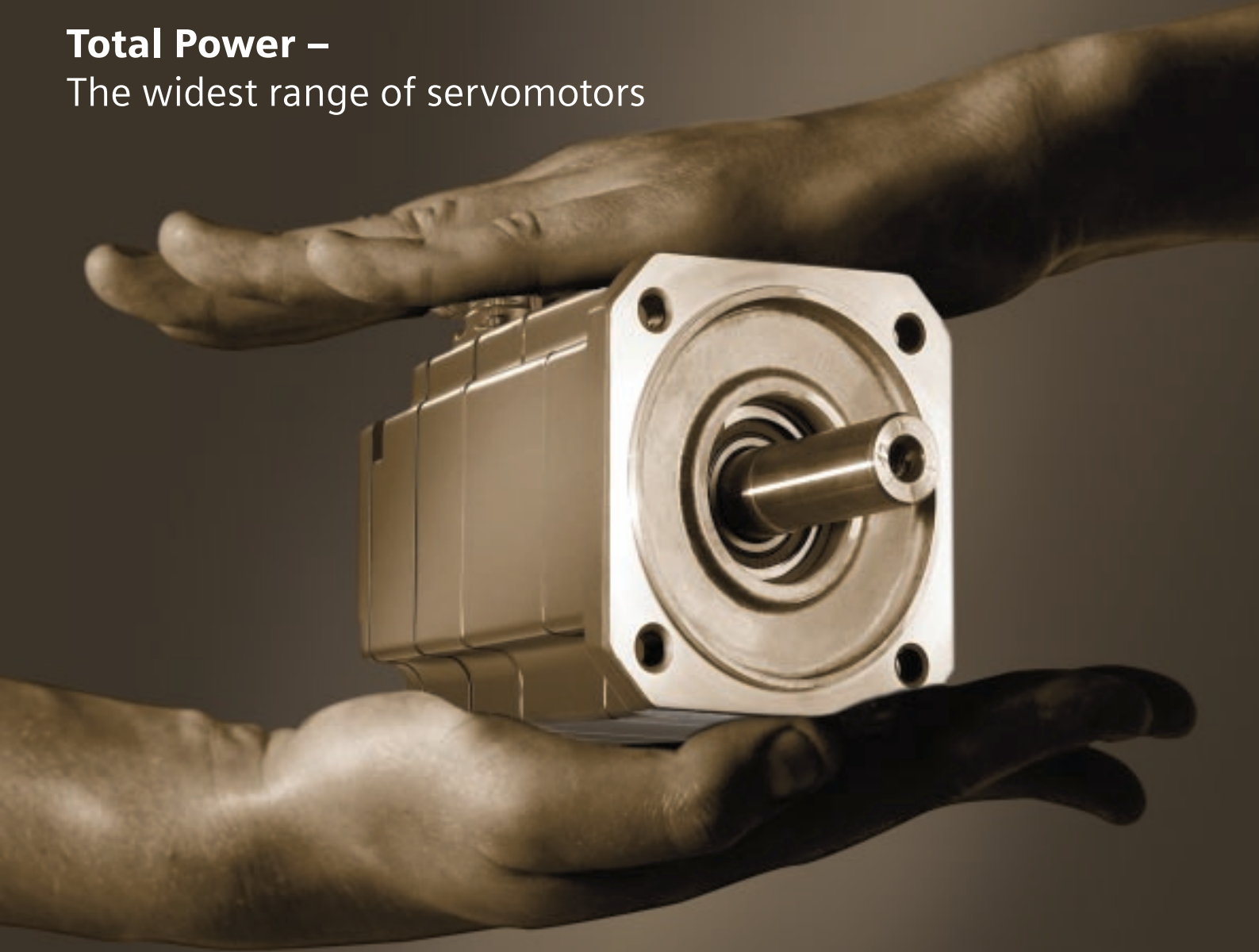


Total Power –
The widest range of servomotors



servomotors



SIEMENS

Balance between force and motion – the right motor for every application

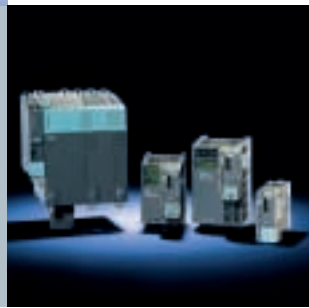
The demands placed on drive technology reflect the rapid pace of innovation in the technological arena. More compact motors with higher dynamic performance are increasingly in demand – in a broad range of outputs and versions. We address this trend with an extremely wide range of servomotors allowing you to select the optimum motor for every drive application. Whether synchronous or asynchronous servomotors or highly innovative linear and torque motors. Drive force and motion dynamics are balanced to obtain a level of performance which you have come to expect from Siemens.

Fit for all tasks:

Motor outputs from 0.05 to 630 kW (0.07 to 850 HP)

