**Autonics**

# Remote I/O Boxes
## IO-Link Hub Type
## Analog Input Type

# ADIO Series
## PRODUCT MANUAL

**For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.**
The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

## Features

- Upper level communication protocol: IO-Link ver. 1.1 (port class: Class A)
- Housing material: Zinc die casting
- Protection rating: IP67, IP69K
- I/O port setting and status monitoring
  (cable short circuit and connection status, etc.)

CE UKCA cULus LISTED KC ◈ IO-Link

## Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

⚠ **Warning** Failure to follow instructions may result in serious injury or death.

01. **Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss.(e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)**
    Failure to follow this instruction may result in personal injury, economic loss or fire.
02. **Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity may be present.**
    Failure to follow this instruction may result in explosion or fire.
03. **Do not connect, repair, or inspect the unit while connected to a power source.**
    Failure to follow this instruction may result in fire.
04. **Check 'Connections' before wiring.**
    Failure to follow this instruction may result in fire.
05. **Do not disassemble or modify the unit.**
    Failure to follow this instruction may result in fire.
06. **Do not touch the product during operation or for a certain period of time after stopping.**
    Failure to follow this instruction may result in burn.

⚠ **Caution** Failure to follow instructions may result in injury or product damage.

01. **Use the unit within the rated specifications.**
    Failure to follow this instruction may result in fire or shortening the life cycle of the product.
02. **Use a dry cloth to clean the unit, and do not use water or organic solvent.**
    Failure to follow this instruction may result in fire.
03. **Keep the product away from metal chip, dust, and wire residue which flow into the unit.**
    Failure to follow this instruction may result in fire or product damage.
04. **Connect the cable correctly and prevent poor contact.**
    Failure to follow this instruction may result in fire or product damage.
05. **Do not connect or cut off the wire of the cable while operating the unit.**
    Failure to follow this instruction may result in fire or product damage.

## Cautions during Use

- Follow instructions in 'Cautions during Use'.
  Otherwise, it may cause unexpected accidents.
- The UA power (actuator power) and US power (sensor power) should be insulated by the individually isolated power device.
- Power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Use the rated standard cables and connectors. Do not apply excessive power when connecting or disconnecting the connectors of the product.
- Keep away from high voltage lines or power lines to prevent inductive noise.
  In case installing power line and input signal line closely, use line filter or varistor at power line and shielded wire at input signal line.
  For stable operation, use shield wire and ferrite core, when wiring communication wire, power wire, or signal wire.
- Do not use near the equipment which generates strong magnetic force or high frequency noise.
- Do not connect, or remove this unit while connected to a power source.
- This unit may be used in the following environments.
  - Indoors (in the environment condition rated in 'Specifications')
  - Altitude max. 2,000 m
  - Pollution degree 2
  - Installation category II

## Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

**ADIO - ❶ - ❷ ❸ ❹ ❺ ❻ ❼ ❽ - ❾**

**❶ Communication**
IL: IO-Link
**❷ Material**
M: Zinc die casting
**❸ Port class**
A: Class A
**❹ Ports**
08: 8-port
**❺ I/O connector type**
No mark: M12

**❻ I/O configuration**
E: Analog input, 8-CH
**❼ Power connector type**
A: Auxiliary power unsupported
**❽ I/O specification**
A1: Voltage input (-10 to 10 VDC⎓, 0 to 10 VDC⎓)
　　Current input (0 to 20 mA, 4 to 20 mA)
**❾ IO-Link product type**
HUB3: IO-Link hub (transmission rate: COM3)

## Product Components

- Product × 1
- Name plates × 20
- M4×10 screw with washer × 1
- Instruction manual × 1
- Waterproof cover × 4

## Sold Separately

| Sold separately | Appearance | Packaging unit |
|---|---|---|
| Name plates: NAMEP-1-10 | | × 10 |
| Waterproof cover: P96-M12-2 [01] | | × 1 |

01) The protection rating of the product is guaranteed when using the waterproof cover.

## Software

Download the installation file and the manuals from the Autonics website.

### ■ atIOLink

The Port and Device Configuration Tool (PDCT) software, atIOLink, is designed for configuring, diagnosing, and maintaining IO-Link devices using an IODD file.

- IODD (IO-Link Device Description)

This file contains information such as manufacturer details, process data, diagnostic data, and parameter settings for a sensor using IO-Link communication.
By uploading the IODD file to the PDCT software, you can check the settings and communication data based on the user interface.
You can download the IODD file from the Autonics website.

