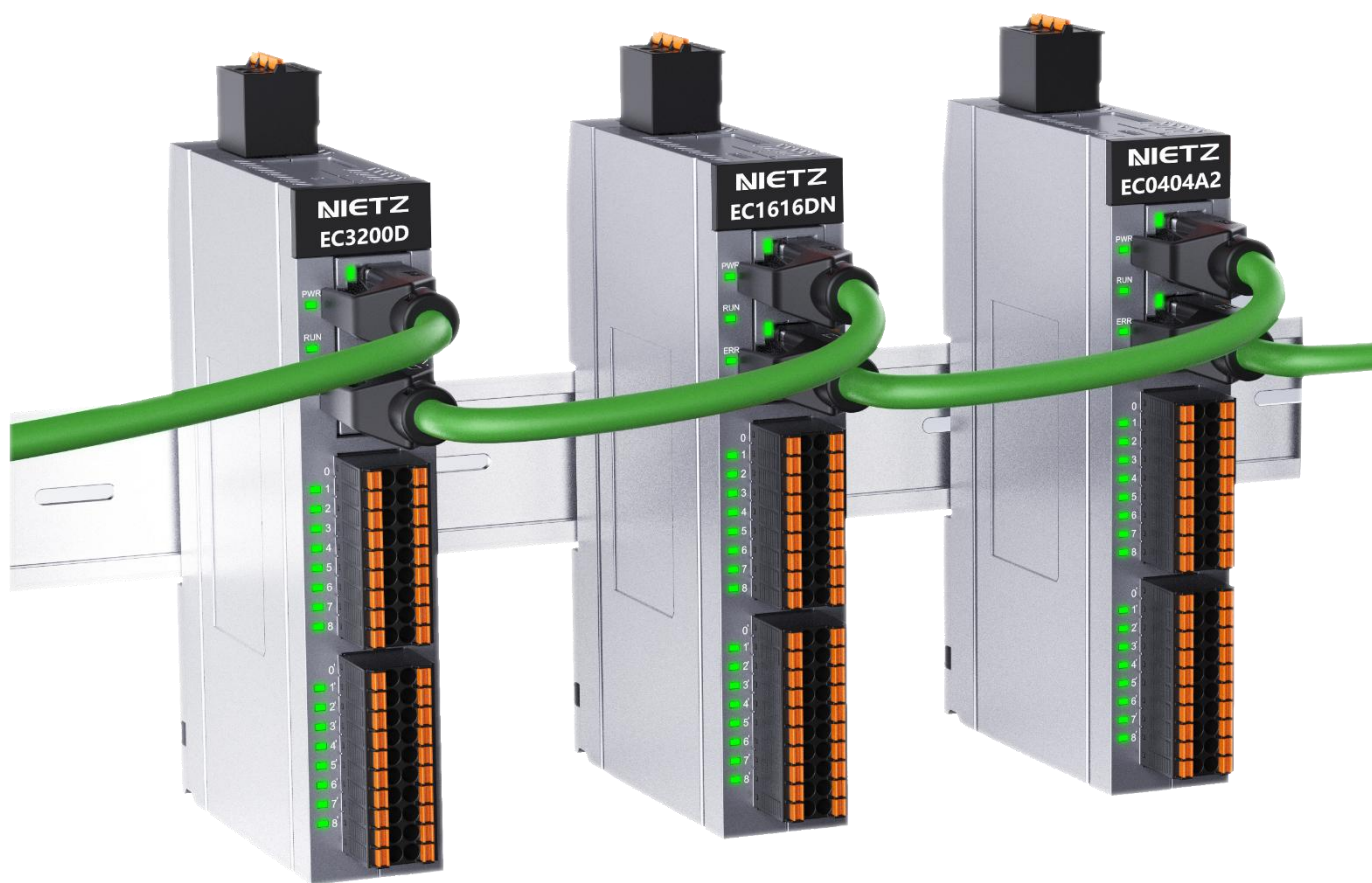




EC series I/O Compact Station

Nietz Electric Co.,Ltd

202608

Table of contents

Table of Contents.....	1
Copyright Notice	2
Contact Us	3
Document version	4
1. Introduction	5
1.1 Warning Prompt System	5
1.1.1 Security Statement	5
1.1.2 Security Level Definition	5
1.2 Safety Considerations in Control System Design	6
2 Product Introduction	7
3 Product Selection	8
3.1 Model Naming	8
3.2 Ordering Guide	9
4. Cable Description	10
4.1 Input/Output Cable Description	10
4.2 Communication Cable Description	11
5. Product Interface/Dimension Drawing	12
5.1 Interface Diagram	12
5.2 Dimensional Drawing	13
6. Product Overview	14
6.1 EC1616DN/P	14
6.1.1 Wiring Diagram	14
6.1.2 Electrical Specifications	15
6.1.3 Internal Parameter Configuration	15
6.2 EC3200D	17
6.2.1 Wiring Diagram	17
6.2.2 Electrical Specifications	18
6.2.3 Internal Parameter Configuration	18
6.3 EC0032DN/P	19
6.3.1 Wiring Diagram	19
6.3.2 Electrical Specifications	20
6.3.3 Internal Parameter Configuration	20
6.4 EC0800AM2	21
6.4.1 Wiring Diagram	21
6.4.2 Electrical Specifications	23
6.4.3 Internal Parameter Configuration	24
6.5 EC0808AV2	26
6.5.1 Wiring Diagram	26
6.5.2 Electrical Specifications	27
6.5.3 Internal Parameter Configuration	28
7. Indicator light status and meaning during malfunctions	29

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This manual describes the specifications, features, installation wiring, parameter configuration, and usage precautions for the EC series EtherCAT communication slave I/O modules. Due to continuous product improvements, the images, interface definitions, parameter ranges, wiring diagrams, and functional descriptions in this manual may differ from the actual product. Please refer to the product nameplate, accompanying documentation, and the latest information released by our company. We reserve the right to the final interpretation of this document; any changes will not be notified separately.

