kintech engineering

BROCHURE

WIND-NAPSTER

Enables wind farm owners to replace mechanical turbine control sensors with modern ultrasonic sensors from FT Technologies without modifying the turbine control system.

- Less turbine downtime
- Less nacelle yaw bearing wear
- Adds yaw adjustment options

Wind turbines that can directly benefit from this solution include but is not limited to: Gamesa G4, Gamesa G5, Vestas V47, Vestas V52, Made/Endesa AE56 and AE59.

WIND-NAPSTER | LESS TURBINE DOWNTIME. LESS NACELLE YAW BEARING WEAR.

DESCRIPTION

Many wind turbines are still using mechanical wind sensors. A large number of them suffer from downtimes related to icing buildup on the nacelle mounted control sensors, dust or salt being buildup inside the mechanical wind sensors and the risk of lightning. Furthermore, mechanical wind sensors need re-calibration.

A main issue is downtime caused by icing build-up on these mechanical sensors. This leads to turbine downtime and lost revenue with even worse consequences during the winter season, since cold air is denser and so produces more energy.

Using modern ultrasonic sensors from FT Technologies in combination with Wind Napster eliminate all these potential issues with mechanical wind sensors.

FT Technologies Ultrasonic Anemometer Operating in Harsh Conditions

The performance and reliability for nacelle mounted control sensors are understandably very important as they directly influence the turbine control system triggering cut-in speed, yaw orientation, feathering and cut-out speed.

When the turbine control anemometer measures wind speeds higher than cut-out speed, it triggers the blades to begin to feather, reducing their surface area by pointing them into the wind, and even in some cases triggers a complete shutdown of the turbine. A partially iced-up mechanical anemometer however, can in extreme situations, mislead the turbine to "think" it is under its rated cut-out speed and cause complete turbine failure.

Turbine downtimes can be avoided by retrofitting modern ultrasonic sensors fitted with a much more efficient de-icing system. However, for some wind turbine models, modifications to the turbine control system is required to replace mechanical control sensors with FT ultrasonic sensors.

To overcome this hurdle, we have developed Wind-Napster in close co-operation with FT Technologies and wind farm owners. Wind-Napster allow modern ultrasonic high-performance sensors from FT Technologies to be retrofitted to wind turbines by imitating the output signal from a mechanical control sensor.

"We have used Wind-Napster from Kintech Engineering to easily integrate nacelle mounted ultrasonic sensors from FT Technologies on our wind turbines (Gamesa G42 and G47). As a result we have reduced the enormous risk of having completely or partially iced-up mechanical control sensors. In certain climatic conditions with both high winds and ice (very common condition in our El Toranzo wind farm) this can mislead the turbine to think it is under the turbine rated cut-out speed and cause either serious breakdowns or complete turbine failure.

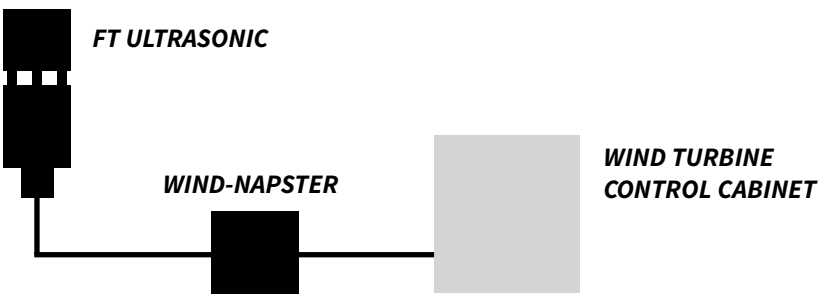
Furthermore, we have also been able to decrease the turbine downtimes caused by iced-up mechanical control sensors, and we have reduced wear of the entire yaw orientation system (including yaw drive pinions, yaw bearings, yaw drive, yaw motors and yaw gearbox) by reducing the frequency at which the turbine aligns itself in conditions with high turbulence. We have also noticed an increase in power production, given the higher precision of the ultrasonic anemometer."

