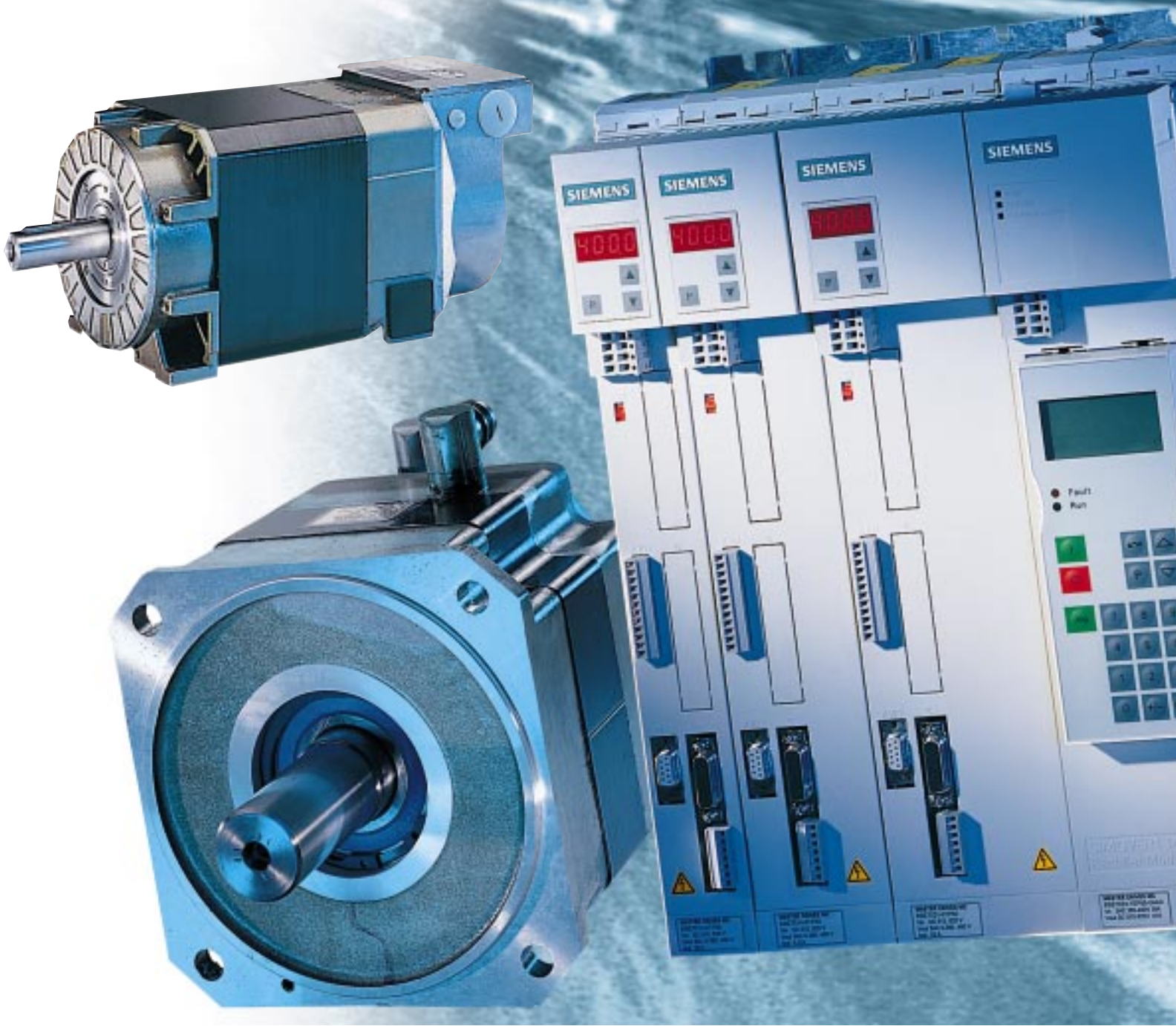
SIEMENS

The New Servo Standard
SIMOVERT MASTERDRIVES™ Motion Control and High Performance Servo Motors



SIMOVERT MASTERDRIVES™ Motion Control: The New Worldwide Servo Standard

Dynamic performance, efficiency, flexibility - and perfect drive synchronization: The new SIMOVERT® MASTERDRIVES Motion Control sets a completely new worldwide servo standard, with the smallest standard common DC BUS configuration. They have an extremely high output, are precise and have a communications port.

Surprisingly compact
For the first time ever, the new control quality Motion Control handles the lower output range from 0.5 HP to 270 HP (300 Watts to 200 kW). And this is across the board for all industrial sectors and the internationally approved standards - CE, EN, UL, CSA.
Motion Control can be connected anywhere in the world as a result of its wide voltage range.

A unique worldwide device spectrum
That's our MASTERDRIVES drive converter program with its unique performance. The Motion Control (MC) series and Vector Control (VC) can handle any drive application and they are ideally harmonized with one another to cover the complete range of drive tasks.

Connectivity
Motion Control can be used universally - for every motor type. Synchronous Servo, Asychronous Servo or Standard Induction Motors. Modular, plug-in option cards for encoder evaluation solve every drive task; Whether it's a pulse encoder, sin/cos encoder, resolver or absolute value encoder, connection is always simple. And not only that, MASTERDRIVES Motion Control can handle any drive task. Fast, safe and reliable, no matter how complex the drive solution is.

The smart servo drive is no longer an issue. The reason: The superior intelligence of Motion Control, embedded in every unit. Locally where it is needed and for all communication levels.

Unique: The unified Motion Control program from 0.5 HP to 270 HP (0.3 kW to 200 kW.)

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Motion CONTROL

The new servo standard

- from 0.5 HP to 270 HP (300 Watts to 200 kW)
- Motion Control - and Vector Control drive converters
- with full CE/EN/UL/CSA international approval
- wide voltage range
- for industrial sectors and applications
- all encoder systems
- integrated intelligence

Fast, flexible, modular - security for every drive concept

Unified dynamic performance
The dynamic performance of Motion Control has the same excellent performance as analog drives - but beats them when it comes to flexibility and accuracy. And why? - because MASTERDRIVES Motion Control has 32-bit technology.

