



PERFECTION BY PRECISION

SENSORS FOR WIND ENERGY APPLICATIONS



FIELD-PROVEN SENSORS FOR WIND ENERGY APPLICATIONS

PITCH CONTROL SOLUTIONS

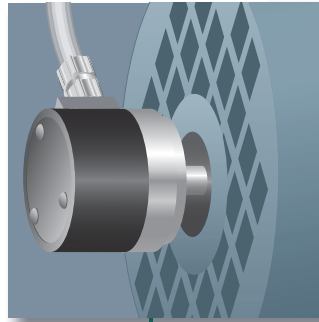
MAGNETIC ENCODER MNI40

- AMR/GMR technology
- Up to 3600 pulses per revolution
- Ultra rugged – up to 200 g shock resistance, 40 g vibration resistance
- -40 °C to 100 °C
- Unaffected by harsh environments



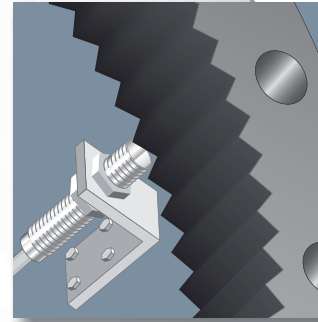
ABSOLUTE ROTARY ENCODERS

- Mount directly to pitch drive or on idler gear
- Monitor absolute blade pitch position, even through power loss
- IP65 protection class

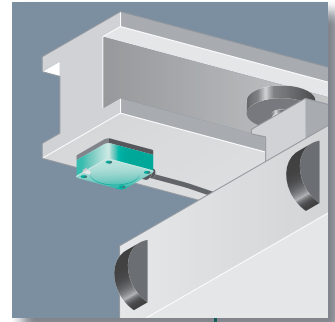


INDUCTIVE PROXIMITY SENSORS

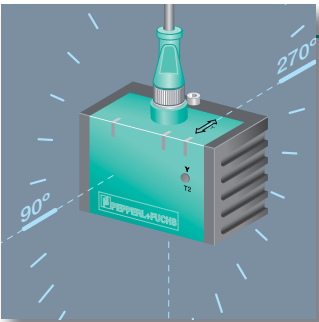
- Sense motion of pitch slew rings and drive gears
- Mobile equipment-rated for exceptional reliability
- Wide range of sizes and styles to fit every application



SERVICE HOIST CONTROL

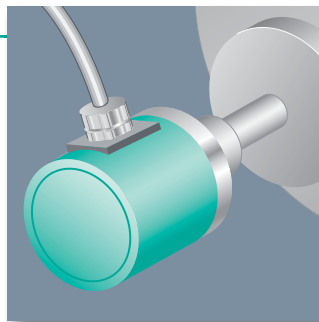


ROTOR/HUB ANGULAR POSITION DETECTION



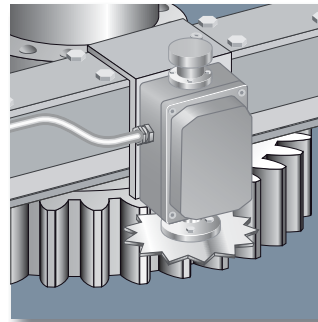
INCLINATION/ACCELERATION SENSOR F99

- 0° ... 360° rotational position
- Reliable – no moving parts!
- IP68/IP69K protection class
- 0.1° angular resolution



ABSOLUTE ROTARY ENCODERS

- Up to 30 bit resolution
- Solid, hollow, and recessed hollow shaft styles
- Up to IP65 protection class



CABLE TWIST SENSOR

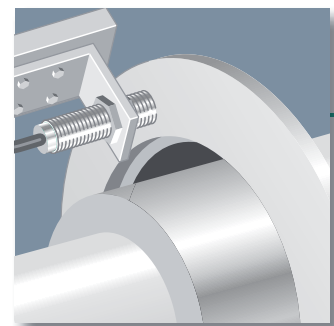
ROTARY ENCODERS

- Track nacelle rotation to prevent cable twisting
- Absolute encoders maintain position data through power loss
- Incremental encoders available with SIL3, PLe rating

