The right spin on efficiency
Profit from drive and automation solutions from a single source
Pumps, fans and compressors
Complete portfolio for customized applications:

Everything for pump, fan and compressor applications

Pumps, fans and compressors are indispensable in the widest range of sectors – whether in water supply and water treatment, the chemical and pharmaceutical industries, the production of mineral oil or plastics or in building systems. Every application has its own particular requirements that must be addressed. However, one thing is always the same: every application must be efficiently implemented. And it is precisely here that we can support you. In all of the essential requirements relating to your specific application.

We can offer you all of the drive and automation components for your pump, fan and compressor applications from a single source – when required, either individually or linked to create integrated systems. Further, we focus our efforts to help you in creating an optimum design – and can competently support you when it comes to implementing concepts that are fit for the future. We accompany you with extensive service & support over the complete life cycle of the application and around the globe.

Profit from the value added of our portfolio

• Higher productivity and cost-effectiveness as a result of a seamlessly integrated product portfolio – where all of the components interact perfectly with one another within the framework of integrated systems
• An extensive selection allows system solutions to be crafted that perfectly fit each and every application in the pump, fan and compressor domains
• Lower operating costs by minimizing the energy requirement as well as maintenance costs
• Secured plant and system availability due to the higher product quality, reliable support and fast spare parts service
• Systems for smooth and disturbance free operation, even in extreme as well as hazardous environments
• More precise processes based on harmonized systems with a higher control accuracy
• High degree of investment security as a result of tailored service, including training
• Wide range of options for changes or expansions using scalable solutions as well as modular system components

More on the Internet:
www.siemens.com/pfc
Advantages for companies operating plants and systems

• Minimized operating costs through the implementation of energy-saving concepts
• High degree of cost-effectiveness through products and systems with exceptional service life
• High plant and system availability through reliable products and perfect interaction
• Lower noise emissions as a result of quiet drive systems
• Full transparency as a result of numerous diagnostic functions in products and systems that are harmonized and coordinated with one another
• Maximum security for the future as a result of the long-term availability of spare parts
• Global standards and certificates are supported, e.g. IEC, UL, CCC, ATEX and marine certification

Advantages for machine builders

• High degree of cost-effectiveness through a good price-performance ratio
• Lower costs from planning through procurement up to plant integration
• Interface engineering eliminated
• Shorter manufacturing time and faster delivery of the complete machine or system
• Global availability of products and systems through global pre- and after-sales service and support
• User-friendly selection of components using standard tools
• Maximum efficiency and lifetime based on innovative drive and automation products from a single source
• Products and systems tailored to the particular application
• Fast and simple installation and commissioning using a set of standard engineering and commissioning tools
• Support of global standards and certificates such as IEC, UL, CCC, ATEX and marine certification

Whether machine builder or plant operating company – both profit to the same extent from our comprehensive training programs and the ability to integrate the widest range of components in the world of Integrated Drive Systems and Totally Integrated Automation.
Pumps: Activating efficiency

Pumps are used in many sectors – the chemical industry, pharmaceutical, oil & gas, food and beverage, textiles, paper, mining and water and wastewater. In all of these sectors, they transport and pump the widest range of liquid substances. Reliable, disturbance-free and efficient operation is always the decisive issue – both for variable-speed as well as fixed-speed pumps. The basis to achieve this is the interaction of the widest range of components. These include motors with a high efficiency as well as motor management systems, which protect the motors and also control and acquire energy usage. The portfolio also includes converters, which especially in the partial load range reduce energy usage, or soft starters that reduce inrush currents and pressure fluctuations – therefore reducing mechanical stress on valves and throttles in piping systems.

