Sensors for steelworks

Proxitron

SENSORS MADE IN GERMANY

Sensor technology at the highest level

Sensors for steelworks

Over 40 years of experience

Development and production exclusively at our site in Germany

Sensors specifically designed for the steel industry

Reliable also under extreme conditions

Maintenance-free

Long lifetime

Customized versions to fit individual needs

Certified quality

We never compromise when it comes to quality. We place the highest value on quality in the selection of material, the design and manufacture of our products.

Sensors for steelworks

Sensors perfectly adapted to extreme conditions

Piros Infrared Sensors (Hot Metal Detectors)

Infrared sensors (Hot Metal Detectors) detect hot objects by using the infrared radiation emitted by hot materials. Proxitron temperature switches are characterized by their extremely robust and maintenance-free housing. They withstand for years harsh working conditions such as water vapour, smoke, vibrations and radiated heat, as well as consistent high ambient temperatures. Hot Metal Detectors of the OX series can be parameterized in a teaching mode and offer the possibility to set different behaviours for multiple outputs, as well as an offset function with different response and switch-off temperatures, or an alarm function. The sensor is equipped with a comfortable software interface to meet the needs of Industry 4.0.

Versions:
· with fibre optic cable
· cooling housing
· different designs

Unique features

· response temperature of 100 °C up to 1000 °C
· object temperature of 150 °C up to 1800 °C
· fast response time (0,3 ms/1500 Hz)
· software based configuration
· test / alarm function
· fully parameterizable outputs
· automatic object temperature detection (Teach)
· bus compatible (MODBUS)
· great selection of accessories for mounting, cable protection,
· adjustment and dirt protection
· maintenance-free

Light barriers

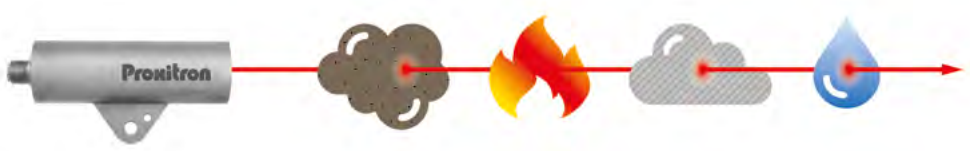
Proxitron light barriers achieve a very high range, even in a dusty and dirty environment. Depending on the application area, Proxitron offer through-beam light barriers, retroreflective sensors, or diffuse sensors. Proxitron through-beam light barriers are ideal for the detection of hot and cold objects. Since the receiver reacts only to the modulated light signals of the transmitter, these sensors cannot be influenced by any other stray light. They are also insensitive to the infrared radiation coming from other heat sources and therefore can be used to track material inside furnaces. Versions in compact stainless steel housing (with or without cooling jacket) are available, as well as fibre optic cable versions for use in hot environments without cooling.

Versions

· through-beam light barrier
· retroreflective sensor
· diffuse sensor
· Laser light barrier
· light grid
· with cooling jacket or fibre optic cable and separate optics

Unique features

· max. range 2500 m
· for ambient temperatures up to 600 °C
· fast response time (1ms/1000 Hz)
· contamination control
· high functional reserve
· LED signalization
· complete range of accessories



Sensors for steelworks

Sensors perfectly adapted to extreme conditions

Laser Distance Sensors and Lidar

With its Laser distance sensors and LiDAR sensors Proxitron sets new standards in path and distance measurement. As the best of its kind, the Laser distance sensor measures distances of up to 200 meters, precise and confident. Even at ambient temperatures of 200 °C the water-cooled model is not disconcerted given its stainless steel cooling housing. The LiDAR sensors offer a cost-effective alternative to the laser distance measurement. On top of that, Proxitron sensors face object temperatures of up to 1300 °C. Maximum performance guaranteed with both sensors for use in steel plants and rolling mills.

Versions
· with or without cooling jacket

Unique features
· measurement distance up to 200 m
· high accuracy (± 1 mm)
· ambient temperatures up to 200 °C
· object temperatures up to 1300 °C
· accurate measurement of moving objects
· freely adjustable digital outputs
· easy parameterization via software
· bus compatible

Pyrometers

Pyrometers enable a non-contact temperature measurement on objects through detection of infrared radiation. The intensity of the infrared radiation depends on the temperature of an object. The incoming infrared radiation is converted into an electrical signal whose size changes in relation to the radiation intensity. Therefore, this electrical signal is directly proportional to the temperature of the object and can be used as a measurement value. An integrated microprocessor processes the measured value and provides a linearized industrial analog output signal. Customized pyrometers are available for different applications in the steel industry.

Versions
· compact or with fiber optic cable
· optional cooling housing
· several designs

Unique characteristics
· for object temperatures from -40 up to 2500 °C
· measurement through flames possible
· for metal, non-metal, glass
· robust and maintenance free
· resistant to shock and vibration
· various optics available

HMD Loop Scanner

The Proxitron infrared loop scanner detects hot material and measures its position with high precision. The integrated, maintenance-free CCD line detects hot material even under the toughest conditions. No matter whether it is a large slab or a thin wire. The loop scanner scans a narrow measuring area contactless and detects the exact position of wire, sections or rods even through dust and steam. With the analog output it is possible to adjust speed downstream as for example in the case of loop control, centre the hot material or determine the position of hot material of any kind. Furthermore a switching signal provides information on the presence of hot material in the scan area.

Unique features
· robust housing with water cooling
· ambient temperature up to 120 °C with cooling
· object temperature from 600 °C
· reaction time 3 ms
· integrated sensor function test
· 1x switching output (NPN / PNP)
· 1x analog output 4 - 20 mA or 0 - 10 V
· maintenance-free

Inductive Proximity Switches

These sensors have been designed for ambitious applications in steel mill areas. The high switching distance allows the metal detection where other sensors are overstrained. High ambient temperatures or chemical environments are no problem for these sensors. The ProxiTeach function is available for most versions: they learn the installation conditions and the influence of surrounding metal on their magnetic field; by one touch the sensor adjusts its operating distance automatically, which provides safe object detection and stable operation. The key benefit of a proximity switch is that it is not sensitive to water or pollution.

