90.2 | 90.7 | 91.0 | 92.0 | 92.0 | 92.7 | 92.7 | 93.6 | 93.9 | 94.1 | 93.5 | 93.6 | 93.7 | 94.1 | 94.1 | 94.5 | 94.5 | 94.5 |
| itors - Fram Ambient: Duty | | | | i | FL | 72.2 | 74.8 | 77.4 | 79.6 | 81.3 | 83.2 | 85.5 | 87.0 | 88.1 | 88.8 | 89.4 | 90.3 | 90.9 | 91.3 | 92.0 | 92.5 | 92.9 | 93.2 | 93.8 | 94.1 | 94.3 | 94.5 | 94.6 | 94.7 | 94.8 | 94.9 | 95 | 95.0 | 95 |
| uction Mo | | | | | 1/2L | 0.60 | 0.58 | 0.62 | 0.63 | 0.68 | 0.68 | 0.76 | 0.77 | 0.77 | 0.82 | 0.82 | 0.82 | 0.86 | 0.83 | 0.80 | 0.80 | 0.78 | 0.86 | 0.83 | 0.87 | 0.78 | 0.76 | 0.78 | 0.76 | 0.77 | 0.75 | 0.77 | 0.84 | 0.84 |
| TEFC 3 Phase Squirrel Cage Induction Motors - Frame size 71 to 355L : 415V+/-10% Ambient: : 50 °C : 50H2+/-5% Duty : 51(Continuous) riation : +/-10% 3000 rpm (2-Pole) | ed output | Power Factor | | | 3/4L | 0.68 | 0.72 | 0.74 | 0.75 | 0.78 | 0.78 | 0.84 | 0.85 | 0.85 | 0.86 | 0.86 | 0.88 | 0.89 | 0.87 | 0.86 | 0.86 | 0.85 | 0.91 | 0.88 | 0.89 | 0.86 | 0.85 | 0.86 | 0.84 | 0.85 | 0.82 | 0.85 | 0.88 | 0.88 |
| ase Squirre 10% 5% '-10% | icteristics at Rat | Н | | i | FL | 0.74 | 0.79 | 0.82 | 0.82 | 0.82 | 0.82 | 0.86 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 06.0 | 0.89 | 0.89 | 0.89 | 0.88 | 0.92 | 0.90 | 0.91 | 0.90 | 0.89 | 0.90 | 0.89 | 0.90 | 0.88 | 0.90 | 0.90 | 0 90 |
| TEFC 3 Phase S Voltage : 415V+/-10% Frequency : 50Hz+/-5% Combined Variation : +/-10% | Operating Characteristics at Rated output | Rated | Torque | 2 | Kg.m | 0.130 | 0.190 | 0.256 | 0.380 | 0.514 | 0.755 | 1.24 | 1.83 | 2.49 | 3.09 | 3.66 | 4.99 | 6.15 | 7.30 | 9.89 | 12.2 | 14.8 | 18.1 | 24.6 | 29.5 | 35.9 | 40.8 | 43.1 | 49.0 | 52.3 | 58.80 | 65.30 | 81.60 | 102.80 |
| Voltage Frequency Combined V | 0 | Current | | | Amps. | 0.96 | 1.29 | 1.64 | 2.34 | 3.13 | 4.49 | 7.00 | 9.9 | 13.3 | 16.4 | 19.2 | 26.0 | 31.5 | 37.7 | 51.0 | 62.5 | 76.6 | 89.2 | 124 | 146 | 180 | 207 | 216 | 248 | 261 | 300 | 325 | 407 | 513 |
| | | Rated | Speed | | RPM | 2800 | 2805 | 2830 | 2830 | 2840 | 2840 | 2890 | 2930 | 2930 | 2930 | 2930 | 2930 | 2930 | 2935 | 2950 | 2950 | 2965 | 2965 | 2970 | 2970 | 2982 | 2982 | 2982 | 2982 | 2982 | 2982 | 2982 | 2985 | 2985 |
| | Type | Ref. | | ć | B3 Construction | 2H0712A3 | 2H071233 | 2H080213 | 2H080233 | 2H09S243 | 2H09L273 | 2H10L233 | 2H13S2G3 | 2H13S2N3 | 2H16M233 | 2H16M253 | 2H16M263 | 2H16L293 | 2H18M233 | 2H20L2A3 | 2H20L253 | 2H22M253 | 2H25M233 | 2H28S233 | 2H28M253 | 2H31S233 | 2H31M2A3 | 2H31M233 | 2H31L2A3 | 2H31L253 | 2H31L2B3 | 2H31L273 | 2H35L213 | 2H35L233 |
| | Frame | size | | c L | IEC | 71 | 71 | 80 | | | 106 | 100L | | 132S | 160M | 1 | 160M | 160L | 180M | 200L | | | | | 280M | 315S | 315M | 315M | 315L | 315L | 315L | 315L | 355L | 355L |
| | out | | | 4 | ЧН | 0.50 | 0.75 | 1.0 | 1.5 | 2.0 | 3.0 | 5.0 | 7.5 | 10.0 | 12.5 | 15.0 | 20.0 | 25.0 | 30.0 | 40.0 | 50.0 | 60.0 | 75.0 | 100 | 120 | 150 | 170 | 180 | 200 | 215 | 240 | 270 | 335 | 475 |
| | Rated Output | | | | κw | 0.37 | 0.55 | 0.75 | 1.1 | 1.5 | 2.2 | 3.7 | 5.5 | 7.5 | 9.3 | 11 | 15 | 18.5 | 22 | 30 | 37 | 45 | 55 | 75 | 90 | 110 | 125 | 132 | 150 | 160 | 180 | *200 | *250 | *315 |