How you profit from our products and systems

- Flexible process control through fast and precise adaptation of the flow rate
- Operation that minimizes equipment stress levels: Minimizing pressure surges, low cavitation levels
- Comprehensive functionality – e.g. dry running protection, cascading
- Low-maintenance requirements of the components used
- High system availability and long service life
- Energy-saving potential through our high-efficiency motors and closed-loop speed control
- Complete product range for hazardous zones
- Reliable torque transmission
- Safety-relevant shutdown of pumps according to SIL 2/3 possible

Efficient pump drives for an irrigation project in the south of Portugal

The challenge
The Alentejo region in the south of Portugal is known for its severe summer drought conditions. Profitable agriculture is only possible here thanks to extensive irrigation provided by Empresa de Desenvolvimento e Infra-Estruturas do Alqueva (EDIA), who places a lot of emphasis on sustainability – especially when it comes to pump drives. The most important requirement: The drives must be in a position to continually adapt the flow rate to the prevailing water demand, which fluctuates depending on the temperature, humidity of the soil and the growth phase of the plants – without wasting any energy.

Solution
Siemens equipped the pumping stations with variable-speed drive systems. Example: Brinches Laje close to Serpa, is a pumping station designed for a flow rate of 3 m³/s to irrigate 12,000 hectares. A total of 10 low-voltage motors were installed, whose speed is...
Our portfolio for pumps – perfect interoperability

**Motors**
Energy-saving potential through:
- Energy-efficient motors for IEC and NEMA standards
- Converter-based variable-speed operation, which allows the flow rate to be continuously varied
- Cascading pumps using soft starters (for base load) and converters – for the highest efficiency and availability

**Couplings**
- Versions with spacers allow pumps to be serviced on-site
- Damping capability and appropriate torsional spring stiffness minimize component stress levels
- Optional: fail-safe design or non-fail-safe design
- Low operating costs through long service intervals

**Converters, soft starters / motor starters, monitoring relays and motor management systems**
- Minimizing pressure surges in piping systems through soft starting and stopping
- Low cavitation
- Dry running protection and monitoring for dirty filters (integrated in the converter and motor management systems): Additional sensors can be eliminated
- Power failure monitoring
- Automatic restart after a power failure
- Direction of rotation monitoring and correction
- Suppression of critical speeds
- Monitoring levels and leakage
- Thermistor motor protection to protect against overheating
- Cascading pump units
- Energy-saving mode in controlled operation

**Communication**
- Simple connection of converters and motor starters to the supervisory control system via integrated communication interfaces such as PROFINET, PROFInergy, PROFIBUS, AS-Interface or USS/RS485 interface

**Control**
- PID controller for closed-loop pressure control in the SIMATIC S7
- Limit value monitor for shutdown thresholds

Controlled by SINAMICS G150 converters. The drives were linked with the SIMATIC S7 automation devices, local and remote monitoring systems, the instrumentation as well as low-voltage switchgear – all via industrial communication systems.

**Advantages**
- Energy consumption was slashed by a double-digit percentage as a result of the high motor efficiencies and variable-speed operation
- Valuable resources are carefully used through precise, flexible process control
- High system availability thanks to reliable components that are perfectly coordinated with one another
- Complete solution that perfectly addresses customer and project-specific requirements of the irrigation project

More on the Internet:
www.siemens.com/pump-reference
Fans: A fresh breeze

Fans are used in the widest range of industrial sectors – in building systems, water and wastewater, chemical, paper and mining. Fans move atmospheric air as positive displacement machines. High energy efficiency and quiet operation are important parameters. The power demand of a fan increases by the square of the speed, which means that they have special characteristics that must be consequentially taken into account. All of these requirements can be perfectly satisfied using our products that are optimally harmonized and coordinated with one another.

