

Digital upgrade with IO-Link

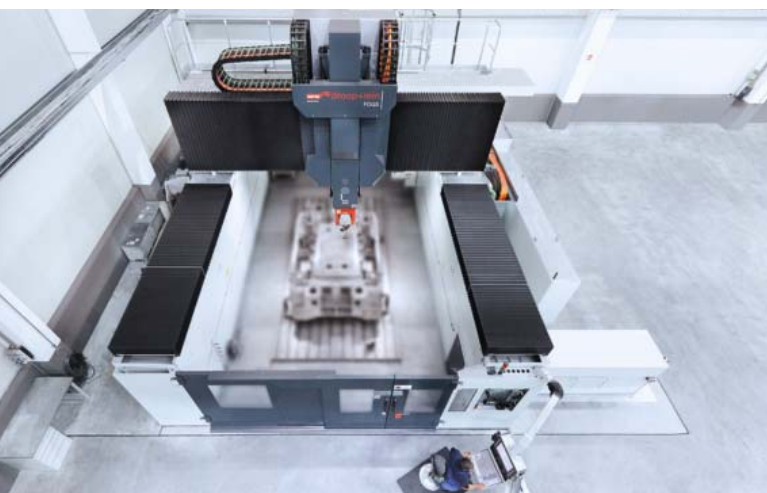


More information from the sensor

The implementation of Industry 4.0 is, among other things, about creating a digital silhouette of a plant, thus allowing for process optimisation.

The essential information is provided by many sensors that are already installed for machine control anyway. Thanks to IO-Link, these sensors provide much more data than mere switching signals or analogue values.

The Droop+Rein product area of Starrag Technology GmbH in Bielefeld manufactures portal milling machines for the international market.



Starrag Technology GmbH is a company based in Bielefeld that produces machine tools and extensively equips them with IO-Link sensors from ifm electronic.

The FOGS-series portal machining centre from Starrag Technology GmbH is a machine that has these features. It is used in mechanical engineering and in the aviation and automotive industries, for example, to manufacture body shell parts. The machine in the picture is used to process chassis components (landing gear) in the aviation industry.

These complex machine tools require sensors to monitor all media (e.g. coolants and lubricants, hydraulics, machine temperature control). Tight tolerances are required for medium temperatures, pressure values and volumetric flow quantities to ensure that tools are used with optimum efficiency in fully automated production processes.

■ Sensors with digital interface

IO-Link is a robust digital interface based on 24 V signal levels that, in addition to mere switching signals, enables bidirectional communication with the controller via the



IO-Link sensors provide data for optimum machine control.

regular sensor cable. The sensors transmit digital measured values and diagnostic information via IO-Link to the IO-Link master, such as an IO module, gateway or a PLC equipped with IO-Link ports. The sensors are connected with standard M12 connectors. Screened cables and associated grounding are no longer necessary.

Starrag Technology GmbH opt for fluid sensors from ifm electronic. The reason: The sensor specialist offers the largest product range of process sensors featuring IO-Link.

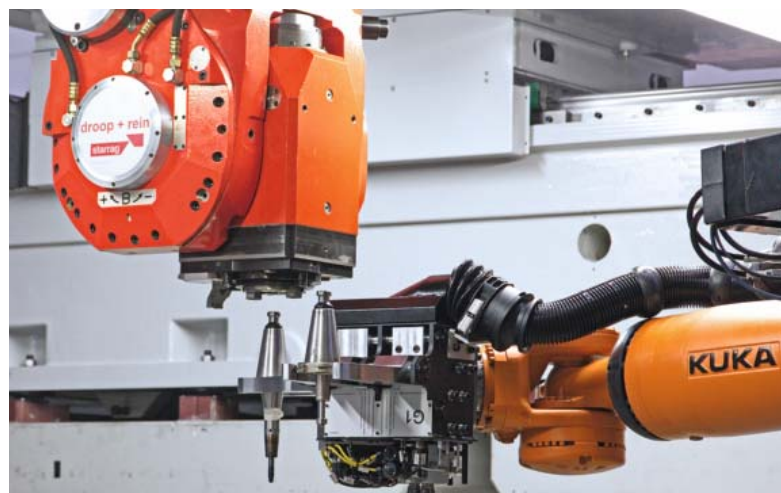
■ Remote sensor parameter setting

One of the greatest advantages of IO-Link is the possibility to transfer all necessary parameter data via the IO-Link connection cable to the sensor. The sensor parameter data (e.g. switch points, switching hysteresis, display colour) can be transferred from the controller to IO-Link compatible sensors, either when the sensors are set up or later during operation and to adjust them to a specific situation. Benefit for the customer: During the

