ifm IO-Link - we connect you!

..... with most comprehensive system solutions for automotive applications in the market.
IO-Link technology description

IO-Link is a manufacturer-independent point-to-point communication system used to connect sensors and actuators to an automation system. An IO-Link system consists of an IO-Link master and several IO-Link devices. The IO-Link master represents the interface to the controller or fieldbus level and communicates with the connected IO-Link devices. IO-Link is capable of processing switching signals of binary sensors, process values of analogue sensors and their parameters in a purely digital form based on a 24 V signal. This eliminates measuring value errors associated with the transmission and conversion of analogue signals. IO-Link can be used to transfer several process values or parameters of a device simultaneously via one unscreened standard cable. IO-Link is an internationally standardised fieldbus and controller independent interface.
**IO-Link features**

**No external influence of the signal**
Data transfer is based on a 24 V signal. Screened cables and associated grounding are no longer necessary.

**No measured value losses**
The entire measured value transmission is digital. Transmission that is prone to errors and calculation of analogue signals is replaced.

**Simple replacement of sensors**
All sensor parameters are stored in the master and transferred to the replaced unit.

**Tamper free**
No wrong settings by operators.

**Identification**
Only like for like replacement. No wrong sensors accepted.

**Wire-break detection / diagnostics**
Wire-break or short-circuit is immediately detected.

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### ifm IO-Link products

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### ifm supplies the complete system from sensor to PLC!!!
IO-Link masters

• For connection of up to eight IO-Link devices
• Reliable transmission of machine data, process parameters and diagnostic data to the controller
• Simultaneous data exchange with the controller and the IT world
• Units for field applications and control cabinets
• With integrated fieldbus interface

The product range includes interfaces to Profinet, EtherCat, Ethernet/IP, Profibus or AS-Interface.
IO-Link modules

- For the simple connection of binary sensors to any IO-Link master
- Data and energy transmission also possible with unscreened connection cable
- Clearly visible LEDs for displaying operation, switching status and error
- Robust design with full potting for use in harsh industrial environments
- Robust M12 connectors for connecting sensors and actuators

Up to eight conventional sensors with switching outputs can be connected to the field modules with IO-Link.
IO-Link devices

• Display for displaying up to four process values
• Electronic circuit breakers for the permanent monitoring of the 24 V secondary circuit
• Reliable switch-off in case of a fault
• Modular and selective protection of machinery and plant
• With IO-Link for transmission of signals and diagnostic data

ifm's range of IO-Link devices comprises displays and electronic circuit breakers.
IO-Link position sensors

• Capacitive sensors for position detection or level monitoring
• Distance sensors with very long range and background suppression
• Ultrasonic sensors for non-contact detection of objects
• Photoelectric sensors for specific applications
• With switching output, analogue signal and IO-Link

Position sensors are nowadays indispensable in industrial applications to reliably detect positions on machines.
IO-Link sensors for motion control

- Encoder for precise position determination and linear measurement
- Inclination sensors for precise measurement of angles of inclination on X and Y axes
- High measurement accuracy across the total angular range in two axes
- High protection rating for the requirements of harsh industrial environments

The sensors can be configured via IO-Link, using, for example, a USB interface.
IO-Link process sensors

• Pressure sensors for the detection of the system pressure in machinery and plant
• Reliable monitoring of liquids and gases in pipes
• Level and limit level monitoring on tanks and containers
• Temperature sensors with high precision over the whole temperature measurement range
• Devices with clearly visible LED display with alternating red-green indication

In industrial processes where liquids, air or gases are used, process sensors serve to measure and detect pressure, temperature, flow and levels.
IO-Link software

- Fast and easy integration of intelligent sensors into the PLC world
- Easy, fast and intuitive start-up of 1D/2D code readers, 3D cameras and RFID readers
- Apps for operation on AS-Interface gateways with fieldbus interface
- Simple, clear representation of the process values
- Shortened set-up time during commissioning

The LINERECORDER SENSOR is a software for clearly structured online and offline parameter setting of ifm IO-Link sensors via a USB adapter. It allows consistent parameter setting and visualisation of all sensors and actuators with IO-Link interface. App are used for parameter setting and set-up of IO-Link sensors, 1D/2D code readers, 3D cameras and RFID read/write heads. ifm also offers apps for logging and saving process data of AS-i IO-Link modules and for managing AS-i configurations.
IO-Link accessories / connection technology

• USB interface for connecting sensors with IO-Link capability to a PC
• Quick and easy parameter setting of IO-Link sensors using the memory plug
• Complete sets with power supply for the sensors
• Reading of the current measured values, process values and parameter settings
• Connection cable for connection to the Ethernet interface of the IO-Link master

The interface connects sensors with IO-Link capability to a PC and enables parameter setting of sensors, reading of the current parameter setting, of the current measured values and further process values. The LINERECORDER sensor operating software is used for set-up, parameter setting and process data exchange of the IO-Link devices. An EtherNet patch cable is used to connect the IO-Link master and the processor.