Overload factor 3
In the up to 25 HP (18.5 kW) output range, MASTERDRIVES Motion Control has an extremely high overload factor: 300% for 250 ms in the Compact Plus Form Factor (Photo shown). Thus, it offers adequate power reserves even for fast-response Siemens - servo-motors.

Surprisingly compact
This is an important factor in the lower power range: They are extremely compact. MASTERDRIVES Motion Control fit perfectly into every mounting concept: The dimensions speak for themselves. For example, a 1HP (.75 kW) drive is only 1.75"W x 10.25 D x 14.25 H (45 mm W 260 mm D, 360 mm H).This means that it can be easily installed in cabinets or directly onto the machine.

Software: Modular using BICO technology
The software of MASTERDRIVES Motion Control is not a rigid structure, but consists of function blocks: They are configured in self-contained, autonomous units, with a clearly defined functional scope. They cover all of the closed-loop control functions.

SIMOLINK: Peer To Peer coupling via fiber-optic cable
SIMOLINK, with its fiberoptic cable ring, guarantees fast data transfer with other drive converters or with SIMATIC® and SIMADYN®.

Current rise time: 0.4 ms

MASTERDRIVES Motion Control has an extremely fast current rise time of only 0.4 ms

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Motion CONTROL

Security for every drive concept:

- 32 - bit technology
- 0.4 ms current rise time
- 300 % overload
- 1.75 "W x 10.25 D x 14.25 H (45 x 260 x 360 mm)
- function blocks can be freely interconnected using BICO technology
- SIMOLINK coupling

Motion Control:
Plug & Drive for all sectors

Can handle all industrial sectors
MASTERDRIVES Motion Control can handle even the most complex motion. It offers new, highly efficient drive solutions for all industrial sectors - whether in the packaging, printing - or paper industries, or in woodworking, textile, converting, manufacturing, conveyor technology or for high-bay racking vehicles.

Safety-off function
The safety-off function of Motion Control replaces many contactors. This function can be used to reliably and safely shutdown the drives, e.g. for cleaning.

Smart operator control panel
The new OP1S operator control panel has an alphanumeric text display. Start-up is always fast and simple using a keyboard and a new menu prompting feature. OP1S can store up to 8 parameter sets and copy them for other drives using uploading and downloading functions. OP1S is small and easy to use, and not only that, but it can be connected immediately to all MASTERDRIVES.

Serial interface with USS protocol
MASTERDRIVES have, as standard, a serial interface (USS interface). It can be used as an RS232 interface for point-to-point data coupling, or as RS485 interface for bus operation. SIMOVIS®, the start-up and diagnostic tool can be connected to this interface to commission drives.

Start-up using a PC or SIMATIC®
SIMOVIS® - which now runs under Windows 95 & NT simplifies drive start-up and drive-related diagnostics as a PC supported tool. SIMOVIS® is connected to the drive converter via the serial interface with USS protocol.

For SIMATIC users, the advantages of a unified system solution are quite evident. This is because SIMOVIS®, embedded in the software environment of SIMATIC Engineering Tools such as STEP 7, can be used to commission the drives directly via PROFIBUS® - DP without having to use an additional interface.

The PMU can be used for display and setting - and is integrated into every drive converter. All of the important quantities can be called-up or changed at any time: Drive status, bus address, speed, torque and every parameter.

PMU

OP1S

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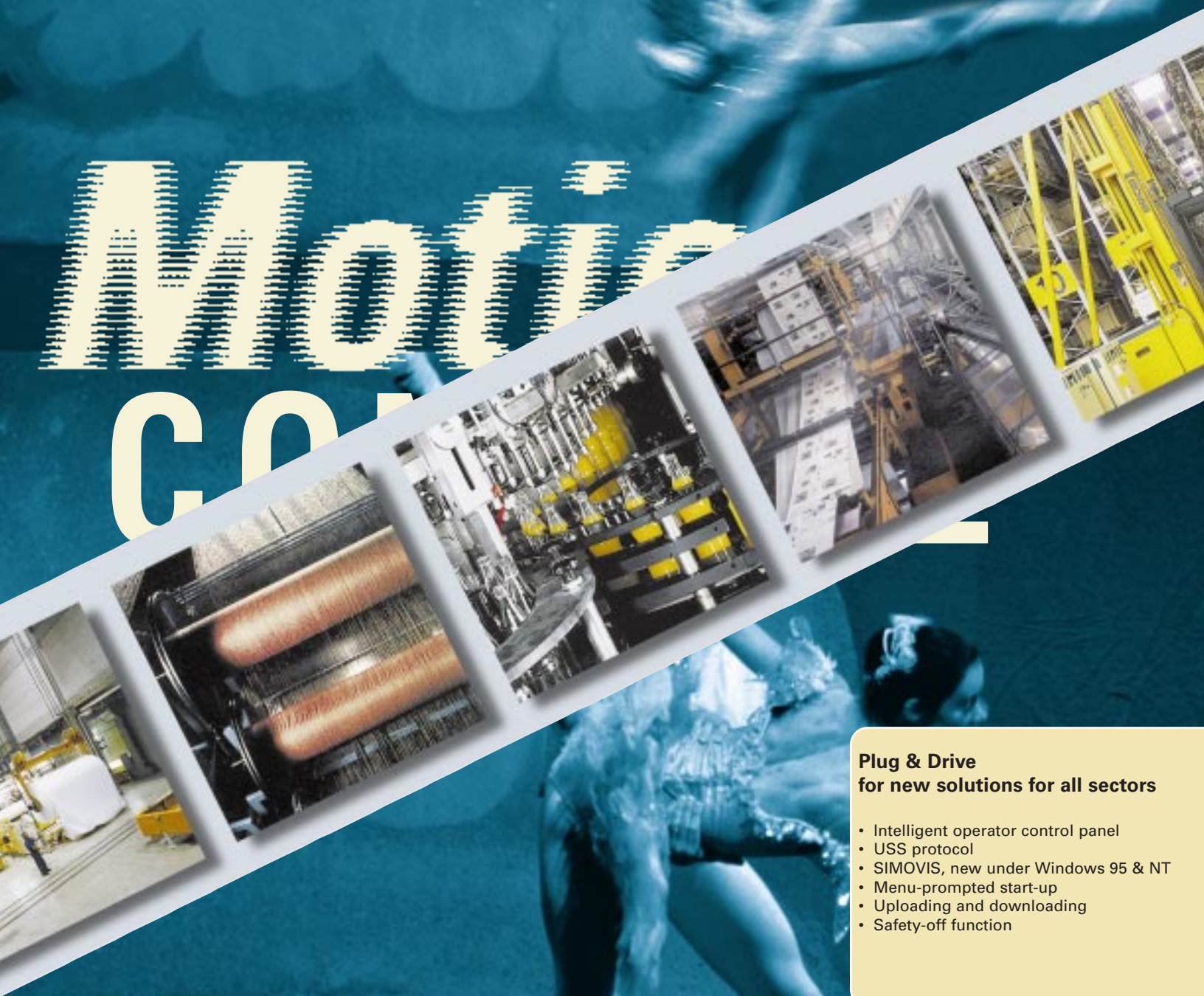
Motion Control



