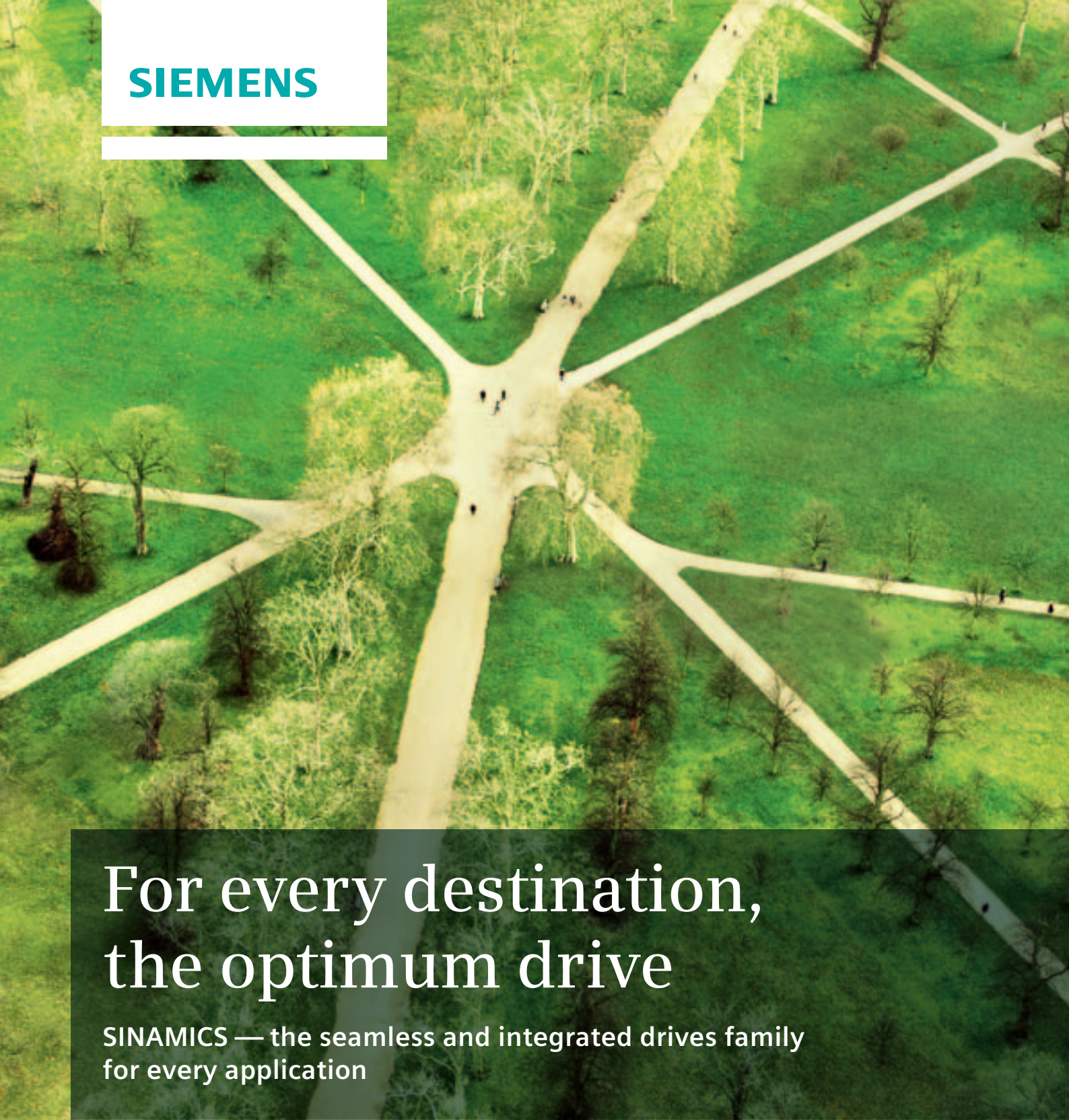
SIEMENS



For every destination, the optimum drive

SINAMICS — the seamless and integrated drives family for every application

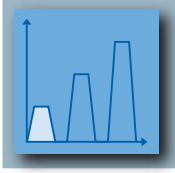
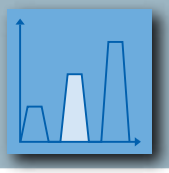
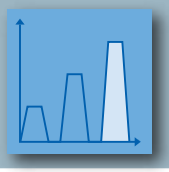
siemens.com/sinamics

SINAMICS —
for every application, power rati

Purpose \ Performance*)	Continuous motion		
	Basic	Medium	High
Pumping/ ventilating/ compressing	Centrifugal pumps Radial/axial fans Compressors		Excentric worm pumps
Moving	Belt conveyors Roller conveyors Chain conveyors	Belt conveyor Roller conveyors Chain conveyors Vertical/horizontal material handling Elevators/escalators Gantry cranes Ship's drives Cable railways	Elevators Container cranes Mine hoists Open cast mine excavators Test stands
Processing	Mills Mixers Kneaders Crushers Agitators Centrifuges	Mills Mixers Kneaders Crushers Agitators Centrifuges Extruders Rotary furnaces	Extruders Winders/unwinders Leading/following drives Calenders Mechanical presses Printing machines
Machining	Main drives for • Turning • Milling • Drilling	Main drives for • Drilling • Sawing	Main drives for • Turning • Milling • Drilling • Gear cutting • Grinding

*) Requirements regarding torque precision/speed precision/positioning precision/axis coordination/functionality

ng and performance level

Discontinuous motion		
 Basic	 Medium	 High
Hydraulic pumps Dosing pumps		Descaling pumps Hydraulic pumps
Accelerating conveyors Rack feeders	Accelerating conveyors Rack feeders Crosscutters Roll changers	Rack feeders Robotics Pick-and-place Indexing tables Crosscutters Roller feeds Engaging/disengaging
Tubular bagging machines Single-axis motion control i.e. • Positioning profiles • Path profiles		Servo presses Rolling mill drives Multi-axis machine control i.e. • Multi-axis positioning • Cam discs • Interpolation
Axis drives for • Turning • Milling • Drilling	Axis drives for • Drilling • Sawing	Axis drives for • Turning • Milling • Drilling • Laser machining • Gear cutting • Grinding • Nibbling/punching

SINAMICS is the most comprehensive drive family available today. It is based on a simple, integrated engineering concept, inherently providing innovative, energy-efficient solutions for the future. No matter which direction you wish to go, Siemens offers you the optimum drive — from one source for every application.

Solutions for your specific application

With SINAMICS, you always achieve your objectives. No matter whether it involves flow control applications such as pumps, fans and compressors, or processing applications such as extruding and crushing; from lifting and moving applications such as conveyors and elevators to complex motion control applications such as milling, turning and machining — Siemens SINAMICS drives offer you a unique range of power and performance.

Minimize your costs

The engineering costs for configuring and commissioning drive solutions must be kept as low as possible. Using SINAMICS, you minimize your costs — with integrated and standard tools for selecting, configuring and commissioning — permitting fast, straightforward engineering at a favorable cost.

