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1. Description

1.1 Agreement

The following terms/abbreviations are used synonymously in this document:

IOL: IO-Link.

LSB: least significant bit.

MSB: most significant bit.

This device: equivalent to "this product", refers to the product model or series described in this manual.

1.2 Purpose

This manual contains all the information required to use the device correctly, including information on necessary functions, performance, usage, etc. It is suitable both for programmers and test/debugging personnel who debug the system themselves and interface it with other units (automation systems, other programming devices), as well as for service and maintenance personnel who install extensions or perform fault/error analysis.

Please read this manual carefully before installing this equipment and putting it into operation.

This manual contains instructions and notes to help you step-by-step through installation and commissioning. This ensures trouble-free use of the product. By familiarizing yourself with this manual, you will gain.

The following benefits:

- ❖ ensuring safe operation of this device.
- ❖ take advantage of the full capabilities of this device.
- ❖ avoid errors and related failures.
- ❖ reduce maintenance and avoid cost waste.

1.3 Valid Scope

The descriptions in this document apply to the IO-Link device module products of the ULK-EIP series.

1.4 Declaration of Conformity

This product has been developed and manufactured in compliance with applicable European standards and guidelines (CE, ROHS). You can obtain these certificates of conformity from the manufacturer or your local sales representative.

2. Safety Instructions

2.1 Safety Symbols

Read these instructions carefully and inspect the equipment before attempting to install, operate, repair, or maintain it. The following special messages may appear throughout this document or on the equipment to indicate status information or to warn of potential hazards.

We divide the safety prompt information into four levels: "Danger", "Warning", "Attention", and "Notice".

DANGER	indicates a severely hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	indicates a hazardous situation which, if not avoided, could result in death or serious injury.
ATTENTION	indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	used to prompt information not related to personal injury



This is the DANGER symbol, which indicates an electrical hazard exists which, if instructions are not followed, will result in personal injury.



This is a WARNING symbol, which indicates an electrical hazard exists which, if instructions are not followed, could result in personal injury.

Attention

This is the "Attention" symbol. Used to warn you of a potential personal injury hazard. Observe all safety instructions following this symbol to avoid injury or death.

Notice

This is the "Notice" symbol, which is used to warn the user of possible risks. Failure to observe this regulation may result in faulty of device.

2.2 General Safety

This equipment should only be installed, operated, serviced and maintained by qualified personnel. Qualified person is a person who has skills and knowledge concerning the construction and operation of electrical equipment, and its installation, and has received safety training to recognize and avoid the hazards involved.

There shall be a statement in the instructions that if the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Notice

User modifications and/or repairs are dangerous and will void the warranty and release the manufacturer from any liability.

Attention

Product maintenance can only be carried out by our personnel. Unauthorized opening and improper servicing of the product can result in extensive equipment damage or possibly personal injury to the user.

In the event of a serious malfunction, discontinue use of the equipment. Prevent accidental operation of the device. If repairs are required, please return the device to your local representative or sales office.

It is the operating company's responsibility to comply with locally applicable safety regulations.

Store unused equipment in its original packaging. This provides the best protection against impact and moisture for the device. Please ensure that the ambient conditions comply with this relevant regulation.

2.3 Special Safety



A process started in an uncontrolled manner may endanger or be exposed to other equipment, therefore, before commissioning, make sure that the use of the equipment does not involve risks that may endanger other equipment or be endangered by other equipment risks of.

Power Supply

This device can only be operated with a current source of limited power, that is, the power supply must have overvoltage and overcurrent protection functions. To prevent the power failure of this equipment, affecting the safety of other equipment; or the failure of external equipment, affecting the safety of this equipment.

3. Product Overview

The IO-Link master establishes the connection between the IO-Link device and the automation system. As an integral part of the I/O system, the IO-Link master station is either installed in the control cabinet, or directly installed on site as a remote I/O, and its encapsulation level is IP65/67.

- ❖ Designed for industrial environments, it is a system applied to automated lines.
- ❖ Compact structure, suitable for usage scenarios with limited installation conditions.
- ❖ IP67 high protection level, anti-interference design, suitable for demanding application environments.

As a special reminder, IP rating is not part of UL certification.

