HARTING, SICK AND B&R – A STRONG COOPERATION FOR DIGITALISATION IN ROBOTICS

HARTING
Pushing Performance
Since 1945

THE COMPANY:
KUKA

SECTOR:
Robotic

TECHNOLOGY:
Single Pair Ethernet (SPE)

KUKA

THE CHALLENGE

Too many languages and dialects.

With regard to the worlds of operational technology (OT) and information technology (IT), which are still largely separate today, different systems are used to pass on information. IT has always relied on Ethernet, while the robot usually connects with the OT field level by way of a BUS system. The problem is that there is an almost incalculable range of BUS protocols for the most diverse application scenarios. While some of these protocols already use Ethernet, there is no universal compatibility, meaning that translators have to be used. This requires a great deal of coordination, while real-time communication in the millisecond range is difficult to realise.

On the way to seamless communication of the robots from the sensor to the cloud, this system break has so far stood in the way. New approaches are therefore needed to advance robot communication not only vertically but also horizontally to a new level of Industry 4.0.

> **THE APPROACH: Availability of maschine data.**
> KUKA is taking this approach: the manufacturer is making robot data available for specific applications such as asset management, troubleshooting, condition monitoring or diagnostics.

THE SOLUTION

Basically, networking is based on general IIoT principles: Sensors or interfaces to existing PLCs send the data via cable or radio to a gateway that establishes the connection to the internet and sends the sensor data to a cloud platform. The gateway is frequently so-called edge device with its own computing capacity.

Connectivity specialist Harting, sensor manufacturer Sick and OPC UA expert B&R have thought ahead to a possible future solution for networking robots with the cloud. The solution, which can also be retrofitted and is readily scalable, is based on the three pillars of:

1. State of the art Sick sensors, for collision monitoring, for example, can pass on information on sizes and shapes in addition to the actual object position. This enables a robot to regulate its working speed and adapt to the environment.

2. Harting Single Pair Ethernet cabling that connects the sensor with an IIoT gateway. The new industry standard SPE enables a maximum bandwidth of 1Gbit/s with only one pair of wires. SPE is a robust and materials-saving Ethernet cabling that is intended to replace the fieldbuses over the long term that have prevailed to date.

3. The standardised OPC UA over TSN serves as the transmission protocol, which expands the Industry 4.0 standard OPC UA by adding real-time capabilities. The "Open Platform Communications Unified Architecture" offers cross-manufacturer communication from sensors via gateways to the processing IT systems situated in the backend or in the cloud. Here, TSN makes OPC UA real-time capable.

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THE RESULT

The bottom line is an IIoT solution consisting of compact and smart sensors, a resource-saving and cost-efficient infrastructure and a universal Ethernet protocol with real-time capability.

Three strong pillars that will enable manufacturers to seamlessly network robots from the sensor to the cloud in the future and integrate them into new production processes.
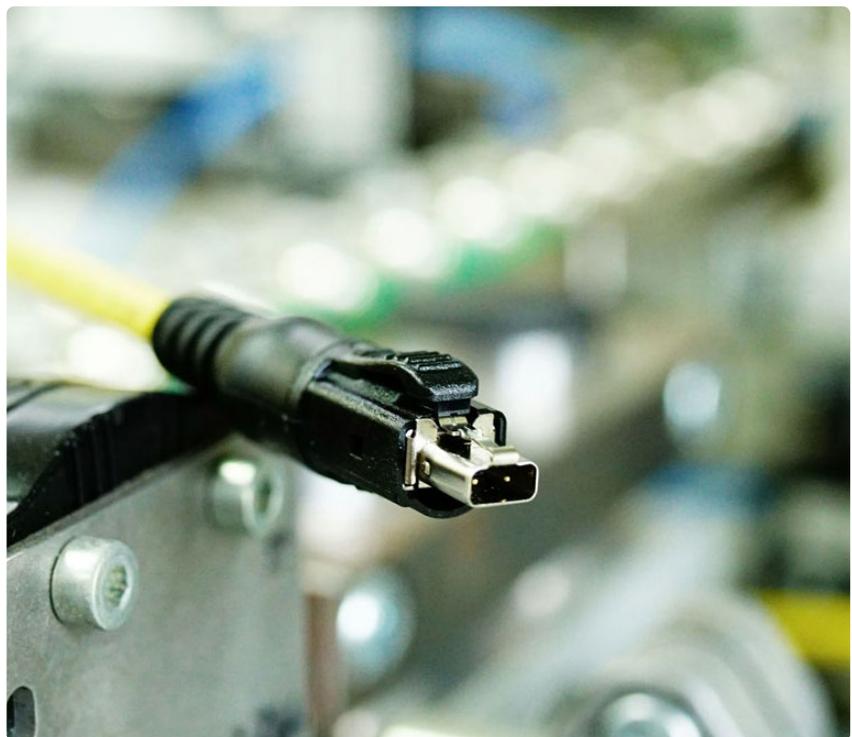
B&R

SICK
Sensor Intelligence.

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Robotics

Robots are playing an important role of modern industrial pruduction. Parts handling, welding processes, Co-work units with employees and much more. In all applications, processes were continously optimised with the survey and processing datas from the edge. New, smart sensors, a small data infrastructure and a universal protocol are the key elements for bringing industrial factorys into the IIoT era.