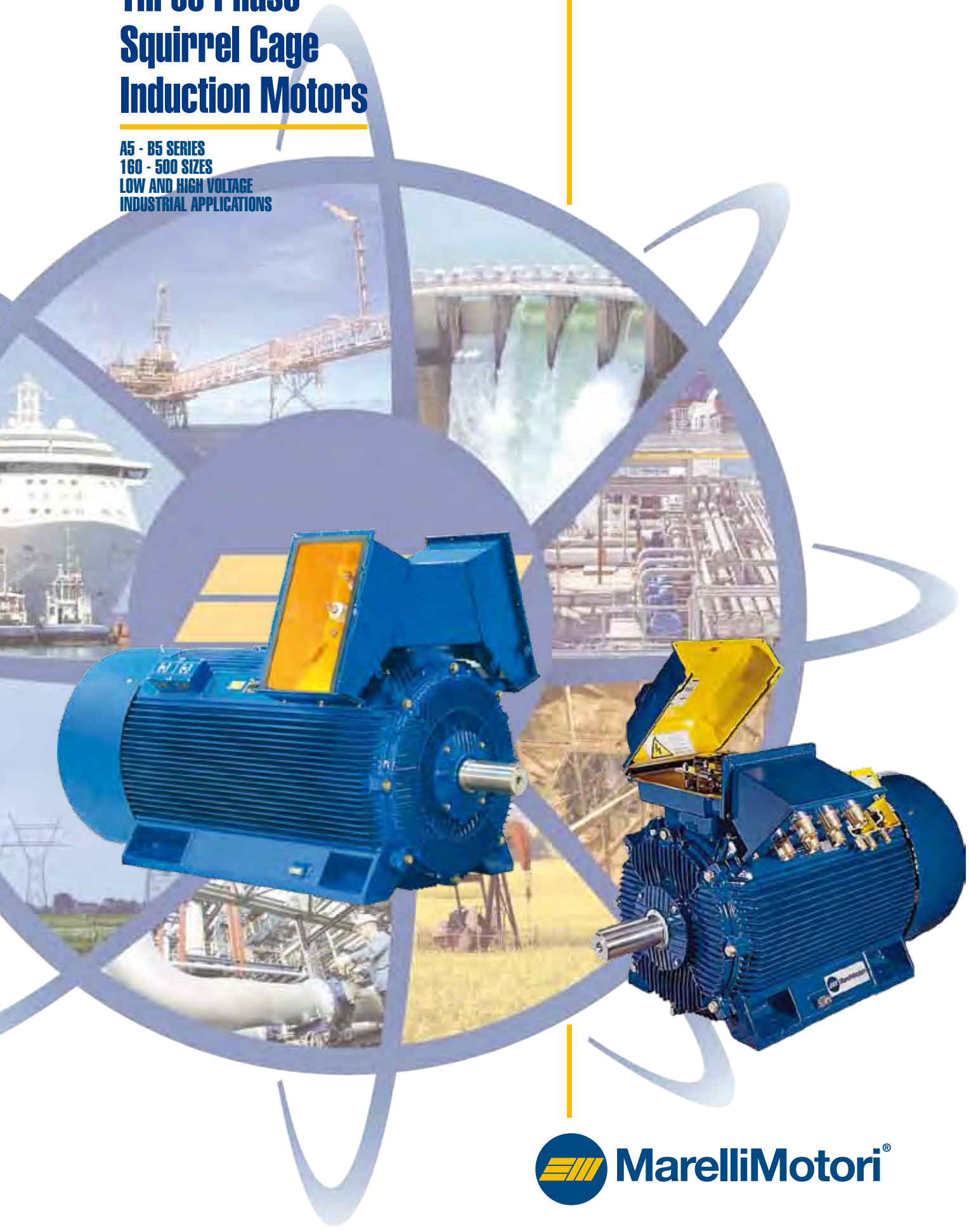
# Three Phase Squirrel Cage Induction Motors

**A5 - B5 SERIES**
**160 - 500 SIZES**
**LOW AND HIGH VOLTAGE**
**INDUSTRIAL APPLICATIONS**

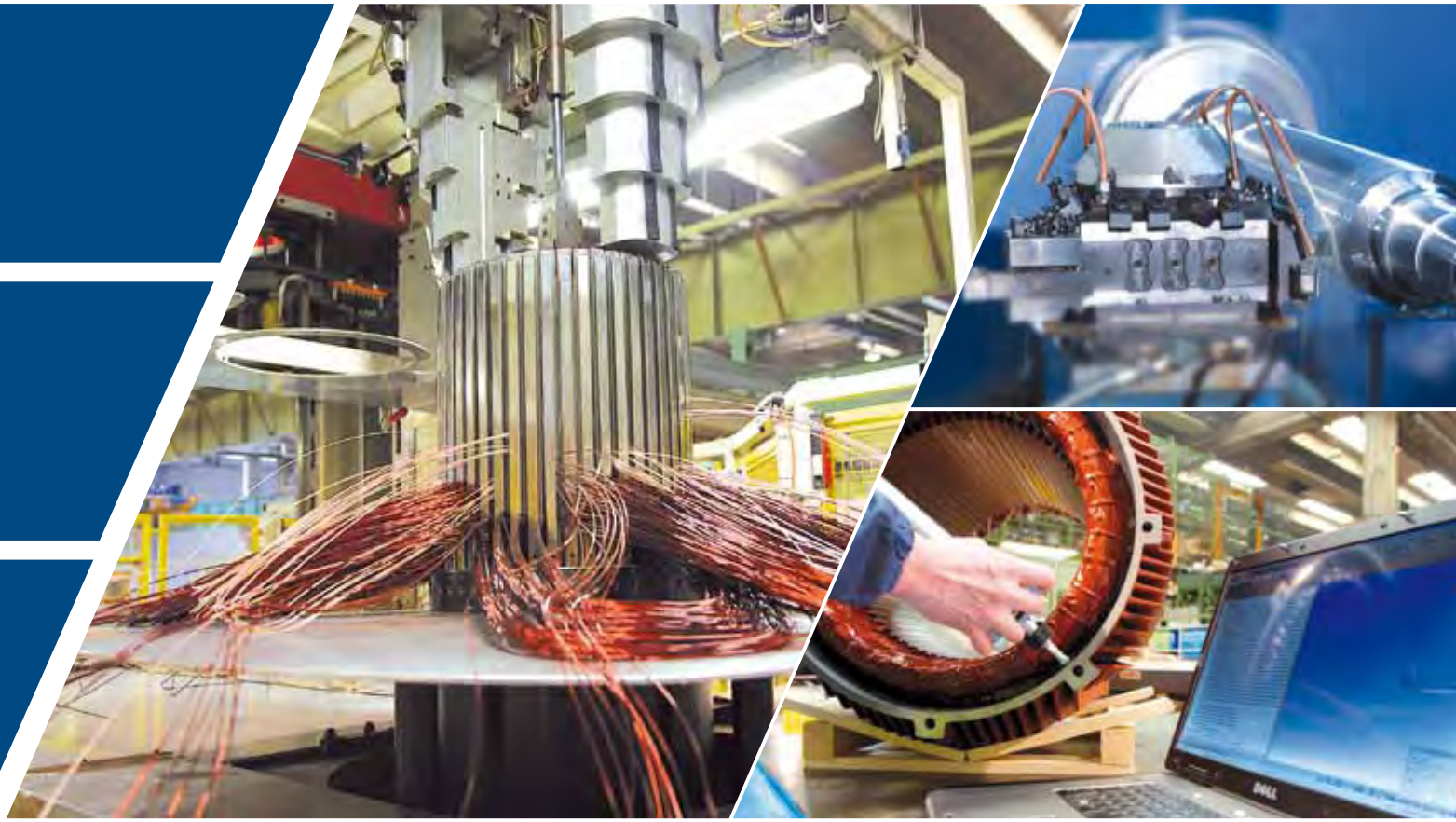


MarelliMotori®

ASI.CT.045.0 GB

MarelliMotori®

your partner in power technology



## INDEX

## PRODUCT CODE STRUCTURE

MarelliMotori products are identified by a 13-digit code shown on the nameplate. The code is constructed as follows.

| Code | Material |
|---|---|
| A | Aluminium |
| B | Cast Iron (315-500 mm) |

| Execution | Description |
|---|---|
| C | Single Polarity Industrial Applications |
| D | Double Polarity Industrial Applications |
| F | Single Polarity Self Ventilated for Inverter Application |
| H | High Voltage |
| M | Single Polarity Marine Applications |
| S | Single Polarity Forced Ventilation for Inverter Application |

**Design Revision**

| A | 5 | C | 1 | 6 | 7 | 2 | A | 0 | 0 | 0 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Code | Fame Size [mm] |
|---|---|
| 16 | 160 |
| 18 | 180 |
| 20 | 200 |
| 22 | 225 |
| 25 | 250 |
| 28 | 280 |
| 31 | 315 |
| 35 | 355 |
| 40 | 400 |
| 45 | 450 |
| 50 | 500 |

**Option Code**
See last Page

| Code | Single Polarity [V] | | Freq. [Hz] |
|---|---|---|---|
| | Delta | Star | |
| 08 | 220 | 380 | 60 |
| 10 | 220 | 380 | 50 |
| 12 | 240 | 415 | 50 |
| 15 | 290 | 500 | 50 |
| 16 | 400 | - | 50 |
| 17 | 230 | 400 | 50 |
| 20 | 380 | - | 50 |
| 21 | 415 | - | 50 |
| 24 | 500 | - | 50 |
| 26 | 380 | - | 60 |
| U1 | - | 3300 | 50 |
| U2 | - | 6600 | 50 |
| J3 | - | 11000 | 50 |
| **Code** | **Double Polarity** | | **Hz** |
| 44 | 380 | 50 | 50 |

| Frame Size [mm] | Code | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 160-280 | SA | SB | - | - | MA | MB | LA | LB | - |
| 315 | - | - | - | - | MA | MB | MC | LA | LB |
| 355-500 | LA | LB | LC | LD | LE | LF | - | - | - |

| Polarity (Poles) | | | |
|---|---|---|---|
| Single | | Double | |
| 1 | 2 | 5 | 2-4 |
| 2 | 4 | 6 | 4-8 |
| 3 | 6 | 7 | 4-6 |
| 4 | 8 | 8 | 6-8 |
| 5 | 10 | 9 | Other |
| 6 | 12 | | |

| Code | Mounting |
|---|---|
| A | B3 |
| B | B5 |
| D | B3/B5 |
| Q | V1 |
| V | V6 |
| T | V5 |
| X | V1/V5 |
| S | Special Mounting |

## RATING PLATES

All identification plates are laser engraved with data as shown in the following standard typologies.
Motors subject to the efficiency classification in accordance to IEC 60034-30 and the commission regulation (EC) No 640/2009, have the correspondent efficiency level and the nominal efficiency at full, 3/4 and 2/4 rated load.

**From 160 to 315 frame size:**

High efficiency motors IE2

MarelliMotori
MADE IN ITALY – ARZIGNANO (VI)
IE2 IEC 60034-1 CE

MOT.3~ A5C 280 M4 B3 COD. A5C2842A00016
N° Y013264 04–11 I.Cl. F/B IP 55
S 1 kg 472
NU 2217–EC–C3 | 6314–Z–C3
1400 h 22 g | MOBILUX EP3

| Δ V Y | Hz | Δ A Y | kW | min⁻¹ | cos.φ |
|---|---|---|---|---|---|
| 400 690 | 50 | 154,5 89,5 | 90 | 1480 | 0,89 |

LOAD – η 4/4 – 94,5% 3/4 – 95,9% 2/4 – 94,8%

AD OGNI ASSIEM. RIPRIST. IL GRASSO SUI GIUNTI – APPLY GREASE ON THE MATING SURFACES BEFORE REASSEMBLING

Motors not IE2

MarelliMotori
ARZIGNANO (VI) ITALY
EN 60034–1 IEC 60034–1 CE

MOT.3~ A5C 280 M8 B3 COD. A5C2844A00016
N° Y015827 04–11 I.Cl. F/B IP 55
S 1 kg 402
NU 2217–EC–C3 | 6314–Z–C3
3400 h 22 g | MOBILUX EP3

| Δ V Y | Hz | Δ A Y | kW | min⁻¹ | cos.φ |
|---|---|---|---|---|---|
| 400 690 | 50 | 89 51,5 | 45 | 735 | 0,79 |

AD OGNI ASSIEM. RIPRIST. IL GRASSO SUI GIUNTI – APPLY GREASE ON THE MATING SURFACES BEFORE REASSEMBLING

**From 355 frame size and above:**

Low voltage:

High efficiency motors IE2

MarelliMotori
MADE IN ITALY – ARZIGNANO (VI)
IE2 IEC 60034-1 CE

MOT.3~ B5C 355 LA4 B3 COD. B5C3502A00016A
N° X019895 05–11 I.Cl. F/B IP 55
S 1 kg 1690

| Δ V Y | Hz | Δ A Y | kW | min⁻¹ | cos.φ |
|---|---|---|---|---|---|
| 400 690 | 50 | 438.5 254 | 250 | 1490 | 0,86 |

LOAD – η 4/4 – 95,7% 3/4 – 95,5% 2/4 – 94,4%
6322–C3 | 6322–C3
2800 h 15 g | MOBILUX EP3

AD OGNI ASSIEMAGGIO RIPRISTINARE IL GRASSO SUI GIUNTI
APPLY GREASE ON THE MATING SURFACES BEFORE REASSEMBLING

Motors not IE2

MarelliMotori
MADE IN ITALY – ARZIGNANO (VI)
EN 60034–1 IEC 60034–1 CE

MOT.3~ B5C 400 LA2 B3 COD. B5C4001A00016
N° X020726 05/11 I.Cl. F/B IP 55
S 1 kg 2790

| Δ V Y | Hz | Δ A Y | kW | min⁻¹ | cos.φ |
|---|---|---|---|---|---|
| 400 690 | 50 | 841 488 | 500 | 2980 | 0,89 |

6317–C3 | 6317–C3
2000 h 30 g | MOBILUX EP3

AD OGNI ASSIEMAGGIO RIPRISTINARE IL GRASSO SUI GIUNTI
APPLY GREASE ON THE MATING SURFACES BEFORE REASSEMBLING

High voltage:

MarelliMotori
MADE IN ITALY – ARZIGNANO (VI)
EN 60034–1 IEC 60034–1

MOT.3~ B5H 400 LC4 B3 COD. B5H4022A000P5
N° Y019562 05–11 I.Cl. F/B IP 55
S 1 kg 3190

| V | Hz | A | kW | min⁻¹ | cos.φ |
|---|---|---|---|---|---|
| 6000 | 50 | 54 | 450 | 1490 | 0,84 |

6322–C3 | 6322–C3
4500 h 48 g | MOBILUX EP3

AD OGNI ASSIEMAGGIO RIPRISTINARE IL GRASSO SUI GIUNTI
APPLY GREASE ON THE MATING SURFACES BEFORE REASSEMBLING

## STANDARDS

| TITLE | International Standard |
|---|---|
| Rating and performance | IEC 60034 - 1 |
| Standard methods for determining losses and efficiency from tests | IEC 60034 - 2 - 1 |
| Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification | IEC 60034 - 5 |
| Methods of cooling (IC Code) | IEC 60034 - 6 |
| Classification of types of construction, mounting arrangements and terminal box position (IM Code) | IEC 60034 - 7 |
| Terminal markings and direction of rotation | IEC 60034 - 8 |
| Noise limits | IEC 60034 - 9 |
| Thermal protection | IEC 60034 - 11 |
| Starting performance of single-speed three-phase cage induction motors | IEC 60034 - 12 |
| Mechanical vibration of certain machines with shaft heights 56 mm and higher - Measurement, evaluation and limits of vibration severity | IEC 60034 - 14 |
| Efficiency classes of single-speed, three-phase, cage-induction motors (IE-code) | IEC 60034 - 30 |
| Standard voltages | IEC 60038 |
| Dimensions and output series for rotating electrical machines - Part 1: Frame numbers 56 to 400 and flange numbers 55 to 1080 | IEC 60072 - 1 |

## CE MARK AND DECLARATION OF CONFORMITY

All low voltage products described in this catalogue are marked CE and are in conformity with the requirements of the applicable Directive.
With reference to the Machinery Directive (89/392/EEC amended by 91/368/EEC, 93/44/EEC and 93/68/EEC), the above mentioned product is to considered as a component.

## ENERGY SAVING

The International Electrotechnical Commission (IEC), in order to harmonize the energy consumption regulations aimed to reduce the CO2 emissions and the impact of industrial operations on the environment, has established the standard IEC 60034-30:2008 which defines energy efficiency classes for single-speed, three-phase, 50 Hz and 60 Hz induction motors.
To that regard, the European Community (EC) has recently passed the regulation EC N° 640/2009 which is essentially based on the IEC 60034-30 and requires all the EU countries to conform themselves to the new efficiency standards.
Electric motors account for about 70% of the electricity consumed by industry.
The potential cost saving of high efficiency systems is estimated 20% to 30% and one of the major factors in such cost-effective improvement is the use of energy efficient motors.
The IEC 60034-30 is part of an effort to unify motor testing standards, efficiency requirements and product labeling requirements to easily recognize worldwide high-efficiency products.
To show compliance with these new efficiency standards, motors must be tested in accordance with the new testing standard IEC 60034-2-1:2007.
The motor efficiency class and nominal motor efficiency must be stated on the motor nameplate and given in product documentation and motor catalogues.

## Efficiency Classes

The new IEC 60034-30 defines worldwide the following efficiency classes of single-speed three-phase, cage-induction motors in the 0,75 kW - 375 kW power range.

| | | |
|---|---|---|
| **IE1** | **Standard** | Motors with a rated efficiency at full-load (rated output) equal to or exceeding the limits listed |
| **IE2** | **High** | Motors with a rated efficiency at full-load (rated output) equal to or exceeding the limits listed |
| **IE3** | **Premium** | Motors with a rated efficiency at full-load (rated output) equal to or exceeding the limits listed; |
| **IE4** | **Super Premium** | Under consideration* |

* it is expected that technologies other than cage-induction motors will be required to meet ie4 levels.

## Deadlines

16 June 2011
Motor efficiency less than IE2 level will not be allowed;
1 January 2015
Motor efficiency for output powers 7,5-375 kW less than IE3 level will not be allowed or if the IE2 efficiency level is met, motors will have to be equipped with variable speed drive;
1 January 2017
Motor efficiency for output powers 0,75-375 kW less than IE3 level will not be allowed or if the IE2 efficiency level is met, motors will have to be equipped with variable speed drive.

## Efficiency values at 50 Hz

| Power | IE1 - Standard | | | IE2 - High | | | IE3 - Premium | | |
|---|---|---|---|---|---|---|---|---|---|
| kW | 2 pole | 4 pole | 6 pole | 2 pole | 4 pole | 6 pole | 2 pole | 4 pole | 6 pole |
| **0,75** | 72,1 | 72,1 | 70,0 | 77,4 | 79,6 | 75,9 | 80,7 | 82,5 | 78,9 |
| **1,1** | 75,0 | 75,0 | 72,9 | 79,6 | 81,4 | 78,1 | 82,7 | 84,1 | 81,0 |
| **1,5** | 77,2 | 77,2 | 75,2 | 81,3 | 82,8 | 79,8 | 84,2 | 85,3 | 82,5 |
| **2,2** | 79,7 | 79,7 | 77,7 | 83,2 | 84,3 | 81,8 | 85,9 | 86,7 | 84,3 |
| **3,0** | 81,5 | 81,5 | 79,7 | 84,6 | 85,5 | 83,3 | 87,1 | 87,7 | 85,6 |
| **4,0** | 83,1 | 83,1 | 81,4 | 85,8 | 86,6 | 84,6 | 88,1 | 88,6 | 86,8 |
| **5,5** | 84,7 | 84,7 | 83,1 | 87,0 | 87,7 | 86,0 | 89,2 | 89,6 | 88,0 |
| **7,5** | 86,0 | 86,0 | 84,7 | 88,1 | 88,7 | 87,2 | 90,1 | 90,4 | 89,1 |
| **11** | 87,6 | 87,6 | 86,4 | 89,4 | 89,8 | 88,7 | 91,2 | 91,4 | 90,3 |
| **15** | 88,7 | 88,7 | 87,7 | 90,3 | 90,6 | 89,7 | 91,9 | 92,1 | 91,2 |
| **19** | 89,3 | 89,3 | 88,6 | 90,9 | 91,2 | 90,4 | 92,4 | 92,6 | 91,7 |
| **22** | 89,9 | 89,9 | 89,2 | 91,3 | 91,6 | 90,9 | 92,7 | 93,0 | 92,2 |
| **30** | 90,7 | 90,7 | 90,2 | 92,0 | 92,3 | 91,7 | 93,3 | 93,6 | 92,9 |
| **37** | 91,2 | 91,2 | 90,8 | 92,5 | 92,7 | 92,2 | 93,7 | 93,9 | 93,3 |
| **45** | 91,7 | 91,7 | 91,4 | 92,9 | 93,1 | 92,7 | 94,0 | 94,2 | 93,7 |
| **55** | 92,1 | 92,1 | 91,9 | 93,2 | 93,5 | 93,1 | 94,3 | 94,6 | 94,1 |
| **75** | 92,7 | 92,7 | 92,6 | 93,8 | 94,0 | 93,7 | 94,7 | 95,0 | 94,6 |
| **90** | 93,0 | 93,0 | 92,9 | 94,1 | 94,2 | 94,0 | 95,0 | 95,2 | 94,9 |
| **110** | 93,3 | 93,3 | 93,3 | 94,3 | 94,5 | 94,3 | 95,2 | 95,4 | 95,1 |
| **132** | 93,5 | 93,5 | 93,5 | 94,6 | 94,7 | 94,6 | 95,4 | 95,6 | 95,4 |
| **160** | 93,8 | 93,8 | 93,8 | 94,8 | 94,9 | 94,8 | 95,6 | 95,8 | 95,6 |
| **200** | 94,0 | 94,0 | 94,0 | 95,0 | 95,1 | 95,0 | 95,8 | 96,0 | 95,8 |
| **250** | 94,0 | 94,0 | 94,0 | 95,0 | 95,1 | 95,0 | 95,8 | 96,0 | 95,8 |
| **315** | 94,0 | 94,0 | 94,0 | 95,0 | 95,1 | 95,0 | 95,8 | 96,0 | 95,8 |
| **355** | 94,0 | 94,0 | 94,0 | 95,0 | 95,1 | 95,0 | 95,8 | 96,0 | 95,8 |
| **375** | 94,0 | 94,0 | 94,0 | 95,0 | 95,1 | 95,0 | 95,8 | 96,0 | 95,8 |

## Scope

The efficiency classes specified in the IEC 60034-30 are relevant to single speed, three-phase, 50Hz and 60Hz induction motors with:

- 2, 4 or 6 pole
- rated output from 0,75 to 375kW;
- rated voltage UN up to 1000V;
- duty type S1 (continuous duty) or S3 (intermittent periodic duty) with a rated cyclic duration factor of 80% or higher;
- direct on-line starting.

The following motors are excluded from the IEC 60034-30:

- motors made solely for converter operation;
- motors completely integrated into a machine (for example, pump, fan or compressor) that cannot be tested separately from the machine.

The following motors are excluded from regulation EC No 640/2009:

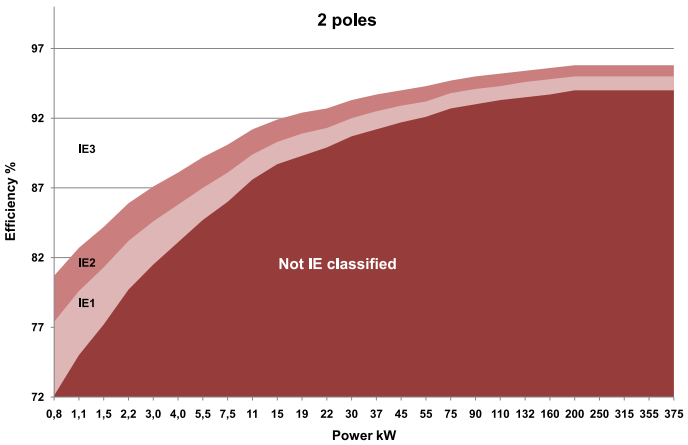
- motors designed to operate wholly immersed in a liquid;
- motors completely integrated into a product (for example gear, pump, fan or compressor) of which the energy performance cannot be tested independently from the product;
- brake motors;
- water cooled motors with inlet temperature less than 5°C or exceeding 25°C;
- motors specifically designed to operate:
  - at altitudes exceeding 1000 m above sea-level;
  - where ambient air temperatures exceed 40°C;
  - in maximum operating temperature above 400°C;
  - where ambient air temperatures are less than -15°C for any type of motor or less than 0°C for a motor with air cooling;
  - in potentially explosive atmospheres as defined in Directive 94/9/EC

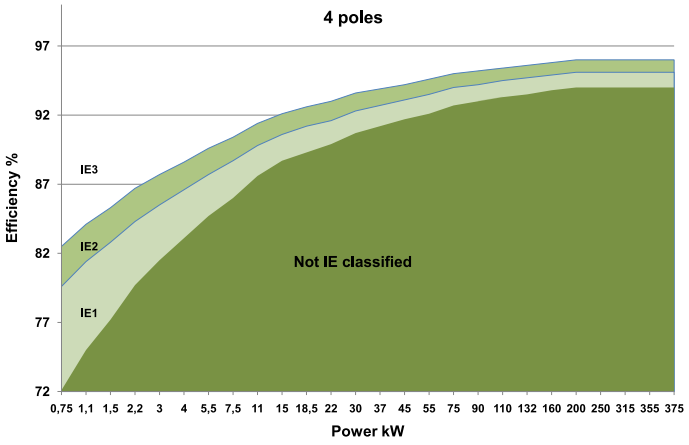
## New method for determining the Efficiency (IEC 60034-2-1:2007)

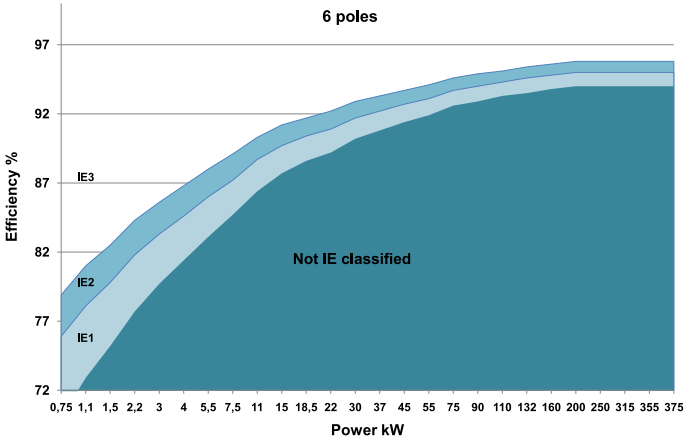
The method for measuring the efficiency of low-voltage three-phase asynchronous motors was revised with the IEC 60034-2-1 standard which replaced the previous IEC 60034-2:1996. The actual losses are now measured under defined laboratory conditions and no longer added as a lump sum. This new standard significantly increases the efficiency level accuracy.

## MarelliMotori IE solutions

MarelliMotori measures the efficiency of all motors strictly in accordance with the IEC 60034-2-1.
With his 100 years of experience MarelliMotori offers a complete range of high efficiency motors (IE2) in respect of the European Directive EN 640/2009.



## TECHNICAL CHARACTERISTICS

**Continuous duty S1:**

The type of duty is indicated by the symbols S1…S9 as defined in standard IEC 60034-1. Duty type S1 refers to operation at a constant load maintained for sufficient time to allow the machine to reach thermal equilibrium.

**Degree of Protection IP55**

The motors in standard execution have **IP55** protection degree, where:
5 (first number in code):
Ingress of dust is not totally prevented but dust does not enter in sufficient quantity to interfere with satisfactory operation of the machine.
5 (second number in code):
Water projected against the machine from a nozzle from any direction has no harmful effect.

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*IP56 protection can be provided upon request.*

**Insulation class F:**

Class F insulation systems are utilised in MarelliMotori motors. This is the most common requirement among the industry today. The class F insulation system allows a temperature rise of 105K, measured by the resistance variation method, and a maximum hot spot temperature value of 155°C. The materials and the impregnation systems used make these motors suitable for use in tropical environments, for applications with high vibrations and for applications with high thermal variations.

100

Insulation class H can be provided upon request.

**Temperature rise compatible with class B:**

Class B rise allows a maximum winding temperature rise of 80K under normal running conditions (rated voltage, frequency and load) with maximum ambient temperature of 40°C and altitude below 1000m a.s.l.

**Installation ≤1000 m a.s.l.:**

The performance of standard motors is considered at a maximum height of 1000m above sea level (a.s.l.) with motors running in continuous duty, at nominal voltage and frequency and a maximum ambient temperature of 40°C. The table displayed on page 39 gives the performance variations of the motors when utilised in other conditions.

## PROTECTIVE TREATMENT

### External surfaces

The **standard painting process** consists of epoxy vinylpolyurethane paint: of a thickness used to ensure an optimum environmental resistance. Standard finishing paint colour is RAL 5010.

930

A **special painting process**, consisting of epoxy vinyl paint followed by polyacrilic paint is available on request.
This process is particularly recommended for:

- Environments where acids or basic liquids are present;
- Outdoor installations where salt is present;
- Marine applications,
- Environments where anhydridic gases are present.

919

Other RAL and MUNSELL colours are available on request.

| Description | Process | Characteristics | Minimum Thickness |
|---|---|---|---|
| **Base Painting** | Standard<br>F96833 | Two component paint formulated with solid epoxy resins modified with vinyl polyamide catalysers | ≥ 50 µm |
| | On request<br>F96819 | Typical Marine Application<br>Base paint: epoxy vinyl paint<br>Final Paint: polyacrilic paint | ≥ 200 µm |
| | On request<br>F96826 | For aggressive atmosphere and environment classification C5I<br>Base paint: epoxy vinyl paint + Final Paint: polyacrilic paint | |
| **Finishing paint** | Std | RAL 5010 | - |
| | On request | RAL or MUNSELL colours | - |

## Internal surfaces

All internal surfaces of motors from 280 frame size are tropicalised with an insulating enamel to prevent motor corrosion due to humidity and agressive substances.

107

Tropicalisation can also be applied to motors from 160 to 250 frame size on request.

## MOUNTINGS AND POSITIONS

Mountings and positions are defined by the following codes according to IEC 60034-7:

*Code I (Simplified)*

IM _ _

*B: Horizontal*
*V: Vertical*

*Mounting code*

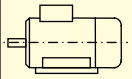
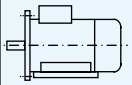
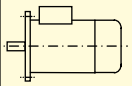
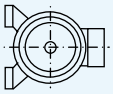
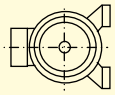
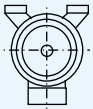
*Code II (Simplified)*

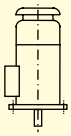
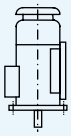
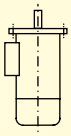
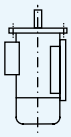
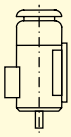
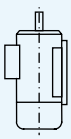
IM _ _ _

*Mounting category (1-9)*

*Mounting arrangement*

*Type of shaft extension (1-9)*

| IEC 60034-7 | | | Frame Size | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Code I* | *Code II* | *Mount* | 160 + 250 | 280 | 315 M | 315 L | 355 | 400 | 450 | 500 |
| **IM B3** | **IM 1001** |  1) | • | • | • | • | • | • | • | • |
| **IM B35** | **IM 2001** |  1) 2) | • | • | • | • | • | • | • | • |
| **IM B5** | **IM 3001** |  2) | • | X | X | X | X | — | — | — |
| **IM B6** | **IM 1051** |  1) | • | X | X | X | X | — | — | — |
| **IM B7** | **IM 1061** |  1) | • | X | X | X | X | — | — | — |
| **IM B8** | **IM 1071** |  1) | • | X | X | X | X | — | — | — |

| IEC 60034-7 | | | Frame Size | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Code I* | *Code II* | *Mount* | 160 + 250 | 280 | 315 M | 315 L | 355 | 400 | 450 | 500 |
| **IM V1** | **IM 3011** |  2) | • | • | • | • | • | • | • | • |
| **IM V15** | **IM 2011** |  1) 2) | • | • | • | • | • | • | • | • |
| **IM V3** | **IM 3031** |  2) | • | X | X | X | X | — | — | — |
| **IM V36** | **IM 2031** |  1) 2) | • | X | X | X | X | — | — | — |
| **IM V5** | **IM 1011** |  1) | • | X | X | X | X | — | — | — |
| **IM V6** | **IM 1031** |  1) | • | X | X | X | X | — | — | — |

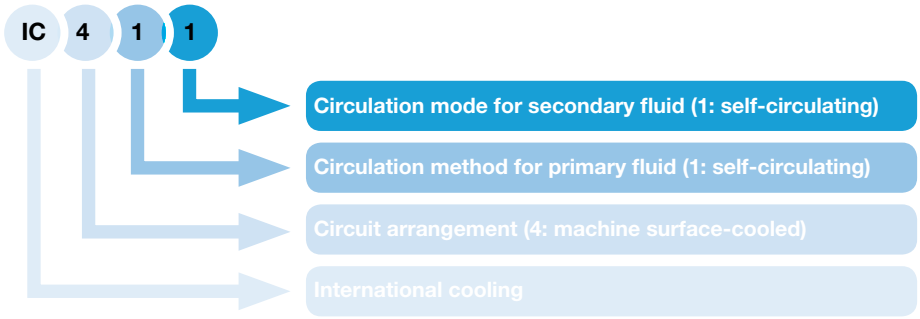
1) Motors with feet
2) Flanged Motor: unthreaded through holes

• Standard
— Not applicable
**X** Consult Marelli Motori

For other mounting arrangements refer to IEC 60034-7
The motors should be installed on a rigid foundation with negligible structural vibrations.

## COOLING

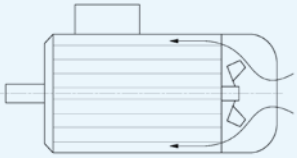
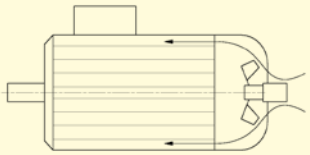
The cooling method designation is given by IC (International Cooling) code, according to IEC 60034-6.
The designation system is made up as follows, using the example IC 411 for simplified designation:




Motors in standard execution are supplied with IC 411 cooling system, cooling is achieved by a bi-directional fan mounted at the NDE of the motor, inside a fan cover which acts as a safety guard. The fan draws the air through the grille in the cover and sends it along the housing fins, giving an identical heat balance in either direction of rotation.
On request, all frame sizes can be supplied with cooling system IC 418 or IC 416.

177: Option code for assisted ventilation, cooling system IC 416.

For motors with cooling system IC 418, please refer to MarelliMotori in order to verify which motor size to choose, according to the rated power.

| Code | Description | Figure |
|---|---|---|
| **IC 411** | Self ventilated motor.<br>Enclosed machine with finned casing.<br>External shaft-mounted fan. |  |
| **IC 416** | Motor with assisted ventilation.<br>Enclosed machine with finned casing.<br>Independent ventilation device mounted inside the fan cover. |  |
| **IC 418** | Motor with external ventilation.<br>Enclosed machine with finned casing.<br>Ventilation provided by air flow coming from the driven system. |  |

## MATERIALS

The table below, show the materials used on the mechanical components for standard motors.

| Components | | Frame size | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 160 | 180 | 200 | 225 | 250 | 280 | 315 | 355 | 400 | 450 | 500 |
| **Frame** | | Alluminium | | | | | | Cast iron | | | | |
| **Shield** | **D-end IMB3** | Alluminium | Cast iron | | | | | | | | | |
| | **D-end IMB5** | Cast iron | | | | | | | | | | |
| | **N-end** | Alluminium | | | Cast iron | | | | | | | |
| **Fan cover** | | Steel | | | | | | | Fibreglass | | | |
| **Fan** | **2 Poles** | Polypropylene | | | | | | | Polyamide | | | |
| | **≥4 poles** | Polypropylene | | | | | | | Alluminium | | | |
| **Terminal box** | | Steel | | | | | | | Cast iron | | | |

## BALANCING AND VIBRATION GRADES

The motors are subjected to dynamic balancing with a half key applied to the shaft extension in accordance with standard IEC 60034-14 to vibration grade A in standard execution.
The following table indicates the limits of vibration magnitude in displacement, velocity and acceleration (r.m.s.) for shaft height H.
Large vibrations may occur on motors installed on site, due to several factors such as unsuitable foundations or reactions caused by the driven application. In such cases checks should also be carried out on each element of the installation.

