

Communication from cloud to the field

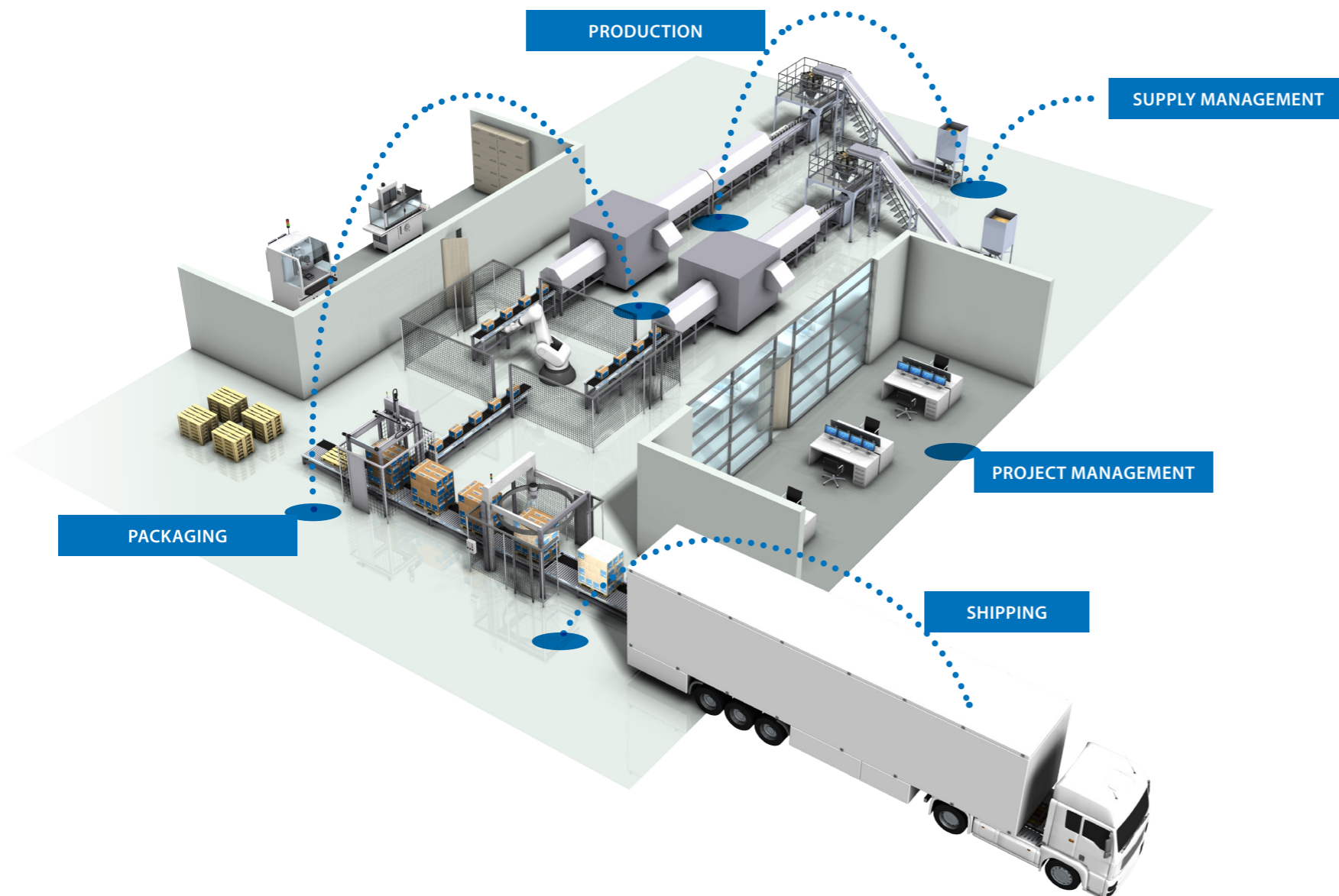
IO-Link Sensors & Controllers



- Improve productivity
- Reduce machine downtime
- Simplify engineering

Smart Factory

The dream of the Smart Factory, with real-time bi-directional communication to field level devices, is now more realisable than ever. Thanks, in part, to the IO-Link digitalised protocol. Now, sensors and actuators can communicate more than simple on/off signals or analogue ranges. They can now provide advanced status and diagnostics information communicating with the controller about how they are performing. Furthermore, the controller can also change the sensor's parameters, creating the ultimate in flexible manufacturing. IO-Link also helps make Industry 4.0 possible by providing connectivity to the field level (sensors and actuators).



Just think about the benefits:

- Real-time data collection from field level, leading the way to IoT
- Escalating this data for instant 'Big Data' analysis
- Mass customisation and fast production changeovers
- Maximised uptime via condition monitoring and predictive maintenance
- Full lifecycle traceability and single product serialisation
- Extensive machine collaboration
- Fast design and installation

There has never been a better time to be in factory automation.

