Product brochure

Low voltage wind turbine converter ACS880, 800 kW – 8 MW

Power and productivity
for a better world™

ACS880 low voltage wind turbine converter

The ACS880 wind turbine converter is engineered to lower the levelized cost of energy through maximum availability, high efficiency and advanced grid code compliance.

Wind turbine converters play an important role in helping customers to create the perfect wind economy. Selecting the right wind turbine converter is critical in the turbine design and for a higher wind farm return on investment.

Proven and tested

The ACS880 low voltage wind turbine converter is based on ABB's variable-speed drive platform, a technology proven and tested in thousands of applications worldwide. It has been adapted and optimized to meet the demanding requirements of the wind industry.

Full power converter for onshore and offshore installations

The liquid-cooled ACS880 full power converter is suitable for onshore and offshore utility-scale wind turbines. It is rated from 0.8 to 8 megawatt (MW), with the highest powers being assembled using parallel-connected sub-converters. It is available in in-line and back-to-back configurations and for operation with induction and permanent magnet generators. Its compact footprint allows nacelle and tower installations.

Lower cost of energy

The ACS880 helps to utilize the full potential of wind energy reliably and economically. It further lowers the levelized cost of energy (LCoE) through maximum availability, high efficiency, advanced grid code compliance and easy maintenance.

ABB, your partner in wind

As a leading supplier with over 30 years of wind power experience, ABB has the know-how and understanding to ensure its solutions integrate seamlessly with your needs. Safety, efficient lifetime performance, reliability and availability are key. We call it wind economy and it's engineered into every megawatt.

ACS880 key product features

- Full power converter
- Modular design for high availability and high efficiency
- Enhanced DTC for precise and fast generator control, grid code compliance and longer lifetime of drivetrain
- Very low total harmonic distortion
- Long-life components for high availability and low life-cycle costs
- Advanced diagnostics system enabling long-term planning of service and maintenance work

Superior reliability for maximum availability

The ACS880 wind turbine converter is designed for reliable operation in extreme weather conditions.

Long-life components for lower life-cycle costs

The ACS880 is designed for a long lifetime in harsh environmental conditions. During the design phase, the annual wind distribution curve has been taken into account to optimize converter design and components. Long-lasting components are used such as self-healing foil capacitors, which avoids the need for replacement during the converter's lifetime. Similarly cooling fans are designed to considerably extend component replacement intervals.

Fast generator control for longer drivetrain lifetime

The ACS880 uses ABB's enhanced direct torque control (DTC) for generator control. It can monitor generator torque up to 80,000 times per second, ensuring immediate reaction and control. The precise and fast control dampens drivetrain oscillations, thereby minimizing stress on the generator gearbox shaft. This results in a longer lifetime of the mechanical drivetrain.

Redundancy

The ACS880 has a built-in redundancy which ensures continues operation of the converter. In the unlikely event that one sub-converter or power module fails, the faulty unit is disconnected and the converter continues operating at partial load. Thus, repair can be planned and unpredicted downtime is prevented.

Enhanced diagnostics

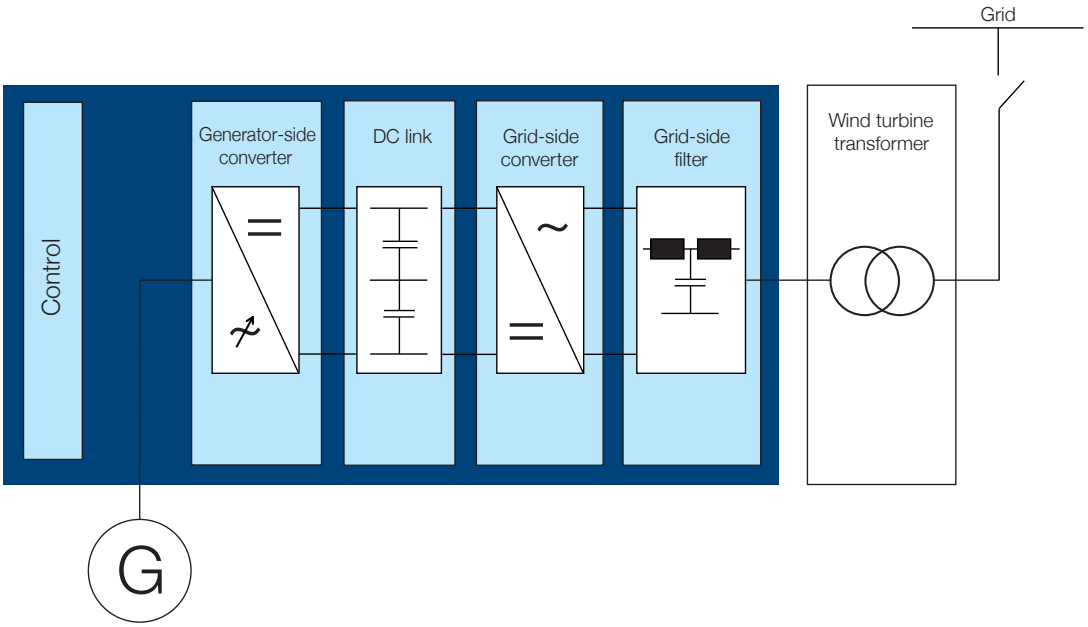
The converter incorporates an enhanced diagnostics system which enables long-term planning of service and maintenance work.