Plug & Drive
for new solutions for all sectors

- Intelligent operator control panel
- USS protocol
- SIMOVIS, new under Windows 95 & NT
- Menu-prompted start-up
- Uploading and downloading
- Safety-off function

Technology inside: Intelligence where it's needed - locally

No programming - only parameterizing

The blocks are simply interconnected using binectors and connectors. Benefit: You always have access to the optimal functional scope, and only parameterization is required, absolutely no programming knowledge. Just select a structure from the library of standard functions - and the drive is commissioned and is ready to run.

Motion control without PC

This is completely new and relieves the computer significantly: MASTERDRIVES Motion Control controls the movements of many machines - without PC and supplementary control board. Position, synchronous operation and cams are additionally controlled with 32-bit resolution.

Complex know-how as standard

Motion Control together with the motors, reliably masters even extremely complex sequences. The units have the required know-how as standard. This is in the form of software for positioning, speed and angular synchronization and even for synchronous operation with cams which are already integrated in the units. Electronic axes and gearboxes can be directly implemented in the drive converter thanks to BICO technology, simply by using plug-in function blocks: Plug & Drive. Or via PC, PLC and fieldbus - just as you want it.

Comprehensive BICO library

Open-loop and closed-loop control blocks can be freely interconnected using BICO technology - i.e. no programming, only parameterization. Frequently used standard functions are already configured as macros, and can be immediately used in the software package: Positioning, and additionally synchronous operation, cam, electronic gearbox etc. Depending on the particular requirement, even the standard macros can be expanded flexibly using additional BICO blocks. Several functions can be coupled to form a sequence control. We have also gone one step further: The customer can protect his own technological knowhow which is implemented in the form of his software solution.

Electronic shaft directly in the drive converter

The unique technology of MASTERDRIVES Motion Control with fully integrated closed-loop positioning control, speed and angular synchronization allows electronic shafts and gearboxes to be directly implemented in the drive converter. SIMOLINK guarantees that all of the drives are precisely synchronized.

Absolute reliability: The electronic shaft

Motion Control MC technology can handle everything even when something goes wrong - power failure, bus error, tachometer fault. And why? - because the "electronic shaft" cannot break. Motion Control gives you the decisive advantage for any drive concept - for greater speed, enhanced quality and cost-effectiveness in production; the system or plan can be flexibly changed-over to handle new products and processes.

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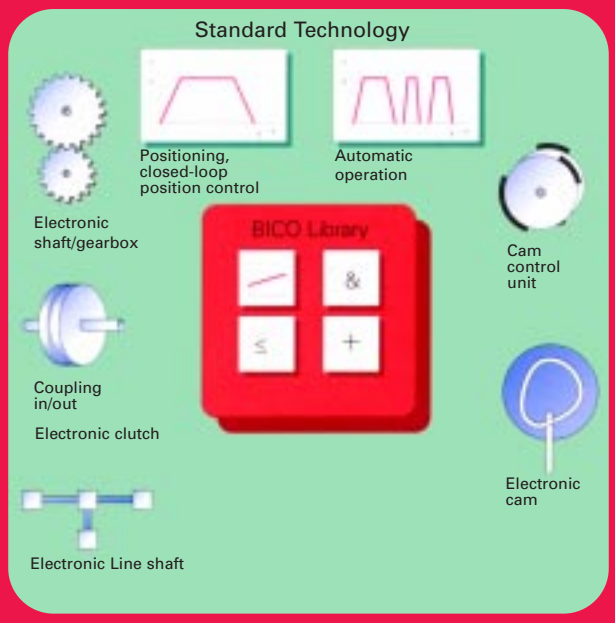
Technological customer solutions



Technology Inside

Total communication from a single vendor

- Distributed motion control
- All standard functions are integrated
- Positioning and synchronous operation
- Line Shaft , coupling, electronic cam
- BICO library
- Protection for individual software solutions
- Maximum security and safety

