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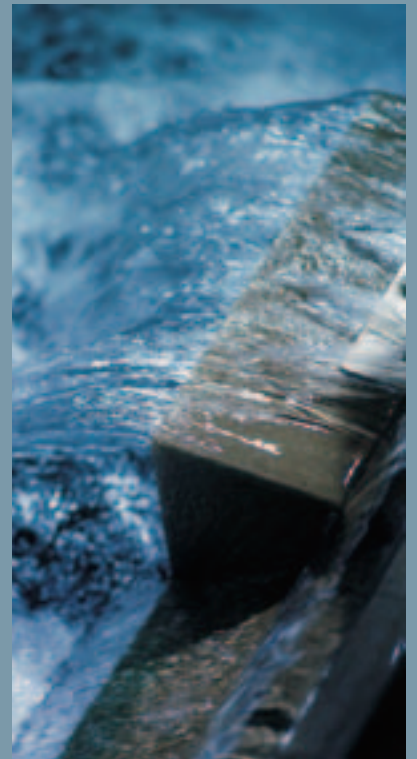
SINAMICS S120

Inverter components for regenerative energy

High-performance converters

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

SINAMICS S120 – Inverter components for regenerative energy





In all plants and systems for renewable energy, inverters have the task of suitably processing the generated energy and feeding it into the grid. An additional application area is energy conversion if energy storage devices are integrated in the grids.

For these types of applications, Siemens offers units which, as a result of their high efficiency, their grid quality and their reliability, increase the cost-effectiveness of systems used for renewable energy generation and energy storage.

In addition to products such as the well known ready-to-connect SINVERT PVS photovoltaic inverter, Siemens AG is now offering, with its SINAMICS S120, inverter components for chassis solutions. These are used as basis for system integrators or OEMs to create their own complete inverter systems that are ready to be connected up for renewable energy solutions.

**Indispensable:
Inverters for feeding into the grid**

Inverters represent the core components for feeding power from the energy source into the grid. What is of prime importance is that the grid requires a constant voltage and frequency – and this is precisely the challenge, as the power generation depends on external factors, for example mechanical or thermal effects:

For photovoltaic systems, for example, it is the amount of cloud, angle of the sun and ambient temperature, for water power, the fluctuating levels and flow rates of the water, for biomass, different intensities of the fermentation process. For battery storage devices, the degree of discharge is decisive. The consequence: the generated voltage and frequency vary.

Inverters decouple the voltage and frequency of the generating source from the grid voltage and frequency. The inverter means that the energy source can always be kept at the optimum operating point, and using intelligent power electronics, the voltage and frequency fed into the grid can be controlled so that they remain constant.

SINAMICS S120

Active Line Module (ALM) – newly designed but proven thousands of times over

ALM

The Active Line Module (ALM) is predestined for feeding energy back into the grid. For chassis solutions, Active Line Modules and the associated closed-loop control are offered as core components for complete and ready-to-connect inverter systems for renewable energy solutions. As a consequence, users have the option of expanding these components to create their own product which they then market.

The closed-loop control for the Active Line Module supports functions such as:

- Reactive power infeed with setpoint inputs from higher-level control systems
- Voltage and frequency control

Users can implement additional specific functions for renewable energy such as MPP tracking, plant monitoring and control, charging/discharging battery storage devices and other functions in a user-friendly fashion in a higher-level control or in the Battery Management System (BMS), and communicate with the inverter via standard systems such as PROFIBUS or PROFINET.

Here, within the framework of Totally Integrated Automation, Siemens AG offers products that are perfectly coordinated and harmonized with one another.

AIM

The Active Interface Module (AIM) is the line filter and therefore the other core component of the ready-to-connect inverter for renewable energy solutions. The Active Line Module and the line filter must be optimally harmonized and coordinated with one another to achieve the correct filter function.

