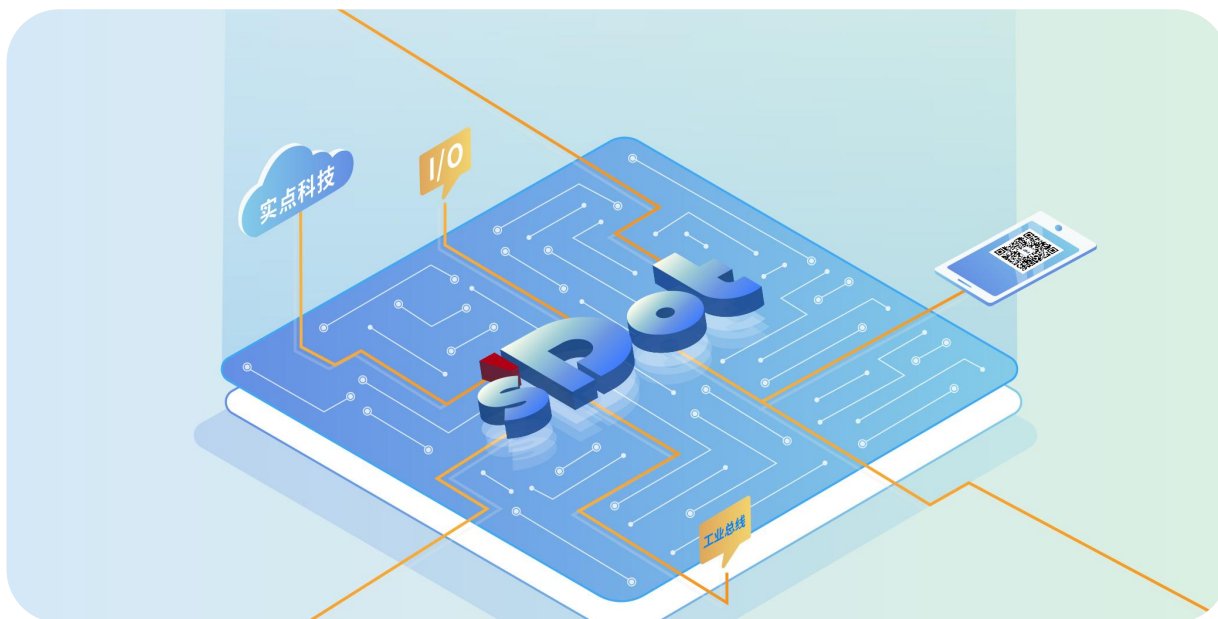




# **IO-Link HUB**

## **IOL5 Series Hubs**

### **User Manual**



Nanjing Shidian Electronic Technology Co., Ltd.

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# 1 Product Overview

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## 1.1 Product Introduction

IO-Link is the world's first standardized cross-vendor I/O technology (IEC 61131-9), an open standard serial communication protocol. The IOL5 series signal hubs (hereinafter referred to as "HUBs") support IO-Link communication, supporting up to 32 channels of digital input or 32 channels of digital output. As an IO-Link slave, it can connect to any brand of IO-Link master, fulfilling users' needs for acquiring process data, diagnostics, and configuration data transmission.

## 1.2 Product Features

- Designed using the IO-Link V1.1.3 specification.
- It can connect to various IO-Link standard devices and standard switch signals.
- LED status display, channel protection and diagnostics
- Wiring is convenient and quick, using spring-loaded terminal blocks.

This manual mainly introduces the structure, product parameters and main functions of the IOL5 series hubs.

# 2 Naming Rules

## 2.1 Naming Rules

**IOL   5A   -   16   16   C   A**  
**(1)   (2)   (3)   (4)   (5)   (6)**

| serial number | meaning                             | Value description            |                       |                                                   |
|---------------|-------------------------------------|------------------------------|-----------------------|---------------------------------------------------|
| (1)           | Product Technology                  | IOL: Short for IO-Link       |                       |                                                   |
| (2)           | Product Series                      | 5A: Single IO-Link interface |                       | 5B: Two IO-Link interfaces, supporting cascading. |
| (3)           | Number of input channels            | 32: 32-channel input         | 16: 16-channel input  | 00:0 channel input                                |
| (4)           | Number of output channels           | 32: 32-channel output        | 16: 16-channel output | 00:0 channel output                               |
| (5)           | Is the output channel configurable? | C: Configurable input/output |                       | Default: Channels are not configurable            |
| (6)           | Output channel type                 | A: NPN                       | B: PNP                | Default: No output channel                        |

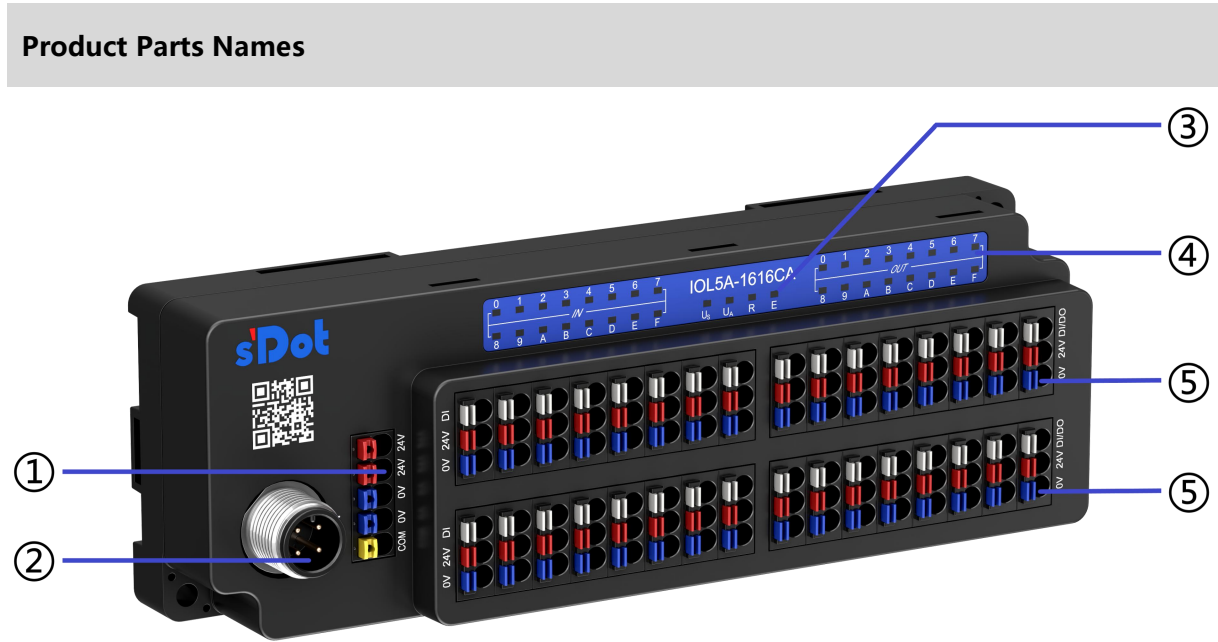
## 2.2 Model List

| model       | Product Description                                      |
|-------------|----------------------------------------------------------|
| IOL5A-3200  | 32-channel digital input IO-Link hub, NPN/PNP compatible |
| IOL5A-0032A | 32-channel digital output IO-Link HUB, NPN               |

|              |                                                                                                                                                   |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| IOL5A-0032B  | 32-channel digital output IO-Link HUB, PNP                                                                                                        |
| IOL5A-1616CA | 16-channel input, 16-channel input/output configurable IO-Link hub. Inputs are NPN/PNP compatible, outputs are NPN.                               |
| IOL5A-1616CB | 16-channel input, 16-channel input/output configurable IO-Link hub. Inputs are NPN/PNP compatible, outputs are PNP.                               |
| IOL5B-1616CA | A 16-channel input, 16-channel input/output configurable IO-Link hub. Inputs are NPN/PNP compatible, outputs are NPN, and cascading is supported. |
| IOL5B-1616CB | A 16-channel input, 16-channel input/output configurable IO-Link hub. Inputs are NPN/PNP compatible, outputs are PNP, and cascading is supported. |

# 3 Panel

## 3.1 Hub structure



| serial number | name                               | illustrate                                         |
|---------------|------------------------------------|----------------------------------------------------|
| ①             | Power terminal                     | 5P spring-loaded terminal block                    |
| ②             | IO-Link interface                  | M12-A, 4-pin, pin tip                              |
| ③             | System indicator lights and labels | Indicator module power status and operating status |
| ④             | Channel indicator lights and signs | Indicate channel status                            |
| ⑤             | Input/output channels              | Terminal blocks                                    |

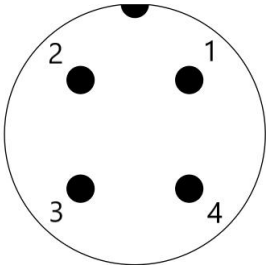
Note: For easy distinction, all module front views in this article are divided by the model number and system indicator light as vertical dividing lines. The left channel is called Group A Channel 0~F, and the right channel is called Group B Channel 0~F.

