

The SINAMICS drive family Suitable for each and every application



Performance ¹⁾	Continuous motion			Discontinuous motion		
	Basic	Medium	High	Basic	Medium	High
Purpose						
Pumping/ventilating/compressing	Centrifugal pumps Radial/axial fans Compressors		Eccentric spiral worm/screw pumps	Hydraulic pumps Dosing pumps		Descaling pumps Hydraulic pumps
Moving	Belt conveyors Roller conveyors Chain conveyors	Belt conveyors Roller conveyors Chain conveyors Vertical/horizontal material handling Crawlers/excavators Gantry cranes Ship's drives Cable railways	Elevators Container cranes Mine hoists Open cast mine excavators Test stands	Accelerating conveyors Rack feeders	Accelerating conveyors Rack feeders Cross cutters Roll changers	Rack feeders Robotics Pick & Place Indexing tables Cross cutters Roller feeds Engaging/disengaging
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	Tubular bagging machines Single axis motion-control i.e. • positioning profiles • path profiles		Servo presses Rolling mill drives Coordinated multi-axis motion control i.e. • Multi-axis positioning • Cam discs • Interpolation
Machining	Main Drives i.e. • Turning • Milling • Drilling	Main Drives i.e. • Drilling • Sawing	Main Drives i.e. • Turning • Milling • Drilling • Gear cutting • Grinding	Axis Drives i.e. • Turning • Milling • Drilling	Axis Drives i.e. • Drilling • Sawing	Axis Drives i.e. • Turning • Milling • Drilling • Laser machining • Gear cutting • Grinding • Nibbling and Punching

¹⁾ Requirements regarding torque precision / speed precision / positioning precision / axis coordination / functionality

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SINAMICS application-based approach Low-voltage product assignment



Performance ¹⁾	Continuous motion			Discontinuous motion		
	Basic	Medium	High	Basic	Medium	High
Purpose						
Pumping/ventilating/compressing	V20 G120C G120P	G120P G130/G150 G180 ²⁾	S120	G120	S110	S120
Moving	V20 G110D G110M G120C	G120 G150D G130/G150 G180 ²⁾	S120 S150 DCM	V90 G120 G120D	S110 DCM	S120 DCM
Processing	V20 G120C	G120 G130/G150 G180 ²⁾	S120 S150 DCM	V90 G120	S110	S120 DCM
Machining	S110	S110 S120	S120	S110	S110 S120	S120

¹⁾ Requirements regarding torque precision / speed precision / positioning precision / axis coordination / functionality
²⁾ Industry specific drive

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The SINAMICS drive family

Complete regarding power ratings and functionality



Low voltage AC										Direct current DC	Medium voltage AC					
Basic Performance		General Performance							High Performance		For basic applications and demanding applications	For demanding applications with high power ratings				
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	Servo control	V/f control, vector control with/without encoder, servo control with/without encoder		Speed control, torque control	V/f control, vector control		V/f control, vector control		
0.12 - 30 kW	0.05 - 7 kW	0.55 - 18.5 kW		0.37 - 630 kW	0.55 - 250 kW	0.37 - 7.5 kW	75 - 2,700 kW	2.2 - 6,600 kW	0.55 - 132 kW	0.55 - 5,700 kW		75 - 1,200 kW	6 kW - 30 MW	2.8 - 85 MW	0.8 - 31.5 MW	0.15 - 28.5 MW
Pumps, fans, compressors, conveyor belts, mixers, mills, spinning machines, textile machines	Handling machines, packaging machines, automatic assembly machines, metal forming machines	Pumps, fans, compressors, conveyor belts, mixers, mills, extruders		Pumps, fans, compressors, conveyor belts, mixers, mills, extruders, single-axis positioning applications in plant and machinery	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, control valves	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, ships and test stands	Test stands, cross cutters, centrifuges	Rolling mill drives, wire drawing machines, extruders and kneaders, lobby railways and lifts, test stand drives	Pumps, fans, compressors, mixers, extruders, mills, rolling lines, mine hoist drives, elevators, test stands, ship drives, conveyor belts, blast furnace blowers	Pumps, fans, test stands, ore conveying systems, one-way compressors, excavators, marine drives	Pumps, fans, compressors, mills, crushers, conveyor systems, retrofit projects		
<p>Excluded: V20: needs no tool; V90: SINAMICS V-ASSISTANT commissioning tool; G180: IMS commissioning software (Inverter Management Software)</p> <p>Engineering tools: Drive Technology Configurator - selection and configuration SIMATIC Manager - simple planning and engineering SIMATIC Manager - for fast commissioning*, optimizing and diagnostics</p>																

- Wide range of power ratings from 0.12 kW to 85 MW
- Available in low voltage, medium voltage as well as DC voltage versions

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SINAMICS products

Brief overview.

