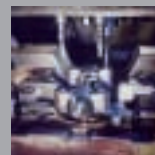


**Siemens Direct Drives** for higher dynamic performance and precision

direct drives



**SIEMENS**



Our drive is your productivity



### Linear or rotary direct drives

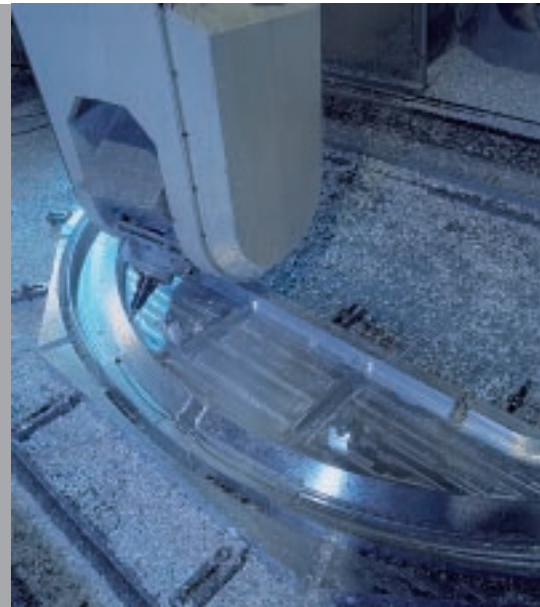
Siemens direct drives are available in two fundamentally different designs: The linear motor for linear motion and the torque motor for rotary motion. We can offer, for each individual application, the optimum drive for the highest dynamic performance and precision with different versions and sizes and in every type of construction. Furthermore, our engineers professionally support you in every phase, from the initial design through integration up to commissioning. Our drive goes far beyond just being a synchronous direct drive – our overall drive is to help our customers obtain a real competitive advantage.

### The direct route to new solutions

Current is directly transformed into motion without having to go through an intermediate mechanical step – this is the principle of operation of Siemens synchronous direct drives. Just like a magnetic levitation train, the force is transferred without contacting. The driving force is achieved through a traveling electromagnetic field in the generally moved primary section as opposed to the magnetic secondary section. The primary section is mounted on linear guides traveling at high speed and with track precision. The force transmission elements, which are generally required for a conventional electro-mechanical drive, for example, ballscrew, belts or rack and pinion, are no longer required.

### The advantages:

The forces are directly transferred which results in the highest dynamic performance but at the same time with high precision – almost without play and without overshooting. All of this is achieved without the motor components being subject to mechanical wear and without jerky motion.



**Siemens Linear Motor Systems**

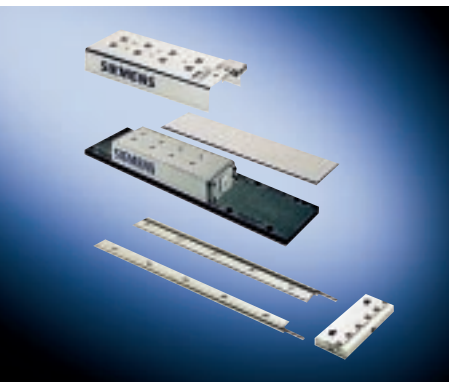
# Impetus for innovation: Siemens Linear Motors

## Siemens synchronous direct drives remain cool

The principle of operation of a linear synchronous direct drive results in a high temperature increase of the primary section. However, for Siemens linear motors, this thermal stressing is neutralized to a significant extent. The motors which are designed for especially high continuous forces have integrated water cooling. For precision applications, we offer motors with the Thermo-Sandwich® type of construction. With this special type of construction, a second precision water cooling reliably limits the temperature rise at the mechanical interfaces to the machine to a max. of 2 K or 4 K. This precision cooler is harmonized to the various motor types which results in an especially compact design.

