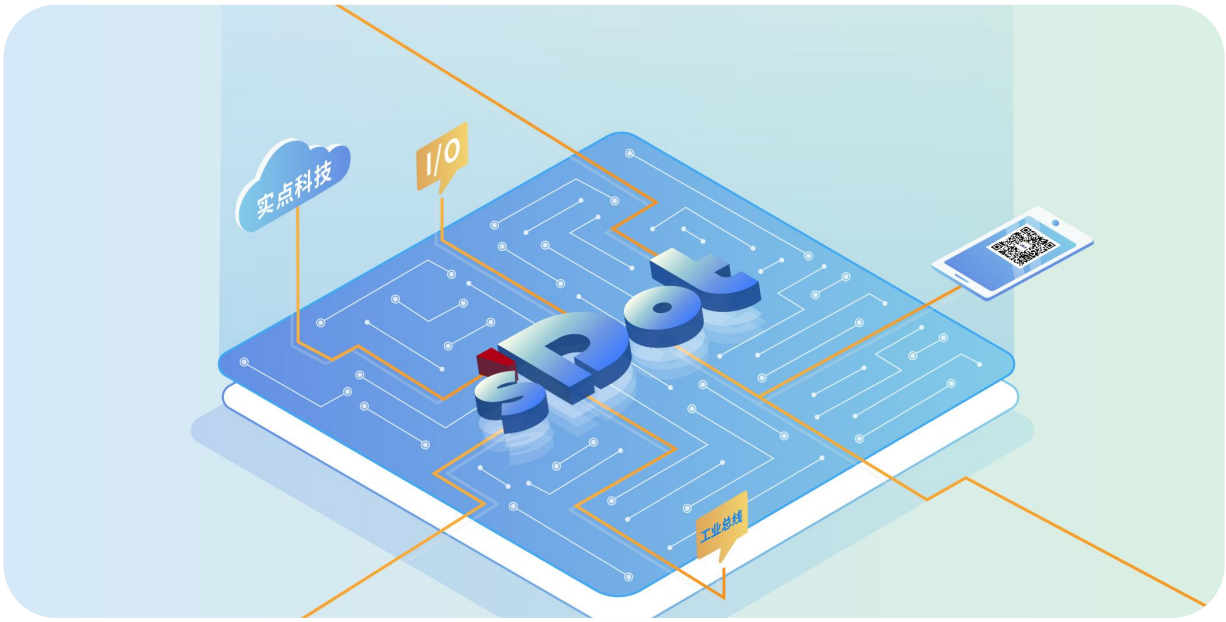


IO-Link HUB

IOL7A Series Hubs

User Manual

Nanjing Solidot Electronic Technology Co.,Ltd.

Trademark Declaration

All other Solidot trademarks are trademarks of Nanjing Solidot Electronic Technology Co.,Ltd.

All other trademarks or registered trademarks mentioned in this document are the property of their respective owners.

Notice

Your purchase of products,services,or features is subject to the terms and conditions of the Solidot Company's commercial contracts.All or part of the products,services,or features described in this document may not be included in your purchase or use.Unless otherwise agreed in the contract,Solidot Company makes no express or implied representations or warranties regarding the contents of this document.
This document will be updated periodically due to product version upgrades or other reasons.Unless otherwise agreed,this document is for guidance only,and all statements,information,and suggestions in this document do not constitute any express or implied warranty.

Nanjing Solidot Electronic Technology Co.,Ltd.
Address:11th Floor,Angying Building,No.91 Shengli Road,Jiangning District,Nanjing City,Jiangsu Province
Postal code:211106
Telephone:4007788929
Website:http://www.solidotech.com

Table of contents

1 Product Overview

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 IOL7A series signal hub(hereinafter referred to as"HUB")supports IO-Link communication,supporting up to 16 channels of digital input or 16 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

- With an IP67 protection rating,it is suitable for harsh industrial environments.
- The wiring is simple and quick,enabling both power supply and data transmission.
- 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

This manual mainly introduces the structure,product parameters and main functions of the IOL7A series hubs.