Users should strictly follow this manual and relevant safety regulations for installation, wiring, debugging, operation, and maintenance. The company shall not be liable for any direct or indirect losses caused by improper use, use beyond product specifications, unauthorized disassembly or alteration, or repair by unauthorized personnel.

Contact Us

Thank you for purchasing and using the EtherCAT communication slave IO module independently developed and manufactured by Nietz Electric Co.,Ltd.!

This manual mainly describes the specifications, characteristics, and usage methods of the EC module. Please read it carefully before use to ensure a clearer and safer use of this product.

Contact Us

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Document Version

Version information		
Version number	Revision Date	content
V 1.0	2022-11-16	-
V1.5	2024-04-03	Added some products and adjusted some parameters
V2.0	2025-12-22	Adjust some products
V2.1	2026-07-01	Add and adjust some products

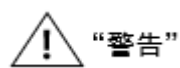
1. Introduction

1.1 Warning Prompt System

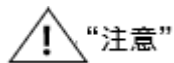
1.1.1 Security Statement

1. When installing, operating, and maintaining the product, please read and comply with the following safety precautions.
2. To ensure personal and equipment safety, please follow all safety precautions as indicated on the product label and in the manual when installing, operating and maintaining the product.
3. The “Caution,” “Warning,” and “Danger” items in the manual do not represent all the safety precautions that should be followed, but are only supplementary to all safety precautions.
4. This product should be used in an environment that meets the design specifications. Otherwise, it may cause malfunctions. Functional abnormalities or component damage caused by failure to comply with relevant regulations are not covered by the product quality guarantee.
5. Our company will not bear any legal responsibility for personal safety accidents or property losses caused by improper operation of the products.

1.1.2 Security Level Definition



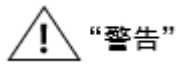
Failure to follow the procedures may result in death or serious bodily injury.



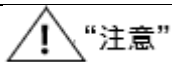
Failure to follow the instructions may result in minor physical injury or equipment damage.

Please keep this guide safe for future reference and be sure to give it to the end user.

1.2 Safety Considerations in Control System Design



- Please be sure to design a safety circuit to ensure that the control system can still operate safely when the external power supply fails or the programmable controller malfunctions;
- If the overcurrent exceeds the rated load current or a short circuit causes prolonged overcurrent, the module may smoke or catch fire. Safety devices such as fuses or circuit breakers should be installed externally.



- Emergency braking circuit, protection circuit, interlock circuit for forward and reverse operation, and upper and lower limit interlock switches to prevent machine damage must be set in the external circuit of the programmable controller.
- To ensure the safe operation of the equipment, please design external protection circuits and safety mechanisms for output signals related to major accidents;
- the CPU of a programmable controller detects an abnormality in its own system, it may shut down all outputs. When a part of the controller's circuit fails, its output may become uncontrollable. To ensure normal operation, a suitable external control circuit needs to be designed.
- When the output units of a programmable controller, such as relays and transistors, are damaged, its output cannot be controlled to be in an ON or OFF state.
- Programmable controllers are designed for use in indoor electrical environments with overvoltage level II . Their power system should have lightning protection devices to ensure that lightning overvoltages are not applied to the power input terminals, signal input terminals, control output terminals, or other ports of the programmable controller, so as to avoid damage to the equipment.

2. Product Introduction

LED display optimization

LED display is located near the terminal block for easy observation and debugging .

High communication speed

Minimum communication cycle supports 250 μ s

Strong anti-interference ability

All inputs and outputs are optically isolated, making them robust and durable.

Strong protection

All inputs and outputs have comprehensive protection against short circuits, over-temperature, and over-voltage, ensuring they can withstand prolonged short circuits without damage.

Simple and reliable wiring

Using spring-clamp technology, it's plug-and-play, offering over 60% higher efficiency than traditional wiring methods.

Flexible combination of multiple bus products

It can be paired with a variety of bus products, and new products will be continuously added based on customer needs.



