

# Introduction

## Orientation

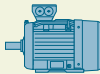
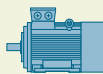
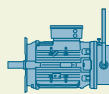
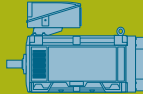
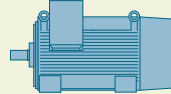
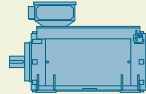
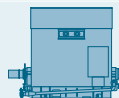
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### Overview

#### The SIMOTICS family of motors

With SIMOTICS, Siemens offers a comprehensive range of electric motors. These extend from energy-efficient, low-voltage motors through servomotors with high dynamic performance up to well-proven DC motors and powerful high-voltage motors.

Innovative drive technology for all industries, applications and power classes. Outstanding performance, quality, efficiency and compactness.

| SIMOTICS                                                                          |                                                                                   |                                                                                   |                                                                                    |                                                                                    |                                                                                     |                                                                                     |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Low-voltage motors for line and converter operation                               |                                                                                   |                                                                                   |                                                                                    |                                                                                    |                                                                                     |                                                                                     |
| General Purpose<br>SIMOTICS GP                                                    | Severe Duty<br>SIMOTICS SD                                                        | Explosion-proof<br>SIMOTICS XP                                                    | Definite Purpose<br>SIMOTICS DP                                                    | Flexible Duty<br>SIMOTICS FD                                                       | Transnorm<br>SIMOTICS TN                                                            | High Torque<br>SIMOTICS HT                                                          |
|  |  |  |   |  |  |  |
| DC Motors                                                                         |                                                                                   | High Voltage Motors                                                               |                                                                                    |                                                                                    |                                                                                     |                                                                                     |
| Direct Current SIMOTICS DC                                                        |                                                                                   | High Voltage SIMOTICS HV                                                          |                                                                                    |                                                                                    |                                                                                     |                                                                                     |
|  |                                                                                   |  |                                                                                    |                                                                                    |  |                                                                                     |
| Motors for Motion Control                                                         |                                                                                   |                                                                                   |                                                                                    |                                                                                    |                                                                                     |                                                                                     |
| SIMOTICS S Servomotors                                                            | SIMOTICS M Main Motors                                                            |                                                                                   | SIMOTICS L Linear Motors                                                           |                                                                                    | SIMOTICS T Torque Motors                                                            |                                                                                     |
|  |  |                                                                                   |  |                                                                                    |  |                                                                                     |

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#### SIMOTICS – Low-voltage motors for line and converter operation

SIMOTICS low-voltage motors for line and converter operation are subdivided into seven segments depending on the particular application.

- **General Purpose – SIMOTICS GP**  
Motors for everyday applications in industry under standard environmental conditions.
- **Severe Duty – SIMOTICS SD**  
Motors with cast-iron housing for applications under harsh environmental conditions.
- **Explosion-proof – SIMOTICS XP**  
Motors for hazardous zones.
- **Definite Purpose – SIMOTICS DP**  
Special motors, e.g. smoke extraction motors or built-in motors.
- **Flexible Duty – SIMOTICS FD**  
Converter-optimized motor series for flexible applications with higher power ratings in the range of 200 kW to over 1800 kW, with various cooling methods. Water-cooled motors are also available for line operation.
- **Transnorm – SIMOTICS TN**  
Motors with cast-iron housing with higher power ratings in the range of 145 kW to 1250 kW.
- **High Torque – SIMOTICS HT**  
Permanent magnet synchronous motors for applications that require extremely powerful drives without gear units, even at low speeds.

**Overview** (continued)**Performance features of the SIMOTICS FD series**

The SIMOTICS FD series is characterized by the following features:

- Series of low-voltage motors optimized for converter operation
- Three product lines
  - Air-cooled, enclosed version
  - Water-cooled version
  - Air-cooled, open version
- Wide range of power ratings from 200 to 1800 kW in frame sizes 315, 355, 400 and 450
- Rugged cast-iron housing

A wide range of water-cooled motors is also available for line operation.

SIMOTICS FD can also be used in Zone 2 or 22 hazardous areas.

The SIMOTICS FD motor series covers power ratings from 200 kW and higher (at 1500 rpm), and is available in versions optimized for converter operation with various cooling methods and in water-cooled versions for line operation.

A number of technical features provide this motor series with its ruggedness and long lifetime and ensure the highest level of availability, for instance, KTY 84-130 temperature sensors are integrated in the winding as motor protection in series.

SIMOTICS FD motors are characterized by a very high power rating with a small frame size. The result of this is an extremely compact design that saves space in a number of industrial applications.

SIMOTICS FD motors are not only optimized in terms of their design, but also in terms of their efficiency, so they also contribute towards lower energy consumption.

The system optimized converter version is harmonized for operation with SINAMICS low-voltage frequency converters. Together, they form a perfectly coordinated drive system for variable-speed applications.

**Overview of the product lines**

|                                     | <b>Air-cooled, enclosed version</b> |                              | <b>Water-cooled version</b>                     |                                      | <b>Air-cooled, open version</b> |                              |
|-------------------------------------|-------------------------------------|------------------------------|-------------------------------------------------|--------------------------------------|---------------------------------|------------------------------|
|                                     | with self-ventilation               | with forced ventilation      | with water-jacket cooling                       | with heat exchanger                  | with self-ventilation           | with forced ventilation      |
| Operation                           | VSD                                 | VSD                          | DOL & VSD                                       | VSD                                  | VSD                             | VSD                          |
| Power                               | 200 ... 1200 kW                     | 200 ... 1200 kW              | 200 ... 1300 kW                                 | 200 ... 1500 kW                      | 200 ... 1600 kW                 | 200 ... 1800 kW              |
| Cooling method                      | IC411                               | IC416 <sup>1)</sup>          | IC71W                                           | IC86W                                | IC01                            | IC06 <sup>1)</sup>           |
| Degree of protection <sup>2)</sup>  | IP55/IP54                           | IP55/IP54                    | IP55/IP54                                       | IP55/IP54                            | IP23                            | IP23                         |
| Features                            | Low-noise basic design              | Low-noise or increased power | High power density, potable/fresh water cooling | High power density, seawater cooling | Low-noise basic design          | Low-noise or increased power |
| Primary load characteristic         | $T \sim n^2$                        | $T = \text{const}$           | $T = \text{const}$<br>$T \sim n^2$              | $T = \text{const}$<br>$T \sim n^2$   | $T \sim n^2$                    | $T = \text{const}$           |
| Motor type Safe Area                | 1LM1                                | 1LQ1                         | 1LH1                                            | 1LN1                                 | 1LL1                            | 1LP1                         |
| Motor type Ex n, Ex t <sup>3)</sup> | 1MM1                                | 1MQ1                         | 1MH1                                            | 1MN1                                 | –                               | –                            |

VSD **V**ariable **S**peed **D**rives (converter operation)

DOL **D**irect **O**n **L**ine (line operation)

<sup>1)</sup> Cooling method IC37 (separately cooled using an external pipe system) on request.

<sup>2)</sup> Other degrees of protection optionally available.

<sup>3)</sup> Explosion-proof motors, Zones 2 and 22.