DU03L Series
Programable Logic Controller User Manual

V1.00

Odot Automation System Co., Ltd.

Catelog

· Legal Statement

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Security Information

Important information

Before attempting to install, operate, repair, or maintain the equipment, please carefully read the instructions below and familiarize yourself with the equipment by reviewing it. The following specific information may appear elsewhere in the text or on devices, alerting users to potential dangers or alerting them to information that clarifies or simplifies a process. If the device is used in a way not specified by the manufacturer, the protection provided by the device may become ineffective.

The addition of this symbol to a DANGER or WARNING label indicates the presence of an electric shock hazard which, if instructions are not followed, will result in personal injury.

DANGER

DANGER INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN SERIOUS INJURY OR DEATH.

WARNING

WARNING INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN SERIOUS INJURY OR DEATH.

CAUTION

CAUTION INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN MINOR OR MODERATE INJURY OR DEATH.

NOTICE

NOTICE INDICATES A HAZARD NOT RELATED TO PERSONAL INJURY.

Attention

Installation, operation, repair and maintenance of electrical equipment is restricted to qualified personnel only. Sichuan ODOT Automation System Co., Ltd. shall not be responsible for any consequences arising from the use of this user manual.

Qualified personnel are those who have the skills and knowledge related to the manufacturing and operation of electrical equipment and its installation, and who have been trained in safety to be able to detect and avoid related hazards.

Personnel Qualification

Only properly trained personnel who are familiar with and understand the contents of this manual and all other related product documentation are authorized to use this product.

Qualified personnel must be able to detect possible hazards arising from setting parameters and modifying parameter values, usually from mechanical, electrical or electronic equipment. Qualified personnel must be familiar with the various standards, rules and regulations aimed at preventing industrial accidents and must comply with them when designing and building systems.

Expected Usage

The products described or referred to in this document, together with their software, accessories and options, are expansion modules designed for industrial use and should be used in accordance with the relevant instructions, guide, examples and safety instructions in this document and other supporting documents.

This product must be used in compliance with all applicable safety laws and regulations, specified requirements and technical parameters.

Due to planned application, you must perform a risk assessment before using this product.

Appropriate safety-related measures must be taken based on the results of the evaluation.

Since this product should be used as an integral part of the entire machine or process, the safety of personnel must be ensured through the design of the entire system.

This product must be used with the specified cables and accessories. Please use only original spare parts and original replacement parts.

Any use other than that expressly permitted is prohibited as unintended hazards may result.

Network Safety Tips

A. Use controllers and devices only in protected environments to minimize network exposure and ensure inaccessibility from the outside.

B. Use a firewall to protect the control system network and separate it from other.

C. If remote access is required, please use a VPN (Virtual Private Network) tunnel.

D. Restrict access to development and control systems by physical means, operating system capabilities, etc.

E. Protect development and control systems with the latest virus detection solutions.

About This Manual

Document revision record

Date	Version	Modification	Author
2026-06-15	V1.00	Release the version	YPP

More information

Information	Link	Information Description
"D Series - Removable High-Speed Redundant Backplane Remote IO User Manual."	www.odot.com	The manual mainly includes technical specifications of the D series network adapters and I/O modules, as well as communication configuration use cases;

Ownership information

Disclaimer

This document is only intended to assist the reader in using the products, and the company shall not be responsible for any loss or error caused by the use of the information in this document. The product and text described in this document are under constant development and refinement. Odot Automation System Co., Ltd. has the right to modify this document without notifying users.

Software/data download

Please log on the official website: www.odot.cn and click on the corresponding product page to download.

Document scope

This guide introduces the parameters and usage methods of the DU03L series PLC modules, providing an overview of the features, function descriptions, wiring diagrams, and installation details of related products.

Explanation of effectiveness

In accordance with our policy of continuous improvement, we will continue to revise the content of this manual to make it clearer and more accurate.

Sichuan ODOT Automation System Co., Ltd. reserves the right of final interpretation of this manual.

Product Information

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Disconnect power from all equipment (including connected equipment) before removing any covers, or installing or removing any accessories, hardware, cables, or wires, unless otherwise specified in the corresponding hardware guide for this equipment.

As directed, at the appropriate place and time, it is important to always use a properly rated voltage sensing devices to detect if the power is off.

Replace and secure all covers, accessories, hardware, cables and wires, and verify proper ground connection before powering on the device.

When operating this equipment and related products, the specified voltage must be used.

Failure to follow instructions specified by the manufacturer may result in serious consequences such as death, personal injury, or damage to equipment since the protection provided by the equipment may be impaired.

⚠ DANGER

POSSIBLE EXPLOSION HAZARD

Do not connect or disconnect equipment unless it is unplugged or the location is known to be non-hazardous.

Use the USB port (if equipped) only if the work area is known to be non-hazardous.

Failure to follow instructions specified by the manufacturer may result in serious consequences such as death, personal injury, or damage to equipment since the protection provided by the equipment may be impaired.

⚠ WARNING

OUT OF CONTROL

The designer of any control scheme must account for the possible failure of the control path and provide a means for certain critical control functions could be restored to a safe state during and

after path failure. These critical control functions include emergency stop, over-travel stop, power-off restart, and similar safety measures.
For critical control functions, separate or redundant control paths must be provided.
System control paths may include communication links. Consideration must be given to the implications of unforeseen transmission delays or link failures.
Comply with all accident prevention regulations and local safety guidelines.
To guarantee proper operation, each implementation of the device must be fully tested individually before being placed into service.
Failure to follow instructions specified by the manufacturer may result in serious consequences such as death, personal injury, or damage to equipment since the protection provided by the equipment may be impaired.

⚠WARNING

UNINTENDED EQUIPMENT OPERATION

Only use software approved by Sichuan ODOT Automation System Co., Ltd. for use with this equipment.

Please update the application after every change to the physical hardware configuration.

Failure to follow instructions specified by the manufacturer may result in serious consequences such as death, personal injury, or damage to equipment since the protection provided by the equipment may be impaired.

⚠WARNING

UNINTENDED EQUIPMENT OPERATION

The risk assessment should include the possibility of a communication failure between the logic controller and any I/O expansion modules.

If the I/O module output signal "maintain current value" does not meet your application requirements when the I/O expansion Bus error occurs, other solutions should be used to ensure that the application can cope with Bus error events.

Failure to follow instructions specified by the manufacturer may result in serious consequences such as death, personal injury, or damage to equipment since the protection provided by the equipment may be impaired.

Disclaimer of Warranties

Product Usage

NOTICE
• WHEN INSTALLING, OPERATING, AND MAINTAINING THE EQUIPMENT, DO NOT EXCEED ANY OF THE RATINGS SPECIFIED IN THE ELECTRICAL CHARACTERISTICS; • WHEN INSTALLING, OPERATING, AND MAINTAINING THE EQUIPMENT, DO NOT EXCEED ANY OF THE RATINGS SPECIFIED IN THE ENVIRONMENTAL CHARACTERISTICS. DO NOT USE THE PRODUCT IN THE FOLLOWING PLACES: PLACES WITH DUST, OIL FUMES, CONDUCTIVE DUST, CORROSIVE GASES, AND FLAMMABLE GASES; DO NOT EXPOSE TO HIGH TEMPERATURES, CONDENSATION, WIND AND RAIN; VIBRATION AND SHOCK WILL ALSO CAUSE DAMAGE TO THE PRODUCT; FAILURE TO FOLLOW THE INSTRUCTIONS MAY RENDER THE PROTECTION PROVIDED BY THE DEVICE NULL AND MAY RESULT IN MINOR BODILY INJURY OR DAMAGE TO THE DEVICE.

Disclaimer of Warranties

The Company shall not be liable for any damage or malfunction of the equipment caused by: 1. Transportation damage: equipment damage caused by improper transportation or packaging;

2. Natural factors: damage caused by lightning strikes, voltage fluctuations, water ingress or natural disasters (such as fires, floods, etc.);

3. Improper use: damage caused by overload, non-standard operation, unauthorized modification or use of unqualified accessories;

4. Unauthorized maintenance: equipment failure caused by unauthorized maintenance or alteration;

5. Other non-product reasons: damage caused by other reasons that have nothing to do with the equipment itself.

Repair services

1. For the damage caused by the above reasons, the company will charge the repair fee according to the actual situation.

2. Outside the warranty period, the company provides paid maintenance services, and the cost is charged according to the maintenance situation.

Assumption of Risk

The company shall not be liable for casualties, property damage or other related losses caused by the use of the equipment. All risks are borne by the user.

1 Product Overview

1.1 Module Overview

PLC Overview:

- DU03L series controllers support the IEC 61499 standard, programming languages include LD and ST, as well as C language programming. The PLC programming platform is AIOSYS, supports web programming, can be installed on local PC or remote servers, and supports Linux and Windows installation environments.
- The DU03L series PLC features 3*RJ45, 2*RS485, and 1*CAN interfaces, supporting multiple communication protocols: PROFINET master, EtherCAT master, Modbus TCP client/server, TCP and UDP free-port communication, OPC UA server, Modbus RTU master/slave, CAN transparent, etc.
- PLC supports motion control of EtherCAT servo axes, supporting both single-axis and multi-axis controls; Supports PID control. The PLC can expand up to 32 I/O modules, and the PLC and expansion I/O modules can be freely combined according to site requirements.
- The PLC adopts a split two-section structure, with staggered spring light guide terminals and pluggable terminals, making module maintenance and replacement easy; Supports connection of cables with diameters of 0.2mm² (AWG 24) ~ 1.5mm² (AWG 16). The module's OLED screen allows viewing of relevant module parameters, allowing access to some important information without software.

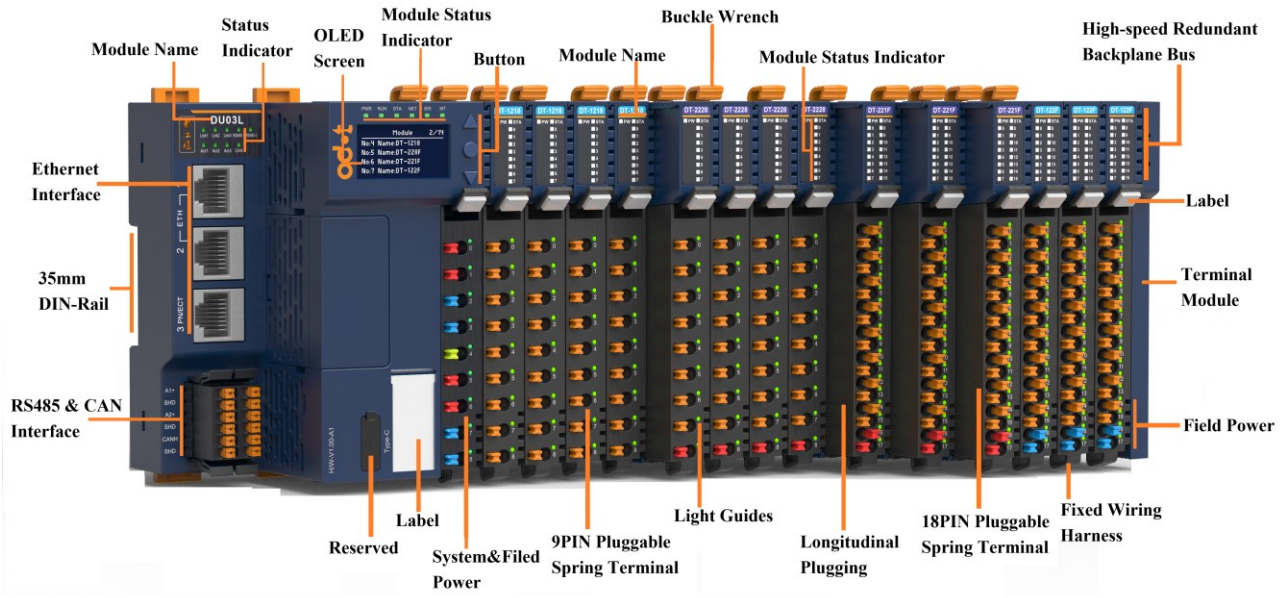
Introduction to AIOSYS Programming Software:

- The AIOSYS software platform is an advanced control system software solution based on IEC61499 standards, specifically designed to meet the needs of modern industrial applications. AIOSYS supports multiple hardware platforms and operating systems, is compatible with the IEC61131-3 programming standard, and also supports advanced programming languages such as C/C++, Python, and Java. Provides highly flexible programming and deployment

capabilities to help customers achieve more efficient and scalable industrial automation control systems.

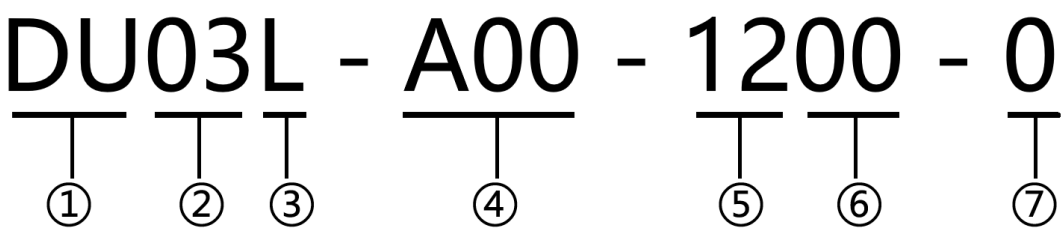
- IEC 61499 standard support: The AIOSYS distributed control runtime must comply with IEC 61499, support distributed control architectures, implement modularization of control logic and task coordination, and be suitable for complex control requirements in industrial automation systems.
- Functional Blocks and Programming Languages: AIOSYS's distributed control runtime supports simple, basic, composite, and service functional blocks. Users can use programming languages such as ST, LD, C, and C++ to develop within these functional blocks. Enhance development flexibility and code reusability.
- Data management and monitoring functions: AIOSYS provides global variables, structure lists, recipe managers, data logging, and TRACE functions, supporting efficient data storage, configuration, and real-time monitoring, facilitating system debugging and maintenance.

Module characteristics



1.2 Explanation of Module Naming Rules

Example:



No.	Name	Description
①	Main series code	DU: Main series code
②	Subseries codes	03: Subseries code
③	Structural model code	L: Only supports one type of real-time Ethernet master station, and only one RunTime can run at a time;
④	Hardware solution version code	A00: Hardware solution version
⑤	Added master protocol code	12: PROFINET RT 13: EtherCAT
⑥	Added slave protocol code	00: None
⑦	Reserved function code	1: Supports motion control PART1 and PART2

***Note: The above serial codes can be freely combined.**

1.3 DU03L Series and I/O Module Selection Table

Model selection table

No.	Model	Function description
DU03L series PLC		
1	DU03L-A00-1200-0	The programming platform is AIOSYS, supporting the IEC 61499 standard, LD, ST, and C programming languages, featuring 3*RJ45, 2*RS485, and 1*CAN interface, supports multiple communication protocols including PROFINET RT master station, Modbus TCP client/server, TCP and UDP free-port communication, Modbus RTU master/slave station, CAN transparent transmission, and more.
2	DU03L-A00-1300-0	The programming platform is AIOSYS, supporting the IEC 61499 standard, LD, ST, and C programming languages, featuring 3*RJ45, 2*RS485, and 1*CAN interface, supports various communication protocols including EtherCAT master, Modbus TCP client/server, TCP and UDP free-port communication, Modbus RTU master/slave station, CAN transparent transmission, and more.
3	DU03L-A00-1300-1	The programming platform is AIOSYS, supporting the IEC 61499 standard, LD, ST, and C programming languages, featuring 3*RJ45, 2*RS485, and 1*CAN interface, supports multiple communication protocols including EtherCAT master station, Modbus TCP client/server, TCP and UDP free-port communication, Modbus RTU master/slave station, CAN transparent transmission, and motion control PART1 and PART2;
I/O Modules		
1	DT-121F	16 channels digital input module PNP/ high level valid
2	DT-122F	16 channels digital input module NPN/ low level valid
3	DT-1314	4 channels digital input module 110 VAC /220VAC
4	DT-221F	16 channels digital output module NPN/ low level valid
5	DT-222F	16 channels digital output module PNP/ high level valid
6	DT-2794	4 channels relay output module 2A@250VAC/30VDC(Resistive load), 1A@250VAC/30VDC (Inductive load)
7	DT-3168	8 channels voltage input module 0~5VDC/0~10VDC/±5VDC/±10VDC, 16 bits
8	DT-3238	8 channels current input module 0&4-20mA, 16 bits
9	DT-3364	4 channels voltage input module 0~5VDC/ 0~10VDC/ ±5VDC/ ±10VDC, 16 bits
10	DT-3434	4 channels current input module 0& 4~20mA, 16 bits
11	DT-3714	4 channels RTD input module RTD-PT100
12	DT-3804	4 channels thermocouple input module TC-J / K/ E / T / S / R / B / N type
13	DT-4164	4 channels voltage output module 0~5VDC/0~10VDC/±5VDC/±10VDC, 16 bits
14	DT-4234	4 channels current output module 0&4-20mA, 16 bits
15	DT-5800	Terminal module, required modules
16	DT-7221	Power expansion module SV: 2A @5VDC /FV: 8A @24VDC

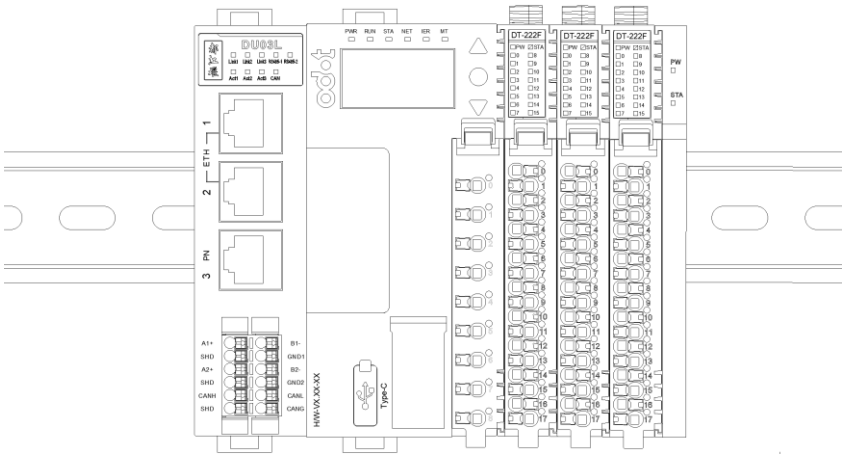
1.4 Product Installation and Disassembly

1.4.1 Module Installation Steps

1) First, open all the buckles on the back of the DU03L module outward, install them onto the 35mm DIN-Rail, and once installed, lock all the buckles.

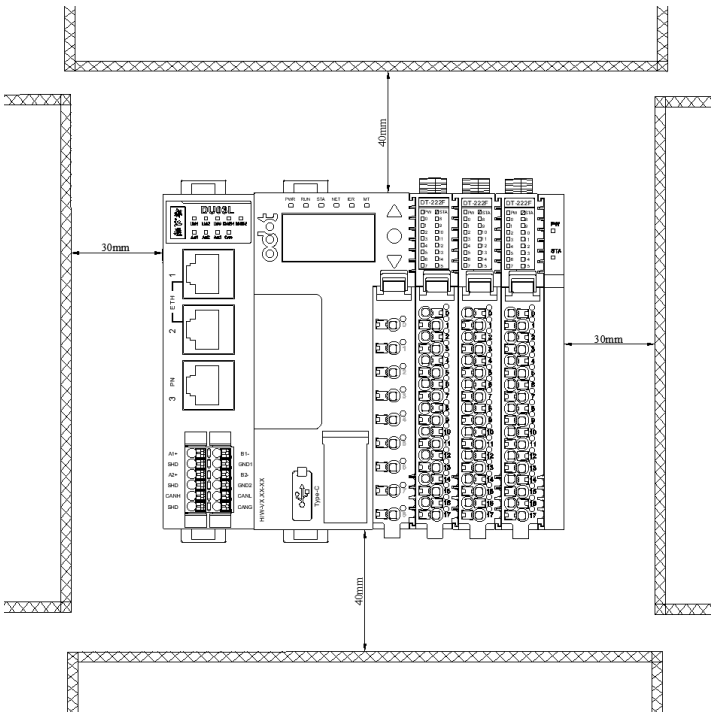
2) After PLC installation, open the latch above the I/O module, then move the I/O module down along the slot from top to bottom so that the I/O module is flush with the PLC. Once installed, tighten the latch above the I/O module;

3) Then install the remaining I/O modules until all I/O modules are installed. After installing the I/O modules, please install the DT-5800 terminal module last.



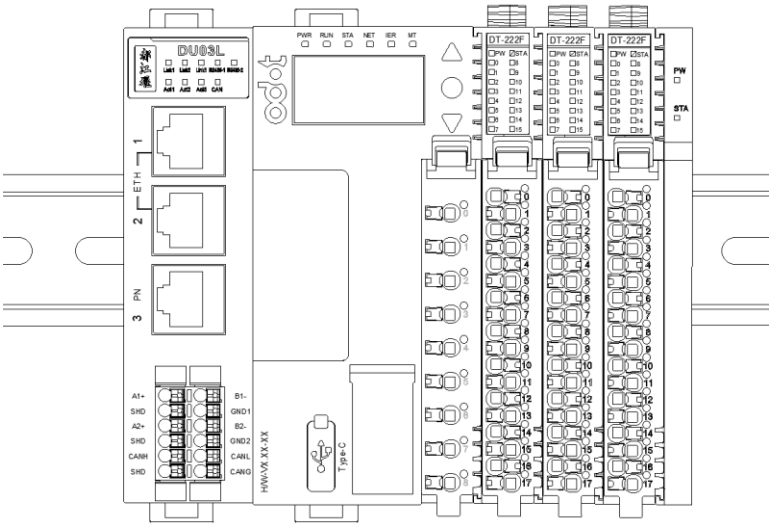
Note: When installing and removing modules, please ensure the module is powered off.

To ensure proper ventilation, heat dissipation, and module wiring and installation, please reserve the minimum gap. It is recommended to illustrate the installation gap, as shown below:

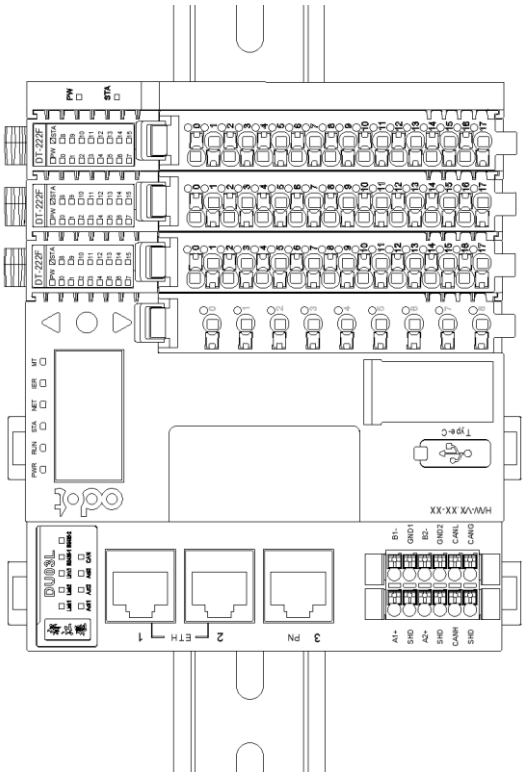


The module supports both horizontal and vertical installation modes. The operating temperature for horizontal mounting modules is: -35°C~60°C; The operating temperature for vertical mounting modules is: -35°C~50°C.

Horizontal installation diagram:



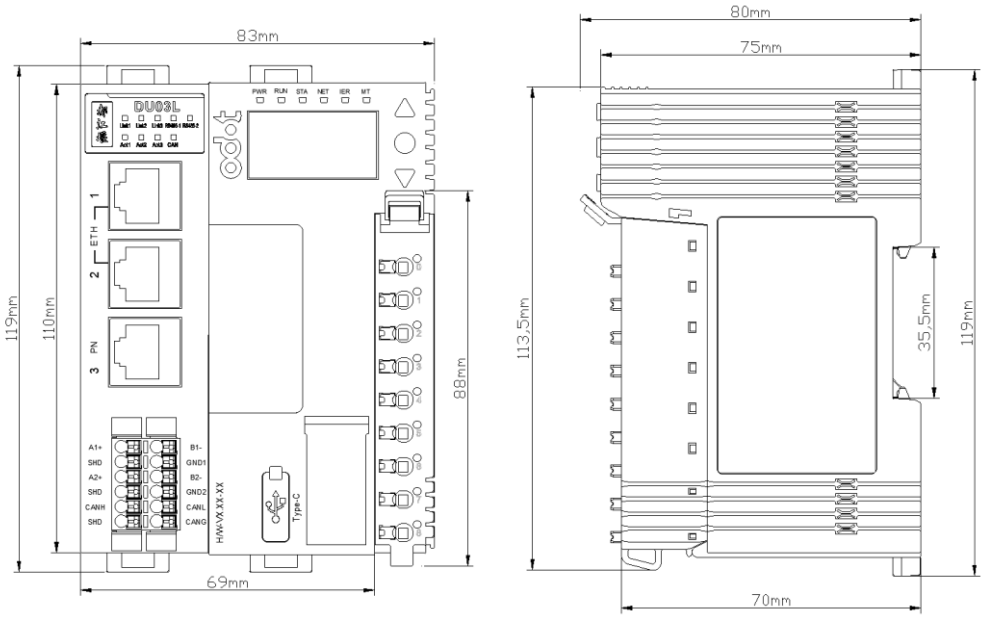
Vertical installation diagram:



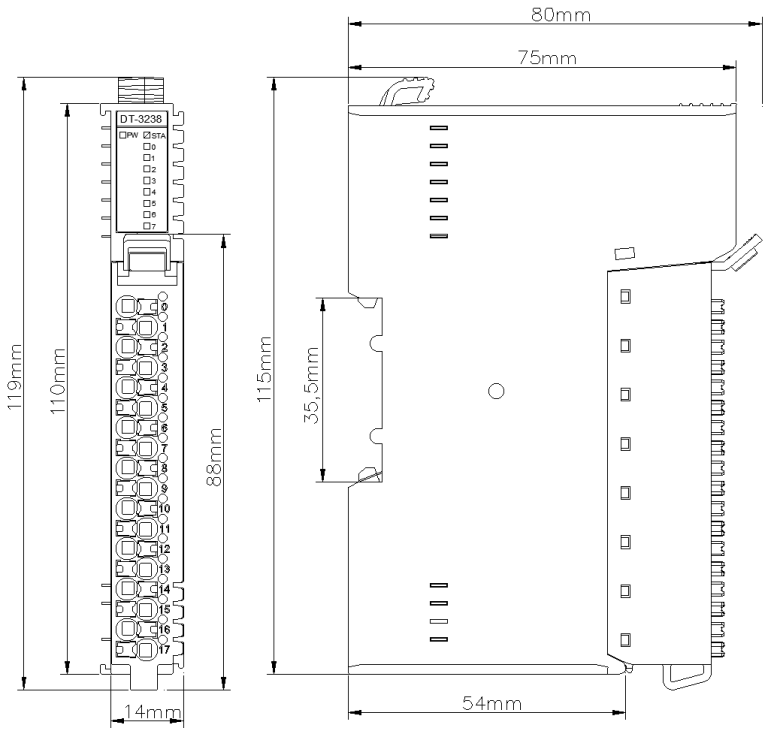
All expansion module components must be electrically isolated between internal circuits and input/output channels, and modules must be installed in control cabinets or control rooms. The equipment is designed for industrial environments with pollution level 2 and altitudes below 2000 meters.

1.4.2 Module Dimension Diagram

PLC Dimensions: 83 mm*119 mm*80 mm



I/O module dimensions: 14 mm *119 mm *80 mm



Terminal module dimensions: 7mm*110mm*75mm

1.4.3 Wiring Instructions

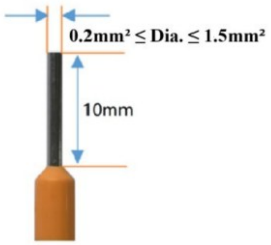
Spring terminal blocks

Use push-in connections to connect single wires or crimp terminals (rings) without any other tools. Users can save wiring time and ensure secure connections regardless of wiring experience.

The module has a wiring harness fixing end, used to secure the cable when the I/O module is connected to multi-strand cables.

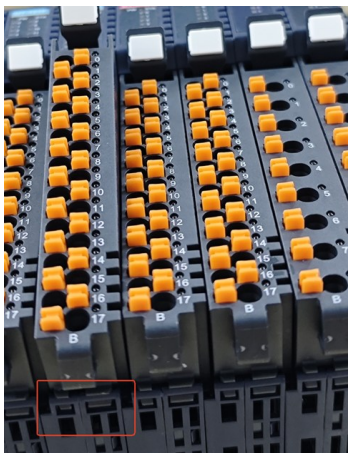
Cold-pressed terminals

When terminating cold-pressed terminals, they must strictly follow the relevant termination standards or requirements for termination and inspection, and terminate according to the corresponding node serial number. Wires must use copper wires with cores larger than 0.2mm² and less than 1.5mm². Reference parameters for cold-pressed terminals are as follows:



Terminal block

When installing the terminal blocks, first place the bottom of the terminal into the slot, then press the terminal inward. Once installed, you will hear a "click" sound.



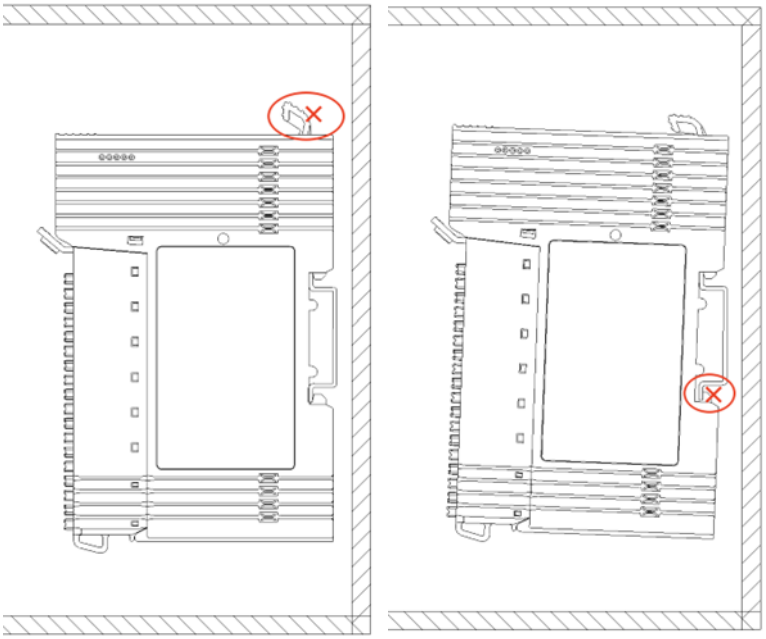
1.4.4 Incorrect Installation

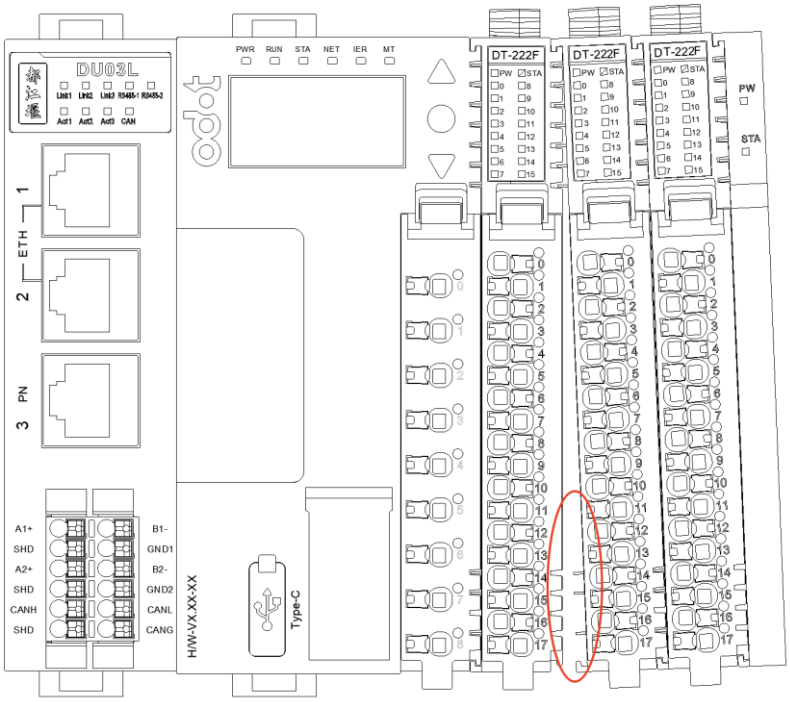
A. After installation, the latches at both ends of the PLC are not tightened, or the clips above the I/O module are not fastened to the guide rails, or the pressed positions are not properly pressed.

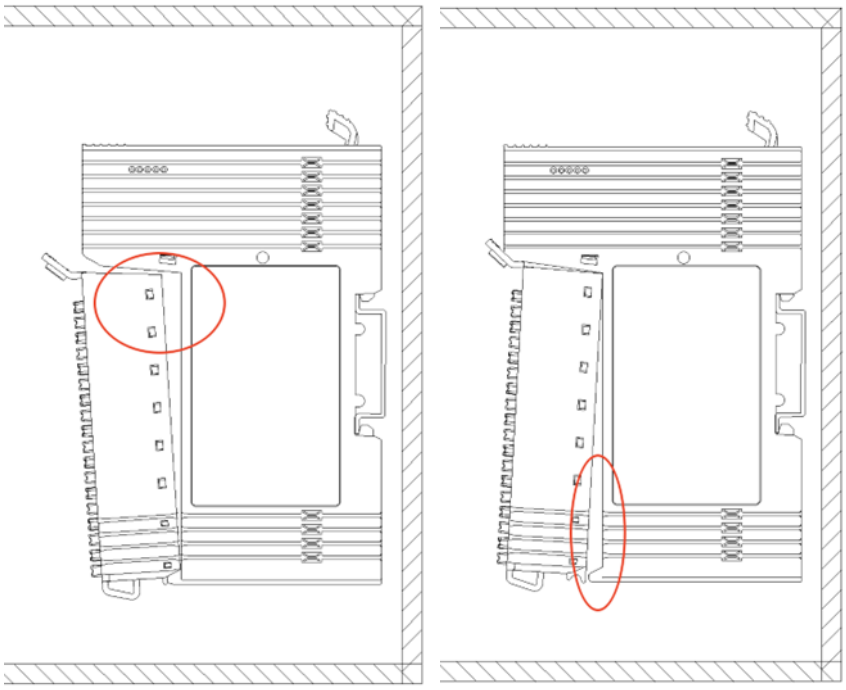
B. After installation, if the lower side of the module is not properly installed, the module is not installed vertically, and the backplate is tilted.

