

Services for greater productivity in production machinery

Support over the entire lifecycle,
from the design simulation to the retrofit

Brochure · October 2009

Mechatronic Support

Answers for industry.

SIEMENS

First-class mechatronic solutions through application consulting and Mechatronic Support

With bundled competence for the perfect machine

Increasing competition is forcing machine manufacturers to continuously optimize the productivity of their machines. For this purpose, the machines must meet ever higher demands: greater productivity, i.e. shorter cycle times, increased availability, more consistent product quality, and lower lifecycle costs. Additionally, many machine builders increasingly face new demands, and thus more flexible machines are needed that can quickly be adapted to new products and formats and integrated easily into existing plants. Here, a drastic reduction of the machine development times is crucial and ensures a competitive advantage.

We'll be there for you over the entire lifecycle

Siemens supports production machinery over the complete lifecycle – from the initial idea and design to operation and retrofit.

Because innovative mechatronic services for machines offer enormous potential for optimizing lifecycle costs. Significantly reduced total construction costs and higher productivity can be achieved for new machines already in the planning and construction phases.

A strong team of competent partners

We implement our efficient mechatronic solutions in close cooperation with you as a partner. Your technology and our industry expertise complement each other, forming a team with strong innovation capacity.

Our goal: We want to help you meet the requirements of your customers. Besides global pre-sales and after-sales service, our offer includes special services such as application consulting and Mechatronic Support.

Higher productivity of your machine with integrated application support

The range of products and solutions offered by Siemens covers the entire spectrum of automation technology – from drives to closed-loop and open-loop control technology, including software systems. Our specialists know the needs of the industry from countless successful projects. Based on this experience, they develop innovative ideas and user-specific machine concepts – hand in hand with the machine manufacturer. Thus they create first-class solution packages tailored to individual requirements.

Our technical and application consultants accompany the projects on site from planning to commissioning, from the idea to the functioning machine.

Worldwide application support is ensured by a network of application centers in more than 10 countries in Europe, the Americas, and Asia.

Our range of services

- Selection of the optimal solution packages from our product portfolio
- Development and delivery of customer-specific add-ons
- Support in testing and commissioning

Your advantages

In practical terms, support at each stage of the machine lifecycle means for you:

- High planning reliability
- Substantial reduction of cost and effort
- Optimal and safe machine operation

Further information

For an overview of our portfolio of products and services, visit us on the Internet:

www.siemens.com/motioncontrol/apc

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Our services

Complete simulation of machinery – To reduce costs and improve processes

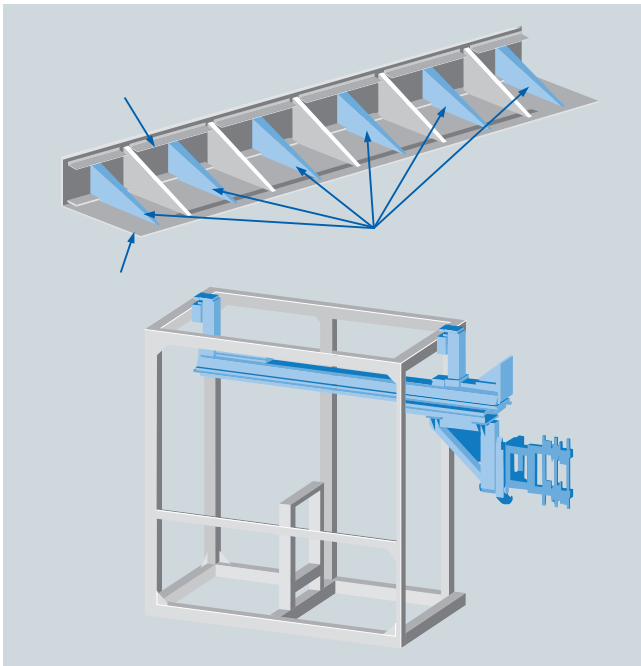
By modeling and analyzing the overall mechatronic system, consisting of mechanics (FEM), controls, drives, motors, and encoders, cost savings potential can already be identified during machine development:

Analysis of overall mechatronic system

- Analysis of vibrations and determination of counter-measures
- Improvement of machine rigidity and quality of control of machine axes
- Improvement of manufacturing processes (positioning accuracy, follow-up behavior, ...)
- Identification of potential material savings in machine construction without changing the dynamic characteristics of the machine