We enable Intelligence in Automation

Full digital factory

Assured compatibility

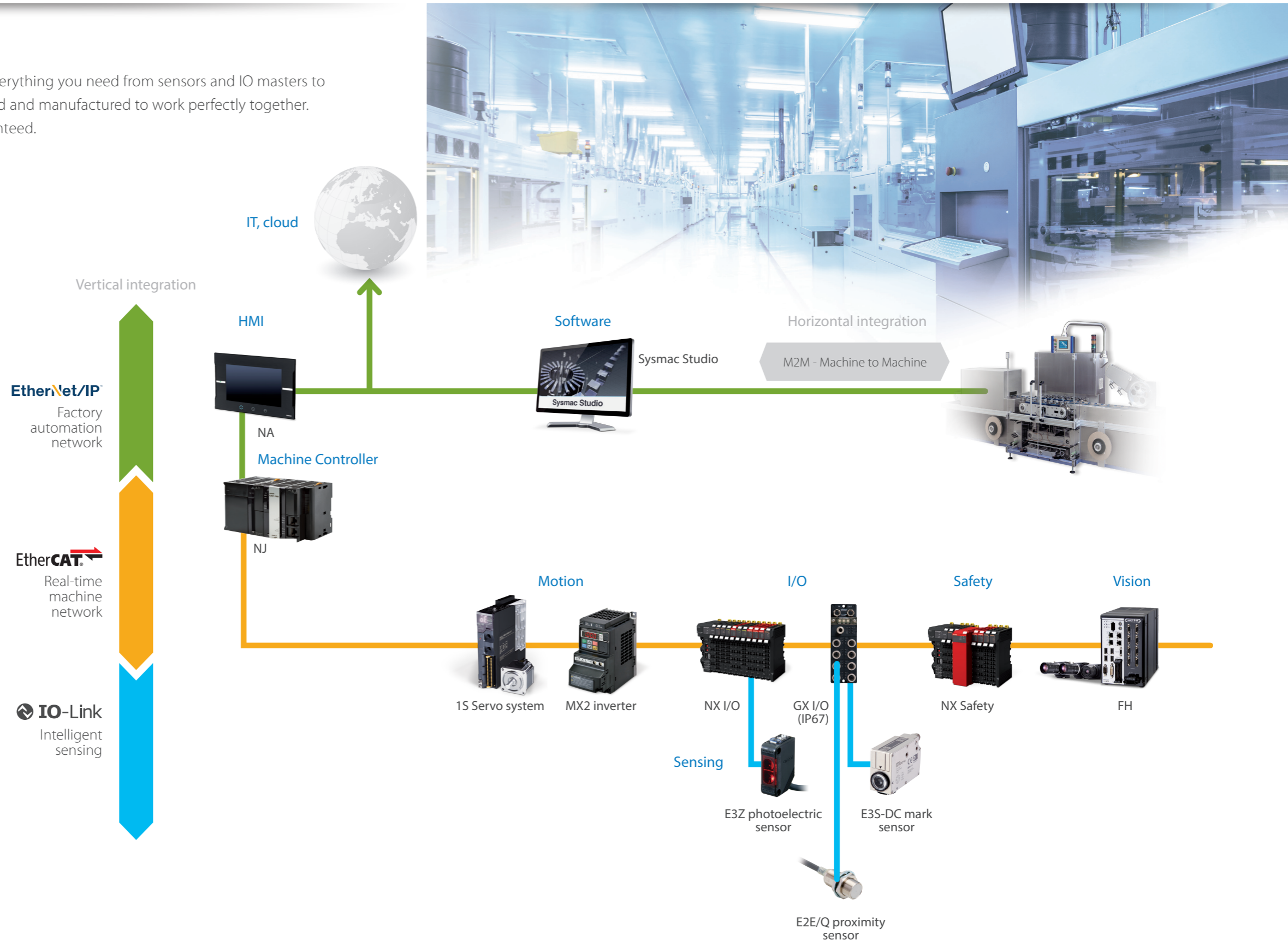
Providing a complete smart factory system, we offer everything you need from sensors and IO masters to controllers and HMIs. Everything is designed, developed and manufactured to work perfectly together. All products integrate easily and compatibility is guaranteed.

Faster commissioning

We offer one software environment for all configuration, programming, simulation, and monitoring: Sysmac Studio - to give you complete control over your automation system. Graphics-oriented configuration allows quick set-up of the controller, field devices and networks while machine and motion programming, based on IEC standards and PLCopen Function Blocks for Motion Control, minimises programming time. The Smart Editor with On-line debugging helps quick and error free programming. Advanced simulation of sequence and motion control, and data trace reduce machine tuning and set-up.