How you profit from our products and systems

- Flexible process control through fast and precise adaptation of the flow rate
- Operation that minimizes equipment stress levels: minimizing pressure surges
- Extensive functionality and a wide range for various tasks – also specifically tailored for fan applications
- Low-maintenance components
- High plant and system availability (e.g. belt monitoring) and long service life
- Energy-saving potential through our high-efficiency motors and closed-loop speed control
- Reliable torque transmission by specifically harmonizing the components used to avoid inadmissibly high torque loads that are caused by power-on/changeover operations in the drive transmission train

Fan drive for vertical mills in Great Britain optimized for maximum energy efficiency

The challenge
The Hanson cement plant in Purfleet, Britain produces millions of tons of slag sand every year. The replacement for cement is used in ready mixed concrete to manufacture ready mixed concrete parts. Two ball mills in a closed circuit configuration and a vertical milling system were used in the plant. The blowers of mill 3 used an 11 kV slip-ring motor with a power rating of 1 MW. The fixed speed blower ran continuously at 350,000 m³ per hour, and a throttle reduced the flow to approximately 241,000 m³ per hour. Operating the blower with such a high, unnecessary flow rate resulted in an extremely low energy efficiency, and drove up the costs.

Solution
In the course of modernizing their plant, Hanson Cement decided to install a complete solution – Integrated Drive Systems (IDS). This meant that the fixed speed blower for mill 3 was replaced by SINAMICS.
Our portfolio for fans – perfect interoperability

**Motors**
Energy-saving potential through:
- Energy-efficient motors to IEC and NEMA standards
- Converter-based variable speed operation, which allows the flow rate to be continually varied
- Rugged and absolute oil tight FLENDER gearboxes as blower gearboxes with contactless and wear-free shaft seals

**Couplings**
- Rugged design for disturbance-free operation
- Damping capability and appropriate torsional spring stiffness minimize component stress levels
- Best balance quality for vibration-free operation

**Converters, soft starters / motor starters, monitoring relays and motor management systems**
- Automatic restart after a power failure
- Flying restart to connect to the spinning motor
- Suppression of critical speeds
- Drive belt monitoring
- Closed-loop pressure and temperature control
- Load monitoring
- Recording operational measured values
- Power failure monitoring
- Direction of rotation and speed monitoring
- Detecting no-load operation, monitoring air filter clogging

**Open-loop control**
- Simple connection of converters and motor starters to the supervisory control system via integrated communication interfaces such as PROFINET, PROFienergy, PROFIBUS, AS-Interface or USS/RS485 interface
- Storage of various profiles, e.g. for day/night control of actuators

**Operator control and visualization**
- Display of measured values and system states

**Advantages**
- Higher degree of productivity by optimizing speed and process performance
- Higher degree of flexibility, shorter acceleration and deceleration times
- Standardization, smaller size and less work for operating personnel
- More information for predictive maintenance
- Significantly lower total cost of ownership

PERFECT HARMONY with 1000 kW and 11 kV/4160 kV, which is connected to a controller with the SIMATIC WinAC PLC software. In addition, a six-pole medium-voltage motor with a rating of 1000 kW and 4160 V including new motor cable and modified motor base were installed. The equipment was supplied by Siemens as a turnkey solution.

More on the Internet:
www.siemens.com/sleco
Compressors: Boosting productivity

Compressors are used in a wide variety of applications – climate control and refrigeration systems, the chemical and pharmaceutical industries, oil & gas, water and wastewater, general machinery construction, food & beverage industry, mining and paper. Their task is to pump and compress gases to almost any pressure level. In addition to fulfilling general requirements regarding the efficiency – availability and a high power density are also decisive factors. Here, our compact motors with increased power rating play a central role. They comply with international efficiency specifications.

How you profit from our products

- Flexible process control through fast and precise adaptation of the flow rate
- Less stress on the plant or system in operation by avoiding supersonic compression surges
- Flexibility – from the standard product up to customized solution
- Low-maintenance requirements of the components used
- High plant and system availability (e.g. belt monitoring) and long service life
- Energy-saving potential through our high-efficiency motors and closed-loop speed control
- Complete product range for hazardous zones
- Reliable torque transmission by using harmonized and coordinated components to avoid inadmissibly high torque loads that are caused by power-on/changeover operations in the drive transmission train

High-speed 22 MW compressor drives for the West-East Pipeline in China

The challenge
In the densely populated Yangtze Delta, including the huge city of Shanghai, the quickly growing energy demand was to be addressed. And to reduce the CO₂ emissions, coal was to be replaced as the main source of energy. A decisive step in achieving this: Increasing the capacity of the West-East Pipeline from 12 to 17 billion cubic meters of natural gas per year. This pipeline is over 4000 km long and connects the natural gas reserves in Xinjiang (the most western province of China) with the main areas of population. This was to be achieved with new powerful compressor stations, which were to set themselves apart through maximum reliability and efficiency with minimum maintenance costs.