3 Product Selection

3.1 Model Naming

Model Structure Description

EC	08	08	A	V	2
EtherNet Bus	Input ways	Output ways	I/O Type	Output signal	Resolution
①	②	③	④	⑤	⑥

Code meaning

① EtherNet Bus type	
EC	EtherCAT Bus
② Input channels	
00/04/08/16/32	0 / 4 / 8 / 16 / 32 input channel
③ Output Channels	
00/04/08/16/32	0 / 4 / 8 / 16 / 32 output channels
⑥ Resolution	
2	16bit

④ I/O Type	
D	Digital input / output
A	Analog input / output
⑤ Output signals	
N	Transistor NPN output
P	Transistor PNP output
V	Voltage
M	Current

Example

Model	Destription
EC1616DN	EtherCAT Bus 16 ways input, 16 ways output, Digital, NPN output

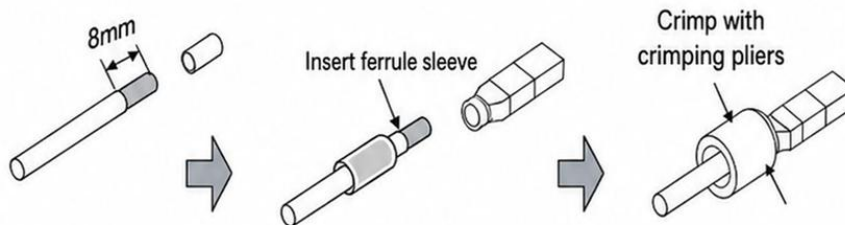
3.2 Ordering Guide

Serial Number	model	describe
1	EC1616DN	EtherCAT, vertical, 16-in-16-out digital input, NPN
2	EC1616DP	EtherCAT, vertical, 16-in-16-out digital input, PNP
3	EC3200D	EtherCAT, vertical, digital input 32-input 0-output
4	EC0032DN	EtherCAT, vertical, digital input 0 input 32 output, NPN
5	EC0032DP	EtherCAT, vertical, digital input 0 inputs 32 outputs, PNP
6	EC0404AM2	EtherCAT, vertical, 4 analog inputs and 4 analog outputs, each channel supports both voltage and current inputs. Voltage input/output: -10V to 10V, 0V to 10V; Current input: $\pm 20\text{mA}$, 0-20mA; Output: 0-24mA, 0-20mA, 4-20mA.
7	EC0808AV2	EtherCAT, vertical, 8-input, 8-output analog inputs, voltage type, input/output -10V to -10V , 0-10V.
8	EC0800AM2	EtherCAT, vertical, 8- channel analog input, each channel supports both voltage and current input modes: voltage -10V to 10V, 0V to 10V; current $\pm 20\text{mA}$, 0mA to 20mA.

4. Cable Description

4.1 Input/Output Cable Description

- ◆ The signal and power terminals adopt a screwless design, and the installation and removal of cables can be completed by hand and with a flathead screwdriver;
- ◆ Using a single-strand rigid wire, after the cable is made , press down the button to insert the single-strand wire at the same time;
- ◆ The multi-strand flexible wires, after being stripped to the corresponding length, can be directly connected or used with corresponding standard cold-pressed terminals (tubular pre-insulated terminals). Pressing down the button connects the wires simultaneously.
- ◆ The 24V power cord can be bundled together with the signal cord to prevent the signal cord from coming loose when the IO module moves.
- ◆ Do not bundle control lines and communication cables together with main circuits or power supply lines. The cables should be at least 100mm apart, otherwise noise may cause malfunctions.
- ◆ The cable making steps are as follows:
 - a) Strip the cable insulation layer, exposing 8mm of copper, and thread the cable into the wire gauge sleeve;
 - b) Insert the conductor portion of the cable into the circular hole of the lug and crimp it using the crimping pliers recommended by the manufacturer.



Cable diagram

4.2 Communication Cable Description

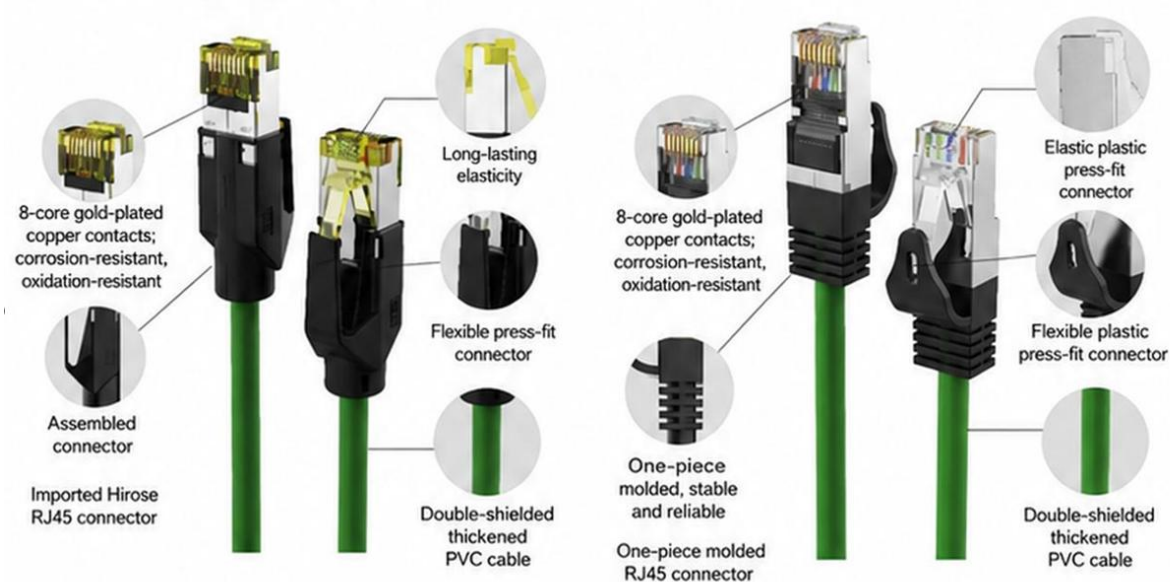
Length requirement:

- Fast Ethernet technology confirms that when using the EtherCAT bus, the length of the cable between devices should not exceed 100 meters. Exceeding this length will cause signal attenuation and affect normal communication.

