

concycle[®] | EFFICIENCY, RELIABILITY
EXPERIENCE, PERFORMANCE

LOW-VOLTAGE FULL SIZE CONVERTER
FOR PERMANENT MAGNET EXCITED
SYNCHRONOUS GENERATORS



POWER CONVERSION
Controlling the Power of Energy





WIND IS OUR PASSION

Woodward is one of the leading suppliers of wind converters used for renewable energy generation. More than 7,000 installed converters used in onshore and offshore applications attest to the competence and experience of Woodward within the wind energy business.

The precise and intelligent control algorithms of CONCYCLE wind converters together with variable-speed generators create an optimised power-generation system.

CONCYCLE wind converters actively dampen dynamic torque loads in the drivetrain thus protecting the gearbox. This will extend the lifetime and increase the reliability of your system.

The intelligent control of your CONCYCLE wind converter ensures compliance with all valid international grid code requirements at the point of common coupling. The modular design of CONCYCLE full size converters currently covers power classes from 2 MW to 5 MW.

Woodward's modern manufacturing facilities in the US and China also guarantee converter availability for growth markets.





The right choice | FOR HIGHEST PERFORMANCE AND RELIABILITY

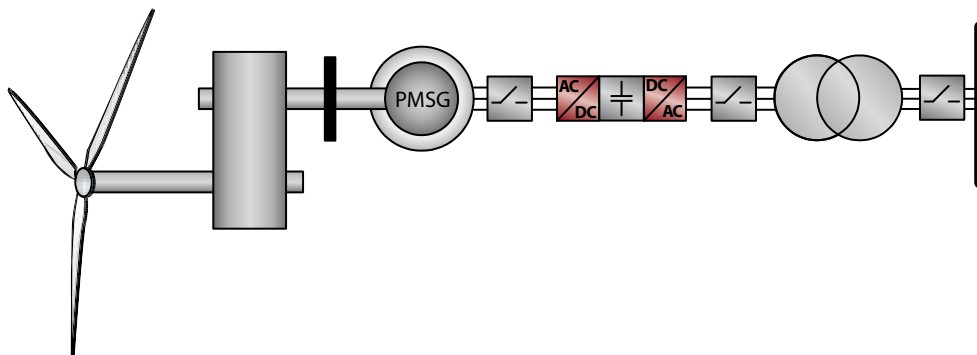
CONCYCLE wind converters have considerably enhanced the success of large wind turbines. The unmatched reliability and quality of CONCYCLE wind converters results in a perfect power-generating system for variable-speed wind turbines. The high technology – made in Germany – provides the best way of integrating modern wind power plants in the supply chain of renewable energy.