Application examples

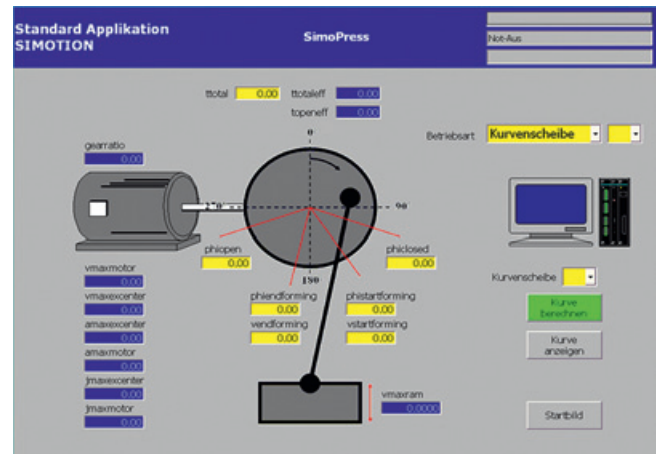
- Processing centers/manufacturing cells
- Handling systems
- Packaging machines
- Printing machines
- Presses
- Plastics processing machines
- Woodworking and glass processing machines
- Textile machinery



Modeling and analysis of overall mechatronic systems

Development of industry-specific mechatronic functions in the SIMOTION Motion Control System – Solutions as individual as your requirements

By analyzing typical industry applications, mechatronic functionalities can be developed and incorporated into mechatronic control solutions.



Motion control of nonlinear kinematics

Examples of applications that have already been implemented

- Optimal control of servo presses
- Algorithms to avoid vibrations

Application examples

- Motion control of nonlinear kinematics
- Development of process-oriented open-loop and closed-loop control procedures

Mechatronic drive design

To ensure a wider choice of motors for your application, our experts have special tools that go beyond the standard motor design.

Advanced motor design

- Testing of axial stiffness
 - Allowable jerk (jerk limitation)
- Ensuring the required cycle times (forces, torques)
- Checking of the inertia ratio of load to motor inertia
 - Increased efficiency through optimal controllability and utilization of the machine

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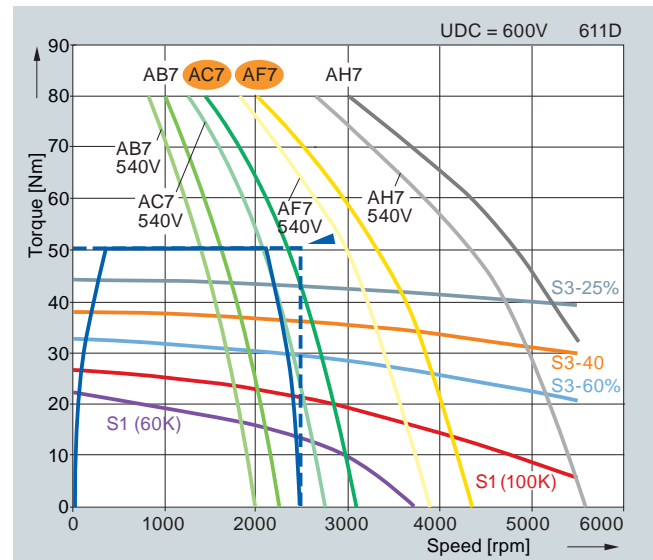
Our services

Motor analysis

When operating machine axes with third-party controllers, the load process can be calculated by using the analysis measurement tool for current and voltage measurements on the machine, allowing the optimal motor to be determined.

Application examples

- Handling systems
- Machine axes with highly dynamic clocking and/or high-frequency reversing operation (such as in metal forming)
- Printing machines



