SIMOTICS T-1 FW3 Torque Motors
The Powerful Torque Motors

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SIMOTICS T-1FW3 Torque Motors

The powerful torque motors

Overview

The right torque at the right moment – this is decisive for high-tech machines both today and tomorrow. Using SIMOTICS T-1FW3 torque motors, you always obtain higher precision at high torques at the right speeds.

This means that your machine tools and production machines are fit for every task – no matter in which industrial sector you are active.

Torque motors from Siemens always precisely fit the bill: The permanent-magnet synchronous motors clearly show their strength as dynamic direct drives for all rotary axes. This means that you obtain an extremely stiff drive train, allowing you to operate your machine in the profitable zone without any risk.

SIMOTICS T-1FW3 torque motors, motors for innovative machine construction for tomorrow – for more productive and precise machine construction.

- The right design for every application
  - Wide power range between 3 kW and 380 kW
  - Rated torques between 100 Nm and 7,000 Nm
  - High-speed version with speeds up to 1,800 rpm available
  - Hollow shaft, plug-on shaft or solid shaft
  - Different encoder types for speed control and high-precision positioning
- High torque, compact design and low construction volume
- Outstanding performance
  - Excellent rotational accuracy
  - High dynamic response (short rise times)
- The optimum motor for energy-efficient solutions
- The mounting set permits an optimized mechatronic solution to be created
  - Highest degree of stiffness
  - Service intervals increased up to 60,000 hours
  - New machine concepts are possible
  - Increased productivity and quality
  - Space saving – when compared to solutions with gearboxes
- Simple encoder replacement without requiring any readjustment for plug-on and solid shafts

Overview of the entire SIMOTICS motor portfolio

SIMOTICS – The broadest motor portfolio worldwide. From low-voltage motors, through motors for motion control tasks, all the way to DC and high-voltage motors. With a wide range of performance categories and sizes, you are certain to find the right answer for your specific requirements.
SIMOTICS T-1FW3 Torque Motors
For innovative and efficient machine construction

For tomorrow’s innovative machine construction

Energy, raw materials, space, time … – the scarcer and more expensive the resources, the higher the necessity to use these as efficiently as possible. One strategy to achieve this is to employ state-of-the-art, stiff direct drive technology. This technology facilitates more compact, more productive and more precise machine construction.

New machine concepts can be implemented based on direct drives – and more specifically with the SIMOTICS T-1FW3 torque motors in conjunction with high-performance SINAMICS S120 drives from Siemens.

Using these machine concepts, motion is directly controlled, therefore reducing the restrictions that generally apply regarding dynamic performance and disturbances in the torque transmission.

As a consequence, companies operating the machines have the advantage that they can more efficiently use production resources that are becoming scarcer and more expensive, therefore being able to noticeably reduce operating and unit costs.

SIMOTICS T-1FW3 torque motors stand out for:

- Improved efficiency
- Lower space requirement and installation costs
- Minimized components subject to wear and usage
- Less waste and post machining
- Process and energy-optimized motion curves
- Lower energy consumption per produced unit

Smooth without any mechanical system

In drive solutions based on our torque motors, you will search in vain for mechanical transmission elements such as gearboxes. In fact, the force is transmitted exactly to where it is required – directly in the machine.

There are many decisive benefits: An extremely compact mechanical design is achieved by directly integrating the motor into the machine structure which excludes disturbing elasticities and gearbox play from the very start.

Lower weight, increased power and significantly reduced frictional losses increase the efficiency and the dynamic performance of your machines and plants. The repeat and positioning accuracy are significantly improved at the same time.

Ready to mount – saving time and money

Our torque motors eliminate time-consuming mounting procedures. Mounting the motor to the machine is simplified and optimized using the innovative mounting set comprising a torque arm, clamping element and centering sleeve.

Further, various shaft versions allow more flexible design and maintenance concepts to be realized. SIMOTICS T-1FW3 torque motors play a significant role in increasing the availability and cost-effectiveness of your production machines.

SIMOTICS T-1FW3 torque motors stand out for:

- Lower energy consumption per produced unit

SIMOTICS T-1FW3 Torque Motors
Servo presses
Printing
SIMOTICS T-1FW3 Torque Motors

The mounting set, the perfect supplement to achieve an extremely stiff drive train

The optional mounting set that can be supplied pre-mounted with the motor to optimally mount plug-on shaft motors and hollow shaft motors comprising a torque arm, clamping element and centering sleeve (only necessary for hollow shaft motors). Not only is the complete drive engineering simplified, but this new torque arm also increases the control performance, precision and dynamic performance.