Versions
· various designs
· any cable length available
· different switching or analog outputs available

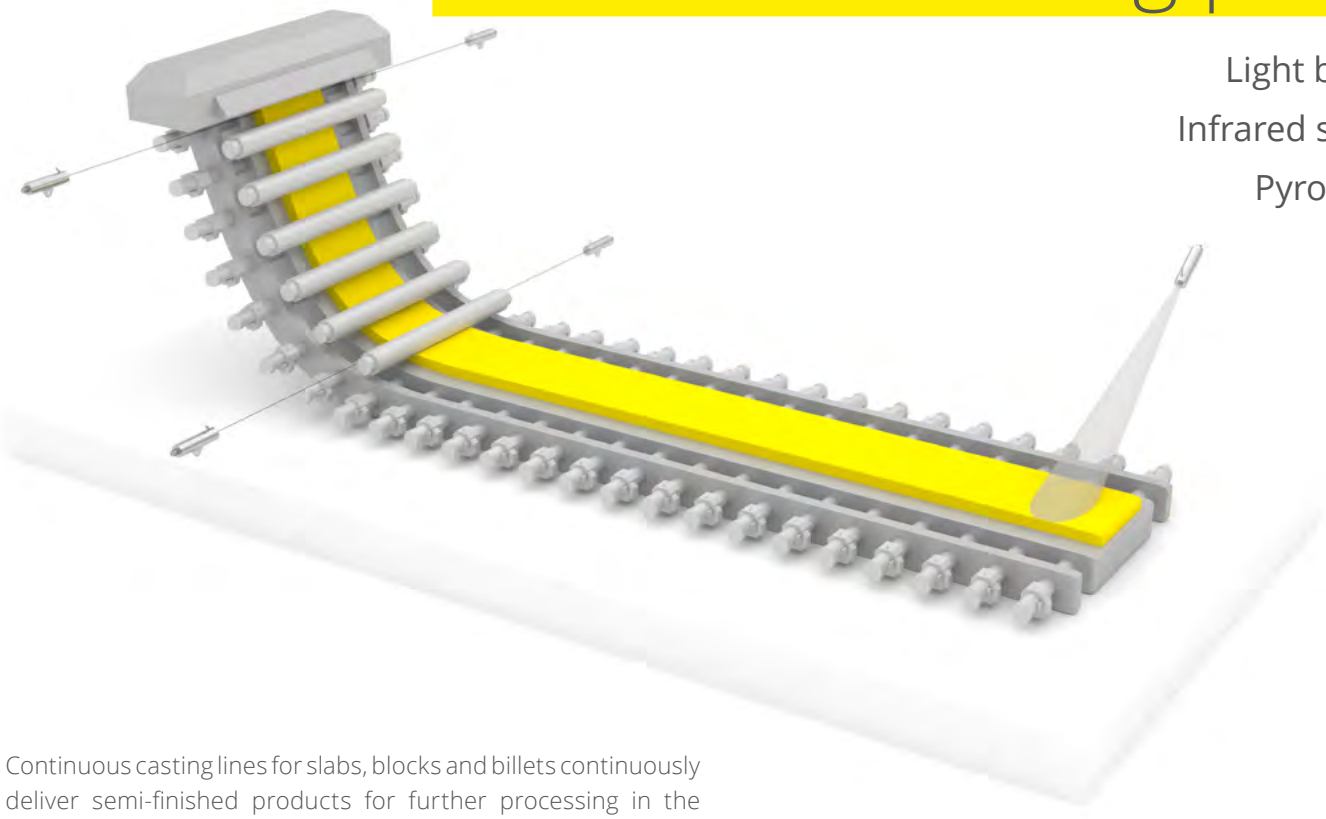
Unique features
· ambient temperatures up to 230 °C
· sensing distances up to 250 mm
· resistant to humidity and rapid temperature changes
· suitable for aggressive environments (chemical)
· suitable for applications in hot and cold rolling mills

Continuous casting plants

Light barriers

Infrared sensors

Pyrometers



Continuous casting lines for slabs, blocks and billets continuously deliver semi-finished products for further processing in the rolling train. Proxitron light barriers and Piros infrared sensors are ideal for material recognition and monitoring in the area of the cut-to-length machine, and for the dummy bar detection. Pyrometers allow for accurate non-contact temperature measurement on materials up to 2500 °C.