2 Naming Rules

2.1 Naming Rules

IOL 7A - 00 16 B S - M12 - ▢
(1) (2) (3) (4) (5)(6) (7) (8)

serial number	meaning	Value description		
(1)	Product Technology	IOL:Short for IO-Link		
(2)	Protection level	7A:IP67		
(3)	Number of input channels	16:16-channel input	00:0 channel input	
(4)	Number of output channels	00:0 channel output	16:16-channel output	C:Configurable input/output channels
(5)	Input/output channel types	B:PNP	A:NPN	
(6)	Does it support diagnostic functions?	Default:Channel-level diagnostics are not supported.	S:Supports channel-level diagnostics.	
(7)	I/O interface	M12	M8	
(8)	IO-Link interface type	Default:Class-A	B:Class-B	E:Class-A with external power supply

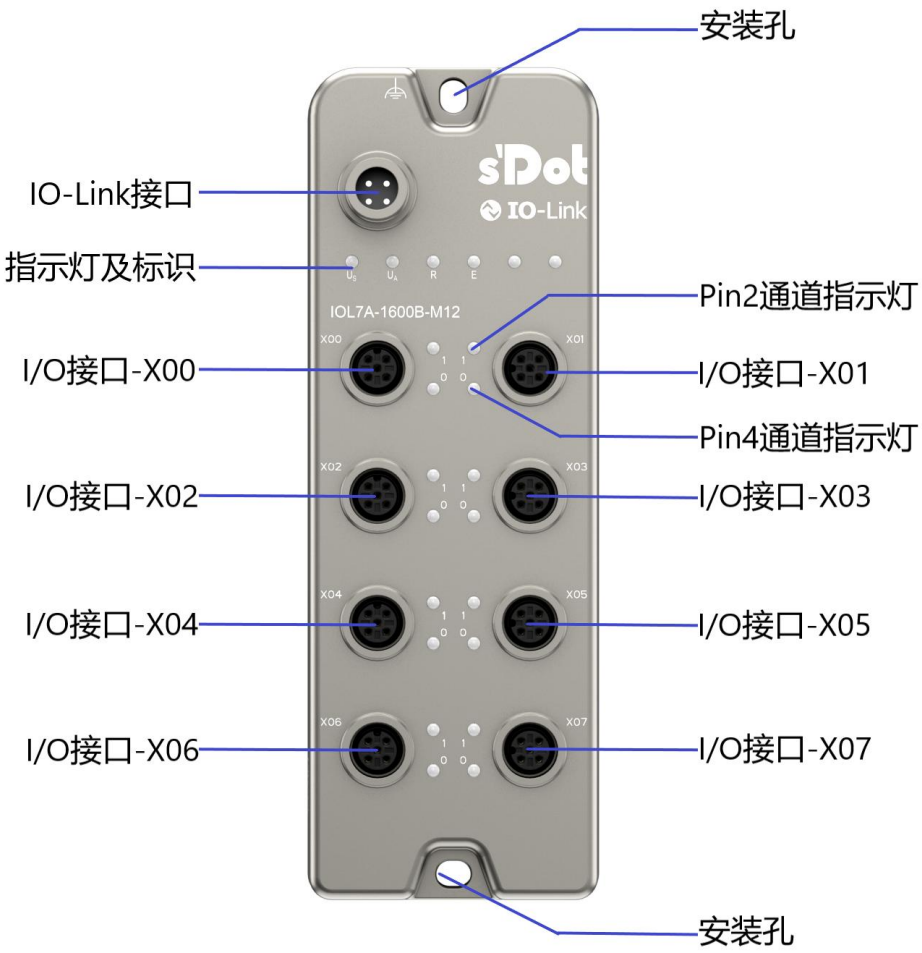
2.2 Model List

Model	Product Description
IOL7A-1600B-M12	16-channel digital input IO-Link HUB,PNP type,IP67
IOL7A-0016B-M12	16-channel digital output IO-Link HUB,PNP type,IP67
IOL7A-0016BS-M12	16-channel digital output IO-Link HUB,PNP type,IP67(supports channel-level diagnostics).
IOL7A-16CB-M12	IO-Link HUB with up to 16 input or 16 output channels,PNP type,IP67
IOL7A-16CBS-M12	Configurable IO-Link HUB with up to 16 input or 16 output channels,PNP type,IP67(supports channel-level diagnostics).
IOL7A-1600A-M12	16-channel digital input IO-Link HUB,NPN type,IP67
IOL7A-0016A-M12	16-channel digital output IO-Link HUB,NPN type,IP67
IOL7A-0016AS-M12	16-channel digital output IO-Link HUB,NPN type,IP67(supports channel-level diagnostics).
IOL7A-16CA-M12	IO-Link HUB with up to 16 input or 16 output channels,NPN type,IP67
IOL7A-16CAS-M12	Configurable IO-Link HUB with up to 16 input or 16 output channels,NPN type,IP67(supports channel-level diagnostics).

