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SIEMENS

MOTION CONTROL DRIVES

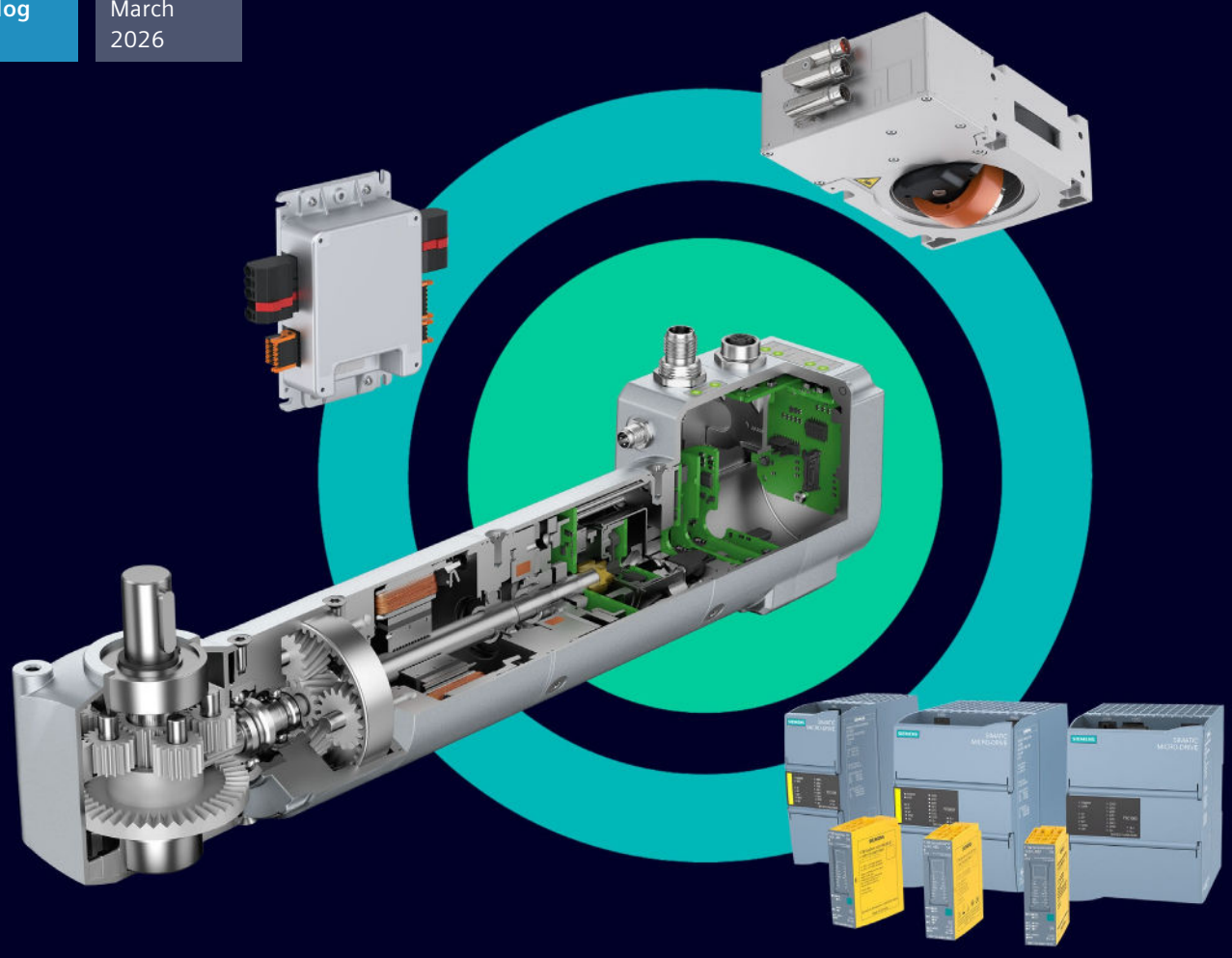
SIMOTICS E

Drive system for extra low-voltage

siemens.com/d60

Catalog D 60

Edition March 2026



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Related catalogs

Motion Control Drives D 31.1
SINAMICS Converters for Single-Axis Drives
Built-In Units

PDF (E86060-K5531-A111-A5-7600)

Motion Control Drives D 31.2
SINAMICS Converters for Single-Axis Drives
Distributed Converters

PDF (E86060-K5531-A121-A4-7600)

Motion Control Drives D 31.5
SINAMICS Converters for Single-Axis Drives
SINAMICS G120X infrastructure converters
for HVAC/Water/Wastewater

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Motion Control Drives D 32
SINAMICS S210 Servo Drive System

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Motion Control Drives D 36.1
SINAMICS Converters for Single-Axis Drives
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SINAMICS S120 D 21.3
Chassis Format Converter Units
Chassis-2 Format Converter Units
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Converter Cabinet Units
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Motion Control Drives D 23.1
SINAMICS DCM
series of converters
DC Converter, Control Module

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Products for
Totally Integrated Automation

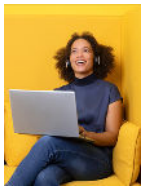
PDF (E86060-K4670-A101-C1-7600)

SIMATIC HMI / ST 80/ST PC
PC-based Automation
Human Machine Interface Systems
PC-based Automation

PDF (E86060-K4680-A101-D3-7600)

SITRAIN
Digital Industry Academy

www.siemens.com/sitrain



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Catalog
D 60

Edition
March
2026

SIEMENS

Combining the real and digital worlds ...
Transformation

MOTION CONTROL DRIVES

SIMOTICS E
Drive system for extra low-voltage

siemens.com/d60

Dear Customer,

We are happy to present you with the new PDF version of the Catalog D 60 · March 2026.

The catalog provides a first insight into the SIMOTICS E Drive system for extra low-voltage, which primarily consists of extra-low voltage motors and corresponding extra-low voltage converters.

The SIMOTICS E extra-low voltage motors, with or without integrated converters, are a targeted addition to the Siemens portfolio and strengthen our role as a technology leader in factory automation and digitalization. They are ideal for intelligent, battery-powered systems in intralogistics and production – for example in mobile robots, driverless transport systems or in the automated conversion of machines. The SIMOTICS E extra low-voltage drive system consists of SIMOTICS E extra low-voltage motors, VTD and SIMATIC MICRO-DRIVE extra low-voltage converters and the SIMOTICS E ArgoDrive driving steering system.

For more information on ordering and configuration, see Siemens Product Configurator in SiePortal at:
www.siemens.com/simotics-e/configuration

The products listed in this Catalog are also included in SiePortal.

Please contact your local Siemens office for additional information.

Up-to-date information about SIMOTICS E is available online at www.siemens.com/simotics-e

You can access SiePortal on the internet at: https://sieportal.siemens.com

Your personal contact will be glad to receive your suggestions and recommendations for improvement. You can find your representative in our personal contacts database at www.siemens.com/automation-contact

We hope that you will often enjoy using the new Catalog D 60 · March 2026 as a selection and ordering reference document and wish you every success with our products and solutions.

With kind regards

Frank Golüke
Vice President
General Motion Control
Siemens AG, Digital Industries, Motion Control

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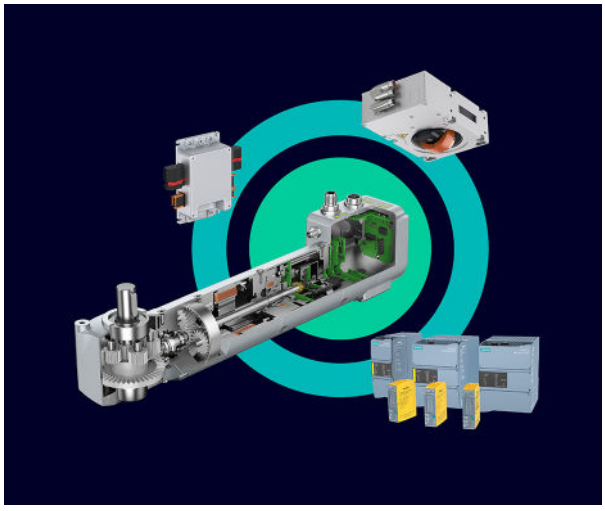
SIMOTICS E Drive system for extra low-voltage

Motion Control Drives



Catalog D 60 · March 2026

Supersedes:
Catalog D 60 · November 2025
Catalog D 34 · July 2023

Refer to SiePortal for current updates of this catalog:
https://sieportal.siemens.com

Please contact your local Siemens branch.

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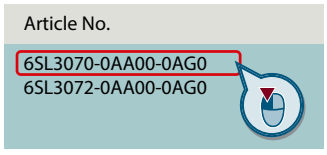
Click on an Article No. in the catalog PDF to call it up in SiePortal and to obtain all the information.



Or directly on the internet, e.g.
www.siemens.com/product_catalog_DIMC?6SL3070-0AA00-0AG0

The products and systems described in this catalog are manufactured/distributed under application of a certified quality management system in accordance with EN ISO 9001. The certificate is recognized by all IQNet countries.

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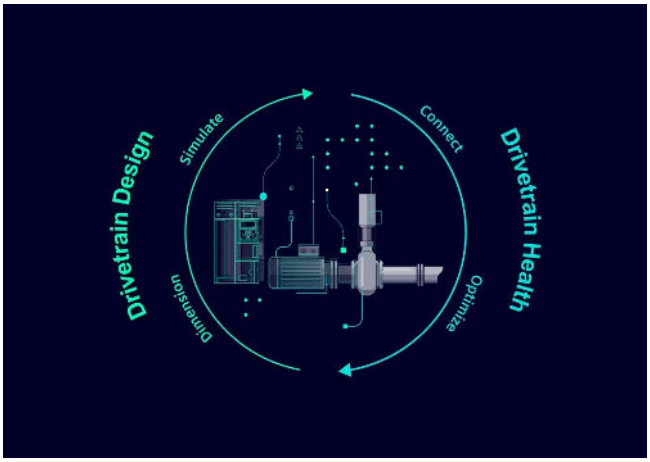
Motion beyond expectations

Drives move the industries. But how can they make them more efficient, more reliable and more sustainable – and exceed all expectations while they are doing it? Our answer: Siemens Xcelerator for Digital Drivetrain.

Digital solutions for Drivetrain Design and Drivetrain Health

Combine the real and the digital world to reach the next level of efficiency and sustainability in your drivetrain value chain: with suitable digital solutions for drivetrain design and drivetrain health.
Drivetrain Design:
Simplify and shorten the engineering steps to get faster and more efficiently from concept to the commissioned drive-train.
Drivetrain Health:
Reduce total cost of ownership for your equipment and machine park – energy, maintenance, downtime.



siemens.com/digital-drivetrain

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Digitalization along the drivetrain value chain

Dimension

Accurate in motion: Dimension your motors, gearboxes, and complete drivetrains digitally with greater precision – for greater reliability and energy efficiency.

Simulate

Faster in motion: Add the digital twin of the drivetrain to your machine simulation to speed up your design and engineering phases and to accelerate your time-to-market!

Connect

Data in motion: Acquire high-quality raw data and connect your entire drive-trains or machines to cloud or on-premise platforms – for a consistent and secure data flow.

Optimize

Better in motion: Analyze and visualize drivetrain and machine data in digital solutions and apps to identify optimization potentials and concrete actionable measures how to tap it.

Use cases for digital drivetrain technology

Condition monitoring for drivetrains

Healthy in motion: Gain valuable insights into your drivetrain to optimize maintenance, system availability, cost efficiency, and sustainability: Discover intelligent digital condition monitoring for your drivetrains!

Are your drivetrains fit enough for tough times?

The industries are expected to produce ever more efficiently, ever more sustainably and ever more cost-effectively. And if you can't do that, it's easier to be left behind by the competition. Use digitalization and the data from your motors and converters to optimize your competitiveness – and to keep your production in motion.

What if you consume too much electricity?

With digital solutions and digital drive technology, you can significantly reduce your share of this!

What if you waste too much energy?

Digitalization enables you to detect energy waste and impending system down-times at an early stage so that you can take counter-measures in due time!

What if your motors are incorrectly designed?

Digital tools make it quicker and easier to correctly design your drive components!

What if your drives fail unexpectedly?

With digital solutions, you can identify risks in your drivetrain at an early stage and react before a failure occurs.

"Our digital solutions transform your drivetrain value chain to the next level of efficiency and sustainability."

siemens.com/digital-drivetrain

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SINAMICS frequency converters

SINAMICS frequency converters – the ultimate solution for all drive applications. From low voltage to direct current (DC), our frequency converters meet your needs. With increased efficiency and versatility, take your applications to the next generation for a digital and sustainable future.

Driving next generation applications

When it comes to driving industry advancements, look no further than our SINAMICS frequency converters. They fuel the creation of innovative, next-generation applications that meet the unique needs of every industry.

From pumping and ventilating to moving, positioning, processing, and machining, our converters have you covered. Get ready to take your applications to new heights.

siemens.com/sinamics

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Low voltage converters

Low voltage frequency converters are suitable for a huge range of applications. For example, if materials must be moved, processed, positioned, pumped or compressed. Variable-speed operation saves energy and also increases process quality and process availability.

Servo converters

These servo converters meet the highest dynamic requirements for single and multi-axis applications. The perfect solution for machine tools, packaging machines, continuous material handling, cranes, rolling mills, test stands, material handling, robotics and many other applications requiring high-precision, dynamic motion control.

DC converters

The dynamic performance, ruggedness, and cost-effectiveness of DC technology continue to make it the most cost-effective and proven drive solution for many applications today – with numerous advantages in terms of reliability, ease of use, and operational performance.

Accelerating the digital and sustainable transformation of industry

How can you make production more efficient? Accelerate your digital transformation? And become more sustainable?

The answer is our SINAMICS frequency converters. They are energy efficient, offer the versatility you need for any application, and drive your digital transformation by providing the data to continuously improve production efficiency and sustainability. Our converters offer you integrated safety and security features, efficient engineering and software tools as well as comprehensive lifecycle services. In other words: Everything you need to address the next generation of applications – today and tomorrow.

EFFICIENT

Implement energy-efficient applications easily, quickly, and safely with efficient motion control.

- Sustainable drive systems
- Efficient Motion Control solutions
- Drive System Services

VERSATILE

Drives equipped with tailored safety features to ensure optimal machine safety in a wide range of industrial applications.

- Safety and Security Integrated
- Drive applications
- Drives for any industry

FUTURE-PROOF

Efficient engineering, powerful software tools, and cloud and edge connectivity for greater transparency.

- Digitalization in drive technology
- Efficient drive engineering
- Drive Software for all applications

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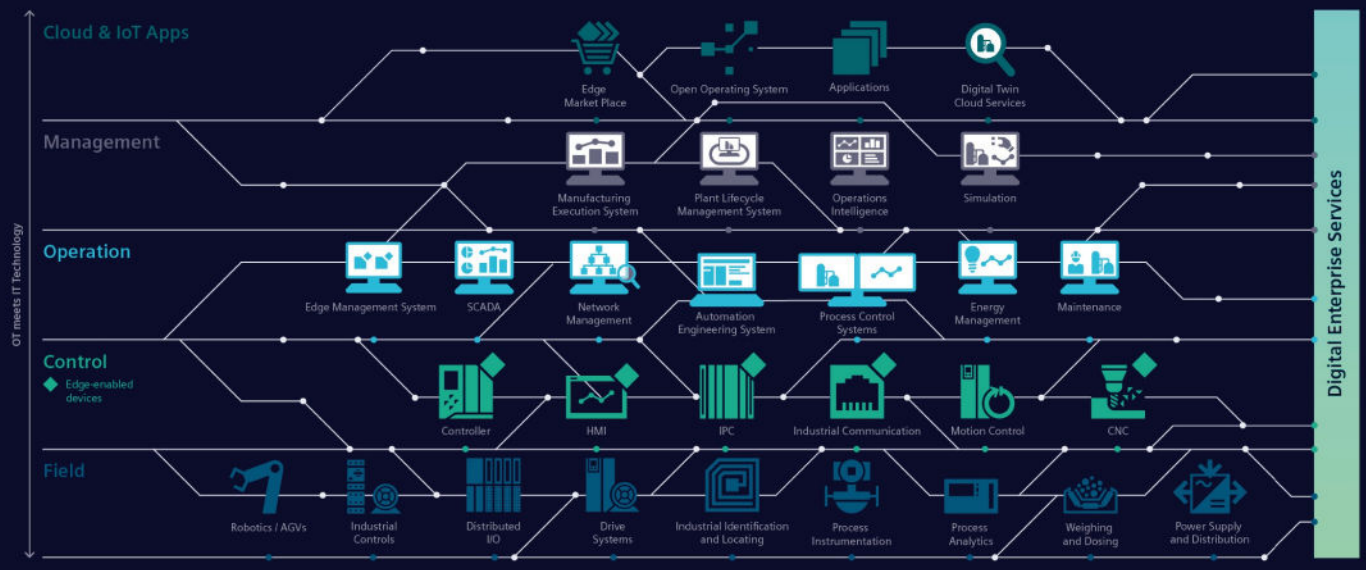
Totally Integrated Automation

Totally Integrated Automation (TIA) offers smart automation development, flexible machine concepts, transparent operation, and sustainable solutions that enable access to data to calculate and optimize the product carbon footprint. We are constantly improving and expanding TIA to be future-proof and adaptive to existing and upcoming challenges.

A comprehensive portfolio for the challenges of today and tomorrow

The TIA offering is integrated seamlessly and it's so comprehensive that it provides the right automation solutions for every industry. We will continue to improve and expand our proven automation portfolio and are constantly including innovative technologies and solutions that pave the way towards the factory of the future.



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Real added value for the automation of your production

From the development of innovative machine concepts to engineering and optimized production:
TIA offers real added value along the entire value chain.

Smart Automation Development

Innovative machine concepts made easy: When you use standardized library concepts and preconfigured expertise, you can count on efficient engineering. Thanks to the integration of safety features, diagnostic functions, and cybersecurity, you also save valuable time.

Flexible Machine Concepts

No matter what new requirements emerge in the market, TIA supports modular machine concepts and the simple integration of new machines into existing lines – thanks to standardized hardware interfaces and engineering libraries. As a machine builder, this enables you to meet any challenge quickly and reliably.

Transparent Operation

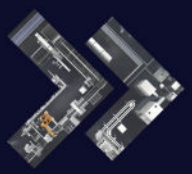
Integrated interfaces let you achieve a new level of transparency for the essential performance indicators in your processes and plants. The connection between IT and OT along with efficient data management lay the foundation for new service models such as predictive maintenance.

Future-proof Automation

Our TIA portfolio is constantly being refined with a view to integrating automation technologies more and more efficiently. The components can then interact with modern IT capabilities, which are becoming increasingly important for specific applications in automation. TIA provides a solid foundation, whether for working with our Industrial Operations X portfolio or for everything the future has in store.

Sustainable Solutions

Sustainability starts with the acquisition of data. With the TIA portfolio, you can measure energy and resource data and make it transparent, providing a solid foundation for calculating the Product Carbon Footprint. This is crucial for drawing the right conclusions and responding to sudden changes in order to lastingly reduce CO_2 emissions and save more resources in production.



www.siemens.com/tia

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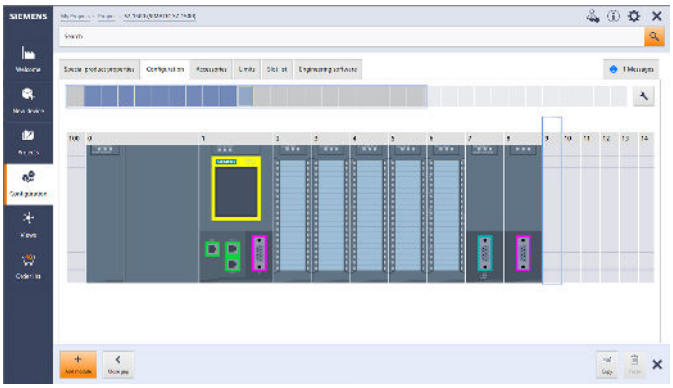
TIA Selection Tool – quick, easy, smart configuration

For you to get the most out of our portfolio quickly and easily.

Do you always need the optimum configuration for planning your project?
For your application we offer the TIA Selection Tool to support all project planners, beginners and experts alike.
No detailed portfolio knowledge is necessary.
TIA Selection Tool is available for download as a free desktop version or a cloud variant.



Your Advantages

Quick

- Configure a complete project with just a few entries – without a manual, without special knowledge
- Import and export of hardware configuration to TIA Portal or other systems
- Ideal visualization of the projects to be configured

Easy

- Tool download either as desktop version or web-based cloud version
- Technically always up-to-date about product portfolio and innovative approaches
- Highly flexible, secure, cross-team work in the cloud
- Direct ordering in SiePortal

Smart

- Smart selection wizard for error-free configuration and ordering
- Configuration options can be tested and simulated in advance
- Library for archiving sample configurations

The TIA Selection Tool is a completely paperless solution.
Download it now:
www.siemens.com/tst

For more information, scan the QR code

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Sustainability @Siemens

Transforming the everyday to create a better tomorrow.

For more information, see www.siemens.com/sustainability

As a company, Siemens considers environmental, social and governance (ESG) criteria from all angles with its DEGREE framework (decarbonization, ethics, governance, resource efficiency, equity and employability). We are not only committed to reducing the carbon footprint in our own operations to net zero by 2030, but also helping our customers achieve their decarbonization and sustainability goals.

Mission & strategy

As a focused technology company, Siemens is committed to addressing the world's most profound challenges by leveraging the synergies between digitalization and sustainability.

Technology with aim and purpose

We develop technologies that connect the real and digital worlds and enable our customers to positively transform the industries that form the backbone of our economy: industry, infrastructure, transportation and healthcare.

Our contribution

Siemens makes an impact every day by providing innovative solutions in response to challenges relating to environmental protection, decarbonization, health and safety. Innovative solutions that have a clear goal: to make the world more sustainable, more integrative and a better place to live.

Sustainability facts

For almost 175 years, Siemens has been driven by the desire to improve the lives of people around the world with our technologies.

Siemens EcoTech

Siemens EcoTech is an environmental product performance label designed to drive the sustainable transformation of industry and infrastructure. The label gives you transparency on the performance of our certified products across environmental relevant criteria, enabling you to make informed choices to support your sustainability goals, see www.siemens.com/SiemensEcoTech.

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Further information about SIMOTICS E
can be found on the internet at
www.siemens.com/simotics-e

Siemens D 60 · March 2026

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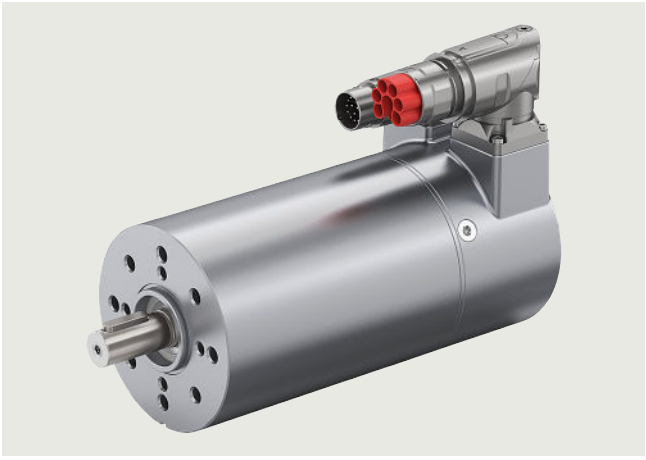
Overview

SIMOTICS E – Extra low-voltage motors with oder without integrated converters

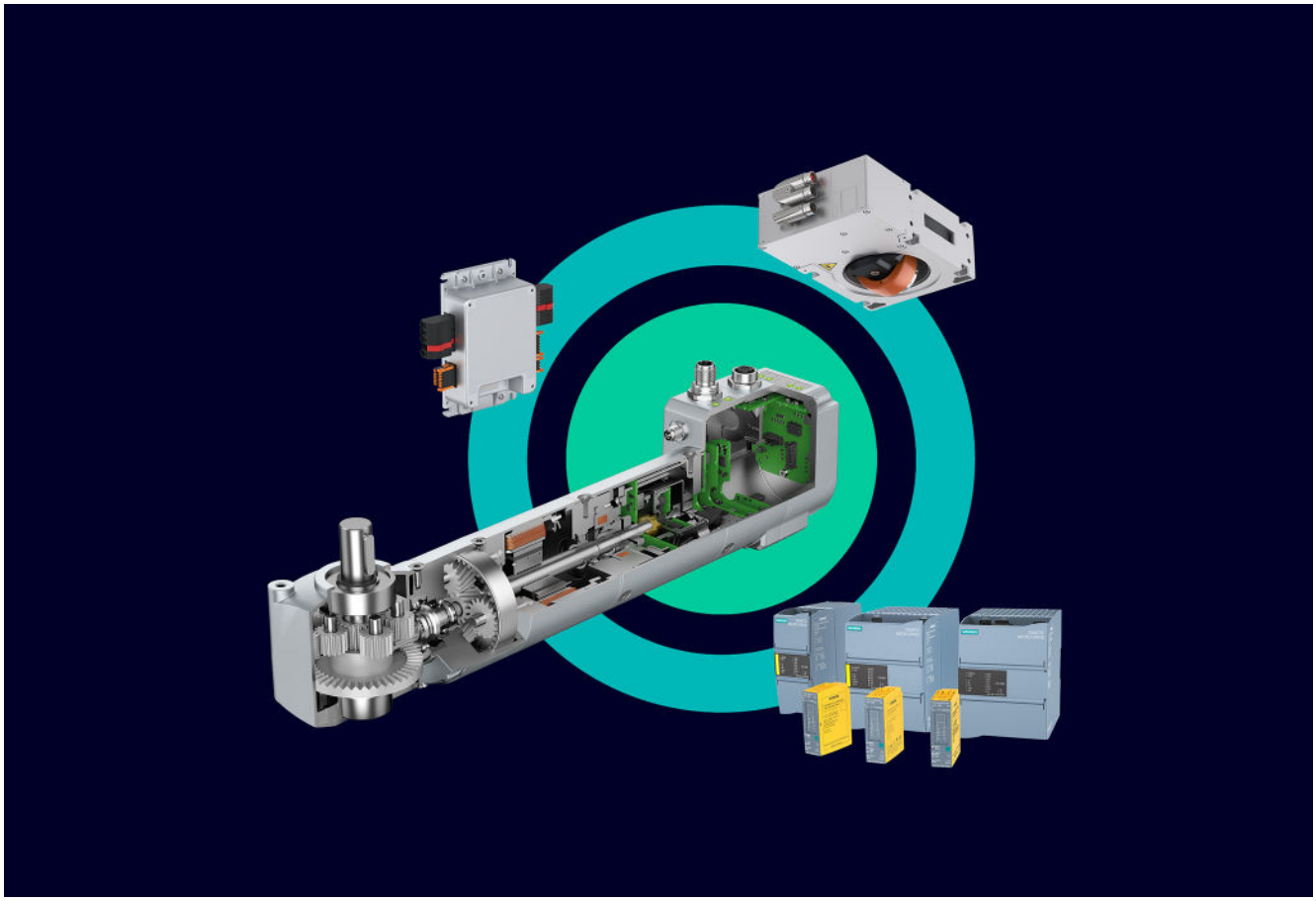


Example: SIMOTICS E-1EE1 extra low-voltage motor without integrated converter and without gearbox; shaft height 40R, length 60

The SIMOTICS E extra low-voltage motors, with or without integrated converters, are a targeted addition to the Siemens portfolio and strengthen our role as a technology leader in factory automation and digitalization. They are ideal for intelligent, battery-powered systems in intralogistics and production – for example in mobile robots, driverless transport systems or in the automated conversion of machines. In addition to battery-powered solutions, the focus is also on stationary applications and can be served in a targeted manner with the portfolio.

The VTD extra low-voltage converters or the SIMATIC MICRO-DRIVE extra low-voltage converterscontrol SIMOTICS E extra low-voltage motors without an integrated converter precisely and efficiently. The result: more flexibility and productivity.
www.siemens.com/simotics-e

For more information on ordering and configuration, see Siemens Product Configurator in SiePortal at:
www.siemens.com/simotics-e/configuration
and in Catalog D 60 at: www.siemens.com/d60



SIMOTICS E drive system for extra low-voltage with SIMOTICS E extra low-voltage motors, VTD and SIMATIC MICRO-DRIVE extra low-voltage converters and SIMOTICS E ArgoDrive driving steering system

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SIMATIC MICRO-DRIVE extra low-voltage converters

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Overview

The SIMATIC MICRO-DRIVE extra low-voltage converters are comprised of the main components

- PDC Drives
- TM Drives

In addition, other system components are also available, e.g. SIMOTICS E extra low-voltage motors, connection systems from Siemens Product Partners or shielding bracket sets.

Component selection and dimensioning of the right components based on physical key data, travel profiles and/or load profiles can be done directly in the "download" file of the TIA Selection Tool:

www.siemens.com/tst

Properties

- DC supply voltage for logic (24 V DC) and power (up to 48 V DC)
- Different performance classes from 100 W to 1000 W for servo converters/PDC drive controllers, and 280 W for F-TM ServoDrive
- Communication via PROFINET with PROFIdrive profiles
- Failsafe communication via PROFIsafe for the failsafe variants (e.g. PDC100F)
- Extended Safety drive functions (e.g. SLS or SLT [1]) for the failsafe variants already possible with the encoders integrated in the motors)
- Pre-assembled plug-in cables from multiple Siemens Product Partners, can also be partially ordered directly via Siemens

More information

- Internet
  www.siemens.com/mirco-drive
  www.siemens.com/d60
  https://sieportal.siemens.com

Design

SIMATIC MICRO-DRIVE extra low-voltage converters, PDC Drives, PDC100, PDC100F, PDC600, PDC600F, PDC1000 V1 variants

Drive controller modules for ET200SP
SIMATIC MICRO-DRIVE F-TM StepDrive ST, ServoDrive HF und ServoDrive ST

First-class extra low-voltage converters in the protective extra-low voltage range

The requirements for motion control tasks in automation are ever increasing and are becoming more and more multi-faceted and complex. Digitalization is bringing about new solution approaches, regardless of the industry or application.

Fit for digitalization with SIMATIC MICRO-DRIVE

The SIMATIC MICRO-DRIVE extra low-voltage converters allow you to make a perfect entry into the world of digitalization. Thanks to Totally Integrated Automation (TIA), converters and motors are completely integrated into the Siemens automation environment and can be easily selected using the TIA Selection Tool and configured using the TIA Portal. A wide range of tools for the complete machine building cycle ensures efficient engineering and fast commissioning.

Well designed, flexible and fit for the future

SIMATIC MICRO-DRIVE is an extremely versatile, seamless and safety-oriented system that covers a wide range of applications in the protective extra-low voltage range.

It comprises the SIMATIC MICRO-DRIVE PDC Drives and TM Drives. The right SIMOTICS E extra low-voltage motors, connection systems from Siemens Product Partners and controllers from the SIMATIC portfolio from Siemens optimally round out the motion control functions of this future-proof solution.

The F-TM StepDrive ST completes the portfolio within the range of controlling stepper motors.

In combination with EC Motors and stepper motors up to 280 W the F-TM ServoDrive HF allows positioning and speed control in very confined spaces. The triple overload capability and the support of BiSS-C Multiturn encoders extend the scope of applications.

[1] Only for PDC100F

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Design

Can be combined with SIMOTICS E extra low-voltage motors and plug-in cables from selected Siemens Product Partners

To ensure that all of the requirements in drive technology are met in the best way possible, the SIMATIC MICRO-DRIVE extra low-voltage converters are compatible with individual and supplementary SIMOTICS E extra low-voltage motors.

Strong in classic and innovative applications

SIMATIC MICRO-DRIVE is the ideal drive in numerous application areas. The system stands out when executing positioning tasks in production and manufacturing as well as in innovative application domains. Examples include drives for storage and retrieval machine shuttles and high bay racking systems, driverless transport systems as well as medical applications such as safely and reliably moving MRT examination tables and automatically aligning ceiling-mounted devices in radiographic applications.

For all applications

Moving

Energy-efficient and rugged solutions for basic conveyor technology with roller or chain conveyors, for hoisting gear and elevators – as well as for storage and retrieval machines – and always with Safety Integrated on board.

Processing

Ideal solution for continuous processes with simple speed and torque accuracy, for example with extruders, centrifuges, agitators an all types of production machines – motion control, isochronous communication (only for SIMATIC MICRO-DRIVE PDC Drives) and Safety Integrated.

Positioning

SIMATIC MICRO-DRIVE is the solution for
24/48 V DC applications: The positioning of individual axes and even the coordinated interpolation of several axes – such as in complex robotic applications – can be achieved easily.

Simple commissioning of SIMATIC MICRO-DRIVE PDC Drives through One Button Tuning and TIA Portal (V15 SP1 or higher)

Commissioning and engineering are possible with TIA Portal (V15 SP1 or higher). The tool for configuration, commissioning and diagnostics has been optimized with regard to the consistent utilization of the TIA Portal advantages – one shared work environment for PLC, HMI and drives.

For more information, see the Engineering tools section.

Safety Integrated

The integrated safety functions provide highly effective, application-oriented protection for personnel and machinery (terms as defined in IEC 61800-5-2).

The following Safety Integrated functions are included (not all of the functions are included in all of the drive controllers):

- Safe Torque Off (STO) [1)]
- Safe Stop 1 (SS1, only for failsafe variants, e.g. PDC100F)
- Safely-Limited Speed (SLS, only for failsafe variants, e.g. PDC100F)
- Safely-Limited Torque (SLT, only for PDC100F)
  Monitoring of motor current and torque during operation by means of safely-limited torque
- Safe Speed Monitor (SSM, only for failsafe variants, e.g. PDC100F)

The Safety Integrated functions are implemented electronically and therefore require no additional installation effort or space in the control cabinet. Furthermore, the costs are considerably lower than for externally implemented monitoring functions.

The Safety Integrated functions can be easily put into operation via the TIA Portal (V15 SP1 or higher) and activation through a SIMATIC controller via PROFIsafe.

Perfect combination with SIMATIC S7-1500, SIMATIC S7-1500 T-CPU, SIMATIC ET 200SP Open Controller via PROFINET or SIMATIC ET 200SP

Communication with the higher-level control takes place via PROFINET. For optimal interaction between the controller and the SIMATIC MICRO-DRIVE drive system, SIMATIC S7-1200, SIMATIC S7-1500, SIMATIC S7-1500 T-CPU, SIMATIC ET 200SP Open Controller can be used as the control system.

The SIMATIC MICRO-DRIVE PDC Drives features an integrated PROFINET IRT communication interface with a communication cycle of up to 1 ms for connecting to a control system.

Standardized protocols for linking to a higher-level control with RT and IRT are supported – the PROFIdrive profile for positioning mode and the PROFIsafe profile for safety-oriented communication. Functions such as Shared Device and ring redundancy PROFIenergy are also possible.

All from a single source: Through the use of Motion Control functionalities in the controller, the combination of converter and SIMATIC S7 automation system or a controller allows ideally harmonized engineering. As a result, commissioning times are shortened.

Technology objects and Motion Control blocks of the higher-level controller provide numerous possibilities of motion, such as continuous operation, positioning, synchronous operation, coordinated motion of multiple axes, cam disks, or interpolation.

Siemens offers tested SIMATIC PLC/HMI application examples for connection of the drive system to a SIMATIC control system:

www.siemens.com/sinamics-applications

Further information on the SIMATIC S7-1500, SIMATIC S7-1500 T-CPU controllers and SIMATIC ET 200SP Open Controller is available in the ST 70 Catalog and on the internet at

www.siemens.com/simatic-s7-1500

Identification link according to IEC 61406 for SIMATIC MICRO-DRIVE

The ID link contains the article and serial number of the product. As a QR code, it replaces the previous data matrix code on the nameplate and takes you with the URL directly to a product information page on the internet with access to the technical documentation, data sheet, certificates, FAQs, product notifications, and catalogs. Paper package inserts become superfluous since the information is available electronically directly via the QR code, even years later. In this way, we are making a valuable contribution to the preservation of our environment. You don't need an additional app. Simply scan the QR code with your smartphone or tablet. According to IEC 61406, the QR code of an ID link is marked with a frame and a triangle at the bottom right.
With their globally unique identifiers, Siemens products are ready for Industry 4.0.
The ID serves as a connection to the administration shell with which modules of the digital twin can be provided.

[1)] Does not apply for PDC1000 V1

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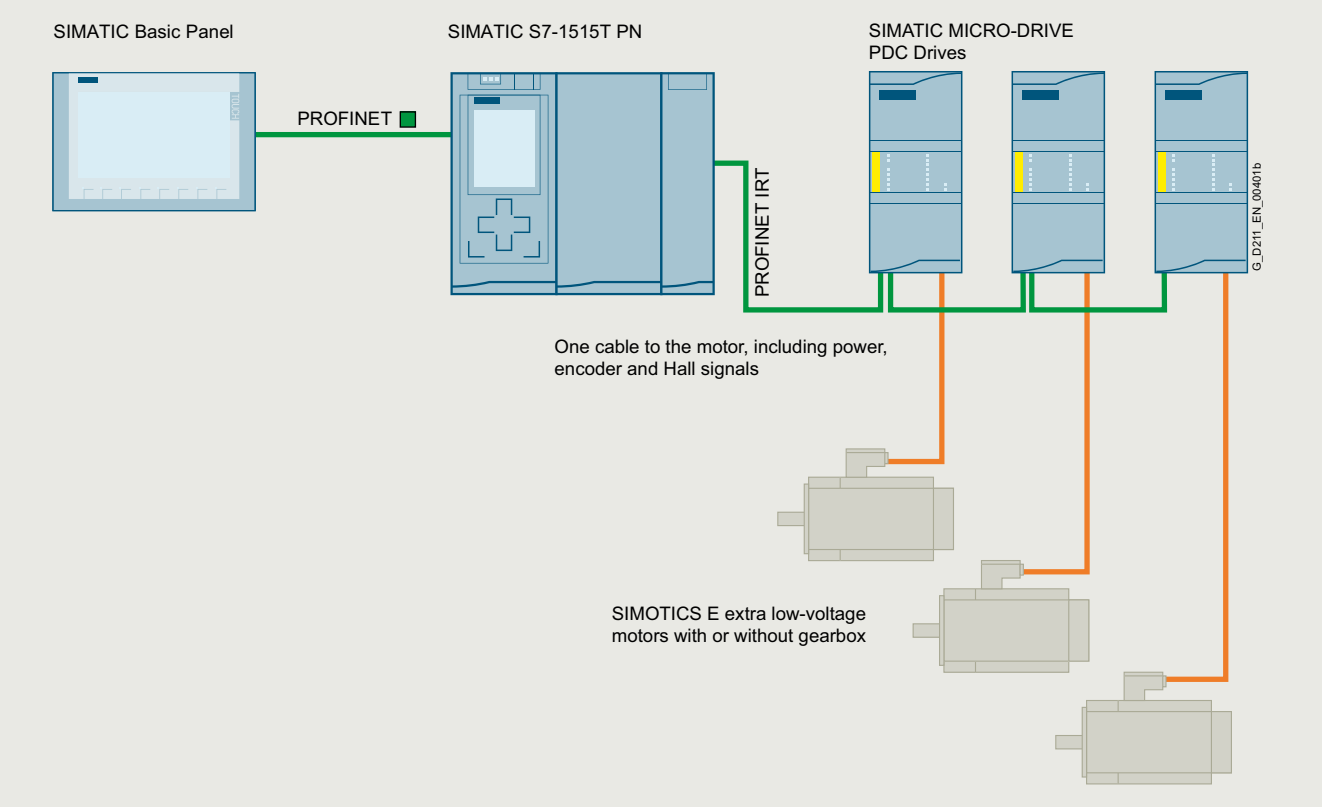
Design



Example: communication via PROFINET with SIMATIC MICRO-DRIVE PDC Drives

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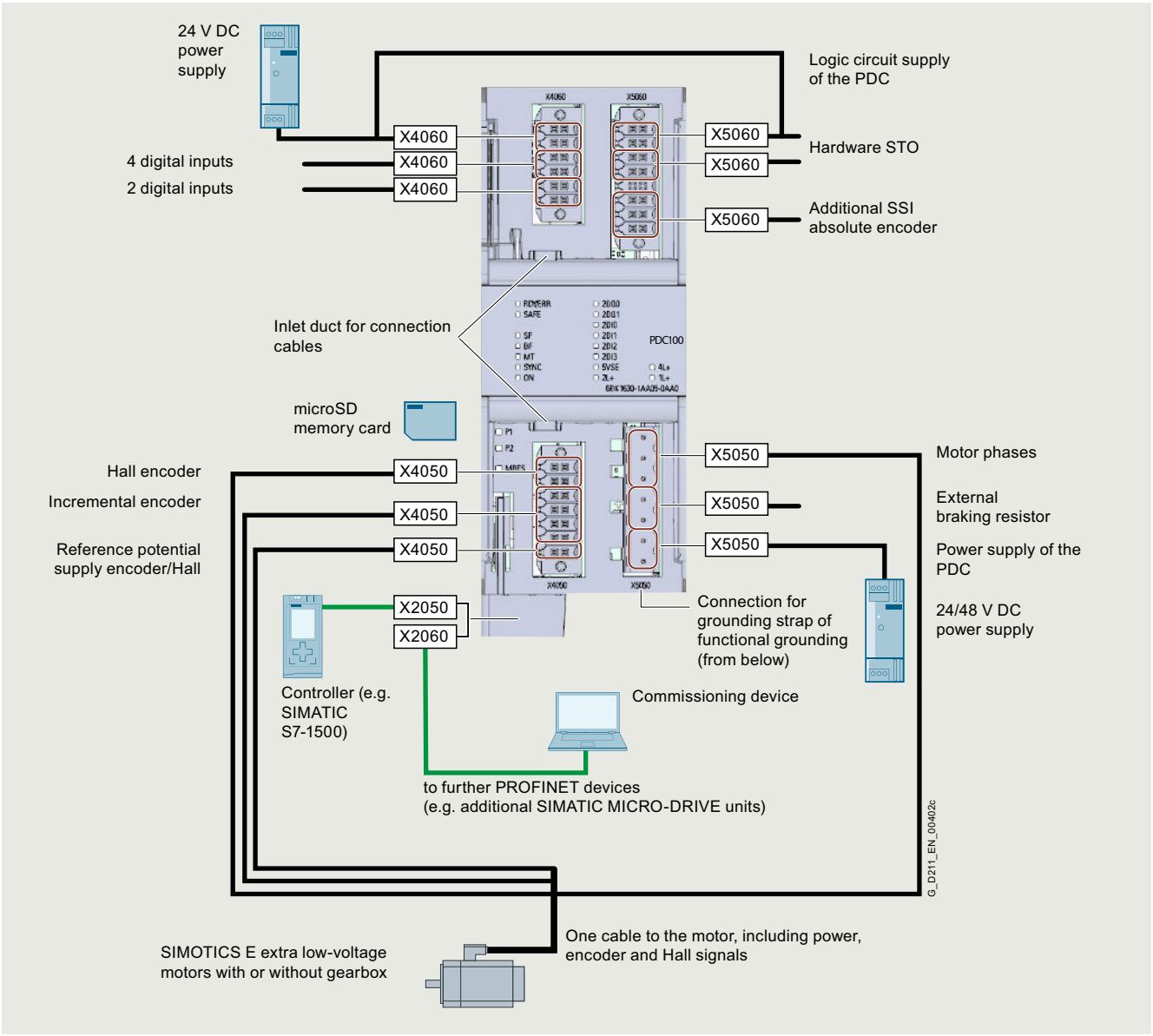
Design



Connection example: SIMATIC MICRO-DRIVE extra low-voltage converters, PDC Drives, PDC100 variant

Can be used worldwide

In addition to the usual approvals, the UL approval for the North American market are also available for the SIMATIC MICRO-DRIVE extra low-voltage converters [1]. Thus, the SIMATIC MICRO-DRIVE extra low-voltage converters are available for worldwide use.

Further information

Detailed information on the SIMATIC MICRO-DRIVE extra low-voltage converters, including the latest technical documentation (brochures, tutorials, dimensional drawings, certificates, equipment manuals and operating instructions), is available on the internet at:

www.siemens.com/micro-drive

and also via the TIA Selection Tool:

www.siemens.com/tia-selection-tool

[1] Does not apply for PDC1000 V1

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Configuration

The TIA Selection Tool is available for selecting the individual drive components. Drive dimensioning can also be carried out there with program support, comparable to the SIZER engineering tool.

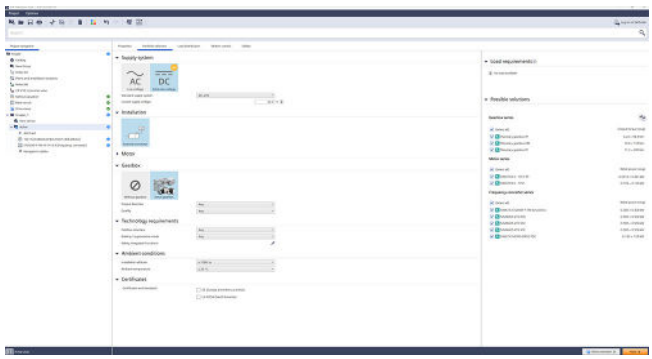
You can find information about the TIA Selection Tool at:

www.siemens.com/tst

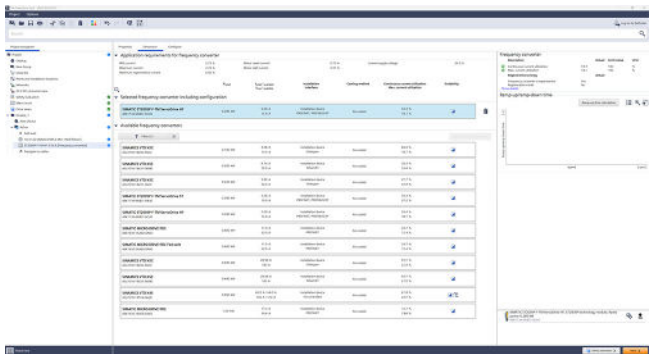
Currently, these functions are only available in the offline version:

www.siemens.com/tia-selection-tool-standalone

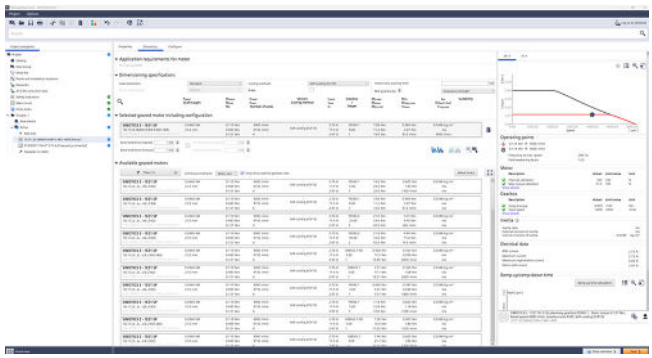
Functions in the TIA Selection Tool



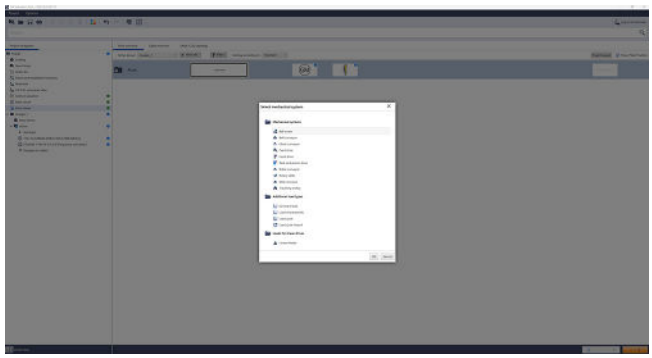
Portfolio selection / axis



Selection converter



Selection motor



Drive system & load selection

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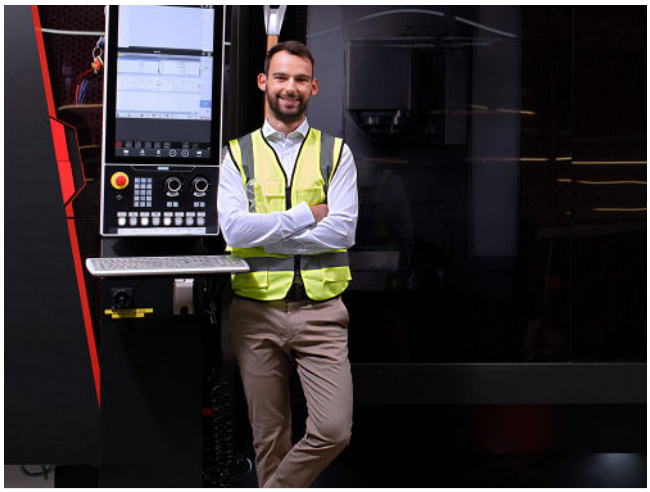
Overview



Legal framework

Machine manufacturers and manufacturing plants must ensure that their machines or plants cannot cause danger due to malfunctions in addition to the general risks of electric shock, heat or radiation.

In Europe, for example, compliance with the Machinery Directive 2006/42/EC is legally stipulated by the EU Directive on Safety and Health at Work. In order to ensure compliance with this directive, it is recommended that the corresponding harmonized European standards are applied. This triggers the "assumption of conformity" and gives manufacturers and operators the legal security in terms of compliance with both national regulations and EU directives. The machine manufacturer uses the CE marking to document the compliance with all relevant directives and regulations in the free movement of goods.

Safety-related standards

Functional safety is specified in various standards. For example, ISO 12100 specifies standards pertaining to machine safety (risk assessment and risk reduction). IEC 61508 specifies basic requirements for electronic and programmable safety-related systems. IEC 62061 (only applicable for electrical and electronic control systems) and ISO 13849-1, which has replaced EN 954-1, define the functional and safety-related requirements of safety-oriented control systems.

The above-mentioned standards define different safety requirements that the machine has to satisfy in accordance with the risk, frequency of a dangerous situation, probability of occurrence and the opportunities for recognizing impending danger.

- ISO 13849-1: Performance Level PL a ... e; Category B, 1 ... 4
- IEC 62061: Safety Integrity Level SIL 1 ... 3

Trend toward integrated safety systems

The trend toward greater complexity and higher modularity of machines has seen a shift in safety functions away from the classical central safety functions (for example, shutdown of the complete machine using a main disconnecting means) and into the machine control system and the drives. This is often accompanied by a significant increase in productivity because the equipping times are shortened. Depending on the type of machine, it may even be possible to continue manufacturing other parts while equipping is in progress.

Integrated safety functions act much faster than those of a conventional design. The safety of a machine is increased further with Safety Integrated. Furthermore, thanks to the faster method of operation, safety measures controlled by integrated safety systems are perceived as less of a hindrance by the machine operator, therefore significantly reducing the motivation to consciously bypass safety functions.

Function

The safety functions integrated in SIMATIC MICRO-DRIVE are described below.

Safety functions integrated in the SIMATIC MICRO-DRIVE extra low-voltage converters (integrated in the failsafe variants, e.g. PDC100F)

The large number of safety functions integrated in the SIMATIC MICRO-DRIVE extra low-voltage converters in combination with the sensors and safety control required for the safety function contribute to the implementation of highly effective, practical personnel and machine protection.

They comply with the requirements of the following safety categories:

- PL d and Category 3 according to ISO 13849-1
- SIL 2 according to IEC 61508 and IEC 61800-5-2

The Safety Integrated functions are generally certified by independent institutes. You can obtain the corresponding test certificates and manufacturer's declarations from your Siemens contacts.

The integrated safety functions that are currently available are described below. Their functional safety satisfies the requirements defined in the international standard IEC 61800-5-2 for variable-speed drive systems.

The safety functions integrated into the SIMATIC MICRO-DRIVE extra low-voltage converters can be roughly divided into two categories:

- **Functions for safely stopping a drive**
  - Safe Torque Off (STO [1])
  - Safe Stop 1 (SS1)
- **Functions for safely monitoring the motion of a drive**
  - Safely-Limited Speed (SLS)
  - Safely-Limited Torque (SLT [2])
  - Safe Speed Monitor (SSM)

[1] Does not apply for PDC1000 V1

[2] Only for PDC100F

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Function

Safe Torque Off (STO)

The STO function is the most common and basic drive-integrated safety function. It ensures that no torque-generating energy can continue to affect a motor and prevents unintentional start-ups.

Effect

This function is a mechanism that prevents the drive from restarting unexpectedly, in accordance with EN 60204-1, Section 5.4. The STO function suppresses the drive pulses (corresponds to Stop Category 0 according to EN 60204-1). The drive is reliably torque-free. This state is monitored internally in the drive.

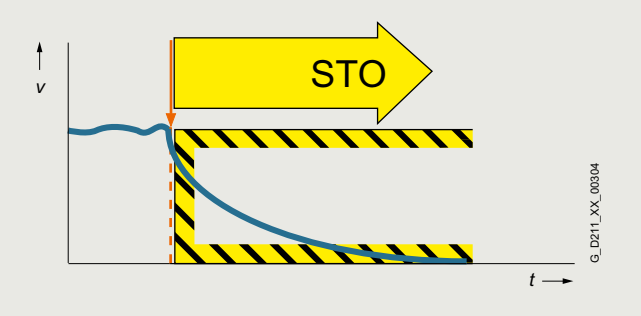
Application

STO has the immediate effect that the drive cannot supply any torque-generating energy. STO can be used wherever the drive will naturally reach a standstill due to load torque or friction in a sufficiently short time or when "coasting down" of the drive will not have any relevance for safety.

STO makes it possible for persons to work safely when the protective door is open (restart interlock) and is used on machines/installations with moving axes, e.g. on handling or conveyor systems.

Customer benefits

Some of the advantages of the Safety Integrated Function STO over conventional safety technology with electromechanical switchgear include the elimination of separate components as well as of the work that would be required to wire and service them, i.e. no wearing parts as a result of the electronic shutdown. Because of the fast electronic switching times, the function provides a shorter reaction time than the conventional solution comprising electromechanical components. When STO is triggered, the converter remains connected to the network and can be fully diagnosed.



Safe Stop 1 (SS1)

The SS1 function causes a motor to stop rapidly and safely and switches the motor to torque-free mode after coming to a standstill by activating STO.

Effect

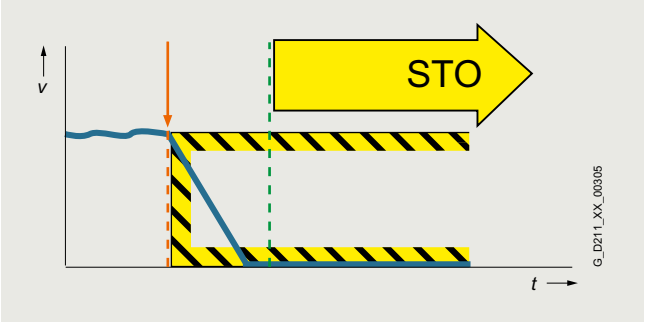
The SS1 function can safely stop the drive in accordance with EN 60204-1, Stop Category 1. When the SS1 function is selected, the drive brakes autonomously along a quick stop ramp and automatically activates the Safe Torque Off functions when the set safe delay time has expired.

Application

The SS1 function is used when, in the event of a safety-relevant incident, the drive must stop as quickly as possible with a subsequent transition into the STO state (e.g. EMERGENCY STOP). It is thus used to bring large centrifugal masses to a stop as quickly as possible for the safety of the operating personnel, or to brake motors at high speeds as quickly as possible. Examples of typical applications are saws, grinding machine spindles, centrifuges, winders and storage and retrieval machines.

Customer benefits

The targeted stopping of a drive by means of SS1 reduces the risk of danger, increases the productivity of a machine, and allows the safety clearances in a machine to be reduced. The principle is to bring the drive actively to a standstill, compared with just using the STO function. Complex mechanical brakes that are susceptible to wear are not normally required to brake the motor.



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Function

Safely-Limited Speed (SLS)

The SLS function monitors the drive to ensure that it does not exceed a preset speed or velocity limit.

Effect

The SLS function monitors the drive against a parameterized speed limit. Four different limit values can be selected. The speed setpoint is not influenced independently. After SLS has been selected, the higher-level control must bring the drive down below the selected speed limit within a parameterizable time. If the speed limit is exceeded, a customizable drive-integrated fault reaction occurs.

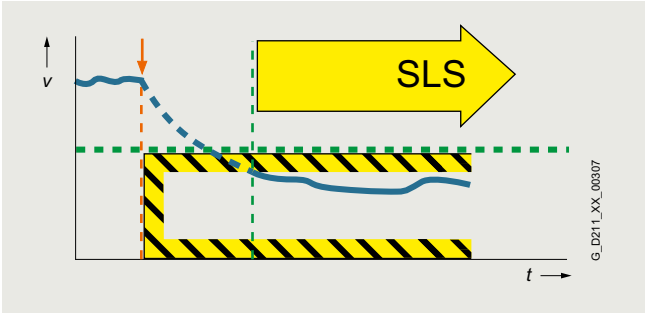
The SLS limit stage 1 can be multiplied by a factor that is transferred in 16-bit resolution via PROFIsafe. This allows an almost unlimited number of limits to be specified.

Application

The SLS function is used if people are in the danger zone of a machine and their safety can only be guaranteed by reduced speed. Typical application cases include those in which an operator must enter the danger zone of the machine for the purposes of maintenance or setting up, such as a winder in which the material is manually threaded by the operator. To prevent injury to the operator, the roller may only spin at a safely reduced speed. SLS is often also used as part of a two-stage safety concept. While a person is in a less critical zone, the SLS function is activated, and the drives are only stopped in a smaller area with higher potential risk. SLS can be used not only for operator protection, but also for machinery protection, e.g. if a maximum speed must not be exceeded.

Customer benefits

The SLS function can contribute to a significant reduction in downtime, or greatly simplify or even accelerate setup. The overall effect achieved is a higher availability of the machine. Moreover, external components such as speed monitors can be omitted.



Safely-Limited Torque (SLT)

The SLT function monitors the current/torque of a motor.

Effect

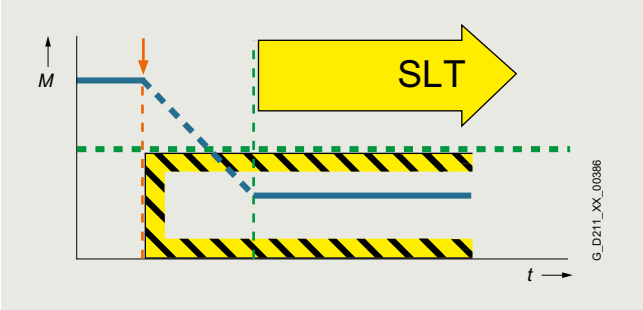
The SLT function allows the torque to be reduced within a defined period of time. If the torque exceeds the SLT monitoring limit, the drive responds with a "Safe Stop". The stop responses STO or SS1 can be specified via parameters.

Application

In the simplest case, this function is used for force limiting when opening and closing a protective door on a machine.

Customer benefits

The SLT function avoids the use of external hardware for measuring and limiting the force and the associated wiring effort.



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2

Function

Safe Speed Monitor (SSM)

The SSM function warns when a drive is working below an adjustable speed limit. As long as it remains below the threshold, the function issues a safety-related signal.

Effect

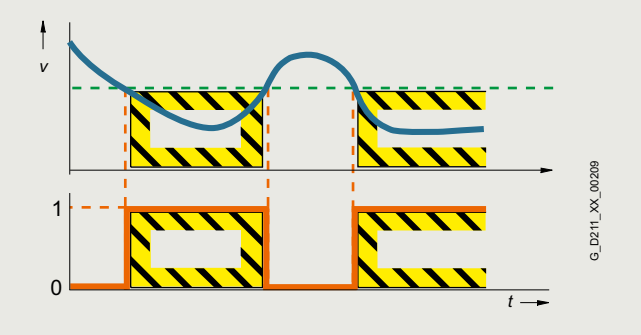
If a speed value drops below a parameterized limit, a safety-related signal is generated. This can, for example, be processed in a safety controller to respond to the event by programming, depending on the situation.

Application

With the SSM function, in the simplest case, a safety door can be unlocked if the speed drops below a non-critical level. Another typical example is that of a centrifuge that may be filled only when it is operating below a configured speed limit.

Customer benefits

Unlike SLS, there is no drive-integrated fault reaction when the speed limit is exceeded. The safe feedback can be evaluated in a safety control unit, allowing the user to respond appropriately to the situation.



Activation of the Safety Integrated Functions

The STO safety function for SIMATIC MICRO-DRIVE extra low-voltage converters can be activated via terminals, e.g. for use of a conventional safety circuit.

For standalone safety solutions for small to medium sized applications, it is frequently sufficient that the various sensing components are directly hardwired to the drive.

For integrated safety solutions, the safety-relevant sequences are generally processed and coordinated in the fail-safe SIMATIC controller. In this case, the system components communicate via the PROFINET fieldbus. The safety functions are controlled via the safe PROFIsafe communication protocol.

The SIMATIC MICRO-DRIVE extra low-voltage converters can be easily integrated into the plant or system topology.

PROFIsafe (only for the failsafe variants, e.g. PDC100F)

SIMATIC MICRO-DRIVE extra low-voltage converters support the PROFIsafe profile based on PROFINET.

PROFIsafe is an open communications standard that supports standard and safety-related communication over the same communication path (wired or wireless). A second, separate bus system is therefore not necessary. The telegrams that are sent are continually monitored to ensure safety-relevant communication.

Possible errors such as telegrams that have been lost, repeated or received in the incorrect sequence are avoided. This is done by consecutively numbering the telegrams in a safety-relevant fashion, monitoring their reception within a defined time and transferring an ID for transmitter and receiver of a telegram. A CRC (cyclic redundancy check) data security mechanism is also used.

The operating principle of Safety Integrated

Two independent switch-off signal paths

Two independent switch-off signal paths are available. All switch-off signal paths are low active. This ensures that the system is always switched to a safe state if a component fails or in the event of cable breakage. If a fault is discovered in the switch-off signal paths, the STO or SS1 function (depending on parameter settings) is activated and a system restart inhibited.

Two-channel monitoring structure

All the main hardware and software functions for Safety Integrated are implemented in two independent monitoring channels (e.g. switch-off signal paths, data management, data comparison). A cyclic crosswise comparison of the safety-relevant data in the two monitoring channels is carried out.

The monitoring functions in each monitoring channel work on the principle that a defined state must prevail before each action is carried out and a specific acknowledgement must be made after each action. If these expectations of a monitoring channel are not fulfilled, the drive coasts to a standstill (two channel) and an appropriate message is output.

Safe actual value sensing with encoder

The safe actual value sensing is based on the redundant evaluation of the differential incremental tracks A/B that supply HTL/TTL and the three Hall-effect sensors integrated in the motor.

All SIMOTICS E extra low-voltage motors with IQ encoder and Hall-effect sensors can be used for all of the safety functions of the SIMATIC MICRO-DRIVE extra low-voltage converters.

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Overview

Communication overview

The properties and special application areas of the different bus systems for SIMATIC MICRO-DRIVE are described briefly below.

Protocol	SIMATIC MICRO-DRIVE PDC100, PDC600, PDC1000 V1	SIMATIC MICRO-DRIVE PDC100F, PDC600F	SIMATIC MICRO-DRIVE TM Drives
PROFINET	✓	✓	✓
- PROFINET RT	✓	✓	✓
- PROFINET IRT isochronous	✓	✓	✓
- PROFINET Shared Device	✓	✓	–
- PROFINET media redundancy MRP (surge-prone)	✓	✓	–
- PROFIsafe	–	✓	–
- PROFIdrive application class 1	✓	✓	✓
- PROFIdrive application class 4	✓	✓	–

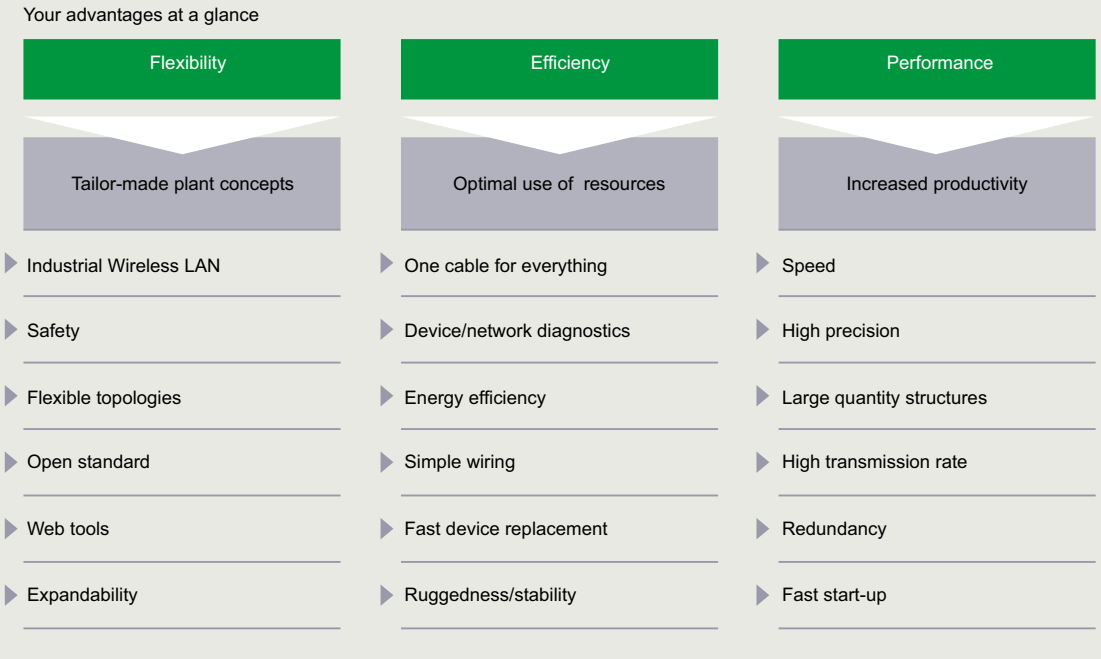
Overview

G_D211_XX_00050

PROFINET – the Ethernet standard for automation

PROFINET is the world's leading Industrial Ethernet standard for automation with more than 40 million nodes installed worldwide.

PROFINET makes companies more successful, because it speeds up processes and raises both productivity and plant availability.



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2

Overview

Flexibility

Short response times and optimized processes are the basic requirements for competitiveness in global markets because the product lifecycles are becoming shorter and shorter.