Technical requirements:

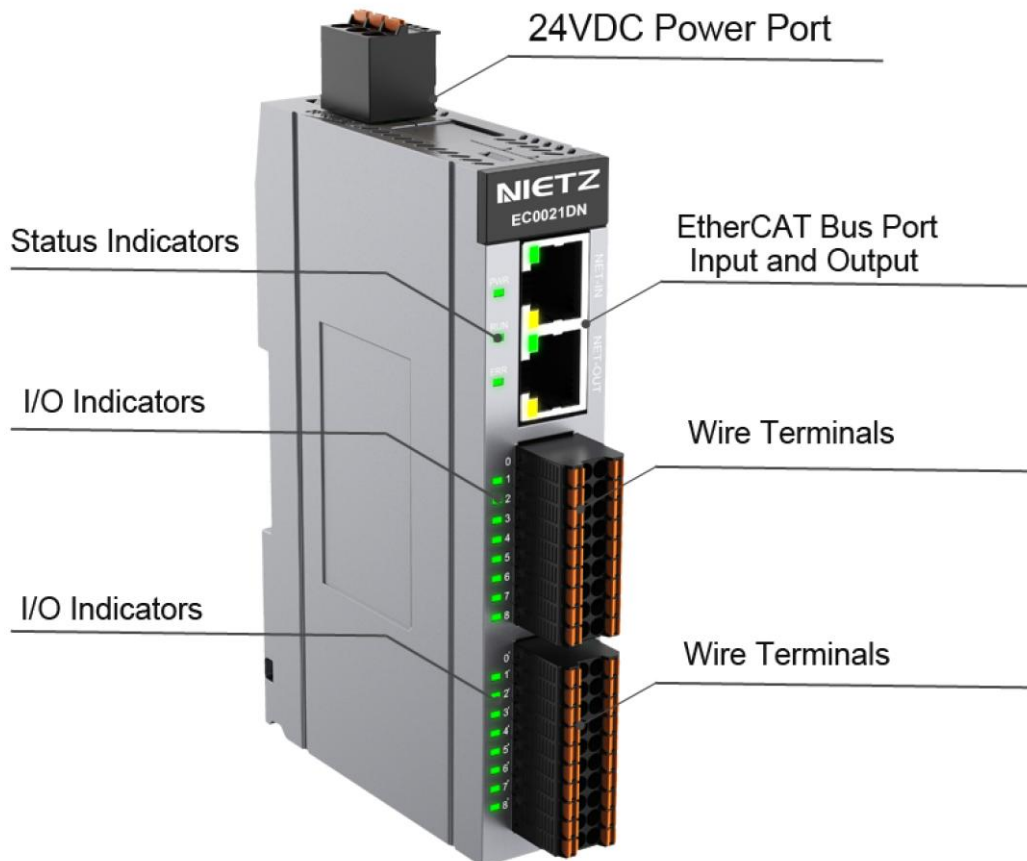
- 100% continuity test, with no short circuits, open circuits, misalignments, or poor contact;
- The EtherCAT bus uses shielded cables for network data transmission.
- We recommend using network cables of the following specifications:
-

Project	Specification
Cable type	Flexible crossover cable, S -FTP , Category 6e
Meets standards	EIA/TIA568A, EN50173, ISO/IEC11801 EIA/TIA TSB, EIA/TIA SB40-A & TSB36
Wire type	Twisted pair
Line Pair	4

