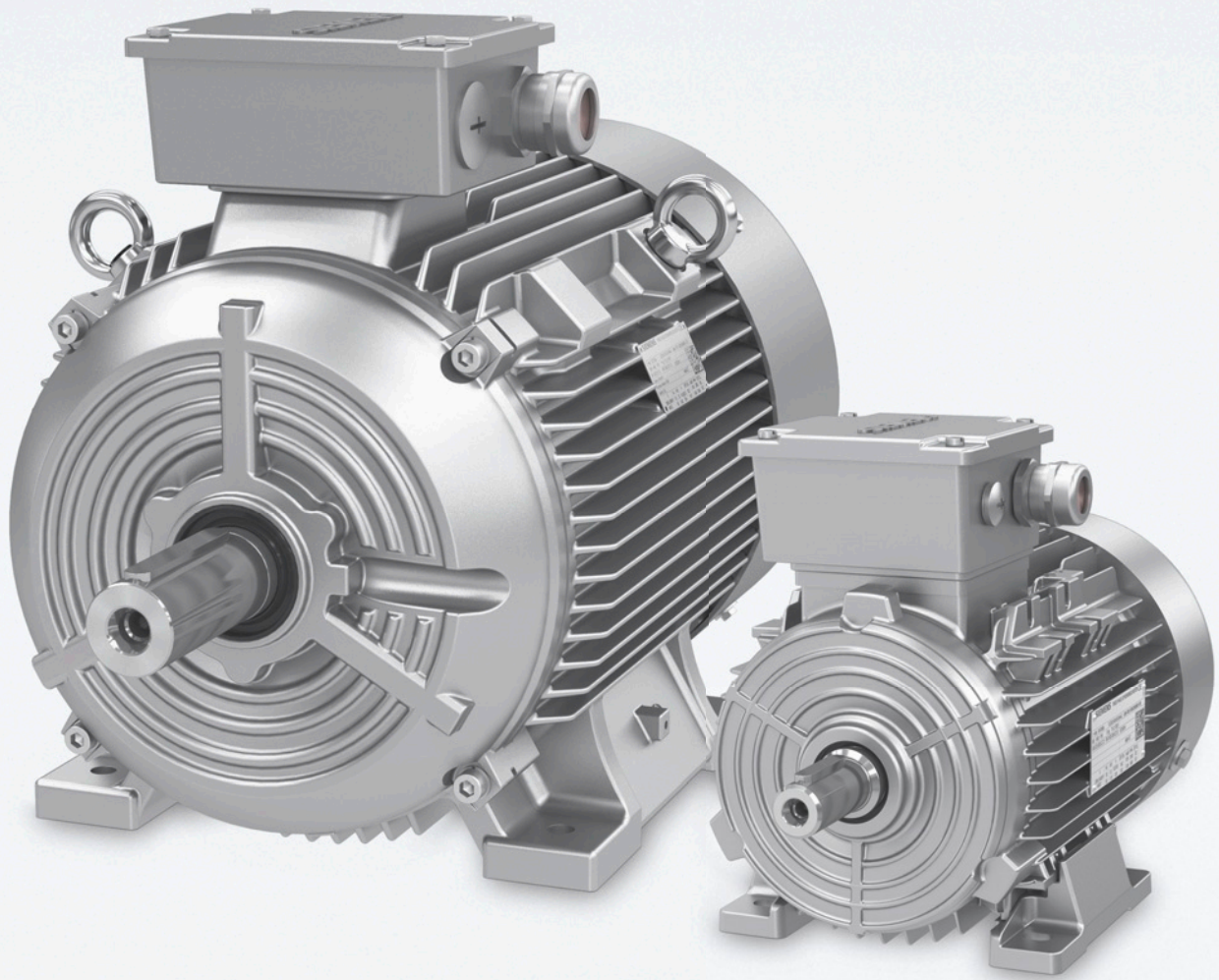


**SIEMENS**



**SIMOTICS Motors**

# SIMOTICS FL Low-Voltage Motors

Type series 1LE0323 and 1LE0023

Frame sizes 80 to 225 · Power range 0.55 to 45 kW

Catalog  
D 81.6

Edition  
10/2020

[siemens.com/drives](https://www.siemens.com/drives)

## Related catalogs

### **SIMOTICS GP, SD, XP, DP** **Low-Voltage Motors**

D 81.1

Type series 1FP1, 1LE1, 1LE5, 1MB1, 1MB5, 1PC1  
Frame sizes 63 to 450  
Power range 0.09 to 1000 kW  
PDF (E86060-K5581-A111-B4-7600)



### **Motion Control Drives**

D 31.1

SINAMICS Inverters for Single-Axis Drives  
Built-In Units

E86060-K5531-A111-A1-7600



### **Motion Control Drives**

D 31.2

SINAMICS Inverters for Single-Axis Drives  
Distributed Inverters

E86060-K5531-A121-A1-7600



### **SINAMICS G130**

Drive Converter Chassis Units

### **SINAMICS G150**

Drive Converter Cabinet Units

D 11

E86060-K5511-A101-A6-7600



### **SINAMICS S120**

Chassis Format Converter Units  
Chassis-2 Format Converter Units  
Cabinet Modules, Cabinet Modules-2

### **SINAMICS S150**

Converter Cabinet Units  
E86060-K5521-A131-A7-7600

D 21.3



All catalogs and other information material, such as brochures, manuals and operating instructions for standard drive systems are available up-to-date on the Internet at the following address:

[www.siemens.com/drives/catalogs](http://www.siemens.com/drives/catalogs)

The listed documentation can be ordered here or it is available in commonly used file formats (PDF, ZIP) for downloading.

### **SinaSave energy saving/energy efficiency tool**

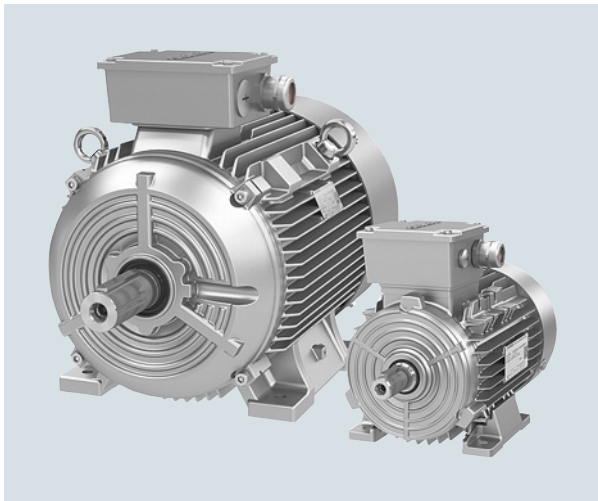
Further information on the subject of energy saving and the SinaSave energy efficiency tool is available at the following address:

[www.sinasave.siemens.com](http://www.sinasave.siemens.com)

# SIMOTICS FL Low-Voltage Motors

Type series 1LE0323 and 1LE0023

## Motors



**Catalog D 81.6 · 2020**

This catalog is only applicable in designated countries for the following regions:

- Africa
- Europe
- Middle East

Please contact your local Siemens branch.

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**Introduction**  
SIMOTICS motors  
Technical features

1

**SIMOTICS FL standard motors**  
Orientation  
Flow Line · IE3 Premium Efficiency  
Article No. supplements and special versions  
Dimensions

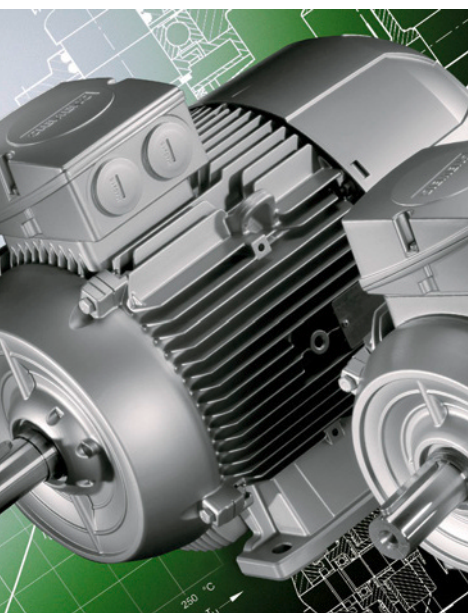
2



The products and systems described in this catalog are manufactured/distributed under application of a certified quality management system in accordance with DIN EN ISO 9001 (04-31-1267 Certified Registration No. CN00118Q37058R5L/3200). The certificate is recognized by all IQNet countries.



## Introduction



|            |  |
|------------|--|
| <b>1/2</b> | <b>SIMOTICS motors</b>   |
| 1/2        | General information  |
| <b>1/7</b> | <b>Technical features</b>  |
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| 1/24       | Terminal boxes   |
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| 1/25       | Lifting eyes and transport   |
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## Introduction

### SIMOTICS motors

#### General information

1

#### Overview

##### *SIMOTICS – The name for the widest range of motors in the world*

With 150 years of experience, we have driven motor technology forward, optimized them and played a decisive role in defining them.

Based on over 150 years of experience Siemens offers with SIMOTICS the most comprehensive range of motors for industrial applications proven with more than 40 million Siemens motors and drives installed around the world.

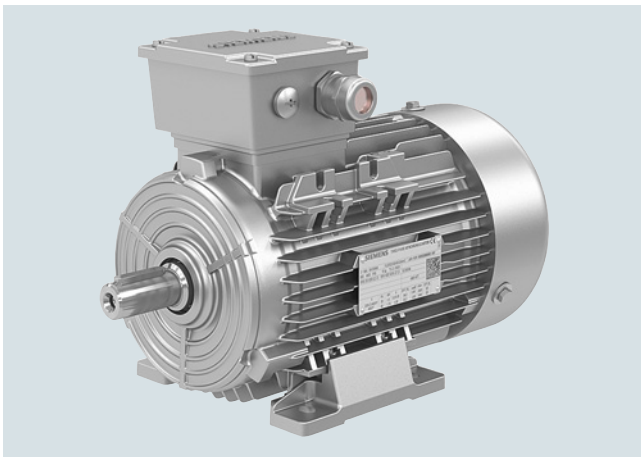
Our low-voltage motors meet the latest efficiency standards and stand for highest quality, reliability and compactness. Our motors are optimally integrated into the drive train. They are perfectly harmonized for the use with SIRIUS motor starters and SINAMICS frequency converters.

Our foundation of outstanding quality is the unparalleled experience from numerous Siemens production facilities around the world and close to our customers. This is how our experience drives your success!

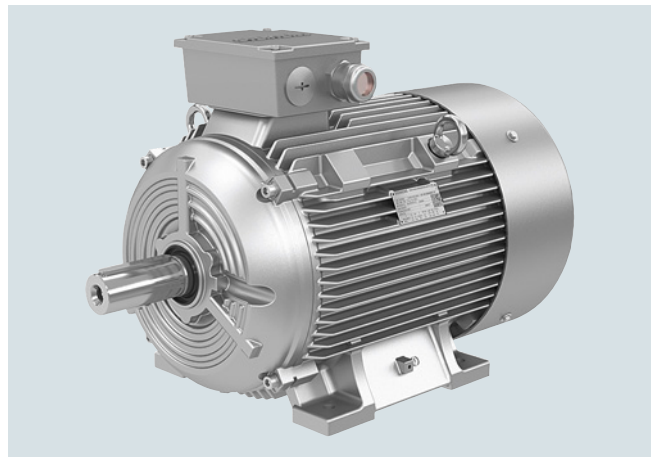
Siemens is present in more than 190 countries around the world and a true local global player. We manufacture locally serving the individual markets. All of our products are based on one common global quality and design standard derived from our German engineering roots adapted to global market requirements.

We are present in your local market, understand your market's needs and also comply with local requirements and standards.

Let us show you how our experience and our partnership will drive your success with a new motors series specifically defined for the distribution business.

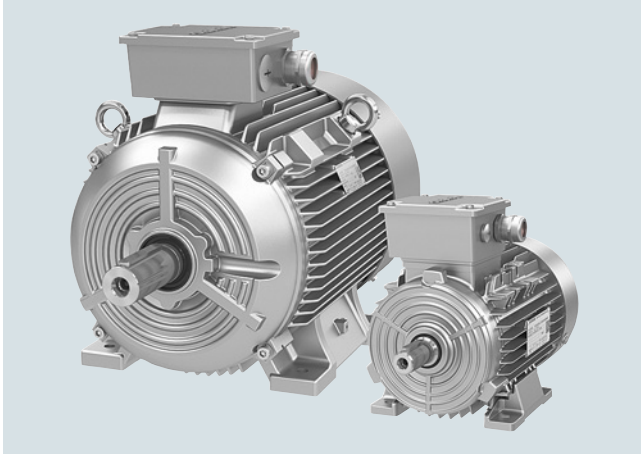


SIMOTICS 1LE0 with aluminum housing, frame size 90



SIMOTICS 1LE0 with cast-iron housing, frame size 180

## Overview



SIMOTICS FL 1LE0 low-voltage motors

This catalog is using all of our 150 years experience and focuses on our SIMOTICS low-voltage IEC motors, especially defined for the distribution market and OEMs. It covers aluminum and cast-iron motor series.

Additional offering is always available from our standard motor catalog portfolio. For further information, please refer to Catalog D 81.1. The SIMOTICS low voltage motors portfolio is covering efficiency classes from IE1 to IE4. This catalog describes only IE3 solutions, which is according to the range of SIMOTICS FL series.

In addition to these general IE1, IE2 and IE3 solutions, Siemens can also provide specific variants for specific markets i.e. in India, China etc. In such instances please consult your local Siemens representative.

|                          |                            |
|--------------------------|----------------------------|
| Brief overview           | Aluminum motors 1LE0323    |
| Power and voltage range: | 0.55 ... 18,5 kW           |
| Frame sizes              | 80 ... 160                 |
| Rated speed:             | 1000 ... 3000 rpm          |
| Number of poles:         | 2, 4, 6                    |
| Efficiency classes:      | • IE3 (Premium Efficiency) |

|                          |                            |
|--------------------------|----------------------------|
| Brief overview           | Cast-iron motors 1LE0023   |
| Power and voltage range: | 15 ... 45 kW               |
| Frame sizes              | 180 ... 225                |
| Rated speed:             | 1000 ... 3000 rpm          |
| Number of poles:         | 2, 4, 6                    |
| Efficiency classes:      | • IE3 (Premium Efficiency) |

# Introduction

## SIMOTICS motors

### General information

1

#### Benefits

##### Product highlights

**Defined range of options** – can be selected according to specific customer requirements. The 1LE0 SIMOTICS FL motor is a standard motor without any built-in options.

**Fulfill voltage and construction requirements** – The SIMOTICS FL offer additional selection of rated voltages and mounting types.

**Easy retrofit and upgrade to higher efficiency class** – due to harmonized design dimensions throughout the whole 1LE0 motor family.

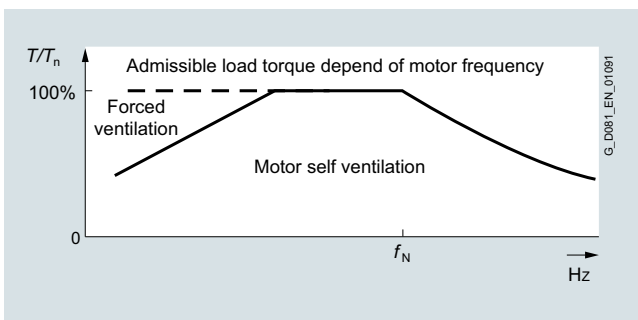
**Common user and spare parts** – are applicable within the 1LE0 motor series SIMOTICS FL.

##### Rotatable terminal box

**Global support** – worldwide warranty and service

##### Flexible control options

Working with SINAMICS, you can rely on a drive family with flexible control options – with V/f control as well as vector control. As a result, applications can be addressed with basic speed control and with higher speed precision with encoderless vector control or with encoder.



##### Note:

Forced ventilation is currently not part of the SIMOTICS FL scope.

#### Application

##### Application note

- **Pump:** Energy saving for quadratic torque load with variable speed operation
- **Fan:** Ideal for flow control application
- **Material handling:** Effectively working with continuous and intermittent periodic duties. Reliable operation.



Pump



Fan



Material handling



**Technical specifications****Key features**

Standard SIMOTICS FL motor is without any build-in options. Defined range of options can be selected according to specific customer requirements.

Besides we can always offer you the most comprehensive motor portfolio made to order for all applications and industries available from our standard catalog portfolio D 81.1.

**Low vibration**

The low vibration results from our precision manufacturing and the use of defined and controlled quality components. The quality bearings used augment this and result in longer life and lower noise.

For more details, see technical features from page 1/20.

**True IP55 as standard**

Our IP55 design covers a vast majority of applications and is tested and proven for full lifetime, plus you have the full modification possibility within IP55 rating.

**F to B thermal class for built-in reserve**

The Siemens motors are rated at normal sinusoidal voltage with a class B (130 °C) temperature rise. The windings are rated to class F (155 °C) thus allowing for reserve for the additional losses associated with variable speed drive operation and / or higher ambient temperature and / or overload conditions when operating directly on line.

F to F is possible for converter operation.

**Converter operation for variable speed as standard**

For all motors offered up to 460 V converter operation is possible as standard configuration – no special option or series is needed.

**Global motor platform**

Our motor design is based on one global motor platform with the same look and feel on all low-voltage motor IEC products.

**Preparation for easy modifications and mountings**

Preparation of the shaft extension at NDE can be ordered with the option "Prepared for mountings, threaded hole only", order code **G46** for the following frame sizes:

| Frame size | Threaded hole acc. to DIN 332 |
|------------|-------------------------------|
| 80         | DR M5                         |
| 90         | DR M6                         |
| 100        | DR M8                         |
| 112        | DR M8                         |
| 132        | DR M10                        |
| 160        | DR M12                        |
| 180        | DR M16                        |
| 200        | DR M20                        |
| 225        | DR M20                        |

The length of the motor does not change because the shaft extension is still under the fan cover.

# Introduction

## SIMOTICS motors

### General information

1

### Technical specifications

#### Special features

|                                    |   | SIMOTICS FL                         |                                     |
|------------------------------------|---|-------------------------------------|-------------------------------------|
|                                    |   | Aluminum series                     | Cast-iron series                    |
|                                    |   | IE3                                 | IE3                                 |
|                                    |   | 1LE0323                             | 1LE0023                             |
| <b>DOL</b>                         | Efficiency class  |                                     |                                     |
|                                    | Series  |                                     |                                     |
|                                    | Voltage up to   | 690 V                               | 690 V                               |
|                                    | Frequency   | 50 Hz                               | 50 Hz                               |
| <b>Converter operation up to</b>   |   | 460 V <sub>rms</sub>                | 460 V <sub>rms</sub>                |
| <b>Frame sizes</b>                 |   | 80 ... 160                          | 180 ... 225                         |
| <b>Type of construction</b>        | Standard  | IM B3                               | IM B3                               |
|                                    | Optional  | IM B35, IM B14, IM B5, IM V1        | IM B35, IM B5, IM V1                |
| <b>Bearing designation</b>         | Bearing 62 (DE/NDE)   | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                    | Bearing 63 (DE)   | <input checked="" type="checkbox"/> | –                                   |
|                                    | Bearing NU (DE)   | –                                   | <input checked="" type="checkbox"/> |
| <b>Others</b>                      | Metal fan cover   | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                    | Metal rating plate  | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                    | Drain hole  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                    | Threaded hole at non-drive end prepared for auxiliary mountings | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                    | Space heater  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <b>Motor protection</b>            | 3 × PTC   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <b>Certificates, documentation</b> | Extra rating plate for voltage tolerance                        | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                    | CE marking  | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                    | Routine test  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <b>Standard color</b>              | Stone gray (RAL 7030)   | <input type="checkbox"/>            | <input type="checkbox"/>            |

= Standard

= Option

– = Not possible

For converter operation with the powers specified in the catalog, the motors are used according to temperature class 155 (F), i.e. in this case neither a service factor > 1 nor an increased coolant temperature is possible.