C. Gaps are left between modules.

D. Terminal Blocks Not Properly Installed.







1.4.5 Disassemble

1) First, disconnect all power supplies to the PLC and I/O modules, open the latch lock of the module to be removed, and loosen the rails;

2) Remove the module to be removed in the direction perpendicular to the guide rail;

NOTE

- THE MODULE DOES NOT SUPPORT HOT-SWAPPING. IF YOU NEED TO REMOVE OR REPLACE THE MODULE, PLEASE DISCONNECT ALL POWER TO THE DEVICE BEFORE REMOVING OR REPLACING THE MODULE.
- WHEN REPLACING I/O MODULES DURING SUBSEQUENT MAINTENANCE, ENSURE THE MODULE MODEL MATCHES THE SLOT NUMBER; OTHERWISE, THERE IS A RISK OF BURNING OUT THE MODULE OR DAMAGING ON-SITE EQUIPMENT.

IF NOT OPERATED ACCORDING TO INSTRUCTIONS, THE PROTECTION PROVIDED BY THE EQUIPMENT MAY FAIL, POTENTIALLY CAUSING MINOR BODILY INJURY OR EQUIPMENT DAMAGE.

1.5 Power Supply

The rated voltage for PLC and I/O modules is 24V DC. According to IEC 61140, 24V DC power supplies must be rated at Safety Ultra-Low Voltage (SELV) or Protective Ultra-Low Voltage (PELV). These power supplies are isolated between the electrical input and output circuits of the power supply.

Please note the following points during use:

- The load capacity of the power supply must exceed the actual power consumption of all mounted devices, with a 20% margin reserved.
- The actual current must be less than the maximum load capacity of the power terminal line.
- Check whether the positive and negative terminals of the entire system are reversed. For example, the PLC's system power supply is normally connected to the field power supply, but the DT-7221 module (power expansion module) has reversed polarity. This can cause a short circuit in the system or field power supply, potentially causing equipment burnout or abnormal operation.

1.6 Grounding

The system's DIN rail serves as a common functional grounding plane and must always be installed on the conductive backplane.

Functional grounding (FG) is connected to the conductive backplate via a heavy-duty wire (usually a copper wire braided cable with the maximum allowable cable cross-section). On the back of the module, there is a metal spring piece used for effective grounding with the guide rail. The metal spring and the internal terminal FG of the PLC or I/O module are connected.

2 Hardware Parameters

2.1 Module Functions

- The DU03L series PLC programming platform is AIOSYS, supporting the IEC 61499 standard, with programming languages supporting ST, LD, and C programming languages.
- The PLC has 3*RJ45 interfaces, Port1 and Port2 have switch cascading functions, which can serve as debugging or configuration interfaces or communication interfaces, supporting Modbus TCP client/server, TCP, UDP free-port communication, OPC UA server communication, and more. Port3 supports either EtherCAT master or PROFINET master (please refer to specific product models).
- The PLC has 2*RS485 interfaces, with two serial ports operating independently. Each serial port can be configured individually as a Modbus RTU/ASCII master/slave or freeport communication; It has 1*CAN interface supporting free CAN communication.
- The PLC uses staggered layout spring light guide terminals and pluggable terminals, making module maintenance and replacement easy. It can connect cables with 0.2mm² (AWG 24) ~ 1.5mm² (AWG 16) diameters. The PLC OLED display panel allows viewing of module parameters and provides access to some important information without software.

- DU03L-A00-1200-0 support PROFINET matser；
- DU03L-A00-1300-0 support EtherCAT matser；
- DU03L-A00-1300-1 support EtherCAT matser, supports EtherCAT servo axis motion control, as well as single-axis and multi-axis control.

2.2 Technical Parameters

General parameters

1 General Parameters		
Module Consumption		Max.168mA@24VDC
System Power		19.2V~28.8V DC (Nominal 24V DC) Current: Max.1.5A Anti-polarity protection: supported
Internal Bus Supply Current		Max.2A@5VDC
Field Power		19.2V~28.8V DC（Nominal 24V DC）
Field Power Current		Max. DC 8A
Wirring Diameter		Min.0.2mm²(AWG24) Max.1.5mm²(AWG16)
Terminal Pluggable		Support
The Maximum Number of Expansion Modules		32
Installation		35 mm DIN-Rail
Backplane Bus		Double bus redundancy
Dimension		83 mm*119 mm*80 mm
2 Environmental Parameters		
Horizontal Installation Operating Temperature		-35 ℃~60 ℃
Vertical Installation Operating Temperature		-35 ℃~50 ℃
Storage temperature		-40 ℃~85 ℃
Installation altitude		<2000m
Pollution Degree		II
Protection Grade		IP20
Mechanical Properties		Comply with IEC 60068-2-6, IEC 60068-2-27 standard
Insulation Withstand		Comply with IEC 61131-2 standard
EMC Performance		Comply with IEC 61000-4，IEC 61131-2 standard
3 Module Interface Definition		
Ethernet	Interface	3*RJ45
	Line Length	Maximum length between 2 stations: 100 m (segment length)
	Transmission Rate	10/100 Mbit/s
	Full Duplex	Support
	Automatic Negotiation	Support
	Automatic MDI/MDIX	Support
RS485	Number of Interfaces	2*RS485
	Interface Type	Terminal wiring
	Communication Speed	300 bps-500 kbps
CAN	Interface	1*CAN
	Interface Type	Terminal wiring
	Transmission Rate	10 kbit/s ~ 1000 kbit/s
Type-C Interface		1 (Reserved interface)
TF Card Interface		1
4 Hardware Parameters		
Program Storage		1 GB
Runtime Storage		1 GB
Power-down Protection Area		512K Bytes
Real-time clock		Support
5 Other Parameters		
PID Controls Self-tuning		Support

Web Function	Upgrades and configurations	Support
Default IP Address		10.10.10.100 (Port1, Port2 interface)
6 Programming software		
Programming platform		AIOSYS
Programming languages		LD, ST, C
Complex variables		Supports struct variables
Configuration (self-parameters and communication)		Support
Global variables		Support
Engineering encryption		Support
PLC program debugging		Support
TRACE		Support
Simulation		Support
Data recording		Support
Recipe		Support

DU03L-A00-1200-0 Technical Parameters

1 Communication Protocol		
Modbus TCP Server	Support Protocol	Modbus TCP server
	TCP Timed Keep-alive	Support
	Modbus Application Watchdog	Support
	Modbus Function Code	01/02/03/04/05/06/15/16/23
Modbus TCP Client	Support Protocol	Modbus TCP client
	Modbus Function Code	01/02/03/04/05/06/15/16/23
TCP and UDP Free-port Communication		Support
OPC UA Communication		Support, OPC UA server
PROFINET Protocol	Support Protocol	PROFINET Master
CAN Interface	Support Protocol	CAN 2.0 A/B
Modbus Protocol	Support Protocol	Modbus RTU/ASCII Master/Slave
	Modbus Function Code	01/02/03/04/05/06/15/16/23

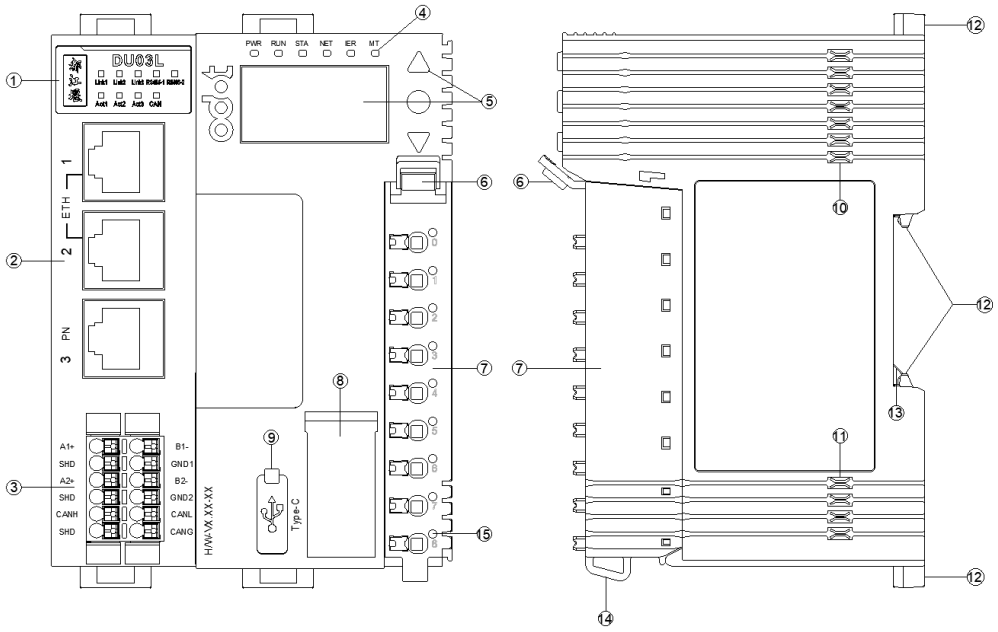
DU03L-A00-1300-0 Technical Parameters

1 Communication Protocol		
Modbus TCP Server	Support Protocol	Modbus TCP server
	TCP Timed Keep-alive	Support
	Modbus Application Watchdog	Support
	Modbus Function Code	01/02/03/04/05/06/15/16/23
Modbus TCP Client	Support Protocol	Modbus TCP client
	Modbus Function Code	01/02/03/04/05/06/15/16/23
TCP and UDP Free-port Communication		Support
OPC UA Communication		Support, OPC UA server
EtherCAT Protocol	Support Protocol	EtherCAT master
CAN Interface	Support Protocol	CAN 2.0 A/B
Modbus Protocol	Support Protocol	Modbus RTU/ASCII master/slave
	Modbus Function Code	01/02/03/04/05/06/15/16/23

DU03L-A00-1300-1 Technical Parameters

1 Communication Protocol		
Modbus TCP Server	Support Protocol	Modbus TCP server
	TCP Timed Keep-alive	Support
	Modbus Application Watchdog	Support
	Modbus Function Code	01/02/03/04/05/06/15/16/23
Modbus TCP Client	Support Protocol	Modbus TCP client
	Modbus Function Code	01/02/03/04/05/06/15/16/23
TCP and UDP Free-port Communication		Support
OPC UA Communication		Support, OPC UA server
EtherCAT Protocol	Support Protocol	EtherCAT master
CAN Interface	Support Protocol	CAN 2.0 A/B
Modbus Protocol	Support Protocol	Modbus RTU/ASCII master/slave
	Modbus Function Code	01/02/03/04/05/06/15/16/23
2. Motion Control		
Shaft Type		Real axis, imaginary axis
Real Axis Type		EtherCAT servo shaft
Single-Axis Control		Speed control, position control
Multi-Axis Linkage		Electronic cams, electronic gears

2.3 Hardware Description



①: Interface indicator

②: Network interface

③: RS485&CAN interface

④: Module status indicator

⑤: OLED screen and button

⑥: Wiring terminal label

⑦: Removable terminal

⑧: Module label

⑨: Reserved interface

⑩: High-speed redundant backplane bus

⑪: Field power

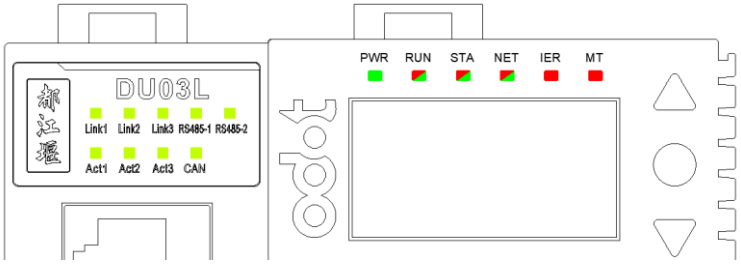
⑫: Buckle

⑬: Grounding spring sheet

⑭: Fixed wiring harness

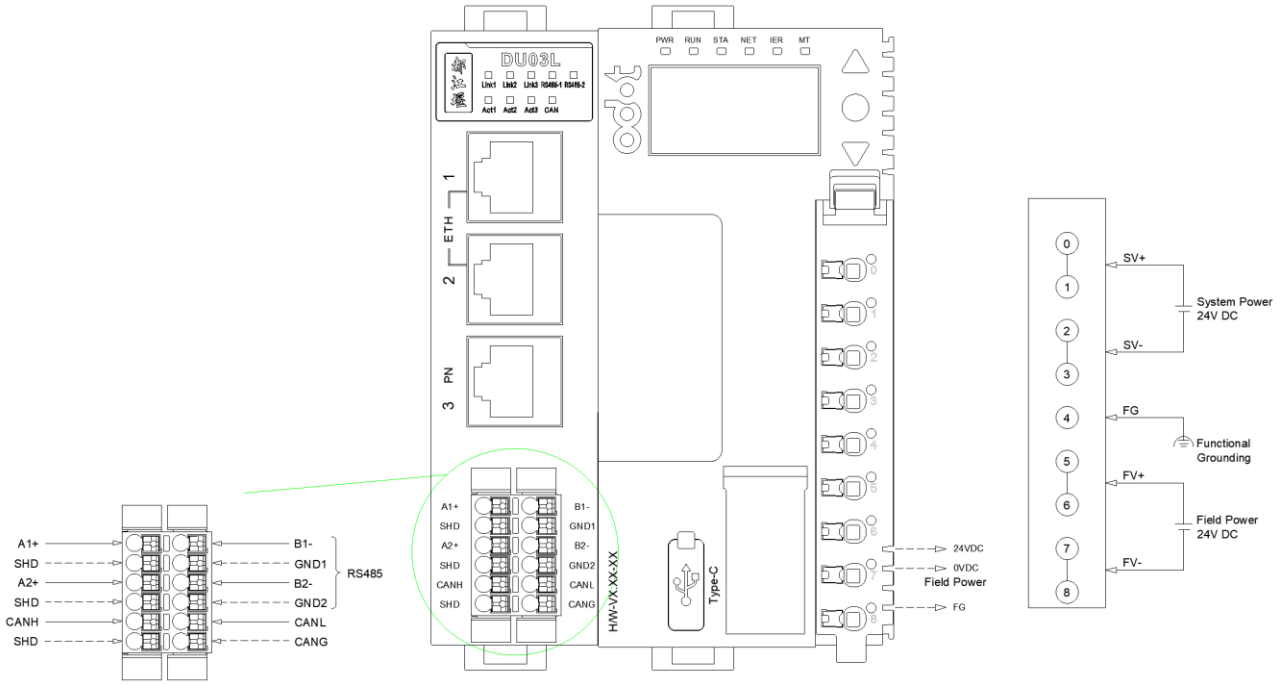
⑮: No instruction functions

2.4 Indicator Definition



PWR System Power Indicator (Green)	Definition
ON	The system power supply is normal
OFF	The system power supply is abnormal
RUN Module Running Indicator (Red/Green)	Definition
ON (Green)	The PLC is in running mode
Flash (Red)	The PLC is in stop mode
ON (Red)	The device currently has no program
STA Module Status Indicator (Red/Green)	Definition
ON (Green)	Running mode
Slow flash (Red)	Power-on default state
Fast flash (Green)	Firmware Update
Flash 2 times (Red)	The module exception has been soft-restarted
NET Network Status Indicator (Red/Green)	Definition
ON (Green)	Software configuration matches actual modules
ON (Red)	Software configuration does not match actual module
IER I/O Error Indicator (Red)	Definition
OFF	I/O communication is normal
Flash	I/O communication is error
MAINT Error Indicator (Red)	Definition
OFF	The system is running normally
ON	System operation abnormal, maintenance required
Link1/ Link2/ Link3 Network Connection Status Indicator (Green)	Definition
ON	The network cable is connected
OFF	The network cable is not connected
Act1/ Act2/ Act3 Network Data Transceiver Indicator (Green)	Definition
Flash	Data transmission and reception
OFF	No data transmission or transmission
RS485-1/ RS485-1 Data Transceiver Indicator (Green)	Definition
Flash	Data transmission and reception
OFF	No data transmission or transmission
CAN Data Transceiver Indicator (Green)	Definition
Flash	Data transmission and reception
OFF	No data transmission or transmission

2.5 Wiring Definition



Ethernet interface

The module has 3 Ethernet interfaces: Port 1/Port 2 have switch cascade functionality, communication rates of 10/100Mbps, and can be used as module debugging or communication interfaces;

Port 3 can serve as a communication interface for either the PROFINET master or EtherCAT master (the functionality of this port depends on the specific product model), with adaptive speeds of 10Mbps/100Mbps.

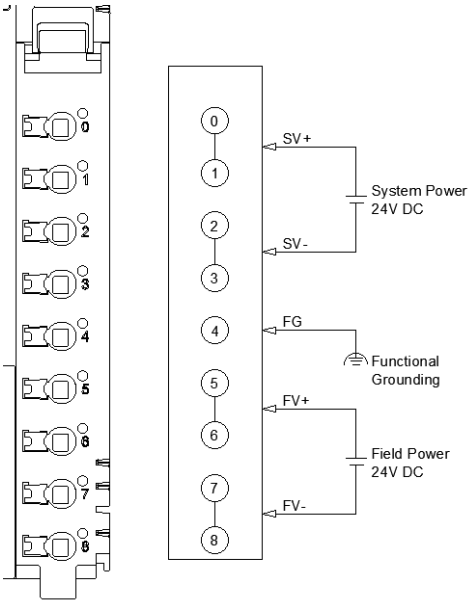
RJ45 pin definitions:

Pin	Definition	Description
1	TD+	Transmit+
2	TD-	Transmit-
3	RD+	Receive+
4	-	-
5	-	-
6	RD-	Receive-
7	-	-
8	-	-

Power wiring definition

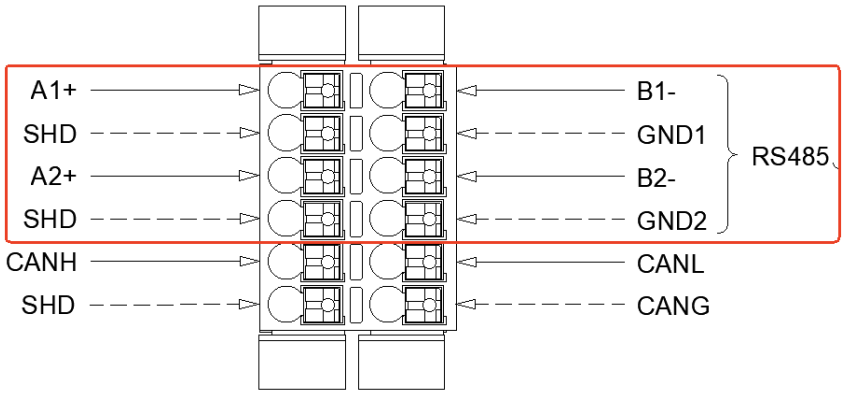
No.	Mark	Description
0	SV+	System power positive
1	SV+	
2	SV-	System power negative
3	SV-	
4	FG	Functional grounding
5	FV+	Filed power positive
6	FV+	
7	FV-	Filed power negative
8	FV-	

Power terminal diagram:



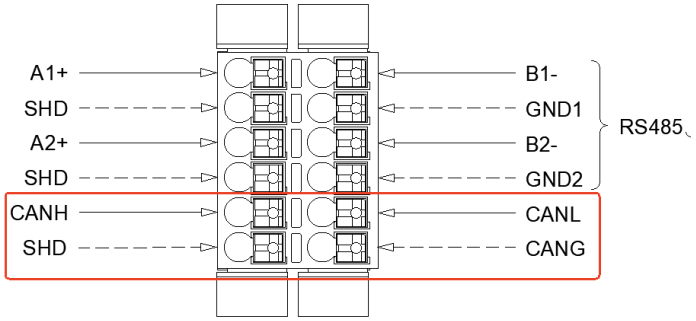
RS485 wiring definition:

Description	Mark	Mark	Description
A+ signal line (RS485 interface 1)	A1+	B1-	B- signal line (RS485 interface 1)
Signal shield (RS485 interface 1)	SHD	GND1	Signal ground (RS485 interface 1)
A+ signal line (RS485 interface 2)	A2+	B2-	B- signal line (RS485 interface 2)
Signal shield (RS485 interface 2)	SHD	GND2	Signal ground (RS485 interface 2)

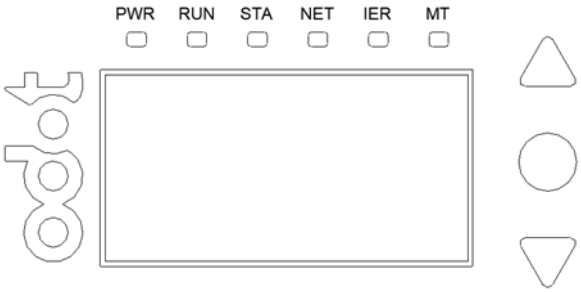


CAN wiring definition:

Description	Mark	Mark	Description
CAN H signal line	CANH	CANL	CAN L signal line
Signal shield	SHD	CANG	CAN signal ground



2.6 OLED Interface



Key definition:

▲ is the page up button, ● is the confirmation and exit button, ▼ is the page down Button.

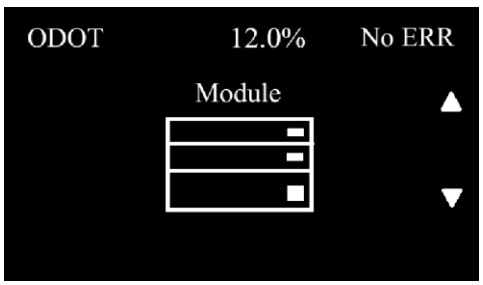
Special application notes:

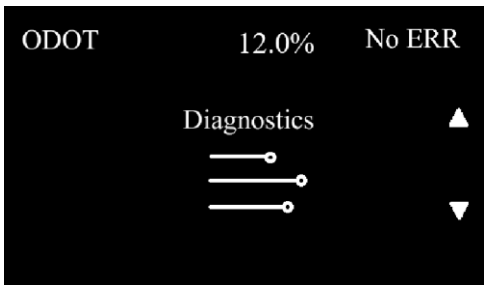
1. Press the up and down buttons ▲ and ▼ at the same time, and the screen will appear “Is it reset ?”, the network adapter parameters can be reset by pressing the ● button.

2. Short press the middle button ● to confirm, and long press to exit.

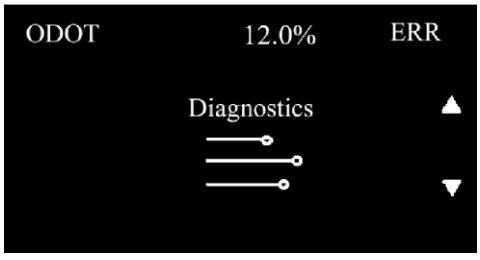
Display interface:

After the initial configuration is completed after power on, there are two interfaces, in which "Module" displays the basic information and channel information of the module. "Diagnostics" is displayed for diagnostic records. Toggle the display by clicking the ▲ and ▼ buttons.



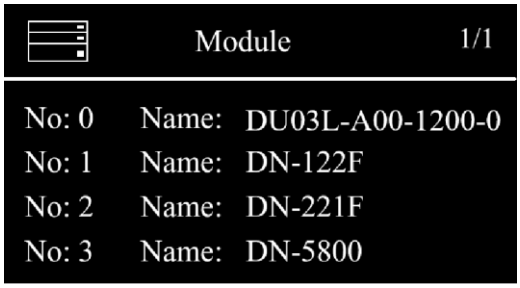


When there is an error, the "ERR" logo will flash in the upper right corner.

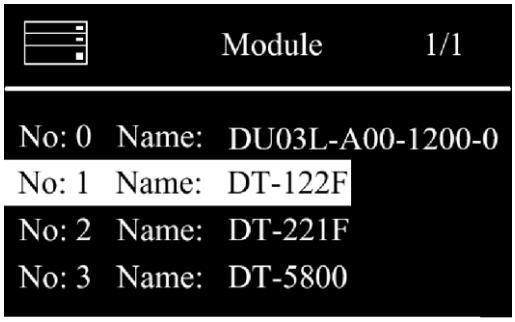


Click ● on the "Module" interface to enter the next-level module selection interface, and switch the display page by press the ▲ and ▼ buttons, as shown in the following figure. At this time, press

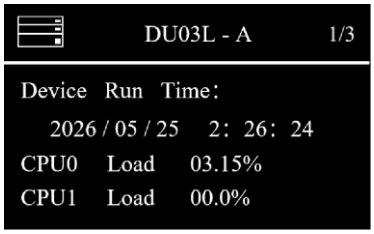
and hold the ● button to return to the previous level.

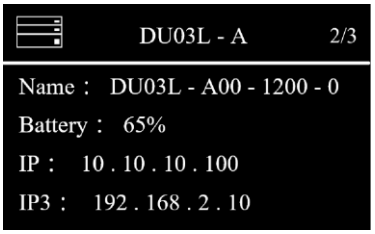


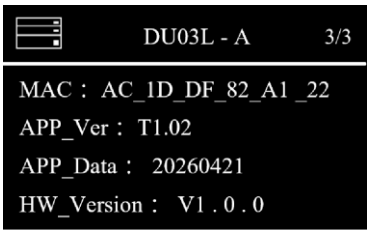
Click the ● button in the figure above to enter the next level module selection interface, and click the ▲ and ▼ buttons to switch module selection. At this time, press and hold the ● button to return to the previous level.



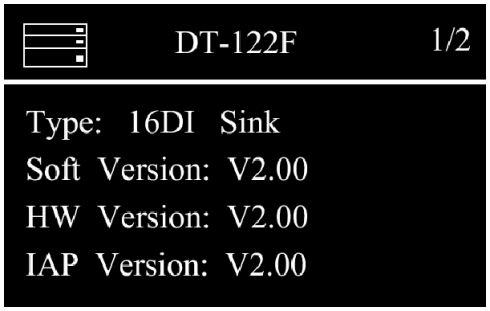
Enter the module information display interface and switch the display by clicking the ▲ and ▼ buttons, as shown in the figure below. At this time, press and hold the ● button to return to the previous level.





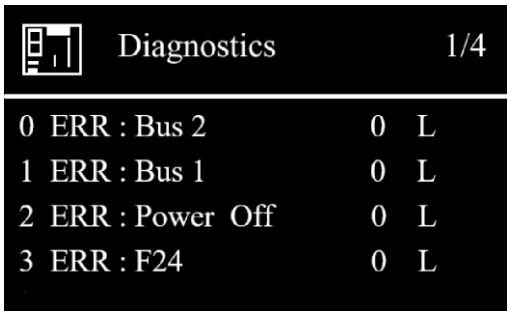


(Note: The PLC displays: APP version and date, IAP version and date, hardware version, IP address, MAC address, and other information. Module display: module type, software version, hardware version, IAP version, and channel status.)

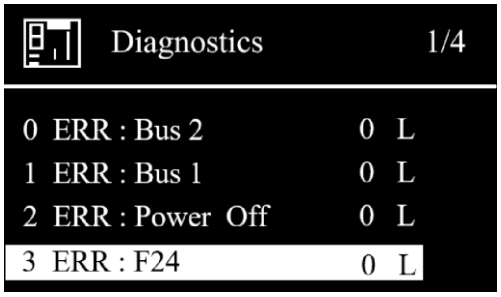


Diagnosis interface:

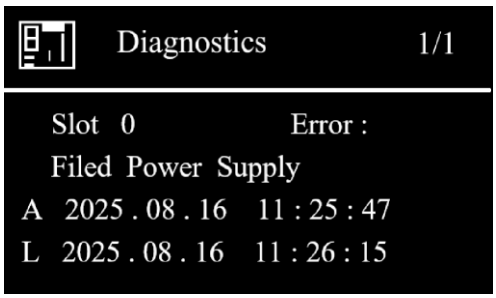
Display the module diagnostic information on the Diagnostics screen, and click the ▲ and ▼ buttons to switch the display page. At this time, press and hold the ● button to return to the previous level.



(Note: The error that occurs after this interface is displayed first, with a maximum of 200 items, as shown in the above figure, "A" and "L" represent respectively, the error still exists and the error has been eliminated, "Power Off" is the specific error of the current error, and "0" is the slot number) Click the ● button in the interface as shown in the figure above to enter the next level of diagnostic data selection interface, and click the ▲ and ▼ buttons to select and switch the diagnostic data. At this time, press and hold the ● button to return to the previous level.



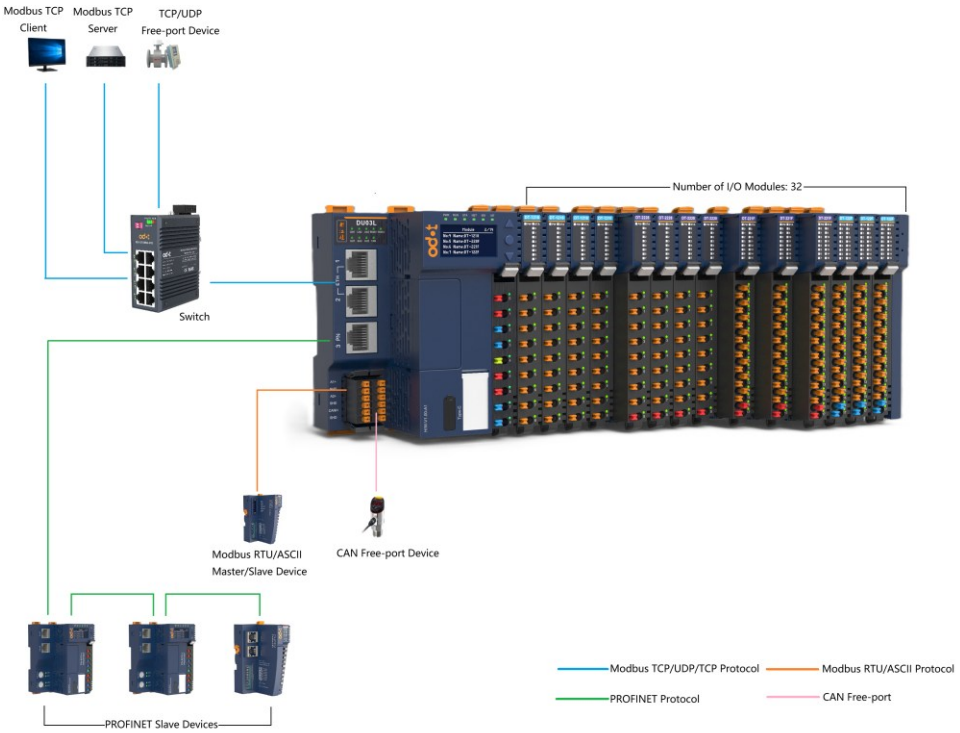
Enter the module error information display interface, as shown in the figure below, press and hold the ● button to return to the previous level.