PROFINET ensures maximum flexibility in plant structures and production processes, and it enables you to implement innovative machine and plant concepts. For example, mobile devices can also be integrated at locations that are difficult to access.

Flexible topologies

In addition to the linear structure characterized by the established fieldbuses, PROFINET also enables the use of star, tree and ring structures. This is made possible by switching technology via active network components, such as Industrial Ethernet switches and media converters, or by integrating switch functionality into the field devices. This results in increased flexibility in the planning of machines and plants, as well as savings in cabling.

The PROFINET network can be installed without any specialist knowledge at all and meets all requirements that are relevant to the industrial environment. The "PROFINET Installations Guidelines" assist manufacturers and users with network planning, installation and commissioning. Symmetrical copper cables or RFI-resistant fiber-optic cables are used, depending on the application. Devices from different manufacturers are easily connected via standardized and rugged plug-in connectors (up to IP65/IP67 degree of protection).

By integrating switch functionality into the devices, linear topologies can be created that are directly oriented toward an existing machine or plant structure. This reduces cabling overhead and cuts down on components such as external switches.

IWLAN

PROFINET also supports wireless communication with Industrial Wireless LAN, thus opening up new fields of application. For example, technologies subject to wear, such as trailing cables, can be replaced and automated guided vehicle systems and mobile operator panels can be used.

Safety

The PROFIsafe safety profile, which has been tried and tested with PROFIBUS and which permits the transmission of standard and safety-related data on a single bus cable, can also be used with PROFINET. No special network components are necessary for fail-safe communication, which means that standard switches and standard network transitions can continue to be used without any restrictions. In addition, fail-safe communication is equally possible via Industrial Wireless LAN (IWLAN).

Open standard

PROFINET, the open multi-vendor standard (IEC 61158/IEC 61784), is supported by PROFIBUS and PROFINET International (PI). It stands for maximum transparency, open IT communication, network security and simultaneous real-time communication.

Thanks to its openness, PROFINET provides the basis for a standardized automation network in the plant, to which all other machines and devices can be connected. Even the integration of existing plant components, for example using PROFIBUS, presents no problems due to the use of network transitions.

Use of web tools

Thanks to the unrestricted support of TCP/IP, PROFINET permits the use of standard web services such as web servers. Irrespective of the tool used, information from the automation level can be accessed from virtually any location using a commercially available internet browser. This considerably simplifies commissioning and diagnostics. Users can then decide for themselves how much openness to the IT world they want to allow for their machine or plant. This means that PROFINET can be used simply as an isolated plant network or connected via appropriate security modules, such as the SCALANCE S modules, to the office network or the internet. In this way, new remote maintenance concepts or the high-speed exchange of production data become possible.

Expandability

On the one hand, PROFINET facilitates the integration of existing systems and networks without any great effort. In this way, PROFINET safeguards investments in existing plant components that communicate via PROFIBUS and other fieldbuses such as AS-Interface. On the other hand, additional PROFINET nodes can be added at any time. By using additional network components, network infrastructures can be expanded using cabling or wireless methods – even while the plant is operating.

Efficiency

Greater global competition means that companies must use their resources economically and efficiently. This applies in particular to production. This is where PROFINET ensures greater efficiency. Simple engineering guarantees fast commissioning, while reliable devices ensure a high level of plant availability. Comprehensive diagnostic and maintenance concepts help to reduce plant downtimes and keep maintenance costs to a minimum.

One cable for everything

PROFINET permits simultaneous fieldbus communication with isochronous mode and standard IT communication (TCP/IP) on one cable. This real-time communication for the transmission of user/process data and diagnostic data takes place on a single cable. Specific profile communication (PROFIsafe and PROFIdrive) can be integrated without any additional cabling. This solution offers a wide scope of functions at a low level of complexity.

Device and network diagnostics

By retaining the tried and tested PROFIBUS device model, the same diagnostics information is available with PROFINET. In addition, module-specific and channel-specific data can also be read out from the devices during device diagnosis, enabling faults to be located quickly and easily. Apart from the availability of device information, the reliability of network operation has top priority in the network management.

In existing networks the Simple Network Management Protocol (SNMP) has established itself as the de facto standard for the maintenance and monitoring of the network components and their functions. PROFINET uses this standard and gives users the opportunity to maintain their networks with tools that are familiar to them, such as the SINEMA Server network management software.

For easier maintenance of PROFINET devices, both on-site and remotely via a secure VPN connection, application-specific websites can be set up on the web server of the field devices using the familiar HTML standard.

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Overview

Simple wiring

Particularly stringent demands are made on the installation of cables in the industrial environment. In addition, there is a requirement to set up industry-standard networks in the shortest possible time without any special knowledge.

With FastConnect, Siemens offers a high-speed installation system that meets all of these requirements. FastConnect is the standard-compliant, industry-standard cabling system consisting of cables, connectors and assembly tools for PROFINET networks. The time required for connecting terminals is minimized by the simple installation method using just a single tool, while installation errors are prevented by the practical color-coding. Both copper cables and glass fiber optic cables can be easily assembled on site in this way.

Fast device replacement

PROFINET devices are identified by means of a name assigned during configuration. When replacing a defective device, a new device can be recognized from its topology information by the IO controller and a new name can be assigned to it automatically. This means that no engineering tool is necessary for the replacement of equipment.

This mechanism can even be used for the initial commissioning of a complete system. This speeds up commissioning, particularly in the case of series machines.

Ruggedness

An automation network must be able to withstand most external sources of interference. The use of Switched Ethernet prevents faults in one section of the network from affecting the entire plant network. For areas that are particularly prone to radio frequency interference (RFI), PROFINET allows the use of fiber optic cables.

Performance

Productivity and product quality determine the level of success in the market. Precise motion control, dynamic drives, high-speed controllers and the deterministic synchronization of devices are therefore key factors in achieving superior production. They facilitate high production rates and optimum product quality at the same time.

Speed and precision

Fast motion control applications demand precise and deterministic exchange of data. This is implemented by means of drive controllers using isochronous real time (IRT).

With IRT and isochronous mode, PROFINET permits fast and deterministic communication. This synchronizes the various cycles of a system (input, network, CPU processing and output), even in the case of parallel TCP/IP traffic. The short cycle times of PROFINET make it possible to raise the productivity of machines and plants and to guarantee the product quality and high level of precision.

The standardized PROFIdrive profile permits vendor-independent communication between CPUs and drives.

Large quantity structures

The use of PROFINET makes it possible to overcome the existing restrictions regarding the scope of machines and systems that can be implemented. In one network, several different controllers can interact with their assigned field devices. The number of field devices per PROFINET network is virtually unlimited – the entire range of IP addresses is available.

High data rate

By using 100 Mbit/s in full duplex mode, PROFINET achieves a significantly higher data rate than previous fieldbuses. This means that other plant data can be transmitted over TCP/IP without any problems, in addition to the process data. PROFINET therefore meets the combined industrial demands for simultaneously transmitting high-speed IO data and large volumes of data for additional sections of the application. Even the transmission of large volumes of data, such as that from cameras, has no adverse effect on the speed and precision of the IO data transmission, thanks to PROFINET mechanisms.

Media redundancy

A higher plant availability can be achieved with a redundant installation (ring topology). The media redundancy can be implemented not only with the aid of external switches, but also by means of integrated PROFINET interfaces. Using the media redundancy protocol (MRP), reconfiguration times of 200 ms can be achieved. If the communication is interrupted in just one part of the ring installation this means that a plant standstill is prevented and any necessary maintenance or repair work can be performed without any time pressure.

For motion control applications, PROFINET with IRT in ring topologies offers extended media redundancy for planned duplication (MRPD) which operates in a bumpless mode without any reconfiguration time. If communication is interrupted (e.g. a cable break) the process can continue operating without interruption.

Benefits

- PROFINET is the open Industrial Ethernet standard for automation
- PROFINET is based on Industrial Ethernet
- PROFINET uses TCP/IP and IT standards
- PROFINET is real-time Ethernet
- PROFINET enables seamless integration of fieldbus systems
- PROFINET supports fail-safe communication via PROFIsafe and also via IWLAN

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Overview

PROFIdrive – the standardized drive interface for PROFINET and PROFIBUS

PROFIdrive defines the device behavior and technique to access internal device data for electric drives connected to PROFINET and PROFIBUS – from basic frequency converters up to high-performance servo controllers.

It describes in detail the practical use of communication functions – device-to-device communication, equidistance and clock cycle synchronization (isochronous mode) in drive applications. In addition, it specifies all device characteristics which influence interfaces connected to a controller over PROFINET or PROFIBUS. This also includes the state machine (sequence control), the encoder interface, scaling of values, definition of standard telegrams, access to drive parameters etc.

The PROFIdrive profile supports both central as well as distributed motion control concepts.

What are profiles?

For devices and systems used in automation technology, profiles define properties and modes of behavior. This allows manufacturers and users to define common standards. Devices and systems that comply with such a cross-manufacturer profile, are interoperable on a fieldbus and, to a certain degree, can be interchanged.

Are there different types of profiles?

A distinction is made between what are known as application profiles (general or specific) and system profiles:

- Application profiles (also device profiles) predominantly refer to devices (e.g. drives) and include an agreed selection regarding bus communication as well as specific device applications.
- System profiles describe classes of systems, including master functionality, program interfaces and integration resources.

Is PROFIdrive fit for the future?

PROFIdrive has been specified by the PROFIBUS and PROFINET International (PI) user organization, and is specified as a standard that is fit for the future through standard IEC 61800-7.

The basic philosophy: Keep it simple

The PROFIdrive profile tries to keep the drive interface as simple as possible and free from technology functions. As a result, referencing models as well as the functionality and performance of the PROFINET/PROFIBUS master have either no or only little influence on the drive interface.

One drive profile – different application classes

The integration of drives into automation solutions depends very strongly on the particular drive application. In order to be able to address the complete, huge bandwidth of drive applications – from basic frequency converters up to synchronized multi-axis systems with a high dynamic performance – using just one profile, PROFIdrive defines six application classes, to which most drive applications can be assigned:

- Class 1 – standard drives (pumps, fans, agitators, etc.)
- Class 2 – standard drives with technological functions
- Class 3 – positioning drives
- Class 4 – motion control drives with central, higher-level motion control intelligence and the patented "Dynamic Servo Control" positioning concept
- Class 5 – motion control drives with central, higher-level motion control intelligence and position setpoint interface
- Class 6 – motion control drives with distributed motion control intelligence integrated in the drives

Design

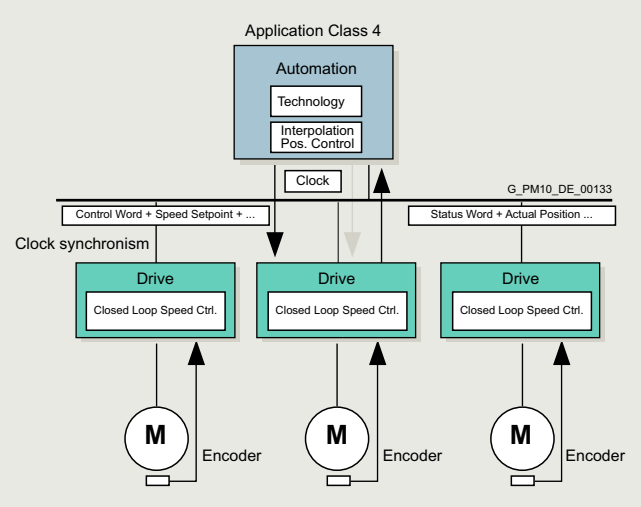
The device model of PROFIdrive

PROFIdrive defines a device model comprising function modules, which interoperate inside the device and which reflect the intelligence of the drive system. These modules have objects assigned to them which are described in the profile and are defined with respect to their functions. The overall functionality of a drive is therefore described through the sum of its parameters.

In contrast to other drive profiles, PROFIdrive defines only the access mechanisms to the parameters as well as a subset of profile parameters (approx. 30) such as the fault buffer, drive control and device identification.

All other parameters are vendor-specific which gives drive manufacturers great flexibility with respect to implementing control functions. The elements of a parameter are accessed acyclically over data records.

As a communication protocol, PROFIdrive uses DP-V0, DP-V1, and the DP-V2 expansions for PROFIBUS including the functions "Device-to-Device Communication" and "Isochronous Operation", or PROFINET IO with real-time classes RT and IRT.



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Overview

SIMATIC MICRO-DRIVE extra low-voltage converters, PDC Drives, PDC100, PDC100F, PDC600, PDC600F, PDC1000 V1 variants

- SIMATIC MICRO-DRIVE PDC Drives (ProfiDriveControl)
- Available in the variants: Standard (PDCxxx), Failsafe (PDCxxxF)

Variant	Power	Device width
Standard		
PDC100	100 W	50 mm
PDC600	600 W	90 mm
PDC1000 V1	1000 W	90 mm
Failsafe		
PDC100F	100 W	50 mm
PDC600F	600 W	90 mm

Function

Basic functions (for standard PDC for all PDC Drives)

- PROFIdrive profile via PROFINET
- Hardware STO (does not apply for PDC1000 V1)
- Digital inputs and outputs
- PDC100 and PDC100F with integrated braking chopper
- PROFINET line-capable (2 × PROFINET ports)
- PROFINET Shared Device
- TTL/HTL Hall signals

In addition to standard PDC for PDCxxxF variants

- Extended Safety drive functions STO, SS1, SLT [1], SLS [2] and SSM [2] via PROFIsafe

Selection and ordering data

SIMATIC MICRO-DRIVE PDC Drives (ProfiDriveControl)	
Variant	Article No.
Standard	
• PDC100 Power 100 W	**6BK1630-1AA10-0AA0**
• PDC600; Power 600 W	**6BK1630-1AA60-0AA0**
• PDC1000 V1; Power 1000 W	**6BK1630-1BA00-0AA0**
Failsafe **with Extended Safety drive functions**	
• PDC100F; Power 100 W	**6BK1630-2AA10-0AA0**
• PDC600F; Power 600 W	**6BK1630-2AA60-0AA0**

[1] Only for PDC100F

[2] Extended requirements for the motor and encoder system must be observed. The SIMOTICS E extra low-voltage converters comply with these requirements.

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Technical specifications

Article number	**6BK1630-1AA10-0AA0**	**6BK1630-2AA10-0AA0**
	SIMATIC MICRO-DRIVE PDC100 boxed	SIMATIC MICRO-DRIVE PDC100F boxed
General information		
Product type designation	DC and EC motor controller	DC and EC motor controller
Product description	Control of DC and EC motors	Control of DC and EC motors
Mean time between failures (MTBF)	100 000 h	100 000 h
Product function		
• Isochronous mode	Yes	Yes
• Four-quadrant operation	Yes	Yes
• Speed control with encoder	Yes	Yes
• Speed control without encoder	No	No
• Safety Functions	Yes; STO	Yes; STO, SS1, SLT, SLS, SSM
Protection function		
• Undervoltage protection	Yes	Yes
• Overvoltage protection	Yes	Yes
• Overload protection	Yes	Yes
• Ground-fault protection	Yes	Yes
• Short-circuit protection	Yes	Yes
Engineering with		
• STEP 7 TIA Portal configurable/ integrated from version	V14 SP1	V14 SP1
Installation type/mounting		
Mounting type	35 mm rail, screw mounting	35 mm rail, screw mounting
Type of ventilation	Convection cooling	Convection cooling
Supply voltage		
Design of the power supply	DC	DC
Rated value (DC)	24 V	24 V
Supply voltage of the motor		
• Type of motor voltage	24 ... 48 V DC, SELV / PELV	24 ... 48 V DC, SELV / PELV
• permissible range, lower limit (DC)	19.2 V	19.2 V
• permissible range, upper limit (DC)	50.4 V	50.4 V
Output current		
Current output (rated value)	1.56 A	1.56 A
Output current, max.	2.3 A	2.3 A
Digital inputs		
Number of digital inputs	4	4
Number of safety inputs	1; For STO, antivalent (2-pin) - 24 V DC	1; For STO, antivalent (2-pin) - 24 V DC
Input characteristic according to IEC 61131	Permissible DC leakage current (0 signal) to 2 mA	Permissible DC leakage current (0 signal) to 2 mA
Digital outputs		
Type of digital output	Source output (PNP, current-sourcing)	Source output (PNP, current-sourcing)
Number of digital outputs	2	2
Number of safety outputs	0	0
Encoder		
Connectable encoders		
• Incremental encoder (symmetrical)	Yes; Up to 200 kHz	Yes; Up to 200 kHz
• Incremental encoder (asymmetrical)	Yes	Yes
• Absolute encoder (SSI)	Yes; 350 kHz	Yes; 350 kHz
Interfaces		
Number of industrial Ethernet interfaces	0	0
Number of PROFINET interfaces	2	2

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Technical specifications

Article number	**6BK1630-1AA10-0AA0**	**6BK1630-2AA10-0AA0**
	SIMATIC MICRO-DRIVE PDC100 boxed	SIMATIC MICRO-DRIVE PDC100F boxed
Degree and class of protection		
IP degree of protection	IP20	IP20
Standards, approvals, certificates		
CE mark	Yes	Yes
CSA approval	No	No
cULus	Yes	Yes
RCM (formerly C-TICK)	Yes	Yes
KC approval	Yes	Yes
EAC (formerly Gost-R)	Yes	Yes
China RoHS compliance	Yes	Yes
Reference designation according to IEC 81346-2 (2009)	T	T
Highest safety class achievable in safety mode		
• Performance level according to ISO 13849-1	d	d
• SIL acc. to IEC 61508	SIL 2	SIL 2
Ambient conditions		
Ambient temperature during operation		
• min.	-20 °C	-20 °C
• max.	60 °C	60 °C
• horizontal installation, max.	40 °C	40 °C
Ambient temperature during storage/transportation		
• Storage, min.	-20 °C	-20 °C
• Storage, max.	80 °C	80 °C
Relative humidity		
• Operation, max.	95 %; no condensation	95 %; no condensation
• Storage, max.	95 %; no condensation	95 %; no condensation
Vibrations		
• Vibration resistance during operation acc. to IEC 60068-2-6	5 ... 8.5 Hz / 3.5 mm, 8.5 ... 150 Hz / 1 g; for wall mounting: 9 ... 29 Hz / 1.5 mm, 29 ... 200 Hz / 5 g	5 ... 8.5 Hz / 3.5 mm, 8.5 ... 150 Hz / 1 g; for wall mounting: 9 ... 29 Hz / 1.5 mm, 29 ... 200 Hz / 5 g
• Vibration resistance during storage acc. to IEC 60068-2-6	5 ... 9 Hz / 3.5 mm, 9 ... 500 Hz / 1 g	5 ... 9 Hz / 3.5 mm, 9 ... 500 Hz / 1 g
Shock testing		
• Shock resistance during operation acc. to IEC 60068-2-27	15 g / 11 ms; for wall mounting: 10 g / 30 ms, 25 g / 6 ms	15 g / 11 ms; for wall mounting: 10 g / 30 ms, 25 g / 6 ms
Cables		
Cable length for motor, shielded, max.	10 m	10 m
Dimensions		
Width	50 mm	50 mm
Height	125 mm; 136 mm with protective collar for PN connector	125 mm; 136 mm with protective collar for PN connector
Depth	120 mm	120 mm
Weights		
Weight, approx.	350 g	350 g
Other		
Brake design	Holding brake	Holding brake
Braking chopper	Yes; Onboard, expandable	Yes; Onboard, expandable
Note:	Maximum 30 J per braking process, maximum 30 J per minute	Maximum 30 J per braking process, maximum 30 J per minute

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Technical specifications

Article number	**6BK1630-1AA60-0AA0**	**6BK1630-2AA60-0AA0**
	SIMATIC MICRO-DRIVE PDC600 boxed	SIMATIC MICRO-DRIVE PDC600F boxed
General information		
Product type designation	EC motor controller	EC motor controller
Product description	Control of EC motors	Control of EC motors
Mean time between failures (MTBF)	100 000 h	100 000 h
Product function		
• Isochronous mode	Yes	Yes
• Four-quadrant operation	Yes	Yes
• Speed control with encoder	Yes	Yes
• Speed control without encoder	No	No
• Safety Functions	Yes; STO	Yes; STO, SS1, SLS, SSM
Protection function		
• Undervoltage protection	Yes	Yes
• Overvoltage protection	Yes	Yes
• Overload protection	Yes	Yes
• Ground-fault protection	Yes	Yes
• Short-circuit protection	Yes	Yes
Engineering with		
• STEP 7 TIA Portal configurable/ integrated from version	V14 SP1	V14 SP1
Installation type/mounting		
Mounting type	35 mm rail, screw mounting	35 mm rail, screw mounting
Type of ventilation	Convection cooling	Convection cooling
Supply voltage		
Design of the power supply	DC	DC
Rated value (DC)	24 V	24 V
Supply voltage of the motor		
• Type of motor voltage	24 ... 48 V DC, SELV / PELV	24 ... 48 V DC, SELV / PELV
• permissible range, lower limit (DC)	16.8 V	16.8 V
• permissible range, upper limit (DC)	52.8 V	52.8 V
Output current		
Current output (rated value)	11 A	11 A
Output current, max.	22 A	22 A
Output frequency	500 Hz	500 Hz
Digital inputs		
Number of digital inputs	4	4
Number of safety inputs	1; For STO, antivalent (2-pin) - 24 V DC	1; For STO, antivalent (2-pin) - 24 V DC
Digital outputs		
Type of digital output	Source output (PNP, current-sourcing)	Source output (PNP, current-sourcing)
Number of digital outputs	2	2
Number of safety outputs	0	0
Encoder		
Connectable encoders		
• Incremental encoder (symmetrical)	Yes; Up to 200 kHz	Yes; Up to 200 kHz
• Incremental encoder (asymmetrical)	Yes	Yes
• Absolute encoder (SSI)	Yes; 350 kHz	Yes; 350 kHz
Interfaces		
Number of industrial Ethernet interfaces	0	0
Number of PROFINET interfaces	2	2

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Technical specifications

Article number	**6BK1630-1AA60-0AA0**	**6BK1630-2AA60-0AA0**
	SIMATIC MICRO-DRIVE PDC600 boxed	SIMATIC MICRO-DRIVE PDC600F boxed
Degree and class of protection		
IP degree of protection	IP20	IP20
Standards, approvals, certificates		
CE mark	Yes	Yes
CSA approval	No	No
cULus	Yes	Yes
RCM (formerly C-TICK)	Yes	Yes
KC approval	Yes	Yes
EAC (formerly Gost-R)	Yes	Yes
China RoHS compliance	Yes	Yes
Highest safety class achievable in safety mode		
• Performance level according to ISO 13849-1	d	d
• SIL acc. to IEC 61508	SIL 2	SIL 2
Ambient conditions		
Ambient temperature during operation		
• min.	-20 °C	-20 °C
• max.	60 °C	60 °C
Ambient temperature during storage/transportation		
• Storage, min.	-20 °C	-20 °C
• Storage, max.	80 °C	80 °C
Relative humidity		
• Operation, max.	95 %; no condensation	95 %
• Storage, max.	95 %; no condensation	95 %
Vibrations		
• Vibration resistance during operation acc. to IEC 60068-2-6	5 ... 8.5 Hz / 3.5 mm, 8.5 ... 150 Hz / 1 g; for wall mounting: 9 ... 29 Hz / 1.5 mm, 29 ... 200 Hz / 5 g	5 ... 8.5 Hz / 3.5 mm, 8.5 ... 150 Hz / 1 g; for wall mounting: 9 ... 29 Hz / 1.5 mm, 29 ... 200 Hz / 5 g
• Vibration resistance during storage acc. to IEC 60068-2-6	5 ... 8.5 Hz / 3.5 mm, 8.5 ... 500 Hz / 1 g	5 ... 8.5 Hz / 3.5 mm, 8.5 ... 500 Hz / 1 g
Shock testing		
• Shock resistance during operation acc. to IEC 60068-2-27	15 g / 11 ms; for wall mounting: 5 g / 30 ms, 15 g / 11 ms	15 g / 11 ms; for wall mounting: 5 g / 30 ms, 15 g / 11 ms
Cables		
Cable length for motor, shielded, max.	10 m	10 m
Dimensions		
Width	90 mm	90 mm
Height	125 mm; 136 mm with protective collar for PN connector	125 mm; 136 mm with protective collar for PN connector
Depth	120 mm	120 mm
Weights		
Weight, approx.	0.65 kg	0.65 kg
Other		
Braking chopper	Yes; External resistance	Yes; External resistance

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Technical specifications

Article number	**6BK1630-1BA00-0AA0** SIMATIC MICRO-DRIVE PDC1000-V1 boxed
General information	
Product type designation	EC motor controller
Product description	Control of EC motors
Mean time between failures (MTBF)	100 000 h
Product function	
• Isochronous mode	Yes
• Four-quadrant operation	Yes
• Speed control with encoder	Yes
• Speed control without encoder	No
• Safety Functions	No
Protection function	
• Undervoltage protection	Yes
• Overvoltage protection	Yes
• Overload protection	Yes
• Short-circuit protection	Yes
Engineering with	
• STEP 7 TIA Portal configurable/ integrated from version	V15 SP1
Installation type/mounting	
Mounting type	35 millimeter rail and mounting plate screw connection
Type of ventilation	Convection cooling
Supply voltage	
Design of the power supply	DC
Rated value (DC)	24 V
Supply voltage of the motor	
• Type of motor voltage	24 ... 48 V DC, SELV / PELV
• permissible range, lower limit (DC)	16.8 V
• permissible range, upper limit (DC)	52.8 V
Output current	
Current output (rated value)	17.3 A
Output current, max.	34.6 A
Output frequency	500 Hz
Digital inputs	
Number of digital inputs	5
Number of safety inputs	0
Digital outputs	
Number of digital outputs	2; 24 V DC, 1 A
Number of safety outputs	0
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes; Up to 200 kHz
• Absolute encoder (SSI)	Yes; With SSI interface
Interfaces	
Number of industrial Ethernet interfaces	0
Number of PROFINET interfaces	2
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
CE mark	Yes
CSA approval	No
UL approval	No
cULus	No
FM approval	No

Article number	**6BK1630-1BA00-0AA0** SIMATIC MICRO-DRIVE PDC1000-V1 boxed
RCM (formerly C-TICK)	No
KC approval	No
EAC (formerly Gost-R)	Yes
RoHS conformity	Yes
China RoHS compliance	No
reference designation according to IEC 81346-2 (2009)	T
Ambient conditions	
Ambient temperature during operation	
• min.	-20 °C
• max.	60 °C
Ambient temperature during storage/transportation	
• Storage, min.	-20 °C
• Storage, max.	80 °C
Relative humidity	
• Operation, max.	90 %; no condensation
• Storage, max.	95 %; no condensation
Vibrations	
• Vibration resistance during operation acc. to IEC 60068-2-6	5 ... 8.5 Hz / 3.5 mm, 8.5 ... 150 Hz / 1 g; for wall mounting: 9 ... 29 Hz / 1.5 mm, 29 ... 200 Hz / 5 g
• Vibration resistance during storage acc. to IEC 60068-2-6	5 ... 9 Hz / 3.5 mm, 9 ... 500 Hz / 1 g
Shock testing	
• Shock resistance during operation acc. to IEC 60068-2-27	15 g / 11 ms; for wall mounting: 10 g / 30 ms, 25 g / 6 ms
Cables	
Cable length for motor, shielded, max.	10 m
connection method	
Type of connection	Plug-in terminal
Dimensions	
Width	90 mm
Height	125 mm; 136 mm with protective collar for PN connector
Depth	120 mm
Weights	
Weight, approx.	0.65 kg
Other	
Brake design	Holding brake
Braking chopper	Yes; External resistance

Accessories

Shielding bracket set

For good EMC shielding on the PDC Drives

- For supporting the plug-in cable/cable shields
- Available in widths of 50 mm, 70 mm und 90 mm

Description	Article No.
Shielding bracket set	
For supporting the plug-in cable/cable shields	
• Width 50 mm	**6BK1638-0XA50-0AA0**
• Width 70 mm	**6BK1638-0XA70-0AA0**
• Width 90 mm	**6BK1638-0XA80-0AA0**

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Overview

SIMATIC ET 200SP TM Drives technology modules in comparison – compact and practical

The SIMATIC ET 200SP TM Drives family offers powerful and compact drive controllers for a wide range of automation requirements. Whether it's highly dynamic servo applications, standardized EC motor control or precise stepper motor control – the F-TM ServoDrive HF, F-TM ServoDrive ST and F-TM StepDrive ST technology modules have the right solution for every task. The following overview shows the most important differences and similarities between the three technology modules and supports you in selecting the optimal technology module for your application.

SIMATIC ET 200SP TM Drives	**F-TM ServoDrive HF** 6BK1136-6AB01-0CU0	**F-TM ServoDrive ST** 6BK1136-6AB01-0BU0	**F-TM StepDrive ST** 6BK1136-6SB01-0BU0
			
Motor types	EC & stepper motors	EC motors	Stepper motors
Power (nominal)	280 W	280 W	280 W
Output current, max.	15 A	10 A	10 A
Supply voltage	24 ... 48 V DC	24 ... 48 V DC	24 ... 48 V DC
Overload	3-fold	2-fold	2-fold
Encoder connection	BiSS-C, Hall, Incremental, IQ encoder	Hall, Incremental	Incremental
Encoderless open-loop controlled operation	Only for stepper motors	No	Yes
Braking chopper integrated	Yes	Yes	No
Hardware STO	SIL 3	SIL 2	SIL 3
Device width	20 mm	20 mm	20 mm
TIA Portal integration	Yes	Yes	Yes

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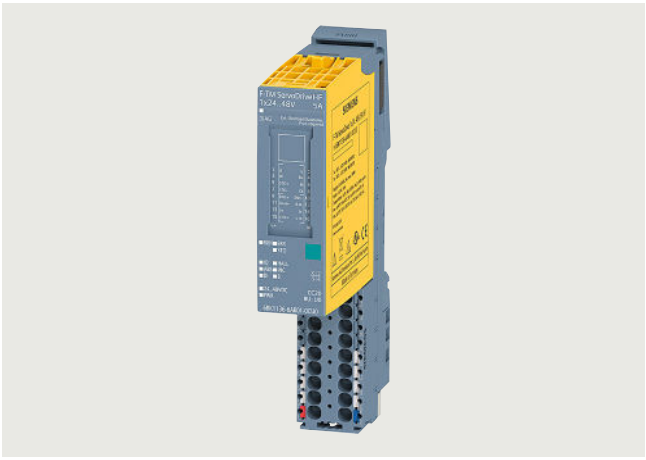
F-TM ServoDrive HF

Overview



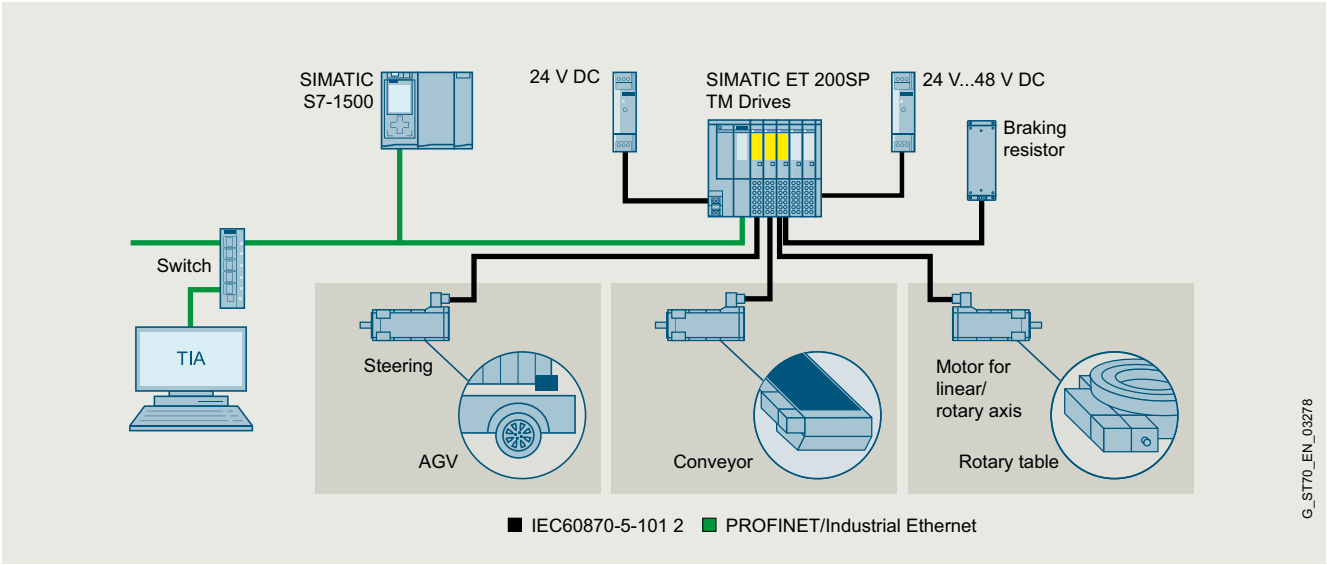
In combination with EC Motors and stepper motors up to 280 W the ET 200SP technology module F-TM ServoDrive HF allows positioning and speed control in very confined spaces. The triple overload capability and the support of BiSS-C multi-turn encoders extend the scope of applications of the TM Drive product family.

Engineering in the TIA Portal stands for consistency in a single tool. This facilitates drive dimensioning, commissioning and servicing.

The new drive system consists of:

- The F-TM ServoDrive HF,
- The BaseUnit (U0),
- Motors with gearbox for flexible use and
- Connecting cables.

Further information on the distributed I/O system SIMATIC ET 200SP is available in the ST 70 Catalog and on the internet at www.siemens.com/et200sp



Application example TM Drives

Characteristics

- PROFINET RT/IRT from firmware FW2.1
- Hardware-STO (SIL 3)
- Triple overload
- Digital input
- Integrated braking chopper
- Encoder connection for
  - IQ encoders
  - Incremental encoders
  - BiSS-C encoders
  - Hall encoder

Variant	Power	Peak power	Device width
High Feature	280 W	840 W	20 mm

More information:
www.siemens.com/micro-drive

Selection and ordering data

F-TM ServoDrive HF for SIMATIC MICRO-DRIVE	
Variant	Article No.
• High Feature V1; 24 ... 48 V, 5 A with hardware STO and integrated braking chopper	**6BK1136-6AB01-0CU0**

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Technical specifications

Article number	**6BK1136-6AB01-0CU0**
	F-TM ServoDrive HF
General information	
Product type designation	F-TM ServoDrive HF
Product description	control of EC and stepper motors
Product function	
• I&M data	Yes
• Isochronous mode	Yes
• Four-quadrant operation	Yes
• Speed control with encoder	Yes
• Speed control without encoder	No
• Safety Functions	Yes; Drive controller with hardwired STO
Protection function	
• Undervoltage protection	Yes
• Overvoltage protection	Yes
• Overload protection	Yes
• Ground-fault protection	No
• Short-circuit protection	Yes
Installation type/mounting	
Type of ventilation	Convection cooling
Supply voltage	
Design of the power supply	24 ... 48 V DC, SELV / PELV
Output voltage	
Rated value, min.	24 V
Rated value, max.	48 V
Output current	
Current output (rated value)	5 A
Output current, max.	15 A
Output frequency	599 Hz; 1 500 Hz with stepper motors
Encoder supply	
Number of outputs	1
5 V encoder supply	
• 5 V	Yes
• Short-circuit protection	Yes
• Output current, max.	150 mA
Digital inputs	
Number of digital inputs	1; input for message signal
Number of safety inputs	1; For STO, antivalent (2-pin) - 24 V DC
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes; up to 500 Hz per channel
• Absolute encoder (SSI)	Yes; BiSS-C
• Hall encoder	Yes
• BiSS-C encoder	Yes
Interrupts/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes
• Hardware interrupt	No
Diagnoses	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
• Short-circuit	Yes
• Telegram error at SSI encoder	Yes; BiSS-C
• Group error	Yes
Diagnostics indication LED	
• RUN LED	Yes
• ERROR LED	Yes

Article number	**6BK1136-6AB01-0CU0**
	F-TM ServoDrive HF
Integrated Functions	
Position detection	
• Incremental acquisition	Yes
• Absolute acquisition	Yes
• Suitable for S7-1500 Motion Control	Yes
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
CE mark	Yes
UKCA mark	Yes
cULus	Yes
RCM (formerly C-TICK)	Yes
KC approval	Yes
EAC (formerly Gost-R)	Yes
RoHS conformity	Yes
China RoHS compliance	Yes
Standard for EMC according to EN 61800-3	Yes
Standard for drive acc. to EN 61800-5-1	Yes
Standard for drive acc. to EN 61800-5-2	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	Category 3, performance level d, according to EN ISO 13849-1:2015
• SIL acc. to IEC 61508	SIL 3
• SIL according to DIN EN 61800-5-2	SIL 3
Ambient conditions	
Pollution degree during storage and transport	2
Ambient temperature during operation	
• horizontal installation, min.	-30 °C; No condensation, splash water, icing, salt spray or oil mist permitted.
• horizontal installation, max.	60 °C; No condensation, splash water, icing, salt spray or oil mist permitted. Note the derating data!
• vertical installation, min.	-30 °C; No condensation, splash water, icing, salt spray or oil mist permitted.
• vertical installation, max.	50 °C; No condensation, splash water, icing, salt spray or oil mist permitted. Note the derating data!
Ambient temperature during storage/transportation	
• Storage, min.	-30 °C
• Storage, max.	70 °C
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	3 000 m

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Technical specifications

Article number	**6BK1136-6AB01-0CU0**
	F-TM ServoDrive HF
Cables	
Cable length for motor, shielded, max.	10 m
Dimensions	
Width	20 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	55 g
Other	
Brake design	holding brake control via the process image
Braking chopper	Yes

Accessories

Description	Article No.
ET 200SP BaseUnit type U0	
• For constructing a new potential group (white)	**6ES7193-6BP00-0DU0**
• For continuing an existing potential group (gray)	**6ES7193-6BP00-0BU0**
Shield connection for ET 200SP Includes 5 shield connections	**6ES7193-6SC20-1AM0**

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Overview

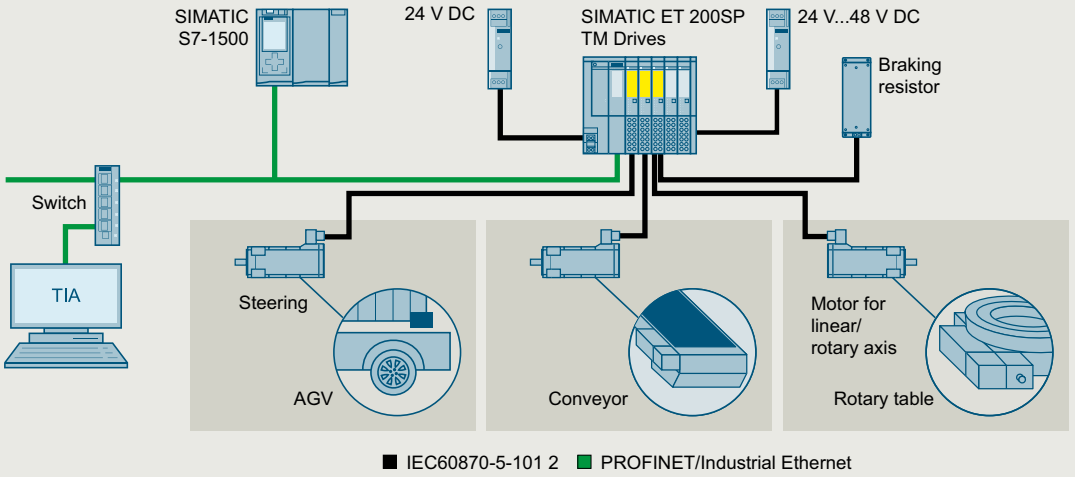
In combination with EC motors, the ET 200SP technology module F-TM ServoDrive ST allows positioning and speed control of EC motors up to 280 W in very confined spaces.

Engineering in the TIA Portal stands for consistency in a single tool. This facilitates drive dimensioning, commissioning and servicing.

The new drive system consists of

- The F-TM ServoDrive ST
- The BaseUnit (U0)
- Motors with gearbox for flexible use and
- Connecting cables.

Further information on the distributed I/O system SIMATIC ET 200SP is available in the ST 70 Catalog and on the internet at www.siemens.com/et200sp



Application example TM Drives

Characteristics

- PROFINET RT/IRT from firmware FW2.1
- Hardware STO (SIL 2)
- Double overload
- Digital input
- Integrated braking chopper
- Encoder connection for
  - IQ encoders
  - Incremental encoders
  - Hall encoder

Variant	Power	Device width
Standard	280 W	20 mm

More information:

www.siemens.com/micro-drive

Selection and ordering data

F-TM ServoDrive ST for SIMATIC MICRO-DRIVE	
Variant	Article No.
• Standard V1; 24 ... 48 V, 5 A with hardware STO and integrated braking chopper	**6BK1136-6AB01-0BU0**

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2

Technical specifications

Article number	**6BK1136-6AB01-0BU0**
	F-TM ServoDrive ST
General information	
Product type designation	F-TM ServoDrive ST
Product description	Control of EC motors
Product function	
• I&M data	Yes
• Isochronous mode	Yes
• Four-quadrant operation	Yes
• Speed control with encoder	Yes
• Speed control without encoder	No
• Safety Functions	Yes; Drive controller with hardwired STO
Protection function	
• Undervoltage protection	Yes
• Overvoltage protection	Yes
• Overload protection	Yes
• Ground-fault protection	No
• Short-circuit protection	Yes
Installation type/mounting	
Type of ventilation	Convection cooling
Supply voltage	
Design of the power supply	24 ... 48 V DC, SELV / PELV
Output voltage	
Rated value, min.	24 V
Rated value, max.	48 V
Output current	
Current output (rated value)	5 A
Output current, max.	10 A
Output frequency	599 Hz
Encoder supply	
Number of outputs	1
5 V encoder supply	
• 5 V	Yes
• Short-circuit protection	Yes
• Output current, max.	150 mA
Digital inputs	
Number of digital inputs	1; input for message signal
Number of safety inputs	1; For STO, antivalent (2-pin) - 24 V DC
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes; up to 500 Hz per channel
• Hall encoder	Yes
Interrupts/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes
• Hardware interrupt	No
Diagnoses	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
• Short-circuit	Yes
• Group error	Yes
Diagnostics indication LED	
• RUN LED	Yes
• ERROR LED	Yes

Article number	**6BK1136-6AB01-0BU0**
	F-TM ServoDrive ST
Integrated Functions	
Position detection	
• Incremental acquisition	Yes
• Absolute acquisition	No
• Suitable for S7-1500 Motion Control	Yes
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
CE mark	Yes
UKCA mark	Yes
cULus	Yes
RCM (formerly C-TICK)	Yes
KC approval	Yes
EAC (formerly Gost-R)	Yes
RoHS conformity	Yes
China RoHS compliance	Yes
Standard for EMC according to EN 61800-3	Yes
Standard for drive acc. to EN 61800-5-1	Yes
Standard for drive acc. to EN 61800-5-2	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	Category 3, performance level d, according to EN ISO 13849-1:2015
• SIL acc. to IEC 61508	SIL 3
• SIL according to DIN EN 61800-5-2	SIL 3
Ambient conditions	
Pollution degree during storage and transport	2
Ambient temperature during operation	
• horizontal installation, min.	-30 °C; No condensation, splash water, icing, salt spray or oil mist permitted.
• horizontal installation, max.	60 °C; No condensation, splash water, icing, salt spray or oil mist permitted. Note the derating data!
• vertical installation, min.	-30 °C; No condensation, splash water, icing, salt spray or oil mist permitted.
• vertical installation, max.	50 °C; No condensation, splash water, icing, salt spray or oil mist permitted. Note the derating data!
Ambient temperature during storage/transportation	
• Storage, min.	-30 °C
• Storage, max.	70 °C
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	3 000 m

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Technical specifications

Article number	**6BK1136-6AB01-0BU0**
	F-TM ServoDrive ST
Cables	
Cable length for motor, shielded, max.	10 m
Dimensions	
Width	20 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	55 g
Other	
Brake design	holding brake control via the process image
Braking chopper	Yes

Accessories

Description	Article No.
SIMATIC F-TM ServoDrive ST Starter Kit Scope of supply: • SIMATIC MICRO-DRIVE F-TM ServoDrive ST • SIMATIC ET 200SP PROFINET IM 155-6PN ST Interface Module • SIMATIC ET 200SP BaseUnit type U0 • All-in-one plug-in cable CSD_LAiO2, length 1.5 m • SIMOTICS E extra low-voltage motor 1EE1122, 24 V	**6BK1637-6AB00-0BU0**
ET 200SP BaseUnit type U0 • For constructing a new potential group (white) • For continuing an existing potential group (gray)	**6ES7193-6BP00-0DU0** **6ES7193-6BP00-0BU0**
Shield connection for ET 200SP Includes 5 shield connections	**6ES7193-6SC20-1AM0**

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F-TM StepDrive ST

Overview

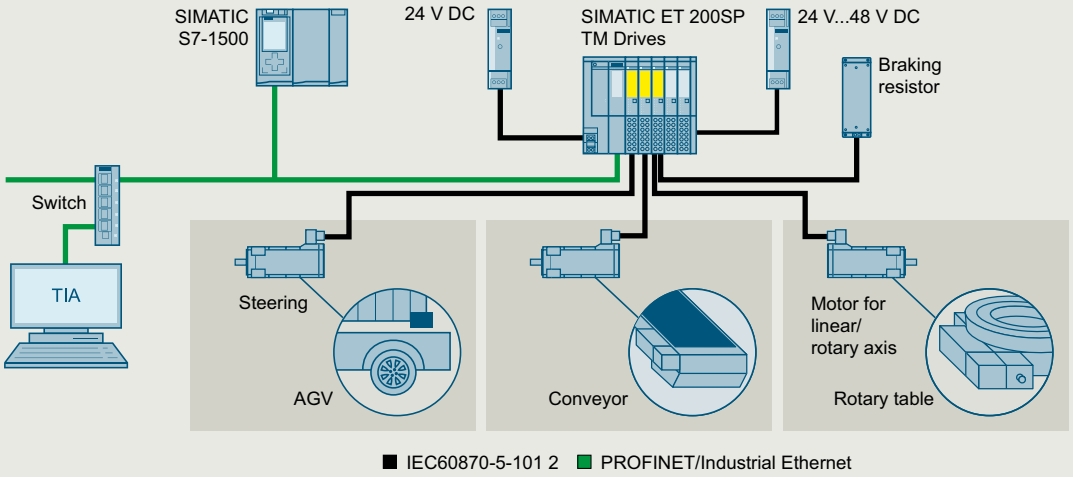
The ET 200SP technology module F-TM StepDrive ST allows positioning and speed control of stepper motors up to 10 A peak current in very confined spaces.

Engineering in the TIA Portal stands for consistency in a single tool. This facilitates drive dimensioning, commissioning and servicing.

The new drive system consists of

- The F-TM StepDrive ST,
- The BaseUnit (U0)

Further information on the distributed I/O system SIMATIC ET 200SP is available in the ST 70 Catalog and on the internet at www.siemens.com/et200sp



Application example TM Drives

Characteristics

- Bipolar stepper motors
- PROFINET RT/IRT from firmware FW2.1
- Hardware STO (SIL3)
- Digital input
- Encoderless open-loop controlled operation
- Closed-loop operation with encoder feedback
- Encoder connection for
  - Incremental encoders

Variant	Power	Device width
Standard	280 W	20 mm

More information:

www.siemens.com/micro-drive

Selection and ordering data

F-TM StepDrive ST for SIMATIC MICRO-DRIVE	
Variant	Article No.
• Standard V1; 24 ... 48 V, 5 A with hardware STO	**6BK1136-6SB01-0BU0**

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Technical specifications

Article number	**6BK1136-6SB01-0BU0**
	F-TM StepDrive ST
General information	
Product type designation	F-TM StepDrive ST
Product description	control of stepper motors
Product function	
• I&M data	Yes
• Isochronous mode	Yes
• Four-quadrant operation	Yes
• Speed control with encoder	Yes
• Speed control without encoder	No
• Safety Functions	Yes; Drive controller with hardwired STO
Protection function	
• Undervoltage protection	Yes
• Overvoltage protection	Yes
• Overload protection	Yes
• Ground-fault protection	No
• Short-circuit protection	Yes
Installation type/mounting	
Type of ventilation	Convection cooling
Supply voltage	
Design of the power supply	24 ... 48 V DC, SELV / PELV
Output voltage	
Rated value, min.	24 V
Rated value, max.	48 V
Output current	
Current output (rated value)	5 A
Output current, max.	10 A
Output frequency	1 500 Hz
Encoder supply	
Number of outputs	1
5 V encoder supply	
• 5 V	Yes
• Short-circuit protection	Yes
• Output current, max.	150 mA
Digital inputs	
Number of digital inputs	1; input for message signal
Number of safety inputs	1; For STO, antivalent (2-pin) - 24 V DC
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes; up to 500 Hz per channel
Interrupts/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes
• Hardware interrupt	No
Diagnoses	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
• Short-circuit	Yes
• Group error	Yes

Article number	**6BK1136-6SB01-0BU0**
	F-TM StepDrive ST
Diagnostics indication LED	
• RUN LED	Yes
• ERROR LED	Yes
Integrated Functions	
Position detection	
• Incremental acquisition	Yes
• Absolute acquisition	No
• Suitable for S7-1500 Motion Control	Yes
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
CE mark	Yes
UKCA mark	Yes
cULus	Yes
RCM (formerly C-TICK)	Yes
KC approval	Yes
EAC (formerly Gost-R)	Yes
RoHS conformity	Yes
China RoHS compliance	Yes
Standard for EMC according to EN 61800-3	Yes
Standard for drive acc. to EN 61800-5-1	Yes
Standard for drive acc. to EN 61800-5-2	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	Category 3, performance level d, according to EN ISO 13849-1:2015
• SIL acc. to IEC 61508	SIL 3
• SIL according to DIN EN 61800-5-2	SIL 3
Ambient conditions	
Pollution degree during storage and transport	2
Ambient temperature during operation	
• horizontal installation, min.	-30 °C; No condensation, splash water, icing, salt spray or oil mist permitted.
• horizontal installation, max.	60 °C; No condensation, splash water, icing, salt spray or oil mist permitted. Note the derating data!
• vertical installation, min.	-30 °C; No condensation, splash water, icing, salt spray or oil mist permitted.
• vertical installation, max.	50 °C; No condensation, splash water, icing, salt spray or oil mist permitted. Note the derating data!
Ambient temperature during storage/transportation	
• Storage, min.	-30 °C
• Storage, max.	70 °C
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	3 000 m

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Technical specifications

Article number	**6BK1136-6SB01-0BU0**
	F-TM StepDrive ST
Cables	
Cable length for motor, shielded, max.	10 m
Dimensions	
Width	20 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	55 g
Other	
Brake design	holding brake control via the process image
Braking chopper	No

Accessories

Description	Article No.
ET 200SP BaseUnit type U0	
• For constructing a new potential group (white)	**6ES7193-6BP00-0DU0**
• For continuing an existing potential group (gray)	**6ES7193-6BP00-0BU0**
Shield connection for ET 200SP Includes 5 shield connections	**6ES7193-6SC20-1AM0**

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SIMATIC F-TM ServoDrive ST Starter Kit

Overview

The SIMATIC F-TM ServoDrive ST Starter Kit with Article No. 6BK1637-6AB00-0BU0 includes

- SIMATIC MICRO-DRIVE F-TM ServoDrive ST
- SIMATIC ET 200SP PROFINET IM 155-6PN ST Interface Module
- SIMATIC ET 200SP BaseUnit type U0
- All-in-one plug-in cable CSD_LAiO2, length 1.5 m
- SIMOTICS E extra low-voltage motor 1EE1122, 24 V

Selection and ordering data

Description	Article No.
SIMATIC F-TM ServoDrive ST Starter Kit Scope of supply: • SIMATIC MICRO-DRIVE F-TM ServoDrive ST • SIMATIC ET 200SP PROFINET IM 155-6PN ST Interface Module • SIMATIC ET 200SP BaseUnit type U0 • All-in-one plug-in cable CSD_LAiO2, length 1.5 m • SIMOTICS E extra low-voltage motor 1EE1122, 24 V	**6BK1637-6AB00-0BU0**

SIMATIC MICRO-DRIVE training case

Overview

SIMATIC MICRO-DRIVE, training case, advanced version with F-TM ServoDrive ST

The SIMATIC MICRO-DRIVE training case is a convincing demonstration system thanks to its compact design.
It is suitable for direct customer presentations as well as for tests in technical departments. It enables the functions of SIMATIC MICRO-DRIVE to be demonstrated and tested quickly and easily.

The SIMATIC MICRO-DRIVE training case contains the following components:

- F-TM ServoDrive ST
- PDC Drives, PDC100F variant
- SIMOTICS E extra low-voltage motor 1EE1122, 24 V, with angle disc, without gear unit, without brake
- KnorrTec cable
- 4 buttons for digital inputs and 2 LED lamps for digital outputs for PDC100F
- Prepared for S7-1500 PLC.

The SIMATIC MICRO-DRIVE training case is supplied in the form of a stackable Tanos Systainer case.

Technical specifications

SIMATIC MICRO-DRIVE training case	**6AG1067-2AA00-0AE0**
Supply voltage	110 ... 220 V AC
Dimensions	
• Width	210 mm
• Height	270 mm
• Depth	380 mm
Weight, approx.	11 kg

Selection and ordering data

SIMATIC MICRO-DRIVE training case	
Variant	Article No.
SIMATIC MICRO-DRIVE training case including PDC Drives, PDC100F variant and F-TM ServoDrive ST bundle	**6AG1067-2AA00-0AE0**

SIMATIC MICRO-DRIVE documentation

Overview

The operating instructions for SIMATIC MICRO-DRIVE are available free of charge on the internet at:

www.siemens.com/micro-drive/documentation

Detailed information on the SIMATIC MICRO-DRIVE extra low-voltage converters, including the latest technical documentation (brochures, tutorials, dimensional drawings, certificates, equipment manuals and operating instructions), is available on the internet at:

www.siemens.com/micro-drive

and also via the TIA Selection Tool:

www.siemens.com/tia-selection-tool

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Notes

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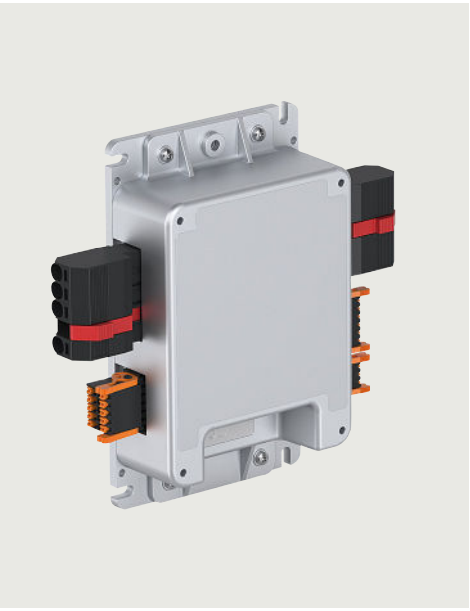

Further information about SIMOTICS E
can be found on the internet at
www.siemens.com/simotics-e

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Overview

VTD extra low-voltage converters - Compact, powerful, versatile

Example: VTD extra low-voltage converter 6SL7018-1BV23-5AE0 with integrated speed, torque and positioning control and communication via CANopen

The VTD extra low-voltage converters control SIMOTICS E extra low-voltage motors without an integrated converter precisely and efficiently.
www.siemens.com/simotics-e

For more information on ordering and configuration, see Siemens Product Configurator in SiePortal at:
www.siemens.com/simotics-e/configuration

Selection and ordering data

Description	Performance data	Article No.
Extra low-voltage converter VTD 6SL7018-1B . . . - . AQ0 with speed, torque and positioning control plus communication via digital IOs		
• Compact 4-quadrant-converter for controlling SIMOTICS E extra low-voltage motors • Communication via digital IOs • Selection of operating modes and parameter assignment via RS485 • User-friendly parameter assignment via "driveSTUDIO" PC software (on request) • Integrated ballast control • Device status via 2 LEDs • Connection plugs are also included		
	• Supply voltage: 24 V DC (18 … 30 V) • Permissible continuous output current: 40 A	**6SL7018-1BT24-0AQ0**
	• Supply voltage: 48 V DC (18 … 53 V) • Permissible continuous output current: 20 A	**6SL7018-1BU22-0AQ0**

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Selection and ordering data

Description	Performance data	Article No.
Extra low-voltage converter VTD 6SL7018-1B . . . - . AE0 with speed, torque and positioning control plus communication via CANopen		
• Compact 4-quadrant-converter for controlling SIMOTICS E extra low-voltage motors • CANopen interface (DS301 protocol, DS402 device profile) • Integrated digital I/Os as well as integrated analog inputs • Overvoltage, undervoltage and overtemperature monitoring • Device status indicated via 3 LEDs (power, status, error) • Freely programmable thanks to integrated MPU (Motion Process Unit)		
	• Supply voltage: 24 V DC / 48 V DC (9 … 60 V) • Permissible continuous output current: 5 A (24 V DC), 4.3 A (48 V DC)	**6SL7018-1BV20-5AE0**
	• Supply voltage: 24 V DC / 48 V DC (9 … 60 V) • Permissible continuous output current: 12 A (24 V DC), 12 A (48 V DC)	**6SL7018-1BV21-3AE0**
	• Supply voltage: 24 V DC / 48 V DC (9 … 60 V) • Permissible continuous output current: 35 A (24 V DC), 35 A (48 V DC)	**6SL7018-1BV23-5AE0**
	• Supply voltage: 24 V DC (9 … 30 V)/ 48 V DC (31 … 60 V) • Permissible continuous output current: 44 A (24 V DC), 40 A (48 V DC) • Safety Integrated STO (Safe Torque Off): Functional safety according to SIL 3 / PL e	**6SL7018-1BV24-4AE0**
Extra low-voltage converter VTD 6SL7018-1B . . . - . AM0 with speed, torque and positioning control plus communication via EtherCAT		
• Compact 4-quadrant-converter for controlling SIMOTICS E extra low-voltage motors • EtherCAT interface (CoE: CANopen over EtherCAT) • Integrated digital I/Os as well as integrated analog inputs • Overvoltage, undervoltage and overtemperature monitoring • Device status indicated via 3 LEDs (power, status, error) • CANopen service interface • Freely programmable thanks to integrated MPU (Motion Process Unit)		
	• Supply voltage: 24 V DC / 48 V DC (9 … 60 V) • Permissible continuous output current: 10 A (24 V DC), 8.5 A (48 V DC)	**6SL7018-1BV21-0AM0**
	• Supply voltage: 24 V DC / 48 V DC (9 … 60 V) • Permissible continuous output current: 35 A (24 V DC), 26 A (48 V DC)	**6SL7018-1BV23-5AM0**
	• Supply voltage: 24 V DC / 48 V DC (9 … 60 V) • Permissible continuous output current: 54 A (24 V DC), 49 A (48 V DC) • Safety Integrated STO (Safe Torque Off): Functional safety according to SIL 3 / PL e	**6SL7018-1BV25-4AM0**

Note:
Mating connectors are also included.