MAIN SHAFT DEFLECTION MONITORING

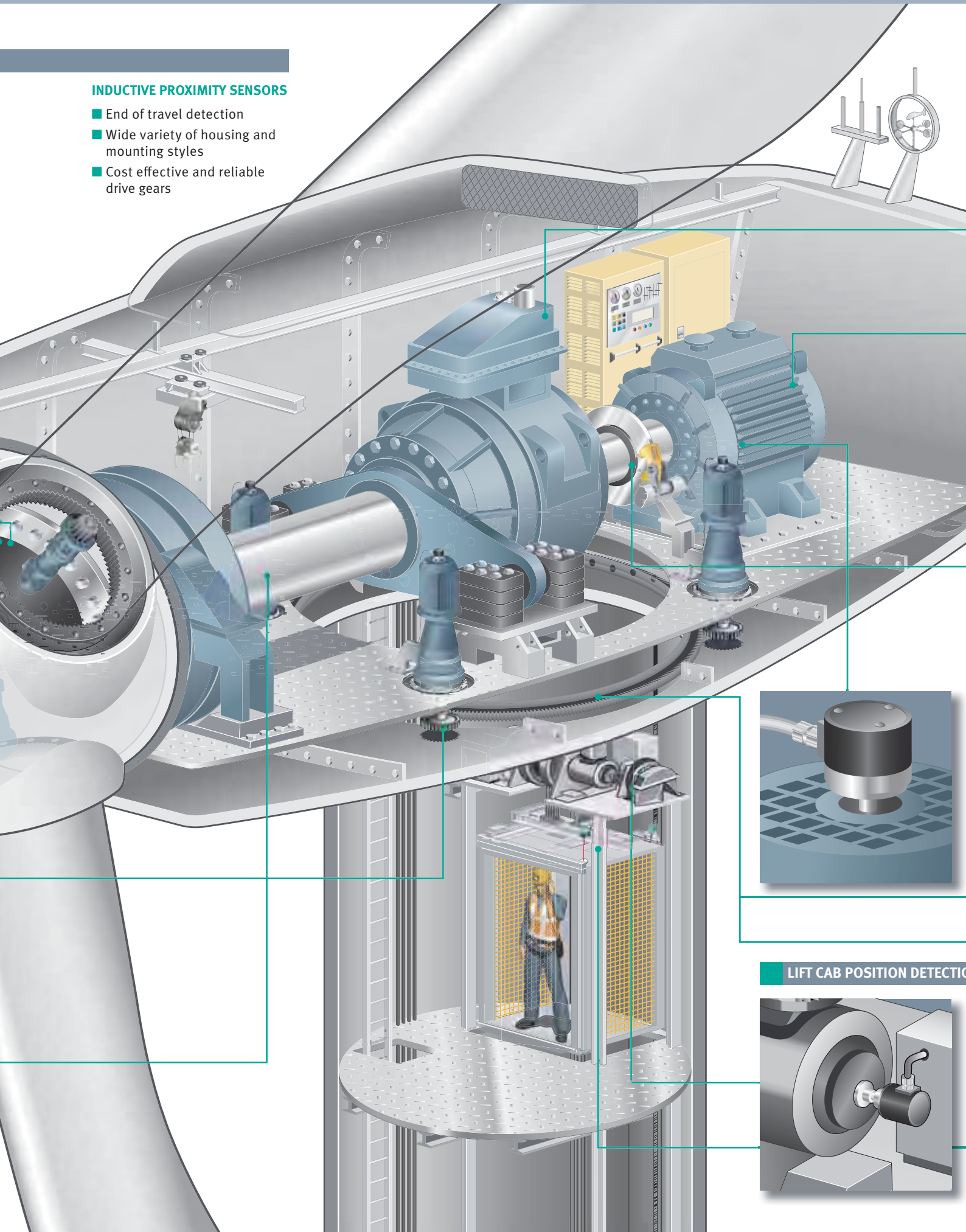
ANALOG PROXIMITY SENSORS

- Detect rotor load-induced deflection of main shaft
- 4-20 mA or 0-10 V DC output; ±10% linearity
- IP67 protection class