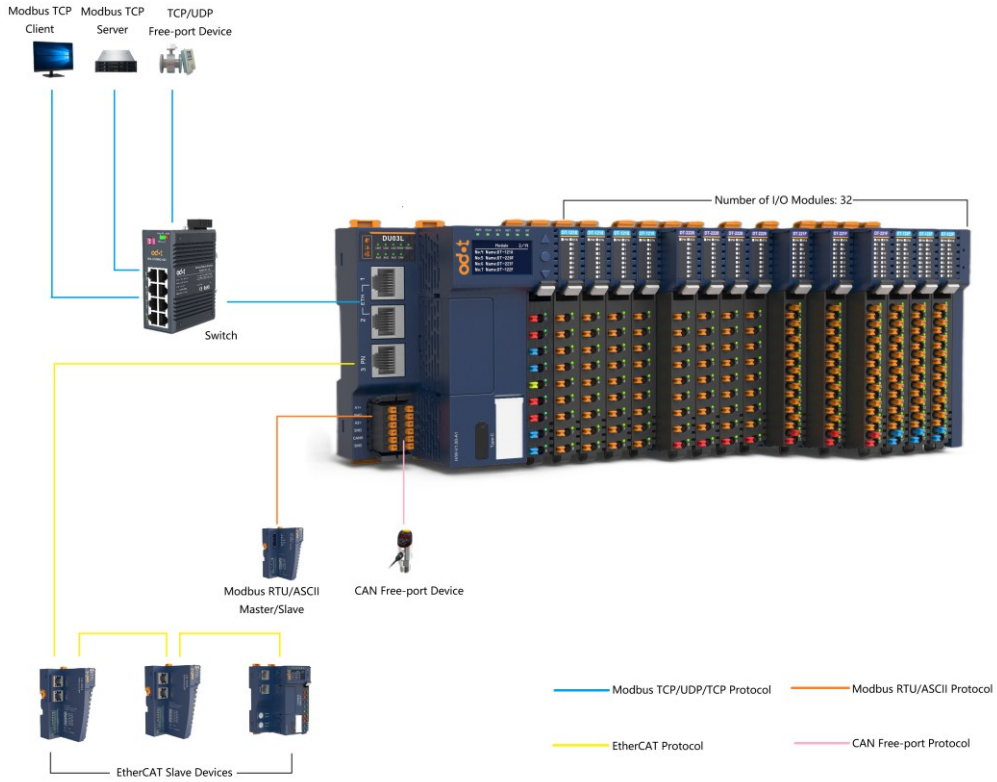
(Note: " Filed Power Supply " is the specific error of the current error, and "slot" is the slot number where the error occurred.) "A" is the time when the error occurred. "L" is the time when the error left)

2.7 Communication Topology

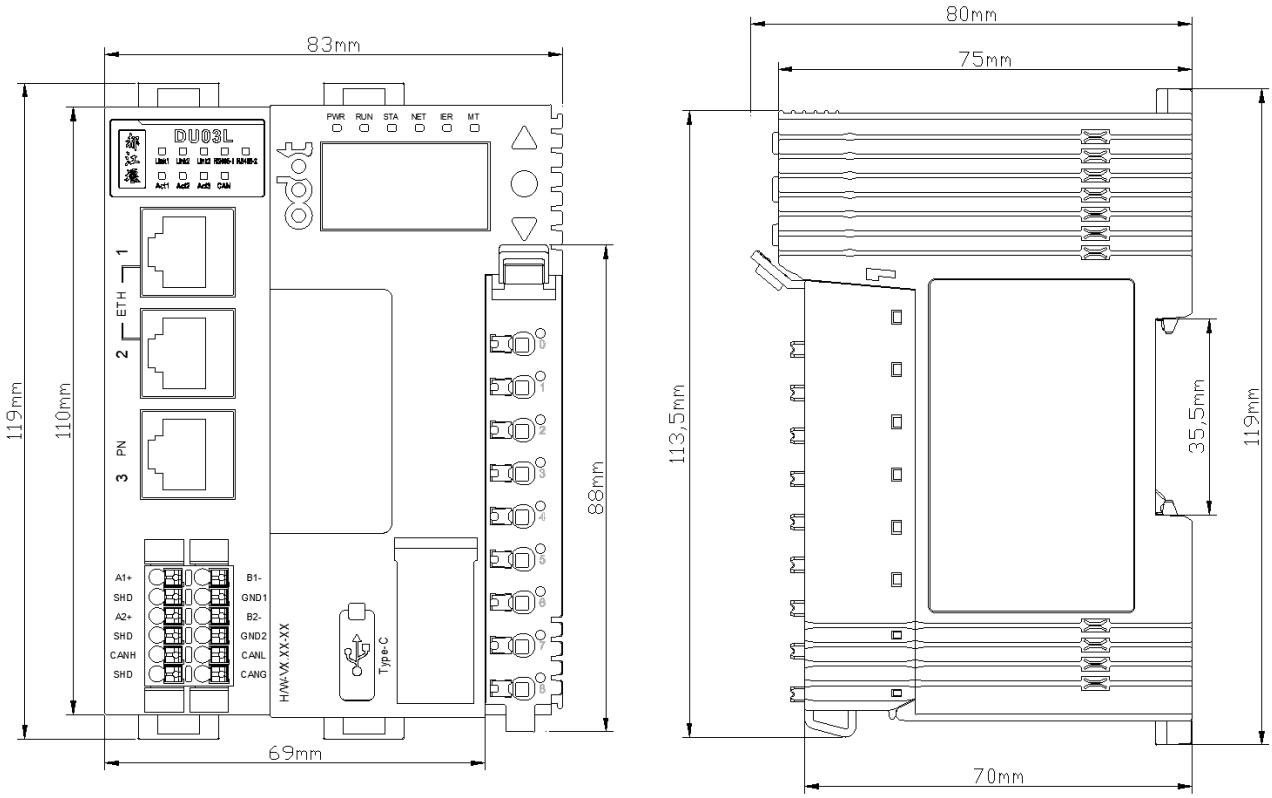
DU03L-A00-1200-0 communication topology:



DU03L-A00-1300-0 communication topology:



2.8 Module Dimension

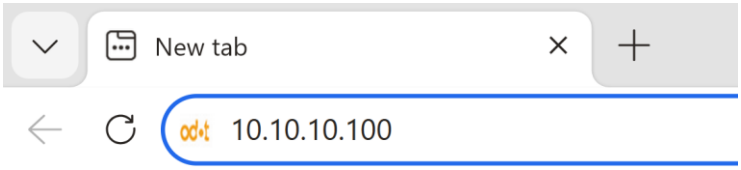


3 Use Cases

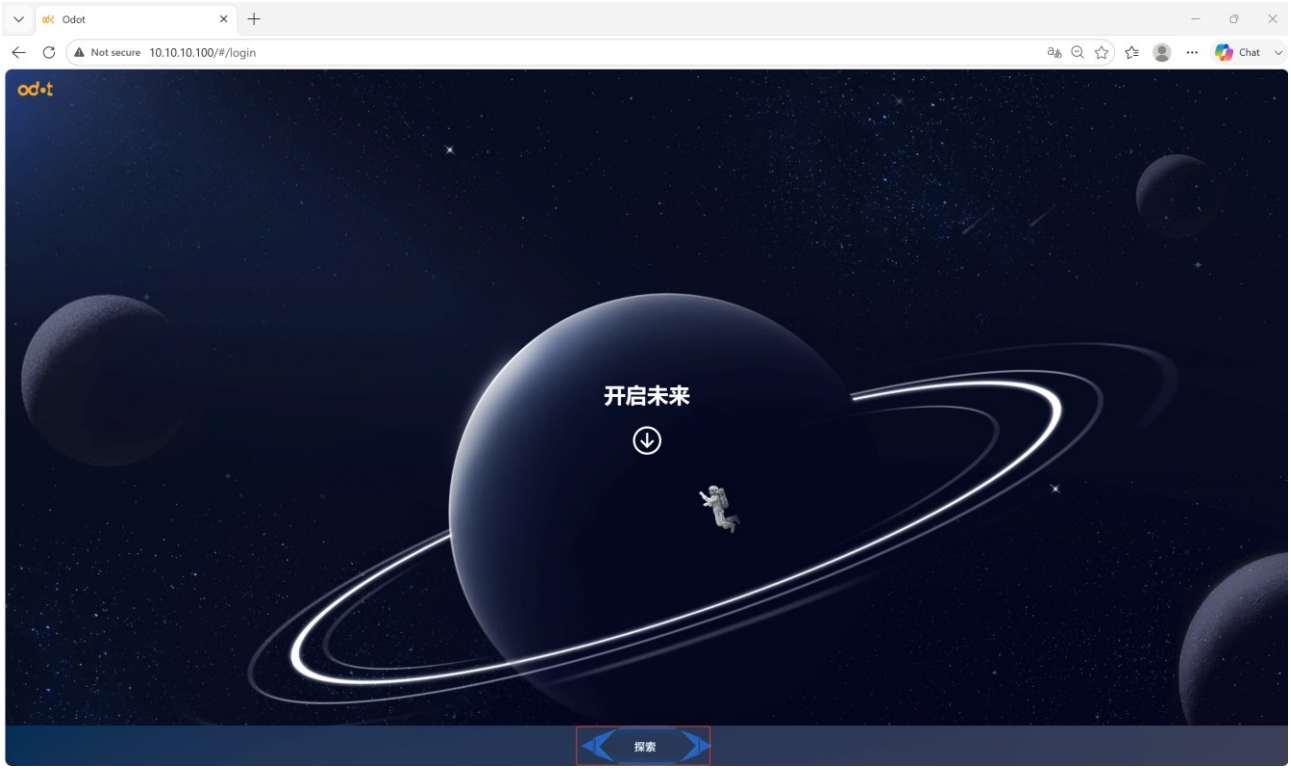
3.1 Modify & View Module Parameters

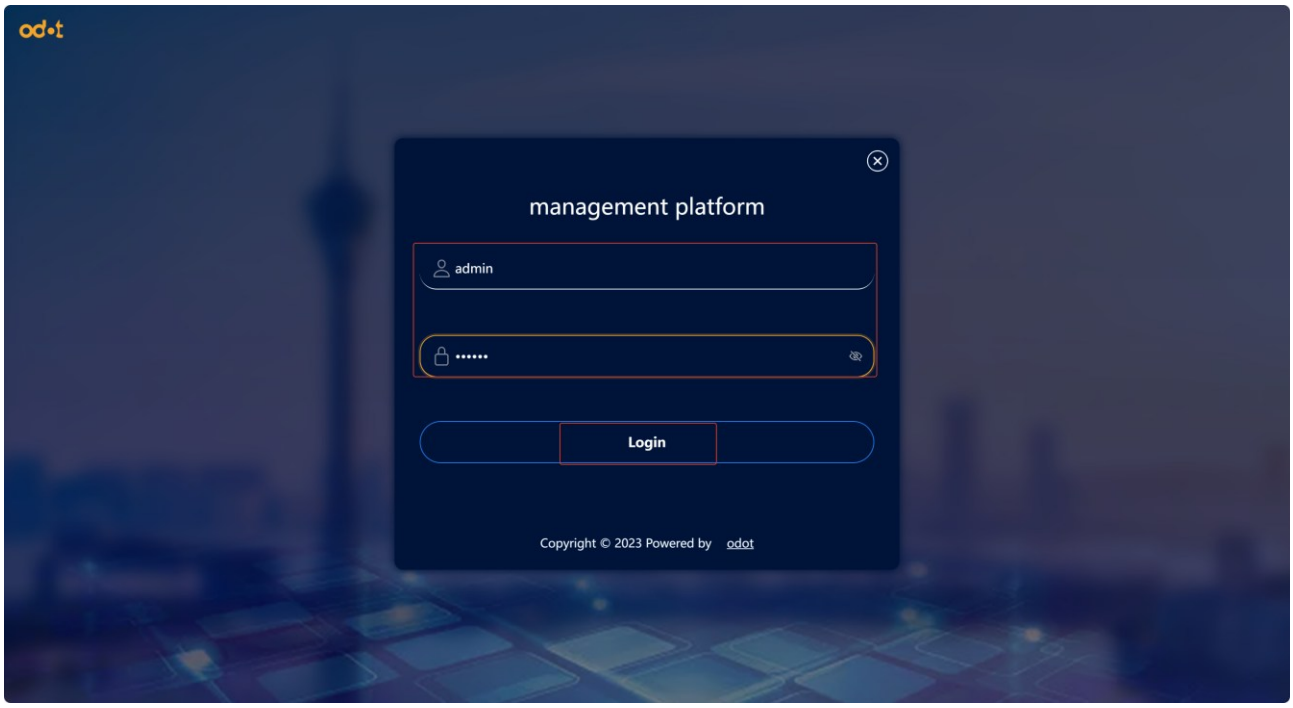
The DU03L series PLC supports web configuration. First, supply the system power (24V DC) and field power (24V DC) to the PLC, connecting the computer with the PLC's Port 1 or Port 2 interface.

The IP address of PLC can be viewed through the module information on the OLED screen (in the example, the IP address of PLC is 10.10.10.100), then open the browser, enter the IP address of PLC and press enter.



Click Explore to enter the management platform interface, log in with admin username, default password is 123456, then click login.

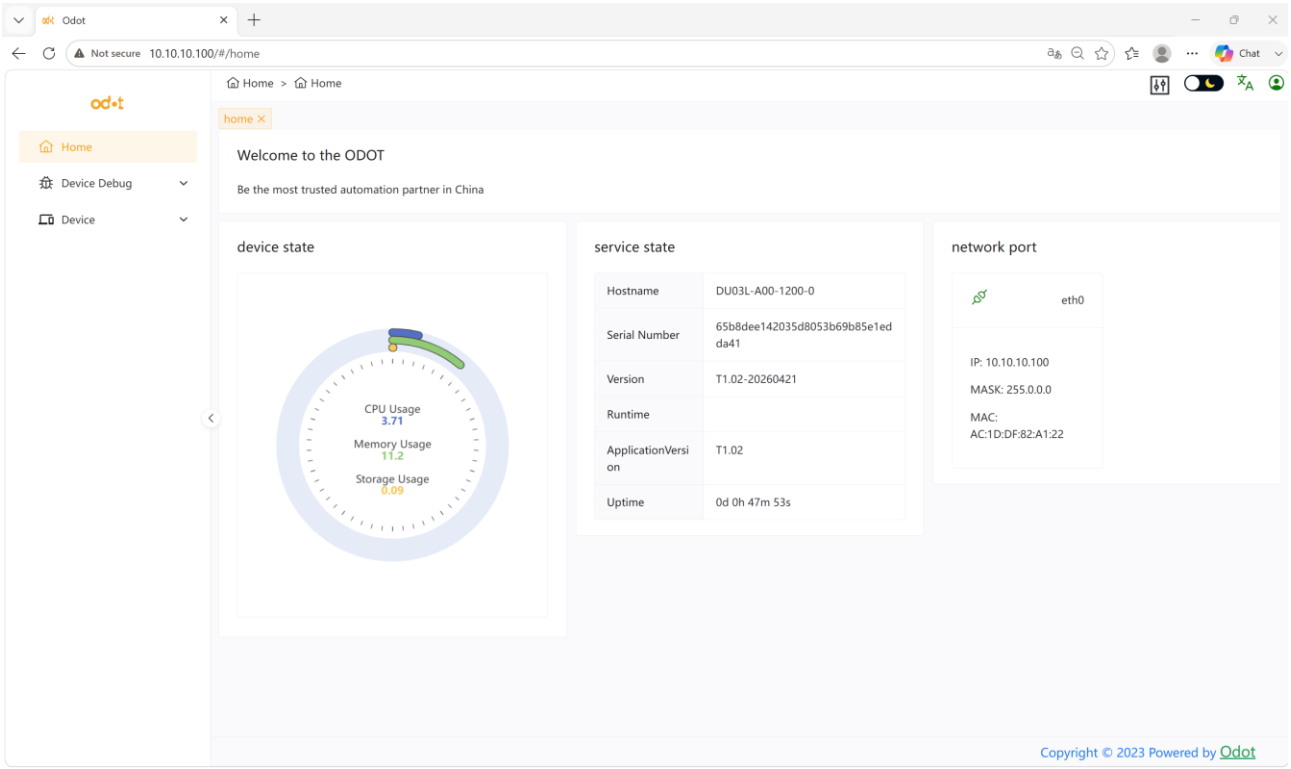




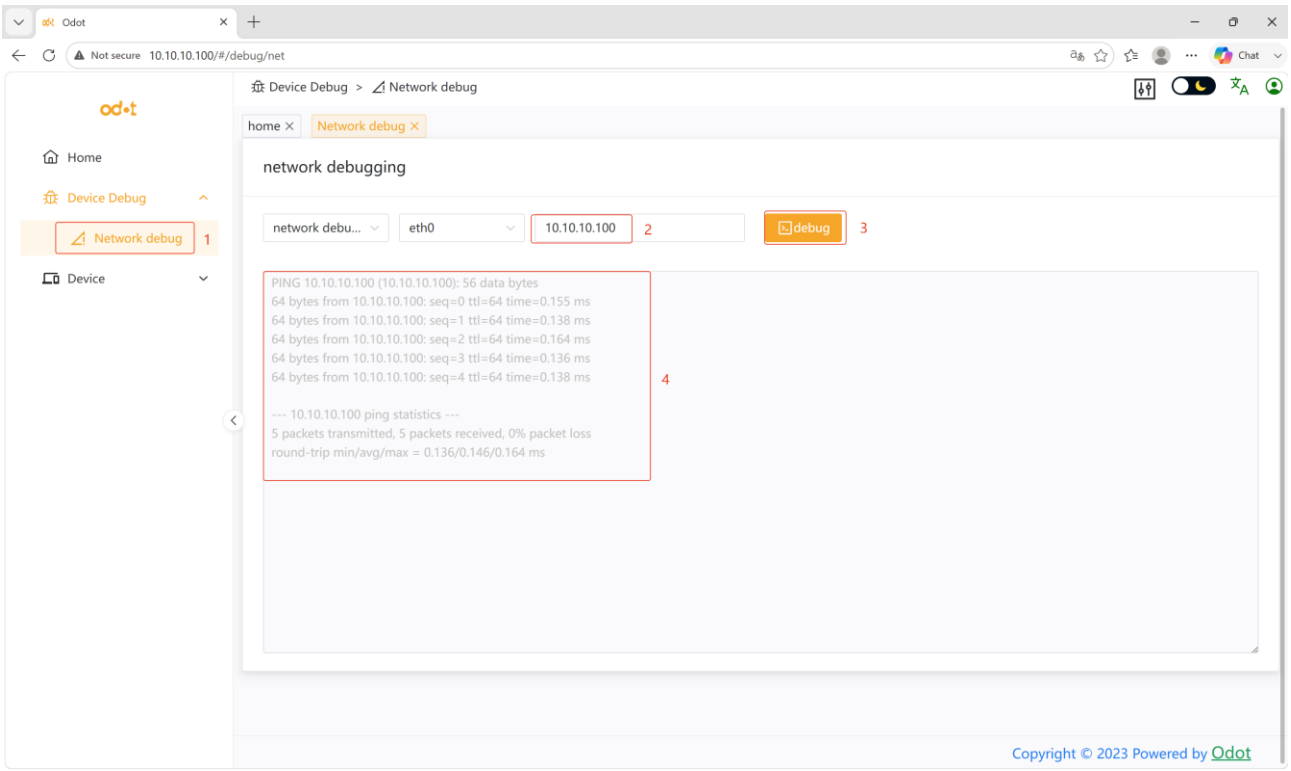
Go to the device homepage to view device status: CPU usage, memory usage, storage usage;

Service state: hostname, firmware version, application version, runtime, and other information;

Network interfaces: IP address, MASK, MAC address.

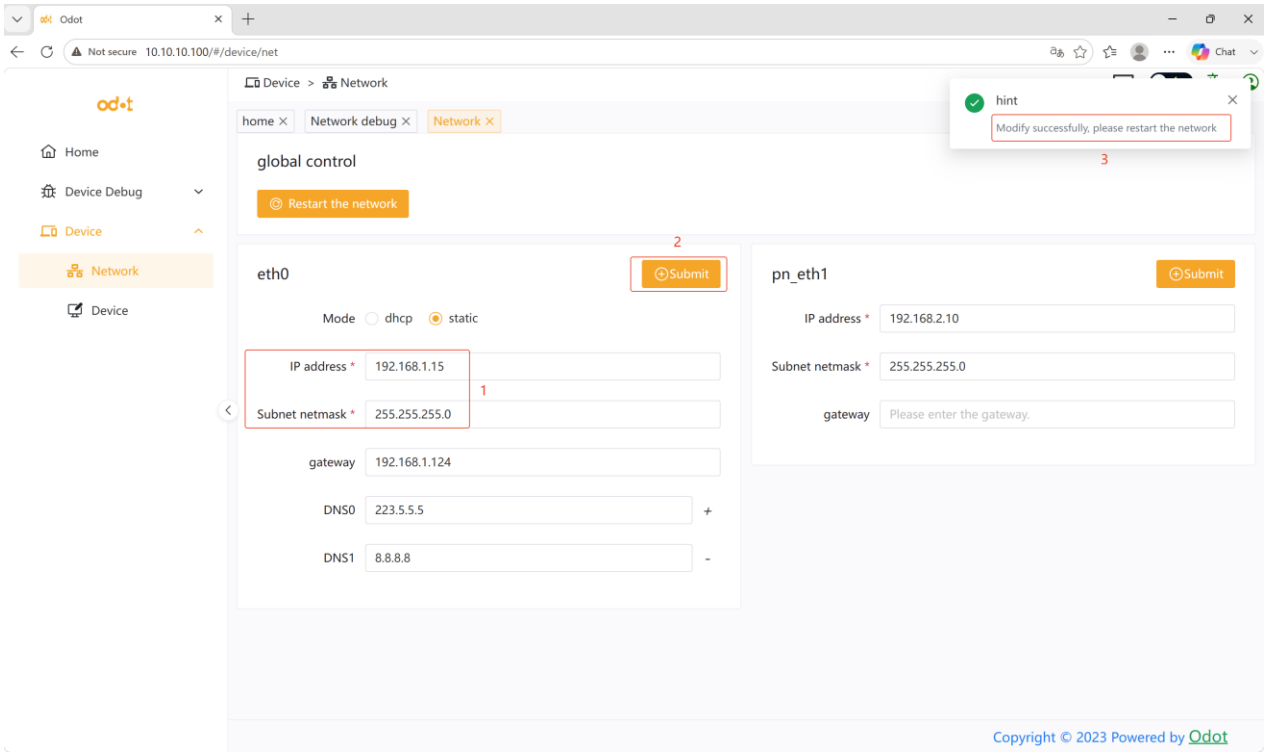


In the menu bar, click Device Debug — Network Debug, then enter the PLC's IP address on the right side of the interface, click Debug, and it can view the network status.



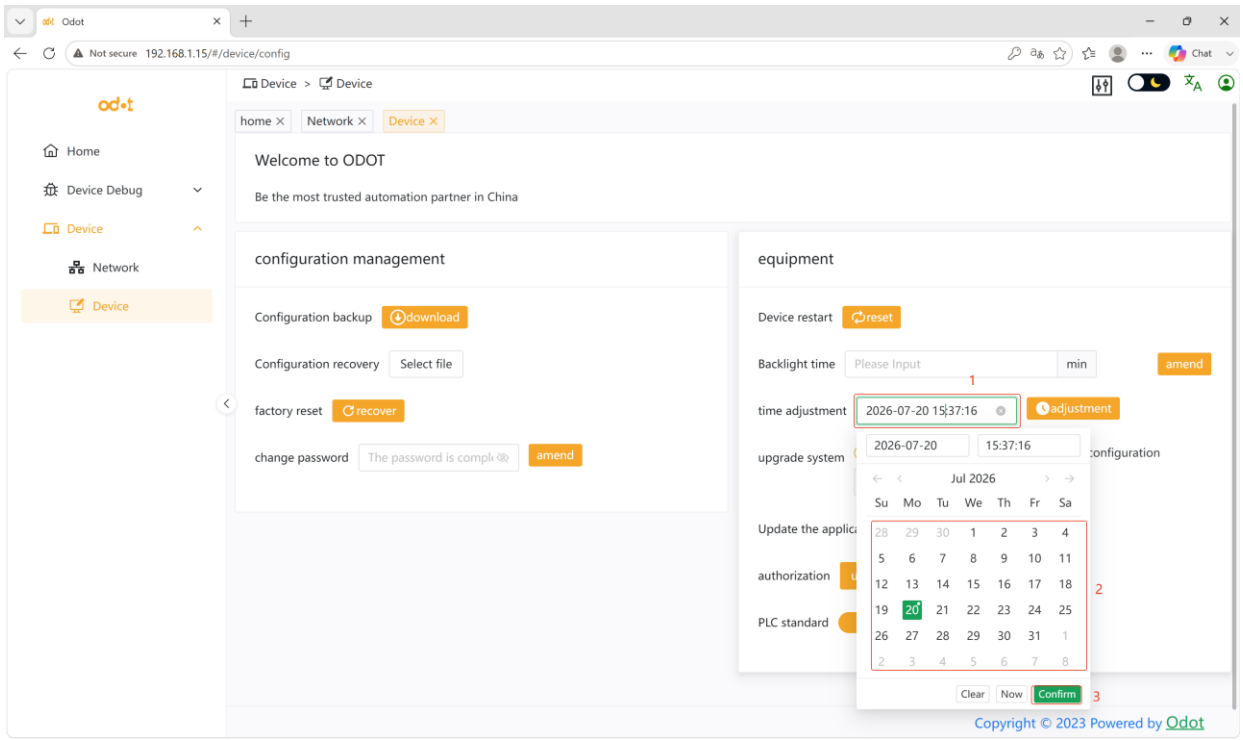
Click Device — Network in the left menu bar to modify module IP addresses and other information. Eth0 corresponds to the first and second network ports of the PLC, with two network ports featuring switch cascading functions; PN_ Eth1 corresponds to the third network port of the PLC. (Example model is DU03L-A00-1200-0).

For example, if need to change the IP address of Eth0 to 192.168.1.15 and the subnet mask to 255.255.255.0. After configuration, click Submit, and a message will pop up in the upper right corner indicating the modification was successful. Please restart the network. Click to restart the network or repower on the PLC, and the modified IP address will take effect.

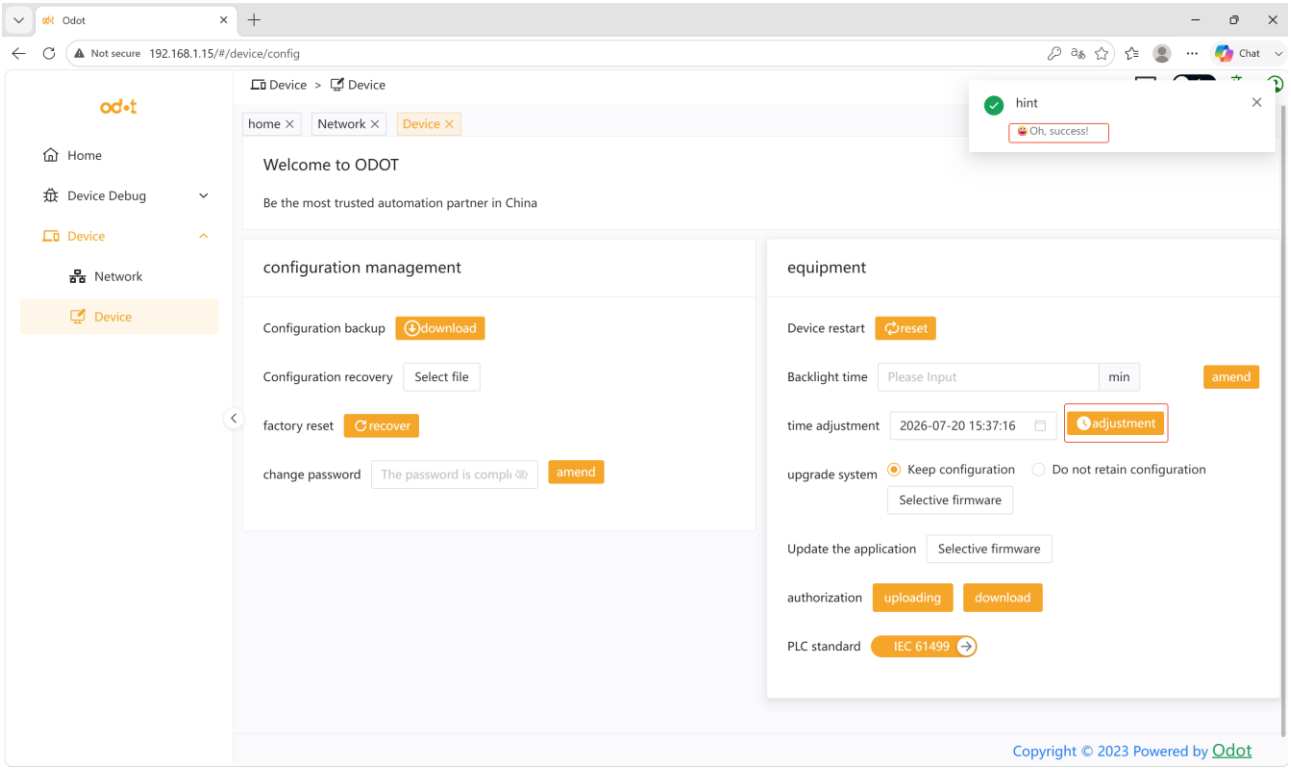


Then click on Device to configuration management: configuration backup, configuration recovery, factory restore, change password; Equipment: Operations such as equipment restart, backlight time, time adjustment, system upgrades, and more.

For example, if need to set the time to the current time, click the time, and a window will pop up to select the time want to modify. ← icon adjust the year, ‹ icon adjust the month, or directly click 'Now' and then click confirm after making the change.



Then click Adjustment, and a message will pop up in the upper right corner indicating the modification was successful. At this point, it can click Reset to activate the configuration.



3.2 AIOSYS Usage

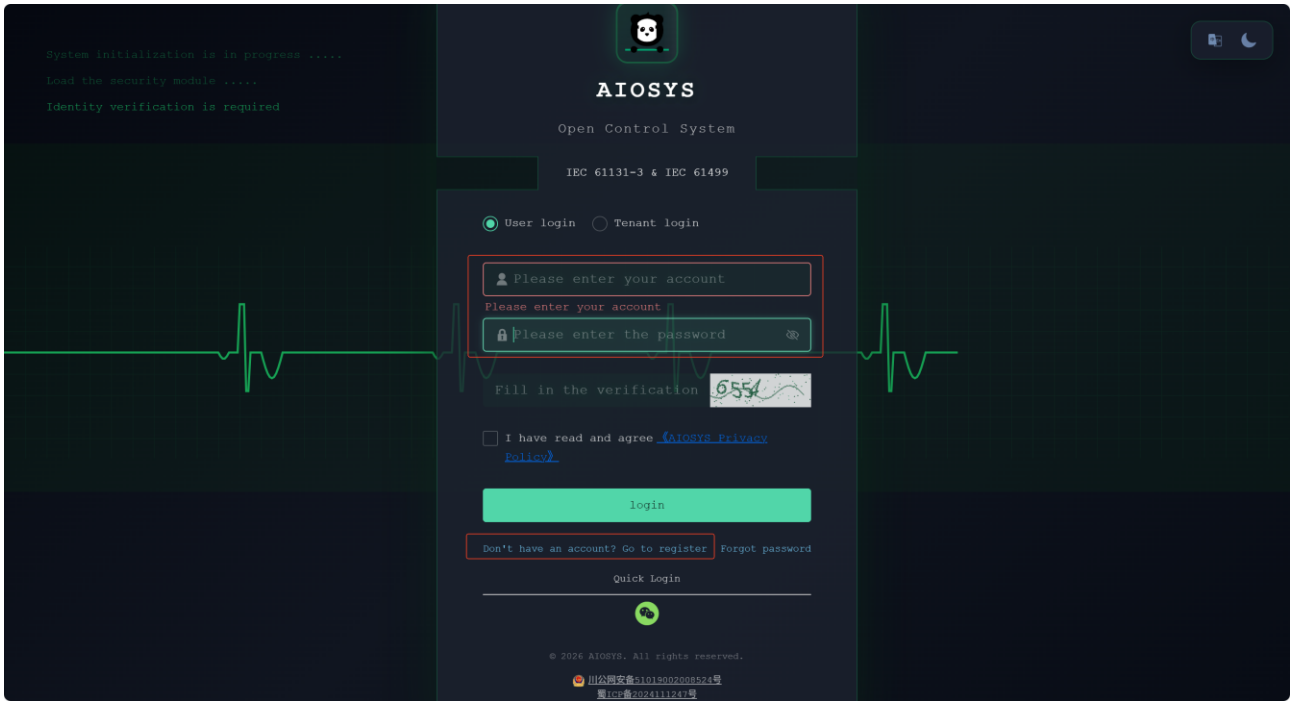
The PLC programming platform is AIOSYS, supports web programming, can be installed on local PC or remote server, and supports Linux and Windows installation environments.

3.2.1 AIOSYS Quick Access (Online Version)

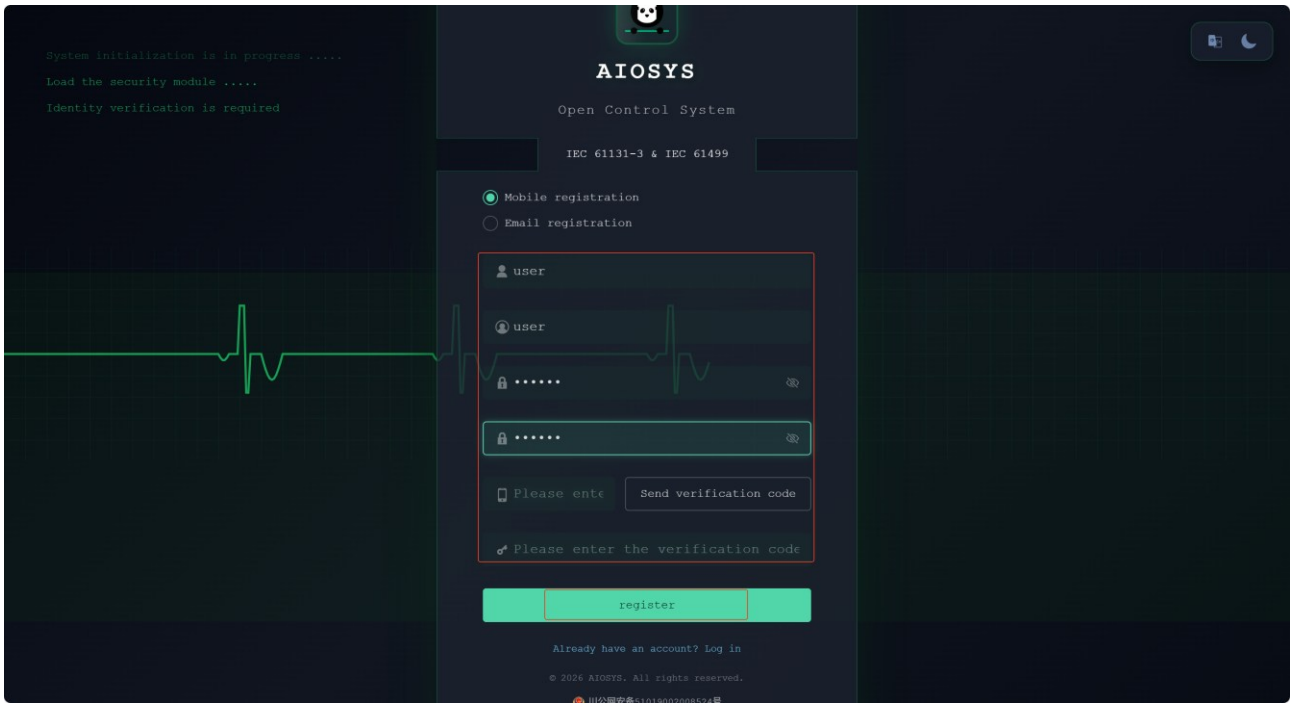
AIOSYS Platform Website: https://ide.AIOSYS.cn/

For the detailed AIOSYS user manual, please refer to: https://ide.AIOSYS.cn:19200/

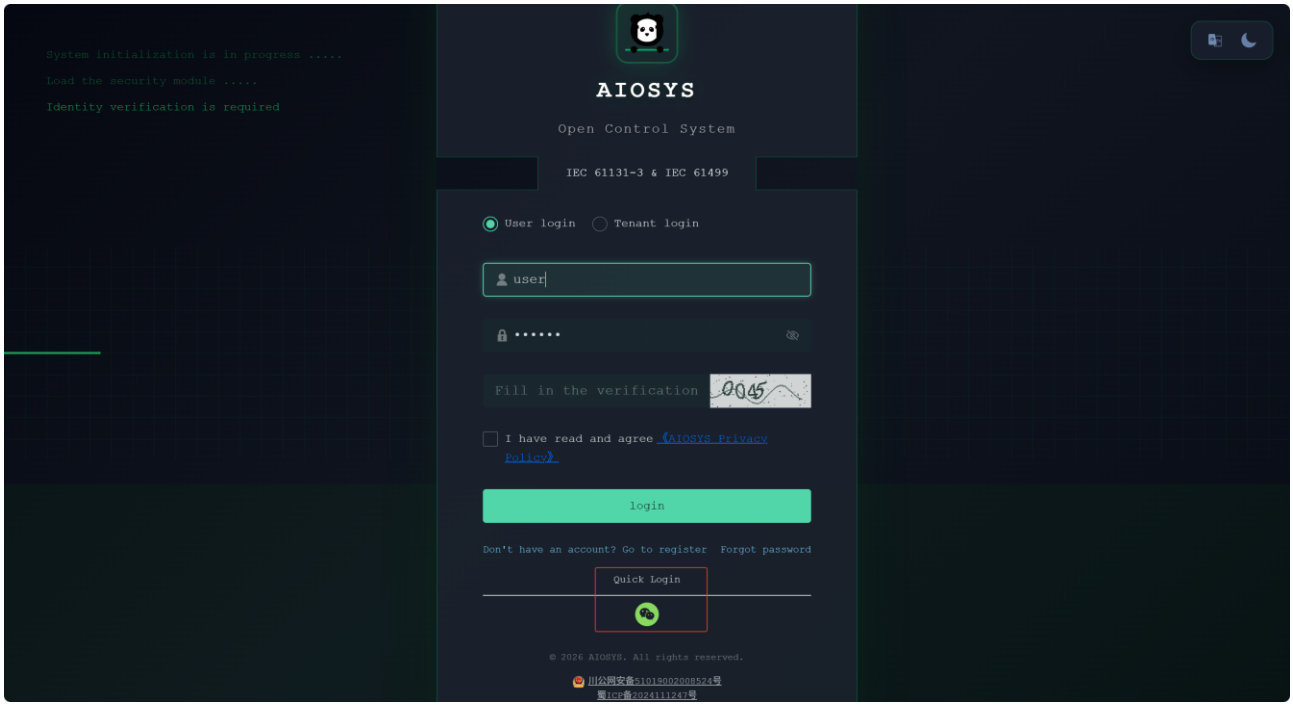
Open the browser such as Edge or Firefox, and enter the address: https://ide.AIOSYS.cn/, enter the login page. User need to register an account for the first time. Click the "Don't have an account? Go to register" button below the login button.



On the registration page, it can choose to register via mobile phone or email. After entering account, username, and password, enter the phone number, click to send verification code, fill in the received verification code, and then click the register button. After registration, return to the login page to log in.