3 Panel

3.1 Hub structure

Product Parts Names



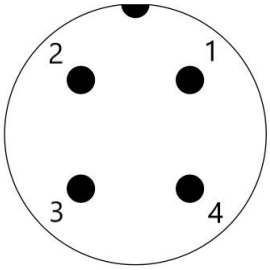
3.2 Indicator light function

Logo	Color	State	Status Description
Power indicator light US	green	Bright	Power supply is normal
		blinking	Low power supply,overvoltage
		Extinguish	The product is not powered on or the power supply is abnormal.
Power indicator light UA	green	Bright	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.
Communication indicator R	green	Bright	Communication abnormal
		blinking	Communication is normal
		Extinguish	Power supply abnormality
Fault indicator light E	red	Bright	Equipment malfunction
		blinking[1]	Channel short circuit
		Extinguish	No abnormalities
Input channel indicator	green	Bright	PNP type,channel signal input high
			NPN type,low channel signal input
		Extinguish	PNP type,low channel signal input
			NPN type,channel signal input high
Output channel indicator	green	Bright	PNP type,high channel signal output
			NPN type,low channel signal output
		Extinguish	PNP type,low channel signal output
			NPN type,high channel signal output

Note:The flashing status of the fault indicator light will only take effect if the IO-Link hub model used supports channel-level diagnostics.

3.3 IO-Link Interface Definition

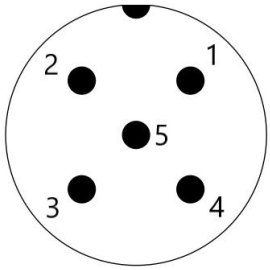
IO-Link interface connection view(Class-A port,pin end)	Definitions



Pin	Function
1	Power supply voltage,+24V
2	NC or P24
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.

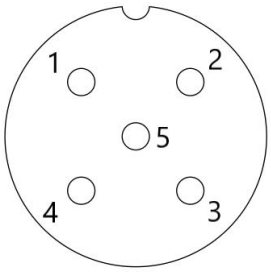
IO-Link interface connection view(Class-B port,pin end)	Definitions



Pin	Function
1	Power supply voltage,+24V
2	Auxiliary power supply P24
3	0V,Power supply GND
4	C/Q,IO-Link data transmission channels
5	Auxiliary power supply N24

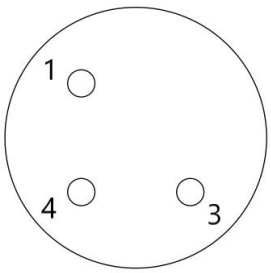
3.4 I/O interface definition

I/O interface connection view(M12,hole end)	Definitions



Pin	Function
1	Power supply voltage,+24V
2	DI/DO 1,Signal Input/Output 1
3	0V,Power supply GND
4	DI/DO 0,signal input/output 0
5	NC

I/O interface connection view(M8,hole end)	Definitions



Pin	Function
1	Power supply voltage,+24V
3	0V,Power supply GND
4	DI/DO,signal input/output

4 Product Parameters

4.1 General parameters

Communication parameters			
Product Model	IOL7A-1600B-M12	IOL7A-0016B-M12	IOL7A-16CB-M12
VendorID	1320(0x0528)		
VendorName	SOLIDOT		
DeviceID	2401013(0x24A2F5)	2401014(0x24A2F6)	2401015(0x24A2F7)
IO-Link version	V1.1.3		
Communication rate	COM3(230.4kbps)		
Minimum cycle time	1ms		
Process data length	2-byte input	2-byte output	2-byte input/output
Interface type	M12-A,4-pin,pin tip		
Cable length	≤20m(between HUB and main station)		
Electrical parameters			
Operating voltage(V)	24 VDC(18V ~ 30V)		
Power consumption(mA)	120mA		
Configurable inputs and outputs	no		yes
Input/output interfaces	M12-A,5-pin,pin end		
Number of input channels	16	-	Maximum 16
Input current	4mA	-	4mA
Input Channel Type	PNP	-	PNP
Input filtering	Configurable	-	Configurable
Digital input	support	-	support