3.2 Indicator light function

| logo | name                          | color | state      | Status Description                                                                |
|------|-------------------------------|-------|------------|-----------------------------------------------------------------------------------|
| US   | Power indicator light         | green | ON         | Power supply is normal                                                            |
|      |                               |       | blinking   | Low power supply, overvoltage                                                     |
|      |                               |       | Extinguish | The product is not powered on or the power supply is abnormal.                    |
| UA   | Power indicator light         | green | ON         | Auxiliary power supply or external power supply is normal                         |
|      |                               |       | blinking   | Low power supply, overvoltage                                                     |
|      |                               |       | Extinguish | The product is not powered on or the auxiliary/external power supply is abnormal. |
| R    | Communication indicator light | green | ON         | Communication abnormal                                                            |
|      |                               |       | blinking   | Communication is normal                                                           |
|      |                               |       | Extinguish | Power supply abnormality                                                          |
| E    | Fault indicator light         | red   | ON         | Low voltage, overvoltage, and abnormal equipment operation occur.                 |
|      |                               |       | Extinguish | No abnormalities                                                                  |
| IOL  | Cascaded indicator lights     | green | ON         | Communication abnormal                                                            |
|      |                               |       | blinking   | Communication is normal                                                           |
|      |                               |       | Extinguish | Power supply abnormality                                                          |
| 0~F  | Input channel indicator       | green | ON         | The module channel has a signal input.                                            |
|      |                               |       | Extinguish | The module channel has no signal input or the signal input is abnormal.           |
| 0~F  | Output channel indicator      | green | ON         | The module channel has signal output.                                             |
|      |                               |       | Extinguish | The module channel has no signal output or the signal output is abnormal.         |

3.3 IO-Link Interface Definition

**IO-Link interface connection view (Class-A port, pin end)**



| Pin | Function                                |
|-----|-----------------------------------------|
| 1   | US, +24V                                |
| 2   | UA, +24V                                |
| 3   | 0V,Power supply GND                     |
| 4   | C/Q, IO-Link data transmission channels |

Note: For Class-A interfaces, the main station needs to configure Pin2 to output 24V in order to use the output function of the output module normally.

# 4 Product Parameters

## 4.1 Technical parameters

### 4.1.1 Digital input module

| Communication parameters |                                                                                                                            |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Product Model            | IOL5A-3200                                                                                                                 |
| VendorID                 | 1320 (0x0528)                                                                                                              |
| VendorName               | SOLIDOT                                                                                                                    |
| DeviceID                 | 2401020 (0x24A2FC)                                                                                                         |
| IO-Link version          | V1.1.3                                                                                                                     |
| Communication rate       | COM3 (230.4kbps)                                                                                                           |
| Minimum cycle time       | 4.5ms                                                                                                                      |
| Interface type           | M12-A, 4-pin, pin tip                                                                                                      |
| Cable length             | ≤20m (between HUB and main station)                                                                                        |
| Digital input            |                                                                                                                            |
| Input rated voltage      | 24VDC (20.4V~28.8V)                                                                                                        |
| Typical input current    | 5mA/ch (24VDC)                                                                                                             |
| Input signal type        | NPN/PNP compatible                                                                                                         |
| Input signal form        | direct voltage input form<br>Sink input: NPN open-collector input form<br>Source type input: PNP open collector input form |
| OFF voltage/OFF current  | -3V to +5V / below 0.9mA                                                                                                   |
| ON voltage/ON current    | 11V~30V/2.1mA or above                                                                                                     |
| reaction time            | <50us                                                                                                                      |
| Input filtering          | No filtering, 0.1ms, 0.2ms, 0.5ms, 1ms, 2ms, 3ms (factory setting), 4ms...18ms, 19ms, 20ms                                 |
| Maximum input            | 100Hz                                                                                                                      |

|                          |                   |
|--------------------------|-------------------|
| frequency                |                   |
| Input impedance          | 5.4KΩ             |
| Numeric input type       | Type1/Type3       |
| Isolation methods        | Optical isolation |
| Channel indicator lights | Green LED lights  |
| Power consumption        | 15mA              |

### 4.1.2 Digital Input/Output Module

| Communication parameters        |                                                                                                                            |                       |                       |                       |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|
| Product Model                   | IOL5A-1616CA                                                                                                               | IOL5A-1616CB          | IOL5B-1616CA          | IOL5B-1616CB          |
| VendorID                        | 1320 (0x0528)                                                                                                              |                       |                       |                       |
| VendorName                      | SOLIDOT                                                                                                                    |                       |                       |                       |
| DeviceID                        | 2401022<br>(0x24A2FE)                                                                                                      | 2401024<br>(0x24A300) | 2401025<br>(0x24A301) | 2401026<br>(0x24A302) |
| IO-Link version                 | V1.1.3                                                                                                                     |                       |                       |                       |
| Communication rate              | COM3 (230.4kbps)                                                                                                           |                       |                       |                       |
| Minimum cycle time              | 4.5ms                                                                                                                      |                       |                       |                       |
| Interface type                  | M12-A, 4-pin, pin tip                                                                                                      |                       |                       |                       |
| Cable length                    | ≤20m (between HUB and main station)                                                                                        |                       |                       |                       |
| Configurable inputs and outputs | yes                                                                                                                        |                       |                       |                       |
| Digital input                   |                                                                                                                            |                       |                       |                       |
| Input rated voltage             | 24VDC (20.4V~28.8V)                                                                                                        |                       |                       |                       |
| Typical input current           | 5mA/ch (24VDC)                                                                                                             |                       |                       |                       |
| Input signal type               | NPN/PNP compatible                                                                                                         |                       |                       |                       |
| Input signal form               | direct voltage input form<br>Sink input: NPN open-collector input form<br>Source type input: PNP open collector input form |                       |                       |                       |
| OFF voltage/OFF current         | -3V to +5V / below 0.9mA                                                                                                   |                       |                       |                       |
| ON voltage/ON current           | 11V~30V/2.1mA or above                                                                                                     |                       |                       |                       |
| reaction time                   | <50us                                                                                                                      |                       |                       |                       |
| Input filtering                 | No filtering, 0.1ms, 0.2ms, 0.5ms, 1ms, 2ms, 3ms (factory setting), 4ms...18ms, 19ms, 20ms                                 |                       |                       |                       |
| Maximum input frequency         | 100Hz                                                                                                                      |                       |                       |                       |
| Input impedance                 | 5.4KΩ                                                                                                                      |                       |                       |                       |
| Numeric input type              | Type1/Type3                                                                                                                |                       |                       |                       |
| Isolation methods               | Optical isolation                                                                                                          |                       |                       |                       |
| Channel indicator               | Green LED lights                                                                                                           |                       |                       |                       |

|                                |                                                                                           |      |     |     |
|--------------------------------|-------------------------------------------------------------------------------------------|------|-----|-----|
| lights                         |                                                                                           |      |     |     |
| Digital output                 |                                                                                           |      |     |     |
| Field-side input voltage range | 24VDC (20.4V~28.8V)                                                                       |      |     |     |
| Output voltage drop            | <1V                                                                                       |      |     |     |
| Output signal type             | NPN                                                                                       | PNP  | NPN | PNP |
| Output load type               | Resistive load, inductive load, lamp load                                                 |      |     |     |
| Single-channel rated current   | Max: 0.5A                                                                                 |      |     |     |
| Leakage current                | <10uA                                                                                     |      |     |     |
| reaction time                  | <150us                                                                                    |      |     |     |
| Output channel protection      | Short circuit protection (automatic recovery mechanism)                                   |      |     |     |
| Module protection              | Reverse connection protection (automatic recovery mechanism), field-side surge protection |      |     |     |
| Isolation methods              | Optical isolation                                                                         |      |     |     |
| Clear and keep                 | support                                                                                   |      |     |     |
| Channel indicator lights       | Green LED lights                                                                          |      |     |     |
| Power consumption              | 15mA                                                                                      | 15mA | /   | /   |

