

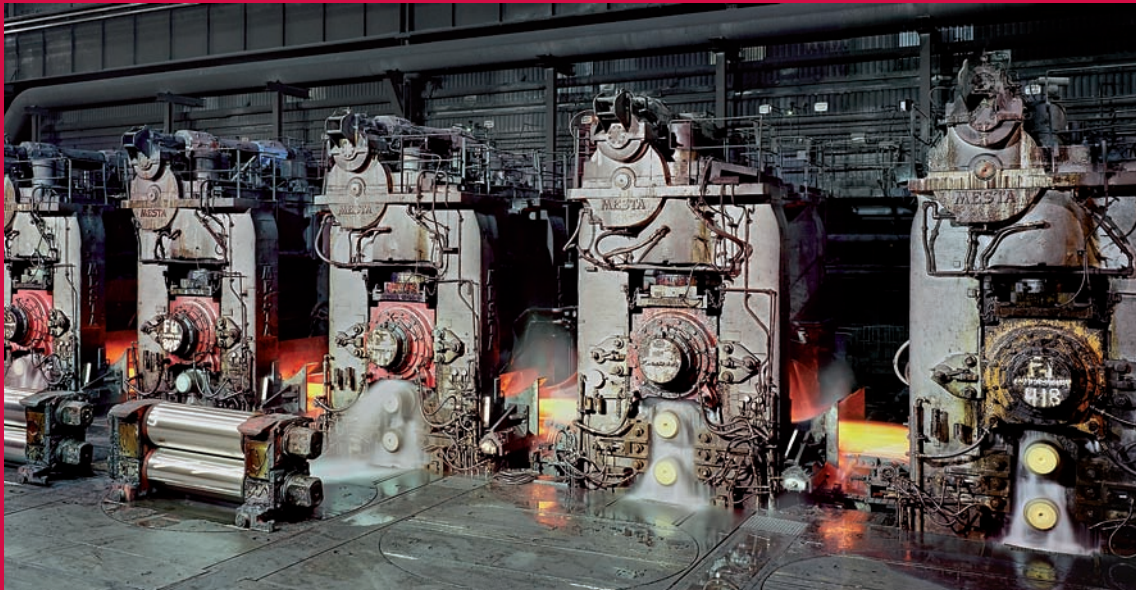
# Temposonics<sup>®</sup>

## *Magnetostrictive Linear-Position Sensors*

Absolute, Non-contact Position Sensors for



# *ROLLING MILL TECHNOLOGY*



*The Measureable Difference*

## Tight Tolerances

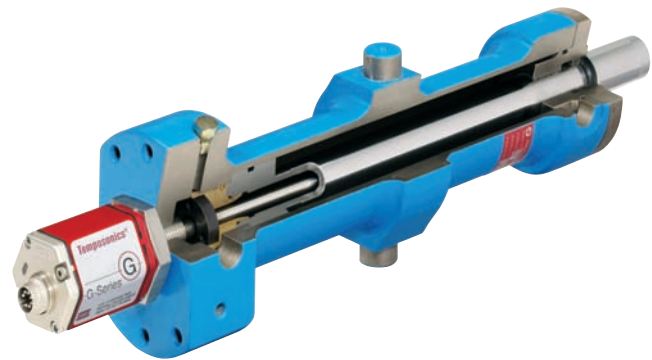
The demands on hot or cold rolled steel products are high. The thickness tolerances are subjected to strict, international standards, which must be met or even exceeded in the field. At the same time the surface texture of the products have to be extremely homogeneous.

Hydraulic controlling systems adjust the rollers during the rolling process by horizontal and vertical displacement. During the roller positioning, high accuracy is essential. Temposonics magnetostrictive linear-position sensors are reliable, precise and dynamic in this rugged environment. They are a cost-effective alternative to other measuring systems, such as linear encoders.

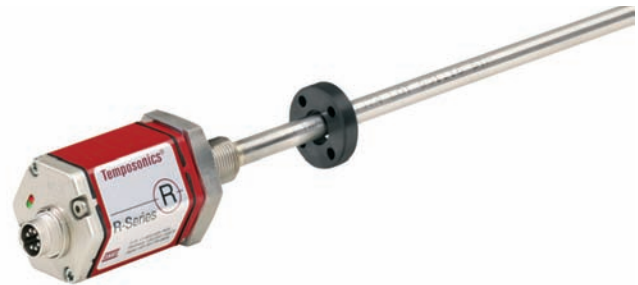
## Durable in a rugged Environment

For direct-stroke measurement MTS has developed position sensors which can be integrated into the hydraulic cylinder as well as mounted externally. The pressure-resistant sensor pipe protects the sensing element containing the ferromagnetic waveguide that carries the measuring signal. A passive position magnet moves without contact and wear along the sensor pipe and indicates the position through the wall of the pipe.