Easy integration

We offer one complete integrated platform, one machine control through one connection and one software. Our Machine Automation architecture integrates logic, motion, safety, robotics, vision, sensors, information, visualisation and networking under one software: Sysmac Studio. Sysmac architecture is fully compatible with EtherNet/IP in its top level, with EtherCAT in its machine level and with IO-Link for reaching low level sensors and actuators. The three networks with one connection purpose is the perfect match between real-time machine control and data plant management.



A communication technology reaching the sensors level

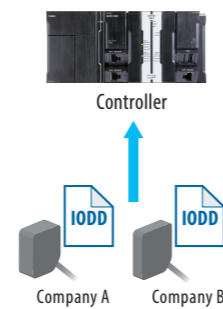
IO-Link is a standardised point-to-point communication protocol allowing sensors and actuators exchange data with the controller. Bidirectional communication is established so parameters can be transferred from the controller to the devices and the status can be read.

An Open International Standard

Since December 2015, over 100 companies, including major sensor manufacturers, have joined the IO-Link Consortium.

Responding to Global Development

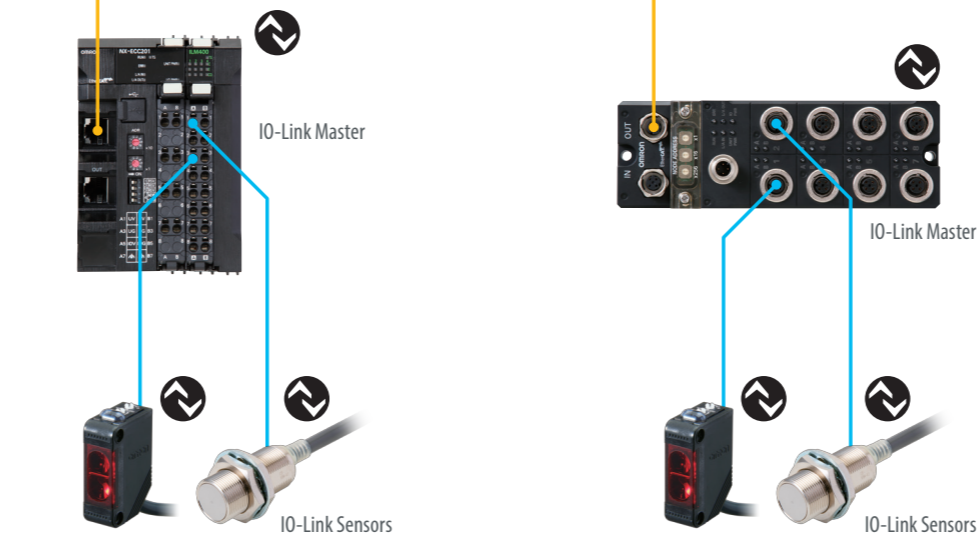
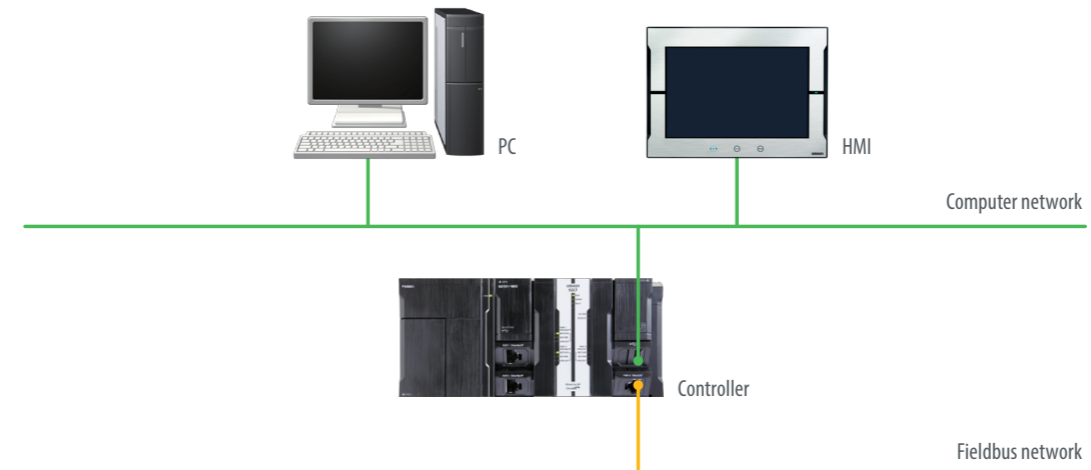
The use of 3rd party devices can be easily integrated via the IODD (IO Device Description files).