## ISDU Parameters and Functions

### ■ Process data input

- Port □ switch point 1 / 2
- Analog value port □
- Port □ pin 1 short
- Port □ analog value underflow
- Port □ analog value overflow
- Low supply voltage

### ■ Parameter configuration

- Process data alignment
- Analog mode
- Resolution
- Pin assignment
- Process data format
- Switch point 1, 2
- Switch point enable
- Operating hours alarm setting
- Data storage lock
- Restore factory settings

### ■ Diagnosis

- Operating hours

## Configuration of ADIO IO-Link Hub

The figure below shows the ADIO IO-Link Hubs and the devices that make up the configuration. For proper use of the product, refer to the manuals and be sure to follow the safety precautions in the manuals.
You can download the relevant manuals from the Autonics website.
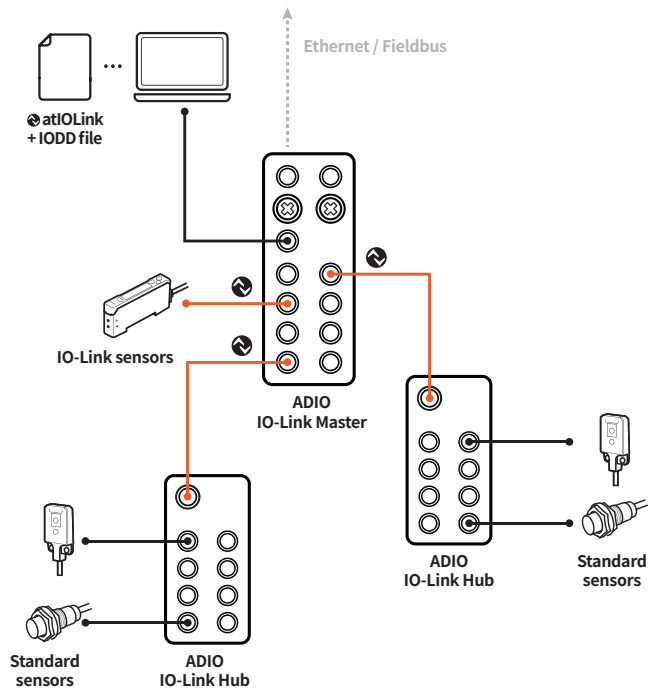


| Step | | Reference manual |
|---|---|---|
| **1. Hardware installation** Mounting and grounding, connecting the ports | → | ADIO IO-Link Master Product Manual, ADIO IO-Link Hub Product Manual |
| **2. Power supply** IO-Link master: Connecting the power ⬇ IO-Link hub: Connecting the power (power supply through the IO-Link master) | → | ADIO IO-Link Master Product Manual, ADIO IO-Link Hub Product Manual |
| **3. Parameter configuration** IO-Link master: Configuring the communication mode of ports connected to the IO-Link hub • Pin 4 (C/Q): IO-Link mode ⬇ IO-Link hub: Configuring the parameters and functions | → | ADIO IO-Link Hub Product Manual, atIOLink User Manual |
| **4. Verification of normal operation** Checking the indicators | → | ADIO IO-Link Master Product Manual, ADIO IO-Link Hub Product Manual |

## Unit Descriptions
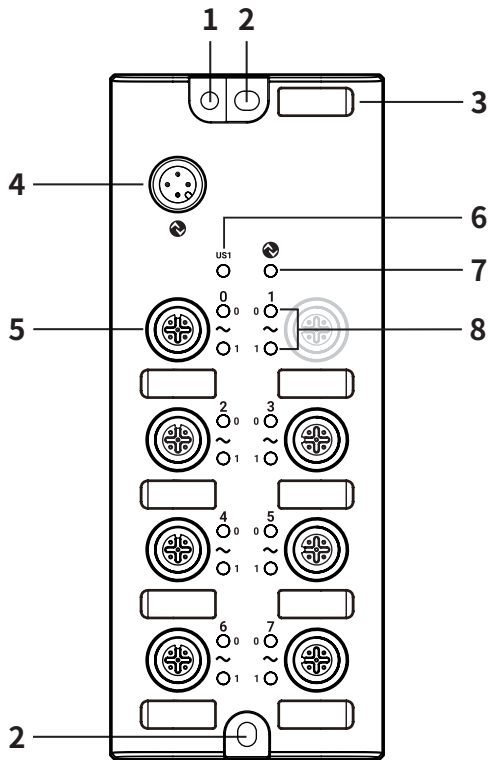


01. **Grounding hole**
02. **Mounting hole**
03. **Insertion part for the name plate**
04. **IO-Link port**
05. **Standard I/O port**
06. **Power supply status indicator**
07. **IO-Link status indicator**
08. **Standard I/O port status indicator**

