

SINAMICS S150:

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



SINAMICS S150 cabinet units are designed for variable-speed drives in the machinery construction and plant building sectors. They are especially suitable when it comes to high requirements placed on the dynamic performance and speed accuracy – as well as frequent braking cycles with high levels of braking energy and 4-quadrant operation. The drive converter cabinet units provide high-performance closed-loop speed control with high precision and dynamic performance – and are available for a range of power ratings from 75 up to 1200 kW (100 up to 1600 HP).

Applications

SINAMICS S150 is predestined for use in all applications that place the highest demands on processes with dynamic and reproducible operations. These include:

- Test stand drives
- Centrifuges
- Elevator and crane systems
- Cross-cutters and shears
- Conveyor belts
- Presses
- Cable winches

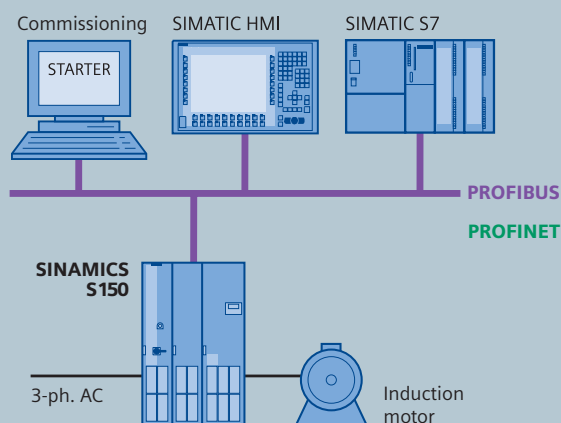
Benefits for you

- Regenerative feedback into the line supply as standard – permits unrestricted 4-Q operation
- Significant energy saving – especially when there are frequent braking cycles
- High accuracy and high dynamic line supply infeed by using IGBTs (insensitive to line supply voltage fluctuations)
- Almost perfectly sinusoidal line currents are impressed as a result of the fast closed-loop current control
- Innovative Clean Power Filter ensures low-frequency harmonics that are fed back into the line supply that can be almost neglected; the stringent THD limit values according to IEEE 519 are significantly over-fulfilled – this therefore avoids losses, in the low-voltage distribution and/or line supply transformer and in the line supply feeder cable caused by the harmonic currents
- Possibility of reactive power compensation (inductive or capacitive)
- Can be simply integrated into automation solutions using the standard PROFIBUS interface as well as various analog and digital interfaces
- Increased plant availability by being able to simply and quickly replace individual modules and power components
- Simple commissioning and parameterization – menu-prompted on the user-friendly AOP30 panel with graphics-capable LCD display and plain text display

Structure

SINAMICS S150 units are drive converters in a standard cabinet that are ready to be connected up. They can be perfectly adapted to the particular application as a result of an extensive range of options. Different versions allow the line supply and motor to either be connected at the top or bottom. This ensures a high degree of flexibility regarding mounting and installation. The drive units are available with cabinet widths starting at 1400 mm – increasing in steps of 200 mm. The standard degree of protection of the cabinets is IP20, but this can be optionally extended up to IP54. The user-friendly AOP30 panel is mounted in the door as standard.

Configuration example SINAMICS S150 with SIMATIC S7



Technical data

Electrical data

Line voltages; power ranges	<ul style="list-style-type: none"> • 3-ph. 380 ... 480 V AC, $\pm 10\%$ ($-15\% < 1 \text{ min}$) 110 ... 800 kW (150 ... 1000 HP) • 3-ph. 660 ... 690 V AC, $\pm 10\%$ ($-15\% < 1 \text{ min}$) 75 ... 1200 kW (100 ... 1600 HP)
Line types	TN/TT or IT line supplies
Line frequency	47 ... 63 Hz
Output frequency	0 ... 300 Hz
Control techniques	Vector control with and without encoder or V/f control
Fixed speeds	15 fixed plus 1 base speed, can be parameterized
Speed ranges that can be skipped	4, parameterizable
Customer terminal strip	Digital inputs/outputs, analog inputs/outputs, inputs for motor temperature evaluation, the number is variable
Communication interface	PROFIBUS DP as standard/optional: PROFINET, CANopen
Braking operation	4-Q operation is possible as standard

Functions

Software functions	The drive converter can be bumplessly connected to a rotating motor kinetic buffering, Automatic motor identification to optimize the control, parameterizable ramp-up/ramp-down times, ramp smoothing
Protective functions	Undervoltage, overvoltage, ground fault, short circuit, stall protection, thermal motor protection, thermal drive converter protection
Motors than can be connected	Induction motors and synchronous motors

