Temposonics®

Magnetostrictive, Absolute, Non-contact
Linear-Position Sensors

MTS SENSORS

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Tempsonics R-Series Model RF Sensor Can Improve Productivity in Paper Slitters / Stations White Paper

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ENSURING PRECISION FOR OPTIMAL EFFICIENCY

According to a report from the Technical Association of the Pulp and Paper Industry (TAPPI), more than 300 million metric tons of paper and paperboard are produced each year at hundreds of facilities. Paper winders, which are used to slit large rolls into smaller sizes, operate at speeds averaging 2,000 to 6,000 FPM depending on machine size, continually every day to help meet that demand, paper winders.

Industry standards require that slitters not deviate more than ± 1/32nd of an inch at any point in the process. To accomplish this, these machines have to reposition automatically to accommodate the various sizes today's on-demand customers insist upon. In addition single drum winders use individual stations to build the rolls. These stations also require precise positioning to align them properly with the used slitters, and to park the unused units when necessary. Improper alignment or slippage means thousands of dollars in waste material and lost production.

As the industry grows and demand for paper products exceeds what could have been produced reliably even a few years ago, pulp and paper producers need better solutions. This isn't easy in a commodity industry where profit often dictates level of innovation. The most common solution is to retrofit old equipment for as long as possible without compromising performance and reliability.

In an industry where deviations greater than a 1/32nd of an inch mean wasted time and products, this can be a tricky proposition. Faulty equipment, even for a few moments, results in manual intervention by the operators. When this occurs it can significantly increase setup and down times. Added to the wear and tear always present in older equipment and it can directly affect the profitability of a mill.

Historically, paper slitters have used expensive encoders to gauge deviations in the cutting process. While effective to a degree, encoders have significant limitations in these applications. They require a large amount of festoon cabling systems and are attached to the rack and pinion portion of the assembly restricting access. Additionally, when they do fail, slitters have to be taken off line for extended periods for repairs – that often, due to the proprietary nature of the existing control systems, adds to the cost considerably. Finally encoders are prone to wear and tear due to vibrations, heat, dust, and mechanical deficiencies in their mounting system. Some systems also use magnetic tapes with a movable photo eye to measure the leading and trailing edge of the slitters. These systems are not reliable over time for most of the same reasons the encoders aren't.

The Temposonics® R-Series Model RF sensor, which can be easily retrofitted to existing paper slitters, uses a fixed electronics head and simple moving magnet that allow customers to remove all of the problematic and costly festoon cabling systems associated with a traditional moving encoder on each section. In addition, the MTS sensor wire directly into a system, allowing traditional controllers direct access to feedback data. This enables faster positioning sequences and easier detection when a blade is outside acceptable parameters.

Systems using encoders require the entire encoder assembly to transverse the machine during normal operation. This constant movement and the cabling required increases the likelihood of damage and failure from constant cable flexing, along with the mechanical Festoon cable management system wearing from constant movement. In addition, after many hours of operation the rack and pinion system used on the AC motor driven units would suffer significant wear, resulting in potential drifting over time.

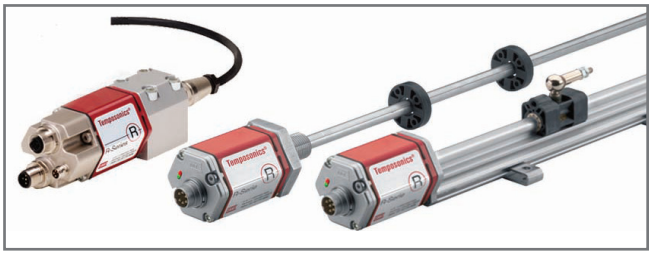
The R-Series Model RF sensor has no moving parts. Using a technology known as magnetostriction to provide the level of control desired, these sensors work by inducing a sonic strain pulse in a specially designed magnetostrictive waveguide by the momentary interaction of two magnetic fields. One field comes from a small movable permanent magnet (the system's only movable part) which passes along the outside of the sensor tube, the other field comes from a current pulse or interrogation pulse applied along the waveguide. This interaction produces a strain pulse, which travels at sonic speed along the waveguide until the pulse is detected at the head of the sensor.

The magnet's position is determined with high precision by measuring the elapsed time between the application of the interrogation pulse and the arrival of the resulting strain pulse. Consequently, accurate non-contact position is achieved with absolutely no wear to the sensing components.

These advantages allow paper producers to integrate, and even retrofit, more reliable positioning technologies into their slitter operations. Compared to more traditional linear positioning methods used, the R-Series Model RF sensor has proven to provide the performance desired without costly downtime, repairs, equipment start up time or wear and tear.

ABOUT MTS SENSORS:

MTS Sensors, a division of MTS Systems Corp., is the global leader in the development and production of magnetostrictive linear-position and liquid-level sensors.



MTS Sensors Division is continually developing new ways to apply Temposonics® magnetostrictive sensing technology to solve critical applications in a variety of markets worldwide. With facilities in the U.S., Germany, Japan, and China, MTS Sensors Division is an ISO 9001 certified supplier committed to providing customers with innovative sensing products that deliver reliable position sensing solutions.

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