#### Notes:

All our motors are shown as 400 V as the nominal standard. The IEC 60034 regulations state that the rating plate data is only valid at the specific given voltage. In practice, all listed 400 V motors may be used at connection voltages 400 V ±5%.

The motors will function well, although there would be deviations from the nominal electrical rating plate data.

According to the standard, motors can also be operated at 400 V ±10% (Category B), only longer operation is not recommended.

#### Overview

##### *Applicable standards and specifications*

| <b>Title</b>  | <b>IEC</b>             |
|---|------------------------|
| Efficiency classes and efficiencies   | IEC 60034-30-1:30-2014 |
| Rotating electrical machines – Part 1:<br>Rating and performance  | IEC 60034-1            |
| Rotating electrical machines – Part 2-1:<br>Standard methods for determining losses and efficiency from tests<br>(excluding machines for traction vehicles)                           | IEC 60034-2            |
| Rotating electrical machines – Part 5:<br>Degrees of protection provided by the integral design of rotating electrical machines<br>(IP code) – Classification                         | IEC 60034-5            |
| Rotating electrical machines – Part 6: Methods of cooling (IC Code)   | IEC 60034-6            |
| Rotating electrical machines – Part 7:<br>Classification of types of construction, mounting arrangements and terminal box position<br>(IM Code)                                       | IEC 60034-7            |
| Rotating electrical machines – Part 8:<br>Terminal markings and direction of rotation   | IEC 60034-8            |
| Rotating electrical machines – Part 9: Noise limits   | IEC 60034-9            |
| Rotating electrical machines – Part 14:<br>Mechanical vibration of certain machines with shaft heights 56 mm and higher –<br>Measurement, evaluation and limits of vibration severity | IEC 60034-14           |
| Rotating electrical machines – Part 1:<br>Frame numbers 56 to 400 and flange numbers 55 to 1080   | IEC 60072-1            |
| Classification of environmental conditions Part 2-1:<br>Environmental conditions appearing in nature – Temperature and humidity   | IEC 60721-2-1          |
| Standard voltages   | IEC 60038              |
| Electrical insulation – Thermal classification  | IEC 60085              |

## Introduction

### Technical features

#### Voltage and frequency · Tolerances for electrical data

##### Overview

##### Voltage and frequency

IEC 60034-1 differentiates between Category A (combination of voltage deviation  $\pm 5\%$  and frequency deviation  $\pm 2\%$ ) and Category B (combination of voltage deviation  $\pm 10\%$  and frequency deviation  $+3\%$  /  $-5\%$ ) for voltage and frequency fluctuations.

The motors can supply their rated torque in both Category A and B. In Category A, the temperature rise is approximately 10 K higher than during normal operation.

| Standard 60034-1   | Category A   | Category B   |
|--|--|--|
| Voltage deviation  | $\pm 5\%$  | $\pm 10\%$   |
| Frequency deviation  | $\pm 2\%$  | $3\%$ / $-5\%$   |
| Rating plate data stamped with rated voltage a (e.g. 230 V)                      | a $\pm 5\%$<br>(e.g. 230 V $\pm 5\%$ )                       | a $\pm 10\%$<br>(e.g. 230 V $\pm 10\%$ )                         |
| Rating plate data stamped with rated voltage ranges b to c (e.g. 220 V to 240 V) | b $-5\%$ to c $+5\%$<br>(e.g. 220 V $-5\%$ to 240 V $+5\%$ ) | b $-10\%$ to c $+10\%$<br>(e.g. 220 V $-10\%$ to 240 V $+10\%$ ) |

In Category B, the standard does not recommend extended operation.

The selection and ordering data state the rated current at 400 V. The IEC 60038 standard specifies a tolerance of  $\pm 10\%$  for line voltages of 230 V, 400 V and 690 V.

Rotors are dynamically balanced with half key. This corresponds to vibration quantity level A.

| Limits (rms values) for max. vibration severity in terms of vibration displacement (s) and vibration velocity (v) for the shaft height H |                      |                      |                   |                      |                   |
|--|----------------------|----------------------|-------------------|----------------------|-------------------|
| Vibration severity grade   | Machine installation | Shaft height H in mm |                   |                      |                   |
|  |                      | $56 \leq H \leq 132$ |                   | $H > 132$            |                   |
|  |                      | $s_{rms}$<br>$\mu m$ | $v_{rms}$<br>mm/s | $s_{rms}$<br>$\mu m$ | $v_{rms}$<br>mm/s |
| A  | Free suspension      | 45                   | 2.8               | 45                   | 2.8               |
|  | Rigid clamping       | –                    | –                 | 37                   | 2.3               |
| B  | Free suspension      | 18                   | 1.1               | 29                   | 1.8               |
|  | Rigid clamping       | –                    | –                 | 24                   | 1.5               |

For details, see standard EN 60034-14 Aug. 2018, EN 60034-14:2004 + A1:2007

##### Tolerances for electrical data

- Efficiency  $\eta$  at
  - $P_{rated} \leq 150$  kW:  $-0.15 \cdot (1 - \eta)$
  - $P_{rated} > 150$  kW:  $-0.10 \cdot (1 - \eta)$
  - With  $\eta$  being a decimal number
- Power factor
  - Power factor  $= \frac{1 - \cos \phi}{6}$
  - Minimum absolute value: 0.02
  - Maximum absolute value: 0.07
- Slip  $\pm 20\%$  (for motors  $< 1$  kW  $\pm 30\%$  is admissible)
- Locked-rotor current  $+20\%$
- Locked-rotor torque  $-15\%$  to  $+25\%$
- Breakdown torque  $-10\%$
- Moment of inertia  $\pm 10\%$

**Overview**

**Standardization of the efficiency classes**

Different energy efficiency standards exist worldwide for induction motors: To promote international standardization, the international standard IEC 60034-30-1-1 03/2014 (Rotating electrical machines – Part 30-1: Efficiency classes of single-speed, three-phase, cage-induction motors (IE code) was created. This groups low-voltage asynchronous motors into new efficiency classes (first released in October 2008).

Applicability (excerpt)

The efficiency classes are grouped according to the following nomenclature (IE = International Efficiency):

- Low-voltage motors up to 1000 V (50/60 Hz with line operation)
- Rating: 0.12 to 1000 kW; with 2, 4, 6, or 8 poles
- Operating mode: S1

The efficiencies in IEC 60034-30-1 are based on the method for determining losses according to IEC 60034-2-1:2014.

**Standardization of the efficiency classes**

The efficiency classes are grouped according to the following nomenclature (IE = International Efficiency):

- IE1 (Standard Efficiency)
- IE2 (High Efficiency)
- IE3 (Premium Efficiency)
- IE4 (Super Premium Efficiency)

| IEC 60034-30-1           | NEMA MG1                         | GB 18613-2012        |
|--------------------------|----------------------------------|----------------------|
| <b>IE4</b> <sup>1)</sup> |                                  | <b>Grade 1 (IE4)</b> |
| <b>IE3</b>               | <b>Premium Efficient (60 Hz)</b> | <b>Grade 2 (IE3)</b> |

Comparison of IE efficiency classes

Notes:

All efficiency classes are stated with reference to 50 Hz data (unless specified otherwise).

We comply with the latest efficiency standards and describe motors from IE1 to IE3 efficiencies.

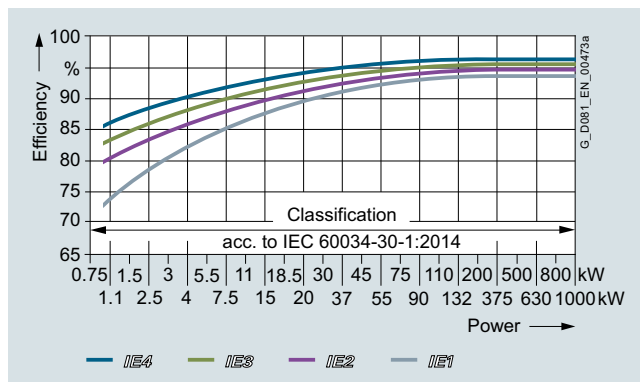
Although Siemens also has ranges for specific solutions for IE4 efficiency, these IE4 types are not in the scope of the SIMOTICS FL series.

**Measuring method according to IEC 60034-2-1:2014 for determining the efficiency**

With this measuring method, motor losses are no longer applied as a percentage, but are determined by standard methods. The nominal efficiencies are therefore reduced from EFF1 to IE2 and from EFF2 to IE1, even though there have been no technical or physical changes to the motors.

Previously:  $P_{LL} = 0.5\%$  of  $P_1$  (power drawn; IEC 60034-2)  
Now:  $P_{LL}$  = individual measurement (IEC 60034-1)

$P_{LL}$  = additional load losses



IE1-IE4 efficiencies, 4-pole, 50 Hz, according to power

<sup>1)</sup> Defined in IEC/TS 60034-31



## Introduction

### Technical features

## Efficiency classes and efficiencies according to IEC 60034-30-1

1

### Overview

#### Background information

Comprehensive laws have been introduced in the European Union with the objective of reducing energy consumption and therefore CO<sub>2</sub> emissions. EU Regulations 640/2009 and 2019/1781 concern the energy consumption or efficiency of induction motors in the industrial environment. This regulation is in force in every country of the European Economic Area until June 30, 2021.

Effective July 1, 2021, the new regulation (EU) 2019/1781 will come into force. The main contents of and exceptions to both regulations are explained below.

For more information on internationally applicable standards and legal requirements, visit:

[www.siemens.com/international-efficiency](http://www.siemens.com/international-efficiency)

#### Regulation (EC) 640/2009

##### Exceptions

- Motors that are designed to be operated totally submerged in a liquid;
- Motors fully integrated into a product (e.g. a gear unit, pump, fan or compressor) whose energy efficiency cannot be measured independently of the product;
- Motors that are specially designed for operation under the following conditions:
  - At altitudes greater than 4000 meters above sea level;
  - At ambient temperatures above 60 °C;
  - At maximum operating temperatures above 40 °C;
  - At ambient temperatures below -30 °C
  - With cooling liquid temperatures at the product intake of below 0 °C or above 32 °C;
  - In hazardous areas in the context of Directive 2014/34/EU of the European Parliament and Council;

##### ■ Brake motors

The following motors are not affected:

- Pole-changing motors
- Synchronous motors
- Motors for intermittent duty S2 to S9
- Single-phase motors
- Motors specially developed for converter operation in accordance with IEC 60034-25

#### The following changes came into effect on the dates below:

##### From January 1, 2015:

Compliance with the legally required minimum efficiency class IE3 for a power range from 7.5 to 375 kW (2-, 4-, 6-pole) or, as an alternative, IE2 motor plus frequency converter.

##### From January 1, 2017:

Compliance with the legally required minimum efficiency class IE3 for a power range from 0.75 to 375 kW (2-, 4-, 6-pole) or, as an alternative, IE2 motor plus frequency converter.

##### From July 1, 2021:

Compliance with the legally required minimum efficiency class IE2 for a power range from 0.12 to 0.75 kW (2-, 4-, 6-, and 8-pole).

#### New regulation (EU) 2019/1781

##### Exceptions

- Motors that are designed to be operated totally submerged in a liquid
- Motors fully integrated into a product (e.g. a gear unit, pump, fan or compressor) whose energy efficiency cannot be measured independently of the product
- Motors that are specially designed for operation under the following conditions:
  - At altitudes greater than 4000 meters above sea level
  - Where ambient temperatures exceed 60 °C
  - At maximum operating temperatures above 400 °C
  - At ambient temperatures below -30 °C
  - With cooling liquid temperatures at the product intake of below 0 °C or above 32 °C
  - In hazardous areas as defined in Directive 2014/34/EU of the European Parliament and Council that are designed and certified for underground mining applications
  - Motors with an integrated brake that is an integral part of the interior motor structure and can neither be removed or powered from a separate source during motor efficiency testing.
  - Motors with an integrated speed control (compact drives), whose energy efficiency cannot be tested independently of the speed control

The following motors are not affected:

- Pole-changing motors
- Synchronous motors
- Totally enclosed, naturally ventilated motors (TENV motors);
- Motors specially developed for converter operation in accordance with IEC 60034-25

Other potential restrictions as described in the technical documentation may apply to converter operation and must be taken into account!

The following are generally recommended for converter operation:


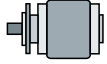

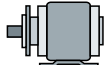

- Motor temperature detection by embedded temperature sensor
- Bearing insulation with frame size 225 and larger

**Overview**

In addition to the basic IM B3 type of construction, motors can also be supplied in other types of construction.

The possible versions in our selection for a particular motor type can be taken from the table below.

**Standard types of construction and special types of construction**

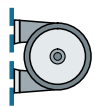
| Type of construction acc. to IEC 60034-7 |   | Frame size | Letter of the 14th position of the Article No. | Additional identification code <b>-Z</b> with order code |
|--|---|------------|--|--|
| <b>Without flange</b>                    |   |            |  |  |
| IM B3/IM 1001                            |    | 80 to 225  | <b>A</b>                                       | –  |
| <b>With flange</b>                       |   |            |  |  |
| IM B5/IM 3001                            |    | 80 to 225  | <b>F</b>                                       | –  |
| IM V1/IM 3011 without protective cover   |    | 80 to 225  | <b>G</b>                                       | –  |
| IM B35/IM 2001                           |    | 80 to 225  | <b>J</b>                                       | –  |
| <b>With flange</b>                       |   |            |  |  |
| IM B14/IM 3601                           |  | 80 to 160  | <b>K</b>                                       | –  |

Apart from the distribution portfolio covered types of construction, here is the general overview of the possible types of construction. Many of them can be achieved by modifying this offered portfolio. Anything else can still be supplied out of our standard catalog portfolio, see D 81.1.

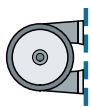
**Notes:**

When mounting the motors in diverse orientations consider the location of the drain hole – it must be at the lowest point to drain water.

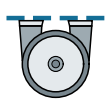
Mounting motors in orientations other than these intended could lead to mechanical or structural premature failure. If in any doubt, please consult your Siemens partner.

**Types of construction according to DIN IEC 34, Part 7**

IM B6



IM B7



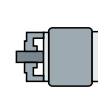
IM B8



IM V5



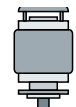
IM V6



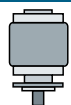
IM B14



IM V18



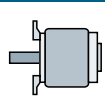
IM V19



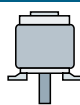
IM V1



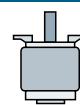
IM V3



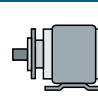
IM B9



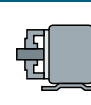
IM V8



IM V9



IM B35



IM B34

## Introduction

### Technical features

#### IP rating

#### Overview

The IP code (or Ingress Protection Rating, sometimes also interpreted as International Protection Rating) consists of the letters IP followed by two digits or one digit and one letter and an optional letter. As defined in international standard IEC 60529, IP code classifies and rates the degrees of protection provided against the intrusion of solid objects, dust, accidental contact, and water in mechanical casings and with electrical enclosures

**IP 5 5**

Code number indicating protection against water

Code number indicating touch protection and protection against foreign bodies

International Protection

#### Note:

Some manufacturers offer sealing and protection above IP55. Although it is available as an option, Siemens prefers a true IP55 as a default standard.

- IP55 covers the vast majority of applications as it offers dust and rain protection
- The IP55 is stable over the life of the motor. Higher protections can need maintenance or an exact assembly to ensure that the higher protection is real and not just on paper.
- Modifications can be made on an IP55 motor whilst maintaining that degree of protection.

#### Solids, first digit

The first digit indicates the level of protection that the enclosure provides against access to hazardous parts (e.g., electrical conductors, moving parts) and the ingress of solid foreign objects.

| Level | Object size protected against | Effective against  |
|-------|-------------------------------|--|
| 0     | –                             | No protection against contact and ingress of objects   |
| 1     | > 50 mm                       | Any large surface of the body, such as the back of a hand, but no protection against deliberate contact with a body part   |
| 2     | > 12.5 mm                     | Fingers or similar objects   |
| 3     | > 2.5 mm                      | Tools, thick wires, etc.   |
| 4     | > 1 mm                        | Most wires, screws, etc.   |
| 5     | Dust protected                | Ingress of dust is not entirely prevented, but it must not enter in sufficient quantity to interfere with the satisfactory operation of the equipment; complete protection against contact |
| 6     | Dust tight                    | No ingress of dust; complete protection against contact  |

#### Note:

A suitable degree of protection should be selected depending on the operating and environmental conditions. Siemens offers a standard which is most suitable and applicable over the lifetime of a motor such as true IP55 standard.

#### Liquids, second digit

Protection of the equipment inside the enclosure against harmful ingress of water.

| Level | Protected against                    | Testing for  | Details  |
|-------|--------------------------------------|--|--|
| 0     | Not protected                        | –  | –  |
| 1     | Dripping water                       | Dripping water (vertically falling drops) shall have no harmful effect.  | Test duration: 10 minutes<br>Water equivalent to 1 mm rainfall per minute  |
| 2     | Dripping water when tilted up to 15° | Vertically dripping water shall have no harmful effect when the enclosure is tilted at an angle up to 15° from its normal position.  | Test duration: 10 minutes<br>Water equivalent to 3 mm rainfall per minute  |
| 3     | Spraying water                       | Water falling as a spray at any angle up to 60° from the vertical shall have no harmful effect.  | Test duration: 5 minutes<br>Water volume: 0.7 liters per minute<br>Pressure: 80–100 kN/m <sup>2</sup>                          |
| 4     | Splashing water                      | Water splashing against the enclosure from any direction shall have no harmful effect.   | Test duration: 5 minutes<br>Water volume: 10 liters per minute<br>Pressure: 80–100 kN/m <sup>2</sup>                           |
| 5     | Water jets                           | Water projected by a nozzle (6.3 mm) against enclosure from any direction shall have no harmful effects.   | Test duration: at least 3 minutes<br>Water volume: 12.5 liters per minute<br>Pressure: 30 kN/m <sup>2</sup> at distance of 3 m |
| 6     | Powerful water jets                  | Water projected in powerful jets (12.5 mm nozzle) against the enclosure from any direction shall have no harmful effects.  | Test duration: at least 3 minutes<br>Water volume: 100 liters per minute<br>Pressure: 100 kN/m <sup>2</sup> at distance of 3 m |
| 7     | Immersion up to 1 m                  | Ingress of water in harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time (up to 1 m of submersion).  | Test duration: 30 minutes<br>Immersion at depth of 1 m   |
| 8     | Immersion beyond 1 m                 | The equipment is suitable for continuous immersion in water under conditions which shall be specified by the manufacturer. Normally, this will mean that the equipment is hermetically sealed. However, with certain types of equipment, it can mean that water can enter but only in such a manner that it produces no harmful effects. | Test duration: continuous immersion in water<br>Depth specified by manufacturer  |

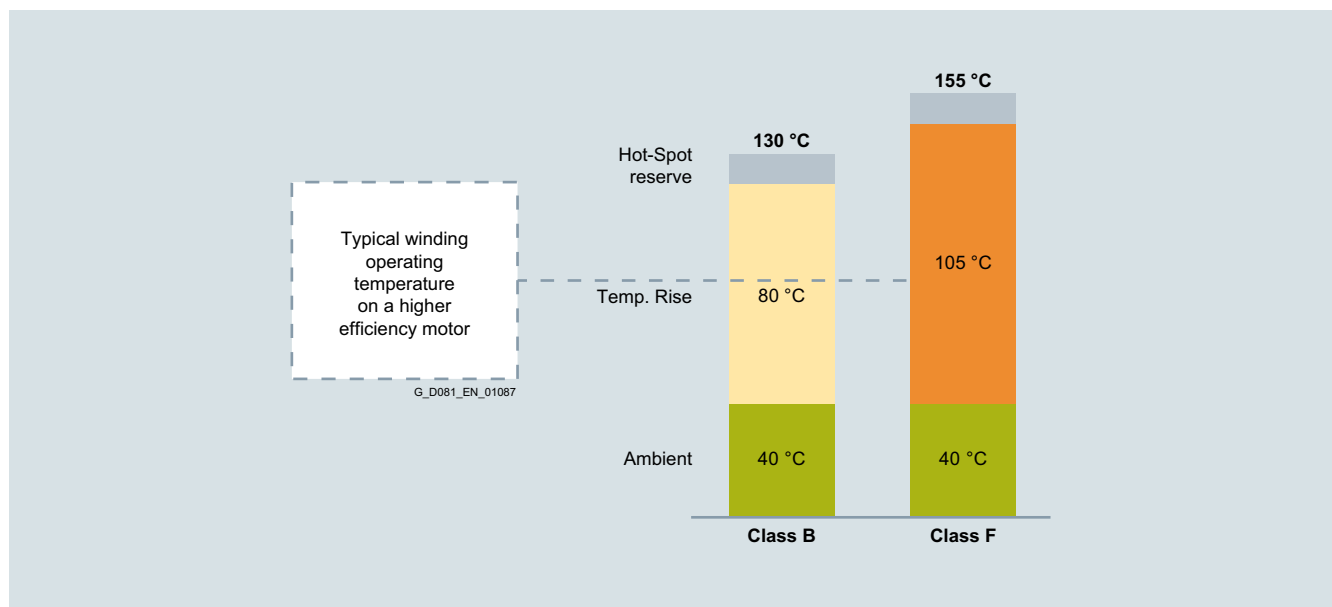
**Overview****Thermal class**

The Siemens motors are rated at normal sinusoidal voltage with a class B (130 °C) temperature rise. The windings are rated to class F (155 °C) thus allowing for reserve for the additional losses associated with variable speed drive operation and/or higher ambient temperature and/or overload conditions.

