# Industrial Connectivity
## Pepperl+Fuchs Comtrol

Spreker

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BDM- Systems Group

A company with solutions for every demand in automation technology
# The Pepperl+Fuchs Group



Industrial Sensors

Explosion Protection

Vision Technology Solutions

IoT Infrastructure

3-D Scanning Technology

Industry 4.0 Solutions

Mobile Solutions

# Technology Range



| | |
|---|---|
| • Proximity Sensors | • Photoelectric Sensors |

• Vision Sensors

• Ultrasonic Sensors

• Inclination Sensors

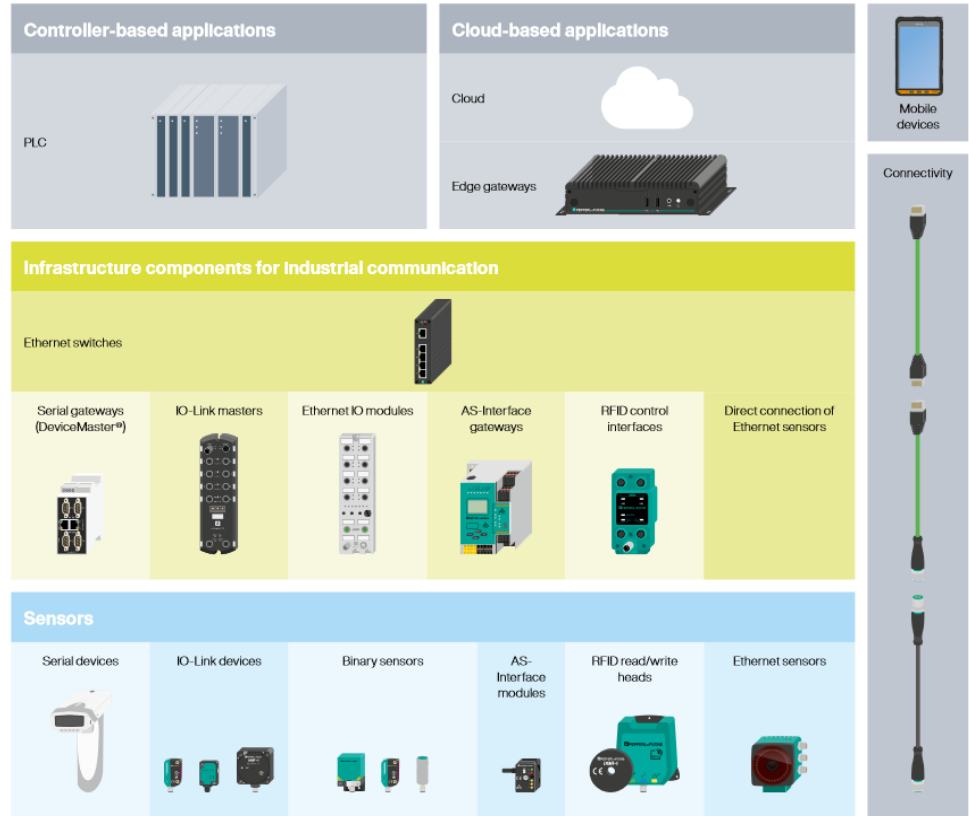• Rotary Encoders

• Positioning Systems

• RFID Systems

• Industrial Communication

• Connectivity

# Network Overview
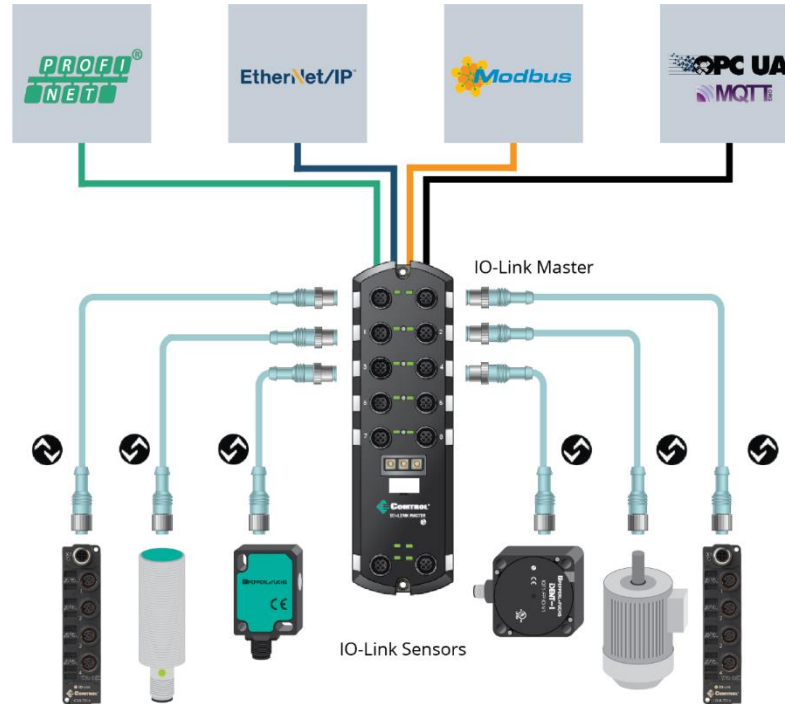
Industrial Ethernet can have different meanings

