The top-performing wind converter

Trusted technology for maximum power yield – SINAMICS W180

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Decades of experience in the wind industry, an impressive track record of over 40,000 wind turbine generators in reliable operation, and converter technology proven in industry and infrastructure – time and time again... That’s the solid foundation on which we developed the SINAMICS W180. A wind turbine converter that takes the standards to the next level in terms of efficiency, compactness, availability, and reliability. As a result, the SINAMICS W180 is ready to fully meet future requirements.

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SINAMICS W180
Built to redefine the standards

SINAMICS: bringing industrial standards to wind power applications
The SINAMICS W180’s features usher in a new era in wind turbine converter design. This new converter boasts impressive characteristics in every respect: top-notch efficiency, highest power generation reliability, perfectly harmonized operation with Siemens wind turbine generators, and outstanding power-related dimensions and weight.

Flexibility rules – ideally suited for onshore and offshore
The SINAMICS W180 unites flexibility with performance. Exceeding all of the current grid codes, it’s ready to fully comply with even more stringent requirements in the future. The converter concept covers all the usual generator types, with or without gear unit, including double-fed induction generators, squirrel-cage induction generators, and permanent-magnet synchronous generators.

The converters can be integrated into the turbine automation via all common industrial interfaces. Thanks to its ultra-compact and modular design, the SINAMICS W180 can be incorporated into any conceivable wind turbine concept, making it the first choice for both onshore and offshore wind power generation.

Reliable operation for economic success
Knowing as we do that availability is a prerequisite of economic success, we’ve equipped the SINAMICS W180 with a comprehensive package of assets, including a highly reliable and rugged design, and the SINAMICS control software was adapted from our own industrial applications. In addition, we’ve added optional remote diagnostics and remote maintenance and cloud-based analyses of status data, which form an advanced preventive service concept.

Technical details at a glance

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<th>Range of use</th>
<th>Onshore</th>
<th>Offshore</th>
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<tr>
<td>Power range</td>
<td>2 to 10 MW</td>
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<td>Suitable generator types</td>
<td>Partial converter (DFIG)</td>
<td>Full converter (synchronous/induction/g geared drive/direct drive)</td>
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<td>Suitable communications protocols</td>
<td>PROFINET</td>
<td>CANopen</td>
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<td>Grid code compatibility</td>
<td>VDE-AR-N 4120</td>
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Your benefits at a glance

Single platform for the entire power range
Uniform engineering for all generator types

Highly advanced control system
As market-leading platform for industrial applications, SINAMICS guarantees a high level of standardization along with advanced features

SINAMICS standard tools (like STARTER)
The adaptation of SINAMICS control software from industrial applications allows consistent software engineering as well as simple and intuitive commissioning

Converter and generator from Siemens
Optimized system efficiency and reliability thanks to matching designs

SINAMICS standard control software
Quick innovation and adoption of future standards and trends, vertical integration into turbine automation

Paralleling of uniform power modules
Low costs and easy access to spare parts

Global Siemens service organization
Short downtimes due to quick response
Experience from a leading supplier

Profit from our decades of experience with electrical equipment for wind turbine systems.
- Over 40,000 Siemens wind turbine generators in operation – with extreme reliability
- Leading supplier of automation, communication, switchgear, power distribution, and process control technology for individual wind turbine systems
- Linking expertise in wind and industrial domains
- Common platform that ensures seamless integration, synergies, and innovation

Reliable operation and highest availability

Opt for a future-proof system with optimized serviceability.
- Rugged and reliable design
- Use of well-proven components and modules
- Extended options for remote diagnostics and maintenance
- Preventive service concept with cloud-based analyses of status data
- Firmware updates and easy maintenance via remote access
- Reduced DC-link voltage in partial load enhances IGBT service life
- Soft torque on/off before tripping reduces mechanical stress on the shaft
- Current reduced and restored instead of tripping when exceeding rated conditions

Opt for standardized and simplified engineering, integration, and spare part commissioning

Optimized engineering as a matter of principle.
- Modern SINAMICS platform software tools, the consistency of the SIMATIC Controller platform, and the comprehensive TIA Portal engineering framework provide useful information on the fly, accelerating the entire engineering process
- Standard components allow for quick and easy access to spare parts
- Standardized interfaces like PROFINET, CANopen, and OPC UA make for a seamless integration into turbine automation

Maximum power yield and flexibility

Achieve a new level of efficiency and power yield, and at the same time take advantage of overall flexibility.
- SINAMICS W180 stands for high power density and maximum power yield – quickly and simply
- Simple selection and configuration starting in the planning and engineering phase
- Easy integration of the converter into the overall system
- Easily scalable, ultra compact, and modular design
Built for optimally stable turbine operation
Dynamic overload capability

Provide maximum overload capability to the turbine depending on ambient conditions and past load profile.

- The SINAMICS W180 monitors the junction temperature of the IGBTs online using a comprehensive and proven thermal model.
- In the event of turbine overload conditions, the overcurrent capability is dynamically adjusted depending on actual IGBT junction temperature. So overload conditions of >110% can be accommodated depending on water temperature, switching frequency, and load profile without tripping.
- To further increase current limits dynamically, the switching frequency can be lowered temporarily to a minimum value, increasing overcurrent capability even more.
- When reaching the IGBT junction temperature limit, the SINAMICS W180 gradually reduces turbine torque to avoid tripping or failure under all circumstances.
- All of the converter’s features add up to maximally stable turbine operation.

Adjustable clock frequency for optimal operation

Benefit from precise system optimization.

- Both the converter and the generator can be precisely optimized thanks to the continuously adjustable clock cycle frequency.
- PWM random pattern function for less generator noise and lower line-side harmonics.
- PWM frequency for line and generator sides can be optimized separately in the range from 1 kHz to 4 kHz, even online during operation.