### 4.1.3 Digital output module

| Communication parameters       |                                           |                    |
|--------------------------------|-------------------------------------------|--------------------|
| Product Model                  | IOL5A-0032A                               | IOL5A-0032B        |
| VendorID                       | 1320 (0x0528)                             |                    |
| VendorName                     | SOLIDOT                                   |                    |
| DeviceID                       | 2401021 (0x24A2FD)                        | 2401023 (0x24A2FF) |
| IO-Link version                | V1.1.3                                    |                    |
| Communication rate             | COM3 (230.4kbps)                          |                    |
| Minimum cycle time             | 4.5ms                                     |                    |
| Interface type                 | M12-A, 4-pin, pin tip                     |                    |
| Cable length                   | ≤20m (between HUB and main station)       |                    |
| Digital output                 |                                           |                    |
| Field-side input voltage range | 24VDC (20.4V~28.8V)                       |                    |
| Output voltage drop            | <1V                                       |                    |
| Output signal type             | NPN                                       | PNP                |
| Output load type               | Resistive load, inductive load, lamp load |                    |
| Single-channel rated current   | Max: 0.5A                                 |                    |
| Leakage current                | <10uA                                     |                    |
| reaction time                  | <150us                                    |                    |

|                           |                                                                                           |      |
|---------------------------|-------------------------------------------------------------------------------------------|------|
| Output channel protection | Short circuit protection (automatic recovery mechanism)                                   |      |
| Module protection         | Reverse connection protection (automatic recovery mechanism), field-side surge protection |      |
| Isolation methods         | Optical isolation                                                                         |      |
| Clear and keep            | support                                                                                   |      |
| Channel indicator lights  | Green LED lights                                                                          |      |
| Power consumption         | 10mA                                                                                      | 10mA |

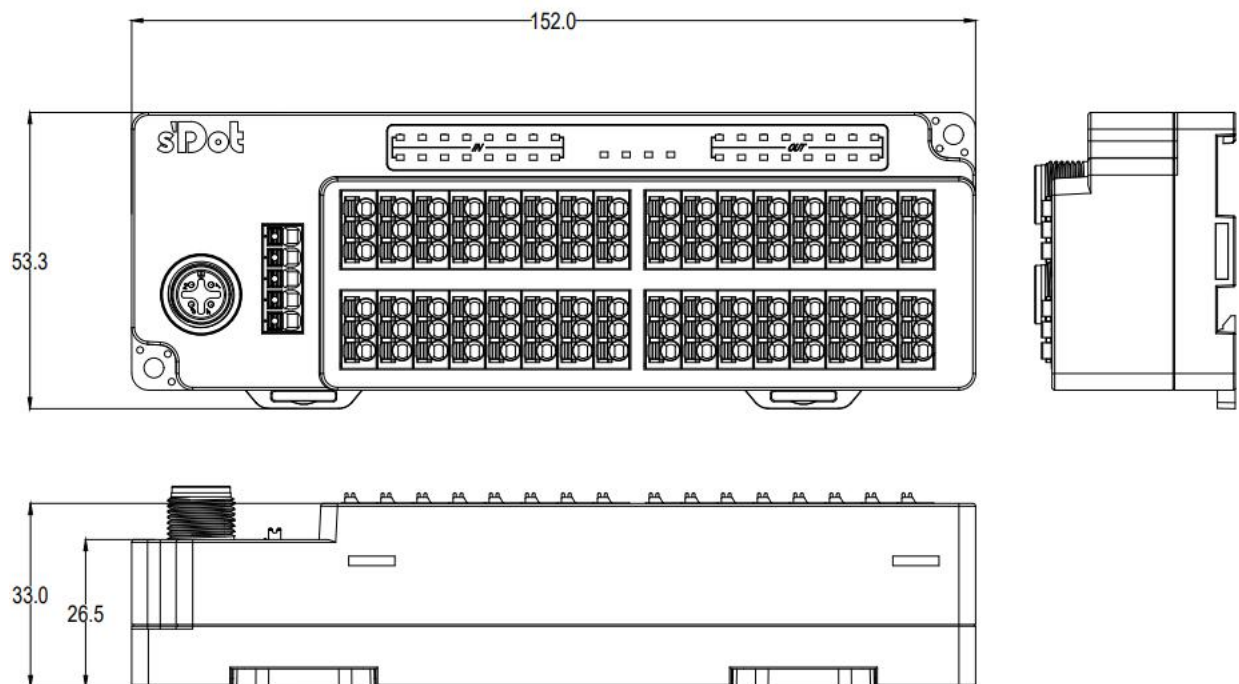
## 4.2 General parameters

| General technical parameters        |                      |
|-------------------------------------|----------------------|
| Operating voltage (V)               | 24VDC (18V ~ 30.2V)  |
| Configurable input/output functions | Adaptive             |
| Pressure monitoring                 | support              |
| Firmware upgrade                    | support              |
| Data storage                        | support              |
| Power supply output current         | 100mA                |
| Operating temperature               | -25°C ~ +70°C        |
| Storage temperature                 | -40°C ~ +85°C        |
| relative humidity                   | 95%, no condensation |
| Altitude                            | ≤2000m               |
| Protection level                    | IP20                 |
| Pollution level                     | Level 2              |
| Overvoltage category                | I                    |
| Specifications and dimensions       | 152 × 53.3 × 33mm    |
| weight                              | 180g                 |

# 5 Wiring instructions

## 5.1 Outline dimension drawing

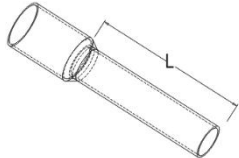
### External dimensions (mm)



## 5.2 Wiring instructions

| Terminal blocks                                             |                |                                           |
|-------------------------------------------------------------|----------------|-------------------------------------------|
| Power terminals                                             | Rated voltage  | 300V                                      |
|                                                             | Rated current  | 7A                                        |
|                                                             | Extreme number | 5P                                        |
|                                                             | wire diameter  | 28~18 AWG 0.2~0.75 mm <sup>2</sup>        |
| I/O signal line terminals<br>(i.e., input/output terminals) | Rated voltage  | 300V                                      |
|                                                             | Rated current  | 8A                                        |
|                                                             | Extreme number | 32×3P                                     |
|                                                             | wire diameter  | twenty two~16 AWG 0.3~1.5 mm <sup>2</sup> |

The specifications for power supply terminals and signal line terminals are shown in the table below:

| Specifications of tubular insulated ends                                                                                                   |       |                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------------------------------------|
| Specifications                                                                                                                             | model | conductor cross-sectional area (mm <sup>2</sup> ) |
|  <p>Tubular insulated terminalsLThe length is 8~10mm</p> | E0308 | 0.3                                               |
|                                                                                                                                            | E0508 | 0.5                                               |
|                                                                                                                                            | E7508 | 0.75                                              |
|                                                                                                                                            | E1008 | 1.0                                               |
|                                                                                                                                            | E1508 | 1.5                                               |
|                                                                                                                                            | E0310 | 0.3                                               |
|                                                                                                                                            | E0510 | 0.5                                               |
|                                                                                                                                            | E7510 | 0.75                                              |
|                                                                                                                                            | E1010 | 1.0                                               |
|                                                                                                                                            | E1510 | 1.5                                               |



warn

- For personal and equipment safety, it is recommended to disconnect the power supply when performing wiring operations.