Applications, advantages

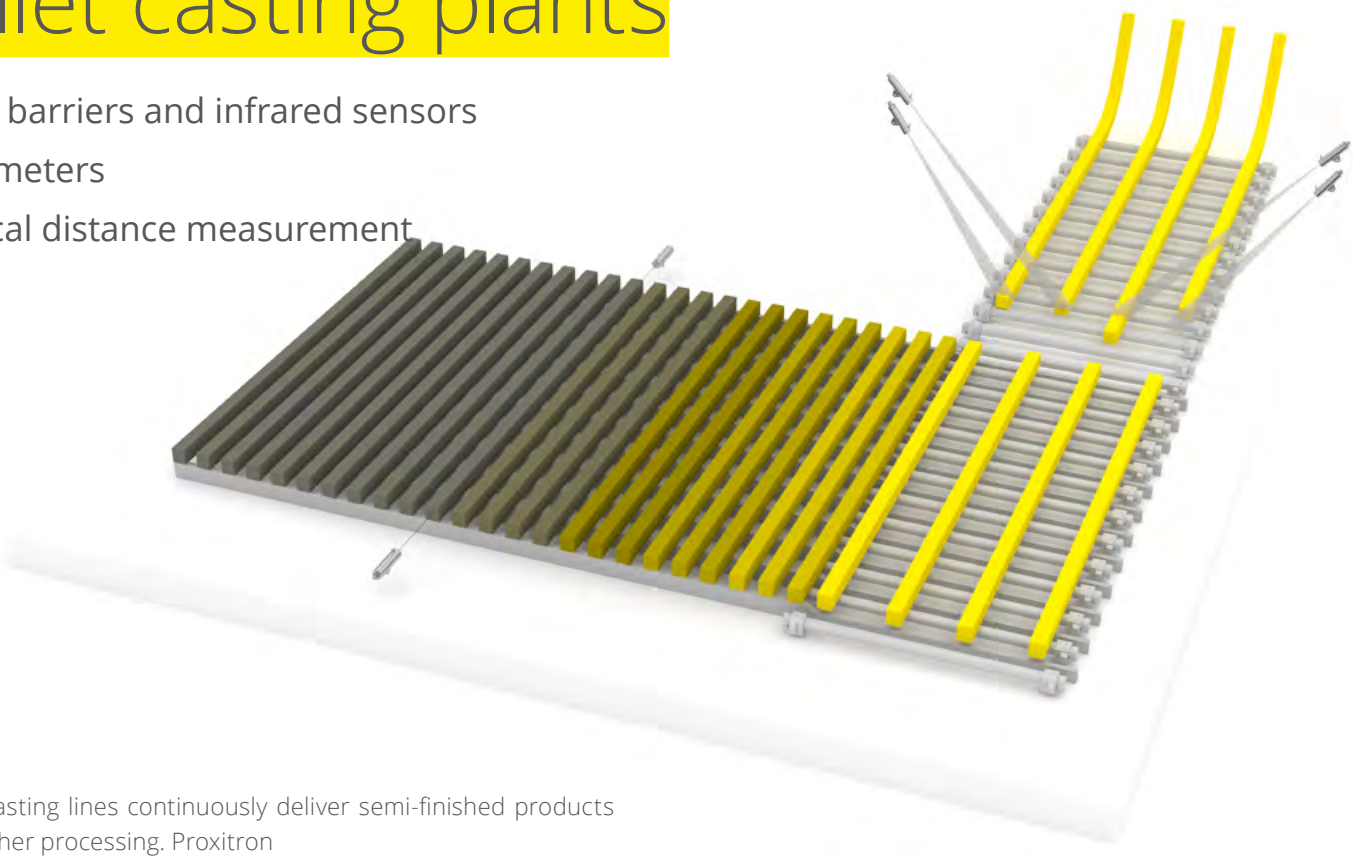
- Edge control of slabs in cutting machines
- Material detection at continuous casting
- Infrared sensor with adjustable response temperature
- Light barriers with very high resistance to pollution
- Pyrometers up to 2500 °C with 0,5% accuracy
- Versions with cooling jacket or separate fibre optic cable and optics for installation in the hot area
- Extremely robust and maintenance-free

Billet casting plants

Light barriers and infrared sensors

Pyrometers

Optical distance measurement



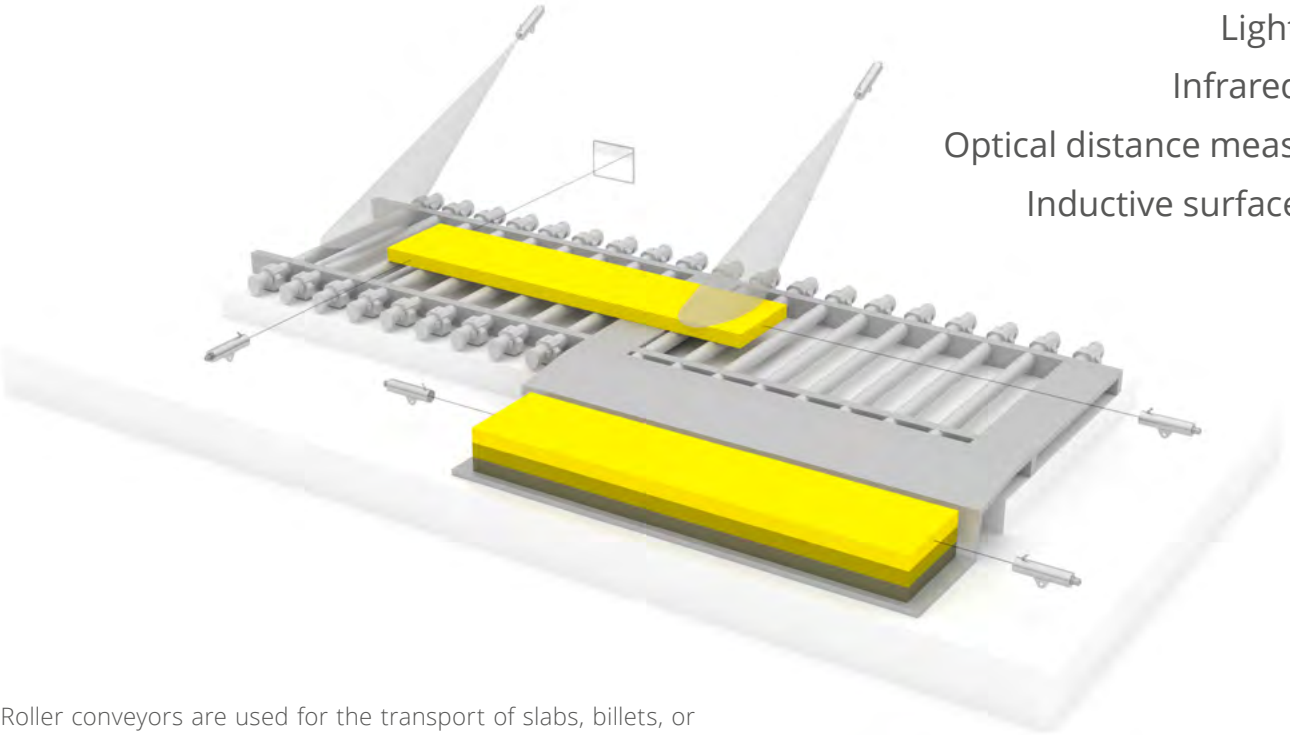
Billet casting lines continuously deliver semi-finished products for further processing. Proxitron infrared sensors with optical fibre cable and separate optics, as well as pyrometers, are ideal for material detection directly in the hot area of the billet casting line. The cooling bed is a typical application for Proxitron light barriers, for material tracking over the bed or at the end positions. Light barriers can detect both hot and cold material and work undisturbed by contamination thanks to their functional reserve.