4. Technical Parameters

4.1 ULK-1616P2-M2P6



4.1.1 ULK-1616P2-M2P6 Specification

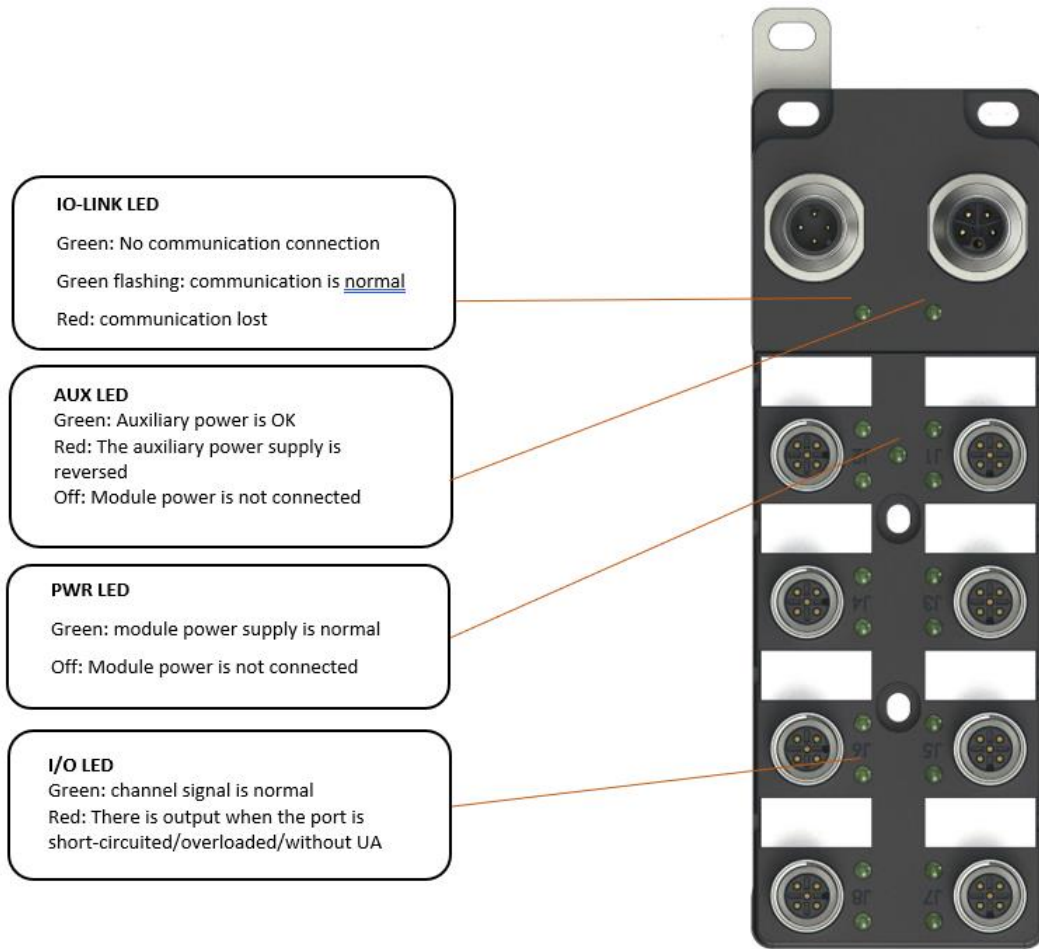
The technical specifications of ULK-1616P2-M2P6 are as follows:

Basic Parameters	Full Series
Housing Material	PA6 + GF
Housing Color	Black
Protection Level	IP67, Epoxy full potting
Dimensions (W x H x D)	155mm×53mm×28.7mm
Weight	227g
Operating Temperature	-25°C...70°C
Storage Temperature	-40°C...85°C
Operating Humidity	5%...95%
Storage Humidity	5%...95%
Operating Atmospheric Pressure	80KPa...106KPa
Storage Atmospheric Pressure	80KPa...106KPa
Altitude	0...2000m
Pollution Degree	3
Tightening Torque (I/O)	M12:0.5Nm
Application Environment	conforms to EN-61131
Vibration Test	conforms to IEC60068-2
Impact Test	conforms to IEC60068-27
Free Drop Test	conforms to IEC60068-32
EMC	conforms to IEC61000-4-2,-3,-4
Certification	CE,RoHS
Mounting Hole Size	Φ4.3mm ×4

