ENERTECH

2nd Edition

IE2

IE1

# ESA Series Three Phase IEC Low Voltage Motors

## Three phase asynchronous

ESA Series Motors  Enhanced performance aluminum units

# General specification

## Introduction

ESA electric motors with aluminum units are suitable for various kinds of applications. The output ratings are from 0.06kW to 11kW. The frame sizes are from 56 to 160.

The ESA motors have aluminum stator frames, endshields, feet and terminal boxes.

The location of the terminal box in standard design is on the top, on the right or on the left are possible. The position of the entry opening can be adjusted to suit the existing connection facilities by turning through 90°.

Those aluminum motors are suitable for the following applications: pumps, fans, compressors, conveyor systems, packaging machines, automation and drives, manufacturing industry...

All motors comply with the requirements of European CE marking.

All motors are designed for high efficiency IE1 and IE2, reliable operation and low temperature giving a long economical service life.

## Specification

### Cooling and ventilation

The standard cooling method is totally enclosed fan-cooled (TEFC) in accordance with code IC411 of IEC 60034-6.

Standard motors in sizes 56-160 are equipped with radial-flow plastic fans.

### Enclosure

The standard degree of protection is IP 55.

The IP55 enclosure means complete hoseproof and dustproof protection.

A higher degree of protection is available.

### Voltage and frequency

Standard voltages are 380V/50Hz or 425V/50Hz, but can be wound for any single voltage in the range 200-600V at a frequency 50 or 60 Hz.

The motors will operate satisfactorily with voltage variations of ±10% from the rated voltage.

### Connection

Direct - on line starting can be used on all frame sizes. Motors up to and including 3kW are star connected and cannot be started with Star/Delt started. Motors 4kW and above can be started with Star/Delt started.

### Noise

The permitted noise levels of electrical machines are fixed in IEC60034 - 9 (EN60034-9). The noise level of ESA motors is well below these limit values.

For details, please refer to the performance data tables.

### Vibration

Standard motors are designed for vibration class N (normal). Vibration class R (reduced) and vibration class S (special) are available on request.

### Quality assurance

Stringent quality procedures are observed from the first design to finished products in accordance with ISO9001 documented quality systems.

Our factories have been assessed to meet these requirements, a further assurance that only the highest possible standards of quality are accepted.

# Standards and regulations

ESA motors are built to comply with the requirements of the following international standards and regulations

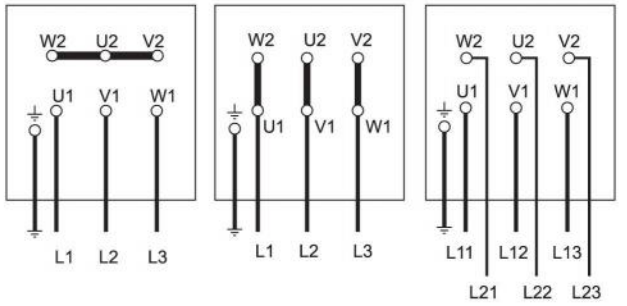
1. International Electrotechnical Commission - IEC 60034 and IEC 60072.
2. British Standards - BS5000 and BS 4999.
3. Australian Standards - AS 1359.
4. The requirements of European EC marking. Low voltage Directive 73/23 (1973), modified by Directive 93/68 (1993) and the EMC - Directive 89/336. These ESA motors are designed to use with other machinery, and they should only be used if the complete machinery is in conformity with the provisions of the Directive of safety of machinery (89/93/EEC).
5. CEMEP agreement-all motors with standard rating included in this catalogue comply with IE1 efficiency (class EFF2)* and IE2 efficiency.

| Standards | IEC | CENELEC | BS |
|---|---|---|---|
| General requirements for electrical machines | 60034-1 | EN 60034-1 | 4999-1<br>4999-69 |
| Methods of determining losses and efficiency | 60034-2 | HD 53 2 | 4999-34 |
| Degrees of protection | 60034-5 | EN60034-5 | 4999-20 |
| Methods of cooling | 60034-6 | EN60034-6 | 4999-21 |
| Mounting arrangements | 60034-7 | EN60034-7 | 4999-22 |
| Terminal markings and direction of rotation | 60034-8 | HD 53 8S4 | 4999-3 |
| Noise limits | 60034-9 | EN60034-9 | 4999-51 |
| Starting performance | 60034-12 | EN60034-12 | 4999-112 |
| Mechanical vibration | 60034-14 | EN60034-14 | 4999-50 |
| Standard voltages | 60038 | HD 472 S1 | |
| Dimensions and output ratings | 60072 | | |
| Mounting dimensions and relationship framesizes-output ratings | 60072 | HD 231 | 4999-10<br>51-110 |
| Shaft dimensions | 60072 | HD 231 | 4999-10 |
| Classification of environmental conditions | 600721-2-1 | | |
| Insulation material | 60085 | | |

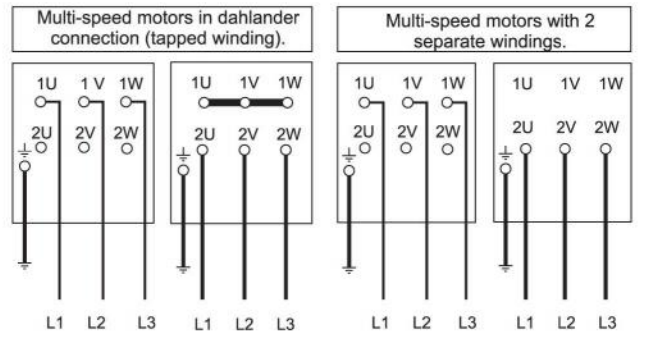
* The ESA motor range corresponds to the new international standard IEC 00034-30

# Standards and regulations

## Connection diagrams




Star connection | Delta connection | Connection to Star-delta starter




Low speed | High speed | Low speed | High speed

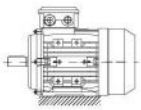
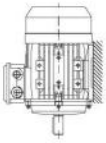
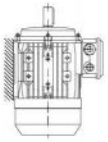
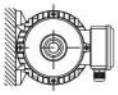
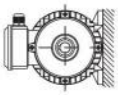
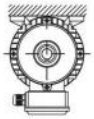
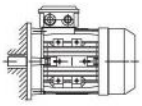
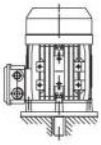
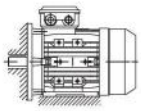
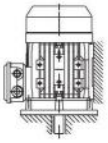
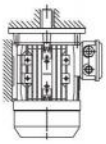
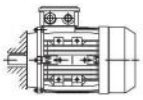
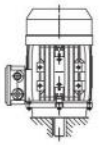
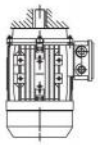
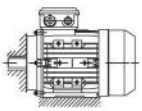
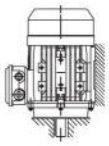
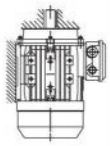
## Rating plates

Frame size from 56 to 160

| ENERTECH ELECTRIC MOTORS (AUSTRALIA) CE | | | | | | | |
|---|---|---|---|---|---|---|---|
| ENERTECH 3 PHASE ASYNCHRONOUS MOTOR IE1 | | | | | | | |
| TYPE | | | | SERIAL NUMBER | | | |
| O | INS.CL. | | IP | PRODUCT CODE: | | | O |
| | AMB.TEMP | | ℃ | DUTY | | | |
| BEARING DE | | | NDE | | WEIGHT | | KG |
| VOLTS | CONN. | Hz | kW | RPM | AMP | Cos φ | EFF.% |
| | | | | | | | |
| | | | | | | | |

| ENERTECH ELECTRIC MOTORS (AUSTRALIA) CE | | | | | | | |
|---|---|---|---|---|---|---|---|
| ENERTECH 3 PHASE ASYNCHRONOUS MOTOR IE 2 | | | | | | | |
| TYPE | | | | SERIAL NUMBER | | | |
| O | INS.CL. | | IP | PRODUCT CODE: | | | O |
| | AMB.TEMP | | ℃ | DUTY | | | |
| BEARING DE | | | NDE | | WEIGHT | | KG |
| VOLTS | CONN. | Hz | kW | RPM | AMP | Cos φ | EFF.% |
| | | | | | | | |
| | | | | | | | |

## Mountings

| | | |
|---|---|---|
| Foot mount<br>  <br>B3 (IM1001)* |  <br>V5 (IM1011) |  <br>V6 (IM1031) |
|  <br>B6 (IM1051) |  <br>B7 (IM1061) |  <br>B8 (IM1071) |
| Large flange mount<br>  <br>B5 (IM3001)* |  <br>V1 (IM3011)* |  <br>V3 (IM3031) |
| Large flange and feet<br>  <br>B3/B5 (IM2001)* |  <br>V1/V5 (IM2011) |  <br>V3/V6 (IM2031) |
| Small flange mount<br>  <br>B14 (IM3601) |  <br>V18 (IM3611) |  <br>V19 (IM3631) |
| Small flange and feet<br>  <br>B3/B14 (IM2101) |  <br>V5/V18 (IM2111) |  <br>V6/V19 (IM2131) |

# General specification

## Against solar radiation

High solar radiation will result in undue temperature rise. In these circumstances motors should be screened from solar radiation by placement of adequate sunshades which do not inhibit the air flow.

## Degree of protection

Standard levels of enclosure protection for all ESA frame sizes for both motor and terminal box is IP55, with IP56, IP65 and IP66 available on request. Enclosure designations comply with IEC or AS60529. The enclosure protection required will depend upon the environmental and operational conditions within which the motor is to operate.