The path to the future: Optimum integration into the automation environment

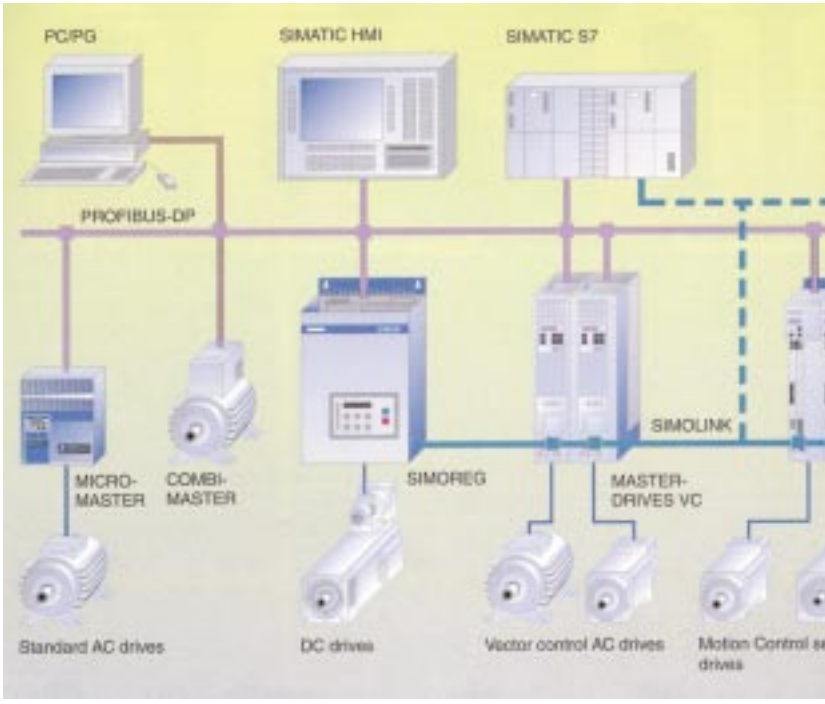
The best drive is only perfect if it can be integrated flexibly into any drive and automation solution. Motion Control provides ideal access to the automation environment with its standard serial interface (USS protocol) or via other optional communication interfaces.

System solutions for drives in the automation environment
One of Siemens' strengths is the unified system solution for automation - from the process control level down to the field level. The SIMATIC automation system is setting new standards here. Motion Control is optimally embedded in this automation system, from engineering up to process operation.

Communications via PROFIBUS® -DP
PROFIBUS-DP, the most successful fieldbus standard worldwide, is the communications platform for MASTERDRIVES Motion Control. Data is transferred to the PLC, the control system or a PC at a rate of 12 Mbaud.

However Motion Control can also be automated via other digital and analog I/O. when integrated into third-party automation systems, the serial standard interfaces of the drive or other communication interfaces can be used.

SIMOLINK:
Perfected synchronization Motion Control units can be coupled with one another via SIMOLINK to form electronic axis and gearboxes - where up to 200 motors can be synchronized perfectly. Data is transferred via fiber-optic cables so that all the drives are harmonized with one another, quickly and easily, without disturbance, in any situation.



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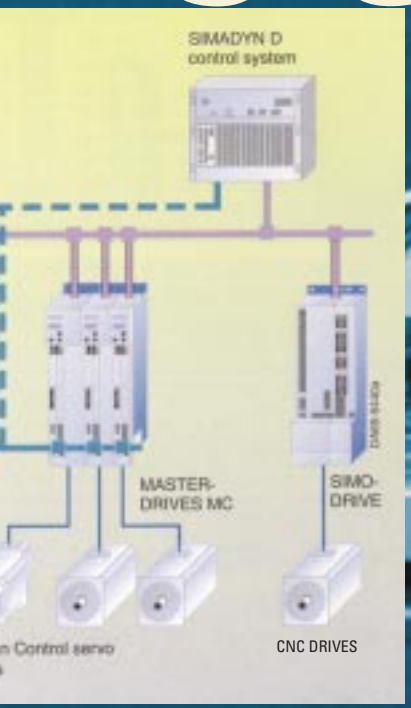


System solutions from a single vendor

- PROFIBUS-DP - communications at 12 Mbaud
- SIMOLINK - perfect synchronization
  - Up to 200 drives
  - Only 630 µs for (100) 32- bit words.
- For any PLC, any control board,any PC
- Perfectly harmonized system solutions from a single vendor

SHAFTLESS OFFSET PRINTING

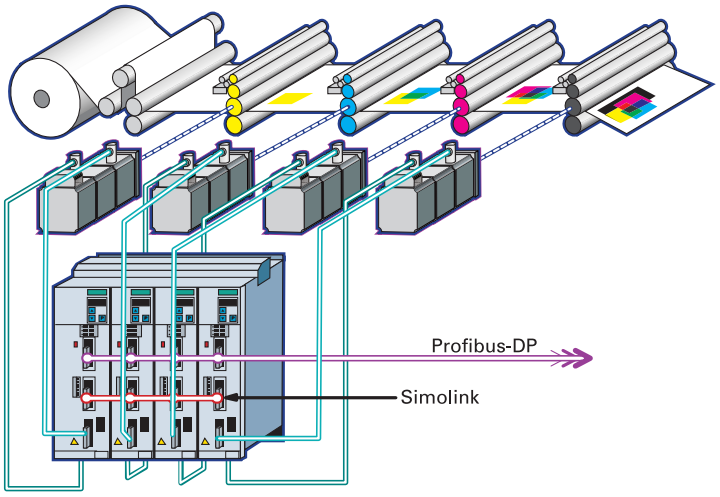
Offset printing traditionally uses a mechanical line shaft to synchronize the different color print stations and down stream equipment. With the MASTERDRIVES MC, the speed limited, high maintenance, mechanical shaft is replaced by individual motors which are precisely synchronized, with quartz accuracy, via a high speed (11 MBaud) fiber-optic peer-to-peer ring (SIMOLINK).

Using the Technology functions of the MASTERDRIVES MC a Virtual Master (calculated position setpoint) is used to precisely synchronize the individual print sections with superior accuracy and isolation from real world disturbance. Thus allowing for higher operating speeds, while maintaining superior print quality.

By implementing the electronic line shaft, plate change on the fly is now possible. No longer is there a need for shutting down the press to clutch in alternate print sections.

The MASTERDRIVES Motion Control ability to angular synchronize the new section to the running web reduces unwanted down time and increases productivity.

Communication to higher level controls(e.g.. SIMATIC S7 PLC) for evaluation of status signals and for drive setpoint signals, and the like, is carried out over PROFIBUS.