The memory plug is used where sensor data is to be copied or stored. This could for instance be the case when a defective unit needs to be replaced or several sensors with the same parameter settings are installed.
LINERECORDER SENSOR 4.0 – Parameter setting software for IO-Link sensors

- Uniform parameter setting and visualisation for all IO-Link sensors
- Simple, clear representation of the process values
- Shortened set-up time during commissioning
- Automatic identification of the connected devices
- Optimised device replacement process

The LINERECORDER SENSOR is a software for clearly structured online and offline parameter setting of ifm IO-Link sensors via USB adapter. It allows consistent parameter setting and visualisation of all sensors and actuators with IO-Link interface. The process values are shown graphically during set-up. This helps the user optimise the parameters to the respective application and ensures smooth operation of the plant.
Pressure monitoring in hydraulic power packs on the scrap press
In the scrap press loose parts are turned into bales of scrap. The blank offcuts are compressed into bales in a high-pressure press. The pressure in the respective hydraulic power pack is monitored by the PN7160 sensor (600 bar). The TR2439 evaluation unit continuously detects the temperature of the hydraulic oil. The level sensor of the LR7 series detects if there is sufficient oil in the pressure vessel by means of guided wave radar.
IO-Link in press shop applications (palletiser / decoiler)

Level detection in the mobile hydraulics of heavy load lifters

Here, a hydraulic drive is used instead of electric motors. A level sensor of the KQ series detects the level in the tank. The PN7092 pressure sensors control the movements of the mobile drive system. As protection against overheating, the TN2511 temperature sensor monitors the oil temperature.
IO-Link in press shop applications (suction grippers)

Vacuum sensors monitor suction grippers
PN7 series vacuum sensors detect the required vacuum for operating the suction grippers.
Monitoring the skid position
The IMC- and IDC-type inductive sensors reliably detect the positions of the skids.

Detecting the body position
Using time of flight measurement, photoelectric sensors O5 reliably detect the position of the body on the skid, for controlling the subsequent welding processes.
IO-Link in body shop applications (metal part control)

Inductive sensors are close by
Inductive IO-Link sensors are designed for linear detection of the right position of metal parts.

Photoelectric sensors detect the side part in a turntable
All parts must be placed correctly in the clamping frame. Here, the OID photoelectric distance sensors ensure reliable detection.
IO-Link in paint shop applications (conveying systems)

Monitoring the skid position
The IDC-type inductive sensors reliably detect the positions of the skids.

Detecting the body position
Using time of flight measurement, photoelectric sensors O5 reliably detect the position of the body on the skid, for controlling the subsequent welding processes.

Flow measurement on painting robots
The paint application demands a high degree of availability from the systems. Here, the SU volumetric flow sensor detects any blockages of the nozzles.
Detecting the level in the tanks during paint recycling
The paint spray, precipitated by the water, is captured and filtered. The paint acquired in this way can be reintroduced to the mixture. The LMT100 level sensor detects whether the level in the tank falls below a minimum value.
IO-Link in paint shop applications (air consumption)

Air consumption measurement for fresh air supply
The compressed air sensor of the SD series continuously measures the air flow. The measured values are used as a basis to determine the actual consumption.
Detection of the air volume for blowing out drill holes
During dry processing for chip removal machining
the compressed air meters of the SD6000 series
detect a defined air volume for blowing out drill holes.
In addition, the PN7094 pressure sensor
monitors the required minimum pressure.
IO-Link in powertrain applications (cooling water)

Cooling water monitoring in the foundry
Melt furnaces and casting moulds must be cooled. Water is drawn from deep wells for this purpose. The SM flow meter detects whether air is sucked up with it, thus helping to avoid damage to the equipment.
IO-Link in powertrain applications (pressure detection)

Pressure loss monitoring in automated test stations

Leak test on components and assemblies
In automated test stations, the test pieces are placed under pressure using compressed air. Depending on the rate of leakage, the pressure loss must not exceed the tight tolerances.
IO-Link in powertrain applications (maintenance units)

Measurement of compressed air consumption on a pneumatic maintenance unit
The SD flow meter continuously monitors the compressed air consumption of the consumers connected to the maintenance unit. The pressure of the system is detected and monitored by pressure sensors PN7094.
IO-Link in final assembly applications (door assembly)

Position detection during transport to the door module assembly
The doors are transported for further processing via the overhead electric monorail conveyor. IMC series inductive sensors detect the position of the hangers. O1D and/or O5D series optical distance sensors are in addition used for collision avoidance.
Optical detection of a start position in the manufacture of exhaust systems

In an automatic saw, the pipes for an exhaust system are cut to the appropriate length corresponding to that stored in the program. The O8 diffuse reflection sensor is used to determine the start position for the length measurement using an absolute shaft encoder.
Flow rate measurement in the washing plant

In the "rain test", the finished vehicles are tested for leaks. The SM6000 flow meter measures the water flow rate in the washing plant. Here, the PG2 series pressure sensor, with an analogue output, controls the optimum working pressure of the pump.
IO-Link in final assembly applications (car presence)

Optical car present detection on the way to visual inspection
The assembled vehicle is placed on a conveyor by a lift. The O5D150 photoelectric distance sensor detects whether this conveyor is already occupied. In addition, IM5172 series inductive sensors monitor the conveyor motion.
ifm electronic – close to you!

Most competent IO-Link partner for the automotive industry