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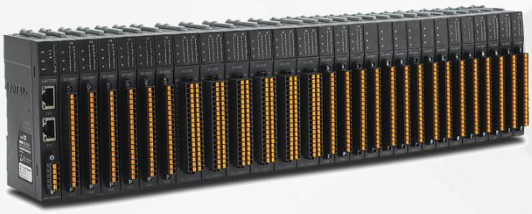
User Manual



Lamina Series wafer type IO module

PROFINET_RT protocol
ETHERNET/IP protocol
CC-LINK IE FIELD BASIC protocol
ETHERCAT protocol
MODBUS TCP protocal
Distributed IO Module

version information

version number	Revision date	Imprint	modifier
V1.00	2022.01.20	Release version	Liu Xiaofeng
V1.01	2022.04.15	Add ES-3087A,ES-3088A module	offshore
V1.02	2022.07.13	Increase ES-1320D,ES-2321D,ES-2322D,ES-2308D Module	Liu Xiaofeng
V1.03	2023.5.20	Add ES-04PM module	Luo Shiping
V1.04	2023.06.20	Add ES-3043A,ES-4043A,ES-3047A module	Liu Xiaofeng
V1.05	2023.7.19	Add ES-2041D,ES-2042D,LUC-MTB,ES-04DMA module	Liu Xiaofeng
V1.06	2024.1.5	Add ES-02HC,ES-02MB-485,ES-02MB-232 module	Liu Xiaofeng
V1.07	2024.8.16	Add ES-2163D module	Liu Xiaofeng
V1.08	2024.12.30	Naming rules for adding modules	wutong
V1.09	2025.04.02	Add ES-3026A、ES-3026B module	Liu Xiaofeng

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This product is specialized equipment for use in industrial settings and should only be used by personnel with experience in electrical operation. Please read this manual carefully before use and follow the instructions to avoid injury to personnel or damage to the product.

This product is designed to meet IP20 protection level, and when used, it needs to be installed in a power distribution cabinet with dust and moisture-proof function.

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CATALOGUE

1. Product Overview

Anaphora

This product is specialized equipment for use in industrial settings and should only be used by personnel with experience in electrical operation. Please read this manual carefully before use and follow the instructions to avoid injury to personnel or damage to the product.

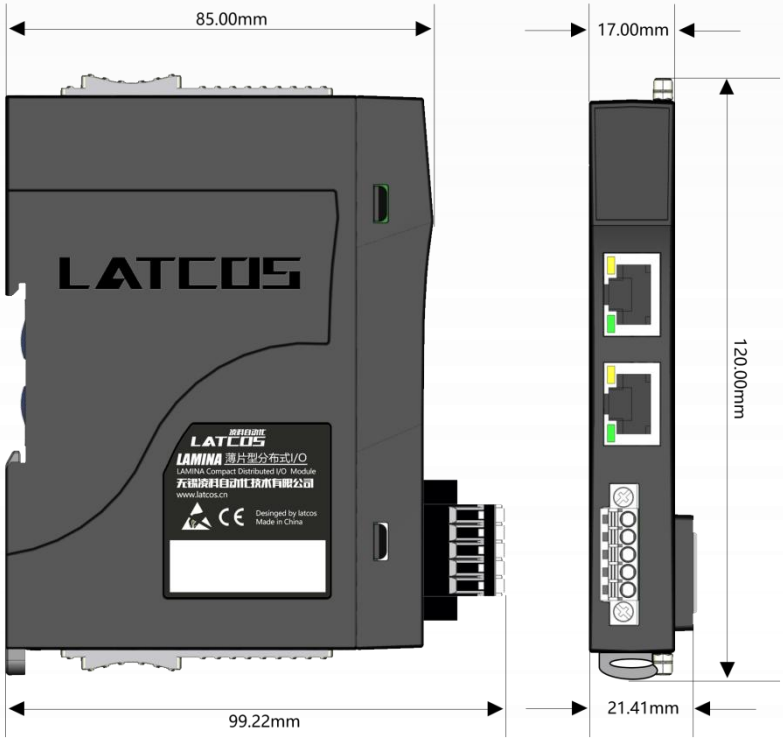
This product is designed to meet IP20 protection level, and when used, it needs to be installed in a power distribution cabinet with dust and moisture-proof function.

Distributed remote IO system consists of network coupler module and expansion IO module, the network coupler module is responsible for the field bus communication, to realize the communication connection with the master controller or host computer software. The extended IO module is responsible for connecting with the input and output sensors in the field. The input IO module collects all kinds of signals in the field and sends them to the network coupler through the internal bus, the controller reads the data from the coupler through the field bus and processes the data, and then writes the output data to the network coupler, and then the network coupler writes the output data to the output IO module through the internal bus to realize the control of the equipment. The network coupler then writes the output data to the output IO module through the internal bus, thus realizing the control of the device. The network coupler can select the corresponding bus module according to the communication interface of the controller system, and the mainstream industrial communication protocols include PROFINET, EtherCAT, EtherNet/IP, CC-Link IE Field Basic and so on. Extended IO modules are divided into 6 categories, digital input modules, digital output modules, analog input modules, analog output modules, special modules, and hybrid IO modules. The network coupler and the expansion IO module can be freely combined according to the field requirements, and the distributed IO module can realize the lower cost requirement in the case of more points.

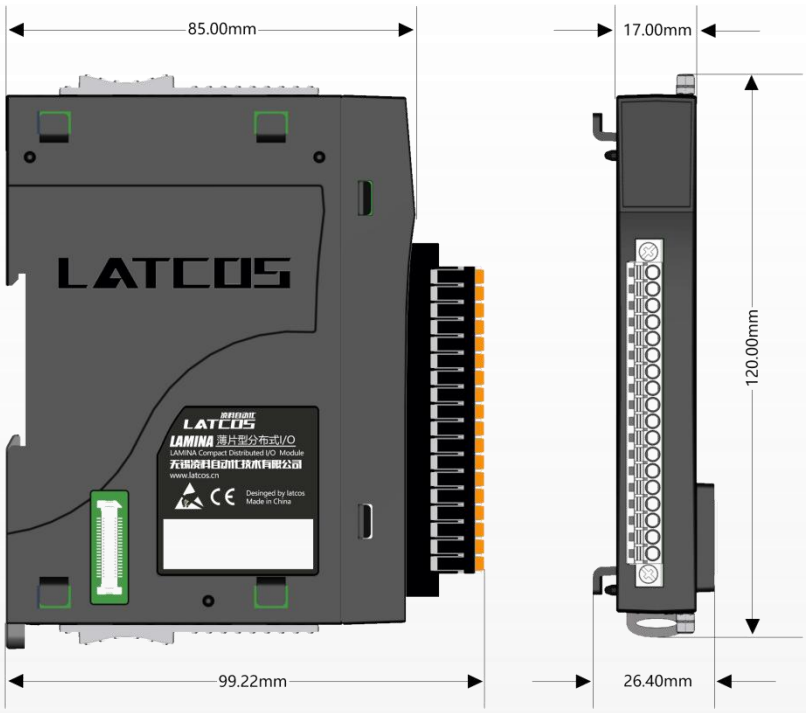
1.1 Product Characterization

1.1.1 LUC Series Coupler Module - Dimension Drawing

(120*17*99mm)

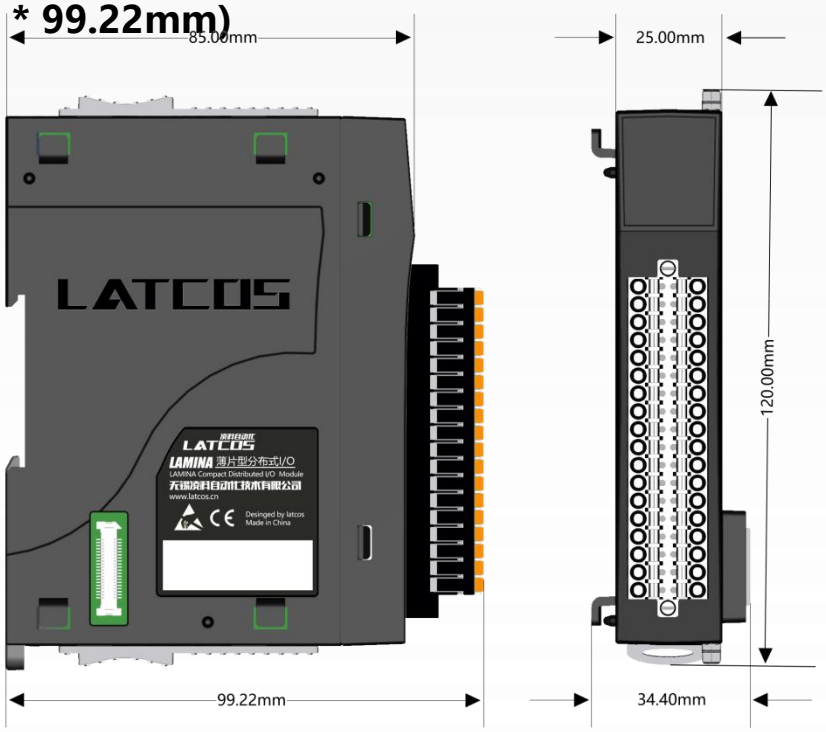


1.1.2 ES Series Expansion Modules - Dimensional Drawing (120 * 17 * 99.22mm)

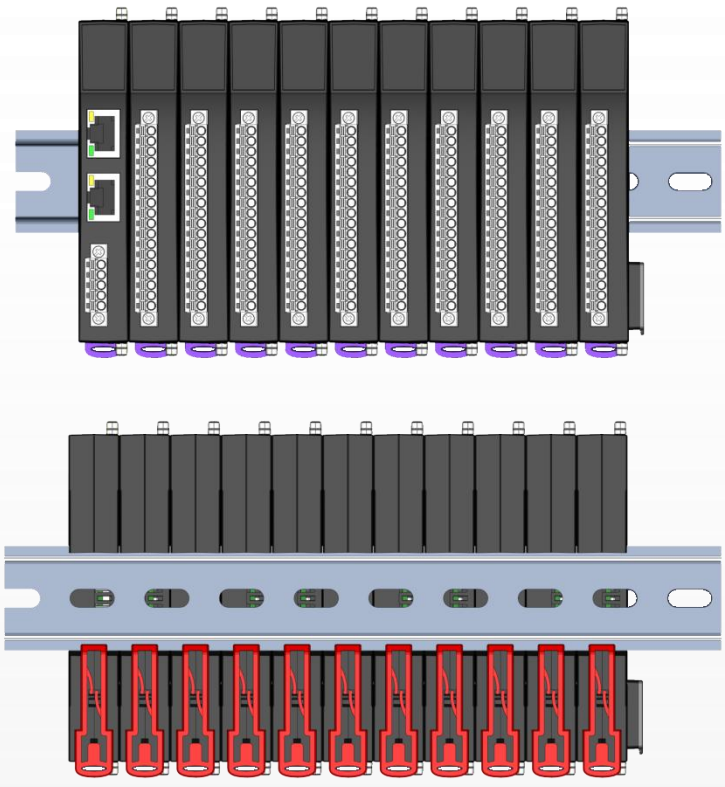


1.1.3 ES Series Expansion Modules - Dimensional Drawing

(120 * 25 * 99.22mm)



1.1.4 Mounting method (DIN35 rail mounting)



2. Network coupler module

2.1 LUC-PNB

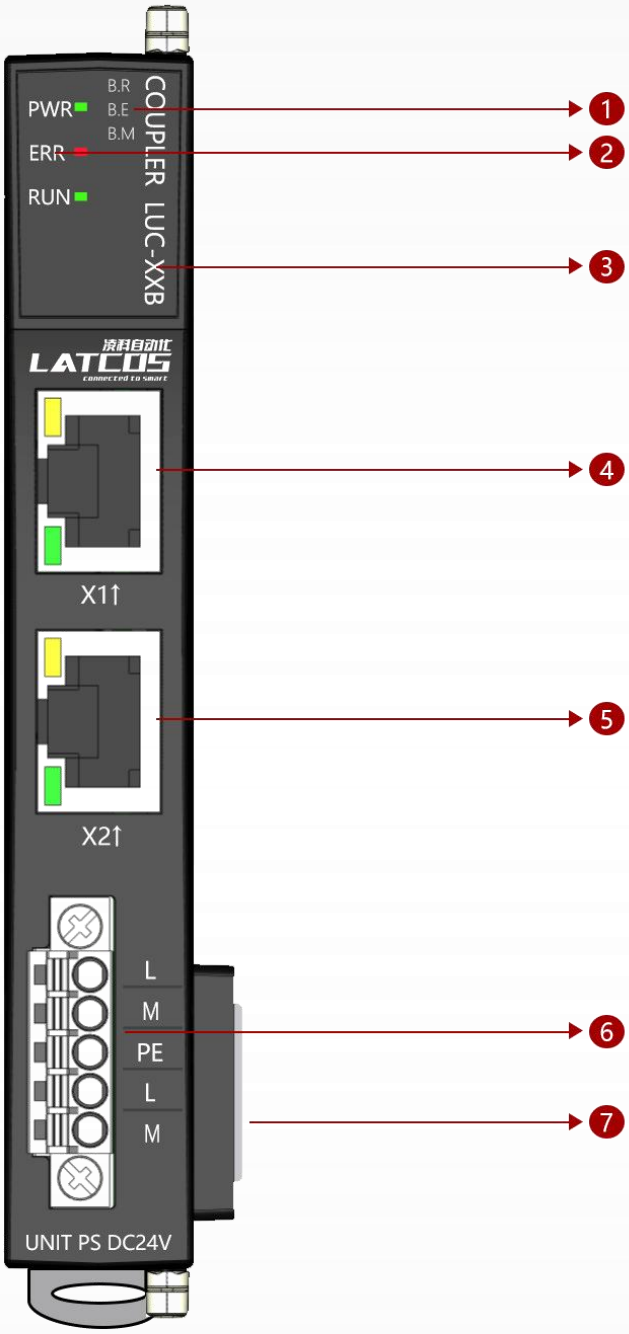
2.1.1 Module overview

LUC-PNB PROFINET network coupler, support standard PROFINET IO Device device communication. Support RT communication mode, RT real-time communication minimum cycle is 1ms, the coupler supports maximum input 1440 bytes, maximum output 1440 bytes, the number of supported expansion IO modules is 32.

Coupler Hardware Parameters		
model number		LUC-PNB
bus interface		2*RJ45
Extended Interface		2*20Pin Board-to-Board Connector
Power connector		Plug-in terminal block 5Pin (with screw fixing)
operating voltage		24V DC (-15%~20%)
Operating Current		100mA
communication protocols		PROFINET RT
Communication rate (Max)		100Mb/s
addressing mode		Set by Master Software
Number of extensions supported (Max)		32
I/O Capacity (Max)	Input(bit)	1440
	Output(bit)	1440
Backplane Output	input voltage	24V DC
	amps	2A
Interface/Communication Cable		2*RJ45/ Category 5 twisted-pair cable
Installation		DN35 rail mounting
Environmental parameters		
operating temperature		-40~85℃
Environmental humidity		5%-95% non-condensing
protection class		IP20

Table 1 Coupler hardware parameters

2.1.2 Introduction to interfaces



Coupler interface descriptionDescription
①Backplane status indicator
②Bus system status indicator
③Module type
④Communication interface X1
⑤Communication interface X2
⑥Module power terminals
⑦Backplane expansion

Note: X1 and X2 are PROFINET communication ports, support switch function, 10M/100M adaptive rate.

2.1.3 LED indicators

The LED indicators of the module are divided into three parts: bus system status indicator, backplane indicator, and RJ45 link indicator.

2.1.4 System Status Indication The operating status of the system is described in Table

PWR (power supply)	ERR (fault)	RUN	clarification
○	○	○	Abnormal power supply or no power supply
●	●	○	communication interface failure
●	○	●	The module successfully enters into operation and successfully establishes cyclic data interaction with the master.

Table 2 System Status Indication

● The green light is on ● Indicates that the red light is on ○ Not bright

2.1.5 The operating status of the backplane indication system is described in the table below.

B.R	B.E	B.M	clarification
◔	○	○	Backplane activation in progress
●	○	○	Backplane operating normally
●	●	○	Coupler module backplane error

Table 3 System Status Indications

● The green light is on ◔ Flashing green ○ Not bright

2.1.6 RJ45 indicator

Under normal circumstances, the RJ45 port indicator should be a long green light, yellow light flashing, if not, it means that the fault occurred. Green light does not light, indicating that the RJ45 port has a connection to the Hub or switch connection is faulty; yellow light does not light, it may be a failure of the module itself as Table 4: RJ45 indicator description

LINK1/LINK2	ACT1/ACT2	clarification
○	irrelevant	RJ45 port without network cable connection or poor connection
●	irrelevant	RJ45 ports are correctly identified to the Ethernet network
irrelevant	○	No data interaction on RJ45 port
irrelevant	●	RJ45 port has data interaction

Table 4 RJ45 Indicator Description

2.1.7 PROFINET coupler communication interface definition

The module uses a physical interface for communication with dual RJ45 sockets, and the module itself has switch functionality. They are identified as X1P1 and X1P2.

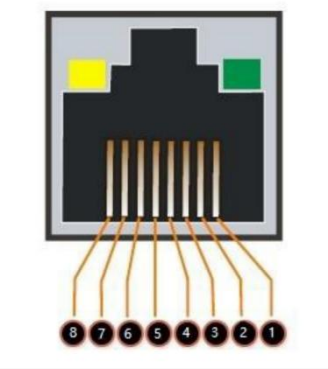
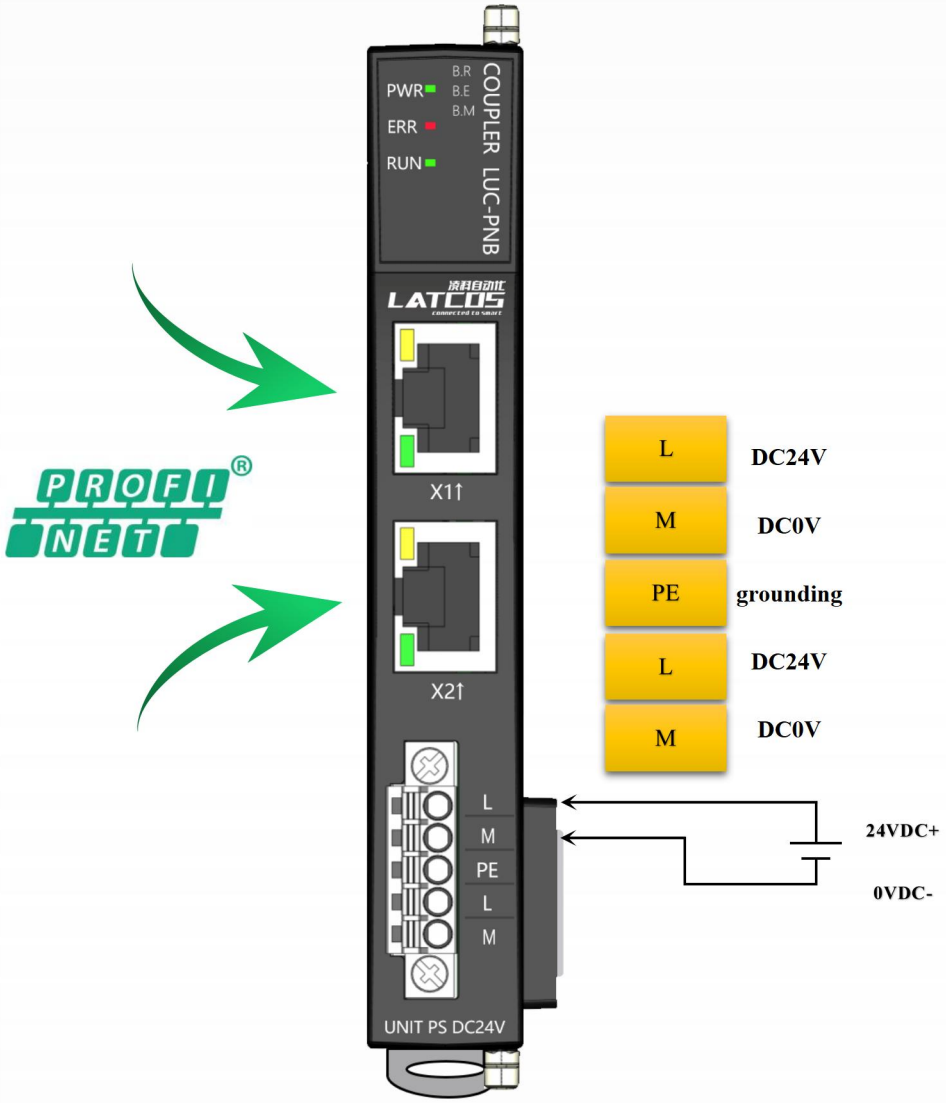


Table 5 PROFINET communication interfaces

pinout	code	descriptive
1	TX+	Data transmission +
2	TX-	Data transmission -
3	RX+	Data reception+
4	NC	unused
5	NC	unused
6	RX-	Data reception -
7	NC	unused
8	NC	unused
Connector Housings	PE	grounding

2.1.8 Electrical wiring diagram for PROFINET coupler



2.1.9 Network topology

The following figure shows a typical network layout for PROFINET IO. As shown in Figures 1-1, 1-2, 1-3

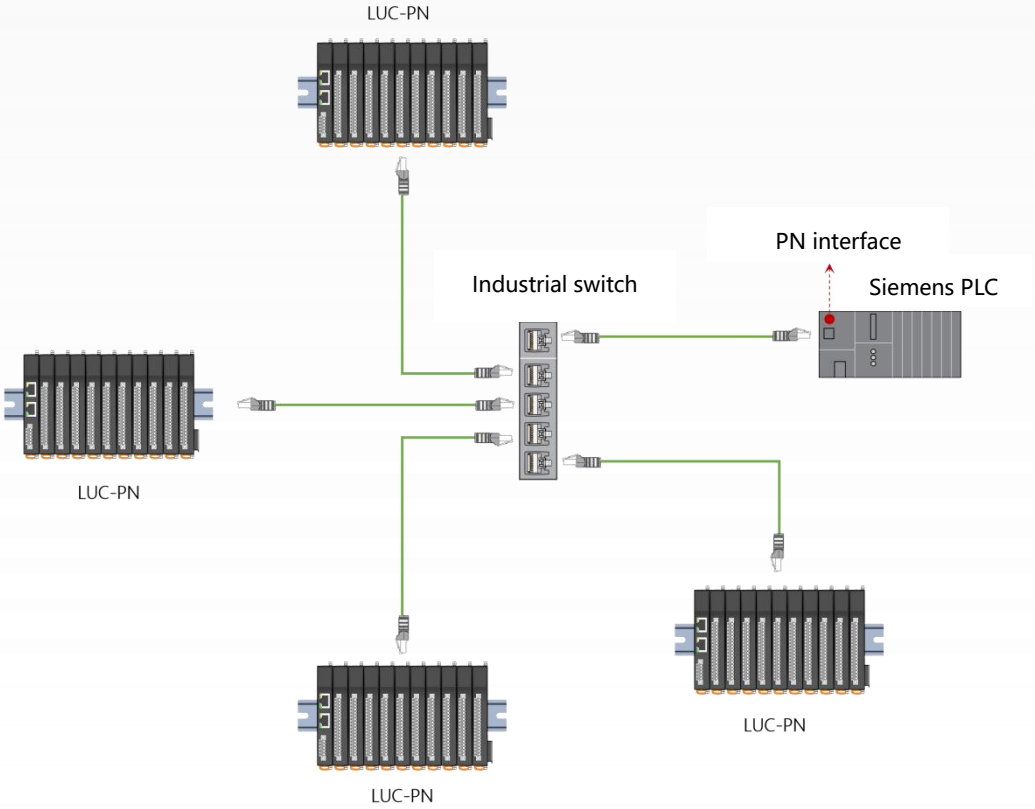


Figure 1-1 PROFINET Star Network Topology

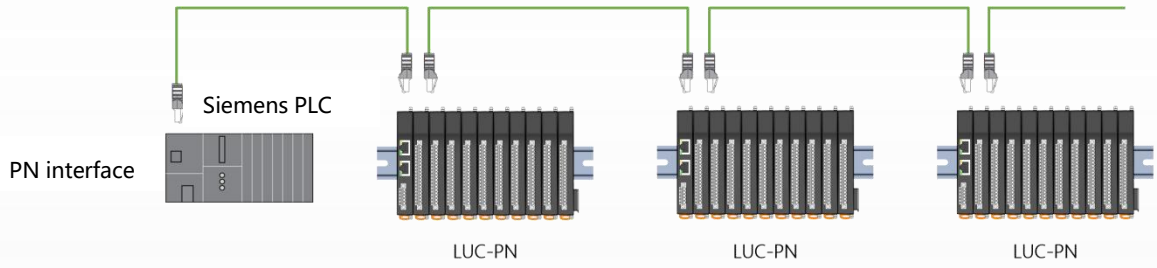


Figure 1-2 PROFINET daisy chain topology

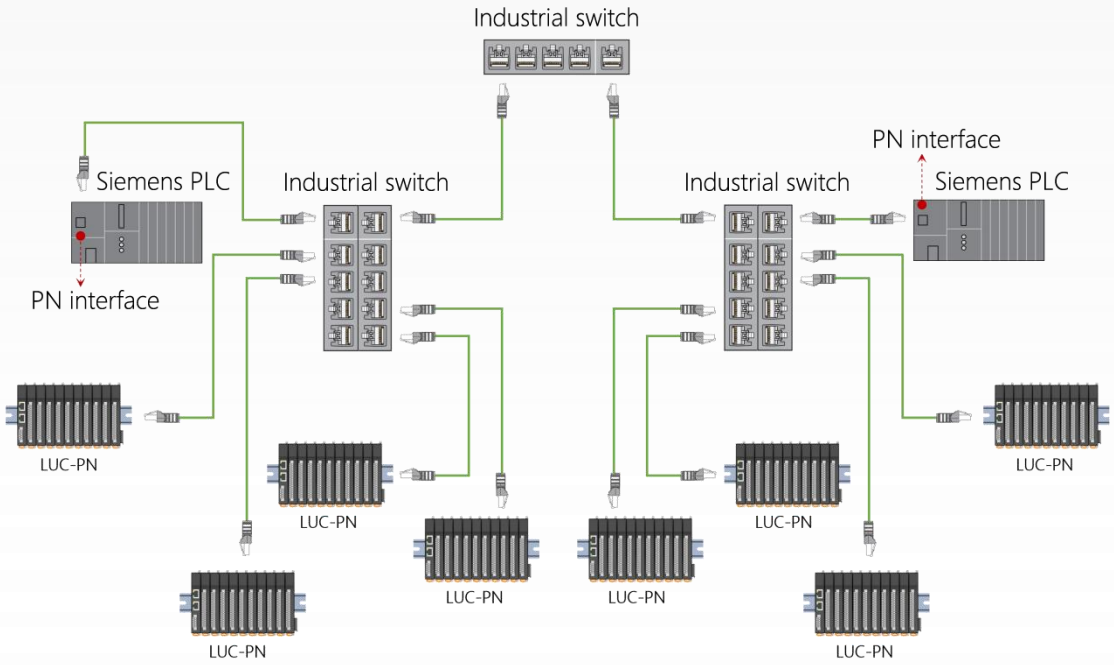


Figure 1-3 PROFINET Tree Network Topology

2.2 LUC-EPB

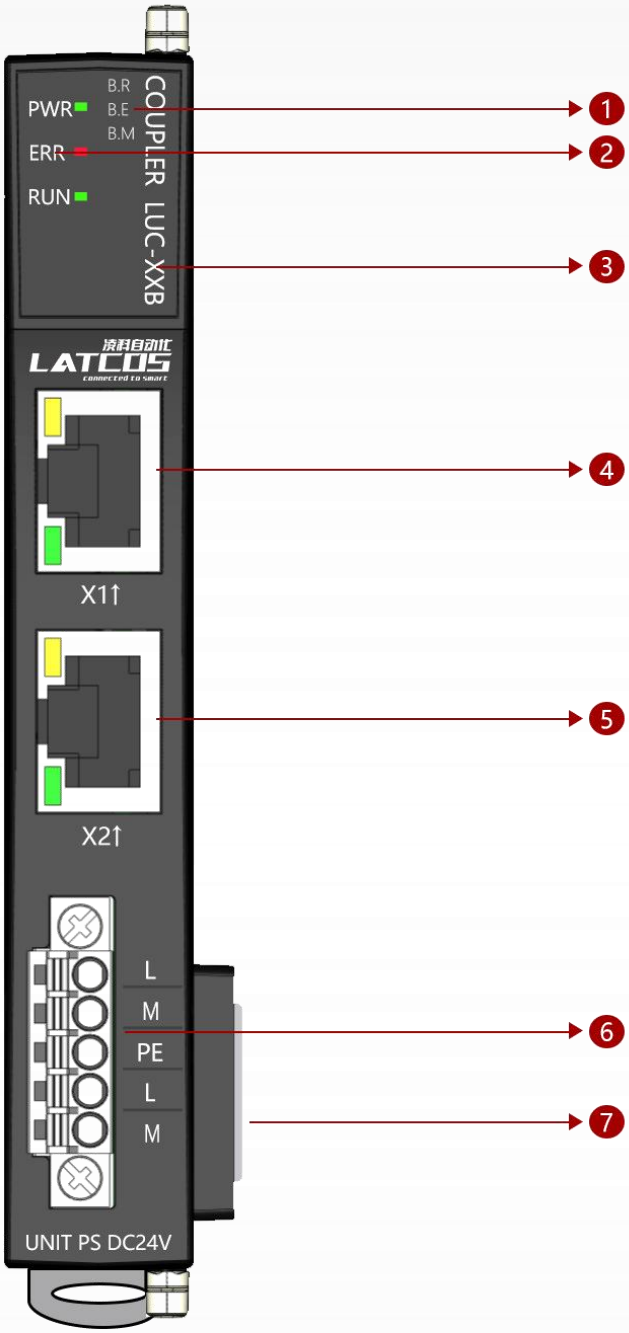
2.2.1 Module overview

The LUC-EPB ETHERNET/IP Network Coupler supports standard ETHERNET/IP I/O Device device communication. The number of supported expansion IO modules is 32.

Coupler hardware parameters		
model number		LUC-EPB
bus interface		2*RJ45
Extended Interface		2*20Pin Board-to-Board Connector
Power connector		Plug-in terminal block 5Pin (with screw fixing)
operating voltage		24V DC (-15%~20%)
Operating Current		100mA
communication protocols		ETHERNET/IP
Communication rate (Max)		100Mb/s
addressing mode		Set by LAEConfig
Number of extensions supported (Max)		32
I/O Capacity (Max)	Input(bit)	512
	Output(bit)	512
Backplane Output	input voltage	24V DC
	amps	2A
Interface/Communication Cable		2*RJ45/ Category 5 twisted-pair cable
Installation		DN35 rail mounting
Environmental parameters		
operating temperature		-40~85℃
Environmental humidity		5%-95% non-condensing
protection class		IP20

Table 6 Coupler Hardware Parameters

2.2.2 Introduction to interfaces



Coupler Interface Description
①Backplane status indicator ②Bus system status indicator ③Module type ④Communication interface X1 ⑤Communication interface X2 ⑥Module power terminals ⑦Backplane expansion interface

Note: X1 and X2 are ETHERNET/IP communication ports, support switch function, 10M/100M adaptive rate.

2.2.3 LED indicators

The LED indicators of the module are divided into three parts: bus system status indicator, backplane indicator, and RJ45 link indicator.

2.2.4 System Status Indication The operating status of the system is described in Table

PWR (power supply)	ERR (fault)	RUN	clarification
○	○	○	Abnormal power supply or no power supply
●	●	○	communication interface failure
●	○	●	The module successfully enters into operation and successfully establishes cyclic data interaction with the master.

Table 7 System Status Indication

● The green light is on ● Indicates that the red light is on ○ Not bright

2.2.5 The operating status of the backplane indication system is described in the table below.

B.R	B.E	B.M	clarification
◐	○	○	Backplane activation in progress
●	○	○	Backplane operating normally
●	●	○	Coupler module backplane error

Table 8 System Status Indication

● The green light is on ◐ Flashing green ○ Not bright

2.2.6 RJ45 indicator light

Under normal circumstances, the RJ45 port indicator should be a long green light, yellow light blinking, if not, it means that the fault occurred. If the green light is not on, it indicates that the RJ45 port has a faulty connection to the Hub or switch; if the yellow light is not on, it may be a fault in the module itself as shown in Table (4).

LINK1/LINK2	ACT1/ACT2	clarification
○	irrelevant	RJ45 port without network cable connection or poor connection
●	irrelevant	RJ45 ports are correctly identified to the Ethernet network
irrelevant	○	No data interaction on RJ45 port
irrelevant	●	RJ45 port has data interaction

Table 9 RJ45 Indicator Description

2.2.7 ETHERNET/IP Coupler Communication Interface Definition

The module uses dual RJ45 sockets to communicate with the physical interface, the module itself has a switch function. The modules are labeled X1P1 and X1P2.

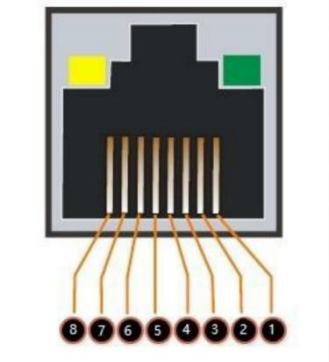
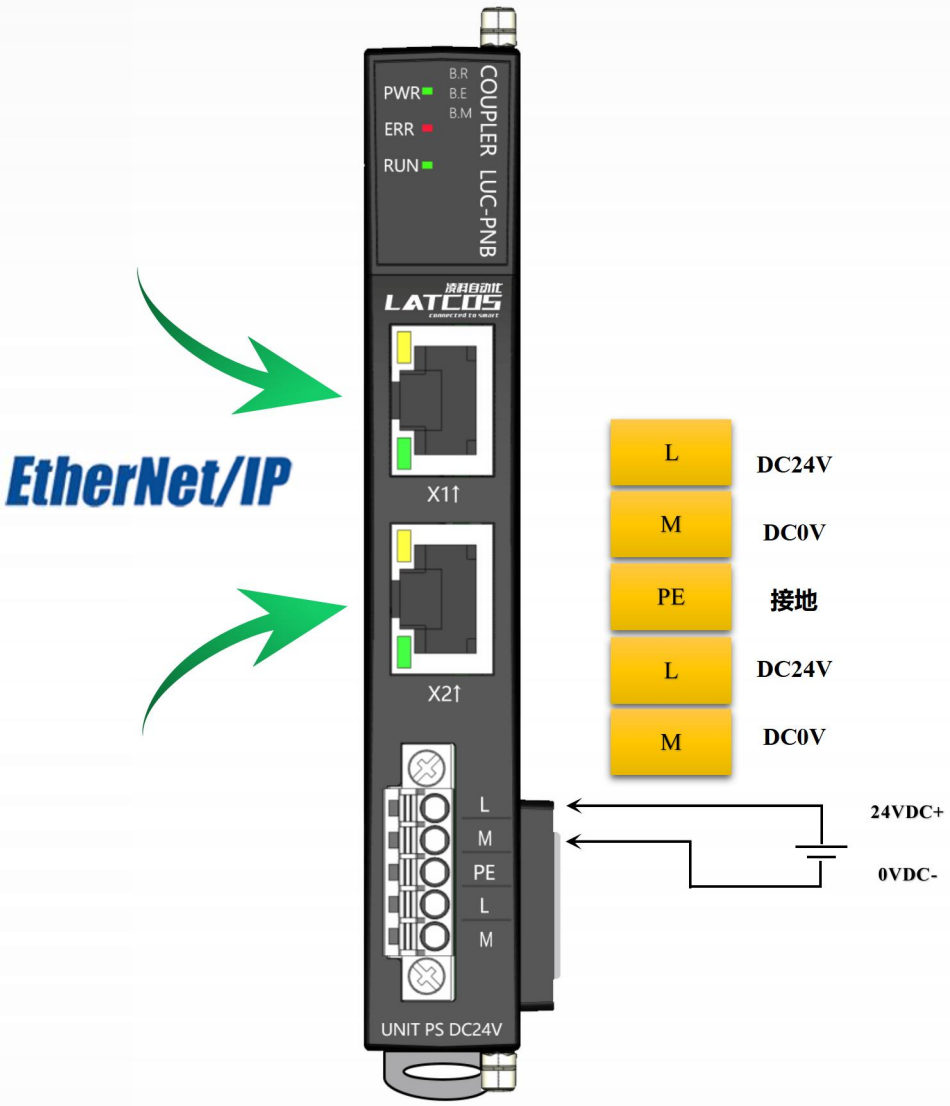


Table 10 ETHERNET/IP Communication Interfaces

pinout	code	descriptive
1	TX+	Data transmission +
2	TX-	Data transmission -
3	RX+	Data reception+
4	NC	unused
5	NC	unused
6	RX-	Data reception -
7	NC	unused
8	NC	unused
Connector Housings	PE	grounding

2.2.8 ETHERNET/IP Coupler Electrical Wiring Diagrams



2.2.9 Network topology

The following figure shows a typical network layout for ETHERNET/IP IO. As shown in Figures 2-1, 2-2, 2-3

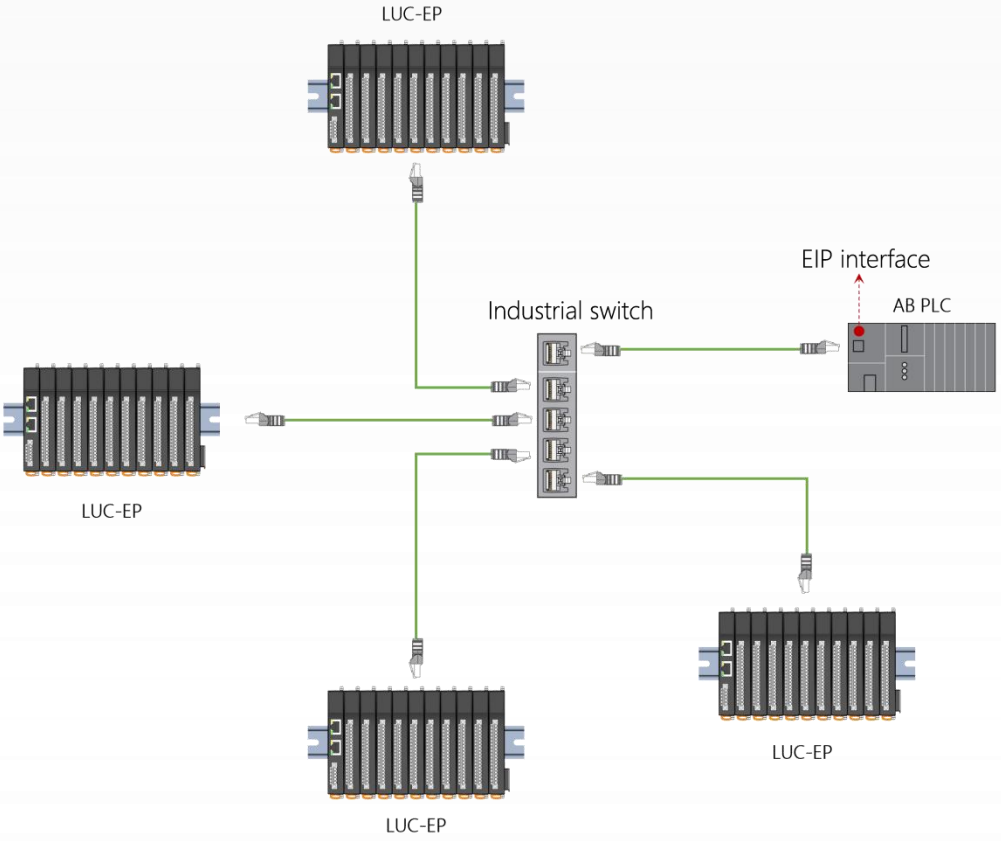


Figure 2-1 ETHERNET/IP Star Network Topology

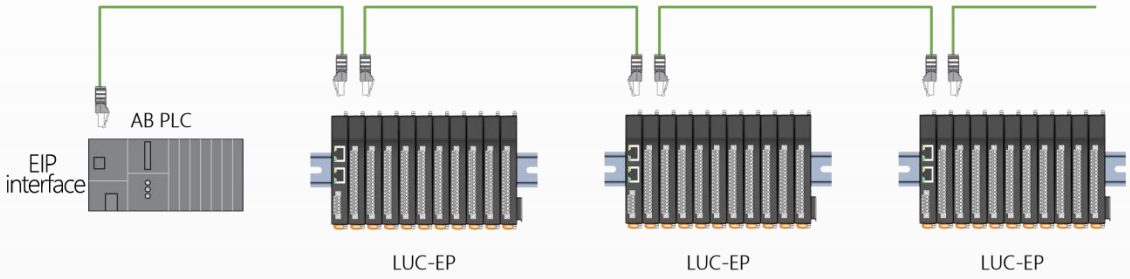


Figure 2-2 ETHERNET/IP daisy chain topology

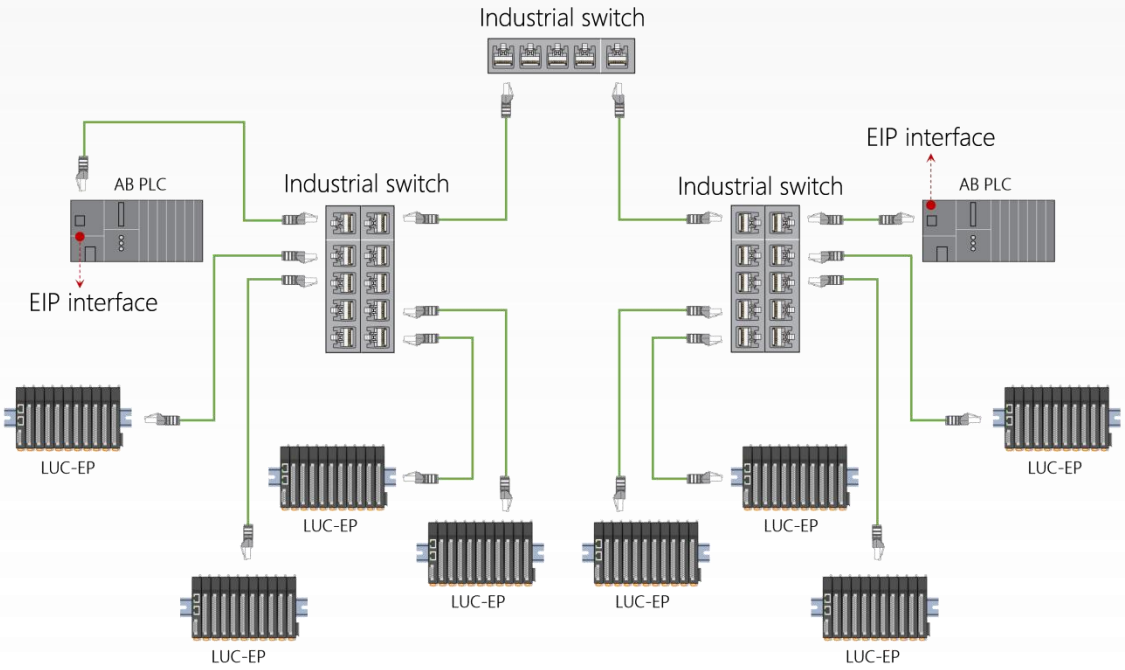


Figure 2-3 ETHERNET/IP Tree Network Topology

2.3 LUC-CEB

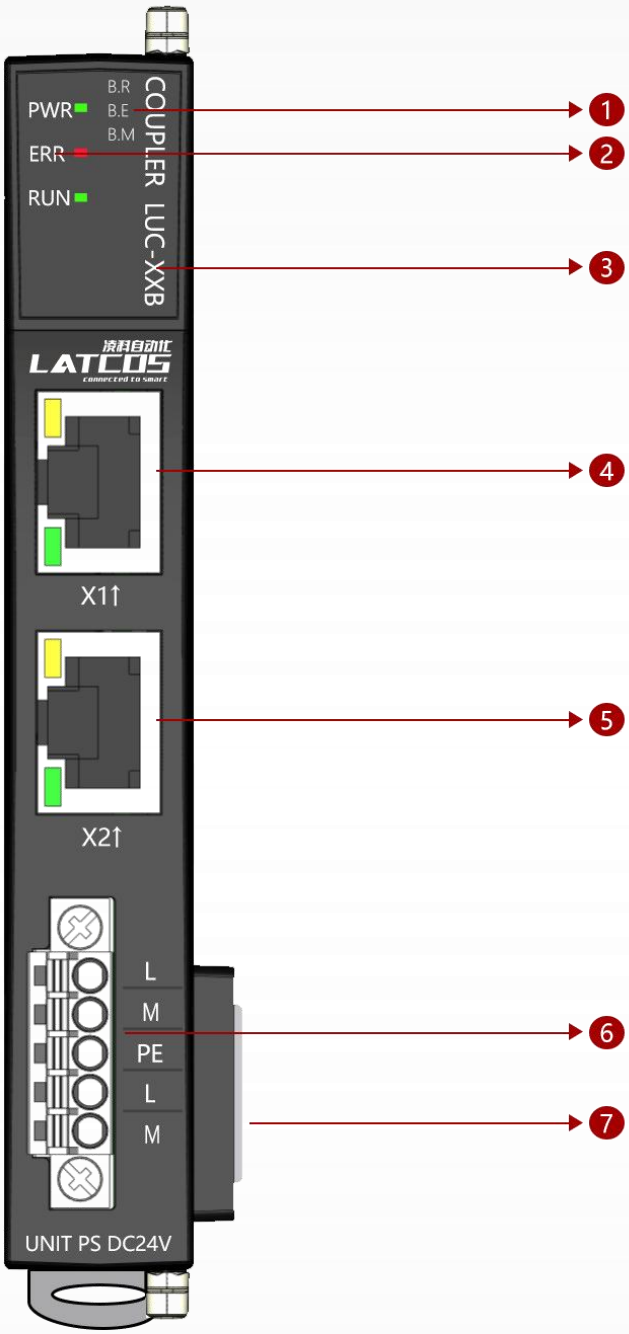
2.3.1 Module overview

The LUC-CEB CC-Link IE Field Basic Network Coupler supports standard CC-Link IE Field Basic IO Device device communication. The number of supported expansion IO modules is 32.

