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SINAMICS G110

The versatile inverter for low power ratings

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The ideal introduction

The more flexible an inverter, the better it is.
And if it's simple to install and straightforward in operation, then it provides the best platform for a wide range of variable-speed drive applications.

Typical areas of application

Versatile: can be used

- For pumps, fans, ventilators
- In conveyor system applications
- For factory gate and garage door operating mechanisms
- For fitness machines
- For a wide variety of industrial and trade applications

Advantages of Siemens inverters

- Optimum adaptation of production rates due to stepless speed control
- Energy saving for pumps and fans in the partial-load range, for example
- Reduced system load, as a result of low starting currents, unlike with fixed-speed drives
- Improved quality, as inverters balance out severe impacts and peak loads
- Compliance with EMC legislation due to integrated/optional RFI suppression filters

Highlights

Mechanical system

- Simple cable connection, screwless control terminals
- Compact devices in three frame sizes
- LED for status information
- Variant with flat heat sink – ideal for narrow installation conditions
- Rugged EMC design
- Clearly arranged power terminals as with contactors

Electronics

- Ready to use right out of the box
- Time-saving copying of parameters via the optional BOP
- 2/3-wire method for versatile control via digital inputs

Communication

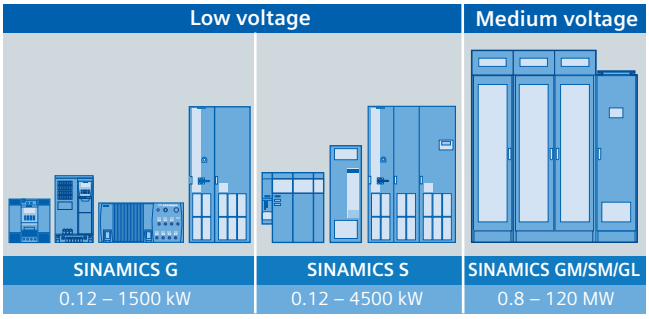
- Version with an RS485 interface
- Easy to integrate into automation systems with SIMATIC S7-200



SINAMICS G110 belongs to the SINAMICS drive family of innovative, future-oriented drive solutions

- Wide power range from 0.12 kW to 120 MW
- Low-voltage and medium-voltage versions available
- Seamless, integrated functionality by using common hardware and software platforms
- One standard engineering for all drives
  - SIZER for configuration
  - STARTER for parameterization and commissioning
- High degree of flexibility and combination capability

SINAMICS offers the optimum drive for every drive application – and all drives can be configured, parameterized, commissioned and operated according to the same standard.



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References

Sorting and packaging machines:
More flexibility in terms of the mechanical system

The task

Ways of optimizing drive technology for sorting and packaging machines used in the furniture industry were needed to reduce component variance. Previously, the transmission ratios had to be adapted for every new task, meaning that important characteristic values such as cycle times or optimum integration into other systems had to be defined at a very early stage. The fixed-speed setting meant there was always an element of uncertainty when planning any adaptations in accordance with recent customer requests.

The solution

Standardization was achieved with just one type of inverter, in this case the SINAMICS G110.
Due to the inverter's functionality being exactly right for the application in question and not overdimensioned, up to 40 % was saved in relation to the cost of previous inverter solutions. This enabled standardization of geared motors, which makes design, production and service planning easier. The removable inverter operator panel also makes it easier to enter and transfer parameters. Thanks to the continuous speed control, several drives can be coordinated and adapted simply to the prevailing production conditions.
In contrast to earlier solutions, only two or three different geared motors now have to be kept in stock.

Grinding and polishing machines:
Inverters play their part in producing beautiful jewels

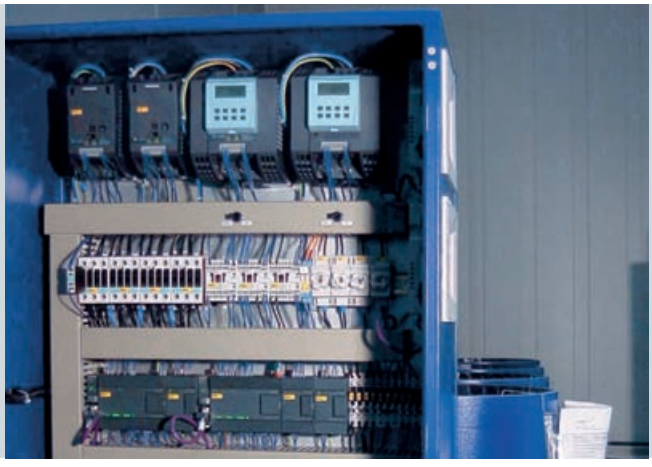
The task

A manufacturer of grinding and polishing systems using centrifugal disk and drag finishing processes was looking for an inverter that could control a large speed range at a high torque output. In both machining processes, the machine parameters have to be aligned with the grinding media, which can be highly specialized, as well as the shape or material of the object to be ground, in order to achieve the best possible result in efficiency and quality.