Applications, advantages

- Billet detection at burr remover
- Distance measurement at the marking machine
- Material tracking over cooling bed
- Infrared sensor with adjustable response temperature
- Light barriers with extremely high resistance to pollution
- Pyrometers up to 2500 °C with 0,5% accuracy
- Accurate distance measurement on hot material
- Extremely robust and maintenance-free

Rolled material on roller beds

Light barriers
Infrared sensors
Optical distance measurement
Inductive surface sensors



Roller conveyors are used for the transport of slabs, billets, or sheets in steel mills and hot rolling mills. Depending on the rolled product, single loads of up to 30 tons or more can be conveyed. In hot rolling mills, for example, the rolled product should never stop, otherwise the conveyor rolls could get damaged. Therefore, the rolled product is constantly in movement until it is cooled down or it has arrived at the next processing step. The movement, positioning, and control of the rolled product must be continuously monitored and checked.

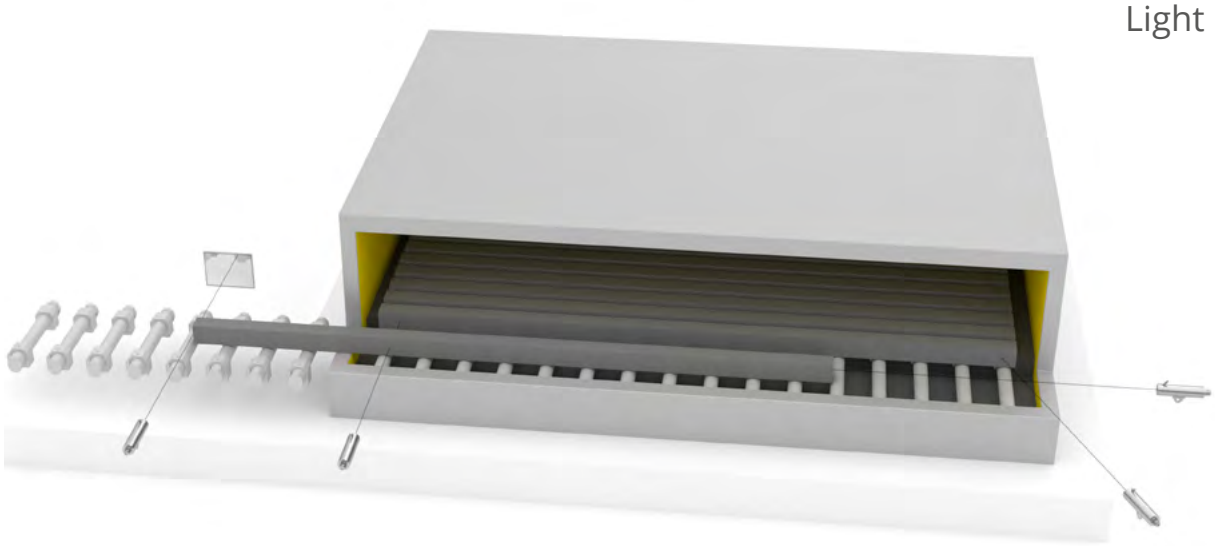
Proxitron light barriers and infrared sensors are well suited for material detection and monitoring in the area of the roller conveyor. The position or dimensions of the slab can be determined and measured through optical distance measurement or with a LiDAR sensor.

Applications, advantages

- Distance measurement at conveyor end
- Pile height control in slab warehouse
- Infrared sensor with adjustable response temperature
- Light barriers with extremely high resistance to pollution
- Versions with cooling jacket or separate fibre optic cable and optics for installation in the hot area
- Inductive proximity switches monitoring the entire conveyor width
- Accurate distance measurement on hot material
- Extremely robust and maintenance-free

Reheating furnaces

Optical distance measurement
High temperature proximity switches
Light barriers



The reheating furnace is a fundamental component in many production processes for the manufacture of semi-finished material. Material which has already cooled down in the previous processing stage needs to be heated up again for further processing. Proxitron light barriers monitor the production process at the reheating furnace and thus assure a smooth and fault-free progression. The reheating furnaces are particularly challenging due to the high temperatures prevailing there. Proxitron light barriers reliably monitor the charging and discharging operations with billets or blooms at the reheating furnace.

The exact positioning can be performed with Proxitron optical distance measurement or diffuse sensors which guarantee safe operation on material with up to 1300 °C temperature.

Applications, advantages

- Material detection in furnaces
- Feeding control at furnace entry or exit
- Monitoring of the furnace door position
- Light barriers unaffected by flames or high temperatures in furnace
- Versions with separate fibre optic cable and optics with no need to cool down the casing
- Accurate distance measurement on hot material
- Inductive proximity switches, up to 230 °C
- Extremely robust and maintenance-free

