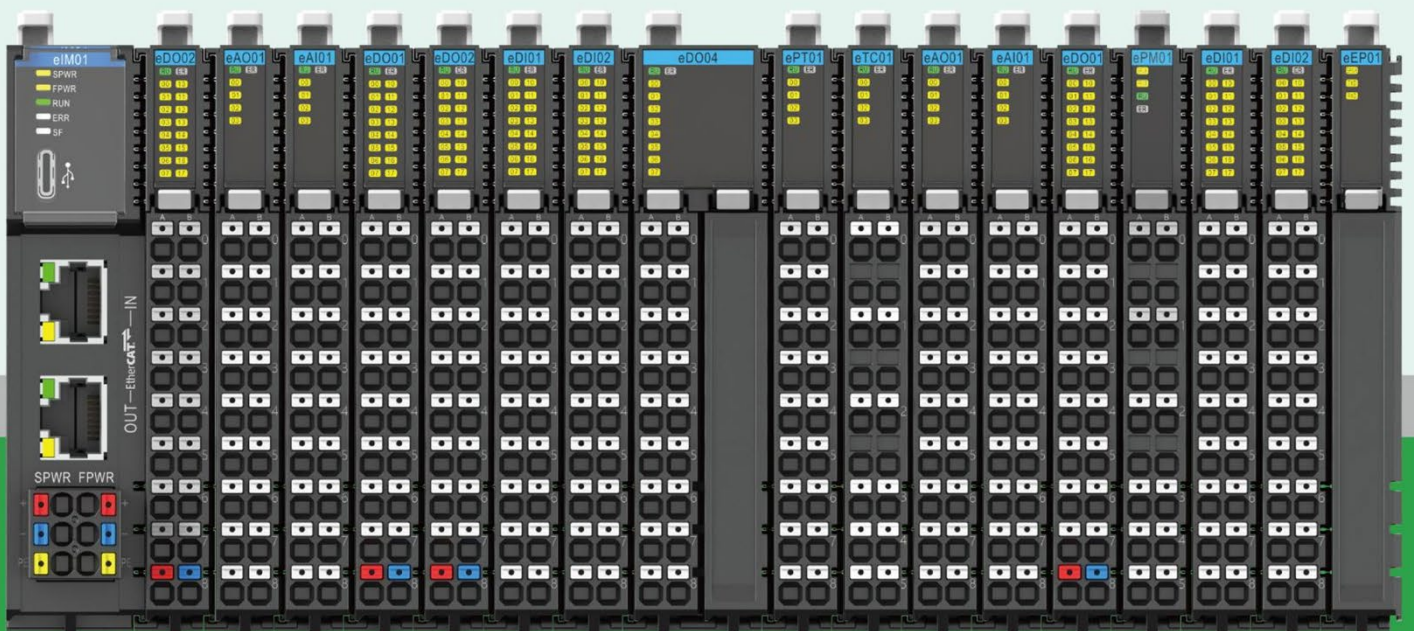


LT-e series

Distributed I/O

Module Manual



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Chapter 1 Preface

Document Overview

This document primarily introduces the LT-e series distributed I/O modules and related knowledge, including module dimension diagrams, wiring diagrams, parameter specifications, and other information.

Intended Audience

This manual is intended for engineers with expertise in automation and control systems, or related technical professionals.

Usage Statement

- The content of this manual has been tested according to regulations, and the diagrams correspond to the described software and hardware products. However, errors are inevitable, and complete consistency cannot be guaranteed. If you have any suggestions for improving or correcting the content of this manual, please inform us promptly, and we will make corrections in the next version.
- Due to product iteration and updates, relevant parameters and information in this manual are subject to change. If you have any questions, please consult technical support.
- As the equipment described in this manual can be used in various ways, the user and the person responsible for the equipment usage must ensure the permissibility of each method. HollySys will not bear legal responsibility for any direct or indirect losses caused by the use or misuse of this equipment.
- Due to uncertain factors in practical applications, HollySys does not assume responsibility for directly using the data provided in this manual.

Safety Declaration

- Before using this product, please read and comply with these safety precautions.
- To ensure personal and equipment safety, strictly adhere to the identification information on the product and the safety precautions in the manual when using this product.
- The "Note", "Caution", "Warning", and "Danger" items in the manual do not represent all safety precautions to be followed but serve as supplements to all safety considerations.
- This product must be used in environments that meet the design specifications; otherwise, malfunctions may occur. Damage caused by failure to follow relevant regulations is not covered under the product warranty.
- HollySys Co., Ltd. shall not be responsible for any personal safety accidents or property losses caused by any operation not performed in accordance with this manual's specifications or by unqualified personnel.

Symbols and Conventions

For your personal safety and to avoid property damage, pay attention to the warning prompts in this manual. The following warning prompts are indicated in descending order of hazard level. When multiple hazard levels exist, only the highest level is prompted. If the highest level is a warning leading to personal injury, there may also be warnings leading to property loss.

Symbol	Meaning
	Danger. Indicates that improper operation may cause major accidents resulting in equipment damage or personal injury or death.

	Warning. Indicates that improper operation may cause equipment failure, electric shock, or personal injury accidents.
	Caution. Indicates content that requires special attention during operation.
	Note. Indicates supplementary explanatory content.

Revision History

Date	Version	Description
2026.04.30	V1.2	• Added LT-eEP02, LT-eIO01, LT-eIO02, LT-eIO11, LT-eIO12. • Updated the "Expansion Module Quantity", "Version Compatibility", and "Hardware Material Codes" chapters, supplementing the newly added modules. • Updated the "Serial Port" Chapter of LT-eCM01 and modify the pin numbers. • Updated the "Communication Interface and Wiring Diagram" chapters of LT-eIM02 and LT-eIM03, added the default IP address for the network port.
2026.03.30	V1.1	• Updated the "Naming Convention" chapter, supplementing the explanation of the conformal coating identifier. • Updated the "Cable Requirements" chapter, optimizing the wire gauge description. • Updated the "Firmware Upgrade" chapter, adding steps for performing "Clear IO Configuration" before upgrading the coupler firmware. • Update the "Communication Interface and Wiring Diagram" chapter of the LT-eIM03 module, and supplement with different meanings of the Ethernet port indicator lights under different versions.
2025.12.30	V1.0	First official release.

Chapter 2 Related Manuals

All manuals related to the LT-e distributed I/O series products are shown in the table below.

Manual Name	Description
LT-e Series Distributed I/O Module Manual	Primarily introduces hardware-related content of the LT-e distributed I/O series products, including: module dimensions, specification parameters, terminal wiring, and installation, etc.
LT Intelligent Tool Usage Guide	Primarily introduces the usage methods of the LT Intelligent Tool software.

Chapter 3 LT-e Distributed I/O Overview

The LT-e series is a new generation of blade-type distributed I/O modules launched by HollySys, featuring small size, high integration, and a wide range of module types, which can meet the usage needs of different application scenarios. In addition to supporting HollySys PLCs, the LT-e series distributed I/O modules can also be adapted for use with common PLCs on the market.

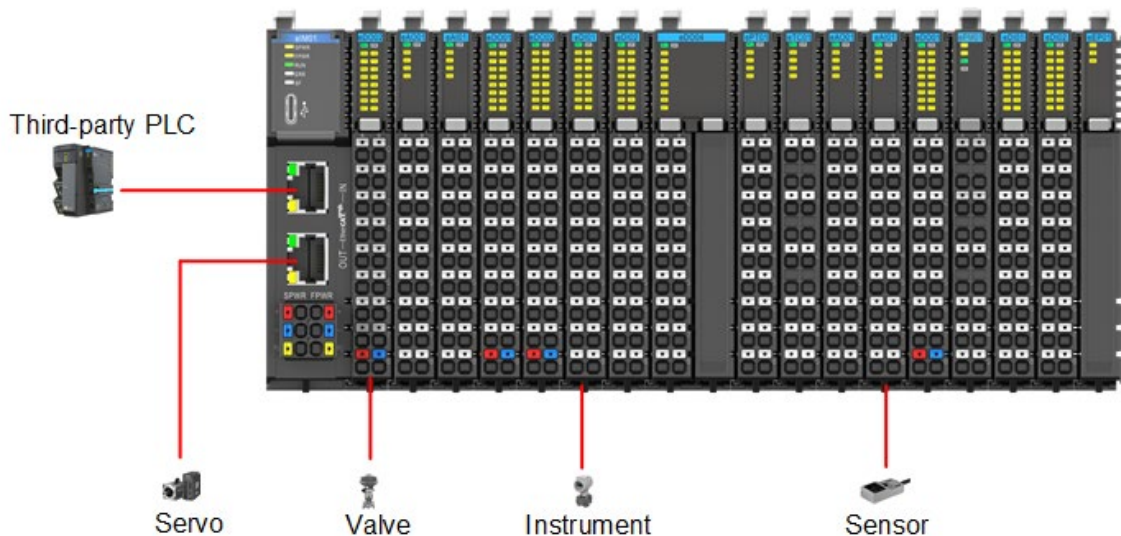
This series of I/O modules has a rich variety, including bus coupler modules, communication modules, digital I/O modules, analog I/O modules, etc. (for detailed types and models, refer to the 'Device Details' chapter). This manual mainly introduces the basic information, specifications, and parameters of the LT-e series distributed I/O modules.

LT Intelligent Tool

LT Intelligent Tool is the configuration software supporting HollySys LT-e distributed I/O series products. It is a software configuration platform used for hardware configuration, parameter setting, firmware upgrade, and data monitoring. For detailed introduction and usage guidance of this software, please refer to the 'LT Intelligent Tool Usage Guide'.

LT-e System Typical Structure

The typical structure of the LT-e series distributed I/O is shown in the figure below. It connects to the controller through coupler and I/O module, has modular characteristics, supports DIN rail mounting, and the installation cabinets and chassis can be flexibly planned by users according to application requirements, supporting distributed arrangement in multiple cabinets.



3.1 Technical Features

- DIN rail mounting, compact and aesthetically pleasing design with 12mm blade-style form factor saves 63% of electrical cabinet space, reducing control cabinet procurement costs.
- Utilizes embedded self-locking terminals with Push-In tool-free wiring, saving 20% of installation time.
- Two-section module design with detachable terminals allows module replacement without disconnecting wiring, saving 50% of maintenance time.

- Couplers support multiple communication protocols, freely adapting to various main controllers, achieving seamless interconnection and modular program management.
- Type-C interface for connecting to LT Intelligent Tool configuration software, enabling debugging without a controller, saving 10% of commissioning time.
- 38 types of intelligent diagnostics and logs, covering 100% of equipment status, helping field technicians quickly locate fault points and making outstanding contributions to reducing equipment manufacturing man-hours.
- Independently controllable with 100% domestic component localization.

3.2 General Specifications

Parameter			Specification
Electromagnetic Compatibility	Immunity	Electrostatic Discharge	IEC 61000-4-2: Air discharge $\pm 8.8\text{kV}$
		Radiated RF Electromagnetic Field Immunity	IEC 61000-4-3: 10V/m, 80MHz~6GHz, 80%AM(1KHz)
		Electrical Fast Transient/Burst	IEC 61000-4-4: $\pm 1.1\text{kV}$, 5KHz/100KHz
		Surge Immunity	IEC 61000-4-5: 1.2/50 μs ; $\pm 1.1\text{kV}$ CM
		Conducted RF Immunity	IEC 61000-4-6: 11V RMS, 150KHz~80MHz, 80%AM(1KHz)
		Power Frequency Magnetic Field Immunity	IEC 61000-4-8: • Magnetic field strength 33A/m, duration 300s • Magnetic field strength 330A/m, duration 3s
		Voltage Dips, Short Interruptions and Voltage Variations Immunity	• Dip to 0%, duration 0.5 cycle (10ms) • Dip to 0%, duration 1 cycle (20ms) • Dip to 40%, duration 10 cycles (200ms) • Dip to 70%, duration 25 cycles (500ms) • Dip to 0%, duration 250 cycles (5000ms)
	Electromagnetic Emission	Radiated Emission	• 30~230MHz, 3m, Quasi-peak 50dB($\mu\text{V}/\text{m}$) • 230~1000MHz, 3m, Quasi-peak 57dB($\mu\text{V}/\text{m}$) • 1~3GHz, 3m, Average 56dB($\mu\text{V}/\text{m}$) • 1~3GHz, 3m, Peak 76dB($\mu\text{V}/\text{m}$) • 3~6GHz, 3m, Average 60dB($\mu\text{V}/\text{m}$) • 3~6GHz, 3m, Peak 80dB($\mu\text{V}/\text{m}$)
		Conducted Emission	• 0.15~0.5MHz, Quasi-peak 79dB(μV), Average 66dB(μV) • 0.5~30MHz, Quasi-peak 73dB(μV), Average 60dB(μV)
Environmental Conditions	Climatic Environment	Operating Ambient Temperature	-20°C~60°C
		Operating Relative Humidity	5%~95%, non-condensing
		Operating Altitude	0~2500m
		Operating	Degree 2

		Pollution Degree	
		Storage Ambient Temperature	-40°C~85°C
		Storage Relative Humidity	5%~95%, non-condensing
		Storage Pollution Degree	Degree 2
	Mechanical Environment	Vibration	IEC60068-2-6: • 5Hz≤f≤8.4 Hz, 3.5mm(single amplitude) • 8.4Hz≤f≤150Hz, 1.0g, constant acceleration • One octave per minute (±10%) • 10 sweeps in each of three mutually perpendicular directions
		Shock	IEC60068-2-27: • Half-sine wave with random amplitude of 15g (peak acceleration) and duration of 11ms in each of three mutually perpendicular directions • 3 shocks in positive and negative directions in each of three mutually perpendicular directions, total 18 shocks
		Free Fall	• With transport packaging, 1m, 5 drops • With product packaging, 0.3m, 5 drops
	Protection Rating	Enclosure Protection Rating	IEC60529: IP20 (Protection against solid objects larger than 12mm, not waterproof)
Electrical Safety	Isolation Method		Field side to system side Note: PM01 module does not support field side to system side isolation withstand voltage.
	Isolation Withstand Voltage		1000VAC, duration 1min, leakage current ≤5mA
	Insulation Resistance		≥10MΩ (500VDC)

3.3 Naming Convention

LT-eIM01-P
EtherCAT slave coupler module

LT-e IM 01 -P
1 2 3 4

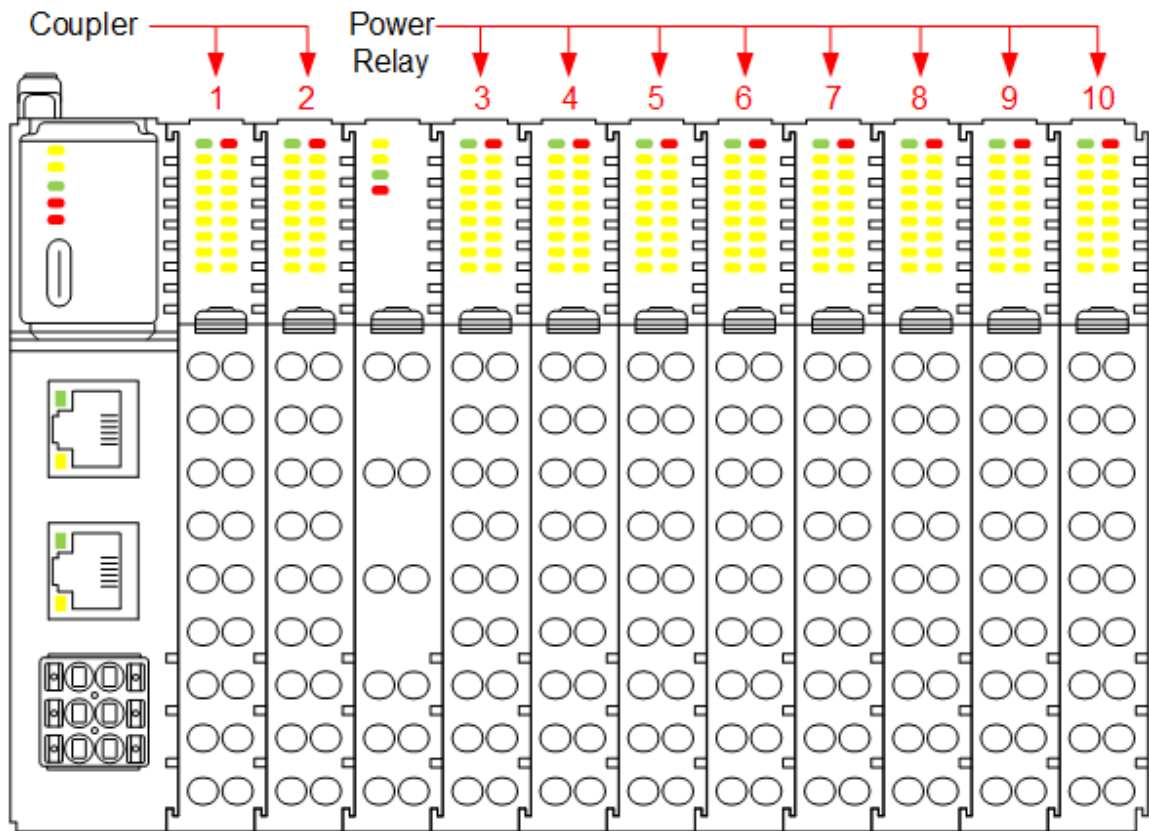
No.	Name	Description
1	Product Series Name	The product series to which the module belongs, all are LT-e.

2	Module Type	• IM: Interface Module, coupler module • CM: Communication Module, communication module • DI: Digital Input, digital input module • DO: Digital Output, digital output module • IO: Input and Output Hybrid Module • AI: Analog Input, analog input module • AO: Analog Output, analog output module • PT: Platinum Thermistor, RTD module • TC: Thermocouple, thermocouple module • PM: Power Module, power module • EP: Endpoint, termination module
3	Model Number	The model number of the module. Different model numbers have different functions. For detailed information, please refer to the "Device Details" Chapter.
4	Conformal Coating Identifier	Modules with this identifier support conformal coating (moisture protection, salt spray protection, anti-fungal protection). Modules without this identifier do not support conformal coating.

3.4 Expansion Module Quantity

The LT-e series coupler module can support up to 64 I/O modules to the right. In actual use, the specific quantity of right expansion modules needs to be calculated based on the bus current consumption. Please note the following during calculation:

- When calculating the current consumption of right expansion modules, power extension modules do not need to be included in the calculation
- The coupler or power extension module only supplies power to the continuously adjacent right expansion modules and does not supply power across modules. For example: As shown in the figure below, the coupler module supplies power to modules 1 and 2 on the right, but does not supply power to modules 3-10 even if current capacity remains; the power extension module does not supply power to modules 1 and 2 on the left, but only supplies power to modules 3-10 on the right



The bus current provided by coupler modules is shown in the following table:

Model	Provided Bus Current (mA)
LT-eIM01	2400
LT-eIM02	2400
LT-eIM03	2400
LT-ePM01	2400

The bus current consumed by I/O modules is shown in the following table:

Model	Consumed Bus Current (mA)
LT-eCM01	220
LT-eDI01	47
LT-eDI02	47
LT-eDI11	51
LT-eDI12	51
LT-eDO01	89
LT-eDO02	89
LT-eDO04	53
LT-eDO11	104
LT-eDO12	104
LT-eIO01	56
LT-eIO02	56
LT-eIO11	96
LT-eIO12	96
LT-eAI01	38
LT-eAI02	40
LT-eAI03	40
LT-eAO01	38
LT-eAO02	40

LT-eAO03	40
LT-ePT01	62
LT-eTC01	62

When the total bus current consumed by the right expansion modules powered by the coupler module is greater than or equal to the bus current provided by that coupler module, a power extension module needs to be added. Where: Total bus current consumed by right expansion modules = Bus current consumed by expansion module 1 + Bus current consumed by expansion module 2 + ... + Bus current consumed by expansion module n.

For example: If coupler LT-eIM01 module expands 10 LT-eDI01, 10 LT-eDO01, 11 LT-eAI01, and 10 LT-ePT01 modules to the right, then the total bus current consumed by the right expansion modules = $47 \times 10 + 89 \times 10 + 38 \times 11 + 62 \times 10 = 2398\text{mA}$. At this point, if any additional I/O module is expanded to the right, the consumed bus current will exceed the current provided by the module, so a power extension module needs to be added.

Chapter 4 Device Details

4.1 Statement

- In the module details introduction, all images are for reference only. The actual appearance of the module may vary slightly due to different hardware versions. Please refer to the actual product.
- Modules with the same dimensions use the same example image in the introduction. The actual appearance of the module should be based on the physical product.

4.2 Version Compatibility

Compatibility between Coupler and LT Intelligent Tool

Module Model	Hardware Version	Software Version	Description File Name	Minimum LT Intelligent Tool Version
LT-eIM01	A01	010101000307	Hollysys_LT-eIM01.xml	V0.0.1
		010101001021	Hollysys_LT-eIM01.xml (in A01_SP1 folder)	V0.0.1SP1
	A02	010102001124	Hollysys_LT-eIM01(A02).xml	V1.0.0
		010103000310	Hollysys_LT-eIM01.xml (in A02_SP1 folder)	V1.0.0SP1
LT-eIM02	A01	010101000312	GSDML-V2.31-hollysys-lt-20250331.xml	V0.0.1
		010101001023	GSDML-V2.31-hollysys-lt-20251030.xml	V0.0.1SP1
	A02	010102001218	GSDML-V2.31-hollysys-lt-20251230.xml	V1.0.0
		010103000310	GSDML-V2.31-hollysys-lt-20260228.xml	V1.0.0SP1
LT-eIM03	A01	010101000316	-	V0.0.1
		010101001024	-	V0.0.1SP1
	B01	020102000310	-	V1.0.0SP1

Compatibility between I/O Modules and Coupler

Module Model	Hardware Version	Software Version	Minimum LT-eIM01 Version	Minimum LT-eIM02 Version	Minimum LT-eIM03 Version	Minimum LT Intelligent Tool Version
LT-eDI01	A01	010101000301	010101000307	010101000312	010101000316	V0.0.1
LT-eDI02	A01	010101000301				
LT-eDO01	A01	010101000301				
LT-eDO02	A01	010101000301				
LT-eDO04	A01	010101000301				
LT-eAI01	A01	010101000306				
LT-eAO01	A01	010101000306				
LT-ePT01	A01	010101000306				
LT-ePM01	A01	010101000301	010102001124	010102001218	020102000310	V1.0.0
LT-eTC01	A01	010101000310				
LT-eTC01	A02	010202001121				
LT-eCM01	A01	010101001028				
LT-eAI02	A01	010101001028				
LT-eAI03	A01	010101001028				
LT-eAO02	A01	010101000929				
LT-eAO03	A01	010101000929				
LT-eDI11	A01	010101001120	010102001124	010102001218	020102000310	V1.0.0
LT-eDI12	A01	010101001120				
LT-eDO11	A01	010101001215				
LT-eDO12	A01	010101001120				
LT-eIO01	A01	010101000210	010103000310	010103000310	020102000310	V1.0.0SP1
LT-eIO02	A01	010101000210				
LT-eIO11	A01	010101000121				
LT-eIO12	A01	010101000121				

Appendix

In the version compatibility table, the methods for obtaining each version are as follows:

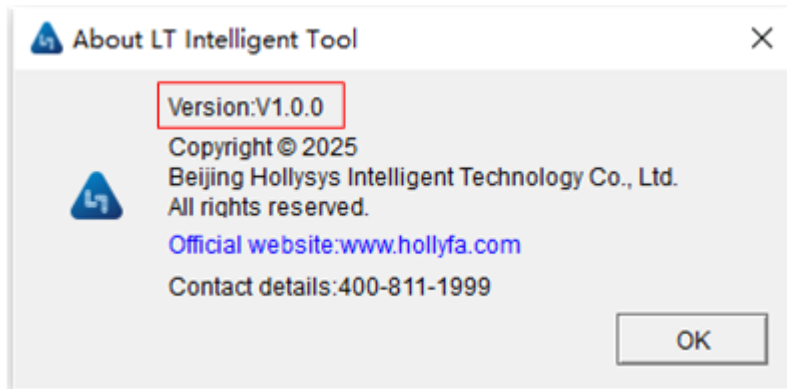
- Hardware Version: The version number printed on the silk-screen on the side of the module.



- Software Version: The "Software Version" read by the LT Intelligent Tool software when searching for devices.

Search Device											
Communication Type		Serial Port		Serial Port Number		USB Serial Device(COM3)		Search		Upgrade	
Serial Port	Slot ID	Device Name	Device Type	Device ID	Hardware Version	Firmware Version	Software Version	IP	Net Gateway	Net Mask	
☐ USB Serial Device(COM3)	0	LT-eIM01	Coupler	2001	01	V1	010101000905				

- LT Intelligent Tool Version: The installed version displayed when selecting "Help > About LT Intelligent Tool" in the software.



4.3 Coupler Module

4.3.1 LT-eIM01 EtherCAT Coupler Module

LT-eIM01 is an EtherCAT communication coupler module of the LT-e series. This module is used for:

- Communicating with third-party masters supporting EtherCAT master protocol via its built-in Ethernet port.
- Providing system and field power to up to 64 I/O modules on the right via its built-in power terminals. For actual usage, refer to the [Expansion Module Quantity](#) chapter for the specific number of right expansion modules.
- Communicating with mounted I/O modules via its built-in internal bus, performing parameter configuration for I/O modules, and providing communication functions with the master.

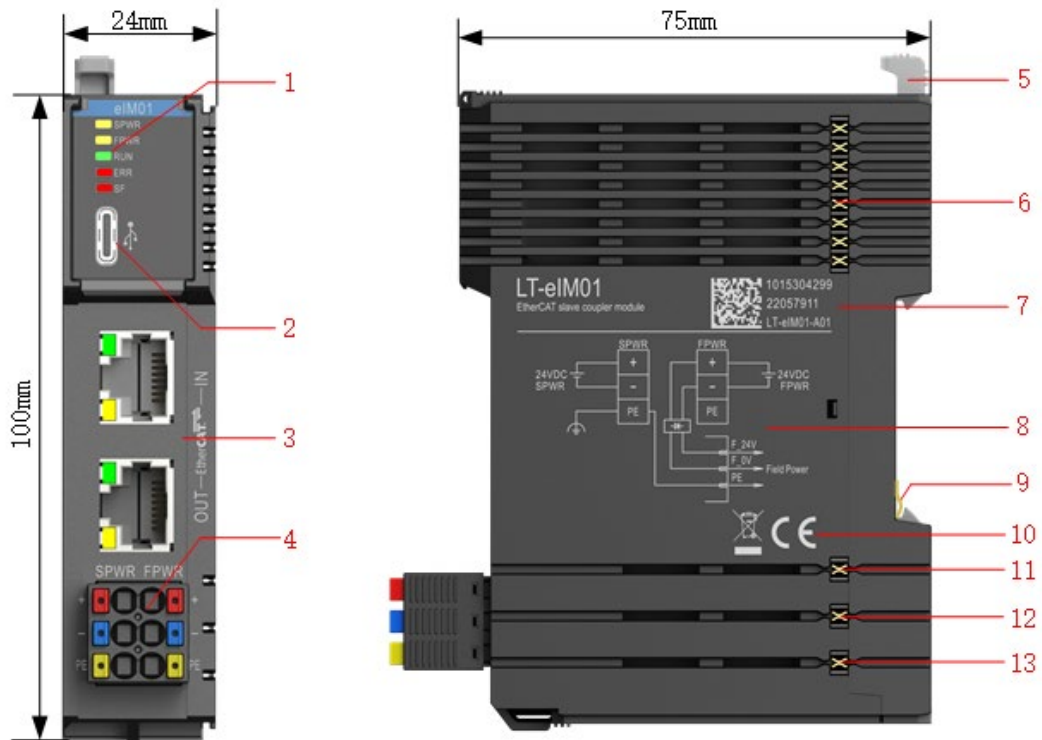
- Communicating with the host configuration software via USB protocol, while enabling data exchange between the configuration software and I/O modules.



Usage Precautions

- When configuring module parameters through the master, use the LT Intelligent Tool to set the module's parameter configuration source to the master. For detailed operations, refer to the "LT Intelligent Tool Usage Guide".
- Before upgrading the firmware of the LT-eIM01 module, the IO configuration must be cleared using the LT Intelligent Tool software. For detailed operations, refer to the [Firmware Upgrade](#) chapter.

4.3.1.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicates the module's power supply and operating status
2	Type-C Interface	Interface for connecting to configuration software
3	Ethernet Ports	Two standard RJ45 Ethernet interfaces supporting EtherCAT protocol
4	Power Terminals	Input wiring terminals for system power and field power supply
5	DIN Rail Top Mounting Latch	• Before installing the module on the DIN rail, pull this latch upward to the unlocked position • After installing the module on the DIN rail, press this latch downward to the locked position
6	Gold Plated Contacts	Internal bus contact points for inter-module data transmission, system power supply, etc.
7	Nameplate	• Left side shows module model and basic information • Right side shows serial number QR code and plain text information. Plain text from top to bottom: serial number, production batch number, module version number
8	Wiring Diagram Silkscreen	Module wiring diagram silkscreen. For detailed wiring diagram, see Communication Interface and Wiring Diagram
9	Protective Earth (PE) Spring Contact	Contacts the DIN rail, internally connected to No.13
10	Other Descriptive Logos	• Do not dispose of randomly • Module complies with CE certification standards
11	Field Power +24VDC	Field power +24VDC contact point, provides field power to right-side I/O modules
12	Field Power 0VDC	Field power 0VDC contact point, provides field power to right-side I/O modules
13	Protective Earth (PE)	Protective earth (PE) contact point, provides protective earth to right-side I/O modules

4.3.1.2 Technical Specifications

Basic Information

Parameter	Specification
System Power	
Power Supply Method	Power Terminals
Rated Voltage	24VDC
Voltage Input Range	19.2VDC~28.8VDC
Undervoltage Diagnosis Threshold	17VDC (±10%)
System-side Output Voltage	4.5VDC~5.5VDC
Power Consumption	≤1.5W
Load Power	≥17.5W
Power Protection	Supports undervoltage and reverse polarity protection
Field Power	
Rated Voltage	24VDC
Input Voltage Range	19.2VDC~28.8VDC
Undervoltage Diagnosis Threshold	17VDC (±10%)
Output Current	≤3.5A
Power Protection	Supports undervoltage and reverse polarity protection
Other	
Module Hot Swap	Not Supported

Redundancy	Not Supported
Dimensions	24mm(W) * 100mm(H) * 75mm(D) (excluding local protrusions)
Weight	≤120g
Protection Rating	IP20



Field power undervoltage diagnosis threshold is 17VDC±10%. The module only guarantees fault detection within this range and cannot guarantee consistency in diagnostic reporting across all modules.

Communication

Parameter	Specification
EtherCAT Communication	
Interface Quantity	2 ports (IN, OUT)
Interface Type	Standard RJ45 Ethernet Port
Communication Cable	EtherNet Cat.5e or above shielded twisted pair cable
Communication Rate	100Mbps, Full Duplex
Transmission Distance	≤100m between two nodes
Supported I/O Module Quantity	≤64. In actual use, power extension modules need to be added based on bus current consumption
Supported Topologies	Supports connecting this module into EtherCAT linear, star, tree, and ring network topologies
Communication Mode	• FreeRun • DC Note: In DC mode, only this module is guaranteed to function as a DC clock source; periodic data output in DC mode for this module and right-mounted I/O modules is not guaranteed.
Communication Cycle	≥125μs
Periodic Data Size	This module and right-mounted I/O modules support up to 1280 bytes each for input and output periodic data
Aperiodic (Mailbox) Communication	Mailbox supports up to 256 bytes each for input and output; packets larger than 256 bytes are transmitted in segments
Alias	Supports configuring the module's alias address via EtherCAT master
Slave Scan Function	Supports master scanning this module and right-mounted I/O modules
Configuration Parameters	• Supports modifying configuration parameters for this module and right-mounted I/O modules via master • Mounted I/O modules support multiple I/O mapping methods; refer to the "Technical Specifications" chapter of each module for details • Supports selective configuration of variable parameter enumeration types • Supports modifying configuration parameters during operation • Empty slot module configuration not supported
Application Protocol	Supports COE communication
Type-C Communication	
Connection Method	Connects to configuration software via TYPE-C interface, appears as a virtual COM port on the computer after successful connection; configuration software communicates with coupler via USB protocol
Periodic Data	Supports configuration software reading and writing coupler and I/O module periodic data
View Alarm Information	Supports viewing all alarm information for coupler and I/O modules, including hardware diagnostics, channel diagnostics, and protocol diagnostics
Logs	Supports coupler and I/O module log reporting
Firmware Upgrade	• Supports coupler and I/O module firmware upgrade; requires power cycle after upgrade to restore diagnostic information • During upgrade, do not power off, disconnect USB cable, or close

	software • No firmware backup performed • During any module firmware upgrade, the system does not perform periodic communication, causing other modules to go offline
Configuration Parameters	• Supports reporting and receiving configuration parameters for coupler and I/O modules • Supports activating configuration parameters via master or configuration software • Supports modifying configuration parameters during operation; modules with unchanged parameters remain online • Supports power-off saving of coupler and I/O configuration parameters
Safe Output State	• When configuration parameter source is master: ◦ When slave protocol transitions from normal to offline, IO modules enter safe output state; when slave protocol recovers online, I/O modules exit safe output state • When configuration parameter source is configuration software: ◦ When slave protocol transitions from normal to offline and configuration software is not online, I/O modules enter safe output state; when slave protocol recovers online or configuration software comes online, IO modules exit safe output state ◦ When slave protocol transitions from normal to offline and configuration software is online, I/O modules do not enter safe output state and are controlled by configuration software
Other	• Supports reporting topology information to configuration software • Supports reporting module basic information to configuration software, including: coupler name, module version, module description, vendor, output current, etc. • Supports configuration software forcibly modifying module output values during operation • Supports indicator light control for module identification

Diagnostics and Logs

Parameter	Specification
Diagnostics	
Internal Fault Diagnosis	Detects chip watchdog status; when watchdog reset occurs, an internal fault is detected; this fault bit cannot be automatically cleared
External Fault Diagnosis	• Detects system-side power supply voltage; when below threshold (software can still operate normally), an external fault is detected; this fault bit is automatically cleared when voltage rises above threshold • Detects field-side power supply status; when faulty, an external fault is detected; this fault bit is automatically cleared when fault is resolved • Detects ambient temperature; when above threshold, an external fault is detected; this fault bit is automatically cleared when temperature drops below threshold
Protocol Diagnosis	Supported
I/O Diagnosis	Can read and upload I/O module diagnostic data
Diagnostic Reporting	Diagnostics can be directly reported via master or configuration software, or recorded in logs and reported via log reading
Logs	
Logs	Records diagnostic status changes, module runtime, etc.; supports over 3000 entries maximum; overwrites old logs when exceeded. Writing logs does not block normal communication
I/O Log Reporting	Supports reading I/O module logs via coupler
Log Upload	Supports uploading coupler and I/O logs to configuration software via USB protocol

4.3.1.3 Indicator LEDs



- SPWR: System Power Indicator
- FPWR: Field Power Indicator
- RUN: Module Run Status Indicator
- ERR: Module Fault Indicator
- SF: System Fault Indicator

LED Name	Color	Status	Description
SPWR	Yellow	Off	Module system side is not powered on or power is abnormal
		Steady On	Module system side power is normal
FPWR	Yellow	Off	Module field side is not powered on or power is abnormal
		Steady On	Module field side power is normal
RUN	Green	Off	Module is in initial state
		Fast Flash (200ms on, 200ms off)	Module connection not established
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Single Flash (200ms on, 1000ms off)	Module communication fault
		Steady On	Module communication normal
ERR	Red	Off	Module has no fault
		Fast Flash (200ms on, 200ms off)	Module external fault
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Module internal fault or module is starting up
SF	Red	Off	I/O module has no fault
		Fast Flash (200ms on, 200ms off)	No configuration or configuration does not match the actual scanned I/O modules
		Single Flash (200ms on, 1000ms off)	Initial communication failed or I/O module communication is offline
		Steady On	I/O module has hardware fault or channel fault

4.3.1.4 Communication Interface and Wiring Diagram

Ethernet Port



IN/OUT:

- Standard RJ45 interface, for cable details refer to the [Cable Requirements](#) chapter
- IN connects to the upper level of the EtherCAT network, OUT connects to the next level of the EtherCAT network
- Supports EtherCAT Slave protocol

Color	Status	Description
Green	Steady On	Network connected
	Flashing	Data exchange in progress
	Off	Network not connected
Yellow	No significance	

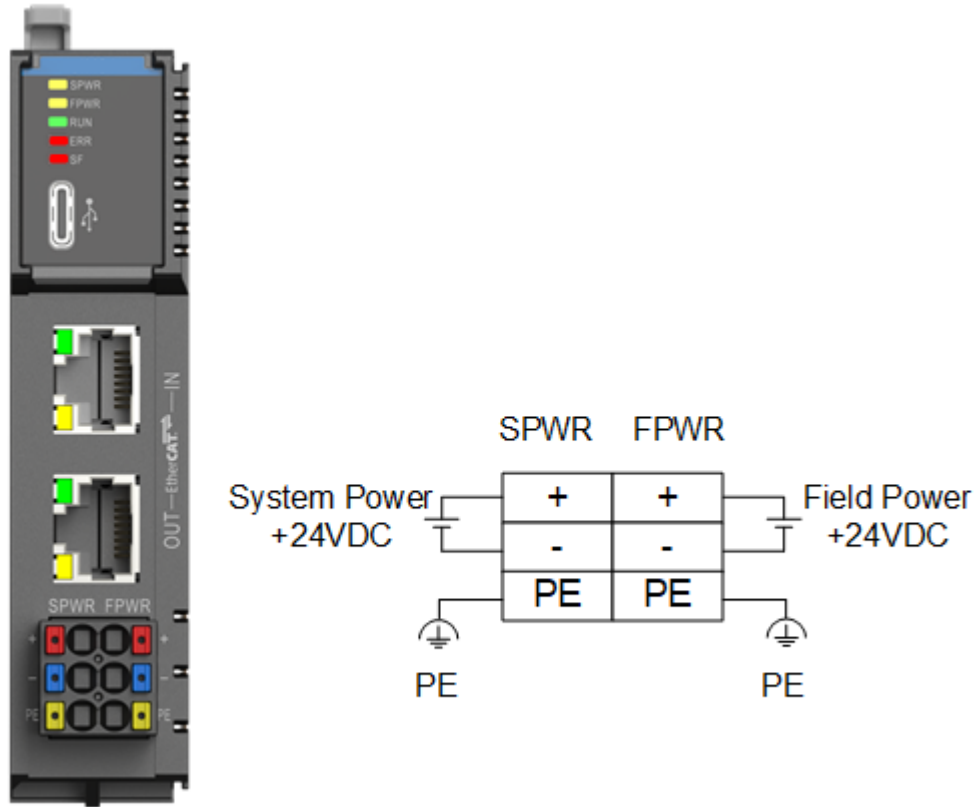


The indicator flashing indicates data exchange is in progress; the flashing has no fixed frequency.

Type-C Interface

Below the module indicator lights, there is a standard Type-C interface for connecting the module to the LT Intelligent Tool configuration software. After a successful connection, it appears as a virtual COM port on the computer. The configuration software communicates with the module via the USB protocol, enabling debugging without the need for a controller. The USB cable used must comply with the USB protocol specification. For details, refer to the [Cable Requirements](#) chapter.

Terminal Block



Identifier	Instructions	Identifier	Instructions
SPWR +	System Power Supply +24VDC Input	FPWR +	Field Power Supply +24VDC Input
SPWR -	System Power Supply 0VDC Input	FPWR -	Field Power Supply 0VDC Input
SPWR PE	Protective Earthing	FPWR PE	Protective Earthing

4.3.1.5 Configuration Parameters

Category	Paramter Name	Description	Configuration Principle
Module	Interface Version	Module software version number, modification is not supported	Default value: 0x20010001
	Device Type	Type of the third-party master station connected to the coupler, this parameter is only visible on the master station side	Default value: 0 Value range: • 0: General • 1: LX-CU500/LX-CU501 • 2: NX701

4.3.1.6 Diagnosis and Channel Information



During cyclic communication, the module's input data is diagnostic information; this module has no channel information. The number of bytes occupied by the input data is shown in the table below.

Bit/Byte	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5
	Module Diagnosis		Protocol Diagnosis	LTBUS Diagnosis		
Bit0	System Power Fault	Force Variable Indication	Slave Protocol Communication Fault	IO Module Communication Fault	Slot of the First IO Module With Fault	Number of IO Module Communication Online
Bit1	Field Power Fault	-	-	IO Module Topology Mismatch Fault		
Bit2	Watchdog Fault			IO Module Report Fault		
Bit3	Hardware Fault			-		
Bit4	Temperature Fault					
Bit5	Net1 Link Fault					
Bit6	Net2 Link Fault					
Bit7	Source Of Configuration					

Diagnostic Information



After the coupler restarts and during communication establishment, the internal bus communication diagnosis in the cyclic diagnosis is changing, which is normal. Wait for the communication to stabilize (no more than 10s), then check the diagnostic information to determine the module status.

Category		Parameter Name	Description
Periodic Diagnostic Information	Module	System Power Fault	• 0: System side power normal • 1: System side power fault
		Field Power Fault	• 0: Field side power normal • 1: Field side power fault
		Watchdog Fault	• 0: Watchdog normal • 1: Watchdog fault
		Hardware Fault	• 0: Hardware normal • 1: Hardware fault
		Temperature Fault	• 0: Temperature normal • 1: High temperature or low temperature fault
		Net1 Link Fault	• 0: Net Port 1 connection normal • 1: Net Port 1 connection fault

		Net2 Link Fault	• 0: Net Port 2 connection normal • 1: Net Port 2 connection fault
		Source Of Configuration	• 0: Master station protocol • 1: Configuration software
		Force Variable Indication	• 0: No forced variables • 1: Forced variables exist
	Protocol	Slave Protocol Communication Fault	• 0: Slave protocol communication (northbound communication) normal • 1: Slave protocol communication (northbound communication) fault
	LTBUS	IO Module Communication Fault	• 0: I/O module communication (internal bus communication) normal • 1: I/O module communication (internal bus communication) fault
		IO Module Topology Mismatch Fault	• 0: I/O module topology matches software configuration • 1: Module ID or module version mismatch^{Note1}
		IO Module Report Fault	• 0: No I/O module reported fault • 1: I/O module reported fault
		Slot Of The First IO Module With Fault ^{Note2}	• 0: I/O module without fault • 1~64: The slot address of the first I/O module with fault
		Number Of IO Module Communication Online	Number of online I/O modules
	Aperiodic Diagnostic Information	Module Temperature	Indicates the current temperature of the module, unit: °C. The displayed value divided by 100 represents the actual value, e.g., displayed value 5430 represents 54.3°C
		System Power Voltage	Indicates the voltage value of the system power, unit: V. The displayed value divided by 10 represents the actual value, e.g., displayed value 52 represents 5.2VDC
		LTBUS Communication Status	• 0: Unknown • 1: Stopped • 2: Running
		LTBUS Communication Polling Cycle Current Time	Indicates the actual value of the internal bus polling cycle, unit: μs
		LTBUS Communication Polling Cycle Max Time	Indicates the maximum value of the internal bus polling cycle, unit: μs
		LTBUS Communication Polling Cycle Min Time	Indicates the minimum value of the internal bus polling cycle, unit: μs
		IO Module LTBUS Communication Total Count	Indicates the total number of times the internal bus polls I/O slaves
		IO Module LTBUS Communication Error Count	Indicates the count of input data errors when the internal bus polls I/O slaves. When there is one error count in the internal bus, it means there is an error in the input data of the current data packet, and the entire data packet is discarded. The coupler reports the data from the last cycle to the controller. In the next internal bus polling, it will be rechecked. If there is no error, the data packet is updated normally and reported to the controller.

Note1: When the module version does not match (e.g. software configuration LT-eTC01-A01 version, actual

module is LT-eTC01-A02 version), it is a version compatibility issue and does not affect normal use. The module can communicate normally. To eliminate this fault, please upgrade the coupler to the latest version. The matching relationship of the modules can be referred to the [Version Compatibility](#) chapter.

Note2: LT-eIM01-A01 version, the diagnostic information is "Slot Of The First IO Module With Communication Fault", only reporting the slot number of the module with communication failure; LT-eIM01-A02 and above versions report the module slot number for communication faults when there are communication faults, report the module slot number for faults when there are no communication faults, and report 0 when there are no faults.

Channel Information

None.

4.3.2 LT-eIM02 PROFINET Coupler Module

LT-eIM02 is the PROFINET communication coupler module of the LT-e series. This module is used for:

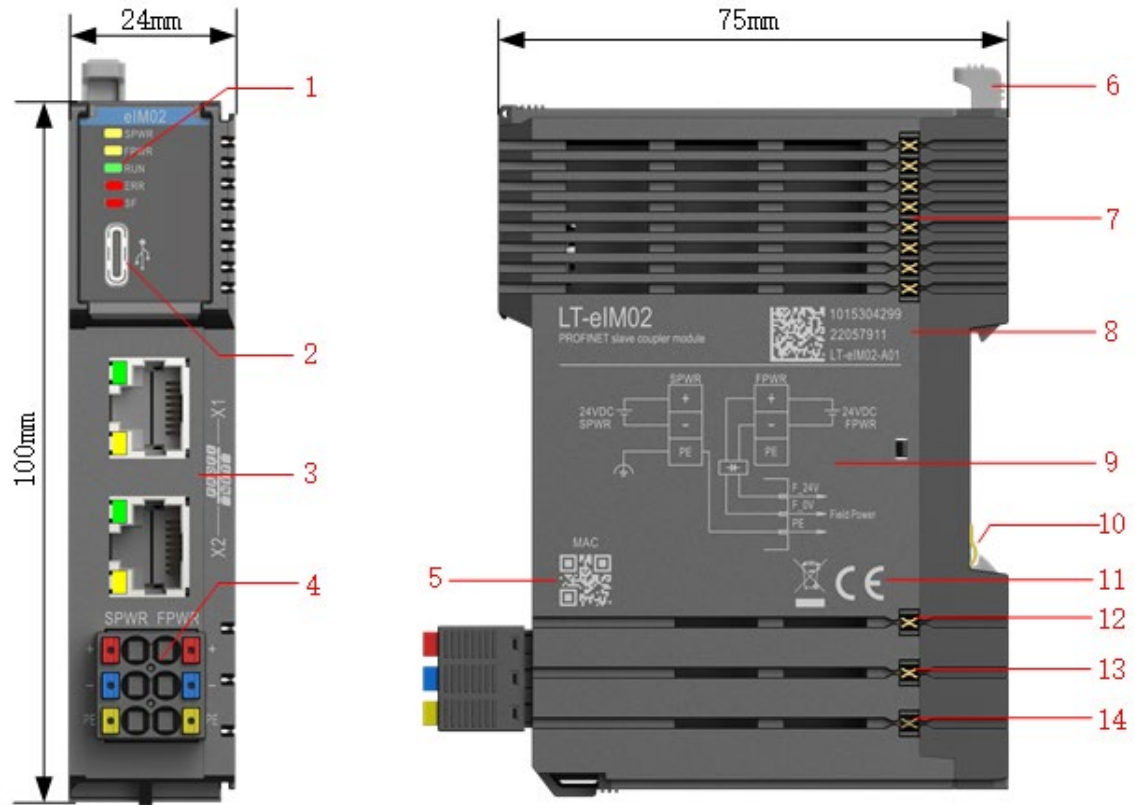
- Communicating with third-party master stations supporting PROFINET master protocol via its built-in Ethernet port.
- Providing system and field power to up to 64 I/O modules on the right side via its built-in power terminal block. For the actual number of right expansion modules in use, refer to the [Expansion Module Quantity](#) chapter.
- Communicating with mounted I/O modules via its built-in internal bus, performing parameter configuration for I/O modules, and providing communication functions with the master station.
- Communicating with the host computer configuration software via the USB protocol, while enabling data exchange between the configuration software and I/O modules.



Usage Precautions

- When configuring module parameters via the master station, it is necessary to use the LT Intelligent Tool to set the module's parameter configuration source to the master station. For detailed operations, refer to the "LT Intelligent Tool Usage Guide".
- The acyclic data of the LT-eIM02 module is not supported for reading by Siemens 300 and 400 series PLCs.
- The LT-eIM02 module has two firmware version files. Both must be upgraded during the upgrade process, with no specific order required. However, the IO configuration must be cleared, and PROFINET communication must be disconnected (stop communication on the PN master or disconnect the network cable) before the upgrade. For detailed operations, refer to the [Firmware Upgrade](#) chapter.

4.3.2.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicates the module's power supply and operating status
2	Type-C Interface	Configuration software interface
3	Ethernet Ports	Two standard RJ45 Ethernet interfaces, supporting PROFINET protocol
4	Power Terminal Block	System power and field power supply input terminal block
5	Module MAC Address QR Code	QR code of the module's MAC address
6	DIN Rail Top Mounting Latch	- Before installing the module onto the DIN rail, pull this latch upward to the unlocked state - After installing the module onto the DIN rail, press this latch downward to the locked state
7	Gold Plated Contacts	Internal bus contact points, used for inter-module data transmission, system power supply, etc.
8	Nameplate	- Left side shows module model and basic information - Right side shows serial number QR code and plain text information, from top to bottom: Serial Number, Production Batch Number, Module Version Number
9	Wiring Diagram Silkscreen	Module wiring diagram silkscreen, for detailed wiring diagram see the Communication Interface and Wiring Diagram
10	Protective Earth (PE) Spring Contact	Contacts the DIN rail, internally connected to No.14
11	Other Informative Logos	- Do not dispose of arbitrarily - Module complies with CE certification standards

12	Field Power +24VDC	Field power +24VDC contact point, provides field power to I/O modules on the right
13	Field Power 0VDC	Field power 0VDC contact point, provides field power to I/O modules on the right
14	Protective Earth (PE)	Protective earth (PE) contact point, provides protective earth to I/O modules on the right

4.3.2.2 Technical Specifications

Basic Information

Parameter	Specification
System Power	
Power Supply Method	Power Terminals
Rated Voltage	24VDC
Voltage Input Range	19.2VDC~28.8VDC
Undervoltage Diagnosis Threshold	17VDC ($\pm 10\%$)
System Side Output Voltage	4.5VDC~5.5VDC
Power Consumption	$\leq 3W$
Load Power	$\geq 17.5W$
Power Protection	Supports undervoltage, reverse connection protection
Field Power	
Rated Voltage	24VDC
Input Voltage Range	19.2VDC~28.8VDC
Undervoltage Diagnosis Threshold	17VDC ($\pm 10\%$)
Output Current	$\leq 3.5A$
Power Protection	Supports undervoltage, reverse connection protection
Others	
Module Hot Swap	Not supported
Redundancy	Not supported
Dimensions	24mm(W) * 100mm(H) * 75mm(D) (excluding local protrusions)
Weight	$\leq 120g$
Protection Rating	IP20



The field power undervoltage diagnosis threshold is 17VDC $\pm 10\%$. The module only guarantees fault diagnosis within this range and cannot guarantee consistency in diagnostic reporting across all modules.

Communication

Parameter	Specification
PROFINET Communication	
Number of Interfaces	2 ports (X1, X2), supporting switch function
Interface Type	Standard RJ45 Ethernet port
Communication Cable	EtherNet Cat.5e or above shielded twisted pair cable
Communication Rate	100Mbps, full duplex
Transmission Distance	$\leq 100m$ between two nodes
Supported Number of Mounted I/O Modules	≤ 64 , in actual use, power repeater modules need to be added according to the bus current consumption

Supported Topologies	Supports connecting this module into PROFINET linear, star, tree, and ring network topologies
Communication Mode	RT
Communication Cycle	≥1ms
Cyclic Data Scale	This module and the I/O modules mounted on the right support a maximum of 1440 bytes each for input and output cyclic data
PROFINET Version	V2.3
I&M Data	I&M0 to I&M3
Configuration Parameters	• Supports modifying configuration parameters of this module and the I/O modules mounted on the right via the master station • Supports selective configuration of variable parameter enumeration types • Supports modifying configuration parameters during operation • Supports configuring PROFINET slave name, IP address, and subnet mask • Does not support empty slot module configuration
Diagnosis	Supports alarm/diagnosis/status information, supports uploading error codes to the master station
Others	• Supports MRP • Supports master station scanning
Type-C Communication	
Connection Method	Connect to the configuration software via the TYPE-C interface. After successful connection, it appears as a virtual COM port on the computer. The configuration software communicates with the coupler via the USB protocol
Cyclic Data	Supports configuration software reading and writing cyclic data of the coupler and I/O modules
View Alarm Information	Supports viewing all alarm information of the coupler and I/O modules, including hardware diagnosis, channel diagnosis, and protocol diagnosis
Restore Factory Settings	Supports restoring the coupler protocol parameters to factory settings
Logs	Supports coupler and I/O module log reporting
Firmware Upgrade	• Supports coupler and I/O module firmware upgrade. After upgrade, power off and restart the module to restore diagnostic information. • During the upgrade process, do not perform operations such as power off, unplug USB cable, close software, etc. • No firmware backup is performed. • During the firmware upgrade of any module, the system does not perform cyclic communication, which will cause other modules to go offline.
Configuration Parameters	• Supports reporting and receiving configuration parameters of the coupler and I/O modules • Supports two methods for configuration parameters to take effect: master station or configuration software • Supports modifying configuration parameters during operation, and modules with unmodified parameters will not go offline • Supports power-off saving of coupler and I/O configuration parameters
Safe Output State	• When the configuration parameter source is the master station: ○ When the slave protocol goes from normal to offline, the I/O modules enter the safe output state; when the slave protocol recovers online, the I/O modules exit the safe output state. • When the configuration parameter source is the configuration software: ○ When the slave protocol goes from normal to offline and the configuration software is not online, the I/O modules enter the safe output state; when the slave protocol recovers online or the configuration software comes online, the I/O modules exit the safe output state.

	When the slave protocol goes from normal to offline and the configuration software is online, the I/O modules do not enter the safe output state and are controlled by the configuration software.
Others	- Supports reporting topology information to the configuration software - Supports reporting module basic information to the configuration software, including: coupler name, module version, module description, vendor, output current, etc. - Supports the configuration software forcibly modifying module output values during operation - Supports lighting indicator for module identification

Diagnosis and Logs

Parameter	Specification
Diagnosis	
Internal Fault Diagnosis	Detects chip watchdog status. When a watchdog reset occurs, it is considered an internal fault. This fault bit cannot be cleared automatically.
External Fault Diagnosis	- Detects system side power voltage. When below the threshold (software can still work normally), it is considered an external fault. This fault bit can be cleared automatically when the voltage rises above the threshold. - Detects field side power status. When faulty, it is considered an external fault. This fault bit can be cleared automatically when the fault recovers. - Detects ambient temperature. When above the threshold, it is considered an external fault. This fault bit can be cleared automatically when the temperature drops below the threshold.
Protocol Diagnosis	Supported
I/O Diagnosis	Can read and upload I/O module diagnostic data
Diagnosis Reporting	Diagnosis can be reported directly via the master station or configuration software, or recorded in logs and reported via log reading
Logs	
Logs	Records diagnostic status changes, module running time, and other information. Supports a maximum of over 3000 entries. When exceeded, old logs are overwritten. Writing logs does not block normal communication.
I/O Log Reporting	Supports reading I/O module logs via the coupler
Log Upload	Supports uploading coupler and I/O logs to the configuration software via USB protocol

4.3.2.3 Indicator LEDs

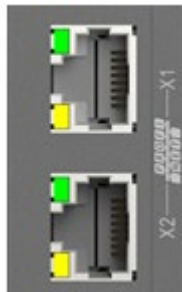


- SPWR: System Power Indicator
- FPWR: Field Power Indicator
- RUN: Module Run Status Indicator
- ERR: Module Fault Indicator
- SF: System Fault Indicator

LED Name	Color	Status	Description
SPWR	Yellow	Off	Module system side is not powered on or power supply is abnormal
		Steady On	Module system side power supply is normal
FPWR	Yellow	Off	Module field side is not powered on or power supply is abnormal
		Steady On	Module field side power supply is normal
RUN	Green	Off	Module is not powered on
		Fast Flash (200ms on, 200ms off)	Module has not established PROFINET communication connection
		Slow Flash (500ms on, 500ms off)	Firmware upgrade or indicator light flash test
		Steady On	PROFINET communication is normal
ERR	Red	Off	Module has no fault
		Fast Flash (200ms on, 200ms off)	Module external fault
		Slow Flash (500ms on, 500ms off)	Firmware upgrade or indicator light flash test
		Steady On	Module internal fault or module is starting up
SF	Red	Off	I/O module has no fault
		Fast Flash (200ms on, 200ms off)	No configuration or configuration does not match the actual scanned I/O modules
		Slow Flash (500ms on, 500ms off)	Indicator light flash test
		Single Flash (200ms on, 1000ms off)	Initialization communication failed or I/O module communication is offline
		Steady On	I/O module has internal fault, external fault, or channel fault

4.3.2.4 Communication Interface and Wiring Diagram

Ethernet Port



X1/X2:

- Standard RJ45 interface. For cable details, refer to the [Cable Requirements](#) chapter.
- Supports PROFINET Slave protocol.
- Default IP: 192.168.0.240

Color	Status	Description
Green	Flashing	Data exchange in progress
	Off	No data exchange
Yellow	Steady On	Network connected
	Off	No network connection

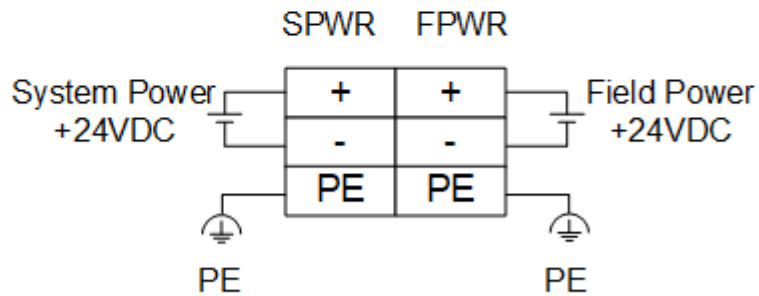
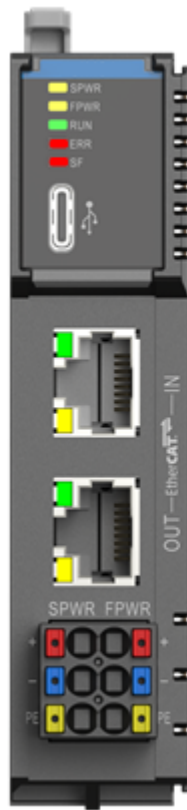


The indicator light flashing indicates data exchange is in progress; the flashing has no fixed frequency.

Type-C Interface

Below the module indicator light, there is a standard Type-C interface for connecting the module to the LT Intelligent Tool configuration software. After a successful connection, it appears as a virtual COM port on the computer. The configuration software communicates with the module via the USB protocol, enabling debugging without the need for a controller. The USB cable used must comply with the USB protocol specification. For details, refer to the [Cable Requirements](#) chapter.

Terminal Block



Identifier	Instructions	Identifier	Instructions
SPWR +	System Power Supply +24VDC Input	FPWR +	Field Power Supply +24VDC Input
SPWR -	System Power Supply 0VDC Input	FPWR -	Field Power Supply 0VDC Input
SPWR PE	Protective Earthing	FPWR PE	Protective Earthing

4.3.2.5 Configuration Parameters

Category	Parameter Name	Description	Configuration Principle
Module	Interface Version	Module software version number, modification is not supported	Default value: 0x20020001
	IP Address	Module IP address	Default value: 192.168.0.240 Value range: IPv4 address, cannot conflict with existing IP addresses in the network
	Net Mask	Subnet mask corresponding to the module IP address	Default value: 255.255.255.0 Value range: Subnet mask
	Device name	Module custom name	Default value: It Value range: String not exceeding 64 bytes

4.3.2.6 Diagnosis and Channel Information



During cyclic communication, the module's input data is diagnostic information. This module has no channel information. The number of bytes occupied by the input data is shown in the table below.

Bit/Byte	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5
	Module Diagnosis		Protocol Diagnosis	LTBUS Diagnosis		
Bit0	System Power fault	Force Variable Indication	Slave Protocol Communication Fault	IO Module Communication Fault	Slot of The First IO Module With Fault	Number of IO Modules Communication Online
Bit1	Field Power fault	-	-	IO Module Topology Mismatch Fault		
Bit2	Watchdog fault			IO Module Report Fault		
Bit3	Hardware fault			-		
Bit4	Temperature fault					
Bit5	Net1 Link Fault					
Bit6	Net2 Link Fault					
Bit7	Source Of Configuration					

Diagnostic Information



After the coupler restarts, during communication establishment, the internal bus communication diagnosis in cyclic diagnosis is changing, which is normal. Wait until the communication stabilizes (no more than 10s), then check the diagnostic information to determine the module status.

Category		Parameter Name	Description
Periodic Diagnostic Information	Module	System Power Fault	• 0: System side power normal • 1: System side power fault
		Field Power Fault	• 0: Field side power normal • 1: Field side power fault
		Watchdog Fault	• 0: Watchdog normal • 1: Watchdog fault
		Hardware Fault	• 0: Hardware normal • 1: Hardware fault
		Temperature Fault	• 0: Temperature normal • 1: High temperature or low temperature fault
		Net1 Link Fault	• 0: Network port 1 connection normal • 1: Network port 1 connection fault
		Net2 Link Fault	• 0: Network port 2 connection normal • 1: Network port 2 connection fault
		Source Of Configuration	• 0: Master station protocol • 1: Configuration software
		Force Variable Indication	• 0: No forced variables • 1: Forced variables exist
	Protocol	Slave Protocol Communication Fault	• 0: Slave protocol communication (northbound communication) normal • 1: Slave protocol communication (northbound communication) fault
	LTBUS	IO Module Communication Fault	• 0: I/O module communication (internal bus communication) normal • 1: I/O module communication (internal bus communication) fault
		IO Module Topology Mismatch Fault	• 0: I/O module topology matches software configuration • 1: Module ID or module version mismatch^{Note1}
		IO Module Report Fault	• 0: No I/O module reported fault • 1: I/O module reported fault
		Slot Of The First IO Module With Fault ^{Note2}	• 0: I/O module without fault • 1~64: The slot address of the first I/O module with fault
		Number Of IO Module Communication Online	Number of online I/O modules
Aperiodic Diagnostic Information	Module Temperature		Indicates the current temperature of the module, unit: °C. Display value divided by 100 represents actual value, for example: display value 5430 represents 54.3°C
	System Power Voltage		Indicates the voltage value of system power, unit: V. Display value divided by 10 represents actual value, for example: display value 52 represents 5.2VDC
	LTBUS Communication Status		• 0: Unknown • 1: Stopped • 2: Running

	LTBUS Communication Polling Cycle Current Time	Indicates the actual value of internal bus polling cycle, unit: μ s
	LTBUS Communication Polling Cycle Max Time	Indicates the maximum value of internal bus polling cycle, unit: μ s
	LTBUS Communication Polling Cycle Min Time	Indicates the minimum value of internal bus polling cycle, unit: μ s
	IO Module LTBUS Communication Total Count	Indicates the total number of internal bus polling I/O slave stations
	IO Module LTBUS Communication Error Count	Indicates the count of input data errors during internal bus polling of I/O slave stations. When there is one error count in the internal bus, it means there is an error in the input data of the current data packet, and the entire data packet will be discarded. The coupler reports the data from the previous cycle to the controller. In the next internal bus polling, it will be rechecked. If there is no error, the data packet will be updated normally and reported to the controller.

Note1: When the module versions do not match, please upgrade the coupler to the latest version. The matching relationship of the modules can be referred to the [Version Compatibility](#) chapter.

Note2: LT-eIM02-A01 version, the diagnostic information is "Slot Of The First IO Module With Communication Fault", only reporting the slot number of the module with communication failure; LT-eIM02-A02 and above versions report the module slot number for communication faults when there are communication faults, report the module slot number for faults when there are no communication faults, and report 0 when there are no faults.

Channel Information

None.

4.3.3 LT-eIM03 EtherNet/IP Coupler Module

LT-eIM03 is the EtherNet/IP communication coupler module of the LT-e series. This module is used for:

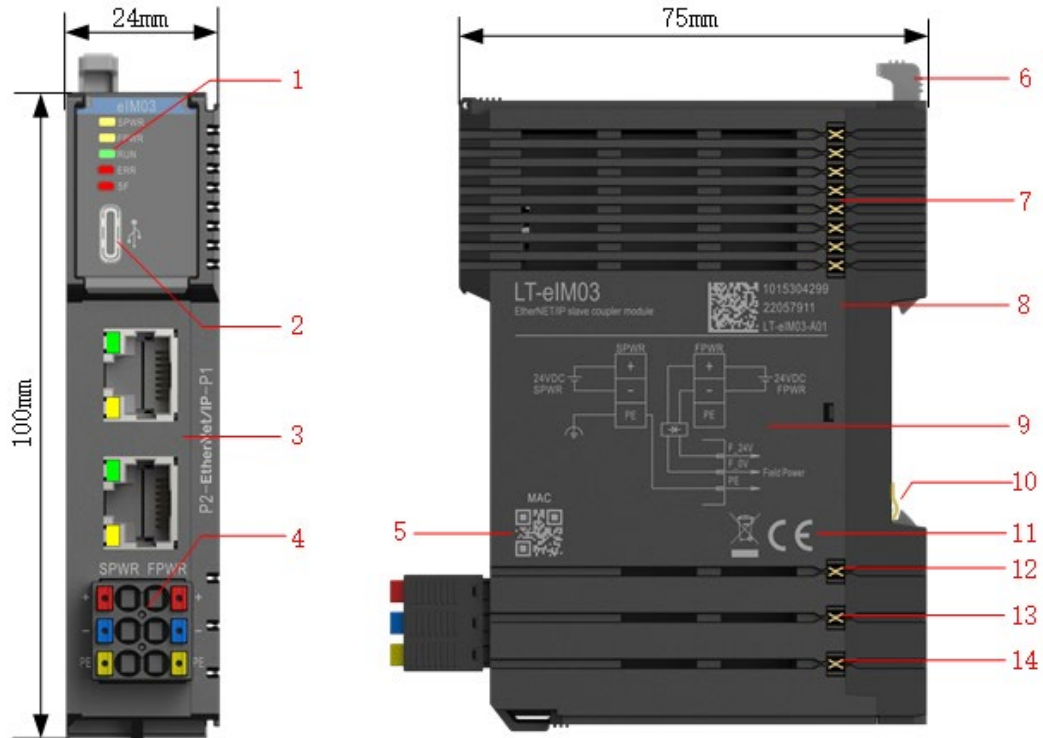
- Communicating with third-party master stations supporting EtherNet/IP master protocol via its built-in Ethernet port.
- Providing system and field power to up to 64 I/O modules on the right side via its built-in power terminal block. For the actual number of right expansion modules in use, refer to the [Expansion Module Quantity](#) chapter.
- Communicating with mounted I/O modules via its built-in internal bus, performing parameter configuration for I/O modules, and providing communication functions with the master station.
- Communicating with the host computer configuration software via the USB protocol, while enabling data exchange between the configuration software and I/O modules.



Usage Precautions

- The LT-eIM03 module only supports the parameter source as "LT Intelligent Tool" and does not support the parameter source as "Master". Before use, please download configuration parameters via the LT Intelligent Tool. For specific operations, refer to the "LT Intelligent Tool Usage Guide".
- Before using the LT-eIM03 module, the module's EDS file must be imported into the configuration software of the third-party controller. For obtaining the EDS file, refer to the "LT Intelligent Tool Usage Guide".
- If replacing EIP master station hardware (e.g., controller), it is necessary to power off and restart the LT-eIM03 module. Otherwise, EIP communication may not be established.
- Before upgrading the firmware of the LT-eIM03 module, the IO configuration must be cleared using the LT Intelligent Tool software. For detailed operations, refer to the [Firmware Upgrade](#) chapter.

4.3.3.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicate module power supply and operating status
2	Type-C interface	Configuration software interface
3	Ethernet ports	Two standard RJ45 Ethernet interfaces, supporting EtherNet/IP protocol
4	Power supply terminals	System power and field power supply input terminals
5	Module MAC address QR code	QR code of module MAC address
6	DIN rail top mounting latch	- Before installing the module on the DIN rail, pull this latch upward to the unlocked position - After installing the module on the DIN rail, press this latch downward to the locked position
7	Gold Plated Contacts	Internal bus contact points, used for inter-module data transmission, system power supply, etc.
8	Nameplate	- Left side shows module model and basic information - Right side shows serial number QR code and plain code information, from top to bottom: serial number, production batch number, module version number
9	Wiring diagram silkscreen	Module wiring diagram silkscreen, detailed wiring diagram see Communication Interface and Wiring Diagram
10	Protective earth (PE) spring contact	Contacts with DIN rail, internally connected to No.14
11	Other explanatory logos	- Do not dispose of randomly - Module complies with CE certification standards
12	Field power +24VDC	Field power +24VDC contact point, provides field power for right-side I/O modules
13	Field power 0VDC	Field power 0VDC contact point, provides field power for right-side I/O modules

14	Protective earth (PE)	Protective earth (PE) contact point, provides protective earth for right-side I/O modules
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4.3.3.2 Technical Specifications

Basic Information

Parameter	Specification
System Power Supply	
Power Supply Method	Power Terminals
Rated Voltage	24VDC
Voltage Input Range	19.2VDC~28.8VDC
Undervoltage Diagnosis Threshold	17VDC ($\pm 10\%$)
System-side Output Voltage	4.5VDC~5.5VDC
Power Consumption	$\leq 1.5W$
Load Power Supply Capacity	$\geq 17.5W$
Power Protection	Supports Undervoltage, Reverse Connection Protection
Field Power Supply	
Rated Voltage	24VDC
Input Voltage Range	19.2VDC~28.8VDC
Undervoltage Diagnosis Threshold	17VDC ($\pm 10\%$)
Output Current	$\leq 3.5A$
Power Protection	Supports Undervoltage, Reverse Connection Protection
Others	
Module Hot Swap	Not Supported
Redundancy	Not Supported
Dimensions	24mm(W) * 100mm(H) * 75mm(D) (excluding local protrusions)
Weight	$\leq 120g$
Protection Rating	IP20



The field power undervoltage diagnosis threshold is 17VDC $\pm 10\%$. The module only guarantees fault detection within this range and cannot guarantee consistency in diagnostic reporting across all modules.

Communication

Parameter	Specification
EtherNet/IP Communication	
Number of Ports	2 ports (P1, P2), supporting switch function
Port Type	Standard RJ45 Ethernet Port
Communication Cable	Shielded Twisted Pair Cable, EtherNet Cat.5e or above
Communication Rate	10/100Mbps, Auto-negotiation, Full Duplex
Transmission Distance	$\leq 100m$ between two nodes
Maximum Number of Mountable I/O Modules	≤ 64 . In actual use, power repeater modules should be added according to the bus current consumption.
Supported Topologies	Supports connecting this module into EtherNet/IP linear, star, tree, and ring network topologies.
Communication Cycle	RPI Time 1~5000ms
Cyclic Data Size	This module and the modules mounted to its right support a maximum

	of 504 bytes each for input and output cyclic data.
Maximum CIP Connections	3 (One each for Exclusive Owner, Read Only, Listen Only)
Compatibility	Passed the EtherNet/IP Conformance Test by ODVA
Configuration Parameters	• Supports modifying the module's IP address via configuration software. • Supports modifying configuration parameters via configuration software during operation.
Type-C Communication	
Connection Method	Connect to the configuration software via the TYPE-C interface. After a successful connection, it appears as a virtual COM port on the computer. The configuration software communicates with the coupler via the USB protocol.
Cyclic Data	Supports reading and writing cyclic data of the coupler and I/O modules via configuration software.
View Alarm Information	Supports viewing all alarm information of the coupler and I/O modules, including hardware diagnostics, channel diagnostics, and protocol diagnostics.
Restore Factory Settings	Supports restoring the coupler's protocol parameters to factory settings.
Logs	Supports log reporting for the coupler and I/O modules.
Firmware Upgrade	• Supports firmware upgrade for the coupler and I/O modules. After upgrade, power off and restart the module to restore diagnostic information. • Do not power off, unplug the USB cable, or close the software during the upgrade process. • No firmware backup is performed. • During the firmware upgrade of any module, the system does not perform cyclic communication, causing other modules to go offline.
Configuration Parameters	• Supports reporting and receiving configuration parameters of the coupler and I/O modules. • Configuration parameters take effect only via the configuration software. • Supports modifying configuration parameters during operation, and modules with unmodified parameters will not go offline. • Supports power-down saving of coupler and I/O configuration parameters. • Supports modifying the coupler's IP address parameters.
Safe Output State	• When configuration parameter source is the Master: ◦ When the slave protocol changes from normal to offline, the I/O module enters the safe output state; when the slave protocol recovers online, the I/O module exits the safe output state. • When configuration parameter source is the configuration software: ◦ When the slave protocol changes from normal to offline and the configuration software is not online, the I/O module enters the safe output state; when the slave protocol recovers online or the configuration software comes online, the I/O module exits the safe output state. ◦ When the slave protocol changes from normal to offline and the configuration software is online, the I/O module does not enter the safe output state and is controlled by the configuration software.
Others	• Supports reporting topology information to the configuration software. • Supports reporting module basic information to the configuration software, including: coupler name, module version, module description, vendor, output current, etc. • Supports the configuration software forcibly modifying module output values during operation. • Supports indicator light test for module identification.

Diagnostics and Logging

Parameter	Specification
Diagnostics	
Internal Fault Diagnostics	Detects the chip's watchdog status. A watchdog reset is considered an internal fault. This fault bit cannot be cleared automatically.
External Fault Diagnostics	• Detects the system-side power supply voltage. When it falls below the threshold (software can still operate normally), it is considered an external fault. This fault bit is automatically cleared when the voltage rises above the threshold. • Detects the field-side power supply status. A fault is considered an external fault. This fault bit is automatically cleared when the fault is resolved. • Detects the ambient temperature. When it exceeds the threshold, it is considered an external fault. This fault bit is automatically cleared when the temperature drops below the threshold.
Protocol Diagnostics	Supported
I/O Diagnostics	Can read and upload I/O module diagnostic data.
Diagnostic Reporting	Diagnostics can be reported directly via the Master or configuration software, or recorded in logs and reported via log reading.
Logging	
Logs	Records diagnostic status changes, module runtime, etc. Supports a maximum of over 3000 entries. Older logs are overwritten when full. Writing logs does not block normal communication.
I/O Log Reporting	Supports reading I/O module logs via the coupler.
Log Upload	Supports uploading coupler and I/O logs to the configuration software via the USB protocol.

4.3.3.3 Indicator LEDs



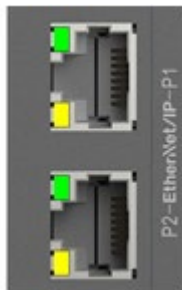
- SPWR: System Power Indicator
- FPWR: Field Power Indicator
- RUN: Module Run Status Indicator
- ERR: Module Fault Indicator
- SF: System Fault Indicator

LED Name	Color	Status	Description
SPWR	Yellow	Off	Module system side is not powered on or power supply is abnormal
		Steady On	Module system side power supply is normal
FPWR	Yellow	Off	Module field side is not powered on or power supply is abnormal
		Steady On	Module field side power supply is normal
RUN	Green	Off	Module is in initial state
		Fast Flash (200ms on, 200ms off)	Module has not established EtherNet/IP communication connection
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	EtherNet/IP communication is normal

ERR	Red	Off	Module has no fault
		Fast Flash (200ms on, 200ms off)	Module external fault
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Module internal fault or module is starting up
SF	Red	Off	I/O module has no fault
		Fast Flash (200ms on, 200ms off)	No configuration or configuration does not match the actual scanned I/O modules
		Single Flash (200ms on, 1000ms off)	Initialization communication failed or I/O module communication is offline
		Steady On	I/O module has internal fault, external fault, or channel fault

4.3.3.4 Communication Interface and Wiring Diagram

Ethernet Port



P1/P2:

- Standard RJ45 interface. For cable details, refer to the [Cable Requirements](#) chapter.
- Supports EtherNet/IP Slave protocol.
- Default IP: 192.168.0.240

The indicator lights of different versions of LT-eIM03 have slightly different meanings. For LT-eIM03-B01 and later versions, please refer to [Table 1](#). For LT-eIM03-A01 version, please refer to [Table 2](#).

Table 1 LT-eIM03-B01 and later Versions

Color	Status	Description
Green	Steady On	Network connected
	Flashing	Data exchange in progress
	Off	Network not connected
Yellow	No significance	

Table 2 LT-eIM03-A01 Version

Color	Status	Description
Green	Flashing	Data exchange in progress
	Off	No data exchange
Yellow	Steady On	Network connected
	Off	No network connection

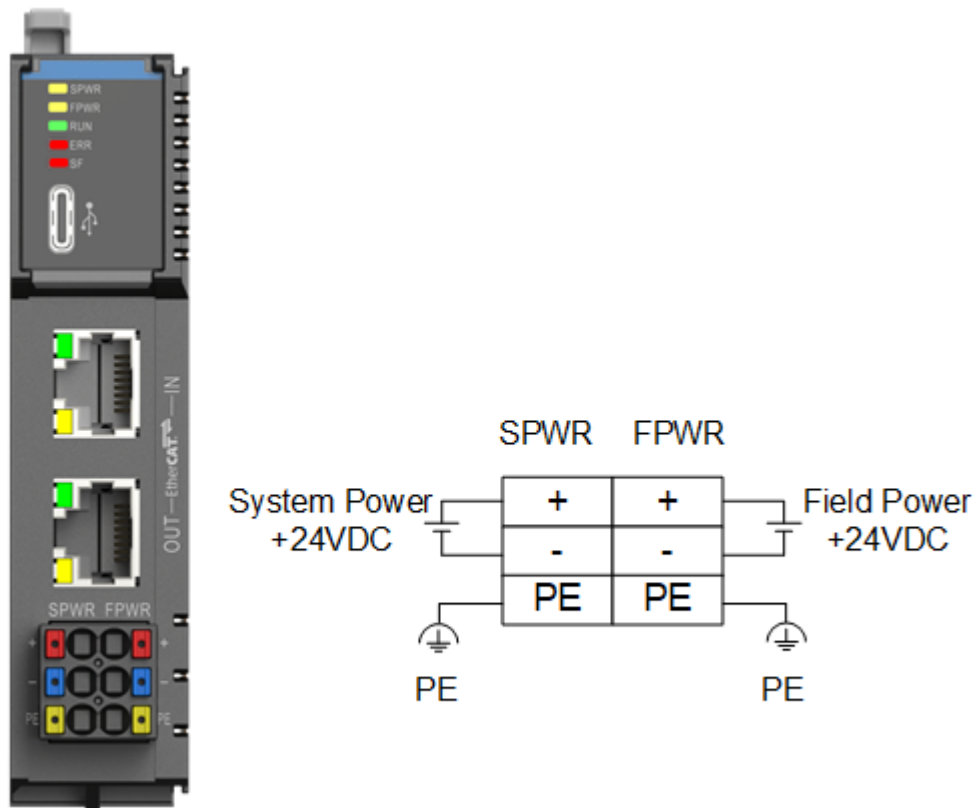


The indicator light flashing indicates data exchange is in progress; the flashing has no fixed frequency.

Type-C Interface

Below the module indicator light, there is a standard Type-C interface for connecting the module to the LT Intelligent Tool configuration software. After a successful connection, it appears as a virtual COM port on the computer. The configuration software communicates with the module via the USB protocol, enabling debugging without the need for a controller. The USB cable used must comply with the USB protocol specification. For details, refer to the [Cable Requirements](#) chapter.

Terminal Block



Identifier	Instructions	Identifier	Instructions
SPWR +	System Power Supply +24VDC Input	FPWR +	Field Power Supply +24VDC Input
SPWR -	System Power Supply 0VDC Input	FPWR -	Field Power Supply 0VDC Input
SPWR PE	Protective Earthing	FPWR PE	Protective Earthing

4.3.3.5 Configuration Parameters



When using the LT-eIM03 module for EtherNet/IP communication with Omron controllers, in addition to the configuration parameters in the table below, please set the Input Assembly Instance to 100 and the Output Assembly Instance to 101.

Category	Parameter Name	Description	Configuration Principle
Module	Interface Version	Module software version number, modification is not supported.	Default: 0x20030001
	IP Address	Module IP address	Default: 192.168.0.240 Value Range: IPv4 address, must not conflict with existing IP addresses in the network.
	Net Mask	Subnet mask corresponding to the module's IP address	Default: 255.255.255.0 Value Range: Subnet mask
	Net Gateway	Default gateway corresponding to the module's IP address	Default: 0.0.0.0 Value Range: Gateway address

4.3.3.6 Diagnosis and Channel Information



During cyclic communication, the module's input data is diagnostic information. This module has no channel information. The number of bytes occupied by the input data is shown in the table below.

Bit/Byte	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5
	Module Diagnosis		Protocol Diagnosis	LTBUS Diagnosis		
Bit0	System Power fault	Force Variable Indication	Slave Protocol Communication Fault	IO Module Communication Fault	Slot of The First IO Module With Fault	Number of IO Modules Communication Online
Bit1	Field power fault	-	-	IO Module Topology Mismatch Fault		
Bit2	Watchdog fault			IO Module Report Fault		
Bit3	Hardware fault			-		
Bit4	Temperature fault					
Bit5	Net1 Link Fault					
Bit6	Net2 Link Fault					
Bit7	Source Of Configuration					

Diagnostic Information



After the coupler restarts, during communication establishment, the internal bus communication diagnosis in cyclic diagnosis is changing, which is normal. Wait until the communication stabilizes (no more than 10s), then check the diagnostic information to determine the module status.

Category		Parameter Name	Description
Periodic Diagnostic Information	Module	System Power Fault	• 0: System side power normal • 1: System side power fault
		Field Power Fault	• 0: Field side power normal • 1: Field side power fault
		Watchdog Fault	• 0: Watchdog normal • 1: Watchdog fault
		Hardware Fault	• 0: Hardware normal • 1: Hardware fault
		Temperature Fault	• 0: Temperature normal • 1: High temperature or low temperature fault
		Net1 Link Fault	• 0: Network port 1 connection normal • 1: Network port 1 connection fault
		Net2 Link Fault	• 0: Network port 2 connection normal • 1: Network port 2 connection fault
		Source Of Configuration	• 0: Master station protocol • 1: Configuration software
		Force Variable Indication	• 0: No forced variables • 1: Forced variables exist
	Protocol	Slave Protocol Communication Fault	• 0: Slave protocol communication (northbound communication) normal • 1: Slave protocol communication (northbound communication) fault
	LTBUS	IO Module Communication Fault	• 0: I/O module communication (internal bus communication) normal • 1: I/O module communication (internal bus communication) fault
		IO Module Topology Mismatch Fault	• 0: I/O module topology matches software configuration • 1: Module ID or module version mismatch^{Note1}
		IO Module Report Fault	• 0: No I/O module reported fault • 1: I/O module reported fault
		Slot Of The First IO Module With Fault ^{Note2}	• 0: I/O module without fault • 1~64: The slot address of the first I/O module with fault
		Number Of IO Module Communication Online	Number of online I/O modules
Aperiodic Diagnostic Information	Module Temperature		Indicates the current temperature of the module, unit: °C. Display value divided by 100 represents actual value, for example: display value 5430 represents 54.3°C
	System Power Voltage		Indicates the voltage value of system power, unit: V. Display value divided by 10 represents actual value, for example: display value 52 represents 5.2VDC
	LTBUS Communication Status		• 0: Unknown • 1: Stopped • 2: Running
	LTBUS Communication Polling Cycle Current		Indicates the actual value of internal bus polling cycle, unit: μs

	Time	
	LTBUS Communication Polling Cycle Max Time	Indicates the maximum value of internal bus polling cycle, unit: μ s
	LTBUS Communication Polling Cycle Min Time	Indicates the minimum value of internal bus polling cycle, unit: μ s
	IO Module LTBUS Communication Total Count	Indicates the total number of internal bus polling I/O slave stations
	IO Module LTBUS Communication Error Count	Indicates the count of input data errors during internal bus polling of I/O slave stations. When there is one error count in the internal bus, it means there is an error in the input data of the current data packet, and the entire data packet will be discarded. The coupler reports the data from the previous cycle to the controller. In the next internal bus polling, it will be rechecked. If there is no error, the data packet will be updated normally and reported to the controller.

Note1: When the module version does not match (e.g. software configuration LT-eTC01-A01 version, actual module is LT-eTC01-A02 version), it is a version compatibility issue and does not affect normal use. The module can communicate normally. To eliminate this fault, please upgrade the coupler to the latest version. The matching relationship of the modules can be referred to the [Version Compatibility](#) chapter.

Note2: LT-eIM03-A01 version, the diagnostic information is "Slot Of The First IO Module With Communication Fault", only reporting the slot number of the module with communication failure; LT-eIM03-A02 and above versions report the module slot number for communication faults when there are communication faults, report the module slot number for faults when there are no communication faults, and report 0 when there are no faults.

Channel Information

None.