Solution
The three stations – Yumen, Pu Xian, Zhengzou – are equipped with a total of five identical 2-pole synchronous motors with pressurized
enclosures Ex p for gas explosion protection, Zone 1. Each of them has a power rating of 22 MW and a rated speed of 4800 rpm. As a result of the high-speed, the motor can be directly coupled to the compressor without using a gearbox. Rugged, load-commutated SINAMICS GL150 medium-voltage converters employing thyristor technology control the motor speed; these converters have been specifically tailored to operate high-rating synchronous motors.

Advantages
• Especially low-maintenance and reliable drive solution
• High degree of efficiency
• More flexible process control through variable-speed operation
• Very quiet and emission-free compressor station

Motors
Energy-saving potential through:
• Energy-efficient motors for IEC and NEMA standards
• Converter-based variable speed operation that allows the pressure to be continuously controlled
• Customized hermetic or semi-hermetic motors
• Special winding design for lower inrush current with increased starting torque

Couplings
• Damping capability and appropriate torsional spring stiffness minimize component stress levels
• Fail-safe version optionally available
• Best balance quality for vibration-free operation even at high speeds
• Maintenance-free series

Converters, soft starters / motor starters, monitoring relays, motor management systems
• Setting the optimum operating point
• High overload capability
• Optimum speed adaptation for load peaks
• Filter monitoring
• Soft starting to reduce machinery stress levels
• Reduction of the inrush current when starting the compressor
• Power failure monitoring
• Direction of rotation and speed monitoring

Communication
• Simple connection of converters and motor starters to the supervisory control system via integrated communication interfaces such as PROFINET, PROFlenergy, PROFIBUS, AS-Interface or USS/RS485 interface

Open-loop control
• Precise pressure monitoring using control and sensor systems
• PID controller for closed-loop pressure control in the SIMATIC S7
• Limit value monitor for shutdown thresholds
Save up to 70%:

Energy-efficient drive concepts for pumps, fans and compressors

To increase the efficiency of your pumps, fans and compressors, we can offer you the optimum drive solution – energy-saving motors with a high efficiency require less valuable kilowatt hours, soft starters help to reduce current peaks, converters save energy by adapting to the optimum operating point. Depending on the particular application, every concept can fully leverage its advantages. This allows maximum energy efficiency, cost-effectiveness and the best possible operational management and control to be achieved depending on the individual pumping profile and the required control precision.

Pumps have a high energy-saving potential

Premium efficiency motors form the basis for a wide range of system solutions. Basic throttle control is only cost-effective for flow rates that remain constant close to the maximum – or for applications that have low demands regarding the control precision. In all other cases, depending on the particular application, the 2-level control, cascade or closed-loop speed control promises enormous energy-saving potential when compared to mechanical throttles. Energy usage can even be slashed by up to 70% in extreme cases.

An overview of the usual drive concepts used

2-level closed-loop control using SIRIUS soft starters
• Advantageous for fluctuating amounts removed, e.g. for tank filling level control
• Avoids frequent switching operations through long switch-on and switch-off phases (the off phases are the most favorable state from an energy perspective)
• Avoids hard surges and shocks and reduces the stress on the mechanical components
• Very low energy consumption with optimum efficiency
• Very low installation, procurement, maintenance and operating costs

Cascade, SIRIUS soft starter – SINAMICS converter
• Multi-motor drive optimized for the base load
• Suitable for significantly fluctuating flow rates
• Drive solution comprising soft starter/converter combination, the converter is used to make the fine adjustment
• Up to 60% energy saving when compared to a throttle control
• Optimally leverages the advantages of the soft starter and the converter