Mechanical data

Degree of protection	IP20, optional: IP21/IP23/IP54
Cooling type	Integral fan (forced air cooling)
Sound pressure level	$\leq 78 \text{ dB (A)}$ for 50-Hz line supply frequency
Cabinet system	Rittal TS 8

Standards

In conformance with the standards	CE
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SINAMICS GM150/SINAMICS SM150:

The SINAMICS solutions for the medium-voltage range

SINAMICS GM150

SINAMICS GM150 is designed for medium-voltage drives without regenerative feedback into the line supply – for example for large pumps, fans, extruders, mixers and crushers. This means that it continues the range of functions and applications of the SINAMICS G150 up into the medium-voltage range. Reliable power components and protective measures against environmental effects, insensitive control modules and redundant fans and pumps in the cooling system guarantee smooth, disturbance-free operation – and more specifically, even under the toughest of conditions. Up to approx. 8.5 MW (11,557 HP), the drive units are equipped with the second generation of reliable HV-IGBT power semiconductors that are now also available for 6.5 kV. Well-proven IGCT technology is used for even higher power ratings up into the double-digit megawatt range.

Well thought out in detail

Engineering, commissioning and operation are simple and standard – just the same as for the low-voltage drive units. Operator control is menu-prompted from the user-friendly AOP30 panel with plain text display. The space-saving design, the availability of all voltage classes, either air or water cooling, connections that are prepared at either the top or bottom of the unit as well as the seamless integration into higher-level automation systems make integration into the plant or system straightforward.

Intelligent maintenance functions

Using the intelligent maintenance functions the components automatically issue a signal if maintenance is required. For example, a differential pressure technique determines how dirty the dust filter is. For water-cooled versions, the analog conductivity measurement continually monitors the mode of operation of the ion exchanger and provides a signal well in advance if its ion exchanging capability diminishes too much. This ensures that components are replaced or other maintenance work is carried out at the optimum time – for instance as part of a routine inspection. When service is required, all of the essential components are accessible from the front. Components can be replaced with just a few manual operations as a result of the well thought-out arrangement.

SINAMICS GL150

SINAMICS GL150 is the rugged single-motor drive for synchronous motors up to 100 MW (136,000 HP). The number of components has been reduced to a minimum by using thyristors. The simple design makes SINAMICS GL150 extremely reliable in operation, almost maintenance-free and compact. SINAMICS GL150 is designed as single-motor drive for applications with square-law and constant load characteristics. From its circuit principle, it is suitable for four-quadrant operation – i.e. driving and braking in both directions of operation – without any additional equipment. Typical applications

include: Pumps, fans, compressors, extruders and kneaders in the double-digit Megawatt range – such as those used in the oil & gas, petrochemical and chemical sectors – as well as large ships' drives.

SINAMICS SM150

SINAMICS SM150 is the medium-voltage drive converter for sophisticated drive tasks with regenerative feedback into the line supply. It is suitable both for single-motor as well as multi-motor drives and continues the range of functions and applications of SINAMICS S150 and SINAMICS S120 cabinet modules up into the high-performance range. Rolling mills and elevator cabins in mining are just some typical applications. Thanks to their features, the drive units are tailored to these types of high-dynamic applications with regenerative feedback into the line supply.

Transvector control for a high efficiency and long service life

The Transvector control with optimized pulsed patterns offers a whole raft of advantages: Maximum dynamic performance, minimum torque ripple, high overload capacity, insensitivity to critical operating situations and low noise. The extended Transvector control with ROTOS (Reduced Optimized Task Oriented Switching) is the technical highlight of SINAMICS SM150. This control technique with a high dynamic performance and with optimized pulse patterns guarantees sinusoidal currents and optimum voltage utilization – but at the same time with low switching frequencies. The result: High efficiency and low stressing on the motor.

4-Q operation and Active Infeed

SINAMICS SM150 can handle 4-Q operation without any restrictions. The Active Infeed technology makes this drive unit ideal for transferring power between regenerating and motoring applications. For multi-motor drives, this is realized using a common DC bus. Further, Active Infeed can supply capacitive reactive power to compensate other drive converters. The power factor $\cos\varphi$ can be set. Further, the Active Infeed minimizes harmonics and makes the SINAMICS SM150 especially line-friendly.