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The family members: SINAMICS devices are available in various formats and designs



Ready to switch on cabinets units for high power ratings +

Flexible chassis devices for high power ratings +





Compact blocksize devices for low and medium power ratings +

Modular booksize devices for low and medium power ratings +

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SINAMICS V: converters for basic performance applications



SINAMICS V20 	SINAMICS V90 
Blocksize device	Blocksize device
The versatile converter for basic applications	The performance optimized servo drive system that is simple to operate
Industry, the trades	Industry, the trades
IP20	Converter IP20, motor IP65
1 AC 200 ... 240 V: 0.12 – 3 kW 3 AC 380 ... 480 V: 0.37 – 30 kW	Sinamics V90 Servosystem, Low Inertia (LI) 1AC 200 ... 240 V: 0.10 kW - 0.75 kW 3AC 200 ... 240 V: 1.00 kW - 2 kW Sinamics V90 Servosystem, High Inertia (HI) 3AC 380 ... 480 V: 0.4 kW - 7.0 kW
V/f control	Servo control
SINAMICS includes basic converters ...	

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SINAMICS G: converters for General Performance applications

SINAMICS G120	SINAMICS G120C	SINAMICS G120P/ G120P Cabinet
		
Blocksize device	Blocksize device	Blocksize and chassis devices, devices for wall/panel mounting and cabinet units
Modular converters for variable-speed single-motor drives	Compact and versatile converter with optimum functionality	The specialist for pumps, fans and compressors
Industrial applications	Machinery construction and distribution for e.g. conveyor belts, mixers, extruders, pumps, fans, compressors or basic handling machines	Wide range of applications in industry, water and wastewater and building systems for HVAC,
IP20	IP20	IP20, IP55
1/3 AC 200 – 240 V: 0.55 – 55 kW 3 AC 380 – 480 V: 0.55 – 250 kW 3 AC 500 – 690 V: 11 – 132 kW	3 AC 380 – 480 V: 0.55 – 18.5 kW	3AC 380 – 480 V: 110 bis 560 kW 3AC 500 – 690 V: 500 bis 630 kW
V/f control, vector control with/without encoder, torque control with/without encoder	V/f control, vector control without encoder	V/f control, vector control without encoder, torque control without encoder

SINAMICS includes generalists ...

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SINAMICS G: converters for General Performance applications




SINAMICS G110D	SINAMICS G120D	SINAMICS G110M
		
Blocksize device	Blocksize device	Integrated in the motor
Distributed drive for basic, single-axis applications in the lower power range	Distributed drive for complex single-axis/multi-axis applications	The distributed converter for SIMOGEAR geared motors
Basic conveyor technology applications in airports and logistics solutions in the horizontal plane with AS-i connection and local/remote operation.	Conveyor-related application, specifically for the automotive industry, as well as other high-performance applications with BUS connection	Industrial applications
IP65	IP65	Up to IP66
3 AC 380 – 480 V: 0.75 – 7.5 kW +/-10%	3 AC 380 – 480 V: 0.75 – 7.5 kW	3AC 380 V - 500 V -10/+6% 0.37 kW to 4 kW
V/f control	V/f control, vector control with/without encoder, torque control with/without encoder	V/f control, FCC (flux current control), sensorless vector control

SINAMICS includes generalists ...