protection short circuit			
Number of output channels	-	16	Maximum 16
Maximum output current of single channel	-	0.5A	
Total output current	-	Maximum 2A	
Output channel type	-	PNP	
Communication parameters			
Product Model	IOL7A-0016BS-M12	IOL7A-16CBS-M12	
VendorID	1320(0x0528)		
VendorName	SOLIDOT		
DeviceID	2401019(0x24A2FB)	2401029(0x24A305)	
IO-Link version	V1.1.3		
Communication rate	COM3(230.4kbps)		
Minimum cycle time	1ms		
Process data length	2-byte output	2-byte input/output	
Interface type	M12-A,4-pin,pin tip		
Cable length	≤20m(between HUB and main station)		
Electrical parameters			
Operating voltage(V)	24 VDC(18V ~ 30V)		
Power consumption(mA)	120mA		
Configurable inputs and outputs	no	yes	
Input/output interfaces	M12-A,5-pin,pin end		
Number of input channels	-	Maximum 16	
Input current	-	4mA	
Input Channel Type	-	PNP	
Input filtering	-	Configurable	
Digital input protection short circuit	-	support	
Number of output channels	16	Maximum 16	
Maximum output current of single	0.5A		

channel	
Total output current	Maximum 2A
Output channel type	PNP
Channel-level diagnostics	support

Communication parameters			
Product Model	IOL7A-1600A-M12	IOL7A-0016A-M12	IOL7A-16CA-M12
VendorID	1320(0x0528)		
VendorName	SOLIDOT		
DeviceID	2401010(0x24A2F2)	2401011(0x24A2F3)	2401012(0x24A2F4)
IO-Link version	V1.1.3		
Communication rate	COM3(230.4kbps)		
Minimum cycle time	1ms		
Process data length	2-byte input	2-byte output	2-byte input/output
Interface type	M12-A,4-pin,pin tip		
Cable length	≤20m(between HUB and main station)		
Electrical parameters			
Operating voltage(V)	24 VDC(18V ~ 30V)		
Power consumption(mA)	120mA		
Configurable inputs and outputs	no		yes
Input/output interfaces	M12-A,5-pin,pin end		
Number of input channels	16	-	Maximum 16
Input current	4mA	-	4mA
Input Channel Type	NPN	-	NPN
Input filtering	Configurable	-	Configurable
Digital input protection short circuit	support	-	support
Number of output channels	-	16	Maximum 16
Maximum output current of single channel	-	0.5A	
Total output current	-	Maximum 2A	
Output channel type	-	NPN	

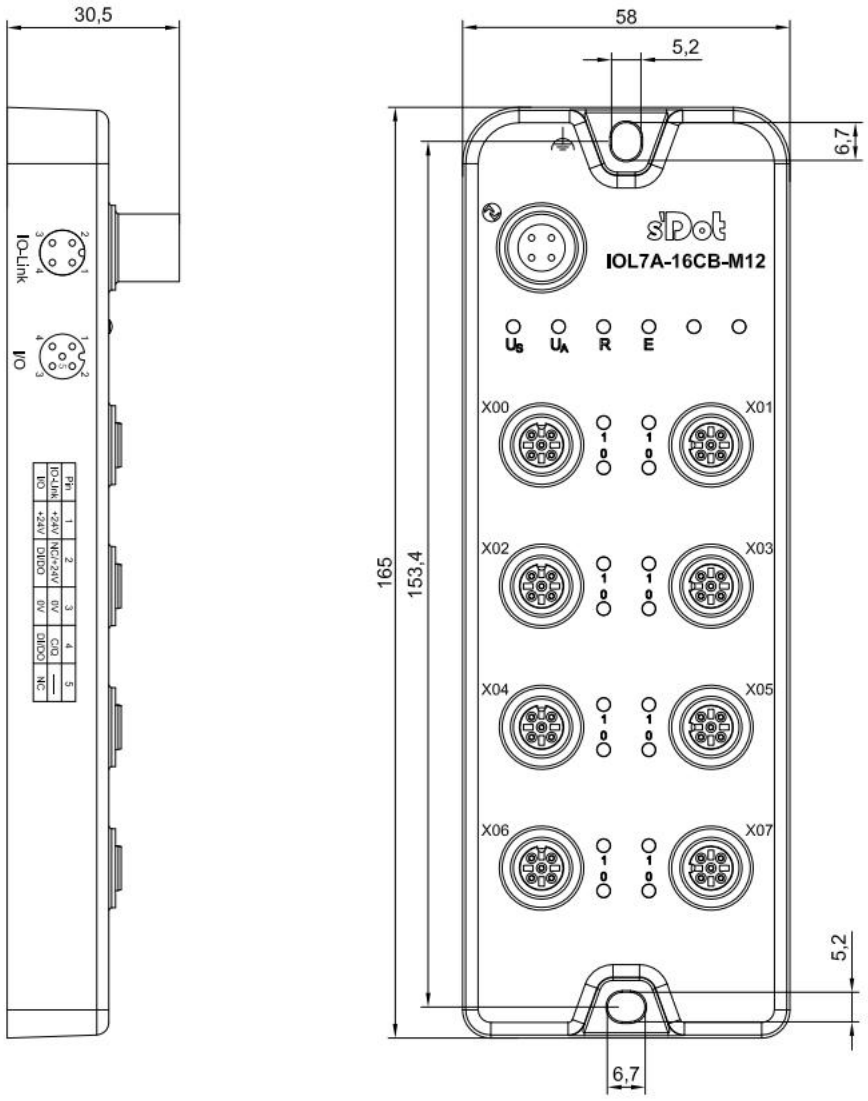
Communication parameters		
Product Model	IOL7A-0016AS-M12	IOL7A-16CAS-M12
VendorID	1320(0x0528)	
VendorName	SOLIDOT	
DeviceID	2401017(0x24A2F9)	2401018(0x24A2FA)
IO-Link version	V1.1.3	
Communication rate	COM3(230.4kbps)	
Minimum cycle time	1ms	
Process data length	2-byte output	2-byte input/output
Interface type	M12-A,4-pin,pin tip	
Cable length	≤20m(between HUB and main station)	
Electrical parameters		
Operating voltage(V)	24 VDC(18V ~ 30V)	
Power consumption(mA)	120mA	
Configurable inputs and outputs	no	yes
Input/output interfaces	M12-A,5-pin,pin end	
Number of input channels	-	Maximum 16
Input current	-	4mA
Input Channel Type	-	NPN
Input filtering	-	Configurable
Digital input protection short circuit	-	support
Number of output channels	16	Maximum 16
Maximum output current of single channel	0.5A	
Total output current	Maximum 2A	
Output channel type	NPN	
Channel-level diagnostics	support	