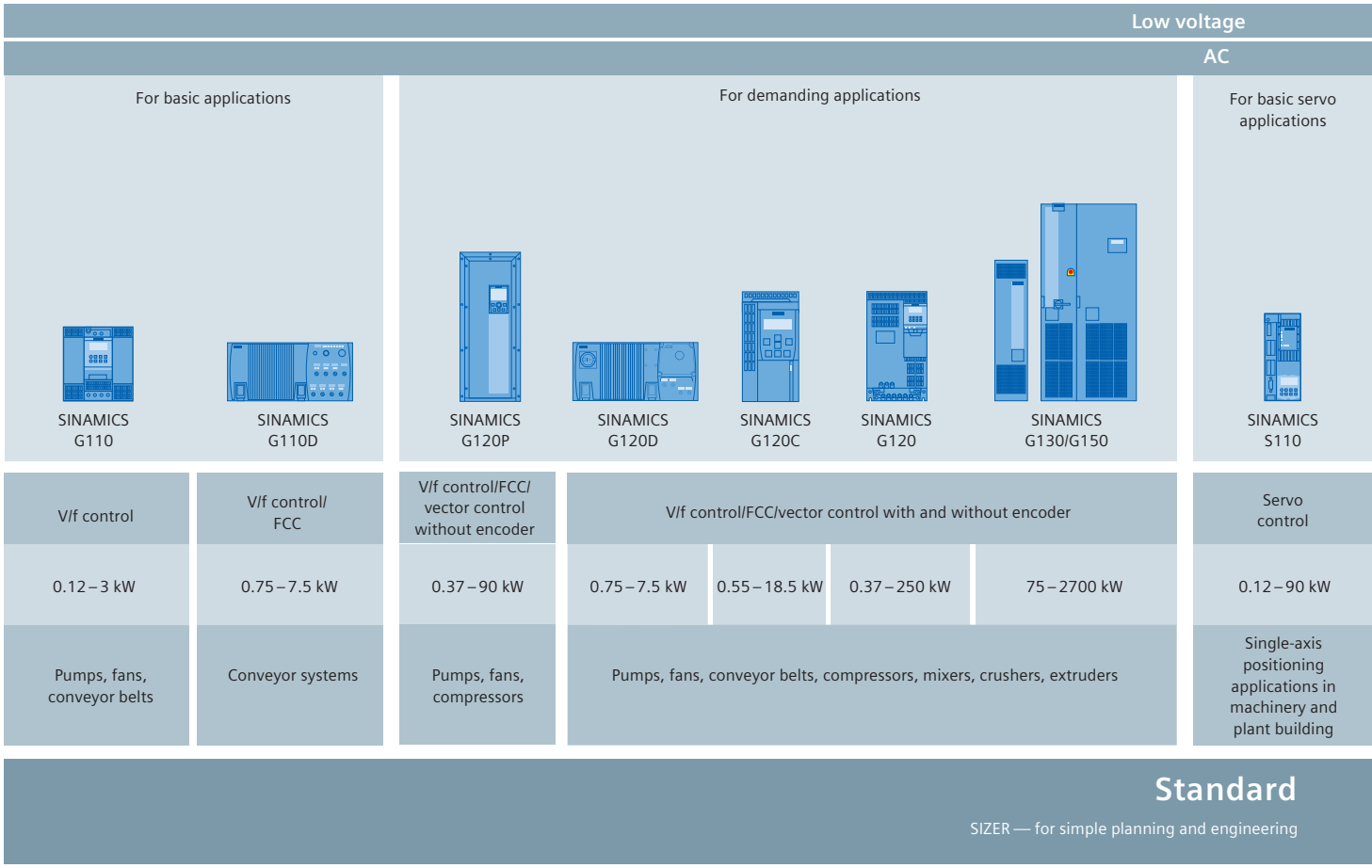
The entire family at a glance

With SINAMICS, Siemens offers you a platform that optimally complies with the high requirements in the low-voltage, medium-voltage and DC-voltage ranges. The complete and integrated drive family addresses all of the performance levels and sets itself apart as a result of the highest degree of flexibility, functionality and efficiency.

Today, machinery and plant construction is demanding automation and drive solutions that must be highly flexible and scalable. In all industrial sectors, there is a demand for individual solutions which are extremely easy to use, have a high efficiency and have integrated safety technology.

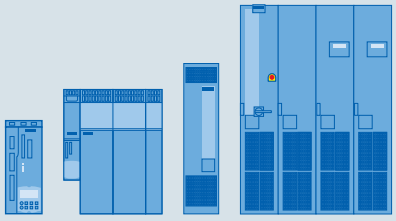
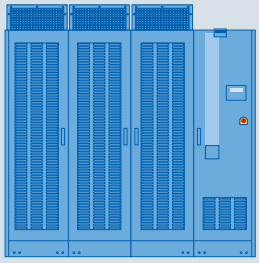
Customized solutions

Whether single- or multi-axis applications, basic open-loop speed control or servo control with a high dynamic performance — in order to be able to implement tailored drive solutions at optimum costs, a well-conceived system is required — a system that allows only the components and functions to be used that are actually required for a specific application.



A very innovative platform concept

Regardless of the power and performance requirement, every SINAMICS drive is based upon the same hardware and software platform. This development strategy — that has been established for several years now — offers you some unique advantages: standard operation, the same selection and commissioning tools, identical options and minimum training costs. This innovative platform approach allows the optimum drive to be designed to address the widest range of target markets and combines this with the advantages of the world's largest series of drives.

	DC	Medium voltage
		AC
For sophisticated applications	For basic and sophisticated applications	For applications with high power ratings
 SINAMICS S120	 SINAMICS DCM	 SINAMICS GL150 / GM150 / SM150 / SL150
V/f control/vector control/servo control	Closed-loop speed/ torque control	V/f control/vector control
0.12 – 4500 kW / 75 – 1200 kW	6 kW – 30 MW	0.8 – 120 MW
Production machines (packaging machines, textile and printing machines, paper machines, plastics machines), machine tools, plants, process lines and rolling mills / Test stands, crosscutters, centrifuges	Rolling mill drives, wire-drawing machines, extruders and kneaders, cable railways and lifts, test stand drives	Pumps, fans, compressors, mixers, extruders, crushers, rolling mill lines, mine hoist drives, excavators, test stands, ship's drives, conveyor belts, blast furnace blowers

engineering tools

STARTER — for fast commissioning, optimizing and diagnostics

Pumping, ventilating and compressing

Whenever your application involves pumps, fans or compressors, in the SINAMICS portfolio, you will find a solution for the simplest and the most complex application. Centrifugal pumps and gas compressors are just two examples from the wide range of applications covered by SINAMICS drives.

Centrifugal pumps

Using our SINAMICS G-series drives, beginning with the G110 at 0.12 kW up to the GL150 at 120 MW, every conceivable centrifugal pump size in every type of pump application — from supplying water to cooling buildings and other types of flow control applications in the process industry. Energy consumption can be slashed by up to 70 % by operating pumps at a variable speed.

Performance*) / Use	Continuous motion	
	Basic	Medium
Pumping/ventilating/ compressing	Centrifugal pump	
Supply voltages	1AC 200–240 V/3AC 380–690 V/3AC 2.3–13.4 kV	
Power	0.12 kW–120 MW	
Degree of protection	IP00–IP55	
SINAMICS platform	SINAMICS G110 SINAMICS G120C SINAMICS G130 SINAMICS G150 SINAMICS GM/GL150	SINAMICS G120P SINAMICS G120 SINAMICS G130 SINAMICS G150 SINAMICS GM/GL150

*) Requirements relating to torque/speed/functionality

Additional advantages:

- More precise flow control with shorter response times
- No pressure surges in piping systems
- Damaging vibration and cavitation are avoided
- Integrated pump-specific functions

Gas compressors

SINAMICS drives provide solutions for gas compressors in every industry and power range extending from 0.12 kW up to 120 MW. With SINAMICS, every conceivable compressor application can be implemented. SINAMICS offers a more flexible, more reliable and quieter solution versus gas turbine compression — all with significantly lower maintenance costs.

Performance*) / Use	Continuous motion	
	Basic	Medium
Pumping/ventilating/ compressing	Turbo compressor; reciprocating compressor	
Supply voltages	1AC 200–240 V/3AC 380–690 V/3AC 2.3–13.4 kV	
Power	0.12 kW–120 MW	
Degree of protection	IP00–IP55	
SINAMICS platform	SINAMICS G110 SINAMICS G120C SINAMICS G130 SINAMICS G150 SINAMICS GM/GL150	SINAMICS G120 SINAMICS G130 SINAMICS G150 SINAMICS GM/GL150

*) Requirements relating to torque/speed/functionality

Additional advantages:

- Energy usage can be slashed by up to 70 % as a result of variable-speed compressor operation
- More precise flow rate control with shorter response times
- No ultrasonic compression surges

Move more

SINAMICS moves continuously running or high-dynamic elevators, roller feeds and many other applications extending from basic up to complex versions in conveyor technology, in material handling and in many other areas. The examples presented below for rack feeders and large conveyor belts are just two examples from the wide range of applications.

Rack feeders

SINAMICS S110 and S120 with power ratings from 0.12 up to 107 kW are admirably suited for motion control systems for synchronous and induction motors in rack feeders. Depending on the precise requirement, you can select between a solution based on the drive-integrated positioning functions Epos, a solution based on the SIMOTION motion control system or a SIMATIC-based motion control solution.

Performance*) / Use	Discontinuous motion		
	Basic	Medium	High
Moving	Travel drive; hoist/lowering drive; telescopic conveyor		
Supply voltages	3AC 380–690 V		
Power	0.12–107 kW		
Degree of protection	IP20		
SINAMICS platform	SINAMICS S110		SINAMICS S120

*) The requirements on torque precision/speed precision/positioning precision/axis coordination/functionality

Additional advantages:

- Precise positioning functions
- High degree of flexibility, also for multi-axis groups and for 3-dimensional motion sequences
- Energy-efficient through energy recovery
- Can be controlled with SIMOTION or SIMATIC

Large conveyor systems

Drive solutions with any power rating — with or without energy recovery — are available for conveyor systems in the cement and mining industries. With individual motor ratings extending from 200 kW up to 5 MW, every conceivable conveyor application can be implemented.

