

An aerial photograph of a lush green park. A network of light-colored, sandy paths crisscrosses the landscape, forming a star-like pattern with multiple junctions. The paths are surrounded by dense green grass and numerous trees, some with light green foliage and others with darker green. Small figures of people can be seen walking along the paths, providing a sense of scale.

SIEMENS

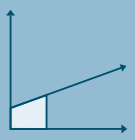
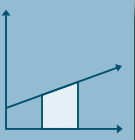
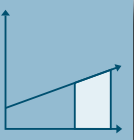
Ingenuity for life

For every destination,
the optimum drive

SINAMICS –
the seamless and integrated drives
family for every application

[siemens.com/sinamics](https://www.siemens.com/sinamics)

SINAMICS – for every application, power and performance

Use	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	Conveyor belts Roller conveyors Chain conveyors Vertical material handling Elevators Escalators Gantry cranes Marine drives Cable railways	Elevators Container cranes Mine hoists Opencast 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 Main press drives Printing machines
Machining		Main drives for <ul style="list-style-type: none">• Turning• Milling• Drilling	Main drives for <ul style="list-style-type: none">• Drilling• Sawing	Main drives for <ul style="list-style-type: none">• Turning• Milling• Drilling• Gear cutting• Grinding

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

SINAMICS is the most comprehensive drive family available today. It is based on a straightforward, standard engineering, is energy-efficient and so future-proof that it can keep up with every innovation step. Whatever direction you take, Siemens can offer you the optimum drive for it. Select your application, find your converter – power and performance for each and every application. SINAMICS – the powerful name in drive technology.

At home in your sector

No matter whether it involves the operation of pumps, fans, compressors or moving conveyor belts or elevators, whether processing in mills or extruders, whether milling, turning, drilling or sawing – with SINAMICS, you always achieve your goals. Pumping, ventilating and compressing as well as moving, processing and machining – these are all applications, where Siemens can 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. You can minimize your costs with SINAMICS – with seamless and integrated tools for selecting, engineering and commissioning, which facilitate fast, straightforward engineering at a favorable price.

Perfect interaction based on Integrated Drive Systems (IDS)

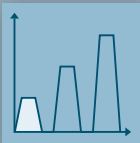
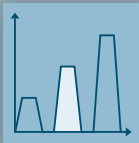
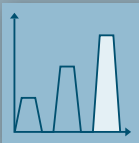
Siemens Integrated Drive Systems (IDS) are the only real complete solution for complete drive trains worldwide. IDS guarantee that all of the drive components seamlessly operate with one another. Converters and motors as well as couplings and gearboxes are perfectly coordinated and harmonized with one another. This means that you profit from maximum productivity, highest energy efficiency and reliability. Combined with additional drive components, the extensive range of SINAMICS converters provides solutions for almost any drive application – and seamless integration is a given.

Not only this, Integrated Drive Systems secure a real value-added by ensuring a shorter time to market and time to profit – and consequentially follow the path to digitalization set out with Industrie 4.0.

- Components that interact perfectly with one another in the drive train
- Integrated in automation technology (TIA Portal)
- Software and services over the complete lifecycle

Integrated Drive Systems – for higher efficiency, availability and productivity.


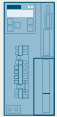

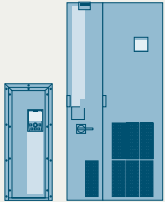

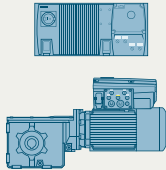
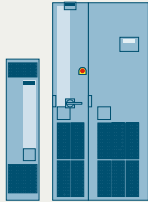
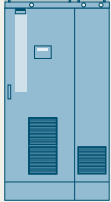
- Highest efficiency based on optimized drive systems
- Highest possible flexibility as perfectly embedded in Totally Integrated Automation
- Highest degree of availability thanks to powerful tools and intelligent software

Discontinuous motion		
Basic	Medium	High
		
Hydraulic pumps Dosing pumps		Descaling pumps Hydraulic pumps
Accelerating conveyors Storage and retrieval machines	Accelerating conveyors Storage and retrieval machines Cross cutters Roll changers	Storage and retrieval machines Robotics Pick & place Rotary indexing machines Cross cutters Roll feeds Engaging/disengaging function
Tubular bagging machines Single-axis motion control such as <ul style="list-style-type: none"> • Position profiles • Path profiles 		Servo presses Rolling mill drives Multi-axis motion control <ul style="list-style-type: none"> • Multi-axis positioning • Cam discs • Interpolations
Axis drives for <ul style="list-style-type: none"> • Turning • Milling • Drilling 	Axis drives for <ul style="list-style-type: none"> • Drilling • Sawing 	Axis drives for <ul style="list-style-type: none"> • Turning • Milling • Drilling • Lasering • Gear cutting • Grinding • Nibbling and punching

The entire family at a glance

With SINAMICS, Siemens is providing a platform, that satisfies the high requirements in the low-voltage, DC voltage and the medium-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, plant and machinery 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 that are extremely easy to use, have a high efficiency and have integrated safety technology.

Low voltage AC							
Basic Performance		General Performance					
							
SINAMICS V20	SINAMICS V90	SINAMICS G120C	SINAMICS G120P / G120P Cabinet	SINAMICS G120	SINAMICS G110D / G120D / G110M	SINAMICS G130 / G150	SINAMICS G180
V/f control	Servo control (speed and torque) with encoder	V/f control, vector control without encoder		V/f control, vector control with/without encoder	V/f control (G110D), sensorless vector control (G120D / G110M)	V/f control, vector control with/without encoder	V/f control, vector control with encoder
0.12 – 30 kW	0.05 – 7 kW	0.55 – 132 kW	0.37 – 630 kW	0.55 – 250 kW	0.37 – 7.5 kW	75 – 2,700 kW	2.2 – 6,600 kW
Pumps, fans, compressors, conveyor belts, mixers, crushers, spinning machines, textile machines, refrigerated display cabinets, fitness equipment, ventilation systems	Handling machines, packaging machines, automatic assembly machines, metal-forming machines, printing machines, winders and unwinders	Pumps, fans, compressors, conveyor belts, mixers, mills, extruders	Pumps, fans, compressors, building technology, process industry, HVAC	Pumps, fans, compressors, conveyor belts, mixers, mills, extruders, single-axis positioning applications in plant and machinery construction	Conveyor technology, single-axis positioning applications (G120D)	Pumps, fans, compressors, conveyor belts, mixers, mills, extruders	Sector-specific for pumps, fans, compressors, conveyor belts, extruders, mixers, mills, kneaders, centrifuges, separators

Engineering tools:

*Exceptions:


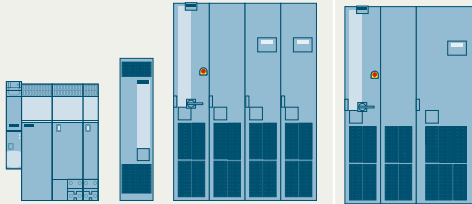

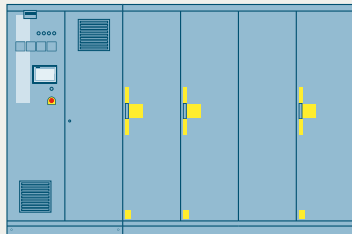
V20: needs no tool; V90: Commissioning tool SINAMICS V-ASSISTANT; G180: Commissioning software IMS (Inverter Management Software)

Customized solutions

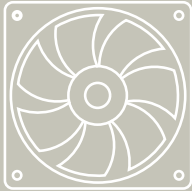
Whether single- or multi-axis applications, basic speed control or closed-loop servo control with a high dynamic performance: In order to cost-effectively address customized drive solutions, a well-conceived system is demanded – a system that ensures that only those components and functions that are required by the specific application are actually used.

