

LOW VOLTAGE WIND CONVERTERS

ABB wind turbine converters

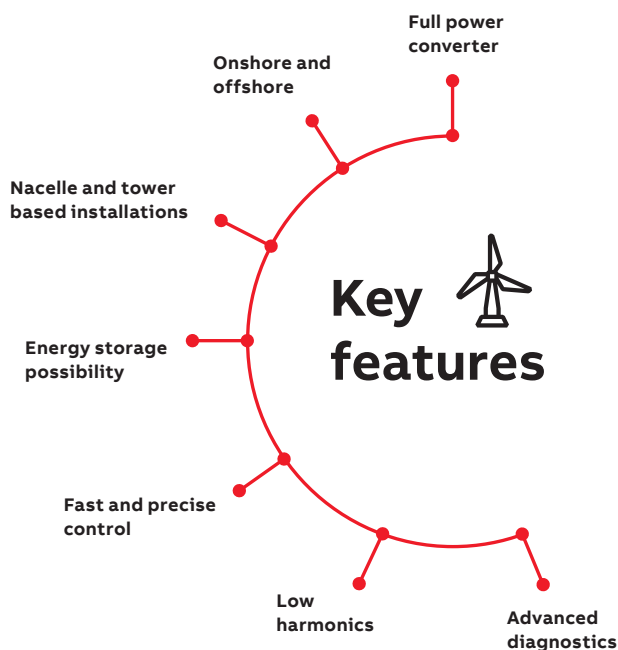
ACS880, 800 kW to 8 MW



ACS880 wind turbine converter

Flexible solution

The ACS880 converter is a full power converter engineered for onshore and offshore wind turbines.



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

Ratings

The 690 V converters are rated for utility-scale wind turbines with powers ranging from 0.8 to 8 MW. They operate both asynchronous and permanent magnet generators.

Flexibility

The converter is available as in-line or back-to-back cabinet with liquid cooling or combined cooling. Various cabling options enable adaption to different installations. The compact footprint allows nacelle and tower installations.

Modular construction

The converter is built from a set of standardized modular components, such as control units and power modules. Possible faults are limited to one modular component, which enables easy troubleshooting and fast replacement.

Improved stability with energy storage

With the optional integrated battery control, the converter can be connected to an external energy storage. The storage improves the stability of the turbine's power supply according to user-defined settings.

ABB, the leading wind expert

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 customers' needs. Safety, efficient performance, reliability and availability are the keys to the success of ABB wind converters.

Superior reliability

Designed for extreme conditions

Fast, precise control

The ACS880 converter regulates active and reactive power output according to the commands from the wind turbine PLC. The converter uses ABB's direct torque control (DTC) for generator and grid control. It monitors operations up to 80,000 times per second, ensuring immediate reaction and control. This precise, fast control dampens drivetrain oscillations, minimizing stress on the gearbox. This results in a longer lifetime for the mechanical drivetrain.

Advanced diagnostics

The control continuously measures inputs and outputs, as well as the internal condition of the converter. The diagnostics is able to detect both fast deviations and slowly occurring ones that might be caused by incorrect settings, clogged pipes or filters, or incorrect operation of auxiliary equipment. Identifying problems early and taking corrective actions prevent future hardware failures of the converter or other turbine equipment.

Long-life components

The optimization of the converter design and component selection is based on wind classes. Long-lasting components are used to extend replacement and maintenance intervals.

Reliability even in harsh environments

The ACS880 is designed for a long lifetime. Features such as coated boards and a totally enclosed, IP54-class cabinet make the ACS880 suitable for harsh environmental conditions. To ensure maximum reliability, each converter goes through an extensive test routine at the factory.

Low harmonics

ACS880 converters produce exceptionally low harmonic content. The total harmonic current distortion is typically less than 3%.

ABB Ability™

The converter is compatible with ABB Ability™ solutions. These digitally enabled services provide better availability and turbine uptime.

- Remote Assistance automatically and continuously collects converter performance data. Using this data, ABB specialists can provide rapid support.
- Condition Monitoring delivers accurate, real-time information about converter events to ensure the equipment is available, reliable and maintainable.
- Predictive Maintenance predicts potential problems and proposes maintenance to reduce the risk of failure.