Siemens servomotors always provide the optimum motor over a wide range of outputs – no matter what your requirements are – high stall torques or high rated outputs, high maximum speeds or dynamic response, air or water cooling, linear or rotary motion. The lowest output range starts at 0.05 kW (0.07 HP) and is essentially dominated by the compact synchronous servomotor with a high dynamic response. These servomotors are available in a wide range of versions – including explosion-proof designs – and with a full line of accessories. Our

compact asynchronous servomotors, which have a similar design, complement the synchronous motors for applications in the higher output range up to 630 kW (850 HP). High outputs can be achieved thanks to the open-circuit, air-cooled version (IP23). We also have a full range of linear and torque motors for direct drive applications. These motors distinguish themselves as a result of the extremely high dynamic response and precision.



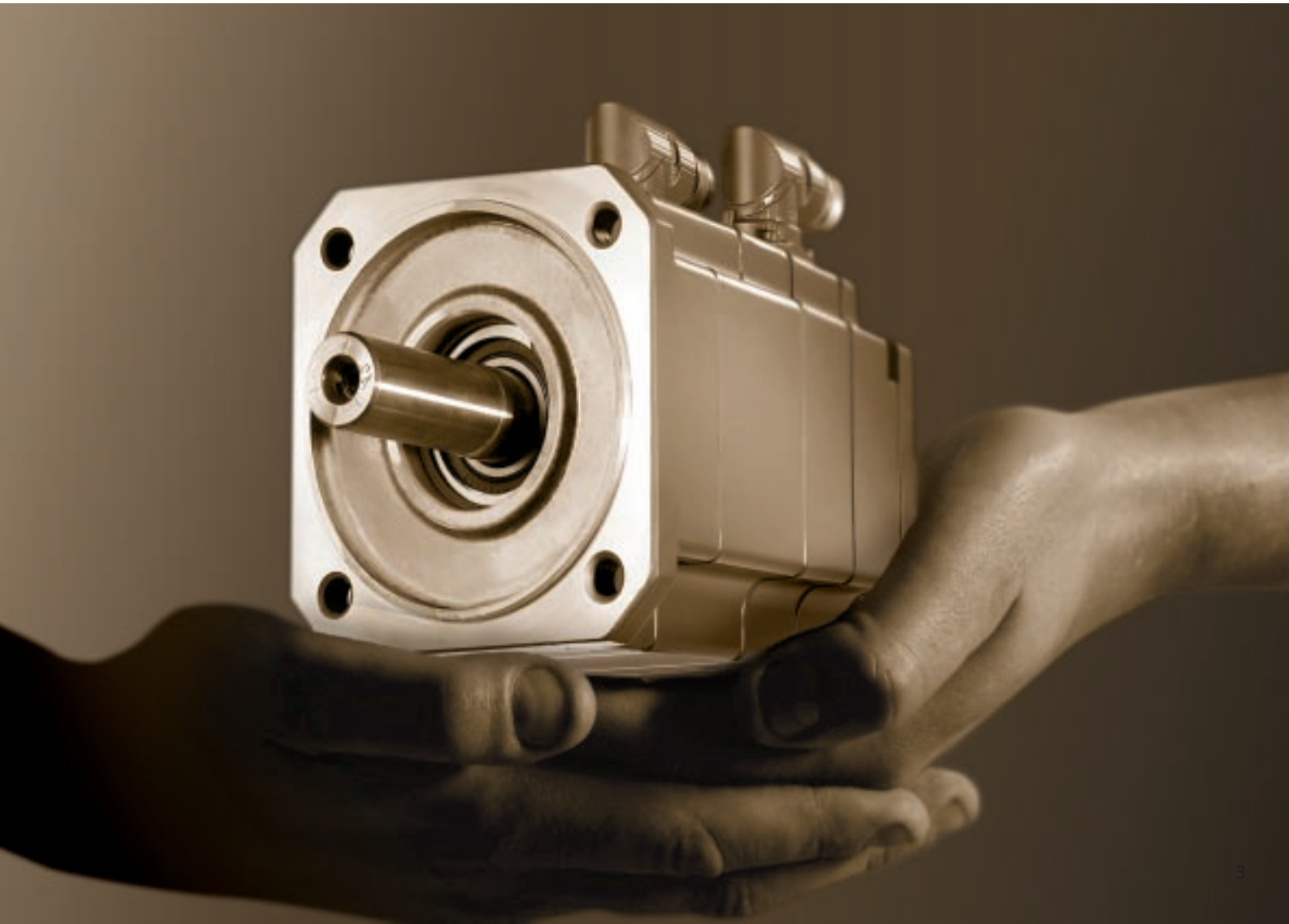
Long service life and high efficiency as standard for low life cycle costs