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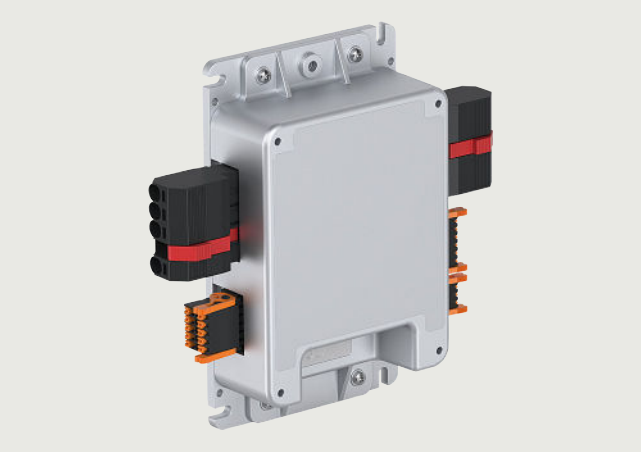
VTD 6SL7018-1B . . . - . AQ0 communication via digital IOs

Technical specifications

Extra low-voltage converter VTD 6SL7018-1B . . . - . AQ0 with speed, torque and positioning control as well as communication via digital IOs



Converter for controlling SIMOTICS E extra low-voltage motors

- 4-quadrant control
- Speed, torque and positioning control
- Communication via digital IOs
- Selection of operating modes and parameter assignment via RS485
- User-friendly parameter assignment via "driveSTUDIO" PC software (on request)
- Integrated ballast control
- Device status via two LEDs
- Connection plugs are also included

Extra low-voltage converter VTD • **with speed, torque and positioning control** • **communication via digital IOs**		**6SL7018-1BT24-0AQ0** 24 V DC	**6SL7018-1BU22-0AQ0** 48 V DC
Environmental conditions			
Permissible ambient temperature (air) in operation (T_U)	°C (°F)	-30 … +40 (-22 … +104)	
Permissible ambient humidity [1]	%	5 … 85	
• Degree of protection		IP20	
General technical specifications			
Maximum output current (max. 5 sec.) [2]	A	100	
Rated voltage (logic supply U_L)	V DC	24	
Logic power consumption (at 24 V DC) [3]	mA	< 100	
Maximum commutation frequency	kHz	2	
Switching frequency	kHz	20	
Minimum connection inductance	mH	0.1	
Digital inputs	Quantity	4	
Digital outputs	Quantity	3	
Analog inputs	Quantity	1	
Service interface		RS485	
Efficiency (in optimum working range)	%	> 95	
Weight, approx.	kg (lb)	0.50 (1.10)	
Nominal voltage (power supply U_N)			
Permissible supply voltage range (U)	V DC	18 … 30	18 … 53
Permissible continuous output current [2]	A	40	20

[1] Condensation not permissible

[2] Applies at rated temperature T_U = 25 °C (77 °F), derating at deviating (higher) temperatures

[3] Power consumption without digital outputs current demand

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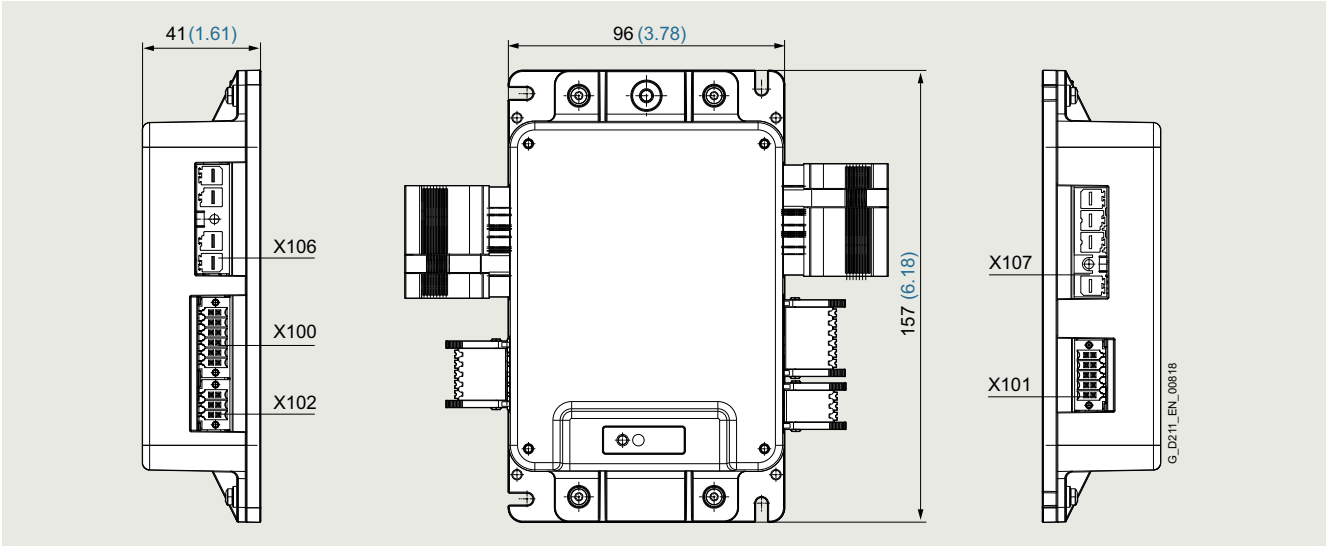
Dimensional drawings

Extra low-voltage converter VTD 6SL7018-1B . . . - . AQ0 with speed, torque and positioning control as well as communication via digital IOs



For more information about the dimensional drawings (CAD, pin assignment, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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Technical specifications

Extra low-voltage converter VTD 6SL7018-1BV20-5AE0 with speed, torque and positioning control as well as communication via CANopen

Compact 4-quadrant converter for BLDC motors

- CANopen interface (DS301 protocol, DS402 device profile)
- Integrated digital I/Os as well as integrated analog inputs
- Overvoltage, undervoltage and overtemperature monitoring
- Device status indicated via 3 LEDs (Power, Status, Error)
- Freely programmable, thanks to integrated MPU (Motion Process Unit)

Extra low-voltage converter VTD **• with speed, torque and positioning control** **• communication via CANopen**		**6SL7018-1BV20-5AE0**
Environmental conditions		
Permissible ambient temperature (air) in operation (T_U)	°C (°F)	-25 … +40 (-13 … +104)
Permissible ambient humidity [1]	%	5 … 90
Degree of protection		IP20
General technical specifications		
Maximum output current	A	15
Rated voltage (logic supply U_L)	V DC	9 … 30
Logic power consumption (at 24 V DC) [2]	mA	typ. 40
Maximum commutation frequency	kHz	10
Switching frequency [3]	kHz	32
Minimum connection inductance	mH	0.2
Digital inputs	Quantity	2
Digital outputs	Quantity	1
Analog inputs	Quantity	1
Service interface		CANopen
Efficiency (in optimum working range)	%	95
Weight, approx.	kg (lb)	0.30 (0.661)
Nominal voltage (power supply U_N) 24 V DC		
Permissible supply voltage range (U)	V DC	9 … 60
Permissible continuous output current [4]	A	5
Nominal voltage (power supply U_N) 48 V DC		
Permissible supply voltage range (U)	V DC	9 … 60
Permissible continuous output current [4]	A	4.3

[1] Condensation not permissible

[2] Output stage off, 5 V output (encoder supply) is unloaded

[3] Default value, other values can be set

[4] Connecting cable with maximum possible cable cross-section, PWM frequency 32 kHz (asymmetrical), ambient temperature 40 °C (104 °F), I/Os and 5 V output loaded, rms current: 5 A --> 4.1 A_{eff}, 4.3 A --> 3.5 A_{eff}

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Technical specifications

Extra low-voltage converter VTD 6SL7018-1BV21-3AE0 with speed, torque and positioning control as well as communication via CANopen

Compact 4-quadrant converter for BLDC motors

- CANopen interface (DS301 protocol, DS402 device profile)
- Integrated digital I/Os as well as integrated analog inputs
- Overvoltage, undervoltage and overtemperature monitoring
- Device status indicated via 3 LEDs (Power, Status, Error)
- Hex switch for setting the device node ID
- Freely programmable, thanks to integrated MPU (Motion Process Unit)

Extra low-voltage converter VTD **• with speed, torque and positioning control** **• communication via CANopen**		**6SL7018-1BV21-3AE0**
Environmental conditions		
Permissible ambient temperature (air) in operation (T_U)	°C (°F)	0 … +70 (32 … +158)
Permissible ambient humidity [1]	%	5 … 85
Degree of protection		IP20
General technical specifications		
Maximum output current [2]	A	50
Rated voltage (logic supply U_L)	V DC	9 … 30
Logic power consumption (at 24 V DC) [3]	mA	60
Maximum commutation frequency	kHz	10
Switching frequency	kHz	32
Minimum connection inductance	mH	0.2
Digital inputs	Quantity	8
Digital outputs	Quantity	2
Analog inputs	Quantity	2
Service interface		CANopen
Efficiency (in optimum working range)	%	95
Weight, approx.	kg (lb)	0.31 (0.683)
Nominal voltage (power supply U_N) 24 V DC		
Permissible supply voltage range (U)	V DC	9 … 60
Permissible continuous output current [2]	A	12 (at 24 V)
Nominal voltage (power supply U_N) 48 V DC		
Permissible supply voltage range (U)	V DC	9 … 60
Permissible continuous output current [2]	A	12 (at 24 V)

[1] Condensation not permissible

[2] Applies at rated temperature T_U = 25 °C (77 °F), derating at deviating (higher) temperatures

[3] Power consumption without digital outputs current demand

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Technical specifications

Extra low-voltage converter VTD 6SL7018-1BV23-5AE0 with speed, torque and positioning control as well as communication via CANopen

Compact 4-quadrant converter for BLDC motors

- CANopen interface (DS301 protocol, DS402 device profile)
- Integrated digital I/Os as well as integrated analog inputs
- Overvoltage, undervoltage and overtemperature monitoring
- Device status indicated via 3 LEDs (Power, Status, Error)
- Hex switch for setting the device node ID
- Freely programmable, thanks to integrated MPU (Motion Process Unit)

Extra low-voltage converter VTD **• with speed, torque and positioning control** **• communication via CANopen**		**6SL7018-1BV23-5AE0**
Environmental conditions		
Permissible ambient temperature (air) in operation (T_U)	°C (°F)	0 … +70 (32 … +158)
Permissible ambient humidity [1]	%	5 … 85
Degree of protection		IP20
General technical specifications		
Maximum output current [2]	A	100
Rated voltage (logic supply U_L)	V DC	9 … 30
Logic power consumption (at 24 V DC) [3]	mA	70
Maximum commutation frequency	kHz	10
Switching frequency	kHz	32
Minimum connection inductance	mH	0.2
Digital inputs	Quantity	8
Digital outputs	Quantity	2
Analog inputs	Quantity	2
Service interface		CANopen
Efficiency (in optimum working range)	%	95
Weight, approx.	kg (lb)	0.38 (0.838)
Nominal voltage (power supply U_N) 24 V DC		
Permissible supply voltage range (U)	V DC	9 … 60
Permissible continuous output current [2]	A	35 (at 24 V)
Nominal voltage (power supply U_N) 48 V DC		
Permissible supply voltage range (U)	V DC	9 … 60
Permissible continuous output current [2]	A	35 (at 24 V)

[1] Condensation not permissible

[2] Applies at rated temperature T_U = 25 °C (77 °F), derating at deviating (higher) temperatures

[3] Power consumption without digital outputs current demand

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Technical specifications

Extra low-voltage converter VTD 6SL7018-1BV24-4AE0 with speed, torque and positioning control as well as communication via CANopen – Safety Integrated STO (Safe Torque Off)

Compact 4-quadrant converter for BLDC motors

- CANopen interface (DS301 protocol, DS402 device profile)
- Functional safety with STO function and SIL 3 / PL e
- Integrated digital I/Os as well as integrated analog inputs
- Overvoltage, undervoltage and overtemperature monitoring
- Device status indicated via 3 LEDs (Power, Status, Error)
- Hex switch for setting the device node ID
- Freely programmable, thanks to integrated MPU (Motion Process Unit)

Extra low-voltage converter VTD • **with speed, torque and positioning control** • **communication via CANopen – Safety Integrated STO (Safe Torque Off)**		**6SL7018-1BV24-4AE0**
Environmental conditions		
Permissible ambient temperature (air) in operation (T_U)	°C (°F)	-40 … +55 (-40 … +131)
Permissible ambient humidity [1]	%	5 … 90
Degree of protection		IP20
General technical specifications		
Maximum output current	A	160
Rated voltage (logic supply U_L)	V DC	9 … 30
Logic power consumption (at 24 V DC) [2]	mA	typ. 70
Maximum commutation frequency	kHz	10
Switching frequency [3]	kHz	32
Minimum connection inductance	mH	0.2
Digital inputs	Quantity	6
Digital outputs	Quantity	3
Analog inputs	Quantity	2
Service interface		CANopen
Efficiency (in optimum working range)	%	95
Safety function		Safe Torque Off (STO)
Safety integrity level (SIL)		to SIL 3
Performance Level (PL)		to PL e
Weight, approx.	kg (lb)	0.414 (0.913)
Nominal voltage (power supply U_N) 24 V DC		
Permissible supply voltage range (U)	V DC	9 … 30
Permissible continuous output current [4]	A	44
Nominal voltage (power supply U_N) 48 V DC		
Permissible supply voltage range (U)	V DC	31 … 60
Permissible continuous output current [4]	A	40

[1] Condensation not permissible

[2] Output stage off, 5 V output (encoder supply) is unloaded, STO active

[3] Default value, other values can be set

[4] Connecting cable with maximum possible cable cross-section, PWM frequency 32 kHz (asymmetrical), ambient temperature 55 °C (131 °F), I/Os and 5 V output loaded, rms current: 44 A --> 36 A_{eff}, 40 A --> 33 A_{eff}

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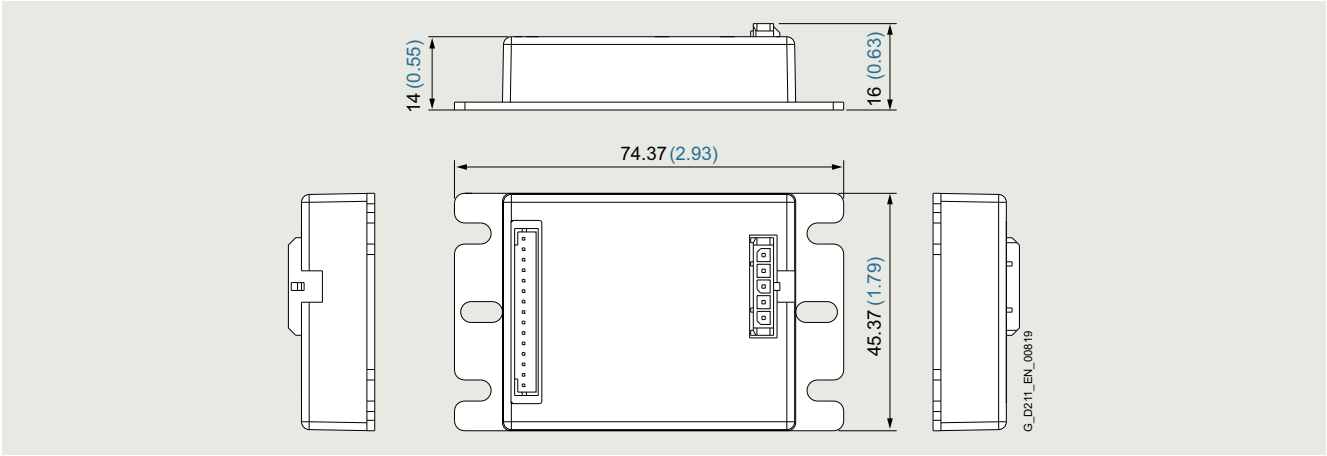
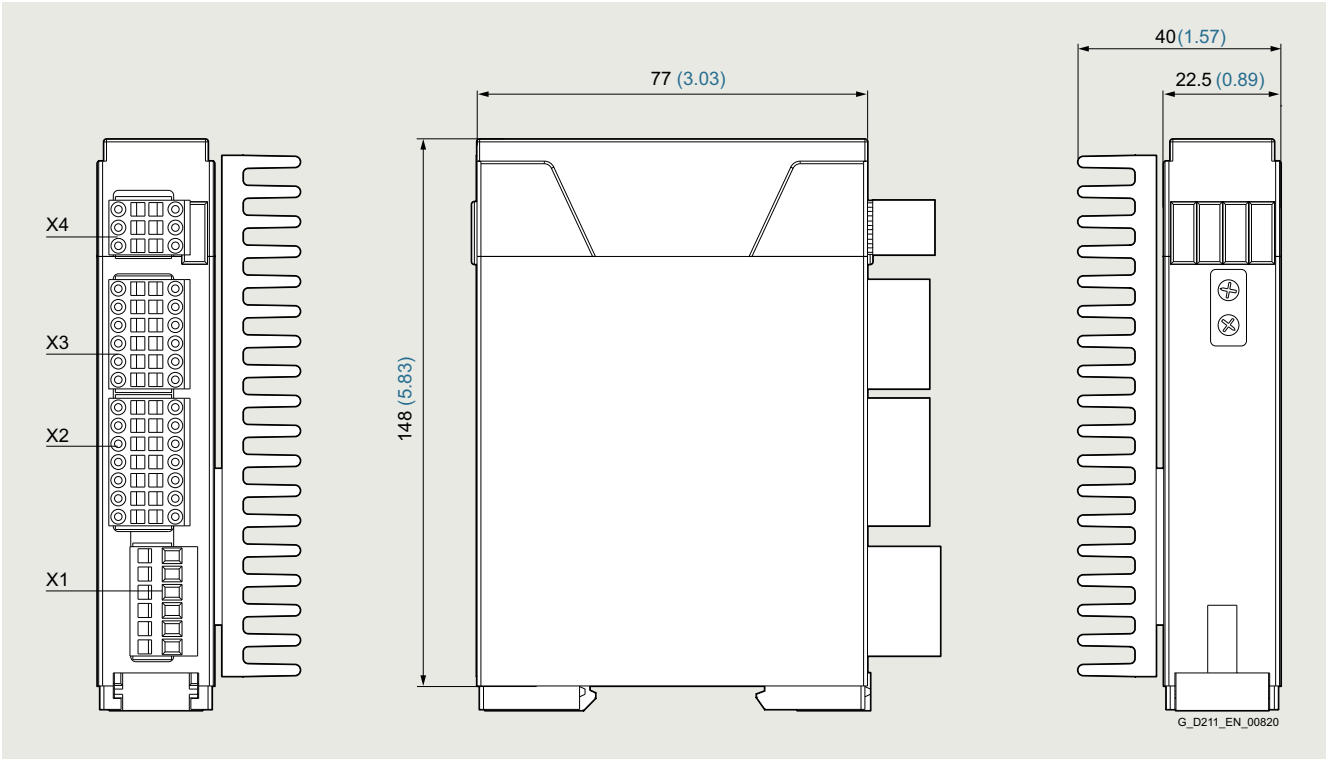
Dimensional drawings

Extra low-voltage converter VTD 6SL7018-1BV20-5AE0 with speed, torque and positioning control as well as communication via CANopen



For more information about the dimensional drawings (CAD, pin assignment, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

Extra low-voltage converter VTD 6SL7018-1BV21-3AE0 with speed, torque and positioning control as well as communication via CANopen



For more information about the dimensional drawings (CAD, pin assignment, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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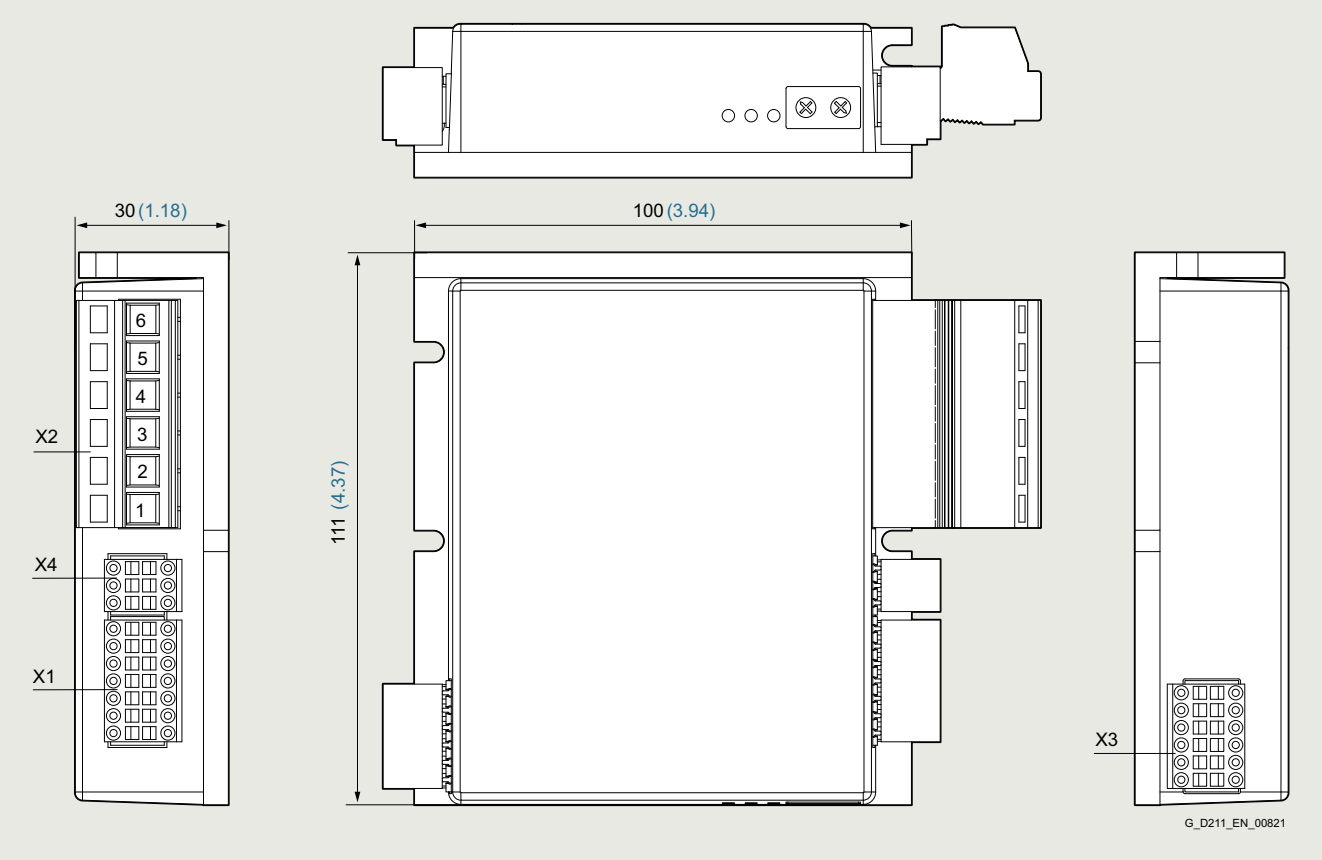
Dimensional drawings

Extra low-voltage converter VTD 6SL7018-1BV23-5AE0 with speed, torque and positioning control as well as communication via CANopen



For more information about the dimensional drawings (CAD, pin assignment, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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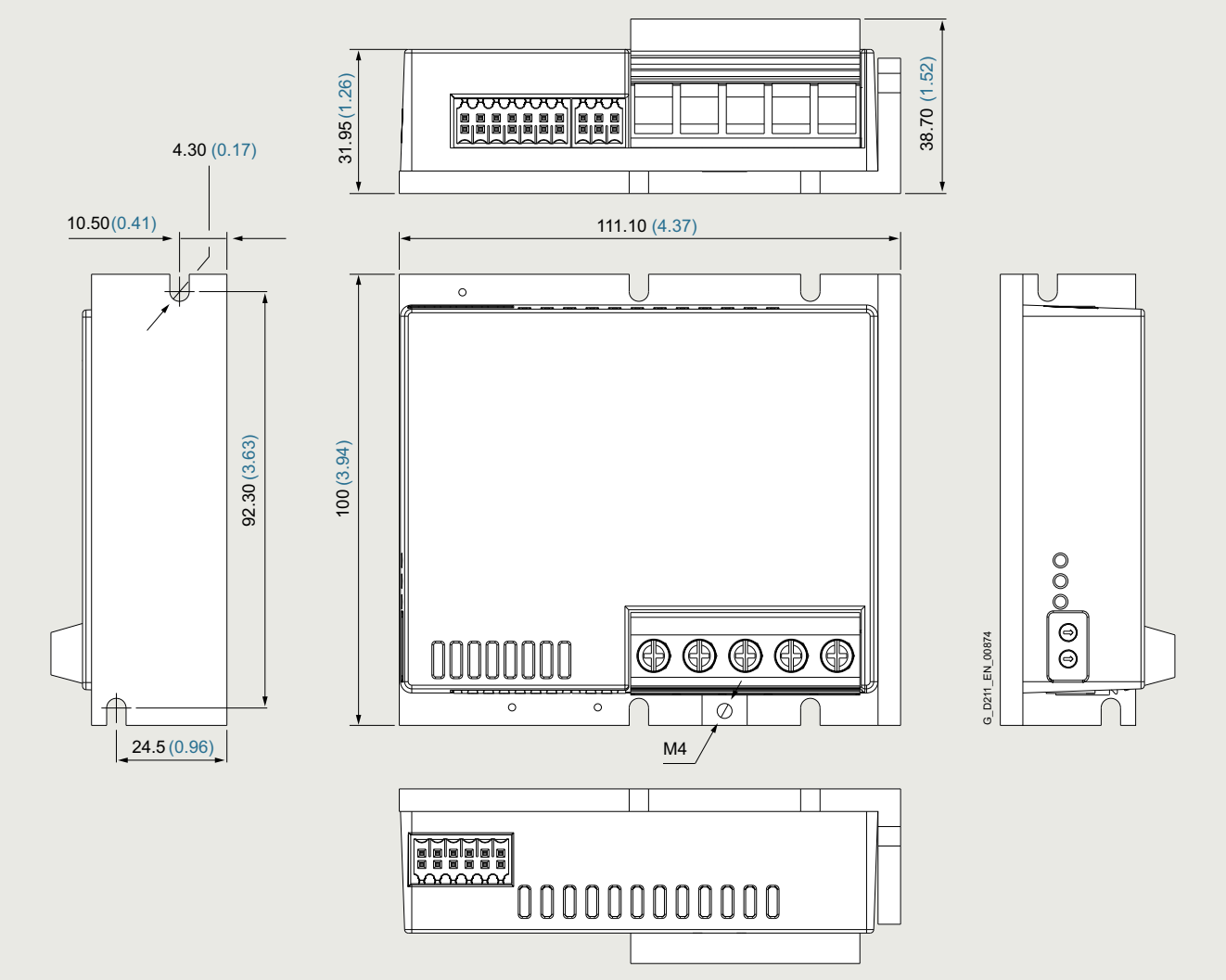
Dimensional drawings

Extra low-voltage converter VTD 6SL7018-1BV24-4AE0 with speed, torque and positioning control as well as communication via CANopen – Safety Integrated STO (Safe Torque Off)



For more information about the dimensional drawings (CAD, pin assignment, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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Technical specifications

Extra low-voltage converter VTD 6SL7018-1BV21-0AM0 with speed, torque and positioning control as well as communication via EtherCAT

Compact 4-quadrant converter for BLDC motors

- EtherCAT interface (CoE: CANopen over EtherCAT)
- Integrated digital I/Os as well as integrated analog inputs
- Overvoltage, undervoltage and overtemperature monitoring
- Device status indicated via 3 LEDs (Power, Status, Error)
- CANopen service interface
- Freely programmable, thanks to integrated MPU (Motion Process Unit)

Extra low-voltage converter VTD **• with speed, torque and positioning control** **• communication via EtherCAT**		**6SL7018-1BV21-0AM0**
Environmental conditions		
Permissible ambient temperature (air) in operation (T_U)	°C (°F)	-25 … +70 (-13 … +158)
Permissible ambient humidity [1]	%	5 … 90
Degree of protection		IP20
General technical specifications		
Maximum output current	A	50
Rated voltage (logic supply U_L)	V DC	9 … 30
Logic power consumption (at 24 V DC) [2]	mA	typ. 90
Maximum commutation frequency	kHz	10
Switching frequency [3]	kHz	32
Minimum connection inductance	mH	0.2
Digital inputs	Quantity	8
Digital outputs	Quantity	2
Analog inputs	Quantity	2
Service interface		CANopen
Efficiency (in optimum working range)	%	95
Weight, approx.	kg (lb)	0.17 (0.375)
Nominal voltage (power supply U_N) 24 V DC		
Permissible supply voltage range (U)	V DC	9 … 60
Permissible continuous output current [4]	A	10
Nominal voltage (power supply U_N) 48 V DC		
Permissible supply voltage range (U)	V DC	9 … 60
Permissible continuous output current [4]	A	8.5

[1] Condensation not permissible

[2] Output stage off, 5 V output (encoder supply) is unloaded

[3] Default value, other values can be set

[4] Connecting cable with maximum possible cable cross-section, PWM frequency 32 kHz, ambient temperature 40 °C (104 °F) (t > 40 °C derating), rms current: 10 A --> 8.2 A_{eff}, 8.5 A --> 6.9 A_{eff}

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Technical specifications

Extra low-voltage converter VTD 6SL7018-1BV23-5AM0 with speed, torque and positioning control as well as communication via EtherCAT

Compact 4-quadrant converter for BLDC motors

- EtherCAT interface (CoE: CANopen over EtherCAT)
- Integrated digital I/Os as well as integrated analog inputs
- Overvoltage, undervoltage and overtemperature monitoring
- Device status indicated via 3 LEDs (Power, Status, Error)
- Hex switch for setting the device node ID
- CANopen service interface
- Freely programmable, thanks to integrated MPU (Motion Process Unit)

Extra low-voltage converter VTD **• with speed, torque and positioning control** **• communication via EtherCAT**		**6SL7018-1BV23-5AM0**
Environmental conditions		
Permissible ambient temperature (air) in operation (T_U)	°C (°F)	-25 … +70 (-13 … +158)
Permissible ambient humidity [1]	%	5 … 90
Degree of protection		IP20
General technical specifications		
Maximum output current	A	100
Rated voltage (logic supply U_L)	V DC	9 … 30
Logic power consumption (at 24 V DC) [2]	mA	typ. 100
Maximum commutation frequency	kHz	10
Switching frequency [3]	kHz	32
Minimum connection inductance	mH	0.2
Digital inputs	Quantity	8
Digital outputs	Quantity	2
Analog inputs	Quantity	2
Service interface		CANopen
Efficiency (in optimum working range)	%	95
Weight, approx.	kg (lb)	0.58 (1.28)
Nominal voltage (power supply U_N) 24 V DC		
Permissible supply voltage range (U)	V DC	9 … 60
Permissible continuous output current [4]	A	35
Nominal voltage (power supply U_N) 48 V DC		
Permissible supply voltage range (U)	V DC	9 … 60
Permissible continuous output current [4]	A	26

[1] Condensation not permissible

[2] Output stage off, 5 V output (encoder supply) is unloaded

[3] Default value, other values can be set

[4] Connecting cable with maximum possible cable cross-section, PWM frequency 32 kHz, ambient temperature 40 °C (104 °F) (t > 40 °C derating), rms current: 10 A --> 8.2 A_{eff}, 8.5 A --> 6.9 A_{eff}

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Technical specifications

Extra low-voltage converter VTD 6SL7018-1BV25-4AM0 with speed, torque and positioning control as well as communication via EtherCAT – Safety Integrated STO (Safe Torque Off)

Compact 4-quadrant converter for BLDC motors

- EtherCAT interface (CoE: CANopen over EtherCAT)
- Functional safety with STO function and SIL 3 / PL e
- Integrated digital I/Os as well as integrated analog inputs
- Overvoltage, undervoltage and overtemperature monitoring
- Device status indicated via 3 LEDs (Power, Status, Error)
- Hex switch for setting the device node ID
- CANopen service interface
- Freely programmable, thanks to integrated MPU (Motion Process Unit)

Extra low-voltage converter VTD • **with speed, torque and positioning control** • **communication via EtherCAT – Safety Integrated STO (Safe Torque Off)**		**6SL7018-1BV25-4AM0**
Environmental conditions		
Permissible ambient temperature (air) in operation (T_U)	°C (°F)	-25 … +40 (-13 … +104)
Permissible ambient humidity [1]	%	5 … 90
Degree of protection		IP20
General technical specifications		
Maximum output current	A	160
Rated voltage (logic supply U_L)	V DC	9 … 30
Logic power consumption (at 24 V DC) [2]	mA	typ. 100
Maximum commutation frequency	kHz	10
Switching frequency [3]	kHz	32
Minimum connection inductance	mH	0.2
Digital inputs	Quantity	6
Digital outputs	Quantity	3
Analog inputs	Quantity	2
Service interface		CANopen
Efficiency (in optimum working range)	%	95
Safety function		Safe Torque Off (STO)
Safety integrity level (SIL)		to SIL 3
Performance Level (PL)		to PL e
Weight, approx.	kg (lb)	0.63 (1.39)
Nominal voltage (power supply U_N) 24 V DC		
Permissible supply voltage range (U)	V DC	9 … 60
Permissible continuous output current [4]	A	54
Nominal voltage (power supply U_N) 60 V DC		
Permissible supply voltage range (U)	V DC	9 … 60
Permissible continuous output current [4]	A	49

[1] Condensation not permissible

[2] Output stage off, 5 V output (encoder supply) is unloaded, STO active

[3] Default value, other values can be set

[4] Connecting cable with maximum possible cable cross-section, PWM frequency 32 kHz (asymmetrical), ambient temperature 40 °C (104 °F), I/Os and 5 V output loaded, rms current: 54 A -> 44 A_{eff}, 49 A -> 40 A_{eff}

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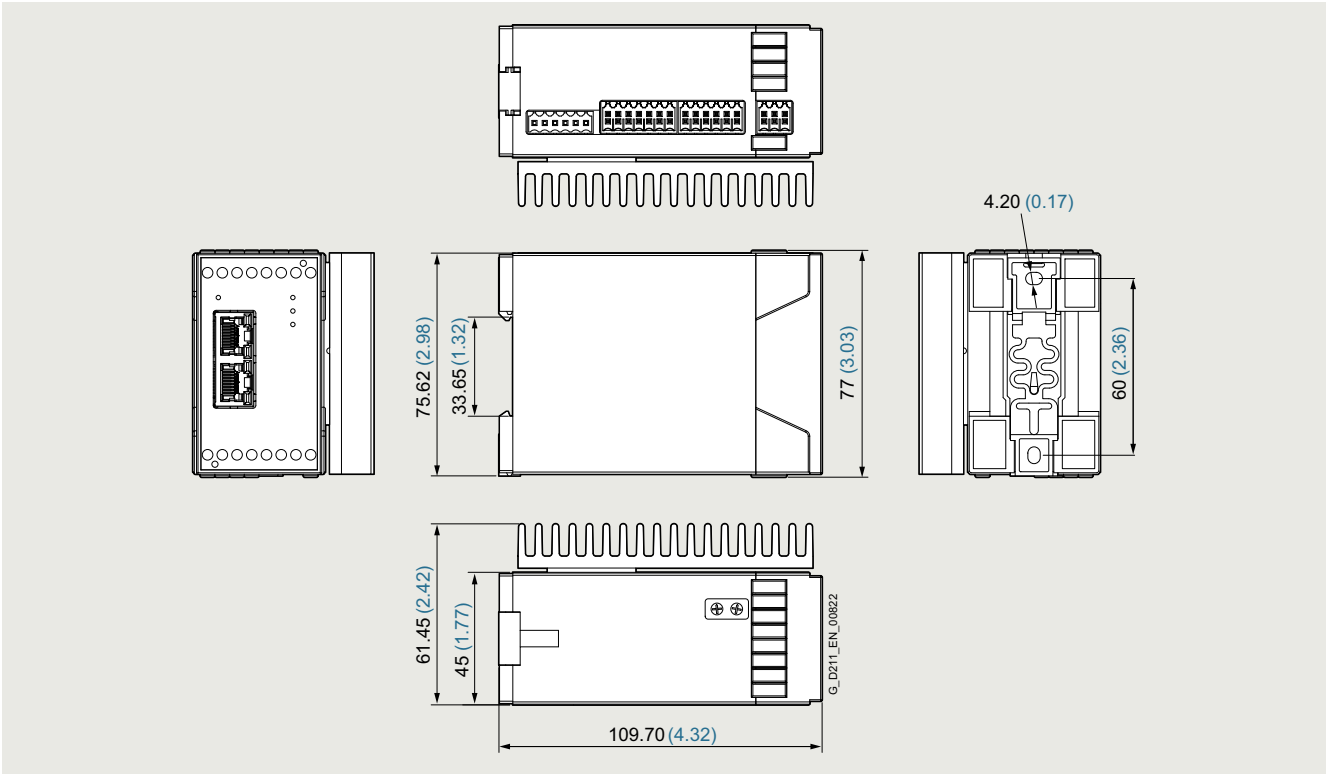
Dimensional drawings

Extra low-voltage converter VTD 6SL7018-1BV21-0AM0 with speed, torque and positioning control as well as communication via EtherCAT



For more information about the dimensional drawings (CAD, pin assignment, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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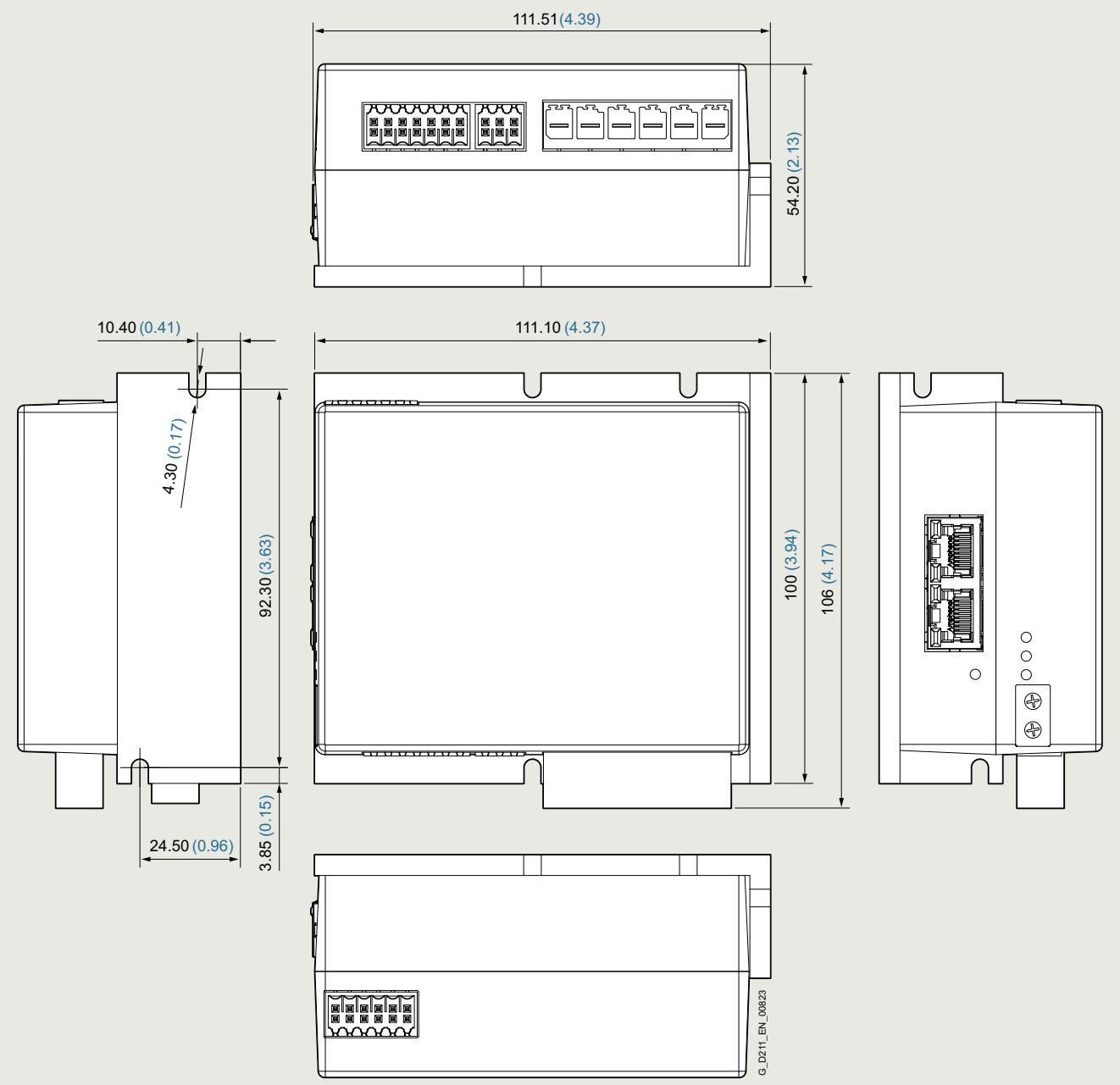
Dimensional drawings

Extra low-voltage converter VTD 6SL7018-1BV23-5AM0 with speed, torque and positioning control as well as communication via EtherCAT



For more information about the dimensional drawings (CAD, pin assignment, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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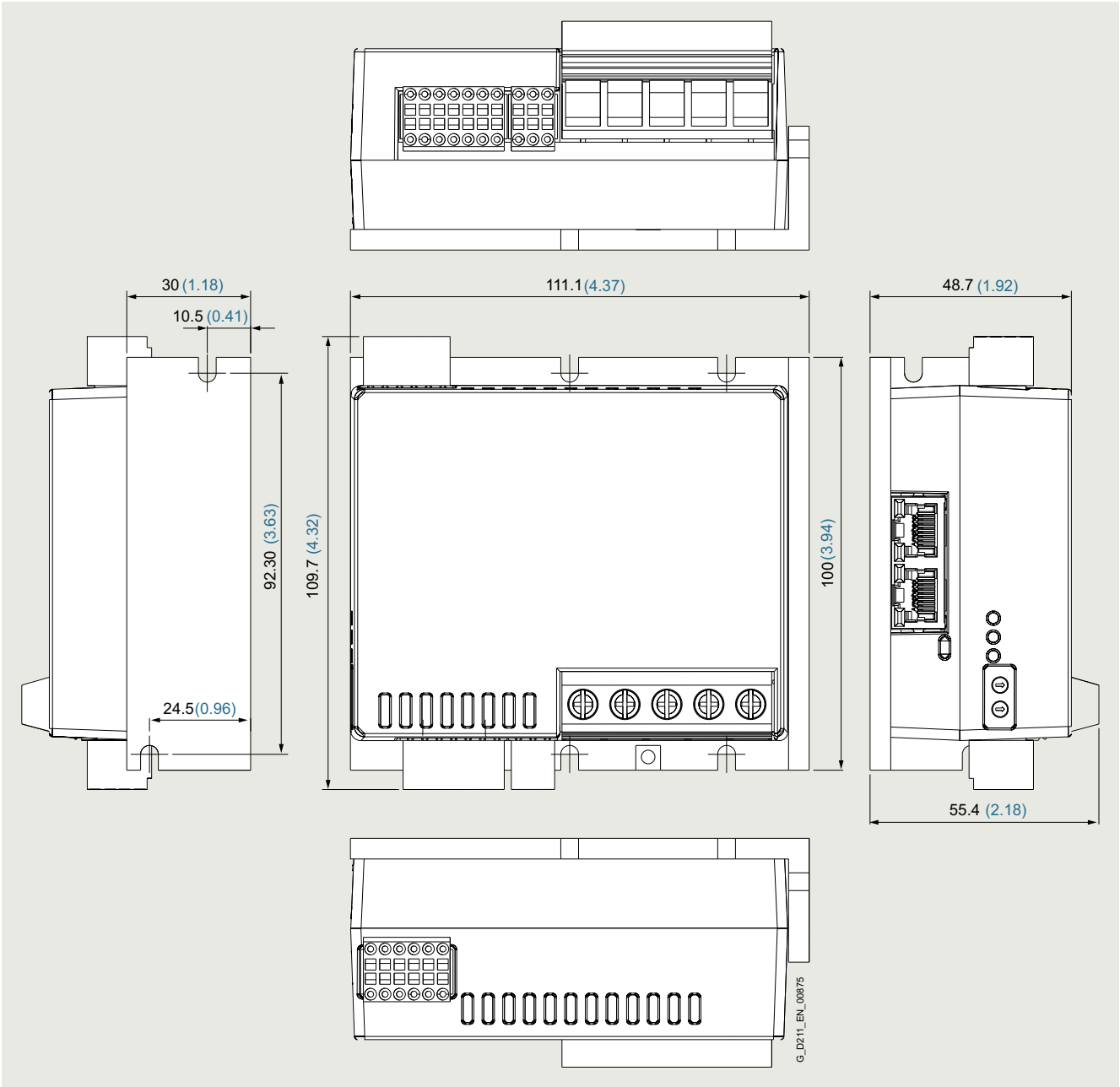
3

Dimensional drawings

Extra low-voltage converter VTD 6SL7018-1BV25-4AM0 with speed, torque and positioning control as well as communication via EtherCAT – Safety Integrated STO (Safe Torque Off)



For more information about the dimensional drawings (CAD, pin assignment, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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Accessories

See Chapter 6 Connection systems

Further information about SIMOTICS E

can be found on the internet at www.siemens.com/simotics-e

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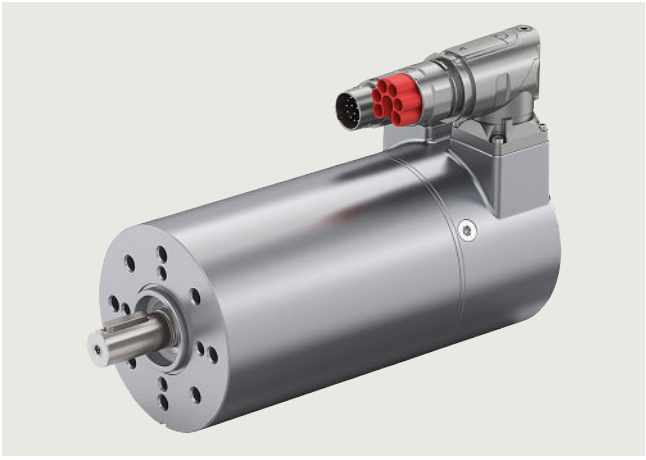
Overview

SIMOTICS E extra low-voltage motors with or without integrated converters



Example: SIMOTICS E-1EE1 extra low-voltage motor without integrated converter and without gearbox; shaft height 40R, length 60

With the SIMOTICS E extra low-voltage motors, Siemens offers modular and individually adaptable drive solutions for extra-low voltage protection applications in industrial drive technology – also in combination with various transmission technologies. The motors have integrated logic and power electronics and are optionally available with gearbox, encoder or brake.

The VTD extra low-voltage converters or the SIMATIC MICRO-DRIVE extra low-voltage converters control SIMOTICS E extra low-voltage motors without an integrated converter precisely and efficiently.
www.siemens.com/simotics-e

For more information on ordering and configuration, see Siemens Product Configurator in SiePortal at:
www.siemens.com/simotics-e/configuration

Notes:

- SIMOTICS E extra-low voltage motors are designed for operation on an converter with periodic intermittent operation under the influence of the start-up process. Typical applications for this are, for example, general mechanical engineering or intralogistics with periodic intermittent operation with influence of the start-up process. This corresponds to operating mode S4 according to IEC 60034-1. In the case of operating mode S4, a correspondingly selected constant load based on operating mode S1 is used as a reference value.
- All rated values refer to an ambient temperature of 40 °C and to the operating temperature of the motor at rated voltage. The thermal connection of the motor is carried out via a thermally conductive mounting on a square aluminum plate. This has edge lengths that correspond to three times the outer diameter of the motor, with a material thickness of 10 mm.

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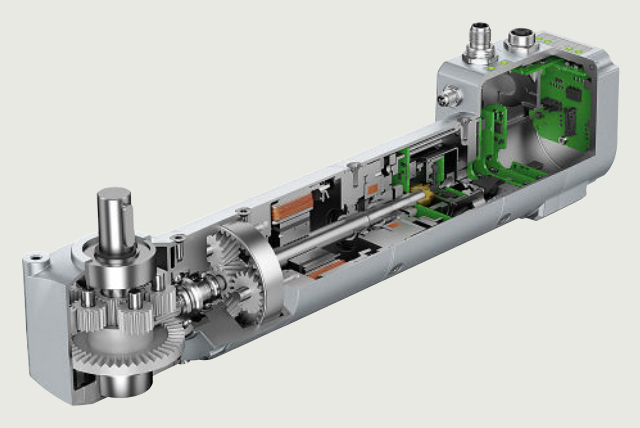
Benefits

Efficient drive solutions from a single source

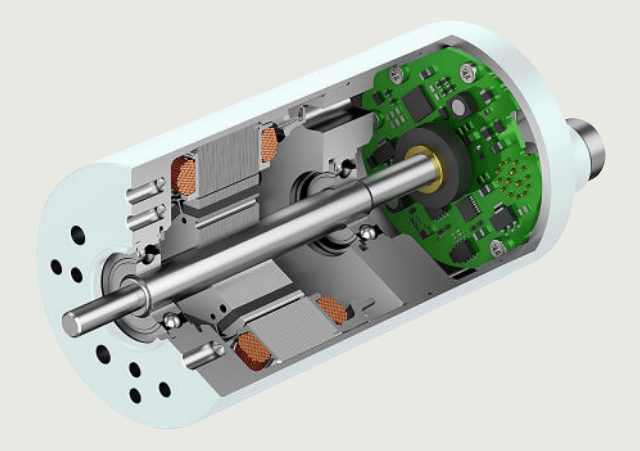
A powerful drive consists of a motor, control electronics and transmission. The individual selection and integration of these components is often complex and cost-intensive. With our modular system and tailor-made special solutions, we offer an efficient alternative – tailored to your application.

SIMOTICS E modular drive system for extra low-voltage



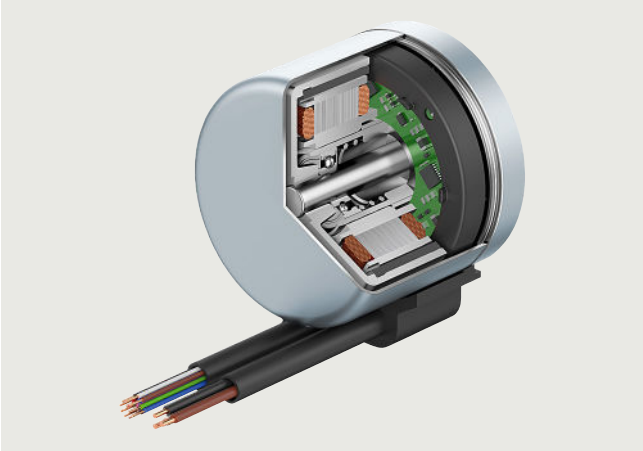
Motors with integrated logic and power electronics, optionally with gearbox, encoder and brake.

SIMOTICS E-1EE1 (internal rotor)



High power density and dynamics for precise movements in limited installation space – up to 750 W.

SIMOTICS E-1EV1 (external rotor)



Durable, highly controllable and smooth running – ideal for a wide range of automation applications up to 135 W.

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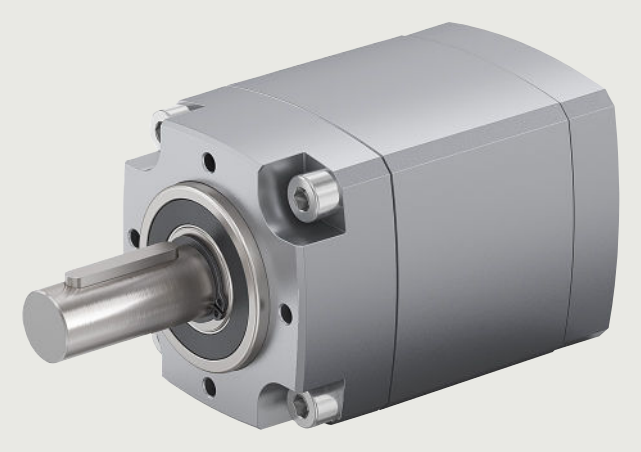
Benefits

Transmission solutions as an integral part of the drive system

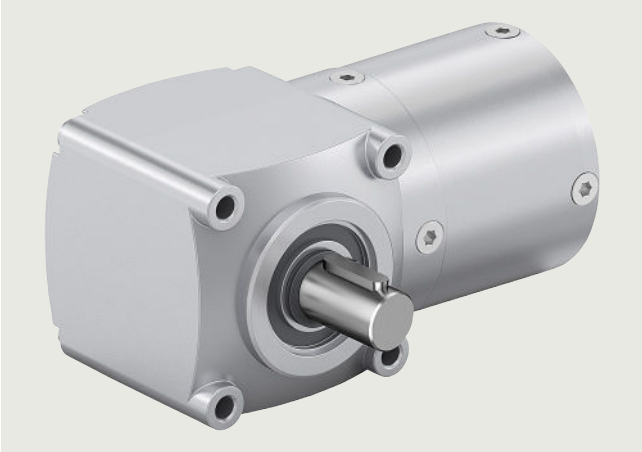
To optimally complement the SIMOTICS E motors, we offer coordinated transmission solutions. These are only available in combination with a motor and are configured together to ensure a tailor-made system solution.

Planetary gearbox



For applications with high performance requirements, our extensive portfolio of planetary gearboxes is a suitable solution. The available series are characterized by smooth running, which is achieved by robust, straight or helical gears made of high-strength plastic or steel.

Right-angle gearboxes



Our angular gearboxes are based on innovative crown gear technology, which enables compact, high-performance and economically manufacturable solutions. The output shafts are made of hardened and ground case-hardened steel and offer a long service life. Torque is transmitted via a keyway connection as standard. A special feature of these transmissions is the lack of self-locking.

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Design

Article number code of the SIMOTICS E-1EE1 extra low-voltage motors (internal rotor)

Data position of the Article No.	Article No.											Additional identification code -Z with order code
SIMOTICS E extra low-voltage motors	**1EE1**	■■■	-	■■■■	0	-	■■■■					
Series [1st to 4th Data position of the Article No.]												
SIMOTICS E-1EE1 extra low-voltage motors, internal rotor, brushless	1EE1											
Shaft height (R = round housing) [5th Data position of the Article No.]												
20R		**1**										
30R		**3**										
40R		**4**										
Overall length [6th Data position of the Article No.]												
20			**2**									
40			**4**									
60 (only for shaft heights 30R and 40R)		3 4	**6** **6**									
Voltage [7th Data position of the Article No.]												
24 V DC				**2**								
48 V DC				**4**								
Holding brake [8th Data position of the Article No.]												
Without holding brake					**0**							
With holding brake					**1**							
Encoder [9th Data position of the Article No.]												
Integrated rotor position detection						**A**						
Incremental encoder 1024 S/R (encoder TTL1024S/R)						**B**						
Incremental encoder 100 S/R (encoder TTL100S/R) (in the case of connector for SIMATIC MICRO-DRIVE PDC drive)						**C**						
Multiturn absolute encoder 17 bit + 16 bit (encoder AM17BC)						**D**						
Integrated converter [10th, 11th and 16th Data position of the Article No.]												
Without (for shaft heights 20R and 30R)		2 3					**A0** **A0**				**4** **4**	
Without (for shaft height 40R only incremental encoder 1024 S/R (encoder TTL1024S/R))		4				B	**A0**				**4**	
With integrated speed, torque or positioning control – communication via digital IOs		3				A	**D0**				**2**	
With integrated speed, torque or positioning control – communication via CANopen		3				B	**C0**				**2**	
With integrated speed, torque or positioning control – communication via EtherCAT – without Safety Integrated		3 4 3 4				B B D D	**E0** **E0** **E0** **E0**				**4** **4** **4** **4**	
With integrated speed, torque or positioning control – communication via EtherCAT – with Safety Integrated STO = Safe Torque Off		3 4 3 4				B B D D	**E1** **E1** **E1** **E1**				**4** **4** **4** **4**	
Degree of protection [12th Data position of the Article No.]									0			
Standard IP54									0			

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Design

Data position of the Article No.	Article No.										Additional identification code -Z with order code
SIMOTICS E extra low-voltage motors	**1EE1**	■■■	-	■■■■		**0**	-	■■■■			
Connection system [13th Data position of the Article No.]											
Connector for extra low-voltage converter SIMATIC MICRO-DRIVE F-TM Drives					A	**0**					
Connector for extra low-voltage converter VTD					A	**1**					
Connection with integrated speed, torque or positioning control – communication via CANopen					C	**1**					
Connection with integrated speed, torque or positioning control – communication via digital IOs					D	**1**					
Connection with integrated speed, torque or positioning control – communication via EtherCAT					E	**1**					
Connector for extra low-voltage converter SIMATIC MICRO-DRIVE PDC drive (in the case of incremental encoder 100 S/R (encoder TTL100S/R))				C	A	**3**					
Gearbox [14th and 15th Data position of the Article No.]											
Without gearbox											
• Shaft: In the case of shaft heights 20R and 30R, "plain shaft" is the standard version (without additional order code)	1 3							**A** **A**	**A** **A**		
• Shaft: Mandatory order code **N11** "shaft with feather key" for shaft height 40R, as standard version	4							**A**	**A**		**-Z N11**
With planetary gearbox • Gearbox shaft: Mandatory order code **M01** "gearbox shaft with feather key, standard lubrication", as standard version • Selection of gearbox stage and transmission ratio: Mandatory order codes **R■■** (Details see Motor-gearbox combinations) • Toothed wheel material: Optional order code **M60** "First gearbox stage made of plastic instead of metal" for planetary gearboxes OM042 and OM063 – "Made of metal" is standard (without additional order code)											
Planetary gearbox NL042 (for shaft height 20R)	1							**B**	**B**	4	**-Z M01+R■■**
Planetary gearbox PP042 (for shaft height 20R)	1							**D**	**B**	4	**-Z M01+R■■**
Planetary gearbox OM042 (for shaft height 20R)	1							**E**	**B**	4	**-Z M01+R■■ (+M60)**
Servo planetary gearbox PE040 (for shaft height 20R)	1							**H**	**B**	4	**-Z M01+R■■**
Planetary gearbox NL063 (for shaft height 30R)	3							**B**	**C**	4	**-Z M01+R■■**
Planetary gearbox PP063 (for shaft height 30R)	3							**D**	**C**		**-Z M01+R■■**
Planetary gearbox OM063 (for shaft height 30R)	3							**E**	**C**		**-Z M01+R■■ (+M60)**
Servo planetary gearbox PE060 (for shaft height 30R)	3							**H**	**C**	4	**-Z M01+R■■**
Planetary gearbox OM080 (for shaft height 40R)	4							**E**	**D**	4	**-Z M01+R■■**
Servo planetary gearbox PE080 (for shaft height 40R)	4							**H**	**D**	4	**-Z M01+R■■**
With angular gearbox • Gearbox shaft: Mandatory order code **M01** "gearbox shaft with feather key, standard lubrication", as standard version. Not necessary for the combination of angular gearbox EC063 and order code **M80** "shaft output gearbox hollow shaft". • Selection of gearbox stage and transmission ratio: Mandatory order codes **R■■** (Details see Motor-gearbox combinations) • Angular gearbox shaft output: Optional order codes **M80** "Hollow shaft",**M81** "Left" and **M82** "Both ends" – "Right" is standard (without additional order code) • Angular gearbox orientation: Optional order codes **Q91** "Connector on the output side", **Q92** "Connector offset through 180° with respect to the standard" and **Q93** "Connector opposite to the output side" – Standard orientation (without additional order code)											
Angular gearbox EC042 (for shaft height 20R)	1							**F**	**B**	4	**-Z M01+R■■ (+M8■+Q9■)**
Angular gearbox EP042 (for shaft height 20R)	1							**G**	**B**	4	**-Z M01+R■■ (+M8■+Q9■)**
Angular gearbox EC063 (for shaft height 30R)	3							**F**	**C**		**-Z M01+R■■ (+M8■+Q9■)**
Angular gearbox EP063 (for shaft height 30R)	3							**G**	**C**		**-Z M01+R■■ (+M8■+Q9■)**

For more information on ordering and configuration, see the Siemens Product Configurator in SiePortal at:
www.siemens.com/simotics-e/configuration

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Design

Article number code of the SIMOTICS E-1EV1 extra low-voltage motors (external rotor)

Data position of the Article No.	Article No.											Additional identification code -Z with order code
SIMOTICS E extra low-voltage motors	**1EV1**	**4**	**3**	**■**	**-**	**0**	**A**	**■■**	**0**	**-**	**1**	**■■**	**0**	
Series [1st to 4th Data position of the Article No.]														
SIMOTICS E-1EV1 extra low-voltage motors, external rotor, brushless	1EV1													
Shaft height (R = round housing) [5th Data position of the Article No.]														
30R		4												
Overall length [6th Data position of the Article No.]														
15			3											
Voltage [7th Data position of the Article No.]														
24 V DC				**2**										
48 V DC				**4**										
Holding brake [8th Data position of the Article No.]														
Without holding brake						0								
Encoder [9th Data position of the Article No.]														
Integrated rotor position detection							A							
Integrated converter [10th, 11th and 16th Data position of the Article No.]														
Without								**A**	**0**				0	
With integrated speed, torque or positioning control – communication via digital IOs								**D**	**0**				0	
Degree of protection [12th Data position of the Article No.]														
Standard IP54									0					
Connection system [13th Data position of the Article No.]														
Connector for extra low-voltage converter VTD								A			1			
Connection with integrated speed, torque or positioning control – communication via digital IOs								D			1			
Gearbox [14th and 15th Data position of the Article No.]														
Without gearbox												**A**	**A**	
With planetary gearbox • Gearbox shaft: Mandatory order code **M01** "gearbox shaft with feather key, standard lubrication", as standard version • Selection of gearbox stage and transmission ratio: Mandatory order codes **R■■** (Details see Motor-gearbox combinations)														
Planetary gearbox NL063												**B**	**C**	**-Z M01+R■■**
Planetary gearbox PF063												**C**	**C**	**-Z M01+R■■**
Planetary gearbox PP063												**D**	**C**	**-Z M01+R■■**
With angular gearbox • Gearbox shaft: Mandatory order code **M01** "gearbox shaft with feather key, standard lubrication", as standard version. Not necessary for the combination of angular gearbox EC063 and order code **M80** "shaft output gearbox hollow shaft". • Selection of gearbox stage and transmission ratio: Mandatory order codes **R■■** (Details see Motor-gearbox combinations) • Angular gearbox shaft output: Optional order codes **M80** "Hollow shaft",**M81** "Left" and **M82** "Both ends" – "Right" is standard (without additional order code) • Angular gearbox orientation: Optional order codes **Q91** "Connector on the output side", **Q92** "Connector offset through 180° with respect to the standard" and **Q93** "Connector opposite to the output side" – Standard orientation (without additional order code)														
Angular gearbox EC063												**F**	**C**	**-Z M01+R■■ (+M8■+Q9■)**
Angular gearbox EP063												**G**	**C**	**-Z M01+R■■ (+M8■+Q9■)**
With spur gearbox • Gearbox shaft: Mandatory order code **M01** "gearbox shaft with feather key, standard lubrication", as standard version • Selection of gearbox stage and transmission ratio: Mandatory order codes **R■■**														
Spur gearbox FL085												**U**	**C**	**-Z M01+R■■**

For more information on ordering and configuration, see the Siemens Product Configurator in SiePortal at:
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SIMOTICS E-1EE1 extra low-voltage motors

Selection and ordering data

	Overall length	Voltage	Rated power [1) 2)]	Rated torque [1) 2)]	Maximum torque [1) 2)]	Static torque [1) 2)]	Rated speed	Maximum speed	Rotor moment of inertia (without brake)	Extra low-voltage motors SIMOTICS E-1EE1
			P_N	M_N	M_{max}	M_0	n_N	n_{max}	J_{Mot}	
			W	Nm	Nm	Nm	r/min	r/min	10^{-6} kg m^2	Article No.
SIMOTICS E-1EE1 extra low-voltage motors – without integrated converter, without gearbox										
• Highly dynamic 3-phase internal rotor motor with EC technology										
• Basic motor for operation with external converter										
• Mechanical design and interfaces, designed for modular systems										
• Degree of protection IP54 and connection via industry-standard, rotatable connector										
Shaft height 20R (R = round housing)										
	20	24 V DC	46 [41]	0.11 [0.099]	0.4 [0.36]	0.121 [0.11]	4000	5900	3.48	**1EE1122-■■A00-■AA4**
	20	48 V DC	46 [41]	0.11 [0.099]	0.4 [0.36]	0.121 [0.11]	4000	5900	3.48	**1EE1124-■■A00-■AA4**
	40	24 V DC	92 [83]	0.22 [0.198]	0.75 [0.675]	0.242 [0.22]	4000	5900	6.67	**1EE1142-■■A00-■AA4**
	40	48 V DC	92 [83]	0.22 [0.198]	0.8 [0.72]	0.242 [0.22]	4000	5900	6.67	**1EE1144-■■A00-■AA4**
Shaft height 30R (R = round housing)										
	20	24 V DC	180 [162]	0.43 [0.387]	1.5 [1.35]	0.473 [0.43]	4000	5600	19.3	**1EE1322-■■A00-■AA4**
	20	48 V DC	180 [162]	0.43 [0.387]	1.5 [1.35]	0.473 [0.43]	4000	5900	19.3	**1EE1324-■■A00-■AA4**
	40	24 V DC	280 [245]	0.65 [0.585]	2.2 [1.98]	0.65 [0.64]	4000	5600	37.5	**1EE1342-■■A00-■AA4**
	40	48 V DC	330 [294]	0.78 [0.702]	2.73 [2.457]	0.858 [0.77]	4000	5600	37.5	**1EE1344-■■A00-■AA4**
	60	48 V DC	420 [377]	1 [0.9]	4 [3.6]	1.1 [0.99]	4000	5800	55.7	**1EE1364-■■A00-■AA4**
Shaft height 40R (R = round housing) with order code N11 "shaft with feather key" [3)]										
	20	24 V DC	314 [283]	0.75 [0.675]	2.4 [2.16]	0.83 [0.74]	4000	4700	5.41	**1EE1422-■BA00-■AA4-Z N11**
	20	48 V DC	314 [283]	0.75 [0.675]	2.4 [2.16]	0.83 [0.74]	4000	4700	5.41	**1EE1424-■BA00-■AA4-Z N11**
	40	24 V DC	461 [415]	1.1 [0.99]	3.75 [3.375]	1.1 [0.99]	4000	4700	10.43	**1EE1442-■BA00-■AA4-Z N11**
	40	48 V DC	565 [509]	1.35 [1.215]	4.4 [3.96]	1.49 [1.34]	4000	4700	10.43	**1EE1444-■BA00-■AA4-Z N11**
	60	48 V DC	670 [603]	1.6 [1.44]	5.6 [5.04]	1.6 [1.44]	4000	5900	15.44	**1EE1464-■BA00-■AA4-Z N11**

Article No. supplements				
Holding brake				
Without holding brake	**0**			
With holding brake	**1**			
Encoders				
Integrated rotor position detection (only for shaft height 20 and 30)		**A**		
Incremental encoder 1024 S/R (encoder TTL1024S/R)		**B**		
Incremental encoder 100 S/R (encoder TTL100S/R) (in the case of connector for SIMATIC MICRO-DRIVE PDC drive)		**C**		
Multiturn absolute encoder 17 bit + 16 bit (encoder AM17BC)		**D**		
Connection system				
Connector for extra low-voltage converter SIMATIC MICRO-DRIVE F-TM Drives				**0**
Connector for extra low-voltage converter VTD				**1**
Connector for extra low-voltage converter SIMATIC MICRO-DRIVE PDC drive (in the case of incremental encoder 100 S/R (encoder TTL100S/R))		C		**3**

For more information on ordering and configuration, see the Siemens Product Configurator in SiePortal at:
www.siemens.com/simotics-e/configuration

[1)] Depending on the commutation. Value without brackets is sinusoidal commutated (I_d = 0), value in brackets is block commutated.

[2)] The values listed for the AH20 only apply to the version without holding brake.

[3)] The additional order code **N11** "shaft with feather key" is mandatory for shaft height 40R, as this is the standard version. In the case of shaft heights 20R and 30R, "plain shaft" is the standard version (without additional order code).

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Selection and ordering data

	Overall length	Voltage	Rated power [1]	Rated torque [1]	Maximum torque [1]	Rated speed	Maximum speed	Rotor moment of inertia (without brake)	Extra low-voltage motors SIMOTICS E-1EE1
			P_N	M_N	M_{max}	n_N	n_{max}	J_{Mot}	
			W	Nm	Nm	r/min	r/min	10^{-6} kg m^2	Article No.
SIMOTICS E-1EE13 extra low-voltage motors – with integrated speed, torque or positioning control – communication via digital IOs – without gearbox – shaft height 30R (R = round housing)									
• Drive with integrated 4Q converter (8-pin) • Speed, torque or positioning mode possible • Selection of operating modes and parameter assignment via RS485 • Extensive interface with a wide range of inputs and outputs • Integrated encoder system with 10-bit resolution									
	20	24 V DC	178	0.43	0.64	4000	5600	19	**1EE1322-■AD00-1AA2**
	20	48 V DC	188	0.45	0.9	4000	5900	19	**1EE1324-■AD00-1AA2**
	40	24 V DC	251	0.6	0.9	4000	5600	38	**1EE1342-■AD00-1AA2**
	40	48 V DC	251	0.6	1.2	4000	5800	38	**1EE1344-■AD00-1AA2**
	60	48 V DC	356	0.85	1.7	4000	5800	56	**1EE1364-■AD00-1AA2**

Article No. supplements	
Holding brake	
Without holding brake	**0**
With holding brake	**1**

For more information on ordering and configuration, see the Siemens Product Configurator in SiePortal at:
www.siemens.com/simotics-e/configuration

	Overall length	Voltage	Rated power [1]	Rated torque [1]	Maximum torque [1]	Rated speed	Maximum speed	Rotor moment of inertia (without brake)	Extra low-voltage motors SIMOTICS E-1EE1
			P_N	M_N	M_{max}	n_N	n_{max}	J_{Mot}	
			W	Nm	Nm	r/min	r/min	10^{-6} kg m^2	Article No.
SIMOTICS E-1EE13 extra low-voltage motors – with integrated speed, torque or positioning control – communication via CANopen – without gearbox – shaft height 30R (R = round housing)									
• Sinusoidal commutation of the drives with field-oriented control • Speed control range up to n = 0 r/min with holding torque up to 5000 r/min possible • Different operating modes according to DS 402 (speed, torque, positioning) possible via software • M16 and M12 sealed industry standard connector terminals • Interface with analog and digital control inputs • Integrated encoder system									
	20	24 V DC	178	0.425	0.64	4000	5600	19	**1EE1322-■BC00-1AA2**
	20	48 V DC	188	0.45	0.9	4000	5600	19	**1EE1324-■BC00-1AA2**
	40	24 V DC	251	0.6	0.9	4000	5600	37.5	**1EE1342-■BC00-1AA2**
	40	48 V DC	314	0.75	1.5	4000	5600	37.5	**1EE1344-■BC00-1AA2**
	60	48 V DC	356	0.85	1.7	4000	5800	55.7	**1EE1364-■BC00-1AA2**

Article No. supplements	
Holding brake	
Without holding brake	**0**
With holding brake	**1**

For more information on ordering and configuration, see the Siemens Product Configurator in SiePortal at:
www.siemens.com/simotics-e/configuration

[1] The values listed for the AH20 only apply to the version without holding brake.

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SIMOTICS E-1EE1 extra low-voltage motors

Selection and ordering data

	Overall length	Voltage	Rated power [1]	Rated torque [1]	Maximum torque [1]	Rated speed	Maximum speed	Rotor moment of inertia (without brake)	Extra low-voltage motors SIMOTICS E-1EE1
			P_N	M_N	M_{max}	n_N	n_{max}	J_{Mot}	
			W	Nm	Nm	r/min	r/min	10^{-6} kg m^2	Article No.
SIMOTICS E-1EE1 extra low-voltage motors – with integrated speed, torque or positioning control – communication via EtherCAT – without gearbox									
• CoE (CAN over EtherCAT) supports different operating modes according to DS 402									
• Integration as slave in EtherCAT networks using TwinCAT									
• Operation as NC axis possible									
• Separate interface allows diagnostics parallel to BUS operation									
• Status LEDs on the drive housing									
• Safe Shut-off Safe Torque Off (optional)									
Integrated encoder system									
Shaft height 30R (R = round housing)									
	20	24 V DC	201	0.48	1.2	4000	5900	19.3	**1EE1322-■■E■0-1AA4**
	20	48 V DC	197	0.47	1.4	4000	5900	19.3	**1EE1324-■■E■0-1AA4**
	40	24 V DC	268	0.64	1.3	4000	5600	37.5	**1EE1342-■■E■0-1AA4**
	40	48 V DC	343	0.82	2.6	4000	5900	37.5	**1EE1344-■■E■0-1AA4**
	60	48 V DC	394	0.94	2.7	4000	5900	55.7	**1EE1364-■■E■0-1AA4**
Shaft height 40R (R = round housing) with order code N11 "shaft with feather key" [2]									
	20	24 V DC	335	0.8	2.4	4000	5300	54	**1EE1422-■■E■0-1AA4-Z N11**
	20	48 V DC	335	0.8	2.4	4000	5300	54	**1EE1424-■■E■0-1AA4-Z N11**
	40	24 V DC	398	0.95	3.25	4000	5100	104	**1EE1442-■■E■0-1AA4-Z N11**
	40	48 V DC	586	1.4	4.2	4000	5100	104	**1EE1444-■■E■0-1AA4-Z N11**
	60	48 V DC	691	1.65	4.8	4000	5900	155	**1EE1464-■■E■0-1AA4-Z N11**

Article No. supplements	
Holding brake	
Without holding brake	**0**
With holding brake	**1**
Encoders	
Incremental encoder 1024 S/R (encoder TTL1024S/R)	**B**
Multiturn absolute encoder 17 bit + 16 bit (encoder AM17)	**D**
Safety Integrated with integrated converter	
Without Safety Integrated	**0**
With Safety Integrated STO = Safe Torque Off	**1**

For more information on ordering and configuration, see the Siemens Product Configurator in SiePortal at:
www.siemens.com/simotics-e/configuration

[1] The values listed for the AH20 only apply to the version without holding brake.