## IP standards explanation

| IP | 5 | 5 |
|---|---|---|
| | 1 | 2 |

International protection rating prefix (IEC 60034 - 5)

### First numeral

First characteristic numeral

4 = Protected against solid object greater than 1.0 mm: Wires or strips of thickness greater than 1.0 mm, solid objects exceeding 1.0 mm

5 =Dust protected: Ingress of dust is not totally prevented but it does not enter in sufficient quantity to interfere with satisfactory operation of the equipment.

6 = Dust tight: No ingress of dust.

### Second numeral

Second characteristic numeral

4 = Protected against splashing water: Water splashed against the enclosure from any direction shall have no harmful effect.

5 = Protected against water jets: Water projected by a nozzle against the enclosure from any direction shall have no harmful effect.

6 = Protected against heavy seas: Water from heavy seas or water projected in powerful jets (larger nozzle and higher pressure than second numeral 5) shall not enter the enclosure in harmful quantities.

## Shaft

ESA motors have standard shaft extension lengths which provided with standard key, drilled and tapped hole. Non standard shaft extensions are available upon special order, with shaft design outlined on a detailed drawing.

Shaft extension run out, concentricity and perpendicularity to the face of standard flange mount motors, comply with the normal grade tolerance as specified in IEC 60072-1 and AS1359. Precision grade tolerance is available upon special order.

## Finish

Standard ESA motor color is RAL 7044. Other colors are also available.

The finishing coat of enamel paint is sufficient for normal conditions, however special paint systems can be provided to accommodate stringent requirements for motors in corrosive environments. Special coatings are needed to resist such substances as acid, salt water and extremely climatic conditions.

## Electrical design

As standard, ESA motors have the following design and operating parameters. Performance data is based on this standard. Any deviation should be examined and performance values are altered in accordance with the information provided in this section.

Three phase, 380V, 50Hz

Ambient cooling air temperature, 40°C

Altitude - 1000m Duty cycle S1 (continuous)

Rotation - Clockwise viewed from drive end

Connection - 230 volt Delta/380 volt Star (3kW and below)

- 380 volt Delta/660 volt Star (4kW and above)

## Voltage and frequency

Standard ESA motors are designed for a power supply of three phase 380V, 50Hz. Motors can be manufactured for any supply between 100V and 1100V and frequencies other than 50Hz.

Standard ESA motors wound for a certain voltage at 50Hz can also operate at other voltages at 50Hz and 60Hz without modification, subject to the changes in their data .

# General specification

| Motor wound for 50Hz at rated voltage - | Connected to | Data in percentage of values at 50Hz and rated voltage | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Output | r/min | $I_N/I_N$ | $I_L$ | $T_N$ | $T_L/T_N$ | $T_B/T_N$ |
| 380V | 400V 50Hz | 100 | 100 | 95 | 110 | 100 | 110 | 110 |
| | 380V 60Hz | 100 | 120 | 98 | 83 | 83 | 70 | 85 |
| | 400V 60Hz | 105 | 120 | 98 | 90 | 87 | 80 | 90 |
| | 415V 60Hz | 110 | 120 | 98 | 95 | 91 | 85 | 93 |
| | 440V 60Hz | 115 | 120 | 100 | 100 | 96 | 95 | 98 |
| | 460V 60Hz | 120 | 120 | 100 | 105 | 100 | 100 | 103 |
| 400V | 380V 50Hz | 100 | 100 | 105 | 91 | 100 | 90 | 90 |
| | 415V 50Hz | 100 | 100 | 96 | 108 | 100 | 108 | 108 |
| | 400V 60Hz | 100 | 120 | 98 | 83 | 83 | 70 | 85 |
| | 415V 60Hz | 104 | 120 | 98 | 89 | 86 | 75 | 88 |
| | 440V 60Hz | 110 | 120 | 98 | 95 | 91 | 85 | 93 |
| | 460V 60Hz | 115 | 120 | 100 | 100 | 96 | 93 | 98 |
| | 480V 60Hz | 120 | 120 | 100 | 105 | 100 | 100 | 103 |
| 415V | 380V 50Hz* | 100 | 100 | 109 | 84 | 100 | 84 | 84 |
| | 400V 50Hz | 100 | 100 | 104 | 93 | 100 | 93 | 93 |
| | 440V 50Hz | 100 | 100 | 94 | 112 | 100 | 112 | 112 |
| | 415V 60Hz | 100 | 120 | 98 | 83 | 83 | 70 | 85 |
| | 440V 60Hz | 105 | 120 | 98 | 90 | 87 | 80 | 90 |
| | 460V 60Hz | 110 | 120 | 98 | 95 | 91 | 85 | 94 |
| | 480V 60Hz | 115 | 120 | 100 | 100 | 96 | 95 | 98 |
| 525V | 550V 50Hz | 100 | 100 | 95 | 110 | 100 | 110 | 110 |
| | 525V 60Hz | 100 | 120 | 98 | 83 | 83 | 70 | 85 |
| | 550V 60Hz | 105 | 120 | 98 | 90 | 87 | 80 | 90 |
| | 575V 60Hz | 110 | 120 | 98 | 95 | 91 | 85 | 94 |
| | 600V 60Hz | 115 | 120 | 100 | 100 | 96 | 95 | 98 |

* Not applicable for motors with F class temperature rise.

* Note: This table is not applicable for hazardous area motors

1) N = Full load current $T_N$ = Full load torque

$I_L/I_N$ = Locked rotor current/ full load current

$T_L/T_N$ = Locked rotor torque/ full load torque

$T_B/T_N$ = Breakdown torque/full load torque

Standard torque values for alternative supplies are obtainable only with special windings. For these purpose-built motors the performance data is the same as for 380V motors except for the currents which are calculated with the accompanying formula:

Where:

$$I_X = \frac{380 \times I_N}{U_X}$$

$I_X$ = Current

$I_N$ = Full load current at 380 volt

$U_X$ = Design voltage

## Temperature and altitude

Rated power specified in the performance data tables apply for standard ambient conditions of 40°C at 1000m above sea level. Where temperature or altitude differs from the standard, multiplication factors in the table below should be used.

| Ambient temperature | Temperature factor |
|---|---|
| 30°C | 1.06 |
| 35°C | 1.03 |
| 40°C | 1.00 |
| 45°C | 0.97 |
| 50°C | 0.93 |
| 55°C | 0.88 |
| 60°C | 0.82 |

| Altitude above sea level | Altitude factor |
|---|---|
| 1000m | 1.00 |
| 1500m | 0.98 |
| 2000m | 0.94 |
| 2500m | 0.91 |
| 3000m | 0.87 |
| 3500m | 0.82 |
| 4000m | 0.77 |

**Effective Power = Rated Power x Temperature Factor x Altitude Factor**

Example 1

Effective Power required = 2.2 kW

Air temperature = 50°C (factor 0.93)

Altitude = 2500 metres (factor 0.91)

$$\text{Rated power required} = \frac{2.2}{0.93 \times 0.91} = 2.6 \text{ kW}$$

The appropriate motor is one with a rated power above the required, being 3 kW.

Example 2

Rated power = 7.5 kW

Air temperature = 50°C (factor 0.93)

Altitude = 1500 metres (factor 0.98)

Effective Power = 7.5 x 0.93 x 0.98 = 6.84 kW

## Rotation

For clockwise rotation, viewed from drive end, standard three phase ESA motor terminal markings coincide with the sequence of the phase line conductors.

For counter clockwise rotation, viewed from drive end, two of the line conductors have to be reversed. This is made clear in the table of connection diagrams three phase motors with cage rotor (page 3).

# General specification

## Duty

Enertech motors are suitable for S1 operation (continuous operation under rated load). When the motor is operated under any other type of duty the following information should be supplied to determine the correct motor size:

**1. Continuous duty S1**: The motor works at a constant load for enough time to reach temperature equilibrium.

**2. Short time duty S2**: The motor works at a constant load, but not long enough to reach temperature equilibrium, and the rest periods are long enough for the motor to reach ambient temperature.

**3. Intermittent periodic duty S3**: Sequential, identical run and rest cycles with constant load. Temperature equilibrium is never reached. Starting current has little effect on temperature rise.

**4. Intermittent periodic duty with starting S4**: Sequential identical start, run and rest cycles with constant load. Temperature equilibrium is not reached, but starting current affects temperature rise.

**5. Intermittent periodic duty with electric braking S5**: Sequential, identical cycles of starting, running at constant load, electric braking and rest.Temperature equilibrium is not reached.

**6. Continuous operation with intermittent load S6**: Sequential, identical cycles of running with constant load and running with no load. No rest periods.

**7. Continuous operation with electric braking S7**: Sequential, identical cycles of starting, running at constant load and electric braking. No rest periods.

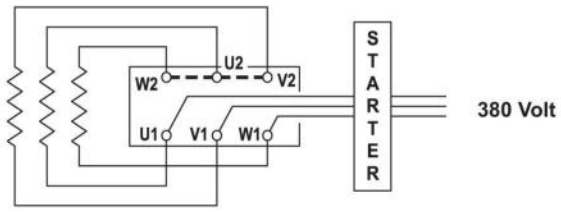
**8. Continuous operation with periodic changes in load and speed S8**: Sequential, identical, duty cycles of start, running at constant load and given speed, then run at other constant loads and speeds. No rest periods.

## Connection

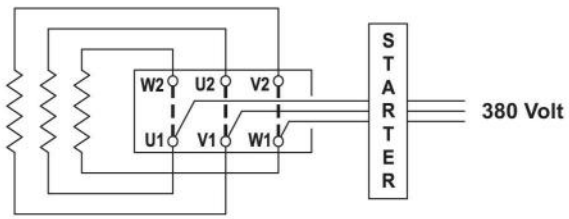
A motor's rated voltage must agree with the power supply line-to-line voltage. It is careful to ensure the correct connection to the motor terminals.