# IO-Link Masters IOT

**Industrial Ethernet**

# WHAT IS IO-LINK?

IO-Link is a bi-directional point-to-point serial communication protocol used to communicate with sensors and/or actuators. Electrical Layer - PNP, NPN or 4-20mA outputs for sensors. IO-Link is now another option.

# IO-Link Master Gateways



1. **MultiLink™ -** Allows for communication with Ethernet/IP *or* PROFINET/IO and ***SIMULTANEOUSLY:***
   - *OPC UA, MQTT, Modbus TCP*
2. IP67 and DIN-Rail options for Masters
3. All Ports Configurable (IO-Link, DI, DO)
4. Class 1 and 3 Ethernet/IP supported
   - ***Do not have to upgrade older PLC's, supports Micrologix, SLC, PLC-5***
5. Advanced IO-Link functionality and Block Backup

# MultiLink™ - Simultaneously Provides IO-Link device Access to Multiple Controllers
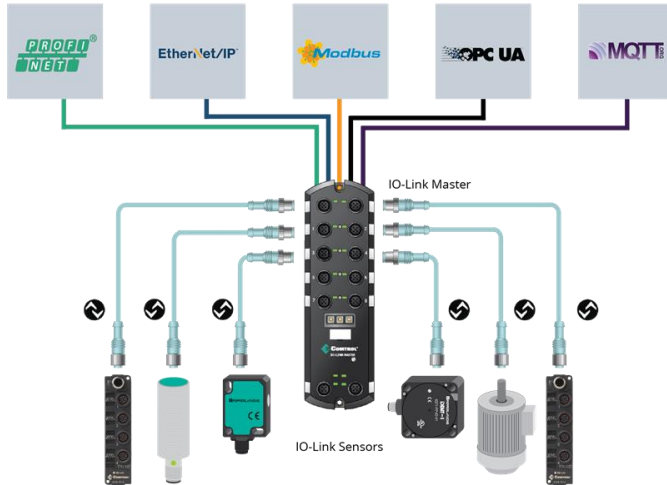


P+F MultiLink™ technology allows our IO-Link Masters to simultaneously provide sensor Process data to multiple control platforms:

- **ICE 2** = EtherNet/IP
- **ICE 3** = Profinet
- **Both ICE2/3 include OPC UA, Modbus TCP, MQTT**
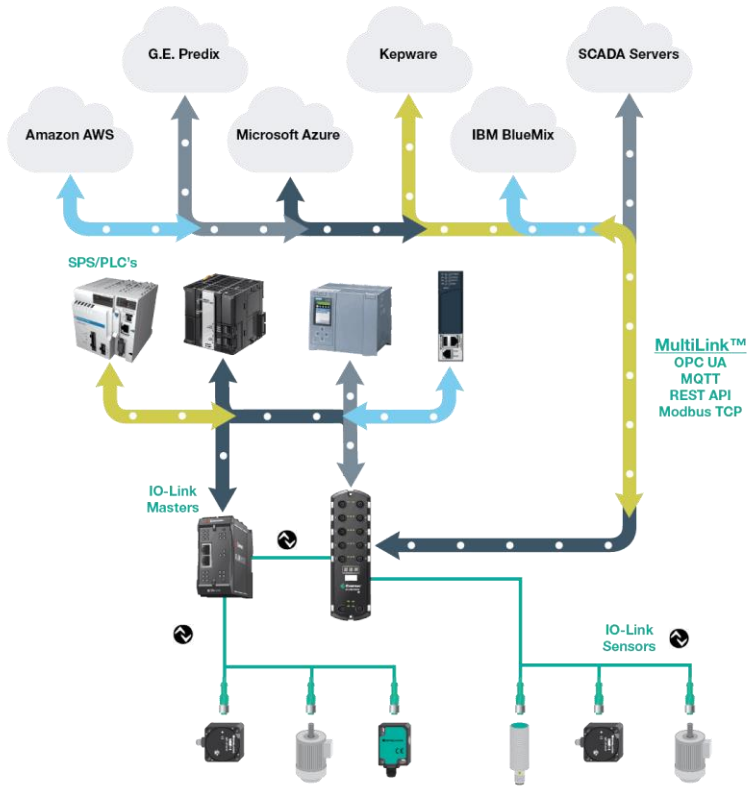
# Application- Machine Builder/OEM
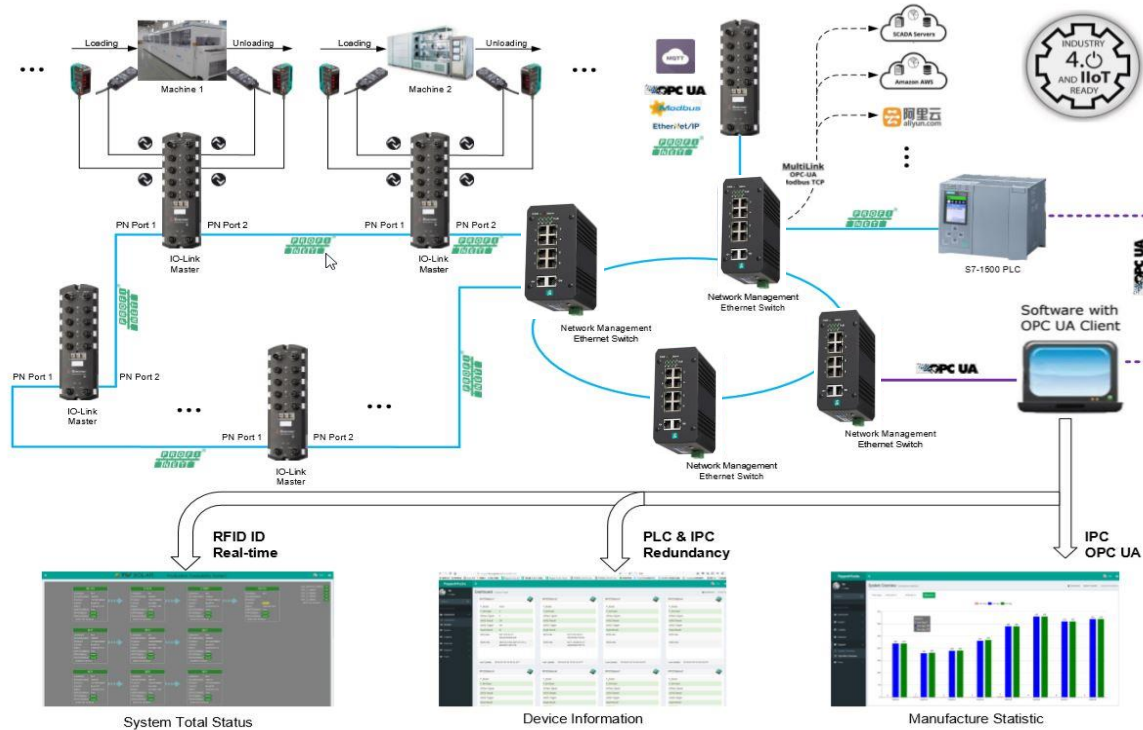
## Application: Robotic End of Arm Tooling

