WindCore ANA-750 Ultrasonic Anemometer

Professional Maintenance Manual - Wind Monitoring System

Component Type: Ultrasonic wind speed and direction sensor

EAN: 30981244

Compatible Turbine Model: GreenSpire GS250 Rural Turbine Series

Dimensions: 65mm × 105mm

Weight: 390g

Sensor Interfaces: sensor_W, sensor_D

Stock Location: Germany/Bremen

Component Overview

The WindCore ANA-750 is a high-precision ultrasonic anemometer used to measure wind speed and direction at the nacelle.

It operates without moving parts, using time-of-flight measurements of ultrasonic pulses between transducers.

This sensor offers fast response in all weather conditions and is resilient to icing, dust, and mechanical wear.

It integrates with sensor_W (wind speed) and sensor_D (wind direction) channels to provide real-time data to yaw, pitch, and power regulation systems.

Common Faults and Operational Warnings

- SCADA shows constant wind speed despite visible wind
- Sudden gust detection with no wind pattern to match
- Wind direction shows significant offset from nacelle orientation
- Tilt or echo quality errors in diagnostics panel

Diagnostic Codes and Recommended Actions

ANA-005

Description: Sensor_W reports wind speed = 0 for >90 seconds in active wind environment.

Resolution: Inspect sensor for contamination or bird nesting. Clean transducers and check SCADA for signal dropouts.

ANA-011

Description: Direction offset >25° compared to turbine yaw alignment.

Resolution: Recalibrate sensor_D. Confirm sensor is level and properly aligned to turbine nose.

ANA-026

Description: Temperature compensation failure - signal drift at low temperatures.

Resolution: Run temperature compensation test. Replace if internal thermal correction fails diagnostic.

ANA-034

Description: Sensor communication timeout with SCADA bus.

Resolution: Verify cabling and connector integrity. Replace cable or power injector if voltage is unstable.

ANA-045

Description: Ultrasonic echo quality below threshold.

Resolution: Clean all transducer heads with alcohol wipe. If problem persists, replace sensor head module.

ANA-063

Description: Internal tilt detected >10° for over 5 minutes.

Resolution: Check sensor mounting plate and bolts. Realign or remount to eliminate tilt.

ANA-078

Description: Wind speed fluctuation >80% in 3 seconds (false gust detected).

Resolution: Check for reflective obstruction near sensor. Apply gust filtering in SCADA settings if terrain-dependent.

Service Interval and Calibration Policy

Clean transducers every 4 months. Recalibrate direction alignment annually or after SCADA drift alerts. Replace sensor every 4 years or on drift/echo failure.

Safe Replacement and Alignment Workflow

1. Deactivate turbine yaw movement. Confirm safe roof access and nacelle lockout.

2. Climb to nacelle rooftop and secure PPE harness. Identify ANA-750 mount near weather station pole.

3. Disconnect signal cable from sensor base. Shield connector with protective cap.

4. Unfasten mounting screws (usually 4 mm Allen head) and gently lift sensor off mount.

5. Inspect sensor body and transducer heads for contamination, insect ingress, or damage.

6. Install new WindCore ANA-750, ensuring exact north-facing alignment for accurate direction data.

7. Tighten mounting screws evenly to avoid tilt. Use digital level if needed.

8. Reconnect signal cable. Check for corrosion or wear on contacts before securing.

9. Return to SCADA interface and check for live wind speed and direction telemetry.

10. Run self-test and verify echo quality, internal temperature, and tilt angle are nominal.

11. Simulate wind changes (if possible) or wait for natural variance to validate response.

12. Log replacement timestamp, sensor serial, and telemetry readings at install.

13. Photograph mount position and attach to service record for traceability.

14. Re-enable yaw control and monitor 1-hour wind tracking session for anomalies.