The solution

The SINAMICS G110 inverter had one major advantage as far as the end user was concerned: The drive can be operated at temperatures of up to 50 °C and does not require additional cooling. Another feature that was extremely useful for jewelers and other users of mobile polishing machines was that SINAMICS G110 uses single-phase alternating current to generate its three-phase motor current, so many different types of machines can easily be operated via the outlet.
The disk/drag drive requires between 250 W and 2.2 kW of power, depending on the machine. Dry or wet polishing is performed at low speeds of between 250 and 300 rpm, although the drive must provide a high torque. In magnetic polishing, however, high speeds of up to 2,400 rpm generate a very high-energy flow within the grinding medium, which makes the workpiece surface extremely smooth.
Engineers use the plug-on PC interface for first commissioning. The STARTER software tool enables all inverter parameters to be accessed in a manner that is user-friendly, intuitive, and easy to understand. The basic operator panel (BOP) is used for standard commissioning. All data can be transferred to other inverters using the BOP.





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References

Mixers:
Reproducible recipes for high quality

The task

In modernizing a range of machines used to mix bonding agents, such as cement, automatically and in a reproducible fashion to produce concrete, the decision was made to also redesign the machines' control technology. The aim was to replace the previous method of contactor control with a simple solution that could be individually programmed.
The new concept should be straightforward, future-oriented, and flexible, without any notable additional cost.

The solution

The SINAMICS G110 inverter was chosen. This drive was ideally suited to the series machine, as it is operated on the single-phase 230 V line with an effective installed load of 370 W. SINAMICS G110 uses this input voltage and provides a three-phase output voltage for operating standard AC induction motors. A parameterizable V/f characteristic is used for closed-loop control.
It is absolutely vital for mixers used in the field of construction testing that the process values specified in the test report are observed and documented accurately. These values include automatic sand and water dosages and the prescribed mixing speed and period. To ensure the components are mixed thoroughly and precisely with the beater operating in the required speed range, SINAMICS G110 regulates the frequency between 20 Hz and 50 Hz.
A belt drive in the machine head is used to reduce the speed from the electric motor to the mixer.
As inverters and SIMATIC S7-200 controllers can "talk" to one another extremely well, communication between them covers not only control commands, but also monitoring functions.

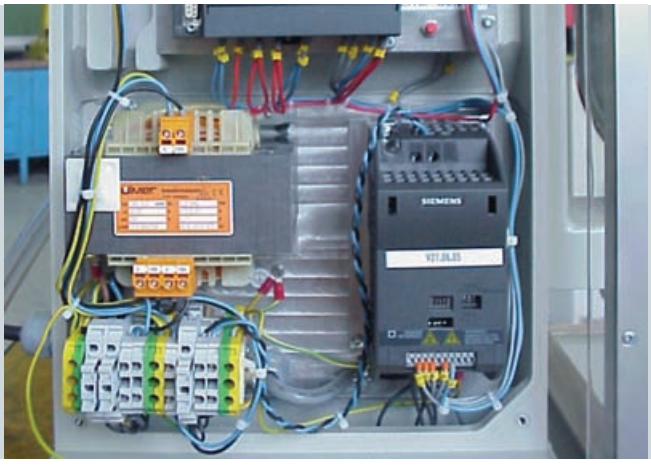
Conveyor systems:
Simplifying assembly automation

The task

In this project for the automotive industry, gear parts of relatively heavy low-load-bearing implements had to be separated, equipped, and finally repacked. An unusual aspect was that heavy weights had to be moved very precisely over relatively short distances. The result was a great number of drives within one system.
To prevent bottlenecks at the low-load-bearing implements in continuous assembly automation, 10 relatively short conveyor belts were used, each of which was moved by an inverter. Another inverter rotated the rotating disk in the assembly line. It was important that the inverters established smooth startup and coasting and a controlled belt speed.
Furthermore, the costs of the precise inverters should not considerably exceed those of a standard, direct switching motor feeder, as is usually used on conveyor belts.

The solution

With SINAMICS G110, a linear characteristic curve can be selected or the control characteristic itself can be parameterized. The ramp smoothing function is also useful.
As VDE regulations state that inverters not only work as control element, but can be used for motor protection, a device like this can be used as a complete motor feeder. It provides overload protection, short-circuit protection, and many other protective functions.
In the context of this project, it was also important that the inverter would automatically start again following an interruption in its operation caused by a power failure, thus contributing to the system's high availability.





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Simple installation, easy commissioning

Compact on the outside ...

With three frame sizes, the SINAMICS G110 ranges in power from 0.12 kW to 3 kW (0.16 to 4 HP). The smallest frame size has a heat sink, which cools through self-convection. The version featuring a flat, non-ribbed heat sink is recommended for use in narrow installation conditions.

... Flexible on the inside

Up to four digital inputs of the inverter are user programmable and enable the inverter to be switched on and off via static or pulsed signals (2/3-wire method). The inverter features a built-in DIP switch, which facilitates rapid adaptation to the line frequency, allowing the inverter to be used around the world.