## Internal connections, voltages and VF drive selection

Standard terminal connections for motors 3kW and below is 220V delta / 380V star. These motors are designed for 380V Direct On Line (D.O.L.) starting, when connected in the star configuration. They are also suitable for operation with 220V three phase variable frequency drives when connected in the delta configuration. Standard terminal connection for motors 4kW and above is 380V delta / 660V star. These motors are designed for 380V Direct On Line (D.O.L.) starting, when connected in the delta configuration. They are also suitable for operation with 380V three phase variable frequency drives. Alternatively they can be operated D.O.L. in the star configuration from a 660V supply or with a 660V variable frequency drive. In this case the drive must be supplied with an output reactor to protect the winding insulation. These size motors are also suitable for 380V star-delta starting as described below. Motor connected for D.O.L. starting with bridges in place for star connection ( 3kW and below).




Motor connected for D.O.L. starting with bridges in place for delta connection (4kW and above).



# General specification

## Starting

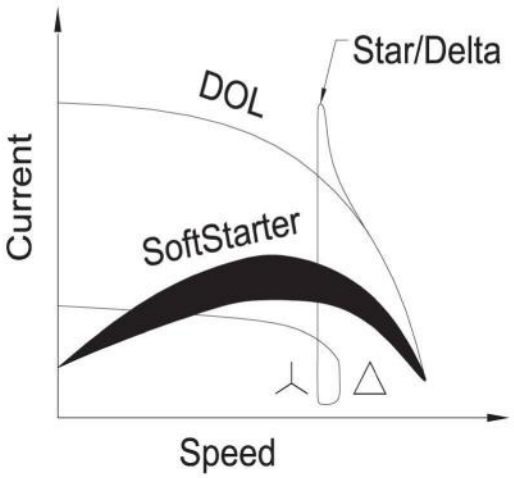
All of the following starter options are available and are the best supplied together with the motor.

### D.O.L Starters

When an electric motor is started by direct connection to the power supply (D.O.L.), it draws a high current, called the 'starting current', which is approximately equal in magnitude to the locked rotor current $I_L$. As listed in the performance data, locked rotor current can be up to 8 times the rated current $I_N$ of the motor. In circumstances where the motor starts under no load or where high starting torque is not required, it is preferable to reduce the starting current by one of the following means.

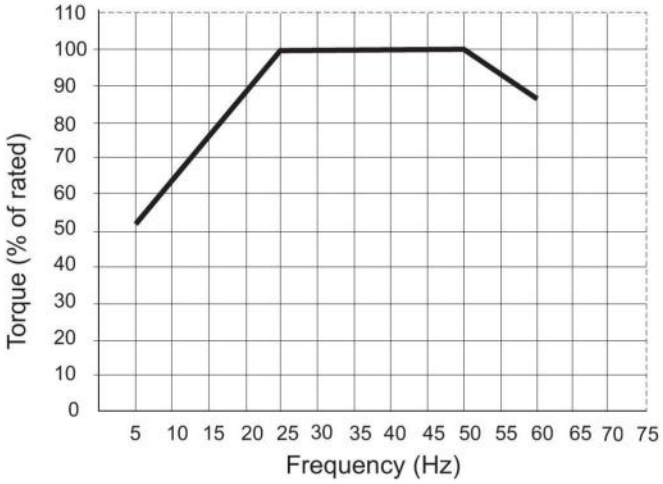
### Star - Delta starting

The ESA motors 4kW and above are suitable for the star-delta starting method. Through the use of a star-delta starter, the motor terminals are connected in the star configuration during starting, and reconnected to the delta configuration when running.
The benefits of this starting method are a significantly lower starting current, to a value about 1/3 of the D.O.L. starting current, and a corresponding starting torque also reduced to about 1/3 of its D.O.L. value. It should be noted that a second current surge occurs on changeover to the delta connection. The level of this surge will depend on the speed the motor has reached at the moment of change over.




## VVVF

Variable Voltage Variable Frequency drives are primarily recognized for their ability to manipulate power from a constant 3 phase 50/60Hz supply converting it to variable voltage and variable frequency power. This enables the speed of the motor to be matched to its load in a flexible and energy efficient manner. The only way of producing starting torque equal to full load torque with full load current is by using VVVF drives. The functionally flexible VVVF drive is also commonly used to reduce energy consumption on fans, pumps and compressors and offers a simple and repeatable method of changing speeds or flow rates.




## EDM Concerns

Capacitive voltages in the rotor can be generated due to an effect caused by harmonics in the waveform causing voltage discharge to earth through the bearings. This discharge results in etching of the bearing running surfaces. This effect is known as Electrical Discharge Machining (EDM). It can be controlled with the fitment of appropriate filters to the drive.
To futher reduce the effect of EDM, an insulated non drive bearing can be used.

# General specification

## Insulation

The insulation system is Class F (150K) and the motors are designed to operate with Class B (80K).

This ensures long life and reliability with the ability to withstand ambient temperatures as high as 54°C or up to 15% overload in adverse electrical supply situations.

| | Insulation class | | |
|---|---|---|---|
| | B | F | H |
| Max. permissible winding temp. (°C) | 130 | 155 | 180 |
| Less ambient temp. (°C) | -40 | -40 | -40 |
| Less hotspot allowance (K) | -10 | -10 | -15 |
| Equals max. permissible temp.rise (K) | 80 | 150 | 125 |
| Less max. design temp. rise (K) | -80 | -80 | -80 |
| Equals min. safety margin (K) | - | 25 | 45 |

## Speed at partial loads

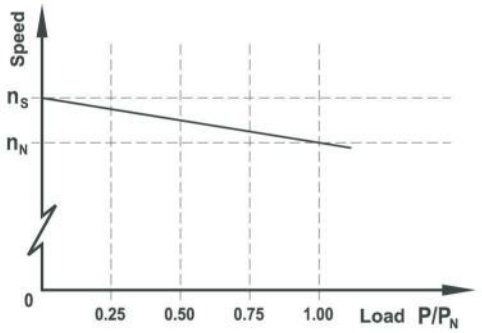
The relationship between the motor speed and the degree of loading on an ESA motor is approximately linear up to the rated load. This is expressed graphically in the accompanying drawing.

Where:

$n_N$ = full load speed

$n_S$ = asynchronous speed

$P/P_N$ = partial load factor




Where:

$n_N$ = full load speed

$n_S$ = asynchronous speed

$P/P_N$ = partial load factor

## Current at partial loads

Current at partial loads can be calculated using the following formula

$$I_x = \frac{Pout_x}{\sqrt{3} \times U_N \times \cos\varphi_x \times \eta_x} \times 10^5$$

Where:

$I_x$ = partial load current (amps)

$Pout_x$ = partial load (kW)

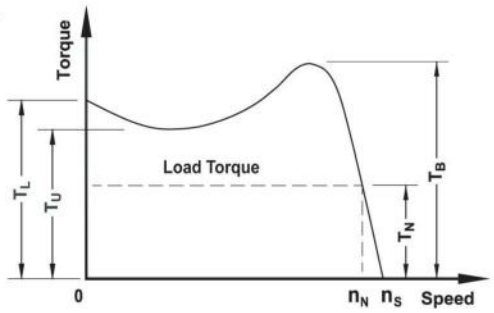
$U_N$ = rated voltage

$\cos\varphi_x$ = partial load power factor

$\eta_x$ = partial load efficiency (%)

## Torque characteristics

Typical characteristics of torque behaviour relative to speed are shown in the torque speed curve example below.




Where:

$T_N$ = full load torque

$T_L$ = locked rotor torque

$T_U$ = pull-up torque

$T_B$ = break down torque

$n_N$ = full load speed

$n_S$ = asynchronous speed

ESA motors all exceed the minimum starting torque requirements for Design N (Normal torque) as specified in IEC60034-12, and in most cases meet the requirements of Design H (High torque). Rated torque can be calculated with the following formula:

$$T_N = \frac{9950 \times p_N}{n_N}$$

Where:

$T_N$ = full load torque (Nm)

$P_N$ = full load output power (kW)

$n_N$ = full load speed (r/min)