Grid code compliance

Easy grid integration

—
01 Topology of
the ACS880
wind turbine
converter

Fault ride-through

ABB's direct torque control (DTC) enables precise and fast generator and grid-side converter control. It provides the foundation for smooth grid integration, even with demanding grid codes. The ACS880 ensures wind turbines stay connected during brief grid disturbances by providing grid-supporting current.

Grid code compliance

The performance of ABB wind turbine converters is tested and verified in various grid disturbance cases. This documented performance simplifies turbine certification and reduces on-site testing costs.

Simulation

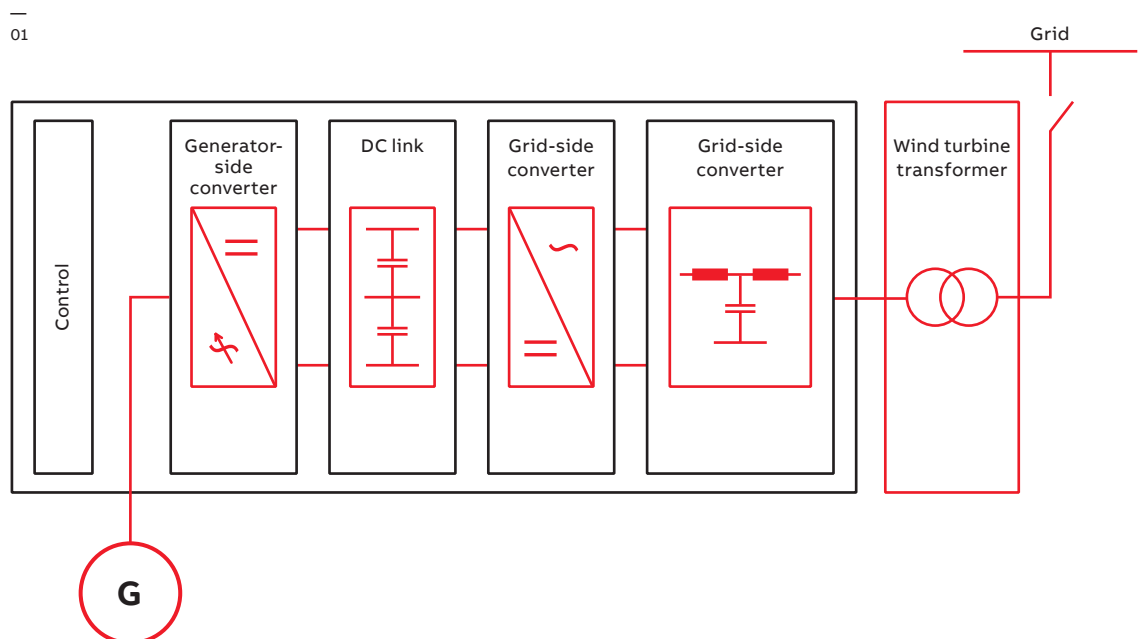
ABB maintains a set of simulation models that enable OEMs, park developers, and transmission system operators to conduct various grid behavior studies.

Weak grids

Wind parks are often in remote locations behind long transmission lines, giving them weak grid connections. With the ACS880's superior control performance, the converter can handle operations even with weak grids.

GL certified

ABB wind converters have the DNV GL product certificate to verify their quality and reliability.



Efficiency

Redundant configuration for high yield

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02 Twin
converter
setup

Twin converters

Instead of having a single ACS880 cabinet, ABB offers the design option of two separate cabinets with parallel-connected converters. Each of these sub-converters can be activated and deactivated, depending on the wind conditions and grid limitations. Operation at partial load with a single converter reduces total losses.