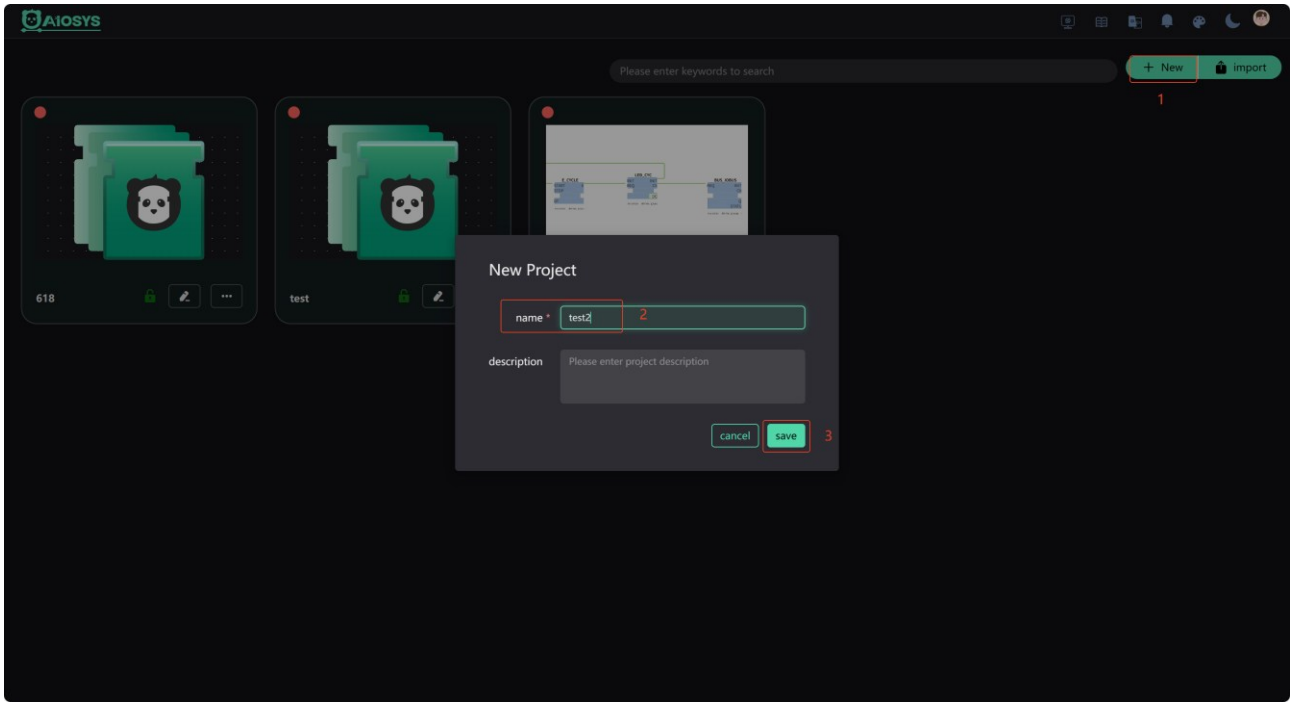


Alternatively, on the login page, click the "WeChat" icon below Quick Login and use WeChat to scan the QR code to register an account and log in.

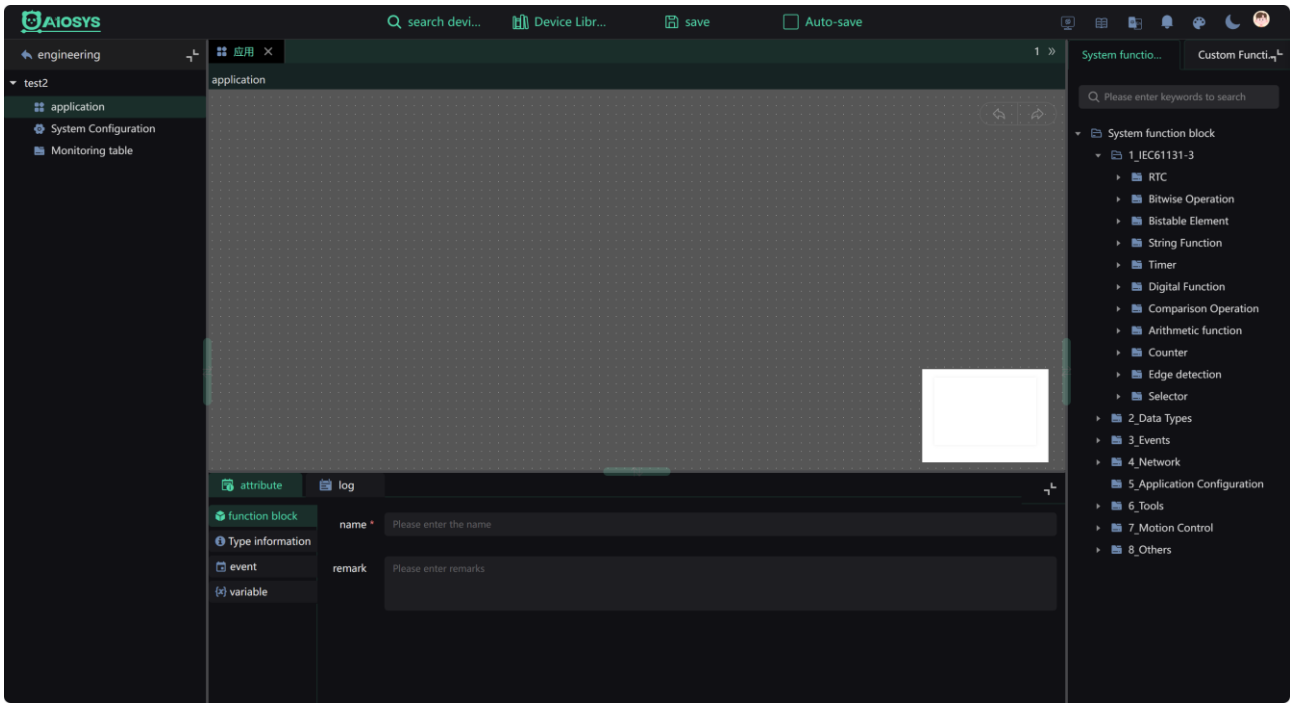


After successfully logging in, enter the homepage and click the shortcut icon on the interface to quickly open the software manual, set the theme color, or enter the personal center.

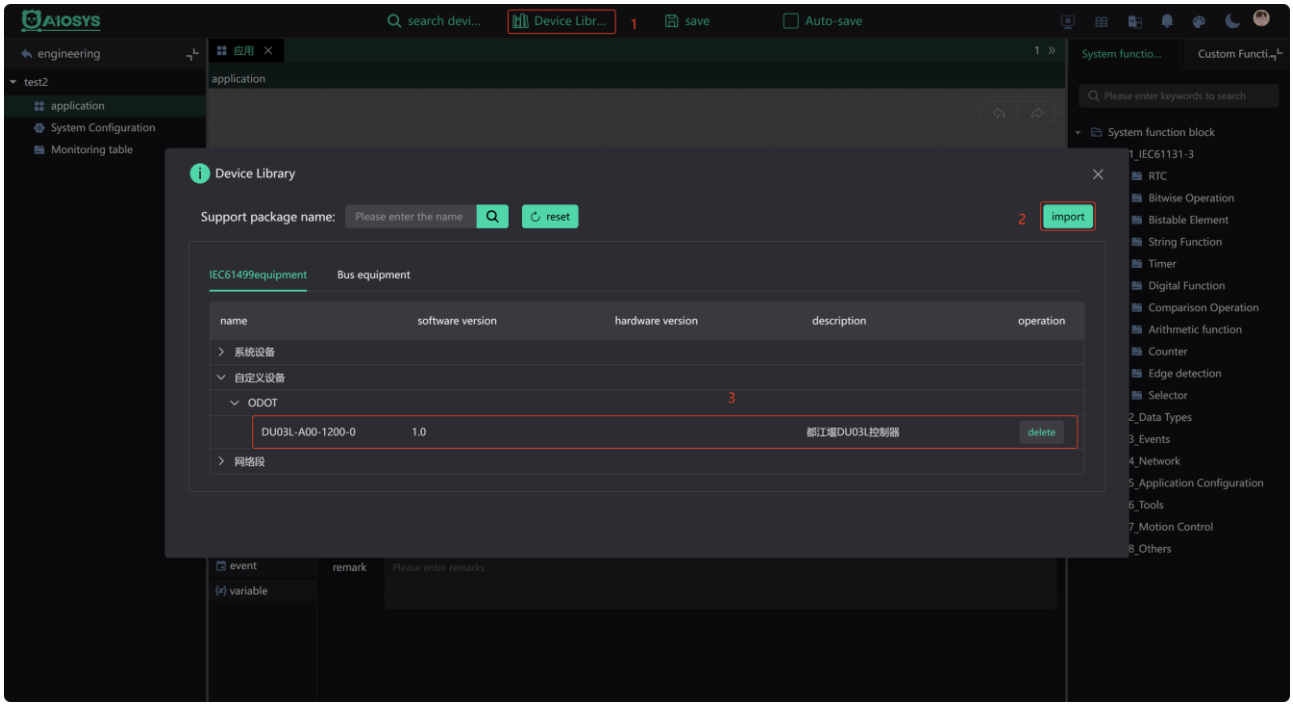
Click IEC 61499 to enter the programming platform, click "New" to create a new project, set the project name and description in the pop-up window, and click save.



Double-click the created project "test2" to enter the project view.



Click Device Library, then in the pop-up interface click Import and upload the device description file for the DU03L-A00-1200-0 module.

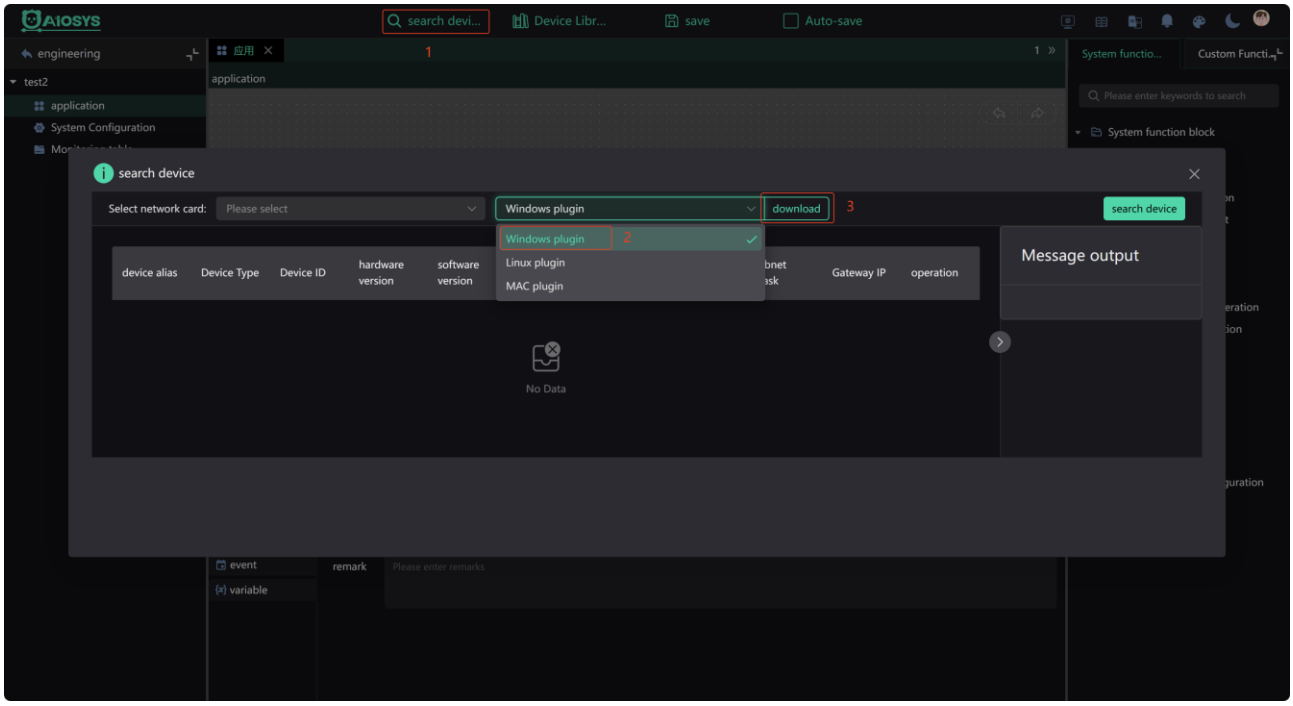


There are two ways to add DU03L-A00-1200-0 devices to the project: manually add and search for device addition.

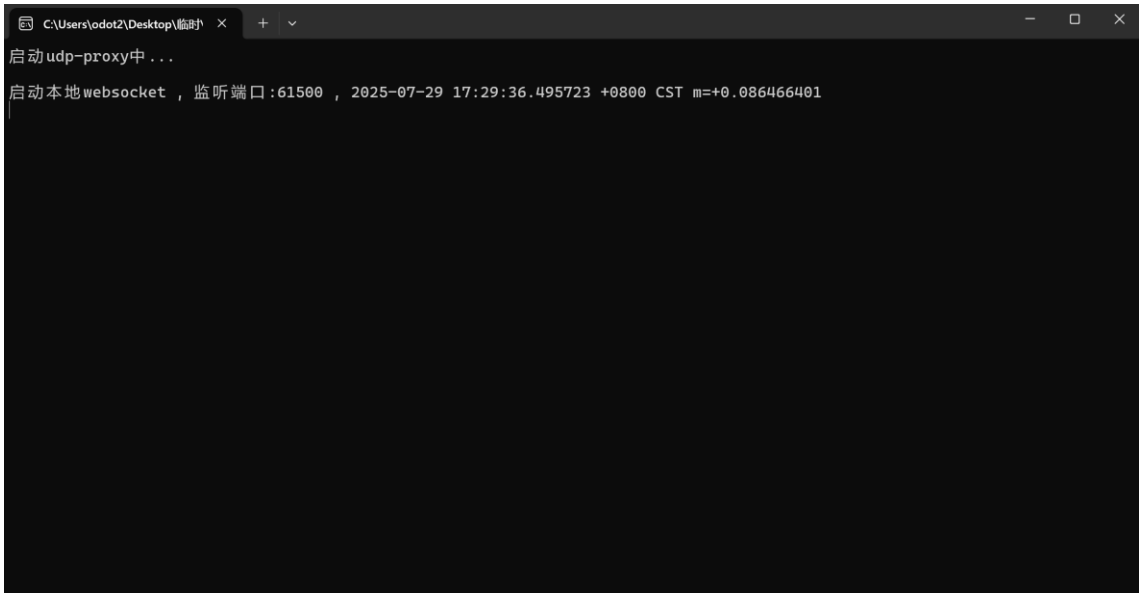
Search device for addition

Click Search Devices. If this is the first time, it needs to select the appropriate plugin based on the

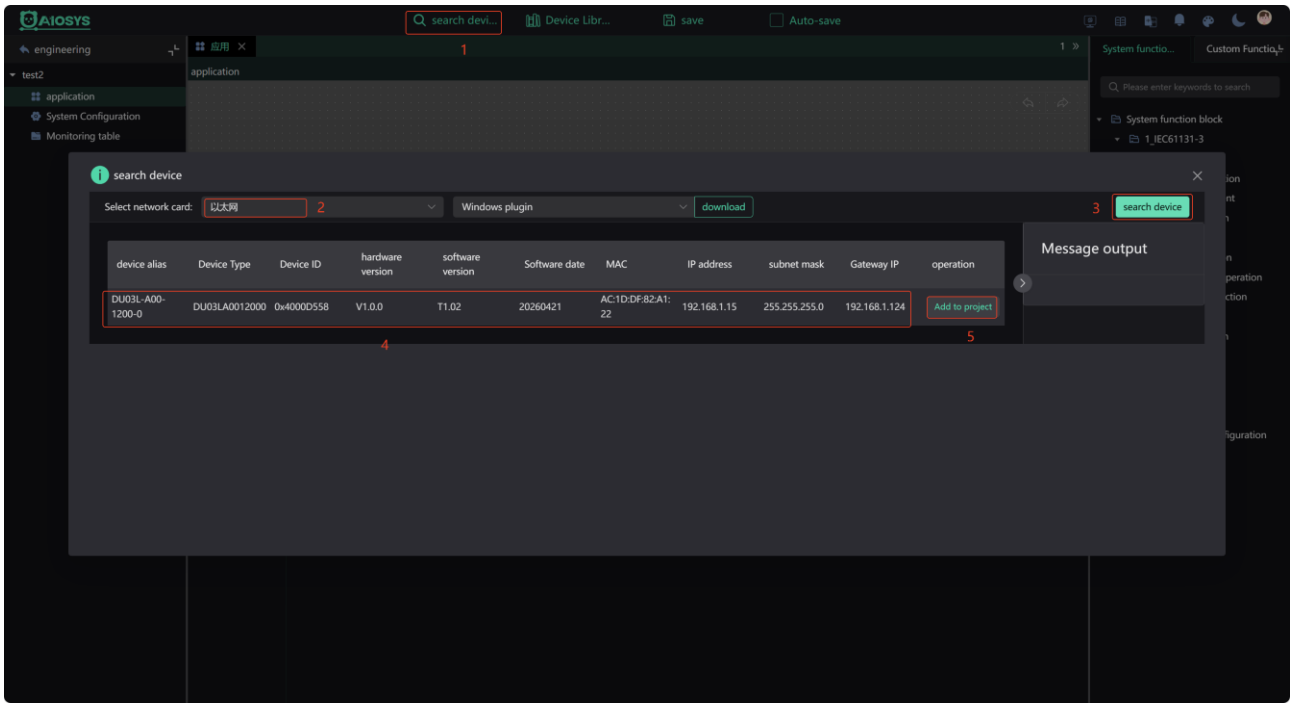
system to download.



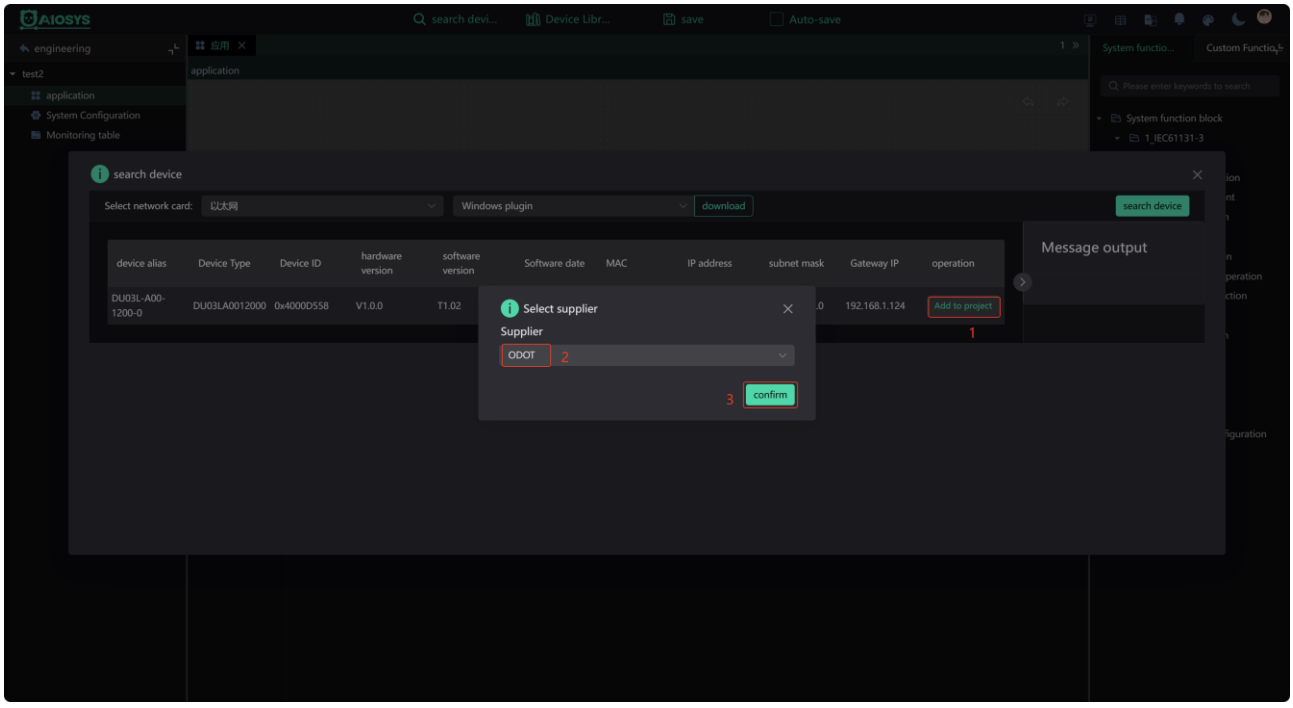
After downloading, run the plugin:

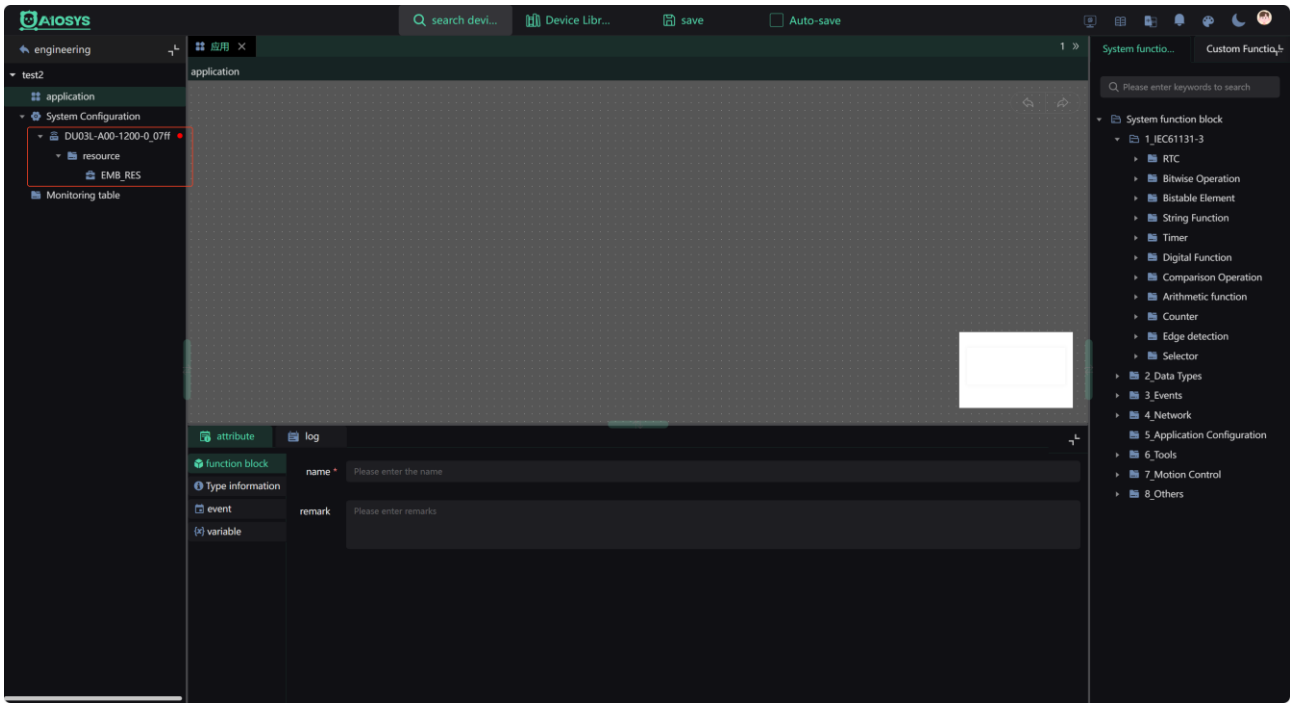


Return to the project interface, click Search Device again, select the corresponding network card, then click Search Device. Note: When searching for devices, turn off the firewall.



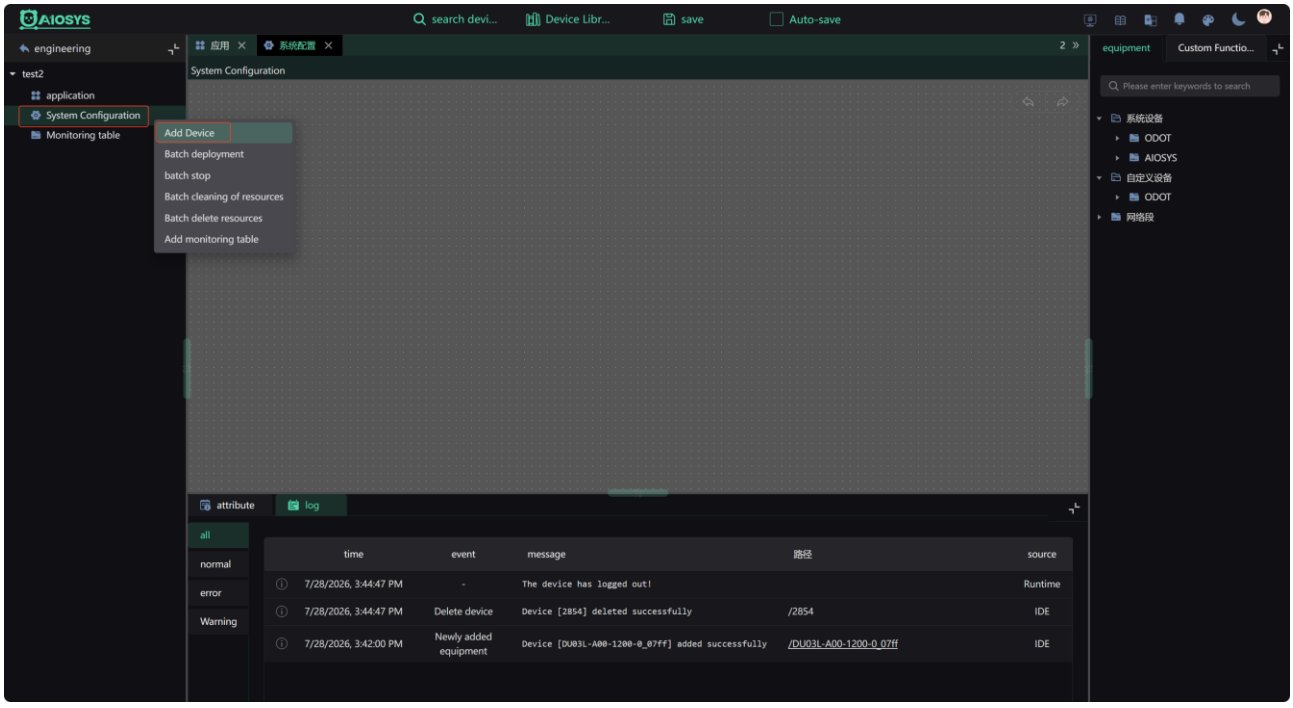
Click Add to Project to add the searched device to the project. In the pop-up "Select Supplier" window, set the supplier to "ODOT" and click confirm.



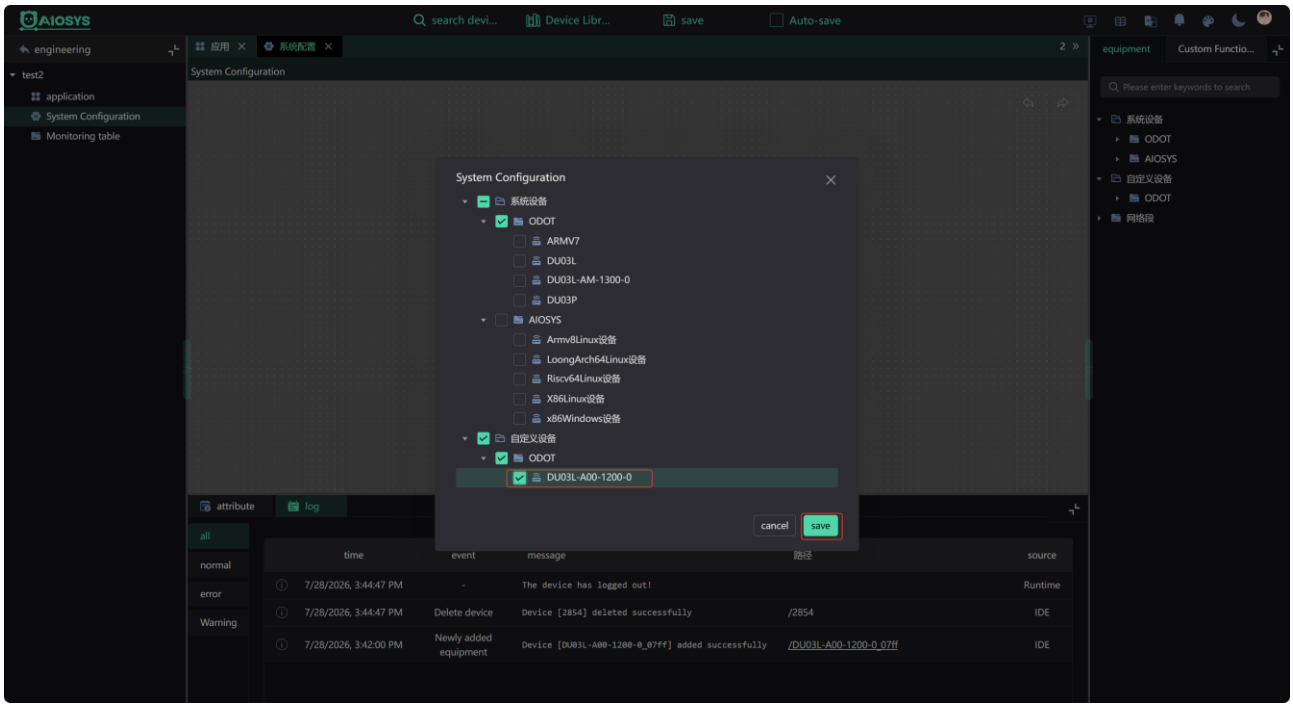


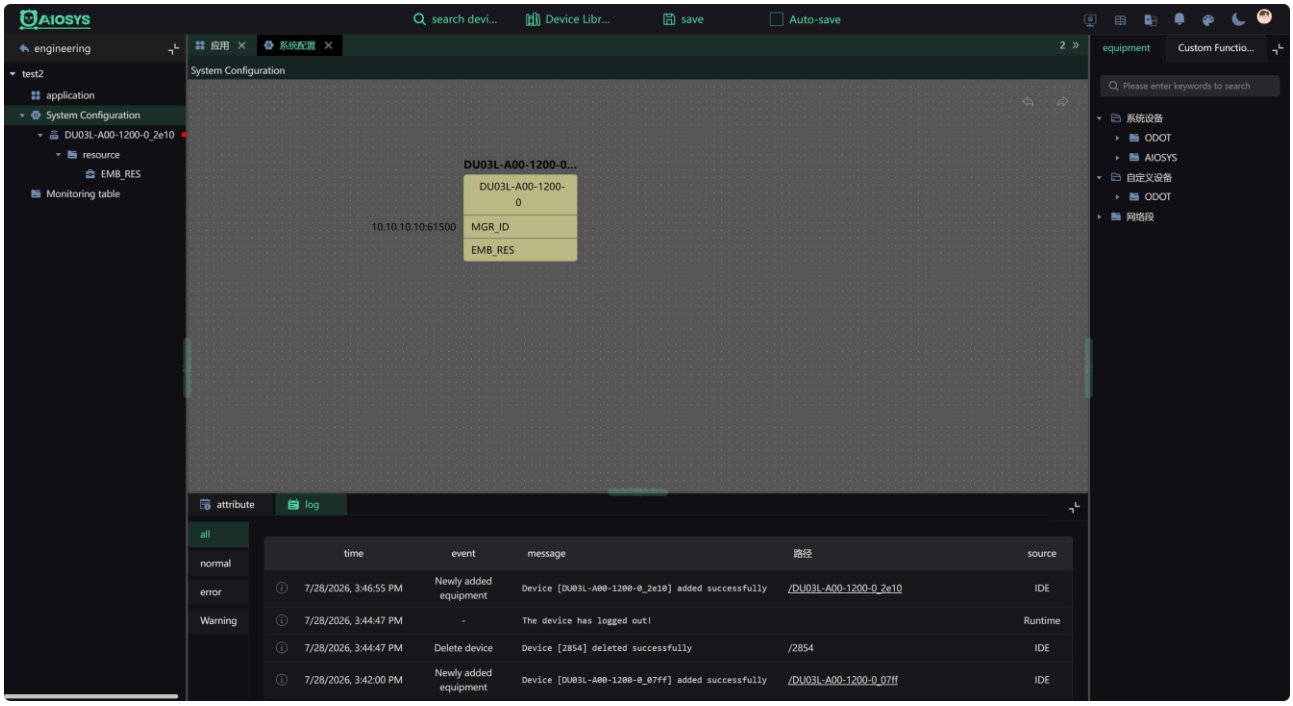
Add manually

Right-click System Configuration and select Add Device.

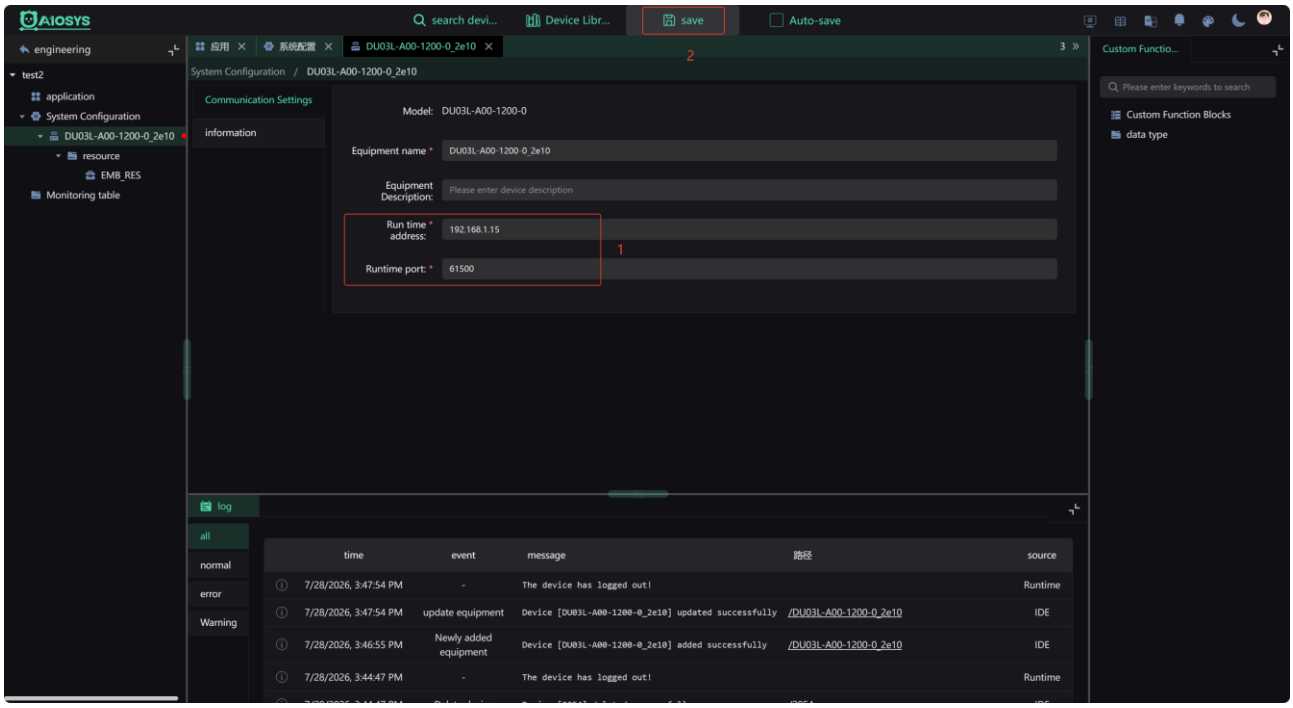


In the pop-up interface, select the DU03L-A00-1200-0 device and click Save.

