



FEC650

HIGH EFFICIENCY 650 KVA BACK-TO-BACK CONVERTER

The four-quadrant converter FEC1150 is designed as a building block for power conversion as full scale converter for wind turbines.

The FEC650 cabinet comprises all devices needed to build up a converter system:

- Pulse rectifier and inverter based on IGBT modules on water-cooled, easy-to-change power stacks
- DC-link made of film-capacitors
- Break chopper and break resistor
- Controller boards linked via fast bus system (EtherCAT)
- Grid main contactor and precharge-circuit
- Generator-side filter (du/dt) and grid-side filter
- Heat exchanger air-to-water for cooling of all passive parts: cabinet has IP54

The concept is suitable for electrical as well as permanent magnet excited synchronous generators and also valid for asynchronous generators

The main advantages can be summarised as follows:

- Combines high power density with reasonable costs.
- Protection class and cooling type allow offshore use.
- All serviceable parts are easy to replace.
- Reduced grid current harmonics.
- New control algorithm allows managing symmetric and asymmetric voltage drops.



FEC650



PRELIMINARY TECHNICAL DATA OF THE FEC650

Inverter (grid side)

| | | |
|------------------------|-----------------------|--------------------------|
| Rated power | 515 kW | |
| Rated voltage | 690 V, 3-phase, 50 Hz | Other values on request. |
| Rated output current | 431 A | |
| Maximum apparent power | 650 kVA | At rated voltage. |
| Maximum output current | 545 A | |
| Switching frequency | 2.5 kHz | |

DC-link

| | | |
|---------------------------|-----------------|--------------------------|
| Rated DC-link voltage | 1050 V | |
| Operating DC-link voltage | 1000 V...1150 V | IGBTs are released. |
| Maximum DC-link voltage | 1400 V | IGBTs are blocked. |
| Maximum breaking energy | 800 kJ | Other values on request. |

Pulse Rectifier (generator side)

| | | |
|-----------------------|------------------------|--------------------------|
| Rated input power | 529 kW | |
| Generator voltage | typical 620 V, 3-phase | Other values on request. |
| Rated Frequency | typical 50 Hz | |
| Rated input current | typical 548 A | |
| Maximum input current | 600 A | For 1 minute. |
| cos ϕ | typical -0.90 | |
| Switching frequency | 2.5 kHz | |

General Data

| | | |
|--------------------------------------|--------------------------------------|---|
| Rated losses | 14 kW | At rated power and cos ϕ = 1.0 |
| Rated efficiency | 97.4 % | At rated conditions |
| Maximum losses | 17 kW | At minimum voltage and cos ϕ = 0.9 |
| Cooling type | Water cooling | |
| Temperature range | -20 °C...+50 °C | Other values on request. |
| Storage temperature range | -30 °C...+60 °C | |
| Water temperature range | -20 °C...+50 °C | Other values on request. |
| Coolant medium | Water-Glycol (50 %/50 %) | |
| Rate of flow | 50 ℓ /min | |
| Pressure loss | 1.0 bar | |
| Dimensions (H \times W \times T) | (2005 \times 1005 \times 805) mm | |
| Weight | < 900 kg | |