RFID-based Tambour-ID
Basic System Overview

Introduction

Tambour identification has in the past mostly been done using Microwave-based systems. That hardware is now getting to a point where it needs to be replaced in order to warrant a safe and trouble-free operation in the mills. Since a few years Ident System AB offers an economic and well-proven replacement system based on LF-RFID instead of the microwave systems.

The system consists of a reader connected to the present Mill Executive System via a TCP/IP network. That system will keep track of Tambour-ID, orientation and acceptable destinations. The logic is normally handled by the local mill system. The Tambour ID-system easily integrates with various MES e.g. Honeywell Optivision, ABB Automation, Paperline and similar systems.

Ident System AB has in the past years successfully installed well over 30 systems and more are on the way. The customers have greatly appreciated the quick and easy installation and the good performance of the systems.

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The hardware
The reader is a self-contained unit, having all necessary parts integrated into one
single stainless cabinet. The readers main tasks are to provide energy to the ID-Tag and to decode the unique identification code coming from each tag.

A communication controller is connected directly to the reader, forming one complete assembly. The basic communication interface is RS232. As mentioned in the beginning, the communication to the mill execution system is done via a TCP/IP network. The RS232 interface is converted into an Ethernet signal by means of a serial server. The server settings are easily configured according to requirements by the local mill network using the systems Web Console.

The antenna handles the transmission of energy to the data tag and the coded data transfer from the data tag back to the reader to be decoded. Depending on where and how the antenna is installed it will have to be tuned to frequency for optimal function. To achieve high resonance voltage and thus high charge-up field strength the antenna circuit must be tuned to resonance.

To facilitate the use of standard parts the antenna has a short cable connected to a Connection Box. From there, a longer cable connects to the Antenna Tuning Device. Depending on how and where the antenna is installed, that cable shall then be shortened as required during installation.

The Object Detect Sensor (optional)
The Baumer sensor FZAM-30P5002 is a diffuse sensor with intensity difference. The light source is a pulsed infrared diode and has a sensing range between 300 and 1 500mm. It can be configured to function either on a dark or light background. Some customers prefer to work without using an Object Detect Sensor, hence this is an optional part.

The ID-Tag
The tag housing is designed to be mounted directly onto metal, as is the case in Spool Identification where the tag is mounted in the centre of the Spool end. Since there are many different designs of the tambour ends due to various machine types in the mills, Ident System AB has two basic tag designs; round and a rectangular. The tag height may also be varied to optimise the system performance considering the different air gaps at the drive ends. The rectangular type makes the switch from Microwave to LF very easy since the LF-tag has the exact base dimensions and hole distances as the Microwave-tags. No machining is needed.

The ID-Inlay is a 24 mm LF circular disk containing a chip and a copper coil. It is placed in a recess in the tag housing and then cast with a two-component PU material. This gives optimal protection, both mechanical a and against water. The inlays provide superior performance and operate at a resonance frequency of 134.2 kHz. The chip is compliant with ISO/IEC 11784/11785 global open standards. Prior to delivery, the inlays undergo complete functional and parametric testing.

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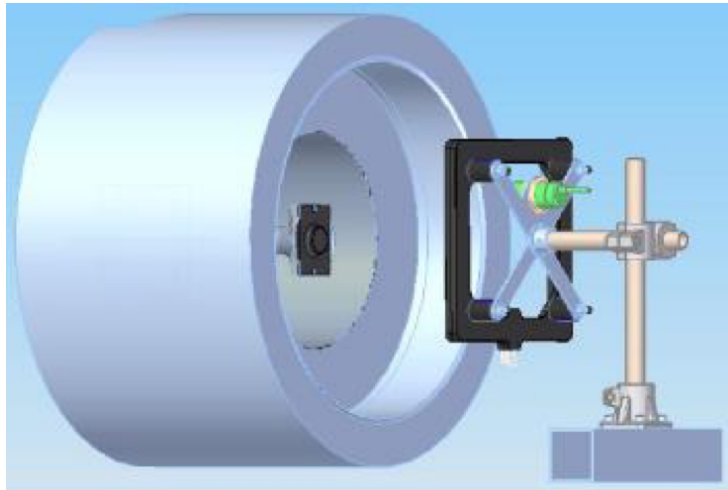
Installation

The Spool Detection System

The reader is a self-contained unit, having all necessary parts integrated into one single stainless cabinet (300 x 380 x 210mm L-H-W). All wiring to the reader and to the controller is done inside the cabinet at the factory.
The only external cabling necessary is for:

- Power 220VAC
- Ethernet
- Antenna
- Object Detect Sensor (optional)

Mounting the antenna

The antenna shall be mounted so that its center is concentric with the tambour center. We have found that the dimension on which the reel is supported in the machine commonly is Ø420mm. Hence, we have set the nominal center height to 210mm. Thanks to the adjustability in height and distance (+/- 100mm), it is very quick and easy to meet other machine parameters. The antenna is fixed to the metal X-frame using standard rubber mounts Ø25 x 30mm with M6 screws. The X-frame also has a Ø30mm hole to fit the optional Object Detect Sensor. Standard mounting elements are used for mounting.