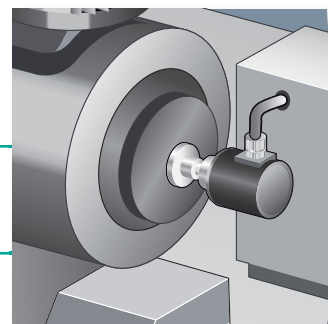


INDUCTIVE PROXIMITY SENSORS

- End of travel detection
- Wide variety of housing and mounting styles
- Cost effective and reliable drive gears



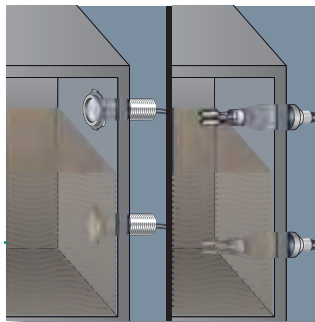
LIFT CAB POSITION DETECTION



LEVEL MONITORING FOR GEARBOX LUBRICATION AND COOLANTS

CAPACITIVE SENSORS

- Noncontact level sensing
- Cylindrical and surface mount styles
- 1 mm to 50 mm range
- Stainless steel and crastin housings



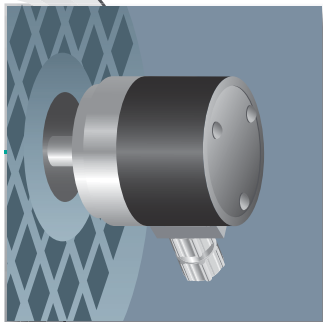
VIBRACON SENSORS

- 100 °C and 150 °C liquid temperature versions available
- Small, slender design for easy mounting in limited-access locations

GENERATOR RPM MONITORING

INCREMENTAL ROTARY ENCODER

- Reliable, accurate feedback of generator speed
- Up to 50,000 pulses per revolution
- Styles to fit a variety of mounting configurations, including slip rings
- Durable optical technology for use in the most demanding environments



BRAKE PAD POSITION/WEAR MONITORING

INDUCTIVE PROXIMITY SENSORS

- Sense position of brake pads or actuator piston
- Wide variety of housings and mounting styles
- Mobile equipment-rated for exceptional reliability

ANALOG PROXIMITY SENSORS

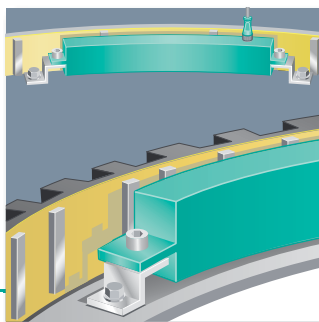
- Detect amount of wear on friction surfaces to facilitate scheduling of preventive maintenance
- 4-20 mA or 0-10 V DC output; ±10% linearity
- IP67 protection class



YAW POSITION SOLUTIONS

ABSOLUTE ROTARY ENCODERS

- Mount directly to yaw drive
- Sense motion and direction to determine position of slew ring gear
- Absolute position maintained even through loss of power

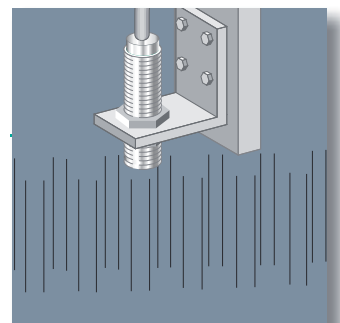


POSITION CODING SYSTEM PCI

- Absolute, noncontact determination of angular position of slew ring
- Extremely reliable and resistant to soiling
- Analog output signal proportional to range of motion
- Resolution: 1 mm independent from radius