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SINAMICS G: converters for General Performance applications

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SINAMICS G130 	SINAMICS G150 	SINAMICS G180 
Chassis device	Converter cabinet unit	Compact device, converter cabinet unit
The universal drive solution for high-rating single-motor drives	The universal drive solution for high rating single-motor drives	The specific drive solution for oil & gas, chemical and process industries
Industrial plant construction, companies operating plants.	Industrial plant construction, companies operating plants in the process and production industries	Applications in general machinery construction
Dependent on the particular type, IP00 or IP20	IP20 – IP54	IP20 – IP54
3 AC 380 – 480 V: 110 – 560 kW 3 AC 500 – 600 V: 110 – 560 kW 3 AC 660 – 690 V: 75 – 800 kW	3 AC 380 – 480 V: 110 – 900 kW 3 AC 500 – 600 V: 110 – 1000 kW 3 AC 660 – 690 V: 75 – 2700 kW	3 AC 380 – 480 V: 2.2 – 4100 kW 3 AC 500 – 600 V: 2.2 – 5300 kW 3 AC 660 – 690 V: 2.6 – 6600 kW 3 AC 660 – 690 V: 7.5 – 6600 kW
V/f control, vector control with/without encoder, closed-loop speed/torque control	V/f control, vector control with/without encoder, closed-loop speed/torque control	V/f control, vector control with/without encoder, closed-loop speed/torque control

SINAMICS includes generalists ...

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SINAMICS S: servo drives and flexible, modular drive systems




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SINAMICS S110 	SINAMICS S120 AC/AC drive units 	
Blocksize drive	Blocksize device	Chassis device
Single-axis positioning drive	Modular drive system for demanding single-axis applications	
Plant and machinery construction, laboratory automation, Solar systems, medical technology.	Plant and machinery construction	
IP20	IP20	IP20 (air- and liquid cooled)
1 AC, 200 – 240 V / 0.12 – 0.75 kW 3 AC, 380 – 480 V / 0.37 – 90 kW	1 AC 200 – 240 V: 0.12 – 0.75 kW 3 AC 380 – 480 V: 0.37 – 90 kW	3 AC 380 – 480 V: 110 – 250 kW
V/f control, servo control with/without encoder, closed-loop speed/torque control	V/f control, vector control with/without encoder, servo control with/without encoder, speed control/torque control	

... specialists and all-rounders ...



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SINAMICS S120: Flexible, modular drive system for demanding drive applications

SINAMICS S120 DC/AC drive units		SINAMICS S120 Cabinet Modules
		
Booksize device	Chassis device	Modular cabinet elements
Modular drive system for demanding multi-axis applications		Modular drive system for demanding multi-axis applications
Plant and machinery construction		Plant construction
IP20	IP20 air and liquid cooled	IP20 (IP21,23, 43, 54) air cooled IP23,43,55 liquid cooled
3 AC 380 – 480 V: 1.6 – 107 kW	3 AC 380 – 480 V: 110 – 3040 kW 3 AC 500 – 690 V: 75 – 5700 kW	3 AC 380 – 480 V: 4.8 – 3000 kW 3 AC 500 – 690 V: 75 – 5700 kW
V/f control, vector control with/without encoder, servo control with/without encoder, speed control/torque control		V/f control, vector control with/without encoder, servo control with/without encoder, speed control/torque control
... all-rounders ...		

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SINAMICS S150: Applications as ready to switch on SINAMICS DCM cabinet units – the new DC drive

SINAMICS S150	SINAMICS DCM / Cabinet
	
Converter cabinet unit	Converter device, converter cabinet
Converter for demanding variable-speed single-motor drives	Scalable converter for basic and demanding applications
Industrial plant construction, companies operating plants	Rolling mill drives, wire-drawing machines, extruders and kneaders, cable railways and lifts, test stand drives, cross cutters and shears, presses, elevator and crane systems, mine hoists
IP20 (IP21, IP23, IP43, IP54)	IP00 - IP54
3 AC 380 – 480 V: 110 – 800 kW 3 AC 500 – 690 V: 75 – 1200 kW	1 AC 85 V – 3 AC 950 V: 6 – 2508 kW (parallel connection up to 30 MW)
V/f control, vector control with/without encoder, servo control with/without encoder, speed control/torque control	Speed control/torque control
... LV cabinets ready to be connected up ...	