Redundancy for maximum availability

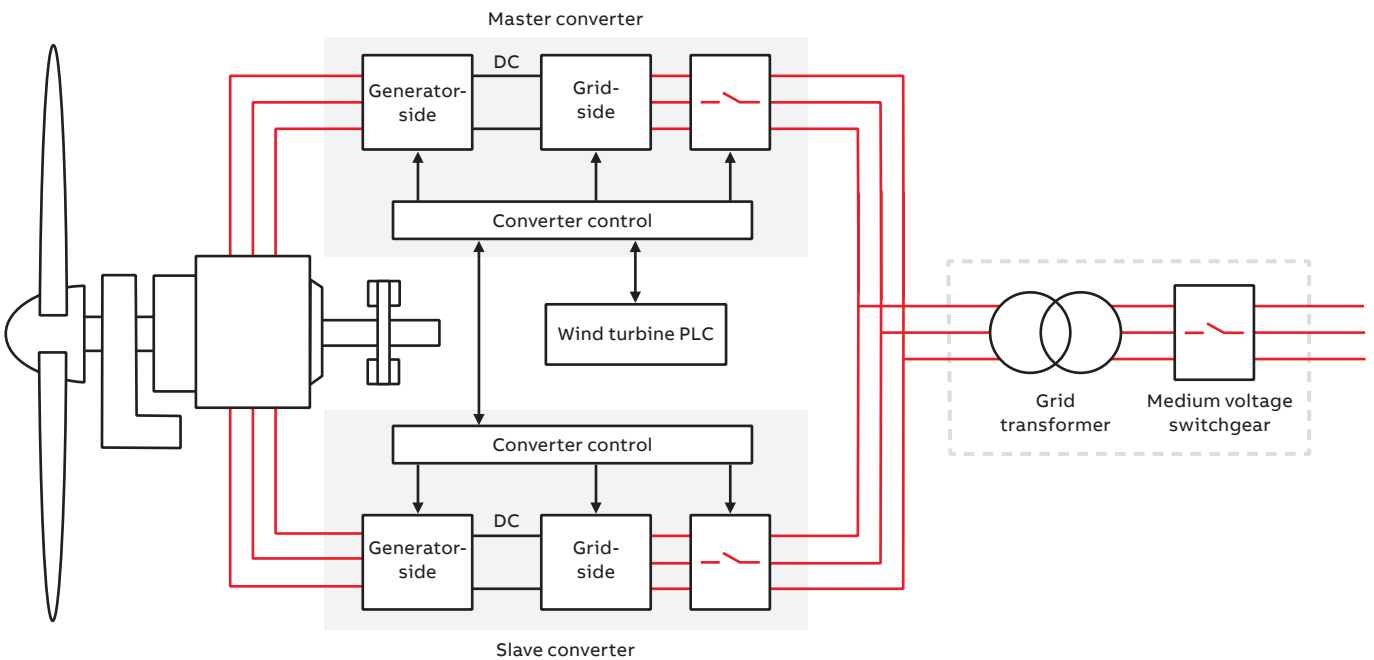
The twin converter setup significantly increases the turbine's availability. In the unlikely event

that one sub-converter or power module fails, the faulty unit is disconnected and the converter continues operation according to the technical capabilities of one sub-converter. Repair can be planned and scheduled without a total loss of production.