# ESA Performance data

## 2 Pole - 3000 rpm asynchronous speed 50 Hz

| Power [kW] | Frame Size | IE Class | Full load speed [rpm] | Current | | | Locked rotor $I_L/I_N$ | Efficiency at % full load | Power factor at % full load | Torque | | | | Noise level at 1 meter dB (A) | Weight of foot mount motor [kg] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Full load $I_N$ 380V | Full load $I_N$ 400V | Full load $I_N$ 415V | | | | Full load $T_N$ | Locked rotor $T_L/T_N$ | Pull up $T_U/T_N$ | Break down $T_U/T_N$ | | |
| **2 poles - 3000 rpm** | | | | | | | | | | | | | | | |
| 0.09 | 56 | IE 1 | 2710 | 0.38 | 0.36 | 0.35 | 4 | 53 | 0.72 | 0.32 | 2.2 | 2.3 | 2 | 58 | 2.60 |
| 0.12 | 56 | IE 1 | 2700 | 0.42 | 0.40 | 0.39 | 4 | 61 | 0.72 | 0.43 | 2.2 | 2.3 | 2 | 58 | 3.00 |
| 0.18 | 63 | IE 1 | 2710 | 0.58 | 0.55 | 0.53 | 6 | 63 | 0.75 | 0.64 | 2.2 | 2.4 | 1.6 | 61 | 4.00 |
| 0.25 | 63 | IE 1 | 2710 | 0.75 | 0.71 | 0.69 | 6 | 65 | 0.78 | 0.89 | 2.2 | 2.4 | 1.6 | 61 | 4.20 |
| 0.37 | 71 | IE 1 | 2730 | 1.02 | 0.97 | 0.93 | 6 | 70 | 0.79 | 1.31 | 2.2 | 2.4 | 1.6 | 64 | 5.20 |
| 0.55 | 71 | IE 1 | 2760 | 1.49 | 1.42 | 1.36 | 6 | 71 | 0.79 | 1.92 | 2.2 | 2.4 | 1.6 | 64 | 6.00 |
| 0.75 | 80 | IE 1 | 2770 | 1.86 | 1.77 | 1.70 | 6 | 73 | 0.84 | 2.61 | 2.2 | 2.4 | 1.5 | 67 | 8.70 |
| 1.1 | 80 | IE 1 | 2770 | 2.64 | 2.51 | 2.42 | 6 | 76.2 | 0.83 | 3.83 | 2.2 | 2.4 | 1.5 | 67 | 10.00 |
| 1.5 | 90S | IE 1 | 2840 | 3.46 | 3.28 | 3.16 | 6 | 78.5 | 0.84 | 5.10 | 2.2 | 2.4 | 1.5 | 72 | 12.00 |
| 2.2 | 90L | IE 1 | 2840 | 4.85 | 4.61 | 4.45 | 6 | 81 | 0.85 | 7.48 | 2.2 | 2.4 | 1.4 | 72 | 14.50 |
| 3 | 100L | IE 1 | 2840 | 6.34 | 6.03 | 5.81 | 7 | 82.6 | 0.87 | 10.20 | 2.2 | 2.3 | 1.4 | 76 | 20.00 |
| 4 | 112M | IE 1 | 2880 | 8.30 | 7.88 | 7.60 | 7.5 | 84.2 | 0.87 | 13.41 | 2.2 | 2.3 | 1.4 | 77 | 26.00 |
| 5.5 | 132S1 | IE 1 | 2900 | 11.1 | 10.5 | 10.1 | 7.5 | 85.7 | 0.88 | 18.31 | 2 | 2.2 | 1.2 | 80 | 38.40 |
| 7.5 | 132S2 | IE 1 | 2920 | 14.9 | 14.1 | 13.6 | 7.5 | 87 | 0.88 | 24.80 | 2 | 2.2 | 1.2 | 80 | 41.30 |
| 9.2 | 132M | IE 1 | 2930 | 17.8 | 17.3 | 16.3 | 7.5 | 88 | 0.89 | 30.32 | 2 | 2.2 | 1.2 | 81 | 48.20 |
| 11 | 160M | IE 1 | 2940 | 21.0 | 20.0 | 19.2 | 7.5 | 88.4 | 0.9 | 36.12 | 2 | 2.2 | 1.2 | 86 | 76.00 |
| 0.75 | 80 | IE 2 | 2840 | 1.86 | 1.77 | 1.70 | 5.8 | 77.4 | 0.80 | 2.55 | 2.9 | 2.4 | 3.3 | 67 | 8.70 |
| 1.1 | 80 | IE 2 | 2850 | 2.64 | 2.51 | 2.42 | 6.8 | 80 | 0.82 | 3.73 | 3.5 | 2.4 | 3.6 | 67 | 10.00 |
| 2.2 | 90 | IE 2 | 2850 | 4.85 | 4.61 | 4.45 | 7.9 | 81.4 | 0.83 | 7.45 | 3.5 | 2.4 | 4.1 | 72 | 14.50 |
| 3 | 100 | IE 2 | 2860 | 6.34 | 6.03 | 5.81 | 7.8 | 83.2 | 0.84 | 10.13 | 4.1 | 2.3 | 3.4 | 76 | 20.00 |
| 4 | 112 | IE 2 | 2880 | 8.30 | 7.88 | 7.60 | 7.5 | 84.6 | 0.87 | 13.41 | 3.4 | 2.3 | 3.3 | 77 | 26.00 |
| 5.5 | 132S1 | IE 2 | 2890 | 11.1 | 10.5 | 10.1 | 7.7 | 86 | 0.89 | 18.37 | 2.7 | 2.2 | 3 | 80 | 38.40 |
| 7.5 | 132S2 | IE 2 | 2900 | 14.9 | 14.1 | 13.6 | 8.4 | 87.2 | 0.89 | 24.97 | 2.4 | 2.2 | 3.2 | 80 | 41.30 |
| 11 | 160M | IE 2 | 2910 | 17.8 | 20.0 | 19.2 | 7.6 | 88.1 | 0.89 | 36.50 | 2.6 | 2.2 | 3.1 | 86 | 76.00 |

# ESA Performance data

## 4 Pole - 1500 rpm asynchronous speed 50 Hz

| Power [kW] | Frame Size | IE Class | Full load speed [rpm] | Current | | | Locked rotor $I_L/I_N$ | Efficiency at % full load | Power factor at % full load | Torque | | | | Noise level at 1 meter dB (A) | Weight of foot mount motor [kg] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Full load $I_N$ 380V | Full load $I_N$ 400V | Full load $I_N$ 415V | | | | Full load $T_N$ | Locked rotor $T_L/T_N$ | Pull up $T_U/T_N$ | Break down $T_U/T_N$ | | |
| **4 poles - 1500 rpm** | | | | | | | | | | | | | | | |
| 0.06 | 56 | IE 1 | 1360 | 0.37 | 0.35 | 0.34 | 4 | 50 | 0.56 | 0.12 | 2.3 | 2.4 | 2 | 50 | 2.90 |
| 0.09 | 56 | IE 1 | 1360 | 0.47 | 0.45 | 0.43 | 4 | 52 | 0.59 | 0.12 | 2.3 | 2.4 | 2 | 50 | 3.20 |
| 0.12 | 63 | IE 1 | 1360 | 0.58 | 0.55 | 0.53 | 4 | 52 | 0.64 | 0.85 | 2.2 | 2.4 | 2 | 52 | 3.70 |
| 0.18 | 63 | IE 1 | 1310 | 0.74 | 0.7 | 0.67 | 4 | 57 | 0.65 | 1.33 | 2.2 | 2.4 | 2 | 52 | 4.20 |
| 0.25 | 71 | IE 1 | 1350 | 0.88 | 0.84 | 0.81 | 6 | 60 | 0.72 | 1.79 | 2.2 | 2.4 | 1.7 | 55 | 5.00 |
| 0.37 | 71 | IE 1 | 1370 | 1.17 | 1.11 | 1.07 | 6 | 65 | 0.74 | 2.61 | 2.2 | 2.4 | 1.7 | 55 | 5.80 |
| 0.55 | 80 | IE 1 | 1370 | 1.66 | 1.58 | 1.52 | 6 | 67 | 0.75 | 3.88 | 2.2 | 2.4 | 1.7 | 58 | 8.10 |
| 0.75 | 80 | IE 1 | 1380 | 2.03 | 1.93 | 1.86 | 6 | 72 | 0.78 | 5.25 | 2.2 | 2.4 | 1.6 | 58 | 9.10 |
| 1.1 | 90S | IE 1 | 1400 | 2.78 | 2.64 | 2.54 | 6 | 76.2 | 0.79 | 7.59 | 2.2 | 2.4 | 1.6 | 61 | 11.70 |
| 1.5 | 90L1 | IE 1 | 1400 | 3.63 | 3.45 | 3.32 | 6 | 78.5 | 0.8 | 10.34 | 2.2 | 2.4 | 1.6 | 61 | 14.40 |
| 2.2 | 100L1 | IE 1 | 1420 | 5.09 | 4.84 | 4.66 | 7 | 81 | 0.81 | 14.96 | 2.2 | 2.3 | 1.5 | 64 | 19.20 |
| 3 | 100L2 | IE 1 | 1420 | 6.81 | 6.47 | 6.24 | 7 | 82.6 | 0.81 | 20.40 | 2.2 | 2.3 | 1.5 | 64 | 22.50 |
| 4 | 120M | IE 1 | 1430 | 8.7 | 8.26 | 7.96 | 7 | 84.2 | 0.83 | 27.01 | 2.2 | 2.2 | 1.5 | 65 | 29.00 |
| 5.5 | 132S | IE 1 | 1450 | 11.6 | 11.0 | 10.6 | 7 | 85.7 | 0.84 | 36.62 | 2.2 | 2.2 | 1.4 | 71 | 39.00 |
| 7.5 | 132M | IE 1 | 1450 | 15.4 | 14.6 | 14.1 | 7 | 87 | 0.85 | 49.94 | 2.2 | 2.2 | 1.4 | 71 | 48.60 |
| 9.2 | 132L1 | IE 1 | 1460 | 18.8 | 17.9 | 17.2 | 7.5 | 87.5 | 0.85 | 60.84 | 2.2 | 2.2 | 1.4 | 74 | 56.50 |
| 11 | 160M | IE 1 | 1460 | 21.7 | 20.6 | 19.9 | 7 | 88.4 | 0.87 | 72.74 | 2.2 | 2.2 | 1.4 | 75 | 73.00 |
| 0.75 | 80 | IE 2 | 1410 | 2.03 | 1.93 | 1.86 | 5.3 | 79.6 | 0.76 | 5.14 | 2.8 | 2.4 | 3 | 58 | 9.10 |
| 1.1 | 90S | IE 2 | 1420 | 2.78 | 2.64 | 2.54 | 6.7 | 81.4 | 0.78 | 7.48 | 3.8 | 2.4 | 2.6 | 61 | 11.70 |
| 1.5 | 90L | IE 2 | 1420 | 3.63 | 3.45 | 3.32 | 7.2 | 82.8 | 0.79 | 10.20 | 4 | 2.4 | 2.7 | 61 | 14.40 |
| 2.2 | 100L1 | IE 2 | 1440 | 5.09 | 4.84 | 4.72 | 7.4 | 84.3 | 0.78 | 14.75 | 3.6 | 2.3 | 3.6 | 64 | 19.20 |
| 3 | 100L2 | IE 2 | 1440 | 6.81 | 6.47 | 6.24 | 7.8 | 85.5 | 0.80 | 20.11 | 3.8 | 2.3 | 3.5 | 64 | 22.50 |
| 4 | 112M | IE 2 | 1440 | 8.7 | 8.26 | 7.96 | 7.1 | 86.6 | 0.81 | 26.82 | 3.1 | 2.2 | 2.9 | 65 | 29.00 |
| 5.5 | 132S | IE 2 | 1450 | 11.6 | 11.0 | 10.6 | 7.4 | 87.9 | 0.83 | 36.62 | 2.6 | 2.2 | 2.7 | 71 | 39.00 |
| 7.5 | 132M | IE 2 | 1450 | 15.4 | 14.6 | 14.1 | 7.7 | 88.7 | 0.84 | 49.94 | 2.8 | 2.2 | 2.7 | 71 | 48.60 |
| 11 | 160M | IE 2 | 1450 | 21.7 | 20.6 | 19.9 | 7.7 | 89.8 | 0.82 | 73.24 | 2.7 | 2.2 | 3.1 | 75 | 73.00 |