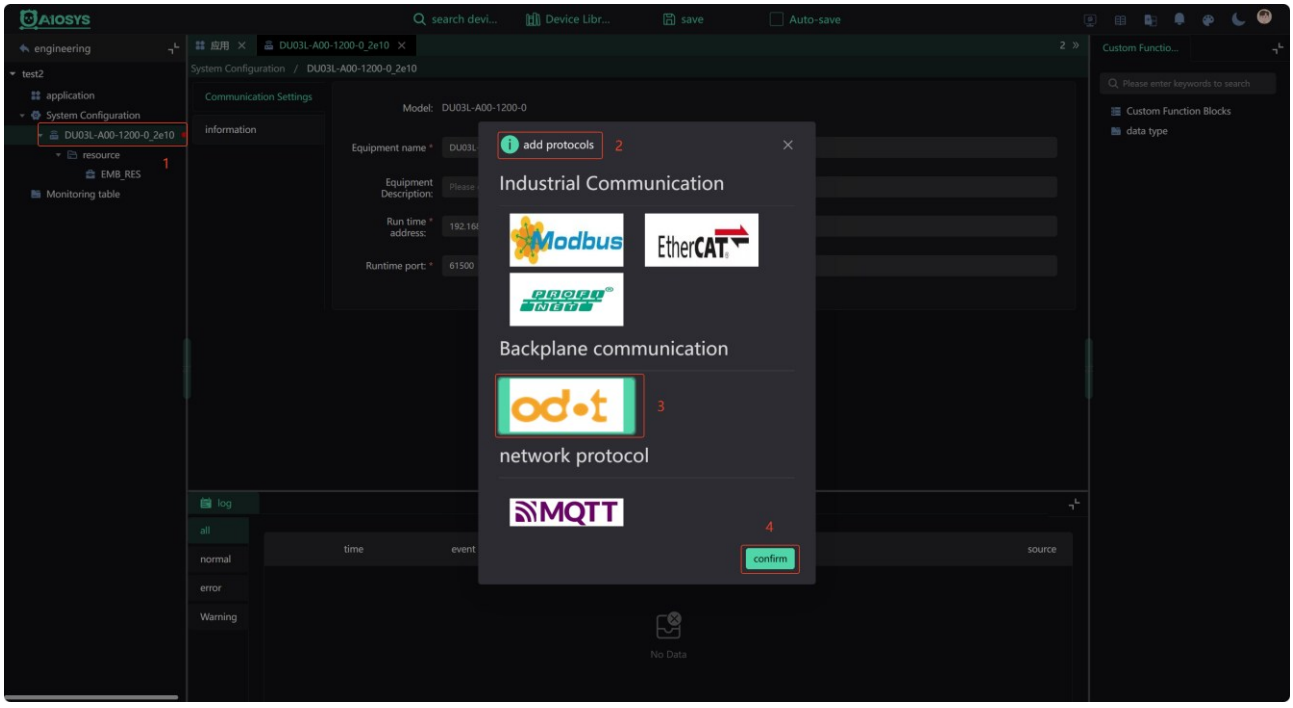




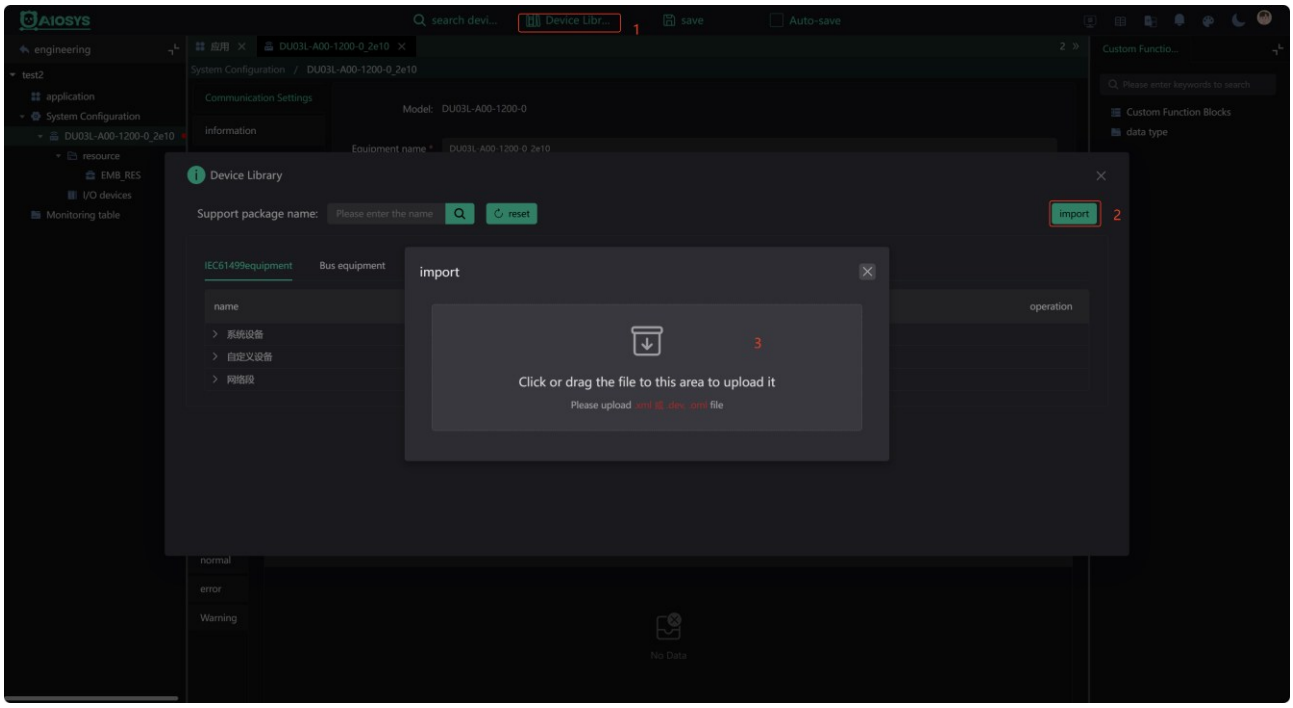
Select device DU03L-A00-1200-0, choose communication configuration, modify the device name, and set the module's runtime address and runtime port (in the example, the device's IP address is: 192.168).1.15. Runtime port is 61500), click Save.



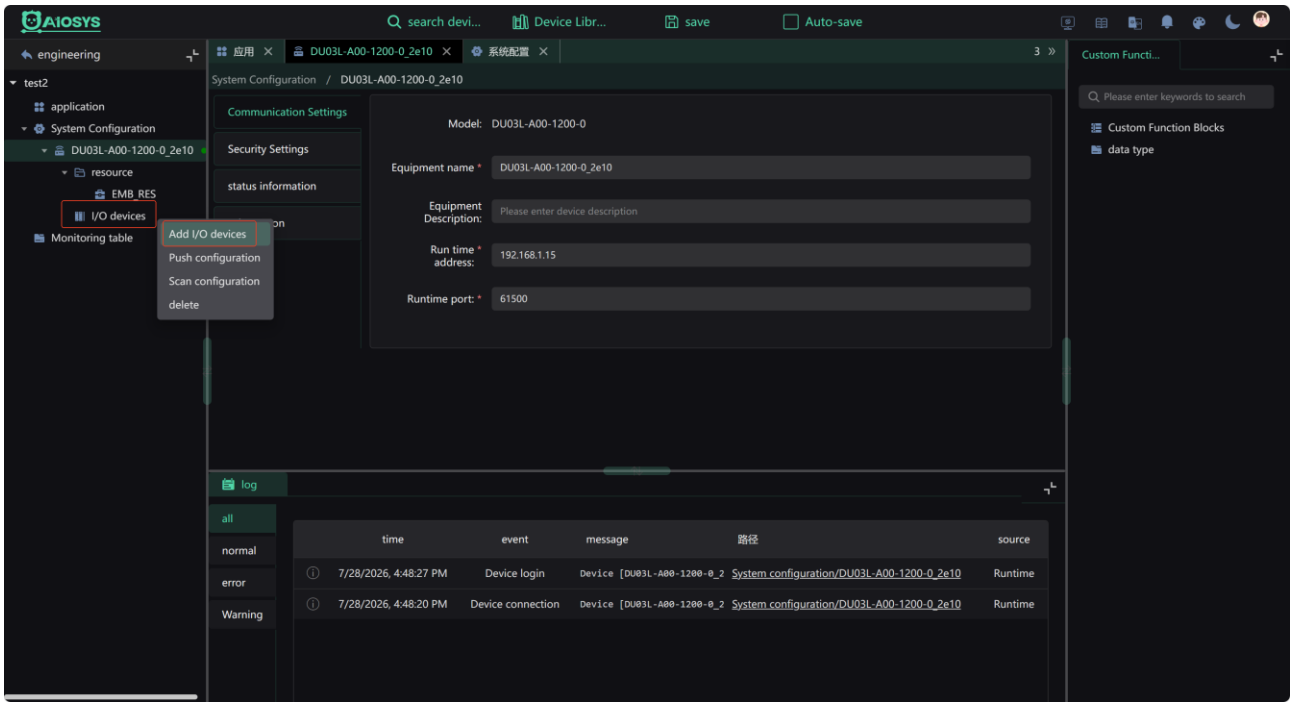
Right-click DU03L-A00-1200-0, select Add Protocol, click Add Backplane Communication "ODOT", and click confirm.

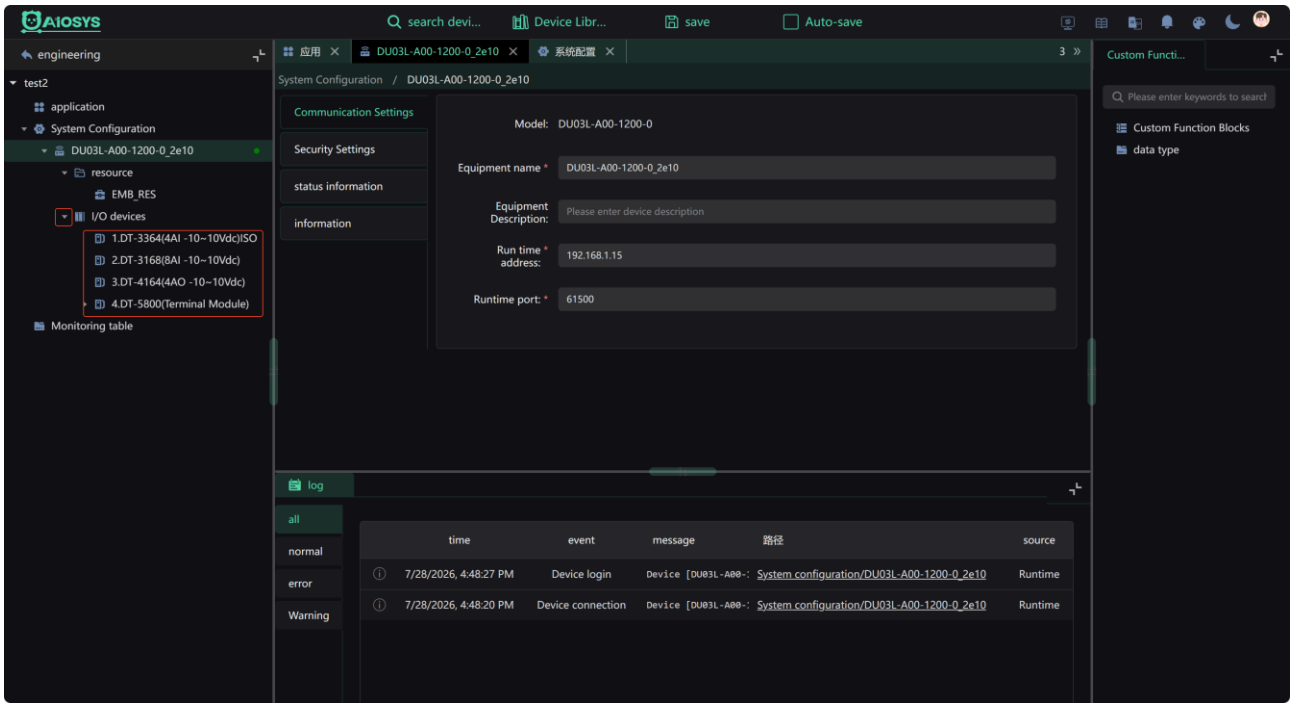


After successful addition, "I/O Devices" will appear in the project section. When using it for the first time, it needs to import the device description file for the I/O module. Click Device Library, then in the pop-up window click "Import", select the corresponding OML file, and click OK.



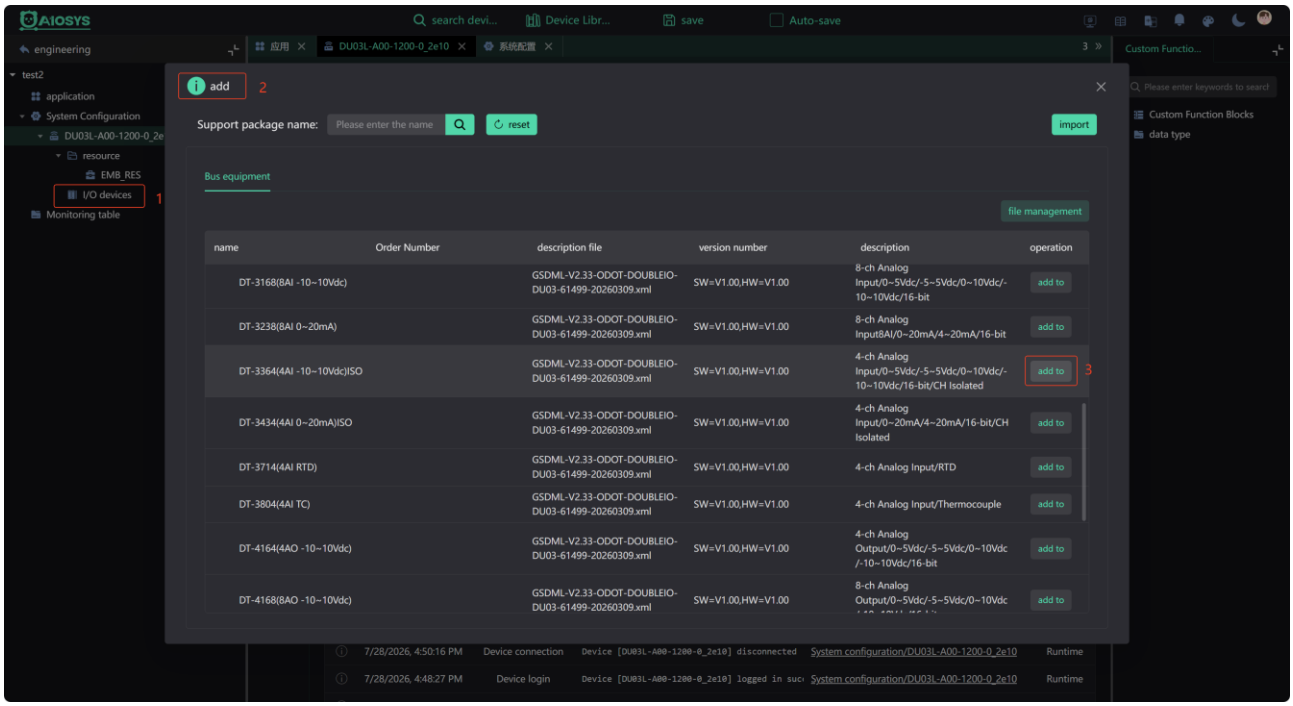
It can directly scan the I/O module at the back. First, right-click DU03L-A00-1200-0, select Device Login, and after successful login, right-click the I/O Device and select the Scan configuration. Then, unfold the small arrow in front of the I/O device, and the I/O module behind the PLC has been scanned.



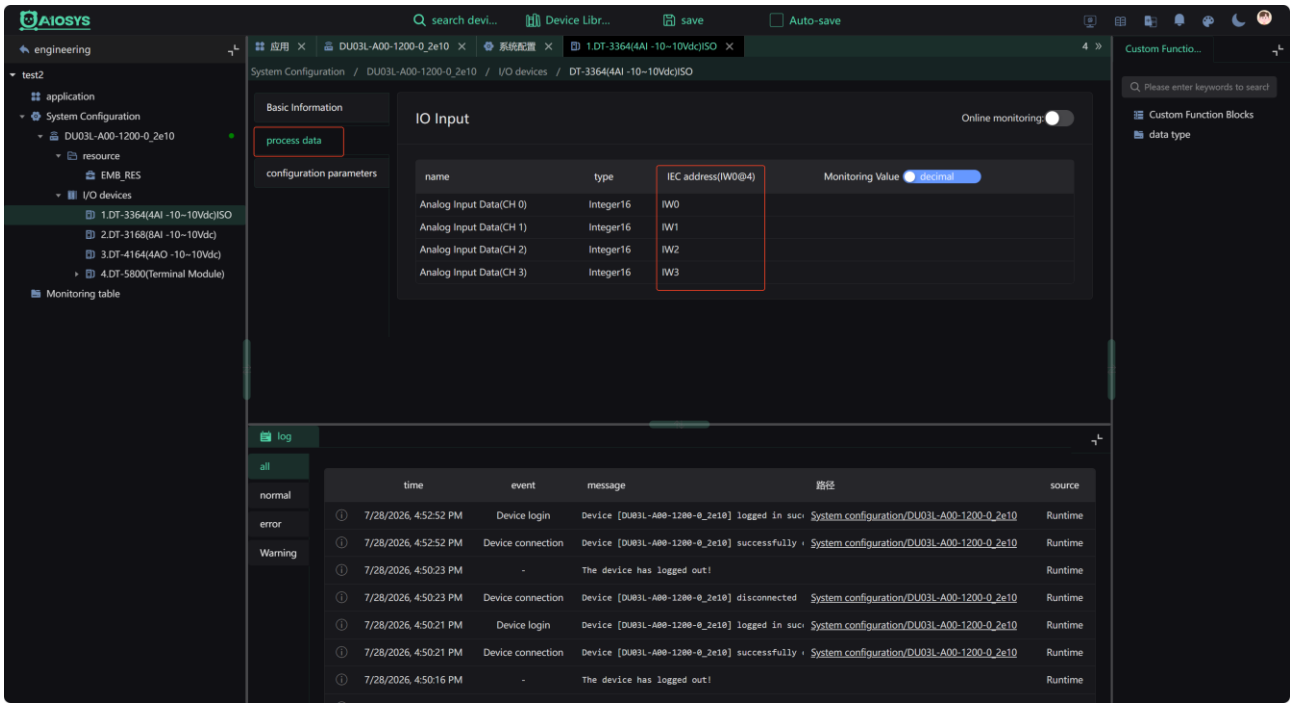


It can choose to manually add I/O modules. Right-click on the I/O device, select Add I/O Device, and in the pop-up window, add the corresponding model module. (In the example, the hardware is DU03LA00-1200-0 + DT-3364 + DT-3168 + DT-4164 + DT-5800).

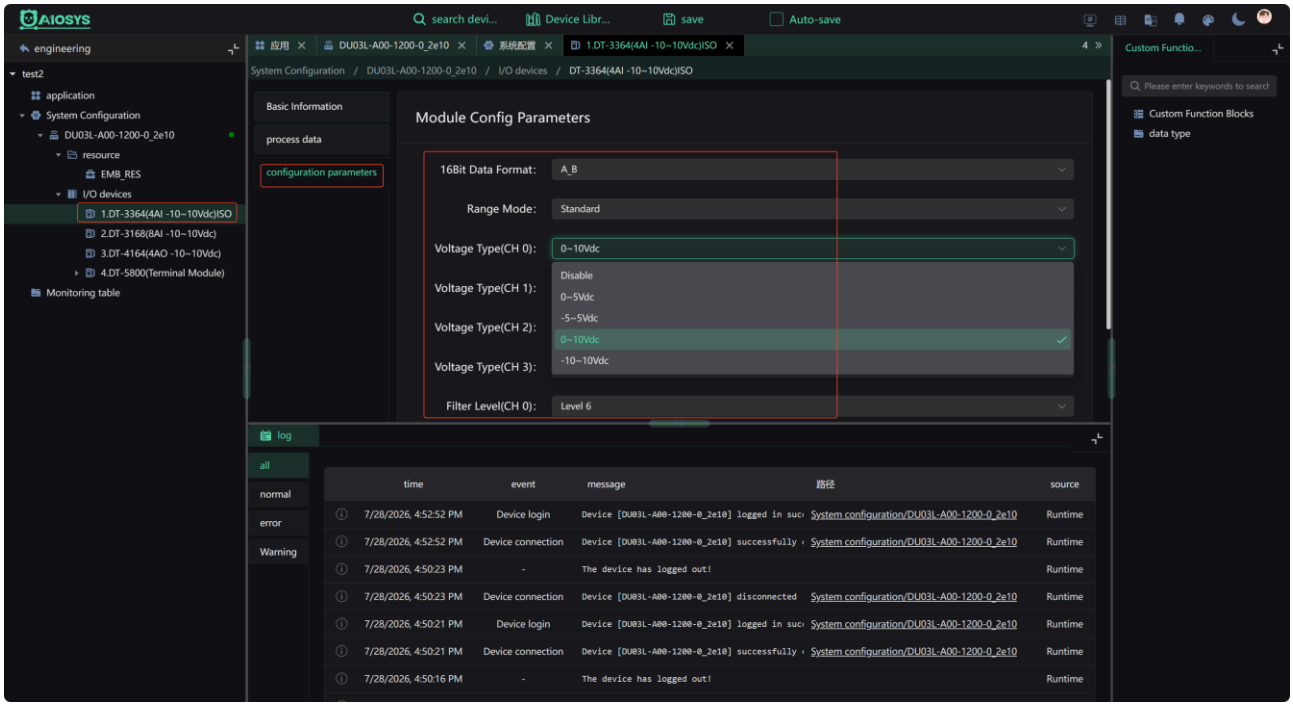
Note that the added module model must match the actual module model.



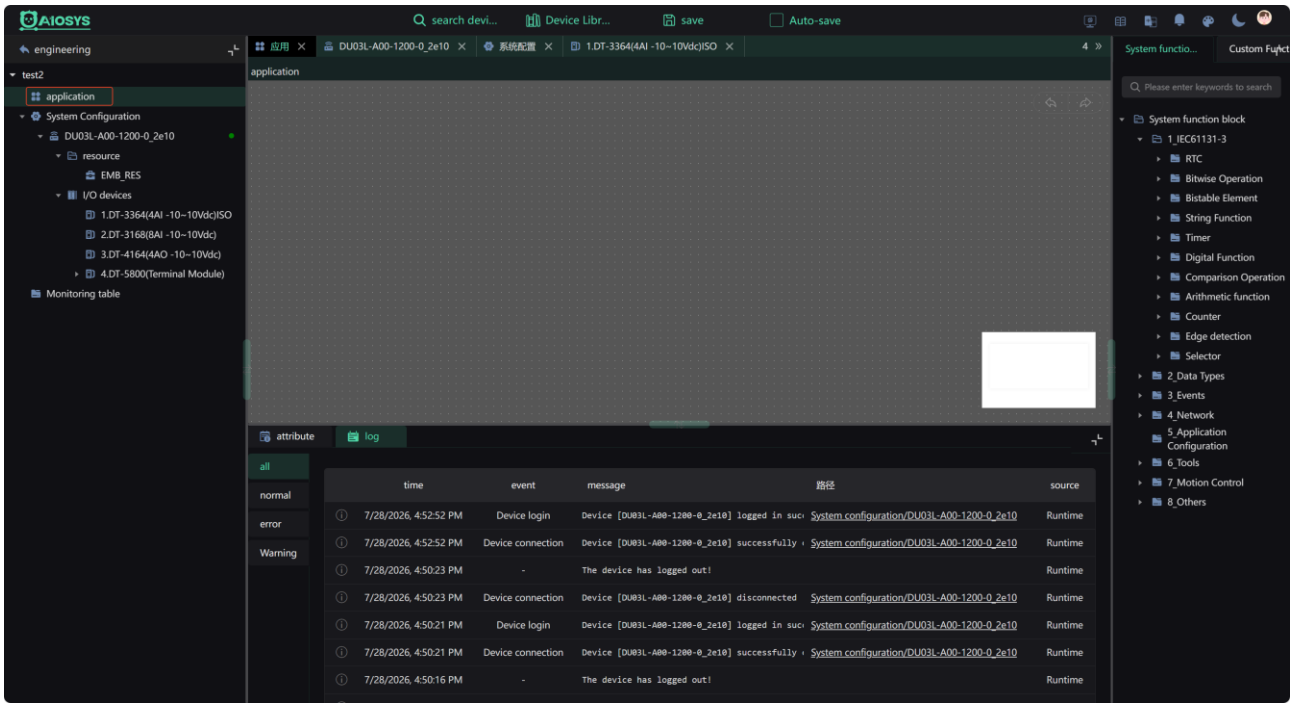
After adding modules, click the DT-3364 module, select process data, and view the assigned IEC address and online data monitoring.



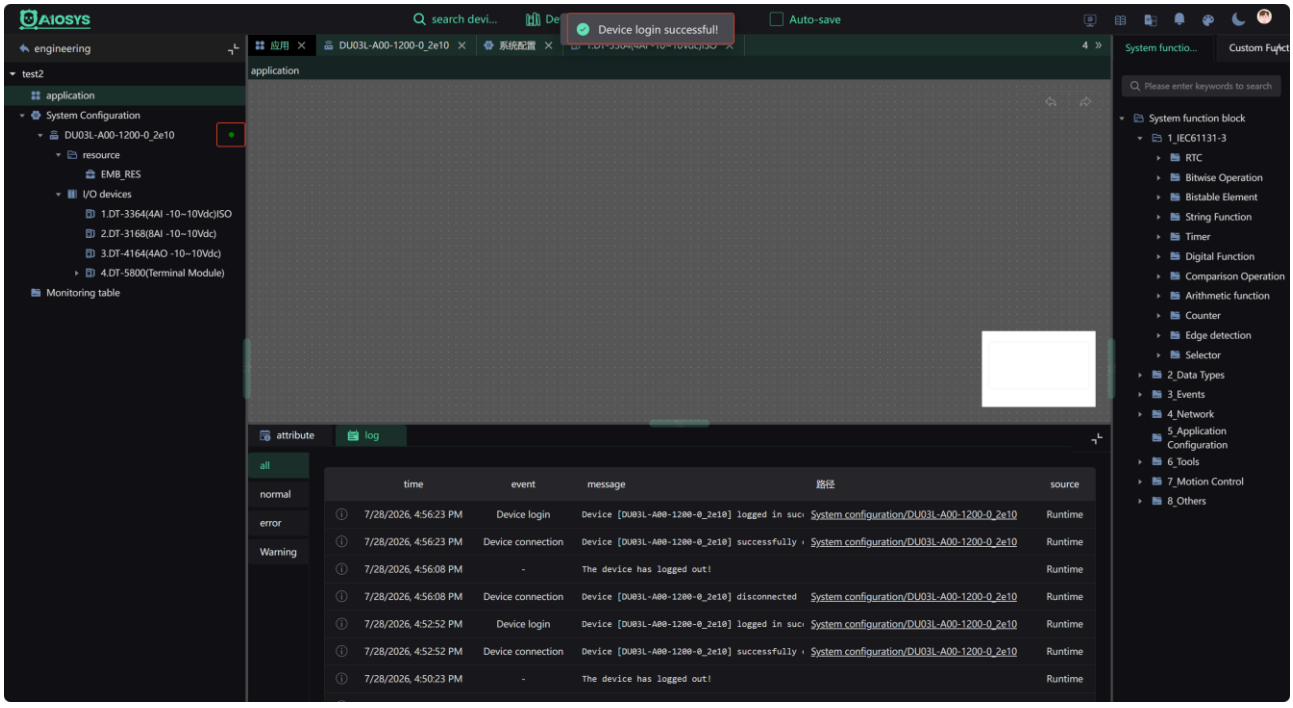
Click Configuration Parameters to modify the module's parameter settings.



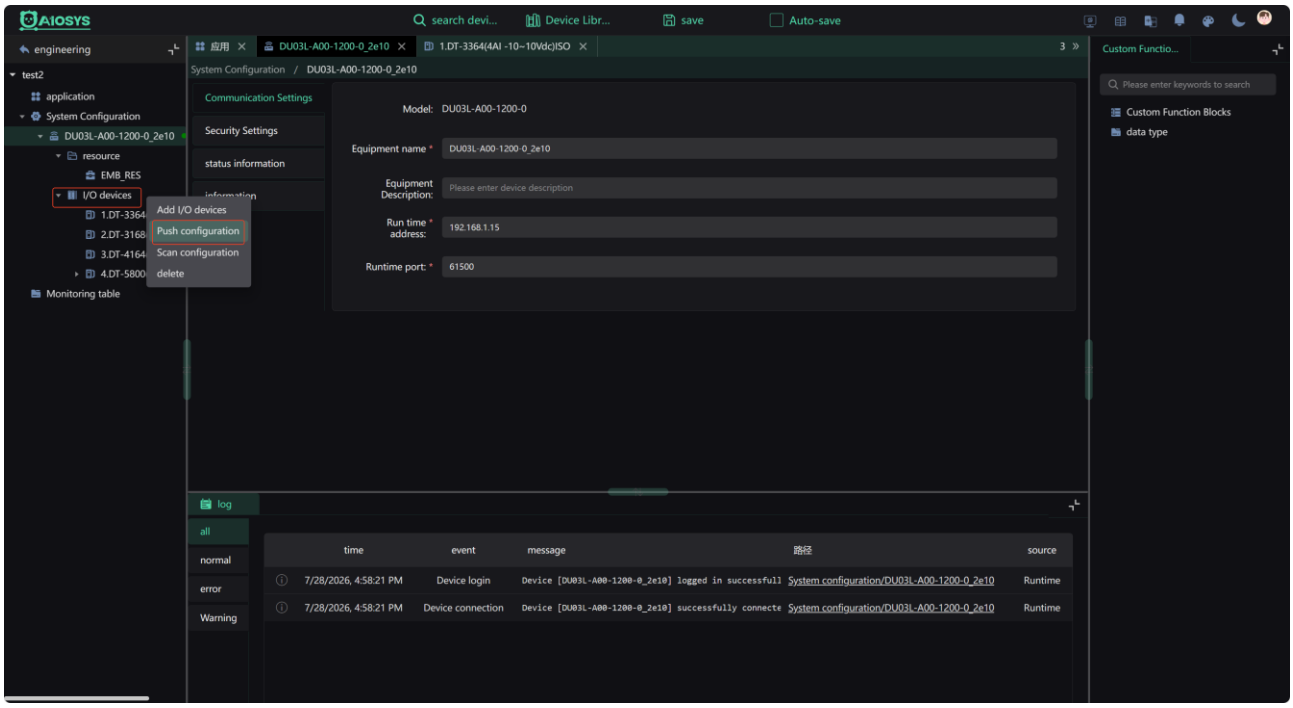
Click on the application to enter the programming interface. For detailed information, please refer to the AIOSYS User Guide: https://ide.AIOSYS.cn:19200/。



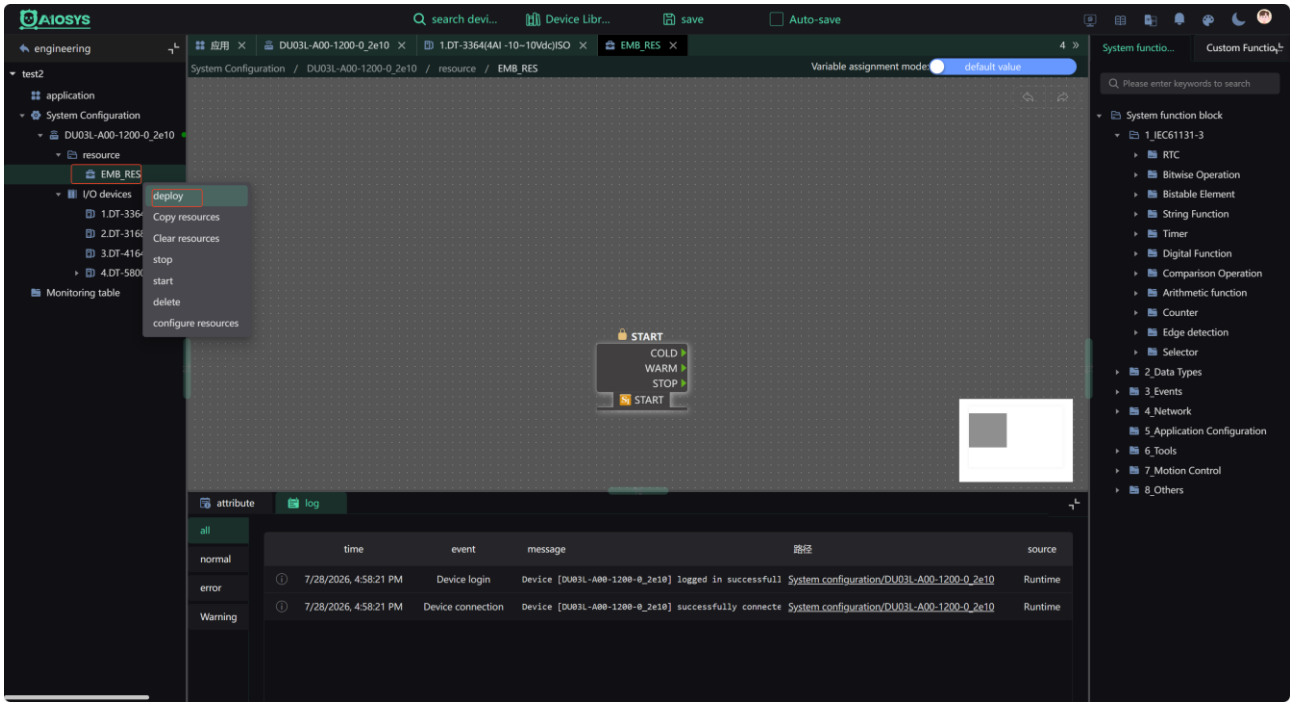
After configuring parameters, right-click DU03L-A00-1200-0 and select Device Login. Once logging in successfully, the dot next to DU03L-A00-1200-0 will turn green, and a device will be prompted to log in successfully.



After successfully logging in, right-click the I/O device and select Push Configuration.



Right-click EMB_RES Resources and click Deploy.