Coupler Hardware Parameters		
model number		LUC-CEB
bus interface		2*RJ45
Extended Interface		2*20Pin Board-to-Board Connector
Power connector		Plug-in terminal block 5Pin (with screw fixing)
operating voltage		24V DC (-15%~20%)
Operating Current		150mA
communication protocols		CC-Link IE Field Basic
Communication rate (Max)		100Mb/s
addressing mode		Set by LAEConfig
Number of extensions supported (Max)		32
I/O Capacity (Max)	Input(bit)	512
	Output(bit)	512
Backplane Output	input voltage	24V DC
	amps	2A
Interface/Communication Cable		2*RJ45/ Category 5 twisted-pair cable
Installation		DN35 rail mounting
Environmental parameters		
operating temperature		-40~85℃
Environmental humidity		5%-95% non-condensing
protection class		IP20

Table 11 Coupler hardware parameters

2.3.2 Introduction to interfaces



Coupler Interface Description
①Backplane status indicator
②Bus system status indicator
③Module type
④Communication interface X1
⑤Communication interface X2
⑥Module power terminals
⑦Backplane expansion

Note: X1 and X2 are CC-Link IE Field Basic communication ports, support switch function, 10M/100M adaptive rate.

2.3.3 LED indicators

The LED indicators of the module are divided into 3 parts: bus system status indicator, backplane indicator, and RJ45 link indicator.

2.3.4 System Status Indication The operating status of the system is described in Table

PWR (power supply)	ERR (fault)	RUN	clarification
○	○	○	Abnormal power supply or no power supply
●	●	○	communication interface failure
●	○	●	The module successfully enters into operation and successfully establishes cyclic data interaction with the master.

Table 12 System Status Indication

● **The green light is on** ● **Indicates that the red light is on** ○ **Not bright**

2.3.5 The operating status of the backplane indication system is described in the table

B.R	B.E	B.M	clarification
◐	○	○	Backplane activation in progress
●	○	○	Backplane operating normally
●	●	○	Coupler module backplane error

Table 13 System Status Indication

● **The green light is on** ◐ **Flashing green** ○ **Not bright**

2.3.6 RJ45 indicator light

Under normal circumstances, the RJ45 port indicator should be a long green light, yellow light flashing, if not, it means that the fault occurred. Green light does not light, indicating that the RJ45 port has a connection to the Hub or switch connection is faulty; yellow light does not light, it may be a failure of the module itself as Table 14: RJ45 indicator description

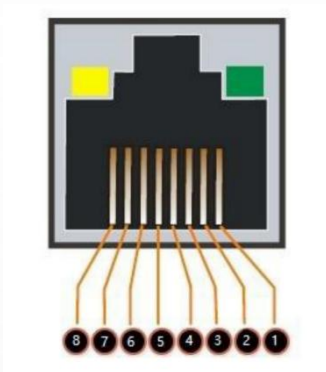
LINK1/LINK2	ACT1/ACT2	clarification
○	irrelevant	RJ45 port without network cable connection or poor connection
●	irrelevant	RJ45 ports are correctly identified to the Ethernet network
irrelevant	○	No data interaction on RJ45 port
irrelevant	●	RJ45 port has data interaction

Table 14 RJ45 Indicator Description

2.3.7 CC-Link IE Field Basic Coupler Communication Interface Definition

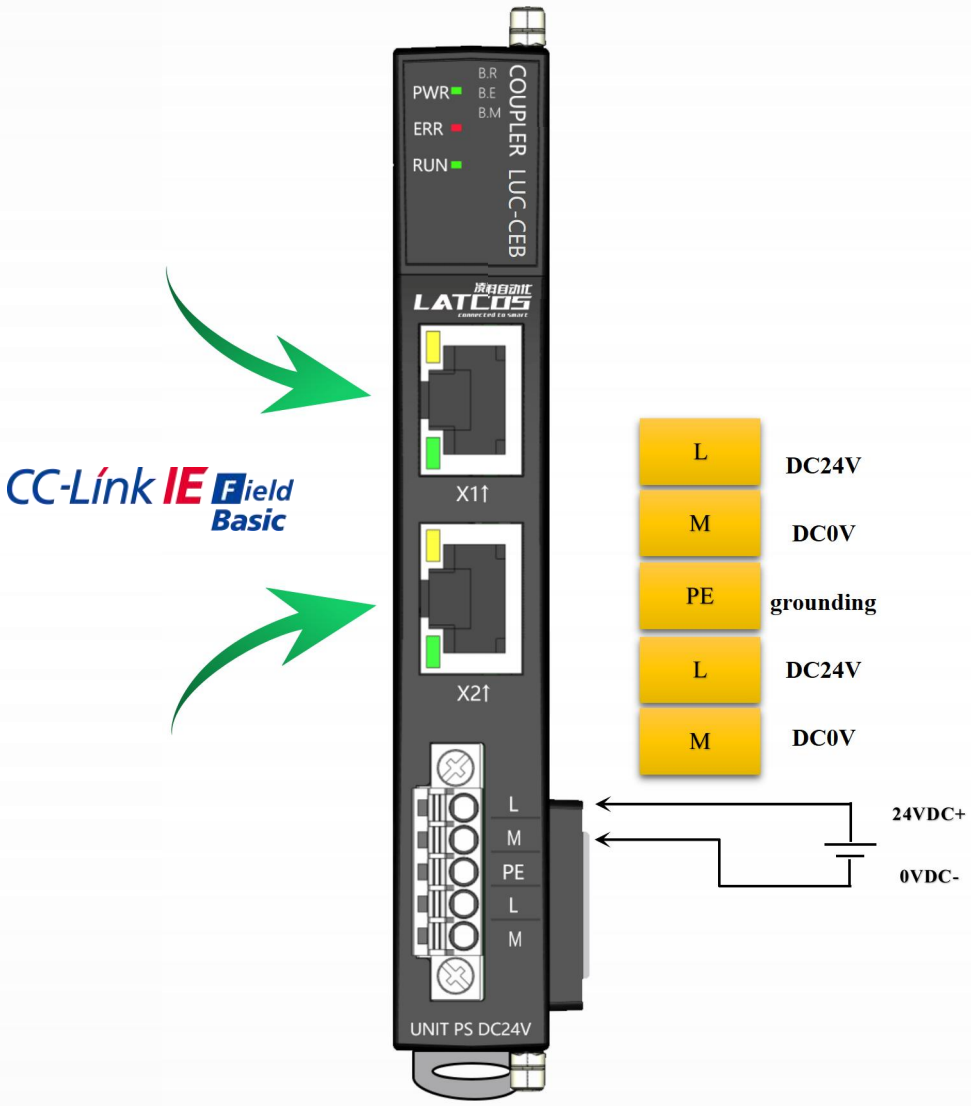
The module uses dual RJ45 sockets to communicate with the physical interface, the module itself has a switch function. They are labeled X1P1 and X1P2.

Table 15 CC-Link IE Field Basic communication interfaces



pinout	code	descriptive
1	TX+	Data transmission +
2	TX-	Data transmission -
3	RX+	Data reception+
4	NC	unused
5	NC	unused
6	RX-	Data reception -
7	NC	unused
8	NC	unused
Connector Housings	PE	grounding

2.3.8 Electrical Wiring Diagram for CC-Link IE Field Basic Coupler



2.3.9 Network topology

The following figure shows a typical network layout for CC-Link IE Field Basic IO. As shown in Figure 3-1, 3-2

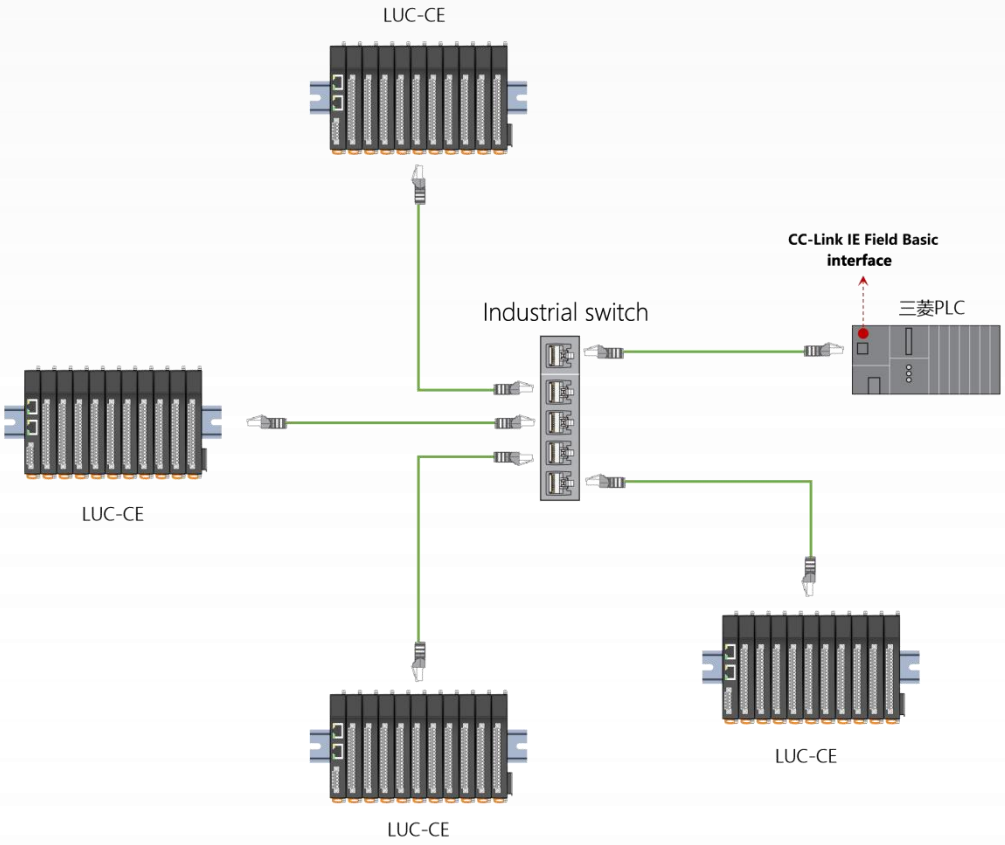


Figure 3-1 CC-Link IE Field Basic Star Network Topology

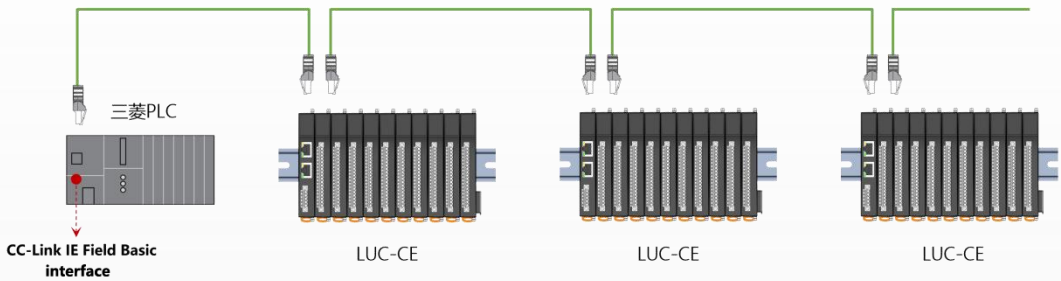


Figure 3-3 CC-Link IE Field Basic daisy chain topology

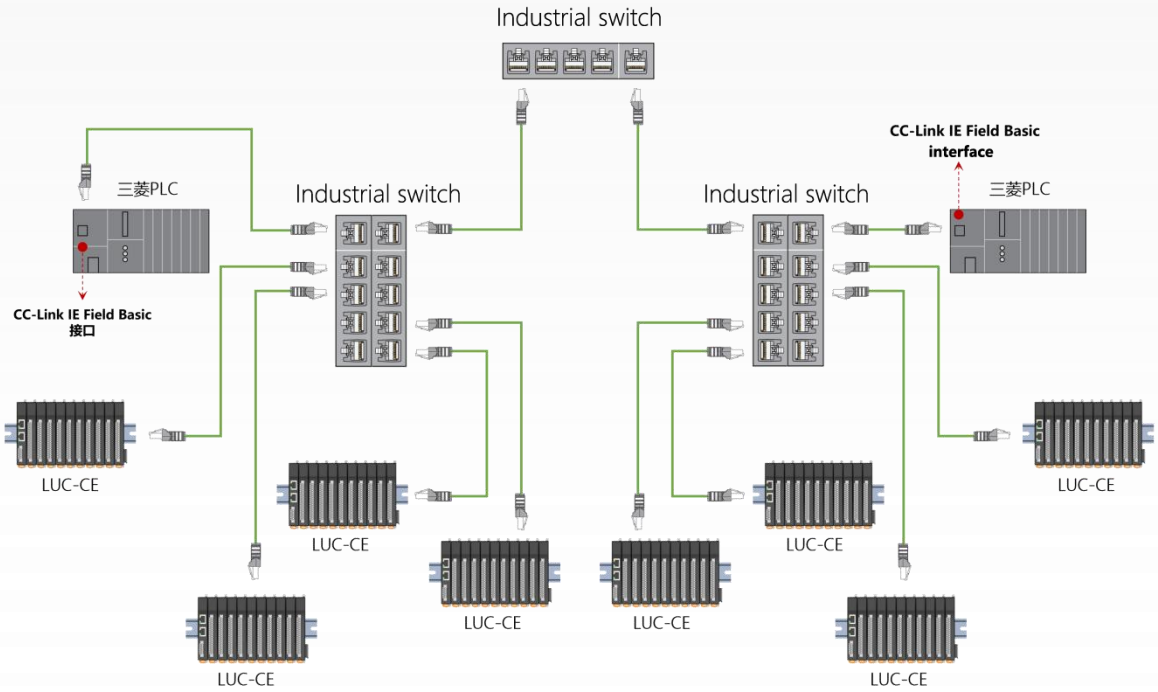


Figure 3-2 CC-Link IE Field Basic Tree Network Topology

2.4 LUC-EAB

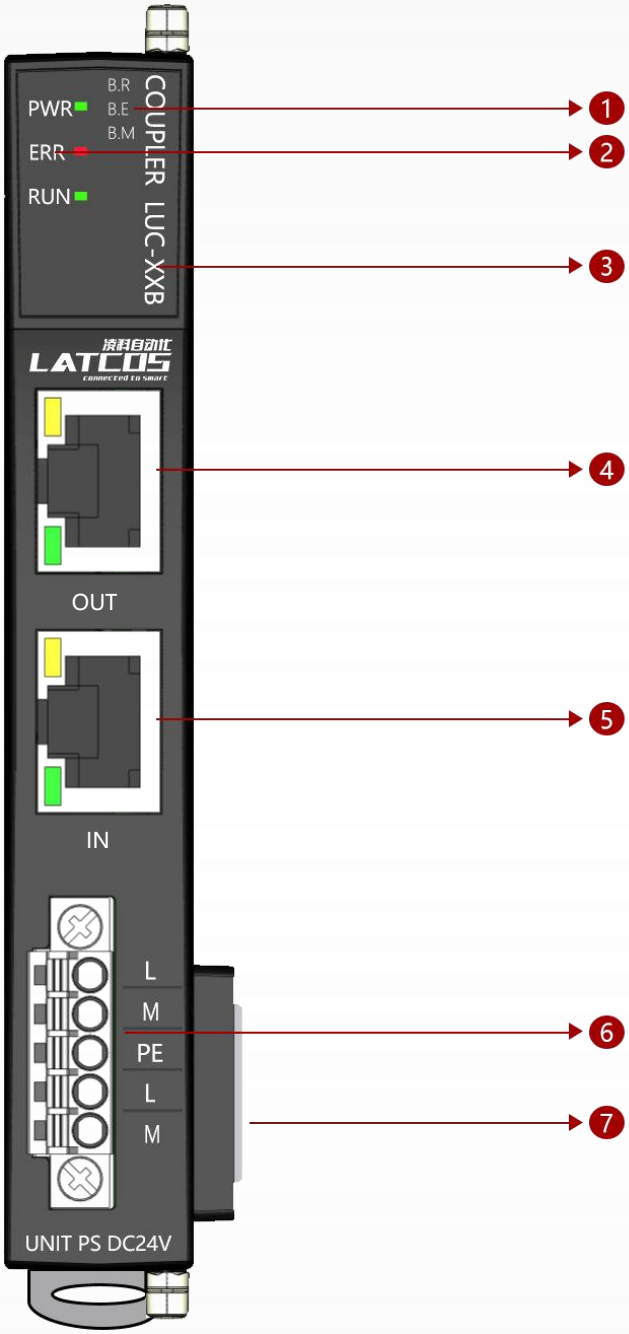
2.4.1 Module overview

The LUC-EAB network coupler supports the high-performance ETHERCAT bus communication protocol and can directly provide high-performance input and output functions by expanding the digital or analog module I/O interface. Expandable versions of the module can also be optionally equipped with different expansion modules to increase the number of IO points required.

Coupler Hardware Parameters		
model number		LUC-EAB
bus interface		2*RJ45
Extended Interface		2*20Pin Board-to-Board Connector
Power connector		Plug-in terminal block 5Pin (with screw fixing)
operating voltage		24V DC (-15%~20%)
Operating Current		100mA
communication protocols		ETHERCAT
Communication rate (Max)		10/100 Mbaud, automatic transmission speed recognition
addressing mode		Set by master software
Number of extensions supported (Max)		32
I/O Capacity (Max)	Input(bit)	1440
	Output(bit)	1440
Backplane Output	input voltage	24V DC
	amps	2A
Interface/Communication Cable		2*RJ45/ Category 5 twisted-pair cable
Installation		DN35 rail mounting
Environmental parameters		
operating temperature		-40~85℃
Environmental humidity		5%-95% non-condensing
protection class		IP20

Table 16 Coupler Hardware Parameters

2.4.2 Introduction to interfaces



Coupler Interface Description
①Backplane status indicator
②Bus system status indicator
③Module type
④Communication interface OUT
⑤Communication interface IN
⑥Module power terminals
⑦Backplane expansion

Note: OUT and IN are ETHERCAT communication ports, 10M/100M adaptive rate.

2.4.3 LED indicators

The LED indicators of the module are divided into 3 parts: bus system status indicator, backplane indicator, and RJ45 link indicator.

2.4.4 System Status Indication The operating status of the system is described in Table

PWR (power supply)	ERR (fault)	RUN	clarification
○	○	○	Abnormal power supply or no power supply
●	●	○	communication interface failure
●	○	●	The module successfully enters into operation and successfully establishes cyclic data interaction with the master.

Table 17 System Status Indication

● **The green light is on** ● **Indicates that the red light is on** ○ **Not bright**

2.4.5 The operating status of the backplane indication system is described in the table below.

B.R	B.E	B.M	clarification
◐	○	○	Backplane activation in progress
●	○	○	Backplane operating normally
●	●	○	Coupler module backplane error

Table 18 System Status Indication

● **The green light is on** ◐ **Flashing green** ○ **Not bright**

2.4.6 RJ45 indicator light

Under normal circumstances, the RJ45 port indicator should be a long green l ight, yellow light flashing, if not, it means that the fault occurred. Green light does not light, indicating that the RJ45 port has a connection to the Hub or switch co nnection is faulty; yellow light does not light, it may be the module itself is faulty as Table 19: RJ45 indicator description

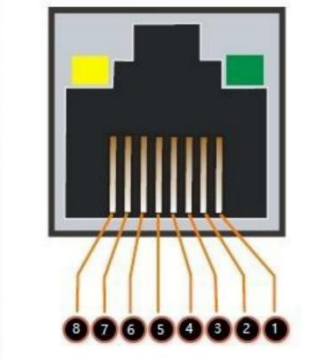
LINK1/LINK2	ACT1/ACT2	clarification
○	irrelevant	RJ45 port without network cable connection or poor connection
●	irrelevant	RJ45 ports are correctly identified to the Ethernet network
irrelevant	○	No data interaction on RJ45 port
irrelevant	●	RJ45 port has data interaction

Table 19 RJ45 Indicator Description

2.4.7 ETHERCAT Coupler Communication Interface Definition

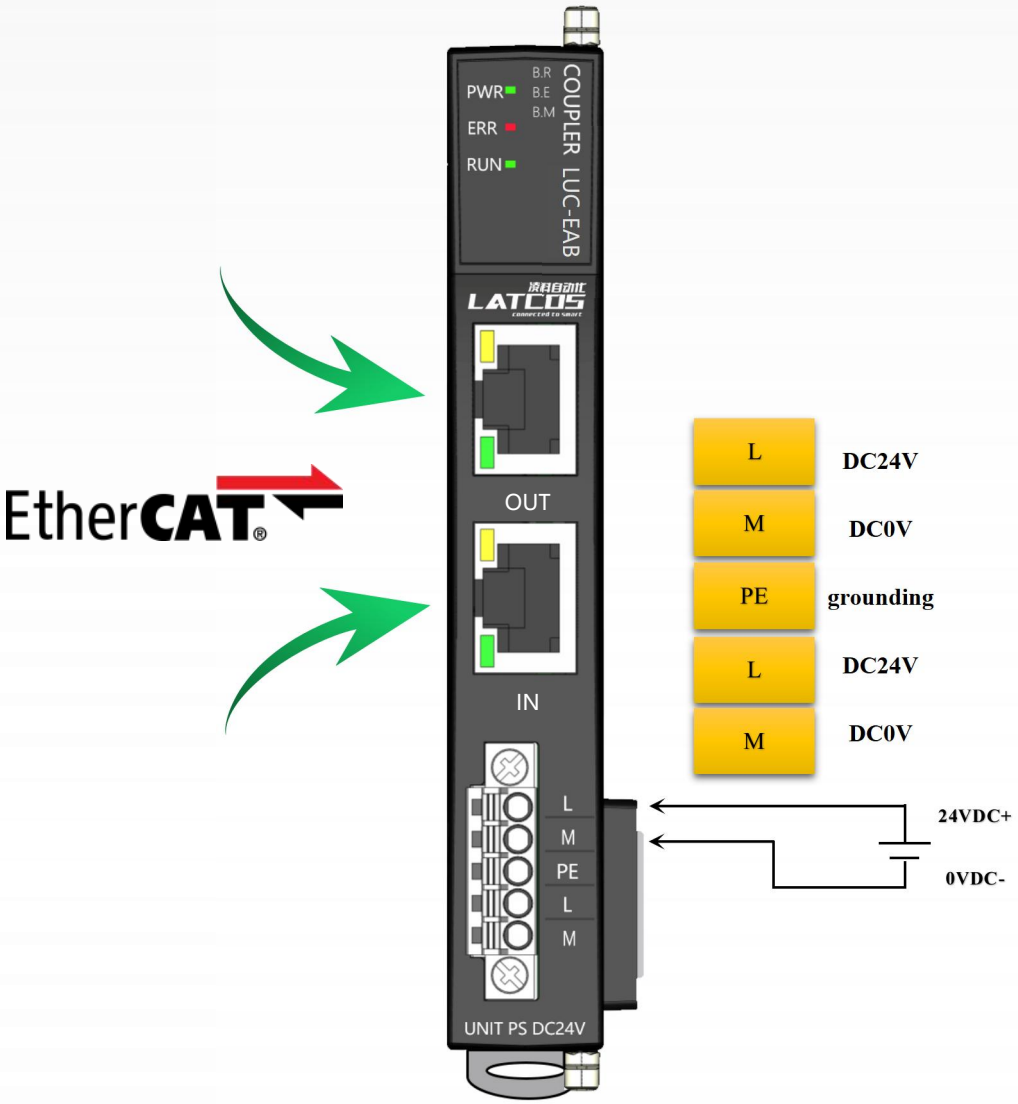
The module uses dual RJ45 sockets to communicate with the physical interface. They are identified as IN and OUT.

Table 20 ETHERCAT Communication Interface



pinout	code	descriptive
1	TX+	Data transmission +
2	TX-	Data transmission -
3	RX+	Data reception+
4	NC	unused
5	NC	unused
6	RX-	Data reception -
7	NC	unused
8	NC	unused
Connector Housings	PE	grounding

2.4.8 Electrical wiring diagram for ETHERCAT coupler



2.4.9 Network topology

The following figure shows a typical network layout for ETHERCAT IO. As shown in Figure 4

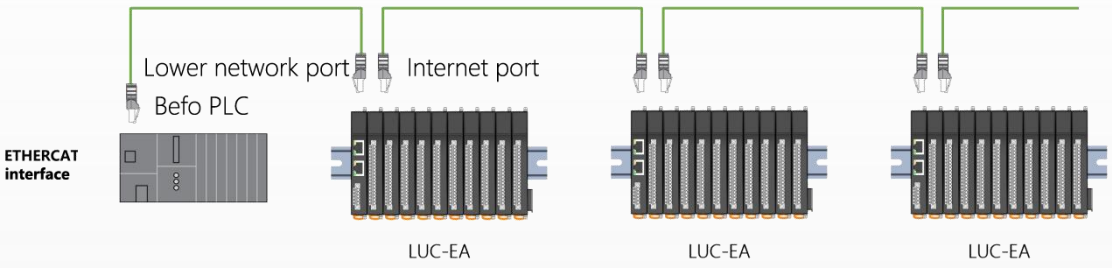


Fig. 4 ETHERCAT daisy chain topology

2.5 LUC-MTB

2.5.1 Module overview

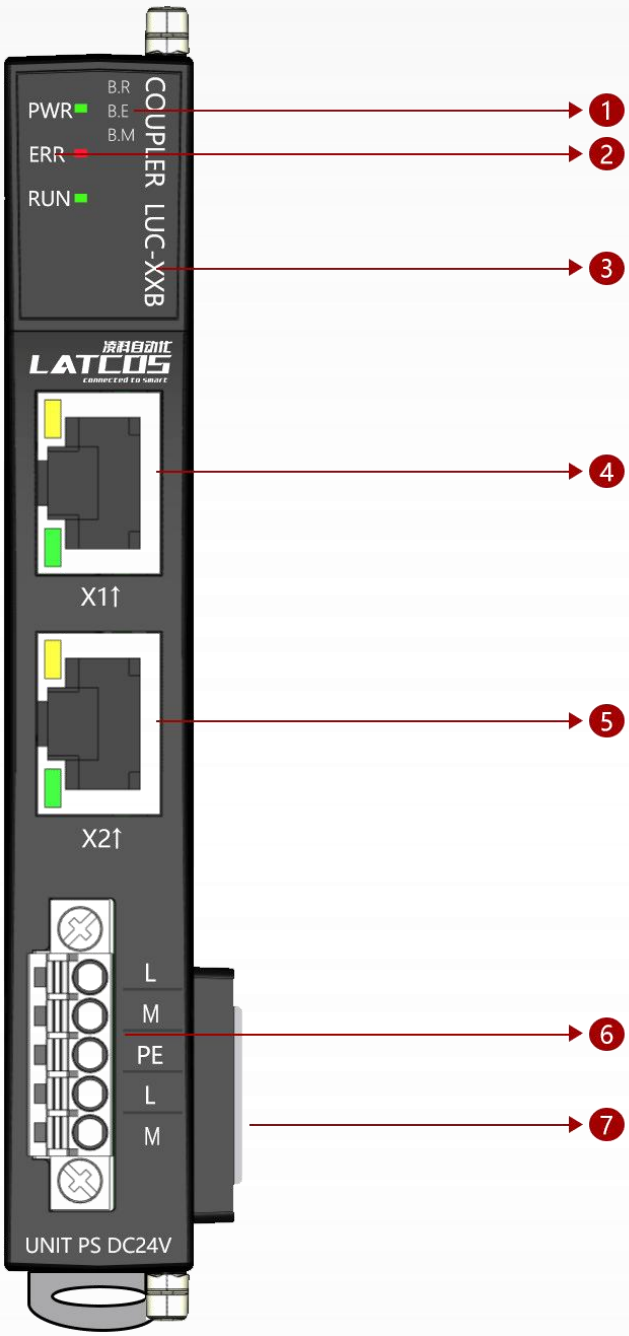
LUC-MTB network adapter supports standard Modbus-TCP server communication, Ethernet support dual port switch cascade function. The device supports simultaneous access of 5 clients, function code 01/02/03/04/05/06/15/16/23, and Modbus application watchdog.

High-performance input and output functions can be provided directly by expanding the I/O interfaces of digital or analog modules. Expandable versions of the modules can also be optionally equipped with different expansion modules to increase the number of IO points required.

Coupler Hardware Parameters		
model number		LUC-MTB
bus interface		2*RJ45
Extended Interface		2*20Pin Board-to-Board Connector
Power connector		Plug-in terminal block 5Pin (with screw fixing)
operating voltage		24V DC (-15%~20%)
Operating Current		100mA
communication protocols		Modbus-TCP
Communication rate (Max)		10/100 Mbaud, automatic transmission speed recognition
addressing mode		Set by master software
Number of extensions supported (Max)		32
I/O Capacity (Max)	Input(bit)	1440
	Output(bit)	1440
Backplane Output	input voltage	24V DC
	amps	2A
Interface/Communication Cable		2*RJ45/ Category 5 twisted-pair cable
Installation		DN35 rail mounting
Environmental parameters		
operating temperature		-40~85℃
Environmental humidity		5%-95% non-condensing
protection class		IP20

Table 16 Coupler Hardware Parameters

2.5.2 Introduction to interfaces



Coupler Interface Description
①Backplane status indicator
②Bus system status indicator
③Module type
④Communication interface X1
⑤Communication interface X2
⑥Module power terminals
⑦Backplane expansion

Note: X1 and X2 are Modbus-TCP communication ports, support switch function, 10M/100M adaptive rate.

2.5.3 LED indicators

The LED indicators of the module are divided into 3 parts: bus system status indicator, backplane indicator, and RJ45 link indicator.

2.5.4 System Status Indication The operating status of the system is described in Table

PWR (power supply)	ERR (Error)	RUN	clarification
○	○	○	Abnormal power supply or no power supply
●	●	○	communication interface failure
●	○	●	The module successfully enters into operation and successfully establishes cyclic data interaction with the master.

Table 17 System Status Indication

● **The green light is on** ● **Indicates that the red light is on** ○ **Not bright**

2.5.5 The operating status of the backplane indication system is described in the table below.

B.R	B.E	B.M	clarification
◐	○	○	Backplane activation in progress
●	○	○	Backplane operating normally
●	●	○	Coupler module backplane error

Table 18 System Status Indication

● **The green light is on** ◐ **Flashing green** ○ **Not bright**

2.5.6 RJ45 indicator light

Under normal circumstances, the RJ45 port indicator should be a long green light, yellow light flashing, if not, it means that the fault occurred. Green light does not light, indicating that the RJ45 port has a connection to the Hub or switch connection is faulty; yellow light does not light, it may be the module itself is faulty as Table 19: RJ45 indicator description

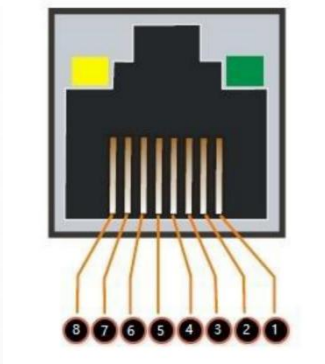
LINK1/LINK2	ACT1/ACT2	clarification
○	irrelevant	RJ45 port without network cable connection or poor connection
●	irrelevant	RJ45 ports are correctly identified to the Ethernet network
irrelevant	○	No data interaction on RJ45 port
irrelevant	●	RJ45 port has data interaction

Table 19 RJ45 Indicator Description

2.5.7 Modbus-TCP Coupler Communication Interface Definition

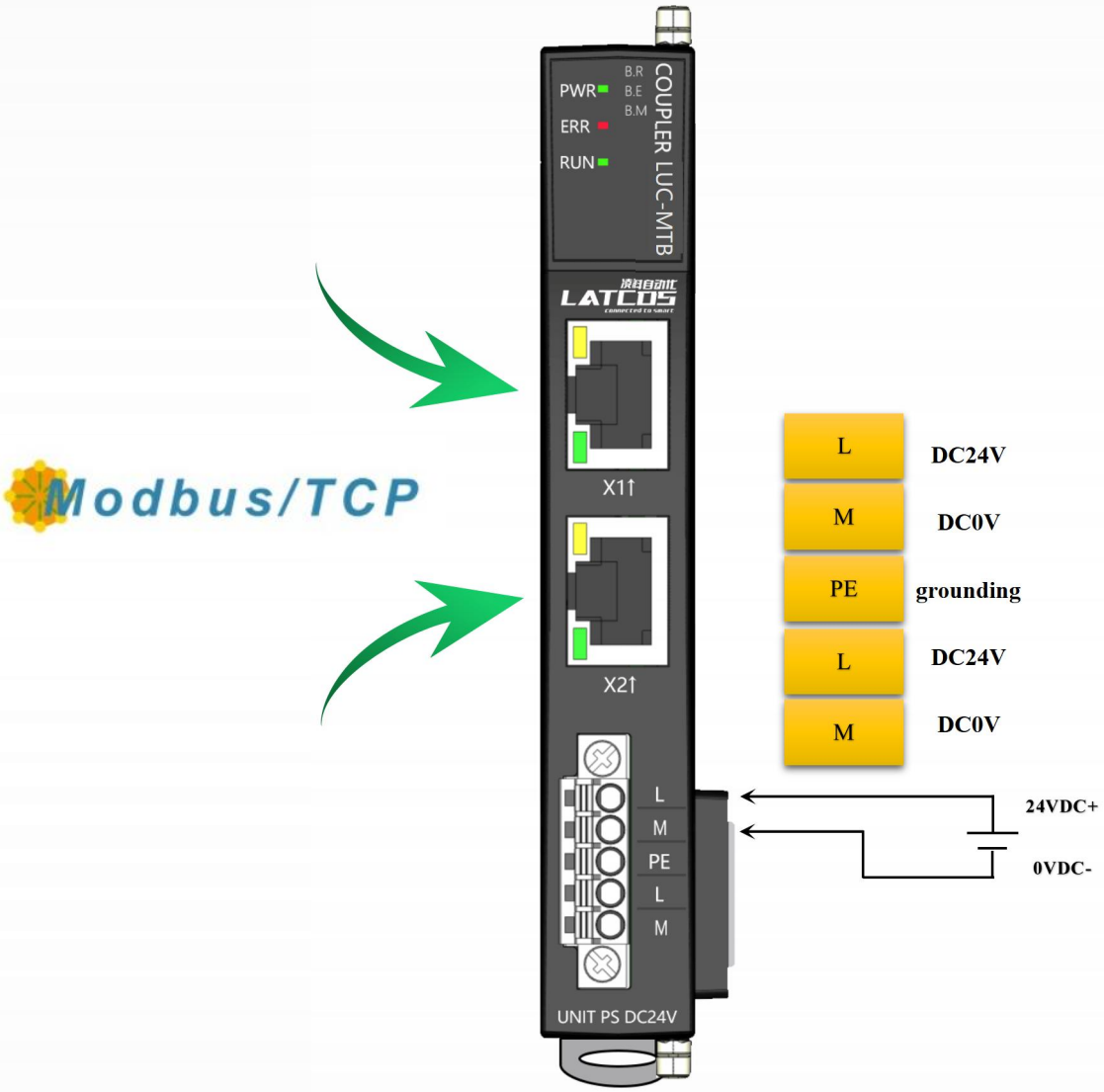
The module uses dual RJ45 sockets to communicate with the physical interface. They are identified as IN and OUT.

Table 20 Modbus-TCP communication interface



pinout	code	descriptive
1	TX+	Data transmission +
2	TX-	Data transmission -
3	RX+	Data reception+
4	NC	unused
5	NC	unused
6	RX-	Data reception -
7	NC	unused
8	NC	unused
Connector Housings	PE	grounding

2.5.8 Modbus-TCP Coupler Electrical Wiring Diagrams



2.5.9 Network topology

The following figure shows a typical network layout for Modbus-TCP IO. As shown in Figure 2-1, 2-2, 2-3

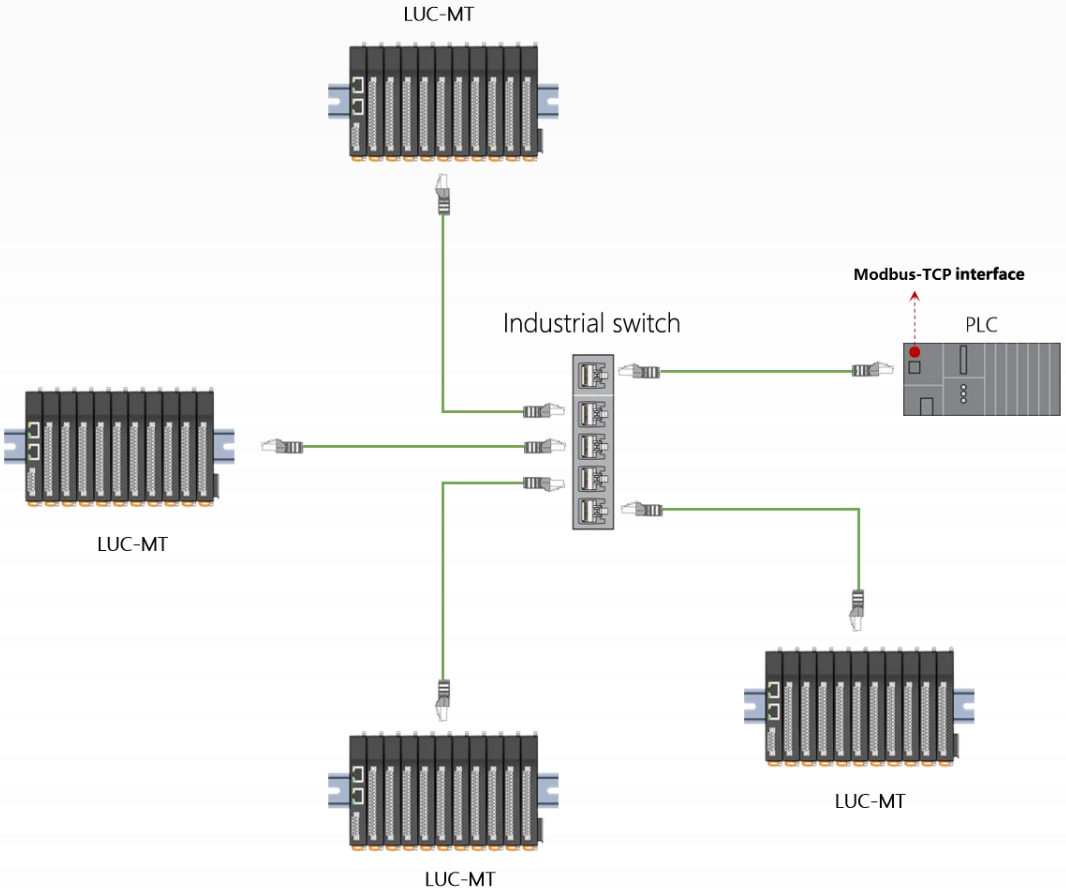


Figure 2-1 Modbus-TCP Star Network Topology

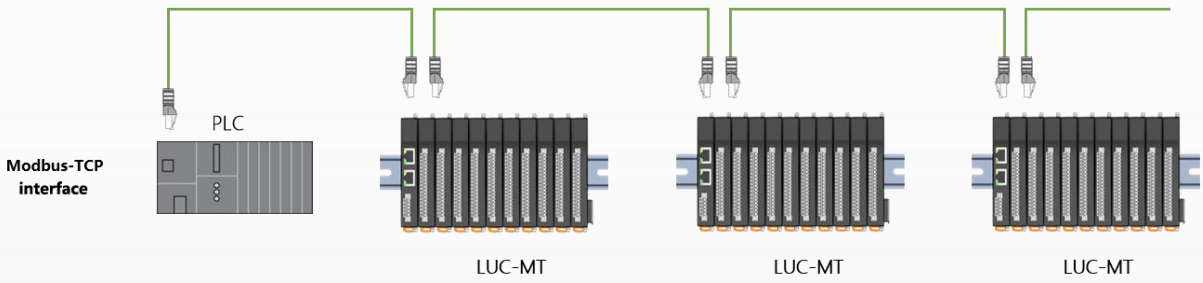


Figure 2-2 Modbus-TCP daisy chain topology

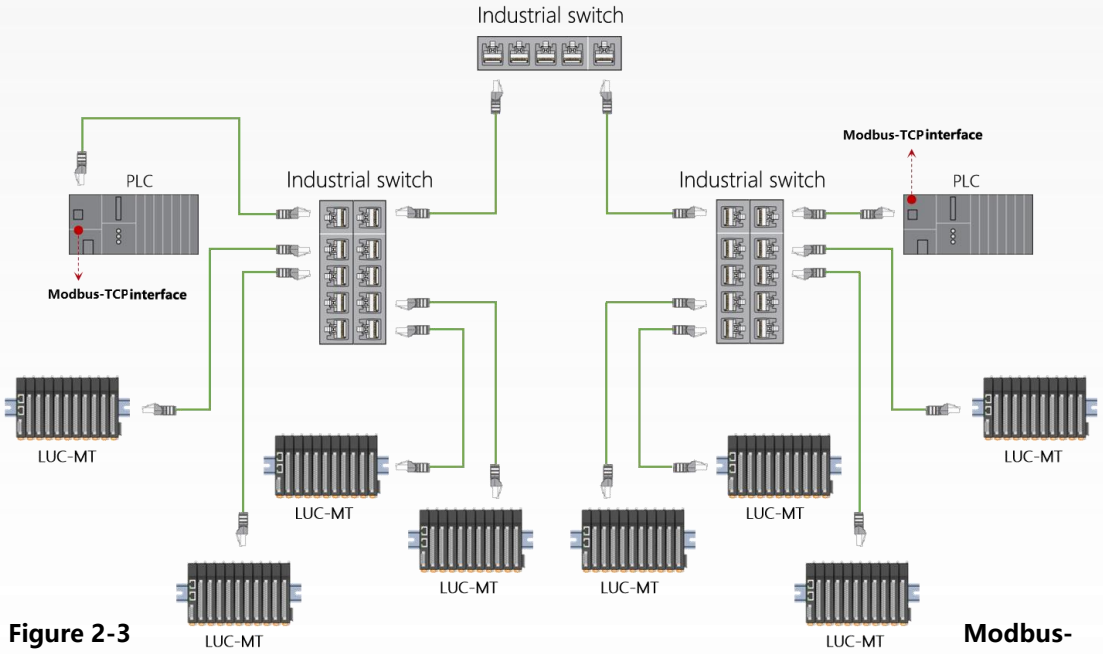


Figure 2-3 Modbus-TCP Tree Network Topology

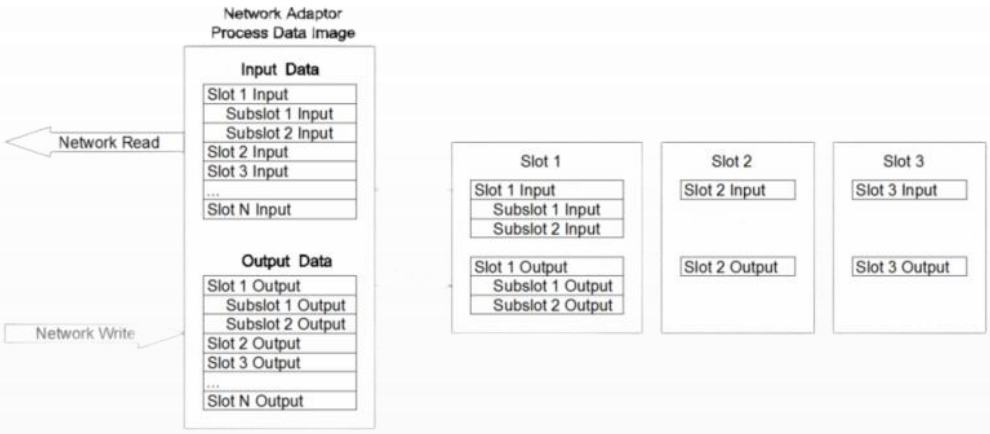
2.5.10 Process data definition

(1), adapter process data definition

The Modbus-TCP adapter itself has no input or output process data.

(2), IO Module Process Data Mapping

The network adapter reads and writes the IO module input and output process data in real time through the internal bus, and its data mapping model is shown in the following figure:



The Modbus address mapping table varies depending on the module combination, and can be viewed through the LAE Config configuration software.