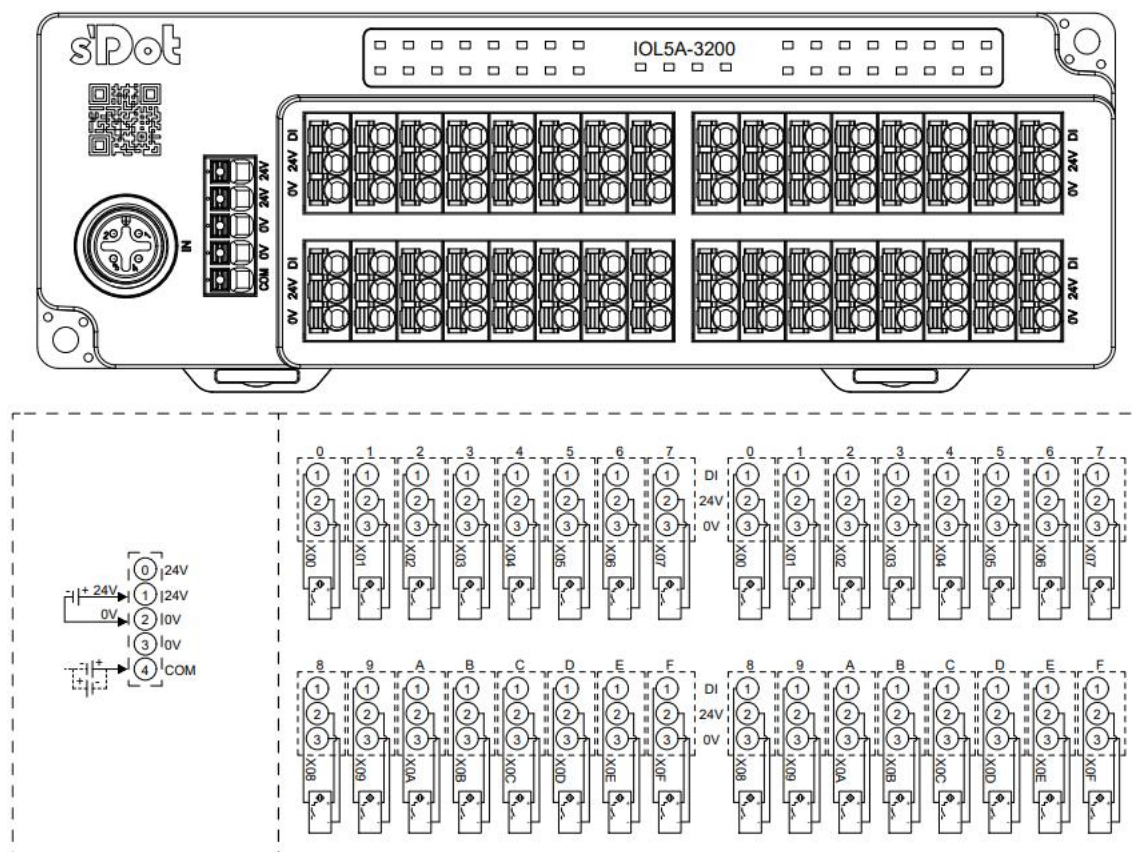
- IO-Link Interface: Connects the IO-Link hub to any IO-Link master product using a standardized four-core cable.
- Only copper wires can be used for wiring.

warn

- Cable temperature: 80°C.

### 5.3 Wiring diagram

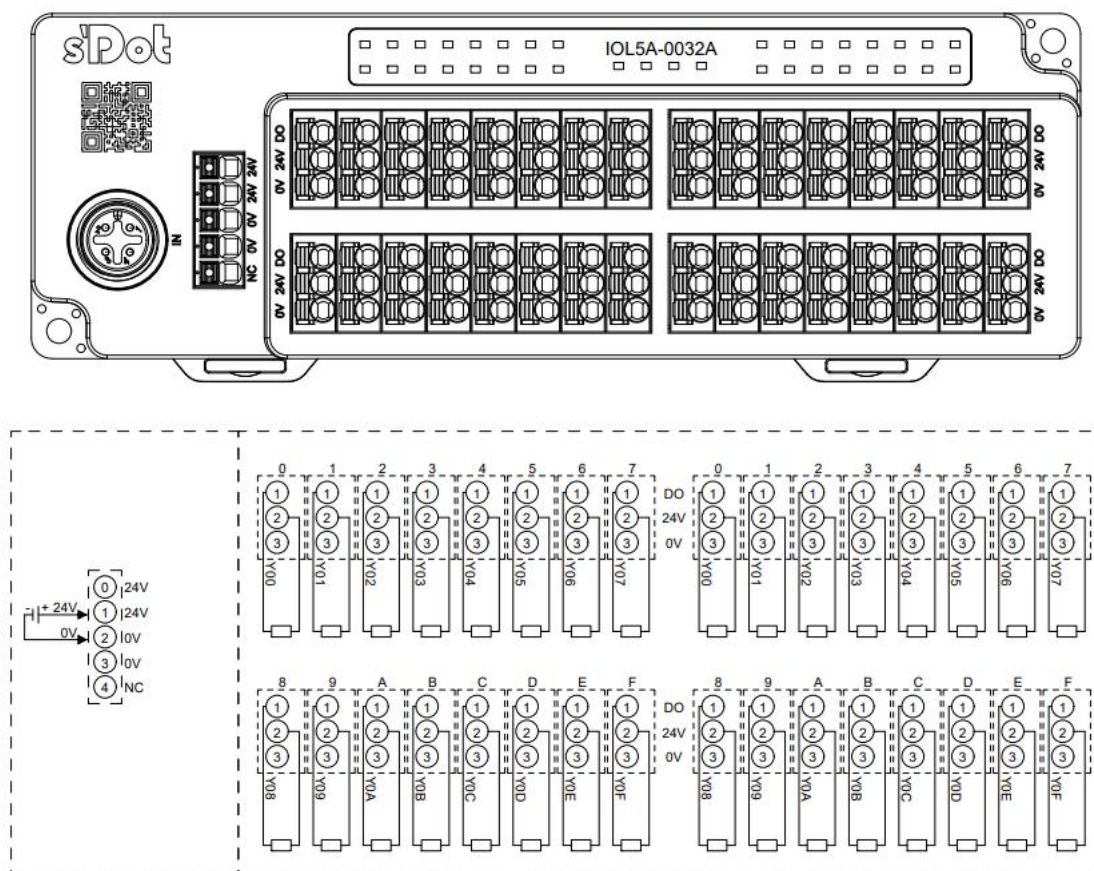
### 5.3.1 IOL5A-3200



\*24V internal conduction; 0V internal conduction

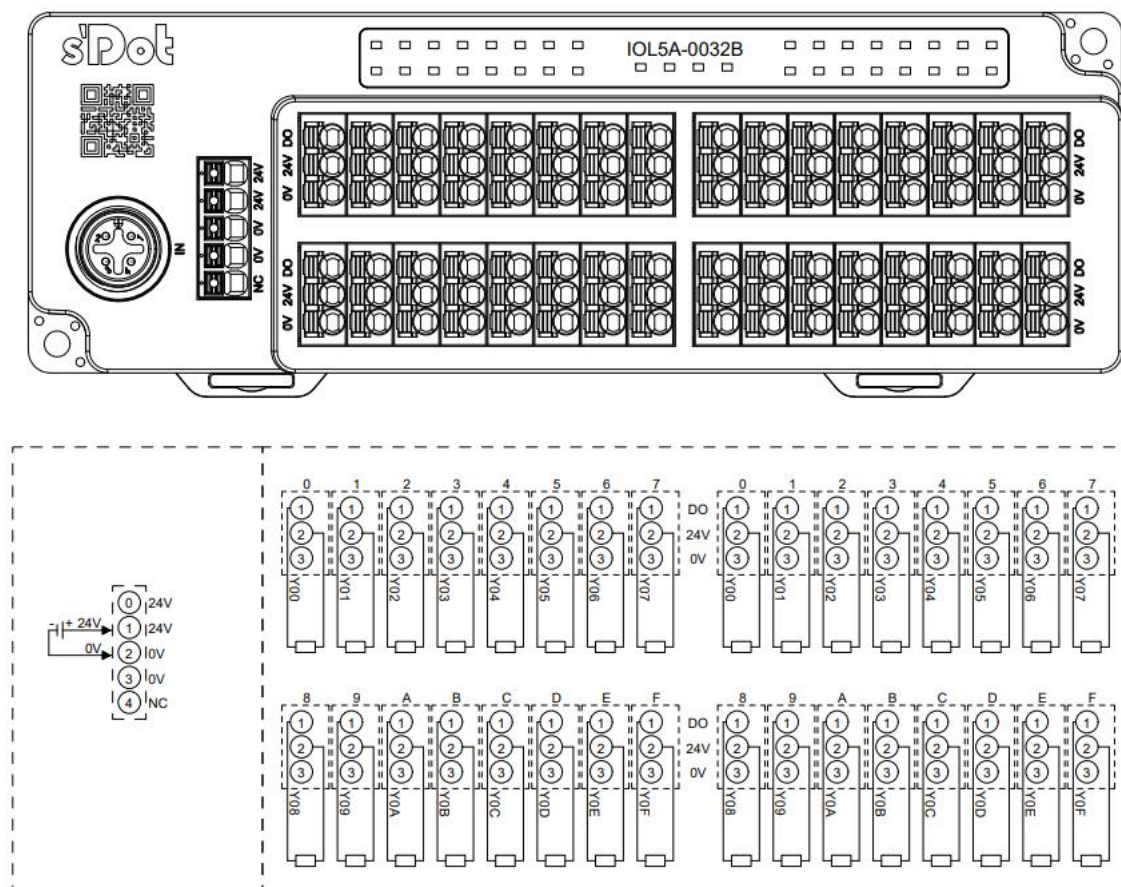
\*COM is the common terminal for DI, compatible with NPN/PNP.

