Value Added IO-Link Solution Partner

Turck has already implemented IO-Link solutions for its customers in many fields of application and for various industries. Here we present two case studies.

Case study gear production

Several magnetic field sensors on the production line of the differential gears detect the positions of pneumatic cylinders and clamps, while proximity switches detect components of the differentials themselves. There are also many actuators such as air valves, solenoid valves and other devices, which perform the commands of the controller.

The initial plan to connect the signals of sensors and actuators to the fieldbus gateways in the control cabinet using passive junctions and multicore cables, was quickly discarded. The costs of the cable lengths and the extensive wiring effort involved had a negative effect on the overall cost. Turck could offer a space saving IO-Link solution that simplified the wiring of the production workbenches. The system also allowed the implementation of diagnostics right down to the sensor level.

Turck offered a BL20 Profibus gateway for the control cabinet in conjunction with IO-Link master modules. Turck's IO-Link compatible TBIL junction boxes are ideal for connecting the sensors and actuators in the field. These I/O hubs use IO-Link to bring up to 16 binary signals to the IO-Link master via a standard sensor cable. The 16-bit process signal of the IO-Link protocol is therefore not used for an analog process value, but for transferring 16 individual switch signals for digital input or output signals. As the TBIL I/O hubs offer protection to IP67, they can be mounted directly in the field as close as possible to the sensors and actuators. IO-Link is a digital protocol that allows the use of standard three-wire cables, which eliminates the need for any expensive shielding and lengthy cable commissioning.

This network structure, consisting of I/O hubs and Profibus DP gateways with IO-Link master modules, enabled the user to avoid the need for any time consuming wiring in the control cabinet as well as making savings in the terminals, expensive cables, and space required. The solution also provided an outstandingly simple and clear network structure that prevented faults already at the installation stage. If any faults occurred later, however, maintenance was simple thanks to the use of IO-Link. The location of faults can be identified right down to the individual field device and differentiated between a wire break or a short circuit.

Case study roundabout ride

In order to determine the horizontal position of the arms of a roundabout ride, the manufacturer previously used five sensors on each hydraulic lift cylinder. Although this ensured safe operation, the installation of the sensors and their adjustment was relatively complex and the position of the gondolas could not be determined exactly at any time

Today Turck's Li linear position sensors measure the travel of the hydraulic cylinder up to its total length of 1,000 millimeters. Even with rapid movements and the resulting centrifugal forces, the sensor reliably supplies the exact position of the positioning element via the 4…20 mA analog signal. The controller can determine from this the exact position of the arm at any time.

For safety reasons, the manufacter also wanted the possibility to indicate any failure of the positioning element and to output this signal on the controller. Here the Li sensor was able to impress thanks to its ability to be parameterized via IO-Link. The IO-Link interface allows the user from the controller to define the measuring ranges, invert the output signal or simply output special signals like the failure signal. The controller recognizes this special condition and shuts down the ride according to a stored safety routine.

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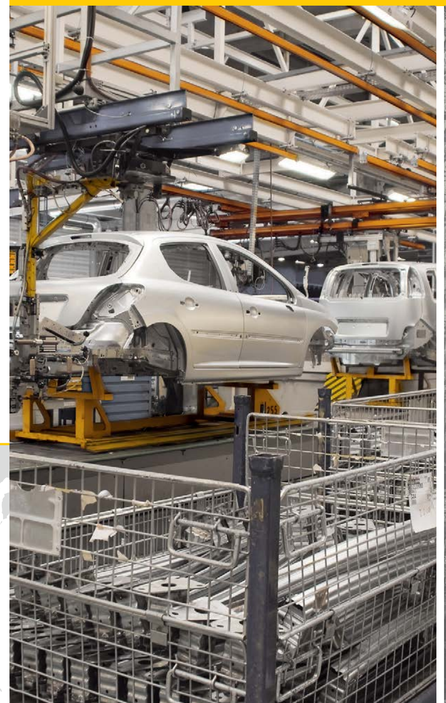
IO-Link
Simple, Seamless, Efficient



IO-Link

IO-Link – Simple, Seamless, Efficient

What is IO-Link?

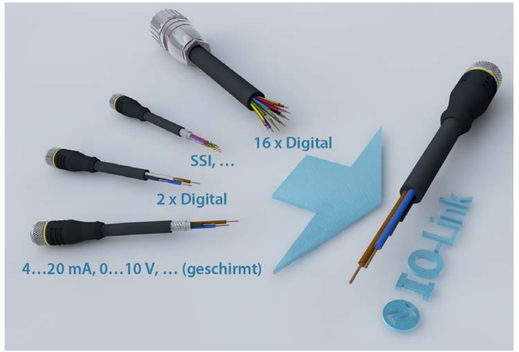
IO-Link is based on a point-to-point connection between the sensor/actuator and an interface module. Up to now, the binary connection was only designed for transferring switching information, but IO-Link now allows two bytes to be transferred normally in a 2 ms cycle via a combined switching status and data channel. Other information can be exchanged in addition to the process values, such as parameters or diagnostics messages. This enables communication with sensors and actuators down to the "last meter" to be established for universal communication.

Standard wiring

IO-Link does not require any special wiring. The sensors and actuators can continue to be connected using the proven, attractively priced and unshielded industrial three core cables. The operating modes available for selection are the standard switch mode and the communication mode.

Your benefits

IO-Link users benefit from a lot of pros, above all reduced machine costs, efficient processes and improved machine availability.



