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IO-Link application in factory automation

Industrial Automation
Competence Center

Factory automation tomorrow with IO-Link

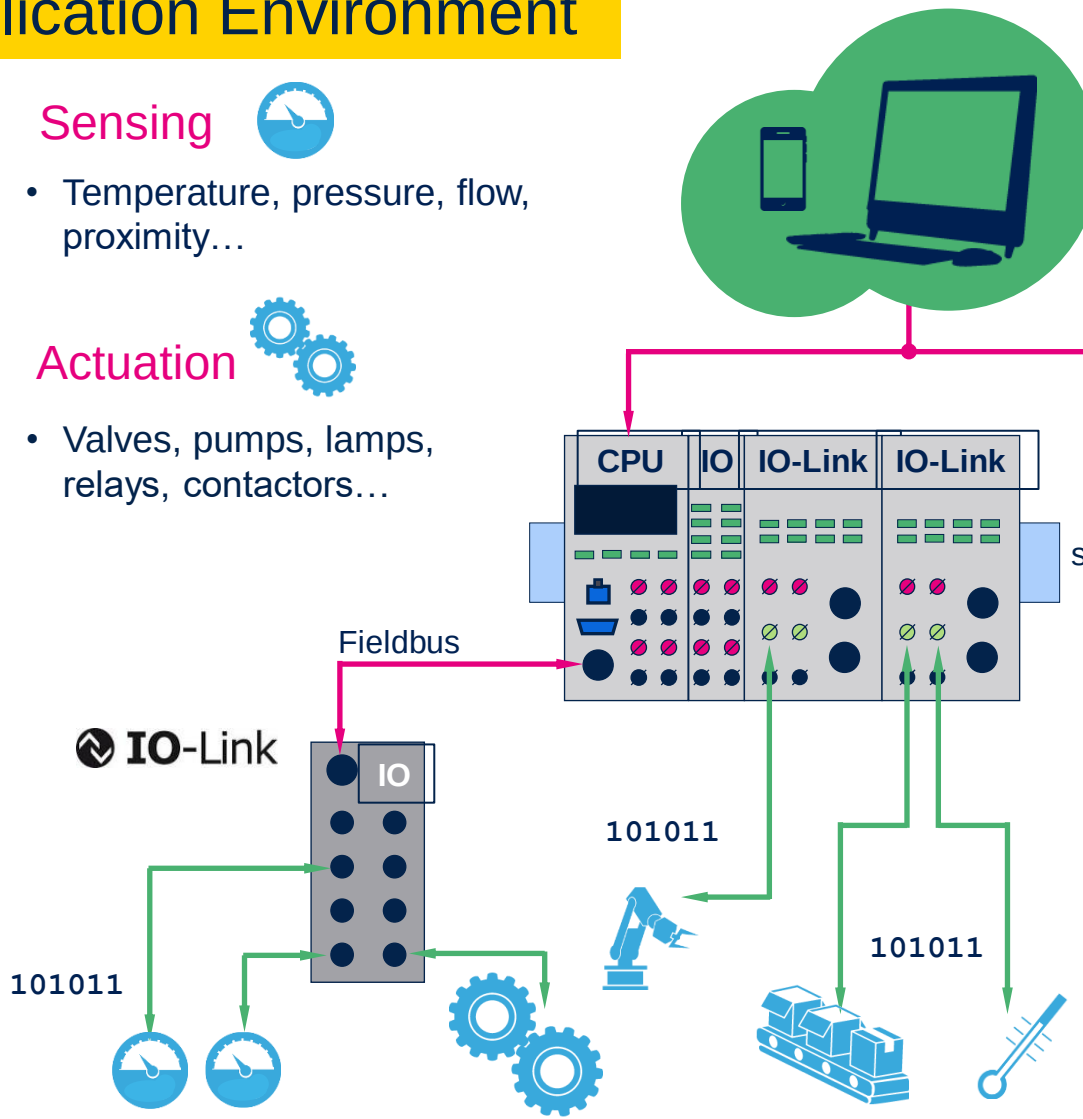
Typical Application Environment

Sensing

- Temperature, pressure, flow, proximity…

Actuation

- Valves, pumps, lamps, relays, contactors…



System attributes:

Unified access to sensors & actuators	Simplified & modular system structure
Digital information transfer	Reliable communication
Bidirectional communication	Allows use of smart sensors & actuators!
	Easy monitoring & system diagnostics (minimized downtimes)

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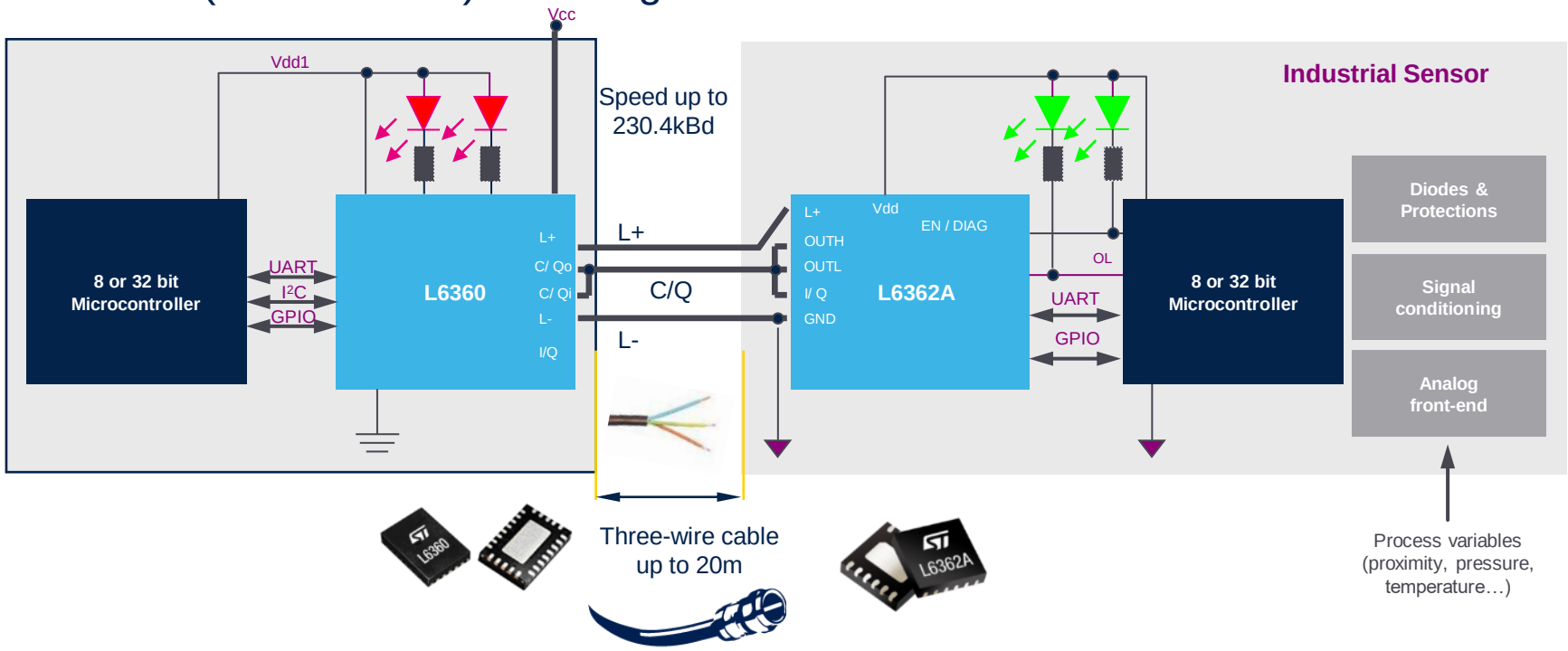
L6360 & I6362A
Master & device for IO-Link and general purpose transceivers

A smart way of driving 3 wires digital sensors and actuators

- First standardized technology for digital communication with sensors and actuators: **IEC 61131-9**
- **3-wire point-to-point digital** communication **compatible** with the conventional binary sensors & actuators (**Standard IO**) including the **cable material** and **connectors**!



