

APPLICATION NOTE: Wire drawing machines for copper, aluminum and alloy wires - Precise control of wire winding

Overview

Application: Correct winding system for the coil spiral.

Products: HYPERWAVE WPG-A absolute magnetostrictive position transducers

The process

Drawing machines represent the initial stage of the wire production process, which begins with the drawing of the rod. Through the use of drawing machines, the raw material is transformed into wire by reducing its cross-section and altering its shape using a drawing die, with the essential aid of a lubrication process. During this process, drawing machines can also increase the wire's temper or hardness.

The single-wire drawing line is generally used for intermediate drawing, as well as for fine and superfine wire intended for specific applications. It is specially designed for processing special materials, such as bare copper wire, annealed copper, and tinned copper.



Figure 1 - Drawing machine



Figure 2 - Copper wire coils after the winding stage

The challenge

Winding is a coiling solution designed for copper, aluminum and alloy wires, ideal for optimizing drawing systems, including those from other manufacturers.

The quality of the wire winding on the spool must be flawless, and cycle times minimized (automatic spool change).

Winders must offer several advantages, including:

- Integration of a dancer arm to further reduce space requirements
- Possibility of winding into metal or cardboard support containers
- Automatic container replacement at full speed, without operator intervention
- Wide range of available conveyors
- Optional wire cooling and drying system for raw wire production
- Easy integration with existing lines

Product benefits

WPG-A Magnetostrictive sensor – “General” series

- Non-contact transducer based on magnetostrictive technology that detects the position of a magnetic cursor mechanically attached to the moving part of the machine;
- low-profile aluminum housing for reduced space requirement;
- environmental protection rating (IP67);
- WPG-A offers:
 - Greater robustness and durability compared to potentiometers
 - Better price/performance ratio compared to other magnetostrictive transducers

Solution

In the final stage of the process, the drawn wire is wound onto a spool with special attention to uniform distribution. A sensor is used to precisely monitor the position of the wire during winding, ensuring accurate and consistent placement.

Requirements:

- Precise positioning (within ± 0.1 mm) over a 250 mm stroke;
- resistance to cursor vibrations caused by high-speed movements;
- cost effective sensor solution.

Product used: **WPG-A**

WPG-A linear magnetostrictive sensors enable real-time reading of spool position, providing accurate feedback for effective synchronization between the various units along the production line.

Gefran offers a complete range of linear magnetostrictive sensors, available in different configurations to suit various application needs.

The **WPG-A** series represents the best cost-performance compromise within the available product range.

Main technical features:

- Independent linearity within ± 0.1 mm for strokes up to 250 mm;
- sliding or floating cursors, depending on installation constraints;
- multiple analog output options available;
- M12 connector with IP67 protection rating.

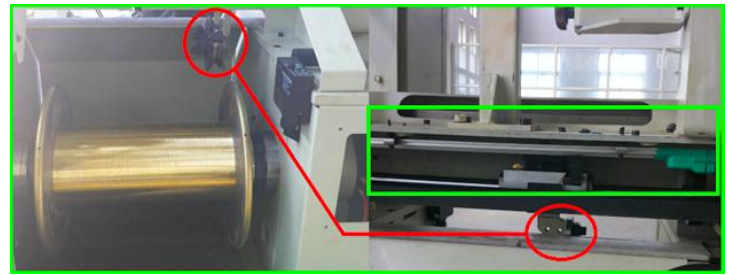


Figure 3 - Product: WPG-A magnetostrictive transducer installed on a coil winding system.



Figure 4 - Product: WPG-A magnetostrictive transducer with low profile in aluminum

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