CRISTÓBAL JIMÉNEZ
Manager at the El Toranzo windfarm

WIND-NAPSTER | LESS TURBINE DOWNTIME. LESS NACELLE YAW BEARING WEAR.

Wind-Napster imitates the output signal from a mechanical control sensor and enables wind farm owners to retrofit modern ultrasonic sensors from FT Technologies.

Wind-Napster is developed and manufactured by Kintech Engineering and consists of a DIN rail mounted box that is installed in between the FT ultrasonic sensor and the wind turbine control system.



SPECIFICATIONS

Protection with 3000V galvanic isolation between the anemometer and turbine control cabinet
EMC-conformant (optimum protection against electromagnetic interference)
External mounting slots with spring nuts
Paint-free guide grooves (for earthing/grounding contact or similar)
External mounting brackets for DIN rails
Ad hoc data filtering according to customer specifications (upon request)
Material: Extruded aluminum, Power supply: 0…24V, Output signal: push pull, optional RS485 output

BENEFITS

Significantly increases turbine availability
Increases AEP due to improved anemometer and wind direction readings
Avoids turbine downtime because of iced-up cup anemometers
Avoids misleading speed readings from partially ice-up cup anemometers
Avoids misalignments because of partially iced-up wind vane
Keeps down costs related to service and maintenance