- laser scanners (R2000 family) and two ICE2 IOLM used to develop information about the interaction with picking target and robotic arm/tooling
- 3D cameras could not be used because of the range
- Opted for IO-Link because the protocol interface is fast, efficient and offers a high density

# DeviceMaster® ICDM PLatform Serial to Ethernet Gateways

**Configuration Options-**

- EtherNet/IP or Profinet to serial, Modbus TCP or remote Modbus slave devices
- EtherNet/IP or Profinet controllers to a wide variety of Modbus masters
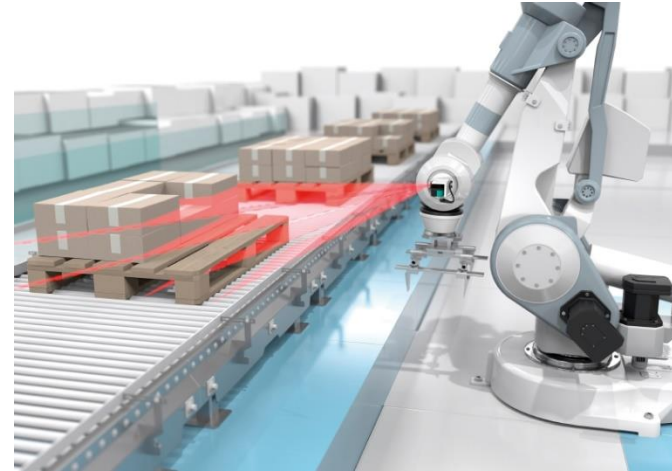- Modbus masters to other Modbus masters, and Modbus slaves to other slaves
- Modbus masters to serial, Modbus TCP or remote serial slaves

- Modbus concentrator lessons the load on Modbus and/or EtherNet/IP controllers
- Quickly diagnose problems with System Snapshot
- Backup/Restore configuration feature

# Industrial Gateways

## Supported Protocols and Availability

| Industrial Ethernet Gateways | ICDM-RX/TCP-DB9/RJ45-PM | ICDM-RX/TCP-DB9/RJ45-DIN | ICDM-RX/TCP-ST/RJ45-DIN | ICDM-RX/TCP-2ST/RJ45-DIN | ICDM-RX/TCP-2DB9/RJ45-DIN | ICDM-RX/TCP-4DB9/2RJ45-DIN | ICDM-RX/TCP-4DB9/2RJ45-PM | ICDM-RX/TCP-8DB9/2RJ45-PM | ICDM-RX/TCP-16RJ45/RJ45-RM | ICDM-RX/TCP-16DB9/RJ45-RM | ICDM-RX/TCP-32RJ45/2RJ45-RM |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EtherNet/IP™ | ICDM-RX/EN-DB9/RJ45-PM | ICDM-RX/TCP-DB9/RJ45-DIN | ICDM-RX/EN-ST/RJ45-DIN | ICDM-RX/EN-2ST/RJ45-DIN | ICDM-RX/EN-2DB9/RJ45-DIN | ICDM-RX/EN-4DB9/2RJ45-DIN | N/A | N/A | N/A | N/A | N/A |
| PROFINET IO | ICDM-RX/PN-DB9/RJ45-PM | ICDM-RX/PN-DB9/RJ45-DIN | ICDM-RX/PN-ST/RJ45-DIN | ICDM-RX/PN-2ST/RJ45-DIN | ICDM-RX/PN-2DB9/RJ45-DIN | ICDM-RX/PN-4DB9/2RJ45-DIN | N/A | N/A | N/A | N/A | N/A |
| MODBUS TCP | ICDM-RX/MOD-DB9/RJ45-PM | ICDM-RX/MOD-DB9/RJ45-DIN | ICDM-RX/MOD-ST/RJ45-DIN | ICDM-RX/MOD-2ST/RJ45-DIN | ICDM-RX/MOD-2DB9/RJ45-DIN | ICDM-RX/MOD-4DB9/2RJ45-DIN | N/A | N/A | N/A | N/A | N/A |
| EtherNet/IP™ to MODBUS | ICDM-RX/EN1-DB9/RJ45-PM | ICDM-RX/EN1-DB9/RJ45-DIN | ICDM-RX/EN1-ST/RJ45-DIN | ICDM-RX/EN1-2ST/RJ45-DIN | ICDM-RX/EN1-2DB9/RJ45-DIN | ICDM-RX/EN1-4DB9/2RJ45-DIN | N/A | N/A | N/A | N/A | N/A |
| PROFINET IO to MODBUS | ICDM-RX/PN1-DB9/RJ45-PM | ICDM-RX/PN1-DB9/RJ45-DIN | ICDM-RX/PN1-ST/RJ45-DIN | ICDM-RX/PN1-2ST/RJ45-DIN | ICDM-RX/PN1-2DB9/RJ45-DIN | ICDM-RX/PN1-4DB9/2RJ45-DIN | N/A | N/A | N/A | N/A | N/A |