Innovative platform concept

Independent of the power and performance, all of the products of the family are based on the same hardware and software platform. This established development strategy offers you some unique advantages: standard operation, the same selection and commissioning tools, identical options and minimum training costs.

			DC voltage DC	Medium voltage AC		
	High Performance		For basic applications and demanding applications	For demanding applications with high power ratings		
						
SINAMICS S110	SINAMICS S120/S120M	SINAMICS S150	SINAMICS DCM	SINAMICS GL150/SL150	SINAMICS SM120 CM / SM150/GM150	SINAMICS GH150/GH180 (cell-based)
Servo control	V/f control, vector control with/without encoder, servo control with/without encoder		Speed control, torque control	V/f control, vector control		
0.55–132 kW	0.55–5,700 kW	75–1,200 kW	6 kW–2,5 MW	2.8–85 MW	0.8–31.5 MW	0.12–28,5 MW
Single-axis positioning applications in plant and machinery construction	Production machines (packaging, textile and printing machines, paper machines, plastics machines), machine tools, plants, process lines and rolling mills, marine and test stands	Test stands, cross cutters, centrifuges	Rolling mill drives, wire drawing machines, extruders and kneaders, cable railways and lifts, test stand drives	Pumps, fans, com- pressors, mixers, ex- truders, mills, rolling lines, mine hoist drives, excavators, test stands, ships' drives, conveyor belts, blast furnace blowers	Pumps, fans, test stands, ore convey- ing systems, ore mills, compressors, excavators, marine drives	Pumps, fans, compressors, mills, crushers, conveyor systems, retrofit projects

Drive Technology Configurator – selection and configuration
 SIZER – simple planning and engineering
 STARTER and SINAMICS Startdrive – 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

With SINAMICS V20 up to SINAMICS GL150 – from 0.12 kW up to 85 MW – every conceivable centrifugal pump drive can be implemented for building technology, water supply and the process industry.

Energy consumption can be slashed by up to 70% by operating pumps at a variable speed.



Performance*)	Continuous motion	
	Basic	Medium
Use		
Pumping/ventilating/compressing	Centrifugal pump	
Supply voltages	1AC 200–240 V / 3AC 380–690 V / 3AC 2.3–12 kV	
Power	0.12 kW–85 MW	
Degree of protection	IP00–IP55	
SINAMICS platform	SINAMICS V20 SINAMICS G120P SINAMICS G120C SINAMICS GM/GL150 SINAMICS GH180	SINAMICS G120P SINAMICS G130/G150 SINAMICS G180 SINAMICS GM/GL150 SINAMICS GH180 SINAMICS GH150

*) Requirements relating to torque / speed / functionality

Further advantages:

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

Gas compressors

Drive solutions for gas compressors in all sectors and power classes from 0.12 kW to 85 MW. With SINAMICS, every conceivable compressor application can be implemented – when compared to gas turbine concepts, significantly more flexible, efficient, quiet and reliable. With significantly lower maintenance costs.



Performance*)	Continuous motion	
	Basic	Medium
Use		
Pumping/ventilating/compressing	Turbo compressor; reciprocating compressor	
Supply voltages	1AC 200–240 V / 3AC 380–690 V / 3AC 2.3–12 kV	
Power	0.12 kW–85 MW	
Degree of protection	IP00–IP55	
SINAMICS platform	SINAMICS V20 SINAMICS G120P SINAMICS G120C SINAMICS GM/GL150 SINAMICS GH180 SINAMICS GH150	SINAMICS G120P SINAMICS G130/G150 SINAMICS G180 SINAMICS GM/GL150 SINAMICS GH150 SINAMICS GH180

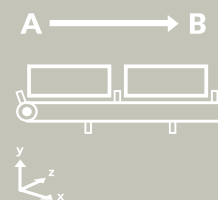
*) Requirements relating to torque / speed / functionality

Further advantages:

- Up to 70% lower energy demand for 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 storage and retrieval machines and large conveyor belts are just two examples from the wide range of applications.



Storage and retrieval machines

SINAMICS S110 and S120, with power ratings from 0.12 kW up to 107 kW, are predestined for controlling the motion of synchronous and induction motors in storage and retrieval machines. Depending on the specific requirement, you can select between a solution based on the drive-integrated positioning EPos function, 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 380–480 V		
Power	0.37–132 kW		
Degree of protection	IP20		
SINAMICS platform	SINAMICS G110M SINAMICS V90	SINAMICS G120D SINAMICS S110	SINAMICS S120

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

Further advantages:

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



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.

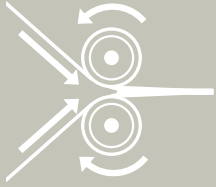
Performance*) Use	Continuous motion	
	Basic	Medium
Moving	Conveyor systems; chain conveyors; roller conveyors	
Supply voltages	3AC 380–690 V / 3AC 2.3–4.16 kV	
Power	200 kW–40 MW	
Degree of protection	IP00–IP55	
SINAMICS platform	SINAMICS G130/G150 SINAMICS G180 SINAMICS GM150/SL150 SINAMICS SM150 SINAMICS SM120 CM SINAMICS S120	

*) Requirements placed on the torque accuracy / speed accuracy / positioning accuracy / axis coordination / functionality

Further advantages:

- Energy consumption slashed by up to 20% when using variable-speed conveyor belt operation
- Power is exchanged between regenerating and motoring motors
- Soft, jerk-free acceleration reduces the stress on gearboxes, 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. Preconfigured function modules result in significantly lower costs and shorter time. Foil stretching and injection molding machines are two examples.

Foil stretching machine

When implementing multi-motor drives, for instance in a master-slave on a foil stretching machine, the SINAMICS S120 greatly increases the productivity when compared to conventional drive concepts.



Performance*)	Continuous motion	
	 High	
Use		
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	0.55–5,700 kW	
Degree of protection	IP20	
SINAMICS platform	SINAMICS S120	

*) Requirements regarding torque accuracy / speed accuracy / functionality



Additional advantages:

- Individual closed-loop control of each drive location
- High degree of flexibility through fast, simple reequipping
- Overview of the complete plant or system, production and possible faults using a seamlessly integrated automation concept

Injection molding machine

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



Performance*)	Discontinuous motion	
	 Medium	 High
Use		
Processing	Dosing; injection; close tool; ejector; carrier	
Supply voltages	3AC 380–480 V	
Power	0.55–250 kW	
Degree of protection	IP20	IP20
SINAMICS platform	SINAMICS S110 SINAMICS V90	SINAMICS S120

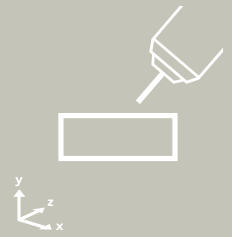
*) Requirements regarding torque accuracy / speed accuracy / positioning accuracy / axis coordination / functionality

Additional advantages:

- Faster tool change based on standard components
- Highest degree of flexibility thanks to a scalable solution
- Low environmental stress 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 and complex versions up to special machines, for example, bending or deburring machines.



Drilling machine

With torques of between 0.18 and 1,145 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 address a wide range of performance requirements.

Performance*)	Continuous motion	Discontinuous motion
Use	 Medium	 Medium
Machining	Drilling spindle	Spindle feed
Supply voltages	3AC 380–690 V	3AC 380–690 V
Torque	24–1,145 Nm	0.18–48 Nm
Degree of protection	IP20	IP20
SINAMICS platform	SINAMICS S110	SINAMICS S110

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



Additional advantages:

- High degree of productivity through fast retooling
- 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 2,602 Nm.