The temperature rise of the winding of the motor is important. It provides a great insight into the design of the motor and its life expectancy. The cooler a motor runs the better its life expectancy and longer its life. Siemens builds motors to a minimum of class F (155 °C) on all material – continuous operation for a very long life expectancy.

The more efficient the motor, the less heat it produces – to the extent that modern motors often only run with internal temperatures of 95 °C – much cooler than the limits set by the standards.

Siemens uses double coated wires with DURIGNIT insulation materials and capable varnishes – we consider all components including electrical connections and bearing grease – our motors are true class F under all circumstances – with reserve built in on top.

**Note:**

Siemens builds motors with reserve: The motors are capable to operate at least at 155 °C (class F) but we only rate at a nominal 130 °C (class B).

# Introduction

## Technical features

### Rating plates

1

#### Overview

##### Examples of rating plates

|                                       |      |                      |           |                               |       |       |         |
|---------------------------------------|------|----------------------|-----------|-------------------------------|-------|-------|---------|
| <b>THREE-PHASE ASYNCHRONOUS MOTOR</b> |      |                      |           |                               |       |       |         |
| 3-Mot. OAV3162A                       |      | 1LE0323-1DA23-3AA4-Z |           | LMH-1008 / 800003888993 / 001 |       |       |         |
| 160M                                  | IMB3 | IP55                 | 99 kg     | Th.Cl.155(F)                  |       |       |         |
| BRG DE: 6209 C3                       |      | BRG NDE 6209 C3      |           | IEC60034                      |       |       |         |
| Grease: Unirex N3                     |      |                      |           |                               |       |       |         |
| Re-grease interval: 8000h             |      |                      |           | AMB 40°C                      |       |       |         |
| Quantity: 15g                         |      |                      |           |                               |       |       |         |
| V                                     | Hz   | kW                   | A         | EFF.(%)                       | cos φ | r/min | EFF.Cl. |
| 380V Δ/660VY                          | 50   | 11                   | 20.5/11.9 | 91.2                          | 0.89  | 2935  | IE3     |

G\_D081\_XX\_01084

Rating plate for aluminum motor series 1LE0323

|                                       |      |                      |           |                               |       |       |         |
|---------------------------------------|------|----------------------|-----------|-------------------------------|-------|-------|---------|
| <b>THREE-PHASE ASYNCHRONOUS MOTOR</b> |      |                      |           |                               |       |       |         |
| 3-Mot. OCV3182A                       |      | 1LE0023-1EA23-3AB4-Z |           | LMH-1008 / 800003888993 / 001 |       |       |         |
| 180M                                  | IMB3 | IP55                 | 171 kg    | Th.Cl.155(F)                  |       |       |         |
| BRG DE 6210 C3                        |      | BRG NDE 6210 C3      |           | IEC60034                      |       |       |         |
| Grease: Unirex N3                     |      |                      |           |                               |       |       |         |
| Re-grease interval: 4000h             |      |                      |           | AMB 40°C                      |       |       |         |
| Quantity: 20g                         |      |                      |           |                               |       |       |         |
| V                                     | Hz   | kW                   | A         | EFF.(%)                       | cos φ | r/min | EFF.Cl. |
| 380V Δ/660VY                          | 50   | 22                   | 40.5/23.5 | 92.7                          | 0.89  | 2935  | IE3     |

G\_D081\_XX\_01085

Rating plate for cast-iron motor series 1LE0023

|                                       |       |                      |         |                               |       |       |         |
|---------------------------------------|-------|----------------------|---------|-------------------------------|-------|-------|---------|
| <b>THREE-PHASE ASYNCHRONOUS MOTOR</b> |       |                      |         |                               |       |       |         |
| 3-Mot. OCV3352A                       |       | 1LE0003-3BA23-3JA5-Z |         | LMH-1008 / 800003888992 / 001 |       |       |         |
| 355M                                  | IMB35 | IP55                 | 1600 kg | Th.Cl.155(F)                  |       |       |         |
| BRG DE: 6319 C3                       |       | BRG NDE 6319 C3      |         | IEC60034-30                   |       |       |         |
| Grease: Unirex N3                     |       |                      |         |                               |       |       |         |
| Re-grease interval: 2000h             |       |                      |         | SF1.15 AMB 40°C               |       |       |         |
| Quantity: 40g                         |       |                      |         |                               |       |       |         |
| V                                     | Hz    | kW                   | A       | EFF.(%)                       | cos φ | r/min | EFF.Cl. |
| 380V Δ/660VY                          | 50    | 220                  | 390/225 | 95                            | 0.90  | 2980  | IE3     |
| 440V Δ                                | 60    | 246                  | 375     | 95.4                          | 0.90  | 3580  |         |

- 1 Motor type
- 2 Category of motor
- 3 Frame size
- 4 Bearing type
- 5 Bearing grease type
- 6 Re-grease interval
- 7 Re-grease quantity
- 8 Rated voltage and connection
- 9 Rated frequency
- 10 Rated power
- 11 Rated current
- 12 Efficiency
- 13 Power factor
- 14 Rated speed
- 15 IEC Efficiency class according to IEC standard

- 16 Service factor
- 17 Ambient temperature
- 18 GB Efficiency class according to GB standard
- 19 QR code
- 20 IEC standard
- 21 Company standard
- 22 Product series number
- 23 Balance method
- 24 CE mark
- 25 Thermal class
- 26 Order No.
- 27 Motor weight
- 28 IP protection class
- 29 Mounting type

G\_D081\_LEN\_01086

Explanation of the standard rating plate



**Overview****Derating****Environmental**

- Degree of motor protection IP55 (IEC 60034-5).
- Altitude shall not exceed 1000 m above sea level (IEC 60034-1).
- Allowed air temperature between -20 and 40 °C (IEC 60034-1).
- Permitted relative humidity:
  - -20 °C < T < 20 °C: 100%
  - 20 °C < T < 30 °C: 95%
  - 30 °C < T < 40 °C: 55%

For higher coolant temperatures and / or site altitudes higher than 1000 m above sea level, the specified motor must be reduced by using the factor  $k_{HT}$ . This results in an admissible output ( $P_{adm}$ ) of the motor:

$$P_{adm} = P_{rated} \cdot k_{HT}$$

**Reduction factor  $k_{HT}$  for different site altitudes and/or coolant temperatures**

| Site altitude<br>above sea level<br>m | Ambient temperature/coolant temperature |              |       |       |       |       |
|---------------------------------------|---|--------------|-------|-------|-------|-------|
|                                       | < 30 °C                                 | 30 ... 40 °C | 45 °C | 50 °C | 55 °C | 60 °C |
| 1000                                  | 1.07                                    | 1.00         | 0.96  | 0.92  | 0.87  | 0.82  |
| 1500                                  | 1.04                                    | 0.97         | 0.93  | 0.89  | 0.84  | 0.79  |
| 2000                                  | 1.00                                    | 0.94         | 0.90  | 0.86  | 0.82  | 0.77  |
| 2500                                  | 0.96                                    | 0.90         | 0.86  | 0.83  | 0.78  | 0.74  |
| 3000                                  | 0.92                                    | 0.86         | 0.82  | 0.79  | 0.75  | 0.70  |
| 3500                                  | 0.88                                    | 0.82         | 0.79  | 0.75  | 0.71  | 0.67  |
| 4000                                  | 0.82                                    | 0.77         | 0.74  | 0.71  | 0.67  | 0.63  |

**Note:**

If operating conditions exceed above values, please contact our local sales office for the selection of catalog motors.

## Introduction

### Technical features

#### Coolant temperature and installation altitude

#### Overview

##### Anti-condensation

Moisture is present in the air around us. Under the correct circumstances it can condensate. The warmer the air the higher the possible moisture content. As air cools the moisture carrying content reduces to the point when the moisture condenses – called the "dew point".

This condition can be met several times a day under normal operation, as a motor operates and cools at differing times of the day.

Smaller motors are less susceptible than larger motors due to the smaller volume of moist air possible in the motor. Dew moisture condenses and accumulates in a motor, which is seen as water collection. The water accumulates at the lowest point of the motor. It often does no harm as long as the collection point is below the level of the electrical system.

Two points that need to be paid attention to are, first, how much water there is in the air and when it will condensate. The second is, whether it will do any harm.

| Relative humidity | Temperature |       |       |       |       |       |       |       |
|-------------------|-------------|-------|-------|-------|-------|-------|-------|-------|
|                   | 20 °C       | 30 °C | 40 °C | 50 °C | 60 °C | 70 °C | 80 °C | 90 °C |
| 10%               | 2           | 3     | 5     | 8     | 13    | 20    | 29    | 42    |
| 15%               | 3           | 5     | 8     | 12    | 19    | 30    | 44    | 63    |
| 20%               | 3           | 6     | 10    | 17    | 26    | 39    | 58    | 84    |
| 25%               | 4           | 8     | 13    | 21    | 32    | 49    | 73    | 105   |
| 30%               | 5           | 9     | 15    | 25    | 39    | 59    | 87    | 126   |
| 35%               | 6           | 11    | 18    | 29    | 45    | 69    | 102   | 146   |
| 40%               | 7           | 12    | 20    | 33    | 52    | 79    | 116   | 167   |
| 45%               | 8           | 14    | 23    | 37    | 58    | 89    | 131   | 188   |
| 50%               | 9           | 15    | 26    | 41    | 65    | 98    | 145   | 209   |
| 55%               | 10          | 17    | 28    | 46    | 71    | 108   | 160   | 230   |
| 60%               | 10          | 19    | 31    | 50    | 78    | 118   | 174   | 251   |
| 65%               | 11          | 20    | 33    | 54    | 84    | 128   | 189   | 272   |
| 70%               | 12          | 21    | 36    | 58    | 91    | 138   | 203   | 293   |
| 75%               | 13          | 23    | 38    | 62    | 97    | 148   | 218   | 314   |
| 80%               | 14          | 24    | 41    | 66    | 104   | 157   | 233   | 335   |
| 85%               | 15          | 26    | 43    | 70    | 110   | 167   | 247   | 356   |
| 90%               | 16          | 27    | 46    | 74    | 117   | 177   | 262   | 377   |
| 95%               | 16          | 29    | 49    | 79    | 123   | 187   | 276   | 398   |
| 100%              | 17          | 30    | 51    | 83    | 130   | 197   | 291   | 419   |

If operating conditions exceed temperatures of 60 °C, please contact our local sales office for the selection of catalog motors.

The table shows the weight of moisture contained in the air, given as g/m<sup>3</sup>.

The local temperature is on the X-axis and the local relative humidity is shown on the Y-axis.

Blue fields show normal conditions.

Light gray fields show higher moisture – not available in SIMOTICS FL, only from our standard catalog portfolio D 81.1

Dark gray fields show moisture above 60 g water per m<sup>3</sup> of air – not available in SIMOTICS FL, only from our standard catalog portfolio D 81.1

##### Note:

In humid climates, during motor cool down the air inside contracts, pulling in fresh, warm, humid air. This humidity condensates inside the motor, forming water droplets. Those water droplets have to drain.

Therefore on many motors, especially the larger ones, Siemens has foreseen drain holes as standard. For SIMOTICS FL series they are optionally.

**Overview**

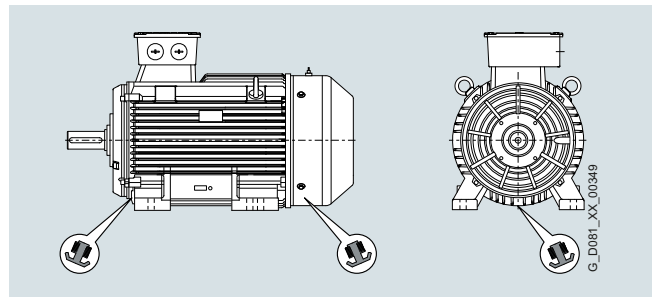
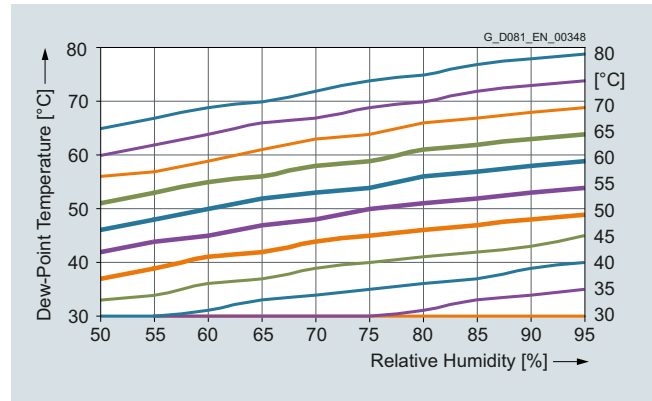
Anti-condensation heating can be provided for motors where there is a danger that moisture condensation will form on the winding due to the climatic situation. This anti-condensation heater warms up the air in the motor to a temperature above the dew point temperature in order to prevent condensation forming inside the motor. The anti-condensation heating must not be switched on while the motor is operating.

The graphic shows the temperature at which the moisture in the air will condensate to water. The lines on the right show the local temperature. The X-axis gives the local relative humidity. The "dew point" temperature can be read on the Y-axis.

Note:

Another possible solution is to connect a voltage to the stator terminals U1 and V1 that should be between 4 and 10% of the rated motor voltage.

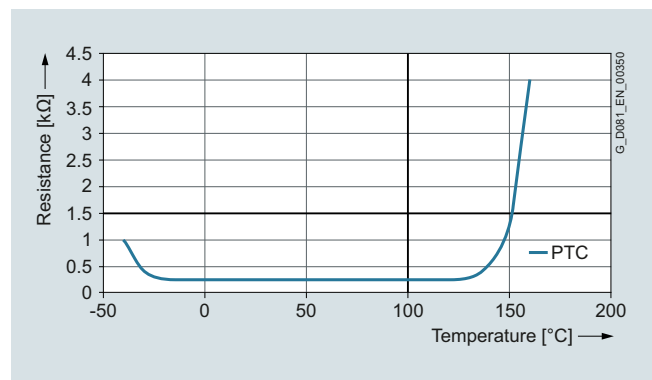
Approximately 20 to 30% of the rated current is sufficient in order to achieve an adequate temperature rise to avoid condensation.

Motor with option code **Q02** and drain hole location**Motor protection****Overview****PTC thermistors – Thermistor motor protection**

PTC thermistor temperature sensors are predominantly used for thermistor motor protection devices (alarm or shutdown) for motors. These thermistors are generally integrated in the winding overhang. As a consequence, the stator winding is directly protected. The temperature difference between alarm and shutdown (trip) is 10 K.

When a limit temperature is reached (nominal tripping temperature), the resistance of PTC thermistors will have a step change. This is evaluated by a tripping unit and can be used to open auxiliary circuits.

Thermal protection with PTC thermistors with 3 embedded temperature sensors for tripping are optionally. Connection can be done through 2 auxiliary terminals in the terminal box.

Note:

The PTC thermistors themselves cannot be subjected to high currents and voltages. This would result in destruction of the semiconductor. The switching hysteresis of the PTC thermistor and tripping unit is low, which supports fast restarting of the drive. Motors with this type of protection are recommended for heavy duty starting, switching duty, extreme changes in load, high ambient temperatures or fluctuating supply systems.

## Introduction

### Technical features

## Converter operation

1

### Overview

#### Converter application

The insulation system of our motors is capable for converter operation as standard.

Our motors are suitable e.g. for pumps, fans, compressors, textile machines and mechanical machine applications where variable or constant speed is required.

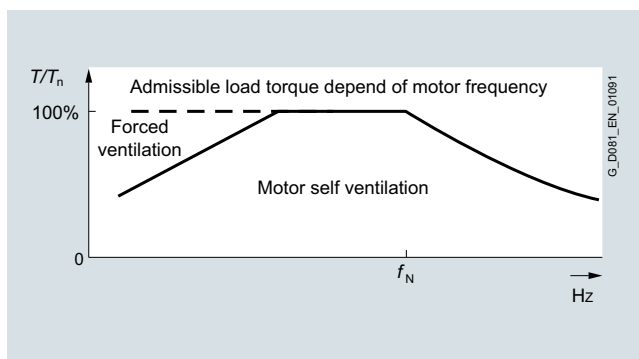
In applications where the motor is driven by a converter, the degree of electrical interference depends on the type of converter used (type, number of IGBTs, interference suppression measures, and manufacturer), cabling, distance and application requirements. The installation guidelines of the converter manufacturer with regards to electromagnetic compatibility must be considered at all times during the design and implementation phases.

At rated output with converter operation, the motors will be used in temperature class 155 (F). To prevent damage as a result of bearing currents, insulated bearings are recommended to be assembled for frame size 250 and above. Please inquire Siemens about the detailed information of insulated bearing.

#### Converter operation

The standard insulation of our motors is designed such that operation is possible on the converter at mains voltage up to 460 V.

Our motors are capable for converter operation with certain characteristics load, of which the load torque characteristics is referred in the following diagram:



By usage with admissible torque and below, the motor can be operated with self cooling; by usage over the admissible torque line, the motor with forced ventilation is needed. Forced ventilation is currently not part of the SIMOTICS FL scope.

#### Note:

These motors do not have a special series for converter operation – they are suited as standard direct-on-line operation or converter operation.

At operating speeds above rated speed the noise and vibration levels increase and the bearing lifetime reduces. Attention should be paid to the re-greasing intervals and the grease service life. For converter operation with frequencies greater than 60 Hz special balancing is required for compliance with the specified limit values.

**Overview****Mechanical stress and grease lifetime (converter operation).**

High speeds that exceed the rated speed and the resulting increased vibrations alter the mechanical running smoothness and the bearings are subject to increased mechanical stress. This reduces the grease lifetime and the bearing lifetime. More detailed information on request.