Communications of the ON/OFF Signals and Sensor Information

IO-Link allows not only typical sensor and actuator signals but also setting parameters and device status information. This communication is done in a bidirectional manner.

Several baud rates are possible in IO-Link specifications as well as being compatible with COM2 and COM3.



Uses 3-wire standard Unshielded Cable

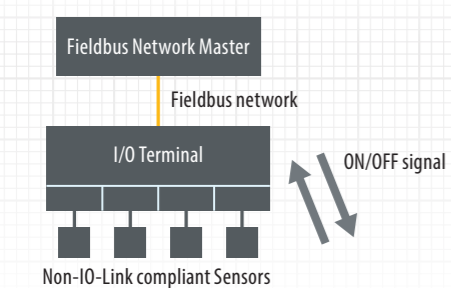
No special cables are needed. The same connectors are used as in standard I/O.

Each IO-Link channel can be reconfigured from IO-Link mode to a standard I/O mode.

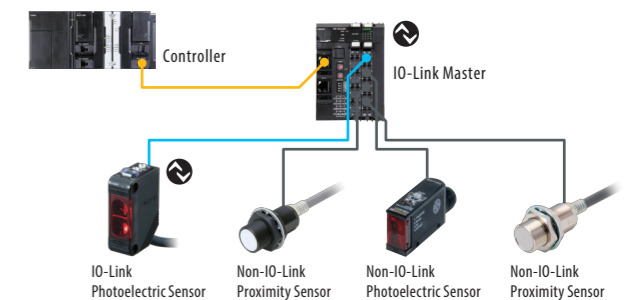
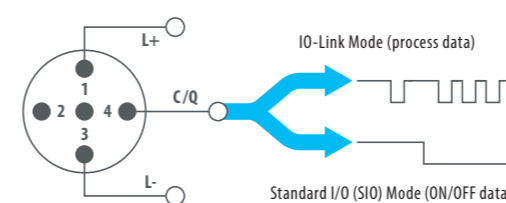
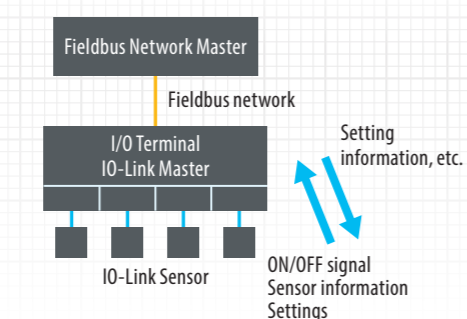
Capable of Intermixing IO-Link Sensors and standard sensors

You can connect an IO-Link Sensor and both IO-Link and standard devices with a single IO-Link Master. The master is able to manage both operating modes at the same time.

Without IO-Link support



With IO-Link



A choice of masters and sensors

To match your needs

We offer two types of IO Master, both with fast cable connections. One with Plug-in Plus screw-less clamp terminals, and another for M12 Smartclick connections.

IO-Link Masters



Screw-less Clamp Terminal Blocks Allows Wiring Time to be Reduced

NX-series IO-Link Master Unit
NX-ILM400
4-port/screw-less clamp terminal block
Note: Four sensors can be connected to one device.

EtherCAT Coupler

IO-Link

IO-Link Sensors

Screw-less Clamp Terminals Connection Devices



Photoelectric Sensor
E3Z-IL-IL
Pre-wired Models

Colour Mark
Photoelectric Sensor
Models for M12 Connector
E3S-DCP21-IL

Photoelectric Sensor
E3Z-IL-IL
Models for M8 Connector

Proximity Sensor
E2E-IL-IL
Pre-wired Models

Spatter-resistant
Proximity Sensor
E2EQ-IL-IL
Pre-wired Models

IO-Link



The M12 Smartclick Connector Can Be Used in Wet, and Dusty Environments

Environment-resistant Unit IP67 Type
GX-ILM08C
8-port/M12 Smartclick connector
Note: Eight sensors can be connected to one device.

Just plug it in and turn it 1/8 of a rotation

IO-Link

M12 Connector Connection Devices



Colour Mark
Photoelectric Sensor
Models for M12 Connector
E3S-DCP21-IL

Proximity Sensor
E2E-IL-IL
Models with M12 Pre-wired
Smartclick Connector

Photoelectric Sensor
E3Z-IL-IL
Models with M12 Pre-wired
Smartclick Connector

Spatter-resistant
Proximity Sensor
E2EQ-IL-IL
Models with M12 Pre-wired
Smartclick Connector