Model	ULK-1616P2-M2P6
IOLINK Parameters	
IO-LINK Device	1×Device
Data Length	2 bytes input/2 bytes output
Minimum Cycle Time	3ms
Power Parameters	
Rated Voltage	18...30V DC
Total Current UI	<1.6A
Total Current UO	<12A
Port Parameters (input)	
Input Port Position	J1.....J8
Input Port Number	up to16
Input Polarity	PNP
Input Signal	3-wire PNP sensor or 2-wire passive signal
Input Signal "0"	Low level 0~5V
Input Signal "1"	High level 11~30V
Switching Threshold	EN 61131-2 Type 1/3
Switching Frequency	250HZ
Input Delay	20µs
Maximum Load Current	200mA
I/O Connection	M12 5pin Female A coded
Port Parameters (output)	
Output Port Position	J1.....J8
Output Port Number	up to16
Output Polarity	PNP
Output Voltage	24V(follow UA)
Output Current	2A
Output Diagnostic Type	point diagnosis
Synchronization Factor	1
Switching Frequency	250HZ
Load Type	Resistive, Pilot Duty, Tungsten
Short Circuit Protection	yes
Overload Protection	yes
I/O Connection	M12 5pin Female A coded

4.1.2 ULK-1616P2-M2P6 Series LED Definition

ULK-1616P2-M2P6 LED is shown in the below figure.

