

WIND TURBINE

MONITORING & CONTROL SYSTEM

ANALOG INPUTS (AI)

- 1 Wind Speed (m/s)
- 2 Wind Direction (°)
- 3 Ambient Temperature (°C)
- 4 Nacelle Temperature (°C)
- 5 Generator Temperature (°C)
- 6 Gearbox Oil Temperature (°C)
- 7 Gearbox Bearing Temperature (°C)
- 8 Main Bearing Temperature (°C)
- 9 Hydraulic Oil Pressure (bar)
- 10 Hydraulic Oil Temperature (°C)
- 11 Pitch Oil Pressure (bar)
- 12 Pitch Oil Temperature (°C)
- 13 Lubrication Oil Pressure (bar)
- 14 Lubrication Oil Temperature (°C)
- 15 Gearbox Vibration (mm/s)
- 16 Generator Vibration (mm/s)
- 17 Nacelle Vibration (mm/s)
- 18 Generator Speed (RPM)
- 19 Rotor Speed (RPM)
- 20 Pitch Angle (Blade 1) (°)
- 21 Pitch Angle (Blade 2) (°)
- 22 Pitch Angle (Blade 3) (°)
- 23 Yaw Position (°)
- 24 Transformer Oil Temperature (°C)
- 25 Transformer Winding Temp (°C)
- 26 Transformer Oil Level (%)
- 27 Grid Voltage (L1, L2, L3) (V)
- 28 Grid Current (L1, L2, L3) (A)
- 29 Active Power (kW)
- 30 Reactive Power (kVAR)
- 31 Power Factor
- 32 Frequency (Hz)
- ...and more

ANALOG OUTPUTS (AO)

- 1 Power Reference (4-20mA)
- 2 Pitch Reference (4-20mA)
- 3 Yaw Reference (4-20mA)
- 4 Hydraulic Pressure Ref (4-20mA)
- 5 Spare AO
- ...and more

DIGITAL OUTPUTS (DO)

- 1 Turbine Start Enable
- 2 Turbine Stop Command
- 3 Generator Breaker Close
- 4 Grid Breaker Close
- 5 Lubrication Pump Start
- 6 Hydraulic Pump Start
- 7 Alarm Horn ON
- 8 Beacon Light ON
- 9 Heater ON/OFF
- 10 Spare DO
- ...and more

DIGITAL INPUTS (DI)

- 1 Turbine Run Status
- 2 Turbine Stop Status
- 3 Turbine Fault
- 4 Emergency Stop
- 5 Generator Breaker Status
- 6 Grid Breaker Status
- 7 Transformer Trip
- 8 Oil Level Low
- 9 High Vibration Alarm
- 10 Fire Alarm
- 11 Door Open Status
- 12 UPS Healthy or OK
- 13 Communic.
- ...and more

SYSTEM ARCHITECTURE



WIND SPEED
SENSOR

WIND DIRECTION
SENSOR

WIND BEARING
Temperature, Vibration

GEARBOX
Oil Temp, Oil Pressure,
Vibration

GENERATOR
Temperature, Vibration,
Speed, Current

POWER CONVERTER
Temperature, Status

TOWER
SENSORS
Vibration, Door, Vibration,
Temperature

PITCH SYSTEM
Oil Pressure, Oil Temp,
Pitch Angle

YAW SYSTEM
Yaw Position, Yaw Motor
Status

NACELLE SENSORS
Temperature, Vibration,
Door Status

TRANSFORMER
Oil Temp, Oil Level,
Winding Temp, Pressure

ENERGY METER
Voltage, Current,
kW, kVAR, kWh, PF

GRID / SUBSTATION
Breaker Status,
Voltage, Current,
Frequency

MONITORED PARAMETERS

- Energy Generation (kWh)
- Power (kW), Voltage, Current
- Wind Speed, Wind Direction
- Turbine Speed (RPM)
- Pitch Angle, Yaw Position
- Gearbox Condition
- Generator Condition
- Oil System (Pressure, Temp, Level)
- Vibration Monitoring
- Transformer Health
- Weather Monitoring
- Alarms & Events
- Performance & Availability

ALARM & EVENT MANAGEMENT

- Warning, Alarm, Trip
- Event Logging
- Alarm Acknowledgement
- Alarm Shelving
- Notification (Email/SMS)

REPORTS

- Daily Energy Report
- Monthly Performance Report
- Turbine Availability Report
- Alarm Summary Report
- Maintenance Report
- Custom Reports (Email PDF/Excel)