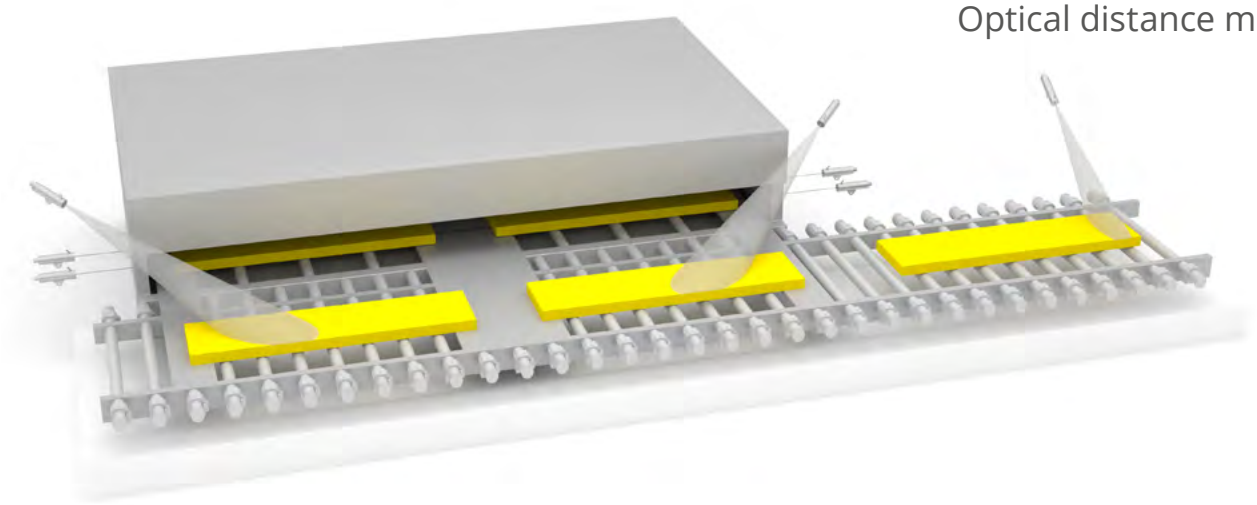
Hot strip and sheet rolling mill

Light barriers

Infrared sensors

Optical distance measurement

Pyrometers



After the semi-finished material - e.g. a block - had been heated to the rolling temperature in a walking beam furnace, it is rolled to a defined measurement in the blooming train. In this area Proxitron infrared sensors or light barriers in the compact version or with fibre optic cable and separate optics suitable for ambient temperature up to 600 °C can be used for material tracking.

Additionally, where detection from the above is difficult due to the presence of water and heavy steam formation, the OIL high-temperature infrared sensor in protective tube system can be used. The protective tube system can be integrated into the roller conveyor from below.

Pyrometers measure the temperature of material up to 2500 °C contactless.

Applications, advantages

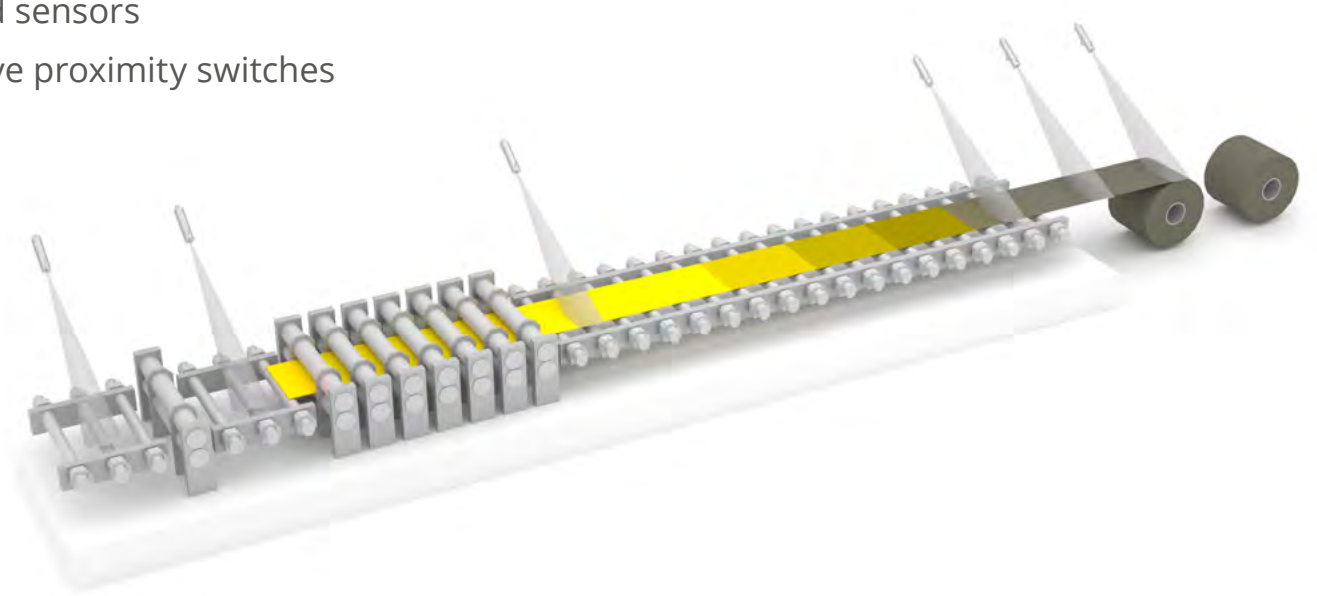
- Crop detection at flying shear
- Distance measurement in charging operations
- Oblique material detection at furnace discharging
- Infrared sensor with adjustable response temperature
- Light barriers with extremely high resistance to pollution
- Accurate distance measurement on hot material
- Pyrometers for temperature measurement also through flames
- Extremely robust and maintenance-free

Finishing train and downcoiler

Light barriers

Infrared sensors

Inductive proximity switches



In hot rolling mills, starting from a semi-finished product - for example a slab - steel is rolled down or reduced to a specific size (flat product) in the blooming train. It is in the finishing train that the rolled product achieves the surface quality which is required for further treatment. At the end of this process, there is often a surface inspection with subsequent cooling section and downcoiler. Proxitron light barriers or infrared sensors are used to detect the head and the tail of the hot strip. High temperature proximity switches from Proxitron resist changing temperatures also under strong water cascades; for this reason they are used worldwide, especially in steel and rolling mills.