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SINAMICS S120 - different formats optimized for single and multi-axis applications



SINAMICS S120 – description

Modular drive system for demanding single-axis and multi-axis applications

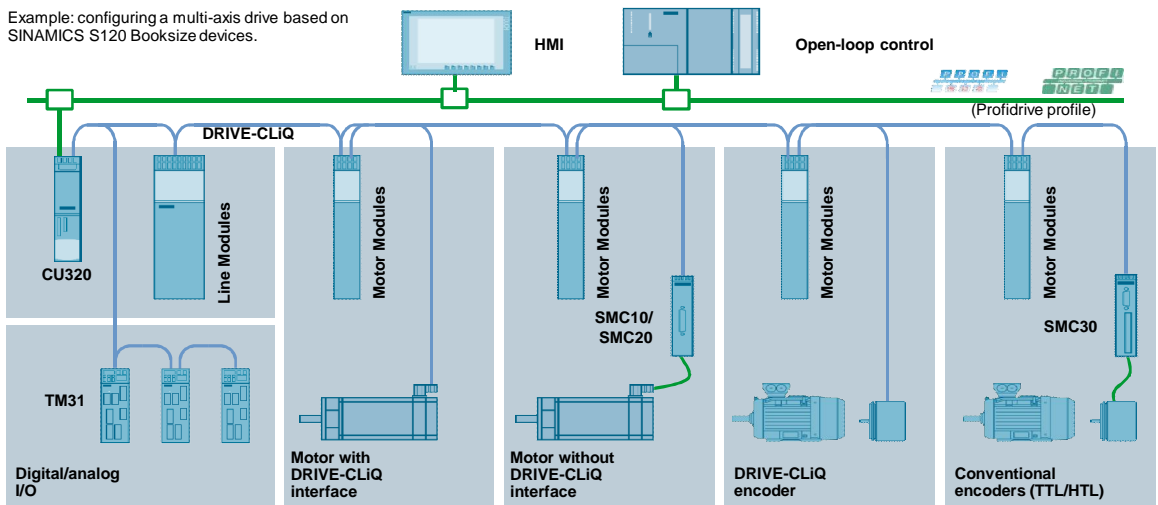
AC/DC-unit for single-axis use		DC/AC-system for multi-axis use			
Blocksize	Chassis	Booksize Compact	Booksize	Chassis	Cabinet Modules
0,12 – 90 kW	110 – 250 kW	0.9 – 9,7 kW	1,6 – 107 kW	75 – 5700 kW	1,6 – 5700 kW

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SINAMICS S120 - scalability through modularity



Example: configuring a multi-axis drive based on SINAMICS S120 Booksize devices.



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Conveyor technology application

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Siemens has the fitting and optimum portfolio for all conveyor-related applications

Whether it involves conveying, sorting, storing or picking & placing – in conveyor systems, across-the-board productivity defines the success of the operation. In all sectors. Whether for standard or highly complex applications.

- The optimum products and systems: As THE partner for conveyor technology, Siemens provides support with a portfolio of drive and automation components that precisely fits the application
- Competent consulting and extensive support for engineering concepts that are fit for the future.
- Service in over 130 countries around the world.

Products:

Converters, geared motors, motor starters and control systems



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Application conveyor system for bulk materials (bulk material handling)

SIEMENS

Drives for bulk material conveyor systems up to 1500 kW – for smooth and efficient transport

Our harmonized drive systems for conveyor systems for bulk materials are supplied mounted on a frame and ensure that materials are safely, reliably and efficiently transported even under the harshest of conditions – heat, cold, dust, dirt and vibration.

Perfect interaction between SINAMICS converters, SIMOTICS motors, FLENDER couplings and FLENDER gearboxes:

- The belts speed is precisely adapted to fluctuating loads on the conveyor belt
- Lower operating costs as a result of lower energy usage
- Minimum belt oscillation
- Lower brake wear
- Low maintenance overall system with long service life

Products: SINAMICS G120, G130, G150 and S120 - SIMOTICS SD, TN and FD – FLENDER couplings – FLENDER FZG and SIG gearboxes



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Pump, fan and compressor applications

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Siemens offers integrated drive solutions for pumps, fans and compressors:

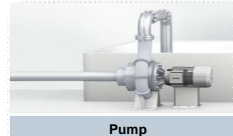
Integrated drive trains with components that are perfectly harmonized and coordinated with one another plus the corresponding automation technology – all from a single source.

To precisely dimension fluid flow machines and positive displacement pumps. With competent support when implementing future-proof concepts – for basic throttle controls as well as for soft starter-converter cascades and other complex applications.

Over the complete lifecycle of the application with comprehensive service and support.

