SINUMERIK Ctrl-Energy makes machine tools fit for the future

Energy-efficient solutions …
With a wide range of drive and motor components, CNC and drive functions, PC software solutions and SINUMERIK Manufacturing Excellence services, SINUMERIK Ctrl-Energy sets energy efficiency standards for machine tools.

… for the complete lifecycle of the machine
SINUMERIK Ctrl-Energy offers energy efficient solutions for the machine’s complete lifecycle – from the machine design, including the job preparation and use of the machine, through to the partial or complete upgrade. This gives both the machine builders and the machine users a perfect basis for efficient economics.

… for a wide range of machine tools
A very broad portfolio of SINUMERIK CNCs, SINAMICS drive systems and motors forms the basis for SINUMERIK Ctrl-Energy. This means this solution package can be used for almost every machine tool – from the standard machine through to the premium machining center.

... with an intuitive key combination
With the simple and intuitive key combination Ctrl + E on the operator panel, the SINUMERIK CNC allows you to quickly evaluate the energy consumption and the management of energy consumption during times of machine standstill – energy efficiency at the press of a button!
The SINUMERIK Ctrl-Energy solution matrix

More information can be found online:
www.siemens.com/sinumerik/ctrl-energy

You will also find additional information and technical descriptions on our website under “Support”.

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SINUMERIK Ctrl-Energy

Maximum energy efficiency for your machine tools

siemens.com/sinumerik/ctrl-energy
Energy efficiency – it’s a global challenge

The intelligent and careful use of energy is a milestone on the path to sustainable management. This will make the topic of energy efficiency even more important in the future.

Energy is a valuable good
In every industrial country, energy efficiency plays an increasingly important role. The central factor is the increasing production costs caused by increasing energy prices. The emerging countries, in particular, are also fighting against production stoppages that result from the rapidly increasing energy consumption. Not least, the “green image” is an increasingly important sales factor in times of global warming.

Increasing political pressure
Even today, many countries are attempting to use regulations, laws or taxation to influence the local energy consumption caused by industrial goods. This pressure will increase significantly in the near future. With the introduction of ISO 50001, an international standard for energy management systems, manufacturing companies are forced to tackle the subject of energy efficiency.

Siemens – the name is a commitment
In 2008, Siemens achieved a third of its sales with an environmentally-friendly portfolio. Thanks to the deployment of these environmentally-sustainable solutions, in 2009 approximately 210 million tons of CO2 emissions were avoided already. Consequently, as pioneer in the areas of sustainability and energy efficiency, we see ourselves obligated to adopt a leading role as provider of energy efficient systems for machine tools, too. With SINUMERIK Ctrl-Energy, we have created a package that meets just this claim.
SINAMICS S120 / motors
SINAMICS drives and motors are developed consistently with regard to energy efficiency aspects. This allows the drive modules to achieve a highly-efficient 97-99% efficiency level. With an efficiency of 88-94% for synchronous technology and 81-91% for asynchronous technology, the motor spectrum also forms an innovative fundament for energy-efficient machine concepts.

Siemens control cabinets
The construction of the control cabinet, and the associated heat dissipation concept, has a significant effect on the energy balance of the machine. Our expertise in control cabinet construction – through to the evaluation of the thermal images – guarantees an optimum layout and a maximum control cabinet energy efficiency.

Weiss motor spindles
The mechatronic design of the spindle unit with the associated supply units is decisive for the machine’s energy balance. Weiss motor spindles offer energy-saving concepts, such as brush sealing and grease lubrication without the need for compressed air or an electrical tool release unit – and therefore guarantee minimum energy consumption.

Energy saving motors and frequency converters
In a typical machine tool, more than 50% of the energy consumption is caused by auxiliary equipment, such as hydraulic equipment or chip conveyors. Energy-saving 1LE standard asynchronous motors with an efficiency as high as 97% are a decisive factor. The deployment of SINAMICS G120 frequency converters allows the speed, and so the energy consumption of the auxiliary equipment, to be adapted to the associated process requirements.

State-of-the-art design of drive components, spindle and feed motors – including control cabinets – is the basis for innovative and energy efficient machine tool concepts.