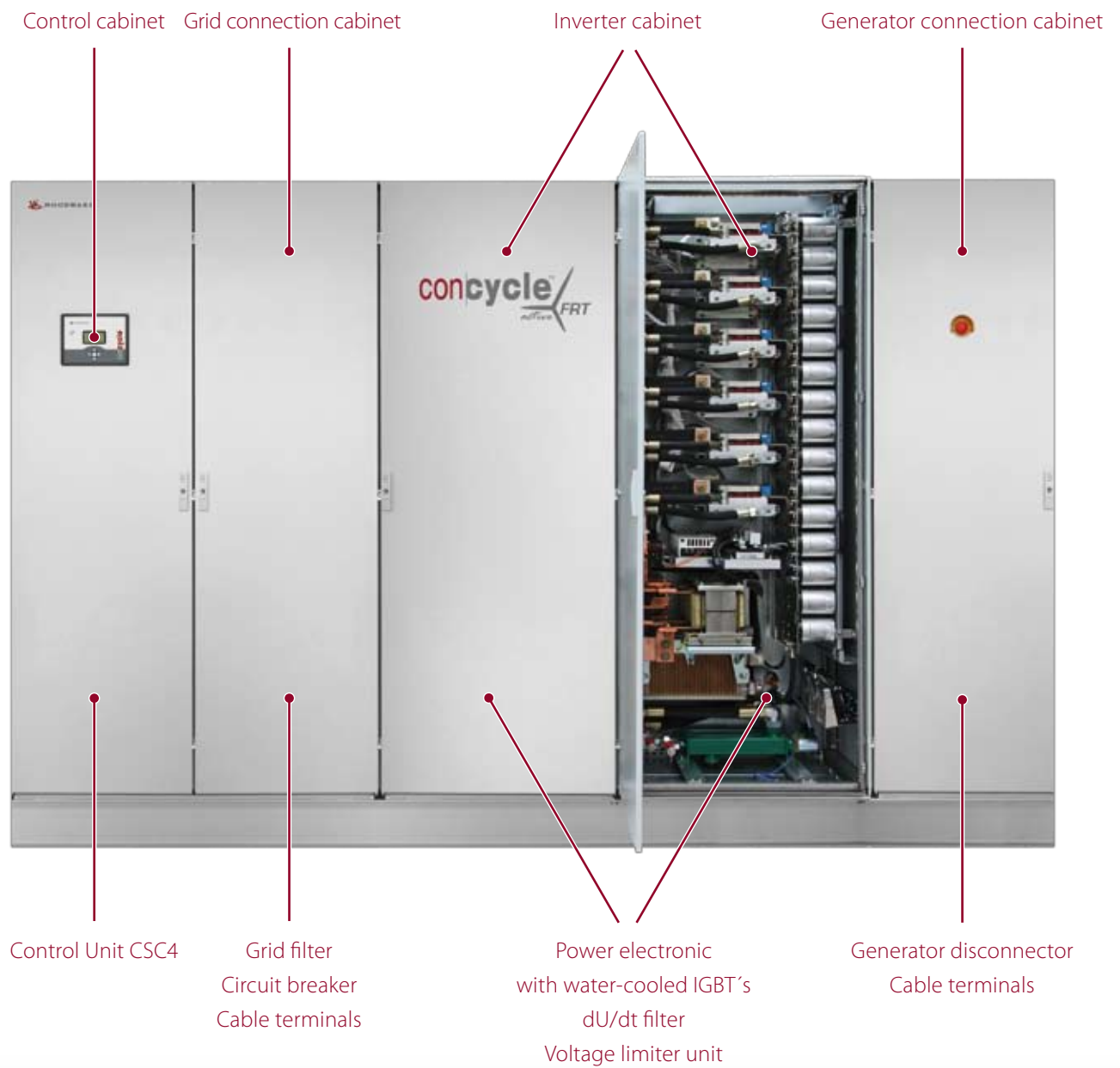
CONCYCLE® PERFORMANCE

The CONCYCLE wind converter sets benchmarks in product innovation for compact and modular system design. The CONCYCLE wind converter is successfully established in onshore and offshore wind turbines and is being constantly developed in accordance with the latest international grid code requirements. This is verified by simulations and successful field tests in different international system variations for 50 Hz and 60 Hz grids.

CONCYCLE® BENEFITS

- High efficiency at any rotation speed
- High power density
- Reactive power compensation
- Asymmetrical fault compensation
- Concycle activeFRT™ active damping of dynamic torque loads
- Highly dynamic regulation control
- Low inrush currents
- Detailed simulation models
- Compact, modular design
- Rugged design
- Service organisation worldwide
- Integrated data logger and fault data recorder
- Variable field bus communication interfaces
- Fast software updates







Modular platform | FOR YOUR INDIVIDUAL MODULAR DESIGN

With the new CONCYCLE wind converter design, a modular converter platform for the multi-megawatt class has been created.