| Motors |
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|---|--------------|------------------|-----------------------------|--------------------|---|---------------|-----------------|----------|---------|--------------|----------|---------------|-------|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | | | | | | Net | Weight | B3 | Constn. | a B R | | 1 | 17 | ŗ, | ۲ I | 26 | 36 | 50 | 56 | 105 | 115 | 128 | 188 | 200 | 275 | 362 | 377 | 500 | 670 | 735 | 902 | 1010 | 1010 | 1185 | 1185 | 1262 | 1305 | 1680 | 1855 | 2025 |
| ⊜ | | | | | | Rotor | GD ² | | | kgm² | 0.0033 | 7/00/0 | 0.015 | | ATU.U | 0.028 | 0.066 | 0.126 | 0.163 | 0.177 | 0.229 | 0.300 | 0.540 | 0.61 | 0.93 | 1.60 | 1.85 | 3.06 | 5.53 | 6.36 | 8.70 | 10.20 | 10.20 | 12.20 | 12.20 | 13.40 | 14.60 | 23.30 | 32.70 | 37.90 |
| | ц. | 8 | : IP55 | | | Pullout | Torque | to Rated | Torque | Ratio | C.2 | 3.0 | 0.0 | 0.2 | 0.0 | 3.0 | 3.0 | 3.0 | 3.2 | 2.8 | 2.9 | 2.7 | 2.9 | 3.0 | 2.6 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| | Ins. Class : | Temp. Rise : B | Protection : IP55 | | g | Starting | Torque | to Rated | Torque | Ratio | 2.2 | 7.8 2.0 | 0'7 | 1 t | 7.7 | 2.6 | 2./ | 2.6 | 2.6 | 2.5 | 2.7 | 2.4 | 2.7 | 2.6 | 2.6 | 2.6 | 2.6 | 2.5 | 2.2 | 2.2 | 2.1 | 2.2 | 2.1 | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 |
| | _ | F | | | With DOL Starting | Starting | Current | to Rated | Current | Ratio | 4. r | 0.0 | 0.0 | 0.0 | 0.0 | 6.0 | c.d | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| 355L | | ous) | | | M | | | | 1/2L | C L U | 0.00 | 68.U | 74.0 | 0.01 | 10.0 | 81.5 | 83.8 | 86.0 | 86.8 | 86.5 | 87.5 | 89.4 | 89.5 | 89.8 | 90.06 | 90.5 | 90.8 | 91.0 | 92.0 | 92.0 | 92.3 | 92.7 | 93.0 | 92.8 | 93.1 | 93.2 | 93.3 | 93.5 | 93.5 | 93.5 |
| e size 71 to | : 50 °C | : S1(Continuous) | | | | Efficiency | - | | 3/4L | - OF | 1.U/ | 1.c/ | 0.51 | 4.TO | 07.0 | 84.3 | 86.3 | 87.4 | 88.4 | 89.3 | 89.8 | 90.6 | 91.2 | 91.6 | 92.0 | 92.5 | 92.8 | 93.0 | 93.5 | 94.0 | 94.3 | 94.3 | 94.5 | 94.4 | 94.6 | 94.7 | 94.8 | 94.9 | 94.8 | 94.9 |
| ors - Frame | Ambient: : | | | | | % | - | | Н | 1 O L | T.U/ | T.C/ | 0.51 | 4.TO | 07.0 | 84.3 | 86.3 | 87.7 | 88.7 | 89.3 | 89.8 | 90.6 | 91.2 | 91.6 | 92.3 | 92.7 | 93.1 | 93.5 | 94.0 | 94.2 | 94.5 | 94.6 | 94.7 | 94.7 | 94.9 | 95.0 | 95.1 | 95.1 | 95.1 | 95.1 |
| ction Mot | A | D | | -Pole) | | tor | | | 1/2L | 010 | 0.50 | 0.50 | 00 | 10.0 | /6.0 | 0.59 | 0.63 | 0.70 | 0.76 | 0.73 | 0.76 | 0.70 | 0.76 | 0.72 | 0.78 | 0.77 | 0.77 | 0.76 | 0.80 | 0.80 | 0.77 | 0.77 | 0.78 | 0.77 | 0.78 | 0.78 | 0.78 | 0.75 | 0.75 | 0.75 |
| Cage Indu | 1 | | | 1500 rpm (4-Pole) | l output | Power Factor | - | | 3/4L | , j | 70.0 | 0.64 | 00.0 | 0.10 | 0.70 | 0.73 | 0./8 | 0.80 | 0.83 | 0.82 | 0.82 | 0.80 | 0.82 | 0.80 | 0.82 | 0.85 | 0.85 | 0.84 | 0.86 | 0.86 | 0.83 | 0.83 | 0.85 | 0.83 | 0.86 | 0.86 | 0.86 | 0.85 | 0.85 | 0.85 |
| se Squirrel | . % | % | 10% | | eristics at Rated | | | | Н | 1 | 1/.0 | 0./4 | C/-D | 11.0 | 0.77 | 0.81 | 0.82 | 0.85 | 0.86 | 0.84 | 0.85 | 0.85 | 0.85 | 0.85 | 0.86 | 0.87 | 0.87 | 0.86 | 0.88 | 0.88 | 0.86 | 0.86 | 0.87 | 0.86 | 0.87 | 0.87 | 0.87 | 0.88 | 0.88 | 0.88 |
| TEFC 3 Phase Squirrel Cage Induction Motors - Frame size 71 to 355L | : 415V+/-10% | : 50Hz+/-5% | Combined Variation : +/-10% | | Operating Characteristics at Rated output | Rated | lorque | | Kg.m | 0.20 | 07.0 | 0.377 | OTC:0 | c/.n | 70'T | 1.49 | 2.49 | 3.68 | 5.02 | 6.20 | 7.34 | 9.97 | 12.25 | 14.60 | 19.88 | 24.50 | 29.82 | 36.20 | 49.40 | 59.20 | 72.10 | 81.90 | 86.50 | 98.30 | 104.8 | 117.9 | 131.0 | 163.6 | 206.2 | 232.4 |
| · | Voltage | Frequency | ombined Va | | OF | Current | | | Amps. | 1 03 | 1.03 | 1.38 1 -71 | C/-T | 4:+ | 7.5 | 4.48 | 17.1 | 10.2 | 13.8 | 17.2 | 20.0 | 27.1 | 33.2 | 39.3 | 52.6 | 63.8 | 77.3 | 95.2 | 126 | 151 | 188 | 214 | 223 | 256 | 270 | 303 | 336 | 416 | 524 | 590 |
| | × | F | ŭ | | | Rated Cu | speed | | RPM An | 1200 | 138U | 1420 | 1420 | 1430 | 143U | 1435 | 1445 | 1455 | 1455 | 1460 | 1460 | 1465 | 1470 | 1470 | 1470 | 1470 | 1470 | 1480 | 1480 | 1480 | 1485 | 1486 | 1486 | 1487 | 1486 | 1487 | 1487 | 1488 | 1488 | 1488 |
| | | | | | | Type Ref. | | | B3 | Construction | 2HU/1433 | 2H080433 | | | 2009L4/3 | 2H10L473 | 2H11M4/3 | 2H13S4K3 | 2H13M4T3 | 2H16M4C3 | 2H16M4K3 | 2H16L4T3 | 2H18M473 | 2H18L483 | 2H20L453 | 2H22S433 | 2H22M453 | 2H25M433 | 2H28S423 | 2H28M453 | 2H31S413 | 2H31M4A3 | 2H31M433 | 2H31L4A3 | 2H31L453 | 2H31L463 | 2H31L473 | 2H35L413 | 2H35L433 | 2H35L453 |
| | | | | | _ | Frame size | | | EC | | | 9H7 08 | | | | | | | | | ~ | 160L 2H: | 180M 2H1 | 180L 2H: | 200L 2H2 | 225S 2H2 | 225M 2H2 | 250M 2H2 | 280S 2H2 | 280M 2H2 | | 315M 2H3 | 315M 2H3 | 315L 2H3 | 315L 2H3 | | | 355L 2H3 | | |
| | | | | | | F 。 | | | HP H | - | | | | + | | | | | | 12.5 16 | | 20.0 16 | 25.0 18 | 30 18 | | | 60 22 | | 100 28 | 120 28 | 150 31 | 170 31 | 180 31 | 200 3. | 215 3 | 240 3 | | 335 35 | | 475 35 |
| | | | | | Rated Output | | | | | | | | | - | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | Rat | | | | κw | | 1.37 | cc.U | r, v | 1.1 | C.1 | 2.2 | 3./ | 5.5 | 7.5 | 9.3 | 11 | 15 | 18.5 | 22 | 30 | 37 | 45 | 55 | 75 | 60 | 110 | 125 | 132 | 150 | 160 | 180 | *200 | *250 | *315 | **355 |