The robust design and the non-contact measuring principle reduce the time for maintenance and downtime. Despite hits during the rolling process, Temposonics linear-position sensors are shock and vibration resistant and continue to perform well in these extreme conditions.



**Temposonics G-Series linear-position sensors offer enhanced diagnostics and programming capabilities.**

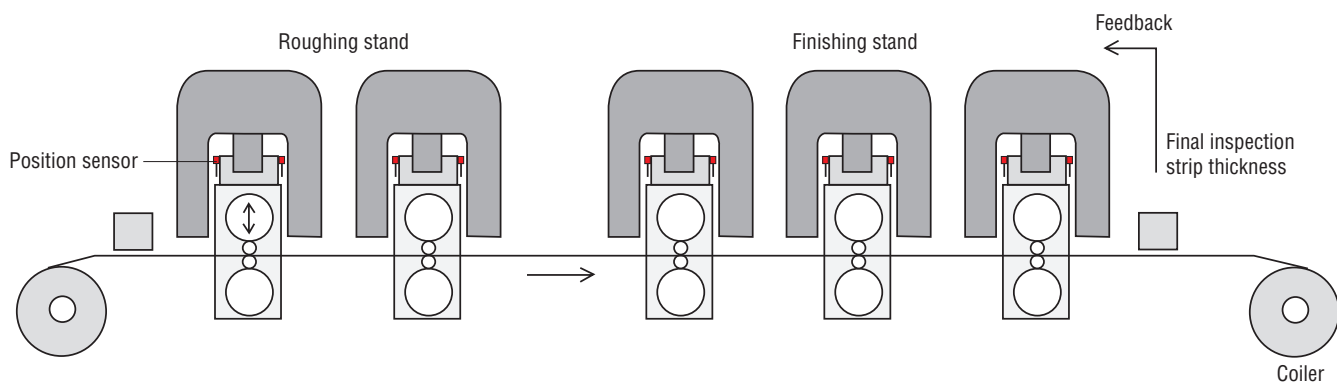


**Temposonics R-Series linear-position sensors for continuous operation in harsh conditions. Output/Interface protocols include SSI, CANbus, DeviceNet, Profibus, DP and EtherCAT.**

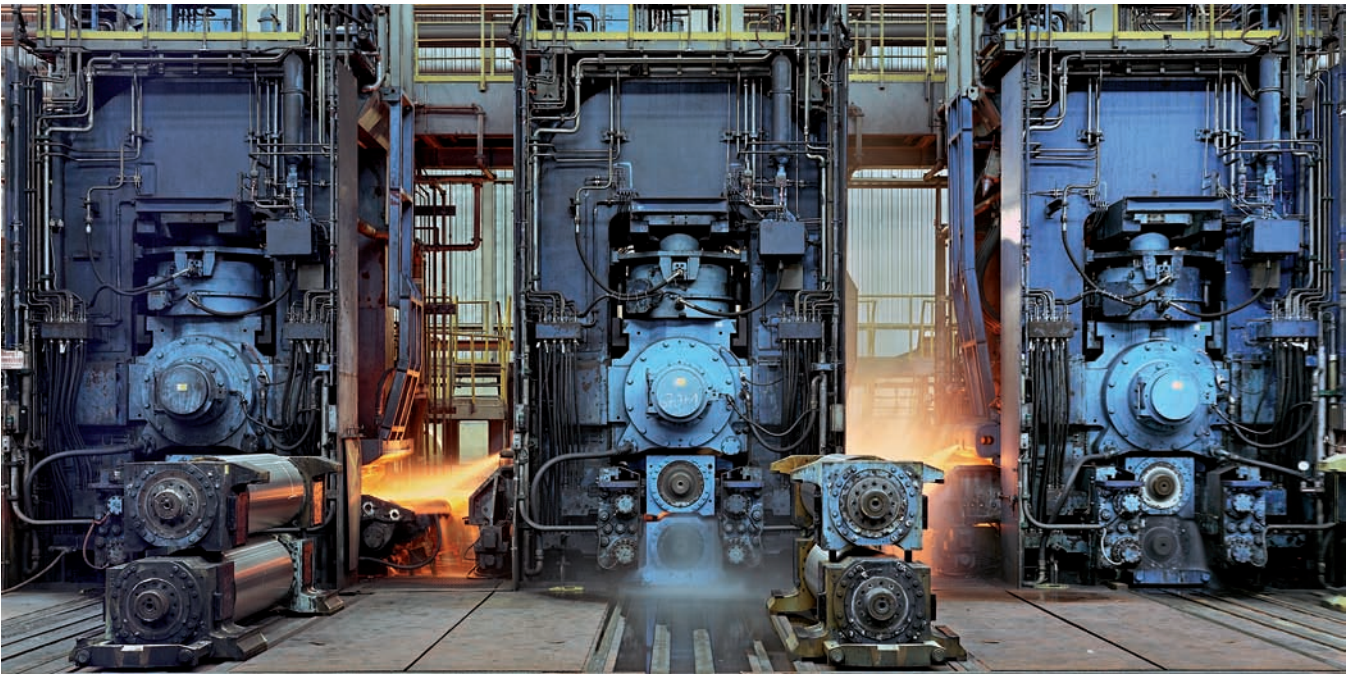
## Applications

Rugged Temposonics sensors measure the position

- Of the working roller for hydraulic gap control
- To control the width of the strip
- For lateral support and alignment of the entering rolling stock
- Of the pressure roller at the winder
- For the roller changeover.