## Hardware

| Number of Ports: 10/100BASE-TX | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 |
| Number of Serial Ports | 1 x RS232/422/485 | 1 x RS232/422/485 | 1 x RS232/422/485 | 2 x RS-232/422/485 | 2 x RS-232/422/485 | 4 x RS-232/422/485 | 4 x RS-232/422/485 | 8 x RS-232/422/485 | 16 x RS-232/422/485 | 16 x RS-232/422/485 | 32 x RS-232/422/485 |

Pepperl+Fuchs availability     Pepperl+Fuchs availability coming soon

**Industrial Ethernet**

# RocketLinx Models



| Item no. | Type code | Description | Availability |
|---|---|---|---|
| 70104880 | ICRL-U-5RJ45-DIN | RocketLinx unmanaged 5-port switch, extended temperature | ✓ |
| 70104881 | ICRL-U-8RJ45-DIN | RocketLinx umanaged 8-port switch, extended temperature | ✓ |
| 70114052 | ICRL-U-5RJ45-DIN-NT | RocketLinx unmanaged 5-port switch | ✓ |
| 70114053 | ICRL-U-8RJ45-DIN-NT | RocketLinx Unmanaged 8-Port switch | ✓ |
| 70114054 | ICRL-U-5RJ45-G-DIN | RocketLinx unmanaged 5-port gigabit switch, extended temperature | ✓ |
| 70114055 | ICRL-U-4RJ45/SFP-G-DIN | RocketLinx unmanaged 4-port +1 SFP gigabit switch, extended temperature | ✓ |
| 70114058 | ICRL-M-8RJ45/4SFP-G-DIN | RocketLinx managed 8-port + 4 SFP gigabit switch, extended temperature | ✓ |
| 70114060 | ICRL-M-16RJ45/4CP-G-DIN | RocketLinx managed 16-port + 4 RJ45/SFP combo gigabit switch, extended temperature | ✓ |

