

The sum of all requirements counts

Sensor masters challenges

Dirt, dust, high temperatures and other harsh environmental conditions of a foundry make a considerable difference to sensor technology. On a cooling line for castings a manufacturer of spherical cast parts has successively replaced the existing sensor technology with solutions from ipf electronic, because not only „robust“ is required as a property.

SLR Gußwerk II Betriebsgesellschaft mbH in Steyr (Austria) produces spherical cast parts for utility vehicles. The company's customers include, among others, DaimlerChrysler's truck division, the John Deere agricultural machine manufacturer and the ZF Group.

The spheroidal graphite iron is carried out in special containers, which are filled with sand that is subsequently compacted, in order to obtain a negative mold. After pouring and cooling, the casting is removed, the sand is reprocessed and the container is filled again with sand for the next casting. "For the cooling of the spheroidal graphite iron, we use a separate cooling section, a sort of station, in which the containers have to be transported and positioned in a variety of chain-operated roller conveyors in the run-out. We need particularly robust and reliable sensor technology to check the positions of the casting containers and coordinate their transport on the total of six lanes of the cooling section," explains Christian Beran, the deputy of the maintenance department and responsible for the plant electricity in SLR Gußwerk II.

Problems with range and reflections

The reason why particularly robust sensor technology is required here is obvious, since the devices are not only on the cooling path exposed to extreme temperatures, but also to extreme dirt and dust. In the field of reliability, however, the sensor technology used so far left something to be desired, as Christian Beran reports: "In the past, we used conventional inductive proximity switches to position the cast containers. After a relocation these were no longer usable since the range was too small. For the detection of the containers, we need at least a sensing range of about 20 centimeters. As an alternative to this, we initially decided to use optical sensors, which, however, had difficulties due to the partially reflecting side walls of the casting containers."

Robust solution with decisive properties

Several years ago, an application specialist from ipf electronic recommended to replace the existing diffuse reflection sensors with the optical sensors of series OT43. As it is always worth trying, the previous sensors were replaced by OT430423 devices in some areas within the container station. These optical sensors, which operate with pulsed red light provide a compact design (transmitter and receiver are in one unit), have a robust plastic housing in IP67, are suitable for the use in a temperature range of -25°C to +65°C and convince by a sensing range of 30 to 500mm. An advantage for the application described here was also the fact that the sensors are capable of recognizing materials in the sensing region independently of their degree of reflection, as far as both the color and the surface of the object to be detected are concerned.

This is based on the operating principle that the receiving elements of the optical sensors evaluate the object position from which the incident transmitted light is reflected. Thus, a statement is possible as to whether an object is within the selected detection or switching area, always provided that the object surface, in this case the side walls of the casting container, adequately reflect the incident transmitter light. The effective sensing range of the OT430423 therefore doesn't depend on the object to be detected, but only on the previously set sensing distance.

New solution replaces successively old equipment

The optical sensors of ipf electronic that are allocated to various areas of the cooling line up to now are connected to the system's PLC. If a casting container is located at a desired position, it is detected by one of the diffuse reflection sensors. Via a corresponding message to the system's control, its position is confirmed or the transport of the container within the station coordinated.

The first OT430423 devices were installed around 4 years ago. Since the beginning of the renovation work, there are nine sensors now, and in the end, all of the old devices are to be replaced by the optical diffuse reflection sensors from ipf electronic, as Christian Beran is completely satisfied with the new solutions: "These sensors prove to be particularly dirt-resistant. In addition, its comparatively wide sensing range is also advantageous, whereby the necessary range of 200mm upwards has been chosen somewhat more generously in order to ensure an absolutely safe detection of the casting containers."

According to the company's electrician, it is particularly important that the diffuse reflection sensors are suitable for the use on differently reflective materials: "This is an immense plus because the casting containers have different reflective properties. Such reflections, especially on new casting containers, which have been introduced into the system, have always caused problems with the previous devices when querying the container position. Problems we do not have any longer."

This is reason enough to gradually replace all older sensors that have been used so far in the coming years with ipf electronic's optical sensors. "In the end there will be about 30 devices", says Christian Beran.

Image captions:

ipf electronic_SLR-Gusswerk_001:

The cooling section runs over a total of 6 lanes, on which the casting containers are transported and positioned in the run-out.



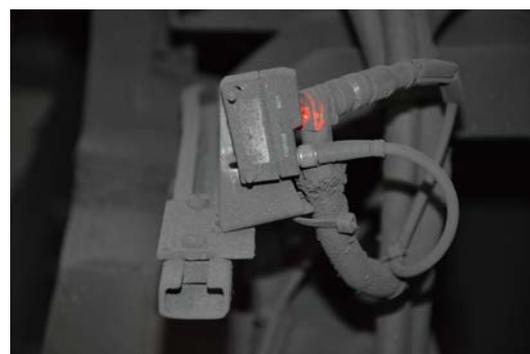
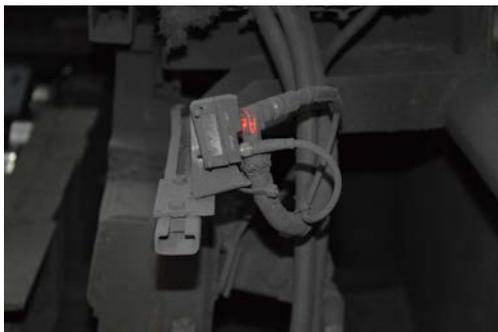
ipf electronic_SLR-Gusswerk_002/ipf electronic_SLR-Gusswerk_003:

At this position within the station, the sensors must detect the presence of a casting container.



ipf electronic_SLR-Gusswerk_004/ipf electronic_SLR-Gusswerk_005:

The OT430423 sensors operate reliably, despite of extreme dirt and dust.



ipf electronic_SLR-Gusswerk_006:

The optical sensors are connected to the system's PLC in order to confirm the castong containers' position within the cooling section via the positional query and, on the other hand, to coordinate the transport of the containers.



ipf electronic_SLR-Gusswerk_007 (Abbildung):

Not only robust, but also reliable under adverse ambient conditions: The OT430423 with protection class IP67 is suitable for application temperature ranges from -25°C to $+65^{\circ}\text{C}$ and reaches a sensing range of 30 to 500mm.