Online reconfiguration

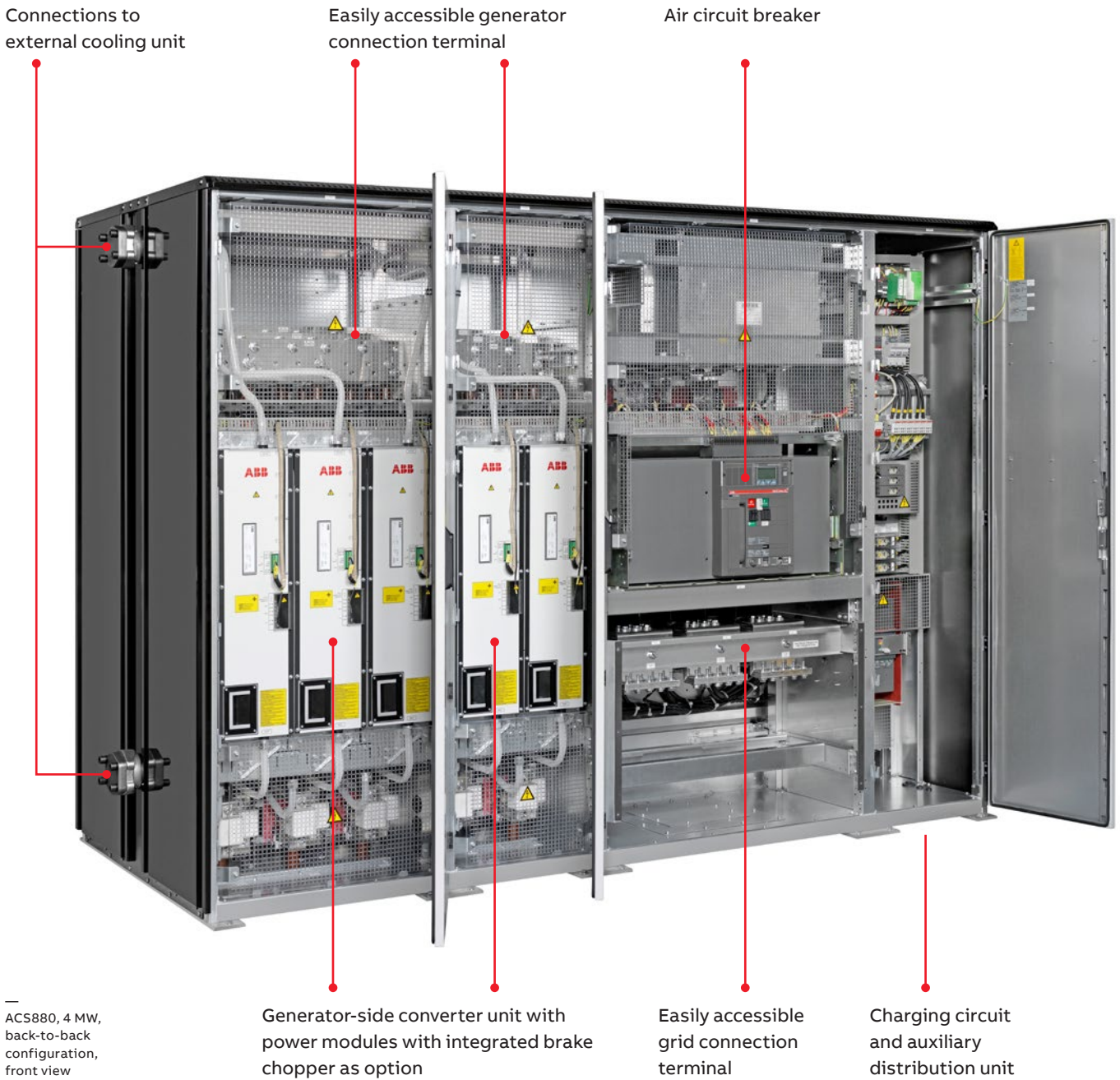
In traditional redundant converter setups, the change in available power affects the control and protections and requires a restart. The ACS880 converter can be reconfigured online without stopping the wind turbine.

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ACS880 4 MW revealed

The ACS880 wind turbine converter is designed for easy maintenance.