The high degree of protection, rugged bearing design and vibration-free construction make these servomotors the ideal solution when conditions are demanding. Integrated KTY84 temperature sensors additionally protect the DURIGNIT-IR-2000 winding insulation. The Siemens permanent-magnet synchronous motors utilize the latest magnet technology and have the highest efficiency compared to conventional three-phase motors.

The permanent-magnet excitation means that these variable-speed servomotors have no excitation losses. This translates into extremely high efficiencies with the lowest energy consumption. The result: your operating costs are drastically reduced!

Efficiency through direct contact partners

Siemens offers the most comprehensive range of motors – ensuring a high degree of flexibility for the widest range of drive applications. This means that you can always find the optimum motor and beyond this, you always have the same competent partner in every phase of your project – from the initial concept through integration up to commissioning.



Leading-edge drive concepts in machinery construction – **system-based power at your demand**

No matter what task the machinery construction sector challenges us with, we can always respond with the optimum solution. Drive systems, which are adapted to the particular application, fulfill every requirement when it comes to the mechanical design and ensure that you get the drive power where you need it. This is because we not only offer the motor, gearbox, brake and drive converter as compact unit, but also connection systems, sensors, engineering and worldwide service. All of the drive components are from a single source and are harmonized with one another. This reduces your engineering costs and ensures a high degree of system security.

We offer motors, drive converters and accessories for all categories

Thanks to the flexible, modular system which can be simply adapted to your application, you can combine our servomotor components to create an individual drive solution for the widest range of requirements. Our servomotors have an excellent price-performance ratio – and they are extremely versatile. The fact that the servomotors can be easily adapted to provide degree of protection up to IP68, versions with non-ventilated, forced or water cooling and individual modules, such as gear-



boxes, brakes, encoders and sensors, make our servomotors real multitalents. In order that the power is always there where you need it, the servomotors can be reliably connected to our SINAMICS, SIMOVERT MASTERDRIVES and SIMODRIVE converters using the new MOTION-CONNECT system. This is an innovative connection system which offers you preassembled power and signal cables for every type of application and saves time and money thanks to the simple installation.