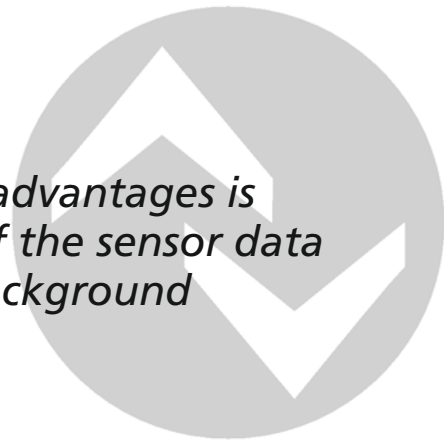
commissioning phase of a machine, the previously projected sensor parameters can be transferred quickly, easily and reliably to the sensor. If necessary, for example in case of small lot sizes, IO-Link makes it possible to store different parameter sets for different products separately on the sensor. Moreover, thanks to the controller-based parameter setting, subsequent process optimisation via remote maintenance is easy with IO-Link.

All in all, one can say that IO-Link is a key technology for Industry 4.0 applications.

If necessary, the parameters of the process sensors can be set separately for each tool.



”One of IO-Link’s great advantages is the automated backup of the sensor data that takes place in the background



The user can access each individual sensor from the control panel.

■ Double data backup

In addition to controller-based sensor parameter setting, IO-Link from version 1.1 or higher ensures double data storage of sensor parameters on the device and the IO-Link master.

Dietmar Wallenstein, e-construction and commissioning department manager at Starrag Technologies, says: “One of IO-Link’s great advantages is the automated backup of the sensor data that takes place in the background. Each sensor (device) sends its parameter sets automatically to the IO-Link master. There, they will be mirrored and stored as a backup. As soon as a sensor is replaced, the data is exchanged automatically with the new device. The parameter data will then be transferred automatically from the IO-Link master to the IO-Link device. This makes it a lot easier to replace a sensor and it reduces machine downtime significantly in case of a

fault. At the same time, this reduces the workload of the service and maintenance staff.”

Sensor parameter setting mistakes are a thing of the past. Replacing a sensor only requires the mechanical installation. The customer can replace it without needing any support. The maintenance staff does not need to be trained with regard to sensor parameter setting since it takes place automatically in the background. Thanks to this, technical problems can be solved much faster and much more efficiently. This saves costs.

■ Error-free digital transmission of measured values

Up until now, analogue sensor signals are digitised via A/D converters and scaled in the PLC. This leads to inaccuracies of the actual measuring value.

IO-Link, however, provides the measured values from the sensor digitally to the controller. Transmission errors and conversion of analogue signals are ruled out.

The digitally transmitted measured values can be directly displayed in the control room. The transferred value is always identical with the measured value. There are no longer any deviations between the local display and the value that the PLC derives from the analogue signal. Thanks to IO-Link, even interference with the analogue signal, for example caused by electromagnetic fields, is a thing of the past.

■ Two measured values – one sensor

Modern process sensors from ifm often provide more than just one measured value.

Dietmar Wallenstein says: “Often, a sensor processes more than just one physical value. In addition to volumetric flow quantity or pressure, for example, it is also possible to read the medium temperature via the IO-Link interface. In the past, we needed two sensors for this.”

This saves money for hardware, wiring and mounting since instead of two sensors you only need one.



The numerous IO-Link sensors enable centralised parameter setting.

■ Diagnostic data

Apart from the process data, the IO-Link sensor can also provide diagnostic data about the status of the device.

Example: The level sensor detects critical deposits and signals them to the controller. Photoelectric sensors detect if a lens is soiled and signal it automatically. Pressure sensors store minimum pressure losses and maximum pressure peaks from the process and totalise the number of times that limit values are exceeded or not reached. This additional functionality supports the user decisively when it comes to condition-based maintenance. This extended information about the condition minimises expensive downtimes while increasing process reliability.

■ Conclusion

Sensors offer a considerable additional value if they are equipped with IO-Link.

Dietmar Wallenstein summarises the advantages for Starrag Technology: *"Everyone is talking about Industry 4.0, and of course we at Starrag are not ignorant of this megatrend. When it comes to mechanical engineering, we think in particular about digital machine upgrading. This is why we opt for IO-Link. Thanks to low-cost robust interfaces, the sensors provide us with more information about the process which then can be more efficiently evaluated and optimised. This is one of the great advantages of IO-Link and a sensor feature contributing to Industry 4.0."*



Two measured values (volumetric flow quantity and temperature) with only one sensor.