Products:

SINAMICS G120P, SIMOTICS motors, SIRIUS switchgear



Pump



Fan



Compressor

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Servo pump application

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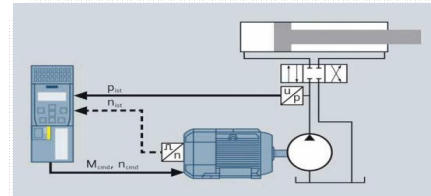
High efficiency, high dynamic performance and quiet

The Siemens solution is based on SINAMICS S120, SINAMICS G120 and SINAMICS V20 converters in conjunction with SIMOTICS S-1FK7, SIMOTICS S-1FT7, SIMOTICS M-1PH8 and SIMOTICS GP 1LE1 motors. The portfolio allows the suitable combination – ranging from the highest performance products to those that have been optimized from a cost perspective.

Advantages when compared to conventional solutions

- Energy costs are slashed by up to 70%
- Noise levels are significantly reduced
- Lower oil temperatures
- Space saving through a compact design
- Simple integration and commissioning
- All of the relevant parameters are monitored
- All in all, a simpler hydraulic system

Products: SINAMICS V20, G120 and S120



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Storage and retrieval machine application

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In addition to conveyor systems, storage and retrieval machines represent the core of warehouse technology. A storage and retrieval machine is a rail-based, single-track vehicle for storing and retrieving goods in a high bay warehouse

A storage and retrieval machine moves in three axes:

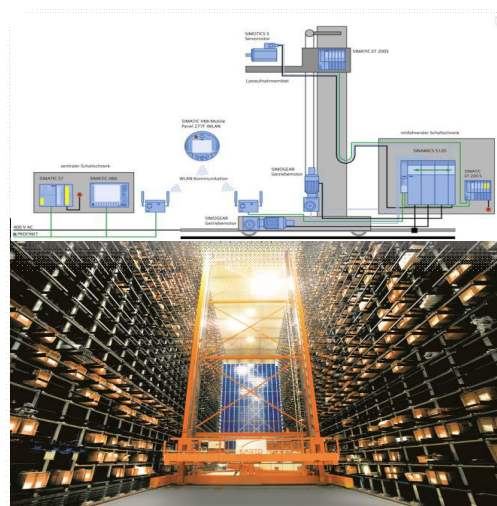
- x = along the aisle - travel gear
- y = vertical direction - hoisting gear
- z = transverse to the aisle - load suspension device

For typical requirements like...

- Oscillation of the mast
- Safety functions acc. type C standard (EN528)
- Optimized throughput
- Maximum storage capacity
- Energy efficiency

... the optimal solution is included in Products from Siemens.

Products: SINAMICS S120



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Segment winder as converting application

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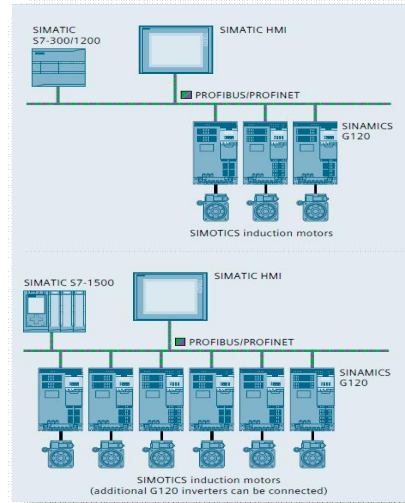
Siemens offers all of the usual control modes for winders

Winders are a fixed element of every converting machine. The application specifically developed for the purpose covers all of the usual control modes. The following modes are available:

- Dancer roll position control with speed correction
- Tension control with torque limiting
- Tension control with speed correction, and
- Open-loop torque control (indirect tension control).

This application eliminates complex work steps. The diameter is either calculated using an external sensor, from the ratio of the material web velocity and speed - or by adding the material thickness over several revolutions.

Products: SINAMICS G120, S120



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Battery-based energy storage application

SIEMENS

Siemens offers the optimum products to implement battery-based energy storage devices

- Storing energy from renewable energy sources is a significant trend for the future
- The increasing use of batteries to save energy over hours and days is being forced by renewable energies – a global mega trend
- The modular solution based on SINAMICS S120 allows the functionality to be adapted to address all applications – and also facilitates a shorter time to market.