[2] The additional order code **N11** "shaft with feather key" is mandatory for shaft height 40R, as this is the standard version. In the case of shaft height 30R, "plain shaft" is the standard version (without additional order code).

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Selection and ordering data

	Overall length	Voltage	Rated power [1]	Rated torque [1]	Maximum torque [1]	Static torque [1]	Rated speed	Maximum speed	Rotor moment of inertia (without brake)	**SIMOTICS E-1EV1 extra low-voltage motors**
			P_N	M_N	M_{max}	M_0	n_N	n_{max}	J_{Mot}	
			W	Nm	Nm	Nm	r/min	r/min	10^{-6} kg m^2	Article No.
SIMOTICS E-1EV14 extra low-voltage motors – without integrated converter – without gearbox – shaft height 30R (R = round housing)										
• 3-phase external rotor servomotor with EC technology • Basic motor for operation with external converter • Robust mechanical design in IP54 for industrial use • Electrical connection via cable with attached connectors										
	15	24 V DC	120 [109]	0.288 [0.259]	1.3 [1.17]	0.32 [0.29]	4000	5500	107.26	**1EV1432-0AA00-1AA0**
	15	48 V DC	133 [120]	0.319 [0.287]	1.3 [1.17]	0.35 [0.32]	4000	5500	107.26	**1EV1434-0AA00-1AA0**

For more information on ordering and configuration, see the Siemens Product Configurator in SiePortal at:
www.siemens.com/simotics-e/configuration

	Overall length	Voltage	Rated power	Rated torque	Maximum torque	Static torque	Rated speed	Maximum speed	Rotor moment of inertia (without brake)	**SIMOTICS E-1EV1 extra low-voltage motors**
			P_N	M_N	M_{max}	M_0	n_N	n_{max}	J_{Mot}	
			W	Nm	Nm	Nm	r/min	r/min	10^{-6} kg m^2	Article No.
SIMOTICS E-1EV14 extra low-voltage motors – with integrated speed, torque or positioning control – communication via digital IOs – without gearbox – shaft height 30R (R = round housing)										
• 3-phase external rotor servomotor with EC technology • Drive with fully integrated operating and control electronics • Robust mechanical design in IP54 for industrial use • Electrical connection via cable with free strand ends										
	15	24 V DC	99	0.235	0.705	0.26	4000	5900	108	**1EV1432-0AD00-1AA0**
	15	48 V DC	126	0.3	0.9	0.33	4000	5900	108	**1EV1434-0AD00-1AA0**

For more information on ordering and configuration, see the Siemens Product Configurator in SiePortal at:
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[1] Depending on the commutation. Value without brackets is sinusoidal commutated (I_d = 0), value in brackets is block commutated.

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SIMOTICS E-1EE11 extra low-voltage motors

Selection and ordering data

	Overall length	Voltage	SIMOTICS E-1EE1 extra low-voltage motors with planetary gearbox Article No.
SIMOTICS E-1EE11 extra low-voltage motors – without integrated converter – with planetary gearbox and order code M01 "gearbox shaft with feather key, standard lubrication" [1] – shaft height 20R (R = round housing)			
	20	24 V DC	**1EE1122-■■A00-■■B4-Z M01**
	20	48 V DC	**1EE1124-■■A00-■■B4-Z M01**
	40	24 V DC	**1EE1142-■■A00-■■B4-Z M01**
	40	48 V DC	**1EE1144-■■A00-■■B4-Z M01**

Article No. supplements				
Holding brake				
Without holding brake	**0**			
With holding brake	**1**			
Encoders				
Integrated rotor position detection		**A**		
Incremental encoder 1024 S/R (encoder TTL1024S/R)		**B**		
Incremental encoder 100 S/R (encoder TTL100S/R) (in the case of connector for SIMATIC MICRO-DRIVE PDC drive)		**C**		
Multiturn absolute encoder 17 bit + 16 bit (encoder AM17BC)		**D**		
Connection system				
Connector for extra low-voltage converter SIMATIC MICRO-DRIVE F-TM Drives			**0**	
Connector for extra low-voltage converter VTD			**1**	
Connector for extra low-voltage converter SIMATIC MICRO-DRIVE PDC drive (in the case of incremental encoder 100 S/R (encoder TTL100S/R))		C	**3**	

Gearbox		Gearbox stage and transmission ratio Additional identification code with order code		Toothed wheel material Additional identification code with order code	
Planetary gearbox NL042	**B**	z = 1-stage: i = 4.33 z = 2-stage: i = 26	**R04** **R26**	Metal (default)	–
Planetary gearbox PP042	**D**	z = 1-stage: i = 3.18 i = 5 i = 9 z = 2-stage: i = 21.18 i = 30 i = 54	 **R03** **R05** **R90** **R20** **R30** **R53**	Metal (default)	–
Planetary gearbox OM042	**E**	z = 1-stage: i = 3 i = 5 i = 9 z = 2-stage: i = 9 i = 15 i = 25 i = 45	 **R03** **R05** **R90** **R09** **R15** **R25** **R45**	Metal (default) First gearbox stage made of plastic instead of metal	– **M60**
Servo planetary gearbox PE040	**H**	z = 1-stage: i = 5 i = 8 z = 2-stage: i = 25 i = 40	 **R05** **R08** **R25** **R40**	Metal (default)	–

For more information on ordering and configuration, see the Siemens Product Configurator in SiePortal at:
www.siemens.com/simotics-e/configuration

[1] The order code **M01** "gearbox shaft with feather key, standard lubrication" is mandatory, as this is the standard version.

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Selection and ordering data

	Overall length	Voltage	SIMOTICS E-1EE1 extra low-voltage motors with angular gearbox Article No.
SIMOTICS E-1EE11 extra low-voltage motors – without integrated converter – with angular gearbox and order code M01 "gearbox shaft with feather key, standard lubrication" [1] – shaft height 20R (R = round housing)			
	20	24 V DC	**1EE1122-■■A00-■■B4-Z M01**
	20	48 V DC	**1EE1124-■■A00-■■B4-Z M01**
	40	24 V DC	**1EE1142-■■A00-■■B4-Z M01**
	40	48 V DC	**1EE1144-■■A00-■■B4-Z M01**

Article No. supplements				
Holding brake				
Without holding brake	**0**			
With holding brake	**1**			
Encoders				
Integrated rotor position detection		**A**		
Incremental encoder 1024 S/R (encoder TTL1024S/R)		**B**		
Incremental encoder 100 S/R (encoder TTL100S/R) (in the case of connector for SIMATIC MICRO-DRIVE PDC drive)		**C**		
Multiturn absolute encoder 17 bit + 16 bit (encoder AM17BC)		**D**		
Connection system				
Connector for extra low-voltage converter SIMATIC MICRO-DRIVE F-TM Drives			**0**	
Connector for extra low-voltage converter VTD			**1**	
Connector for extra low-voltage converter SIMATIC MICRO-DRIVE PDC drive (in the case of incremental encoder 100 S/R (encoder TTL100S/R))		C	**3**	

Gearbox		Gearbox stage and transmission ratio		Angular gearbox shaft output		Angular gearbox orientation	
		Additional identification code with order code					
Angular gearbox EC042	**F**	z = 1-stage:		Right (standard)	–	Standard orientation	–
		i = 4.1	**R04**				
		i = 6.7	**R07**	Left	**M81**	Connector on the output side	**Q91**
		z = 2-stage:		Both ends	**M82**		
		i = 21.2	**R20**			Connector offset through 180° with respect to the standard	**Q92**
		i = 33.3	**R33**				
		i = 60	**R62**				
		i = 113	**R93**				
						Connector opposite to the output side	**Q93**
Angular gearbox EP042	**G**	z = 3-stage:		Right (standard)	–	Standard orientation	–
		i = 54	**R55**				
		i = 84.8	**R85**			Connector on the output side	**Q91**
		i = 153	**R56**				
		i = 289	**R89**			Connector offset through 180° with respect to the standard	**Q92**
						Connector opposite to the output side	**Q93**

For more information on ordering and configuration, see the Siemens Product Configurator in SiePortal at:
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[1] The order code **M01** "gearbox shaft with feather key, standard lubrication" is mandatory, as this is the standard version.

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SIMOTICS E-1EE13 extra low-voltage motors

Selection and ordering data

	Overall length	Voltage	SIMOTICS E-1EE1 extra low-voltage motors with planetary gearbox Article No.
SIMOTICS E-1EE13 extra low-voltage motors – with planetary gearbox and order code M01 "gearbox shaft with feather key, standard lubrication" [1] – shaft height 30R (R = round housing)			
	20	24 V DC	**1EE1322-■■■■0-■■C4-Z M01**
	20	48 V DC	**1EE1324-■■■■0-■■C4-Z M01**
	40	24 V DC	**1EE1342-■■■■0-■■C4-Z M01**
	40	48 V DC	**1EE1344-■■■■0-■■C4-Z M01**
	60	48 V DC	**1EE1364-■■■■0-■■C4-Z M01**

Article No. supplements						
Holding brake						
Without holding brake	**0**					
With holding brake	**1**					
Encoders						
Integrated rotor position detection		**A**				
Incremental encoder 1024 S/R (encoder TTL1024S/R)		**B**				
Incremental encoder 100 S/R (encoder TTL100S/R) (in the case of connector for SIMATIC MICRO-DRIVE PDC drive)		**C**				
Multiturn absolute encoder 17 bit + 16 bit (encoder AM17BC)		**D**				
Integrated converter						
Without			**A**	**0**		
With integrated speed, torque or positioning control – communication via EtherCAT – without Safety Integrated	B D		**E** **E**	**0** **0**		
With integrated speed, torque or positioning control – communication via EtherCAT – without Safety Integrated	B D		**E** **E**	**1** **1**		
Connection system						
Connector for extra low-voltage converter SIMATIC MICRO-DRIVE F-TM Drives			A		**0**	
Connector for extra low-voltage converter VTD			A		**1**	
Connection with integrated speed, torque or positioning control – communication via EtherCAT			E		**1**	
Connector for extra low-voltage converter SIMATIC MICRO-DRIVE PDC drive (in the case of incremental encoder 100 S/R (encoder TTL100S/R))	C		A		**3**	

Gearbox		Gearbox stage and transmission ratio Additional identification code with order code	Toothed wheel material Additional identification code with order code
Planetary gearbox NL063	**B**	z = 1-stage: i = 4.33 **R04** i = 6 **R06** z = 2-stage: i = 26 **R26**	Metal (default) –
Planetary gearbox PP063	**D**	z = 1-stage: i = 3.18 **R03** i = 5 **R05** i = 9 **R90** i = 17 **R17** z = 2-stage: i = 21.18 **R20** i = 30 **R30** i = 38.12 **R38** i = 54 **R53** i = 72.00 **R72** i = 102 **R00** i = 204 **R42**	Metal (default) –
Planetary gearbox OM063	**E**	z = 1-stage: i = 3 **R03** i = 5 **R05** i = 9 **R90** z = 2-stage: i = 9 **R09** i = 15 **R15** i = 25 **R25** i = 45 **R45**	Metal (default) – First gearbox stage made of plastic instead of metal **M60**
Servo planetary gearbox PE060	**H**	z = 1-stage: i = 5 **R05** i = 8 **R08** z = 2-stage: i = 25 **R25** i = 40 **R40**	Metal (default) –

For more information on ordering and configuration, see the Siemens Product Configurator in SiePortal at:
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[1] The order code **M01** "gearbox shaft with feather key, standard lubrication" is mandatory, as this is the standard version.

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Selection and ordering data

	Overall length	Voltage	SIMOTICS E-1EE1 extra low-voltage motors with angular gearbox Article No.
SIMOTICS E-1EE13 extra low-voltage motors – with angular gearbox and order code M01 "gearbox shaft with feather key, standard lubrication" [1] – shaft height 30R (R = round housing)			
	20	24 V DC	**1EE1322-■■■■0-■■C4-Z M01**
	20	48 V DC	**1EE1324-■■■■0-■■C4-Z M01**
	40	24 V DC	**1EE1342-■■■■0-■■C4-Z M01**
	40	48 V DC	**1EE1344-■■■■0-■■C4-Z M01**
	60	48 V DC	**1EE1364-■■■■0-■■C4-Z M01**

Article No. supplements						
Holding brake						
Without holding brake	**0**					
With holding brake	**1**					
Encoders						
Integrated rotor position detection		**A**				
Incremental encoder 1024 S/R (encoder TTL1024S/R)		**B**				
Incremental encoder 100 S/R (encoder TTL100S/R) (in the case of connector for SIMATIC MICRO-DRIVE PDC drive)		**C**				
Multiturn absolute encoder 17 bit + 16 bit (encoder AM17BC)		**D**				
Integrated converter						
Without			**A**	**0**		
With integrated speed, torque or positioning control – communication via EtherCAT – without Safety Integrated		B D	**E**	**0**		
With integrated speed, torque or positioning control – communication via EtherCAT – with Safety Integrated STO = Safe Torque Off		B D	**E**	**1**		
Connection system						
Connector for extra low-voltage converter SIMATIC MICRO-DRIVE F-TM Drives			A		**0**	
Connector for extra low-voltage converter VTD			A		**1**	
Connection with integrated speed, torque or positioning control – communication via EtherCAT			E		**1**	
Connector for extra low-voltage converter SIMATIC MICRO-DRIVE PDC drive (in the case of incremental encoder 100 S/R (encoder TTL100S/R))		C	A		**3**	

Gearbox		Gearbox stage and transmission ratio		Angular gearbox shaft output		Angular gearbox orientation	
		Additional identification code with order code					
Angular gearbox EC063	**F**	z = 1-stage:		Right (standard)	–	Standard orientation	–
		i = 4.07	**R04**				
		i = 6.67	**R07**	Hollow shaft [1]	**M80**	Connector on the output side	**Q91**
		z = 2-stage:					
		i = 20.3	**R19**	Left	**M81**	Connector offset through 180° with respect to the standard	**Q92**
		i = 33.3	**R33**	Both ends	**M82**		
		i = 60	**R62**				
		i = 113.33	**R93**				
						Connector opposite to the output side	**Q93**
Angular gearbox EP063	**G**	z = 2-stage:		Right (standard)	–	Standard orientation	–
		i = 16.69	**R71**				
		z = 3-stage:				Connector on the output side	**Q91**
		i = 53.98	**R55**				
		i = 84.82	**R85**			Connector offset through 180° with respect to the standard	**Q92**
		i = 152.68	**R56**				
		i = 288.39	**R89**				
						Connector opposite to the output side	**Q93**

For more information on ordering and configuration, see the Siemens Product Configurator in SiePortal at:
www.siemens.com/simotics-e/configuration

[1] The order code **M01** "gearbox shaft with feather key, standard lubrication" is mandatory, as this is the standard version. Not necessary for the combination of angular gearbox EC063 (14th data position of the article No. "**F**") and order code **M80** "shaft output gearbox hollow shaft".

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SIMOTICS E-1EE14 extra low-voltage motors

Selection and ordering data

	Overall length	Voltage	SIMOTICS E-1EE1 extra low-voltage motors with planetary gearbox Article No.
SIMOTICS E-1EE14 extra low-voltage motors – with planetary gearbox and order code M01 "gearbox shaft with feather key, standard lubrication" [1] – shaft height 40R (R = round housing)			
	20	24 V DC	**1EE1422-■■■■0-■■D4-Z M01**
	20	48 V DC	**1EE1424-■■■■0-■■D4-Z M01**
	40	24 V DC	**1EE1442-■■■■0-■■D4-Z M01**
	40	48 V DC	**1EE1444-■■■■0-■■D4-Z M01**
	60	48 V DC	**1EE1464-■■■■0-■■D4-Z M01**

Article No. supplements					
Holding brake					
Without holding brake	**0**				
With holding brake	**1**				
Encoders					
Integrated rotor position detection		**A**			
Incremental encoder 1024 S/R (encoder TTL1024S/R)		**B**			
Incremental encoder 100 S/R (encoder TTL100S/R) (in the case of connector for SIMATIC MICRO-DRIVE PDC drive)		**C**			
Multiturn absolute encoder 17 bit + 16 bit (encoder AM17BC)		**D**			
Integrated converter					
Without (for shaft height 40R only incremental encoder 1024 S/R (encoder TTL1024S/R))		B	**A**	**0**	
With integrated speed, torque or positioning control – communication via EtherCAT – without Safety Integrated		B D	**E** **E**	**0** **0**	
With integrated speed, torque or positioning control – communication via EtherCAT – with Safety Integrated STO = Safe Torque Off		B D	**E** **E**	**1** **1**	
Connection system					
Connector for extra low-voltage converter SIMATIC MICRO-DRIVE F-TM Drives			**A**	**0**	
Connector for extra low-voltage converter VTD			**A**	**1**	
Connection with integrated speed, torque or positioning control – communication via EtherCAT			**E**	**1**	
Connector for extra low-voltage converter SIMATIC MICRO-DRIVE PDC drive (in the case of incremental encoder 100 S/R (encoder TTL100S/R))		C	**A**	**3**	

Gearbox		Gearbox stage and transmission ratio Additional identification code with order code
Planetary gearbox OM080	**E**	z = 1-stage:
		i = 3 **R03**
		i = 5 **R05**
		i = 9 **R90**
		z = 2-stage:
		i = 9 **R09**
		i = 15 **R15**
		i = 25 **R25**
		i = 45 **R45**
Servo planetary gearbox PE080	**H**	z = 1-stage:
		i = 5 **R05**
		i = 8 **R08**
		z = 2-stage:
		i = 25 **R25**
		i = 40 **R40**

For more information on ordering and configuration, see the Siemens Product Configurator in SiePortal at:
www.siemens.com/simotics-e/configuration

[1] The order code **M01** "gearbox shaft with feather key, standard lubrication" is mandatory, as this is the standard version.

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Selection and ordering data

	Overall length	Voltage	SIMOTICS E-1EE1 extra low-voltage motors with planetary gearbox Article No.
SIMOTICS E-1EE13 extra low-voltage motors – with integrated speed, torque or positioning control – with planetary gearbox and order code M01 "gearbox shaft with feather key, standard lubrication" [1] – shaft height 30R (R = round housing)			
	20	24 V DC	**1EE1322-■■■00-1■C2-Z M01**
	20	48 V DC	**1EE1324-■■■00-1■C2-Z M01**
	40	24 V DC	**1EE1342-■■■00-1■C2-Z M01**
	40	48 V DC	**1EE1344-■■■00-1■C2-Z M01**
	60	48 V DC	**1EE1364-■■■00-1■C2-Z M01**

Article No. supplements						
Holding brake						
Without holding brake	**0**					
With holding brake	**1**					
Communication						
Communication via digital IOs		**A**	**D**			
Communication via CANopen		**B**	**C**			

Gearbox		Gearbox stage and transmission ratio		Toothed wheel material	Additional identification code with order code
Planetary gearbox PP063	**D**	z = 1-stage:		Metal (default)	–
		i = 3.18	**R03**		
		i = 5	**R05**		
		i = 9	**R90**		
		i = 17	**R17**		
		z = 2-stage:			
		i = 21.18	**R20**		
		i = 30	**R30**		
		i = 38.12	**R38**		
		i = 54	**R53**		
		i = 72.00	**R72**		
		i = 102	**R00**		
		i = 204	**R42**		
Planetary gearbox OM063	**E**	z = 1-stage:		Metal (default)	–
		i = 3	**R03**	First gearbox stage made of plastic instead of metal	**M60**
		i = 5	**R05**		
		i = 9	**R90**		
		z = 2-stage:			
		i = 9	**R09**		
		i = 15	**R15**		
		i = 25	**R25**		
		i = 45	**R45**		

For more information on ordering and configuration, see the Siemens Product Configurator in SiePortal at:
www.siemens.com/simotics-e/configuration

[1] The order code **M01** "gearbox shaft with feather key, standard lubrication" is mandatory, as this is the standard version.

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SIMOTICS E-1EE13 extra low-voltage motors

Selection and ordering data

	Overall length	Voltage	SIMOTICS E-1EE1 extra low-voltage motors with angular gearbox Article No.
SIMOTICS E-1EE13 extra low-voltage motors – with integrated speed, torque or positioning control – with angular gearbox and order code M01 "gearbox shaft with feather key, standard lubrication" [1] – shaft height 30R (R = round housing)			
	20	24 V DC	**1EE1322-■■■00-1■C2-Z M01**
	20	48 V DC	**1EE1324-■■■00-1■C2-Z M01**
	40	24 V DC	**1EE1342-■■■00-1■C2-Z M01**
	40	48 V DC	**1EE1344-■■■00-1■C2-Z M01**
	60	48 V DC	**1EE1364-■■■00-1■C2-Z M01**

Article No. supplements			
Holding brake			
Without holding brake	**0**		
With holding brake	**1**		
Communication			
Communication via digital IOs		**A**	**D**
Communication via CANopen		**B**	**C**

Gearbox		Gearbox stage and transmission ratio		Angular gearbox shaft output		Angular gearbox orientation	
		Additional identification code with order code					
Angular gearbox EC063	**F**	z = 1-stage:		Right (standard)	–	Standard orientation	**–**
		i = 4.07	**R04**				
		i = 6.67	**R07**	Hollow shaft [1]	**M80**	Connector on the output side	**Q91**
		z = 2-stage:					
		i = 20.3	**R19**	Left	**M81**		
		i = 33.3	**R33**	Both ends	**M82**	Connector offset through 180° with respect to the standard	**Q92**
		i = 60	**R62**				
		i = 113.33	**R93**				
						Connector opposite to the output side	**Q93**
Angular gearbox EP063	**G**	z = 2-stage:		Right (standard)	–	Standard orientation	**–**
		i = 16.69	**R71**				
		z = 3-stage:				Connector on the output side	**Q91**
		i = 53.98	**R55**				
		i = 84.82	**R85**				
		i = 152.68	**R56**			Connector offset through 180° with respect to the standard	**Q92**
		i = 288.39	**R89**				
						Connector opposite to the output side	**Q93**

For more information on ordering and configuration, see the Siemens Product Configurator in SiePortal at:
www.siemens.com/simotics-e/configuration

[1] The order code **M01** "gearbox shaft with feather key, standard lubrication" is mandatory, as this is the standard version. Not necessary for the combination of angular gearbox EC063 (14th data position of the article No. "**F**") and order code **M80** "shaft output gearbox hollow shaft".

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Selection and ordering data

	Overall length	Voltage	SIMOTICS E-1EV1 extra low-voltage motors with planetary gearbox Article No.
SIMOTICS E-1EV14 extra low-voltage motors – with planetary gearbox and order code M01 "gearbox shaft with feather key, standard lubrication" [1] – shaft height 30R (R = round housing)			
	15	24 V DC	**1EV1432-0A■00-1■C0-Z M01**
	15	48 V DC	**1EV1434-0A■00-1■C0-Z M01**

Article No. supplements		
Integrated converter		
Without	**A**	
With integrated speed, torque or positioning control – communication via digital IOs	**D**	

Gearbox		Gearbox stage and transmission ratio Additional identification code with order code	
Planetary gearbox NL063	**B**	z = 1-stage:	
		i = 4.33	**R04**
		i = 6	**R06**
		z = 2-stage:	
		i = 26	**R26**
Planetary gearbox PF063	**C**	z = 1-stage:	
		i = 5	**R05**
		i = 9	**R09**
		z = 2-stage:	
		i = 21.18	**R20**
		i = 30	**R30**
		i = 38.12	**R38**
		i = 54	**R53**
Planetary gearbox PP063	**D**	z = 1-stage:	
		i = 3.18	**R03**
		i = 5	**R05**
		i = 9	**R90**
		i = 17	**R17**
		z = 2-stage:	
		i = 21.18	**R20**
		i = 30	**R30**
		i = 38.12	**R38**
		i = 54	**R53**
		i = 72.00	**R72**
		i = 102	**R00**
		i = 204	**R42**

For more information on ordering and configuration, see the Siemens Product Configurator in SiePortal at:
www.siemens.com/simotics-e/configuration

[1] The order code **M01** "gearbox shaft with feather key, standard lubrication" is mandatory, as this is the standard version.

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SIMOTICS E-1EV14 extra low-voltage motors

Selection and ordering data

	Overall length	Voltage	SIMOTICS E-1EV1 extra low-voltage motors with angular gearbox Article No.
SIMOTICS E-1EV14 extra low-voltage motors – with angular gearbox and order code M01 "gearbox shaft with feather key, standard lubrication" [1] – shaft height 30R (R = round housing)			
	15	24 V DC	**1EV1432-0A■00-1■C0-Z M01**
	15	48 V DC	**1EV1434-0A■00-1■C0-Z M01**

Article No. supplements	
Integrated converter	
Without	**A**
With integrated speed, torque or positioning control – communication via digital IOs	**D**

Gearbox		Gearbox stage and transmission ratio		Angular gearbox shaft output		Angular gearbox orientation	
		Additional identification code with order code					
Angular gearbox EC063	**F**	z = 1-stage:		Right (standard)	–	Standard orientation	–
		i = 4.07	**R04**				
		i = 6.67	**R07**	Hollow shaft [1]	**M80**	Connector on the output side	**Q91**
		z = 2-stage:					
		i = 20.3	**R19**	Left	**M81**	Connector offset through 180° with respect to the standard	**Q92**
		i = 33.3	**R33**	Both ends	**M82**		
		i = 60	**R62**				
		i = 113.33	**R93**				
						Connector opposite to the output side	**Q93**
Angular gearbox EP063	**G**	z = 2-stage:		Right (standard)	–	Standard orientation	–
		i = 16.69	**R71**				
		z = 3-stage:				Connector on the output side	**Q91**
		i = 53.98	**R55**				
		i = 84.82	**R85**			Connector offset through 180° with respect to the standard	**Q92**
		i = 152.68	**R56**				
		i = 288.39	**R89**				
						Connector opposite to the output side	**Q93**

For more information on ordering and configuration, see the Siemens Product Configurator in SiePortal at:
www.siemens.com/simotics-e/configuration

[1] The order code **M01** "gearbox shaft with feather key, standard lubrication" is mandatory, as this is the standard version. Not necessary for the combination of angular gearbox EC063 (14th data position of the article No. "**F**") and order code **M80** "shaft output gearbox hollow shaft".

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Selection and ordering data

	Overall length	Voltage	SIMOTICS E-1EV1 extra low-voltage motors with spur gearbox Article No.		
SIMOTICS E-1EV14 extra low-voltage motors – with spur gearbox and order code M01 "gearbox shaft with feather key, standard lubrication" [1] – shaft height 30R (R = round housing)					
	15	24 V DC	**1EV1432-0A■00-1■C0-Z M01**		
	15	48 V DC	**1EV1434-0A■00-1■C0-Z M01**		
Article No. supplements					
Integrated converter					
Without				**A**	
With integrated speed, torque or positioning control – communication via digital IOs				**D**	
Gearbox					Gearbox stage and transmission ratio Additional identification code with order code
Stirnradgetriebe FL085				**U**	z = 3-stage: i = 8.2 **R82** i = 12.3 **R36**

For more information on ordering and configuration, see the Siemens Product Configurator in SiePortal at:
www.siemens.com/simotics-e/configuration

[1] The order code **M01** "gearbox shaft with feather key, standard lubrication" is mandatory, as this is the standard version.

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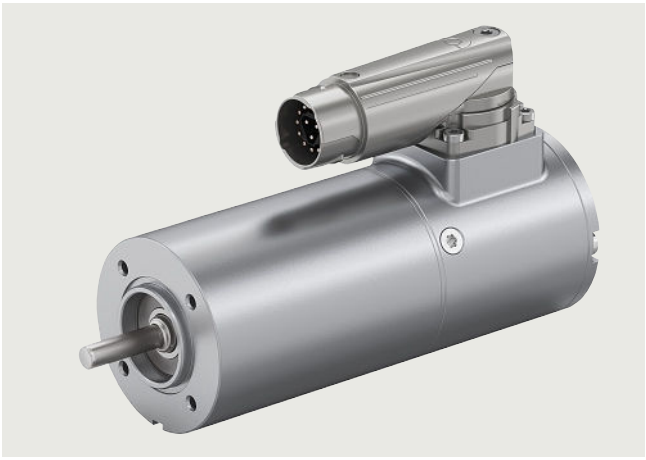
SIMOTICS E-1EE11 without integrated converter, shaft height 20R

Technical specifications



Motor with integrated rotor position encoder

- Highly dynamic 3-phase servomotor with EC technology (6-pin)
- Low cogging torque
- Robust and noise-optimized ball bearing system for a long service life
- High efficiency and high power density with a compact design
- Basic motor for operation with external converter
- Mechanical design and interfaces, designed for modular systems
- Degree of protection IP54 and connection via industry-standard, rotatable connector

Extra low-voltage motors SIMOTICS E-1EE11		**1EE11 . . - . . A0 . - . AA4**			
Shaft height 20R		**Overall length 20**		**Overall length 40**	
General technical specifications		**1EE112 . - . . A0 . - . AA4**		**1EE114 . - . . A0 . - . AA4**	
Maximum speed n_{max}	r/min	5900		5900	
Rotor moment of inertia J_{Mot}	10^{-6} kgm^2	3.48		6.67	
Moment of inertia (with brake) $J_{Mot,Br}$	10^{-6} kgm^2	3.74		6.93	
Motor weight with basic equipment m_{Mot}	kg (lb)	0.48 (1.06)		0.65 (1.43)	
Weight (with brake) $m_{Mot,Br}$	kg (lb)	0.56 (1.23)		0.72 (1.59)	
Overload protection		to be implemented via control electronics			
Permissible ambient temperature range	°C (°F)	0 … +40 (32 … 104)			
Technical specifications for winding	**24 V DC**	**1EE1122- . . A0 . - . AA4**		**1EE1142- . . A0 . - . AA4**	
		without brake	with brake	without brake	with brake
Rated speed n_N	r/min	4000		4000	
Rated torque M_N [1]	Nm	0.11 [0.099]	0.083 [0.074]	0.22 [0.198]	0.176 [0.158]
Maximum torque M_{max} [1]	Nm	0.4 [0.36]		0.75 [0.675]	
Static torque M_0 [1]	Nm	0.121 [0.11]	0.121 [0.08]	0.242 [0.22]	0.242 [0.17]
Rated current (phase RMS) I_N	A	2.7		5	
Rated power P_N [1]	W	46 [41]	35 [31]	92 [83]	74 [66]
Permissible peak current I_{max}	A	11.4		19.2	
Stall current I_0	A	2.97		5.5	
Voltage constant k_e	V/1000 r/min	4.05		4.21	
Terminal resistance R_V	Ohm	0.94		0.39	
Rotating field inductance transverse direction L_q	µH	664		398	
Rotating field inductance longitudinal direction L_d	µH	378		211	
Technical specifications for winding	**48 V DC**	**1EE1124- . . A0 . - . AA4**		**1EE1144- . . A0 . - . AA4**	
		without brake	with brake	without brake	with brake
Rated speed n_N	r/min	4000		4000	
Rated torque M_N [1]	Nm	0.11 [0.099]	0.083 [0.074]	0.22 [0.198]	0.176 [0.158]
Maximum torque M_{max} [1]	Nm	0.4 [0.36]		0.8 [0.72]	
Static torque M_0 [1]	Nm	0.121 [0.11]	0.121 [0.08]	0.242 [0.22]	0.242 [0.17]
Rated current (phase RMS) I_N	A	1.4		2.6	
Rated power P_N [1]	W	46 [41]	35 [31]	92 [83]	74 [66]
Permissible peak current I_{max}	A	5.7		10.9	
Stall current I_0	A	1.54		2.86	
Voltage constant k_e	V/1000 r/min	8.16		8.15	
Terminal resistance R_V	Ohm	3.2		1.5	
Rotating field inductance transverse direction L_q	µH	2776		1311	
Rotating field inductance longitudinal direction L_d	µH	1580		720	

[1] Depending on the commutation: Value without brackets is sinusoidal commutated (I_d = 0), value in brackets is block commutated.

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Technical specifications

Holding brake for SIMOTICS E-1EE11 extra low-voltage motors, shaft height 20R

Exemplary representation of the brake

Holding brake with EMERGENCY STOP function

- Fail-safe brake according to spring force principle
- Single-disk brake with two friction surfaces
- Braking torque acts in the current-free state
- Brake force is cancelled by electromagnetic force
- Brake is actuated in the current-free state, with a high power density
- Reduced moment of inertia for optimal dynamic response
- Degree of protection IP54 (by means of installation in the drive)

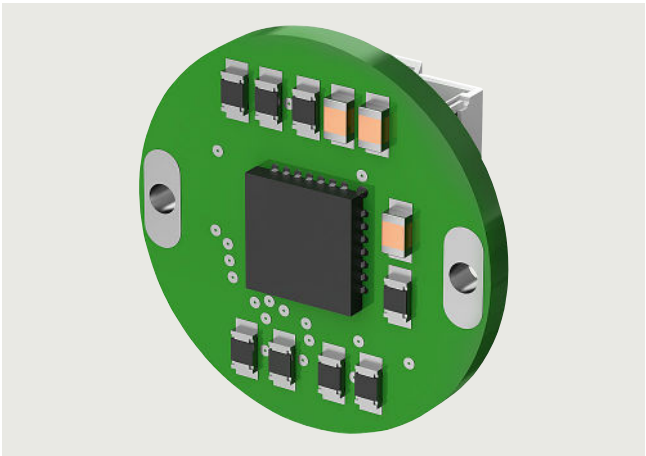
Extra low-voltage motors SIMOTICS E-1EE11		**With holding brake**
Shaft height 20R		**1EE11 . . - 1 . A00 - . . . 4**
Rated voltage	V DC	24
Maximum operating energy per stop	J	10
Total operating energy (service life)	J	5000
Min. braking torque [1]	Nm	0.3
Closing time	ms	25
Opening time	ms	85

Encoder for SIMOTICS E-1EE11 extra low-voltage motors, shaft height 20R

Incremental encoder 1024 S/R
(encoder TTL1024S/R)

Magnetic 3-channel incremental encoder integrated into the motor enclosure

- A 12-bit resolution is achieved through appropriate evaluation
- The rotary encoder is non-contact and wear-free
- Other resolutions and interfaces are possible on request



Multiturn absolute encoder 17 bit + 16 bit
(encoder AM17BC)

Multiturn magnetic absolute encoder; optional: Singleturn integrated in the motor enclosure

- A resolution of up to 17 bit (singleturn) or 16 bit (multiturn) is achieved through appropriate evaluation
- The rotary encoder is non-contact and wear-free
- Battery-less counter buffering due to Wiegand effect
- Other resolutions and interfaces are possible on request

[1] Value in run-in state

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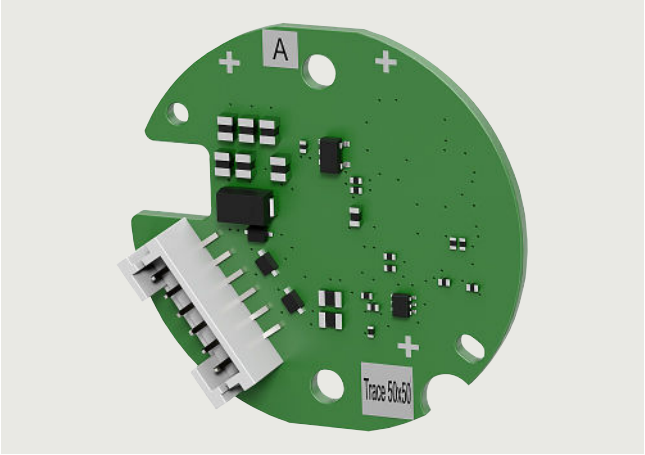
SIMOTICS E-1EE11 without integrated converter, shaft height 20R

Technical specifications

Incremental encoder 100 S/R (encoder TTL100S/R)

Magnetic IQ incremental encoder integrated into the motor enclosure

- Motor data saved in the HSP motor library (TIA Portal; Siemens)
- Automatic component identification during commissioning
- Electronic Data Sheet (EDS) for the configured drive available in the IQ encoder
- Quick and easy commissioning process
- System diagnostics
- Temperature model stored in TIA
- Patented data transmission via existing signaling lines



Extra low-voltage motors SIMOTICS E-1EE11				
Shaft height 20R		**Incremental encoder 1024 S/R (encoder TTL1024S/R) 1EE11 . . - . BA00 - . AA4**	**Multiturn absolute encoder 17 bit + 16 bit (encoder AM17BC) 1EE11 . . - . DA00 - . AA4**	**Incremental encoder 100 S/R (encoder TTL100S/R) 1EE11 . . - . CA00-3AA4**
Resolution		1024 PPR	Singleturn 17 bit	100 PPR
		4096 CPR	Multiturn 16 bit	400 CPR
Max. signal frequency f	kHz	4000	10000	5
Supply voltage U_B	V DC	+5 ± 10 %	5 … 15	+5 (+/-10 %)
Power consumption I_B	mA	max. 30	60	typ. 40/max. 100
Accuracy	°	in preparation	± 0.5	in preparation

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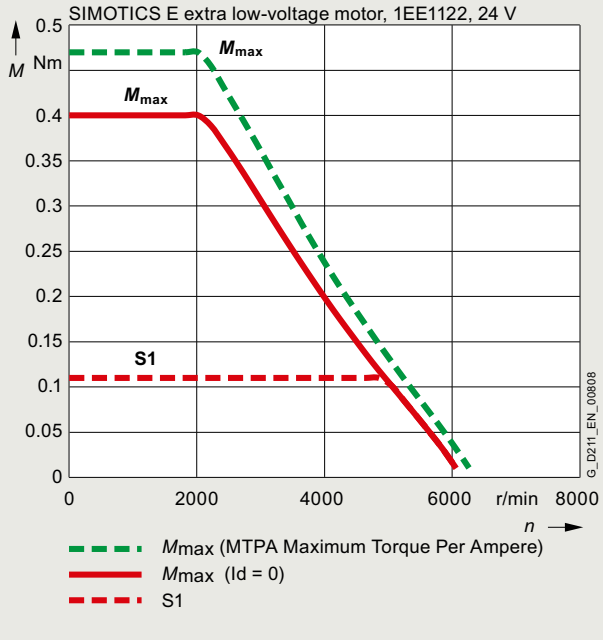
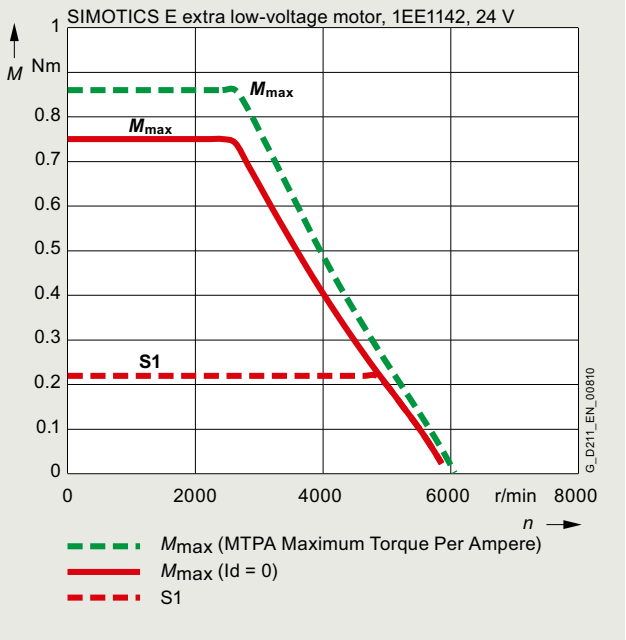
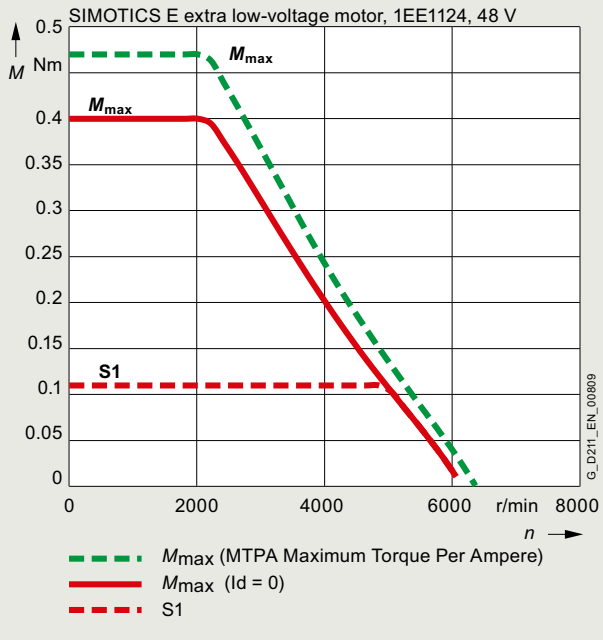
Characteristic curves

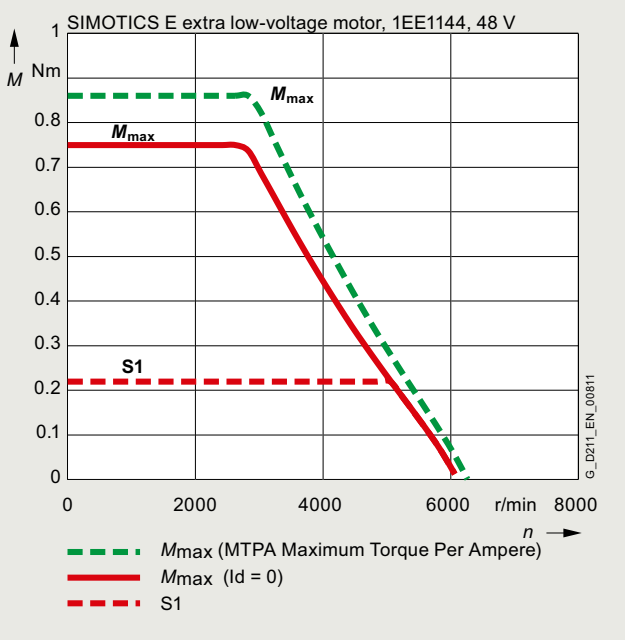
SIMOTICS E-1EE11 extra low-voltage motors without integrated converter, without gearbox, shaft height 20R

Without holding brake









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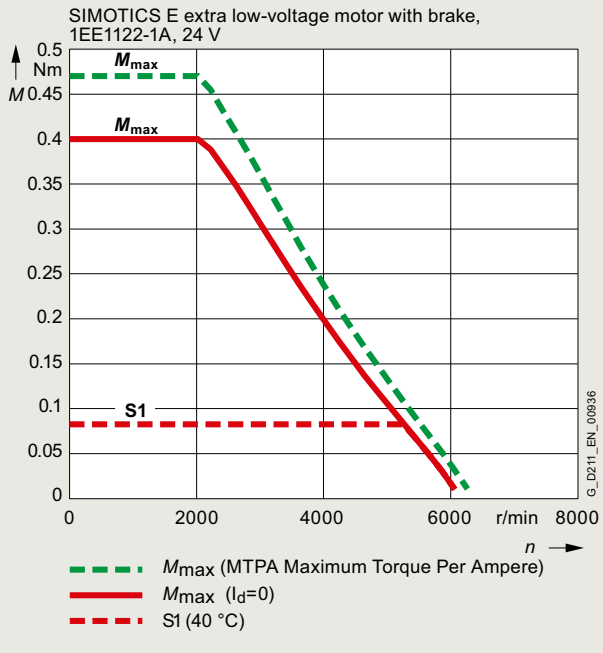
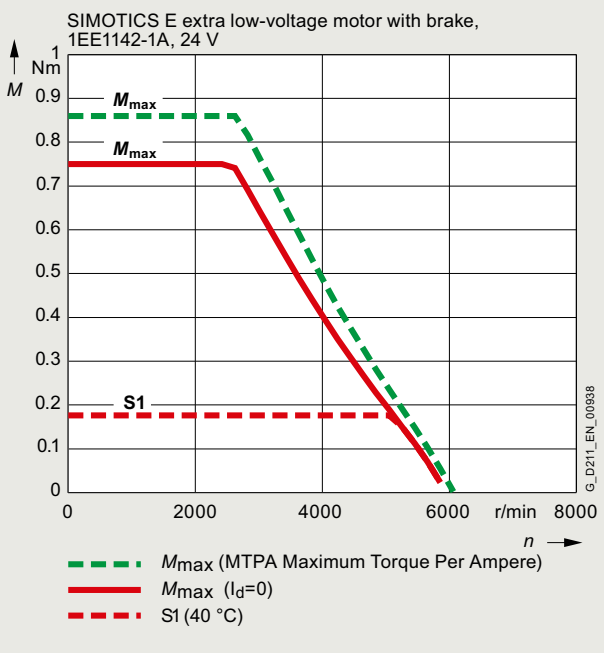
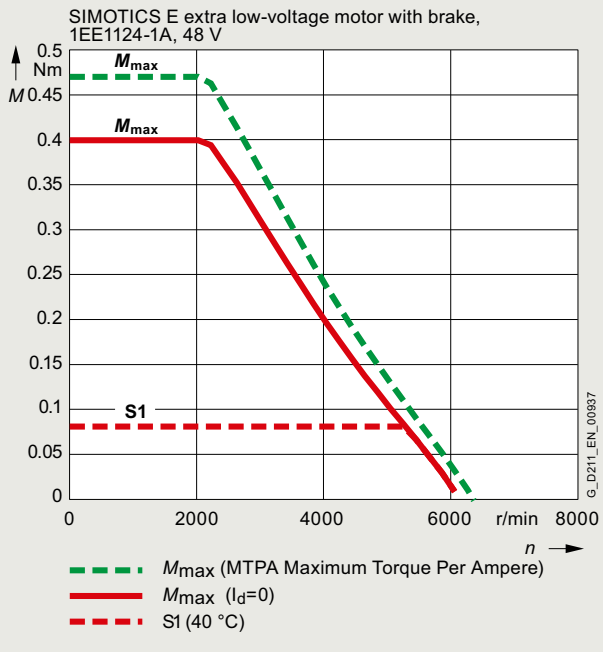
SIMOTICS E-1EE11 without integrated converter, shaft height 20R

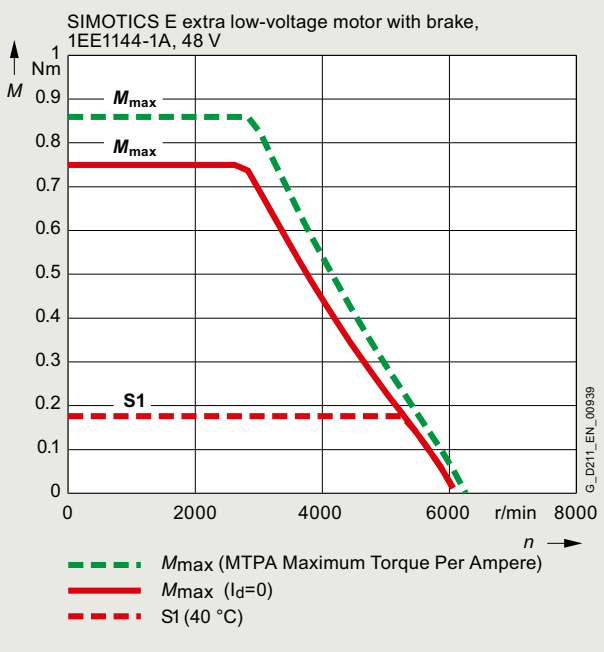
Characteristic curves

With holding brake









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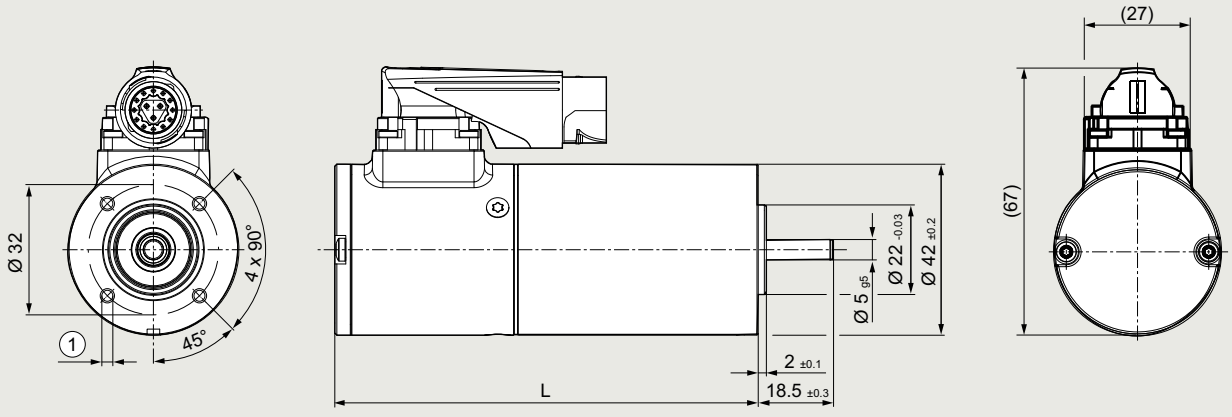
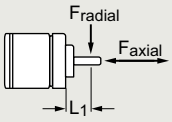
Dimensional drawings

SIMOTICS E-1EE11 extra low-voltage motors without integrated converter, without gearbox, shaft height 20R



1 4 x for thread-forming screws M3 according to DIN 7500, 9.5 mm deep

Permissible shaft loading



F_{axial}:	20 N
F_{radial}:	100 N
L_1:	10 mm

Permissible simultaneous shaft loadings at rated speed and service life expectancy L10 (in rated operation) of 20000 h (at T_U max. 40 °C)

G_D211_EN_00812

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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SIMOTICS E-1EE13 without integrated converter, shaft height 30R

Technical specifications

Motor with integrated rotor position encoder

- Highly dynamic 3-phase servomotor with EC technology (6-pin)
- Low cogging torque
- Robust and noise-optimized ball bearing system for a long service life
- High efficiency and high power density with a compact design
- Basic motor for operation with external converter
- Mechanical design and interfaces, designed for modular systems
- Optional magnetic incremental encoder and/or holding brake integrated into the motor enclosure
- Degree of protection IP54 and connection via industry-standard, rotatable connector

Extra low-voltage motors SIMOTICS E-1EE13		**1EE13 . . - . . A0 . - . AA4**		
Shaft height 30R		**Overall length 20**	**Overall length 40**	**Overall length 60**
General technical specifications		**1EE132 . - . . A0 . - . AA4**	**1EE134 . - . . A0 . - . AA4**	**1EE136 . - . . A0 . - . AA4**
Maximum speed n_{max}	r/min	5600	5600	5800
Rotor moment of inertia J_{Mot}	10^{-6} kgm^2	19.3	37.5	55.7
Moment of inertia (with brake) $J_{Mot,Br}$	10^{-6} kgm^2	20.5	38.7	56.9
Motor weight with basic equipment m_{Mot}	kg (lb)	0.97 (2.14)	1.34 (2.95)	1.71 (3.77)
Weight (with brake) $m_{Mot,Br}$	kg (lb)	1.15 (2.54)	1.71 (3.77)	2.08 (4.59)
Overload protection		to be implemented via control electronics		
Permissible ambient temperature range	°C (°F)	0 … +40 (32 … 104)		
Technical specifications for winding 24 V DC		**1EE1322- . . A0 . - . AA4**	**1EE1342- . . A0 . - . AA4**	**–**
Rated speed n_N	r/min	4000	4000	–
Rated torque M_N [1]	Nm	0.43 [0.387]	0.65 [0.585]	–
Maximum torque M_{max} [1]	Nm	1.5 [1.35]	2.2 [1.98]	–
Static torque M_0 [1]	Nm	0.473 [0.43]	0.65 [0.64]	–
Rated current (phase RMS) I_N	A	9.3	14	–
Rated power P_N [1]	W	180 [162]	280 [245]	–
Permissible peak current I_{max}	A	48	56	–
Stall current I_0	A	10.23	14	–
Voltage constant k_e	V/1000 r/min	4.25	4.39	–
Terminal resistance R_V	Ohm	0.14	0.08	–
Rotating field inductance transverse direction L_q	µH	205	97	–
Rotating field inductance longitudinal direction L_d	µH	122	54	–
Technical specifications for winding 48 V DC		**1EE1324- . . A0 . - . AA4**	**1EE1344- . . A0 . - . AA4**	**1EE1364- . . A0 . - . AA4**
Rated speed n_N	r/min	4000	4000	4000
Rated torque M_N [1]	Nm	0.43 [0.387]	0.78 [0.702]	1 [0.9]
Maximum torque M_{max} [1]	Nm	1.5 [1.35]	2.73 [2.457]	4 [3.6]
Static torque M_0 [1]	Nm	0.473 [0.43]	0.858 [0.77]	1.1 [0.99]
Rated current (phase RMS) I_N	A	5.5	8.4	11.2
Rated power P_N [1]	W	180 [162]	330 [294]	420 [377]
Permissible peak current I_{max}	A	29	40	56
Stall current I_0	A	6.05	9.24	12.32
Voltage constant k_e	V/1000 r/min	7.44	8.8	8.46
Terminal resistance R_V	Ohm	0.42	0.24	0.15
Rotating field inductance transverse direction L_q	µH	540	397	241
Rotating field inductance longitudinal direction L_d	µH	320	217	132

[1] Depending on the commutation: Value without brackets is sinusoidal commutated (I_d = 0), value in brackets is block commutated.

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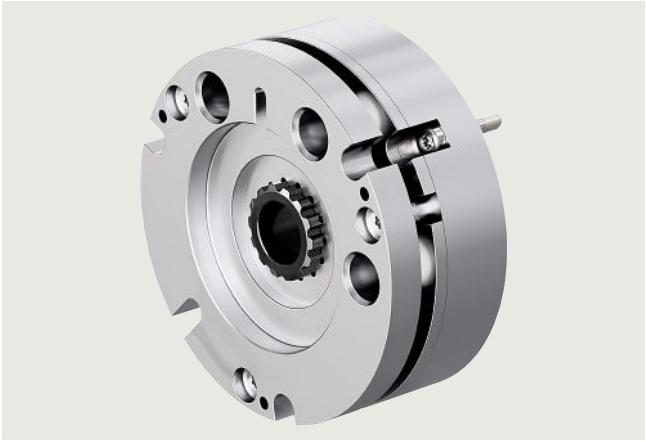
Technical specifications

Holding brake for SIMOTICS E-1EE13 extra low-voltage motors, shaft height 30R



Exemplary representation of the brake

Holding brake with EMERGENCY STOP function

- Fail-safe brake according to spring force principle
- Single-disk brake with two friction surfaces
- Braking torque acts in the current-free state
- Brake force is cancelled by electromagnetic force
- Brake is actuated in the current-free state, with a high power density
- Reduced moment of inertia for optimal dynamic response
- Special feature for brake control module 1EE13:
  - Reduced power consumption to hold the open state
  - Innovative brake concept offers installation-space-optimized dimensions
- Degree of protection IP54 (by means of installation in the drive)

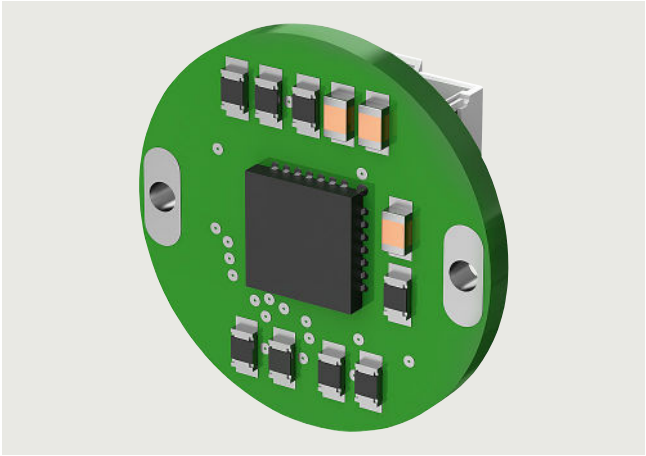
Extra low-voltage motors SIMOTICS E-1EE13 Shaft height 30R		**With holding brake 1EE13 . . - 1 . A00 - . . . 4**
Rated voltage	V DC	24
Maximum operating energy per stop	J	68
Total operating energy (service life)	J	34000
Min. braking torque [1]	Nm	1
Closing time	ms	8
Opening time	ms	30

Encoder for SIMOTICS E-1EE13 extra low-voltage motors, shaft height 30R

Incremental encoder 1024 S/R
(encoder TTL1024S/R)

Magnetic 3-channel incremental encoder integrated into the motor enclosure

- A 12-bit resolution is achieved through appropriate evaluation
- The rotary encoder is non-contact and wear-free
- Other resolutions and interfaces are possible on request



Multiturn absolute encoder 17 bit + 16 bit
(encoder AM17BC)

Multiturn magnetic absolute encoder; optional: Singleturn integrated in the motor enclosure

- A resolution of up to 17 bit (singleturn) or 16 bit (multiturn) is achieved through appropriate evaluation
- The rotary encoder is non-contact and wear-free
- Battery-less counter buffering due to Wiegand effect
- Other resolutions and interfaces are possible on request

[1] Value in run-in state

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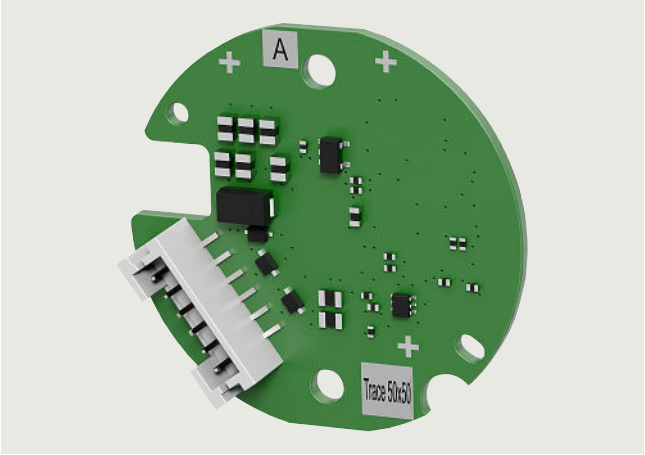
SIMOTICS E-1EE13 without integrated converter, shaft height 30R

Technical specifications

Incremental encoder 100 S/R (encoder TTL100S/R)

Magnetic IQ incremental encoder integrated into the motor enclosure

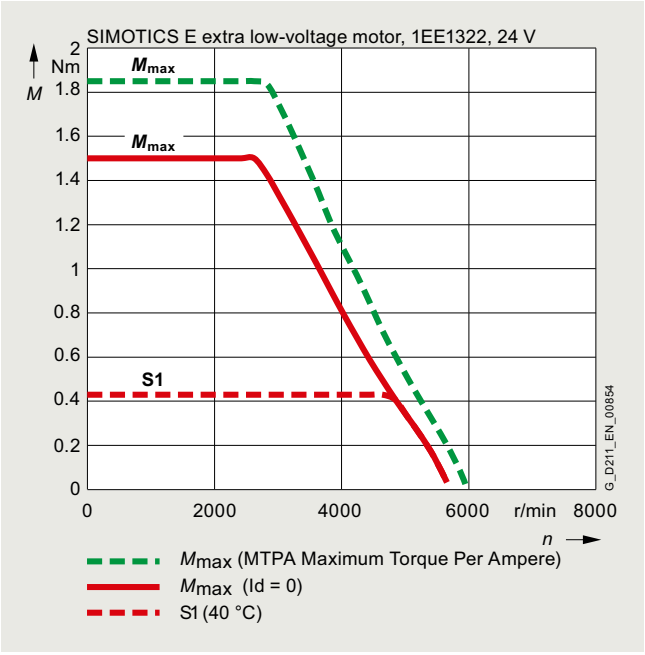
- Motor data saved in the HSP motor library (TIA Portal; Siemens)
- Automatic component identification during commissioning
- Electronic Data Sheet (EDS) for the configured drive available in the IQ encoder
- Quick and easy commissioning process
- System diagnostics
- Temperature model stored in TIA
- Patented data transmission via existing signaling lines

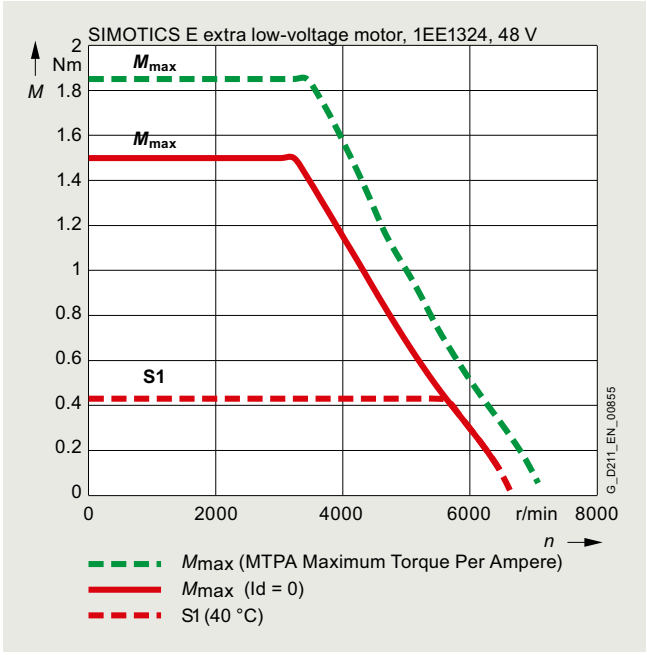


Extra low-voltage motors SIMOTICS E-1EE13 Shaft height 30R		Incremental encoder 1024 S/R (encoder TTL1024S/R) 1EE13 . . - . BA00 - . AA4	Multiturn absolute encoder 17 bit + 16 bit (encoder AM17BC) 1EE13 . . - . DA00 - . AA4	Incremental encoder 100 S/R (encoder TTL100S/R) 1EE13 . . - . CA00-3AA4
Resolution		1024 PPR	Singleturn 17 bit	100 PPR
		4096 CPR	Multiturn 16 bit	400 CPR
Max. signal frequency f	kHz	120	10000	5
Supply voltage U_B	V DC	5 ... 24	5 ... 15	+5 (+/-10 %)
Power consumption I_B	mA	max. 20	60	typ. 40/max. 100
Accuracy	°	± 0.5	± 0.5	in preparation

Characteristic curves

SIMOTICS E-1EE13 extra low-voltage motors without integrated converter, without gearbox, shaft height 30R





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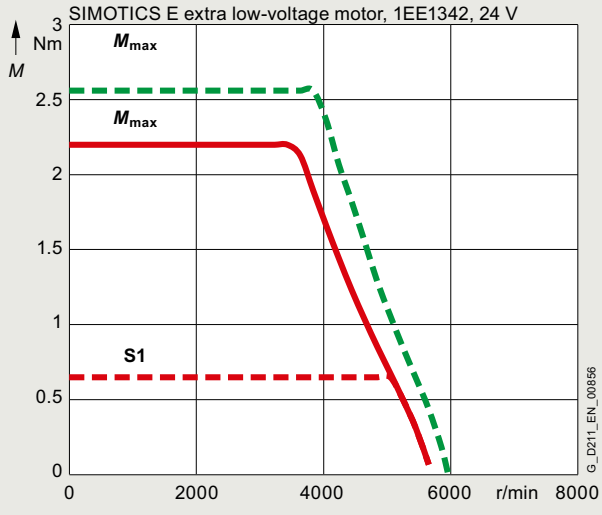
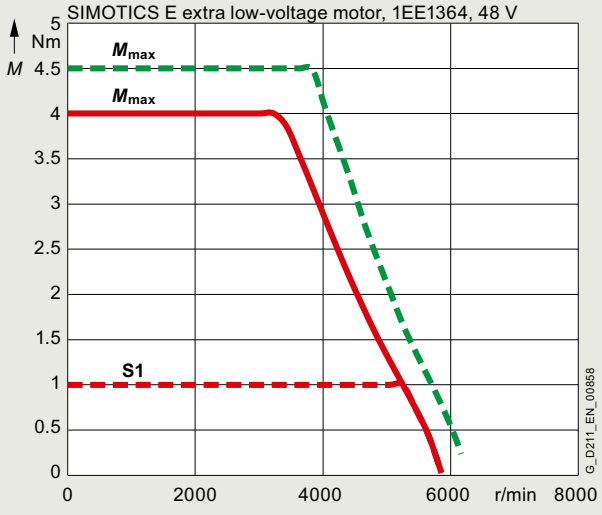
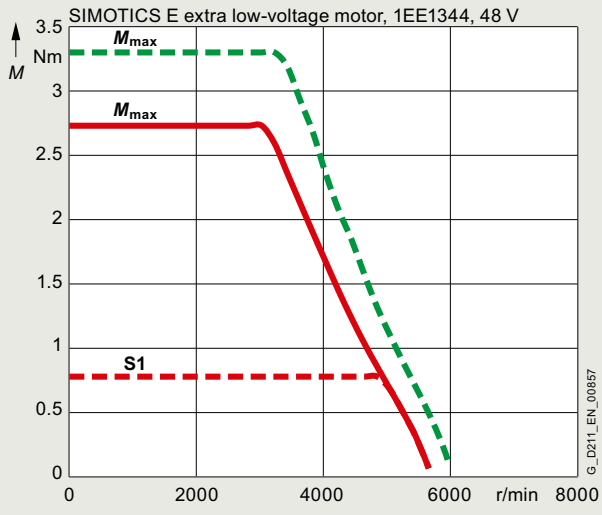
Characteristic curves







