

Enabling the shore-to-ship power connection

ABB Static Frequency Converters



ABB static frequency converters are an economic and efficient solution to convert the grid electricity to the appropriate load frequency.

Enabling the connection

ABB medium voltage and low voltage static frequency converters utilize ABB's modular converter design providing highly reliable, clean and efficient power conversion.

ABB static frequency converters are internally configured as an arrangement of modular rectifiers and inverters controlled by a power electronic controller. The converters produce sine wave voltage to supply the output load.

Shore-to-ship power

Shore-to-ship power helps to reduce polluting emissions, noise and vibration in ports by connecting vessels to the port electricity grid and allowing them to shut down the onboard power generation units while at berth.

Since most ships operate with 60 Hz electricity whereas local grid in most parts of the world is 50 Hz, ABB static frequency converters help to adjust the grid electricity to the appropriate ship frequency and are a viable solution in replacing vintage rotating frequency converters (motor/generator set).

Features

- Industrial design
- Two or four quadrants operation
- Selectable frequency setting (50Hz to 60 Hz or viceversa)
- Scalable solutions ranging from 0.1 up to 40 MVA
- High efficiency also under partial-load conditions
- Optimized foot print (high power density permits compact design)
- High availability (high reliability, low maintenance, proven service concept with 24/365 support, remote diagnosis)

User benefits

- Full range of solution spanning from Low Voltage to Medium Voltage frequency converter to cover all application segments and customer needs
- Flexibility of choice between one-to-one connection or centralized frequency conversion serving multiple vessels
- Optimized CAPEX (lower cost/MVA)
- Optimized cost of ownership and maintenance
- Full integration in ABB's pre-engineered solutions minimizes overall project risks and costs.

ACS6080 SFC [5-27 MVA]

ACS6080 converters utilize the proven high performance IGCT (Integrated Gate Commutated Thyristor) power switching devices.

ACS6080 SFC converters are highly efficient even at partial load. Highest safety levels for personnel as well as high reliability through well proven design ensure best operations and easy maintenance.

| Input | |
|----------------------------|--------------------------------------------|
| Typical input voltage | 6 .. 132 kV a) |
| Frequency | 50 / 60 Hz |
| Input section | 12/24 pulse diode bridge /active rectifier |
| Total harmonics distortion | According to IEC61000-2-4 |
| Output | |
| Typical ship voltage | 6.6 kV / 11 kV |
| Frequency | 60 / 50 Hz |
| Output section | IGCT voltage source converter |
| Converter voltage | 2,7-3 kVac b) |
| Total harmonics distortion | According to IEC/ISO/IEEE 80005-1 |
| Conversion efficiency | >98% |
| Short circuit limit | depending on nominal power and model |

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01 ACS6080 SFC
indoor cabinet



| Mechanical | |
|----------------|-------------------------------------------------|
| Enclosure | IP 32/42/54 indoor cabinet or outdoor container |
| Cooling | Closed loop liquid cooling |
| Standard color | RAL 7035 |

| Interface | |
|-------------------|----------------------------------------------------------|
| Control interface | Hardwired, Modbus-TCP, Anybus S, Human Machine Interface |

| Environmental | |
|-----------------------|-------------------------------------------------------------------------|
| Operation temperature | + 5°C ... 32°C standard/no derating (c) -40°C ... 50°C with derating |
| Humidity | < 95% non-condensing |
| EMC emissions | IEC 61000-2-2, IEC 61000-2-4, IEC 61000-6-2 |

| Standards and norms compliance | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| ISO/IEEE 80005-1 & 80005-3, IEC 62103/ENSO178, IEC 60146-2, IEC 61800-3, IEC 60721-1, IEC 61071, IEC 60871-1, IEC 61439, IEC 62271-1, IEC 60071-1, IEC 60664, IEC 60529, IEEE 519, IEC 61000-2-4 | |

Designed to CE mark requirements

| Service | |
|---------------------------------------------------------------------------------------------------------------------|--|
| 24/365 (optional) service support expert, remote access and diagnosis and worldwide service and spare parts network | |