3. Extension modules

3.1 ES-1160D (16-channel digital input module)

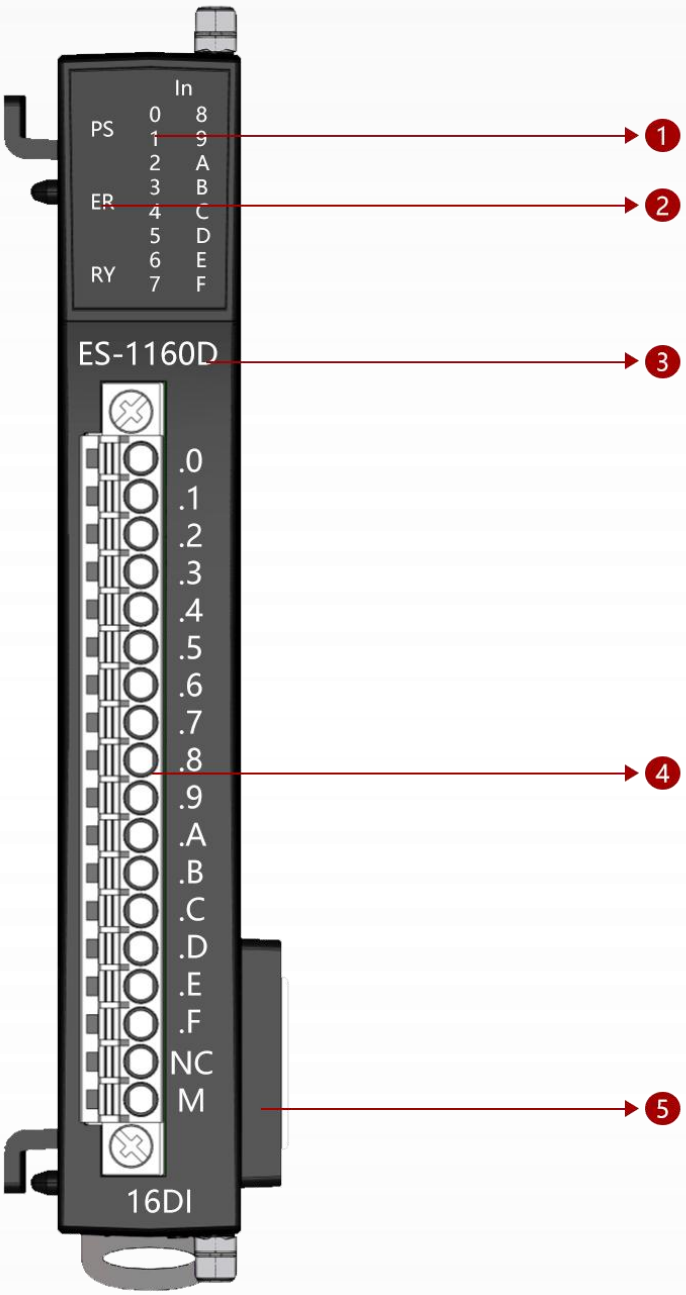
3.1.1 Module overview

- The module supports 16 channels of digital inputs, NPN or PNP inputs, input voltage DC24V.
- The module can collect digital output signals (dry contact or active output) from field devices.
- The module can access 2-wire or 3-wire digital sensors.
- The internal bus and field inputs of the module are isolated by optocouplers.
- The module comes with 16 digital input channel LED indicators.
- The module can set the digital signal input filtering time.

3.1.2 Module parameters

Hardware parameters	
model number	ES1160D
Backplane Current	20MA
Extended Interface	2*20Pin Board-to-Board Connector
connect a wire	I/O wiring: Max.1.5mm^2(AWG 16)
Installation	DN35 rail mounting
Environmental parameters	
operating temperature	-40~85℃
Environmental humidity	5%-95% non-condensing
protection class	IP20
input parameter	
channel number	16CH
Type of access	2 Bytes
Input Type	Source or Drain
Rated Input Voltage	24 V DC (-15 %/+20 %), (IEC61131-2, type 2)
"0" signal level	-3...+5 V (IEC61131-2, type 2)
"1" signal level	15...30 V (IEC61131-2, type2)
Input Current	Typ. 10mA/Ch (IEC61131-2, type 2)
Ton	Type. 18uS / Max. 35uS
Toff	Type. 135uS / Max. 250uS
electrical isolation	Input/control area: 500V DC

3.1.3 Introduction to interfaces



Expansion Module Interface Description

①Digital input status indicator

②Backplane system status indicator

③Module type

④Digital input terminal

⑤Backplane Expansion Interface

3.1.4 LED indicators

The LED indicators of the module are divided into two parts: the backplane status indicator and the input status indicator.

3.1.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	◐	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	●	Expansion Module Backplane Error

Table 21 System Status Indication

● **The green light is on** ◐ **Flashing red** ◐ **Flashing green** ○ **Not bright**

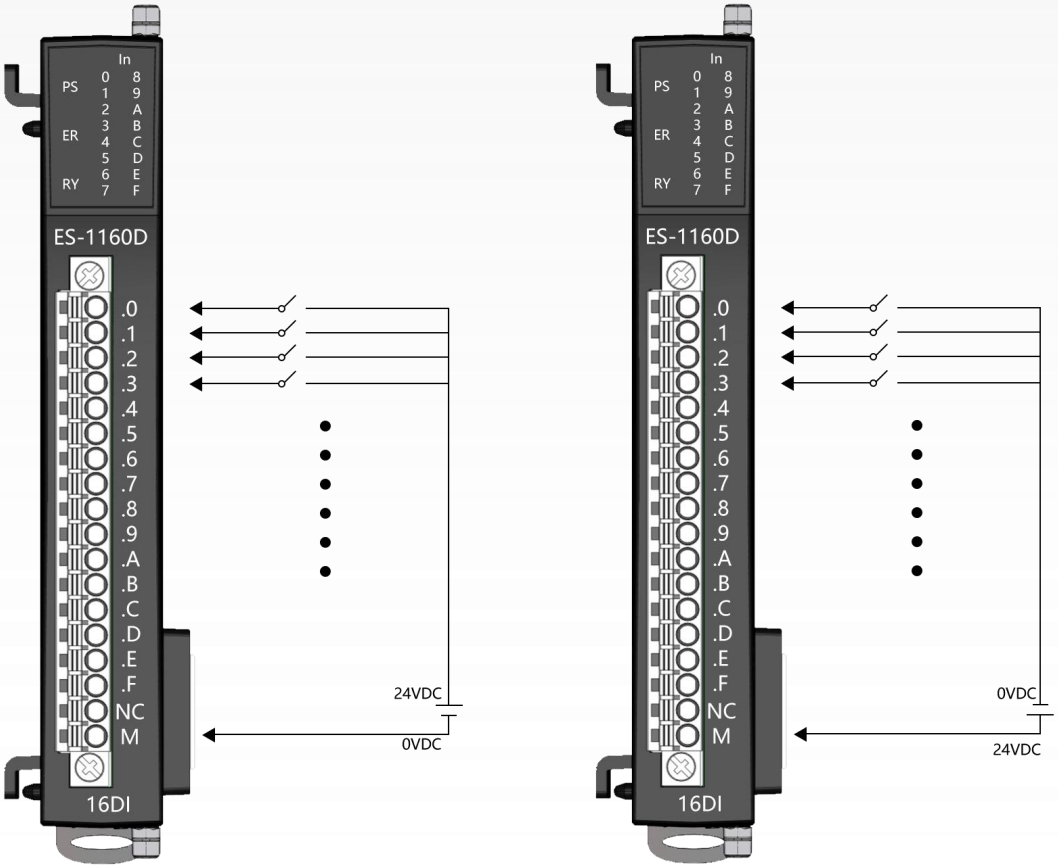
3.1.6 Input status indication

The digital input port uses a green LED to indicate the status of the corresponding channel. A bright LED indicates that the logic state of the input port is "1", and a dark LED indicates that the logic state of the input port is "0".

3.1.7 Definition of terminal blocks

Terminal Serial Number	notation	clarification
1	.0	Digital Input Signal
2	.1	
3	.2	
4	.3	
5	.4	
6	.5	
7	.6	
8	.7	
9	.8	
10	.9	
11	.A	
12	.B	
13	.C	
14	.D	
15	.E	
16	.F	
17	NC	unoccupied
18	M	Input common point

3.1.8 Wiring diagram



High-level input wiring method (PNP) Low-level input wiring method (NPN)

3.1.9 Process data definitions

input data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	.7	.6	.5	.4	.3	.2	.1	.0
BYTE 1	.F	.E	.D	.C	.B	.A	.9	.8

Data description: DI (0-F): When the corresponding channel to the input signal is valid, the position is "1"; when the input signal is invalid, the position is "0".

3.1.10 Configuration parameter definitions

input data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	Input Filter Time (Filter)							

Data description

Parameter name		unit (of measure)	specification	Input Range	clarification
Chinese	English (language)				
Input Filter Time	Filter	ms	decimal system	0-255 (default: 5)	

3.2 ES-1320D (32-channel digital input module)

3.2.1 Module overview

◆ The module supports 32 channels of digital inputs, NPN or PNP inputs, and input voltage DC24V.

◆ The module can collect digital output signals (dry contact or active output) from field devices.

◆ The module can access 2-wire or 3-wire digital sensors.

◆ The internal bus and field inputs of the module are isolated by optocouplers.

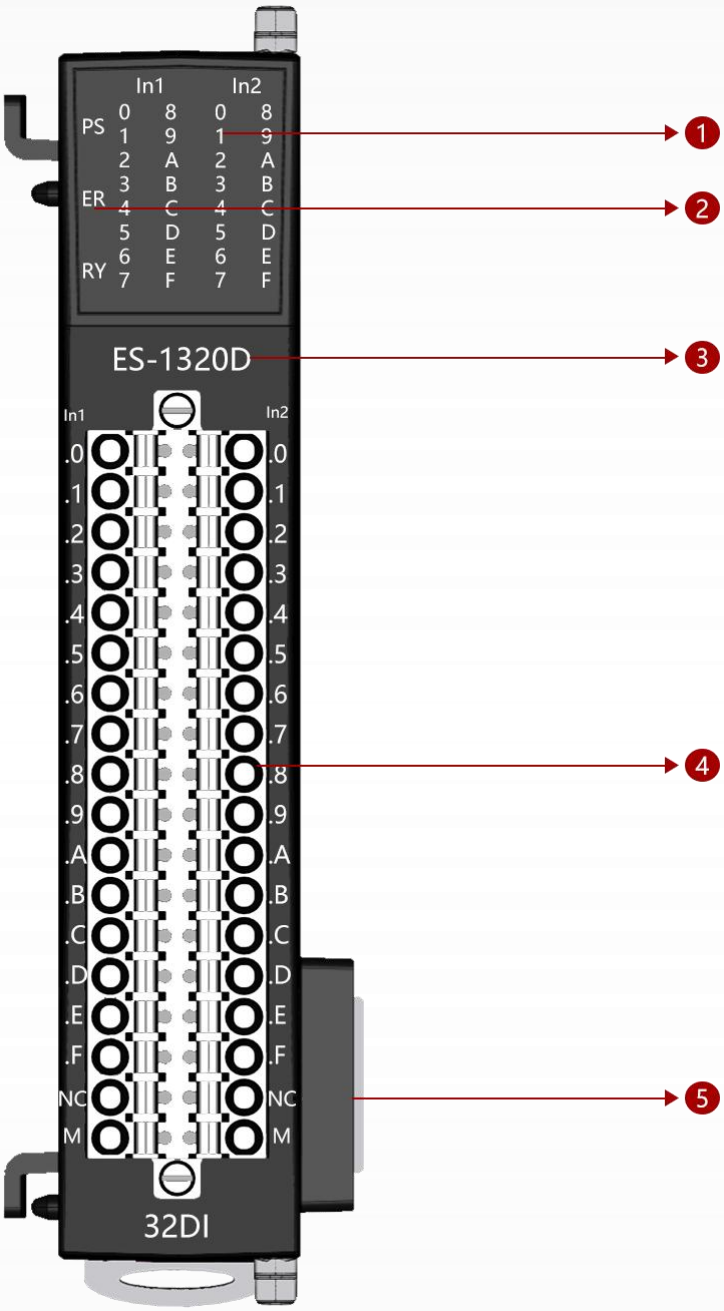
◆ Module with 32 digital input channel LED indicators.

◆ The module can set the digital signal input filtering time.

3.2.2 Module parameters

Hardware parameters	
model number	ES1320D
Backplane Current	20MA
Extended Interface	2*20Pin Board-to-Board Connector
connect a wire	I/O wiring: Max.1.5mm²(AWG 16)
Installation	DN35 rail mounting
Environmental parameters	
operating temperature	-40~85℃
Environmental humidity	5%-95% non-condensing
protection class	IP20
input parameter	
channel number	32CH
Type of access	4 Bytes
Input Type	Source or Drain
Rated Input Voltage	24 V DC (-15 %/+20 %), (IEC61131-2, type 2)
"0" signal level	-3...+5 V (IEC61131-2, type 2)
"1" signal level	15...30 V (IEC61131-2, type2)
Input Current	Typ. 10mA/Ch (IEC61131-2, type 2)
Ton	Type. 18uS / Max. 35uS
Toff	Type. 135uS / Max. 250uS
electrical isolation	Input/control area: 500V DC

3.2.3 Introduction to Interfaces



Expansion Module Interface Description

①Digital input status indicator

②Backplane system status indicator

③Module type

④Digital input terminal

⑤Backplane Expansion Interface

3.2.4 LED indicators

The LED indicators of the module are divided into two parts: the backplane status indicator and the input status indicator.

3.2.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	○	Expansion Module Backplane Error

Table 22 System Status Indication

● **The green light is on** ◐ **Flashing red** ◐ **Flashing green** ○ **Not bright**

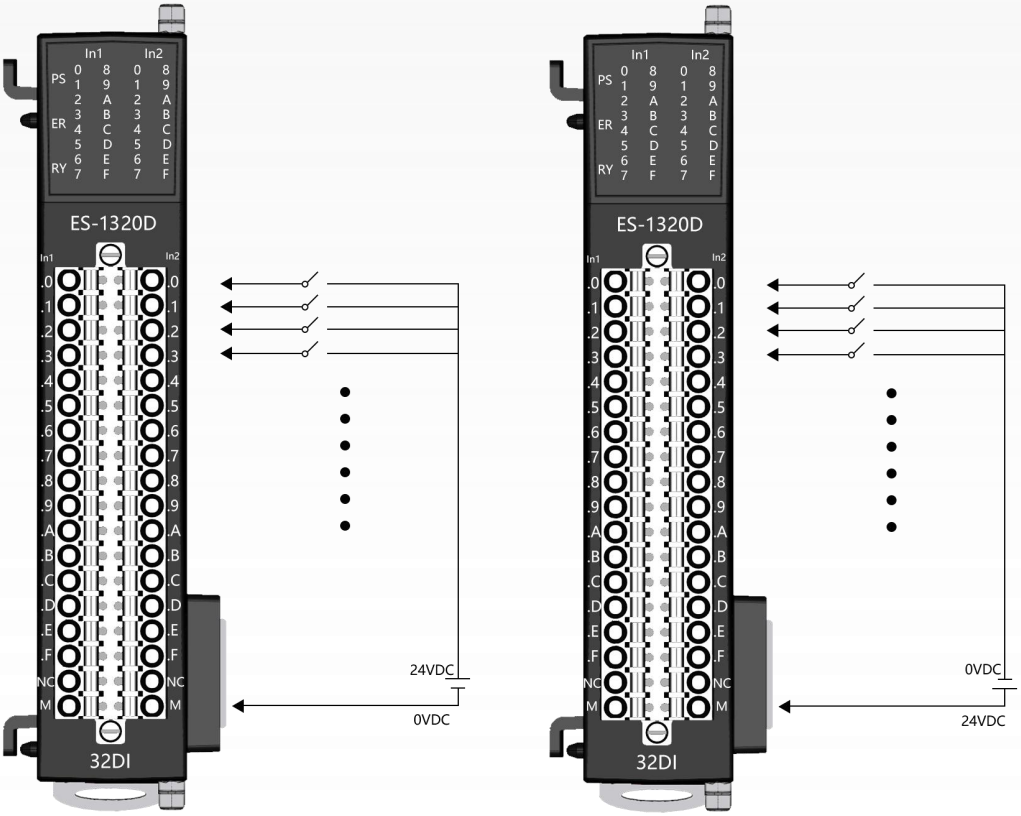
3.2.6 Input status indication

The digital input port uses a green LED to indicate the status of the corresponding channel. A bright LED indicates that the logic state of the input port is "1", and a dark LED indicates that the logic state of the input port is "0".

3.2.7 Definition of terminal blocks

Terminal Serial Number	notation	clarification	Terminal Serial Number	notation
the left side	In1		right, the right	In2
1	.0	Digital Input Signal	1	.0
2	.1		2	.1
3	.2		3	.2
4	.3		4	.3
5	.4		5	.4
6	.5		6	.5
7	.6		7	.6
8	.7		8	.7
9	.8		9	.8
10	.9		10	.9
11	.A		11	.A
12	.B		12	.B
13	.C		13	.C
14	.D		14	.D
15	.E		15	.E
16	.F		16	.F
17	NC	unoccupied	17	NC
18	M	Input common point	18	M

3.2.8 Wiring diagram



High-level input wiring method (PNP) Low-level input wiring method (NPN)

3.2.9 Process data definitions

input data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	.7	.6	.5	.4	.3	.2	.1	.0
BYTE 1	.F	.E	.D	.C	.B	.A	.9	.8
BYTE 2	.7	.6	.5	.4	.3	.2	.1	.0
BYTE 3	.F	.E	.D	.C	.B	.A	.9	.8

Data description: DI (0-F): When the corresponding channel to the input signal is valid, the position is "1"; when the input signal is invalid, the position is "0".

3.2.10 Configuration parameter definitions

input data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	Input Filter Time (Filter)							

Data description

Parameter name		unit (of measure)	specification	Input Range	clarification
Chinese	English (language)				
Input Filter Time	Filter	ms	decimal system	0-255 (default: 5)	

3.3 ES-2161/ES-2162D(16-channel digital transistor output module)

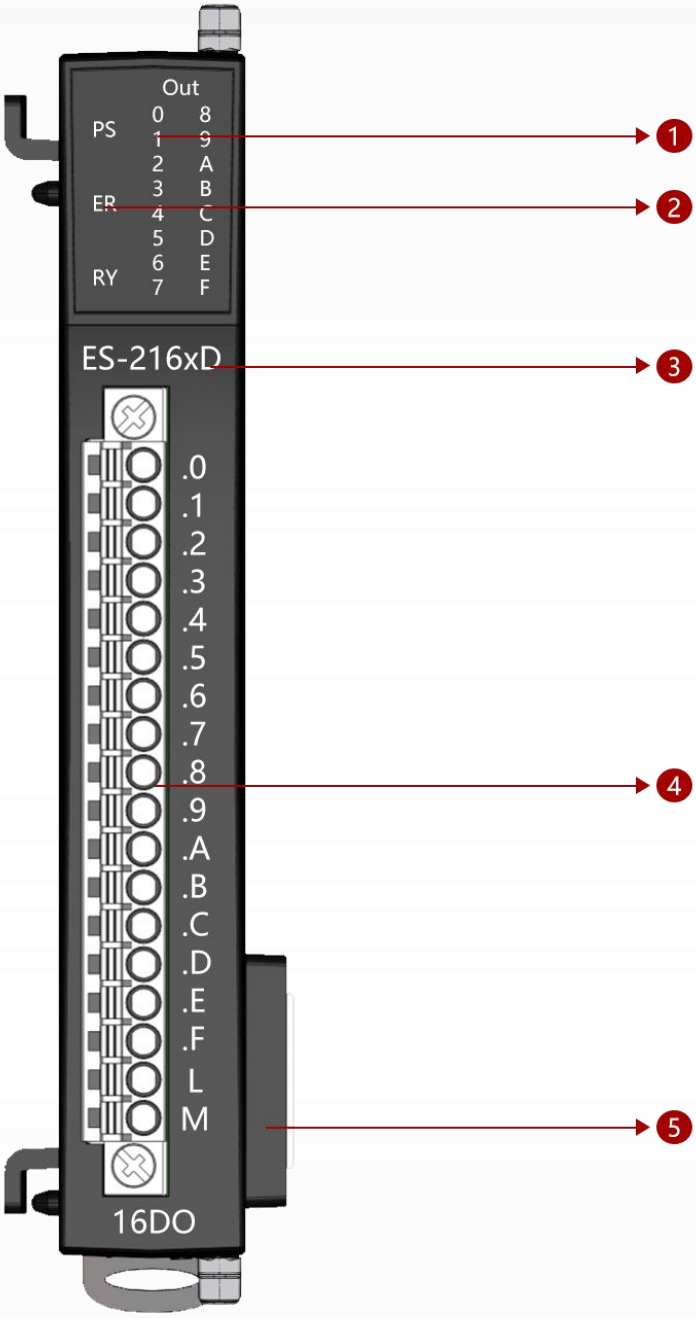
3.3.1 Module overview

- The module supports 16 channels of digital output.
- ES-2161D is a high level output, ES-2162D is a low level output, output voltage DC24V.
- The module can drive field devices (intermediate relays, solenoid valves, etc.).
- The internal bus and field inputs of the module are isolated by optocouplers.
- The module supports the output signal safe mode function, which allows you to define the state of the output point in case of bus communication disconnection.
- The module comes with 16 digital output channel LED indicators.
- The module supports short circuit protection and overload protection.
- The module is equipped with thermal shutdown and overcurrent protection.

3.3.2 Module parameters

Hardware parameters		
model number	ES2161D	ES2162D
Backplane current	20MA	
Extended Interface	2*20Pin Board-to-Board Connector	
connect a wire	I/O wiring: Max.1.5mm²(AWG 16)	
Installation	DN35 rail mounting	
Environmental parameters		
operating temperature	-40~85℃	
Environmental humidity	5%-95% non-condensing	
protection class	IP20	
output parameter		
channel number	16CH	
Type of access	2 Bytes	
Output type	Source type high level	Drain Low Output (NPN)
Rated output voltage	24 V DC (-15 %/+20 %), (IEC61131-2, type 2)	
output connector	Plug-in connectors	
Load Type	Pure Resistive, Inductive, Bulb	
Maximum Output Current	Max. 0.5 A/Ch, independent short-circuit protection	
Ton	Type. 2.4uS / Max. 2.4uS	
Toff	Type. 50uS / Max. 875uS (no load)	
Rated total current	8A	
electrical isolation	Input/control area: 500V DC	

3.3.3 Introduction to interfaces



Expansion Module Interface Description

①Digital output status indicator

②Backplane system status indicator

③Module type

④Digital output terminal

⑤Backplane Expansion Interface

3.2.4 LED indicators

The LED indicators of the module are divided into two parts: the backplane status indicator and the output status indicator.

3.3.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	○	Expansion Module Backplane Error

Table 23 System Status Indication

● **The green light is on** ◐ **Flashing red** ◐ **Flashing green** ○ **Not bright**

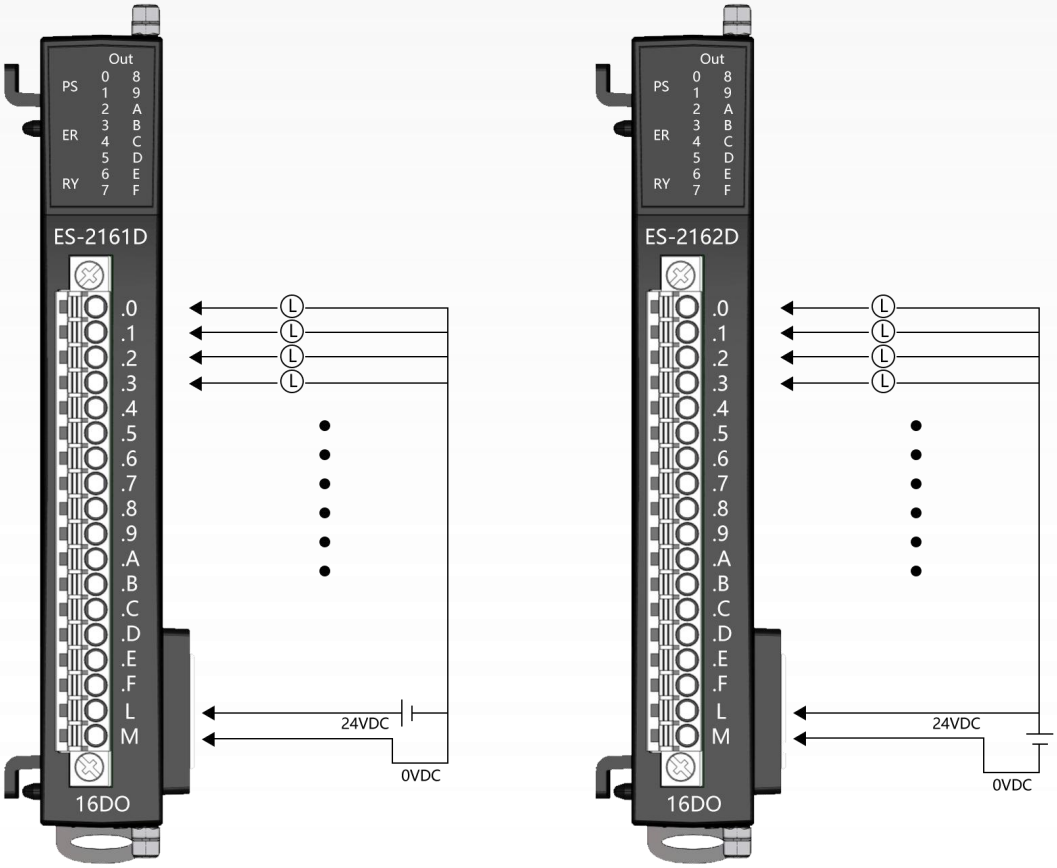
3.3.6 Output status indication

The digital output ports use green LEDs to indicate the status of the corresponding channels. A bright light indicates that the output port logic status is "1", and a dark light indicates that the output port logic status is "0".

3.3.7 Definition of terminal blocks

Terminal Serial Number	notation	clarification
1	.0	Digital Output Signal
2	.1	
3	.2	
4	.3	
5	.4	
6	.5	
7	.6	
8	.7	
9	.8	
10	.9	
11	.A	
12	.B	
13	.C	
14	.D	
15	.E	
16	.F	
17	L	External power supply 24V+
18	M	External power supply 24V-

3.3.8 Wiring diagrams



High level output wiring method (PNP) Low level output wiring method (NPN)

3.3.9 Process data definitions

output data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	.7	.6	.5	.4	.3	.2	.1	.0
BYTE 1	.F	.E	.D	.C	.B	.A	.9	.8

Data description: DQ (0-F): When the corresponding channel to the input signal is valid, the position is "1"; when the input signal is invalid, the position is "0".

3.3.10 Configuration parameter definitions

output data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0 (DO Error_Mode bits 0-7)	DO Error_Mode For .7	DO Error_Mode For .6	DO Error_Mode For .5	DO Error_Mode For .4	DO Error_Mode For .3	DO Error_Mode For .2	DO Error_Mode For .1	DO Error_Mode For .0
BYTE 1 (DO Error_Value bits 0-7)	DO Error Value For .7	DO Error Value For .6	DO Error Value For .5	DO Error Value For .4	DO Error Value For .3	DO Error Value For .2	DO Error Value For .1	DO Error Value For .0
BYTE 2 (DO Error_Mode bits 8-15)	DO Error_Mode For .	DO Error_Mode For .	DO Error_Mode For .	DO Error_Mode For .	DO Error_Mode For .	DO Error_Mode For .	DO Error_Mode For .9	DO Error_Mode For .8
BYTE 3 (DO Error_Value bits 8-15)	DO Error Value For .F	DO Error Value For .E	DO Error Value For .D	DO Error Value For .C	DO Error Value For .B	DO Error Value For .A	DO Error Value For .9	DO Error Value For .8

Data Description:

Parameter name		unit (of measure)	specification	Input Range	clarification
Chinese	**English (language)**				
Failure mode enable	DO Error_Mode bits	-	decimal system	0-255 (Default: 0)	Fail-safe state value enable for DQ0.x port, the binary bit of this parameter corresponds to DQ0.x port (Bit0 corresponds to DQ-0.0 and so on). When the module enters the fail-safe state, if the bit corresponding to "Error Mode" is "1", the value of the bit corresponding to "Error Value[7..0]" is output to the DQ0.x port (Bit0 corresponds to DQ-0.0 and so on). If the bit corresponding to "Error Mode" is "1", the value of the bit corresponding to "Error Value[7..0]" is output to the corresponding DQ0.x port.
Fault value Safety status value	DO Error_Value bits	-	decimal system	0-255 (Default: 0)	If the binary bit corresponding to the "Error Mode [7..0]" parameter is set to enable, the value of this parameter is output to the DQ port when the system enters the fail-safe state.

3.4 ES-2321/ES-2322D (32-channel digital transistor output module)

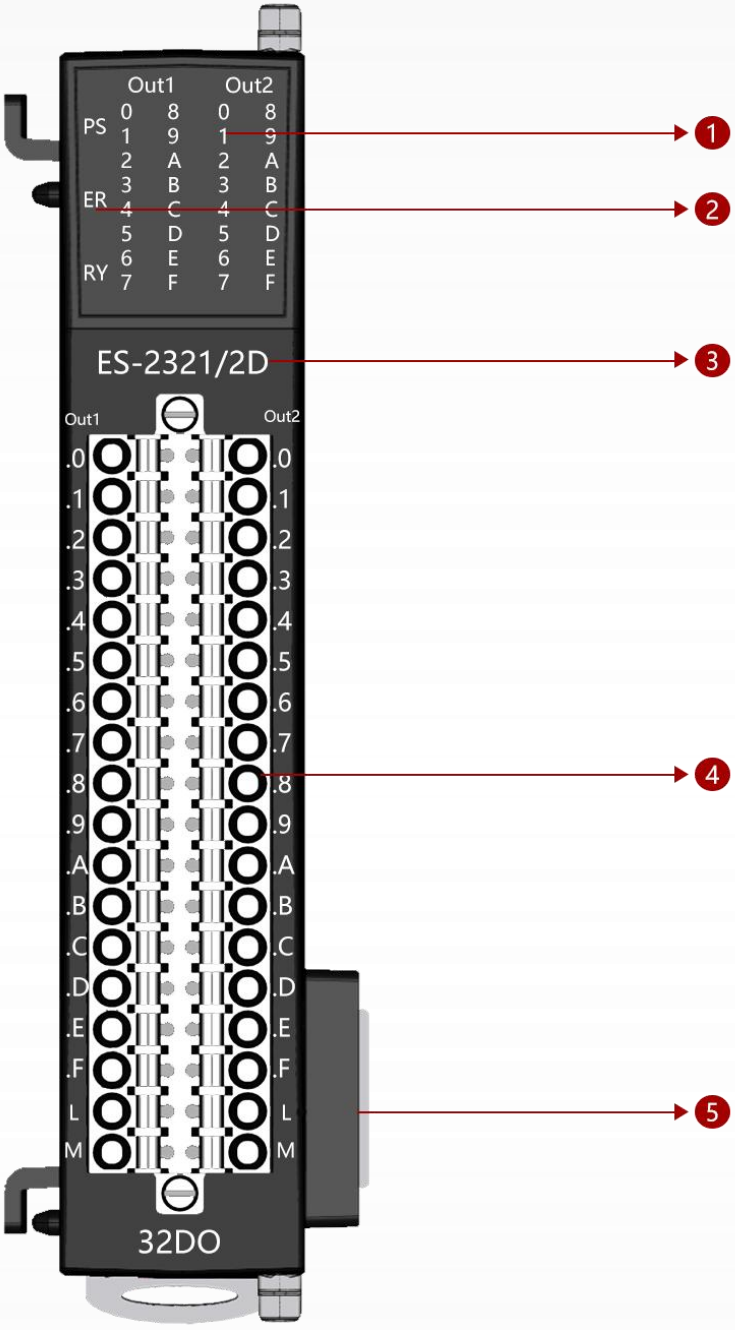
3.4.1 Module overview

- The module supports 32 channels of digital output.
- ES-2321D is a high level output, ES-2322D is a low level output, output voltage DC24V.
- The module can drive field devices (intermediate relays, solenoid valves, etc.).
- The internal bus and field inputs of the module are isolated by optocouplers.
- The module supports the output signal safe mode function, which allows you to define the state of the output point in case of bus communication disconnection.
- The module comes with 32 digital output channel LED indicators.
- The module supports short circuit protection and overload protection.
- The module is equipped with thermal shutdown and overcurrent protection.

3.4.2 Module parameters

Hardware parameters		
model number	ES2321D	ES2322D
Backplane Current	20MA	
Extended Interface	2*20Pin Board-to-Board Connector	
connect a wire	I/O wiring: Max.1.5mm²(AWG 16)	
Installation	DN35 rail mounting	
Environmental parameters		
operating temperature	-40~85℃	
Environmental humidity	5%-95% non-condensing	
protection class	IP20	
output parameter		
channel number	32CH	
Type of access	4 Bytes	
Output type	Source Type High Level	Drain Low Output (NPN)
Rated output voltage	24 V DC (-15 %/+20 %), (IEC61131-2, type 2)	
output connector	Plug-in connectors	
Load Type	Pure Resistive, Inductive, Bulb	
Maximum Output Current	Max. 0.5 A/Ch, independent short-circuit protection	
Ton	Type. 2.4uS / Max. 2.4uS	
Toff	Type. 50uS / Max. 875uS (no load)	
Rated total current	8A	
electrical isolation	Input/control area: 500V DC	

3.4.3 Introduction to interfaces



Expansion Module Interface Description

①Digital output status indicator

②Backplane system status indicator

③Module type

④Digital output terminal

⑤Backplane Expansion Interface

3.2.4 LED indicators

The LED indicators of the module are divided into two parts: the backplane status indicator and the output status indicator.

3.4.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	○	Expansion Module Backplane Error

Table 24 System Status Indication

● **The green light is on** ◐ **Flashing red** ◐ **Flashing green** ○ **Not bright**

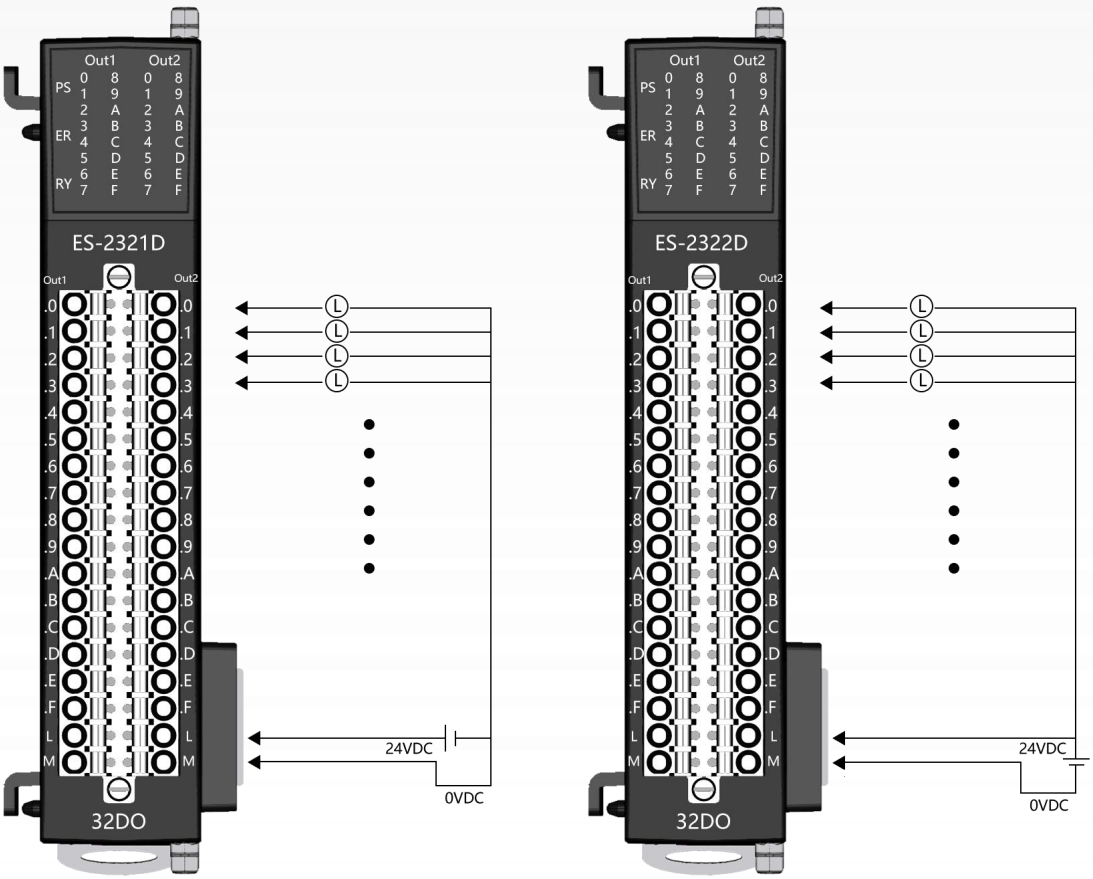
3.4.6 Output status indication

The digital output ports use green LEDs to indicate the status of the corresponding channels. A bright light indicates that the output port logic status is "1", and a dark light indicates that the output port logic status is "0".

3.4.7 Definition of terminal blocks

Terminal Serial Number	notation	clarification	Terminal Serial Number	notation
the left side	**Out1**		**right, the right**	**Out2**
1	.0	Digital Output Signal	1	.0
2	.1		2	.1
3	.2		3	.2
4	.3		4	.3
5	.4		5	.4
6	.5		6	.5
7	.6		7	.6
8	.7		8	.7
9	.8		9	.8
10	.9		10	.9
11	.A		11	.A
12	.B		12	.B
13	.C		13	.C
14	.D		14	.D
15	.E		15	.E
16	.F		16	.F
17	L	External power supply 24V+	17	L
18	M	External power supply 24V-	18	M

3.4.8 Wiring diagrams



High level output wiring method (PNP) Low level output wiring method (NPN)

3.4.9 Process data definitions

output data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	.7	.6	.5	.4	.3	.2	.1	.0
BYTE 1	.F	.E	.D	.C	.B	.A	.9	.8
BYTE 2	.7	.6	.5	.4	.3	.2	.1	.0
BYTE 3	.F	.E	.D	.C	.B	.A	.9	.8

Data description: DQ (0-F): When the corresponding channel to the input signal is valid, the position is "1"; when the input signal is invalid, the position is "0".

3.4.10 Configuration parameter definitions

output data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0 (DO Error_Mode bits 0-7)	DO Error_Mode For .7	DO Error_Mode For .6	DO Error_Mode For .5	DO Error_Mode For .4	DO Error_Mode For .3	DO Error_Mode For .2	DO Error_Mode For .1	DO Error_Mode For .0
BYTE 1 (DO Error_Value bits 0-7)	DO Error Value For .7	DO Error Value For .6	DO Error Value For .5	DO Error Value For .4	DO Error Value For .3	DO Error Value For .2	DO Error Value For .1	DO Error Value For .0
BYTE 2 (DO Error_Mode bits 8-15)	DO Error_Mode For .	DO Error_Mode For .	DO Error_Mode For .	DO Error_Mode For .	DO Error_Mode For .	DO Error_Mode For .	DO Error_Mode For .9	DO Error_Mode For .8
BYTE 3 (DO Error_Value bits 8-15)	DO Error Value For .F	DO Error Value For .E	DO Error Value For .D	DO Error Value For .C	DO Error Value For .B	DO Error Value For .A	DO Error Value For .9	DO Error Value For .8
.....	.....							

Data Description:

Parameter name		unit (of measure)	specification	Input Range	clarification
Failure mode enable	DO Error_Mode bits	-	decimal system	0-255 (Default: 0)	Fail-safe state value enable for DQ0.x port, the binary bit of this parameter corresponds to DQ0.x port (Bit0 corresponds to DQ-0.0 and so on). When the module enters the fail-safe state, if the bit corresponding to "Error Mode" is "1", the value of the bit corresponding to "Error Value[7..0]" is output to the DQ0.x port (Bit0 corresponds to DQ-0.0 and so on). If the bit corresponding to "Error Mode" is "1", the value of the bit corresponding to "Error Value[7..0]" is output to the corresponding DQ0.x port.
Fault value Safety status value	DO Error_Value bits	-	decimal system	0-255 (Default: 0)	If the binary bit corresponding to the "Error Mode [7..0]" parameter is set to enable, the value of this parameter is output to the DQ port when the system enters the fail-safe state.

3.5 ES-2083D (8-channel digital relay output module)

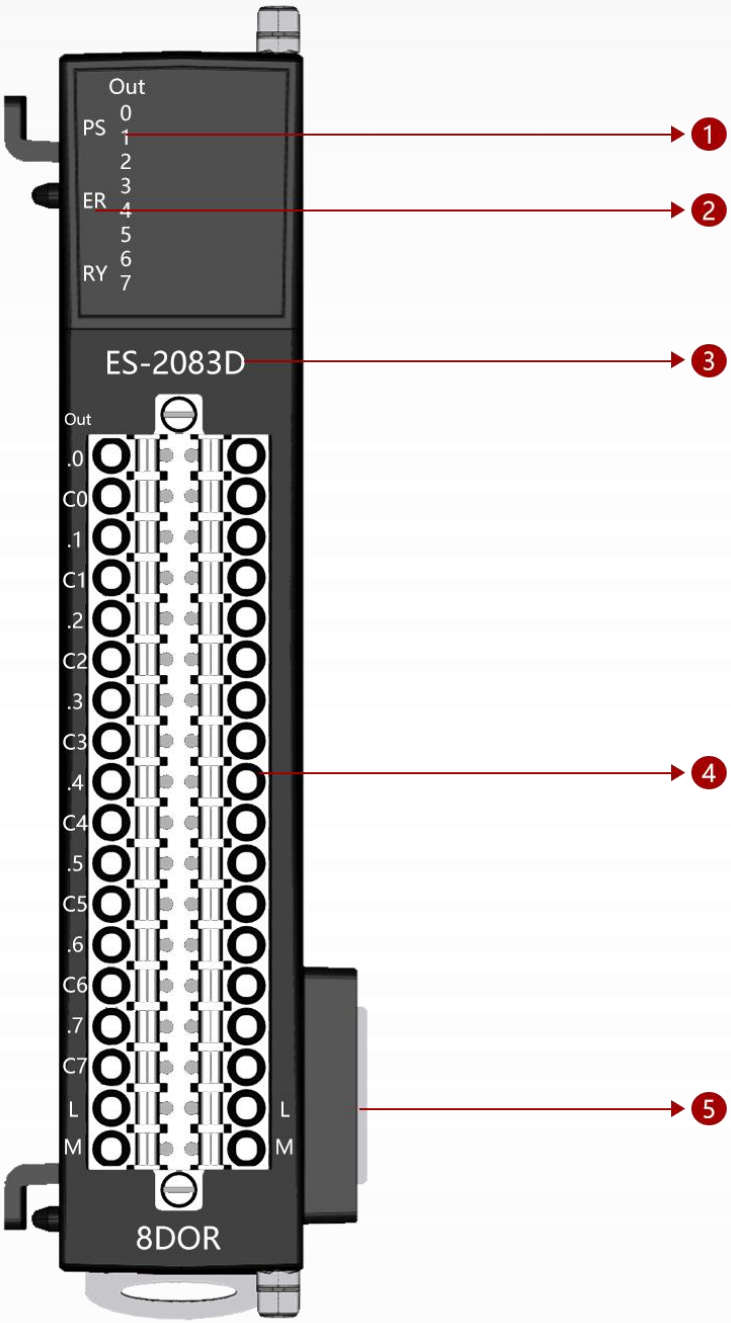
3.5.1 Module overview

- The module supports 8 channels of digital relay outputs rated at 5A.
- The module can drive field devices (intermediate relays, solenoid valves, etc.).
- The internal bus and field inputs of the module are isolated by optocouplers.
- The module supports the output signal safe mode function, which allows you to define the state of the output point in case of bus communication disconnection.
- The module comes with 8 digital output channel LED indicators.

3.5.2 Module parameters

Hardware parameters	
model number	ES2083D
Backplane Current	20MA
Extended Interface	2*20Pin Board-to-Board Connector
connect a wire	I/O wiring: Max.1.5mm²(AWG 16)
Installation	DN35 rail mounting
Environmental parameters	
operating temperature	-40~85℃
Environmental humidity	5%-95% non-condensing
protection class	IP20
output parameter	
channel number	8CH
Type of access	1 Bytes
Output type	relay output
output connector	Plug-in connectors
Load Type	Pure Resistive, Inductive, Bulb
Maximum Output Current	Max. 5 A/Ch, independent per channel
Ton	Type. 12uS / Max. 25uS
Toff	Type. 10mS / Max. 20mS (no load)
electrical isolation	Input/control area: 500V DC

3.5.3 Introduction to interfaces



Expansion Module Interface Description

①Digital output status indicator

②Backplane system status indicator

③Module type

④Digital output terminal

⑤ Backplane Expansion Interface

3.5.4 LED indicators

The LED indicators of the module are divided into two parts: the backplane status indicator and the output status indicator.