## 5.3.2 IOL5A-0032A



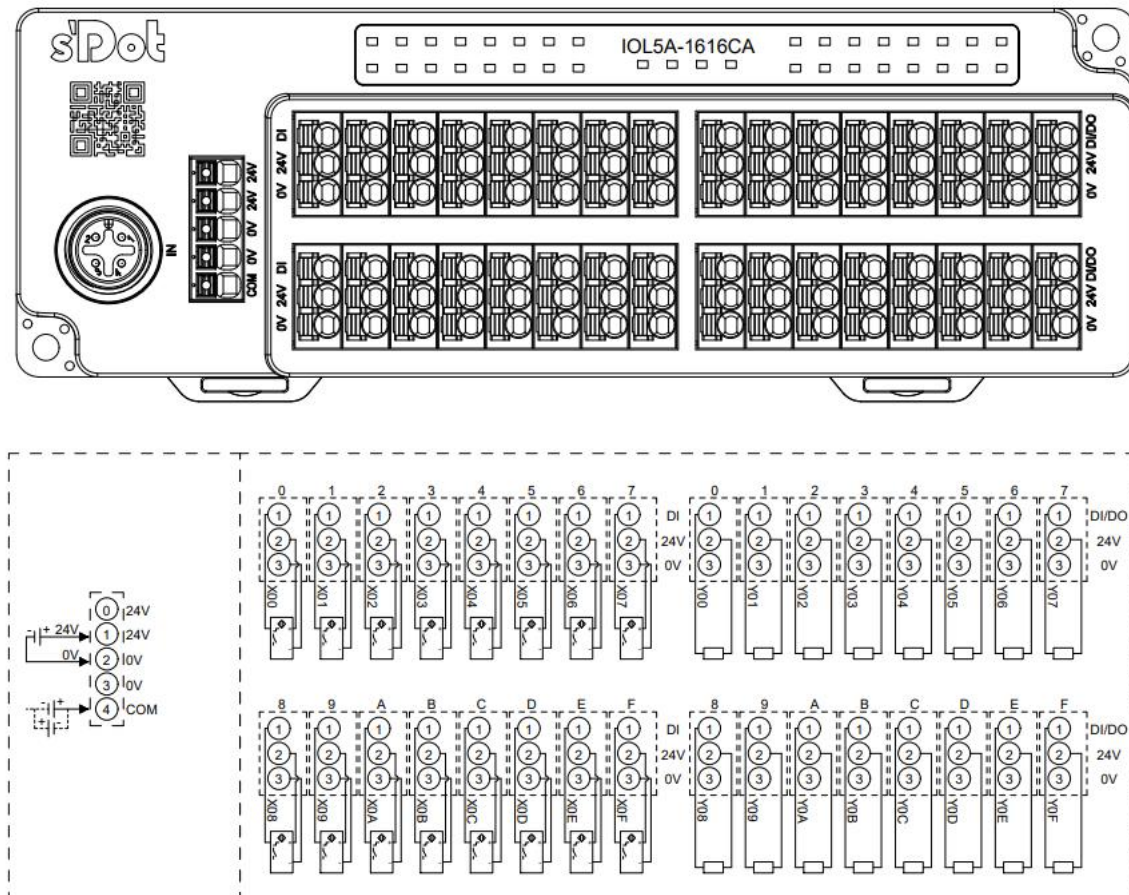
\*24V internal conduction; 0V internal conduction

## 5.3.3 IOL5A-0032B



\*24V internal conduction; 0V internal conduction

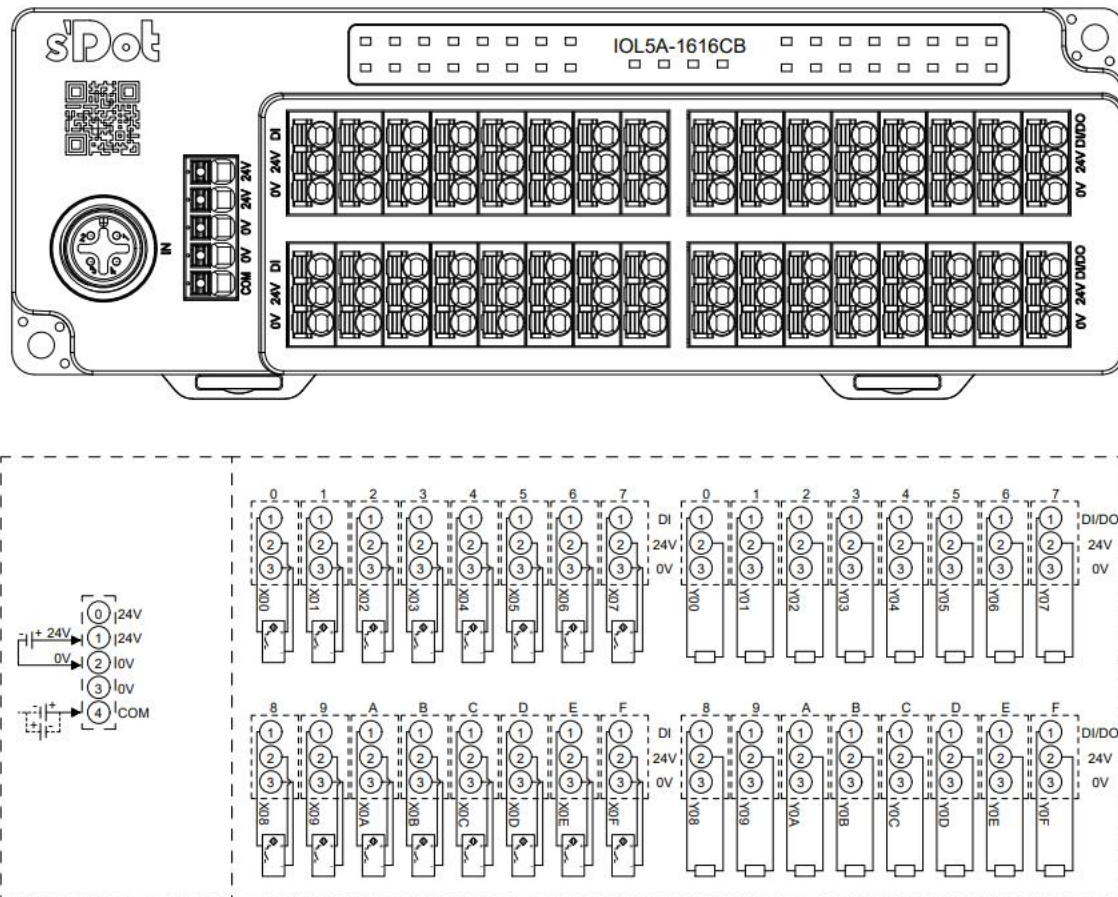
## 5.3.4 IOL5A-1616CA



\*24V internal conduction; 0V internal conduction

\*COM is the common terminal for DI, compatible with NPN/PNP.