Performance*)	Continuous motion	Discontinuous motion
Use	 High	 High
Machining	Milling spindle	X/Y/Z axes adjustment; turning / swiveling milling spindle
Supply voltages	3AC 380–690 V	3AC 380–690 V
Torque	10–2,602 Nm	0.08–1,651 Nm
Degree of protection	IP20	IP20
SINAMICS platform	SINAMICS S120	SINAMICS S120

*) Requirements regarding torque accuracy / speed accuracy / positioning accuracy / 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



Siemens supports you when identifying energy-saving potential and allows the energy efficiency of products and applications to be analyzed. We offer a professional portfolio of tools, from configuring basic drive components up to engineering and ordering complex drive systems and solutions. Siemens also provides you with the optimum solution when it comes to commissioning and integrating into the automation landscape.

Simple entry using the DT Configurator

Irrespective of which direction you take or your particular application – SINAMICS has the optimum converter to take you forward. The DT Configurator supports you, to select the optimum drive solution for your particular application.

The Drive Technology Configurator (DT Configurator) supports you when configuring the optimum drive products for your application – from gearboxes, motors, converters and the associated options and components up to control systems, software licenses and connection systems. Whether with detailed product knowledge or just a little: You can easily and quickly configure your particular drive using product group pre-selectors, by specifically navigating through selection menus or by entering article numbers directly to select the products.

DT Configurator supports you

- when selecting the appropriate converter – expert knowledge is not required
- with the subsequent ordering process through the Industry Mall

DT Configurator supplies you with

- CAD files
- Operating instructions
- 2-D/3-D dimension drawings
- Certificates
- EPLAN macros in the edz format
- Technical data sheets
- Product images

By transferring the parts list into the Industry Mall shopping cart, products can be immediately ordered without having to be entered twice.

In order to avoid making ordering mistakes, the article number is checked to ensure that it is correct.



Engineering with SIZER ...

SINAMICS sets itself apart as a result of its seamless and integrated engineering. Once you know one converter, then in principle 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-axis 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 gearbox
- 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
- calculating the load-dependent energy demand
- calculating the performance
- calculating the line harmonics
- part lists with the associated ordering data

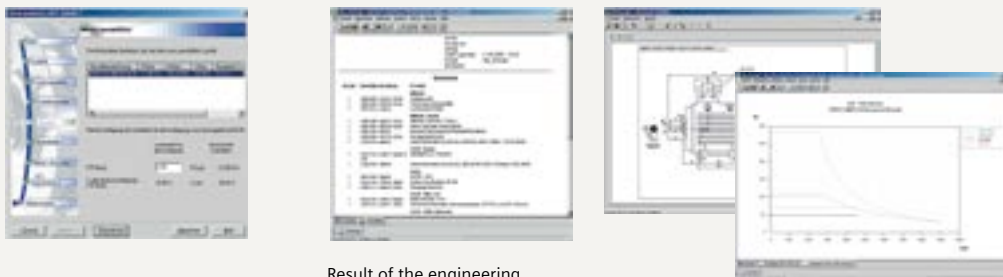
In addition, using an integrated EDP interface, SIZER allows a parts list to be exported to an ordering system (e.g. SAP).

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 with the most favorable energy efficiency.

Engineering with SIZER



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



... commissioning with STARTER

STARTER is an intelligent tool that you can use to simply configure and commission the drive components for all SINAMICS drives, more specifically 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.

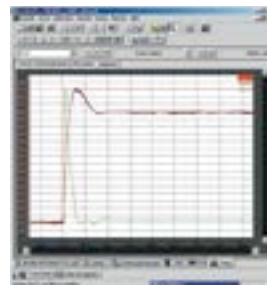
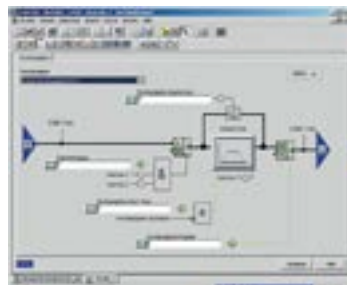
Using integrated test functions, you can check your entries and optimize parameters. Velocity characteristics, as well as setpoint and actual value curves, are logged over time and processed to create transparent graphics for clear diagnostics and fast orientation.

Even stronger in a team

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

The same applies when operating the drives in conjunction with the SIMATIC automation system. Embedded in STEP 7, the drive technology is completely integrated into the PLC environment. Completely integrated automation solutions are obtained by linking SINAMICS with SIMOTION, SIMATIC or SINUMERIK machine tool control solutions. These solutions are from a single source that can be engineered, parameterized and commissioned using one central engineering software. This concept also pays off when it comes to service, as it facilitates simple diagnostics and troubleshooting on site or through teleservice.

STARTER and SIZER are available in German, English, French and Italian, STARTER is additionally available in Spanish. Further, for SIZER we provide an online help in Japanese and Chinese.



Optimally integrated in the automation

The SINAMICS G120 family of converters and SINAMICS S120 are already integrated in the Totally Integrated Automation Portal (TIA Portal) via SINAMICS Startdrive.

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 and SIMOTION control systems.

One engineering tool for drives and controllers

With SINAMICS Startdrive, SINAMICS G120 and S120 drives are seamlessly integrated into SIMATIC automation solutions and can easily be parameterized, commissioned, and diagnosed. This saves time, reduces engineering errors and training costs.

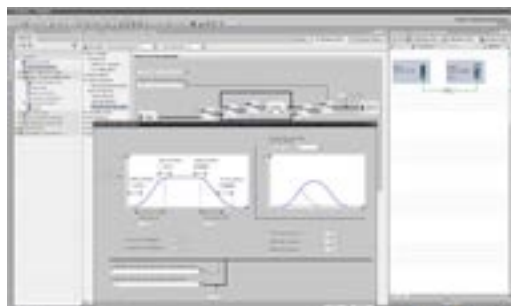
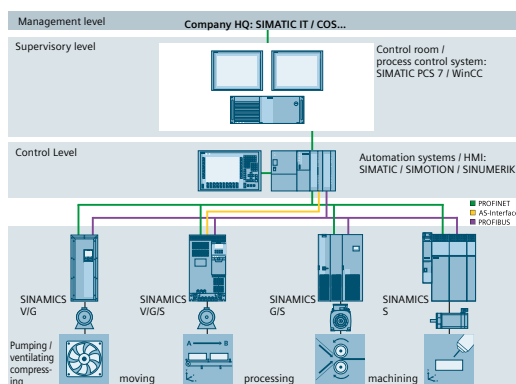
The basic SINAMICS V90 servo drive system can be simply integrated into the SIMATIC automation environment via PROFINET using the Hardware Support Package (HSP) – and with just three clicks can be simply commissioned.

Standard drive and control engineering

- Automatic synchronization of bus address and telegram settings between controller and converter
- Perfect interaction of Safety Integrated functions – as well as fail-safe communication via PROFIsafe
- Simplified series commissioning using a copy function and automatic parameter download from the controller to the drive
- Remote maintenance using routing to the drive beyond network boundaries
- Converter diagnostic information available in the PLC, web server and HMI – without requiring any programming
- Can be simply connected to SIMATIC motion control functions
- Identical trace function for converter and control

Quick familiarization and high user-friendliness

- Full support of the TIA Portal features such as drag & drop, libraries and graphic network configuration
- Workflow-oriented user navigation
- Set-up wizards and optimized interfaces for experts and beginners



SINAMICS is part of TIA, and in conjunction with the SIMATIC 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.