3.5.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	○	Expansion Module Backplane Error

Table 25 System Status Indication

● **The green light is on** ◐ **Flashing red** ◐ **Flashing green** ○ **Not bright**

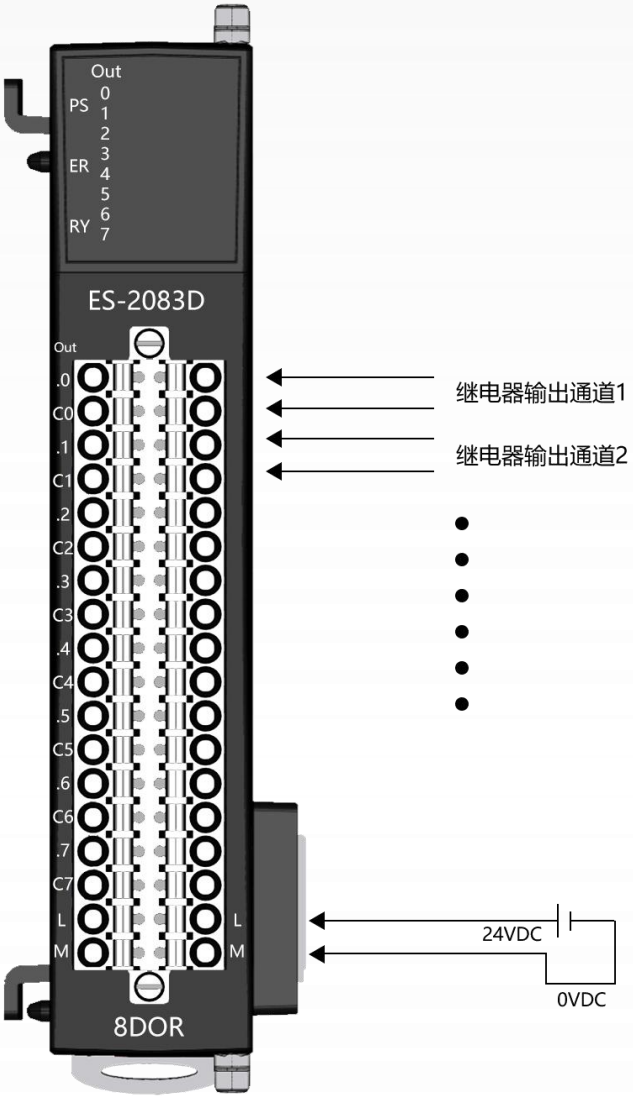
3.5.6 Output status indication

The digital output ports use green LEDs to indicate the status of the corresponding channels. A bright light indicates that the output port logic status is "1", and a dark light indicates that the output port logic status is "0".

3.5.7 Definition of terminal blocks

Terminal Serial Number	notation	Terminal Serial Number	notation	clarification
the left side	out	right, the right		
1	.0	1	In parallel with the left	Digital Output Signal
2	C0	2	In parallel with the left	
3	.1	3	In parallel with the left	
4	C1	4	In parallel with the left	
5	.2	5	In parallel with the left	
6	C2	6	In parallel with the left	
7	.3	7	In parallel with the left	
8	C3	8	In parallel with the left	
9	.4	9	In parallel with the left	
10	C4	10	In parallel with the left	
11	.5	11	In parallel with the left	
12	C5	12	In parallel with the left	
13	.6	13	In parallel with the left	
14	C6	14	In parallel with the left	
15	.7	15	In parallel with the left	
16	C7	16	In parallel with the left	
17	L	17	L	External power supply 24V+
18	M	18	M	External power supply 24V-

3.5.8 Wiring diagram



3.5.9 Process data definitions

output data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	.7	.6	.5	.4	.3	.2	.1	.0

Data description: DQ (0-F): When the corresponding channel to the input signal is valid, the position is "1"; when the input signal is invalid, the position is "0".

3.5.10 Configuration parameter definitions

output data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0 (DO Error_ Mode bits 0-7)	DO Error_ Mode For .7	DO Error_ Mode For .6	DO Error_ Mode For .5	DO Error_ Mode For .4	DO Error_ Mode For .3	DO Error_ Mode For .2	DO Error_ Mode For .1	DO Error_ Mode For .0
BYTE 1 (DO Error_ Value bits 0-7)	DO Error Value For .7	DO Error Value For .6	DO Error Value For .5	DO Error Value For .4	DO Error Value For .3	DO Error Value For .2	DO Error Value For .1	DO Error Value For .0

Data Description:

Parameter name		unit (of measure)	specification	Input Range	clarification
Chinese writing	**English (language)**				
Failure mode enable	DO Error_Mode bits	-	decimal system	0-255 (Default: 0)	Fail-safe state value enable for DQ0.x port, the binary bit of this parameter corresponds to DQ0.x port (Bit0 corresponds to DQ-0.0 and so on). When the module enters the fail-safe state, if the bit corresponding to "Error Mode" is "1", the value of the bit corresponding to "Error Value[7..0]" is output to the DQ0.x port (Bit0 corresponds to DQ-0.0 and so on). If the bit corresponding to "Error Mode" is "1", the value of the bit corresponding to "Error Value[7..0]" is output to the corresponding DQ0.x port.
Fault value Safety status value	DO Error_Value bits	-	decimal system	0-255 (Default: 0)	If the binary bit corresponding to the "Error Mode [7..0]" parameter is set to enable, the value of this parameter is output to the DQ port when the system enters the fail-safe state.

3.6 ES-2163D (16-channel Digital Relay Output Module)

3.6.1 Module Overview

◆The module supports 16-channel digital relay outputs with a rated current of 5A.

◆The module can drive on-site devices (such as intermediate relays, solenoid valves, etc.).

◆The internal bus and on-site inputs of the module are isolated by optocouplers.

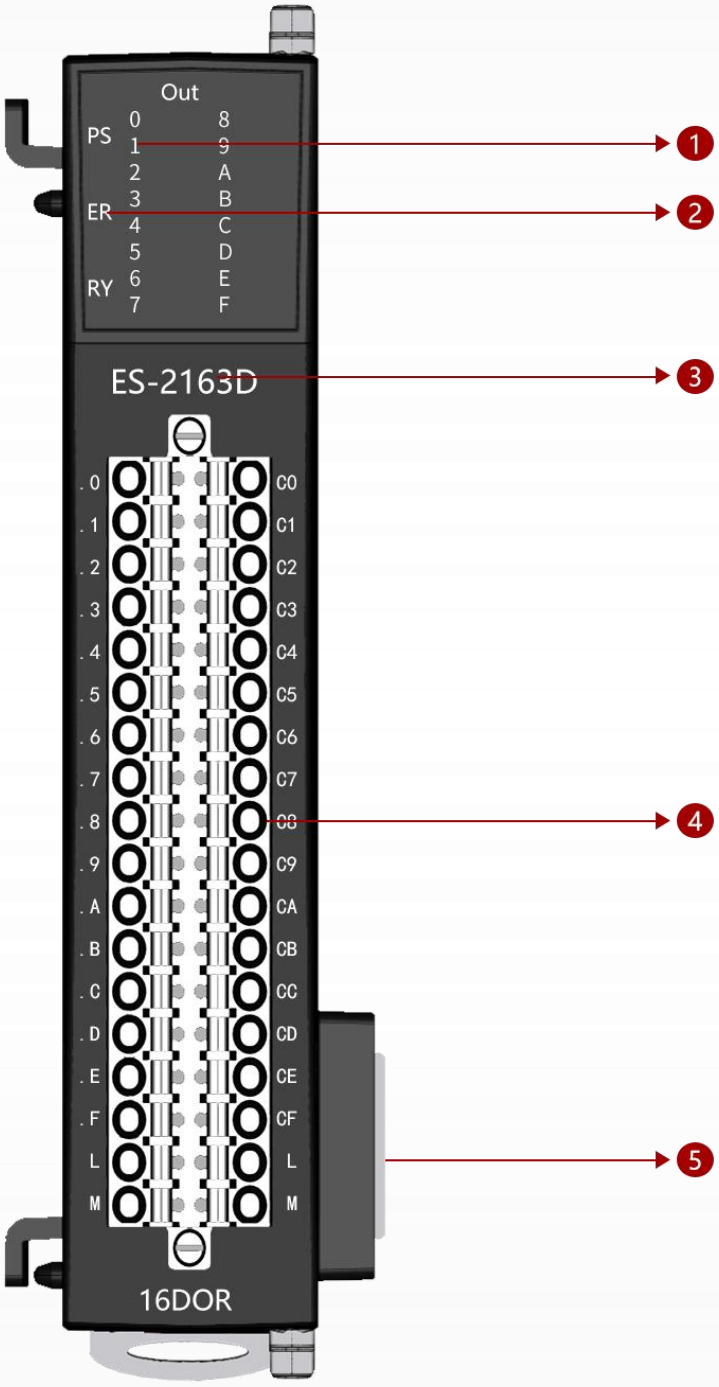
◆The module supports the safety mode function of output signals, allowing the status of output points to be defined in the case of disconnection of the bus communication.

◆The module is equipped with 16 LED indicator lights for digital output channels.

3.6.2 Module parameters

Hardware parameters	
model number	ES-2163D
Backplane Current	20MA
Extended Interface	2*20PinBoard-to-board connector
connect a wire	I/O wiring： Max.1.5mm²(AWG 16)
Installation	DN35Guide rail installation
Environmental parameters	
operating temperature	-20℃~75℃
Environmental humidity	5%~95%
protection class	IP20 No condensation
output parameter	
Channel number	16CH
Access type	2 Bytes
Output type	Relay output
Output connector	Plug-in connector
Load type	Pure resistive, inductive, bulb
Maximum output current	Max. 5 A/Channel, independent for each channel
Ton	Type. 12uS / Max. 25uS
Toff	Type. 10mS / Max. 20mS(Empty load)
Electrical isolation	Input/Control Area： 500V DC

3.6.3 Introduction to interfaces



Expansion Module Interface Description

①Digital output status indicator

②Backplane system status indicator

③Module type

④Digital output terminal

⑤Backplane Expansion Interface

3.6.4 LED indicators

The LED indicators of the module are divided into two parts: the backplane status indicator and the output status indicator.

3.6.5 The description of the working status of the back panel indication system is as follows in the table.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	○	Expansion Module Backplane Error

Table 26 System Status Indication

● **The green light is on** ◐ **Flashing red** ◐ **Flashing green** ○ **Not bright**

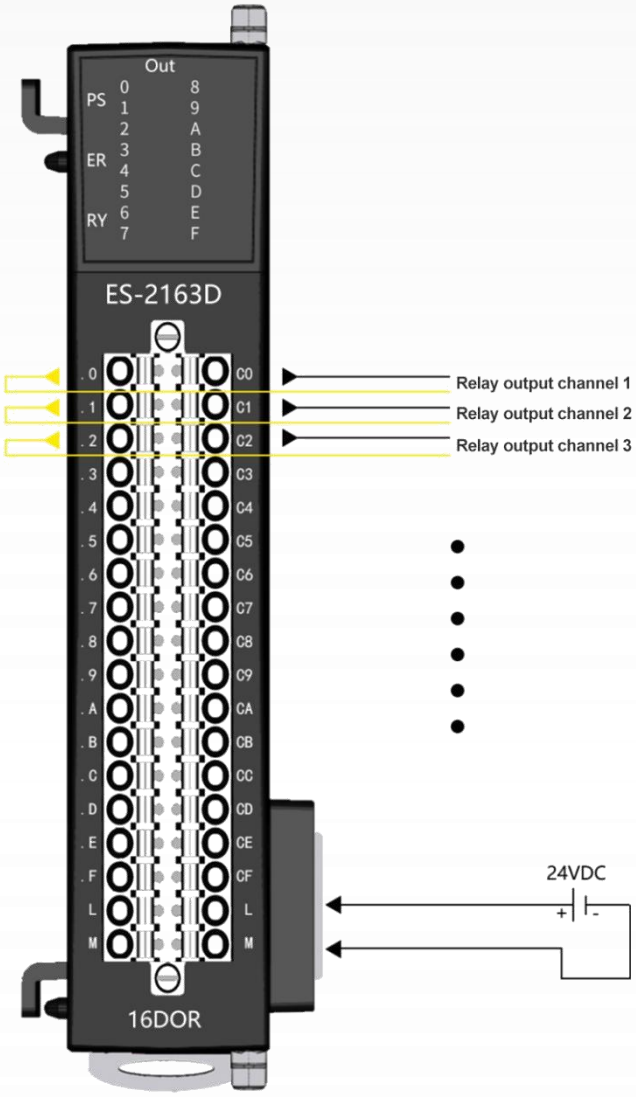
3.6.6 Output status indication

The digital output ports use green LEDs to indicate the status of the corresponding channels. A bright light indicates that the output port logic status is "1", and a dark light indicates that the output port logic status is "0".

3.6.7 Terminal connection definition

Terminal number	Symbol	Terminal number	Symbol	Explanation
Left side	**Out**	**right side**		
1	.0	1	C0	Contact output: .x and Cx
2	.1	2	C1	
3	.2	3	C2	
4	.3	4	C3	
5	.4	5	C4	
6	.5	6	C5	
7	.6	7	C6	
8	.7	8	C7	
9	.8	9	C8	
10	.9	10	C9	
11	.A	11	CA	
12	.B	12	CB	
13	.C	13	CC	
14	.D	14	CD	
15	.E	15	CE	
16	.F	16	CF	
17	L	17	L	External power supply 24V+
18	M	18	M	External power supply 24V-

3.6.8 Wiring diagrams



3.6.9 Process data definition

Output data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	.7	.6	.5	.4	.3	.2	.1	.0
BYTE 1	.F	.E	.D	.C	.B	.A	.9	.8

Data Description: DQ (0-F): When the corresponding channel is connected to a valid input signal, this position is "1"; when the input signal is invalid, this position is "0".

3.6.10 Configuration parameter definition

Output data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0 (DO Error_ Mode bits 0-7)	DO Error_ Mode For .7	DO Error_ Mode For .6	DO Error_ Mode For .5	DO Error_ Mode For .4	DO Error_ Mode For .3	DO Error_ Mode For .2	DO Error_ Mode For .1	DO Error_ Mode For .0
BYTE 1 (DO Error_ Value bits 0-7)	DO Error Value For .7	DO Error Value For .6	DO Error Value For .5	DO Error Value For .4	DO Error Value For .3	DO Error Value For .2	DO Error Value For .1	DO Error Value For .0
BYTE 2 (DO Error_ Mode bits 8-F)	DO Error_ Mode For .F	DO Error_ Mode For .E	DO Error_ Mode For .D	DO Error_ Mode For .C	DO Error_ Mode For .B	DO Error_ Mode For .A	DO Error_ Mode For .9	DO Error_ Mode For .8
BYTE 3 (DO Error_ Value bits 8-F)	DO Error Value For .F	DO Error Value For .E	DO Error Value For .D	DO Error Value For .C	DO Error Value For .B	DO Error Value For .A	DO Error Value For .9	DO Error Value For .8

Data Explanation:

Parameter name		unit (of measure)	specification	Input Range	clarification
Failure mode enable	DO Error_Mode bits	-	decimal system	0-255 (Default: 0)	Fail-safe state value enable for DQ0.x port, the binary bit of this parameter corresponds to DQ0.x port (Bit0 corresponds to DQ-0.0 and so on). When the module enters the fail-safe state, if the bit corresponding to "Error Mode" is "1", the value of the bit corresponding to "Error Value[7..0]" is output to the DQ0.x port (Bit0 corresponds to DQ-0.0 and so on). If the bit corresponding to "Error Mode" is "1", the value of the bit corresponding to "Error Value[7..0]" is output to the corresponding DQ0.x port.
Fault value Safety status value	DO Error_Value bits	-	decimal system	0-255 (Default: 0)	If the binary bit corresponding to the "Error Mode [7..0]" parameter is set to enable, the value of this parameter is output to the DQ port when the system enters the fail-safe state.

3.7 ES-2041D/ES-2042D (4-channel digital 2A output module)

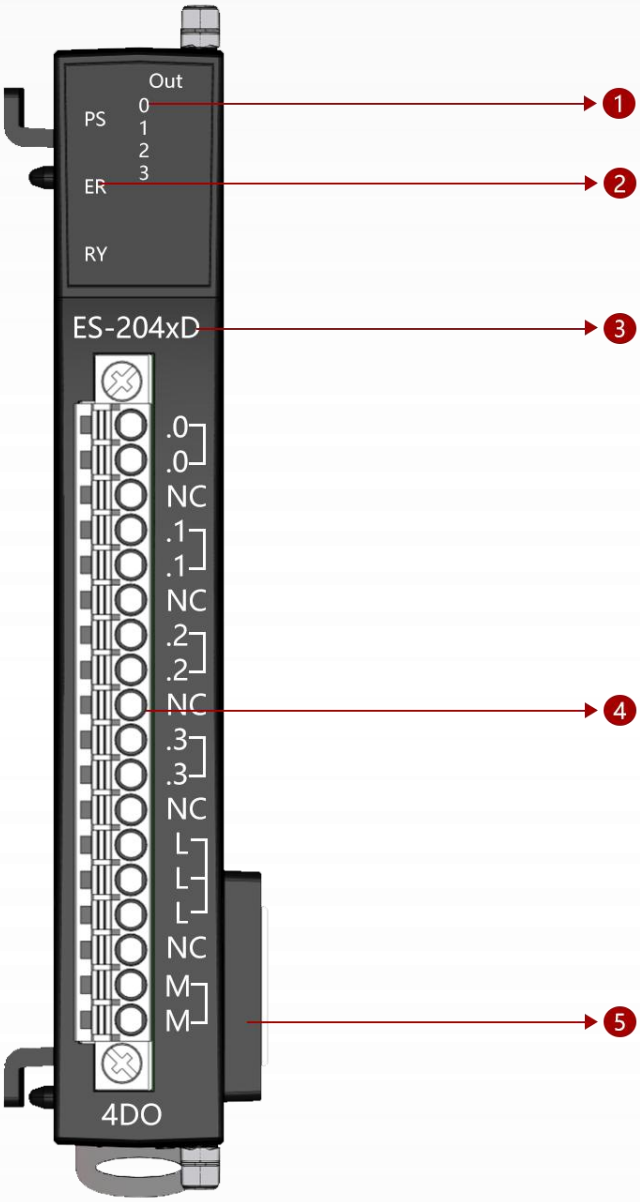
3.6.1 Module overview

- The module supports 4 channels of digital transistor outputs rated at 2A.
- The module can drive field devices (intermediate relays, solenoid valves, etc.).
- The internal bus and field inputs of the module are isolated by optocouplers.
- The module supports the output signal safe mode function, which allows you to define the state of the output point in case of bus communication disconnection.
- The module comes with 4 digital output channel LED indicators.

3.6.2 Module parameters

Hardware parameters		
model number	ES2041D	ES2042D
Backplane current	20MA	
Extended Interface	2*20Pin Board-to-Board Connector	
connect a wire	I/O wiring: Max.1.5mm²(AWG 16)	
Installation	DN35 rail mounting	
Environmental parameters		
operating temperature	-40~85℃	
Environmental humidity	5%-95% non-condensing	
protection class	IP20	
output parameter		
channel number	4CH	
Type of access	4 bits	
Output type	Source Type High Level	Drain Low Output (NPN)
output connector	24 V DC (-15 %/+20 %), (IEC61131-2, type 2)	
Load Type	Plug-in connectors	
Maximum Output Current	Pure Resistive, Inductive, Bulb	
Ton	Max. 2 A/Ch, independent short-circuit protection per	
Toff	Type. 2.4uS / Max. 2.4uS	
electrical isolation	Type. 50uS / Max. 875uS (no load)	

3.6.3 Introduction to interfaces



Expansion Module Interface Description

①Digital output status indicator

②Backplane system status indicator

③Module type

④Digital output terminal

⑤Backplane Expansion Interface

3.6.4 LED indicators

The LED indicators of the module are divided into two parts: the backplane status indicator and the output status indicator.

3.6.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	○	Expansion Module Backplane Error

Table 27 System Status Indication

● **The green light is on** ◐ **Flashing red** ◐ **Flashing green** ○ **Not bright**

3.6.6 Output status indication

The digital output ports use green LEDs to indicate the status of the corresponding channels. A bright light indicates that the output port logic status is "1", and a dark light indicates that the output port logic status is "0".

3.6.7 Definition of terminal blocks

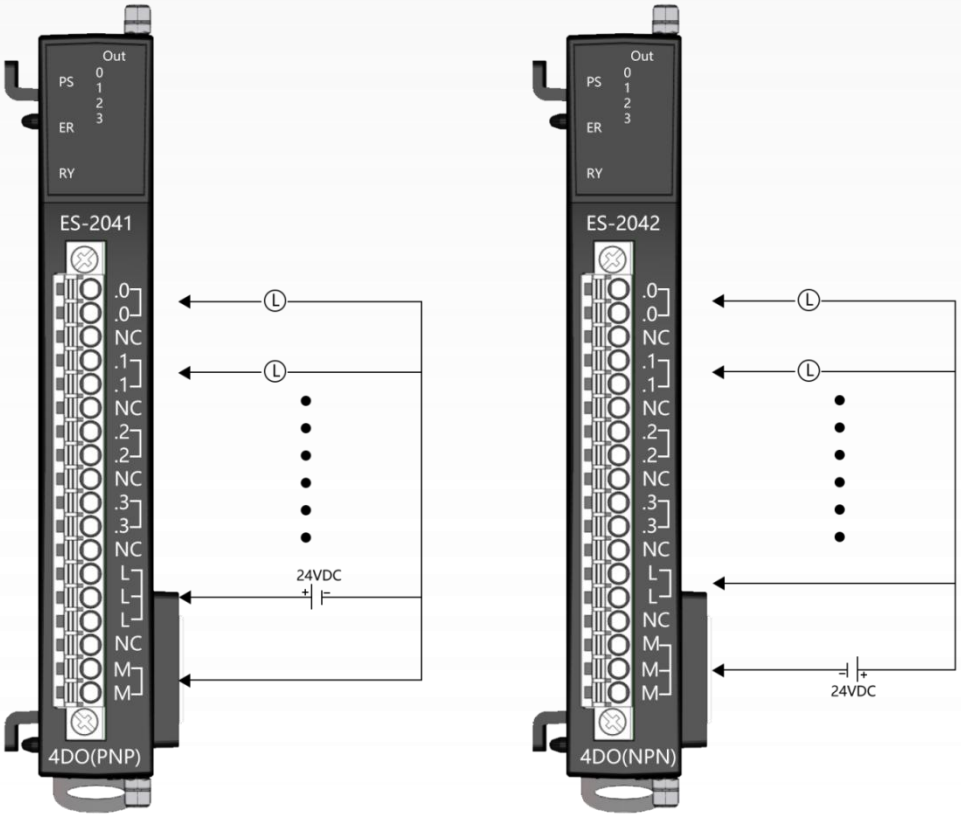
ES2041 Terminal Definition

Terminal Serial Number	notation	note	clarification
the left side	**out**		
1	.0	CH0 Internal parallel connection	Digital Output Signal
2	.0		
3	L	External power supply 24V+ Internal parallel connection	
4	L		
5	.1	CH1 Internal parallel connection	
6	.1		
7	L	External power supply 24V+ Internal parallel connection	
8	L		
9	.2	CH2 Internal parallel connection	
10	.2		
11	L	External power supply 24V+ Internal parallel connection	
12	L		
13	.3	CH3 Internal parallel connection	
14	.3		
15	L	External power supply 24V+ Internal parallel connection	
16	L		
17	L	External power supply 24V+	
18	M	External power supply 24V-	

ES2042 Terminal Definition

Terminal Serial Number	notation	note	clarification
the left side	**out**		
1	.0	CH0 Internal parallel connection	Digital Output Signal
2	.0		
3	M	External power supply 24V- Internal parallel connection	
4	M		
5	.1	CH1 Internal parallel connection	
6	.1		
7	M	External power supply 24V- Internal parallel connection	
8	.M		
9	.2	CH2 Internal parallel connection	
10	.2		
11	M	External power supply 24V- Internal parallel connection	
12	M		
13	.3	CH3 Internal parallel connection	
14	.3		
15	M	External power supply 24V- Internal parallel connection	
16	M		
17	L	External power supply 24V+	
18	M	External power supply 24V-	

3.5.8 Wiring diagram



3.5.9 Process data definitions

output data								
BIT No					BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0					.3	.2	.1	.0

Data description: DQ (0-3): when the corresponding channel to the input signal is valid, the position is "1"; when the input signal is invalid, the position is "0".

3.5.10 Configuration parameter definitions

output data								
BIT No					BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0 (DO Error_ Mode bits 0-7)					DO Error_ Mode For .3	DO Error_ Mode For .2	DO Error_ Mode For .1	DO Error_ Mode For .0
BYTE 1 (DO Error_ Value bits 0-7)					DO Error Value For .3	DO Error Value For .2	DO Error Value For .1	DO Error Value For .0

Data Description:

Parameter name		unit (of measure)	specification	Input Range	clarification
Chinese writing	**English (language)**				
Failure mode enable	DO Error_Mode bits	-	decimal system	0-255 (Default: 0)	Fail-safe state value enable for DQ0.x port, the binary bit of this parameter corresponds to DQ0.x port (Bit0 corresponds to DQ-0.0 and so on). When the module enters the fail-safe state, if the bit corresponding to "Error Mode" is "1", the value of the bit corresponding to "Error Value[7..0]" is output to the DQ0.x port (Bit0 corresponds to DQ-0.0 and so on). If the bit corresponding to "Error Mode" is "1", the value of the bit corresponding to "Error Value[7..0]" is output to the corresponding DQ0.x port.
Fault value Safety status value	DO Error_Value bits	-	decimal system	0-255 (Default: 0)	If the binary bit corresponding to the "Error Mode [7..0]" parameter is set to enable, the value of this parameter is output to the DQ port when the system enters the fail-safe state.

3.8 ES-3043A (4-channel Analog Input Module)

3.8.1 Module Overview

◆The module supports 4-channel analog signal acquisition. The ES-3043A is for current signal/voltage signal acquisition.

◆The ES-3043A module can be configured to acquire 0-20mA/4-20mA current signals or 0-10V voltage signals.

◆The module supports 2-wire (non-loop output, requires external power supply) or 4-wire current sensor input.

◆The internal bus and field input of the module are magnetically isolated.

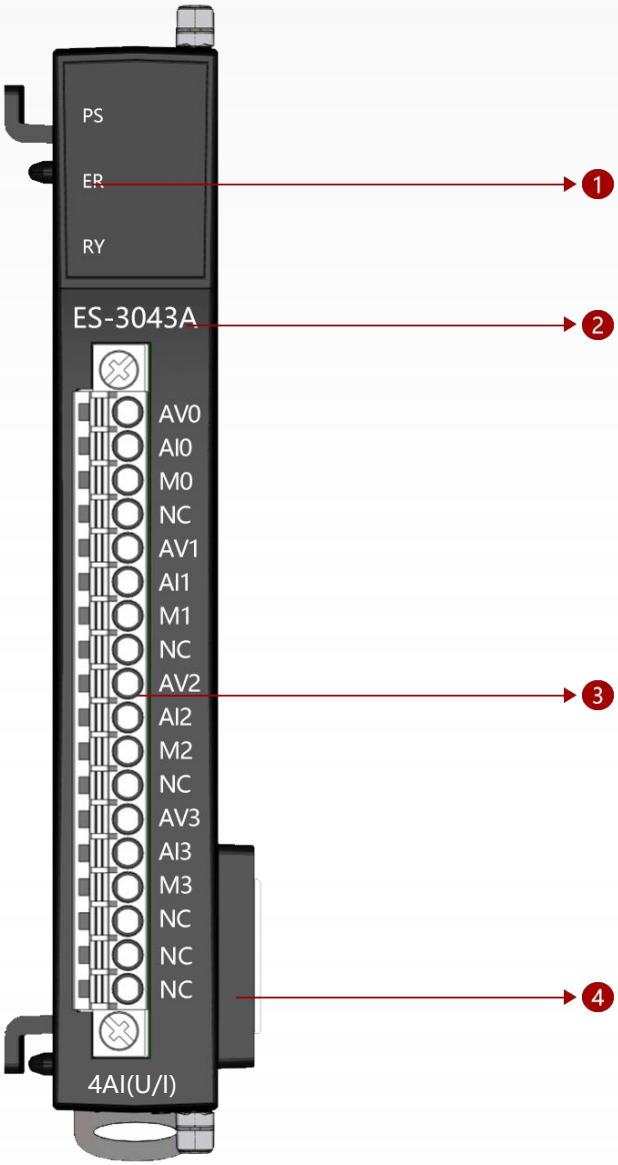
◆The input channels of the module are connected to on-site active analog signal current output sensors.

◆The channels of the module have TVS overvoltage protection.

3.8.2 Module parameters

Hardware parameters		
model number	ES3043A	
Backplane current	20MA	
Extended Interface	2*20Pin Board-to-Board Connector	
connect a wire	I/O wiring: Max.1.5mm²(AWG 16)	
Installation	DN35 rail mounting	
Environmental parameters		
operating temperature	-20℃~75℃	
Environmental humidity	5%~95% non-condensing	
protection class	IP20	
output parameter		
Number of channels	4CH	
Access type	8 Bytes or 4 Words	
Resolution	16bit	
Input type	0~20mA/4~20mA	0~10V/±10V
Input impedance	≤125Ω	≥10MΩ
Sampling error	±0.3% (Full scale)	
Sampling speed	2ms	
Filtering time	Configurable	

3.8.3 Interface Introduction



Extended module interface description

① Backplane system status indicator light

② Module model

③ Analog input connection terminals

④ Backplane expansion interface

3.8.4 LED indicators

The LED indication of the module is divided into one part: the back panel status indication.

3.6.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◑	○	Expansion Module Backplane Error

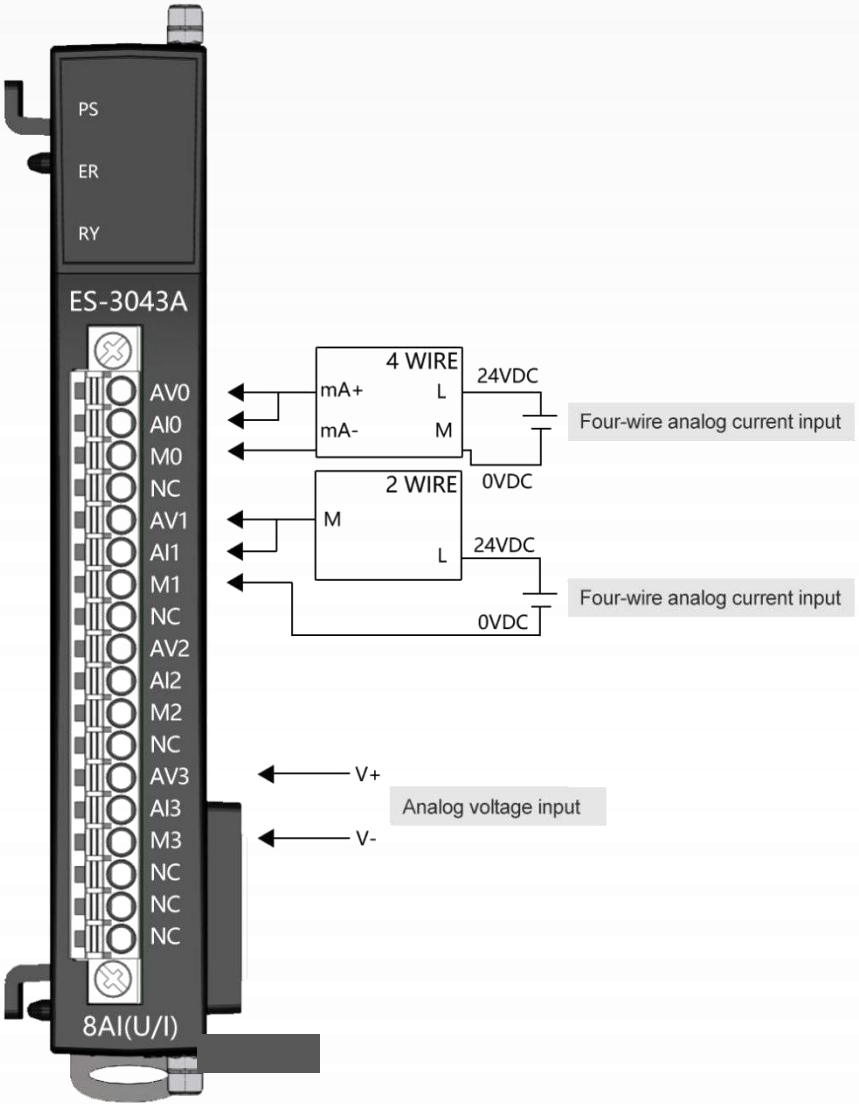
Table 28 System Status Indication

● **The green light is on** ◑ **Flashing red** ◐ **Flashing green** ○ **Not bright**

3.8.6 Terminal connection definition

Terminal number	ES3043A	
	Symbol	Explanation
1	AV0	Analog signal input CH0
2	AI0	
3	M0	
4	NC	Empty
5	AV1	Analog signal input CH1
6	AI1	
7	M1	
8	NC	Empty
9	AV2	Analog signal input CH2
10	AI2	
11	M2	
12	NC	Empty
13	AV3	Analog signal input CH3
14	AI3	
15	M3	
16	NC	Empty
17	NC	
18	NC	

3.8.7 Wiring diagram

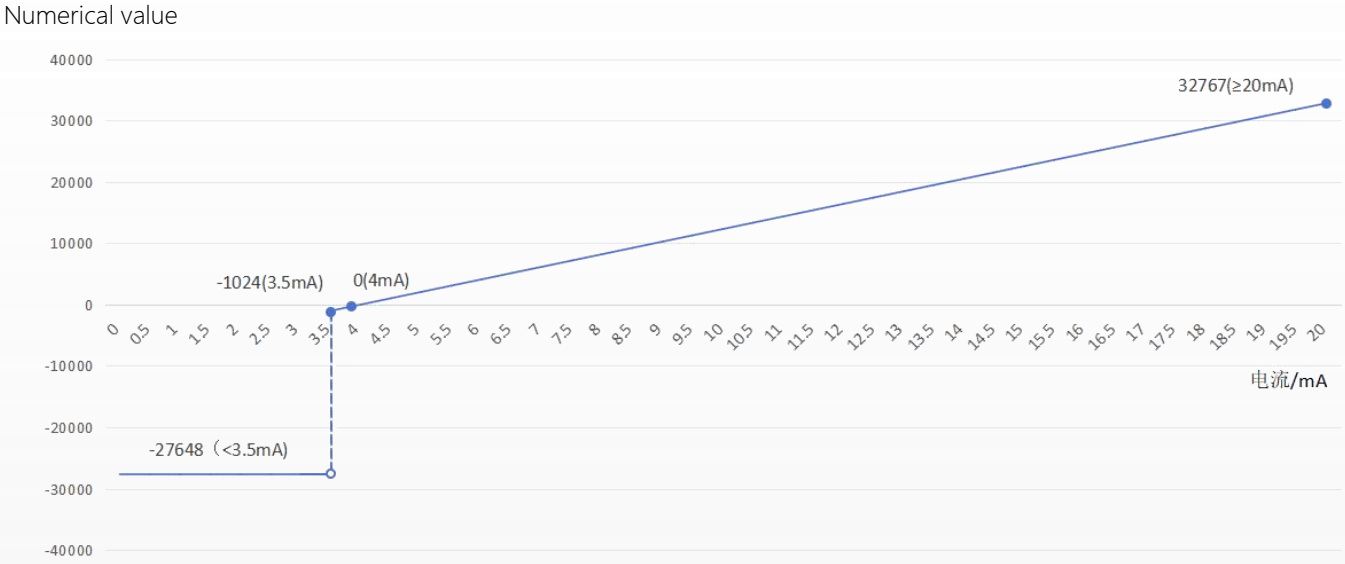


Method for connecting analog current/voltage input

3.8.8 4~20mA Definition and Line Chart

Current measurement range value			
System		Current measurement range	
Decimal	Hexadecimal	4mA~20mA	
32767	7FFF		Overflow
32767	7FFF	20mA	Rated range
0	0	4mA	Downward range
-1	FFFF		Underflow
-1024	FFFF_FC00	3.5mA	Overflow
-27648	FFFF_8001		Rated range

4-20mACurrent line graph



3.8.9 Process data definition

Analog Input Data (CH0-3): The analog signal input value of the corresponding channel.

Input data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	Analog Input Data (CH0)							
BYTE 1								
BYTE 2	Analog Input Data (CH1)							
BYTE 3								
BYTE 4	Analog Input Data (CH2)							
BYTE 5								
BYTE 6	Analog Input Data (CH3)							
BYTE 7								

3.8.10 Configuration parameter definition

Input data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	Measuring_Range For CH0							
BYTE 1	Offset For CH0							
BYTE 2								
BYTE 3	Gain For CH0							
BYTE 4								
BYTE 5	Notch_Filter For CH0							
BYTE 6	AverageNum For CH0							

BYTE 7	Full_value For CH0
BYTE 8	
BYTE 9	Zero_valueFor CH0
BYTE 10	
BYTE 11	Measuring_Range For CH1
BYTE 12	Offset For CH1
BYTE 13	
BYTE 14	Gain For CH1
BYTE 15	
BYTE 16	Notch_Filter For CH1
BYTE 17	AverageNum For CH1
BYTE 18	Full_value For CH1
BYTE 19	
BYTE 20	Zero_valueFor CH1
BYTE 21	
.....	.....

Data description: The configuration parameters of channels 1-3 are the same as those of channel 0.

Parameter Name		Unit	Format	Input Range	Explanation
Chinese	English				
Measurement range of channel 0	Measuring_ Range For CH1	-	Symbol	Disable 0-10V (Default) 4-20mA 0-20mA	Select the corresponding range of analog input. "Disable" indicates that the sampling channel is turned off.
Offset of sampling value of channel 0	Offset For CH1	-	Decimal	-32768..32767 (Defaul: 0)	These two parameters are mainly used for calibrating the analog front-end. Vi = Vr * Gain / 1000 + Offset; (Vi represents the read data, Vr is the actual input data)

Gain of sampling value of channel 0	Gain For CH1	-	system	.65336 （Defaul：1000）	Filter out 50Hz or 60Hz power frequency interference noise
Frequency filter of channel 0	Notch_Filter For CH1	-	Symbol	Disable（Defaul） 50Hz 60Hz	The module adopts the average value algorithm. Adjusting this parameter can adjust the depth of the average value, improving the sampling accuracy. On the contrary, it will reduce the response time.
Number of times of averaging for sampling of channel 0	AverageNum For CH1	-	Symbol	×0（Defaul） ×4 ×8 ×16 ×32	The engineering value of the maximum range
Engineering value of full scale of channel 0	Full_value For CH1	-	Decimal	-32768..32767 （Defaul：32767）	The engineering value of the minimum range
Engineering value of zero scale of channel 0	Zero_valueFor CH1	-	system	-32768..32767 （Defaul：0）	Select the corresponding range of analog input. "Disable" indicates that the sampling channel is turned off.

3.9 ES-3081A/ES-3082A (8-channel analog input module)

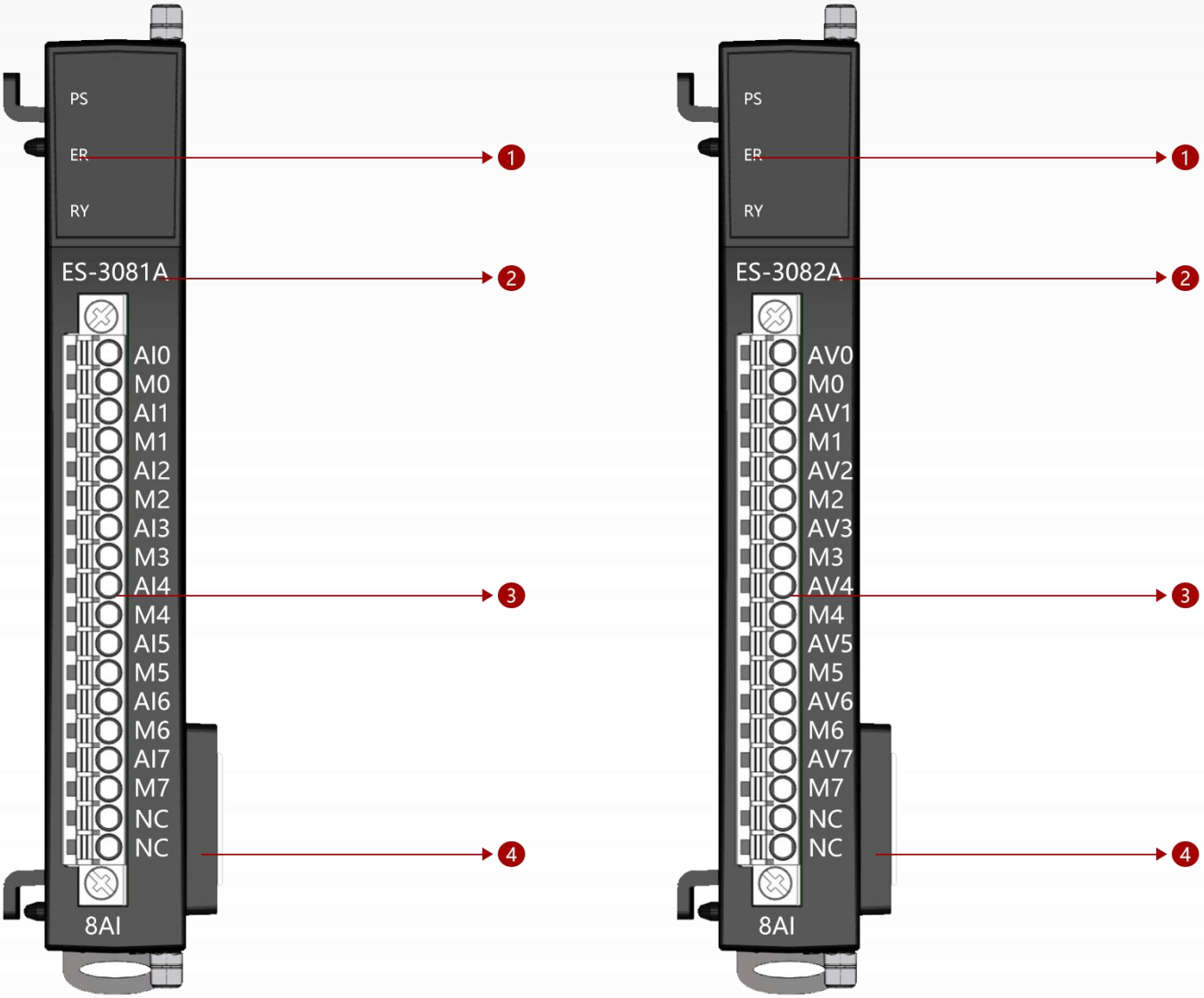
3.7.1 Module overview

◆ The module supports 8-channel analog signal acquisition, ES-3081A is current signal acquisition and ES-3082A is voltage signal acquisition.
◆ ES-3081A module can be configured for 0~20mA/4~20mA current signal acquisition.
◆ ES-3082A module can be configured for 0~10V/±10V voltage signal acquisition.
◆ The module supports 2-wire (non-loop output, external power supply required) or 4-wire current sensor input.
◆ The input channel of the module is connected to an active analog signal current output sensor in the field.
◆ The module channels are equipped with TVS over-voltage protection.

3.9.2 Module parameters

Hardware parameters		
model number	ES3081A	ES3082A
Backplane current	20MA	
Extended Interface	2*20Pin Board-to-Board Connector	
connect a wire	I/O wiring: Max.1.5mm²(AWG 16)	
Installation	DN35 rail mounting	
Environmental parameters		
operating temperature	-40~85℃	
Environmental humidity	5%-95% non-condensing	
protection class	IP20	
output parameter		
channel number	8CH	
Type of access	16 Bytes or 8 words	
resolution (of a photo)	16-bit	
Input Type	0~20mA/4~20mA	0~10V/±10V
Input Impedance	≤125Ω	≥10MΩ
sampling error	±0.3% (full scale)	
sampling speed	2ms	
filtering time	configurable	
line break protection	Maximum value of output (65535) when 4~20mA is selected for type	

3.9.3 Introduction to interfaces



Expansion Module Interface Description

①Backplane system status indicator

②Module Model

③ Analog input terminal

④Backplane expansion interface

3.9.4 LED indicators

The LED indication of the module is divided into 1 part: backplane status indication .