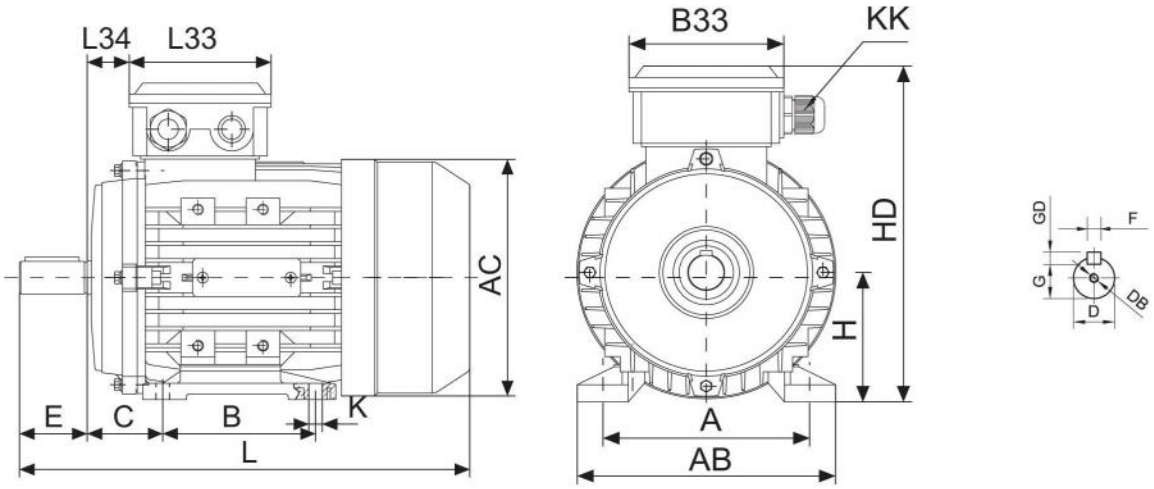
# ESA Performance data

## 6 Pole - 1000 rpm asynchronous speed 50 Hz

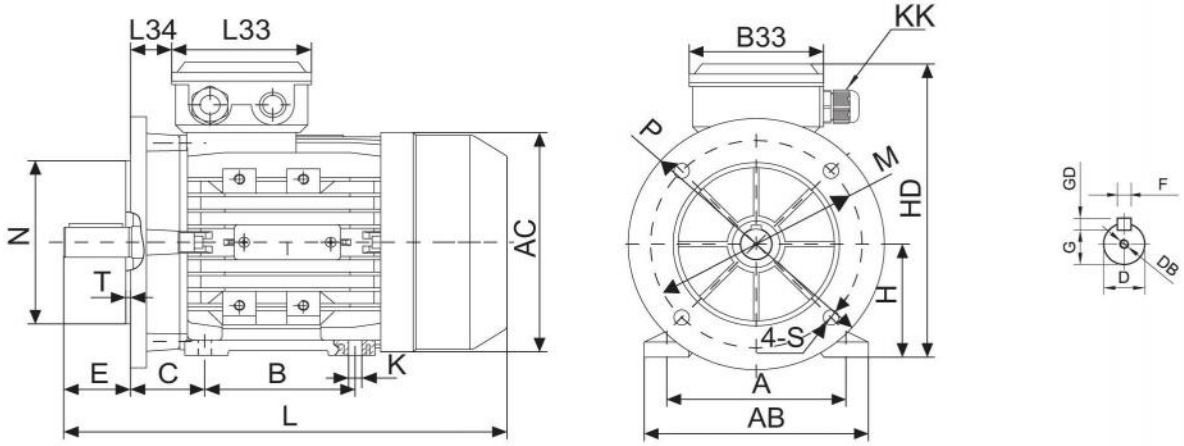
| Power [kW] | Frame Size | IE Class | Full load speed [rpm] | Current | | | Locked rotor $I_L/I_N$ | Efficiency at % full load | Power factor at % full load | Torque | | | | Noise level at 1 meter dB (A) | Weight of foot mount motor [kg] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Full load $I_N$ 380V | Full load $I_N$ 400V | Full load $I_N$ 415V | | | | Full load $T_N$ | Locked rotor $T_L/T_N$ | Pull up $T_U/T_N$ | Break down $T_U/T_N$ | | |
| **6 poles - 1000 rpm** | | | | | | | | | | | | | | | |
| 0.09 | 63 | IE 1 | 840 | 0.53 | 0.51 | 0.49 | 3.5 | 42 | 0.61 | 1.03 | 2 | 2 | 1.5 | 50 | 4.20 |
| 0.12 | 63 | IE 1 | 850 | 0.65 | 062 | 0.60 | 3.5 | 45 | 0.62 | 1.36 | 2 | 2 | 1.5 | 50 | 4.50 |
| 0.18 | 71 | IE 1 | 880 | 0.74 | 0.70 | 0.68 | 4 | 56 | 0.66 | 1.97 | 1.6 | 1.7 | 1.5 | 52 | 5.60 |
| 0.25 | 71 | IE 1 | 900 | 0.92 | 0.87 | 0.84 | 4 | 59 | 0.7 | 2.68 | 2.1 | 2.2 | 1.5 | 52 | 6.00 |
| 0.37 | 80 | IE 1 | 900 | 1.30 | 1.23 | 1.19 | 4 | 62 | 0.7 | 3.97 | 1.9 | 1.9 | 1.5 | 56 | 8.10 |
| 0.55 | 80 | IE 1 | 900 | 1.73 | 1.65 | 1.59 | 4 | 67 | 0.72 | 5.90 | 2 | 2.3 | 1.5 | 56 | 9.60 |
| 0.75 | 90S | IE 1 | 920 | 2.29 | 2.18 | 2.10 | 5.5 | 69 | 0.72 | 7.78 | 2.2 | 2.2 | 1.5 | 59 | 11.30 |
| 1.1 | 90L | IE 1 | 925 | 3.18 | 3.02 | 2.91 | 5.5 | 72 | 0.73 | 11.48 | 2.2 | 2.2 | 1.3 | 59 | 14.40 |
| 1.5 | 100 | IE 1 | 945 | 4.05 | 3.85 | 3.71 | 6 | 74 | 0.76 | 15.33 | 2.2 | 2.2 | 1.3 | 61 | 18.80 |
| 2.2 | 112M | IE 1 | 955 | 5.64 | 5.36 | 5.16 | 6 | 78 | 0.76 | 22.24 | 2.2 | 2.2 | 1.3 | 64 | 25.00 |
| 3 | 132S | IE 1 | 960 | 7.59 | 7.21 | 6.95 | 6.5 | 79 | 0.76 | 30.17 | 2 | 2 | 1.3 | 64 | 35.00 |
| 4 | 132M1 | IE 1 | 960 | 9.93 | 9.44 | 9.10 | 6.5 | 80.5 | 0.76 | 40.23 | 2 | 2 | 1.3 | 68 | 47.60 |
| 5.5 | 132M2 | IE 1 | 960 | 13.1 | 12.4 | 12.0 | 6.5 | 83 | 0.77 | 55.32 | 2 | 2 | 1.3 | 68 | 50.70 |
| 7.5 | 160M | IE 1 | 960 | 16.6 | 15.7 | 15.2 | 6.5 | 86 | 0.8 | 75.43 | 2 | 2.2 | 1.3 | 68 | 70.00 |
| 11 | 160L | IE 1 | 960 | 24.2 | 23.0 | 22.1 | 6.5 | 87.5 | 0.79 | 110.63 | 2 | 2.2 | 1.2 | 73 | 87.00 |
| 0.75 | 90S | IE 2 | 925 | 2.29 | 2.18 | 2.10 | 4.7 | 76.0 | 0.71 | 5.14 | 3.1 | 2.2 | 3.1 | 59 | 11.30 |
| 1.1 | 90L | IE 2 | 930 | 3.18 | 3.02 | 2.91 | 5 | 78.1 | 0.72 | 7.48 | 3.2 | 2.2 | 3.2 | 59 | 14.40 |
| 1.5 | 100L | IE 2 | 940 | 4.05 | 3.85 | 3.71 | 5.9 | 80.0 | 0.73 | 10.20 | 3.1 | 2.2 | 2.9 | 61 | 18.80 |
| 2.2 | 112M | IE 2 | 945 | 5.64 | 5.36 | 5.16 | 5.5 | 81.8 | 0.75 | 14.75 | 2.6 | 2.2 | 2.8 | 64 | 25.00 |
| 3 | 132S | IE 2 | 960 | 7.59 | 7.21 | 6.95 | 5.7 | 83.3 | 0.76 | 20.11 | 2.2 | 2 | 2.7 | 64 | 35.00 |
| 4 | 132M1 | IE 2 | 960 | 9.93 | 9.44 | 9.10 | 6.2 | 84.6 | 0.77 | 26.82 | 2.4 | 2 | 2.7 | 68 | 47.60 |
| 5.5 | 132M2 | IE 2 | 960 | 13.1 | 12.4 | 12.0 | 6.7 | 86 | 0.77 | 36.62 | 2.6 | 2 | 2.7 | 68 | 50.70 |
| 7.5 | 160M | IE 2 | 970 | 16.6 | 15.7 | 15.2 | 5.6 | 87.5 | 0.77 | 49.94 | 2 | 2.2 | 2.8 | 68 | 70.00 |
| 11 | 160L | IE 2 | 970 | 24.2 | 23.0 | 22.1 | 5.8 | 89.0 | 0.78 | 73.24 | 2 | 2.2 | 2.8 | 73 | 87.00 |