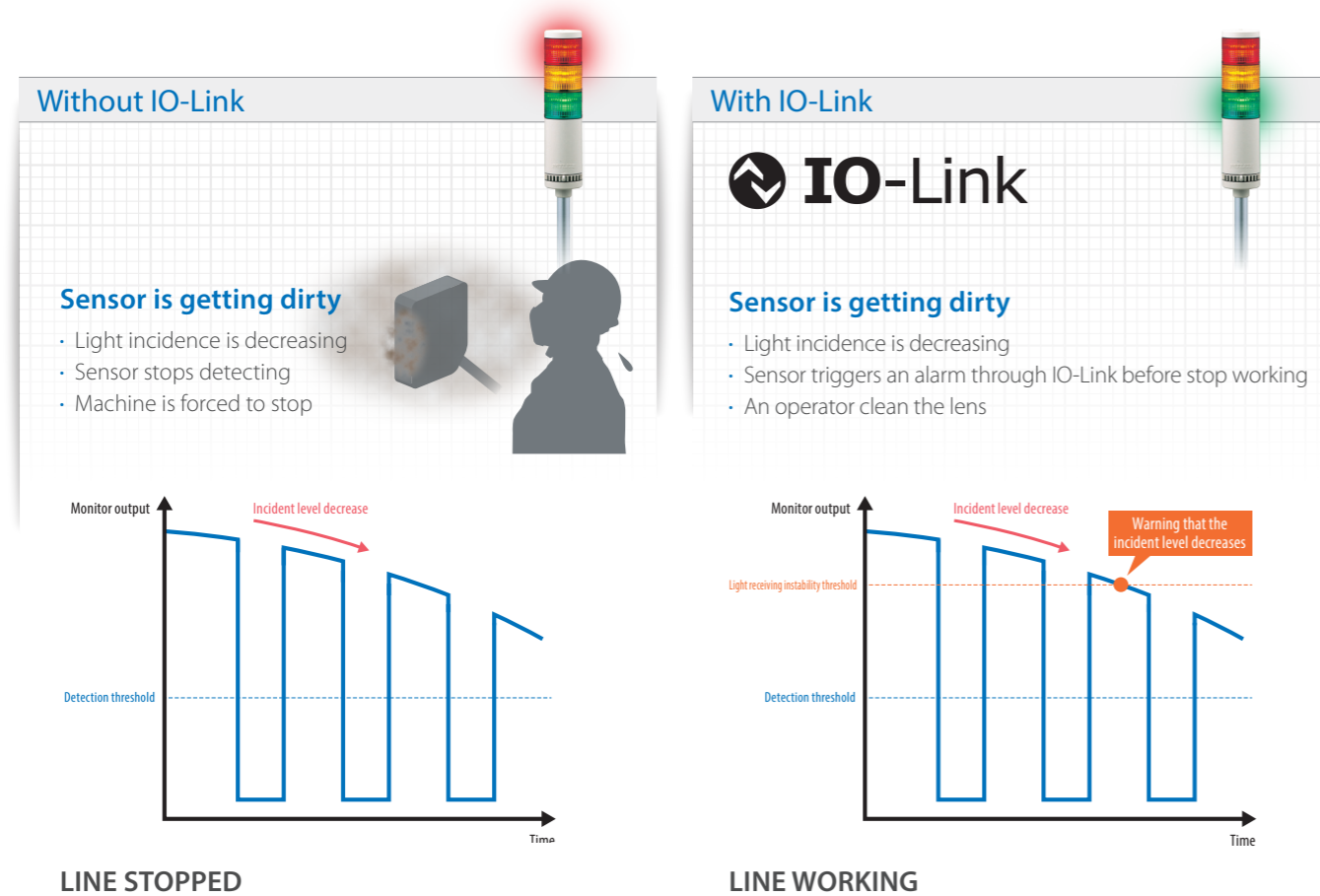
IO-Link

IO-Link in action

Reduce Machine Downtime - Monitoring for preventive maintenance avoids unexpected line stoppages

With IO-Link, field devices are monitored and corrected before they malfunction and cause a line stoppage. For example, if a photoelectric sensor's lens is building up dirt, the sensor can trigger an alarm via IO-Link and alert the operator to clean it before the sensor stops working. Another example is identifying excessive proximity checking which can cause inductive sensors to crash.

By continually monitoring each sensor, corrective actions can be taken before the device malfunctions. In addition, corrective action can also be planned for quiet periods to minimise their impact on productivity.



Improved productivity - Fast and automated product changeovers

With conventional sensors and actuators, changing the format of the production (switching from product A to product B) requires manual adjustments. This takes time and errors are possible. But with IO-Link new format settings are automatically and faultlessly transferred from the controller to all sensors and actuators. This means

- Error-free installation
- Faster changeover time
- Higher productivity
- Increased flexibility

The result is production on demand which also helps to reduce inventories and their associated costs.



