

Monitoring of walking beam furnaces

Light Barriers for position monitoring in industrial furnaces.



Proxitron Light Barrier

Walking beam furnaces are used for heating slabs, billets, or rods prior to the rolling process. The goods which are to be heated are moved inside a walking beam furnace. The temperature in a walking beam furnace can normally reach up to 1,200°C. How can the hot material be detected under these extreme conditions? Hot metal detectors can't help, since the material temperature is not significantly different from the furnace temperature. Proximity switches cannot be used because of the high temperatures involved. Light barriers may be used to avoid costly mechanical solutions that require touching the material directly inside the furnace. Light barriers can detect the positioning and allocation of the goods without contacting them, and can control the movement inside the furnace.

Nevertheless, high background radiation levels and interruptions caused by different layers of hot air complicate object measurement inside tunnel and annealing furnaces. Conventional light barriers are often over-strained in these cases. However, the combination with the 600 series of Piros light barriers has proved to be reliable. These sensors have been used for tracing materials in steel mills for years, and their performance under tough conditions is proven.

The basic version LAA 600 (transmitter) with LSA 600 (receiver) features a barrier range of up to 2,500 m, which guarantees an extremely high level of operating reserves and are designed for ambient temperatures of up to 70° C. The transmitter and receiver are also available with a cooling jacket housing or with a fiber optic cable and separate optics for ambient temperatures up to 600° C, depending on installation conditions.

In a pipe application at the world's market leader for premium pipe solutions, Proxitron successfully installed its LAA 600.3 transmitter and LSD600.38GV receiver together with a fiber optic cable and a OACF 154 optic. The light barrier signal in the system stops the pipe moving inside the furnace and monitors the allocation of the walking beam. The test function of the transmitter enables the function of the light barrier to be tested without detecting an object, which thereby permits simulation of different system states.

In this case, this combination is expanded with the HL 133 furnace window. The Proxitron furnace window prevents possible flame exhaust due to over-pressure to protect the transmitter- and the receiver optics. The contamination control also notifies in case the minimal operating reserves are not reached, thereby enabling timely intervention if contamination is increasing and the light barrier is in danger of malfunctioning. The sensors in this application have proven a completely new standard of reliability and resistance.

At a glance

- max. range 2,500 m
- ambient temperature up to +600° C
- extremely fast (1 ms/ 1000 Hz)
- extremely high functional reserve
- robust stainless steel housing
- simple LED signalling
- contamination control

Accessories

- LLK 4 fiber optic cable (length 4 m)
- OACF 154 optics
- HL 133 furnace window

Technical data LAA 600.3

- Range: 2,500 m max.
- Operating voltage: 10 - 55 V DC
- Housing material: Stainless steel
- Test function: Yes

Technical data LSD 600.38 GV

- Range: 750 m max.
- Operating voltage: 10 - 55 V DC
- Output: PNP normally open and normally closed
- Contamination control output: PNP normally closed, open in case of contamination