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

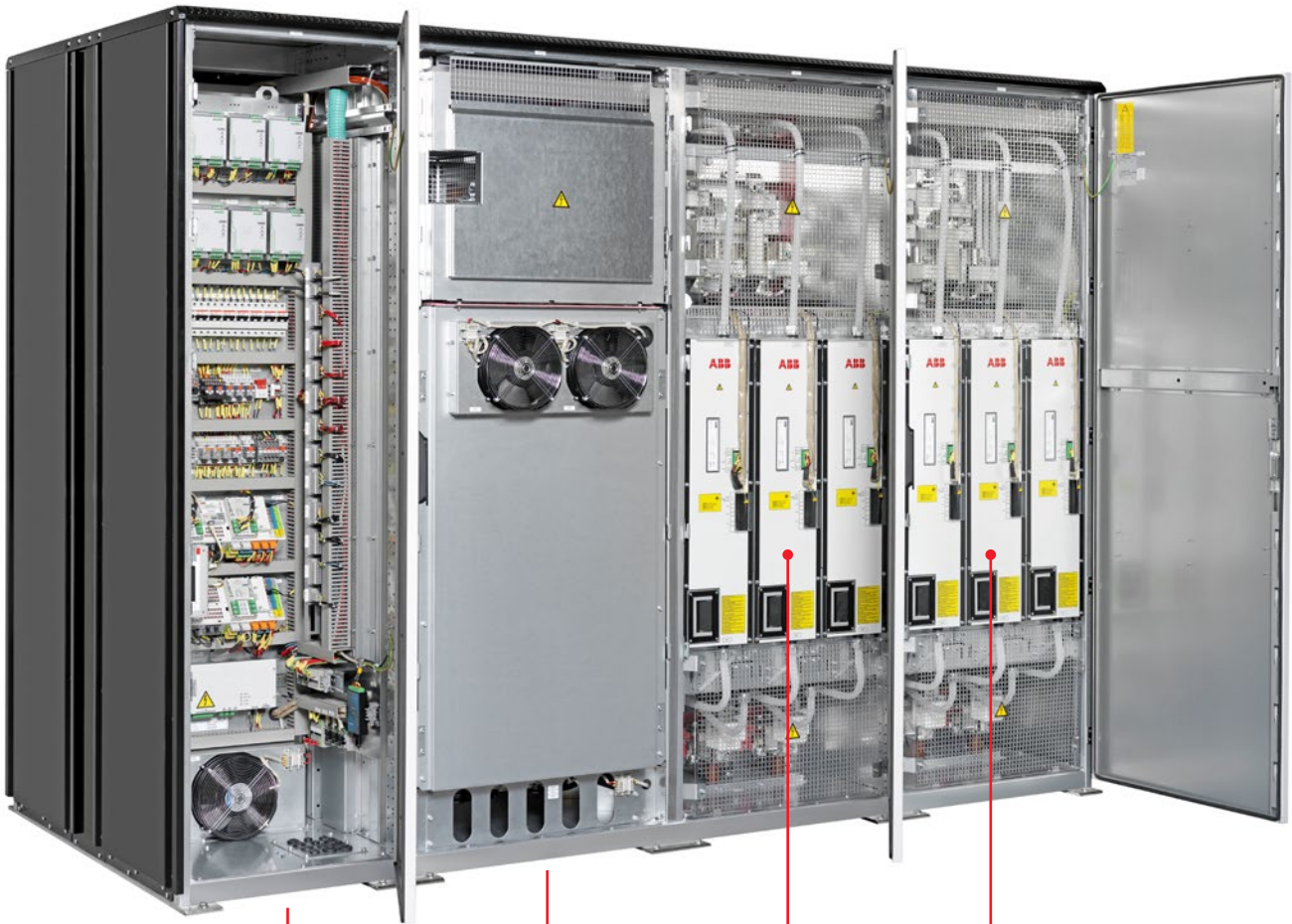
Generator-side converter unit with power modules with integrated brake chopper as option

Easily accessible grid connection terminal

Charging circuit and auxiliary distribution unit

Fast servicing

- Modular construction for easy troubleshooting and fast replacements
- Easy access to components to speed up maintenance and repair work
- All converter service activities require front access only
- Remote software updates
- Easy to send the latest converter data to the customer's technical experts or an ABB specialist for analysis
- Easy access to generator and grid connection terminals