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Motors can be supplied also with grade B on request.

| Vibration grade | Shaft height [mm] / Mounting | 160 ≤ H ≤ 280 | | | H > 280 | | |
|---|---|---|---|---|---|---|---|
| | | Displac. [µm] | Vel. [mm/s] | Acc. [m/s²] | Displac. [µm] | Vel. [mm/s] | Acc. [m/s²] |
| A | Free suspension | 35 | 2,2 | 3,5 | 45 | 2,8 | 4,4 |
| | Rigid mounting | 29 | 1,8 | 2,8 | 37 | 2,3 | 3,6 |
| B | Free suspension | 18 | 1,1 | 1,7 | 29 | 1,8 | 2,8 |
| | Rigid mounting | 14 | 0,9 | 1,4 | 24 | 1,5 | 2,4 |

The instrumentation can have a measurement tolerance of ± 10%.
The free suspension condition is achieved by suspending the machine on a spring or by mounting on a elastic support (springs, rubber, etc)

## COUPLING

The coupling realized by elastic or flexible couplings, have to be correctly carried out in order to avoid any axial and / or radial loads transmission to the motor shaft and bearings. The permissible radial load with regards to belt coupling are indicated in the table on page 17.

## NOISE

Medium values of A-sound pressure level (LpA) and A-sound power level (LwA) are measured at a one metre distance according to standard ISO R 1680. Sound levels are measured at no-load and a tolerance of 3 dB(A) shall be applied. Values of sound pressure increase by approximately 4 dB (A) at 60 Hz.

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To reduce noise levels, a special fan can be fitted to motors on request, starting from 225 frame size. Ask Marelli Motori to check requested derating and admissible outputs.

## BEARINGS

The theoretical lifetime of bearings, L10h according to ISO 281/1 standard, of standard horizontal construction motors, without external forces (radial and/or axial) is in excess of 50 000 hours.
The lifetime of bearings is determined by multiple factors and specifically by:
- the lifetime of the grease (mainly on double screen bearings),
- the environmental conditions and working temperature,
- the external loads and vibrations.

The motors from 160 to 250 frame size have single screen prelubricated ball bearings (without grease nipples).
The motors from 280 frame size and above have regreasable bearings (with grease nipples Tecalemit UNI type) and the relative exhausted grease dreinage.
The correspondent grease life for motors with prelubricated ball bearings under normal operating conditions for a motor with horizontal shaft, maximum ambient temperature of 40°C is :
- 10 000 hours in continuous duty for 2-pole motors,
- 20 000 hours in continuous duty for ≥4-pole motors.

For initial charge of standard motor bearings a grease with mineral oil as basic oil and lithium soap as thickener, NLGI consistency grade 3, is used.
Motors for unfavourable operating conditions can be lubricated with special grease.
The name plate indicates the type of grease, the quantity and the relubrication intervals. For standard motors relubrication data applies for neutral ambient conditions, at the rated speed, with almost vibration-free running, without any additional axial or radial load.
Immediately after regreasing the bearing temperature rises (10-15 °C) for a while, and then drops to normal values after the grease has been uniformly distributed and the exceeding grease displaced from the bearing.
An excessive quantity of grease causes bearing self heating.
The relubrication intervals refers to an average temperature about 70°C. With higher temperatures the lubrication interval must be shortened.
For vertical mounting the values must be halved.

The lubrication intervals of motors without grease nipples and the relubrication intervals of motors with grease nipples are shown in the tables below.

### Motors without grease nipples

| Frame size | Lubrication intervals [hours] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 3600 min$^{-1}$ | 3000 min$^{-1}$ | 1800 min$^{-1}$ | 1500 min$^{-1}$ | 1200 min$^{-1}$ | 1000 min$^{-1}$ | 900 min$^{-1}$ | 750 min$^{-1}$ |
| **160 – 180** | 14000 | 15000 | 24000 | 28000 | 28000 | 36000 | 36000 | 36000 |
| **200** | 11000 | 14000 | 22000 | 24000 | 24000 | 32000 | 32000 | 32000 |
| **225** | 11000 | 14000 | 20000 | 22000 | 22000 | 32000 | 32000 | 32000 |
| **250** | 10000 | 11000 | 19000 | 22000 | 22000 | 28000 | 28000 | 28000 |

### Motors with grease nipples

| Frame size | Relubrication intervals [hours] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 3600 min$^{-1}$ | 3000 min$^{-1}$ | 1800 min$^{-1}$ | 1500 min$^{-1}$ | 1200 min$^{-1}$ | 1000 min$^{-1}$ | 900 min$^{-1}$ | 750 min$^{-1}$ | 600 min$^{-1}$ | 500 min$^{-1}$ |
| **280** | 2300 | 2600 | 1500 | 1800 | 2400 | 2800 | 2900 | 3400 | - | - |
| **315 M** | 2100 | 2400 | 1200 | 1500 | 2000 | 2400 | 2500 | 3000 | - | - |
| **315 L** | 2100 | 2400 | 2600 | 3000 | 4500 | 5000 | - | - | - | - |
| **355** | 1500 | 2500 | 4000 | 5500 | 7000 | 7500 | 8000 | 9000 | 9000 | 9000 |
| **400** | 1000 | 2000 | 3200 | 4500 | 6500 | 7000 | 7500 | 8000 | 8000 | 8000 |
| **450** | 1000 | 1500 | 2800 | 4000 | 5000 | 6000 | 7000 | 8000 | 8000 | 8000 |
| **500** | 1000 | 1500 | 2800 | 4000 | 5000 | 6000 | 7000 | 8000 | 8000 | 8000 |

### Lubrication - Grease quantity

| Frame size | 160 | | 180 | | 200 | | 225 | | 250 | | 280 | | 315 | | 355 | | 400 | | 450 | | 500 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Poles** | 2 | ≥4 | 2 | ≥4 | 2 | ≥4 | 2 | ≥4 | 2 | ≥4 | 2 | ≥4 | 2 | ≥4 | 2 | ≥4 | 2 | ≥4 | 2 | ≥4 | 2 | ≥4 |
| **Grease quantity (g)** | 12 | 12 | 12 | 12 | 16 | 16 | 20 | 20 | 22 | 22 | 22 | 22 | 30 | 30 | 30 | 48 | 30 | 48 | 42 | 66 | 42 | 76 |

The bearings should be lubricated at least once a year independently from lubrication intervals.

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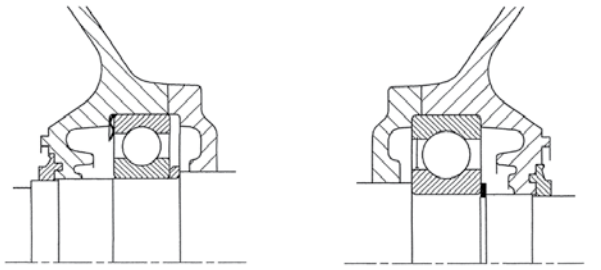
Motors 160 – 250 frame sizes can be supplied with grease nipples and the relative grease exhausts on request.

## AXIAL ROTOR POSITION

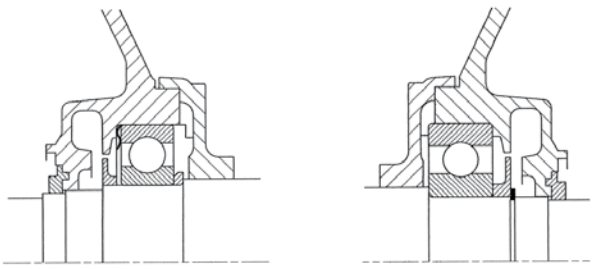
| Frame size | Poles | Horizontal arrangement | Vertical arrangement |
|---|---|---|---|
| **160 – 250** | **-** | Preload washer at N-end | |
| **280** | **-** | Fixed bearing at N-end | |
| **315 M** | **2** | Fixed bearing at D-end | Fixed bearing at N-end |
| **315 S - M** | **≥4** | Fixed bearing at N-end | |
| **315 L** | **-** | Fixed bearing at D-end | Fixed bearing at N-end |
| **355 – 500** | **-** | Fixed bearing at D-end | Fixed bearing at N-end |

On request, for motors frame size 280 – 315 S and M ≥4 poles can be supplied with ball bearings on both sides. In these cases the bearings are axially preloaded, as shown in the following diagrams.



D-end (4 – 8 poles) N-end

**280 – 315 S**
Ball bearings



D-end (4 –8 poles) N-end

**315 M**
Ball bearings

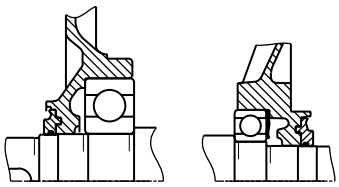
## BEARINGS FOR STANDARD MOTORS

| Type | Frame Size | Poles | Horizontal | | | Vertical | | |
|---|---|---|---|---|---|---|---|---|
| | | | D-end | N-end | Bearing Assembly Diagrams ID | D-end | N-end | Bearing Assembly Diagrams ID |
| **A5C** | **160** | - | 6310-Z-C3 | 6209-Z-C3 | **1** | 6310-Z-C3 | 6209-Z-C3 | **1** |
| **A5C** | **180 M** | - | 6310-Z-C3 | 6209-Z-C3 | **1** | 6310-Z-C3 | 6209-Z-C3 | **1** |
| **A5C** | **180 L** | - | 6310-Z-C3 | 6210-Z-C3 | **1** | 6310-Z-C3 | 6210-Z-C3 | **1** |
| **A5C** | **200** | - | 6312-Z-C3 | 6210-Z-C3 | **1** | 6312-Z-C3 | 6210-Z-C3 | **1** |
| **A5C** | **225** | - | 6313-Z-C3 | 6213-Z-C3 | **1** | 6313-Z-C3 | 6213-Z-C3 | **1** |
| **A5C** | **250** | - | 6314-Z-C3 | 6213-Z-C3 | **1** | 6314-Z-C3 | 6213-Z-C3 | **1** |
| **A5C** | **280** | 2 | 6314-Z-C3 | 6314-Z-C3 | **2** | 6314-Z-C3 | 6314-Z-C3 | **2** |
| **A5C** | **280** | ≥4 | NU 2217-EC-C3 | 6314-Z-C3 | **3** | NU 2217-EC-C3 | 6314-Z-C3 | **3** |
| **B5C** | **315 M-L** | 2 | 6316-Z-C3 | 6316-Z-C3 | **4** | 6316-Z-C3 | 6316-Z-C3 | **5** |
| **B5C** | **315 M** | ≥4 | NU 2219-EC-C3 | 6316-Z-C3 | **6** | NU 2219-EC-C3 | 6316-Z-C3 | **6** |
| **B5C** | **315 L** | ≥4 | 6319-C3 | 6316-Z-C3 | **7** | 6319-C3 | 6316-Z-C3 | **8** |
| **B5C** | **355** | 2 | 6317-C3 | 6317-C3 | **9** | 6317-C3 | 7317-BE | **11** |
| **B5C** | **355** | ≥4 | 6322-C3 | 6322-C3 | **9** | 6322-C3 | 6322-C3 | **10** |
| **B5C** | **400** | 2 | 6317-C3 | 6317-C3 | **9** | 6317-C3 | 7317-BE | **11** |
| **B5C** | **400 LA-LB** | ≥4 | 6322-C3 | 6322-C3 | **9** | 6322-C3 | 6322-C3 | **10** |
| **B5C** | **400 LC-LD** | ≥4 | 6322-C3 | 6322-C3 | **9** | 6322-C3 | 7322-BE | **11** |
| **B5C** | **450 LA-LC** | 2 | 6320-C3 | 6320-C3 | **9** | 6320-C3 | 7320-BE | **11** |
| **B5C** | **450 LA-LC** | ≥4 | 6326-C3 | 6326-C3 | **9** | 6326-C3 | 7326-BC | **11** |
| **B5C** | **500** | 2 | **ON REQUEST** | | | | | |
| **B5C** | **500 LA-LC** | ≥4 | 6328-C3 | 6328-C3 | **9** | 6328-C3 | 7328-BC | **11** |

- All poles

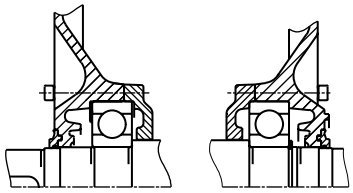
## DRAWINGS BEARINGS FOR STANDARD MOTORS

1



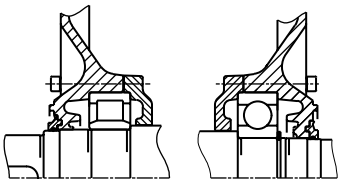
D-end N-end

2



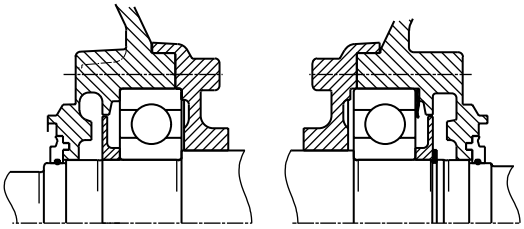
D-end N-end

3



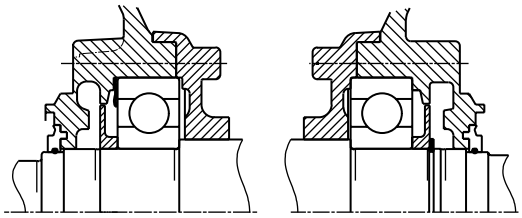
D-end N-end

4



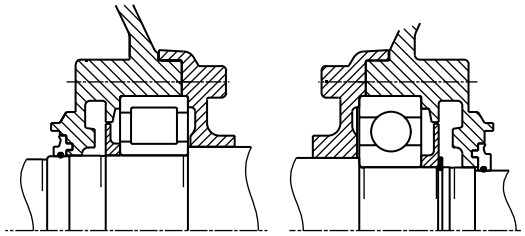
D-end N-end

5



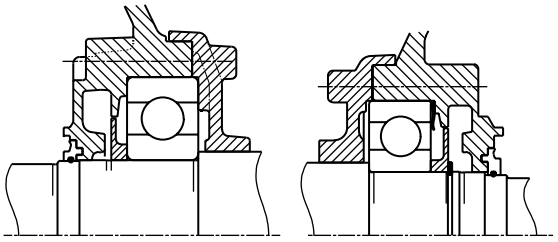
D-end N-end

6



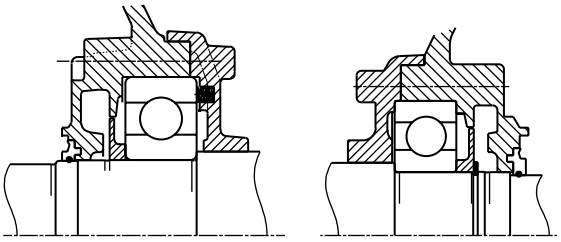
D-end N-end

7



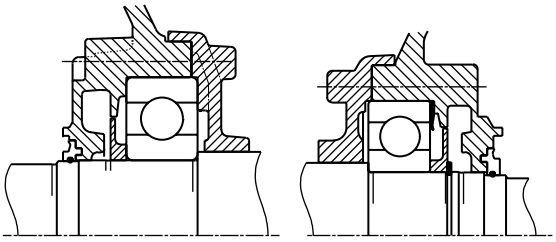
D-end N-end

8



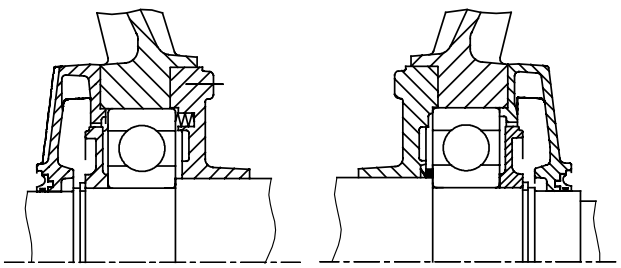
D-end N-end

9



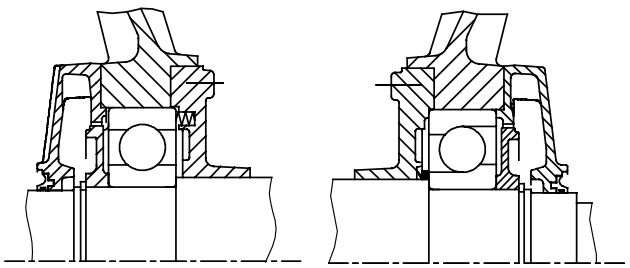
D-end N-end

10



D-end N-end

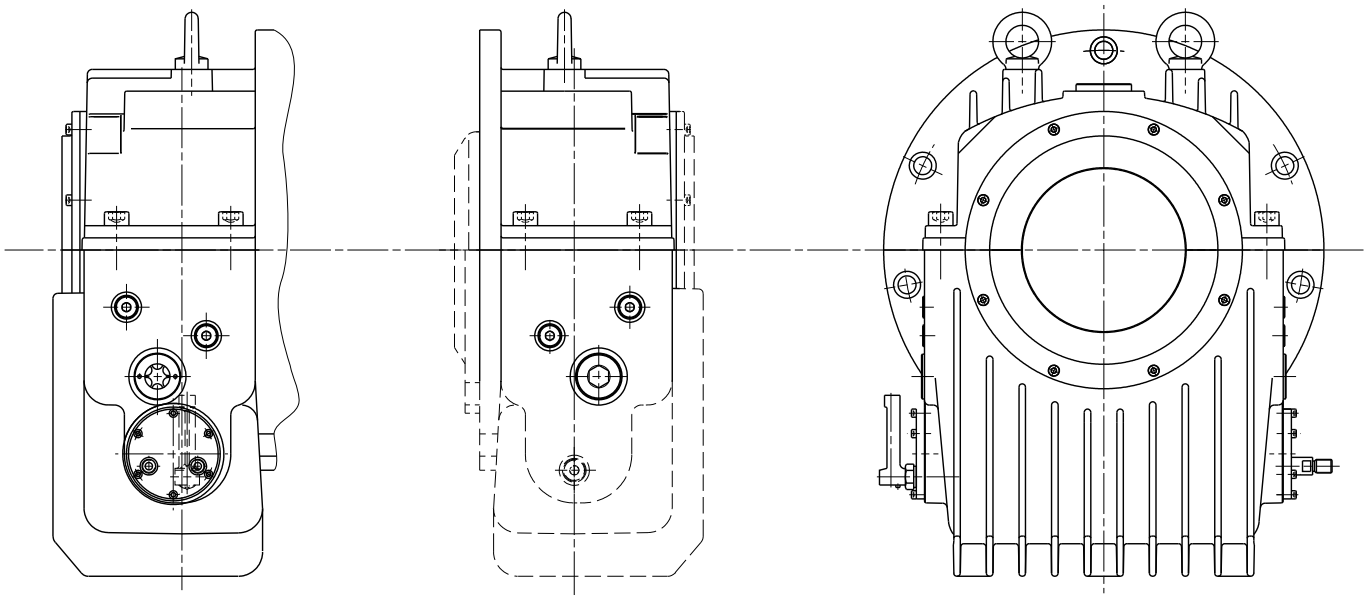
11



D-end N-end

## SLEEVE BEARINGS

For specific applications, motors from frame size 355 can be provided with sleeve bearings.



## AXIAL FORCES – HORIZONTAL MOUNTING

The maximum allowable axial force at the shaft extension for motors having the following characteristics:

- standard construction;
- horizontal mounting (Mounting arrangement IM B3, IM B35 only;[1])
- operating frequency 50Hz;
- bearing life of 20 000 hours (according to ISO 281:1990);
- bearing operating temperature between - 20 and + 70°C;
- no external radial forces;
- motor installed on a rigid foundation with negligible structural vibrations;

are shown in the following table.

| Frame size | Mounting arrangement IM B3, IM B35[1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Maximum allowed axial force [N] → | | | | Maximum allowed axial force [N] ← | | | |
| | 2 poles | 4 poles | 6 poles | 8 poles | 2 poles | 4 poles | 6 poles | 8 poles |
| **160** | 1000 | 1200 | 1450 | 1650 | 2000 | 2500 | 2900 | 3300 |
| **180** | 950 | 1300 | 1500 | 1700 | 2000 | 2500 | 2900 | 3200 |
| **200** | 710 | 710 | 710 | 710 | 2650 | 3350 | 3850 | 4300 |
| **225** | 1750 | 2100 | 2500 | 2750 | 3000 | 3700 | 4300 | 4750 |
| **250** | 1700 | 2050 | 2000 | 2120 | 3400 | 4200 | 4800 | 5400 |
| **280** | 3250 | 4050 | 4700 | 5200 | 3250 | 4050 | 4700 | 5200 |
| **315 M** | 4000 | 4850 | 5600 | 6200 | 4000 | 4850 | 5600 | 6200 |
| **315 L** | 3240 | 3930 | 4530 | - / - | 3240 | 3930 | 4530 | - / - |
| **355 L** | 2000 | 6000 | 7000 | 8000 | 2000 | 6000 | 7000 | 8000 |
| **400 LA - LB** | 1850 | 6000 | 7100 | - / 6900 | 1850 | 6000 | 7100 | - / 6900 |
| **400 LC - LD** | 1000 / - | 1630 / - | 300 | 300 | 1000 / - | 1630 / - | 300 | 300 |
| **450 L** | 4200 | 7300 | 8300 | 4600 | 4200 | 7300 | 8300 | 4600 |
| **500 L** | - / - | 3400 | 300 | 300 | - / - | 3400 | 300 | 300 |

1) For other mounting arrangements consult Marelli Motori

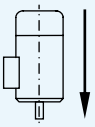
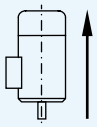
The corresponding values for motors running at 60Hz can be obtained by reducing the indicated values by 7% (160-315) and by 10% (355-500).For double speed motors the higher speed should always be considered.

## AXIAL FORCES – VERTICAL MOUNTING

The maximum allowable axial force at the shaft extension for motors having the following characteristics:

- standard construction;
- vertical mounting shaft extension downwards (Mounting arrangement IM V1, IM V15 only;[1])
- operating frequency 50Hz;
- bearing life of 20 000 hours (according to ISO 281:1990);
- bearing operating temperature between - 20 and + 70°C;
- no external radial forces;
- motor installed on a rigid foundation with negligible structural vibrations;

are shown in the following table.

| Frame size | Shaft extension downwards Mounting arrangement IM V1, IM V15[1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Maximum allowable axial force in downwards direction [N]  | | | | Maximum allowable axial force in upwards direction [N]  | | | |
| | 2 poles | 4 poles | 6 poles | 8 poles | 2 poles | 4 poles | 6 poles | 8 poles |
| **160** | 1730 | 2040 | 2470 | 2930 | 1270 | 1660 | 1880 | 2020 |
| **180** | 1650 | 1990 | 2340 | 2680 | 1300 | 1820 | 2060 | 2230 |
| **200** | 2190 | 2750 | 3140 | 3660 | 1170 | 1310 | 1430 | 1350 |
| **225** | 2380 | 2760 | 3330 | 3820 | 2370 | 3040 | 3470 | 3680 |
| **250** | 2700 | 3160 | 3540 | 4250 | 2410 | 3090 | 3260 | 3270 |
| **280** | 2130 | 2430 | 3100 | 3640 | 4370 | 5670 | 6300 | 6760 |
| **315 M** | 2170 | 1950 | 2150 | 2820 | 5830 | 7750 | 9050 | 9580 |
| **315 L** | 1350 | 1270 | 490 | - / - | 5850 | 7470 | 9590 | - / - |
| **355 L** | 3690 | 1880 | 300 | 300 | 160 | 14100 | 15800 | 17100 |
| **400 LA-LB** | 1350 | 300 | 300 | - / 300 | 2450 | 14400 | 16900 | - / 6900 |
| **400 LC-LD** | 1000 / - | 300 / - | 300 | 300 | 1000 / - | 1630 / - | 300 | 300 |
| **450** | 300 | 300 | 300 | 300 | 100 | 714 | 11100 | 13900 |
| **500** | - / - | 3400 | 300 | 300 | - / - | 3400 | 300 | 300 |

1) For other mounting arrangements consult Marelli Motori

Corresponding values for motors running at 60Hz:
Frame sizes: 160 – 315:
The indicated values have to be reduced by 7%
Frame sizes: 355 – 500:
Maximum allowable axial force in downwards direction: The indicated values have to be reduced by 10%.
Maximum allowable axial force in upwards direction:
2 poles, frame sizes 400 e 500: The indicated values have to be reduced by 50%.
2 poles, frame sizes 355 e 450: Consult Marelli Motori
≥ 4 poles, frame sizes 355-500: The indicated values have to be reduced by 25%.

For double speed motors the higher speed should always be considered.

## RADIAL FORCES

The maximum allowable radial forces at the shaft extension ($X_{max}$) and at the shaft collar ($X_0$) for motors having the following characteristics:

- standard construction;
- horizontal mounting (Mounting arrangement IM B3, IM B35 only;[1]);
- operating frequency 50Hz;
- bearing life of 20 000 hours (according to ISO 281:1990);
- bearing operating temperature between - 20 and +70°C;
- no external axial forces;

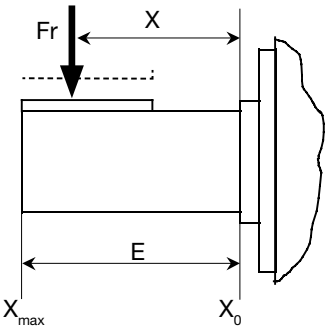
motor installed on a rigid foundation with negligible structural vibrations;
are shown in the following table.

| Mounting arrangement IM B3, IM B35[1] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Frame Size | 2 poles | | 4 poles | | 6 poles | | 8 poles | |
| | Fx0 [N] | Fxmax [N] | Fx0 [N] | Fxmax [N] | Fx0 [N] | Fxmax [N] | Fx0 [N] | Fxmax [N] |
| **160** | 3000 | 2400 | 3600 | 2000 | 4300 | 2000 | 4500 | 2000 |
| **180** | 3000 | 2400 | 3650 | 2500 | 4300 | 2500 | 4900 | 2500 |
| **200** | 1390 | 950 | 1390 | 950 | 1390 | 950 | 1390 | 950 |
| **225** | 4550 | 3800 | 5400 | 3800 | 6300 | 3800 | 7000 | 3800 |
| **250** | 3260 | 2000 | 3260 | 2000 | 3260 | 2000 | 3260 | 2000 |
| **280** | 4600 | 3750 | See construction for high radial loads | | | | | |
| **315 M** | 6100 | 3530 | See construction for high radial loads | | | | | |
| **315 L** | 6330 | 4040 | 9530 | 5020 | 10120 | 5020 | / | / |
| **355 L** | 4300 | 2200 | 9000 | 6500 | 9800 | 3400 | 9800 | 3000 |
| **400 LA-LB** | 3600 | 2000 | 9000 | 7800 | 10500 | 4500 | - / 2000 | - / 1000 |
| **400 LC-LD** | 1000 / - | 500 / - | 2000 / - | 1000 / - | 300 | 300 | 300 | 300 |
| **450 L** | 3400 | 3100 | 5500 | 4800 | 5600 | 3000 | 2000 | 1000 |
| **500 L** | / | / | 3000 | 1500 | 300 | 300 | 300 | 300 |

1) For other mounting arrangements consult Marelli Motori

The external radial forces between the values $X_0$=0 and $X_{max}$=E can be determined by following linear relationship.

$$Fr = F_{xo} - \frac{X}{E} * (F_{xo} - F_{xmax})$$




$F_{xo}$ = maximum radial force on the shaft collar [N].

$F_{xmax}$ = maximum radial force at the shaft extension [N].

E = shaft extension length [mm].

X = distance from radial force application point to the shaft collar [mm].

## CONSTRUCTION FOR HIGH RADIAL LOADS

Maximum allowable external radial loads for motors 4 - 8 poles equipped with roller bearings and having the following characteristics:
- horizontal mounting (Mounting arrangement IM B3, IM B35 only;[1])
- operating frequency of 50Hz;
- bearing life of 20 000 hours (in accordance with ISO 281:1990);
- bearing operating temperature between - 20 and +70C°
- no external axial forces;
- motor installed on a rigid foundation with negligible structural vibrations;

In the high radial loads option, for all frame sizes, the rotor is axially positioned by N-end bearing.

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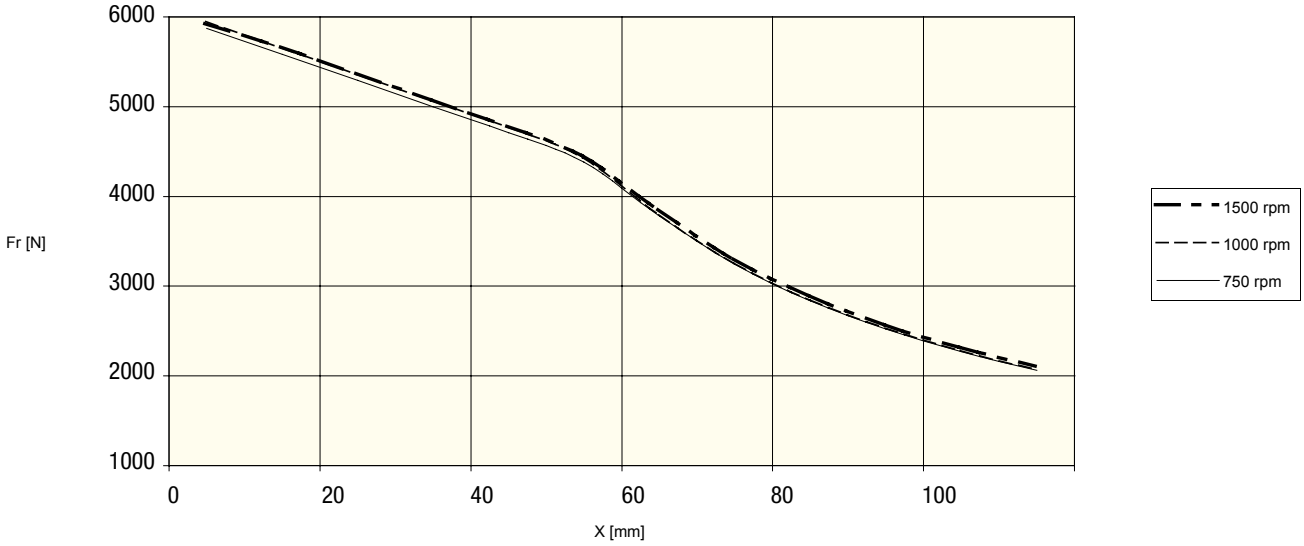
Motors for high radial loads - bearings (horizontal construction)

| Frame Size | *Mounting arrangement* IM B3, IM B35[1] 4 poles – 6 poles – 8 poles | |
|---|---|---|
| | *D-end* | *N-end* |
| **A5C 160** | NU310 | 6209-Z-C3 |
| **A5C 180** | NU310 | 6210-Z-C3 |
| **A5C 200** | NU312 | 6210-Z-C3 |
| **A5C 225** | NU313 | 6213-Z-C3 |
| **A5C 250** | NU314 | 6213-Z-C3 |
| **A5C 280** [2] | NU2217-EC-C3 | 6314-Z-C3 |
| **B5C 315 M** [2] | NU2219-EC-C3 | 6316-Z-C3 |
| **B5C 315 L** | NU319-EC-C3 | 6316-Z-C3 |
| **B5C 355 L** | NU322-C3 | 6322-C3 |
| **B5C 400 L** | NU322-C3 | 6322-C3 |
| **B5C 450 L** | NU326-C3 | 6326-C3 |
| **B5C 500 L** | NU328-C3 | 6328-C3 |

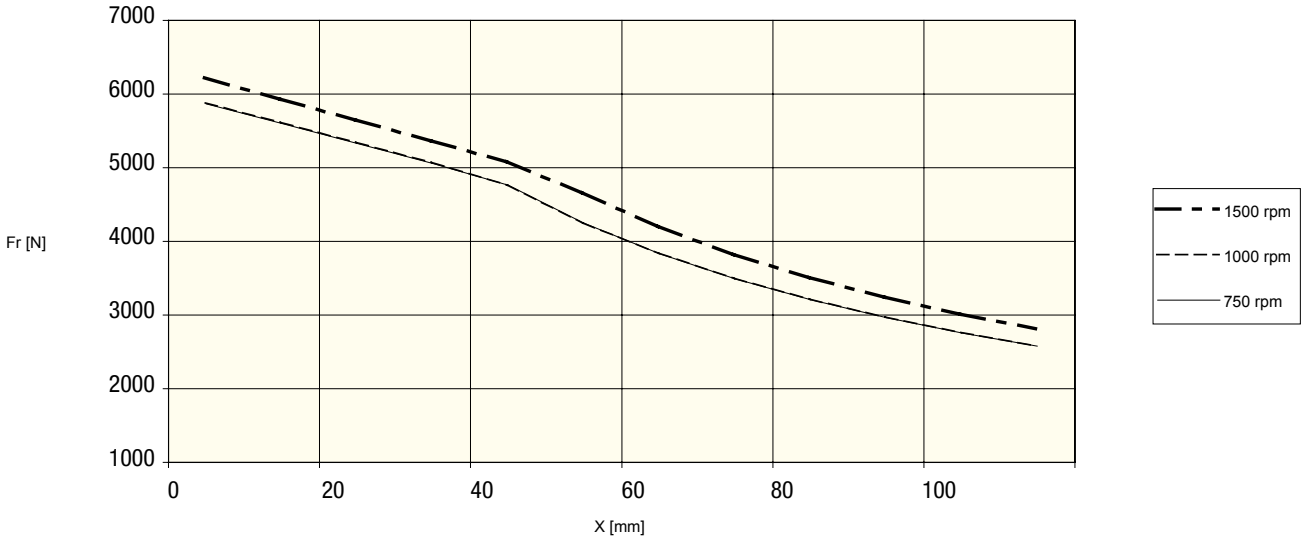
1) For other mounting arrangements consult Marelli Motori
2) Frame sizes 280, 315M are supplied with bearing construction for high loads as standard.