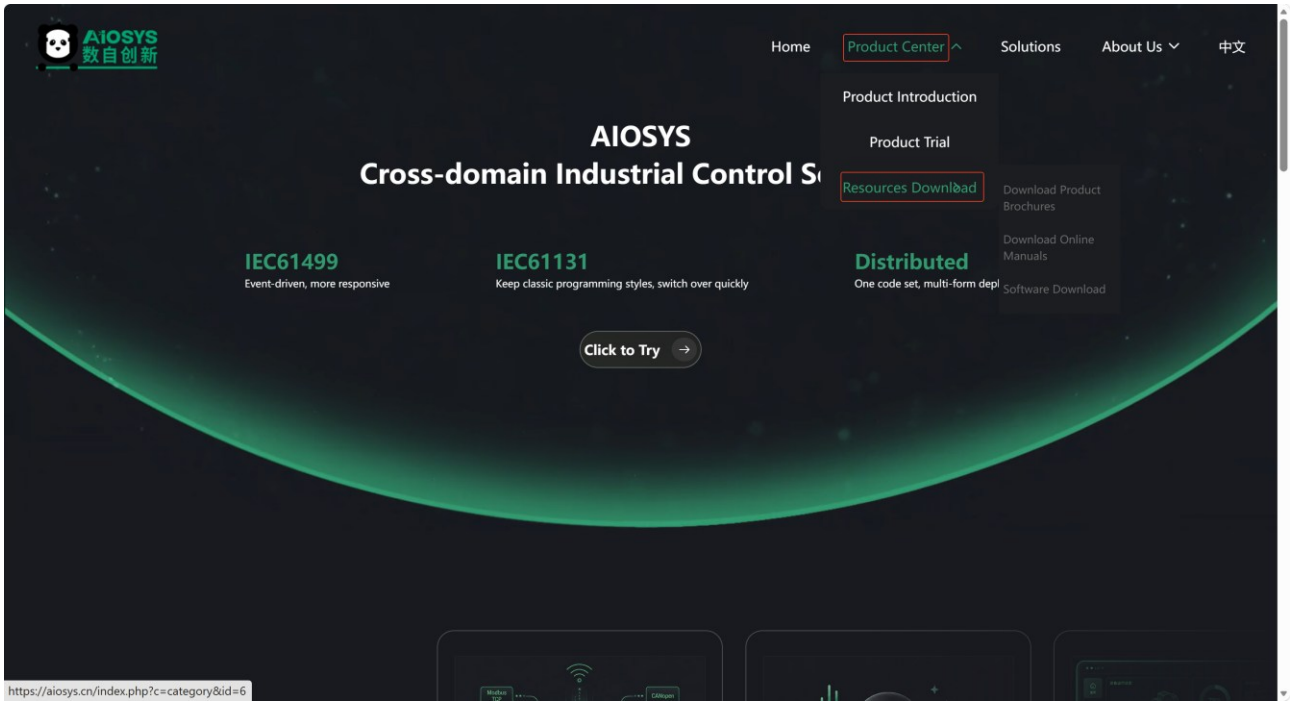


3.2.2 AIOSYS Quick Access (Offline Version)

For the detailed AIOSYS user manual, please refer to: https://ide.AIOSYS.cn:19200/

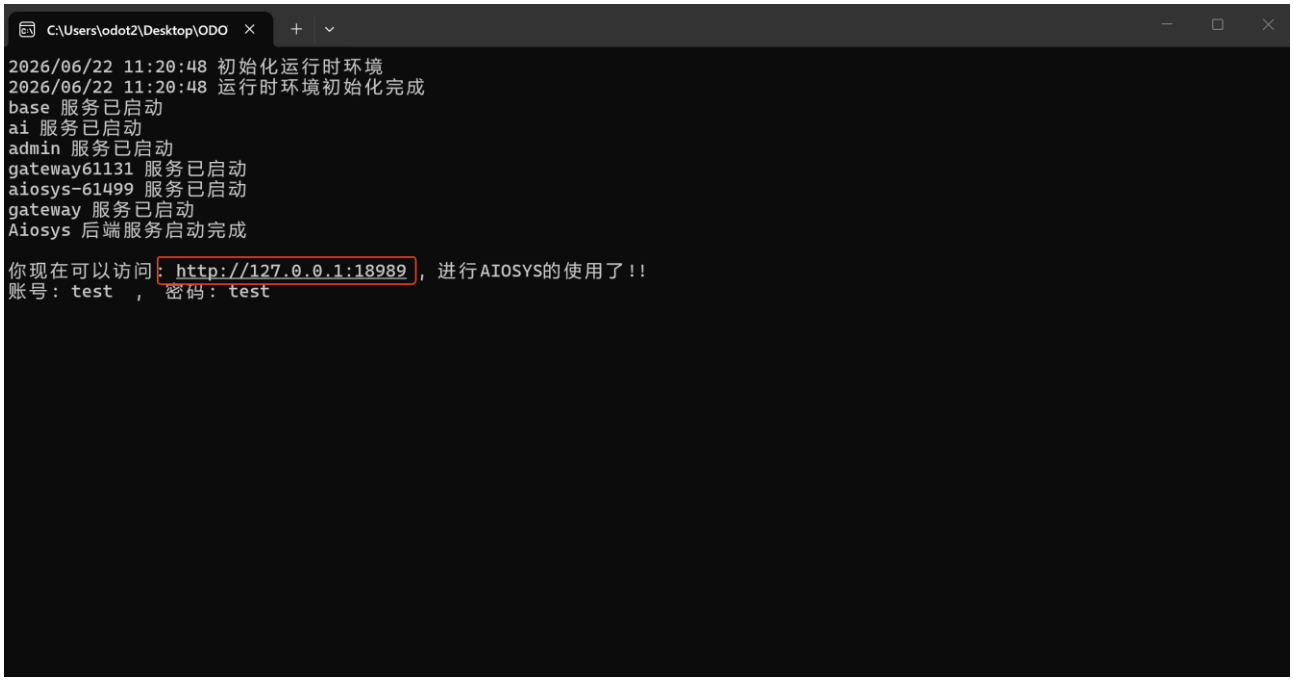
AIOSYS software offline version download link: https://aiosys.cn/

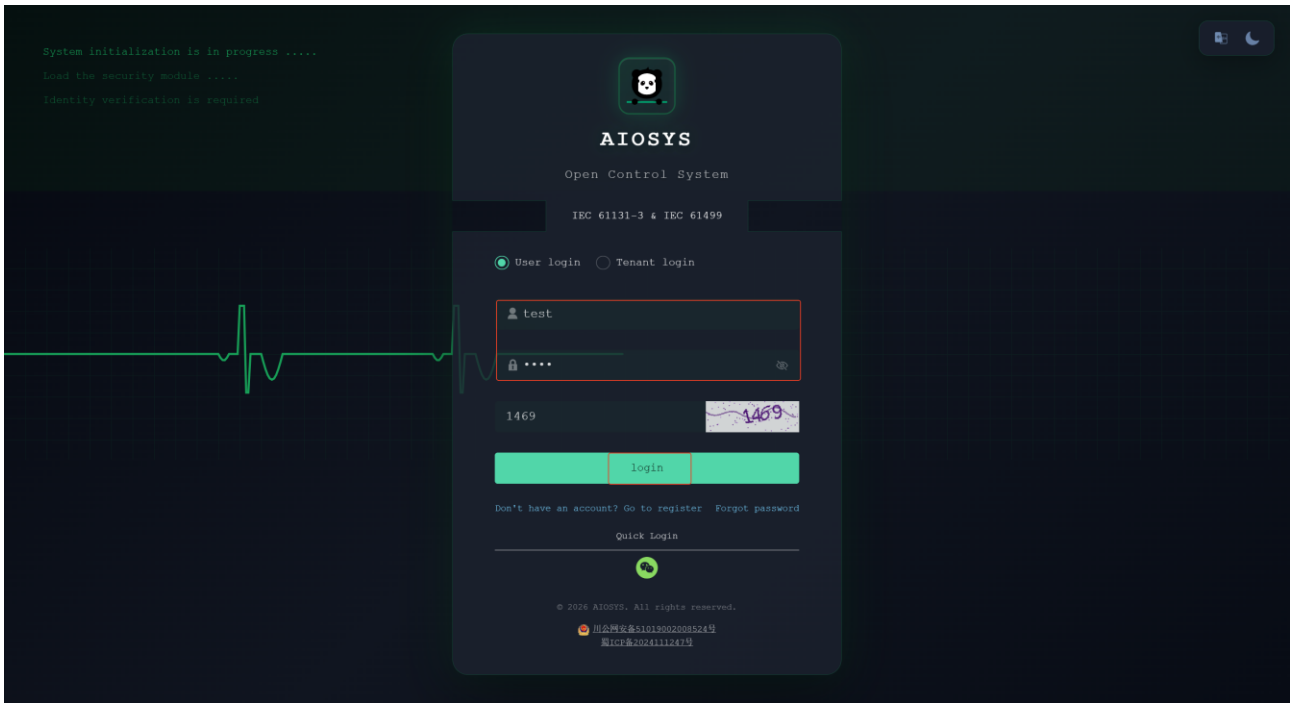
Open the download website, then click on Product Center -- Downloads, and click to download the "Programming Software AIOSYS-Windows (.exe)".



After downloading, extract the file, double-click aiosys.exe run.

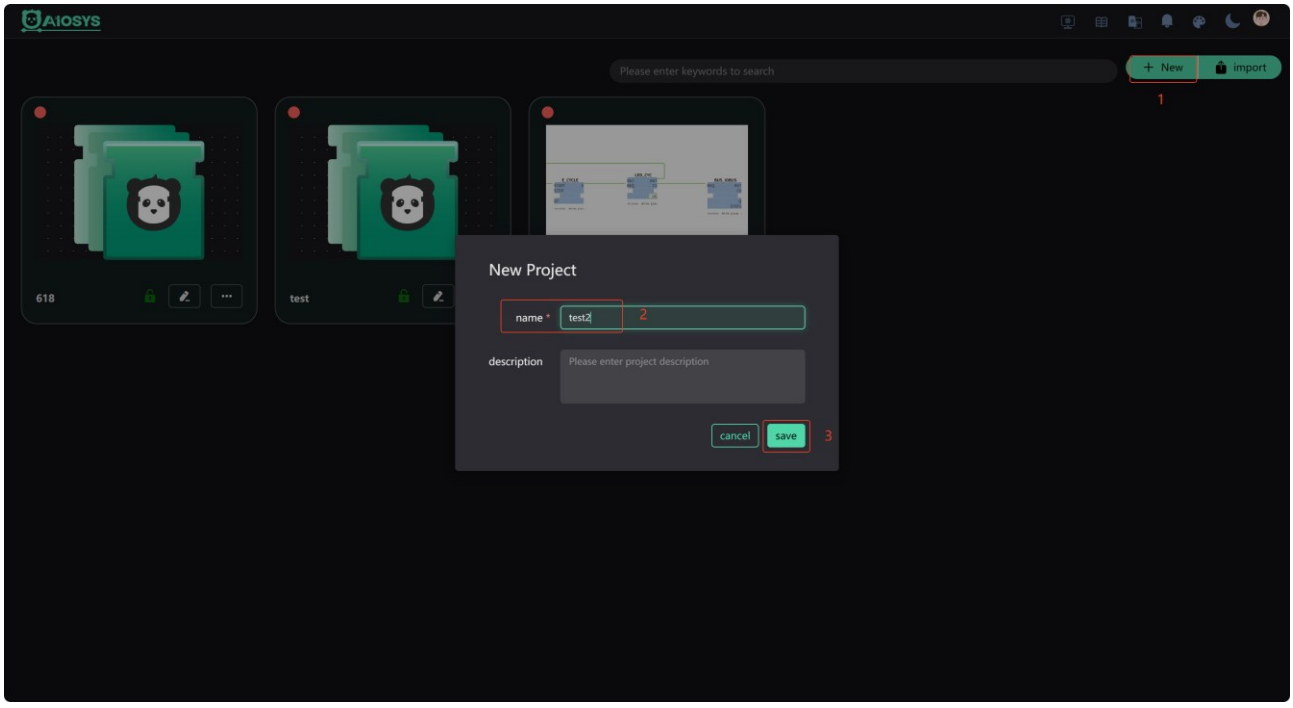
The runtime interface is shown below. Hold down the Ctrl key and click the website URL to go to the login page. Use account test and password test to log in.



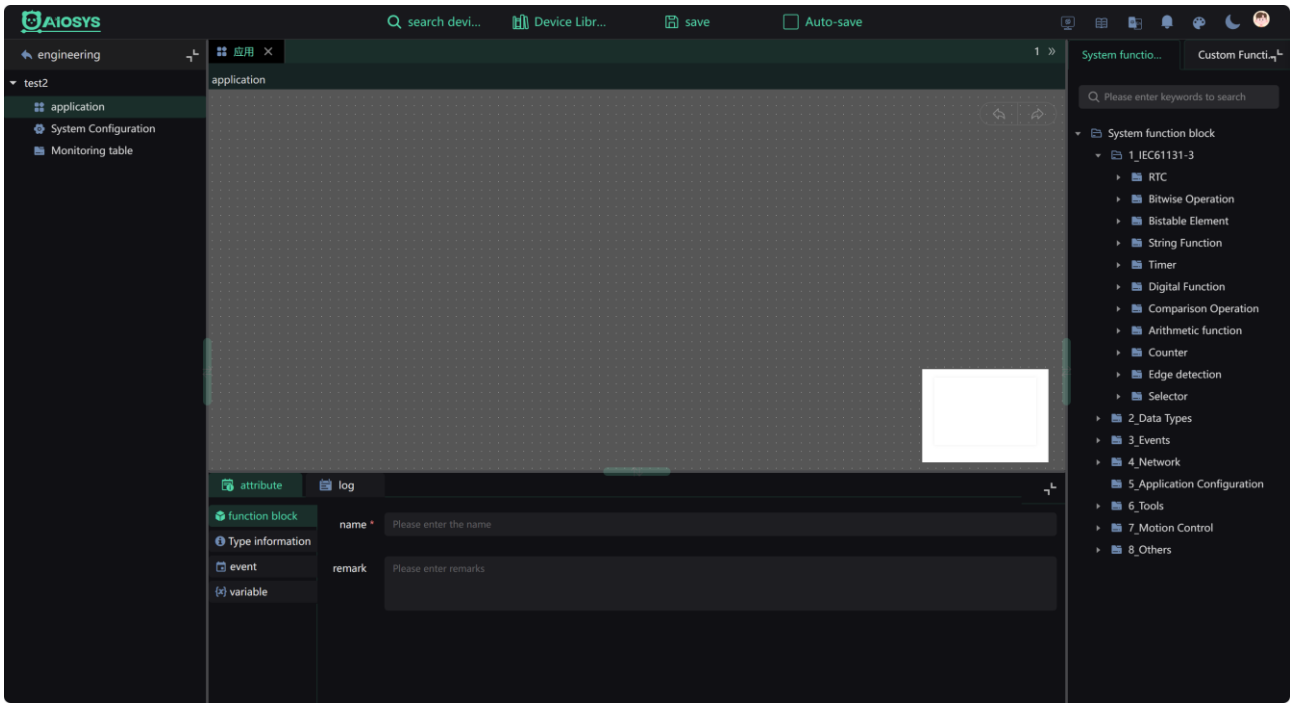


After successfully logging in, enter the homepage and click the shortcut icon on the interface to quickly open the software manual, set the theme color, or enter the personal center.

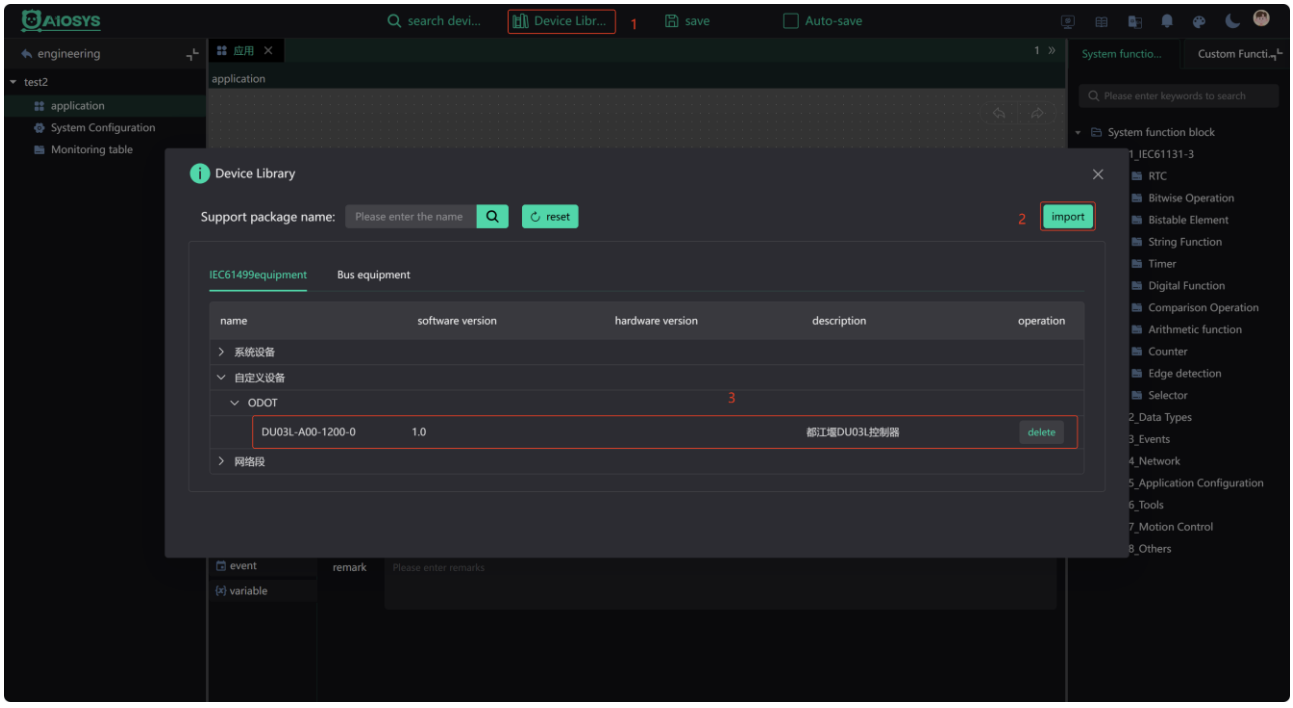
Click IEC 61499 to enter the programming platform, click "New" to create a new project, set the project name and description in the pop-up window, and click save.



Double-click the created project "test2" to enter the project view.



Click Device Library, then in the pop-up interface click Import and upload the device description file for the DU03L-A00-1200-0 module.

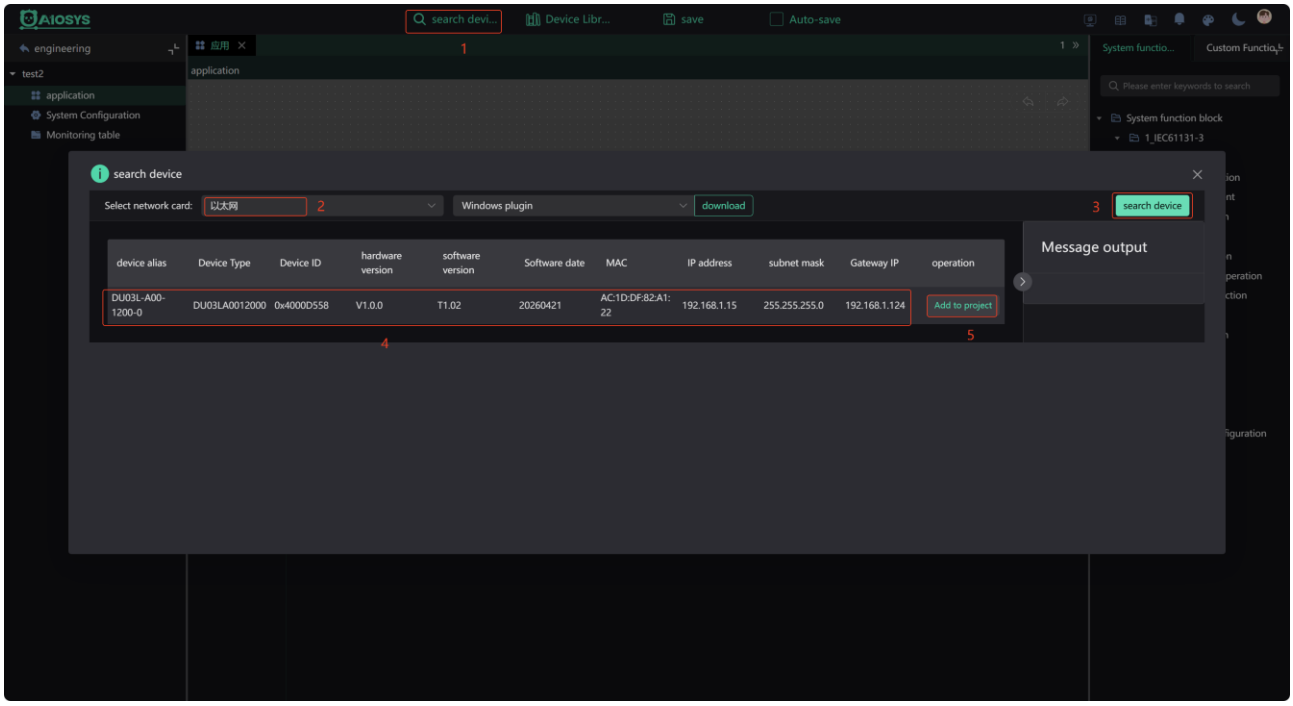


There are two ways to add DU03L-A00-1200-0 devices to the project: manually add and search for device addition.

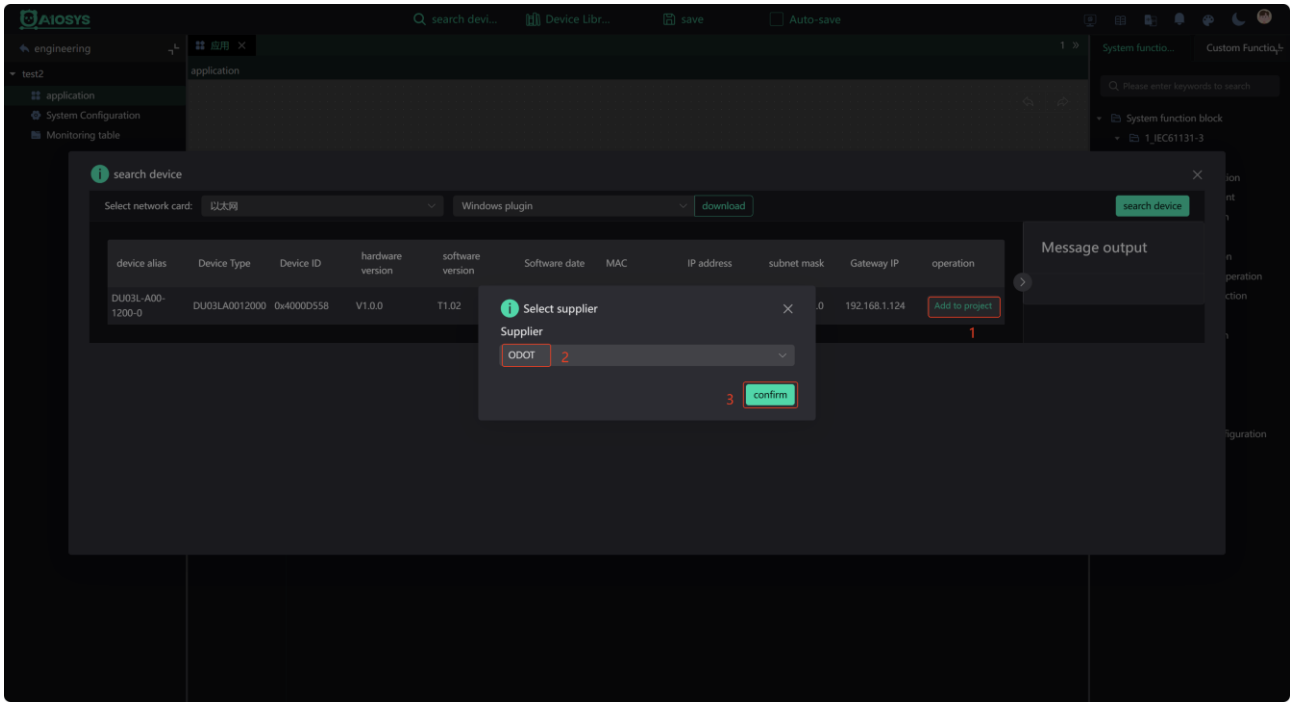
Search device for addition

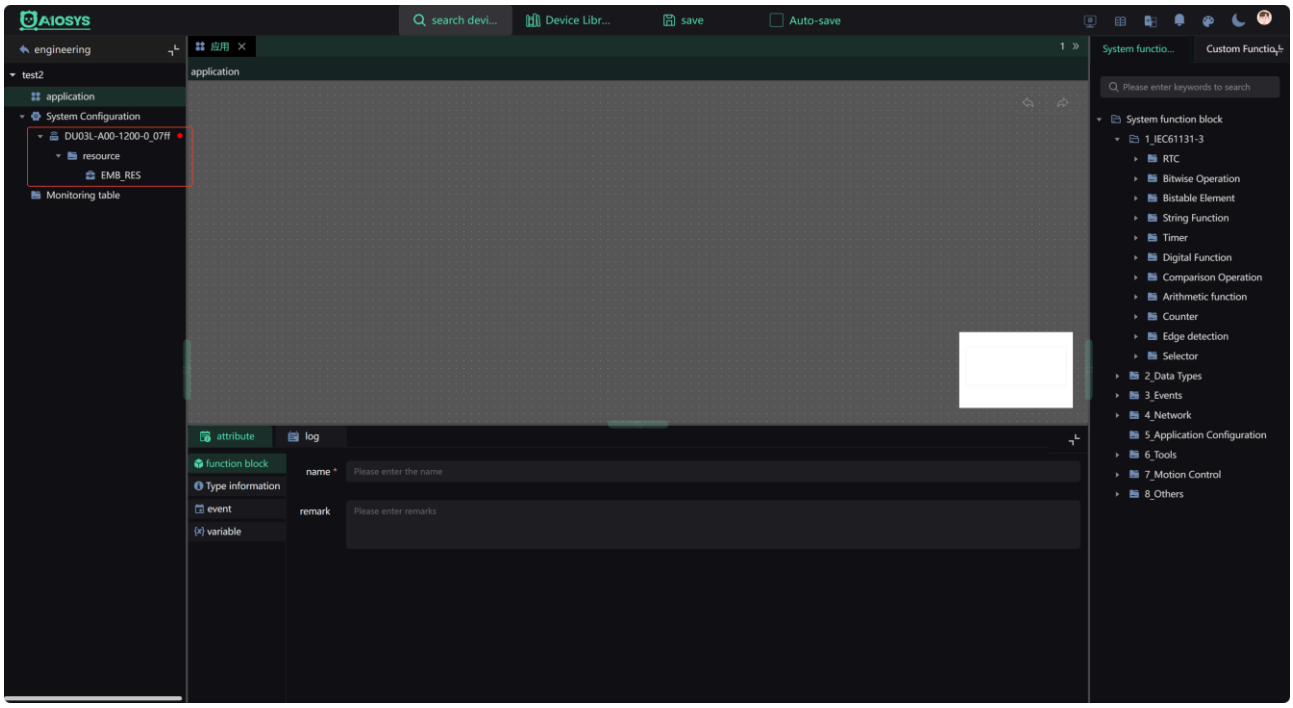
Click Search Device, select the corresponding network card, then click Search Device. Note: When

searching for devices, turn off the firewall.



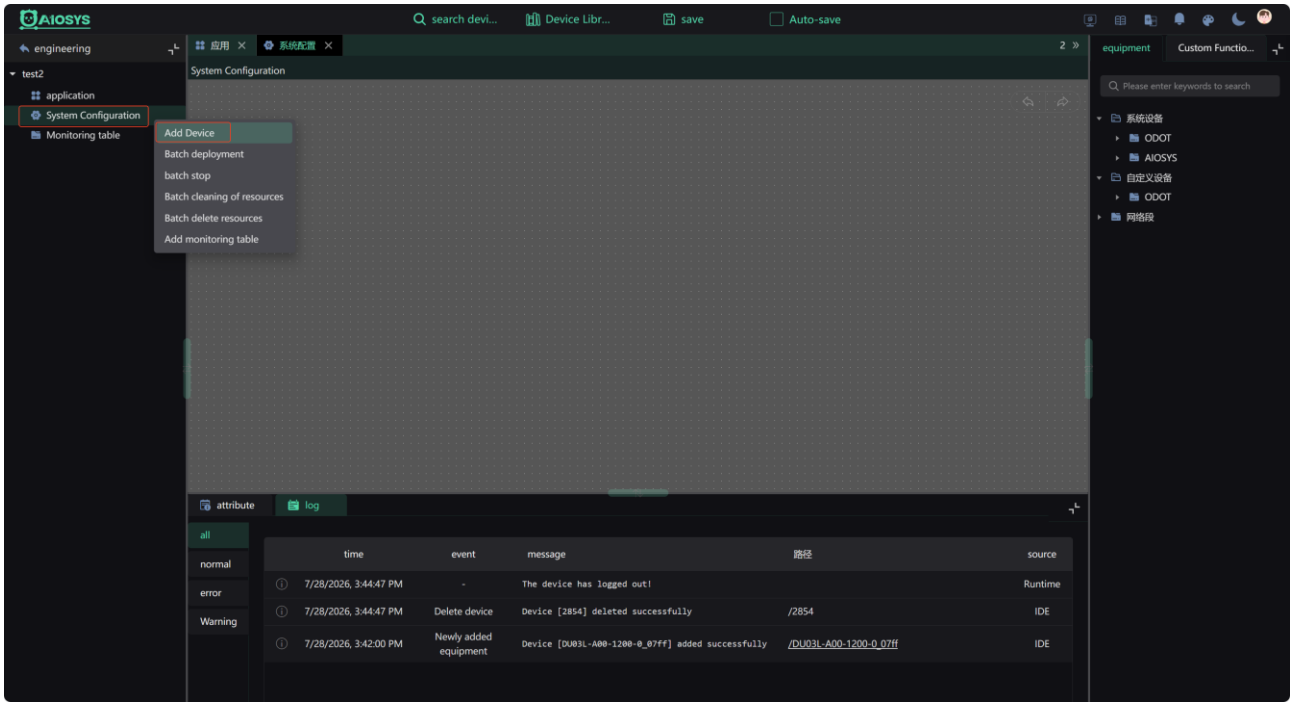
Click Add to Project to add the searched device to the project. In the pop-up "Select Supplier" window, set the supplier to "ODOT" and click confirm.



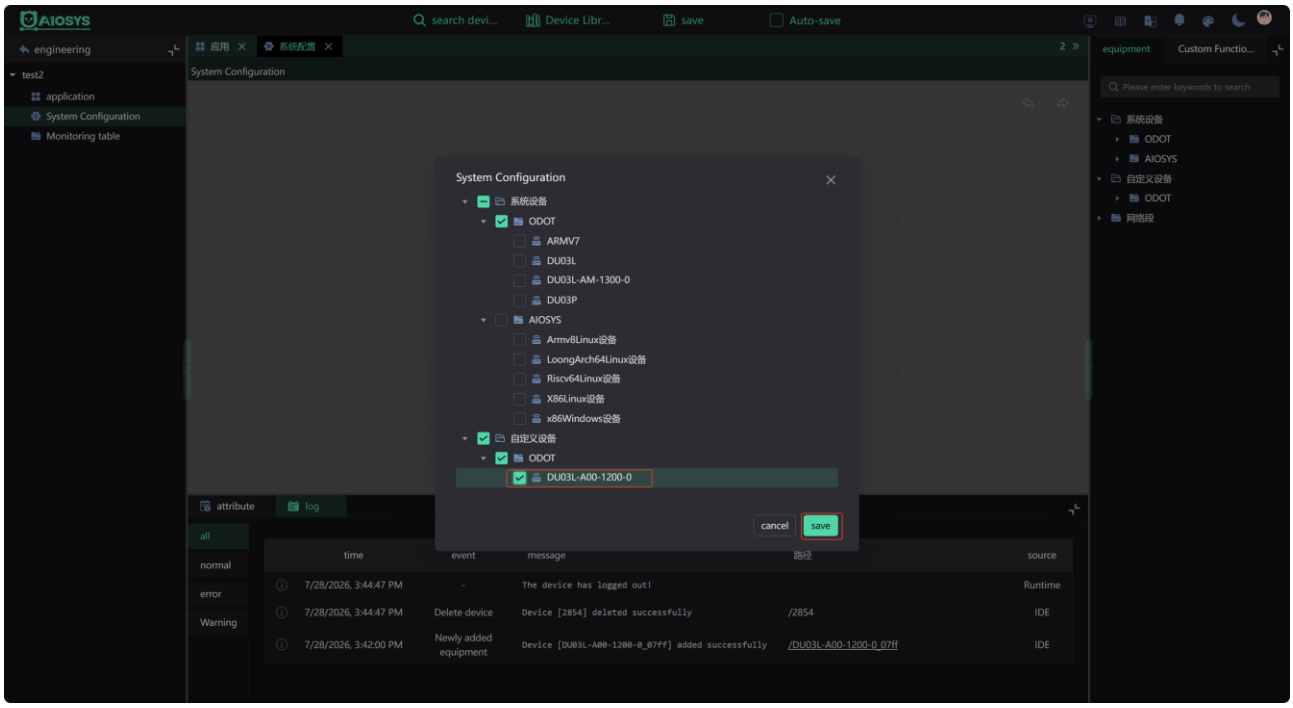


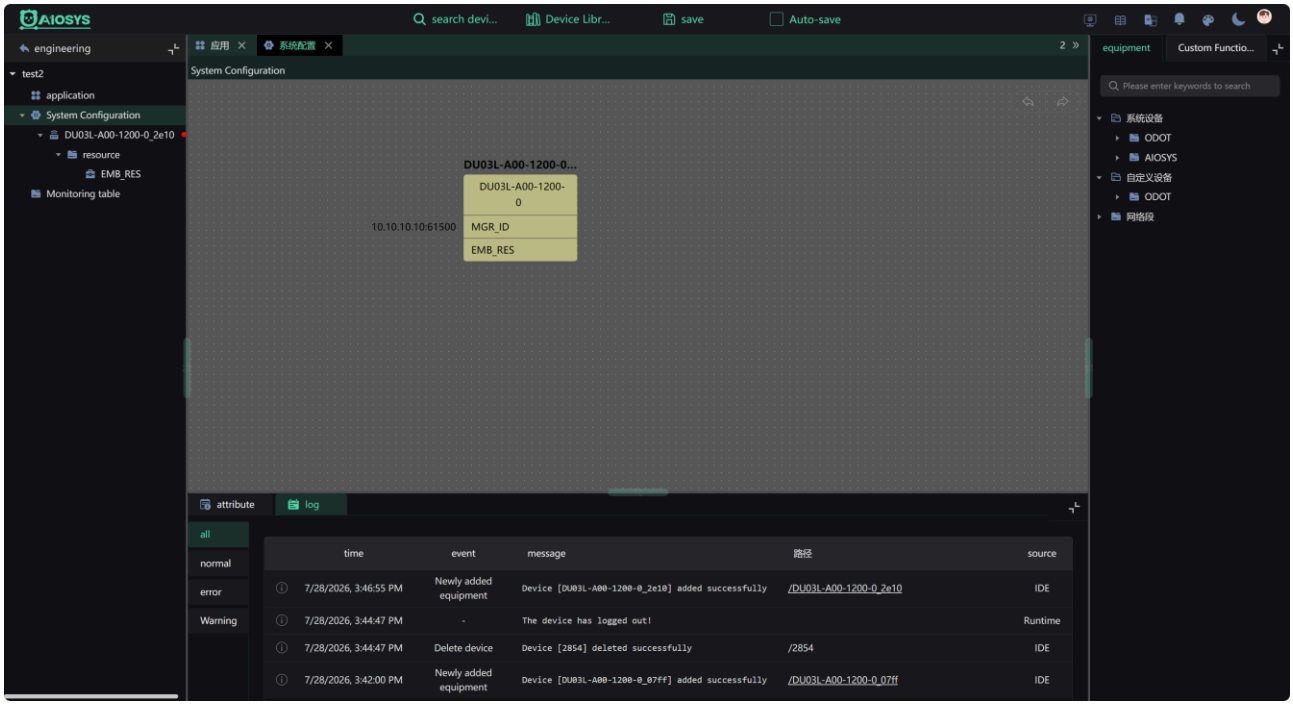
Add manually

Right-click System Configuration and select Add Device.