Performance*) / Use	Continuous motion	
	Basic	Medium
Moving	Conveyor systems; chain conveyor; roller conveyor	
Supply voltages	3AC 380–690 V/3AC 2.3–4.16 kV	
Power	200 kW–5 MW (per motor)	
Degree of protection	IP00–IP55	
SINAMICS platform	SINAMICS G130 SINAMICS G150 SINAMICS S120 CM SINAMICS S150 SINAMICS GM150 SINAMICS SM150	

*) Requirements on the torque precision/speed precision/positioning precision/axes coordination/functionality

Additional advantages:

- Energy consumption reduced by up to 20 % using variable-speed conveyor belt operation
- Power is exchanged between motors regenerating and motoring
- Soft, jerk-free acceleration reduces the stress on the gear units, bearings, drums and rollers
- Belt vibration and breakage are avoided

Process better

For continuously running or high-dynamic extruders, centrifuges, agitators or production machines, SINAMICS drive solutions can be implemented — from the most basic application to the most complex. Thanks to pre-configured function modules, drives can shorten commissioning and start-up times, as well as reduce costs. Below are just two examples — foil stretching and injection molding — that show the capabilities of SINAMICS drives.

Foil stretching machine

When implementing multi-motor drives, for instance in a master-slave configuration on a foil stretching machine, the SINAMICS S120 greatly increases the productivity versus conventional drive installations.

Performance*) / Use	Continuous motion
	High
Processing	Extruder; casting roll; take-off roll; longitudinal stretcher; transverse stretcher; take-off roll; film handling; suction roll; winder
Supply voltages	3AC 380–690 V
Power	0.37–4500 kW
Degree of protection	IP20
SINAMICS platform	SINAMICS S120

*) Requirements regarding torque precision/speed precision/functionality

Additional advantages:

- Individual control of each drive
- High degree of flexibility through fast, simple re-equipping
- Overview of the complete system, production and possible faults using integrated automation

Injection molding machine

By using SINAMICS S110 and S120 drives for single-axis motion control in injection molding machines, energy usage can be reduced by 50% when compared to hydraulic machines.

Performance*) / Use	Discontinuous motion	
	Medium	High
Processing	Dosing; injection; close tool; ejector; carrier	
Supply voltages	3AC 380–690 V	
Power	0.37 kW–250 kW	
Degree of protection	IP20	IP20
SINAMICS platform	SINAMICS S110	SINAMICS S120

*) Requirements regarding torque precision/speed precision/positioning precision/axis coordination/functionality

Additional advantages:

- Faster tool change based on standard components
- Highest degree of flexibility thanks to a scalable solution
- Low environmental stressing and noise by using water cooling
- Individually adaptable application solution

Machine more efficiently

SINAMICS offers the optimum drive for every machining application. Whether it involves continuous or high-dynamic spindles, or feed and auxiliary axes in machine tools for turning, milling, drilling and sawing. This includes basic or complex versions up to special machines, for example, bending or deburring machines.

Drilling machine in metal cutting

With torques of between 0.18 and 1145 Nm, SINAMICS S110 offers the highest degree of stability at high as well as at low drive speeds. Thanks to its modularity, it can be simply adapted to a wide range of performance requirements.

Performance*) / Use	Continuous motion	Discontinuous motion
	Medium	Medium
Machining	Drilling spindle	Spindle feed
Supply voltages	3AC 380–690V	3AC 380–690V
Torque	24 – 1145 Nm	0.18 – 48 Nm
Degree of protection	IP20	IP20
SINAMICS platform	SINAMICS S110	SINAMICS S110

*) Requirements relating to torque precision/speed precision/positioning precision/axis coordination/ functionality

Additional advantages:

- High productivity through fast workpiece loading
- Fast change and simple management of programs
- Simple automation thanks to Totally Integrated Automation
- Controlled with SIMATIC

Woodworking machine

For CNC-controlled spindles and feeds in a 5D wood machining center, SINAMICS S120 drives ensure high dynamic performance with torques between 0.08 and 2602 Nm.

Performance*) / Use	Continuous motion	Discontinuous motion
	High	High
Machining	Milling spindle	X/Y/Z axis adjustment; turning/swiveling milling spindle
Supply voltages	3AC 380–690V	3AC 380–690V
Torque	10–2602 Nm	0.08–1651 Nm
Degree of protection	IP20	IP20
SINAMICS platform	SINAMICS S120	SINAMICS S120

*) Requirements regarding torque precision/speed precision/positioning precision/axis coordination/ functionality

Additional advantages:

- High performance even for low unit quantities through minimum equipping times
- High production rate for repeated parts
- Modular and scalable in performance and axis number
- Suitable for use in harsh industrial environments
- Controlled with SINUMERIK

No matter which direction you take, SINAMICS is the ideal drive system to take you forward.

The DT Configurator supports you by defining the optimum drive solution for your application.

Simple entry using the DT Configurator

The Drive Technology Configurator was developed to optimally support you when selecting products for your drive train. With its help, not only will you find the optimum drive solution from the wide range of products available, but you will also be provided with the correct order number and the associated documentation. With the pre-selection, you can also restrict the product range and determine the best product series for you. As a result, you can select your drive to precisely address the requirements of your application.

The DT Configurator supports you with:
- Selecting the drive based on the application
- The subsequent ordering process

DT Configurator supplies you with:
- A drive that is optimally tailored to your requirements
- 2D/3D models
- Operating instructions
- Data sheets

You can directly order the selected components through the Industry Mall — the Siemens e-commerce website — and without having to duplicate entries. In order to avoid making ordering mistakes, the order number is checked to ensure that it is correct.

www.siemens.com/dt-configurator

Engineering with SIZER

Dimensioning the optimum components in steps guided by the program

Result of the configuration, e.g. parts list, characteristics and dimension drawings

Engineering with SIZER ...

SINAMICS sets itself apart as a result of its standard engineering. Once you know one variable frequency drive, then you know them all. This makes it easier for you, especially when it comes to implementing complex plants and systems with several drives – or subsequently expanding them. SIZER is available to help engineer all of the drives in the same standard fashion.

SIZER engineering software

The SIZER engineering software supports you when engineering a complete drive system. Not only this, it also allows you to handle single-motor drives up to complex multi-axes drives. The workflow wizard navigates you intuitively and in a user-friendly manner through the individual engineering phases, step by step.

SIZER supports you when

- Defining the mechanical system
- Dimensioning the drive, motor and gear unit
- Configuring additional system components
- Configuring the open-loop/closed-loop control

SIZER supplies you with

- Engineering results: characteristics, technical data, layout drawings and dimension drawings
- Calculation of the load-dependent energy demand
- Calculation of the performance
- Calculation of the harmonics
- Part lists with the associated ordering data

In addition, using an integrated EDP interface, SIZER allows components to be electronically ordered, even through SAP-based systems.

Enhanced engineering reliability

A guided tour makes it easier for first-time users to get to know SIZER. The help functions integrated in SIZER support you during the complete engineering phase and provide comprehensive physical and technical background knowledge. All of this prevents possible errors when combining components — including any incorrect orders that may result.

In fact, with the latest version of SIZER, you can even optimize your energy balance. In addition to providing a load-dependent energy usage calculation, SIZER also includes a drive conversion function, which automatically selects the drive versions — and with the most favorable energy efficiency.

www.siemens.com/sizer

… commissioning drives with STARTER

STARTER is an intelligent tool that can be used for all SINAMICS drives. It allows you to simply configure and commission the drive components. More specifically, STARTER is menu-prompted and graphically supported.

STARTER commissioning software

STARTER is especially helpful in importing all of the relevant data from the electronic type plates of the drive components. This speeds up parameterization, prevents possible incorrect entries and, therefore, significantly reduces your costs.

Using integrated test functions, you can check your entries and optimize parameters. Velocity characteristics, as well as setpoint and actual value curves, are logged over time and are processed to create transparent graphics for clear diagnostics and fast orientation.

Even stronger in a team

STARTER and SIZER can run as dedicated Windows applications. They are linked to the drives via USB, serial interface, PROFIBUS DP or Ethernet/PROFINET. STARTER can also be integrated into SIMOTION SCOUT, the engineering system for the SIMOTION motion control system.

The same applies when operating the drives in conjunction with the SIMATIC industrial automation system. Embedded in STEP 7, the drive technology is completely integrated into the PLC environment.

Linking SINAMICS with SIMOTION, SIMATIC or the SINUMERIK machine tool CNC system allows completely integrated automation solutions to be created. STARTER provides configuration, parameterization and commissioning solutions from a single, central engineering software. This concept also pays off when it comes to service, as it facilitates simple diagnostics and troubleshooting on site or through tele-service.

Both SIZER and STARTER are available in English, French, German, Italian and Spanish.




www.siemens.com/starter

Optimally integrated in the automation

SINAMICS is an integral component of "Totally Integrated Automation", the comprehensive and seamless product and system portfolio from Siemens.