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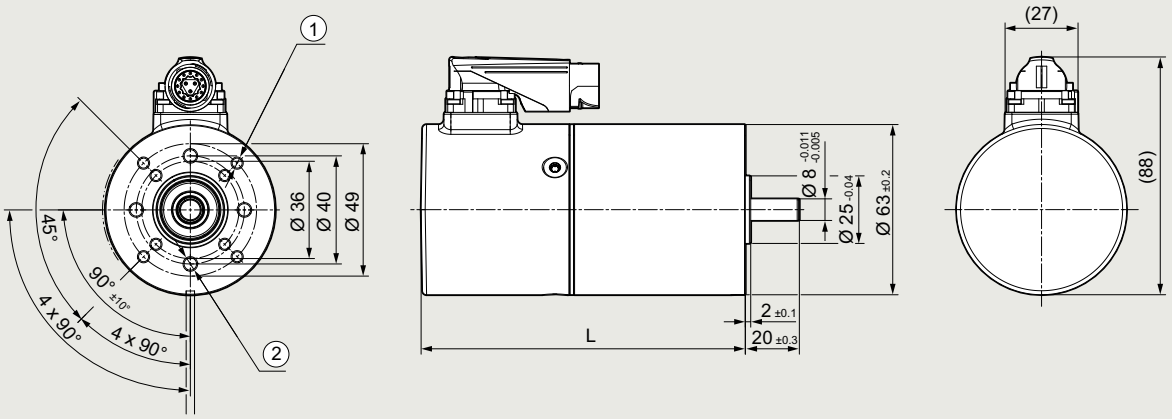
SIMOTICS E-1EE13 without integrated converter, shaft height 30R

Dimensional drawings

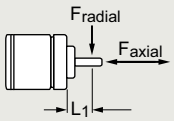
SIMOTICS E-1EE13 extra low-voltage motors without integrated converter, without gearbox, shaft height 30R



(1) 4 x for thread-forming screws M5 according to DIN 7500, 10.5 mm deep

(2) 8 x for thread-forming screws M4 according to DIN 7500, 10.5 mm deep

Permissible shaft loading



F_{axial}:	45 N
F_{radial}:	98 N
L_1:	10 mm

Permissible simultaneous shaft loadings at rated speed and service life expectancy L10 (in rated operation) from 20000 h (at T_U max. 40 °C)

G_D211_EN_00813

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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SIMOTICS E-1EE13 with integrated drive control, digital IOs, shaft height 30R

Technical specifications

Motor with integrated speed, torque or positioning control

- Drive with integrated 4Q converter (8-pin)
- Speed, torque or positioning mode possible
- Selection of operating modes and parameter assignment via RS485
- Extensive interface with a wide range of inputs and outputs
- Integrated braking chopper function
- Speed setpoints of n = 0 with a holding torque of up to 5000 r/min possible
- Excellent control behavior through field-oriented control
- High efficiency and high power density with a compact design
- User-friendly parameter assignment via "driveSTUDIO" PC software (on request)
- Integrated encoder system with 10-bit resolution, 3° accuracy

Extra low-voltage motors SIMOTICS E-1EE13		**1EE13 . . - . AD0 . - . AA2**					
Shaft height 30R		**Overall length 20**		**Overall length 40**		**Overall length 60**	
General technical specifications		**1EE132 . - . AD0 . - . AA2**		**1EE134 . - . AD0 . - . AA2**		**1EE136 . - . AD0 . - . AA2**	
Rotor moment of inertia J_{Mot}	10^{-6} kgm^2	19		38		56	
Moment of inertia (with brake) $J_{Mot,Br}$	10^{-6} kgm^2	20.6		39.6		57.6	
Motor weight with basic equipment m_{Mot}	kg (lb)	0.85 (1.87)		1.15 (2.54)		1.5 (3.31)	
Weight (with brake) $m_{Mot,Br}$	kg (lb)	1.2 (2.65)		1.5 (3.31)		1.8 (3.97)	
Overload protection		Integrated					
Permissible ambient temperature range	°C (°F)	0 … +40 (32 … 104)					
Setpoint input		Analog/PWM/frequency/digital					
Blocking protection function		thermal					
Recommended speed control range	r/min	0 ... 5000					
Technical specifications for winding	**24 V DC**	**1EE1322- . AD0 . - . AA2**		**1EE1342- . AD0 . - . AA2**		**–**	
		without brake	with brake	without brake	with brake		
Permissible supply voltage range $U_{DC\ link}$	V DC	18 ... 30		18 ... 30		–	
Max. reverse voltage	V DC	35		35		–	
Rated speed n_N	r/min	4000		4000		–	
Rated torque M_N	Nm	0.43	0.37	0.6	0.5	–	
Maximum torque M_{max}	Nm	0.64		0.9		–	
Static torque M_0	Nm	0.47	0.41	0.66	0.55	–	
Stall current (supply line) I_0	A	10.23	9.0	13	12.01	–	
Rated current (supply line) I_N	A	9.3	8.2	13	10.9	–	
Maximum current (supply line) I_{max}	A	14.3		19.5		–	
Rated power P_N	W	178	157	251	211	–	
Maximum speed n_{max}	r/min	5600		5600		–	
Technical specifications for winding	**48 V DC**	**1EE1324- . AD0 . - . AA2**		**1EE1344- . AD0 . - . AA2**		**1EE1364- . AD0 . - . AA2**	
		without brake	with brake	without brake	with brake	without brake	with brake
Permissible supply voltage range $U_{DC\ link}$	V DC	18 ... 53		18 ... 53		18 ... 53	
Max. reverse voltage	V DC	58		58		58	
Rated speed n_N	r/min	4000		4000		4000	
Rated torque M_N	Nm	0.45	0.39	0.6	0.5	0.85	0.7
Maximum torque M_{max}	Nm	0.9		1.2		1.7	
Static torque M_0	Nm	0.5	0.43	0.66	0.55	0.94	0.77
Stall current (supply line) I_0	A	6.27	5.45	7.26	6.03	10.45	8.57
Rated current (supply line) I_N	A	5.7	5.0	6.6	5.5	9.5	7.8
Maximum current (supply line) I_{max}	A	12.6		13.2		19.2	
Rated power P_N	W	188	164	251	209	356	292
Maximum speed n_{max}	r/min	5900		5600		5800	

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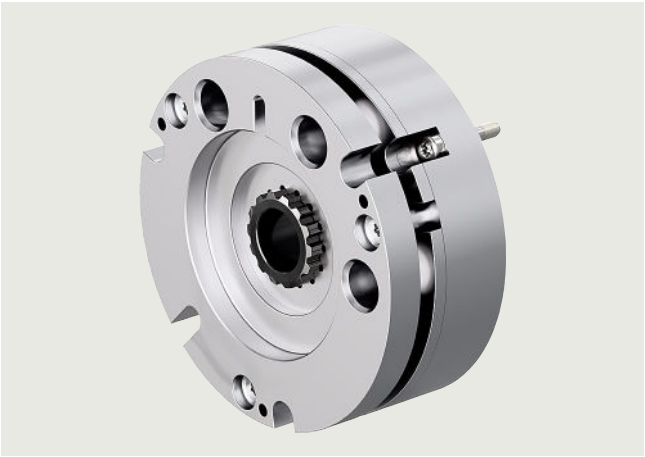
SIMOTICS E-1EE13 with integrated drive control, digital IOs, shaft height 30R

Technical specifications

Holding brake for SIMOTICS E-1EE13 extra low-voltage motors, shaft height 30R



Exemplary representation of the brake

Holding brake with EMERGENCY STOP function

- Fail-safe brake according to spring force principle
- Single-disk brake with two friction surfaces
- Braking torque acts in the current-free state
- Brake force is cancelled by electromagnetic force
- Brake is actuated in the current-free state, with a high power density
- Reduced moment of inertia for optimal dynamic response
- Degree of protection IP54 (by means of installation in the drive)

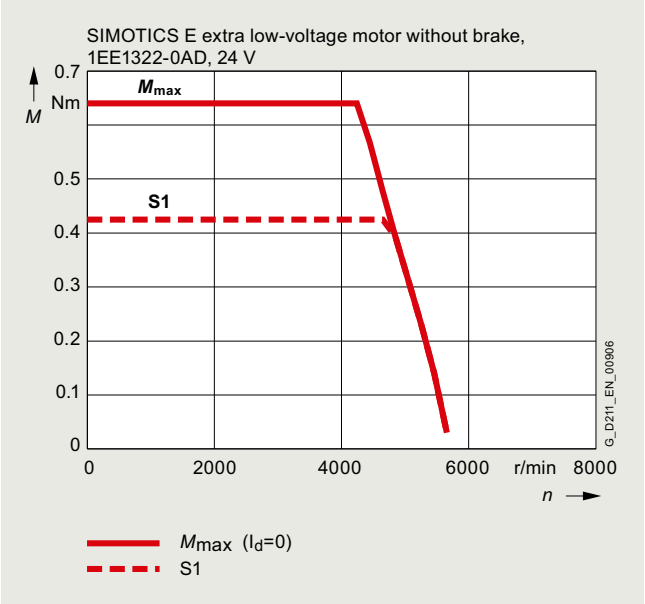
Extra low-voltage motors SIMOTICS E-1EE13		**With holding brake**
Shaft height 30R		**1EE14 . . - 1 . A00 - . . . 4**
Rated voltage	V DC	24
Maximum operating energy per stop	J	50
Total operating energy (service life)	J	25000
Min. braking torque [1]	Nm	1
Closing time	ms	48
Opening time	ms	40

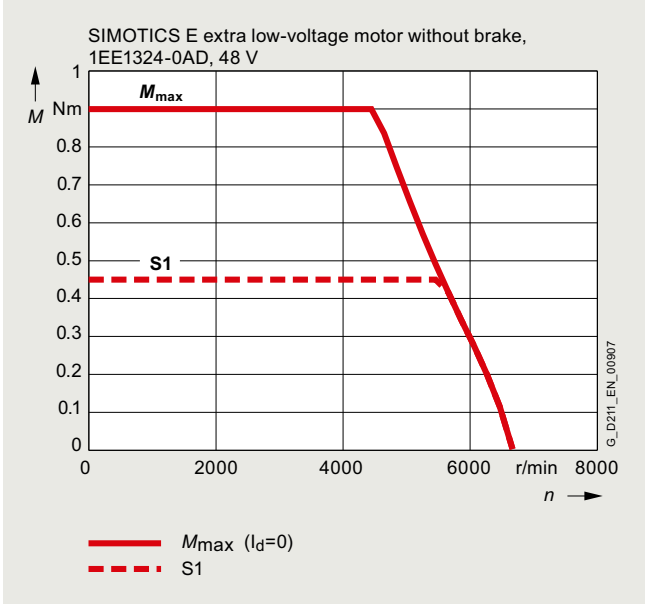
4

Characteristic curves

SIMOTICS E-1EE13 extra low-voltage motors with integrated speed, torque or positioning control, digital IOs, without gearbox, shaft height 30R

Without holding brake





[1] Value in run-in state

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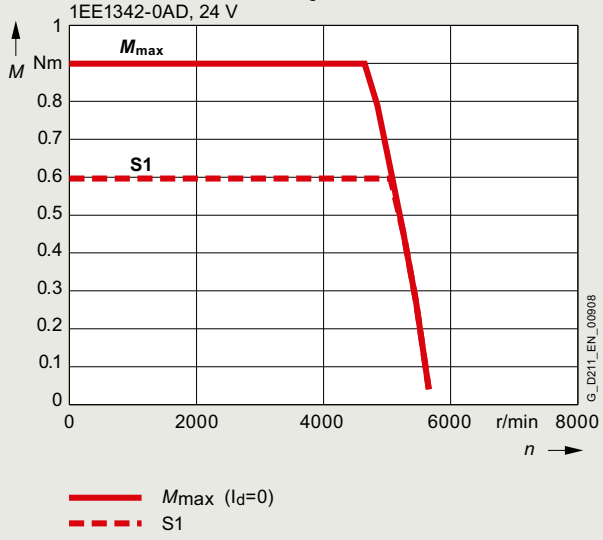
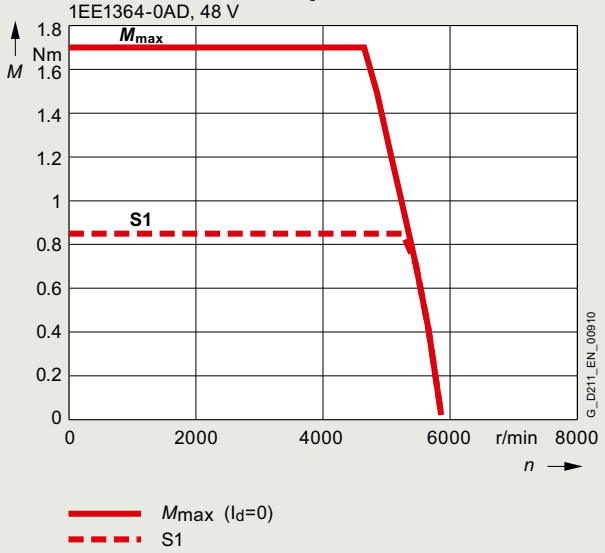
Characteristic curves

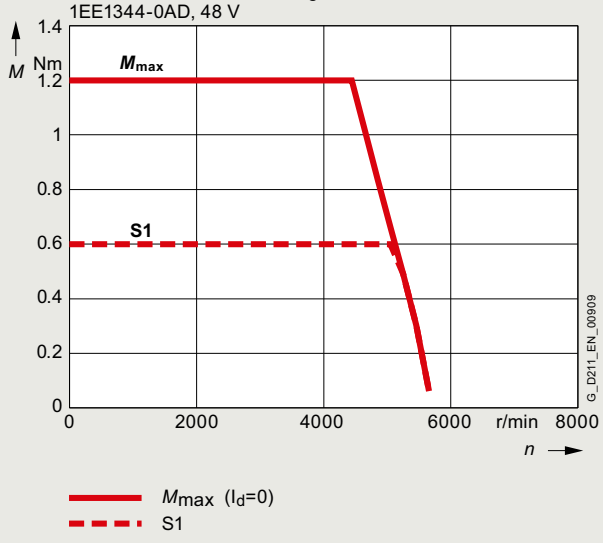
SIMOTICS E extra low-voltage motor without brake, 1EE1342-0AD, 24 V



SIMOTICS E extra low-voltage motor without brake, 1EE1364-0AD, 48 V



SIMOTICS E extra low-voltage motor without brake, 1EE1344-0AD, 48 V



4

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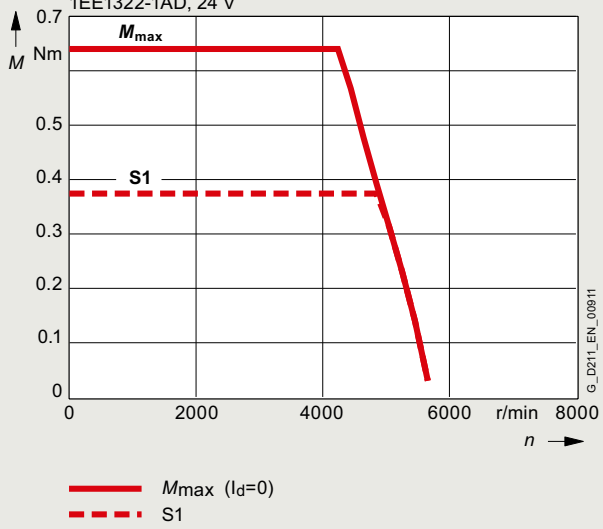
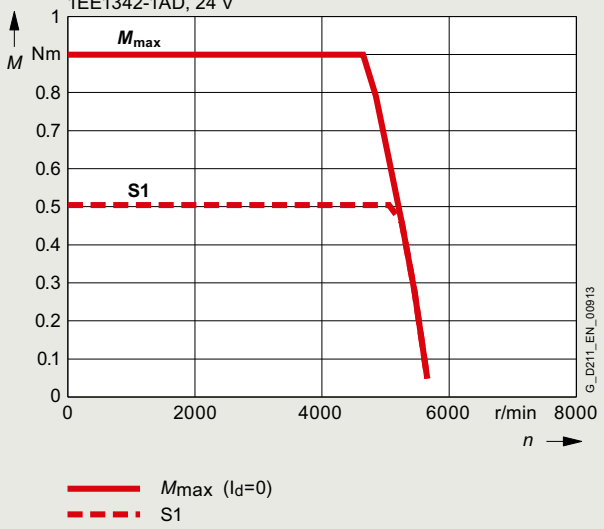
Characteristic curves

With holding brake

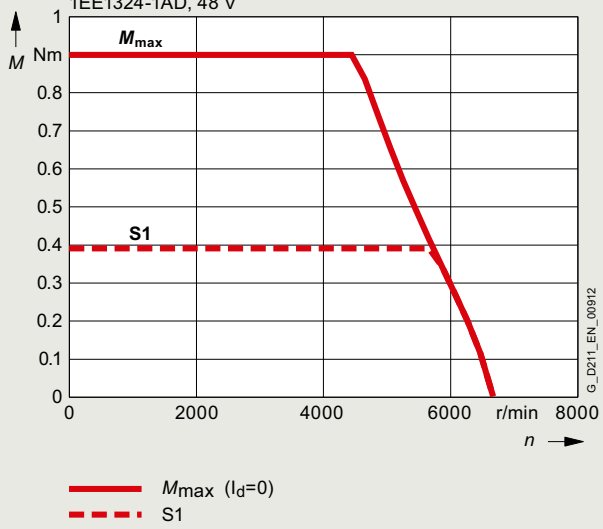
SIMOTICS E extra low-voltage motor with brake, 1EE1322-1AD, 24 V



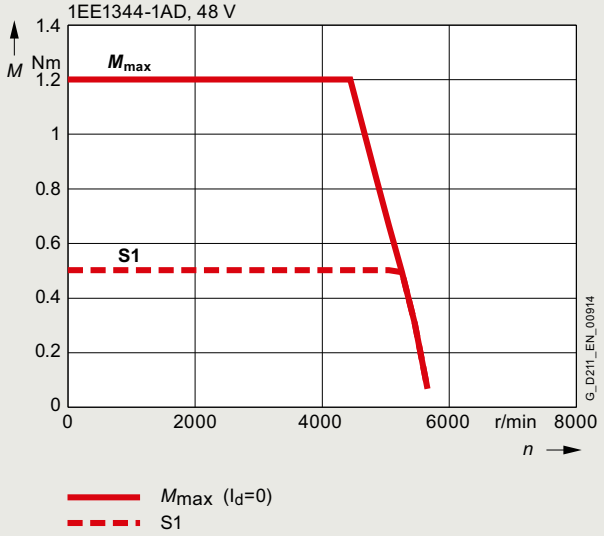
SIMOTICS E extra low-voltage motor with brake, 1EE1342-1AD, 24 V



SIMOTICS E extra low-voltage motor with brake, 1EE1324-1AD, 48 V



SIMOTICS E extra low-voltage motor with brake, 1EE1344-1AD, 48 V



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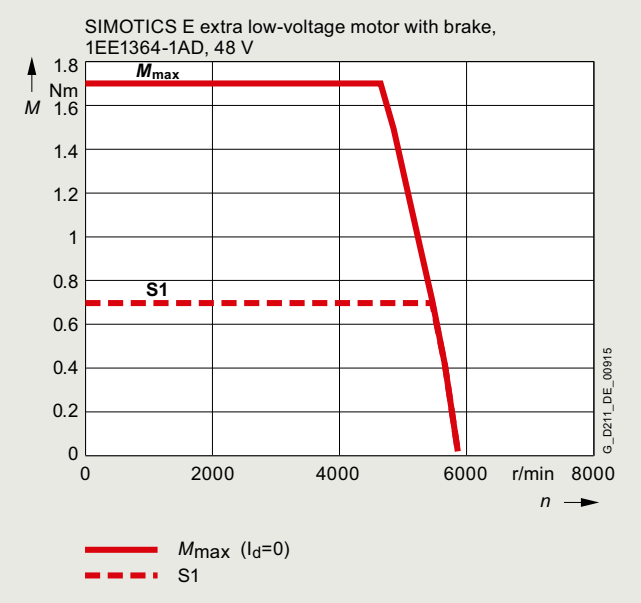
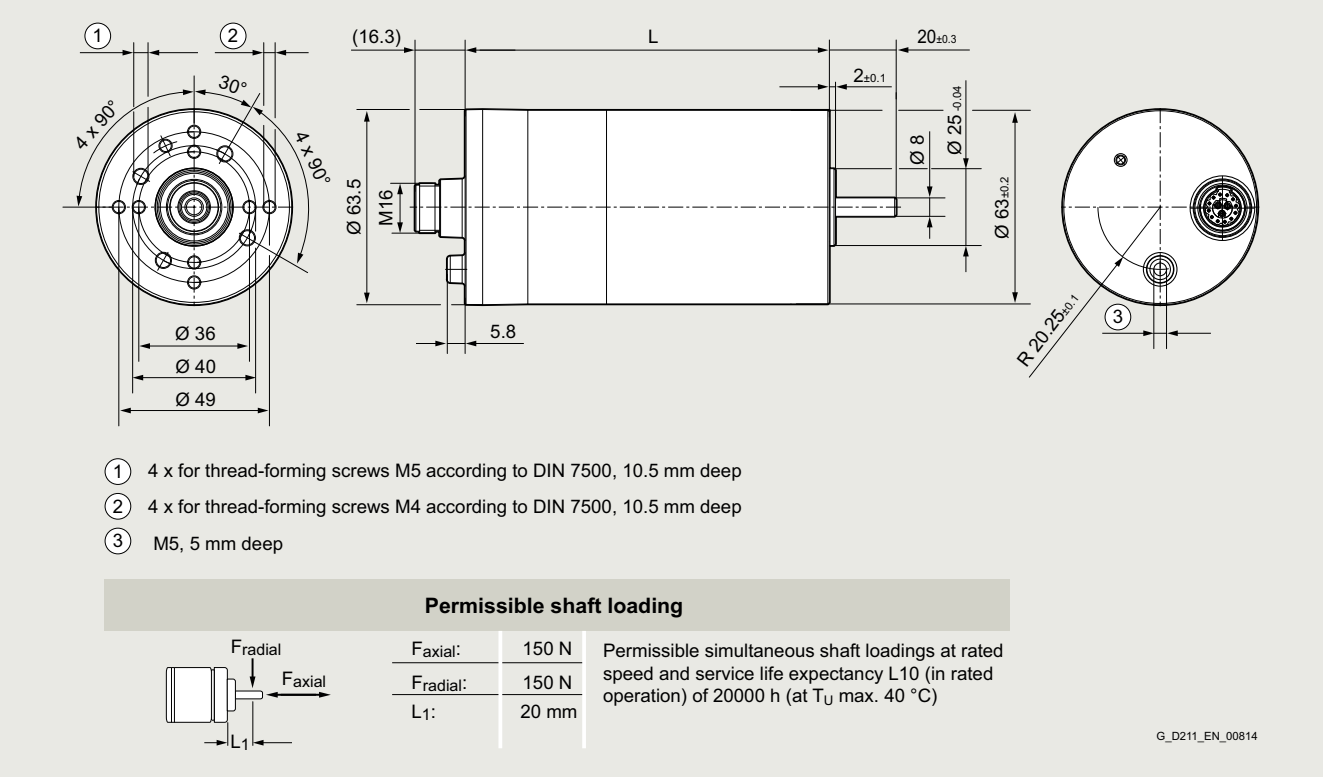
Characteristic curves



Dimensional drawings

SIMOTICS E-1EE13 extra low-voltage motors with integrated speed, torque or positioning control, digital IOs, without gearbox, shaft height 30R



Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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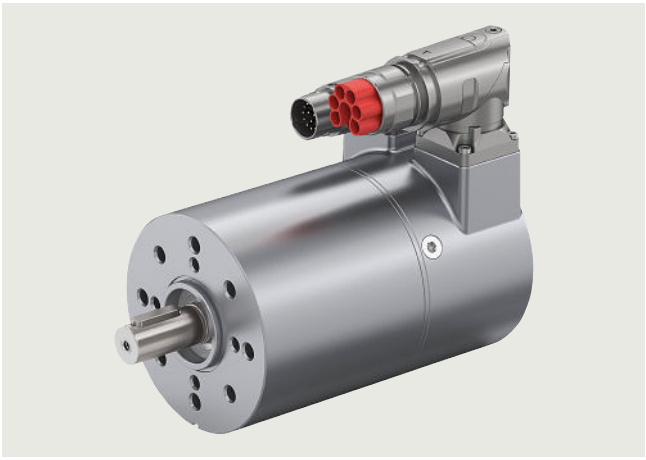
SIMOTICS E-1EE14 without integrated converter, shaft height 40R

Technical specifications



Highly dynamic 3-phase internal rotor motor with EC technology (8-pin)

- Low cogging torque
- Robust and noise-optimized ball bearing system for a long service life
- High efficiency and high power density with a compact design
- Basic motor for operation with external converter
- Mechanical design and interfaces, designed for modular systems
- Degree of protection IP54 and connection via industry-standard, rotatable connector

Extra low-voltage motors SIMOTICS E-1EE14		**1EE14 . . - . . A0 . - . AA4**		
Shaft height 40R		**Overall length 20**	**Overall length 40**	**Overall length 60**
General technical specifications		**1EE142 . - . . A0 . - . AA4**	**1EE144 . - . . A0 . - . AA4**	**1EE146 . - . . A0 . - . AA4**
Maximum speed n_{max}	r/min	4700	4700	5900
Rotor moment of inertia J_{Mot}	10^{-6} kgm^2	5.41	10.43	15.44
Moment of inertia (with brake) $J_{Mot,Br}$	10^{-6} kgm^2	15.01	20.03	25.04
Motor weight with basic equipment m_{Mot}	kg (lb)	1.7 (3.75)	2.3 (5.07)	2.9 (6.39)
Weight (with brake) $m_{Mot,Br}$	kg (lb)	2.37 (5.23)	2.97 (6.55)	3.57 (7.87)
Overload protection		to be implemented via control electronics		
Permissible ambient temperature range	°C (°F)	0 … +40 (32 … +104)		
Technical specifications for winding 24 V DC		**1EE1422- . . A0 . - . AA4**	**1EE1442- . . A0 . - . AA4**	**–**
Rated speed n_N	r/min	4000	4000	–
Rated torque M_N [1]	Nm	0.75 [0.675]	1.1 [0.99]	–
Maximum torque M_{max} [1]	Nm	2.4 [2.16]	3.75 [3.375]	–
Static torque M_0 [1]	Nm	0.83 [0.74]	1.1 [0.99]	–
Rated current (phase RMS) I_N	A	14	20	–
Rated power P_N [1]	W	314 [283]	461 [415]	–
Permissible peak current I_{max}	A	60	80	–
Stall current I_0	A	15.62	20	–
Voltage constant k_e	V/1000 r/min	4.98	5.09	–
Terminal resistance R_V	Ohm	0.086	0.046	–
Rotating field inductance transverse direction L_q	µH	205	97	–
Rotating field inductance longitudinal direction L_d	µH	122	54	–
Technical specifications for winding 48 V DC		**1EE1424- . . A0 . - . AA4**	**1EE1444- . . A0 . - . AA4**	**1EE1464- . . A0 . - . AA4**
Rated speed n_N	r/min	4000	4000	4000
Rated torque M_N [1]	Nm	0.75 [0.675]	1.35 [1.215]	1.6 [1.44]
Maximum torque M_{max} [1]	Nm	2.4 [2.16]	4.4 [3.96]	5.6 [5.04]
Static torque M_0 [1]	Nm	0.83 [0.74]	1.49 [1.34]	1.6 [1.44]
Rated current (phase RMS) I_N	A	7.1	12.3	20
Rated power P_N [1]	W	314 [283]	565 [509]	670 [603]
Permissible peak current I_{max}	A	30	50	80
Stall current I_0	A	7.81	13.53	20
Voltage constant k_e	V/1000 r/min	9.99	10.24	7.67
Terminal resistance R_V	Ohm	0.285	0.125	0.155
Rotating field inductance transverse direction L_q	µH	540	397	241
Rotating field inductance longitudinal direction L_d	µH	320	217	132

[1] Depending on the commutation: Value without brackets is sinusoidal commutated (I_d = 0), value in brackets is block commutated.

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Technical specifications

Holding brake for SIMOTICS E-1EE14 extra low-voltage motors, shaft height 40R

Exemplary representation of the brake

Holding brake with EMERGENCY STOP function

- Fail-safe brake according to spring force principle
- Single-disk brake with two friction surfaces
- Braking torque acts in the current-free state
- Brake force is cancelled by electromagnetic force
- Brake is actuated in the current-free state, with a high power density
- Reduced moment of inertia for optimal dynamic response
- Special feature for brake control module 1EE13:
  - Reduced power consumption to hold the open state
  - Innovative brake concept offers installation-space-optimized dimensions
- Degree of protection IP54 (by means of installation in the drive)

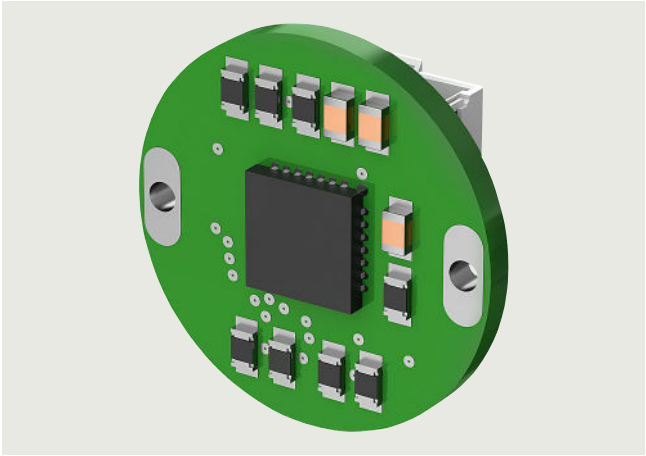
Extra low-voltage motors SIMOTICS E-1EE14 Shaft height 40R		**With holding brake 1EE14 . . - 1 . A00 - . . . 4**
Rated voltage	V DC	24
Maximum operating energy per stop	J	180
Total operating energy (service life)	J	36000
Min. braking torque [1]	Nm	2.2
Closing time	ms	25
Opening time	ms	85

Encoder for SIMOTICS E-1EE14 extra low-voltage motors, shaft height 40R

Incremental encoder 1024 S/R
(encoder TTL1024S/R)

Magnetic 3-channel incremental encoder integrated into the motor enclosure

- A 12-bit resolution is achieved through appropriate evaluation
- The rotary encoder is non-contact and wear-free
- Other resolutions and interfaces are possible on request



Multiturn absolute encoder 17 bit + 16 bit
(encoder AM17BC)

Multiturn magnetic absolute encoder; optional: Singleturn integrated in the motor enclosure

- A resolution of up to 17 bit (singleturn) or 16 bit (multiturn) is achieved through appropriate evaluation
- The rotary encoder is non-contact and wear-free
- Battery-less counter buffering due to Wiegand effect
- Other resolutions and interfaces are possible on request

[1] Value in run-in state

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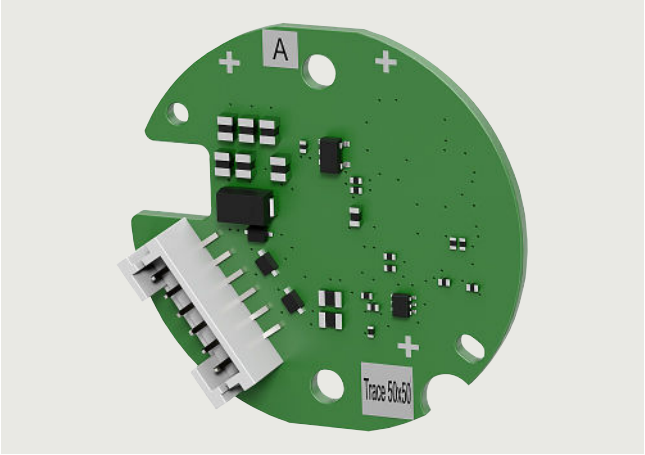
SIMOTICS E-1EE14 without integrated converter, shaft height 40R

Technical specifications

Incremental encoder 100 S/R (encoder TTL100S/R)

Magnetic IQ incremental encoder integrated into the motor enclosure

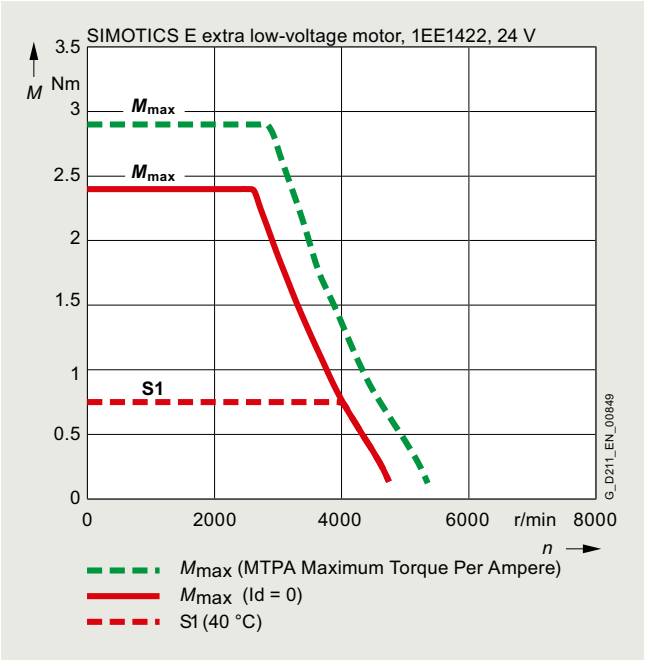
- Motor data saved in the HSP motor library (TIA Portal; Siemens)
- Automatic component identification during commissioning
- Electronic Data Sheet (EDS) for the configured drive available in the IQ encoder
- Quick and easy commissioning process
- System diagnostics
- Temperature model stored in TIA
- Patented data transmission via existing signaling lines

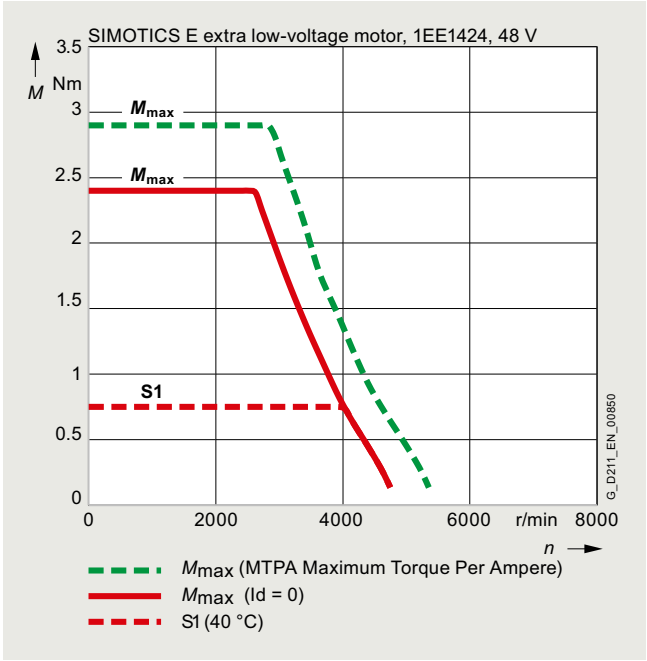


Extra low-voltage motors SIMOTICS E-1EE14 Shaft height 40R		Incremental encoder 1024 S/R (encoder TTL1024S/R) 1EE14 . . - . BA00 - . AA4	Multiturn absolute encoder 17 bit + 16 bit (encoder AM17BC) 1EE14 . . - . DA00 - . AA4	Incremental encoder 100 S/R (encoder TTL100S/R) 1EE14 . . - . CA00-3AA4
Resolution		1024 PPR	Singleturn 17 bit	100 PPR
		4096 CPR	Multiturn 16 bit	400 CPR
Max. signal frequency f	kHz	4000	10000	5
Supply voltage U_B	V DC	+5 ± 10 %	5 … 15	+5 (+/-10 %)
Power consumption I_B	mA	max. 30	60	typ. 40/max. 100
Accuracy	°	± 0.5	± 0.5	in preparation

Characteristic curves

SIMOTICS E-1EE14 extra low-voltage motors without integrated converter, without gearbox, shaft height 40R





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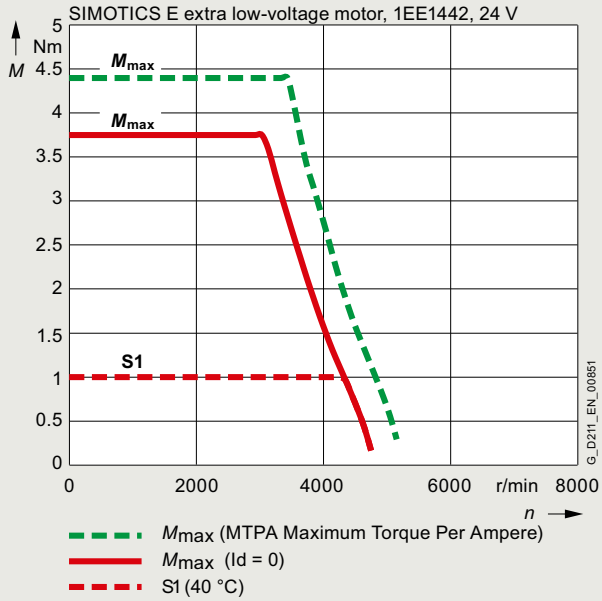
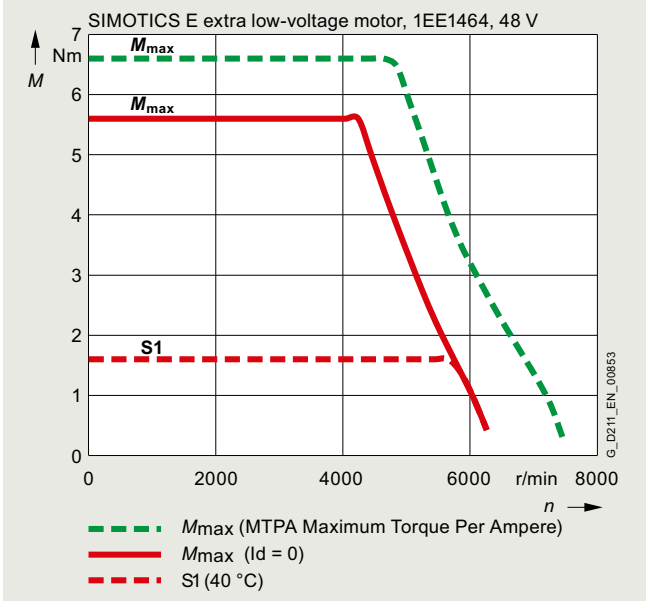
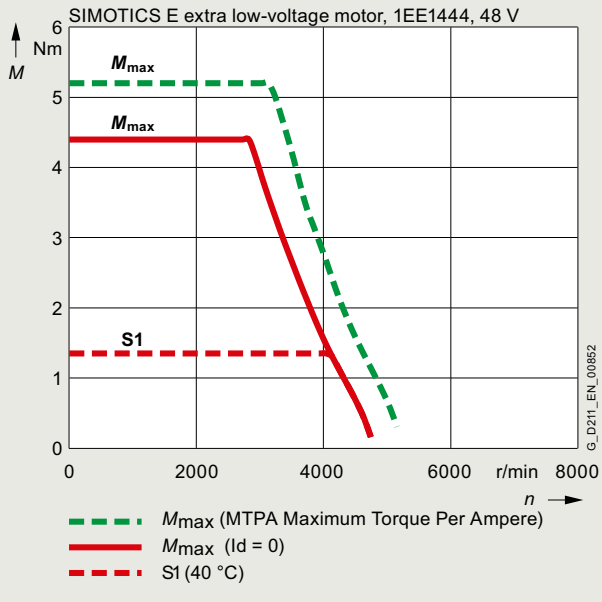
Characteristic curves







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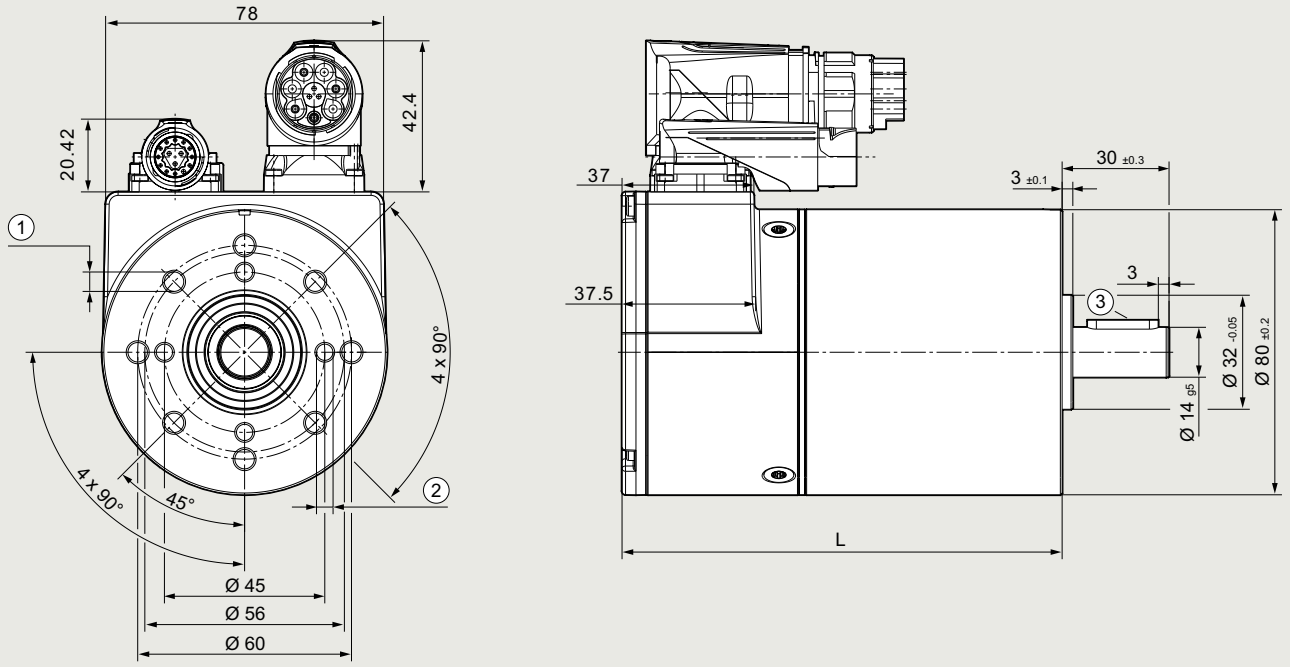
SIMOTICS E-1EE14 without integrated converter, shaft height 40R

Dimensional drawings

SIMOTICS E-1EE14 extra low-voltage motors without integrated converter, without gearbox, shaft height 40R

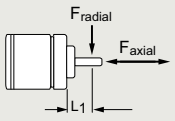


1 8 x for thread-forming screws M6 according to DIN 7500, 13 mm deep

2 4 x for thread-forming screws M5 according to DIN 7500, 13 mm deep

3 Feather key A5 x 5 x 20 DIN 6885

Permissible shaft loading



F_{axial}:	70 N
F_{radial}:	330 N
L_1:	15 mm

Permissible simultaneous shaft loadings at rated speed and service life expectancy L10 (in rated operation) of 20000 h (at T_U max. 40 °C)

G_D211_EN_00817

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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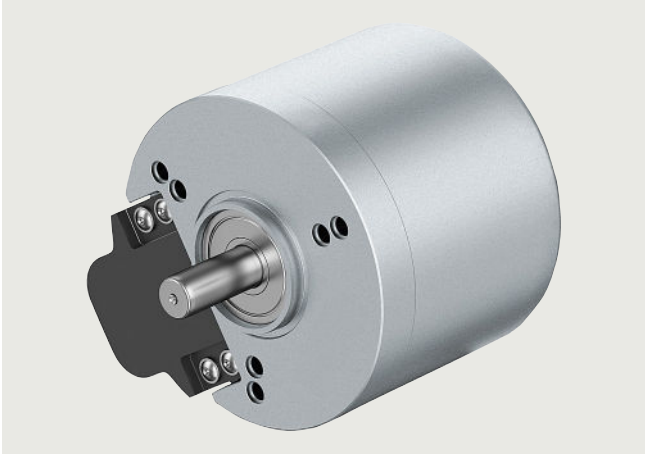
Technical specifications



3-phase external rotor servomotor with EC technology

- High-pole motor design for optimum power density
- Basic motor for operation on external control electronics
- Excellent synchronous operation characteristics
- Robust mechanical design in IP54 for industrial use
- Long service life through use of precision ball bearings
- Insulating material class E
- Electrical connection via cable with attached connectors

Extra low-voltage motors SIMOTICS E-1EV14 Shaft height 30R		1EV143 . -0AA00-1AA0
General technical specifications		**Overall length 15**
Maximum speed n_{max}	r/min	5500
Rotor moment of inertia J_{Mot}	10^{-6} kgm^2	107.26
Motor weight with basic equipment m_{Mot}	kg (lb)	0.59 (1.3)
Overload protection		to be implemented via control electronics
Permissible ambient temperature range	°C (°F)	0 … +40 (32 … 104)
Technical specifications for winding 24 V DC		**1EV1432-0AA00-1AA0**
Rated speed n_N	r/min	4000
Rated torque M_N [1]	Nm	0.288 [0.259]
Maximum torque M_{max} [1]	Nm	1.3 [1.17]
Static torque M_0 [1]	Nm	0.32 [0.29]
Rated current (phase RMS) I_N	A	6.3
Rated power P_N [1]	W	120 [109]
Permissible peak current I_{max} [2]	A	30
Stall current I_0	A	6.93
Voltage constant k_e	V/1000 r/min	4.34
Terminal resistance R_V	Ohm	0.203
Rotating field inductance transverse direction L_q	µH	100
Rotating field inductance longitudinal direction L_d	µH	79
Technical specifications for winding 48 V DC		**1EV1434-0AA00-1AA0**
Rated speed n_N	r/min	4000
Rated torque M_N [1]	Nm	0.319 [0.287]
Maximum torque M_{max} [1]	Nm	1.3 [1.17]
Static torque M_0 [1]	Nm	0.35 [0.32]
Rated current (phase RMS) I_N	A	3.5
Rated power P_N [1]	W	133 [120]
Permissible peak current I_{max} [2]	A	30
Stall current I_0	A	3.85
Voltage constant k_e	V/1000 r/min	8.22
Terminal resistance R_V	Ohm	0.551
Rotating field inductance transverse direction L_q	µH	397
Rotating field inductance longitudinal direction L_d	µH	306

[1] Depending on the commutation: Value without brackets is sinusoidal commutated (I_d = 0), value in brackets is block commutated.

[2] Permissible peak current duration: Max. 1 sec. – can only be repeated after complete cooling.

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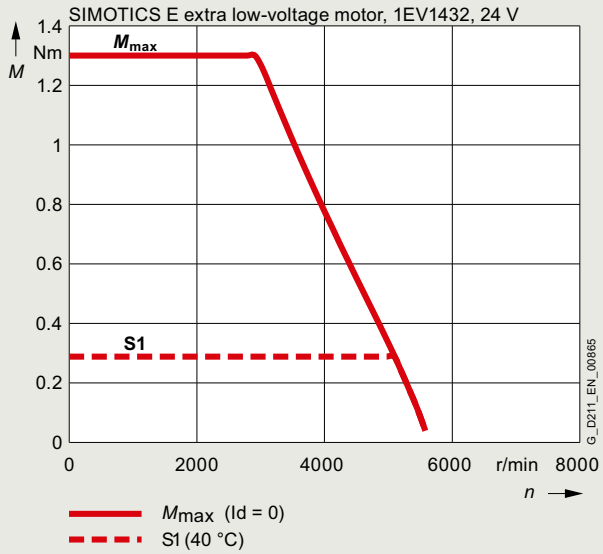
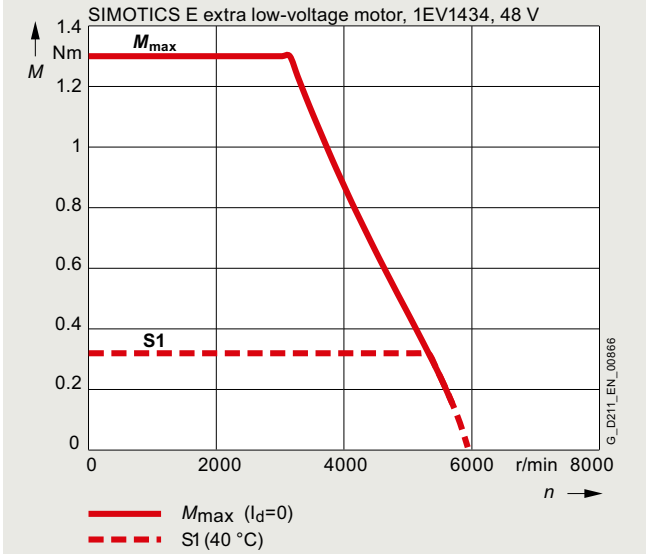
SIMOTICS E-1EV14 without integrated converter, shaft height 30R

Characteristic curves

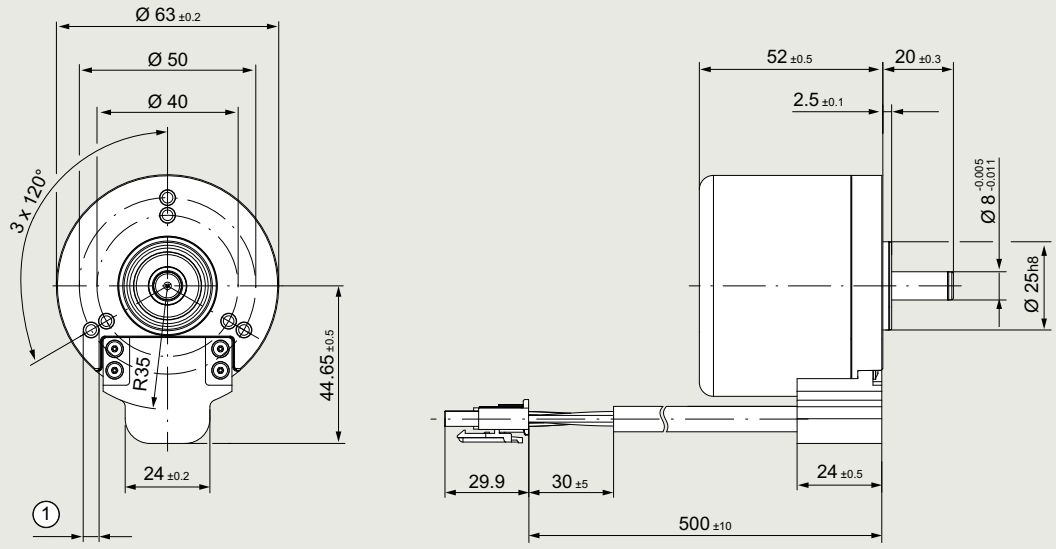
SIMOTICS E-1EV14 extra low-voltage motors without integrated converter, without gearbox, shaft height 30R





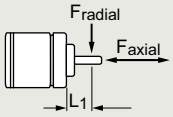
Dimensional drawings

SIMOTICS E-1EV14 extra low-voltage motors without integrated converter, without gearbox, shaft height 30R



1 6 x for thread-forming screws M4 according to DIN 7500

Permissible shaft loading



F_{axial}:	20 N
F_{radial}:	20 N
L_1:	10 mm

Permissible simultaneous shaft loadings at rated speed and service life expectancy L10 (in rated operation) from 20000 h | (at T_U max. 40 °C)

G_D211_EN_00847

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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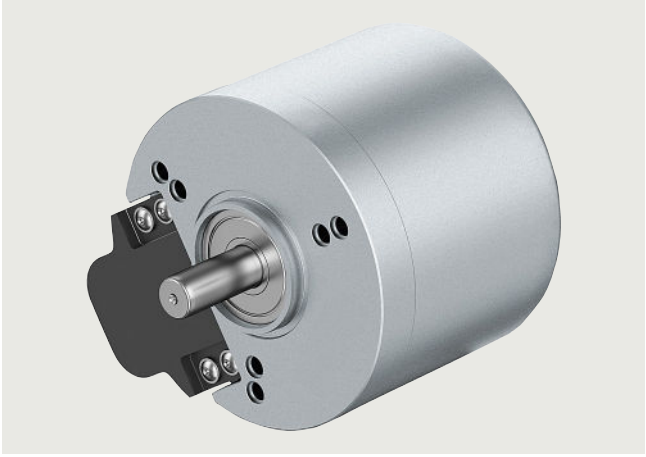
Technical specifications



Motor with integrated speed, torque or positioning control

- 3-phase external rotor servomotor with EC technology
- High-pole motor design for optimum power density
- Drive with fully integrated operating and control electronics
- Selection of operating modes and parameter asssignment via RS485
- Interface with analog and digital control inputs
- Integrated braking chopper function
- Robust mechanical design in IP54 for industrial use
- Electrical connection via cable permanently attached to the motor with free stranded ends

Extra low-voltage motors SIMOTICS E-1EV14 Shaft height 30R		**1EV143 . -0AD00-1AA0**
General technical specifications		**Overall length 15**
Rotor moment of inertia J_{Mot}	10^{-6} kgm^2	108
Motor weight with basic equipment m_{Mot}	kg (lb)	0.59 (1.3)
Overload protection		Integrated
Permissible ambient temperature range	°C (°F)	0 … +40 (32 … 104)
Recommended speed control range	r/min	0 … 4000
Technical specifications for winding 24 V DC		**1EV1432-0AD00-1AA0**
Permissible supply voltage range $U_{DC\ link}$	V DC	18 ... 30
Rated speed n_N	r/min	4000
Rated torque M_N	Nm	0.235
Maximum torque M_{max}	Nm	0.705
Static torque M_0	Nm	0.26
Stall current (supply line) I_0	A	5.83
Rated current (supply line) I_N	A	5.3
Maximum current I_{max} [1]	A	15.3
Rated power P_N	W	98
Maximum speed n_{max}	r/min	5900
Technical specifications for winding 48 V DC		**1EV1434-0AD00-1AA0**
Permissible supply voltage range $U_{DC\ link}$	V DC	18 ... 53
Rated speed n_N	r/min	4000
Rated torque M_N	Nm	0.3
Maximum torque M_{max}	Nm	0.9
Static torque M_0	Nm	0.33
Stall current (supply line) I_0	A	3.85
Rated current (supply line) I_N	A	3.5
Maximum current I_{max} [1]	A	10.5
Rated power P_N	W	126
Maximum speed n_{max}	r/min	5900

[1] Permissible peak current duration: Max. 1 sec. – can only be repeated after complete cooling.

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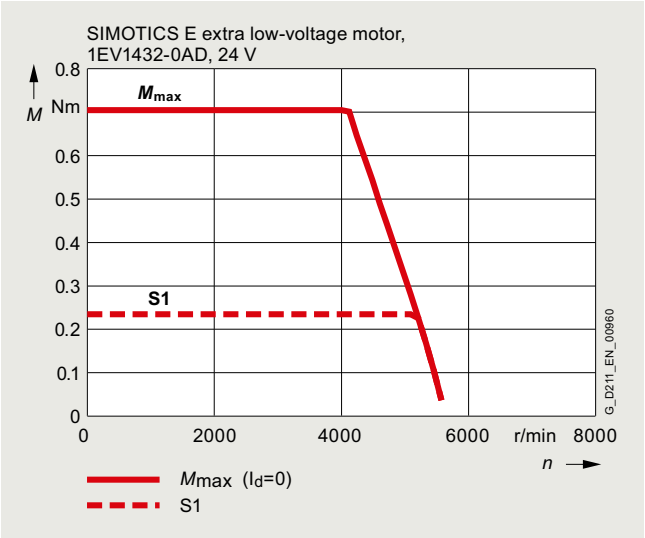
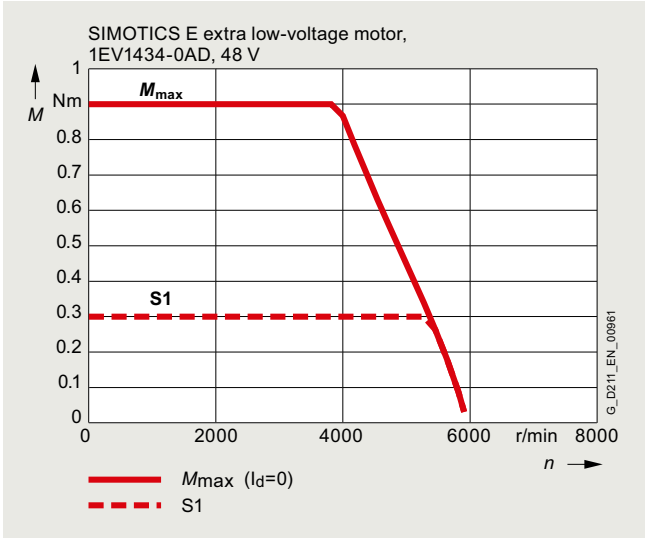
SIMOTICS E-1EV14 with integated drive control, digital IOs, shaft height 30R

Characteristic curves

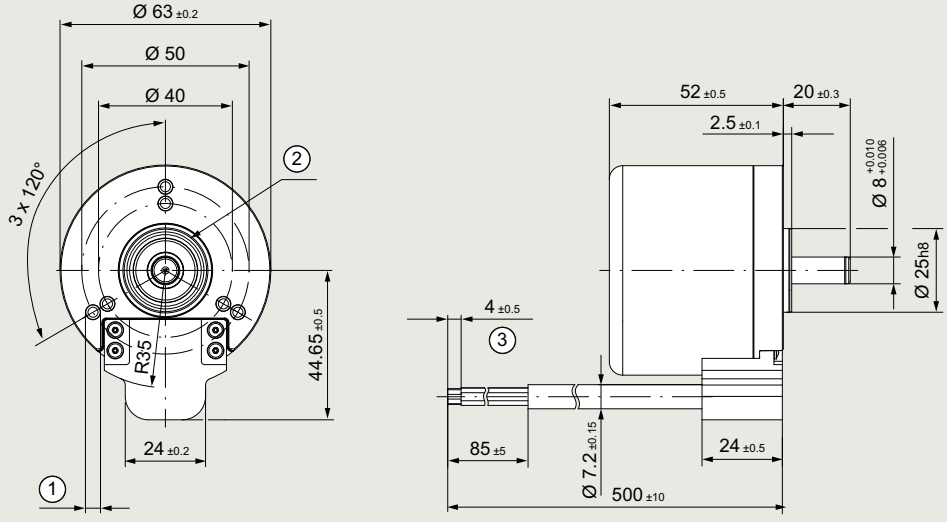
SIMOTICS E-1EV14 extra low-voltage motors with integrated speed, torque or positioning control, digital IOs, without gearbox, shaft height 30R





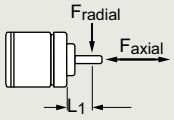
Dimensional drawings

SIMOTICS E-1EV14 extra low-voltage motors with integrated speed, torque or positioning control, digital IOs, without gearbox, shaft height 30R



1 6 x for thread-forming screws M4 according to DIN 7500
2 Way for O seal/O-ring
3 Twisted and tinned

Permissible shaft loading



F_{axial}:	20 N
F_{radial}:	20 N
L_1:	10 mm

Permissible simultaneous shaft loadings at rated speed and service life expectancy L10 (in rated operation) from 20000 h (at T_U max. 40 °C)

G_D211_EN_00848

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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SIMOTICS E-1EE13 with integrated drive control, CANopen, shaft height 30R

Technical specifications

Drive with integrated operating and control electronics with CANopen communications interface (8-pin)

- Sinusoidal commutation of the drives with field-oriented control
- Speed control range of up to n = 0 r/min with a holding torque of up to 5000 r/min possible
- Different operating modes according to DS 402 (speed, torque, positioning) possible via software
- M16 and M12 sealed industry standard connector terminals
- Interface with analog and digital control inputs
- Integrated encoder system with 12-bit resolution

Extra low-voltage motors SIMOTICS E-1EE13		**1EE13 . . - . C00-1AA2**					
Shaft height 30R		**Overall length 20**		**Overall length 40**		**Overall length 60**	
General technical specifications		**1EE132 . - . BC00-1AA2**		**1EE134 . - . BC00-1AA2**		**1EE136 . - . BC00-1AA2**	
Rotor moment of inertia J_{Mot}	10^{-6} kgm^2	19		37.5		55.7	
Moment of inertia (with brake) $J_{Mot,Br}$	10^{-6} kgm^2	20.6		39.1		57.3	
Motor weight with basic equipment m_{Mot}	kg (lb)	0.95 (2.09)		1.25 (2.76)		1.55 (3.42)	
Weight (with brake) $m_{Mot,Br}$	kg (lb)	1.3 (2.87)		1.6 (3.53)		1.9 (4.19)	
Overload protection		Integrated					
Permissible ambient temperature range	°C (°F)	0 … +40 (32 … +104)					
Blocking protection function		thermal					
Recommended speed control range	r/min	0 ... 4000					
Technical specifications for winding	**24 V DC**	**1EE1322- . BC00-1AA2**		**1EE1342- . BC00-1AA2**		–	
		without brake	with brake	without brake	with brake		
Permissible supply voltage range $U_{DC\ link}$	DC V	18 ... 30		18 ... 30		–	
Max. reverse voltage	DC V	35		35		–	
Rated speed n_N [1]	r/min	4000		4000		–	
Rated torque M_N	Nm	0.425	0.74	0.6	0.504	–	
Maximum torque M_{max}	Nm	0.64		0.9		–	
Static torque M_0	Nm	0.47	0.41	0.66	0.55	–	
Stall current (supply line) I_0	A	10.23	9.0	14.30	12.01	–	
Rated current (supply line) I_N	A	9.3	8.18	13	10.92	–	
Maximum current (supply line) I_{max}	A	14.3		19.5		–	
Rated power P_N	W	178		251		–	
Maximum speed n_{max}	r/min	5600		5600		–	
Technical specifications for winding	**48 V DC**	**1EE1324- . BC00-1AA2**		**1EE1344- . BC00-1AA2**		**1EE1364- . BC00-1AA2**	
		without brake	with brake	without brake	with brake	without brake	with brake
Permissible supply voltage range $U_{DC\ link}$	DC V	18 ... 52		18 ... 52		18 ... 52	
Max. reverse voltage	DC V	58		58		58	
Rated speed n_N [1]	r/min	4000		4000		4000	
Rated torque M_N	Nm	0.45	0.392	0.75	0.62	0.85	0.697
Maximum torque M_{max}	Nm	0.9		1.5		1.7	
Static torque M_0	Nm	0.5	0.43	0.83	0.68	0.94	0.77
Stall current (supply line) I_0	A	6.3	5.45	9.0	7.49	10.5	8.57
Rated current (supply line) I_N	A	5.7	4.96	8.2	6.8	9.5	7.79
Maximum current (supply line) I_{max}	A	12.6		17		19.2	
Rated power P_N	W	188		314		356	
Maximum speed n_{max}	r/min	5900		5600		5800	

[1] At ambient temperature max. 40°C (104°F)

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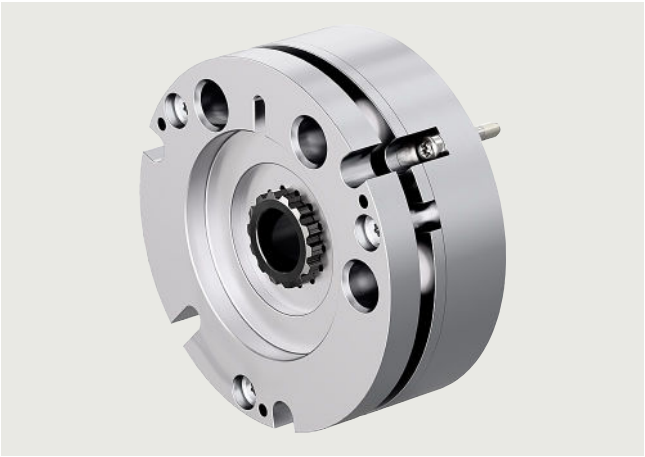
SIMOTICS E-1EE13 with integrated drive control, CANopen, shaft height 30R

Technical specifications

Holding brake for SIMOTICS E-1EE13 extra low-voltage motors, shaft height 30R



Exemplary representation of the brake

Holding brake with EMERGENCY STOP function

- Fail-safe brake according to spring force principle
- Single-disk brake with two friction surfaces
- Braking torque acts in the current-free state
- Brake force is cancelled by electromagnetic force
- Brake is actuated in the current-free state, with a high power density
- Reduced moment of inertia for optimal dynamic response
- Degree of protection IP54 (by means of installation in the drive)

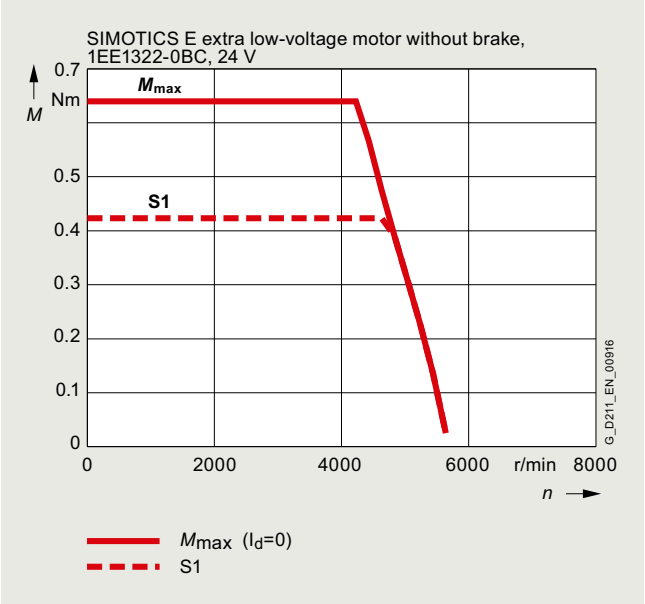
Extra low-voltage motors SIMOTICS E-1EE13 Shaft height 30R		**With holding brake 1EE13 . . -1 . C00-1 . . 4**
Rated voltage	V DC	24
Maximum operating energy per stop	J	50
Total operating energy (service life)	J	25000
Min. braking torque [1]	Nm	1
Closing time	ms	48
Opening time	ms	40