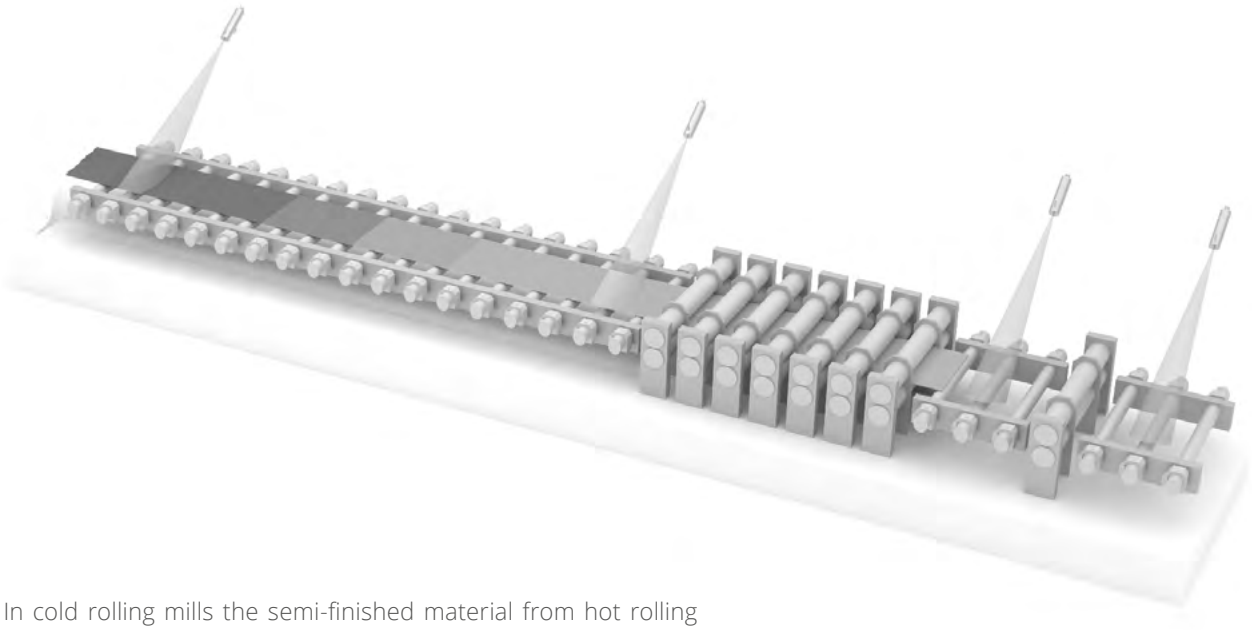
Applications, advantages

- Strip detection at coiler
- Monitoring the gap between the rolls
- Position detection in the annealing line
- Infrared sensor with adjustable response temperature from 100 °C to 1000 °C
- Light barriers with extremely high resistance to pollution
- Inductive proximity switches, up to 230 °C
- Extremely robust and maintenance-free

Cold rolling

Light barriers

Inductive proximity switches



In cold rolling mills the semi-finished material from hot rolling is reduced into very thin plates at ambient temperature. Rolling emulsions, which are used in the most cold rolling processes for surface finishing, place high demands on sensors being exposed to aggressive chemicals. Inductive proximity switches in PTFE housing have a special connection cable and are resistant to these substances. Thanks to their long lifetime, a drastic reduction in down time can be achieved in these applications.
Combined with its light barriers in stainless steel housing Proxitron offers sensors which best suit demanding applications as in rolling mills.

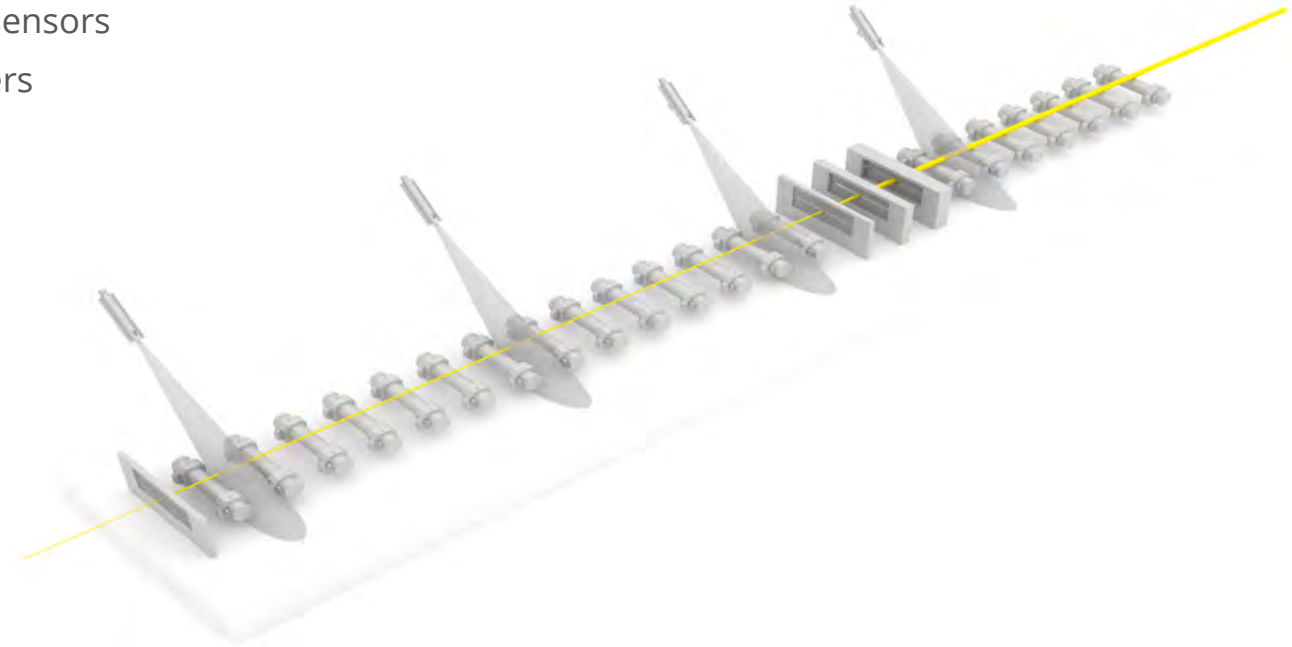
Applications, advantages

- Batch detection
- Position control of continuous steel / strip
- Inductive proximity switches for the PLC
- Light barriers with extremely high resistance to pollution
- Inductive proximity switches with PTFE housing
- Resistance to aggressive cold rolling emulsion
- Extremely robust and maintenance-free