The system continuously measures the conditions the turbine is exposed to and records when the converter operates outside its specification. Depending on the converter's loading, a component lifetime calculator works out the wear and tear of each device and notifies any service needs. Preventive maintenance intervals, therefore, are accurately predicted.

Easy maintenance

The ACS880 is designed with easy and fast servicing in mind. All converter components are easily accessed which speeds up maintenance and repair work.

Software updates are easily uploaded with the help of a memory unit and the latest converter data can be sent with one mouse click to ABB's service experts for analysis.



Topology of the ACS880 low voltage wind turbine converter

Enhanced grid code compliance

The ACS880 wind turbine converter ensures compliance with the strictest grid codes.

Low voltage ride-through and grid support

ABB's enhanced DTC enables very efficient and fast control of the generator side and grid side converters. This provides the foundation for grid code and fault ride-through compliance.

The ACS880 regulates the active and reactive power output of the wind turbine. This ensures wind turbines stay connected during voltage dips by providing full reactive current as soon as a grid fault occurs.

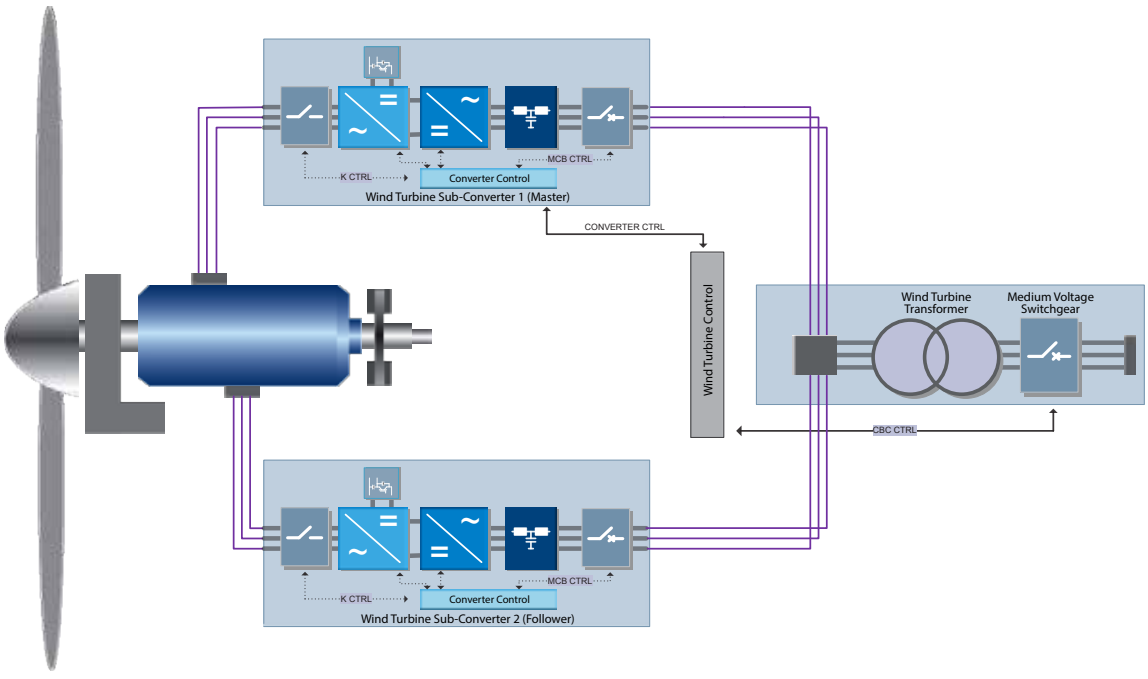
Verification of grid code compliance

ABB's low voltage wind turbine converters are subjected to comprehensive fault ride-through and power quality tests in ABB's multi-megawatt grid code laboratory before being shipped to the customer. This simplifies turbine cerfication and reduces on-site testing costs.

Furthermore, ABB provides tools to simulate different wind turbine scenarios. This lets the customer optimize their design to fit their wind patterns. For example, simulation models let the customer investigate the converter's behavior in grid transient situations before making a financial commitment.

