What is the proven basis for economic drive solutions that are fit for the future?

Compact, modular DC motors - continually optimized through technical innovation.

Answers for industry.
DC motors: well-proven technology to address the demands of tomorrow

As pioneer of DC drive technology, over 130 years ago, Siemens built the first DC motor. Also today, our DC motors prove themselves in daily use - around the world in an uncountable number of plants. DC technology is and remains the first choice in many applications in industry and the infrastructure; this is because it is favorably-priced, compact and reliable, offers a high degree of operator friendliness as well as many advantages in its operational behavior. This is why we are convinced about this technology and consequentially optimizing our DC motors and converters further. Together with our SINAMICS DC MASTER converter units, our 5/6/7 series of DC motors form the ideal team when low investment costs and the highest degree of availability are demanded.

Advantages at a glance
- High power density with low envelope dimensions
- High efficiency
- High degree of reliability as a result of the rugged design, low-wear materials and well-proven insulation system
- Optimum operating behavior as a result of maximum dynamic performance with high smooth running characteristics and balance quality
- Low noise emission
- Always the optimum solution as a result of the modular concept and a wide range of options
- Perfectly coordinated with SINAMICS DC MASTER

Typical applications
- Extruders for the plastics industry
- Hoisting and travel gear drives for cranes
- Rolling mill drives and winders
- Rotary kilns for cement factories
- Drives for wire-drawing machines
- Press drives
- Drives for lifts and cable railways
- Paper machine drives
The highest level of DC technology

Maximum power in minimum space

With our DC motors you profit from an especially high power density. As a result of their low space requirement they allow innovative machine concepts to be implemented and at the same time reduce construction costs.

Thermal and magnetic utilization as well as the mechanical design have been optimized. We only use high-quality materials with outstanding mechanical, magnetic and electrical properties in production. The result: the highest power densities with an extremely compact design and low shaft heights.
High degree of reliability for smooth operation
Based on computer simulation, our DC motors have been designed to achieve the maximum degree of operational reliability. By using high-quality materials and supplier parts - complemented by perfect quality management - these motors are especially rugged, require little maintenance and have a long service life. The high mechanical stiffness of the enclosures, bearing shields and shafts, the smooth running characteristics and balance quality reduce the stress on the motor - therefore extending its service life. This also applies to the bearings, commutators and brush holders. We use especially harmonized materials for the brushes to reduce wear. This results in long brush lifetimes. The high-quality Durignit 2000® insulation system is also decisive in achieving long lifetimes. It allows the motors to be operated under tough environmental conditions - such as in hot humid tropical climates or aggressive industrial environments.
For an even higher operational reliability, for example, microswitches can be used to monitor the brush length and temperature sensors to monitor the winding and bearing temperatures.

Perfect operational characteristics
The operational characteristics of our DC motors ensure the highest precision of machines, therefore securing optimum and consistent quality of end products. The smooth running characteristics are also decisive here; these have been achieved through minimized vibration levels and torque ripple. This is complemented by the enormous dynamic performance as a result of the high current rate-of-change - guaranteeing maximum precision.

Especially quiet
When it comes to noise, we left nothing to chance for our DC motors - for example, with the special main pole shape as well as optimized separately-driven fans. These measures in the mechanical and magnetic areas as well as the optimum fan design guarantee an extremely low noise level.
Operating personnel benefit from this, and the costs associated with noise damping measures in the plant are reduced.

Always the optimum motor
Our DC motors seamlessly cover a range of power ratings extending from 31.5 kW up to 1610 kW - uncompensated from shaft height 160 up to 280 and compensated, from shaft height 355 up to 630; either self-ventilated or separately ventilated, with or without fan. The modular motor design permits all combinations. Our DC motors are available in IP23, IP54 and IP55 degrees of protection for use in rugged environments. A wide range of options allow these motors to be optimally adapted to the specific application.
A unique team: DC motors and SINAMICS DCM converters

Highest efficiency across the board. Our DC motors and SINAMICS DC MASTER converters are perfectly coordinated with one another. Together, they offer you high productivity, low operating costs and a high availability of the overall drive system. They are convincing in the system as a result of their outstanding steady-state and dynamic control behavior. This is supplemented by the wide control range with high control precision, the high efficiency of the drive system, the increased reliability as a result of the optimum motor-converter interaction - as well as a whole raft of diagnostic features.
Optimized technology for perfect processes: SINAMICS DC MASTER
SINAMICS DC MASTER replaces the well-known and well-proven SIMOREG DC-MASTER. SINAMICS DC MASTER is based on the technological platform of our state-of-the-art, standard SINAMICS drive family - and has been optimized further. This means that many of the SINAMICS tools and components known from AC drive technology are now also available for DC technology. With SINAMICS DC MASTER you can rely on optimum processes as the motor speed is controlled with high precision. For instance, to accurately position loads for cranes, rolling steel, where the precision of the drive system is decisive for product quality, and for mine hoists. DC technology is also used for cable railways, where fast and precise control ensures the comfort and safety of the passengers.