**Ventilation/noise generation (converter operation)**

The fan noise can increase at speeds that are higher than the rated speed of self-ventilated motors. To increase motor utilization at low speeds it is recommended that forced ventilated motors are used.

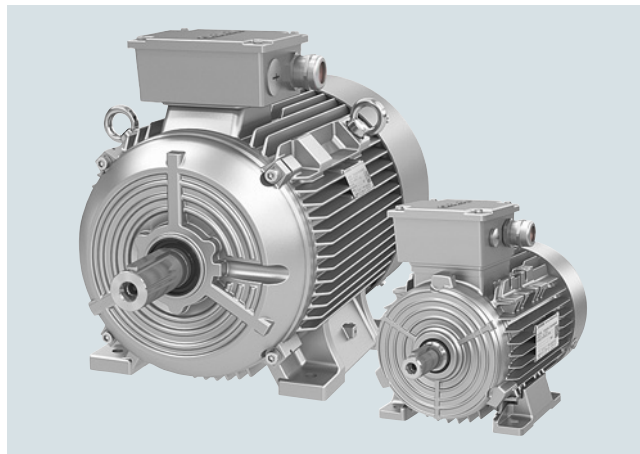
**Mechanical limit speeds**

When the motor is operated at its rated frequency, it is important to note that the maximum speeds are limited by the limits for the bearings, critical rotor speed and rigidity of the rotating parts.

With converter operation, the reduction factors for constant torque and drives for fans, pumps and compressors must be observed.

**Mechanical limit speeds  $n_{\max}$  at maximum supply frequency  $f_{\max}$  for SIMOTICS FL**

| Frame size | Mechanical speed limit |                  |                   |                  |                   |                  |
|------------|------------------------|------------------|-------------------|------------------|-------------------|------------------|
|            | 2-pole                 |                  | 4-pole            |                  | 6-pole            |                  |
|            | $n_{\max}$<br>rpm      | $f_{\max}$<br>Hz | $n_{\max}$<br>rpm | $f_{\max}$<br>Hz | $n_{\max}$<br>rpm | $f_{\max}$<br>Hz |
| 80         | 3600                   | 60               | 3000              | 100              | 2000              | 100              |
| 90         | 3600                   | 60               | 3000              | 100              | 2000              | 100              |
| 100        | 3600                   | 60               | 3000              | 100              | 2000              | 100              |
| 112        | 3600                   | 60               | 3000              | 100              | 2000              | 100              |
| 132        | 3600                   | 60               | 2700              | 90               | 2000              | 100              |
| 160        | 3600                   | 60               | 2700              | 90               | 2000              | 100              |
| 180        | 3600                   | 60               | 2700              | 90               | 2000              | 100              |
| 200        | 3600                   | 60               | 2300              | 77               | 1800              | 90               |
| 225        | 3600                   | 60               | 2300              | 77               | 1800              | 90               |

**Note:**

By use of converter operation, motors can run at speeds higher than 50 Hz nominal speed. High speeds that exceed the rated speed of a motor can lead to increased vibration and substantially decrease the life expectancy of the bearings. The maximum mechanical speed of a motor must not be exceeded due to risk of failure. More detailed information on request.



## Introduction

### Technical features

#### Noise levels

##### Overview

Motors are often used in applications in which noise is a primary concern. The use of converters can excite the surfaces of motors and the sound of diverse frequencies can be resonated in the cooling channels.

Siemens has addressed this issue by modifying the core design. Surfaces, shapes and materials and air channels have been optimized. The result is a motor which is quieter, especially with converter operation.

In order to define the motor noise level, the A-weighted sound pressure level ( $L_{p(A)}$ ) is measured at several points on the measuring plane (1 m away from the motor surface).

The measurement is carried out in a room with low reflection. As a result of noise reflection, the level can be increased up to 3 dB (A) depending on the acoustic properties of the surroundings.

The A sound power level ( $L_{WA}$ ) is normally used when engineering projects and when it is necessary to determine the noise radiated from a group of motors whose envelope dimensions differ significantly.

For sound power level, see "Selection and ordering data" from page 2/3.

#### Bearings and lubrication

##### Overview

The bearings are especially important in order that the motor runs perfectly. A good selection of bearing will guarantee long lubrication intervals, low noise, low-vibration operation and longer lifetime as well.

There are many types of bearing: diverse ball and roller bearings, tapered roller bearings and specialized bearings. Siemens has selected an applicable range of single-shielded and double-shielded bearings. Z for when regreasing is needed and ZZ when no regreasing is wished for.

Sealed-for-life bearings are avoided as they bring inherent disadvantages in operation temperatures and limit operating speeds.

Special bearings are avoided due to their disadvantages outside of their specific application.

##### Note:

Factors that reduce the lifetime of a bearing:

- Operating a motor beyond the rated speed increases the motor vibration and results in an additional radial and axial force on the bearing.
- Increased motor vibration due to the environment or other equipment results in a higher radial and axial force.

The bearing lifetime of motors with horizontal type of construction is at least 40000 hours if there is no additional axial loading at the coupling output and at least 20000 hours with the maximum admissible loads.

This assumes that the motor is operated at 50 Hz.

A bearing is only as good as its lubrication. Siemens designed a special lithium complex grease – Unirex N3.

It gives a super thermal stability for optimized bearing life. The grease gives a great temperature range from –30 to 130 °C – with an intermittent temperature reserve to 165 °C.

##### Grease lifetime and regreasing intervals for horizontal installation

| Motor series                 | Frame size  | No. of poles | Grease lifetime up to CT 40 °C |
|------------------------------|-------------|--------------|--------------------------------|
| <b>Permanent lubrication</b> |             |              |                                |
| <b>1LE0</b>                  | 80 ... 160  | 2 ... 6      | 20000 h or 40000 h             |
|                              | 180 ... 225 | 2            | 4000 h                         |
|                              |             | 4, 6         | 8000 h                         |

**Overview****Cantilever force**

This force acts transversely at the center line of the motor shaft extension. The cantilever force is calculated from the circumferential force multiplied by the pre-tension factor, which is dependent on the mechanical transmission characteristics of the particular belt.

For motors with deep-groove ball bearings, the permissible cantilever force can be increased by replacing the bearings at the drive end with cylindrical roller bearings.

In order to calculate the admissible cantilever forces for a radial load, the line of force (i.e. the center line of the pulley) of the cantilever force  $F_Q$ (N) must lie within the free shaft extension (dimension  $x$ ).

Dimension  $x$  (mm) is the distance between the point of application of force  $F_Q$  and the shaft shoulder.

Dimension  $x_{\max}$  corresponds to the length of the shaft extension. Total cantilever force is calculated using the following equation.

$$F_Q = c \cdot F_u$$

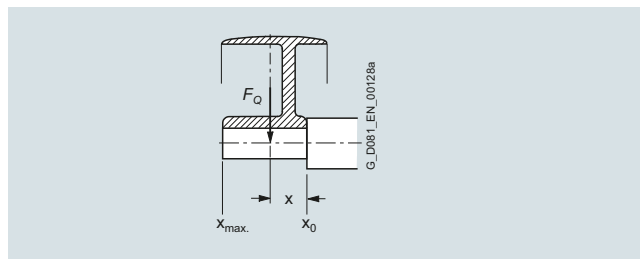
The pre-tension factor  $c$  is a value gained from experience by the belt manufacturer. The following approximate value can be assumed.

- For normal flat leather belts with an idler pulley,  $c = 2$ .
- For V-belts,  $c = 2$  to 2.5.
- For special synthetic belts (depending on the type and load),  $c = 2$  to 2.5.

The circumferential force  $F_u$ (N) is calculated using the following equation.

$$F_u = 2 \cdot 10^7 \frac{P}{n \cdot D}$$

- $F_u$  circumferential force in N
- $P$  rated motor power (transmitted power) in kW
- $n$  rated motor speed in rpm
- $D$  belt pulley diameter in mm.

**Belt drive**

A belt drive is used to connect two parallel shafts, the motor shaft with the shaft of the driven machine, whereby the speed can be simultaneously changed corresponding to the ratio between the two belt pulley diameters.

The belt must be pre-tensioned so that it can transmit the circumferential force through friction. The pre-tension factor indicates how much higher the actual tension load (cantilever force) is than the circumferential force (peripheral force).

Today, flat belts are almost always manufactured out of plastic with an adhesive coating (e.g. chrome leather).

Pre-tension factor, approx. 2 to 2.5.

The pre-tension factor for V-belts is approx. 1.5 to 2.5.

The belt must be able to transmit the power at the defined circumferential velocity. This defines the belt thickness and width. The belt supplier specifies the pre-tension factor.

The recommended circumferential velocity is approx. 35 m/s for flat belts and approx. 25 m/s for V-belts.

Steel belt pulleys must be used for circumferential velocities greater than 26 m/s due to the centrifugal force which occurs.

The actual cantilever force (belt tension) must be compared with the cantilever force permissible for the motor to select the correct motor and bearing sizes.

## Introduction

### Technical features

## Bearings and lubrication

1

### Overview

#### *Bearing selection table for 1LE0 motors – basic version*

| Frame size     | No. of poles | Drive end (DE) bearing                        | Non-drive end (NDE) bearing                   |
|----------------|--------------|---|---|
|                |              | Horizontal and vertical types of construction | Horizontal and vertical types of construction |
| <b>1LE0323</b> |              |   |   |
| 80             | 2 ... 6      | 6204 2Z C3                                    | 6204 2Z C3                                    |
| 90             | 2 ... 6      | 6205 2Z C3                                    | 6205 2Z C3                                    |
| 100            | 2 ... 6      | 6206 2Z C3                                    | 6206 2Z C3                                    |
| 112            | 2 ... 6      | 6206 2Z C3                                    | 6206 2Z C3                                    |
| 132            | 2 ... 6      | 6208 2Z C3                                    | 6208 2Z C3                                    |
| 160            | 2 ... 6      | 6209 2Z C3                                    | 6209 2Z C3                                    |
| <b>1LE0023</b> |              |   |   |
| 180            | 2 ... 6      | 6210 Z C3                                     | 6210 Z C3                                     |
| 200            | 2 ... 6      | 6212 Z C3                                     | 6212 Z C3                                     |
| 225            | 2 ... 6      | 6213 Z C3                                     | 6213 Z C3                                     |

#### *Bearing selection table for 1LE0 motors – bearings for increased cantilever forces – order code L22*

| Frame size     | No. of poles | Drive end (DE) bearing                        | Non-drive end (NDE) bearing                   |
|----------------|--------------|---|---|
|                |              | Horizontal and vertical types of construction | Horizontal and vertical types of construction |
| <b>1LE0323</b> |              |   |   |
| 80             | 2 ... 6      | –   | –   |
| 90             | 2 ... 6      | –   | –   |
| 100            | 2 ... 6      | 6306 2Z C3                                    | 6206 2Z C3                                    |
| 112            | 2 ... 6      | 6306 2Z C3                                    | 6206 2Z C3                                    |
| 132            | 2 ... 6      | 6308 2Z C3                                    | 6208 2Z C3                                    |
| 160            | 2 ... 6      | 6309 2Z C3                                    | 6209 2Z C3                                    |
| <b>1LE0023</b> |              |   |   |
| 180            | 2 ... 6      | NU210   | 6210 Z C3                                     |
| 200            | 2 ... 6      | NU212   | 6212 Z C3                                     |
| 225            | 2 ... 6      | NU213   | 6213 Z C3                                     |

#### Note:

When the load pulls sideways on the shaft, it is called a radial load. A heavy radial load is a belt or pulley drive. If in doubt, it is common to use or strengthened bearings.

## Overview

**Bearings – Cantilever forces**Admissible cantilever forces – basic version**1LE0 motors (frame sizes 80 ... 225)**Valid are:  $x_0$  values for  $x = 0$  and  $x_{max}$  values for  $x = l$  ( $l$  = shaft extension)

| Frame size                                    | No. of poles | Admissible cantilever force $F_Q$ |              |
|---|--------------|-----------------------------------|--------------|
|   |              | at $x_0$                          | at $x_{max}$ |
| N   |              |                                   |              |
| <b>1LE0323 motors – values for IE3 motors</b> |              |                                   |              |
| 80  | 2            | 620                               | 510          |
|   | 4            | 790                               | 640          |
|   | 6            | 910                               | 740          |
| 90  | 2            | 700                               | 560          |
|   | 4            | 880                               | 720          |
|   | 6            | 1020                              | 820          |
| 100   | 2            | 980                               | 790          |
|   | 4            | 1230                              | 990          |
|   | 6            | 1420                              | 1140         |
| 112   | 2            | 980                               | 790          |
|   | 4            | 1230                              | 990          |
|   | 6            | 1420                              | 1140         |
| 132   | 2            | 1440                              | 1120         |
|   | 4            | 1820                              | 1420         |
|   | 6            | 2080                              | 1630         |
| 160   | 2            | 1560                              | 1240         |
|   | 4            | 1970                              | 1570         |
|   | 6            | 2260                              | 1800         |
| <b>1LE0023 motors – values for IE3 motors</b> |              |                                   |              |
| 180   | 2            | 1820                              | 1470         |
|   | 4            | 2300                              | 1900         |
|   | 6            | 2630                              | 2150         |
| 200   | 2            | 2650                              | 2230         |
|   | 4            | 3350                              | 2800         |
|   | 6            | 3850                              | 3230         |
| 225   | 2            | 3000                              | 2540         |
|   | 4            | 3700                              | 3000         |
|   | 6            | 4250                              | 3470         |

Admissible cantilever forces – bearings for increased cantilever forces – order code **L22****1LE0 motors (frame sizes 80 ... 225) at 50 Hz with reinforced deep-groove bearings at DE**Valid are:  $x_0$  values for  $x = 0$  and  $x_{max}$  values for  $x = l$  ( $l$  = shaft extension)

| Frame size                                    | No. of poles | Admissible cantilever force $F_Q$ |              |
|---|--------------|-----------------------------------|--------------|
|   |              | at $x_0$                          | at $x_{max}$ |
| N   |              |                                   |              |
| <b>1LE0323 motors – values for IE3 motors</b> |              |                                   |              |
| 80  | 2            | –                                 | –            |
|   | 4            | –                                 | –            |
|   | 6            | –                                 | –            |
| 90  | 2            | –                                 | –            |
|   | 4            | –                                 | –            |
|   | 6            | –                                 | –            |
| 100   | 2            | 1480                              | 1220         |
|   | 4            | 1870                              | 1540         |
|   | 6            | 2140                              | 1720         |
| 112   | 2            | 1480                              | 1220         |
|   | 4            | 1870                              | 1540         |
|   | 6            | 2140                              | 1720         |
| 132   | 2            | 2100                              | 1700         |
|   | 4            | 2720                              | 2170         |
|   | 6            | 3100                              | 2420         |
| 160   | 2            | 2650                              | 2120         |
|   | 4            | 3300                              | 2600         |
|   | 6            | 3750                              | 2900         |
| <b>1LE0023 motors – values for IE3 motors</b> |              |                                   |              |
| 180   | 2            | 3300                              | 2700         |
|   | 4            | 4200                              | 3400         |
|   | 6            | 4750                              | 3900         |
| 200   | 2            | 5000                              | 4200         |
|   | 4            | 6330                              | 5320         |
|   | 6            | 7250                              | 6080         |
| 225   | 2            | 5650                              | 4800         |
|   | 4            | 6950                              | 5600         |
|   | 6            | 7900                              | 6500         |

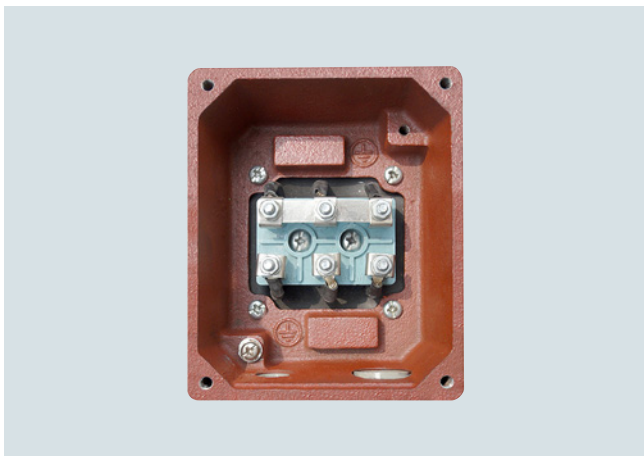
## Introduction

### Technical features

## Terminal boxes

1

### Overview



#### Technical specifications for terminal boxes for 1LE0 motors

| Frame size     | Number of terminals | Max. auxiliary terminals | Thread of the contact screw | Max. connectable cable mm <sup>2</sup> | Outer cable diameter (sealing end) mm | Cable entry           |
|----------------|---------------------|--------------------------|-----------------------------|--|---------------------------------------|-----------------------|
| <b>1LE0323</b> |                     |                          |                             |  |                                       |                       |
| 80             | 6                   | 12                       | M4                          | 1,5                                    | 13 ... 18                             | M25 × 1.5 + M16 × 1.5 |
| 90             |                     |                          |                             | 4                                      |                                       |                       |
| 100            |                     |                          |                             |  |                                       |                       |
| 112            |                     |                          |                             |  |                                       |                       |
| 132            |                     |                          |                             | M5                                     | 16                                    | M36 × 2 + M36 × 2     |
| 160            |                     |                          |                             |  |                                       |                       |
| <b>1LE0023</b> |                     |                          |                             |  |                                       |                       |
| 180            | 6                   | -                        | M5                          | 16                                     | 22 ... 32                             | M40 × 1.5 + M40 × 1.5 |
| 200            |                     |                          | M6                          | 25                                     |                                       |                       |
| 225            |                     |                          | M8                          | 35                                     |                                       |                       |

## Packaging

### Overview

#### Packaging size

| Frame size | Packaging size mm |       |        |
|------------|-------------------|-------|--------|
|            | IE3 efficiency    |       |        |
|            | 1LE0              |       |        |
|            | Length            | Width | Height |
| 80         | 395               | 225   | 260    |
| 90         | 455               | 225   | 280    |
| 100        | 565               | 275   | 315    |
| 112        | 565               | 275   | 335    |
| 132        | 665               | 33    | 385    |
| 160        | 730               | 460   | 580    |
| 180        | 910               | 460   | 630    |
| 200        | 1040              | 510   | 695    |
| 225        | 1040              | 560   | 735    |



Overview

Handling and storage

When lifting the motors, always use the lifting eyes provided. Prior to lifting the motor make sure that the lifting eyes are installed correctly and tightened. Never lift a motor using the rotor shaft and fan cover. In addition, care must be taken during lifting and lowering of the motor to avoid any shocks or vibrations which can result in bearing damages.

It is recommended that all motors be stored in a dry, dust-free environment and free of excessive vibrations.

If the DE and NDE bearings are of the sealed types, it is recommended that they are replaced if storage has exceeded 2 years from date of motor manufacture. If the motors have the regreasable bearings, then the recommendation is to replace the grease after 2 years of storage.

The service life of the motor can be considerably reduced if the storage period extends beyond 2 years in environments with high moisture and dirt. If necessary, the insulation resistance of the winding could be measured to determine the health of the motor prior to installation and start-up.

Machined surfaces (flange, DE rotor shaft) are treated at the factory with an anticorrosive agent to prevent rusting. However, these surfaces should be retreated during storage as deemed necessary. It is recommended that the motor shaft is rotated by hand on a frequent basis to ensure even grease distribution.

Certificates

ISO 9001 Quality Management System Certificate and ISO 14001 Environmental Management System Certificate



G\_D081\_XX\_0108

## Introduction

### Technical features

#### Rated power, rated torque, speed

##### Overview

###### Rated power

Power is the work performed in a unit of time, measured in W (Watt).

