

Application Report

No profile – fans off!

Energy saving application with light section sensors from Leuze electronic



LRS 36 switching light section sensors from Leuze electronic offer functionality which has not been available until now. At apt HILLER GmbH, they are used for a simple but extremely effective fan control system in the refrigerated table of an aluminum extrusion press line. The result is enormous energy savings.

In contrast to light scanners, light section sensors do not create punctual light spots. Instead they project a divergent light beam by means of line illumination. This allows the height profiles of objects be determined with an inclined setting angle. In this way, the light section technology offers a large array of functions with regard to safe object detection and a large detection range at the same time. Furthermore, as is typical of all Leuze electronic light section sensors, the transmitter as well as the receiver are integrated in a compact housing (Figures 1a/b and 2a/b).

Reliably detect undefined object positions

In addition to the measuring variants of the Line Profile Sensors (LPS), which measure object profiles and supply 3D information, switching Line Range Sensors (LRS), as they are used at apt Hiller in Monheim, make possible completely new functionality. Comparable to a laser scanner, the devices detect the presence of objects - even in undefined object positions. With its large detection range of up to 800 millimeters, the LRS opens new application fields without complex sensor solutions, sensor combinations or additional evaluation units.

The sensor determines depth and width information and enables the detection of objects on the basis of pre-configuration. To do this, 16 analysis windows and 16 inspection tasks are available which can be set by means of a PC via an EtherNet interface.

Switch on fans only when necessary

"Compared to a switching light barrier, the LRS does not have separate transmitter or receiver components, which makes installation into the refrigerated table very simple", reports Hans-Joachim Hopf from apt HILLER GmbH. He then spoke about the special circumstances when manufacturing aluminum extrusion press profiles. The apt Hiller Group, to which the Monheimer Werk belongs, makes aluminum semifinished products for the most important markets in Europe. The custom profile solutions are produced on the most modern systems with fully-automated process technology. In run-out lengths of up to 60 meters, the profiles are transported via giant cross conveyors to the cold saw roller table (Figures 3a/b).

Cooling between press and saw

At the same time, the cross conveyors function as refrigerated tables on which the roughly 500° C profiles from the press are cooled down to 30° to 40° C. Ventilators which blow air from below through the conveying belts accelerate this process (Figures 4a/b).

The refrigerated table is equipped with four rows of 45 fans. Each fan has a diameter of 500 millimeters. *"All in all, that amounts to a power consumption of around 80 kW, which, depending on the process, runs through from Sunday evening to Saturday after the last shift",* says Hans-Joachim Hopf. However, since the flexible production of different profiles means the refrigerated table is not always equally full, he wanted to

find a solution to control the rows of fans if necessary, to find a way to switch off the fans above which no profile is currently located.

Wide detection range

What Hans-Joachim Hopf needed was a sensor solution that detects the presence of profiles, independent of their strength, form, condition and position. In addition, he wanted a solution which didn't require an opposing installation, like with reflectors or receivers.

Mechanical assembly over the refrigerated table was out of the question for him due to the costs and also because he wanted to avoid configuring the sensors in the hot air stream. Even though the assembly of the sensors under the conveying belts meant the danger that their function could be impaired if the optics were to get contaminated, this solution below the conveying belts was prioritized.

The particularly compact design of the LRS 36 devices made placing them between the fans easier. Furthermore, there was enough distance to the conveying level so that, in the end, widening the light beam up to the transport height of the profiles yielded a sufficiently wide detection range which covers the 500 millimeter "gauge" of the fans.

Result: reduced operating times

Since the Line Range Sensors can detect the existing profiles independent of their position throughout the total detection range, a single sensor per fan row is enough. The profiles, however, are manufactured in differing lengths of at least 20 meters, and depending on the profile type, arches can develop due to normal heat expansion or profiles can be inclined. This is why a second row of light section sensors is installed at a distance of 18 meters. This ensures that profiles are detected by at least one sensor even in the worst case. When neither sensor detects a profile, the fan row is switched off after a short time delay.

"With this energy saving measure, we have reduced the operating time of the fans by about 25%. What that means monetarily for 80 kW of power can be easily calculated", says Hans-Joachim Hopf happily, who has since put his worries about the contamination of the optics to rest and confirms that the function is reliable.

Configuration by means of LRSsoft

LRS Line Range Sensors from Leuze electronic are designed to perform proximity object detection along a laser line. With one individual configuration, a sensor can be

used to detect single or multiple objects. Configuration is done by means of LRSsoft, the software developed by Leuze electronic. It was carried out completely independently in the case of the energy saving application at apt HILLER and all data was transmitted to all sensors used.

The measurement time is 10 ms. The scanning area lies between 200 and 800 millimeters. Data calculation and processing occur directly inside the sensor. With dimensions of 160 x 74 x 56 mm, the devices are uniquely compact, which facilitates the implementation in systems considerably. Zero checks of cases as well as controls to determine if objects or covers are present or, like here, the single or multiple track presence/absence detection on transport paths number among the typical areas of application of the LRS.

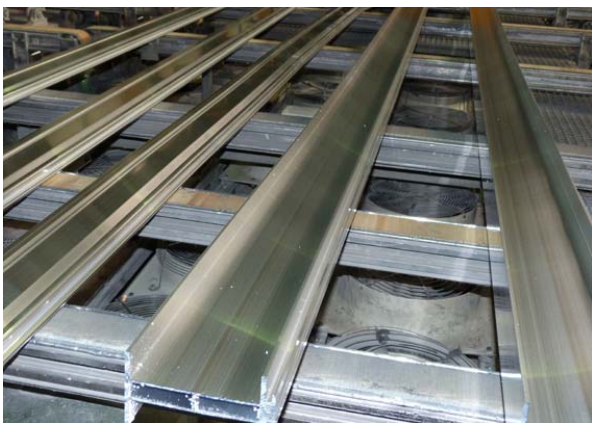
Figures and captions



Figures 1a and 1b. Status display via the OLED display integrated in the sensor housing makes function control possible. The display is also used to set the IP address and as alignment aid.



Figures 2a and 2b. There is enough room between the fans for the compact LRS 36.



Figures 3a and 3b. The aluminum profiles are transported in run-out lengths of up to 60 meters over a refrigerated table to the cold saw roller table.



Figures 4a and 4b. Four rows of 45 fans cool the pressed profiles.

Press inquiries

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