## CONSTRUCTION FOR HIGH RADIAL LOADS

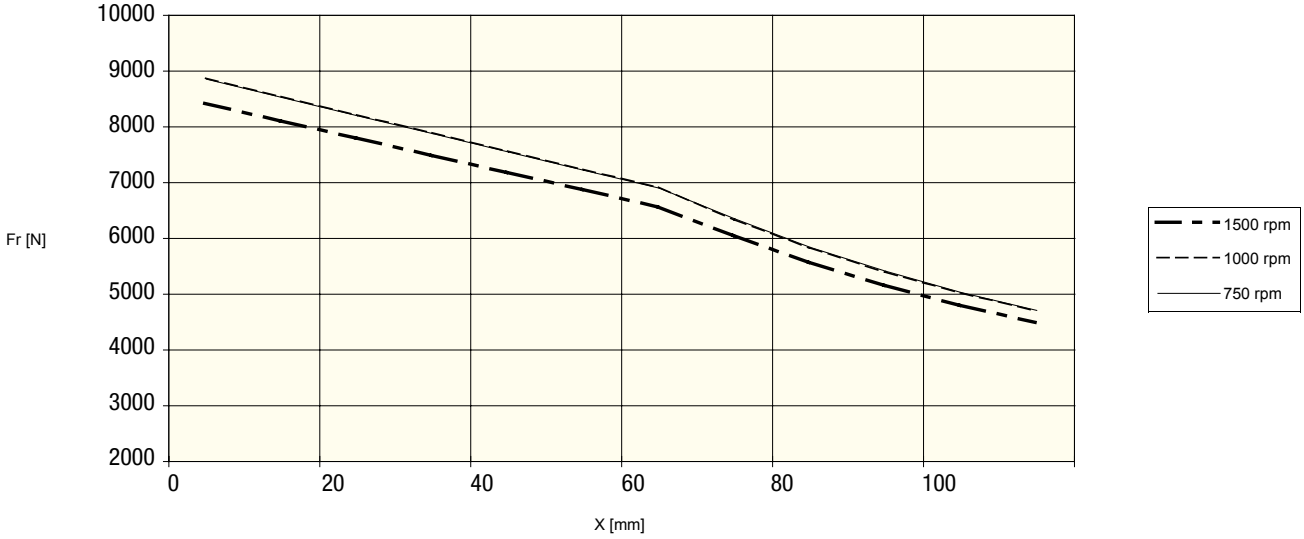
### A5C 160



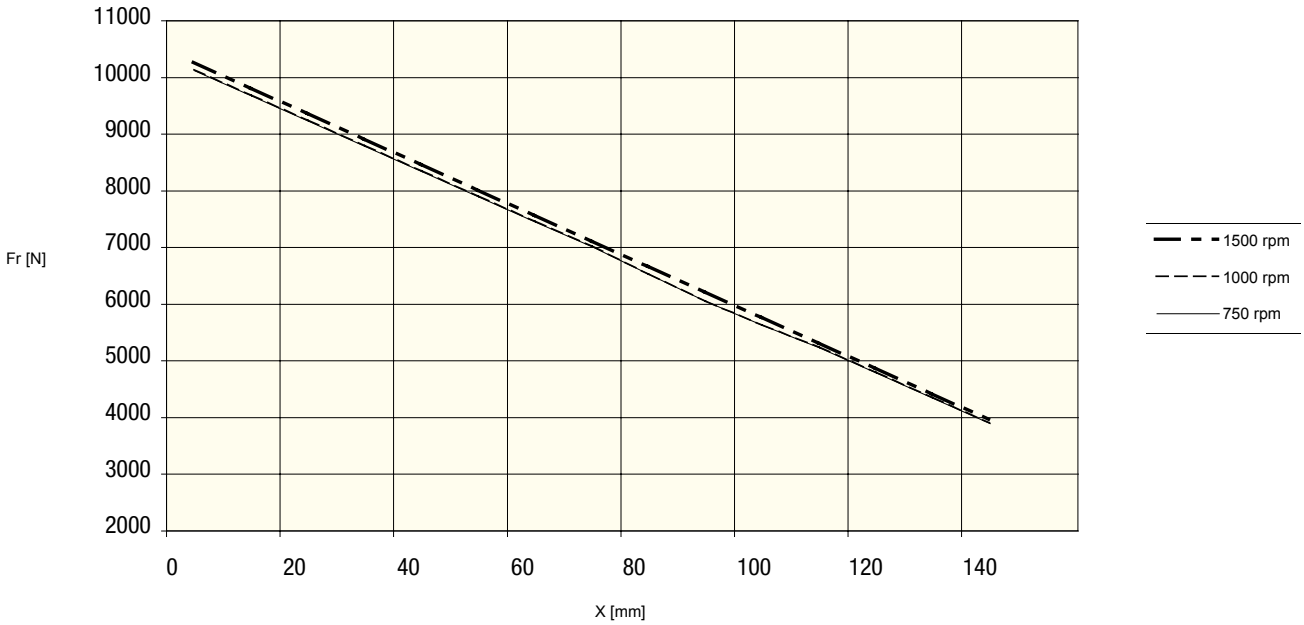

### A5C 180



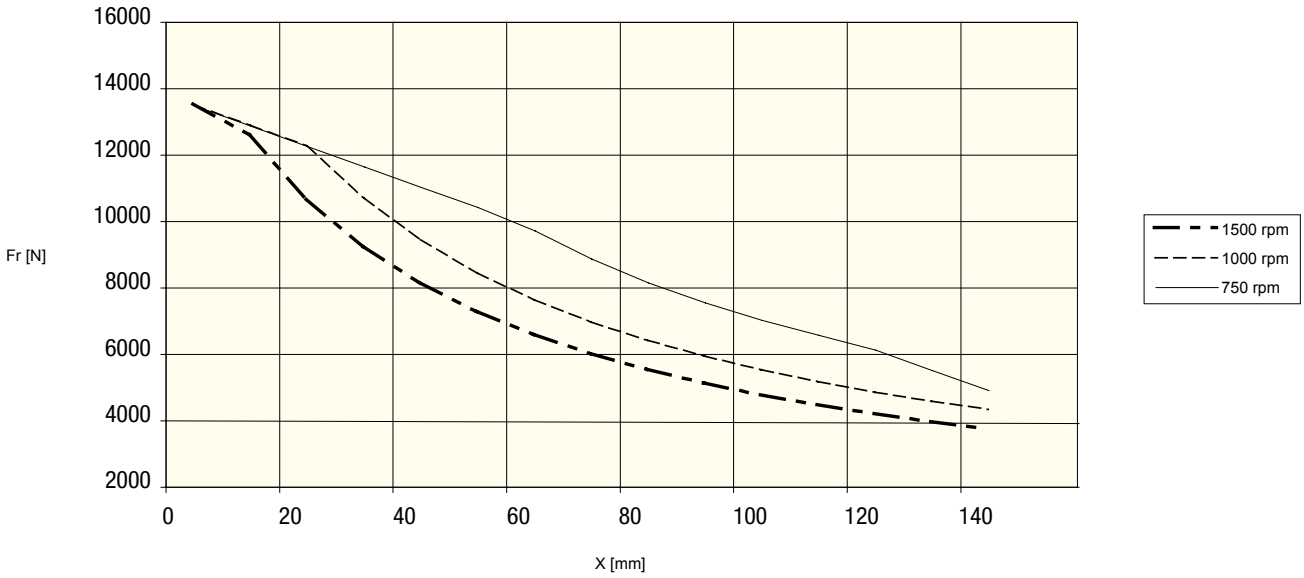

### A5C 200



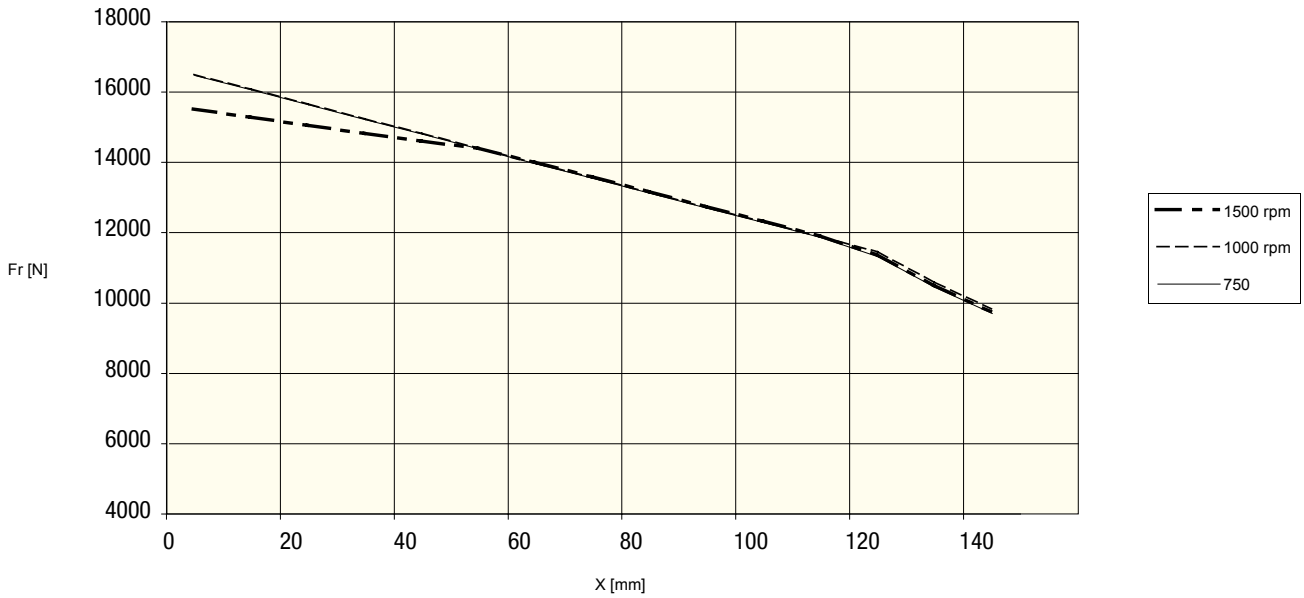
## A5C 225



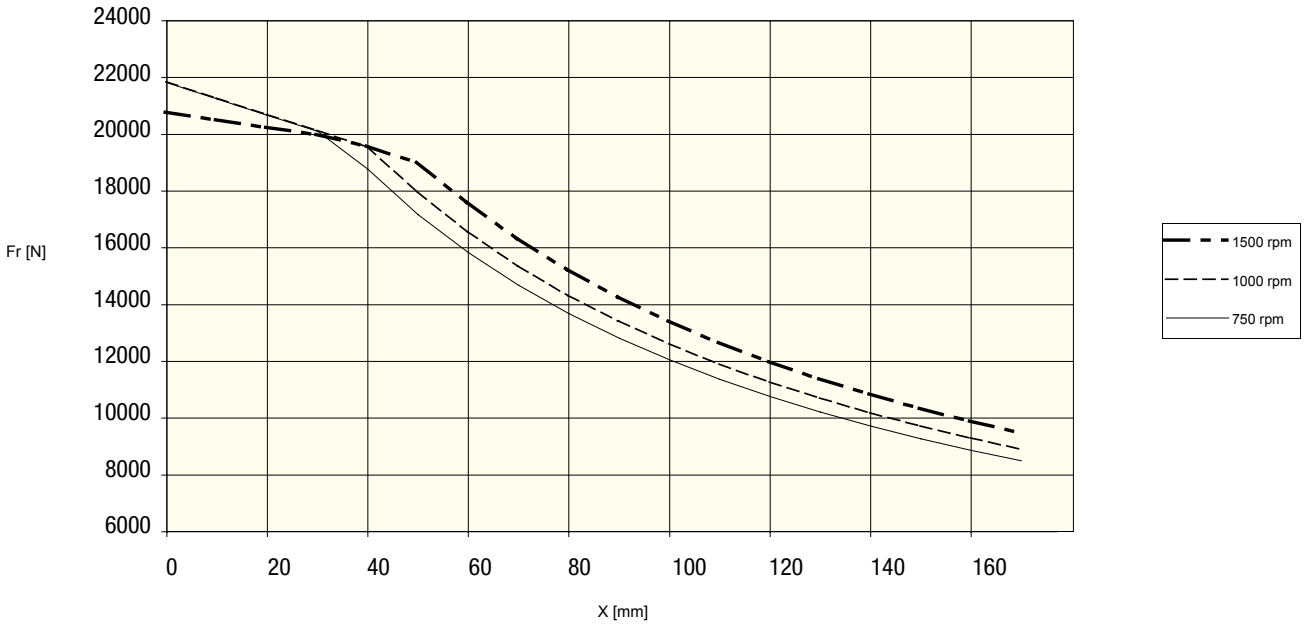

## A5C 250



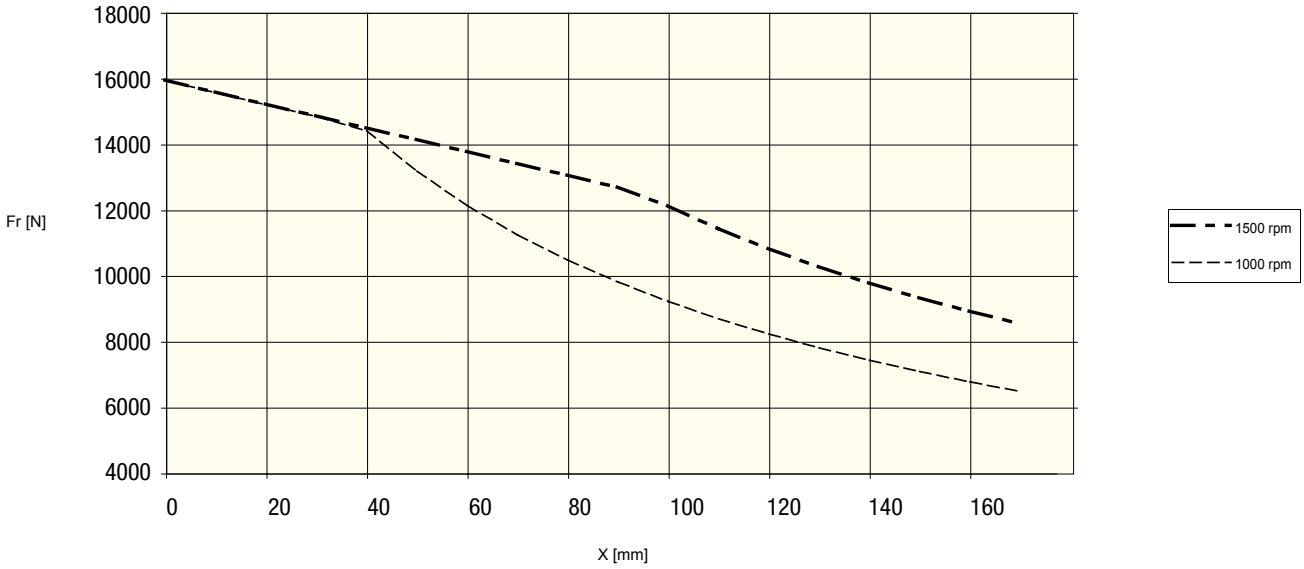

## A5C 280



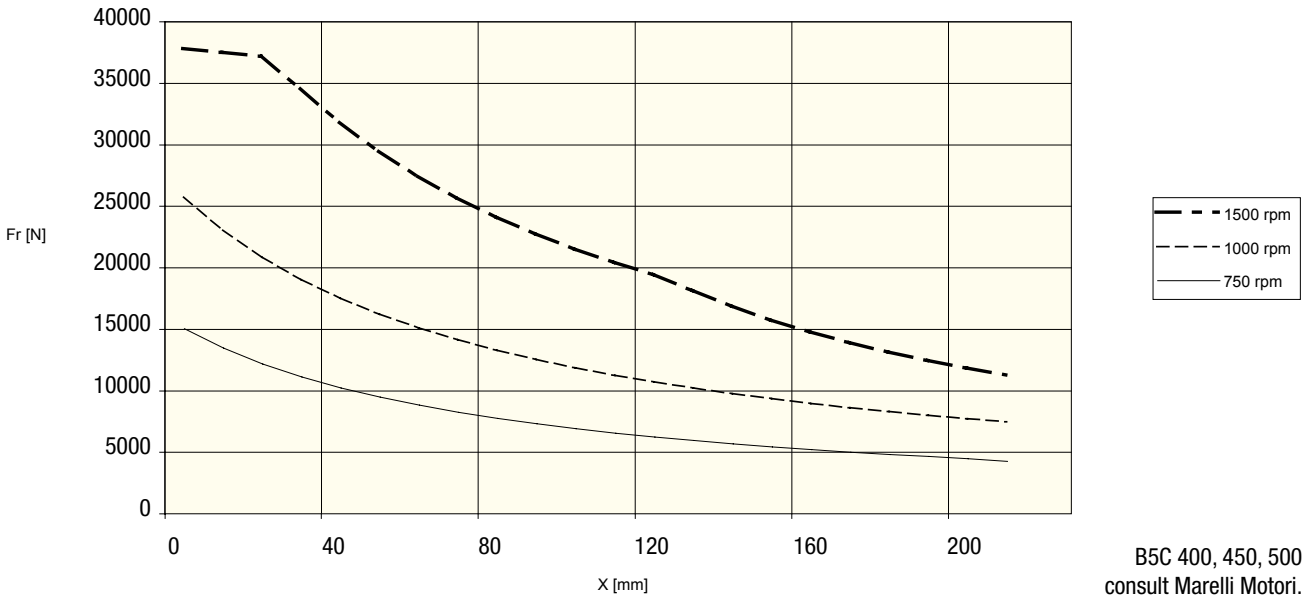
## B5C 315 M




## B5C 315 L




## B5C 355 L




B5C 400, 450, 500
consult Marelli Motori.

## TERMINAL BOX AND CABLE ENTRY

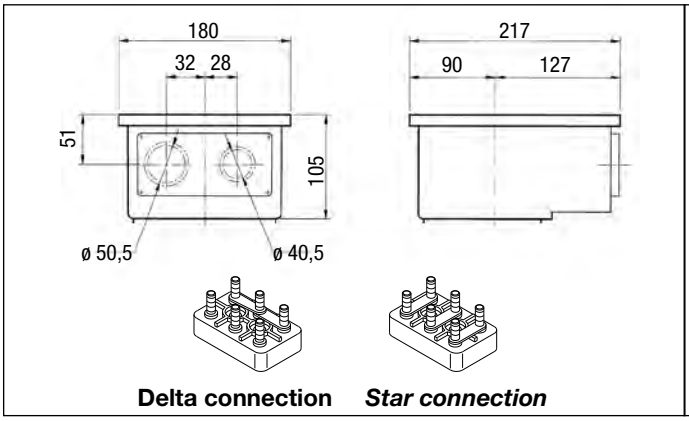
The main terminal box is placed on top and is normally equipped with 6 leads.

| Frame size | Type of terminal | Terminal bolt size | Maximum conductor section [mm²] | Maximum cable diameter [mm] | Clearance holes formetric cableglands |
|---|---|---|---|---|---|
| **160-250** | Threaded Terminals | M8 | 35 | 38 | M40 1) + M50 1) |
| **280-315M** | Threaded Terminals | M12 | 120 | 43 | 2 x M63 1) |
| **315 L** | Threaded Terminals | M12 | 120 | 43 | 2 x M63 |
| **355-400** | Flat Copper Bars | M12 | 2 x 300 | / | Undrilled gland plate |
| **450-500** | Flat Copper Bars | M12 | 6 x 300 | / | Undrilled gland plate |

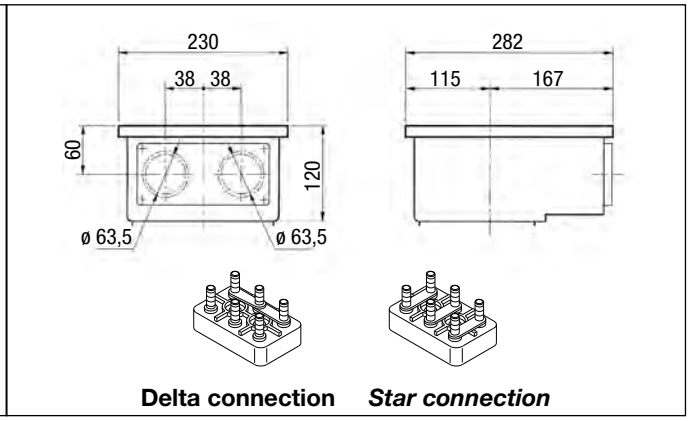
1): Knockout opening

## TERMINAL BOXES - DIMENSIONS

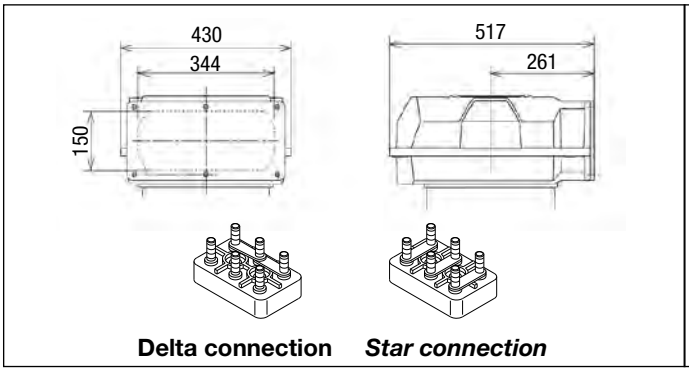
Motors in standard execution are supplied with main terminal box having the following dimensions:



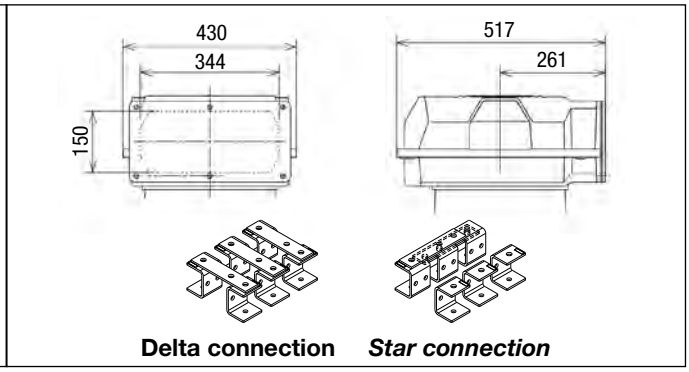

**160 - 250**



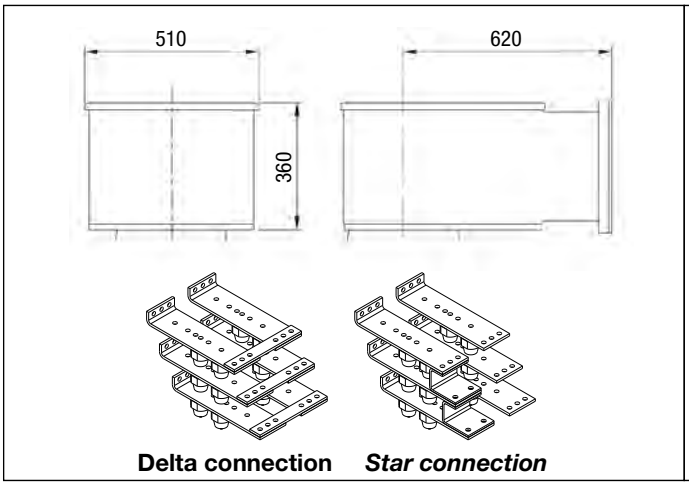

**280 - 315 M**



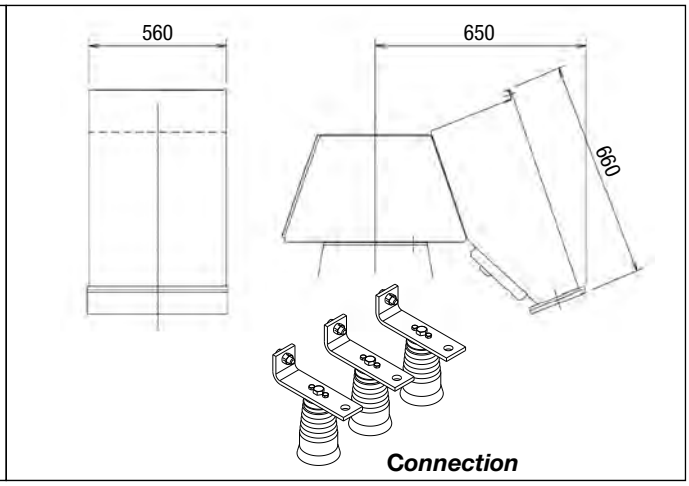

**315 L**




**355 - 400**



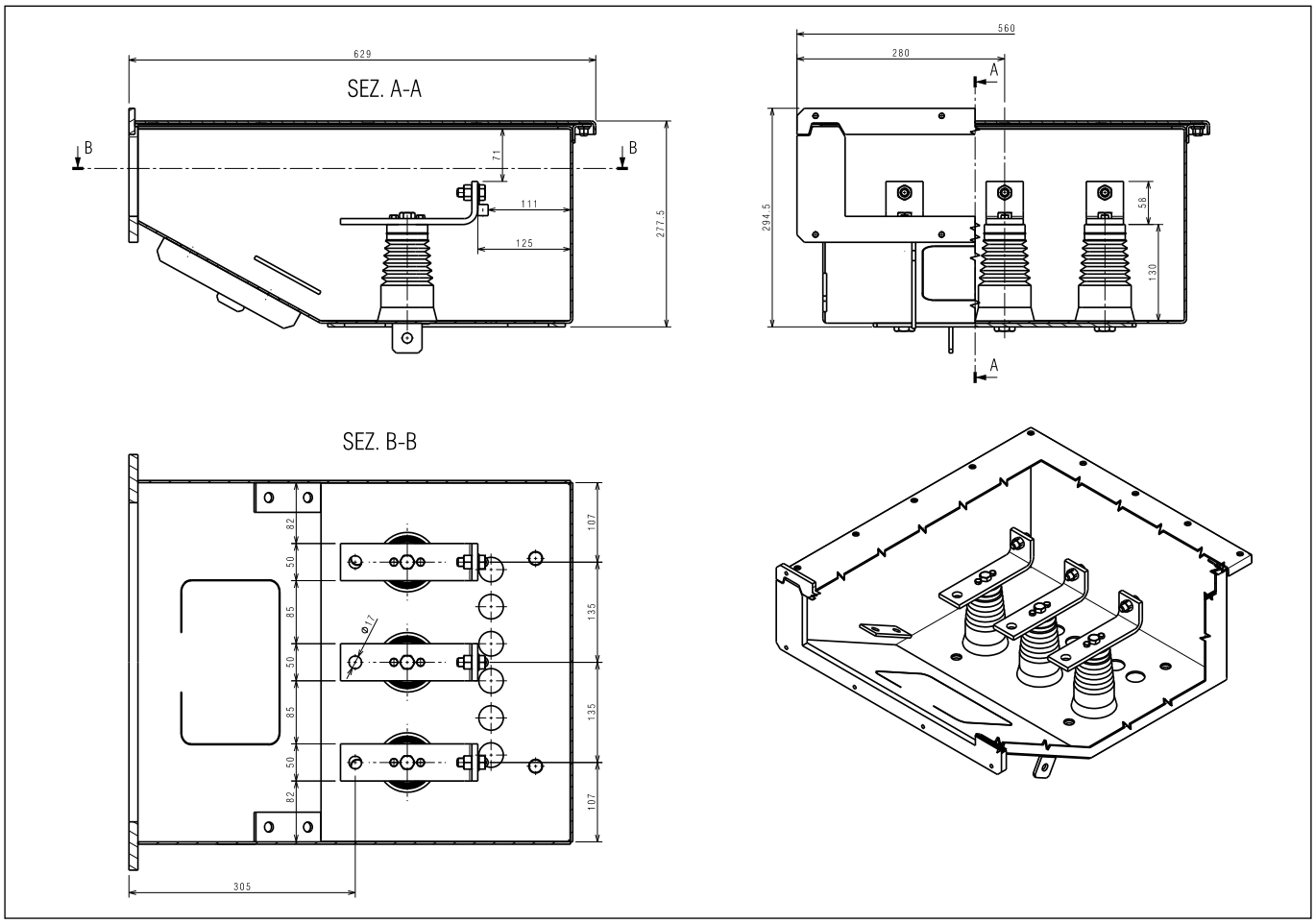

**450 - 500 LV Low Voltage**



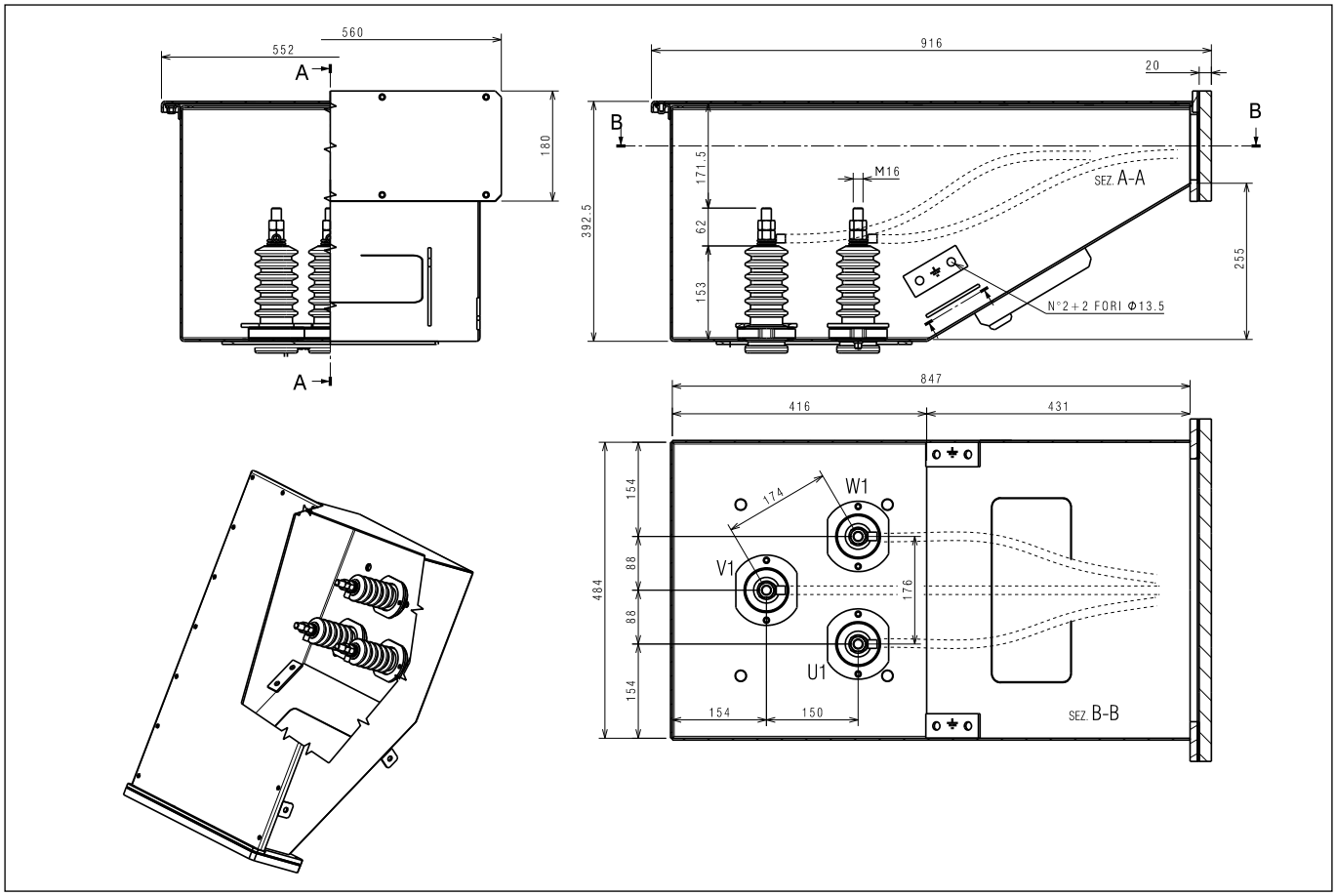

**355 - 500 MV Medium Voltage**

Non-standard design of terminal boxes, eg size, degree of protection, are available on request as options.
Degree of protection of standard terminal box is IP 55.

The medium voltage terminal box up to 6.6 kV is shown below.




The high voltage terminal box up to 11 kV is shown below.



## GROUNDING

Two terminals exist for grounding, one inside the terminal box and one outside.

## CONDENSATION DRAINAGE

When installed outdoors or used for intermittent work in environments with high humidity levels, motors must be provided with holes for condensation drainage. In order to assure the correct positioning of the holes the operating position of the motors must be specified. Motors with frame sizes from 280 to 500 have holes for condensation drainage as standard.

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Motors can be supplied with drainage holes on request.

## ANTICONDENSATION HEATERS

108, 109

Motors subject to atmospheric condensation, either through standing idle in damp environments or because of wide ambient temperature variations, may be fitted with anticondensation heaters. They are of tape form. Anticondensation heaters are normally switched on automatically when the supply to the motor is interrupted, heating the motor to avoid water condensation. They are normally mounted on D-end winding heads.
Normal feeding voltage is 220//230/240V.
Motors can be supplied with anticondensation heaters with terminals in main terminal box (Opt. 108) or, with terminals in a separate terminal box (Opt. 109).
The power values normally used are shown in the table below.

| Frame size | Power (W) |
|---|---|
| **160 - 180** | 50 |
| **200 - 250** | 65 |
| **280** | 100 |
| **315** | 200 |
| **355** | 300 |
| **400-450** | 400 |
| **500** | 600 |

## THERMAL PROTECTIONS

110, 111, 112, 113, 114, 115,122

Standard magnetothermal circuit brakers are sufficient to suitably protect the motor from overloading. Anyway the motors can be supplied with additional thermal protections with the characteristics described in the following table.

| Type | Operating principle | Active temperature [°C] |
|---|---|---|
| Bimetallic devices | Motoprotectors with contact normally closed. The disc opens when the winding temperature reaches limits dangerous to the insulation system of the motor. | 150 |
| Positive temperature coefficient thermistors **PTC** | At the active temperature this device quickly changes its resistance value. | 155 |
| Platinum resistance thermometer **PT100** | Variable linear resistance with the winding temperature, particularly suitable for a continuous winding temperature monitoring. | Set up in control panel |

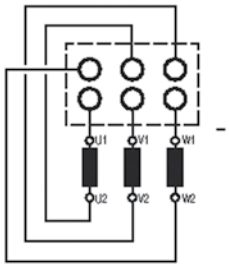
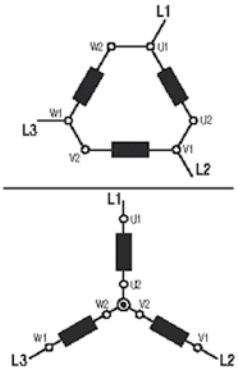
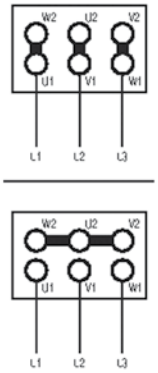
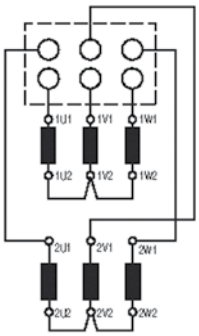
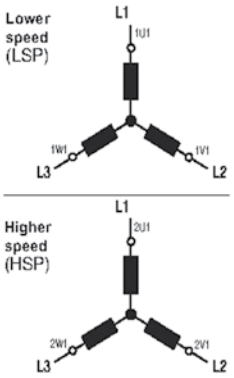
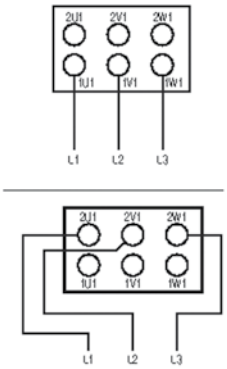
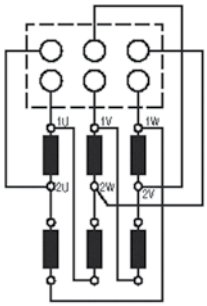
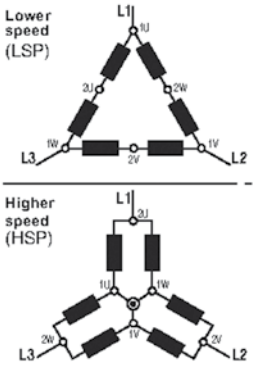
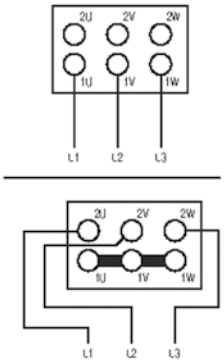
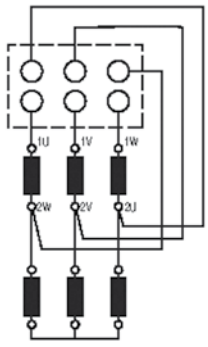
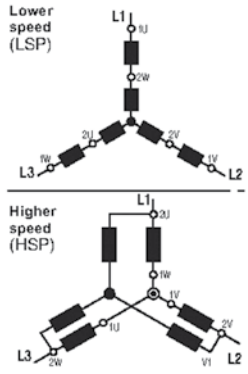
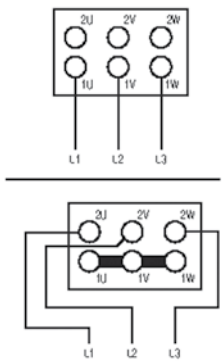
Motors from 315M frame size are supplied with N. 3 PTC with terminals in main terminal box, in standard execution. Frame size from 355 are supplied with terminals in separate terminal box, in standard execution.

122

Motors from 280 frame size can be supplied with PT100 thermal detectors on the bearings on request.

## CONNECTION DIAGRAMS

The table below, show the materials used on the mechanical components for standard motors.