3.9.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	○	Expansion Module Backplane Error

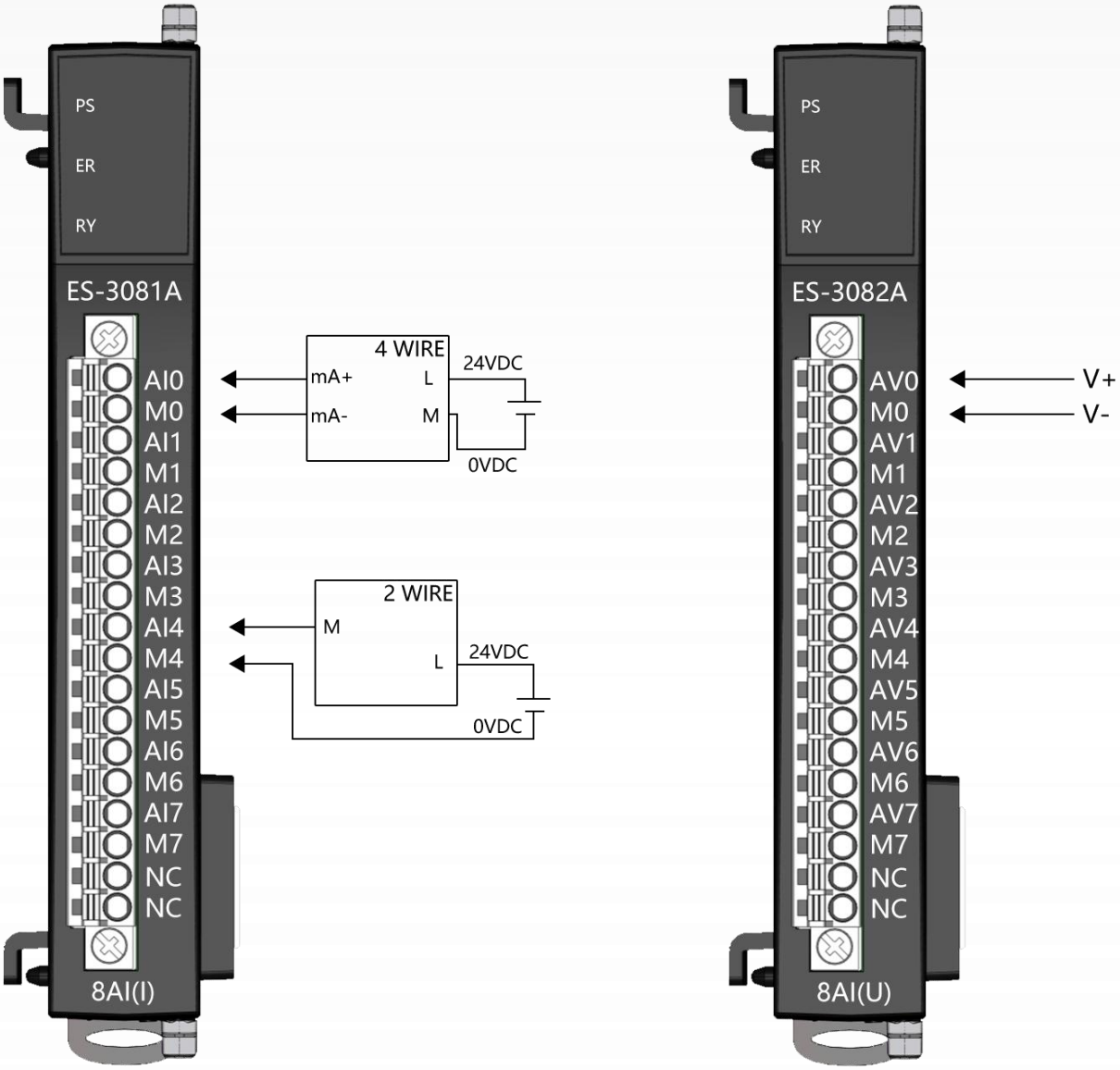
Table 28 System Status Indication

● **The green light is on** ◐ **Flashing red** ◐ **Flashing green** ○ **Not bright**

3.9.6 Definition of terminal blocks

Terminal Serial Number	ES3081A	ES3082A	
	notation		clarification
1	AI0	AV0	Analog signal input
2	M0	M0	
3	AI1	AV1	
4	M1	M1	
5	AI2	AV2	
6	M2	M2	
7	AI3	AV3	
8	M3	M3	
9	AI4	AV4	
10	M4	M4	
11	AI5	AV5	
12	M5	M5	
13	AI6	AV6	
14	M6	M6	
15	AI7	AV7	
16	M7	M7	
17	NC	NC	unoccupied
18	NC	NC	unoccupied

3.9.7 Wiring diagrams

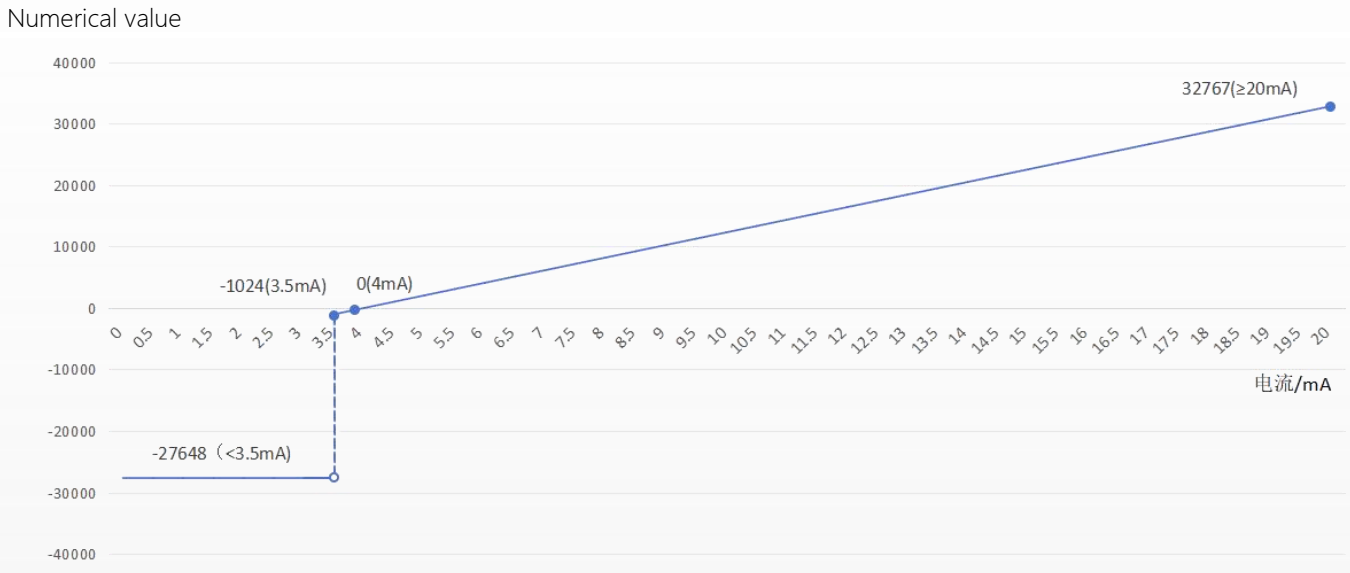


Analog current input wiring method Analog voltage input wiring method

3.9.8 4~20mA Definition and Line Chart

Current measurement range value			
System		Current measurement range	
Decimal	Hexadecimal	4mA~20mA	
32767	7FFF		Overflow
32767	7FFF	20mA	Rated range
0	0	4mA	Downward range
-1	FFFF		Underflow
-1024	FFFF_FC00	3.5mA	Overflow
-27648	FFFF_8001		Rated range

4-20mACurrent line graph



3.9.9 Process data definitions

Analog Input Data (CH0-7): Analog signal input value of the corresponding channel.

input data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	Analog Input Data (CH0)							
BYTE 1								
BYTE 2	Analog Input Data (CH1)							
BYTE 3								
BYTE 4	Analog Input Data (CH2)							
BYTE 5								
BYTE 6	Analog Input Data (CH3)							
BYTE 7								
BYTE 8	Analog Input Data (CH4)							
BYTE 9								
BYTE 10	Analog Input Data (CH5)							
BYTE 11								
BYTE 12	Analog Input Data (CH6)							
BYTE 13								
BYTE 14	Analog Input Data (CH7)							
BYTE 15								

3.9.10 Configuration parameter definitions

input data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	Measuring_Range For CH0							
BYTE 1	Offset For CH0							
BYTE 2								
BYTE 3	Gain For CH0							
BYTE 4								
BYTE 5	Notch_Filter For CH0							
BYTE 6	AverageNum For CH0							
BYTE 7	Full_value For CH0							
BYTE 8								
BYTE 9	Zero_valueFor CH0							
BYTE 10								
BYTE 11	Measuring_Range For CH1							
BYTE 12	Offset For CH1							
BYTE 13								
BYTE 14	Gain For CH1							
BYTE 15								
BYTE 16	Notch_Filter For CH1							
BYTE 17	AverageNum For CH1							
BYTE 18	Full_value For CH1							
BYTE 19								
BYTE 20	Zero_valueFor CH1							
BYTE 21								
.....	.....							

Data Note: The configuration parameters for channels 1-7 and channel 0 are the same.

Parameter name		unit (of measure)	specification	Input Range	clarification
Chinese	English (language)				
Channel 0 Measuring Range	Measuring_Range For CH1	-	notation	4-20mA (default)	Select the corresponding analog input range where Disable means to close the sampling channel.
Sample value offset for channel 0	Offset For CH1	-	decimal system	-32768..32767 (Default: 0)	These two parameters are mainly used to calibrate the analog front-end. vi=Vr*Gain/1000+Offset; (Vi reads the data Vr actual input)
Sample value gain for channel 0	Gain For CH1	-	decimal system	0. .65336 (Default: 1000)	
Frequency filter for channel 0	Notch_Filter For CH1	-	notation	Disable (default) 50Hz 60Hz	Filtering of 50 Hz or 60 Hz industrial frequency noise.
Number of samples averaged for channel 0	AverageNum For CH1	-	notation	×x 0 (default) ×4 ×8 ×16 ×32	The averaging algorithm is used within the module, and adjusting this parameter adjusts the averaging depth and improves the sampling accuracy, and conversely decreases the response time.
Full scale engineering value for channel 0	Full_value For CH1	-	decimal system	-32768..32767 (Default: 32767)	Engineering values for maximum range
Zero range engineering value for channel 0	Zero_valueFor CH1	-	decimal system	-32768..32767 (Default: 0)	Engineering values for minimum range

3.10 ES-3047A (4-channel PT100 temperature input module)

3.10.1 Module overview

◆ The module supports 4-channel PT100 temperature signal acquisition, ES-3047A is PT100 signal acquisition.

◆ ES-3047A module can be configured for PT100,CU50 signal acquisition.

◆ The module supports 4-wire PT100 sensor input.

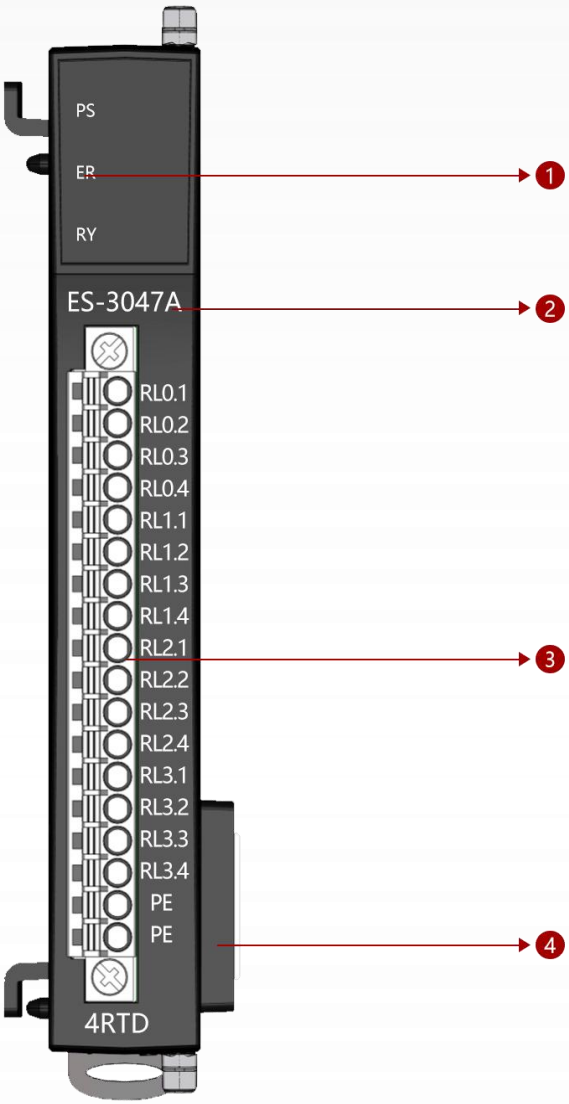
◆ The internal bus and field inputs of the module are magnetically isolated.

◆ The module channels are equipped with TVS over-voltage protection.

3.10.2 Module parameters

Hardware parameters	
model number	ES3047A
Backplane Current	20MA
Extended Interface	2*20Pin Board-to-Board Connector
connect a wire	I/O wiring: Max.1.5mm²(AWG 16)
Installation	DN35 rail mounting
Environmental parameters	
operating temperature	-40~85℃
Environmental humidity	5%-95% non-condensing
protection class	IP20
output parameter	
channel number	4CH
Type of access	16 Bytes or 8 words
resolution (of a photo)	0.1°C/digit
Input Type	PT100,CU50
overpressure protection	be in favor of
sampling error	±1°C
sampling speed	2ms
filtering time	configurable

3.10.3 Introduction to interfaces



Expansion Module Interface Description

①Backplane system status indicator

②Module Model

③Analog input terminal

④Backplane expansion interface

3.10.4 LED indicators

The LED indication of the module is divided into 1 part: backplane status indication .

3.10.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	○	Expansion Module Backplane Error

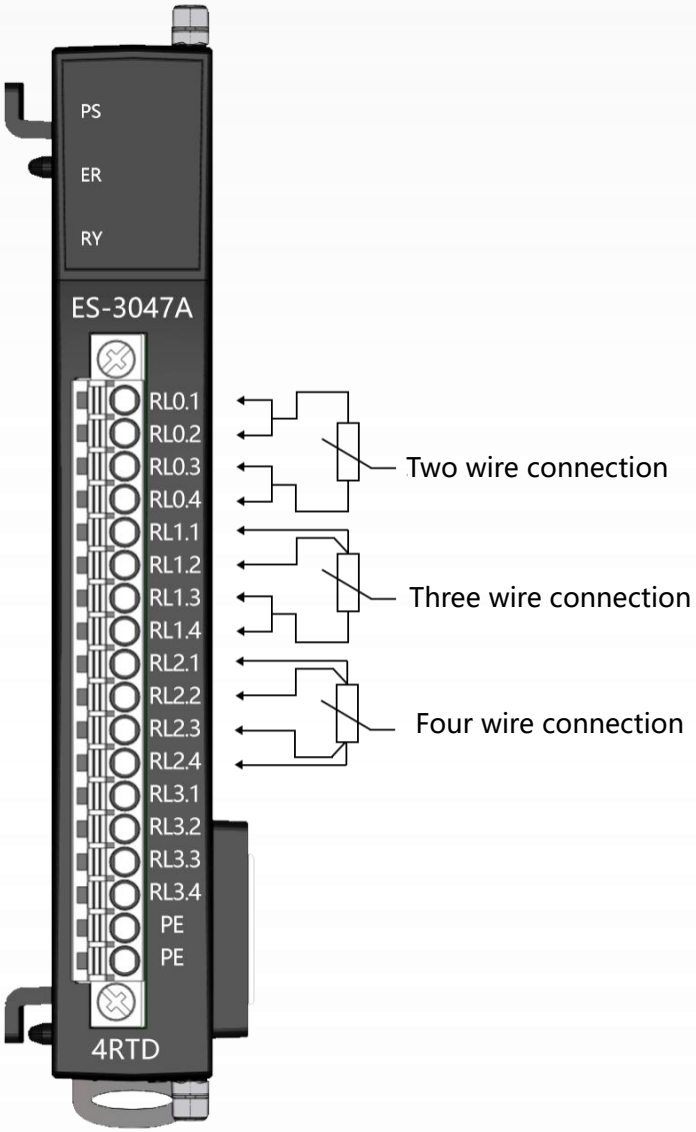
Table 29 System Status Indication

● **The green light is on** ◐ **Flashing red** ◐ **Flashing green** ○ **Not bright**

3.10.6 Definition of terminal blocks

Terminal Serial Number	ES3047A	
	notation	clarification
1	RL0.1	Temperature signal input CH0
2	RL0.2	
3	RL0.3	
4	RL0.4	
5	RL1.1	Temperature signal input CH1
6	RL1.2	
7	RL1.3	
8	RL1.4	
9	RL2.1	Temperature signal input CH2
10	RL2.2	
11	RL2.3	
12	RL2.4	
13	RL3.1	Temperature signal input CH3
14	RL3.2	
15	RL3.3	
16	RL3.4	
17	PE	grounding
18	PE	grounding

3.10.7 Wiring diagrams



PT100 2-wire, 3-wire, 4-wire wiring diagrams

3.10.8 Process data definitions

Analog Input Data (CH0-3): Analog signal input value of the corresponding channel.

input data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	Analog Input Data (CH0)							
BYTE 1								
BYTE 2	Analog Input Data (CH1)							
BYTE 3								
BYTE 4	Analog Input Data (CH2)							
BYTE 5								
BYTE 6	Analog Input Data (CH3)							
BYTE 7								

3.10.9 Configuration parameter definitions

input data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	RTD_Sensor_Type For CH0							
BYTE 1	AverageNum For CH0							
BYTE 2	Full_value For CH0							
BYTE 3								
BYTE 4	Zero_valueFor CH0							
BYTE 5								
BYTE 6	RTD_Sensor_Type For CH1							
BYTE 7	AverageNum For CH1							
BYTE 8	Full_value For CH1							
BYTE 9								
BYTE 10	Zero_valueFor CH1							
BYTE 11								
.....	.....							

Data description: Configuration parameters for channels 1-3 and channel 0

Parameter name		unit (of measure)	specification	Input Range	clarification
Chinese	**English (language)**				
Channel 0 Measuring range	RTD_Sensor_Type For CH1	-	notation	PT100 (default) CU50	Select the corresponding analog input range
Number of samples averaged for channel 0	AverageNum For CH1	-	notation	××0 (default) ×4 ×8 ×16 ×32	The averaging algorithm is used within the module, and adjusting this parameter adjusts the averaging depth and improves the sampling accuracy, and conversely decreases the response time.
Full scale engineering value for channel 0	Full_value For CH1	-	decimal system	-32768..32767 (Default: 32767)	Engineering values for maximum range
Zero range engineering value for channel 0	Zero_valueFor CH1	-	decimal system	-32768..32767 (Default: 0)	Engineering values for minimum range

3.11 ES-3087A (8-channel RTD input module)

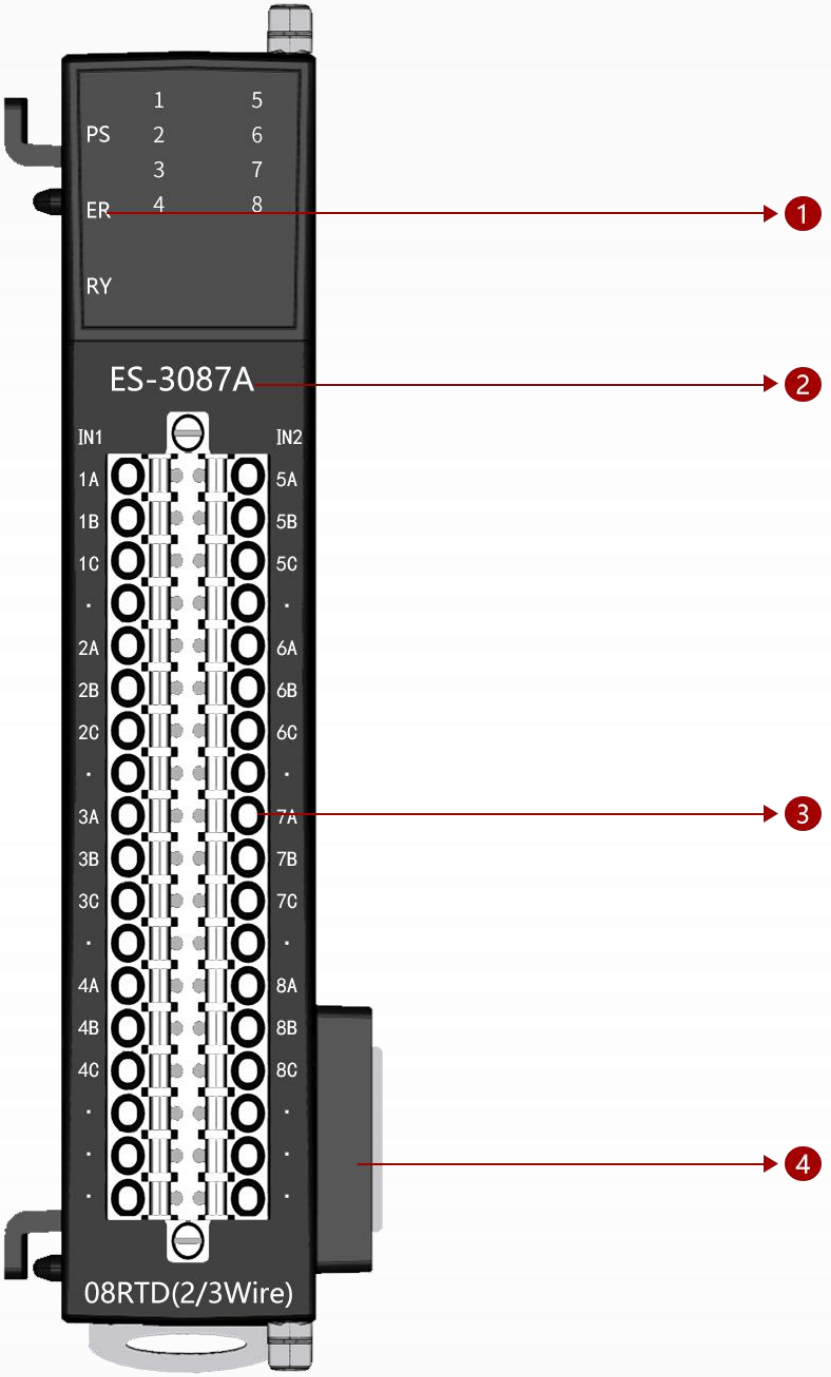
3.11.1 Module overview

- The module supports 8-channel RTD RTD (PT100, Cu50) temperature acquisition.
- Module can access 2-wire or 3-wire PT100 temperature sensors
- Module with 8 input channel LED indicators.
- The internal bus and field inputs of the module are magnetically isolated.

3.11.2 Module parameters

Hardware parameters	
model number	ES3087A
Backplane current	20MA
Extended Interface	2*20Pin Board-to-Board Connector
connect a wire	I/O wiring: Max.1.5mm^2(AWG 16)
Installation	DN35 rail mounting
Environmental parameters	
operating temperature	0~+55℃
Environmental humidity	5%-95% non-condensing
protection class	IP20
output parameter	
channel number	8CH (2-wire or 3-wire)
Type of access	16 Bytes or 8 words
Input Type	PT100,Cu50
temperature range	-200°C to +850°C (PT sensor), -60°C to +250°C (Ni sensor)
data output	0.1°C per channel bit
sampling error	Less than ±0.3% (full scale)
sampling speed	2ms
filtering time	configurable

3.11.3 Introduction to interfaces



Expansion Module Interface Description

①Backplane system status indicator

②Module Model

③ RTD input terminals

④Backplane expansion interface

3.11.4 LED indicators

The LED indication of the module is divided into 1 part: backplane status indication .

3.11.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	○	Expansion Module Backplane Error

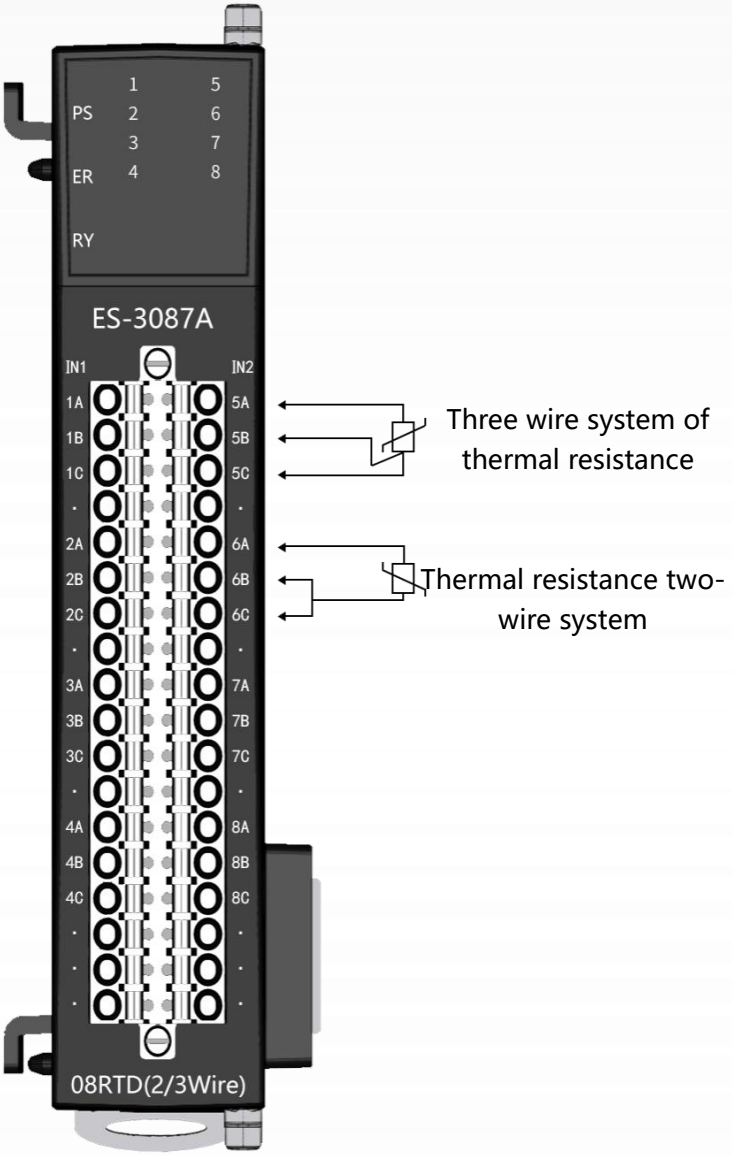
Table 30 System Status Indication

● **The green light is on** ◐ **Flashing red** ◐ **Flashing green** ○ **Not bright**

3.11.6 Definition of terminal blocks

Terminal Serial Number	notation	clarification		Terminal Serial Number	notation
the left side	**Out1**			**right, the right**	**Out2**
1	1A	Channel 1	Channel 5	1	5A
2	1B			2	5B
3	1C			3	5C
4	●	undefined		4	●
5	2A	Channel 2	Channel 6	5	6A
6	2B			6	6B
7	2C			7	6C
8	●	undefined		8	●
9	3A	Channel 3	Channel 7	9	7A
10	3B			10	7B
11	3C			11	7C
12	●	undefined		12	●
13	4A	Channel 4	Channel 8	13	8A
14	4B			14	8B
15	4C			15	8C
16	●	undefined		16	●
17	●			17	●
18	●			18	●

3.11.7 Wiring diagrams



RTD Input Wiring Method

3.11.8 Process data definitions

Analog Input Data (CH1-8): Analog signal input value of the corresponding

input data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	Analog Input Data (CH1)							
BYTE 1								
BYTE 2	Analog Input Data (CH2)							
BYTE 3								
BYTE 4	Analog Input Data (CH3)							
BYTE 5								
BYTE 6	Analog Input Data (CH4)							
BYTE 7								
BYTE 8	Analog Input Data (CH5)							
BYTE 9								
BYTE 10	Analog Input Data (CH6)							
BYTE 11								
BYTE 12	Analog Input Data (CH7)							
BYTE 13								
BYTE 14	Analog Input Data (CH8)							
BYTE 15								

channel.

3.11.9 Configuration parameter definitions

input data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	Measuring_Range For CH1							
BYTE 1	AverageNum For CH1							
BYTE 2	Offset For CH1							
BYTE 3								
BYTE 4	Gain For CH1							
BYTE 5								
BYTE 6	Measuring_Range For CH2							
BYTE 7	AverageNum For CH2							
BYTE 8	Offset For CH2							
BYTE 9								
BYTE 10	Gain For CH2							
BYTE 11								
.....	.....							

Data Note: The configuration parameters for channels 3-7 and channel 0 are identical.

Parameter name		unit (of measure)	specification	Input Range	clarification
Chinese writing	**English (language)**				
Channel 1 Measurement Type	Measuring_Range For CH1	-	notation	PT100 (default) CU50	Select the corresponding temperature sensor
Number of filters for channel 1	AverageNum For CH1	-	notation	x0 x4 x8 x16 x32 (Default: 0)	The averaging algorithm is used within the module, and adjusting this parameter adjusts the averaging depth and improves the sampling accuracy, and conversely decreases the response time.
Bias setting for channel 1	Offset For CH1	-	decimal system	-32768..32767 (default: 0)	These two parameters are mainly used to calibrate the analog front-end. vi=Vr*Gain/1000+Offset; (Vi reads the data Vr actual input)
Gain setting for channel 1	Gain For CH1	-	decimal system	1..65335 (Default: 1000)	

3.12 ES-3048A (4-channel thermocouple input module)

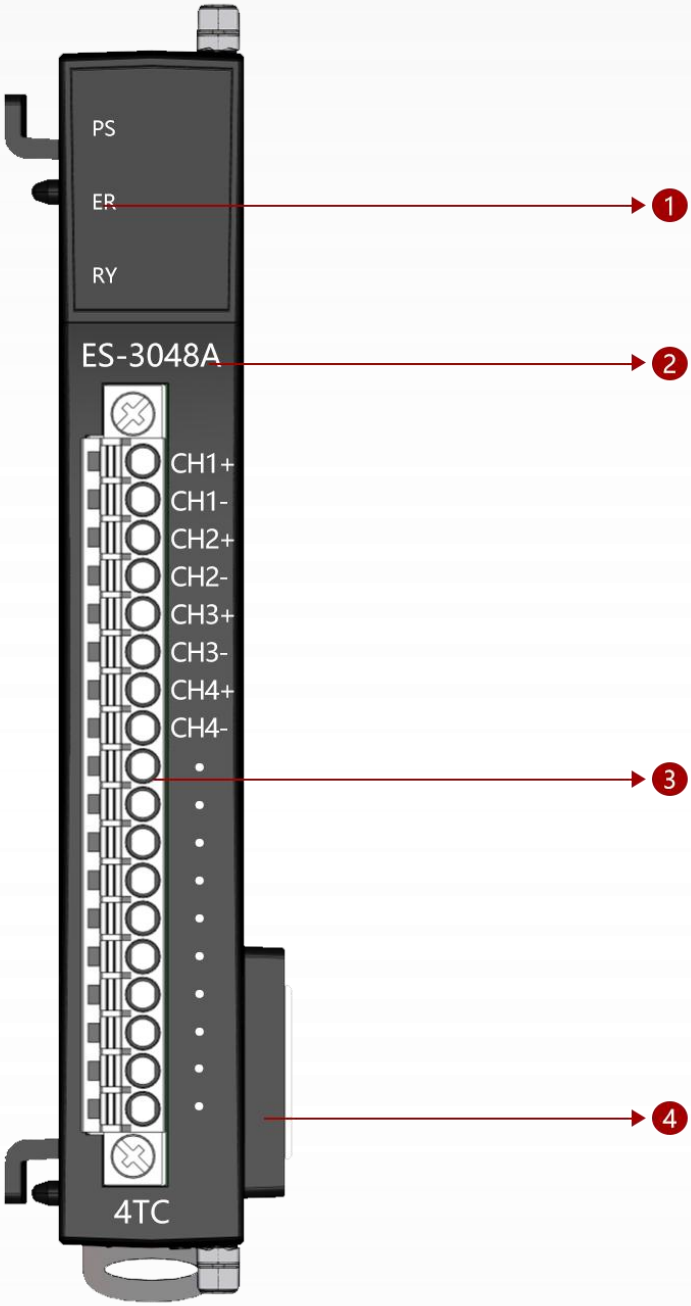
3.12.1 Module Overview

- The module supports 4-channel TC thermocouple temperature acquisition.
- The module can be connected to 2-wire TC temperature sensors.
- The module has 4 input channels with LED indicators.
- The internal bus and field input of the module are isolated by magnetic means.
- The module supports the opening and closing of the internal reference temperature and manual reference temperature.

3.12.2 Module Parameters

Hardware Specifications	
Model number	ES3048A
Backplate current	20MA
Expansion interface	2*20-pin board-to-board connector
Connecting the wires	I/O wiring: Max. 1.5mm² (AWG 16)
Installation method	DIN35 rail mounting
Environmental parameters	
Working temperature	-20℃~75℃
Environmental humidity	5% to 95% no condensation
Protection level	IP20
Input parameters	
Channel number	4CH (two-wire system)
Access type	8 Bytes or 4 words
Input type	J / K / E / T / S / R / B / N type thermocouples
Data output	Per-channel bit 0.1℃
Sampling error	±0.5℃ (full scale)
Sampling speed	500ms per time Configurable
Filtering time	K type: -270 to 1370℃
Measurement range: ℃	S type: -50 to 1760℃
	R type: -50 to 1760℃
	B type: 0 to 1820℃
	J type: -210 to 1200℃
	N type: -270 to 1300℃
	E type: -270 to 1000℃
	T type: -270 to 400℃
	16-bit signed integer (Integer)
Data format	4CH (two-wire system)
Output parameters	
Number of channels	4CH (two-wire system)
Output type	Manually set the reference temperature value

3.12.3 Interface Introduction



Expansion Module Interface Description

① Backplane system status indicator light

② Module model

③ Thermocouple input terminal

④ Backplane expansion interface

3.12.4 LED indicator light

The LED indication of the module is divided into one part: the back panel status indication.

3.12.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	○	Expansion Module Backplane Error

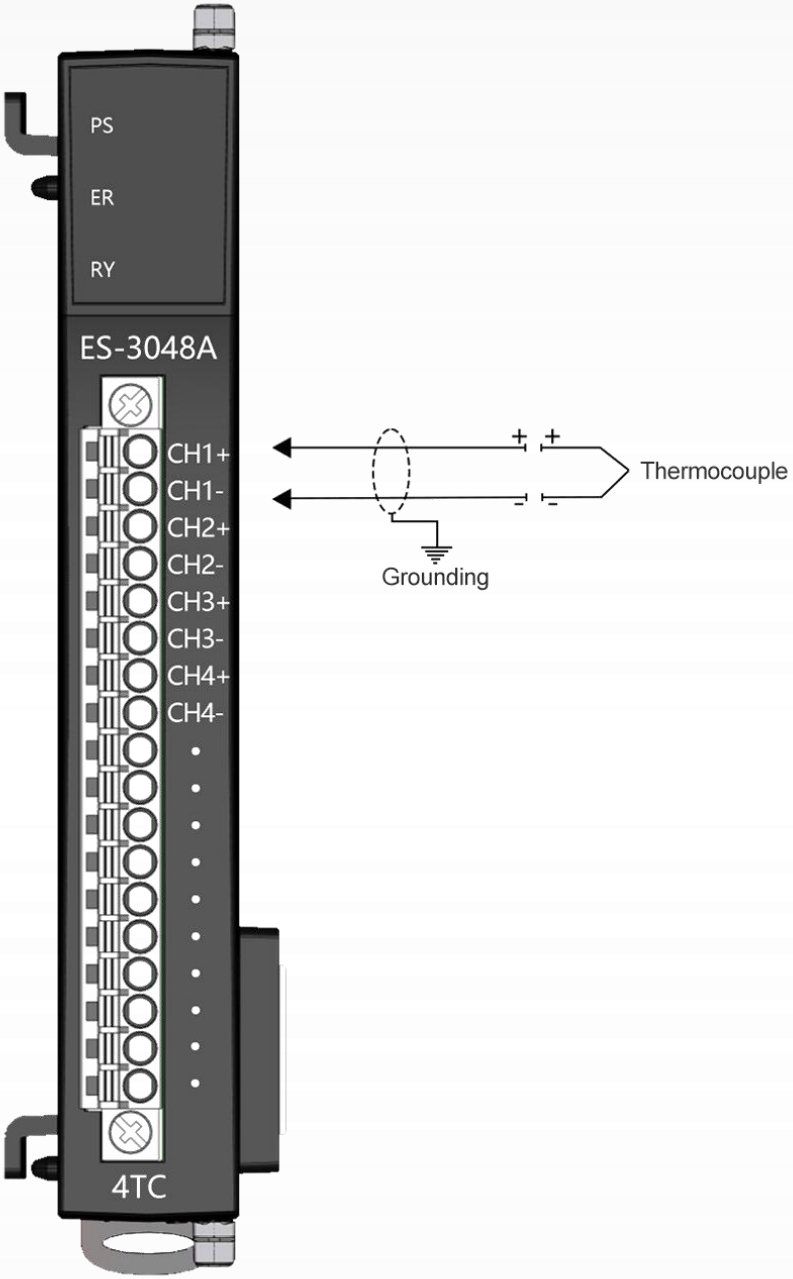
Table 31 System Status Indication

● **The green light is on** ◐ **Flashing red** ◐ **Flashing green** ○ **Not bright**

3.12.6 Terminal connection definition

Terminal number	ES3048A	
	Symbol	Explanation
1	CH1+	Thermocouple signal input
2	CH1-	
3	CH2+	
4	CH2-	
5	CH3+	
6	CH3-	
7	CH4+	
8	CH4-	
9	●	NULL
10	●	NULL
11	●	NULL
12	●	NULL
13	●	NULL
14	●	NULL
15	●	NULL
16	●	NULL
17	●	NULL
18	●	NULL

3.12.7 Wiring diagrams



Method for connecting the thermocouple input

3.12.8 Process data definition

Analog Input Data (CH1-4): The values of analog signals input for each corresponding

Input data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	Analog Input Data （CH1）							
BYTE 1								
BYTE 2	Analog Input Data （CH2）							
BYTE 3								
BYTE 4	Analog Input Data （CH3）							
BYTE 5								
BYTE 6	Analog Input Data （CH4）							
BYTE 7								

channel.

Analog Output Data (CH1-4): When the manual reference is enabled, the provided data represents the reference temperature.

Output data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	Manual reference temperature Data （CH1）							
BYTE 1								
BYTE 2	Manual reference temperature Data （CH2）							
BYTE 3								
BYTE 4	Manual reference temperature Data （CH3）							
BYTE 5								
BYTE 6	Manual reference temperature Data （CH4）							
BYTE 7								

3.12.9 Configuration parameter definition

Input data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BIT 0..3	Measuring_Range For CH1							
BIT 4..7	REF_JUN_STATE For CH1							
BYTE 1	AverageNum For CH1							
BYTE 2	Offset For CH1							
BYTE 3								
BYTE 4	Gain For CH1							
BYTE 5								
BIT 6.0..6.3	Measuring_Range For CH2							
BIT 6.4..6.7	REF_JUN_STATE For CH2							
BYTE 7	AverageNum For CH2							
BYTE 8	Offset For CH2							
BYTE 9								
BYTE 10	Gain For CH2							
BYTE 11								
.....	.....							

Data description: The configuration parameters of channel 3-4 are the same as those of channel 0.

Parameter name		unit (of measure)	specification	Input Range	clarification
Chinese writing	English (language)				
Measurement type of Channel 1	Measuring_Range For CH1	-	Symbol	TC_K (Default) TC_K TC_S TC_R TC_B TC_J TC_N TC_E TC_T	Select the corresponding temperature sensor
Internal reference temperature of Channel 1	REF_JUN_STATE For CH1		Symbol	Internal reference temperature enabled Internal reference temperature disabled Manually set temperature (Default: Internal reference temperature enabled)	Select the corresponding reference temperature method
Number of filtering cycles of Channel 1	AverageNum For CH1	-	Symbol	x0 x4 x8 x16 x32 (默认：0)	The module employs an average value algorithm. Adjusting this parameter allows you to modify the depth of the average value, thereby improving sampling accuracy. On the contrary, it will reduce the response time.
Bias setting of Channel 1	Offset For CH1	-	Decimal system	-32768..32767 (Default：0)	These two parameters are mainly used for calibrating the analog front-end. Vi = Vr * Gain / 1000 + Offset; (Vi represents the read-in data, while Vr is the actual input data)
Gain setting for Channel 1	Gain For CH1	-	Decimal system	1..65335 (Default：1000)	

3.13 ES-3088A (8-channel thermocouple input module)

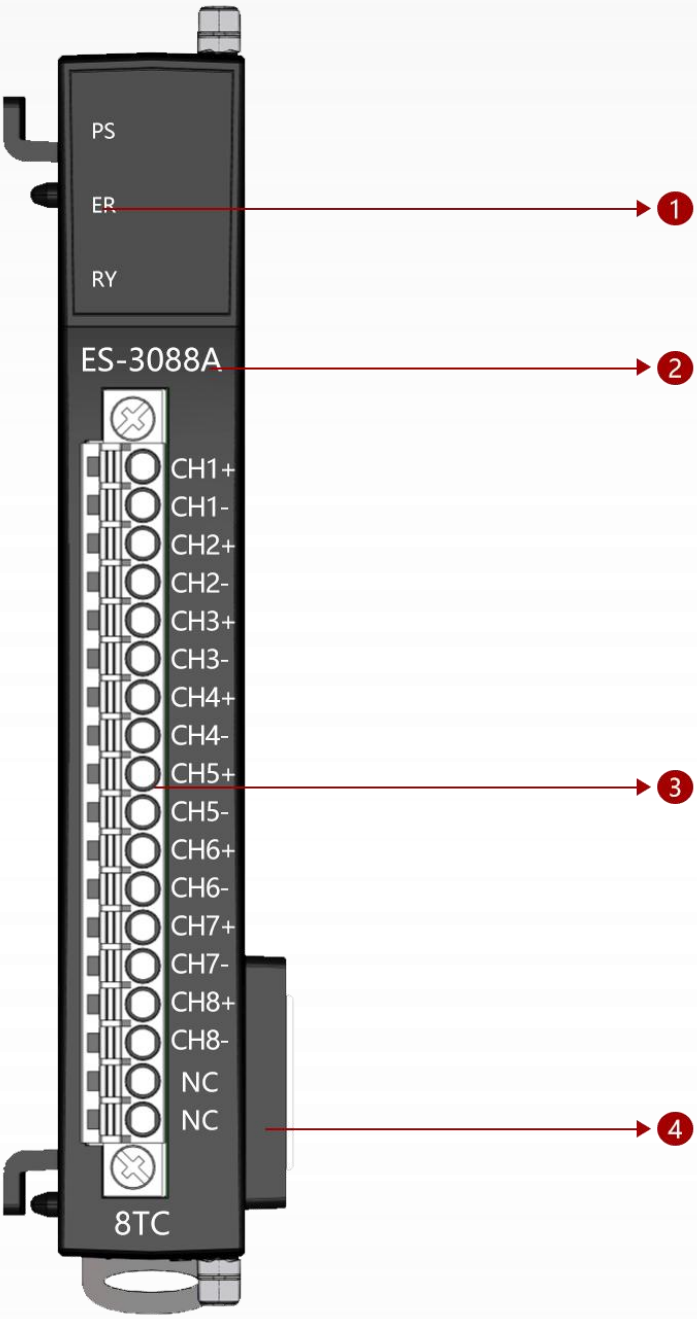
3.13.1 Module overview

- The module supports 8-channel TC thermocouple temperature acquisition.
- Module can access 2-wire TC temperature sensor
- Module with 8 input channels LED indicators.
- The internal bus and field inputs of the module are magnetically isolated.

3.13.2 Module parameters

Hardware parameters	
model number	ES3088A
Backplane Current	20MA
Extended Interface	2*20Pin Board-to-Board Connector
connect a wire	I/O wiring: Max.1.5mm²(AWG 16)
Installation	DN35 rail mounting
Environmental parameters	
operating temperature	0~+55℃
Environmental humidity	5%-95% non-condensing
protection class	IP20
output parameter	
channel number	8CH (2-wire)
Type of access	16 Bytes or 8 words
Input Type	J / K / E / T / S / R / B / N Type Thermocouple
data output	0.1°C per channel bit
sampling error	Less than ±0.3% (full scale)
sampling speed	2ms
filtering time	configurable
conjecture measure word example wear by wrapping around (scarf, shawl) ℃	Type K -270~1370℃
	S type -50~1760℃
	R type -50~1760℃
	B Type 0~1820℃
	J type -210~1200℃
	N Type -270~1300℃
	E type -270~1000℃
	T type -270~400℃
data format	16-bit signed integer (Integer)

3.13.3 Introduction to interfaces



Expansion Module Interface Description

①Backplane system status indicator

②Module Model

③Thermocouple input terminals

④Backplane expansion interface

3.13.4 LED indicators

The LED indication of the module is divided into 1 part: backplane status indication .