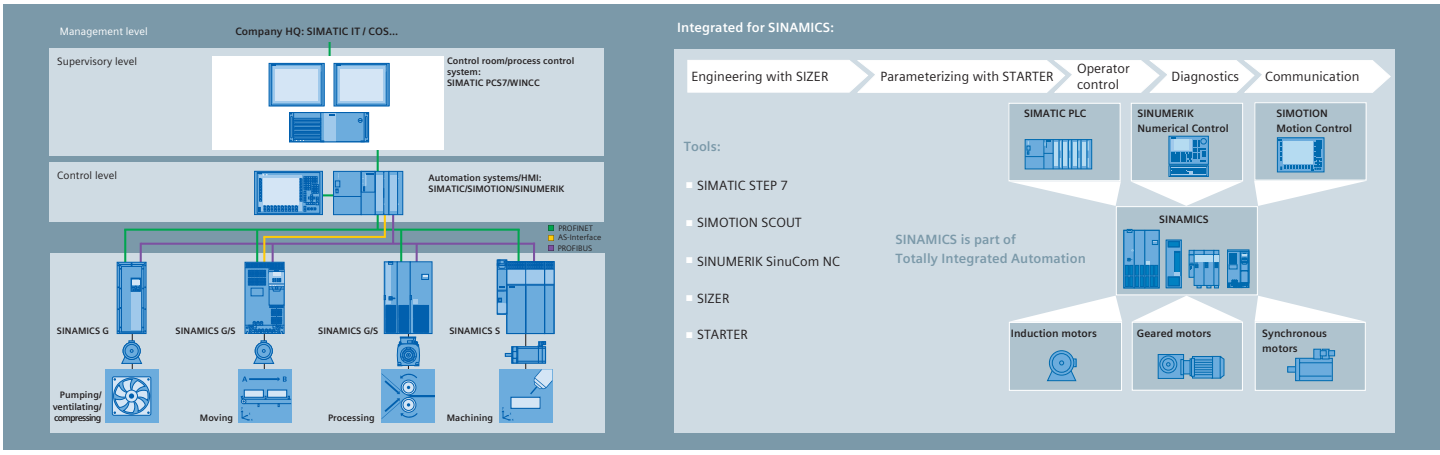
Totally Integrated Automation

The integration of SINAMICS regarding engineering, data management and communication to the automation level guarantees low-cost, highly efficient solutions in conjunction with the SIMATIC, SIMOTION and SINUMERIK control systems.

Communication

Depending on the particular application, the optimum variable frequency drive can be selected and integrated into the automation concept. This is the reason that the drives are transparently classified according to various application types. Depending on the particular drive, a wide range of communication protocols is available:

- PROFINET
- PROFIBUS
- AS-Interface
- USS
- CANopen
- Modbus RTU
- BacNet MS/TP



SINAMICS is part of TIA, and in conjunction with the SIMATIC, SINUMERIK and SIMOTION automation systems, ensures that the performance of your plant or system is increased — from the field devices, through the controllers up to the management level.

The drive to optimize your energy efficiency

Electric drives use about two-thirds of all of the industrial power consumed. Variable frequency drives offer one of the single largest opportunities for you to reduce your facility's energy consumption. Consequently, installing drives greatly increases plant up-time while providing you with optimum process reliability. SINAMICS drives from Siemens offer you energy-efficient solutions with which you can significantly reduce your energy costs.

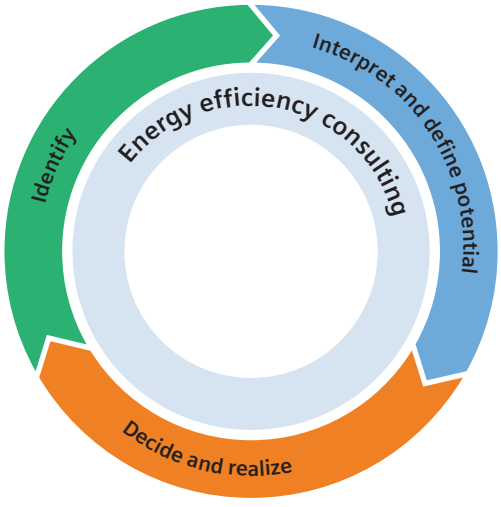
Slash your energy usage by up to 70% with variable-speed operation

With SINAMICS, considerable cost-saving potential can be tapped into by controlling the motor speed. There is an especially huge energy saving potential for pumps, fans and compressors that are operated with mechanical throttles and valves. Here, the conversion to variable frequency drives offers enormous economic benefits: Contrary to mechanical controls, the power drawn in the partial load operating range is always immediately adapted to the actual demand. As a consequence, energy is no longer simply wasted, which allows cost savings of up to 60% to be achieved, and in extreme cases, even up to 70%.

When compared to mechanical controls, variable-speed drives offer some significant service and maintenance advantages. Torque and current surges are greatly reduced when using drives, providing stability for your facility's power grid. Additionally, pressure surges in piping systems that cause damaging cavitation and vibration are virtually eliminated with the soft starting and stopping features of drives. This all results in a significantly longer service life of the complete drive train.

Energy recovery when braking

In conventional drive systems, the braking energy is simply dissipated in the braking resistors. The SINAMICS G and S drives are capable of energy recovery and do not require any braking resistors — they feed the braking energy back into the line supply. For example, in hoisting applications, this means that energy usage can be slashed by up to 60% — energy that you can use at another location within your plant or system. Consequently, this reduced power loss simplifies system cooling and facilitates a more compact design.



Energy management process

Efficient energy management consulting services identify the energy flows, determine the cost-saving potential and realize this by applying specific measures.

Energy equalization in the DC link

By using inverters, e.g. SINAMICS S120, for coupled drives, energy is exchanged along the common DC link bus. This direct energy exchange from inverter to inverter minimizes the power loss in the overall system, so that the power rating and/or size of the infeed can be dimensioned a lot smaller than the total power of the connected inverters.

Storing excess energy

Dynamic power peaks — caused by reversing operations for example — can be covered, and flicker can be avoided by using additional capacitors in the DC link. As a result, regenerative energy is stored rather than wasted in the form of heat.

Energy transparency in all engineering phases

Already in the engineering phase, the SIZER engineering software provides you with information about your specific energy demand. The energy consumption in the complete drive train is visualized and compared with different plant and system concepts.

SINAMICS in combination with energy-saving motors

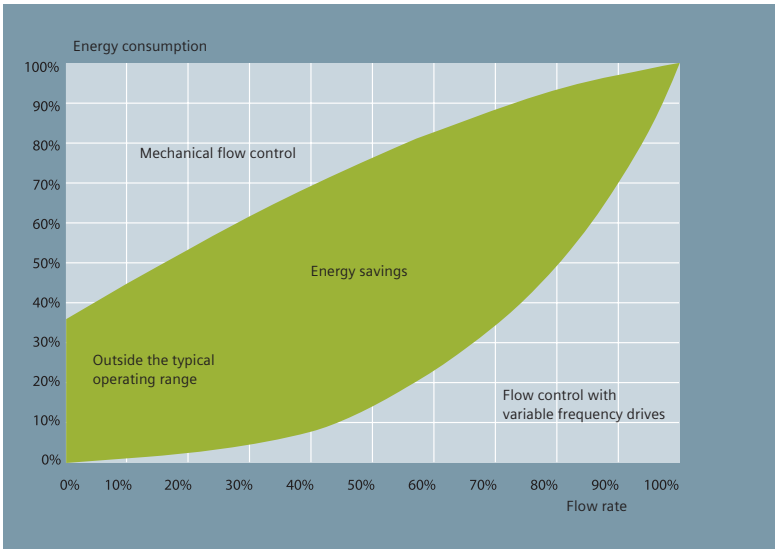
The standard engineering extends beyond the SINAMICS drive family to the higher-level automation system as well as to a broad range of energy-efficient motors with the widest range of power classes. These motors, when compared to previous motors, have an efficiency that is up to 10% higher.

Determining the energy-saving potential with SinaSave

Using SinaSave, you can determine the cost-saving potential when using SINAMICS over the complete life cycle. This intelligent software takes into account all of the necessary plant-specific parameters as well as the values required for the process. Based on the number of work days, operating shifts and the pumping profile, SinaSave selects the optimum drive system for you. Not only this. It calculates the price of the drive system and compares its energy consumption with all of the other alternative concepts that could be considered. In addition to the specific energy-saving potential as a result of energy-efficient drive solutions based on SINAMICS, SinaSave also provides you with the payback time of the corresponding units — which is frequently just a few months.

You can now use SinaSave online — free of charge. Visit www.siemens.com/sinasave

Energy-savings potential
When compared to mechanical flow controls, variable frequency drives such as SINAMICS can significantly reduce energy consumption.