As a result of the special design, the torque arm compensates axial and radial motion in the micrometer range, which is obtained as a result of alignment errors, production tolerances and thermal expansion. On the other hand, the torque transmission is extremely stiff at the circumference. Regarding the control accuracy and the dynamic performance, this means that the coupled SIMOTICS T-1FW3 torque motors can transmit the full performance regarding precision and torque to the machine axis.

The motor and the torque arm form a unit that is ready to be mounted. As a consequence of the defined mounting conditions, the lifetime of the motor bearings can be increased up to 60,000 operating hours, which represents a 50 percent increase.

As a consequence, the newly developed torque arm is a perfect solution to mount our high precision SIMOTICS T-1FW3 torque motors with a high dynamic performance. This means that design engineers are perfectly supported when it comes to optimally designing drives.

Using the new mounting set in conjunction with high precision and powerful SIMOTICS T-1FW3 torque motors it is possible to create a perfectly harmonized mechatronic solution to couple motors to the machine.
SIMOTICS T-1FW3 Torque Motors

Technical specifications

<table>
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<th>SIMOTICS T-1FW3 torque motors</th>
<th>SH150</th>
<th>SH200</th>
<th>SH280</th>
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<tr>
<td><strong>Shaft height</strong></td>
<td>SH150</td>
<td>SH200</td>
<td>SH280</td>
</tr>
<tr>
<td><strong>Electrical design/winding type</strong></td>
<td>Standard winding</td>
<td>Standard winding</td>
<td>High-speed winding</td>
</tr>
<tr>
<td><strong>Shaft design</strong></td>
<td>Hollow, plug-on, solid shaft</td>
<td>Hollow, plug-on, solid shaft</td>
<td>Plug-on, solid shaft</td>
</tr>
<tr>
<td><strong>Rated power</strong></td>
<td>3 – 40 kW</td>
<td>5 – 100 kW</td>
<td>20 – 215 kW</td>
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<tr>
<td><strong>Rated speed</strong></td>
<td>300 – 750 rpm</td>
<td>150 – 750 rpm</td>
<td>800 – 1,200 rpm</td>
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<tr>
<td><strong>Rated torque</strong></td>
<td>100 – 500 Nm</td>
<td>300 – 2,000 Nm</td>
<td>245 – 1,700 Nm</td>
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<tr>
<td><strong>Max. speed</strong></td>
<td>1,700 rpm</td>
<td>1,000 rpm</td>
<td>1,800 rpm</td>
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<tr>
<td><strong>Line voltage</strong></td>
<td>400 – 480 V</td>
<td></td>
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<tr>
<td><strong>Cooling method</strong></td>
<td>Water cooling</td>
<td></td>
<td></td>
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<tr>
<td><strong>Degree of protection</strong></td>
<td>IP54 (hollow shaft); IP55 (solid shaft, plug-on shaft)</td>
<td></td>
<td></td>
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<tr>
<td><strong>Type of construction</strong></td>
<td>Hollow shaft SH150/SH200: IM B14</td>
<td>Hollow shaft SH280: IM B35</td>
<td>Plug-on shaft: plug-on installation performed by the customer</td>
</tr>
<tr>
<td><strong>Connection system</strong></td>
<td>Terminal box for power cable</td>
<td>Connector for encoder signals and temperature sensor</td>
<td></td>
</tr>
<tr>
<td><strong>Insulation</strong></td>
<td>Temperature class 155 (F)</td>
<td></td>
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<tr>
<td><strong>Encoder system</strong></td>
<td>High-resolution incremental encoder, high-resolution absolute encoder, multi-pole resolver, without encoder</td>
<td></td>
<td></td>
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<tr>
<td><strong>Converter system</strong></td>
<td>SINAMICS S120</td>
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Motor versions

Our permanent-magnet excited SIMOTICS T-1FW3 torque motors are available in a range of shaft designs and always provide the ideal solution for your requirements:

**SIMOTICS T-1FW3 with hollow shaft**
- Highest degree of stiffness in the speed control loop
- Gland to route through media (coolant/heating media, measuring cables, compressed air lines etc.)
- Motor interchangeability

**SIMOTICS T-1FW3 with plug-on shaft**
- Highest degree of stiffness in the speed control loop
- Simple and quick mounting using the integrated shaft centering
- Cost-optimized connection concept
- Simple encoder replacement without readjustment

**SIMOTICS T-1FW3 with solid shaft**
- High degree of stiffness in the speed control loop
- Simple replacement of a geared motor without having to change the connection to the machine
- Simple encoder replacement without readjustment
Get more information

Motors for Motion Control:
www.siemens.com/simotics

SINUMERIK automation systems for machine tools:
www.siemens.com/sinumerik

The drives family SINAMICS:
www.siemens.com/sinamics

Motion Control Systems and Motion Control Solutions for production machine and machine tool equipment:
www.siemens.com/motioncontrol

Local partners worldwide:
www.siemens.com/automation-contact