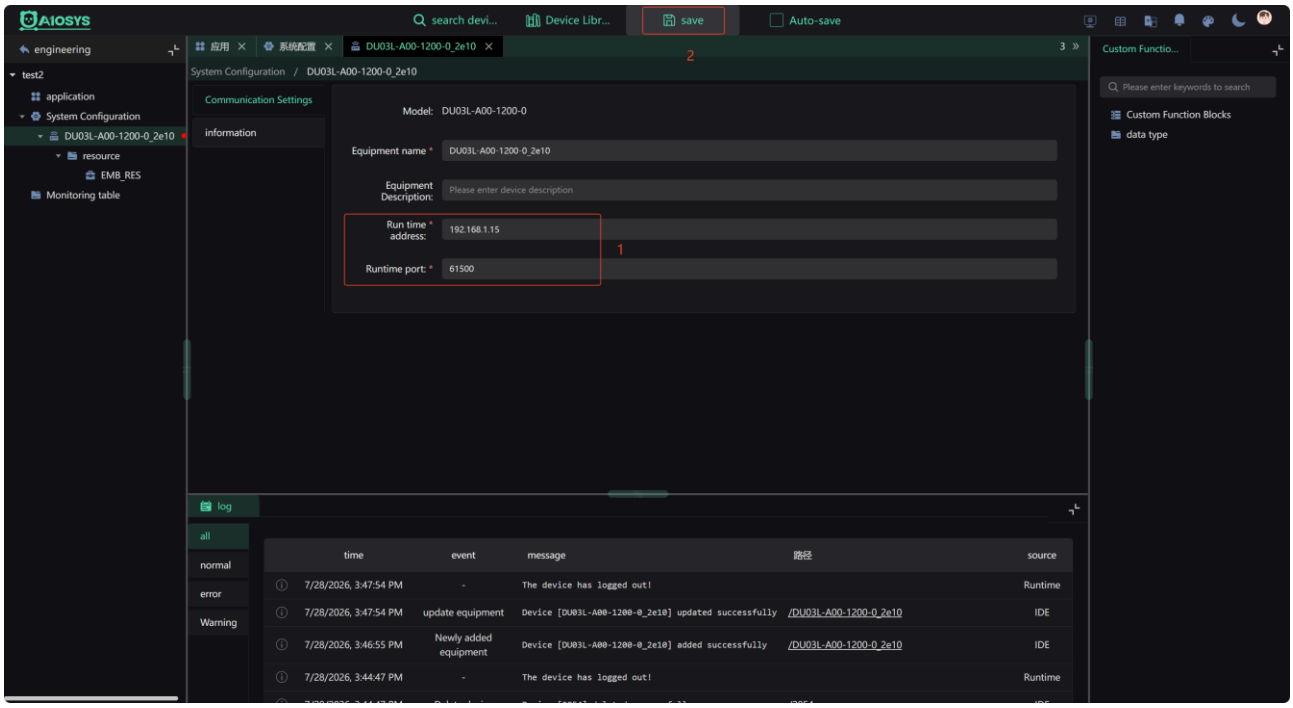


In the pop-up interface, select the DU03L-A00-1200-0 device and click Save.

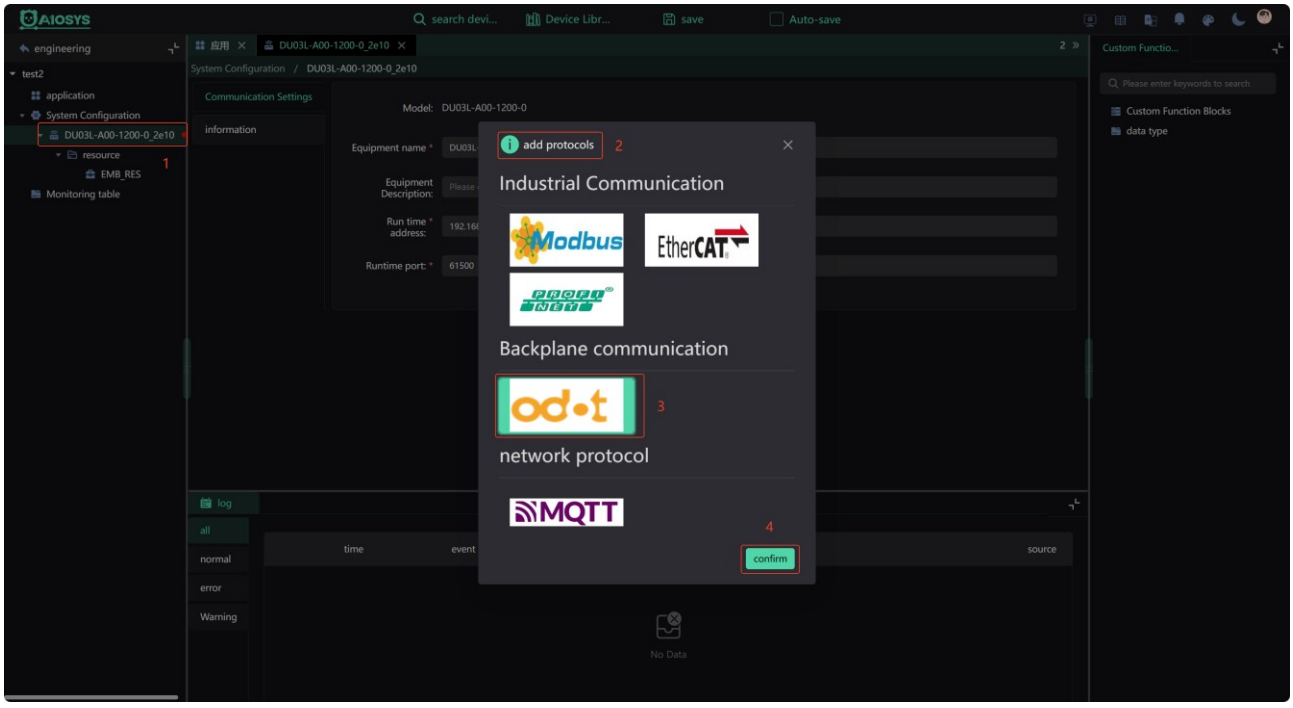




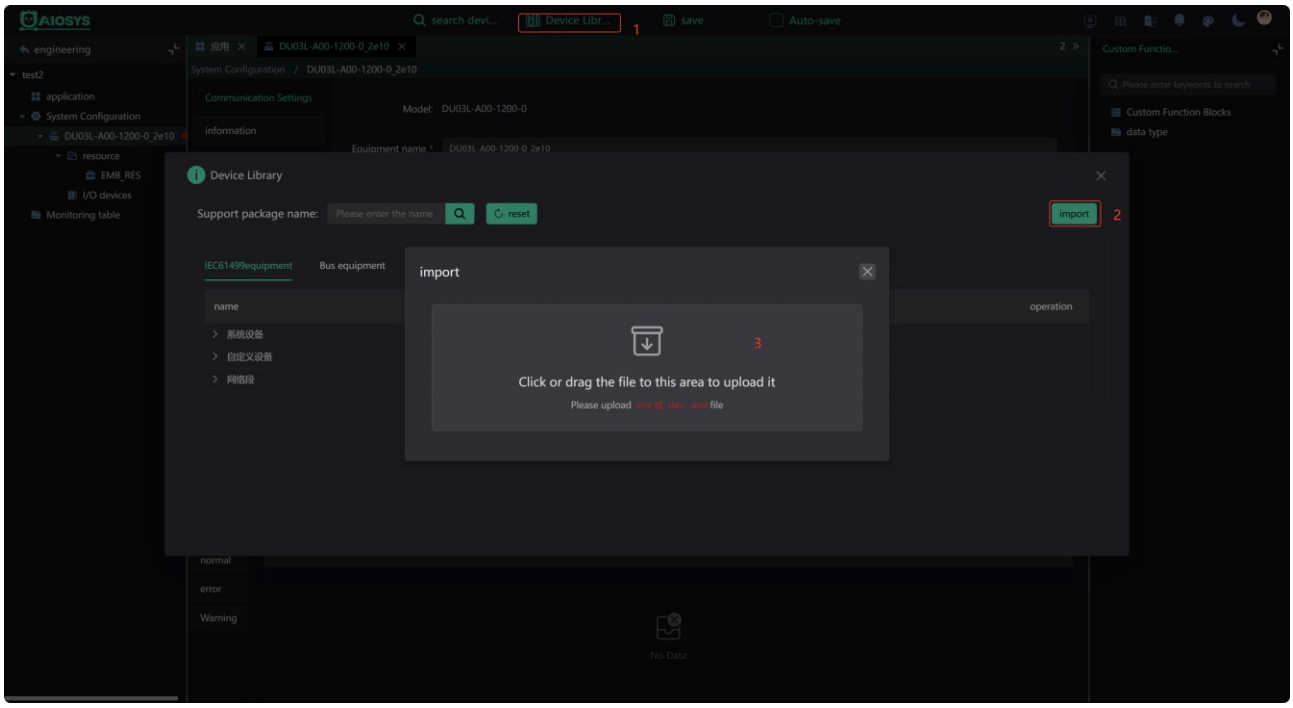
Select device DU03L-A00-1200-0, choose communication configuration, modify the device name, and set the module's runtime address and runtime port (in the example, the device's IP address is: 192.168).1.15. Runtime port is 61500), click Save.



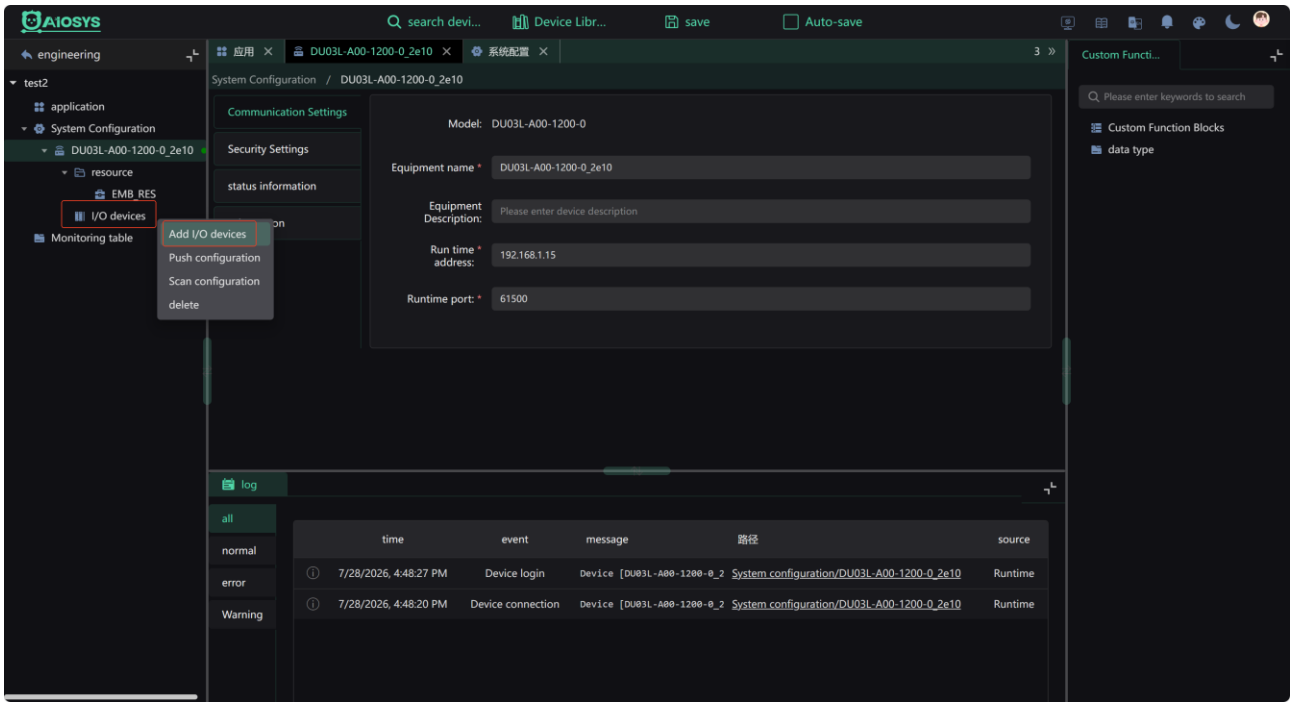
Right-click DU03L-A00-1200-0, select Add Protocol, click Add Backplane Communication "ODOT", and click confirm.

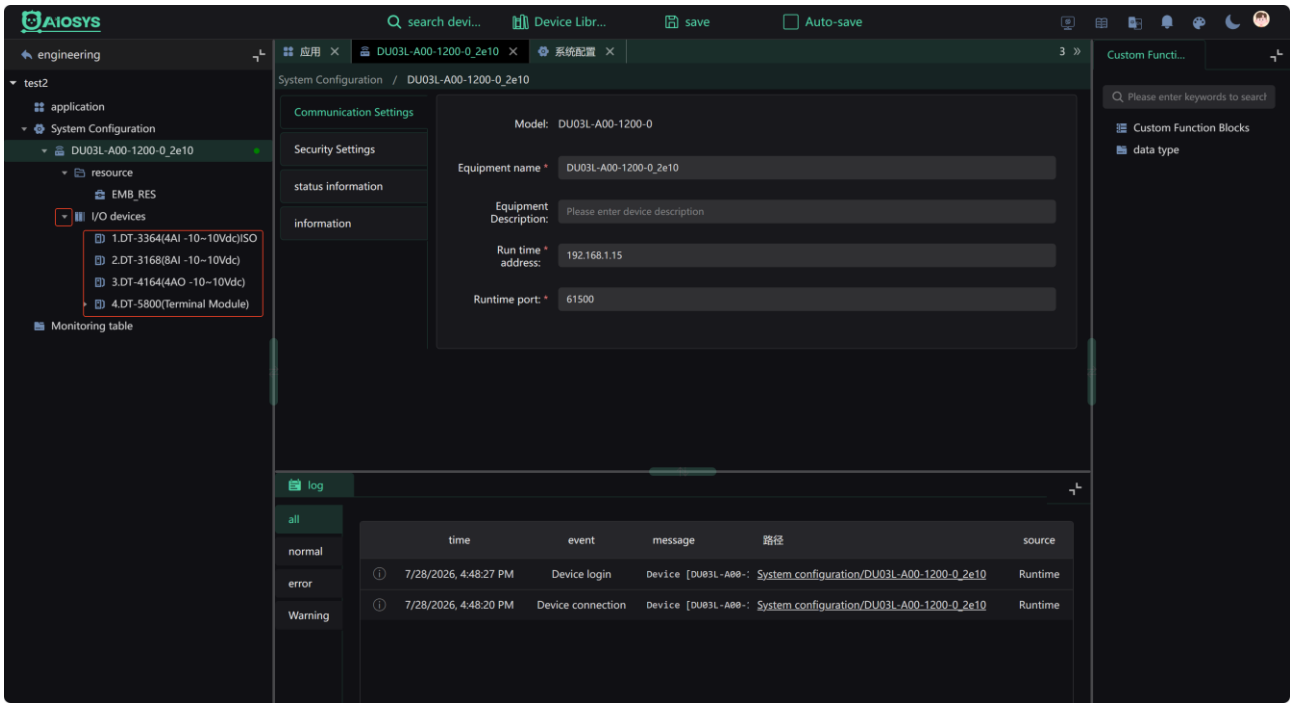


After successful addition, "I/O Devices" will appear in the project section. When using it for the first time, it needs to import the device description file for the I/O module. Click Device Library, then in the pop-up window click "Import", select the corresponding OML file, and click OK.



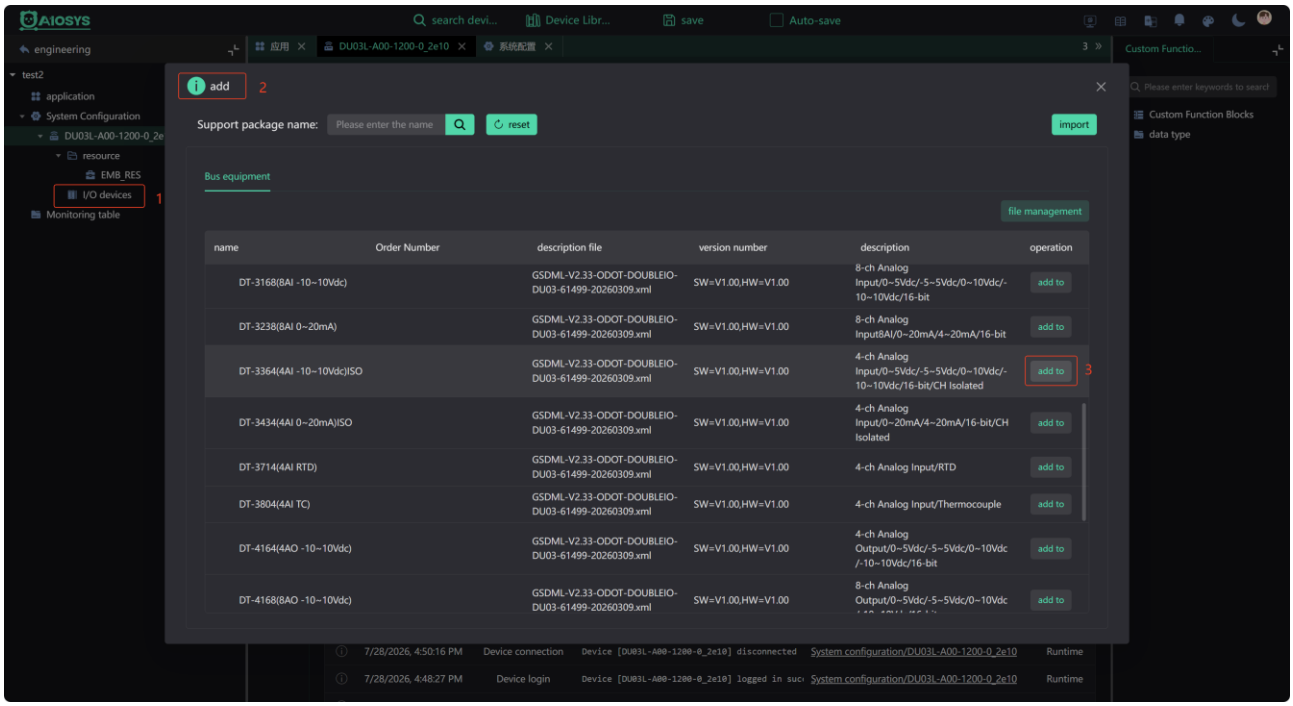
It can directly scan the I/O module at the back. First, right-click DU03L-A00-1200-0, select Device Login, and after successful login, right-click the I/O Device and select the Scan configuration. Then, unfold the small arrow in front of the I/O device, and the I/O module behind the PLC has been scanned.



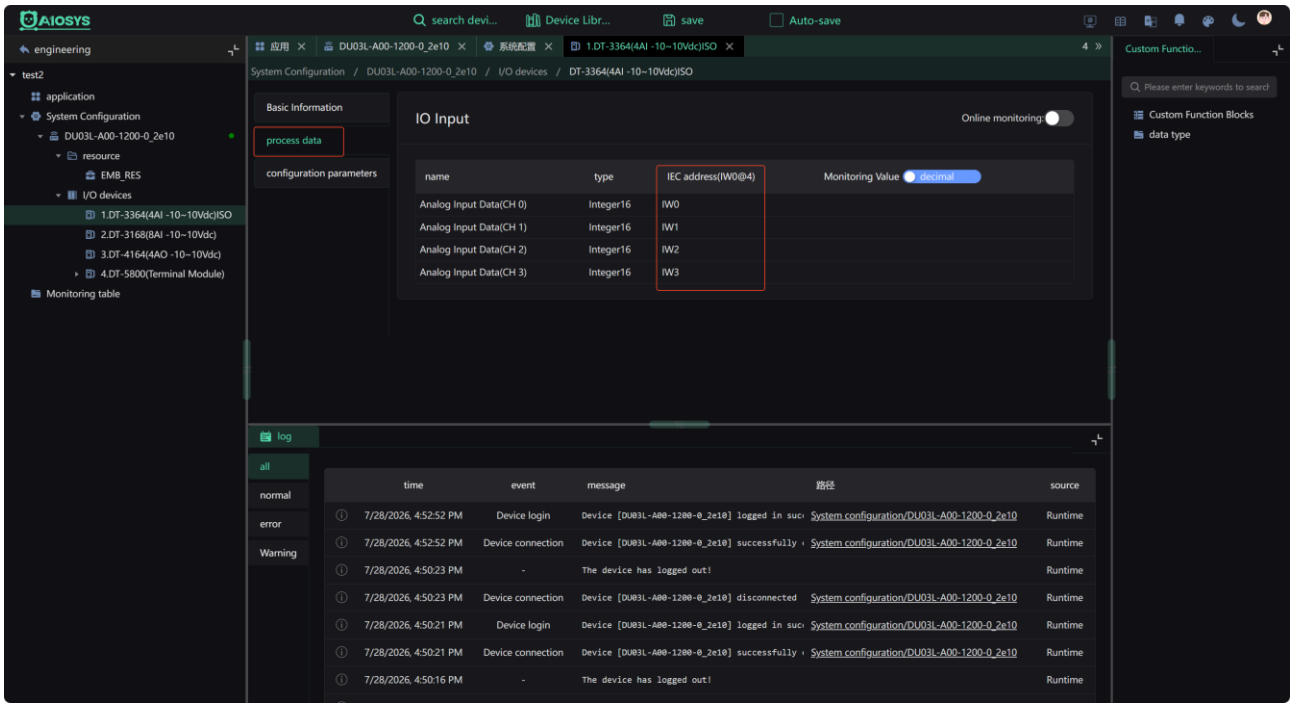


It can choose to manually add I/O modules. Right-click on the I/O device, select Add I/O Device, and in the pop-up window, add the corresponding model module. (In the example, the hardware is DU03LA00-1200-0 + DT-3364 + DT-3168 + DT-4164 + DT-5800).

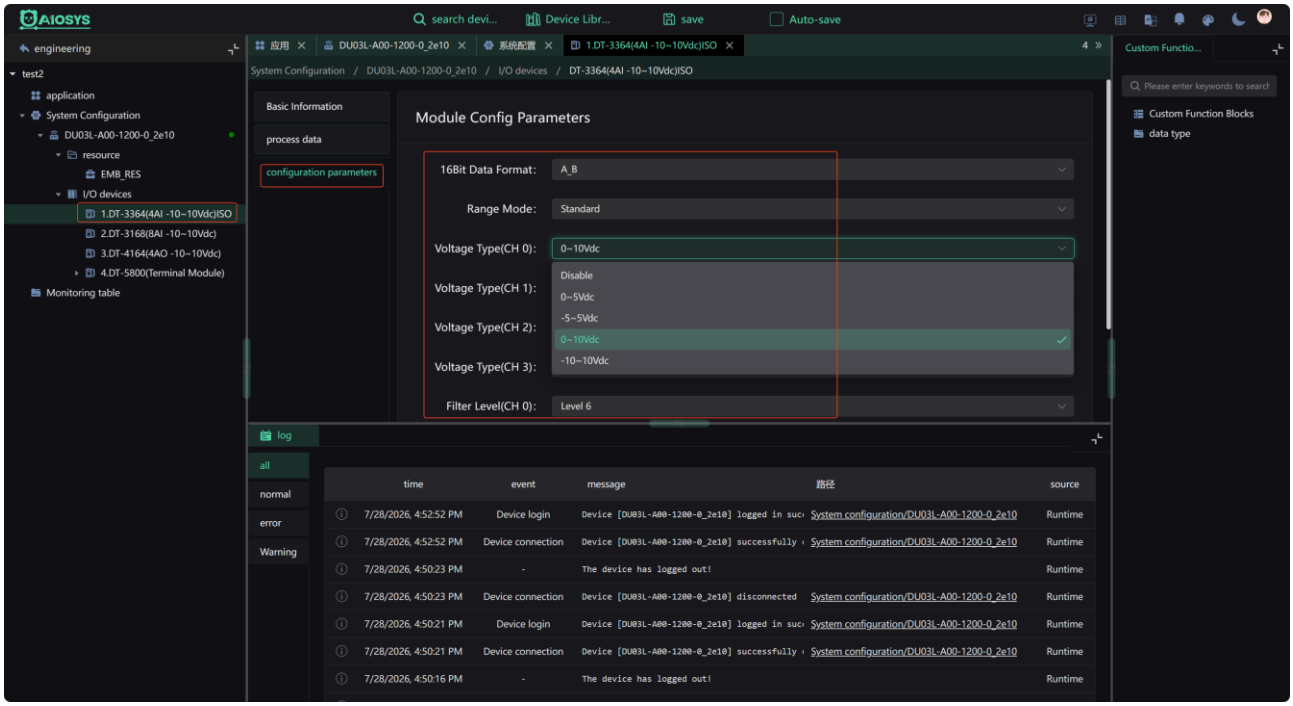
Note that the added module model must match the actual module model.



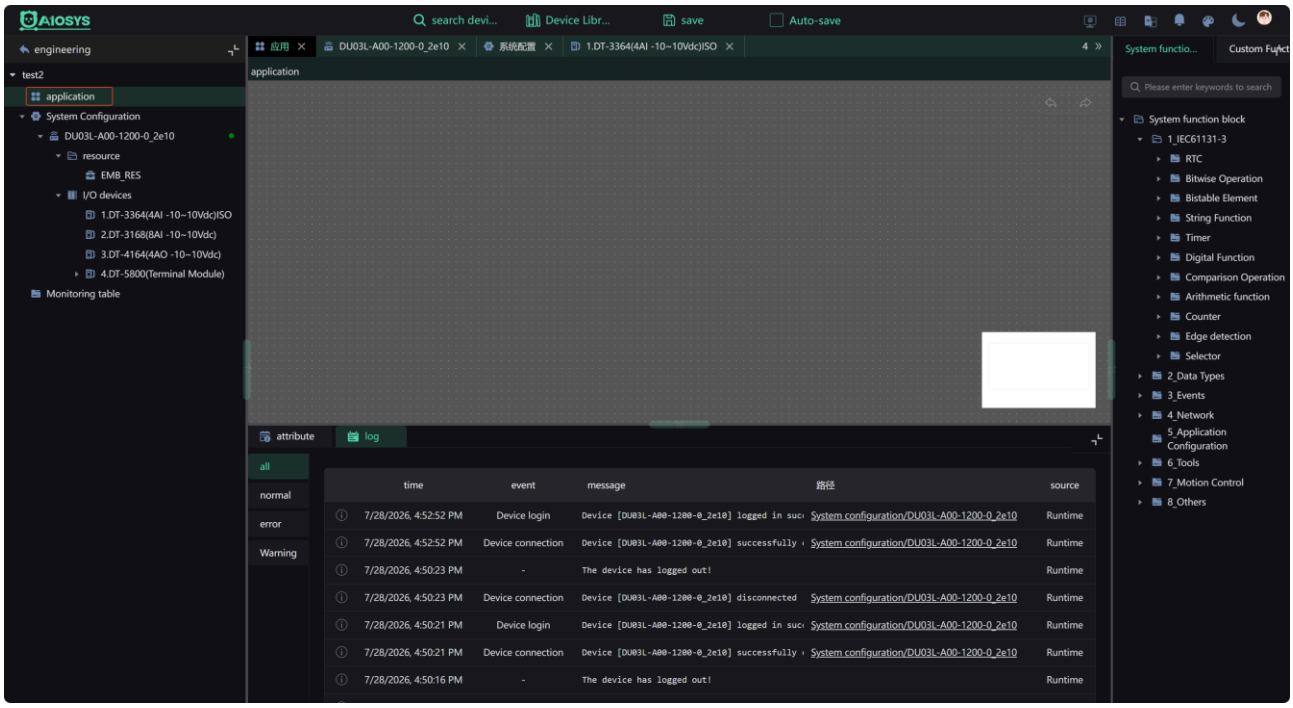
After adding modules, click the DT-3364 module, select process data, and view the assigned IEC address and online data monitoring.



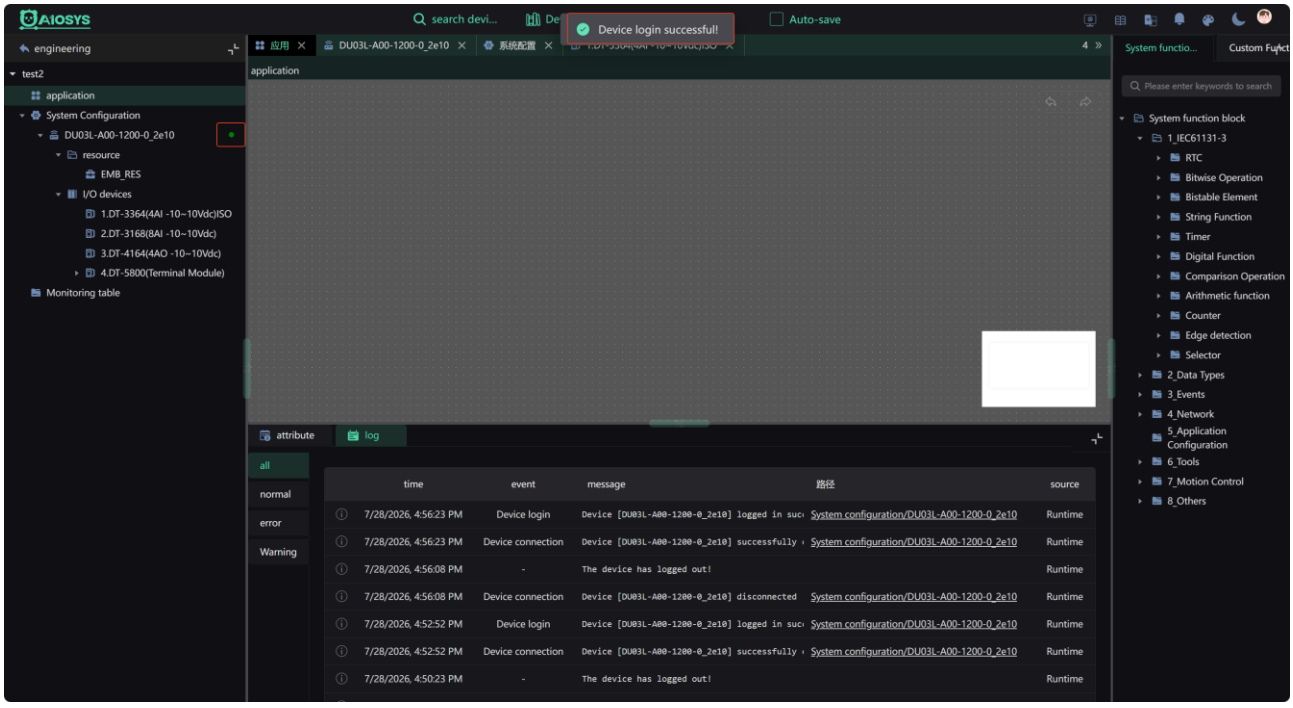
Click Configuration Parameters to modify the module's parameter settings.