Dimensions:

$$\begin{aligned} 1 \text{ W} &= \text{J/s (1 Joule per second)} \\ &= 1 \text{ Nm/s (1 Newton meter per second)} \\ &= 1 \text{ kgm}^2/\text{s}^3 \\ &= 0.102 \text{ kpm/s} \\ 1 \text{ kW} &= 1.36 \text{ hp} \end{aligned}$$

The following applies to three-phase motors:

$$P_N = \sqrt{3} \cdot V_{\text{supply}} \cdot I_{\text{supply}} \cdot \eta \cdot \cos\phi$$

|            |                    |
|------------|--------------------|
| $P_N$      | Rated power in W   |
| $V$        | Rated voltage in V |
| $I$        | Line current in A  |
| $\eta$     | Efficiency         |
| $\cos\phi$ | Power factor       |

The rated power is one of the most important parameters of a motor. According to DIN 42673 – and maintaining the regulations according to VDE 0530 – the individual motor frame sizes are assigned specific power ratings for continuous duty S1. Different operating conditions or different duty types generally result in a change in the rated power.

###### Rated torque

Torque is generated by the effect of force applied to a lever arm. This is the product of force multiplied by the vertical distance from the axis of rotation; for belt drives, e.g. circumferential force multiplied by the radius of the belt pulley.

$$T = \frac{9.55 \cdot P \cdot 1000}{n}$$

|     |              |
|-----|--------------|
| $M$ | Torque in Nm |
| $P$ | Power in kW  |
| $n$ | Speed in rpm |

###### Speed

The synchronous speed  $n_s$  (rpm) of a three-phase induction motor is obtained from the line frequency  $f$  and the pole pair number  $p$  (4-pole  $\rightarrow 2p = 4$ ).

$$n_s = \frac{120 \cdot f}{2 \cdot p}$$

When connected to a 50 Hz line supply, a  $2p = 4$ -pole motor has a synchronous speed of

$$\frac{120 \cdot 50}{4} = 1500 \text{ rpm}$$

The synchronous speeds of the generally used 2, 4, and 6-pole motors are correspondingly obtained at a line frequency of 50 Hz 3000, 1500, 1000 rpm

The rotor of a three-phase induction motor rotates with a lower speed (with slip) than the rotating field.

Slip  $s$  is calculated according to the following formula:

$$s_{\text{rated}} = \frac{n_s - n_{\text{rated}}}{n_s} \cdot 100$$

|       |                          |
|-------|--------------------------|
| $s$   | Slip as a%               |
| $n_s$ | Synchronous speed in rpm |
| $n$   | Rotor speed in rpm       |

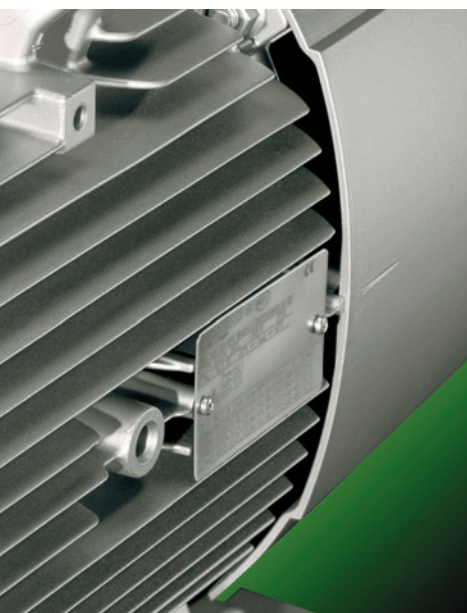
The rated slip  $s_N$  is correspondingly calculated.

The rotor losses of the motor are approximately proportional to the slip. The objective is to achieve a low rated slip in order to achieve a good efficiency.

The rated slip depends on the motor size.

For instance, for small motors, it is approx. 10% and for large motors, approx. 1%.

## SIMOTICS FL standard motors



|             |   |
|-------------|---|
| <b>2/2</b>  | <b>Orientation</b>                                  |
| 2/2         | <a href="#">Article number code</a>                 |
| <b>2/3</b>  | <b>Flow Line · IE3 Premium Efficiency</b>           |
| 2/3         | <a href="#">Aluminum series SIMOTICS FL</a>         |
|             | • 1LE0323   |
| 2/3         | <a href="#">Cast-iron series SIMOTICS FL</a>        |
|             | • 1LE0023   |
| <b>2/6</b>  | <b>Article No. supplements and special versions</b> |
| 2/6         | <a href="#">Voltages</a>                            |
| 2/7         | <a href="#">Types of construction</a>               |
| 2/8         | <a href="#">Motor protection</a>                    |
| 2/8         | <a href="#">Terminal box position</a>               |
| 2/9         | <a href="#">Options</a>                             |
| <b>2/10</b> | <b>Dimensions · Aluminum series SIMOTICS FL</b>     |
|             | <a href="#">IE3</a>                                 |
| 2/10        | • Frames sizes 80 M to 160 L                        |
| <b>2/12</b> | <b>Dimensions · Cast-iron series SIMOTICS FL</b>    |
|             | <a href="#">IE3</a>                                 |
| 2/12        | • Frames sizes 180 L to 225 L                       |
| <b>2/14</b> | <b>Flange dimensions</b>                            |

# SIMOTICS FL standard motors

## Orientation

### Article number code

#### Selection and ordering data

The article number consists of a combination of figures and letters and is divided into three blocks linked with hyphens for a better overview, e.g.:

**1LE0323-0DA22-2AA4-Z  
H03**

The first block (positions 1 to 7) identifies the motor type. The second block (positions 8 to 12) defines the motor frame size and length, the number of poles and power and in some cases the frequency/voltage. In the third block (positions 13 to 16), the frequency/voltage, type of construction and further design features are encoded.

For deviations in the second and third block from the catalog codes either **Z** should be used as appropriate.

#### Ordering data:

- Complete Article No. and order code(s) or plain text
- If a quotation has been requested, please specify the quotation number in addition to the Article No.
- When ordering a complete motor as a spare part, please specify the works serial No. for the previously supplied motor as well as the Article No.

| Structure of the Article No.:                               | Position:  | 1 | 2 | 3 | 4 | 5      | 6 | 7 | - | 8        | 9        | 10       | 11       | 12       | - | 13       | 14       | 15     | 16 |     |
|---|--|---|---|---|---|--------|---|---|---|----------|----------|----------|----------|----------|---|----------|----------|--------|----|-----|
| <b>1st to 4th position:</b><br>Digit, letter, letter, digit | • Flow Line – self-ventilated by a fan mounted on and driven by the rotor                            | 1 | L | E | 0 |        |   |   |   |          |          |          |          |          |   |          |          |        |    |     |
| <b>5th position:</b><br>Digit                               | Aluminum housing<br>Cast-iron housing  |   |   |   |   | 3<br>0 |   |   |   |          |          |          |          |          |   |          |          |        |    |     |
| <b>6th to 7th position:</b><br>2 digits                     | Motors with IE3 Premium Efficiency   |   |   |   |   |        | 2 | 3 |   |          |          |          |          |          |   |          |          |        |    |     |
| <b>8th, 9th and 11th position:</b><br>Digit, letter, digit  | <b>Motor frame size</b><br>(frame size as a combination of shaft height and overall length, encoded) |   |   |   |   |        |   |   |   | 0<br>... | A<br>... |          | 0<br>... |          |   |          |          |        |    |     |
| <b>10th position:</b><br>Letter                             | <b>No. of poles</b><br>A: 2-pole, B: 4-pole, C: 6-pole   |   |   |   |   |        |   |   |   |          |          | A<br>... |          |          |   |          |          |        |    |     |
| <b>12th and 13th position:</b><br>2 digits                  | <b>Voltage, circuit and frequency</b><br>(encoded with two digits)                                   |   |   |   |   |        |   |   |   |          |          |          |          | 2<br>... |   | 1<br>... |          |        |    |     |
| <b>14th position:</b><br>Letter                             | <b>Type of construction</b><br>(encoded with A ... J)  |   |   |   |   |        |   |   |   |          |          |          |          |          |   |          | A<br>... |        |    |     |
| <b>15th position:</b><br>Letter                             | <b>Motor protection</b><br>A: without winding protection<br>B: PTC thermistors for tripping          |   |   |   |   |        |   |   |   |          |          |          |          |          |   |          |          | A<br>B |    |     |
| <b>16th position:</b><br>Digit                              | <b>Terminal box position</b><br>4: Terminal box top  |   |   |   |   |        |   |   |   |          |          |          |          |          |   |          |          |        | 4  |     |
|   | Special order versions:<br>encoded – additional order code required                                  |   |   |   |   |        |   |   |   |          |          |          |          |          |   |          |          |        |    | - Z |

#### Ordering example

| Selection criteria                        | Requirement  | Structure of the Article No. |
|---|--|------------------------------|
| Motor type 1LE0                           | Standard motor with IE3 Premium Efficiency, IP55 degree of protection, cast-iron housing | 1LE0023-■■■■■■-■■■■■         |
| Motor frame size/No. of poles/Speed       | 180 M/2-pole/3000 rpm  | 1LE0023-1EA2■■■■■            |
| Rated power                               | 22 kW  | 1LE0023-1EA23-4■■■■          |
| Voltage and frequency                     | 400 VΔ/690 VY, 50 Hz   | 1LE0023-1EA23-4A■■■-Z<br>H03 |
| Type of construction with special version | IM B3 (standard)   | 1LE0023-1EA23-4AA■-Z<br>H03  |
| Motor protection                          | Without protection   | 1LE0023-1EA23-4AA4-Z<br>H03  |
| Terminal box position                     | Terminal box top   | 1LE0023-1EA23-4AA4-Z<br>H03  |



Aluminum series SIMOTICS FL 1LE0323 and cast-iron series SIMOTICS FL 1LE0023 – self-ventilated

**Selection and ordering data**

| P <sub>rated</sub> ,<br>50 Hz/<br>P50   | Frame<br>size | IE<br>class | Operating values at rated power |                             |                                     |                                     |                                     |  |                                       |                               |                         |                         | L <sub>pfA</sub> ,<br>50 Hz | L <sub>WA</sub> ,<br>50 Hz | Aluminum series<br>1LE0323<br>Cast-iron series<br>1LE0023<br>Article No. | m <sub>IM B3</sub> | J       |
|---|---------------|-------------|---------------------------------|-----------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--|---------------------------------------|-------------------------------|-------------------------|-------------------------|-----------------------------|----------------------------|--|--------------------|---------|
|   |               |             | η <sub>rated</sub><br>50 Hz     | T <sub>rated</sub><br>50 Hz | η <sub>rated</sub><br>50 Hz,<br>4/4 | η <sub>rated</sub><br>50 Hz,<br>3/4 | η <sub>rated</sub><br>50 Hz,<br>2/4 | cosφ <sub>rated</sub><br>50 Hz,<br>4/4 | I <sub>rated</sub><br>50 Hz,<br>400 V | Start-<br>ing<br>cur-<br>rent | Start-<br>ing<br>torque | Break<br>down<br>torque |                             |                            |  |                    |         |
| kW  | FS            |             | rpm                             | Nm                          | %                                   | %                                   | %                                   | A                                      |                                       |                               |                         |                         | dB(A)                       | dB(A)                      | kg   | kgm <sup>2</sup>   |         |
| <ul style="list-style-type: none"> <li>• Cooling: Self-ventilated (IC 411)</li> <li>• Efficiency according to IEC 60034-30: IE3 Premium Efficiency</li> <li>• Insulation: Thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B)</li> </ul> |               |             |                                 |                             |                                     |                                     |                                     |  |                                       |                               |                         |                         |                             |                            |  |                    |         |
| 2-pole: 3000 rpm at 50 Hz, 230 VΔ / 400 VY  |               |             |                                 |                             |                                     |                                     |                                     |  |                                       |                               |                         |                         |                             |                            |  |                    |         |
| 0.75  | 80 M          | IE3         | 2835                            | 2.5                         | 80.7                                | 82.9                                | 82.9                                | 0.86                                   | 1.56                                  | 6.0                           | 2.4                     | 3.0                     | 51                          | 62                         | 1LE0323-0DA22-2  | 12,5               | 0.00208 |
| 1.1   | 80 M          | IE3         | 2870                            | 3.7                         | 82.7                                | 84.0                                | 83.9                                | 0.83                                   | 2.30                                  | 6.5                           | 2.4                     | 3.4                     | 51                          | 62                         | 1LE0323-0DA32-2  | 13                 | 0.00154 |
| 1.5   | 90 S          | IE3         | 2900                            | 4.9                         | 84.2                                | 84.8                                | 82.3                                | 0.86                                   | 3.00                                  | 6.5                           | 2.0                     | 3.4                     | 58                          | 70                         | 1LE0323-0EA02-2  | 18                 | 0.00276 |
| 2.2   | 90 L          | IE3         | 2910                            | 7.2                         | 85.9                                | 87.2                                | 86.5                                | 0.88                                   | 4.20                                  | 7.5                           | 2.3                     | 3.6                     | 58                          | 70                         | 1LE0323-0EA42-2  | 22                 | 0.00356 |
| 3   | 100 L         | IE3         | 2875                            | 10.0                        | 87.1                                | 88.3                                | 88.3                                | 0.87                                   | 5.7                                   | 7.8                           | 2.6                     | 3.6                     | 60                          | 72                         | 1LE0323-1AA42-2  | 29                 | 0.00462 |
| 4   | 112 M         | IE3         | 2925                            | 13.1                        | 88.1                                | 89.6                                | 89.8                                | 0.90                                   | 7.3                                   | 7.8                           | 2.6                     | 3.6                     | 62                          | 74                         | 1LE0323-1BA22-2  | 36                 | 0.00879 |
| 5.5   | 132 S         | IE3         | 2930                            | 17.9                        | 89.2                                | 90.2                                | 90.3                                | 0.89                                   | 10.0                                  | 7.5                           | 2.3                     | 3.6                     | 65                          | 77                         | 1LE0323-1CA02-2  | 50                 | 0.01847 |
| 7.5   | 132 S         | IE3         | 2925                            | 24.5                        | 90.1                                | 91.5                                | 92.2                                | 0.90                                   | 13.3                                  | 7.5                           | 2.3                     | 3.6                     | 65                          | 77                         | 1LE0323-1CA12-2  | 56                 | 0.02323 |
| 2-pole: 3000 rpm at 50 Hz, 400 VΔ / 690 VY  |               |             |                                 |                             |                                     |                                     |                                     |  |                                       |                               |                         |                         |                             |                            |  |                    |         |
| 3   | 100 L         | IE3         | 2875                            | 10.0                        | 87.1                                | 88.3                                | 88.3                                | 0.87                                   | 5.7                                   | 7.8                           | 2.6                     | 3.6                     | 60                          | 72                         | 1LE0323-1AA43-4  | 29                 | 0.00462 |
| 4   | 112 M         | IE3         | 2925                            | 13.1                        | 88.1                                | 89.6                                | 89.8                                | 0.90                                   | 7.3                                   | 7.8                           | 2.6                     | 3.6                     | 62                          | 74                         | 1LE0323-1BA23-4  | 36                 | 0.00879 |
| 5.5   | 132 S         | IE3         | 2930                            | 17.9                        | 89.2                                | 90.2                                | 90.3                                | 0.89                                   | 10.0                                  | 7.5                           | 2.3                     | 3.6                     | 65                          | 77                         | 1LE0323-1CA03-4  | 50                 | 0.01847 |
| 7.5   | 132 S         | IE3         | 2925                            | 24.5                        | 90.1                                | 91.5                                | 92.2                                | 0.90                                   | 13.3                                  | 7.5                           | 2.3                     | 3.6                     | 65                          | 77                         | 1LE0323-1CA13-4  | 56                 | 0.02323 |
| 11  | 160 M         | IE3         | 2935                            | 35.8                        | 91.2                                | 92.0                                | 91.7                                | 0.89                                   | 19.6                                  | 7.5                           | 2.3                     | 2.5                     | 69                          | 81                         | 1LE0323-1DA23-4  | 84                 | 0.03903 |
| 15  | 160 M         | IE3         | 2930                            | 48.9                        | 91.9                                | 92.6                                | 92.5                                | 0.89                                   | 26.5                                  | 7.5                           | 2.4                     | 3.4                     | 69                          | 81                         | 1LE0323-1DA33-4  | 94                 | 0.04720 |
| 18.5  | 160 L         | IE3         | 2940                            | 60.1                        | 92.4                                | 93.0                                | 92.9                                | 0.89                                   | 32.5                                  | 7.8                           | 2.4                     | 3.4                     | 69                          | 81                         | 1LE0323-1DA43-4  | 109                | 0.05773 |
| 22  | 180 M         | IE3         | 2950                            | 71.2                        | 92.7                                | 93.0                                | 92.4                                | 0.89                                   | 38.5                                  | 7.8                           | 2.4                     | 3.4                     | 70                          | 83                         | 1LE0023-1EA23-4  | 171                | 0.077   |
| 30  | 200 L         | IE3         | 2955                            | 97.0                        | 93.3                                | 93.4                                | 92.4                                | 0.89                                   | 52                                    | 7.8                           | 2.4                     | 3.4                     | 71                          | 84                         | 1LE0023-2AA43-4  | 250                | 0.133   |
| 37  | 200 L         | IE3         | 2955                            | 120                         | 93.7                                | 93.9                                | 93.3                                | 0.89                                   | 64                                    | 7.8                           | 2.4                     | 3.4                     | 71                          | 84                         | 1LE0023-2AA53-4  | 260                | 0.152   |
| 45  | 225 M         | IE3         | 2960                            | 145                         | 94.0                                | 94.3                                | 93.8                                | 0.89                                   | 78                                    | 7.8                           | 2.4                     | 3.2                     | 72                          | 85                         | 1LE0023-2BA23-4  | 342                | 0.254   |
| <b>Voltagess</b>  |               |             |                                 |                             |                                     |                                     |                                     |  |                                       |                               |                         |                         |                             |                            |  |                    |         |
| For other voltagess and more information, see from page 2/6   |               |             |                                 |                             |                                     |                                     |                                     |  |                                       |                               |                         |                         |                             |                            |  |                    |         |
| <b>Types of construction</b>  |               |             |                                 |                             |                                     |                                     |                                     |  |                                       |                               |                         |                         |                             |                            |  |                    |         |
| Without flange IM B3  |               |             |                                 |                             |                                     |                                     |                                     |  |                                       |                               |                         |                         |                             |                            |  |                    |         |
| Version <b>Standard</b>   |               |             |                                 |                             |                                     |                                     |                                     |  |                                       |                               |                         |                         |                             |                            |  |                    |         |
| For other types of construction and more information, see from page 2/7   |               |             |                                 |                             |                                     |                                     |                                     |  |                                       |                               |                         |                         |                             |                            |  |                    |         |
| <b>Motor protection</b>   |               |             |                                 |                             |                                     |                                     |                                     |  |                                       |                               |                         |                         |                             |                            |  |                    |         |
| Without   |               |             |                                 |                             |                                     |                                     |                                     |  |                                       |                               |                         |                         |                             |                            |  |                    |         |
| Version <b>Standard</b>   |               |             |                                 |                             |                                     |                                     |                                     |  |                                       |                               |                         |                         |                             |                            |  |                    |         |
| For other motor protection and more information, see from page 2/8  |               |             |                                 |                             |                                     |                                     |                                     |  |                                       |                               |                         |                         |                             |                            |  |                    |         |
| <b>Terminal box position</b>  |               |             |                                 |                             |                                     |                                     |                                     |  |                                       |                               |                         |                         |                             |                            |  |                    |         |
| Terminal box at top   |               |             |                                 |                             |                                     |                                     |                                     |  |                                       |                               |                         |                         |                             |                            |  |                    |         |
| Version <b>Standard</b>   |               |             |                                 |                             |                                     |                                     |                                     |  |                                       |                               |                         |                         |                             |                            |  |                    |         |
| <b>Special versions</b>   |               |             |                                 |                             |                                     |                                     |                                     |  |                                       |                               |                         |                         |                             |                            |  |                    |         |
| For options, see from page 2/9  |               |             |                                 |                             |                                     |                                     |                                     |  |                                       |                               |                         |                         |                             |                            |  |                    |         |
| 1LE0...-.....-Z-+...+...+...  |               |             |                                 |                             |                                     |                                     |                                     |  |                                       |                               |                         |                         |                             |                            |  |                    |         |