Note : All performance values are subject to tolerance as per IS/IEC 60034-1 Efficiency measurements are without seals. *- These ratings are suitable for ambient temperature 40°C **- These ratings are suitable for ambient temperature 40°C

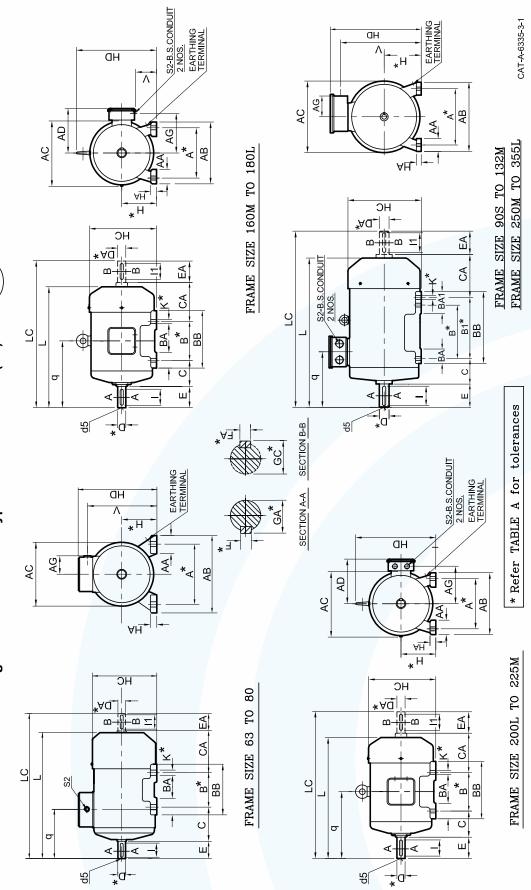


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| | | | | Net | Weight | B3 | Constn. Kg | 10 | 11 | 14 | 17 | 22 | 33 | 48 | 55 | 103 | 113 | 123 | 200 | 254 | 270 | 358 | 528 | 573 | 620 | 830 | 912 | 1010 | 1175 | 1175 | 1231 | 1231 | 1670 | 1670 | 1780 |
| ⊜ | | | | Rotor | GD ² | | kem² | 0.0060 | 0.0084 | 0.0122 | 0.0160 | 0.0250 | 0.065 | 0.130 | 0.193 | 0.276 | 0.34 | 0.40 | 0.82 | 1.20 | 1.37 | 2.41 | 3.72 | 5.11 | 6.16 | 10.7 | 12.4 | 15.5 | 18.0 | 18.0 | 21.5 | 21.5 | 28.7 | 28.7 | 35.5 |
| | : F : B : IP55 | | | Pullout | Torque | to Rated | Torque Ratio | 2.3 | 2.5 | 2.5 | 2.6 | 2.5 | 2.5 | 2.5 | 2.50 | 2.5 | 2.5 | 2.5 | 2.3 | 2.3 | 2.3 | 2.2 | 2.3 | 2.4 | 2.4 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| | lns. Class : F Temp. Rise : B Protection : IP55 | | starting | Starting | Torque | to Rated | Torque Ratio | 2.1 | 2.2 | 2.0 | 2.0 | 2.0 | 2.1 | 2.0 | 2.5 | 2.0 | 2.1 | 2.0 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.0 | 2.0 | 2.0 |
| | | | With DOL Starting | Starting | Current | to Rated | Current Ratio | 3.0 | 4.0 | 4.0 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | 5.5 | 6.0 | 7.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
|) 355L | (sno | | | | | | 1/2L | 67.0 | 68.5 | 72.3 | 74.0 | 75.0 | 79.8 | 81.5 | 82.0 | 85.2 | 86.7 | 87.0 | 87.2 | 88.3 | 88.8 | 88.7 | 91.0 | 91.2 | 91.0 | 92.5 | 92.5 | 93.3 | 93.0 | 92.8 | 92.8 | 93.0 | 93.3 | 93.5 | 93.4 |
| e size 80 to | : 50 °C : S1(Continuous) | | | % Efficiency | | | 3/4L | 69.0 | 72.9 | 75.9 | 78.1 | 79.6 | 81.8 | 83.0 | 84.5 | 87.2 | 88.0 | 88.7 | 89.7 | 90.4 | 90.9 | 91.2 | 92.2 | 92.7 | 93.1 | 93.7 | 93.9 | 94.3 | 94.4 | 94.3 | 94.4 | 94.6 | 94.6 | 94.7 | 94.7 |
| ors - Fram | Ambient: : Duty : | | | % | | | н | 69.0 | 72.9 | 75.9 | 78.1 | 79.8 | 81.8 | 84.3 | 86.0 | 87.2 | 88.0 | 88.7 | 89.7 | 90.4 | 90.9 | 91.7 | 92.2 | 92.7 | 93.1 | 93.7 | 94.0 | 94.3 | 94.4 | 94.6 | 94.7 | 94.8 | 94.9 | 95.0 | 95.0 |
| TEFC 3 Phase Squirrel Cage Induction Motors - Frame size 80 to 355L | 4 0 | 5-Pole) | | | | | 1/2L | 0.48 | 0.48 | 0.50 | 0.50 | 0.52 | 0.58 | 0.57 | 0.60 | 0.64 | 0.64 | 0.66 | 0.62 | 0.69 | 0.69 | 0.76 | 0.82 | 0.70 | 0.73 | 0.75 | 0.72 | 0.73 | 0.71 | 0.73 | 0.70 | 0.73 | 0.65 | 0.7 | 0.7 |
| l Cage Indi | | 1000 rpm (6-Pole) | d output | Power Factor | | | 3/4L | 0.60 | 0.62 | 0.61 | 0.61 | 0.60 | 0.65 | 0.65 | 0.68 | 0.74 | 0.74 | 0.77 | 0.75 | 0.77 | 0.77 | 0.84 | 0.85 | 0.80 | 0.83 | 0.82 | 0.81 | 0.82 | 0.80 | 0.82 | 0.80 | 0.82 | 0.77 | 0.80 | 0.80 |
| ase Squirre | 0% % 10% | | teristics at Rate | PC | | | н | 0.70 | 0.71 | 0.72 | 0.72 | 0.72 | 0.75 | 0.76 | 0.78 | 0.80 | 0.80 | 0.80 | 0.80 | 0.82 | 0.82 | 0.86 | 0.88 | 0.83 | 0.85 | 0.85 | 0.84 | 0.85 | 0.84 | 0.85 | 0.83 | 0.85 | 0.82 | 0.84 | 0.84 |
| TEFC 3 Ph | Voltage : 415V+/-10% Frequency : 50Hz+/-5% Combined Variation : +/-10% | | Operating Characteristics at Rated output | Rated | Torque | | Kg.m | 0.396 | 0.59 | 0.79 | 1.15 | 1.56 | 2.28 | 3.75 | 5.58 | 7.61 | 9.44 | 11.1 | 15.1 | 18.5 | 22.0 | 30.0 | 36.8 | 44.7 | 54.7 | 74.1 | 88.8 | 108.4 | 123.2 | 130.0 | 147.8 | 158.0 | 177.0 | 196.7 | 246 |
| | Voltage Frequency Combined Vá | | 0 | Current | | | Amps. | 1.07 | 1.48 | 1.91 | 2.72 | 3.63 | 4.99 | 8.00 | 11.4 | 15.0 | 18.4 | 21.6 | 29.1 | 34.7 | 41.1 | 52.9 | 63.4 | 81.4 | 96.7 | 131 | 159 | 191 | 219 | 228 | 265 | 276 | 322 | 349 | 436 |
| | > E O | | | Rated C | Speed | | RPM | 910 | 915 | 925 | 930 | 935 | 940 | 960 | 960 | 960 | 960 | 965 | 965 | 975 | 975 | 975 | 980 | 980 | 980 | 985 | 987 | 988 | 988 | 988 | 988 | 988 | 066 | 066 | 066 |
| | | | Tvne | Ref. | | | B3 Construction | 2H080613 | 2H080633 | 2H09S633 | 2H09L653 | 2H10L633 | 2H11M653 | 2H13S6G3 | 2H13M6T3 | 2H16M633 | 2H16L663 | 2H16L673 | 2H18L633 | 2H20L633 | 2H20L653 | 2H22M643 | 2H25M633 | 2H28S613 | 2H28M633 | 2H31S613 | 2H31M633 | 2H31M653 | 2H31L6A3 | 2H31L673 | 2H31L6B3 | 2H31L693 | 2H35L6A3 | 2H35L613 | 2H35L633 |
| | | | Frame | size | | | IEC | | 80 | | - 106 | | 112M | 132S 2 | 132M 2 | 160M | 160L | 160L | | | | | - | 280S | _ | | | F | 315L | 315L | 315L | 315L | | | 355L |
| | | | ut | | | | ЧН | 0.5 | 0.75 | 1.0 | 1.5 | 2.0 | 3.0 | 5.0 | 7.5 | 10 | 12.5 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 | 100 | 120 | 150 | 170 | 180 | 200 | 215 | 240 | 270 | 335 |
| | | | Rated Output | | | | κw | 0.37 | 0.55 | 0.75 | 1.1 | 1.5 | 2.2 | 3.7 | 5.5 | 7.5 | 9.3 | 11 | 15 | 18.5 | 22 | 30 | 37 | 45 | 55 | 75 | 06 | 110 | 125 | 132 | 150 | 160 | 180 | 200 | 250 |