# ESA Electric Motors Dimensions

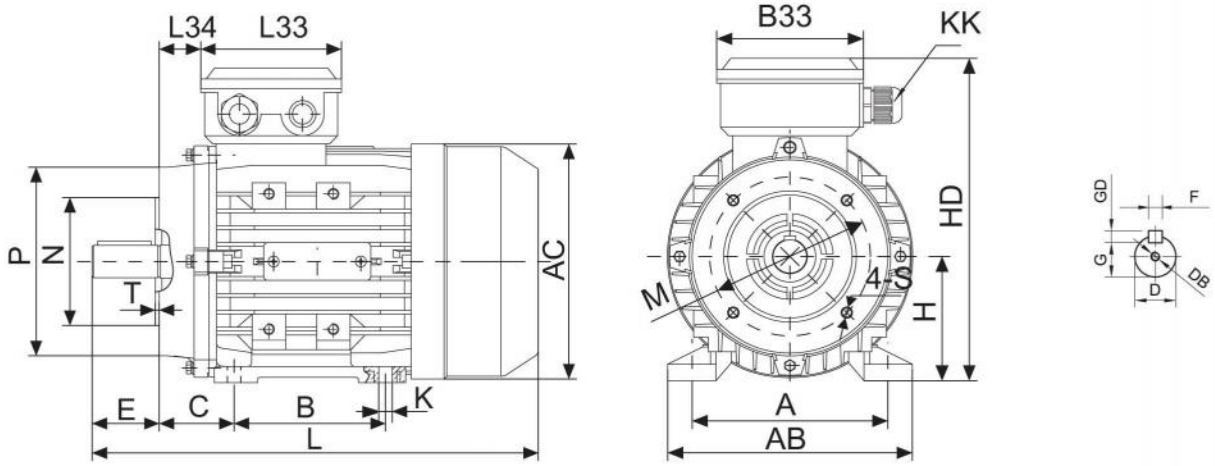
## Dimension foot mount B3




## Dimension foot - flange mount B35




## Dimension foot - flange mount B34



# ESA Performance data

## 8 Pole - 750 rpm asynchronous speed 50 Hz

| Power [kW] | Frame Size | IE Class | Full load speed [rpm] | Current | | | Locked rotor $I_L/I_N$ | Efficiency at % full load | Power factor at % full load | Torque | | | | Noise level at 1 meter dB (A) | Weight of foot mount motor [kg] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Full load $I_N$ 380V | Full load $I_N$ 400V | Full load $I_N$ 415V | | | | Full load $T_N$ | Locked rotor $T_L/T_N$ | Pull up $T_U/T_N$ | Break down $T_U/T_N$ | | |
| **8 poles - 750 rpm** | | | | | | | | | | | | | | | |
| 0.09 | 71 | IE 1 | 680 | 0.51 | 0.48 | 0.47 | 3 | 48 | 0.56 | 1.28 | 1.5 | 1.7 | 1.3 | 50 | 5.60 |
| 0.12 | 71 | IE 1 | 690 | 0.61 | 0.58 | 0.55 | 2.7 | 51 | 0.59 | 1.68 | 1.6 | 1.7 | 1.3 | 50 | 6.00 |
| 0.18 | 80 | IE 1 | 680 | 0.88 | 0.84 | 0.80 | 2.8 | 51 | 0.61 | 2.56 | 1.5 | 1.7 | 1.3 | 52 | 9.40 |
| 0.25 | 80 | IE 1 | 680 | 1.11 | 1.06 | 1.02 | 2.7 | 56 | 0.61 | 3.55 | 1.6 | 2 | 1.3 | 52 | 10.10 |
| 0.37 | 90S | IE 1 | 680 | 1.42 | 1.35 | 1.30 | 2.8 | 63 | 0.63 | 5.25 | 1.6 | 1.8 | 1.3 | 56 | 12.50 |
| 0.55 | 90L | IE 1 | 680 | 1.95 | 1.85 | 1.78 | 3 | 66 | 0.65 | 7.81 | 1.6 | 1.8 | 1.3 | 56 | 15.30 |
| 0.75 | 100L1 | IE 1 | 710 | 2.58 | 2.45 | 2.36 | 3.5 | 66 | 0.67 | 10.20 | 1.7 | 2.1 | 1.3 | 59 | 17.20 |
| 1.1 | 100L2 | IE 1 | 710 | 3.36 | 3.20 | 3.08 | 3.5 | 72 | 0.69 | 14.96 | 1.7 | 2.1 | 1.2 | 59 | 19.50 |
| 1.5 | 112M | IE 1 | 710 | 4.53 | 4.30 | 4.15 | 4.2 | 74 | 0.68 | 20.40 | 1.8 | 2.1 | 1.2 | 61 | 25.50 |
| 2.2 | 132S | IE 1 | 720 | 6.28 | 5.96 | 5.75 | 5.5 | 75 | 0.71 | 29.50 | 2 | 2 | 1.2 | 64 | 34.20 |
| 3 | 132M | IE 1 | 720 | 8.11 | 7.70 | 7.43 | 5.5 | 77 | 0.73 | 40.23 | 2 | 2 | 1.2 | 64 | 40.00 |
| 4 | 160M1 | IE 1 | 730 | 10.4 | 9.89 | 9.53 | 6 | 80 | 0.73 | 52.90 | 1.9 | 2.1 | 1.2 | 68 | 59.00 |
| 5.5 | 160M2 | IE 1 | 720 | 13.5 | 12.9 | 12.4 | 6 | 83.5 | 0.74 | 73.75 | 2 | 2.2 | 1.2 | 68 | 69.00 |
| 7.5 | 160L | IE 1 | 720 | 17.9 | 17.0 | 16.4 | 6 | 85 | 0.75 | 100.57 | 1.9 | 2.2 | 1.2 | 68 | 87.00 |
| 11 | 180L | IE 1 | 715 | 26.2 | 25.1 | 24.0 | 6 | 87.4 | 0.73 | 148.54 | 1.9 | 2.2 | 1.2 | 78 | 125.0 |

# ESA Electric Motors Dimensions

## Foot mount B3

| Frame size | A | AB | AC | B | B33 | C | D | DB | E | F | GD | G | H | HD | K | KK | L | L33 | L34 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **56** | 90 | 110 | 117 | 71 | 88 | 36 | 9 | M3 | 20 | 3 | 3 | 7.2 | 56 | 156 | 5.8X8.8 | - | 196 | 88 | 14 |
| **63** | 100 | 120 | 130 | 80 | 94 | 40 | 11 | M4 | 23 | 4 | 4 | 8.5 | 63 | 171 | 7X10 | M16 | 220 | 94 | 14 |
| **71** | 112 | 132 | 147 | 90 | 94 | 45 | 14 | M5 | 30 | 5 | 5 | 11 | 71 | 186 | 7X10 | M20 | 241 | 94 | 20 |
| **80** | 125 | 160 | 163 | 100 | 105 | 50 | 19 | M6 | 40 | 6 | 6 | 15.5 | 80 | 213 | 10X13 | M20 | 290 | 105 | 27 |
| **90S** | 140 | 175 | 183 | 100 | 105 | 56 | 24 | M8 | 50 | 8 | 7 | 20 | 90 | 229 | 10X13 | M20 | 312 | 105 | 30 |
| **90L** | 140 | 175 | 183 | 125 | 105 | 56 | 24 | M8 | 50 | 8 | 7 | 20 | 90 | 229 | 10X13 | M20 | 337 | 105 | 30 |
| **100L** | 160 | 198 | 205 | 140 | 105 | 63 | 28 | M10 | 60 | 8 | 7 | 24 | 100 | 252 | 12X15 | M20 | 369 | 105 | 26 |
| **112M** | 190 | 220 | 229 | 140 | 112 | 70 | 28 | M10 | 60 | 8 | 7 | 24 | 112 | 279 | 12X15 | M25 | 395 | 112 | 32 |
| **132S** | 216 | 252 | 265 | 140 | 112 | 89 | 38 | M12 | 80 | 10 | 8 | 33 | 132 | 318 | 12X15 | M25 | 437 | 112 | 38 |
| **132M/L** | 216 | 252 | 265 | 178 | 112 | 89 | 38 | M12 | 80 | 10 | 8 | 33 | 132 | 318 | 12X15 | M25 | 475 | 112 | 38 |
| **160M/L** | 254 | 290 | 325 | 210 | 143 | 108 | 42 | M16 | 110 | 12 | 8 | 37 | 160 | 384 | 15X19 | M32 | 640 | 143 | 64 |