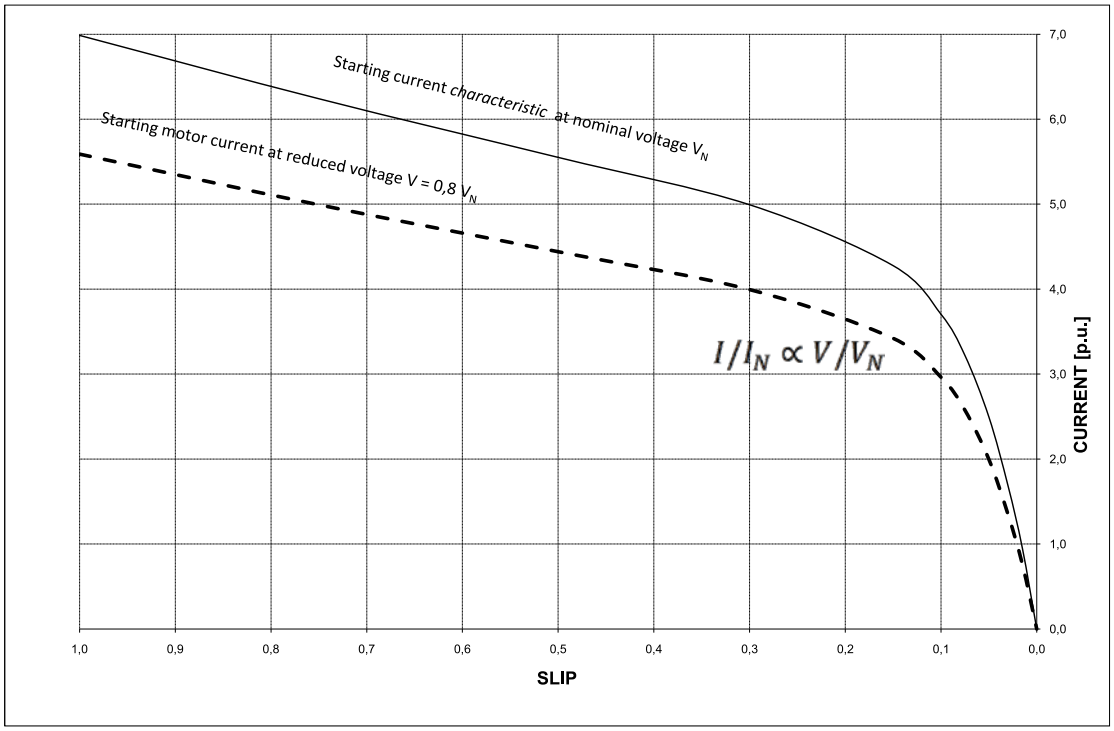
| Voltages and connection | Internal connection diagrams | Outline diagrams | External connection diagrams |
|---|---|---|---|
| **Single speed motors** | | | |
| **- Voltage: U**<br>**- Connection Δ**<br>**(at lower marked voltage)**<br>**e.g. 230 V / Δ**<br><br>**- Voltage: U**<br>**- Connection Y**<br>**(at lower marked voltage)**<br>**e.g. 400 V / Y** |  |  |  |
| **Double speed motors** | | | |
| **Two separat winding**<br>**(Y internal)** |  |  |  |
| **Double speed motors** | | | |
| **Dahlander**<br>**6 Terminals (Δ internal)**<br>**Δ - YY** |  |  |  |
| **Double speed motors** | | | |
| **Dahlander**<br>**6 Terminals (Y internal)**<br>**Y - YY** |  |  |  |

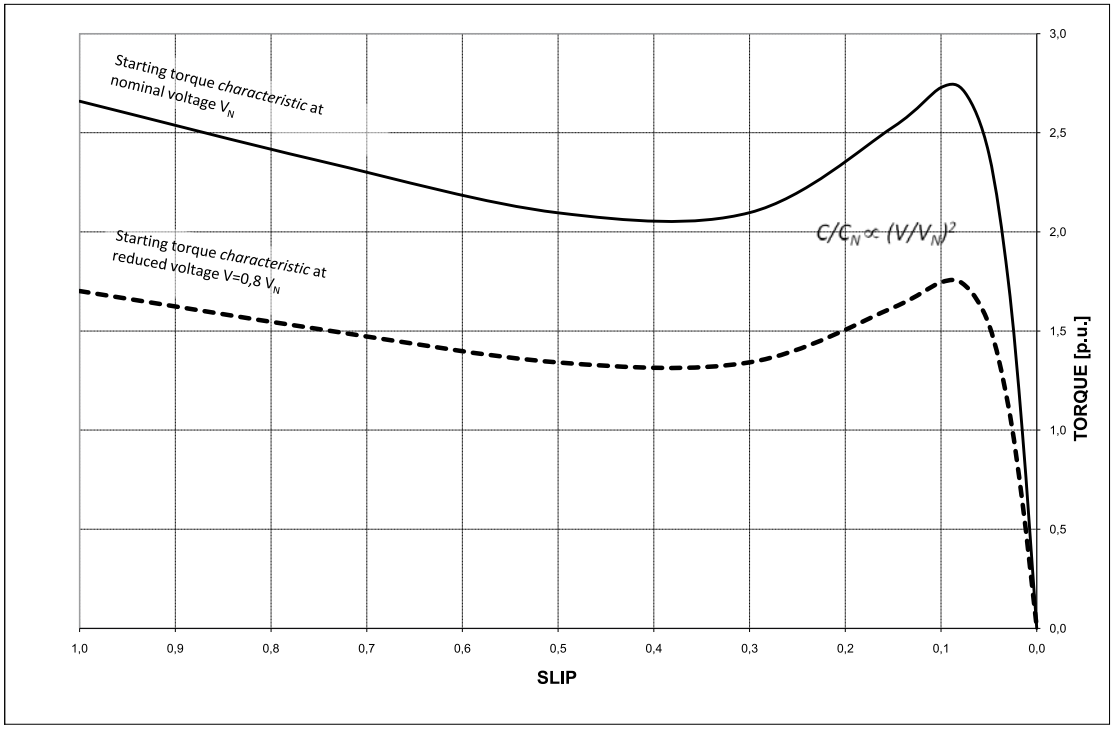
## STARTING

The performances of a motor in the starting phases are, in first approximation, related to the corresponding feeding voltage by the following relationships:

- The starting current is almost varying directly with the motor feeding voltage: $I/I_N \propto V/V_N$.
- The starting torque ($C_s$) and the maximum torque ($C_M$) of the motor is almost varying directly with the square of the feeding voltage: $C/C_N \ (V/V_N)^2$.

Example of starting current and torque characteristics modification when voltage is varying from 100 % of $V_N$ to 80 % of $V_N$




## Starting response

The starting current values given in p.u. detailed in the present catalogue allow to obtain the starting current rms values, and so measured after some sinusoidal periods from insertion: in the first instant it is possible to have peak currents which can be up to 2.5 times the stable values. The amplitude of the peaks depends essentially on the instantaneous value of the sinusoidal supply voltage at the moment of insertion. These peaks are rapidly damped. The starting torque peaks, having an analogue behavior, come considerably attenuated by the inertia of the motor and the coupling load, with negligible resulting stress of the shaft and coupling.

## Type of starting

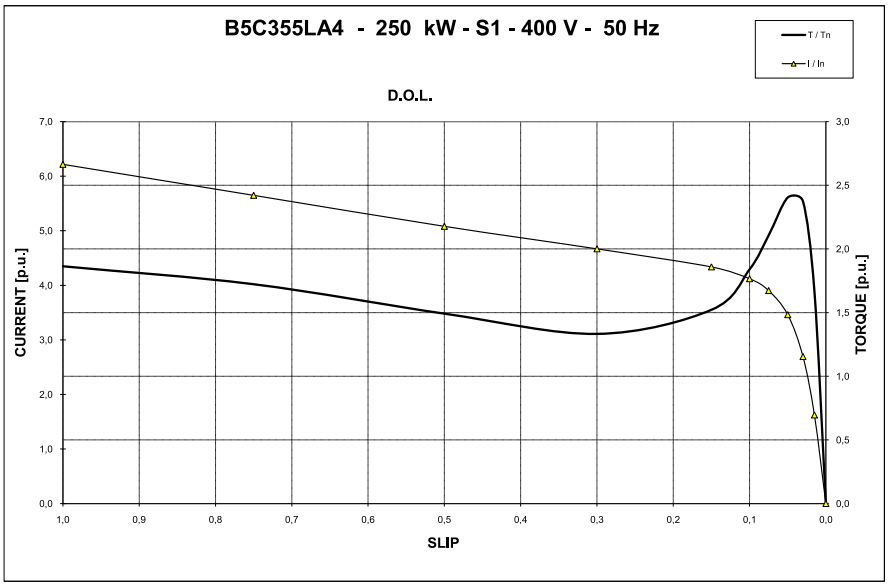
Knowing the torque versus speed diagram of the load driven by the motor is the first fundamental point to evaluate which type of starting method can be used in the system: the motor coupled to the load can be started positively only when the accelerating motor torque is higher than the required load torque in all the speed range of the starting process (from zero to the nominal speed).
Torque load diagrams are mainly divided in the following categories:

- **Machines with quadratic torque versus speed diagram:** typically these machines can be centrifugal pumps, ventilators, propellers or screw compressors
- **Machines with constant torque versus speed diagram**: typically these can be paper continuative machines, refrigeration piston compressor, or skiing cable car
- **Machines with proportional torque versus speed diagram**: typically are rolling mills or liquid ring pump.

During the starting a big attention is usually paid to the starting current that, for DOL starting can achieve very high values. Considering all these factors, an appropriate starting system can be chosen.
The most common starting methods are the following:

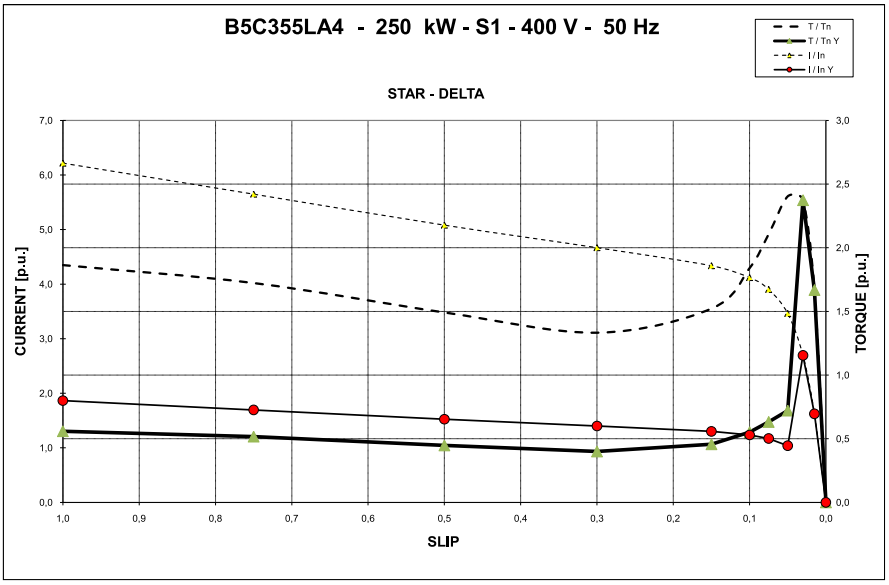
## 1. Direct-on-line starting (D.O.L.)

D.O.L. starting means the direct insertion of the motor at its nominal voltage and frequency values. In these conditions the starting torque and current are those given in the catalogue.



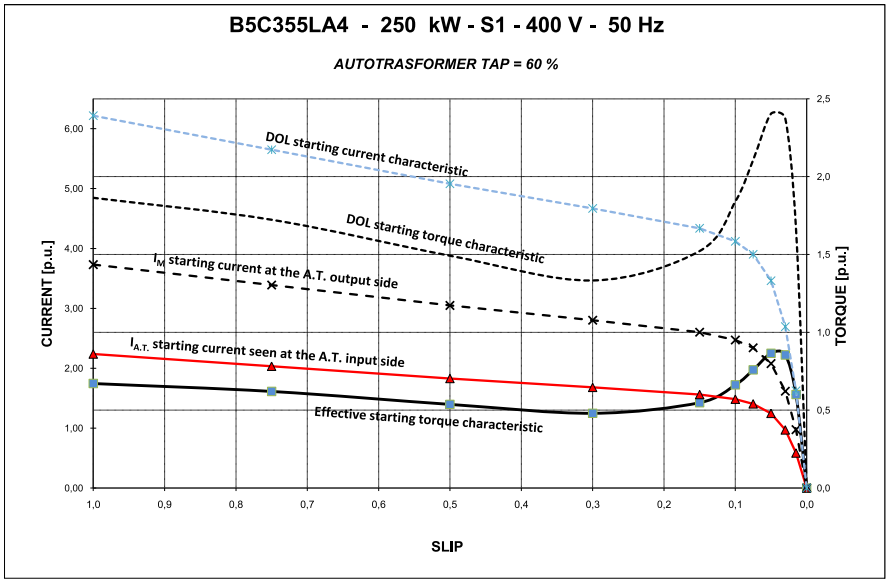

## 2. Star-Delta starting (Y / △)

With this method both the starting torque (▬▲▬) and the current (▬●▬), in the starting phase, will be reduced at a value of approx 30% of the correspondent value indicated for DOL starting (with a negligible transient at delta insertion). This starting method can be adopted in cases where the resistant torque is very low and low starting currents are also requested.
A motor that should be started with star – delta device should have all the six winding terminals in the main terminal box and the motor should be designed for delta connection when fed at nominal voltage / frequency.



## 3. Autotransformer starting (A.T.)

When the starting is realized by the use of an autotransformer it should be considered the voltage ratio ($K=V_{AT}/V_N$) between the output and input of the transformer during the starting.
In this conditions the starting performances will be as in the following:
The use of an autotransformer allows a reduction of the starting current but also results in a lower motor torque characteristic. Functioning is given with the following relationships:




$$I_{A.T.} = I_N \cdot \left(\frac{V_{A.T.}}{V_N}\right)^2 = I \cdot K^2$$

$$I_M = I_N \cdot \frac{V_{A.T.}}{V_N} = I_N \cdot K$$

$$C_{A.T.} = C_{D.O.L.} \cdot \left(\frac{V_{A.T.}}{V_N}\right)^2 = C_{D.O.L.} \cdot K^2$$

$V_N$ = motor nominal voltage [V]

$V_{A.T.}$ = reduced voltage at the exit of autotransformer [V]

$I_N$ = motor nominal current [A]

$I_M$ = motor starting current at voltage $V_{AT}$ [A]

$I_{D.O.L.}$ = motor starting current at nominal voltage

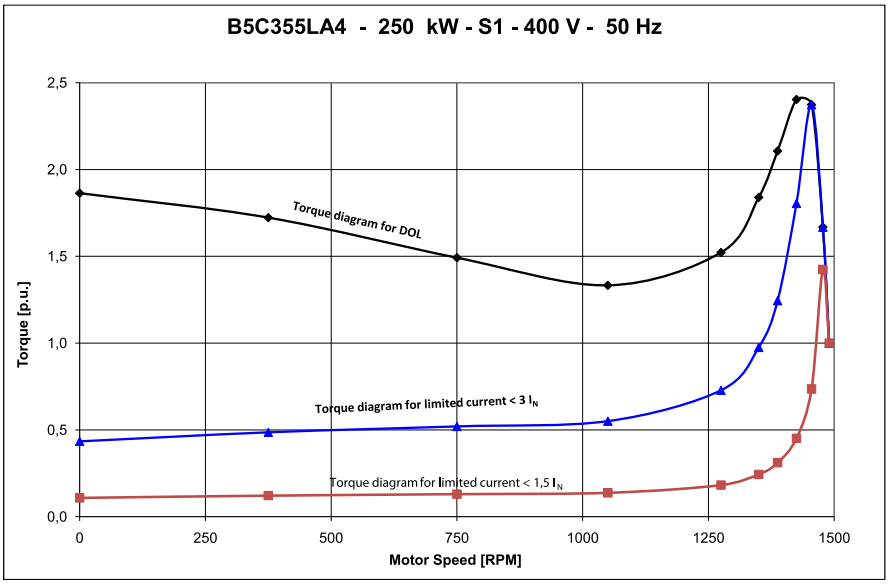
$C_{D.O.L.}$ = starting torque at nominal voltage

$I_{A.T.}$ = reduced starting current seen by the main supply (input side of autotransformer [A])

$C_{A.T.}$ = starting motor torque at reduced voltage $V_{A.T.}$

## 4. Soft starter starting

The soft starter can be seen as a device that, during the starting process, increase gradually the voltage, limiting the starting current at a fixed value (usually the limited current range is from 1,5 to 3 times the nominal current).
Being fixed the limited current during the starting, the torque diagram will be consequently reduced almost directly with the square ratio of the limited current and the correspondent D.O.L. current.
This method of starting is indicated for machines with very low torque profile at low speed.



## MOTORS FOR VARIABLE SPEED APPLICATIONS

A.C. motors designed for sinusoidal feeding voltage and constant feeding frequency can, under normal conditions, be used in variable speed applications by means of a frequency converter. Motors for variable speed applications are generally fed by the frequency converter by upholding the relationship $U_n/f_n$ up to the speed correspondent to the nominal voltage and frequency and, for higher speeds, by increasing the frequency and keeping constant the nominal voltage value. The performances of a motor fed by frequency converter depend on the cooling type: self-ventilated motors are suitable for use at loads with quadratic torque/speed shapes (typical case for pumps and fans).

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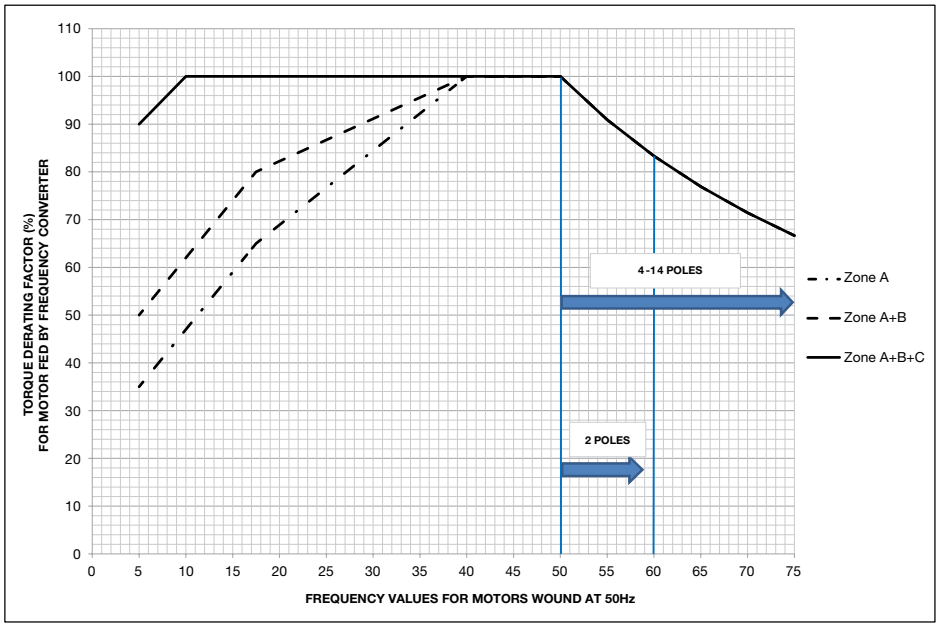
When constant torque is required from low speeds, forced ventilation must be employed.

Generally the motor type can be choosen referring to the following diagram by considering: the torque diagram of the motor, the speed range, the cooling type.




In both cases the resistant torque of the driven machine must be lower than the leading torque of the motor for the total running speed range.
The speed range is set from a minimum frequency $F_{MIN}$ (typically around 5-10 Hz depending on the converter), and a maximum frequency $F_{MAX}$ given by the speed limits of the rotating system and/or the reduction in torque.

| Cooling Method IC 411 | Poles | Frame size |
|---|---|---|
| Zone A + B | 2 – 14 | ≥ 355 |
| Zone A | 6 – 8 | ≤ 315 |
| Zone A + B | 2 – 4 | ≤ 315 |
| **Cooling Method IC 416** | **Poles** | **Frame size** |
| Zone A +B + C | 2 – 14 | ≤ 500 |

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The use of the frequency converter requires some precautions regarding the voltage peaks and wave-fronts. The values of the peaks depend on the supply voltage of the frequency converter and on the motor feeding cable length.
According to different voltage levels, peaks values and features of the insulation are based on the following table.

| Frame Size | Vn ≤ 500 V | | Vn ≤ 690 V | |
|---|---|---|---|---|
| | Peak Voltage Limits | Features | Peak Voltage Limits | Features |
| **160 ÷ 250** | Vpk ≤ 800 V<br>Rise Time ≥ 1 µs | Standard motor | Vpk ≤ 800 V<br>Rise Time ≥ 1 µs | Standard insulation + dU/dt-filter* |
| **280 ÷ 315** | Vpk ≤ 1000 V<br>Rise Time ≥ 1 µs | Enhanced insulation | Vpk ≤ 1000 V<br>Rise Time ≥ 1 µs | Enhanced insulation + dU/dt-filter* |
| **355 ÷ 500** | Vpk ≤ 1350 V<br>Rise Time ≥ 1 µs | Enhanced insulation | Vpk ≤ 2150 V<br>Rise Time ≥ 0,5 µs<br>Vpk ≤ 1900 V<br>Rise Time ≥ 0,2 µs | Superior insulation |

*: The filter depends on the characteristics of the converter and therefore any inquiries should be directed to the converter manufacturer.

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Motors fed by frequency converter can be subject to voltages between the D-end and N-end bearing arrangements. This is due to the effects of the feeding system. The values of the aforementioned voltages depend on the characteristics of the frequency converter and on the dimensions of the motor itself. For motors from 315 frame size or those where the shaft peak voltage exceeds 500mV, MarelliMotori suggest to insulate one of the bearing arrangments of the motor. Normally this solution is applied to the N-end of the motor.

These guidelines, coupled with the correct grounding of the operating system, motor and coupled machine, guarantee the best results.

## MOTORS FOR FORCED VENTILATION

The forced ventilation is available as an optional for specific application.

| Motors for forced ventilation | | | Nominal data | | | |
|---|---|---|---|---|---|---|
| | | | 400V - 50Hz | | 440V - 60Hz | |
| Frame Size | Approx. Δp [kg] | Approx. Δl [mm] | P [W] | In [A] | P [W] | In [A] |
| **160-180M** | 5,3 | 215 | 0,25 | 0,82 | 0,26 | 0,75 |
| **180L-200** | 7,7 | 222 | 0,55 | 1,7 | 0,58 | 1,4 |
| **225-250** | 7,7 | 232 | 0,55 | 1,7 | 0,58 | 1,4 |
| **280** | 7,7 | 248 | 0,55 | 1,7 | 0,58 | 1,4 |
| **315** | 32 | 250 | 0,55 | 1,7 | 0,58 | 1,4 |
| **355** | 60 | 400 | 2,2 | 4,65 | 2,4 | 4,39 |
| **400** | 60 | 400 | 2,2 | 4,65 | 2,4 | 4,39 |
| **450** | 80 | 450 | 3 | 6,57 | 3,3 | 6,32 |
| **500** | 80 | 450 | 4 | 8,08 | 4,4 | 7,8 |

## TOLERANCES FOR ELECTROMECHANICAL CHARACTERISTICS

Tolerances for electromechanical characteristics in accordance with standard IEC 60034-1.

| | |
|---|---|
| **Efficiency η** | -15% of (1 - η) for Pnom ≤ 150 kW<br>-10% of (1 - η) for Pnom > 150 kW |
| **Power factor** | -1/6 (1 - cos φ)<br>Minimum absolute value 0.02<br>Maximum absolute value 0.07 |
| **Slip** | ±20% for Pnom ≥ 1 kW<br>±30% for Pnom < 1 kW |
| **Locked rotor current** | +20% of the current |
| **Locked rotor torque** | -15% +20% of rated torque |
| **Run up torque** | -10% of rated torque<br>$>1,5M_n$ |
| **Breakdown torque** | -10% of the value |
| **Moment of inertia** | ±10% |
| **Noise** | +3 dB (A) |
| **Vibration** | +10% of the guaranteed class |

## ROUTINE, TYPE AND SPECIAL TESTS

Marelli Motori has a state of the art test facility in Arzignano capable of testing motors and generators in their original mounting arrangement (vertical and horizontal).
Testing can be conducted at 50/60 Hz and variable speed as the facility is provided with a large power – high frequency AFE inverter (regenerative).
Testing is carried out in compliance with all major international standards (IEC, IEEE), customer specifications, marine/navy and ATEX rules.

### Routine Test

- Winding insulation resistance test
- Stator winding resist. measurement at cold
- High voltage test
- No-load run test at nominal voltage
- No-load vibration test
- Phase rotation
- Short circuit test
- Auxiliary check
- Visual and dimensional check
- Name plate check

### Type (or Complete) Test

Includes ROUTINE TEST plus the following:

- Locked rotor test
- Full load heat run test
- Load run test at nominal power, voltage and frequency, with measurement of current, power factor efficiency at 4/4 - 3/4 - 1/2

### Special Tests

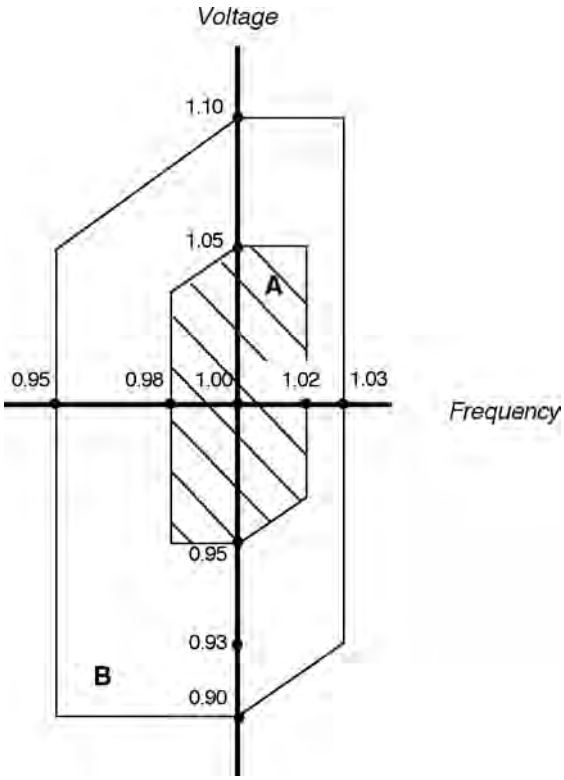
- Measurement of curve C=f(n)
- Measurement of noise level
- Overspeed
- Polarisation index

### High Voltage Diagnosis & Analysing System

- Measurement of dissipation factor Tan δ up to 15 kV
- Surge test - 5 stations up to 5 kV and 1 to 40 kV
- High applied voltage 35 kV
- Partial discharge

## VOLTAGE AND FREQUENCY

The motors described in this catalogue have nominal ratings and performances referred to the nominal voltage mentioned in the main nameplate, according to the Standard IEC 60034-1. This Standard classifies voltage and frequency variations in two different areas A and B as shown in the following figure.




Area A – The motor shall be capable of performing its primary function continuously, but need not comply fully with its performance at rated voltage and frequency and may exhibit some deviations.

Area B – In this area the motor shall be capable of performing its primary function, but may exhibit greater deviations from its performance at rated voltage and frequency than in zone A. Extended operation at the perimeter of zone B is not recommended.

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The motors can be wound for special voltage and frequency values, on request

## DERATINGS

Should the environmental conditions be different from the conditions given by IEC 60034-1 §6 standards (continuous duty S1, at 50 Hz for rated voltage,40°ambient temperature, and an altitude up to 1000 m a.s.l.), the output ratings are obtained by applying the factors as per the following table.

| Altitude [m] a.l.m. | Ambient temperature [°C] | | | | | | |
|---|---|---|---|---|---|---|---|
| | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| 1000 | - | - | 1,00 | 0,95 | 0,92 | 0,88 | 0,83 |
| 1500 | - | 1,00 | 0,97 | 0,92 | 0,90 | 0,85 | 0,82 |
| 2000 | 1,00 | 0,95 | 0,94 | 0,90 | 0,87 | 0,83 | 0,80 |
| 2500 | 0,96 | 0,93 | 0,90 | 0,88 | 0,85 | 0,81 | 0,77 |
| 3000 | 0,92 | 0,90 | 0,86 | 0,85 | 0,82 | 0,78 | 0,75 |
| 3500 | 0,90 | 0,88 | 0,82 | 0,81 | 0,80 | 0,76 | 0,73 |
| 4000 | 0,86 | 0,84 | 0,80 | 0,78 | 0,77 | 0,73 | 0,70 |
| 4500 | 0,82 | 0,80 | 0,76 | 0,74 | 0,72 | 0,70 | 0,67 |
| 5000 | 0,78 | 0,75 | 0,71 | 0,69 | 0,67 | 0,65 | 0,62 |

## THREE PHASE SQUIRREL CAGE - LOW VOLTAGE
## DETERMINATION OF EFFICIENCY ACCORDING TO IEC 60034-2-1 (2007)
## IE2 EFFICIENCY ACCORDING TO IEC 60034-30

Insulation class: F - Temperature rise class: B - Protection degree: IP 55 - Cooling method: IC 411

| RATED OUTPUT | MOTOR TYPE | | PERFORMANCES AT RATED OUTPUTS | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | RATED SPEED | EFFICIENCY η % | | | POWER FACTOR | CURRENT | | TORQUE | | | SOUND PRESSURE LEVEL | MOMENT OF INERTIA | WEIGHT IM 1001 ( IM B3 ) | WEIGHT IM 3011 ( IM V1 ) |
| | | | | FULL LOAD | 3/4 LOAD | 2/4 LOAD | cos φ | In | Is/In | Tn | Ts/Tn | Tmax/Tn | $L_{pa}$ | J | | |
| kW | | | rpm | | | | | A | p.u. | Nm | p.u. | p.u. | dB(A) | kgm2 | kg | kg |
| **2 poles - 400V - 50Hz** | | | | | | | | | | | | | | | | |
| **11** | **A5C** | **160 MA2** | 2925 | 89,5 | 90,3 | 89,0 | 0,86 | 20,6 | 6,6 | 36 | 2,2 | 3,4 | 72 | 0,035 | 95 | 105 |
| **15** | | **160 MB2** | 2920 | 90,4 | 91,1 | 90,6 | 0,85 | 28,2 | 6,4 | 49 | 2,2 | 3,1 | 72 | 0,040 | 105 | 115 |
| **18,5** | | **160 L2** | 2925 | 91,2 | 92,1 | 91,9 | 0,87 | 33,7 | 7,4 | 60 | 2,5 | 3,3 | 72 | 0,048 | 115 | 125 |
| **22** | | **180 M2** | 2950 | 91,5 | 92,0 | 91,4 | 0,90 | 38,6 | 7,0 | 71 | 2,0 | 2,8 | 74 | 0,165 | 140 | 145 |
| **30** | | **200 LA2** | 2950 | 92,4 | 93,0 | 92,2 | 0,89 | 52,7 | 6,4 | 97 | 2,2 | 3,1 | 74 | 0,180 | 179 | 183 |
| **37** | | **200 LB2** | 2940 | 92,6 | 93,2 | 93,0 | 0,90 | 64,1 | 6,9 | 120 | 2,4 | 2,8 | 74 | 0,190 | 186 | 193 |
| **45** | | **225 M2** | 2960 | 93,4 | 92,9 | 92,0 | 0,87 | 79,9 | 7,1 | 146 | 2,5 | 3,3 | 77 | 0,250 | 238 | 247 |
| **55** | | **250 M2** | 2960 | 94,0 | 94,5 | 94,1 | 0,88 | 96,0 | 6,6 | 177 | 2,3 | 3,1 | 77 | 0,290 | 264 | 252 |
| **75** | | **280 S2** | 2960 | 94,1 | 94,5 | 94,2 | 0,90 | 128 | 6,3 | 242 | 2,2 | 2,7 | 80 | 0,416 | 392 | 400 |
| **90** | | **280 M2** | 2960 | 94,4 | 95,0 | 94,8 | 0,91 | 151 | 6,8 | 290 | 2,0 | 2,4 | 80 | 0,550 | 450 | 457 |
| **110** | **B5C** | **315 MA2** | 2975 | 94,6 | 94,4 | 93,7 | 0,88 | 191 | 6,8 | 353 | 2 | 2 | 83 | 0,950 | 740 | 745 |
| **132** | | **315 MB2** | 2980 | 95,0 | 94,8 | 93,3 | 0,85 | 236 | 6,0 | 423 | 1,8 | 1,7 | 83 | 1,12 | 807 | 812 |
| **160** | | **315 MC2** | 2980 | 95,3 | 95,7 | 94,8 | 0,86 | 282 | 6,5 | 513 | 2 | 1,9 | 83 | 1,13 | 855 | 885 |
| **200** | | **315 LA2** | 2980 | 95,5 | 95,3 | 94,0 | 0,85 | 356 | 7,2 | 641 | 2,2 | 2,2 | 83 | 1,60 | 1000 | 1030 |
| **250** | | **355 LA2** | 2980 | 95,5 | 95,3 | 94,5 | 0,89 | 425 | 7,0 | 801 | 2,3 | 2,3 | 82 | 3,7 | 1620 | 1660 |
| **315** | | **355 LB2** | 2980 | 95,6 | 95,7 | 95,2 | 0,90 | 528 | 7,1 | 1009 | 2,2 | 2,2 | 82 | 4,5 | 1810 | 1850 |
| **355** | | **355 LC2** | 2980 | 95,6 | 95,5 | 94,6 | 0,89 | 603 | 7,2 | 1138 | 2,1 | 2,2 | 82 | 5,2 | 2030 | 1980 |
| **400** | | **355 LD2** | 2980 | 96,7 | 95,7 | 93,6 | 0,90 | 663 | 6,5 | 1282 | 2,2 | 2,2 | 82 | 5,9 | 2180 | 2130 |
| **450** | | **355 LE2** | 2980 | 96,7 | 95,7 | 93,6 | 0,90 | 746 | 6,5 | 1442 | 2,4 | 2,3 | 82 | 6,5 | 2310 | 2260 |
| **500** | | **400 LA2** | 2981 | 96,9 | 95,9 | 93,8 | 0,90 | 827 | 5,7 | 1602 | 1,9 | 2,1 | 82 | 8,2 | 2680 | 2650 |
| **560** | | **400 LB2** | 2982 | 97,0 | 96,0 | 93,9 | 0,90 | 926 | 6,1 | 1793 | 1,8 | 2,1 | 82 | 9,1 | 2850 | 2820 |
| **630** | | **400 LC2** | 2983 | 97,2 | 96,2 | 94,1 | 0,90 | 1039 | 7,0 | 2017 | 2,1 | 2,3 | 82 | 10 | 3030 | 3000 |
| **710** [1] | | **450 LA2** | 2987 | 97,4 | 96,4 | 94,3 | 0,91 | 670 [2] | 5,8 | 2270 | 0,5 | 2,9 | 84 [3] | 22 | 4130 | 4095 |
| **800** [1] | | **450 LB2** | 2988 | 97,5 | 96,5 | 94,4 | 0,92 | 746 [2] | 6,3 | 2557 | 0,6 | 3,2 | 84 [3] | 24 | 4450 | 4415 |
| **900** [1] | | **450 LC2** | 2989 | 97,6 | 96,6 | 94,5 | 0,92 | 839 [2] | 6,6 | 2876 | 0,6 | 3,2 | 84 [3] | 27 | 4780 | 4745 |
| **4 poles - 400V - 50Hz** | | | | | | | | | | | | | | | | |
| **11** | **A5C** | **160 M4** | 1470 | 90,3 | 90,4 | 89,1 | 0,81 | 21,7 | 6,5 | 71 | 2,5 | 3,1 | 62 | 0,075 | 115 | 125 |
| **15** | | **160 L4** | 1470 | 90,6 | 90,8 | 90,5 | 0,82 | 29,1 | 6,6 | 97 | 2,5 | 2,7 | 62 | 0,090 | 127 | 137 |
| **18,5** | | **180 M4** | 1465 | 91,3 | 92,0 | 92,2 | 0,87 | 33,6 | 6,0 | 121 | 2,3 | 2,6 | 63 | 0,110 | 143 | 148 |
| **22** | | **180 L4** | 1470 | 92,0 | 92,4 | 91,7 | 0,86 | 40,1 | 6,8 | 143 | 2,5 | 3,0 | 63 | 0,180 | 165 | 169 |
| **30** | | **200 L4** | 1465 | 92,4 | 93,0 | 92,7 | 0,86 | 54,5 | 6,0 | 196 | 2,6 | 2,9 | 63 | 0,220 | 188 | 195 |
| **37** | | **225 S4** | 1480 | 93,1 | 93,3 | 93,0 | 0,86 | 66,7 | 6,4 | 239 | 2,0 | 2,5 | 68 | 0,410 | 247 | 257 |
| **45** | | **225 M4** | 1475 | 93,2 | 93,7 | 93,6 | 0,88 | 79,2 | 6,2 | 291 | 2,0 | 2,4 | 68 | 0,520 | 277 | 287 |
| **55** | | **250 M4** | 1480 | 93,7 | 93,9 | 92,2 | 0,87 | 97,4 | 7,2 | 355 | 2,8 | 2,9 | 68 | 0,580 | 307 | 325 |
| **75** | | **280 S4** | 1480 | 94,3 | 94,8 | 94,6 | 0,90 | 128 | 7,2 | 484 | 2,6 | 2,3 | 75 | 1,060 | 448 | 456 |
| **90** | | **280 M4** | 1480 | 94,5 | 95,9 | 94,8 | 0,89 | 154 | 6,9 | 581 | 2,5 | 2,5 | 75 | 1,150 | 472 | 479 |
| **110** | **B5C** | **315 MA4** | 1485 | 94,7 | 94,8 | 94,3 | 0,85 | 197 | 6,0 | 707 | 1,9 | 2,0 | 78 | 2,1 | 740 | 750 |
| **132** | | **315 MB4** | 1490 | 95,2 | 95,3 | 94,6 | 0,85 | 235 | 6,5 | 846 | 2,2 | 2,0 | 78 | 2,5 | 821 | 830 |
| **160** | | **315 MC4** | 1490 | 95,6 | 95,6 | 94,8 | 0,85 | 284 | 6,4 | 1025 | 2,1 | 2,0 | 78 | 3,1 | 940 | 967 |
| **200** | | **315 LA4** | 1490 | 95,8 | 95,8 | 95,5 | 0,85 | 354 | 6,5 | 1282 | 2,3 | 2,0 | 78 | 3,4 | 1010 | 1040 |
| **250** | | **355 LA4** | 1490 | 95,7 | 95,5 | 94,4 | 0,86 | 438 | 6,2 | 1602 | 1,9 | 2,4 | 79 | 6,1 | 1690 | 1730 |
| **315** | | **355 LB4** | 1490 | 95,7 | 95,4 | 94,2 | 0,86 | 552 | 6,2 | 2019 | 2,0 | 2,4 | 79 | 7,4 | 1880 | 1920 |
| **355** | | **355 LC4** | 1490 | 95,8 | 95,6 | 94,7 | 0,86 | 622 | 6,2 | 2275 | 1,9 | 2,3 | 79 | 8,3 | 2100 | 2140 |
| **400** | | **355 LD4** | 1490 | 96,0 | 95,0 | 92,9 | 0,86 | 699 | 5,6 | 2564 | 2,0 | 2,5 | 79 | 9,4 | 2250 | 2200 |
| **450** | | **355 LE4** | 1490 | 96,3 | 95,3 | 93,2 | 0,87 | 775 | 5,6 | 2884 | 2,0 | 2,4 | 79 | 10,2 | 2360 | 2310 |
| **500** | | **355 LF4** | 1490 | 96,4 | 95,4 | 93,3 | 0,90 | 832 | 5,9 | 3205 | 1,3 | 2,9 | 79 | 11,2 | 2430 | 2380 |
| **560** | | **400 LA4** | 1489 | 96,7 | 95,7 | 93,6 | 0,87 | 961 | 5,9 | 3592 | 2,1 | 2,4 | 81 | 11,4 | 2700 | 2670 |
| **630** | | **400 LB4** | 1489 | 96,8 | 95,8 | 93,7 | 0,87 | 1080 | 5,9 | 4041 | 2,1 | 2,5 | 81 | 13 | 2900 | 2870 |
| **710** | | **400 LC4** | 1490 | 96,9 | 95,9 | 93,8 | 0,87 | 1216 | 6,7 | 4551 | 1,0 | 2,6 | 81 | 18 | 3100 | 3070 |
| **800** | | **450 LA4** | 1492 | 97,2 | 96,2 | 94,1 | 0,89 | 774 [2] | 6,0 | 5121 | 1,0 | 2,8 | 83 | 29 | 4250 | 4215 |
| **900** | | **450 LB4** | 1493 | 97,3 | 96,3 | 94,2 | 0,89 | 870 [2] | 6,3 | 5757 | 1,1 | 2,9 | 83 | 33 | 4530 | 4495 |
| **1000** | | **450 LC4** | 1493 | 97,4 | 96,4 | 94,3 | 0,89 | 965 [2] | 6,1 | 6397 | 1,1 | 2,9 | 83 | 37 | 4860 | 4825 |
| **1250** | | **500 LA4** | 1493 | 97,6 | 96,6 | 94,5 | 0,89 | 1204 [2] | 4,7 | 7996 | 0,6 | 2,2 | 85 | 47 | 6200 | 6090 |
| **1400** | | **500 LB4** | 1493 | 97,7 | 96,7 | 94,6 | 0,89 | 1347 [2] | 5,0 | 8955 | 0,7 | 2,4 | 85 | 53 | 6620 | 6510 |
| **1600** [1] | | **500 LC4** | 1494 | 97,8 | 96,8 | 94,7 | 0,89 | 1538 [2] | 5,2 | 10228 | 0,7 | 2,5 | 85 | 60 | 7140 | 7030 |