4.4 Communication Module

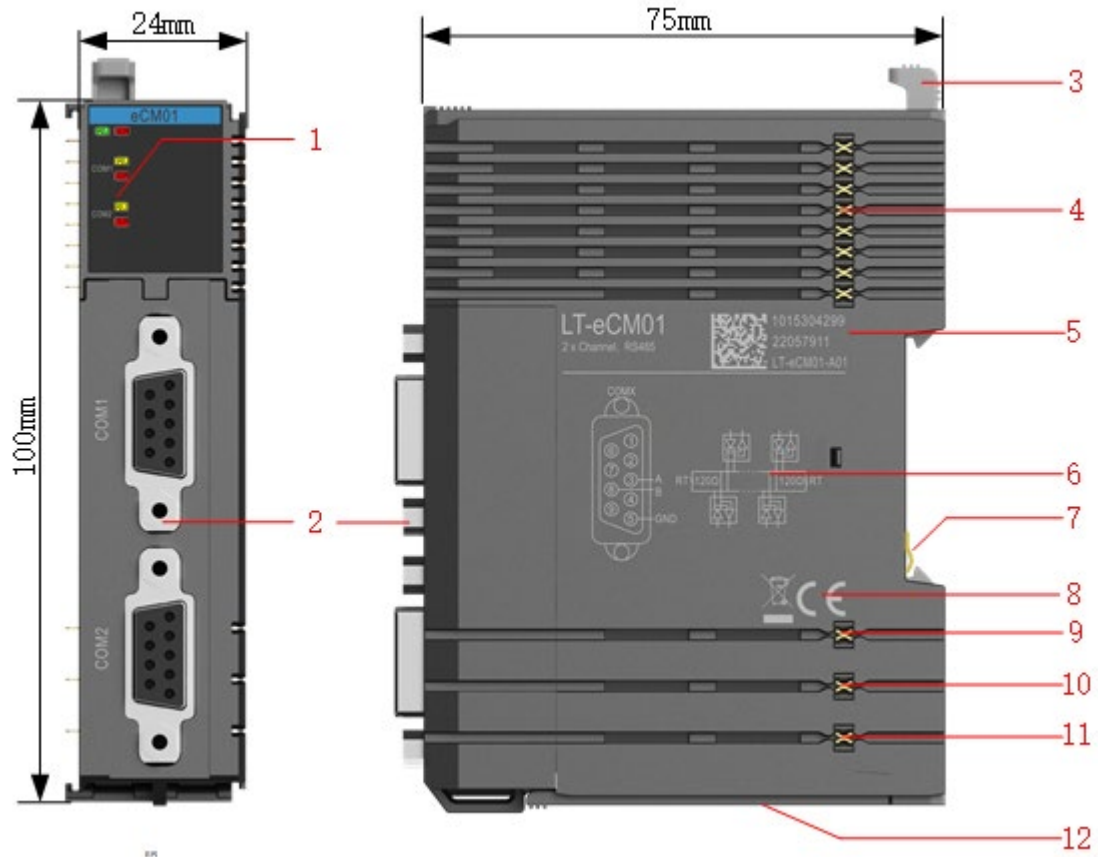
4.4.1 LT-eCM01 2-Channel RS-485 Serial Communication Module

The LT-eCM01 is a 2-channel RS-485 serial communication module. It communicates with transmitters, instruments, and valves via the RS-485 bus and reports data to the CPU module through the internal bus for system calculation and processing.

Usage Notes

In actual use, information such as the word mode, communication data address, and read/write data length for the LT-eCM01 are configured via the module or channel configuration parameters. There is no dedicated function block provided for using this module.

4.4.1.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicates the module's power supply and operating status
2	Serial Port (DB9 Female)	Two RS-485 serial ports. For details, see Serial Port
3	DIN Rail Top Mounting Latch	• Before installing the module onto the DIN rail, pull this latch upward to the unlocked state • After installing the module onto the DIN rail, press this latch downward to the locked state
4	Gold Plated Contacts	Internal bus contact points, used for inter-module data transmission, system power supply, etc.
5	Nameplate	• The left side shows the module model and basic information • The right side shows the serial number QR code and plain text information. The plain text from top to bottom is: Serial Number, Production Batch Number, Module Version Number
6	Wiring Diagram Silkscreen	Module wiring diagram silkscreen
7	Protective Earth (PE) Spring Contact	Contacts the DIN rail and is internally connected to No.11
8	Other Informative Logos	• Do not dispose of arbitrarily • Module complies with CE certification standards
9	Field Power +24VDC	Field power +24VDC contact point, used for field power cascading between modules
10	Field Power 0VDC	Field power 0VDC contact point, used for field power cascading between modules

11	Protective Earth (PE)	Protective earth (PE) contact point, used for protective earth cascading between modules
12	Termination Resistor DIP Switch	Built-in termination resistor DIP switch at the bottom

4.4.1.2 Technical Specifications

Basic Information

Parameter	Specification
System Power Supply	
Power Supply Method	Internal Bus Power Supply
Rated Voltage	5VDC
Voltage Input Range	4.5VDC~5.5VDC
Power Consumption	≤1.5W
Others	
Module Hot Swap	Not Supported
Redundancy	Not Supported
Dimensions	24mm(W) * 100mm(H) * 75mm(D) (excluding local protrusions)
Weight	≤130g
Protection Rating	IP20

Communication

Parameter	Specification
Quantity	2
Interface Level	RS-485
Connection Type	DB9 Female
Inter-Channel Isolation	Not Supported
Supported Protocols	Modbus RTU (Master, Slave), Modbus ASCII (Master, Slave), Free Protocol. Each channel is configured individually.
Supported Function Codes	01, 02, 03, 04, 05, 06, 0F, 10 (Hexadecimal)
Expandable Quantity	One coupler module supports expansion with up to 3 LT-eCM01 modules. Note: In actual use, consider the capability limitations of the controller or coupler, such as the cyclic communication data size limit of the coupler.
Number of Supported Slaves as Master	Each channel can connect up to 32 slave devices.
Termination Resistor	Built-in, enabled or disabled via the bottom DIP switch.
Characteristic Impedance	120Ω
Cable Length	≤1200m
Dynamic Parameter Configuration	Not supported. Modifying any parameter for either channel stops communication on both channels; communication resumes after configuration is complete.
Baud Rate	1200bps, 2400bps, 4800bps, 9600bps, 19200bps, 38400bps, 57600bps, 115200bps. Each channel is configured individually.
Data Bits	8 bits
Stop Bits	1 bit, 2 bits. Each channel is configured individually.
Parity Bit	Odd, Even, None. Each channel is configured individually.
Slave ID	• Modbus Master: Configured individually for each command. • Modbus Slave: Configured individually for each channel. • Configuration Options: 1~247
Cyclic Data Size	Supports 32 bytes, 64 bytes, 128 bytes, 255 bytes per channel.

	Configured uniformly for the module.
Inter-Frame Delay	1~65535 bits. Each channel is configured individually.
Modbus Master	
Number of Supported Commands	Single channel supports up to 32 commands.
Response Timeout	0~65535 ms. Each channel is configured individually.
Input Data Area Handling on Read Timeout	Hold, Clear. Each channel is configured individually.
Command Send Interval	0~65535 ms. Each channel is configured individually.
Command or Data Output Mode	Polling, Data Change. Each channel is configured individually.
Command Send Control Mode	Disable, High Level, Rising Edge. Configured individually for each command.
Modbus Slave	
Number of Supported Memory Areas	Single channel supports up to 32 memory areas.
Register Start Address Configuration	0~65535. Each channel is configured individually.
Slave Response Delay	0~65535 ms. Each channel is configured individually.
Free Protocol	
Master Command Send Interval	0~65535 ms. Each channel is configured individually.
Command or Data Output Mode	Polling, Data Change. Each channel is configured individually.
Master Command Send Control Mode	Disable, High Level, Rising Edge
Free Protocol Receive Mode	Prefix & Suffix, Prefix With Reception Length, Prefix With Timeout Frame Break, Suffix, Reception Length, Timeout Frame Break. Each channel is configured individually.

Diagnostics

Parameter	Specification
System Power Diagnosis Threshold	4.1VDC±5%
Internal Fault Diagnostics	• Detects chip watchdog status. A watchdog reset is considered an internal fault. This fault bit cannot be cleared automatically; clearing requires power cycling the module. • When the system power is normal, detecting a field-side power fault is considered an internal fault. This fault bit cannot be cleared automatically; clearing requires power cycling the module.
External Fault Diagnostics	Detects the system-side power supply voltage. When it falls below the threshold (software can still operate normally), it is considered an external fault. This fault bit is automatically cleared when the voltage rises above the threshold.
Modbus Master Channel Diagnostics	• Communication Completion Diagnosis • Checksum Error Diagnosis • Communication Error Diagnosis
Modbus Slave Channel Diagnostics	• Communication Count • Communication Error Diagnosis
Free Protocol Channel Diagnostics	• Communication Completion Diagnosis • Checksum Error Diagnosis • Received Error Frame Count • Total Received Frame Count • Current Frame Received Data Length • Communication Error
Diagnostic Log	Logs are recorded when diagnostic status changes. Supports a maximum of 100 entries.

Module Runtime Diagnostics	Supports recording the module's cumulative running time.
Channel Runtime Diagnostics	Supports recording the enabled time of the module channels.

4.4.1.3 Indicator LEDs

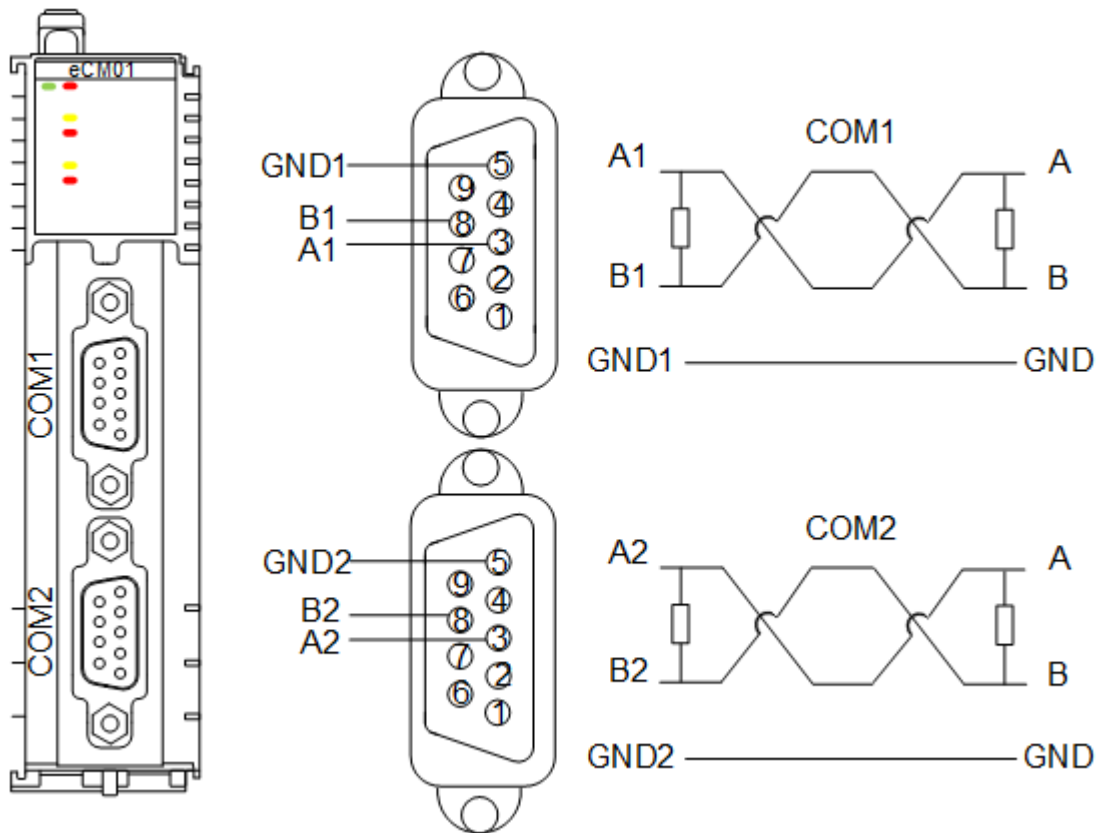


- RU: Run Indicator
- ER: Fault Indicator
- COMx - RU: Channel Status Indicator
- COMx - ER: Channel Communication Indicator

LED Name	Color	Status	Description
RU	Green	Off	Module not powered or firmware not running
		Fast Flash (200ms on, 200ms off)	Internal bus communication offline
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Internal bus communication online
ER	Red	Off	Module has no faults
		Fast Flash (200ms on, 200ms off)	Module external fault
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Module internal fault or module starting up
COMx - RU	Yellow	Off	Channel xx not enabled or configuration verification failed after enabling
		Steady On	Channel xx enabled and configuration verification successful
COMx - ER	Red	Off	Channel communication normal
		Flashing ^{Note}	Some commands communication normal, some commands communication faulty
		Steady On	Channel configuration verification failed or all commands communication faulty

Note: The flashing indicator shows the communication status of the current command - off when current command communication is normal, on when abnormal.

4.4.1.4 Serial Port



Mark	Description	Mark	Description
1	-	6	-
2	-	7	-
3	Bidirectional, RS-485 signal positive, i.e., RS-485 port A signal	8	Bidirectional, RS-485 signal negative, i.e., RS-485 port B signal
4	-	9	-
5	Signal ground GND	-	-



Termination Resistor is built-in and can be enabled or disabled through the bottom DIP switch. For details, refer to the [Termination Resistor](#) chapter.

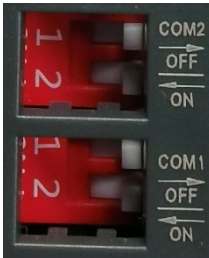
4.4.1.5 Termination Resistor

At the bottom of the module, built-in RS-485 termination resistors are provided, controlling the termination resistors for COM1 and COM2 channels respectively, with a resistance value of 120Ω. Each set of termination resistors is configured via a two-position resistor DIP switch. By default, termination resistors are not set (i.e., both switches are set to OFF).

In the field, according to actual requirements, set both DIP switches to ON by pressing them downward along the arrow direction. The setting takes effect immediately.



Do not set one DIP switch to ON and the other to OFF.



4.4.1.6 Configuration Parameters

Module Configuration Parameters

The parameters shown in the table below are module-level parameters. Once configured, they take effect uniformly across all channels.



After changing the length of the module's cyclic communication data, it is necessary to download the configuration and power cycle the module for the change to take effect.

Parameter Name	Description	Configuration Principle
Module Version	Software version number of the module	Default Value: • 32-byte cyclic data: 0x00130001 • 64-byte cyclic data: 0x00140001 • 128-byte cyclic data: 0x00150001 • 255-byte cyclic data: 0x00160001 Value Range: Automatically adapted after selecting the cyclic data length
Cycle Length	This parameter is visible in the LT Intelligent Tool software but not on the master station side. It represents the length of the module's cyclic communication data, unit: Byte	Default Value: • 32-byte cyclic data: 32 • 64-byte cyclic data: 64 • 128-byte cyclic data: 128 • 255-byte cyclic data: 255 Value Range: • 32 • 64 • 128 • 255

Channel Configuration Parameters

Parameter Name	Description	Configuration Principle
Operating Mode	Serial communication protocol	Default Value: Modbus RTU Master Value Range: • None • Modbus RTU Master

		• Modbus RTU Slave • Modbus ASCII Master • Modbus ASCII Slave • Freeport
BaudRate	Baud rate for serial communication	Default Value: 9600bps Value Range: • 1200bps • 2400bps • 4800bps • 9600bps • 19200bps • 38400bps • 57600bps • 115200bps
DataBits	Number of data bits contained in a communication frame	Default Value: 8bits Value Range: Only supports 8bits
Parity	Parity method for the communication frame	Default Value: None • None • Odd • Even
StopBits	Number of stop bits in a data packet	Default Value: 1bit Value Range: • 1bit • 2bits
Minimum Frame Interval	The interval time between the transmission of two communication frames. Interval time = (1/BaudRate) * Minimum Frame Interval. After the serial port detects that the interval between two frames of data is greater than the interval time, it considers one frame transmission complete. Unit: bit	Default Value: 50 Value Range: [1,65535]

Protocol Configuration Parameters

Modbus RTU Master/Modbus ASCII Master

Table 1 Modbus RTU Master/Modbus ASCII Master

Parameter Name	Description	Configuration Principle
Modbus RTU Master / Modbus ASCII Master		
Response Timeout	The time the master station waits for the slave station's response after sending a request frame. If this time is exceeded, the request frame is considered unacknowledged. Unit: ms	Default Value: 1000 Value Range: [0,65535]
Command Interval	The interval time between the master station receiving the response of the previous command and issuing the next command. Unit: ms	Default Value: 100 Value Range: [0,65535]
Read Timeout Handling	How to handle the cached data in the input data area after a read command from the master station to the slave station times out	Default Value: Hold Value Range: • Hold • Clear
Data Output Mode	The mode in which the master station sends commands	Default Value: Polling Value Range: • Polling • Data Change
Command Count	Number of commands sent by the	Default Value: 0

	master station	Value Range: [0,32]
Res	Reserved	
Command Configuration Parameters		
Enable	Whether to enable the current command ^{Note}	Default Value: Enable Value Range: • Enable: The command is executed • Disable: The command is not executed, but the command's configuration parameters are downloaded
Control Method	The trigger method for the command: • When this parameter is disabled, the command's control method follows the value of the "Data Output Mode" parameter • For other values, the command trigger is controlled by the status of the control bit. The control bit corresponding to each command can be found in Diagnosis and Channel Information , specifically in Table 6 and Table 7	Default Value: Disable Value Range: • Disable: The command trigger method follows the "Data Output Mode" parameter value • High Level: The command is polled when its control bit is at a high level • Rising Edge: The command is sent once when a rising edge is detected on its control bit
Slave ID	ID of the slave station	Default Value: 1 Value Range: [1,247]
Function Code	Function code of the command	Default Value: Read Coils(0xxxx,01H) Value Range: • Read Coils(0xxxx,01H) • Read Discrete Inputs(1xxxx,02H) • Read Holding Registers(4xxxx,03H) • Read Input Registers(3xxxx,04H) • Write Single Coil(0xxxx,05H) • Write Single Holding Register(4xxxx,06H) • Write Multiple Coils(0xxxx,0FH) • Write Multiple Holding Registers(4xxxx,10H)
Address	Modbus starting address for accessing slave data (coils/discrete inputs/registers)	Default Value: 0 Value Range: [0,65535]
Length	Length (bits/words) of the slave data (coils/discrete inputs/registers) to access	Default Value: 0 Value Range: • Bit operation: [1,2000] • Word operation: [1,125] Configuration Principle: The total data length of read or write commands cannot exceed the configured cyclic data length
Res	Reserved	-

Note:

- During communication, the input (output) cyclic data corresponding to each command is tightly arranged in the order of the commands. Even if a command is disabled, the corresponding data area is allocated. The arrangement diagram for input and output area commands is shown below:

Input	Command	Description
0	Command 1	Read, Enabled, Length 2 bytes
1		
2	Command 2	Read, Enabled, Length 1 byte
3	Command	Read, Disabled, Length 4 bytes

4	5	
5		
6		
7	Command 7	Read, Enabled, Length 2 bytes
8		
...	...	...

Output	Command	Description
0	Command 3	Write, Enabled, Length 1 byte
1	Command 4	Write, Enabled, Length 4 bytes
2		
3		
4		
5	Command 6	Write, Disabled, Length 2 bytes
6		
7	Command 8	Write, Disabled, Length 2 bytes
8		
...	...	...

- Read commands allocate input data areas but do not allocate output data areas; Write commands allocate output data areas but do not allocate input data areas.
- After executing a read command, the read data is placed in the input data area allocated to the command; when executing a write command, data is fetched from the output data area allocated to the command.

Modbus RTU Slave/Modbus ASCII Slave

Table 2 Modbus RTU Slave/Modbus ASCII Slave

Parameter Name	Description	Configuration Principle
Modbus RTU Slave / Modbus ASCII Slave		
Slave ID	ID of the slave station	Default Value: 1 Value Range: [1,247]
Slave Response Delay	The delay time for the slave station to respond after receiving a command from the master station. Unit: ms	Default Value: 50 Value Range: [0,65535]
Space Count	Number of spaces for the slave station	Default Value: 0 Value Range: [0,32]
Res	Reserved	-
Space Configuration Parameters		
Start Address	Modbus starting address of the space ^{Note}	Default Value: 0 Value Range: [0,65535], must be a multiple of 8
Space Length	Number of bytes occupied by the space. Unit: byte	Default Value: 0 Value Range: [1,32/64/128/255]. The sum of the lengths of all spaces cannot exceed the cyclic data amount configured for the current channel.
Res	Reserved	-

Note:

- Each space is a Modbus read/write access area. The address range accessible by the area is determined by the configured start address and length. For example:
 - Space 1 Start Address: 8, Length: 16 bytes. Then Space 1 supports Modbus access range: 8~135 (0x, 1x), 8~15 (3x, 4x). The corresponding cyclic data area offset is 0~15 bytes.
 - Space 2 Start Address: 16, Length: 16 bytes. Then Space 2 supports Modbus access range: 16~143

(0x, 1x), 16~23 (3x, 4x). The corresponding cyclic data area offset is 16~31 bytes.

- Input and output data areas are allocated simultaneously for each space in the order of the spaces (according to length). The Modbus accessible addresses for each space can overlap. For spaces with overlapping addresses, the packet is assembled based on the first matching space. Only one space can be effective for a single command at a time; single-command cross-space access is not supported.

Freeport

Table 3 Freeport

Parameter Name	Description	Configuration Principle
Freeport		
Command Interval	Interval time between two commands sent by the master station. Unit: ms	Default Value: 100 Value Range: [0,65535]
Data Output Mode	The mode in which the master station sends data	Default Value: Polling Value Range: • Polling • Data Change
Control Method	The trigger method for the command: • When this parameter is disabled, the command's control method follows the value of the "Data Output Mode" parameter • For other values, the command trigger is controlled by the status of the control bit. The control bit corresponding to each command can be found in Diagnosis and Channel Information , specifically in Table 18 and Table 19	Default Value: Disable Value Range: • Disable: The command trigger method follows the "Data Output Mode" parameter value • High Level: The command is polled when its control bit is at a high level • Rising Edge: The command is sent once when a rising edge is detected on its control bit
Reception Mode	Mode for receiving data ^{Note1}	Default Value: Timeout Frame Break Value Range: • Prefix&Suffix • Prefix with Reception Length • Prefix with Timeout Frame Break • Suffix • Reception Length • Timeout Frame Break
Prefix <i>n</i>	Prefix and suffix information for transmitted data. The corresponding content takes effect based on the value of the "Reception Mode" parameter ^{Note2}	Default Value: 0 Value Range: Valid when greater than 0, not exceeding 8 bytes. When configuring multiple prefixes, the sum of all prefixes should not exceed 8 bytes.
Prefix Size		Default Value: 0 Value Range: [0,8]
Suffix <i>n</i>		Default Value: 0 Value Range: Valid when greater than 0, not exceeding 8 bytes. When configuring multiple suffixes, the sum of all suffixes should not exceed 8 bytes.
Suffix Size		Default Value: 0 Value Range: [0,8]
Receive Size	Number of bytes of user data	Default Value: 0 Value Range: Valid when greater than 0. The upper limit depends on the cyclic data amount, which is 32/64/128/255 bytes respectively.

Res	Reserved	-
-----	----------	---

Note1:

- Prefix & Suffix: Matches the specified prefix in the receive data buffer, then matches the suffix from the position after the prefix, and reads the data between the prefix and suffix, including them.
- Prefix with Reception Length: Matches the specified prefix in the receive data buffer. After matching, reads the prefix and the fixed length of data following it.
- Prefix with Timeout Frame Break: Matches the specified prefix in the receive data buffer. If no new data arrives within the specified time or the buffer is full, it triggers reading the prefix and all subsequent data. The specified time is the duration calculated by **(1/BaudRate) * Minimum Frame Interval**.
- Suffix: Matches the specified suffix in the receive data buffer. After matching, reads the suffix and the valid data preceding it.
- Reception Length: Reads the buffer data directly according to the specified length.
- Timeout Frame Break: If no new data arrives within the specified time or the buffer is full, reads all current data. The specified time is the duration calculated by **(1/BaudRate) * Minimum Frame Interval**.

Note2:

When configuring prefixes and suffixes, pay attention to the number of prefixes/suffixes and the endianness mode. Taking hexadecimal as an example, if the actual data is: AABBCDDDEEFF user data 1122, where AABBCDDDEEFF is the prefix and 1122 is the suffix, then the prefixes and suffixes should be configured as:

- Prefix 1: DDCCBBAA
- Prefix 2: FFEE
- Prefix Byte Count: 6
- Suffix 1: 2211
- Suffix 2: Not configured
- Suffix Byte Count: 2

4.4.1.7 Diagnosis and Channel Information



During cyclic communication, the number of bytes occupied by input data and output data is shown in the following table. Among them:

- The input data of the module includes channel input information and diagnostic information. The channel input information is arranged before the diagnostic information.
- The size of a single channel's input information should not exceed the selected cyclic data length.
- The size of a single channel's output information should not exceed the selected cyclic data length.
- In the following table, the bytes occupied by channel information and diagnostic information correspond to different cyclic data lengths, subject to the actual situation.

Modbus Master Input Information

Table 3 Bytes Occupied by Channel 1 Information (Modbus Master, Input Data)

Bit/Byte	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	...	Byte36 Byte68 Byte132 Byte259
	Status Information					Reception Data Rx		
Bit0	Communication Start	Error Instruction	Error Code	-	-	Channel1 Reception Data	...	Channel1 Reception Data
Bit1	Busy Status							
Bit2	Completion Status							
Bit3	Communication Verification Error							
Bit4	-							
Bit5								
Bit6								
Bit7								

Table 4 Bytes Occupied by Channel 2 Information (Modbus Master, Input Data)

Bit/Byte	Byte37 Byte69 Byte133 Byte260	Byte38 Byte70 Byte134 Byte261	Byte39 Byte71 Byte135 Byte262	Byte40 Byte72 Byte136 Byte263	Byte41 Byte73 Byte137 Byte264	Byte42 Byte74 Byte138 Byte265	...	Byte73 Byte137 Byte265 Byte519
	Status Information					Reception Data Rx		
Bit0	Communication Start	Error Instruction	Error Code	-	-	Channel2 Reception Data	...	Channel2 Reception Data
Bit1	Busy Status							
Bit2	Completion Status							
Bit3	Communication Verification Error							
Bit4	-							
Bit5								
Bit6								
Bit7								

Table 5 Channel Information Details (Modbus Master, Input Data)

Parameter Name		Description
Status 1	Communication Start	• 0: Channel communication not started • 1: Channel communication started
	Busy Status	• 0: Channel idle • 1: Channel busy
	Completion Status	• 0: Channel communication not completed • 1: Channel communication completed
	Communication Verification Error	• 0: No error in channel communication link • 1: Error in channel communication link
Status 2	Error Instruction	Command number where the error occurred
Status 3	Error Code	• 0x0: No error • 0x20: Device address error • 0x21: CRC check error • 0x22: LRC check error • 0x23: ASCII frame error • 0x24: Function code error • 0x25: Response byte count error • 0x26: Data length error • 0x27: Response timeout • 0x40: Slave returned illegal command • 0x41: Slave returned illegal data address • 0x42: Slave returned illegal data value • 0x43: Slave returned slave device failure

		• 0x44: Slave returned other error diagnosis • 0x45: Slave response function code mismatch • 0x46: Slave response address mismatch • 0x47: Slave response data length mismatch • 0x61: Command data area out of limit • 0x62: Common configuration error • 0x63: Channel configuration error • 0x64: Protocol configuration error
Status 4	-	Reserved
Status 5	-	
Rxn	Reception Data	Modbus master input data

Modbus Master Output Information

Table 6 Bytes Occupied by Channel 1 Information (Modbus Master, Output Data)

Bit/Byte	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	...	Byte36 Byte68 Byte132 Byte259
	Control Information					Transmit Data Tx		
Bit0	Communication Error Clear	Command 1 Control Bit	Command 9 Control Bit	Command 17 Control Bit	Command 25 Control Bit	Channel 1 Transmit Data	...	Channel 1 Transmit Data
Bit1	Communication Reset	Command 2 Control Bit	Command 10 Control Bit	Command 18 Control Bit	Command 26 Control Bit			
Bit2	-	Command 3 Control Bit	Command 11 Control Bit	Command 19 Control Bit	Command 27 Control Bit			
Bit3		Command 4 Control Bit	Command 12 Control Bit	Command 20 Control Bit	Command 28 Control Bit			
Bit4		Command 5 Control Bit	Command 13 Control Bit	Command 21 Control Bit	Command 29 Control Bit			
Bit5		Command 6 Control Bit	Command 14 Control Bit	Command 22 Control Bit	Command 30 Control Bit			
Bit6		Command 7 Control Bit	Command 15 Control Bit	Command 23 Control Bit	Command 31 Control Bit			
Bit7		Command 8 Control Bit	Command 16 Control Bit	Command 24 Control Bit	Command 32 Control Bit			

Table 7 Bytes Occupied by Channel 2 Information (Modbus Master, Output Data)

Bit/Byte	Byte37 Byte69 Byte133 Byte260	Byte38 Byte70 Byte134 Byte261	Byte39 Byte71 Byte135 Byte262	Byte40 Byte72 Byte136 Byte263	Byte41 Byte73 Byte137 Byte264	Byte42 Byte74 Byte138 Byte265	...	Byte73 Byte137 Byte265 Byte519
	Control Information					Transmit Data Tx		
Bit0	Communication Error Clear	Command 1 Control Bit	Command 9 Control Bit	Command 17 Control Bit	Command 25 Control Bit	Channel 2 Transmit Data	...	Channel 2 Transmit Data
Bit1	Communication Reset	Command 2 Control Bit	Command 10 Control	Command 18 Control	Command 26 Control			

			Bit	Bit	Bit			
Bit2	-	Command 3 Control Bit	Command 11 Control Bit	Command 19 Control Bit	Command 27 Control Bit			
Bit3		Command 4 Control Bit	Command 12 Control Bit	Command 20 Control Bit	Command 28 Control Bit			
Bit4		Command 5 Control Bit	Command 13 Control Bit	Command 21 Control Bit	Command 29 Control Bit			
Bit5		Command 6 Control Bit	Command 14 Control Bit	Command 22 Control Bit	Command 30 Control Bit			
Bit6		Command 7 Control Bit	Command 15 Control Bit	Command 23 Control Bit	Command 31 Control Bit			
Bit7		Command 8 Control Bit	Command 16 Control Bit	Command 24 Control Bit	Command 32 Control Bit			

Table 8 Channel Information Details (Modbus Master, Output Data)

Parameter Name		Description
Control 1	Communication Error Clear	• 0: No operation • 1: Clear communication error
	Channel Reset	• 0: No operation • 1: Clear channel buffer
Control 2	Command 1~8 Control Bits	Trigger the command when the parameter value of the control bit changes, according to the command control method. Command control method see Configuration Parameters
Control 3	Command 9~16 Control Bits	
Control 4	Command 17~24 Control Bits	
Control 5	Command 25~32 Control Bits	
Txn	Transmit Data	Modbus master output data

Modbus Slave Input Information

Table 9 Bytes Occupied by Channel 1 Information (Modbus Slave, Input Data)

Bit/Byte	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	...	Byte36 Byte68 Byte132 Byte259
	Status Information					Reception Data Rx		
Bit0	Communication Start	Receive Error Count	Total Reception Count	Error Code	-	Channel 1 Reception Data	...	Channel 1 Reception Data
Bit1	Communication Verification Error							
Bit2	-							
Bit3								
Bit4								
Bit5								
Bit6								
Bit7								

Table 10 Bytes Occupied by Channel 2 Information (Modbus Slave, Input Data)

Bit/Byte	Byte37 Byte69 Byte133 Byte260	Byte38 Byte70 Byte134 Byte261	Byte39 Byte71 Byte135 Byte262	Byte40 Byte72 Byte136 Byte263	Byte41 Byte73 Byte137 Byte264	Byte42 Byte74 Byte138 Byte265	...	Byte73 Byte137 Byte265 Byte519
	Status Information					Reception Data Rx		
Bit0	Communication	Receive	Total	Error	-	Channel	...	Channel

	Start	Error Count	Reception Count	Code		2 Reception Data		2 Reception Data
Bit1	Communication Verification Error							
Bit2	-							
Bit3								
Bit4								
Bit5								
Bit6								
Bit7								

Table 11 Channel Information Details (Modbus Slave, Input Data)

Parameter Name		Description
Status 1	Communication Start	• 0: Channel communication not started • 1: Channel communication started
	Communication Verification Error	• 0: No error in channel communication link • 1: Error in channel communication link
Status 2	Receive Error Count	Error packet count, value 0~255. Cycle counting from 0 when exceeding 255
Status 3	Total Reception Count	Total packet count, value 0~255. Cycle counting from 0 when exceeding 255
Status 4	Error Code	• 0x0: No error • 0x01: Illegal function • 0x02: Illegal data address • 0x03: Illegal data value • 0x04: Slave device failure • 0x20: Device address error • 0x21: CRC check error • 0x22: LRC check error • 0x23: ASCII frame error • 0x61: Command data area out of limit • 0x62: Common configuration error • 0x63: Channel configuration error • 0x64: Protocol configuration error • 0x65: Configured data area is empty
Status 5	-	Reserved
Rxn	Reception Data n	Modbus slave input data

Modbus Slave Output Information

Table 12 Bytes Occupied by Channel 1 Information (Modbus Slave, Output Data)

Bit/Byte	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	...	Byte36 Byte68 Byte132 Byte259
	Control Information					Transmit Data Tx		
Bit0	Receive Error Count Clear	-				Channel 1 Transmit Data	...	Channel 1 Transmit Data
Bit1	Total Received Frame Count Clear							
Bit2	Communication Errors Clear							
Bit3	-							
Bit4								
Bit5								
Bit6								
Bit7								

Table 13 Bytes Occupied by Channel 2 Information (Modbus Slave, Output Data)

Bit/Byte	Byte37 Byte69 Byte133 Byte260	Byte38 Byte70 Byte134 Byte261	Byte39 Byte71 Byte135 Byte262	Byte40 Byte72 Byte136 Byte263	Byte41 Byte73 Byte137 Byte264	Byte42 Byte74 Byte138 Byte265	...	Byte73 Byte137 Byte265 Byte519
	Control Information					Transmit Data Tx		
Bit0	Receive Error	-				Channel	...	Channel

	Count Clear		2 Transmit Data		2 Transmit Data
Bit1	Total Received Frame Count Clear				
Bit2	Communication Errors Clear				
Bit3					
Bit4					
Bit5	-				
Bit6					
Bit7					

Table 14 Channel Information Details (Modbus Slave, Output Data)

Parameter Name		Description
Control 1	Receive Error Count Clear	• 0: No operation • 1: Clear receive error count
	Total Received Frame Count Clear	• 0: No operation • 1: Clear total receive frame count
	Communication Errors Clear	• 0: No operation • 1: Clear communication error
Control 2~5	-	Reserved
Txn	Transmit Data	Modbus slave output data

Free Protocol Input Information

Table 15 Bytes Occupied by Channel 1 Information (Free Protocol, Input Data)

Bit/Byte	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	...	Byte36 Byte68 Byte132 Byte259
	Status Information					Reception Data Rx		
Bit0	Communication Start	Received Error Frame Count	Total Received Frame Count	Current Frame Received Data Length	Error Code	Channel 1 Reception Data	...	Channel 1 Reception Data
Bit1	TX Busy Status							
Bit2	RX Completion Status							
Bit3	Communication Verification Error							
Bit4								
Bit5	-							
Bit6								
Bit7								

Table 16 Bytes Occupied by Channel 2 Information (Free Protocol, Input Data)

Bit/Byte	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	...	Byte36 Byte68 Byte132 Byte259
	Status Information					Reception Data Rx		
Bit0	Communication Start	Received Error Frame Count	Total Received Frame Count	Current Frame Received Data Length	Error Code	Channel 2 Reception Data	...	Channel 2 Reception Data
Bit1	TX Busy Status							
Bit2	RX Completion Status							
Bit3	Communication Verification Error							
Bit4								
Bit5	-							
Bit6								
Bit7								

Table 17 Channel Information Details (Free Protocol, Input Data)

Parameter Name		Description
Status 1	Communication Start	• 0: Channel communication not started • 1: Channel communication started
	TX Busy Status	• 0: Channel in send idle state • 1: Channel in send busy state
	RX Completion Status	• 0: Channel has not completed receiving data • 1: Channel has completed receiving data
	Communication Verification Error	• 0: No error in channel communication link • 1: Error in channel communication link
Status 2	Received Error Frame Count	Error packet count, value 0~255. Cycle counting from 0 when exceeding 255
Status 3	Total Received Frame Count	Total packet count, value 0~255. Cycle counting from 0 when exceeding 255
Status 4	Current Frame Received Data Length	Length of the currently received completed data packet, unit: Byte
Status 5	Error Code	• 0x0: No error • 0x59: Received data length out of limit • 0x60: No valid data received • 0x62: Common configuration error • 0x63: Channel configuration error • 0x64: Protocol configuration error • 0x65: Sent data length out of limit
Rxn	Reception Data	Free protocol input data

Free Protocol Output Information

Table 18 Bytes Occupied by Channel 1 Information (Free Protocol, Output Data)

Bit/Byte	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	...	Byte36 Byte68 Byte132 Byte259
	Control Information					Transmit Data Tx		
Bit0	Output Control Bits	Current Tx Frame Data Length	-			Channel 1 Transmit Data	...	Channel 1 Transmit Data
Bit1	Receive Error Count Clear							
Bit2	Total Received Frame Count Clear							
Bit3	Communication Errors Clear							
Bit4	Receive Length Clear							
Bit5	Receive Buffer Clear							
Bit6 Bit7	-							

Table 19 Bytes Occupied by Channel 2 Information (Free Protocol, Output Data)

Bit/Byte	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	...	Byte36 Byte68 Byte132 Byte259
	Control Information					Transmit Data Tx		
Bit0	Output Control Bits	Current Tx Frame Data Length	-			Channel 2 Transmit Data	...	Channel 2 Transmit Data
Bit1	Receive Error Count Clear							
Bit2	Total Received Frame Count Clear							
Bit3	Communication Errors Clear							
Bit4	Receive Length Clear							
Bit5	Receive Buffer Clear							

Bit6	-					
Bit7						

Table 20 Channel Information Details (Free Protocol, Output Data)

Parameter Name		Description
Control 1	Output Control Bits	Trigger the command when the parameter value of the control bit changes, according to the command control method. Command control method see Configuration Parameters
	Receive Error Count Clear	• 0: No operation • 1: Clear receive error count
	Total Received Frame Count Clear	• 0: No operation • 1: Clear total receive frame count
	Communication Errors Clear	• 0: No operation • 1: Clear communication error
	Receive Length Clear	• 0: No operation • 1: Clear receive length
	Receive Buffer Clear	• 0: No operation • 1: Clear receive buffer
Control 2	Current Tx Frame Data Length	Length of the current packet to be sent, value 0~255, unit: byte
Control 3~5	-	Reserved
Txn	Transmit Data	Free protocol output data

Diagnostic Information



The diagnostic information of the module is arranged after the channel input information. The bytes occupied by diagnostic information (Byte74/138/266/520) correspond to different cyclic data volumes of the module.

Table 21 Bytes Occupied by Diagnostic Information

Bit/Byte	Byte74 Byte138 Byte266 Byte520	Channel Diagnosis
	Module Diagnosis	
Bit0	System Power Fault	Not Supported
Bit1	Field Power Fault	
Bit2	Watchdog Fault	
Bit3	Hardware Fault	
Bit4	Communication Fault	
Bit5		
Bit6	-	
Bit7		

Table 22 Diagnostic Information Details

Parameter Name	Description
System Power Fault	Whether the system power is faulty: • 0: System side power normal • 1: System side power fault
Field Power Fault	Whether the field power is faulty: • 0: Field side power normal • 1: Field side power fault
Watchdog Fault	Whether the watchdog is faulty: • 0: Watchdog normal • 1: Watchdog fault
Hardware Fault	Whether the hardware is faulty: • 0: Hardware normal • 1: Hardware fault
Communication Fault	Whether the communication is faulty: • 0: Communication normal • 1: Communication fault

4.4.1.8 Configuration Operation Example

4.4.1.8.1 LT Intelligent Tool Operation Example

After the user performs configuration and parameter settings on the LT Intelligent Tool, the configuration information is downloaded to the coupler. The coupler parses and processes the configuration parameters and then synchronizes them to the LT-eCM01 module via the internal bus. The LT-eCM01 module first verifies and parses the configuration parameters. After confirming the configuration parameters are correct, it initializes the serial port according to these parameters and performs polling processing based on the serial port's operation mode to handle polling-based read/write requests for external modules.

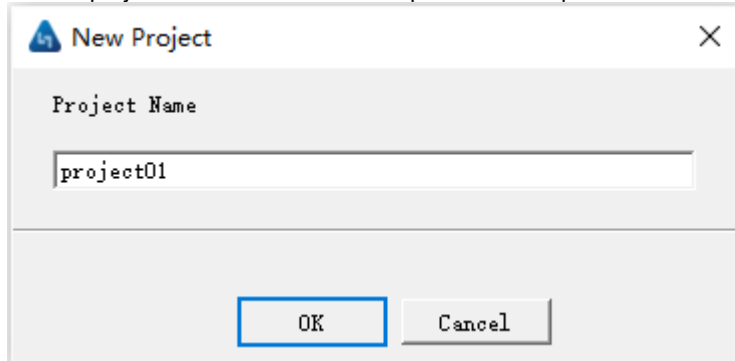


This chapter is only an operation example. For the specific meaning of configuration parameters and configuration precautions, please refer to the [Configuration Parameters](#) chapter.

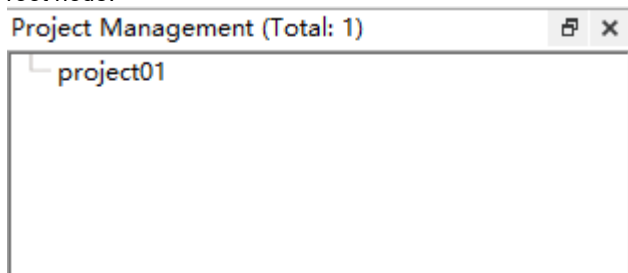
Procedure

Step 1 Create a project.

1. In the software menu bar, select "Project > New Project".
2. In the pop-up interface, enter the project name and click "OK".
 - The project name cannot exceed 32 characters, uses UTF-8 encoding, and each Chinese character is counted as one character
 - The project name cannot be the same as existing project names in the current workspace
 - The project name cannot contain spaces or the special characters "\:|*?<>"

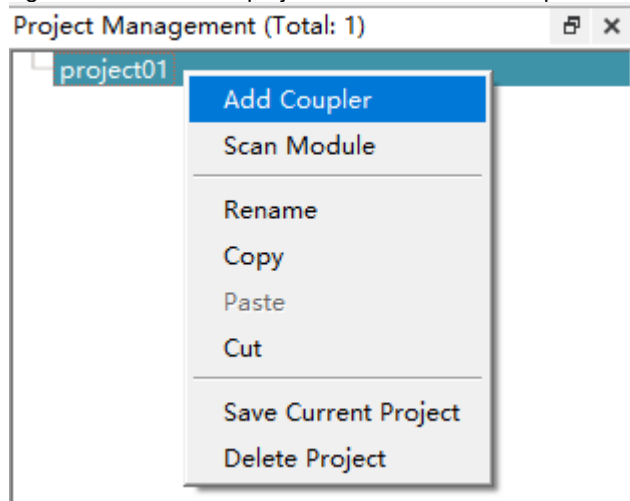


3. In the left project management area, you can see a navigation tree with the project name as the root node.

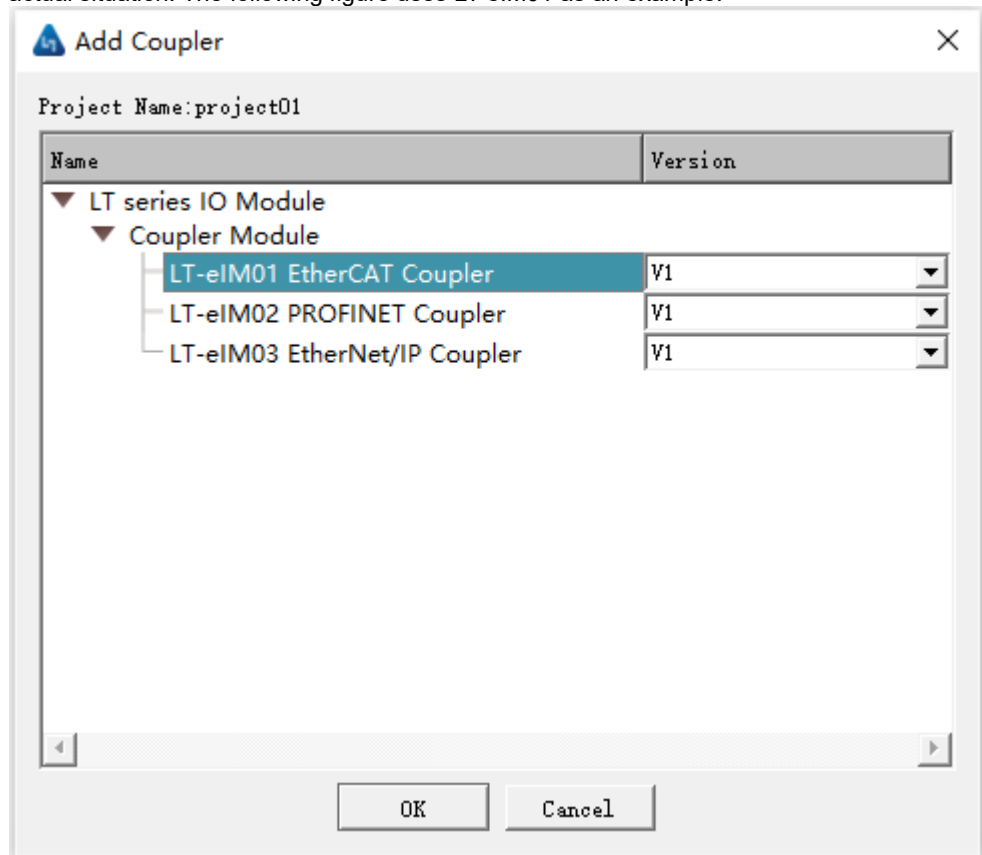


Step 2 Add coupler module.

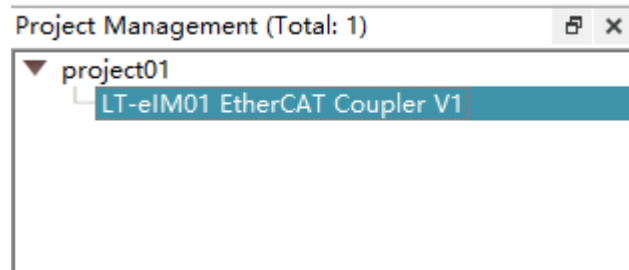
1. Right-click the created project and select "Add Coupler".



2. In the pop-up interface, select the corresponding coupler model and version according to the actual situation. The following figure uses LT-eIM01 as an example.

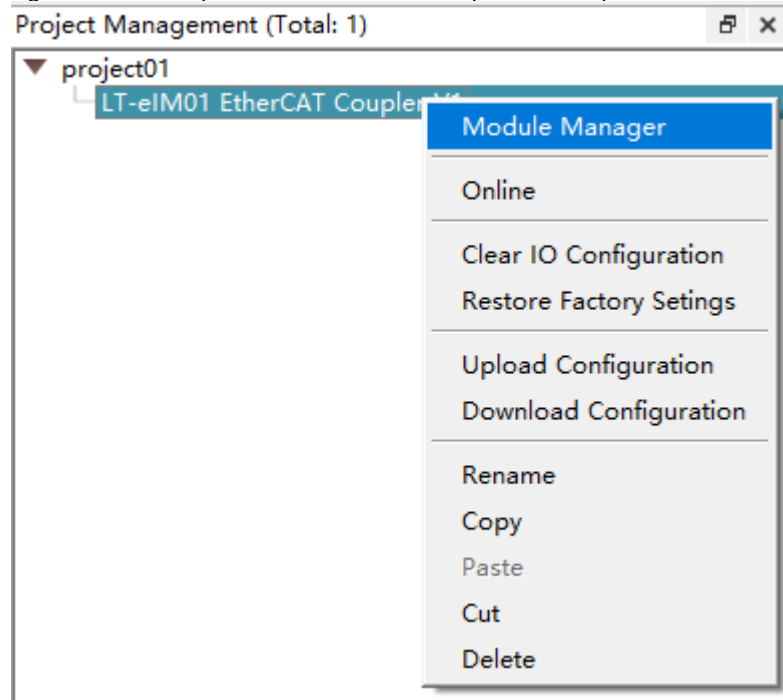


3. Click "OK", and you can see the coupler has been added under the project node.



Step 3 Add LT-eCM01 module.

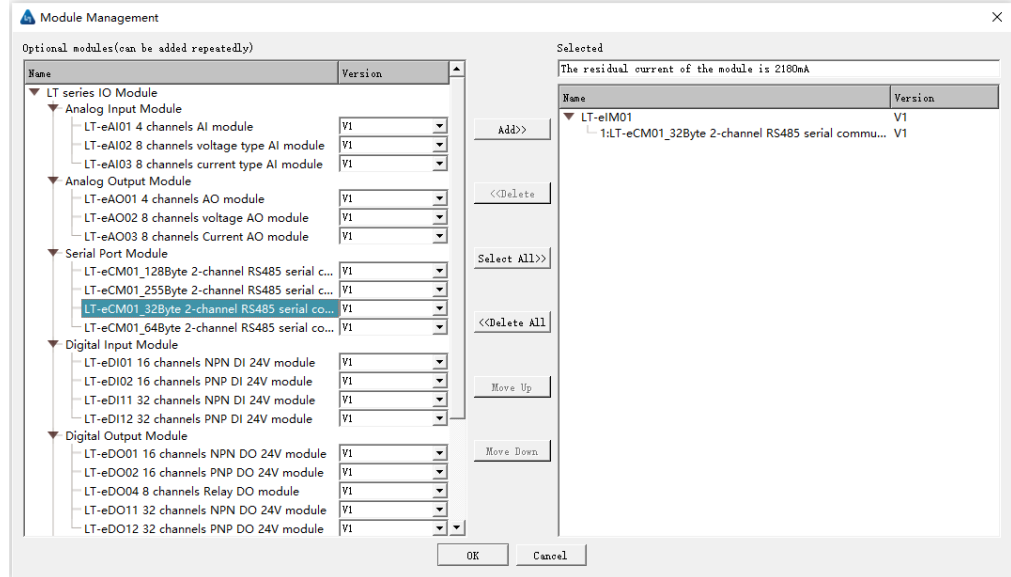
1. Right-click the coupler module added in the previous step and select "Module Manager".



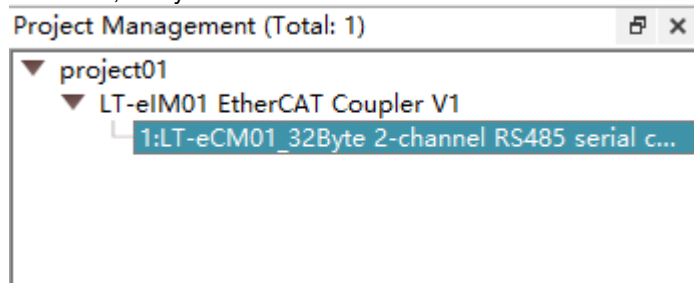
2. In the pop-up dialog box, in the "Optional modules" area on the left, double-click LT-eCM01, and this module will be automatically added to the "Selected" area on the right.



- There are 4 LT-eCM01 modules in the "Optional modules" area, representing different cyclic communication data amounts. Please add according to the actual situation. The figure below shows a schematic of 32-byte cyclic communication data.
- Double-click a module in the "Selected" area on the right to remove it from the "Selected" list.

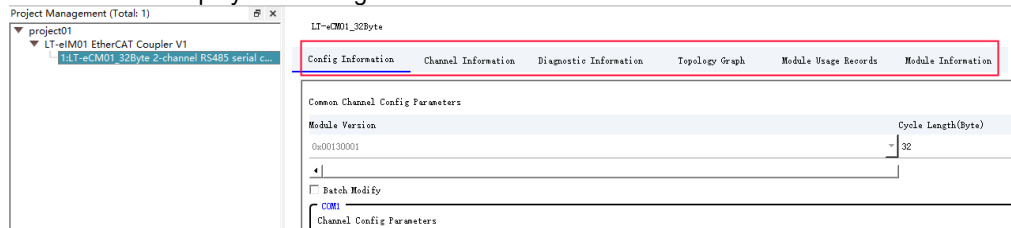


- Click "OK", and you can see the LT-eCM01 module has been added under the coupler node.



Step 4 Configure parameters.

- Click the LT-eCM01 module added in the previous step, and the configuration interface for this module will be displayed in the right work area.



- Click the "Config Information" tab. The configuration parameters include "Module Config Parameters" and "Channel Config Parameters". For detailed information about the configuration parameters supported by each module, their meanings, value ranges, etc., please refer to the [Configuration Parameters](#) chapter.

Project Management (Total: 1)

- project01
 - LT-eCM01 EtherCAT Coupler V1
 - LT-eCM01 32Byte 2-channel RS485 serial C...

LT-eCM01_32Byte

Config Information Channel Information Diagnostic Information Topology Graph Module Usage Records Module Information

Common Channel Config Parameters

Module Version: 0x00130001 Cycle Length(Byte): 32

Batch Modify

Channel Config Parameters

Work Mode: Modbus RTU Master Baud Rate(bps): 9600 Data Bits: 8 BIT Parity Bits: None Stop Bits: 1 BIT Frame Interval(μs): 50

Protocol Configuration Parameters

Response Timeout(ms): 1000 Command Interval(ms): 100 Timeout Behavior: Hold Data Output Mode: Pulling Instruction Number: 0

Channel Config Parameters

Work Mode: Modbus RTU Master Baud Rate(bps): 9600 Data Bits: 8 BIT Parity Bits: None Stop Bits: 1 BIT Frame Interval(μs): 50

Protocol Configuration Parameters

Response Timeout(ms): 1000 Command Interval(ms): 100 Timeout Behavior: Hold Data Output Mode: Pulling Instruction Number: 0

- Configure the parameters of the LT-eCM01 module according to the actual usage scenario. The content of "Protocol Configuration Parameters" will be dynamically refreshed based on the selected "Work Mode". Please refer to the actual interface display.

Project Management (Total: 1)

- project01
 - LT-eCM01 EtherCAT Coupler V1
 - LT-eCM01 32Byte 2-channel RS485 serial C...

LT-eCM01_32Byte

Config Information Channel Information Diagnostic Information Topology Graph Module Usage Records Module Information

Common Channel Config Parameters

Module Version: 0x00130001 Cycle Length(Byte): 32

Batch Modify

Channel Config Parameters

Work Mode: Modbus RTU Master Baud Rate(bps): 9600 Data Bits: 8 BIT Parity Bits: None Stop Bits: 1 BIT Frame Interval(μs): 50

Protocol Configuration Parameters

Response Timeout(ms): 1000 Command Interval(ms): 100 Timeout Behavior: Hold Data Output Mode: Pulling Instruction Number: 0

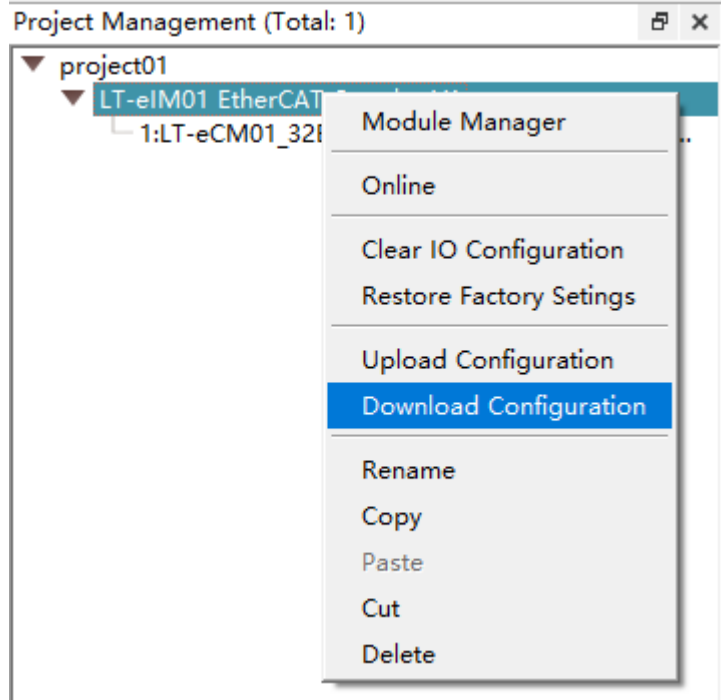
Instruction Configuration Parameters

Instructional: Enable Control Mode: Disable Class ID: 1 Position Code: 0 Protocol Addr: 0 Length: 1

Instructional2: Enable Control Mode: Disable Class ID: 1 Position Code: 0 Protocol Addr: 0 Length: 1

Step 5 Download configuration.

- Ensure the coupler is connected. For connecting the coupler, please refer to the [Connecting to Coupler](#) chapter.
- The operations in this chapter are for example purposes only. In actual operation, ensure that the hardware configuration in the software completely matches the actual topology.
- Right-click the coupler in the left navigation tree and select "Download Configuration".

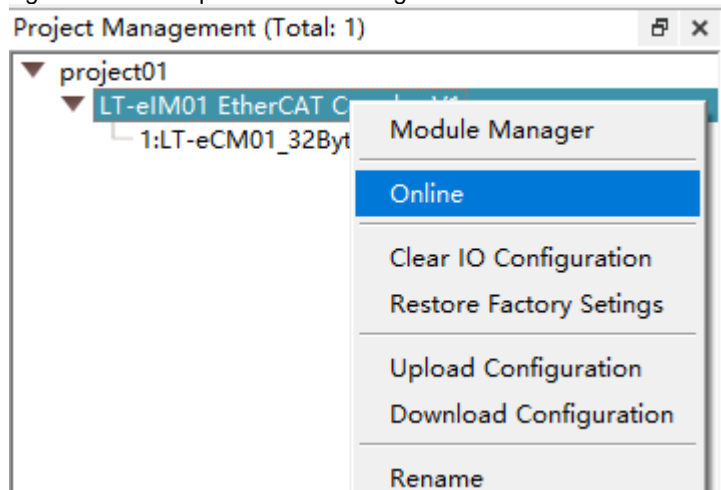


4. Check the prompt messages in the "Output Information" window.

Output Information			
Level	Date	Log Source	Content
Error	2025-12-03 17:52:22	project01	Failed to scan module
Info	2025-12-03 17:52:25	System	Serial port COM3 configured successfully
Warning	2025-12-03 17:52:28	System	IO module configuration not downloaded or mismatched with physical topology. Creating module with default settings!
Info	2025-12-03 17:52:28	project01	Scan module was successful
Info	2025-12-03 17:52:46	1:LT-eCM01_128Byte	Common channel config parameters modified
Info	2025-12-03 17:52:54	0:LT-eIM01	Configuration downloaded successfully

Step 6 View online information.

1. Right-click the coupler in the left navigation tree and select "Online".



2. After the module is online, check the "Channel Information" and "Diagnostic Information" tabs of the LT-eCM01 module to ensure the module is configured correctly and operating normally.

Project Management (Total: 1)

- project01
 - LT-eIM01 EtherCAT Coupler V1
 - LT-eCM01_32Byte 2-channel RS485 serial co...

LT-eCM01_32Byte

Config Information
Channel Information
Diagnostic Information
Topology Graph
Module Usage Records
Module Information

2D Input:

Channel Name	Type	Offset Address	Online Value	Description
COM1				
communication...	BOOL	0.0	TRUE	FALSE:Not started,TRUE:Started
Busy State	BOOL	0.1	FALSE	FALSE:Idle,TRUE:Busy
Completion Sta...	BOOL	0.2	FALSE	FALSE:Unfinished,TRUE:Finish
Communication...	BOOL	0.3	FALSE	FALSE:No Error,TRUE:Fault
Error Instruction	USINT	1	0	Error Instruction
Error Code	USINT	2	0	0:Normal,32:Device Addr Error,33:CRC Check Error,34:LRC Check Error,35:ASO
COM2				
communication...	BOOL	37.0	TRUE	FALSE:Not started,TRUE:Started

2D Output:

Channel Name	Type	Offset Address	Online Value	Description
COM1				
Communication...	BOOL	0.0	FALSE	TRUE:Enable,FALSE:Disable
Communication...	BOOL	0.1	FALSE	TRUE:Enable,FALSE:Disable
Command 1-8...	USINT	1	0	Command 1-8 Control Bits
Command 9-16...	USINT	2	0	Command 9-16 Control Bits
Command 17-2...	USINT	3	0	Command 17-24 Control Bits
Command 25-3...	USINT	4	0	Command 25-32 Control Bits
COM2				
Communication...	BOOL	37.0	FALSE	TRUE:Enable,FALSE:Disable

Project Management (Total: 1)

- project01
 - LT-eIM01 EtherCAT Coupler V1
 - LT-eCM01_32Byte 2-channel RS485 serial co...

LT-eCM01_32Byte

Config Information
Channel Information
Diagnostic Information
Topology Graph
Module Usage Records
Module Information

No.	Diagnostic Name	Status	Description
1	System Power Fault	Normal	0:Normal,1:Fault
2	Field Power Fault	Normal	0:Normal,1:Fault
3	Watchdog Fault	Normal	0:Normal,1:Fault
4	Hardware Fault	Normal	0:Normal,1:Fault
5	Communication Fault	Normal	0:Normal,1:Fault

4.4.1.8.2 AutoThink Operation Example

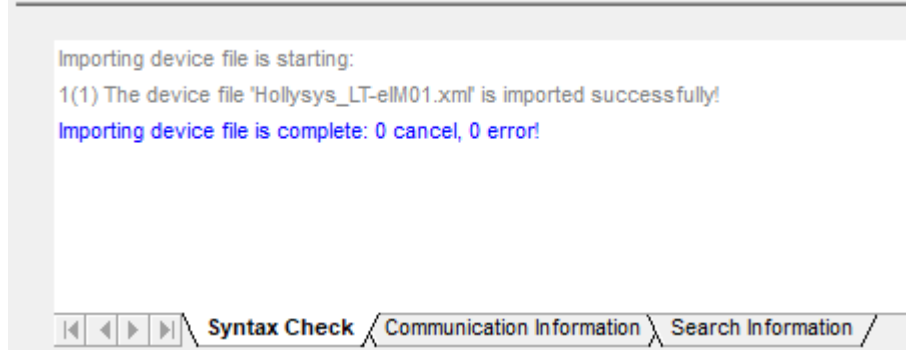
After the user performs configuration in the configuration software, the configuration information is downloaded to the coupler. The coupler parses and processes the configuration parameters and then synchronizes them to the LT-eCM01 module via the internal bus. The LT-eCM01 module first verifies and parses the configuration parameters. After confirming the configuration parameters are correct, it initializes the serial port according to these parameters and performs polling processing based on the serial port's operation mode to handle data read/write requests from external modules and requests to read/write data to external modules.



This chapter is only an operation example. For the specific meaning of configuration parameters and configuration precautions, please refer to the [Configuration Parameters](#) chapter.

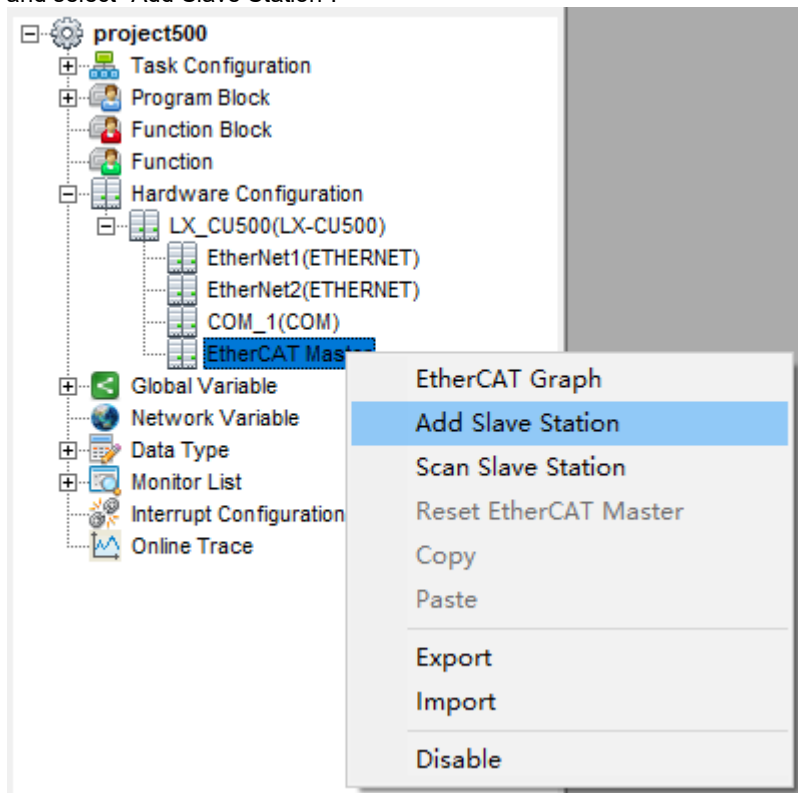
Procedure

- Step 1 For AutoThink software, LT-e series modules are considered third-party devices. Before adding hardware, you need to import the device description file.
1. In the software menu bar, select "Project > Import Device Description File".
 2. In the pop-up dialog box, select the device description file corresponding to the LT-e coupler and click "Open".
 3. AutoThink prompts that the import was successful.

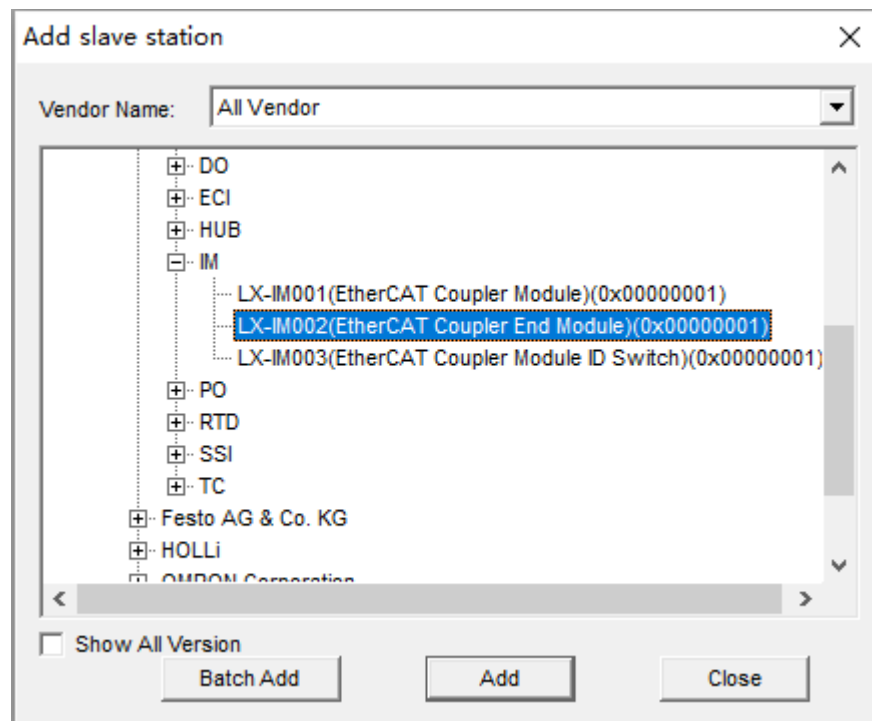


Step 2 Add coupler module (Taking the LX-CU500 right extension LX-IM002 module to lead out the EtherCAT network, and using the LT-eIM01 coupler on the LT-e side as an example).

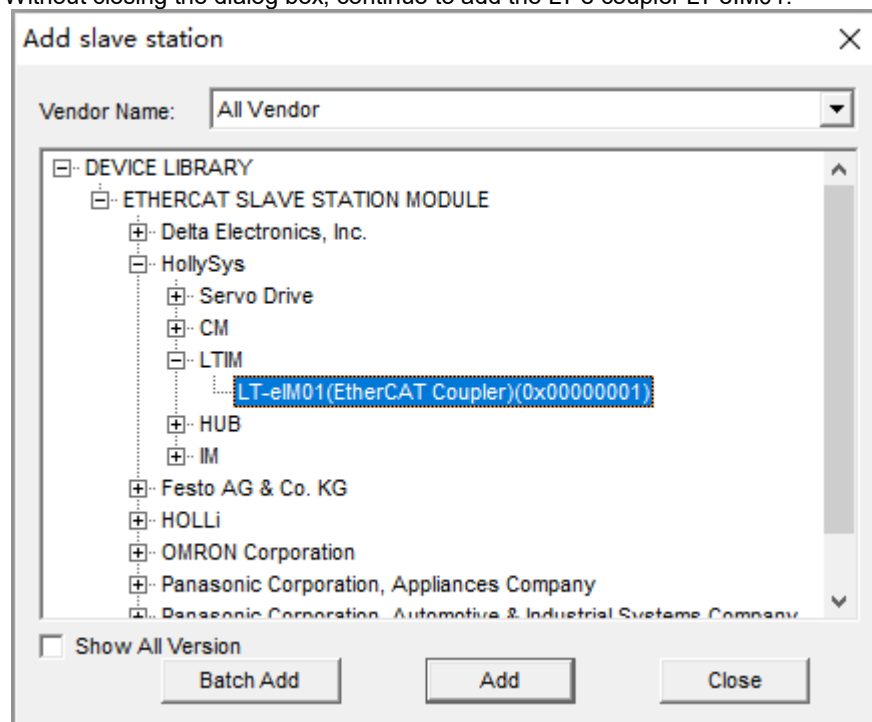
1. In the left navigation tree of the configuration software, right-click the "EtherCAT Master" node and select "Add Slave Station".



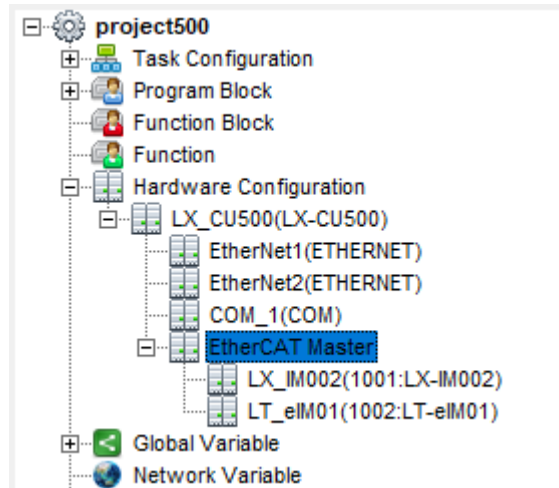
2. In the pop-up dialog box, expand the list sequentially. According to the actual topology, select the LX terminal coupler LX-IM002 and click "Add".



3. Without closing the dialog box, continue to add the LT-e coupler LT-eIM01.

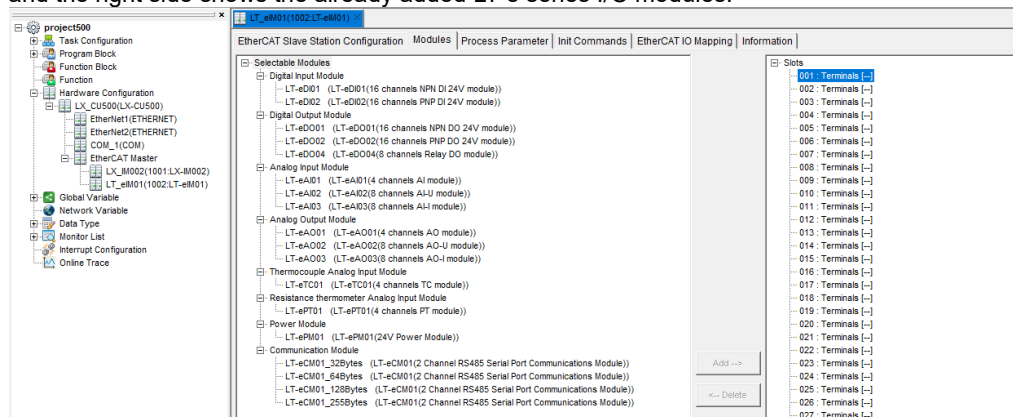


4. Close the "Add Slave Station" dialog box. In the left project management area, you can see that LX-IM002 and LT-eIM01 have been added under the LX-CU500 EtherCAT Master node.



Step 3 Add LT-eCM01 module.

1. Double-click the LT-eIM01 node added in the previous step.
2. Click the "Modules" tab. The left side of the tab displays the available LT-e series I/O modules, and the right side shows the already added LT-e series I/O modules.



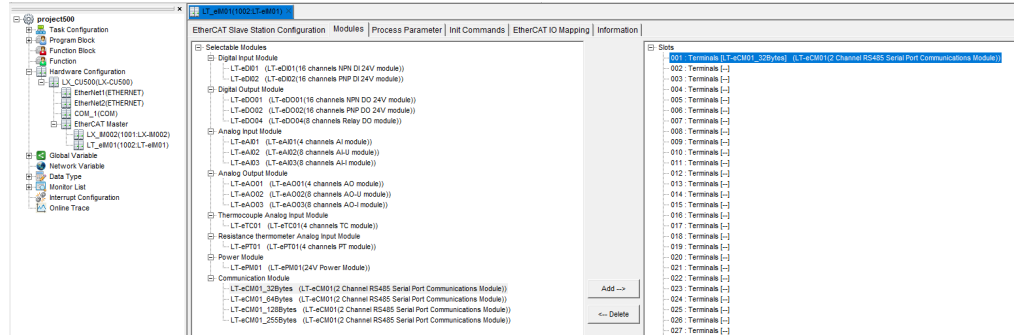
3. In the left "Selectable Modules" list, select the LT-eCM01 module; in the right "Slots" area, select the target slot number, and click **Add -->** to add the LT-eCM01 to the specified slot number.



- There are 4 LT-eCM01 modules in the "Selectable Modules" area, representing different cyclic communication data amounts. Please add according to the actual situation. The figure below shows a schematic of 32-byte cyclic communication data.

- If the selected slot number already has a module, that module will be overwritten.

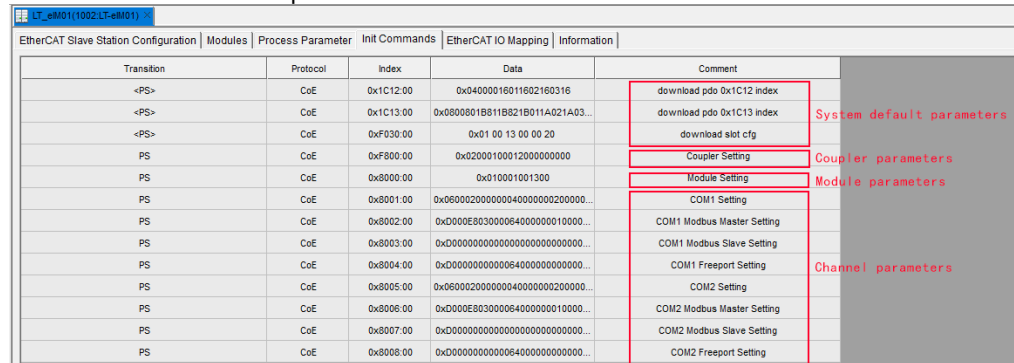
- To delete a module in the "Slots" area, select the module and click **<-- Delete**.



Step 4 Configure parameters.

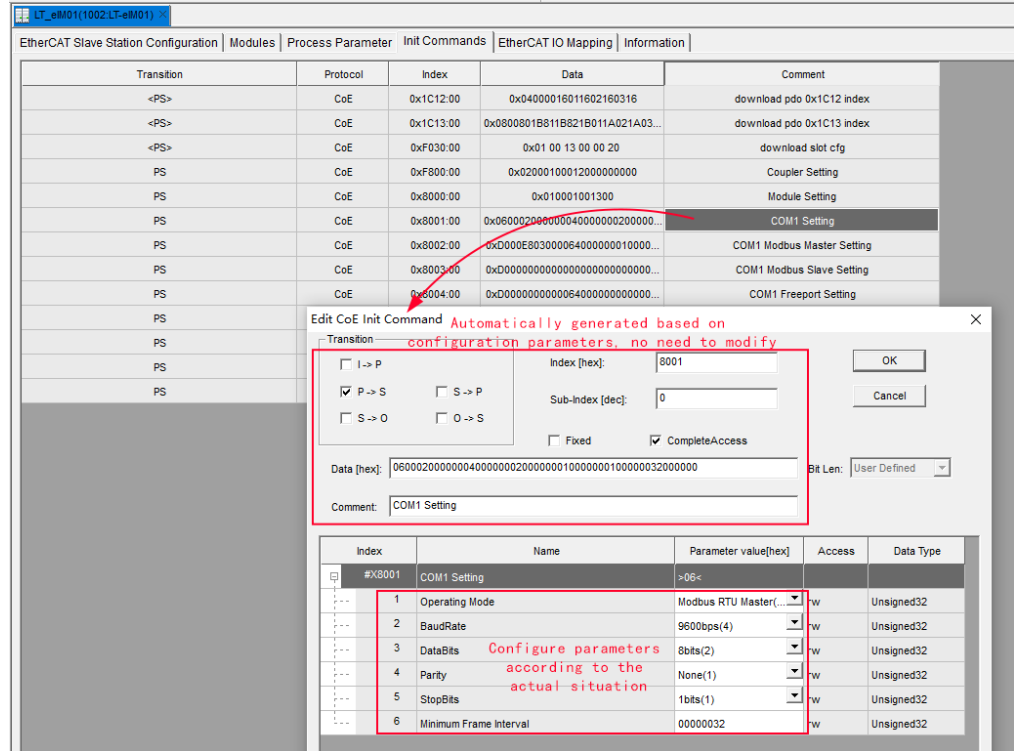
1. Click the "Init Commands" tab. As shown in the figure below, the meaning of each row's parameters is as follows:

- The first three rows are system default parameters and cannot be modified.
- Coupler Setting are the coupler configuration parameters.
- Module Setting are the I/O module configuration parameters. Each Module Setting corresponds to an index. After querying the slot corresponding to the index in [Table 1](#), you can obtain the corresponding module model in the "Modules" tab.
- COMx are the channel parameters of the LT-eCM01 module.



Transition	Protocol	Index	Data	Comment
<PS>	CoE	0x1C12:00	0x04000016011602160316	download pdo 0x1C12 index
<PS>	CoE	0x1C13:00	0x0600001B811B821B011A021A03...	download pdo 0x1C13 index
<PS>	CoE	0xF030:00	0x01 00 13 00 00 20	download slot cfg
PS	CoE	0xF800:00	0x02000100012000000000	Coupler Setting
PS	CoE	0x8000:00	0x010001001300	Module Setting
PS	CoE	0x8001:00	0x06000200000000400000000000...	COM1 Setting
PS	CoE	0x8002:00	0x0000E8030000064000000010000...	COM1 Modbus Master Setting
PS	CoE	0x8003:00	0x00000000000000000000000000...	COM1 Modbus Slave Setting
PS	CoE	0x8004:00	0x0000000000000006400000000000...	COM1 Freepoint Setting
PS	CoE	0x8005:00	0x06000200000000400000000200000...	COM2 Setting
PS	CoE	0x8006:00	0x0000E80300000640000000010000...	COM2 Modbus Master Setting
PS	CoE	0x8007:00	0x00000000000000000000000000...	COM2 Modbus Slave Setting
PS	CoE	0x8008:00	0x0000000000000006400000000000...	COM2 Freepoint Setting

2. Double-click the parameter that needs to be configured. In the pop-up dialog box, configure it according to the actual usage scenario. For detailed information about the configuration parameters supported by each module, their meanings, value ranges, etc., please refer to the [Configuration Parameters](#) chapter.

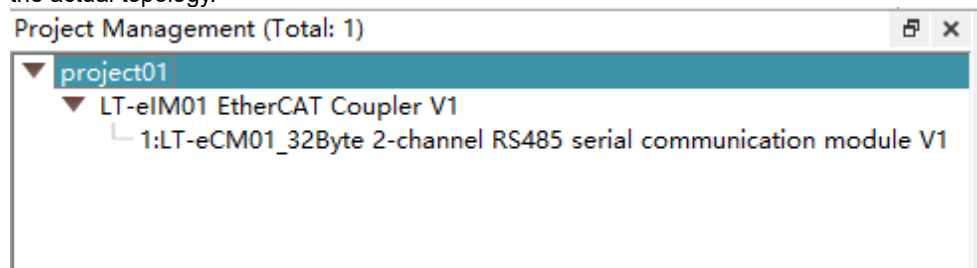


Transition	Protocol	Index	Data	Comment
<PS>	CoE	0x1C12:00	0x04000016011602160316	download pdo 0x1C12 index
<PS>	CoE	0x1C13:00	0x0800801B811B821B011A021A03...	download pdo 0x1C13 index
<PS>	CoE	0xF030:00	0x01 00 13 00 00 20	download slot cfg
PS	CoE	0xF800:00	0x02000100012000000000	Coupler Setting
PS	CoE	0x8000:00	0x010001001300	Module Setting
PS	CoE	0x8001:00	0x0600020000000040000000020000...	COM1 Setting
PS	CoE	0x8002:00	0xD000E803000064000000010000...	COM1 Modbus Master Setting
PS	CoE	0x8003:00	0xD0000000000000000000000000...	COM1 Modbus Slave Setting
PS	CoE	0x8004:00	0xD0000000000064000000000000...	COM1 Freepoint Setting

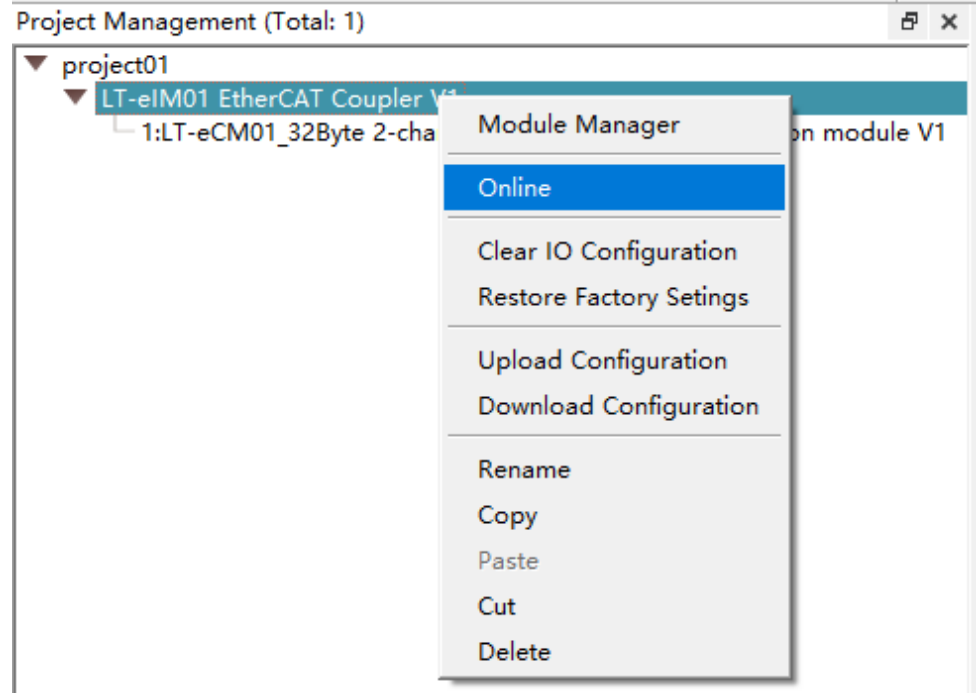
Index	Name	Parameter value[hex]	Access	Data Type
#X8001	COM1 Setting	>06<		
1	Operating Mode	Modbus RTU Master(...)	w	Unsigned32
2	BaudRate	9600bps(4)	w	Unsigned32
3	DataBites	8bits(2)	w	Unsigned32
4	Parity	None(1)	w	Unsigned32
5	StopBites	1bits(1)	w	Unsigned32
6	Minimum Frame Interval	00000032	w	Unsigned32

Step 5 Download configuration.

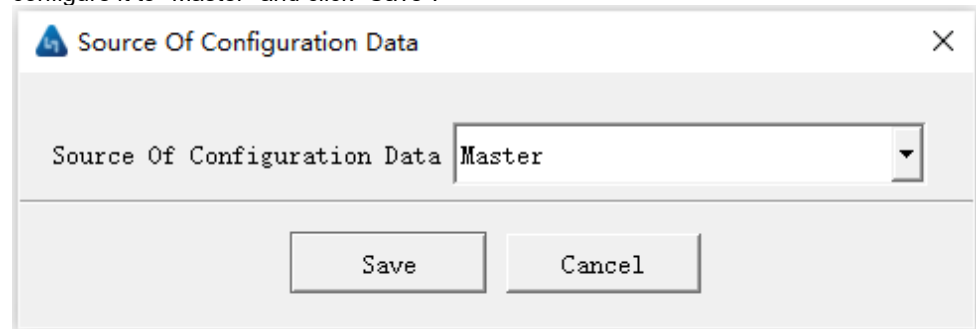
1. The parameter configuration source for the LT-e coupler should be configured as the master station. Checking this configuration requires using the LT Intelligent Tool software.
 - a. Connect the LT-e coupler to the local PC via a Type-C cable and power on the LT-e coupler. For detailed operations, please refer to [LT Intelligent Tool Configuration Operations](#) chapter's [Connecting to Coupler](#).
 - b. In the LT Intelligent Tool software interface, add a project and add LT-e modules based on the actual topology.



- c. Right-click the coupler in the left navigation tree and select "Online".



- d. After the modules are online, choose "Online > Param Source" from the menu bar.
- e. In the pop-up dialog box, check if the parameter configuration source is "Master". If not, configure it to "Master" and click "Save".

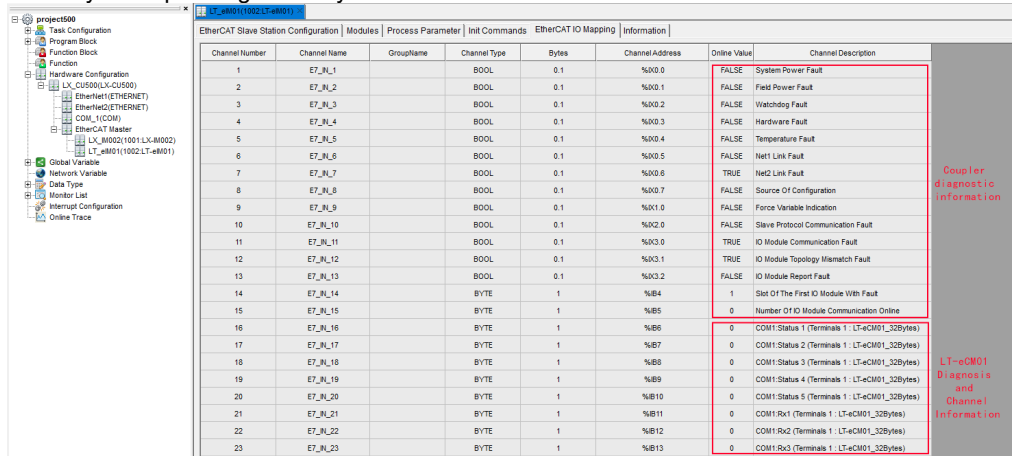


- f. Disconnect the LT-e coupler from the local PC and close the LT Intelligent Tool software.
2. Ensure that the LX-CU500 controller is connected to AutoThink. For connecting the controller, please refer to the [Connecting to Controller](#) chapter.
3. The operations in this chapter are for example purposes only. In actual operation, ensure that the hardware configuration in the software completely matches the actual topology.
4. In the AutoThink software menu bar, select "Project > Compile" to ensure the project has no syntax errors.
5. In the menu bar, select "Online > Download", and complete the download configuration according to the interface prompts.