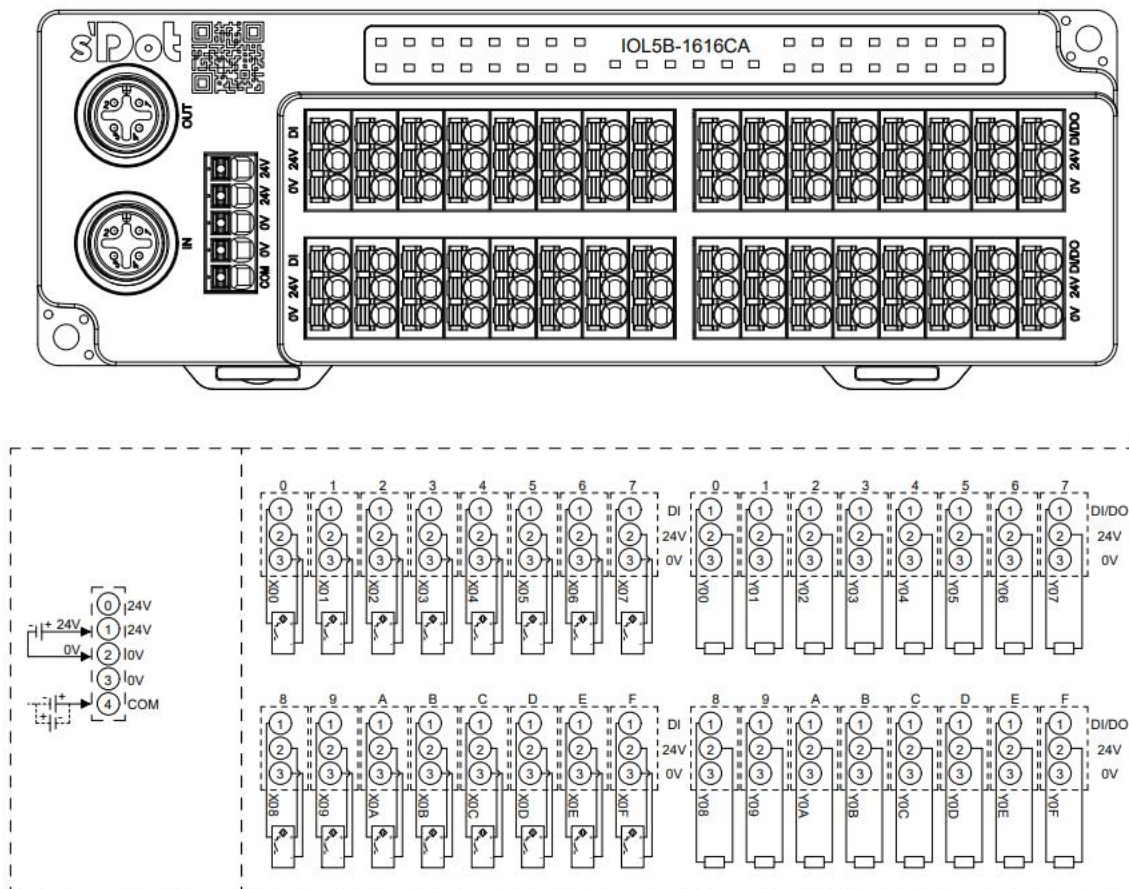
## 5.3.5 IOL5A-1616CB



\*24V internal conduction; 0V internal conduction

\*COM is the common terminal for DI, compatible with NPN/PNP.

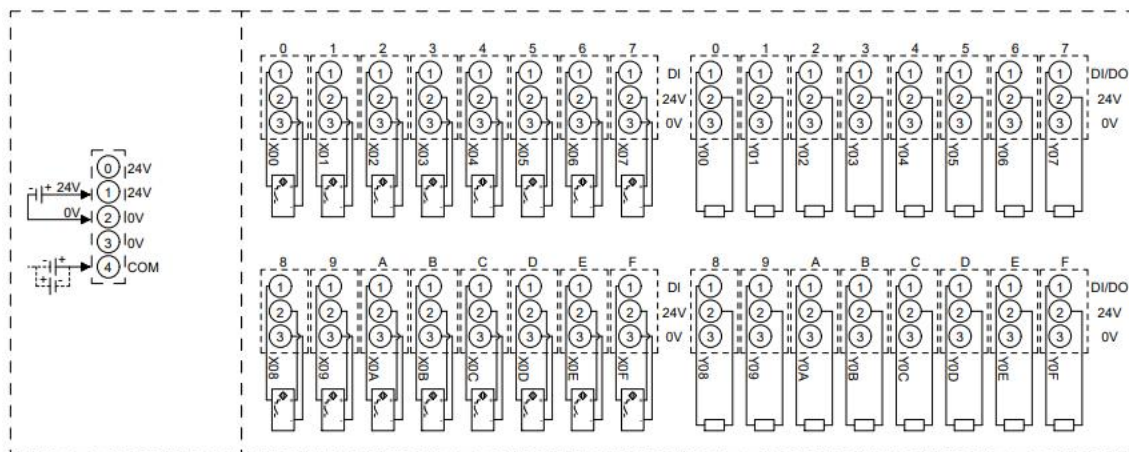
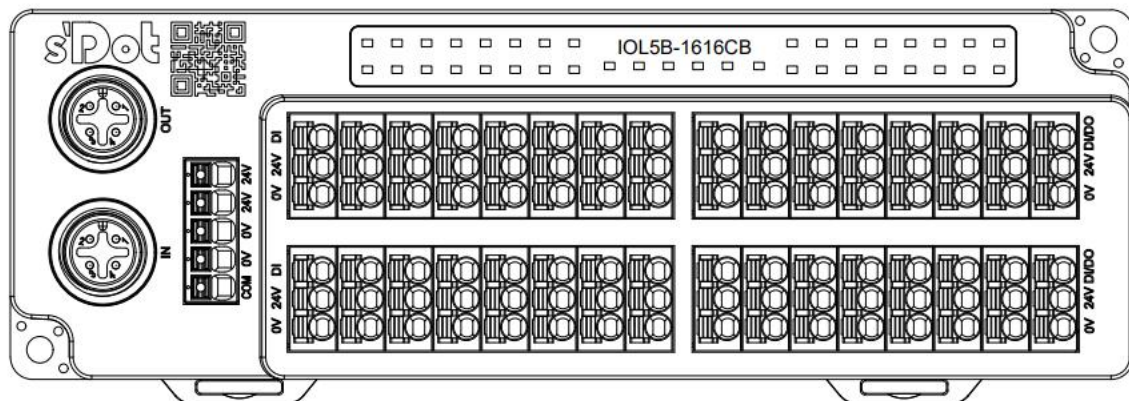
## 5.3.6 IOL5B-1616CA



\*24V internal conduction; 0V internal conduction

\*COM is the common terminal for DI, compatible with NPN/PNP.

## 5.3.7 IOL5B-1616CB



\*24V internal conduction; 0V internal conduction

\*COM is the common terminal for DI, compatible with NPN/PNP.