1) Temperature rise class F

2) Current at 690V - 50Hz

3) Unidirectional fan

2 poles 500 size motors are available on request.

## THREE PHASE SQUIRREL CAGE - LOW VOLTAGE
## DETERMINATION OF EFFICIENCY ACCORDING TO IEC 60034-2-1 (2007)
## IE2 EFFICIENCY ACCORDING TO IEC 60034-30

Insulation class: F - Temperature rise class: B - Protection degree: IP 55 - Cooling method: IC 411

| RATED OUTPUT | MOTOR TYPE | | PERFORMANCES AT RATED OUTPUTS | | | | | | | | | | | SOUND PRESSURE LEVEL | MOMENT OF INERTIA | WEIGHT IM 1001 ( IM B3 ) | WEIGHT IM 3011 ( IM V1 ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | RATED SPEED | EFFICIENCY η % | | | POWER FACTOR | CURRENT | | TORQUE | | | | | | | |
| | | | | FULL LOAD | 3/4 LOAD | 2/4 LOAD | cos φ | In | Is/In | Tn | Ts/Tn | Tmax/Tn | | | | | |
| kW | | | rpm | | | | | A | p.u. | Nm | p.u. | p.u. | | $L_{pa}$ dB(A) | J kgm2 | kg | kg |
| **6 poles - 400V - 50Hz** | | | | | | | | | | | | | | | | | |
| **7,5** | **A5C** | **160 M6** | 975 | 88,7 | 89,2 | 88,3 | 0,80 | 15,3 | 7,3 | 73 | 2,5 | 3,4 | 62 | 0,110 | 103 | 113 |
| **11** | | **160 L6** | 970 | 89,0 | 90,1 | 89,9 | 0,80 | 22,3 | 7,0 | 108 | 2,5 | 3,1 | 62 | 0,150 | 114 | 124 |
| **15** | | **180 L6** | 975 | 90,0 | 90,5 | 90,8 | 0,84 | 28,6 | 6,9 | 147 | 2,3 | 2,6 | 63 | 0,214 | 152 | 156 |
| **18,5** | | **200 LA6** | 975 | 90,8 | 92,0 | 91,5 | 0,83 | 35,4 | 6,8 | 181 | 2,4 | 2,9 | 63 | 0,260 | 179 | 183 |
| **22** | | **200 LB6** | 975 | 91,0 | 92,3 | 92,6 | 0,83 | 42,0 | 6,6 | 215 | 2,3 | 2,8 | 63 | 0,280 | 192 | 199 |
| **30** | | **225 M6** | 980 | 91,9 | 93,0 | 93,3 | 0,84 | 56,1 | 7,3 | 292 | 2,2 | 2,9 | 66 | 0,580 | 250 | 258 |
| **37** | | **250 M6** | 980 | 92,3 | 93,5 | 93,0 | 0,82 | 70,6 | 6,9 | 360 | 2,6 | 2,7 | 66 | 0,740 | 304 | 325 |
| **45** | | **280 S6** | 985 | 92,9 | 93,2 | 92,7 | 0,84 | 83,2 | 6,7 | 436 | 2,3 | 2,4 | 72 | 1,150 | 383 | 392 |
| **55** | | **280 M6** | 985 | 93,3 | 93,7 | 93,2 | 0,84 | 101 | 6,8 | 533 | 2,4 | 2,4 | 72 | 1,380 | 424 | 432 |
| **75** | **B5C** | **315 MA6** | 990 | 93,9 | 94,0 | 92,0 | 0,87 | 132 | 7,0 | 723 | 2,4 | 2,3 | 74 | 3,4 | 782 | 795 |
| **90** | | **315 MB6** | 990 | 94,2 | 94,8 | 94,3 | 0,85 | 162 | 7,2 | 868 | 2,7 | 2,3 | 74 | 4,1 | 852 | 865 |
| **110** | | **315 MC6** | 990 | 94,4 | 94,6 | 94,0 | 0,87 | 193 | 6,8 | 1061 | 2,4 | 2,1 | 74 | 4,7 | 968 | 980 |
| **132** | | **315 LA6** | 990 | 94,8 | 95,0 | 94,7 | 0,86 | 234 | 6,9 | 1273 | 2,6 | 2,1 | 74 | 6,0 | 1130 | 1160 |
| **160** | | **315 LB6** | 990 | 95,0 | 95,3 | 94,9 | 0,86 | 283 | 7,2 | 1543 | 2,6 | 2,2 | 74 | 6,7 | 1220 | 1250 |
| **200** | | **355 LA6** | 990 | 95,3 | 95,0 | 93,8 | 0,85 | 356 | 6,0 | 1929 | 2,1 | 2,1 | 75 | 10,5 | 1160 | 1200 |
| **250** | | **355 LB6** | 990 | 95,5 | 95,3 | 94,2 | 0,85 | 444 | 6,0 | 2411 | 2,1 | 2,1 | 75 | 13,1 | 1890 | 1930 |
| **315** | | **355 LC6** | 990 | 95,5 | 95,6 | 94,9 | 0,86 | 554 | 6,3 | 3038 | 2,3 | 2,3 | 75 | 17,0 | 2315 | 2355 |
| **355** | | **355 LD6** | 990 | 95,6 | 95,4 | 94,4 | 0,87 | 616 | 6,5 | 3424 | 2,3 | 2,4 | 75 | 18,6 | 2390 | 2430 |
| **400** | | **400 LA6** | 992 | 96,2 | 95,2 | 93,1 | 0,84 | 714 | 6,2 | 3851 | 1,6 | 2,6 | 76 | 17,50 | 2680 | 2650 |
| **450** | | **400 LB6** | 992 | 96,4 | 95,4 | 93,3 | 0,85 | 793 | 6,5 | 4332 | 1,7 | 2,6 | 76 | 19,50 | 2850 | 2820 |
| **500** | | **400 LC6** | 993 | 96,5 | 95,5 | 93,4 | 0,84 | 890 | 6,9 | 4809 | 1,8 | 2,7 | 76 | 22,00 | 3070 | 3040 |
| **560** | | **400 LD6** | 994 | 96,5 | 95,5 | 93,4 | 0,87 | 963 | 6,2 | 5380 | 1,5 | 2,7 | 76 | 30,00 | 3200 | 3170 |
| **630** | | **450 LA6** | 994 | 96,7 | 95,7 | 93,6 | 0,85 | 1106 | 5,6 | 6053 | 1,1 | 2,6 | 79 | 41,00 | 4300 | 4265 |
| **710** | | **450 LB6** | 994 | 97,0 | 96,0 | 93,9 | 0,85 | 1243 | 5,9 | 6821 | 1,1 | 2,7 | 79 | 46,00 | 4600 | 4565 |
| **800** [1] | | **450 LC6** | 994 | 97,1 | 96,1 | 94,0 | 0,85 | 1399 | 5,6 | 7686 | 1,1 | 2,6 | 79 | 51,00 | 4950 | 4915 |
| **950** | | **500 LA6** | 995 | 97,2 | 96,2 | 94,1 | 0,86 | 951 [2] | 4,7 | 9118 | 0,7 | 2,2 | 82 | 71,00 | 6000 | 5890 |
| **1100** | | **500 LB6** | 995 | 97,3 | 96,3 | 94,2 | 0,87 | 1087 [2] | 4,8 | 10558 | 0,7 | 2,3 | 82 | 82,00 | 6570 | 6460 |
| **1300** [1] | | **500 LC6** | 995 | 97,5 | 96,5 | 94,4 | 0,87 | 1282 | 5,0 | 12477 | 0,9 | 2,3 | 82 | 97,00 | 7300 | 7190 |
| **8 poles - 400V - 50Hz** | | | | | | | | | | | | | | | | | |
| **4** | **A5C** | **160 MA8** | 720 | 81,5 | 80,6 | 80,0 | 0,73 | 9,7 | 4,2 | 53 | 1,9 | 2,1 | 61 | 0,080 | 78 | 88 |
| **5,5** | | **160 MB8** | 720 | 82,4 | 81,5 | 80,8 | 0,77 | 12,5 | 4,2 | 73 | 1,9 | 2,1 | 61 | 0,092 | 87 | 97 |
| **7,5** | | **160 L8** | 720 | 84,7 | 84,3 | 83,2 | 0,77 | 16,6 | 4,2 | 99 | 2,0 | 2,1 | 61 | 0,110 | 98 | 106 |
| **11** | | **180 L8** | 725 | 86,7 | 87,1 | 85,6 | 0,74 | 24,7 | 4,5 | 145 | 2,0 | 2,2 | 62 | 0,160 | 134 | 139 |
| **15** | | **200 L8** | 725 | 87,1 | 87,5 | 86,1 | 0,74 | 33,6 | 5,0 | 198 | 2,1 | 2,3 | 62 | 0,220 | 174 | 182 |
| **18,5** | | **225 S8** | 725 | 88,0 | 88,0 | 85,5 | 0,76 | 39,9 | 5,2 | 244 | 2,2 | 2,4 | 63 | 0,420 | 222 | 231 |
| **22** | | **225 M8** | 730 | 88,9 | 88,4 | 86,0 | 0,74 | 48,3 | 5,3 | 288 | 2,2 | 2,4 | 63 | 0,520 | 230 | 240 |
| **30** | | **250 M8** | 730 | 90,8 | 90,4 | 87,5 | 0,74 | 64,4 | 5,5 | 392 | 2,3 | 2,5 | 63 | 0,620 | 278 | 296 |
| **37** | | **280 S8** | 735 | 92,2 | 92,6 | 90,4 | 0,79 | 73,3 | 6,0 | 481 | 2,5 | 2,5 | 72 | 1,050 | 345 | 352 |
| **45** | | **280 M8** | 735 | 92,6 | 93,1 | 91,0 | 0,79 | 88,8 | 6,0 | 585 | 2,5 | 2,5 | 72 | 1,250 | 402 | 410 |
| **55** | | **315 S8** | 735 | 93,0 | 92,9 | 91,1 | 0,81 | 105 | 5,8 | 714 | 2,0 | 2,2 | 72 | 1,6 | 459 | 468 |
| **75** | **B5C** | **315 MA8** | 735 | 93,8 | 94,1 | 92,0 | 0,81 | 142 | 6,0 | 974 | 2,1 | 2,2 | 74 | 2,8 | 735 | 755 |
| **90** | | **315 MB8** | 735 | 94,4 | 94,3 | 92,8 | 0,83 | 166 | 6,2 | 1169 | 2,2 | 2,3 | 74 | 3,5 | 815 | 835 |
| **110** | | **315 MC8** | 735 | 94,5 | 94,4 | 93,0 | 0,83 | 202 | 6,2 | 1429 | 2,2 | 2,3 | 74 | 4,0 | 883 | 910 |
| **132** | | **315 MD8** | 735 | 94,6 | 94,6 | 93,1 | 0,83 | 243 | 6,2 | 1715 | 2,2 | 2,3 | 74 | 4,3 | 952 | 975 |
| **160** | **B5C** | **355 LA8** | 740 | 95,3 | 94,3 | 92,2 | 0,83 | 292 | 5,2 | 2065 | 2,2 | 2,2 | 70 | 12,7 | 1710 | 1635 |
| **200** | | **355 LB8** | 740 | 95,4 | 94,4 | 92,3 | 0,83 | 365 | 5,0 | 2581 | 2,1 | 2,2 | 70 | 15,4 | 1910 | 1835 |
| **250** | | **355 LC8** | 740 | 95,7 | 94,7 | 92,6 | 0,83 | 454 | 5,2 | 3226 | 2,1 | 2,1 | 70 | 18,8 | 2240 | 2190 |
| **315** | | **355 LD8** | 740 | 95,7 | 94,7 | 92,6 | 0,83 | 572 | 5,4 | 4065 | 1,6 | 2,7 | 70 | 21,4 | 2390 | 2340 |
| **355** | | **400 LA8** | 743 | 95,7 | 94,7 | 92,6 | 0,82 | 653 | 5,4 | 4563 | 1,4 | 2,4 | 73 | 26 | 2850 | 2820 |
| **400** | | **400 LB8** | 743 | 95,9 | 94,9 | 92,8 | 0,82 | 734 | 5,6 | 5141 | 1,4 | 2,4 | 73 | 30 | 3070 | 3040 |
| **450** | | **400 LC8** | 743 | 96,0 | 95,0 | 92,9 | 0,82 | 825 | 5,2 | 5784 | 1,3 | 2,3 | 73 | 33 | 3230 | 3200 |
| **500** | | **450 LA8** | 745 | 96,5 | 95,5 | 93,4 | 0,84 | 890 | 4,8 | 6409 | 1,0 | 2,1 | 76 | 55 | 4350 | 4315 |
| **560** | | **450 LB8** | 745 | 96,6 | 95,6 | 93,5 | 0,85 | 984 | 4,7 | 7179 | 1,0 | 2,1 | 76 | 61 | 4620 | 4585 |
| **630** | | **450 LC8** | 745 | 96,7 | 95,7 | 93,6 | 0,85 | 1106 | 4,7 | 8076 | 1,0 | 2,1 | 76 | 69 | 5020 | 4985 |
| **710** | | **500 LA8** | 745 | 97,0 | 96,0 | 93,9 | 0,85 | 721 [2] | 4,7 | 9101 | 0,7 | 2,3 | 80 | 95 | 6180 | 6070 |
| **800** | | **500 LB8** | 745 | 97,1 | 96,1 | 94,0 | 0,86 | 802 [2] | 4,7 | 10255 | 0,7 | 2,3 | 80 | 110 | 6750 | 6640 |
| **900** [1] | | **500 LC8** | 746 | 97,2 | 96,2 | 94,1 | 0,86 | 901 [2] | 5,0 | 11521 | 0,9 | 2,3 | 80 | 122 | 7230 | 7120 |

1) Temperature rise class F

2) Current at 690V - 50Hz

## THREE PHASE SQUIRREL CAGE - LOW VOLTAGE
## DETERMINATION OF EFFICIENCY ACCORDING TO IEC 60034-2-1 (2007)
## IE2 EFFICIENCY ACCORDING TO IEC 60034-30

Insulation class: F - Temperature rise class: B - Protection degree: IP 55 - Cooling method: IC 411

| RATED OUTPUT | MOTOR TYPE | | PERFORMANCES AT RATED OUTPUTS | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | RATED SPEED | EFFICIENCY η % | | | POWER FACTOR | CURRENT | | TORQUE | | | SOUND PRESSURE LEVEL | MOMENT OF INERTIA | WEIGHT IM 1001 ( IM B3 ) | WEIGHT IM 3011 ( IM V1 ) |
| | | | | FULL LOAD | 3/4 LOAD | 2/4 LOAD | cos φ | In | Is/In | Tn | Ts/Tn | Tmax/Tn | $L_{pa}$ | J | | |
| kW | | | rpm | | | | | A | p.u. | Nm | p.u. | p.u. | dB(A) | kgm2 | kg | kg |
| **10 poles - 400V - 50Hz** | | | | | | | | | | | | | | | | |
| **55** | **B5C** | **315 MA10** | 590 | 92,0 | 91,9 | 90,1 | 0,78 | 111 | 5,0 | 890 | 1,4 | 2,6 | 74 | 4 | 735 | 755 |
| **75** | | **315 MB10** | 590 | 92,0 | 92,1 | 90,0 | 0,79 | 149 | 4,8 | 1214 | 1,2 | 2,5 | 74 | 5 | 815 | 835 |
| **90** | | **315 MC10** | 590 | 93,0 | 93,0 | 91,0 | 0,79 | 177 | 4,5 | 1456 | 1,1 | 2,3 | 74 | 5 | 883 | 910 |
| **125** | **B5C** | **355 LA10** | 591 | 93,3 | 92,3 | 90,2 | 0,78 | 248 | 4,1 | 2020 | 1,1 | 2,5 | 70 | 11 | 1660 | 1585 |
| **150** | | **355 LB10** | 591 | 93,6 | 92,6 | 90,5 | 0,78 | 297 | 4,2 | 2424 | 1,1 | 2,5 | 70 | 14 | 1890 | 1815 |
| **180** | | **355 LC10** | 591 | 93,9 | 92,9 | 90,8 | 0,77 | 359 | 4,6 | 2909 | 1,2 | 2,6 | 70 | 17 | 2315 | 2265 |
| **200** | | **355 LD10** | 592 | 94,1 | 93,1 | 91,0 | 0,78 | 393 | 4,3 | 3226 | 1,1 | 2,5 | 70 | 18 | 2390 | 2340 |
| **250** | | **400 LA10** | 593 | 95,0 | 94,0 | 91,9 | 0,78 | 487 | 4,3 | 4026 | 1,2 | 2,4 | 73 | 23 | 2680 | 2650 |
| **280** | | **400 LB10** | 593 | 95,2 | 94,2 | 92,1 | 0,78 | 544 | 4,6 | 4509 | 1,3 | 2,5 | 73 | 27 | 2850 | 2820 |
| **315** | | **400 LC10** | 593 | 95,3 | 94,3 | 92,2 | 0,78 | 612 | 4,6 | 5073 | 1,3 | 2,5 | 73 | 32 | 3070 | 3040 |
| **380** | | **450 LA10** | 595 | 95,6 | 94,6 | 92,5 | 0,80 | 717 | 4,5 | 6099 | 0,9 | 2,3 | 75 | 64 | 4300 | 4265 |
| **420** | | **450 LB10** | 595 | 95,7 | 94,7 | 92,6 | 0,80 | 792 | 4,5 | 6741 | 0,9 | 2,3 | 75 | 71 | 4600 | 4565 |
| **480** | | **450 LC10** | 595 | 95,9 | 94,9 | 92,8 | 0,80 | 903 | 4,5 | 7704 | 0,9 | 2,3 | 75 | 80 | 4950 | 4915 |
| **550** | | **500 LA10** | 595 | 96,3 | 95,3 | 93,2 | 0,81 | 1018 | 4,7 | 8828 | 0,9 | 2,4 | 78 | 98 | 6100 | 5990 |
| **620** | | **500 LB10** | 595 | 96,5 | 95,5 | 93,4 | 0,82 | 1131 | 4,5 | 9951 | 0,7 | 2,3 | 78 | 111 | 6580 | 6470 |
| **700** | | **500 LC10** | 596 | 96,6 | 95,6 | 93,5 | 0,82 | 1275 | 4,8 | 11216 | 0,9 | 2,5 | 78 | 126 | 7140 | 7030 |
| **12 poles - 400V - 50Hz** | | | | | | | | | | | | | | | | |
| **45** | | **315 MA12** | 490 | 91,0 | 90,7 | 88,8 | 0,76 | 94 | 4,8 | 877 | 1,5 | 2,4 | 74 | 4 | 735 | 755 |
| **55** | | **315 MB12** | 490 | 92,0 | 92,0 | 89,8 | 0,77 | 112 | 5,2 | 1072 | 1,4 | 2,5 | 74 | 5 | 815 | 835 |
| **75** | | **315 MC12** | 490 | 92,0 | 92,0 | 90,0 | 0,77 | 153 | 4,3 | 1461 | 1,2 | 2,1 | 74 | 5 | 883 | 910 |
| **90** | **B5C** | **355 LA12** | 492 | 92,2 | 91,2 | 89,1 | 0,74 | 190 | 4,5 | 1747 | 1,4 | 2,4 | 70 | 11 | 1660 | 1585 |
| **110** | **B5C** | **355 LB12** | 492 | 92,8 | 91,8 | 89,7 | 0,75 | 228 | 4,5 | 2135 | 1,4 | 2,5 | 70 | 14 | 1890 | 1815 |
| **132** | | **355 LC12** | 493 | 93,2 | 92,2 | 90,1 | 0,75 | 273 | 4,8 | 2557 | 1,5 | 2,5 | 70 | 17 | 2315 | 2265 |
| **150** | | **355 LD12** | 493 | 93,4 | 92,4 | 90,3 | 0,75 | 309 | 4,7 | 2906 | 1,5 | 2,6 | 70 | 18 | 2390 | 2340 |
| **180** | | **400 LA12** | 494 | 94,1 | 93,1 | 91,0 | 0,73 | 378 | 4,7 | 3480 | 1,5 | 2,5 | 73 | 28 | 2680 | 2650 |
| **200** | | **400 LB12** | 495 | 94,2 | 93,2 | 91,1 | 0,73 | 420 | 5,0 | 3859 | 1,6 | 2,6 | 73 | 32 | 2850 | 2820 |
| **225** | | **400 LC12** | 495 | 94,4 | 93,4 | 91,3 | 0,73 | 471 | 4,9 | 4341 | 1,6 | 2,6 | 73 | 34 | 3070 | 3040 |
| **280** | | **450 LA12** | 496 | 95,5 | 94,5 | 92,4 | 0,78 | 543 | 5,1 | 5391 | 1,1 | 2,5 | 75 | 73 | 4300 | 4265 |
| **315** | | **450 LB12** | 496 | 95,6 | 94,6 | 92,5 | 0,78 | 610 | 5,0 | 6065 | 1,1 | 2,5 | 75 | 81 | 4600 | 4565 |
| **355** | | **450 LC12** | 496 | 94,7 | 93,7 | 91,6 | 0,78 | 694 | 4,8 | 6835 | 1,0 | 2,5 | 75 | 91 | 4950 | 4915 |
| **400** | | **500 LA12** | 496 | 95,9 | 94,9 | 92,8 | 0,78 | 772 | 4,1 | 7702 | 0,6 | 2,4 | 78 | 101 | 6100 | 5990 |
| **480** | | **500 LB12** | 496 | 96,1 | 95,1 | 93,0 | 0,80 | 901 | 4,0 | 9242 | 0,6 | 2,3 | 78 | 122 | 6580 | 6470 |
| **550** | | **500 LC12** | 496 | 96,2 | 95,2 | 93,1 | 0,80 | 1032 | 4,0 | 10590 | 0,6 | 2,2 | 78 | 138 | 7140 | 7030 |
| **14 poles - 400V - 50Hz** | | | | | | | | | | | | | | | | |
| **75** | **B5C** | **355 LA14** | 419 | 93,1 | 92,1 | 90,0 | 0,82 | 142 | 4,5 | 1709 | 1,4 | 2,4 | 68 | 11 | 1675 | 1600 |
| **90** | | **355 LB14** | 419 | 93,1 | 92,1 | 90,0 | 0,82 | 170 | 4,5 | 2051 | 1,4 | 2,5 | 68 | 14 | 1900 | 1825 |
| **115** | | **355 LC14** | 419 | 93,1 | 92,1 | 90,0 | 0,81 | 220 | 4,8 | 2621 | 1,5 | 2,5 | 68 | 17 | 2340 | 2290 |
| **130** | | **355 LD14** | 419 | 93,2 | 92,2 | 90,1 | 0,81 | 249 | 4,7 | 2963 | 1,5 | 2,6 | 68 | 18 | 2410 | 2360 |
| **150** | | **400 LA14** | 424 | 94,0 | 93,0 | 90,9 | 0,81 | 284 | 4,7 | 3379 | 1,5 | 2,5 | 71 | 28 | 2700 | 2670 |
| **170** | | **400 LB14** | 424 | 94,1 | 93,1 | 91,0 | 0,81 | 322 | 5,0 | 3829 | 1,6 | 2,6 | 71 | 32 | 2870 | 2840 |
| **190** | | **400 LC14** | 423 | 94,1 | 93,1 | 91,0 | 0,81 | 360 | 4,9 | 4290 | 1,6 | 2,6 | 71 | 34 | 3100 | 3070 |
| **210** | | **450 LA14** | 425 | 94,6 | 93,6 | 91,5 | 0,80 | 401 | 5,1 | 4719 | 1,1 | 2,5 | 73 | 73 | 4330 | 4295 |
| **240** | | **450 LB14** | 424 | 94,6 | 93,6 | 91,5 | 0,80 | 458 | 5,0 | 5406 | 1,1 | 2,5 | 73 | 81 | 4650 | 4615 |
| **280** | | **450 LC14** | 424 | 94,7 | 93,7 | 91,6 | 0,80 | 533 | 4,8 | 6307 | 1,0 | 2,5 | 73 | 91 | 4990 | 4955 |
| **330** | | **500 LA14** | 425 | 95,0 | 94,0 | 91,9 | 0,81 | 619 | 4,1 | 7415 | 0,6 | 2,4 | 76 | 101 | 6150 | 6040 |
| **420** | | **500 LB14** | 425 | 95,1 | 94,1 | 92,0 | 0,81 | 787 | 4,0 | 9438 | 0,6 | 2,3 | 76 | 122 | 6630 | 6520 |
| **480** | | **500 LC14** | 424 | 95,0 | 94,0 | 91,9 | 0,80 | 912 | 4,0 | 10811 | 0,6 | 2,2 | 76 | 138 | 7200 | 7090 |

## THREE PHASE SQUIRREL CAGE - LOW VOLTAGE
## DOUBLE SPEED MOTORS
## DETERMINATION OF EFFICIENCY ACCORDING TO IEC 60034-2-1 (2007)

Insulation class: F - Temperature rise class: B - Protection degree: IP 55 - Cooling method: IC 411