Step 6 View online information.

1. In the menu bar, select "Online > Monitor".
2. According to the interface prompts, enter the controller's username and password to log in to the controller, and click "OK".

- After the module is online, click the "EtherCAT IO Mapping" tab to view the channel information and diagnostic information of the LT-eCM01 module, ensuring the module is configured correctly and operating normally.



Channel Number	Channel Name	GroupName	Channel Type	Bytes	Channel Address	Online Value	Channel Description
1	E7_RL_1		BOOL	0.1	%X0.0	FALSE	System Power Fault
2	E7_RL_2		BOOL	0.1	%X0.1	FALSE	Field Power Fault
3	E7_RL_3		BOOL	0.1	%X0.2	FALSE	Watchdog Fault
4	E7_RL_4		BOOL	0.1	%X0.3	FALSE	Hardware Fault
5	E7_RL_5		BOOL	0.1	%X0.4	FALSE	Temperature Fault
6	E7_RL_6		BOOL	0.1	%X0.5	FALSE	Net1 Link Fault
7	E7_RL_7		BOOL	0.1	%X0.6	TRUE	Net2 Link Fault
8	E7_RL_8		BOOL	0.1	%X0.7	FALSE	Source Of Configuration
9	E7_RL_9		BOOL	0.1	%X1.0	FALSE	Force Variable Indication
10	E7_RL_10		BOOL	0.1	%X2.0	FALSE	Slave Protocol Communication Fault
11	E7_RL_11		BOOL	0.1	%X3.0	TRUE	IO Module Communication Fault
12	E7_RL_12		BOOL	0.1	%X3.1	TRUE	IO Module Topology Mismatch Fault
13	E7_RL_13		BOOL	0.1	%X3.2	FALSE	IO Module Report Fault
14	E7_RL_14		BYTE	1	%B4	1	Slot 01 The First IO Module With Fault
15	E7_RL_15		BYTE	1	%B5	0	Number Of IO Module Communication Online
16	E7_RL_16		BYTE	1	%B6	0	COM1 Status 1 (Terminals 1 - LT-eCM01_32Bytes)
17	E7_RL_17		BYTE	1	%B7	0	COM1 Status 2 (Terminals 1 - LT-eCM01_32Bytes)
18	E7_RL_18		BYTE	1	%B8	0	COM1 Status 3 (Terminals 1 - LT-eCM01_32Bytes)
19	E7_RL_19		BYTE	1	%B9	0	COM1 Status 4 (Terminals 1 - LT-eCM01_32Bytes)
20	E7_RL_20		BYTE	1	%B10	0	COM1 Status 5 (Terminals 1 - LT-eCM01_32Bytes)
21	E7_RL_21		BYTE	1	%B11	0	COM1 Rx1 (Terminals 1 - LT-eCM01_32Bytes)
22	E7_RL_22		BYTE	1	%B12	0	COM1 Rx2 (Terminals 1 - LT-eCM01_32Bytes)
23	E7_RL_23		BYTE	1	%B13	0	COM1 Rx3 (Terminals 1 - LT-eCM01_32Bytes)

Reference Information

Table 1 Slots and Index Correspondence

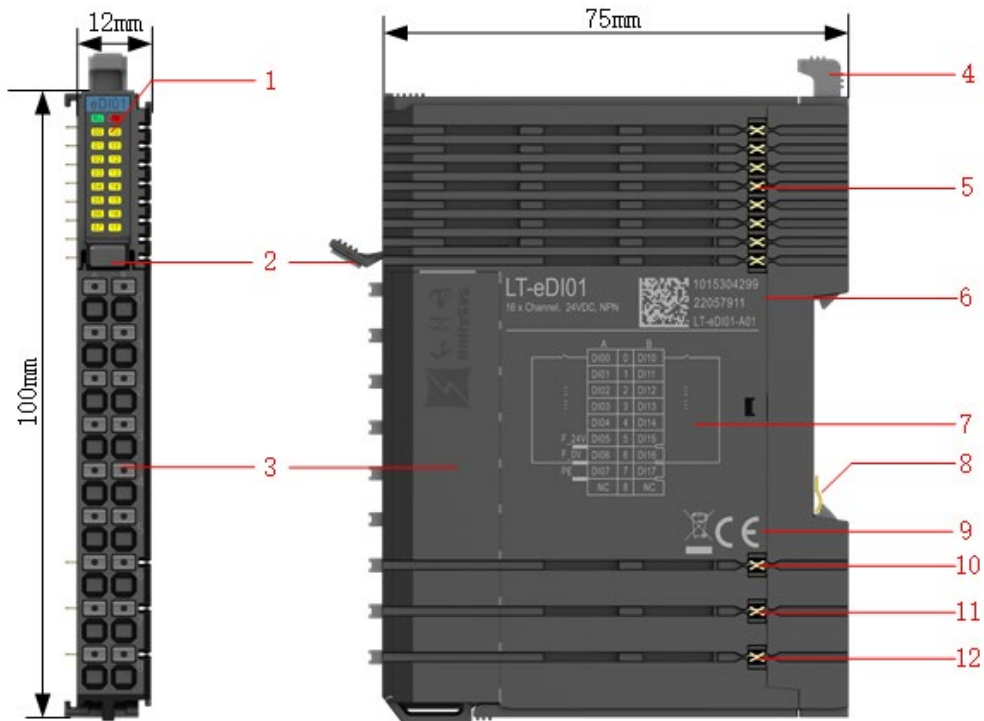
Slots	Index	Slots	Index	Slots	Index	Slots	Index
001	0x8000	017	0x8400	033	0x8800	049	0x8C00
002	0x8040	018	0x8440	034	0x8840	050	0x8C40
003	0x8080	019	0x8480	035	0x8880	051	0x8C80
004	0x80C0	020	0x84C0	036	0x88C0	052	0x8CC0
005	0x8100	021	0x8500	037	0x8900	053	0x8D00
006	0x8140	022	0x8540	038	0x8940	054	0x8D40
007	0x8180	023	0x8580	039	0x8980	055	0x8D80
008	0x81C0	024	0x85C0	040	0x89C0	056	0x8DC0
009	0x8200	025	0x8600	041	0x8A00	057	0x8E00
010	0x8240	026	0x8640	042	0x8A40	058	0x8E40
011	0x8280	027	0x8680	043	0x8A80	059	0x8E80
012	0x82C0	028	0x86C0	044	0x8AC0	060	0x8EC0
013	0x8300	029	0x8700	045	0x8B00	061	0x8F00
014	0x8340	030	0x8740	046	0x8B40	062	0x8F40
015	0x8380	031	0x8780	047	0x8B80	063	0x8F80
016	0x83C0	032	0x87C0	048	0x8BC0	064	0x8FC0

4.5 Digital Input Module

4.5.1 LT-eDI01 16-Channel Digital Input Module (NPN Type)

LT-eDI01 is a digital input module in the LT-e series, containing 16 channels, all of which are NPN type inputs. It implements digital signal acquisition functions through internal bus communication.

4.5.1.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicates the module's power supply and operating status
2	Terminal Locking Switch	Press to detach the terminal block
3	Terminal Block	16-channel digital input terminal block
4	DIN Rail Top Mounting Latch	- Before installing the module onto the DIN rail, pull this latch upward to the unlocked state - After installing the module onto the DIN rail, press this latch downward to the locked state
5	Gold Plated Contacts	Internal bus contact points, used for data transmission between modules, system power supply, etc.
6	Nameplate	- The left side shows the module model and basic information - The right side shows the serial number QR code and plain text information. The plain text from top to bottom is: serial number, production batch number, module version number
7	Wiring Diagram Silkscreen	Module wiring diagram silkscreen. For the detailed wiring diagram, refer to the Module Terminal Wiring Diagram
8	Protective Earth (PE) Spring Contact	Contacts the DIN rail and is internally connected to No.12
9	Other Descriptive Logos	- Do not dispose of arbitrarily - Module complies with CE certification standards
10	Field Power +24VDC	Field power +24VDC contact point, used for field power cascading between modules
11	Field Power 0VDC	Field power 0VDC contact point, used for field power cascading between modules
12	Protective Earth (PE)	Protective earth (PE) contact point, used for protective earth cascading between modules

4.5.1.2 Technical Specifications

Basic Information

Parameter	Specification
System Power	
Power Supply Method	Internal Bus Power Supply
Rated Voltage	5VDC
Voltage Input Range	4.5VDC~5.5VDC
Power Consumption	≤0.5W
Field Power	
Rated Voltage	24VDC
Input Voltage Range	19.2VDC~28.8VDC
Others	
Module Hot Swap	Not Supported
Dimensions	Width 12mm * Height 100mm * Depth 75mm (excluding local protrusions)
Weight	≤90g
Protection Rating	IP20

Channels

Parameter	Specification
Number of Channels	16
Signal Type	NPN Type
Inter-channel Isolation	Not Supported
Channel Protection	Not Supported
Channel Cable	Unshielded cable or shielded cable, cable length ≤100m
Logic 1 Signal	< 5VDC
Logic 0 Signal	> 15VDC
Response Time	- Logic 0 to Logic 1: ≤100μs - Logic 1 to Logic 0: ≤100μs
Input Voltage Level	24VDC (19.2VDC~28.8VDC)
Maximum Load Current	2.7mA/channel @24VDC
Configuration Method (I/O Mapping Method)	- EtherCAT Coupler: BOOL, USINT, UINT - Other Couplers: BOOL
Channel Filter Parameter	Each channel is configured individually, configuration options: 0.1ms (no filter), 0.25ms, 0.5ms, 1ms, 2ms, 4ms, 8ms, 16ms, 32ms Description: Filter error 0.1ms
Input Derating	75% derating when operating at 60°C (no more than 12 input points ON simultaneously), or 15°C derating when all input points are ON

Diagnostics

Parameter	Specification
Internal Fault Diagnostics	Detects chip watchdog status. When a watchdog reset occurs, it is considered an internal fault. This fault bit cannot be cleared automatically.
External Fault Diagnostics	Detects system side power supply voltage. When below the threshold (software can still operate normally), it is considered an external fault. This fault bit can be cleared automatically when the voltage rises above the threshold.

	Detects field side power status. When faulty, it is considered an external fault. This fault bit can be cleared automatically when the fault is resolved.
Channel Diagnostics	Reserved
System Power Diagnostic Threshold	4.1VDC±5%
Field Power Diagnostic Threshold	17VDC±10%
Diagnostic Log	Logs are recorded when diagnostic status changes, supports up to 100 entries
Module Runtime Diagnostics	Supports recording cumulative module operating time
Channel Runtime Diagnostics	Supports recording cumulative operating time of module channels in OFF and ON states

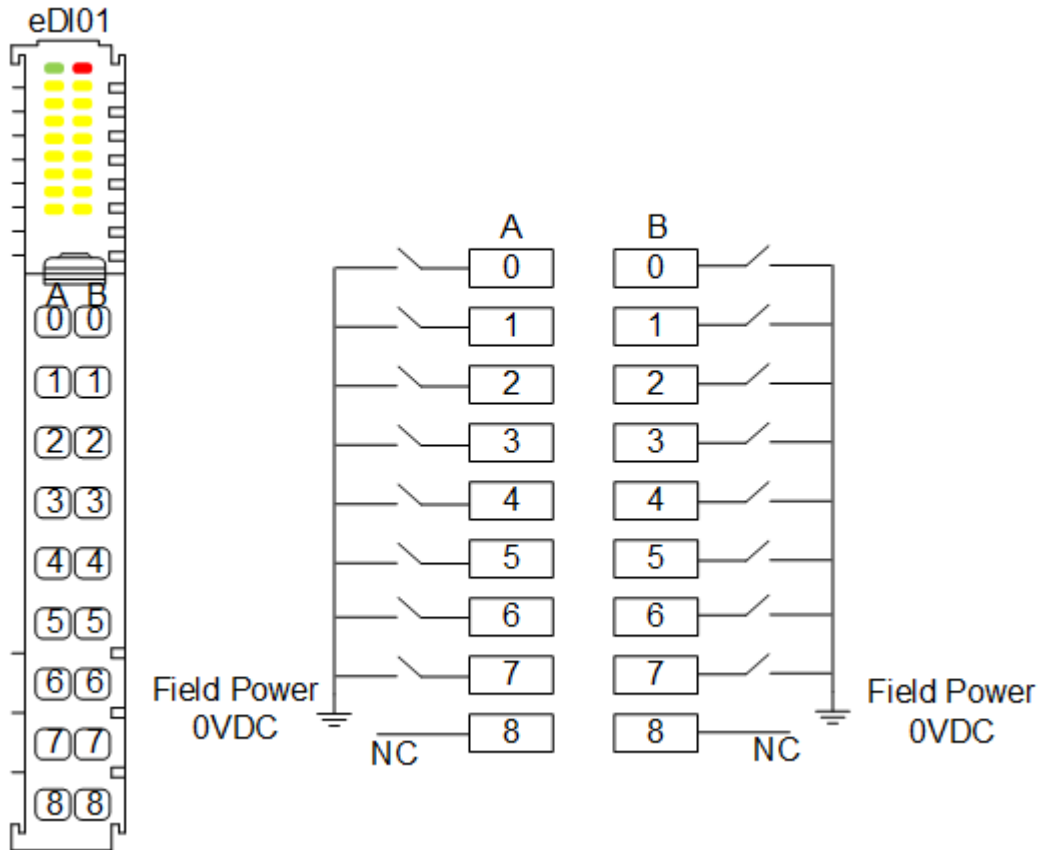
4.5.1.3 Indicator LEDs



- RU: Run Indicator
- ER: Error Indicator
- 00~07, 10~17: Channel Indicators

LED Name	Color	Status	Description
RU	Green	Off	Module is not powered or firmware is not running
		Fast Flash (200ms on, 200ms off)	Internal bus communication is offline
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Internal bus communication is online
ER	Red	Off	Module has no fault
		Fast Flash (200ms on, 200ms off)	Module external fault
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Module internal fault or module is starting up
00~07, 10~17	Yellow	Off	Channel xx has no input signal
		Steady On	Channel xx has input signal

4.5.1.4 Module Terminal Wiring Diagram



Mark	Description	Mark	Description
A0	Digital Input Channel 00	B0	Digital Input Channel 10
A1	Digital Input Channel 01	B1	Digital Input Channel 11
A2	Digital Input Channel 02	B2	Digital Input Channel 12
A3	Digital Input Channel 03	B3	Digital Input Channel 13
A4	Digital Input Channel 04	B4	Digital Input Channel 14
A5	Digital Input Channel 05	B5	Digital Input Channel 15
A6	Digital Input Channel 06	B6	Digital Input Channel 16
A7	Digital Input Channel 07	B7	Digital Input Channel 17
A8	NC, Floating	B8	NC, Floating

4.5.1.5 Configuration Parameters

Category	Parameter Name	Description	Configuration Principle
Module	Module Version	Software version number of the module, cannot be modified	Default Value: 0x00010001
Channel	Channel Diag Enable ^{Note}	Whether to enable channel diagnostics function	Default Value: Enable Value Range: • Enable: Enable channel diagnostics function

			• Disable: Disable channel diagnostics function
	Channel Filter	Filter parameter of the channel	Default Value: 1ms Value Range: • 0.1ms, indicates no filtering • 0.25ms • 0.5ms • 1ms • 2ms • 4ms • 8ms • 16ms • 32ms

Note: Channel diagnostics is a reserved function and is not implemented at present. Enabling it will not generate channel diagnostic information.

4.5.1.6 Diagnosis and Channel Information



During cyclic communication, the module's input data includes diagnosis information and channel information. The diagnosis information is arranged before the channel information. The number of bytes occupied by the input data is shown in the following table.

Table 1 Diagnosis Information Occupied Bytes

Table 1. Diagnostic Information: Accepted Bytes			
Bit/Byte	Byte0	Byte1	Byte2
	Module Diagnosis	Channel Diagnosis	
Bit0	System Power Fault	Reserved	
Bit1	Field Power Fault		
Bit2	Watchdog Fault		
Bit3	Hardware Fault		
Bit4	-		
Bit5			
Bit6			
Bit7			

Table 2 Channel Information Occupied Bytes

Bit/Byte	Byte3	Byte4
Bit0	Channel 00	Channel 10
Bit1	Channel 01	Channel 11
Bit2	Channel 02	Channel 12
Bit3	Channel 03	Channel 13
Bit4	Channel 04	Channel 14
Bit5	Channel 05	Channel 15
Bit6	Channel 06	Channel 16
Bit7	Channel 07	Channel 17

Diagnosis Information

Category	Parameter Name	Description
Module	System Power Fault	• 0: System side power is normal • 1: System side power is faulty

	Field Power Fault	• 0: Field side power is normal • 1: Field side power is faulty
	Watchdog Fault	• 0: Watchdog is normal • 1: Watchdog is faulty
	Hardware Fault	• 0: Hardware is normal • 1: Hardware is faulty
Channel	Reserved	

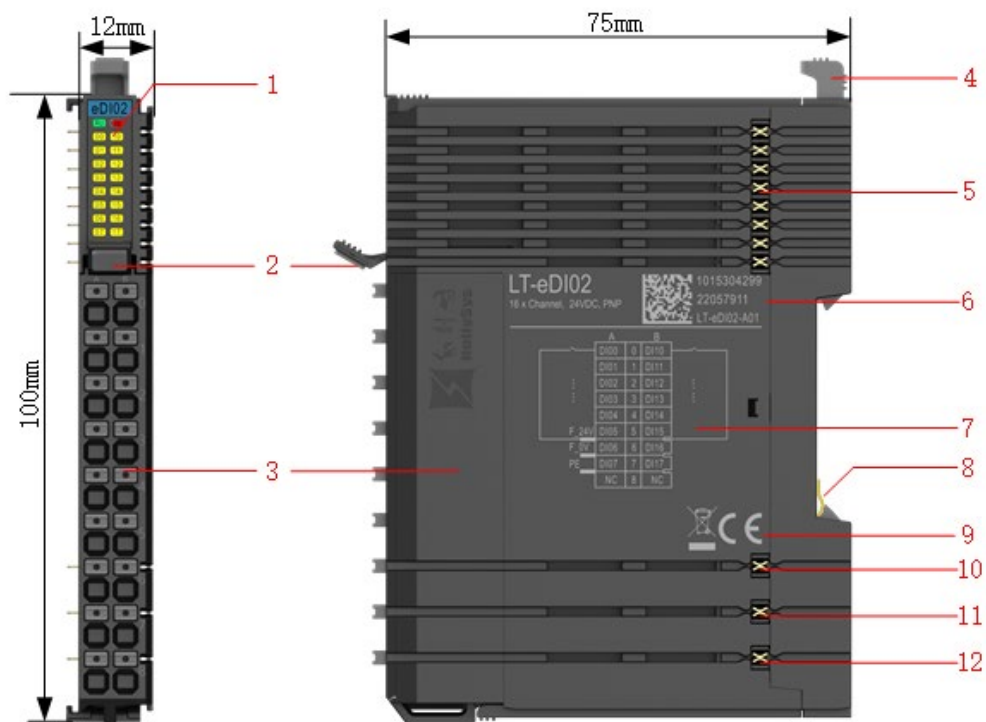
Channel Information

Parameter Name	Description
CHxx	• FALSE: Channel has no input signal • TRUE: Channel has input signal

4.5.2 LT-eDI02 16-Channel Digital Input Module (PNP Type)

The LT-eDI02 is a digital input module in the LT-e series, featuring 16 channels, all of which are PNP type inputs. It realizes digital signal acquisition functions through internal bus communication.

4.5.2.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicates the module's power supply and operating status
2	Terminal Locking Switch	Press to detach the terminal block
3	Terminal Block	16-channel digital input terminal block
4	DIN Rail Top Mounting Latch	• Before installing the module onto the DIN rail, pull this latch upward to the unlocked state • After installing the module onto the DIN rail, press this latch downward to the locked state
5	Gold Plated Contacts	Internal bus contact points, used for data transmission between modules, system power supply, etc.
6	Nameplate	• The left side shows the module model and basic information • The right side shows the serial number QR code and plain text information. The plain text from top to bottom is: serial number, production batch number, module version number
7	Wiring Diagram Silkscreen	Module wiring diagram silkscreen. For the detailed wiring diagram, refer to the Module Terminal Wiring Diagram
8	Protective Earth (PE) Spring Contact	Contacts the DIN rail and is internally connected to No.12
9	Other Descriptive Logos	• Do not dispose of arbitrarily • Module complies with CE certification standards
10	Field Power +24VDC	Field power +24VDC contact point, used for field power cascading between modules
11	Field Power 0VDC	Field power 0VDC contact point, used for field power cascading between modules
12	Protective Earth (PE)	Protective earth (PE) contact point, used for protective earth cascading between modules

4.5.2.2 Technical Specifications

Basic Information

Parameter	Specification
System Power Supply	
Power Supply Method	Internal Bus Power Supply
Rated Voltage	5VDC
Voltage Input Range	4.5VDC~5.5VDC
Power Consumption	≤0.5W
Field Power Supply	
Rated Voltage	24VDC
Input Voltage Range	19.2VDC~28.8VDC
Others	
Module Hot Swap	Not Supported
Dimensions	Width 12mm * Height 100mm * Depth 75mm (excluding local protrusions)
Weight	≤90g
Protection Rating	IP20

Channels

Parameter	Specification
Number of Channels	16
Signal Type	PNP Type
Channel-to-Channel	Not Supported

Isolation	
Channel Protection	Not Supported
Channel Cable	Unshielded or shielded cable, cable length $\leq 100\text{m}$
Logic 1 Signal	$> 15\text{VDC}$
Logic 0 Signal	$< 5\text{VDC}$
Response Time	- Logic 0 to Logic 1: $\leq 100\mu\text{s}$ - Logic 1 to Logic 0: $\leq 100\mu\text{s}$
Input Voltage Level	24VDC (19.2VDC~28.8VDC)
Maximum Load Current	2.7mA/channel @24VDC
Configuration Method (I/O Mapping Method)	- EtherCAT Coupler: BOOL, USINT, UINT - Other Couplers: BOOL
Channel Filter Parameter	Each channel is configured individually, configuration options: 0.1ms (no filter), 0.25ms, 0.5ms, 1ms, 2ms, 4ms, 8ms, 16ms, 32ms Note: Filter error 0.1ms
Input Derating	75% derating when operating at 60°C (no more than 12 input points ON simultaneously), or 15°C derating when all input points are ON

Diagnostics

Parameter	Specification
Internal Fault Diagnostics	Detects chip watchdog status. When a watchdog reset occurs, it is considered an internal fault. This fault bit cannot be cleared automatically.
External Fault Diagnostics	- Detects system side power supply voltage. When it falls below the threshold (software can still operate normally), it is considered an external fault. This fault bit can be cleared automatically when the voltage rises above the threshold. - Detects field side power supply status. In case of failure, it is considered an external fault. This fault bit can be cleared automatically when the fault is resolved.
Channel Diagnostics	Reserved
System Power Supply Diagnostic Threshold	4.1VDC $\pm 5\%$
Field Power Supply Diagnostic Threshold	17VDC $\pm 10\%$
Diagnostic Log	Logs are recorded when diagnostic status changes, supporting up to 100 entries
Module Runtime Diagnostics	Supports recording the module's cumulative operating time
Channel Runtime Diagnostics	Supports recording the cumulative operating time of module channels in OFF and ON states

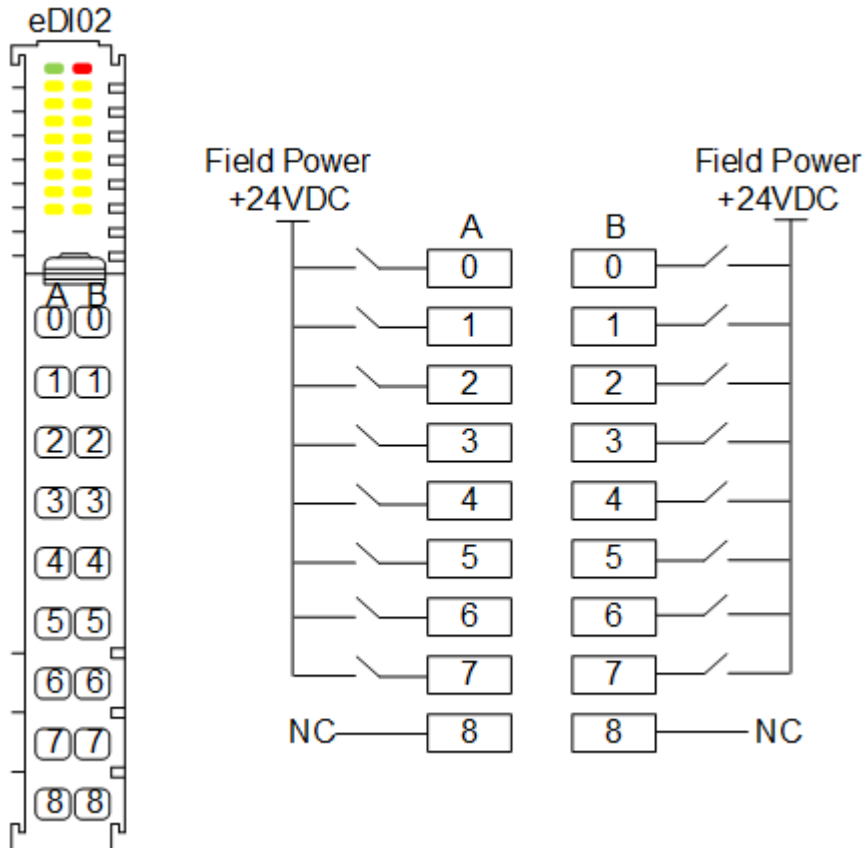
4.5.2.3 Indicator LEDs



- RU: Run Indicator
- ER: Error Indicator
- 00~07, 10~17: Channel Indicators

LED Name	Color	Status	Description
RU	Green	Off	Module is not powered or firmware is not running
		Fast Flash (200ms on, 200ms off)	Internal bus communication is offline
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Internal bus communication is online
ER	Red	Off	Module has no fault
		Fast Flash (200ms on, 200ms off)	Module external fault
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Module internal fault or module is starting up
00~07, 10~17	Yellow	Off	Channel xx has no input signal
		Steady On	Channel xx has input signal

4.5.2.4 Module Terminal Wiring Diagram



Mark	Description	Mark	Description
A0	Digital Input Channel 00	B0	Digital Input Channel 10
A1	Digital Input Channel 01	B1	Digital Input Channel 11
A2	Digital Input Channel 02	B2	Digital Input Channel 12
A3	Digital Input Channel 03	B3	Digital Input Channel 13
A4	Digital Input Channel 04	B4	Digital Input Channel 14
A5	Digital Input Channel 05	B5	Digital Input Channel 15
A6	Digital Input Channel 06	B6	Digital Input Channel 16
A7	Digital Input Channel 07	B7	Digital Input Channel 17
A8	NC, Floating	B8	NC, Floating

4.5.2.5 Configuration Parameters

Category	Parameter Name	Description	Configuration Principle
Module	Module Version	Module software version number, cannot be modified	Default value: 0x00020001
Channel	Channel Diag Enable ^{Note}	Whether to enable channel diagnosis function	Default value: Enable Value range: • Enable: Enable channel diagnosis function

			• Disable: Disable channel diagnosis function
	Channel Filter	Channel filter parameter	Default value: 1ms Value range: • 0.1ms, indicates no filtering • 0.25ms • 0.5ms • 1ms • 2ms • 4ms • 8ms • 16ms • 32ms

Note: Channel diagnostics is a reserved function and is not implemented at present. Enabling it will not generate channel diagnostic information.

4.5.2.6 Diagnostics and Channel Information



During cyclic communication, the module's input data includes diagnostic information and channel information, with diagnostic information arranged before channel information. The number of bytes occupied by input data is shown in the table below.

Table 1 Diagnostic Information Occupied Bytes

Bit/Byte	Byte0	Byte1	Byte2
	Module Diagnostics	Channel Diagnostics	
Bit0	System Power Fault	Reserved	
Bit1	Field Power Fault		
Bit2	Watchdog Fault		
Bit3	Hardware Fault		
Bit4	-		
Bit5			
Bit6			
Bit7			

Table 2 Channel Information Occupied Bytes

Bit/Byte	Byte3	Byte4
Bit0	Channel 00	Channel 10
Bit1	Channel 01	Channel 11
Bit2	Channel 02	Channel 12
Bit3	Channel 03	Channel 13
Bit4	Channel 04	Channel 14
Bit5	Channel 05	Channel 15
Bit6	Channel 06	Channel 16
Bit7	Channel 07	Channel 17

Diagnostic Information

Category	Parameter Name	Description
Module	System Power Fault	• 0: System side power supply normal • 1: System side power supply fault

	Field Power Fault	• 0: Field side power supply normal • 1: Field side power supply fault
	Watchdog Fault	• 0: Watchdog normal • 1: Watchdog fault
	Hardware Fault	• 0: Hardware normal • 1: Hardware fault
Channel	Reserved	

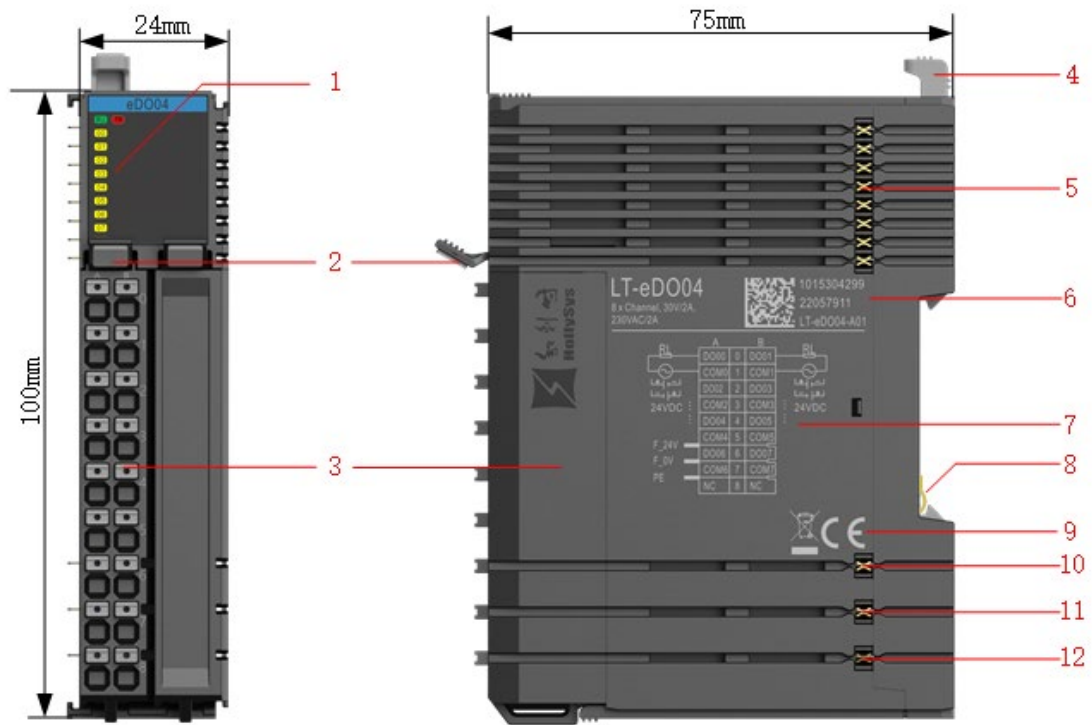
Channel Information

Parameter Name	Description
CHxx	• FALSE: No input signal on channel • TRUE: Input signal present on channel

4.5.3 LT-eDI11 32-Channel Digital Input Module (NPN Type)

The LT-eDI11 is a digital input module in the LT-e series, featuring 32 channels, all of which are NPN inputs. It realizes digital signal acquisition functions through internal bus communication.

4.5.3.1 Module Appearance Introduction



No.	Name	Description
1	Indicator	Indicates the module's power supply and operating status
2	Terminal Locking Switch	Press to remove the terminal block
3	Terminal Block	32-channel digital input terminal block
4	DIN Rail Top Mounting Latch	- Before mounting the module to the DIN rail, pull this latch upward to the unlocked position - After mounting the module to the DIN rail, press this latch downward to the locked position
5	Gold Plated Contacts	Internal bus contact points, used for data transmission between modules, system power supply, etc.
6	Nameplate	- The left side shows the module model and basic information - The right side shows the serial number QR code and plain code information. The plain code from top to bottom is: serial number, production batch number, module version number
7	Wiring Diagram Silkscreen	Module wiring diagram silkscreen. For the detailed wiring diagram, refer to the Module Terminal Wiring Diagram
8	Protective Earth (PE) Spring Contact	Contacts the DIN rail and is internally connected to No.12
9	Other Descriptive Logos	- Do not dispose of arbitrarily - Module complies with CE certification standards
10	Field Power +24VDC	Field power +24VDC contact point, used for field power cascading between modules
11	Field Power 0VDC	Field power 0VDC contact point, used for field power cascading between modules
12	Protective Earth (PE)	Protective earth (PE) contact point, used for protective earth cascading between modules

4.5.3.2 Technical Specifications

Basic Information

Parameter	Specification
System Power Supply	
Power Supply Method	Internal Bus Power Supply
Rated Voltage	5VDC
Voltage Input Range	4.5VDC~5.5VDC
Power Consumption	≤0.7W
Field Power Supply	
Rated Voltage	24VDC
Input Voltage Range	19.2VDC~28.8VDC
Others	
Module Hot Swap	Not Supported
Dimensions	Width 24mm * Height 100mm * Depth 75mm (excluding local protrusions)
Weight	≤180g
Protection Rating	IP20

Channels

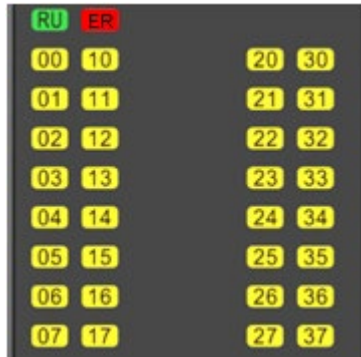
Parameter	Specification
Number of Channels	32
Signal Type	NPN Type

Input Voltage	24VDC (19.2VDC~28.8VDC)
Logic 1 Signal	< 5VDC
Logic 0 Signal	> 15VDC
Response Time	• Logic 0 to Logic 1: $\leq 100\mu s$ • Logic 1 to Logic 0: $\leq 100\mu s$
Channel Cable	Unshielded cable or shielded cable, cable length $\leq 100m$
Maximum Load Current	2.7mA/channel @24VDC
Channel-to-Channel Isolation	Not Supported
Redundancy	Not Supported
Configuration Method (I/O Mapping Method)	• EtherCAT Coupler: BOOL, USINT, UINT • Other Couplers: BOOL
Channel Filter Parameter	0.1ms (no filter), 0.5ms, 1ms, 2ms, 4ms, 8ms, 16ms, 32ms, individually configurable per channel Note: Filter error 0.12ms
Input Derating	• All channels ON at operating temperature 45°C • Derated to 75% at operating temperature 60°C (no more than 24 input points ON simultaneously)

Diagnostics

Parameter	Specification
Internal Fault Diagnostics	Detects chip watchdog status. A watchdog reset is considered an internal fault. This fault bit cannot be cleared automatically.
External Fault Diagnostics	• Detects system-side power supply voltage. When below the threshold (software can still operate normally), it is considered an external fault. This fault bit can be cleared automatically when the voltage rises above the threshold. • Detects field-side power supply status. A fault condition is considered an external fault. This fault bit can be cleared automatically upon fault recovery.
Channel Diagnostics	Reserved
System Power Supply Diagnostic Threshold	4.1VDC $\pm 5\%$
Field Power Supply Diagnostic Threshold	17VDC $\pm 10\%$
Diagnostic Log	Logs entries when diagnostic status changes, supports up to 100 entries
Module Runtime Diagnostics	Supports recording the module's cumulative runtime
Channel Runtime Diagnostics	Supports recording the cumulative runtime of module channels in OFF and ON states: • During normal operation, records based on the input value • Not recorded during system power supply or field power supply faults

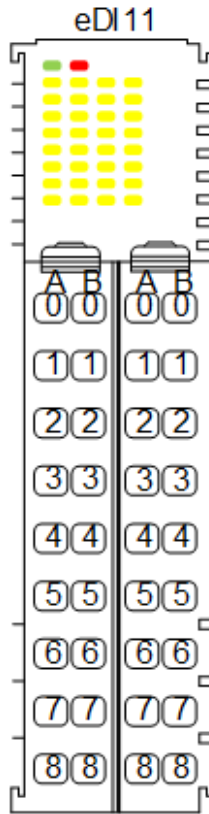
4.5.3.3 Indicator LEDs



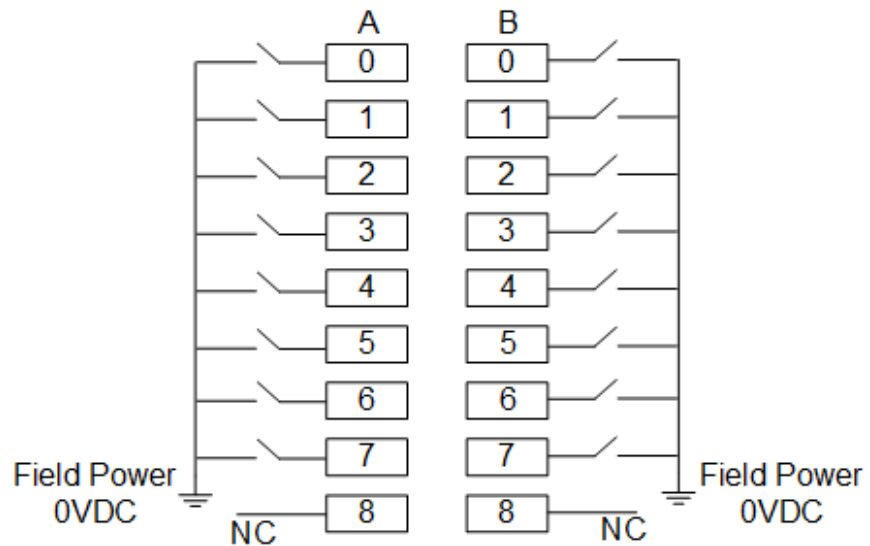
- RU: Run Indicator
- ER: Error Indicator
- 00~07, 10~17, 20~27, 30~37: Channel Indicators

LED Name	Color	Status	Description
RU	Green	Off	Module not powered or firmware not running
		Fast Flash (200ms on, 200ms off)	Internal bus communication offline
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Internal bus communication online
ER	Red	Off	Module has no fault
		Fast Flash (200ms on, 200ms off)	Module external fault
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Module internal fault or module starting up
00~07, 10~17 20~27, 30~37	Yellow	Off	Channel xx has no input signal
		Steady On	Channel xx has input signal

4.5.3.4 Module Terminal Wiring Diagram



The wiring diagrams for both the left and right 18 terminals:



Marking	Description	Marking	Description
Left 18 Terminals			
A0	Digital Input Channel 00	B0	Digital Input Channel 10
A1	Digital Input Channel 01	B1	Digital Input Channel 11
A2	Digital Input Channel 02	B2	Digital Input Channel 12
A3	Digital Input Channel 03	B3	Digital Input Channel 13
A4	Digital Input Channel 04	B4	Digital Input Channel 14
A5	Digital Input Channel 05	B5	Digital Input Channel 15
A6	Digital Input Channel 06	B6	Digital Input Channel 16
A7	Digital Input Channel 07	B7	Digital Input Channel 17
A8	NC, Floating	B8	NC, Floating
Right 18 Terminals			
C0	Digital Input Channel 20	D0	Digital Input Channel 30
C1	Digital Input Channel 21	D1	Digital Input Channel 31
C2	Digital Input Channel 22	D2	Digital Input Channel 32
C3	Digital Input Channel 23	D3	Digital Input Channel 33
C4	Digital Input Channel 24	D4	Digital Input Channel 34
C5	Digital Input Channel 25	D5	Digital Input Channel 35
C6	Digital Input Channel 26	D6	Digital Input Channel 36
C7	Digital Input Channel 27	D7	Digital Input Channel 37
C8	NC, Floating	D8	NC, Floating

4.5.3.5 Configuration Parameters

Category	Parameter Name	Description	Configuration Principle
Module	Module Version	Software version number of the module, modification is not supported	Default: 0x000F0001
Channel	Channel Diag Enable ^{Note}	Whether to enable the channel diagnosis function	Default: Enable Value Range: • Enable: Enable channel diagnosis function • Disable: Disable channel diagnosis function
	Channel Filter	Filter parameter of the channel	Default: 1ms Value Range: • 0.1ms, indicates no filtering • 0.5ms • 1ms • 2ms • 4ms • 8ms • 16ms • 32ms

Note: Channel diagnostics is a reserved function and is not implemented at present. Enabling it will not generate channel diagnostic information.

4.5.3.6 Diagnosis and Channel Information



During cyclic communication, the module's input data includes channel information and diagnosis information. The channel information is arranged before the diagnosis information. The number of bytes occupied by the input data is shown in the table below.

Table 1 Channel Information Occupied Bytes

Bit/Byte	Byte0	Byte1	Byte2	Byte3
Bit0	Channel 00	Channel 10	Channel 20	Channel 30
Bit1	Channel 01	Channel 11	Channel 21	Channel 31
Bit2	Channel 02	Channel 12	Channel 22	Channel 32
Bit3	Channel 03	Channel 13	Channel 23	Channel 33
Bit4	Channel 04	Channel 14	Channel 24	Channel 34
Bit5	Channel 05	Channel 15	Channel 25	Channel 35
Bit6	Channel 06	Channel 16	Channel 26	Channel 36
Bit7	Channel 07	Channel 17	Channel 27	Channel 37

Table 2 Diagnosis Information Occupied Bytes

Bit/Byte	Byte4	Byte5	Byte6	Byte7	Byte8	Byte9
	Module Diagnosis	Channel Diagnosis				
Bit0	System Power Fault	Reserved				
Bit1	Field Power					

	Fault	
Bit2	Watchdog Fault	
Bit3	Hardware Fault	
Bit4	-	
Bit5		
Bit6		
Bit7		

Channel Information

Parameter Name	Description
CHxx	• FALSE: Channel has no input signal • TRUE: Channel has input signal

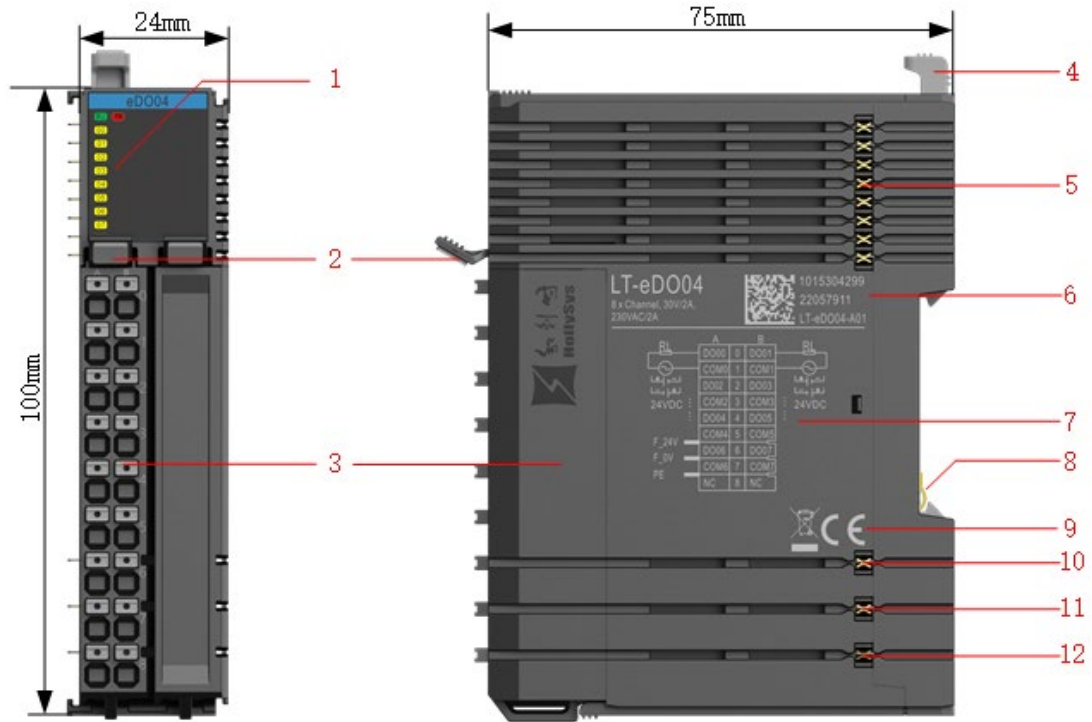
Diagnosis Information

Category	Parameter Name	Description
Module	System Power Fault	• 0: System-side power normal • 1: System-side power fault, diagnosis threshold 4.1VDC±5%
	Field Power Fault	• 0: Field-side power normal • 1: Field-side power fault, diagnosis threshold 17VDC±10%
	Watchdog Fault	• 0: Watchdog normal • 1: Watchdog fault
	Hardware Fault	• 0: Hardware normal • 1: Hardware fault
Channel	Reserved	

4.5.4 LT-eDI12 32-Channel Digital Input Module (PNP Type)

The LT-eDI12 is a digital input module in the LT-e series, featuring 32 channels, all of which are PNP inputs. It realizes digital signal acquisition functions through internal bus communication.

4.5.4.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicates the power supply and operating status of the module
2	Terminal Locking Switch	Press to remove the wiring terminal
3	Wiring Terminal	32-channel digital input wiring terminal
4	DIN Rail Top Mounting Latch	- Before installing the module to the DIN rail, pull this latch upward to the unlocked position - After installing the module to the DIN rail, press this latch downward to the locked position
5	Gold Plated Contacts	Internal bus contact point, used for data transmission between modules, system power supply, etc.
6	Nameplate	- Left side shows module model and basic information - Right side shows serial number QR code and plain text information, from top to bottom: serial number, production batch number, module version number
7	Wiring Diagram Silkscreen	Wiring diagram silkscreen of the module, detailed wiring diagram see Module Terminal Wiring Diagram
8	Protective Earth (PE) Spring Contact	Contacts the DIN rail, internally connected to No.12
9	Other Descriptive Logos	- Do not dispose of arbitrarily - Module complies with CE certification standards
10	Field Power +24VDC	Field power +24VDC contact point, used for field power cascading between modules
11	Field Power 0VDC	Field power 0VDC contact point, used for field power cascading between modules
12	Protective Earth (PE)	Protective earth (PE) contact point, used for protective earth cascading between modules

4.5.4.2 Technical Specifications

Basic Information

Parameter	Specification
System Power Supply	
Power Supply Method	Internal Bus Power Supply
Rated Voltage	5VDC
Voltage Input Range	4.5VDC~5.5VDC
Power Consumption	≤0.7W
Field Power Supply	
Rated Voltage	24VDC
Input Voltage Range	19.2VDC~28.8VDC
Others	
Module Hot Swap	Not Supported
Dimensions	Width 24mm * Height 100mm * Depth 75mm (excluding local protrusions)
Weight	≤180g
Protection Rating	IP20

Channels

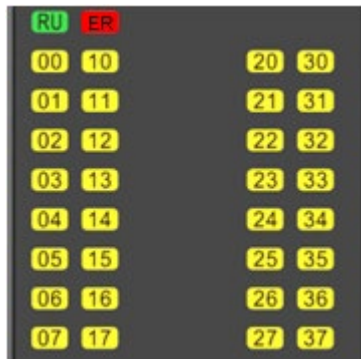
Parameter	Specification
Number of Channels	32
Signal Type	PNP Type
Input Voltage Level	24VDC (19.2VDC~28.8VDC)
Logic 1 Signal	> 15VDC
Logic 0 Signal	< 5VDC
Response Time	- Logic 0 to Logic 1: ≤100μs - Logic 1 to Logic 0: ≤100μs
Channel Cable	Unshielded cable or shielded cable, cable length ≤100m
Maximum Load Current	2.7mA/channel @24VDC
Channel-to-Channel Isolation	Not Supported
Redundancy	Not Supported
Configuration Method (I/O Mapping Method)	- EtherCAT Coupler: BOOL, USINT, UINT - Other Couplers: BOOL
Channel Filter Parameter	0.1ms (no filter), 0.5ms, 1ms, 2ms, 4ms, 8ms, 16ms, 32ms, individually configurable per channel Note: Filter error 0.12ms
Input Derating	- All channels ON at operating temperature 45°C - Derated to 75% at operating temperature 60°C (no more than 24 input points ON simultaneously)

Diagnostics

Parameter	Specification
Internal Fault Diagnostics	Detects chip watchdog status. A watchdog reset is considered an internal fault. This fault bit cannot be cleared automatically.
External Fault Diagnostics	Detects system-side power supply voltage. When below the

	threshold (software can still operate normally), it is considered an external fault. This fault bit can be cleared automatically when the voltage rises above the threshold. • Detects field-side power supply status. A fault condition is considered an external fault. This fault bit can be cleared automatically upon fault recovery.
Channel Diagnostics	Reserved
System Power Supply Diagnostic Threshold	4.1VDC±5%
Field Power Supply Diagnostic Threshold	17VDC±10%
Diagnostic Log	Logs entries when diagnostic status changes, supports up to 100 entries
Module Runtime Diagnostics	Supports recording the module's cumulative runtime
Channel Runtime Diagnostics	Supports recording the cumulative runtime of module channels in OFF and ON states: • During normal operation, records based on the input value • Not recorded during system power supply or field power supply faults

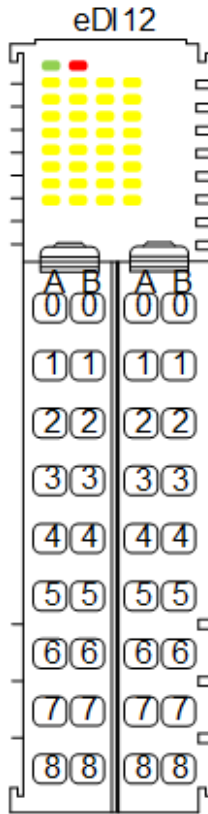
4.5.4.3 Indicator LEDs



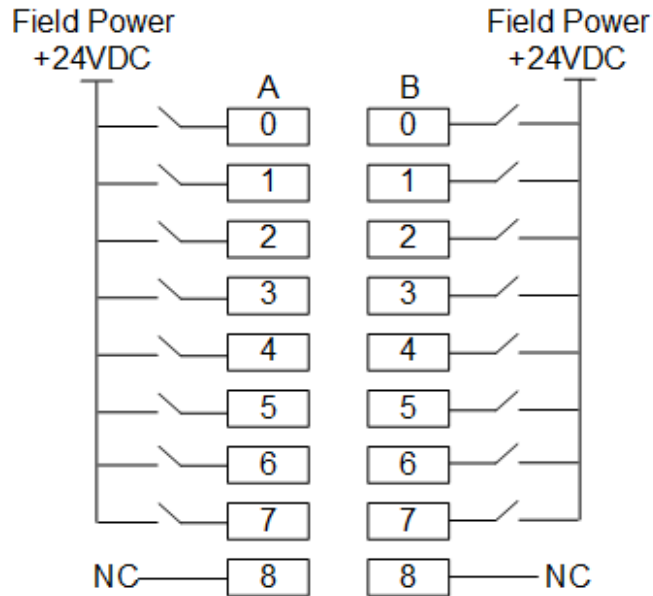
- RU: Run Indicator
- ER: Error Indicator
- 00~07, 10~17, 20~27, 30~37: Channel Indicators

LED Name	Color	Status	Description
RU	Green	Off	Module not powered or firmware not running
		Fast Flash (200ms on, 200ms off)	Internal bus communication offline
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Internal bus communication online
ER	Red	Off	Module has no fault
		Fast Flash (200ms on, 200ms off)	Module external fault
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Module internal fault or module starting up
00~07, 10~17 20~27, 30~37	Yellow	Off	Channel xx has no input signal
		Steady On	Channel xx has input signal

4.5.4.4 Module Terminal Wiring Diagram



The wiring diagrams for both the left and right 18 terminals:



Mark	Description	Mark	Description
Left 18 Terminals			
A0	Digital Input Channel 00	B0	Digital Input Channel 10
A1	Digital Input Channel 01	B1	Digital Input Channel 11
A2	Digital Input Channel 02	B2	Digital Input Channel 12
A3	Digital Input Channel 03	B3	Digital Input Channel 13
A4	Digital Input Channel 04	B4	Digital Input Channel 14
A5	Digital Input Channel 05	B5	Digital Input Channel 15
A6	Digital Input Channel 06	B6	Digital Input Channel 16
A7	Digital Input Channel 07	B7	Digital Input Channel 17
A8	NC, Floating	B8	NC, Floating
Right 18 Terminals			
C0	Digital Input Channel 20	D0	Digital Input Channel 30
C1	Digital Input Channel 21	D1	Digital Input Channel 31
C2	Digital Input Channel 22	D2	Digital Input Channel 32
C3	Digital Input Channel 23	D3	Digital Input Channel 33
C4	Digital Input Channel 24	D4	Digital Input Channel 34
C5	Digital Input Channel 25	D5	Digital Input Channel 35
C6	Digital Input Channel 26	D6	Digital Input Channel 36
C7	Digital Input Channel 27	D7	Digital Input Channel 37
C8	NC, Floating	D8	NC, Floating

4.5.4.5 Configuration Parameters

Category	Parameter Name	Description	Configuration Principle
Module	Module Version	Module software version number, modification not supported	Default value: 0x00100001
Channel	Channel Diag Enable ^{Note}	Whether to enable channel diagnosis function	Default value: Enable Value range: • Enable: Enable channel diagnosis function • Disable: Disable channel diagnosis function
	Channel Filter	Channel filter parameter	Default value: 1ms Value range: • 0.1ms, indicates no filtering • 0.5ms • 1ms • 2ms • 4ms • 8ms • 16ms • 32ms

Note: Channel diagnostics is a reserved function and is not implemented at present. Enabling it will not generate channel diagnostic information.

4.5.4.6 Diagnosis and Channel Information



During cyclic communication, the module's input data includes channel information and diagnosis information. The channel information is arranged before the diagnosis information. The number of bytes occupied by the input data is shown in the table below.

Table 1 Channel Information Occupied Bytes

Bit/Byte	Byte0	Byte1	Byte2	Byte3
Bit0	Channel 00	Channel 10	Channel 20	Channel 30
Bit1	Channel 01	Channel 11	Channel 21	Channel 31
Bit2	Channel 02	Channel 12	Channel 22	Channel 32
Bit3	Channel 03	Channel 13	Channel 23	Channel 33
Bit4	Channel 04	Channel 14	Channel 24	Channel 34
Bit5	Channel 05	Channel 15	Channel 25	Channel 35
Bit6	Channel 06	Channel 16	Channel 26	Channel 36
Bit7	Channel 07	Channel 17	Channel 27	Channel 37

Table 2 Diagnosis Information Occupied Bytes

Bit/Byte	Byte4 Module Diagnosis	Byte5	Byte6	Byte7	Byte8	Byte9
Bit0	System Power Fault	Reserved				
Bit1	Field Power Fault					

Bit2	Watchdog Fault	
Bit3	Hardware Fault	
Bit4	-	
Bit5		
Bit6		
Bit7		

Channel Information

Parameter Name	Description
CHxx	• FALSE: Channel has no input signal • TRUE: Channel has input signal

Diagnosis Information

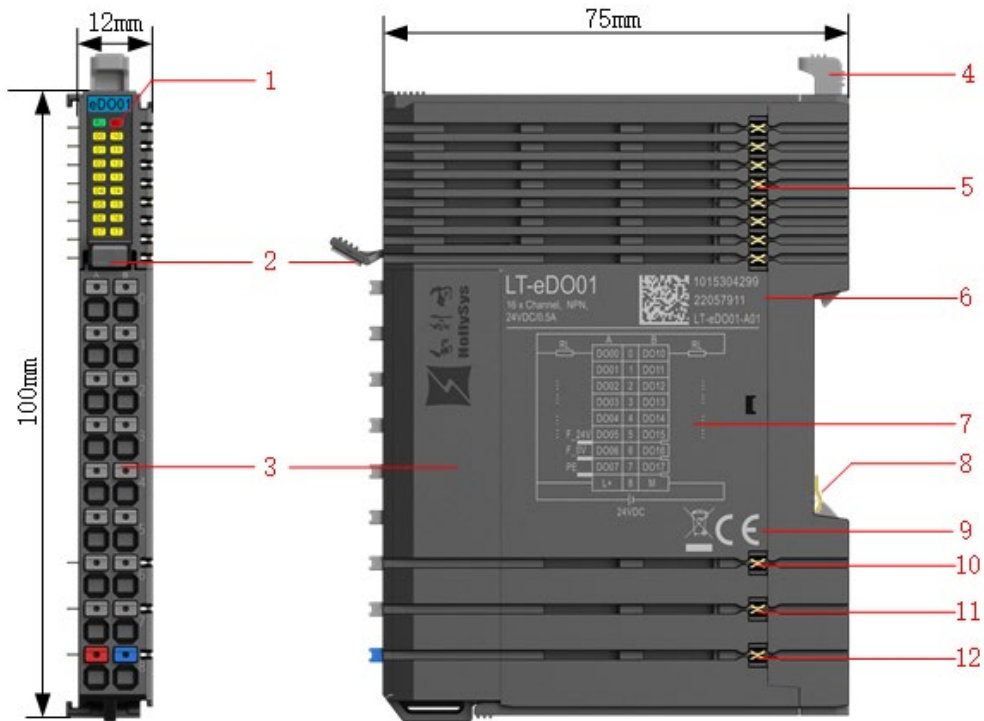
Category	Parameter Name	Description
Module	System Power Fault	• 0: System-side power normal • 1: System-side power fault, diagnosis threshold 4.1VDC±5%
	Field Power Fault	• 0: Field-side power normal • 1: Field-side power fault, diagnosis threshold 17VDC±10%
	Watchdog Fault	• 0: Watchdog normal • 1: Watchdog fault
	Hardware Fault	• 0: Hardware normal • 1: Hardware fault
Channel	Reserved	

4.6 Digital Output Module

4.6.1 LT-eDO01 16-Channel Digital Output Module (NPN Type)

The LT-eDO01 is a digital output module in the LT-e series, featuring 16 NPN type channels and load power supply terminals. It can directly control actuators such as solenoid valves, indicator lights, and motor starters. Through internal bus communication, it achieves switching output.

4.6.1.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicates the module's power supply and operating status
2	Terminal Locking Switch	Press to detach the wiring terminal
3	Wiring Terminal	16-channel digital output wiring terminal
4	DIN Rail Top Mounting Latch	- Before installing the module onto the DIN rail, pull this latch upward to the unlocked position - After installing the module onto the DIN rail, press this latch downward to the locked position
5	Gold Plated Contacts	Internal bus contact points, used for inter-module data transmission, system power supply, etc.
6	Nameplate	- Left side shows module model and basic information - Right side shows serial number QR code and plain text information, from top to bottom: serial number, production batch number, module version number
7	Wiring Diagram Silkscreen	Module wiring diagram silkscreen, detailed wiring diagram see Module Terminal Wiring Diagram
8	Protective Earth (PE) Spring Contact	Contacts the DIN rail, internally connected to No.12
9	Other Descriptive Logos	- Do not dispose of randomly - Module complies with CE certification standards
10	Field Power +24VDC	Field power +24VDC contact point, used for inter-module field power cascading
11	Field Power 0VDC	Field power 0VDC contact point, used for inter-module field power cascading
12	Protective Earth (PE)	Protective earth (PE) contact point, used for inter-module protective earth cascading

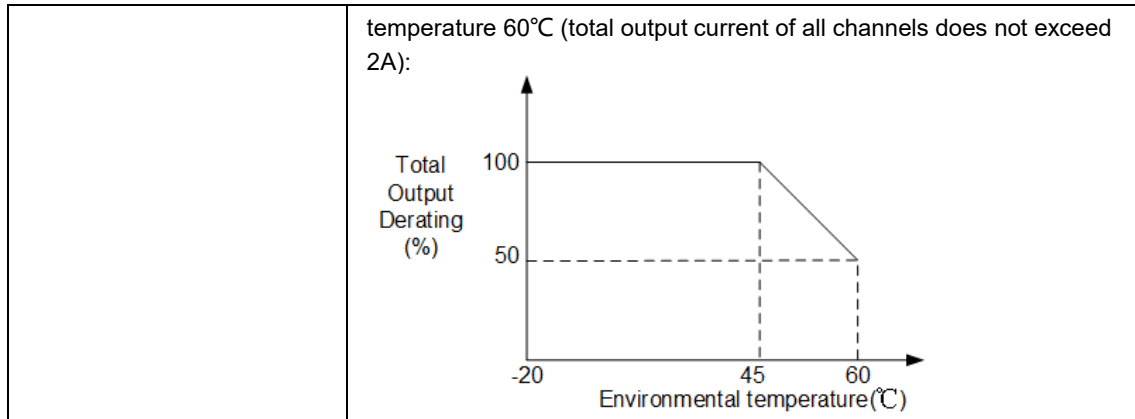
4.6.1.2 Technical Specifications

Basic Information

Parameter	Specification
System Power	
Power Supply Method	Internal Bus Power Supply
Rated Voltage	5VDC
Voltage Input Range	4.5VDC~5.5VDC
Power Consumption	≤0.5W
Field Power	
Power Supply Method	Power Terminals
Rated Voltage	24VDC
Input Voltage Range	19.2VDC~28.8VDC
Others	
Module Hot Swap	Not Supported
Dimensions	Width 12mm * Height 100mm * Depth 75mm (excluding local protrusions)
Weight	≤90g
Protection Rating	IP20

Channels

Parameter	Specification
Number of Channels	16
Signal Type	Transistor Low-side Output
Load Voltage	24VDC (19.2VDC~28.8VDC)
Channel On-state Voltage Drop	≤0.5VDC@500mA
Channel-to-Channel Isolation	Not Supported
Protection Functions	Supports short-circuit protection, overcurrent protection, overtemperature protection
Channel Protection Recovery Method	Automatic Recovery
Channel Cable	Unshielded cable, cable length ≤100m
Output Load (Resistive Load)	• 0.5A/channel @24VDC • 4A/module @24VDC
Output Load (Inductive Load)	• 7.2W/channel @24VDC • 12W/module @24VDC
Output Load (Lamp Load)	• 5W/channel @24VDC • 18W/module @24VDC
Switching Frequency	Resistive load 100Hz, inductive load 0.5Hz, lamp load 10Hz
OFF Maximum Leakage Current	10μA
Response Time	• Logic 0 to Logic 1: ≤100μs • Logic 1 to Logic 0: ≤100μs
Configuration Method (I/O Mapping)	• EtherCAT Coupler: BOOL, USINT, UINT • Other Couplers: BOOL
Channel Safety Value	• When system power or field power fails, channel output Off • When communication fails, channels can output safety values, each channel configured separately • Channel safety values configurable: Hold, Off, On
Output Derating	Full load at operating temperature 45°C (total output current of all channels does not exceed 4A), 50% load derating at operating



Diagnosis

Parameter	Specification
Internal Fault Diagnosis	Detects chip watchdog status. When watchdog reset occurs, it is considered an internal fault. This fault bit cannot be cleared automatically
External Fault Diagnosis	• Detects system side power supply voltage. When below threshold (software can still operate normally), it is considered an external fault. This fault bit can be cleared automatically when voltage rises above threshold • Detects field side power status. When faulty, it is considered an external fault. This fault bit can be cleared automatically when fault recovers
Channel Diagnosis	Not Supported
System Power Diagnosis Threshold	4.1VDC±5%
Field Power Diagnosis Threshold	17VDC±10%
Diagnostic Log	Logs records when diagnostic status changes, supports up to 100 entries
Module Runtime Diagnosis	Supports recording module cumulative operating time
Channel Runtime Diagnosis	Supports recording cumulative operating time of channels in OFF and ON states: • During normal operation, records according to output values • During safety value output, records according to safety values • Not recorded during system power or field power faults

4.6.1.3 Indicator LEDs



- RU: Run Indicator
- ER: Fault Indicator
- 00~07, 10~17: Channel Indicators

LED Name	Color	Status	Description
RU	Green	Off	Module not powered or firmware not running
		Fast Flash (200ms on, 200ms off)	Internal bus communication offline
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Internal bus communication online
ER	Red	Off	Module fault-free
		Fast Flash (200ms on, 200ms off)	Module external fault Note: ER light flashes fast when terminals A8 and B8 are not connected to power supply
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Module internal fault or module starting up
00~07, 10~17	Yellow	Off	Channel xx has no output signal
		Steady On	Channel xx has output signal

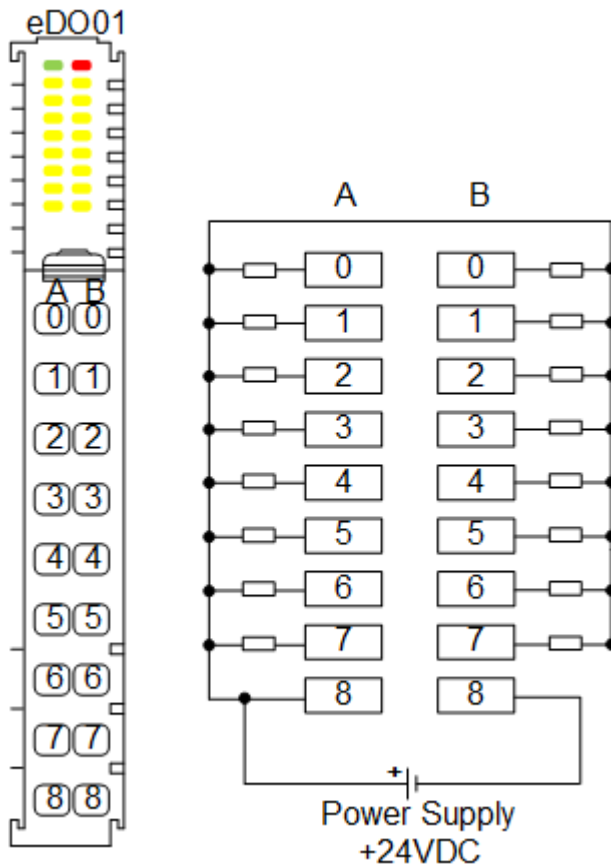


Channel indicators do not turn off when the module channels experience short circuit, overcurrent, or overtemperature fault protection.

4.6.1.4 Module Terminal Wiring Diagram



The A8 and B8 channels of the LT-eDO01 module are load power supply terminal blocks, marked with color coding. Since the module's terminal blocks are pluggable, do not confuse them with terminal blocks without color coding, as this may cause short circuits.



Mark	Description	Mark	Description
A0	Digital Output Channel 00	B0	Digital Output Channel 10
A1	Digital Output Channel 01	B1	Digital Output Channel 11
A2	Digital Output Channel 02	B2	Digital Output Channel 12
A3	Digital Output Channel 03	B3	Digital Output Channel 13
A4	Digital Output Channel 04	B4	Digital Output Channel 14
A5	Digital Output Channel 05	B5	Digital Output Channel 15
A6	Digital Output Channel 06	B6	Digital Output Channel 16
A7	Digital Output Channel 07	B7	Digital Output Channel 17
A8	Load Power Supply +24VDC Input	B8	Load Power Supply 0VDC Input

4.6.1.5 Configuration Parameters

Category	Parameter Name	Description	Configuration Principle
Module	Module Version	Module software version number, cannot be modified	Default value: 0x00030001
	Channel Safe Value	Safe output value for channels when internal bus communication fails	Default value: Off • Hold: Maintains the value before the fault • Off: Output 0 • On: Output 1

4.6.1.6 Diagnostics and Channel Information



During cyclic communication, the module's input data is diagnostic information. The number of bytes occupied by input data and output data is shown in the table below.

Table 1 Diagnostic Information Occupied Bytes

Bit/Byte	Byte0	Channel Diagnostics
	Module Diagnostics	
Bit0	System Power Fault	Not Supported
Bit1	Field Power Fault	
Bit2	Watchdog Fault	
Bit3	Hardware Fault	
Bit4	-	
Bit5		
Bit6		
Bit7		

Table 2 Channel Information Occupied Bytes

Bit/Byte	Byte0	Byte1
Bit0	Channel 00	Channel 10
Bit1	Channel 01	Channel 11
Bit2	Channel 02	Channel 12
Bit3	Channel 03	Channel 13
Bit4	Channel 04	Channel 14
Bit5	Channel 05	Channel 15
Bit6	Channel 06	Channel 16
Bit7	Channel 07	Channel 17

Diagnostic Information

Parameter Name	Description
System Power Fault	• 0: System side power supply normal • 1: System side power supply fault
Field Power Fault	• 0: Field side power supply normal • 1: Field side power supply fault
Watchdog Fault	• 0: Watchdog normal • 1: Watchdog fault
Hardware Fault	• 0: Hardware normal • 1: Hardware fault

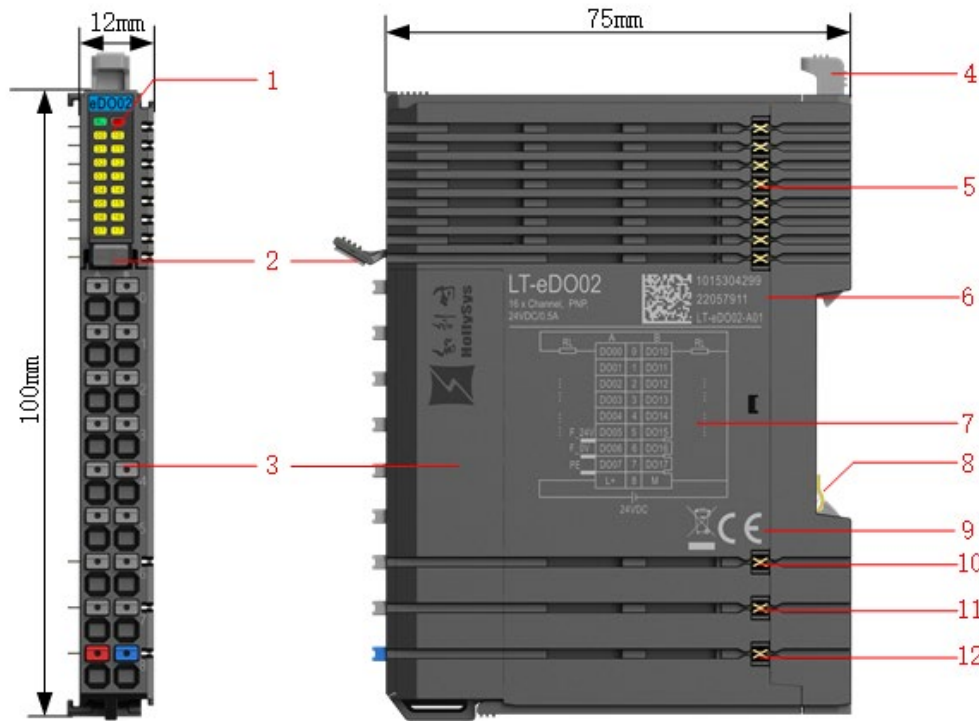
Channel Information

Parameter Name	Description
CHxx	• FALSE: No output signal on channel • TRUE: Output signal present on channel

4.6.2 LT-eDO02 16-Channel Digital Output Module (PNP Type)

The LT-eDO02 is a digital output module in the LT-e series, featuring 16 PNP-type channels and load power supply terminals. It can directly control actuators such as solenoid valves, indicator lights, and motor starters. Switch output is achieved through internal bus communication.

4.6.2.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicates the module's power supply and operating status
2	Terminal Locking Switch	Press to release the terminal block
3	Terminal Block	16-channel digital output terminal block
4	DIN Rail Top Mounting Latch	- Before mounting the module to the DIN rail, pull this latch upward to the unlocked position - After mounting the module to the DIN rail, press this latch downward to the locked position
5	Gold Plated Contacts	Internal bus contact points for inter-module data transmission and system power supply
6	Nameplate	- Left side shows module model and basic information - Right side shows serial number QR code and plain text information (from top to bottom): serial number, production batch number, module version number
7	Wiring Diagram Silkscreen	Module wiring diagram silkscreen. For detailed wiring

		diagram, refer to the Module Terminal Wiring Diagram
8	Protective Earth (PE) Spring Contact	Contacts the DIN rail and is internally connected to No.12
9	Other Informational Logos	- Do not dispose of arbitrarily - Module complies with CE certification standards
10	Field Power +24VDC	Field power +24VDC contact point for inter-module field power cascading
11	Field Power 0VDC	Field power 0VDC contact point for inter-module field power cascading
12	Protective Earth (PE)	Protective earth (PE) contact point for inter-module protective earth cascading

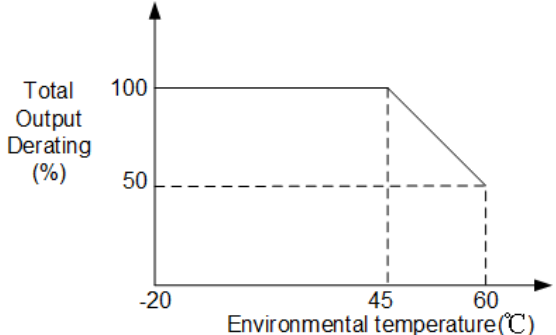
4.6.2.2 Technical Specifications

Basic Information

Parameter	Specification
System Power Supply	
Power Supply Method	Internal Bus Power Supply
Rated Voltage	5VDC
Voltage Input Range	4.5VDC~5.5VDC
Power Consumption	≤0.5W
Field Power Supply	
Power Supply Method	Power Terminals
Rated Voltage	24VDC
Input Voltage Range	19.2VDC~28.8VDC
Others	
Module Hot Swap	Not Supported
Dimensions	Width 12mm * Height 100mm * Depth 75mm (excluding local protrusions)
Weight	≤90g
Protection Rating	IP20

Channels

Parameter	Specification
Number of Channels	16
Signal Type	Transistor High-Side Output
Load Voltage	24VDC (19.2VDC~28.8VDC)
Channel On-State Voltage Drop	≤0.5VDC@500mA
Channel-to-Channel Isolation	Not Supported
Protection Functions	Supports short-circuit protection, overcurrent protection, overtemperature protection
Channel Protection Recovery Method	Automatic Recovery
Channel Cable	Unshielded cable, cable length ≤100m
Output Load (Resistive Load)	0.5A/channel@24VDC 4A/module@24VDC
Output Load (Inductive Load)	7.2W/channel@24VDC 12W/module@24VDC
Output Load (Lamp Load)	5W/channel@24VDC 18W/module@24VDC

Switching Frequency	Resistive load 100Hz, inductive load 0.5Hz, lamp load 10Hz
OFF Maximum Leakage Current	10μA
Response Time	- Logic 0 to Logic 1: ≤100μs - Logic 1 to Logic 0: ≤100μs
Configuration Method (I/O Mapping Method)	- EtherCAT Coupler: BOOL, USINT, UINT - Other Couplers: BOOL
Channel Safe Value	- Channels output Off when system power or field power fails - Channels can output safe values during communication failure, each channel configured individually - Channel safe values configurable: Hold, Off, On
Output Derating	Full load at operating temperature 45°C (total output current of all channels not exceeding 4A), 50% load derating at operating temperature 60°C (total output current of all channels not exceeding 2A): 

Diagnostics

Parameter	Specification
Internal Fault Diagnostics	Detects chip watchdog status. When a watchdog reset occurs, it is considered an internal fault. This fault bit cannot be cleared automatically.
External Fault Diagnostics	- Detects system side power supply voltage. When it falls below the threshold (software can still operate normally), it is considered an external fault. This fault bit can be cleared automatically when the voltage rises above the threshold. - Detects field side power supply status. In case of failure, it is considered an external fault. This fault bit can be cleared automatically when the fault is resolved.
Channel Diagnostics	Not Supported
System Power Supply Diagnostic Threshold	4.1VDC±5%
Field Power Supply Diagnostic Threshold	17VDC±10%
Diagnostic Log	Logs are recorded when diagnostic status changes, supporting up to 100 entries
Module Runtime Diagnostics	Supports recording the module's cumulative operating time
Channel Runtime Diagnostics	Supports recording the cumulative operating time of channels in off and on states: - During normal operation, records according to output values - During safe value output, records according to safe values - Not recorded during system power or field power failure

4.6.2.3 Indicator LEDs



- RU: Run Indicator
- ER: Fault Indicator
- 00~07, 10~17: Channel Indicators

LED Name	Color	Status	Description
RU	Green	Off	Module not powered or firmware not running
		Fast Flash (200ms on, 200ms off)	Internal bus communication offline
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Internal bus communication online
ER	Red	Off	Module fault-free
		Fast Flash (200ms on, 200ms off)	Module external fault Note: ER light flashes fast when terminals A8 and B8 are not connected to power supply
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Module internal fault or module starting up
00~07, 10~17	Yellow	Off	Channel xx has no output signal
		Steady On	Channel xx has output signal

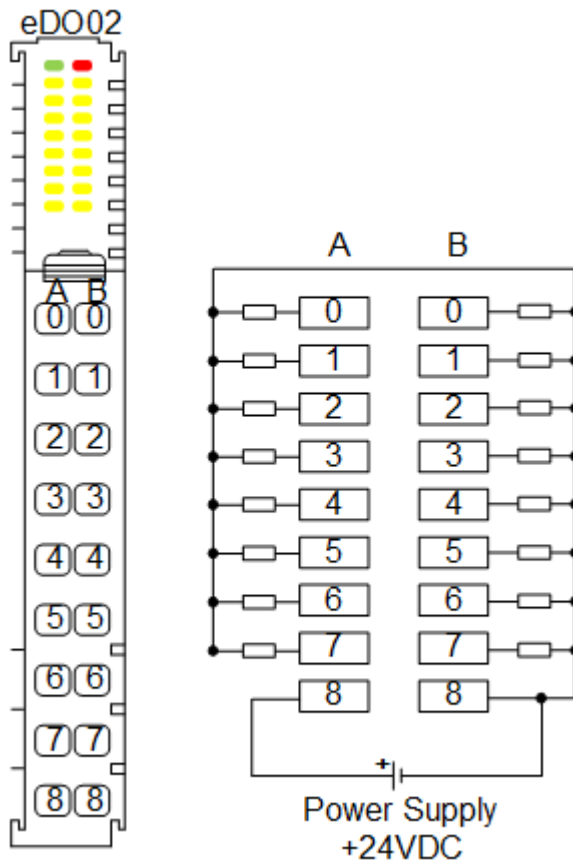


Channel indicators do not turn off when the module channels experience short circuit, overcurrent, or overtemperature fault protection.

4.6.2.4 Module Terminal Wiring Diagram



Channels A8 and B8 of the LT-eDO02 module are load power supply terminals with color coding. Since the module's terminal blocks are pluggable, do not confuse them with terminal blocks without color coding, as this may cause short circuits.



Marking	Description	Marking	Description
A0	Digital Output Channel 00	B0	Digital Output Channel 10
A1	Digital Output Channel 01	B1	Digital Output Channel 11
A2	Digital Output Channel 02	B2	Digital Output Channel 12
A3	Digital Output Channel 03	B3	Digital Output Channel 13
A4	Digital Output Channel 04	B4	Digital Output Channel 14
A5	Digital Output Channel 05	B5	Digital Output Channel 15
A6	Digital Output Channel 06	B6	Digital Output Channel 16
A7	Digital Output Channel 07	B7	Digital Output Channel 17
A8	Load Power Supply +24VDC Input	B8	Load Power Supply 0VDC Input

4.6.2.5 Configuration Parameters

Category	Parameter Name	Description	Configuration Principle
Module	Module Version	Module software version number, cannot be modified	Default: 0x00040001
	Channel Safe Value	Safety value output by channels during internal bus communication failure	Default: Off • Hold: Maintains the pre-failure value • Off: Outputs 0 • On: Outputs 1

4.6.2.6 Diagnosis and Channel Information



During cyclic communication, the module's input data contains diagnostic information. The byte usage of input and output data is shown in the following tables.

Table 1 Diagnostic Information Byte Usage

Bit/Byte	Byte0	Channel Diagnosis
	Module Diagnosis	
Bit0	System Power Fault	Not Supported
Bit1	Field Power Fault	
Bit2	Watchdog Fault	
Bit3	Hardware Fault	
Bit4	-	
Bit5		
Bit6		
Bit7		

Table 2 Channel Information Byte Usage

Bit/Byte	Byte0	Byte1
Bit0	Channel 00	Channel 10
Bit1	Channel 01	Channel 11
Bit2	Channel 02	Channel 12
Bit3	Channel 03	Channel 13
Bit4	Channel 04	Channel 14
Bit5	Channel 05	Channel 15
Bit6	Channel 06	Channel 16
Bit7	Channel 07	Channel 17

Diagnostic Information

Parameter Name	Description
System Power Fault	• 0: System side power normal • 1: System side power fault
Field Power Fault	• 0: Field side power normal • 1: Field side power fault
Watchdog Fault	• 0: Watchdog normal • 1: Watchdog fault
Hardware Fault	• 0: Hardware normal • 1: Hardware fault

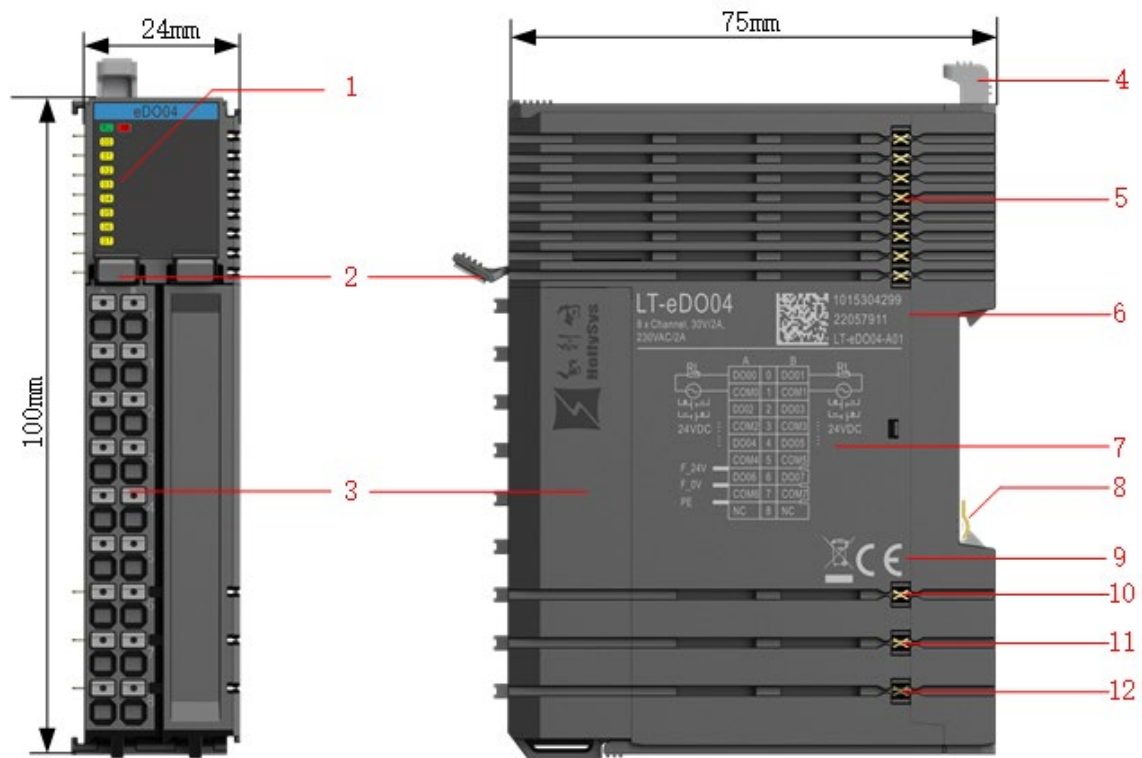
Channel Information

Parameter Name	Description
CHxx	• FALSE: Channel has no output signal • TRUE: Channel has output signal

4.6.3 LT-eDO04 8-Channel Digital Output Module (Relay Type)

The LT-eDO04 is a digital output module in the LT-e series, featuring 8 relay type, passive normally open contact output channels, capable of controlling high-power loads that do not require high-frequency switching. Through internal bus communication, it achieves switching output.

