WTGS UNISON U5x

Description of Power Conversion System

9. October. 2009

Document No.	UNS-U5x-G026-000		
	Name	Date	Revision
Prepared by			
Checked by			
Approved by			

UNISON Co., Ltd.

■Revision History

Rev	Date	Name	Revised pages	Comments
1				
2				
3				

■ Contents

1. INTRODUCTION

This document described the Power Conversion System(hereinafter “PCS”) for U5x-750kW wind turbine.

2. GENERAL DESCRIPTION

The power flow of U5x wind turbine consists of rotor hub, shaft, generator and power conversion system. PCS consists of the AC/DC/AC power converter module, harmonic filter and protection system including auxiliary voltage transformer. The generator output is transferred to the grid through power conversion system. Generator side converter(AC/DC) module provides the maximum power of generator using active torque control with PWM technology. The grid side converter(DC/AC) module provides the high quality power production and soft connection to the grid. Dynamic braking module protects the switching device and DC link from abnormal condition. The harmonic filter reduces the harmonic ripple creating by power converter. The low voltage distribution provides the internal power of wind turbine and it also protects the wind turbine from grid failure. The protection system measures the grid information to protect against excessively high current and voltages that could damage the components and devices of the wind turbine.

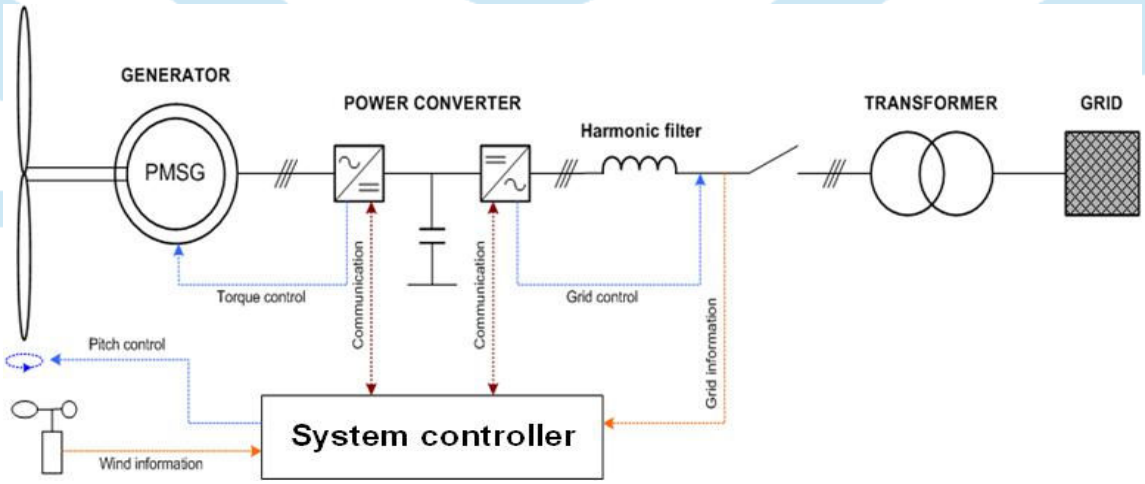

Fig. 1 System configuration of U5x wind turbine

3. PCS characteristics

3.1. Performance characteristics

- Highly reliable ALSiC IGBTs
- Self-healing type polypropylene capacitors
- Low level harmonic distortion
- Comply with the most demanding grid requirement
- Power factor control and reactive power management
- Low voltage ride through capability
- High performance 32bit Micro Processor application
- MPPT torque control and PWM technology application
- Actively control power factors for generator

3.2. Protective characteristics

- Over voltage
- Under voltage
- Over load
- Supervisor IGBT temperature
- Over current
- Frequency variation
- Voltage phase sequence
- Lightening

3.3. System characteristics

- Ambient operating condition		Temperature	-20 ~ 40 ℃
		Humidity	5 ~ 95 %
		Altitude	Up to 2,000 m
- Protection class		IP54	
- Rating			
	Generator side converter	Rated power	850kW
		Rated current[1)]	598A
	Line side converter	Rated power	770kW
		Rated current[1)]	645A
		Rated voltage	690V
		Rated frequency	50/60Hz
- Control		Space vector PWM	
- Cooling		Force water cooling	
- Efficiency		more than 95%	

[1)] The rated current shall be possible to change according to power factor