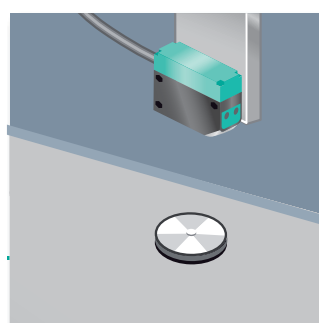
INDUCTIVE PROXIMITY SENSORS

- Directly sense gear teeth on slew ring or targets on yaw drive motors
- Mobile equipment-rated for exceptional reliability
- Cost effective and reliable



ROTARY ENCODERS

- Absolute or incremental position
- Easy installation on lift drive or idler pulley



LASER DISTANCE MEASUREMENT SYSTEMS VDM28

- Direct measurement of absolute cab position
- No rope/cable slip or stretch error

Extreme performance, durability, and reliability are prerequisites for all key components used in wind energy applications. It's the only way to achieve the operating efficiencies and up-time required in today's competitive energy market. Field-proven sensors and rotary encoders from Pepperl+Fuchs meet these demanding requirements, providing dependable performance in even the most challenging environments and applications.

With our broad product offering, available from a single source, our experts can help you select the appropriate sensing technologies for your specific application. With locations on six continents, our global presence enables Pepperl+Fuchs to offer the best of both worlds: extremely high engineering standards combined with efficient, low-cost manufacturing capabilities. We have exactly what you need to make your wind energy systems efficient, rugged, and reliable.

PEPPERL+FUCHS – COMPETENCE AT A GLANCE

- Pepperl+Fuchs has over 10 years of experience in delivering reliable sensors to the wind power industry worldwide; we're a valued supplier to four of the top five wind turbine manufacturers in the world.
- In partnership with valued customers, Pepperl+Fuchs has developed unique solutions to address the special requirements and specifications of the wind energy market.
- Together with leading wind industry certification agencies TÜV and Germanischer-Lloyd (GL), Pepperl+Fuchs is an active participant in the development of performance and test standards for both onshore and offshore wind applications.
- Our stability as a world leader in presence and position sensing ensures a long-term partnership with our valued customers.

Our specialists will be glad to help you.

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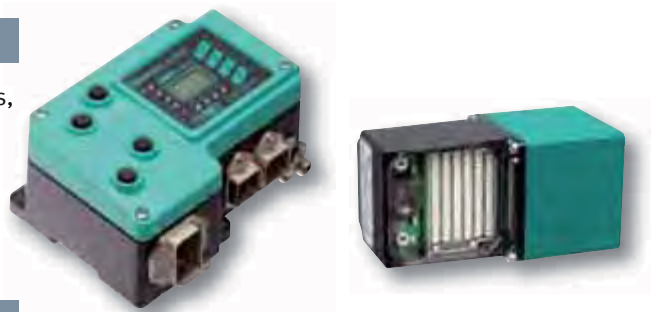
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Pepperl+Fuchs invented and introduced the first inductive proximity sensor in 1958. Over the years we've extended our product portfolio to include ultrasonic, photoelectric, and capacitive sensors, rotary encoders, vision sensors, AS-Interface, RFID and barcode systems, and a complete line of cordsets and accessories. We continue to increase our product range with ongoing innovations.

IDENTIFICATION TECHNOLOGY

Choose from a wide range of innovative RFID identification systems, camera-based code readers and barcode scanners.



ULTRASONIC SENSORS

Ultrasonic sensors present the ideal solution for non-contact position and distance measurement. They are not affected by dust, smoke or steam and are, therefore, ideal for wind energy solutions.



CONNECTIVITY

Pepperl+Fuchs offers you a comprehensive selection of electrical and mechanical accessories for your sensor system solution.



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SENSING YOUR NEEDS