Drawn wire

Infrared sensors

Pyrometers



Wire drawing is an industrial process for the production of a large variety of wires. Wires are first hot rolled and in the subsequent processing steps cold-formed. Different methods have established, as for example deformation under tensile stress, or profile rolling. Infrared sensors are used to monitor possible wire breaks, and to detect the start and the end of the wire, quite reliably even with material velocity up to 30 m/sec.
Because of the high radiated heat and the small dimensions of the rolled product, a sensor solution with separate optics withstanding max 600 °C ambient temperature is recommended. This layout allows for installation and safe detection directly near the wire, thus preventing troubles caused by steam or water. Proxitron pyrometers monitor the manufacturing process and measure the temperature of material up to 2500 °C contactless.

Applications, advantages

- Quick detection of material start and end
- Temperature measurement in the cooling box
- Loop control
- Infrared sensor with fibre optic cable for installation near the hot material
- Loop scanner with analog output
- Pyrometers for accurate temperature measurement on slim, swaying materiall

Monitoring of long products

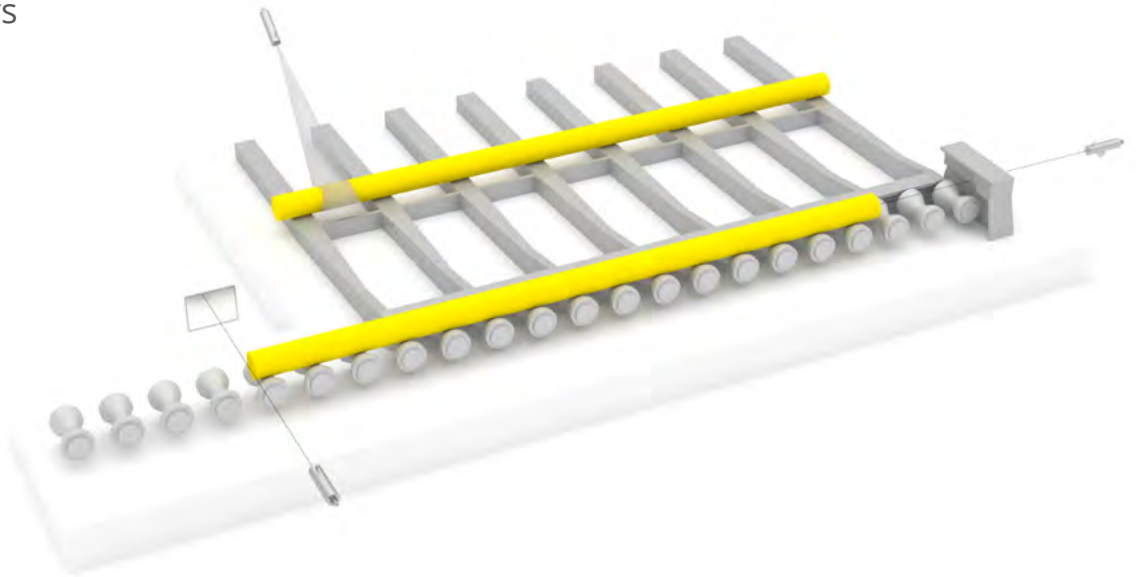
Optical distance measurement

Infrared sensors

Light barriers

Light grid

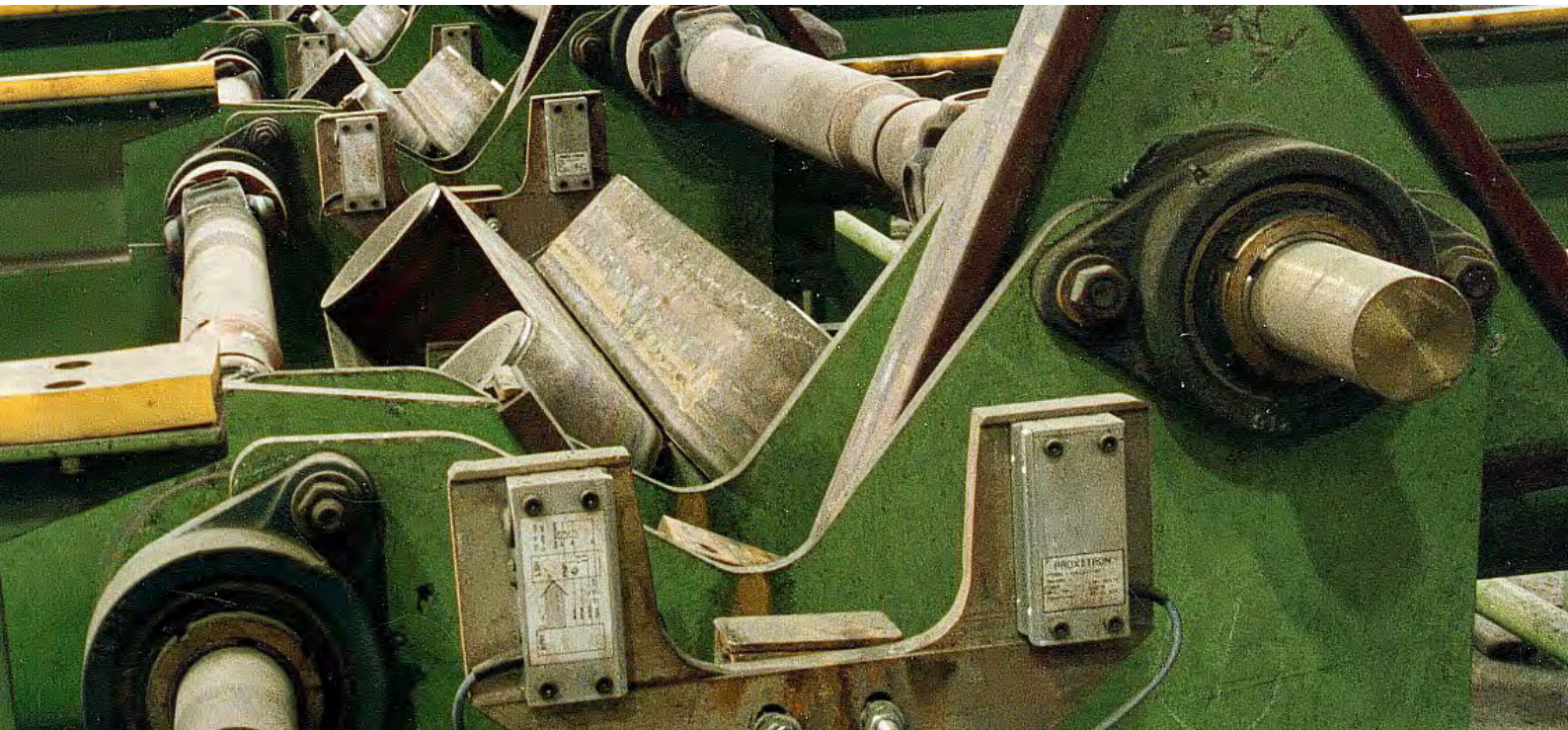
Pyrometers



Long products include a. o. bars, rods, profiles, etc. In the production of long products, in particular during the rolling process and transport - for example from and to the cooling bed - the correct tracking and positioning as well as the length measurement of the rolled product play an important role. Infrared sensors, through-beam light barriers or retroreflective sensors, as wells as diffuse sensors, provide a signal when the long product passes a specific position. Combined with other devices, as for example Proxitron distance measurement, they allow the precise positioning and length measurement of objects with temperature up to 1300 °C.