4.6.3.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicates the module's power supply and operating status
2	Terminal Locking Switch	Press to release the terminal block
3	Terminal Block	8-channel digital output terminal block
4	DIN Rail Top Mounting Latch	- Before mounting the module to the DIN rail, pull this latch upward to the unlocked position - After mounting the module to the DIN rail, press this latch downward to the locked position
5	Gold Plated Contacts	Internal bus contact points for inter-module data transmission and system power supply
6	Nameplate	- Left side shows module model and basic information - Right side shows serial number QR code and plain text information (from top to bottom): serial number, production

		batch number, module version number
7	Wiring Diagram Silkscreen	Module wiring diagram silkscreen. For detailed wiring diagram, refer to the Module Terminal Wiring Diagram
8	Protective Earth (PE) Spring Contact	Contacts the DIN rail and is internally connected to No.12
9	Other Informational Logos	- Do not dispose of arbitrarily - Module complies with CE certification standards
10	Field Power +24VDC	Field power +24VDC contact point for inter-module field power cascading
11	Field Power 0VDC	Field power 0VDC contact point for inter-module field power cascading
12	Protective Earth (PE)	Protective earth (PE) contact point for inter-module protective earth cascading

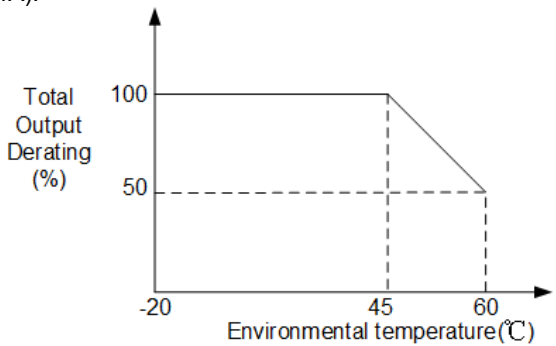
4.6.3.2 Technical Specifications

Basic Information

Parameter	Specification
System Power	
Power Supply Method	Internal Bus Power Supply
Rated Voltage	5VDC
Voltage Input Range	4.5VDC~5.5VDC
Power Consumption	≤0.5W
Field Power	
Rated Voltage	24VDC
Input Voltage Range	19.2VDC~28.8VDC
Power Consumption	≤2.6W
Others	
Hot Swapping	Not Supported
Dimensions	Width 24mm * Height 100mm * Depth 75mm (excluding local protrusions)
Weight	≤130g
Protection Rating	IP20

Channels

Parameter	Specification
Number of Channels	8
Signal Type	Relay Output, Passive Normally Open Contact
Maximum Load Voltage	250VAC 30VDC
Minimum Load	5VDC 5mA
Mechanical Life	20 million operations
Electrical Life	100,000 operations (rated load)
Channel-to-Channel Isolation	Supported
Protection Function	Not Supported
Channel Cable	Unshielded or shielded cable, cable length ≤100m
Output Load (Resistive Load)	2A/channel 8A/module
Output Load (Inductive Load)	1A/channel 4A/module

	Note: The relay contact inrush current must be less than 5A when each channel closes or opens. If it exceeds 5A, contact current limiting protection measures must be added. Solenoid inrush current is generally 10~20 times the rated current, contactor inrush current is generally 3~10 times the rated current.
Output Load (Lamp Load)	• 30W/channel • 120W/module Note: The relay contact inrush current must be less than 5A when each channel closes or opens. If it exceeds 5A, contact current limiting protection measures must be added. Incandescent lamp inrush current is generally 3~10 times the rated current, fluorescent lamp inrush current is 5~10 times the rated current.
Response Time	• Logic 0 to Logic 1: ≤15ms • Logic 1 to Logic 0: ≤15ms
Configuration Method (I/O Mapping)	• EtherCAT Coupler: BOOL, USINT • Other Couplers: BOOL
Channel Safety Value	• When system power or field power fails, channel output turns Off • During communication failure, channels can output safety values, each channel configured separately • Channel safety values configurable: Hold, Off, On
Output Derating	Full load at operating temperature 45°C (total output current of all channels does not exceed 8A), 50% load derating at operating temperature 60°C (total output current of all channels does not exceed 4A): 



When the channel contact load type is uncertain, the relay contact inrush current must be less than 5A when each channel closes or opens. If it exceeds 5A, contact current limiting protection measures must be added.

Diagnostics

Parameter	Specification
Internal Fault Diagnosis	Detects chip watchdog status. When watchdog reset occurs, it is considered an internal fault. This fault bit cannot be cleared automatically.
External Fault Diagnosis	• Detects system side power supply voltage. When below threshold (software can still operate normally), it is considered an external fault. This fault bit can be automatically cleared when voltage rises above threshold. • Detects field side power status. When faulty, it is considered an external fault. This fault bit can be automatically cleared when fault recovers.
Channel Diagnosis	Not Supported
System Power Diagnosis	4.1VDC±5%

Threshold	
Field Power Diagnosis Threshold	17VDC±10%
Diagnostic Log	Records logs when diagnostic status changes, supports up to 100 entries
Module Runtime Diagnosis	Supports recording module cumulative operating time
Channel Runtime Diagnosis	Supports recording channel cumulative operating time in off and on states: • During normal operation, records according to output value • During safety value output, records according to safety value • During system power or field power failure, no recording

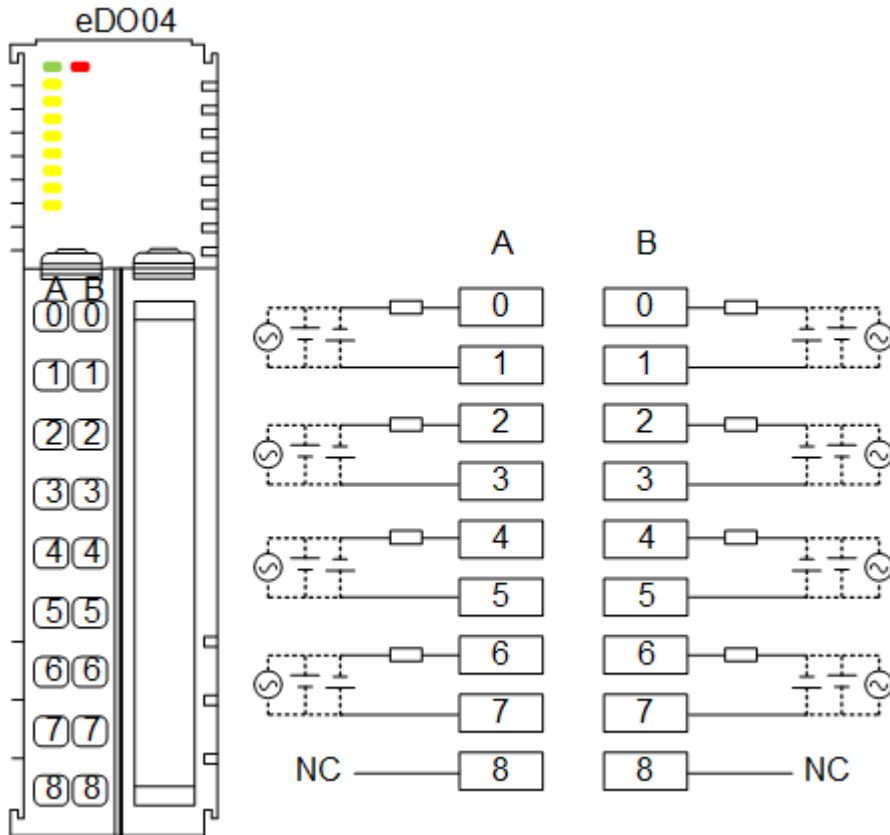
4.6.3.3 Indicator LEDs



- RU: Run Indicator
- ER: Fault Indicator
- 00~07: Channel Indicators

LED Name	Color	Status	Description
RU	Green	Off	Module not powered or firmware not running
		Fast Flash (200ms on, 200ms off)	Internal bus communication offline
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Internal bus communication online
ER	Red	Off	Module fault-free
		Fast Flash (200ms on, 200ms off)	Module external fault
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Module internal fault or module starting up
00~07	Yellow	Off	Channel xx contact open
		Steady On	Channel xx contact closed

4.6.3.4 Module Terminal Wiring Diagram



Marking	Description	Marking	Description
A0	Digital Output Channel 00	B0	Digital Output Channel 01
A1	Channel 00 Common Terminal	B1	Channel 01 Common Terminal
A2	Digital Output Channel 02	B2	Digital Output Channel 03
A3	Channel 02 Common Terminal	B3	Channel 03 Common Terminal
A4	Digital Output Channel 04	B4	Digital Output Channel 05
A5	Channel 04 Common Terminal	B5	Channel 05 Common Terminal
A6	Digital Output Channel 06	B6	Digital Output Channel 07
A7	Channel 06 Common Terminal	B7	Channel 07 Common Terminal
A8	NC, Floating	B8	NC, Floating



For inductive loads, lamp loads, or when the load type is uncertain, ensure that the relay contact inrush current is less than 5A when each channel closes or opens.

4.6.3.5 Configuration Parameters

Category	Parameter Name	Description	Configuration Principle
Module	Module Version	Software version number of the module, modification is not supported	Default value: 0x00050001
	Channel Safe Value	Safe value output by the channel when internal bus communication fails	Default value: Off • Hold: Maintains the value before the fault • Off: Outputs 0 • On: Outputs 1

4.6.3.6 Diagnosis and Channel Information



During cyclic communication, the module's input data is diagnostic information. The number of bytes occupied by input data and output data is shown in the table below.

Table 1 Diagnostic Information Byte Usage

Bit/Byte	Byte0	Channel Diagnosis
	Module Diagnosis	
Bit0	System Power Fault	Not Supported
Bit1	Field Power Fault	
Bit2	Watchdog Fault	
Bit3	Hardware Fault	
Bit4	-	
Bit5		
Bit6		
Bit7		

Table 2 Channel Information Byte Usage

Bit/Byte	Byte0
Bit0	Channel 00
Bit1	Channel 01
Bit2	Channel 02
Bit3	Channel 03
Bit4	Channel 04
Bit5	Channel 05
Bit6	Channel 06
Bit7	Channel 07

Diagnostic Information

Parameter Name	Description
System Power Fault	• 0: System side power is normal • 1: System side power is faulty
Field Power Fault	• 0: Field side power is normal • 1: Field side power is faulty

Watchdog Fault	• 0: Watchdog is normal • 1: Watchdog is faulty
Hardware Fault	• 0: Hardware is normal • 1: Hardware is faulty

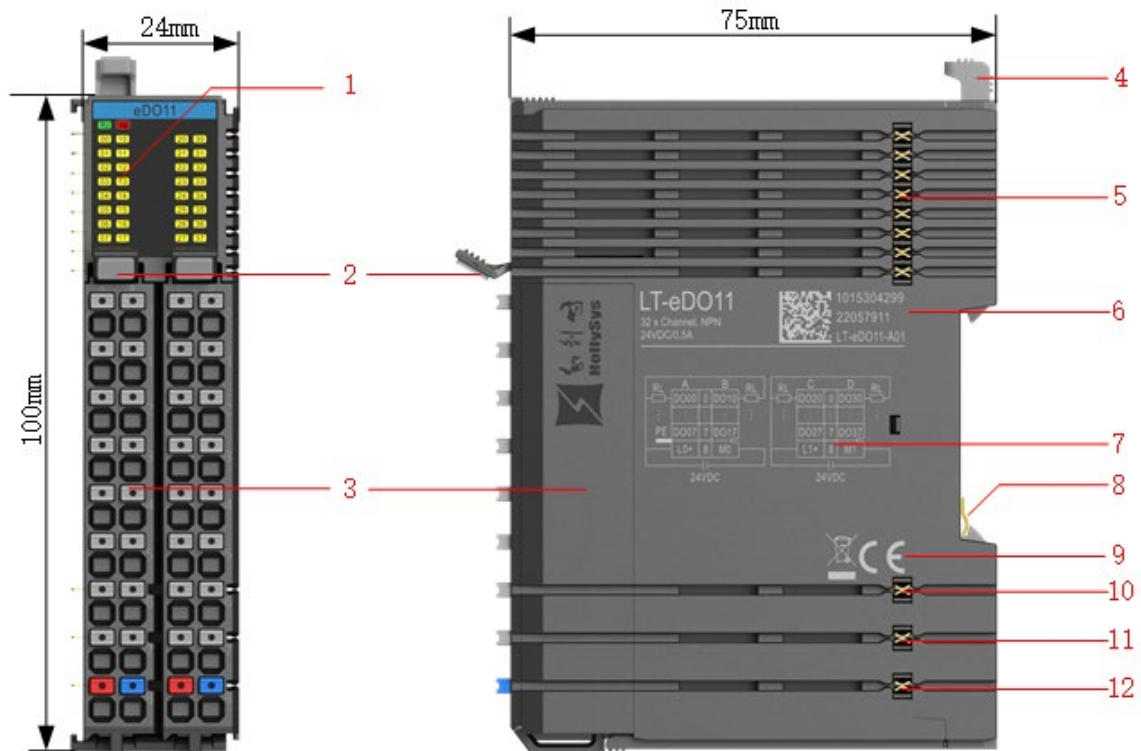
Channel Information

Parameter Name	Description
CHxx	• FALSE: No output signal from the channel • TRUE: Output signal from the channel

4.6.4 LT-eDO11 32-Channel Digital Output Module (NPN Type)

The LT-eDO11 is a digital output module in the LT-e series, featuring 32 NPN channels and load power supply terminals. It can directly control actuators such as solenoid valves, indicator lights, and motor starters. Switch output is realized through internal bus communication.

4.6.4.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicates the power supply and operating status of the

		module
2	Terminal Locking Switch	Press to remove the wiring terminal
3	Wiring Terminal	32-channel digital output wiring terminal
4	DIN Rail Top Mounting Latch	• Before installing the module to the DIN rail, pull this latch upward to the unlocked position • After installing the module to the DIN rail, press this latch downward to the locked position
5	Gold Plated Contacts	Internal bus contact point, used for data transmission between modules, system power supply, etc.
6	Nameplate	• Left side shows module model and basic information • Right side shows serial number QR code and plain text information, from top to bottom: serial number, production batch number, module version number
7	Wiring Diagram Silkscreen	Wiring diagram silkscreen of the module, detailed wiring diagram see Module Terminal Wiring Diagram
8	Protective Earth (PE) Spring Contact	Contacts the DIN rail, internally connected to No.12
9	Other Descriptive Logos	• Do not dispose of arbitrarily • Module complies with CE certification standards
10	Field Power +24VDC	Field power +24VDC contact point, used for field power cascading between modules
11	Field Power 0VDC	Field power 0VDC contact point, used for field power cascading between modules
12	Protective Earth (PE)	Protective earth (PE) contact point, used for protective earth cascading between modules

4.6.4.2 Technical Specifications

Basic Information

Parameter	Specification
System Power Supply	
Power Supply Method	Internal Bus Power Supply
Rated Voltage	5VDC
Voltage Input Range	4.5VDC~5.5VDC
Power Consumption	≤0.7W
Field Power Supply	
Power Supply Method	Power Terminals
Rated Voltage	24VDC
Input Voltage Range	19.2VDC~28.8VDC
Others	
Module Hot Swap	Not Supported
Dimensions	Width 24mm * Height 100mm * Depth 75mm (excluding local protrusions)
Weight	≤180g
Protection Rating	IP20

Channels

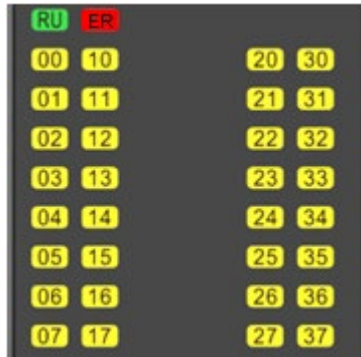
Parameter	Specification
Number of Channels	32
Signal Type	Transistor Low-Side Output
Load Voltage	24VDC (19.2VDC~28.8VDC)
Channel On-State Voltage	≤0.5VDC@500mA

Drop	
Maximum Load Current (Resistive)	16 channels per group: 0.5A/channel, 4A/group, 8A/module @24VDC
Maximum Load Current (Inductive)	16 channels per group: 7.2W/channel, 12W/group, 24W/module @24VDC
Maximum Load Current (Lamp)	16 channels per group: 5W/channel, 18W/group, 36W/module @24VDC
Response Time	- Logic 0 to Logic 1: $\leq 100\mu s$ - Logic 1 to Logic 0: $\leq 100\mu s$
Channel Protection	Short-circuit protection, overcurrent protection, overtemperature protection
Channel Protection Recovery Method	Automatic recovery
Channel-to-Channel Isolation	Not Supported
Redundancy	Not Supported
Channel Cable	Unshielded cable, cable length $\leq 100m$
Configuration Method (I/O Mapping Method)	- EtherCAT Coupler: BOOL, USINT, UINT - Other Couplers: BOOL
Channel Safe Value	- Channel output Off during system power or field power faults - During communication faults, channels can output safe values, individually configurable per channel - Channel safe values configurable: Hold, Off, On
Output Derating	- Full load at operating temperature $45^{\circ}C$ (total current per group not exceeding 4A, total output current of all channels not exceeding 8A) - Load derated to 50% at operating temperature $60^{\circ}C$ (total current per group not exceeding 4A, total output current of all channels not exceeding 4A)

Diagnostics

Parameter	Specification
Internal Fault Diagnostics	Detects chip watchdog status. A watchdog reset is considered an internal fault. This fault bit cannot be cleared automatically.
External Fault Diagnostics	- Detects system-side power supply voltage. When below the threshold (software can still operate normally), it is considered an external fault. This fault bit can be cleared automatically when the voltage rises above the threshold. - Detects field-side power supply status. A fault condition is considered an external fault. This fault bit can be cleared automatically upon fault recovery.
Channel Diagnostics	Reserved
System Power Supply Diagnostic Threshold	$4.1VDC \pm 5\%$
Field Power Supply Diagnostic Threshold	$17VDC \pm 10\%$
Diagnostic Log	Logs entries when diagnostic status changes, supports up to 100 entries
Module Runtime Diagnostics	Supports recording the module's cumulative runtime
Channel Runtime Diagnostics	Supports recording the cumulative runtime of channels in Off and On states: - During normal operation, records based on the output value - During safe value output, records based on the safe value - Not recorded during system power or field power faults

4.6.4.3 Indicator LEDs



- RU: Run Indicator
- ER: Error Indicator
- 00~07, 10~17, 20~27, 30~37: Channel Indicators

LED Name	Color	Status	Description
RU	Green	Off	Module not powered or firmware not running
		Fast Flash (200ms on, 200ms off)	Internal bus communication offline
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Internal bus communication online
ER	Red	Off	Module has no fault
		Fast Flash (200ms on, 200ms off)	Module external fault Note: When terminals A8 and B8 of the module are not connected to the power supply, it will cause the ER light to flash fast
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Module internal fault or module starting up
00~07, 10~17, 20~27, 30~37	Yellow	Off	Channel xx has no output signal
		Steady On	Channel xx has output signal

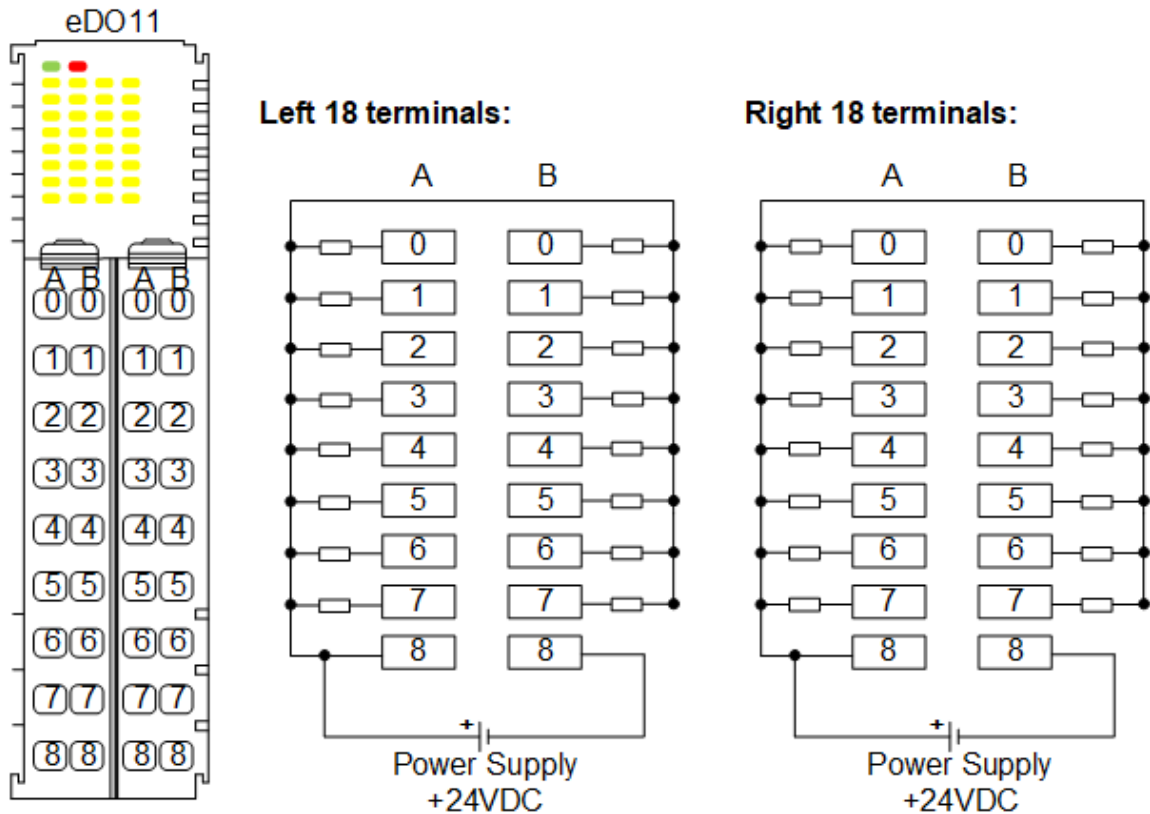


When the module channel experiences short circuit, overcurrent, or overtemperature fault protection, the channel indicator light does not turn off.

4.6.4.4 Module Terminal Wiring Diagram



- Channels A8 and B8 of the LT-eDO11 module are load power supply wiring terminals with color identification. Since the module's wiring terminals are pluggable, do not confuse them with terminals without color identification, as this may cause short circuits.
- The left and right side power supplies can be from the same source or different sources.



Mark	Description	Mark	Description
Left 18 Terminals			
A0	Digital Output Channel 00	B0	Digital Output Channel 10
A1	Digital Output Channel 01	B1	Digital Output Channel 11
A2	Digital Output Channel 02	B2	Digital Output Channel 12
A3	Digital Output Channel 03	B3	Digital Output Channel 13
A4	Digital Output Channel 04	B4	Digital Output Channel 14
A5	Digital Output Channel 05	B5	Digital Output Channel 15
A6	Digital Output Channel 06	B6	Digital Output Channel 16
A7	Digital Output Channel 07	B7	Digital Output Channel 17
A8	Load Power Supply +24VDC Input	B8	Load Power Supply 0VDC Input
Right 18 Terminals			
C0	Digital Output Channel 20	D0	Digital Output Channel 30
C1	Digital Output Channel 21	D1	Digital Output Channel 31
C2	Digital Output Channel 22	D2	Digital Output Channel 32
C3	Digital Output Channel 23	D3	Digital Output Channel 33
C4	Digital Output Channel 24	D4	Digital Output Channel 34
C5	Digital Output Channel 25	D5	Digital Output Channel 35
C6	Digital Output Channel 26	D6	Digital Output Channel 36
C7	Digital Output Channel 27	D7	Digital Output Channel 37
C8	Load Power Supply +24VDC Input	D8	Load Power Supply 0VDC Input

4.6.4.5 Configuration Parameters

Category	Parameter Name	Description	Configuration Principle
Module	Module Version	Module software version number, modification not supported	Default value: 0x00110001
	Safe Value	Channel output safe value when internal bus communication fails	Default value: Off • Hold: Maintain the value before the fault • Off: Output 0 • On: Output 1

4.6.4.6 Diagnosis and Channel Information



- During cyclic communication, the module's input data is diagnosis information. The number of bytes occupied by input data and output data is shown in the table below.
- In the diagnosis information, Field Power 1 refers to the load power supply for the left 18 terminals; Field Power 2 refers to the load power supply for the right 18 terminals.

Table 1 Diagnosis Information Occupied Bytes

Bit/Byte	Byte0	Byte1
	Module Diagnosis	Channel Diagnosis
Bit0	System Power Fault	Reserved
Bit1	Reserved	
Bit2	Watchdog Fault	
Bit3	Hardware Fault	
Bit4	Field Power 1 Fault	
Bit5	Field Power 2 Fault	
Bit6	-	
Bit7		

Table 2 Channel Information Occupied Bytes

Bit/Byte	Byte0	Byte1	Byte2	Byte3
Bit0	Channel 00	Channel 10	Channel 20	Channel 30
Bit1	Channel 01	Channel 11	Channel 21	Channel 31
Bit2	Channel 02	Channel 12	Channel 22	Channel 32
Bit3	Channel 03	Channel 13	Channel 23	Channel 33
Bit4	Channel 04	Channel 14	Channel 24	Channel 34
Bit5	Channel 05	Channel 15	Channel 25	Channel 35
Bit6	Channel 06	Channel 16	Channel 26	Channel 36
Bit7	Channel 07	Channel 17	Channel 27	Channel 37

Diagnosis Information

Category	Parameter Name	Description
Module	System Power Fault	• 0: System side power normal • 1: System side power fault
	Field Power x Fault	• 0: Field side power x normal

		• 1: Field side power x fault
	Watchdog Fault	• 0: Watchdog normal • 1: Watchdog fault
	Hardware Fault	• 0: Hardware normal • 1: Hardware fault
Channel	Reserved	

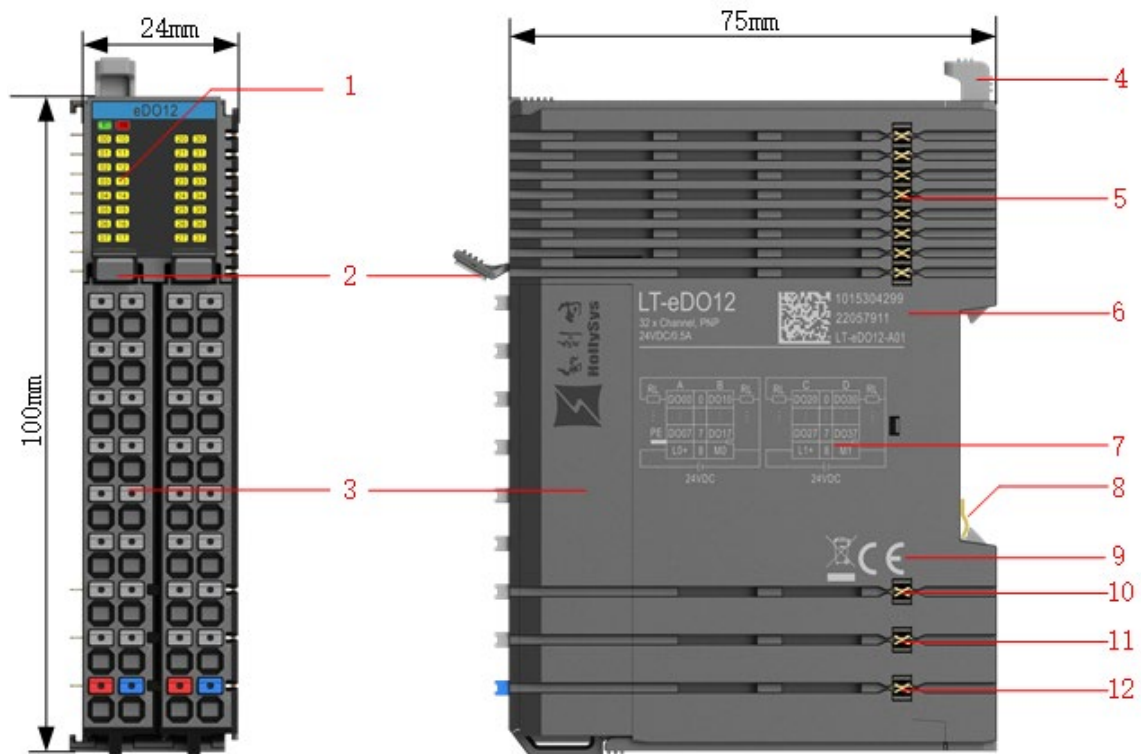
Channel Information

Parameter Name	Description
CHxx	• FALSE: Channel has no output signal • TRUE: Channel has output signal

4.6.5 LT-eDO12 32-Channel Digital Output Module (PNP Type)

The LT-eDO12 is a digital output module in the LT-e series, featuring 32 PNP channels and load power supply terminals. It can directly control actuators such as solenoid valves, indicator lights, and motor starters. Switch output is realized through internal bus communication.

4.6.5.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicates the module's power supply and operating status
2	Terminal Locking Switch	Press to remove the terminal block
3	Terminal Block	32-channel digital output terminal block
4	DIN Rail Top Mounting Latch	• Before mounting the module to the DIN rail, pull this latch upward to the unlocked position • After mounting the module to the DIN rail, press this latch downward to the locked position
5	Gold Plated Contacts	Internal bus contact points, used for data transmission between modules, system power supply, etc.
6	Nameplate	• The left side shows the module model and basic information • The right side shows the serial number QR code and plain code information. The plain code from top to bottom is: serial number, production batch number, module version number
7	Wiring Diagram Silkscreen	Module wiring diagram silkscreen. For the detailed wiring diagram, refer to the Module Terminal Wiring Diagram
8	Protective Earth (PE) Spring Contact	Contacts the DIN rail and is internally connected to No.12
9	Other Descriptive Logos	• Do not dispose of arbitrarily • Module complies with CE certification standards
10	Field Power +24VDC	Field power +24VDC contact point, used for field power cascading between modules
11	Field Power 0VDC	Field power 0VDC contact point, used for field power cascading between modules
12	Protective Earth (PE)	Protective earth (PE) contact point, used for protective earth cascading between modules

4.6.5.2 Technical Specifications

Basic Information

Parameter	Specification
System Power Supply	
Power Supply Method	Internal Bus Power Supply
Rated Voltage	5VDC
Voltage Input Range	4.5VDC~5.5VDC
Power Consumption	≤0.7W
Field Power Supply	
Power Supply Method	Power Terminals
Rated Voltage	24VDC
Input Voltage Range	19.2VDC~28.8VDC
Others	
Module Hot Swap	Not Supported
Dimensions	Width 24mm * Height 100mm * Depth 75mm (excluding local protrusions)
Weight	≤180g
Protection Rating	IP20

Channels

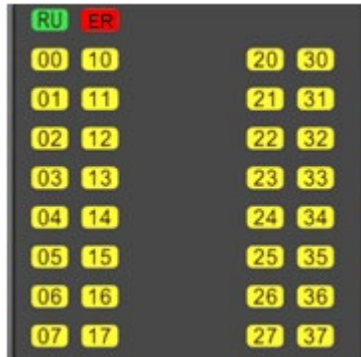
Parameter	Specification
Number of Channels	32

Signal Type	Transistor High-Side Output
Load Voltage	24VDC (19.2VDC~28.8VDC)
Channel On-State Voltage Drop	≤0.5VDC@500mA
Maximum Load Current (Resistive)	16 channels per group: 0.5A/channel, 4A/group, 8A/module @24VDC
Maximum Load Current (Inductive)	16 channels per group: 7.2W/channel, 12W/group, 24W/module @24VDC
Maximum Load Current (Lamp)	16 channels per group: 5W/channel, 18W/group, 36W/module @24VDC
Response Time	• Logic 0 to Logic 1: ≤100μs • Logic 1 to Logic 0: ≤100μs
Channel Protection	Short-circuit protection, overcurrent protection, overtemperature protection
Channel Protection Recovery Method	Automatic recovery
Channel-to-Channel Isolation	Not Supported
Redundancy	Not Supported
Channel Cable	Unshielded cable, cable length ≤100m
Configuration Method (I/O Mapping Method)	• EtherCAT Coupler: BOOL, USINT, UINT • Other Couplers: BOOL
Channel Safe Value	• Channel output Off during system power or field power faults • During communication faults, channels can output safe values, individually configurable per channel • Channel safe values configurable: Hold, Off, On
Output Derating	• Full load at operating temperature 45°C (total output current of all channels not exceeding 8A) • Load derated to 50% at operating temperature 60°C (total output current of all channels not exceeding 4A)

Diagnostics

Parameter	Specification
Internal Fault Diagnostics	Detects chip watchdog status. A watchdog reset is considered an internal fault. This fault bit cannot be cleared automatically.
External Fault Diagnostics	• Detects system-side power supply voltage. When below the threshold (software can still operate normally), it is considered an external fault. This fault bit can be cleared automatically when the voltage rises above the threshold. • Detects field-side power supply status. A fault condition is considered an external fault. This fault bit can be cleared automatically upon fault recovery.
Channel Diagnostics	Reserved
System Power Supply Diagnostic Threshold	4.1VDC±5%
Field Power Supply Diagnostic Threshold	17VDC±10%
Diagnostic Log	Logs entries when diagnostic status changes, supports up to 100 entries
Module Runtime Diagnostics	Supports recording the module's cumulative runtime
Channel Runtime Diagnostics	Supports recording the cumulative runtime of channels in Off and On states: • During normal operation, records based on the output value • During safe value output, records based on the safe value • Not recorded during system power or field power faults

4.6.5.3 Indicator LEDs



- RU: Run Indicator
- ER: Error Indicator
- 00~07, 10~17, 20~27, 30~37: Channel Indicators

LED Name	Color	Status	Description
RU	Green	Off	Module not powered or firmware not running
		Fast Flash (200ms on, 200ms off)	Internal bus communication offline
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Internal bus communication online
ER	Red	Off	Module has no fault
		Fast Flash (200ms on, 200ms off)	Module external fault Note: When terminals A8 and B8 of the module are not connected to the power supply, it will cause the ER light to flash fast
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Module internal fault or module starting up
00~07, 10~17, 20~27, 30~37	Yellow	Off	Channel xx has no output signal
		Steady On	Channel xx has output signal

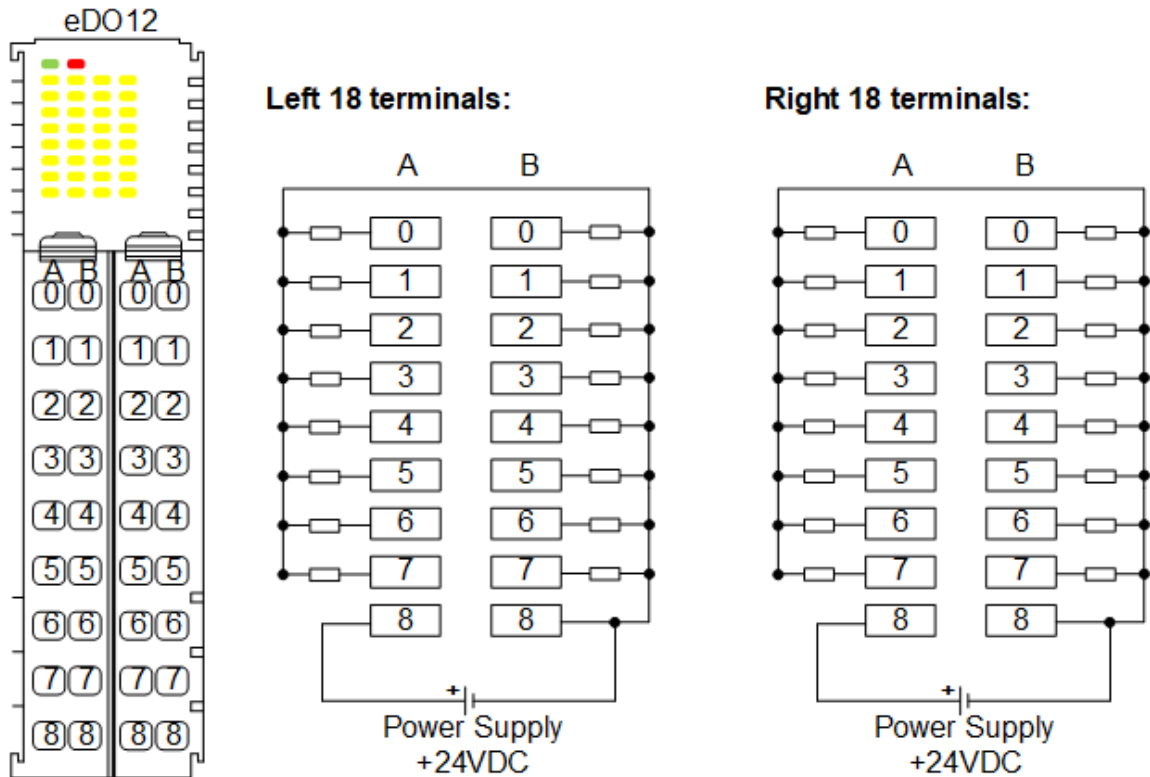


When the module channel experiences short circuit, overcurrent, or overtemperature fault protection, the channel indicator light does not turn off.

4.6.5.4 Module Terminal Wiring Diagram



- The A8 and B8 channels of the LT-eDO12 module are load power supply terminal blocks with color identification. Because the module's terminal blocks are pluggable, do not confuse them with terminal blocks without color identification, otherwise it may cause a short circuit.
- The left and right power supplies can be from the same source or different sources.



Mark	Description	Mark	Description
Left 18 Terminals			
A0	Digital Output Channel 00	B0	Digital Output Channel 10
A1	Digital Output Channel 01	B1	Digital Output Channel 11
A2	Digital Output Channel 02	B2	Digital Output Channel 12
A3	Digital Output Channel 03	B3	Digital Output Channel 13
A4	Digital Output Channel 04	B4	Digital Output Channel 14
A5	Digital Output Channel 05	B5	Digital Output Channel 15
A6	Digital Output Channel 06	B6	Digital Output Channel 16
A7	Digital Output Channel 07	B7	Digital Output Channel 17
A8	Load Power Supply +24VDC Input	B8	Load Power Supply 0VDC Input
Right 18 Terminals			
C0	Digital Output Channel 20	D0	Digital Output Channel 30
C1	Digital Output Channel 21	D1	Digital Output Channel 31
C2	Digital Output Channel 22	D2	Digital Output Channel 32
C3	Digital Output Channel 23	D3	Digital Output Channel 33
C4	Digital Output Channel 24	D4	Digital Output Channel 34
C5	Digital Output Channel 25	D5	Digital Output Channel 35
C6	Digital Output Channel 26	D6	Digital Output Channel 36
C7	Digital Output Channel 27	D7	Digital Output Channel 37
C8	Load Power Supply +24VDC Input	D8	Load Power Supply 0VDC Input

4.6.5.5 Configuration Parameters

Category	Parameter Name	Description	Configuration Principle
Module	Module Version	Software version number of the module, modification is not supported	Default: 0x00120001
	Safe Value	Safe value output by the channel when internal bus communication fails	Default: Off • Hold: Maintain the value before the fault • Off: Output 0 • On: Output 1

4.6.5.6 Diagnostics and Channel Information



- During cyclic communication, the module's input data contains diagnostic information. The byte usage of input data and output data is shown in the table below.
- In the diagnostic information, Field Power 1 refers to the load power supply for the left 18 terminals; Field Power 2 refers to the load power supply for the right 18 terminals.

Table 1 Diagnostic Information Byte Usage

Bit/Byte	Byte0	Byte1
	Module Diagnostics	Channel Diagnostics
Bit0	System Power Fault	Reserved
Bit1	Reserved	
Bit2	Watchdog Fault	
Bit3	Hardware Fault	
Bit4	Field Power 1 Fault	
Bit5	Field Power 2 Fault	
Bit6	-	
Bit7		

Table 2 Channel Information Byte Usage

Bit/Byte	Byte0	Byte1	Byte2	Byte3
Bit0	Channel 00	Channel 10	Channel 20	Channel 30
Bit1	Channel 01	Channel 11	Channel 21	Channel 31
Bit2	Channel 02	Channel 12	Channel 22	Channel 32
Bit3	Channel 03	Channel 13	Channel 23	Channel 33
Bit4	Channel 04	Channel 14	Channel 24	Channel 34
Bit5	Channel 05	Channel 15	Channel 25	Channel 35
Bit6	Channel 06	Channel 16	Channel 26	Channel 36
Bit7	Channel 07	Channel 17	Channel 27	Channel 37

Diagnostic Information

Category	Parameter Name	Description
Module	System Power Fault	• 0: System-side power supply normal • 1: System-side power supply faulty

	Field Power x Fault	• 0: Field-side power supply x normal • 1: Field-side power supply x faulty
	Watchdog Fault	• 0: Watchdog normal • 1: Watchdog faulty
	Hardware Fault	• 0: Hardware normal • 1: Hardware faulty
Channel	Reserved	

Channel Information

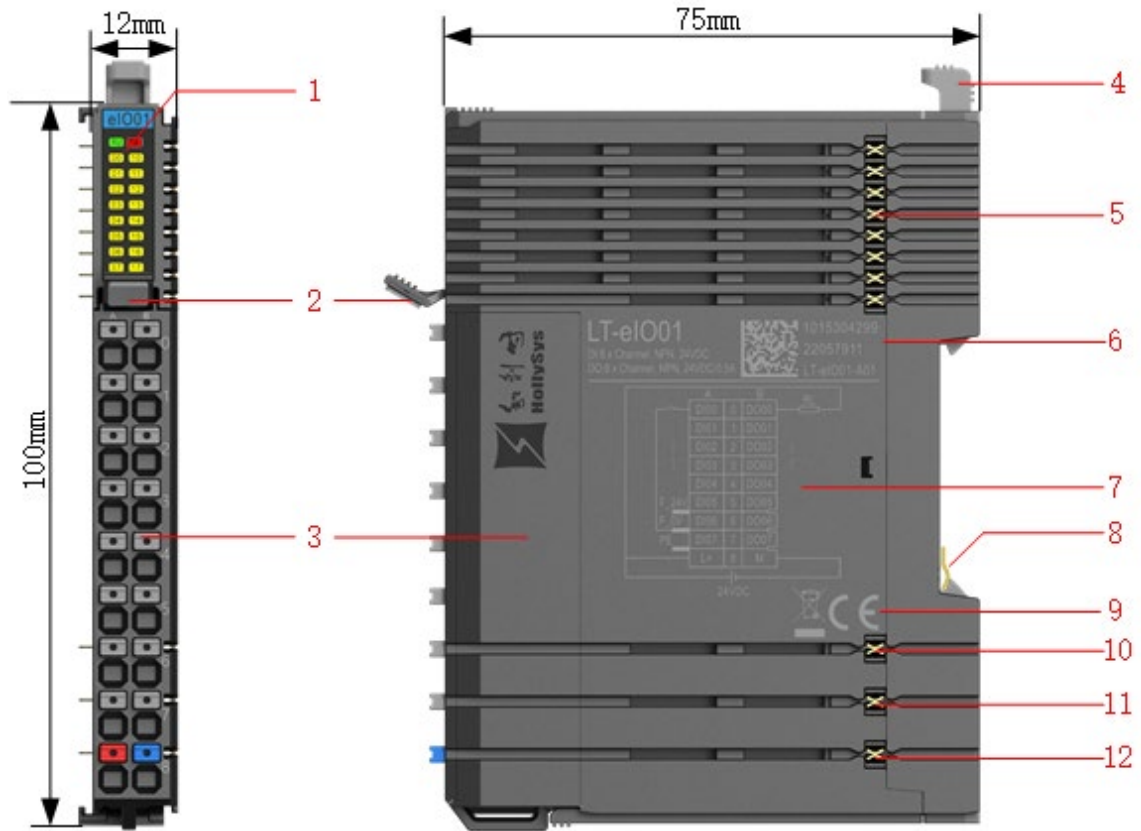
Parameter Name	Description
CHxx	• FALSE: No output signal from channel • TRUE: Output signal present from channel

4.7 Digital Input/Output Module

4.7.1 LT-eIO01 8-Channel Digital Input/Output Hybrid Module (NPN Type)

The LT-eIO01 is a digital hybrid module in the LT-e series, featuring 8 digital input channels and 8 digital output channels, all of NPN type. It realizes digital signal acquisition and discrete output via internal bus communication.

4.7.1.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LED	Indicates the power supply and operation status of the module
2	Terminal Locking Latch	Press to disconnect the detachable terminal block
3	Terminal Block	Terminal block for 8 digital inputs and 8 digital outputs
4	DIN Rail Top Mounting Latch	• Pull this latch upward to the unlocked position before installing the module onto the DIN rail. • Press this latch downward to the locked position after installing the module onto the DIN rail.
5	Gold Finger	Internal bus contacts for data transmission between modules, system power supply, etc.
6	Nameplate	• The left side displays the module model and basic information. • The right side displays the serial number QR code and human-readable information. From top to bottom: serial number, production batch number, module version number.
7	Wiring Diagram Silkscreen	Silkscreen of the module wiring diagram. For detailed wiring, see Module Terminal Wiring Diagram
8	Protective Earth (PE) Spring Clip	Contacts the DIN rail and is internally connected to item No. 12
9	Other Informational Logos	• Do not discard arbitrarily. • The module complies with CE certification standards.
10	Field Power +24 VDC	Field power +24 VDC contact points for daisy-chaining field power between modules
11	Field Power 0 VDC	Field power 0 VDC contact points for daisy-chaining field

		power between modules
12	Protective Earth (PE)	Protective Earth (PE) contact points for daisy-chaining protective earth between modules

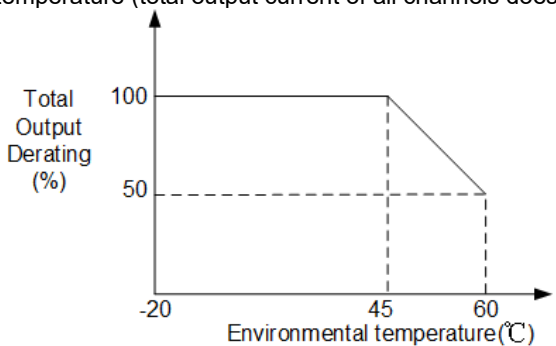
4.7.1.2 Technical Specifications

General Information

Parameter	Specification
System Power Supply	
Power Supply Method	Internal bus power supply
Rated Voltage	5 VDC
Input Voltage Range	4.5 VDC to 5.5 VDC
Power Consumption	≤ 0.5 W
Field Power Supply	
Rated Voltage	24 VDC
Input Voltage Range	19.2 VDC to 28.8 VDC
Other	
Module Hot Swapping	Not supported
Dimensions	12 mm width * 100 mm height * 75 mm depth (excluding local protrusions)
Weight	≤ 90 g
Protection Rating	IP20

Channels

Parameter	Specification
Digital Input DI	
Number of Channels	8
Signal Type	NPN
Channel-to-Channel Isolation	Not supported
Channel Protection	Not supported
Channel Cable	Unshielded or shielded cable, cable length ≤ 100 m
Logic 1 Signal	< 5 VDC
Logic 0 Signal	> 15 VDC
Response Time	- Logic 0 to Logic 1: ≤ 100 μs - Logic 1 to Logic 0: ≤ 100 μs
Input Voltage Level	24 VDC (19.2 VDC to 28.8 VDC)
Rated Current	2.7 mA/channel @ 24 VDC
Configuration Method (I/O Mapping)	BOOL, USINT
Channel Filter Parameter	Configurable per channel, options: 0.1 ms (no filter), 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms Note: Filter error 0.12 ms
Input Derating	75% derating when operating at 60 °C (no more than 6 input points ON simultaneously), or 15 °C derating when all input points are ON
Digital Output DO	
Number of Channels	8
Signal Type	Transistor low-side output
Load Voltage	24 VDC (19.2 VDC to 28.8 VDC)
Channel On-State Voltage Drop	≤ 0.5 VDC @ 500 mA

Channel-to-Channel Isolation	Not supported
Protection Functions	Supports short-circuit protection, overcurrent protection, overtemperature protection
Channel Cable	Unshielded cable, cable length ≤ 100 m
Output Load (Resistive Load)	• 0.5 A/channel @ 24 VDC • 2 A/module @ 24 VDC
Output Load (Inductive Load)	• 7.2 W/channel @ 24 VDC • 12 W/module @ 24 VDC
Output Load (Lamp Load)	• 5 W/channel @ 24 VDC • 9 W/module @ 24 VDC
Switching Frequency	100 Hz for resistive load, 0.5 Hz for inductive load, 10 Hz for lamp load
Maximum Off-State Leakage Current	10 μ A
Response Time	• Logic 0 to Logic 1: ≤ 100 μs • Logic 1 to Logic 0: ≤ 100 μs
Configuration Method (I/O Mapping)	• EtherCAT coupler: BOOL, USINT • Other couplers: BOOL
Channel Safe Value	• Channel output is turned off when system power or field power fails • In case of communication failure, the channel can output a safe value, configurable per channel • Channel safe value configurable: hold, off, on
Output Derating	Full load at 45 °C operating temperature (total output current of all channels does not exceed 2 A); 50% derating at 60 °C operating temperature (total output current of all channels does not exceed 1 A):  Environmental temperature(°C)

Diagnostics

Parameter	Specification
Internal Fault Diagnosis	Detects chip watchdog status. When a watchdog reset occurs, an internal fault is considered to have occurred, and this fault bit cannot be automatically cleared.
External Fault Diagnosis	• Detects system-side supply voltage. When it falls below the threshold (software can operate normally), an external fault is considered to have occurred. This fault bit can be automatically cleared when the voltage rises above the threshold. • Detects field-side power supply status. In case of fault, an external fault is considered to have occurred. This fault bit can be automatically cleared when the fault recovers.
Channel Diagnosis	Reserved
System Power Diagnosis Threshold	4.1 VDC $\pm$ 5%
Field Power Diagnosis Threshold	17 VDC $\pm$ 10%
Diagnostic Log	Logs recorded when diagnostic status changes, maximum 100 entries

	supported
Module Operating Time Diagnosis	Supports recording of module cumulative operating time
Channel Operating Time Diagnosis	Supports recording of cumulative operating time of module channels in OFF and ON states: • During normal operation, recorded according to the actual channel value • Not recorded when system power or field power fails

4.7.1.3 Indicator LEDs



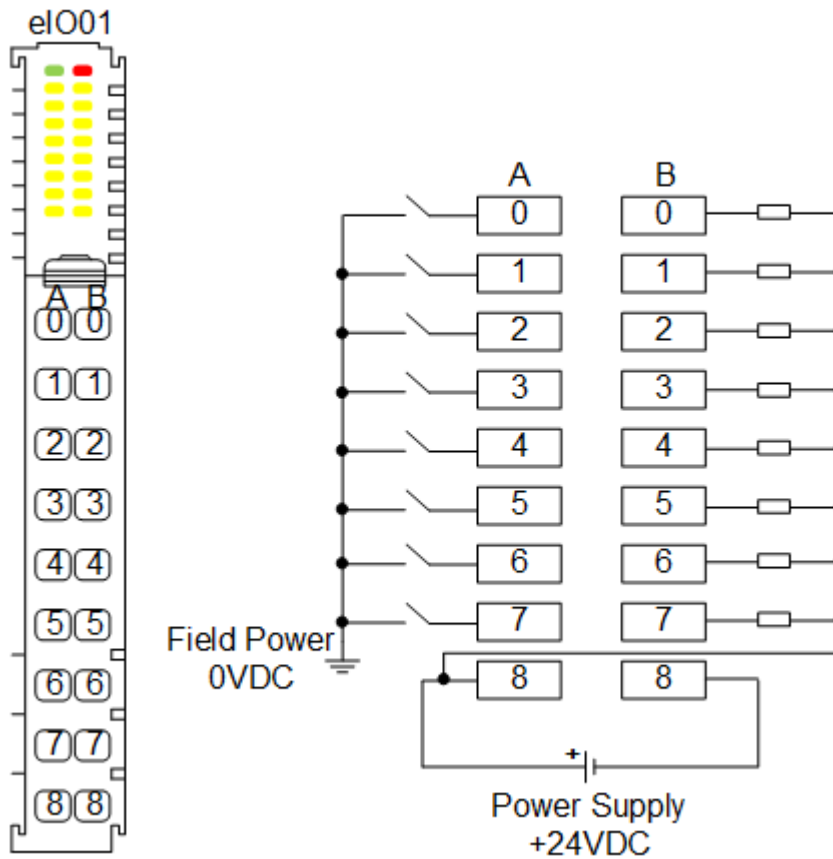
- RU: Run LED
- ER: Error LED
- 00~07, 10~17: Channel LEDs

LED Name	Color	Status	Description
RU	Green	Off	Module not powered or firmware not running
		Fast blinking (200ms on, 200ms off)	Internal bus communication offline
		Slow blinking (500ms on, 500ms off)	Firmware upgrade in progress
		Steady on	Internal bus communication online
ER	Red	Off	No module fault
		Fast blinking (200ms on, 200ms off)	External module fault
		Slow blinking (500ms on, 500ms off)	Firmware upgrade in progress
		Steady on	Internal module fault or module starting up
00~07, 10~17	Yellow	Off	No signal on channel xx
		Steady on	Signal present on channel xx

4.7.1.4 Module Terminal Wiring Diagram



Terminals A8 and B8 of the LT-eIO01 module are load power supply wiring terminals with color identification. Since the module's terminals are pluggable, do not confuse them with terminals without color identification to avoid short circuits.



Identifier	Description	Identifier	Description
A0	Digital Input Channel 00	B0	Digital Output Channel 10
A1	Digital Input Channel 01	B1	Digital Output Channel 11
A2	Digital Input Channel 02	B2	Digital Output Channel 12
A3	Digital Input Channel 03	B3	Digital Output Channel 13
A4	Digital Input Channel 04	B4	Digital Output Channel 14
A5	Digital Input Channel 05	B5	Digital Output Channel 15
A6	Digital Input Channel 06	B6	Digital Output Channel 16
A7	Digital Input Channel 07	B7	Digital Output Channel 17
A8	Load Power Supply +24 VDC Input	B8	Load Power Supply 0 VDC Input

4.7.1.5 Configuration Parameters

Category	English Name	Chinese Name	Description	Configuration Rules
Module	Module Version	Software Interface Version	Software version number of the module, not modifiable	Default value: 0x00170001
DI Channel	Diag Enable ^{Note}	Channel Diagnosis Enable ^{Note}	Enable or disable the channel diagnosis function	Default value: Enable Value range: • Enable: Enable channel diagnosis function • Disable: Disable channel diagnosis function

	Channel Filter	Channel Filter Time	Channel filter parameter	Default value: 1 ms Value range: • 0.1 ms, meaning no filter • 0.5 ms • 1 ms • 2 ms • 4 ms • 8 ms • 16 ms • 32 ms
DO Channel	Safe Value	Channel Safe Value	Safe value output by the channel in case of internal bus communication failure	Default value: Off • Hold: Hold the value before the fault • Off: Output 0 • On: Output 1

Note: Channel diagnosis is a reserved function, not yet implemented. Enabling it will not report channel diagnosis information.

4.7.1.6 Diagnostic and Channel Information



- During cyclic communication, the input data of the module includes channel information and diagnostic information, with channel information arranged before diagnostic information. The number of bytes occupied by input data and output data is shown in the following table.
- In the diagnostic information, Field Power 1 is the field-side power supply; Field Power 2 is the load power supply.

Input Data Occupied Bytes

Table 1 DI Channel Information Occupied Bytes

Bit/Byte	Byte0
Bit0	DI Channel 00
Bit1	DI Channel 01
Bit2	DI Channel 02
Bit3	DI Channel 03
Bit4	DI Channel 04
Bit5	DI Channel 05
Bit6	DI Channel 06
Bit7	DI Channel 07

Table 2 Diagnostic Information Occupied Bytes

Bit/Byte	Byte1 Module Diagnosis	Byte2 Channel Diagnosis
Bit0	System Power Fault	Reserved
Bit1	Reserved	
Bit2	Watchdog Fault	
Bit3	Hardware Fault	
Bit4	Field Power 1 Fault	
Bit5	Field Power 2 Fault	
Bit6	-	
Bit7		

Output Data Occupied Bytes

Table 3 DO Channel Information Occupied Bytes

Bit/Byte	Byte0
Bit0	DO Channel 10
Bit1	DO Channel 11
Bit2	DO Channel 12
Bit3	DO Channel 13
Bit4	DO Channel 14
Bit5	DO Channel 15
Bit6	DO Channel 16
Bit7	DO Channel 17

Diagnostic Information

Category	English Name	Chinese Name	Description
Module	System Power Fault	System Power Fault	• 0: System-side power normal • 1: System-side power fault, diagnostic threshold 4.1 VDC $\pm 5\%$
	Watchdog Fault	Watchdog Fault	• 0: Watchdog normal • 1: Watchdog fault
	Hardware Fault	Hardware Fault	• 0: Hardware normal • 1: Hardware fault
	Field Power x Fault	Field Power x Fault	• 0: Field-side power x normal • 1: Field-side power x fault, diagnostic threshold 17 VDC $\pm 10\%$
Channel	Reserved		

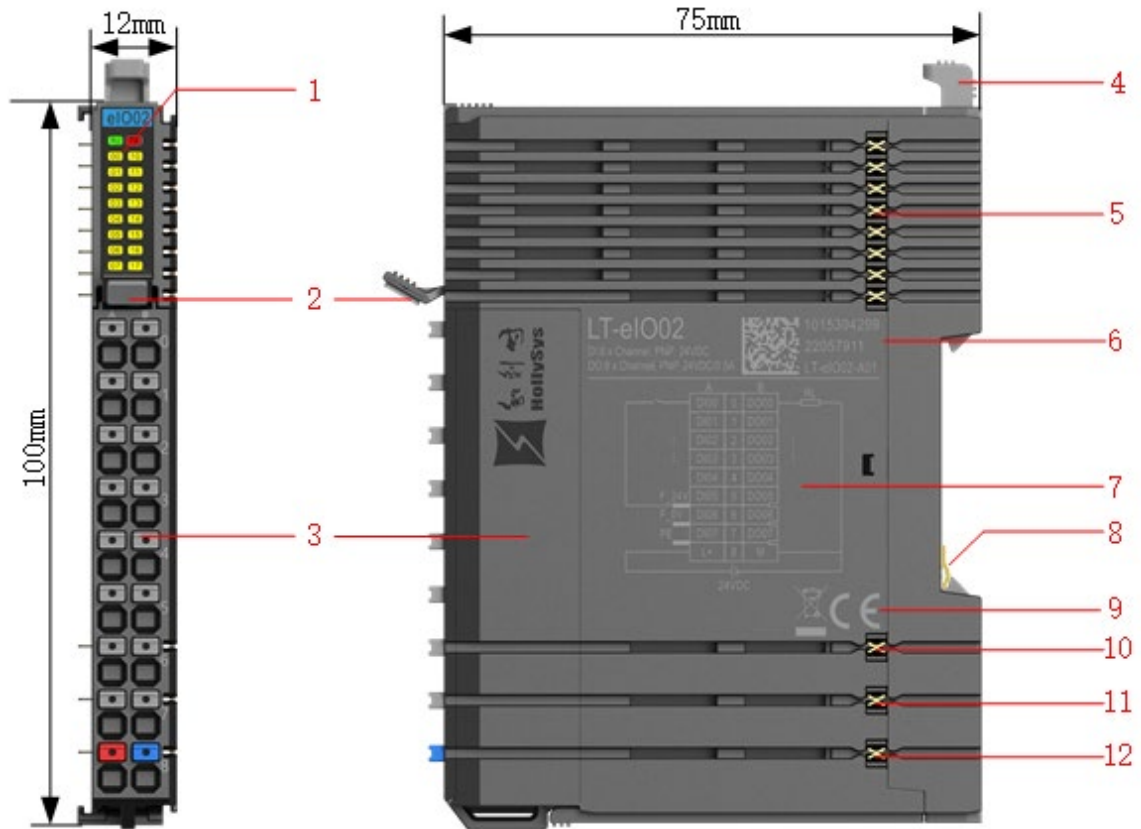
Channel Information

English Name	Chinese Name	Description
CHxx	Channel xx	• FALSE: No signal on channel • TRUE: Signal present on channel

4.7.2 LT-eIO02 8-Channel Digital Input/Output Hybrid Module (PNP)

The LT-eIO02 is a digital hybrid module in the LT-e series, featuring 8 digital input channels and 8 digital output channels, both PNP type. It achieves digital signal acquisition and switching output through internal bus communication.

4.7.2.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LED	Indicates the power supply and operation status of the module
2	Terminal Locking Latch	Press to disconnect the detachable terminal block
3	Terminal Block	Terminal block for 8 digital inputs and 8 digital outputs
4	DIN Rail Top Mounting Latch	• Pull this latch upward to the unlocked position before installing the module onto the DIN rail. • Press this latch downward to the locked position after installing the module onto the DIN rail.
5	Gold Finger	Internal bus contacts for data transmission between modules, system power supply, etc.
6	Nameplate	• The left side displays the module model and basic information. • The right side displays the serial number QR code and human-readable information. From top to bottom: serial number, production batch number, module version number.
7	Wiring Diagram Silkscreen	Silkscreen of the module wiring diagram. For detailed wiring, see Module Terminal Wiring Diagram
8	Protective Earth (PE) Spring Clip	Contacts the DIN rail and is internally connected to item No. 12
9	Other Informational Logos	• Do not discard arbitrarily. • The module complies with CE certification standards.
10	Field Power +24 VDC	Field power +24 VDC contact points for daisy-chaining field power between modules

11	Field Power 0 VDC	Field power 0 VDC contact points for daisy-chaining field power between modules
12	Protective Earth (PE)	Protective Earth (PE) contact points for daisy-chaining protective earth between modules

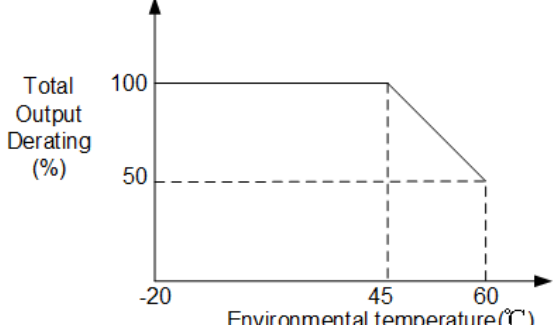
4.7.2.2 Technical Specifications

General Information

Parameter	Specification
System Power Supply	
Power Supply Method	Internal bus power supply
Rated Voltage	5 VDC
Input Voltage Range	4.5 VDC to 5.5 VDC
Power Consumption	≤ 0.5 W
Field Power Supply	
Rated Voltage	24 VDC
Input Voltage Range	19.2 VDC to 28.8 VDC
Other	
Module Hot Swapping	Not supported
Dimensions	12 mm width * 100 mm height * 75 mm depth (excluding local protrusions)
Weight	≤ 90 g
Protection Rating	IP20

Channels

Parameter	Specification
Digital Input DI	
Number of Channels	8
Signal Type	PNP
Channel-to-Channel Isolation	Not supported
Channel Protection	Not supported
Channel Cable	Unshielded or shielded cable, cable length ≤ 100 m
Logic 1 Signal	> 15 VDC
Logic 0 Signal	< 5 VDC
Response Time	- Logic 0 to Logic 1: ≤ 100 μs - Logic 1 to Logic 0: ≤ 100 μs
Input Voltage Level	24 VDC (19.2 VDC to 28.8 VDC)
Rated Current	2.7 mA/channel @ 24 VDC
Configuration Method (I/O Mapping)	BOOL, USINT
Channel Filter Parameter	Configurable per channel, options: 0.1 ms (no filter), 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms Note: Filter error 0.12 ms
Input Derating	75% derating when operating at 60 °C (no more than 6 input points ON simultaneously), or 15 °C derating when all input points are ON
Digital Output DO	
Number of Channels	8
Signal Type	Transistor high-side output
Load Voltage	24 VDC (19.2 VDC to 28.8 VDC)
Channel On-State Voltage	≤ 0.5 VDC @ 500 mA

Drop	
Channel-to-Channel Isolation	Not supported
Protection Functions	Supports short-circuit protection, overcurrent protection, overtemperature protection
Channel Cable	Unshielded cable, cable length ≤ 100 m
Output Load (Resistive Load)	• 0.5 A/channel @ 24 VDC • 2 A/module @ 24 VDC
Output Load (Inductive Load)	• 7.2 W/channel @ 24 VDC • 12 W/module @ 24 VDC
Output Load (Lamp Load)	• 5 W/channel @ 24 VDC • 9 W/module @ 24 VDC
Switching Frequency	100 Hz for resistive load, 0.5 Hz for inductive load, 10 Hz for lamp load
Maximum Off-State Leakage Current	10 μ A
Response Time	• Logic 0 to Logic 1: ≤ 100 μs • Logic 1 to Logic 0: ≤ 100 μs
Configuration Method (I/O Mapping)	• EtherCAT coupler: BOOL, USINT • Other couplers: BOOL
Channel Safe Value	• Channel output is turned off when system power or field power fails • In case of communication failure, the channel can output a safe value, configurable per channel • Channel safe value configurable: hold, off, on
Output Derating	Full load at 45 °C operating temperature (total output current of all channels does not exceed 2 A); 50% derating at 60 °C operating temperature (total output current of all channels does not exceed 1 A): 

Diagnostics

Parameter	Specification
Internal Fault Diagnosis	Detects chip watchdog status. When a watchdog reset occurs, an internal fault is considered to have occurred, and this fault bit cannot be automatically cleared.
External Fault Diagnosis	• Detects system-side supply voltage. When it falls below the threshold (software can operate normally), an external fault is considered to have occurred. This fault bit can be automatically cleared when the voltage rises above the threshold. • Detects field-side power supply status. In case of fault, an external fault is considered to have occurred. This fault bit can be automatically cleared when the fault recovers.
Channel Diagnosis	Reserved
System Power Diagnosis Threshold	4.1 VDC $\pm$ 5%
Field Power Diagnosis Threshold	17 VDC $\pm$ 10%

Diagnostic Log	Logs recorded when diagnostic status changes, maximum 100 entries supported
Module Operating Time Diagnosis	Supports recording of module cumulative operating time
Channel Operating Time Diagnosis	Supports recording of cumulative operating time of module channels in OFF and ON states: • During normal operation, recorded according to the actual channel value • Not recorded when system power or field power fails

4.7.2.3 Indicator LEDs



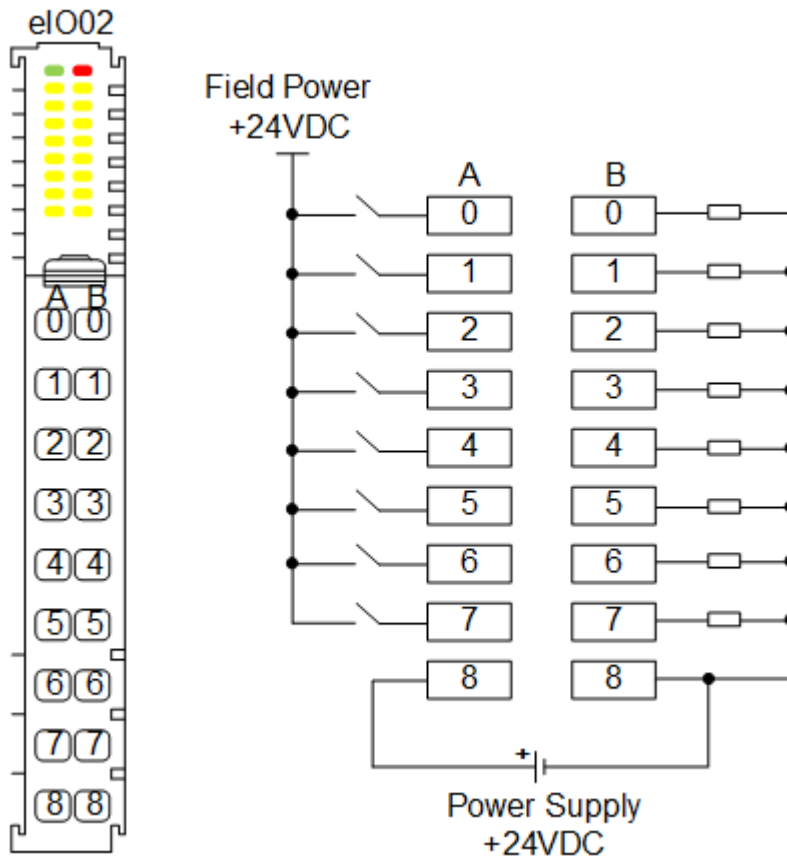
- RU: Run LED
- ER: Error LED
- 00~07, 10~17: Channel LEDs

LED Name	Color	Status	Description
RU	Green	Off	Module not powered or firmware not running
		Fast blinking (200ms on, 200ms off)	Internal bus communication offline
		Slow blinking (500ms on, 500ms off)	Firmware upgrade in progress
		Steady on	Internal bus communication online
ER	Red	Off	No module fault
		Fast blinking (200ms on, 200ms off)	External module fault
		Slow blinking (500ms on, 500ms off)	Firmware upgrade in progress
		Steady on	Internal module fault or module starting up
00~07, 10~17	Yellow	Off	No signal on channel xx
		Steady on	Signal present on channel xx

4.7.2.4 Module Terminal Wiring Diagram



Terminals A8 and B8 of the LT-eIO02 module are load power supply wiring terminals with color identification. Since the module's terminals are pluggable, do not confuse them with terminals without color identification to avoid short circuits.



Identifier	Description	Identifier	Description
A0	Digital Input Channel 00	B0	Digital Output Channel 10
A1	Digital Input Channel 01	B1	Digital Output Channel 11
A2	Digital Input Channel 02	B2	Digital Output Channel 12
A3	Digital Input Channel 03	B3	Digital Output Channel 13
A4	Digital Input Channel 04	B4	Digital Output Channel 14
A5	Digital Input Channel 05	B5	Digital Output Channel 15
A6	Digital Input Channel 06	B6	Digital Output Channel 16
A7	Digital Input Channel 07	B7	Digital Output Channel 17
A8	Load Power Supply +24 VDC Input	B8	Load Power Supply 0 VDC Input

4.7.2.5 Configuration Parameters

Category	Parameter Name	Display Name	Description	Configuration Rules
Module	Module Version	Software Interface Version	Software version number of the module, not modifiable	Default: 0x00180001
DI Channel	Diag Enable ^{Note}	Channel Diagnosis Enable ^{Note}	Whether to enable the channel diagnosis function	Default: Enable Value range: • Enable: Enable the channel diagnosis function • Disable: Disable the

				channel diagnosis function
	Channel Filter	Input Filter Time	Filter parameter for the channel	Default: 1ms Value range: • 0.1ms (No filtering) • 0.5ms • 1ms • 2ms • 4ms • 8ms • 16ms • 32ms
DO Channel	Safe Value	Channel Safe Value	Safe value output by the channel when internal bus communication fails	Default: Off • Hold: Hold the value before the failure • Off: Output 0 • On: Output 1

Note: Channel diagnosis is a reserved function and is not yet implemented. Enabling it will not report channel diagnostic information.

4.7.2.6 Diagnostic and Channel Information



- During cyclic communication, the input data of the module includes channel information and diagnostic information, with channel information arranged before diagnostic information. The number of bytes occupied by input data and output data is shown in the following table.
- In the diagnostic information, Field Power 1 is the field-side power supply; Field Power 2 is the load power supply.

Input Data Occupied Bytes

Table 1 DI Channel Information Occupied Bytes

Bit/Byte	Byte0
Bit0	DI Channel 00
Bit1	DI Channel 01
Bit2	DI Channel 02
Bit3	DI Channel 03
Bit4	DI Channel 04
Bit5	DI Channel 05
Bit6	DI Channel 06
Bit7	DI Channel 07

Table 2 Diagnostic Information Occupied Bytes

Bit/Byte	Byte1 Module Diagnosis	Byte2 Channel Diagnosis
Bit0	System Power Fault	Reserved
Bit1	Reserved	
Bit2	Watchdog Fault	
Bit3	Hardware Fault	
Bit4	Field Power 1 Fault	
Bit5	Field Power 2 Fault	
Bit6	-	
Bit7	-	

Output Data Occupied Bytes

Table 3 DO Channel Information Occupied Bytes

Bit/Byte	Byte0
Bit0	DO Channel 10
Bit1	DO Channel 11
Bit2	DO Channel 12
Bit3	DO Channel 13
Bit4	DO Channel 14
Bit5	DO Channel 15
Bit6	DO Channel 16
Bit7	DO Channel 17

Diagnostic Information

Category	English Name	Chinese Name	Description
Module	System Power Fault	System Power Fault	• 0: System-side power normal • 1: System-side power fault, diagnostic threshold 4.1 VDC $\pm 5\%$
	Watchdog Fault	Watchdog Fault	• 0: Watchdog normal • 1: Watchdog fault
	Hardware Fault	Hardware Fault	• 0: Hardware normal • 1: Hardware fault
	Field Power x Fault	Field Power x Fault	• 0: Field-side power x normal • 1: Field-side power x fault, diagnostic threshold 17 VDC $\pm 10\%$
Channel	Reserved		

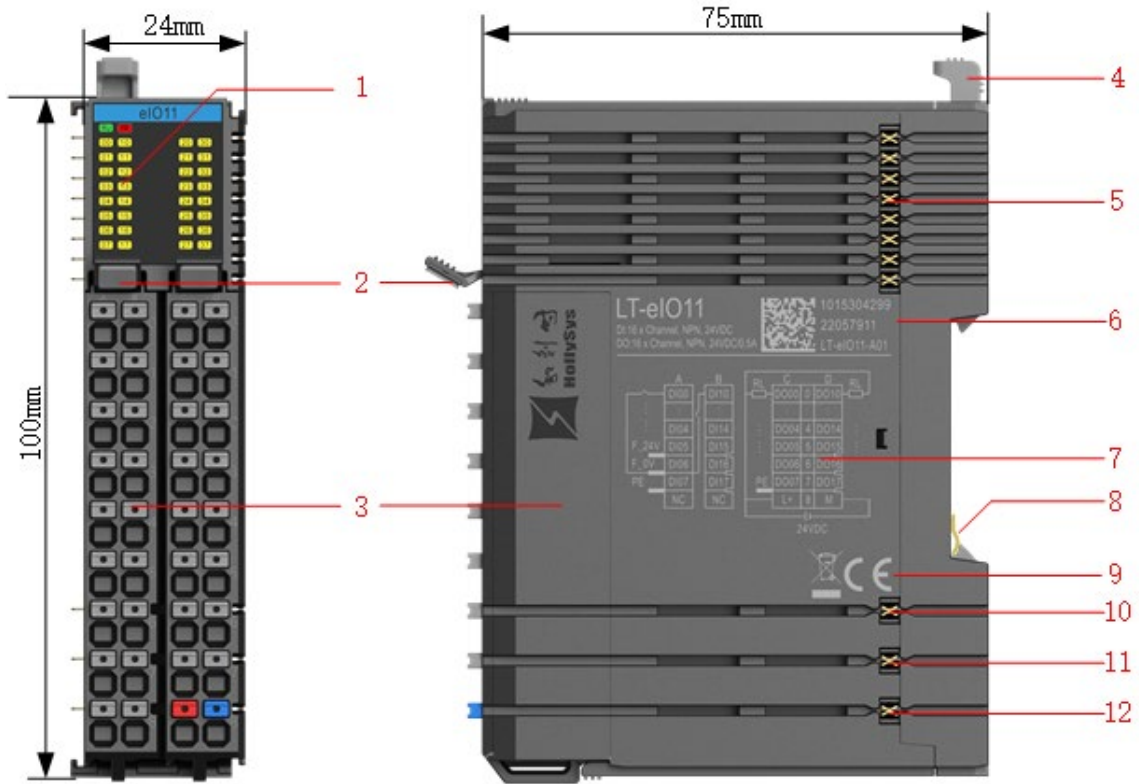
Channel Information

English Name	Chinese Name	Description
CHxx	Channel xx	• FALSE: No signal on channel • TRUE: Signal present on channel

4.7.3 LT-eIO11 16-Channel Digital Input/Output Hybrid Module (NPN)

The LT-eIO11 is a digital hybrid module in the LT-e series, featuring 16 digital input channels and 16 digital output channels, both NPN type. It achieves digital signal acquisition and switching output through internal bus communication.

4.7.3.1 Module Appearance Introduction



No.	Name	Description
1	Status LEDs	Indicates the module's power supply and operating status
2	Terminal locking latch	Press to remove the terminal block
3	Terminal block	Terminal block for 16 digital inputs and 16 digital outputs
4	DIN rail top mounting latch	- Before mounting the module onto the DIN rail, pull this latch upward to the unlocked position. - After mounting the module onto the DIN rail, press this latch downward to the locked position.
5	Goldfinger connector	Internal bus contact points for data transmission between modules, system power supply, etc.
6	Nameplate	- Left side: module model and basic information. - Right side: Serial number QR code and human-readable information. From top to bottom: Serial number, Production batch number, Module version number.
7	Wiring diagram silk screen	Wiring diagram silk screen for the module. For detailed wiring, see Module Terminal Wiring Diagram .
8	Protective Earth (PE) spring clip	Contacts the DIN rail and is internally connected to No. 12.
9	Other informational logos	- Do not discard arbitrarily. - The module complies with CE certification standards.
10	Field power supply +24 VDC	Field power supply +24 VDC contact points for cascading field power between modules.
11	Field power supply 0 VDC	Field power supply 0 VDC contact points for cascading field power between modules.
12	Protective Earth (PE)	Protective Earth (PE) contact points for cascading PE between modules.

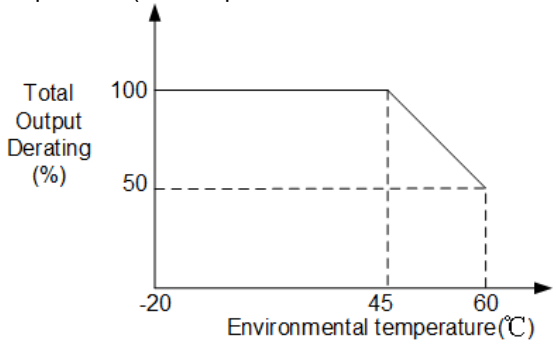
4.7.3.2 Technical Specifications

General Information

Parameter	Specification
System Power Supply	
Power Supply Method	Internal bus power supply
Rated Voltage	5 VDC
Input Voltage Range	4.5 VDC to 5.5 VDC
Power Consumption	≤ 0.7 W
Field Power Supply	
Rated Voltage	24 VDC
Input Voltage Range	19.2 VDC to 28.8 VDC
Other	
Module Hot Swapping	Not supported
Dimensions	24 mm width * 100 mm height * 75 mm depth (excluding local protrusions)
Weight	≤ 180 g
Protection Rating	IP20

Channels

Parameter	Specification
Digital Input DI	
Number of Channels	16
Signal Type	NPN
Channel-to-Channel Isolation	Not supported
Channel Protection	Not supported
Channel Cable	Unshielded or shielded cable, cable length ≤ 100 m
Logic 1 Signal	< 5 VDC
Logic 0 Signal	> 15 VDC
Response Time	- Logic 0 to Logic 1: ≤ 100 μs - Logic 1 to Logic 0: ≤ 100 μs
Input Voltage Level	24 VDC (19.2 VDC to 28.8 VDC)
Rated Current	2.7 mA/channel @ 24 VDC
Configuration Method (I/O Mapping)	BOOL, USINT, UINT
Channel Filter Parameter	Configurable per channel, options: 0.1 ms (no filter), 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms Note: Filter error 0.12 ms
Input Derating	75% derating when operating at 60 °C (no more than 12 input points ON simultaneously), or 15 °C derating when all input points are ON
Digital Output DO	
Number of Channels	16
Signal Type	Transistor low-side output
Load Voltage	24 VDC (19.2 VDC to 28.8 VDC)
Channel On-State Voltage Drop	≤ 0.5 VDC @ 500 mA
Channel-to-Channel Isolation	Not supported
Protection Functions	Supports short-circuit protection, overcurrent protection, overtemperature protection

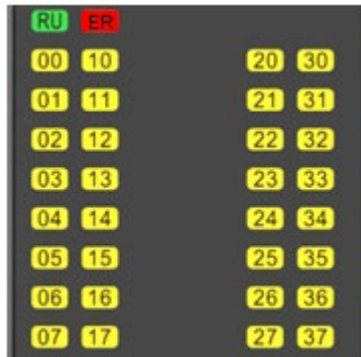
Channel Cable	Unshielded cable, cable length ≤ 100 m
Output Load (Resistive Load)	• 0.5 A/channel @ 24 VDC • 4 A/module @ 24 VDC
Output Load (Inductive Load)	• 7.2 W/channel @ 24 VDC • 12 W/module @ 24 VDC
Output Load (Lamp Load)	• 5 W/channel @ 24 VDC • 18 W/module @ 24 VDC
Switching Frequency	100 Hz for resistive load, 0.5 Hz for inductive load, 10 Hz for lamp load
Maximum Off-State Leakage Current	10 μ A
Response Time	• Logic 0 to Logic 1: ≤ 100 μs • Logic 1 to Logic 0: ≤ 100 μs
Configuration Method (I/O Mapping)	• EtherCAT coupler: BOOL, USINT, UINT • Other couplers: BOOL
Channel Safe Value	• Channel output is turned off when system power or field power fails • In case of communication failure, the channel can output a safe value, configurable per channel • Channel safe value configurable: hold, off, on
Output Derating	Full load at 45 °C operating temperature (total output current of all channels does not exceed 4 A); 50% derating at 60 °C operating temperature (total output current of all channels does not exceed 2 A):  Total Output Derating (%) Environmental temperature(°C)

Diagnostics

Parameter	Specification
Internal Fault Diagnosis	Detects chip watchdog status. When a watchdog reset occurs, an internal fault is considered to have occurred, and this fault bit cannot be automatically cleared.
External Fault Diagnosis	• Detects system-side supply voltage. When it falls below the threshold (software can operate normally), an external fault is considered to have occurred. This fault bit can be automatically cleared when the voltage rises above the threshold. • Detects field-side power supply status. In case of fault, an external fault is considered to have occurred. This fault bit can be automatically cleared when the fault recovers.
Channel Diagnosis	Reserved
System Power Diagnosis Threshold	4.1 VDC $\pm$ 5%
Field Power Diagnosis Threshold	17 VDC $\pm$ 10%
Diagnostic Log	Logs recorded when diagnostic status changes, maximum 100 entries supported
Module Operating Time Diagnosis	Supports recording of module cumulative operating time
Channel Operating Time	Supports recording of cumulative operating time of module channels

Diagnosis	in OFF and ON states: - During normal operation, recorded according to the actual channel value - Not recorded when system power or field power fails
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4.7.3.3 Indicator LEDs



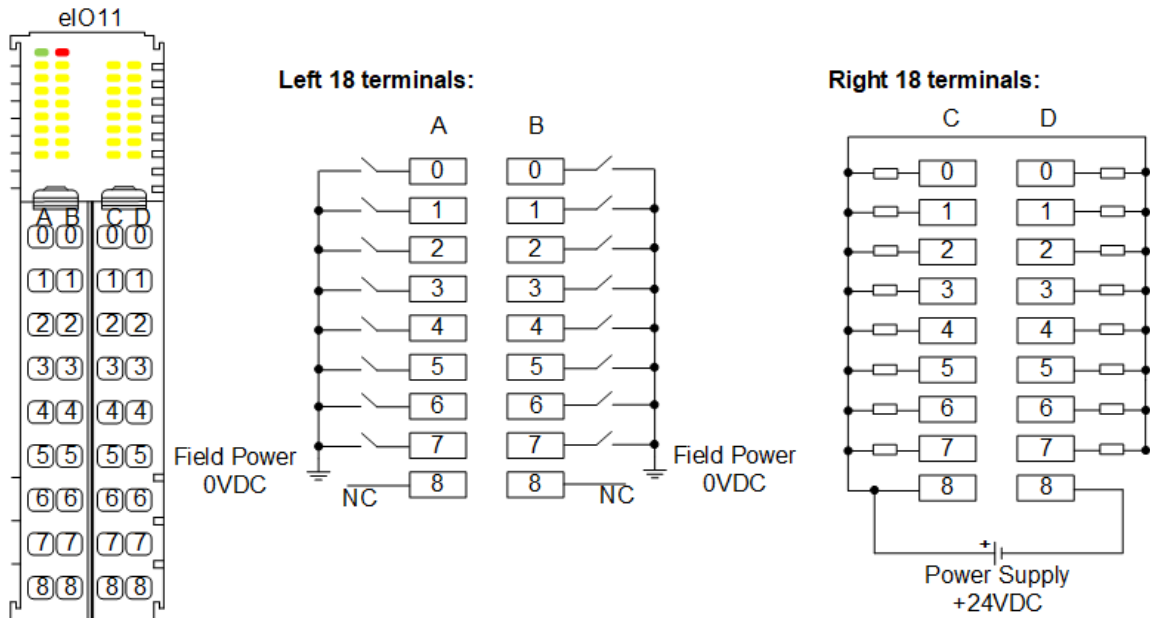
- RU: Run indicator
- ER: Error indicator
- 00~07, 10~17, 20~27, 30~37: Channel indicators

LED Name	Color	Status	Description
RU	Green	Off	Module is not powered or firmware is not running
		Fast Blink (200ms on, 200ms off)	Internal bus communication offline
		Slow Blink (500ms on, 500ms off)	Firmware upgrade in progress
		Steady On	Internal bus communication online
ER	Red	Off	No module fault
		Fast Blink (200ms on, 200ms off)	External module fault
		Slow Blink (500ms on, 500ms off)	Firmware upgrade in progress
		Steady On	Internal module fault or module is starting up
00~07, 10~17, 20~27, 30~37	Yellow	Off	Channel xx has no signal
		Steady On	Channel xx has signal

4.7.3.4 Module Terminal Wiring Diagram



Terminals C8 and D8 of the LT-eIO11 module are load power supply wiring terminals with color identification. Since the module's terminals are pluggable, do not confuse them with terminals without color identification to avoid short circuits.



Identifier	Description	Identifier	Description
Left 18 Terminals			
A0	Digital Input Channel 00	B0	Digital Input Channel 10
A1	Digital Input Channel 01	B1	Digital Input Channel 11
A2	Digital Input Channel 02	B2	Digital Input Channel 12
A3	Digital Input Channel 03	B3	Digital Input Channel 13
A4	Digital Input Channel 04	B4	Digital Input Channel 14
A5	Digital Input Channel 05	B5	Digital Input Channel 15
A6	Digital Input Channel 06	B6	Digital Input Channel 16
A7	Digital Input Channel 07	B7	Digital Input Channel 17
A8	NC, Not connected	B8	NC, Not connected
Right 18 Terminals			
C0	Digital Output Channel 20	D0	Digital Output Channel 30
C1	Digital Output Channel 21	D1	Digital Output Channel 31
C2	Digital Output Channel 22	D2	Digital Output Channel 32
C3	Digital Output Channel 23	D3	Digital Output Channel 33
C4	Digital Output Channel 24	D4	Digital Output Channel 34
C5	Digital Output Channel 25	D5	Digital Output Channel 35
C6	Digital Output Channel 26	D6	Digital Output Channel 36
C7	Digital Output Channel 27	D7	Digital Output Channel 37
C8	Load Power Supply +24 VDC Input	D8	Load Power Supply 0 VDC Input

4.7.3.5 Configuration Parameters

Category	Parameter Name	Display Name	Description	Configuration Rules
Module	Module Version	Software Interface Version	Software version number of the module, not modifiable	Default: 0x00190001
DI Channel	Diag Enable ^{Note}	Channel Diagnosis	Whether to enable the	Default: Enable Value range:

		Enable ^{Note}	channel diagnosis function	• Enable: Enable the channel diagnosis function • Disable: Disable the channel diagnosis function
	Channel Filter	Input Filter Time	Filter parameter for the channel	Default: 1ms Value range: • 0.1ms (No filtering) • 0.5ms • 1ms • 2ms • 4ms • 8ms • 16ms • 32ms
DO Channel	Safe Value	Channel Safe Value	Safe value output by the channel when internal bus communication fails	Default: Off • Hold: Hold the value before the failure • Off: Output 0 • On: Output 1

Note: Channel diagnosis is a reserved function and is not yet implemented. Enabling it will not report channel diagnostic information.