Model ratings and dimensions

| ID Type | Model | Nominal Rating (c) | | | Interface | | Maximum Heat Loss | Dimension | Weight |
|----------|-------------------------|-----------------------------------|------------------------------|-----------------------------|---------------|---------------|-------------------|-----------------|--------|
| | | Max continuous output power [MVA] | Overload capability [10 sec] | Short circuit limit [1 sec] | GRID SIDE | LOAD SIDE | | | |
| Double-A | Double-ACS6109_L12_2a05 | 7,5 | 114% | 162% | DIODE (12p) | 2 UNITS (12p) | 93 | 8830x1069x2162 | 7645 |
| | Double-ACS6107_A06_2a05 | 7,5 | 108% | 180% | ACTIVE (6p) | 2 UNITS (12p) | 134 | 9130x1069x2479 | 8395 |
| | Double-ACS6109_L12_2a7 | 7,5 | 188% | 226% | DIODE (12p) | 2 UNITS (12p) | 85 | 8830x1069x2162 | 7885 |
| Double-B | Double-ACS6114_L12_2a7 | 13 | 108% | 130% | DIODE (12p) | 2 UNITS (12p) | 149 | 9030x1069x2162 | 8015 |
| | Double-ACS6207_A12_2a7 | 14 | 107% | 134% | ACTIVE (2*6p) | 2 UNITS (12p) | 231 | 11830x1069x2479 | 10780 |
| | Double-ACS6114_L12_2a9 | 14 | 108% | 135% | DIODE (12p) | 2 UNITS (12p) | 163 | 9030x1069x2479 | 8195 |
| | Double-ACS6209_A12_2a9 | 15 | 108% | 151% | ACTIVE (2*6p) | 2 UNITS (12p) | 250 | 11830x1069x2479 | 10960 |
| Triple-A | Triple-ACS6209_L24_3a7 | 18 | 141% | 141% | DIODE (24p) | 3 UNITS (18p) | 201 | 13530x1069x2162 | 11940 |
| | Triple-ACS6209_A12_3a7 | 18 | 157% | 157% | ACTIVE (2*6p) | 3 UNITS (18p) | 307 | 14530x1069x2479 | 13575 |
| | Triple-ACS6214_L24_3a7 | 21 | 121% | 121% | DIODE (24p) | 3 UNITS (18p) | 242 | 14930x1069x2479 | 13185 |
| Triple-B | Triple-ACS6214_L24_3a9 | 26 | 113% | 125% | DIODE (24p) | 3 UNITS (18p) | 314 | 14930x1069x2479 | 13185 |
| | Triple-ACS6309_A18_3a9 | 27 | 114% | 134% | ACTIVE (3*6p) | 3 UNITS (18p) | 469 | 17030x1069x2479 | 15970 |

Parallel load sharing allows operation of multiple ACS6080 SFC.

^a Input transformer is required for grid voltage adaptation

^b Depending on the model

^c Standard environmental conditions and maximum preload equal to 70% apply. Use of chiller can reduce derating at higher temperatures.

ACS880 SFC [1..5 MVA]

ACS880 low voltage static frequency converters utilize the latest high performance Insulated Gate Bipolar Transistor (IGBT) power switching devices controlled through a specific off-grid software.

With its modular architecture, ACS880 SFC allows seamless connection of multiple low and/or high voltage low power consumption vessels.

| Input | |
|----------------------------|------------------------------------|
| Typical grid voltage | 0,4...30 kV (a) |
| Frequency | 50 / 60 Hz +/-5% |
| Input section | Grid converter, IGBT supply unit |
| Converter voltage | 3-phase, 525...690Vac, +/-10% |
| Total harmonics distortion | 2,5% |
| Output | |
| Typical ship voltage | LV (up to 690V), MV (6,6/11 kV) a) |
| Frequency | 60 / 50 Hz |
| Output section | Ship converter, IGBT supply unit |
| Converter output voltage | 690 VAC |
| Total harmonics distortion | 2,5 THDi |
| Conversion efficiency | >94% |

| Mechanical | |
|----------------|-------------------------------------|
| Enclosure | IP22 standard, IP42 and IP54 option |
| Cooling | Air cooled, Liquid cooled |
| Standard color | RAL9017, RAL7035 |