4.2 Technical parameters

Diagnosis	
Communication status	LED indicator
Pressure monitoring	support
Short circuit and overload protection	support
Work environment	
Specifications and dimensions	165 × 58 × 30.5 mm
Weight	365g
Operating temperature	-25℃~+70℃
Storage temperature	-40℃~+85℃
relative humidity	95%,no condensation
Protection level	IP67
Other	
Firmware upgrade	support
Data storage	support

5 Wiring instructions

5.1 Outline dimension drawing



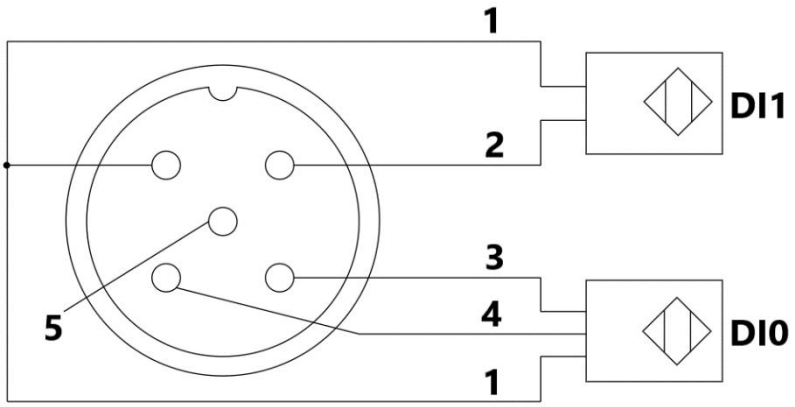
5.2 Wiring instructions

- For personal and equipment safety,it is recommended to disconnect the power supply when performing wiring operations.
- IO-Link Master Interface:Connect IO-Link hubs to any IO-Link master product using standardized three-core or four-core cables.
- I/O Interface:Connect IO-Link hubs to sensors or other devices using standardized five-core cables.