Note : All performance values are subject to tolerance as per IS/IEC 60034-1 Efficiency measurements are without seals.



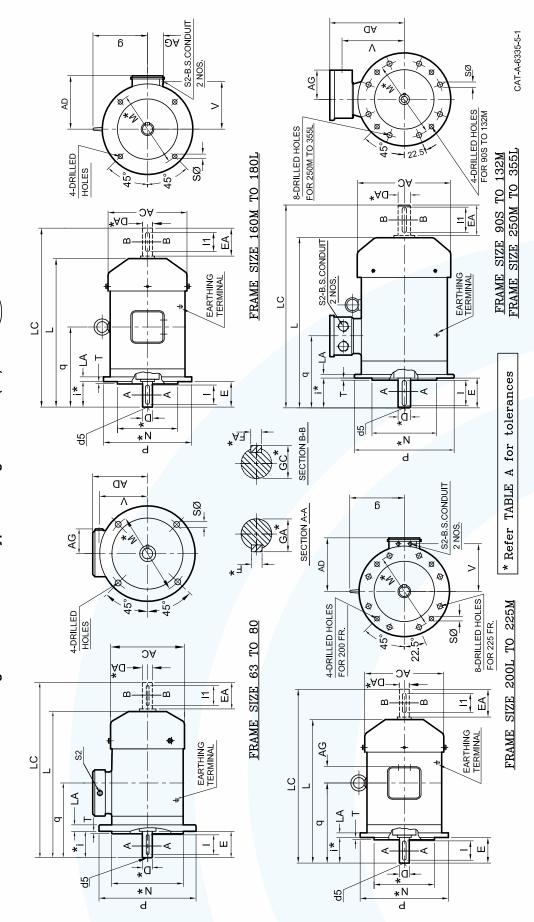
Dimensional Drawing: Industrial Motors Type 2H Foot Mounted (B3) TEFC (IE2) series Frame 63-355L