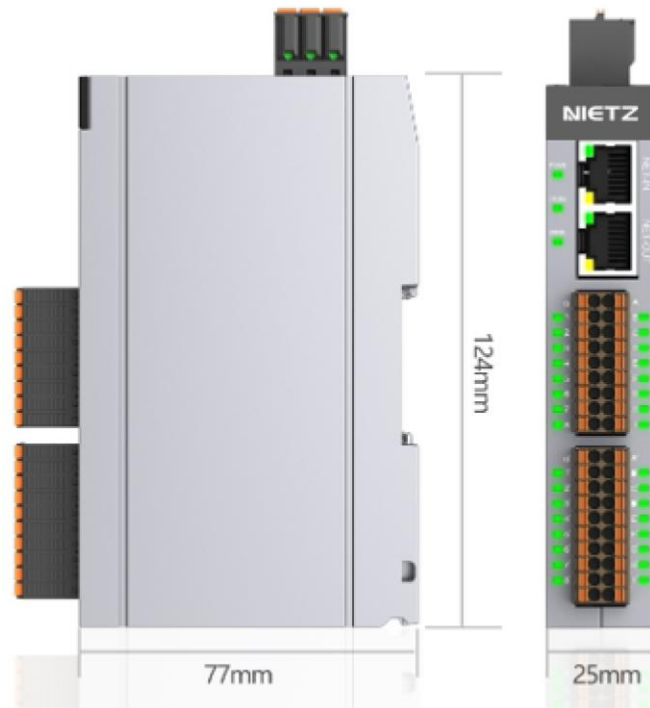


5. Product Interface/Dimension Drawing

5.1 Interface Diagram



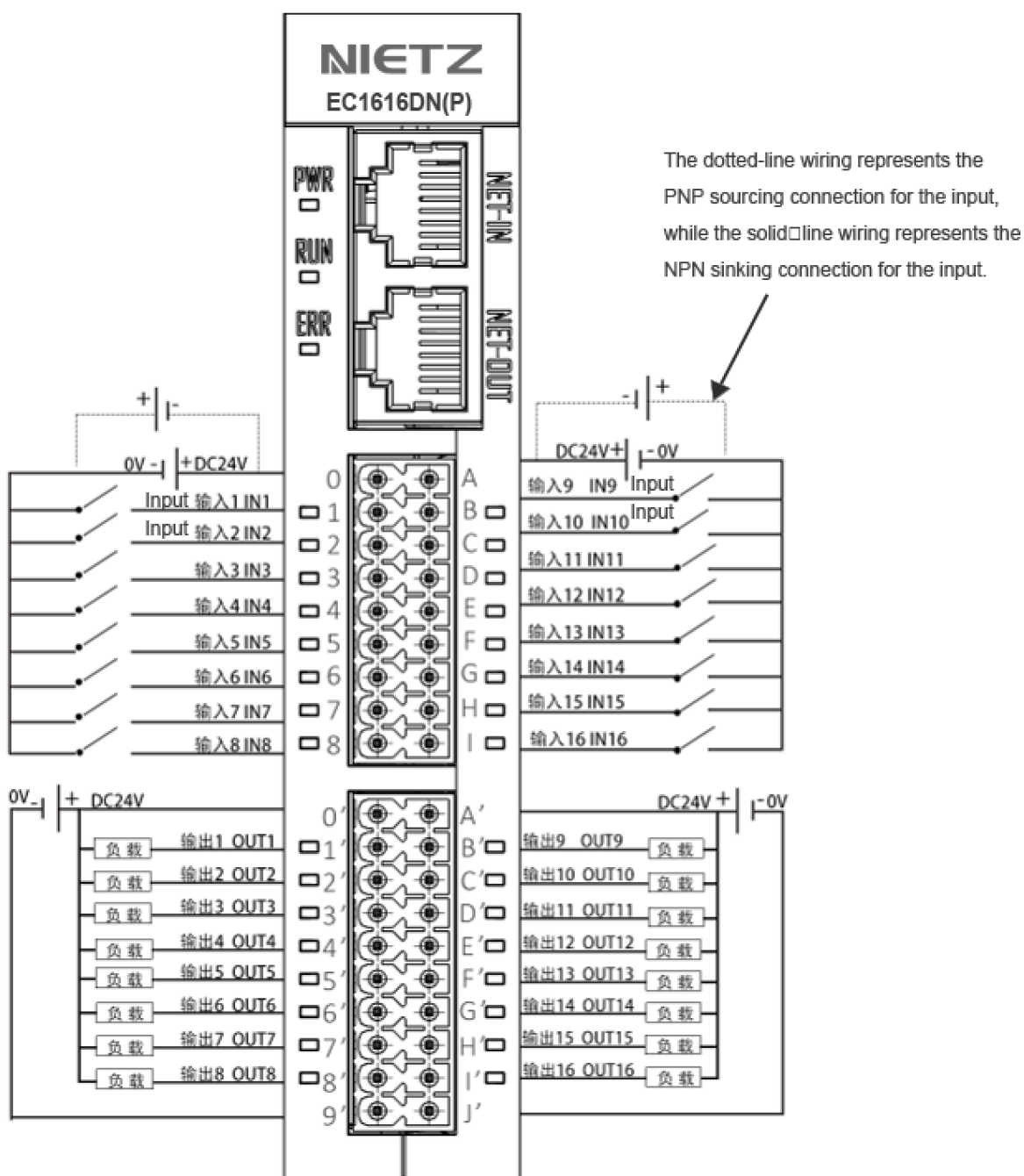
5.2 Dimension Drawing



6. Product Overview

6.1 EC1616DN/P

6.1.1 Wiring Diagram



6.1.2 Electrical Specifications

Electrical Specifications

Category	project	Specifications/Functional Definitions
Standard Specifications	Power specifications	24VDC (20.4VDC ~ 28.8VDC) -15%, +20%
	Maximum communication speed	100Mbps
	Bus interface	2×RJ45
	Transmission distance	≤100m
	Data transmission medium	Ethernet/EtherCAT CAT5 cable
	Operating temperature	-20 ~ +60°C
	Storage temperature	-25 ~ 75°C
	relative humidity	≤95%, non-condensing
	Protection level	IP20
	Compliant with protocol standards	EtherCAT Slave Protocol
	External dimensions (unit: mm)	77*124*25 (excluding terminals)
	weight	120g (excluding terminals)
	Certification	CE certification
	Installation method	DIN rail mounting, snap-fit connection
	Shell material	PC/ABS
Digital input	Input connection method	Spring-type terminals
	Input method	Source and sink compatible
	Input voltage level	24VDC (maximum 30V)
	Input current	Approximately 2.4mA/channel (at 24VDC)
	ON voltage	(10V ~ 30V)
	OFF voltage	(0 V ~ 10 V)
	Input impedance	Approximately 10kΩ
	Isolation methods	Optocoupler isolation , 3000Vrms
	Input action display	When the input status is activated, the indicator light illuminates.
	Input response time	≤500μs
	Filtering time	The default time is 3ms, adjustable from 0 to 255ms.
	input channels	16 channels
	Input Standards	EN 61131-2, type 3
	Input protection	TVS ±30V + PTC + CMC
	Process data bit width	2 bytes (16 bits)
Digital output	Output connection method	Spring-type terminals
	Output type	NPN/PNP (by model)
	Output voltage level	24VDC (-15% to +20%)
	Maximum leakage current when OFF	<0.5mA
	Resistive load	0.5A/point; (0.5 × number of channels)A/common terminal
	Isolation methods	Optocoupler isolation , 3000Vrms
	Output action display	Optocoupler driven, output indicator light illuminates.
	Prevent short-circuit output	have
	Number of output channels	16 channels