3.13.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	○	Expansion Module Backplane Error

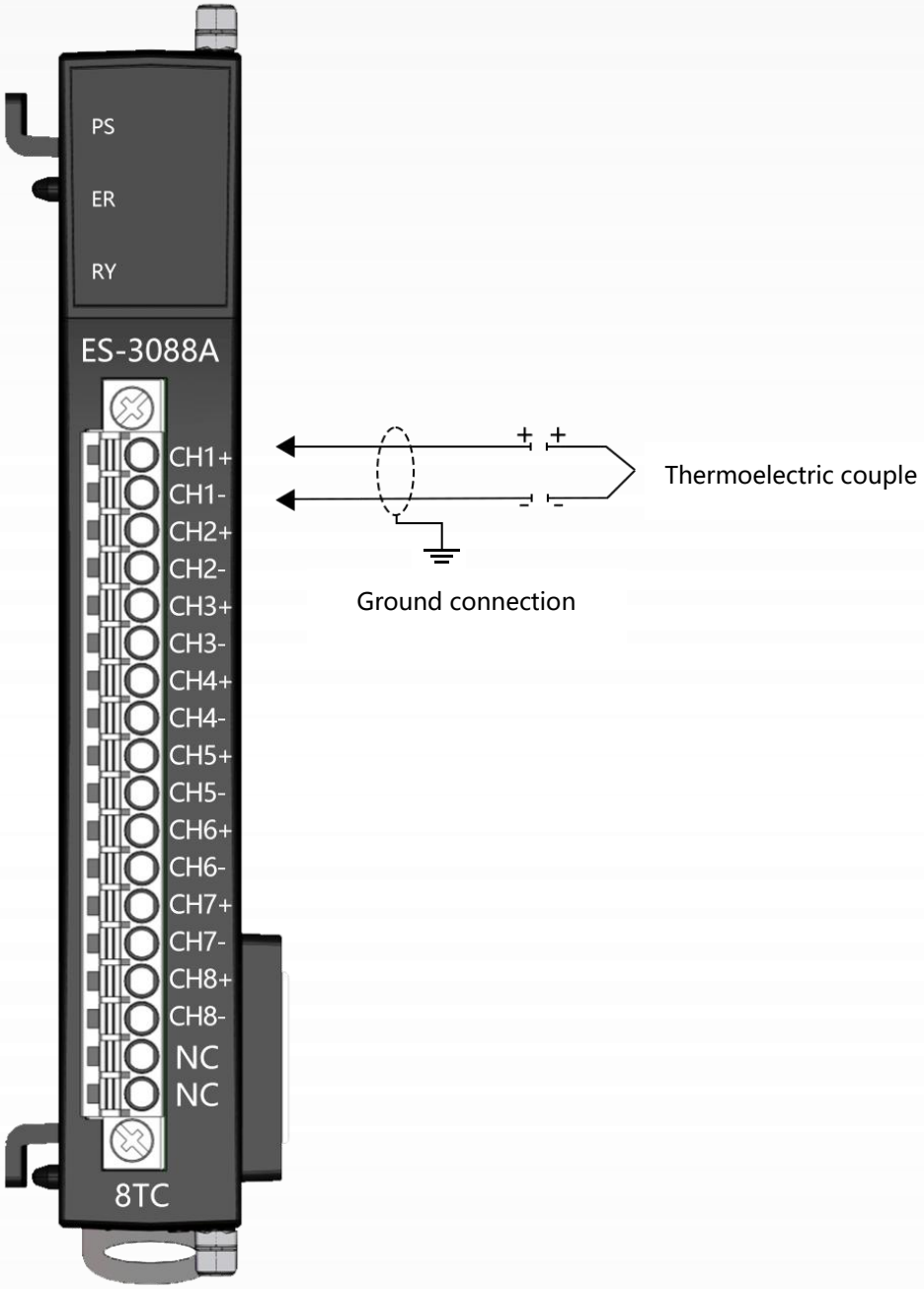
Table 32 System Status Indication

● **The green light is on** ◐ **Flashing red** ◐ **Flashing green** ○ **Not bright**

3.13.6 Definition of terminal blocks

Terminal Serial Number	ES3088A	
	notation	clarification
1	CH1+	Thermocouple Signal Input
2	CH1-	
3	CH2+	
4	CH2-	
5	CH3+	
6	CH3-	
7	CH4+	
8	CH4-	
9	CH5+	
10	CH5-	
11	CH6+	
12	CH6-	
13	CH7+	
14	CH7-	
15	CH8+	
16	CH8-	
17	NC	unoccupied
18	NC	unoccupied

3.13.7 Wiring diagrams



Thermocouple Input Wiring Method

3.13.8 Process data definitions

Analog Input Data (CH1-8): Analog signal input value of the corresponding

input data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	Analog Input Data (CH1)							
BYTE 1								
BYTE 2	Analog Input Data (CH2)							
BYTE 3								
BYTE 4	Analog Input Data (CH3)							
BYTE 5								
BYTE 6	Analog Input Data (CH4)							
BYTE 7								
BYTE 8	Analog Input Data (CH5)							
BYTE 9								
BYTE 10	Analog Input Data (CH6)							
BYTE 11								
BYTE 12	Analog Input Data (CH7)							
BYTE 13								
BYTE 14	Analog Input Data (CH8)							
BYTE 15								

channel.

3.13.9 Configuration parameter definitions

input data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	Measuring_Range For CH1							
BYTE 1	AverageNum For CH1							
BYTE 2	Offset For CH1							
BYTE 3								
BYTE 4	Gain For CH1							
BYTE 5								
BYTE 6	Measuring_Range For CH2							
BYTE 7	AverageNum For CH2							
BYTE 8	Offset For CH2							
BYTE 9								
BYTE 10	Gain For CH2							
BYTE 11								
.....	.....							

Data Note: The configuration parameters for channels 3-7 and channel 0 are identical.

Parameter name		unit (of measure)	specification	Input Range	clarification
Chinese writing	**English (language)**				
Channel 1 Measurement Type	Measuring_Range For CH1	-	notation	TC_K (default) TC_K TC_S TC_R TC_B TC_J TC_N TC_E TC_T	Select the corresponding temperature sensor
Number of filters for channel 1	AverageNum For CH1	-	notation	x0 x4 x8 x16 x32 (Default: 0)	The averaging algorithm is used within the module, and adjusting this parameter adjusts the averaging depth and improves the sampling accuracy, and conversely decreases the response time.
Bias setting for channel 1	Offset For CH1	-	decimal system	-32768..32767 (default: 0)	These two parameters are mainly used to calibrate the analog front-end. vi=Vr* Gain/1000+Offset; (Vi reads the data Vr actual input)
Gain setting for channel 1	Gain For CH1	-	decimal system	1..65335 (Default: 1000)	

3.14 ES-4043A (4-channel analog output module)

3.14.1 Module overview

◆ The module supports 4-channel analog signal output, ES-4043A is current signal/voltage signal output.

◆ ES-4081A module can be configured as 0-20mA current signal output / 0-10V voltage signal output

◆ The module supports 2-wire output.

◆ The internal bus and field inputs of the module are magnetically isolated.

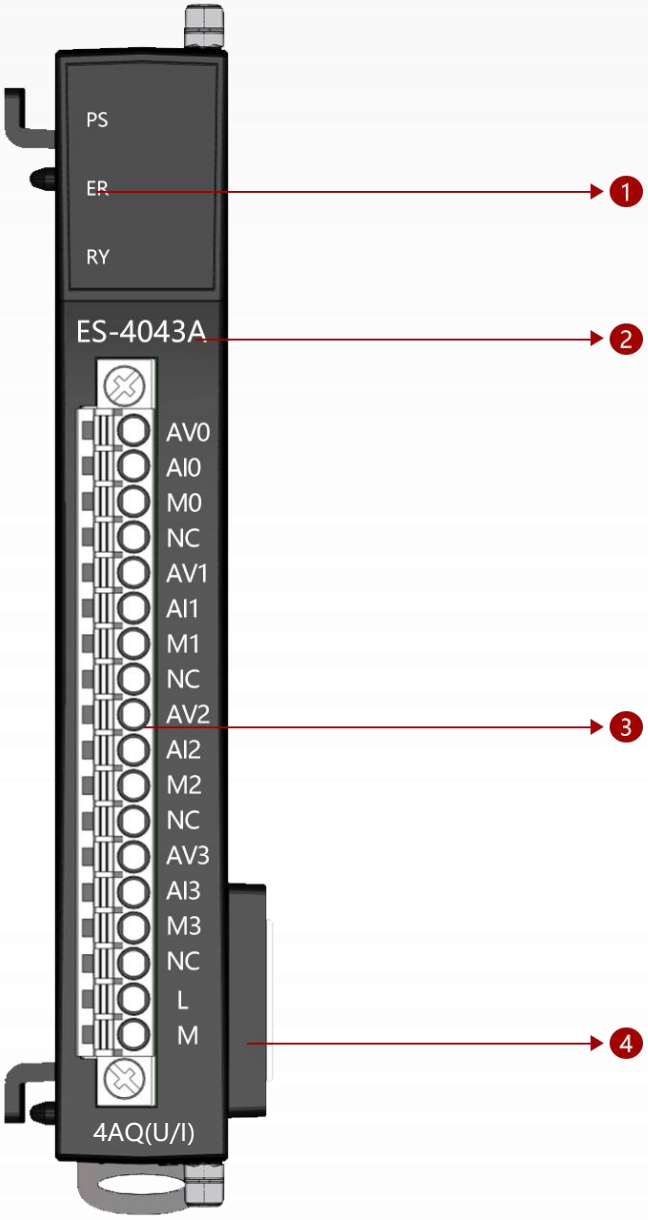
◆ The output channels of the module are connected to current and voltage loads.

◆ The module channels are equipped with TVS over-voltage protection.

3.14.2 Module parameters

Hardware parameters	
model number	ES4043A
Backplane Current	20MA
Extended Interface	2*20Pin Board-to-Board Connector
connect a wire	I/O wiring: Max.1.5mm²(AWG 16)
Installation	DN35 rail mounting
Environmental parameters	
operating temperature	-40~85℃
Environmental humidity	5%-95% non-condensing
protection class	IP20
output parameter	
channel number	8CH
Type of access	16 Bytes or 8 words
resolution (of a photo)	16-bit
Output type	0~20mA/0~10V
sampling speed	Single channel 1MS

3.14.3 Introduction to interfaces



Expansion Module Interface Description

①Backplane system status indicator

②Module Model

③ Analog output terminal

④Backplane expansion interface

3.14.4 LED indicators

The LED indication of the module is divided into 1 part: backplane status indication .

3.14.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	○	Expansion Module Backplane Error

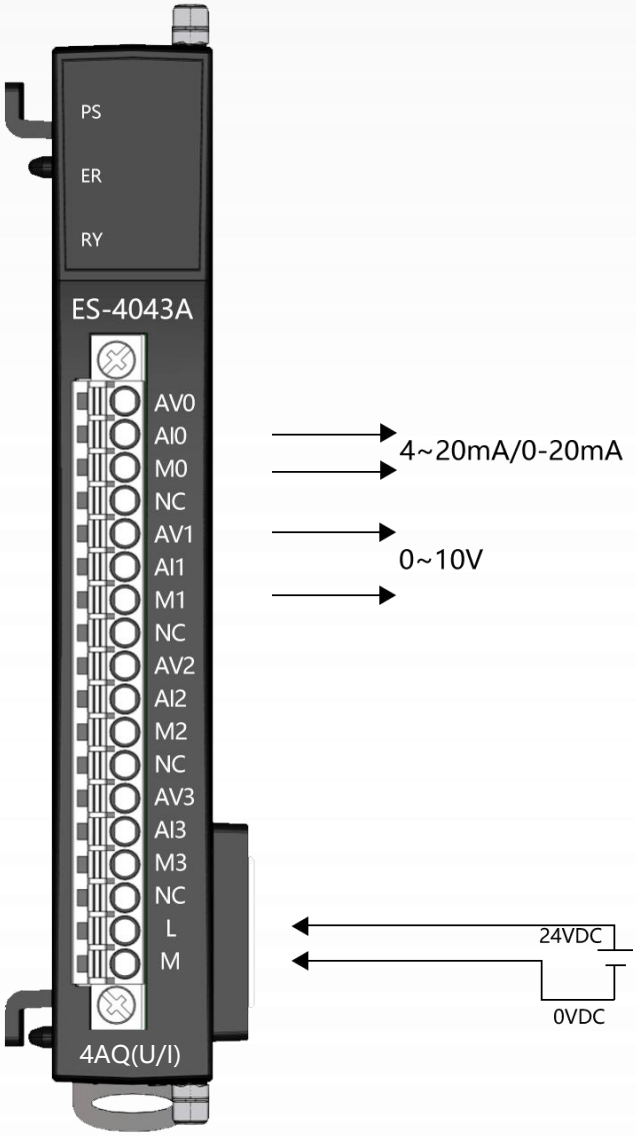
Table 33 System Status Indication

● **The green light is on** ◐ **Flashing red** ◐ **Flashing green** ○ **Not bright**

3.14.6 Definition of terminal blocks

Terminal Serial Number	ES4081A	
	notation	clarification
1	AV0	Analog signal output CH0
2	AI1	
3	M0	
4	NC	unoccupied
5	AV1	Analog signal output CH1
6	AI1	
7	M1	
8	NC	unoccupied
9	AV2	Analog signal output CH2
10	AI2	
11	M2	
12	NC	unoccupied
13	AV3	Analog signal output CH3
14	AI3	
15	M3	
16	NC	unoccupied
17	L	DC24V
18	M	0V

3.14.7 Wiring diagrams



Analog current/voltage output wiring method

3.14.8 Process data definitions

Analog Input Data (CH0-3): Analog signal input value of the corresponding channel

output data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	Analog Output Data (CH0)							
BYTE 1								
BYTE 2	Analog Output Data (CH1)							
BYTE 3								
BYTE 4	Analog Output Data (CH2)							
BYTE 5								
BYTE 6	Analog Output Data (CH3)							
BYTE 7								

3.14.9 Configuration parameter definitions

Transmission data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	OUT_Range For CH0							
BYTE 1	Error_Mode (Param. CH1_Error_Mode) For CH0							
BYTE 2	Replace value For CH0							
BYTE 3								
BYTE 4	Full value For CH0							
BYTE 5								
BYTE 6	Zero value For CH0							
BYTE 7								
BYTE 8	OUT_Range For CH1							
BYTE 9	Error_Mode (Param. CH1_Error_Mode) For CH1							
BYTE 10	Replace value For CH1							
BYTE 11								
BYTE 12	Full value For CH1							
BYTE 13								
BYTE 14	Zero value For CH1							
BYTE 15								
.....	.....							

Data Note: The configuration parameters for channels 1-3 and channel 0 are the same.

Parameter name		unit (of measure)	specification	Input Range	clarification
Chinese	**English (language)**				
Channel 0 type selection	OUT_Range	-	notation	Disable 0-10V (default) 4-20mA 0-20mA	Select the corresponding analog output range where Disable means to close the sampling channel.
Channel 0 Safe Mode	Error_Mode (Param. CH1_Error_Mode) For CH1	-	notation	0..2	0: Output to 0 1: Maintain current value 2: Output alternatives
Alternative values for channel 0	Replace value For CH1	-	decimal system	-32768..32767	-32768..32767 (Default: 0)
Full scale engineering value for channel 0	Full value For CH1	-	decimal system	-32768..32767	-32768..32767 (Default: 32767)
Zero range engineering value for channel 0	Zero value For CH1	-	decimal system	-32768..32767	-32768..32767 (Default: 0)

3.15 ES-4081A/ES-4082A (8-channel analog output module)

3.15.1 Module overview

◆ The module supports 8-channel analog signal output, ES-4081A is current signal output and ES-4082A is voltage signal output.

◆ ES-4081A module can be configured for 0-20mA current signal output. ES-4082A module can be configured for 0-10V voltage signal output.

◆ The module supports 2-wire output.

◆ The internal bus and field inputs of the module are magnetically isolated.

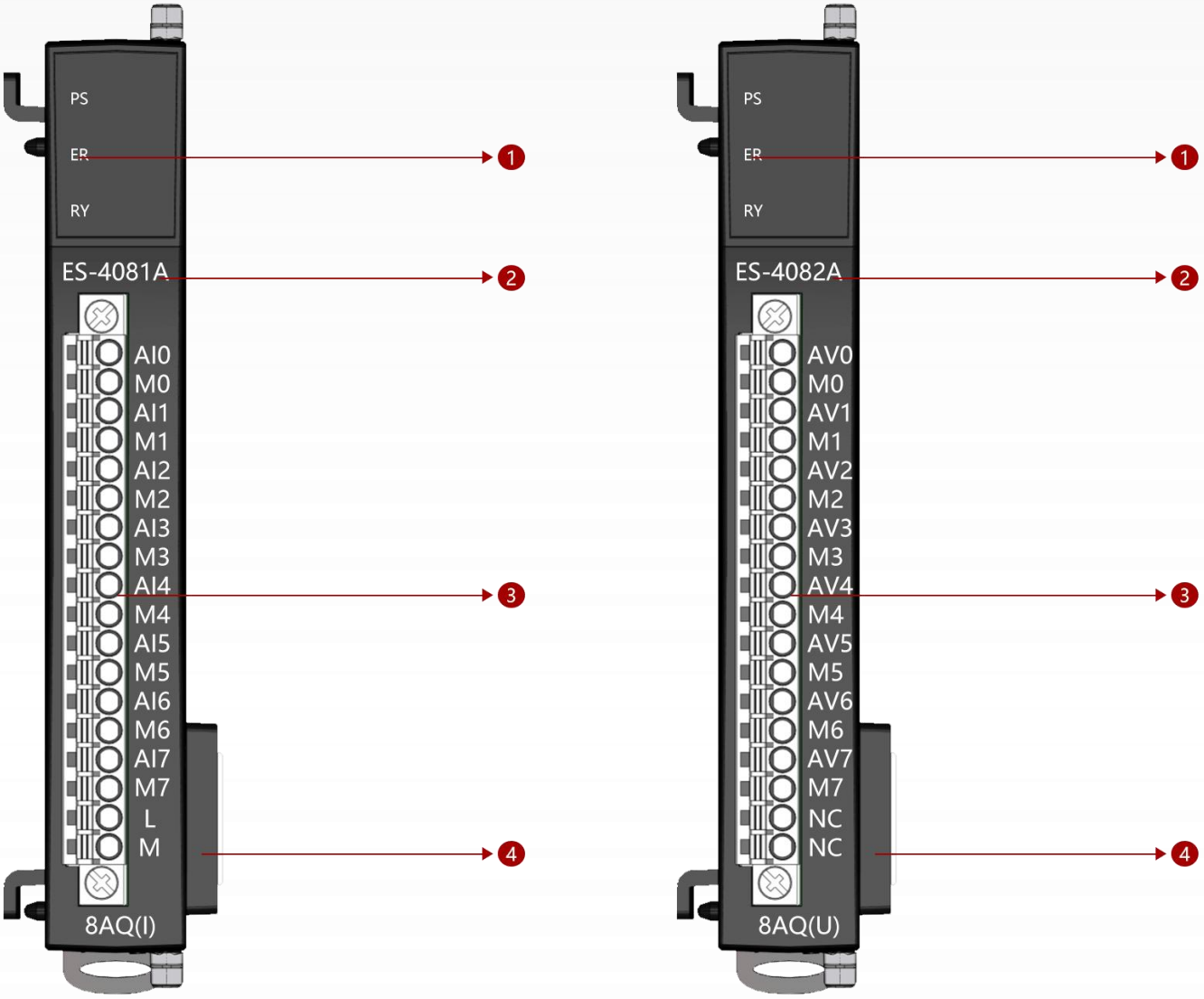
◆ The output channels of the module are connected to current and voltage loads.

◆ The module channels are equipped with TVS over-voltage protection.

3.15.2 Module parameters

Hardware parameters		
model number	ES4081A	ES4082A
Backplane Current	20MA	
Extended Interface	2*20Pin Board-to-Board Connector	
connect a wire	I/O wiring: Max.1.5mm²(AWG 16)	
Installation	DN35 rail mounting	
Environmental parameters		
operating temperature	-40~85℃	
Environmental humidity	5%-95% non-condensing	
protection class	IP20	
output parameter		
channel number	8CH	
Type of access	16 Bytes or 8 words	
resolution (of a photo)	16-bit	
Output type	0~20mA	0~10V
sampling speed	Single channel 1MS	

3.15.3 Introduction to interfaces



Expansion Module Interface Description

①Backplane system status indicator

②Module Model

③Analog output terminal

④Backplane expansion interface

3.15.4 LED indicators

The LED indication of the module is divided into 1 part: backplane status indication .

3.15.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	○	Expansion Module Backplane Error

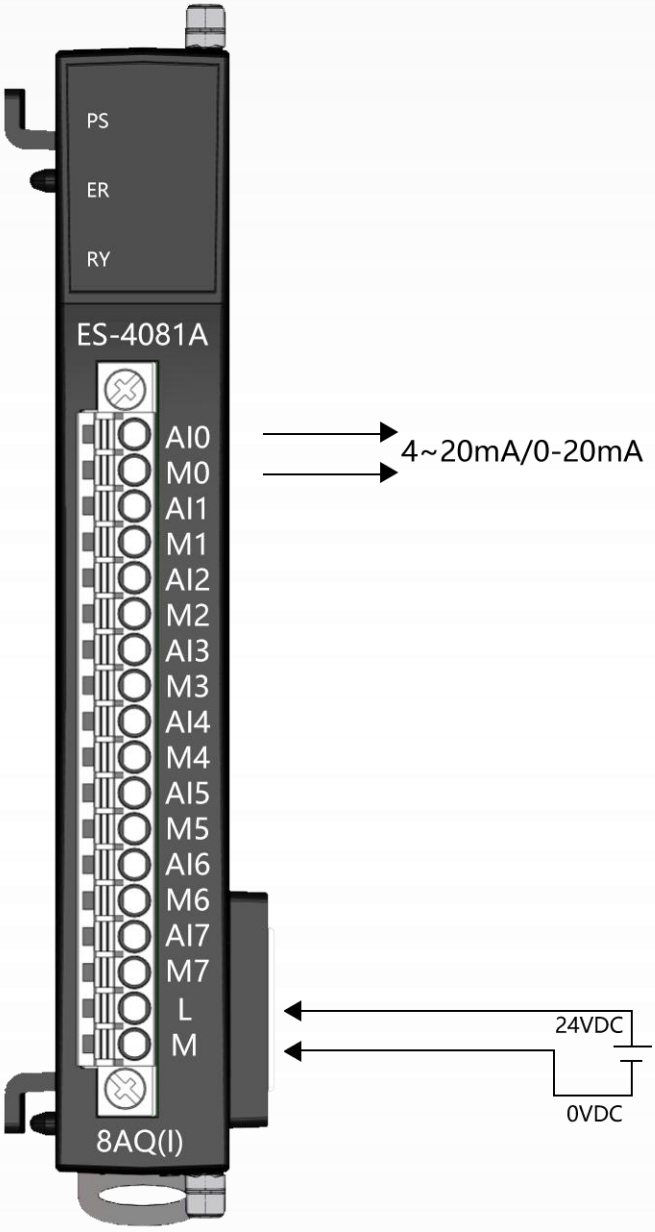
Table 34 System Status Indication

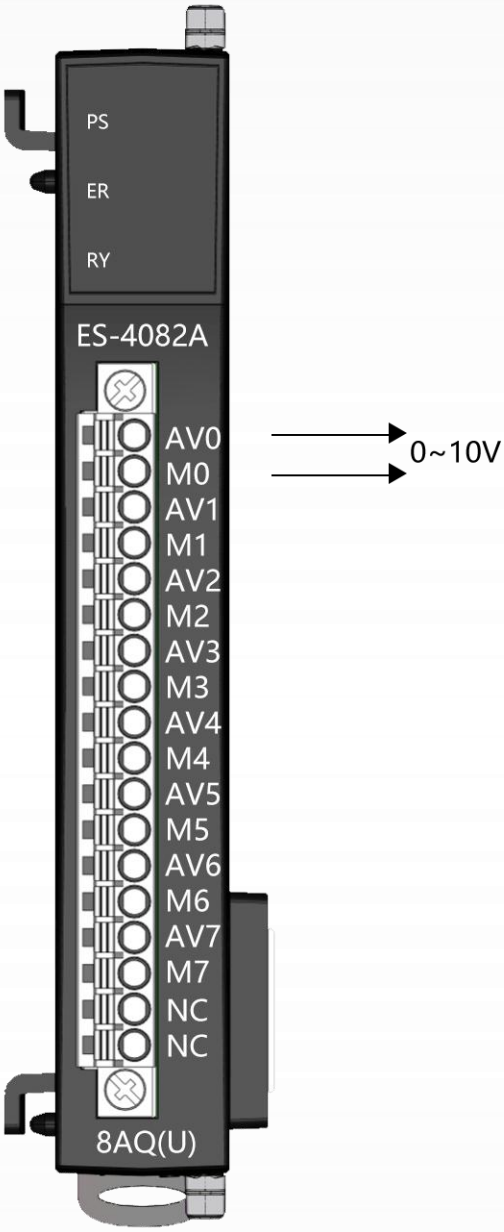
● **The green light is on** ◐ **Flashing red** ◐ **Flashing green** ○ **Not bright**

3.15.6 Definition of terminal blocks

Terminal Serial Number	ES4081A	ES4082A	
	notation		clarification
1	AI0	AV0	Analog signal output
2	M0	M0	
3	AI1	AV1	
4	M1	M1	
5	AI2	AV2	
6	M2	M2	
7	AI3	AV3	
8	M3	M3	
9	AI4	AV4	
10	M4	M4	
11	AI5	AV5	
12	M5	M5	
13	AI6	AV6	
14	M6	M6	
15	AI7	AV7	
16	M7	M7	
17	L	NC	**ES4081A:**DC24V,**ES4082A:**Empty
18	M	NC	**ES4081A:**DC0V,**ES4082A:**Empty

3.15.7 Wiring diagrams





Analog current output wiring method Analog voltage output wiring method

3.15.8 Process Data Definition

Analog Input Data (CH0-7): Analog signal input value of the corresponding channel

output data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	Analog Output Data (CH0)							
BYTE 1								
BYTE 2	Analog Output Data (CH1)							
BYTE 3								
BYTE 4	Analog Output Data (CH2)							
BYTE 5								
BYTE 6	Analog Output Data (CH3)							
BYTE 7								
BYTE 8	Analog Output Data (CH4)							
BYTE 9								
BYTE 10	Analog Output Data (CH5)							
BYTE 11								
BYTE 12	Analog Output Data (CH6)							
BYTE 13								
BYTE 14	Analog Output Data (CH7)							
BYTE 15								

3.15.9 Configuration parameter definitions

Transmission data								
BIT No	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0	Error_Mode (Param. CH0 CH0_Error_Mode) For CH0							
BYTE 1	Replace value For CH0							
BYTE 2								
BYTE 3	Full value For CH0							
BYTE 4								
BYTE 5	Zero value For CH0							
BYTE 6								
BYTE 7	Error_Mode (Param. CH CH0 Error_Mode) For CH1							
BYTE 8	Replace value For CH1							
BYTE 9								
BYTE 10	Full value For CH1							
BYTE 11								
BYTE 12	Zero value For CH1							
BYTE 13								
.....	.....							

Data Note: The configuration parameters for channels 1-7 and channel 0 are the same.

Parameter name		unit (of measure)	specification	Input Range	clarification
Chinese writing	**English (language)**				
Channel 0 Safe Mode	Error_Mode (Param. CH1_Error_Mode) For CH1	-	notation	0..2	0: Output to 0 1: Maintain current value 2: Output alternatives
Alternative values for channel 0	Replace value For CH1	-	decimal system	-32768..32767	-32768..32767 (Default: 0)
Full scale engineering value for channel 0	Full value For CH1	-	decimal system	-32768..32767	-32768..32767 (Default: 32767)
Zero range engineering value for channel 0	Zero value For CH1	-	decimal system	-32768..32767	-32768..32767 (Default: 0)

3.16 ES-04PM (4-channel high-speed pulse output module)

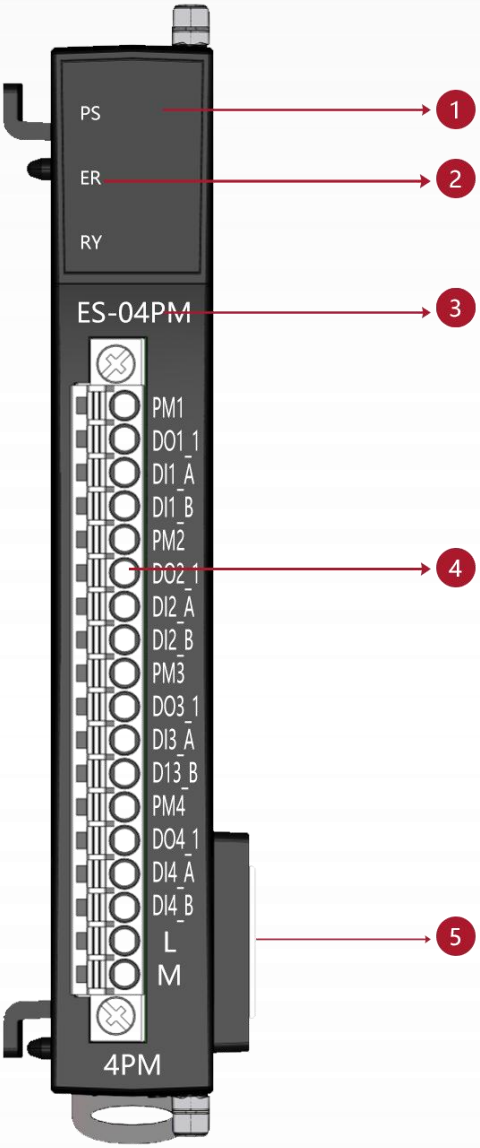
3.16.1 Module overview

- The module supports 4-channel NPN high-speed pulse output module.
- The module can access 4 channels of NPN digital inputs.
- The module can output 8 NPN digital outputs.

3.16.2 Module parameters

Hardware parameters	
model number	ES-04PM
Backplane Current	20MA
Extended Interface	2*20Pin Board-to-Board Connector
connect a wire	I/O wiring: Max.1.5mm²(AWG 16)
Installation	DN35 rail mounting
Environmental parameters	
operating temperature	0~+55℃
Environmental humidity	5%-95% non-condensing
protection class	IP20
Pulse output parameters	
channel number	4CH
Output type	Drain Low Output (NPN)
Rated output voltage	24 V DC (-15 %/+20 %), (IEC61131-2, type 2)
output connector	Plug-in connectors
Load Type	Pure Resistive, Inductive, Bulb
Maximum Output Current	Max. 0.5 A/Ch, independent short-circuit protection per
Maximum Output Frequency	200K/Ch
data format	16-bit signed integer (Integer)
input parameter	
channel number	2x4ch
Output type	Drain Low Level Input (NPN)
Rated output voltage	24 V DC (-15 %/+20 %), (IEC61131-2, type 2)
functionality	Configurable for high-speed pulse start triggering
output parameter	
channel number	1 x4ch
Rated output voltage	24 V DC (-15 %/+20 %), (IEC61131-2, type 2)
Maximum Output Current	Max. 0.5 A/Ch, independent short-circuit protection per
functionality	Configurable as emergency stop or stop status output for

3.16.3 Introduction to interfaces



Expansion Module Interface Description

①Backplane system status indicator

②Module Model

③Pulse output terminal

④Backplane expansion interface

3.16.4 LED indicators

The LED indication of the module is divided into 1 part: backplane status indication .

3.16.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	○	Expansion Module Backplane Error

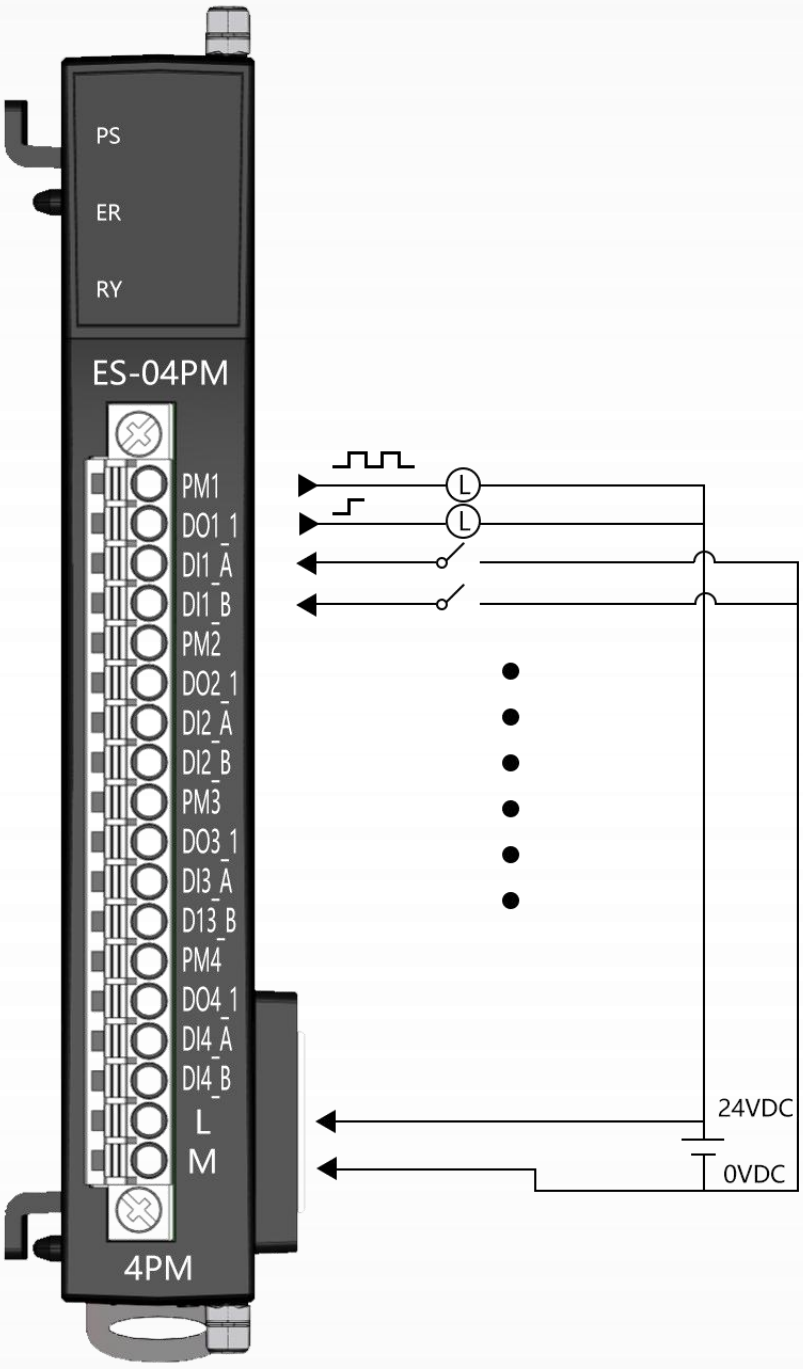
Table 35 System Status Indication

● The green light is on ◐ Flashing red ◐ Flashing green ○ Not bright

3.16.6 Definition of terminal blocks

Terminal Serial Number	ES-04PM	
	notation	clarification
1	PM1	Channel 1 high-speed pulse output
2	DO1_1	Channel 1 digital output DO
3	DI1_A	Channel 1 digital input DI_A
4	DI1_B	Channel 1 digital input DI_B
5	PM2	Channel 2 high-speed pulse output
6	DO2_1	Channel 2 digital output DO
7	DI2_A	Channel 2 digital input DI_A
8	DI2_B	Channel 2 digital input DI_B
9	PM3	Channel 3 high-speed pulse output
10	DO3_1	Channel 3 digital output DO
11	DI3_A	Channel 3 digital input DI_A
12	DI3_B	Channel 3 digital input DI_B
13	PM4	Channel 4 High Speed Pulse Output
14	DO4_1	Channel 4 digital output DO
15	DI4_A	Channel 4 digital input DI_A
16	DI4_B	Channel 4 digital input DI_B
17	L	24VDC Supply Voltage
18	M	Grounding of the supply voltage

3.16.7 Wiring diagrams



3.16.8 Process data definitions

Feedback Interface Address Assignment									
1 channel	BYTE 0	Ch1 actual current channel output pulse number							
	BYTE 1								
	BYTE 2								
	BYTE 3								
	BYTE 4	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
		DQ1	DI1-B	DI1-A	Counter status: 00: Normal count 01: Running 10: Completion 11: Reservations		operational state 00: Downtime status 01: Acceleration phase 10: Frequency arrival 11: Deceleration phase		Enable state
	BYTE 5	error code							
2 channels	BYTE 6..11	Ch2 feedback data (defining parameter Ch1)							
3 channels	BYTE 12...17	Ch3 feedback data (defining parameter Ch1)							
4 channels	BYTE 18...23	Ch4 feedback data (defining parameter Ch1)							

Control Interface Address Assignment									
1 channel	BYTE 0	Ch1 Number of target pulses							
	BYTE 1								
	BYTE 2								
	BYTE 3								
	BYTE 4	Ch1 Target frequency							
	BYTE 5								
	BYTE 6								
	BYTE 7								
	BYTE 8	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
		Reservation 1			Jitter Ratio Enable	DQ	reset (a dislocated joint, an electronic device etc) reckoning	non-urgent cessation	enable
	BYTE 9	duty cycle							
2 channels	BYTE 9...17	Ch2 control data (definition refer to Ch1)							
3-channel	BYTE 18...26	Ch3 control data (definition reference Ch1)							
4 channels	BYTE 27...35	Ch4 control data (definition reference Ch1)							

3.16.9 Configuration parameter definitions

Configuration parameters		
Channel 1	BYTE 0	DQ0 Function Selection
	BYTE 1	DQ0 Safe Mode Value
	BYTE 2	Function selection of DI1_A
	BYTE 3	Function selection of DI1_B
	BYTE 4	DI1_A Filtration factor
	BYTE 5	DI1_B Filtration factor
	BYTE 6...10	Pulse output start frequency
	BYTE 11...15	Maximum pulse output frequency
	BYTE 16...20	Curve acceleration time
	BYTE 21	Curve Type
	BYTE 22	PWM Duty Cycle
	BYTE 23	Error Pulse Output Safety Status
Channel 2	BYTE 24...47	CH2 configuration parameters (refer to CH1 configuration parameters)
Channel 3	BYTE 48...71	CH3 configuration parameters (refer to CH1 configuration parameters)
Channel 4	BYTE 72...95	CH4 Configuration Parameters (refer to CH1 Configuration Parameters)

Parameter name		unit (of measure)	specification	Input Range	clarification
Chinese	English (language)				
DO0 Function Selection	DOO Function	-	enumeration	DO (default) DO_POS_DIR DO_NEG_DIR PULSE_STATE ALM_OUT	Function selection for each group of output points: DO: Normal IO output DO_POS_DIR: Positive high-speed pulse output direction control DO_NEG_DIR: High-speed pulse output direction reversal control PULSE_STATE: High-speed pulse output completion state ALM_OUT: High-speed pulse output error alarm
DO0 Safe Output Method	DO0 Error Output state	-	enumeration	Clean (default) SetHigh Hold	The state of the output point is set when the module sends a communication interruption. Clean : Cleared to "0" SetHigh: set to "1" Hold : Hold the current state
DI Function	DI Function	-	enumeration	DI DI_RISING_START_PWM DI_RISING_FREE_STOP_PWM DI_RISING_STOP_PWM DI_FALLING_START_PWM DI_FALLING_FREE_STOP_PWM DI_FALLING_STOP_PWM DI_RISING_START_FALLING_FREE_STOP DI_RISING_START_FALLING_STOP DI_FALLING_START_RISING_FREE_STOP	DI: Common IO input DI_RISING_START_PWM: Rising edge start pulse output DI_RISING_FREE_STOP_PWM: Rising edge stop pulse output (with curve output) DI_RISING_STOP_PWM: Rising edge stops pulse output immediately

				DI_FALLING_START_RISING_STOP	DI_FALLING_START_PWM : Falling edge start pulse output DI_FALLING_FREE_STOP_PWM: Falling edge stop pulse output (with curve output) DI_FALLING_STOP_PWM : Immediate stopping of pulse output on falling edge. DI_RISING_START_FALLING_FREE_STOP: Rising Edge Startup Pulse output. Falling edge stop output DI_RISING_START_FALLING_STOP: Rising edge starts pulse output. Falling stops the output immediately DI_FALLING_START_RISING_FREE_STOP: Falling edge start pulse output. Rising stop output DI_FALLING_START_RISING_STOP: Falling edge start pulse output. Rising immediately stops the output
DI Filter Coefficient	DI Filter	-	decimal	0..255 (Default: 0)	DI Filter Coefficient

			system		
Curve Start Frequency	Curve Start Velocity	Hz	decimal system	1000..200000 (Default: 1000)	Curve Start Frequency
Curve Maximum Frequency	Curve Max Velocity	Hz	decimal system	1000..200000 (Default: 200000)	Curve Maximum Frequency
Curve Acceleration and Deceleration Time	Curve Time	ms	decimal system	100..1000 (Default: 500)	Curve Acceleration and Deceleration-Time
Curve Type	Curve Type		enumeration	NO_CURVE S_CURVE T_CURVE	NO_CURVE: different curves start directly S_CURVE: S-curve T_CURVE: T-curve
Duty cycle of pulses	Pulse Duty	(%)	decimal system	10-90 (Default: 50)	Duty cycle of output pulse
security model	Error_Mode			STOP (default) DEC_STOP Hold	STOP: Stop immediately DEC_STOP : deceleration stop Hold: Hold output

3.17 ES-04DMA (4-channel pulse positioning module)

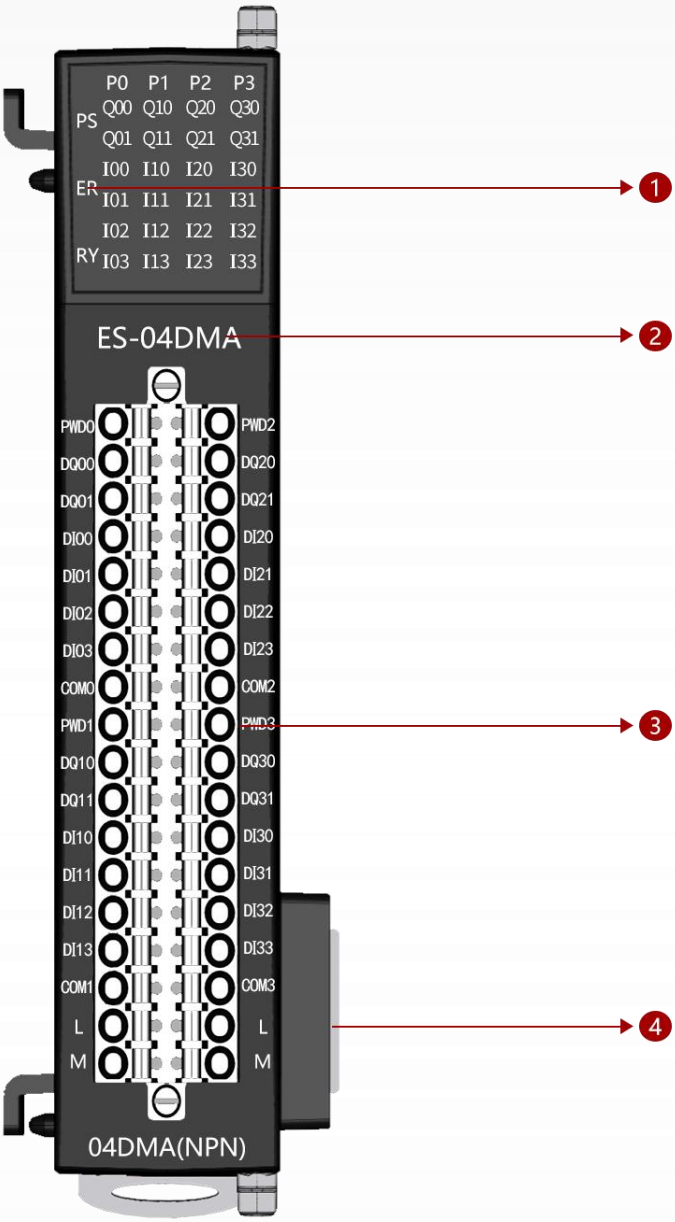
3.17.1 Module overview

- The module supports 4-channel NPN high-speed pulse output module.
- The module can access 16 channels of NPN digital inputs.
- The module can output 8 NPN digital outputs.

3.17.2 Module parameters

Hardware parameters	
model number	ES-04DMA
Backplane current	20MA
Extended Interface	2*20Pin Board-to-Board Connector
connect a wire	I/O wiring: Max.1.5mm²(AWG 16)
Installation	DN35 rail mounting
Environmental parameters	
operating temperature	0~+55℃
Environmental humidity	5%-95% non-condensing
protection class	IP20
Pulse output parameters	
channel number	4CH
Output type	Drain Low Output (NPN)
Rated output voltage	24 V DC (-15 %/+20 %), (IEC61131-2, type 2)
output connector	Plug-in connectors
Load Type	Pure Resistive, Inductive, Bulb
Maximum Output Current	Max. 0.5 A/Ch, independent short-circuit protection per channel
Maximum Output Frequency	200K/Ch
data format	16-bit signed integer (Integer)
input parameter	
channel number	4x4ch
Output type	Drain Low Level Input (NPN)
Rated output voltage	24 V DC (-15 %/+20 %), (IEC61131-2, type 2)
functionality	Can be configured as digital input, pulse stop, left limit, right limit, zero point, near zero
output parameter	
channel number	2x4ch
Rated output voltage	24 V DC (-15 %/+20 %), (IEC61131-2, type 2)
Maximum Output Current	Max. 0.5 A/Ch, independent short-circuit protection per channel
functionality	It can be configured as direction output, reverse direction output, digital output, and

3.17.3 Introduction to interfaces



Expansion Module Interface Description

①Backplane system status indicator

②Module Model

③Pulse output terminal

④Backplane expansion interface

3.17.4 LED indicators

The LED indication of the module is divided into 1 part: backplane status indication .

