

# Reliable Positioning of Yard Machines

RFID System and Absolute Rotary Encoder Provide Precise Measurement Results

## At a Glance

- RFID system and absolute rotary encoder as the ideal solution for reliable positioning, even in highly complex machines
- Redundant positioning information by combining two technologies
- Mechanically robust system to withstand adverse ambient conditions



## The Application

In the steel and mining industries there are yard machines such as stackers and reclaimers. These complex pieces of equipment are used to form and retrieve stacks of materials in storage and homogenization yards. It is important that the position of the machine is monitored throughout the yard to ensure reliable stacking of the materials such as ore.

## The Goal

Even in challenging ambient conditions, the detection of the machine position over the entire travel path of the machine must always be ensured along the rail. The sensor solutions used for this purpose must be particularly robust and resistant to iron ore dust as well as the harsh weather conditions to which they are constantly exposed.

## The Solution

An RFID system—consisting of a long-range IUH-F190 RFID read/write device, an IUC87-F257-T17-M-FR\* UHF tag as well as an IDENTControl evaluation unit—in combination with an absolute rotary encoder is the ideal solution. To monitor the positioning of the yard machine, long-distance UHF tags with information about the stacker and reclaimer position are installed along the entire length of the travel path at predefined positions. An RFID UHF read/write device (F190) is attached to the yard machine, where it is transported along with the equipment and reads the tags at adjustable distances of up to two meters. Each time a new tag is read, the system automatically sends a signal to the PLC and compares it to the position value of the ENA581L absolute rotary encoder.



## The Benefits

The RFID read/write device F190 is highly reliable for this type of application as it ensures position reading even in direct contact with ore and in harsh ambient conditions. In addition, the sensor is able to detect several RFID tags simultaneously with just a single read operation (multitag reading), if required. Moreover, the tags are passive and do not require any external power supply or battery replacement. They can also be installed directly on metal surfaces, allowing mounting onto the conveyor belt base in the yard itself, without the need for adjustments with insulating supports.

Due to its resistance to shock and vibrations, and the ability to withstand harsh environments of dirt and dust, the ENA58IL magnetic rotary encoder is highly reliable. With an accuracy of 0.1 degrees and a 16-bit resolution, the rotary encoder provides exact data positioning.

### Technical Features IUH-F190

- Sensing range: up to 2 m
- Operating frequency: 865 ... 928 MHz
- Multitag reading
- Adjustment of transmission power and polarization
- LEDs for high visibility display
- Compatible with EPC Gen2 standard tags
- Compact and robust housing (114 × 112 × 63 mm)
- Degree of Protection: IP67
- For connection to IDENTControl control interface

### Technical Features IUC87-F257-T17-M-FR\*

- Operating frequency: 865 ... 928 MHz
- Complies with EPC Gen2 (ISO/IEC 18000-63)
- Optimized for mounting on metal
- Sturdy housing, suitable for rough industrial use

### Technical Features ENA58IL

- Very high resolution and absolute accuracy of <math><0.1^\circ</math>
- Compact design for flexible use ( $\varnothing$  58 mm)
- Shaft type: solid and recessed hollow shaft
- Max. rotational speed: 12,000 rpm
- Degree of protection: IP65 and IP67
- Max. shaft load: axial: 40 N, radial: 110 N
- Noncontact technology allows a long service life
- Most common Fieldbus and Industrial Ethernet interfaces available