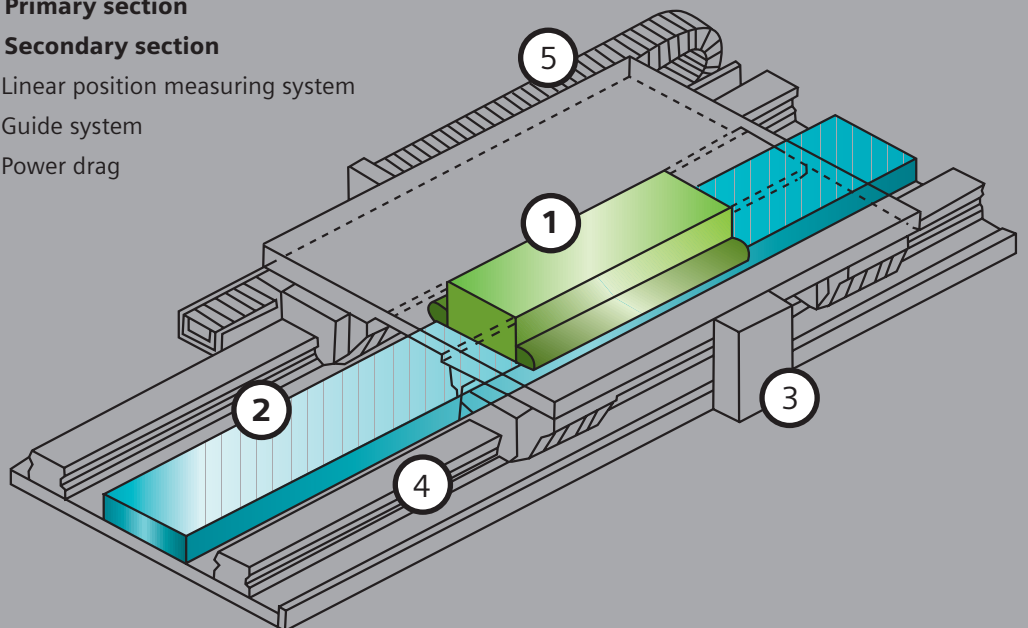
## Customized motor concepts

At Siemens Linear Motor Systems, we create unique motor solutions for every user. We can individually adapt the mechanical design and power to the particular application thanks to the wide variety and versatility of our motors and thanks to the modular component concept. For instance, for the linear motors, the basic motor can be extended by various components (cooling system, covers ...). Furthermore, any traversing length can be implemented by connecting standard secondary sections of a specific length in series. Furthermore, you can use our motors in various mechanical versions – whether as classic single-sided solution or motors arranged in a mirror image to one another as double-sided design. Our torque motors have an extremely compact design and provide the highest torques both for positioning as well as interpolating movement. Typical applications include rotary tables or swiveling axes in machining centers, axes which accelerate extremely quickly for lathes as well as for plastic injection molding machines. These motors round off our spectrum as a supplier of an integrated range of direct drive solutions.

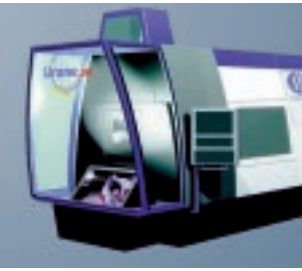


The principle of operation of a synchronous linear motor is based on a conductor, through which a current flows. When this conductor is then placed in a permanent magnetic field, a force is exerted on it which causes it to move. The closed-loop control system comprising CNC control, servo controller and sensor system (linear scale) transforms this into a precision positioning drive system.

- 1) Primary section
- 2) Secondary section
- 3) Linear position measuring system
- 4) Guide system
- 5) Power drag

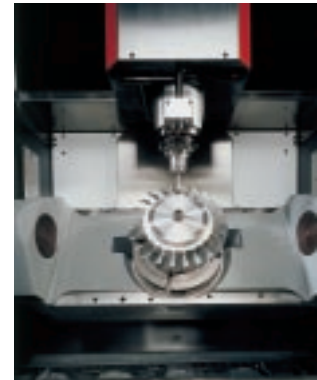


# Our partners with successful applications



## Typical applications for Siemens Linear Motors and Torque Motors

- Machining centers (HSC)
- Lathes
- Grinding machines
- Punching/cutting machines
- Laser-cutting machines
- Machines for processing wood/ glass/plastics
- Interlinking, handling, robotics
- Electronics production (pick&place, bonders)
- PCB production (drilling, milling)
- Printing technology
- Measuring machines



**basysPrint Systeme für die Druckindustrie** ▶▶ D-Boizenburg

**Berthold Hermle AG** ▶▶ D-Gosheim

**Buderus Schleiftechnik GmbH**  
▶▶ D-Ablar

**COMAU Systèmes France**  
▶▶ F-Castres Cedex

**Deckel Maho Seebach GmbH**  
▶▶ D-Seebach

**Deckel Maho Geretsried GmbH**  
▶▶ D-Geretsried

**EIMA Maschinenbau GmbH**  
▶▶ D-Frickenhausen

**Ex-Cell-O** ▶▶ D-Eislingen/Fils

**Finn-Power** ▶▶ B-Eke-Nazareth

**Fooke GmbH** ▶▶ D-Borken

**Forest Liné** ▶▶ F-Capdenac

**FPT Industrie S.P.A.** ▶▶ I-S.MARIA DI SALA

**F. Zimmermann GmbH** ▶▶ D-Denkendorf

**Geiss AG** ▶▶ D-Seßlach

**Gildemeister Drehmaschinen GmbH**  
▶▶ D-Bielefeld

**Hüller Hille GmbH - Cross Hüller**  
▶▶ D-Ludwigsburg

**Hüller Hille, Hessapp GmbH**  
▶▶ D-Taunusstein

**itec Automation & Laser AG** ▶▶ D-Berlin

**J. G. Weisser Söhne** ▶▶ D-St. Georgen

**Jobs** ▶▶ I-Piacenza

**Licon mt GmbH & Co. KG** ▶▶ D-Laupheim

**MCM S.P.A.** ▶▶ I-Vigolzone

**samag Saalfelder Werkzeugmaschinen GmbH**  
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**Samputensili** ▶▶ I-Bologna