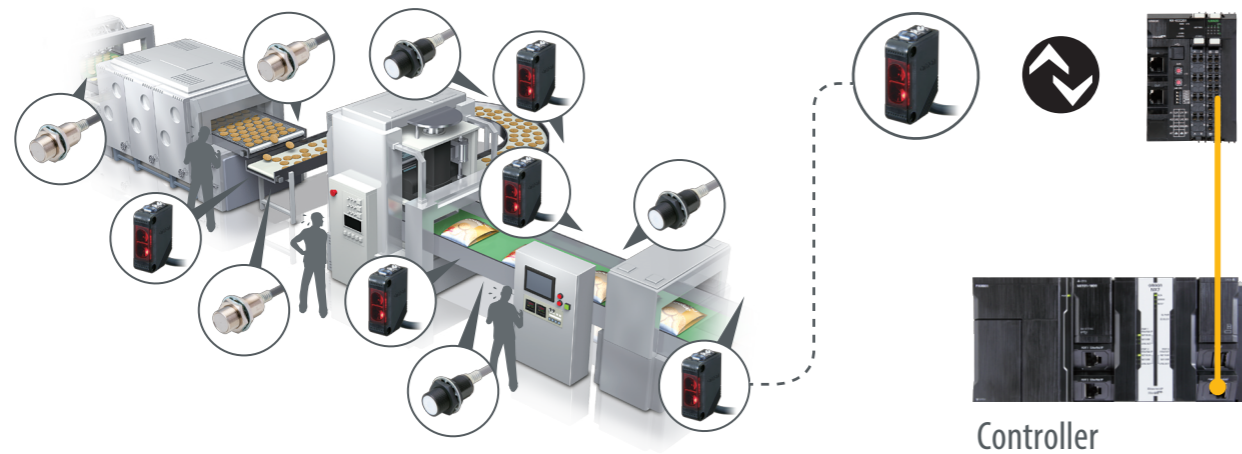
IO-Link in action

Simplify engineering

IO-Link allows downloading of sensor and actuator parameters from the controller, avoiding manual configuration when building the machine or replacing a component. In addition, a device identification check can be done that provides a warning if the wrong device type is installed.

Quick identification of the failure

By monitoring all field devices, the origin of a problem can be easily found, avoiding time lost investigating and correcting the problem thus reducing machine downtime.