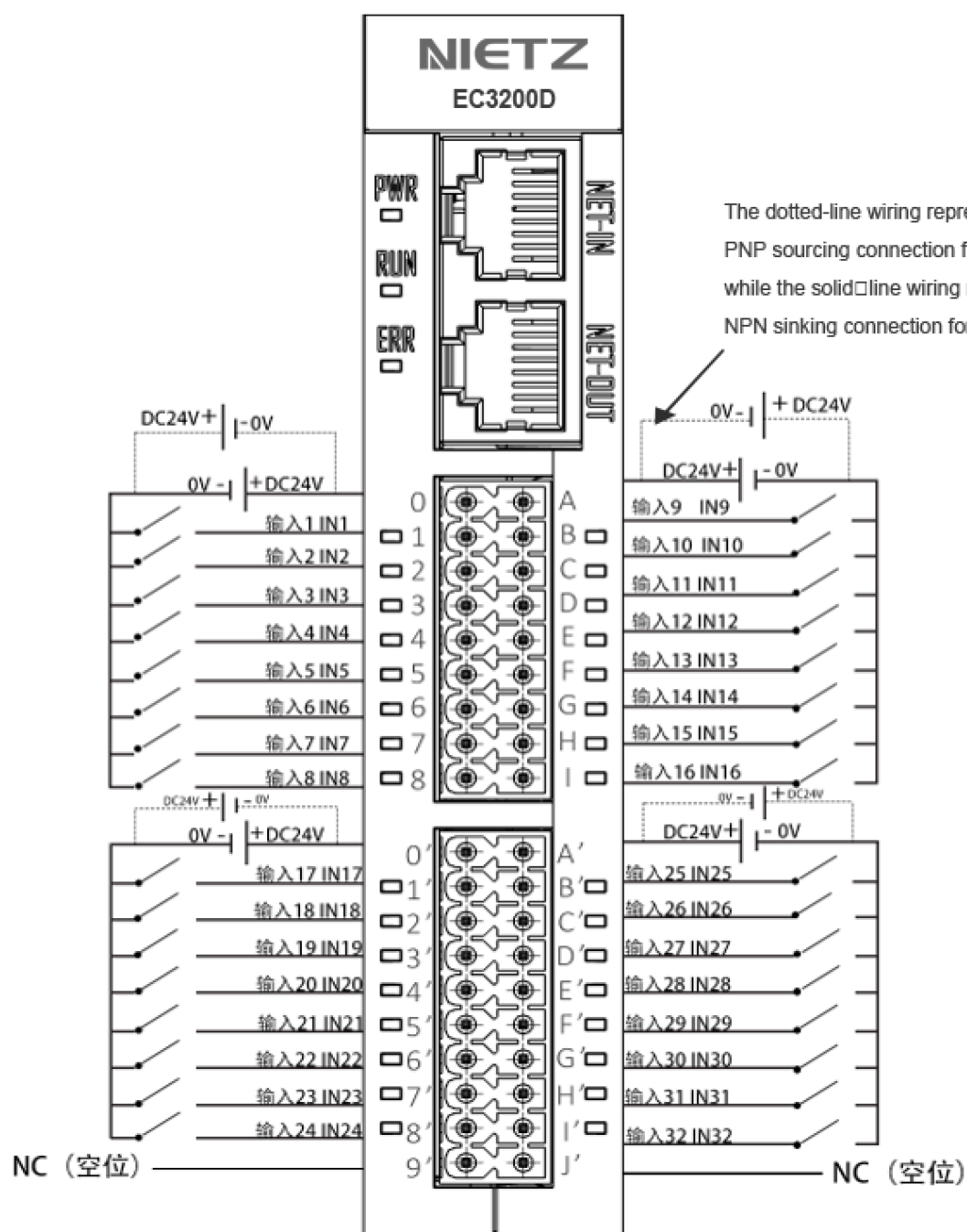
6.1.3 Internal Parameter Configuration

EC1616DN/EC1616DP SDO configuration

Parameter name	Object index number	Data types	Access methods	Function	Remark
BusFault	0x7011	UINT	RW	'0': Clear to zero '1': Set '2': Keep	The default power-on value is '0'.
Filter	0x7012	UINT	RW	Set filter time	Unit: ms Range: 0-255ms Default power-on time: 3ms