With our Active Line Module and Active Interface Module components, we offer an optimally harmonized system. Users have the option of purchasing the line filter as component from Siemens AG, or as an alternative, to develop their own filter solution, which is coordinated with the ALM.

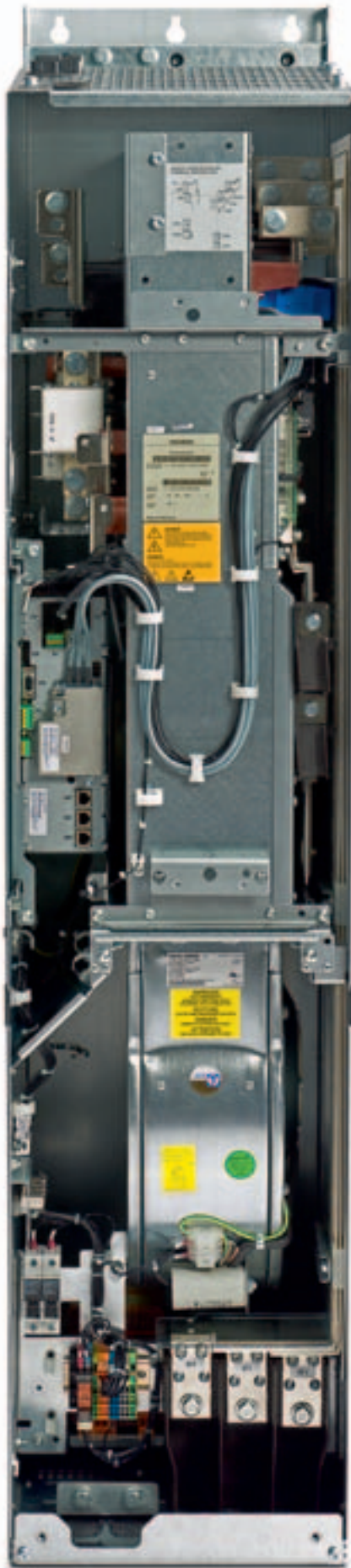
The components listed above are based on an industrial standard. And that pays off:

- Hardware proven thousands of times over
- Demanding, experienced and reliable partners
- Compact, reliable, efficient and low-maintenance products
- Seamless range of power ratings

- Local presence around the globe

- Global service for spare parts and repair

- Shorter installation times
- Lower development costs
- Seamless integration into the automation environment



CU320-2

The CU320-2 is the control unit for the Active Line Module and at the same time provides the I/O for data exchange between the inverter and the higher-level control. Either PROFIBUS or PROFINET is offered as standard communication interface.

We supply components for ready-to-connect inverters for regenerative energy and energy storage solutions

When designing the series of SINAMICS S120 units, we were able to leverage our wealth of experience. Siemens is one of the pioneers of converter technology, and for decades has been developing, producing and marketing converters for various industrial applications. The diverse product portfolio also provides answers to address the applications. Based on many years of experience, concepts well proven in industry can be used for renewable energy solutions and optimally adapted to address these types of applications.

Firmware with function modules

The control functions for feeding energy into the grid are implemented using function modules. Function modules can be ordered as option to the Compact Flash card. The corresponding options are:

Option S01:
Dynamic grid support

Grid support for grid dips and grid faults through reactive power infeed

Option S02:
Grid droop control

Voltage and frequency control on the grid with block start capability

As additional function anti-islanding in conjunction with option S01 or S02 is available .

VSM

The VSM is required to sense the grid voltage. As a consequence, the inverter can sense the amplitude, phase position and phase angle of the grid voltage and synchronize itself to it.