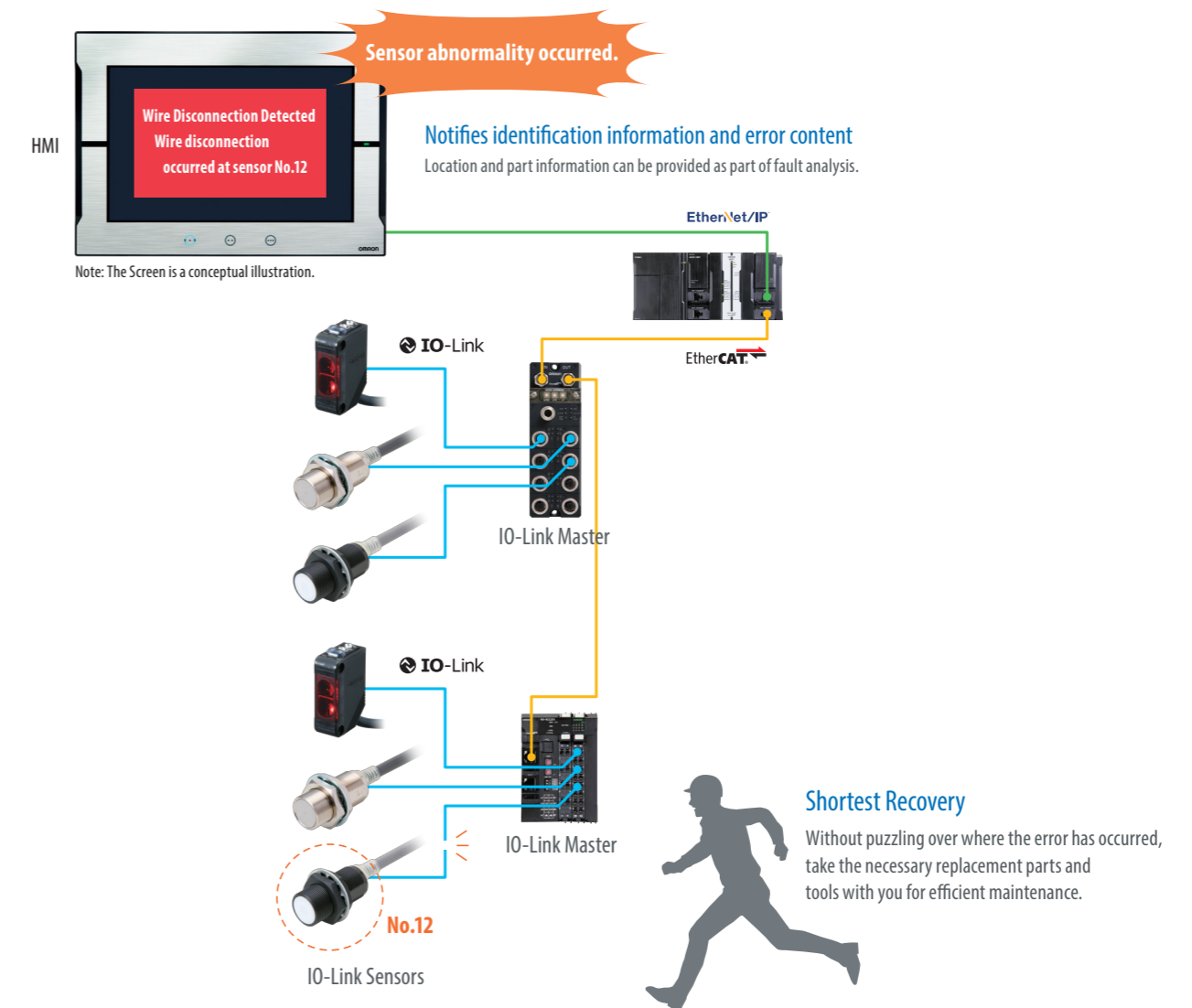


Easy machine troubleshooting

With IO-Link, commissioning time is reduced and configuration mistakes are minimized because the controller checks that each sensor is correct, and then downloads the parameters. So there is never a wrong sensor and there is no need to manually configure sensors one by one. Any wiring mistakes are also identified before the machine is powered up.



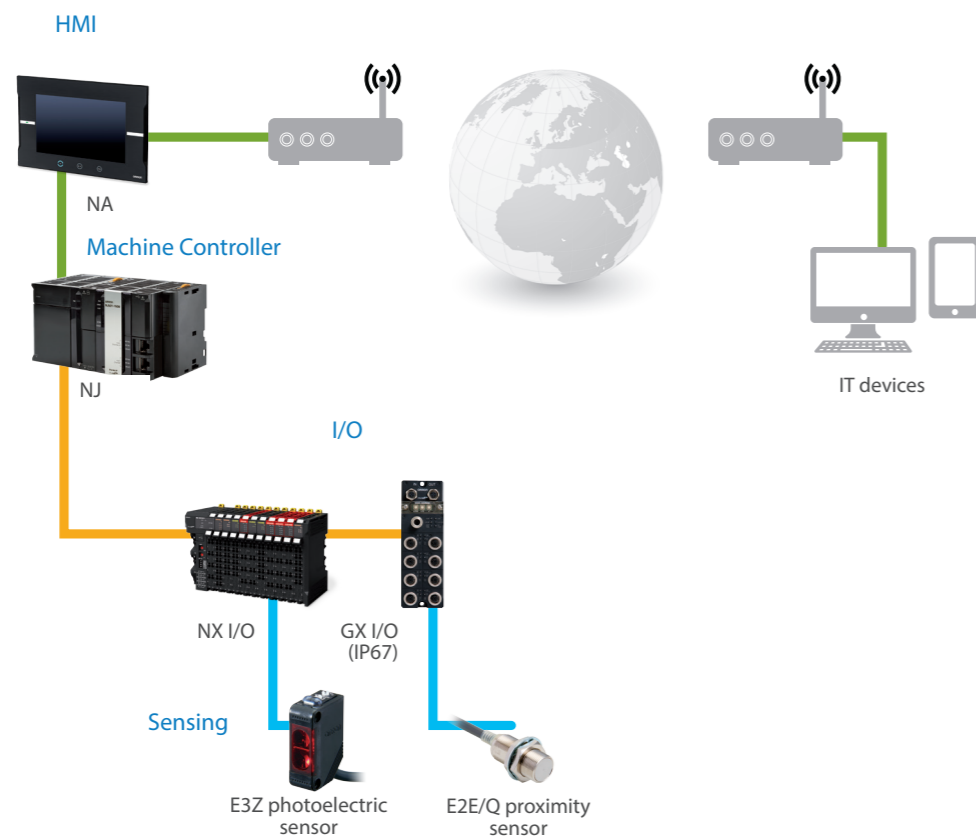
During production, the controller continuously monitors all devices and instantly identifies problems enabling them to be solved before they become urgent. And, in the rare event of a line stoppage, there is no need to spend time investigating the cause because IO-Link provides an instant advanced diagnosis.



IO-Link in action

Remote connectivity

Thanks to IO-Link communication, a remote technical assistance can reach the sensor and actuator level. This helps to simplify machine troubleshooting as expert assistance can connect to all devices with no need to be on site.. Machine downtime can therefore be reduced with no need to have skilled operators in the production plant as issues can be solved remotely.