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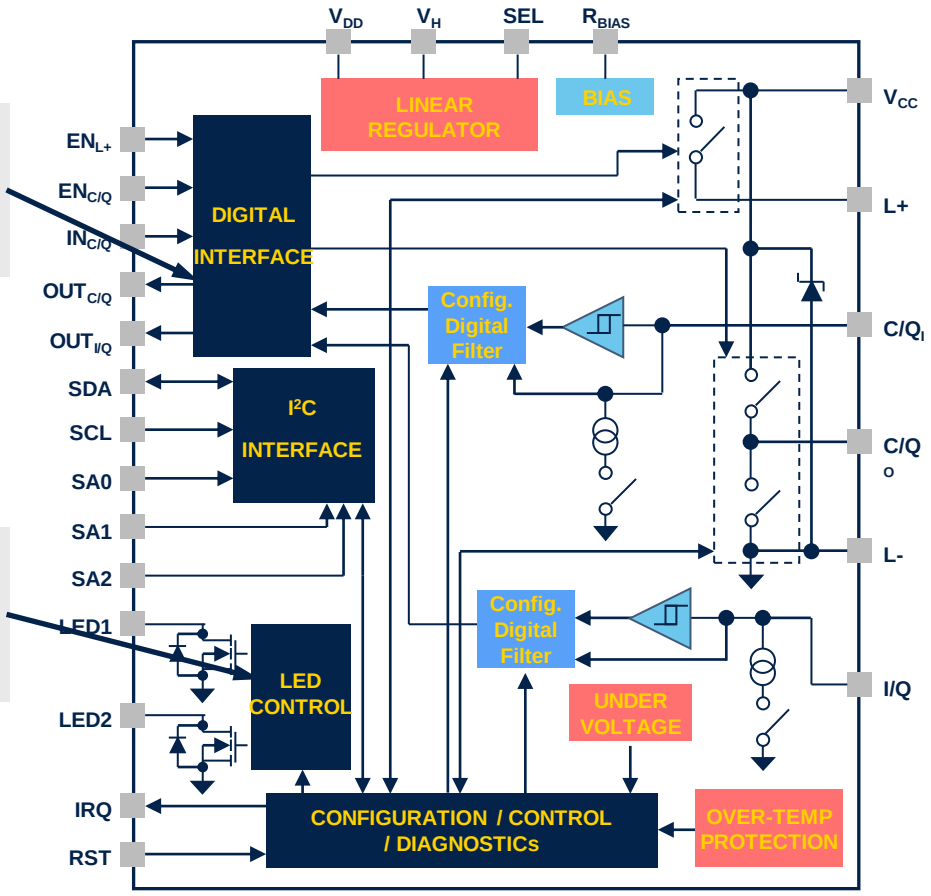
L6360

Key Features

Full configurability through I2C

Embedded LED Drivers & sequence generators



Configurable switches, very low R_{DSON} = $2\Omega_{max}$

Configurable digital filters

Very precise & programmable current generators (sinks)

Tiny package: QFN 3.5×5×1 mm

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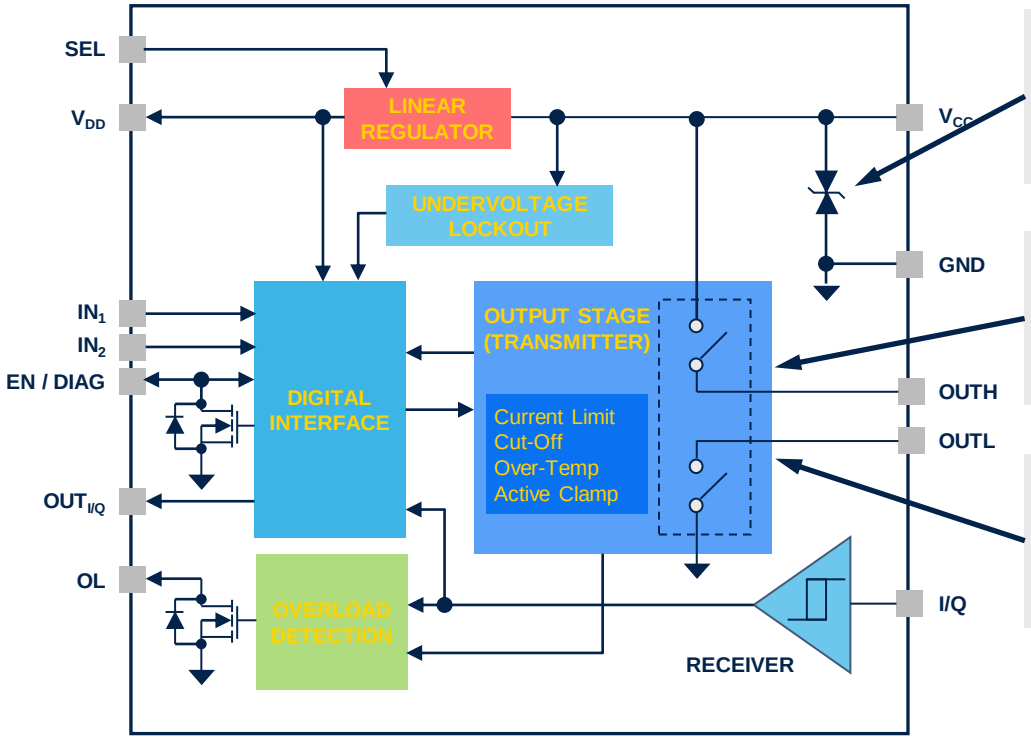
L6362A sensor transceiver