**Rollstand with hydraulic gap control at a cold rolling mill**



### ***Precise Roller Positioning***

Temposonics position sensors offer accurate measurement signals and minimize system related delays for a precise, dynamic control. This performance is critical for accurate roller positioning and roller gap control. The standard resolution for position and velocity is 1  $\mu\text{m}$  and 1 mm/s respectively.

For maximum accuracy the linearity correction option produces linearity down to  $\pm 20$  microns. Due to a repeatability  $<\pm 0.001\%$  of the full stroke, reference points can exactly be defined, stored and recalled for targeted positioning of the rollers.

### ***Cost-saving Alternative***

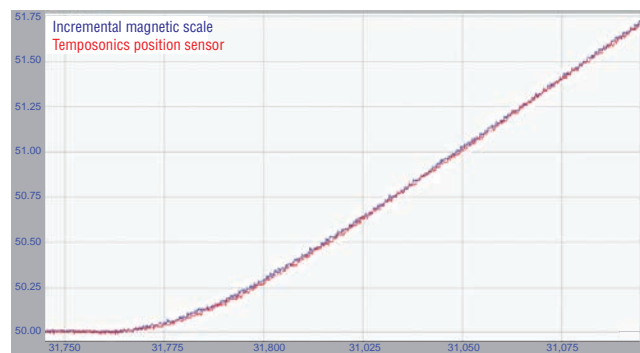
Temposonics magnetostriction linear-position sensors increasingly replace the widely-used incremental measuring systems. Major OEMs engaged in the rolling mill process already accept them as an attractive alternative. In direct comparison, both transducers show the same accuracy. But the sensors by MTS are the more cost-efficient solution due to a cheaper initial investment and their longer life cycle.

Temposonics linear-position sensors are easy to install. All parameters are preset according to the order specifications, thereby avoiding a time-consuming on-site calibration. The sensor head contains the whole electronics. When maintaining the machine the electronics head and the sensing element can be easily and quickly removed from the installed sensor rod just by loosening two screws.

### ***Sample Rates up to 10 kHz***

Temposonics R-Series SSI sensors provide high quality, synchronous position measurement suitable for displacement, velocity and acceleration control and enhance the quality of the finished roller product.

To fulfill high, dynamic requirements, the sampling time for the measuring value is shortened so the controller can read the position values out with an update frequency up to 10 kHz - independent of the measuring length.

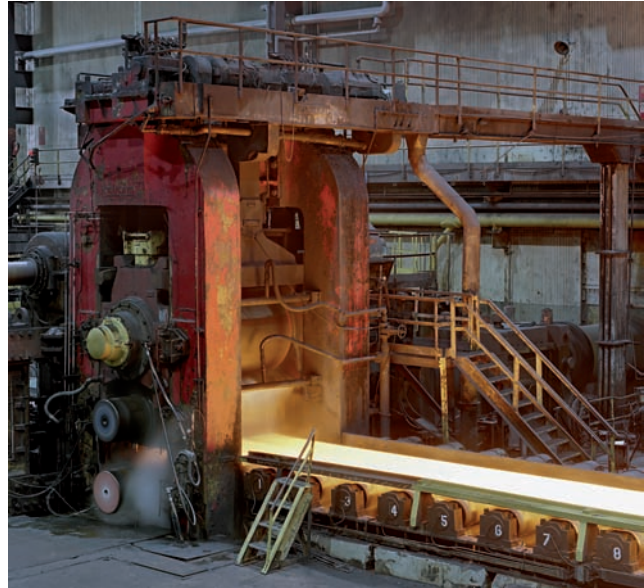


**Comparison of position signals at a resolution of 1  $\mu\text{m}$**

## ***All Advantages at one Glance***

Absolute, non-contact Temposonics linear-position sensors satisfy with a whole range of advantages:

- Easy installation
- No calibration
- Sealed against dirt (no connection for compressed air necessary)
- Long life cycle
- Non-contact and no wear (no friction)
- Maintenance free
- Resolution 1 micron
- Jitter 1 micron
- Absolute measurement: no position loss after emergency stop or power failure
- Shock and vibration resistant
- Competitively priced



**High precision roller displacement and accurate control of the strip thickness enable tight tolerances.**

Photos courtesy of Uwe Niggemeier

**Part Number: 551168 Revision A 03-09**

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All Temposonics sensors are covered by US patent number 5,545,984. Additional patents are pending.  
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