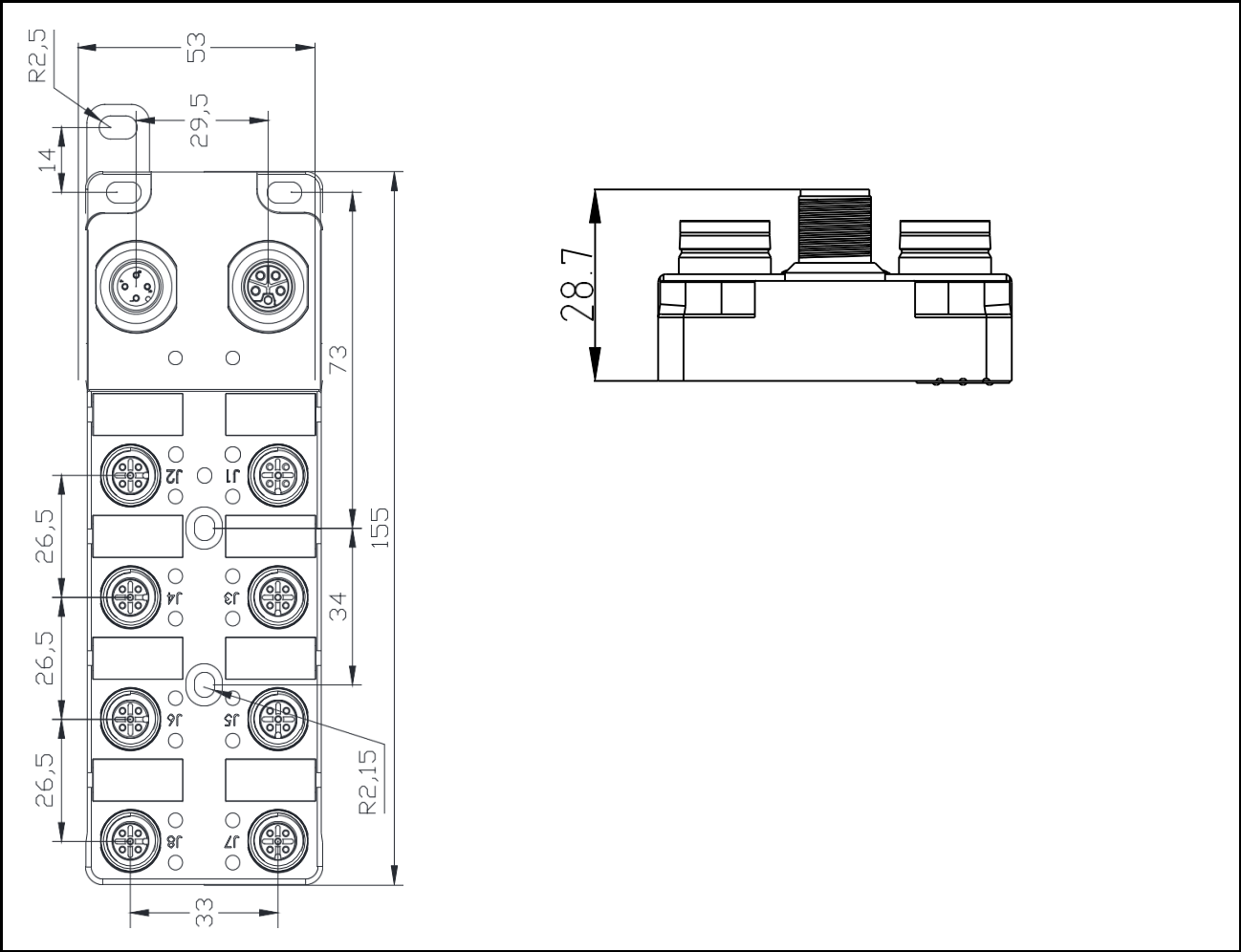


	Status	Solution
PWR	Green: Power OK	
	Off: Module power disconnected	Check power wiring
AUX	Green: Auxiliary power is OK	
	Red: The auxiliary power supply is reversed	Check the wiring of the auxiliary power port
	Off: Auxiliary power disconnected	Check auxiliary power wiring
IO-LINK	Green: link is normal, data communication is abnormal	Check the configuration of the modules in the PLC
	Green flashing: link is normal, data communication is normal	
	Off: Link not established	Check the cable
	Red: Communication with the master station is interrupted	Check the status of the master station / view the connection line
IO	Green: channel signal is normal	
	Red: There is output when the port is short-circuited/overloaded/without UA power	Check whether the wiring is correct/measure UA voltage/PLC program

Note: When the Link indicator is always off, if there is no abnormality in the cable inspection and replacement of other modules, it indicates that the product is working abnormally. Please contact the manufacturer for technical consultation.

4.1.3 ULK-1616P2-M2P6 Dimension

The size of the ULK-1616P2-M2P6 is 155mm × 53mm × 28.7mm, including 4 mounting holes of $\Phi 4.3\text{mm}$, and the depth of the mounting holes is 10mm, as shown in the figure below:



5. Product Installation

5.1 Installation Precautions

To prevent product malfunction, malfunction, or negative impact on performance and equipment, please observe the following items.

5.1.1 Installation Site

Notice

Please avoid installing near devices with high heat dissipation (heaters, transformers, large-capacity resistors, etc.)

Notice

Please avoid installing it near equipment with serious electromagnetic interference (large motors, transformers, transceivers, frequency converters, switching power supplies, etc.). This product uses PN communication. Radio waves (noise) generated by transceivers, motors, inverters, switching power supplies, etc. may affect the communication between the product and other modules. When these devices are around, it may affect the communication between the product and the module or damage the internal components of the module. When using this product near these devices, please confirm the effects before use.

Notice

When multiple modules are installed close to each other, The service life of the modules may be shortened due to the inability to dissipate heat. Please keep more than 20mm between the modules.

5.1.2 Application



Do not use AC power. Otherwise, there is a risk of rupture, seriously affecting the safety of personal and equipment.

Attention

Please avoid wrong wiring. Otherwise, there is a risk of rupture and burnout. It may affect the safety of personal and equipment.

5.1.3 Usage

Attention

Do not bend the cable within a radius of 40mm. Otherwise there is a risk of disconnection.


Attention

If you feel that the product is abnormal, please stop using it immediately and contact the company after cutting off the power.

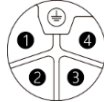
5.2 Hardware Interface
 5.2.1 ULK-1616P2-M2P6 Interface Definition

Power Port Definition


1. ULK-1616P2-M2P6 Port Definition

Power Port Pin Definition			
Port M12 Male	Connection Type	M12, 5 pins, A-code Male	Male  1. V+ 2. N/C 3. 0V 4. C/Q 5. N/C
	Allowable Input Voltage	18...30 VDC (type.24VDC)	
	Maximum Current	1A	
	Static Working Current I _c	≤80mA	
	Power Reverse Polarity Protection	yes	
	Tightening Torque (power port)	M12:0.5Nm	
	Protocol	IOLINK	
	Transfer Speed	38.4 kbit/s (COM2)	
	Minimum Cycle Time	55ms	
	Pin Definition		

2. Auxiliary Power Port Pin Definition

Auxiliary Power Port Pin Definition				
Port M12 L-code Male P	Connection Type	M12, 5 pins, L-code, Male/Female	Male  1. +24V_Ua 2. GND_Ua 3. GND_Ua 4. +24V_Ua 5. FE	
	System Supply Voltage u _s	18...30 VDC (type.24VDC)		
	Auxiliary supply voltage u _a	18...30 VDC (type.24VDC)		
	Total Current I _s	12A		
	Total Current I _a	12A		
	Static Working Current I _c	≤150mA		
	Power Reverse Polarity Protection	yes		
	Tightening Torque (power port)	M12:0.5Nm		