System expertise in IO-Link

Turck is going to provide not only one of the most comprehensive IO-Link portfolios worldwide, from a variety of sensors, cables and junction boxes to programmable fieldbus and Ethernet solutions, but also a distinctive system expertise in IO-Link. Take advantage of Turck's long-term experience in this technology, the resulting product portfolio and the user-friendly software support.

Plug&Play device Integration

The settings of all Turck-own IO-Link devices are now integrated in the station-GSDML-files of the TBEN IO-Link masters. This simplifies significantly the setup. When reading the GSDML file in a project planning software (TIA Portal or others) all Turck devices are selectable as a specific port configuration, additional parameterization or programming is no longer necessary.

Engineering tool integration

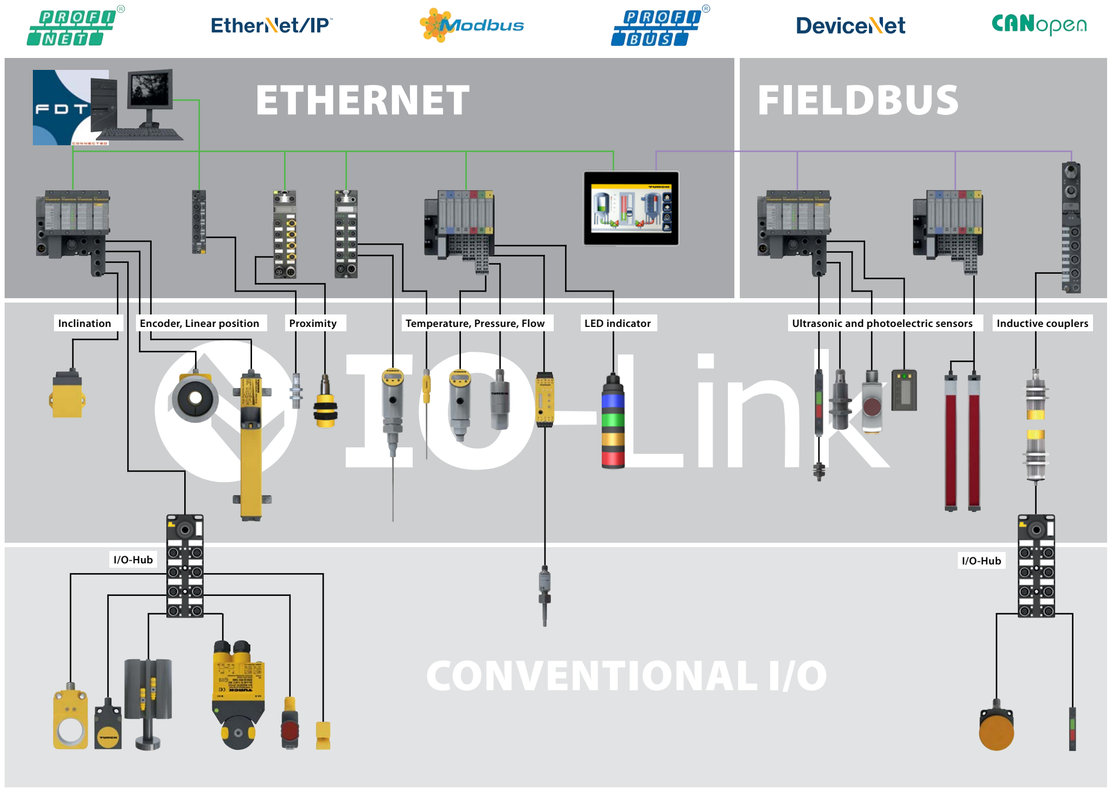
Standardized interfaces (DTM/IODD) implement exhaustive and seamless integration into engineering tools. Furthermore, integration into stand-alone tools such as Asset management or configuration tools is also made available. Connection into enterprise level tools is accomplished using standard ethernet mechanisms.

Device identification

Integrated device identification ensures that in the case of component replacements the correct device has been installed. As each device contains detailed information regarding manufacturer, type etc., component replacement can be safely handled automatically.

Wiring

IO-Link uses the same standard unshielded 3-core cables with standardised pinning as conventional I/O. This eliminates problems with complex devices which have no pinning standards and often multipole connectors.



Ethernet/Fieldbus connection

IO-Link allows connection to all major fieldbuses, as well as Ethernet. Turck offers solutions for the whole range, from master modules for its BL20 and BL67 modular I/O systems to Multiprotocol Ethernet gateways, that can be run in PROFINET, EtherNet/IP and Modbus TCP networks thanks to their automatic protocol detection function.

Sensor mounting

All IO-Link devices allow parameter changes and diagnostic evaluation within the engineering system or separate tools. As such, devices can now be mounted in the machine where they make sense for the application and not where they would need to be to allow access to display or switches.

I/O hubs

Allow the integration of standard 24 VDC devices into automation systems via IO-Link with Turck I/O hubs. Variants for Inputs and outputs are currently available, a version with universal digital I/Os is under development.

Reduced machine costs
- Reduced inventory due to intelligent multi-purpose devices
- Only one I/O module and one inexpensive standard cable required
- Reduced I/O footprint possible
- Displays and switches no longer required on devices
- Reduced engineering and assembly costs and automatic documentation of device parameters during the engineering phase

Efficient processes
- Exhaustive parameterization options for just in time parameter changes to devices
- Efficient processes requiring different parameter sets for switching thresholds, gain, sensitivity and so forth due to differing production conditions
- Faster tool change operations

Improved machine availability
- Comprehensive status information and diagnostic capabilities in the plant lead to drastically reduced machine downtime
- Enhanced information enables cost saving mechanisms such as predictive maintenance or asset management to be easily implemented
- Device replacement without manual intervention to parameterize the new unit alleviates the need for qualified personnel