### ■ Port specifications

Before connecting the device, be sure to check the port specifications below and select the correct connector cable. We recommend that the selected connector cable comply with the protection ratings of IP67 or IP69K.
• IO-Link port: We do not recommend using M12 connector cables manufactured by Autonics.
• Standard I/O port: If you are using a standard sensors, you can find the relevant connector cables in the 'M8/M12 Connector Cable Product Manual.'

|  | IO-Link port | Standard I/O port |
|---|---|---|
| **Connector type** | M12 (Plug-Male), A-coded | M12 (Socket-Female), A-coded |
| **Number of pins** | 4-pin | 4-pin |
| **Number of ports** | 1 | 8 |
| **Tightening torque** | 0.6 N m | 0.6 N m |
| **Push-Pull** | - | YES |
| **Functions** | IO-Link communication connection and power supply | External standard sensors connection |

## Dimensions

• Unit: mm, For the detailed dimensions of the product, follow the Autonics website.
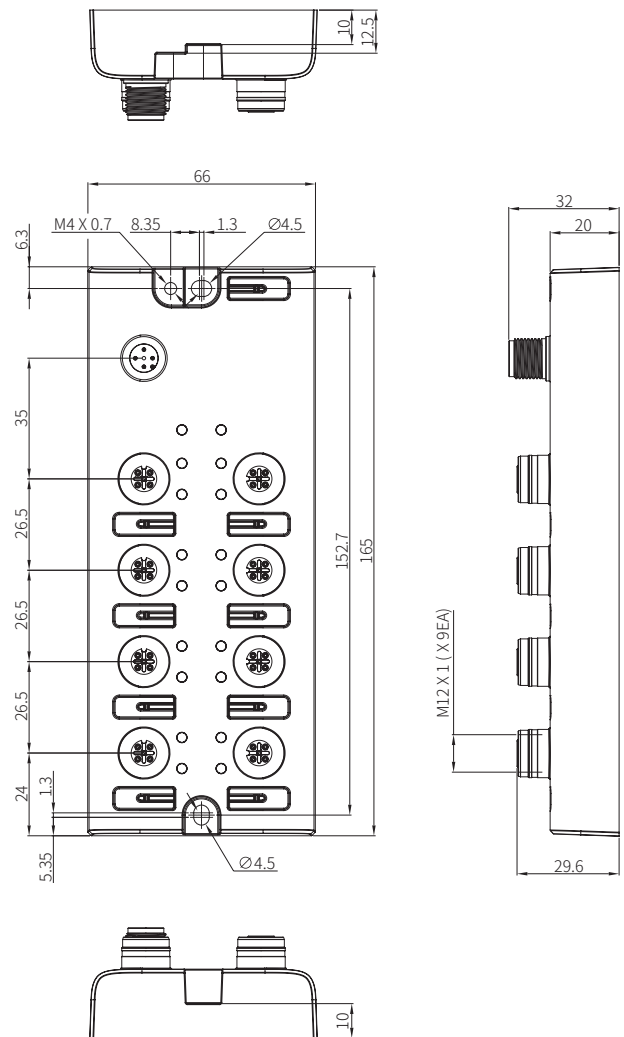
## Installation and Grounding

### ■ Mounting

01. Prepare a flat or metal panel in the enclosure.
02. Drill a hole to mount and ground the product on the surface.
03. Turn off all power.
04. Fix the product using M4 screws in the mounting holes.
    Tightening torque: 1.5 N m
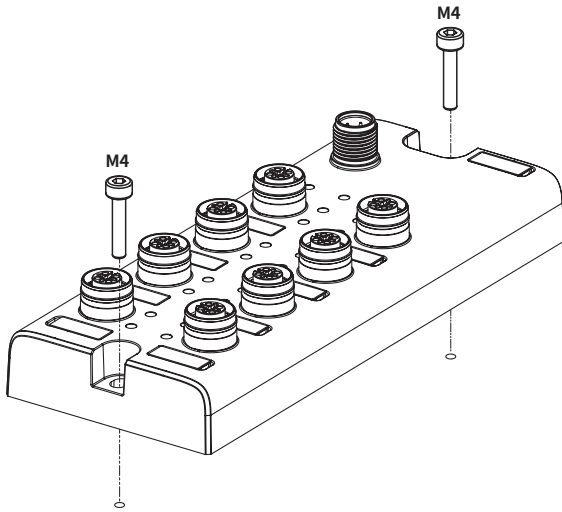


### ■ Grounding

⚠ Be sure to use a cable with low impedance and as short as possible for connecting the housing to the product.