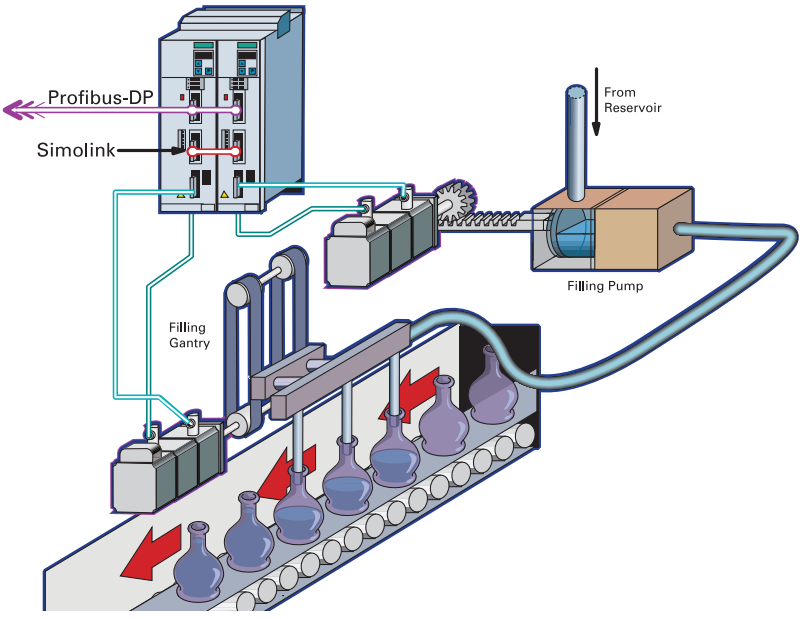


BOTTLE FILLING

Cosmetic bottle filling often requires the distance between the filling pipe and the liquid level in the bottle to be maintained at a constant. The liquid product metering pump must further provide product at a constant flow. These two processes must work in harmony with each other. Using the MASTERDRIVES MC, its Technology Functions and SIMOLINK, the two axis can be precisely synchronized.

For this application the metering pump drive acts as the master and the filling gantry drive acts as the slave. As the metering pump pumps a constant flow of the product the filling gantry is synchronized, through a CAM profile that corresponds to the bottles contour, to maintain its constant filling pipe to liquid distance. When a new bottle profile is required, the CAM function between the metering pump and filling gantry, to fit the new bottle geometry, can be changed in a matter of seconds.

Communication to higher level controls (e.g. SIMATIC S7 PLC) for evaluation of status signals and for drive setpoint signals, and the like, is carried out over PROFIBUS.

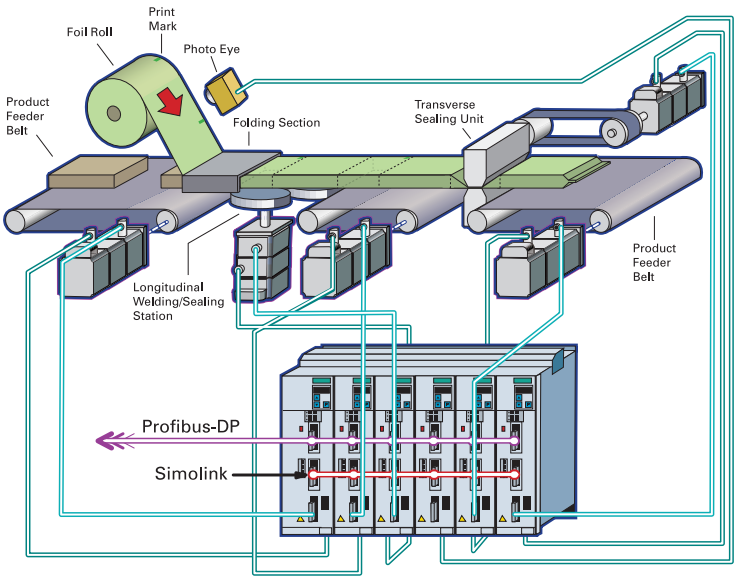


HORIZONTAL BAGGING

High cycle counts and a high degree of flexibility are required on a continuous horizontal bagging machine. The MASTERDRIVES MC, with its Technology Functions, is ideally suited to handle the coordination of this process.

The sealing station, for the longitudinal seam, handles the foil transport. Electronic Line Shafting and Print Mark Synchronization ensure that the foil is synchronized precisely with the products being packaged. Electronic Line Shafting further ensures that the product feeder belt and the foil are in continuous position synchronization. The Print Mark Synchronization feature accelerates or decelerates the foil to make up for possible foil stretch, ensuring that the printed labels will be correctly positioned on the package every time.

In order to achieve the continuous packaging process, the transverse sealing station must "travel" with the line. By utilizing the MASTERDRIVES MC's Electronic Line shaft with its Electronic Cam feature this "travel" movement can be accomplished. The transverse sealing station is initially accelerated to the speed of the product (x-axis), once in the correct position the sealing jaws (y-axis) are closed by a signal from the Cam Sequence output function for the required sealing time. After the sealing time expires the jaws are opened and the sealing station returns to the starting position.
Communication to higher level controls (e.g.. SIMATIC S7 PLC) for evaluation of status signals and for drive setpoint signals, and the like, is carried out over PROFIBUS.