Key Features

Full reverse polarity protection

Embedded linear regulator 3.3V / 5V / 10mA

Up to **230mA** output Current with Overload and Cut-OFF protections



Surge protection on supply & communication lines

Extremely low R_{DSON} power stage $1\Omega_{typ}$

Flexibility to use High Side / Low Side or Push Pull

Tiny package: DFN 3×3×1 mm

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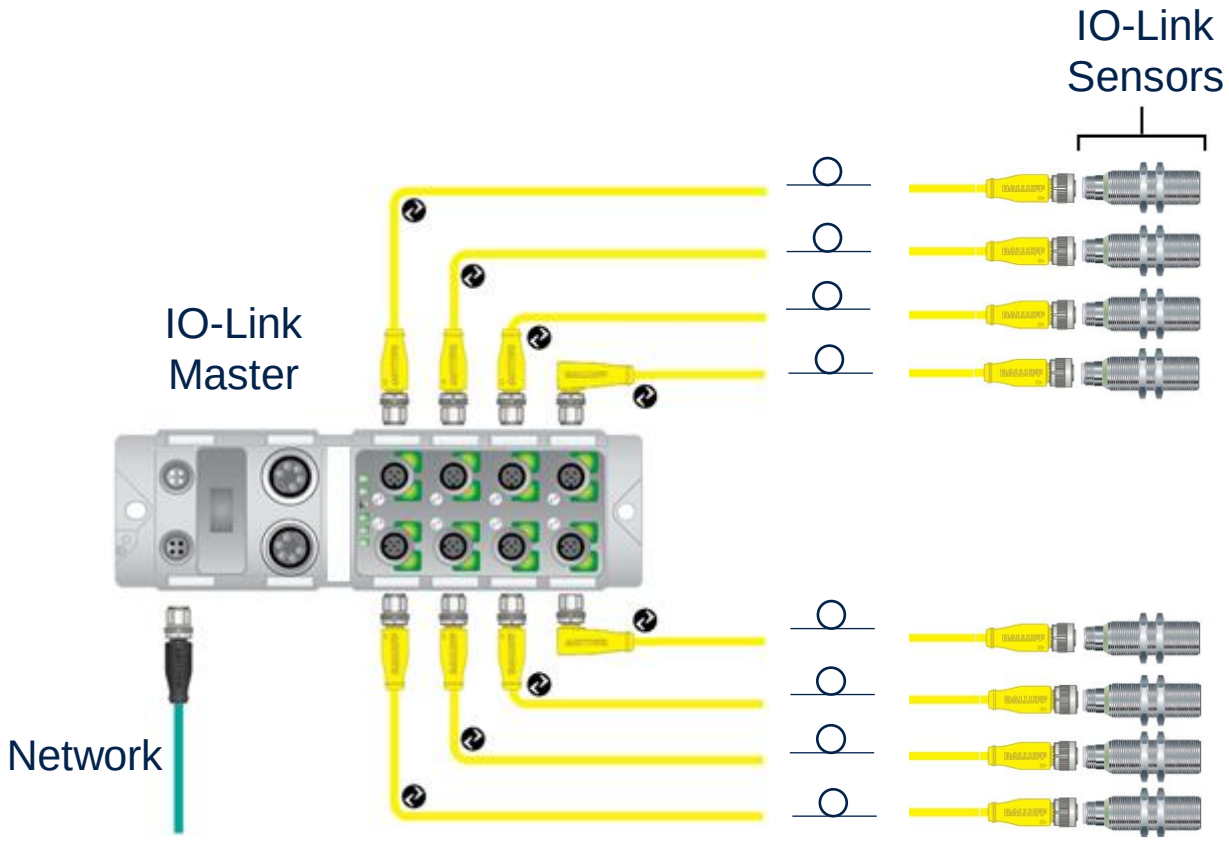
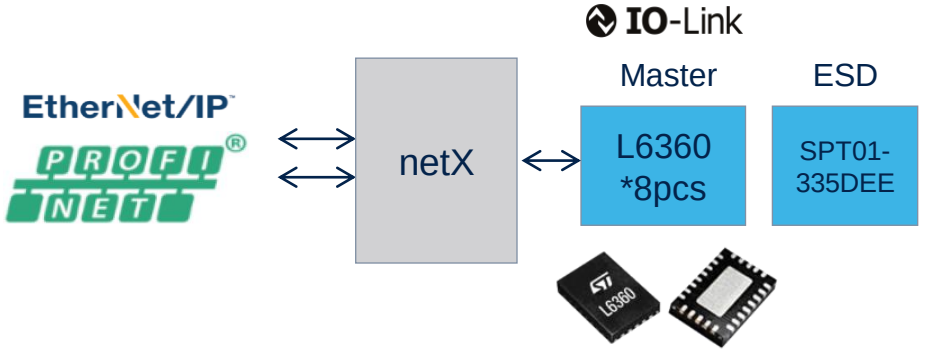
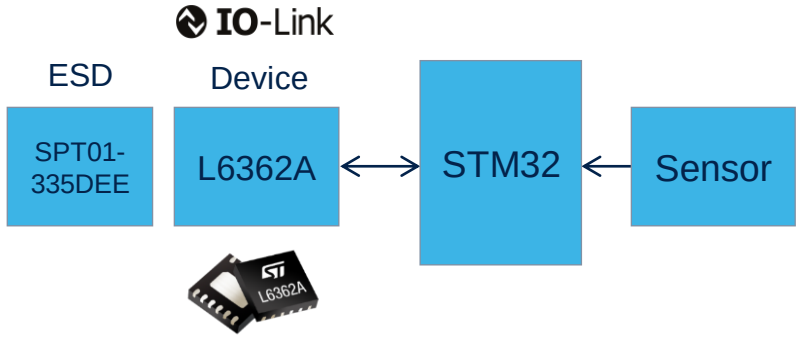
IO-Link master+node