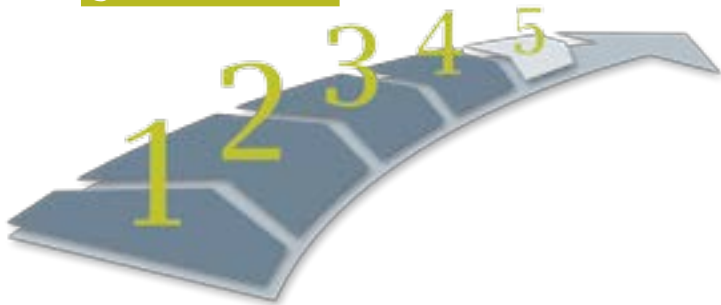
The drive that optimizes your energy efficiency

UP TO
60%
ENERGY SAVINGS

Electric drives use about two thirds of all industrial electric power. This is why it is decisive that drive technology is used from the word go so that already in the engineering phase, future energy consumption can be effectively reduced – thus optimizing plant/system availability and process reliability.

Completely leverage the energy efficiency potential in your production environment with our comprehensive portfolio. This addresses complete product development and production: from the product design through production planning and engineering up to actual production and services. With SINAMICS, we can offer you a seamless and integrated range of energy efficient drive solutions to sustainably secure higher energy efficiency, productivity and competitiveness.

- 1 Product design
- 2 Production planning
- 3 Production engineering
- 4 Production
- 5 Service



Energy transparency in all engineering phases

Already in the engineering phase, the SIZER engineering software provides you with information about your specific energy demand. It visualizes the energy consumption in the complete drive train, and compares this with different system concepts.

High energy-saving potential through variable-speed operation

Controlling the motor speed as a function of the demand using SINAMICS leverages enormous energy-saving potential, especially when it comes to pumps, fans and compressors. Here, energy savings of up to 60% are possible, in individual cases even up to 70%. This is because the power drawn in partial load operation is always adapted to the actual demand.

SINAMICS in combination with SIMOTICS

The seamless and integrated engineering goes far beyond just SINAMICS – up to a higher-level automation system and a wide range of energy-efficient SIMOTICS low-voltage motors with a wide spectrum of power and performance classes. When compared to conventional motors, these have an efficiency that is up to 10% higher.

Determining cost-saving potential with SinaSave

Using SinaSave, the energy-saving potential when using SINAMICS converters can be estimated. To do this, the web-based tool takes into account all of the relevant variables, such as the power and load data of the application, control mode and operating profile. In addition to the energy-saving potential in a specific case, you can also obtain a financial assessment as well as the expected payback time.

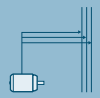
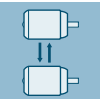



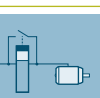
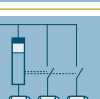



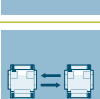
www.siemens.com/sinasave

Intuitively configuring the measuring components

Ready for
SIMATIC
Energy Suite

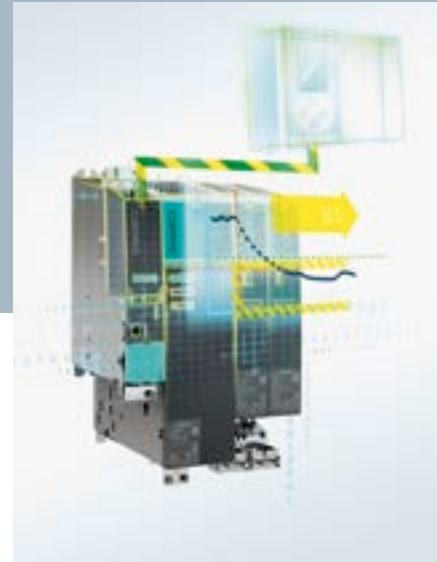
SIMATIC Energy Suite – as integrated option for the TIA Portal – efficiently links energy management with the automation, making energy usage in your production transparent. Further, as a result of the simplified configuration of the energy measuring components, e.g. the SINAMICS G converter series, engineering costs are significantly reduced. Based on the standard and integrated connection to higher-level energy management systems or cloud-based services, you can seamlessly expand the energy data that has been acquired to create an energy management system spanning several locations of facilities.

www.siemens.com/energysuite

Integrated energy-saving functions		
Recovering braking energy		Energy savings of up to 70% can be obtained by recovering the braking energy. It simplifies system cooling and allows a more compact design.
Energy balancing in the DC link		For coupled drives, the power loss in the overall system can be minimized using energy balancing along the common DC bus.
Storing excess energy		Transient power peaks can be covered and flicker avoided by using additional capacitors in the DC link. As a result, regenerative energy is stored rather than wasted in the form of heat.
Automatic adaptation of the operating point		In the ECO mode, the motor operating point in the partial load range is automatically adapted and optimized. This allows motor losses to be reduced.
Energy-saving when idle		If variable-speed drives are only temporarily used, then they can be switched into the hibernation mode. Depending on the demand, the drive is automatically reactivated.
Reducing the power loss		In the bypass mode, the converter can be electrically bypassed as soon as the motor is frequently operating in the range of its rated speed. This means that converter losses can be avoided and the overall efficiency increased.
Cascading drives		If, in applications, the power demand is distributed over several motors, the energy demand can be optimized by switching-in and switching-out these motors in stages using partially or fully controlled cascades in conjunction with converters and motor starters.
Optimized pulse pattern		As a result of the optimized clock frequency and pulse pattern, SINAMICS G and S converters are perfectly harmonized and coordinated with SIMOTICS motors. The advantages: optimized operating response and system efficiency, lower system losses as well as lower temperature rise and noise.
Reactive power compensation		The capacitive and/or inductive reactive power in the machine is reduced by using SINAMICS converters with Active Line Modules. This means that expensive reactive power compensation systems can be eliminated.
Energy-saving meter/energy usage meter		The energy usage in operation is measured. Using the energy-saving meter, the energy saved is cumulated over the operating hours and output in comparison to a fixed-speed application.
DC link coupling with SINAMICS V20		Applications that use SINAMICS V20 drives with the same power rating can share a common DC bus to reuse the regenerative energy.

SINAMICS Safety Integrated

Simply safe – twice the efficiency



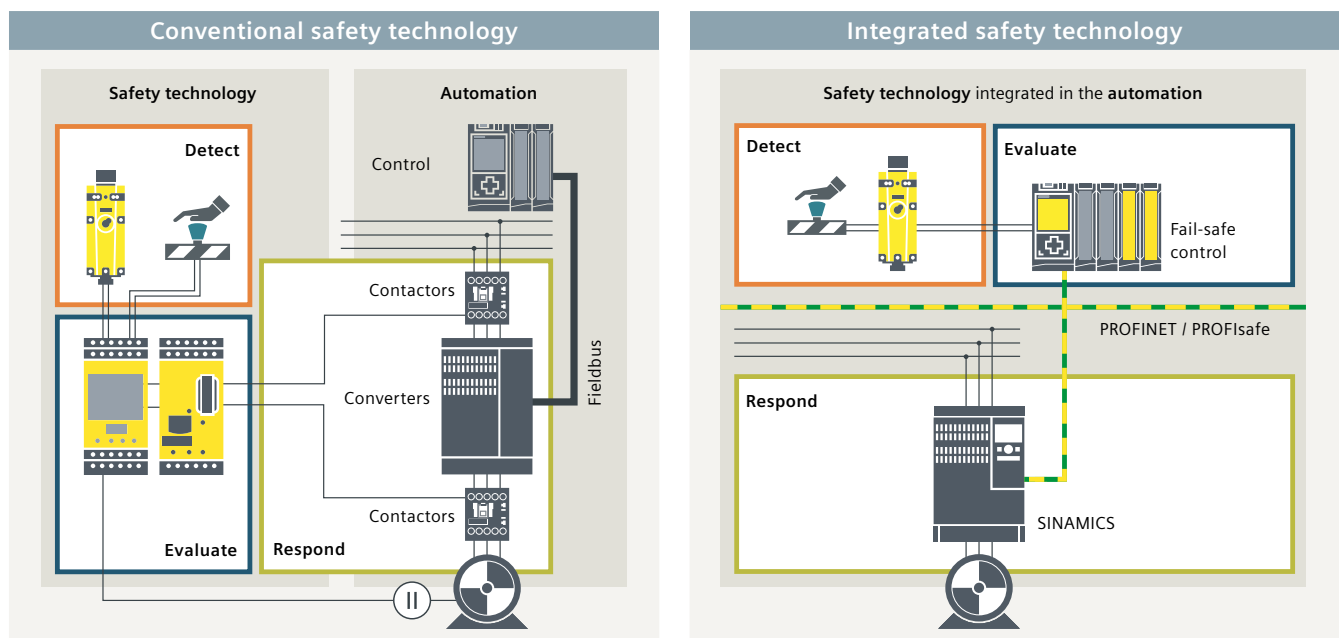
Automated operation of plants and machinery assumes that suitable safety functions are in place, so that operating and maintenance personnel can always work safely in any situation. For SINAMICS with Safety Integrated, these functions are already integrated in the drive.