4.7.3.6 Diagnostic and Channel Information



During cyclic communication, the input data of the module includes channel information and diagnostic information, with channel information arranged before diagnostic information. The number of bytes occupied by input data and output data is shown in the following table.

Input Data Occupied Bytes

Table 1 DI Channel Information Occupied Bytes

Bit/Byte	Byte0	Byte1
Bit0	DI Channel 00	DI Channel 10
Bit1	DI Channel 01	DI Channel 11
Bit2	DI Channel 02	DI Channel 12
Bit3	DI Channel 03	DI Channel 13
Bit4	DI Channel 04	DI Channel 14
Bit5	DI Channel 05	DI Channel 15
Bit6	DI Channel 06	DI Channel 16
Bit7	DI Channel 07	DI Channel 17

Table 2 Diagnostic Information Occupied Bytes

Table 2 Diagnostic Information: Group 1 Data		
Bit/Byte	Byte2	Byte3~5
	Module Diagnosis	Channel Diagnosis
Bit0	System Power Fault	Reserved
Bit1	Reserved	
Bit2	Watchdog Fault	
Bit3	Hardware Fault	
Bit4	Field Power 1 Fault	
Bit5	Field Power 2 Fault	
Bit6	-	
Bit7		

Output Data Occupied Bytes

Table 3 DO Channel Information Occupied Bytes

Bit/Byte	Byte0	Byte1
Bit0	DO Channel 20	DO Channel 30
Bit1	DO Channel 21	DO Channel 31
Bit2	DO Channel 22	DO Channel 32
Bit3	DO Channel 23	DO Channel 33
Bit4	DO Channel 24	DO Channel 34
Bit5	DO Channel 25	DO Channel 35
Bit6	DO Channel 26	DO Channel 36
Bit7	DO Channel 27	DO Channel 37

Diagnostic Information

Category	English Name	Chinese Name	Description
Module	System Power Fault	System Power Fault	• 0: System-side power normal • 1: System-side power fault, diagnostic threshold 4.1 VDC $\pm 5\%$
	Watchdog Fault	Watchdog Fault	• 0: Watchdog normal • 1: Watchdog fault
	Hardware Fault	Hardware Fault	• 0: Hardware normal • 1: Hardware fault
	Field Power x Fault	Field Power x Fault	• 0: Field-side power x normal • 1: Field-side power x fault, diagnostic threshold 17 VDC $\pm 10\%$
Channel	Reserved		

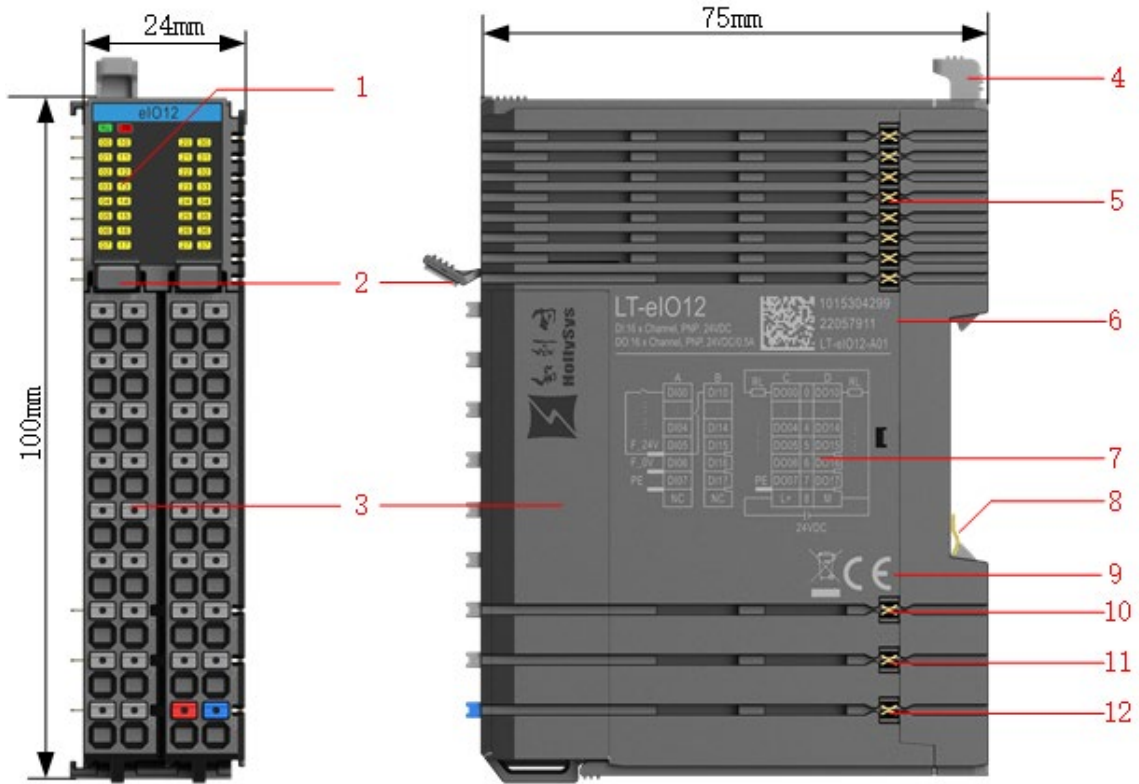
Channel Information

English Name	Chinese Name	Description
CHxx	Channel xx	• FALSE: No signal on channel • TRUE: Signal present on channel

4.7.4 LT-eIO12 16-Channel Digital Input/Output Hybrid Module (PNP)

The LT-eIO12 is a digital hybrid module in the LT-e series, featuring 16 digital input channels and 16 digital output channels, both PNP type. It achieves digital signal acquisition and switching output through internal bus communication.

4.7.4.1 Module Appearance Introduction



No.	Name	Description
1	Status LEDs	Indicates the module's power supply and operating status
2	Terminal locking latch	Press to remove the terminal block
3	Terminal block	Terminal block for 16 digital inputs and 16 digital outputs
4	DIN rail top mounting latch	- Before mounting the module onto the DIN rail, pull this latch upward to the unlocked position. - After mounting the module onto the DIN rail, press this latch downward to the locked position.
5	Goldfinger connector	Internal bus contact points for data transmission between modules, system power supply, etc.
6	Nameplate	- Left side: module model and basic information. - Right side: Serial number QR code and human-readable information. From top to bottom: Serial number, Production batch number, Module version number.
7	Wiring diagram silk screen	Wiring diagram silk screen for the module. For detailed wiring, see Module Terminal Wiring Diagram .
8	Protective Earth (PE) spring clip	Contacts the DIN rail and is internally connected to No. 12.
9	Other informational logos	- Do not dispose of arbitrarily. - Module complies with CE certification standards.
10	Field power supply +24 VDC	Field power supply +24 VDC contact points for cascading field power between modules.
11	Field power supply 0 VDC	Field power supply 0 VDC contact points for cascading field power between modules.
12	Protective Earth (PE)	Protective Earth (PE) contact points for cascading PE between modules.

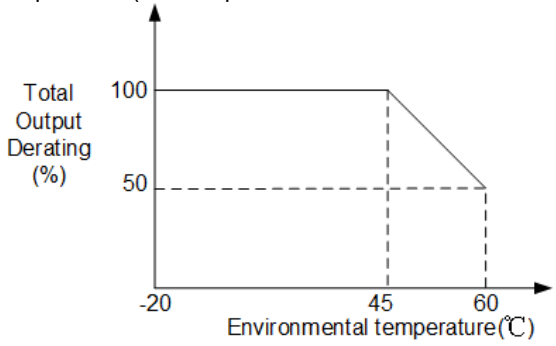
4.7.4.2 Technical Specifications

General Information

Parameter	Specification
System Power Supply	
Power Supply Method	Internal bus power supply
Rated Voltage	5 VDC
Input Voltage Range	4.5 VDC to 5.5 VDC
Power Consumption	≤ 0.7 W
Field Power Supply	
Rated Voltage	24 VDC
Input Voltage Range	19.2 VDC to 28.8 VDC
Other	
Module Hot Swapping	Not supported
Dimensions	24 mm width * 100 mm height * 75 mm depth (excluding local protrusions)
Weight	≤ 180 g
Protection Rating	IP20

Channels

Parameter	Specification
Digital Input DI	
Number of Channels	16
Signal Type	PNP
Channel-to-Channel Isolation	Not supported
Channel Protection	Not supported
Channel Cable	Unshielded or shielded cable, cable length ≤ 100 m
Logic 1 Signal	> 15 VDC
Logic 0 Signal	< 5 VDC
Response Time	- Logic 0 to Logic 1: ≤ 100 μs - Logic 1 to Logic 0: ≤ 100 μs
Input Voltage Level	24 VDC (19.2 VDC to 28.8 VDC)
Rated Current	2.7 mA/channel @ 24 VDC
Configuration Method (I/O Mapping)	BOOL, USINT, UINT
Channel Filter Parameter	Configurable per channel, options: 0.1 ms (no filter), 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms Note: Filter error 0.12 ms
Input Derating	75% derating when operating at 60 °C (no more than 12 input points ON simultaneously), or 15 °C derating when all input points are ON
Digital Output DO	
Number of Channels	16
Signal Type	Transistor high-side output
Load Voltage	24 VDC (19.2 VDC to 28.8 VDC)
Channel On-State Voltage Drop	≤ 0.5 VDC @ 500 mA
Channel-to-Channel Isolation	Not supported
Protection Functions	Supports short-circuit protection, overcurrent protection, overtemperature protection

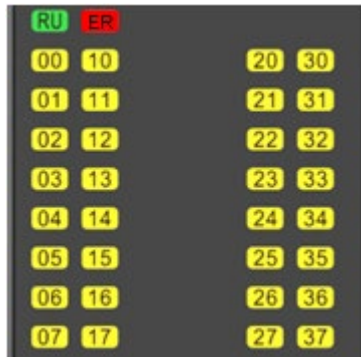
Channel Cable	Unshielded cable, cable length ≤ 100 m
Output Load (Resistive Load)	• 0.5 A/channel @ 24 VDC • 4 A/module @ 24 VDC
Output Load (Inductive Load)	• 7.2 W/channel @ 24 VDC • 12 W/module @ 24 VDC
Output Load (Lamp Load)	• 5 W/channel @ 24 VDC • 18 W/module @ 24 VDC
Switching Frequency	100 Hz for resistive load, 0.5 Hz for inductive load, 10 Hz for lamp load
Maximum Off-State Leakage Current	10 μ A
Response Time	• Logic 0 to Logic 1: ≤ 100 μs • Logic 1 to Logic 0: ≤ 100 μs
Configuration Method (I/O Mapping)	• EtherCAT coupler: BOOL, USINT, UINT • Other couplers: BOOL
Channel Safe Value	• Channel output is turned off when system power or field power fails • In case of communication failure, the channel can output a safe value, configurable per channel • Channel safe value configurable: hold, off, on
Output Derating	Full load at 45 °C operating temperature (total output current of all channels does not exceed 4 A); 50% derating at 60 °C operating temperature (total output current of all channels does not exceed 2 A):  Total Output Derating (%) Environmental temperature(°C)

Diagnostics

Parameter	Specification
Internal Fault Diagnosis	Detects chip watchdog status. When a watchdog reset occurs, an internal fault is considered to have occurred, and this fault bit cannot be automatically cleared.
External Fault Diagnosis	• Detects system-side supply voltage. When it falls below the threshold (software can operate normally), an external fault is considered to have occurred. This fault bit can be automatically cleared when the voltage rises above the threshold. • Detects field-side power supply status. In case of fault, an external fault is considered to have occurred. This fault bit can be automatically cleared when the fault recovers.
Channel Diagnosis	Reserved
System Power Diagnosis Threshold	4.1 VDC $\pm$ 5%
Field Power Diagnosis Threshold	17 VDC $\pm$ 10%
Diagnostic Log	Logs recorded when diagnostic status changes, maximum 100 entries supported
Module Operating Time Diagnosis	Supports recording of module cumulative operating time
Channel Operating Time	Supports recording of cumulative operating time of module channels

Diagnosis	in OFF and ON states: - During normal operation, recorded according to the actual channel value - Not recorded when system power or field power fails
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4.7.4.3 Indicator LEDs



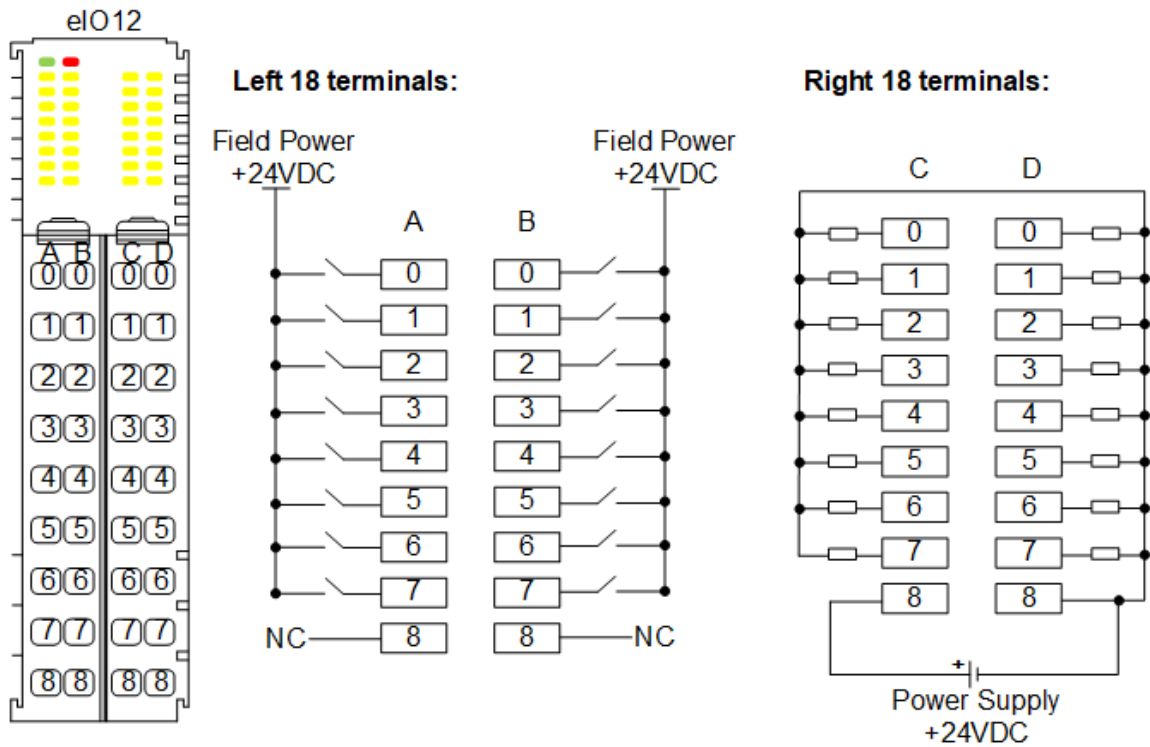
- RU: Run indicator
- ER: Error indicator
- 00~07, 10~17, 20~27, 30~37: Channel indicators

LED Name	Color	Status	Description
RU	Green	Off	Module is not powered or firmware is not running
		Fast Blink (200ms on, 200ms off)	Internal bus communication offline
		Slow Blink (500ms on, 500ms off)	Firmware upgrade in progress
		Steady On	Internal bus communication online
ER	Red	Off	No module fault
		Fast Blink (200ms on, 200ms off)	External module fault
		Slow Blink (500ms on, 500ms off)	Firmware upgrade in progress
		Steady On	Internal module fault or module is starting up
00~07, 10~17, 20~27, 30~37	Yellow	Off	Channel xx has no signal
		Steady On	Channel xx has signal

4.7.4.4 Module Terminal Wiring Diagram



Terminals C8 and D8 of the LT-eIO12 module are load power supply wiring terminals with color identification. Since the module's terminals are pluggable, do not confuse them with terminals without color identification to avoid short circuits.



Identifier	Description	Identifier	Description
Left 18 Terminals			
A0	Digital Input Channel 00	B0	Digital Input Channel 10
A1	Digital Input Channel 01	B1	Digital Input Channel 11
A2	Digital Input Channel 02	B2	Digital Input Channel 12
A3	Digital Input Channel 03	B3	Digital Input Channel 13
A4	Digital Input Channel 04	B4	Digital Input Channel 14
A5	Digital Input Channel 05	B5	Digital Input Channel 15
A6	Digital Input Channel 06	B6	Digital Input Channel 16
A7	Digital Input Channel 07	B7	Digital Input Channel 17
A8	NC, Not connected	B8	NC, Not connected
Right 18 Terminals			
C0	Digital Output Channel 20	D0	Digital Output Channel 30
C1	Digital Output Channel 21	D1	Digital Output Channel 31
C2	Digital Output Channel 22	D2	Digital Output Channel 32
C3	Digital Output Channel 23	D3	Digital Output Channel 33
C4	Digital Output Channel 24	D4	Digital Output Channel 34
C5	Digital Output Channel 25	D5	Digital Output Channel 35
C6	Digital Output Channel 26	D6	Digital Output Channel 36
C7	Digital Output Channel 27	D7	Digital Output Channel 37
C8	Load Power Supply +24 VDC Input	D8	Load Power Supply 0 VDC Input

4.7.4.5 Configuration Parameters

Category	English Name	Chinese Name	Description	Configuration Rules
Module	Module Version	Software Interface	Software version number	Default value: 0x001A0001

		Version	of the module, not modifiable	
DI Channel	Diag Enable ^{Note}	Channel Diagnosis Enable ^{Note}	Enable or disable the channel diagnosis function	Default value: Enable Value range: • Enable: Enable channel diagnosis function • Disable: Disable channel diagnosis function
	Channel Filter	Channel Filter Time	Channel filter parameter	Default value: 1 ms Value range: • 0.1 ms, meaning no filter • 0.5 ms • 1 ms • 2 ms • 4 ms • 8 ms • 16 ms • 32 ms
DO Channel	Safe Value	Channel Safe Value	Safe value output by the channel in case of internal bus communication failure	Default value: Off • Hold: Hold the value before the fault • Off: Output 0 • On: Output 1

Note: Channel diagnosis is a reserved function, not yet implemented. Enabling it will not report channel diagnosis information.

4.7.4.6 Diagnostic and Channel Information



During cyclic communication, the input data of the module includes channel information and diagnostic information, with channel information arranged before diagnostic information. The number of bytes occupied by input data and output data is shown in the following table.

Input Data Occupied Bytes

Table 1 DI Channel Information Occupied Bytes

Bit/Byte	Byte0	Byte1
Bit0	DI Channel 00	DI Channel 10
Bit1	DI Channel 01	DI Channel 11
Bit2	DI Channel 02	DI Channel 12
Bit3	DI Channel 03	DI Channel 13
Bit4	DI Channel 04	DI Channel 14
Bit5	DI Channel 05	DI Channel 15
Bit6	DI Channel 06	DI Channel 16
Bit7	DI Channel 07	DI Channel 17

Table 2 Diagnostic Information Occupied Bytes

Bit/Byte	Byte2	Byte3~5
	Module Diagnosis	Channel Diagnosis
Bit0	System Power Fault	Reserved
Bit1	Reserved	
Bit2	Watchdog Fault	

Bit3	Hardware Fault	
Bit4	Field Power 1 Fault	
Bit5	Field Power 2 Fault	
Bit6	-	
Bit7		

Output Data Occupied Bytes

Table 3 DO Channel Information Occupied Bytes

Bit/Byte	Byte0	Byte1
Bit0	DO Channel 20	DO Channel 30
Bit1	DO Channel 21	DO Channel 31
Bit2	DO Channel 22	DO Channel 32
Bit3	DO Channel 23	DO Channel 33
Bit4	DO Channel 24	DO Channel 34
Bit5	DO Channel 25	DO Channel 35
Bit6	DO Channel 26	DO Channel 36
Bit7	DO Channel 27	DO Channel 37

Diagnostic Information

Category	English Name	Chinese Name	Description
Module	System Power Fault	System Power Fault	• 0: System-side power normal • 1: System-side power fault, diagnostic threshold 4.1 VDC $\pm 5\%$
	Watchdog Fault	Watchdog Fault	• 0: Watchdog normal • 1: Watchdog fault
	Hardware Fault	Hardware Fault	• 0: Hardware normal • 1: Hardware fault
	Field Power x Fault	Field Power x Fault	• 0: Field-side power x normal • 1: Field-side power x fault, diagnostic threshold 17 VDC $\pm 10\%$
Channel	Reserved		

Channel Information

English Name	Chinese Name	Description
CHxx	Channel xx	• FALSE: No signal on channel • TRUE: Signal present on channel

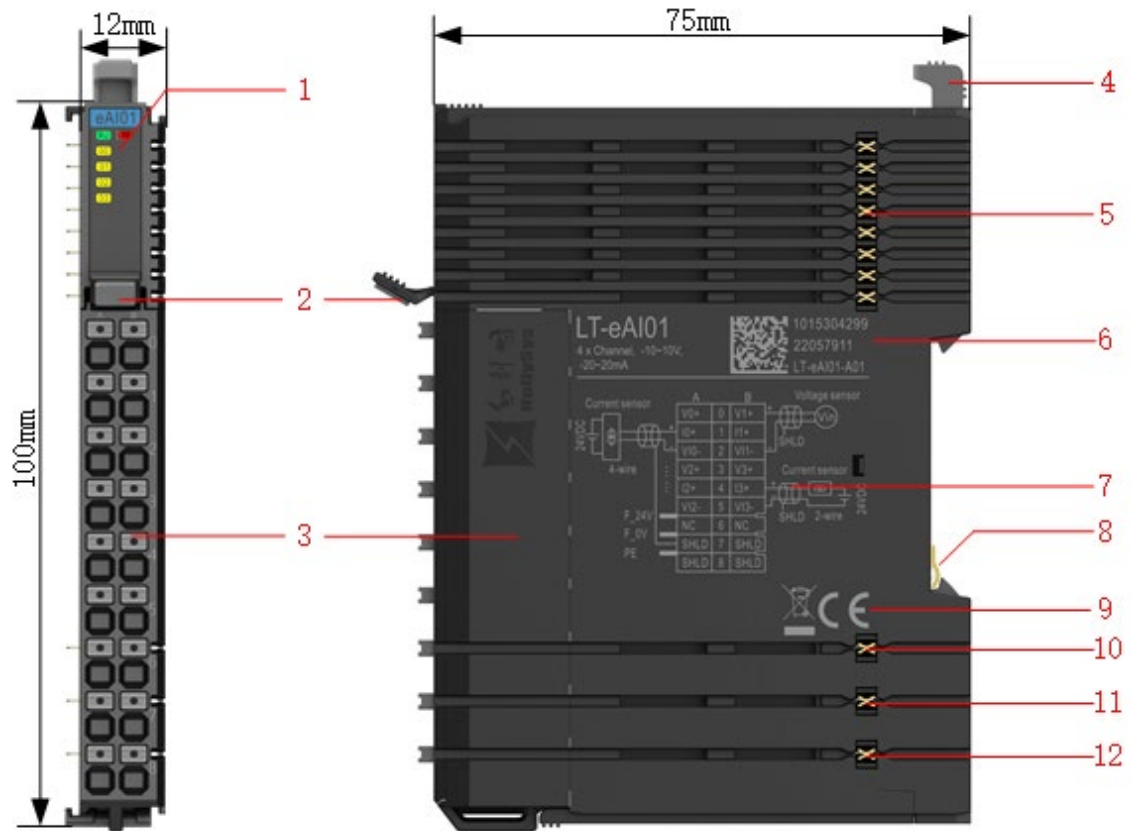
4.8 Analog Input Module

4.8.1 LT-eAI01 4-Channel Analog Input Module (Voltage/Current Type)

The LT-eAI01 is a 4-channel voltage/current analog acquisition module. It provides different measurement ranges and corresponding code values for the acquisition of both voltage and current analog signals. It converts the acquired analog signals into digital signals and reports them to the CPU module via the internal

bus for system calculation and processing.

4.8.1.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDS	Indicates the module's power supply and operating status
2	Terminal Locking Switch	Press to detach the wiring terminal
3	Wiring Terminal	4-channel analog input wiring terminal
4	DIN Rail Top Mounting Latch	- Before installing the module onto the DIN rail, pull this latch upward to the unlocked position - After installing the module onto the DIN rail, press this latch downward to the locked position
5	Gold Plated Contacts	Internal bus contact points, used for inter-module data transmission, system power supply, etc.
6	Nameplate	- The left side shows the module model and basic information - The right side shows the serial number QR code and plain text information. The plain text from top to bottom is: Serial Number, Production Batch Number, Module Version Number
7	Wiring Diagram Silkscreen	Module wiring diagram silkscreen. For detailed wiring diagram, refer to the Module Terminal Wiring Diagram
8	Protective Earth (PE) Spring Contact	Contacts the DIN rail and is internally connected to No.12
9	Other Descriptive Logos	- Do not dispose of arbitrarily - Module complies with CE certification standards

10	Field Power +24VDC	Field power +24VDC contact point, used for inter-module field power cascading
11	Field Power 0VDC	Field power 0VDC contact point, used for inter-module field power cascading
12	Protective Earth (PE)	Protective earth (PE) contact point, used for inter-module protective earth cascading

4.8.1.2 Technical Specifications

Basic Information

Parameter	Specification
System Power Supply	
Power Supply Method	Internal Bus Power Supply
Rated Voltage	5VDC
Voltage Input Range	4.5VDC~5.5VDC
Power Consumption	≤0.5W
Others	
Module Hot Swapping	Not Supported
Dimensions	Width 12mm * Height 100mm * Depth 75mm (excluding local protrusions)
Weight	≤90g
Protection Rating	IP20

Channels

Parameter	Specification
Number of Channels	4
Channel Enable	Individually configurable per channel, enabled by default
Signal Type	Voltage/Current, configurable
Wiring Method	Single-ended
Measurement Range	Voltage Range: 0~5V, 1~5V, 0~10V, -5~5V, -10~10V Current Range: 0~20mA, 4~20mA, -20~20mA
Range Code Value Range	When the range is positive, the following 4 code values are supported, uniformly configured for all channels: • 0~20000 • 0~27648 • 0~32000 • 0~32767 When the range is positive and negative, the following 4 code values are supported, uniformly configured for all channels: • -20000~20000 • -27648~27648 • -32000~32000 • -32768~32767
Configuration Method (I/O Mapping Method)	INT
Resolution	16-bit, optimal 0.01mA/0.001V
Conversion Time	• 50μs/channel • 220μs/all channels
Accuracy	• 0.1% F.S. @20~30°C • 0.2% F.S. @-20~60°C
Channel Filter Parameter	Individually configurable per channel, 1~255

Input Impedance	- Voltage signal $\geq 1\text{M}\Omega$ - Current signal $250\Omega \pm 2\%$
Channel Cable	Shielded cable, cable length $\leq 100\text{m}$
Channel-to-Channel Isolation	Not Supported
Maximum Allowable Voltage	$\pm 15\text{V}$
Maximum Allowable Current	$\pm 25\text{mA}$

Diagnostics

Parameter	Specification
System Power Supply Diagnostic Threshold	$4.1\text{VDC} \pm 5\%$
Field Power Supply Diagnostic Threshold	$17\text{VDC} \pm 10\%$
Internal Fault Diagnosis	Detects chip watchdog status. When a watchdog reset occurs, it is considered an internal fault. This fault bit cannot be cleared automatically.
External Fault Diagnosis	- Detects the system-side power supply voltage. When it falls below the threshold (software can still operate normally), it is considered an external fault. This fault bit can be cleared automatically when the voltage rises above the threshold. - Detects the field-side power supply status. In case of a fault, it is considered an external fault. This fault bit can be cleared automatically when the fault is resolved.
Channel Diagnostics	Supported, individually configurable per channel. When disabled, faults are not reported via the fault bit, and the indicator does not show the fault.
Channel Wire Break/Short-Circuit Diagnosis	Only supported for $4\text{mA} \sim 20\text{mA}$ and $1\text{V} \sim 5\text{V}$ ranges. Specific thresholds are shown in the table below.
Channel Overrange (Overflow/Underflow) Diagnosis	Supported. Specific thresholds are shown in the table below.
Channel Limit (Upper/Lower Limit) Diagnosis	Supported. For upper/lower limit value configuration, refer to Configuration Parameters .
Diagnostic Log	Logs are recorded when diagnostic status changes. Supports up to 100 entries.
Module Runtime Diagnostics	Supports recording the module's cumulative runtime.
Channel Runtime Diagnostics	Supports recording the cumulative runtime of the module channels at different percentages (10% steps) of the full scale. - During normal operation, records based on the input value range. - During underflow fault, records based on the minimum input range. - During overflow fault, records based on the maximum input range. - During system power supply fault, field power supply fault, wire break fault, or short-circuit fault, no recording.

Diagnostic Thresholds

Range	Wire Break	Underflow	Normal	Overflow	Short Circuit
Voltage					
0~5V	-	$< -0.4\text{V}$	0~5V	$> 5.4\text{V}$	-

1~5V	< 0.2V	< 0.6V	1~5V	> 5.4V	> 5.8V
-5~5V	-	< -5.4V	-5~5V	> 5.4V	-
0~10V	-	< -0.8V	0~10V	> 10.8V	-
-10~10V	-	< -10.8V	-10~10V	> 10.8V	-
Current					
0~20mA	-	< -1.6mA	0~20mA	> 21.6mA	-
4~20mA	< 0.8mA	< 2.4mA	4~20mA	> 21.6mA	> 23.2mA
-20~20mA	-	< -21.6mA	-20~20mA	> 21.6mA	-



- The range limit value range: ((Minimum range - 8% * Maximum range value) ~ 108% * Maximum range).
- Overflow and underflow display overflow code values, i.e., the code values corresponding to the overflow threshold.

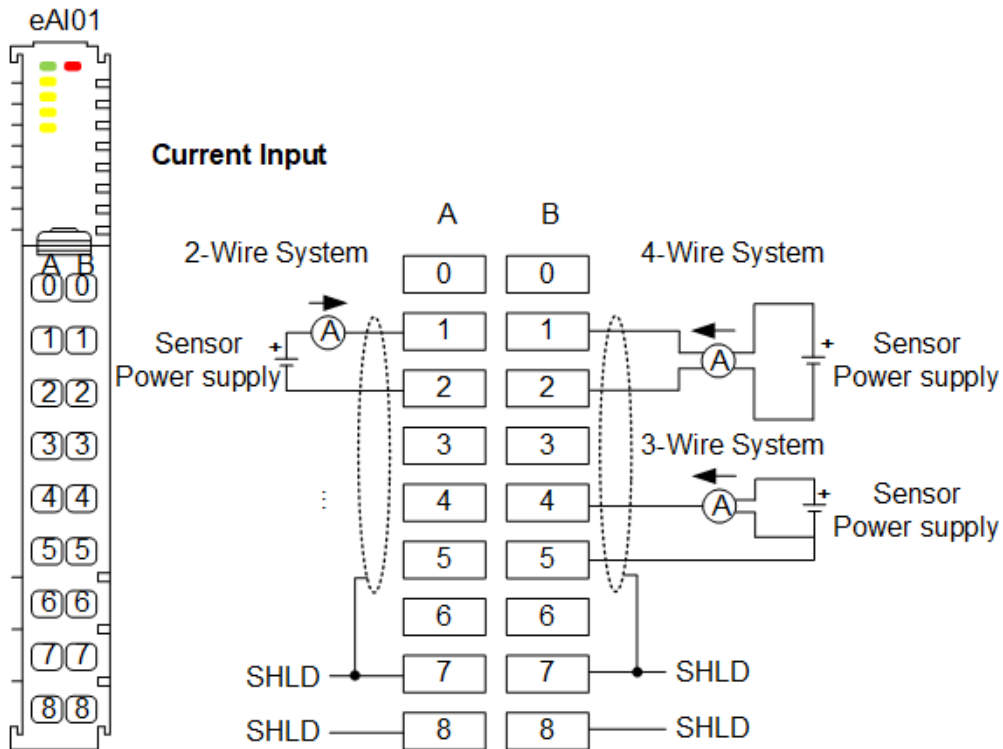
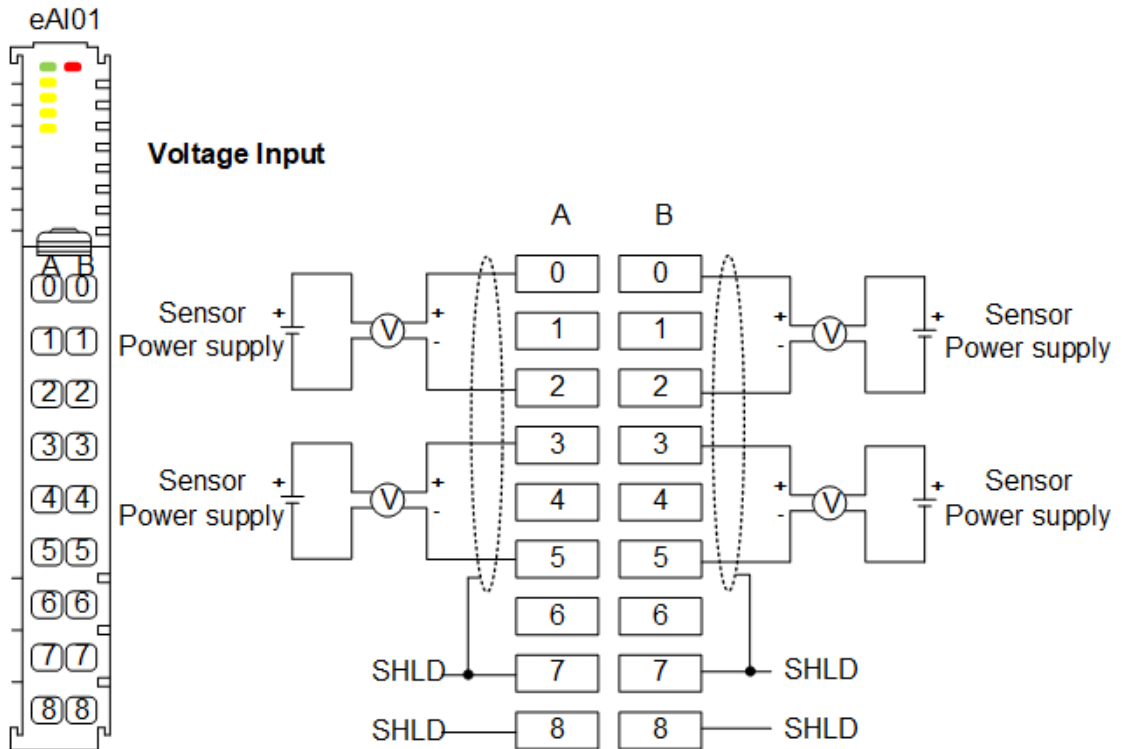
4.8.1.3 Indicator LEDs



- RU: Run Indicator
- ER: Error Indicator
- 00~03: Channel Indicators

LED Name	Color	Status	Description
RU	Green	Off	Module not powered or firmware not running
		Fast Flash (200ms on, 200ms off)	Internal bus communication offline
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Internal bus communication online
ER	Red	Off	Module has no faults
		Fast Flash (200ms on, 200ms off)	Module external fault
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Module internal fault or module starting up
00~03	Yellow	Off	Channel xx not enabled
		Fast Flash (200ms on, 200ms off)	Channel xx fault, including but not limited to: wire break, short circuit, overrange, out of limits, etc.
		Steady On	Channel xx enabled and no fault

4.8.1.4 Module Terminal Wiring Diagram



Mark	Description	Mark	Description
A0	Analog input channel 00, voltage positive	B0	Analog input channel 01, voltage positive
A1	Analog input channel 00, current positive	B1	Analog input channel 01, current positive
A2	Analog input channel 00, voltage/current negative	B2	Analog input channel 01, voltage/current negative
A3	Analog input channel 02, voltage positive	B3	Analog input channel 03, voltage positive
A4	Analog input channel 02, current positive	B4	Analog input channel 03, current positive
A5	Analog input channel 02, voltage/current negative	B5	Analog input channel 03, voltage/current negative
A6	NC, floating	B6	NC, floating
A7	Shield SHLD	B7	Shield SHLD
A8	Shield SHLD	B8	Shield SHLD

4.8.1.5 Configuration Parameters

Category	Parameter Name	Description	Configuration Principle
Module	Module Version	Module software version number, modification not supported	Default value: 0x00060001
	Full Range Value	Code value range corresponding to full scale	Default value: 20000 Value range: • 20000 • 27648 • 32000 • 32767
	Filter Algorithm	Channel filter algorithm	Default value: Sliding filter Value range: • Sliding filter • Median average filter • First order lag filter • Arithmetic average filter Note: Currently only Sliding filter is supported
Channel	Channel Enable	Whether to enable the channel	Default value: Enable Value range: • Enable: Enable channel • Disable: Disable channel
	Channel Diag Enable	Whether to enable channel diagnostics function	Default value: Enable Value range: • Enable: Enable channel diagnostics function • Disable: Disable channel diagnostics function
	Channel Range	Channel measurement range, select according to actual situation	Default value: -10-10V Value range: • 0-5V • 1-5V • -5-5V • 0-10V

			• -10~10V • 0~20mA • 4~20mA • -20~20mA
	Channel Filter	Channel filter parameter	Default value: 8 Value range: [1,255], 1 means no filtering
	Channel Over Limit Value	Upper threshold value for channel over-limit fault	Default value: 32767 Value range: [-32768,32767]
	Channel Under Limit Value	Lower threshold value for channel under-limit fault	Default value: -32768 Value range: [-32768,32767]

Note: Full Scale Code Value and Channel Upper/Lower Limit Configuration Description

- Full scale code value is the upper code value limit corresponding to full scale. The actual effective code value range is determined by both the full scale code value and the channel range.

Example 1: Full scale code value is 20000, channel range is positive and negative, such as -10~10V, then the actual effective code value range is -20000~20000, channel value 20000 represents 10V, -20000 represents -10V, in a linear relationship.

Example 2: Full scale code value is 20000, channel range is positive, such as 4~20mA, then the actual effective code value range is 0~20000, channel value 20000 represents 20mA, 0 represents 4mA, in a linear relationship.

- Channel upper and lower limits are code value settings. Please configure reasonable values within the full scale code value range. If the configured upper/lower limit values exceed the full scale code value, it may result in failure to trigger under-limit or over-limit alarms. For example: 0~10V range corresponds to code values 0~32767, if the channel lower limit is configured as -32768, the under-limit alarm will never be triggered.
- The channel lower limit value cannot be greater than or equal to the upper limit value, otherwise it may cause the module to go offline or other unknown states.

4.8.1.6 Diagnosis and Channel Information



During cyclic communication, the module's input data includes diagnosis information and channel information, with diagnosis information arranged before channel information. The number of bytes occupied by input data is shown in the following table.

Table 1 Diagnosis Information Bytes Occupied

Bit/Byte	Byte0	Byte1	Byte2	Byte3	Byte4
	Module Diagnosis	Channel Diagnosis			
Bit0	System power fault	Channel 00 wire break fault	Channel 01 wire break fault	Channel 02 wire break fault	Channel 03 wire break fault
Bit1	Field power fault	Channel 00 short circuit fault	Channel 01 short circuit fault	Channel 02 short circuit fault	Channel 03 short circuit fault
Bit2	Watchdog fault	Channel 00 underflow fault	Channel 01 underflow fault	Channel 02 underflow fault	Channel 03 underflow fault
Bit3	Hardware fault	Channel 00 overflow fault	Channel 01 overflow fault	Channel 02 overflow fault	Channel 03 overflow fault

Bit4	-	Channel 00 under limit fault	Channel 01 under limit fault	Channel 02 under limit fault	Channel 03 under limit fault
Bit5		Channel 00 over limit fault	Channel 01 over limit fault	Channel 02 over limit fault	Channel 03 over limit fault
Bit6		-	-	-	-
Bit7		-	-	-	-

Table 2 Channel Information Bytes Occupied

Bit/Byte	Byte5~6	Byte7~8	Byte9~10	Byte11~12
Bit0	Channel 00	Channel 01	Channel 02	Channel 03
Bit1				
Bit2				
Bit3				
Bit4				
Bit5				
Bit6				
Bit7				

Diagnosis Information

Category	Parameter Name	Description
Module	System Power Fault	• 0: System side power normal • 1: System side power fault
	Field Power Fault	• 0: Field side power normal • 1: Field side power fault
	Watchdog Fault	• 0: Watchdog normal • 1: Watchdog fault
	Hardware Fault	• 0: Hardware normal • 1: Hardware fault
Channel	Wire Break Fault	• 0: Channel has no wire break fault • 1: Channel wire break
	Short Circuit Fault	• 0: Channel has no short circuit fault • 1: Channel short circuit
	Underflow Fault	• 0: Channel has no underflow fault • 1: Channel underflow
	Overflow Fault	• 0: Channel has no overflow fault • 1: Channel overflow
	Under Limit Fault	• 0: Channel has no under limit fault • 1: Channel under limit
	Over Limit Fault	• 0: Channel has no over limit fault • 1: Channel over limit

Channel Information

Parameter Name	Description
CHxx	Analog input code value, needs to be converted according to the configured full scale code value and channel range ^{Note}

Note: Full Scale Code Value and Channel Range Description

- Full scale code value is the upper limit of the code value corresponding to full scale. The actual valid code value range is determined by both the full scale code value and the channel range.

Example 1: Full scale code value is 20000, channel range is bipolar, such as -10~10V, then the actual valid code value range is -20000~20000, channel value 20000 represents 10V, -20000 represents -10V.

Example 2: Full scale code value is 20000, channel range is unipolar, such as 4~20mA, then the actual valid code value range is 0~20000, channel value 20000 represents 20mA, 0 represents 4mA.

- Channel code value has a linear relationship with the actual value. Actual value = [channel code value/(code value upper limit - code value lower limit)]*(range upper limit - range lower limit). When the range is 1~5V and 4~20mA, 1V or 4mA needs to be added to the calculation result.

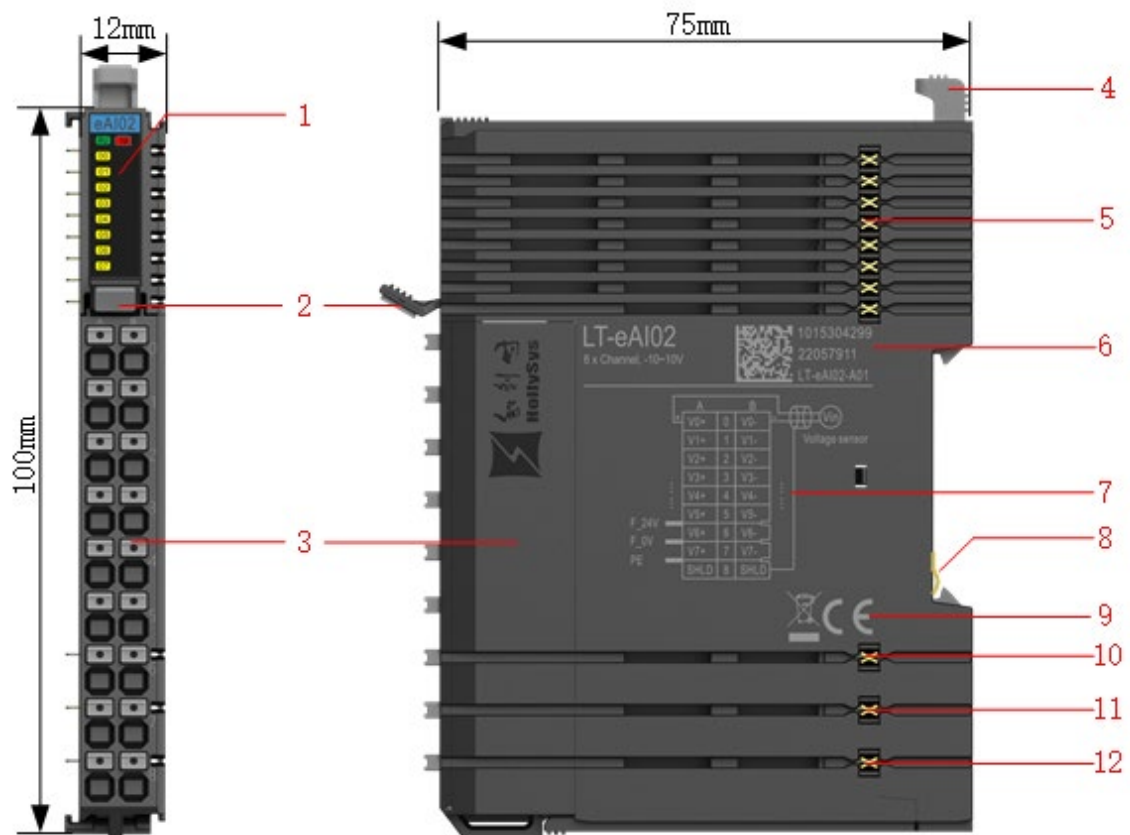
Example 1: Range is -10~10V, code value range is -20000~20000, then voltage value = {channel code value/[(20000-(-20000))]}*[10-(-10)], unit: V

Example 2: Range is 4~20mA, code value range is 0~20000, then current value = 4+[channel code value/(20000-0)]*(20-4), unit: mA

4.8.2 LT-eAI02 8-Channel Analog Input Module (Voltage Type)

The LT-eAI02 is an 8-channel voltage analog acquisition module. It provides different measurement ranges and corresponding code values for the acquisition of voltage analog signals. It converts the acquired analog signals into digital signals and reports them to the CPU module via the internal bus for system calculation and processing.

4.8.2.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicates module power supply and operating status
2	Terminal Locking Switch	Press to detach wiring terminals
3	Wiring Terminals	8-channel analog input wiring terminals
4	DIN Rail Top Mounting Latch	• Before mounting the module to the DIN rail, pull this latch upward to unlock • After mounting the module to the DIN rail, press this latch downward to lock
5	Gold Plated Contacts	Internal bus contact points for inter-module data transmission, system power supply, etc.
6	Nameplate	• Left side shows module model and basic information • Right side shows serial number QR code and plain text information, from top to bottom: serial number, production batch number, module version number
7	Wiring Diagram Silkscreen	Module wiring diagram silkscreen. For detailed wiring diagram, refer to Module Terminal Wiring Diagram
8	Protective Earth (PE) Spring Contact	Contacts DIN rail, internally connected to No.12
9	Other Descriptive Logos	• Do not dispose of arbitrarily • Module complies with CE certification standards
10	Field Power +24VDC	Field power +24VDC contact point for inter-module field power cascading
11	Field Power 0VDC	Field power 0VDC contact point for inter-module field power cascading
12	Protective Earth (PE)	Protective earth (PE) contact point for inter-module protective earth cascading

4.8.2.2 Technical Specifications

Basic Information

Parameter	Specification
System Power	
Power Supply Method	Internal bus power supply
Rated Voltage	5VDC
Voltage Input Range	4.5VDC~5.5VDC
Power Consumption	≤0.5W
Field Power	
Rated Voltage	24VDC
Voltage Input Range	19.2VDC~28.8VDC
Power Consumption	≤1.5W
Others	
Module Hot Swap	Not supported
Dimensions	Width 12mm * Height 100mm * Depth 75mm (excluding local protrusions)
Weight	≤90g
Protection Rating	IP20

Channels

Parameter	Specification
Number of Channels	8
Channel Enable	Each channel individually configured, enabled by default
Signal Type	Voltage

Wiring Method	Single-ended
Range	0~5V, 1~5V, 0~10V, -5~5V, -10~10V
Range Code Value Range	When range is unipolar, supports the following 4 code values, all channels uniformly configured: • 0~20000 • 0~27648 • 0~32000 • 0~32767 When range is bipolar, supports the following 4 code values, all channels uniformly configured: • -20000~20000 • -27648~27648 • -32000~32000 • -32768~32767
Configuration Method (I/O Mapping Method)	INT
Resolution	16-bit, best 0.001V
Conversion Time	• 50μs/channel • 600μs/all channels
Accuracy	• 0.1% F.S. @20~30°C • 0.2% F.S. @-20~60°C
Channel Filter Parameter	Each channel individually configured, 1~255
Input Impedance	≥1MΩ
Channel Cable	Shielded cable, cable length ≤100m
Channel-to-Channel Isolation	Not supported
Maximum Allowable Voltage	±15V

Diagnosis

Parameter	Specification
System Power Diagnosis Threshold	4.1VDC±5%
Field Power Diagnosis Threshold	17VDC±10%
Internal Fault Diagnosis	Detects chip watchdog status. When watchdog reset occurs, it is considered an internal fault. This fault bit cannot be cleared automatically.
External Fault Diagnosis	• Detects system side power supply voltage. When below threshold (software can still operate normally), it is considered an external fault. This fault bit can be cleared automatically when voltage rises above threshold. • Detects field side power status. When faulty, it is considered an external fault. This fault bit can be cleared automatically when fault recovers.
Channel Diagnosis	Supported, each channel individually configured. When disabled, faults are not reported and indicator does not show fault.
Channel Wire Break/Short Circuit Diagnosis	Only supported for 1V~5V range, specific thresholds see table below
Channel Overrange (Overflow/Underflow) Diagnosis	Supported, specific thresholds see table below
Channel Out-of-Limit (Upper/Lower Limit) Diagnosis	Supported, upper/lower limit value configuration see Configuration Parameters
Diagnosis Log	Logs records when diagnosis status changes, maximum support 100

	entries
Module Runtime Diagnosis	Supports recording module cumulative running time
Channel Runtime Diagnosis	Supports recording cumulative running time of module channels at different percentage states of full scale (10% step) • During normal operation, records according to input value range • During underflow fault, records according to minimum input range • During overflow fault, records according to maximum input range • During system power fault, field power fault, wire break fault, short circuit fault, no recording

Diagnosis Thresholds

Range	Wire Break	Underflow	Normal	Overflow	Short Circuit
0~5V	-	< -0.4V	0~5V	> 5.4V	-
1~5V	< 0.2V	< 0.6V	1~5V	> 5.4V	> 5.8V
-5~5V	-	< -5.4V	-5~5V	> 5.4V	-
0~10V	-	< -0.8V	0~10V	> 10.8V	-
-10~10V	-	< -10.8V	-10~10V	> 10.8V	-



- Range limit value range: ((Minimum range - 8% * Maximum range value) ~ 108% * Maximum range).
- Overflow and underflow display overflow code values, i.e., code values corresponding to overflow thresholds.

4.8.2.3 Indicator LEDs

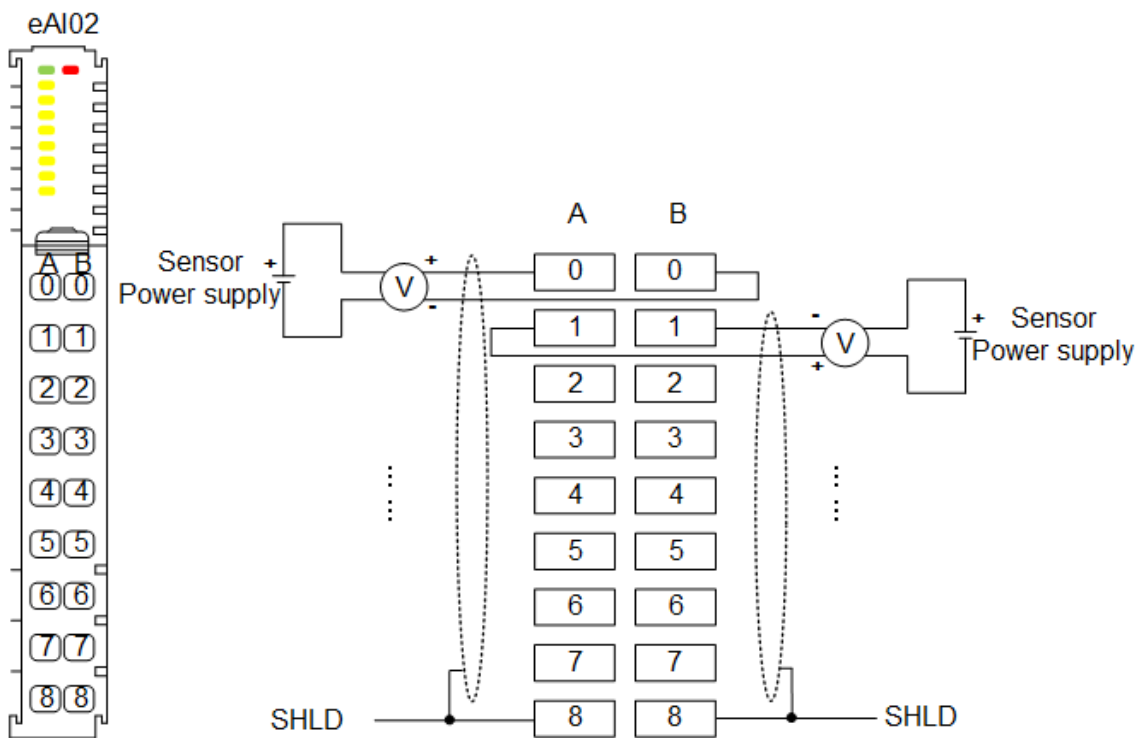


- RU: Run Indicator
- ER: Fault Indicator
- 00~07: Channel Indicators

LED Name	Color	Status	Description
RU	Green	Off	Module not powered or firmware not running
		Fast Flash (200ms on, 200ms off)	Internal bus communication offline
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Internal bus communication online
ER	Red	Off	Module fault-free
		Fast Flash (200ms on, 200ms off)	Module external fault

00~07	Yellow	Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Module internal fault or module starting up
		Off	Channel xx not enabled
		Fast Flash (200ms on, 200ms off)	Channel xx fault, including but not limited to: wire break, short circuit, overrange, overlimit, etc.
		Steady On	Channel xx enabled and fault-free

4.8.2.4 Module Terminal Wiring Diagram



Mark	Description	Mark	Description
A0	Analog Input Channel 00, Voltage Positive	B0	Analog Input Channel 00, Voltage Negative
A1	Analog Input Channel 01, Voltage Positive	B1	Analog Input Channel 01, Voltage Negative
A2	Analog Input Channel 02, Voltage Positive	B2	Analog Input Channel 02, Voltage Negative
A3	Analog Input Channel 03, Voltage Positive	B3	Analog Input Channel 03, Voltage Negative
A4	Analog Input Channel 04, Voltage Positive	B4	Analog Input Channel 04, Voltage Negative
A5	Analog Input Channel 05, Voltage Positive	B5	Analog Input Channel 05, Voltage Negative
A6	Analog Input Channel 06, Voltage Positive	B6	Analog Input Channel 06, Voltage Negative
A7	Analog Input Channel 07, Voltage	B7	Analog Input Channel 07, Voltage

	Positive		Negative
A8	Shield SHLD	B8	Shield SHLD

4.8.2.5 Configuration Parameters

Category	Parameter Name	Description	Configuration Principle
Module	Module Version	Module software version number, modification not supported	Default value: 0x000B0001
	Full Range Value	Code value range corresponding to full scale	Default value: 20000 Value range: • 20000 • 27648 • 32000 • 32767
	Filter Algorithm	Channel filter algorithm	Default value: Sliding filter Value range: • Sliding filter • Median average filter • First order lag filter • Arithmetic average filter Note: Currently only Sliding filter and Arithmetic average filter are supported
Channel	Channel Enable	Whether to enable the channel	Default value: Enable Value range: • Enable: Enable channel • Disable: Disable channel
	Channel Diag Enable	Whether to enable channel diagnostics function	Default value: Enable Value range: • Enable: Enable channel diagnostics function • Disable: Disable channel diagnostics function
	Channel Range	Channel measurement range, select according to actual situation	Default value: 0-10V Value range: • 0-5V • 1-5V • -5-5V • 0-10V • -10-10V
	Channel Filter	Channel filter parameter	Default value: 8 Value range: [1,255], 1 means no filtering, 1 code value corresponds to 1 acquisition cycle
	Channel Over Limit Value	Upper threshold value for channel over-limit fault	Default value: 32767 Value range: [-32768,32767]
	Channel Under Limit Value	Lower threshold value for channel under-limit fault	Default value: -32768 Value range: [-32768,32767]

Note: Full Scale Code Value and Channel Upper/Lower Limit Configuration Description

- Full scale code value is the upper code value limit corresponding to full scale. The actual effective code value range is determined by both the full scale code value and the channel range.

Example 1: Full scale code value is 20000, channel range is positive and negative, such as -10~10V, then the actual effective code value range is -20000~20000, channel value 20000 represents 10V, -20000 represents -10V, in a linear relationship.

Example 2: Full scale code value is 20000, channel range is positive, such as 1~5V, then the actual effective code value range is 0~20000, channel value 20000 represents 5V, 0 represents 1V, in a linear relationship.

- Channel upper and lower limits are code value settings. Please configure reasonable values within the full scale code value range. If the configured upper/lower limit values exceed the full scale code value, it may result in failure to trigger under-limit or over-limit alarms. For example: 0-10V range corresponds to code values 0~32767, if the channel lower limit is configured as -32768, the under-limit alarm will never be triggered.
- The channel lower limit value cannot be greater than or equal to the upper limit value, otherwise it may cause the module to go offline or other unknown states.

4.8.2.6 Diagnosis and Channel Information



During cyclic communication, the module's input data includes channel information and diagnosis information, with channel information arranged before diagnosis information. The number of bytes occupied by input data is shown in the following table.

Table 1 Channel Information Bytes Occupied

Bit/Byte	Byte0~1	Byte2~3	...	Byte14~15
Bit0	Channel 00	Channel 01	...	Channel 07
Bit1				
Bit2				
Bit3				
Bit4				
Bit5				
Bit6				
Bit7				

Table 2 Diagnosis Information Bytes Occupied

Bit/Byte	Byte16 Module Diagnosis	Byte17 Channel Diagnosis	Byte18	...	Byte24
Bit0	System power fault	Channel 00 wire break fault	Channel 01 wire break fault	...	Channel 07 wire break fault
Bit1	Field power fault	Channel 00 short circuit fault	Channel 01 short circuit fault	...	Channel 07 short circuit fault
Bit2	Watchdog fault	Channel 00 underflow fault	Channel 01 underflow fault	...	Channel 07 underflow fault
Bit3	Hardware fault	Channel 00 overflow fault	Channel 01 overflow fault	...	Channel 07 overflow fault
Bit4	-	Channel 00 under limit fault	Channel 01 under limit fault	...	Channel 07 under limit fault
Bit5		Channel 00	Channel 01	...	Channel 07

		over limit fault	over limit fault		over limit fault
Bit6		-	-	-	-
Bit7		-	-	-	-

Channel Information

Parameter Name	Description
CHxx	Analog input code value, needs to be converted according to the configured full scale code value and channel range ^{Note}

Note: Full Scale Code Value and Channel Range Description

- Full scale code value is the upper limit of the code value corresponding to full scale. The actual valid code value range is determined by both the full scale code value and the channel range.

Example 1: Full scale code value is 20000, channel range is bipolar, such as -10~10V, then the actual valid code value range is -20000~20000, channel value 20000 represents 10V, -20000 represents -10V.

Example 2: Full scale code value is 20000, channel range is unipolar, such as 1~5V, then the actual valid code value range is 0~20000, channel value 20000 represents 5V, 0 represents 1V.

- Channel code value has a linear relationship with the actual value. Actual value = [channel code value/(code value upper limit - code value lower limit)]*(range upper limit - range lower limit). When the range is 1~5V, 1V needs to be added to the calculation result.

Example 1: Range is -10~10V, code value range is -20000~20000, then voltage value = {channel code value/[20000-(-20000)]}*[-10-(-10)]], unit: V

Example 2: Range is 1~5V, code value range is 0~20000, then voltage value = 1+[channel code value/(20000-0)]*(5-1), unit: V

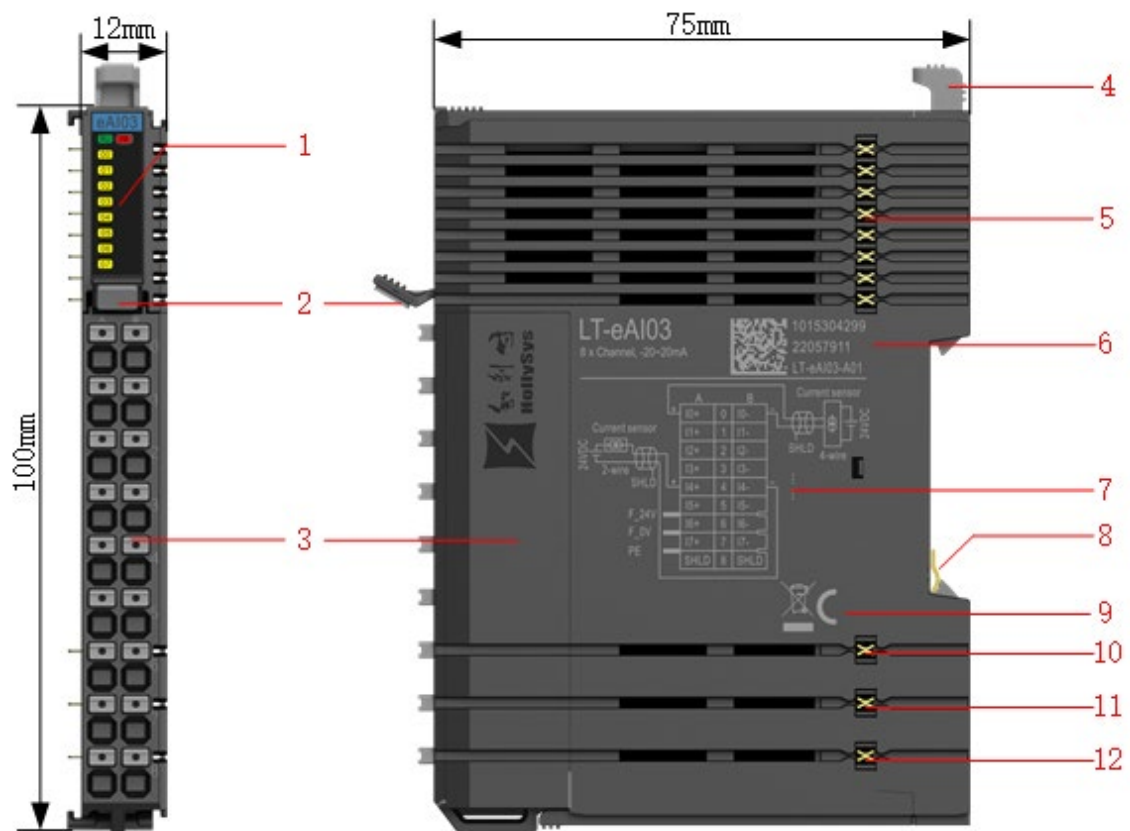
Diagnosis Information

Category	Parameter Name	Description
Module	System Power Fault	0: System side power normal 1: System side power fault
	Field Power Fault	0: Field side power normal 1: Field side power fault
	Watchdog Fault	0: Watchdog normal 1: Watchdog fault
	Hardware Fault	0: Hardware normal 1: Hardware fault
Channel	Wire Break Fault	0: Channel has no wire break fault 1: Channel wire break
	Short Circuit Fault	0: Channel has no short circuit fault 1: Channel short circuit
	Underflow Fault	0: Channel has no underflow fault 1: Channel underflow
	Overflow Fault	0: Channel has no overflow fault 1: Channel overflow
	Under Limit Fault	0: Channel has no under limit fault 1: Channel under limit
	Over Limit Fault	0: Channel has no over limit fault 1: Channel over limit

4.8.3 LT-eAI03 8-Channel Analog Input Module (Current Type)

The LT-eAI03 is an 8-channel current analog acquisition module. It provides different measurement ranges and corresponding code values for the acquisition of current analog signals. It converts the acquired analog signals into digital signals and reports them to the CPU module via the internal bus for system calculation and processing.

4.8.3.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicates module power supply and operating status
2	Terminal Locking Switch	Press to detach wiring terminals
3	Wiring Terminals	8-channel analog input wiring terminals
4	DIN Rail Top Mounting Latch	- Before mounting the module to the DIN rail, pull this latch upward to unlock - After mounting the module to the DIN rail, press this latch downward to lock
5	Gold Plated Contacts	Internal bus contact points for inter-module data transmission, system power supply, etc.
6	Nameplate	- Left side shows module model and basic information - Right side shows serial number QR code and plain text information, from top to bottom: serial number, production

		batch number, module version number
7	Wiring Diagram Silkscreen	Module wiring diagram silkscreen. For detailed wiring diagram, refer to Module Terminal Wiring Diagram
8	Protective Earth (PE) Spring Contact	Contacts DIN rail, internally connected to No.12
9	Other Descriptive Logos	- Do not dispose of arbitrarily - Module complies with CE certification standards
10	Field Power +24VDC	Field power +24VDC contact point for inter-module field power cascading
11	Field Power 0VDC	Field power 0VDC contact point for inter-module field power cascading
12	Protective Earth (PE)	Protective earth (PE) contact point for inter-module protective earth cascading

4.8.3.2 Technical Specifications

Basic Information

Parameter	Specification
System Power Supply	
Power Supply Method	Internal Bus Power Supply
Rated Voltage	5VDC
Voltage Input Range	4.5VDC~5.5VDC
Power Consumption	≤0.5W
Field Power Supply	
Rated Voltage	24VDC
Voltage Input Range	19.2VDC~28.8VDC
Power Consumption	≤1.5W
Others	
Module Hot Swapping	Not Supported
Dimensions	Width 12mm * Height 100mm * Depth 75mm (excluding local protrusions)
Weight	≤90g
Protection Rating	IP20

Channels

Parameter	Specification
Number of Channels	8
Channel Enable	Individually configurable per channel, enabled by default
Signal Type	Current
Wiring Method	Single-ended
Measurement Range	0~20mA、4~20mA、-20~20mA
Range Code Value Range	When the range is positive, the following 4 code values are supported, uniformly configured for all channels: 0~20000 0~27648 0~32000 0~32767 When the range is positive and negative, the following 4 code values are supported, uniformly configured for all channels: -20000~20000 -27648~27648

	• -32000~32000 • -32768~32767
Configuration Method (I/O Mapping Method)	INT
Resolution	16-bit, optimal 0.01mA
Conversion Time	• 50μs/channel • 600μs/all channels
Accuracy	• 0.1% F.S. @20~30°C • 0.2% F.S. @-20~60°C
Channel Filter Parameter	Individually configurable per channel, 1~255
Input Impedance	120Ω±2%
Channel Cable	Shielded cable, cable length ≤100m
Channel-to-Channel Isolation	Not Supported
Maximum Allowable Current	Instantaneous ±30mA, average ±24mA

Diagnostics

Parameter	Specification
System Power Supply Diagnostic Threshold	4.1VDC±5%
Field Power Supply Diagnostic Threshold	17VDC±10%
Internal Fault Diagnosis	Detects chip watchdog status. When a watchdog reset occurs, it is considered an internal fault. This fault bit cannot be cleared automatically.
External Fault Diagnosis	• Detects the system-side power supply voltage. When it falls below the threshold (software can still operate normally), it is considered an external fault. This fault bit can be cleared automatically when the voltage rises above the threshold. • Detects the field-side power supply status. In case of a fault, it is considered an external fault. This fault bit can be cleared automatically when the fault is resolved.
Channel Diagnostics	Supported, individually configurable per channel. When disabled, faults are not reported via the fault bit, and the indicator does not show the fault.
Channel Wire Break/Short-Circuit Diagnosis	Only supported for 4mA~20mA range. Specific thresholds are shown in the table below.
Channel Overrange (Overflow/Underflow) Diagnosis	Supported. Specific thresholds are shown in the table below.
Channel Limit (Upper/Lower Limit) Diagnosis	Supported. For upper/lower limit value configuration, refer to Configuration Parameters .
Diagnostic Log	Logs are recorded when diagnostic status changes. Supports up to 100 entries.
Module Runtime Diagnostics	Supports recording the module's cumulative runtime.
Channel Runtime Diagnostics	Supports recording the cumulative runtime of the module channels at different percentages (10% steps) of the full scale. • During normal operation, records based on the input value range. • During underflow fault, records based on the minimum input range. • During overflow fault, records based on the maximum input range. • During system power supply fault, field power supply fault, wire break fault, or short-circuit fault, no recording.

Diagnostic Thresholds

Range	Wire Break	Underflow	Normal	Overflow	Short Circuit
0~20mA	-	< -1.6mA	0~20mA	> 21.6mA	-
4~20mA	< 0.8mA	< 2.4mA	4~20mA	> 21.6mA	> 23.2mA
-20~20mA	-	< -21.6mA	-20~20mA	> 21.6mA	-



- The range limit value range: ((Minimum range - 8% * Maximum range value) ~ 108% * Maximum range).
- Overflow and underflow display overflow code values, i.e., the code values corresponding to the overflow threshold.

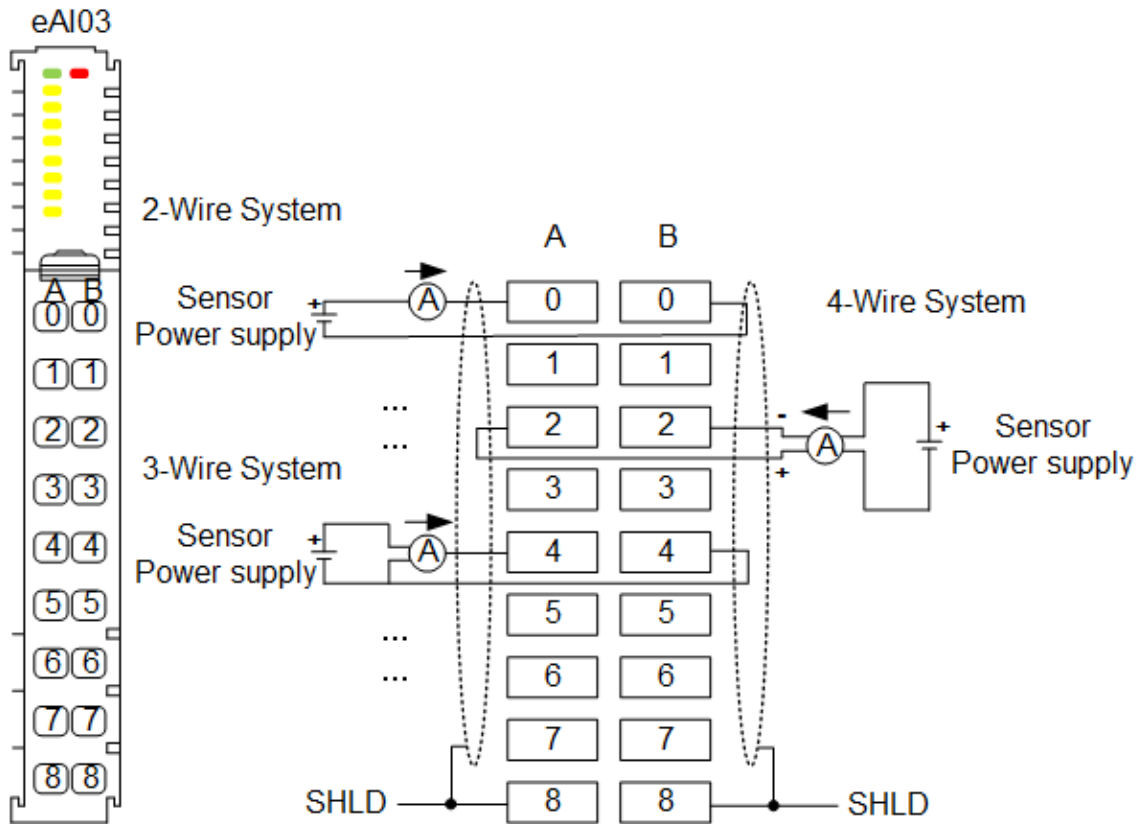
4.8.3.3 Indicator LEDs



- RU: Run Indicator
- ER: Error Indicator
- 00~07: Channel Indicators

LED Name	Color	Status	Description
RU	Green	Off	Module not powered or firmware not running
		Fast Flash (200ms on, 200ms off)	Internal bus communication offline
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Internal bus communication online
ER	Red	Off	Module has no faults
		Fast Flash (200ms on, 200ms off)	Module external fault
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Module internal fault or module starting up
00~07	Yellow	Off	Channel xx not enabled
		Fast Flash (200ms on, 200ms off)	Channel xx fault, including but not limited to: wire break, short circuit, overrange, out of limits, etc.
		Steady On	Channel xx enabled and no fault

4.8.3.4 Module Terminal Wiring Diagram



Mark	Description	Mark	Description
A0	Analog Input Channel 00, Current Positive	B0	Analog Input Channel 00, Current Negative
A1	Analog Input Channel 01, Current Positive	B1	Analog Input Channel 01, Current Negative
A2	Analog Input Channel 02, Current Positive	B2	Analog Input Channel 02, Current Negative
A3	Analog Input Channel 03, Current Positive	B3	Analog Input Channel 03, Current Negative
A4	Analog Input Channel 04, Current Positive	B4	Analog Input Channel 04, Current Negative
A5	Analog Input Channel 05, Current Positive	B5	Analog Input Channel 05, Current Negative
A6	Analog Input Channel 06, Current Positive	B6	Analog Input Channel 06, Current Negative
A7	Analog Input Channel 07, Current Positive	B7	Analog Input Channel 07, Current Negative
A8	Shield Layer SHLD	B8	Shield Layer SHLD

4.8.3.5 Configuration Parameters

Category	Parameter Name	Description	Configuration Principle
Module	Module Version	Module software version number, modification not supported	Default: 0x000C0001
	Full Range Value	Code value range corresponding to full scale	Default: 20000 Value Range: • 20000 • 27648 • 32000 • 32767
	Filter Algorithm	Channel filter algorithm	Default: Sliding filter Value Range: • Sliding filter • Median average filter • First order lag filter • Arithmetic average filter Note: Currently only Sliding filter and Arithmetic average filter are supported
Channel	Channel Enable	Whether to enable the channel	Default: Enable Value Range: • Enable: Enable channel • Disable: Disable channel
	Channel Diag Enable	Whether to enable channel diagnosis function	Default: Enable Value Range: • Enable: Enable channel diagnosis function • Disable: Disable channel diagnosis function
	Channel Range	Channel range, select according to actual situation	Default: 4-20mA Value Range: • 0-20mA • 4-20mA • -20-20mA
	Channel Filter	Channel filter parameter	Default: 8 Value Range: [1,255], 1 means no filtering, 1 code value corresponds to 1 acquisition cycle
	Channel Over Limit Value	Upper threshold value for channel over-limit fault	Default: 32767 Value Range: [-32768,32767]
	Channel Under Limit Value	Lower threshold value for channel under-limit fault	Default: -32768 Value Range: [-32768,32767]

Note: Explanation of Full Scale Code Value and Channel Upper/Lower Limit Configuration

- Full scale code value is the upper limit of the code value corresponding to full scale. The actual effective code value range is determined by both the full scale code value and the channel range.

Example 1: Full scale code value is 20000, channel range is bipolar, such as -20~20mA, then the actual effective code value range is -20000~20000. Channel value 20000 represents 20mA, -20000 represents -20mA, with a linear relationship.

Example 2: Full scale code value is 20000, channel range is unipolar, such as 4~20mA, then the actual effective code value range is 0~20000. Channel value 20000 represents 20mA, 0 represents 4mA, with a linear relationship.

- Channel upper and lower limits are code value settings. Please configure reasonable values within the full scale code value range. If the configured upper/lower limit values exceed the full scale code value, under-limit or over-limit alarms may not be triggered. For example: 0-20mA range corresponds to code values

0~32767. If the channel lower limit is configured as -32768, under-limit alarm will never be triggered.

- The channel lower limit value cannot be greater than or equal to the upper limit value, otherwise it may cause module offline or other unknown states.

4.8.3.6 Diagnosis and Channel Information



During cyclic communication, the module's input data includes channel information and diagnosis information, with channel information arranged before diagnosis information. The number of bytes occupied by the input data is shown in the following tables.

Table 1 Channel Information Occupied Bytes

Bit/Byte	Byte0~1	Byte2~3	...	Byte14~15
Bit0	Channel 00	Channel 01	...	Channel 07
Bit1				
Bit2				
Bit3				
Bit4				
Bit5				
Bit6				
Bit7				

Table 2 Diagnosis Information Occupied Bytes

Bit/Byte	Byte16 Module Diagnosis	Byte17 Channel Diagnosis	Byte18	...	Byte24
Bit0	System Power Fault	Channel 00 Wire Break Fault	Channel 01 Wire Break Fault	...	Channel 07 Wire Break Fault
Bit1	Field Power Fault	Channel 00 Short Circuit Fault	Channel 01 Short Circuit Fault	...	Channel 07 Short Circuit Fault
Bit2	Watchdog Fault	Channel 00 Underflow Fault	Channel 01 Underflow Fault	...	Channel 07 Underflow Fault
Bit3	Hardware Fault	Channel 00 Overflow Fault	Channel 01 Overflow Fault	...	Channel 07 Overflow Fault
Bit4	-	Channel 00 Under Limit Fault	Channel 01 Under Limit Fault	...	Channel 07 Under Limit Fault
Bit5		Channel 00 Over Limit Fault	Channel 01 Over Limit Fault	...	Channel 07 Over Limit Fault
Bit6		-	-	-	-
Bit7		-	-	-	-

Channel Information

Parameter Name	Description
CHxx	The code value of analog input, which needs to be converted according to the configured full scale code value and channel range ^{Note}

Note: Full Scale Code Value and Channel Range Description

- The full scale code value is the upper limit of the code value corresponding to the full scale. The actual effective code value range is determined by both the full scale code value and the channel range.

Example 1: Full scale code value is 20000, channel range is positive and negative, such as -20~20mA, then the actual effective code value range is -20000~20000, channel value 20000 represents 20mA, -20000 represents -20mA.

Example 2: Full scale code value is 20000, channel range is positive, such as 4~20mA, then the actual effective code value range is 0~20000, channel value 20000 represents 20mA, 0 represents 4mA.

- The channel code value has a linear relationship with the actual value. Actual value = [Channel code value / (Code value upper limit - Code value lower limit)] * (Range upper limit - Range lower limit). When the range is 4~20mA, 4mA needs to be added to the calculation result.

Example 1: Range is -20~20mA, code value range is -20000~20000, then current value = {Channel code value / [20000 - (-20000)]} * [20 - (-20)], unit: mA

Example 2: Range is 4~20mA, code value range is 0~20000, then current value = 4 + [Channel code value / (20000 - 0)] * (20 - 4), unit: mA

Diagnosis Information

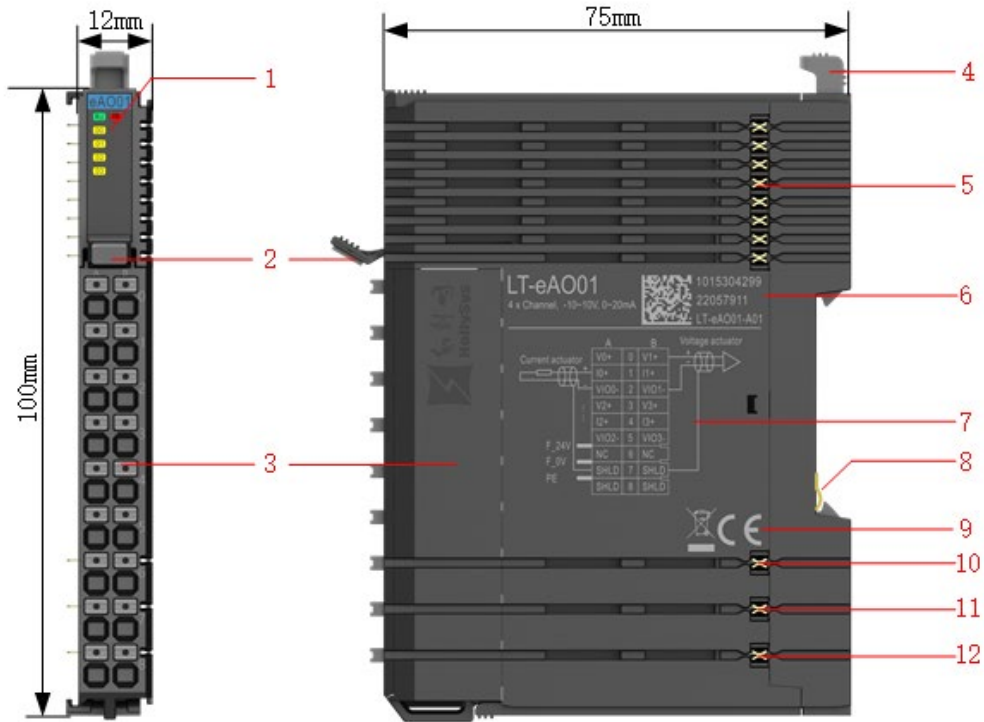
Category	Parameter Name	Description
Module	System Power Fault	0: System side power normal 1: System side power fault
	Field Power Fault	0: Field side power normal 1: Field side power fault
	Watchdog Fault	0: Watchdog normal 1: Watchdog fault
	Hardware Fault	0: Hardware normal 1: Hardware fault
Channel	Wire Break Fault	0: Channel has no wire break fault 1: Channel wire break
	Short Circuit Fault	0: Channel has no short circuit fault 1: Channel short circuit
	Underflow Fault	0: Channel has no underflow fault 1: Channel underflow
	Overflow Fault	0: Channel has no overflow fault 1: Channel overflow
	Under Limit Fault	0: Channel has no under limit fault 1: Channel under limit
	Over Limit Fault	0: Channel has no over limit fault 1: Channel over limit

4.9 Analog Output Module

4.9.1 LT-eAO01 4-Channel Analog Output Module (Voltage/Current Type)

LT-eAO01 is a 4-channel voltage/current type analog output module. Through internal bus communication, the module converts channel code values into corresponding voltage or current signals to control valves or actuators and other operations.

4.9.1.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicates module power supply and operating status
2	Terminal Locking Switch	Press to detach wiring terminals
3	Wiring Terminals	4-channel analog output wiring terminals
4	DIN Rail Top Mounting Latch	- Before mounting module to DIN rail, pull this latch upward to unlock - After mounting module to DIN rail, press this latch downward to lock
5	Gold Plated Contacts	Internal bus contact points for inter-module data transmission and system power supply
6	Nameplate	- Left side shows module model and basic information - Right side shows serial number QR code and plain text information (from top to bottom): serial number, production batch number, module version number
7	Wiring Diagram Silkscreen	Module wiring diagram silkscreen, detailed wiring diagram see Module Terminal Wiring Diagram
8	Protective Earth (PE) Spring Contact	Contacts DIN rail, internally connected to No.12
9	Other Descriptive Logos	- Do not dispose of arbitrarily - Module complies with CE certification standards
10	Field Power +24VDC	Field power +24VDC contact point for inter-module field power cascading
11	Field Power 0VDC	Field power 0VDC contact point for inter-module field power cascading
12	Protective Earth (PE)	Protective earth (PE) contact point for inter-module protective earth cascading

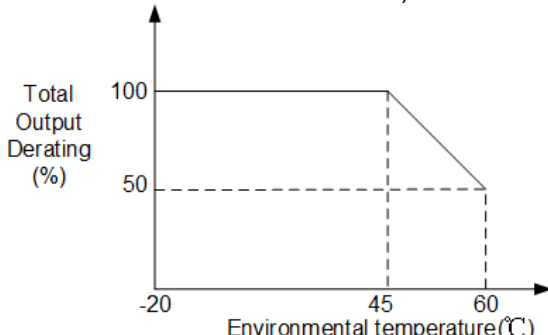
4.9.1.2 Technical Specifications

Basic Information

Parameter	Specification
System Power	
Power Supply Method	Internal Bus Power Supply
Rated Voltage	5VDC
Voltage Input Range	4.5VDC~5.5VDC
Power Consumption	≤0.5W
Field Power	
Rated Voltage	24VDC
Voltage Input Range	19.2VDC~28.8VDC
Power Consumption	≤2.6W
Others	
Module Hot Swap	Not Supported
Dimensions	Width 12mm * Height 100mm * Depth 75mm (excluding local protrusions)
Weight	≤90g
Protection Rating	IP20

Channels

Parameter	Specification
Number of Channels	4
Channel Enable	Each channel individually configurable, enabled by default
Signal Type	Voltage/Current, configurable
Wiring Method	2-wire, single-ended
Range	• Voltage Range: 0~5V, 1~5V, 0~10V, -5~5V, -10~10V • Current Range: 0~20mA, 4~20mA
Range Code Value	For positive ranges, supports the following 4 code values, all channels uniformly configured: • 0~20000 • 0~27648 • 0~32000 • 0~32767 For positive and negative ranges, supports the following 4 code values, all channels uniformly configured: • -20000~20000 • -27648~27648 • -32000~32000 • -32768~32767
Configuration Method (I/O Mapping)	INT
Resolution	16-bit DAC, optimal 0.01mA/0.001V
Conversion Time	• 30μs/channel • 140μs/all channels
Accuracy	• 0.1% F.S. @20~30℃ • 0.2% F.S. @-20~60℃
Output Load	Voltage: • 0~5V, ≥1KΩ • 1~5V, ≥1KΩ • -5~5V, ≥1KΩ • 0~10V, ≥1KΩ • -10~10V, ≥1KΩ

	Current: • 0~20mA, $\leq 600\Omega$ • 4~20mA, $\leq 600\Omega$
Channel Cable	Shielded cable, cable length $\leq 100\text{m}$
Channel Protection	Supports short circuit protection
Channel Safety Value	• When system power or field power fails, channel output Off • During communication failure, channel can output safety value, each channel individually configurable • Channel safety value configurable: Hold, ReplaceValue, Off
Channel-to-Channel Isolation	Not Supported
Channel Redundancy	Not Supported
Output Derating	• Voltage ranges do not require derating • Current ranges or mixed voltage/current ranges require derating, full load at 45°C operating temperature (all channels can output full scale); 50% load derating at 60°C operating temperature (total output current of all channels does not exceed 40mA) 

Diagnosis

Parameter	Specification
System Power Diagnosis Threshold	4.1VDC $\pm 5\%$
Field Power Diagnosis Threshold	17VDC $\pm 10\%$
Internal Fault Diagnosis	Detects chip watchdog status, when watchdog reset occurs, it is considered an internal fault, this fault bit cannot be automatically cleared
External Fault Diagnosis	• Detects system side power voltage, when below threshold (software can still operate normally), it is considered an external fault, this fault bit can be automatically cleared when voltage rises above threshold • Detects field side power status, when faulty, it is considered an external fault, this fault bit can be automatically cleared when fault recovers
Channel Diagnosis	Supported, each channel individually configurable. When disabled, faults are not reported and indicators do not show faults
Channel Wire Break Diagnosis	Only supported for 4mA~20mA range
Channel Short Circuit Diagnosis	Only supported for 1V~5V range
Channel Overrange (Overflow/Underflow) Diagnosis	For positive ranges, the following code values do not support overflow detection: • 0~32000 • 0~32767 For positive and negative ranges, the following code values do

	not support overflow/underflow detection: • -32000~32000 • -32768~32767 Overflow/underflow diagnosis thresholds for other code values are shown in the table below
Diagnosis Log	Logs records when diagnosis status changes, supports up to 100 entries
Module Runtime Diagnosis	Supports recording module cumulative runtime
Channel Runtime Diagnosis	Supports recording cumulative runtime of module channels at different percentage states of full scale (10% step) • During normal operation, records according to output value intervals • During safety output, records according to safety value intervals • Not recorded during system power fault, field power fault, wire break fault, short circuit fault

Diagnosis Thresholds

Range	Underflow	Normal	Overflow
Voltage			
0~5V	<0V	0~5V	>5.4V
1~5V	<0.6V	1~5V	>5.4V
-5~5V	<-5.4V	-5~5V	>5.4V
0~10V	<0V	0~10V	>10.8V
-10~10V	<-10.8V	-10~10V	>10.8V
Current			
0~20mA	<0mA	0~20mA	>21.6mA
4~20mA	<2.4mA	4~20mA	>21.6mA



Range limit value range: ((Minimum range - 8% * maximum range value) ~ 108% * maximum range value).