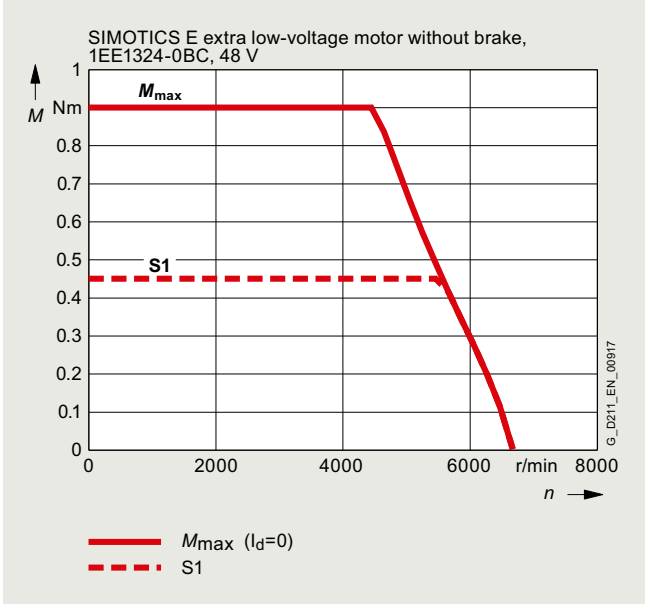
4

Characteristic curves

SIMOTICS E-1EE13 extra low-voltage motors with integrated speed, torque or positioning control, CANopen, without gearbox, shaft height 30R

Without holding brake





[1] Value in run-in state

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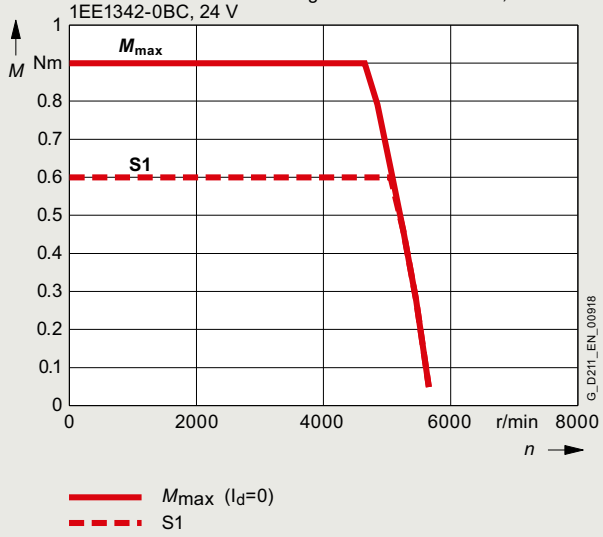
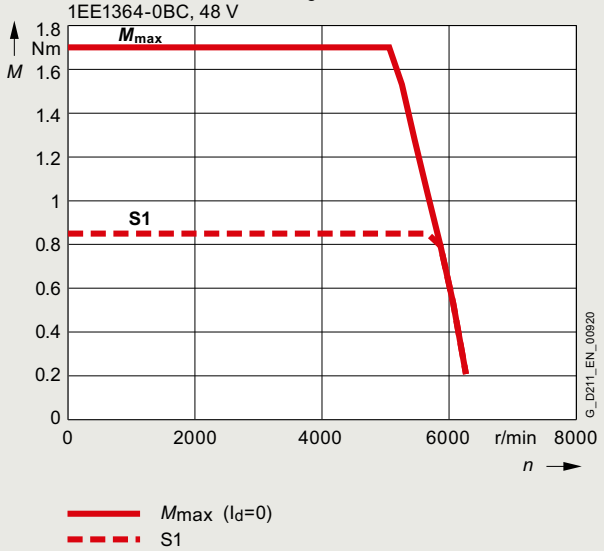
Characteristic curves

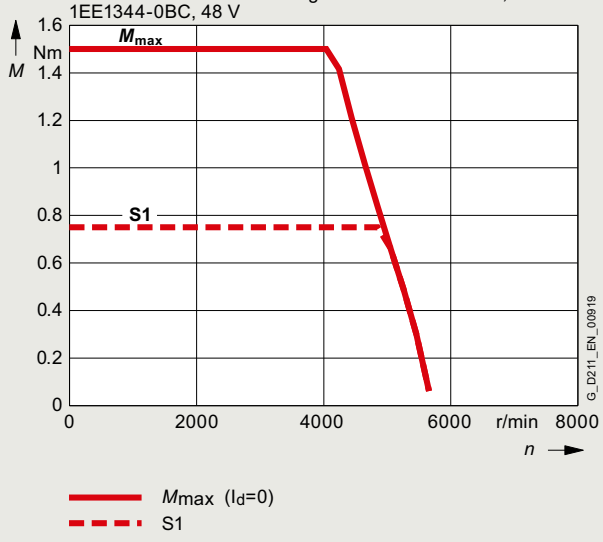
SIMOTICS E extra low-voltage motor without brake, 1EE1342-0BC, 24 V



SIMOTICS E extra low-voltage motor without brake, 1EE1364-0BC, 48 V



SIMOTICS E extra low-voltage motor without brake, 1EE1344-0BC, 48 V



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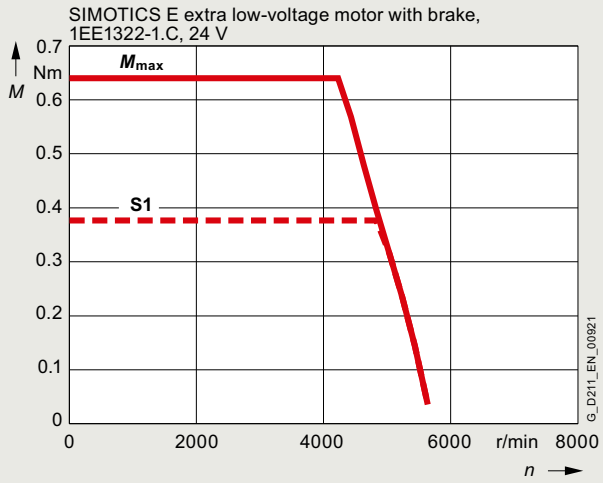
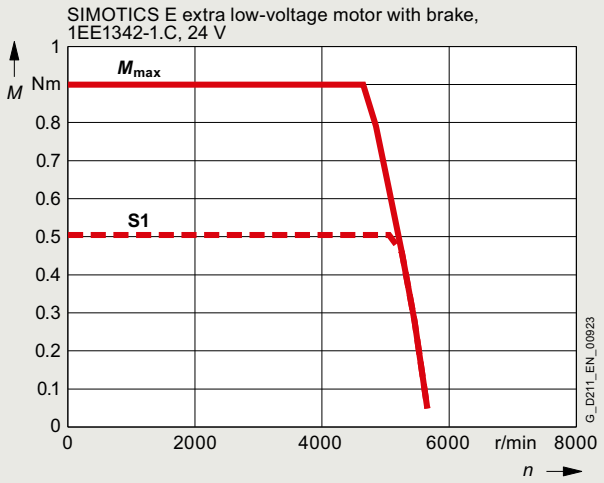
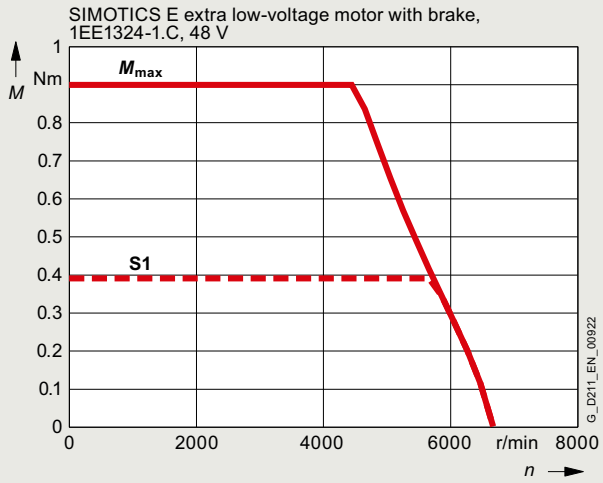
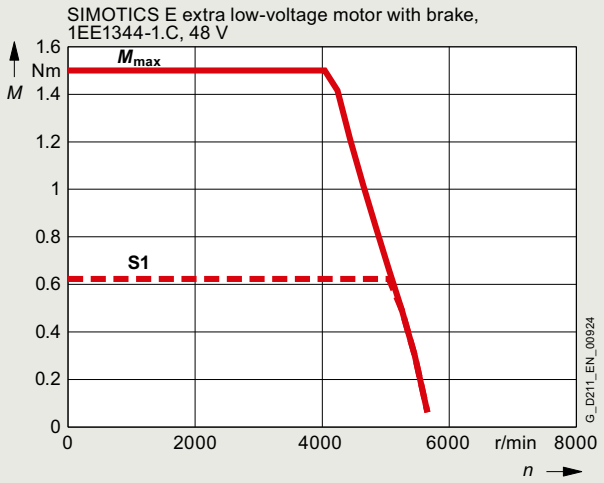
Characteristic curves

With holding brake









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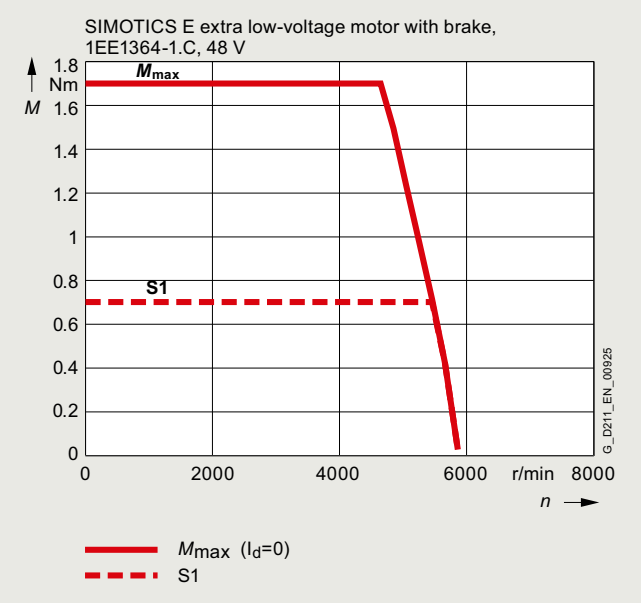
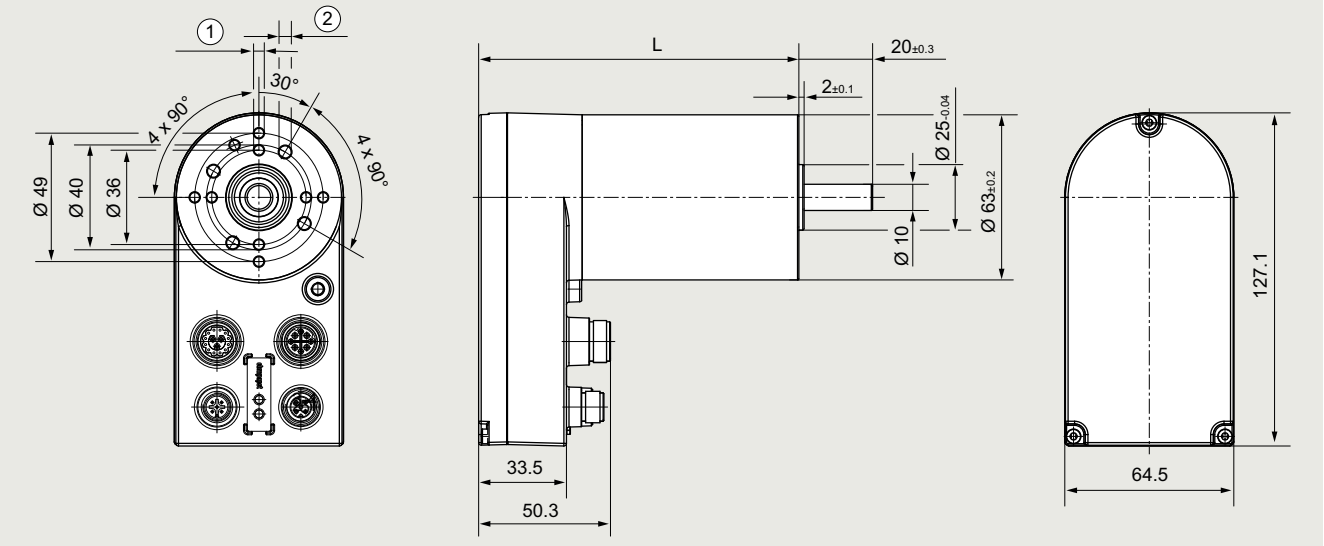
Dimensional drawings



Dimensional drawings

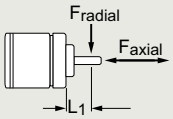
SIMOTICS E-1EE13 extra low-voltage motors with integrated speed, torque or positioning control, CANopen, without gearbox, shaft height 30R



(1) 8 x for thread-forming screws M4 according to DIN 7500, 10.5 mm deep

(2) 4 x for thread-forming screws M5 according to DIN 7500, 10.5 mm deep

Permissible shaft loading



F_{axial}:	150 N
F_{radial}:	150 N
L_1:	20 mm

Permissible simultaneous shaft loadings at rated speed and service life expectancy L10 (in rated operation) of 20000 h (at TU max. 40 °C)

G_D211_EN_00815

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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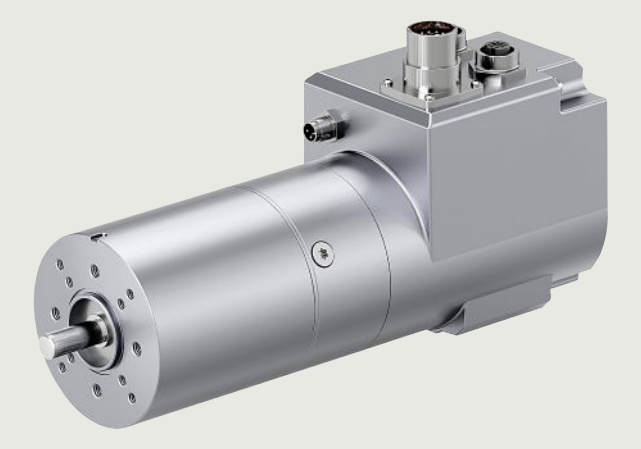
SIMOTICS E-1EE13 with integrated drive control, EtherCAT, shaft height 30R

Technical specifications



Drive with integrated operating and control electronics for operation in EtherCAT networks (8-pin)

- CoE (CAN over EtherCAT) supports different operating modes according to DS 402
- Integration as slave in EtherCAT networks using TwinCAT
- Operation as NC axis is possible
- Separate interface allows diagnostics parallel to BUS operation
- Status LEDs on the drive housing
- Safe shut-off Safe Torque Off (optional)
- Encoder signals are processed internally and exchanged with a higher-level PLC via the bus interface

Extra low-voltage motors SIMOTICS E-1EE13		**1EE13 . . - . . E . 0-1AA4**		
Shaft height 30R		**Overall length 20**	**Overall length 40**	**Overall length 60**
General technical specifications		**1EE132 . - . . E . 0-1AA4**	**1EE134 . - . . E . 0-1AA4**	**1EE136 . - . . E . 0-1AA4**
Rotor moment of inertia J_{Mot}	10^{-6} kgm^2	19.3	37.5	55.7
Moment of inertia (with brake) $J_{Mot,Br}$	10^{-6} kgm^2	20.5	38.7	56.9
Motor weight with basic equipment m_{Mot}	kg (lb)	1.15 (2.54)	1.55 (3.42)	1.9 (4.19)
Weight (with brake) $m_{Mot,Br}$	kg (lb)	1.33 (2.93)	1.73 (3.81)	2.08 (4.59)
Overload protection		Integrated		
Permissible ambient temperature range	°C (°F)	0 … +40 (32 … +104)		
Blocking protection function		thermal		
Recommended speed control range	r/min	0 ... 4000		
Technical specifications for winding 24 V DC		**1EE1322- . . E . 0-1AA4**	**1EE1342- . . E . 0-1AA4**	**–**
Permissible supply voltage range $U_{DC\ link}$	DC V	18 ... 30	18 ... 30	–
Max. reverse voltage	DC V	35	35	–
Rated speed n_N [1]	r/min	4000	4000	–
Rated torque M_N	Nm	0.48	0.64	–
Maximum torque M_{max}	Nm	1.2	1.3	–
Static torque M_0	Nm	0.53	0.7	–
Stall current (supply line) I_0	A	11.22	15.40	–
Rated current (supply line) I_N	A	10.2	14.0	–
Maximum current (supply line) I_{max}	A	26.5	28.8	–
Rated power P_N	W	201	268	–
Maximum speed n_{max}	r/min	5900	5600	–
Technical specifications for winding 48 V DC		**1EE1324- . . E . 0-1AA4**	**1EE1344- . . E . 0-1AA4**	**1EE1364- . . E . 0-1AA4**
Permissible supply voltage range $U_{DC\ link}$	DC V	18 ... 52	18 ... 52	18 ... 52
Max. reverse voltage	DC V	58	58	58
Rated speed n_N [1]	r/min	4000	4000	4000
Rated torque M_N	Nm	0.47	0.82	0.94
Maximum torque M_{max}	Nm	1.4	2.6	2.7
Static torque M_0	Nm	0.52	0.9	1.03
Stall current (supply line) I_0	A	6.49	9.68	11.55
Rated current (supply line) I_N	A	5.9	8.8	10.5
Maximum current (supply line) I_{max}	A	18.6	28.7	29.3
Rated power P_N	W	197	343	394
Maximum speed n_{max}	r/min	5900	5900	5900

[1] At ambient temperature max. 40°C (104°F)

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Technical specifications

Holding brake for SIMOTICS E-1EE13 extra low-voltage motors, shaft height 30R

Exemplary representation of the brake

Holding brake with EMERGENCY STOP function

- Fail-safe brake according to spring force principle
- Single-disk brake with two friction surfaces
- Braking torque acts in the current-free state
- Brake force is cancelled by electromagnetic force
- Brake is actuated in the current-free state, with a high power density
- Reduced moment of inertia for optimal dynamic response
- Special feature for brake control module: Reduced power consumption to hold the open state – innovative brake concept offers installation-space-optimized dimensions
- Degree of protection IP54 (by means of installation in the drive)

Extra low-voltage motors SIMOTICS E-1EE13		**With holding brake**
Shaft height 30R		**1EE13 . . -1 . E . 0-1 . . 4**
Rated voltage	V DC	24
Maximum operating energy per stop	J	68
Total operating energy (service life)	J	34000
Min. braking torque [1)]	Nm	1
Closing time	ms	8
Opening time	ms	30

[1)] Value in run-in state

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SIMOTICS E-1EE13 with integrated drive control, EtherCAT, shaft height 30R

Technical specifications

Encoder for SIMOTICS E-1EE13 extra low-voltage motors, shaft height 30R

Incremental encoder 1024 S/R (encoder TTL1024S/R)

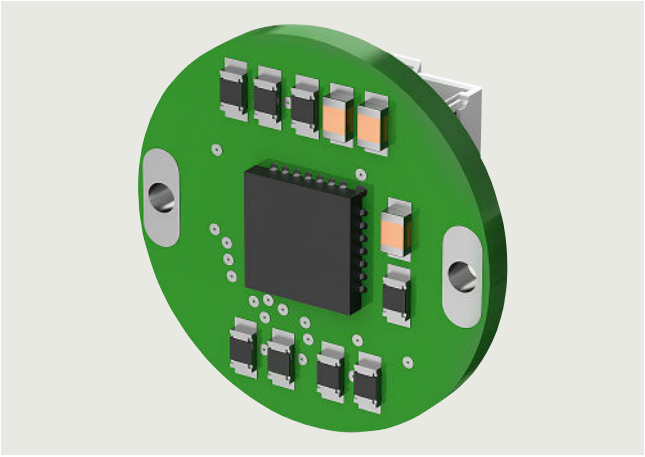
Magnetic 3-channel incremental encoder integrated into the motor enclosure

- A 12-bit resolution is achieved through appropriate evaluation
- The rotary encoder is non-contact and wear-free
- Other resolutions and interfaces are possible on request

Multiturn absolute encoder 17 bit + 16 bit (encoder AM17)

Multiturn magnetic absolute encoder; optional: Singleturn integrated in the motor enclosure

- A resolution of up to 17 bit (singleturn) or 16 bit (multiturn) is achieved through appropriate evaluation
- The rotary encoder is non-contact and wear-free
- Battery-less counter buffering due to Wiegand effect
- Other resolutions and interfaces are possible on request



Extra low-voltage motors SIMOTICS E-1EE13 **Shaft height 30R**		**Incremental encoder 1024 S/R (encoder TTL1024S/R)** **1EE14 . . - . BA00 - . AA4**	**Multiturn absolute encoder 17 bit + 16 bit (encoder AM17)** **1EE14 . . - . DA00 - . AA4**
Resolution		1024 PPR	Singleturn 17 bit
		4096 CPR	Multiturn 16 bit
Max. signal frequency f	kHz	4000	10000
Supply voltage U_B	V DC	+5 ± 10 %	5 … 15
Power consumption I_B	mA	max. 30	60
Accuracy	°	± 0.5	± 0.5

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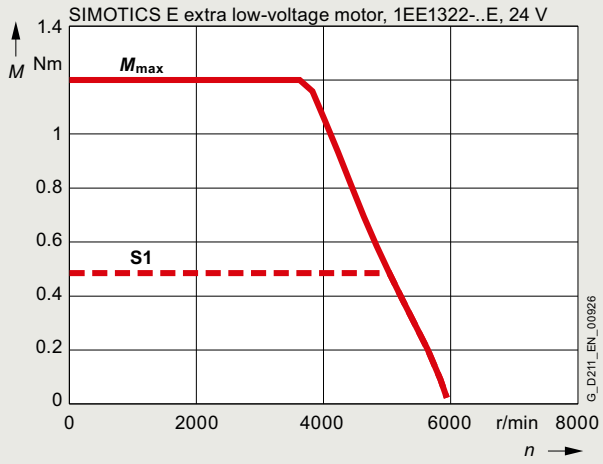
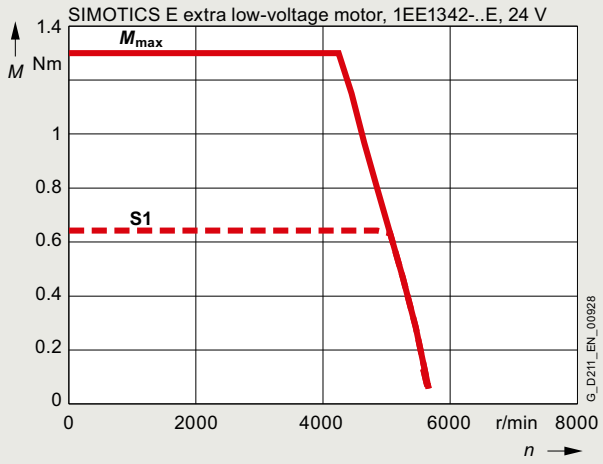
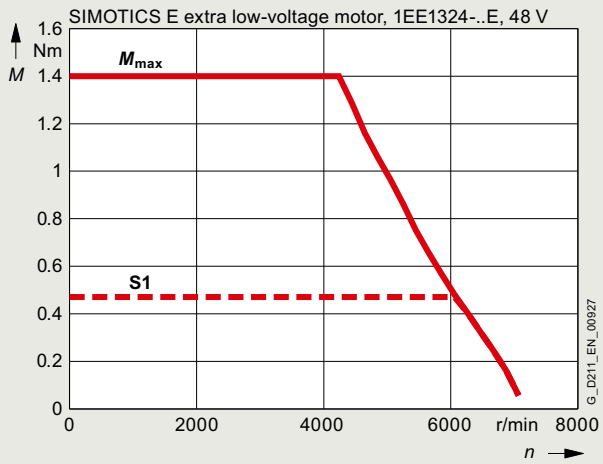
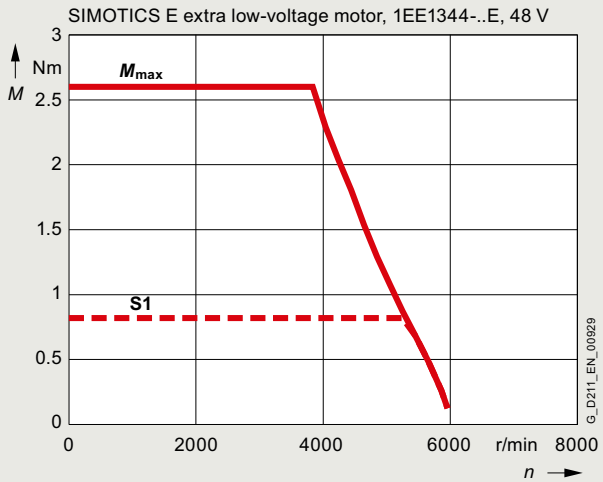
Characteristic curves

SIMOTICS E-1EE13 extra low-voltage motors with integrated speed, torque or positioning control, EtherCAT, without gearbox, shaft height 30R









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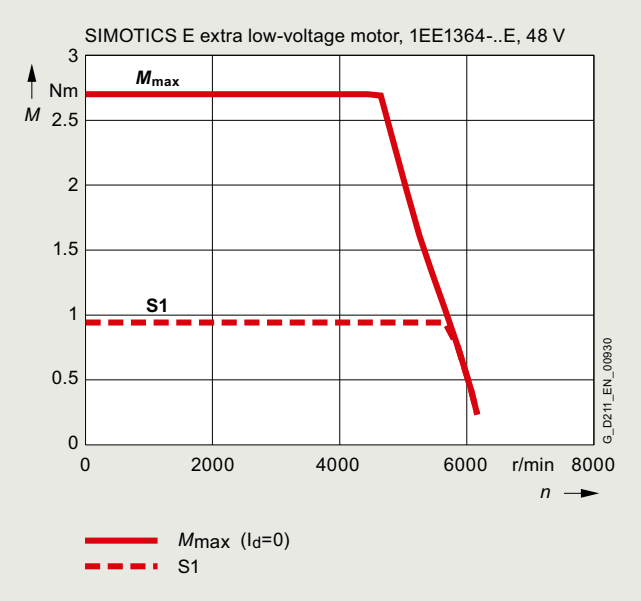
SIMOTICS E-1EE13 with integrated drive control, EtherCAT, shaft height 30R

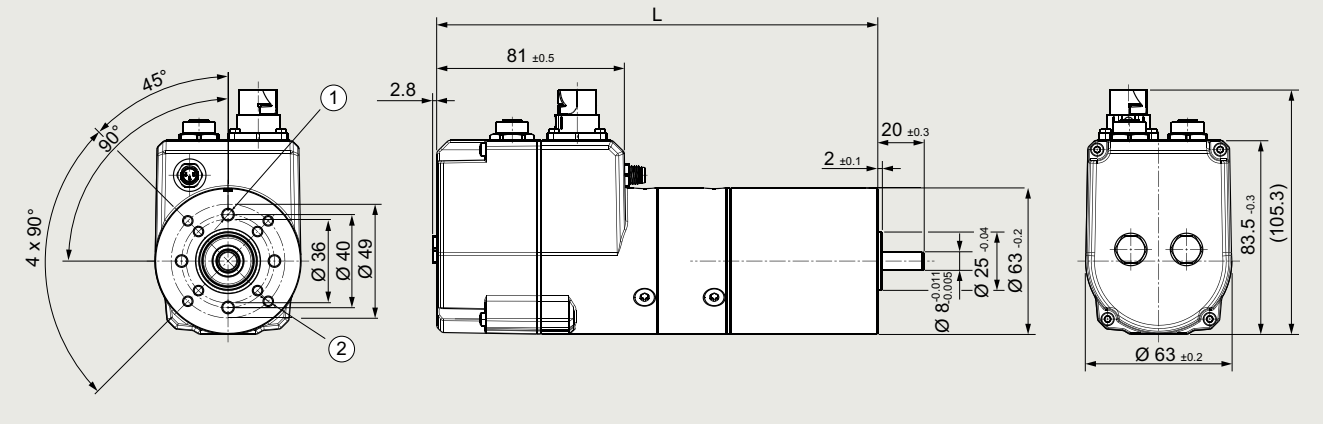
Characteristic curves



4

Dimensional drawings

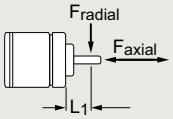
SIMOTICS E-1EE13 extra low-voltage motors with integrated speed, torque or positioning control, EtherCAT, without gearbox, shaft height 30R



① 4 x for thread-forming screws M5 according to DIN 7500, 10.5 mm deep

② 8 x for thread-forming screws M4 according to DIN 7500, 10.5 mm deep

Permissible shaft loading



F_{axial}:	45 N
F_{radial}:	98 N
L_1:	10 mm

Permissible simultaneous shaft loadings at rated speed and service life expectancy L10 (in rated operation) of 20000 h (at T_U max. 40 °C)

G_D211_EN_00816

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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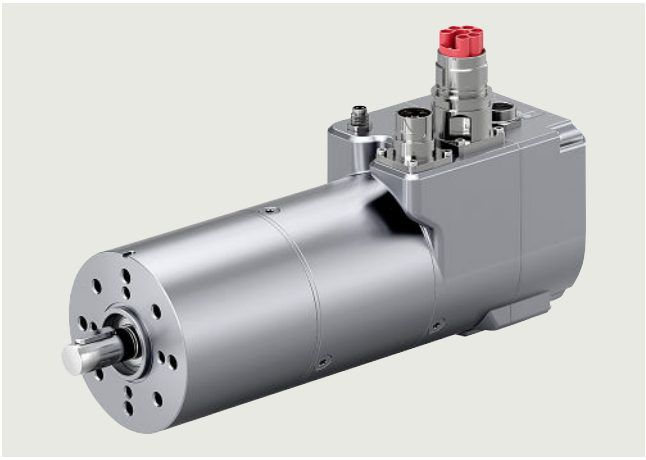
SIMOTICS E-1EE14 with integrated drive control, EtherCAT, shaft height 40R

Technical specifications



Drive with integrated operating and control electronics for operation in EtherCAT networks (8-pin)

- CoE (CAN over EtherCAT) supports different operating modes according to DS 402
- Integration as slave in EtherCAT networks using TwinCAT
- Operation as NC axis is possible
- Separate interface allows diagnostics parallel to BUS operation
- Status LEDs on the drive housing
- Safe shut-off Safe Torque Off (optional)
- Encoder signals are processed internally and exchanged with a higher-level PLC via the bus interface

Extra low-voltage motors SIMOTICS E-1EE14		**1EE14 . . - . . E . 0-1AA4**		
Shaft height 40R		**Overall length 20**	**Overall length 40**	**Overall length 60**
General technical specifications		**1EE142 . - . . E . 0-1AA4**	**1EE144 . - . . E . 0-1AA4**	**1EE146 . - . . E . 0-1AA4**
Rotor moment of inertia J_{Mot}	10^{-6} kgm^2	54	104	155
Moment of inertia (with brake) $J_{Mot,Br}$	10^{-6} kgm^2	63.6	113.6	164.6
Motor weight with basic equipment m_{Mot}	kg (lb)	1.9 (4.19)	2.5 (5.51)	3.1 (6.83)
Weight (with brake) $m_{Mot,Br}$	kg (lb)	2.57 (5.67)	3.17 (6.99)	3.77 (8.31)
Overload protection		Integrated		
Permissible ambient temperature range	°C (°F)	0 … +40 (32 … +104)		
Blocking protection function		thermal		
Recommended speed control range	r/min	0 ... 4000		
Technical specifications for winding 24 V DC		**1EE1422- . . E . 0-1AA4**	**1EE1442- . . E . 0-1AA4**	**–**
Permissible supply voltage range $U_{DC\ link}$	DC V	18 ... 30	18 ... 30	–
Max. reverse voltage	DC V	35	35	–
Rated speed n_N [1]	r/min	4000	4000	–
Rated torque M_N	Nm	0.8	0.95	–
Maximum torque M_{max}	Nm	2.4	3.25	–
Static torque M_0	Nm	0.88	1.05	–
Stall current (supply line) I_0	A	16.28	21.67	–
Rated current (supply line) I_N	A	14.8	19.7	–
Maximum current (supply line) I_{max}	A	46.4	57.5	–
Rated power P_N	W	335	398	–
Maximum speed n_{max}	r/min	5300	5100	–
Technical specifications for winding 48 V DC		**1EE1424- . . E . 0-1AA4**	**1EE1444- . . E . 0-1AA4**	**1EE1464- . . E . 0-1AA4**
Permissible supply voltage range $U_{DC\ link}$	DC V	18 ... 52	18 ... 52	18 ... 52
Max. reverse voltage	DC V	58	58	58
Rated speed n_N [1]	r/min	4000	4000	4000
Rated torque M_N	Nm	0.8	1.4	1.65
Maximum torque M_{max}	Nm	2.4	4.2	4.8
Static torque M_0	Nm	0.88	1.54	1.82
Stall current (supply line) I_0	A	8.14	13.97	22.44
Rated current (supply line) I_N	A	7.4	12.7	20.4
Maximum current (supply line) I_{max}	A	23.2	38.4	49.1
Rated power P_N	W	335	586	691
Maximum speed n_{max}	r/min	5300	5100	5900

[1] At ambient temperature max. 40°C (104°F)

[2] 20 A rated current (supply line) in S1 duty at T_u = 40°C (104°F) must not be exceeded

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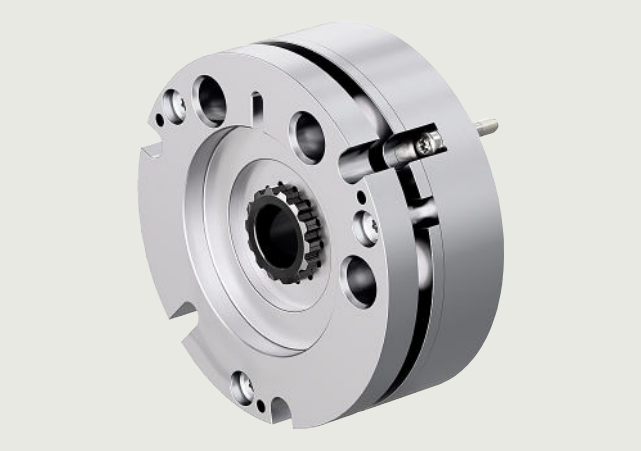
Technical specifications

Holding brake for SIMOTICS E-1EE14 extra low-voltage motors, shaft height 40R



Exemplary representation of the brake

Holding brake with EMERGENCY STOP function

- Fail-safe brake according to spring force principle
- Single-disk brake with two friction surfaces
- Braking torque acts in the current-free state
- Brake force is cancelled by electromagnetic force
- Brake is actuated in the current-free state, with a high power density
- Reduced moment of inertia for optimal dynamic response
- Special feature for brake control module: Reduced power consumption to hold the open state – innovative brake concept offers installation-space-optimized dimensions
- Degree of protection IP54 (by means of installation in the drive)

Extra low-voltage motors SIMOTICS E-1EE14		**With holding brake**
Shaft height 40R		**1EE14 . . -1 . E . 0-1 . . 4**
Rated voltage	V DC	24
Maximum operating energy per stop	J	180
Total operating energy (service life)	J	36000
Min. braking torque [1)]	Nm	2.2
Closing time	ms	25
Opening time	ms	85

[1)] Value in run-in state

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Technical specifications

Encoder for SIMOTICS E-1EE13 extra low-voltage motors, shaft height 30R

Incremental encoder 1024 S/R
(encoder TTL1024S/R)

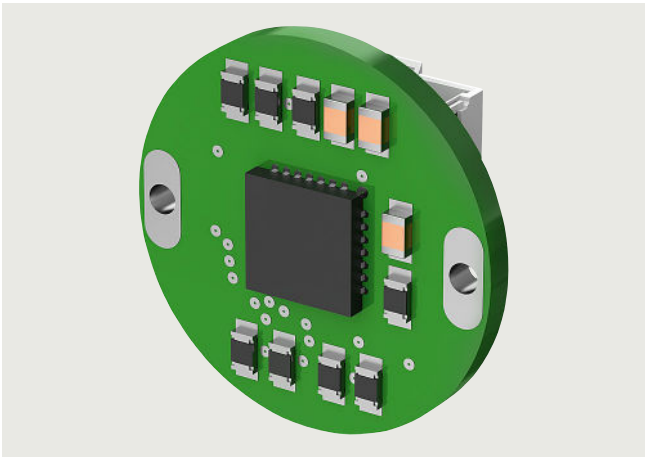
Magnetic 3-channel incremental encoder integrated into the motor enclosure

- A 12-bit resolution is achieved through appropriate evaluation
- The rotary encoder is non-contact and wear-free
- Other resolutions and interfaces are possible on request

Multiturn absolute encoder 17 bit + 16 bit
(encoder AM17)

Multiturn magnetic absolute encoder; optional: Singleturn integrated in the motor enclosure

- A resolution of up to 17 bit (singleturn) or 16 bit (multiturn) is achieved through appropriate evaluation
- The rotary encoder is non-contact and wear-free
- Battery-less counter buffering due to Wiegand effect
- Other resolutions and interfaces are possible on request



Extra low-voltage motors SIMOTICS E-1EE13 **Shaft height 30R**		**Incremental encoder 1024 S/R (encoder TTL1024S/R) 1EE14 . . - . BA00 - . AA4**	**Multiturn absolute encoder 17 bit + 16 bit (encoder AM17) 1EE14 . . - . DA00 - . AA4**
Resolution		1024 PPR	Singleturn 17 bit
		4096 CPR	Multiturn 16 bit
Max. signal frequency f	kHz	4000	10000
Supply voltage U_B	V DC	+5 ± 10 %	5 … 15
Power consumption I_B	mA	max. 30	60
Accuracy	°	± 0.5	± 0.5

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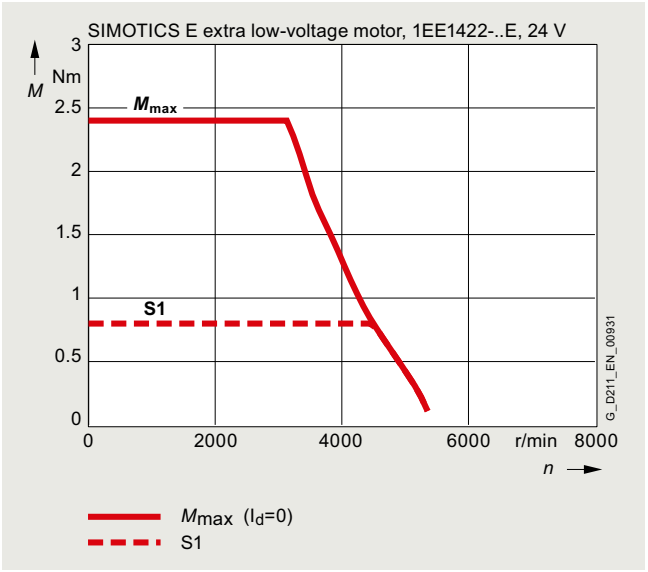
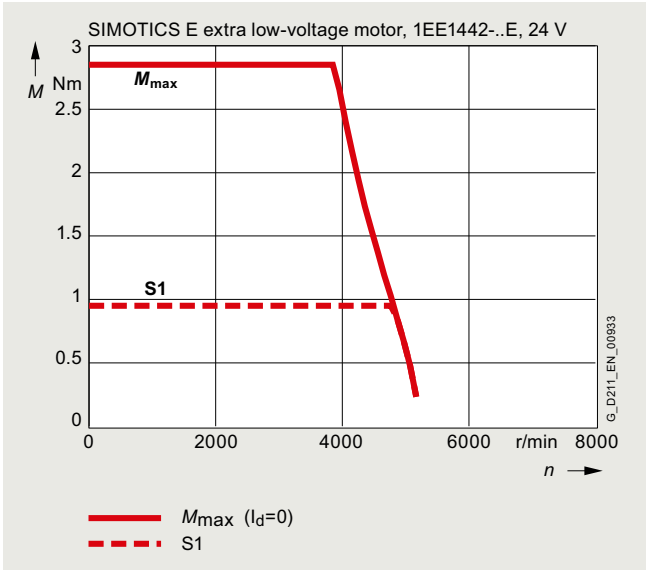
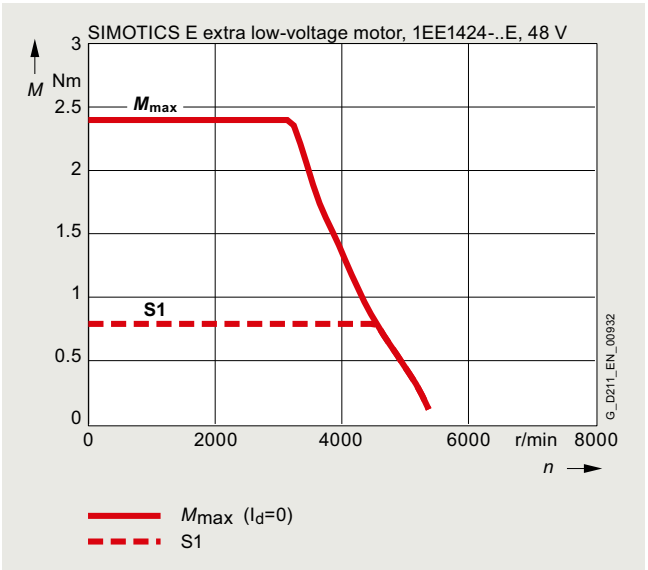
SIMOTICS E-1EE14 with integrated drive control, EtherCAT, shaft height 40R

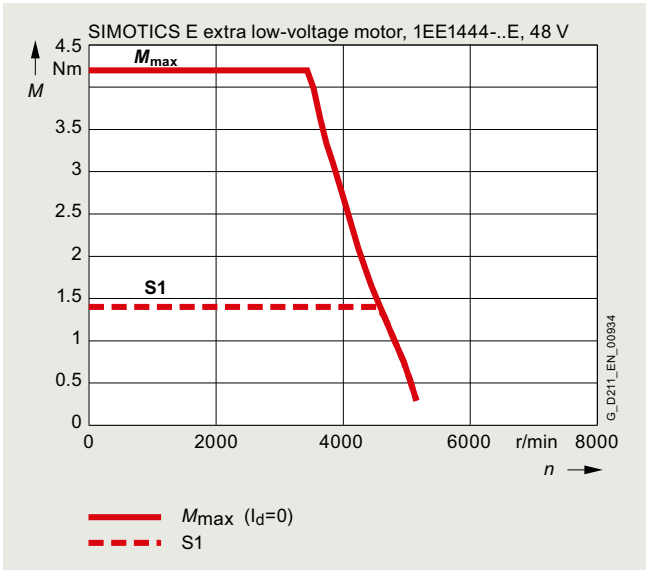
Characteristic curves

SIMOTICS E-1EE14 extra low-voltage motors with integrated speed, torque or positioning control, EtherCAT, without gearbox, shaft height 40R









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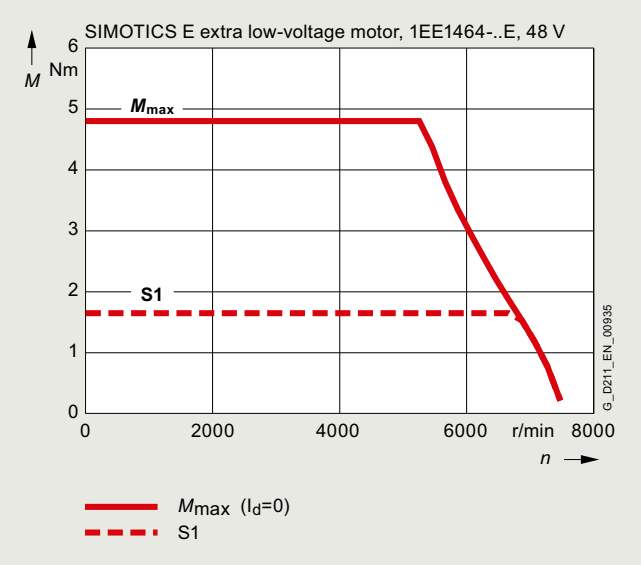
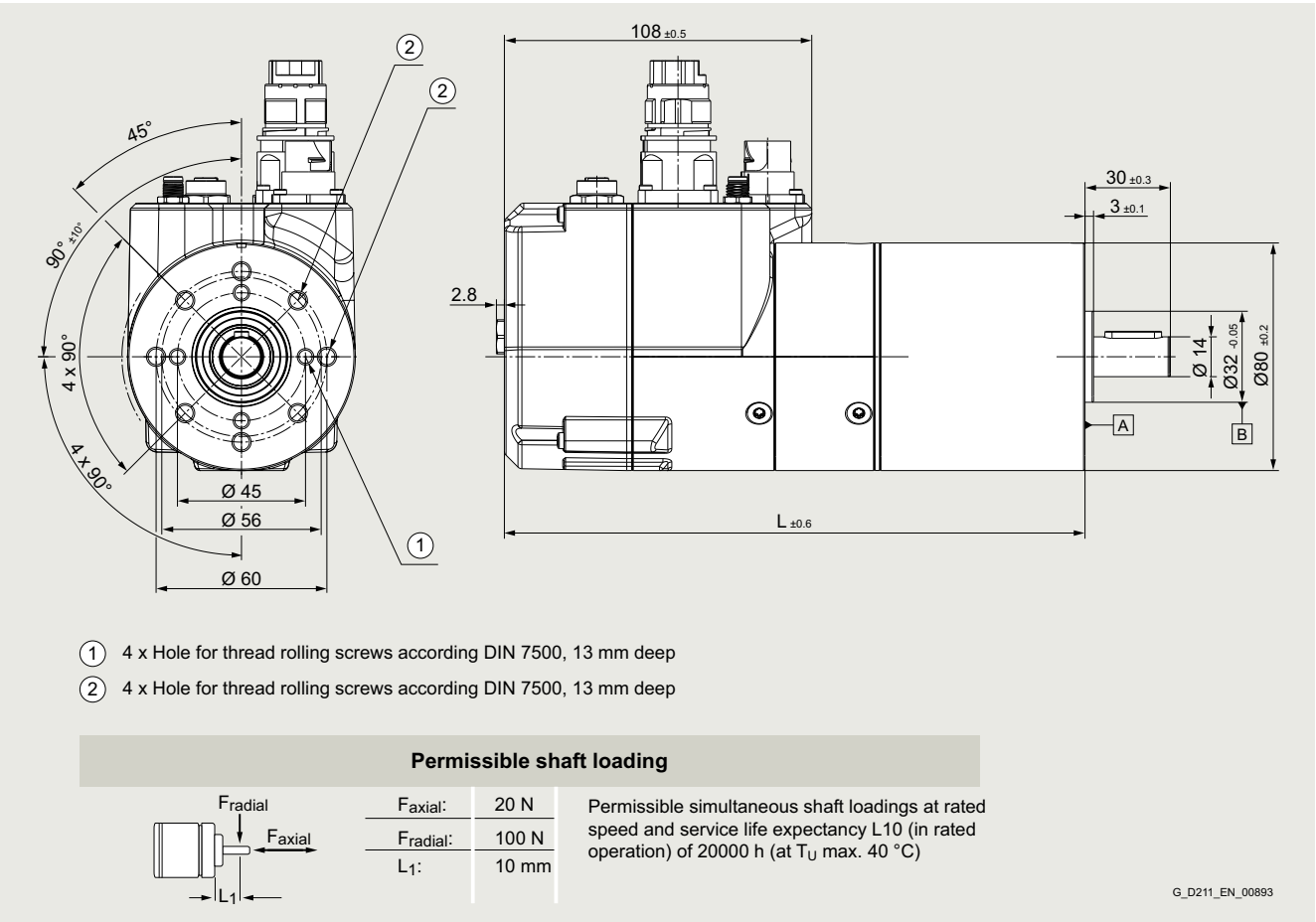
Characteristic curves



Dimensional drawings

SIMOTICS E-1EE14 extra low-voltage motors with integrated speed, torque or positioning control, EtherCAT, without gearbox, shaft height 40R



Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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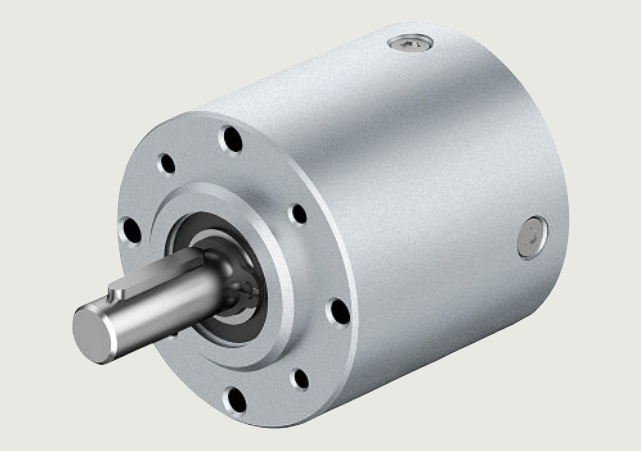
Planetary gearbox NL042 for SIMOTICS E-1EE11, shaft height 20R

Technical specifications



Planetary gearbox for high noise requirements

- Excellent smooth running due to helical gearbox stages
- Gearing parts made of low-friction plastic support smooth running
- High transmission ratio in the first and second gearbox stage
- High radial loads due to double ball bearing of the output shaft
- Flexible connection to customer applications (shaft variants, centering collar, and fastening pitch circle)

Planetary gearbox NL042 for SIMOTICS E-1EE11		**1EE11 . . - . . A00 - . BB4 - Z**	
Shaft height 20R	**Order code**	**R04**	**R26**
Number of gearbox stages	z	1-stage	2-stage
Transmission ratio	i	4.33	26
Efficiency		0.9	0.81
Max. input speed n_1	r/min	6000	
Rated torque of the gearbox component $M_{2N,G}$	Nm	1.04	2.34
Maximum output torque of the gearbox component $M_{2max,G}$	Nm	5.75	9.3
Reference torque of the gearbox component $M_{ref,G}$ [1)]	Nm	2.52	4
Torsional backlash	´	< 12	< 30
Permissible operating temperature range	°C (°F)	-20 … +80 (-4 … +176)	
Duty type		S1	
Degree of protection [2)]		IP50	
Weight	kg (lb)	0.22 (0.49)	0.25 (0.55)
Shaft loading radial/axial	N	50/350	250/350
Service life	h	10000	
Lubrication		Life-long grease lubrication	
Mounting position		Any	
Length of gearbox module	mm (in)	40.1 (1.58)	67.1 (2.64)

[1)] The torque values refer to the service life specification (speed-dependent).

[2)] The degree of protection refers to the installed state with sealing on the flange side.

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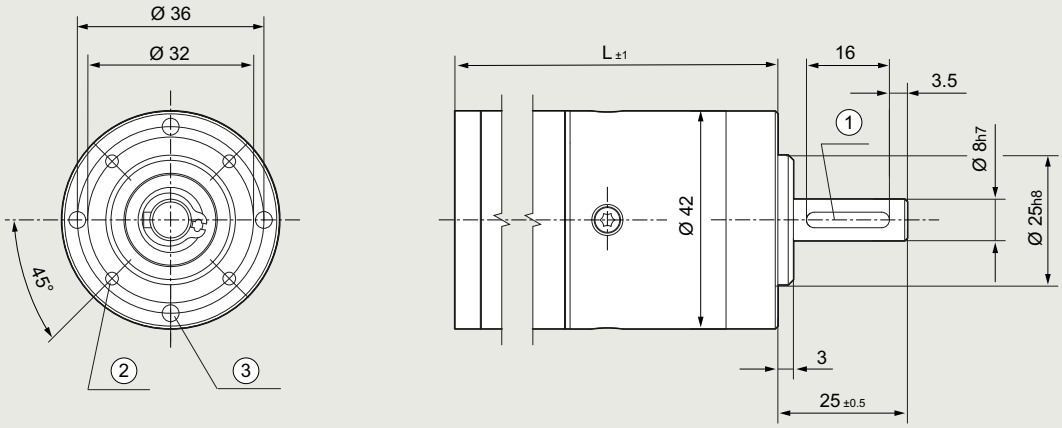
Dimensional drawings

Planetary gearbox NL042 for SIMOTICS E-1EE11 extra low-voltage motors, shaft height 20R

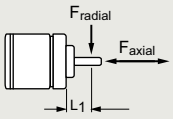


1 Feather key DIN 6885 A-3 x 3 x 16

2 4 x M3, 8 deep

3 4 x M4, 8 deep

Permissible shaft loading



F_{axial}:	350 N
F_{radial}:	see table
L_1:	12.5 mm

At rated speed, service factor CB = 1, and service life expectancy L10 from 10000 h (at T_U 40 °C in rated operation)

G_D211_EN_00824

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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Planetary gearbox PP042 for SIMOTICS E-1EE11, shaft height 20R

Technical specifications

Planetary gearbox with high power density

- High torques due to larger gearing widths in the first gearbox stage
- Good shock resistance thanks to housing made of hardened steel with straight gears in the output stage
- Very smooth running due to helical first gearbox stage
- Planet wheels made of low-friction plastic optimized for smooth running in the first gearbox stage
- Large effective diameter thanks to radial screw connections

Planetary gearbox PP042 for SIMOTICS E-1EE11		**1EE11 . . - . . A00 - . DB4 - Z**					
Shaft height 20R	**Order code**	**R03**	**R05**	**R90**	**R20**	**R30**	**R53**
Number of gearbox stages	z	1-stage			2-stage		
Transmission ratio	i	3.18	5	9	21.18	30	54
Efficiency		0.9	0.9	0.9	0.81	0.81	0.81
Max. input speed n_1	r/min	6000					
Rated torque of the gearbox component $M_{2N,G}$	Nm	0.69	1.18	0.72	4.5	6.37	3.9
Maximum output torque of the gearbox component $M_{2max,G}$	Nm	5.01	3.24	3.64	9.33	9.33	9.33
Reference torque of the gearbox component $M_{ref,G}$ [1]	Nm	2.6	2.0	1.12	4.5	6.37	6.7
Torsional backlash	´	< 42	< 42	< 42	< 72	< 72	< 72
Permissible operating temperature range	°C (°F)	-20 … +80 (-4 … +176)					
Duty type		S1					
Degree of protection [2]		IP50					
Weight	kg (lb)	0.22 (0.49)	0.22 (0.49)	0.22 (0.49)	0.33 (0.73)	0.33 (0.73)	0.33 (0.73)
Shaft loading radial/axial	N	250/150					
Service life	h	5000					
Lubrication		Life-long grease lubrication					
Mounting position		Any					
Length of gearbox module	mm (in)	39.3 (1.55)	39.3 (1.55)	54.75 (2.16)	54.75 (2.16)	54.75 (2.16)	74.2 (2.92)

[1] The torque values refer to the service life specification (speed-dependent).

[2] The degree of protection refers to the installed state with sealing on the flange side.

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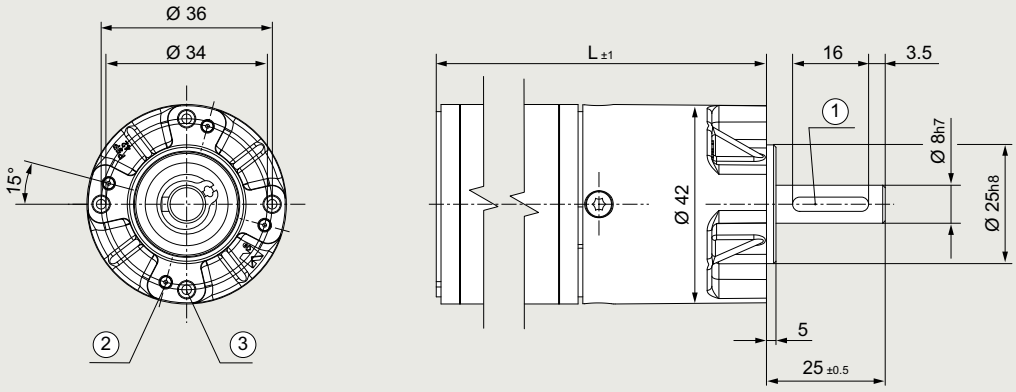
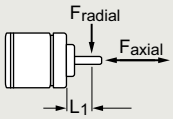
Dimensional drawings

Planetary gearbox PP042 for SIMOTICS E-1EE11 extra low-voltage motors, shaft height 20R



1. Feather key DIN 6885 A-3 x 3 x 16
2. 4 x M3, 8 deep
2. 4 x M4, 8 deep

Permissible shaft loading



F_{axial}:	150 N
F_{radial}:	250 N
L_1:	12.5 mm

At rated speed, service factor CB = 1, and service life expectancy L10 from 5000 h (at TU 40 °C in rated operation)

G_D211_EN_00827

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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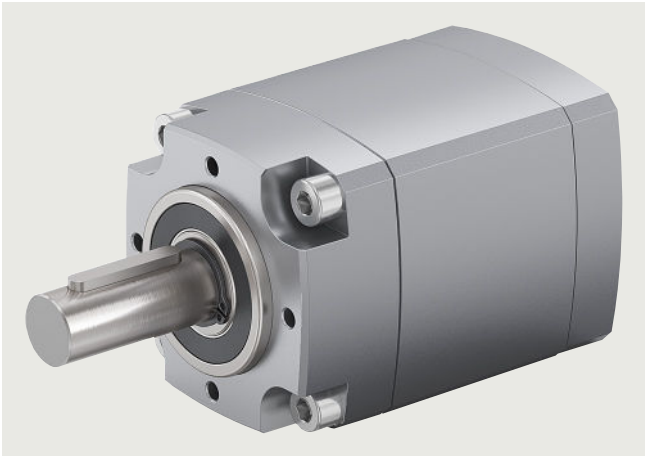
Planetary gearbox OM042 for SIMOTICS E-1EE11, shaft height 20R

Technical specifications



Robust planetary gearbox for a long service life

- Gearbox concept with extremely high overload capability for high peak loads
- Modular design and interfaces for maximum flexibility within the modular system
- High efficiency with a compact design
- Noise-optimized variant with planet wheels made of high-strength plastic
- Degree of protection IP54

Planetary gearbox OM042 for SIMOTICS E-1EE11		**1EE11 . . - . . A00 - . DB4 - Z**						
Shaft height 20R	**Order code**	**R03**	**R05**	**R90**	**R09**	**R15**	**R25**	**R45**
Number of gearbox stages	z	1-stage			2-stage			
Transmission ratio	i	3	5	9	9	15	25	45
Efficiency		0.9	0.9	0.9	0.81	0.81	0.81	0.81
Max. input speed n_1	r/min	6000						
Rated torque of the gearbox component $M_{2N,G}$ [1]	Nm	3.51	7.46	8.23	9.49	11.83	12.08	15.66
Maximum output torque of the gearbox component $M_{2max,G}$ [1]	Nm	17.14	21.71	16.65	19.11	23.38	23.66	26.38
Reference torque of the gearbox component $M_{ref,G}$ [1] [2]	Nm	16	16	10	27	27	27	23
Torsional backlash	´	< 54	< 54	< 54	< 72	< 72	< 72	< 72
Permissible operating temperature range	°C (°F)	-30 … +90 (-22 … +194)						
Duty type		S1/S3						
Degree of protection [3]		IP54						
Weight	kg (lb)	0.45 (0.99)	0.45 (0.99)	0.45 (0.99)	0.7 (1.54)	0.7 (1.54)	0.7 (1.54)	0.7 (1.54)
Shaft loading radial/axial	N	210/210						
Service life	h	10000						
Lubrication		Life-long grease lubrication						
Mounting position		Any						
Length of gearbox module	mm (in)	51.5 (2.03)	51.5 (2.03)	71.0 (2.8)	73.0 (2.87)	73.0 (2.87)	73.0 (2.87)	92.5 (3.64)

[1] In the case of the OM042 and OM063 planetary gearboxes, can be optionally selected with short code **M60** "First gear stage made of plastic instead of metal". This changes the permissible torques, which are only available via SIZER in the TIA Selection Tool or via Siemens Product Configurator SPC at: www.siemens.com/simotics-e/configuration

[2] The torque values refer to the service life specification (speed-dependent).

[3] The degree of protection refers to the installed state with sealing on the flange side.

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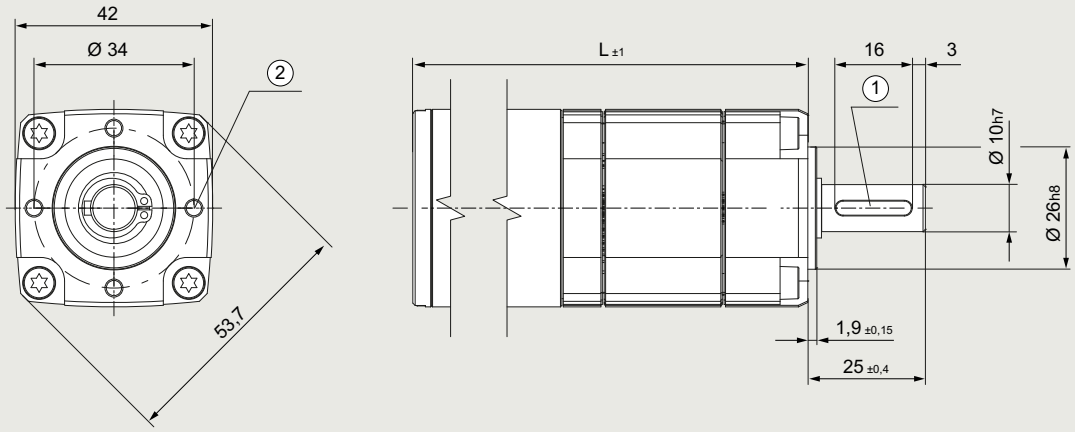
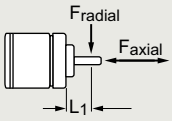
Dimensional drawings

Planetary gearbox OM042 for SIMOTICS E-1EE11 extra low-voltage motors, shaft height 20R



1 Feather key DIN 6885 A-3 x 3 x 16
2 4 x M4, 10 deep

Permissible shaft loading



F_{axial}:	210 N
F_{radial}:	210 N
L_1:	12 mm

At rated speed, service factor CB = 1, and service life expectancy L10 from 5000 h (at T_U of 40 °C in rated operation)

G_D211_EN_00829

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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Servo planetary gearbox PE040 for SIMOTICS E-1EE11, shaft height 20R

Technical specifications

Planetary gearbox with low torsional backlash

- Case-hardened and ground gearing parts ensure increased transmission quality and a long service life
- High efficiency and quiet running thanks to high-quality tooth flanks, needle-bearing planet wheels and high-quality lubricant
- High torsional stiffness and high emergency off torque

Servo planetary gearbox PE040 for SIMOTICS E-1EE11		**1EE11 . . - . . A00 - . HB4 - Z**			
Shaft height 20R	**Order code**	**R05**	**R08**	**R25**	**R40**
Number of gearbox stages	z	1-stage		2-stage	
Transmission ratio	i	5	8	25	40
Efficiency		0.96	0.96	0.94	0.94
Max. input speed n_1	r/min	6500			
Rated torque of the gearbox component $M_{2N,G}$	Nm	16	7	21	21
Maximum output torque of the gearbox component $M_{2max,G}$	Nm	25.6	11.2	33.6	33.6
Reference torque of the gearbox component $M_{ref,G}$ [1]	Nm	16	7	21	21
Torsional backlash	´	13.8	13.8	18	18
Permissible operating temperature range	°C (°F)	-25 … +90 (-13 … +194)			
Duty type		S1			
Degree of protection [2]		IP65			
Weight	kg (lb)	0.4 (0.88)	0.4 (0.88)	0.5 (1.1)	0.5 (1.1)
Shaft loading radial/axial	N	165/165			
Service life [3]	h	30000			
Lubrication		Life-long grease lubrication			
Mounting position		Any			
Length of gearbox module	mm (in)	78.4 (3.09)	78.4 (3.09)	92.9 (3.66)	92.9 (3.66)

[1] The torque values refer to the service life specification (speed-dependent).

[2] The degree of protection refers to the installed state with sealing on the flange side.

[3] The basis for this is a rated speed of 4000 r/min.