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| RAL 9 AD L LC CA 9 206 241 75 6 233 278 83 7 - 267 324 94 75 -366 448 125 2 388 471 141 2 - 388 471 141 450 552 163 8 478 590 163 605 741 203 605 741 203 605 741 203 605 717 838 218 2265 679 990 217 8 226 679 990 2218 6 772 897 239 8 218 337 6 - 1010 1160 271 1137 1293 240 1137 1293 240 1167 1353 240 1162 1458 454 1281 1682 458 1281 1682 458 1381 1682 4588 1381 1688 45888 1381 1688 458888 1381 1688 458888 1381 1688 45888 1381 1688 45 | | | | | | | | | | | | | | | | - | | - 10 | <u>+</u> | | 50 | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | - | | | | | | | - | | | - | - | _ | _ | | <u> </u> | | | | | | | | |) ب ب | t : h9 |
| | | LC | | | | | 39 | | 47, | 552 | | _ | _ | | | | | _ | | 96(| 95 | 66 | | | | | | | | | L. | | |] | ve bol | way ti |
| | | _ | 206 | 234 | 267 | 302 | 327 | 366 | 388 | 450 | 488 | 100 | 605 | 8 | 629 | 679 | 717 | 795 | 772 | 827 | 837 | 842 | 983 | 914 | 1010 | 1137 | 1167 | 1302 1332 | 1461 1491 | | cificatic | : 1231 | 3 2048 3 254(| | iont iort | / key |
| | | AD | | | 1 | 1 | | - | ı | 1 | | | | 226 | | 100 | 202 | 312 | 012 | | 337 | | I | | | | | | | | Spee | <u>0</u> | 0) 0) | |) With | l Key |
| A* B* B1 C H* K* AB BA BA BA BA BA BA HA HC 100 80 | VERA | ЯD | 179 | 195 | 214 | | 230 | 257 | 282 | | 338 | | | 366 | | 3 | 4.1Z | 162 | 101 | | 509 | | 665 | | 725 | | 830 | | 939 | | 0 | 0.950 | | | \sim | U |
| $ \begin{array}{ c c c c c c c c c c c c c c c c c c c$ | - GEN | Ч | | | | | | | | 000 | 202 | | | | | | | | | | 450 | | 495 | | 552 | | 620 | | | | | 5 75 81 | | | DE shê | |
| A* B* B1* C H* A BA BA 100 80 - 40 63 7 126 100 28 30 1100 80 - 40 63 7 126 100 28 30 1110 90 - 56 90 10 150 31 35 1120 - 50 10 12 190 174 47 36 1140 - 50 10 12 190 174 47 36 126 90 10 12 190 174 47 36 127 128 132 12 256 50 174 47 36 254 - 121 180 15 53 58 56 254 279 121 128 <td></td> <td>ΗA</td> <td></td> <td></td> <td>-</td> <td></td> <td>6</td> <td>٥Z</td> <td>ى د</td> <td>70</td> <td></td> <td></td> <td></td> <td>42</td> <td></td> <td>42</td> <td></td> <td>45</td> <td></td> <td>45</td> <td>Г</td> <td>oleral</td> <td>3,42,4</td> <td></td> <td></td> <td>alto</td> <td></td> | | ΗA | | | - | | | | | | | | | | | 6 | ٥Z | ى د | 70 | | | | 42 | | 42 | | 45 | | 45 | Г | oleral | 3,42,4 | | | alto | |
| $ \begin{array}{ c c c c c c c c c c c c c c c c c c c$ | | BA1 | | | | | | | | | | | | | | | | | | | | | | | 149 | ~ | - | | | | ŀ | | 1 | | entice | |
| $\begin{array}{ c c c c c c c c c c c c c c c c c c c$ | | ΒA | 30 | 30 | 35 | 37 E | <u>,</u> | | 36 | 50 | ŭ | 5 | | | | | | 05 | 00 | | 85 | | 115 | | 110 | 4 7 7 | <u>-</u> | | | | | | | | p ug | 2 |
| $ \begin{array}{ c c c c c c c c c c c c c c c c c c c$ | | | | | | | | 43.5 | | | | | | | | | | | | | | | 100 | | 100 | 5 | 3 | 120 | 110 | | lsion | A | F,FA ering) | | iensi | 277 0 |
| $\begin{array}{ c c c c c c c c c c c c c c c c c c c$ | | | 100 | 110 | 124 | | | 174 | 174 | | | × ۱٥ | 250 | | 294 | | | 255 | | 336 | | 8 | | | 490 | 510 | | | 770 | 4 | Dime | D,D | A,GC, | | ft d <u>in</u> | oer IX |
| $\begin{array}{ c c c c c c c c c c c c c c c c c c c$ | Ц | | 126 | 135 | 150 | 160 | | 190 | 220 | | 256 | | | 310 | | | 044 | 000 | 000 | | 436 | | 506 | | 540 | | 675 | 050 | 710 | ШШ | | | d5 d5 | | shat | lasp |
| $\begin{array}{ c c c c c c c c c c c c c c c c c c c$ | Ы | *× | 7 | 7 | | 6 | 2 | 12 | 12 | | 12 | | | | | Ļ | 5 | 10 | 13 | | 19 | | 24 | | 24 | | аc | 2 | 28 | IAE | ion | | 2 | | with : | guing |
| $\begin{array}{ c c c c c c c c c c c c c c c c c c c$ | | *± | 63 | 7 | 80 | 8 | ۶ ۶ | 100 | 112 | 0 | 132 | | | 160 | | | Uð I | 000 | 201 | | 225 | | 250 | | 280 | | 31E | 2 | 355 | | cifica | | 123 | | ded | nom |
| A* B* B1* A* B* B1* A* B* B1* A* B* B1* 100 80 112 100 80 1125 100 1120 1140 1190 140 216 140 216 140 216 219 218 305 254 279 279 356 311 356 311 406 349 508 508 508 508 508 508 508 508 508 | ģ | | 40 | 45 | 50 | U L | R | 63 | 70 | : | 68 | | | 108 | | | .71 | 133 | 2 | | 149 | | 168 | | 190 | | 01G | 2 | 254 | | Spe | | <u>s</u> | | prov | ۹۸ ۱ |
| A* B* 100 80 100 80 125 100 80 125 100 80 125 100 80 125 100 140 125 100 140 125 120 216 140 125 215 210 226 211 225 210 226 211 225 210 226 211 225 226 211 225 226 211 225 226 211 225 226 211 225 226 211 225 226 211 225 226 211 225 226 211 225 226 211 225 211 2 | IXI | в1* | | Ι | Ι | | | - | | | | | | | | | | | | | | | | | 419 | 157 | 5 | | | | | 80 | | 80 | be i be | x v v |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $ | Ī | * <u>m</u> | 80 | 6 | 100 | 100 | 125 | 140 | 140 | 140 | 178 | 0/1 | 210 | i | 254 | 241 | 279 | 305 | 202 | 286 | 311 | ; | 349 | | 368 | 106 | 2024 | 508 | 630 | | e | PTO 2 | , 10Ø | ,24,28 | n car | ň |
| | Ц | *∢ | 100 | 112 | 125 | 110 | | 160 | 190 | 0 | | | | _ | | | | 318 | 2 | | | | 406 | | 457 | | 508 | | 610 | | oleran | | | 19 | insio | 20,B/ |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$ | | e | 4 | | | | 8 | 8 | | æ | | | a | | | | 8 | | | | | 8 | | | | | | 0 | 8 | | | -0.5 | +0.360 +0.430 | 0.520 | ftexte | e tor t |
| Pole 2,4,8,6 6,8,8 7,4,6,8 8,8 6,8,8 6,8,8 7,4,6,8 8,8 6,8,8 7,4,6,8 8,8 7,2,6,8 8,8 7,2,6,8 8,8 7,2,6,8 8,8 7,2,6,8 8,8 7,2,6,8 8,8 7,2,6,8 8,8 7,2,6,8 8,8 7,2,6,8 8,8 7,2,6,8,8 7,2,6,8,8 7,2,6,8,8 7,4,6,8,8,8 7,4,6,8,8,8,8,8,8,8,8 | | Pol | 2 & | 2,4 (| 2,4, | 6& | | 6& | 6& | | » | | 16,2 | | 9 8 | 2,6 | 6& | 2 | 6& | 6 & | 2 | 6 & | ~ | 4,6 | 4,6 5 | 2 | 4,6 | 4.6 | 4,6 | | Ę | <u> </u> | + + | + | shaf | Itable |
| IEC IEC 63 63 63 71 71 2 90S 90S 90S 90S 90S 90S 90S 100L 112M 1 132N 1 160M 2 200L 200L 200L 2 315L 2 A H H H Also sutitic 2 | | size | 33 | - | , | SC | Ъ |) OL | 2M | 32S | MC | | - Moč | - | OUL | MO | 30L | | J L | :5S | E N N | MC | - MC | | -W/S | N/O | 1/0 | 151 | 22F | | nensio | Ξ | × | | ouble. | so su |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $ | | Ш. Ц | | | ® | 6 | Ó | 10 | 1 | 10 | | - | 16 | | | 18 | 15 | 70 | Ň | 22 | ç | 3 | 25 | | 280 | 215 | <u>, 1</u> | <u>.</u> | 36 | | | | | | | Z D |





Dimensional Drawing: Industrial Motors Type 2H Flange Mounted (B5) TEFC (IE2) series Frame 63-355L

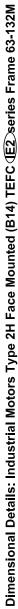


| Frame 63-355L |
|----------------------------|
| (E2) series |
| I (B5) TEFC |
| nge Mounteo |
| ype 2H Flar |
| al Motors T |
| Details: Industrial Motors |
| imensional Deta |
| Dim |