High degree of reliability for profitable processes

Our drive converters and servomotors operate as a single entity to provide you with a cost-effective drive system with components which are perfectly coordinated with one another. With this as the basis, not only can you expect well-proven products from Siemens, but more importantly, system-tested drive solutions. We can also support you when engineering your drive solution, including simulation and machine analysis. This solution competence from a single source is a decisive factor when it comes to increased reliability and productivity of your machines and plants.

Support and service – worldwide

Siemens has one of the most closely meshed and fastest service networks to support our drive systems. Whether it involves engineering drives and integrating systems, after-sales service or training – our experienced service personnel are at your service worldwide.

Servomotors for a wide range of applications:

- Plastic machines
- Paper machines
- Printing machines
- Textile machines
- Woodworking, glass, ceramics and stone finishing machines
- Packaging machines
- Presses
- Wire-drawing machines
- Cable stranding machines
- Machine tools
- Robots and handling equipment
- Logistics-transport systems
- High-bay racking systems
- Crane and hoisting equipment
- Test stands
- Special-purpose machines



Premium synchronous motors – highly dynamic and extremely compact

Today, our synchronous servomotors dominate areas which involve complex motion tasks such as position and speed control. Today, there is a new servo standard which sets a clear benchmark – leading-edge 1FK7 motors. Significantly enhanced dynamic response, compactness and system integration allow every application to be quickly addressed – but the motors will still be fit for future market demands. 1FT6 and 1FS6 motors round out our range of synchronous servomotors for specific industry segment solutions and high-end applications. These motors show their strengths when operating under extreme conditions, e.g. in hazardous zones.

1FK7 HD (High Dynamic): An obvious winner when accelerating

Dynamic performance in your process means increased production. In this case, drive acceleration is the name of the game. Our 1FK7 HD servomotors offer you the necessary performance for these types of applications. In conjunction with the high stall torque, they have a high accelerating capacity and an extremely low intrinsic moment of inertia. Even the optional holding brake has a low moment of inertia. As a result of these features, extreme load duty cycles, fast positioning and stopping can be achieved in the shortest time.

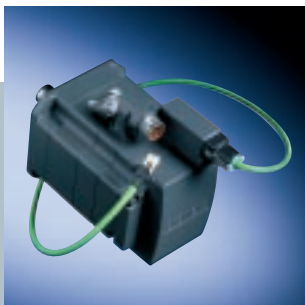
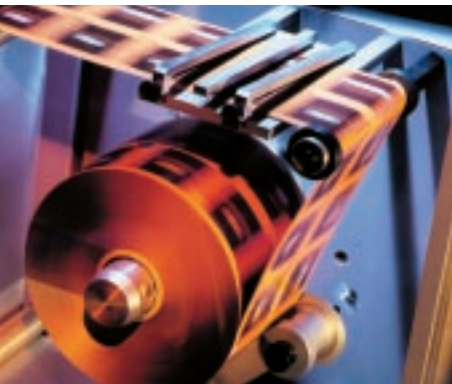
1FK7 CT (Compact): The universal motor for every application