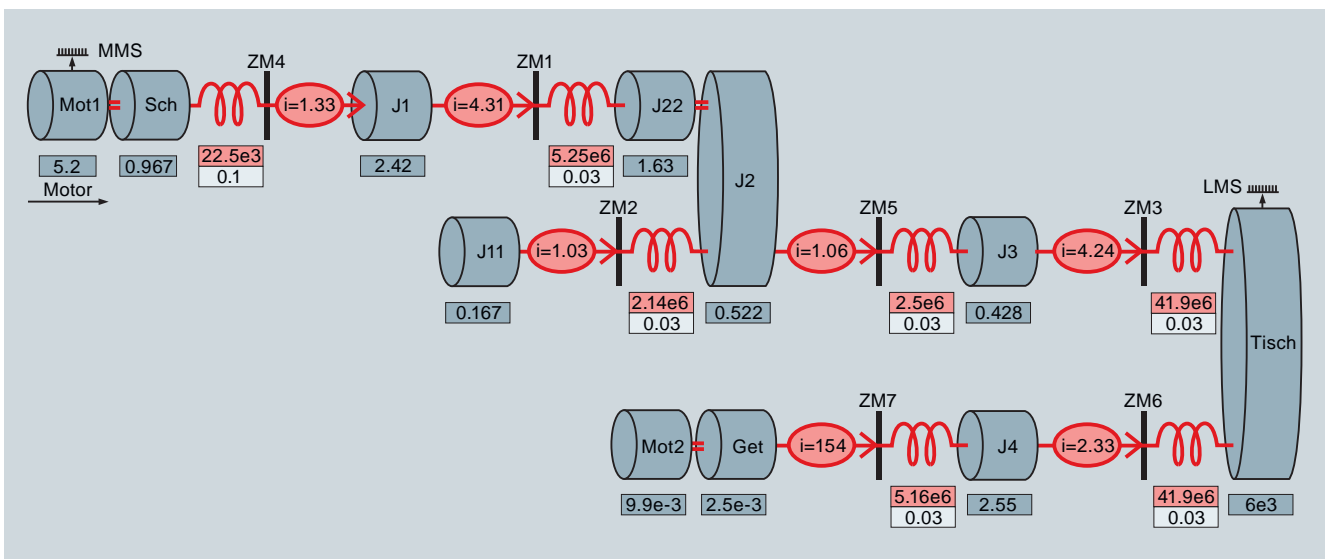
Torque-speed chart 1FT6102 for motor 1FT6...

Machine analyses – Increasing productivity by reducing machine cycle times

To model the relevant dynamic properties of the machine, metrological analysis and multi-body simulations of the machine axes are carried out. The resulting feasibility study for increasing productivity provides information on the increase in throughput while maintaining the control performance. This is how you get vibration problems, lack of productivity, or even component failures under control.

Application examples

- Large-scale plants for continuous conveyor belt production
- Individual machines with multiple (linked) production axes
- Handling systems



Metrological analysis and multi-body simulation

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An optimized machine concept through Mechatronic Support

Already in the design stage of new machines, all the systems involved in mechanics, electronics, and IT are tested and optimized in a simulation environment in terms of their functionality and interaction, before they are actually built. Mechatronic Support provides the intelligent alternative to "trial and error" by modifying, optimizing, and comparing creative new machine concepts with each other in advance – of course, including your ideas on new mechatronic components.

With Mechatronic Support, Siemens provides mechanical engineers with expert services.

Applications

The Mechatronic Support engineering service was developed for the construction and commissioning of machinery. Here, we meet the demands of machine manufacturers to minimize development risk. In addition, the first machine prototype is available much more quickly than in the traditional sequential development process.

In the field of engineering, in the simplest case we can advise you on drive design and dimensioning. Our services can also go much further – all the way to the development of the control, operation or safety concept of a new machine, the development of industry-specific solutions, or complete PLC/MC/HMI programming.