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.

And even more: 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.

www.siemens.com/safety-drives



Integrated safety technology reduces the number of components and wiring costs

"The prevention of accidents should not be regarded as a requirement of the law, but rather as an act of human obligation and economic sense."

Werner von Siemens, 1880

Safety functions in SINAMICS drives can be split up into four categories:

Functions to safely stop the drive:

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.

Functions for safe brake management:

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.

Safe brake best (SBT)

"Safe Brake Test" checks the specified holding torque of a brake.

Functions for monitoring drive motion:

Safely-limited speed (SLS) with/without encoder

"Safely Limited Speed" prevents specified maximum speeds from being exceeded.

Safe speed monitor (SSM) with/without encoder

"Safe Speed Monitor" signals once a specified speed has been fallen below.

Safe direction (SDI) with/without encoder

"Safe monitoring of motion/direction of rotation" ensures that the selected direction of rotation is maintained.

Functions for safely monitoring the position of a drive:

Safely-limited position (SLP) with encoder

"Safely Limited Position" prevents a specified position from being exceeded.

Safe position (SP)

"Safe Position" transfers the position values, safely determined in the drive, to a safety-related control system via safe PROFIsafe communication.

Drive	Currently available integrated safety functions										
	STO	SS1	SS2	SOS	SBC	SLS	SSM	SDI	SLP	SP	SBT
SINAMICS V90	✓										
SINAMICS G120C	✓										
SINAMICS G120	✓	✓			✓	✓	✓	✓			
SINAMICS G120P Cabinet	✓	✓									
SINAMICS G120D / G110M*	✓	✓				✓	✓	✓			
SINAMICS G130 / G150 / G180**	✓	✓			✓	✓	✓	✓			
SINAMICS S110	✓	✓	✓	✓	✓	✓	✓	✓			
SINAMICS S120 Booksize and Blocksize	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SINAMICS S120 Chassis and Cabinet Modules	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SINAMICS S150	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SINAMICS SM150	✓										

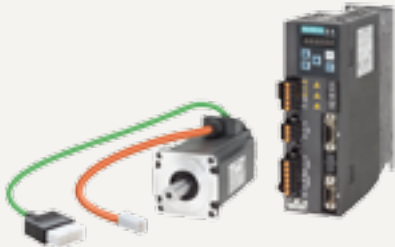
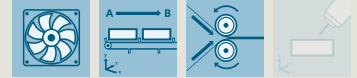
*G110M only STO **G180 only STO



SINAMICS V20

The cost-effective and reliable converter for basic applications

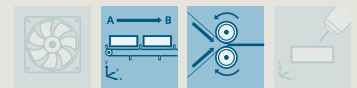
- Suitable for pump, fan, compressor and conveyor drives as well as for basic drive applications
- Integrated energy-saving mode in the idle state
- with FSAA, the smallest converter in the SINAMICS family



SINAMICS V90

The performance-optimized servo drive system that is simple to operate

- Reliable combination comprising SINAMICS V90 servo converter (as 200 V or 400 V version in four frame sizes) and SIMOTICS S-1FL6 servomotor as Low Inertia (shaft heights 20, 30, 40, 50) or High Inertia version (shaft heights 45, 65, 90)
- Pulse sequence or PROFINET version

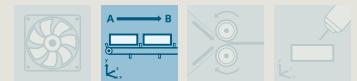


SINAMICS G110D / G120D / G110M

The distributed converter for basic up to high performance solutions

The easy-to-replace converters have a low profile, are compact and extremely rugged as a result of the metal housing.

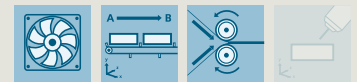
- **G110D:** for basic conveyor-related applications
- **G120D:** for demanding drive applications in conveyor technology
- **G110M:** distributed converters for SIMOGear geared motors and SIMOTICS motors



SINAMICS G120C

The compact and versatile converter with optimum functionality

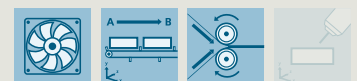
- Compact standard drive
- Perfect integration in the automation environment (TIA)
- With BOP-2 or IOP-2 operator panel
- STO safety function integrated as standard



SINAMICS G120

The modular converter – space-saving, safe and rugged

- Standard drive for universal applications, with a higher power density in a space-saving design
- Low line harmonics
- Parameter copy function for series commissioning
- Available in voltage versions from 200 up to 690 V
- Integrated comprehensive safety concept up to PL e / SIL 3



SINAMICS G120P / G120P Cabinet

The specialist for industrial applications and building technology

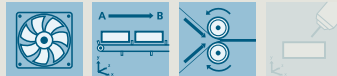
- Applications: simple speed control as well as complex closed-loop control tasks involving pumps, fans and compressors
- With the BOP-2 or IOP-2 operator panel
- High energy efficiency using new and optimized power units – as well as integrated DC link reactor
- Voltage versions 380 to 690 V
- PROFIBUS and PROFINET interface to communicate in industrial networks
- BACnet, Modbus and FLN P1 interfaces to connect to the building supervisory control



SINAMICS G130/G150

The universal converters for high power ratings

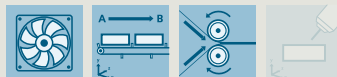
- Quiet and compact
- Applications: pumps, fans, compressors, extruders, mixers, mills etc.
- Service-friendly thanks to device modules that are easy to access
- 100% line supply voltage at the motor without any secondary effects
- When required, with integrated line harmonics filter and dv/dt filter



SINAMICS G180

The specific converter for the oil & gas, chemical and process industries

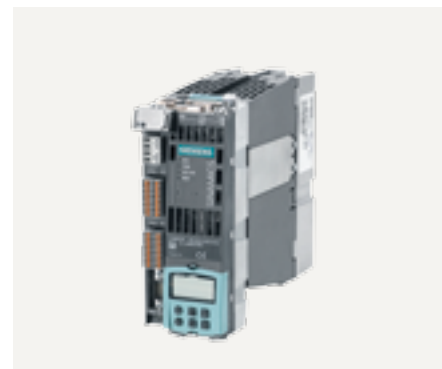
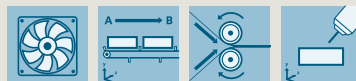
- Sector-specific features such as dv/dt filter and PTC evaluation
- Applications: pumps, fans, extruders, compressors – also in hazardous zones
- Voltage levels: 400 V / 500 V / 690 V
- Line side: 6 to 24 pulse or LHF (Line Filter)
- From 200 kW, air- or liquid-cooled
- ATEX-certified motors for hazardous zones



SINAMICS S110

The specialist for simple positioning tasks

- Applications: basic positioning of individual axes with synchronous or induction motors
- Servo control