Applications, advantages

- Tube positioning at roller conveyor end
- Length measurement for different tube diameters
- Infrared sensor with adjustable response temperature
- Light barriers with extremely high resistance to pollution
- High-temperature reflectors, up to 500 °C
- Pyrometers for accurate temperature measurement starting from 100 °C
- Accurate distance measurement on hot material
- Extremely robust and maintenance-free

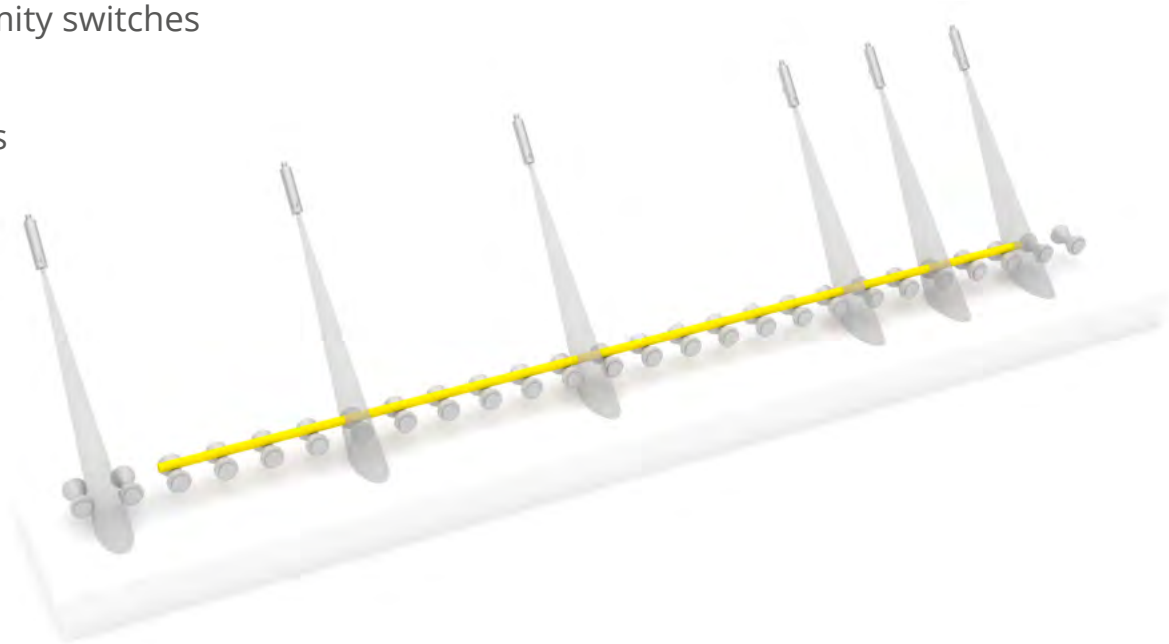


Transport and storage

Inductive proximity switches

Light barriers

Infrared sensors



The transport and storage of warm and cold material in steel or hot rolling mills is a complex operation. In addition to roller conveyor systems, also circulating trolley systems, cold strip lines, lifting bar conveyors, chain conveyors, lifting tables, rotary tables, cavity roller stations, shearing lines and inspection lines are used. Each of these systems has different requirements for object recognition and detection, based on the changing shape after each process, on the function of the process, or on the altered material properties, as to e.g. the temperature or the surface.
Proxitron light barriers and infrared sensors, as well as inductive sensors and proximity switches, are used worldwide in steel and rolling mills. They feature a special design for operation under extreme conditions and long service life.

Applications, advantages

- Tube detection in the finishing line
- Presence detection during coil transport
- Detection of free position in cross feeding system
- Infrared sensor with adjustable response temperature
- Light barriers with extremely high resistance to pollution
- Proximity switches for bar detection
- High operating distance to preserve sensors from mechanical shocks
- Safe operation also with water, fog, snow, vapour or dust
- Versions from -40 °C for outdoor applications
- Proximity switches for the detection of hot objects, up to +230 °C

Proxitron

SENSORS MADE IN GERMANY

Proxitron GmbH . Germany . Telefon: +49 4121 2621-0

info@proxitron.de . www.proxitron.de

P75E 0720