Frame size A



Frame size A with flat heat sink



Frame size B



Frame size C

Easy installation: just like contactors

The ready-to-connect SINAMICS G110 inverters have the same clearly arranged terminals as in the case of the contactors and allow connections to be made without removing any covers. It can be mounted on a wall or DIN rail. The inverter's inputs and outputs have predefined functions; parameters have a preassigned factory setting.

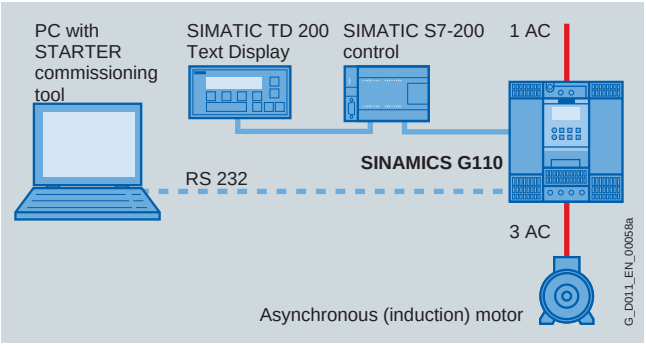
Commissioning: fast and uncomplicated

Install, wire, set the speed setpoint and you're done – that's how easy it is to commission a SINAMICS G110 inverter. The parameters and user-assignable inputs and outputs can be set in two ways:

- Using the STARTER commissioning tool via the PC inverter connection kit
- Via the removable optional BOP

For series commissioning of more inverters with the same parameters, the settings can be simply stored in the opertor panel and transferred to the other inverters.

Integration



SINAMICS G110 configuration example (USS version with SIMATIC S7-200, PC inverter connection with optional PC inverter connection kit)

Micro Automation Sets – combinations of products designed for your tasks – simple, cost-effective and tested

Micro Automation Sets are tailored combinations of automation components for solutions in the low output range. They can be used for industrial, trade, and building engineering applications with a wide range of Siemens Drive Technologies products. Micro Automation Sets make it easier and quicker for you to find and select the most appropriate products. The SINAMICS G110 inverter is part of the following sets: Set 12, Set 22, Set 23, Set 26.
For more information, see: www.siemens.com/microset



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Technical data

Frame size	A		A with flat heat sink	B	C
Power	0.12 ... 0.37 kW	0.55 ... 0.75 kW	0.12 ... 0.75 kW	1.1 ... 1.5 kW	2.2 ... 3 kW
Rated input current (at 230 V)	2.3 ... 6.2 A	7.7 ... 10 A	2.3 ... 10 A	14.7 ... 19.7 A	27.2 ... 35.6 A
Rated output current (at 40 °C)	0.9 ... 2.3 A	3.2 ... 3.9 A	0.9 ... 3.9 A	6 ... 7.8 A	11 ... 13.6 A
Mechanical data					
Degree of protection	IP20				
Operating temperature	-10 ... +40 °C, up to +50 °C with derating				
Width × height × depth (mm)	90 × 150 × 116	90 × 150 × 131	90 × 150 × 101	140 × 160 × 142	184 × 181 × 152
Electrical data					
Line voltage	200 ... 240 V 1 AC ±10 %				
Line frequency	47 ... 63 Hz				
Overload capability	Overload current 1.5 × rated output current (i.e. 150 % overload) for 60 s, then 0.85 × rated output current for 240 s, cycle time 300 s				
Output frequency	0 ... 650 Hz				
Pulse frequency	8 kHz (standard), 2 to 16 kHz (in 2 kHz increments)				
Skipped frequency range	1, parameterizable				
Inverter efficiency	With devices < 0.75 kW: 90 ... 94 %, with devices ≥ 0.75 kW: 95 %				
EMC filter	Version with integrated EMC filter Class A/B				
Digital inputs	Up to 4				
Digital outputs	1 isolated optocoupler output (24 V DC, 50 mA, ohmic, NPN type)				
Analog input	Version with one analog input (can also be used as a digital input)				
Communications interfaces	Version with RS485 serial interface for use with USS protocol				
Functions					
Open-loop and closed-loop control functions	• Linear *V/f* characteristic (with programmable voltage boosting) • Quadratic *V/f* characteristic • Multipoint characteristic (programmable *V/f* characteristic)				
Operating functions	• Jogging operation • Automatic restart following interruptions in operation due to a power failure • Smooth connection of the inverter to the rotating motor (flying restart)				
Fixed frequencies	3, parameterizable				
Braking functions	DC braking, compound braking				
Protective functions	Undervoltage, overvoltage, ground faults, short circuits, stall prevention, thermal motor protection I^2t, inverter overtemperature, motor overtemperature				
Connectable motors	Low-voltage induction motors				
Motor cable length, max.	25 m (shielded), 50 m (non-shielded)				
Standards					
Standards conformance	UL, cUL, CE, c-tick				
CE mark	Conformity with Low Voltage Directive 73/23/EEC				
Accessories					
	Basic operator panel, PC inverter connection kit, adapter for mounting on a DIN rail, line reactor				

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