| - | | | | | \$ | e | 6 | | 2 | | ю | | | | 10 | N | - | | 0 | ю | | - | . | , 1 | | Τ. | Т | | | - | | 1 | | | | Г | <u>s</u> | ied. | | | | |
|---------------|------------------------------|------|---------|--------------------------|--------|--------------------|--------------|-------|-----------|---------|------|-----|----------|----------|-------|---------|--------|-------|------------|--------|-----|--------|------|------------|----------|----------|----------|----------|------------|--------|---------|---------|------------------------------------|---------------------------------------|---------------------------------------|----------------------|-------------------------------------|---|--|--|---|-------|
| ю́ ш | | | | | 3 408 | 433 | 7 469 | 9 502 | 597 | 1 | 635 | | 771 | | 815 | 802 | 841 | | 920 | 7 1026 | | 1051 | | | | | | | | _ | | | ą | 0 | | 1 | ance | nerwise specified | | | | |
| TABLE | | | | | 4 336 | 4 361 | 4 387 | 419 | 4 498 | | 532 | | 4 635 | | 4 679 | 698 | 737 | | 795 | 877 | | 902 | | | | | | | | _ | | | vill hav | ated in | | . | tolerances | nerwise | | | | |
| F | Pole | | | | 2 & . | 2 & 4 | 2 & 4 | 4 | 28, | | 4 | Ι | 2 & 4 | | 2 & 4 | 4 | 4 | | 4 | 4 | | 4 | | | | | | I | | | | | 5kW/2P & 11kW/4P in 160M will have | dimensions "L" & "LC" as Indicated in | | | for t | less oth | | | | |
| | d5 M6 M8 M10 M10 | | | | | 5 6 10 10 | | | | <u></u> | | | M12 | 1 | | | M16 | | | ç | 0 | | MZ0 | | M20 | | 6 | MZ0 | M20 | Т | | M20 | | 77 | 4 | | Special Remarks & 11kW/4P in 160 | - <u>"</u> " | | . | ◄ | un mm |
| | d5 | Σ | Σ | Σ | 2 | ≥ | M10 | M10 | ž | | | | | | | | 9 M | | | | Τ | | | | | + | Т | Т | | M24 | | 10,000 | 0eciai 11kW// | - 8 - 1 | ; 1 | | TABLE | are in | | | | |
| | - = | 18 | 25 | 35 | 45 | 4 2 | 55 | 55 | 02 | 2 | | | 105 | | | 007 | 001 | | 100 | 130 | 100 | 130 | 130 | 130 | 130 | 130 | | 160 | 160 | 130 | 160 | Ċ | ଧୁ <mark>ଜୁ</mark> | sions' | <u>م</u> | | | ensions | | | | |
| SHAFT | eA* GC | 12.5 | 16 | 21.5 | 70 | 7 | 31 | 31 | 41 | - | | | 45 | | | ı i | 0.1.0 | i | 69 | 64 | 59 | 64 | 64 | 69 | 69 | 6.67 | | 60 60 | 82 | 79.5 | 100 | | 15kW/ | dimen | table "B" | | *Refer | All Dimensions are in mm unless otherwise specified. | | | | |
| HS I | * * ≚ [⊻] ¥ | 4 | 5 | 9 | c | 0 | 8 | 8 | 10 | 2 | | | 12 | | | | 14 | | 16 | 18 | 16 | 18 | 18 | 18 | 18 | 2U 18 | 2 8 | 77 | 22 | 20 | 25 | | | | | ΙL | * | | | | | |
| | шΨ | 23 | 30 | 40 | Ĺ | 00 | 60 | 60 | В О | 8 | | | 110 | | | | 0 | | 110 | 140 | 110 | 140 | 140 | 140 | 140 | 140 | | 0/1 | 140 | 140 | 170 | | | | | | | onwar | | | | |
| | * D,DA | 1 | 14 | 19 | ā | 74 | 28 | 28 | 38 | 3 | | | 42 | | | q | 6 0 | ł | çç | 60 | 55 | 60 | 60 | 65 | 65 75 | ری 65 | 8 | Do r | | 75 | 95 | | | | | | | frame | | | | |
| Г× | S2 B.S.C | 3/4" | 3/4" | 3/4" 3/4" 1" 1" | | | . | | | = | | | | ÷ | | | "0/1 1 | 7 | ē | N | | 2" | | | 7 | 2" | | ۳. | | 2 1/2" | | " | | | | | | | Key / key way fit : h9 / N9 8 Nos. Fixing Holes from 2255/M frame onwards | | | |
| LTERMINAL BOX | AG | 40 | 40 | 40 | c u | 70 | 56 | 56 | ŝ | 3 | | | 63 | | | | 76 | 1 | 7/1 | | 172 | | 205 | cu2 | 205 | | | | | | 305 | | | | | e bolt | | / N9 om 22 | | | | |
| ERMIN | σ | 109 | 127 | 112 | 139 | 153 | 152 | 157 | 196 | 1 | GLZ | 323 | 050 | 345 | 2 | 352 | 371 | | 080 | 432.5 | 415 | 445 | | 705 | 360 | 386 | | 4.10 | 300 416 | | _ | | | | | (1) Without Eve bolt | • | t : h9 . oles fr | | | | |
| Ë | > | 86 | 95 | 105 | 100 | | 125 | 137 | 131 | 201 | | | 186 | 2 | | _ | 912 | | 243 | | 273 | | | 320 | 358 | | | 413 | | | 495 | | | | | Witho | | way fi ing Ho | | | | |
| | | | | | 6 | Э | | ı | 1 | | | | 206 | 2 | | 000 | 232 | | 707 | | 284 | 1 | | | | | - | | - | | 1 | | | | | Ē |) | / key s. Fix | | | | |
| | С | 260 | 305 | 324 | 374 | 399 | 448 | 471 | 552 | | 590 | 741 | 721 | 765 | 201 | 799 | 838 | 920 | 897 | 996 | 956 | 991 | 1134 | 1065 | 1160 | 1203 | | 1353 | 1518 | 1622 | 1682 | | Specification | | 1231 | S 2048 | 0.402 : 6 | Key / key way fit : h9 / N9 8 Nos. Fixing Holes from 2 | | | | |
| | | 225 | 261 | 267 | 302 | 327 | 366 | 388 | 450 | | 488 | 605 | 585 | 620 | 070 | 679 | 717 | 795 | 772 | 827 | 837 | 842 | 983 | 914 | 1010 | 1137 | 1011 | /01.1 | 1332 | 1461 | 1491 | | Specit | Specificati IS : 1231 | | ++ | 2 | | | | | |
| GENERAL - | AC | 124 | 140 | 157 | 171 | t - | 195 | 220 | 206 260 - | | | | 316 | 2 | | 354 | 354 | 00 | 1955 | | 450 | | 480 | 402 | 544 | | | 610 | | | 690 | | | 28Ø | 80 95 <i>0</i> | | | D.E.sh | | | | |
| - GEN | AD | 116 | 124 | 134 | 140 | 2 | 157 | 170 | | | | | 226 | | | L | G97 | | 312 | | 337 | | Ļ | 415 | 445 | | | 515 | | | 584 | [| Tolerance | 11,14,19,24,28Ø | k6 38,42,48Ø m6 55.60.65.75.80.95Ø | | | ical to | | | | |
| | ΓP | 6 | 6 | 10 | ç | 2 | 1 | 5 | ç | N | | | ст С | 2 | | | 13 | Ļ | cl | | 16 | | | 18 | 18 | | | 22 | | | 25 | | 10 | J6 11,1, | k6 38,4. n6 55.6 | | | n ident | | | | |
| | F | e | 3.5 | 3.5 | u c | 0.0 0 | 4 | 4 | • | 4 | | | LC. | , | | ι | с С | ı | ი | | S | | L | ç | 5 | | | 9 | | | 9 | | \vdash | | | E,FA | 16111 | nensior | | | | |
| Г | S | 10 | 10 | 12 | ć | 2 | 15 | 15 | Li T | 0 | | | 6 | 2 | | ç | 91 | | 19 | | 19 | | | 19 | 19 | | | 24 | | | 24 | ۔ ح | | D,DA | n n | GA,GC,F,FA | | laft din 253 | | | | |
| | * | 23 | 30 | 40 | E O | 2 | 60 | 60 | Co | 8 | | | 110 | 2 | | 011 | 011 | | 01.1 | 140 | 110 | 140 | | 140 | 140 | 140 | | 170 | 140 | 140 | 170 | TABLE | | | | | 2 | vith sh r IS 23 | | | | |
| FIXING | *≥ | 115 | 130 | 165 | 165 | 3 | 215 | 215 | 200 | C07 | | | 300 | 200 | | 000 | 300 | | 005 | | 400 | | | 009 | 500 | | | 600 | | | 740 | - | | | 23 | | | vided v a as pe | | | | |
| | *z | 95 | 110 | 130 | 120 | 2021 | 180 | 180 | 000 | 007 | | | | 250 | | 250 | | C L C | 750 | 000 | 300 | | 350 | | 0 1 | 450 | 450 | | | 550 | | | 680 | | Specification | | IS : 2223 | | | □ Double shaft extension can be provided with shaft □ Also suitable for V1 & V3 mounting as per IS 2253 | | |
| | | 140 | 160 | 200 | 000 | 2002 | 250 | 250 | 000 | 000 | | | 350 | 200 | | i i | 350 | 001 | 400 | | 450 | | | 066 | 550 | | | 660 | | | 800 | | H | 450 | 265 | 265 265 | 85 | on can & V3 m | | | | |
| | Pole | 4 | & 6 | & 6 | 00 | 8 | 8 | 8 | 8 | | | | & 8 8 | a | 0 | 8 8 | 00 | | 8 | 00 | | 8 | | & 8 | c | o Ø | 0 | × × | 8 | 2 | 8 | | Tolerance | UPTO 450 | OVER 450 UPTO 265 | OVER 265 | OVER 85 | extension V1 | | | | |
| | | 2 & | 2,4 & 6 | 2,4 & 6 | 6&8 | 6&8 | 6 & | 6&8 | 6 & | | 9 | 2 | 4,6 & | e a | 5 | 2.6 & 8 | 6 & 8 | 7 | 6 & 8 8 | 6 & 8 | 7 | 6 & | 2 | 4,6 & | 2 | 4 0,0 | ۷ (۲ | 4,6 & 8 | 46.8 | | 4,6 & 8 | | Ĭ | | js6 ±0.3 | | ±1.5 | shaft e Itable f | | | | |
| | IEC Fr size | 63 | 71 | 80 | 806 | 90L | 100L | 112M | 132S | | 132M | MOG | | 1601 | OUL | 180M | 180L | | 200L | 225S | | MG77 | | | 280S/M | | 315S/M | | 315L | | 355L | | Dimension | z | ; | Σ | | □ Double shaft extension can be provided with shaft dimension identical to D.E.shaft □ Also suitable for V1 & V3 mounting as per IS 2253 | | | | |
| | Ľ | | | | | | [| - | ~ | | ÷ | 1 | - | 1 | - | ~ | - | | 2 | | | N | Č | Ň | 28 | | 31 | | ო | | ო | | ц | | | | | | | | | |