6.2 EC3200D

6.2.1 Wiring Diagram



6.2.2 Electrical Specifications

Electrical Specifications

Category	project	Specifications/Functional Definitions
Standard Specifications	Power specifications	24VDC (20.4VDC ~ 28.8VDC) -15%, +20%
	Maximum communication speed	100Mbps
	Bus interface	2×RJ45
	Transmission distance	≤100m
	Data transmission medium	Ethernet/EtherCAT CAT5 cable
	Operating temperature	-20 ~ +60°C
	Storage temperature	-25 ~ 75°C
	relative humidity	≤95%, non-condensing
	Protection level	IP20
	Compliant with protocol standards	EtherCAT Slave Protocol
	External dimensions (unit: mm)	77*124*25 (excluding terminals)
	weight	120g (excluding terminals)
	Certification	CE certification
	Installation method	DIN rail mounting, snap-fit connection
	Shell material	PC/ABS
Digital input	Input connection method	Spring-type terminals
	Input method	Source and sink compatible
	Input voltage level	24VDC (maximum 30V)
	Input current	Approximately 2.4mA/channel (at 24VDC)
	ON voltage	(10V ~ 30V)
	OFF voltage	(0 V ~ 10 V)
	Input impedance	Approximately 10kΩ
	Isolation methods	Optocoupler isolation , 3000Vrms
	Input action display	When the input status is activated, the indicator light illuminates.
	Input response time	≤500μs
	Filtering time	The default time is 3ms, adjustable from 0 to 255ms.
	input channels	32 channels
	Input Standards	EN 61131-2, type 3
	Input protection	TVS ±30V + PTC + CMC
	Process data bit width	2 bytes (16 bits)

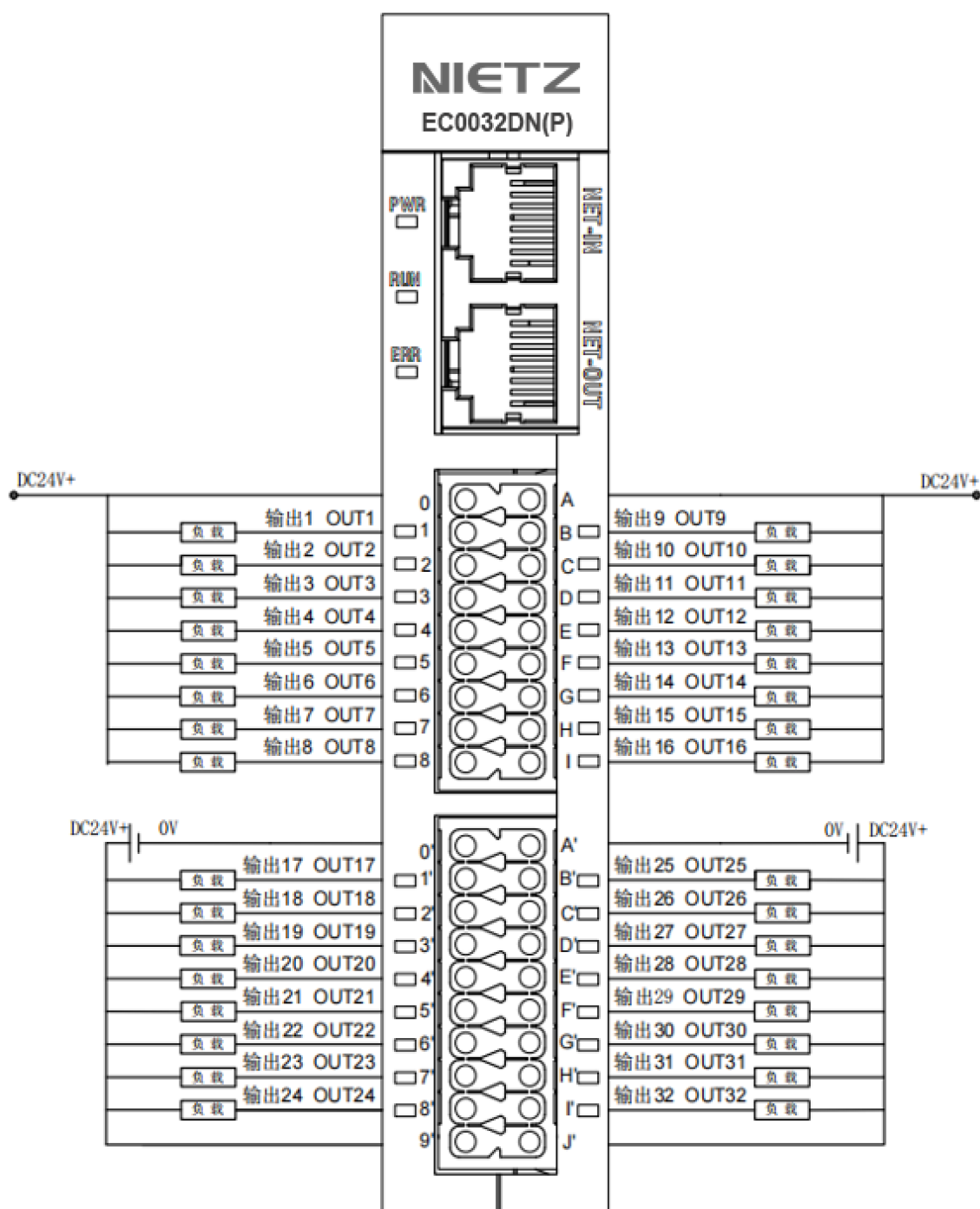
6.2.3 Internal Parameter Configuration

EC3200D SDO Configuration

Parameter name	Object index number	Data types	Access methods	Function	Remark
Filter	0x7012	UINT	RW	Set filter time	Unit: ms Range: 0-255ms Default power-on time: 3 (3ms)
BusFault	0x7011	UINT	RW	'0': Clear to zero '1': Set '2': Keep	The default power-on value is '0'.