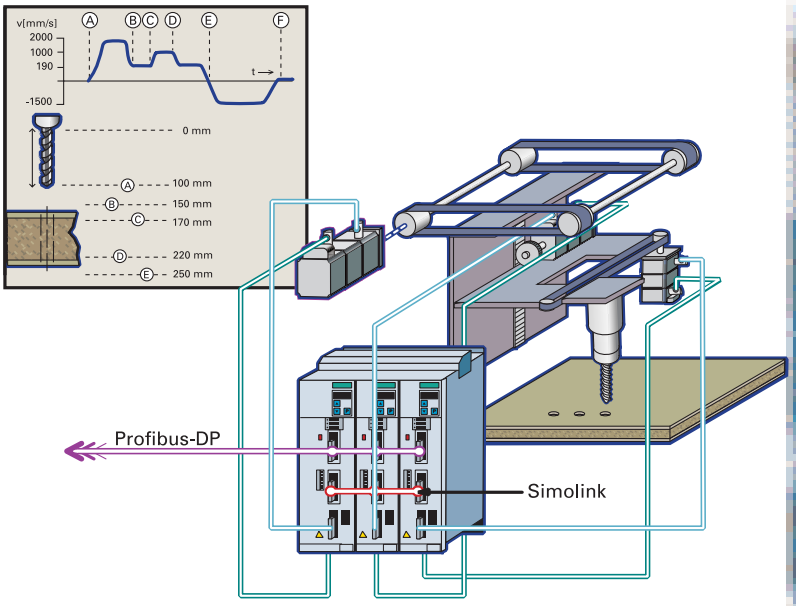


COMPOSITE DRILLING

Precise drilling of composite material, at optimum speed, in furniture manufacturing can be realized using the MASTERDRIVES MC and its Technology Functions.Positioning of the x-axis and the y-axis to locate the drilling tool at the correct drill location can be easily accomplished using the MDI (manual data input) mode. This mode allows the position set point to be defined as an absolute or relative position using the motor encoder or machine encoder as the position encoder.
Once the drilling tool has reached the desired location the Automatic function takes over and controls the movement of the z-axis. By following a set of pre-programmed instructions the drilling tool performs as follows:

Travel from A-B:
The drilling gantry rapidly traverses to just in front of the board and starts to reduce the feed velocity. At precisely Point B, the drill reaches the reduced feed velocity to drill through the plastic laminate.
Travel from B-C:
The drill slowly starts to drill through the plastic laminate.
Travel from C-D:
The press board is then drilled with the normal feed velocity.
Travel from D-E:
The reduced feed velocity is used to drill through the other side of the plastic laminate.
Travel from E-F:
The drill returns with increased velocity.
By increasing the drill travel speed at every possible point, faster production times can be achieved, hence, resulting in increased product throughput.

Communication to higher level controls (e.g.. SIMATIC S7 PLC) for evaluation of status signals and for drive setpoint signals, and the like, is carried out over PROFIBUS.



Unified system technology

Modular hardware

The hardware of the complete MASTERDRIVES spectrum is modular. Each unit can be seamlessly coupled to the next. Thus, the drive converter can always be adapted to the widest range of demands - motor type, mounting location, technology, number of axis, and communications.

Optimum with Servomotors

Motion control is optimally harmonized to the new, compact and high-dynamic performance servomotors. An excellent combination when it comes to the highest demands for dynamic performance of induction servomotors. An effective system is even obtained by simply using standard induction motors.

All encoders can be connected

All of the major encoder types can be connected to Motion Control:

- Resolver: High dynamic performance and reasonably priced
- Sinusoidal-consinusoidal encoder: For highest dynamic performance and accuracy, resolution to a millionth of a degree;
- Absolute value encoder: If reference travel is not permissible; EnDat and SSI protocols;
- Pulse encoder: For induction motors. MASTERDRIVES can reliably evaluate several encoders simultaneously.

For single- and multi-axes systems

MASTERDRIVES Motion Control opens-up applications in the area of single and multi-axes systems for servo drives. AC units are connected directly to the supply and operate completely autonomously. In the lower output range (compact plus form factor), the integrated braking chopper along with an external resistor ensures independent braking with a high dynamic performance.

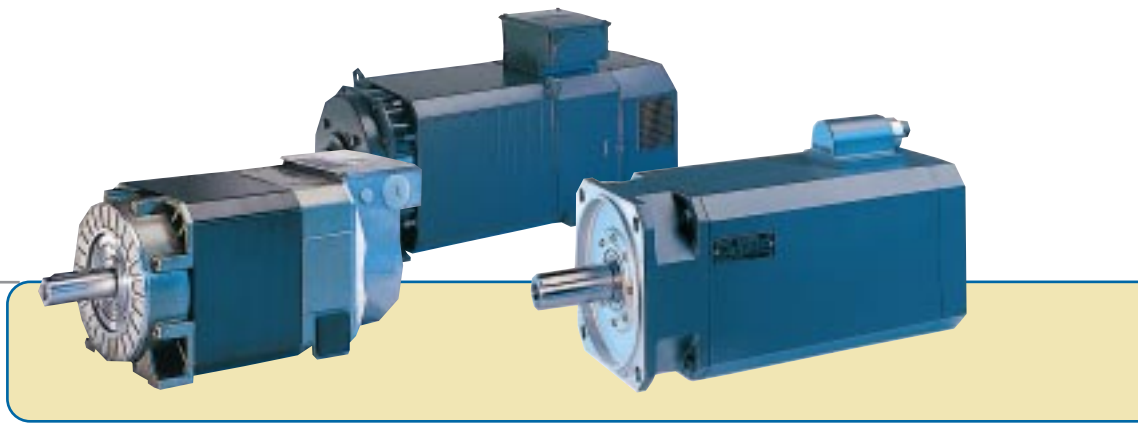
A drive converter and two DC units in one

Ensuring that multi-axis systems become even more compact: Two additional DC inverters can be docked onto an autonomous AC unit. The inverters are fully functional but without any additional rectifier unit. And it's child's play: A new DC link bus design ensures fastest possible installation and mounting. High rating rectifier modules are available for the DC bus, for complex multi-axis systems.

Energy-saving regenerative feedback electronics

The rectifier/regenerative feedback module ensures that excess energy from the DC link is fed back into the supply network for energy-saving drives.

Optimally harmonized to the new servomotors



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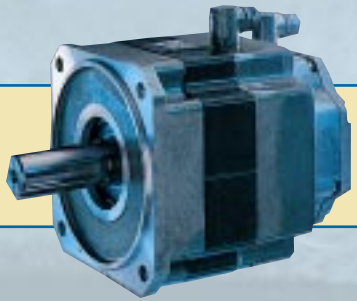


Siemens High Performance Motors: The New Worldwide Servo Motor Standard

Today, general machinery and plant construction demands high performance and highly efficient drive solutions. Production must be faster, more cost effective and result in extremely high quality - and that across all industry sectors. And, the more precise the drive, then the higher the quality. High performance is the name of the game, in all industry sectors.

Siemens servomotors are the drive solution for that all-decisive technology lead: The first high performance AC motor series for the complete range of machinery and plant construction - the solution for the future: Maintenance-free, high dynamic performance and powerful.

Siemens servomotors provide solutions for the printing and paper industry as well as in iron and steel mills, for hoisting equipment such as elevators, cranes and high bay racking vehicles.