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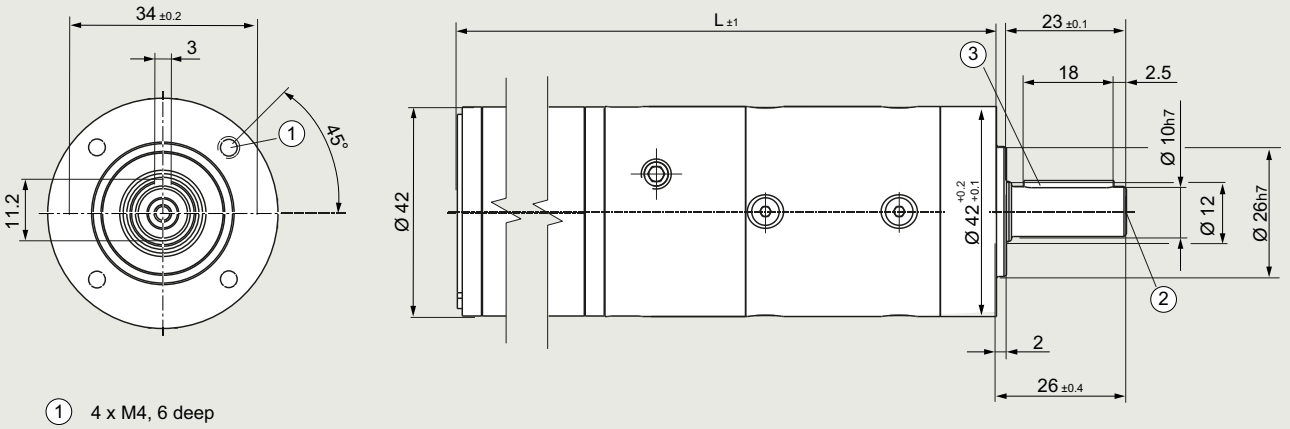
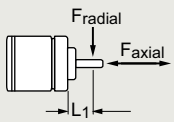
Dimensional drawings

Servo planetary gearbox PE040 for SIMOTICS E-1EE11 extra low-voltage motors, shaft height 20R



① 4 x M4, 6 deep
② 1 x M3, 9 deep / DIN 332
③ Feather key DIN 6885 A-3 x 3 x 18

Permissible shaft loading



F_{axial}:	165 N
F_{radial}:	165 N
L_1:	13 mm

At rated speed, service factor CB = 1, and service life expectancy L10 from 30000 h (at T_U max. 40 °C in rated operation)

G_D211_EN_00832

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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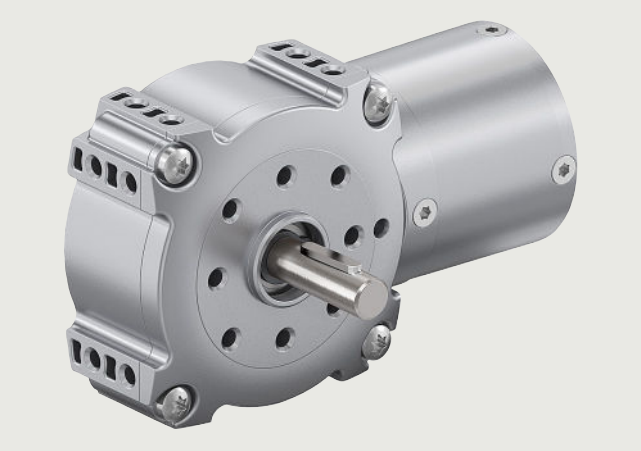
Angular gearbox EC042 for SIMOTICS E-1EE11, shaft height 20R

Technical specifications



Angular gearbox with crown wheel technology and high efficiency

- Maximum safety in terms of design and operation as well as optimum protection against vandalism, as no self-locking mechanism due to the high efficiency of the crown wheel technology
- Space-saving installation due to zero offset and symmetrical design
- Various possible fields of application with a range of optional shaft outputs and available shaft geometries
- Additional transmission ratio range through the ability to connect a planetary stage upstream and/or downstream
- High radial loads due to double ball bearing of the output shaft

Angular gearbox EC042 for SIMOTICS E-1EE11		**1EE11 . . - . . A00 - . FB4 - Z**					
Shaft height 20R	**Order code**	**R04**	**R07**	**R20**	**R33**	**R62**	**R93**
Number of gearbox stages	z	1-stage		2-stage			
Transmission ratio	i	4.1	6.7	21.2	33.3	60	113
Efficiency		0.9	0.9	0.81	0.81	0.81	0.81
Max. input speed n_1	r/min	6000					
Rated torque of the gearbox component $M_{2N,G}$	Nm	0.28	0.4	1.23	1.54	1.8	1.69
Maximum output torque of the gearbox component $M_{2max,G}$	Nm	0.42	0.6	1.85	2.31	2.7	3.23
Reference torque of the gearbox component $M_{ref,G}$ [1]	Nm	0.28	0.4	1.23	1.54	1.8	2.15
Torsional backlash	´	< 33	< 33	< 66	< 66	< 66	< 66
Permissible operating temperature range	°C (°F)	-20 … +80 (-4 … +176)					
Duty type		S1					
Degree of protection [2]		IP50					
Weight	kg (lb)	0.4 (0.88)	0.4 (0.88)	0.65 (1.43)	0.65 (1.43)	0.65 (1.43)	0.65 (1.43)
Shaft loading radial/axial [3]	N	300/150					
Service life [4]	h	5000					
Lubrication		Life-long grease lubrication					
Mounting position		Any					
Length of gearbox module	mm (in)	65.9 (2.59)	65.9 (2.59)	98.6 (3.88)	98.6 (3.88)	98.6 (3.88)	98.6 (3.88)

[1] The torque values refer to the service life specification (speed-dependent).
[2] The degree of protection refers to the installed state with sealing on the flange side.
[3] Max. axial and radial load and max. torque must not occur simultaneously.
[4] The basis for this is a rated speed of 4000 r/min.

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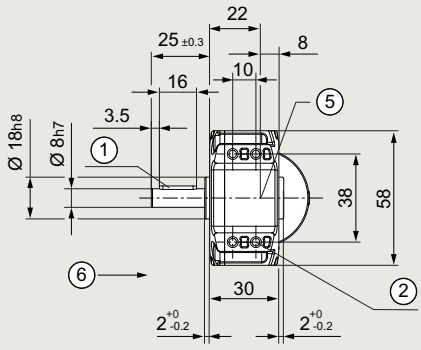
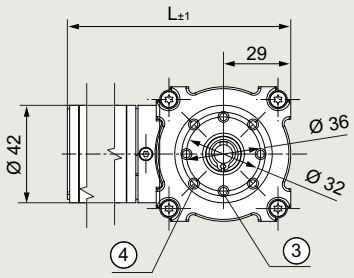
Dimensional drawings

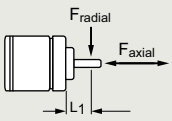
Angular gearbox EC042 for SIMOTICS E-1EE11 extra low-voltage motors, shaft height 20R





1 Feather key DIN 6885 A-3 x 3 x 16
2 4 x M4, 6.5 deep (on all front faces)
3 8 x M4, 6.5 deep (both sides)
4 Without hole on the opposite side
5 Motor centre point
6 Preferred direction of load

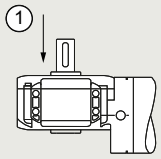
Permissible shaft loading

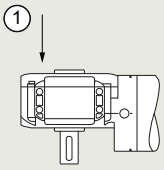


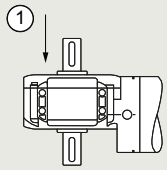
F_{axial}:	150 N
F_{radial}:	see table
L_1:	12.5 mm

At rated speed, service factor CB = 1, and service life expectancy L10 from 5000 h (at T_U max. 40 °C in rated operation)

Shaft end, right (Standard)	Shaft end, left (M81)	Shaft end, both sides (M82)







G_D211_EN_00835

1 Preferred direction of load

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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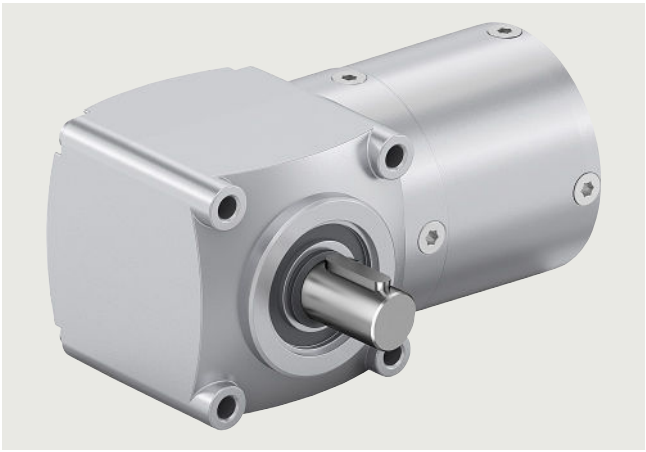
Angular gearbox EP042 for SIMOTICS E-1EE11, shaft height 20R

Technical specifications



Angular gearbox with crown wheel technology with high efficiency for high torques

- Compact design due to combination of crown wheel and planetary stage in one housing
- No self-locking mechanism due to high level of efficiency of the crown wheel technology
- High torques through use of five straight-toothed planet wheels made of hardened sintered steel in the integrated planetary output stage
- Additional transmission ratio range through the ability to connect a planetary stage upstream
- Improved smooth running thanks to the roll-optimized design of the crown wheel stage when using an upstream helical planetary stage made of low-friction plastic

Angular gearbox EP042 for SIMOTICS E-1EE11		**1EE11 . . - . . A00 - . GB4 - Z**			
Shaft height 20R	**Order code**	**R55**	**R85**	**R56**	**R89**
Number of gearbox stages	z	3-stage			
Transmission ratio	i	54	84.8	153	289
Efficiency		0.73			
Max. input speed n_1	r/min	6000			
Rated torque of the gearbox component $M_{2N,G}$	Nm	7.6	7.45	6.71	3.78
Maximum output torque of the gearbox component $M_{2max,G}$	Nm	15.01	14.77	10.04	12.6
Reference torque of the gearbox component $M_{ref,G}$ [1]	Nm	10.00	10.00	6.70	8.40
Torsional backlash	´	< 42 … < 72			
Permissible operating temperature range	°C (°F)	-20 … +80 (-4 … +176)			
Duty type		S1			
Degree of protection		IP50			
Weight	kg (lb)	0.5 (1.1)			
Shaft loading radial/axial	N	300/200			
Service life [2]	h	5000			
Lubrication		Life-long grease lubrication			
Mounting position		Any			
Length of gearbox module	mm (in)	83.8 (3.30)			

[1] The torque values refer to the service life specification (speed-dependent).

[2] The basis for this is a rated speed of 4000 r/min.

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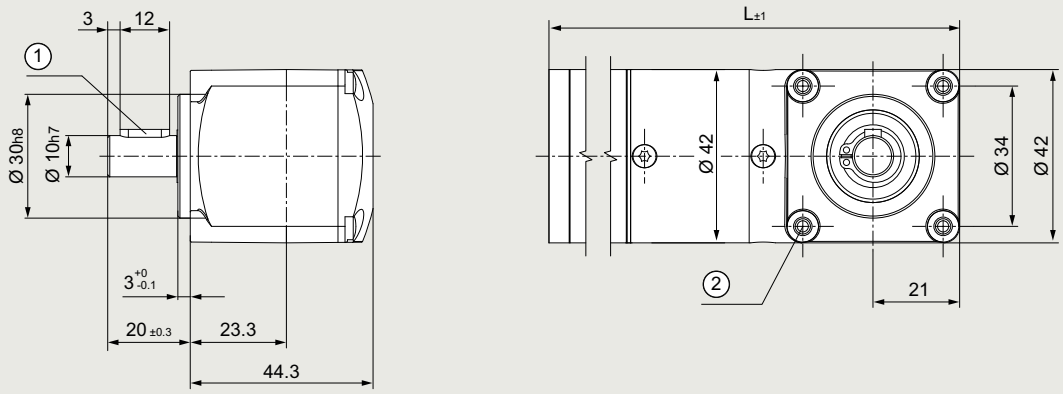
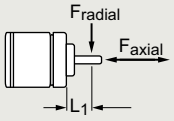
Dimensional drawings

Angular gearbox EP042 for SIMOTICS E-1EE11 extra low-voltage motors, shaft height 20R



1 Feather key DIN 6885 A-4 x 4 x 12
2 4 x M4, 8 deep

Permissible shaft loading



F_{axial}:	200 N
F_{radial}:	300 N
L_1:	10 mm

At rated speed, service factor CB = 1, and service life expectancy L10 from 5000 h (at T_U 40 °C in rated operation)

G_D211_EN_00837

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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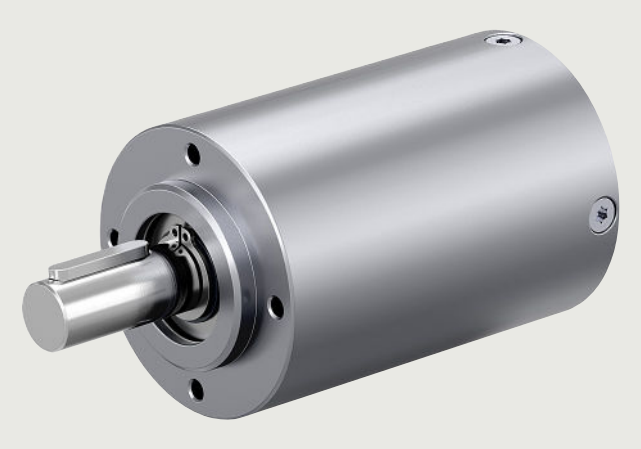
Planetary gearbox NL063 for SIMOTICS E-1EE13/1EV14, shaft height 30R

Technical specifications



Planetary gearbox for high noise requirements

- Excellent smooth running due to helical gearbox stages
- Gearing parts made of low-friction plastic support smooth running
- High transmission ratio in the first and second gearbox stage
- High radial loads due to double ball bearing of the output shaft
- Flexible connection to customer applications (shaft variants, centering collar, and fastening pitch circle)

Planetary gearbox NL063 for SIMOTICS E-1EE13		**1EE13 . . - . . . 00 - . BC . - Z**		
Planetary gearbox NL063 for SIMOTICS E-1EV14		**1EV14 . . - . . . 00 - . BC0 - Z**		
Shaft height 30R	**Order code**	**R04**	**R06**	**R26**
Number of gearbox stages	z	1-stage		2-stage
Transmission ratio	i	4.33	6	26
Efficiency		0.9	0.9	0.81
Max. input speed n_1	r/min	6000		
Rated torque of the gearbox component $M_{2N,G}$	Nm	2.29	3.37	6.29
Maximum output torque of the gearbox component $M_{2max,G}$	Nm	18.62	19.42	19.42
Reference torque of the gearbox component $M_{ref,G}$ [1]	Nm	8.99	7.13	12.6
Torsional backlash	´	< 12	< 12	< 30
Permissible operating temperature range	°C (°F)	-20 … +80 (-4 … +176)		
Duty type		S1		
Degree of protection [2]		IP50		
Weight	kg (lb)	0.56 (1.23)	0.56 (1.23)	0.8 (1.76)
Shaft loading radial/axial	N	50/1000	50/1000	780/1000
Service life	h	10000		
Lubrication		Life-long grease lubrication		
Mounting position		Any		
Length of gearbox module	mm (in)	59 (2.32)	59 (2.32)	91.4 (3.60)

[1] The torque values refer to the service life specification (speed-dependent).

[2] The degree of protection refers to the installed state with sealing on the flange side.

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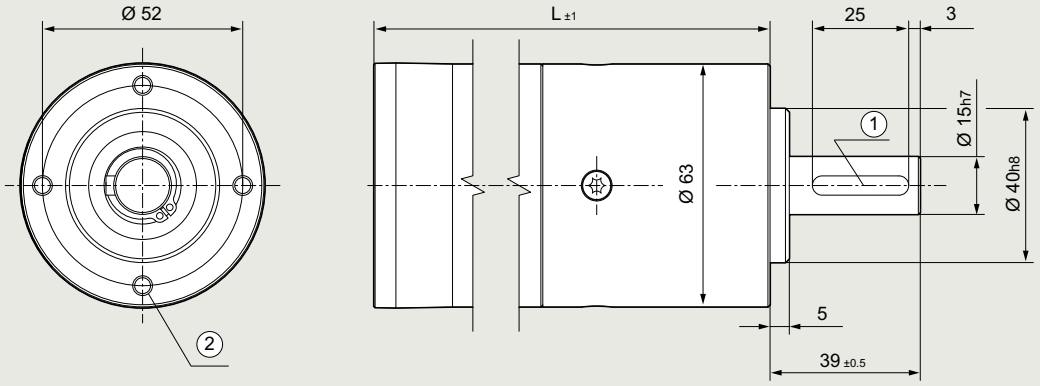
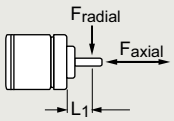
Dimensional drawings

Planetary gearbox NL063 for SIMOTICS E-1EE13 extra low-voltage motors, shaft height 30R



1 Feather key DIN 6885 A-5 x 5 x 25
2 4 x M5, 10 deep

Permissible shaft loading



F_{axial}:	450 N
F_{radial}:	350 N
L_1:	17.5 mm

At rated speed, service factor CB = 1, and service life expectancy L10 from 10000 h (at Tu max. 40 °C in rated operation)

G_D211_EN_00825

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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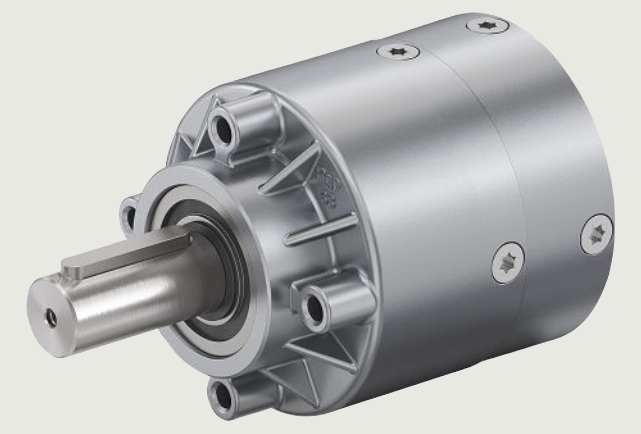
Planetary gearbox PF063 for SIMOTICS 1EV14, shaft height 30R

Technical specifications



Planetary gearbox with high power density

- Very smooth running due to helical first gearbox stage
- Planet wheels made of low-friction plastic optimized for smooth running in the first gearbox stage
- Large effective diameter thanks to radial screw connections
- Economical design due to the use of many individual parts

Planetary gearbox PF063 for SIMOTICS E-1EV14		**1EV143 . - 0A . 00 - 1CC0 - Z**					
Shaft height 30R	**Order code**	**R05**	**R09**	**R20**	**R30**	**R38**	**R53**
Number of gearbox stages	z	1-stage		2-stage			
Transmission ratio	i	5	9	21.18	30	38.12	54
Efficiency		0.9	0.9	0.81	0.81	0.81	0.81
Max. input speed n_1	r/min	6000					
Rated torque of the gearbox component $M_{2N,G}$	Nm	2.15	1.87	5.22	6.66	5.15	6.57
Maximum output torque of the gearbox component $M_{2max,G}$	Nm	10.01	8.46	27.85	30.62	28	30.73
Reference torque of the gearbox component $M_{ref,G}$ [1]	Nm	2.5	2	9.6	6.66	6.1	6.57
Torsional backlash	´	< 51	< 57	< 55	< 54	< 56	< 55
Permissible operating temperature range	°C (°F)	-20 … +80 (-4 … +176)					
Duty type		S1					
Degree of protection [2]		IP50					
Weight	kg (lb)	0.45 (0.99)	0.45 (0.99)	0.67 (1.48)	0.67 (1.48)	0.67 (1.48)	0.67 (1.48)
Shaft loading radial/axial	N	1100/500					
Service life	h	5000					
Lubrication		Life-long grease lubrication					
Mounting position		Any					
Length of gearbox module	mm (in)	45.7 (1.80)	45.7 (1.80)	67.05 (2.64)	67.1 (2.64)	88.4 (3.48)	88.4 (3.48)

[1] The torque values refer to the service life specification (speed-dependent).

[2] The degree of protection refers to the installed state with sealing on the flange side.

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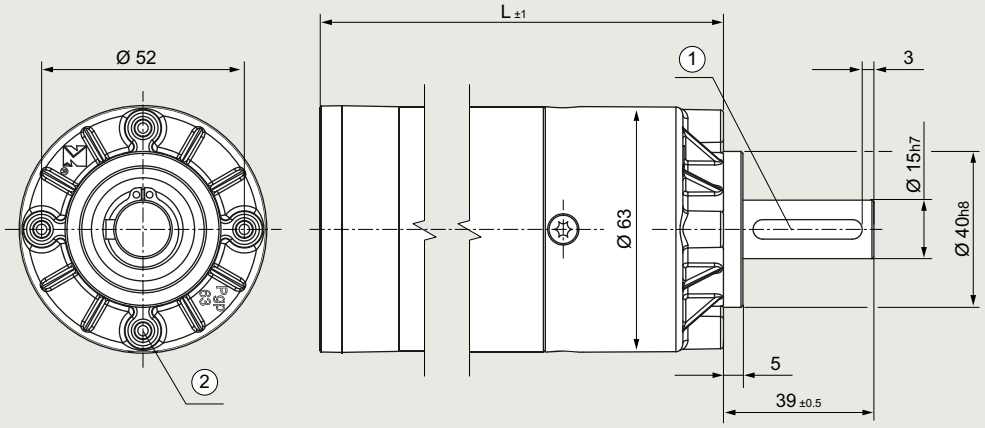
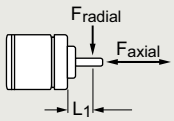
Dimensional drawings

Planetary gearbox PF063 for SIMOTICS E-1EV14 extra low-voltage motors, shaft height 30R



1 Feather key A-5 x 5 x 28 DIN 6885
2 4 x M5, 10 deep

Permissible shaft loading



F_{axial}:	500 N
F_{radial}:	350 N
L_1:	19 mm

Permissible simultaneous shaft loadings at rated speed and service life expectancy L10 (in rated operation) of 5000 h (at T_U max. 40 °C)

G_D211_EN_00826

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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Planetary gearbox PP063 for SIMOTICS E-1EE13/1EV14, shaft height 30R

Technical specifications

Planetary gearbox with high power density

- High torques due to larger gearing widths in the first gearbox stage
- Good shock resistance thanks to housing made of hardened steel with straight gears in the output stage
- Very smooth running due to helical first gearbox stage
- Planet wheels made of low-friction plastic optimized for smooth running in the first gearbox stage
- Large effective diameter thanks to radial screw connections

Planetary gearbox PP063 for SIMOTICS E-1EE13		**1EE13 . . - . . . 00 - . DC . - Z**							
Planetary gearbox PP063 for SIMOTICS E-1EV14		**1EV14 . . - . . . 00 - . DC0 - Z**							
Shaft height 30R	**Order code**	**R03**	**R05**	**R90**	**R20**	**R30**	**R38**	**R53**	**R72**
Number of gearbox stages	z	1-stage			2-stage				
Transmission ratio	i	3.18	5	9	21.18	30	38.12	54	72.00
Efficiency		0.9	0.9	0.9	0.81	0.81	0.81	0.81	0.81
Max. input speed n_1	r/min	6000							
Rated torque of the gearbox component $M_{2N,G}$	Nm	1.55	4.44	3.88	16.94	24	14.79	20.95	4.61
Maximum output torque of the gearbox component $M_{2max,G}$	Nm	17.75	19.35	16.2	45.77	48.12	45.98	48.33	46.11
Reference torque of the gearbox component $M_{ref,G}$ [1]	Nm	6.5	11.9	7.6	45.2	64	28.9	41.0	16.9
Torsional backlash	´	< 42	< 42	< 42	< 72	< 72	< 72	< 72	< 72
Permissible operating temperature range	°C (°F)	-20 … +80 (-4 … +176)							
Duty type		S1							
Degree of protection [2]		IP50							
Weight	kg (lb)	0.66 (1.46)	0.66 (1.46)	0.66 (1.46)	1.2 (2.65)	1.2 (2.65)	1.2 (2.65)	1.2 (2.65)	1.2 (2.65)
Shaft loading radial/axial	N	350/500							
Service life	h	5000							
Lubrication		Life-long grease lubrication							
Mounting position		Any							
Length of gearbox module	mm (in)	57.8 (2.28)	57.8 (2.28)	79.1 (3.11)	79.1 (3.11)	79.1 (3.11)	79.1 (3.11)	100.4 (3.95)	100.4 (3.95)

[1] The torque values refer to the service life specification (speed-dependent).

[2] The degree of protection refers to the installed state with sealing on the flange side.

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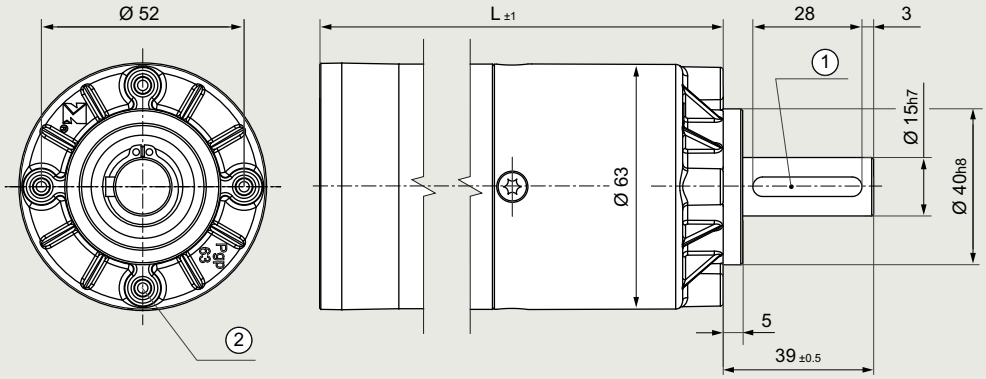
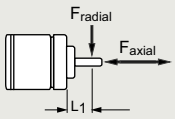
Dimensional drawings

Planetary gearbox PP063 for SIMOTICS E-1EE13/1EV14 extra low-voltage motors, shaft height 30R



1 Feather key DIN 6885 A-5 x 5 x 28
2 4 x M5, 10 deep

Permissible shaft loading



F_{axial}:	500 N
F_{radial}:	350 N
L_1:	19 mm

At rated speed, service factor CB = 1, and service life expectancy L10 from 5000 h (at T_U 40 °C in rated operation)

G_D211_EN_00828

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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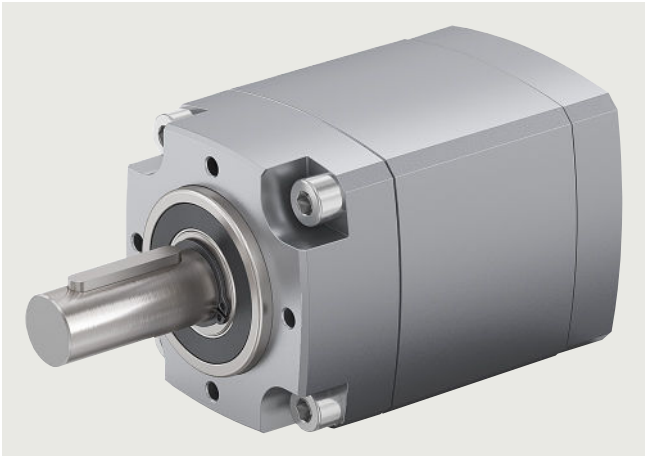
Planetary gearbox OM063 for SIMOTICS E-1EE13, shaft height 30R

Technical specifications



Robust planetary gearbox for a long service life

- Gearbox concept with extremely high overload capability for high peak loads
- Modular design and interfaces for maximum flexibility within the modular system
- High efficiency with a compact design
- Noise-optimized variant with planet wheels made of high-strength plastic
- Degree of protection IP54

Planetary gearbox OM063 for SIMOTICS E-1EE13		**1EE13 . . - . . . 00 - . EC . - Z**						
Shaft height 30R	**Order code**	**R03**	**R05**	**R90**	**R09**	**R15**	**R25**	**R45**
Number of gearbox stages	z	1-stage			2-stage			
Transmission ratio	i	3	5	9	9	15	25	45
Efficiency		0.9	0.9	0.9	0.81	0.81	0.81	0.81
Max. input speed n_1	r/min	6000						
Rated torque of the gearbox component $M_{2N,G}$ [1]	Nm	6.84	14.26	14.44	18.66	31.1	48.54	48.41
Maximum output torque of the gearbox component $M_{2max,G}$ [1]	Nm	66.96	72.00	48.03	65.61	66.5	66.5	66.5
Reference torque of the gearbox component $M_{ref,G}$ [1] [2]	Nm	40	40	25	68	68	68	58
Torsional backlash	´	< 42	< 42	< 42	< 72	< 72	< 72	< 72
Permissible operating temperature range	°C (°F)	-30 … +90 (-22 … +194)						
Duty type		S1/S3						
Degree of protection [3]		IP54						
Weight	kg (lb)	1.3 (2.87)	1.3 (2.87)	1.3 (2.87)	1.9 (4.19)	1.9 (4.19)	1.9 (4.19)	1.9 (4.19)
Shaft loading radial/axial	N	500/500						
Service life	h	10000						
Lubrication		Life-long grease lubrication						
Mounting position		Any						
Length of gearbox module	mm (in)	72.1 (2.84)	72.1 (2.84)	90.6 (3.57)	103.3 (4.07)	103.3 (4.07)	103.3 (4.07)	121.8 (4.80)

[1] In the case of the OM042 and OM063 planetary gearboxes, can be optionally selected with short code **M60** "First gear stage made of plastic instead of metal". This changes the permissible torques, which are only available via SIZER in the TIA Selection Tool or via Siemens Product Configurator SPC at: www.siemens.com/simotics-e/configuration

[2] The torque values refer to the service life specification (speed-dependent).

[3] The degree of protection refers to the installed state with sealing on the flange side.

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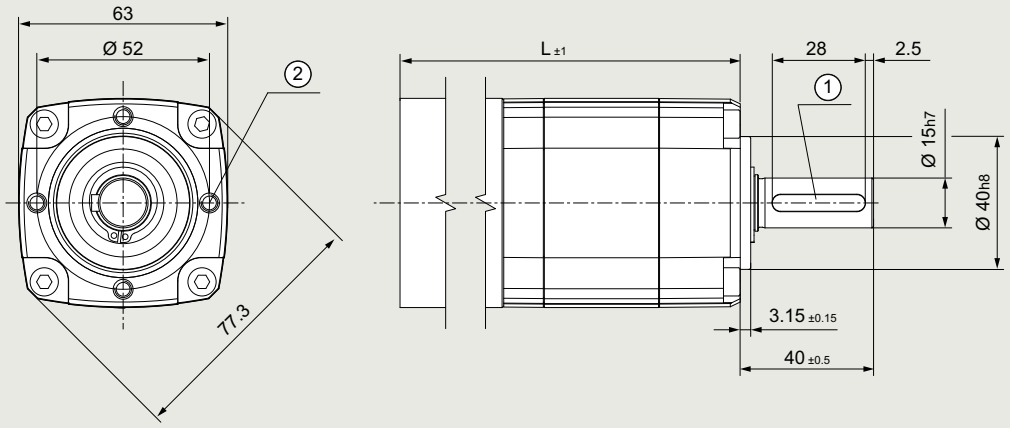
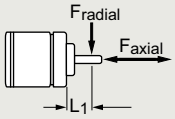
Dimensional drawings

Planetary gearbox OM063 for SIMOTICS E-1EE13 extra low-voltage motors, shaft height 30R



1 Feather key DIN 6885 A-5 x 5 x 28
2 4 x M5, 15 deep

Permissible shaft loading



F_{axial}:	500 N
F_{radial}:	500 N
L_1:	20 mm

At rated speed, service factor CB = 1, and service life expectancy L10 from 5000 h (at T_U max. 40 °C in rated operation)

G_D211_EN_00830

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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Servo planetary gearbox PE060 for SIMOTICS E-1EE13, shaft height 30R

Technical specifications

Planetary gearbox with low torsional backlash

- Case-hardened and ground gearing parts ensure increased transmission quality and a long service life
- High efficiency and quiet running thanks to high-quality tooth flanks, needle-bearing planet wheels and high-quality lubricant
- High torsional stiffness and high emergency off torque

Servo planetary gearbox PE060 for SIMOTICS E-1EE13		**1EE13 . . - . . . 00 - . HC . - Z**			
Shaft height 30R	**Order code**	**R05**	**R08**	**R25**	**R40**
Number of gearbox stages	z	1-stage		2-stage	
Transmission ratio	i	5	8	25	40
Efficiency		0.96	0.96	0.94	0.94
Max. input speed n_1	r/min	6500			
Rated torque of the gearbox component $M_{2N,G}$	Nm	40	20	46	46
Maximum output torque of the gearbox component $M_{2max,G}$	Nm	64	32	73.6	73.6
Reference torque of the gearbox component $M_{ref,G}$ [1]	Nm	40	20	46	46
Torsional backlash	´	9	9	10.8	10.8
Permissible operating temperature range	°C (°F)	-25 … +90 (-13 … +194)			
Duty type		S1			
Degree of protection [2]		IP65			
Weight	kg (lb)	1 (2.2)	1 (2.2)	1.2 (2.65)	1.2 (2.65)
Shaft loading radial/axial	N	350/450			
Service life [3]	h	30000			
Lubrication		Life-long grease lubrication			
Mounting position		Any			
Length of gearbox module	mm (in)	88 (3.46)	88 (3.46)	103.35 (4.07)	103.35 (4.07)

[1] The torque values refer to the service life specification (speed-dependent).

[2] The degree of protection refers to the installed state with sealing on the flange side.

[3] The basis for this is a rated speed of 4000 r/min.

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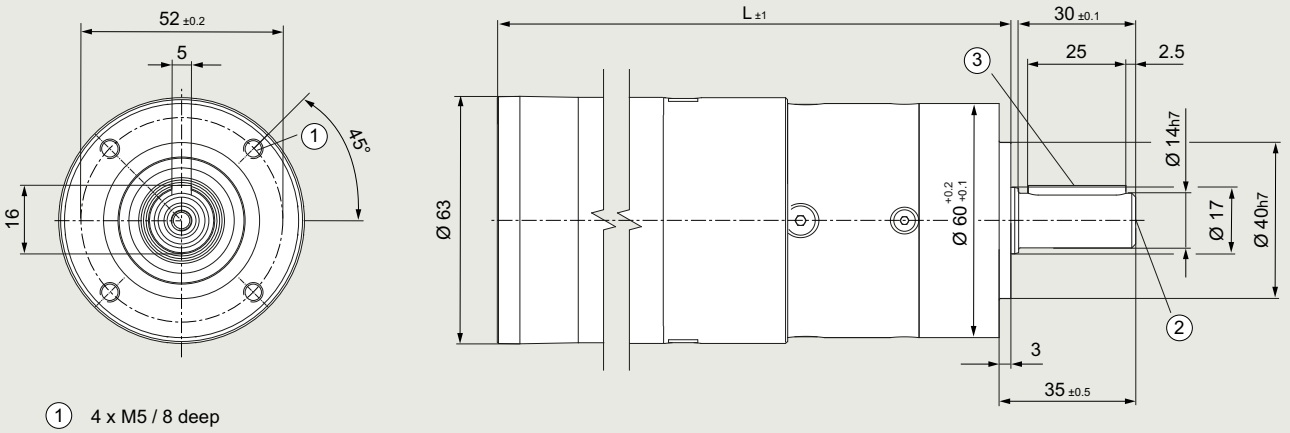
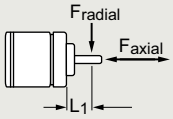
Dimensional drawings

Servo planetary gearbox PE060 for SIMOTICS E-1EE13 extra low-voltage motors, shaft height 30R



Permissible shaft loading



F_{axial}:	450 N
F_{radial}:	350 N
L_1:	17.5 mm

At rated speed, service factor CB = 1, and service life expectancy L10 from 30000 h (at T_U max. 40 °C in rated operation)

G_D211_EN_00833

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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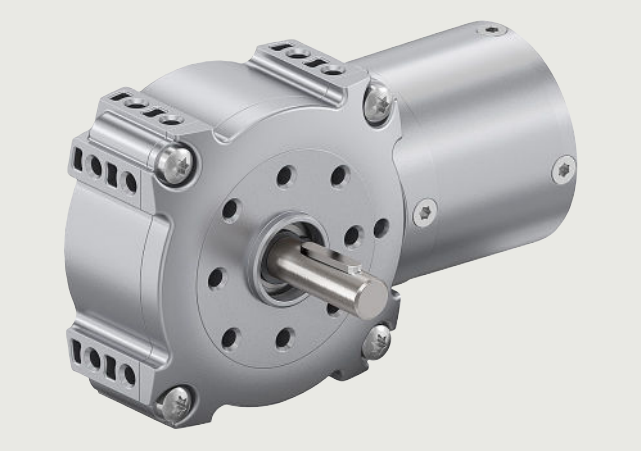
Angular gearbox EC063 for SIMOTICS E-1EE13/1EV14, shaft height 30R

Technical specifications



Angular gearbox with crown wheel technology and high efficiency

- Maximum safety in terms of design and operation as well as optimum protection against vandalism, as no self-locking mechanism due to the high efficiency of the crown wheel technology
- Space-saving installation due to zero offset and symmetrical design
- Various possible fields of application with a range of optional shaft outputs and available shaft geometries
- Additional transmission ratio range through the ability to connect a planetary stage upstream and/or downstream
- High radial loads due to double ball bearing of the output shaft

Angular gearbox EC063 for SIMOTICS E-1EE13		**1EE13 . . - . . . 00 - . FC . - Z**					
Angular gearbox EC063 for SIMOTICS E-1EV14		**1EV14 . . - . . . 00 - . FC0 - Z**					
Shaft height 30R	**Order code**	**R04**	**R07**	**R19**	**R33**	**R62**	**R93**
Number of gearbox stages	z	1-stage		2-stage			
Transmission ratio	i	4.07	6.67	20.3	33.33	60	113.33
Efficiency		0.9	0.9	0.81	0.81	0.81	0.81
Max. input speed n_1	r/min	6000					
Rated torque of the gearbox component $M_{2N,G}$	Nm	6.0	5.0	7.85	12.87	11.24	3.51
Maximum output torque of the gearbox component $M_{2max,G}$	Nm	9.00	7.5	24.75	20.55	20.55	20.55
Reference torque of the gearbox component $M_{ref,G}$ [1]	Nm	6.0	5.0	16.5	13.7	13.7	13.7
Torsional backlash	´	< 33	< 33	< 66	< 66	< 66	< 66
Permissible operating temperature range	°C (°F)	-20 … +80 (-4 … +176)					
Duty type		S1					
Degree of protection [2]		IP50					
Weight	kg (lb)	0.9 (1.98)	0.9 (1.98)	1.3 (2.87)	1.3 (2.87)	1.3 (2.87)	1.3 (2.87)
Shaft loading radial/axial [3]	N	600/500					
Service life [4]	h	5000					
Lubrication		Life-long grease lubrication					
Mounting position		Any					
Length of gearbox module	mm (in)	91 (3.58)	91 (3.58)	133 (5.24)	133 (5.24)	133 (5.24)	133 (5.24)

[1] The torque values refer to the service life specification (speed-dependent).
[2] The degree of protection refers to the installed state with sealing on the flange side.
[3] Max. axial and radial load and max. torque must not occur simultaneously.
[4] The basis for this is a rated speed of 4000 r/min.

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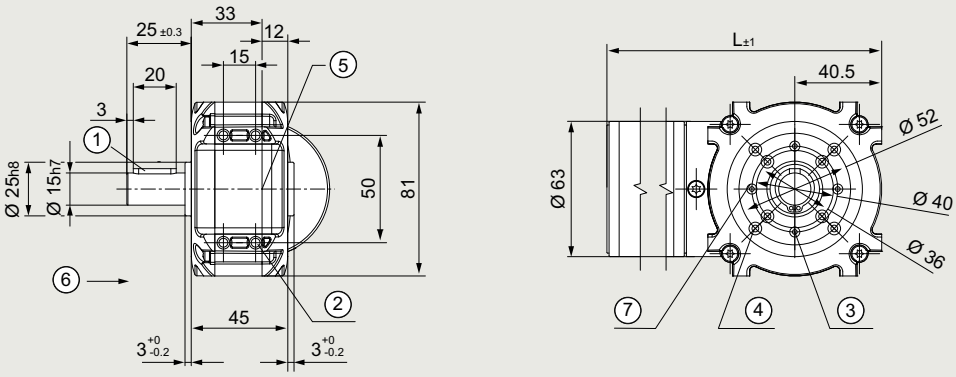
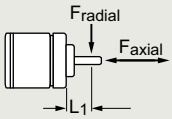
Dimensional drawings

Angular gearbox EC063 for SIMOTICS E-1EE13/1EV14 extra low-voltage motors, shaft height 30R



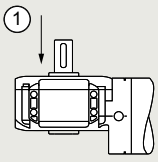
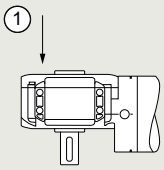
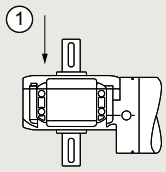
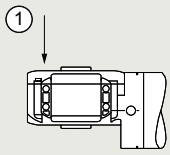
1. Feather key DIN 6885 A-5 x 5 x 20
2. 4 x M5, 6.5 deep (on all front faces)
3. 4 x M4, 6.5 deep (both sides)
4. 8 x M5, 6.5 deep
5. Motor centre point
6. Preferred direction of load
7. Without hole on the opposite side

Permissible shaft loading



F_{axial}:	500 N
F_{radial}:	see table
L_1:	15 mm

At rated speed, service factor CB = 1, and service life expectancy L10 from 5000 h (at T_U max. 40 °C in rated operation)

Shaft end, right (Standard)	Shaft end, right (M81)	Shaft end, right (M82)	Hollow shaft (M80)
			

1. Preferred direction of load

Hollow shaft Ø $10^{+0.3}$mm

G_D211_EN_00836

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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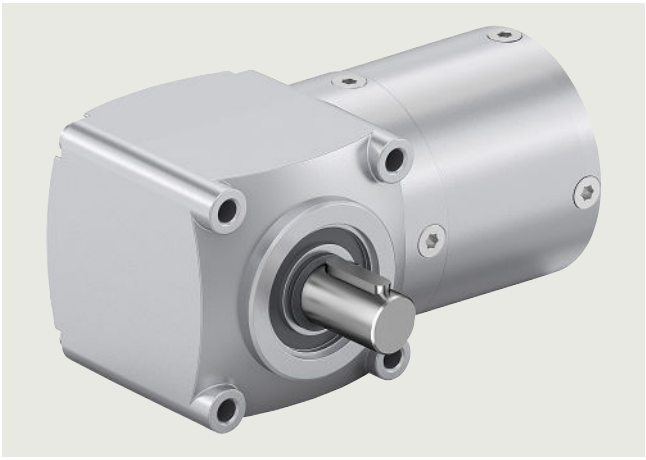
Angular gearbox EP063 for SIMOTICS E-1EE13/1EV14, shaft height 30R

Technical specifications



Angular gearbox with crown wheel technology with high efficiency for high torques

- Compact design due to combination of crown wheel and planetary stage in one housing
- No self-locking mechanism due to high level of efficiency of the crown wheel technology
- High torques through use of five straight-toothed planet wheels made of hardened sintered steel in the integrated planetary output stage
- Additional transmission ratio range through the ability to connect a planetary stage upstream
- Improved smooth running thanks to the roll-optimized design of the crown wheel stage when using an upstream helical planetary stage made of low-friction plastic

Angular gearbox EP063 for SIMOTICS E-1EE13		**1EE13 . . - . . . 00 - . GC . - Z**				
Angular gearbox EP063 for SIMOTICS E-1EV14		**1EV14 . . - . . . 00 - . GC0 - Z**				
Shaft height 30R	**Order code**	**R71**	**R55**	**R85**	**R56**	**R89**
Number of gearbox stages	z	2-stage	3-stage			
Transmission ratio	i	16.96	53.98	84.82	152.68	288.39
Efficiency		0.73				
Max. input speed n_1	r/min	6000				
Rated torque of the gearbox component $M_{2N,G}$	Nm	8.0	10.3	27	25	8.03
Maximum output torque of the gearbox component $M_{2max,G}$	Nm	12.00	40.49	40.49	37.5	25.5
Reference torque of the gearbox component $M_{ref,G}$ [1]	Nm	8.0	27.0	27.0	25.0	17.0
Torsional backlash	´	< 42	< 72	< 72	< 72	< 72
Permissible operating temperature range	°C (°F)	-20 … +80 (-4 … +176)				
Duty type		S1				
Degree of protection		IP50				
Weight	kg (lb)	1.7 (3.75)	1.8 (3.97)	1.8 (3.97)	1.8 (3.97)	1.8 (3.97)
Shaft loading radial/axial	N	700/500				
Service life [1]	h	5000				
Lubrication		Life-long grease lubrication				
Mounting position		Any				
Length of gearbox module	mm (in)	116.3 (4.58)				

[1] The torque values refer to the service life specification (speed-dependent). [2] The basis for this is a rated speed of 4000 r/min.

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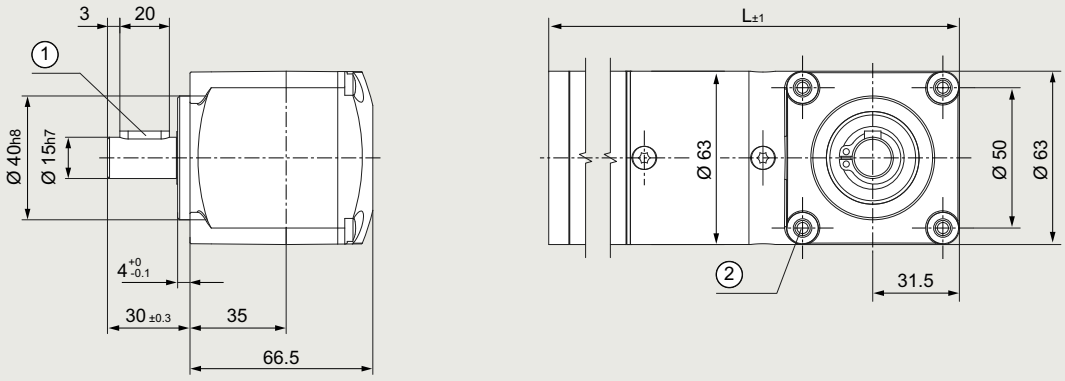
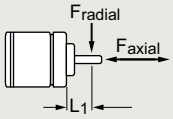
Dimensional drawings

Angular gearbox EP063 for SIMOTICS E-1EE13/1EV14 extra low-voltage motors, shaft height 30R



1 Feather key DIN 6885 A-5 x 5 x 20
2 4 x M5, 10 deep

Permissible shaft loading



F_{axial}:	500 N
F_{radial}:	700 N
L_1:	15 mm

At rated speed, service factor CB = 1, and service life expectancy L10 from 5000 h (at T_U max. 40 °C in rated operation).

G_D211_EN_00838

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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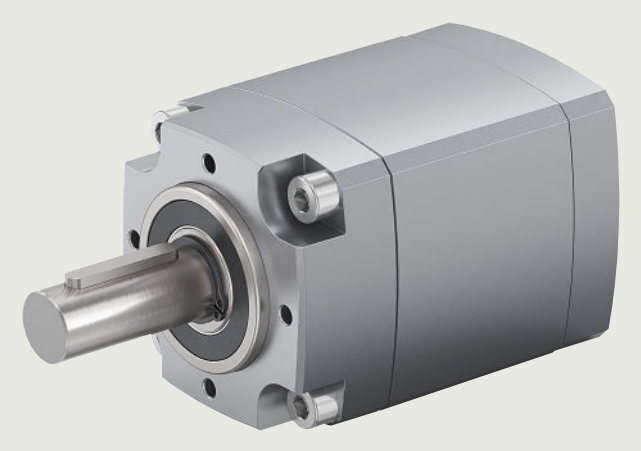
Planetary gearbox OM080 for SIMOTICS E-1EE14, shaft height 40R

Technical specifications



Robust planetary gearbox for a long service life

- Gearbox concept with extremely high overload capability for high peak loads
- Modular design and interfaces for maximum flexibility within the modular system
- High efficiency with a compact design
- Noise-optimized variant with planet wheels made of high-strength plastic
- Degree of protection IP54

Planetary gearbox OM080 for SIMOTICS E-1EE14		**1EE14 . . - . . . 00 - . ED4 - Z**						
Shaft height 40R	**Order code**	**R03**	**R05**	**R90**	**R09**	**R15**	**R25**	**R45**
Number of gearbox stages	z	1-stage			2-stage			
Transmission ratio	i	3	5	9	9	15	25	45
Efficiency		0.9	0.9	0.9	0.81	0.81	0.81	0.81
Max. input speed n_1	r/min	6000						
Rated torque of the gearbox component $M_{2N,G}$	Nm	31.16	43.46	24.96	43.33	42.32	41.8	41.28
Maximum output torque of the gearbox component $M_{2max,G}$	Nm	141.75	93.48	54.84	134.75	90.7	92.71	93.56
Reference torque of the gearbox component $M_{ref,G}$ [1]	Nm	70	70	44	115	115	115	100
Torsional backlash	´	< 42	< 42	< 42	< 72	< 72	< 72	< 72
Permissible operating temperature range	°C (°F)	-30 … +90 (-22 … +194)						
Duty type		S1/S3						
Degree of protection [2]		IP54						
Weight	kg (lb)	1.8 (3.97)	1.8 (3.97)	1.8 (3.97)	2.6 (5.73)	2.6 (5.73)	2.6 (5.73)	2.6 (5.73)
Shaft loading radial/axial	N	1300/500						
Service life	h	10000						
Lubrication		Life-long grease lubrication						
Mounting position		Any						
Length of gearbox module	mm (in)	83.1 (3.27)	83.1 (3.27)	111.4 (4.39)	112.2 (4.42)	112.2 (4.42)	112.2 (4.42)	140.5 (5.53)

[1] The torque values refer to the service life specification (speed-dependent).

[2] The degree of protection refers to the installed state with sealing on the flange side.

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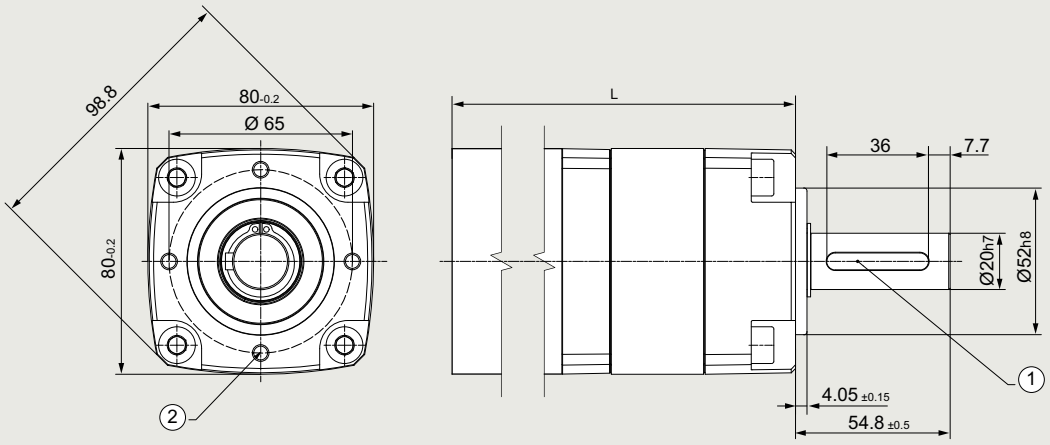
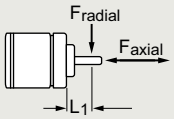
Dimensional drawings

Planetary gearbox OM080 for SIMOTICS E-1EE14 extra low-voltage motors, shaft height 40R



(1) Feather key DIN 6885 A-6 x 6 x 36
(2) 4 x M6, 16 deep

Permissible shaft loading



F_{axial}:	500 N
F_{radial}:	1300 N
L_1:	27 mm

At rated speed, service factor CB = 1, and service life expectancy L10 from 5000 h (at T_U max. 40 °C in rated operation)

G_D211_EN_00831

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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Servo planetary gearbox PE080 for SIMOTICS E-1EE14, shaft height 40R

Technical specifications

Planetary gearbox with low torsional backlash

- Case-hardened and ground gearing parts ensure increased transmission quality and a long service life
- High efficiency and quiet running thanks to high-quality tooth flanks, needle-bearing planet wheels and high-quality lubricant
- High torsional stiffness and high emergency off torque

Servo planetary gearbox PE080 for SIMOTICS E-1EE14		**1EE14 . . - . . . 00 - . HD4 - Z**			
Shaft height 40R	**Order code**	**R05**	**R08**	**R25**	**R40**
Number of gearbox stages	z	1-stage		2-stage	
Transmission ratio	i	5	8	25	40
Efficiency		0.96	0.96	0.94	0.94
Max. input speed n_1	r/min	6500			
Rated torque of the gearbox component $M_{2N,G}$	Nm	115	55	125	115
Maximum output torque of the gearbox component $M_{2max,G}$	Nm	184	88	200	184
Reference torque of the gearbox component $M_{ref,G}$ [1]	Nm	115	55	125	125
Torsional backlash	´	7.2	7.2	9	9
Permissible operating temperature range	°C (°F)	-25 … +90 (-13 … +194)			
Duty type		S1			
Degree of protection [2]		IP65			
Weight	kg (lb)	2.3 (5.07)	2.3 (5.07)	2.8 (6.17)	2.8 (6.17)
Shaft loading radial/axial	N	750/900			
Service life [3]	h	30000			
Lubrication		Life-long grease lubrication			
Mounting position		Any			
Length of gearbox module	mm (in)	112.1 (4.41)	112.1 (4.41)	126.6 (4.98)	126.6 (4.98)

[1] The torque values refer to the service life specification (speed-dependent).

[2] The degree of protection refers to the installed state with sealing on the flange side.

[3] The basis for this is a rated speed of 4000 r/min.

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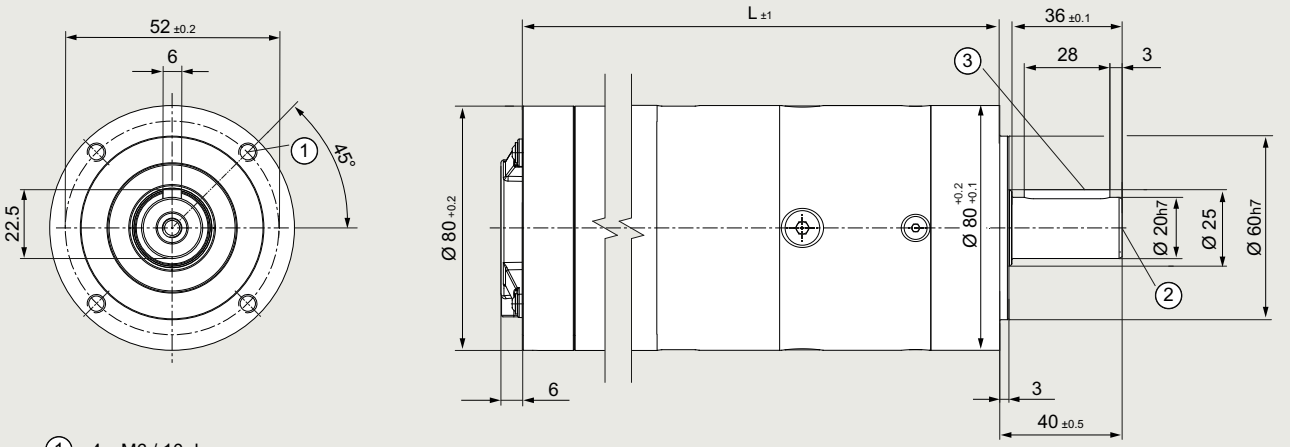
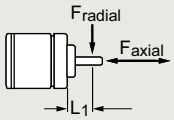
Dimensional drawings

Servo planetary gearbox PE080 for SIMOTICS E-1EE14 extra low-voltage motors, shaft height 40R



① 4 x M6 / 10 deep
② 1 x M6 / DIN 332
③ Feather key DIN 6885 A-6 x 6 x 28

Permissible shaft loading



F_{axial}:	900 N
F_{radial}:	750 N
L_1:	20 mm

At rated speed, service factor CB = 1, and service life expectancy L10 from 30000 h (at T_U max. 40 °C under rated operating conditions).

G_D211_DE_00834

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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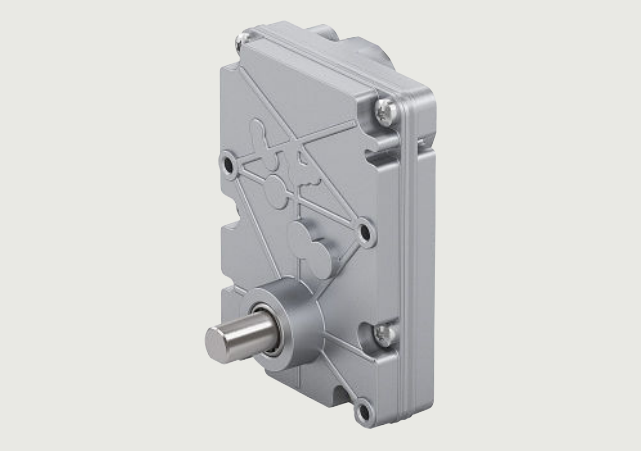
Spur gearbox FL085 for SIMOTICS E-1EV14, shaft height 30R

Technical specifications



Spur gearbox with minimal space requirements due to compact design

- Optimised installation length due to flat gearbox design
- Maintenance-free over the entire service life

Spur gearbox FL085 for SIMOTICS E-1EV14		1EV143 . -0A . 00-1UC0 - Z	
Shaft height 30R	**Order code**	**R82**	**R36**
Number of gearbox stages	z	3-stage	
Transmission ratio	i	8.2	12.3
Efficiency		0.73	0.73
Max. input speed n_1	r/min	6000	
Rated torque of the gearbox component $M_{2N,G}$	Nm	0.77	1.21
Maximum output torque of the gearbox component $M_{2max,G}$	Nm	6.16	9.09
Reference torque of the gearbox component $M_{ref,G}$ [1)]	Nm	1.9	2.8
Torsional backlash	´	< 90	< 71
Permissible operating temperature range	°C (°F)	-20 … +80 (-4 … +176)	
Duty type		S1	
Degree of protection [2)]		IP50	
Weight	kg (lb)	0.5 (1.1)	0.5 (1.1)
Shaft loading radial/axial	N	2300/50	
Service life	h	5000	
Lubrication		Life-long grease lubrication	
Mounting position		Any	
Length of gearbox module	mm (in)	30.1 (1.19)	30.1 (1.19)

[1)] The basis for this is a rated speed of 4000 r/min.

[2)] The degree of protection refers to the installed state with sealing on the flange side.

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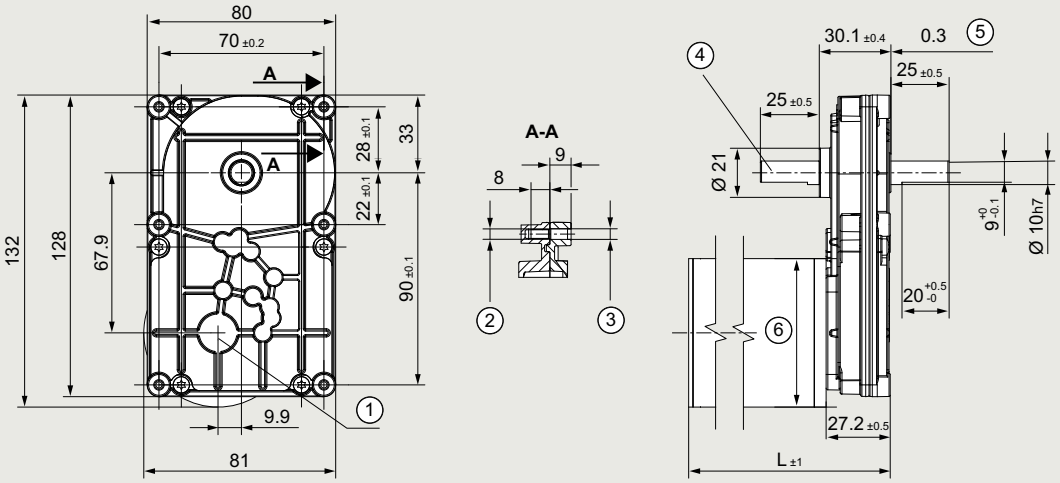
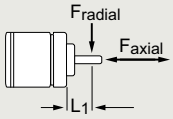
Dimensional drawings

Spur gearbox FL085 for SIMOTICS-E 1EV14, shaft height 30R



1. Motor center point
2. 4 x M4
3. 6x Ø 4.5
4. Alternative shaft end on motor side can be ordered with order code M81
5. Overhang over the mounting plane
6. Motor

Permissible shaft loading



F_{axial}:	50 N
F_{radial}:	150 N
L_1:	17 mm

At rated speed, service factor CB = 1, and service life expectancy L10 from 5000 h (at T_U max. 40 °C in rated operation)

G_D211_EN_00842

Dimension **L** depending on the motor or motor-gearbox combination. The dimensions of the motor or motor-gearbox combination can be found in the dimensional drawing collection of catalog D 60 in SiePortal at: www.siemens.com/d60

For more information on the dimensional drawings (CAD, pin assignments, etc.), see SiePortal and in the Siemens Product Configurator at: www.siemens.com/simotics-e/configuration

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Notes

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SIMOTICS E ArgoDrive driving steering system

5

Further information about SIMOTICS E
can be found on the internet at
www.siemens.com/simotics-e

Siemens D 60 · March 2026

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Overview

SIMOTICS E ArgoDrive driving steering system – flexible and high-performance steering systems for industrial applications

The driving steering systems of the SIMOTICS E ArgoDrive series offer a modular and high-performance solution for use in intralogistics and production. They enable precise control of production stations, flexible route guidance and efficient use of existing space. By using advanced drive technology, logistics processes can be optimized in a targeted manner and system availability can be increased.

Omnidirectional Mobility for AGV/AMRs

The SIMOTICS E ArgoDrive systems enable the implementation of compact, omnidirectionally mobile automated guided transport vehicles (AGV/AMRs). These are characterized by high maneuverability and responsiveness to obstacles. Integrated functions such as condition monitoring, predictive maintenance and standardized interfaces (CANopen, EtherCAT, PROFINET) ensure reliable system integration and enable predictive maintenance.

Heavy-duty suitability with compact design

The systems are designed to transport loads of up to 2000 kg and can handle gradients of up to 10 % – even when stationary. Free navigation over the entire area is just as possible as space-saving installation thanks to compact dimensions and permanently laid cabling. Three variants are available.

Cross-industry applications

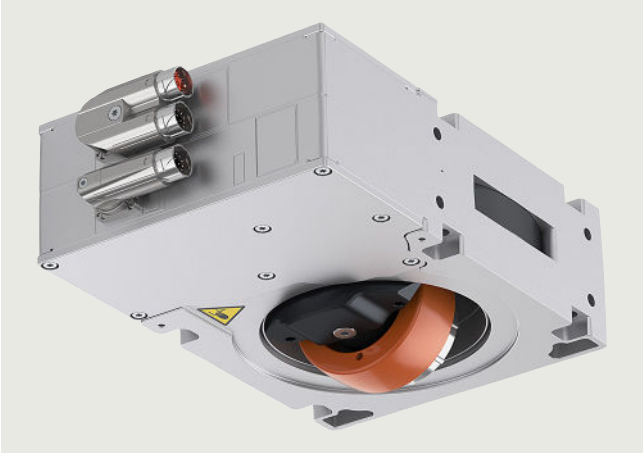
In medical technology, the systems enable the flexible use of limited resources while at the same time meeting high safety requirements. In mobile robotics, they support the safe coexistence of humans and machines. Their high load capacity and reliability also make them ideal for intralogistics applications as well as for automotive production, where they support end-to-end system interlinking.

Variant with steering angle initiator

The driving steering systems 2AG5111-1AB21-0AA02, 2AG5212-1AB21-0AA0 and 2AG5313-1AB21-0AA0 integrate a steering angle initiator, which serves as a reference point for the steering angle position. Thanks to the Initiator steering angle, the steering angle can be referenced via an external control system.

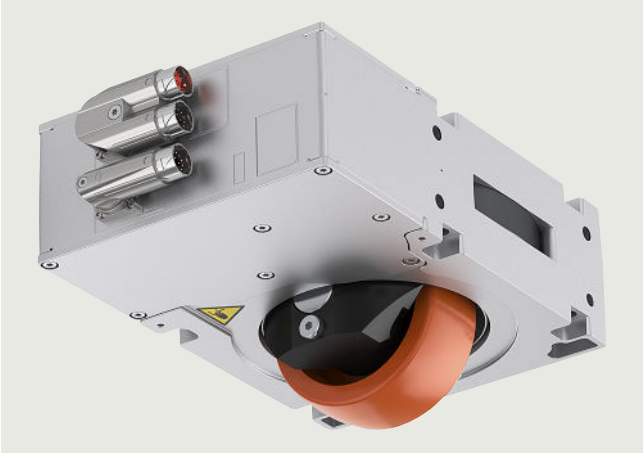
- Extended SSI is used for communication between the steering angle encoder and the controller
- Steering angle encoder: Absolute singleturn position with 12 bit resolution + 2 bit (extended SSI Error-/Warning-Bit)
- Rotor position encoder: incremental position with 9 bit resolution

Light (up to 100 kg)



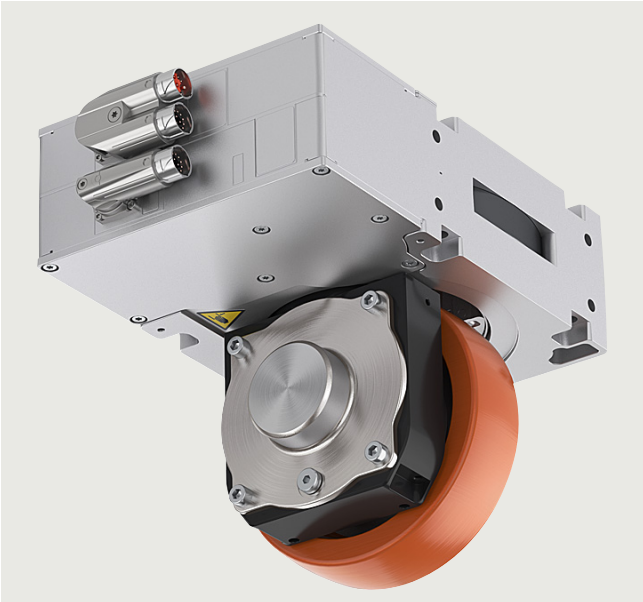
Example: SIMOTICS E ArgoDrive Light without steering angle initiator

Standard (up to 300 kg)



Example: SIMOTICS E ArgoDrive Standard without steering angle initiator

Heavy (up to 500 kg)



Example: SIMOTICS E ArgoDrive Heavy without steering angle initiator

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Selection and ordering data

Description		Variant	Article No.
SIMOTICS E ArgoDrive driving steering system			
 	• Wheel diameter: **80 mm** • Max. load capacity per wheel: **100 kg** • Nominal speed: 3 m/s • Overall height: 103 mm • Ground clearance to the gearbox: 26 mm • Ground clearance to the brake disc: 11 mm	Light without steering angle initiator	**2AG5111-1AB21-0AA0**
		Light with steering angle initiator	**2AG5111-1BA11-0AA0**
 	• Wheel diameter: **100 mm** • Max. load capacity per wheel: **300 kg** • Nominal speed: 2 m/s • Overall height: 123 mm • Ground clearance to the gearbox: 45.5 mm • Ground clearance to the brake disc: 12 mm	Standard without steering angle initiator	**2AG5212-1AB21-0AA0**
		Standard with steering angle initiator	**2AG5212-1BA11-0AA0**
 	• Wheel diameter: **145 mm** • Max. load capacity per wheel: **500 kg** • Nominal speed: 1.5 m/s • Overall height: 205 mm • Ground clearance to the gearbox: 128 mm • Ground clearance to the brake disc: 14 mm	Heavy without steering angle initiator	**2AG5313-1AB21-0AA0**
		Heavy with steering angle initiator	**2AG5313-1BA11-0AA0**

Electrical connection cables for SIMOTICS E ArgoDrive driving steering system

Description	Length	Article No.
M15 - Signal + Power 12 + 3	0.5 m	**6FX1001-2EB10-1AA0**
	3 m	**6FX1001-2MB10-1AA0**
	5 m	**6FX1001-2PB10-1AA0**

Description	Length	Article No.
M15 - Signal + Brake	0.5 m	**6FX1001-5EB10-1AA0**
	3 m	**6FX1001-5MB10-1AA0**
	5 m	**6FX1001-5PB10-1AA0**

Note:
The following connection cables are required for the electrical connection of the SIMOTICS E ArgoDrive driving steering system:

- 2 × cable M15 - Signal + Power 12 + 3
- 1 × cable M15 - Signal + Brake

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Technical specifications

		SIMOTICS E ArgoDrive Light	SIMOTICS E ArgoDrive Standard	SIMOTICS E ArgoDrive Heavy
Variant without steering angle initiator		2AG5111-1AB21-0AA0	2AG5212-1AB21-0AA0	2AG5313-1AB21-0AA0
Variant with steering angle initiator		2AG5111-1BA11-0AA0	2AG5212-1BA11-0AA0	2AG5313-1BA11-0AA0
Performance data				
Wheel diameter	mm	80	100	145
Max. load capacity per wheel	kg	100	300	500
Overall length	mm	250	250	250
Construction width	mm	170	170	170
Construction height	mm	103	123	205
Ground clearance to the gearbox	mm	26	45.5	128
Ground clearance to the brake disc	mm	11	12	14
Nominal speed	m/s	3	2	1.5
Acceleration (fully loaded)	m/s^2	2	0.8	0.6
Motor braking deceleration (fully loaded)	m/s^2	2.6	2	1.5
Overall gear ratio		6.85	11.8	24.97
Steering ratio		32	32	32
Steering speed	°/s	180	180	180
Steering angle		Unlimited		
Nominal wheel rotational speed	r/min	716	382	198
Nominal current per motor	A	2.0	2.0	2.0
Nominal voltage motors	V	48	48	48
Max. acceleration torque	Nm	9.4	16	31.4
Max. braking torque (motorized)	Nm	10.7	28.4	54.6
Replaceability of wheel and brake		Yes		
Weight	kg	10.5	11.5	18
Degree of protection [1]		IP54		
Wheel material		Vulkollan		
Wheel material hardness	Shore A	95	95	95
Service life [2]	h	12000	12000	12000
Brake				
Nominal voltage	DC V	24	24	24
Nominal current (release/hold) [3]	mA	700	700	700
Brake control		PWM not permitted		
Mechanical braking torque slip hub [4]	Nm	13.4	35.5	68.3
Tolerance of slip hub braking torque with environmental influences (internal calculation value)	%	20	20	20
Typical electrical engagement time for brake	ms	30	30	30
Engagement time of the latch	ms	9.3	12.1	19
Permissible number of emergency stops		500	500	500
Replaceability of brake module		Yes		

[1] Gearbox without brake

[2] In compliance with the defined load and ambient conditions. This does not include the components subject to maintenance: Wheel, slip hub (of brake) and lubricant. These are subject to maintenance depending on the load and application.