Pure converter control with SINAMICS
• Applications where flow rates intensively fluctuate, and where it is also necessary to provide precise process control
• Lower usage by adapting to the optimum operating point
• Up to 70% energy saving when compared to a throttle control
• Suitable for processes with high control accuracy and speed

www.siemens.com/sirius/energysaving
www.siemens.com/energy-efficient-production

More on the Internet:
www.siemens.com/pfc-ee
Comply with standards – boost efficiency

Siemens drive systems comply with directives, such as the new IES standard for system efficiencies. At the same time, tailored tools and service packages increase the overall efficiency even further.

The new IES standard defines eco design requirements placed on energy-related products for drive systems in electrically-driven machines. The energy efficiency requirements are extended from individual drive components up to the complete system, as well as to electrically-driven machines, for example, pump systems.

With its Integrated Drive Systems (IDS), Siemens consequentially complies with the holistic and cross-product optimization approach laid down in eco-design standard EN 50598. In addition to a high energy-saving potential, additional advantages are also obtained. These include less space, lower overall costs, higher plant and system performance as well as maximum reliability.

Optimum interaction

Optimized for pump and fan applications, for instance, we can offer the SIMOTICS FD and SINAMICS G120P combination, a powerful drive system with high efficiency. The result obtained with this combination of drive components lies far above the average: When compared with the reference system defined in the standard, this system has a power loss that is over 35% lower. The system comprising SIMOTICS synchronous-reluctance motor with SINAMICS G120 converter achieves the highest efficiency values in the IES-2 Class. The lower energy costs achieved mean significantly lower costs over the complete life cycle.

Identify the most efficient solution using SinaSave

SinaSave allows the energy-saving potential to be estimated, which you can then utilize with Integrated Drive Systems (IDS) for pump and fan applications. The tool determines the various energy requirements of different drive products and systems for comparison purposes, which it then graphically displays. All of the necessary, individual operating parameters of the plant or system are included in the calculation, and a wide range of comparison options involving various control modes are available. Further, SinaSave tells you how quickly the investment in an energy-efficient drive solution pays off. The tool determines the expected payback time based on investment and operating costs – as well as the energy-saving potential. This is a decision-making tool that can be simply and quickly used when it comes to assessing the economics of investing in energy-efficient products.

Customized package – energy performance contracting

Energy-efficient solutions for pump, fan and compressor drives can also be implemented without requiring any investment. Based on energy performance contracting, we can offer you the option of paying for the optimization measures from the money you save as a result of reduced energy costs. The projects are administered according to a four-stage process – analysis, conception, implementation and service – and structured so that part of the cost savings finance the contracting service. The customer banks the rest, even during the contract period, as pure financial benefit.

More on the Internet:

www.siemens.com/iesnorm
Comprehensive – an overview of our portfolio

Motors
Our range of SIMOTICS motors for pumps, fans and compressors extends from standard motors up to sector-specific and customized solutions. Our motors cover voltages from 230 V up to 13.2 kV and power ratings from 0.09 kW up to 100 MW and higher. Our standard motors are available in IE3 and IE4 efficiency classes. They save a lot of energy and reduce the stress on the plant or system. For extreme requirements in the process industry, we can offer motors for high and low temperatures, motors for chemically aggressive or salt-laden environments as well as high speed motors, which even in the Megawatt range, reach speeds of up to 15,900 rpm. When it comes to hazardous zones, our motors cover all of the usual types of protection – Ex n, Ex e, Ex d, Ex p and dust-Ex. Our portfolio even includes motors with double protection: Gas/dust or Ex e and Ex d, for example, which makes sense for pumping systems for liquid gas tankers.
www.siemens.com/simotics