It is safe to say that SINAMICS Safety Integrated responds more quickly

There is an increased risk of injury wherever rotating units such as saws, rollers and spindles are used, but also where handling axes and machine slides are often moved with a high linear velocity. Safety Integrated for SINAMICS reliably masters specific hazardous situations. It has a significantly faster response time and a higher degree of functionality with generally unchanged and occasionally even increased productivity.

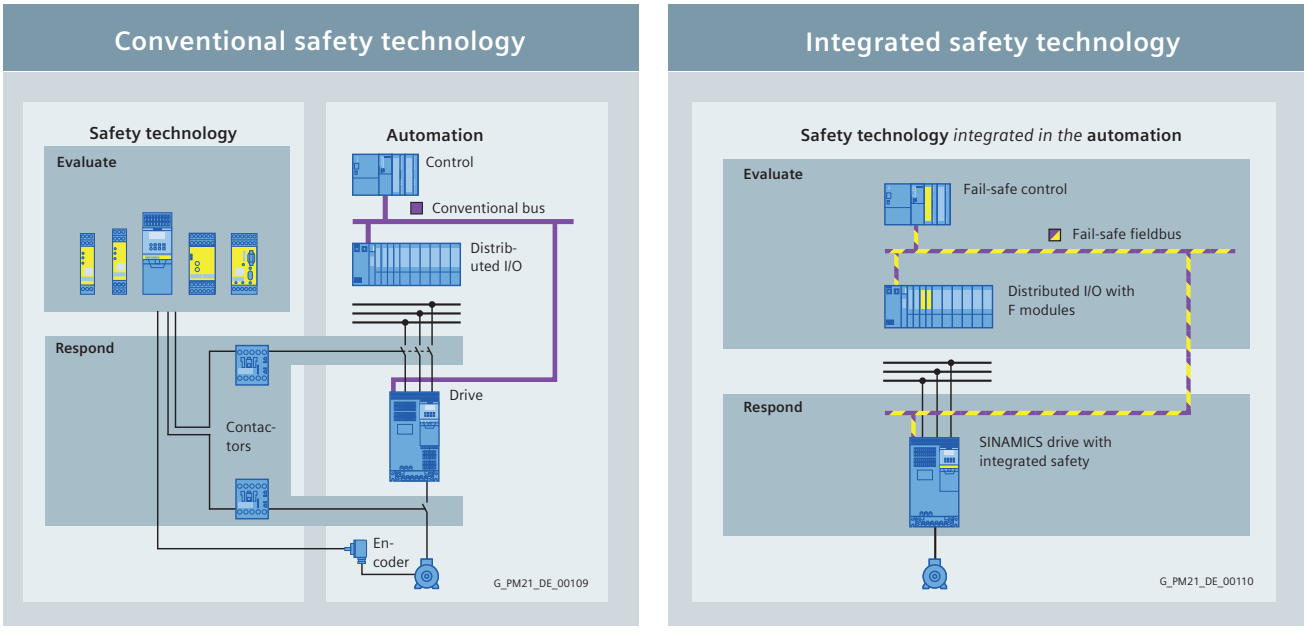
Lower costs, increased safety

While conventional safety technology always requires additional contactors, safety relays and interlocking circuits, for the integrated safety technology from Siemens, all of these additional electromechanical components are eliminated from the very start.

However, there is more to come: as the safety-relevant signals can be transferred via standard fieldbuses, the complexity and therefore wiring costs are reduced. As a consequence, the high requirements of the safety standards can be far more simply implemented. And not only this, as a result of the lower number of components, machine availability is increased.

Safety Integrated for SINAMICS

Almost all members of the SINAMICS family have safety functions integrated in the drive — and in many instances, an encoder is not required. These are certified according to IEC 61508/SIL 2, EN ISO 13849-1 Cat. 3 and PL d.



Integrated safety technology reduces the number components and wiring costs

"Avoiding accidents should not be considered as a legal obligation, but as a human responsibility and economic common sense."

Werner von Siemens, 1880

For SINAMICS, the safety functions integrated in the drive can be roughly sub-divided into two classes:

Functions to safely stop the drive without the necessity of disconnecting the power connection to the line supply:

Safe Torque Off (STO)
"Safe Torque Off" ensures that torque is no longer output at the motor shaft.

Safe Stop (SS1) with/without encoder
"Safe Stop 1" safely brakes drives with a high kinetic energy before STO is activated.

Safe Stop (SS2) with encoder
"Safe Stop 2" safely brakes drives with a high kinetic energy and activates SOS.

Safe Operating Stop (SOS) with encoder
"Safe operating stop" (as alternative to STO) brings the drive into closed-loop position control, maintains its position and monitors standstill.

Safe Brake Control (SBC)
After STO, "Safe Brake Control" activates a holding brake so that the drives can no longer move, e.g. as a result of gravity.

Functions to safely monitor the speed of a drive:

Safely Limited Speed (SLS) with/without encoder
"Safely Limited Speed" prevents specified maximum speeds from being exceeded.

Safe Direction (SDI) with/without encoder
"Safe Direction Monitoring" ensures that the selected direction of rotation is maintained.

Safe Speed Monitor (SSM) with/without encoder
"Safe Speed Monitor" signals when a specified speed is fallen below.

Drive	Currently available integrated safety functions
SINAMICS G120C	STO
SINAMICS G120	STO, SS1, SLS, SDI, SSM
SINAMICS G120D	STO, SS1, SLS
SINAMICS G130/150	STO, SS1
SINAMICS S110	STO, SS1, SS2, SOS, SBC, SLS, SDI, SSM
SINAMICS S120 Booksize and Blocksize	STO, SS1, SS2, SOS, SBC, SLS, SDI, SSM
SINAMICS S120 Chassis and Cabinet Modules	STO, SS1, SS2, SOS, SLS, SSM
SINAMICS S150	STO, SS1, SS2, SOS, SLS, SSM
SINAMICS SM150	STO

SINAMICS G110

The versatile single-motor drive for low power ratings

The compact variable frequency drive for centrifugal pumps, radial/axial fans and compressors as well as conveyor belts, roller and chain conveyors with only three frame sizes and freely parameterizable digital inputs offers the highest possible degree of flexibility.

- Power range: 0.12–3 kW
- Simple installation and mounting
- Fast and straightforward commissioning using an optional operator panel or software engineering tool
- For variable-speed drives (V/f) connected to single-phase 200 V to 240 V line supplies
- Ideal for use with LOGO! and SIMATIC S7-200 control systems

SINAMICS G110D

The distributed single-motor drive for basic solutions

This low-profile solution with degree of protection IP65 for basic drive tasks in conveyor technology combines the Control Unit (CU) and Power Module (PM) function units.

- Continuous speed control of three-phase induction motors
- Fulfills all of the requirements of conveyor-related applications with frequency control
- Distributed topology — ideal for applications dispersed over wide areas
- Integrated into TIA via AS-Interface
- Wide power range from 0.75–7.5 kW

SINAMICS G120P

The specialist for pumps, fans and compressors

The easy-to-use standard drive that is simple to commission is especially used in building technology, the water industry and process industry for heating, ventilation and air-conditioning.

- SB interface, IOP operator unit
- Energy-efficient through minimum apparent power losses, automatic adaptation of the motor current to the actual load relationships using the ECO mode
- Automatic changeover to line operation at rated speed
- Hibernation (sleep mode) depending on the setpoint, auto-ramping function for current limiting
- Communication: USS, Modbus RTU, BacNet MS/TP, PROFIBUS DP, CANopen

SINAMICS G120D

The distributed single drive for high-performance solutions

The distributed, interchangeable variable frequency drive in a high degree of protection (IP65) has a low profile, is compact and thanks to its metal housing, extremely rugged; ideal for demanding conveyor-related applications in the industrial environment.

- Power range from 0.75–7.5 kW
- High efficiency thanks to energy recovery and low line harmonics
- Safety Integrated: STO, SS1 and SLS encoderless
- As a result of the modularity, low stocking costs of electronics
- Interchangeable memory card MMC
- Communication via PROFIBUS, PROFINET, PROFIsafe
- Part of Totally Integrated Automation

SINAMICS G120C

The compact, single-motor drive with small power rating and suitable functionality

The rugged standard drive defines new standards in its class regarding small size, fast commissioning times, extremely simple operator control, high degree of service-friendliness and integrated functionality. For example, for belt conveyors, mixers, extruders, pumps, fans, compressors and simple handling machines.

- Compact device
- Highest power density of its class
- Power range: 0.55–18.5 kW
- Simple commissioning and maintenance
- With BOP-2 or IOP operator panel
- Safety Integrated: STO
- Communication options: DP, CANopen, USS, Modbus RTU

SINAMICS G120

The modular single-motor drive for small up to medium power ratings

The rugged standard drive for universal applications in the industrial environment can even be used under extreme environmental conditions thanks to its clever cooling concept. Power modules capable of energy recovery and Control Units can be freely combined.

