

Case note

Electrically driven anchor and mooring winches using ABB industrial drives



The Pusnes frequency controlled winch™ includes an ABB industrial drive with winch control program.

Photo: Aker Solutions

Deck winches are commonly used on board today's ships. Traditionally the marine winch market has been dominated by hydraulic systems and three-speed direct-on-line electrical systems. Both of these have their drawbacks.

The hydraulic system requires a significant amount of space, while the oil used can constitute an environmental hazard.

The three-speed electrical system has limited speed control, resulting in mechanical wear and coarse winch operation.

Increased winch system reliability

Aker Solutions is a major supplier of Pusnes™ deck machinery. The Pusnes frequency controlled winch™ includes an ABB industrial drive with winch control program. The company saw the benefits of using an AC drive and its associated program on its winches, especially for anchoring and mooring control. Basic requirements for both anchoring and mooring are full torque control throughout the entire speed range without the need for a pulse encoder.

Working with ABB and system integrator Visiontech AS in Norway, the partners developed a dedicated winch control program and cabinet solution.

The key factor in operating the Pusnes frequency controlled winches™ without a pulse encoder is ABB's direct torque control (DTC), motor control method. DTC makes it possible to run anchor and mooring winches without the need for a pulse encoder in open loop control. Eliminating pulse encoders benefits ship owners by increasing the reliability of their winch system.

When commissioning the winch, senior engineer Johan Lång at Visiontech says: "I have never operated an electric winch that is so precise and with the same accuracy throughout the speed range".

Additional benefits include eliminating the need for a separate PLC for the system. Aker Solutions, Visiontech and ABB have successfully developed a cabinet design and control program that includes protection functions for the anchor and mooring winches. A comprehensive I/O interface connects the three control stands directly to the AC drive, removing the need for a PLC.

Challenge

- Precise control of anchor and mooring winches
- Flexible winch control program with multi I/O functionality
- Drive ready-made for anchor and mooring control

Solution

- ABB industrial drive with winch control program



ABB industrial drives with winch control program.

Benefits

- DTC eliminates need for pulse encoder
- Safe and accurate anchor and mooring winch control through the whole speed range
- Cost reduction compared to closed loop systems
- Environmentally friendly electrical solution
- Reduction of mechanical wear
- External PLC not needed due to winch control program that includes winch operation and protection functions
- Multi I/O functionality allowing three different control stands to be connected directly to the drive
- Anchor-in or anchor-slowdown protection reduces speed as anchor approaches its end position. Slip protection operates between winch drum and winch motor
- Handmooring function provides slack rope speed operation with peak torque protection for fast and safe stop of rope when tightened. Adjustable automooring provides accurate rope tension control
- Mechanical brake control with torque memory
- Easy start-up and maintenance of drive system
- Ideal solution for retrofits

For more information please contact:

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