Gearboxes
Universal, compact and adaptable – FLENDER helical gearboxes
The helical and bevel helical gearboxes have been developed for use in many areas of mechanical drive technology. The highest efficiencies, fast availability worldwide and an outstanding price/performance ratio have made this the most popular and comprehensive portfolio of gearboxes in mechanical drive technology. The basis portfolio offers a wide range of versions in a torque range from approx. 2000 up to 1,400,000 Nm – and allows short delivery times; the most important mounted components are already part of the basis program.
www.siemens.com/gearunits

Couplings
Our couplings set quality standards, whether as standard couplings from a modular series or as special couplings adapted to a specific application. Our engineers select the optimum solution to address your specific application. In the torque range from 15 up to 1,500,000 Nm, our standard range of couplings fulfills ATEX 95 and API 610/671 specifications as well as the requirements of various marine classification societies such as DNV or GL.
www.siemens.com/couplings

Converters
We have the optimum converters for future-proof drive concepts for every requirement in the area of pump, fan and compressor drives and for all motor power ratings. For instance, our SINAMICS G120 P series from 0.37 to 400 kW has been specifically tailored to address pump, fan and compressor applications in the public as well as industrial domains. Built-in devices, devices for wall/panel mounting and cabinet units are available. Systems based on our SINAMICS G180 are the optimum solution for hazardous zones. And we recommend our SINAMICS PERFECT HARMONY drives for very high power ratings in the medium voltage range. All SINAMICS converters can be easily operated and commissioned using standard tools.
www.siemens.com/sinamics
Irrespective of whether motor, coupling, soft starter or converter, our comprehensive portfolio for drive concepts for pump, fan and compressor applications addresses each and every requirement. The individual components are optimally harmonized and coordinated with one another, and can be combined to create individual systems for every application.

Motor starters
Our communication-capable SIRIUS motor starters are the optimum choice when it comes to switching, protecting and starting motors. Direct, reversing and soft starters cover the complete range – from a high number of switching operations for pump applications without pressure accumulator up to softly starting large fans.
www.siemens.com/sirius

Soft starters
Low-voltage soft starters are used wherever a particular application demands soft starting and/or stopping – for instance when the motor cannot start with its full power. Our SIRIUS 3RW soft starters with a power range up to 1200 kW are the ideal solution, for example, to avoid belt slip for fans or to avoid pressure surges (water hammer) in pumping systems. Further, they prevent undesirable side effects such as high mechanical loads in the machine and voltage dips in the line supply.
www.siemens.com/sirius

Motor management system
SIMOCODE pro is the flexible, modular motor management system for low-voltage constant-speed motors. It is the preferred solution to protect and control pumps, fans and compressors.
www.siemens.com/simocode

Monitoring relays
SIRIUS relays have everything for your motor feeder. Whether compact time relays or reliable monitoring relays, especially low-profile coupling relays, plug-in relays, low-noise power relays or interface converters. With their display, freely selectable limit values and a whole raft of parameterization options, our relays ensure optimum line supply, load and application-related setpoint monitoring and, in turn, higher plant availability.
www.siemens.com/sirius

Controllers, communication and process control
SIMATIC controllers are synonymous with the highest degree of flexibility and scalability – with standard or fault-tolerant controllers, compact devices, distributed or PC-based automation solutions. These controllers are connected to higher-level process control systems, for example SIMATIC WinCC – or specifically for the process industry SIMATIC PCS7 – via PROFIBUS or PROFINET.
www.siemens.com/simatic
The value added for pumps, fans and compressors –
Integrated Drive Systems

It makes a lot of commercial sense to use integrated drive systems, especially in the domain of pump, fan and compressor applications. Integrated Drive Systems (IDS) from Siemens is the only real complete solution for overall drive systems worldwide, and especially sets itself apart as a result of the triple integration: Horizontal, vertical and life cycle integration guarantee that every drive component can be seamlessly integrated in every drive system, every automation landscape and even in the complete life cycle of a plant or system. The result: Higher energy efficiency, control quality and reliability for pump, fan and compressor drives, lower costs for planning up to commissioning as well as faster project execution to achieve an even shorter time to market.

