

Wind Cluster®  
Creating Synergy

# Redundant 2nd Absolute Encoder for Pitch System

February 2010

## Robust encoder for extreme conditions

This compact absolute encoder is adapted specifically for use in electrical pitch systems. The encoder not only comprises its particularly rugged enclosure, but also rigid ball bearings suitable for running the shaft connected directly with pinion gear on the blade of a wind turbine.

The encoder will withstand even high axial and radial forces on its shaft axis, and the encoder easily achieves a mechanical lifetime of  $10^9$  rotations at a permanent radial load of 300N and simultaneously, an axial load of 300N. It easily withstands the highest accelerations, rotations, extreme climatic fluctuations as are standard conditions in the hub of a wind turbine.



## Reading technology

A traditional electrical pitch system with focus on safety uses two encoders as a minimum per wind turbine blade. One encoder is typically a hollow shaft type like Wind Cluster type 150113-WC installed directly on the shaft of the pitch motor. Since it is installed on the motor, the design of this encoder must be immune to magnetic fields from the motor. Therefore the technology of the type 150113-WC is based on optic reading of the blade position.

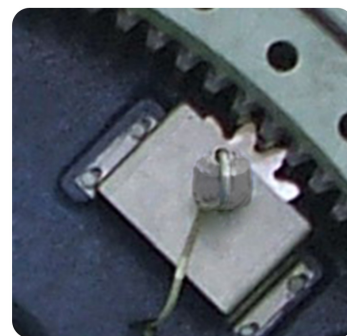
## Features:

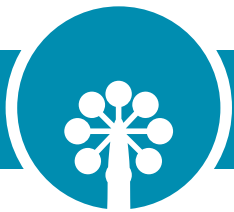
- Compact design
- Magnetic reading technology
- Protection class shaft input and housing: IP 67. IP 69k available on request.
- Max shaft load, radial and axial: 300 N/ 300 N.
- Operating temperature: -40°C to +100°C
- Vibration resistance: 200 m/ s<sup>2</sup>
- Robust pinion gear of synthetic material

In order to ensure true redundancy, the second redundant encoder must be based on alternative reading technology. Hence, the redundant encoder reads position by means of a completely different magnetic technology.

The redundant second absolute encoder is delivered with a robust pinion gear which matches the blade gear. The pinion gear is for mounting on bracket (not included in the supply) and made of synthetic material. Applicable in temperatures from -40°C to +60°C.

Module, number of teeth etc. must be specified per application.



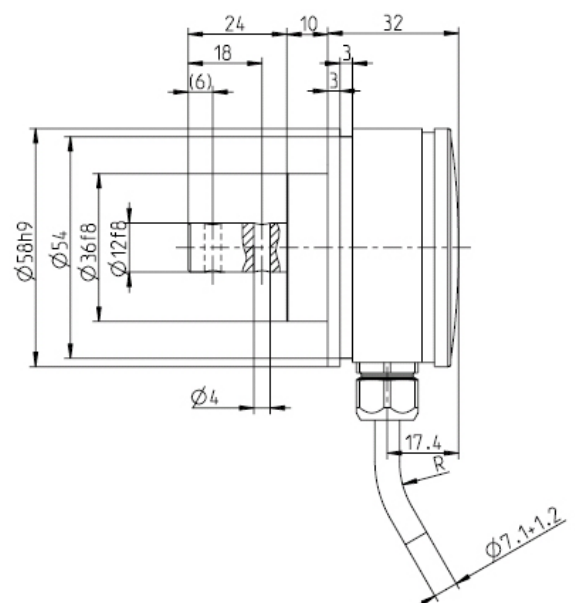
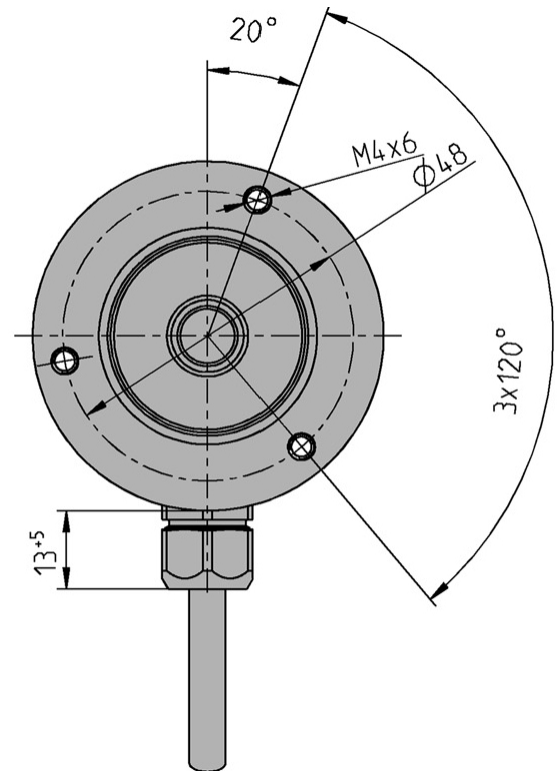


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## Hengstler type 150112-WC

### Technical specifications

Aluminium housing	
Housing diameter	58 mm
Mounting depth	32 mm
Shaft diameter	12 mm (solid shaft)
Protection class shaft input (EN 60529)	IP67. IP69k available on request
Protection class housing (EN 60529)	IP69k
Shaft load axial / radial max.	300 N / 300 N
Max. speed (short term)	5,000 rpm
Vibration resistance (DIN EN 60068-2-6)	200 m/s <sup>2</sup>
Shock resistance (DIN EN 60068-2-27)	2,000 m/s <sup>2</sup> (6 ms)
Operating temperature	-40°C to +100°C
Connection	1.5 m cable
Supply voltage	DC 10-30 V
Max. current w/o load	50 mA (24 V)
EMC	EN 61326 Class A
Resolution	12 bit multurn + 12 bit singleturn
Interface	SSI
Output code	Gray
Absolute accuracy	±0,6°
Repeatability	±0,2°
Control inputs	Preset, direction



### Electrical connections, cable

Colour cable	Signal
yellow	Clock
pink	Data
green	Clock/
grey	Data/
white	UB
brown	0 V
blue	Direction
red	Preset
Screen	Screen

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