5.3 Wiring example

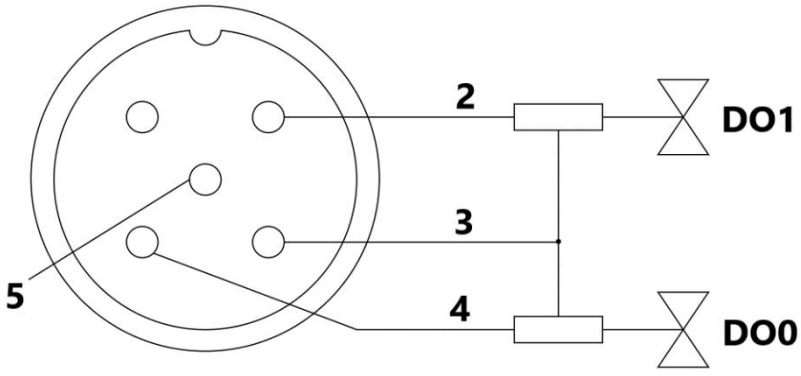
PNP type dual input signal

One connector connects two digital input signals.



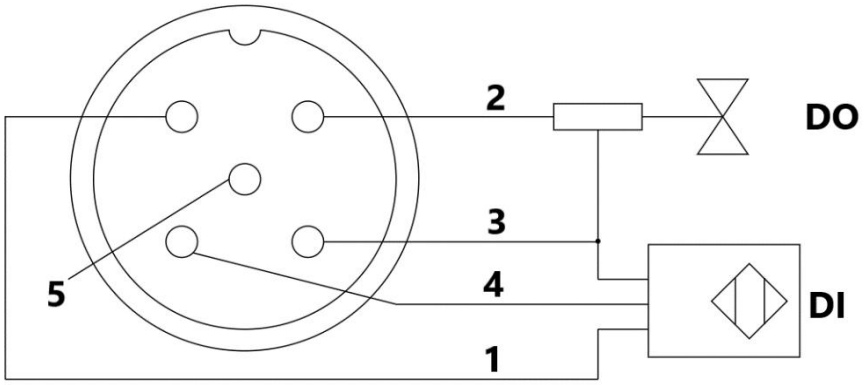
PNP type dual output signal

One connector connects two digital output signals.



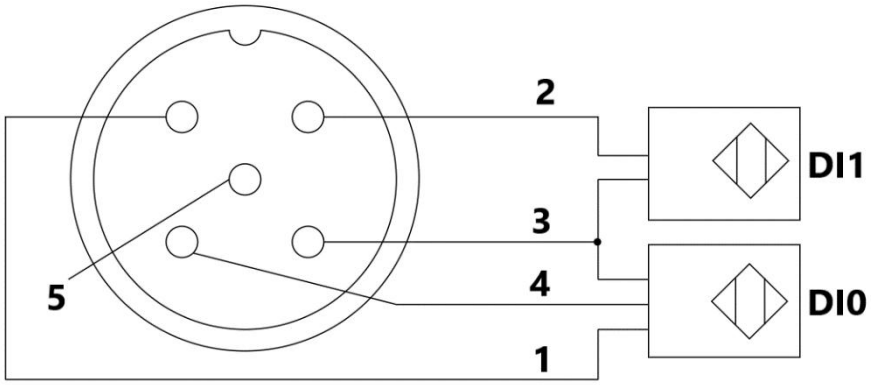
PNP type configurable input/output signals

One connector can be configured to connect one digital input and one digital output signal,two digital input signals,or two digital output signals.



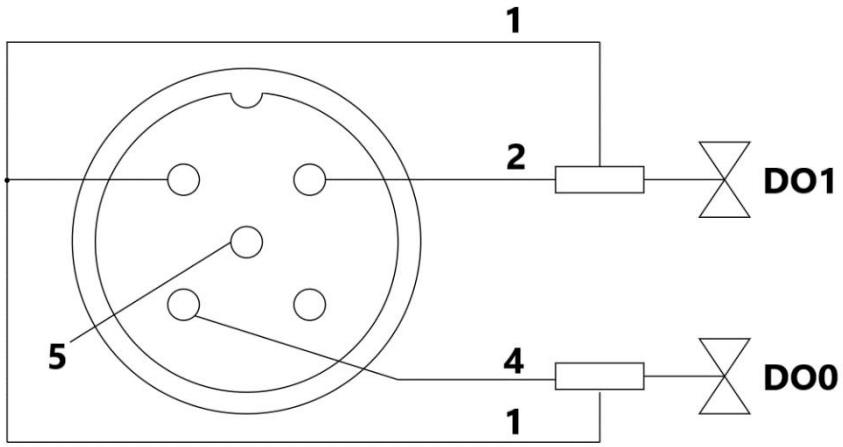
NPN type dual input signal

One connector connects two digital input signals.