| Interface | |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Control protocol | PROFIBUS DP, DPV0/DPV1, CANopen®, DeviceNet™, EtherNet/IP™, Modbus TCP/RTU, PROFINET IO, PROFIsafe, EtherCAT®, POWERLINK, ControlNet™ |

| Environmental | |
|-----------------------|-----------------------------------------------------------|
| Operation temperature | 0 to +50°C no frost allowed, 35°C with derating of 1%/1°C |
| Humidity | 5 to 95%, no condensation allowed |
| EMC emissions | EMC according to EN 61800-3:2004 + A1:2012 |

| Standards and norms compliance | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| IEC/ISO/IEEE 80005-1, IEC PAS 80005-3, IEC61800, IEC60529, IEC60146-2, IEC60721-1, Low Voltage 2014/35/EU, EMC 2004/108/EC, ISO 9001, ISO 14001, RoHS II, IEC62477-1, IEEE 519 Designed to CE requirements. UL, EAC, cUL 508A/C, CSA, RCMMM as option | |

| Service | |
|-------------------------------------------------------------|--|
| 24/365 service support with expert remote access (optional) | |
| Worldwide service and spare parts network | |

01 ACS880 SFC



Parallel load sharing allows operation of multiple ACS880 SFC.

a) Specific voltage levels can be achieved by means of a step-down transformer

b) Dimensions are for side-by-side configuration. Back to back configuration dimensions will vary

c) Standard temperature range 5 to 35°C. Rated values with cos phi 1..0.85

d) Short circuit current 140% nominal current for 5 s

Model ratings and dimensions

| Model | Nominal rating (c) Overload (d) | | | Cabinet | | | Frame size for grid and ship converter |
|--------------------|---------------------------------|---------------------|---------------------|---------------------------|-------------|-----------------------|----------------------------------------|
| | Nominal Power [kVA] | Nominal current [A] | Maximum current [A] | Dimensions (b) HxWxD [mm] | Weight [kg] | Heat dissipation [kW] | |
| ACS880-207-1050A-7 | 1000 | 837 | 1171 | 2145x3600x636 | 3200 | 63 | 2pcs(2xR8i +BLCL-25-7) |
| ACS880-207-1570A-7 | 1500 | 1253 | 1754 | 2145x5200x636 | 4420 | 99 | 2 pcs (3xR8i+2xBLCL-24-7) |
| ACS880-207-2070A-7 | 2000 | 1677 | 2347 | 2145x5600x636 | 5640 | 125 | 2 pcs (3xR8i+2xBLCL-24-7) |
| ACS880-207-3080A-7 | 3000 | 2509 | 3512 | 2145x7200x636 | 7480 | 188 | 2 pcs (6xR8i+3xBLCL-25-7) |
| ACS880-207-4100A-7 | 4000 | 3345 | 4683 | 2145x10200x636 | 9720 | 251 | 2 pcs (8xR8i+4xBLCL-25-7) |
| ACS880-207-5130A-7 | 5000 | 4181 | 5853 | 2145x11800x636 | 11520 | 311 | 2 pcs (10xR8i+5xBLCL-25-7) |

PCS100 SFC [0.1 – 2 MVA]

PCS100 converters utilize the latest high performance Insulated Gate Bipolar Transistor (IGBT) power switching devices controlled by a micro controller.

PCS100 SFC comes with an advanced redundancy feature, which allows the operation at reduced power in case of single module fault.

| Input | |
|----------------------------|-------------------------------|
| Typical grid voltage | 0.4 .. 30 kV a) |
| Frequency | 50 / 60 Hz |
| Input section | IGBT voltage source converter |
| Converter voltage | 200 .. 480 VAC |
| Total harmonics distortion | < 3 % THDi (at rated load) |
| Output | |
| Typical ship voltage | LV (up to 690), MV (6,6 kV) |
| Frequency | 60 / 50 Hz |
| Output section | IGCT voltage source converter |
| Converter voltage | 400 .. 480 VAC |
| Total harmonics distortion | 2,5 THDi (linear load) |
| Efficiency | 95% typical |
| Max overload capability | 30 seconds 150% |
| Short circuit limit | 2 seconds 200% |

| Mechanical | |
|----------------|--------------------|
| Enclosure | IP 20 or IP 42 |
| Cooling | Forced ventilation |
| Standard color | RAL 7035 |

