4 MW System Test Bench at the Center for Wind Power Drives (CWD)

Technical data

- Permanent magnet synchronous direct drive

Nominal power	4 MW
Nominal speed	14 min^{-1}
Max. speed	30 min^{-1}
Nominal torque	2.7 MNm
Max. torque	3.4 MNm

- Wind-load simulator (5 degrees of freedom)

Axial force	4 MN
Radial force	3.25 MN
Vertical force	3.25 MN
Bending torque (radial)	7.2 MNm
Bending torque (vertical)	7.2 MNm

Equipment

- Wind load simulation (HIL)
  - dSPACE Rapid Prototyping System
- Grid simulation (HIL)
  - RTDS-grid simulator
- Grid emulation (converter based)
  - Variation of voltage
    - Amplitude
    - Frequency
    - Phase
- Low Voltage Ride Through
  - According to grid codes

Measurement capabilities	
Torques, Forces	MTS load unit
Speed	MTS load unit
Accelerations	National Instruments PXI
Voltages, Currents	Yokogawa WT1800
Power maps	Yokogawa WT1800
Temperatures	National Instruments PXI

Current application / Opportunities

- Research project: ‘Loads on the drive components of wind turbines’
  - Test object: FVA-gondola
  - Methods to reduce local loads
  - Investigation of mechanical excitations by electromagnetic forces

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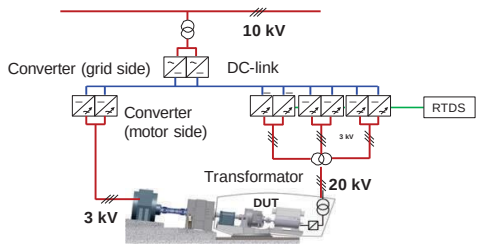
- Measurement of wind power gondolas at system test bench for system certification



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