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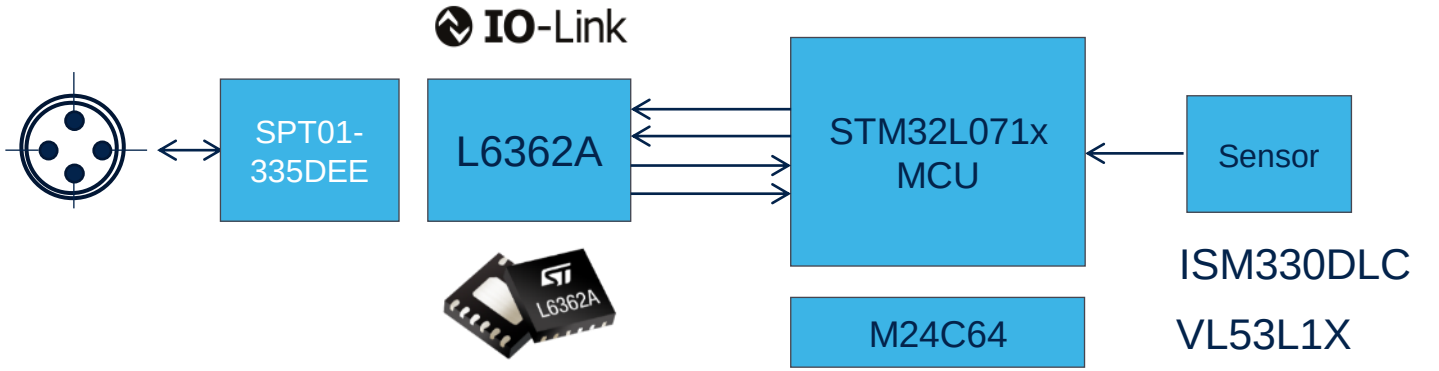
IO-Link sensor