**SIMOTICS FL standard motors**  
Flow Line · IE3 Premium Efficiency

Aluminum series SIMOTICS FL 1LE0323 and cast-iron series SIMOTICS FL 1LE0023 – self-ventilated

**Selection and ordering data**

| P <sub>rated</sub> ,<br>50 Hz/<br>P50   | Frame<br>size | IE<br>class | Operating values at rated power |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         | L <sub>pfA</sub> ,<br>50 Hz | L <sub>WA</sub> ,<br>50 Hz | Aluminum series<br>1LE0323<br>Cast-iron series<br>1LE0023<br>Article No. | m <sub>M B3</sub> | J       |                  |
|---|---------------|-------------|---------------------------------|-----------------------------|-------------------------------------|-------------------------------------|-------------------------------------|---|---------------------------------------|--------------------------|-------------------------|-------------------------|-----------------------------|----------------------------|--|-------------------|---------|------------------|
|   |               |             | η <sub>rated</sub><br>50 Hz     | T <sub>rated</sub><br>50 Hz | η <sub>rated</sub><br>50 Hz,<br>4/4 | η <sub>rated</sub><br>50 Hz,<br>3/4 | η <sub>rated</sub><br>50 Hz,<br>2/4 | cos φ <sub>rated</sub><br>50 Hz,<br>4/4 | I <sub>rated</sub><br>50 Hz,<br>400 V | Start-<br>ing<br>current | Start-<br>ing<br>torque | Break<br>down<br>torque |                             |                            |  |                   |         |                  |
| kW  | FS            |             | rpm                             | Nm                          | %                                   | %                                   | %                                   |   | A                                     |                          |                         |                         |                             | dB(A)                      | dB(A)  |                   | kg      | kgm <sup>2</sup> |
| <ul style="list-style-type: none"> <li>• Cooling: Self-ventilated (IC 411)</li> <li>• Efficiency according to IEC 60034-30: IE3 Premium Efficiency</li> <li>• Insulation: Thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B)</li> </ul> |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  |                   |         |                  |
| 4-pole: 1500 rpm at 50 Hz, 230 VΔ / 400 VY  |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  |                   |         |                  |
| 0.55  | 80 M          | IE3         | 1440                            | 3.6                         | 80.8                                | 81.8                                | 80.2                                | 0.76                                    | 1.29                                  | 5.5                      | 2.2                     | 3.2                     | 45                          | 56                         | 1LE0323-0DB22-2  | 11                | 0.00216 |                  |
| 0.75  | 80 M          | IE3         | 1445                            | 5.0                         | 82.5                                | 82.9                                | 80.7                                | 0.75                                    | 1.75                                  | 6.0                      | 2.7                     | 3.7                     | 45                          | 56                         | 1LE0323-0DB32-2  | 13                | 0.00250 |                  |
| 1.1   | 90 S          | IE3         | 1430                            | 7.3                         | 84.1                                | 85.1                                | 83.9                                | 0.79                                    | 2.40                                  | 6.5                      | 2.7                     | 3.7                     | 47                          | 59                         | 1LE0323-0EB22-2  | 18.5              | 0.00389 |                  |
| 1.5   | 90 L          | IE3         | 1440                            | 9.9                         | 85.3                                | 86.0                                | 85.2                                | 0.79                                    | 3.20                                  | 6.5                      | 2.7                     | 3.8                     | 47                          | 59                         | 1LE0323-0EB42-2  | 22                | 0.00499 |                  |
| 2.2   | 100 L         | IE3         | 1445                            | 14.5                        | 86.7                                | 87.1                                | 85.7                                | 0.81                                    | 4.50                                  | 8.3                      | 3.7                     | 4.6                     | 52                          | 64                         | 1LE0323-1AB42-2  | 32                | 0.01125 |                  |
| 3   | 100 L         | IE3         | 1450                            | 19.8                        | 87.7                                | 88.1                                | 87.1                                | 0.81                                    | 6.1                                   | 8.3                      | 3.7                     | 4.6                     | 52                          | 64                         | 1LE0323-1AB52-2  | 36                | 0.01313 |                  |
| 4   | 112 M         | IE3         | 1450                            | 26.3                        | 88.6                                | 89.6                                | 89.2                                | 0.81                                    | 8.0                                   | 8.3                      | 3.7                     | 4.6                     | 53                          | 65                         | 1LE0323-1BB22-2  | 43                | 0.01493 |                  |
| 5.5   | 132 S         | IE3         | 1455                            | 36.1                        | 89.6                                | 90.9                                | 91.1                                | 0.84                                    | 10.5                                  | 7.8                      | 2.4                     | 3.8                     | 59                          | 71                         | 1LE0323-1CB02-2  | 58                | 0.02847 |                  |
| 7.5   | 132 M         | IE3         | 1455                            | 49.2                        | 90.4                                | 91.7                                | 93.2                                | 0.85                                    | 14.1                                  | 7.8                      | 2.4                     | 3.4                     | 59                          | 71                         | 1LE0323-1CB22-2  | 71                | 0.03561 |                  |
| 4-pole: 1500 rpm at 50 Hz, 400 VΔ / 690 VY  |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  |                   |         |                  |
| 2.2   | 100 L         | IE3         | 1445                            | 14.5                        | 86.7                                | 87.1                                | 85.7                                | 0.81                                    | 4.50                                  | 8.3                      | 3.7                     | 4.6                     | 52                          | 64                         | 1LE0323-1AB43-4  | 32                | 0.01125 |                  |
| 3   | 100 L         | IE3         | 1450                            | 19.8                        | 87.7                                | 88.1                                | 87.1                                | 0.81                                    | 6.1                                   | 8.3                      | 3.7                     | 4.6                     | 52                          | 64                         | 1LE0323-1AB53-4  | 36                | 0.01313 |                  |
| 4   | 112 M         | IE3         | 1450                            | 26.3                        | 88.6                                | 89.6                                | 89.2                                | 0.81                                    | 8.0                                   | 8.3                      | 3.7                     | 4.6                     | 53                          | 65                         | 1LE0323-1BB23-4  | 43                | 0.01493 |                  |
| 5.5   | 132 S         | IE3         | 1455                            | 36.1                        | 89.6                                | 90.9                                | 91.1                                | 0.84                                    | 10.5                                  | 7.8                      | 2.4                     | 3.8                     | 59                          | 71                         | 1LE0323-1CB03-4  | 58                | 0.02847 |                  |
| 7.5   | 132 M         | IE3         | 1455                            | 49.2                        | 90.4                                | 91.7                                | 93.2                                | 0.85                                    | 14.1                                  | 7.8                      | 2.4                     | 3.4                     | 59                          | 71                         | 1LE0323-1CB23-4  | 71                | 0.03561 |                  |
| 11  | 160 M         | IE3         | 1460                            | 72.0                        | 91.4                                | 92.4                                | 92.6                                | 0.86                                    | 20.0                                  | 7.8                      | 2.4                     | 3.8                     | 61                          | 73                         | 1LE0323-1DB23-4  | 95                | 0.06482 |                  |
| 15  | 160 L         | IE3         | 1460                            | 98.1                        | 92.1                                | 92.9                                | 93.0                                | 0.86                                    | 27.5                                  | 7.8                      | 2.6                     | 3.8                     | 61                          | 73                         | 1LE0323-1DB43-4  | 112               | 0.08109 |                  |
| 18.5  | 180 M         | IE3         | 1470                            | 120                         | 92.6                                | 93.0                                | 92.5                                | 0.83                                    | 34.5                                  | 7.8                      | 2.6                     | 3.6                     | 63                          | 76                         | 1LE0023-1EB23-4  | 170               | 0.126   |                  |
| 22  | 180 L         | IE3         | 1470                            | 143                         | 93.0                                | 93.7                                | 93.6                                | 0.83                                    | 41                                    | 7.8                      | 2.6                     | 3.6                     | 63                          | 76                         | 1LE0023-1EB43-4  | 192               | 0.146   |                  |
| 30  | 200 L         | IE3         | 1470                            | 195                         | 93.6                                | 94.3                                | 94.2                                | 0.84                                    | 55                                    | 7.8                      | 2.6                     | 3.6                     | 63                          | 76                         | 1LE0023-2AB43-4  | 255               | 0.22    |                  |
| 37  | 225 S         | IE3         | 1478                            | 239                         | 93.9                                | 94.1                                | 93.4                                | 0.85                                    | 67                                    | 8.3                      | 3.3                     | 3.6                     | 65                          | 78                         | 1LE0023-2BB03-4  | 315               | 0.461   |                  |
| 45  | 225 M         | IE3         | 1478                            | 291                         | 94.2                                | 94.2                                | 93.7                                | 0.85                                    | 81                                    | 8.3                      | 3.3                     | 3.6                     | 65                          | 78                         | 1LE0023-2BB23-4  | 342               | 0.479   |                  |
| <b>Voltages</b>   |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  | Order code        |         |                  |
| For other voltages and more information, see from page 2/6  |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  | ...               |         |                  |
| <b>Types of construction</b>  |               |             |                                 |                             |                                     |                                     |                                     |   |                                       | Version                  |                         |                         |                             | Order code                 |  |                   |         |                  |
| Without flange  |               | IM B3       |                                 |                             |                                     |                                     |                                     | <b>Standard</b>                         |                                       |                          |                         | A                       |                             | -                          |  |                   |         |                  |
| For other types of construction and more information, see from page 2/7   |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  | ...               |         |                  |
| <b>Motor protection</b>   |               |             |                                 |                             |                                     |                                     |                                     |   |                                       | Version                  |                         |                         |                             | Order code                 |  |                   |         |                  |
| Without   |               |             |                                 |                             |                                     | <b>Standard</b>                     |                                     |   |                                       | A                        |                         | -                       |                             |                            |  |                   |         |                  |
| For other motor protection and more information, see from page 2/8  |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  | ...               |         |                  |
| <b>Terminal box position</b>  |               |             |                                 |                             |                                     |                                     |                                     |   |                                       | Version                  |                         |                         |                             | Order code                 |  |                   |         |                  |
| Terminal box at top   |               |             |                                 |                             |                                     | <b>Standard</b>                     |                                     |   |                                       | 4                        |                         | -                       |                             |                            |  |                   |         |                  |
| <b>Special versions</b>   |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  | Order code        |         |                  |
| For options, see from page 2/9  |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  | 1LE0 ... -Z ...   |         |                  |

2



Aluminum series SIMOTICS FL 1LE0323 and cast-iron series SIMOTICS FL 1LE0023 – self-ventilated

**Selection and ordering data**

| P <sub>rated</sub> ,<br>50 Hz/<br>P50   | Frame<br>size | IE<br>class | Operating values at rated power |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         | L <sub>p1A</sub> ,<br>50 Hz | L <sub>WA</sub> ,<br>50 Hz | Aluminum series<br>1LE0323<br>Cast-iron series<br>1LE0023<br>Article No. | m <sub>IM B3</sub>          | J       |                  |
|---|---------------|-------------|---------------------------------|-----------------------------|-------------------------------------|-------------------------------------|-------------------------------------|---|---------------------------------------|--------------------------|-------------------------|-------------------------|-----------------------------|----------------------------|--|-----------------------------|---------|------------------|
|   |               |             | η <sub>rated</sub><br>50 Hz     | T <sub>rated</sub><br>50 Hz | η <sub>rated</sub><br>50 Hz,<br>4/4 | η <sub>rated</sub><br>50 Hz,<br>3/4 | η <sub>rated</sub><br>50 Hz,<br>2/4 | cos φ <sub>rated</sub><br>50 Hz,<br>4/4 | I <sub>rated</sub><br>50 Hz,<br>400 V | Star-<br>ting<br>current | Star-<br>ting<br>torque | Break<br>down<br>torque |                             |                            |  |                             |         |                  |
| kW  | FS            |             | rpm                             | Nm                          | %                                   | %                                   | %                                   |   | A                                     |                          |                         |                         |                             | dB(A)                      | dB(A)  |                             | kg      | kgm <sup>2</sup> |
| <ul style="list-style-type: none"> <li>• Cooling: Self-ventilated (IC 411)</li> <li>• Efficiency according to IEC 60034-30: IE3 Premium Efficiency</li> <li>• Insulation: Thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B)</li> </ul> |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  |                             |         |                  |
| 6-pole: 1000 rpm at 50 Hz, 230 VΔ / 400 VY  |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  |                             |         |                  |
| 0.55  | 80 M          | IE3         | 935                             | 5.6                         | 77.2                                | 77.5                                | 74.6                                | 0.67                                    | 1.53                                  | 5.0                      | 2.7                     | 3.4                     | 44                          | 55                         | 1LE0323-0DC32-2  | 15                          | 0.00310 |                  |
| 0.75  | 90 S          | IE3         | 940                             | 7.6                         | 78.9                                | 80.3                                | 78.0                                | 0.70                                    | 1.96                                  | 5.0                      | 2.4                     | 3.2                     | 45                          | 57                         | 1LE0323-0EC02-2  | 19                          | 0.00436 |                  |
| 1.1   | 90 L          | IE3         | 945                             | 11.1                        | 81.0                                | 81.6                                | 80.4                                | 0.69                                    | 2.85                                  | 5.5                      | 2.7                     | 3.5                     | 45                          | 57                         | 1LE0323-0EC42-2  | 22                          | 0.00513 |                  |
| 1.5   | 100 L         | IE3         | 945                             | 15.2                        | 82.5                                | 84.1                                | 82.9                                | 0.74                                    | 3.55                                  | 5.5                      | 2.7                     | 3.5                     | 49                          | 61                         | 1LE0323-1AC42-2  | 33                          | 0.01136 |                  |
| 2.2   | 112 M         | IE3         | 945                             | 22.2                        | 84.3                                | 86.1                                | 95.7                                | 0.74                                    | 5.1                                   | 6.0                      | 2.7                     | 3.4                     | 53                          | 65                         | 1LE0323-1BC22-2  | 39                          | 0.01451 |                  |
| 3   | 132 S         | IE3         | 965                             | 29.7                        | 85.6                                | 86.6                                | 86.0                                | 0.75                                    | 6.7                                   | 6.0                      | 2.7                     | 4.0                     | 57                          | 69                         | 1LE0323-1CC02-2  | 54                          | 0.02666 |                  |
| 4   | 132 M         | IE3         | 955                             | 40.0                        | 86.8                                | 88.5                                | 88.7                                | 0.75                                    | 8.9                                   | 6.0                      | 2.3                     | 3.4                     | 57                          | 69                         | 1LE0323-1CC22-2  | 63                          | 0.03045 |                  |
| 5.5   | 132 M         | IE3         | 960                             | 54.7                        | 88.0                                | 89.2                                | 89.0                                | 0.76                                    | 11.9                                  | 6.5                      | 2.3                     | 4.0                     | 57                          | 69                         | 1LE0323-1CC32-2  | 71                          | 0.04125 |                  |
| 6-pole: 1000 rpm at 50 Hz, 400 VΔ / 690 VY  |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  |                             |         |                  |
| 1.5   | 100 L         | IE3         | 945                             | 15.2                        | 82.5                                | 84.1                                | 82.9                                | 0.74                                    | 3.55                                  | 5.5                      | 2.7                     | 3.5                     | 49                          | 61                         | 1LE0323-1AC43-4  | 33                          | 0.01136 |                  |
| 2.2   | 112 M         | IE3         | 945                             | 22.2                        | 84.3                                | 86.1                                | 95.7                                | 0.74                                    | 5.1                                   | 6.0                      | 2.7                     | 3.4                     | 53                          | 65                         | 1LE0323-1BC23-4  | 39                          | 0.01451 |                  |
| 3   | 132 S         | IE3         | 965                             | 29.7                        | 85.6                                | 86.6                                | 86.0                                | 0.75                                    | 6.7                                   | 6.0                      | 2.7                     | 4.0                     | 57                          | 69                         | 1LE0323-1CC03-4  | 54                          | 0.02666 |                  |
| 4   | 132 M         | IE3         | 955                             | 40.0                        | 86.8                                | 88.5                                | 88.7                                | 0.75                                    | 8.9                                   | 6.0                      | 2.3                     | 3.4                     | 57                          | 69                         | 1LE0323-1CC23-4  | 63                          | 0.03045 |                  |
| 5.5   | 132 M         | IE3         | 960                             | 54.7                        | 88.0                                | 89.2                                | 89.0                                | 0.76                                    | 11.9                                  | 6.5                      | 2.3                     | 4.0                     | 57                          | 69                         | 1LE0323-1CC33-4  | 71                          | 0.04125 |                  |
| 7.5   | 160 M         | IE3         | 980                             | 73.1                        | 89.1                                | 90.4                                | 90.3                                | 0.78                                    | 15.6                                  | 6.5                      | 2.3                     | 3.6                     | 61                          | 73                         | 1LE0323-1DC23-4  | 95                          | 0.07030 |                  |
| 11  | 160 L         | IE3         | 980                             | 107                         | 90.3                                | 90.3                                | 89.8                                | 0.77                                    | 23.0                                  | 7.0                      | 2.3                     | 3.6                     | 61                          | 73                         | 1LE0323-1DC43-4  | 120                         | 0.07068 |                  |
| 15  | 180 L         | IE3         | 975                             | 147                         | 91.2                                | 92.1                                | 91.8                                | 0.80                                    | 29.5                                  | 7.0                      | 2.3                     | 3.0                     | 59                          | 73                         | 1LE0023-1EC43-4  | 175                         | 0.185   |                  |
| 18.5  | 200 L         | IE3         | 978                             | 181                         | 91.7                                | 92.5                                | 92.2                                | 0.80                                    | 36.5                                  | 7.0                      | 2.3                     | 3.0                     | 59                          | 73                         | 1LE0023-2AC43-4  | 235                         | 0.284   |                  |
| 22  | 200 L         | IE3         | 978                             | 215                         | 92.2                                | 93.1                                | 93.0                                | 0.80                                    | 43                                    | 7.0                      | 2.4                     | 3.0                     | 59                          | 73                         | 1LE0023-2AC53-4  | 251                         | 0.327   |                  |
| 30  | 225 M         | IE3         | 982                             | 2912                        | 92.9                                | 93.9                                | 94.3                                | 0.83                                    | 56                                    | 7.6                      | 2.4                     | 3.0                     | 60                          | 74                         | 1LE0023-2BC23-4  | 350                         | 0.71    |                  |
| <b>Voltagess</b>  |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  | Order code                  |         |                  |
| For other voltagess and more information, see from page 2/6   |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  | ...                         |         |                  |
| <b>Types of construction</b>  |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  | Version                     |         |                  |
| Without flange IM B3  |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  | Standard                    |         |                  |
| For other types of construction and more information, see from page 2/7   |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  | A                           |         |                  |
| <b>Motor protection</b>   |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  | Version                     |         |                  |
| Without   |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  | Standard                    |         |                  |
| For other motor protection and more information, see from page 2/8  |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  | A                           |         |                  |
| <b>Terminal box position</b>  |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  | Version                     |         |                  |
| Terminal box at top   |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  | Standard                    |         |                  |
| For other terminal box position and more information, see from page 2/8   |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  | 4                           |         |                  |
| <b>Special versions</b>   |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  | Order code                  |         |                  |
| For options, see from page 2/9  |               |             |                                 |                             |                                     |                                     |                                     |   |                                       |                          |                         |                         |                             |                            |  | 1LE0...-.....-Z...+...+...+ |         |                  |