High efficiency for a higher energy yield

The ACS880 wind turbine converter offers the design option of parallel-connected sub-converters. Depending on the wind conditions, the sub-converters can be activated or deactivated, which increases the converter's overall efficiency, especially at partial load.



Parallel-connected sub-converters enable redundancy and a higher overall efficiency, especially at partial load

ACS880 – wind economy engineered into every megawatt

The ACS880 wind turbine converter is designed for high reliability, efficiency and easy maintenance.

ACS880, 4 MW,
back-to-back configuration,
front view

ACS880, 4 MW,
back-to-back configuration,
rear view

ABB wind turbine drivetrain packages

ABB provides electrical drivetrain packages, including generator and converter, that work in perfect sync.

ABB's drivetrain experts support turbine manufacturers in designing and dimensioning the drivetrain components and provide support in the grid code certification process.

ABB generators

ABB has supplied more than 35,000 generators over the last 30 years to leading wind turbine customers worldwide. It offers the complete range of generators for wind turbines, supporting all drivetrain concepts. It has been the leader in Permanent Magnet Generator (PMG) technology since the 1990s.

The standard power range is from 100 kilowatts (kW) to 8 MW, with generators available up to 20 MW and 15 kilovolts (kV).

ABB generators are designed for harsh operating conditions. The special ABB high performance F-class insulation system and the rigid form-wound windings guarantee a long lifetime with high overload capability in high temperatures, even with the continuously changing loads common to wind turbines. The bearing construction is designed for reliable operation with long service intervals.

Comprehensive testing

ABB is committed to ensuring the reliability of every wind turbine drivetrain package it delivers. To ensure that quality standards and customer requirements are fully met, the equipment is subjected to thorough testing and simulations in ABB's test facilities.

In addition, ABB is able to perform tests of the complete drive-train to verify its performance and grid code compliance. This simplifies turbine certification and reduces on-site testing costs.

Complementary ABB products for wind

ABB's offering for wind power extends beyond the electrical drivetrain. ABB is one of the largest suppliers of electrical products and solutions to the wind industry. Its portfolio includes transformers, contactors, PLCs, breakers, variable-speed drives, etc.

The ACS880 variable-speed drive, which belongs to the same product family as the ACS880 wind turbine converter, is the ideal solution for yaw motor control. It reduces mechanical stress and excessive vibrations during movement.

Service and support

ACS880 wind turbine converters are backed by a comprehensive set of global life-cycle services that ensure trouble-free operation and maximum availability.

ABB engineers not only work with turbine manufacturers during the design and converter specification phase, but provide their services throughout the entire life cycle of the converters.

Installation and commissioning
ABB provides dedicated wind converter training for installation and commissioning for turbine manufactures. ABB's certified commissioning engineers have extensive know-how and experience and can support turbine manufacturers during installation and commissioning.

Technical support
ABB provides remote services for fast failure analysis as part of its maintenance program. On customer request, a 24/7 support line and on-site field support can be provided.

Spares and consumables
Having the right spare parts available at the correct locations needs to be well planned to ensure the highest wind turbine energy production. ABB can help plan spare part stocking throughout the life cycle of the wind turbine.

Preventive maintenance
Implementing ABB's converter-specific preventive maintenance schedules reduces the risk of failure and increases the lifetime of the converter, lowering overall operational costs. ABB's preventive maintenance kits contain all the genuine ABB spare parts needed for a specific maintenance task, simplifying preventive maintenance.

Training
ABB provides a wide selection of wind turbine converter training to turbine manufacturers and wind farm operators.

Service agreements
Depending on the needs of the turbine manufacturer or wind farm operator, ABB can bundle individual services in one contract. A contract can be made at any stage of the wind turbine converter's service life.

Global network, local presence
ABB's global presence and worldwide organization with its network of selected partners provide local support, training and services as and when required.

Services for ABB wind turbine converters
- Installation and commissioning
- Grid integration support
- On-site support
- Training
- Remote diagnostics
- 24/7 support line
- Maintenance
- Customized maintenance contracts
- Spare parts and logistics network