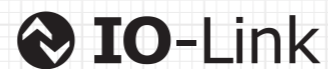


Without IO-Link

Without IO-Link remote assistance down to field-level was not possible. It required skilled workers to resolve and if the machine was installed in a foreign country it may need some local assistance.

- It means higher cost , more time to recover and as consequence bigger safety stock to avoid delivery problems when the machine is stopped

With IO-Link



Thanks to IO-Link functionality and to provide full connectivity in the machine, a remote technical assistance can reach the sensor/actuator level, monitoring them or setting the parameters.

IO-Link masters

Product name	Number of IO-Link ports	Connection type	Degree of protection	Order code
NX Series IO-Link master unit*1	4	Screw-less clamp terminals	IP20	NX-ILM400
GX Series IO-Link master unit	8	M12 Smartclick connector	IP67	GX-ILM08C

*1 EtherCAT Communication Coupler Unit NX-ECC2__ is necessary for the system configuration.

IO-Link sensors

Photoelectric sensors

Product name	Sensor type	Connection type	Order code*1
E3Z-__-IL_	Through-beam	Pre-wired models (2 m)	E3Z-T81-IL_ 2M
		M12 Pre-wired Smartclick connector models (0.3 m)	E3Z-T81-M1TJ-IL_ 0.3M
		Standard M8 connector models	E3Z-T86-IL_
Retro-reflective with MSR function*2	Retro-reflective with MSR function*2	Pre-wired models (2 m)	E3Z-R81-IL_ 2M
		M12 Pre-wired Smartclick connector models (0.3 m)	E3Z-R81-M1TJ-IL_ 0.3M
		Standard M8 connector models	E3Z-R86-IL_
Diffuse-reflective	Diffuse-reflective	Pre-wired models (2 m)	E3Z-D82-IL_ 2M
		M12 Pre-wired Smartclick connector models (0.3 m)	E3Z-D82-M1TJ-IL_ 0.3M
		Standard M8 connector models	E3Z-D87-IL_
Diffuse-reflective Narrow-beam	Diffuse-reflective Narrow-beam	Pre-wired models (2 m)	E3Z-L81-IL_ 2M
		M12 Pre-wired Smartclick connector models (0.3 m)	E3Z-L81-M1TJ-IL_ 0.3M
		Standard M8 connector models	E3Z-L86-IL_

*1 Select transmission rate. COM2 or COM3

*2 The Reflector is sold separately. Select the Reflector model most suited to the application.

Color mark sensors

Product name	Sensor type	Connection type	Order code*1
E3S-DCP21-IL_	Diffuse-reflective	M12 connector models	E3S-DCP21-IL_

*1 Select transmission rate. COM2 or COM3

Standard Proximity sensor (DC 3-wire Shielded model)

Product name	Size	Connection type	Order code*1
E2E-__-IL_	M12	Pre-wired models (2 m)	E2E-X3B4-IL_ 2M
		M12 Pre-wired Smartclick connector models (0.3 m)	E2E-X3B4-M1TJ-IL_ 0.3M
	M18	Pre-wired models (2 m)	E2E-X7B4-IL_ 2M
		M12 Pre-wired Smartclick connector models (0.3 m)	E2E-X7B4-M1TJ-IL_ 0.3M
	M30	Pre-wired models (2 m)	E2E-X10B4-IL_ 2M
		M12 Pre-wired Smartclick connector models (0.3 m)	E2E-X10B4-M1TJ-IL_ 0.3M

*1 Select transmission rate. COM2 or COM3

Spatter-resistant Proximity sensor (DC 3-wire Shielded model)

Product name	Size	Connection type	Order code*1
E2EQ-__-IL_	M12	Pre-wired models (2 m)	E2EQ-X3B4-IL_ 2M
		M12 Pre-wired Smartclick connector models (0.3 m)	E2EQ-X3B4-M1TJ-IL_ 0.3M
	M18	Pre-wired models (2 m)	E2EQ-X7B4-IL_ 2M
		M12 Pre-wired Smartclick connector models (0.3 m)	E2EQ-X7B4-M1TJ-IL_ 0.3M
	M30	Pre-wired models (2 m)	E2EQ-X10B4-IL_ 2M
		M12 Pre-wired Smartclick connector models (0.3 m)	E2EQ-X10B4-M1TJ-IL_ 0.3M

*1 Select transmission rate. COM2 or COM3

Software

Product name	Order code
Sysmac Studio version 1.16 or higher*1	SYSMAC-SE2__

*1 CX-Configurator FDT for IO-Link sensor setup is included in Sysmac Studio.

Would you like to know more?

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