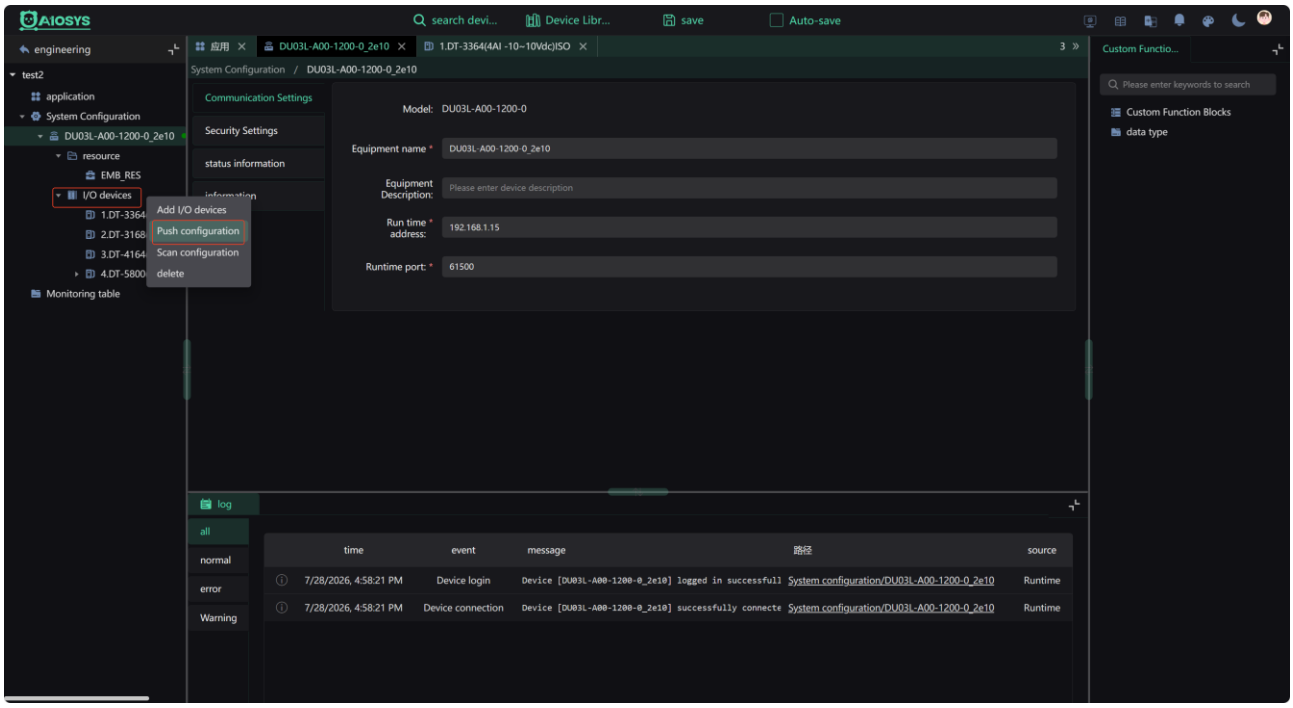
Click on the application to enter the programming interface. For detailed information, please refer to the AIOSYS User Guide: https://ide.AIOSYS.cn:19200/。



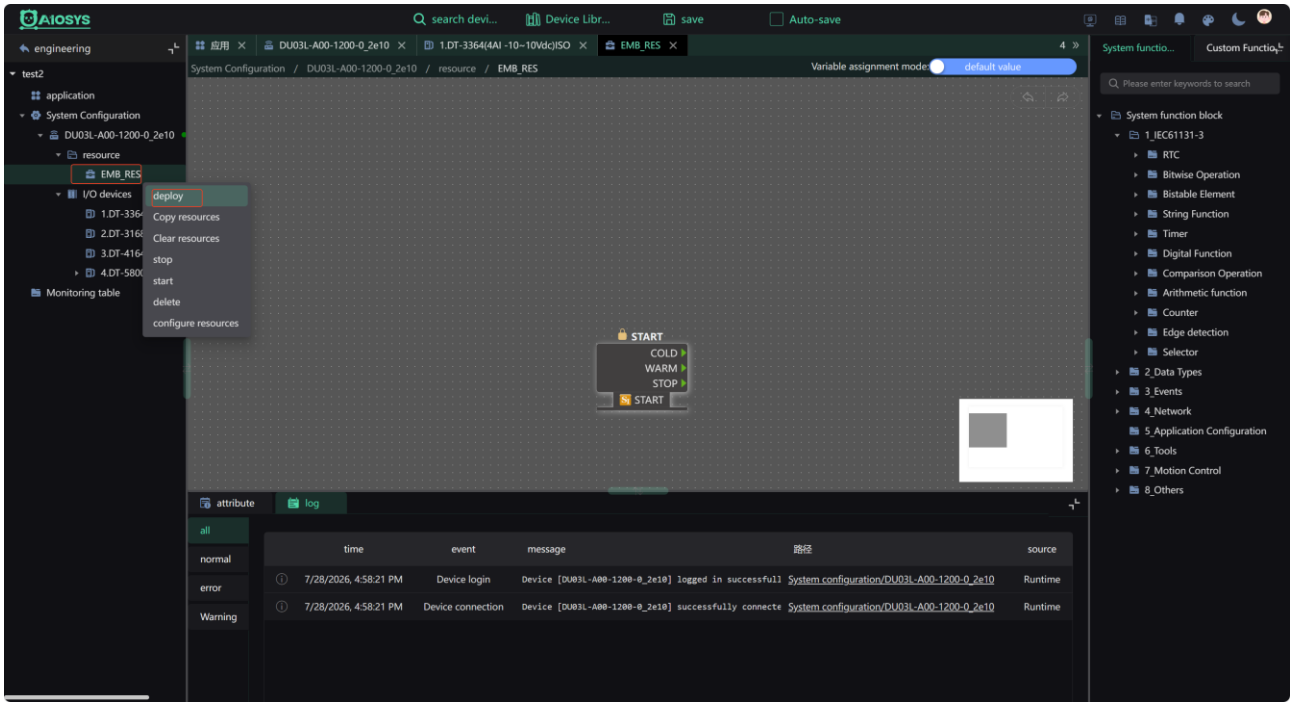
After configuring parameters, right-click DU03L-A00-1200-0 and select Device Login. Once logging in successfully, the dot next to DU03L-A00-1200-0 will turn green, and a device will be prompted to log in successfully.



After successfully logging in, right-click the I/O device and select Push Configuration.

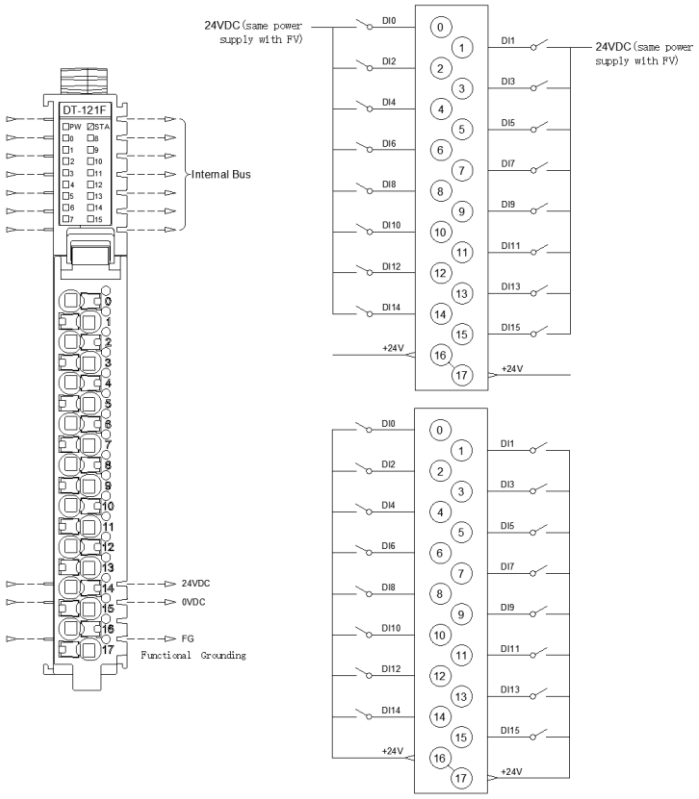


Right-click EMB_RES Resources and click Deploy.

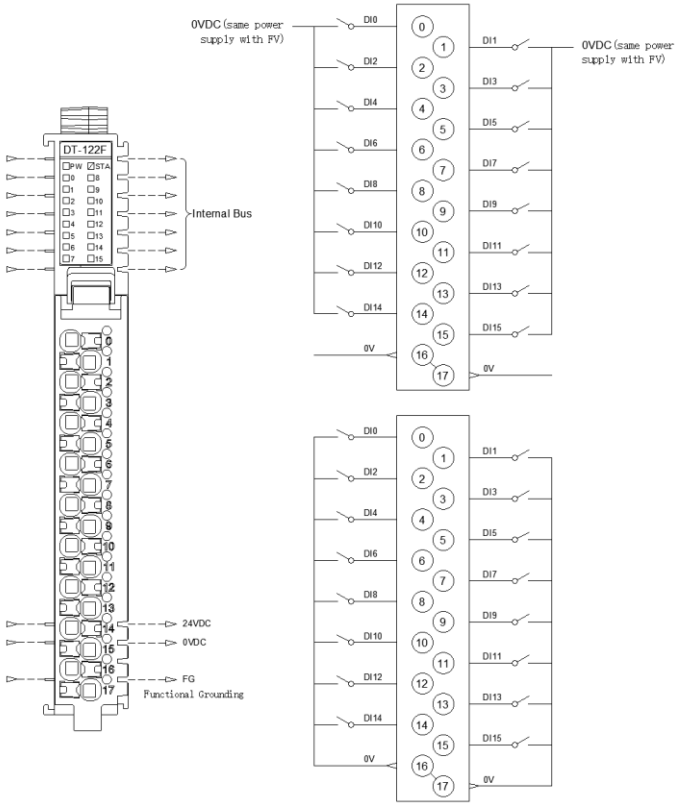


4 Appendix — I/O Module Wiring Diagram

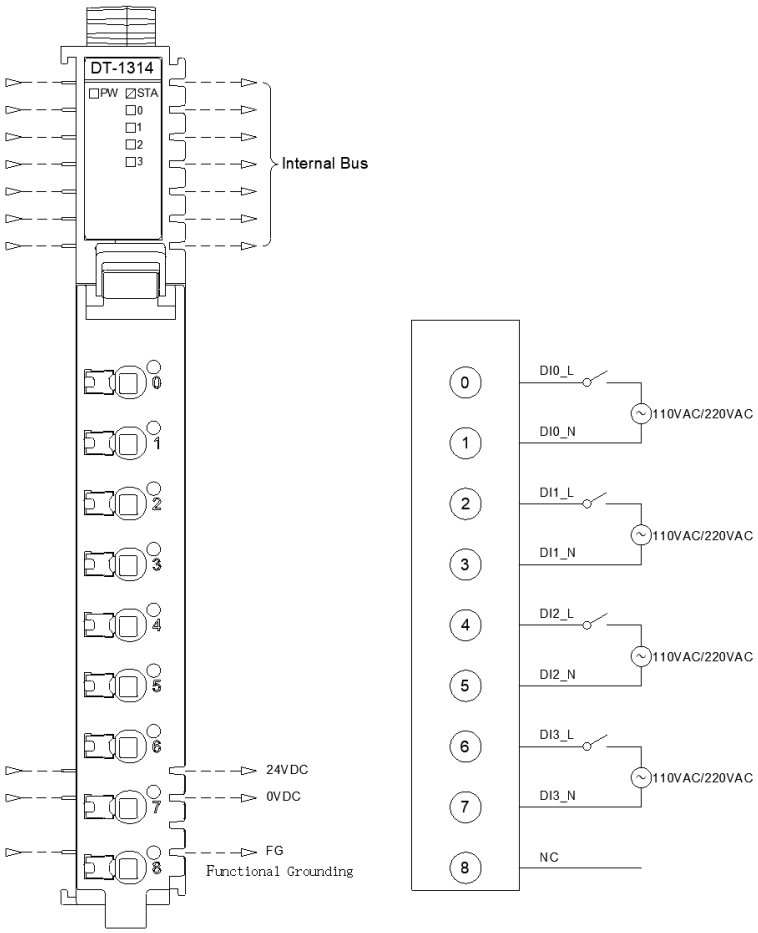
DT-121F 16 channels digital input module / PNP/ high level valid



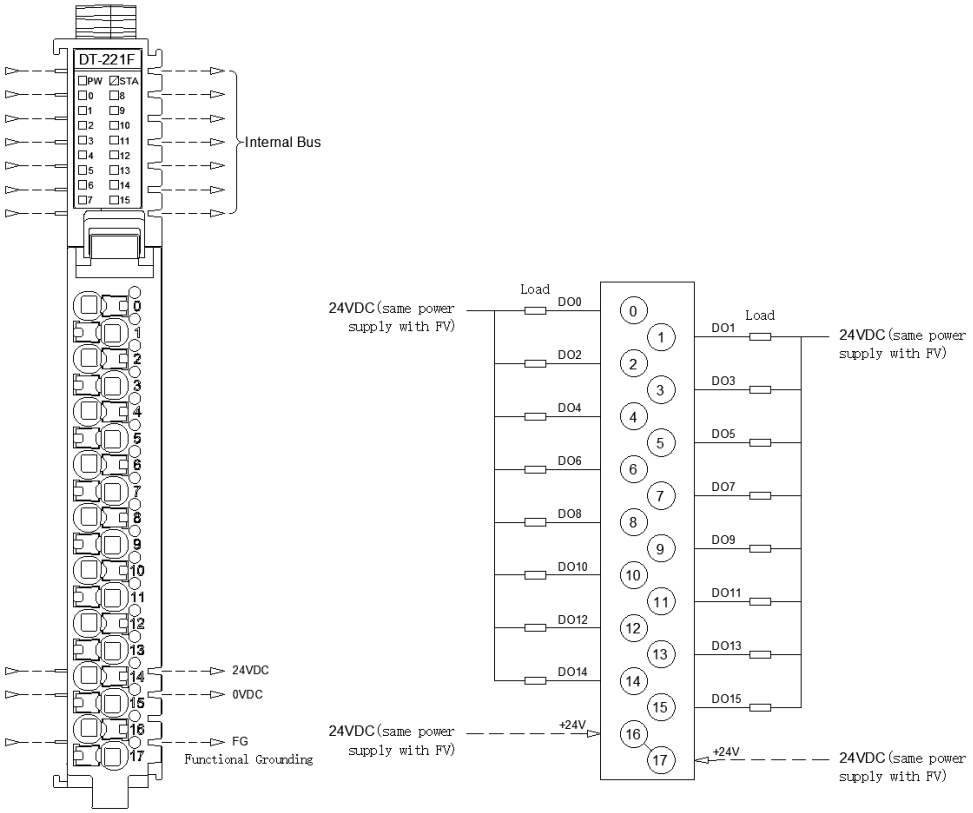
DT-122F 16 channels digital input module / NPN/ low level valid



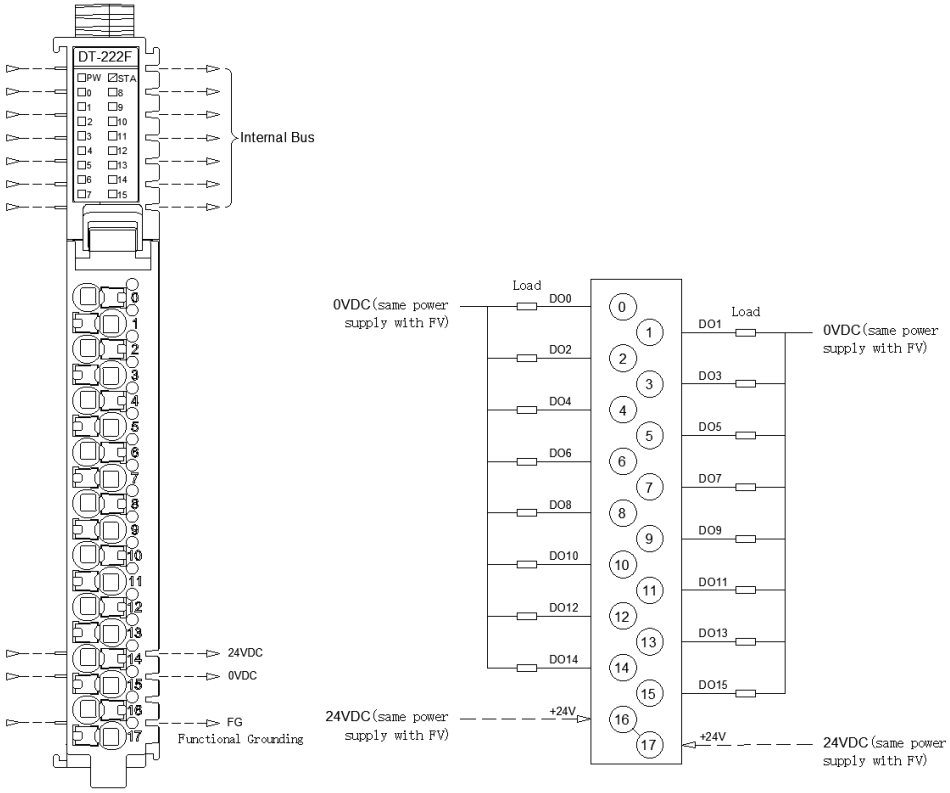
DT-1314 4 channels digital input module 110V AC/ 220V AC



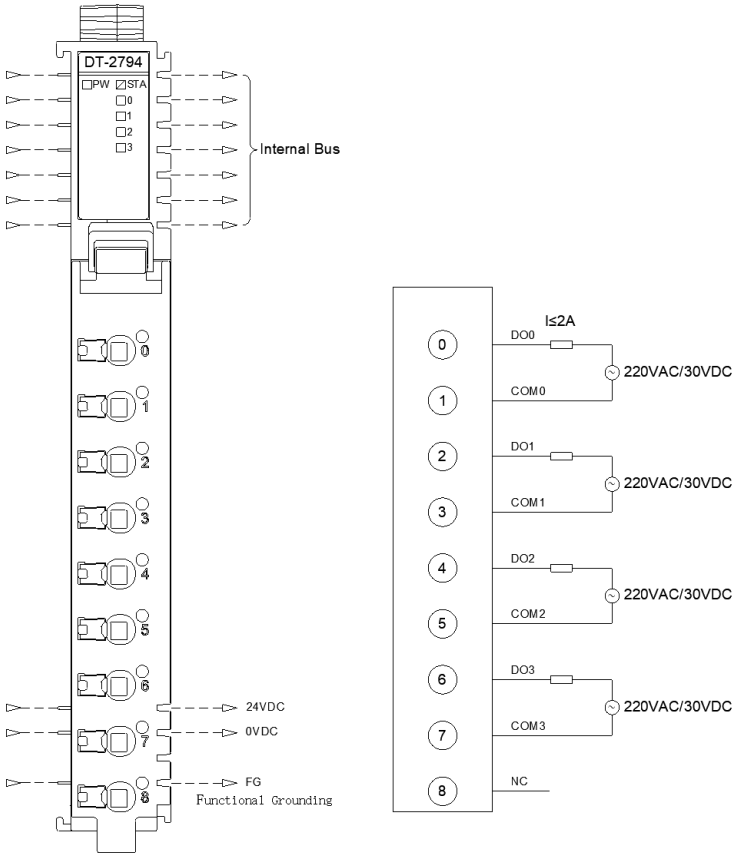
DT-221F 16 channels digital output module / NPN/ low level valid



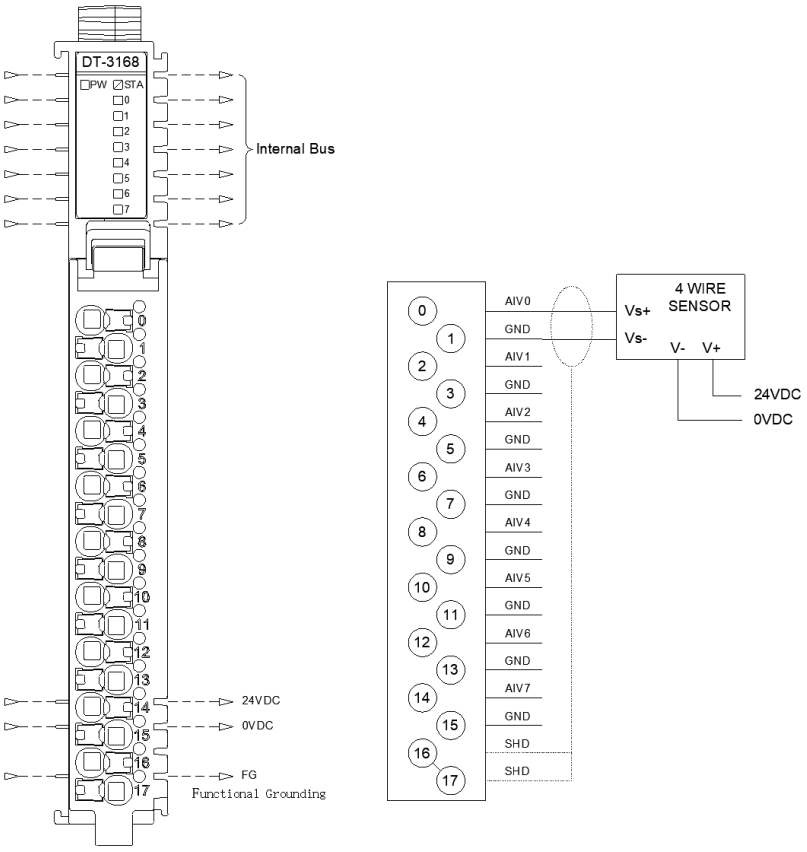
DT-222F 16 channels digital output module/ PNP/ high level valid



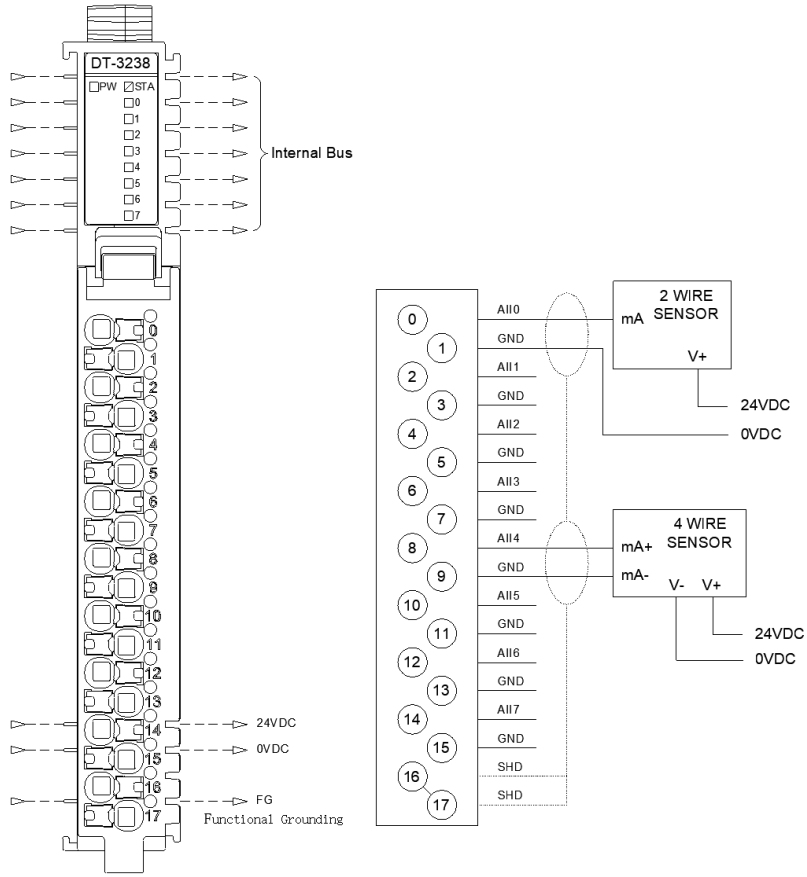
DT-2794 4 channels relay output module 2A@250V AC/30V DC (Resistive load), 1A@250VAC/30VDC (Inductive load)



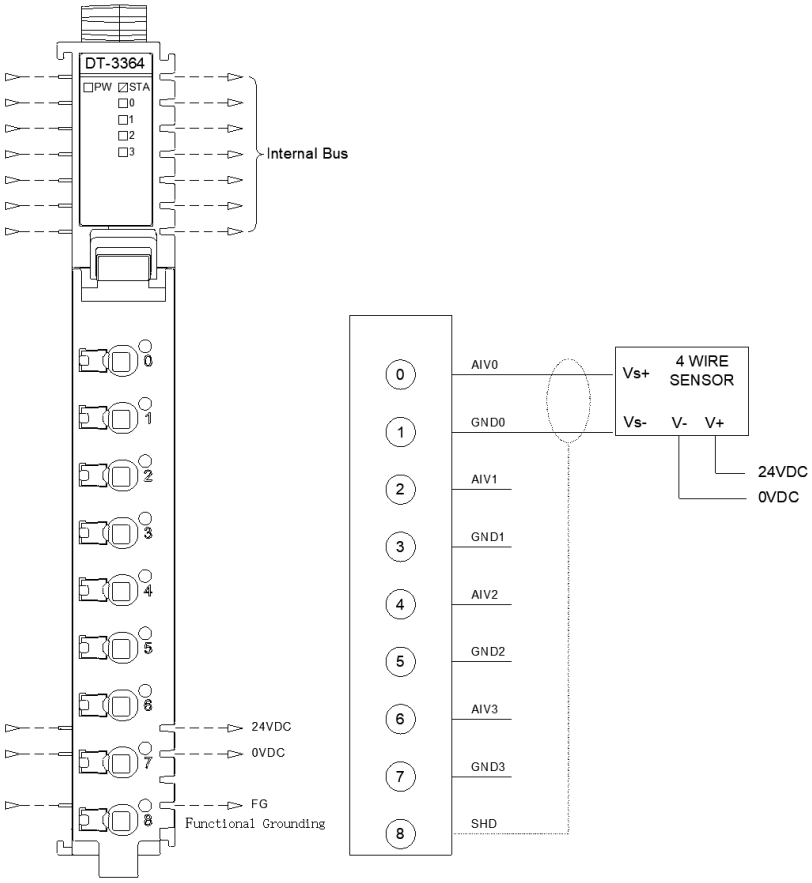
DT-3168 8 channels voltage input module 0~5V DC/0~10V DC/±5V DC/±10V DC, 16 bits



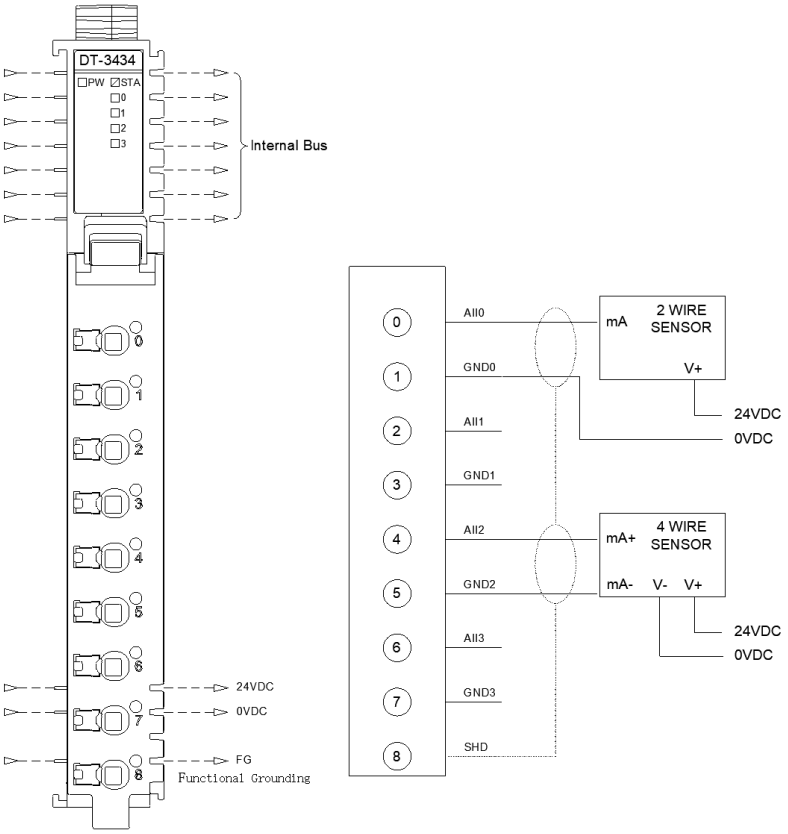
DT-3238 8 channels current input module 0&4-20mA, 16 bits



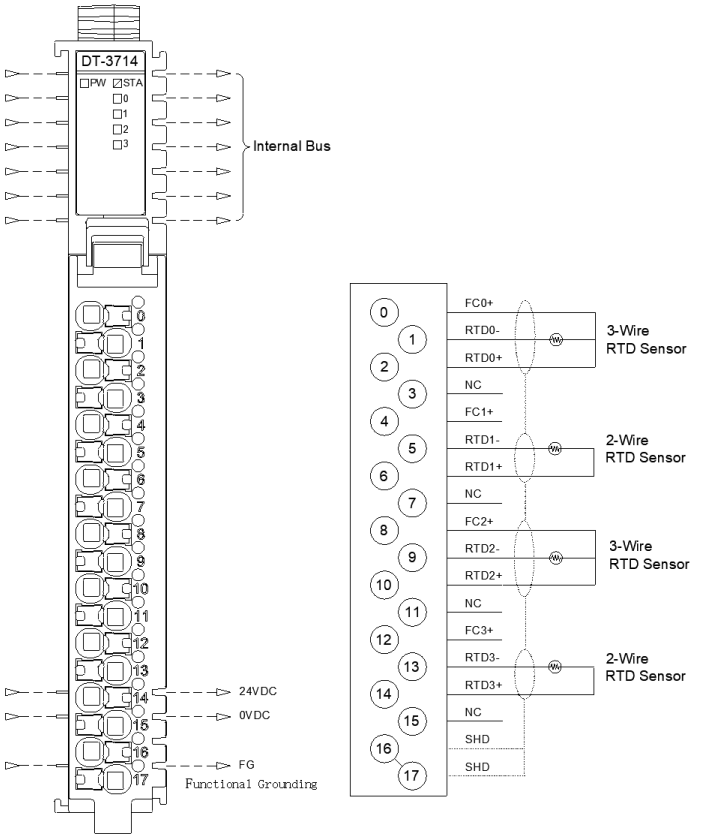
DT-3364　4 channels voltage input module 0~5V DC/ 0~10V DC/ ±5V DC/ ±10V DC, 16 bits



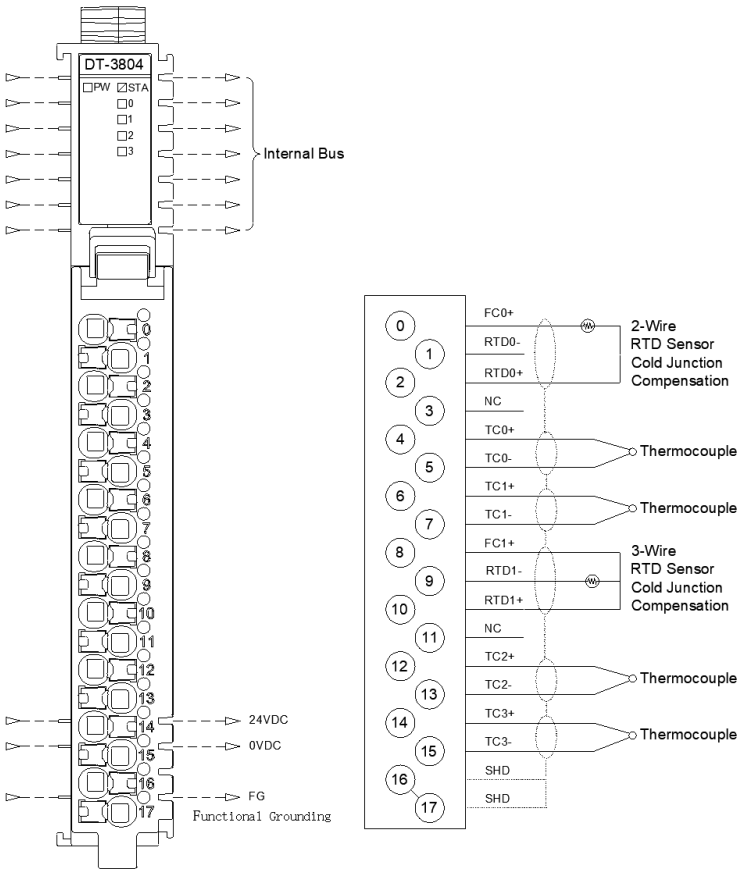
DT-3434　4 channels current input module 0& 4~20mA, 16 bits



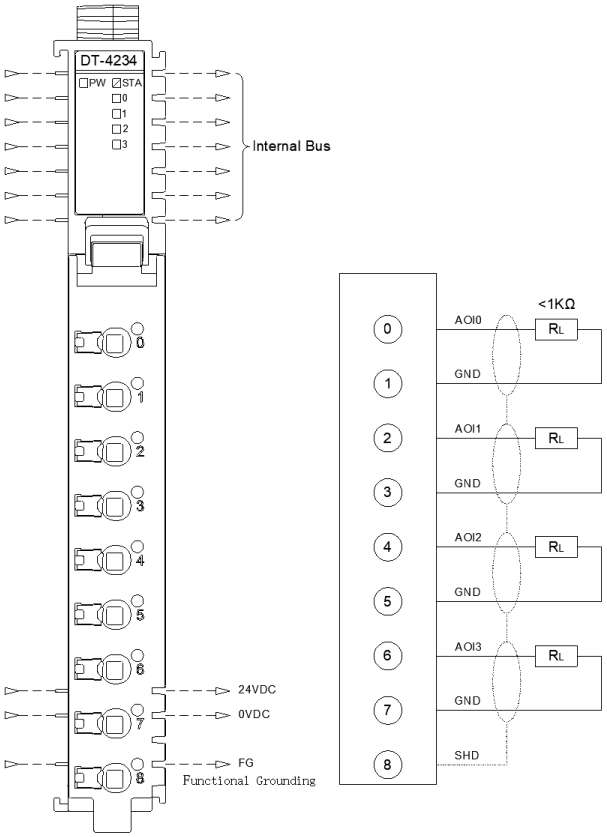
DT-3714 4 channels thermal resistance input module RTD-PT100



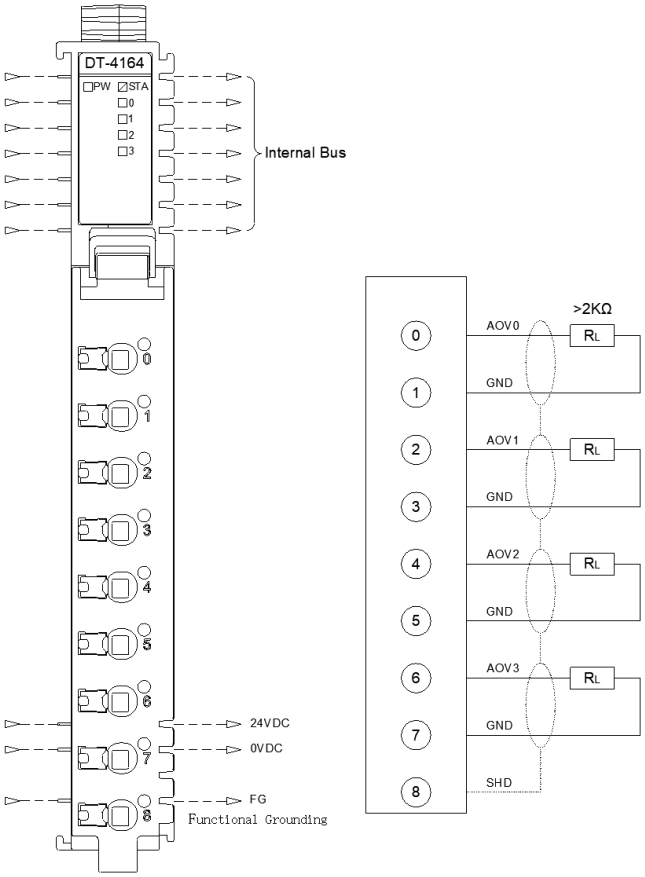
DT-3804 4 channels thermocouple input module TC-J / K/ E / T / S / R / B / N type



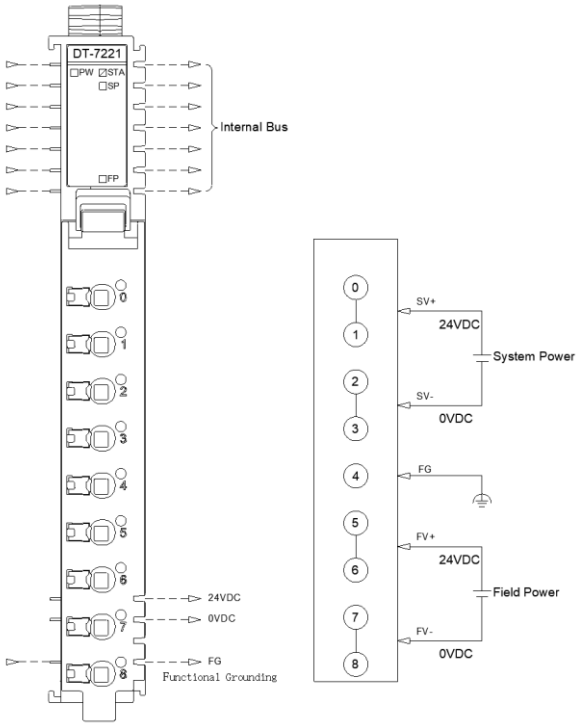
DT-4234 4 channels voltage output module 0~5V DC/0~10V DC/±5V DC/±10V DC, 16 bits



DT-4164 4 channels current output module 0&4-20mA, 16 bits



DT-7221 Power expansion module SV: 2A @5V DC /FV: 8A @24V DC



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