ISM330DLC

VL53L1X

VL6180X

MP34DT05-A

- Position
- Pressure
- Flow
- Level
- Temperature
- Proximity
- Inclination
- Encoder, Linear Position
- Cabinet Condition Monitoring
- Ultrasonic/Photoelectric
- Inductive Couplers…

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P-NUCLEO-IOD01A1
STM32 Nucleo pack for IO-Link device fully compatible

The P-NUCLEO-IOD01A1 is designed around the STEVAL-IOD003V1

IO-Link

Stack v.1.1 embedded

Key Features

Equipped with Arduino UNO R3 connectors and compatible with STM32 Nucleo boards:

- STEVAL-IOD003V1
- IO-Link (PHY) device layer based on L6362A
- Operating voltage range 6.5 to 35 V
- UART interface
- Linear regulators for independent supply from +24 V bus (12 mA 3.3 V and 100 mA 12 V)
- LEDs for status and diagnostics
- Overload and overheating protections with non-dissipative cut-off function
- Full reverse polarity on IO-Link interface pins
- EMC protections according to IO-Link V1.1 and IEC 60947-5-2Ground and V_{CC} wire break protections

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STEVAL-IDP004V2
IO-Link master multi-port evaluation board based on L6360

The STEVAL-IDP004V2 evaluation board with STM32 microcontroller has four L6360

IO-Link

Stack v.1.1 embedded

Key Features

- Main supply voltage 32 V maximum
- 4 L6360 IO-Link master devices
- RS-485, CAN, USB interface
- DC-DC converter
- On-board reverse polarity protection
- Designed to meet IEC requirement for industrial standards
- RoHS and WEEE compliant

Multi-port master based on serial asynchronous communication to support the IO-Link protocol.
Each node is equipped with an industrial M12 connector (as required by the standard) for connection with a single slave node using a cable 20 meter long.
Wire is a normal three-pole: one for the IO-Link bus, one for the L+ line (positive supply voltage pole) and one for the L- line (negative supply voltage pole).

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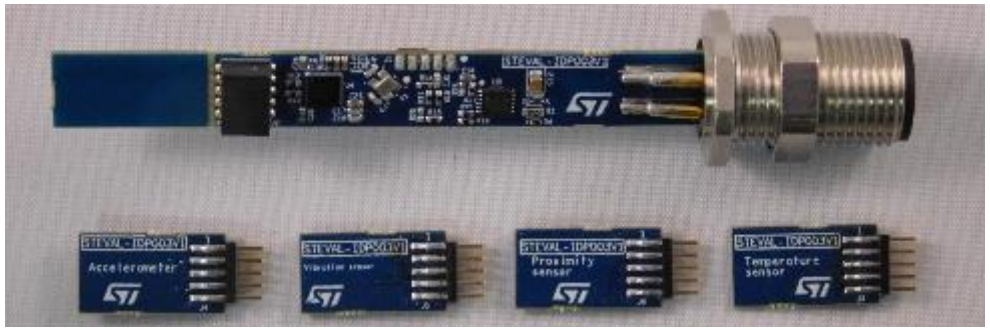
STEVAL-IDP003V1
IO-Link industrial modular sensor board based on L6362A

The STEVAL-IDP003V1D evaluation board based on the L6362A IO-Link device transceiver

The STEVAL-IDP003V1 is a kit with 5 PCBs

STEVAL-IDP003V1D



STEVAL-IDP003V1A

STEVAL-IDP003V1V

STEVAL-IDP003V1P

STEVAL-IDP003V1T

IO-Link

Stack v.1.1 embedded

Key Features

- Main supply voltage: 32 V maximum
- STM32L071CZ microcontroller
- IO-Link PHY using the L6362A device for data communication with host unit
- DC-DC converter and linear regulator on board
- Integrated reverse polarity protection on L6362A ICs
- Multi-sensor connection
- 400 kHz I²C communication
- PCB designed to accept real industrial sensors (8 mm x 70 mm, with 0.8 mm thickness)
- Designed to meet IEC industrial standard requirements
- RoHS compliant

The evaluation board is equipped with an industrial M12 connector (required by the standard) for connection with a single master IC using a 20-meter cable. The wire is a normal three-pole wire: one for IO-Link data, one for the L+ line (positive supply voltage pole) and one for the L- line (negative supply voltage pole).

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