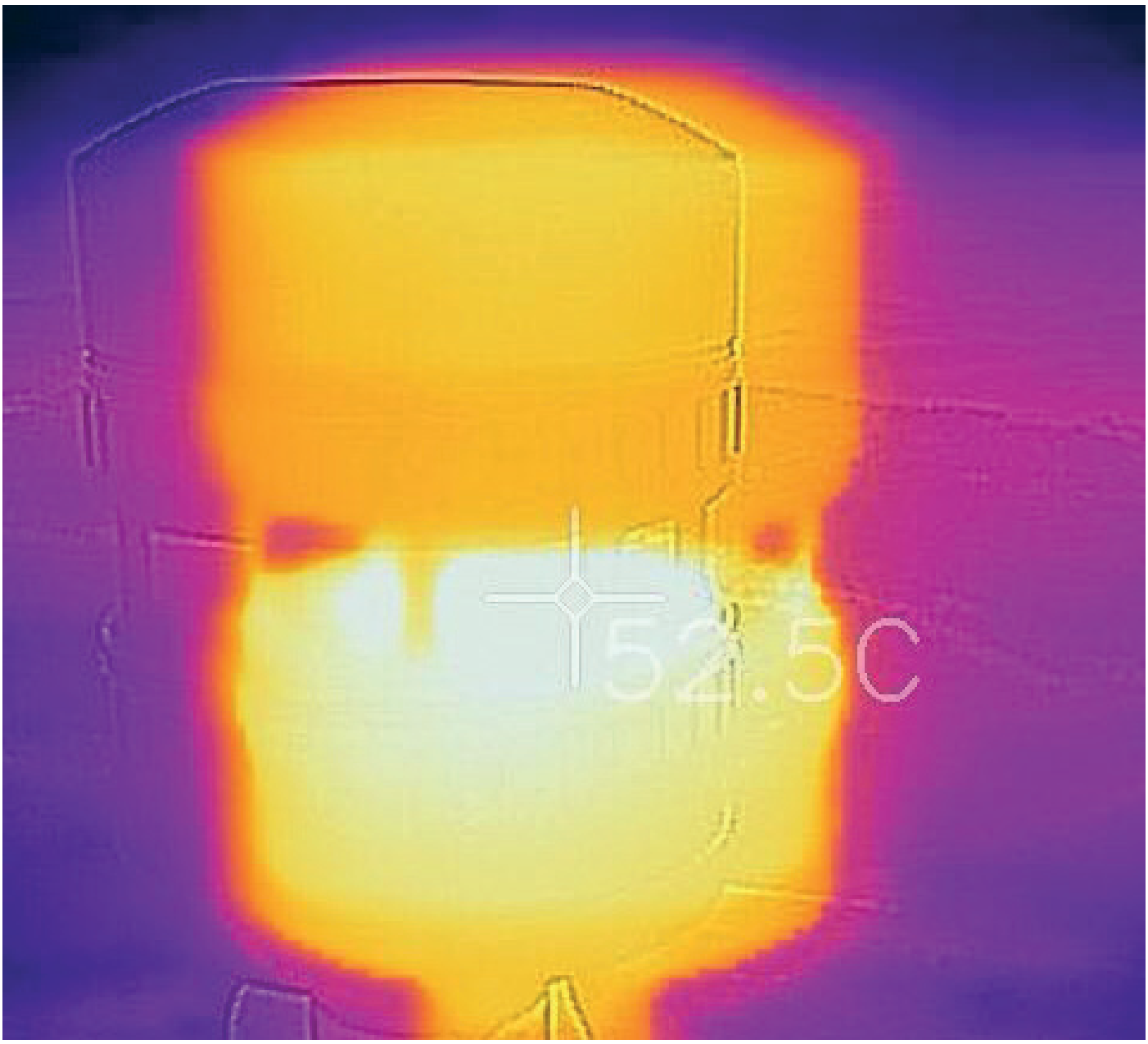
ADVANCED YAW CONTROL

For turbines situated in high turbulence sites, wind direction readings from the nacelle mounted sen¬sor have a tendency to fluctuate very frequently and therefore cause the turbine to yaw more frequently than is required. This frequent yawing causes increased wear to the nacelle bearings, decrease power production and causes increased maintenance costs.

The Wind-Napster unit is placed in between the ultrasonic sensor and the turbine control unit. It allows wind farm owners to manually adjust both the frequency of yawing and the minimum change in wind direction which triggers the nacelle to yaw. On turbulent sites, this will minimize wear on the crucial and expensive main yaw bearings while minimizing maintenance and service cost.

ALL-BODY HEATING

The FT ultrasonic sensor is fitted with a thermostatically controlled 'all-body' heating system. The sensor maintains its temperature at a user specified heater set point of between 0^{o}C and 55^{o}C. Three software controlled heaters are used to distribute heat intelligently over the entire sensor. In standard format the heaters draw a maximum of 99W.



FT Technologies Ultrasonic Anemometer Heating System

For extreme environments the current limit can be adjusted (power supply and cabling permitting) from 0.1 to 6 Amps. The sensor's small size means that the power is used very effectively ensuring that the sensor can stay ice-free

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ABOUT FT TECHNOLOGIES

FT Technologies has been supplying wind sensors to the wind energy industry since 2002. They are now one of largest suppliers of ultrasonic wind sensors and supply many of the top turbine manufacturers. Users typically experience data availability of more than 99.9% with the FT wind sensor. It is designed for long service in adverse environments where traditional mechanical sensors fail.

The FT ultrasonic anemometer is the result of FT Technologies' 15 years of experience in designing durable turbine control wind sensors for the demanding environment on a wind turbine. The sensor is probably the most tested wind sensor in the world. It has passed over 28 independent tests including sand, dust, ice, vibration, drop, corrosion, hail and lightning protection and they have been installed all over the world from the North Sea to Mongolia. During the design phase of the sensor prototypes are tested to the extreme with vibrations of up to 50g and in temperatures between -90C and +120C.

ABOUT KINTECH ENGINEERING

At Kintech Engineering we develop and manufacture segment leading data acquisition systems and sensors for wind & solar resource assessment. We are a group of highly skilled electronic engineers with a flair for usability and optimal performance in remote operations. Our systems are used globally by industry professionals to acquire high accuracy data for optimal project development.

For more information please contact **support@kintech-engineering.com**
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