Optimum drive solutions can be implemented in all industry sectors with the trend moving from DC to AC drives, or for sectors, where conventional AC motors are not adequate, using the new synchronous and induction servomotors. Siemens servomotors can power traversing - and hoisting gear of cranes, weaving machines in the textile industry and machines for positioning and synchronizing functions in the packaging industry.

The new motors realize their full potential when used together with SIMOVERT® MASTERDRIVES MC or VC our frequency converters for synchronous, induction and servo motors.

By harmonizing Siemens High Performance motors and MASTERDRIVES, motor & drive converter form a perfect system with one of the highest dynamic performances available today.

The Siemens High Performance motors and MASTERDRIVES surpass many DC solutions over the entire power spectrum.

MASTERDRIVES™

Motion CONTROL

The Right Features for all Industry Sectors

High degree of protection, rugged and maintenance-free, extremely compact with a high output density, high-dynamic performance for universal use. These are the features of Siemens AC servomotors. They are revolutionizing drive technology in the output range from 0.75 HP to 400 HP, (0.5 to 300 kW). In order to achieve this, we have completely re-developed the motors. They have performance features, which are consequentially tailored to the requirements of modern machinery construction.

Compact - for every application
Servomotors are extremely compact and can be easily integrated due to their square design. A maximum of power can be installed in all machines in the smallest space as a result of the high power density.

Dynamic performance - for the highest precision
Extreme load duty cycles, short rise times, high speed - torque and position accuracy - these are the performance data for a completely new dynamic performance and drive quality. The Siemens servomotors are convincing as a result of their high overload capability, low moment of inertia and high-quality mechanical design.

Flexible - for all demands
Siemens servomotors can be universally used. Full torque from standstill up to the rated speed, high maximum speeds and excellent smooth running characteristics guarantee the highest drive quality for all requirements - also, for applications with a wide field-weakening range.

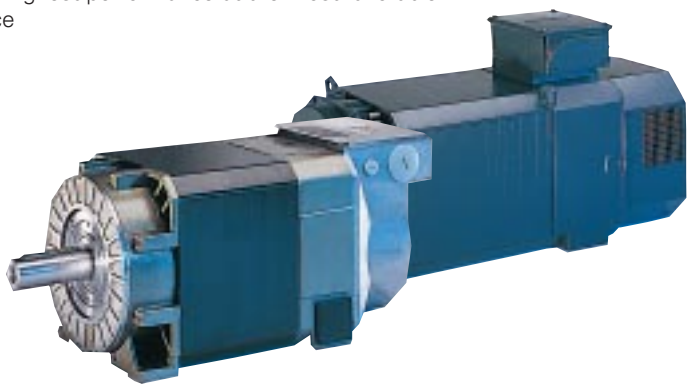
Rugged - for the most extreme conditions
The high degree of protection, rugged bearings which are insensitive to shock and the stiff mechanical design are features which make Siemens servomotors extremely rugged motors. Integrated temperature sensors protect the motor against inadmissible operating conditions.

This means that they are safe and reliable, even under extreme operating conditions, such as in printing units and packing machines.

Cost effective - revolutionary price
Servomotors are convincing as a result of their excellent price-performance ratio: From their purchase price through to operation. They are maintenance-free, have an extremely long lifetime and are energy-saving as a result of their high efficiency.

Servomotors are available in several versions:
- Compact 1PH7, 1PH4, and 1PL6 induction motors
- Standard 1FK6 servo-motors
- Premium1FT6 servomotors

1PH7 and 1PL6 servomotors
The compact induction motors
1PH7 / 1PL6 are the high-performance motors for an output range from 5 to 400 HP. Whether stator-cooled with degree of protection IP55 (1PH7) or with stator and rotor cooling (shaft heights 180 and 225) with degree of protection IP23 (1PL6) - both versions offer the highest performance at the most favorable price



1FT6 - the high tech servomotor
1FT6 is the synchronous servomotor for extreme demands in the output range from 0.7 - 45 HP. It is non-ventilated as standard, degree of protection IP64, or separately ventilated for the highest output density

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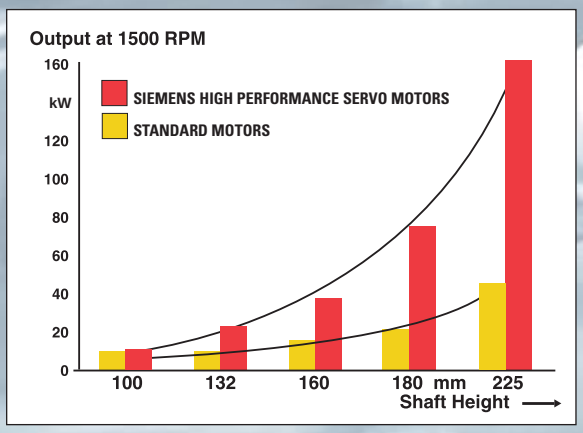


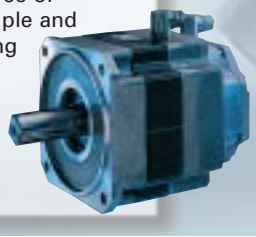
Motion CONTROL

1PH4 water-cooled induction motor

The 1PH4 is the ideal motor for applications where extreme ambient conditions such as high temperature, dust, dirt or aggressive atmosphere prevent air cooling. The motor is available with an output range from 12 to 82 HP in shaft heights from 100 to 160.

1FK6 servomotors - the standard synchronous servomotor

The 1FK6 is the small servomotor but with a high standard - in the output range from 0.7 to 7 HP. Its performance data: Non-ventilated with degree of protection IP64, simple and fast connection using connectors with a cable outlet direction which can be rotated.



The new Generation of AC Motor Technology

No-enclosure type of construction - revolutionary design and technology

1PH7 and 1FK6 servomotors are extremely small and light as a result of their no-enclosure design. The innovative basis for this is the new stator assembly: It has the function of the enclosure. The motor cooling is integrated in the stator assembly. This saves space and the motor is cooled directly there where the heat is generated.

