### SYSTEM

- **Type**: Grid Connected
- **Configuration**: Horizontal Axis
- **Rotor Diameter**: 15 m (49.2 ft)
- **Centerline Hub Height**: 25 m (82 ft)

### PERFORMANCE PARAMETERS

- **Rated Electrical Power**: 50 kW @ 11.3 m/s (25.3 mph)
- **Wind Speed**: @ hub height 25 m (82 ft)
- **cut-in**: 4.6 m/s (10.2 mph)
- **shut-down (high wind)**: 22.4 m/s (50 mph)
- **peak (survival)**: 59.5 m/s (133 mph)
- **Calculated Annual Output**: @ 100 % availability
- **5.4 m/s (12 mph)**: 87,000 kWh
- **6.7 m/s (15 mph)**: 153,000 kWh
- **8.0 m/s (18 mph)**: 215,000 kWh

### ROTOR

- **Type of Hub**: Fixed Pitch
- **Rotor Diameter**: 15 m (49.2 ft)
- **Swept Area**: 177 m² (1902 ft²)
- **Number of Blades**: 3
- **Rotor Solidity**: 0.077
- **Rotor Speed @ rated wind speed**: 59.5 m/s (133 mph)
- **Location Relative to Tower**: Downwind
- **Cone Angle**: 6º
- **Tilt Angle**: 0º
- **Rotor Tip Speed**: 51 m/s (114 mph) @ 60 Hz
- **Design Tip Speed**: 6.1

### BLADE

- **Length**: 7.2 m (23.7 ft)
- **Material**: Wood/epoxy laminate
- **Airfoil (type)**: NREL, Thick Series, modified
- **Twist**: 7º outer blade
- **Root Chord**: 457 mm (18 in) @ 4% 279 mm (11 in)
- **Max Chord**: 749 mm (29.5 in) @ 39% 2925 mm (115 in)
- **Tip Chord**: 406 mm (16 in) @ 100% 7500 mm (295 in)
- **Chord Taper Ratio**: ± 2.1
- **Overspeed Device**: Electro-magnetic tip brake
- **Hub Attachment**: Embedded female bolt receptors
- **Blade Weight**: 150 kg (330 lbs) approximate

### GENERATOR

- **Type**: 3 phase/4 pole asynchronous
- **Rated Temperature**: -25ºC
- **Frequency (Hz)**: 60 Hz
- **Voltage (V)**: 480, 3 phase @ 60 Hz
- **kW @ Rated Wind Speed**: 50 kW
- **kW @ Peak Continuous**: 66 kW
- **Speed RPM (nominal)**: 1800 @ 60 Hz
- **Winding Configuration**: Ungrounded WYE
- **Insulation**: Class F
- **Enclosure**: Totally Enclosed Air Over (TEAO)
- **Frame Size**: 365 TC
- **Mounting**: Direct mount to transmission
- **Options**: Arctic low temp. shafting (-40ºC)

### TRANSMISSION

- **Type**: Planetary
- **Housing**: Ductile iron-integrated casting
- **Ratio (rotor to gen. speed)**: 1 to 28.25 (60 Hz)
- **Rating, output horse power**: 88
- **Lubrication**: Synthetic gear oil/non toxic
- **Filtration**: Service filtration cartridge @ scheduled maintenance.
- **Heater (option)**: Arctic version, electric

### YAW SYSTEM

- **Normal**: Free, rotates 360 degrees
- **Optional**: Yaw damping-required when known conditions frequently exceed 50° yaw rate per second.

### DRIVE TRAIN TOWER INTERFACE

- **Structural**: Yaw bearing mounted on tower top casting
- **Electrical**: Twist Cable

### TOWER

- **Type**: Galvanized 3 legged, bolted lattice, self-supporting
- **Tower Height**: 24.4 m (80 ft)
- **Options**: 18.3 m (60 ft), 30.5 m (100 ft), 36.6 m (120 ft)
- **Tilt down**: 24.4 m (80 ft)

### FOUNDATION

- **Type**: Concrete or special
- **Anchor Bolts**: Certified ASTM A-193-Grade B7

### CONTROL SYSTEM

- **Type**: PLC based
- **Control Inputs**: Wind speed, generator shaft speed
- **Control Outputs**: Line interconnection, brake deployment
- **Communications**: Serial link to central computer for energy monitor and maintenance dispatch (optional)
- **Enclosures**: NEMA 1, NEMA 4 (optional)
- **Soft Start**: Optional

### Rotor Speed Control

- **Production**: Blade stall increases with increased wind velocity
- **Normal Start up**: Aerodynamic, electrical boost if necessary
- **Shut-down**: Control system simultaneously applies dynamic brake and deploys tip brakes. Parking brake brings rotor to standstill.
- **Back-up Overspeed Control**: Centrifugally activated tip brakes deploy

### BRAKE SYSTEM CONTROL

- **Fail-safe brakes automatically deploy when grid failure occurs.**

### APPROXIMATE SYSTEM DESIGN WEIGHTS

- **Tower**: 3,210 kgs (7,080 lbs)
- **Rotor & Drivetrain**: 2,420 kgs (5,340 lbs)
- **Weight on Foundation**: 5,630 kgs (12,420 lbs)

### DESIGN LIFE:

- **30 Years**

### DESIGN STANDARDS:

- **Applicable Standards**: AWEA, EIA and IEC

### DOCUMENTATION:

- **Installation Guide and Operation & Maintenance Manual**

### SCHEDULED MAINTENANCE:

- **Sem-annual or after severe events.**

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**NOTE 1:** Atlantic Orient Corporation and its affiliates are constantly working to improve their products, therefore, product specifications are subject to change without notice.

**NOTE 2:** Power curves show typical power available at the controller based on a combination of measured and calculated data. Annual energy is calculated using power curves and a Rayleigh wind speed distribution. Energy production may be greater or lesser dependent upon actual wind resources and site conditions, and will vary with wind turbine maintenance, altitude, temperature, topography and the proximity to other structures including wind turbines.

**NOTE 3:** For design options to accommodate severe climates or unusual circumstances please contact the corporate office in Norwich, Vermont USA.

**NOTE 4:** For integration into high penetration wind-diesel systems and village electrification schemes contact the corporate office in Norwich, VT USA for technical support and systems design.

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