3.17.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	○	Expansion Module Backplane Error

Table 36 System Status Indication

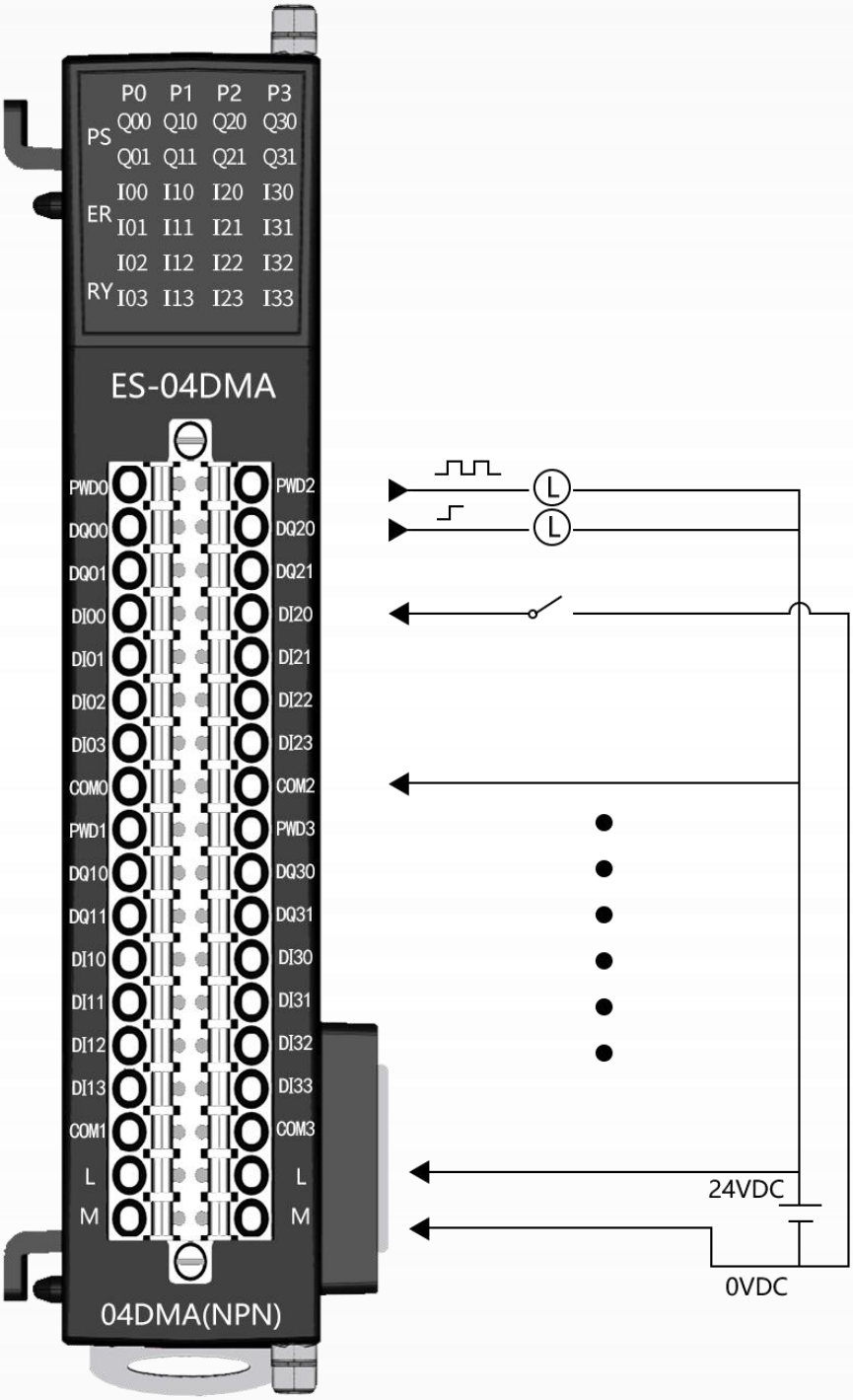
● **The green light is on** ◐ **Flashing red** ◐ **Flashing green** ○ **Not bright**

3.17.6 Definition of terminal blocks

Left terminal serial number	ES-04DMA	
	notation	clarification
1	PWD0	CH1 High-speed pulse output
2	DQ00	Digital output; default function: direction control
3	DQ01	Digital Output; Default Function: Digital Output
4	DI00	Digital input; default function: left limit;
5	DI01	Digital input; default function: right limit;
6	DI02	Digital input; default function: zero point;
7	DI03	Digital input; default function:, pulse output stop;
8	COM0	Input common point: 24V+;
9	PWD1	CH2 high-speed pulse output
10	DQ10	Digital output; default function: direction control
11	DQ11	Digital Output; Default Function: Digital Output
12	DI10	Digital input; default function: left limit;
13	DI11	Digital input; default function: right limit;
14	DI12	Digital input; default function: zero point;
15	DI13	Digital input; default function: pulse output stop;
16	COM1	Input common point: 24V+;
17	L	24 supply voltage input
18	M	Common ground

Right terminal serial number	ES-04DMA	
	notation	clarification
1	PWD2	CH3 high-speed pulse output
2	DQ20	Digital output; default function: direction control
3	DQ21	Digital Output; Default Function: Digital Output
4	DI20	Digital input; default function: left limit;
5	DI21	Digital input; default function: right limit;
6	DI22	Digital input; default function: zero point;
7	DI23	Digital input; default function:, pulse output stop;
8	COM2	Input common point: 24V+;
9	PWD3	CH4 high-speed pulse output
10	DQ30	Digital output; default function: direction control
11	DQ31	Digital Output; Default Function: Digital Output
12	DI30	Digital input; default function: left limit;
13	DI31	Digital input; default function: right limit;
14	DI32	Digital input; default function: zero point;
15	DI33	Digital input; default function: pulse output stop;
16	COM3	Input common point: 24V+;
17	L	24 supply voltage input
18	M	Common ground

3.17.7 Wiring diagrams



3.17.8 Process data definitions

<table>
<tr><th colspan="10">Input port address assignment</th></tr>
<tr><td rowspan="9">1 channel</td><td>BYTE 0</td><td colspan="8" rowspan="4">Ch1 Current motor running position</td></tr>
<tr><td>BYTE 1</td></tr>
<tr><td>BYTE 2</td></tr>
<tr><td>BYTE 3</td></tr>
<tr><td rowspan="5">BYTE 4-5</td><td>BIT 7</td><td>BIT 6</td><td>BIT 5</td><td>BIT 4</td><td>BIT 3</td><td>BIT 2</td><td>BIT 1</td><td>BIT 0</td></tr>
<tr><td>DI2 input status</td><td>DI1 Input Status</td><td>DI0 Input Status</td><td colspan="2">operational state
00: Downtime status
01: Acceleration phase
10: Frequency arrival
11: Deceleration phase</td><td>Target location. Arrive.</td><td>Return of origin complete.</td><td>directional
0: Reverse
1: Positive rotation</td></tr>
<tr><td colspan="2">BIT14-BIT15</td><td>BIT13</td><td>BIT12</td><td>BIT11</td><td>BIT10</td><td>BIT9</td><td>BIT8</td></tr>
<tr><td colspan="2">reservations</td><td>Driver Enable Flag Bit</td><td>Tap Flag Bit</td><td>security model stop sign classifier for honorific people</td><td>DQ1 Output Status</td><td>DQ0 Output Status</td><td>DI3 Input Status</td></tr>
<tr><td>2 channels</td><td>BYTE 6..11</td><td colspan="8">Ch2 Feedback data (definition parameter Ch1)</td></tr>
<tr><td>3 channels</td><td>BYTE 12...17</td><td colspan="8">Ch3 Feedback data (definition parameter Ch1)</td></tr>
<tr><td>4 channels</td><td>BYTE 18...23</td><td colspan="8">Ch4 Feedback data (definition parameter Ch1)</td></tr>
</table>

<table>
<tr><th colspan="11">Output port address assignment</th></tr>
<tr><td rowspan="14">1 channel</td><td>BYTE 0</td><td colspan="9" rowspan="4">Ch1 Target position for controlling motor operation</td></tr>
<tr><td>BYTE 1</td></tr>
<tr><td>BYTE 2</td></tr>
<tr><td>BYTE 3</td></tr>
<tr><td>BYTE 4</td><td colspan="9" rowspan="4">Ch1 Controls the speed of motor operation</td></tr>
<tr><td>BYTE 5</td></tr>
<tr><td>BYTE 6</td></tr>
<tr><td>BYTE 7</td></tr>
<tr><td rowspan="2">BYTE 8</td><td>BIT 7</td><td>BIT 6</td><td>BIT 5</td><td>BIT 4</td><td>BIT 3</td><td>BIT 2</td><td>BIT 1</td><td>BIT 0</td></tr>
<tr><td>Safe mode stop Flag bit clear</td><td>DQ1 output control</td><td>DQ0 output control</td><td>Position, speed mode switching 0: Position 1: Speed</td><td>removals placement</td><td>(math.) return to the origin</td><td>STOP cessation</td><td>driver enable</td></tr>
<tr><td rowspan="2">BYTE 9</td><td colspan="5">BIT10-15</td><td colspan="3">BIT 9</td><td>BIT 8</td></tr>
<tr><td colspan="5">reservations</td><td colspan="3">point and click enable (computing) (driver enable needs to be turned off)</td><td>Velocity Mode and Tap Mode Direction Switching</td></tr>
<tr><td>2 channels</td><td>BYTE 10...19</td><td colspan="9">Ch2 control data (definition refer to Ch1)</td></tr>
<tr><td>3 channels</td><td>BYTE 20...29</td><td colspan="9">Ch3 control data (definition reference Ch1)</td></tr>
<tr><td>4 channels</td><td>BYTE 30...39</td><td colspan="9">Ch4 control data (definition reference Ch1)</td></tr>
</table>

3.17.9 Configuration parameter definitions

Configuration parameters		
Channel 1	BYTE 0	DQ0 Function Selection
	BYTE 1	DQ0 Safe Mode Value
	BYTE 2	DQ1 Function Selection
	BYTE 3	DQ1 Safety Mode Value
	BYTE 4	DI0 function selection
	BYTE 5	DI1 function selection
	BYTE 6	DI2 function selection
	BYTE 7	DI3 function selection
	BYTE 8	DI filter coefficient
	BYTE 9	Curve Type
	BYTE 10...13	Curve Start Frequency
	BYTE 14...17	Curve Maximum Frequency
	BYTE 18...19	Curve Acceleration and Deceleration Time
	BYTE 20...23	Origin return startup speed
	BYTE 24...27	Origin Return Approach Velocity
	BYTE 28	(math.) the origin return model
	BYTE 29	security model
	BYTE 30	Axis operation mode
Channel 2	BYTE 31...61	CH2 configuration parameters (refer to CH1 configuration parameters)
Channel 3	BYTE 62..92	CH3 configuration parameters (refer to CH1 configuration parameters)
Channel 4	BYTE 93...123	CH4 Configuration Parameters (refer to CH1 Configuration Parameters)

Parameter name		unit (of measure)	specification	Input Range	clarification
Chinese	English (language)				
DO0 Function Selection	DO0 Function	-	enumeration	digital output Output Reverse Direction Logic Logic positive direction control (default) Logic Reverse Direction Control Alarm output CW/CCW	Function selection for each group of output points:
DO0 Safe Output Method	DO0 Error Output state	-	enumeration	Clean (default) SetHigh Hold	The state of the output point is set when the module sends a communication interruption. Clean : Cleared to "0" SetHigh: set to "1" Hold : Hold the current state

DO1 Function Selection	DO1 Function	-	enumeration	Digital output (default) Output Reverse Direction Logic Logic Positive Direction Control Logic Reverse Direction Control Alarm output	Function selection for each group of output points:
DO1 Safe Output Method	DO1 Error Output state	-	enumeration	Clean (default) SetHigh Hold	The state of the output point is set when the module sends a communication interruption. Clean : Cleared to "0" SetHigh: set to "1" Hold : Hold the current state
DI0 Function Selection	DI0 function		enumeration	digital input Right limit (default) left limit zero point approach zero (math.) Pulse Emergency Stop Pulse start point-to-point (computing) Inverted digital input inversion right limit left limit of inversion zero point of inversion (math.) inversion near zero Inverted Pulse Emergency Stop Inverted pulse start	Digital input: General IO input. Right limit: Right limit input detection Left Limit: Left limit input detection. Zero: 0 point limit input detection. Near Zero: Input detection close to 0 point.
DI1 Function Selection	DI1 function		enumeration		
DI2 Function Selection	DI2 function		enumeration		

DI3 Function Selection	DI3 function		enumeration	inversion point motion	Pulse Emergency Stop: Input detection stops pulse output. Pulse Start: Input detects the start of pulse output. Tap: Input to detect the tap function. Note: Inverted means the input signal is reversed.
DI Filter Coefficient	DI_Fiter	Ns/Ms	decimal system	0-255 Default value: 2	DI filter coefficient
Curve Type	Curve_Type		enumeration	direct launch T-curve S-curve	Direct start: no curve start T-curve: T-curve activation S-curve: S-curve activation

Curve Starting frequency	StartVelocity	Hz	decimal system	1000-20000 Default value: 1000	Curve Start Frequency
Curve Maximum frequency	MaxVelocity	Hz	decimal system	1000-20000 Default value: 100000	Curve Maximum Frequency
Curve Acceleration and deceleration time	AccDec_Time	ms	decimal system	100-1000 Default value: 500	Curve Acceleration and Deceleration-Time
Return of origin. Starting speed.	ZRN1 Velocity	Hz	decimal system	1000-20000 Default value: 10000	Origin return startup speed
Homeward bound. Approaching velocity.	ZRN2 Velocity	Hz	decimal system	1000-20000 Default value: 1000	Origin Return Approach Velocity

regression mode	ZRN_ MODE		enum eratio n	Home return mode 1 (default) Return-to-origin model 2	Home return mode 1: The drive motor returns to the zero limit. Home return mode 2: The drive motor returns to the set zero limit and decelerates before passing through the near-zero limit and returning to the zero limit.
security model	ERROR_ Mode		enum eratio n	Stop immediately (default) deceleration stop Hold the current state	The state setting of the pulse output when the module sends a communication interruption. Immediate stop: stops the output pulse. Deceleration stop: Deceleration before stopping the output pulse. Hold current state: Holds the current pulse output.
Axis operation mode	AXIS_ MODE		enum eratio n	Absolute positioning (default) relative positioning (of locations)	Absolute positioning: absolute positional positioning Relative positioning: relative positional positioning

3.18 ES-02HC (2-channel high-speed pulse input module)

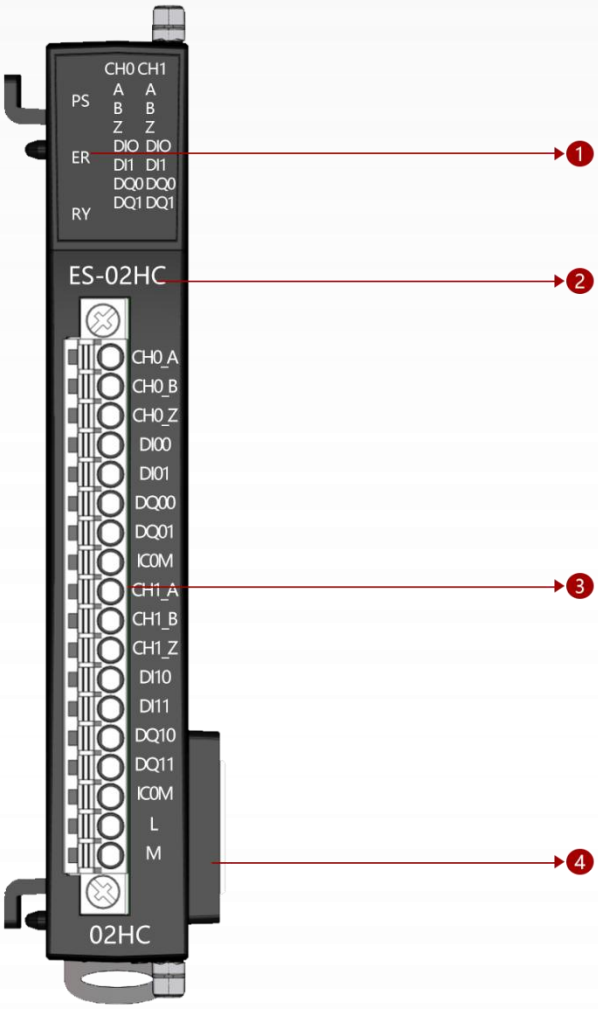
3.18.1 Module overview

- The module supports 2-channel NPN high-speed pulse input module.
- The module can access 4 channels of NPN digital inputs.
- The module can output 4 NPN digital outputs.

3.18.2 Module generalization parameters

Hardware parameters	
model number	ES-02HC
Backplane current	20MA
Extended Interface	2*20Pin Board-to-Board Connector
connect a wire	I/O wiring: Max.1.5mm²(AWG 16)
Installation	DN35 rail mounting
Environmental parameters	
operating temperature	0~+55℃
Environmental humidity	5%-95% non-condensing
protection class	IP20
Pulse Input Parameters	
channel number	2CH
Output type	Drain Low Output (NPN)
Rated output voltage	24 V DC (-15 %/+20 %), (IEC61131-2, type 2)
output connector	Plug-in connectors
Input Type	Incremental Encoder, PWM, Switching
Maximum Input Current	Max. 0.5 A/Ch, independent short-circuit protection per channel
Maximum Input Frequency	200K/Ch
data format	16-bit signed integer (Integer)
input parameter	
channel number	2x2ch
Output type	Drain Low Level Input (NPN)
Rated output voltage	24 V DC (-15 %/+20 %), (IEC61131-2, type 2)
functionality	Configurable for single counting, AB phase counting, digital inputs
output parameter	
channel number	2x2ch
Rated output voltage	24 V DC (-15 %/+20 %), (IEC61131-2, type 2)
Maximum Output Current	Max. 0.5 A/Ch, independent short-circuit protection per channel
functionality	Configurable as a counting mode comparison output or as a normal digital output

3.18.3 Introduction to interfaces



Expansion Module Interface Description

①Backplane system status indicator

②Module Model

③Pulse output terminal

④Backplane expansion interface

3.18.4 LED indicators

The LED indication of the module is divided into 1 part: backplane status indication .

3.18.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	○	Expansion Module Backplane Error

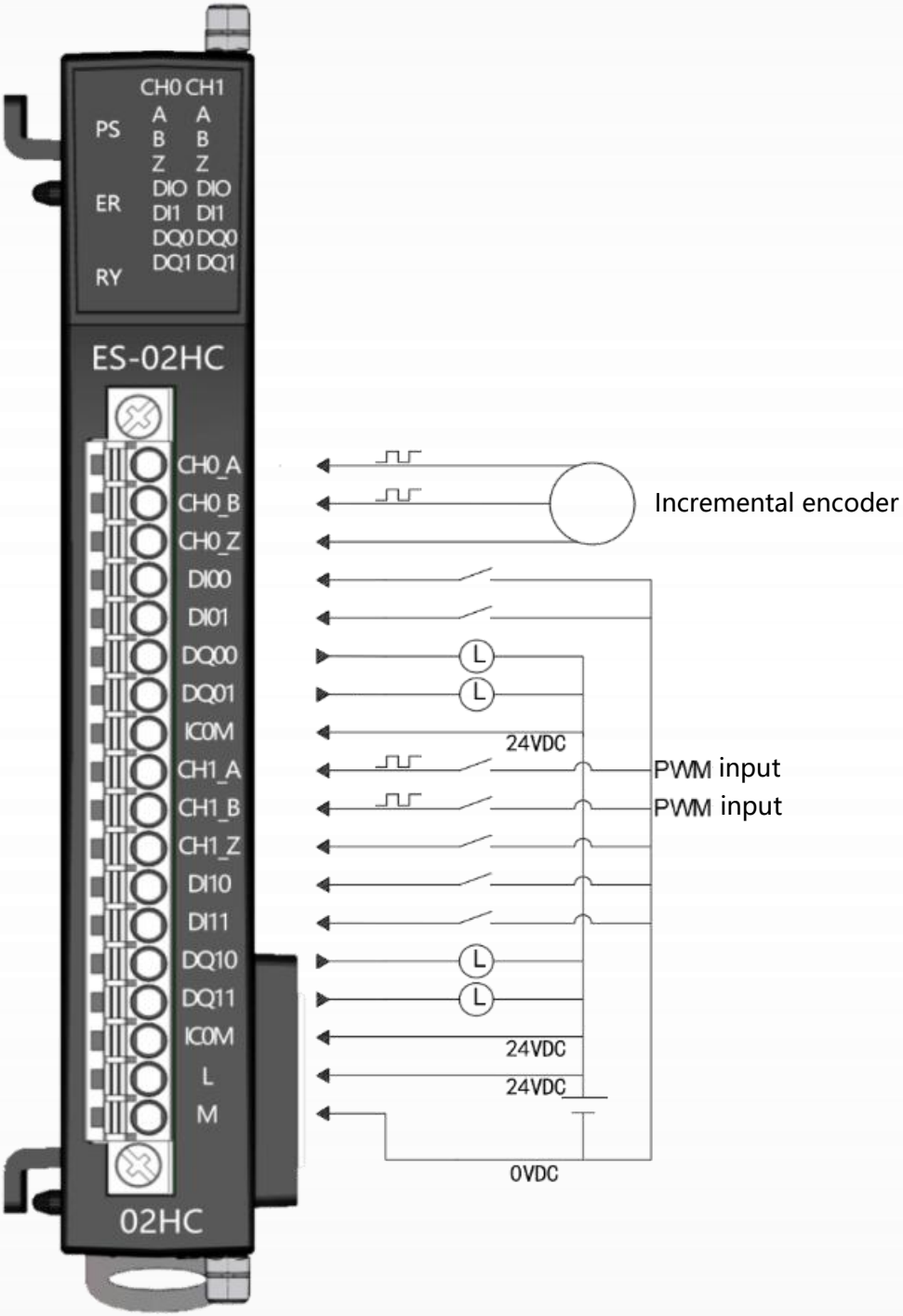
Table 37 System Status Indication

● **The green light is on** ◐ **Flashing red** ◐ **Flashing green** ○ **Not bright**

3.18.6 Definition of terminal blocks

Terminal Serial Number	ES-02HC notation	clarification
1	A	CH1 High-speed pulse input;
2	B	High-speed pulse inputs, digital inputs; Default Function: AB phase encoder mode;
3	Z	Digital Input; Default Function: Digital Input;
4	DI00	Digital Input; Default Function: Digital Input;
5	DI01	Digital Input; Default Function: Digital Input;
6	DQ00	Comparison output, digital output; Default function: digital output;
7	DQ01	Comparison Output, Digital Output; Default Function: Digital Output;
8	ICOM	Input common point: 24V+;
9	A	CH2 High-speed pulse input;
10	B	High-speed pulse inputs, digital inputs; Default Function: AB phase encoder mode;
11	Z	Digital Input; Default Function: Digital Input;
12	DI10	Digital Input; Default Function: Digital Input;
13	DI11	Digital Input; Default Function: Digital Input;
14	DQ10	Comparison output, digital output; Default function: digital output;
15	DQ11	Comparison Output, Digital Output; Default Function: Digital Output;
16	ICOM	Input common point: 24V+;
17	L	24 Supply voltage input;
18	M	Common ground terminal;

3.18.7 Wiring diagrams



3.18.8 Process data definitions

<table>
<tr><th colspan="10">Input port address assignment</th></tr>
<tr><td rowspan="13">1
channel</td><td>BYTE 0</td><td colspan="8" rowspan="4">CH1 pulse counting in real time</td></tr>
<tr><td>BYTE 1</td></tr>
<tr><td>BYTE 2</td></tr>
<tr><td>BYTE 3</td></tr>
<tr><td>BYTE 4</td><td colspan="8" rowspan="4">CH1 Latch Count</td></tr>
<tr><td>BYTE 5</td></tr>
<tr><td>BYTE 6</td></tr>
<tr><td>BYTE 7</td></tr>
<tr><td rowspan="4">BYTE 8</td><td>BIT 7</td><td>BIT 6</td><td>BIT 5</td><td>BIT 4</td><td>BIT 3</td><td>BIT 2</td><td>BIT 1</td><td>BIT 0</td></tr>
<tr><td>lower limit of count flag position</td><td>upper limit of count flag position</td><td>digital quantity Input IO2</td><td>digital quantity Input IO1</td><td>direction of counting 0: Reverse 1: Positive rotation</td><td>Encoder compare output valid bits</td><td>Count initial value startup</td><td>latch</td></tr>
<tr><td>BIT 7</td><td>BIT 6</td><td>BIT 5</td><td>BIT 4</td><td>BIT 3</td><td>BIT 2</td><td>BIT 1</td><td>BIT 0</td></tr>
<tr><td colspan="5">reservations</td><td>Safety status flag bit</td><td>digital input ioz</td><td>digital input iob</td></tr>
<tr><td>2
channels</td><td>BYTE 9...17</td><td colspan="8">Ch2 Feedback data (definition parameter Ch1)</td></tr>
</table>

Output port address assignment									
1 channel	BYTE 0	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
		Single-phase counting mode reverse direction enable	count overflow reset enable (computing)	DQ1	DQ0	Counter Value Clear	counter enable	reverse enable	Compare Enable
		BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
		reservations							safety sign bit clear
2 channels	BYTE 1	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
		Single-phase counting mode reverse direction enable	Count overflow reset enable	DQ1	DQ0	Counter Value Clear	counter enable	reverse enable	Compare Enable
		BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
		reservations							safety sign bit clear

3.18.9 Configuration parameter definitions

Configuration parameters		
Channel 1	BYTE 0..7	upper limit of count
	BYTE 8...15	lower limit of count
	BYTE 16...23	starting value
	BYTE 24...31	Reference value A
	BYTE 32...39	Reference value B
	BYTE 40	DIB function selection
	BYTE 41	DIZ Function Selection
	BYTE 42	DI0 function selection
	BYTE 43	DI1 function selection
	BYTE 44	counting start
	BYTE 45	filtering time
	BYTE 46	counting multiplier
	BYTE 47	DO0 output mode
	BYTE 48	DO1 output mode
	BYTE 49	DO0 Safety Mode
	BYTE 50	DO0 Safety Mode
	BYTE 51	Encoder Count Safe Mode
	BYTE 52	Counting unit switching
	BYTE 53	update cycle
Channel 2	BYTE 54...107	CH2 configuration parameters (refer to CH1 configuration parameters)

Parameter name		unit (of measure)	specification	Input Range	clarification
Chinese writing	English (language)				
fig. put sth online	Count_Upline		decimal system	0-16777215 Default value: 16777215	fig. put sth online
count up and down	Count_Downline		decimal system	0-16777215 Default value: 16777215	count up and down
starting value	Count_Initvalue		decimal system	0-16777215 Default value: 16777215	starting value
Reference value A	CmpA_Value		decimal system	0-16777215 Default value: 16777215	Reference A (and only in normal counting) (Used in mode)
Reference value B	CmpB_Value		decimal system	0-16777215 Default value: 16777215	Reference value B (and only in normal counting) (Used in mode)
DIB Functions	DIB_Function		enumeration	digital input	Function selection for each group of input

				Single-phase counting gate control Functionality preservation AB phase encoder mode Default value: AB phase encoder mode	points;
DIZ Functions	DIZ_Function		enumeration	DI Trigger Rising Edge Trigger Activation DI trigger falling edge trigger start DI trigger rising edge trigger stop DI trigger falling edge trigger stop digital input Latch Enable	Function selection for each group of input points;

				Z-phase control enable Default value: digital input	
DI0 Function	DI0_Function		enumeration	DI Trigger Rising Edge Trigger Activation DI trigger falling edge trigger start DI trigger rising edge trigger stop DI trigger falling edge trigger stop digital input Latch Enable Z-phase control enable	Function selection for each group of input points;

				Default value: digital input	
DI1 Function	DI1_Function		enumeration	DI Trigger Rising Edge Trigger Activation DI trigger falling edge trigger start DI trigger rising edge trigger stop DI trigger falling edge trigger stop digital input Latch Enable Z-phase control enable Default value: digital input	Function selection for each group of input points;
counting start	Count Starts		enumeration	current value starting value Default value: current value	Startup function selection per group;

filtering time	Filtering Time	Ns/Ms	enumeration	DIV1 DIV4 DIV16 DIV64 Default value: DIV1	Filter time;
counting multiplier	Count_Doublin g		enumeration	Model I Model II Model III Default value: mode 1	Mode 1: Single octave Mode 2: Dual Frequency Mode 3: 4x Frequency
DO0 output mode	DO0_Output Mode		enumeration	Output Mode I Output mode II Output Mode III Output mode IV Output mode V Default value: output mode V	Output Mode I: Greater than A Output Mode II: Less than A Output Model III: Between A and B Output Mode 4: Less than A or greater than B Output Mode V: Digital Output

DO1 output mode	DO1_Output Mode		enumeration	Output Mode I Output mode II Output Mode III Output mode IV Output mode V Default value: output mode V	Output Mode I: Greater than A Output mode II: less than A Output model III: between A and B Output Mode 4: Less than A or greater than B Output Mode V: Digital Output
DO0 Safety Mode	DO0_Safe Mode		enumeration	DO Clearance DO Set 1 DO keep	Safe Mode function selection for each group;
DO1 security model	DO1_Safe Mode		enumeration	DO Clearance DO Set 1 DO keep Default value: DO clear	Safe Mode function selection for each group;
Encoder Count	Encoder Count Safe Mode		enumeration	stop counting The count is set to the initial value	Encoder count per group

security model				Holds the current count value Default value: counting stops	Safe mode function selection;
Counting unit switching	Counting Unit Switching		enumeration	numerical value frequency cyclicality Default value: counting stops	Count value: number of pulses Frequency hz Period: 1/frequency (ms)
update cycle	RENEW Cycle	ms	enumeration	10ms 100ms 500ms 2000ms Default value: 10ms	update cycle

3.19 ES-02MB-485 (2-channel 485 module)

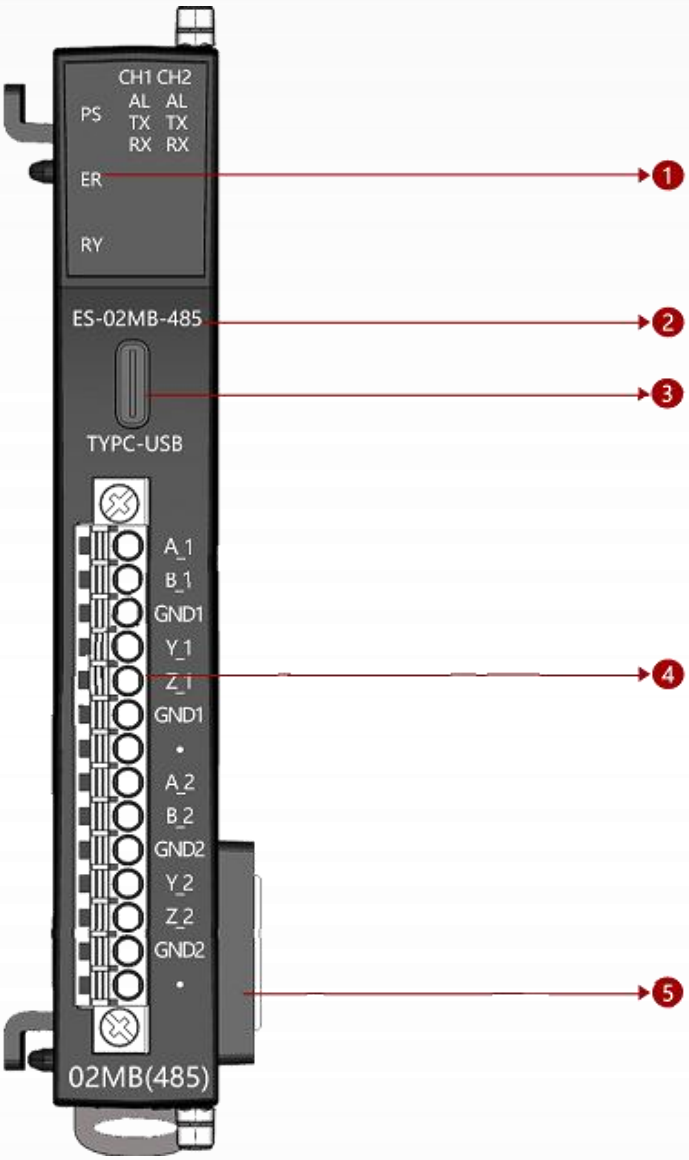
3.19.1 Module overview

- The module supports 2-channel Modbus RTU 485 slave communication.
- The module supports TYPC-USB parameter download.

3.19.2 Module generalization parameters

Hardware parameters	
model number	ES-02MB-485
Backplane Current	20MA
Extended Interface	2*20Pin Board-to-Board Connector
connect a wire	I/O wiring: Max.1.5mm^2(AWG 16)
Installation	DN35 rail mounting
Environmental parameters	
operating temperature	0~+55℃
Environmental humidity	5%-95% non-condensing
protection class	IP20
Modbus communication format	
channel number	2CH
transfer mode	Modbus _RTU Master
Baud (kbps)	2400,4800,9600,19200,38400,57600,115200
function code	01h, 02h, 03h, 04h, 05h, 06h, 0fh, 10h

3.19.3 Introduction to interfaces



Expansion Module Interface Description

①Backplane system status indicator

②Module Model

③Parameter download port

④Pulse output terminal

⑤Backplane Expansion Interface

3.19.4 LED indicators

The LED indication of the module is divided into 1 part: backplane status indication .

3.19.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	○	Expansion Module Backplane Error

Table 38 System Status Indication

● **The green light is on** ◐ **Flashing red** ◐ **Flashing green** ○ **Not bright**

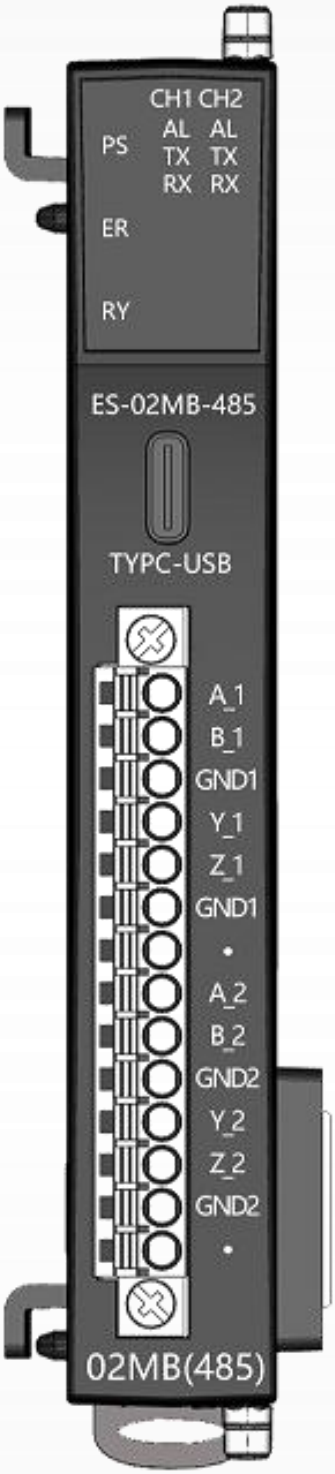
name (of a thing)	color	clarification
AL	green light flashing	Modbus communication exception. Data timeout or receive data error
RX	greener	Modbus has data reception
TX	greener	Modbus has data sending

LED Indicator Definition

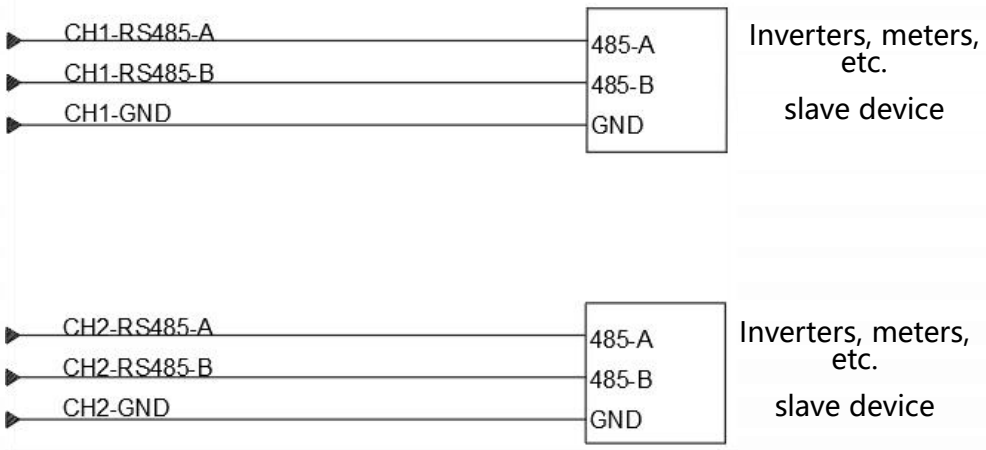
3.19.6 Definition of terminal blocks

Terminal Serial Number	ES-02MB-485	
	notation	clarification
1	TX_1	RS485-A
2	TX_2	RS485-B
3	GND1	grounding
4	Y_1	reservations
5	Z_1	reservations
6	GND1	grounding
7	A_2	RS485-A
8	B_2	RS485-B
9	GND2	grounding
10	Y_2	reservations
11	Z_2	reservations
12	GND2	grounding

3.19.7 Wiring diagrams



The TYPC-USB interface is only used for connection



3.19.8 Parameter definition with LAE-CONFIG

Parameter name Chinese writing	specification	Input Range	clarification
COM Baud Rate	enumeration	2400,4800,9600,19200,38400,57600,115200	baud
COM communication parameters	enumeration	8Date, None Parity, 1Stop 8Date, Even Parity, 1Stop 8Date, Odd Parity, 1Stop 8Date, Exen Parity, 2Stop 8Date, Odd Parity, 2Stop 8Date, None Parity, 2Stop	Data Bits, Parity, Stop Bits
COM frame interval time	decimal system	0-100 Default value: 0	frame rate
COM Termination Resistor	enumeration	prohibit the use of sth. start using Default value: Disabled	Terminating Resistors
COM communication status	enumeration	communication blackout Communications continue Default value: communication stop	communication status

ports	enumeration	Port 1 Port 2	Channel Selection Selection;
slave address	decimal system	0~255	Slave Address Selection Selection;
function code	enumeration	01 Reading Coil 02 read discrete quantities 03 Read registers 04 Read Input Register 05 Write Single Coil 06 Write Single Register 15 Write multiple coils 16 Write Multiple Holding Registers free agreement	function code
polling time	decimal system	100~3000 Default value: 300	polling time
timeout	decimal system	100~3000 Default value: 100	timeout
Status word enable	tick	Check to activate the communication status word	You can see the communication status word after activation No status words for inactivation
Control Word Enable	tick	Check to activate the communication status word	Control word communication after activation Default direct communication without activation

3.20 ES-02MB-232 (2-channel 232 module)

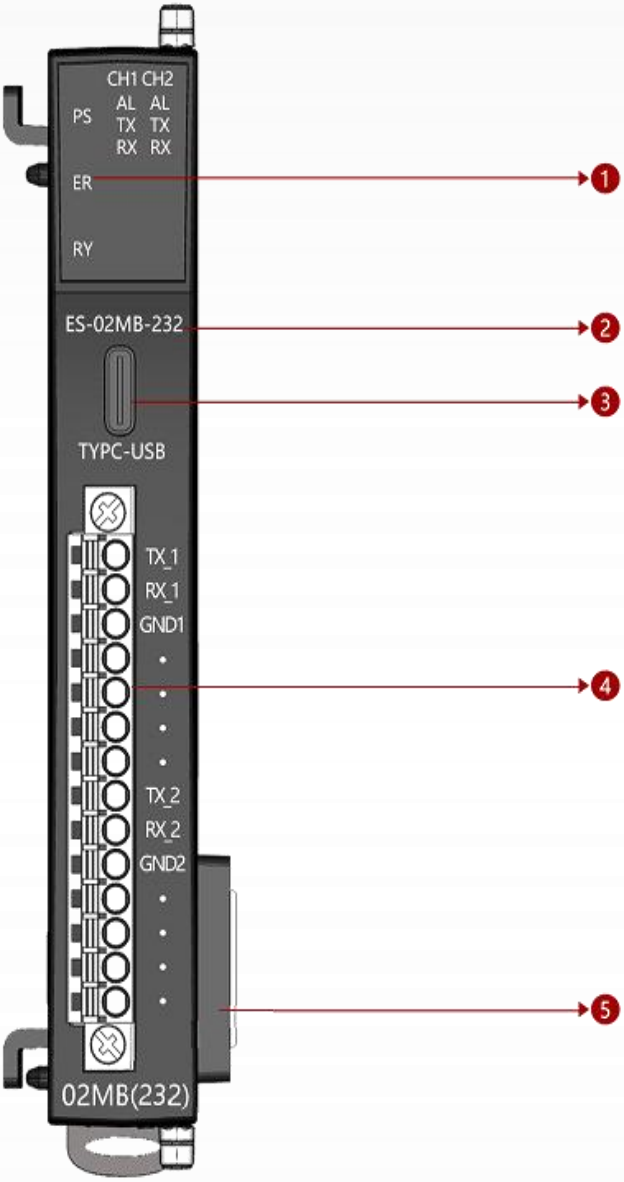
3.20.1 Module overview

- The module supports 2-channel Modbus RTU 232 device communication.
- The module supports TYPC-USB parameter download.

3.20.2 Module generalization parameters

Hardware parameters	
model number	ES-02MB-232
Backplane Current	20MA
Extended Interface	2*20Pin Board-to-Board Connector
connect a wire	I/O wiring: Max.1.5mm²(AWG 16)
Installation	DN35 rail mounting
Environmental parameters	
operating temperature	0~+55℃
Environmental humidity	5%-95% non-condensing
protection class	IP20
Modbus communication format	
channel number	2CH
transfer mode	Modbus _RTU Master
Baud (kbps)	2400,4800,9600,19200,38400,57600,115200
function code	01h, 02h, 03h, 04h, 05h, 06h, 0fh, 10h

3.18.3 Introduction to interfaces



Expansion Module Interface Description

①Backplane system status indicator

②Module Model

③Parameter download port

④Pulse output terminal

⑤Backplane Expansion Interface

3.20.4 LED indicators

The LED indication of the module is divided into 1 part: backplane status indication .

3.20.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	○	Expansion Module Backplane Error

Table 39 System Status Indication

● **The green light is on** ◐ **Flashing red** ◐ **Flashing green** ○ **Not bright**

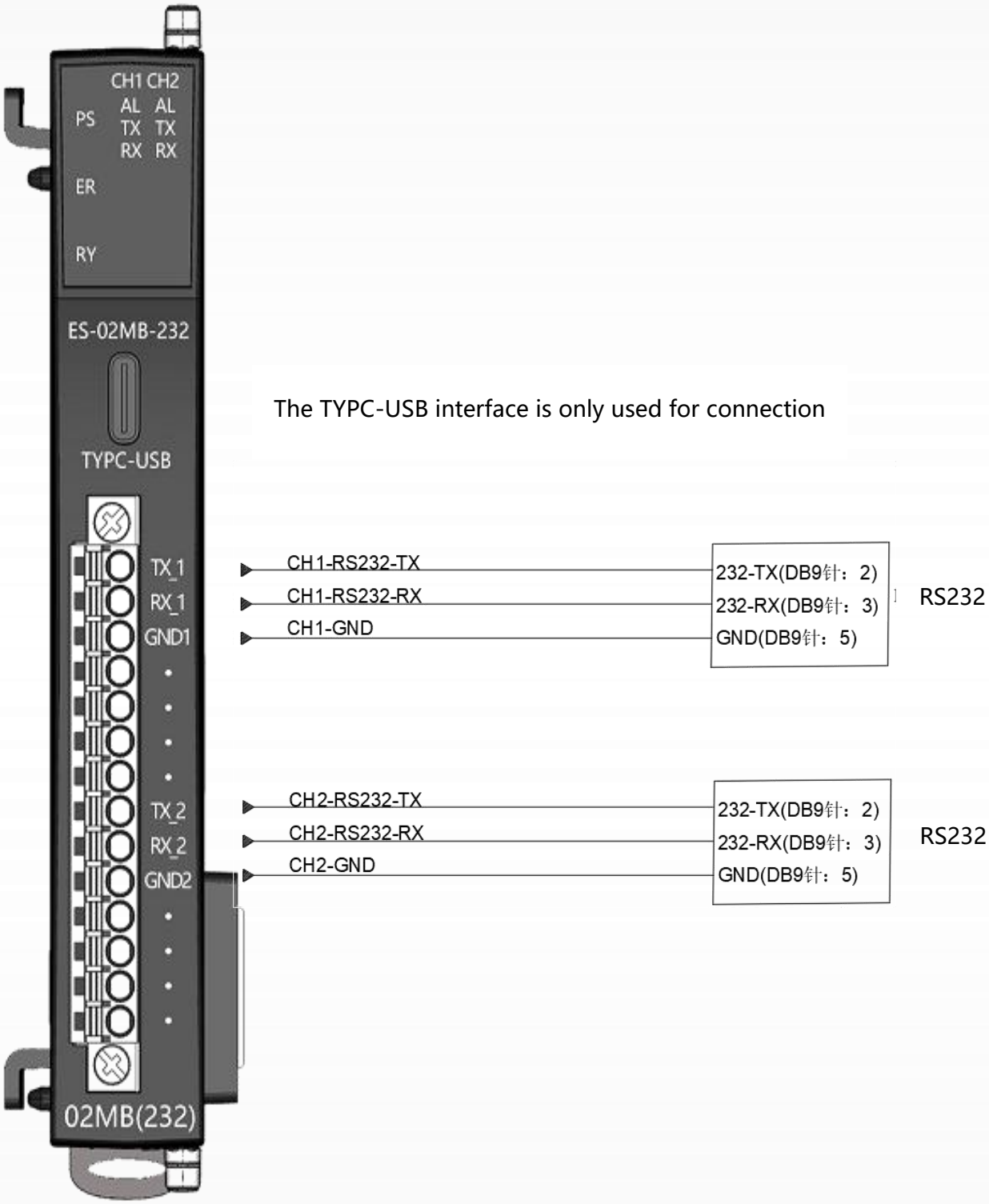
name (of a thing)	color	clarification
AL	green light flashing	Modbus communication exception. Data timeout or receive data error
RX	greener	Modbus has data reception
TX	greener	Modbus has data sending

LED Indicator Definition

3.20.6 Definition of terminal blocks

Terminal Serial Number	ES-02MB-232	
	notation	clarification
1	TX_1	RS232-A (DB9 pin: 2)
2	RX_1	RS232-B (DB9 pin: 3)
3	GND1	Grounding (DB9 pin: 5)
4	●	reservations
5	●	reservations
6	●	reservations
7	TX_2	RS485-A (DB9 pin: 2)
8	RX_2	RS485-B (DB9 pin: 3)
9	GND2	Grounding (DB9 pin: 5)
10	●	reservations
11	●	reservations
12	●	reservations

3.20.7 Wiring diagrams



3.20.8 Define the parameters using LAE-CONFIG

Parameter Name Chinese	Format	Input range	Explanation
COM baud rate	Enumeration	2400,4800,9600,19200,38400,57600,115200	Baud rate
COM communication parameters	Enumeration	8Date，None Parity，1Stop 8Date，Even Parity，1Stop 8Date，Odd Parity，1Stop 8Date，Exen Parity，2Stop 8Date，Odd Parity，2Stop 8Date，None Parity，2Stop	Data bit, parity check, stop bit
COM frame interval time	Decimal system	0-100 Default value: 0	Frame interval time
COM terminal resistance	Enumeration	Disable Enable Default value: Disable	Terminal resistor
COM communication status	Enumeration	Communication stopped Communication resumed Default value: Communication stopped	Communication status
Port	Enumeration	Port 1 Port 2	Channel selection;
From the machine address	Decimal system	0~255	Slave address selection; Function code
Function code	Enumeration	01 Read coil 02 Read discrete quantity 03 Read register 04 Read input register 05 Write single coil 06 Write single register 15 Write multiple coils 16 Write multiple hold registers Free protocol	Polling time
Polling time	Decimal system	100~3000 Default value: 300	Exceeding time
Exceeding time	Decimal system	100~3000 Default value: 100	After activation, the communication status word can be seen, with the minimum unit being a word.
Status word enable	Check box	Check to activate communication status word	1 function code occupies 2 bits: 00 idle, 01 busy, 11 timeout.
Control word enableCOM baud rate	Check box	Check to activate communication status word	When not activated, there is no status word.