## SIMOTICS FL standard motors

Article No. supplements and special versions · Voltages

Aluminum series SIMOTICS FL 1LE0323 and cast-iron series SIMOTICS FL 1LE0023

### Selection and ordering data

| Voltages | Article No. supplement  |   | Frame size |    |     |     |     |     |         |     |     |     | Motor version |  |
|----------|---|---|------------|----|-----|-----|-----|-----|---------|-----|-----|-----|---------------|--|
|          | Voltage code<br>12th and<br>13th position of the<br>Article No. | Additional<br>identification<br>code with order<br>code and plain text<br>if required | 80         | 90 | 100 | 112 | 132 | 160 | 180     | 200 | 225 | IEC | IE3           |  |
|          |   |   | 1LE0323    |    |     |     |     |     |         |     |     |     |               |  |
|          |   |   |            |    |     |     |     |     | 1LE0023 |     |     |     |               |  |
|          | 1LE0 . . . - . . . - . . .                                      | Order code  |            |    |     |     |     |     |         |     |     |     |               |  |

| Voltage at 50 Hz    |   |   |   |   |   |   |   |   |   |   |   |   |  |
|---------------------|---|---|---|---|---|---|---|---|---|---|---|---|--|
| 50 Hz 220 VΔ/380 VY | 2 | 1 | – | ○ | ○ | ○ | ○ | ○ | – | – | – | – |  |
| 50 Hz 230 VΔ/400 VY | 2 | 2 | – | □ | □ | □ | □ | □ | – | – | – | – |  |
| 50 Hz 400 VΔ/690 VY | 3 | 4 | – | – | – | □ | □ | □ | □ | □ | □ | □ |  |
| 50 Hz 380 VΔ/660 VY | 3 | 3 | – | – | – | ○ | ○ | ○ | ○ | ○ | ○ | ○ |  |
| 50 Hz 240 VΔ/415 VY | 2 | 3 | – | ✓ | ✓ | ✓ | ✓ | ✓ | – | – | – | – |  |
| 50 Hz 415 VΔ        | 3 | 5 | – | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |  |


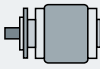

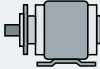

- Standard version
- Without additional charge
- ✓ With additional charge
- Not possible

**SIMOTICS FL standard motors**

Article No. supplements and special versions · Types of construction

## Aluminum series SIMOTICS FL 1LE0323 and cast-iron series SIMOTICS FL 1LE0023

**Selection and ordering data**

| Types of construction          | Article No.   | supplement   | Frame size   |              |              |              |              |              |              |              |              | Motor version |     |  |
|--------------------------------|---|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|-----|--|
|                                |   |  | 80           | 90           | 100          | 112          | 132          | 160          | 180          | 200          | 225          | IEC           | IE3 |  |
|                                | Type of construction code letter  | For types of construction with order code(s)       | 1LE0323      |              |              |              |              |              | 1LE0023      |              |              | IEC           | IE3 |  |
|                                | 14th position of the Article No.  | Article No. with additional identification code -Z |              |              |              |              |              |              |              |              |              |               |     |  |
|                                | 1LE0...-.....-...(-Z)   | Order code   |              |              |              |              |              |              |              |              |              |               |     |  |
| <b>Without flange</b>          |   |  |              |              |              |              |              |              |              |              |              |               |     |  |
| IM B3                          |    | <b>A</b>   | -            | □            | □            | □            | □            | □            | □            | □            | □            | □             |     |  |
| <b>With flange</b>             | <b>EN 50347</b>   |  | <b>FF165</b> | <b>FF165</b> | <b>FF215</b> | <b>FF215</b> | <b>FF265</b> | <b>FF300</b> | <b>FF300</b> | <b>FF350</b> | <b>FF400</b> |               |     |  |
|                                | <b>DIN 42948</b>  |  | <b>A 200</b> | <b>A 200</b> | <b>A 250</b> | <b>A 250</b> | <b>A 300</b> | <b>A 350</b> | <b>A 350</b> | <b>A 400</b> | <b>A 450</b> |               |     |  |
| IM B5                          |    | <b>F</b>   | -            | ✓            | ✓            | ✓            | ✓            | ✓            | ✓            | ✓            | ✓            |               |     |  |
| IM V1 without protective cover |    | <b>G</b>   | -            | ✓            | ✓            | ✓            | ✓            | ✓            | ✓            | ✓            | ✓            |               |     |  |
| IM B35                         |    | <b>J</b>   | -            | ✓            | ✓            | ✓            | ✓            | ✓            | ✓            | ✓            | ✓            |               |     |  |
| <b>With flange</b>             | <b>EN 50347</b>   |  | <b>FT100</b> | <b>FT115</b> | <b>FT130</b> | <b>FT130</b> | <b>FT165</b> | <b>FT215</b> | -            | -            | -            |               |     |  |
|                                | <b>DIN 42948</b>  |  | <b>C 120</b> | <b>C 140</b> | <b>C 160</b> | <b>C 160</b> | <b>C 200</b> | <b>C 250</b> | -            | -            | -            |               |     |  |
| IM B14                         |  | <b>K</b>   | -            | ✓            | ✓            | ✓            | ✓            | ✓            | ✓            | -            | -            |               |     |  |

- Standard version
- ✓ With additional charge
- Not possible

## SIMOTICS FL standard motors

Article No. supplements and special versions · Motor protection · Terminal box position

### Aluminum series SIMOTICS FL 1LE0323 and cast-iron series SIMOTICS FL 1LE0023

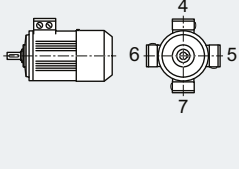
#### Selection and ordering data

| Motor protection | Article No. | supplement  | Frame size |    |     |     |     |     |         |     |     | Motor version |     |  |
|------------------|-------------|---|------------|----|-----|-----|-----|-----|---------|-----|-----|---------------|-----|--|
|                  |             |   | 80         | 90 | 100 | 112 | 132 | 160 | 180     | 200 | 225 | IEC           | IE3 |  |
|                  |             | Additional identification code with order code and plain text if required | 1LE0323    |    |     |     |     |     | 1LE0023 |     |     | IEC           | IE3 |  |
|                  | 1LE0.....   | Order code  |            |    |     |     |     |     |         |     |     |               |     |  |

#### Motor protection

| Motor protection                               | Article No. | supplement | 80 | 90 | 100 | 112 | 132 | 160 | 180 | 200 | 225 |  |
|--|-------------|------------|----|----|-----|-----|-----|-----|-----|-----|-----|--|
| Without (standard)                             | A           | –          | ☐  | ☐  | ☐   | ☐   | ☐   | ☐   | ☐   | ☐   | ☐   |  |
| 3 PTC thermistors – for tripping (2 terminals) | B           | –          | ✓  | ✓  | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   |  |

- ☐ Standard version  
 ✓ With additional charge

| Terminal box position   | Article No. | supplement  | Frame size |    |     |     |     |     |         |     |     | Motor version |     |  |
|---|-------------|---|------------|----|-----|-----|-----|-----|---------|-----|-----|---------------|-----|--|
|   |             |   | 80         | 90 | 100 | 112 | 132 | 160 | 180     | 200 | 225 | IEC           | IE3 |  |
|  |             | Additional identification code with order code and plain text if required | 1LE0323    |    |     |     |     |     | 1LE0023 |     |     | IEC           | IE3 |  |
|   | 1LE0.....   | Order code  |            |    |     |     |     |     |         |     |     |               |     |  |

#### Terminal box position

| Terminal box position | Article No. | supplement | 80 | 90 | 100 | 112 | 132 | 160 | 180 | 200 | 225 |  |
|-----------------------|-------------|------------|----|----|-----|-----|-----|-----|-----|-----|-----|--|
| Terminal box top      | 4           | –          | ☐  | ☐  | ☐   | ☐   | ☐   | ☐   | ☐   | ☐   | ☐   |  |

- ☐ Standard version

## Selection and ordering data

| Special versions  | Additional identification code <b>-Z</b> with order code and plain text if required | Frame size |    |     |     |     |     |         |     |     |     | Motor version  |  |
|---|---|------------|----|-----|-----|-----|-----|---------|-----|-----|-----|--|--|
|   |   | 80         | 90 | 100 | 112 | 132 | 160 | 180     | 200 | 225 | IEC | IE3  |  |
|   |   | 1LE0323    |    |     |     |     |     | 1LE0023 |     |     |     |  |  |
| <b>1LE0...-...-...-Z</b> Order code                                 |   |            |    |     |     |     |     |         |     |     |     |  |  |
| <b>Mechanical version and degrees of protection</b>                 |   |            |    |     |     |     |     |         |     |     |     |  |  |
| Condensation drainage holes   | <b>H03</b>  | ✓          | ✓  | ✓   | ✓   | ✓   | ✓   | ✓       | ✓   | ✓   | ✓   |  |  |
| Prepared for mountings, threaded hole only                          | <b>G46</b>  | ✓          | ✓  | ✓   | ✓   | ✓   | ✓   | ✓       | ✓   | ✓   | ✓   |  |  |
| <b>Versions in accordance with standards and specifications</b>     |   |            |    |     |     |     |     |         |     |     |     |  |  |
| CCC China Compulsory Certification                                  | <b>D01</b>  | ✓          | ✓  | -   | -   | -   | -   | -       | -   | -   | -   | Only for: Voltage code 2-1 (12th and 13th position of the Article No.) |  |
| China Energy Efficiency Label                                       | <b>D34</b>  | ○          | ○  | ○   | ○   | ○   | ○   | ○       | ○   | ○   | ○   |  |  |
| TR CU product safety certificate EAC for Eurasian customs union     | <b>D47</b>  | ✓          | ✓  | ✓   | ✓   | ✓   | ✓   | ✓       | ✓   | ✓   | ✓   |  |  |
| <b>Bearings and lubrication</b>                                     |   |            |    |     |     |     |     |         |     |     |     |  |  |
| Located bearing DE  | <b>L20</b>  | ✓          | ✓  | ✓   | ✓   | ✓   | ✓   | ✓       | -   | -   | -   |  |  |
| Bearing design for increased cantilever forces                      | <b>L22</b>  | -          | -  | ✓   | ✓   | ✓   | ✓   | ✓       | ✓   | ✓   | ✓   |  |  |
| Regreasing device   | <b>L23</b>  | -          | -  | ✓   | ✓   | ✓   | ✓   | ✓       | ✓   | ✓   | ✓   |  |  |
| <b>Heating and ventilation</b>                                      |   |            |    |     |     |     |     |         |     |     |     |  |  |
| Anti-condensation heating for 230 V (2 terminals)                   | <b>Q02</b>  | ✓          | ✓  | ✓   | ✓   | ✓   | ✓   | ✓       | ✓   | ✓   | ✓   |  |  |
| <b>Rating plate and additional rating plates</b>                    |   |            |    |     |     |     |     |         |     |     |     |  |  |
| Additional rating plate for voltage tolerance <sup>1)</sup>         | <b>B07</b>  | ✓          | ✓  | ✓   | ✓   | ✓   | ✓   | ✓       | ✓   | ✓   | ✓   |  |  |
| <b>Packaging, safety notes, documentation and test certificates</b> |   |            |    |     |     |     |     |         |     |     |     |  |  |
| CE marking  |   | □          | □  | □   | □   | □   | □   | □       | □   | □   | □   |  |  |
| Sea-worthy packing for export                                       |   | □          | □  | □   | □   | □   | □   | □       | □   | □   | □   |  |  |
| Acceptance test certificate 3.1 in accordance with EN 10204         | <b>B02</b>  | ✓          | ✓  | ✓   | ✓   | ✓   | ✓   | ✓       | ✓   | ✓   | ✓   |  |  |
| Without "Made in ..." on the rating plate                           | <b>B13</b>  | ○          | ○  | ○   | ○   | ○   | ○   | ○       | ○   | ○   | ○   |  |  |

- Standard version
- Without additional charge
- ✓ With additional charge
- Not possible

<sup>1)</sup> Can be ordered only for 230 VΔ/400 VY or 400 VΔ/690 VY (voltage code "22" or "34")

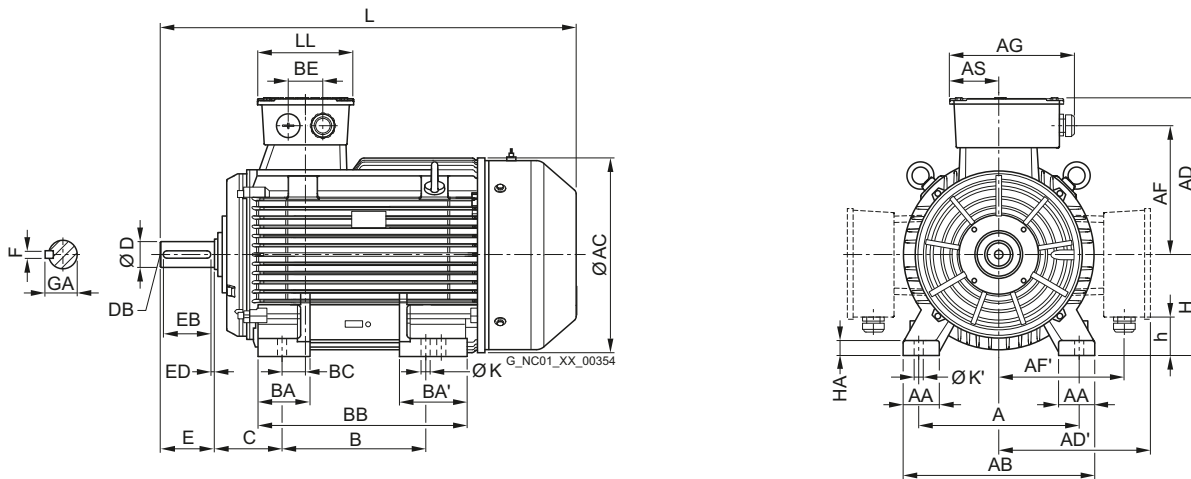
# SIMOTICS FL standard motors

Dimensions · Aluminum series SIMOTICS FL

IE3, Premium Efficiency – self-ventilated · Frame sizes 80 M to 160 L

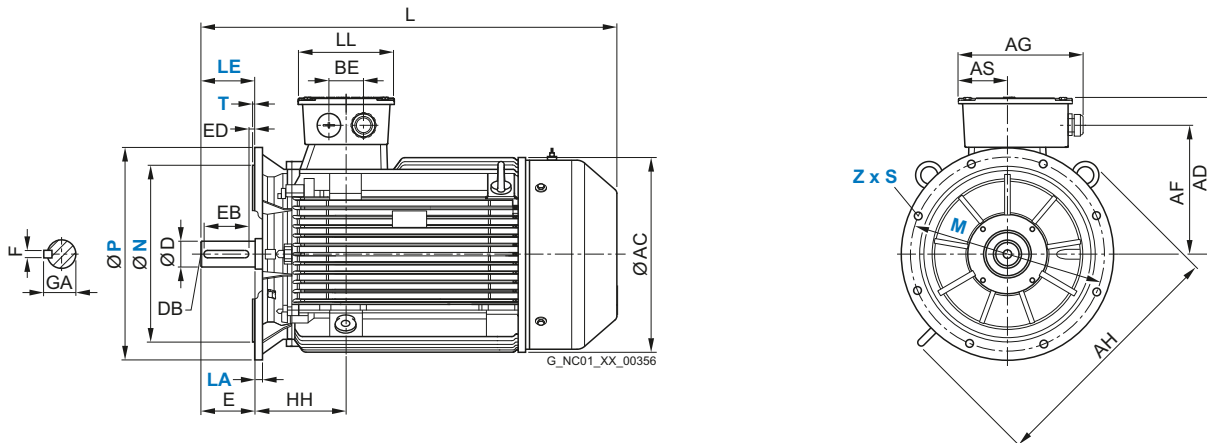
## Dimensional drawings

### Type of construction IM B3



### Types of construction IM B5 and IM V1

For flange dimensions, see page 2/14 (Z = the number of retaining holes)



| For motor  |              | No. of poles | Dimension designation acc. to IEC |    |            |                  |              |       |       |       |     |      |                 |    |     |     |      |    |     |            |    |
|------------|--------------|--------------|-----------------------------------|----|------------|------------------|--------------|-------|-------|-------|-----|------|-----------------|----|-----|-----|------|----|-----|------------|----|
| Frame size | Motor type   |              | A                                 | AA | AB         | AC <sup>1)</sup> | AD           | AD'   | AF    | AF'   | AG  | AS   | B <sup>2)</sup> | BA | BA' | BB  | BC   | BE | C   | H          | HA |
| 80 M       | 0D.2. 0D.3   | 2, 4, 6      | 125                               | 36 | <b>160</b> | 166              | <b>142</b>   | 142   | 110.5 | 110.5 | 145 | 65.5 | 100             | 44 | 44  | 135 | 26   | 42 | 50  | <b>80</b>  | 10 |
| 90 S       | 0E.0         | 2, 4, 6      | 140                               | 46 | <b>175</b> | 184              | <b>152</b>   | 152   | 120.5 | 120.5 | 145 | 65.5 | 100             | 46 | 46  | 140 | 20   | 42 | 56  | <b>90</b>  | 10 |
| 90 L       | 0E.4         |              |                                   |    |            |                  |              |       |       |       |     | 125  |                 |    |     | 165 |      |    |     |            |    |
| 100 L      | 1A.4<br>1A.5 | 2, 4, 6<br>4 | 160                               | 45 | <b>200</b> | 205              | <b>177</b>   | 177   | 140   | 140   | 163 | 70   | 140             | 45 | 45  | 176 | 30.5 | 54 | 63  | <b>100</b> | 12 |
| 112 M      | 1B.2         | 2, 4, 6      | 190                               | 45 | <b>226</b> | 230              | <b>188.5</b> | 188.5 | 152   | 152   | 163 | 70   | 140             | 50 | 50  | 180 | 22   | 54 | 70  | <b>112</b> | 12 |
| 132 S      | 1C.0<br>1C.1 | 2, 4, 6<br>2 | 216                               | 50 | <b>256</b> | 268              | <b>212</b>   | 212   | 175   | 175   | 163 | 70   | 140             | 64 | 64  | 186 | 32.5 | 54 | 89  | <b>132</b> | 15 |
| 132 M      | 1C.2<br>1C.3 | 4, 6<br>6    |                                   |    |            |                  |              |       |       |       |     | 178  |                 |    |     | 224 |      |    | 89  |            |    |
| 160 M      | 1D.2<br>1D.3 | 2, 4, 6<br>2 | 254                               | 60 | <b>314</b> | 324              | <b>255</b>   | 255   | 206   | 206   | 231 | 94   | 210             | 70 | 70  | 258 | 51   | 68 | 108 | <b>160</b> | 20 |
| 160 L      | 1D.4         | 2, 4, 6      |                                   |    |            |                  |              |       |       |       |     | 254  |                 |    |     | 302 |      |    | 108 |            |    |

<sup>1)</sup> Measured across the bolt heads.

<sup>2)</sup> This dimension is assigned in DIN EN 50347 to the frame size listed.