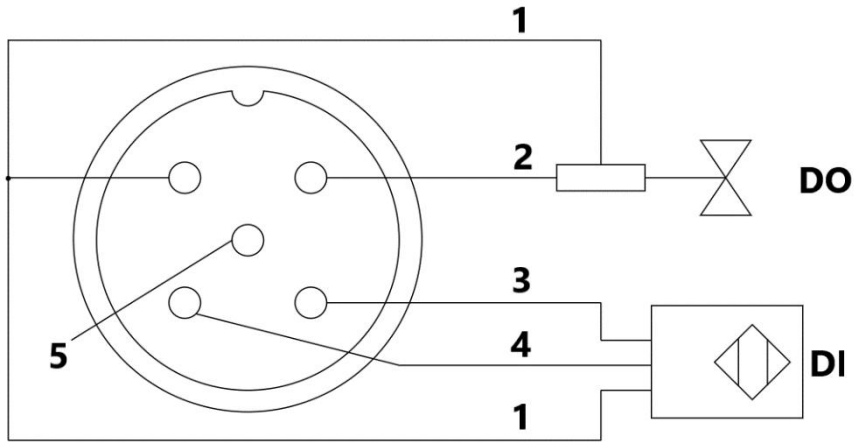
NPN type dual output signal

One connector connects two digital output signals.



NPN type configurable input/output signals

One connector can be configured to connect one digital input and one digital output signal,two digital input signals,or two digital output signals.



6 Function Description

6.1 Process data mapping

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
Pin	X03-Pin2	X03-Pin4	X02-Pin2	X02-Pin4	X01-Pin2	X01-Pin4	X00-Pin2	X00-Pin4	X07-Pin2	X07-Pin4	X06-Pin2	X06-Pin4	X05-Pin2	X05-Pin4	X04-Pin2	X04-Pin4

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
Pin	X03-Pin2	X03-Pin4	X02-Pin2	X02-Pin4	X01-Pin2	X01-Pin4	X00-Pin2	X00-Pin4	X07-Pin2	X07-Pin4	X06-Pin2	X06-Pin4	X05-Pin2	X05-Pin4	X04-Pin2	X04-Pin4

6.2 ISDU parameters

ISDU		name	Permissions	Data types	describe
index	Sub-index				
0x0010	0x00	Supplier Name	R	64 String	Supplier SOLIDOT
0x0011	0x00	Supplier Information	R	64 String	www.solidotech.com
0x0012	0x00	Product Name	R	64 String	For example:SDOT-IOL7A-1600B-M12
0x0013	0x00	Product ID	R	64 String	For example:IOL7A-1600B-M12
0x0014	0x00	Product Information	R	64 String	I/O-HUB
0x0015	0x00	Serial Number	R	64 String	-
0x0016	0x00	Hardware version	R	64 String	-
0x0017	0x00	Firmware version	R	64 String	-
0x0018	0x00	Application Identifier	R/W	32 String	Application Identifier:***
0x0019	0x00	Specific function identifier	R/W	32 String	Specific function identifier:***
0x001A	0x00	Equipment location identification	R/W	32 String	Equipment location description:***
0x0024	0x00	Equipment status	R	1 UintegerT	Note 1
0x0025	0x00	Detailed equipment status	R	ArrayT of OctetStringT3	Note 2

Note 1:Equipment status definition:0:Equipment is normal;1:Equipment needs maintenance;2:Equipment exceeds limits;3:Equipment needs functional check;4:Equipment is malfunctioning,default is 0.
Note 2:Default is 8*3 bytes,default is 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(adaptive,no configuration required)
0x0044	Short circuit recovery	R/W	2 Unsigned	0:Automatic recovery;1:Manual reset recovery;Default 0x0000
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 6.5.5
0x004A	Input hold time	R/W	16 Unsigned	See 6.5.6

6.5 Functional parameter mapping

6.5.1 Input conversion(0x0041)

Sub-index	Pin	Offset	Scope
0x01	X00-Pin4	8	0:Do not reverse,default value 1:Reverse
0x02	X00-Pin2	9	
0x03	X01-Pin4	10	
0x04	X01-Pin2	11	
0x05	X02-Pin4	12	
0x06	X02-Pin2	13	
0x07	X03-Pin4	14	
0x08	X03-Pin2	15	
0x09	X04-Pin4	0	
0x0A	X04-Pin2	1	
0x0B	X05-Pin4	2	
0x0C	X05-Pin2	3	
0x0D	X06-Pin4	4	
0x0E	X06-Pin2	5	
0x0F	X07-Pin4	6	
0x10	X07-Pin2	7	