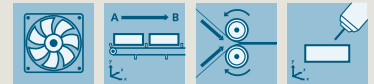




SINAMICS S120

The flexible, modular drive system for sophisticated and demanding single-axis/multi-axis applications

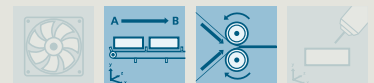
- Servo / vector control, V/f control
- Freely configurable logic and closed-loop control functions
- High degree of scalability, flexibility, combinability
- Energy-efficient as a result of energy recovery and/or DC link
- Air-cooled or liquid-cooled version (dependent on the format)
- AC/AC drives for single-axis applications
 - Can be combined as required with other formats
- DC/AC devices for multi-axis applications
 - Up to 5,700 kW in a liquid-cooled version
 - Energy recovery possible, a controlled DC link as well as lower line harmonics depending on the Line Module selected
 - Highly compact using double-axis modules
- Cabinet Modules specifically for multi-axis applications in plant construction
 - Preconfigured cabinet elements
 - Also available in air-cooled and liquid-cooled versions



SINAMICS S150

The converter for demanding applications in the high power range

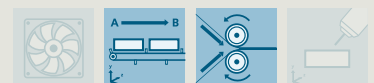
- Applications: test stands, elevators, cranes, conveyor belts, presses, cable winches, centrifuges, cross conductors, cross shears etc.
- 4Q operation
- Rugged with respect to line voltage fluctuations, reactive power can be compensated



SINAMICS DCM

The scalable converter for basic and demanding applications

- Applications: DC applications in all sectors, such as rolling mills, wire-drawing machines, extruders, kneaders, cable railways, lifts, test stands etc.
- Maximum degree of scalability: Standard or Advanced Control Unit – or a combination of both
- Highest degree of flexibility to adapt to plant/system-specific requirements
- High plant availability through maximum reliability, service-friendly design and redundant concepts
- As ready-to-connect converter device or Control Modules for retrofit projects

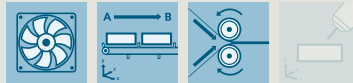


SINAMICS GL150/SL150

The cycloconverter for synchronous and induction motors

Extremely reliable and almost maintenance-free, in a compact design with a high power density

- **GL150 – for synchronous motors with the highest power density**
 - Minimum number of components as a result of the thyristor-based design
- **SL150 – for slow synchronous and induction motors with high torques**
 - 4Q as standard with energy recovery
 - Simple design with three-phase thyristor bridges permits a high efficiency and high reliability
 - High short-time overload capability

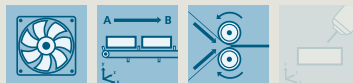


SINAMICS GH180/GH150

The converter for medium-voltage systems with single-axis or multi-axis configurations

A converter comprising a series of low-voltage power cells, which reliably and efficiently generates the required medium voltage at its output.

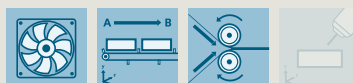
- Applications: pumps, fans, compressors, crushers, mills, retrofit projects etc.
- Very small footprint
- Output transformer, line filter and reactive power compensation not required



SINAMICS GM150/SM150/SM120 CM


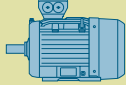
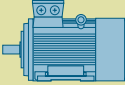
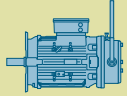
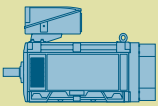
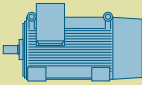
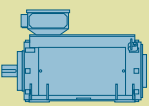
The universal drive solution for single- and multi-motor drives

- **GM150 – for high rating single-motor drives, which do not require energy recovery**
 - Applications: pumps, fans, compressors, extruders, mixers, mills, main ship drives etc.
 - V/f control and vector control with or without encoder
- **SM150 – for single- and multi-motor drives with a high dynamic performance, which must be capable of energy recovery**
 - Main applications: rolling mill and mining
 - Ideal for direct energy exchange between motoring and regenerating applications
- **SM120 CM – customer-specific drive systems for special requirements**
 - Applications: test stands, energy, marine / offshore, mining
 - 4-quadrant operation
 - Rugged and reliable
 - Motor- and line-friendly, long cables lengths possible



SINAMICS and SIMOTICS – a powerful team

Motor and drive converter operate perfectly together: a wide range of high efficiency low-voltage, high-voltage and motion control motors – as well as geared motors – are available to be teamed up with SINAMICS.

SIMOTICS							
	Low-voltage motors for line and converter operation						
	General Purpose SIMOTICS GP	Severe Duty SIMOTICS SD	Explosion protected SIMOTICS XP	Definite Purpose SIMOTICS DP	Flexible Duty SIMOTICS FD	Transstandard SIMOTICS TN	High Torque SIMOTICS HT
							
Power							
IEC:	0.09 – 45 kW	0.09 – 315 kW	0.09 – 1,000 kW	0.09 – 481 kW	200 – 1,800 kW	200 – 3,500 kW	150 – 2,100 kW
NEMA:	1 – 20 HP	1 – 400 HP	1 – 300 HP	1 – 250 HP			
Reluctance:	0.55 – 48 kW	0.55 – 48 kW					
Torque							
IEC:	0.61 – 293,8 Nm	1.3 – 2,070 Nm	0.61 – 8,090 Nm	2.5 – 3,142 Nm	610 – 14,600 Nm	800 – 22,500 Nm	6,000 – 42,000 Nm
NEMA:	1.5 – 60 lb-ft	1.5 – 1,483 lb-ft	11.5 – 1,187 lb-ft	1.5 – 1,104 lb-ft			
Reluctance:	3.5 – 191 Nm	3.5 – 191 Nm					
Speed	750 – 3,000 min ⁻¹	750 – 3,000 min ⁻¹	750 – 3,000 min ⁻¹	750 – 3,000 min ⁻¹	750 – 3,000 min ⁻¹	750 – 3,000 min ⁻¹	200 – 800 min ⁻¹
Applications	Pumps, fans and compressors with special demands regarding low weight	Pumps, fans, compressors, mixers, mills/ crushers, extruders, rolls with special requirements regarding the ruggedness – especially in the chemical and petrochemical industries	General industrial applications with special requirements relating to explosion protection for use in Zones 1, 2, 21 and 22 e.g. in the process industry	Marine, working and transport roller tables, harbor cranes, tunnels and shopping malls – as well as customized motors, adapted to address a specific application	Pumps, fans, compressors, conveyor belts, centrifuges, extruders, winches, hoisting gear in cranes, presses, paper machines, rolling mills, marine applications including propulsion	Pumps, fans, compressors, mixers, extruders in the chemical and petrochemical industry, in paper machines, in mining, in the cement industry, in the steel industry and marine applications	Paper machines, slow running pumps, mills, steel shears, bow thrusters, winches and main drives onboard ships
SINAMICS Converters	V20, G series, S series	V20, G series, S series	V20, G series, S120, S150	G series, S series	G series, S series	G series, S series	S150, S120

www.siemens.com/simotics



SINAMICS can be combined with a whole range of energy-efficient synchronous and induction motors. Motors that have been specifically optimized for converter operation are available in order to achieve the highest possible system utilization – a perfectly harmonized drive system that leverages its strengths from engineering through commissioning up to efficient operation.