4.9.1.3 Indicator LEDs



- RU: Run Indicator
- ER: Error Indicator
- 00~03: Channel Indicators

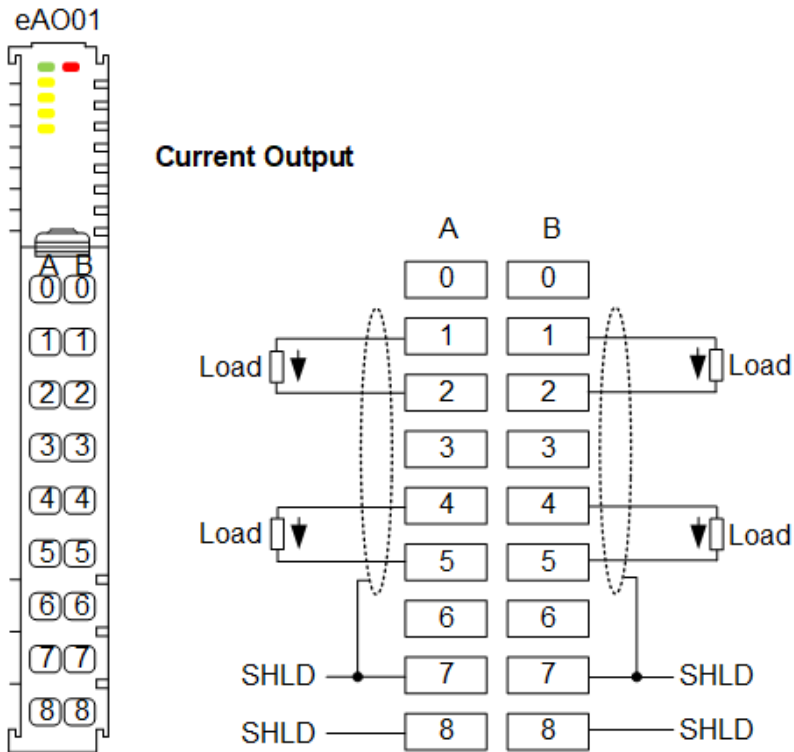
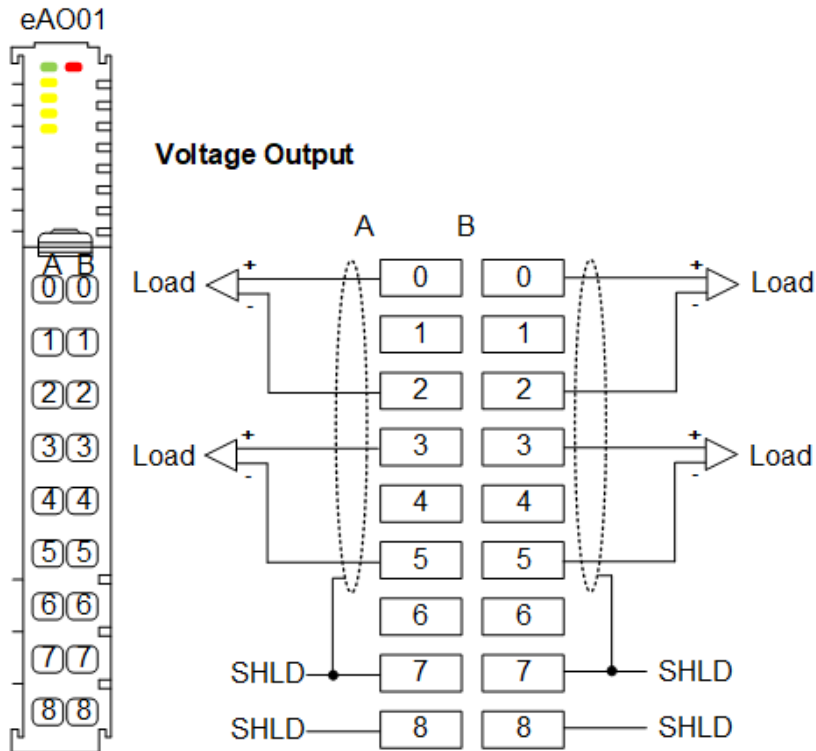
LED Name	Color	Status	Description
RU	Green	Off	Module not powered or firmware not running
		Fast Flash (200ms on, 200ms off)	Internal bus communication offline
		Steady On	Internal bus communication online
ER	Red	Off	Module fault-free

00~03	Yellow	Fast Flash (200ms on, 200ms off)	Module external fault
		Steady On	Module internal fault or module starting up
		Off	Channel xx not enabled
		Fast Flash (200ms on, 200ms off)	Channel xx fault, including but not limited to: open circuit, short circuit, over-range, etc.
		Steady On	Channel xx enabled and fault-free



- When module is not connected to field power, fast flash (200ms on, 200ms off) changes to slow flash (500ms on, 500ms off).
- During firmware upgrade, RU and ER alternate slow flash (500ms on, 500ms off).

4.9.1.4 Module Terminal Wiring Diagram



Mark	Description	Mark	Description
A0	Analog output channel 00, voltage positive	B0	Analog output channel 01, voltage positive
A1	Analog output channel 00, current positive	B1	Analog output channel 01, current positive
A2	Analog output channel 00, voltage/current negative	B2	Analog output channel 01, voltage/current negative
A3	Analog output channel 02, voltage positive	B3	Analog output channel 03, voltage positive
A4	Analog output channel 02, current positive	B4	Analog output channel 03, current positive
A5	Analog output channel 02, voltage/current negative	B5	Analog output channel 03, voltage/current negative
A6	NC, floating	B6	NC, floating
A7	Shield SHLD	B7	Shield SHLD
A8	Shield SHLD	B8	Shield SHLD

4.9.1.5 Configuration Parameters

Category	Parameter Name	Description	Configuration Principle
Module	Module Version	Module software version number, modification not supported	Default: 0x00070001
	Full Range Value	Code value range corresponding to full scale	Default: 20000 Value Range: • 20000 • 27648 • 32000 • 32767
Channel	Channel Enable	Whether to enable the channel	Default: Enable Value Range: • Enable: Enable channel • Disable: Disable channel
	Channel Diag Enable	Whether to enable channel diagnosis function	Default: Enable Value Range: • Enable: Enable channel diagnosis function • Disable: Disable channel diagnosis function
	Channel Range	Channel range, select according to actual situation	Default: -10-10V Value Range: • 0-5V • 1-5V • -5-5V • 0-10V • -10-10V • 0-20mA • 4-20mA
	Channel Safe Value	Safe value output by channel during internal bus communication failure	Default: Off Value Range: • Hold: Maintain value before fault • ReplaceValue: Output substitute value of safe value, substitute value is configured by "Channel

			Replace Value" parameter • Off: Output 0, when range is 1-5V or 4-20mA, output minimum value within range
	Channel Replace Value	Valid when internal bus communication fails and Channel Safe Value parameter is ReplaceValue, represents substitute value of safe value	Default: 0 Value Range: [-32768,32767]

Note: Explanation of Full Scale Code Value and Channel Replace Value Configuration

- Full scale code value is the upper limit of the code value corresponding to full scale. The actual effective code value range is determined by both the full scale code value and the channel range.

Example 1: Full scale code value is 20000, channel range is bipolar, such as -10~10V, then the actual effective code value range is -20000~20000. Channel value 20000 represents 10V, -20000 represents -10V, with a linear relationship.

Example 2: Full scale code value is 20000, channel range is unipolar, such as 4~20mA, then the actual effective code value range is 0~20000. Channel value 20000 represents 20mA, 0 represents 4mA, with a linear relationship.

- Channel replace value is a code value setting. Please configure reasonable values within the full scale code value range.

4.9.1.6 Diagnosis and Channel Information



During cyclic communication, the module's input data is diagnosis information. The number of bytes occupied by input data and output data is shown in the following tables.

Table 1 Diagnosis Information Occupied Bytes

Bit/Byte	Byte0	Byte1	Byte2
	Module Diagnosis	Channel Diagnosis	
Bit0	System Power Fault	Channel 00 Wire Break Fault	Channel 02 Wire Break Fault
Bit1	Field Power Fault	Channel 00 Short Circuit Fault	Channel 02 Short Circuit Fault
Bit2	Watchdog Fault	Channel 00 Underflow Fault	Channel 02 Underflow Fault
Bit3	Hardware Fault	Channel 00 Overflow Fault	Channel 02 Overflow Fault
Bit4	-	Channel 01 Wire Break Fault	Channel 03 Wire Break Fault
Bit5		Channel 01 Short Circuit Fault	Channel 03 Short Circuit Fault
Bit6		Channel 01 Underflow Fault	Channel 03 Underflow Fault
Bit7		Channel 01 Overflow Fault	Channel 03 Overflow Fault

Table 2 Channel Information Occupied Bytes

Bit/Byte	Byte0~1	Byte2~3	Byte4~5	Byte6~7
Bit0	Channel 00	Channel 01	Channel 02	Channel 03
Bit1				
Bit2				

Bit3				
Bit4				
Bit5				
Bit6				
Bit7				

Diagnosis Information

Category	Parameter Name	Description
Module	System Power Fault	• 0: System side power normal • 1: System side power fault
	Field Power Fault	• 0: Field side power normal • 1: Field side power fault
	Watchdog Fault	• 0: Watchdog normal • 1: Watchdog fault
	Hardware Fault	• 0: Hardware normal • 1: Hardware fault
Channel	Wire Break Fault	• 0: Channel has no wire break fault • 1: Channel wire break
	Short Circuit Fault	• 0: Channel has no short circuit fault • 1: Channel short circuit
	Underflow Fault	• 0: Channel has no underflow fault • 1: Channel underflow
	Overflow Fault	• 0: Channel has no overflow fault • 1: Channel overflow

Channel Information

Parameter Name	Description
CHxx	The code value of analog output, which needs to be converted according to the configured full scale code value and channel range ^{Note}

Note: Full Scale Code Value and Channel Range Description

- The full scale code value is the upper limit of the code value corresponding to the full scale. The actual effective code value range is determined by both the full scale code value and the channel range.

Example 1: Full scale code value is 20000, channel range is positive and negative, such as -10~10V, then the actual effective code value range is -20000~20000, channel value 20000 represents 10V, -20000 represents -10V.

Example 2: Full scale code value is 20000, channel range is positive, such as 4~20mA, then the actual effective code value range is 0~20000, channel value 20000 represents 20mA, 0 represents 4mA.

- The channel code value has a linear relationship with the actual value. Actual value = [Channel code value / (Code value upper limit - Code value lower limit)] * (Range upper limit - Range lower limit). When the range is 1~5V and 4~20mA, 1V or 4mA needs to be added to the calculation result.

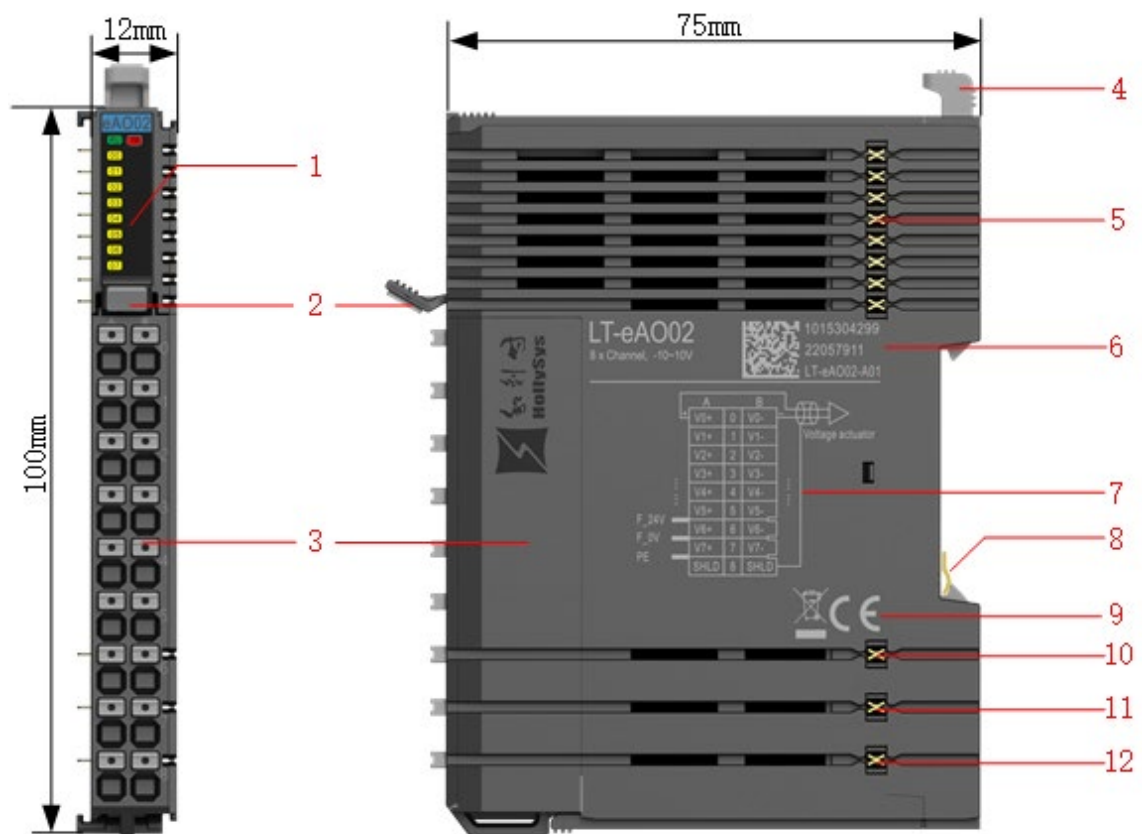
Example 1: Range is -10~10V, code value range is -20000~20000, then voltage value = {Channel code value / [20000 - (-20000)]} * [10 - (-10)], unit: V

Example 2: Range is 4~20mA, code value range is 0~20000, then current value = 4 + [Channel code value / (20000 - 0)] * (20 - 4), unit: mA

4.9.2 LT-eAO02 8-Channel Analog Output Module (Voltage Type)

LT-eAO02 is an 8-channel voltage type analog output module. Through internal bus communication, the module converts channel code values into corresponding voltage signals to control valves or actuators and other operations.

4.9.2.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicates module power supply and operating status
2	Terminal Locking Switch	Press to detach wiring terminals
3	Wiring Terminals	8-channel analog output wiring terminals
4	DIN Rail Top Mounting Latch	- Before mounting module to DIN rail, pull this latch upward to unlock - After mounting module to DIN rail, press this latch downward to lock
5	Gold Plated Contacts	Internal bus contact points for inter-module data transmission and system power supply
6	Nameplate	- Left side shows module model and basic information - Right side shows serial number QR code and plain text information (from top to bottom): serial number, production

		batch number, module version number
7	Wiring Diagram Silkscreen	Module wiring diagram silkscreen, detailed wiring diagram see Module Terminal Wiring Diagram
8	Protective Earth (PE) Spring Contact	Contacts DIN rail, internally connected to No.12
9	Other Descriptive Logos	- Do not dispose of arbitrarily - Module complies with CE certification standards
10	Field Power +24VDC	Field power +24VDC contact point for inter-module field power cascading
11	Field Power 0VDC	Field power 0VDC contact point for inter-module field power cascading
12	Protective Earth (PE)	Protective earth (PE) contact point for inter-module protective earth cascading

4.9.2.2 Technical Specifications

Basic Information

Parameter	Specification
System Power	
Power Supply Method	Internal bus power supply
Rated Voltage	5VDC
Voltage Input Range	4.5VDC~5.5VDC
Power Consumption	≤0.5W
Field Power	
Rated Voltage	24VDC
Voltage Input Range	19.2VDC~28.8VDC
Power Consumption	≤2.5W
Others	
Module Hot Swap	Not supported
Dimensions	Width 12mm * Height 100mm * Depth 75mm (excluding local protrusions)
Weight	≤90g
Protection Rating	IP20

Channel

Parameter	Specification
Number of Channels	8
Channel Enable	Each channel individually configurable, enabled by default
Signal Type	Voltage
Wiring Method	Single-ended
Range	0~5V, 1~5V, 0~10V, -5~5V, -10~10V
Range Code Value	For positive ranges, supports the following 4 code values, uniformly configured for all channels: 0~20000 0~27648 0~32000 0~32767 For bipolar ranges, supports the following 4 code values, uniformly configured for all channels: -20000~20000 -27648~27648 -32000~32000

	• -32768~32767
Configuration Method (I/O Mapping)	INT
Resolution	16-bit DAC, best 0.001V
Conversion Time	• 30 μ s/channel • 280 μ s/all channels
Accuracy	• 0.1% F.S. @20~30°C • 0.2% F.S. @-20~60°C
Output Load (Resistive)	$\geq 1k\Omega$
Output Load (Capacitive)	$\leq 1\mu F$
Channel Cable	Shielded cable, cable length $\leq 100m$
Channel Protection	Supports short-circuit protection
Channel Safe Value	• When system power or field power fails (undervoltage, power loss), channel output Off • During communication failure, channel can output safe value, each channel individually configurable • Channel safe value configurable: Hold, ReplaceValue, Off
Channel-to-Channel Isolation	Not supported
Channel Redundancy	Not supported

Diagnostics

Parameter	Specification
System Power Diagnostic Threshold	4.1VDC $\pm 5\%$
Field Power Diagnostic Threshold	17VDC $\pm 10\%$
Internal Fault Diagnosis	Detects chip watchdog status, when watchdog reset occurs, considered internal fault, this fault bit cannot be automatically cleared
External Fault Diagnosis	• Detects system side power voltage, when below threshold (software can still operate normally), considered external fault, this fault bit can be automatically cleared when voltage rises above threshold • Detects field side power status, when fault occurs, considered external fault, this fault bit can be automatically cleared when fault recovers
Channel Diagnosis	Supported, each channel individually configurable. When disabled, faults are not reported and indicator does not show fault
Channel Short-Circuit Diagnosis	Only supported for 1V~5V range
Channel Over-range (Overflow/Underflow) Diagnosis	For positive ranges, the following code values do not support overflow detection: • 0~32000 • 0~32767 For bipolar ranges, the following code values do not support overflow/underflow detection: • -32000~32000 • -32768~32767 See table below for overflow/underflow diagnostic thresholds supported by other code values
Diagnostic Log	Logs recorded when diagnostic status changes, maximum 100 entries supported
Module Runtime Diagnosis	Supports recording module cumulative runtime
Channel Runtime Diagnosis	Supports recording cumulative runtime of module channels at different percentages of full scale (10% increments) • During normal operation, records according to output value range • During safe output, records according to safe value range

	• Not recorded during system power failure, field power failure, open circuit fault, short circuit fault, or channel disabled • Historical records cleared when range is switched
--	--

Diagnostic Thresholds

Range	Underflow	Normal	Overflow
0~5V	< 0V	0~5V	> 5.4V
1~5V	< 0.6V	1~5V	> 5.4V
-5~5V	< -5.4V	-5~5V	> 5.4V
0~10V	< 0V	0~10V	> 10.8V
-10~10V	< -10.8V	-10~10V	> 10.8V



Range limit value range: ((minimum range - 8% * maximum range value) ~ 108% * maximum range value).

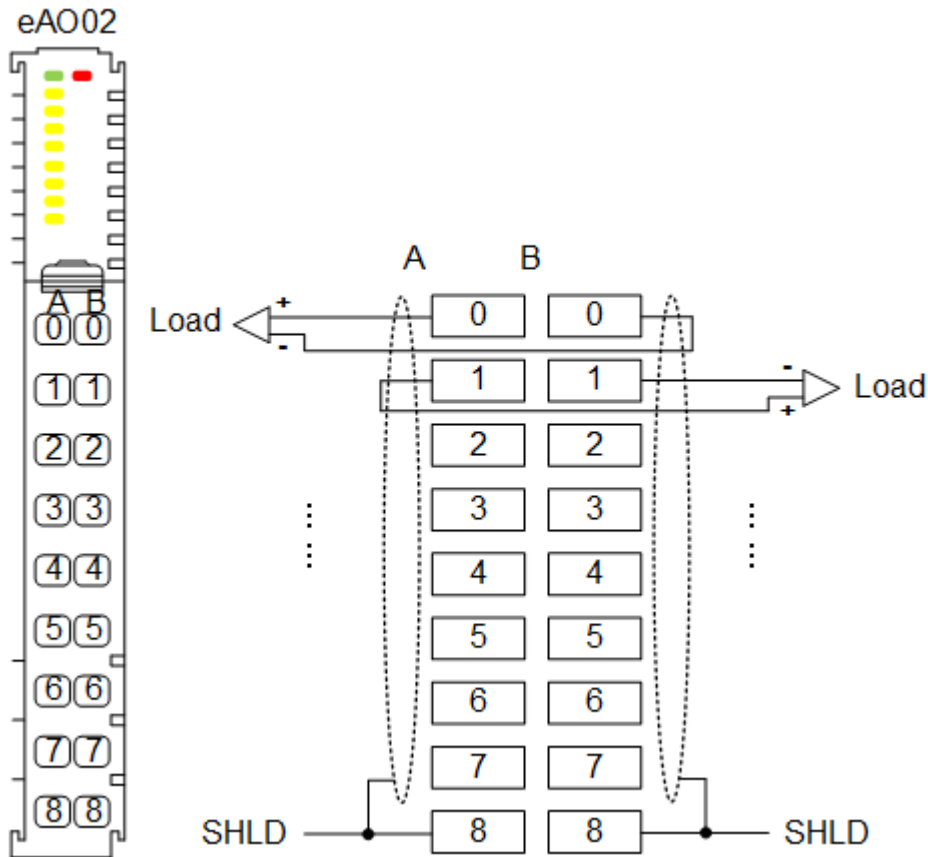
4.9.2.3 Indicator LEDs



- RU: Run Indicator
- ER: Fault Indicator
- 00~07: Channel Indicators

LED Name	Color	Status	Description
RU	Green	Off	Module not powered or firmware not running
		Fast Flash (200ms on, 200ms off)	Internal bus communication offline
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Internal bus communication online
ER	Red	Off	Module has no fault
		Fast Flash (200ms on, 200ms off)	Module external fault
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Module internal fault or module starting up
00~07	Yellow	Off	Channel xx not enabled
		Fast Flash (200ms on, 200ms off)	Channel xx fault, including but not limited to: short circuit, overrange, etc.
		Steady On	Channel xx enabled and no fault

4.9.2.4 Module Terminal Wiring Diagram



Mark	Description	Mark	Description
A0	Analog Output Channel 00, Voltage Positive	B0	Analog Output Channel 00, Voltage Negative
A1	Analog Output Channel 01, Voltage Positive	B1	Analog Output Channel 01, Voltage Negative
A2	Analog Output Channel 02, Voltage Positive	B2	Analog Output Channel 02, Voltage Negative
A3	Analog Output Channel 03, Voltage Positive	B3	Analog Output Channel 03, Voltage Negative
A4	Analog Output Channel 04, Voltage Positive	B4	Analog Output Channel 04, Voltage Negative
A5	Analog Output Channel 05, Voltage Positive	B5	Analog Output Channel 05, Voltage Negative
A6	Analog Output Channel 06, Voltage Positive	B6	Analog Output Channel 06, Voltage Negative
A7	Analog Output Channel 07, Voltage Positive	B7	Analog Output Channel 07, Voltage Negative
A8	Shield Layer SHLD	B8	Shield Layer SHLD

4.9.2.5 Configuration Parameters

Category	Parameter Name	Description	Configuration Principle
Module	Module Version	Module software version number, cannot be modified	Default: 0x000D0001
	Full Range Value	Code value range corresponding to full scale	Default: 20000 Value Range: • 20000 • 27648 • 32000 • 32767
Channel	Channel Enable	Whether to enable the channel	Default: Enable Value Range: • Enable: Enable channel • Disable: Disable channel
	Channel Diag Enable	Whether to enable channel diagnosis function	Default: Enable Value Range: • Enable: Enable channel diagnosis function • Disable: Disable channel diagnosis function
	Channel Range	Channel range, select according to actual situation	Default: 0-10V Value Range: • 0-5V • 1-5V • -5-5V • 0-10V • -10-10V
	Channel Safe Value	Safety value output by the channel during internal bus communication failure	Default: Off Value Range: • Hold: Maintain value before fault • ReplaceValue: Output substitute value of safety value, substitute value is configured by "Channel Replace Value" parameter • Off: Output 0 (when range is 1-5V, output minimum value within range)
	Channel Replace Value	When internal bus communication fails and Channel Safe Value parameter is set to ReplaceValue, this parameter is valid, representing the substitute value of safety value	Default: 0 Value Range: [-32768,32767]

Note: Full Range Value and Channel Replace Value Configuration Description

- The full range value is the upper limit of the code value corresponding to the full scale. The actual effective code value range is determined by both the full range value and the channel range.

Example 1: Full range value is 20000, channel range is positive and negative, such as -10~10V, then the actual effective code value range is -20000~20000, channel value 20000 represents 10V, -20000

represents -10V, with linear relationship.

Example 2: Full range value is 20000, channel range is positive, such as 1~5V, then the actual effective code value range is 0~20000, channel value 20000 represents 5V, 0 represents 1V, with linear relationship.

- Channel replace value is set as code value, please configure reasonable value within the full range value range.

4.9.2.6 Diagnostics and Channel Information



During cyclic communication, the module's input data is diagnostic information. The byte usage of input data and output data is shown in the table below.

Table 1 Diagnostic Information Byte Usage

Bit/Byte	Byte0	Byte1	Byte2	Byte3	Byte4
	Module Diagnostics	Channel Diagnostics			
Bit0	System Power Fault	Channel 00 Short Circuit Fault	Channel 02 Short Circuit Fault	Channel 04 Short Circuit Fault	Channel 06 Short Circuit Fault
Bit1	Field Power Fault	Channel 00 Underflow Fault	Channel 02 Underflow Fault	Channel 04 Underflow Fault	Channel 06 Underflow Fault
Bit2	Watchdog Fault	Channel 00 Overflow Fault	Channel 02 Overflow Fault	Channel 04 Overflow Fault	Channel 06 Overflow Fault
Bit3	Hardware Fault	Channel 01 Short Circuit Fault	Channel 03 Short Circuit Fault	Channel 05 Short Circuit Fault	Channel 07 Short Circuit Fault
Bit4	-	Channel 01 Underflow Fault	Channel 03 Underflow Fault	Channel 05 Underflow Fault	Channel 07 Underflow Fault
Bit5		Channel 01 Overflow Fault	Channel 03 Overflow Fault	Channel 05 Overflow Fault	Channel 07 Overflow Fault
Bit6		-	-	-	-
Bit7					

Table 2 Channel Information Byte Usage

Bit/Byte	Byte0~1	Byte2~3	...	Byte14~15
Bit0	Channel 00	Channel 01	...	Channel 07
Bit1				
Bit2				
Bit3				
Bit4				
Bit5				
Bit6				
Bit7				

Diagnostic Information

Category	Parameter Name	Description
Module	System Power Fault	• 0: System side power normal

		• 1: System side power fault
	Field Power Fault	• 0: Field side power normal • 1: Field side power fault
	Watchdog Fault	• 0: Watchdog normal • 1: Watchdog fault
	Hardware Fault	• 0: Hardware normal • 1: Hardware fault
Channel	Short Circuit Fault	• 0: Channel no short circuit fault • 1: Channel short circuit
	Underflow Fault	• 0: Channel no underflow fault • 1: Channel underflow
	Overflow Fault	• 0: Channel no overflow fault • 1: Channel overflow

Channel Information

Parameter Name	Description
CHxx	Analog output code value, needs to be converted according to configured full scale code value and channel range ^{Note}

Note: Explanation of Full Scale Code Value and Channel Range

- Full scale code value is the upper limit of the code value corresponding to full scale. The actual effective code value range is determined by both the full scale code value and the channel range.

Example 1: Full scale code value is 20000, channel range is bipolar, such as -10~10V, then the actual effective code value range is -20000~20000. Channel value 20000 represents 10V, -20000 represents -10V.

Example 2: Full scale code value is 20000, channel range is unipolar, such as 1~5V, then the actual effective code value range is 0~20000. Channel value 20000 represents 5V, 0 represents 1V.

- Channel code value and actual value have a linear relationship, $\text{actual value} = [\text{channel code value} / (\text{code value upper limit} - \text{code value lower limit})] * (\text{range upper limit} - \text{range lower limit})$. When range is 1~5V, actual value needs to add 1V to the calculation result.

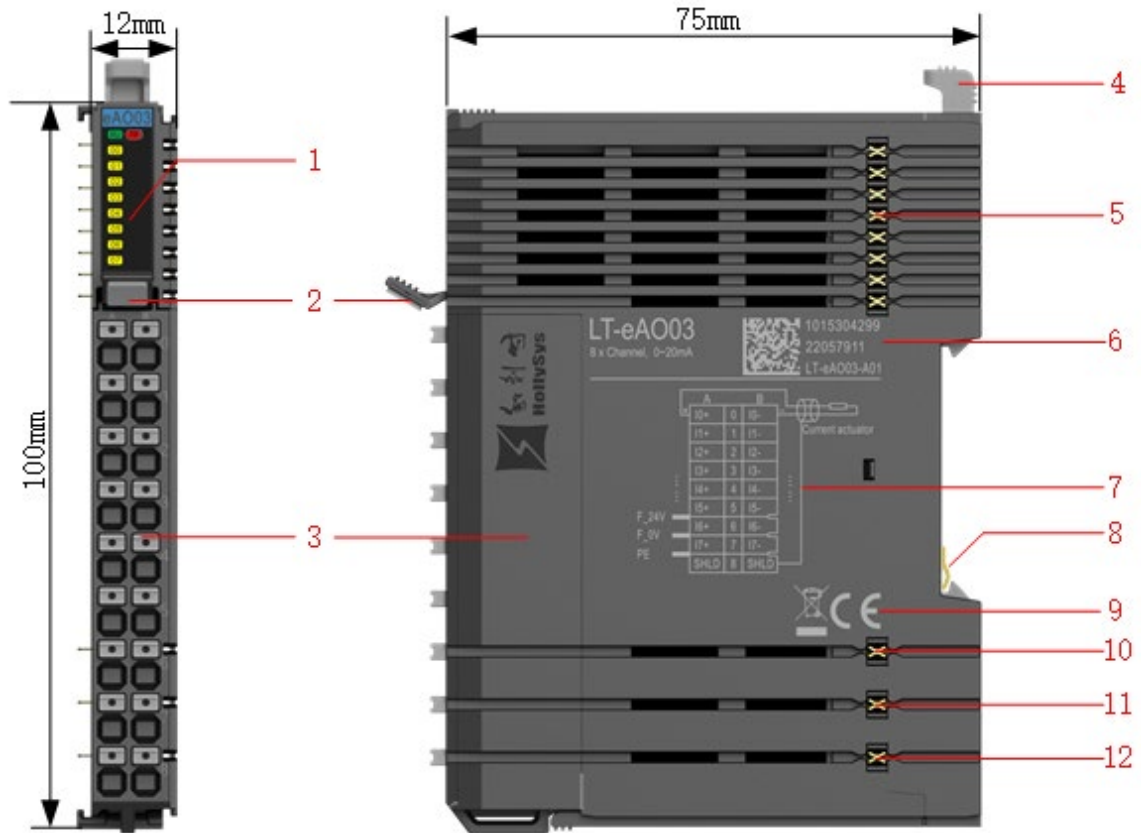
Example 1: Range is -10~10V, code value range is -20000~20000, then voltage value = $\{\text{channel code value} / [20000 - (-20000)]\} * [10 - (-10)]$, unit: V

Example 2: Range is 1~5V, code value range is 0~20000, then voltage value = $1 + [\text{channel code value} / (20000 - 0)] * (5 - 1)$, unit: V

4.9.3 LT-eAO03 8-Channel Analog Output Module (Current Type)

LT-eAO03 is an 8-channel current type analog output module. Through internal bus communication, the module converts channel code values into corresponding current signals to control valves or actuators and other operations.

4.9.3.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicates module power supply and operating status
2	Terminal Locking Switch	Press to detach wiring terminals
3	Wiring Terminals	8-channel analog output wiring terminals
4	DIN Rail Top Mounting Latch	- Before mounting module to DIN rail, pull this latch upward to unlock - After mounting module to DIN rail, press this latch downward to lock
5	Gold Plated Contacts	Internal bus contact points, used for inter-module data transmission, system power supply, etc.
6	Nameplate	- Left side shows module model and basic information - Right side shows serial number QR code and plain text information, from top to bottom: serial number, production batch number, module version number
7	Wiring Diagram Silkscreen	Module wiring diagram silkscreen, detailed wiring diagram see Module Terminal Wiring Diagram
8	Protective Earth PE Spring Contact	Contacts DIN rail, internally connected to No.12
9	Other Descriptive Logos	- Do not dispose of randomly - Module complies with CE certification standards
10	Field Power +24VDC	Field power +24VDC contact point, used for inter-module field power cascading
11	Field Power 0VDC	Field power 0VDC contact point, used for inter-module field power cascading

12	Protective Earth PE	Protective earth PE contact point, used for inter-module protective earth cascading
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4.9.3.2 Technical Specifications

Basic Information

Parameter	Specification
System Power Supply	
Power Supply Method	Internal Bus Power
Rated Voltage	5VDC
Voltage Input Range	4.5VDC~5.5VDC
Power Consumption	≤0.5W
Field Power Supply	
Rated Voltage	24VDC
Voltage Input Range	19.2VDC~28.8VDC
Power Consumption	≤2.5W
Other	
Module Hot Swap	Not Supported
Dimensions	Width 12mm * Height 100mm * Depth 75mm (excluding local protrusions)
Weight	≤90g
Protection Rating	IP20

Channels

Parameter	Specification
Number of Channels	8
Channel Enable	Individually configurable per channel, enabled by default
Signal Type	Current
Wiring Mode	Single-ended
Range	0~20mA, 4~20mA
Range Code Value Range	Common configuration for all channels: • 0~20000 • 0~27648 • 0~32000 • 0~32767
Configuration Method (I/O Mapping Mode)	INT
Resolution	16-bit DAC, Best 0.01mA
Conversion Time	• 30μs/channel • 280μs/all channels
Accuracy	• 0.1% F.S. @20~30°C • 0.2% F.S. @-20~60°C
Output Load (Resistive)	≤300Ω
Output Load (Inductive)	≤1mH
Channel Cable	Shielded cable, cable length ≤100m
Channel Safety Value	• Channel output Off during system power or field power failure (undervoltage, power loss) • During communication failure, the channel can output a safety value, individually configurable per channel • Channel safety value configurable: Hold, ReplaceValue, Off
Inter-Channel Isolation	Not Supported

Channel Redundancy	Not Supported
Output Derating	• Full load at operating temperature 45°C (total output current of all channels does not exceed 180mA) • 50% load derating at operating temperature 60°C (total output current of all channels does not exceed 80mA)

Diagnostics

Parameter	Specification
System Power Supply Diagnostic Threshold	4.1VDC±5%
Field Power Supply Diagnostic Threshold	17VDC±10%
Internal Fault Diagnostics	Detects chip watchdog status. A watchdog reset is considered an internal fault. This fault bit cannot be cleared automatically.
External Fault Diagnostics	• Detects system-side power supply voltage. When below the threshold (software can still operate normally), it is considered an external fault. This fault bit is automatically cleared when the voltage rises above the threshold. • Detects field-side power supply status. A fault is considered an external fault. This fault bit is automatically cleared when the fault recovers.
Channel Diagnostics	Supported, individually configurable per channel. When disabled, faults do not report fault bits and indicators do not show faults.
Channel Wire Break Diagnostics	Only supported for 4mA~20mA range
Channel Overrange (Overflow/Underflow) Diagnostics	The following code values do not support overflow detection: • 0~32000 • 0~32767 See the table below for the overflow and underflow diagnostic thresholds supported by other code values.
Diagnostic Log	Logs records when diagnostic status changes, supports up to 100 entries
Module Runtime Diagnostics	Supports recording the module's cumulative operating time
Channel Runtime Diagnostics	Supports recording the cumulative operating time of module channels at different percentages of full scale (10% step) • During normal operation, records based on the output value range • During safety output, records based on the safety value range • Not recorded during system power failure, field power failure, wire break fault, short circuit fault, or channel disabled • Historical records are cleared when the range is switched

Diagnostic Thresholds

Range	Underflow	Normal	Overflow
0~20mA	< 0mA	0~20mA	> 21.6mA
4~20mA	< 2.4mA	4~20mA	> 21.6mA



The range limit value is: ((Minimum Range - 8% * Maximum Range Value) ~ 108% * Maximum Range Value).

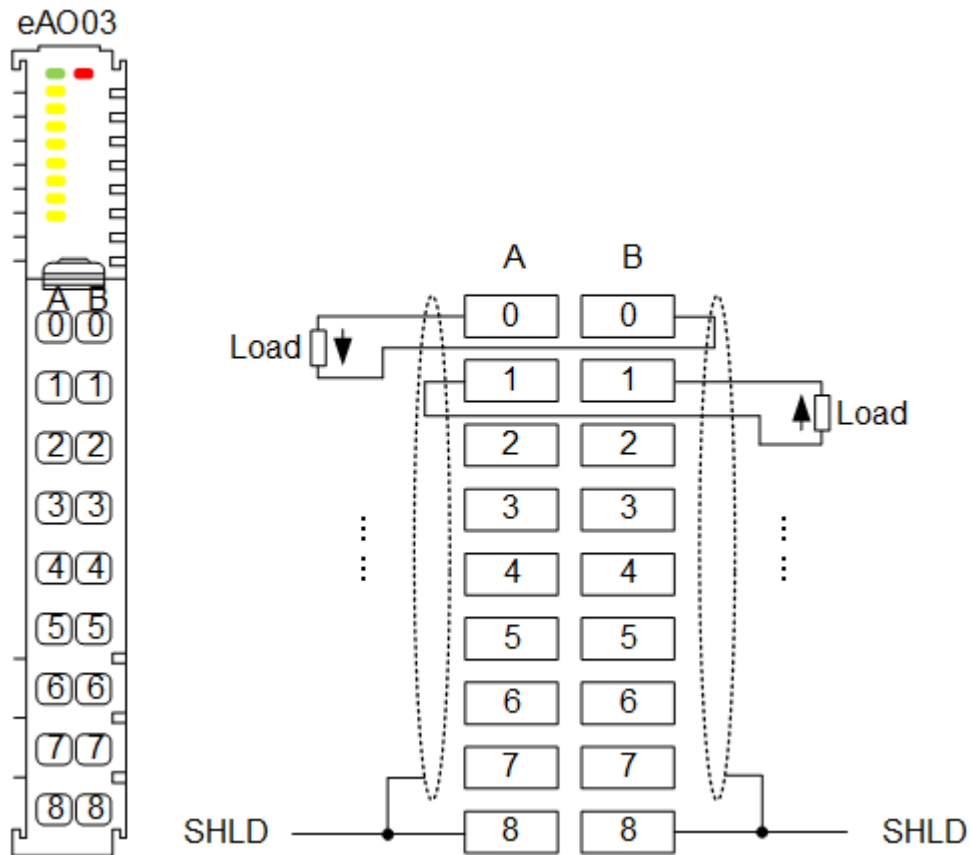
4.9.3.3 Indicator LEDs



- RU: Run Indicator
- ER: Error Indicator
- 00~07: Channel Indicators

LED Name	Color	Status	Description
RU	Green	Off	Module is not powered on or firmware is not running
		Fast Flash (200ms on, 200ms off)	Internal bus communication is offline
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Internal bus communication is online
ER	Red	Off	Module has no fault
		Fast Flash (200ms on, 200ms off)	Module external fault
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Module internal fault or module is starting up
00~07	Yellow	Off	Channel xx is not enabled
		Fast Flash (200ms on, 200ms off)	Channel xx fault, including but not limited to: wire break, over range, etc.
		Steady On	Channel xx is enabled and has no fault

4.9.3.4 Module Terminal Wiring Diagram



Mark	Description	Mark	Description
A0	Analog output channel 00, current positive	B0	Analog output channel 00, current negative
A1	Analog output channel 01, current positive	B1	Analog output channel 01, current negative
A2	Analog output channel 02, current positive	B2	Analog output channel 02, current negative
A3	Analog output channel 03, current positive	B3	Analog output channel 03, current negative
A4	Analog output channel 04, current positive	B4	Analog output channel 04, current negative
A5	Analog output channel 05, current positive	B5	Analog output channel 05, current negative
A6	Analog output channel 06, current positive	B6	Analog output channel 06, current negative
A7	Analog output channel 07, current positive	B7	Analog output channel 07, current negative
A8	Shield layer SHLD	B8	Shield layer SHLD

4.9.3.5 Configuration Parameters

Category	Parameter Name	Description	Configuration Principle
Module	Module Version	Module software version number, modification not supported	Default value: 0x000E0001
	Full Range Value	Code value range corresponding to full scale	Default value: 20000 Value range: • 20000 • 27648 • 32000 • 32767
Channel	Channel Enable	Whether to enable the channel	Default value: Enable Value range: • Enable: Enable channel • Disable: Disable channel
	Channel Diag Enable	Whether to enable channel diagnosis function	Default value: Enable Value range: • Enable: Enable channel diagnosis function • Disable: Disable channel diagnosis function
	Channel Range	Channel range, select according to actual situation	Default value: 4-20mA Value range: • 0-20mA • 4-20mA
	Channel Safe Value	Safe value output by the channel when internal bus communication fails	Default value: Off Value range: • Hold: Maintain the value before failure • ReplaceValue: Output the replacement value of safe value, the replacement value is the value configured by the "Channel Replace Value" parameter • Off: Output 0 (when range is 4-20mA, output the minimum value within the range)
	Channel Replace Value	When internal bus communication fails and Channel Safe Value parameter is set to ReplaceValue, this parameter is valid, representing the replacement value of safe value	Default value: 0 Value range: [-32768,32767]

Note: Configuration instructions for full scale code value and channel replace value

- Full scale code value is the upper limit of code value corresponding to full scale. The actual effective code value range is determined by both the full scale code value and channel range.

Example: When full scale code value is 20000 and channel range is positive, such as 4~20mA, the actual effective code value range is 0~20000. Channel value 20000 represents 20mA, 0 represents 4mA, with a linear relationship.

- Channel replace value is set as code value. Please configure reasonable values within the full scale code value range.

4.9.3.6 Diagnostics and Channel Information



During cyclic communication, the module's input data is diagnostic information. The number of bytes occupied by input data and output data is shown in the table below.

Table 1 Diagnostic Information Byte Usage

Bit/Byte	Byte0	Byte1	Byte2	Byte3	Byte4
	Module Diagnostics	Channel Diagnostics			
Bit0	System Power Fault	Channel 00 Wire Break Fault	Channel 02 Wire Break Fault	Channel 04 Wire Break Fault	Channel 06 Wire Break Fault
Bit1	Field Power Fault	Channel 00 Underflow Fault	Channel 02 Underflow Fault	Channel 04 Underflow Fault	Channel 06 Underflow Fault
Bit2	Watchdog Fault	Channel 00 Overflow Fault	Channel 02 Overflow Fault	Channel 04 Overflow Fault	Channel 06 Overflow Fault
Bit3	Hardware Fault	Channel 01 Wire Break Fault	Channel 03 Wire Break Fault	Channel 05 Wire Break Fault	Channel 07 Wire Break Fault
Bit4	-	Channel 01 Underflow Fault	Channel 03 Underflow Fault	Channel 05 Underflow Fault	Channel 07 Underflow Fault
Bit5		Channel 01 Overflow Fault	Channel 03 Overflow Fault	Channel 05 Overflow Fault	Channel 07 Overflow Fault
Bit6		-	-	-	-
Bit7		-	-	-	-

Table 2 Channel Information Byte Usage

Bit/Byte	Byte0~1	Byte2~3	...	Byte14~15
Bit0	Channel 00	Channel 01	...	Channel 07
Bit1				
Bit2				
Bit3				
Bit4				
Bit5				
Bit6				
Bit7				

Diagnostic Information

Category	Parameter Name	Description
Module	System Power Fault	• 0: System-side power supply normal • 1: System-side power supply fault
	Field Power Fault	• 0: Field-side power supply normal • 1: Field-side power supply fault
	Watchdog Fault	• 0: Watchdog normal • 1: Watchdog fault
	Hardware Fault	• 0: Hardware normal • 1: Hardware fault
Channel	Wire Break Fault	• 0: No wire break fault on the channel

		• 1: Channel wire break
	Underflow Fault	• 0: No underflow fault on the channel • 1: Channel underflow
	Overflow Fault	• 0: No overflow fault on the channel • 1: Channel overflow

Channel Information

Parameter Name	Description
CHxx	The code value for analog output, which needs to be converted based on the configured full-scale code value and channel range ^{Note}

Note: Full-Scale Code Value and Channel Range Description

- The full-scale code value is the upper limit of the code value corresponding to the full scale. The actual valid code value range is determined by both the full-scale code value and the channel range.

Example: If the full-scale code value is 20000 and the channel range is positive, such as 4~20mA, then the actual valid code value range is 0~20000. A channel value of 20000 represents 20mA, and 0 represents 4mA.

- The channel code value has a linear relationship with the actual value. $\text{Actual Value} = [\text{Channel Code Value} / (\text{Code Value Upper Limit} - \text{Code Value Lower Limit})] * (\text{Range Upper Limit} - \text{Range Lower Limit})$. When the range is 4~20mA, add 4mA to the calculated result to get the actual value.

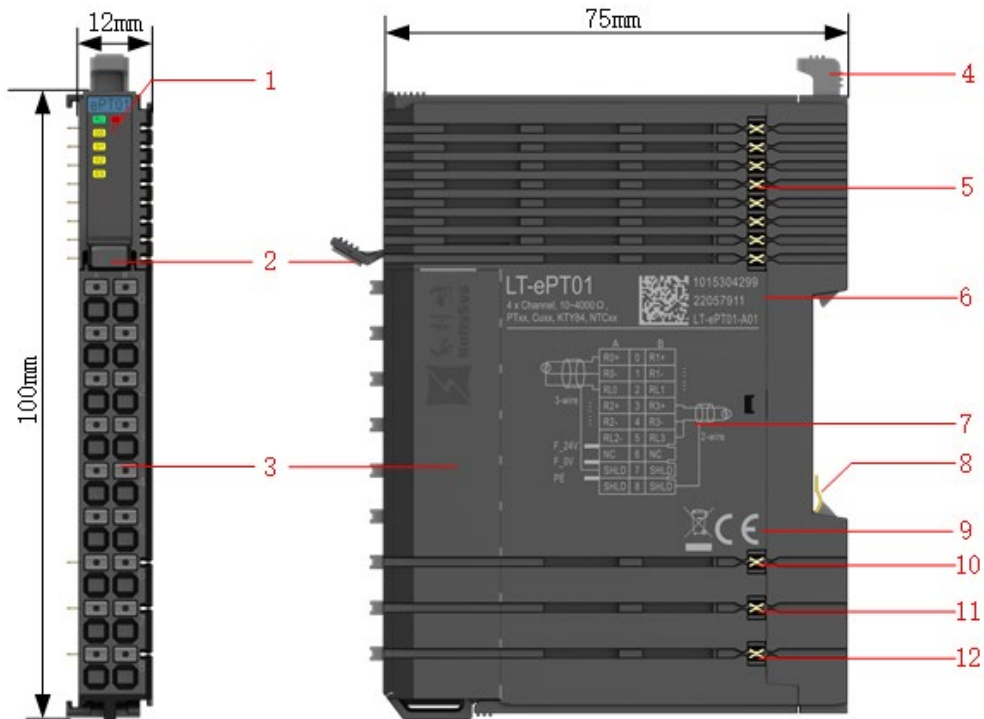
Example: Range is 4~20mA, code value range is 0~20000, then $\text{Current Value} = 4 + [\text{Channel Code Value} / (20000 - 0)] * (20 - 4)$, unit: mA

4.10 Thermal Resistance/Thermocouple Input Module

4.10.1 LT-ePT01 4-Channel Analog Input Module (RTD Type)

The LT-ePT01 is a 4-channel analog input module that supports 2/3-wire resistance signals and RTD signals, with temperature measurement accuracy up to less than 1°C.

4.10.1.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicate module power supply and operating status
2	Terminal lock switch	Press to detach the wiring terminal
3	Wiring terminals	4-channel analog input wiring terminals
4	DIN rail top mounting latch	- Before mounting the module to DIN rail, pull this latch upward to unlock - After mounting the module to DIN rail, press this latch downward to lock
5	Gold Plated Contacts	Internal bus contact points, used for inter-module data transmission, system power supply, etc.
6	Nameplate	- Left side shows module model and basic information - Right side shows serial number QR code and plain text information, from top to bottom: serial number, production batch number, module version number
7	Wiring diagram silkscreen	Module wiring diagram silkscreen, detailed wiring diagram see Module Terminal Wiring Diagram
8	Protective earth (PE) Spring Contact	Contacts DIN rail, internally connected to No.12
9	Other explanatory logos	- Do not dispose of arbitrarily - Module complies with CE certification standards
10	Field power +24VDC	Field power +24VDC contact point, used for inter-module field power cascading
11	Field power 0VDC	Field power 0VDC contact point, used for inter-module field power cascading
12	Protective earth (PE)	Protective earth (PE) contact point, used for inter-module protective earth cascading

4.10.1.2 Technical Specifications

Basic Information

Parameter	Specification
System Power Supply	
Power Supply Method	Internal Bus Power
Rated Voltage	5VDC
Voltage Input Range	4.5VDC~5.5VDC
Power Consumption	≤0.5W
Other	
Module Hot Swap	Not Supported
Dimensions	Width 12mm * Height 100mm * Depth 75mm (excluding local protrusions)
Weight	≤90g
Protection Rating	IP20

Channels

Parameter	Specification
Number of Channels	4
Channel Enable	Individually configurable per channel, enabled by default
Signal Type	• 2-wire, 3-wire resistance input • 2-wire, 3-wire RTD signal input
Supported Resistance Types	• Pt100-385, Pt200-385, Pt500-385, Pt1000-385 • Pt100-3916, Pt200-3916, Pt500-3916, Pt1000-3916 • Cu50, Cu100 • KTY84 • NTC5K, NTC10K
Temperature Range	• Pt100-385, Pt200-385, Pt500-385, Pt1000-385: -200°C ~ 850°C • Pt100-3916, Pt200-3916, Pt500-3916, Pt1000-3916: -200°C ~ 630°C • Cu50, Cu100: -50°C ~ 150°C • KTY84: 0°C ~ 200°C • NTC5K (B value 3380): -20°C ~ 150°C • NTC5K (B value 3470): -20°C ~ 140°C • NTC5K (B value 3950): -15°C ~ 100°C • NTC10K (B value 3435): 0°C ~ 170°C • NTC10K (B value 4100): 0°C ~ 130°C • NTC10K (B value 3950): 0°C ~ 150°C Note: For other B values of NTC5K and NTC10K (within the range of 2000~6000, excluding the listed B values), the temperature range is determined by formula calculation. The calculation resistance range is: 400Ω~40KΩ, $T = \frac{B \cdot T_n}{(B + T_n(\ln(RT) - \ln(R_n)))}$, where RT is the resistance value at room temperature, T_n is 298.15K, RT is the resistance value corresponding to temperature T, and the temperature calculation result is rounded.
Resistance Range	10Ω~4000Ω
Temperature Measurement Accuracy	• Pt type, 3-wire (2-wire has no accuracy requirement): < 1°C @ T < 300°C < 2°C @ 300°C ≤ T ≤ 700°C

	$< 2.5^{\circ}\text{C} @ T > 700^{\circ}\text{C};$ • Cu50/Cu100 type: $< 1^{\circ}\text{C}$ • KTY84, NTC5K, NTC10K: $< 1.5^{\circ}\text{C}$
Resistance Measurement Accuracy	0.1% F.S. @ $20^{\circ}\text{C} \sim 30^{\circ}\text{C}$
Maximum Range Code Value	DINT, -2147483648~2147483647
Channel Safety Value	• When channel wire break occurs, the channel reports according to the safety value, configured independently for each channel • Channel safety value options: Hold, Max, Min
Temperature Measurement Resolution	Acquisition resolution 0.1°C , software displays 2 decimal places
Resistance Measurement Resolution	Acquisition resolution 0.01Ω , software displays 3 decimal places
Conversion Time	• Single channel 50ms • All channels 200ms
Acquisition Cycle	Common configuration for all channels, options: 200ms, 500ms, 1000ms
Power Frequency Interference Rejection	Common configuration for all channels, options: None, 50Hz, 60Hz
Channel Filter Parameter	Individually configurable per channel, options: 1~255, 1 code value corresponds to 1 acquisition cycle
Common Mode Rejection Ratio	100dB
Differential Mode Rejection Ratio	45dB
Channel Cable	Shielded cable, cable length $\leq 100\text{m}$
Inter-Channel Isolation	Not Supported

Diagnostics

Parameter	Specification
System Power Supply Diagnostic Threshold	4.1VDC $\pm$ 5%
Internal Fault Diagnostics	• Detects chip watchdog status. A watchdog reset is considered an internal fault. This fault bit cannot be cleared automatically. • When system power is normal, detecting a field-side power supply fault is considered an internal fault. This fault bit cannot be cleared automatically.
External Fault Diagnostics	Detects system-side power supply voltage. When below the threshold (software can still operate normally), it is considered an external fault. This fault bit is automatically cleared when the voltage rises above the threshold.
Channel Diagnostics	Supported, individually configurable per channel. When disabled, faults do not report fault bits and indicators do not show faults.
Channel Wire Break Detection	Supported
Channel Overrange (Overflow/Underflow) Diagnostics	Supported, specific thresholds are shown in the table below
Channel Limit (Upper/Lower) Diagnostics	Supported, for upper/lower limit value configuration, see Configuration Parameters
Diagnostic Log	Logs records when diagnostic status changes, supports up to 100 entries

Module Runtime Diagnostics	Supports recording the module's cumulative operating time
Channel Runtime Diagnostics	Supports recording the cumulative operating time of module channels at different percentages of full scale (10% step) • During normal operation, records based on the input value range • During underflow fault, records based on the minimum input range • During overflow fault, records based on the maximum input range • Not recorded during system power failure, field power failure, or wire break fault

Diagnostic Thresholds

Range	Underflow	Normal	Overflow
Temperature			
Temperature Range & Non-NTC Range (Max Resistance $\leq 4000\Omega$)	$< R_{min}$	$R_{min} \sim R_{max}$	$> R_{max}$
Temperature Range & NTC Range (Max Resistance $4000\Omega \sim 40000\Omega$)	$< R_{max}$	$R_{min} \sim R_{max}$	$> R_{min}$
Resistance			
$10\Omega \sim 4000\Omega$	$< 10\Omega$	$10\Omega \sim 4000\Omega$	$> 4000\Omega$



- For temperature range, R_{min} is the resistance value corresponding to the minimum temperature of the range, R_{max} is the resistance value corresponding to the maximum temperature of the range.
- Overflow and underflow display overflow code values, i.e., the code values corresponding to the overflow threshold.

4.10.1.3 Indicator LEDs

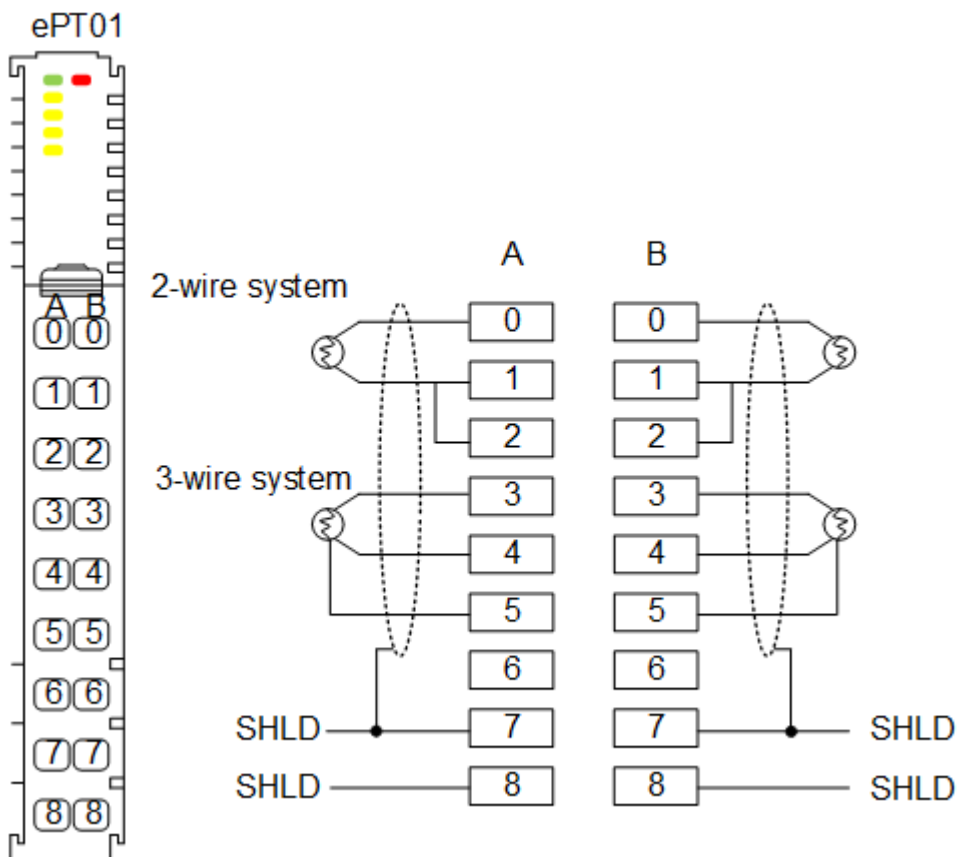


- RU: Run Indicator
- ER: Error Indicator
- 00~03: Channel Indicators

LED Name	Color	Status	Description
RU	Green	Off	Module not powered or firmware not running
		Fast Flash (200ms on, 200ms off)	Internal bus communication offline
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Internal bus communication online
ER	Red	Off	Module has no faults
		Fast Flash (200ms on, 200ms off)	Module external fault

00~03	Yellow	Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Module internal fault or module starting up
		Off	Channel xx not enabled
		Fast Flash (200ms on, 200ms off)	Channel xx fault, including but not limited to: wire break, short circuit, overrange, out of limits, etc.
		Steady On	Channel xx enabled and no fault

4.10.1.4 Module Terminal Wiring Diagram



Mark	Description	Mark	Description
A0	Channel 00, R+ terminal, i.e. positive	B0	Channel 01, R+ terminal, i.e. positive
A1	Channel 00, R- terminal, i.e. negative	B1	Channel 01, R- terminal, i.e. negative
A2	Channel 00, RL terminal, i.e. common. For 2-wire connection, needs to be shorted with R- terminal	B2	Channel 01, RL terminal, i.e. common. For 2-wire connection, needs to be shorted with R- terminal
A3	Channel 02, R+ terminal, i.e. positive	B3	Channel 03, R+ terminal, i.e. positive
A4	Channel 02, R- terminal, i.e. negative	B4	Channel 03, R- terminal, i.e. negative
A5	Channel 02, RL terminal, i.e. common. For 2-wire connection, needs to be shorted with R- terminal	B5	Channel 03, RL terminal, i.e. common. For 2-wire connection, needs to be shorted with R- terminal
A6	NC, floating	B6	NC, floating

A7	Shield layer SHLD	B7	Shield layer SHLD
A8	Shield layer SHLD	B8	Shield layer SHLD

4.10.1.5 Configuration Parameters

Category	Parameter Name	Description	Configuration Principle
Module	Module Version	Module software version number, modification not supported	Default value: 0x00080001
	Sampling Period	Sampling period, module updates data according to configured period	Default value: 200ms Value range: • 200ms • 500ms • 1000ms
	Power Frequency Filter	Power frequency interference rejection parameter setting	Default value: None Value range: • None: Do not enable power frequency interference rejection function • 50Hz: Suppress 50Hz power frequency interference • 60Hz: Suppress 60Hz power frequency interference
	Filter Algorithm	Channel filter algorithm	Default value: Sliding filter Value range: • Sliding filter • Median average filter • First order lag filter • Arithmetic average filter Note: Currently only Sliding filter is supported.
Channel	Channel Enable	Whether to enable the channel	Default value: Enable Value range: • Enable: Enable channel • Disable: Disable channel
	Channel Diag Enable	Whether to enable channel diagnosis function	Default value: Enable Value range: • Enable: Enable channel diagnosis function • Disable: Disable channel diagnosis function
	Channel Wire Connection Type	Channel wiring type	Default value: 3 wire Value range: • 2 wire: Channel uses 2-wire connection • 3 wire: Channel uses 3-wire connection
	Channel Filter	Channel filter parameter	Default value: 4 Value range: [1,255], 1 means no filtering, 1 code value corresponds to 1 acquisition cycle
	Channel Range	Channel range, each option corresponds to different RTD	Default value: Pt100-385 Value range:

		sensors, thermistors, resistance ranges, select according to actual situation	• Pt100-385 • Pt200-385 • Pt500-385 • Pt1000-385 • Pt100-3916 • Pt200-3916 • Pt500-3916 • Pt1000-3916 • Cu50 • Cu100 • KTY84-130/150 • NTC-5K • NTC-10K • 10~4000Ω
	Channel B Value Coefficient	Material constant B value of NTC thermistor, valid when Channel Range parameter is configured as NTC-5K or NTC-10K	Default value: 3950 Value range: [2000,6000]
	Channel Safe Value	Safe value reported by fault channel when channel wire break occurs	Default value: Max • Hold: Maintain value before failure • Max: Report maximum value within range • Min: Report minimum value within range
	Channel Over Limit Value	Upper threshold value for channel over-limit fault	Default value: 2147483647 Value range: [-2147483648,2147483647]
	Channel Under Limit Value	Lower threshold value for channel under-limit fault	Default value: -2147483648 Value range: [-2147483648,2147483647]

Note: Channel upper/lower limit configuration instructions

- Channel upper and lower limits are set as code values:
 - For resistance ranges, the lowest three digits of the code value are decimals, e.g., 12345 represents 12.345Ω
 - For temperature ranges, the lowest two digits of the code value are decimals, e.g., 12345 represents 123.45°C
- Channel lower limit value setting cannot be greater than or equal to upper limit value, otherwise it may cause module offline or other unknown states.

4.10.1.6 Diagnosis and Channel Information



During cyclic communication, the module's input data includes diagnosis information and channel information, with diagnosis information arranged before channel information. The number of bytes occupied by input data is shown in the following tables.

Table 1 Diagnosis Information Occupied Bytes

Bit/Byte	Byte0	Byte1	Byte2	Byte3	Byte4
	Module Diagnosis	Channel Diagnosis			
Bit0	System	Channel 00	Channel 01	Channel 02	Channel 03

	power fault	wire break fault	wire break fault	wire break fault	wire break fault
Bit1	Field power fault	Channel 00 underflow fault	Channel 01 underflow fault	Channel 02 underflow fault	Channel 03 underflow fault
Bit2	Watchdog fault	Channel 00 overflow fault	Channel 01 overflow fault	Channel 02 overflow fault	Channel 03 overflow fault
Bit3	Hardware fault	Channel 00 under limit fault	Channel 01 under limit fault	Channel 02 under limit fault	Channel 03 under limit fault
Bit4	-	Channel 00 over limit fault	Channel 01 over limit fault	Channel 02 over limit fault	Channel 03 over limit fault
Bit5					
Bit6		-	-	-	-
Bit7					

Table 2 Channel Information Occupied Bytes

Bit/Byte	Byte5~8	Byte9~12	Byte13~16	Byte17~20
Bit0	Channel 00	Channel 01	Channel 02	Channel 03
Bit1				
Bit2				
Bit3				
Bit4				
Bit5				
Bit6				
Bit7				

Diagnosis Information

Category	Parameter Name	Description
Module	System Power Fault	0: System side power normal 1: System side power fault
	Field Power Fault	0: Field side power normal 1: Field side power fault
	Watchdog Fault	0: Watchdog normal 1: Watchdog fault
	Hardware Fault	0: Hardware normal 1: Hardware fault
Channel	Wire Break Fault	0: Channel no wire break 1: Channel wire break
	Underflow Fault	0: Channel no underflow fault 1: Channel underflow
	Overflow Fault	0: Channel no overflow fault 1: Channel overflow
	Under Limit Fault	0: Channel no under limit fault 1: Channel under limit
	Over Limit Fault	0: Channel no over limit fault 1: Channel over limit

Channel Information

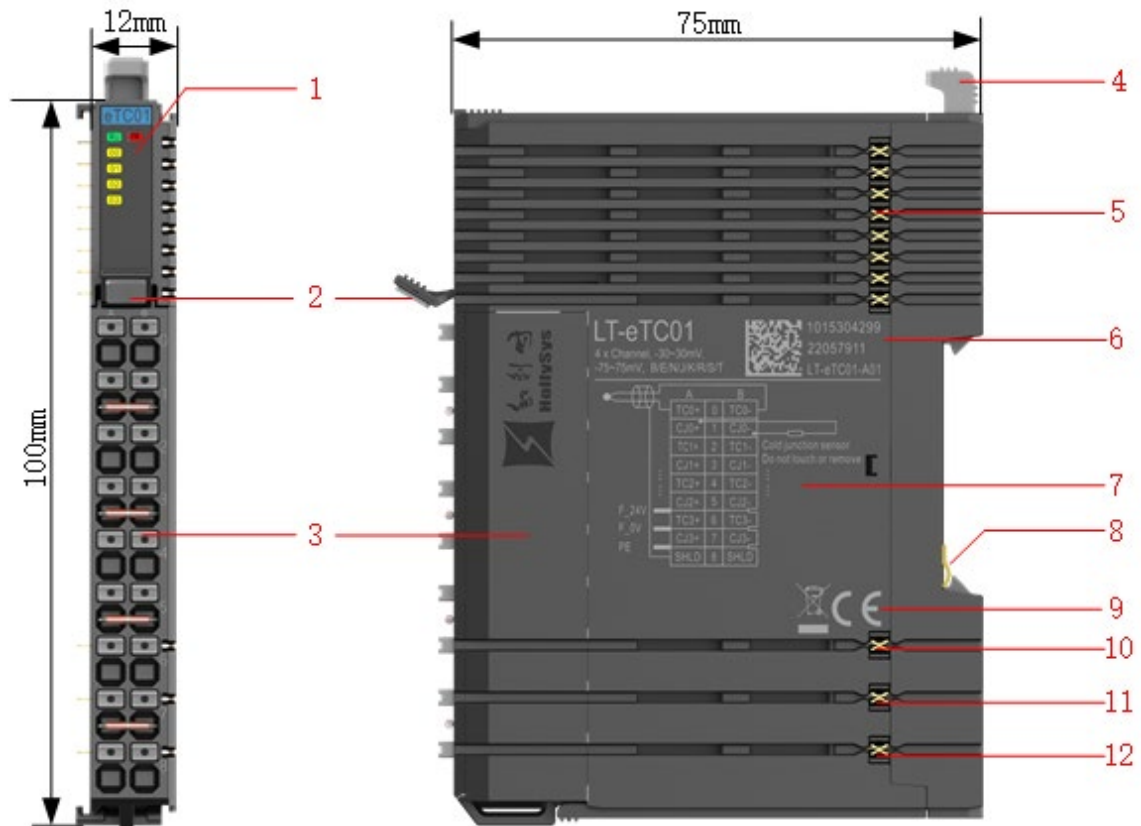
Parameter Name	Description
CHxx	Analog input value: For resistance ranges, the lowest three digits of the display value are decimals, e.g., 12345 represents 12.345Ω

- For temperature ranges, the lowest two digits of the display value are decimals, e.g., 12345 represents 123.45°C

4.10.2 LT-eTC01 4-Channel Analog Input Module (Thermocouple Type)

The LT-eTC01 is a 4-channel analog input module that supports small voltage signals and thermocouple signals, with built-in cold junction compensation, achieving a temperature measurement accuracy of less than 1°C.

4.10.2.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicates the module's power supply and operating status
2	Terminal Locking Switch	Press to detach the wiring terminal
3	Wiring Terminal	4-channel analog input wiring terminal
4	DIN Rail Top Mounting Latch	• Before mounting the module to the DIN rail, pull this latch upward to the unlocked position • After mounting the module to the DIN rail, press this latch downward to the locked position
5	Gold Plated Contacts	Internal bus contact points, used for inter-module data

		transmission, system power supply, etc.
6	Nameplate	- Left side shows module model and basic information - Right side shows serial number QR code and plain text information, from top to bottom: serial number, production batch number, module version number
7	Wiring Diagram Silkscreen	Module wiring diagram silkscreen, for detailed wiring diagram see Module Terminal Wiring Diagram
8	Protective Earth (PE) Spring Contact	Contacts the DIN rail, internally connected to No.12
9	Other Informative Logos	- Do not dispose of arbitrarily - Module complies with CE certification standards
10	Field Power +24VDC	Field power +24VDC contact point, used for inter-module field power cascading
11	Field Power 0VDC	Field power 0VDC contact point, used for inter-module field power cascading
12	Protective Earth (PE)	Protective earth (PE) contact point, used for inter-module protective earth cascading

4.10.2.2 Technical Specifications

Basic Information

Parameter	Specification
System Power Supply	
Power Supply Method	Internal Bus Power Supply
Rated Voltage	5VDC
Voltage Input Range	4.5VDC~5.5VDC
Power Consumption	≤0.5W
Others	
Module Hot Swap	Not Supported
Dimensions	Width 12mm * Height 100mm * Depth 75mm (excluding local protrusions)
Weight	≤90g
Protection Rating	IP20

Channels

Parameter	Specification
Number of Channels	4
Channel Enable	Individually configured per channel, enabled by default
Signal Type	- Voltage Input - Thermocouple Signal Input
Cold Junction Compensation Method	Globally configured for all channels, configuration options: Automatic Compensation, Fixed Compensation
Cold Junction Compensation Measurement Range	-30~65°C
Cold Junction Compensation Operating Temperature	-25~60°C
Cold Junction Compensation Resolution	24-bit ADC
Voltage Range	-75mV ~ 75mV -30mV ~ 30mV

Temperature Range	• Type B: 200°C ~ 1820°C • Type C: 0°C ~ 2300°C (supported for LT-eTC01-A02 and above versions) • Type E: -100°C ~ 1000°C • Type J: -100°C ~ 1200°C • Type K: -270°C ~ 1370°C • Type N: -100°C ~ 1300°C • Type R: -50°C ~ 1767°C • Type S: -50°C ~ 1760°C • Type T: -200°C ~ 400°C
Voltage Measurement Accuracy	• 0.1%F.S. @20~30°C • 0.2%F.S. @-20~60°C
Temperature Measurement Accuracy	Ambient temperature (25°C±2°C), excluding cold junction compensation error: • Type B: ≥±5°C@200°C≤T≤400°C <±5°C@400°C<T≤750°C <±3°C@750°C<T<1200°C <±3.5°C@1200°C≤T≤1820°C • Type C (supported for LT-eTC01-A02 and above versions): <±3°C@0°C≤T<700°C <±4°C@700°C≤T≤2300°C • Type E: <±1°C@-100°C≤T<400°C <±1.5°C@400°C≤T≤1000°C • Type J: <±1°C@-100°C≤T<500°C <±2.4°C@500°C≤T≤1200°C • Type K: ≥±1.5°C@-270°C≤T≤-200°C <±1.5°C@-200°C<T≤-100°C <±1°C@-100°C<T<500°C <±2.6°C@500°C≤T<1300°C ≥±2.6°C@1300°C≤T≤1370°C • Type N: <±1.5°C@-100°C≤T<750°C <±2.6°C@750°C≤T≤1300°C • Type R: ≥±4°C@-50°C≤T≤0°C <±4°C@0°C<T≤250°C <±2°C@250°C<T<500°C <±3.5°C@500°C≤T<1700°C ≥±3.5°C@1700°C≤T≤1767°C • Type S:

	$\geq \pm 4^{\circ}\text{C} @ -50^{\circ}\text{C} \leq T \leq 0^{\circ}\text{C}$ $< \pm 4^{\circ}\text{C} @ 0^{\circ}\text{C} < T \leq 250^{\circ}\text{C}$ $< \pm 2^{\circ}\text{C} @ 250^{\circ}\text{C} < T < 500^{\circ}\text{C}$ $< \pm 3.5^{\circ}\text{C} @ 500^{\circ}\text{C} \leq T < 1700^{\circ}\text{C}$ $\geq \pm 3.5^{\circ}\text{C} @ 1700^{\circ}\text{C} \leq T \leq 1760^{\circ}\text{C}$ • Type T: $< \pm 1^{\circ}\text{C} @ -200^{\circ}\text{C} \leq T \leq 400^{\circ}\text{C}$
Cold Junction Compensation Accuracy	• Horizontal Upright Installation - Adjacent Temperature Module: $3^{\circ}\text{C} @ -25 \sim 0^{\circ}\text{C}$, $1.5^{\circ}\text{C} @ 0 \sim 60^{\circ}\text{C}$ - Adjacent Non-Temperature Module: $6.5^{\circ}\text{C} @ -25 \sim 0^{\circ}\text{C}$, $4.5^{\circ}\text{C} @ 0 \sim 60^{\circ}\text{C}$ $-30 \sim -25^{\circ}\text{C}$, $60 \sim 65^{\circ}\text{C}$, accuracy not guaranteed • Non-Horizontal Upright Installation - Adjacent Temperature Module: $5^{\circ}\text{C} @ -25 \sim 0^{\circ}\text{C}$, $4^{\circ}\text{C} @ 0 \sim 60^{\circ}\text{C}$ - Adjacent Non-Temperature Module: $5.5^{\circ}\text{C} @ -25 \sim 0^{\circ}\text{C}$, $4.5^{\circ}\text{C} @ 0 \sim 60^{\circ}\text{C}$ $-30 \sim -25^{\circ}\text{C}$, $60 \sim 65^{\circ}\text{C}$, accuracy not guaranteed
Range Maximum Code Value Range	DINT, -2147483648~2147483647
Channel Safety Value	• When channel is open circuit, channel reports according to safety value, configured individually per channel • Channel safety value supports: Hold, Max, Min
Voltage Measurement Resolution	Acquisition resolution 0.01mV, software displays 3 decimal places
Temperature Measurement Resolution	Acquisition resolution 0.1°C, software displays 2 decimal places
Conversion Time	• Single channel 60ms • All channels 250ms
Acquisition Cycle	• Globally configured for all channels, configuration options: 250ms, 500ms, 1000ms • When some channels are enabled, acquisition cycle = configured time * number of enabled channels / total number of channels
Channel Filtering	Individually configured per channel, configuration options: 1~255, 1 code value corresponds to 1 acquisition cycle
Power Frequency Filtering	Globally configured for all channels, configuration options: Disabled, 50Hz, 60Hz
Input Impedance	$\geq 10\text{M}\Omega$
Common Mode Rejection Ratio (CMRR)	100dB
Normal Mode Rejection Ratio (NMRR)	45dB
Channel Cable	Shielded cable, cable length $\leq 30\text{m}$
Channel Withstand Voltage	$\pm 12\text{VDC}$
Channel-to-Channel Isolation	Not Supported

Diagnostics

Parameter	Specification
System Power Supply Diagnostic Threshold	4.1VDC $\pm 5\%$

Internal Fault Diagnosis	• Detects chip watchdog status; when a watchdog reset occurs, it is considered an internal fault, and this fault bit cannot be cleared automatically • When the system power supply is normal, if a field-side power supply fault is detected, it is considered an internal fault, and this fault bit cannot be cleared automatically
External Fault Diagnosis	Detects system-side power supply voltage; when it falls below the threshold (software can still operate normally), it is considered an external fault, and this fault bit is automatically cleared when the voltage rises above the threshold
Channel Diagnosis	Supported, individually configured per channel. When disabled, faults do not report fault bits, and indicator does not show fault
Channel Open Circuit Detection	Supported
Channel Overrange (Overflow/Underflow) Diagnosis	Supported, specific thresholds see table below
Channel Out-of-Limit (High/Low Limit) Diagnosis	Supported, high/low limit value configuration see Configuration Parameters
Diagnostic Log	Logs records when diagnostic status changes, supports up to 100 entries
Module Runtime Diagnosis	Supports recording module cumulative runtime
Channel Runtime Diagnosis	Supports recording the cumulative runtime of module channels in different percentage states of full scale (10% step): • During normal operation, records according to input value range • During underflow fault, records according to the minimum input range • During overflow fault, records according to the maximum input range • During system power fault, field power fault, or open circuit fault, no recording

Diagnostic Thresholds

Range	Underflow	Normal	Overflow
Temperature			
All Ranges	$< V_{\min}$	$V_{\min} \sim V_{\max}$	$> V_{\max}$
Voltage			
-30mV ~ +30mV	$< -30.3\text{mV}$	-30mV ~ 30mV	$> 30.3\text{mV}$
-75mV ~ +75mV	$< -75.75\text{mV}$	-75mV ~ 75mV	$> 75.75\text{mV}$



- For temperature ranges, $V_{\min}$ is the voltage value corresponding to the minimum temperature of the range, $V_{\max}$ is the voltage value corresponding to the maximum temperature of the range.
- The voltage range limit is: -101% of maximum range ~ 101% of maximum range.
 - Module channels support overvoltage protection but do not support overvoltage fault isolation. If the input voltage of any channel exceeds 1.5V, other channels cannot work normally; if the input voltage of any channel is within $\pm 12\text{V}$, it will not cause hardware damage, and the module can resume normal operation after removal.

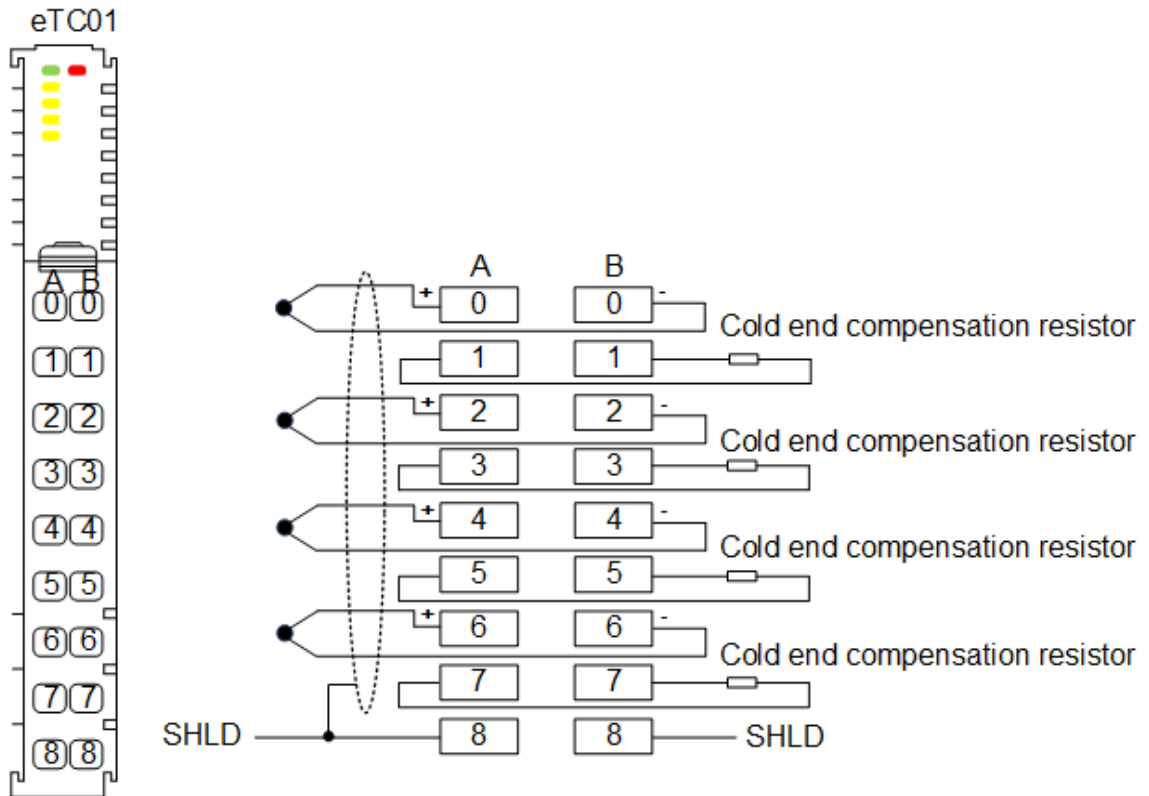
4.10.2.3 Indicator LEDs



- RU: Run Indicator
- ER: Error Indicator
- 00~03: Channel Indicators

LED Name	Color	Status	Description
RU	Green	Off	Module not powered or firmware not running
		Fast Flash (200ms on, 200ms off)	Internal bus communication offline
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Internal bus communication online
ER	Red	Off	Module has no faults
		Fast Flash (200ms on, 200ms off)	Module external fault
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Module internal fault or module starting up
00~03	Yellow	Off	Channel xx not enabled
		Fast Flash (200ms on, 200ms off)	Channel xx fault, including but not limited to: wire break, short circuit, overrange, out of limits, etc.
		Steady On	Channel xx enabled and no fault

4.10.2.4 Module Terminal Wiring Diagram



Mark	Description	Mark	Description
A0	Analog input channel 00, positive	B0	Analog input channel 00, negative
A1	Cold junction compensation input channel 00, positive	B1	Cold junction compensation input channel 00, negative
A2	Analog input channel 01, positive	B2	Analog input channel 01, negative
A3	Cold junction compensation input channel 01, positive	B3	Cold junction compensation input channel 01, negative
A4	Analog input channel 02, positive	B4	Analog input channel 02, negative
A5	Cold junction compensation input channel 02, positive	B5	Cold junction compensation input channel 02, negative
A6	Analog input channel 03, positive	B6	Analog input channel 03, negative
A7	Cold junction compensation input channel 03, positive	B7	Cold junction compensation input channel 03, negative
A8	Shield layer SHLD	B8	Shield layer SHLD



- Module wiring requires the use of dedicated compensation cables, otherwise it may lead to inaccurate data.
- The cold junction compensation resistor for each channel is installed at the factory. To ensure the accuracy of cold junction compensation, please do not touch or remove this resistor.

4.10.2.5 Configuration Parameters

Category	Parameter Name	Description	Configuration Principle
Module	Module Version	Module software version number, modification not supported	Default value: 0x00090001
	Sampling Period	Sampling period, module updates data according to configured period	Default value: 250ms Value range: • 250ms • 500ms • 1000ms
	Power Frequency Filter	Power frequency interference rejection parameter setting	Default value: None Value range: • None: Do not enable power frequency interference rejection function • 50Hz: Suppress 50Hz power frequency interference • 60Hz: Suppress 60Hz power frequency interference
	Cold End Compensation Method	Cold junction compensation method	Default value: Automatic Compensation Value range: • Automatic Compensation: Perform cold junction compensation according to internally collected cold junction temperature • Fixed Compensation: Perform cold junction compensation according to configured temperature, the configured temperature is the value of the "Cold End Compensation Temperature Value" parameter
	Cold End Compensation Temperature Value	Cold junction compensation temperature, valid when Cold End Compensation Method parameter is configured as Fixed Compensation	Default value: 300 Value range: [-250,600] Note: The parameter setting value divided by 10 represents the actual temperature value. For example: the default value 300 of this parameter indicates a cold junction compensation temperature of 30.0°C
	Filter Algorithm	Channel filter algorithm	Default value: Sliding filter Value range: • Sliding filter • Median average filter • First order lag filter • Arithmetic average filter Note: Currently only Sliding filter is supported

Channel	Channel Enable	Whether to enable the channel	Default value: Enable Value range: • Enable: Enable channel • Disable: Disable channel
	Channel Diag Enable	Whether to enable channel diagnosis function	Default value: Enable Value range: • Enable: Enable channel diagnosis function • Disable: Disable channel diagnosis function
	Channel Filter	Channel filter parameter	Default value: 4 Value range: [1,255], 1 means no filtering, 1 code value corresponds to 1 acquisition cycle
	Channel Range	Channel range, each option corresponds to different thermocouple sensors, voltage ranges, select according to actual situation	Default value: K Value range: • B:200...1820°C • C:0...2300°C (supported for LT-eTC01-A02 and above versions) • E:-100...1000°C • J:-100...1200°C • K:-270...1370°C • N:-100...1300°C • R:-50...1767°C • S:-50...1760°C • T:-200...400°C • -75...75mV • -30...30mV
	Channel Safe Value	Safe value reported by fault channel when channel wire break occurs	Default value: Max Value range: • Hold: Maintain value before failure • Max: Report maximum value within range • Min: Report minimum value within range
	Channel Over Limit Value	Channel fault threshold upper limit value	Default value: 2147483647 Value range: [-2147483648,2147483647]
	Channel Under Limit Value	Channel fault threshold lower limit value	Default value: -2147483648 Value range: [-2147483648,2147483647]

Note: Channel upper/lower limit configuration instructions

- Channel upper and lower limits are set as code values:
 - For voltage ranges, the lowest three digits of the display value are decimals, e.g., 12345 represents 12.345mV
 - For temperature ranges, the lowest two digits of the display value are decimals, e.g., 12345 represents 123.45°C
- Channel lower limit value setting cannot be greater than or equal to upper limit value, otherwise it may cause module offline or other unknown states.