**Schaudt Mikrosa BWF GmbH** ▶▶ D-Berlin

**Schwäbische Werkzeugmaschinen GmbH**  
▶▶ D-Schramberg-Waldmössing

**Trumpf Sachsen GmbH** ▶▶ D-Neukirch

# This is our product range: What we have to offer ... ... in the linear motor range

## 1FN1 linear motors:

**Our linear motor with the highest precision**

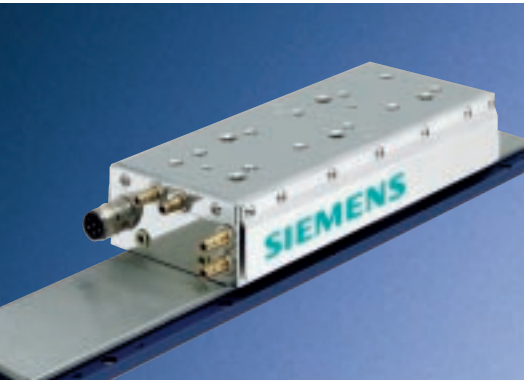
The maximum temperature increase at the mechanical interfaces to the machine is limited to 2 K and, as a result of its integrated force ripple compensation, it is the ideal drive if light masses have to be traversed with an extremely uniform velocity.

**1FN3 linear motor – peak load version: full power for maximum acceleration**

This motor is an excellent drive for accelerating loads as a result of the high ratio between the peak and continuous load. Not only this, when the optional precision cooling components are used, the maximum temperature increase at the mechanical interfaces to the machine is limited to 4 K.

**1FN3 linear motor – continuous load version: The power packs for high thrust**

The high rated power of this series means excellent drives subject to high process forces and permanent acceleration. In addition, it has very low minimal cogging force. And when the optional precision cooling components are used, the maximum temperature increase at the mechanical interfaces to the machine is limited to 4 K.



- ▶▶ Encapsulated and IP65
- ▶▶ Rated force: 790 N to 6600 N (with water cooling)
- ▶▶ Maximum force: 1720 N to 14,500 N
- ▶▶ Velocity (at  $F_{MAX}$ ): up to 105 m/min

- ▶▶ Encapsulated and IP65
- ▶▶ Rated force: 200 N to 8100 N (with water cooling)
- ▶▶ Maximum force: 490 N to 20,700 N
- ▶▶ Velocity (at  $F_{MAX}$ ): up to 240 m/min

- ▶▶ Encapsulated and IP65
- ▶▶ Rated force: 150 N to 10,375 N (with water cooling)
- ▶▶ Maximum force: 260 N to 17,600 N
- ▶▶ Velocity (at  $F_{MAX}$ ): up to 240 m/min



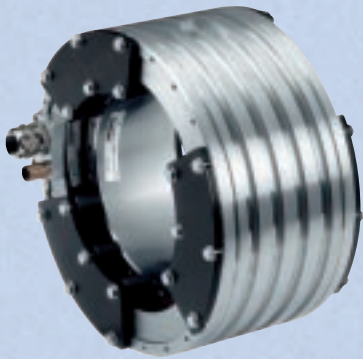
## ... in the torque motor range

### 1FW6 series: Precision rotary torque for machine tools

The high ratio between the peak and continuous torque makes this motor the ideal drive for positioning and interpolating motion. Furthermore, its geometry makes it a perfect fit with all of the bearings which are generally used.

#### For compact installations:

##### 1FW6 torque motor with jacket cooling



- ▶▶ IP23, stator and rotor pre-assembled on transport lock
- ▶▶ Rated torque:  
119 Nm to 775 Nm  
(with water cooling)
- ▶▶ Maximum torque:  
179 Nm to 1320 Nm
- ▶▶ Rated speed:  
up to 430 rpm

#### For maximum precision and simple interfaces:

##### 1FW6 torque motor with integrated cooling



- ▶▶ IP23, stator and rotor pre-assembled on transport lock
- ▶▶ Rated torque:  
467 Nm to 4760 Nm  
(with water cooling)
- ▶▶ Maximum torque:  
716 Nm to 8570 Nm
- ▶▶ Rated speed:  
up to 250 rpm

# Worldwide support and service

Siemens is second to none when it comes to bringing impetus to the machine tool construction industry and automation. By integrating our innovative solutions, together with our partners, we create new solutions for higher productivity. Siemens Linear Motor Systems – a subsidiary of Siemens Automation & Drives (A&D) – is the specialist for direct drives.

Customers have a strong partner for synchronous direct drives with Siemens. Our experienced application engineers are already there to support you in the design-in phase. Our experience and broad knowledge base significantly shorten the development time. Beyond this, Siemens provides a global technical service and, when necessary, around the clock. Siemens offers this level of security as standard.

## Tested system-based reliability



We know what our motors will have to cope with: Heat, chips, oil, dirt, humidity, dust – and often over long years under tough industrial environments. This is the reason that we have built our motors to be extremely rugged. Not only this, our standard motors are quickly and simply commissioned as we subject our products to comprehensive tests in a complete drive system. Our customers benefit by the fact that they can bring up a productive machine faster.

Would you like more information about our direct drives?

Simply request our NC 60 and NC 61 Catalogs!

Or through the Internet:

Find out more about us at

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

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

Or come and see us:

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