# 6 Function Description

## 6.1 Process data mapping

### 6.1.1 Input data

| byte          | 0  |    |    |    |    |    |   |   | 1  |    |    |    |    |    |    |   |
|---------------|----|----|----|----|----|----|---|---|----|----|----|----|----|----|----|---|
| Bit           | 7  | 6  | 5  | 4  | 3  | 2  | 1 | 0 | 7  | 6  | 5  | 4  | 3  | 2  | 1  | 0 |
| Sub-index     | 8  | 7  | 6  | 5  | 4  | 3  | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 |
| Offset bit    | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7  | 6  | 5  | 4  | 3  | 2  | 1  | 0 |
| Input Channel | 7  | 6  | 5  | 4  | 3  | 2  | 1 | 0 | F  | E  | D  | C  | B  | A  | 9  | 8 |
| byte          | 2  |    |    |    |    |    |   |   | 3  |    |    |    |    |    |    |   |
| Bit           | 7  | 6  | 5  | 4  | 3  | 2  | 1 | 0 | 7  | 6  | 5  | 4  | 3  | 2  | 1  | 0 |
| Sub-index     | 8  | 7  | 6  | 5  | 4  | 3  | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 |
| Offset bit    | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7  | 6  | 5  | 4  | 3  | 2  | 1  | 0 |
| Input Channel | 7  | 6  | 5  | 4  | 3  | 2  | 1 | 0 | F  | E  | D  | C  | B  | A  | 9  | 8 |

### 6.1.2 Output data

| byte           | 0  |    |    |    |    |    |   |   | 1  |    |    |    |    |    |    |   |
|----------------|----|----|----|----|----|----|---|---|----|----|----|----|----|----|----|---|
| Bit            | 7  | 6  | 5  | 4  | 3  | 2  | 1 | 0 | 7  | 6  | 5  | 4  | 3  | 2  | 1  | 0 |
| Sub-index      | 8  | 7  | 6  | 5  | 4  | 3  | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 |
| Offset bit     | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7  | 6  | 5  | 4  | 3  | 2  | 1  | 0 |
| Output Channel | 7  | 6  | 5  | 4  | 3  | 2  | 1 | 0 | F  | E  | D  | C  | B  | A  | 9  | 8 |
| byte           | 2  |    |    |    |    |    |   |   | 3  |    |    |    |    |    |    |   |
| Bit            | 7  | 6  | 5  | 4  | 3  | 2  | 1 | 0 | 7  | 6  | 5  | 4  | 3  | 2  | 1  | 0 |
| Sub-index      | 8  | 7  | 6  | 5  | 4  | 3  | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 |

|                |    |    |    |    |    |    |   |   |   |   |   |   |   |   |   |   |
|----------------|----|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|
| Offset bit     | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Output Channel | 7  | 6  | 5  | 4  | 3  | 2  | 1 | 0 | F | E | D | C | B | A | 9 | 8 |

## 6.2 ISDU parameters

| ISDU   |           | name                                               | Permissions | scope                                                                                                           |
|--------|-----------|----------------------------------------------------|-------------|-----------------------------------------------------------------------------------------------------------------|
| index  | Sub-index |                                                    |             |                                                                                                                 |
| 0x0010 | 0x00      | Supplier NameVendor Name                           | R           | 64 Bytes                                                                                                        |
| 0x0011 | 0x00      | Supplier InformationVendor Text                    | R           | 64 Bytes                                                                                                        |
| 0x0012 | 0x00      | Product NameProduct Name                           | R           | 64 Bytes                                                                                                        |
| 0x0013 | 0x00      | Product IDProduct ID                               | R           | 64 Bytes                                                                                                        |
| 0x0014 | 0x00      | Product InformationProduct Text                    | R           | 64 Bytes                                                                                                        |
| 0x0015 | 0x00      | Serial NumberSerial Number                         | R           | 16 Bytes                                                                                                        |
| 0x0016 | 0x00      | Hardware versionHardware Revision                  | R           | 64 Bytes                                                                                                        |
| 0x0017 | 0x00      | Firmware versionFirmware Revision                  | R           | 64 Bytes                                                                                                        |
| 0x0018 | 0x00      | Application IdentifierApplication Specific Tag     | R/W         | 32 Bytes                                                                                                        |
| 0x0019 | 0x00      | Specific function identifierFunction Tag           | R/W         | 32 Bytes                                                                                                        |
| 0x001A | 0x00      | Equipment location identificationLocation Tag      | R/W         | 32 Bytes                                                                                                        |
| 0x0024 | 0x00      | Equipment statusDevice Status[1]                   | R           | Device is OK(0),<br>Maintenance required (1),<br>Out of specification(2),<br>Functional check(3),<br>Failure(4) |
| 0x0025 | 0x00      | Detailed equipment statusDetailed Device Status[2] | R           | 24 Bytes                                                                                                        |

Note [1]: Equipment status definition, 0: equipment is normal; 1: equipment needs maintenance; 2: equipment exceeds limits; 3: equipment needs function check; 4: equipment is malfunctioning, default is 0.

Note [2]: Default 8\*3 bytes, default 0x0, 0x0, 0x0.

## 6.3 System commands

| index  | value     | Function                           | describe                                                                   |
|--------|-----------|------------------------------------|----------------------------------------------------------------------------|
| 0x0002 | 0x7E(126) | Positioner Start                   | Activate location function                                                 |
|        | 0x7F(127) | Positioner stopped                 | Stop location function                                                     |
|        | 0x80(128) | Equipment Reset                    | Device performs reset                                                      |
|        | 0x81(129) | Application Reset                  | Application performs reset                                                 |
|        | 0x82(130) | Factory reset                      | Restore factory settings, all parameters are restored to default values.   |
|        | 0x83(131) | Restore original delivery settings | The equipment will restore the parameters to the original delivery values. |

## 6.4 Configuration parameters

| index  | Configuration function name | Permissions | Data types  | describe                                                                     |
|--------|-----------------------------|-------------|-------------|------------------------------------------------------------------------------|
| 0x0041 | Input conversion            | R/W         | 2 Unsigned  | 0: Do not invert; 1: Invert; Default: 0x0000                                 |
| 0x0042 | Configure port direction    | R/W         | 2 Unsigned  | 0: Input; 1: Output; Default 0xFFFF                                          |
| 0x0045 | Output Failure Protection   | R/W         | 16 Unsigned | 0: Output 0V; 1: Output 24V; 2: Output remains unchanged, default is all 0s. |
| 0x0049 | Input filtering time        | R/W         | 16 Unsigned | See 6.5.4                                                                    |

## 6.5 Functional parameter mapping

### 6.5.1 Input conversion (0x0041)

| Sub-index | aisle                   | offset      | scope                                          |
|-----------|-------------------------|-------------|------------------------------------------------|
| 0x01      | Group A Input Channel 0 | twenty four | 0: Do not reverse, default value<br>1: Reverse |
| 0x02      | Group A Input Channel 1 | 25          |                                                |
| 0x03      | Group A Input Channel 2 | 26          |                                                |
| 0x04      | Group A Input Channel 3 | 27          |                                                |
| 0x05      | Group A Input Channel 4 | 28          |                                                |
| 0x06      | Group A Input Channel 5 | 29          |                                                |
| 0x07      | Group A Input Channel 6 | 30          |                                                |
| 0x08      | Group A Input Channel 7 | 31          |                                                |
| 0x09      | Group A Input Channel 8 | 16          |                                                |
| 0x0A      | Group A Input Channel 9 | 17          |                                                |
| 0x0B      | Group A input channel A | 18          |                                                |
| 0x0C      | Group A input channel B | 19          |                                                |

|      |                            |              |  |
|------|----------------------------|--------------|--|
| 0x0D | Group A input channel<br>C | 20           |  |
| 0x0E | Group A input channel<br>D | twenty one   |  |
| 0x0F | Group A Input Channel<br>E | twenty two   |  |
| 0x10 | Group A Input Channel<br>F | twenty three |  |
| 0x11 | Group B Input Channel<br>0 | 8            |  |
| 0x12 | Group B Input Channel<br>1 | 9            |  |
| 0x13 | Group B Input Channel<br>2 | 10           |  |
| 0x14 | Group B Input Channel<br>3 | 11           |  |
| 0x15 | Group B Input Channel<br>4 | 12           |  |
| 0x16 | Group B Input Channel<br>5 | 13           |  |
| 0x17 | Group B Input Channel<br>6 | 14           |  |
| 0x18 | Group B Input Channel<br>7 | 15           |  |
| 0x19 | Group B Input Channel<br>8 | 0            |  |
| 0x1A | Group B Input Channel<br>9 | 1            |  |
| 0x1B | Group B Input Channel<br>A | 2            |  |
| 0x1C | Group B input channel<br>B | 3            |  |
| 0x1D | Group B input channel<br>C | 4            |  |
| 0x1E | Group B input channel<br>D | 5            |  |
| 0x1F | Group B Input Channel<br>E | 6            |  |
| 0x20 | Group B Input Channel<br>F | 7            |  |

