YawSense ENC-310 Rotary Position Encoder

Professional Maintenance Manual - Nacelle Orientation Sensing

Component Type: Yaw position optical encoder

EAN: 80452271

Compatible Turbine Model: HeliVolt H1200 Medium-Wind Turbine

Dimensions: 110mm × 75mm

Weight: 880g

Sensor Interfaces: sensor_A, sensor_M

Stock Location: Denmark/Odense

Component Overview

The YawSense ENC-310 is a high-precision rotary position encoder used to track nacelle orientation relative to wind direction.

This optical encoder uses a coded disc and dual photodetectors to output angular position in real-time via quadrature signal and serial interface.

It is vital for yaw system feedback and storm misalignment correction. The ENC-310 features anti-vibration mounts, sealed bearings, and operates with

Sensor_A (angular position) and Sensor_M (motor feedback correlation) to maintain real-time alignment to wind vector.

Symptoms Indicating Encoder Issues

- Incorrect yaw angle displayed in SCADA
- Jerky or reversed nacelle movement
- Error codes related to Sensor_A or Sensor_M
- Intermittent loss of yaw tracking during rotation

Error Code Table and Remedial Actions

ENC-003

Description: Sensor_A signal noise exceeds 15% jitter.

Resolution: Check encoder disc for smudge or damage. Clean or replace disc. Shield signal cable from EMI.

ENC-019

Description: Yaw offset >5° between Sensor_A and Sensor_M.

Resolution: Recalibrate yaw zero point. Replace encoder if drift persists. Check mounting bracket stability.

ENC-025

Description: No signal from Sensor_M during yaw motion.

Resolution: Inspect cable routing and connector integrity. Confirm gear coupling is intact and rotating properly.

ENC-047

Description: Excessive vibration detected at encoder mount.

Resolution: Check anti-vibration gaskets. Torque mount bolts. Inspect for nacelle oscillation.

ENC-062

Description: Quadrature channel B signal missing.

Resolution: Replace encoder output cable or entire unit. Verify channel logic at SCADA diagnostics panel.

ENC-073

Description: Encoder temperature >70°C sustained for 10 min.

Resolution: Check for nearby heat source or airflow blockage. Replace encoder if thermal damage is observed.

ENC-091

Description: Unexpected direction reversals in yaw telemetry.

Resolution: Validate yaw control software version. Replace encoder if directional integrity test fails.

Inspection Cycle and Replacement Criteria

Inspect every 6,000 turbine hours or after abnormal yaw events. Replace encoder after 18,000 hours or if mechanical play is detected in shaft fit.

Replacement and Calibration Instructions

1. Disable yaw motor from SCADA. Confirm turbine is parked and rotor is locked.

2. Access encoder mount point on nacelle rotation base. Wear fall protection and helmet.

3. Disconnect Sensor_A and Sensor_M signal cables from the encoder. Tag cables clearly for later reconnection.

4. Unscrew encoder cover and inspect for dust, oil, or corrosion. Clean gently with air and optical wipes.

5. Remove encoder disc and inspect for scratches, delamination, or misalignment. Replace if worn.

6. Unbolt encoder housing from mount bracket. Carefully detach without damaging shaft coupling.

7. Install new encoder onto shaft with alignment key inserted. Torque bolts to 2.5 Nm and verify fit.

8. Reattach signal cables. Check for intact shielding and tight terminals. Avoid crossing wires.

9. Reconnect encoder to yaw controller. Reboot module and verify SCADA detects encoder with no error.

10. Run yaw test: rotate nacelle ±15° and compare SCADA angle with mechanical markings.

11. Confirm directionality, jitter level <5%, and yaw-motor sync with sensor_M telemetry.

12. Record encoder serial, install timestamp, and temperature during test cycle.

13. Log calibration values and verify yaw alignment is within tolerance. Store photos if needed.

14. Enable yaw motor. Monitor 1-hour yaw tracking log to verify stability and correction behavior.