01. Connect the grounding strap and M4×10 screw with washer.
02. Fix the screw in the grounding hole.
    Tightening torque: 1.2 N m
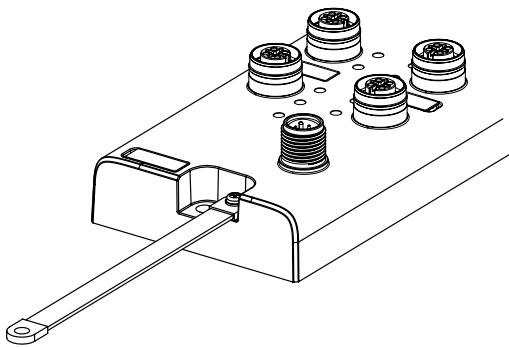


## Connections

⚠ Make sure that the total power consumption of the ADIO hub does not exceed a maximum of 4 A, and be sure to use the provided waterproof covers for any unused standard I/O ports.
Otherwise, the protection rating of the product cannot be guaranteed.

### ■ IO-Link port

• The port type: M12 (Plug-Male), 4-pin, A-coded
• Connected to the I/O ports of the ADIO IO-Link master, it is possible to supply power and establish IO-Link communication for the ADIO IO-Link hub.
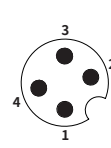


| Pin | Function | Description |
|-----|----------|-------------|
| 1 | +24 VDC⎓, 4 A (US1) | Supply power from the IO-Link master |
| 2 | N.C. | Not connected |
| 3 | GND | Electrical grounding, 0 V |
| 4 | C/Q (IO-Link) | IO-Link data channel |

### ■ Standard I/O port

• The port type: M12 (Socket-Female), 4-pin, A-coded
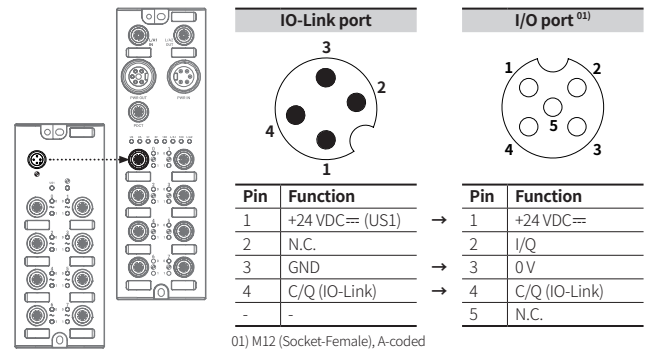• Connected to the standard sensors.



| Pin | Function | Description |
|-----|----------|-------------|
| 1 | +24 VDC⎓, 150 mA (L+) | Supply power [01] |
| 2 | Input (B) | Voltage / Current input |
| 3 | GND (L-) | Electrical grounding, 0 V |
| 4 | Input (A) | Voltage / Current input |

01) A short circuit between Pins 1, 2, and 4 may result in product damage.

### ■ Example of wiring
### (ADIO IO-Link hub to ADIO IO-Link master)



| IO-Link port | | I/O port [01] | |
|-----|----------|-----|----------|
| Pin | Function | Pin | Function |
| 1 | +24 VDC⎓ (US1) → | 1 | +24 VDC⎓ |
| 2 | N.C. | 2 | I/Q |
| 3 | GND → | 3 | 0 V |
| 4 | C/Q (IO-Link) → | 4 | C/Q (IO-Link) |
| - | - | 5 | N.C. |

01) M12 (Socket-Female), A-coded

## Indicators

### ■ Status indicator

US1  

**01. ADIO IO-Link hub supply status**

| Indicator | LED status | Description |
|---|---|---|
| US1 | ● OFF | • Power supply is off. |
| | ● Green ON | • Power supply: Operating normally. |
| | ● Red ON | • Power supply: Operating at a low level.<br>  (< 18 VDC⎓) |