| AG S2-CONDUIT | ENLARGEMENT OF CIRCLE B GCC LA | CAT-C-6313-4-1 | |
|--|--|---|--|
| | Pole L Pole L — — — — — — — — — — — — 2 8.4 387 469 4 419 28.4 498 28.4 498 28.4 498 28.4 498 587 469 4 502 28.4 498 58.4 507 — — — — — — 4 502 28.4 507 — — 4 532 635 635 | wise specified. | |
| LC LC LC LC LC LC EARTHING FRAME SIZE 90S TO 132 | SHAFT D* E F GA I L L DA E F GA I I L <th co<="" td=""><td>All Dimensions are in mm unless otherwise specified.</td></th> | <td>All Dimensions are in mm unless otherwise specified.</td> | All Dimensions are in mm unless otherwise specified. |
| Prave size sos to 132M | TERMINAL BOX V 9 AG S.C. Db 86 104 40 3/4" 11 95 102 40 3/4" 14 105 112 40 3/4" 19 109 153 52 3/4" 24 125 152 56 1" 28 137 157 56 1" 28 137 157 56 1" 28 155 56 1" 28 157 56 1" 28 155 11 28 155 123 157 56 1" 28 155 123 155 123 155 123 155 123 155 123 167 123 167 123 163 123 173 173 173 173 173 173 173 173 173 173 | All Dir | |
| | GENERAL T AD AC L LC 9 2.5 116 124 206 241 3 134 157 267 324 3 134 157 267 324 3 140 174 302 374 O 3.5 157 195 366 448 - 3.5 170 220 388 471 - 3.5 170 220 388 471 - 3.5 170 220 388 471 - 4 206 260 488 590 - A 206 261 488 590 - A 6 380 11.14,19.24.2867 - | | |
| 2-B.S. CONDUIT 2-B.S. CONDUIT B A HOLES B A 45 45 45 45 45 45 10 EARTHING E | FIXING N M* i S N M* i S 60 75 23 M5X10 60 75 23 M5X10 80 100 40 M6X13 95 115 50 M8X12 110 130 60 M8X12 110 130 60 M12X20 180 215 80 M12X20 Specification Dime Is: 2223 Is: 2223 Is: 2223 GA.GC. | | |
| LC LC EARTHING FRAME SIZE 63 TO | IEC Pole Fr. size 63 2 & 4 63 2 & 4 7 71 2,4 & 6 90 80 2,4 & 6 90 90L 6 & 8 90 112M 6 & 8 100 132S 6 & 8 132 0 132 6 & 8 132M 6 8 132M 6 8 132M 6 8 132 6 & 8 10 N 16 M 1 ±0.3 ±1 | for tolerances | |
| | ENLARGEMENT OF CIRCLE W | *Refer TABLE A | |







Special Design Features Offered Electrical

| Non standard Voltage | 42 TO 700V | | | | | | | |
|---------------------------------|---------------------------|--|--|--|--|--|--|--|
| Non standard Frequency | 50/ 60 Hz with efficiency | | | | | | | |
| | class as per IEC 60034-30 | | | | | | | |
| Motor for wide variation | ۱* | | | | | | | |
| Voltage variation | >10% | | | | | | | |
| Frequency Variation | >5% | | | | | | | |
| Motors with higher | >50 °C | | | | | | | |
| ambient temperatures | | | | | | | | |
| Polarities higher than 8 | 10pole, 12pole etc | | | | | | | |
| pole | | | | | | | | |
| Dual Voltage motors | In ratio 1:v3. 1:2 | | | | | | | |
| Multi Speed motors | 2 / 3 speeds | | | | | | | |
| Class H Insulation Scheme | | | | | | | | |
| Motors with Thermal | PTC Thermisters, | | | | | | | |
| protection | Thermostat, RTD, BTD etc. | | | | | | | |
| Space heaters | 90 Frame onwards | | | | | | | |
| Motors with starting | e.g. <600% inclusive of | | | | | | | |
| current Limitations | tolerance | | | | | | | |
| Motors with intermittent duties | | | | | | | | |
| Motors with flying leads | | | | | | | | |
| | | | | | | | | |

* motor performance may vary from the catalogue performance. Please ask for data sheet for non standard motor.