4.10.2.6 Diagnosis and Channel Information



During cyclic communication, the module's input data includes diagnosis information and channel information, with diagnosis information arranged before channel information. The number of bytes occupied by input data is shown in the following tables.

Table 1 Diagnosis Information Occupied Bytes

Bit/Byte	Byte0	Byte1	Byte2	Byte3	Byte4
	Module Diagnosis	Channel Diagnosis			
Bit0	System power fault	Channel 00 wire break fault	Channel 01 wire break fault	Channel 02 wire break fault	Channel 03 wire break fault
Bit1	Field power fault	Channel 00 underflow fault	Channel 01 underflow fault	Channel 02 underflow fault	Channel 03 underflow fault
Bit2	Watchdog fault	Channel 00 overflow fault	Channel 01 overflow fault	Channel 02 overflow fault	Channel 03 overflow fault
Bit3	Hardware fault	Channel 00 under limit fault	Channel 01 under limit fault	Channel 02 under limit fault	Channel 03 under limit fault
Bit4	-	Channel 00 over limit fault	Channel 01 over limit fault	Channel 02 over limit fault	Channel 03 over limit fault
Bit5		Channel 00 cold junction compensation wire break fault	Channel 01 cold junction compensation wire break fault	Channel 02 cold junction compensation wire break fault	Channel 03 cold junction compensation wire break fault
Bit6		-	-	-	-
Bit7		-	-	-	-

Table 2 Channel Information Occupied Bytes

Bit/Byte	Byte5~8	Byte9~12	Byte13~16	Byte17~20
Bit0	Channel 00	Channel 01	Channel 02	Channel 03
Bit1				
Bit2				
Bit3				
Bit4				
Bit5				
Bit6				
Bit7				

Diagnosis Information

Category	Parameter Name	Description
Module	System Power Fault	0: System side power normal 1: System side power fault
	Field Power Fault	0: Field side power normal 1: Field side power fault
	Watchdog Fault	0: Watchdog normal 1: Watchdog fault
	Hardware Fault	0: Hardware normal 1: Hardware fault

Channel	Wire Break Fault	• 0: Channel no wire break fault • 1: Channel wire break
	Underflow Fault	• 0: Channel no underflow fault • 1: Channel underflow
	Overflow Fault	• 0: Channel no overflow fault • 1: Channel overflow
	Under Limit Fault	• 0: Channel no under limit fault • 1: Channel under limit
	Over Limit Fault	• 0: Channel no over limit fault • 1: Channel over limit
	Cold End Compensation Wire Break Fault	• 0: Channel no cold junction compensation wire break fault • 1: Channel cold junction compensation wire break

Channel Information

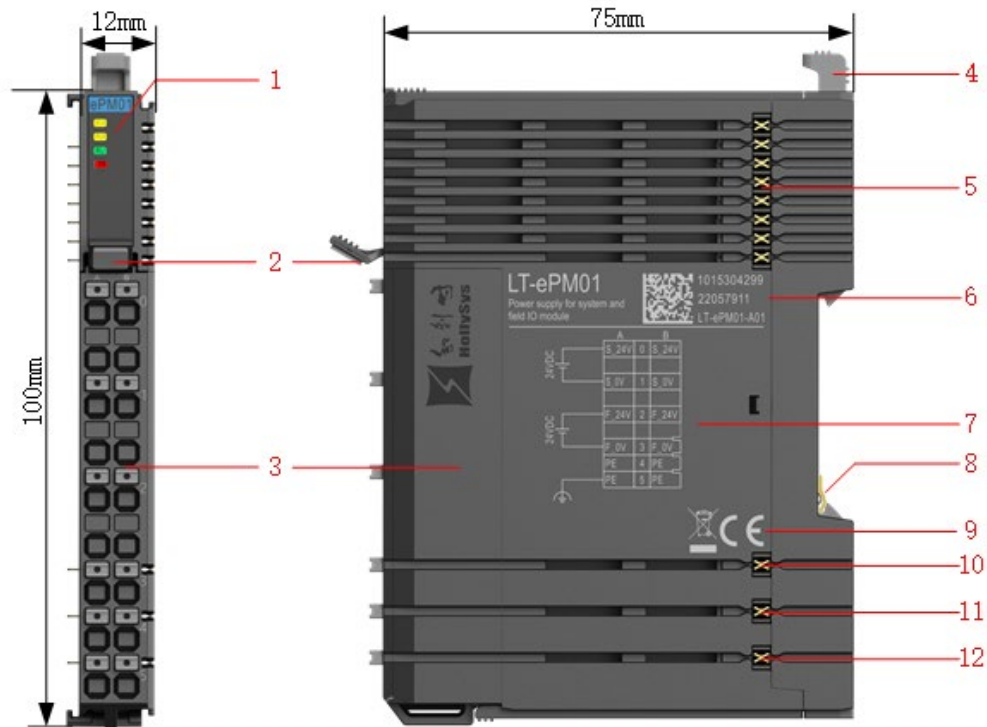
Parameter Name	Description
CHxx	Analog input value: • For voltage ranges, the lowest three digits of the display value are decimals, e.g., 12345 represents 12.345mV • For temperature ranges, the lowest two digits of the display value are decimals, e.g., 12345 represents 123.45°C

4.11 Power Module

4.11.1 LT-ePM01 24VDC Power Extension Module

In the LT-e system, one coupler module can support up to 64 I/O modules. When the system contains a large number of modules, power extension modules need to be added according to the system load power consumption to ensure the proper operation of the system power supply and field power supply.

4.11.1.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicates the module's power supply and operating status
2	Terminal Locking Switch	Press to detach the wiring terminal
3	Wiring Terminal	System power supply and field power supply input wiring terminals
4	DIN Rail Top Mounting Latch	- Before mounting the module to the DIN rail, pull this latch upward to the unlocked position - After mounting the module to the DIN rail, press this latch downward to the locked position
5	Gold Plated Contacts	Internal bus contact points, used for inter-module data transmission, system power supply, etc.
6	Nameplate	- Left side shows module model and basic information - Right side shows serial number QR code and plain text information, from top to bottom: serial number, production batch number, module version number
7	Wiring Diagram Silkscreen	Module wiring diagram silkscreen, detailed wiring diagram see Module Terminal Wiring Diagram
8	Protective Earth (PE) Spring Contact	Contacts the DIN rail, internally connected to No.12
9	Other Descriptive Logos	- Do not dispose of arbitrarily - Module complies with CE certification standards
10	Field Power +24V	Field power +24VDC contact point, provides field power to I/O modules on the right
11	Field Power 0VDC	Field power 0VDC contact point, provides field power to I/O modules on the right
12	Protective Earth (PE)	Protective earth (PE) contact point, provides protective earth to I/O modules on the right

4.11.1.2 Technical Specifications

Basic Information

Parameter	Specification
System Power Supply	
Power Supply Method	Power Terminals
Rated Voltage	24VDC
Voltage Input Range	19.2VDC~28.8VDC
Undervoltage Diagnostic Threshold	17VDC (±10%)
System-side Output Voltage	4.5VDC~5.5VDC
Power Consumption	≤0.5W
Internal Bus Power Supply Capacity	≥17.5W
Reverse Polarity Protection	Supported
Field Power Supply	
Power Supply Method	Power Terminals
Rated Voltage	24VDC
Input Voltage Range	19.2VDC~28.8VDC
Undervoltage Diagnostic Threshold	17VDC (±10%)
Load Current	≤3.5A
Reverse Polarity Protection	Supported
Isolation Withstand Voltage	Not Supported
Others	
Module Hot Swap	Not Supported
Dimensions	Width 12mm * Height 100mm * Depth 75mm (excluding local protrusions)
Weight	≤90g
Protection Rating	IP20

Channels

Parameter	Specification
Voltage Acquisition	Supports real-time acquisition and reporting of input system power supply voltage, acquisition accuracy 2% (full scale 30V)

Diagnostics

Parameter	Specification
Internal Fault Diagnosis	Detects chip watchdog status; when a watchdog reset occurs, it is considered an internal fault, and this fault bit cannot be cleared automatically
External Fault Diagnosis	• Detects system-side power supply voltage; when it falls below the threshold (software can still operate normally), it is considered an external fault, and this fault bit is automatically cleared when the voltage rises above the threshold • Detects field-side power supply status; when a fault occurs, it is considered an external fault, and this fault bit is automatically cleared when the fault is resolved
Diagnostic Log	Logs records when diagnostic status changes, supports up to 100 entries
Module Runtime Diagnosis	Supports recording module cumulative runtime

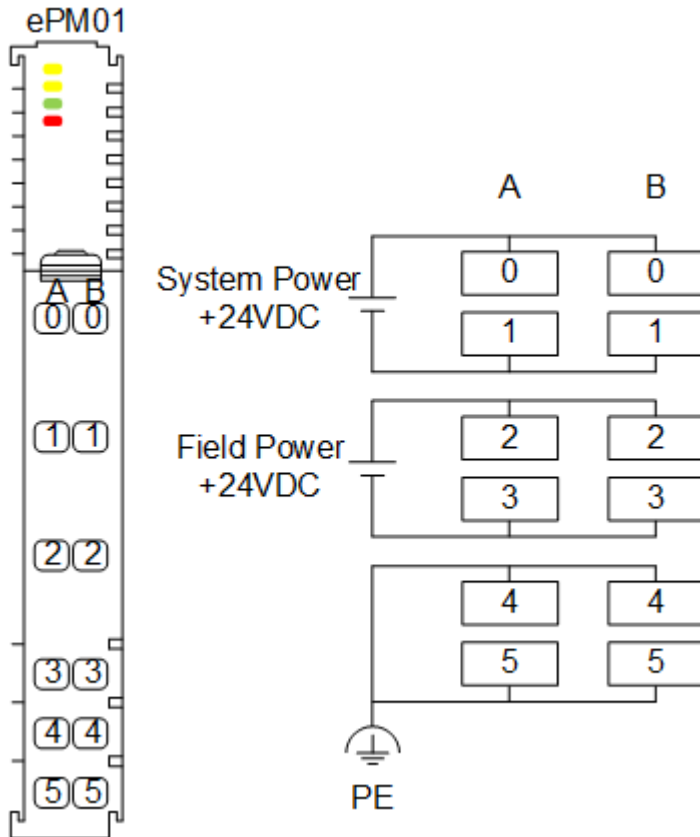
4.11.1.3 Indicator LEDs



- SPWR: System Power Indicator
- FPWR: Field Power Indicator
- RU: Run Indicator
- ER: Error Indicator

LED Name	Color	Status	Description
SPWR	Yellow	Off	Module system side is not powered on or power supply is abnormal
		Steady On	Module system side power supply is normal
FPWR	Yellow	Off	Module field side is not powered on or power supply is abnormal
		Steady On	Module field side power supply is normal
RU	Green	Off	Module is not powered on or firmware is not running
		Fast Flash (200ms on, 200ms off)	Internal bus communication is offline
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Internal bus communication is online
ER	Red	Off	Module has no fault
		Fast Flash (200ms on, 200ms off)	Module external fault
		Slow Flash (500ms on, 500ms off)	Firmware upgrade
		Steady On	Module internal fault or module is starting up

4.11.1.4 Module Terminal Wiring Diagram



Mark	Description	Mark	Description
A0	System Power +24VDC Input	B0	System Power +24VDC Input
A1	System Power 0VDC Input	B1	System Power 0VDC Input
A2	Field Power +24VDC Input	B2	Field Power +24VDC Input
A3	Field Power 0VDC Input	B3	Field Power 0VDC Input
A4	Protective Earth (PE)	B4	Protective Earth (PE)
A5	Protective Earth (PE)	B5	Protective Earth (PE)

4.11.1.5 Configuration Parameters

Category	Parameter Name	Description	Configuration Principle
Module	Module Version	Module software version number, modification is not supported	Default value: 0x000A0001

4.11.1.6 Diagnostic and Channel Information



During cyclic communication, the module's input data includes diagnostic information and channel information, with diagnostic information arranged before channel information. The number of bytes occupied by the input data is shown in the table below.

Table 1 Diagnostic Information Byte Allocation

Bit/Byte	Byte0	Channel Diagnostics
	Module Diagnostics	
Bit0	System Power Fault	Not Supported
Bit1	Field Power Fault	
Bit2	Watchdog Fault	
Bit3	Hardware Fault	
Bit4	-	
Bit5		
Bit6		
Bit7		

Table 2 Channel Information Byte Allocation

Bit/Byte	Byte1~2
Bit0	System Power Voltage
Bit1	
Bit2	
Bit3	
Bit4	
Bit5	
Bit6	
Bit7	

Diagnostic Information

Parameter Name	Description
System Power Fault	• 0: System-side power normal • 1: System-side power fault
Field Power Fault	• 0: Field-side power normal • 1: Field-side power fault
Watchdog Fault	• 0: Watchdog normal • 1: Watchdog fault
Hardware Fault	• 0: Hardware normal • 1: Hardware fault

Channel Information

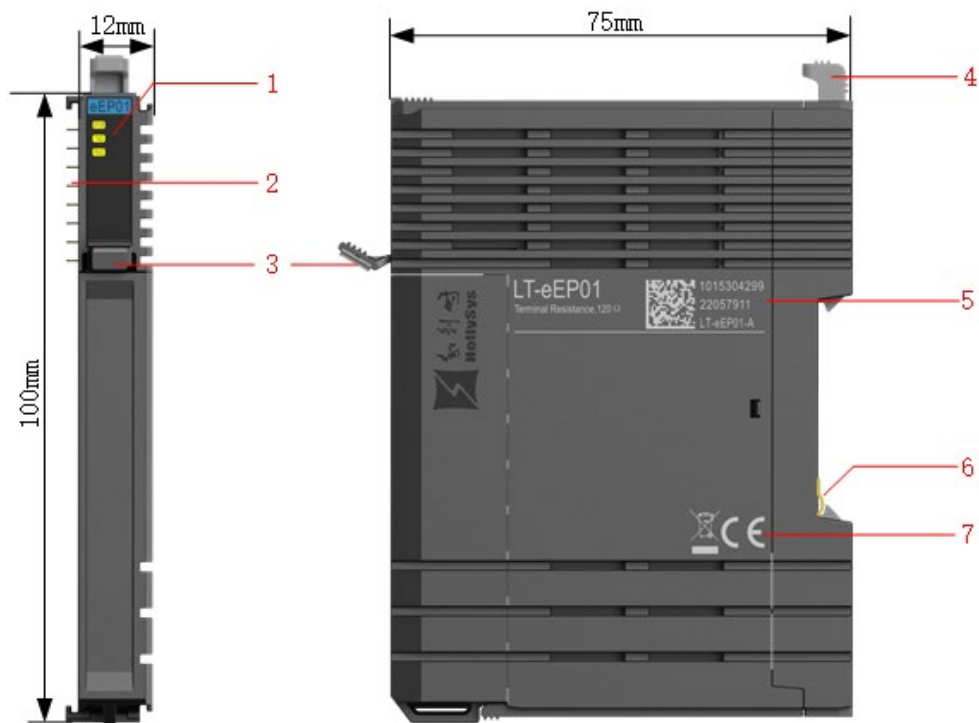
Parameter Name	Description
System Power Voltage	System power voltage input to the module, unit: V. The displayed value divided by 10 represents the actual value, for example: displayed value 240 represents 24.0VDC

4.12 Others

4.12.1 LT-eEP01 Terminal Module

The LT-eEP01 is a terminal module for the LT-e series products, primarily installed at the end to cover the communication and power supply copper sheets, preventing module damage. This module comes with a built-in terminating resistor for the LT-eBus. In harsh electromagnetic environments, installing this module effectively suppresses signal reflections, ensures signal integrity, and enhances communication reliability. Simultaneously, through the TXD and RXD indicators on the LT-eEP01 module, the data transmission status on the internal bus of the LT-e module can be monitored in real-time.

4.12.1.1 Module Appearance Introduction



No.	Name	Description
1	Indicator LEDs	Indicates the module's power supply status and the current data transmission/reception status of the branch coupler
2	Gold Plated Contacts	Internal bus contact points, used to cascade with other modules on the left side
3	Terminal Locking Switch	Press to detach the wiring terminal
4	DIN Rail Top Mounting Latch	• Before mounting the module to the DIN rail, pull this latch upward to the unlocked position • After mounting the module to the DIN rail, press this latch downward to the locked position
5	Nameplate	• Left side shows the module model and basic information • Right side shows the serial number QR code and plain text information, which from top to bottom are: serial

		number, production batch number, module version number
6	Protective Earth (PE) Spring Contact	Contacts the DIN rail
7	Other Informative Logos	- Do not dispose of arbitrarily - Module complies with CE certification standards

4.12.1.2 Technical Specifications

Basic Information

Parameter	Specification
System Power	
Power Supply Method	Internal Bus Power Supply
Rated Voltage	5VDC
Voltage Input Range	4.5VDC~5.5VDC
Power Consumption	≤0.1W
Field Power	
Rated Voltage	None
Others	
Module Hot Swapping	Not Supported
Dimensions	Width 12mm * Height 100mm * Depth 75mm (excluding local protrusions)
Weight	≤90g
Protection Rating	IP20

Channels

Parameter	Specification
Channel Isolation	Not Supported
Channel Protection	Not Supported

4.12.1.3 Indicator LEDs



- SPWR: System Power Indicator
- TXD/RXD: Communication Indicators

LED Name	Color	Status	Description
SPWR	Yellow	Off	Module system-side not powered or power abnormal
		Steady On	Module system-side power normal

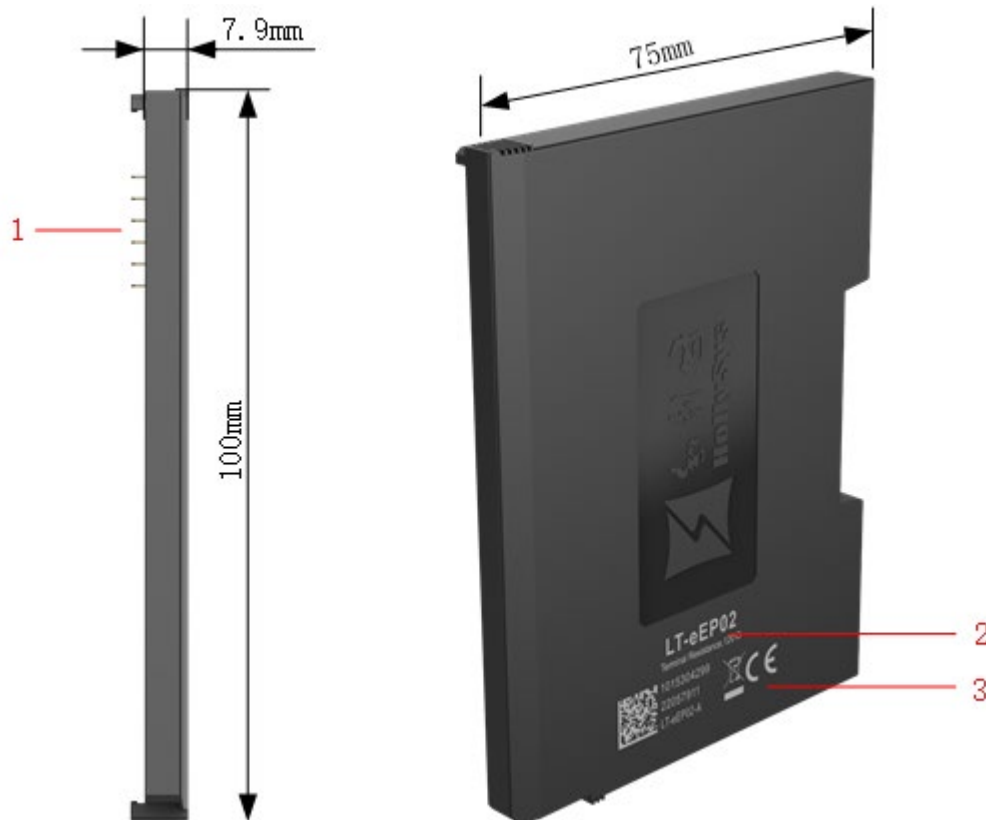
TXD	Yellow	Off	Coupler module internal bus not transmitting data
		Steady On	Coupler module internal bus transmitting data
RXD	Yellow	Off	Coupler module internal bus not receiving data
		Steady On	Coupler module internal bus receiving data

4.12.2 LT-eEP02 Terminal Resistor End Cover

The LT-eEP02 is a terminal resistor end cover module for the LT-e series products. It is primarily placed at the end to cover the communication and power supply copper contacts, preventing module damage. Additionally, this module comes with a built-in terminating resistor for the LT-eBus. In harsh electromagnetic environments, installing this module effectively suppresses signal reflections, ensures signal integrity, and enhances communication reliability.

Compared to the LT-eEP01 module, the LT-eEP02 module does not have an indicator LED, so it cannot provide real-time status of data transmission on the internal bus of the LT-e module.

4.12.2.1 Module Appearance Introduction



No.	Name	Description
1	Gold Plated Contacts	Internal bus contact points, used to cascade with other modules on the left side
2	Nameplate	Includes module model, basic information, serial number QR code and human-readable information. From top to

		bottom: serial number, production batch number, module version number
3	Other Informational Logos	• Do not dispose of arbitrarily • Module complies with CE certification standards

4.12.2.2 Technical Specifications

Basic Information

Parameter	Specification
Terminating Resistor	120Ω ±5%
Dimensions	Width 7.9mm * Height 100mm * Depth 75mm
Weight	≤40g
Protection Rating	IP20

Chapter 5 Installation and Disassembly

5.1 Installation Principles

General Principles

When selecting the equipment installation location, consider the following recommendations to ensure equipment safety and performance:

- Ensure adequate air circulation around the equipment and avoid any obstructions blocking ventilation openings.
- Avoid placing the equipment in environments with prolonged direct sunlight exposure.
- Select an environment where both temperature and humidity are within the equipment's operating specifications.
- Avoid significant temperature fluctuations, which may cause condensation to form on the equipment surface.
- Avoid installing the equipment in environments with corrosive gases or flammable gases.
- Keep away from locations with high concentrations of dust, salt, dirt, or iron filings.
- Avoid installing the equipment in areas that may be subject to vibration or shock.
- Avoid locations where the equipment may be exposed to splashing liquids such as water, oil, or chemicals.

For special environments that may affect normal equipment operation, the following preventive measures are recommended:

- When installing equipment near power lines or power cables, ensure appropriate isolation measures are taken.
- Avoid installing equipment in areas that may be subject to radiation effects.
- When installing near equipment that may generate strong high-frequency electromagnetic interference, consider appropriate shielding.
- Keep away from areas that may generate strong electric or magnetic fields to prevent equipment interference.
- In locations where electrostatic discharge may affect equipment performance, implement corresponding protective measures.
- In vibration environments, implement corresponding reinforcement measures to prevent modules from sliding, loosening, or falling off.

Coupler Module Installation Principles

- The coupler module has built-in power relay. The I/O module expanded on the right side must meet the bus current consumption. If the bus current provided by the coupler is exceeded, a power relay module LT-ePM01 needs to be added. For the calculation method of bus current, refer to the chapter [Expansion Module Quantity](#).
- Under the condition of assembling the power relay module LT-ePM01, up to 64 I/O modules (including LT-ePM01) can be extended on the right side of the coupler module.

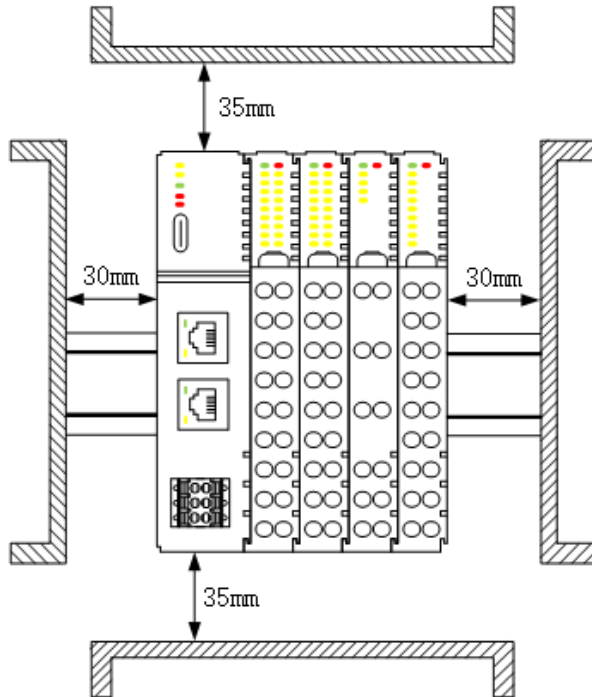
Power Extension Module Installation Principles

- The I/O module extended on the right side of the power relay module LT-ePM01 must meet the bus current consumption requirements. If the bus current provided by the power relay module is exceeded, additional power relay modules need to be added. For the calculation method of bus current, refer to the chapter [Expansion Module Quantity](#).

5.2 Environmental Requirements

- When placed horizontally: Operating ambient temperature $-20^{\circ}\text{C} \sim 60^{\circ}\text{C}$, (horizontal placement is recommended)
- When placed vertically: Operating ambient temperature $-20^{\circ}\text{C} \sim 45^{\circ}\text{C}$
- Operating relative humidity: 5% ~ 95%, non-condensing
- Operating altitude: Not exceeding 2500m

To ensure heat dissipation requirements, horizontal placement is recommended. Considering ventilation and module replacement, maintain at least the spacing shown in the figure below between the coupler and surrounding structural components such as wire ducts, other equipment, structures, and parts:

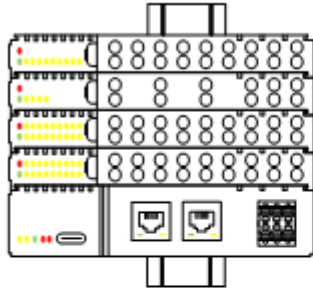


- If high-temperature heat source equipment (heaters, transformers, large resistors, etc.) exists around the product, maintain at least a 100mm gap from such equipment.
- When used in an enclosed environment, the requirements shown in the figure below must be met, and fans should be added on both sides of the enclosure.

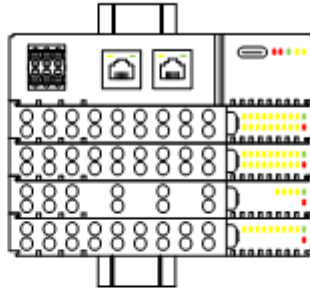
For special requirements requiring vertical or other orientation placement, as shown in the installation directions below, the following requirements must be met:

- Maximum operating temperature not exceeding 45°C
- When wiring, use wire ducts or other means to secure the cables to prevent the weight of the cables from acting on the lower rail clamp, which could cause the lower rail clamp to slide down under the weight of the cables, leading to malfunction of this product.

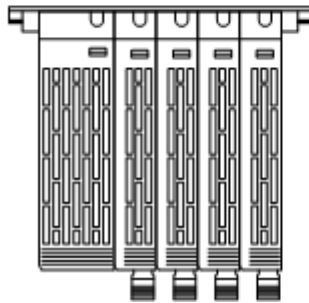
Vertical installation 1



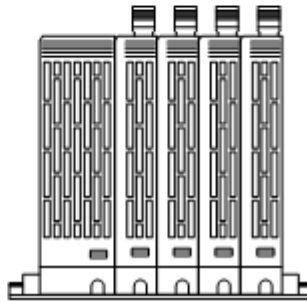
Vertical installation 2



Installation on the top of the electrical cabinet

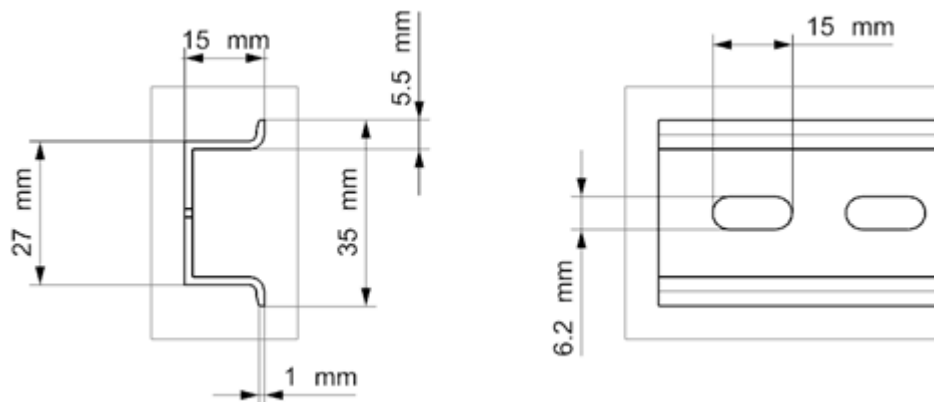


Installation at the bottom of the electrical cabinet

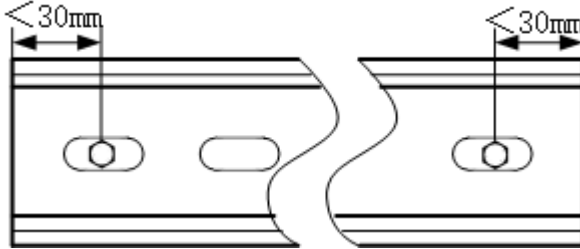


5.3 DIN Rail Requirements

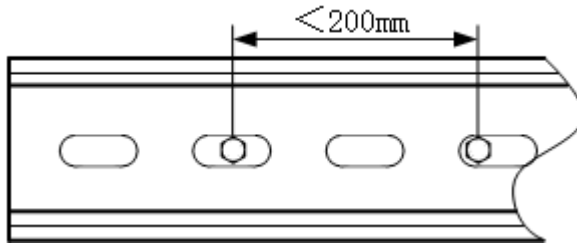
The LT-e series distributed I/O adopts DIN 35mm rail mounting. The DIN rail must comply with EN60715 standard (35mm wide, 1mm thick). The dimensional information is shown in the figure below:



- It is recommended to select a rail with a height of 15mm. If a rail with a height of 7.5mm is selected, use a flat mounting connection (such as countersunk screws or rivets) to avoid conflict with the modules.
- Select the number of bolts according to the rail length. At least 3 bolts should be installed on one rail, distributed on the left, right, and middle.
- The distance from the bolts on the left and right sides of a rail to the outer edge of the rail is recommended to be less than 30mm.



- The spacing between two bolts in the middle of the rail is recommended to be less than 200mm.



5.4 Installing Modules

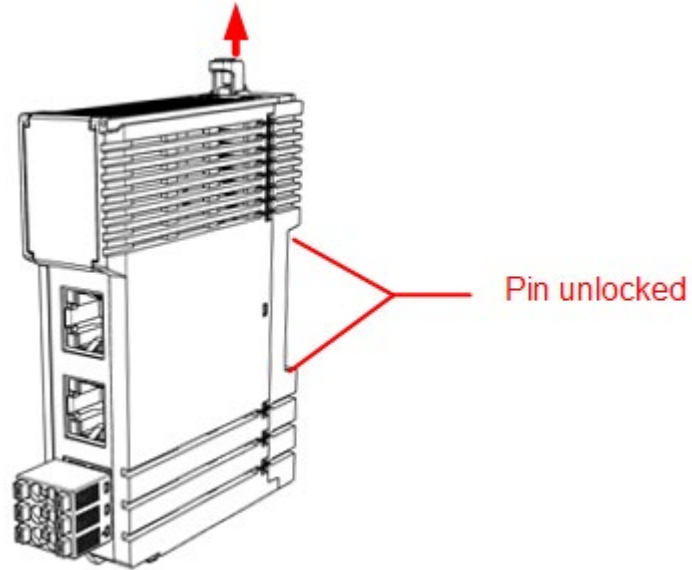
Prerequisites

- Confirm that the on-site installation conditions meet all installation requirements.
- Prepare the modules to be installed and any necessary tools (e.g., screwdrivers, etc.).
- Ensure the safety of personnel and equipment (e.g., perform work with power off).

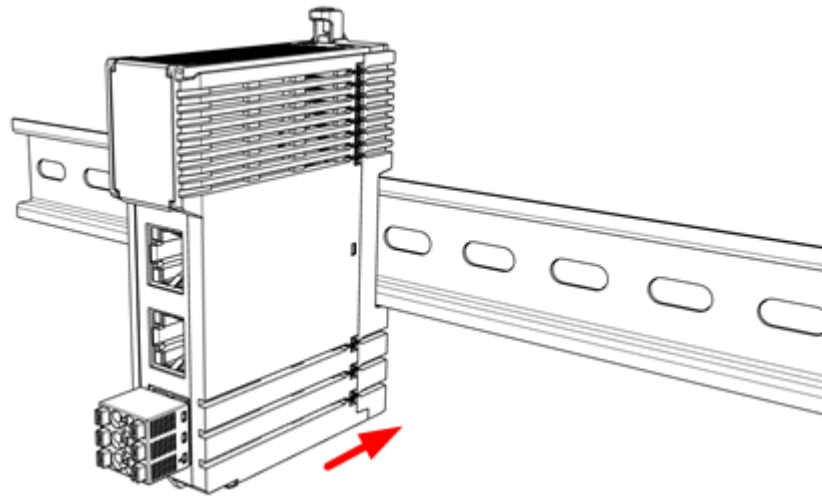
Procedure

Step 1 Install the coupler module.

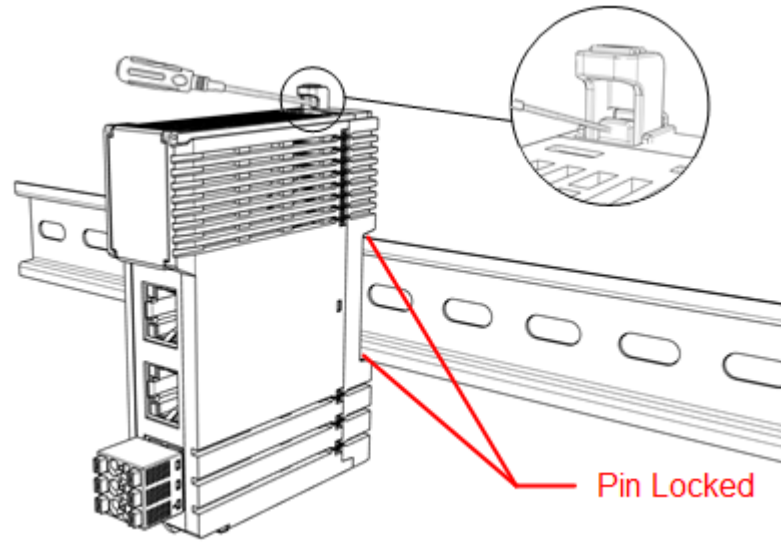
1. Firmly pull the DIN rail top mounting latch on the coupler until a click is heard, indicating the latch is in the unlocked state.



2. Push the coupler module straight onto the DIN rail, applying pressure from the front until the coupler contacts the rail.

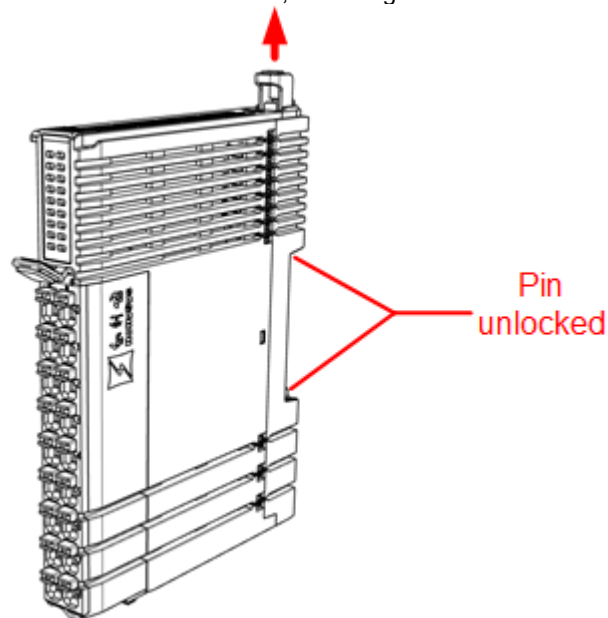


3. Gently press the return button in the mounting latch using a flat-head screwdriver until a click is heard, indicating the latch is in the locked state.

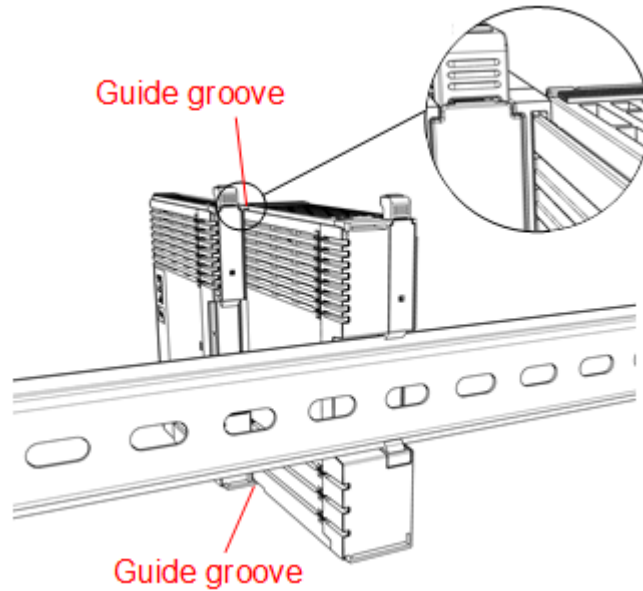


Step 2 Install the I/O module.

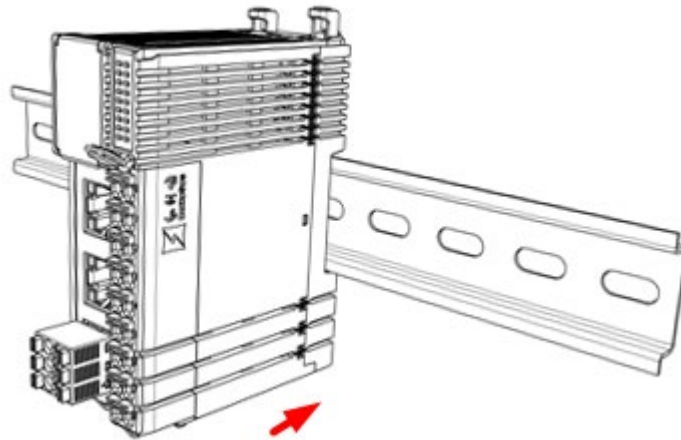
1. Similar to installing the coupler module, firmly pull the DIN rail top mounting latch on the I/O module until a click is heard, indicating the latch is in the unlocked state.



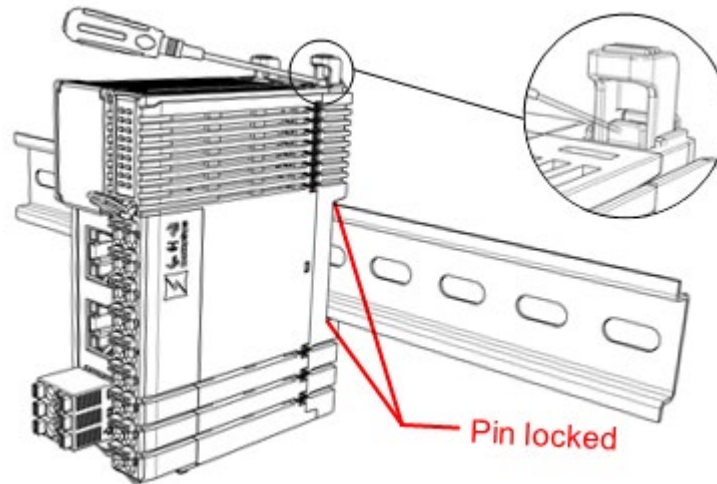
2. From the front, interlock the connection guide grooves of the module to be installed with those of the already installed module on the left (connection guide grooves are located on both the top and bottom of the module).



3. Apply pressure from the front and, following the guide grooves, push the module to be installed straight onto the DIN rail until it contacts the rail.



4. Gently press the return button in the mounting latch using a flat-head screwdriver until a click is heard, indicating the latch is in the locked state.



5. After the module is mounted on the rail, ensure there are no significant gaps between modules, the module fronts are basically flush, and there are no obvious steps.

Step 3 Install the terminal module.

1. Similar to installing the I/O module, after unlocking the top mounting latch, interlock the connection guide grooves of the terminal module with those of the already installed module on the left.
2. Apply pressure from the front and, following the guide grooves, push the terminal module straight onto the DIN rail until the module contacts the rail.
3. Lock the top mounting latch, ensure there are no significant gaps between modules, the module fronts are basically flush with no obvious steps, and the Gold Plated Contacts of the left I/O module are completely covered with no exposed parts.

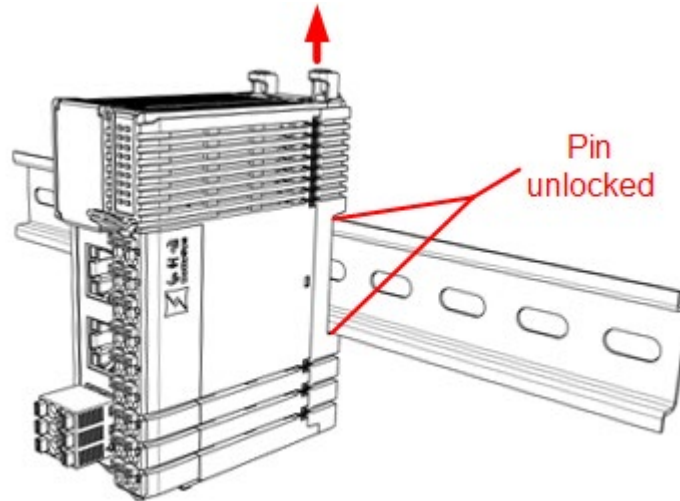
5.5 Disassembling Modules

Prerequisites

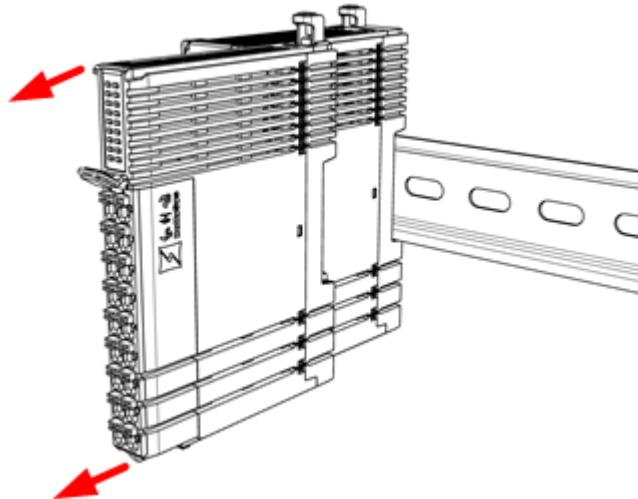
- Ensure that both the system-side and field-side 24VDC power supplies have been disconnected.
- Have tools that may be needed for module removal ready (e.g., screwdriver, etc.).

Procedure

- Step 1 Firmly pull the DIN rail top mounting latch of the terminal module until you hear a click, indicating the latch is in the unlocked position.



Step 2 Along the guide slot, pull the module outward using the anti-slip stripes on the top and bottom of the module to remove it from the rail.



Step 3 Repeat the above steps to remove all I/O modules sequentially from right to left.

Step 4 Similarly, remove the coupler module.

5.6 Replacing Module Wiring Terminals

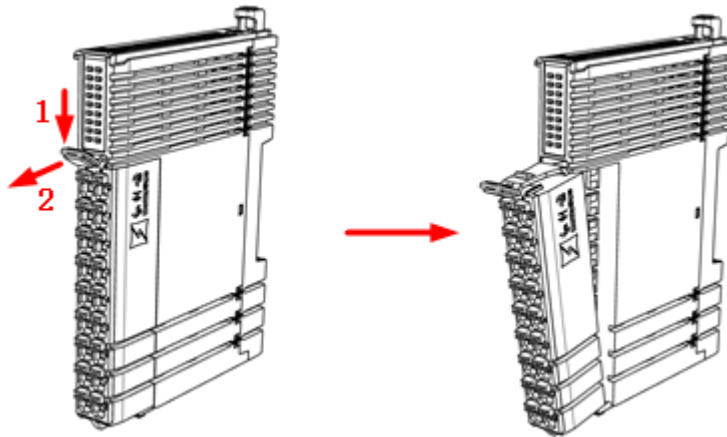
Prerequisites

- Ensure that both the system side and field side 24VDC power supplies are disconnected.
- Prepare the tools that may be needed for module disassembly (e.g., screwdrivers, etc.).

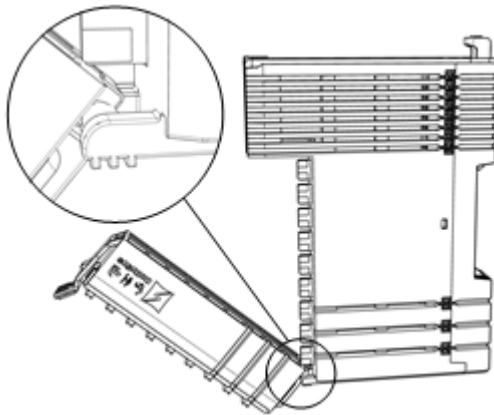
Procedure

The terminals of the LT-e series I/O modules are designed to be pluggable. When necessary, the entire row of wiring terminals can be removed, and then new wiring terminals can be installed onto the module.

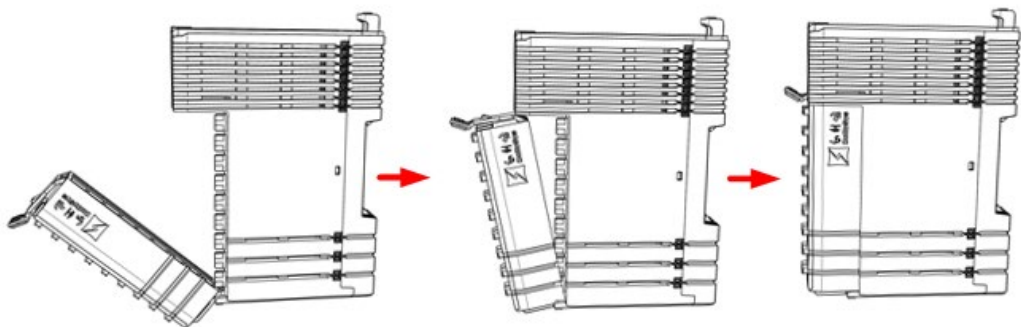
Step 1 Press the terminal locking switch and simultaneously pull the switch outward to detach the entire row of wiring terminals from the module.



Step 2 When installing new wiring terminals, first engage the bottom hooks of the terminals with the module's card slot.



Step 3 Gently push the entire row of wiring terminals into the corresponding position on the module until a click is heard, indicating the terminals are locked in place.



Chapter 6 Wiring

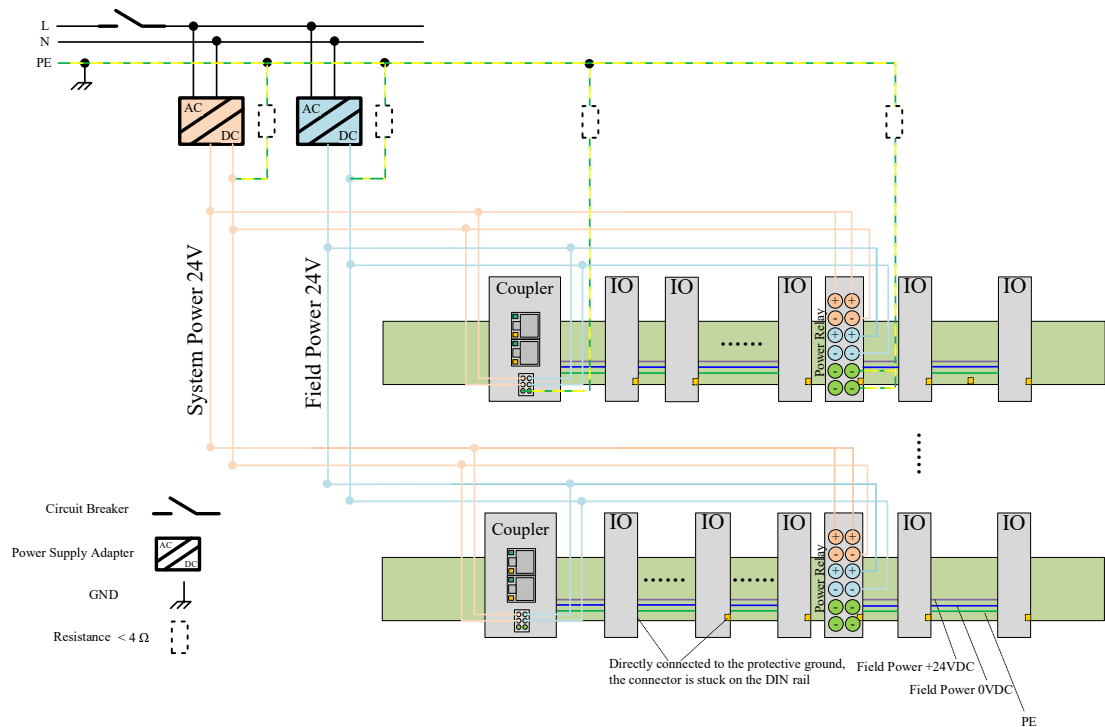
6.1 Power Supply Requirements

As shown in the figure below, after passing through a circuit breaker, the 220V AC power supply is converted by two 220V/24V power adapters to output system-side 24V DC power and field-side 24V DC power respectively. These then pass through circuit breakers and supply power to the entire PLC system via the coupler module and power extension modules.



The system power supply and field power supply must be isolated from each other, otherwise the electrical isolation within the modules may be compromised, leading to reduced EMC immunity performance.

- System Power Supply: Ensures the normal operation of all modules in the PLC system.
- Field Power Supply: Provides power to the field-side inputs of the PLC equipment.



6.2 Grounding Requirements

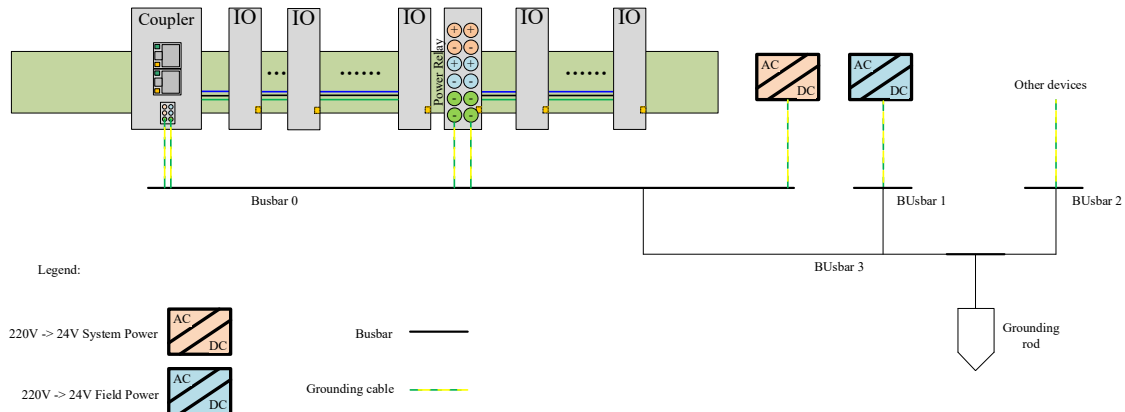
The LT system has three grounds: System Ground, Field Ground, and Protective Earth (PE).

Grounding Method

The negative terminal of the system power supply is connected to the negative terminal of the system side

switching power supply, the negative terminal of the field power supply is connected to the negative terminal of the field side switching power supply. The third busbar is the Protective Earth (PE), which is summarized at the grounding plate inside the equipment, or can be separately led out of the equipment for unified grounding.

The grounding busbar inside the cabinet is made of copper strips with an area not less than 25mm×6mm; each grounding plate is connected to a copper grounding cable with an insulated jacket and a cross-sectional area not less than 2.5mm² from the main grounding bus. Finally, it is connected to the grounding electrode at a single point.



Isolation withstand voltage between Field Ground and System Ground, between channels and System Ground, and between channels and Protective Earth is $\geq 1000\text{VAC}$ @1min @5mA; there is no isolation requirement between channels.

Under normal conditions, the insulation resistance between System Ground, Field Ground, and Protective Earth is not less than 10M Ω @500VDC (temperature 25°C±2°C, relative humidity 30%±5% non-condensing).

Protective Earth (PE)

Protective Earth (PE) reliably connects metal parts of electrical equipment that are not normally live but may become live under fault conditions (such as insulation failure), like enclosures and metal frames, to the earth via a conductor. This prevents electric shock to personnel or equipment damage. This conductor is typically a copper-core wire with good conductivity and high mechanical strength, and its cross-sectional area should meet the equipment's rated current and grounding resistance requirements.

At the DIN rail connection point on the back of the module, there is a Protective Earth (PE) spring. When the module is installed on the DIN rail, this spring contacts the rail, achieving effective grounding of the module. Therefore, ensure the DIN rail is always installed on a conductive backplate within the cabinet.

Reliable Grounding of Shielded Cables

The terminal wiring cables for analog I/O modules must be shielded, and the shield must be effectively grounded. This effective grounding can be achieved by connecting to the module's PE terminal, which is connected to the Protective Earth (PE) spring on the back of the module.

6.3 Cable Requirements

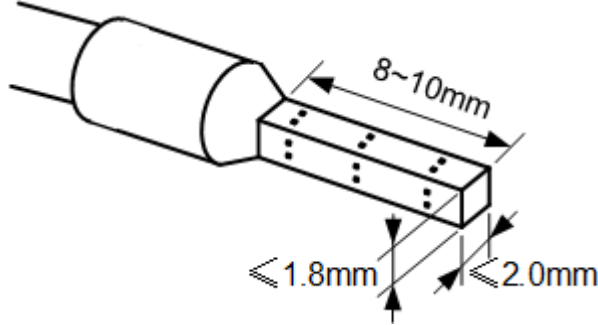
Terminal Wiring Cable Requirements

- 0.5 to 1.5 mm² cables are used for power supply modules. The selected cross-sectional area depends on the load current.

- 0.2 to 1.0 mm² cables are used for other I/O modules. The selected cross-sectional area depends on the load current.
- LT-eTCxx module wiring requires the use of dedicated compensation cables, otherwise it may lead to inaccurate data

Module	Applicable Wire Gauge		
	Material	International Standard/mm ²	American Standard/AWG
Power Supply Module	Ferrule, Copper Core	0.5 to 1.5	20 to 16
Digital Module	Ferrule, Copper Core	0.2 to 1.0	24 to 17
Analog Module	Ferrule, Copper Core	0.2 to 0.75	24 to 18
Temperature Module	Ferrule, Copper Core	0.2 to 0.75	24 to 18

When using a crimping tool for cable crimping, please refer to the following shape and dimension requirements for operation:



Grounding Wiring Requirements

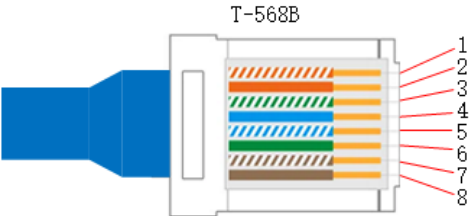
- Must use the correct independent grounding method
- Use cables with a cross-sectional area greater than or equal to 2mm² for grounding, with a grounding resistance below 4Ω
- The grounding point should be close to the PLC, and the grounding cable must be securely fastened

Power Cable Wiring Requirements

- 220VAC and 24VDC power cables should use thick wires
- Maintain a certain distance between different types of cables

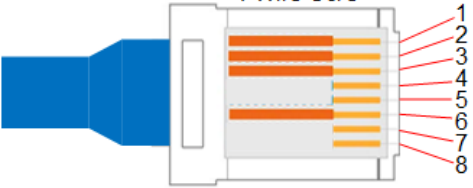
Ethernet Cable Wiring Requirements

- Cables must use Cat.5e or above shielded twisted pair cable
- The cable interface is a standard RJ45 interface, the wiring standard is as follows:

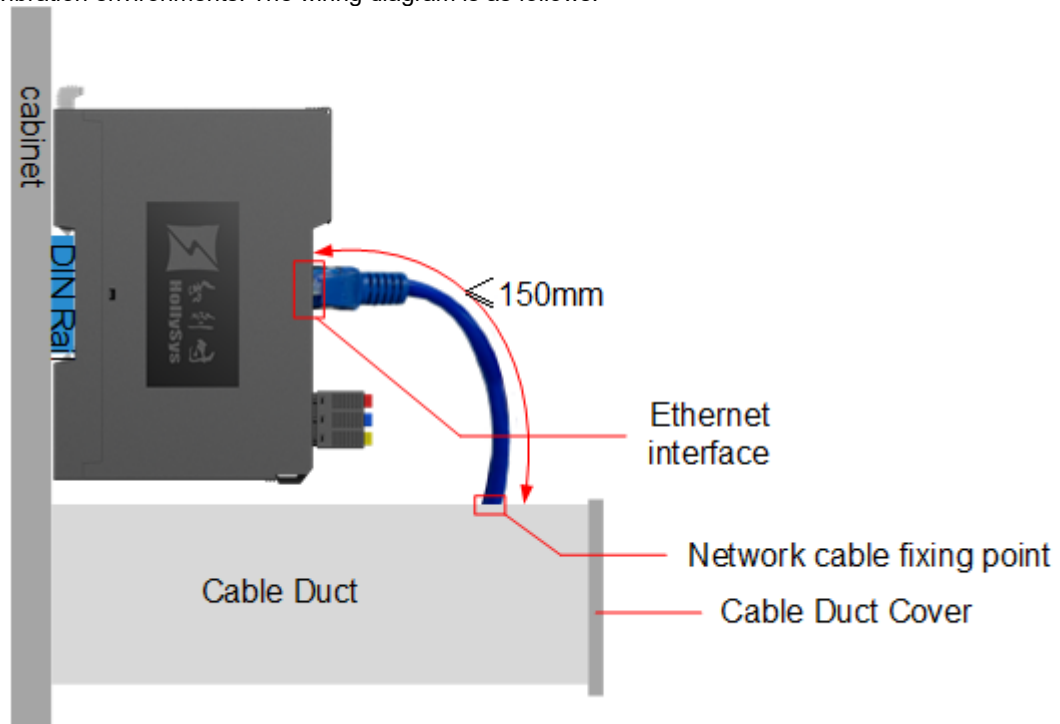
Diagram	No.	Color	Description
	1	White/Orange	Transmit Data Positive (Tx+)
	2	Orange	Transmit Data Negative (Tx-)
	3	White/Green	Receive Data Positive (Rx+)
	4	Blue	Reserved
	5	White/Blue	Reserved
	6	Green	Receive Data Negative (Rx-)
	7	White/Brown	Reserved

	8	Brown	Reserved
--	---	-------	----------

- The EtherCAT communication protocol also supports 4-core RJ45 connector crimping. The crimping requirements are as follows:

Diagram	No.	Wiring Standard
	1	Transmit Data Positive (Tx+)
	2	Transmit Data Negative (Tx-)
	3	Receive Data Positive (Rx+)
	4	-
	5	-
	6	Receive Data Negative (Rx-)
	7	-
	8	-

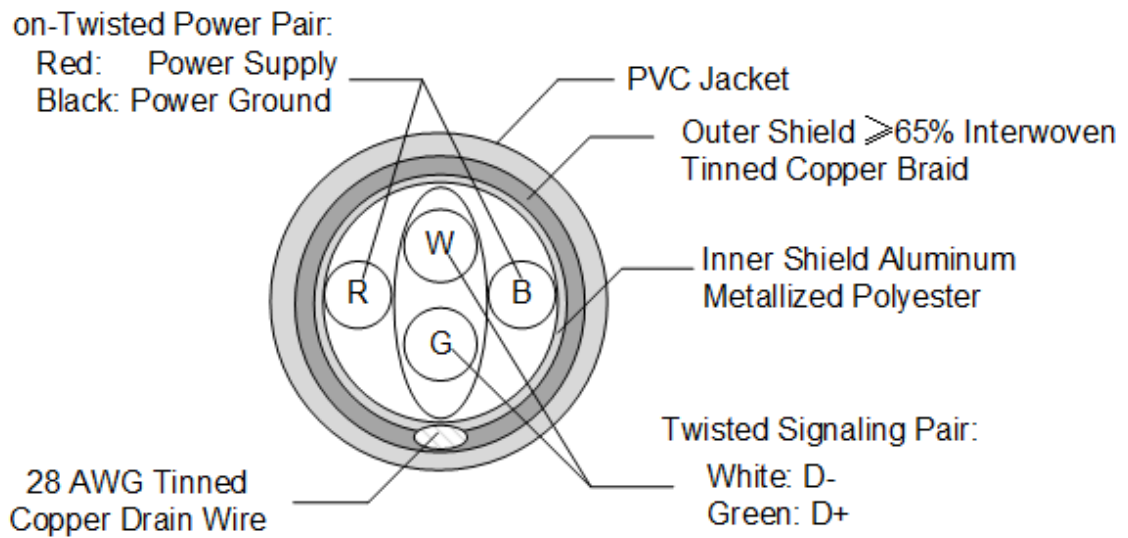
- The length of the Ethernet cable between the Ethernet interface of the coupler module and the cable fixing point should not exceed 150 mm. Excessive length may lead to unstable Ethernet communication in high-vibration environments. The wiring diagram is as follows:



USB Cable Requirements

The USB cable is used to connect the LT-e series coupler module with the LT Intelligent Tool configuration software. This cable must comply with the USB protocol specifications, otherwise the configuration software may not recognize it. Specific requirements are as follows:

- The data lines D+/D- must meet a differential impedance of 90Ω and a common-mode impedance of 30Ω.
- The USB cable must have a shielding layer, and this shielding layer must be grounded via the USB connector shell.



6.4 Wiring/Unwiring Operations

Prerequisites

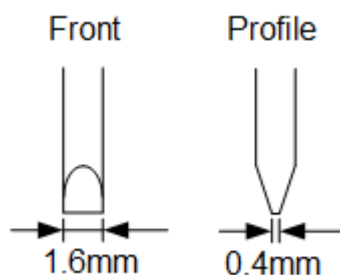
- Ensure all external power supplies are switched off and the equipment or cabinet is de-energized.
- Prepare the pre-made cables.
- Prepare a wiring diagram in advance based on the module wiring schematic and refer to it during wiring.

Precautions

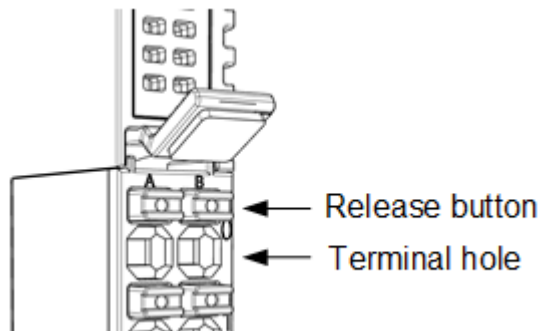
- During wiring, ensure that copper wire strands or burrs do not contact adjacent terminals.
- Refer to the [Expansion Module Quantity](#) chapter to configure power extension modules according to the bus current consumption.

Tools Required

Flat-head screwdriver (1.6mm), as shown in the figure below.

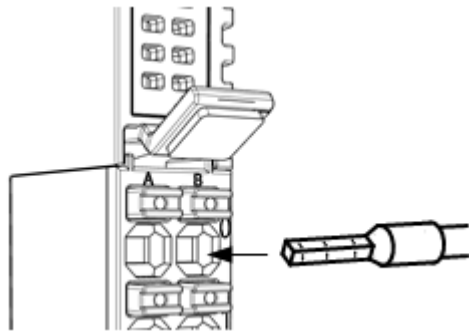


Terminal Description



Wiring Procedure

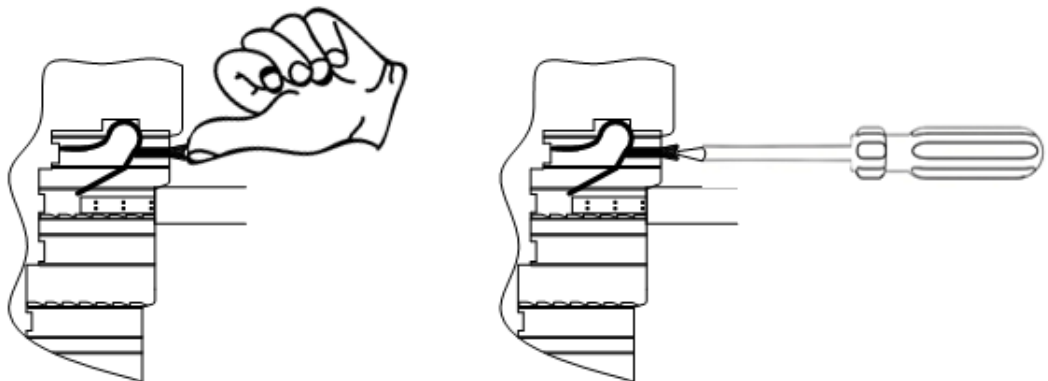
LT-e series modules use embedded self-locking terminals with a Push-In design for tool-free wiring. It is not necessary to use a flat-head screwdriver. Insert the prepared cable straight into the terminal hole. After insertion, gently pull the cable to confirm it is fully secured and not loose.



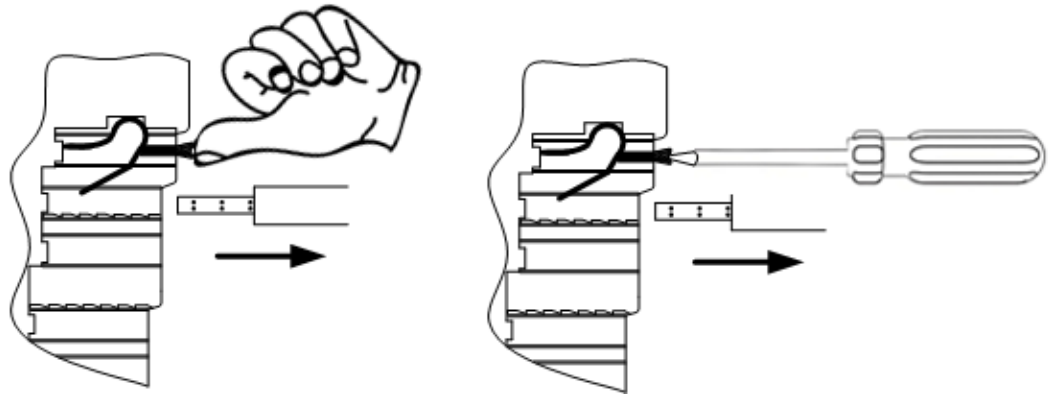
Unwiring Procedure

LT-e series modules utilize spring force technology. Pressing the release button allows easy removal of the cable from the terminal hole.

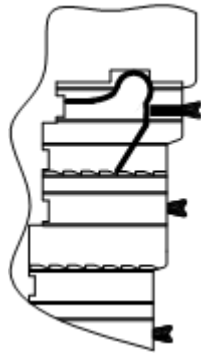
Step 1 Press the button firmly to the bottom by hand, using a flat-head screwdriver if necessary.



Step 2 While keeping the release button pressed, pull the cable out of the terminal hole.



Step 3 Release the release button.



Chapter 7 Power On/Off

7.1 Power On

Prerequisites

- Ensure the power supply voltage and frequency comply with the PLC specifications, check that the power circuit is correctly connected without disconnections, reverse connections, or short circuits
- Confirm that the environmental conditions (temperature, humidity, vibration, air cleanliness, etc.) where the PLC is located meet the equipment requirements
- If the PLC has power failure retention function, check that the battery is correctly installed and has sufficient charge

Precautions

- Check that all input/output modules are correctly installed, connections are stable, without looseness or poor contact
- Check all external wiring, including power cables, signal cables, communication cables, etc., are correctly connected according to specifications
- Ensure the PLC grounding system is correct, grounding resistance meets requirements, and avoid ground loop issues
- Confirm that the control program has been correctly loaded, and backup the latest version of the program
- Set correct communication parameters as needed, such as baud rate, data bits, stop bits, parity, etc.

Procedure



When capacitive loads exist in the system and the capacitive load power is $\geq 20\text{W}$, ensure the system power is turned on before the load power.

Step 1 Power on gradually, first ensure the switching power supply output is normal.

Step 2 Turn on the PLC system power supply switch, observe the indicator light status.

Step 3 Turn on the PLC field power supply switch, observe the indicator light status.

7.2 Power Off

Prerequisites

- Ensure the machine or production line controlled by the PLC has completed its current work cycle to avoid sudden power loss during operation.
- Safely stop the machine or production line according to the safety procedure.
- Notify all relevant personnel of the power-off plan to ensure no one is working in hazardous areas during the power-off period.

- Ensure all programs and data have been saved to prevent data loss due to power failure.
- Confirm that all external devices connected to the PLC (such as sensors, actuators, etc.) are in a safe state.

Precautions

- Back up important programs and data in the PLC before powering off.
- After powering off, appropriately label the PLC and related equipment to prevent misoperation.

Procedure

Perform the power-off sequence correctly, typically starting from the load end, followed by the field power supply, and finally the system power supply, disconnecting the power step by step.

Chapter 8 Configuration Operation

8.1 LT Intelligent Tool Configuration Operations

The LT-e series products are distributed I/O. In scenarios lacking a controller, they support connection to a local PC via Type-C and using the LT Intelligent Tool to perform the following operations on all modules:

- **Parameter Configuration:** Modify all configurable parameters of the module, changes take effect immediately; view configuration information of each module.
- **Diagnostics and Debugging:** Real-time acquisition of module diagnostic information and channel diagnostic information; read channel values of the module; write channel values to the module.
- **Firmware Update:** Update (upgrade/downgrade) the firmware of each module; read module information, firmware version information, module production information, etc.; support generating reports from the above information.
- **Read Logs:** Support log reading, logs use non-plaintext encoding.

8.1.1 Connecting to Coupler

Before downloading configuration parameters or reading information from the coupler and I/O modules via a PC, ensure that the PC and coupler are in a connected state.

Prerequisites

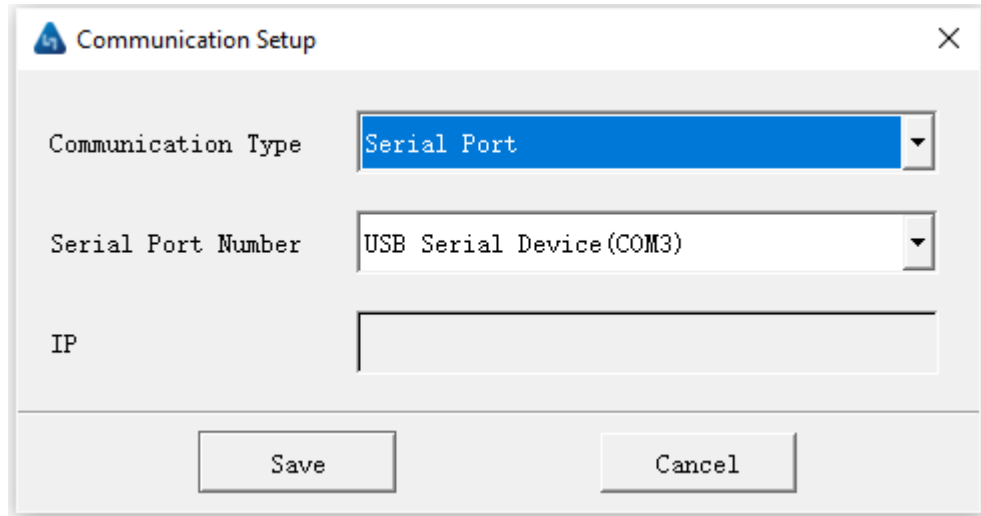
- The PC and coupler are physically connected via a Type-C cable.
- The coupler is powered on.

Procedure

Step 1 In the software interface menu bar, select "Setting > Communication Settings".

Step 2 In the pop-up dialog box, configure the following parameters.

- **Communication Type:** Currently only supports serial communication, i.e., Type-C communication
- **Serial Port Number:** Select the PC serial port number connected to the coupler from the dropdown list
- **IP:** Configurable for Ethernet communication, currently not supported

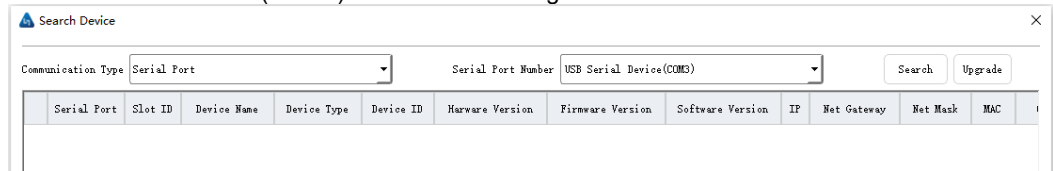


Step 3 Click "Save".

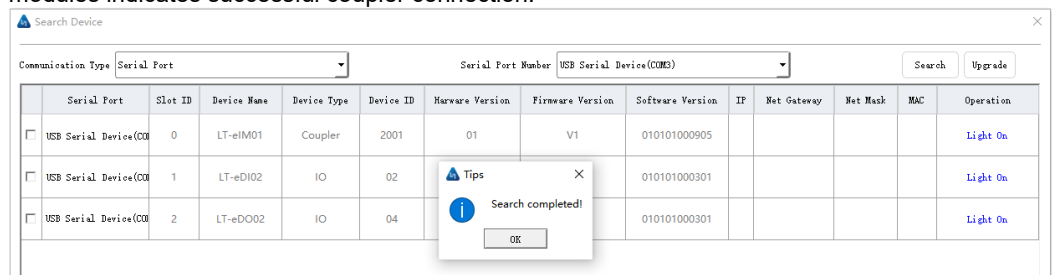
Step 4 In the menu bar, select "Edit > Search Devices".

Step 5 In the pop-up dialog box, configure the following parameters and click "Search".

- Communication Type: Select "Serial Port"
- Serial Port Number: Select according to the connected local PC's USB port, for example, select "USB Serial Device (COM3)" as shown in the figure below



Step 6 The software automatically searches for the coupler and I/O modules. Successful recognition of the modules indicates successful coupler connection.



8.1.2 Adding Hardware

Add the actual field hardware topology in the software to ensure the hardware added in the software matches the actual field situation; otherwise, configuration information cannot be downloaded correctly.

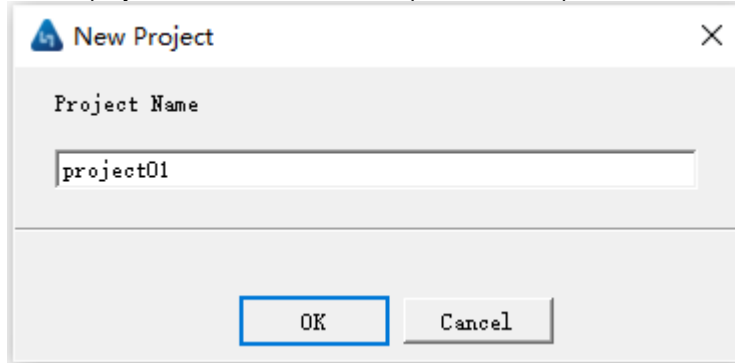
Procedure



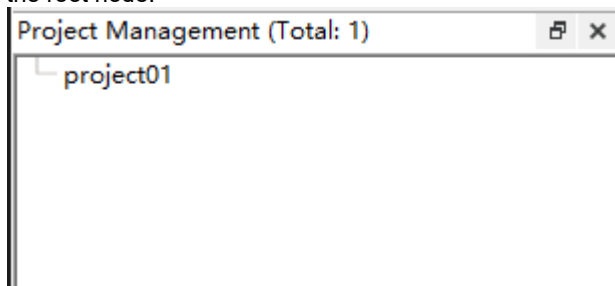
The LT-e series of distributed I/O products are divided into two types of hardware: support conformal coating and not support conformal coating (refer to the [Naming Convention](#) chapter to confirm whether a module supports conformal coating). However, there is no distinction in software configuration, simply operate according to the module model.

Step 1 The LT Intelligent Tool software manages couplers and I/O modules via a project navigation tree. Before adding hardware, a project must be created.

1. In the software menu bar, select "Project > New Project".
2. In the pop-up interface, enter the project name and click "OK".
 - The project name cannot exceed 32 characters, uses UTF-8 encoding, and one Chinese character occupies a length of 1
 - The project name cannot be the same as existing project names in the current workspace
 - The project name cannot contain spaces or the special characters "\:|*?<>"

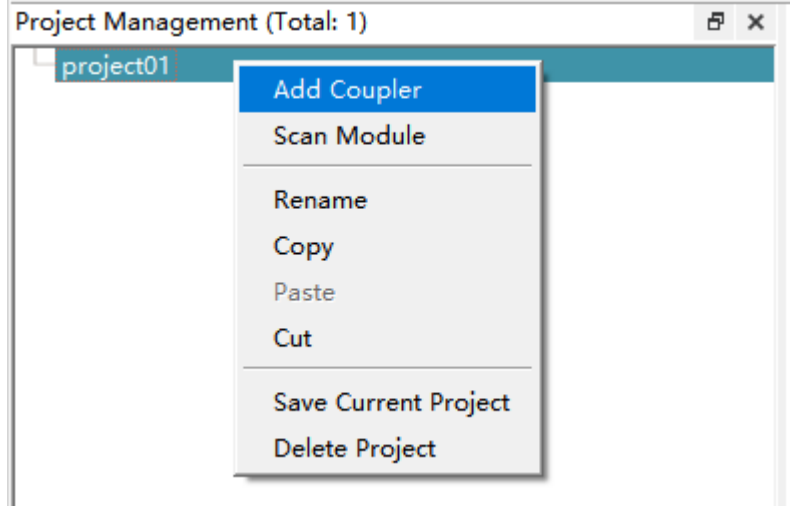


3. In the left project management area, you can see the navigation tree with the project name as the root node.

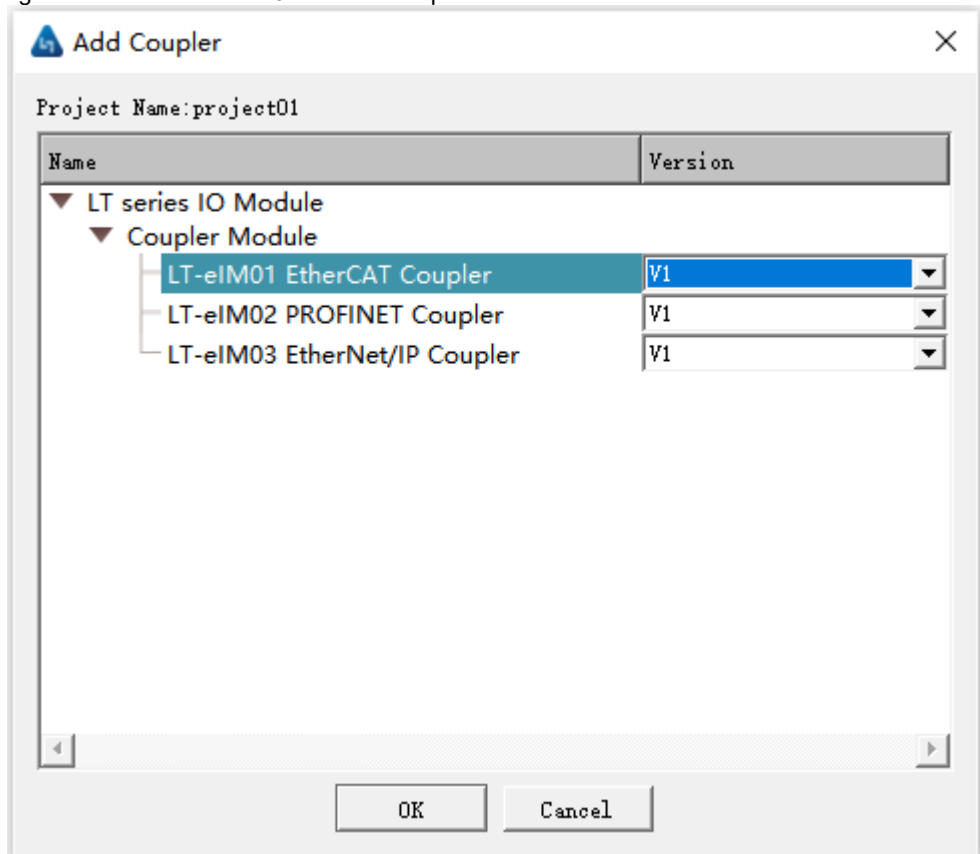


Step 2 Configuration parameters for all LT-e series I/O modules are distributed via the coupler. Therefore, add the coupler module first.

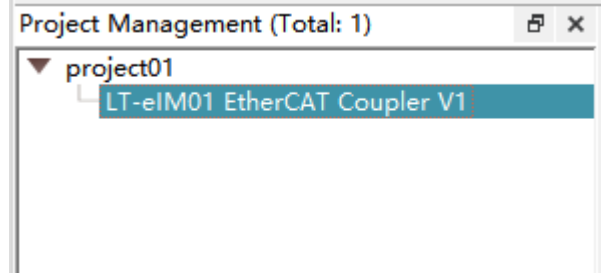
1. Right-click the created project and select "Add Coupler".



2. In the pop-up interface, select the coupler and version according to the actual situation. The figure below uses LT-eIM01 as an example.

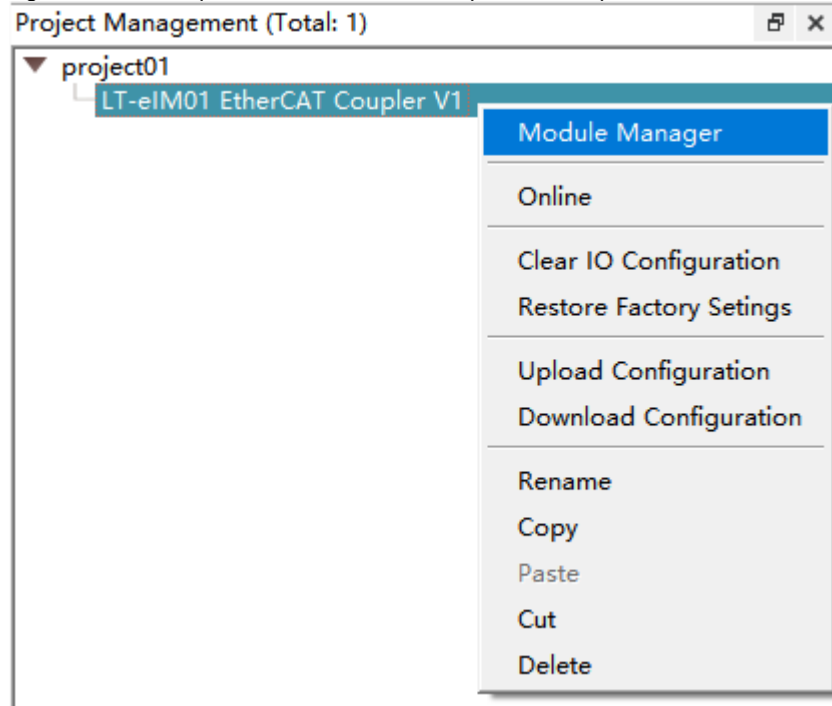


3. Click "OK", and you can see the coupler has been added under the project node.



Step 3 Add I/O modules according to the actual topology.

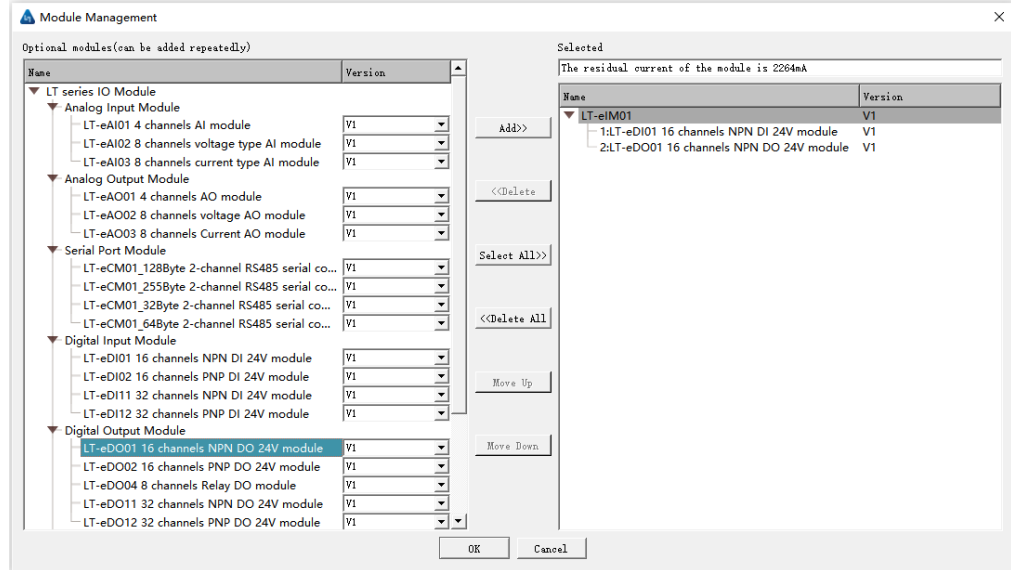
1. Right-click the coupler module added in the previous step and select "Module Manager".



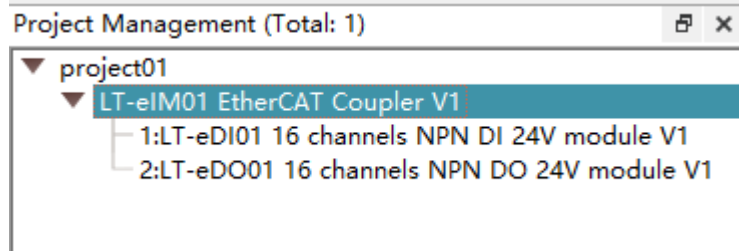
2. In the pop-up dialog box, add I/O modules according to the actual topology structure. The left side is the "Optional modules" list, and the right side is the "Selected" list.
3. Add all I/O modules sequentially according to the actual topology. The order of addition must be consistent with the actual topology; otherwise, communication abnormalities may occur.



Double-click a module in the right "Selected" area to remove it from the "Selected" list.



- Click "OK", and you can see the selected I/O modules have been added under the coupler node.