- Power range: 0.37–250 kW
- Safety Integrated: STO, SS1, SLS and SBC (without encoder) up to SIL2 according to IEC 61508 and up to Category 3 according to EN 954-1; in compliance with IEC 61800-5-2
- Communication via PROFIBUS, PROFINET, RS 485, USS, Modbus RTU, CANopen
- Energy-efficient thanks to energy recovery and low harmonics
- Parameter copy function for series commissioning

SINAMICS G130 / G150

The universal variable frequency drive for high-rating single-motor drives

The quiet and compact drive for single-motor applications, which do not require energy recovery, e.g. pumps, fans, compressors, extruders, mixers and crushers.

- V/f control and vector control with or without encoder
- Power range from 75 up to 2700 kW
- Simple commissioning and operator control

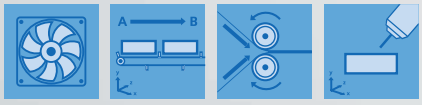
- Available as standard cabinet or as chassis modules
- Service-friendly thanks to easily accessible device modules
- Communication via PROFIBUS, PROFINET and other interfaces
- Energy-efficient through variable-speed operation
- Safety Integrated
- 100% line supply voltage at the motor without any secondary effects
- When required, with integrated line harmonics filter and dv/dt filter

SINAMICS S110

The specialist for basic positioning tasks

The AC/AC unit for basic positioning of single axes with synchronous or induction motors.

- Servo control
- Power ratings from 0.12–90 kW
- Safety Integrated
- Integrated positioning functions
- Simple system connection to higher-level controls (e.g. PLCs) with PROFIBUS, PROFINET, CANopen



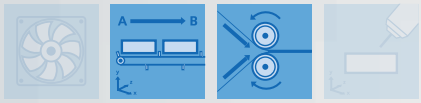
SINAMICS S120

The flexible, modular drive system for sophisticated tasks

The modular drive system in different formats for high-performance and motion control applications in single- and multi-axis configurations for synchronous and induction motors.

- Power range: 0.12–4500 kW
- Servo/vector control, V/f control
- Integrated safety and positioning functions
- Freely configurable logic and closed-loop control functions
- Additional motion control functions in conjunction with SIMOTION or SINUMERIK
- High degree of scalability, flexibility, combinability
- Energy-efficient as a result of energy recovery or DC link
- PROFIBUS/PROFINET/CANopen interface
- Different cooling types: air, liquid, cold plate cooling

- SINAMICS S120 AC drives for high-performance single-axis applications:
  - Blocksize format (0.12–90 kW)
  - Chassis format (110–250 kW)
  - From 18.5 kW also in a liquid-cooled version
  - Can be combined as required with other formats
- SINAMICS S120 DC/AC units for high-performance multi-axis applications
  - In the Booksize Compact format (0.9–9.7 kW)
  - In the Booksize format (1.6–107 kW)
  - In chassis format (75–1200 kW)
  - Also in a liquid-cooled version
  - Highly compact using double-axis modules
- SINAMICS S120 Cabinet Modules as preconfigured cabinet elements, specifically for multi-axis applications in plant construction (power ratings up to 4500 kW)

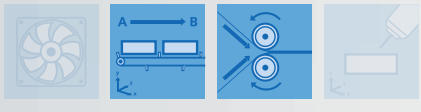


SINAMICS S150

The drive solution for sophisticated high-rating single-motor drives

The ready-to-connect drive cabinet for applications requiring energy recovery, e.g. test stands, elevators, cranes, conveyor belts, presses, cable winches, centrifuges, crosscutters and shears.

- 4Q operation with energy recovery as standard
- Power range: 75–1200 kW
- Significant energy saving, especially for frequent braking cycles
- V/f control and vector control with or without encoder
- Rugged with respect to line voltage fluctuations, reactive power can be compensated
- Communication via PROFIBUS, PROFINET as well as additional interfaces
- Integrated safety functions



SINAMICS DCM

The scalable DC drive for basic and demanding applications

Suitable for DC applications in all sectors, for instance, rolling mills, wire-drawing machines, extruders and kneaders, cable railways and elevators as well as test stands.

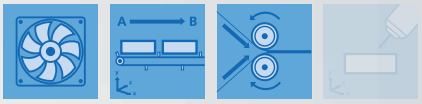
- Highest degree of scalability by being able to select between a Standard Control Unit and an Advanced Control Unit or a combination of both
- Power range: 6 kW–30 MW
- Maximum degree of flexibility for specific plant and system requirements
- Compatible to the predecessor product
- High plant availability through maximum reliability, service-friendly design and redundant concepts
- Simple and fast commissioning
- Communication via PROFIBUS, optionally PROFINET
- As ready-to-connect drive unit or Control Modules for retrofit projects

SINAMICS GL150

Rugged single-motor drive for high-rating synchronous motors in the medium-voltage range

The single-motor drive that has an extremely high operational reliability is almost maintenance-free in a compact design with high power density for pumps, fans, compressors, extruders and kneaders in the double-digit Megawatt range.

- Minimized number of components through the thyristor-based design
- Power range: 2.8–120 MW
- Communication via PROFIBUS, optionally PROFINET
- Simple installation, integration and operator control

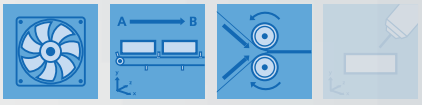


SINAMICS GM150

The universal drive solution for medium-voltage single drives

For single-motor high-rating drives that do not require energy recovery, e.g. pumps, fans, compressors, extruders, mixers, crushers and main ship's drives.

- V/f control and vector control with or without encoder
- Power range: 820 kW–17 MW
- Simple integration and installation
- Straightforward operator control
- Communication via PROFIBUS, optionally PROFINET
- Intelligent maintenance functions

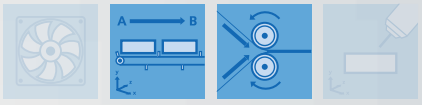


SINAMICS SM150

The sophisticated medium-voltage drive solution for single- and multi-motor drives

For single- and multi-motor drives with a high dynamic performance especially in rolling mills and in mining, which must be capable of energy recovery.

- 4Q operation with energy recovery as standard
- Power range: 2.8–31.5 MW
- Ideal for power exchange between regenerating and motoring applications
- High drive quality and availability
- Simple integration and installation
- Straightforward operator control
- Communication via PROFIBUS, optionally PROFINET
- Intelligent maintenance functions

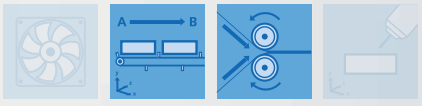


SINAMICS SL150

The medium-voltage cycloconverter for slow-running synchronous and induction motors with a high torque

For rolling mills, mine hoists, ore crushers and cement mills as well as open-cast mining excavators.

- 4Q operation with energy recovery as standard
- Power range 3–36 MW
- Simple design with three-phase thyristor bridges permits a high efficiency and high reliability
- Communication via PROFIBUS
- High short-time overload capability



The ideal motor for every application

A wide range of energy-efficient, low-voltage, geared, explosion-protected and high-voltage motors is available for use with SINAMICS drives.

	Low-voltage motors		
	Induction		**Synchronous**
	Low dynamic performance	Average up to high dynamic performance	Avg. up to very high dyn. performance
	Induction motors for line and drive operation	Induction/synchronous; servo and main motors	Permanent magnet direct drives for rotary axes/linear axes
			
Maximum speed	Drive operation: up to 12,000 rpm	Up to 20,000 rpm	Up to 1700 rpm; up to 836 m/min
Rated power	IEC: 0.09 ... 4000 kW NEMA: 1 ... 400 HP	0.05 ... 1340 kW	3.1 ... 2150 kW (4.22 ... 2924 HP)
Rated torque, rated force	IEC: 0.61 ... 38,000 Nm NEMA: 1.5 ... 1772 lb-ft	0.08 ... 12,415 Nm	100 ... 42,000 Nm
Degree of protection	IEC: IP55, IP56 (non-heavy sea), IP65, IP67, IP68 NEMA: IP54, NEMA: IP55	IP23, IP55, IP64, IP65, IP67, IP68	IP23 , IP54, IP55, IP65
EX protection	Optional: IEC: Ex nAII T3 (Zone 2) or dust-Ex (Zone 21,22) Zone 1: IEC: Ex e II, Ex de IIC, Ex d IIC, Ex de I, Ex d I, Ex p II and double protection Ex d plus Ex e NEMA: Class I, Group D, Class II, Groups F&G, Division 1, Class I, Groups C&D, Division 1	Optional: Zone 2,22 IEC: (E) Exn (Zone 2) or dust-Ex (Zone 22)	–
SINAMICS	SINAMICS G110, G120, S110, S120, G130, G150, S150	SINAMICS G120[1)], G130[2)], G150[2)], S110, S120, S150	SINAMICS S120, G130[2)], G150[2)], S150
Typical applications	Pumps, fans, compressors, conveyor technology with special requirements regarding low weight and the highest possible efficiency, marine applications, offshore, mixers, crushers, extruders, rolling with special requirements on the ruggedness especially in the chemical and petrochemical industry	High up to the highest dynamic applications and applications with higher power ratings demanding a high-dynamic performance and compact design, e.g. printing machines, extruders, main spindle drives in machine tools, robots and handling systems, wood, glass, ceramic and stone processing, packaging, plastics and textile machines and in the machine tool area	Extruders, swiveling axes, rotary and rotary indexing tables, tool magazines, revolver and drum indexing, rotary spindles, rolling drives with high requirements on the dynamic performance and precision for linear motion, e.g. machining centers, turning, grinding, laser machining, handling and in the machine tool area