The solution
• Perfectly integrated components
• Complete and innovative solutions from a single source
• Comprehensive functionality and ruggedness
• Horizontal and vertical integration of the drive technology
• Coordinated drive systems with closed-loop speed control for high energy efficiency

The value added
• High level of cost-effectiveness and long service life
• Precise control of fluid flow machines
• Energy consumption can be slashed by up to 70%
• High efficiency over the complete life cycle
• Lower procurement costs
• Interface engineering is no longer required
• Shorter project execution times
Integrated drive portfolio

All converters, motor starters, motors, couplings and gearboxes are from a single source. Perfectly integrated, perfect interoperation. For all power and performance classes. As standard solution or completely individual solution.

Increase your plant availability by up to 99%

Advantages of horizontal integration

Frequently, specific functions for pumps, fans and compressors are embedded in Integrated Drive Systems (IDS), e.g. PID control, energy-saving mode, staging, fast and precise flow adaptation as well as system monitoring. This simplifies the implementation of innovative products and accelerates programming. From a technological perspective, IDS are optimally dimensioned. When it comes to currents, voltages and winding design etc., motors and converters are already coordinated with one another during the development phase. As a consequence the overall system is more reliable, has a long service life, is quieter and has a higher system efficiency, which allows energy usage to be slashed by up to 70%. Further, IDS ensures an especially precise conveying or compressing process, and reduces the stress on fluid flow machines as a result of the soft operation that can be achieved.

Horizontal integration

Vertical integration

Integrated in the automation technology: from the field through the controller level up to the MES thanks to Totally Integrated Automation (TIA).

For every application.

With the TIA Portal reduce your engineering time by up to 30%

Advantages of vertical integration

An IDS can be completely integrated into the automation environment within the framework of Totally Integrated Automation (TIA). This means that the drive systems can be simply and seamlessly embedded into the control, communication and supervisory control – as well as in SIMATIC PCS7 process control with its sector-specific versions. PID controllers for pressure control, sensor systems for pressure, level and flow monitoring, limit value monitors for shutdown thresholds as well as condition monitoring systems are optimally adapted to the drive system. Pump, fan and compressor drives are prepared for integration into the PROFINET PROFIenergy protocol – so that they can also be embedded in an overall energy management system.

Vertical integration

Life cycle integration

Integrated software and services over the complete life cycle.

For higher performance and maximum investment security.

Reduce your maintenance costs by up to 15%

Advantages of life cycle integration

The advantages of IDS extend over their complete life cycle. Integrated into condition monitoring systems for the drive train, plant and system availability is increased. When requested, this can be within the context of a long-term service agreement. Siemens remote services allow remote pump and compressor stations to be monitored remotely so that potential disturbances can be identified at an early stage. This allows the availability to be increased even more. Further, the 3D data of an IDS from the design phase using Siemens PLM Software – such as NX or Teamcenter – can be used in subsequent life cycle phases. In addition to planning and implementation, it also simplifies future modernization projects.

Life cycle integration

More on the Internet:
www.siemens.com/ids-infographics
We have developed product combinations specifically for pump, fan and compressor applications. This means that especially the motor and converter are optimally coordinated with one another to achieve a true system-based approach. The motor windings and rated currents perfectly match converter voltages, currents and pulse patterns. This results in very high system efficiencies, the overall system can be precisely dimensioned to match the application, and plant and system availability can be maximized.

Up to 200 kW:
SIMOTICS GP/SD VSD10 motors & SINAMICS G120P converters

SIMOTICS G120P, SIMOTICS GP/SD VSD10 & SINAMICS G120P form a drive system optimized from an investment perspective with low energy demand. This team precisely matches the requirement profile of pump, fan and compressor drives up to 200 kW. The motor is optimized for converter operation, and the code stamped on the rating plate provides predefined parameter settings for the converter.