## Flange mount B35

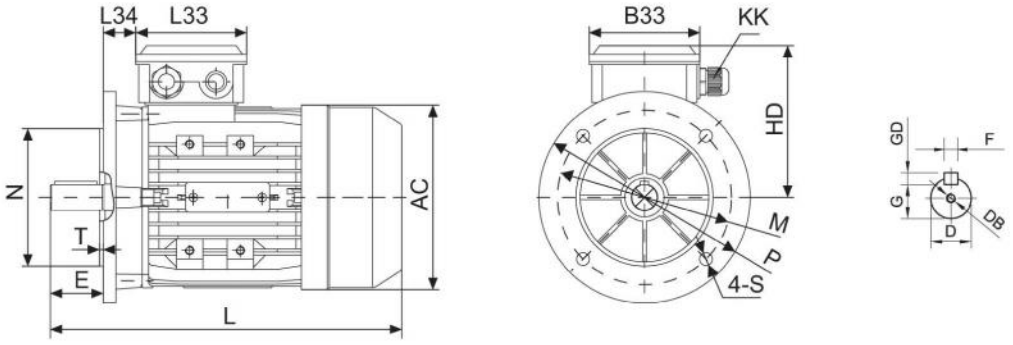
| Frame size | A | AB | AC | B | B33 | C | D | DB | E | F | GD | G | H | HD | K | KK | L | L33 | L34 | M | N | P | S | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **56** | 90 | 110 | 117 | 71 | 88 | 36 | 9 | M3 | 20 | 3 | 3 | 7.2 | 56 | 156 | 5.8X8.8 | - | 196 | 88 | 14 | 100 | 80 | 120 | 7 | 3.0 |
| **63** | 100 | 120 | 130 | 80 | 94 | 40 | 11 | M4 | 23 | 4 | 4 | 8.5 | 63 | 171 | 7X10 | M16 | 220 | 94 | 14 | 115 | 95 | 140 | 10 | 3.0 |
| **71** | 112 | 132 | 147 | 90 | 94 | 45 | 14 | M5 | 30 | 5 | 5 | 11 | 71 | 186 | 7X10 | M20 | 241 | 94 | 20 | 130 | 110 | 160 | 10 | 3.5 |
| **80** | 125 | 160 | 163 | 100 | 105 | 50 | 19 | M6 | 40 | 6 | 6 | 15.5 | 80 | 213 | 10X13 | M20 | 290 | 105 | 27 | 165 | 130 | 200 | 12 | 3.5 |
| **90S** | 140 | 175 | 183 | 100 | 105 | 56 | 24 | M8 | 50 | 8 | 7 | 20 | 90 | 229 | 10X13 | M20 | 312 | 105 | 30 | 165 | 130 | 200 | 12 | 3.5 |
| **90L** | 140 | 175 | 183 | 125 | 105 | 56 | 24 | M8 | 50 | 8 | 7 | 20 | 90 | 229 | 10X13 | M20 | 337 | 105 | 30 | 165 | 130 | 200 | 12 | 3.5 |
| **100** | 160 | 198 | 205 | 140 | 105 | 63 | 28 | M10 | 60 | 8 | 7 | 24 | 100 | 252 | 12X15 | M20 | 369 | 105 | 26 | 215 | 180 | 250 | 15 | 4.0 |
| **112** | 190 | 220 | 229 | 140 | 112 | 70 | 28 | M10 | 60 | 8 | 7 | 24 | 112 | 279 | 12X15 | M25 | 395 | 112 | 32 | 215 | 180 | 250 | 15 | 4.0 |
| **132S** | 216 | 252 | 265 | 140 | 112 | 89 | 38 | M12 | 80 | 10 | 8 | 33 | 132 | 318 | 12X15 | M25 | 437 | 112 | 38 | 265 | 230 | 300 | 15 | 4.0 |
| **132M/L** | 216 | 252 | 265 | 178 | 112 | 89 | 38 | M12 | 80 | 10 | 8 | 33 | 132 | 318 | 12X15 | M25 | 475 | 112 | 38 | 265 | 230 | 300 | 15 | 4.0 |
| **160M/L** | 254 | 290 | 325 | 210 | 143 | 108 | 42 | M16 | 110 | 12 | 8 | 37 | 160 | 384 | 15X19 | M32 | 640 | 143 | 64 | 300 | 250 | 350 | 19 | 4.0 |

## Flange mount B34

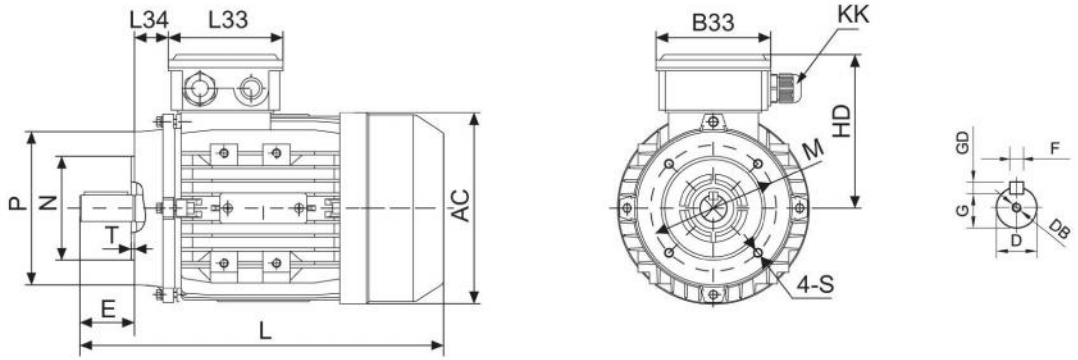
| Frame size | A | AB | AC | B | B33 | C | D | DB | E | F | GD | G | H | HD | K | KK | L | L33 | L34 | M | N | P | S | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **56** | 90 | 110 | 117 | 71 | 88 | 36 | 9 | M3 | 20 | 3 | 3 | 7.2 | 56 | 156 | 5.8X8.8 | - | 196 | 88 | 14 | 65 | 50 | 80 | M5 | 2.5 |
| **63** | 100 | 120 | 130 | 80 | 94 | 40 | 11 | M4 | 23 | 4 | 4 | 8.5 | 63 | 171 | 7X10 | M16 | 220 | 94 | 14 | 75 | 60 | 90 | M5 | 2.5 |
| **71** | 112 | 132 | 147 | 90 | 94 | 45 | 14 | M5 | 30 | 5 | 5 | 11 | 71 | 186 | 7X10 | M20 | 241 | 94 | 20 | 85 | 70 | 105 | M6 | 2.5 |
| **80** | 125 | 160 | 163 | 100 | 105 | 50 | 19 | M6 | 40 | 6 | 6 | 15.5 | 80 | 213 | 10X13 | M20 | 290 | 105 | 27 | 100 | 80 | 120 | M6 | 3.0 |
| **90S** | 140 | 175 | 183 | 100 | 105 | 56 | 24 | M8 | 50 | 8 | 7 | 20 | 90 | 229 | 10X13 | M20 | 312 | 105 | 30 | 115 | 95 | 140 | M8 | 3.0 |
| **90L** | 140 | 175 | 183 | 125 | 105 | 56 | 24 | M8 | 50 | 8 | 7 | 20 | 90 | 229 | 10X13 | M20 | 337 | 105 | 30 | 115 | 95 | 140 | M8 | 3.0 |
| **100** | 160 | 198 | 205 | 140 | 105 | 63 | 28 | M10 | 60 | 8 | 7 | 24 | 100 | 252 | 12X15 | M20 | 369 | 105 | 26 | 130 | 110 | 160 | M8 | 3.5 |
| **112** | 190 | 220 | 229 | 140 | 112 | 70 | 28 | M10 | 60 | 8 | 7 | 24 | 112 | 279 | 12X15 | M25 | 395 | 112 | 32 | 130 | 110 | 160 | M8 | 3.5 |
| **132S** | 216 | 252 | 183 | 125 | 105 | 56 | 24 | M12 | 50 | 8 | 8 | 20 | 90 | 229 | 10X13 | M20 | 337 | 105 | 30 | 165 | 130 | 200 | M10 | 4.0 |
| **132M/L** | 216 | 252 | 205 | 140 | 105 | 63 | 28 | M12 | 60 | 8 | 8 | 24 | 100 | 252 | 12X15 | M20 | 369 | 105 | 26 | 165 | 130 | 200 | M10 | 4.0 |
| **160M/L** | 254 | 290 | 229 | 140 | 112 | 70 | 28 | M16 | 60 | 8 | 8 | 24 | 112 | 279 | 12X15 | M25 | 395 | 112 | 32 | 215 | 180 | 250 | M12 | 4.0 |