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

Auxiliary control
unit

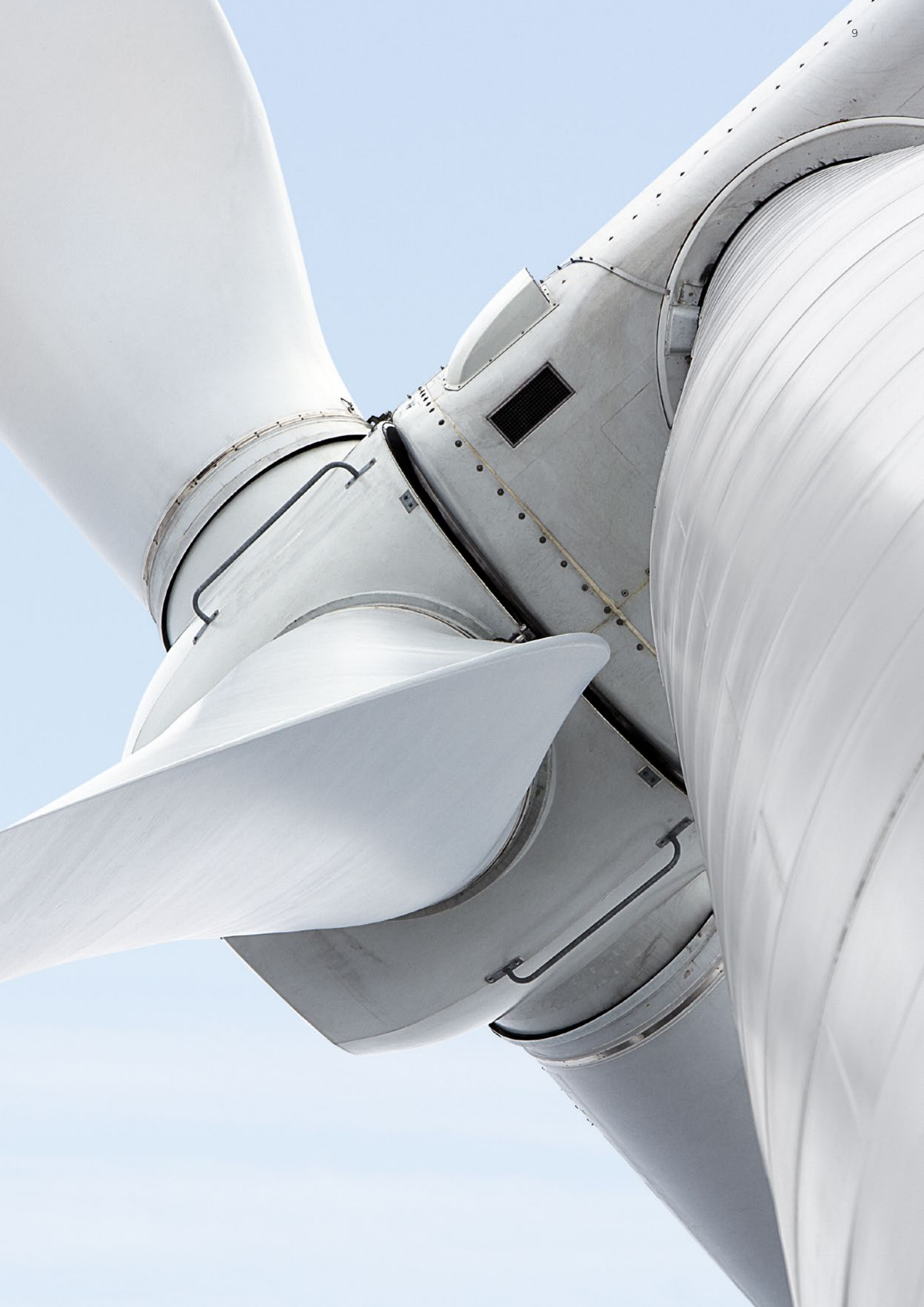
Grid-side
filter unit

Grid-side converter unit
with power modules

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
Cooling	Liquid cooling with totally enclosed cabinet	
Control principle	Direct torque control (DTC)	
Electrical data		
Rated grid voltage	525 to 690 V AC, 3-phase, ±10%	
Rated generator voltage	0 to 750 V AC	
Nominal grid frequency	50/60 Hz	
Efficiency at converter's rated point, typical value	97%	
Generator-side converter du/dt, measured value	1.25 kV/μs	
Grid harmonics		
Total harmonic current distortion, measured value	2.5%	
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
Altitude	0 to 1000 m	
Degree of protection	Totally enclosed cabinet IP54 / UL type 12	
Cabling connections	Bottom	
Cooling connections	Left or right side	
Cabinet configuration	In-line, back-to-back or several separate	
Control		
Fieldbus interface	EtherCAT, PROFINET IO, PROFIBUS-DP, CANopen, Modbus, ControlNet, InterBus-S, DeviceNet	
Interface for PC browser	Standard Ethernet	
Grid code compliance		
Grid codes	Supports wind turbines to comply with the most stringent grid code requirements.	
Product compliance		
Product markings	CE, GL2010, North American	
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	
Options		
Sub-converter configuration	Available from 0.8 MW	Available from 1.5 MW
Cooling method	Liquid or combined cooling	
Reconfiguration	Online	
Energy storage	Integrated	
Generator side protection	Output contactors	
High coolant inlet temperature	Up to +55 °C	
High altitude	Up to 4000 m	
Product approvals	UL61800-5-1, CSA C22.2 No 274, DNVGL-SE-0441	