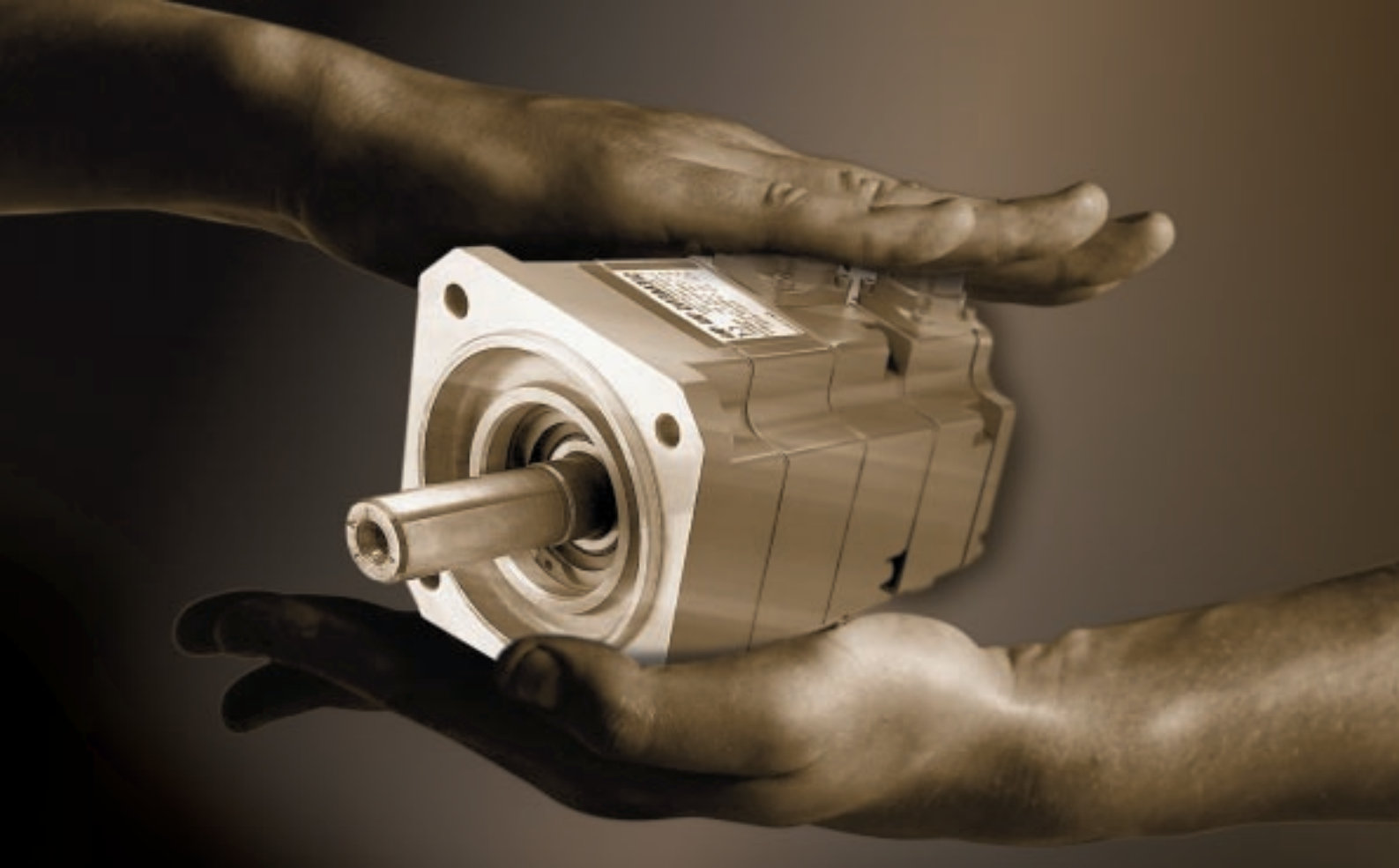
Only the most compact drive has a chance where space is tight. 1FK7 CT servomotors, with their flexible and modular design, are, thanks to their small envelope dimensions, one of the most compact of their class. As a result of the high power density and the square design, they can fit into

the tightest space in any machine to provide maximum drive power. Our smallest version, for instance with frame size 20, packs a torque of 0.35 Nm (3.1 lb_f-in) and is only 40 mm (1.6 in.) long.

1FT6: Flexible, even at high outputs

Extreme applications or outputs up to 118 kW (158 HP) place high demands on our synchronous motors. Demands, which we can completely fulfill with our 1FT6 motor series. In many high-end applications, these servomotors represent the optimum solution, whether in the standard nonventilated version with degree of protection up to IP68 or in separately cooled or water-cooled versions for the highest power densities. The wide range of accessories and options guarantees a high degree of flexibility when they have to be integrated into a complete system.