8.1.3 Configuring Parameters

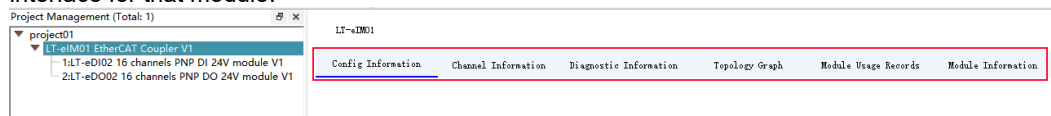
Configure module parameters, channel parameters, ranges, etc., according to the actual usage scenario to ensure the modules operate according to the intended design.

Prerequisites

Hardware addition has been completed.

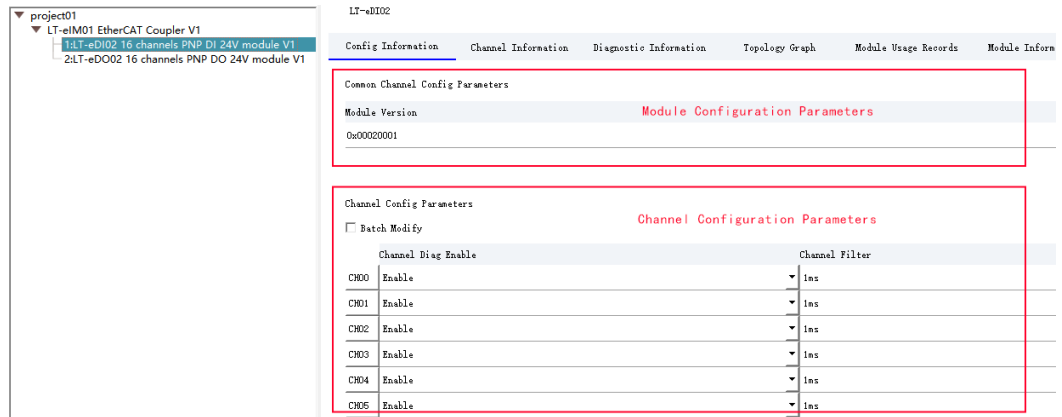
Procedure

- Step 1 In the software interface, click on the module (either coupler or I/O module) that needs configuration in the left navigation tree. The right workspace will display the corresponding configuration interface for that module.



- Step 2 Taking the LT-eDI02 module as an example, click on this module. The right workspace defaults to showing the "Config Information" tab. Configuration parameters include "Module Configuration Parameters" and "Channel Configuration Parameters". For detailed information on the

configuration parameters supported by each module, including parameter meanings, value ranges, etc., please refer to the "Configuration Parameters" chapter of each module in the "Device Details".



Common Channel Config Parameters	
Module Version	Module Configuration Parameters
0x0020001	

Channel Config Parameters	
☐ Batch Modify	
Channel Diag Enable	Channel Filter
CH00 Enable	▼ Ins
CH01 Enable	▼ Ins
CH02 Enable	▼ Ins
CH03 Enable	▼ Ins
CH04 Enable	▼ Ins
CH05 Enable	▼ Ins

Step 3 Complete parameter configuration for all modules according to the actual usage scenario. Parameters take effect automatically after configuration.

8.1.4 Downloading Configuration

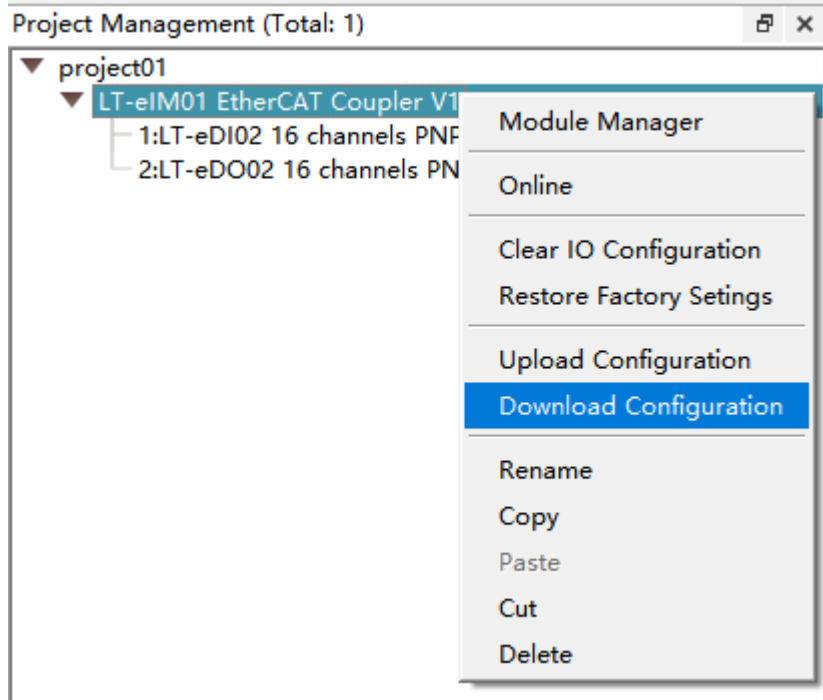
Download the module configuration parameters to the physical hardware.

Prerequisites

- The coupler is connected. For connecting the coupler, refer to the [Connecting to Coupler](#) section.
- The hardware configuration in the software completely matches the actual topology.

Procedure

Step 1 Right-click the coupler in the left navigation tree and select "Download Configuration".



Step 2 The software distributes all configuration information, and the "Output Information" window displays the distribution details.

Output Information			
Level	Date	Log Source	Content
Info	2025-11-21 17:05:00	project01	Scan module was successful
Info	2025-11-21 17:05:08	0:LT-eIM01	The online mode switch was successful
Info	2025-11-21 17:05:14	0:LT-eIM01	Non-periodic diagnostic information updated successfully
Info	2025-11-21 17:05:22	0:LT-eIM01	The offline mode switch was successful
Info	2025-11-21 17:05:27	0:LT-eIM01	Configuration downloaded successfully

8.1.5 Online Debugging

Without a controller, use the configuration software to put the LT-e series coupler and I/O modules into an online state, enabling them to function normally for data transmission and control functions. After modules are online, variables can be written or forced via the configuration software. View module channel data and diagnostic information to observe module operation in real-time.

Prerequisites

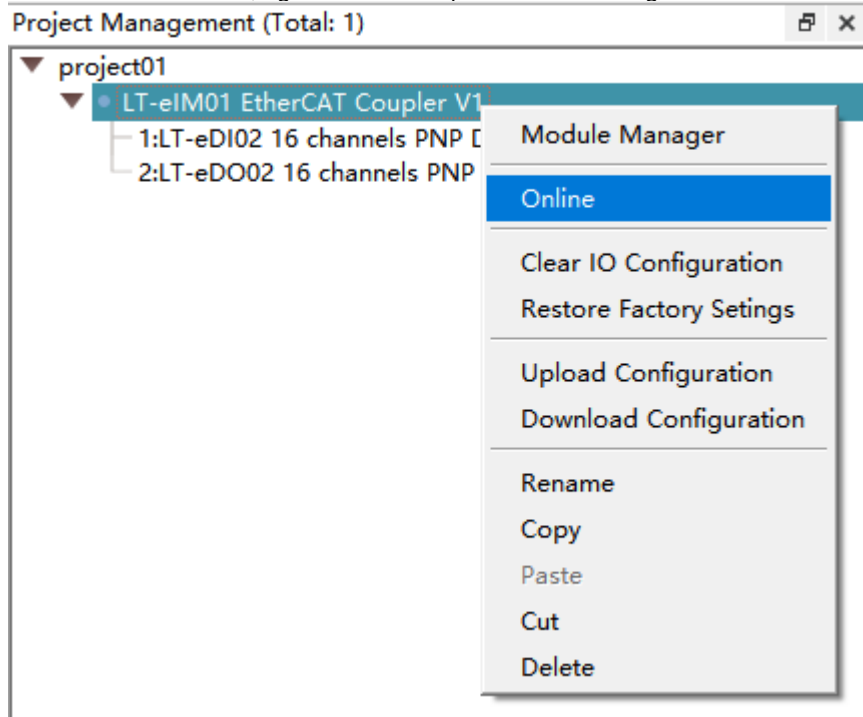
- The coupler is connected. Refer to the [Connecting to Coupler](#) section.
- The hardware configuration in the software completely matches the actual topology.

Procedure



The following steps demonstrate how to bring modules online and perform simple online debugging through a specific example. For detailed debugging functions, please refer to the "LT Intelligent Tool Usage Guide".

Step 1 In the software interface, right-click the coupler in the left navigation tree and select "Online".



Step 2 The "Output Information" window indicates successful online status.

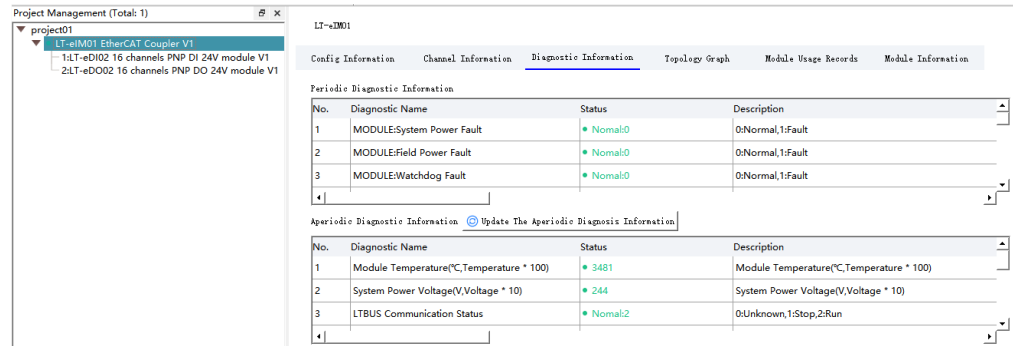
Output Information			
Level	Date	Log Source	Content
Error	2025-11-24 09:10:07	0:LT-eIM01	Failed to switch to online mode:Serial port exception
Info	2025-11-24 09:10:10	System	Serial port COM3 configured successfully
Warning	2025-11-24 09:10:12	0:LT-eIM01	The project management tree topology is different from the actual topology. Stop the online switch over!
Info	2025-11-24 09:10:22	project01	Scan module was successful
Info	2025-11-24 09:10:24	0:LT-eIM01	The online mode switch was successful

Step 3 After modules are online, view the diagnostic information of the coupler and I/O modules to determine module status.



For detailed information on the diagnostic information supported by each module, including parameter meanings and value ranges, please refer to the "Configuration Parameters" chapter of each module in the "Device Details".

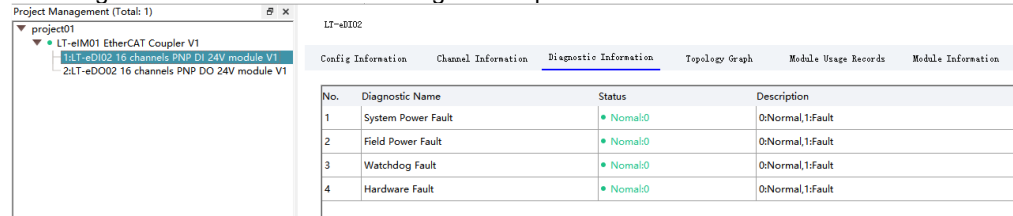
1. Taking LT-eIM01 as an example, select the LT-eIM01 module in the left navigation tree, select the "Diagnostic Information" tab in the right workspace to view the coupler's status.



- The coupler's diagnostic information is divided into cyclic diagnostics and non-cyclic diagnostics. For non-cyclic diagnostic information, click

 **Update The Aperiodic Diagnosis Information** to update manually.

- Taking LT-eDI02 as an example, select the LT-eDI02 module in the left navigation tree, select the "Diagnostic Information" tab in the right workspace to view the I/O module's status.



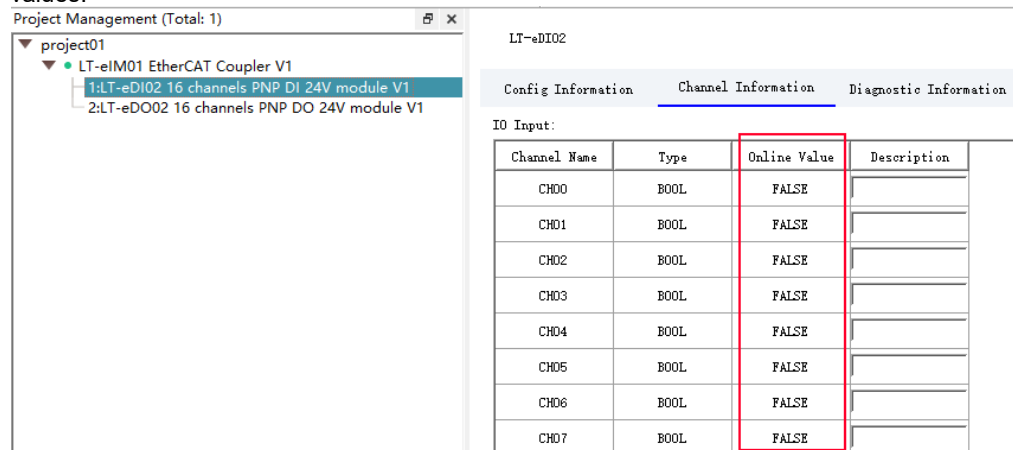
- Similarly, view the diagnostic information of any module as needed.

Step 4 View the channel information of I/O modules (coupler has no channel information) to obtain real-time module data.



For detailed information on the channel information of each module, including parameter meanings and value ranges, please refer to the "Configuration Parameters" chapter of each module in the "Device Details".

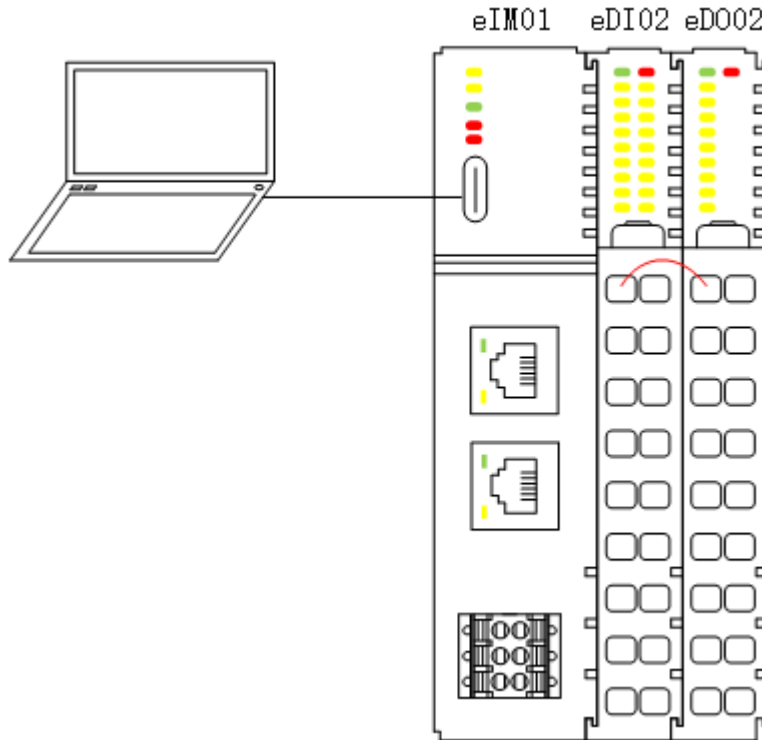
- Taking the LT-eDI02 module as an example, select the LT-eDI02 module in the left navigation tree, select the "Channel Information" tab in the right workspace to view the channel's online values.



2. Similarly, view the channel information of any module as needed.

Step 5 Online debugging. Write or force variables through the configuration software to check if the module channel inputs and outputs meet expectations.

1. Taking LT-eDO02 and LT-eDI02 as an example, connect the A0 channel of LT-eDO02 to the A0 channel of LT-eDI02. That is: use the DO02 output signal as the DI02 input signal, as shown in the figure below.



2. Check the online values of LT-eDO02's A0 channel (Channel 00) and LT-eDI02's A0 channel (Channel 00), both are FALSE.

LT-eDO02

Config Information	Channel Information	Diagnostic Information
--------------------	---------------------	------------------------

IO Output:

Channel Name	Type	Online Value	Description
CH00	BOOL	FALSE	
CH01	BOOL	FALSE	
CH02	BOOL	FALSE	
CH03	BOOL	FALSE	

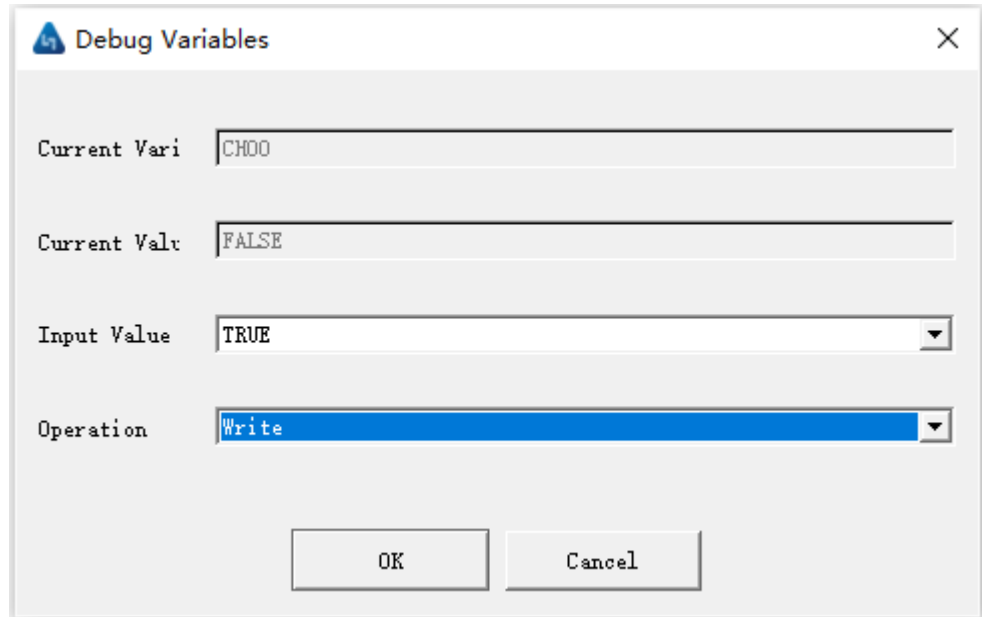
LT-eDI02

Config Information	Channel Information	Diagnostic Information
--------------------	---------------------	------------------------

IO Input:

Channel Name	Type	Online Value	Description
CH00	BOOL	FALSE	
CH01	BOOL	FALSE	
CH02	BOOL	FALSE	
CH03	BOOL	FALSE	

3. In the LT-eDO02 "Channel Information" tab, double-click Channel 00. In the pop-up "Debug Variables" Window, set the Input Value to "TRUE", select "Write" for the Operation, and click "OK".



Debug Variables

Current Vari: CH00

Current Valu: FALSE

Input Value: TRUE

Operation: Write

OK Cancel

4. Check the online values of LT-eDO02's A0 channel (Channel 00) and LT-eDI02's A0 channel (Channel 00) again; both have changed to TRUE.

LT-eDO02

Config Information	Channel Information	Diagnostic Information	
IO Output:			
Channel Name	Type	Online Value	Description
CH00	BOOL	TRUE	
CH01	BOOL	FALSE	
CH02	BOOL	FALSE	
CH03	BOOL	FALSE	

LT-eDI02

Config Information	Channel Information	Diagnostic Information	
IO Input:			
Channel Name	Type	Online Value	Description
CH00	BOOL	TRUE	
CH01	BOOL	FALSE	
CH02	BOOL	FALSE	
CH03	BOOL	FALSE	

Step 6 In the software interface, right-click the coupler in the left navigation tree and select "Offline" to exit online mode.

8.1.6 Firmware Upgrade

Firmware is software stored in a hardware device, which is responsible for controlling the operations of the hardware device. Firmware upgrades are typically used to fix known issues, add new features, improve performance, and ensure compatibility between the coupler and software or hardware.

Prerequisites

- The coupler is connected. For connecting the coupler, refer to the [Connecting to Coupler](#) chapter. The length of the Type-C cable connecting the PC and the coupler must be less than 2m, otherwise it may cause firmware upgrade failure.
- The firmware version file required for the upgrade (the .bin file with the keyword "App" in its name) is ready.

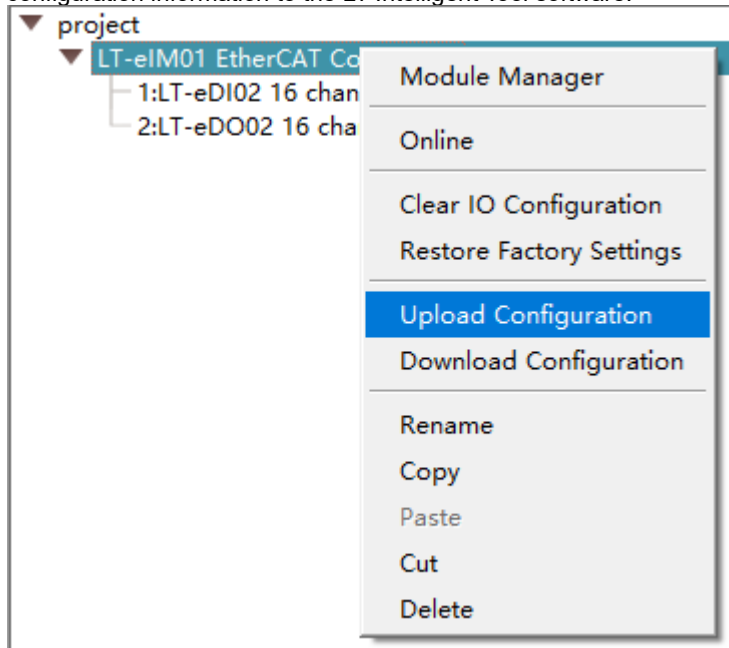
Procedure



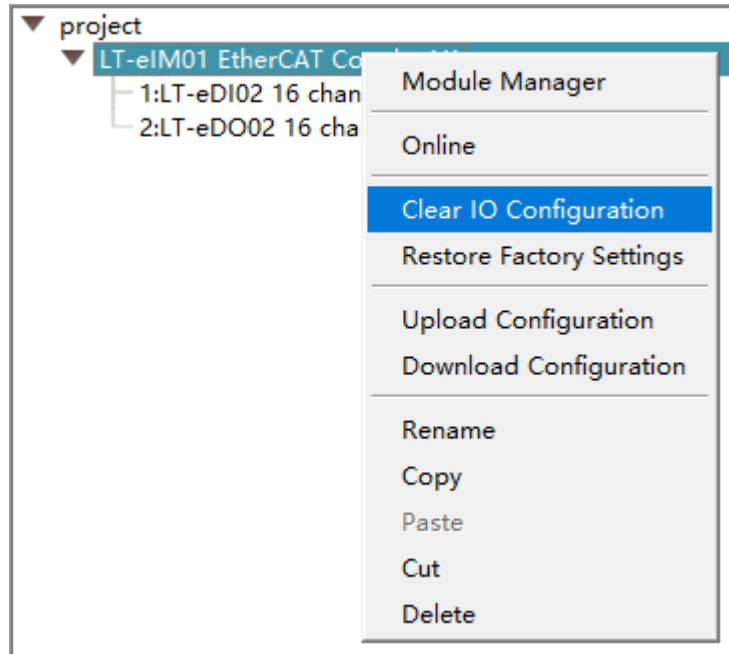
- The LT-eIM02 module has two firmware version files. Both must be upgraded during the upgrade process, with no specific order required.
- Communication between the coupler and the PLC must be disconnected before the upgrade (e.g., disconnect the network cable).
- When upgrading the firmware of the LT-eAO01 module, ensure that the field power supply is normal. Other modules do not have this restriction.
- During the upgrade process, do not perform operations such as power off, unplugging the USB cable, or closing the software.

Step 1 Clear the configuration information of the I/O modules.

1. (Optional) Right-click the coupler node and select "Upload Configuration". Before clearing the I/O module configuration information, it is recommended to upload and back up all I/O module configuration information to the LT Intelligent Tool software.



2. Right-click the coupler and select "Clear IO Configuration".

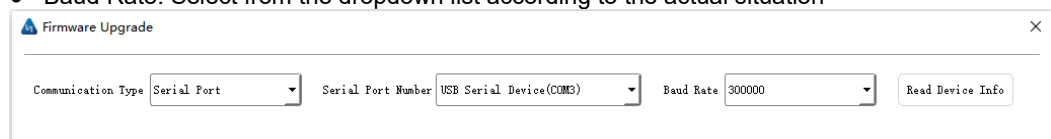


3. Power cycle the coupler module according to the on-screen prompts to make the configuration take effect.
4. (Optional) Right-click the coupler module and select "Download Configuration" to re-download the configuration information backed up in [1](#) to the I/O modules.

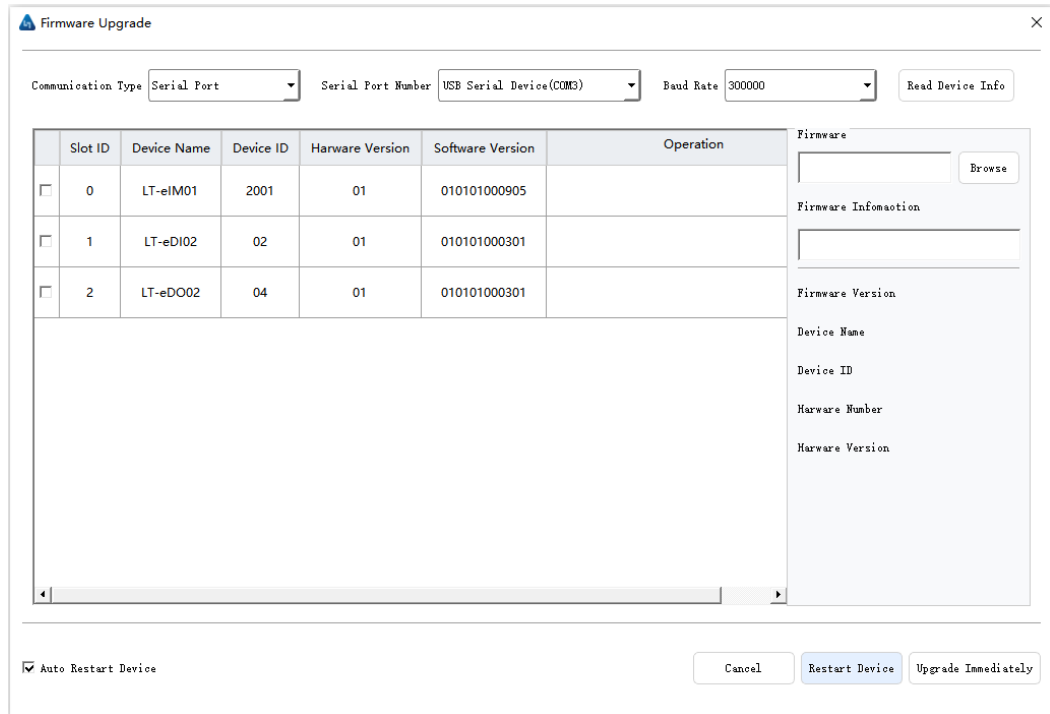
Step 2 In the software interface menu bar, select "Upgrade > Firmware Upgrade".

Step 3 In the pop-up dialog box, configure the following parameters, and click "Read Device Info".

- Communication Type: Select "Serial Port"
- Serial Port Number: Select according to the connected local PC's USB port, for example, select "USB Serial Device (COM3)" as shown in the figure below
- Baud Rate: Select from the dropdown list according to the actual situation



Step 4 The software automatically identifies the coupler and all I/O modules.



The Firmware Upgrade dialog box contains the following fields and controls:

- Communication Type: Serial Port
- Serial Port Number: USB Serial Device(COM3)
- Baud Rate: 300000
- Read Device Info button

Slot ID	Device Name	Device ID	Hardware Version	Software Version	Operation
☐	0	LT-eIM01	2001	01	010101000905
☐	1	LT-eDI02	02	01	010101000301
☐	2	LT-eDO02	04	01	010101000301

On the right side, there is a Firmware section with a text input field and a Browse button. Below this is a Firmware Information section with fields for Firmware Version, Device Name, Device ID, Hardware Number, and Hardware Version.

At the bottom, there is a checkbox for Auto Restart Device (checked), and three buttons: Cancel, Restart Device, and Upgrade Immediately.

Step 5 Check the module(s) that require firmware upgrade (for multiple module upgrades, the selected modules must be of the same model). Click "Browse" to select the firmware version file (the .bin file with the keyword "App" in its name).

Step 6 After confirming that everything is correct, click "Upgrade Immediately" and follow the on-screen prompts to complete the firmware upgrade operation.



If "Auto Restart Device" is checked, the device will restart automatically after the firmware upgrade is completed. If "Auto Restart Device" is not checked, you can click "Restart Device" to restart manually.

Step 7 After the firmware upgrade is completed, it is normal for the system to report a watchdog fault. Please power cycle the module. The fault will be automatically cleared after power cycling.

8.2 AutoThink Configuration Operations

The LT-e series products are distributed I/O systems. In addition to supporting configuration operations via the LT Intelligent Tool software without a controller, they also support configuration operations through the PLC configuration software after being connected to a PLC. Besides being compatible with Hollysys PLCs, the modules in this series can also be adapted for use with common PLCs available on the market. Their robust compatibility design enables these modules to support multiple PLC programming tools.

This section uses the Hollysys PLC main controller LX-CU500 and the independent controllable configuration software AutoThink as examples to introduce the basic operations of the LT-e series products.



The LT-e series products support AutoThink software version V3.2.3 or above.

8.2.1 Connecting to Controller

Connect to the controller via a PC, and download configuration parameters or read information for the LT-e series couplers and I/O modules through the controller.

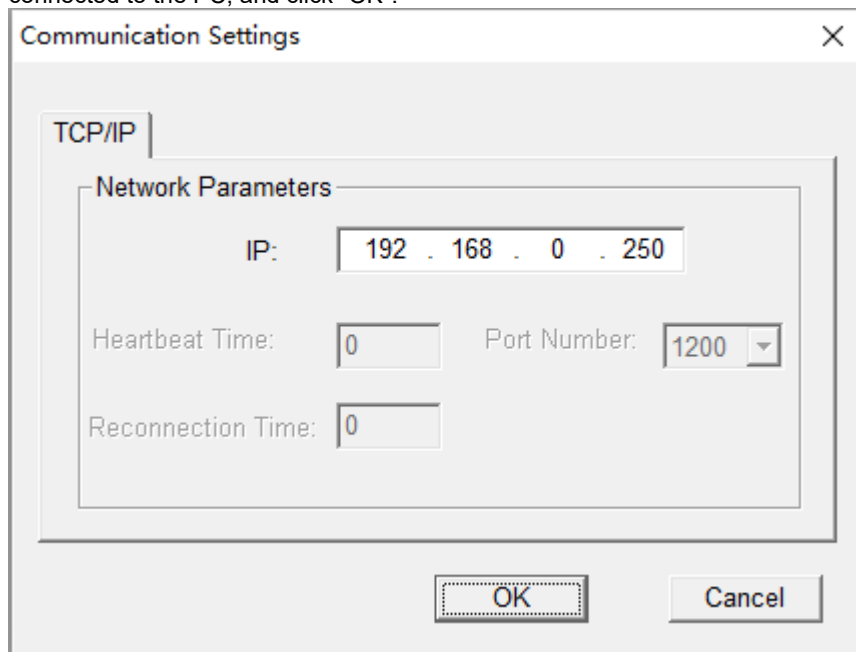
Prerequisites

- The PC and the controller are physically connected via an Ethernet cable.
- The controller is powered on.
- The IP address of the controller's Ethernet port has been obtained. For the default IP address of the controller's Ethernet port, please refer to the corresponding module manual.
- The IP address of the PC and the IP address of the controller are on the same subnet.

Procedure

Step 1 On the programming software menu bar, select "Online > Communication Settings".

Step 2 In the pop-up dialog box, set the IP address to the IP address of the controller's Ethernet port connected to the PC, and click "OK".

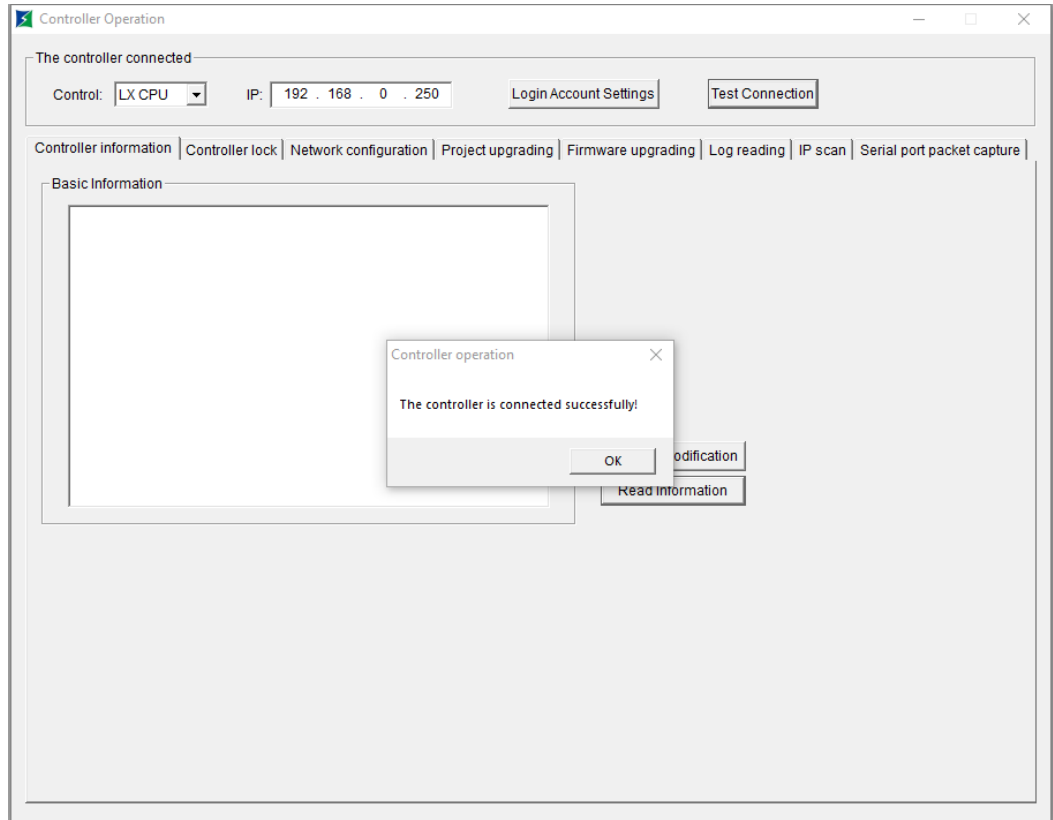


Step 3 On the menu bar, select "Tools > Assistant tool > Controller Operation".

Step 4 In the pop-up dialog box, configure the following parameters.

- Select "LX CPU" for "Control"
- Set "IP" to the IP address of the controller's Ethernet port connected to the PC

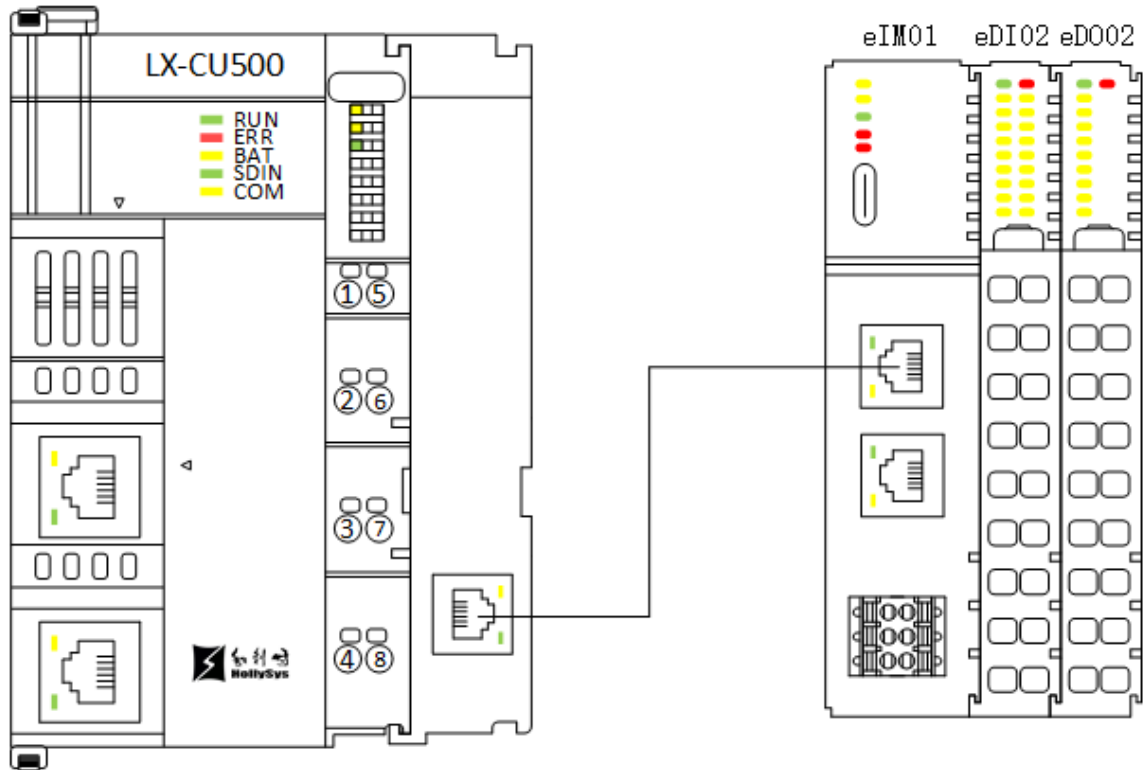
Step 5 Click "Test Connection". A successful connection prompt indicates that the controller is connected.



8.2.2 Adding Hardware

Add the actual field hardware topology in the software to ensure that the hardware added in the software matches the actual field conditions. Otherwise, the configuration information cannot be downloaded properly.

This section uses the LX-CU500 as an example. The EtherCAT network is extended through the LX end coupler module LX-IM002, and then the EtherCAT network is introduced through the LT-e series coupler module LT-eIM01. LT-e series I/O modules are mounted on the right side of the LT-eIM01 module according to the actual situation, thus realizing the topology structure between the LX series main controller and the LT-e series distributed I/O modules. The schematic diagram is as follows:



Prerequisites

The third-party device description file that needs to be imported has been prepared (The LT-eIM01 device description file is in .xml format).

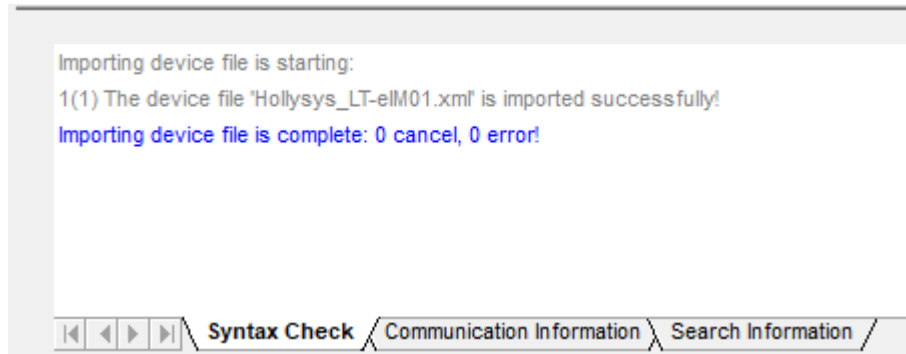
Procedure



The LT-e series of distributed I/O products are divided into two types of hardware: support conformal coating and not support conformal coating (refer to the [Naming Convention](#) chapter to confirm whether a module supports conformal coating). However, there is no distinction in software configuration, simply operate according to the module model.

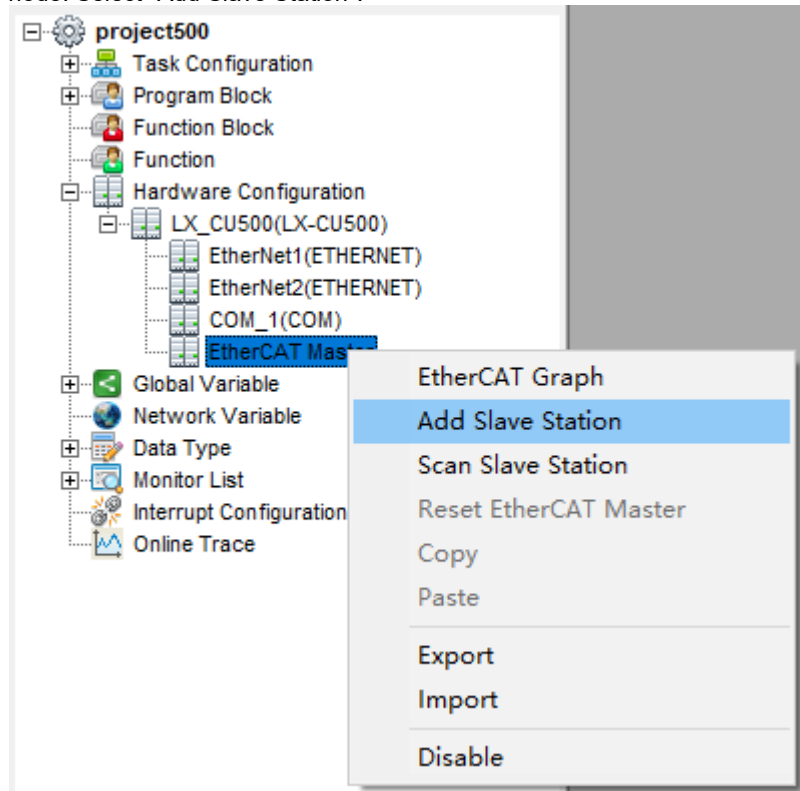
Step 1 For AutoThink software, the LT-e series modules are considered third-party devices. Before adding hardware, the device description file must be imported first.

1. In the software menu bar, select "Project > Import Device Description File".
2. In the pop-up dialog box, select the device description file corresponding to the LT-e coupler, and click "OK".
3. AutoThink prompts that the import was successful.

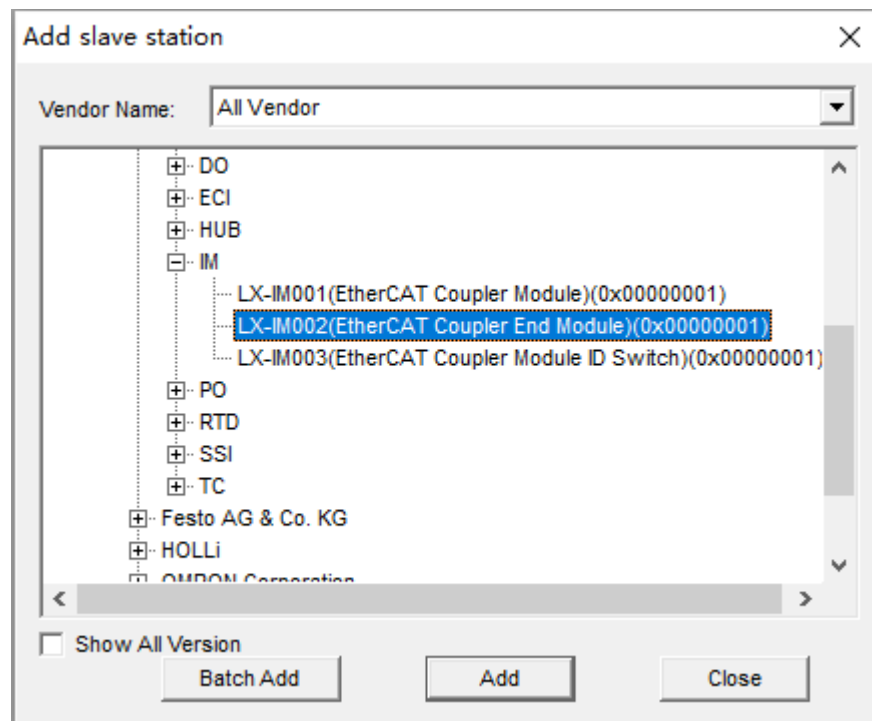


Step 2 Add the hardware on the LX-CU500 side.

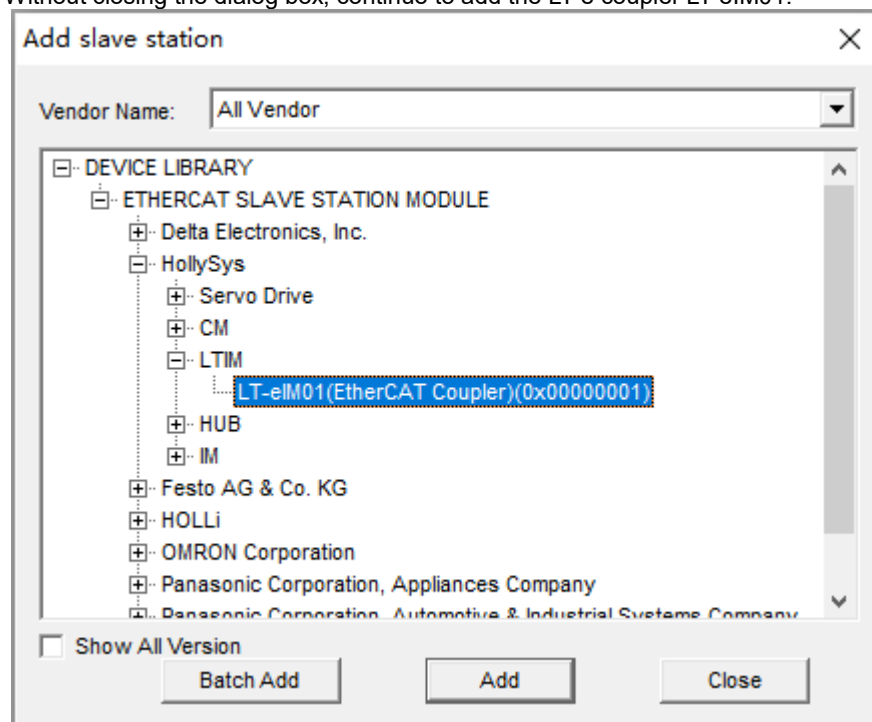
1. In the software project management area, right-click "EtherCAT Master" under the LX-CU500 node. Select "Add Slave Station".



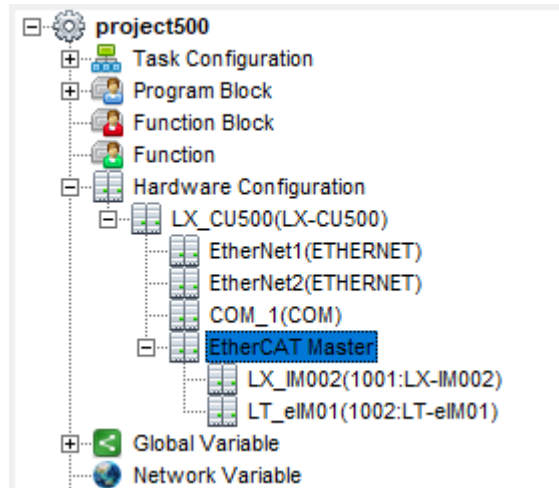
2. In the pop-up dialog box, expand the list sequentially. According to the actual topology, select the LX end coupler LX-IM002, and click "Add".



3. Without closing the dialog box, continue to add the LT-e coupler LT-eIM01.

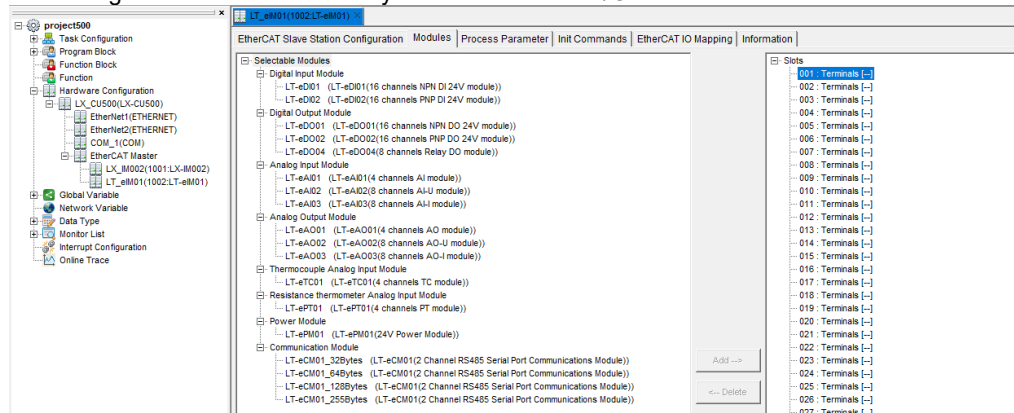


4. Close the "Add Slave Station" dialog box. In the left project management area, you can see that LX-IM002 and LT-eIM01 have been added under the LX-CU500 EtherCAT Master node.

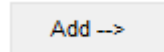


Step 3 The LT-e series distributed I/O modules cannot be added directly in AutoThink; they need to be added through the coupler LT-eIM01.

1. In the left project management area, double-click the LT-eIM01 node.
2. The "EtherCAT Slave Station Configuration" tab is for EtherCAT communication configuration. For detailed configuration operations, please refer to the LX series manuals "Communication Manual for LX Series Programmable Logic Controllers" and "Programming Manual for LX Series Programmable Logic Controllers".
3. Click the "Modules" tab. The left side of the tab displays the selectable LT-e series I/O modules, and the right side shows the already added LT-e series I/O modules.



4. In the left "Selectable Modules" list, select the I/O module to be added, for example: LT-eDI01; in the right "Slots" area, select the slot number to add it to, for example: 001, click

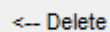


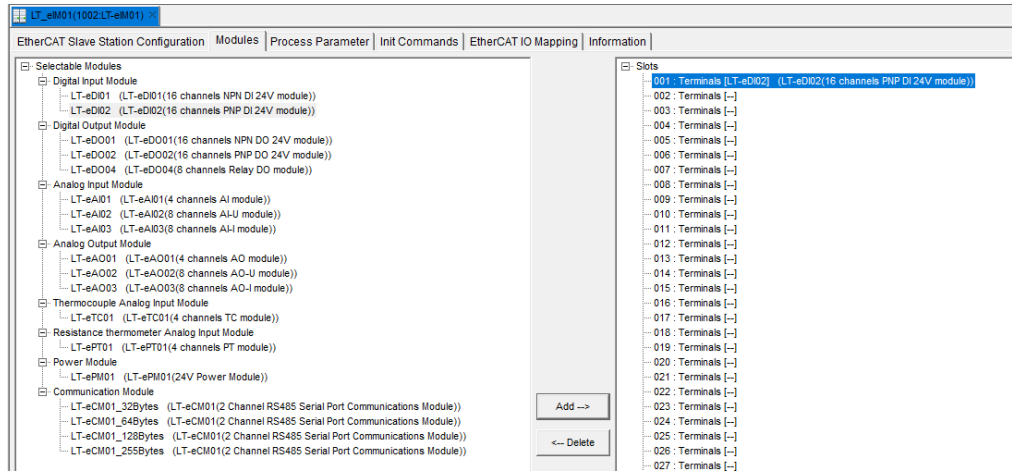
, the selected module will be added to the specified slot number.



- If a module already exists on the selected slot number, it will be overwritten.

- To delete a module in the "Slots" area, select the module and click





5. According to the actual topology, add all I/O modules sequentially. The addition order must be consistent with the actual topology, otherwise communication abnormalities may occur.

8.2.3 Configuring Parameters

Configure module parameters, channel parameters, ranges, etc., according to the actual usage scenario to ensure the modules operate according to the established design requirements.

Prerequisites

Hardware addition has been completed.

Procedure



The following example operation demonstrates parameter configuration for the LT-e series coupler and I/O modules. For other configuration operations (such as EtherCAT communication configuration), please refer to the LX Series Manuals: "Communication Manual for LX Series Programmable Logic Controllers" and "Programming Manual for LX Series Programmable Logic Controllers".

- Step 1 In the Project Management area on the left, double-click the LT-eIM01 node to open the module details.
- Step 2 Click the "Init Commands" tab. As shown in the figure below, the meaning of the parameters in each row is as follows:
 - The first three rows are system default parameters and cannot be modified.
 - Coupler Setting is the coupler configuration parameter.
 - Module Setting is the I/O module configuration parameter. Each Module Setting corresponds to an index. After querying the slot corresponding to the index in [Table 1](#), you can obtain the corresponding module model in the "Modules" tab.

LT_eM01(1002-LT-eM01)				
EtherCAT Slave Station Configuration Modules Process Parameter Init Commands EtherCAT IO Mapping Information				
Transition	Protocol	Index	Data	Comment
<PS>	CoE	0x1C12:00	0x01000616	download pdo 0x1C12 index
<PS>	CoE	0x1C13:00	0x0700801B811B821B001A011A02...	download pdo 0x1C13 index
<PS>	CoE	0xF030:00	0x02 00 02 00 00 20 04 00 00 20	download slot cfg
PS	CoE	0xF800:00	0x02000100012000000000	Coupler Setting
PS	CoE	0x8000:00	0x2100010002000100000000400000...	Module Setting
PS	CoE	0x8040:00	0x1100010004000200000000200000...	Module Setting

Step 3 Configure the coupler parameters.

1. Double-click "Coupler Setting". The pop-up dialog box displays the coupler's configuration parameters.
2. Double-click the white background to modify the configuration item. Items with a gray background cannot be modified:
 - Transition: The effective period of the currently configured initialization command. No modification is needed. I: Init, initialization state; P: PreOP, establishing connection; S: SafeOP, safe mode; O: Operation, run mode.
 - Index, Sub-Index: The index identifier for the configuration parameters below. No modification is needed.
 - Fixed: When checked, it indicates that the configured parameter is a fixed value and cannot be modified during device operation.
 - CompleteAccess: Indicates the display method of the "Data". When checked, the "Data" displays the integrated value of all parameters; when unchecked, the "Data" displays the value of the selected parameter.
 - Data: Displays the integrated value of all parameters or the value of the selected parameter based on the CompleteAccess configuration. Automatically generated by the system. Do not modify.
 - Comment: The description information of the "Data". It can be modified according to the actual situation.
 - Lower parameter configuration area: The configuration parameters supported by the module. For the parameter list and detailed information such as the meaning and value range of the parameters, please refer to the "Configuration Parameters" chapter of the corresponding module in the "Device Details".

Edit CoE Init Command

Transition:

☐ I->P ☐ S->P

☒ P->S ☐ S->O

☐ S->O ☐ O->S

Index [hex]: F800 OK

Sub-Index [dec]: 0 Cancel

☐ Fixed ☒ CompleteAccess

Data [hex]: 02000100012000000000 Bit Len: User Defined

Comment: Coupler Setting

Index	Name	Parameter value[hex]	Access	Data Type
#XF800	Coupler Setting	>02<		
1	Interface Version	20010001	rw	Unsigned32
2	Device Type	General(0)	rw	Unsigned32

3. Modify the coupler's parameter configuration according to the actual scenario, and click "OK".

Step 4 Configure the I/O module parameters.

1. Double-click a "Module Setting". The pop-up dialog box is the parameter configuration window for the I/O module, which is the LT-eDI01 module in this example.
2. Similarly, double-click the white background to modify the configuration item. Items with a gray background cannot be modified. For explanations of parameters such as Transition and Index, please refer to [Step 3](#).
3. Modify the parameter configuration of the LT-eDI01 module and click "OK".
4. Click all "Module Setting" items one by one, and complete the parameter configuration for all modules according to the actual usage scenario.

Edit CoE Init Command

Transition

☐ I -> P
☒ P -> S
☐ S -> P
☐ S -> O
☐ O -> S

Index [hex]: 8000
Sub-Index [dec]: 0

☐ Fixed
☒ CompleteAccess

Data [hex]: 2100010002000100000004000000010000000400000001000000040000000100000000
Bit Len: User Defined

Comment: Module Setting

Index	Name	Parameter value[hex]	Access	Data Type
#X8000	Module Setting	>21<		
1	Module Version	00020001	rw	Unsigned32
2	Channel 00 Diag Enable	Enable(1)	rw	Unsigned32
3	Channel 00 Channel Filter	1ms(4)	rw	Unsigned32
4	Channel 01 Diag Enable	Enable(1)	rw	Unsigned32
5	Channel 01 Channel Filter	1ms(4)	rw	Unsigned32
6	Channel 02 Diag Enable	Enable(1)	rw	Unsigned32
7	Channel 02 Channel Filter	1ms(4)	rw	Unsigned32
8	Channel 03 Diag Enable	Enable(1)	rw	Unsigned32

Reference Information

Table 1 Slots and Index Correspondence

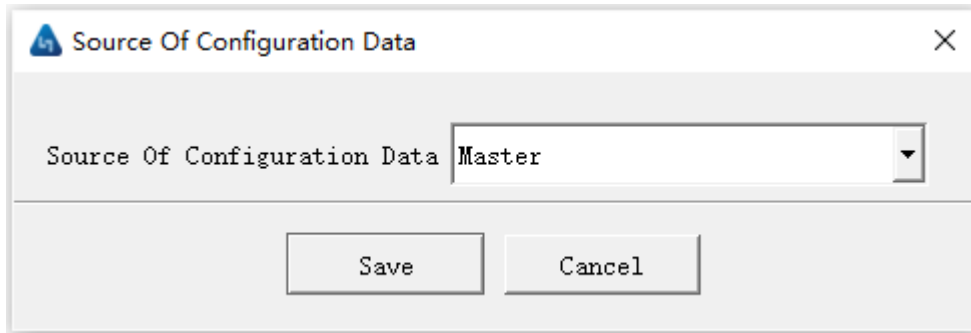
Slots	Index	Slots	Index	Slots	Index	Slots	Index
001	0x8000	017	0x8400	033	0x8800	049	0x8C00
002	0x8040	018	0x8440	034	0x8840	050	0x8C40
003	0x8080	019	0x8480	035	0x8880	051	0x8C80
004	0x80C0	020	0x84C0	036	0x88C0	052	0x8CC0
005	0x8100	021	0x8500	037	0x8900	053	0x8D00
006	0x8140	022	0x8540	038	0x8940	054	0x8D40
007	0x8180	023	0x8580	039	0x8980	055	0x8D80
008	0x81C0	024	0x85C0	040	0x89C0	056	0x8DC0
009	0x8200	025	0x8600	041	0x8A00	057	0x8E00
010	0x8240	026	0x8640	042	0x8A40	058	0x8E40
011	0x8280	027	0x8680	043	0x8A80	059	0x8E80
012	0x82C0	028	0x86C0	044	0x8AC0	060	0x8EC0
013	0x8300	029	0x8700	045	0x8B00	061	0x8F00
014	0x8340	030	0x8740	046	0x8B40	062	0x8F40
015	0x8380	031	0x8780	047	0x8B80	063	0x8F80
016	0x83C0	032	0x87C0	048	0x8BC0	064	0x8FC0

8.2.4 Downloading Configuration

Download the configuration parameters to the physical hardware of the LT-e series modules through the PLC controller.

Prerequisites

- The controller is connected. For connecting the controller, please refer to the [Connecting to Controller](#) chapter.
- The hardware configuration in the software completely matches the actual topology structure.
- The parameter configuration source of the LT-e coupler has been configured as the master station. Checking this configuration requires using the LT Intelligent Tool software. The specific checking method is as follows:
 1. Connect the LT-e coupler to the local PC via a Type-C cable, and power on the LT-e coupler. For detailed operations, please refer to [LT Intelligent Tool Configuration Operations](#) chapter's [Connecting to Coupler](#).
 2. On the LT Intelligent Tool software interface, add a project and add LT-e modules based on the actual topology.
 3. Right-click the coupler in the left navigation tree and select "Online".
 4. After the modules are online, choose "Online > Param Source" from the menu bar.
 5. In the pop-up dialog box, check if the parameter configuration source is "Master". If not, configure it to "Master" and click "Save".



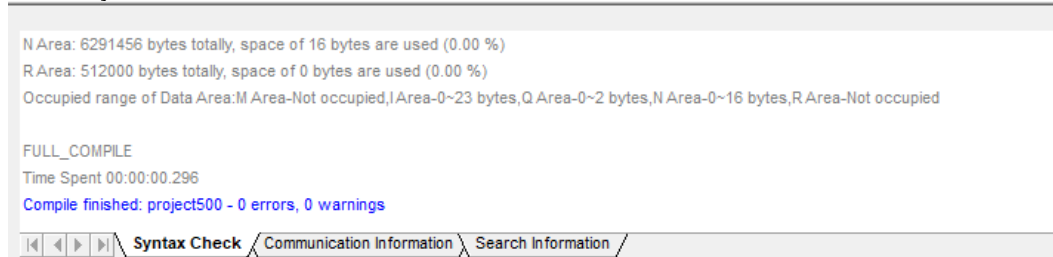
6. Disconnect the LT-e coupler from the local PC and close the LT Intelligent Tool software.

Procedure



Downloading the LT-e series configuration information through the PLC controller means performing a download operation. The following steps are only a simple operation example. For more detailed download operations, please refer to the "Programming Manual for LX Series Programmable Logic Controllers".

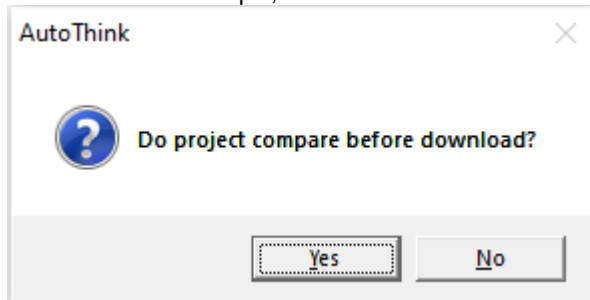
- Step 1 In the AutoThink software interface, select "Project > Compile" in the menu bar to ensure the project has no syntax errors.



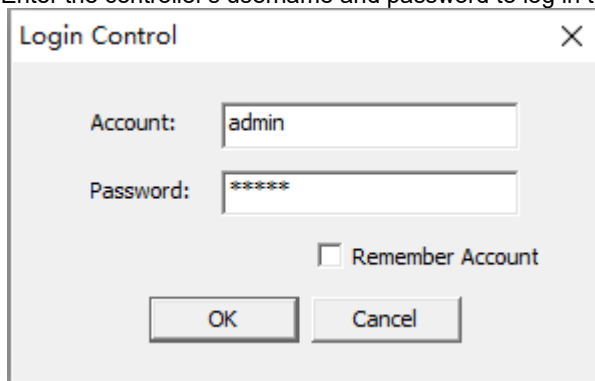
- Step 2 Select "Online > Download" in the menu bar.

1. The interface prompts whether to compare the controller project, i.e., compare the current

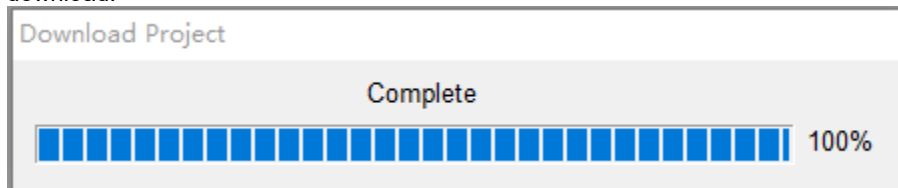
project in the software with the original project in the controller. Choose according to the actual situation. In this example, click "No".



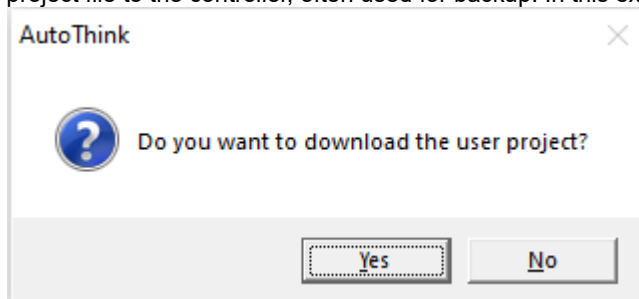
2. Enter the controller's username and password to log in to the controller, and click "OK".



3. According to the interface prompts, confirm the information is correct and complete the download.



4. The interface prompts whether to download the user project, i.e., copy a copy of the current project file to the controller, often used for backup. In this example, click "No".



8.2.5 Online Debugging

After bringing the controller and LT-e series modules online via the PLC programming software, you can

write/force variables, view module channel data and diagnostic information, and observe the module operation status in real-time.

Prerequisites

- The controller is connected. For connecting the controller, please refer to the [Connecting to Controller](#) chapter.
- The hardware configuration in the software completely matches the actual topology.

Procedure



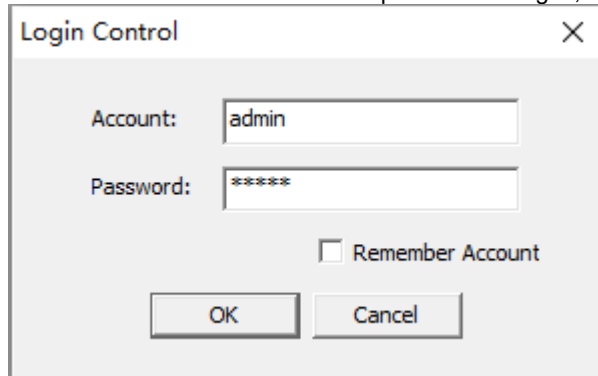
The following steps illustrate how to bring modules online and perform simple online debugging through a specific example. For detailed debugging functions, please refer to the "Programming Manual for LX Series Programmable Logic Controllers".

Step 1 On the menu bar, select "Online > Monitor".



If the "Online > Monitor" button is grayed out, please refer to the [Downloading Configuration](#) section to re-download the configuration information, then select "Online > Monitor".

Step 2 Enter the controller's username and password to log in, and click "OK".



Step 3 On the menu bar, select "Online > Run", and run all programs as prompted.

Step 4 After the modules are online, check the communication status on the LX-CU500 side.

1. In the Project Management area on the left, double-click the EtherCAT Master node to open its details.
2. Select the "Diagnostic Information" tab, and ensure that the "Number of configuration slave stations" equals the "Number of online slave stations". If they are not equal, it indicates a communication exception on the LX-CU500 side.

EtherCAT Master Station Configuration						
No.	Variable Name	Address	Variable Description	Variable Type	Online Value	Power Fail Safeguard
0001	StackState	%SB198608	Protocol stack state machine status co...	USINT	3	FALSE
0002	BusState	%SB198609	Bus status code	USINT	1	FALSE
0003	CfgSlaveNum	%SB198610	Number of configuration slave stations	UNT	2	FALSE
0004	ActiveSlaveNum	%SB198612	Number of activation slave stations	UNT	2	FALSE
0005	OnlineSlaveNum	%SB198614	Number of online slave stations	UNT	2	FALSE
0006	StackReady	%SB198616	Protocol stack ready state	USINT	1	FALSE
0007	StackRunning	%SB198617	Protocol stack operation state	USINT	1	FALSE
0008	StackCommunication	%SB198618	Protocol stack communication status	USINT	1	FALSE
0009	StackError	%SD198620	Protocol stack error code	UDINT	0	FALSE
0010	StackSubError	%SD198624	Protocol stack sub error code	UDINT	0	FALSE
0011	StackErrorState	%SD198628	Protocol stack error state	UDINT	0	FALSE
0012	StackCycPollError	%SD198632	Protocol stack cycle access error stati...	UDINT	0	FALSE
0013	StackAcycPollError	%SD198636	Protocol stack acyclic access error st...	UDINT	0	FALSE
0014	SlaveState	%SB198640	Slave station status code	ARRAY[0..29...		FALSE
0015	ReservedDiagArea	%SD198640	Reserved diagnostic area	ARRAY[0..39...		FALSE

Step 5 Check the diagnostic information on the LT-e side to determine the module status.



For detailed information on the diagnostic information supported by each module and the meaning, value range, etc., of the parameters, please refer to the "Configuration Parameters" chapter of each module in the "Device Details".

1. In the Project Management area on the left, double-click the LT-eIM01 node to open its details.
2. Select the "EtherCAT IO Mapping" tab. The information displayed in this tab corresponds one-to-one with the input/output data in the "Process Parameter" tab. It includes the diagnostic information and channel information of all LT-e modules (coupler and I/O modules).



For configuration operations of the "Process Parameter" tab, please refer to the LX Series Manual "Programming Manual for LX Series Programmable Logic Controllers".

EtherCAT Slave Station Configuration						
Channel Number	Channel Name	Groupname	Channel Type	Bytes	Channel Address	Online Value
1	E7_RL_1		BOOL	0.1	%X0.0	FALSE
2	E7_RL_2		BOOL	0.1	%X0.1	FALSE
3	E7_RL_3		BOOL	0.1	%X0.2	FALSE
4	E7_RL_4		BOOL	0.1	%X0.3	FALSE
5	E7_RL_5		BOOL	0.1	%X0.4	FALSE
6	E7_RL_6		BOOL	0.1	%X0.5	FALSE
7	E7_RL_7		BOOL	0.1	%X0.6	TRUE
8	E7_RL_8		BOOL	0.1	%X0.7	FALSE
9	E7_RL_9		BOOL	0.1	%X1.0	FALSE
10	E7_RL_10		BOOL	0.1	%X2.0	FALSE
11	E7_RL_11		BOOL	0.1	%X3.0	FALSE
12	E7_RL_12		BOOL	0.1	%X3.1	FALSE
13	E7_RL_13		BOOL	0.1	%X3.2	FALSE
14	E7_RL_14		BYTE	1	%B4	0
15	E7_RL_15		BYTE	1	%B5	2
16	E7_RL_16		BOOL	0.1	%X6.0	FALSE
17	E7_RL_17		BOOL	0.1	%X6.1	FALSE
18	E7_RL_18		BOOL	0.1	%X6.2	FALSE
19	E7_RL_19		BOOL	0.1	%X6.3	FALSE
20	E7_RL_20		BOOL	0.1	%X9.0	FALSE
21	E7_RL_21		BOOL	0.1	%X9.1	FALSE
22	E7_RL_22		BOOL	0.1	%X9.2	FALSE

3. Check the diagnostic information of all modules to confirm the communication status on the LT-e side.

Step 6 Online Debugging. Check if the input and output of the module channels meet expectations by writing and forcing variables.

1. Taking LT-eDO02 and LT-eDI02 as an example, connect the A0 channel of LT-eDO02 to the A0 channel of LT-eDI02. That is, let the output signal of DO02 serve as the input signal for DI02,

as shown in the figure below.



2. Check the online values of the A0 channel (Channel 00) of LT-eDO02 and the A0 channel (Channel 00) of LT-eDI02; both are FALSE.

LT_eDI01(1002.LT-eDI01) EtherCAT Master						
46	E7_IN_42	UINT	2	%IW20	0	CH00...CH17 (Terminals 1 : LT-eDI02)
47	E7_IN_43	BOOL	0.1	%D22.0	FALSE	System Power Fault (Terminals 2 : LT-eDO02)
48	E7_IN_44	BOOL	0.1	%D22.1	FALSE	Field Power Fault (Terminals 2 : LT-eDO02)
49	E7_IN_45	BOOL	0.1	%D22.2	FALSE	Watchdog Fault (Terminals 2 : LT-eDO02)
50	E7_IN_46	BOOL	0.1	%D22.3	FALSE	Hardware Fault (Terminals 2 : LT-eDO02)
51	E7_OUT_1	BOOL	0.1	%QX0.0	FALSE	CH00 (Terminals 2 : LT-eDO02)
52	E7_OUT_2	BOOL	0.1	%QX0.1	FALSE	CH01 (Terminals 2 : LT-eDO02)
53	E7_OUT_3	BOOL	0.1	%QX0.2	FALSE	CH02 (Terminals 2 : LT-eDO02)
54	E7_OUT_4	BOOL	0.1	%QX0.3	FALSE	CH03 (Terminals 2 : LT-eDO02)
55	E7_OUT_5	BOOL	0.1	%QX0.4	FALSE	CH04 (Terminals 2 : LT-eDO02)

LT_eDO1(1002-LT-eDO1) EtherCAT Master							
15	E7_IN_15	BYTE	1	%B5	2	Number Of IO Module Communication Online	
16	E7_IN_90	BOOL	0.1	%X6.0	FALSE	System Power Fault (Terminals 1 : LT-eDI02)	
17	E7_IN_91	BOOL	0.1	%X6.1	FALSE	Field Power Fault (Terminals 1 : LT-eDI02)	
18	E7_IN_92	BOOL	0.1	%X6.2	FALSE	Watchdog Fault (Terminals 1 : LT-eDI02)	
19	E7_IN_93	BOOL	0.1	%X6.3	FALSE	Hardware Fault (Terminals 1 : LT-eDI02)	
20	E7_IN_16	BOOL	0.1	%X9.0	FALSE	CH00 (Terminals 1 : LT-eDI02)	
21	E7_IN_17	BOOL	0.1	%X9.1	FALSE	CH01 (Terminals 1 : LT-eDI02)	
22	E7_IN_18	BOOL	0.1	%X9.2	FALSE	CH02 (Terminals 1 : LT-eDI02)	
23	E7_IN_19	BOOL	0.1	%X9.3	FALSE	CH03 (Terminals 1 : LT-eDI02)	
24	E7_IN_20	BOOL	0.1	%X9.4	FALSE	CH04 (Terminals 1 : LT-eDI02)	

3. Double-click Channel 00 of LT-eDO02. In the pop-up "Debug Variables" dialog, set the Input Value to "TRUE", and click "Write".

Debug Variables

Current Variable: E7_OUT_1

Current Value: FALSE

Input Value: TRUE

☐ Readback

Write

Force

Release

Debug

Undebug

Cancel

- Check the online values of the A0 channel (Channel 00) of LT-eDO02 and the A0 channel (Channel 00) of LT-eDI02 again; both have changed to TRUE.

LT_eM01(1002:LT-eM01) EtherCAT Master							
46	E7_IN_42		UINT	2	%W20	0	CH00...CH17 (Terminals 1 : LT-eDI02)
47	E7_IN_43		BOOL	0.1	%X22.0	FALSE	System Power Fault (Terminals 2 : LT-eDO02)
48	E7_IN_44		BOOL	0.1	%X22.1	FALSE	Field Power Fault (Terminals 2 : LT-eDO02)
49	E7_IN_45		BOOL	0.1	%X22.2	FALSE	Watchdog Fault (Terminals 2 : LT-eDO02)
50	E7_IN_46		BOOL	0.1	%X22.3	FALSE	Hardware Fault (Terminals 2 : LT-eDO02)
51	E7_OUT_1		BOOL	0.1	%QX0.0	TRUE	CH00 (Terminals 2 : LT-eDO02)
52	E7_OUT_2		BOOL	0.1	%QX0.1	FALSE	CH01 (Terminals 2 : LT-eDO02)
53	E7_OUT_3		BOOL	0.1	%QX0.2	FALSE	CH02 (Terminals 2 : LT-eDO02)
54	E7_OUT_4		BOOL	0.1	%QX0.3	FALSE	CH03 (Terminals 2 : LT-eDO02)
55	E7_OUT_5		BOOL	0.1	%QX0.4	FALSE	CH04 (Terminals 2 : LT-eDO02)

LT_eM01(1002:LT-eM01) EtherCAT Master							
15	E7_IN_15		BYTE	1	%B5	2	Number Of IO Module Communication Online
16	E7_IN_90		BOOL	0.1	%X6.0	FALSE	System Power Fault (Terminals 1 : LT-eDI02)
17	E7_IN_91		BOOL	0.1	%X6.1	FALSE	Field Power Fault (Terminals 1 : LT-eDI02)
18	E7_IN_92		BOOL	0.1	%X6.2	FALSE	Watchdog Fault (Terminals 1 : LT-eDI02)
19	E7_IN_93		BOOL	0.1	%X6.3	FALSE	Hardware Fault (Terminals 1 : LT-eDI02)
20	E7_IN_16		BOOL	0.1	%X9.0	TRUE	CH00 (Terminals 1 : LT-eDI02)
21	E7_IN_17		BOOL	0.1	%X9.1	FALSE	CH01 (Terminals 1 : LT-eDI02)
22	E7_IN_18		BOOL	0.1	%X9.2	FALSE	CH02 (Terminals 1 : LT-eDI02)
23	E7_IN_19		BOOL	0.1	%X9.3	FALSE	CH03 (Terminals 1 : LT-eDI02)
24	E7_IN_20		BOOL	0.1	%X9.4	FALSE	CH04 (Terminals 1 : LT-eDI02)

Step 7 On the menu bar, select "Online > Exit Monitor" to exit the online mode.

Chapter 9 Maintenance and Repair Guide

9.1 Maintenance

PLC maintenance refers to a series of maintenance tasks performed to ensure the normal operation of the equipment. On-site personnel should refer to this section to perform regular maintenance work on the equipment during use, ensuring the PLC remains in good condition and operates correctly.

Safety Precautions

- **All modules in the LT-e series do not support hot swapping. Forcibly hot swapping may cause irreversible damage to the modules.**
- Before performing maintenance, ensure the operator is in a safe environment. Please disconnect the power supply to all equipment involved in the maintenance operation to prevent electric shock or equipment damage.
- Ensure the operator has basic PLC knowledge, has received necessary training, and is familiar with the equipment and maintenance operation procedures.

Preparations Before Maintenance

- Check the external environment of the equipment to ensure there are no obstructions affecting the maintenance work or hazardous items nearby.
- Prepare the necessary tools for the operation.

Daily Inspection

- Inspect the equipment's appearance to ensure there is no obvious damage or abnormality.
- Check if terminal wires, Ethernet cables, and other connectors are secure, ensuring all connection points are free from looseness or corrosion.
- Check if power, signals, and other inputs/outputs are normal.
- Modules must be protected from heavy pressure to prevent damage.
- Modules must be protected from heavy impact to prevent component damage.
- Keep the supply voltage within the range specified in the manual to prevent internal component burnout.
- Prevent modules from getting wet to avoid internal component damage.

Periodic Maintenance

- Based on the equipment usage and environmental conditions, combined with the actual situation on site, establish a reasonable maintenance plan and perform maintenance according to the plan.
- Clean the equipment regularly to remove dust, oil stains, etc.
- If moving equipment exists, lubricate the moving parts regularly to maintain their normal operation.
- Regularly inspect and replace wearing parts, such as: terminal blocks, seals, etc.

9.2 Repair

Repair involves replacement or factory return operations when issues occur with PLC equipment or

components. When problems arise during equipment use, please refer to this section for repairing procedures.

Coupler and Other I/O Module Maintenance

When issues occur with LT-e series couplers and I/O modules, customer self-repair is not supported. All such cases require factory return for repair. Before returning to the factory, you can refer to the following steps for preliminary diagnosis and information collection:

- Step 1 Check the PLC diagnostic information in the configuration software to examine the PLC's operating status and fault conditions.
- Step 2 Preliminary determination of the fault cause and potentially involved modules or components based on the fault condition.
- Step 3 Record the phenomena when the module or component fails. If necessary, back up fault information, operation logs, or user programs to facilitate subsequent problem localization.
- Step 4 Remove the damaged module or component. For removal operations, please refer to the [Disassembling Modules](#) and [Replacing Module Wiring Terminals](#) chapters.
- Step 5 Return the damaged module or component to the factory for repair. When returning, please simultaneously inform the fault phenomena and provide backup data.

Follow-up Operations:

After the module repair is completed, reinstall it into the system, restart the PLC, and check whether its operating status and functions are normal. Check the PLC diagnostic information in the configuration software to verify the repair results and ensure the fault has been eliminated.

Chapter 10 Appendix

10.1 Hardware Material Code

Model	Material Name	Material Code
LT-eIM01	EtherCAT Coupler Module	3200269742
LT-eIM02	ProfiNet Coupler Module	3200269743
LT-eIM03	EtherNet/IP Coupler Module	3200269744
LT-eCM01	2-Channel RS485 Serial Communication Module	3200298879
LT-eDI01	16-Channel NPN 24VDC Digital Input Module	3200269745
LT-eDI02	16-Channel PNP 24VDC Digital Input Module	3200269746
LT-eDI11	32-Channel NPN Digital Input Module	3200305910
LT-eDI12	32-Channel PNP Digital Input Module	3200306521
LT-eDO01	16-Channel NPN Digital Output Module	3200269747
LT-eDO02	16-Channel PNP Digital Output Module	3200269748
LT-eDO04	8-Channel Digital Output Module	3200269749
LT-eDO11	32-Channel NPN Digital Output Module	3200306522
LT-eDO12	32-Channel PNP Digital Output Module	3200306523
LT-eIO01	8-Channel NPN Digital Input/Output Hybrid Module	3200299289
LT-eIO02	8-Channel PNP Digital Input/Output Hybrid Module	3200299290
LT-eIO11	16-Channel NPN Digital Input/Output Hybrid Module	3200299291
LT-eIO12	16-Channel PNP Digital Input/Output Hybrid Module	3200299292
LT-eAI01	4-Channel Voltage/Current Analog Input Module	3200269750
LT-eAI02	8-Channel Voltage Analog Input Module	3200298875
LT-eAI03	8-Channel Current Analog Input Module	3200298876
LT-eAO01	4-Channel Voltage/Current Analog Output Module	3200270121
LT-eAO02	8-Channel Voltage Analog Output Module	3200298877
LT-eAO03	8-Channel Current Analog Output Module	3200298878
LT-ePT01	4-Channel RTD Analog Input Module	3200270122
LT-eTC01	4-Channel Thermocouple Analog Input Module	3200270123
LT-ePM01	Power Extension Module	3200270124
LT-eEP01	Terminal Module	3200270125
LT-eEP02	Terminal Resistor End Cover	3200282826
LT-eIM01-P	EtherCAT Coupler Module(support conformal coating)	3200309639
LT-eIM02-P	ProfiNet Coupler Module(support conformal coating)	3200309640
LT-eIM03-P	EtherNet/IP Coupler Module(support conformal coating)	3200309641
LT-eCM01-P	2-Channel RS485 Serial Communication Module(support conformal coating)	3200311382
LT-eDI01-P	16-Channel NPN 24VDC Digital Input Module(support conformal coating)	3200309633
LT-eDI02-P	16-Channel PNP 24VDC Digital Input Module(support conformal coating)	3200309634
LT-eDI11-P	32-Channel NPN Digital Input Module(support conformal coating)	3200311383
LT-eDI12-P	32-Channel PNP Digital Input Module(support conformal coating)	3200311384
LT-eDO01-P	16-Channel NPN Digital Output Module(support conformal coating)	3200309635
LT-eDO02-P	16-Channel PNP Digital Output Module(support conformal coating)	3200309636
LT-eDO04-P	8-Channel Digital Output Module(support conformal coating)	3200309637

LT-eDO11-P	32-Channel NPN Digital Output Module(support conformal coating)	3200311385
LT-eDO12-P	32-Channel PNP Digital Output Module(support conformal coating)	3200311386
LT-eAI01-P	4-Channel Voltage/Current Analog Input Module(support conformal coating)	3200309631
LT-eAI02-P	8-Channel Voltage Analog Input Module(support conformal coating)	3200311378
LT-eAI03-P	8-Channel Current Analog Input Module(support conformal coating)	3200311379
LT-eAO01-P	4-Channel Voltage/Current Analog Output Module(support conformal coating)	3200309632
LT-eAO02-P	8-Channel Voltage Analog Output Module(support conformal coating)	3200311380
LT-eAO03-P	8-Channel Current Analog Output Module(support conformal coating)	3200311381
LT-ePT01-P	4-Channel RTD Analog Input Module(support conformal coating)	3200309643
LT-eTC01-P	4-Channel Thermocouple Analog Input Module(support conformal coating)	3200309644
LT-ePM01-P	Power Extension Module(support conformal coating)	3200309642
LT-eEP01-P	Terminal Module(support conformal coating)	3200309638
LT-eEP02-P	Terminal Resistor End Cover(support conformal coating)	3200309217

10.2 Abbreviations

Abbreviation	Full Name
AC	Alternating Current
ADC	Analog-to-Digital Converter
AI	Analog Input
AO	Analog Output
APRD	Auto Increment Read
APWR	Auto Increment Write
AT	AutoThink
AWG	American Wire Gauge
BAT	Battery
BOM	Bill of Material
BRD	Broadcast Read
BWR	Broadcast Write
CE	Conformité Européenne/European Conformity
CFC	Continuous Function Chart
CH	Channel
CIP	Common Industrial Protocol
CM	Communication Module
CoE	CANopen over EtherCAT
CPU	Central Processing Unit
DAC	Digital-to-Analog Converter
DC	Direct Current
DDR	Double Data Rate
DI	Digital Input
DIN	Deutsches Institut für Normung/German Institute for Standardization
DMA	Direct Memory Access
DO	Digital Output
EC	Expansion Card

EDM	External Device Monitor
EEPROM/E2PROM	Electrically Erasable Programmable read only memory
EMC	Electromagnetic Compatibility
ERR	Error
FA-AT	Factory Automation - AutoThink
FB	Function Block
FBD	Functional Block Diagram
FPRD	Configured Address Read
FPWR	Configured Address Write
F.S.	Full Scale
FSoE	Safety over EtherCAT
FUN	Function
HMI	Human Machine Interface
GND	Ground
iAT	Intelligent AutoThink
I/O	Input/Output
IDE	Integrated Development Environment
IEC	-
IM	Interface Module
INC	Incremental Encoder
IP	Ingress Protection
ISO	International Organization for Standardization
LD	Ladder Diagram
LDS	Ladder Diagram Segmented
LRD	Logical Memory Read
LWR	Logical Memory Write
LXS	LX series functional safety PLC system
MCU	Microcontroller Unit
MPU	Microprocessor Unit
MRAM	Magnetoresistive Random Access Memory
NC	Normal Close
NO	Normal Open
NTP	Network Time Protocol
OPS	Operator Station
OS	Operating System
OSSD	Output Signal Switching Device
PE	Protecting Earthing
PID	proportional, integral, derivative
PL	Performance Level
PLC	Programmable Logic Controller
PM	Power Module
POU	Program Organization Unit
PRG	Program
PTO	Pulse Train Output
PWM	Pulse-Width Modulation
RAMS	Reliability, Availability, Maintainability and Safety
RST	Reset
RTC	Real Time Clock
RTD	Resistance Temperature Device
RTS	Real Time System
Safe-AT	Safety FA-AutoThink
SD	Secure Digital
SDRAM	synchronous dynamic random-access memory
SFC	Sequential Function Chart
SIL	Safety Integrity Level
SN	Serial Number
SOE	Sequence Of Event

SRAM	Static Random-Access Memory
SSI	Synchronous Serial Interface
ST	Structured Text
STO	Safe Torque Off
SW	Switch
TC	Thermocouple
TÜV	Technischer Überwachungsverein
UART	Universal Asynchronous Receiver & Transmitter



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