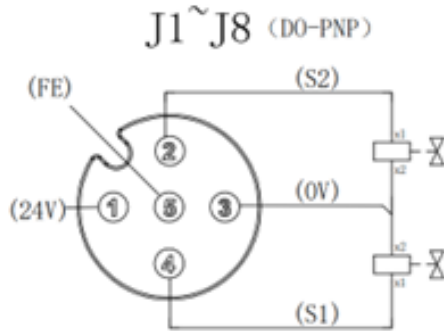
3. IO-Link Port Definition

I/O Port Pin Definition																																																											
Port	Pin Definition		Address Distribution																																																								
	M12 A-code Female			<table border="1"> <thead> <tr> <th rowspan="2">Byte</th> <th colspan="2">(-R)</th> </tr> <tr> <th>1</th> <th>0</th> </tr> </thead> <tbody> <tr> <td>Bit0</td> <td>J1P4</td> <td>J5P4</td> <td>Bit0</td> <td>J1P4</td> <td>J5P4</td> </tr> <tr> <td>Bit1</td> <td>J1P2</td> <td>J5P2</td> <td>Bit1</td> <td>J1P2</td> <td>J5P2</td> </tr> <tr> <td>Bit2</td> <td>J2P4</td> <td>J6P4</td> <td>Bit2</td> <td>J2P4</td> <td>J6P4</td> </tr> <tr> <td>Bit3</td> <td>J2P2</td> <td>J6P2</td> <td>Bit3</td> <td>J2P2</td> <td>J6P2</td> </tr> <tr> <td>Bit4</td> <td>J3P4</td> <td>J7P4</td> <td>Bit4</td> <td>J3P4</td> <td>J7P4</td> </tr> <tr> <td>Bit5</td> <td>J3P2</td> <td>J7P2</td> <td>Bit5</td> <td>J3P2</td> <td>J7P2</td> </tr> <tr> <td>Bit6</td> <td>J4P4</td> <td>J8P4</td> <td>Bit6</td> <td>J4P4</td> <td>J8P4</td> </tr> <tr> <td>Bit7</td> <td>J4P2</td> <td>J8P2</td> <td>Bit7</td> <td>J4P2</td> <td>J8P2</td> </tr> </tbody> </table>			Byte	(-R)		1	0	Bit0	J1P4	J5P4	Bit0	J1P4	J5P4	Bit1	J1P2	J5P2	Bit1	J1P2	J5P2	Bit2	J2P4	J6P4	Bit2	J2P4	J6P4	Bit3	J2P2	J6P2	Bit3	J2P2	J6P2	Bit4	J3P4	J7P4	Bit4	J3P4	J7P4	Bit5	J3P2	J7P2	Bit5	J3P2	J7P2	Bit6	J4P4	J8P4	Bit6	J4P4	J8P4	Bit7	J4P2	J8P2	Bit7	J4P2	J8P2
		Byte	(-R)																																																								
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	Input(In/Output)	Output																																																									
	PNP	PNP																																																									

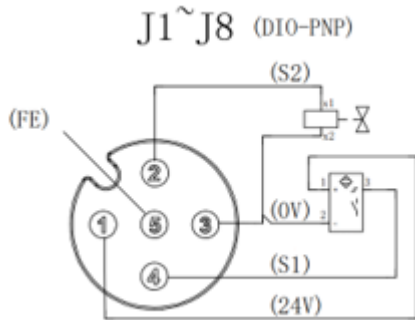
Pin 5 (FE) is connected to the ground plate of the module. If the shielding layer of the connected temperature sensor needs to be grounded, please connect pin 5 to the shielding layer and ground the grounding plate of the module.

5.2.2 ULK-1616P2-M2P6 Wiring Diagram

1. Output Signal



2. Input/Output Signal (self-adaptive)



5.2.3 ULK-1616P2-M2P6 IO Signal Address Correspondence Table

1. Applicable Models: ULK-1616P2-M2P6

Byte	I0.0/Q0.0	I0.1/Q0.1	I0.2/Q0.2	I0.3/Q0.3	I0.4/Q0.4	I0.5/Q0.5	I0.6/Q0.6	I0.7/Q0.7
0	J5P4	J5P2	J6P4	J6P2	J7P4	J7P2	J8P4	J8P2
Byte	I1.0/Q1.0	I1.1/Q1.1	I1.2/Q1.2	I1.3/Q1.3	I1.4/Q1.4	I1.5/Q1.5	I1.6/Q1.6	I1.7/Q1.7
1	J1P4	J1P2	J2P4	J2P2	J3P4	J3P2	J4P4	J4P2

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