SINAMICS Ctrl-Energy – the efficiency package

Drives, motors and control cabinets – a decisive contribution to the energy efficiency

SINAMICS S120 drives
Weiss motor spindles
Energy-efficient control cabinets
SINUMERIK Ctrl-Energy – the efficiency package for machine tools

With the Ctrl-E Analyze function, SINUMERIK CNCs acquire not only the energy consumption of the drive system, but the complete machine. This allows the machine user to analyze the energy consumption for each workpiece, and so derive optimization of the machining strategy. With the Ctrl + E key combination, the machine operator can also visualize the energy consumption at the press of a button.

Dynamic energy management
SINAMICS S120 drive systems permit dynamic energy management in the DC link and offer highly-efficient energy regeneration. This means the resulting braking energy is not converted into heat using brake resistors, but initially held in the DC link and optionally returned to the power supply system. Furthermore, drive axes can be optionally used as kinetic energy storage so that the complete energy remains in the drive system with almost no loss.

As a leader in CNC technology, we offer not only technologically-sophisticated functions, but also powerful functions to increase the energy efficiency of the machine.

Ctrl-E Analyze
With the Ctrl-E Analyze function, SINUMERIK CNCs acquire not only the energy consumption of the drive system, but the complete machine. This allows the machine user to analyze the energy consumption for each workpiece, and so derive optimization of the machining strategy. With the Ctrl + E key combination, the machine operator can also visualize the energy consumption at the press of a button.

Ctrl-E Profile
Ctrl-E Profile provides the machine builder with a configuring platform to control the energy-saving modes of the machine. This allows specific energy-consuming machines to be shutdown during times of stoppage. With Ctrl + E key combination, the machine operator has a very fast and easy means of influencing the energy-saving modes.

Flux reduction and reactive power compensation
SINAMICS S120 drive systems permit an automatic flux reduction in partial-load operation of asynchronous spindles and, therefore, reduce unnecessary heat loss. Intelligent Active Line feed/regeneration modules allow the complete compensation of the machine’s reactive power, so the need for expensive and loss-causing reactive current compensation systems can be avoided.
The perfect match of motors and drive components to the mechanic characteristics of the machine has a decisive effect on energy consumption. The SIZER configuration tool permits the design of the drive system on the basis of machine characteristics. This avoids an overdimensioning with the associated unfavorable energy balance.

As a part of SINUMERIK Integrate, the Analyze MyCondition function is a server-based process monitoring system that offers machine-status monitoring or machine alarm analysis. This is a decisive factor in increasing the productivity of the manufacturing process, which also increases the energy efficiency during the manufacturing process automatically.

Training and programming on the CNC during machine setup cause downtimes in the manufacturing process. Virtual Machine allows this process chain to be moved to the job preparation and thus helps increase the energy efficiency. SinuTrain makes this saving-potential available in the classic shopfloor environment, too.

The perfectly-matched process chain from NX CAM with its integrated post-processor for the SINUMERIK CNC improves not only workpiece quality, but also minimizes machining time. This automatically makes the manufacturing process more energy efficient.
With SINUMERIK Manufacturing Excellence services, Siemens offers unmatched expertise in energy efficiency – for both the machine builder and the machine user.

**Mechatronic Support**
Even during the mechanical design of the machine, the SINUMERIK Manufacturing Excellence Mechatronic Support offers a unique expert consulting service. Simulations and measurements can significantly improve the energy efficiency of the machine, for example, through the specific reduction of moved masses.

**Manufacturing IT**
With Manufacturing IT, we support machine builders and machine users with the integration of machine tools in process monitoring systems. This allows machine downtime to be minimized so the energy efficiency of the manufacturing process can be increased.

**Productivity Improvement**
The machining time for each workpiece and the resulting energy consumption can be improved even during the machine's lifecycle by targeted optimization of, or new innovations to, the CNC. SINUMERIK Manufacturing Excellence offers the customized product through Productivity Improvement.

**Machine Retrofit**
With decades of experience in machine upgrades, SINUMERIK Manufacturing Excellence is the optimum partner for the implementation of state-of-the-art CNC equipment packages. This allows upgraded machines to profit from energy efficiency improvement provided by SINUMERIK Ctrl-Energy.