# SIMOTICS FL standard motors

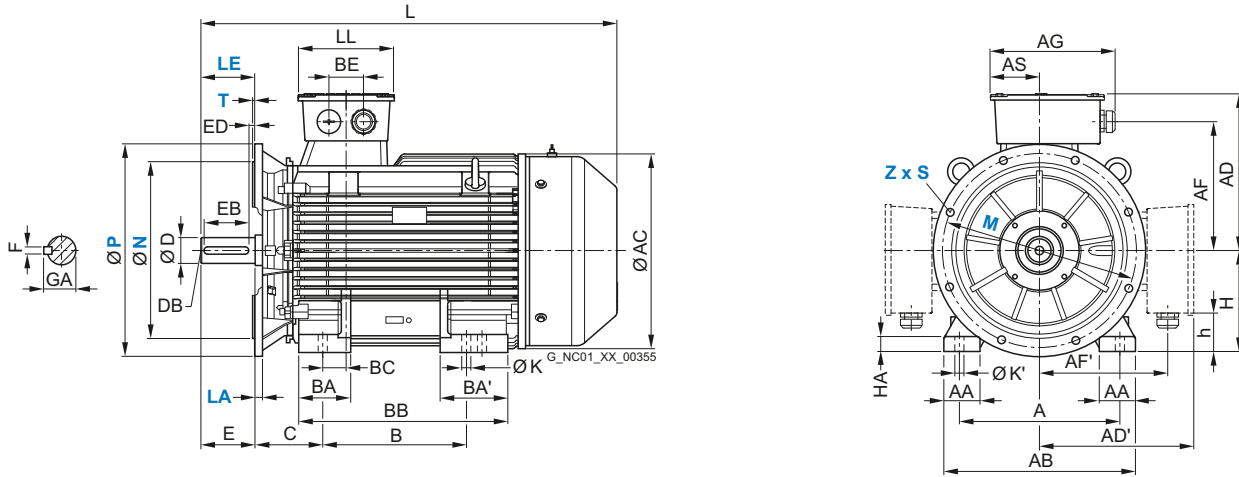
Dimensions · Aluminum series SIMOTICS FL

IE3, Premium Efficiency – self-ventilated · Frame sizes 80 M to 160 L

## Dimensional drawings

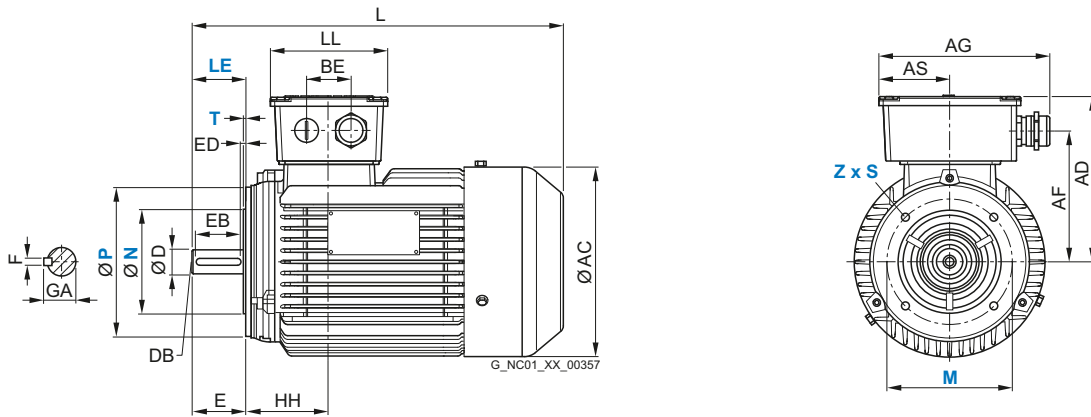
### Type of construction IM B35

For flange dimensions, see page 2/14 (Z = the number of retaining holes)



### Type of construction IM B14

For flange dimensions, see page 2/14 (Z = the number of retaining holes)



| For motor  |                 |              | Dimension designation acc. to IEC |    |    |            |       |     | DE shaft extension |     |     |     |    |    |      |
|------------|-----------------|--------------|-----------------------------------|----|----|------------|-------|-----|--------------------|-----|-----|-----|----|----|------|
| Frame size | Motor type 1LE0 | No. of poles | HH                                | K  | K' | L          | LC    | LL  | D                  | DB  | E   | EB  | ED | F  | GA   |
| 80 M       | OD.2. OD.3      | 2, 4, 6      | 76                                | 10 | 10 | <b>328</b> | 363   | 109 | 19                 | M6  | 40  | 32  | 4  | 6  | 21.5 |
| 90 S       | 0E.0            | 2, 4, 6      | 76                                | 10 | 10 | <b>366</b> | 411   | 109 | 24                 | M8  | 50  | 40  | 5  | 8  | 27   |
| 90 L       | 0E.4            |              |                                   |    |    | <b>391</b> | 436   |     |                    |     |     |     |    |    |      |
| 100 L      | 1A.4<br>1A.5    | 2, 4, 6<br>4 | 93.5                              | 12 | 12 | <b>460</b> | 516.5 | 118 | 28                 | M10 | 60  | 50  | 5  | 8  | 31   |
| 112 M      | 1B.2            | 2, 4, 6      | 92                                | 12 | 12 | <b>448</b> | 504.5 | 118 | 28                 | M10 | 60  | 50  | 5  | 8  | 31   |
| 132 S      | 1C.0<br>1C.1    | 2, 4, 6<br>2 | 121.5                             | 12 | 12 | <b>515</b> | 582   | 118 | 38                 | M12 | 80  | 70  | 5  | 10 | 41   |
| 132 M      | 1C.2<br>1C.3    | 4, 6<br>6    |                                   |    |    | <b>560</b> | 627   |     |                    |     |     |     |    |    |      |
| 160 M      | 1D.2<br>1D.3    | 2, 4, 6<br>2 | 159                               | 15 | 15 | <b>614</b> | 701   | 158 | 42                 | M16 | 110 | 100 | 5  | 12 | 45   |
| 160 L      | 1D.4            | 2, 4, 6      |                                   |    |    | <b>674</b> | 761   |     |                    |     |     |     |    |    |      |

2

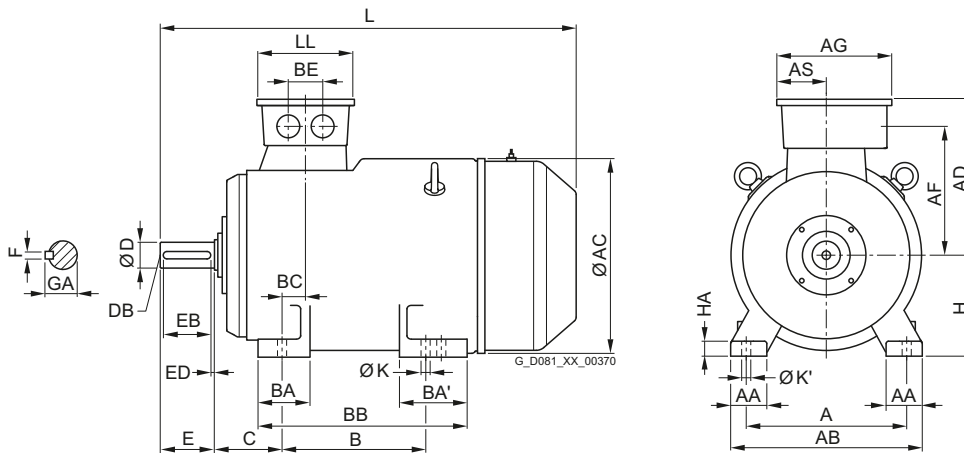
# SIMOTICS FL standard motors

Dimensions · Cast-iron series SIMOTICS FL

IE3, Premium Efficiency – self-ventilated · Frame sizes 180 M to 225 M

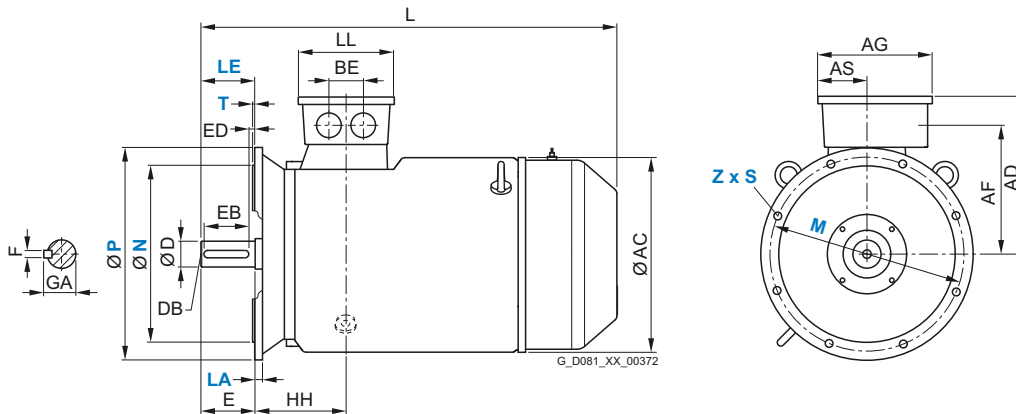
## Dimensional drawings

### Type of construction IM B3



### Types of construction IM B5 and IM V1

For flange dimensions, see page 2/14 (Z = the number of retaining holes)



| For motor  |              |                 | Dimension designation acc. to IEC |    |            |                  |            |       |     |       |                 |    |     |     |    |    |     |            |    |
|------------|--------------|-----------------|-----------------------------------|----|------------|------------------|------------|-------|-----|-------|-----------------|----|-----|-----|----|----|-----|------------|----|
| Frame size | Motor type   | No. of poles    | A                                 | AA | AB         | AC <sup>1)</sup> | AD         | AF    | AG  | AS    | B <sup>2)</sup> | BA | BA' | BB  | BC | BE | C   | H          | HA |
| 180 M      | 1E.2         | 2, 4, 6         | 279                               | 65 | <b>339</b> | 356              | <b>270</b> | 221   | 231 | 94    | 241             | 80 | 80  | 301 | 37 | 68 | 121 | <b>180</b> | 20 |
| 180 L      | 1E.4         | 4, 6            |                                   |    |            |                  |            |       |     |       | 279             |    |     | 339 |    |    | 121 |            |    |
| 200 L      | 2A.4<br>2A.5 | 2, 6<br>2, 4, 6 | 318                               | 70 | <b>378</b> | 397              | <b>300</b> | 247.5 | 288 | 107.5 | 305             | 80 | 80  | 369 | 69 | 85 | 133 | <b>200</b> | 25 |
| 225 S      | 2B.0         | 4               | 356                               | 80 | <b>436</b> | 442              | <b>327</b> | 274   | 288 | 107.5 | 286             | 90 | 90  | 348 | 63 | 85 | 149 | <b>225</b> | 34 |
| 225 M      | 2B.2         | 2<br>4, 6       |                                   |    |            |                  |            |       |     |       | 311             |    |     | 373 |    |    | 149 |            |    |

<sup>1)</sup> Measured across the bolt heads.

<sup>2)</sup> This dimension is assigned in DIN EN 50347 to the frame size listed.



## SIMOTICS FL standard motors

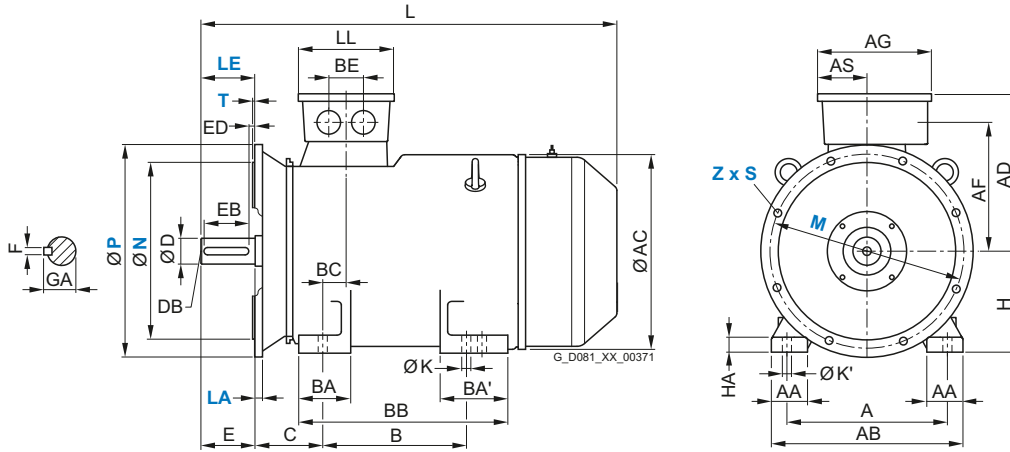
Dimensions · Cast-iron series SIMOTICS FL

IE3, Premium Efficiency – self-ventilated · Frame sizes 180 M to 225 M

### Dimensional drawings

#### Type of construction IM B35

For flange dimensions, see page 2/14 ( $Z$  = the number of retaining holes)



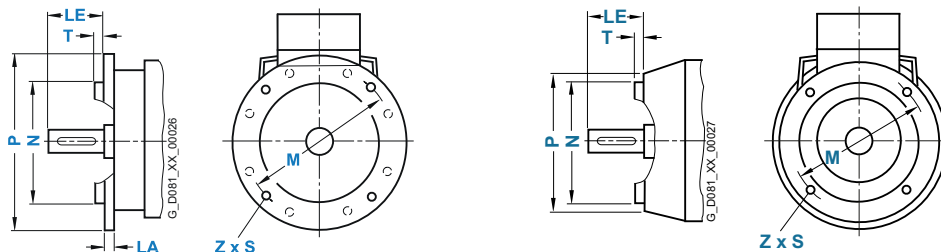
| For motor  |              |                 | Dimension designation acc. to IEC |    |    |                          |            |     | DE shaft extension |     |            |            |         |          |          |
|------------|--------------|-----------------|-----------------------------------|----|----|--------------------------|------------|-----|--------------------|-----|------------|------------|---------|----------|----------|
| Frame size | Motor type   | No. of poles    | HH                                | K  | K' | L                        | LC         | LL  | D                  | DB  | E          | EB         | ED      | F        | GA       |
| 180 M      | 1E.2         | 2, 4, 6         | 158                               | 15 | 15 | <b>718</b>               | 836        | 158 | 48                 | M16 | 110        | 100        | 5       | 14       | 51.5     |
| 180 L      | 1E.4         | 4, 6            |                                   |    |    | <b>758</b>               | 876        |     |                    |     |            |            |         |          |          |
| 200 L      | 2A.4<br>2A.5 | 2, 6<br>2, 4, 6 | 202                               | 19 | 19 | <b>807</b>               | 927        | 215 | 55                 | M20 | 110        | 100        | 5       | 16       | 59       |
| 225 S      | 2B.0         | 4               | 212                               | 19 | 19 | <b>845</b>               | 965        | 215 | 60                 | M20 | 140        | 125        | 10      | 18       | 64       |
| 225 M      | 2B.2         | 2<br>4, 6       |                                   |    |    | <b>820</b><br><b>875</b> | 940<br>995 |     | 55<br>60           |     | 110<br>140 | 100<br>125 | 5<br>10 | 16<br>18 | 59<br>64 |

## SIMOTICS FL standard motors

Dimensions · Aluminum series SIMOTICS FL and cast-iron series SIMOTICS FL

### Flange dimensions

#### Dimensional drawings



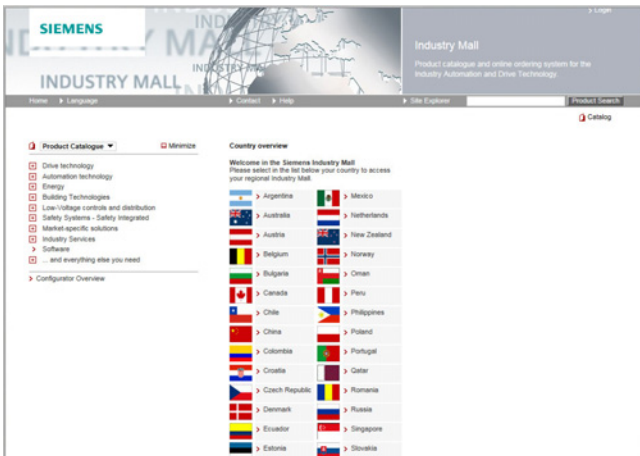
| Frame size | Type of construction | Flange type | Flange with through holes (FF/A)<br>Flange with tapped holes (FT/C) |                   | Dimension designation acc. to IEC |                       |     |     |     |      |     |   |
|------------|----------------------|-------------|---|-------------------|-----------------------------------|-----------------------|-----|-----|-----|------|-----|---|
|            |                      |             | Acc. to EN 50347  | Acc. to DIN 42948 | LA <sup>1)</sup>                  | LE                    | M   | N   | P   | S    | T   | Z |
| 80         | IM B5, IM B35, IM V1 | Flange      | FF165   | A 200             | 10                                | 40                    | 165 | 130 | 200 | 12   | 3,5 | 4 |
|            | IM B14               | Flange      | FT100   | C 120             | –                                 | 40                    | 100 | 80  | 120 | M6   | 3   | 4 |
| 90         | IM B5, IM B35, IM V1 | Flange      | FF165   | A 200             | 10                                | 50                    | 165 | 130 | 200 | 12   | 3,5 | 4 |
|            | IM B14               | Flange      | FT115   | C 140             | –                                 | 50                    | 115 | 95  | 140 | M8   | 3   | 4 |
| 100        | IM B5, IM B35, IM V1 | Flange      | FF215   | A 250             | 11                                | 60                    | 215 | 180 | 250 | 14,5 | 4   | 4 |
|            | IM B14               | Flange      | FT130   | C 160             | –                                 | 60                    | 130 | 110 | 160 | M8   | 3,5 | 4 |
| 112        | IM B5, IM B35, IM V1 | Flange      | FF215   | A 250             | 11                                | 60                    | 215 | 180 | 250 | 14,5 | 4   | 4 |
|            | IM B14               | Flange      | FT130   | C 160             | –                                 | 60                    | 130 | 110 | 160 | M8   | 3,5 | 4 |
| 132        | IM B5, IM B35, IM V1 | Flange      | FF265   | A 300             | 13                                | 80                    | 265 | 230 | 300 | 14,5 | 4   | 4 |
|            | IM B14               | Flange      | FT165   | C 200             | –                                 | 80                    | 165 | 130 | 200 | M10  | 3,5 | 4 |
| 160        | IM B5, IM B35, IM V1 | Flange      | FF300   | A 350             | 14                                | 110                   | 300 | 250 | 350 | 18,5 | 5   | 4 |
|            | IM B14               | Flange      | FT215   | C 250             | –                                 | 110                   | 215 | 180 | 250 | M12  | 4   | 4 |
| 180        | IM B5, IM B35, IM V1 | Flange      | FF300   | A 350             | 13                                | 110                   | 300 | 250 | 350 | 18,5 | 5   | 4 |
| 200        | IM B5, IM B35, IM V1 | Flange      | FF350   | A 400             | 15                                | 110                   | 350 | 300 | 400 | 18,5 | 5   | 4 |
| 225        | IM B5, IM B35, IM V1 | Flange      | FF400   | A 450             | 16                                | 110/140 <sup>2)</sup> | 400 | 350 | 450 | 18,5 | 5   | 8 |

<sup>1)</sup> Flange LA size refer to the thickness at the flange mounting hole.

<sup>2)</sup> Dimension 140 valid for 4- and 6-pole motors.

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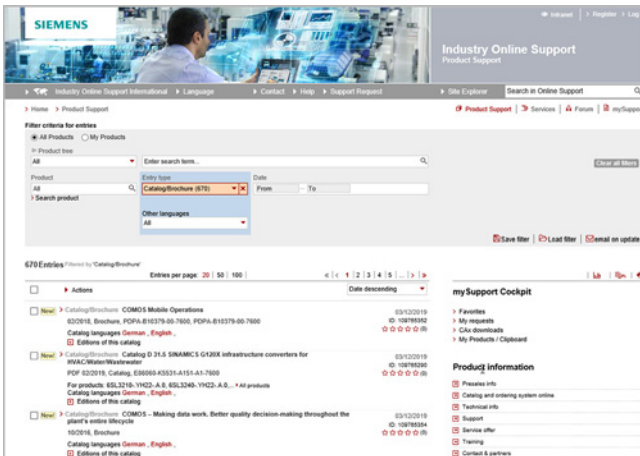
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