1FS6: Flameproof with type of protection EEx de IIC T3

Hazardous zones, for example, in the printing industry and in painting systems, demand motors with special protection. In addition to having to fulfill all of the relevant standards and specifications, they must also have a high dynamic response and be extremely compact. We specifically developed our 1FS6 servomotors for these requirements and these motors can be safely used in hazardous Zone 1 environments. 1FK7, 1FT6 and 1PH7 have additional options for use in hazardous zones – Zone 2 or Zone 22.

Ready for any challenge

A wide spectrum of encoder systems guarantees the demanded drive accuracy. This means that almost all basic up to medium motion control tasks can be tackled using the well-proven resolver systems.

For even higher requirements, you can select from high-precision sin/cos encoders and absolute-value encoders which are ideal for positioning tasks. To simply integrate the motor into your system, you can choose between shaft ends with or without keyway.

Alternatively, you can order the motor with holding brake or mounted gearbox. Here, versions with helical, bevel, offset or worm gearboxes are available. The new 1FK7 DYA compact geared motor with directly integrated planetary gear offers the highest degree of integration. And when it comes to the paint finish, we can also take into account our customers' requirements.

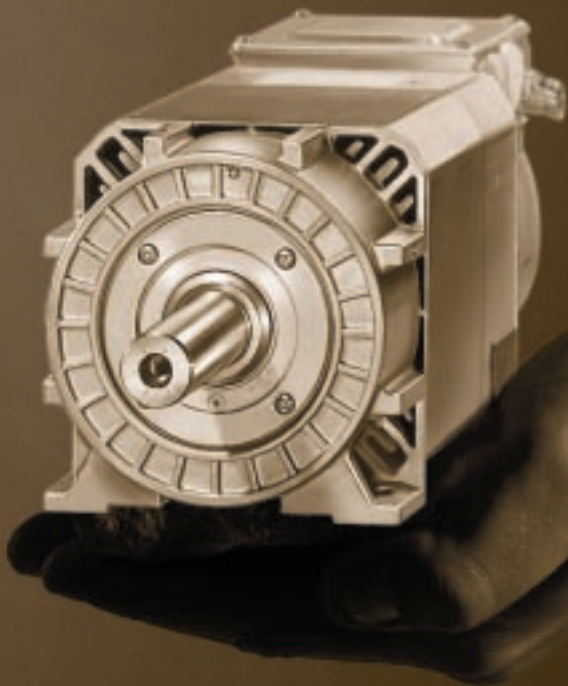


Asynchronous and encoderless – **high performance at a low price**

When it comes to asynchronous servomotors, the emphasis is on cost-effectiveness and high output. The 1PH7 and 1PL6 motors are favorably priced, have low operating costs and can be used with or without an encoder. These motors have a revolutionary design without housing. In this case, the stator is also the motor enclosure – which makes the motor compact and light. The motor cooling, integrated in the stator, saves space and cools precisely where the heat is generated. Thanks to the expanded range of frame sizes up to size 280, our servomotors are now available up to 630 kW (850 HP).

1PH7: The compact high- performer at a favorable price

If the size and technical features of standard motors are not adequate for certain industry segment applications, then our stator-cooled 1PH7 asynchronous servomotors with degree of protection IP55 can be used to provide the optimum drive solution. Up to frame size 225, the 1PH7 motors are equipped with rugged, permanently lubricated bearings – even for increased cantilever forces for belt and pinion drives as well as the highest speeds, as are often required for test stands.



In the medium output range, the motors have an external contour which makes them very easy to install. This is achieved using the terminal box which is integrated in the separately-driven fan assembly. For higher outputs, a traditional solution is used with a mounted, compact terminal box. For motion control tasks ranging from basic to average complexity, these motors, in conjunction with the SINAMICS and the SIMOVERT MASTERDRIVES Vector Control System, can also be controlled without an encoder. Various encoder systems are available for higher requirements, just the same as for the synchronous servomotors and for all drive converter systems.