Rugged bearing design for all requirements

As a result of the extremely rugged bearing design which is insensitive to shocks and jolts, and having permanent lubrication, the motors are suitable for all requirements, even for increased cantilever forces for belt and pinion drives and highest speeds.

Protected encoder system

The encoder system is integrated in the motors. Thus, encoders are optimally protected from mechanical damage and the ingression of foreign bodies and moisture. The integrated encoder system is available for all requirements: Whether as a pulse encoder utilizing noise-immune HTL technology, as rugged resolver or as high-resolution optical absolute value encoder.

Optimized cooling principle for every output range

The larger the motor, then the higher the cooling required. Siemens servomotors have the optimum cooling technique for every output range:

- Non-ventilated for low outputs (1FK6 and 1FT6 motors)
- Separately-ventilated stator for medium outputs and above (1PH7 motors)
- Separately-ventilated stator and rotor for large motors (1PL6)

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Optimum termination technology for every version

For 1PH7 motors, the terminal box is integrated in the separately-driven fan assembly. The result: The motor has an extremely favorable shape for mounting, with freely-selectable cable outlet direction. Siemens servomotors use connectors for low outputs (1FK6, 1FT6 motors), integrated terminal box for the medium-outputs (1PH7 motors) or the traditional solution with terminal's boxes for higher outputs 1PH7, 1PL6 motors).

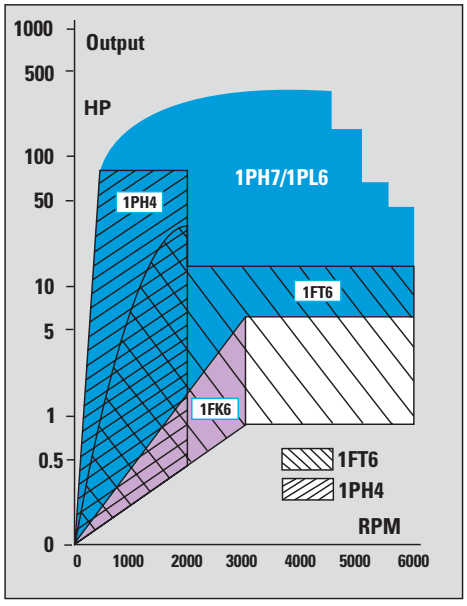
Motion CONTROL

Technology: Revolutionary Facts

	1PH7, 1PL6 compact induction motors	1PH4 water-cooled induction motor	1FK6 standard servomotor
Motor type	Induction motor 	Induction motor 	AC servomotor (permanent magnet synchronous motor) 
Rated data: (for 3-ph. 480V AC) with Masterdrive MC			
• Outputs	5-400 HP (3.7-300 kW)	12-81 HP (8.8 - 61 kW)	0.7 - 7 HP (0.5-5.2kW)
• Speeds	400, 1150, 1750, 2300, 2900 rpm	1750 rpm	3000, 6000 rpm
• Torque	15-1250 lb_f - ft (20-1700 Nm)	35 - 245 lb_f - ft (48 - 333 Nm)	7 - 150 lb_f - in (0.8-17 Nm)
Rated voltage	3-ph. 380-480V AC	3-ph 380 - 480 V	3-ph. 380-480 V AC
Shaft heights	100, 132, 160, 180, 225 mm	100, 132, 160 mm	36, 48, 63, 80, 100 mm
Degree of protection	IP 55 IP 23 (for stator & rotor cooling from shaft height 180-225)	IP 65, shaft exit IP 55	IP 64
Cooling	Separately ventilated using a separately driven axial fan	water-cooled	Non-ventilated
Types of construction	IM B3 (foot mounting) IM B5 (only shaft heights 100, 132) flange mounting Im B35 (foot / flange mounting)	IM B35 (flange / foot mounting)	IM B5 (flange mountng)
Encoder systems	HTL Pulse Encoder Resolver Sin/Cos Encoder Absolute value encoder (Multiturn)	HTL Pulse Encoder; Sin/Cos encoder	Resolver Sin/Cos Encoder Absolute value encoder (Multiturn)
Thermal motor protection	KTY 84 temperature sensor	KTY 84 temperature sensor	KTY 84 temperature sensor
Bearing design	Deep groove ball bearings Cylindrical roller bearing for belt drives Permanent lubrication	Double bearing on DE for belt drive, Single deep groove ball bearing for coupling drive; Permanent lubricant	Deep-groove ball bearings Permanent lubrication
Termination technology	Terminal Box	Terminal Box	Connector
Brake	Holding brake with emergency stop function (external module mounted on the drive end)		Integrated holding brake
Gearbox mounting	Planetary gearbox on request	Planetary gearbox on request	Planetary gearbox

More dynamic performance, higher power, lower price: Servomotors and SIMOVERT MASTERDRIVES are the system for cost-effective and progressive drive solutions. For all applications in all industry sectors of machinery - and plant construction. Here is the revolutionary product family of servomotors with the most important data at a glance

Output ranges of Siemens servomotors



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MASTERDRIVES™

1FT6 premium servomotor
AC servomotor (permanent magnet synchronous motor)

0.7 - 45 HP (0.5-34kW)
1500, 2000, 3000, 4500, 6000 rpm
7 - 1400 lb_f - in (0.8-160 Nm)
3-ph. 380-480 V AC
36, 48, 63, 80, 100, 132 mm
IP 64, IP 65, IP 67 IP 54 when separately - ventilated
Non-ventilated/Sep.-vent. (frames 80,-132)
IM B5 (flange mounting) IM B14 (from shaft height 63) flange with threaded inserts
Resolver Sin/Cos Encoder Absolute value encoder (Multiturn)
KTY 84 temperature sensor
Deep-groove ball bearings Permanent lubrication
Connector
Integrated fail-safe holding brake
Planetary gearbox

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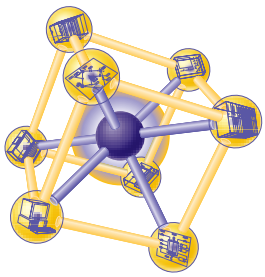

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