6.5.2 Configure port direction (0x0042)

| Sub-index | aisle              | offset | scope                                |
|-----------|--------------------|--------|--------------------------------------|
| 0x01      | Group B Channel 0  | 8      | 0: Input<br>1: Output, default value |
| 0x02      | Group B, Channel 1 | 9      |                                      |
| 0x03      | Group B, Channel 2 | 10     |                                      |
| 0x04      | Group B, Channel 3 | 11     |                                      |
| 0x05      | Group B, Channel 4 | 12     |                                      |
| 0x06      | Group B, Channel 5 | 13     |                                      |
| 0x07      | Group B, Channel 6 | 14     |                                      |
| 0x08      | Group B, Channel 7 | 15     |                                      |
| 0x09      | Group B, Channel 8 | 0      |                                      |
| 0x0A      | Group B, Channel 9 | 1      |                                      |
| 0x0B      | Group B Channel A  | 2      |                                      |
| 0x0C      | Group B Channel B  | 3      |                                      |
| 0x0D      | Group B Channel C  | 4      |                                      |
| 0x0E      | Group B, Channel D | 5      |                                      |
| 0x0F      | Group B Channel E  | 6      |                                      |
| 0x10      | Group B Channel F  | 7      |                                      |

### 6.5.3 Output failure protection (0x0045)

#### 6.5.3.1 IOL5A-1616CA/IOL5A-1616CB

| Sub-index | Output Channel           | offset      | scope                                                                                                                                                                                        |
|-----------|--------------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0x01      | Group B output channel 0 | 64          | 0: Communication failure outputs 0V low level, default value.<br>1: Communication failure outputs 24V high level<br>2: If communication fails, the output will remain in its original state. |
| 0x02      | Group B Output Channel 1 | 72          |                                                                                                                                                                                              |
| 0x03      | Group B Output Channel 2 | 80          |                                                                                                                                                                                              |
| 0x04      | Group B Output Channel 3 | 88          |                                                                                                                                                                                              |
| 0x05      | Group B Output Channel 4 | 96          |                                                                                                                                                                                              |
| 0x06      | Group B Output Channel 5 | 104         |                                                                                                                                                                                              |
| 0x07      | Group B Output Channel 6 | 112         |                                                                                                                                                                                              |
| 0x08      | Group B Output Channel 7 | 120         |                                                                                                                                                                                              |
| 0x09      | Group B Output Channel 8 | 0           |                                                                                                                                                                                              |
| 0x0A      | Group B Output Channel 9 | 8           |                                                                                                                                                                                              |
| 0x0B      | Group B output channel A | 16          |                                                                                                                                                                                              |
| 0x0C      | Group B output channel B | twenty four |                                                                                                                                                                                              |
| 0x0D      | Group B output channel C | 32          |                                                                                                                                                                                              |
| 0x0E      | Group B output channel D | 40          |                                                                                                                                                                                              |
| 0x0F      | Group B output channel E | 48          |                                                                                                                                                                                              |
| 0x10      | Group B output channel F | 56          |                                                                                                                                                                                              |

#### 6.5.3.2 IOL5A-0032A/IOL5A-0032B

| Sub-index | Output Channel          | offset | scope                                                         |
|-----------|-------------------------|--------|---------------------------------------------------------------|
| 0x01      | Group AOutput channel 0 | 192    | 0: Communication failure outputs 0V low level, default value. |

|      |                             |     |                                                                                                                                   |
|------|-----------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------|
| 0x02 | Group AOutput Channel<br>1  | 200 | 1: Communication failure outputs<br>24V high level<br>2: If communication fails, the output<br>will remain in its original state. |
| 0x03 | Group AOutput Channel<br>2  | 208 |                                                                                                                                   |
| 0x04 | Group AOutput Channel<br>3  | 216 |                                                                                                                                   |
| 0x05 | Group AOutput Channel<br>4  | 224 |                                                                                                                                   |
| 0x06 | Group AOutput Channel<br>5  | 232 |                                                                                                                                   |
| 0x07 | Group AOutput Channel<br>6  | 240 |                                                                                                                                   |
| 0x08 | Group AOutput Channel<br>7  | 248 |                                                                                                                                   |
| 0x09 | Group AOutput Channel<br>8  | 128 |                                                                                                                                   |
| 0x0A | Group AOutput Channel<br>9  | 136 |                                                                                                                                   |
| 0x0B | Group AOutput Channel<br>A  | 144 |                                                                                                                                   |
| 0x0C | Group AOutput Channel<br>B  | 152 |                                                                                                                                   |
| 0x0D | Group AOutput channel<br>C  | 160 |                                                                                                                                   |
| 0x0E | Group AOutput channel<br>D  | 168 |                                                                                                                                   |
| 0x0F | Group AOutput channel<br>E  | 176 |                                                                                                                                   |
| 0x10 | Group AOutput channel<br>F  | 184 |                                                                                                                                   |
| 0x11 | Group B output channel<br>0 | 64  |                                                                                                                                   |
| 0x12 | Group B Output<br>Channel 1 | 72  |                                                                                                                                   |
| 0x13 | Group B Output<br>Channel 2 | 80  |                                                                                                                                   |
| 0x14 | Group B Output<br>Channel 3 | 88  |                                                                                                                                   |
| 0x15 | Group B Output<br>Channel 4 | 96  |                                                                                                                                   |
| 0x16 | Group B Output<br>Channel 5 | 104 |                                                                                                                                   |
| 0x17 | Group B Output<br>Channel 6 | 112 |                                                                                                                                   |

|      |                          |             |  |
|------|--------------------------|-------------|--|
| 0x18 | Group B Output Channel 7 | 120         |  |
| 0x19 | Group B Output Channel 8 | 0           |  |
| 0x1A | Group B Output Channel 9 | 8           |  |
| 0x1B | Group B output channel A | 16          |  |
| 0x1C | Group B output channel B | twenty four |  |
| 0x1D | Group B output channel C | 32          |  |
| 0x1E | Group B output channel D | 40          |  |
| 0x1F | Group B output channel E | 48          |  |
| 0x20 | Group B output channel F | 56          |  |

### 6.5.4 Input filtering time (0x0049)

| Sub-index | Input Channel           | offset      | scope                                                                  |
|-----------|-------------------------|-------------|------------------------------------------------------------------------|
| 0x01      | Group A Input Channel 0 | 192         | enterFiltering time settings:<br>off(0), 10ms(1), 30ms(2),<br>100ms(3) |
| 0x02      | Group A Input Channel 1 | 200         |                                                                        |
| 0x03      | Group A Input Channel 2 | 208         |                                                                        |
| 0x04      | Group A Input Channel 3 | 216         |                                                                        |
| 0x05      | Group A Input Channel 4 | 224         |                                                                        |
| 0x06      | Group A Input Channel 5 | 232         |                                                                        |
| 0x07      | Group A Input Channel 6 | 240         |                                                                        |
| 0x08      | Group A Input Channel 7 | 248         |                                                                        |
| 0x09      | Group A Input Channel 8 | 128         |                                                                        |
| 0x0A      | Group A Input Channel 9 | 136         |                                                                        |
| 0x0B      | Group A input channel A | 144         |                                                                        |
| 0x0C      | Group A input channel B | 152         |                                                                        |
| 0x0D      | Group A input channel C | 160         |                                                                        |
| 0x0E      | Group A input channel D | 168         |                                                                        |
| 0x0F      | Group A Input Channel E | 176         |                                                                        |
| 0x10      | Group A Input Channel F | 184         |                                                                        |
| 0x11      | Group B Input Channel 0 | 64          |                                                                        |
| 0x12      | Group B Input Channel 1 | 72          |                                                                        |
| 0x13      | Group B Input Channel 2 | 80          |                                                                        |
| 0x14      | Group B Input Channel 3 | 88          |                                                                        |
| 0x15      | Group B Input Channel 4 | 96          |                                                                        |
| 0x16      | Group B Input Channel 5 | 104         |                                                                        |
| 0x17      | Group B Input Channel 6 | 112         |                                                                        |
| 0x18      | Group B Input Channel 7 | 120         |                                                                        |
| 0x19      | Group B Input Channel 8 | 0           |                                                                        |
| 0x1A      | Group B Input Channel 9 | 8           |                                                                        |
| 0x1B      | Group B Input Channel A | 16          |                                                                        |
| 0x1C      | Group B input channel B | twenty four |                                                                        |
| 0x1D      | Group B input channel C | 32          |                                                                        |
| 0x1E      | Group B input channel D | 40          |                                                                        |
| 0x1F      | Group B Input Channel E | 48          |                                                                        |
| 0x20      | Group B Input Channel F | 56          |                                                                        |