The modular design considers all aspects of the mains supply and grid codes

- Competence in system simulations
- Concepts and solutions for all-round protection, including mains protection of entire wind farms
- Patent consultation

THE FULL SIZE CONVERTER PLATFORM

- Modular and water-cooled design for wind power converters
- Combination from standardised or customised sections:
 - Control cabinet
 - Grid connection cabinet
 - Inverter cabinet
 - Generator connection cabinet
- The optimal solution for your relevant power ratings
- Different footprints for tower, base or nacelle installation
- Minimal number of components
- Specific local standards as well as extreme environmental conditions are available options
(**H**igh **V**oltage **R**ight **T**hrough, UL, **C**old **C**limate **V**ersion, **H**ot **C**limate **V**ersion)
- World-wide flexible manufacturing
- Cost-economic construction
- Integral water-cooled design: compact, extended lifetime
- Improved control algorithms with the Converter Control Unit CSC4





The CONCYCLE family

MODULAR
CONVERTER PLATFORM

WELL-ESTABLISHED FUNCTIONAL FEATURES

- Optimum system efficiency
- High-efficiency gain from the drivetrain
- Highly dynamic regulation response
- Designed to conform to the latest grid code requirements; optimised system due to CONCYCLE activeFRT™ functionality
- Good mains compatibility with low fluctuation values
- Reactive power management in operation and during turbine standstill
- Low inrush currents
- Active auto-reclosing detection
- Soft ride through and compensation of asymmetrical currents
- System integration by using conventional protocols and communication standards
- Integrated data logger and fault data recorder
- Menu-supported commissioning tool

DESIGN AND CONSTRUCTION

- Compact, modular design with highest power density
- Use of modern, low-loss trench-gate IGBTs
- Directed heat dissipation by integrated water-cooling
- Polypropylene capacitors: non-aging, maintenance-free and environmentally compliant
- Optimised service and maintenance work thanks to handling by front access and compact single components
- Vibration-damping construction
- Rugged design, high protection against environmental impact

SIMULATION MODELS FOR CUSTOMERS

- Detailed models for dynamic system performance simulation and simplified simulation to help customers analyse the integration of wind power plants into the mains.
- Constant verifications based on real field measurements ensure the data quality for the simulation.





Global service presence



OUR SERVICE

Maximum availability and operational reliability rank first in the catalogue of requirements of frequency converter systems for wind turbines. Apart from quality there are growing expectations in terms of customer care.

Woodward provides maximum service support worldwide. We offer you the entire service spectrum from one source.

Highly qualified staff members in our internationally set-up service offices guarantee customer service at the highest level for the constantly growing number of systems in use worldwide. They give information on warranty, down-times, spare parts, repairs, orders and technical training.

Apart from local service and delivery of spare parts, we offer individual solutions, worked out for you by a team of very competent staff members.

Highly developed state-of-the-art remote diagnostic systems can monitor and analyze the operating status of your Woodward system anywhere and at all times.

Our strengths are reliability, short reaction times as well as highly qualified and motivated personnel.

With our service expertise we over all requirements to maintain an exceptionally high standard when it comes to the performance and efficiency of your systems.



Enabling Electrical Power Systems Integration

ENABLING ELECTRICAL POWER SYSTEMS INTEGRATION

The shift to distributed generation is changing long-established concepts about how electricity should be produced, transmitted, and used. Power flow through the grid is becoming more decentralised and bi-directional. Local measurement, fault detection, and remote control are now essential for stability and intelligent load management. A new approach is needed: one that encourages greater use of renewable resources and facilitates interconnection of distributed power generation using advanced monitoring, communication and control. Woodward is recognized as a leader in the field of advanced power generation and distribution control products. We continue to build on our legacy by creating cutting-edge control and protection devices, designed to work in complex systems to meet the needs of tomorrow's smart grids. Our global strategy for melding all aspects of power generation and distribution to enable electrical power systems integration is called PowerConnect.



HELP DESK

Telephone: +49 (0)2152 145-397

+49 (0)2152 145-398

Email: kemp.service@woodward.com

Woodward Kempen GmbH

Krefelder Weg 47

47906 Kempen

Germany

Telephone: +49 (0)2152 145-1

Fax: +49 (0) 2152 145-468

Email: concycle@woodward.com

Internet: www.woodward.com

