ABB low voltage wind turbine converters
ACS800, liquid-cooled
0.6 to 6 MW

ABB low voltage wind turbine converters are designed to help increase turbine kilowatt-hour production through high availability, grid code compliance and long life cycles.

The converters are designed for all of the turbine main electrical drivetrain concepts: full converter and doubly-fed. ABB liquid-cooled converters feature totally enclosed, compact cabinets protecting the internal electronics from dust, salt, sand and other environmental pollutants. Liquid-cooling transfers the heat from the converter to outside the turbine.

In case of grid faults, full power converters decouple the generator from the grid and provide dynamic and flexible response to fault conditions. Both full power and doubly-fed converters provide active and reactive power control, and have very low total harmonic distortion (THD) levels.

The converters use ABB's direct torque control (DTC) for generator control. DTC monitors generator torque 40,000 times per second, ensuring immediate reaction and control.

The converters may be installed in either the wind turbine's nacelle or tower. The full power converters over 2 MW offer a design option for parallel connected sub-converters.

ABB's converters are designed for long life and ease of maintenance. A complete set of life cycle services including pre-purchase engineering, training, spare part management, and preventive maintenance plans helps turbine manufacturers and wind power plant operators produce more kilowatt-hours.

ABB manufacturing capacity ensures that global products are produced locally. This provides the high-volume, high-quality production supporting customers around the world.

Highlights

- Products for the main electrical drivetrain concepts, doubly-fed and full power
- Totally enclosed compact cabinets, all parts and components installed inside the cabinet
- Grid side contactor or breaker for safe connection and disconnection
- IGBT power modules with integrated DC capacitors and control electronics
- Very low THD
- DTC for generator control
- Optional parallel connected sub-converter configuration
- Global manufacturing capacity
- Global service and life cycle services

Technical data

Converter model	ACS800-67LC	ACS800-77LC	ACS800-87LC
Converter type	Converter for doubly-fed induction generator (DFIG)	Full power converter for permanent magnet and asynchronous generators	
Generator power range	1 to 3.8 MW	0.6 to 3.3 MW	1.5 to 6 MW
Optional sub-converter configuration		Available from 1.9 MW	Available from 3.6 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	According to generator, up to 12 kV	0 to 750 V AC	
Nominal frequency	50 ± 3 Hz / 60 ± 3 Hz		
Efficiency at converter's rated point	≥ 97%	≥ 96.5%	
Generator side du/dt	1.000 to 1.400 V/µs		
Grid harmonics Total harmonic current distortion (n = 2 to 40)	Max 3% with DFIG generator current	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 +45 °C	+5 to +50 °C	+5 to +45 °C
Optional high coolant inlet temperature	Up to +50 °C	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	Line-up, 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		
Converter supports wind turbine to comply with grid code requirements			
Transmission code 2007 Germany	FRT Grid support*	FRT Grid support	FRT Grid support
REE P.O. 12.3 Spain	FRT Grid support	FRT Grid support	FRT Grid support
Technical regulations TF 3.2.6 Denmark	FRT ***	FRT ***	FRT ***
National Grid Electricity Transmission, Issue 3, Revision 21, July 2007 USA	FRT Grid support* Active current/power**	FRT Grid support Active current/power	FRT Grid support Active current/power
111 FERC 61,252 111 FERC 61,353 USA	FRT ***	FRT ***	FRT ***
CEPRI WED-QR-C01-E-06 China	FRT ***	FRT ***	FRT ***
Product compliance			
Product markings	CE		
Optional	UL508A 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		

* when $U_{dip} > 20\%\ U_n$

** with symmetrical fault when $U_{dip} > 50\%\ U_n$

*** grid code does not require grid support

FRT = fault ride-through

Full power converters

ACS800-77LC, 0.8 to 3.3 MW

- Robust grid code compliance
- Nacelle or tower installation
- Redundant configuration available at higher ratings

Typical generator rating kW	Rated generator current A	Rated grid current A	Rated grid apparent power kVA	Module setup	Cabinet width with control cabinet mm	Cooling flow rate l/min	Cabinet weight kg
800	898	720	860	2 + 2	2300	100	2000
1050	1143	941	1120	2 + 2	2300	100	2000
1150	1143	1397	1670	2 + 3	2600	125	2300
1300	1334	1397	1670	3 + 3	2800	140	2500
1600	1697	1397	1670	3 + 3	2800	140	2500
1800	1697	1843	2200	3 + 4	3300	170	3000
1900	2286	1882	2240	2 x (2 + 2)	2 x 2300	2 x 100	2 x 2000
2200	2286	2338	2790	(2 + 2) + (2 + 3)	2300 + 2600	100 + 125	2000 + 2300
2200	2286	2794	3340	2 x (2 + 3)	2 x 2800	2 x 125	2 x 2500
2400	2668	2338	2790	(3 + 2)+(3 + 3)	2600 + 2800	125 + 140	2300 + 2500
2600	2668	2794	3340	2 x (3 + 3)	2 x 2800	2 x 140	2 x 2500
3100	3394	2794	3340	2 x (3 + 3)	2 x 2800	2 x 140	2 x 2500
3300	3394	3240	3870	(3 + 3) + (3 + 4)	2870 + 3300	140 + 170	2500 + 3000
3300	3394	3686	4400	2 x (3 + 4)	2 x 3300	2 x 170	2 x 3000

Cabinet height 2000 mm and depth 600 mm.

Cooling circuit pressure loss 150 kPA with hydrostatic pressure included.

ACS800-87LC, 1.75 to 6 MW

- Robust grid code compliance
- Compact size, back-to-back configuration
- Optimized for tower base installation

Typical generator rating kW	Rated generator current A	Rated grid current A	Rated grid apparent power kVA	Module setup	Cabinet width mm	Cooling flow rate l/min	Cabinet weight kg
1750	1697	1843	2200	3 + 4	1600	185	3000
2000	2230	1843	2200	4 + 4	1800	197	3250
2300	2230	2330	2740	4 + 5	1800	210	3400
2400	2230	2736	3270	4 + 6	2200	222	3650
2800	2785	2736	3270	5 + 6	2200	235	3800
3000	2785	3192	3810	5 + 7	2600	247	4350
3200	3324	3192	3810	6 + 7	2600	260	4500
3600 to 6000	Contact ABB for the ratings						

Cabinet height 2000 mm and depth 1300 mm.

Doubly-fed converter

ACS800-67LC, 1.7 to 3.8 MW

- Small and light weight
- Lowest harmonics and highest efficiency at rated point

Typical generator rating kW	Rated generator current A	Rated grid current A	Rated grid apparent power kVA	Module setup	Cabinet width with 690 V power cabinet mm	Cooling flow rate with power cabinet l/min	Cabinet weight kg
1700	898	480	570	1 + 2	2200	92	2000
2250	1143	480	570	1 + 2	2200	92	2000
2600	1143	941	1125	2 + 2	2400	100	2200
3000	1334	720	860	2 + 3	2600	113	2500
3800	1697	941	1120	2 + 3	2600	113	2500

Cabinet height 2000 mm and depth 600 mm.

Converter options

- Removable cabinet doors
- Cabling direction
- Cooling connections
- Low voltage ride-through options
- Redundancy (parallel) sub-converter connections
- Pulse encoder interface
- Power cabinet options

ABB global support

ABB offers a full spectrum of life cycle services, from pre-purchase engineering, installation and commissioning, spare parts management, technical support, training, preventive maintenance schedules, spare part kits to retrofit and refurbishment.

For more information please contact:

www.abb.com/windpower
www.abb.com

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