Important benefits for users include:
• Efficient drive solutions to address a wide range of industrial applications
• Time and costs for commissioning are reduced, low probability of making mistakes when entering data
• Increased productivity, high efficiency and reliability

From 200 kW and higher:
SIMOTICS FD motors & SINAMICS G120P converters

SIMOTICS FD and SINAMICS G120P form a powerful system with high energy efficiency that has been specifically designed to address pump and fan applications. The windings for SIMOTICS FD motors are optimally adapted to the output currents and voltages of SINAMICS G120P converters. The rated motor currents are harmonized with the converter output currents, in conjunction with optimized pulse patterns. The control and pulse patterns of SINAMICS G120P have been optimally adapted to SIMOTICS FD motors.

Important benefits for users include:
• Investment costs are reduced by up to 15 % as overdimensioning is avoided
• Energy efficiency is increased as losses are reduced by at least 10 %
• Noise emission is reduced by more than 4 dB allowing noise damping measures to be reduced
• System efficiency class IES 2: High energy efficiency at the operating points – at least 35 % lower losses than the reference system
For hazardous zones:
SIMOTICS XP 1MD5 motors & SINAMICS G180 converters

SIMOTICS XP 1MD5 and SINAMICS G180 form a harmonized explosion-protected, low-voltage drive system. Especially in the chemical and oil & gas sectors, this duo provides a maximum degree of protection with the highest efficiency. This combination is unified regarding both power and voltage up to 690 V – and is suitable for hazardous zones 1 and 21. The explosion-protected motors can be operated without requiring any additional certification. Sector-specific features such as du/dt filter, line reactor and Namur are integrated as standard.

Important benefits for users include:
• Pretested and coordinated system for minimum installation costs
• Low certification costs
• Optimized variance of the drive solutions
• Highest efficiency with maximum safety
For medium voltage applications:
SIMOTICS HV motors & SINAMICS PERFECT HARMONY

SIMOTICS HV and SINAMICS PERFECT HARMONY form the optimum system for pump, fan and compressor drives. These are implemented as medium voltage drives as a result of their high power rating, frequently in the double-digit Megawatt range. Typical applications include compressor stations for gas pipelines and gas liquefaction plants, central blowers for cement plants as well as main pump stations in the process and water industries. The profit-generating combination comprising very reliable SIMOTICS HV motors and SINAMICS PERFECT HARMONY converters with their cell concept keep core processes operational.

Important benefits for users include:
• Smooth, disturbance-free plant operation even under harsh conditions
• Flexible plant layout as a result of the modular system concept
• High system efficiencies (approximately 96%) for an improved energy balance of the complete plant

For especially high system efficiencies:
Reluctance drive systems

The highest efficiency values for pump, fan and compressor drives can be realized by teaming up SIMOTICS synchronous-reluctance motors with SINAMICS G120 converters. This technology allows high torques to be achieved – also without permanent magnets – and results in a low motor moment of inertia. The efficiencies are extremely high, both at full and partial load operating points. The low temperature rise as a result of the minimized losses and the precise coordination of the drive components reduces the loads placed on motors and converters. This is reflected in a lower probability of failure and longer service life. Companies operating plants and systems benefit from a higher plant and system availability and longer usage time.

Important benefits for users include:
• Lowest life cycle costs as a result of the very high system efficiency
• Higher plant and system availability and longer usage time of the complete system
• Simple integration and use by using known platforms
A well-established team for fixed-speed applications: SIMOTICS GP/SD motors & SIRIUS

We recommend the use of industrial switchgear wherever pumps must be automatically switched on and switched off, for instance. When using SIRIUS switchgear, pumps and drives are only switched on when required and remain off at all other times. SIMOTICS GP/SD motors in conjunction with SIRIUS switchgear not only reduce the stress on the devices, but also result in the highest energy-saving potential. If a component is switched off it doesn’t consume any energy.

**Important benefits for users include:**
- Peak loads are reduced by up to 60%
- Approximately 30% less energy is used when compared to other solutions
- “Soft starting and stopping” avoid stress loads, such as water hammer
- Longer motor lifetime
Experience how our drive and automation solutions can make your pump, fan and compressor applications more efficient across the board.