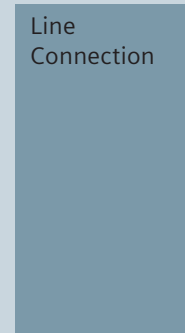
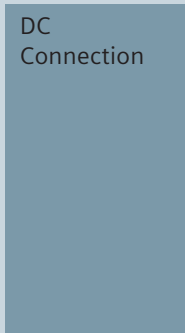
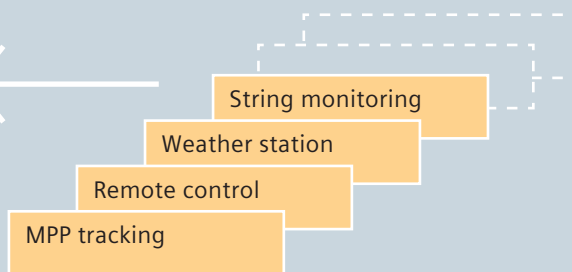
The following products are available as components for a ready-to-connect inverter for renewable energy:

- Active Line Module (ALM)
- Control Unit CU320-2 (CU320-2)
- Compact Flash card (unit firmware) with function modules
- Voltage Sensing Module (VSM)
- Active Interface Module (AIM)

Fit for every task: SINAMICS S120 ALM from 270 kW to 900 kW

Example of a ready-to-connect inverter system for photovoltaic systems based on SINAMICS S120

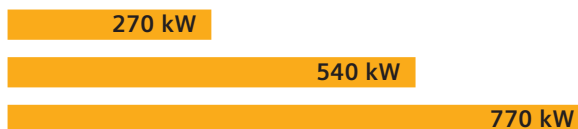
Specific photovoltaic functions/ requirements on the automation system



SINAMICS S120 Active Line Modules and Active Interface Modules, as core components of the ready-to-connect inverter, are available in different power stages depending on the particular application.

When required, additional power ratings can be provided for OEM customers.

Power stages for use in photovoltaic systems for an AC voltage of 320 V:



Power stages for power generation using rotating generators (e.g. hydroelectric, biomass, etc.) for an AC voltage of 400 V:



Technical data

Active Line Module 6SL3330-7TE3__-AA4

Active Interface Module 6SL3300-7TE__-AA0

			Photovoltaic application			Power generation applications using rotating generators (e.g. hydro-electric, biomass, etc.)		
Input DC	Rated DC input power	kW	275	550	785	–		
	MPP voltage range	V	520 – 750			–		
	DC link voltage	V	–			520 – 750		
	Max. DC voltage	V	800			800		
	Rated DC current	A	549	1103	1574	549	1103	1574
Output AC	Rated AC output power	kW	270	540	770			
	Rated power	kW	–			300	630	900
	Line voltage	V	320			380 – 480		
	Rated output current	A	490	985	1405	490	985	1405
	Line frequency	Hz	50/60			50/60		
	Line frequency range	Hz	47 – 63			47 – 63		
	Grid current harmonics	%	5			5		
	cos phi at rated power		0.99			0.99		
	Line supply type		TN, IT			TN, IT		
	Efficiency	Max. efficiency	%	98.25	98.42	98.55	98.25	98.42
European efficiency		%	97.2	97.12	97.75			
Power demand in operation	Own usage in operation	W	990	3280	3280	990	3280	3280
	Usage in standby operation	W	36.5	40	45	36.5	40	45
	Auxiliary power supply demand 24V DC	A	max. 8,8			max. 8,8		
	2AC 230V 50Hz	A	2.5	10.5	10.5	2.5	10.5	10.5
Environment	Max. ambient temperature without derating	°C	40			40		
	with derating	°C	50			50		
	Cooling type	–	Air			Air		
	Coolant flow rate	m³/s	0.36	1.08	1.08	0.36	1.08	1.08
	Sound pressure level LpA (1 m)	dB(A)	73			73		
Mechanical dimensions	Degree of protection (standard)	–	IP20			IP20		
	Width	mm	326	704	704	326	704	704
	Height	mm	1533	1480	1480	1533	1480	1480
	Depth	mm	545	550	550	545	550	550
	Weight	kg	136	450	450	136	450	450

You can contact your local Siemens office for technical data for additional equipment.

Additional information:

www.siemens.com/sinamics-s120

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