Ratings, types and voltages

ACS880-77LC and ACS880-87LC

In-line configuration, ACS880-77LC, 690 V									
Converter type ¹⁾	Typical generator rating	Rated generator apparent power	Rated grid apparent power	Module setup: no. of inverter units + no. of IGBT supply units	Cabinet width	Cabinet depth	Cabinet weight	Cooling flow rate	
	(kW)	(kVA)	(kVA)		INU + ISU	(mm)	(mm)	(kg)	(l/min)
ACS880-77LC-860A/800A-7	800	1028	956	1 + 1	1400	600	1200	90	
ACS880-77LC-1686A/1568A-7	1500	2014	1874	2 + 2	2300	600	2000	135	
ACS880-77LC-2503A/2328A-7	2300	2991	2782	3 + 3	2900	600	2600	175	
Twin cabinet versions									
ACS880-77LC-1720A/1600A-7	1600	2056	1912	2 x (1 + 1)	2 x 1400	2 x 600	2 x 1200	2 x 90	
ACS880-77LC-3372A/3136A-7	3000	4029	3748	2 x (2 + 2)	2 x 2300	2 x 600	2 x 2000	2 x 135	
ACS880-77LC-5006A/4656A-7	4600	5982	5564	2 x (3 + 3)	2 x 2900	2 x 600	2 x 2600	2 x 175	

Back-to-back configuration, ACS880-87LC, 690 V									
Converter type ¹⁾	Typical generator rating	Rated generator apparent power	Rated grid apparent power	Module setup: no. of inverter units + no. of IGBT supply units	Cabinet width	Cabinet depth	Cabinet weight	Cooling flow rate	
	(kW)	(kVA)	(kVA)		INU + ISU	(mm)	(mm)	(kg)	(l/min)
ACS880-87LC-1686A/1568A-7	1500	2014	1874	2 + 2	1250	1200	1800	135	
ACS880-87LC-2503A/2328A-7	2300	2991	2782	3 + 3	1450	1200	2300	175	
ACS880-87LC-3302A/3072A-7	3000	3947	3671	4 + 4	2300	1200	2800	235	
ACS880-87LC-4000A/3800A-7	3800	4780	4541	5 + 5	2500	1200	3500	280	
ACS880-87LC-4000A/4134A-7	4000	4780	4941	5 + 6	2700	1200	4500	300	
Twin cabinet versions									
ACS880-87LC-5006A/4656A-7	4600	5982	5564	2 x (3 + 3)	2 x 1450	2 x 1200	2 x 2300	2 x 175	
ACS880-87LC-6604A/6144A-7	6000	7893	7343	2 x (4 + 4)	2 x 2300	2 x 1200	2 x 2800	2 x 235	
ACS880-87LC-8000A/7600A-7	7600	9561	9083	2 x (5 + 5)	2 x 2500	2 x 1200	2 x 3500	2 x 280	
ACS880-87LC-8000A/8268A-7	8000	9561	9881	2 x (5 + 6)	2 x 2700	2 x 1200	2 x 4500	2 x 300	

Standard cabinet height is 2000 mm. Please see dimensions drawings for exact measurements.
Ratings shown here are subject to change depending on the selected options.

¹⁾ Converter type code shows generator and grid side nominal current ratings. For example for ACS880-77LC-860A/800A-7 the generator side current is 860 A and the grid side current is 800 A.

**Additional information**

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