Products: SINAMICS S120, [SINAMICS DC Power Converter](#)



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Test stand application

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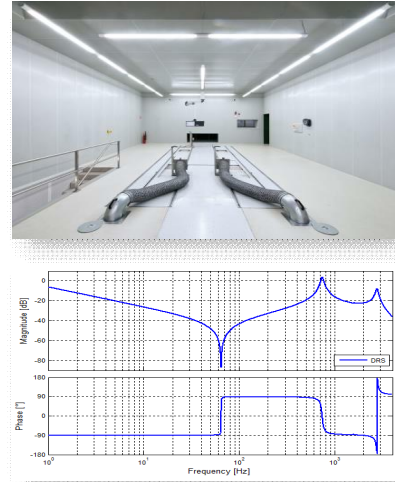
Test stands with intelligent components from Siemens

The properties and attributes of technical equipment are tested on a test stand so that they are reproducible. For example, on vehicle test stands, roller test stands, gearbox test stands, motor test stands/power test stands or special test stands

Siemens advantages:

- Torque fluctuations of internal combustion engines speed and torque stability (low ripple)
- Adaptable closed-loop control system for the highest torque quality
- SIEMENS closed-loop control system for rotating frequencies exceeding 1000 Hz
- Energy recovery when braking without any damaging current harmonics
- Energy balancing in the coupled DC link for multi-axis test stands
- Integrated safety functions, e.g. SLS for entering the test cell
- Integration of state-of-the-art simulation tools such as Matlab or Labview
- Computer coupling for long-term data acquisition (CAN, PROFINET, PROFIBUS, Ethernet, EtherNet/IP)
- High dynamic performance, e.g. for simulating internal combustion engines

Products: SINAMICS S 120, S 150 and DCM



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Coiler drive application

SIEMENS

Drive systems for coilers – for optimum winding and unwinding

Our harmonized drive systems for coilers in hot and cold rolling mills ensure that the strip thickness and strip surface of the wound coil always comply with specifications.

Perfect interaction between SINAMICS S120 CM and SIMOTICS FD motors:

- The **liquid-cooled version** of the drive system is especially suitable for dusty or aggressive air and high ambient temperatures
- Maximum **precision when unwinding and winding**
- **Power is exchanged** between unwinding coilers operating in the generating mode and winding coilers operating in the motoring mode
- Improved energy efficiency of the complete plant or system!

Products: Liquid-cooled SINAMICS S120 CM with water-cooled SIMOTICS FD



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Applications in hazardous zones

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Drive systems for use in hazardous zones, including pumps, fans, compressors and extruders

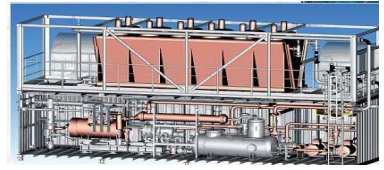
Our harmonized and coordinated drive systems offer the necessary safety combined with the required features and attributes

Perfect interaction between SINAMICS G180 and SIMOTICS XP

The tested combination comprising SINAMICS G180 and SIMOTICS XP motor is the first choice when it comes to dusty or aggressive atmospheres as well as hazardous zones.

- **Certified safety** with EC type examination certificate for motor design and temperature evaluation
- **Long motor cables** are possible as a result of the integrated du/dt filter, also for motors with standard insulation system.
- **Better energy efficiency** of the complete system as a result of the optimized pulse pattern
- **Optimum** interaction with SIMATIC PCS7

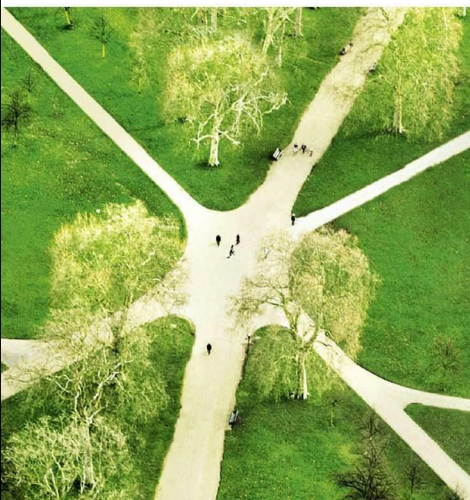
Products: Air and liquid-cooled SINAMICS G180 with air-cooled SIMOTICS XP



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Thank you for your attention!

SIEMENS
Ingenuity for Life



Trần Cửu Long

Nhóm Truyền Động

Công ty TNHH Siemens
33 Lê Duẩn, P. Bến Nghé, Quận 1, Tp. HCM
Phone: +84 28 3825 1900
Fax: +84 28 3825 1580
Email: tran-cuu.long@siemens.com
Phone: 0917137744

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