# ESA Electric Motors Dimensions

## Dimension foot - flange mount B5




## Dimension foot - flange mount B14




### Flange mount B5

| Frame size | AC | B33 | D | DB | E | F | G | H | HD | K | KK | L | L33 | L34 | M | N | P | S | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **56** | 117 | 88 | 9 | M3 | 20 | 3 | 7.2 | 56 | 100 | 5.8X8.8 | - | 196 | 88 | 14 | 100 | 80 | 120 | 7 | 3.0 |
| **63** | 130 | 94 | 11 | M4 | 23 | 4 | 8.5 | 63 | 108 | 7X10 | M16 | 220 | 94 | 14 | 115 | 95 | 140 | 10 | 3.0 |
| **71** | 147 | 94 | 14 | M5 | 30 | 5 | 11 | 71 | 115 | 7X10 | M20 | 241 | 94 | 20 | 130 | 110 | 160 | 10 | 3.5 |
| **80** | 163 | 105 | 19 | M6 | 40 | 6 | 15.5 | 80 | 133 | 10X13 | M20 | 290 | 105 | 27 | 165 | 130 | 200 | 12 | 3.5 |
| **90S** | 183 | 105 | 24 | M8 | 50 | 8 | 20 | 90 | 139 | 10X13 | M20 | 312 | 105 | 30 | 165 | 130 | 200 | 12 | 3.5 |
| **90L** | 183 | 105 | 24 | M8 | 50 | 8 | 20 | 90 | 139 | 10X13 | M20 | 337 | 105 | 30 | 165 | 130 | 200 | 12 | 3.5 |
| **100** | 205 | 105 | 28 | M10 | 60 | 8 | 24 | 100 | 152 | 12X16 | M20 | 369 | 105 | 26 | 215 | 180 | 250 | 15 | 4.0 |
| **112** | 229 | 112 | 28 | M10 | 60 | 8 | 24 | 112 | 167 | 12X16 | M25 | 395 | 112 | 32 | 215 | 180 | 250 | 15 | 4.0 |
| **132S** | 265 | 112 | 38 | M12 | 80 | 10 | 33 | 132 | 186 | 12X15 | M25 | 437 | 112 | 38 | 265 | 230 | 300 | 15 | 4.0 |
| **132M/L** | 265 | 112 | 38 | M12 | 80 | 10 | 33 | 132 | 186 | 12X15 | M25 | 475 | 112 | 38 | 265 | 230 | 300 | 15 | 4.0 |
| **160M/L** | 325 | 143 | 42 | M16 | 110 | 12 | 37 | 160 | 224 | 15X19 | M32 | 640 | 143 | 64 | 300 | 250 | 350 | 19 | 5.0 |

### Flange mount B14

| Frame size | AC | B33 | D | DB | E | F | G | H | HD | K | KK | L | L33 | L34 | M | N | P | S | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **56** | 117 | 88 | 9 | M3 | 20 | 3 | 7.2 | 56 | 100 | 5.8X8.8 | - | 196 | 88 | 14 | 65 | 50 | 80 | M5 | 2.5 |
| **63** | 130 | 94 | 11 | M4 | 23 | 4 | 8.5 | 63 | 108 | 7X10 | M16 | 220 | 94 | 14 | 75 | 60 | 90 | M5 | 2.5 |
| **71** | 147 | 94 | 14 | M5 | 30 | 5 | 11 | 71 | 115 | 7X10 | M20 | 241 | 94 | 20 | 85 | 70 | 105 | M6 | 2.5 |
| **80** | 163 | 105 | 19 | M6 | 40 | 6 | 15.5 | 80 | 133 | 10X13 | M20 | 290 | 105 | 27 | 100 | 80 | 120 | M6 | 3.0 |
| **90S** | 183 | 105 | 24 | M8 | 50 | 8 | 20 | 90 | 139 | 10X13 | M20 | 312 | 105 | 30 | 115 | 95 | 140 | M8 | 3.0 |
| **90L** | 183 | 105 | 24 | M8 | 50 | 8 | 20 | 90 | 139 | 10X13 | M20 | 337 | 105 | 30 | 115 | 95 | 140 | M8 | 3.0 |
| **100** | 205 | 105 | 28 | M10 | 60 | 8 | 24 | 100 | 152 | 12X16 | M20 | 369 | 105 | 26 | 130 | 110 | 160 | M8 | 3.5 |
| **112** | 229 | 112 | 28 | M10 | 60 | 8 | 24 | 112 | 167 | 12X16 | M25 | 395 | 112 | 32 | 130 | 110 | 160 | M8 | 3.5 |
| **132S** | 265 | 112 | 38 | M12 | 80 | 10 | 33 | 132 | 186 | 12X15 | M25 | 437 | 112 | 38 | 165 | 130 | 200 | M10 | 4.0 |
| **132M/L** | 265 | 112 | 38 | M12 | 80 | 10 | 33 | 132 | 186 | 12X15 | M25 | 475 | 112 | 38 | 165 | 130 | 200 | M10 | 4.0 |
| **160M/L** | 325 | 143 | 42 | M16 | 110 | 12 | 37 | 160 | 224 | 15X19 | M32 | 640 | 143 | 64 | 215 | 180 | 250 | M12 | 4.0 |

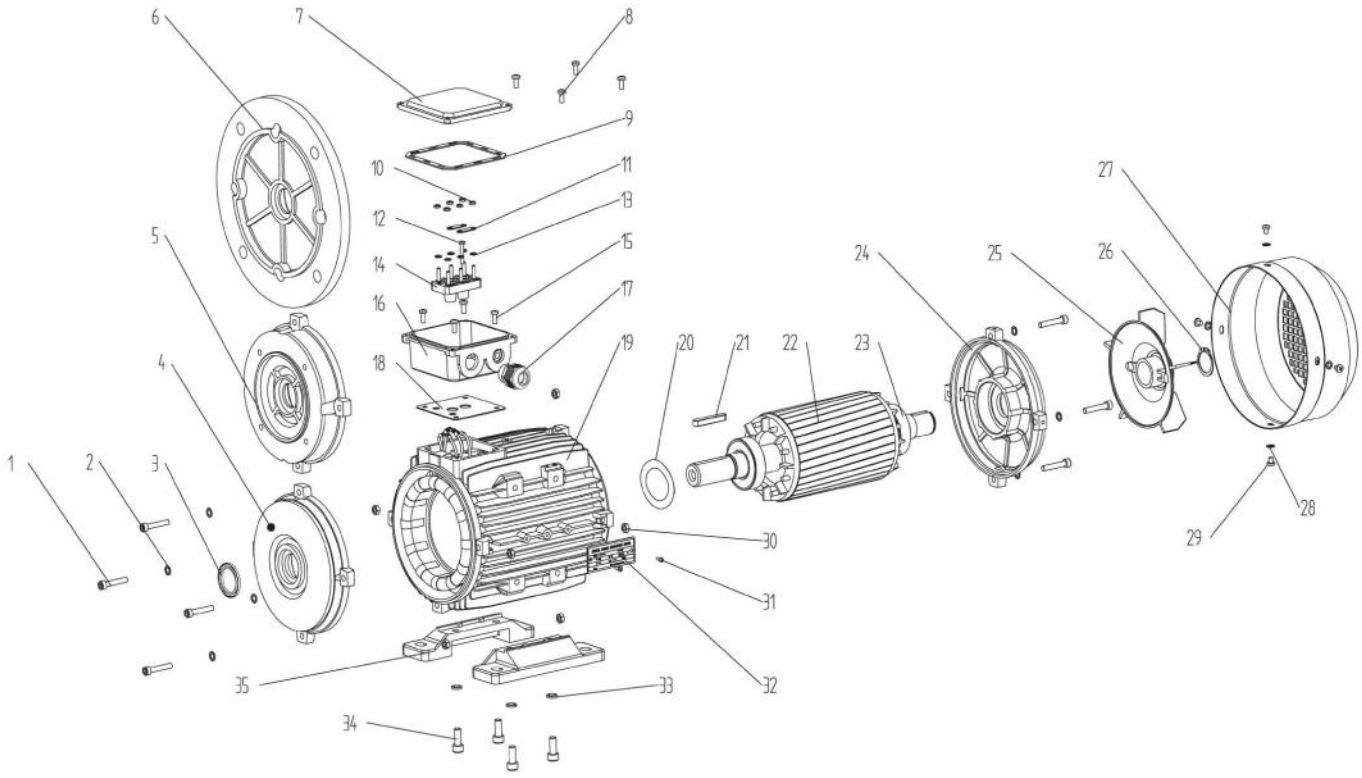
# Bearing and oil seal

Aluminum Housing Electric Motors Bearings & Oil Seals

| Frame | Bearings | | Oil Seals | |
|---|---|---|---|---|
| | Drive End | Non-drive End | Drive End | Non-drive End |
| 56 | 6201 | 6201 | 12x22x5 | 12x22x5 |
| 63 | 6201 | 6201 | 12x24x5 | 12x24x5 |
| 71 | 6202 | 6202 | 15x25x7 | 15x25x7 |
| 80 | 6204 | 6204 | 20x34x7 | 20x34x7 |
| 90S | 6205 | 6205 | 25x37x7 | 25x37x7 |
| 90L | 6205 | 6205 | 25x37x7 | 25x37x7 |
| 100L | 6206 | 6206 | 30x44x7 | 30x44x7 |
| 112M | 6306 | 6206 | 30x44x7 | 30x44x7 |
| 132S | 6308 | 6208 | 40x58x7 | 40x58x7 |
| 132M/L | 6308 | 6208 | 40x58x7 | 40x58x7 |
| 160M | 6309 | 6309 | 45x65x8 | 45x65x8 |

Other standards are also available on request.

## Motor Spare Part List "Exploded Drawing"




1. Srew
2. Gasket
3. Oil seal
4. Front endshield
5. B14 flange
6. B5 flange
7. TB cover
8. TB fixing screws
9. TB upper gasket
10. Terminal board fixing nut
11. Terminal bridge
12. Terminal pin
13. Terminal shim
14. Terminal board
15. TB fixing screws
16. TB base
17. Cable gland
18. TB bottom gasket
19. Frame
20. Preload washer
21. Key
22. Rotor
23. Bearing
24. NDE endshield
25. Cooling fan
26. Fan circlip
27. Fan cover
28. Fan cover fixing shim
29. Fan cover fixing screws
30. Endshield fixing nut
30. Endshield fixing nut
31. Rivet
32. Nameplate
33. Foot fixing nut
34. Foot fixing screws
35. Foot

## HEAD OFFICE

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