| RATED OUTPUT | | MOTOR TYPE | | PERFORMANCES AT RATED OUTPUTS | | | | | | | | | | | | | | | | MOMENT OF INERTIA | WEIGHT IM 1001 (IM B3) | WEIGHT IM 3011 (IM V1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | RATED SPEED | | EFFICIENCY | | POWER FACTOR | | CURRENT | | | | TORQUE | | | | | | | | |
| kW | | | | rpm | | η % | | cos φ | | In A | | Is/In p.u. | | Tn Nm | | Ts/Tn p.u. | | Tmax/Tn p.u. | | J kgm² | kg | kg |
| **2/4 poles - 400V - 50Hz - Single winding** | | | | | | | | | | | | | | | | | | | | | | |
| **11** | **2,3** | **A4D** | **160 M2/4** | 2880 | 1445 | 83 | 66 | 0,85 | 0,68 | 22,5 | 7,4 | 5,5 | 7,2 | 36 | 15 | 1,8 | 2,2 | 2,1 | 2,6 | 0,062 | 72 | 82 |
| **14** | **3** | | **160 L2/4** | 2890 | 1450 | 84 | 67 | 0,85 | 0,68 | 28,3 | 9,5 | 6,0 | 8,0 | 46 | 20 | 2,0 | 2,5 | 2,3 | 2,9 | 0,075 | 85 | 95 |
| **18,5** | **4** | | **180 M2/4** | 2900 | 1455 | 85 | 67 | 0,86 | 0,68 | 36,5 | 12,7 | 6,0 | 8,0 | 61 | 26 | 2,0 | 2,6 | 2,3 | 3,0 | 0,09 | 108 | 118 |
| **22** | **4,6** | | **180 LA2/4** | 2920 | 1460 | 86 | 70 | 0,87 | 0,70 | 42,4 | 13,6 | 6,5 | 8,0 | 72 | 30 | 2,0 | 2,5 | 2,3 | 2,8 | 0,11 | 144 | 154 |
| **25** | **5,5** | | **180 LB2/4** | 2920 | 1460 | 87 | 71 | 0,87 | 0,70 | 47,7 | 16,0 | 6,5 | 7,6 | 82 | 36 | 2,2 | 2,4 | 2,6 | 2,6 | 0,15 | 155 | 165 |
| **30** | **6,5** | | **200 L2/4** | 2920 | 1465 | 88 | 72 | 0,88 | 0,72 | 55,9 | 18,1 | 7,0 | 8,7 | 98 | 42 | 2,2 | 2,3 | 2,6 | 2,5 | 0,19 | 168 | 180 |
| **37** | **8,5** | | **225 S2/4** | 2930 | 1470 | 88 | 72 | 0,88 | 0,72 | 69,0 | 23,7 | 7,5 | 7,9 | 121 | 55 | 2,2 | 2,3 | 2,8 | 2,4 | 0,37 | 207 | 216 |
| **45** | **11** | | **225 M2/4** | 2930 | 1475 | 89 | 73 | 0,88 | 0,72 | 82,9 | 30,2 | 7,5 | 7,3 | 147 | 71 | 2,2 | 2,1 | 2,8 | 2,2 | 0,4 | 225 | 234 |
| **55** | **14** | | **250 M2/4** | 2930 | 1475 | 89 | 74 | 0,88 | 0,72 | 101 | 37,9 | 7,5 | 7,0 | 179 | 91 | 2,0 | 2 | 2,8 | 2,1 | 0,5 | 238 | 250 |
| **70** | **18** | | **280 S2/4** | 2940 | 1480 | 90 | 76 | 0,87 | 0,74 | 129 | 46,2 | 7,0 | 6,9 | 227 | 116 | 2,0 | 2,1 | 2,4 | 2,1 | 0,91 | 370 | 380 |
| **80** | **21** | | **280 M2/4** | 2940 | 1480 | 91 | 77 | 0,87 | 0,74 | 146 | 53,2 | 7,2 | 7,2 | 260 | 135 | 2,0 | 2,1 | 2,4 | 2,2 | 1,05 | 435 | 445 |
| **95** | **27** | | **315 S2/4** | 2940 | 1485 | 91 | 78 | 0,88 | 0,75 | 172 | 66,6 | 7,2 | 6,4 | 309 | 174 | 2,0 | 1,9 | 2,3 | 1,9 | 1,15 | 465 | 475 |
| **110** | **30** | **B4D** | **315 MA2/4** | 2945 | 1485 | 90 | 80 | 0,89 | 0,77 | 198 | 70,3 | 7,5 | 6,9 | 357 | 193 | 2,2 | 2,2 | 2,4 | 2,2 | 2,1 | 740 | 770 |
| **130** | **35** | | **315 MC2/4** | 2945 | 1485 | 91 | 82 | 0,90 | 0,77 | 229 | 80,0 | 7,5 | 7,1 | 421 | 225 | 2,2 | 2,2 | 2,4 | 2,2 | 2,5 | 815 | 845 |
| **160** | **45** | | **315 MD2/4** | 2945 | 1485 | 92 | 84 | 0,90 | 0,77 | 279 | 100 | 7,5 | 6,6 | 519 | 289 | 2,2 | 2,2 | 2,4 | 2,1 | 3,1 | 920 | 950 |
| **4/6 poles - 400V - 50Hz - Separate winding** | | | | | | | | | | | | | | | | | | | | | | |
| **7** | **2,4** | **A4D** | **160 M4/6** | 1470 | 984 | 83 | 73 | 0,75 | 0,49 | 16,2 | 9,7 | 5,9 | 4,6 | 45 | 23 | 2,0 | 1,8 | 2,6 | 1,8 | 0,063 | 74 | 84 |
| **10** | **3,3** | | **160 L4/6** | 1475 | 984 | 85 | 78 | 0,75 | 0,49 | 22,6 | 12,5 | 6,4 | 5,1 | 65 | 32 | 2,2 | 1,9 | 2,8 | 1,9 | 0,075 | 88 | 98 |
| **12** | **4** | | **180 M4/6** | 1475 | 985 | 86 | 79 | 0,75 | 0,51 | 26,8 | 14,3 | 6,6 | 5,2 | 78 | 39 | 2,4 | 2 | 2,9 | 2,0 | 0,09 | 100 | 110 |
| **15** | **5** | | **180 LA4/6** | 1455 | 985 | 80 | 76 | 0,88 | 0,71 | 30,7 | 13,3 | 4,2 | 5,0 | 98 | 48 | 1,4 | 1,7 | 2 | 1,7 | 0,13 | 110 | 120 |
| **18** | **6** | | **200 LA4/6** | 1460 | 984 | 82 | 77 | 0,87 | 0,71 | 36,2 | 15,8 | 4,5 | 5,0 | 118 | 58 | 1,6 | 1,8 | 2,2 | 1,8 | 0,17 | 125 | 137 |
| **23** | **7,5** | | **200 LB4/6** | 1465 | 985 | 85 | 79 | 0,87 | 0,71 | 44,8 | 19,2 | 5,4 | 5,4 | 150 | 73 | 1,9 | 1,9 | 2,5 | 1,9 | 0,22 | 145 | 157 |
| **31** | **10,5** | | **225 S4/6** | 1460 | 985 | 86 | 84 | 0,84 | 0,85 | 61,9 | 21,4 | 5,2 | 6,0 | 203 | 102 | 1,3 | 2 | 1,8 | 2 | 0,42 | 195 | 204 |
| **38** | **12,5** | | **225 M4/6** | 1465 | 985 | 87 | 85 | 0,83 | 0,83 | 76,0 | 25,7 | 5,4 | 6,6 | 248 | 121 | 1,4 | 2,2 | 2 | 2,2 | 0,52 | 220 | 229 |
| **45** | **15** | | **250 M4/6** | 1465 | 985 | 88 | 85 | 0,86 | 0,85 | 86,2 | 30,0 | 5,5 | 6,5 | 293 | 145 | 1,4 | 2,2 | 2 | 2,2 | 0,62 | 263 | 275 |
| **52** | **17,5** | | **280 M4/6** | 1480 | 988 | 92 | 86 | 0,83 | 0,87 | 98,6 | 33,8 | 5,5 | 5,2 | 335 | 169 | 1,9 | 2,1 | 2,4 | 2,1 | 1,07 | 353 | 365 |
| **68** | **22,5** | | **315 S4/6** | 1482 | 988 | 91 | 87 | 0,85 | 0,86 | 127 | 43,4 | 6,0 | 5,4 | 438 | 217 | 2,0 | 2,2 | 2,5 | 2,2 | 1,44 | 426 | 438 |
| **80** | **26** | **B4D** | **315 MA4/6** | 1485 | 990 | 90 | 87 | 0,85 | 0,83 | 151 | 52,0 | 5,3 | 6,0 | 514 | 251 | 1,5 | 2 | 2,2 | 2 | 2,6 | 707 | 740 |
| **95** | **32** | | **315 MB4/6** | 1485 | 995 | 91 | 88 | 0,85 | 0,83 | 178 | 63,1 | 5,6 | 6,5 | 611 | 307 | 1,6 | 2,2 | 2,3 | 2,2 | 3 | 758 | 790 |
| **120** | **40** | | **315 MC4/6** | 1490 | 995 | 91 | 88 | 0,82 | 0,81 | 232 | 80,6 | 6,0 | 7,7 | 769 | 384 | 1,8 | 2,7 | 2,5 | 2,7 | 3,6 | 848 | 870 |
| **150** | **50** | | **315 MD4/6** | 1490 | 995 | 92 | 90 | 0,85 | 0,84 | 277 | 95,6 | 6,2 | 7,7 | 961 | 480 | 1,9 | 2,7 | 2,4 | 2,7 | 4,4 | 953 | 975 |
| **4/8 poles - 400V - 50Hz - Single winding** | | | | | | | | | | | | | | | | | | | | | | |
| **10** | **2,2** | **A4D** | **160 M4/8** | 1460 | 730 | 85 | 75 | 0,79 | 0,53 | 21,6 | 8,0 | 5,6 | 3,2 | 65 | 29 | 2,2 | 1,8 | 2,5 | 2,2 | 0,063 | 74 | 84 |
| **13** | **2,8** | | **160 L4/8** | 1465 | 730 | 86 | 77 | 0,79 | 0,52 | 27,6 | 10,2 | 6,0 | 3,4 | 85 | 37 | 2,3 | 2 | 2,6 | 2,3 | 0,075 | 88 | 98 |
| **16** | **3,5** | | **180 M4/8** | 1465 | 730 | 87 | 78 | 0,80 | 0,53 | 33,4 | 12,3 | 6,0 | 3,5 | 104 | 46 | 2,4 | 1,9 | 2,6 | 2,5 | 0,09 | 100 | 110 |
| **18** | **4,5** | | **180 L4/8** | 1465 | 735 | 90 | 78 | 0,82 | 0,57 | 35,3 | 14,6 | 6,5 | 3,7 | 117 | 58 | 2,1 | 1,8 | 2,5 | 2 | 0,11 | 122 | 120 |
| **25** | **6,2** | | **200 L4/8** | 1465 | 735 | 89 | 83 | 0,83 | 0,57 | 49,4 | 18,9 | 6,3 | 4,0 | 163 | 81 | 2,0 | 1,9 | 2,4 | 2,1 | 0,18 | 146 | 137 |
| **32** | **8** | | **225 S4/8** | 1480 | 740 | 92 | 86 | 0,83 | 0,58 | 60,8 | 23,2 | 7,7 | 5,3 | 206 | 103 | 2,2 | 2 | 2,6 | 2,5 | 0,32 | 207 | 157 |
| **40** | **10** | | **225 M4/8** | 1480 | 740 | 92 | 87 | 0,84 | 0,59 | 74,5 | 28,3 | 7,7 | 5,3 | 258 | 129 | 2,4 | 2 | 2,6 | 2,4 | 0,41 | 230 | 204 |
| **50** | **12** | | **250 M4/8** | 1480 | 740 | 93 | 87 | 0,83 | 0,56 | 93,9 | 35,6 | 8,2 | 5,4 | 323 | 155 | 2,6 | 2,2 | 2,8 | 2,8 | 0,32 | 264 | 229 |
| **55** | **13** | | **280 S4/8** | 1480 | 740 | 93 | 88 | 0,89 | 0,75 | 96,1 | 28,4 | 6,5 | 5,5 | 355 | 168 | 1,9 | 1,7 | 2,3 | 2,4 | 1,05 | 356 | 275 |
| **65** | **16** | | **280 M4/8** | 1480 | 740 | 93 | 89 | 0,90 | 0,77 | 112 | 33,9 | 6,3 | 5,1 | 419 | 206 | 2,0 | 1,6 | 2,5 | 2,2 | 1,25 | 388 | 365 |
| **80** | **19** | | **315 S4/8** | 1480 | 740 | 94 | 89 | 0,91 | 0,75 | 136 | 41,1 | 6,9 | 5,7 | 516 | 245 | 2,2 | 1,8 | 2,7 | 2,4 | 1,6 | 459 | 438 |
| **100** | **25** | **B4D** | **315 MB4/8** | 1480 | 740 | 94 | 90 | 0,90 | 0,78 | 171 | 51,3 | 6,0 | 5,0 | 645 | 323 | 1,4 | 1,6 | 2 | 1,8 | 3 | 758 | 740 |
| **120** | **30** | | **315 MC4/8** | 1485 | 740 | 94 | 91 | 0,89 | 0,76 | 207 | 62,5 | 7,4 | 5,9 | 772 | 387 | 1,7 | 2 | 2,4 | 2,2 | 3,6 | 848 | 790 |
| **150** | **37** | | **315 MD4/8** | 1485 | 740 | 94 | 92 | 0,90 | 0,78 | 255 | 74,6 | 7,1 | 5,7 | 964 | 477 | 1,7 | 1,9 | 2,3 | 2 | 4,4 | 953 | 870 |

## THREE PHASE SQUIRREL CAGE - MEDIUM VOLTAGE
## DETERMINATION OF EFFICIENCY ACCORDING TO IEC 60034-2-1 (2007)

Insulation class: F - Temperature rise class: B - Protection degree: IP 55 - Cooling method: IC 411

| RATED OUTPUT | MOTOR TYPE | | PERFORMANCES AT RATED OUTPUTS | | | | | | | | | | | SOUND PRESSURE LEVEL | MOMENT OF INERTIA | WEIGHT IM 1001 (IM B3) | WEIGHT IM 3011 (IM V1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | RATED SPEED | EFFICIENCY η % | | | POWER FACTOR | CURRENT | | TORQUE | | | | | | | |
| kW | | | rpm | FULL LOAD | 3/4 LOAD | 2/4 LOAD | cos φ | In A | Is/In p.u. | Tn Nm | Ts/Tn p.u. | Tmax/Tn p.u. | | $L_{pA}$ dB(A) | J kgm² | kg | kg |
| **2 poles - 3000V - 50Hz** | | | | | | | | | | | | | | | | | |
| 300 | B5H | 355 LA2 | 2975 | 95,5 | 94,5 | 92,4 | 0,91 | 66 | 5,4 | 963 | 0,5 | 2,7 | | 82 | 3,8 | 1940 | 1865 |
| 340 | | 355 LB2 | 2979 | 95,7 | 94,7 | 92,6 | 0,91 | 75 | 5,6 | 1090 | 0,6 | 2,9 | | 82 | 4,3 | 2050 | 1975 |
| 380 | | 355 LC2 | 2979 | 95,9 | 94,9 | 92,8 | 0,91 | 84 | 5,6 | 1218 | 0,6 | 2,9 | | 82 | 4,8 | 2140 | 2090 |
| 470 | | 400 LA2 | 2979 | 96,2 | 95,2 | 93,1 | 0,91 | 103 | 5,5 | 1507 | 0,5 | 2,7 | | 82 | 5,7 | 2360 | 2330 |
| 530 | | 400 LB2 | 2979 | 96,4 | 95,4 | 93,3 | 0,90 | 118 | 5,8 | 1699 | 0,5 | 2,7 | | 82 | 6,4 | 2480 | 2450 |
| 600 | | 400 LC2 | 2981 | 96,7 | 95,7 | 93,6 | 0,91 | 131 | 5,9 | 1922 | 0,6 | 2,7 | | 82 | 7,2 | 2600 | 2570 |
| 740 | | 450 LA2 | 2981 | 96,7 | 95,7 | 93,6 | 0,89 | 165 | 6,1 | 2371 | 0,5 | 2,7 | | 84 [3] | 9,7 | 3520 | 3485 |
| 820 | | 450 LB2 | 2984 | 97,1 | 96,1 | 94,0 | 0,89 | 183 | 6,1 | 2624 | 0,5 | 2,7 | | 84 [3] | 11,0 | 3690 | 3655 |
| 930 | | 450 LC2 | 2985 | 97,2 | 96,2 | 94,1 | 0,91 | 202 | 6,2 | 2975 | 0,6 | 2,7 | | 84 [3] | 12,2 | 3860 | 3825 |
| 1000 | | 450 LD2 | 2985 | 97,2 | 96,2 | 94,1 | 0,90 | 220 | 6,4 | 3199 | 0,6 | 2,8 | | 84 [3] | 13,9 | 4100 | 4065 |
| 1100 | | 500 LA2 | 2988 | 97,3 | 96,3 | 94,2 | 0,90 | 242 | 6,3 | 3516 | 0,5 | 2,8 | | 85 [3] | | on request | |
| 1250 | | 500 LB2 | 2988 | 97,4 | 96,4 | 94,3 | 0,91 | 271 | 6,4 | 3995 | 0,5 | 2,8 | | 85 [3] | | on request | |
| 1350 | | 500 LC2 | 2989 | 97,5 | 96,5 | 94,4 | 0,90 | 296 | 6,4 | 4313 | 0,6 | 2,9 | | 85 [3] | | on request | |
| **4 poles - 3000V - 50Hz** | | | | | | | | | | | | | | | | | |
| 310 | B5H | 355 LA4 | 1483 | 95,1 | 94,1 | 92,0 | 0,88 | 71 | 5,2 | 1996 | 0,7 | 2,3 | | 79 | 6,4 | 2020 | 1945 |
| 340 | | 355 LB4 | 1484 | 95,3 | 94,3 | 92,2 | 0,88 | 78 | 5,2 | 2188 | 0,8 | 2,6 | | 79 | 7,2 | 2120 | 2045 |
| 380 | | 355 LC4 | 1485 | 95,5 | 94,5 | 92,4 | 0,88 | 87 | 5,4 | 2444 | 0,9 | 2,8 | | 79 | 8,0 | 2240 | 2190 |
| 430 | | 355 LD4 | 1485 | 95,8 | 94,8 | 92,7 | 0,88 | 98 | 5,5 | 2765 | 0,9 | 2,8 | | 79 | 9,0 | 2390 | 2340 |
| 520 | | 400 LA4 | 1488 | 96,2 | 95,2 | 93,1 | 0,88 | 118 | 5,5 | 3337 | 0,7 | 2,4 | | 81 | 12,7 | 2560 | 2530 |
| 580 | | 400 LB4 | 1488 | 96,2 | 95,2 | 93,1 | 0,88 | 132 | 5,5 | 3722 | 0,7 | 2,3 | | 81 | 14,2 | 2700 | 2670 |
| 620 | | 400 LC4 | 1489 | 96,3 | 95,3 | 93,2 | 0,88 | 141 | 5,6 | 3976 | 7,0 | 2,6 | | 81 | 15,5 | 2840 | 2810 |
| 700 | | 450 LA4 | 1490 | 96,4 | 95,4 | 93,3 | 0,88 | 159 | 5,5 | 4487 | 0,7 | 2,3 | | 83 | 25 | 3870 | 3835 |
| 800 | | 450 LB4 | 1490 | 96,7 | 95,7 | 93,6 | 0,88 | 181 | 6,0 | 5128 | 0,7 | 2,4 | | 83 | 28 | 4100 | 4065 |
| 880 | | 450 LC4 | 1491 | 96,8 | 95,8 | 93,7 | 0,88 | 199 | 6,0 | 5636 | 0,7 | 2,4 | | 83 | 31 | 4300 | 4265 |
| 1000 | | 450 LD4 | 1491 | 97,0 | 96,0 | 93,9 | 0,88 | 225 | 6,1 | 6405 | 0,8 | 2,5 | | 83 | 35 | 4600 | 4565 |
| 1100 | | 500 LA4 | 1494 | 97,1 | 96,1 | 94,0 | 0,85 | 256 | 6,0 | 7031 | 0,7 | 2,5 | | 85 | 49 | 6050 | 5940 |
| 1200 | | 500 LB4 | 1493 | 97,2 | 96,2 | 94,1 | 0,86 | 276 | 6,0 | 7676 | 0,8 | 2,4 | | 85 | 53 | 6320 | 6210 |
| 1300 | | 500 LC4 | 1494 | 97,2 | 96,2 | 94,1 | 0,86 | 299 | 6,1 | 8310 | 0,8 | 2,5 | | 85 | 59 | 6630 | 6520 |
| **6 poles - 3000V - 50Hz** | | | | | | | | | | | | | | | | | |
| 240 | B5H | 355 LA6 | 989 | 94,3 | 93,3 | 91,2 | 0,82 | 60 | 5,0 | 2317 | 0,8 | 2,5 | | 75 | 10,5 | 2170 | 2095 |
| 270 | | 355 LB6 | 989 | 94,6 | 93,6 | 91,5 | 0,82 | 67 | 5,1 | 2607 | 0,9 | 2,7 | | 75 | 11,8 | 2300 | 2225 |
| 300 | | 355 LC6 | 989 | 94,8 | 93,8 | 91,7 | 0,83 | 73 | 5,1 | 2897 | 0,9 | 2,7 | | 75 | 13,2 | 2440 | 2390 |
| 330 | | 400 LA6 | 991 | 95,2 | 94,2 | 92,1 | 0,81 | 82 | 5,0 | 3180 | 0,8 | 2,5 | | 76 | 19 | 2590 | 2560 |
| 370 | | 400 LB6 | 991 | 95,3 | 94,3 | 92,2 | 0,82 | 91 | 5,1 | 3566 | 0,8 | 2,6 | | 76 | 21 | 2750 | 2720 |
| 410 | | 400 LC6 | 991 | 95,5 | 94,5 | 92,4 | 0,83 | 100 | 5,1 | 3951 | 0,8 | 2,5 | | 76 | 24 | 2910 | 2880 |
| 530 | | 450 LA6 | 992 | 95,7 | 94,7 | 92,6 | 0,83 | 128 | 5,2 | 5102 | 0,7 | 2,3 | | 79 | 35 | 3870 | 3835 |
| 580 | | 450 LB6 | 992 | 95,7 | 94,7 | 92,6 | 0,84 | 139 | 5,2 | 5584 | 0,7 | 2,3 | | 79 | 40 | 4100 | 4065 |
| 660 | | 450 LC6 | 993 | 96,0 | 95,0 | 92,9 | 0,85 | 156 | 5,3 | 6347 | 0,7 | 2,3 | | 79 | 44 | 4350 | 4315 |
| 720 | | 450 LD6 | 993 | 96,0 | 95,0 | 92,9 | 0,84 | 172 | 5,3 | 6924 | 0,7 | 2,3 | | 79 | 60 | 4640 | 4605 |
| 830 | | 500 LA6 | 992 | 96,2 | 95,2 | 93,1 | 0,88 | 189 | 5,5 | 7990 | 0,7 | 2,1 | | 82 | 75 | 5960 | 5850 |
| 920 | | 500 LB6 | 993 | 96,3 | 95,3 | 93,2 | 0,88 | 209 | 5,5 | 8848 | 0,7 | 2,3 | | 82 | 82 | 6220 | 6110 |
| 1000 | | 500 LC6 | 993 | 96,4 | 95,4 | 93,3 | 0,88 | 227 | 5,6 | 9617 | 0,8 | 2,3 | | 82 | 92 | 6600 | 6490 |
| **8 poles - 3000V - 50Hz** | | | | | | | | | | | | | | | | | |
| 230 | B5H | 400 LA8 | 740 | 93,4 | 92,4 | 90,3 | 0,73 | 65 | 5,0 | 2968 | 0,8 | 2,4 | | 73 | 20 | 2620 | 2590 |
| 260 | | 400 LB8 | 742 | 93,7 | 92,7 | 90,6 | 0,73 | 73 | 5,0 | 3346 | 0,9 | 2,7 | | 73 | 23 | 2790 | 2760 |
| 290 | | 400 LC8 | 742 | 94,0 | 93,0 | 90,9 | 0,74 | 80 | 5,1 | 3732 | 0,9 | 2,7 | | 73 | 26 | 2950 | 2920 |
| 370 | | 450 LA8 | 743 | 94,7 | 93,7 | 91,6 | 0,79 | 95 | 5,1 | 4756 | 0,6 | 2,4 | | 76 | 39 | 3900 | 3865 |
| 410 | | 450 LB8 | 743 | 94,9 | 93,9 | 91,8 | 0,80 | 104 | 5,1 | 5270 | 0,6 | 2,4 | | 76 | 44 | 4140 | 4105 |
| 460 | | 450 LC8 | 744 | 95,0 | 94,0 | 91,9 | 0,78 | 119 | 5,2 | 5905 | 0,7 | 2,5 | | 76 | 50 | 4380 | 4345 |
| 520 | | 450 LD8 | 744 | 95,3 | 94,3 | 92,2 | 0,80 | 131 | 5,2 | 6675 | 0,7 | 2,5 | | 76 | 56 | 4670 | 4635 |
| 630 | | 500 LA8 | 744 | 95,4 | 94,4 | 92,3 | 0,79 | 161 | 5,1 | 8087 | 0,6 | 2,3 | | 80 | 79 | 5970 | 5860 |
| 680 | | 500 LB8 | 744 | 95,5 | 94,5 | 92,4 | 0,80 | 171 | 5,1 | 8728 | 0,6 | 2,3 | | 80 | 87 | 6270 | 6160 |
| 750 | | 500 LC8 | 744 | 95,7 | 94,7 | 92,6 | 0,80 | 189 | 5,2 | 9627 | 0,7 | 2,3 | | 80 | 95 | 6560 | 6450 |

3) Unidirectional fan

## THREE PHASE SQUIRREL CAGE - MEDIUM VOLTAGE
## DETERMINATION OF EFFICIENCY ACCORDING TO IEC 60034-2-1 (2007)

Insulation class: F - Temperature rise class: B - Protection degree: IP 55 - Cooling method: IC 411

| RATED OUTPUT | MOTOR TYPE | | PERFORMANCES AT RATED OUTPUTS | | | | | | | | | | | SOUND PRESSURE LEVEL | MOMENT OF INERTIA | WEIGHT IM 1001 (IM B3) | WEIGHT IM 3011 (IM V1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | RATED SPEED | EFFICIENCY η % | | | POWER FACTOR | CURRENT | | TORQUE | | | | | | | |
| kW | | | rpm | FULL LOAD | 3/4 LOAD | 2/4 LOAD | cos φ | In A | Is/In p.u. | Tn Nm | Ts/Tn p.u. | Tmax/Tn p.u. | | $L_{pa}$ dB(A) | J kgm² | kg | kg |
| **2 poles - 6000V - 50Hz** | | | | | | | | | | | | | | | | | |
| 275 | B5H | 355 LA2 | 2977 | 95,3 | 94,3 | 92,2 | 0,90 | 31 | 5,4 | 882 | 0,5 | 2,7 | | 82 | 3,8 | 1940 | 1865 |
| 310 | | 355 LB2 | 2981 | 95,5 | 94,5 | 92,4 | 0,90 | 35 | 5,6 | 993 | 0,6 | 2,9 | | 82 | 4,3 | 2050 | 1975 |
| 350 | | 355 LC2 | 2981 | 95,7 | 94,7 | 92,6 | 0,90 | 39 | 5,6 | 1121 | 0,6 | 2,9 | | 82 | 4,8 | 2140 | 2090 |
| 430 | | 400 LA2 | 2981 | 96,1 | 95,1 | 93,0 | 0,90 | 48 | 5,5 | 1378 | 0,5 | 2,7 | | 82 | 5,7 | 2360 | 2330 |
| 480 | | 400 LB2 | 2981 | 96,3 | 95,3 | 93,2 | 0,90 | 53 | 5,8 | 1538 | 0,5 | 2,7 | | 82 | 6,4 | 2480 | 2450 |
| 540 | | 400 LC2 | 2982 | 96,6 | 95,6 | 93,5 | 0,90 | 60 | 5,9 | 1729 | 0,6 | 2,7 | | 82 | 7,2 | 2600 | 2570 |
| 680 | | 450 LA2 | 2982 | 96,7 | 95,7 | 93,6 | 0,88 | 77 | 6,1 | 2178 | 0,5 | 2,7 | | 84 [3] | 9,7 | 3520 | 3485 |
| 750 | | 450 LB2 | 2985 | 97,1 | 96,1 | 94,0 | 0,89 | 84 | 6,1 | 2399 | 0,5 | 2,7 | | 84 [3] | 11,0 | 3690 | 3655 |
| 850 | | 450 LC2 | 2986 | 97,2 | 96,2 | 94,1 | 0,90 | 93 | 6,2 | 2719 | 0,6 | 2,7 | | 84 [3] | 12,2 | 3860 | 3825 |
| 950 | | 450 LD2 | 2986 | 97,2 | 96,2 | 94,1 | 0,90 | 104 | 6,4 | 3038 | 0,6 | 2,8 | | 84 [3] | 13,9 | 4100 | 4065 |
| 1050 | | 500 LA2 | 2988 | 97,3 | 96,3 | 94,2 | 0,90 | 115 | 6,3 | 3356 | 0,5 | 2,8 | | 85 [3] | | on request | |
| 1200 | | 500 LB2 | 2988 | 97,4 | 96,4 | 94,3 | 0,91 | 130 | 6,4 | 3835 | 0,5 | 2,8 | | 85 [3] | | on request | |
| 1300 | | 500 LC2 | 2989 | 97,4 | 96,4 | 94,3 | 0,90 | 143 | 6,4 | 4154 | 0,6 | 2,9 | | 85 [3] | | on request | |
| **4 poles - 6000V - 50Hz** | | | | | | | | | | | | | | | | | |
| 280 | B5H | 355 LA4 | 1485 | 94,8 | 93,8 | 91,7 | 0,87 | 33 | 5,2 | 1801 | 0,7 | 2,3 | | 79 | 6,4 | 2020 | 1945 |
| 315 | | 355 LB4 | 1486 | 95,2 | 94,2 | 92,1 | 0,87 | 37 | 5,2 | 2024 | 0,8 | 2,6 | | 79 | 7,2 | 2120 | 2045 |
| 355 | | 355 LC4 | 1487 | 95,3 | 94,3 | 92,2 | 0,87 | 41 | 5,4 | 2280 | 0,9 | 2,8 | | 79 | 8,0 | 2240 | 2190 |
| 400 | | 355 LD4 | 1487 | 95,5 | 94,5 | 92,4 | 0,87 | 46 | 5,5 | 2569 | 0,9 | 2,8 | | 79 | 9,0 | 2390 | 2340 |
| 450 | | 400 LA4 | 1489 | 96,0 | 95,0 | 92,9 | 0,87 | 52 | 5,5 | 2886 | 0,7 | 2,4 | | 81 | 12,7 | 2560 | 2530 |
| 500 | | 400 LB4 | 1489 | 96,0 | 95,0 | 92,9 | 0,87 | 58 | 5,5 | 3207 | 0,7 | 2,3 | | 81 | 14,2 | 2700 | 2670 |
| 560 | | 400 LC4 | 1490 | 96,1 | 95,1 | 93,0 | 0,87 | 64 | 5,6 | 3589 | 7,0 | 2,6 | | 81 | 15,5 | 2840 | 2810 |
| 630 | | 450 LA4 | 1491 | 96,3 | 95,3 | 93,2 | 0,87 | 72 | 5,5 | 4035 | 0,7 | 2,3 | | 83 | 25 | 3870 | 3835 |
| 710 | | 450 LB4 | 1491 | 96,6 | 95,6 | 93,5 | 0,87 | 81 | 6,0 | 4548 | 0,7 | 2,4 | | 83 | 28 | 4100 | 4065 |
| 800 | | 450 LC4 | 1492 | 96,7 | 95,7 | 93,6 | 0,87 | 92 | 6,0 | 5121 | 0,7 | 2,4 | | 83 | 31 | 4300 | 4265 |
| 900 | | 450 LD4 | 1492 | 96,9 | 95,9 | 93,8 | 0,87 | 103 | 6,1 | 5761 | 0,8 | 2,5 | | 83 | 35 | 4600 | 4565 |
| 1000 | | 500 LA4 | 1494 | 97,1 | 96,1 | 94,0 | 0,85 | 117 | 6,0 | 6392 | 0,7 | 2,5 | | 85 | 49 | 6050 | 5940 |
| 1100 | | 500 LB4 | 1493 | 97,2 | 96,2 | 94,1 | 0,86 | 127 | 6,0 | 7036 | 0,8 | 2,4 | | 85 | 53 | 6320 | 6210 |
| 1250 | | 500 LC4 | 1494 | 97,2 | 96,2 | 94,1 | 0,86 | 144 | 6,1 | 7990 | 0,8 | 2,5 | | 85 | 59 | 6630 | 6520 |
| **6 poles - 6000V - 50Hz** | | | | | | | | | | | | | | | | | |
| 220 | B5H | 355 LA6 | 990 | 94,0 | 93,0 | 90,9 | 0,81 | 28 | 5,0 | 2122 | 0,8 | 2,5 | | 75 | 10,5 | 2170 | 2095 |
| 250 | | 355 LB6 | 990 | 94,3 | 93,3 | 91,2 | 0,81 | 31 | 5,1 | 2412 | 0,9 | 2,7 | | 75 | 11,8 | 2300 | 2225 |
| 275 | | 355 LC6 | 990 | 94,6 | 93,6 | 91,5 | 0,82 | 34 | 5,1 | 2653 | 0,9 | 2,7 | | 75 | 13,2 | 2440 | 2390 |
| 310 | | 400 LA6 | 992 | 95,1 | 94,1 | 92,0 | 0,81 | 39 | 5,0 | 2984 | 0,8 | 2,5 | | 76 | 19 | 2590 | 2560 |
| 340 | | 400 LB6 | 992 | 95,3 | 94,3 | 92,2 | 0,81 | 42 | 5,1 | 3273 | 0,8 | 2,6 | | 76 | 21 | 2750 | 2720 |
| 380 | | 400 LC6 | 992 | 95,4 | 94,4 | 92,3 | 0,82 | 47 | 5,1 | 3658 | 0,8 | 2,5 | | 76 | 24 | 2910 | 2880 |
| 480 | | 450 LA6 | 992 | 95,6 | 94,6 | 92,5 | 0,83 | 58 | 5,2 | 4621 | 0,7 | 2,3 | | 79 | 35 | 3870 | 3835 |
| 530 | | 450 LB6 | 992 | 95,7 | 94,7 | 92,6 | 0,84 | 63 | 5,2 | 5102 | 0,7 | 2,3 | | 79 | 40 | 4100 | 4065 |
| 600 | | 450 LC6 | 993 | 95,9 | 94,9 | 92,8 | 0,84 | 72 | 5,3 | 5770 | 0,7 | 2,3 | | 79 | 44 | 4350 | 4315 |
| 660 | | 450 LD6 | 993 | 96,0 | 95,0 | 92,9 | 0,84 | 79 | 5,3 | 6347 | 0,7 | 2,3 | | 79 | 60 | 4640 | 4605 |
| 760 | | 500 LA6 | 992 | 96,2 | 95,2 | 93,1 | 0,88 | 86 | 5,5 | 7317 | 0,7 | 2,1 | | 82 | 75 | 5960 | 5850 |
| 840 | | 500 LB6 | 993 | 96,3 | 95,3 | 93,2 | 0,88 | 95 | 5,5 | 8079 | 0,7 | 2,3 | | 82 | 82 | 6220 | 6110 |
| 950 | | 500 LC6 | 993 | 96,4 | 95,4 | 93,3 | 0,88 | 108 | 5,6 | 9136 | 0,8 | 2,3 | | 82 | 92 | 6600 | 6490 |
| **8 poles - 6000V - 50Hz** | | | | | | | | | | | | | | | | | |
| 220 | B5H | 400 LA8 | 741 | 93,4 | 92,4 | 90,3 | 0,73 | 31 | 5,0 | 2835 | 0,8 | 2,4 | | 73 | 20 | 2620 | 2590 |
| 240 | | 400 LB8 | 742 | 93,6 | 92,6 | 90,5 | 0,73 | 34 | 5,0 | 3089 | 0,9 | 2,7 | | 73 | 23 | 2790 | 2760 |
| 265 | | 400 LC8 | 742 | 93,9 | 92,9 | 90,8 | 0,74 | 37 | 5,1 | 3411 | 0,9 | 2,7 | | 73 | 26 | 2950 | 2920 |
| 340 | | 450 LA8 | 743 | 94,7 | 93,7 | 91,6 | 0,79 | 44 | 5,1 | 4370 | 0,6 | 2,4 | | 76 | 39 | 3900 | 3865 |
| 390 | | 450 LB8 | 743 | 94,9 | 93,9 | 91,8 | 0,80 | 49 | 5,1 | 5013 | 0,6 | 2,4 | | 76 | 44 | 4140 | 4105 |
| 440 | | 450 LC8 | 744 | 95,0 | 94,0 | 91,9 | 0,78 | 57 | 5,2 | 5648 | 0,7 | 2,5 | | 76 | 50 | 4380 | 4345 |
| 490 | | 450 LD8 | 744 | 95,3 | 94,3 | 92,2 | 0,80 | 62 | 5,2 | 6290 | 0,7 | 2,5 | | 76 | 56 | 4670 | 4635 |
| 600 | | 500 LA8 | 744 | 95,5 | 94,5 | 92,4 | 0,79 | 76 | 5,1 | 7702 | 0,6 | 2,3 | | 80 | 79 | 5970 | 5860 |
| 650 | | 500 LB8 | 744 | 95,6 | 94,6 | 92,5 | 0,80 | 82 | 5,1 | 8343 | 0,6 | 2,3 | | 80 | 87 | 6270 | 6160 |
| 720 | | 500 LC8 | 744 | 95,8 | 94,8 | 92,7 | 0,80 | 90 | 5,2 | 9242 | 0,7 | 2,3 | | 80 | 95 | 6560 | 6450 |