Technical data ACS880 full power wind turbine converter

Converter model	ACS880-77LC in-line configuration	ACS880-87LC back-to-back configuration
Converter type	Full power converter for permanent magnet and asynchronous generators	
Generator power range	0.8 to 4.6 MW	1.5 to 8 MW
Optional sub-converter configuration	Available from 0.8 MW	Available from 1.5 MW
Cooling	Liquid cooling with totally enclosed cabinet	
Control principle	Direct torque control (DTC)	
Electrical data		
Rated grid voltage	525 to 690 V AC, 3 ph, ±10%	
Rated generator voltage	0 to 750 V AC	
Nominal frequency	50 Hz / 60 Hz	
Efficiency at converter's rated point	≥ 96.5%	
Generator-side converter du/dt	1.0 to 1.4 kV/µs	
Grid harmonics Total harmonic current distortion	Max 4%	
Environmental limits		
Ambient temperature	Transport -40 to +70 °C Storage -40 to +70 °C Operation -30 to +50 °C	
Coolant inlet temperature	+5 to +50 °C	+5 to +45 °C
Optional high coolant inlet temperature	Up to +55 °C	
Altitude	0 to 1000 m	
Optional high altitude	Up to 4000 m	
Degree of protection	Totally enclosed cabinet IP54 / UL type 12	
Cabling connections	Top or bottom	
Cooling connections	Left or right side	
Cabinet configuration	In-line, back-to-back or several separate	
Control		
Field bus interface	EtherCAT, PROFINET IO, PROFIBUS-DP, CANopen and Modbus, ControlNet, InterBus-S, DeviceNet	
Ethernet interface	Ethernet interface with PC browser is included	
Control tool link	Optical DDCS communication link for communication with PC tools as standard	
Grid code compliance		
Grid codes	Supports wind turbine to comply with the most stringent grid code requirements	
Product compliance		
Product markings	CE	
Optional	UL508C, CSA C22.2 No 14-05	
EMC EN 61800-3/ A11 (2000), EN 61800-3 (2004)	2nd environment, unrestricted distribution, category C3	
Quality assurance system	ISO 9001	
Environmental system	ISO 14001	

ACS880 in-line configuration (ACS880-77LC)

Type code	Typical generator rating	Rated generator apparent power	Rated grid apparent power	Cabinet width		Cabinet depth		Cabinet weight		Cooling flow rate
	kW	kVA	kVA	mm	inch	mm	inch	kg	lbs	l/min
ACS880-77LC-860A/800A-7	800	1028	956	1400	55	600	24	1200	2646	90
ACS880-77LC-1686A/1568A-7	1500	2014	1874	2300	91	600	24	2000	4409	135
ACS880-77LC-2503A/2328A-7	2300	2991	2782	2900	114	600	24	2600	5732	175
ACS880-77LC-1720A/1600A-7	1600	2056	1912	2 x 1400	2 x 55	2 x 600	2 x 24	2 x 1200	2 x 2646	2 x 90
ACS880-77LC-3372A/3136A-7	3000	4029	3748	2 x 2300	2 x 91	2 x 600	2 x 24	2 x 2000	2 x 4409	2 x 135
ACS880-77LC-5006A/4656A-7	4600	5982	5564	2 x 2900	2 x 114	2 x 600	2 x 24	2 x 2600	2 x 5732	2 x 175

Notes:

Cabinet height: 2000 mm (79 inch)

Dimensions and weights shown here are subject to change depending on the selected options. Please contact ABB for more detailed information.

ACS880 back-to-back configuration (ACS880-87LC)

Type code	Typical generator rating	Rated generator apparent power	Rated grid apparent power	Cabinet width		Cabinet depth		Cabinet weight		Cooling flow rate
	kW	kVA	kVA	mm	inch	mm	inch	kg	lbs	l/min
ACS880-87LC-1686A/1568A-7	1500	2014	1874	1250	49	1200	47	1800	3968	135
ACS880-87LC-2503A/2328A-7	2300	2991	2782	1450	57	1200	47	2300	5071	175
ACS880-87LC-3302A/3072A-7	3000	3947	3671	2300	91	1200	47	2800	6173	235
ACS880-87LC-4000A/3800A-7	3800	4780	4541	2500	98	1200	47	3500	7716	280
ACS880-87LC-4000A/4134A-7	4000	4780	4941	2700	106	1200	47	4500	9921	300
ACS880-87LC-5006A/4656A-7	4600	5982	5564	2 x 1450	2 x 57	2 x 1200	2 x 47	2 x 2300	2 x 5071	2 x 175
ACS880-87LC-6604A/6144A-7	6000	7893	7343	2 x 2300	2 x 91	2 x 1200	2 x 47	2 x 2800	2 x 6173	2 x 235
ACS880-87LC-8000A/7600A-7	7600	9561	9083	2 x 2500	2 x 98	2 x 1200	2 x 47	2 x 3500	2 x 7716	2 x 280
ACS880-87LC-8000A/8268A-7	8000	9561	9881	2 x 2700	2 x 106	2 x 1200	2 x 47	2 x 4500	2 x 9921	2 x 300

Notes:

Cabinet height: 2000 mm (79 inch)

Dimensions and weights shown here are subject to change depending on the selected options. Please contact ABB for more detailed information.

Contact us

For more information contact your local ABB representative or visit:

www.abb.com/converters-inverters

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