**02. IO-Link communication status**

| Indicator | LED status | Description |
|---|---|---|
| ⬙ | ● OFF | • IO-Link communication error. |
| | ◑ Flashing green | • IO-Link communication is running. |
| | ● Green ON | • IO-Link communication is in standby.<br>  (pre-operate) |

### ■ Standard I/O port status indicator
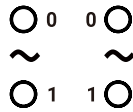
**01. Input status on Pin 4**

| Indicator | LED status | Description |
|---|---|---|
| 0 | ● OFF | • When the analog mode is set to OFF.<br>• No analog input signal. |
| | ● Orange ON | • When the pin assignment is set to Pin 4,<br>  the input signal is within the rated range. |
| | ● Red ON | • Short circuit between the L+ / L- (Pin 1, 3)<br>• The analog input value is out of the allowable<br>  input range (underflow, overflow). |

**02. Input status on Pin 2**

| Indicator | LED status | Description |
|---|---|---|
| 1 | ● OFF | • When the analog mode is set to OFF.<br>• No analog input signal. |
| | ● Orange ON | • When the pin assignment is set to Pin 2,<br>  the input signal is within the rated range. |
| | ● Red ON | • Short circuit between the L+ / L- (Pin 1, 3)<br>• The analog input value is out of the allowable<br>  input range (underflow, overflow). |

## Specifications

### ■ Electrical / Mechanical specifications

| Type | Analog Input |
|---|---|
| Model | ADIO-IL-MA08EAA1-HUB3 |
| Rated voltage / current | 24 VDC⎓, ≤ 4 A (±10%) |
| Supply current | 150 mA ±10% |
| Dimensions | W 66 × H 165 × D 32 (20) mm |
| Material | Zinc die casting |
| IO-Link port | M12 (Plug-Male), 4-pin, A-coded<br>Number of ports: 1 |
| Standard I/O port | M12 (Socket-Female), 4-pin, A-coded<br>Push-Pull connector supported<br>Number of ports: 8 |
| Mounting method | Mounting hole: fixed with M4 screw |
| Grounding method | Grounding hole: fixed with M4 screw |
| Unit weight (packaged) | ≈ 550 g (≈ 750 g) |

### ■ Analog input specifications

| Type | Analog Input | |
|---|---|---|
| Number of<br>input channels | 8-CH (1 channel in each port) | |
| Input type | Voltage input | Current input |
| Input range | -10 to 10 VDC⎓ (default value),<br>   0 to 10 VDC⎓ | 0 to 20 mA,<br>4 to 20 mA |
| Input allowable range | ±5% F.S. | ±5% F.S. |
| Input impedance | ≥ 500 kΩ | ≤ 30 Ω |
| Resolution | 10 / 12 / 14 / 16-bit (default value) | |
| Accuracy [01] | At room temperature: PV ±0.1% F.S.<br>At out of room temperature: PV ±0.3% F.S. | |

01) The range of room temperature: 25 °C ±5 °C

### ■ Environmental conditions

| | |
|---|---|
| Vibration | 1.5 mm double amplitude at frequency of 10 to 55 Hz<br>in each X, Y, Z direction for 2 hours |
| Shock | 400 m/s² (≈ 40 G) in each X, Y, Z direction for 3 times |
| Ambient temperature [01] | -5 to 70 °C, Storage: -25 to 70 °C<br>(no freezing or condensation) |
| Ambient humidity | 35 to 85%RH (no freezing or condensation) |
| Protection rating | IP67 (IEC standard), IP69K (DIN standard) |

01) UL approved ambient temperature: 45 °C

### ■ Certification

| Certification | C€ UK℗ c(UL)us LISTED Ⓚ ⬙ IO-Link |
|---|---|

## Communication Interface

### ■ IO-Link

| | |
|---|---|
| IO-Link version | 1.1 |
| IO-Link port class | Class A |
| Minimum cycle time | 5 ms |
| Transmission rate | COM3 (230.4 kbps) |
| IO-Link frame type | M-sequence TYPE_2_V |
| Cable length | ≤ 20 m |
| Size of<br>process data [01] | Process data input (PD In.): 22-byte<br>Process data output (PD Out.): N.A |
| Data storage | YES |
| IODD file | Download the IODD file from the Autonics website |
| Standard | IO-Link Interface and System Specification Version 1.1.2<br>IO-Link Test Specification Version 1.1.2 |

01) The process data input: IO-Link hub → IO-Link master<br>    The process data output: IO-Link master → IO-Link hub