The frame size 280 can be easily integrated into any machine configuration as a result of the versatile cooling and terminal box concept. The motors are either cooled using a radially-mounted cooling unit or through a cooling duct connected to the bearing endshield. The terminal box position can be freely selected depending on the cooling type.

1PL6: The BIG one for machines with the highest power density

If you prefer a compact three-phase drive over DC solutions or if the ambient conditions allow the use of open motors, then our 1PL6 motors cannot be beaten when it comes to cost-effectiveness and output. 1PL6 servomotors, available in frame sizes 180 to 280, are open-circuit ventilated asynchronous motors with stator and rotor cooling. This motor cooling means that outputs are available up to 630 kW (850 HP). 1PL6 motors are in full compliance with IEC 60034-5 with degree of protection IP23.

1PH4: Rugged water-cooled motors for special industry sectors

Our 1PH4 water-cooled servomotors are the optimum solution for extreme ambient conditions, such as high temperature, dust, dirt or aggressive atmosphere where air cooling cannot be used but suitable cooling water is available. These motors have water intake and discharge connections at the non-drive end instead of a fan unit which means that they can develop their full output independent of the ambient conditions.



Linear, rotary, innovative – cool solutions for direct drive motors

Innovation and loss-free force transfer are distinguishing features of the direct linear and rotary drive motors from Siemens: The linear motor for straight-line motion and the torque motor for rotary motion. Both of these series guarantee the highest dynamic response and precision no matter what the application. What makes our direct drive motors so special: On one hand, the current is directly transformed into motion without any significant power loss and detour through the mechanical system. On the other hand, the integrated water cooling neutralizes the motor temperature increase therefore always guaranteeing optimum motor performance.

Motors for innovative designs: Tailored concepts

When it comes to innovation, our motors are always leading-edge. In this case, it is not a question as to whether DC or three-phase motors are to be used, but what is the fundamental concept which is both cost-effective and technically fits the particular production process. In addition to the high efficiency and motor quality, it is especially important that the motor can be easily integrated into

your machine. This is because it is far simpler to directly apply the force where it is needed without having to use mechanical transmission elements such as gears, belts or rack and pinion. In this case, direct drive motors from Siemens offer a tailored solution precisely aligned to requirements in the field. These motors simplify the mechanical design of your machine, reduce its life cycle costs by providing a higher availability and lower the operating costs.

1FN3 linear motors: The universal power packs

For linear motors, the force is transferred without contact similar to the principle of a magnetic levitation train. The driving force is generated by a traveling electromagnetic field in the primary section which moves with respect to the magnetic secondary section. The primary section, located on linear guides, can then move with a high velocity and with absolute track precision. This results in a simple linear force transfer which allows you to create new solutions for innovative machine concepts. Siemens linear motors can be simply selected from a modular system which means that the characteristics and features can be more precisely tailored to your particular drive application. Two motor versions ensure this: 1FN3 linear motors for extreme load duty cycles and short rise times. This is guaranteed as a result of the high ratio between the peak and continuous load. A version for low-loss continuous operation with cyclic load changes is also available.



**1FW6 and 1FW3 torque motors:
Precision rotary motion for
production machines**

Torque motors, similar to linear motors, are direct drive motors based on synchronous drive technology. Torque motors have been optimized for high torques at low rated speeds. 1FW6 motors are modular motors which are mainly used as direct drives for rotary tables or swiveling axes of processing machines. With 1FW3 motors, you have a complete range of torque motors im Drehmomentenbereich von 100 Nm bis 20000 Nm which are ready to be installed. Thanks to their compact design, these motors represent the ideal solutions for machinery construction, such as injection molding and special-purpose machines. Both series are water-cooled and are available in different sizes and lengths.



**Would you like more details about
our range of servomotors?**

**Simply go to
www.siemens.com/drivesolutions**



Siemens AG

Automation and Drives
Motion Control Systems

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