# RocketLinx Model Comparison



| Switch Models | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Type code | ICRL-U-5RJ45-DIN | ICRL-U-5RJ45-DIN-NT | ICRL-U-8RJ45-DIN | ICRL-U-8RJ45-DIN-NT | ICRL-U-5RJ45-G-DIN | ICRL-U-4RJ45/SFP-G-DIN | ICRL-M-8RJ45/4SFP-G-DIN | ICRL-M-16RJ45/4CP-G-DIN |
| Item number | 70104880 | 70114052 | 70104881 | 70114053 | 70114054 | 70114055 | 70114058 | 70114060 |
| | Unmanaged | Unmanaged | Unmanaged | Unmanaged | Unmanaged | Unmanaged | Managed | Managed |
| **Communication** | | | | | | | | |
| Fast Ethernet ports | 5 | 5 | 8 | 8 | N/A | N/A | N/A | N/A |
| Gigabit ports | N/A | N/A | N/A | N/A | 5 | 4 | 8 | 16 |
| Gigabit SFP fiber ports | N/A | N/A | N/A | N/A | N/A | 1 | 4 | N/A |
| Gigabit/fiber combo ports | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 4 |
| **Physical** | | | | | | | | |
| Housing | Aluminum | Aluminum | Aluminum | Aluminum | Steel | Steel | Aluminum | Aluminum |
| Mounting style | DIN-Rail | DIN-Rail | DIN-Rail | DIN-Rail | DIN-Rail | DIN-Rail | DIN-Rail | DIN-Rail |
| Degree of protection | IP30 | IP30 | IP30 | IP30 | IP30 | IP30 | IP30 | IP30 |
| **Power** | | | | | | | | |
| Input power | 18-32 V DC | 18-32 V DC | 10-60 V DC | 10-60 V DC | 10-60 V DC | 10-60 V DC | 10-36 V DC | 10-60 V DC |
| Dual power input | N/A | N/A | Yes | Yes | Yes | Yes | Yes | Yes |
| Alarm relay | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **Management** | | | | | | | | |
| CLI | N/A | N/A | N/A | N/A | N/A | N/A | **Yes** | **Yes** |
| Web | N/A | N/A | N/A | N/A | N/A | N/A | **Yes** | **Yes** |
| PortVision | N/A | N/A | N/A | N/A | N/A | N/A | **Yes** | **Yes** |
| **Environment** | | | | | | | | |
| Operating temperature | -40 °C to 75 °C | -25 °C to 70 °C | -40 °C to 75 °C | -25 °C to 70 °C | --40 °C to 75 °C | -40 °C to 75 °C | --40 °C to 75 °C | -40 °C to 75 °C |
| **Compliance** | | | | | | | | |
| C1D2 | **Yes** | N/A | **Yes** | N/A | N/A | N/A | N/A | N/A |
| NEMA TS2 | N/A | N/A | N/A | N/A | N/A | N/A | **Yes** | **Yes** |
| EN50121-4 | N/A | N/A | N/A | N/A | **Yes** | **Yes** | **Yes** | **Yes** |

**Industrial Ethernet**

- Material Handling

# Applications

Material handling involves equipment from conveyor belts to forklifts. Many of these devices rely on sensor data and are network controlled. The RocketLinx line of switches is a good fit for reliably enabling the network connectivity of this equipment.

**Key Criteria:**

- Wide operating temperature ranges

- Fiber connectivity for long cable runs
- Ethernet Wifi component for Mobility

- No moving parts make switches more resilient to shock and vibration

- Redundant ring protocol enables 20 ms or less recovery time when a link goes down
- IO-Link for RFID / Barcode / Sensors on forklift

**Industrial Ethernet**
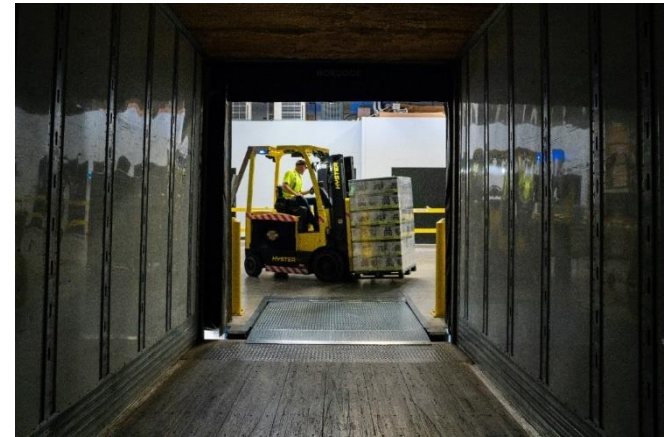
- Wastewater Treatment

# Applications

Wastewater treatment relies on sensor data to determine the waste levels in treated water, the number of treatment chemicals to use, and whether water has been treated to required standards. All collected sensor information must be transmitted to PLCs and HMIs.

**Key Criteria:**

- Wide operational temperature range

- Modbus devices & Network redundancy capabilities

- Modbus HMI's, SCADA and PLCS

- Network error reporting capabilities (could indicate network link or sensor damage)

- Fiber connectivity for long cable runs

**Industrial Ethernet**

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