[3] 310 mA after 1 second

[4] Tolerance 10 %

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Technical specifications

		SIMOTICS E ArgoDrive Light	SIMOTICS E ArgoDrive Standard	SIMOTICS E ArgoDrive Heavy
Variant without steering angle initiator		2AG5111-1AB21-0AA0	2AG5212-1AB21-0AA0	2AG5313-1AB21-0AA0
Variant with steering angle initiator		2AG5111-1BA11-0AA0	2AG5212-1BA11-0AA0	2AG5313-1BA11-0AA0
Motor Feedback Hall – variant without steering angle initiator				
Feedback type		Digital Hall		
Supply voltage range of Hall sensors	V	5 ... 24	5 ... 24	5 ... 24
Design		Open Drain		
Commutation sequence	PPR	3 × 4	3 × 4	3 × 4
Motor Feedback Hall – variant with steering angle initiator				
Feedback type		Digital Hall		
Supply voltage range of Hall sensors	V	5 ... 24	5 ... 24	5 ... 24
Design		Open Drain		
Commutation sequence	PPR	3 × 4	3 × 4	3 × 4
Mean Time To Dangerous Failure ($MTTF_D$)		12972	12972	12972
Motor Feedback Encoder – variant without steering angle initiator				
Encoder type		Magnetic incremental		
Magnetic field used		Separate sensor magnet		
Supply voltage of encoders	V	4.8 ... 5.5	4.8 ... 5.5	4.8 ... 5.5
Encoder interface		RS 422 (TTL)		
Output voltage level of encoders	V	5	5	5
Maximum resolution (bits)	bit	10	10	10
Maximum resolution (pulses per revolution)	PPR	1024	1024	1024
Quadrature evaluation	CPR	4096	4096	4096
Signals at ArgoDrive connector		A, B, nA, nB		
$MTTF_D$ values / Hall and encoder subsystems	Years	12972	12972	12972
Motor Feedback Encoder – variant with steering angle initiator				
Encoder type		Magnetic incremental		
Magnetic field used		Separate sensor magnet		
Supply voltage of encoders	V	4.8 ... 5.5	4.8 ... 5.5	4.8 ... 5.5
Encoder interface		RS 422 (TTL)		
Output voltage level of encoders		RS422 compatible differential 4 mA		
Maximum resolution (bits)	bit	10	10	10
Maximum resolution (pulses per revolution)	PPR	512	512	512
Quadrature evaluation	CPR	2048	2048	2048
Signals at ArgoDrive connector		A, B, nA, nB		
$MTTF_D$ values / Hall and encoder subsystems	Years	266	266	266

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Technical specifications

		SIMOTICS E ArgoDrive Light	SIMOTICS E ArgoDrive Standard	SIMOTICS E ArgoDrive Heavy
Variant without steering angle initiator		2AG5111-1AB21-0AA0	2AG5212-1AB21-0AA0	2AG5313-1AB21-0AA0
Variant with steering angle initiator		2AG5111-1BA11-0AA0	2AG5212-1BA11-0AA0	2AG5313-1BA11-0AA0
Steering angle sensor – variant without steering angle initiator				
Encoder type		Magnetic incremental (absolute)		
Power supply [1]	V	24	24	24
Output signal levels	V	5	5	5
Zero-position accuracy	°	± 1	± 1	± 1
Resolution	bit	12	12	12
Protocol		Standard SSI protocol		
Encoding		Gray		
Data frame	bit	13	13	13
Transmission frequency	MHz	10	10	10
Steering angle sensor – variant with steering angle initiator				
Encoder type		Magnetic absolute (sensing sensor magnet)		
Power supply [1]	V	24	24	24
Output signal levels	V	5	5	5
Zero-position accuracy	°	± 1	± 1	± 1
Resolution	bit	12	12	12
Protocol		Extended SSI protocol with error and warning bit		
Encoding		Gray		
Data frame		12 bit user information and 2 bit (error and warning)		
Transmission frequency	MHz	Max. 1	Max. 1	Max. 1
Mean Time To Dangerous Failure ($MTTF_D$)	Years	244	244	244
Steering angle initiator [2]				
Feedback type		Magnetic (sensing steering angle initiator magnet)		
Supply voltage	V	20.4 ... 28.8	20.4 ... 28.8	20.4 ... 28.8
High level range	°	± 3	± 3	± 3
High-active	V	20.4 ... 28.8	20.4 ... 28.8	20.4 ... 28.8
Mean Time To Dangerous Failure ($MTTF_D$)	Years	855	855	855
Environmental operation conditions				
Climatic conditions EN 60721-3-3:1995	Class	3K3		
Environment temperature	°C	5 ... 50	5 ... 50	5 ... 50
Relative humidity	%	5 ... 95	5 ... 95	5 ... 95
Max. installation height	m above sea level	1000	1000	1000
Permissible ground condition		Dry/fixed/(asphalt/screed concrete/industrial floor floors)		
Thresholds / steps (permissible height)	mm	2	2.5	3.6
Maximum incline	%	5	5	5
Environmental conditions				
EMC immunity and emissions		DIN EN 1175-1 Safety of industrial trucks DIN EN 12895:2020-03 Industrial trucks electromagnetic compatibility		

[1] Internally, controlled to 5 V

[2] Applies only to 2AG5111-1BA11-0AA0, 2AG5212-1BA11-0AA0 and 2AG5313-1BA11-0AA0

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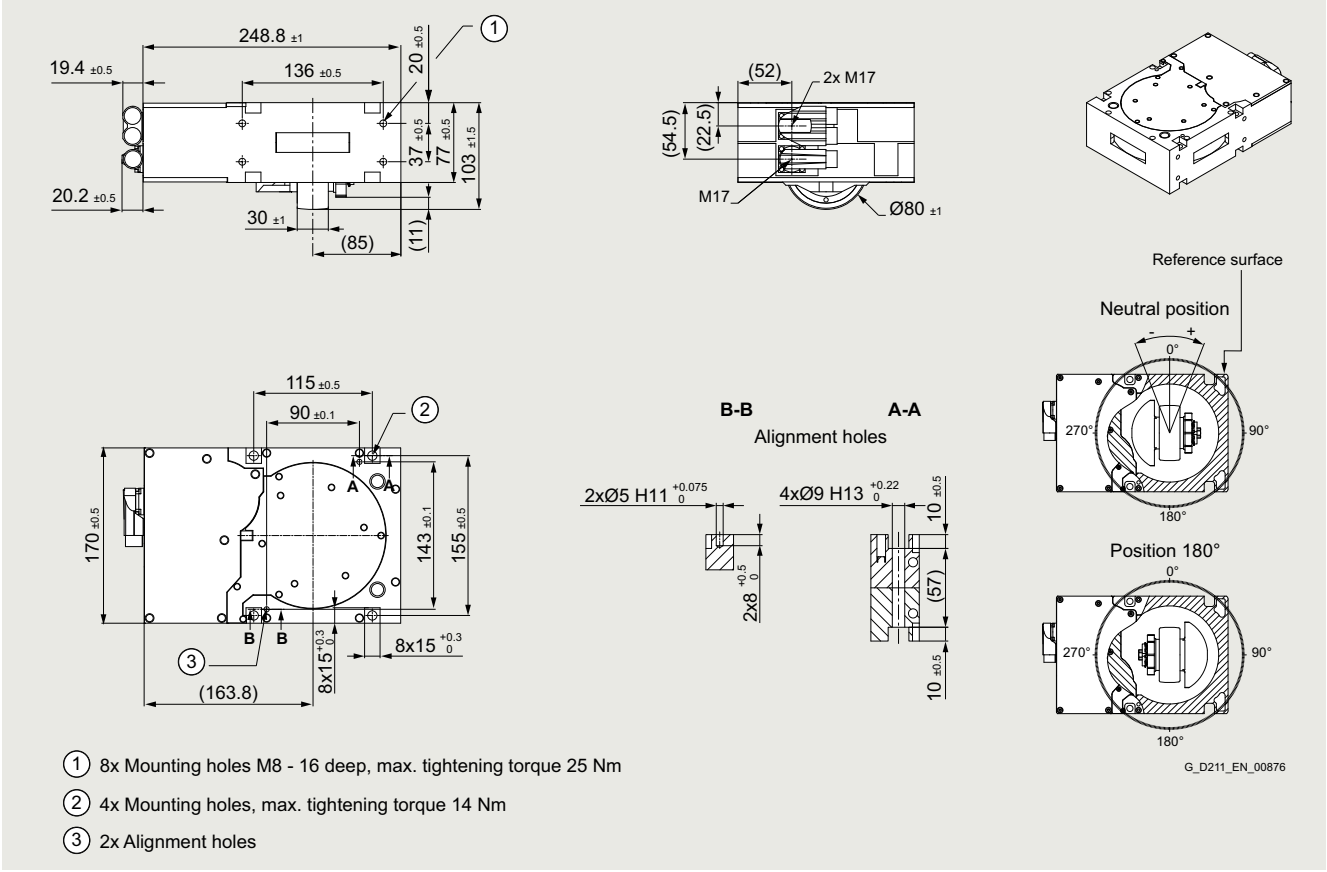
Dimensional drawings

SIMOTICS E ArgoDrive driving steering system – variant Light



① 8x Mounting holes M8 - 16 deep, max. tightening torque 25 Nm

② 4x Mounting holes, max. tightening torque 14 Nm

③ 2x Alignment holes

Representation without steering angle initiator – see SPC for dimensional drawing with steering angle initiator

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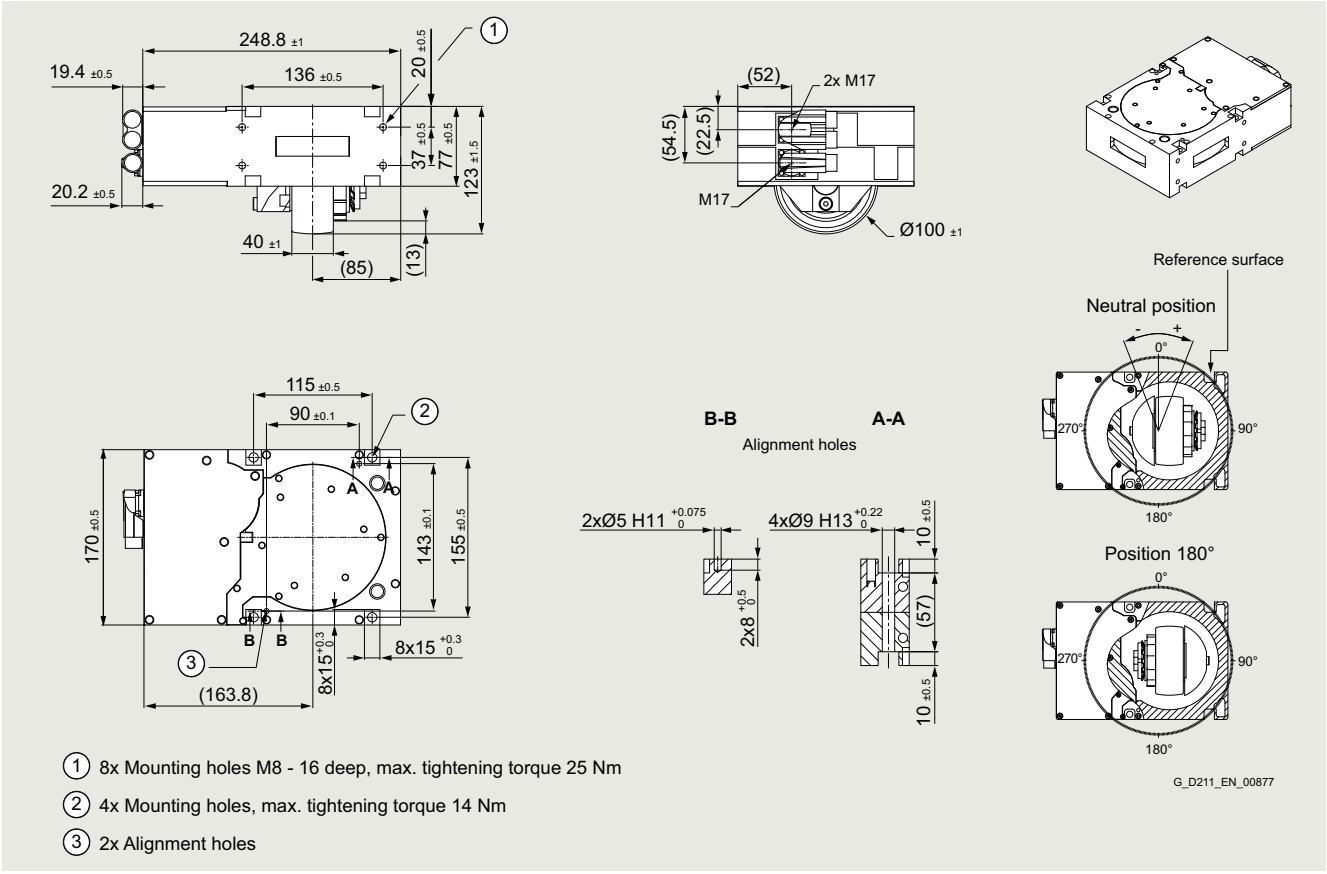
Dimensional drawings

SIMOTICS E ArgoDrive driving steering system – variant Standard



1. 8x Mounting holes M8 - 16 deep, max. tightening torque 25 Nm
2. 4x Mounting holes, max. tightening torque 14 Nm
3. 2x Alignment holes

Representation without steering angle initiator – see SPC for dimensional drawing with steering angle initiator

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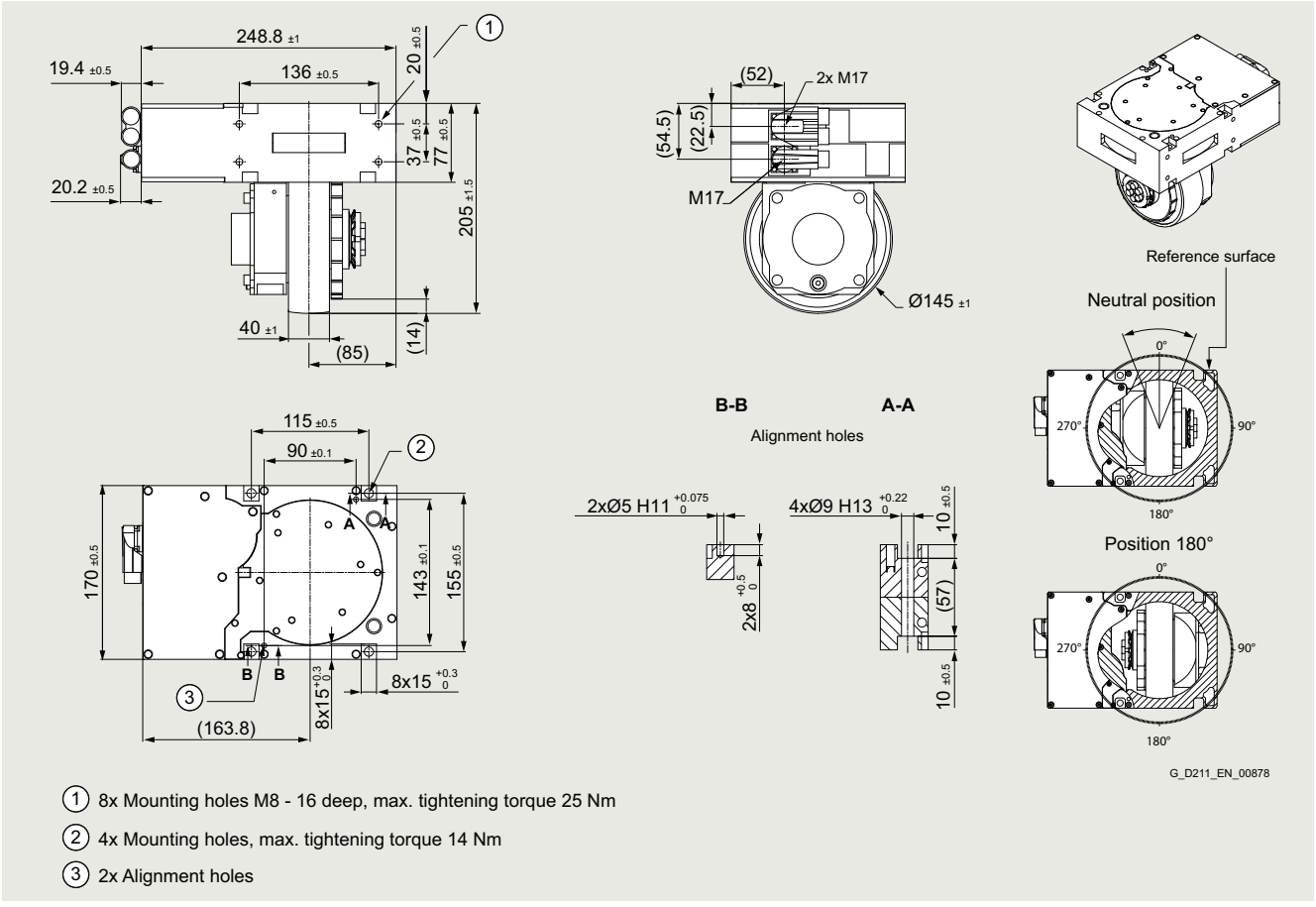
Dimensional drawings

SIMOTICS E ArgoDrive driving steering system – variant Heavy



(1) 8x Mounting holes M8 - 16 deep, max. tightening torque 25 Nm

(2) 4x Mounting holes, max. tightening torque 14 Nm

(3) 2x Alignment holes

Representation without steering angle initiator – see SPC for dimensional drawing with steering angle initiator

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More information

The driving steering systems of the SIMOTICS E ArgoDrive series offer a modular and high-performance solution for use in intralogistics and production. For more information, see www.siemens.com/simotics-e-argodrive

For more information on ordering and configuration, see Siemens Product Configurator in SiePortal at: www.siemens.com/simotics-e/configuration

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Further information about SIMOTICS E
can be found on the internet at
www.siemens.com/simotics-e

Siemens D 60 · March 2026

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Overview

Compatible connection cables for SIMOTICS E-1EE1 extra-low voltage motors

- Pre-assembled on the motor side
- Not pre-assembled on the converter side (open, cut)
- Suitable for drag chains
- UL/cUL approval for connector and basic cable

For more information on ordering and configuration, see the Siemens Product Configurator in SiePortal at:
https://www.siemens.com/simotics-e/configuration

Note:

SIMOTICS E-1EV1 extra-low voltage motors, as the electrical connection is made via a connection cable with free stranded ends that is permanently mounted on the motor.

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Selection and ordering data

Extra low-voltage motors SIMOTICS E-1EE11 **Shaft height 20R**	Design on the motor side	Halogen free/ Silicon free	Temperature plug/ cable	Outer diameter (OD)	Bending radius	Length	Article No.
1EE11 . . - . . A00-1 . . 4 – for operation with VTD extra low-voltage converters							
Hybrid cable $3 \times 1.5\ mm^2 + 12 \times 0.25\ mm^2$ (supply and signal line, converter to motor)	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	1 m	**6FX1001-2HA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	3 m	**6FX1001-2MA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	10 m	**6FX1001-2SA10-1AA0**
1EE11 . . - . BA00-0 . . 4 – for operation with SIMATIC MICRO-DRIVE F-TM Drives Drives with incremental encoder							
Hybrid cable $3 \times 1.5\ mm^2 + 12 \times 0.25\ mm^2$ (supply and signal line, converter to motor)	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	1 m	**6FX1001-2HA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	3 m	**6FX1001-2MA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	10 m	**6FX1001-2SA10-1AA0**
1EE11 . . - 0DA00-0 . . 4 – for operation with SIMATIC MICRO-DRIVE F-TM Drives with absolut encoder – without holding brake							
Connection cable: CSD_LAiO2 [1]							
1EE11 . . - 1DA00-0 . . 4 – for operation with SIMATIC MICRO-DRIVE F-TM Drives Drives with absolut encoder – with holding brake							
Hybrid cable $3 \times 1.5\ mm^2 + 12 \times 0.25\ mm^2$ (supply and signal line, converter to motor)	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	1 m	**6FX1001-2HA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	3 m	**6FX1001-2MA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	10 m	**6FX1001-2SA10-1AA0**
1EE11 . . -0CA00-3 . . 4 – for operation with SIMATIC MICRO-DRIVE PDC100 and PDC100F – without holding brake – with incremental encoder 100 S/R (encoder TTL100S/R)							
Connection cable: LAiO2 [1]							
1EE11 . . -1CA00-3 . . 4 – for operation with SIMATIC MICRO-DRIVE PDC100 and PDC100F – with holding brake – with incremental encoder 100 S/R (encoder TTL100S/R)							
Connection cable: LAiO2 and brake line: LPBr2 [1]							

[1] Available through the product partner program with KnorrTec (https://www.knorrtec.de) and/or Harting (https://www.harting.com).
Cables are pre-assembled on both sides.
Various lengths are available from the product partner.
Can be found via the specified order designation, e.g. **CSD_LAiO2**.

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Electrical connecting cables for SIMOTICS E-1EE11

Selection and ordering data

Extra low-voltage motors SIMOTICS E-1EE11 Shaft height 20R	Design on the motor side	Halogen free/ Silicon free	Temperature plug/ cable	Outer diameter (OD)	Bending radius	Length	Article No.
1EE11 . . -0CA00-3 . . 4 – for operation with SIMATIC MICRO-DRIVE PDC600 and PDC1000 – without holding brake – with incremental encoder 100 S/R (encoder TTL100S/R)							
Hybrid cable 3 × 1.5 mm^2 + 12 × 0.25 mm^2 (supply and signal line, converter to motor)	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	1 m	**6FX1001-2HA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	3 m	**6FX1001-2MA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	10 m	**6FX1001-2SA10-1AA0**
1EE11 . . -1CA00-3 . . 4 – for operation with SIMATIC MICRO-DRIVE PDC600 and PDC1000 – with holding brake – with incremental encoder 100 S/R (encoder TTL100S/R)							
Hybrid cable 3 × 1.5 mm^2 + 12 × 0.25 mm^2 (supply and signal line, converter to motor)	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	1 m	**6FX1001-2HA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	3 m	**6FX1001-2MA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	10 m	**6FX1001-2SA10-1AA0**

Brake cable: LPBr2 [1)]

[1)] Available through the product partner program with KnorrTec (https://www.knorrtec.de) and/or Harting (https://www.harting.com).
Cables are pre-assembled on both sides.
Various lengths are available from the product partner.
Can be found via the specified order designation, e.g. **CSD_LAiO2**.

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Selection and ordering data

Extra low-voltage motors SIMOTICS E-1EE13 Shaft height 30R	Design on the motor side	Halogen free/ Silicon free	Temperature plug/ cable	Outer diameter (OD)	Bending radius	Length	Article No.
1EE13 . . - . . A . 0- . . . . – for operation without integrated converter							
Hybrid cable 3 × 1.5 mm^2 + 12 × 0.25 mm^2 (supply and signal line, converter to motor)	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	1 m	**6FX1001-2HA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	3 m	**6FX1001-2MA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	10 m	**6FX1001-2SA10-1AA0**
1EE13 . . - . . D . 0- . . . . – for operation with integrated drive control – communication via digital IOs							
Hybrid cable 3 × 1.5 mm^2 + 12 × 0.25 mm^2	Straight connector, M16	No/ Yes	-40 ... 125 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	1 m	**6FX1001-2HC10-1AA0**
	Straight connector, M16	No/ Yes	-40 ... 125 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	3 m	**6FX1001-2MC10-1AA0**
	Angled connector, M16	No/ Yes	-40 ... 125 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	1 m	**6FX1001-2HC20-1AA0**
	Angled connector, M16	No/ Yes	-40 ... 125 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	3 m	**6FX1001-2MC20-1AA0**

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Electrical connecting cables for SIMOTICS E-1EE13

Selection and ordering data

Extra low-voltage motors SIMOTICS E-1EE13 Shaft height 30R	Design on the motor side	Halogen free/ Silicon free	Temperature plug/ cable	Outer diameter (OD)	Bending radius	Length	Article No.
1EE13 . . - . BC . 0- . . . . – for operation with integrated drive control – communication via CANopen – with incremental encoder 1024 S/R (encoder TTL1024S/R)							
Hybrid cable 3 × 1 mm^2 + 12 × 0.25 mm^2 (supply and signal line)	Straight connector, M16	No/ Yes	-40 ... 125 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	max. 9.5 mm	Fix: 10 × OD Flex: 15 × OD	1 m	**6FX1001-2HD10-1AA0**
	Straight connector, M16	No/ Yes	-20 ... 125 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	max. 9.5 mm	Fix: 10 × OD Flex: 15 × OD	3 m	**6FX1001-2MD10-1AA0**
	Angled connector, M16	No/ Yes	-40 ... 125 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	max. 9.5 mm	Fix: 10 × OD Flex: 15 × OD	1 m	**6FX1001-2HD20-1AA0**
	Angled connector, M16	No/ Yes	-40 ... 125 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	max. 9.5 mm	Fix: 10 × OD Flex: 15 × OD	3 m	**6FX1001-2MD20-1AA0**
Supply line 4 × 1.5 mm^2 + 2 × (2 × 0.25 mm^2)	Straight connector, M16	No/ Yes	-40 ... 125 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	max. 11 mm	Fix: 10 × OD Flex: 15 × OD	1 m	**6FX1001-2HF10-1AA0**
	Straight connector, M16	No/ Yes	-40 ... 125 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	max. 11 mm	Fix: 10 × OD Flex: 15 × OD	3 m	**6FX1001-2MF10-1AA0**
	Angled connector, M16	No/ Yes	-40 ... 125 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	max. 11 mm	Fix: 10 × OD Flex: 15 × OD	1 m	**6FX1001-2HF20-1AA0**
	Angled connector, M16	No/ Yes	-40 ... 125 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	max. 11 mm	Fix: 10 × OD Flex: 15 × OD	3 m	**6FX1001-2MF20-1AA0**
	Straight connector, M16	No/ Yes	-40 ... 125 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	max. 11 mm	Fix: 10 × OD Flex: 15 × OD	10 m	**6FX1001-2SF10-1AA0**
CANopen line 3 × AWG24 + 2 × AWG22	Straight connector, M12	Yes/ No	-20 ... 90 °C/ Fix: -40 ... 80 °C Flex: -20 ... 75 °C	6.7 mm +/-0.3 mm	Fix: 8 × OD Flex: 15 × OD	5 m	**6FX1001-3PA21-1AA0**
	Straight connector, M12	Yes/ No	-20 ... 90 °C/ Fix: -40 ... 80 °C Flex: -20 ... 75 °C	6.7 mm +/-0.3 mm	Fix: 8 × OD Flex: 15 × OD	5 m	**6FX1001-3PB21-1AA0**
Connecting cable CANopen 2 × AWG24 + 2 × AWG22	Straight connector (on the converter side: straight connector), M12	in preparation	-20 ... 90 °C/ Fix: -40 ... 80 °C Flex: -20 ... 75 °C	6.7 mm +/-0.3 mm	Fix: 4 × OD Flex: 8 × OD	2 m	**6FX1001-3KB11-1AA0**
Hybrid cable including CANopen [1] 4 × 1.5 mm^2 + 2 × (2 × 0.25 mm^2)	Straight connector, M16	No/ Yes	-40 ... 125 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	max. 11 mm	Fix: 10 × OD Flex: 15 × OD	3 m	**6FX1001-2ME10-1AA0**
	Angled connector, M16	No/ Yes	-40 ... 125 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	max. 11 mm	Fix: 10 × OD Flex: 15 × OD	1 m	**6FX1001-2HE20-1AA0**

[1] This cable combines the power transmission and the connection to CANopen. It is generally recommended to use the additional separate cables offered. For standard CANopen bus operation, the following cables are required: 1 × hybrid cable, 1 × supply line , 2 × CANopen line, or alternatively 1 × connecting cable CANopen.

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Selection and ordering data

Extra low-voltage motors SIMOTICS E-1EE13 Shaft height 30R	Design on the motor side	Halogen free/ Silicon free	Temperature plug/ cable	Outer diameter (OD)	Bending radius	Length	Article No.
1EE13 . . -1CA . 0-3 . . 4 – for operation with SIMATIC MICRO-DRIVE PDC-Drive – with holding brake – with incremental encoder 100 S/R (encoder TTL100S/R)							
Hybrid cable 3 × 1.5 mm² + 12 × 0.25 mm² (supply and signal line, converter to motor)	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	1 m	**6FX1001-2HA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	3 m	**6FX1001-2MA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	10 m	**6FX1001-2SA10-1AA0**
Brake line: LPBr2 [1]							
1EE13 . 0- . . E . 0- . . . . – for operation with integrated drive control – communication via EtherCAT							
Hybrid cable 3 × 1.5 mm² + 12 × 0.25 mm² (supply and signal line)	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	1 m	**6FX1001-2HA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	3 m	**6FX1001-2MA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	10 m	**6FX1001-2SA10-1AA0**
Diagnostic line 3 × 0.25 mm² (with SUB-D)	Straight connector, M8 (on the diagnostic side: SUB-D)	No/ Yes	in preparation/ Fix: -40 ... 80 °C Flex: -25 ... 80 °C	in preparation	Fix: 8 × OD Flex: 12 × OD	3 m	**6FX1001-6MA24-1AA0**
EtherCAT line 4 × 0.34 mm²	Straight connector, M12	Yes/ Yes	in preparation/ Fix: -40 ... 70 °C Flex: -40 ... 70 °C	6.5 mm +/-0.2 mm	Fix: 5 × OD Flex: 7.5 × OD	1 m	**6FX1001-3HA11-1AA0**
	Straight connector, M12	Yes/ Yes	in preparation/ Fix: -40 ... 70 °C Flex: -40 ... 70 °C	6.5 mm +/-0.2 mm	Fix: 5 × OD Flex: 7.5 × OD	2 m	**6FX1001-3KA11-1AA0**
	Straight connector, M12	Yes/ Yes	in preparation/ Fix: -40 ... 70 °C Flex: -40 ... 70 °C	6.5 mm +/-0.2 mm	Fix: 5 × OD Flex: 7.5 × OD	5 m	**6FX1001-3PA11-1AA0**
STO line 2 × 0.34 mm²	Straight connector	in preparation	in preparation	in preparation	in preparation	1 m	**6FX1001-2HG10-1AA0**
	Straight connector	in preparation	in preparation	in preparation	in preparation	3 m	**6FX1001-2MG10-1AA0**

[1] Available through the product partner program with KnorrTec (https://www.knorrtec.de) and/or Harting (https://www.harting.com).
Cables are pre-assembled on both sides.
Various lengths are available from the product partner.
Can be found via the specified order designation.

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Electrical connecting cables for SIMOTICS E-1EE14

Selection and ordering data

Extra low-voltage motors SIMOTICS E-1EE14 Shaft height 40R	Design on the motor side	Halogen free/ Silicon free	Temperature plug/ cable	Outer diameter (OD)	Bending radius	Length	Article No.
1EE14 . . - . . A . 0- . . . . – for operation without integrated converter							
Hybrid cable 3 × 1.5 mm² + 12 × 0.25 mm² (supply and signal line, converter to motor)	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	1 m	**6FX1001-2HA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	3 m	**6FX1001-2MA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	10 m	**6FX1001-2SA10-1AA0**
Supply line, motor 3 × 4 mm²	Straight connector, M23	Yes/ Yes	-20 ... 130 °C/ according to cULus: Fix: -50 ... 80 °C Flex: -30 ... 80 °C outside UL: 125 °/3000 h	10 mm +/-0.6 mm	10 × OD	1 m	**6FX1001-1HA10-1AA0**
	Straight connector, M23	Yes/ Yes	-20 ... 130 °C/ according to cULus: Fix: -50 ... 80 °C Flex: -30 ... 80 °C outside UL: 125 °/3000 h	10 mm +/-0.6 mm	10 × OD	3 m	**6FX1001-1MA10-1AA0**
	Straight connector, M23	Yes/ Yes	-20 ... 130 °C/ according to cULus: Fix: -50 ... 80 °C Flex: -30 ... 80 °C outside UL: 125 °/3000 h	10 mm +/-0.6 mm	10 × OD	10 m	**6FX1001-1SA10-1AA0**
1EE14 . . -1CA00-3 . . 4 – for operation with SIMATIC MICRO-DRIVE PDC-Drive – with holding brake – with incremental encoder 100 S/R (encoder TTL100S/R)							
Hybrid cable 3 × 1.5 mm² + 12 × 0.25 mm² (supply and signal line, converter to motor)	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	1 m	**6FX1001-2HA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	3 m	**6FX1001-2MA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	10 m	**6FX1001-2SA10-1AA0**
Supply line, motor 3 × 4 mm²	Straight connector, M23	Yes/ Yes	-20 ... 130 °C/ according to cULus: Fix: -50 ... 80 °C Flex: -30 ... 80 °C outside UL: 125 °/3000 h	10 mm +/-0.6 mm	10 × OD	1 m	**6FX1001-1HA10-1AA0**
	Straight connector, M23	Yes/ Yes	-20 ... 130 °C/ according to cULus: Fix: -50 ... 80 °C Flex: -30 ... 80 °C outside UL: 125 °/3000 h	10 mm +/-0.6 mm	10 × OD	3 m	**6FX1001-1MA10-1AA0**
	Straight connector, M23	Yes/ Yes	-20 ... 130 °C/ according to cULus: Fix: -50 ... 80 °C Flex: -30 ... 80 °C outside UL: 125 °/3000 h	10 mm +/-0.6 mm	10 × OD	10 m	**6FX1001-1SA10-1AA0**
Brake cable: LPBr2 [1]							

[1] Available through the product partner program with KnorrTec (https://www.knorrtec.de) and/or Harting (https://www.harting.com). Cables are pre-assembled on both sides. Various lengths are available from the product partner. Can be found via the specified order designation.

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Selection and ordering data

Extra low-voltage motors SIMOTICS E-1EE14 Shaft height 40R	Design on the motor side	Halogen free/ Silicon free	Temperature plug/ cable	Outer diameter (OD)	Bending radius	Length	Article No.
1EE14 . . - . . E . 0- . . . . – for operation with integrated drive control – communication via EtherCAT							
Hybrid cable 3 × 1.5 mm² + 12 × 0.25 mm² (supply and signal line, converter to motor)	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	1 m	**6FX1001-2HA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	3 m	**6FX1001-2MA10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × OD Flex: 15 × OD	10 m	**6FX1001-2SA10-1AA0**
Supply line 3 × 4 mm²	Straight connector, M23	Yes/ Yes	-20 ... 130 °C/ according to cULus: Fix: -50 ... 80 °C Flex: -30 ... 80 °C outside UL: 125 °/3000 h	10 mm +/-0.6 mm	10 × OD	1 m	**6FX1001-1HB10-1AA0**
	Straight connector, M23	Yes/ Yes	-20 ... 130 °C/ according to cULus: Fix: -50 ... 80 °C Flex: -30 ... 80 °C outside UL: 125 °/3000 h	10 mm +/-0.6 mm	10 × OD	3 m	**6FX1001-1MB10-1AA0**
	Straight connector, M23	Yes/ Yes	-20 ... 130 °C/ according to cULus: Fix: -50 ... 80 °C Flex: -30 ... 80 °C outside UL: 125 °/3000 h	10 mm +/-0.6 mm	10 × OD	10 m	**6FX1001-1SB10-1AA0**
Diagnostic line 3 × 0.25 mm² (with SUB-D)	Straight connector, M8 (on the diagnostic side: SUB-D)	No/ Yes	in preparation/ Fix: -40 ... 80 °C Flex: -25 ... 80 °C	in preparation	Fix: 8 × OD Flex: 12 × OD	3 m	**6FX1001-6MA24-1AA0**
EtherCAT line 4 × 0.34 mm²	Straight connector, M12	Yes/ Yes	in preparation/ Fix: -40 ... 70 °C Flex: -40 ... 70 °C	6.5 mm +/-0.2 mm	Fix: 5 × OD Flex: 7.5 × OD	1 m	**6FX1001-3HA11-1AA0**
	Straight connector, M12	Yes/ Yes	in preparation/ Fix: -40 ... 70 °C Flex: -40 ... 70 °C	6.5 mm +/-0.2 mm	Fix: 5 × OD Flex: 7.5 × OD	2 m	**6FX1001-3KA11-1AA0**
	Straight connector, M12	Yes/ Yes	in preparation/ Fix: -40 ... 70 °C Flex: -40 ... 70 °C	6.5 mm +/-0.2 mm	Fix: 5 × OD Flex: 7.5 × OD	5 m	**6FX1001-3PA11-1AA0**
STO line 2 × 0.34 mm²	Straight connector	in preparation	in preparation	in preparation	in preparation	1 m	**6FX1001-2HG10-1AA0**
	Straight connector	in preparation	in preparation	in preparation	in preparation	3 m	**6FX1001-2MG10-1AA0**

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Electrical connecting cables for SIMOTICS E ArgoDrive

Selection and ordering data

SIMOTICS E ArgoDrive driving steering system	Design on the motor side	Halogen free/ Silicon free	Temperature plug/ cable	Outer diameter (OD)	Bending radius	Length	Article No.
For the electrical connection of the SIMOTICS E ArgoDrive driving steering system [1)]							
Connection cable: Signal + Power 12 + 3 3 × 1.5 mm^2 + 12 × 0.25 mm^2	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × AD Flex: 15 × AD	0.5 m	**6FX1001-2EB10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × AD Flex: 15 × AD	3 m	**6FX1001-2MB10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	10.8 mm +/-0.3 mm	Fix: 10 × AD Flex: 15 × AD	5 m	**6FX1001-2PB10-1AA0**
Connection cable: Signal + Brake 4 × 0.5 mm^2 + 2 × 0.25 mm^2	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	max. 9 mm	Fix: 10 × AD Flex: 15 × AD	0.5 m	**6FX1001-5EB10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	max. 9 mm	Fix: 10 × AD Flex: 15 × AD	3 m	**6FX1001-5MB10-1AA0**
	Straight connector, M15	No/ Yes	-20 ... 130 °C/ Fix: -40 ... 80 °C Flex: -20 ... 80 °C	max. 9 mm	Fix: 10 × AD Flex: 15 × AD	5 m	**6FX1001-5PB10-1AA0**

[1)] The following connection cables are required for the electrical connection of the SIMOTICS E ArgoDrive driving steering system:
2 × cable M15 Signal + Power 12 + 3 and
1 × cable M15 Signal + Brake.

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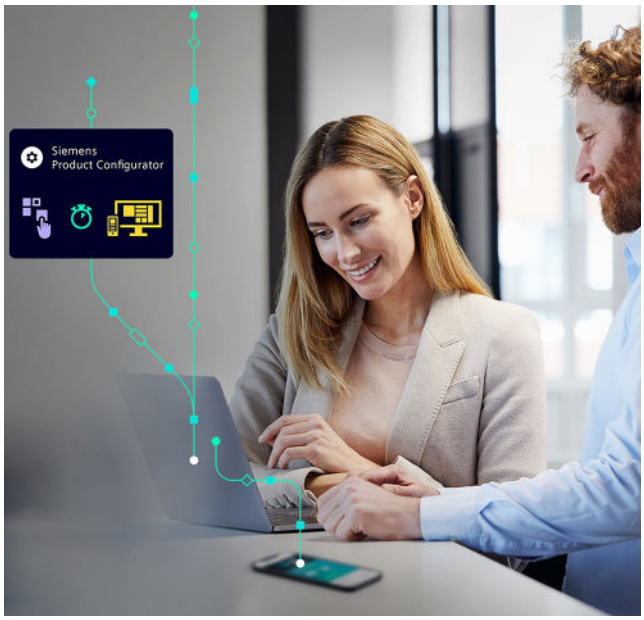
Siemens Product Configurator

Overview

The Siemens Product Configurator helps you to configure the optimum drive technology products for a number of applications. The product portfolio comprises the full drive technology range of gearbox, motor, converter and connection system as well as corresponding controller with suitable software license. The intuitive user interface in conjunction with product-specific preliminary selectors makes it simple, fast and efficient to configure products. The result is a bill of materials with extensive documentation consisting of technical data sheets, motor characteristic curves, 2D dimensional drawings / 3D CAD models, EPLAN macros and much more. You can order the products directly by transferring the bill of materials to the shopping cart of SiePortal.



Siemens Product Configurator at a glance

- Quick and easy configuration of drive products and associated components – gearboxes, motors, converters, controllers, connection systems
- Extensive documentation for all products and components, such as
  - Data sheets in up to 12 languages
  - Motor characteristic curves
  - 2D dimensional drawings / 3D CAD models in different formats
  - Terminal box drawing and terminal connection diagram
  - Certificates
  - EPLAN macros
- Ability to order products directly through SiePortal

Access to the Siemens Product Configurator

The Siemens Product Configurator can be accessed without the need for registration or logging in:
www.siemens.com/spc

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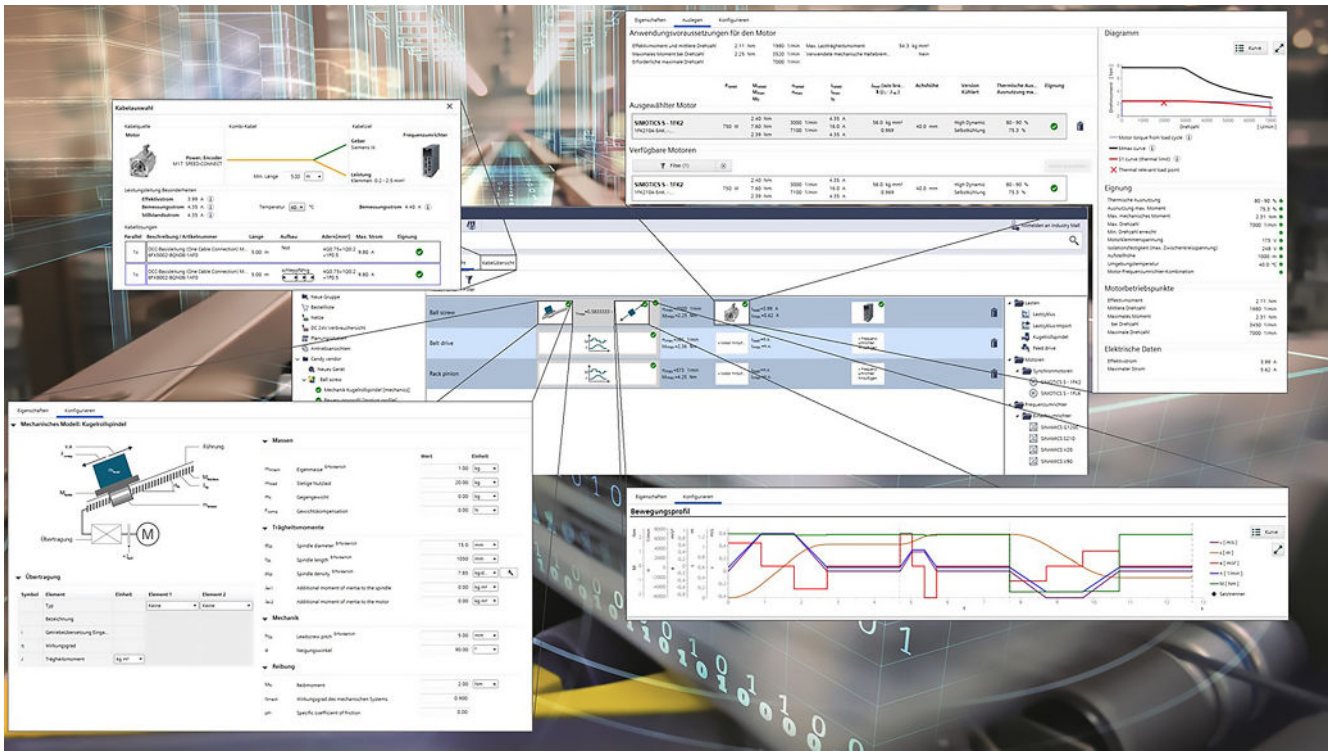
Overview



Selection guide and configurator for automation technology

Error-free configuration without expert knowledge through intelligent configurators and selection wizards. Desktop and cloud versions enable cross-team collaboration with maximum flexibility.

There are two versions of the TIA Selection Tool:

- Desktop version: for downloading and executing on Microsoft Windows PCs (from Microsoft Windows 10)
- Cloud version: for running in the cloud and launching directly out of the browser (we recommend Google Chrome, Mozilla Firefox and Microsoft Edge)

Projects stored in the cloud can be edited with both tools. This makes it possible to work on-the-go using a tablet, at home on a PC – and vice versa, or together with colleagues and customers.

To use the full functionality, we recommended setting up a SiePortal account for both cases. This gives you access to prices and enables you to save your projects to our cloud.

You can find additional information about the TIA Selection Tool at:
www.siemens.com/tia-selection-tool

Drive system dimensioning with SIZER in the TIA Selection Tool (desktop version)

Application-specific requirements can be determined using drive technology dimensioning in TIA Selection Tool. This can include motors, gearboxes, converters and cables. The tool supports the configuration and dimensioning of control functions with an open and closed control loop. The technical documentation with features of the technical drive system, as well as a product list for ordering via SiePortal can also be compiled.

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Notes

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Appendix

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Certificates of suitability (approvals)

Overview

Many of the products in this catalog fulfill requirements, e.g. for UL, CSA or FM and are labeled with the corresponding approval designation.

All of the certificates of suitability, approvals, certificates, declarations of conformity, test certificates, e.g. CE, UL, Safety Integrated etc. have been performed with the associated system components as they are described in the Catalogs and Configuration Manuals.

The certificates are only valid if the products are used with the described system components, are installed according to the Installation Guidelines and used for their intended purpose.

In other cases, the vendor of these products is responsible for arranging for the issue of new certificates.

Test code	Tested by	Device series/ Component	Test standard	Product category/ File No.
UL: Underwriters Laboratories Independent public testing body in North America				
	UL according to UL standard	SINUMERIK	Standard UL 508, CSA C22.2 No. 142	NRAQ/7.E164110 NRAQ/7.E217227
		SIMOTION	Standard UL 508, CSA C22.2 No. 142	NRAQ/7.E164110
	UL according to CSA standard	SINAMICS	Standard UL 508, 508C, 61800-5-1 CSA C22.2 No. 142, 274	NRAQ/7.E164110, NMMS/2/7/8.E192450, NMMS/2/7/8.E203250, NMMS/7.E214113, NMMS/7.E253831
	UL according to UL and CSA standards			NMMS/2/7/8.E121068 NMMS/7.E355661 NMMS/7.E323473
	UL according to UL standard	SIMODRIVE	Standard UL 508C, CSA C22.2 No. 274	NMMS/2/7/8.E192450 NMMS/7.E214113
	UL according to CSA standard	SIMOTICS	Standard UL 1004-1, 1004-6, 1004-8, CSA C22.2 No. 100	PRGY2/8.E227215 PRHZ2/8.E93429
	UL according to UL and CSA standards			PRHJ2/8.E342747 PRGY2/8.E253922 PRHZ2/8.E342746
		Line/motor reactors	Standard UL 508, 506, 5085-1, 5085-2, 1561, CSA C22.2 No. 14, 47, 66.1-06, 66.2-06	XQNX2/8.E257859 NMTR2/8.E219022 NMMS2/8.E333628 XPTQ2/8.E257852 XPTQ2/8.E103521 NMMS2/8.E224872 XPTQ2/8.E354316 XPTQ2/8.E198309 XQNX2/8.E475972
		Line filters, dv/dt filters, sine-wave filters	UL 1283, CSA C22.2 No. 8	FOKY2/8.E70122
		Resistors	UL 508, 508C, CSA C22.2 No. 14, 274	NMTR2/8.E224314 NMMS2/8.E192450 NMTR2/8.E221095 NMTR2/8.E226619
TUV: TUV Rheinland of North America Inc. Independent public testing body in North America, Nationally Recognized Testing Laboratory (NRTL) TÜV: TÜV SÜD Product Service Independent public testing body in Germany, Nationally Recognized Testing Laboratory (NRTL) for North America				
	TUV according to UL and CSA standards	SINAMICS	NRTL listing according to standard UL 508C	U7V 12 06 20078 013 U7 11 04 20078 009 U7 11 04 20078 010 U7 11 04 20078 011
		SIMOTION	NRTL listing according to standard UL 508	U7V 13 03 20078 01
		SIMODRIVE	NRTL listing according to standard UL 508C, CSA C22.2. No. 14	CU 72090702
		Motion Control Encoder	NRTL listing according to UL 61010-1 CSA C22.2 No. 61010-1	U8V 10 06 20196 024

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Overview

Test code	Tested by	Device series/ Component	Test standard	Product category/ File No.
CSA: Canadian Standards Association Independent public testing body in Canada				
	CSA according to CSA standard	SINUMERIK	Standard CSA C22.2 No. 142	2252-01 : LR 102527
FMRC: Factory Mutual Research Corporation Independent public testing body in North America				
	FM according to FM standard	SINUMERIK	Standard FMRC 3600, FMRC 3611, FMRC 3810, ANSI/ISA S82.02.1	–
EAC: Independent public testing body within the Eurasian Conformity Area				
	EAC in accordance with the EAC Directive	SINAMICS SINUMERIK SIMOTION	Standard IEC 61800-5-1/-2, IEC 61800-3	–
RCM: Australian Communications and Media Authority Independent public testing body in Australia				
	RCM according to EMC standard	SINAMICS SINUMERIK SIMOTION	Standard IEC AS 61800-3, EN 61800-3	–
KC: National Radio Research Agency Independent public testing body in South Korea				
	KC according to EMC standard	SINAMICS SINUMERIK SIMOTION	Standard KN 11	–
BIA Federal Institute for Occupational Safety				
–	Functional safety	SINAMICS SINUMERIK SIMOTION	Standard EN 61800-5-2	–
TÜV SÜD Rail				
–	Functional safety	SINAMICS SINUMERIK SIMOTION	Standard EN 61800-5-2	–

More information about certificates can be found online at:
https://support.industry.siemens.com/cs/ww/en/ps/cert

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Software licenses

Overview

Software types

Software requiring a license is categorized into types.
The following software types have been defined:

- Engineering software
- Runtime software

Engineering software

This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third-parties free-of-charge.

Runtime software

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameterization/configuration tools supplied as integral components of the scope of supply can be found in the readme file supplied with the relevant product(s).

License types

Siemens Digital Industries and Smart Infrastructure offers various types of software license:

- Floating license
- Single license
- Rental license
- Rental floating license
- Trial license
- Demo license
- Demo floating license

Floating license

The software may be installed for internal use on any number of devices by the licensee. Only the concurrent user is licensed. The concurrent user is the person using the program. Use begins when the software is started.
A license is required for each concurrent user.

Single license

Unlike the floating license, a single license permits only one installation of the software per license.

The type of use licensed is specified in the ordering data and in the Certificate of License (CoL). Types of use include for example per instance, per axis, per channel, etc.

One single license is required for each type of use defined.

Rental license

A rental license supports the "sporadic use" of engineering software. Once the license key has been installed, the software can be used for a specific period of time (the operating hours do not have to be consecutive).
One license is required for each installation of the software.

Rental floating license

The rental floating license corresponds to the rental license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

Trial license

A trial license supports "short-term use" of the software in a non-productive context, e.g. for testing and evaluation purposes. It can be transferred to another license.

Demo license

The demo license support the "sporadic use" of engineering software in a non-productive context, for example, use for testing and evaluation purposes. It can be transferred to another license. After the installation of the license key, the software can be operated for a specific period of time, whereby usage can be interrupted as often as required.

One license is required per installation of the software.

Demo floating license

The demo floating license corresponds to the demo license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

Certificate of License (CoL)

The CoL is the licensee's proof that the use of the software has been licensed by Siemens. A CoL is required for every type of use and must be kept in a safe place.

Downgrading

The licensee is permitted to use the software or an earlier version/release of the software, provided that the licensee owns such a version/release and its use is technically feasible.

Delivery versions

Software is constantly being updated.
The following delivery versions

- PowerPack
- Upgrade

can be used to access updates.

Existing bug fixes are supplied with the ServicePack version.

PowerPack

PowerPacks can be used to upgrade to more powerful software. The licensee receives a new license agreement and CoL (Certificate of License) with the PowerPack. This CoL, together with the CoL for the original product, proves that the new software is licensed.
A separate PowerPack must be purchased for each original license of the software to be replaced.

Upgrade

An upgrade permits the use of a new version of the software on the condition that a license for a previous version of the product is already held.
The licensee receives a new license agreement and CoL with the upgrade. This CoL, together with the CoL for the previous product, proves that the new version is licensed.
A separate upgrade must be purchased for each original license of the software to be upgraded.

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Overview

ServicePack

ServicePacks are used to debug existing products. ServicePacks may be duplicated for use as prescribed according to the number of existing original licenses.

License key

Siemens Digital Industries and Smart Infrastructure supplies software products with and without license keys.

The license key serves as an electronic license stamp and is also the "switch" for activating the software (floating license, rental license, etc.).

The complete installation of software products requiring license keys includes the program to be licensed (the software) and the license key (which represents the license).

Software Update Service (SUS)

As part of the SUS contract, all software updates for the respective product are made available to you free of charge for a period of one year from the invoice date. The contract will automatically be extended for one year if it is not canceled three months before it expires.

The possession of the current version of the respective software is a basic condition for entering into an SUS contract.

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Appendix

Conversion tables

Rotary inertia (to convert from A to B, multiply by entry in table)

A \ B	lb-in^2	lb-ft^2	lb-in-s^2	lb-ft-s^2 slug-ft^2	kg-cm^2	kg-cm-s^2	gm-cm^2	gm-cm-s^2	oz-in^2	oz-in-s^2
lb-in^2	1	6.94×10^{-3}	2.59×10^{-3}	2.15×10^{-4}	2.926	2.98×10^{-3}	2.92×10^{3}	2.984	16	4.14×10^{-2}
lb-ft^2	144	1	0.3729	3.10×10^{-2}	421.40	0.4297	4.21×10^{5}	429.71	2304	5.967
lb-in-s^2	386.08	2.681	1	8.33×10^{-2}	1.129×10^{3}	1.152	1.129×10^{6}	1.152×10^{3}	6.177×10^{3}	16
lb-ft-s^2 slug-ft^2	4.63×10^{3}	32.17	12	1	1.35×10^{4}	13.825	1.355×10^{7}	1.38×10^{4}	7.41×10^{4}	192
kg-cm^2	0.3417	2.37×10^{-3}	8.85×10^{-4}	7.37×10^{-5}	1	1.019×10^{-3}	1000	1.019	5.46	1.41×10^{-2}
kg-cm-s^2	335.1	2.327	0.8679	7.23×10^{-2}	980.66	1	9.8×10^{5}	1000	5.36×10^{3}	13.887
gm-cm^2	3.417×10^{-4}	2.37×10^{-6}	8.85×10^{-7}	7.37×10^{-8}	1×10^{-3}	1.01×10^{-6}	1	1.01×10^{-3}	5.46×10^{-3}	1.41×10^{-5}
gm-cm-s^2	0.335	2.32×10^{-3}	8.67×10^{-4}	7.23×10^{-5}	0.9806	1×10^{-3}	980.6	1	5.36	1.38×10^{-2}
oz-in^2	0.0625	4.34×10^{-4}	1.61×10^{-4}	1.34×10^{-5}	0.182	1.86×10^{-4}	182.9	0.186	1	2.59×10^{-3}
oz-in-s^2	24.13	0.1675	6.25×10^{-2}	5.20×10^{-3}	70.615	7.20×10^{-2}	7.09×10^{4}	72.0	386.08	1

Torque (to convert from A to B, multiply by entry in table)

A \ B	lb-in	lb-ft	oz-in	N-m	kg-cm	kg-m	gm-cm	dyne-cm
lb-in	1	8.333×10^{-2}	16	0.113	1.152	1.152×10^{-2}	1.152×10^{3}	1.129×10^{6}
lb-ft	12	1	192	1.355	13.825	0.138	1.382×10^{4}	1.355×10^{7}
oz-in	6.25×10^{-2}	5.208×10^{-3}	1	7.061×10^{-3}	7.200×10^{-2}	7.200×10^{-4}	72.007	7.061×10^{4}
N-m	8.850	0.737	141.612	1	10.197	0.102	1.019×10^{4}	1×10^{7}
kg-cm	0.8679	7.233×10^{-2}	13.877	9.806×10^{-2}	1	10^{-2}	1000	9.806×10^{5}
kg-m	86.796	7.233	1.388×10^{3}	9.806	100	1	1×10^{5}	9.806×10^{7}
gm-cm	8.679×10^{-4}	7.233×10^{-5}	1.388×10^{-2}	9.806×10^{-5}	1×10^{-3}	1×10^{-5}	1	980.665
dyne-cm	8.850×10^{-7}	7.375×10^{-8}	1.416×10^{-5}	10^{-7}	1.0197×10^{-6}	1.019×10^{-8}	1.019×10^{-3}	1

Length (to convert from A to B, multiply by entry in table)

A \ B	inches	feet	cm	yd	mm	m
inches	1	0.0833	2.54	0.028	25.4	0.0254
feet	12	1	30.48	0.333	304.8	0.3048
cm	0.3937	0.03281	1	1.09×10^{-2}	10	0.01
yd	36	3	91.44	1	914.4	0.914
mm	0.03937	0.00328	0.1	1.09×10^{-3}	1	0.001
m	39.37	3.281	100	1.09	1000	1

Power (to convert from A to B, multiply by entry in table)

A \ B	hp	Watts
hp (English)	1	745.7
(lb-in) (deg./s)	2.645×10^{-6}	1.972×10^{-3}
(lb-in) (r/min)	1.587×10^{-5}	1.183×10^{-2}
(lb-ft) (deg./s)	3.173×10^{-5}	2.366×10^{-2}
(lb-ft) (r/min)	1.904×10^{-4}	0.1420
Watts	1.341×10^{-3}	1

Force (to convert from A to B, multiply by entry in table)

A \ B	lb	oz	gm	dyne	N
lb	1	16	453.6	4.448×10^{5}	4.4482
oz	0.0625	1	28.35	2.780×10^{4}	0.27801
gm	2.205×10^{-3}	0.03527	1	1.02×10^{-3}	N.A.
dyne	2.248×10^{-6}	3.59×10^{-5}	980.7	1	0.00001
N	0.22481	3.5967	N.A.	100000	1

Mass (to convert from A to B, multiply by entry in table)

A \ B	lb	oz	gm	kg	slug
lb	1	16	453.6	0.4536	0.0311
oz	6.25×10^{-2}	1	28.35	0.02835	1.93×10^{-3}
gm	2.205×10^{-3}	3.527×10^{-2}	1	10^{-3}	6.852×10^{-5}
kg	2.205	35.27	10^{3}	1	6.852×10^{-2}
slug	32.17	514.8	1.459×10^{4}	14.59	1

Rotation (to convert from A to B, multiply by entry in table)

A \ B	r/min	rad/s	degrees/s
r/min	1	0.105	6.0
rad/s	9.55	1	57.30
degrees/s	0.167	1.745×10^{-2}	1

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Temperature Conversion

°F	°C	°C	°F
0	–17.8	–10	14
32	0	0	32
50	10	10	50
70	21.1	20	68
90	32.2	30	86
98.4	37	37	98.4
212	100	100	212
subtract 32 and multiply by $^5/_9$		multiply by $^9/_5$ and add 32	

Mechanism Efficiencies

Acme-screw with brass nut	~0.35–0.65
Acme-screw with plastic nut	~0.50–0.85
Ball-screw	~0.85–0.95
Chain and sprocket	~0.95–0.98
Preloaded ball-screw	~0.75–0.85
Spur or bevel-gears	~0.90
Timing belts	~0.96–0.98
Worm gears	~0.45–0.85
Helical gear (1 reduction)	~0.92

Friction Coefficients

Materials	μ
Steel on steel (greased)	~0.15
Plastic on steel	~0.15–0.25
Copper on steel	~0.30
Brass on steel	~0.35
Aluminum on steel	~0.45
Steel on steel	~0.58

Mechanism	μ
Ball bushings	<0.001
Linear bearings	<0.001
Dove-tail slides	~0.2++
Gibb ways	~0.5++

Material Densities

Material	lb-in^3	gm-cm^3
Aluminum	0.096	2.66
Brass	0.299	8.30
Bronze	0.295	8.17
Copper	0.322	8.91
Hard wood	0.029	0.80
Soft wood	0.018	0.48
Plastic	0.040	1.11
Glass	0.079–0.090	2.2–2.5
Titanium	0.163	4.51
Paper	0.025–0.043	0.7–1.2
Polyvinyl chloride	0.047–0.050	1.3–1.4
Rubber	0.033–0.036	0.92–0.99
Silicone rubber, without filler	0.043	1.2
Cast iron, gray	0.274	7.6
Steel	0.280	7.75

Wire Gauges[1)]

Cross-section mm^2	Standard Wire Gauge (SWG)	American Wire Gauge (AWG)
0.2	25	24
0.3	23	22
0.5	21	20
0.75	20	19
1.0	19	18
1.5	17	16
2.5	15	13
4	13	11
6	12	9
10	9	7
16	7	6
25	5	3
35	3	2
50	0	1/0
70	000	2/0
95	00000	3/0
120	0000000	4/0
150	–	6/0
185	–	7/0

[1)] The table shows approximate SWG/AWG sizes nearest to standard metric sizes; the cross-sections do not match exactly.

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c. for services:
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[1] Download under www.siemens.com/sts-base-terms-deu
[2] Download under www.siemens.com/sts-st-deu

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[3)] Download under https://mall.industry.siemens.com/legal/de-en/LKB002966.pdf

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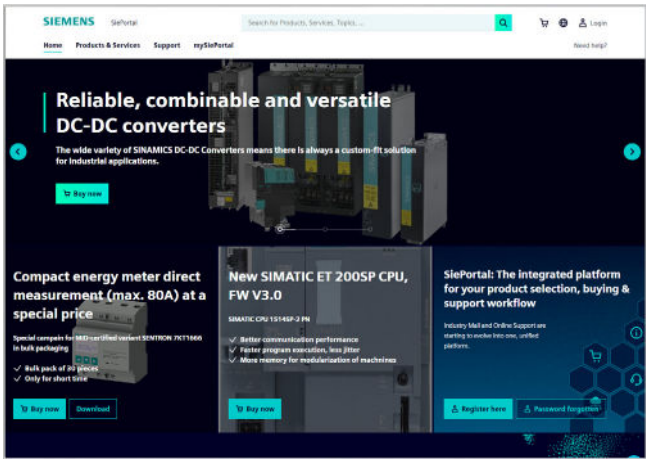

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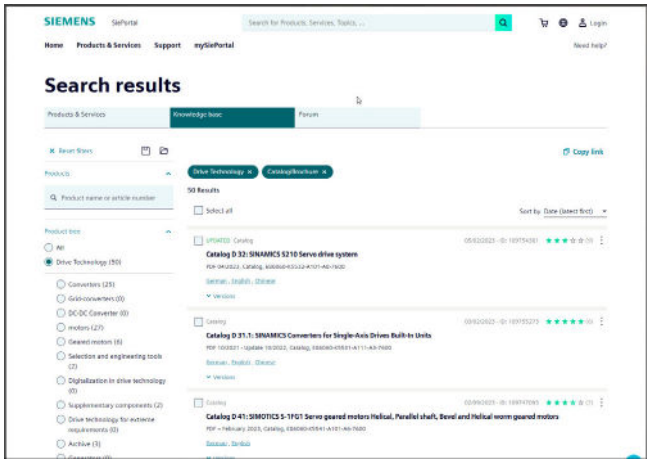

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