3) Unidirectional fan

## THREE PHASE SQUIRREL CAGE - HIGH VOLTAGE
## DETERMINATION OF EFFICIENCY ACCORDING TO IEC 60034-2-1 (2007)

Insulation class: F - Temperature rise class: B - Protection degree: IP 55 - Cooling method: IC 411

| RATED OUTPUT | MOTOR TYPE | | PERFORMANCES AT RATED OUTPUTS | | | | | | | | | | | SOUND PRESSURE LEVEL | MOMENT OF INERTIA | WEIGHT IM 1001 (IM B3) | WEIGHT IM 3011 (IM V1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | RATED SPEED | EFFICIENCY η % | | | POWER FACTOR | CURRENT | | TORQUE | | | | | | | |
| kW | | | rpm | FULL LOAD | 3/4 LOAD | 2/4 LOAD | cos φ | In A | Is/In p.u. | Tn Nm | Ts/Tn p.u. | Tmax/Tn p.u. | | $L_{pA}$ dB(A) | J kgm² | kg | kg |
| **2 poles - 11000V - 50Hz** | | | | | | | | | | | | | | | | | |
| 400 | B5H | 450 LA2 | 2984 | 95,4 | 94,4 | 92,3 | 0,91 | 24 | 7,1 | 1280 | 0,6 | 3,0 | | 84 [3] | 9,7 | 3800 | 3765 |
| 450 | | 450 LB2 | 2985 | 95,6 | 94,6 | 92,5 | 0,90 | 27 | 7,1 | 1440 | 0,7 | 3,0 | | 84 [3] | 10,9 | 3900 | 3865 |
| 500 | | 450 LC2 | 2986 | 95,8 | 94,8 | 92,7 | 0,91 | 30 | 7,2 | 1599 | 0,6 | 3,1 | | 84 [3] | 12,1 | 4000 | 3965 |
| 630 | | 500 LA2 | 2988 | 96,2 | 95,2 | 93,1 | 0,92 | 37 | 7,1 | 2014 | 0,5 | 2,8 | | 85 [3] | | on request | |
| 710 | | 500 LB2 | 2988 | 96,3 | 95,3 | 93,2 | 0,91 | 43 | 7,1 | 2269 | 0,5 | 2,7 | | 85 [3] | | on request | |
| 800 | | 500 LC2 | 2989 | 96,5 | 95,5 | 93,4 | 0,92 | 47 | 7,2 | 2556 | 0,5 | 2,8 | | 85 [3] | | on request | |
| **4 poles - 11000V - 50Hz** | | | | | | | | | | | | | | | | | |
| 450 | B5H | 450 LA4 | 1491 | 96,1 | 95,1 | 93,0 | 0,86 | 28 | 6,2 | 2882 | 0,8 | 2,7 | | 83 | 25,8 | 3800 | 3765 |
| 500 | | 450 LB4 | 1492 | 96,3 | 95,3 | 93,2 | 0,85 | 32 | 6,5 | 3200 | 0,8 | 2,7 | | 83 | 29,0 | 4100 | 4065 |
| 560 | | 450 LC4 | 1492 | 96,5 | 95,5 | 93,4 | 0,86 | 35 | 6,8 | 3584 | 0,9 | 2,8 | | 83 | 32,2 | 4350 | 4315 |
| 630 | | 500 LA4 | 1492 | 96,5 | 95,5 | 93,4 | 0,86 | 40 | 6,2 | 4033 | 0,6 | 2,3 | | 85 | 40,1 | 6100 | 5990 |
| 710 | | 500 LB4 | 1492 | 96,5 | 95,5 | 93,4 | 0,86 | 45 | 6,2 | 4545 | 0,6 | 2,3 | | 85 | 45,8 | 6400 | 6290 |
| 800 | | 500 LC4 | 1493 | 96,7 | 95,7 | 93,6 | 0,87 | 50 | 6,3 | 5117 | 0,6 | 2,4 | | 85 | 51,4 | 6650 | 6540 |
| **6 poles - 11000V - 50Hz** | | | | | | | | | | | | | | | | | |
| 355 | B5H | 450 LA6 | 993 | 95,6 | 94,6 | 92,5 | 0,83 | 24 | 6,1 | 3414 | 0,9 | 2,7 | | 79 | 36,7 | 3900 | 3865 |
| 400 | | 450 LB6 | 994 | 95,8 | 94,8 | 92,7 | 0,82 | 26 | 6,2 | 3843 | 0,9 | 2,8 | | 79 | 41,2 | 4150 | 4115 |
| 450 | | 450 LC6 | 993 | 96,0 | 95,0 | 92,9 | 0,83 | 30 | 6,1 | 4328 | 0,9 | 2,8 | | 79 | 46,3 | 4400 | 4365 |
| 560 | | 500 LA6 | 995 | 96,3 | 95,3 | 93,2 | 0,83 | 36 | 6,0 | 5375 | 0,7 | 2,4 | | 82 | 64,2 | 6000 | 5890 |
| 630 | | 500 LB6 | 995 | 96,4 | 95,4 | 93,3 | 0,84 | 41 | 6,0 | 6047 | 0,7 | 2,5 | | 82 | 72,9 | 6250 | 6140 |
| 710 | | 500 LC6 | 995 | 96,4 | 95,4 | 93,3 | 0,84 | 46 | 6,1 | 6815 | 0,7 | 2,5 | | 82 | 81,7 | 6650 | 6540 |
| **8 poles - 11000V - 50Hz** | | | | | | | | | | | | | | | | | |
| 315 | B5H | 450 LA8 | 744 | 94,9 | 93,9 | 91,8 | 0,79 | 22 | 5,7 | 4043 | 0,9 | 2,5 | | 76 | 41,2 | 4000 | 3965 |
| 355 | | 450 LB8 | 744 | 95,0 | 94,0 | 91,9 | 0,79 | 25 | 5,6 | 4557 | 0,9 | 2,6 | | 76 | 46,3 | 4200 | 4165 |
| 400 | | 450 LC8 | 744 | 95,0 | 94,0 | 91,9 | 0,80 | 27 | 5,6 | 5134 | 0,9 | 2,6 | | 76 | 52,0 | 4450 | 4415 |
| 500 | | 500 LA8 | 744 | 95,4 | 94,4 | 92,3 | 0,78 | 35 | 5,4 | 6418 | 0,7 | 2,2 | | 80 | 66,4 | 6000 | 5890 |
| 560 | | 500 LB8 | 744 | 95,5 | 94,5 | 92,4 | 0,78 | 39 | 5,4 | 7188 | 0,7 | 2,3 | | 80 | 75,4 | 6300 | 6190 |
| 630 | | 500 LC8 | 745 | 95,5 | 94,5 | 92,4 | 0,79 | 44 | 5,3 | 8076 | 0,7 | 2,2 | | 80 | 84,5 | 6650 | 6540 |

3) Unidirectional fan

The voltage range can be upto 13.6kV on request

## THREADED HOLES IN THE SHAFT EXTENSION

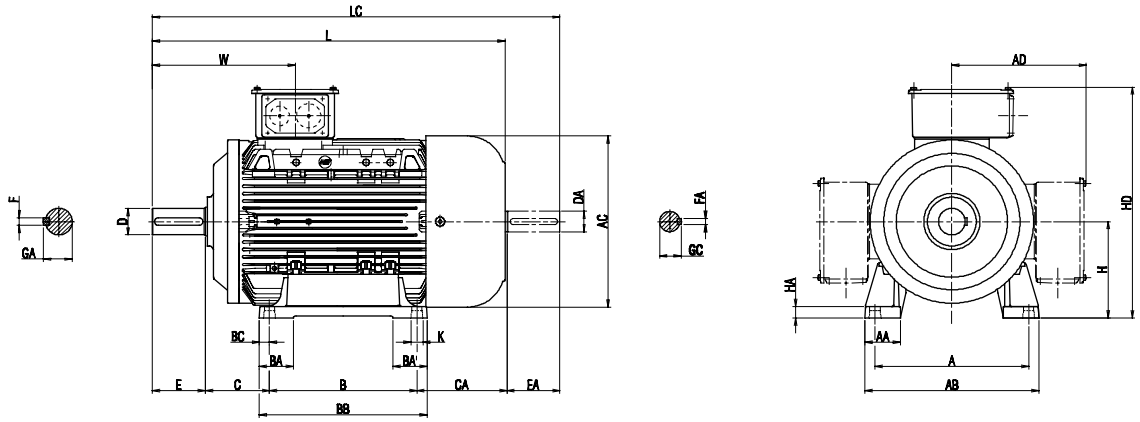
The following table contains information of the tapped holes in the shaft extension, as per DIN 332.

| Frame size | Poles | Dimensions |
|---|---|---|
| 160 | All | M16 DIN 332 |
| 180 | All | M16 DIN 332 |
| 200 | All | M16 DIN 332 |
| 225 | All | M16 DIN 332 |
| 250 | All | M16 DIN 332 |
| 280 | All | M16 DIN 332 |
| 315 | All | M20 DIN 332 |
| 355 | 2 | M20 DIN 332 |
| | ≥4 | M24 DIN 332 |
| 400 | 2 | M20 DIN 332 |
| | ≥4 | M24 DIN 332 |
| 450 | 2 | M20 DIN 332 |
| | ≥4 | M24 DIN 332 |
| 500 | ≥4 | M30 DIN 332 |

## DIMENSIONS
### IM B3 (IM 1001)

| MOTOR TYPE | | POLES | A | AA | AB | AC | AD | B | BA | BB | BC | BA' | C | CA | H | HA | HD | K | L | LC | W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A5_ 160 | M | 2 - 8 | 254 | 55 | 296 | 314 | 258 | 210 | 60 | 296 | 21 | 90 | 108 | 223 | 160$^{-0.5}$ | 20 | 418 | 14,5 | 648 | 761 | 279 |
| | L | | 254 | 55 | 296 | 314 | 258 | 254 | 60 | 296 | 21 | 90 | 108 | 179 | 160$^{-0.5}$ | 20 | 418 | 14,5 | 648 | 761 | 279 |
| A5_ 180 | M | 2 - 4 | 279 | 58 | 320 | 354 | 278 | 241 | 80 | 320 | 20,5 | 80 | 121 | 254 | 180$^{-0.5}$ | 22 | 458 | 14,5 | 723 | 836 | 296 |
| | L | 4 - 8 | 279 | 58 | 320 | 354 | 278 | 279 | 80 | 320 | 20,5 | 80 | 121 | 216 | 180$^{-0.5}$ | 22 | 458 | 14,5 | 723 | 836 | 296 |
| A5_ 200 | L | 2 - 8 | 318 | 74 | 360 | 354 | 278 | 305 | 70 | 347 | 21 | 70 | 133 | 220 | 200$^{-0.5}$ | 24 | 478 | 18,5 | 764 | 877 | 296 |
| A5_ 225 | M | 2 | 356 | 76 | 405 | 411 | - | 311 | 80 | 360 | 24,5 | 80 | 149 | 255 | 225$^{-0.5}$ | 28 | 523 | 18,5 | 820 | 935 | 288 |
| | S - M | 4 - 8 | 356 | 76 | 405 | 411 | - | 311 | 80 | 360 | 24,5 | 80 | 149 | 255 | 225$^{-0.5}$ | 28 | 523 | 18,5 | 850 | 965 | 318 |
| A5_ 250 | M | 2 | 406 | 90 | 465 | 411 | - | 349 | 90 | 406 | 28,5 | 90 | 168 | 223 | 250$^{-0.5}$ | 28 | 548 | 22 | 875 | 990 | 318 |
| | | 4 - 8 | 406 | 90 | 465 | 411 | - | 349 | 90 | 406 | 28,5 | 90 | 168 | 223 | 250$^{-0.5}$ | 28 | 548 | 22 | 875 | 990 | 318 |
| A5_ 280 | S | 2 | 457 | 90 | 540 | 490 | - | 368 | 110 | 480 | 30,5 | 110 | 190 | 272 | 280$^{-1}$ | 40 | 640 | 24 | 959 | 1110 | 350 |
| | | 4 - 8 | 457 | 90 | 540 | 490 | - | 368 | 110 | 480 | 30,5 | 110 | 190 | 272 | 280$^{-1}$ | 40 | 640 | 24 | 959 | 1110 | 350 |
| | M | 2 | 457 | 90 | 540 | 490 | - | 419 | 110 | 480 | 30,5 | 110 | 190 | 221 | 280$^{-1}$ | 40 | 640 | 24 | 959 | 1110 | 350 |
| | | 4 - 8 | 457 | 90 | 540 | 490 | - | 416 | 110 | 480 | 30,5 | 110 | 190 | 221 | 280$^{-1}$ | 40 | 640 | 24 | 959 | 1110 | 350 |
| B5_ 315 | MA-MC | 2 | 508 | 110 | 590 | 604 | - | 457 | 110 | 520 | 32 | 165 | 216 | 299 | 315$^{-1}$ | 43 | 800 | 27 | 1102 | 1252 | 387 |
| | | 4 - 8 | 508 | 110 | 590 | 604 | - | 457 | 110 | 520 | 32 | 165 | 216 | 299 | 315$^{-1}$ | 43 | 800 | 27 | 1132 | 1282 | 417 |
| | MD | 8 | 508 | 110 | 590 | 604 | - | 457 | 110 | 520 | 32 | 165 | 216 | 299 | 315$^{-1}$ | 43 | 800 | 27 | 1132 | 1282 | 417 |
| | L | 2 | 508 | 110 | 590 | 604 | - | 508 | 110 | 582 | 32 | 200 | 216 | 398 | 315$^{-1}$ | 43 | 862 | 27 | 1252 | 1402 | 402 |
| | | 4 - 6 | 508 | 110 | 590 | 604 | - | 508 | 110 | 582 | 32 | 200 | 216 | 398 | 315$^{-1}$ | 43 | 862 | 27 | 1282 | 1432 | 432 |

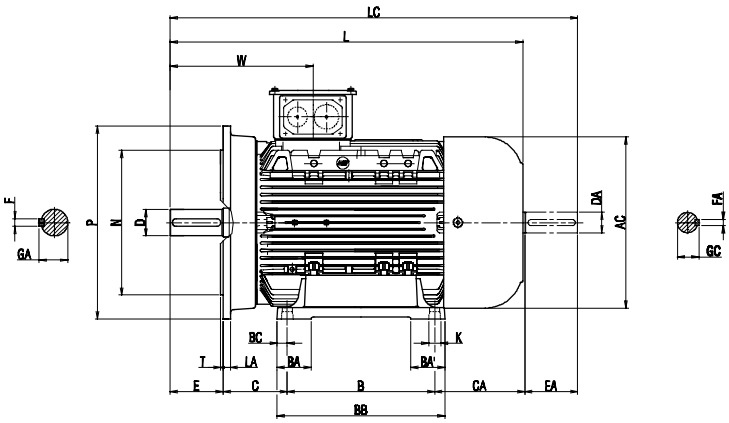
| | | | Shaft extension | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| MOTOR TYPE | | POLES | D | E | F | GA | DA | EA | FA | GC |
| A5_ 160 | M | 2 - 8 | 42$^{k6}$ | 110 | 12$^{h9}$ | 45 | 42$^{k6}$ | 110 | 12$^{h9}$ | 45 |
| | L | | 42$^{k6}$ | 110 | 12$^{h9}$ | 45 | 42$^{k6}$ | 110 | 12$^{h9}$ | 45 |
| A5_ 180 | M | 2 - 4 | 48$^{k6}$ | 110 | 14$^{h9}$ | 51,5 | 42$^{k6}$ | 110 | 12$^{h9}$ | 45 |
| | L | 4 - 8 | 48$^{k6}$ | 110 | 14$^{h9}$ | 51,5 | 42$^{k6}$ | 110 | 12$^{h9}$ | 45 |
| A5_ 200 | L | 2 - 8 | 55$^{m6}$ | 110 | 16$^{h9}$ | 59 | 42$^{k6}$ | 110 | 12$^{h9}$ | 45 |
| A5_ 225 | M | 2 | 55$^{m6}$ | 110 | 16$^{h9}$ | 59 | 55$^{m6}$ | 110 | 16$^{h9}$ | 59 |
| | S - M | 4 - 8 | 60$^{m6}$ | 140 | 18$^{h9}$ | 64 | 55$^{m6}$ | 110 | 16$^{h9}$ | 59 |
| A5_ 250 | M | 2 | 60$^{m6}$ | 140 | 18$^{h9}$ | 64 | 55$^{m6}$ | 110 | 16$^{h9}$ | 59 |
| | | 4 - 8 | 65$^{m6}$ | 140 | 18$^{h9}$ | 69 | 55$^{m6}$ | 110 | 16$^{h9}$ | 59 |
| A5_ 280 | S | 2 | 65$^{m6}$ | 140 | 18$^{h9}$ | 69 | 60$^{m6}$ | 140 | 18$^{h9}$ | 64 |
| | | 4 - 8 | 75$^{m6}$ | 140 | 20$^{h9}$ | 79,5 | 60$^{m6}$ | 140 | 18$^{h9}$ | 64 |
| | M | 2 | 65$^{m6}$ | 140 | 18$^{h9}$ | 69 | 60$^{m6}$ | 140 | 18$^{h9}$ | 64 |
| | | 4 - 8 | 75$^{m6}$ | 140 | 20$^{h9}$ | 79,5 | 60$^{m6}$ | 140 | 18$^{h9}$ | 64 |
| B5_ 315 | MA-MC | 2 | 65$^{m6}$ | 140 | 18$^{h9}$ | 69 | 60$^{m6}$ | 140 | 18$^{h9}$ | 64 |
| | | 4 - 8 | 80$^{m6}$ | 170 | 22$^{h9}$ | 85 | 65$^{m6}$ | 140 | 18$^{h9}$ | 69 |
| | MD | 8 | 90$^{m6}$ | 170 | 25$^{h9}$ | 95 | 65$^{m6}$ | 140 | 18$^{h9}$ | 69 |
| | L | 2 | 70$^{m6}$ | 140 | 20$^{h9}$ | 74,5 | 65$^{m6}$ | 140 | 18$^{h9}$ | 64 |
| | | 4 - 6 | 90$^{m6}$ | 170 | 25$^{h9}$ | 95 | 65$^{m6}$ | 140 | 18$^{h9}$ | 69 |



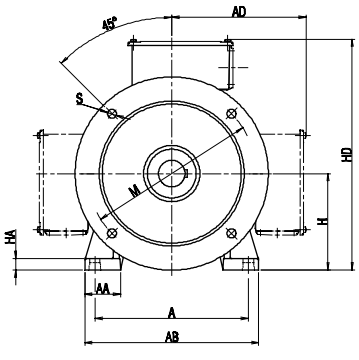
## DIMENSIONS
### IM B35 (IM 2001)

| MOTOR TYPE | | POLES | A | AA | AB | AC | AD | B | BA | BB | BC | BA' | C | CA | H | HA | HD | K | L | LC | W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A5_ 160 | M | 2 - 8 | 254 | 55 | 296 | 314 | 258 | 210 | 60 | 296 | 21 | 90 | 108 | 223 | 160 -0.5 | 20 | 418 | 14,5 | 648 | 761 | 279 |
| | L | | 254 | 55 | 296 | 314 | 258 | 254 | 60 | 296 | 21 | 90 | 108 | 179 | 160 -0.5 | 20 | 418 | 14,5 | 648 | 761 | 279 |
| A5_ 180 | M | 2 - 4 | 279 | 58 | 320 | 354 | 278 | 241 | 80 | 320 | 20,5 | 80 | 121 | 254 | 180 -0.5 | 22 | 458 | 14,5 | 723 | 836 | 296 |
| | L | 4 - 8 | 279 | 58 | 320 | 354 | 278 | 279 | 80 | 320 | 20,5 | 80 | 121 | 216 | 180 -0.5 | 22 | 458 | 14,5 | 723 | 836 | 296 |
| A5_ 200 | L | 2 - 8 | 318 | 74 | 360 | 354 | 278 | 305 | 70 | 347 | 21 | 70 | 133 | 220 | 200 -0.5 | 24 | 478 | 18,5 | 764 | 877 | 296 |
| A5_ 225 | M | 2 | 356 | 76 | 405 | 411 | - | 311 | 80 | 360 | 24,5 | 80 | 149 | 255 | 225 -0.5 | 28 | 523 | 18,5 | 820 | 935 | 288 |
| | S - M | 4 - 8 | 356 | 76 | 405 | 411 | - | 311 | 80 | 360 | 24,5 | 80 | 149 | 255 | 225 -0.5 | 28 | 523 | 18,5 | 850 | 965 | 318 |
| A5_ 250 | M | 2 | 406 | 90 | 465 | 411 | - | 349 | 90 | 406 | 28,5 | 90 | 168 | 223 | 250 -0.5 | 28 | 548 | 22 | 875 | 990 | 318 |
| | | 4 - 8 | 406 | 90 | 465 | 411 | - | 349 | 90 | 406 | 28,5 | 90 | 168 | 223 | 250 -0.5 | 28 | 548 | 22 | 875 | 990 | 318 |
| A5_ 280 | S | 2 | 457 | 90 | 540 | 490 | - | 368 | 110 | 480 | 30,5 | 110 | 190 | 272 | 280 -1 | 40 | 640 | 24 | 959 | 1110 | 350 |
| | | 4 - 8 | 457 | 90 | 540 | 490 | - | 368 | 110 | 480 | 30,5 | 110 | 190 | 272 | 280 -1 | 40 | 640 | 24 | 959 | 1110 | 350 |
| | M | 2 | 457 | 90 | 540 | 490 | - | 419 | 110 | 480 | 30,5 | 110 | 190 | 221 | 280 -1 | 40 | 640 | 24 | 959 | 1110 | 350 |
| | | 4 - 8 | 457 | 90 | 540 | 490 | - | 416 | 110 | 480 | 30,5 | 110 | 190 | 221 | 280 -1 | 40 | 640 | 24 | 959 | 1110 | 350 |
| B5_ 315 | MA-MC | 2 | 508 | 110 | 590 | 604 | - | 457 | 110 | 520 | 32 | 165 | 216 | 299 | 315 -1 | 43 | 800 | 27 | 1102 | 1252 | 387 |
| | | 4 - 8 | 508 | 110 | 590 | 604 | - | 457 | 110 | 520 | 32 | 165 | 216 | 299 | 315 -1 | 43 | 800 | 27 | 1132 | 1282 | 417 |
| | MD | 8 | 508 | 110 | 590 | 604 | - | 457 | 110 | 520 | 32 | 165 | 216 | 299 | 315 -1 | 43 | 800 | 27 | 1132 | 1282 | 417 |
| | L | 2 | 508 | 110 | 590 | 604 | - | 508 | 110 | 582 | 32 | 200 | 216 | 398 | 315 -1 | 43 | 862 | 27 | 1252 | 1402 | 402 |
| | | 4 - 6 | 508 | 110 | 590 | 604 | - | 508 | 110 | 582 | 32 | 200 | 216 | 398 | 315 -1 | 43 | 862 | 27 | 1282 | 1432 | 432 |

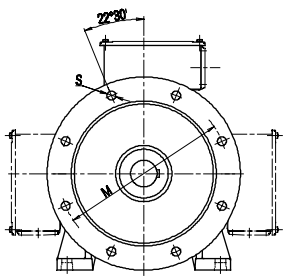
| | | | Shaft extension | | | | | | | | Flange B5 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MOTOR TYPE | | POLES | D | E | F | GA | DA | EA | FA | GC | LA | M | N | P | S | T |
| A5_ 160 | M | 2 - 8 | 42 k6 | 110 | 12 h9 | 45 | 42 k6 | 110 | 12 h9 | 45 | 15 | 300 | 250 h6 | 350 | 18,5 | 5 |
| | L | | 42 k6 | 110 | 12 h9 | 45 | 42 k6 | 110 | 12 h9 | 45 | 15 | 300 | 250 h6 | 350 | 18,5 | 5 |
| A5_ 180 | M | 2 - 4 | 48 k6 | 110 | 14 h9 | 51,5 | 42 k6 | 110 | 12 h9 | 45 | 14 | 300 | 250 h6 | 350 | 18,5 | 5 |
| | L | 4 - 8 | 48 k6 | 110 | 14 h9 | 51,5 | 42 k6 | 110 | 12 h9 | 45 | 14 | 300 | 250 h6 | 350 | 18,5 | 5 |
| A5_ 200 | L | 2 - 8 | 55 m6 | 110 | 16 h9 | 59 | 42 k6 | 110 | 12 h9 | 45 | 15 | 350 | 300 h6 | 400 | 18,5 | 5 |
| A5_ 225 | M | 2 | 55 m6 | 110 | 16 h9 | 59 | 55 m6 | 110 | 16 h9 | 59 | 16 | 400 | 350 h6 | 450 | 18,5 | 5 |
| | S - M | 4 - 8 | 60 m6 | 140 | 18 h9 | 64 | 55 m6 | 110 | 16 h9 | 59 | 16 | 400 | 350 h6 | 450 | 18,5 | 5 |
| A5_ 250 | M | 2 | 60 m6 | 140 | 18 h9 | 64 | 55 m6 | 110 | 16 h9 | 59 | 18 | 500 | 450 h6 | 550 | 18,5 | 5 |
| | | 4 - 8 | 65 m6 | 140 | 18 h9 | 69 | 55 m6 | 110 | 16 h9 | 59 | 18 | 500 | 450 h6 | 550 | 18,5 | 5 |
| A5_ 280 | S | 2 | 65 m6 | 140 | 18 h9 | 69 | 60 m6 | 140 | 18 h9 | 64 | 18 | 500 | 450 h6 | 550 | 18,5 | 5 |
| | | 4 - 8 | 75 m6 | 140 | 20 h9 | 79,5 | 60 m6 | 140 | 18 h9 | 64 | 18 | 500 | 450 h6 | 550 | 18,5 | 5 |
| | M | 2 | 65 m6 | 140 | 18 h9 | 69 | 60 m6 | 140 | 18 h9 | 64 | 18 | 500 | 450 h6 | 550 | 18,5 | 5 |
| | | 4 - 8 | 75 m6 | 140 | 20 h9 | 79,5 | 60 m6 | 140 | 18 h9 | 64 | 18 | 500 | 450 h6 | 550 | 18,5 | 5 |
| B5_ 315 | MA-MC | 2 | 65 m6 | 140 | 18 h9 | 69 | 60 m6 | 140 | 18 h9 | 64 | 22 | 600 | 550 h6 | 660 | 22 | 6 |
| | | 4 - 8 | 80 m6 | 170 | 22 h9 | 85 | 65 m6 | 140 | 18 h9 | 69 | 22 | 600 | 550 h6 | 660 | 22 | 6 |
| | MD | 8 | 90 m6 | 170 | 25 h9 | 95 | 65 m6 | 140 | 18 h9 | 69 | 22 | 600 | 550 h6 | 660 | 22 | 6 |
| | L | 2 | 70 m6 | 140 | 20 h9 | 74,5 | 65 m6 | 140 | 18 h9 | 64 | 22 | 600 | 550 h6 | 660 | 22 | 6 |
| | | 4 - 6 | 90 m6 | 170 | 25 h9 | 95 | 65 m6 | 140 | 18 h9 | 69 | 22 | 600 | 550 h6 | 660 | 22 | 6 |




160 - 200



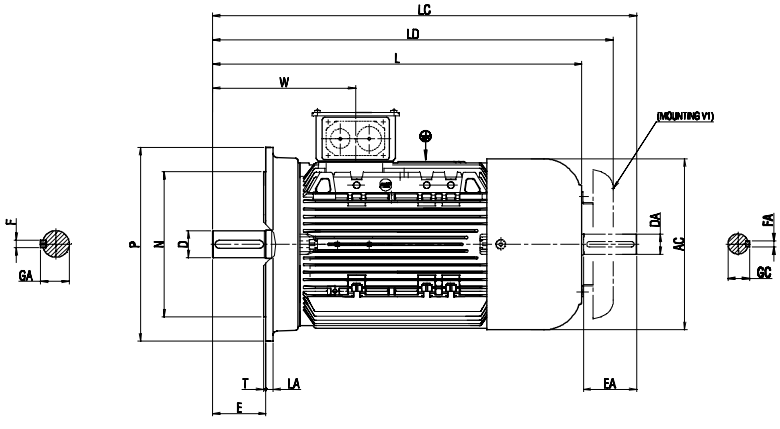

225 - 315

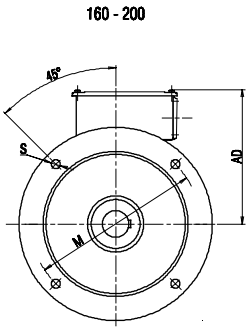


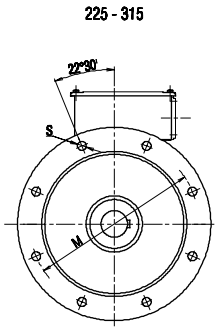
## DIMENSIONS

### IM B5 (IM 3001) - IM V1 (IM 3011)

| MOTOR TYPE | | POLES | AC | AD | L | LC | LD | W | Shaft extension | | | | | | | | Flange B5 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | D | E | F | GA | DA | EA | FA | GC | LA | M | N | P | S | T |
| A5_ 160 | M | 2 - 8 | 314 | 258 | 648 | 761 | 713 | 279 | $42^{k6}$ | 110 | $12^{h9}$ | 45 | $42^{k6}$ | 110 | $12^{h9}$ | 45 | 15 | 300 | $250^{h6}$ | 350 | 18,5 | 5 |
| | L | | 314 | 258 | 648 | 761 | 713 | 279 | $42^{k6}$ | 110 | $12^{h9}$ | 45 | $42^{k6}$ | 110 | $12^{h9}$ | 45 | 15 | 300 | $250^{h6}$ | 350 | 18,5 | 5 |
| A5_ 180 | M | 2 - 4 | 354 | 278 | 723 | 836 | 788 | 296 | $48^{k6}$ | 110 | $14^{h9}$ | 51,5 | $42^{k6}$ | 110 | $12^{h9}$ | 45 | 14 | 300 | $250^{h6}$ | 350 | 18,5 | 5 |
| | L | 4 - 8 | 354 | 278 | 723 | 836 | 788 | 296 | $48^{k6}$ | 110 | $14^{h9}$ | 51,5 | $42^{k6}$ | 110 | $12^{h9}$ | 45 | 14 | 300 | $250^{h6}$ | 350 | 18,5 | 5 |
| A5_ 200 | L | 2 - 8 | 354 | 278 | 764 | 877 | 829 | 296 | $55^{m6}$ | 110 | $16^{h9}$ | 59 | $42^{k6}$ | 110 | $12^{h9}$ | 45 | 15 | 350 | $300^{h6}$ | 400 | 18,5 | 5 |
| A5_ 225 | M | 2 | 411 | 298 | 820 | 935 | 885 | 288 | $55^{m6}$ | 110 | $16^{h9}$ | 59 | $55^{m6}$ | 110 | $16^{h9}$ | 59 | 16 | 400 | $350^{h6}$ | 450 | 18,5 | 5 |
| | S - M | 4 - 8 | 411 | 298 | 850 | 965 | 915 | 318 | $60^{m6}$ | 140 | $18^{h9}$ | 64 | $55^{m6}$ | 110 | $16^{h9}$ | 59 | 16 | 400 | $350^{h6}$ | 450 | 18,5 | 5 |
| A5_ 250 | M | 2 | 411 | 298 | 875 | 990 | 940 | 318 | $60^{m6}$ | 140 | $18^{h9}$ | 64 | $55^{m6}$ | 110 | $16^{h9}$ | 59 | 18 | 500 | $450^{h6}$ | 550 | 18,5 | 5 |
| | | 4 - 8 | 411 | 298 | 875 | 990 | 940 | 318 | $65^{m6}$ | 140 | $18^{h9}$ | 69 | $55^{m6}$ | 110 | $16^{h9}$ | 59 | 18 | 500 | $450^{h6}$ | 550 | 18,5 | 5 |
| A5_ 280 | S | 2 | 490 | 360 | 959 | 1110 | 1054 | 350 | $65^{m6}$ | 140 | $18^{h9}$ | 69 | $60^{m6}$ | 140 | $18^{h9}$ | 64 | 18 | 500 | $450^{h6}$ | 550 | 18,5 | 5 |
| | | 4 - 8 | 490 | 360 | 959 | 1110 | 1054 | 350 | $75^{m6}$ | 140 | $20^{h9}$ | 79,5 | $60^{m6}$ | 140 | $18^{h9}$ | 64 | 18 | 500 | $450^{h6}$ | 550 | 18,5 | 5 |
| | M | 2 | 490 | 360 | 959 | 1110 | 1054 | 350 | $65^{m6}$ | 140 | $18^{h9}$ | 69 | $60^{m6}$ | 140 | $18^{h9}$ | 64 | 18 | 500 | $450^{h6}$ | 550 | 18,5 | 5 |
| | | 4 - 8 | 490 | 360 | 959 | 1110 | 1054 | 350 | $75^{m6}$ | 140 | $20^{h9}$ | 79,5 | $60^{m6}$ | 140 | $18^{h9}$ | 64 | 18 | 500 | $450^{h6}$ | 550 | 18,5 | 5 |
| B5_ 315 | MA-MC | 2 | 604 | 485 | 1102 | 1252 | 1177 | 387 | $65^{m6}$ | 140 | $18^{h9}$ | 69 | $60^{m6}$ | 140 | $18^{h9}$ | 64 | 22 | 600 | $550^{h6}$ | 660 | 22 | 6 |
| | | 4 - 8 | 604 | 485 | 1132 | 1282 | 1207 | 417 | $80^{m6}$ | 170 | $22^{h9}$ | 85 | $65^{m6}$ | 140 | $18^{h9}$ | 69 | 22 | 600 | $550^{h6}$ | 660 | 22 | 6 |
| | MD | 8 | 604 | 485 | 1132 | 1282 | 1207 | 417 | $90^{m6}$ | 170 | $25^{h9}$ | 95 | $65^{m6}$ | 140 | $18^{h9}$ | 69 | 22 | 600 | $550^{h6}$ | 660 | 22 | 6 |
| | L | 2 | 604 | 547 | 1252 | 1402 | 1327 | 402 | $70^{m6}$ | 140 | $20^{h9}$ | 74,5 | $65^{m6}$ | 140 | $18^{h9}$ | 64 | 22 | 600 | $550^{h6}$ | 660 | 22 | 6 |
| | | 4 - 6 | 604 | 547 | 1282 | 1432 | 1357 | 432 | $90^{m6}$ | 170 | $25^{h9}$ | 95 | $65^{m6}$ | 140 | $18^{h9}$ | 69 | 22 | 600 | $550^{h6}$ | 660 | 22 | 6 |



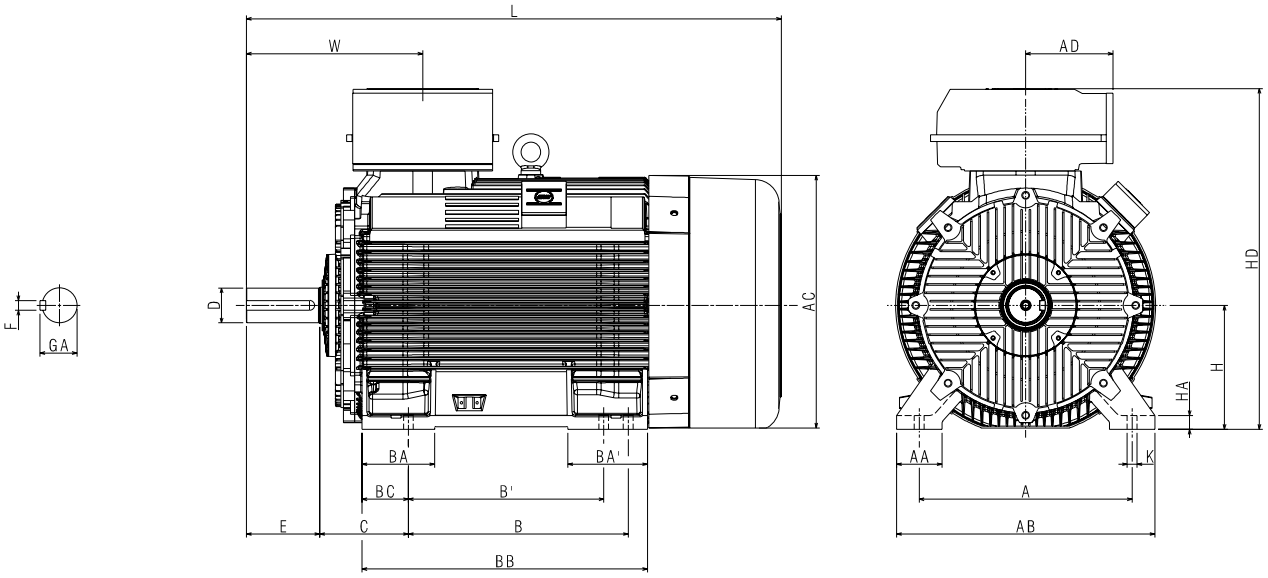



## DIMENSIONS
### IM B3 (IM 1001)

| MOTOR TYPE | | POLES | A | AA | AB | AC | AD | B | BA | BB | BC | B' | BA' | C | H | HA | HB | HD | K | L | LC | W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B5_ 355 | LA - LB | 2 | 610 | 130 | 740 | 770 | 267 | 630 | 208 | 818 | 133 | 560 | 228 | 254 | 355$^{-1}$ | 40 | 607 | 962 | 28 | 1475 | 1595 | 435 |
| | LA - LB | 4 - 12 | 610 | 130 | 740 | 770 | 267 | 630 | 208 | 818 | 133 | 560 | 228 | 254 | 355$^{-1}$ | 40 | 607 | 962 | 28 | 1545 | 1665 | 505 |
| | LC - LE | 2 | 610 | 130 | 740 | 770 | 267 | 630 | 208 | 1018 | 133 | 800 | 313 | 254 | 355$^{-1}$ | 40 | 607 | 962 | 28 | 1675 | 1795 | 435 |
| | LC - LF | 4 - 12 | 610 | 130 | 740 | 770 | 267 | 630 | 208 | 1018 | 133 | 800 | 313 | 254 | 355$^{-1}$ | 40 | 607 | 962 | 28 | 1745 | 1865 | 505 |
| B5_ 400 | LA - LC | 2 | 686 | 140 | 830 | 850 | 267 | 710 | 248 | 1239 | 155 | 900 | 458 | 280 | 400$^{-1}$ | 42 | 657 | 1057 | 35 | 1910 | 2030 | 455 |
| | LA - LD | 4 - 12 | 686 | 140 | 830 | 850 | 267 | 710 | 248 | 1239 | 155 | 900 | 458 | 280 | 400$^{-1}$ | 42 | 657 | 1057 | 35 | 1980 | 2100 | 525 |
| B5_ 450 | LA - LC | 2 | 800 | 150 | 950 | 950 | 620 | 1120 | 251 | 1373 | 130 | 1000 | 382 | 280 | 450$^{-1}$ | 42 | 865 | 1315 | 35 | 2135 | 2262 | 510 |
| | | 4 - 12 | 800 | 150 | 950 | 950 | 620 | 1120 | 251 | 1373 | 130 | 1000 | 382 | 280 | 450$^{-1}$ | 42 | 865 | 1315 | 35 | 2175 | 2302 | 550 |
| B5_ 500 | LA - LC | 4 - 12 | 900 | 170 | 1050 | 1070 | 620 | 1250 | 310 | 1552 | 130 | - | 310 | 280 | 500$^{-1}$ | 50 | 930 | 1430 | 42 | 2390 | 2515 | 590 |

