

TECH TIPS

Implementing the Industrial Internet of Things via IO-Link

The Industrial Internet of Things (IIoT) is integral to engineering and production applications today. IIoT connects sensors, actuators, controllers, and other equipment to make data about their environment and function available anywhere. Below are some helpful tips on connecting your equipment to the IIoT:

1 Choose what to connect to the IIoT

Point-to-point connections easily connect enabled devices to interface modules like IO-Link masters. IO-Link protocol transmits switching information or combined switching status and data, depending on the protocol version. Devices configured for IO-Link devices are also compatible with standard PLCs through the IEC61131 program standards.

Most sensors enabled with IO-Link capabilities are three-wire designs that monitor a variety of parameters. They include proximity, photoelectric, ultrasonic, pressure, temperature, flow, linear position, rotary, HF RFID, and inclination sensors. The structure of IO-Link means that properly configured sensors can act as switches, transmit data, or both.

For example, capacitive proximity sensors detect the presence of liquids and solids in applications like plastic and rubber production, food and beverage processing, and material handling. Such sensors have allowed engineers to eliminate the need for an external PLC or amplifier for filling/emptying applications by providing basic logic functions in addition to sensing.

Likewise, inductive proximity sensors work in tight spaces to detect metallic objects for motion control tasks like tool selection, robotic position-sensing, and control of micro-mechanisms. The most up-to-date version of IO-Link lets inductive proximity sensors double as RPM detectors as they provide an output once in a specified number of revolutions or target detections.

2 Maintain and replace the specified sensors

Once you've chosen to implement sensors configured for IO-Link in your application, be sure to protect your investment by choosing units certified to withstand your application environment. For example, sensors with an IP69K rating are dust tight and can withstand a washdown environment's high pressure water jets. ECOLAB certifications indicate that the housing will not break down under exposure to common industrial fluids.

You can plan for quick replacement by choosing sensors that adhere to standard sizes, connectors, and cabling. That way, you won't need to keep so many unique replacements on hand. For example, inductive proximity sensors with IO-Link capabilities are available in standard sizes from M4 to M30, and their capacitive counterparts come in M18 and M30 sizes.

When it comes time to replace a sensor, its configuration has already been stored by its connected IO-Link master. That makes it easy to download an old sensor's configuration to its replacement prior to installation.

3 Troubleshoot each sensor remotely

Sensors that use IO-Link protocols for both data communication and switching status can provide a wealth of troubleshooting information. To make the most of the available data, query the sensor with a portable configurator. These handheld units are battery-powered and connect to sensors directly, so there's no need to be tethered to a laptop or PC.

In addition to configuring IO-Link sensors prior to installation, portable smart configurators can also display sensor readings, operating hours, alarms, and statistics like quality of run and quality of teach. They place all the information required to troubleshoot the sensor at the operator's fingertips remotely.hysteresis and time delays.

4 Configure sensors for smart operation

IO-Link sensors can operate in standard I/O mode, such as in communication with a PLC. When they are connected with an IO-Link master, they switch automatically into the richer IO-Link communication mode.

Using this feature, portable configurators can configure sensors remotely. Operators can download the IODD file that contains sensor configuration data via WiFi and change the sensor's operations. This includes altering the switch point mode, sensing distance, and timing functions as well as output configurations like PNP, NPN, push-pull, and normally open or normally closed.

5 Prepare for rapid changeovers

Portable configurators also shine in today's production environment where product changeovers using the same equipment are becoming more frequent. The performance of many smart sensors can be changed remotely using the IO-Link protocol to accommodate changes in production setup.

One example comes from material handling applications where changeovers may include changes in product dimensions. Using a remote configurator, operators can adjust the sensing distance of proximity sensors to between 62% and 100% of maximum without changing the physical location of the sensor.

6 Ensure ease of use for all tasks

A great depth and breadth of information is available through the communication between sensor and IO-Link master. To organize this information, a portable configurator like the SCTL55 from Carlo Gavazzi can guide users through intuitive graphical user interfaces (GUIs). The options available to each user depend on his or her level of access. For example, a sensor specialist, an engineer, and an operator might each have access to the specific information and commands he or she needs, thus adding an extra level of application security.

7 Future-proof your process with advanced products

Although there are many sensors configured for IO-Link and compatible configurators on the market, it's best to choose units that are compatible with the most up-to-date communications protocol. Sensors and configurators designed for IO-Link 1.1 can exchange more than simple switching data. A combined switching status and data channel exchanges two bytes every 2 msec.

It is this enhanced data stream available with advanced IO-Link sensors that connects the details of industrial processes into the IIoT. With it, process values, parameters, and diagnostics become available across the enterprise.

Just as Industry 4.0 and the IIoT are becoming the standard for industry worldwide, IO-Link 1.1 provides a standardized way to configure, troubleshoot, and read sensors. Suppliers like Carlo Gavazzi can provide expert advice on implementing sensors configured for IO-Link, smart configurators, and masters.

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