6.5.2 Configure port direction(0x0042)

Sub-index	Pin	offset	scope
0x01	X00-Pin4	8	0:Input 1:Output,default value
0x02	X00-Pin2	9	
0x03	X01-Pin4	10	
0x04	X01-Pin2	11	
0x05	X02-Pin4	12	
0x06	X02-Pin2	13	
0x07	X03-Pin4	14	
0x08	X03-Pin2	15	
0x09	X04-Pin4	0	
0x0A	X04-Pin2	1	
0x0B	X05-Pin4	2	
0x0C	X05-Pin2	3	
0x0D	X06-Pin4	4	
0x0E	X06-Pin2	5	
0x0F	X07-Pin4	6	
0x10	X07-Pin2	7	

6.5.3 Short circuit recovery(0x0044)

Sub-index	Pin	offset	scope
0x01	X00-Pin4	8	0:Auto-recover,default value 1:Manual reset recovery
0x02	X00-Pin2	9	
0x03	X01-Pin4	10	
0x04	X01-Pin2	11	
0x05	X02-Pin4	12	
0x06	X02-Pin2	13	
0x07	X03-Pin4	14	
0x08	X03-Pin2	15	
0x09	X04-Pin4	0	
0x0A	X04-Pin2	1	
0x0B	X05-Pin4	2	
0x0C	X05-Pin2	3	
0x0D	X06-Pin4	4	
0x0E	X06-Pin2	5	
0x0F	X07-Pin4	6	
0x10	X07-Pin2	7	

6.5.4 Output failure protection(0x0045)

Sub-index	Pin	offset	scope
0x01	X00-Pin4	64	0:Communication failure outputs 0V low level,default value. 1:Communication failure outputs 24V high level 2:If communication fails,the output will remain in its original state.
0x02	X00-Pin2	72	
0x03	X01-Pin4	80	
0x04	X01-Pin2	88	
0x05	X02-Pin4	96	
0x06	X02-Pin2	104	
0x07	X03-Pin4	112	
0x08	X03-Pin2	120	
0x09	X04-Pin4	0	
0x0A	X04-Pin2	8	
0x0B	X05-Pin4	16	
0x0C	X05-Pin2	24	
0x0D	X06-Pin4	32	
0x0E	X06-Pin2	40	
0x0F	X07-Pin4	48	
0x10	X07-Pin2	56	

6.5.5 Input filtering time(0x0049)

Sub-index	Pin	offset	scope
0x01	X00-Pin4	64	Input Filtering time setting value 0~25(corresponding to 0~50ms,2ms unit),default 0:off
0x02	X00-Pin2	72	
0x03	X01-Pin4	80	
0x04	X01-Pin2	88	
0x05	X02-Pin4	96	
0x06	X02-Pin2	104	
0x07	X03-Pin4	112	
0x08	X03-Pin2	120	
0x09	X04-Pin4	0	
0x0A	X04-Pin2	8	
0x0B	X05-Pin4	16	
0x0C	X05-Pin2	24	
0x0D	X06-Pin4	32	
0x0E	X06-Pin2	40	
0x0F	X07-Pin4	48	
0x10	X07-Pin2	56	

6.5.6 Input hold time(0x004A)

Sub-index	Pin	offset	scope
0x01	X00-Pin4	64	Input Hold time setting value is 0~25(corresponding to 0~50ms,2ms unit),default is 0.
0x02	X00-Pin2	72	
0x03	X01-Pin4	80	
0x04	X01-Pin2	88	
0x05	X02-Pin4	96	
0x06	X02-Pin2	104	
0x07	X03-Pin4	112	
0x08	X03-Pin2	120	
0x09	X04-Pin4	0	
0x0A	X04-Pin2	8	
0x0B	X05-Pin4	16	
0x0C	X05-Pin2	twenty four	
0x0D	X06-Pin4	32	
0x0E	X06-Pin2	40	
0x0F	X07-Pin4	48	
0x10	X07-Pin2	56	

Note:The offset determines the byte in which the parameter is located.The high-order byte of the offset comes first.For example,if the index is 0x45 and the sub-index is 0x08 with an offset of 120,then the first byte of index 0x45 is sub-index 0x08 and the last byte is sub-index 0x09 with an offset of 0.
For example,index 0x41 has two bytes.The highest bit of the first byte is sub-index 0x08 with an offset of 15,and the lowest bit of the second byte is sub-index 0x09 with an offset of 0.