Ideal for basic and demanding applications
With current and torque rise times of significantly less than 10 milliseconds, SINAMICS DC MASTER has a high dynamic performance. An additional and decisive feature: its scalability, which allows it to be adapted to the complete range of drive tasks - extending from basic up to sophisticated and demanding applications.

The Advanced CUD is available to increase the closed-loop control capability for applications demanding a higher computational performance and more interfaces. Different requirements placed on the computational performance and speed can therefore be precisely fulfilled by selecting either a standard CUD, an Advanced CUD or a combination of both. Further, the unit can be expanded in a modular fashion and quickly and flexibly adapted to the particular application using free function blocks and function modules.

Highlights of SINAMICS DC MASTER at a glance
• Integration in the SINAMICS drive family
• PROFIBUS/PROFINET
• Variance of the Control Units
• Field power supply in-line with actual requirements
• 24 V DC electronics power supply
• Power unit is insulated with respect to ground
• Free function blocks and Drive Control Chart
• Functionality can be expanded using SINAMICS components
• Single-phase connection possible
• Coated modules and nickel-plated copper busbars
• Wide temperature range
## Facts and data: 5/6/7 series of DC motors

### Motor series at a glance

<table>
<thead>
<tr>
<th>Series 6</th>
<th>Series 7</th>
<th>Series 5</th>
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<tbody>
<tr>
<td>31.5–510 kW</td>
<td>197–1020 kW</td>
<td>288–1610 kW</td>
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<tr>
<td>Uncompensated</td>
<td>Compensated</td>
<td>Compensated</td>
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<td>Inner and circulating cooling</td>
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<tr>
<td>SH 160–280</td>
<td>SH 355–450</td>
<td>SH 500–630</td>
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<tr>
<td>No enclosure, fully laminated</td>
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</tbody>
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![Motor Series Images](image1.png)
Technical data
- Power range: $31.5 - 1610$ kW
- Supply voltage: up to $810$ V
- Excitation: separately excited
- Shaft heights: $160 - 630$ mm
- Pole numbers: 4 and 6-pole
- Speed: up to $4500$ rpm
- Degrees of protection: IP23, IP54, IP55

- Types of protection: IM 1001 (IM B3), IM 2001 (IM B35), IM 3011 (IM V1) and others
- Cooling types: IC06/IC17/IC37/IC A06 A66/IC W37 A86
- Stator design: fully laminated
- Standards: IEC, EN, DIN
- Operation: converter operation, 2Q and 4Q, S1–S9
Wide range of options for maximum flexibility

Options for mounted components open up a wide range of possibilities when it comes to mounting and installing the motors, e.g.
- Terminal box can be mounted on the left, right or at the top
- Cable entry can be rotated through steps of 90°
- Separately-driven fan can be mounted at the top or side - air can enter the fan either from the DE or NDE
- Shaft end with non-standard diameter and length, with and without key, versions in special steel possible

Operation and diagnostic options permit safe and reliable operation and increase the availability of the plant or system, e.g.
- Brush materials adapted to the operational and environmental conditions
- Reinforced mechanical design
- Additional impregnation
- Winding and bearing temperature monitoring
- Brush length monitoring
- Airflow monitoring and leakage alarm device
- Either half or full key balancing
- Reduced vibration severity (B)
Options for mounted components ensure flexible adaptation to each and every application

- Wide selection of tachometers and pulse encoders available
- Can be prepared for tachometers to be mounted by customers
- Mounted air-to-air heat exchanger (1HQ)
- Mounted air-to-water heat exchanger (1HS)
- Fan motors with non-standard voltage and frequency
- Water heat exchanger in a special version
- DC spring-operated brakes are available as holding brakes
The information in this brochure only provides a general description and performance features. For a specific application, this information will not always be applicable in the form described here. This information can also change due to ongoing product development. The required performance features are only binding if they had been expressly agreed upon in the form of a written contract.

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