Industry sector-specific motors, e. g.
- Spindles/spindle drives for machine tools (turning, milling, grinding)
- Special drives for the textile industry
- Special motors for oil and gas, chemical/petrochemical, marine, mining, steel industry

Application-specific motors, e.g.
- High-speed motors with up to 21,000 rpm
- Motors for high- and low-temperature applications
- Distributed drives with integrated converters
- Smoke extraction motors, submersible motors, stepping motors

www.siemens.com/motors

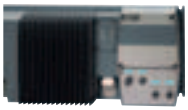
[1)] only induction motors
[2)] Synchronous motors only without encoder

SINAMICS can be combined with a wide range of energy-efficient synchronous or induction motors. No matter where you want to go or what you are trying to achieve, you'll always reach your objective with an ideal, integrated solution from Siemens.

Geared motors		DC motors	High-voltage motors
Induction	**Synchronous**		**Induction/synchronous**
Low dynamic performance	High dynamic performance	Medium dynamic performance	Dynamic performance levels
Geared motors for line and converter operation	Geared servomotors with coaxial planetary gear	DC motors for variable-speed operation	High-voltage induction/synchronous motors for line and converter operation
			
Up to 1088 rpm	Up to 1500 rpm		Converter operation: up to 15,000 rpm
0.09 ... 200 kW (0.12 ... 272 HP)	0.3 ... 57 kW (0.41 ... 77.52 HP)	Up to 1610 kW (2189.6 HP)	200 kW ... 100 MW
40 ... 360.000 Nm	2 ... 3400 Nm	Up to 44,500 Nm	Up to 600,000 Nm
IP55, IP56, IP65	IP64, IP65	IP23, IP54	IP23, IP55, IP56, IP67, IP68
Optional: Zone 1, 2, 21, 22	-	-	Ex n AII (Zone 2) or dust-Ex, Zone 1: IEC: Ex e II, Ex de IIC, Ex d IIC, Ex de I, Ex d I, Ex p II and double protection Ex d plus Ex e NEMA: Class I, Group D, Class II, Groups F&G, Division 1, Class I, Groups C&D, Division 1
SINAMICS G110, G120, S110, S120	SINAMICS S110, S120,	SINAMICS DCM	SINAMICS GM150, SM150, SL150, GL150
Simple positioning tasks and continuously running auxiliary drives with servo quality (production machines, high bay racking units, filling plants, transport conveyors, positioning tasks in machine tools, production machines, robots and handling systems, auxiliary axes, conveyor technology, cooling tower drives, agitators, pumps and mixers, crane systems, washing lines, food industry, solar technology, elevators, escalators, theater drives, presses, heavy load applications e.g. in the area of steelworks and power stations		Motors for standard drive applications in all industry sectors and in the infrastructure, especially rolling mill drives, wire-drawing machines, extruders and kneaders, cable railways and lifts, test stand drives	Medium- and high-voltage drive applications, especially pumps, compressors, blowers, extruders, mixers, crushers, conveyor belt systems, ship's propulsion systems, compressors, blast furnace blowers, refiners

Customer-specific motors and drive solutions —
Together with customers, we design individual motors up to integrated mechatronic drive solutions that go far beyond the range shown here

Technical data



Use

Designation		SINAMICS G110	SINAMICS G110D	SINAMICS G120P
Continuous motion				
Pumping, ventilating, compressing		Basic		Medium
Moving		Basic	Basic	
Processing				
Machining				
Discontinuous motion				
Pumping, ventilating, compressing				
Moving				
Processing				
Machining				
		Frequency converter for variable-speed drives in the lower power range	Distributed drive for basic single-axis applications in the lower power range	Versatile single-motor inverter for pumps, fans and compressors
Type of construction		Blocksize unit	Blocksize unit	Blocksize unit
Drive type		AC/AC unit ready to be connected up	AC/AC unit ready to be connected up	AC/AC unit, modular
Degree of protection		IP20	IP65	• With operator unit: IP54/UL Type 12 • With blanking cover: IP55/UL Type 12
Line voltage V_{line} /power ranges				
1AC 200 ... 240 V		0.12 ... 3 kW	–	–
3AC 380 ... 480 V		–	0.75 ... 7.5 kW ±10 %	0.37 ... 90 kW ±10 %
3AC 500 ... 600 V		–	–	–
3AC 500 ... 690 V		–	–	–
3AC 660 ... 690 V		–	–	–
1AC 85 ... 3AC 950 V				–
3AC 2.3 ... 36 kV motor voltage 1.5 ... 13.4 kV		–	–	–
Current infeed		Uncontrolled	Uncontrolled	Uncontrolled
Energy recovery		No	No	No
Output frequency		0 ... 650 Hz	0 ... 200 Hz (*U*/*f*)	0 ... 200 Hz (*U*/*f*)
Closed-loop control mode				
V/*f* control		Yes	Yes	Yes
Vector control with / without encoder		–	–	Yes
Servo control with / without encoder		–	–	–
Closed-loop speed/torque control		Yes	–	Yes
Motors	Induction motors	Yes	Yes	Yes
	Synchronous motors	–	–	–
	Torque motors	–	–	–
	Linear motors	–	–	–
Control dynamic performance				
Vector control (SINAMICS DCM: V/I control)	Rise time, speed control	–	–	–
	Rise time, torque control	–	–	–
Servo control	Rise time, speed control	–	–	–
	Rise time torque control	–	–	–
Technological functions		Flying restart, automatic restart, compound braking (2- or 3-wire control), DC braking	Flying restart, automatic restart, BICO technology, technology controller, free function blocks, compound braking, DC braking, dynamic braking	Automatic restart, energy-saving mode, hibernation, flying restart, motor staging, 4 PID technology controllers, logical and arithmetic functions, extended emergency service operation, multi-zone controller, bypass
Safety functions		–	–	–
Communication profiles		RS 485	RS 232, AS-Interface	USS, Modbus RTU, BacNet MS/TP, PROFIBUS DP, CANopen
Catalog		D11.1	D11.1	D11.1

1) Being prepared 2) For 4 kHz pulse frequency 3) For 2 kHz pulse frequency (others on request) 4) Max. output voltage in individual cases depends on the n