Motion control motors					DC motors	High-voltage motors
Servomotors SIMOTICS S*		Main motors SIMOTICS M	Linear motors SIMOTICS L	Torque motors SIMOTICS T	SIMOTICS DC	SIMOTICS HV
Servomotors	Servo geared motors					
0.05 – 45.5 kW	0.3 – 7 kW					
0.08 – 280 Nm	Dep. on the geared motor, up to 8,160 Nm	13 – 12,435 Nm	150 – 10,375 Nm	10 – 7,000 Nm	256 – 44,500 Nm	up to 2,500,000 Nm
up to 10,000 min ⁻¹	up to 1,300 min ⁻¹	up to 40,000 min ⁻¹	up to 836 m/min	up to 1,200 min ⁻¹	up to 4,500 min ⁻¹	7 – 15,900 min ⁻¹
High-dynamic performance with high precision applications, for example, handling systems, storage and retrieval machines, wood, glass, ceramic and stone processing, packaging, plastics and textile machines, machine tools		Precisely rotating, rotary drives with a high dynamic performance, e.g. main drives in presses, printing machines, rolling mill drives and winders in foil machines and other converting applications, main spindle drives in machine tools	Applications with the highest requirements regarding dynamic performance and precision for linear motion, e.g. machining centers, turning, grinding, laser machining, handling and in the machine tool domain	Rotary axis applications with the highest requirements regarding precision and force, e.g. extruders, winders, rolling mill drives, rotary axes in machine tools, rotary indexing tables, tool magazines	Standard drive applications in all industrial areas and in the infrastructure	Pumps, fans, compressors, extruders, mills/crushers, conveyor belts, refiners, open cast mine excavators, main propulsion drives for ships, main rolling mill drives
S110, S120 V90 only in combination with SIMOTICS S-1FL6		G120, S110, S120, S150	S120	S120	DCM	GM150, SM150, SL150, GL150, SM120, GH180, GH150

* Values without 1FK2

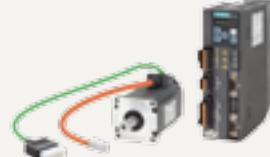
SIMOGEAR geared motors

When using geared motors, we recommend the range of SIMOGEAR geared motors from Siemens to achieve an optimum interaction with SINAMICS converters.

www.siemens.com/simogear

Technical data







Use









Designation		SINAMICS V20	SINAMICS V90	SINAMICS G120C
Continuous motion type (see selection tool P. 2-3)				
Pumping, ventilating, compressing		Basic		Basic
Moving		Basic		Basic
Processing		Basic		Basic
Machining				
Discontinuous motion type (see selection tool P. 2-3)				
Pumping, ventilating, compressing				
Moving			Basic	
Processing			Basic	
Machining				
Description		The cost-effective and reliable converter for basic applications	The performance-optimized servo drive system that is simple to operate	The compact and versatile converter with optimum functionality
Format		Blocksize device	Blocksize device	Blocksize device
Drive type		Ready-to-connect AC/AC device	Ready-to-connect AC/AC device	Compact AC/AC device
Degree of protection		IP20	Converters: IP20 motor: IP65	IP20
Supply voltage / power ranges				
1AC 200–240 V		0.12–3 kW	0.05–0.75 kW	–
3AC 200–240 V		–	0.05–2 kW	–
3AC 380–480 V		0.37–30 kW	0.4–7 kW	0.55–132 kW
3AC 500–600 V		–	–	–
3AC 500–690 V		–	–	–
3AC 660–690 V		–	–	–
1AC 85 V–3AC 950 V		–	–	–
3AC 2.3–11 kV		–	–	–
Energy recovery		–	–	–
Closed-loop control modes				
V/f control		yes	–	yes
Vector control with/without encoder		–	–	yes, without encoder
Servo control with/without encoder		–	yes	–
Motors	Induction motors	yes	–	yes
	Synchronous motors	–	yes	–
	Torque motors	–	–	–
	Linear motors	–	–	–
Technological functions		Integrated braking chopper for 7.5 kW to 30 kW, parameter cloning, integrated connection and application macros, Keep-Running mode, ECO mode, energy exchange, cascading	Auto tuning in real time, automatic suppression of machine resonance points, integrated braking resistor, integrated positioning function, switching over the open-loop control type, DI/DO parameterization	Flying restart, automatic restart, kinetic buffering, BICO technology, technology controller, free function blocks, compound braking, DC braking, dynamic braking
Safety functions		–	STO	STO
Communication profiles		USS/Modbus RTU	Pulse/direction interface, USS/Modbus RTU, PROFINET	PROFINET, PROFIBUS DP, EtherNet/IP, USS/Modbus RTU
PROFInergy		–	–	yes
PROFIsafe		–	–	yes
PROFIdrive		–	yes	yes
Additional energy-saving functions		yes	–	yes
Tools		DT Configurator	SINAMICS V-ASSISTANT, DT Configurator	STARTER, Startdrive, SIZER, DT Configurator
Catalog		V20 brochure/distribution catalog	V90 brochure	D31/distribution catalog

1) On request 2) Only DC/AC devices

Low voltage

					
SINAMICS G120P/G120P Cabinet	SINAMICS G120	SINAMICS G110M	SINAMICS G110D/G120D	SINAMICS G130	SINAMICS G150
Basic/medium	Medium	Basic	Basic/medium	Medium	Medium
	Medium			Medium	
	Basic				
	Basic		–/Basic		
	Basic				
The specialist for industrial applications and building technology	The modular converter – energy-efficient, reliable and rugged	The distributed converter for SIMOGEAR geared motors and SIMOTICS GP motors	Distributed drives from simple basic applications to demanding positioning tasks	The universal converters for high power ratings	
For wall/panel mounting, chassis devices and cabinet units	Blocksize device	Blocksize device	Separate from the motor	Chassis device	Converter cabinet unit
Modular AC/AC device Ready-to-connect AC/AC device	Modular AC/AC device	AC/AC device integrated in the motor	Ready-to-connect/modular AC/AC device	Modular AC/AC device	Ready-to-connect AC/AC device
Chassis units IP20 Devices for wall/panel mounting IP55 Cabinet units IP20 – IP54	IP20	up to IP66	IP65	IP00 / IP20	IP20–IP54
–	0.55–4 kW	–	–	–	–
–	0,55–55 kW	–	–	–	–
0.37–560 kW	0.55–250 kW	0.37–4 kW	0.75–7.5 kW	110–560 kW	110–900 kW
–	–	–	–	110–560 kW	110–1,000 kW
11–132 kW / 315–630 kW	11–132 kW	–	–	–	–
–	–	–	–	75–800 kW	75–2,700 kW
–	–	–	–	–	–
–	–	–	–	–	–
–	Optional	–	–/yes	–	
yes	yes	yes	yes (G110D)	yes	
yes, without encoder	yes	yes, without encoder	yes (G120D)	yes	
–	–	–	–	–	
yes	yes	yes	yes	yes	
yes ¹	yes ¹	–	–	yes, without encoder	
–	–	–	yes	yes, without encoder	
–	–	–	–	–	
Automatic restart, energy-saving mode, hibernation mode, flying restart, motor staging, 4-PID technology controllers, logic and arithmetic functions, extended emergency service mode, multi-zone controller, bypass mode	Flying restart, automatic restart, kinetic buffering, BICO technology, technology controller, free function blocks, compound braking, DC braking, dynamic braking	Stand-alone converter for customers to install/mount themselves or as complete drive unit (SIMOGEAR geared motor or SIMOTICS motor). Quick stop, limit switch function, free function blocks (PLC function), integrated braking resistor (optional), software braking technique, wall/panel mounting kit, repair switch	Flying restart, automatic restart, technology controller G110D: Quick stop, jog mode, control for motor holding and operating brake, electrical brakes G120D: BICO technology, free function blocks, motor and machine encoder evaluation, integrated positioning functionality	Flying restart, automatic restart, kinetic buffering, BICO technology, technology controller, Drive Control Chart, free function blocks	
STO, SS1	STO, SS1, SBC, SLS, SDI, SSM	STO	STO (G110D), SS1, SLS, SDI, SSM	STO, SS1, SBC, SLS, SDI, SSM, SBT	
PROFINET, PROFIBUS DP, EtherNet/IP, USS/Modbus RTU, BACnet MS/TP	PROFINET, PROFIBUS DP, EtherNet/IP, USS/Modbus RTU, BACnet MS/TP, CANopen	PROFINET, PROFIBUS DP, EtherNet/IP, USS/Modbus RTU	G110D: AS-Interface G120D: PROFINET, PROFIBUS DP, EtherNet/IP	PROFINET, PROFIBUS DP, EtherNet/IP, USS, CANopen	
yes	yes	yes	–/yes	yes	
–	yes	yes	–/yes	yes	
yes	yes	yes	–/yes	yes	
yes	yes	yes	Energy usage display / yes	yes	
STARTER, Startdrive, SIZER, DT Configurator	STARTER, Startdrive, SIZER, DT Configurator	STARTER, Startdrive, SIZER, DT Configurator	STARTER, SIZER, DT Configurator; G120D: Startdrive	STARTER, SIZER, DT Configurator	
D35/in part distribution catalog	D31/in part distribution catalog	D31	D31	D31	