Product Range

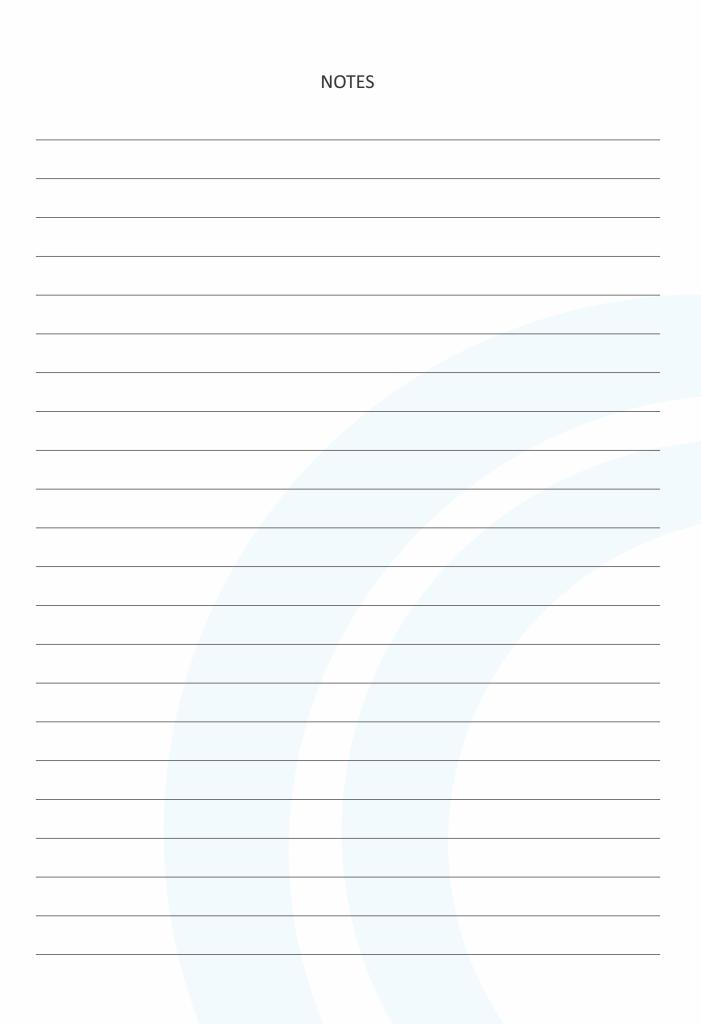
| Motor used in Hazardous Area | | | | | | | | |
|---|------------------------|--|--|--|--|--|--|--|
| •Flame proof motors- | Frame 80 to 315L (MD) | | | | | | | |
| Ex'd' (IS/IEC:60079-1) | | | | | | | | |
| Increased Safety –Ex'e' | Frame 63 to 355L (ME) | | | | | | | |
| (IS/IEC 60079-7) | | | | | | | | |
| Non sparking-Ex'n' | Frame 63 to 355L (MN) | | | | | | | |
| (IS/IEC 60079-15) | | | | | | | | |
| Brake Motors | Frame 71 to 132L (MB) | | | | | | | |
| Slip ring Motors | Frame 100 to 160L (MP) | | | | | | | |
| Roller table motors | As per Requirement | | | | | | | |
| Crane Duty Motors | Frame 63 to 355L (MC) | | | | | | | |
| Railway motors | Frame 180M TO 225M | | | | | | | |
| (Auxiliary drives) | | | | | | | | |
| Cane unloader motors | Frame 160L TO 225M | | | | | | | |
| Marine duty motors | Frame 63 to 355L | | | | | | | |

Mechanical

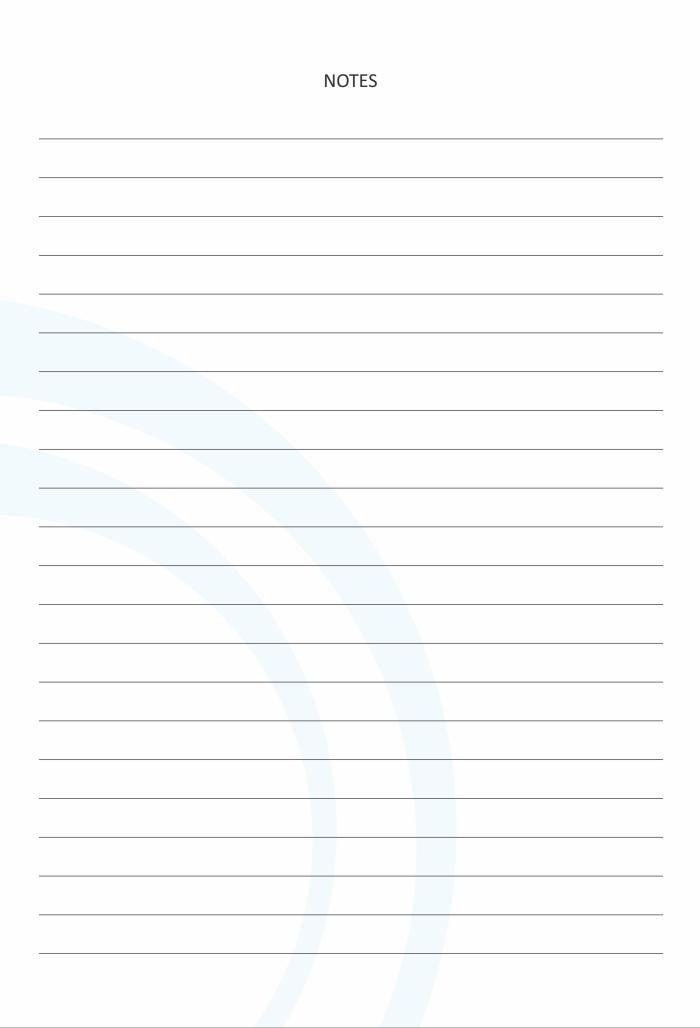
| Special Mounting | Non Standard mounting dimensions | | | | | | | |
|---|-------------------------------------|--|--|--|--|--|--|--|
| Cable entries | Metric equivalent | | | | | | | |
| Non Standards shaft materials | e.g. EN 24 | | | | | | | |
| Non Standards shaft extension dimension | | | | | | | | |
| Non standards 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 | | | | | | | |
| Low vibration motors | Reduced or special class as | | | | | | | |
| | per IS : 12075 or vibration | | | | | | | |
| | grade B as per IEC 60037-14 | | | | | | | |
| Non standards paint type | Non standards paint type | | | | | | | |
| Paint shade | e.g. Shade no. 632 RAL | | | | | | | |
| | 7030 etc | | | | | | | |
| Forced cooling | | | | | | | | |
| arrangement (IC416) | (132 frame onwards) | | | | | | | |
| Surface cooled motors (IC410) | | | | | | | | |
| Motors for brake fitment | | | | | | | | |
| Motors with clean flow cowl arrangement | | | | | | | | |
| Motors with C.I Fan up to 225 Frame | | | | | | | | |
| 56 Frame motors in B5 AND B14 Mounting construction | | | | | | | | |











NORTH

DELHI

1st Floor, 7 B Rajindra ParkPusa Road, New Delhi 110 060 T: +91 11 25816931/32/33/35/38 F: +91 11 25816940 Email: bbldelhi@bharatbijlee.com

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EAST

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MARKETING OFFICE & WORKS

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