3.21 ES-04IOL (4-channel IOLINK master station module)

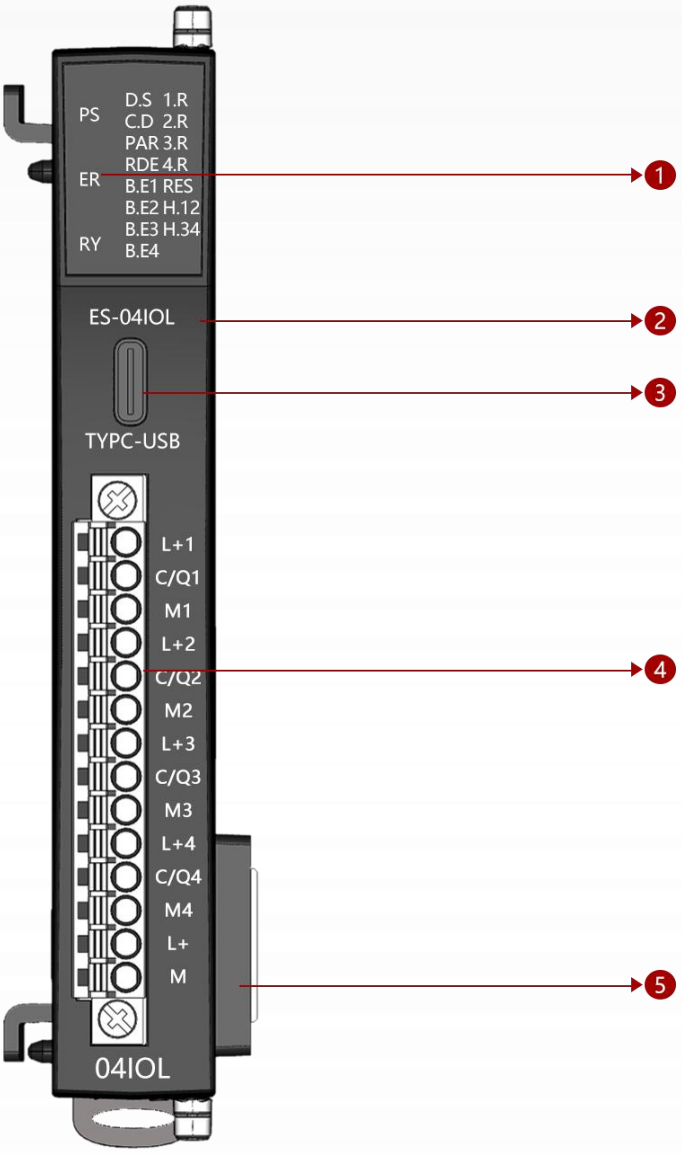
3.21.1 Module Overview

- The module supports communication with 4-channel IOLINK slave devices.
- The module supports TYPC-USB parameter download.
- The maximum number of digital PNP inputs is 4; the maximum number of digital PNP & NPN outputs is 4.

3.21.2 Module parameter values

Hardware Specifications	
Model number	ES-04IOL
Backplate current	20MA
Expansion interface Connecting the wires	2*20-pin board-to-board connector
Installation method	I/O wiring: Max. 1.5mm² (AWG 16)
Model number	DN35 rail mounting
Environmental parameters	
Working temperature	-20℃~75℃
Environmental humidity	5%~95% No condensation
Protection level	IP20
IO-LINK format	
Number of IO-LINK channels	4CH
Interface data	Type C
IO-LINK type	4xClassA,Io-linkV1.1
IO-LINK connection	European type plug-in spring terminals
Communication rate	COM1(4.8Kbps)、COM2(38.4Kbps)、COM3(230.4Kbps)
Digital quantity	
Digital quantity input	Maximum 4 points, 24VDC (-15% + 20%), PNP
Input filtering	Minimum 2ms
Digital quantity output	Maximum 4 points, 24VDC (-15% + 20%), PNP & NPN
Maximum output current	Single channel 0.5A (MAX)

3.21.3 Interface Introduction



Expansion Module Interface Description

①Backplane system status indicator light

②Module model

③Parameter download port

④Pulse output terminal

⑤Backplane expansion interface

3.18.4 LED indicators

The LED indication of the module is divided into 1 part: backplane status indication .

3.18.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	○	Expansion Module Backplane Error

Table 40 System Status Indication

● **The green light is on** ◐ **Flashing red** ◐ **Flashing green** ○ **Not bright**

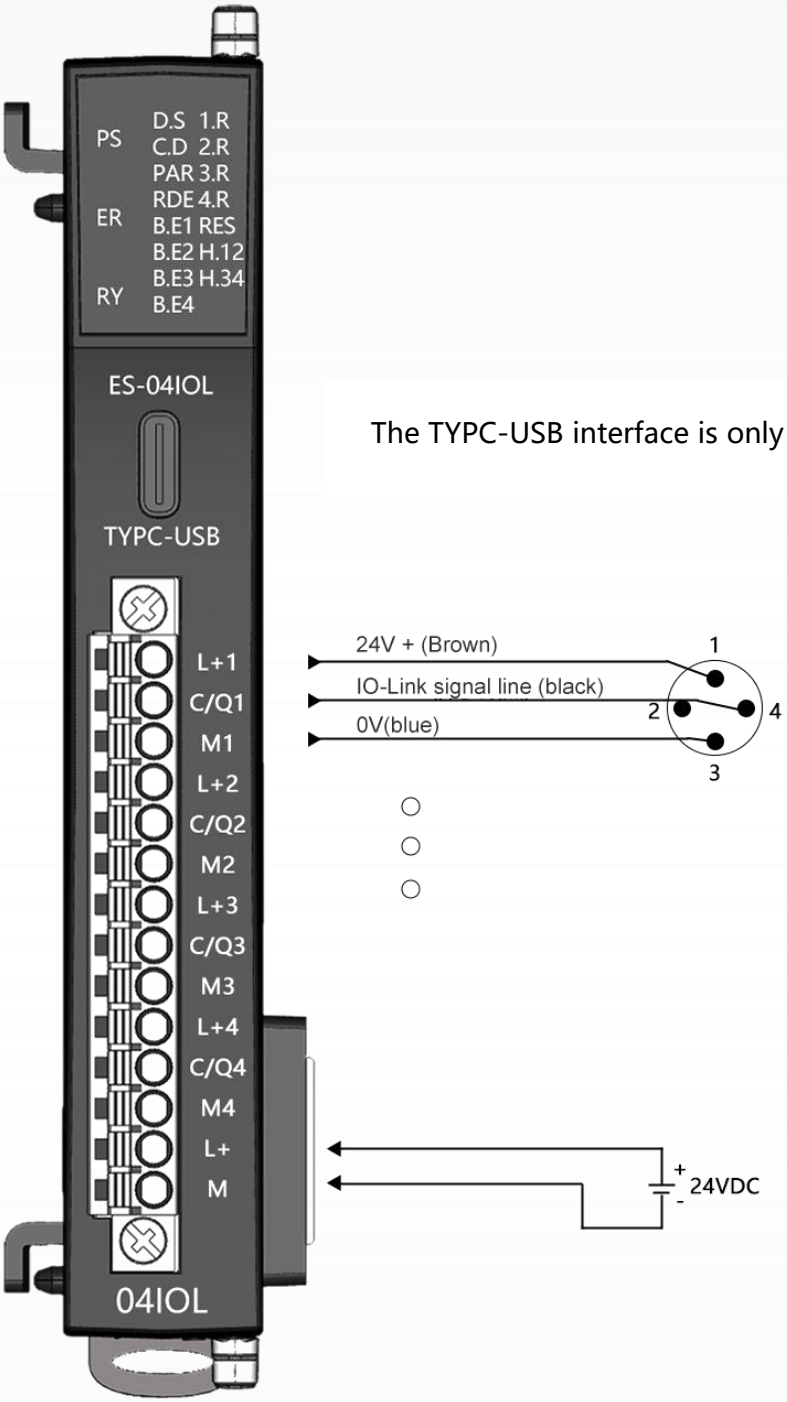
LED light		Normal state	Error state	Explanation
D.S	There is a disconnection from the slave station.	Extinguish	Flashing	At least one of the four slave stations is disconnected.
C.D	The settings of the configuration software are different from those of the PLC.	Extinguish	Flashing	Use the configuration software to reconfigure or modify the PLC module es04iol sub-slot until they are the same.
PAR	The LED3. module does not match the process data on the backplane / Configuring the parameters of the slave station module itself.	Extinguish	Flashing	Restart the module and the backplane together.
RDE	Reading the parameters in the EEPROM.	Extinguish	Flashing	Wait until all data is read before configuring the parameters.
B.E1	Corresponding port 1	Extinguish	Constant	The process data length of the module and the backplane is lower than that of the slave station. Reconfigure the process data length.
B.E2	Corresponding port 2	Extinguish	Constant	
B.E3	Corresponding port 3	Extinguish	Constant	
B.E4	Corresponding port 4	Extinguish	Constant	
1.R	Corresponding port 1	Flashing	Extinguish	CH1 IO-link communication light
2.R	Corresponding port 2	Flashing	Extinguish	CH2 IO-link communication light
3.R	Corresponding port 3	Flashing	Extinguish	CH3 IO-link communication light
4.R	Corresponding port 4 Auxiliary power supply	Out	Extinguish	CH4 IO-link communication light
RES	1iolink chip 1 may be damaged	Out	Constant	
H.12	1iolink chip 2 may be damaged	Out	Constant	
H.34	There is a disconnection from the slave station.	Out	Constant	

Definition of LED Indicator Lights

3.21.6 Terminal connection definition

Terminal number	ES-04IOL	
	Symbol	Explanation
1	L+1	24V+ (brown)
2	C/Q1	IOLINK signal line (black)
3	M1	0V (blue)
4	L+2	24V+ (brown)
5	C/Q2	IOLINK signal line (black)
6	M2	0V (blue)
7	L+3	24V+ (brown)
8	C/Q3	IOLINK signal line (black)
9	M3	0V (blue)
10	L+	Power positive
11	M	Power negative

3.21.7 Wiring diagrams



The TYPC-USB interface is only used for connecting to the

3.21.8 Define the parameters using LAE-CONFIG

Parameter Name Chinese	Format	Input range	Explanation
Function	Enumeration	INACTIVE: Port is closed SDCI: IOLINK communication DI: Digital input of the body DO-NPN: NPN digital output of the body DO-PNP: PNP digital output of the body	Port Function
Supplier ID	Enumeration	03DC(Hex)	Link ID of Lingke Io-link
Device ID	Decimal system	000016D1:IOL-1600X-HUB 000016D0:IOL-0016X-HUB 00008180:IOL-0808X-HUB 002008D1:IOL20-0800X-HUB 00204140:IOL20-0404X-HUB 002008D1:IOL20-0008X-HUB 002016D1:IOL20-1600X-HUB 00208I80:IOL20-0808X-HUB 002016D0:IOL20-0016X-HUB	Slave Device ID
Cycle	Decimal system	Default: 6.4ms (minimum 2ms)	Cycle
Verification	Enumeration	Verification: Check the supplier ID and device ID No verification: Do not check the supplier ID and device ID	Slave Inspection
Input length	Decimal system	0~2bytes	Input Length Unit Byte
Output length	Decimal system	0~2bytes	Output Length Unit Byte
Byte swap	Enumeration	Enable：Exchange DisEnable：No exchange	Exchange Byte
Original output secure mode	Enumeration	Maintain Set one Set to zero	Body Output Security Mode
Original Pin4 input filtering	Decimal system	0~255	Body Pin4 Input Filtering

3.22 ES-3026A/ES-3026B (2-channel weighing module)

3.22.1 Module Overview

◆ The ES-3026A module supports 2-channel excitation voltage of 5VDC, with 4-wire or 6-wire sensor connections.

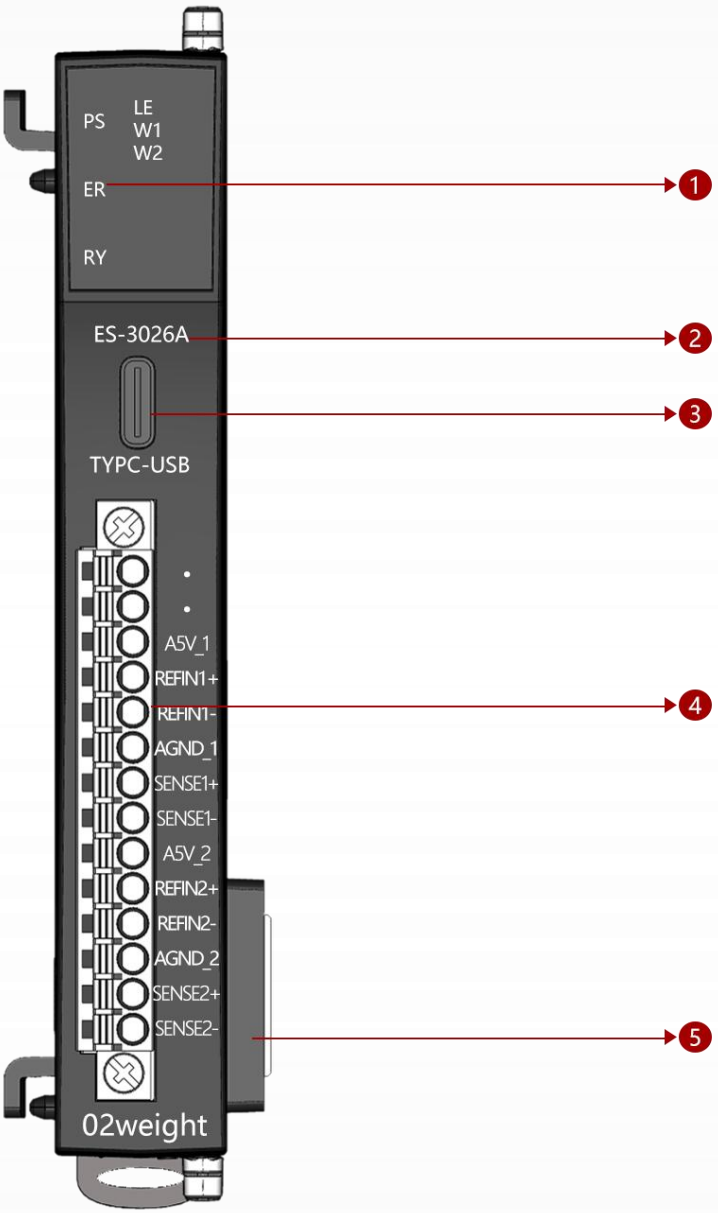
◆ The ES-3026B module supports 2-channel excitation voltages of 5VDC, 10VDC, with 4-wire or 6-wire sensor connections.

◆ Calibration mode: weight calibration, zero point and full-scale correction; multi-point (3, 4 or 5 points) linear correction.

3.22.2 Module parameter values

Hardware Specifications		
Model number	ES-3026A	ES-3026B
Backplate current	20MA	
Expansion interface Connecting the wires	2*20-pin board-to-board connector	
Installation method	I/O wiring: Max. 1.5mm² (AWG 16)	
Model number	DN35 rail mounting	
Environmental parameters		
Working temperature	-20℃~75℃	
Environmental humidity	5% to 95% no condensation	
Protection level	IP20	
Module parameters		
Channel number	2CH	
Calibration mode	Weight calibration	Weight calibration / No calibration required mode
Sensor type	4-wire system, 6-wire system	
Excitation voltage	5VDC	5VDC，10VDC
Measurement error	Measurement error ≤ ±0.05%	
Correction form	Weight calibration, zero point and full scale correction; multiple-point (3, 4 or 5 points) linear correction	
Sampling period	200ms	
ADC resolution	24bit	
Weighing unit	G、KG、T	
Power-on settings	Power-on reset, power-on reset and reset on power-on	

3.22.3 Interface Introduction



Expansion Module Interface Description

① Backplane system status indicator light

② Module model

③ Parameter download port

④ Pulse output terminal

⑤ Backplane expansion interface

3.18.4 LED indicators

The LED indication of the module is divided into 1 part: backplane status indication .

3.18.5 The operating status of the backplane indication system is described in the table below.

PS (Power Supply)	ER (fault)	RY (Running)	clarification
○	○	○	Expansion module without power supply
●	○	◐	Expansion Module Backplane Initialization
●	○	●	Expansion modules are functioning properly
●	◐	○	Expansion Module Backplane Error

Table 41 System Status Indication

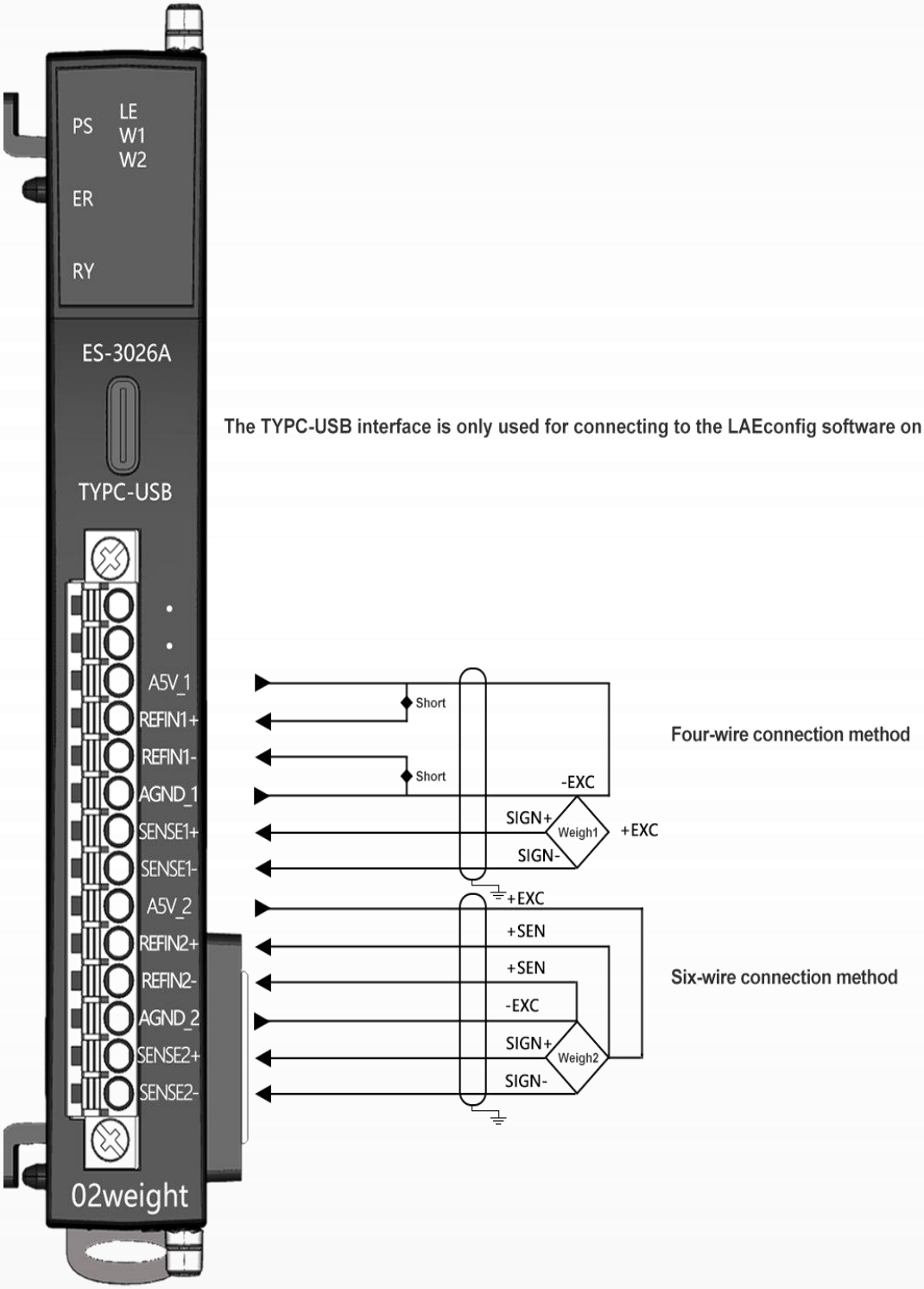
● **The green light is on** ◐ **Flashing red** ◐ **Flashing green** ○ **Not bright**

Name	Colour	Description
W1	green	Weighing stability indicator for channel 1
W2	green	Weighing stability indicator for channel 2

3.22.6 Terminal connection definition

Terminal number	ES-3026	
	Symbol	Explanation
1	Null	——
2	Null	——
3	A5V_1	CH1 5V output
4	REFIN1+	CH1 reference source +
5	REFIN1-	CH1 reference source -
6	AGND_1	CH1 ground
7	SENSE1+	CH1 sensor signal input +
8	SENSE1-	CH1 sensor signal input -
9	A5V_2	CH2 5V output
10	REFIN2+	CH2 reference source +
11	REFIN2-	CH2 reference source -
12	AGND_2	CH2 ground
13	SENSE2+	CH2 sensor signal input +
14	SENSE2-	CH2 sensor signal input -

3.22.7 Wiring diagrams



The TYPC-USB interface is only used for connecting to the LAEconfig software on the computer.

Four-wire connection method

Six-wire connection method

3.22.8 Process Data Definition

<table>
<tr><th colspan="10">Input address allocation</th></tr>
<tr><td rowspan="11">Channel One</td><td>BYTE 0</td><td colspan="8" rowspan="4">Net weight</td></tr>
<tr><td>BYTE 1</td></tr>
<tr><td>BYTE 2</td></tr>
<tr><td>BYTE 3</td></tr>
<tr><td>BYTE 4</td><td colspan="8" rowspan="4">Gross weight</td></tr>
<tr><td>BYTE 5</td></tr>
<tr><td>BYTE 6</td></tr>
<tr><td>BYTE 7</td></tr>
<tr><td rowspan="4">BYTE 8..15</td><td>BIT 7</td><td>BIT 6</td><td>BIT 5</td><td>BIT 4</td><td>BIT 3</td><td>BIT 2</td><td>BIT 1</td><td>BIT 0</td></tr>
<tr><td>Maintain</td><td>Maintain</td><td>Power-on reset timeout</td><td>Clean skin completed</td><td>Skin removal completed</td><td>Reset completed</td><td>Stable flag</td><td>Enable flag</td></tr>
<tr><td colspan="8">BIT 8-15</td></tr>
<tr><td colspan="8">0: Idle, 1: Executing, 2: Command completed, 3: Error occurred while saving</td></tr>
<tr><td>Channel Two</td><td>BYTE 16..31</td><td colspan="8">Ch2 Feedback Data (Defining Parameter Ch1)</td></tr>
</table>

<table>
<tr><th colspan="10">Output address allocation</th></tr>
<tr><td rowspan="11">Channel One</td><td>BYTE 0</td><td colspan="8" rowspan="4">Set the value of the stable range / Set the value of calibration 1 for the weights / Set the value of calibration 2 for the weights / Set the value of calibration 3 for the weights / Set the value of calibration 4 for the weights</td></tr>
<tr><td>BYTE 1</td></tr>
<tr><td>BYTE 2</td></tr>
<tr><td>BYTE 3</td></tr>
<tr><td rowspan="7">BYTE 4-5</td><td>BIT 7</td><td>BIT 6</td><td colspan="3">BIT 5</td><td>BIT 4</td><td>BIT 3</td><td>BIT 2</td><td>BIT 1</td><td>BIT 0</td></tr>
<tr><td>Maintain</td><td>Unit: Value is 0, g Value is 1, kg Value is 2, ton</td><td colspan="3">Number of filtering cycles: Value 0: Filter once Value 01: Filter 4 times Value 02: Filter 8 times Value 03: Filter 16 times Value 04: Filter 32 times</td><td>Restore body weight</td><td>Peel off the skin</td><td>Reset</td></tr>
<tr><td colspan="9">BYTE 5</td></tr>
<tr><td colspan="9">Mode selection: Value 0, weighing mode
Value 1: Stable range
Value 2: Restore factory settings
Value 16: Zero point calibration
Value 17: Weighing calibration 1
Value 18: Weighing calibration 2
Value 19: Weighing calibration 3
Value 20: Weighing calibration 4
Value 21: Weighing calibration completed</td></tr>
<tr><td colspan="9"></td></tr>
<tr><td colspan="9"></td></tr>
<tr><td colspan="9"></td></tr>
<tr><td>Channel Two</td><td>BYTE 6..11</td><td colspan="8">Ch2 Control Data (Defining Parameter Ch1)</td></tr>
<tr><td></td><td>BYTE 12..15</td><td colspan="8">Maintain</td></tr>
</table>

3.22.9 Configuration Parameter Definition

Configuration parameters		
Channel 1	BYTE 0	Weighing enable
	BYTE 1	Power-on setting
	BYTE 2	Calibration mode
	BYTE 3	Voltage value
	BYTE 4..7	Sensor sensitivity
	BYTE 8..11	Sensor range
	BYTE 12..15	Sampling gain
	BYTE 16..19	Sampling value offset
Channel 2	BYTE 20..39	CH2 configuration parameters (refer to CH1 configuration parameters)

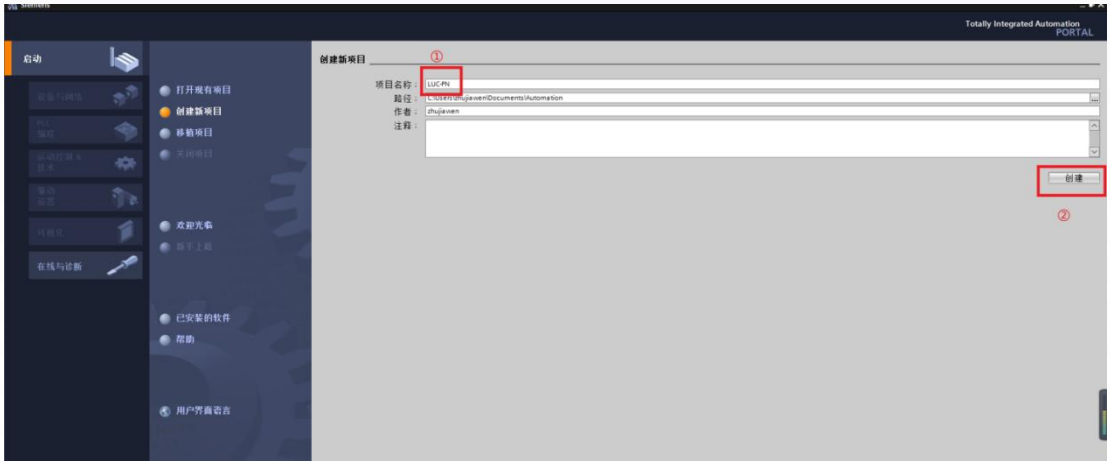
Parameter name		Unit	Format	Value Range	Default Value
Chinese	English				
Weighing enable Power-on setting	WeightEN	-	Enumeration	0: Disabled 1: Enabled	1
Calibration mode Voltage value Sensor sensitivity	OnPowerInit	-	Enumeration	0: Power-on reset 1: Power-on reset 2: Restore factory settings on power-on	1
Sensor range Sampling gain	WeightCalibMode	-	Enumeration	0: Calibrate weights 1: No calibration (not enabled temporarily)	0
Sampling value offset Weighing enable	PowerValue	-	Enumeration	0: DC5V 1: DC12V (not enabled temporarily)	0
Power-on setting	SensorEnsitivity	mv/v	Decimal floating-point number	1~500.00mv/v	2.00mv/v
Calibration mode	Sensorcapacity	g	Decimal floating-point number	0~1.0E+8g	10000.00g
Voltage value	WeightGain	-	Decimal floating-point number	-3.4028E+038~3.4028E+038	1.00
Sensor sensitivity	WeightOffset	-	Decimal floating-point number	-3.4028E+038~3.4028E+038	0.00

4. Communication Configuration

4.1 Getting Started with the LUC-PNB and S7-1200 (TIA V14) Connection

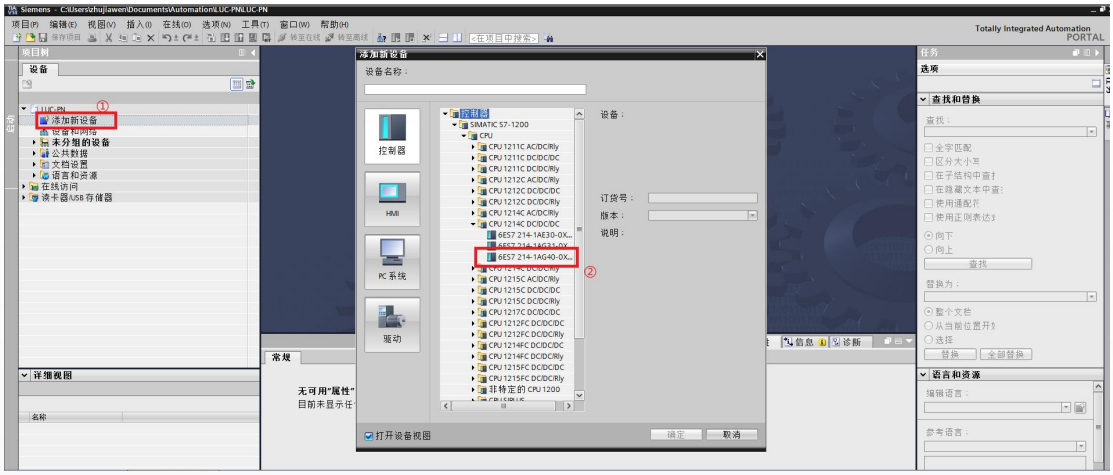
4.1.1 New projects

Power up the LUC-PNB module and S7-1214C DC/DC/DC and connect the network cable to the PC. open the Siemens TIA V14 Software. Create a new project "LUC-PN".



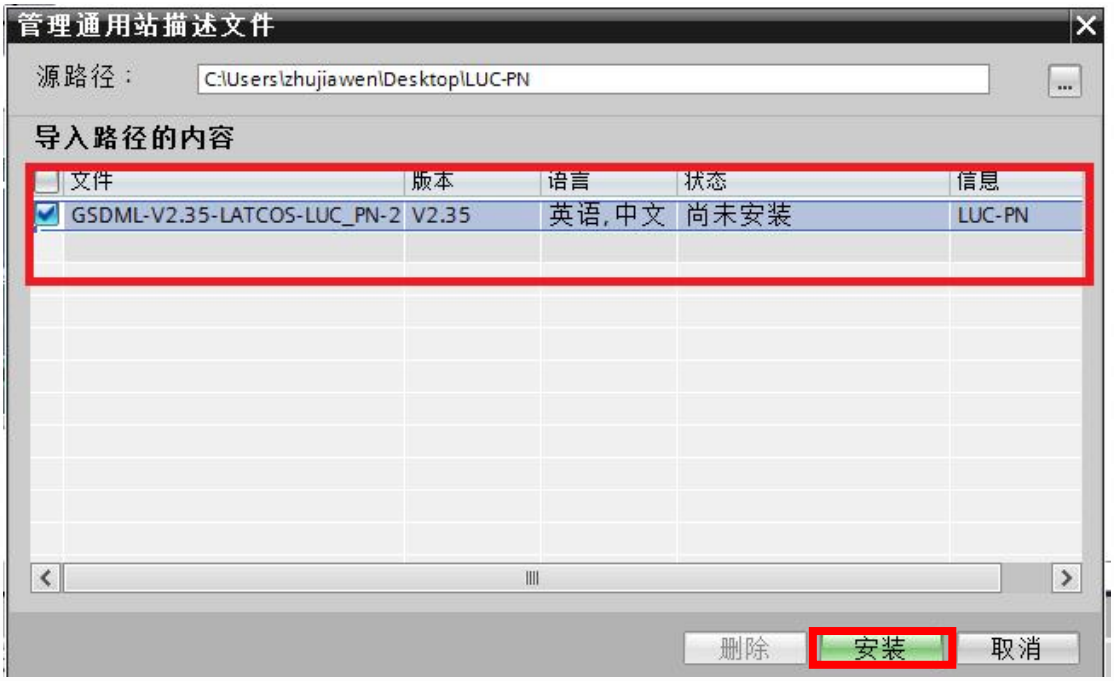
4.1.2 Adding a Siemens PLC

Enter the project view, in the device column of the project tree, click "Add new device" under the LUC-PN item, add PLC S7-1214C DC/DC/DC, and click Confirm.



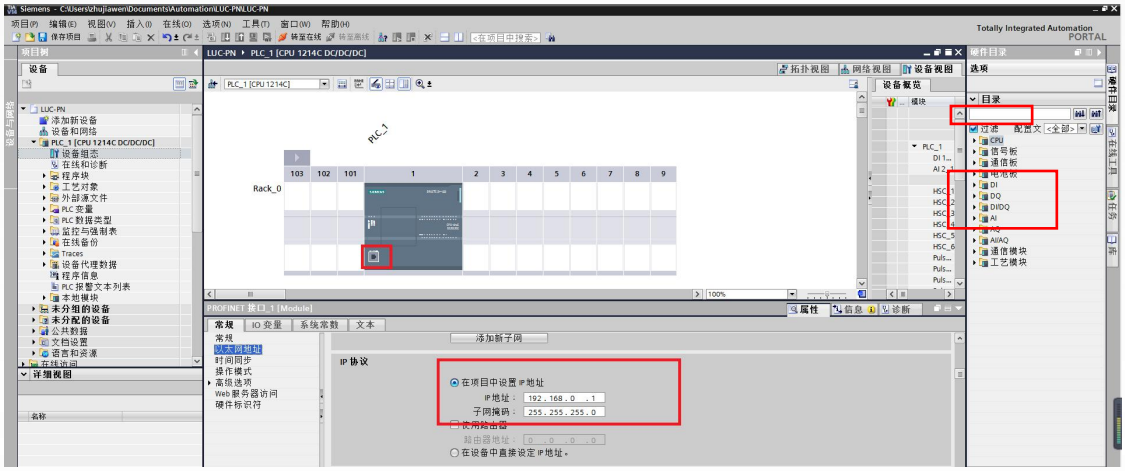
4.1.3 GSD file import

Click "Options" - "Manage Generic Station Description File GSD", in the pop-up dialog box, find the location of the GSD file of LUC-PNx, select the GSD file. Click Install, after the installation is completed, the hardware catalog will be updated automatically.



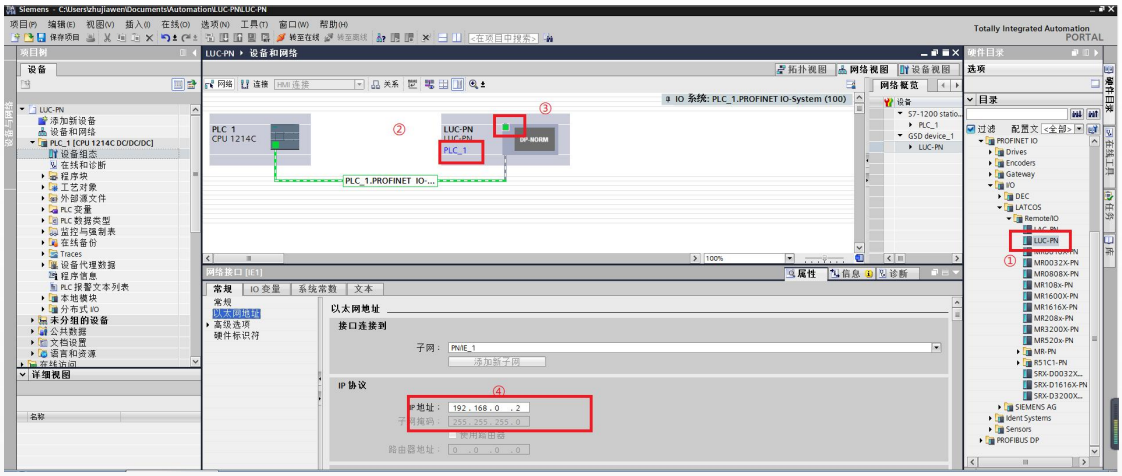
4.1.4 Setting PLC parameters

In the Device view, select the PLC network port and set the network port parameters.



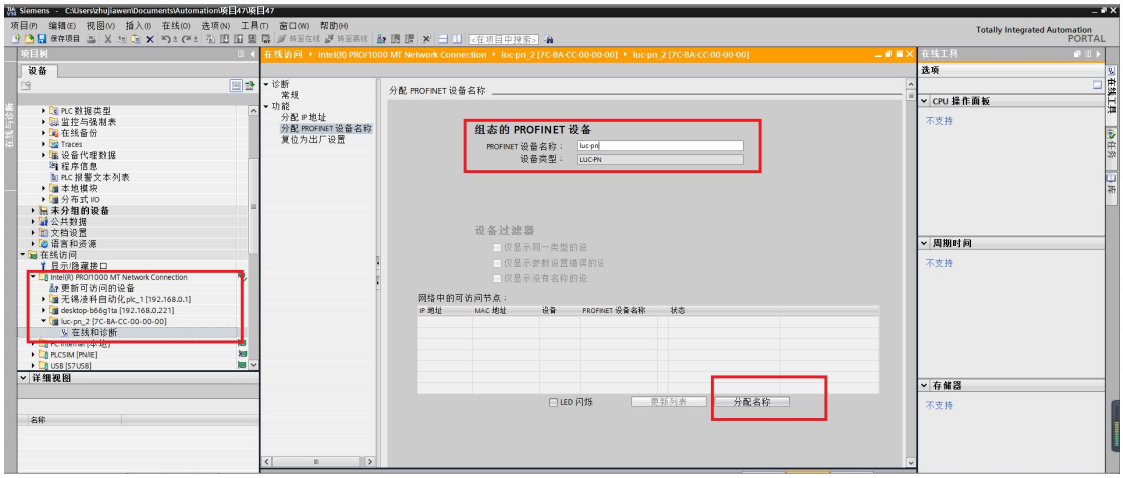
4.1.5 Adding modules

In the network view, first drag and drop the LUC-PNx module into the network view, then assign the network interface to "PLC_1. PROFINET IO-System", click onthe network port, modify the Ethernet parameters, you can assign the module IP address (192.168.0.2), the module's The PROFINET device name of the module is "LUC-PN", note: the name must be the same as the internal name of the module.



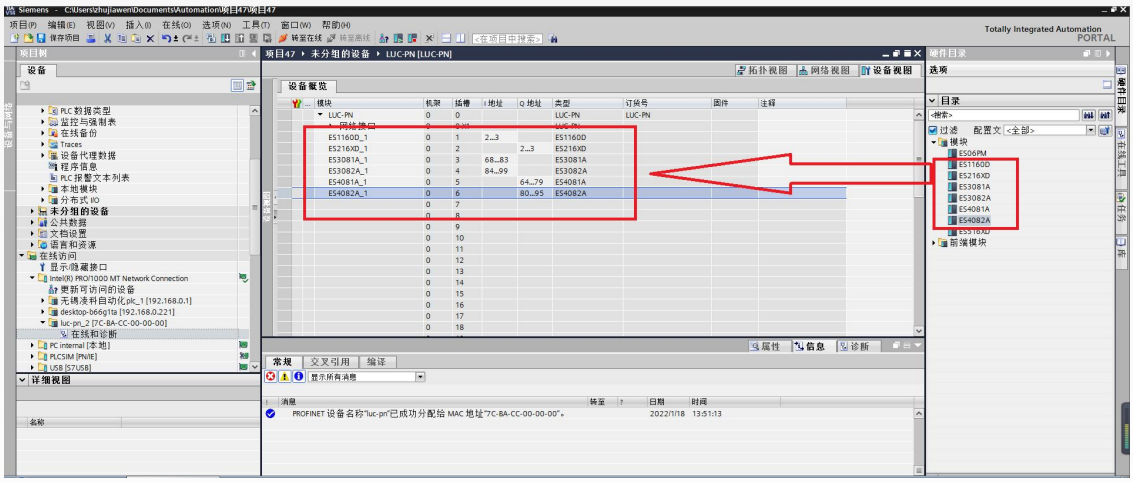
4.1.6 Modifying device names within the module

Click "Online Access" under the project tree, select your computer's network card, click "Update Accessible Devices" to refresh all the online modules, double-click Online and Diagnostics to enter the setting interface. Double-click Online andDiagnostics to enter the setting interface. Set the name and assign it.



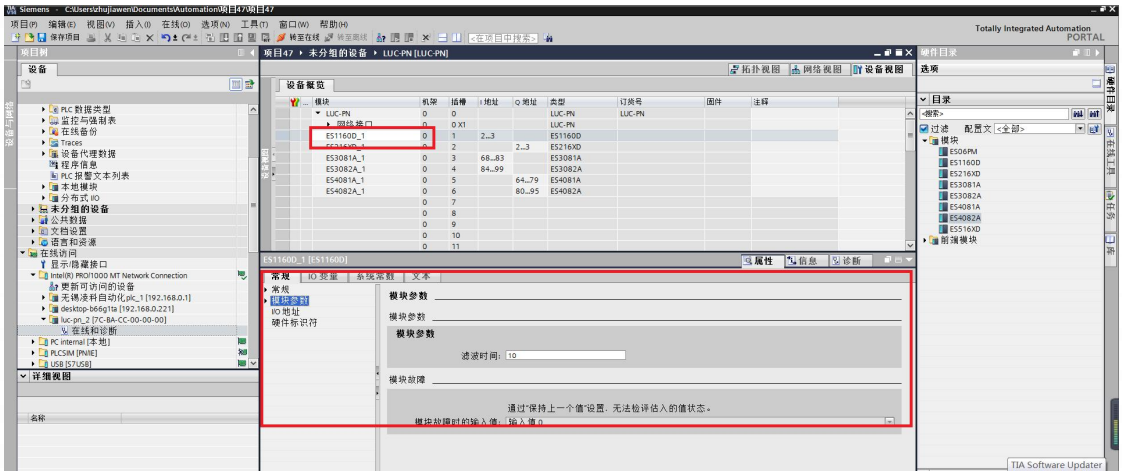
4.1.7 Insertion of extension modules

Double-click the coupler icon to enter the "Device View", and add the extended IO modules: ES1160D, ES216XD, ES3081A, ES3082A, etc. in the "Device Overviw".



4.1.8 Expansion Module Parameter Settings

Click on the appropriate module and set the parameters inside the properties.



4.1.9 Hardware configuration completed

Save, compile, download. Click "Go Online". At the same time, you can add anew monitoring table and monitor the field IO values online on the monitoring table.

5.1 Communication case of LUC-EPB \ LUC-EAB \ LUC-CEB

Please go to the official website www.latcos.cn-Download Area - Download the corresponding case file in the Case tutorial.

Official website

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