								
SINAMICS G180	SINAMICS S110	SINAMICS S120M	SINAMICS S120					SINAMICS S150
Medium			High					
Medium			High					High
Medium			High					High
	Basic/medium		Medium/high					
	Medium		High					
	Medium	Medium/high	High					
	Medium	Medium/high	High					
	Basic/medium		Medium/high					
The specific converter for the oil & gas, chemical and process industries	The specialist for simple positioning tasks	The flexible, modular drive system for sophisticated and demanding single-axis/multi-axis applications						The converter for demanding applications in the high power range
Compact device, converter cabinet unit	Blocksize device	Integrated in the motor	Blocksize device	Chassis device	Booksize device	Chassis device	Cabinet Modules	Converter cabinet unit
Ready-to-connect AC/AC device	Modular AC/AC device	Modular AC/AC device	Modular AC/AC device	Modular AC/AC device	Modular DC/AC device			Ready-to-connect AC/AC device
IP20–IP54	IP20	IP65	IP20	IP20, optional: IP43	IP20	IP00 / IP20	IP20 (IP21 / IP23/ IP43 / IP54) IP55*	IP20 (IP21 / IP23 / IP43 / IP54)
–	0.55–4 kW	–	0.55–4 kW	–	–	–	–	–
–	–	–	0.55–55 kW	–	–	–	–	–
2.2–4,100 kW	0.55–132 kW	0.25–1.1 kW	0.55–132 kW	110–250 kW	1.6–107 kW	110–3,040 kW	4.8–3,040 kW	110–800 kW
2.2–5,300 kW	–	–	–	–	–	–	–	–
2.6–6,600 kW	–	–	–	–	–	90–5,700 kW	90–5,700 kW	75–1,200 kW
7.5–6,600 kW	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
–	–	yes, depending on the infeed	–	yes, depending on the infeed				yes
yes	yes	–	yes					yes
with encoder	–	–	yes					yes
–	yes	–	yes					yes
yes	yes	yes	yes					yes
yes	yes	yes	yes					yes
–	–	–	yes					yes
–	–	–	yes					–
Flying restart, kinetic buffering, automatic restart, DC current limiting, current and voltage control, line synchronization, process control, logic functions	Basic positioner, BICO technology, technology controller, controller optimization using auto tuning	Flying restart circuit, automatic restart, kinetic buffering, basic positioner, BICO technology, technology controller, Drive Control Chart, motion control in conjunction with SIMOTION, numeric control with SINUMERIK solution line						Flying restart, automatic restart, kinetic buffering, technology controller, Drive Control Chart, BICO technology
STO	STO, SOS, SBC, SS1, SS2, SLS, SDI, SSM	STO, SS1, SBC, SOS, SS2, SLS, SSM, SDI, SLP, SP, SBT	STO, SS1, SBC, SOS, SS2, SLS, SSM, SDI, SLP, SP, SBT					STO, SS1, SBC, SOS, SS2, SLS, SSM, SDI, SLP, SP, SBT
PROFIBUS DP, EtherNet/IP, Modbus TCP/IP, Modbus RTU, CANopen, on request: PROFINET	PROFINET, PROFIBUS DP, USS, pulse/direction interface	PROFINET, PROFIBUS DP, EtherNet/IP², USS, CANopen	PROFINET, PROFIBUS DP, EtherNet/IP², USS, CANopen, pulse/direction interface					PROFINET, PROFIBUS DP, EtherNet/IP, USS, CANopen
–			yes					yes
–			yes					yes
–			yes					yes
yes	–	yes						yes
IMS (Inverter Management Software), SIZER, DT Configurator	STARTER, SIZER, DT Configurator							STARTER, SIZER, DT Configurator
D18.1	PM22, D31	Siemens Mall, SIOS	PM21, D21.3, D21.4					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)	SLS: Safe			

DC voltage		Medium voltage		
				
SINAMICS DCM	SINAMICS GM150	SINAMICS SM120 CM/SM150	SINAMICS GL150/SL150	SINAMICS GH150/GH180
	Basic/medium			Basic/medium
High	Basic/medium/high	Medium/high	High	Basic/medium/high
High	Basic/medium			Basic/medium
	High			High
Medium/high				
High		High	High	
The scalable converter for basic and demanding applications	Converter for medium-voltage variable-speed drives	Converters for demanding single-axis and multi-axis applications in the medium-voltage range	Cycloconverter for synchronous and induction motors	Converters for medium-voltage systems with single-axis or multi-axis configurations
Converter unit	Converter cabinet unit	Converter cabinet unit	Converter cabinet unit	Converter cabinet unit
Compact AC/DC device	Ready-to-connect AC/AC device	Ready-to-connect AC/AC device DC bus system for several motors connected to a common DC bus	Ready-to-connect AC/AC device	Ready-to-connect AC/AC device
IP00 – IP20	Air-cooled IP22 (opt. IP42), liquid-cooled IP43 (opt. IP54)	IP43 (opt. IP54)	IP21 – IP54	Air-cooled IP21 or higher, liquid-cooled IP52
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
6–2,508 kW (parallel connection up to 30 MW)	–	–	–	–
–	820–18,000 kW (for induction motors)	2,800–31,500 kW	800 – 85,000 kW	112–28,500 kW
yes, for the corresponding version	–	yes	yes	–
–		yes	yes	yes
–		yes	yes	yes
–		–	–	–
DC motors		yes	yes	yes
		yes	yes	yes
		–	–	–
		–	–	–
BICO technology, technology controller, free function blocks, automatic restart, Drive Control Chart			Flying restart, automatic restart, kinetic buffering, technology controller, Drive Control Chart, BICO technology	Advanced cell bypass, Pro TOPs, parallel connection, automatic restart, anti-condensation heating, other options on request
–	–	STO	–	Emergency Stop Cat 0, standard for uncontrolled rundown
PROFINET, PROFIBUS DP, USS, EtherNet/IP	PROFINET, PROFIBUS DP, EtherNet/IP, additional profiles on request	PROFINET, PROFIBUS DP, EtherNet/IP, additional profiles on request	PROFINET, PROFIBUS DP, EtherNet/IP, USS	Modbus Plus, Modbus RTU, Modbus Ethernet, DeviceNet, Control Net, PROFIBUS DP
–		yes	yes	–
–		yes	yes	–
–		yes	yes	–
yes		yes, application-specific		
SIZER, DT Configurator		STARTER, SIZER, DT Configurator	STARTER, SIZER, DT Configurator	SIZER WEB ENGINEERING, DT Configurator
D23.1		D12	EM3.5/1.2	D15.2/16.2

y Limited Speed SSM: Safe Speed Monitor SDI: Safe Direction SLP: Safely Limited Position *IP55 for devices with liquid cooling

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