SINAMICS G120D	SINAMICS G120C	SINAMICS G120	SINAMICS G130	SINAMICS G150	SINAMICS S110
	Basic/medium	Medium	Basic/medium	Basic/medium	
Medium	Basic/medium	Medium	Basic/medium	Basic/medium	
	Basic/medium	Medium	Basic/medium	Basic/medium	
					Basic/medium
					Basic/medium
					Basic/medium
					Basic/medium
					Basic/medium
Distributed drives for complex single-axis/multi-axis applications	Compact single drive for machinery construction	Modular frequency converter for variable-speed single drives	Frequency converter for variable-speed single drives		Single-axis positioning drive
Blocksize unit	Blocksize unit	Blocksize unit	Chassis unit	Converter cabinet unit	Blocksize unit
AC/AC unit, modular	AC/AC unit, compact	AC/AC unit, modular	AC/AC unit, modular	AC/AC unit ready to be connected up	AC/AC unit, modular
IP65	IP20	IP20	IP00/IP20	IP20 (IP21/IP23/IP43/IP54)	IP20
–	–	–	–	–	0.12 ... 0.75 kW
0.75 ... 7.5 kW	0.55 ... 18.5 kW	0.37 ... 250 kW	110 ... 560 kW	110 ... 900 kW	0.37 ... 90 kW
–	–	–	110 ... 560 kW	110 ... 1000 kW	–
–	–	–	–	–	–
–	–	11 ... 55 kW	75 ... 800 kW	75 ... 2700 kW	–
–	–	–	–	–	–
Uncontrolled	Uncontrolled	Uncontrolled	Uncontrolled		Uncontrolled
Yes	No	optional	No		No
0 ... 650 Hz	0 ... 650 Hz	0 ... 650 Hz (V/f)	0 ... 300 Hz		0 ... 300 Hz
Yes	Yes	Yes	Yes		Yes
Yes	–	Yes	Yes		–
–	–	–	–		Yes
Yes	Yes	Yes	Yes		Yes
Yes	Yes	Yes	Yes		Yes
–	–	–	Yes, encoderless		Yes
–	–	–	Yes, encoderless		–
–	–	–	–		–
35 ... 40 ms	–	35 ... 40 ms	11 ... 15 ms	11 ... 15 ms	–
approx. 3 ms	–	approx. 3 ms	2 ... 3 ms	2 ... 3 ms	–
–	–	–	–	–	5 ... 7 ms[3]
–	–	–	–	–	1 ... 2 ms[3]
Flying restart, automatic restart, kinetic buffering, BICO technology, technology controller, free function blocks, compound braking, DC braking, dynamic braking			Flying restart, automatic restart, kinetic buffering, BICO technology, technology controller, Drive Control Chart		Basic positioner, BICO technology, technology controller, controller optimization using auto-tuning
STO, SS1, SLS	STO	STO, SS1, SLS, SDI, SSM SBC	STO, SS1		STO, SOS, SBC, SS1, SS2, SLS, SDI, SSM
PROFIBUS and PROFINET, also with PROFIdrive profile 4 with PROFIsafe	PROFIBUS DP, CAN, USS, Modbus RTU	RS 232, RS 485, PROFIBUS and PROFINET, also with PROFIdrive profile 4 with NAMUR, with PROFIsafe; Modbus RTU, CANopen	RS 232, RS 485, PROFIBUS DP, CANopen, PROFINET (PROFIdrive profile 4 with NAMUR), PROFIsafe		PROFIBUS DP, PROFINET[1], CANopen, pulse/direction interface, USS protocol
D11.1	D11.1	D11.1	D11		PM22

motor type, motor power and dynamic performance 5) In conjunction with SINUMERIK up to 1300 Hz






SINAMICS S120					SINAMICS S150
Medium/high					Medium/high
Medium/high					Medium/high
Medium/high					
Medium/high					
Medium/high					
Medium/high					
Medium/high					
Modular drive system for demanding single-axis/multi-axis applications					Frequency converter for demanding variable-speed single drives
Blocksize unit	Chassis unit	Booksize unit	Chassis unit	Cabinet Modules	Converter cabinet unit
AC/AC unit, modular	AC/AC unit, modular	DC/AC unit, modular			AC/AC unit ready to be connected up
IP20	IP20, optional: IP43	IP20	IP00/IP20, optional: IP43	IP20 (IP21/IP23/ IP43/IP54)	IP20 (IP21/IP23/IP43/IP54)
0.12 ... 0.75 kW	–	–	–	–	–
0.37 ... 90 kW	110 ... 250 kW	1.6 ... 107 kW	110 ... 3000 kW	1.6 ... 3000 kW	110 ... 800 kW
–	–	–	–	–	–
–	–	–	75 ... 4500 kW	75 ... 4500 kW	75 ... 1200 kW
–	–	–	–	–	–
–	–	–	–	–	–
Uncontrolled		Optional, uncontrolled or controlled			Controlled
No		Yes, depending on the infeed			Yes
V/f control: 0 ... 400 Hz[2] Vector control: 0 ... 300 Hz[2] Servo control: 0 ... 650 Hz[2]	200 Hz[3] 160 Hz[3] 300 Hz[3]	0 ... 400 Hz[2] 0 ... 300 Hz[2] 0 ... 650 Hz[2, 5]	0 ... 200 Hz[3] 0 ... 160 Hz[3] 0 ... 300 Hz[3]		0 ... 300 Hz
		Yes			Yes
		Yes			Yes
		Yes			Yes
		Yes			Yes
		Yes			Yes
		Yes			Yes
		Yes			Yes
		Yes			–
8 ... 10 ms[2]	11 ... 15 ms[3]	8 ... 10 ms[2]	11 ... 15 ms[3]	11 ... 15 ms[3]	11 ... 15 ms
1 ... 2 ms[2]	2 ... 3 ms[3]	1 ... 2 ms[2]	2 ... 3 ms[3]	2 ... 3 ms[3]	2 ... 3 ms
2 ... 3 ms[2]	5 ... 7 ms[3]	2 ... 3 ms[2]	5 ... 7 ms[3]	5 ... 7 ms[3]	5 ... 7 ms[3]
0.5 ... 1 ms[2]	1 ... 2 ms[3]	0,5 ... 1 ms[2]	1 ... 2 ms[3]	1 ... 2 ms[3]	1 ... 2 ms[3]
	Flying restart, automatic restart, kinetic buffering, basic positioner, BICO technology, technology controller, control optimization using auto tuning				Flying restart, automatic restart, kinetic buffering, technology controller, Drive Control Chart, BICO technology
STO, SOS, SBC, SS1, SS2, SLS, SDI, SSM	STO, SS1, SS2, SOS, SLS, SSM	STO, SOS, SBC, SS1, SS2, SLS, SDI, SSM	STO, SOS, SS1, SS2, SLS, SSM,	STO, SOS SS1, SS2, SLS, SSM,	STO, SS1, SS2, SLS, SSM, SOS
RS 232, RS 485, PROFIBUS DP, PROFINET, PROFIsafe, CANopen (in conjunction with CU320)					
PM21	PM21, D21.3	PM21	PM21, D21.3	D21.3	D21.3

STO: Safe Torque Off SOS: Safe Operating Stop SBC: Safe Brake Control SS1: Safe Stop 1 (safe stopping process, Cat. 1) SS2: Safe Stop 2 (safe stopping process, Cat. 2) S

DC	Medium voltage			
				
SINAMICS DCM	**SINAMICS GL150**	**SINAMICS GM150**	**SINAMICS SM150**	**SINAMICS SL150**
	Basic/medium	Basic/medium		
Medium/high	Medium	Basic/medium/high	Medium/high	High
Medium/high	Medium	Basic/medium		
		High		
Medium/high				
High			High	High
Scalable DC converter for basic and demanding applications	Frequency converter for synchronous motors with the highest power rating	Frequency converter for medium-voltage variable-speed drives	Frequency converter for demanding single- and multi-axis applications in the medium-voltage range	Cycloconverter for slow-speed synchronous and induction motors with a high torque
DC converter unit	Converter cabinet unit	Converter cabinet unit	Converter cabinet unit	Converter cabinet unit
AC/DC unit, compact	AC/AC unit ready to be connected up	AC/AC units are ready to be connected up	AC/AC unit, ready to connect up, DC bus system for several motors connected to a common DC bus	AC/AC unit ready to be connected up
IP00/IP20	Air-cooled IP20 (opt. IP42), liquid-cooled IP41 (opt. IP54)	Air-cooled IP22 (opt. IP42) Liquid-cooled IP43 (opt. IP54)	IP43 (opt. IP54)	Control section: IP20 Power unit: IP41, optional IP54
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
6 ... 2508 kW (parallel connection up to 30 MW)				
–	2.8 ... 120 MW	820 ... 17,000 kW (for induction motors)	2800 ... 31,500 kW	3000 ... 36,000 kW
–	Controlled	Uncontrolled	Controlled	Controlled
Yes, with the appropriate version	Yes	No	Yes	Yes
	0 ... 125 Hz	0 ... 250 Hz		0 ... 30 Hz
–	–	Yes		–
–	Yes	Yes		Yes
–	–	–		–
Yes	Yes	Yes		Yes
DC motors	–	Yes		Yes
	Yes	Yes		Yes
	–	–		–
	–	–		–
40 ms	100 ... 2000 ms	15 ... 35 ms	15 ... 20 ms	–
6 ... 9 ms	40 ... 100 ms	5 ... 10 ms	5 ms	–
–	–	–	–	–
–	–	–	–	–
BICO technology, technology controller, free function blocks, automatic restart, Drive Control Chart	Flying restart, automatic restart, kinetic buffering, Drive Control Chart, BICO technology			Flying restart, automatic restart, Drive Control Chart, BICO technology
–	–	–	STO	
RS 232, RS 485, PROFIBUS DP, PROFINET	PROFIBUS DP, PROFINET	RS 232, RS 485, PROFIBUS DP, PROFINET		PROFIBUS DP
D23.1	–	D12		–

LS: Safely Limited Speed SSM: Safe Speed Monitor

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Subject to change without prior notice 03/11
Order No.: E20001-A200-M112-X-7600
DISPO 21510
GM.XXXSI.52101 WS 031112.0
Printed in Germany