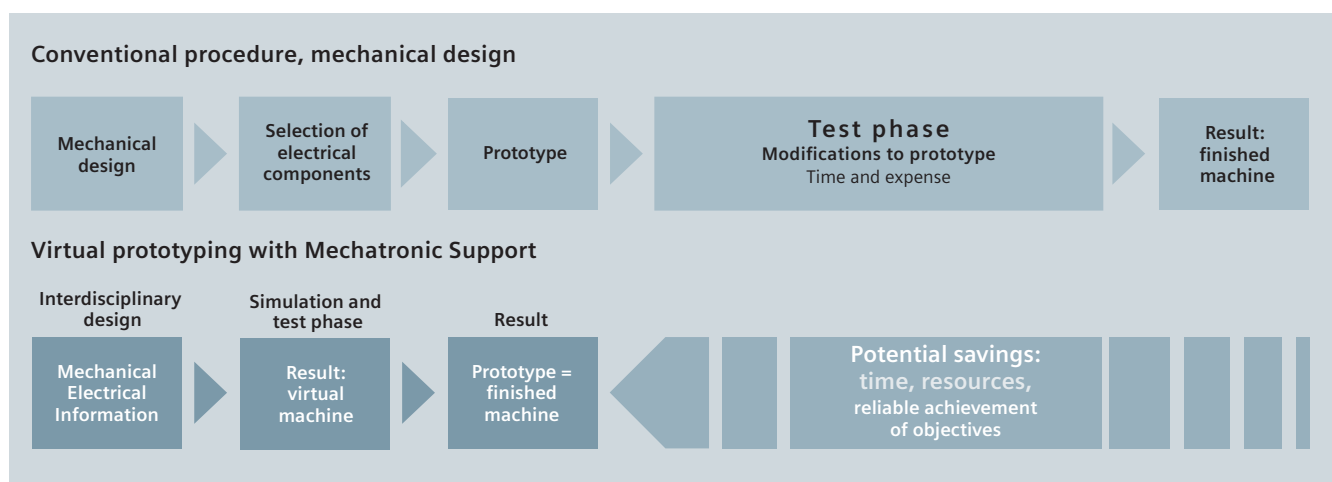
Virtual simulation, real construction

With Mechatronic Support, machinery ideas and new developments can be mechatronically tested and modified in a short time at low expense. The first real prototype can be built immediately afterwards as a functioning machine. As a machine manufacturer, you benefit from shorter development time and time to market.

As end user, on the other hand, you benefit from an optimized, high-performance machine.

Your advantages

- Shorter development times – shorter time to market
- Reliable achievement of development objectives
- Risk-free testing of innovative machine concepts
- Higher quality and productivity from the outset
- Get to the finished machine more quickly with specialist support



Methods of machine development

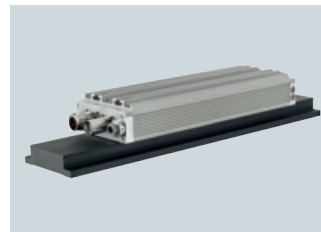
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Support for “design-in” of built-in direct drives

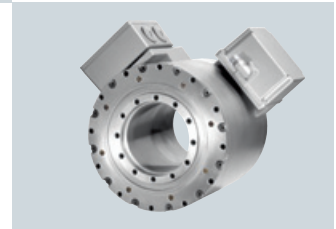
The integration of linear and torque motors in a machine concept is changing the requirements for machine construction compared to conventionally driven machines. In this phase of machine development, Siemens provides the designer with consulting support in the selection of direct-drive-compatible machine components and the design criteria for mechanical construction. This service is provided after the design of the motors and expands the perspective to take in the overall system.

Your advantages

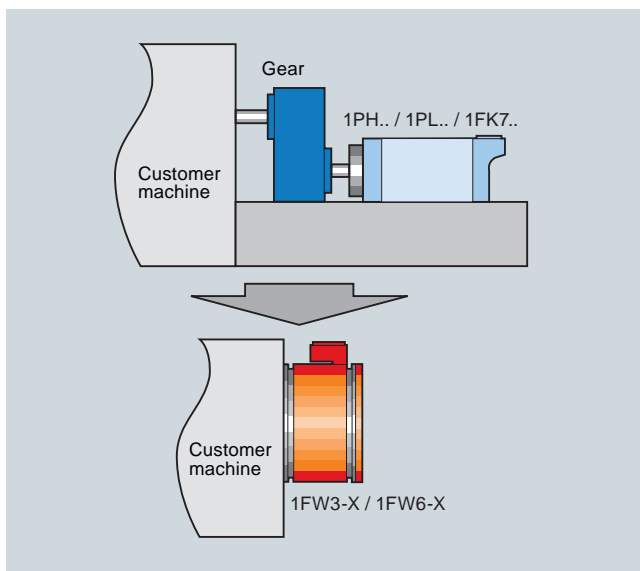
Experienced application engineers for linear and torque motors are available for consultation to help designers find solutions. Possible solutions can be discussed and the optimal concept developed jointly. The result is an optimized system integration of motors, drives, and control technology in the machine concept. This provides an ideal basis for more detailed analysis in the context of Mechatronic Support. As a result, project objectives can be implemented reliably while reducing development time and costs.



1FN6 linear motor



1FW3 torque motor



More information on application support:
www.siemens.com/motioncontrol/apc

More information on Mechatronic Support:
www.siemens.com/motioncontrol/mechatronic

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Subject to change without prior notice
 Order No.: 6ZB5711-0AS02-0AA0
 3P.8122.06.01 / Dispo 18401
 BR 1009 2.0 VOG 6 EN
 Printed in Germany
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