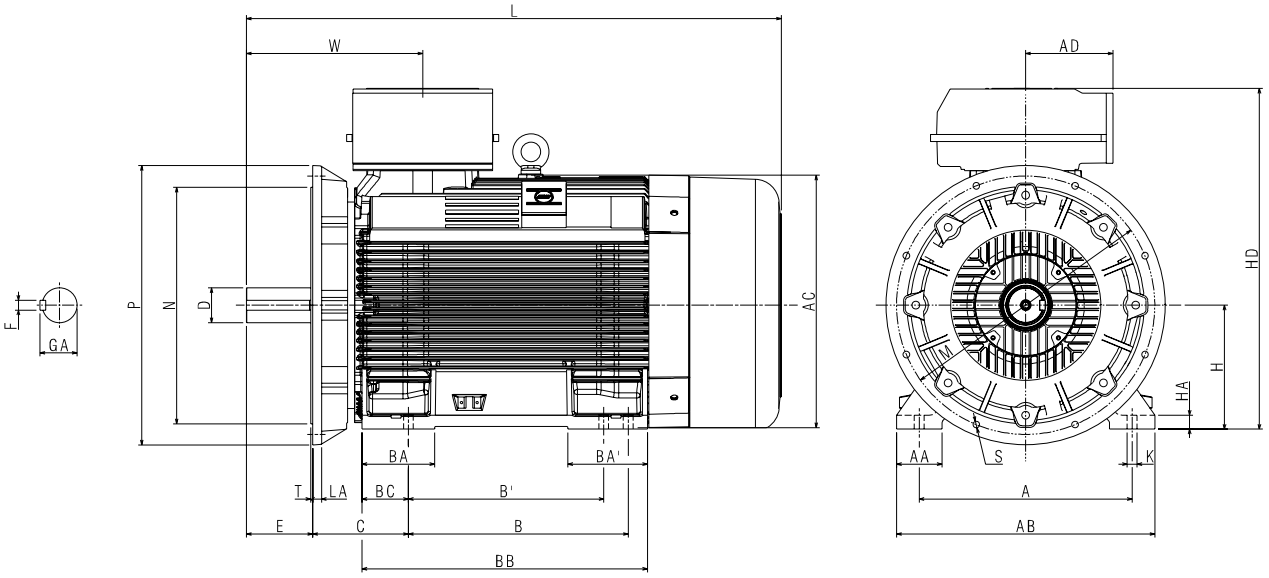
| | | | Shaft extension | | | |
|---|---|---|---|---|---|---|
| MOTOR TYPE | | POLES | D | E | F | GA |
| B5_ 355 | LA - LB | 2 | 75$^{m6}$ | 140 | 20$^{h9}$ | 79,5 |
| | LA - LB | 4 - 12 | 100$^{m6}$ | 210 | 28$^{h9}$ | 106 |
| | LC - LE | 2 | 75$^{m6}$ | 140 | 20$^{h9}$ | 79,5 |
| | LC - LF | 4 - 12 | 100$^{m6}$ | 210 | 28$^{h9}$ | 106 |
| B5_ 400 | LA - LC | 2 | 75$^{m6}$ | 140 | 20$^{h9}$ | 79,5 |
| | LA - LD | 4 - 12 | 100$^{m6}$ | 210 | 28$^{h9}$ | 106 |
| B5_ 450 | LA - LC | 2 | 90$^{m6}$ | 170 | 25$^{h9}$ | 95 |
| | | 4 - 12 | 120$^{m6}$ | 210 | 32$^{h9}$ | 127 |
| B5_ 500 | LA - LC | 4 - 12 | 130$^{m6}$ | 250 | 32$^{h9}$ | 137 |



## DIMENSIONS
### IM B35 (IM 2001)

| MOTOR TYPE | | POLES | A | AA | AB | AC | AD | B | BA | BB | BC | B' | BA' | C | H | HA | HB | HD | K | L | LC | W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B5_ 355 | LA - LB | 2 | 610 | 130 | 740 | 770 | 267 | 630 | 208 | 818 | 133 | 560 | 228 | 254 | 355$^{-1}$ | 40 | 607 | 962 | 28 | 1475 | 1595 | 435 |
| | LA - LB | 4 - 12 | 610 | 130 | 740 | 770 | 267 | 630 | 208 | 818 | 133 | 560 | 228 | 254 | 355$^{-1}$ | 40 | 607 | 962 | 28 | 1545 | 1665 | 505 |
| | LC - LE | 2 | 610 | 130 | 740 | 770 | 267 | 630 | 208 | 1018 | 133 | 800 | 313 | 254 | 355$^{-1}$ | 40 | 607 | 962 | 28 | 1675 | 1795 | 435 |
| | LC - LF | 4 - 12 | 610 | 130 | 740 | 770 | 267 | 630 | 208 | 1018 | 133 | 800 | 313 | 254 | 355$^{-1}$ | 40 | 607 | 962 | 28 | 1745 | 1865 | 505 |
| B5_ 400 | LA - LC | 2 | 686 | 140 | 830 | 850 | 267 | 710 | 248 | 1239 | 155 | 900 | 458 | 280 | 400$^{-1}$ | 42 | 657 | 1057 | 35 | 1910 | 2030 | 455 |
| | LA - LD | 4 - 12 | 686 | 140 | 830 | 850 | 267 | 710 | 248 | 1239 | 155 | 900 | 458 | 280 | 400$^{-1}$ | 42 | 657 | 1057 | 35 | 1980 | 2100 | 525 |
| B5_ 450 | LA - LC | 2 | 800 | 150 | 950 | 950 | 620 | 1120 | 251 | 1373 | 130 | 1000 | 382 | 280 | 450$^{-1}$ | 42 | 865 | 1315 | 35 | 2135 | 2262 | 510 |
| | | 4 - 12 | 800 | 150 | 950 | 950 | 620 | 1120 | 251 | 1373 | 130 | 1000 | 382 | 280 | 450$^{-1}$ | 42 | 865 | 1315 | 35 | 2175 | 2302 | 550 |
| B5_ 500 | LA - LC | 4 - 12 | 900 | 170 | 1050 | 1070 | 620 | 1250 | 310 | 1552 | 130 | - | 310 | 280 | 500$^{-1}$ | 50 | 930 | 1430 | 42 | 2390 | 2515 | 590 |

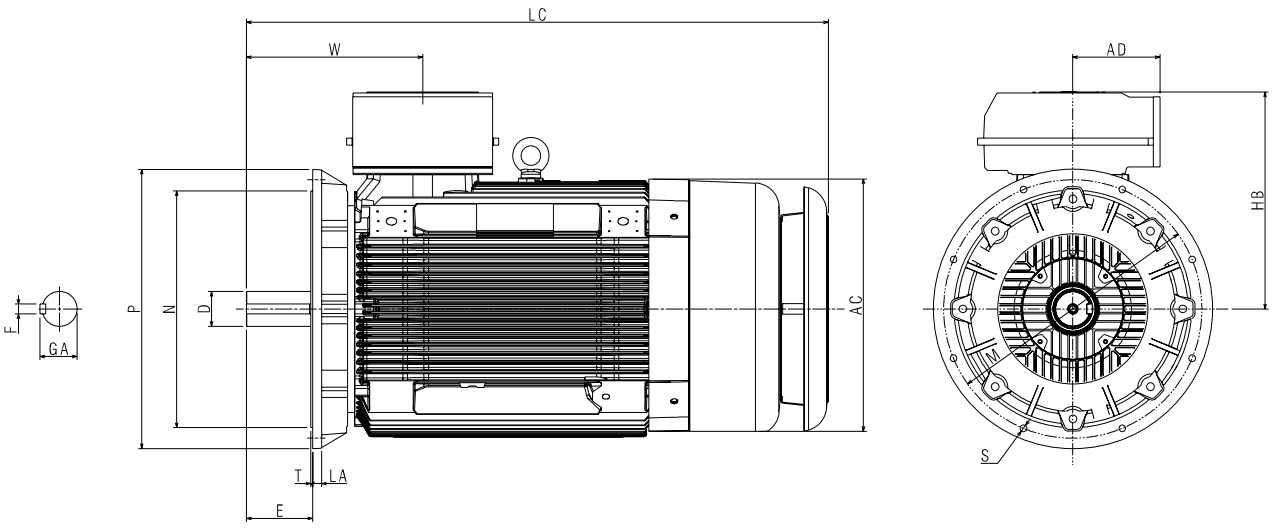
| | | | Shaft extension | | | | Flange B5 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MOTOR TYPE | | POLES | D | E | F | GA | LA | M | N | P | S | T |
| B5_ 355 | LA - LB | 2 | 75$^{m6}$ | 140 | 20$^{h9}$ | 79,5 | 25 | 740 | 680$^{h6}$ | 800 | 24 | 6 |
| | LA - LB | 4 - 12 | 100$^{m6}$ | 210 | 28$^{h9}$ | 106 | 25 | 740 | 680$^{h6}$ | 800 | 24 | 6 |
| | LC - LE | 2 | 75$^{m6}$ | 140 | 20$^{h9}$ | 79,5 | 25 | 740 | 680$^{h6}$ | 800 | 24 | 6 |
| | LC - LF | 4 - 12 | 100$^{m6}$ | 210 | 28$^{h9}$ | 106 | 25 | 740 | 680$^{h6}$ | 800 | 24 | 6 |
| B5_ 400 | LA - LC | 2 | 75$^{m6}$ | 140 | 20$^{h9}$ | 79,5 | 28 | 940 | 880$^{h6}$ | 1000 | 28 | 6 |
| | LA - LD | 4 - 12 | 100$^{m6}$ | 210 | 28$^{h9}$ | 106 | 28 | 940 | 880$^{h6}$ | 1000 | 28 | 6 |
| B5_ 450 | LA - LC | 2 | 90$^{m6}$ | 170 | 25$^{h9}$ | 95 | 30 | 1080 | 1000$^{h6}$ | 1150 | 28 | 6 |
| | | 4 - 12 | 120$^{m6}$ | 210 | 32$^{h9}$ | 127 | 30 | 1080 | 1000$^{h6}$ | 1150 | 28 | 6 |
| B5_ 500 | LA - LC | 4 - 12 | 130$^{m6}$ | 250 | 32$^{h9}$ | 137 | 30 | 1080 | 1000$^{h6}$ | 1150 | 28 | 6 |



## DIMENSIONS

### IM V1 (IM 3011)

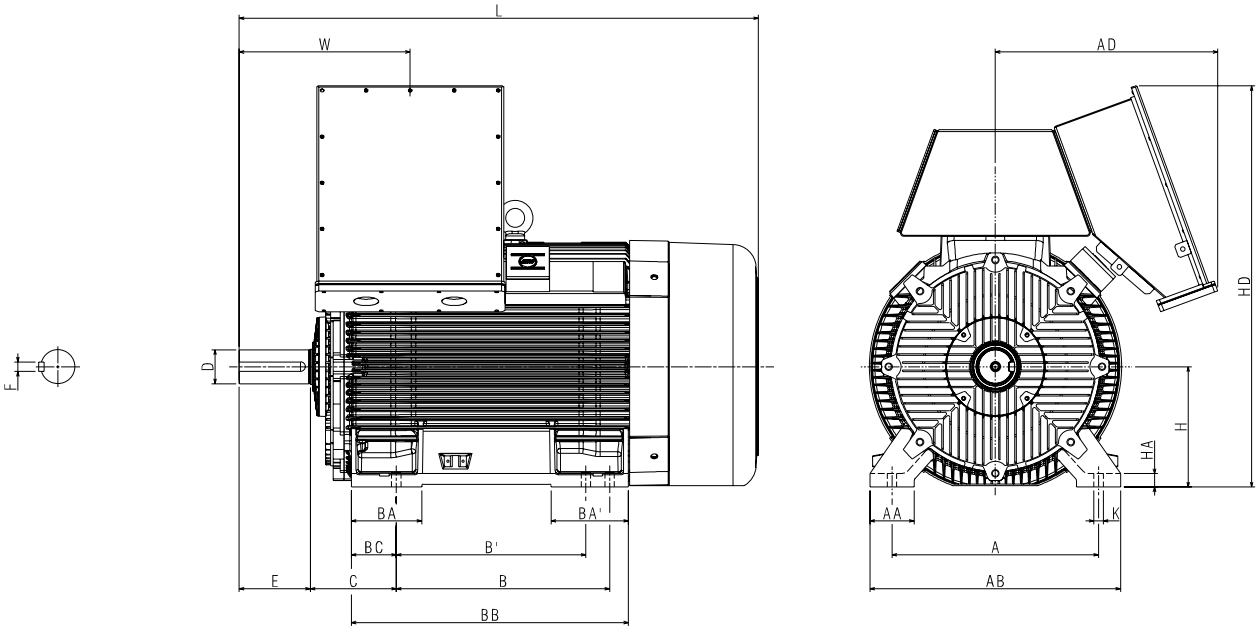
| MOTOR TYPE | | POLES | AC | AD | HB | LC | W | Shaft extension | | | | Flange B5 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | D | E | F | GA | LA | M | N | P | S | T |
| B5_ 355 | LA - LB | 2 | 770 | 267 | 607 | 1595 | 435 | $75^{m6}$ | 140 | $20^{h9}$ | 79,5 | 25 | 740 | $680^{h6}$ | 800 | 24 | 6 |
| | LA - LB | 4 - 12 | 770 | 267 | 607 | 1665 | 505 | $100^{m6}$ | 210 | $28^{h9}$ | 106 | 25 | 740 | $680^{h6}$ | 800 | 24 | 6 |
| | LC - LE | 2 | 770 | 267 | 607 | 1795 | 435 | $75^{m6}$ | 140 | $20^{h9}$ | 79,5 | 25 | 740 | $680^{h6}$ | 800 | 24 | 6 |
| | LC - LF | 4 - 12 | 770 | 267 | 607 | 1865 | 505 | $100^{m6}$ | 210 | $28^{h9}$ | 106 | 25 | 740 | $680^{h6}$ | 800 | 24 | 6 |
| B5_ 400 | LA - LC | 2 | 850 | 267 | 657 | 2030 | 455 | $75^{m6}$ | 140 | $20^{h9}$ | 79,5 | 28 | 940 | $880^{h6}$ | 1000 | 28 | 6 |
| | LA - LD | 4 - 12 | 850 | 267 | 657 | 2100 | 525 | $100^{m6}$ | 210 | $28^{h9}$ | 106 | 28 | 940 | $880^{h6}$ | 1000 | 28 | 6 |
| B5_ 450 | LA - LC | 2 | 950 | 620 | 865 | 2262 | 510 | $90^{m6}$ | 170 | $25^{h9}$ | 95 | 30 | 1080 | $1000^{h6}$ | 1150 | 28 | 6 |
| | | 4 - 12 | 950 | 620 | 865 | 2302 | 550 | $120^{m6}$ | 210 | $32^{h9}$ | 127 | 30 | 1080 | $1000^{h6}$ | 1150 | 28 | 6 |
| B5_ 500 | LA - LC | 4 - 12 | 1070 | 620 | 930 | 2515 | 590 | $130^{m6}$ | 250 | $32^{h9}$ | 137 | - | 930 | 1430 | 42 | 2390 | 2515 |



## DIMENSIONS
### IM B3 (IM 1001)

| MOTOR TYPE | | POLES | A | AA | AB | AC | AD | B | BA | BB | BC | B' | BA' | C | H | HA | HB | HD | K | L | LC | W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B5_ 355 | LA | 2 | 610 | 130 | 740 | 770 | 650 | 630 | 208 | 1018 | 133 | 800 | 313 | 254 | 355-1 | 40 | 835 | 1190 | 28 | 1675 | 1795 | 435 |
| | LA | 4 - 8 | 610 | 130 | 740 | 770 | 650 | 630 | 208 | 1018 | 133 | 800 | 313 | 254 | 355-1 | 40 | 835 | 1190 | 28 | 1745 | 1865 | 505 |
| | LB - LC | 2 | 610 | 130 | 740 | 770 | 650 | 800 | 248 | 1168 | 133 | 900 | 293 | 254 | 355-1 | 40 | 835 | 1190 | 28 | 1825 | 1945 | 435 |
| | LB - LD | 4 - 8 | 610 | 130 | 740 | 770 | 650 | 800 | 248 | 1168 | 133 | 900 | 293 | 254 | 355-1 | 40 | 835 | 1190 | 28 | 1895 | 2015 | 505 |
| B5_ 400 | LA - LC | 2 | 686 | 140 | 830 | 850 | 650 | 710 | 248 | 1239 | 155 | 900 | 458 | 280 | 400-1 | 42 | 885 | 1285 | 35 | 1910 | 2030 | 455 |
| | LA - LD | 4 - 8 | 686 | 140 | 830 | 850 | 650 | 710 | 248 | 1239 | 155 | 900 | 458 | 280 | 400-1 | 42 | 885 | 1285 | 35 | 1980 | 2100 | 525 |
| B5_ 450 | LA - LD | 2 | 800 | 150 | 950 | 950 | 650 | 1120 | 251 | 1373 | 130 | 1000 | 382 | 280 | 450-1 | 42 | 948 | 1398 | 35 | 2135 | 2262 | 510 |
| | | 4 - 8 | 800 | 150 | 950 | 950 | 650 | 1120 | 251 | 1373 | 130 | 1000 | 382 | 280 | 450-1 | 42 | 948 | 1398 | 35 | 2175 | 2302 | 550 |
| B5_ 500 | LA - LC | 2 | Dimensions available on request | | | | | | | | | | | | | | | | | | | |
| | | 4 - 8 | 900 | 170 | 1050 | 1070 | 650 | 1250 | 310 | 1552 | 130 | - | 310 | 280 | 500-1 | 50 | 1010 | 1510 | 42 | 2390 | 2515 | 590 |

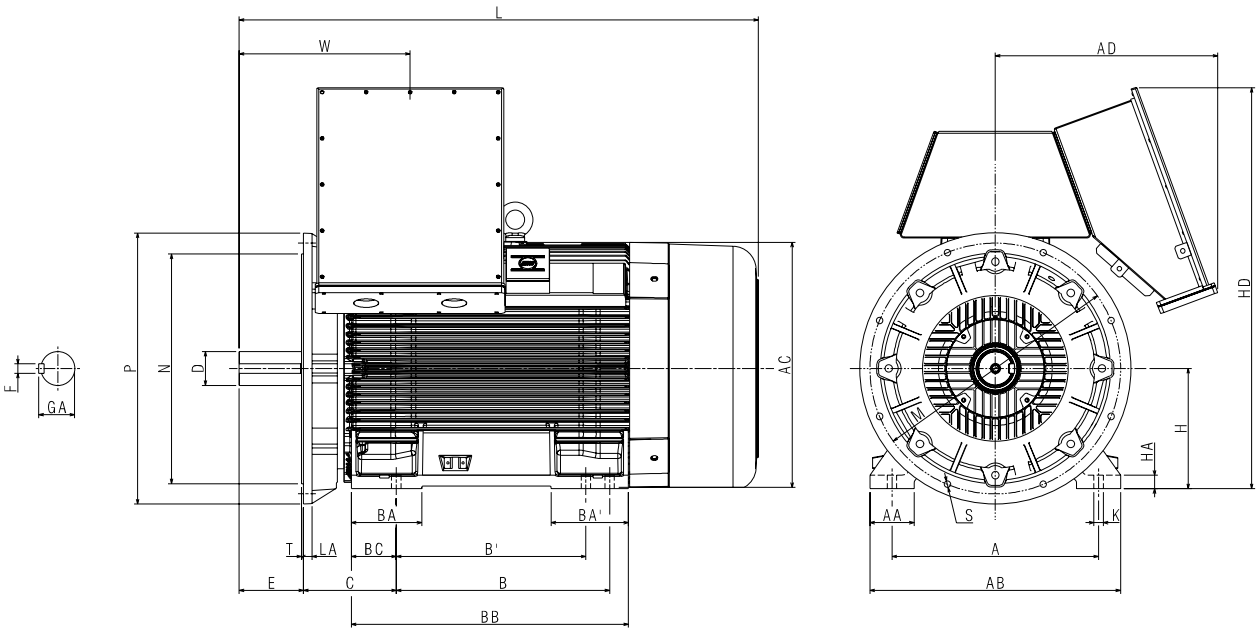
| | | | Shaft extension | | | |
|---|---|---|---|---|---|---|
| MOTOR TYPE | | POLES | D | E | F | GA |
| B5_ 355 | LA | 2 | 75m6 | 140 | 20h9 | 79,5 |
| | LA | 4 - 8 | 100m6 | 210 | 28h9 | 106 |
| | LB - LC | 2 | 75m6 | 140 | 20h9 | 79,5 |
| | LB - LD | 4 - 8 | 100m6 | 210 | 28h9 | 106 |
| B5_ 400 | LA - LC | 2 | 75m6 | 140 | 20h9 | 79,5 |
| | LA - LD | 4 - 8 | 100m6 | 210 | 28h9 | 106 |
| B5_ 450 | LA - LD | 2 | 90m6 | 170 | 25h9 | 95 |
| | | 4 - 8 | 120m6 | 210 | 32h9 | 127 |
| B5_ 500 | LA - LC | 2 | Dimensions available on request | | | |
| | | 4 - 8 | 130m6 | 250 | 32h9 | 137 |



## DIMENSIONS
### IM B35 (IM 2001)

| MOTOR TYPE | | POLES | A | AA | AB | AC | AD | B | BA | BB | BC | B' | BA' | C | H | HA | HB | HD | K | L | LC | W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B5_ 355 | LA | 2 | 610 | 130 | 740 | 770 | 650 | 630 | 208 | 1018 | 133 | 800 | 313 | 254 | 355-1 | 40 | 835 | 1190 | 28 | 1675 | 1795 | 435 |
| | LA | 4 - 8 | 610 | 130 | 740 | 770 | 650 | 630 | 208 | 1018 | 133 | 800 | 313 | 254 | 355-1 | 40 | 835 | 1190 | 28 | 1745 | 1865 | 505 |
| | LB - LC | 2 | 610 | 130 | 740 | 770 | 650 | 800 | 248 | 1168 | 133 | 900 | 293 | 254 | 355-1 | 40 | 835 | 1190 | 28 | 1825 | 1945 | 435 |
| | LB - LD | 4 - 8 | 610 | 130 | 740 | 770 | 650 | 800 | 248 | 1168 | 133 | 900 | 293 | 254 | 355-1 | 40 | 835 | 1190 | 28 | 1895 | 2015 | 505 |
| B5_ 400 | LA - LC | 2 | 686 | 140 | 830 | 850 | 650 | 710 | 248 | 1239 | 155 | 900 | 458 | 280 | 400-1 | 42 | 885 | 1285 | 35 | 1910 | 2030 | 455 |
| | LA - LD | 4 - 8 | 686 | 140 | 830 | 850 | 650 | 710 | 248 | 1239 | 155 | 900 | 458 | 280 | 400-1 | 42 | 885 | 1285 | 35 | 1980 | 2100 | 525 |
| B5_ 450 | LA - LD | 2 | 800 | 150 | 950 | 950 | 650 | 1120 | 251 | 1373 | 130 | 1000 | 382 | 280 | 450-1 | 42 | 948 | 1398 | 35 | 2135 | 2262 | 510 |
| | | 4 - 8 | 800 | 150 | 950 | 950 | 650 | 1120 | 251 | 1373 | 130 | 1000 | 382 | 280 | 450-1 | 42 | 948 | 1398 | 35 | 2175 | 2302 | 550 |
| B5_ 500 | LA - LC | 2 | Dimensions available on request | | | | | | | | | | | | | | | | | | | |
| | | 4 - 8 | 900 | 170 | 1050 | 1070 | 650 | 1250 | 310 | 1552 | 130 | - | 310 | 280 | 500-1 | 50 | 1010 | 1510 | 42 | 2390 | 2515 | 590 |

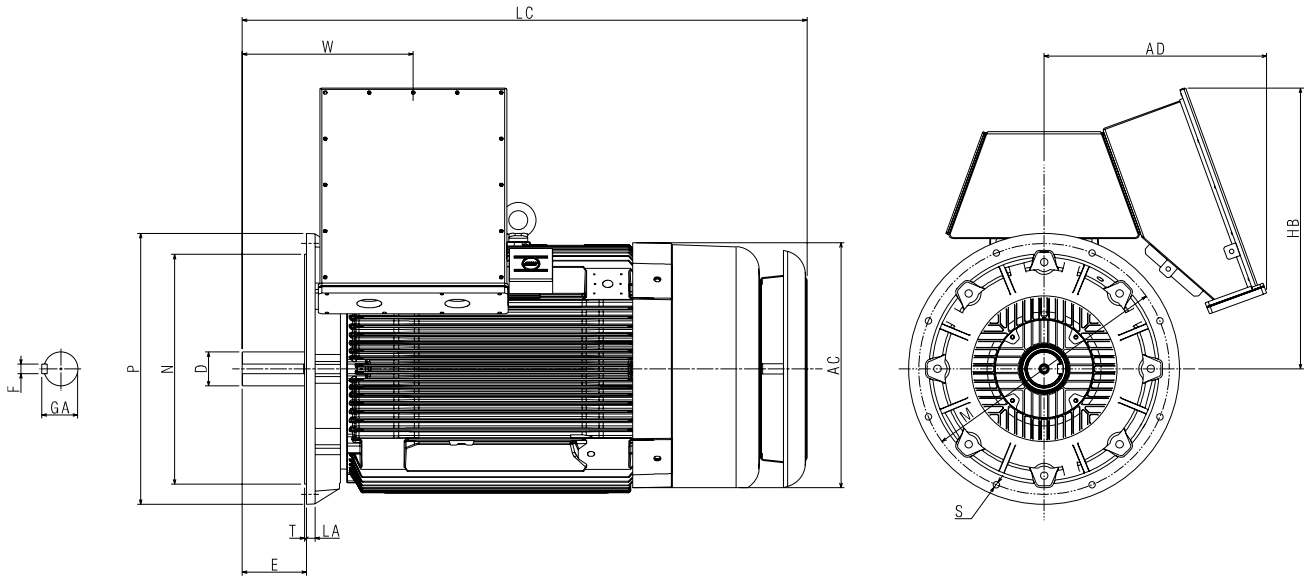
| | | | Shaft extension | | | | Flange B5 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MOTOR TYPE | | POLES | D | E | F | GA | LA | M | N | P | S | T |
| B5_ 355 | LA | 2 | 75m6 | 140 | 20h9 | 79,5 | 25 | 740 | 680h6 | 800 | 24 | 6 |
| | LA | 4 - 8 | 100m6 | 210 | 28h9 | 106 | 25 | 740 | 680h6 | 800 | 24 | 6 |
| | LB - LC | 2 | 75m6 | 140 | 20h9 | 79,5 | 25 | 740 | 680h6 | 800 | 24 | 6 |
| | LB - LD | 4 - 8 | 100m6 | 210 | 28h9 | 106 | 25 | 740 | 680h6 | 800 | 24 | 6 |
| B5_ 400 | LA - LC | 2 | 75m6 | 140 | 20h9 | 79,5 | 28 | 940 | 880h6 | 1000 | 28 | 6 |
| | LA - LD | 4 - 8 | 100m6 | 210 | 28h9 | 106 | 28 | 940 | 880h6 | 1000 | 28 | 6 |
| B5_ 450 | LA - LD | 2 | 90m6 | 170 | 25h9 | 95 | 30 | 1080 | 1000h6 | 1150 | 28 | 6 |
| | | 4 - 8 | 120m6 | 210 | 32h9 | 127 | 30 | 1080 | 1000h6 | 1150 | 28 | 6 |
| B5_ 500 | LA - LC | 2 | Dimensions available on request | | | | NA | | | | | |
| | | 4 - 8 | 130m6 | 250 | 32h9 | 137 | 30 | 1080 | 1000h6 | 1150 | 28 | 6 |



## DIMENSIONS

### IM V1 (IM 3011)

| MOTOR TYPE | | POLES | AC | AD | HB | LC | W | Shaft extension | | | | Flange B5 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | D | E | F | GA | LA | M | N | P | S | T |
| B5_ 355 | LA | 2 | 770 | 650 | 835 | 1795 | 435 | $75^{m6}$ | 140 | $20^{h9}$ | 79,5 | 25 | 740 | $680^{h6}$ | 800 | 24 | 6 |
| | LA | 4 - 8 | 770 | 650 | 835 | 1865 | 505 | $100^{m6}$ | 210 | $28^{h9}$ | 106 | 25 | 740 | $680^{h6}$ | 800 | 24 | 6 |
| | LB - LC | 2 | 770 | 650 | 835 | 1945 | 435 | $75^{m6}$ | 140 | $20^{h9}$ | 79,5 | 25 | 740 | $680^{h6}$ | 800 | 24 | 6 |
| | LB - LD | 4 - 8 | 770 | 650 | 835 | 2015 | 505 | $100^{m6}$ | 210 | $28^{h9}$ | 106 | 25 | 740 | $680^{h6}$ | 800 | 24 | 6 |
| B5_ 400 | LA - LC | 2 | 850 | 650 | 885 | 2030 | 455 | $75^{m6}$ | 140 | $20^{h9}$ | 79,5 | 28 | 940 | $880^{h6}$ | 1000 | 28 | 6 |
| | LA - LD | 4 - 8 | 850 | 650 | 885 | 2100 | 525 | $100^{m6}$ | 210 | $28^{h9}$ | 106 | 28 | 940 | $880^{h6}$ | 1000 | 28 | 6 |
| B5_ 450 | LA - LD | 2 | 950 | 650 | 948 | 2262 | 510 | $90^{m6}$ | 170 | $25^{h9}$ | 95 | 30 | 1080 | $1000^{h6}$ | 1150 | 28 | 6 |
| | | 4 - 8 | 950 | 650 | 948 | 2302 | 550 | $120^{m6}$ | 210 | $32^{h9}$ | 127 | 30 | 1080 | $1000^{h6}$ | 1150 | 28 | 6 |
| B5_ 500 | LA - LC | 2 | Dimensions available on request | | | | | | | | | NA | | | | | |
| | | 4 - 8 | 1070 | 650 | 1010 | 2515 | 590 | $130^{m6}$ | 250 | $32^{h9}$ | 137 | 30 | 1080 | $1000^{h6}$ | 1150 | 28 | 6 |



## OPTIONS CODES

| Option | | Size | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | Description | 160 | 180 | 200 | 225 | 250 | 280 | 315 | 355 | 400 | 450 | 500 |
| 100 | Insulation class H | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 102 | N° 9 Terminals | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 103 | N° 12 Terminals | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 104 | Flying Leads = L mm | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 107 | Tropicalisation | 0 | 0 | 0 | 0 | 0 | S | S | S | S | S | S |
| 108 | Anticondensation heaters, with terminals in main terminal box | 0 | 0 | 0 | 0 | 0 | 0 | 0 | NA | NA | NA | NA |
| 109 | Anticondensation heaters, with terminals in auxiliary terminal box | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 110 | Bi-metal cut-out switch with terminals in main terminal box | 0 | 0 | 0 | 0 | 0 | 0 | 0 | NA | NA | NA | NA |
| 111 | PTC thermistors with terminals in main terminal box | 0 | 0 | 0 | 0 | 0 | 0 | S | NA | NA | NA | NA |
| 112 | PT100 thermodetectors with terminals in main terminal box | 0 | 0 | 0 | 0 | 0 | 0 | 0 | NA | NA | NA | NA |
| 113 | Bi-metal cut-out switch with terminals in auxiliary terminal box | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 114 | PTC thermistors with terminals in auxiliary terminal box | 0 | 0 | 0 | 0 | 0 | 0 | 0 | S | S | S | S |
| 115 | PT100 thermodetectors with terminals in auxiliary terminal box | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 122 | Thermodetectors PT100 in Bearings | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 125 | Protection degree IP56 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 126 | Protection degree IP65 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | NA | NA | NA | NA |
| 127 | Second shaft end | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 128 | Sealed bearings | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 129 | Roller bearins on D-end | 0 | 0 | 0 | 0 | 0 | S* | S* | S | S | S | S |
| 130 | Oil seal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 131 | Drainage hole with tap | 0 | 0 | 0 | 0 | 0 | 0 | S | S | S | S | S |
| 132 | Vibration level A | S | S | S | S | S | S | S | S | S | S | S |
| 133 | Vibration level B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 134 | Metallic Fan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | S | S | S | S |
| 135 | Fan cover textile | 0 | 0 | 0 | 0 | 0 | 0 | 0 | NA | NA | NA | NA |
| 136 | D-end special shaft extension | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 137 | Low temperature duty -25°C. -40°C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 138 | D-end and N-end grease nipples | 0 | 0 | 0 | 0 | 0 | S | S | S | S | S | S |
| 139 | Arrangement for SPM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | S | S | S | S |
| 154 | Arrangement for tachometer | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 159 | Complete with tachometer | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 160 | Arrangement for encoder standard type | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 161 | Complete with encoder standard type | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 170 | Anti rain canopy for IM V1 | S | S | S | S | S | S | S | S | S | S | S |
| 174 | Locked D-end bearing | 0 | 0 | 0 | 0 | 0 | S* | S* | S | S | S | S |
| 175 | Insulated D-end bearing | NA | NA | NA | NA | NA | 0 | 0 | 0 | 0 | 0 | 0 |
| 177 | Forced ventilation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 178 | Enhanced insulation system for Inverter application | NA | NA | NA | NA | NA | 0 | 0 | 0 | 0 | 0 | 0 |
| 179 | Special fan for reduced noise level | NA | NA | NA | NA | NA | NA | 0 | 0 | 0 | 0 | 0 |
| 304 | Special voltage and/or fraquency | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 312 | Special cable entry | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 313 | Brass cablglands | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 919 | Non standard RAL paint colour | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 930 | Special painting process for agressive environments | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

* Optional for 2 poles
0 Optional
S Standard
NA Not Available

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**HEADQUARTERS**

**Marelli Motori S.p.A.**

Via Sabbionara 1
36071 Arzignano (VI) - Italy
(T) +39 0444 479711
(F) +39 0444 479888
www.marellimotori.com
sales@marellimotori.com

**Branches**

**Milan**

Via Cesare Cantù 29
20092 Cinisello Balsamo (MI) - Italy
(T) +39 02 66013166
(F) +39 02 66013483
milan@marellimotori.com

**Florence**

Via Panciatichi 37/2
50127 Firenze - Italy
(T) +39 055 431838
(F) +39 055 433351
florence@marellimotori.com

**OVERSEAS COMPANIES**

**ASIA PACIFIC**

**Marelli Asia Pacific Sdn Bhd**
**Marelli Manufacturing Asia Sdn Bhd**

Lot PT 5038-5041 Jalan Teluk Datuk 28/40
Off Persiaran Sepang, Seksyen 28,
40400 Shah Alam, Selangor D.E.
Malaysia
(T) +60 3 5192 7213
(F) +60 3 5192 6293
asiapacific@marellimotori.com

**SOUTH AFRICA**

**Marelli Electrical Machines South Africa (Pty) Ltd**
Unit 4, 55 Activia Rd - Activia Park
Elandsfontein,
1406 Gauteng
Republic of South Africa
(T) +27 11 822 5566
(F) +27 11 828 8089
southafrica@marellimotori.com

**CENTRAL EUROPE**

**Marelli Central Europe GmbH**
Heilswannenweg 50
31008 Elze
Germany

(T) +49 5068 462 400
(F) +49 5068 462 409
germany@marellimotori.com

**SPAIN**

**Representative Office**
Calle Constanza 5
08029 Barcelona
Spain

(T) +34 66 446 4121
(F) +34 93 419 6094
spain@marellimotori.com

**GREAT BRITAIN**

**Marelli UK Ltd**
Meadow Lane
Loughborough
Leicester LE11 1NB
UK
(T) +44 1509 615 518
(F) +44 1509 615 514
uk@marellimotori.com

**USA**

**Marelli USA, Inc**
1620 Danville Road
PO Box 410
Harrodsburg, KY 40330
USA
(T) +1 859 7 342 588
(F) +1 859 7 340 629
usa@marellimotori.com