| Interface | |
|------------------|---------------------------------------------------------|
| User interface | Graphic display module touch panel, notebook connection |
| Control protocol | Ethernet, Modbus-TCP, dry contacts |

| Environmental | |
|-----------------------|------------------------------------------------------------------|
| Operation temperature | 5°C ...40°C standard/no derating (c) up to 50°C with derating |
| Humidity | < 95% non-condensing |
| EMC emissions | IEC 61000-2-2, IEC 61000-2-4, IEC 61000-6-2 |

| Standards and norms compliance | |
|---------------------------------------------------------------------------------------------------------------------------------------------------|--|
| IEC/ISO/IEEE 80005-1, IEC PAS 80005-3, IEC 60146-2, IEC 61800-3, IEC 60721-1, IEC 61071, IEC 60529, IEEE 519, CISPR 11 ISM, EN 50178, IEC 62477-1 | |

Designed to CE mark requirements

| Service | |
|---------------------------------------------------------------------------------------------------------------------|--|
| 24/365 (optional) service support expert, remote access and diagnosis and worldwide service and spare parts network | |

01 PCS100 SFC



Model ratings and dimensions

| Model | Nominal rating (c) | | Cabinet | | | |
|-----------------|---------------------------------------|----------------|----------------------|-------------|-----------------------|------------------------|
| | Converter output continuous power kVA | Current rating | Dimensions WxDxH [m] | Weight [kg] | Heat dissipation [kW] | Number of module pairs |
| PCS100 SFC-0125 | 125 | 150 | 2.2 x 0.8 x 0.8 | 860 | 6.3 | 1 |
| PCS100 SFC-0250 | 250 | 300 | 2.2 x 0.8 x 0.8 | 601 | 12.5 | 2 |
| PCS100 SFC-0375 | 375 | 450 | 2.2 x 0.8 x 0.8 | 761 | 18.8 | 3 |
| PCS100 SFC-0500 | 500 | 600 | 2.3 x 1.6 x 0.8 | 1503 | 25 | 4 |
| PCS100 SFC-0625 | 625 | 750 | 2.3 x 2.0 x 0.8 | 1772 | 31.3 | 5 |
| PCS100 SFC-0750 | 750 | 900 | 2.3 x 2.4 x 0.8 | 1932 | 37.5 | 6 |
| PCS100 SFC-0875 | 875 | 1050 | 2.3 x 2.4 x 0.8 | 2308 | 43.8 | 7 |
| PCS100 SFC-1000 | 1000 | 1200 | 2.3 x 2.4 x 0.8 | 2586 | 50 | 8 |
| PCS100 SFC-1125 | 1125 | 1350 | 2.3 x 4.4 x 0.8 | 2746 | 56 | 9 |
| PCS100 SFC-1250 | 1250 | 1500 | 2.3 x 4.4 x 0.8 | 3407 | 62.5 | 10 |
| PCS100 SFC-1375 | 1375 | 1650 | 2.3 x 4.4 x 0.8 | 3700 | 69 | 11 |
| PCS100 SFC-1500 | 1500 | 1800 | 2.3 x 4.4 x 0.8 | 3860 | 75 | 12 |
| PCS100 SFC 1625 | 1625 | 1950 | 2.3 x 5.2 x 0.8 | 4248 | 81 | 13 |
| PCS100 SFC-1750 | 1750 | 2100 | 2.3 x 5.2 x 0.8 | 4550 | 87.5 | 14 |
| PCS100 SFC-1875 | 1875 | 2250 | 2.3 x 5.2 x 0.8 | 4710 | 94 | 15 |
| PCS100 SFC-2000 | 2000 | 2400 | 2.3 x 6.0 x 0.8 | 5102 | 100 | 16 |

Parallel load sharing allows operation of multiple PCS100 SFC.

a Specific voltage levels can be achieved by means of a step-down transformer

b Dimensions are for side-by-side configuration. Back to back configuration dimensions will vary: i.e. 2 x 2MVA converters deliver up to 4MVA power. For IP 23 add 0.1 m depth

c Standard environmental conditions apply. Current rating refers to 480 Vac

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