6.3 EC0032DN/P

6.3.1 Wiring Diagram



6.3.2 Electrical Specifications

Electrical Specifications

category	project	Specifications/Functional Definitions
Standard Specifications	Power specifications	24VDC (20.4VDC ~ 28.8VDC) -15%, +20%
	Maximum communication speed	100Mbps
	Bus interface	2×RJ45
	Transmission distance	≤100m
	Data transmission medium	Ethernet/EtherCAT CAT5 cable
	Operating temperature	-20 ~ +60°C
	Storage temperature	-25 ~ 75°C
	relative humidity	≤95%, non-condensing
	Protection level	IP20
	Compliant with protocol standards	EtherCAT Slave Protocol
	External dimensions (unit: mm)	77*124*25 (excluding terminals)
	weight	120g (excluding terminals)
	Certification	CE certification
	Installation method	DIN rail mounting, snap-fit connection
	Shell material	PC/ABS
Digital output	Output connection method	Spring-type terminals
	Output type	NPN/PNP (by model)
	Output voltage level	24VDC (-15% to +20%)
	Maximum leakage current when OFF	<0.5mA
	Resistive load	0.5A/point; (0.5 × number of channels)A/common terminal
	Isolation methods	Optocoupler isolation , 3000Vrms
	Output action display	Optocoupler driven, output indicator light illuminates.
	Prevent short-circuit output	have
	Number of output channels	32 channels

6.3.3 Internal Parameter Configuration

EC0032DN/P SDO Configuration

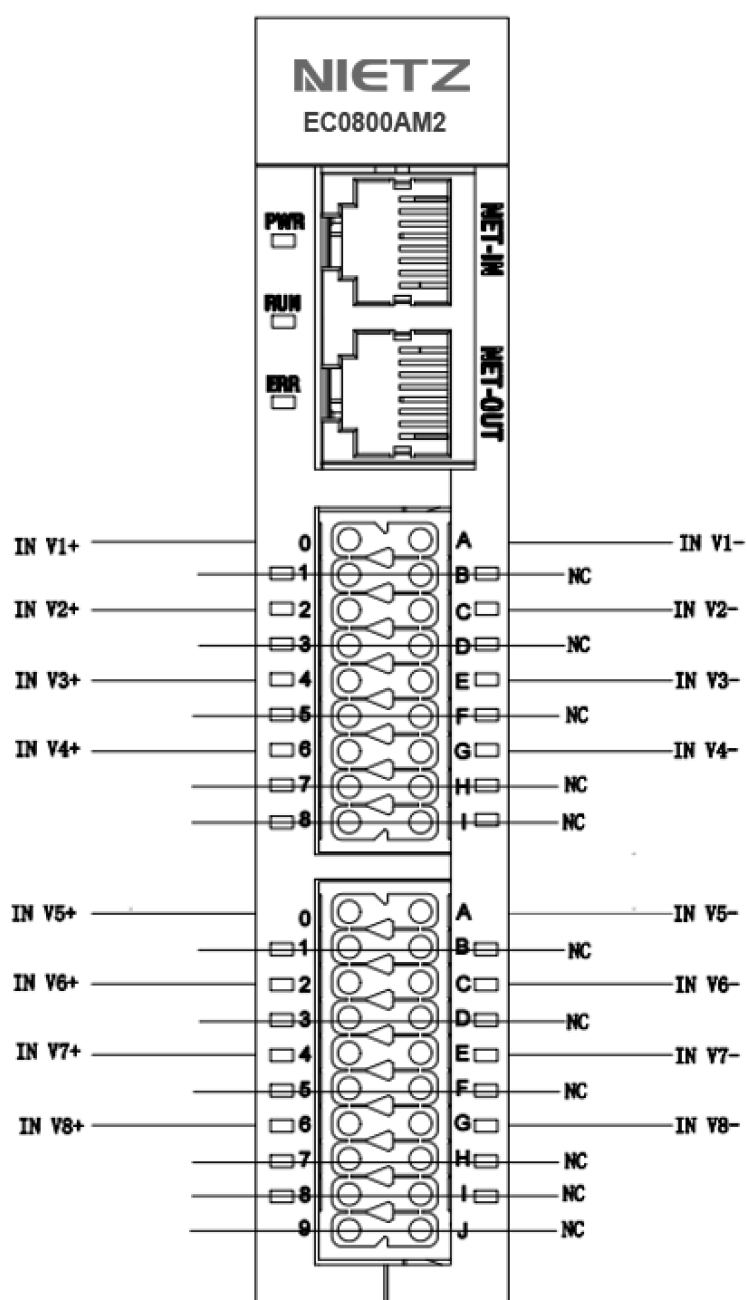
Parameter name	Object index number	Data types	Access methods	Function	Remark
BusFault	0x7011	UINT	RW	'0': Clear to zero '1': Set '2': Keep	The default power-on value is '0'.

6.4 EC0800AM2

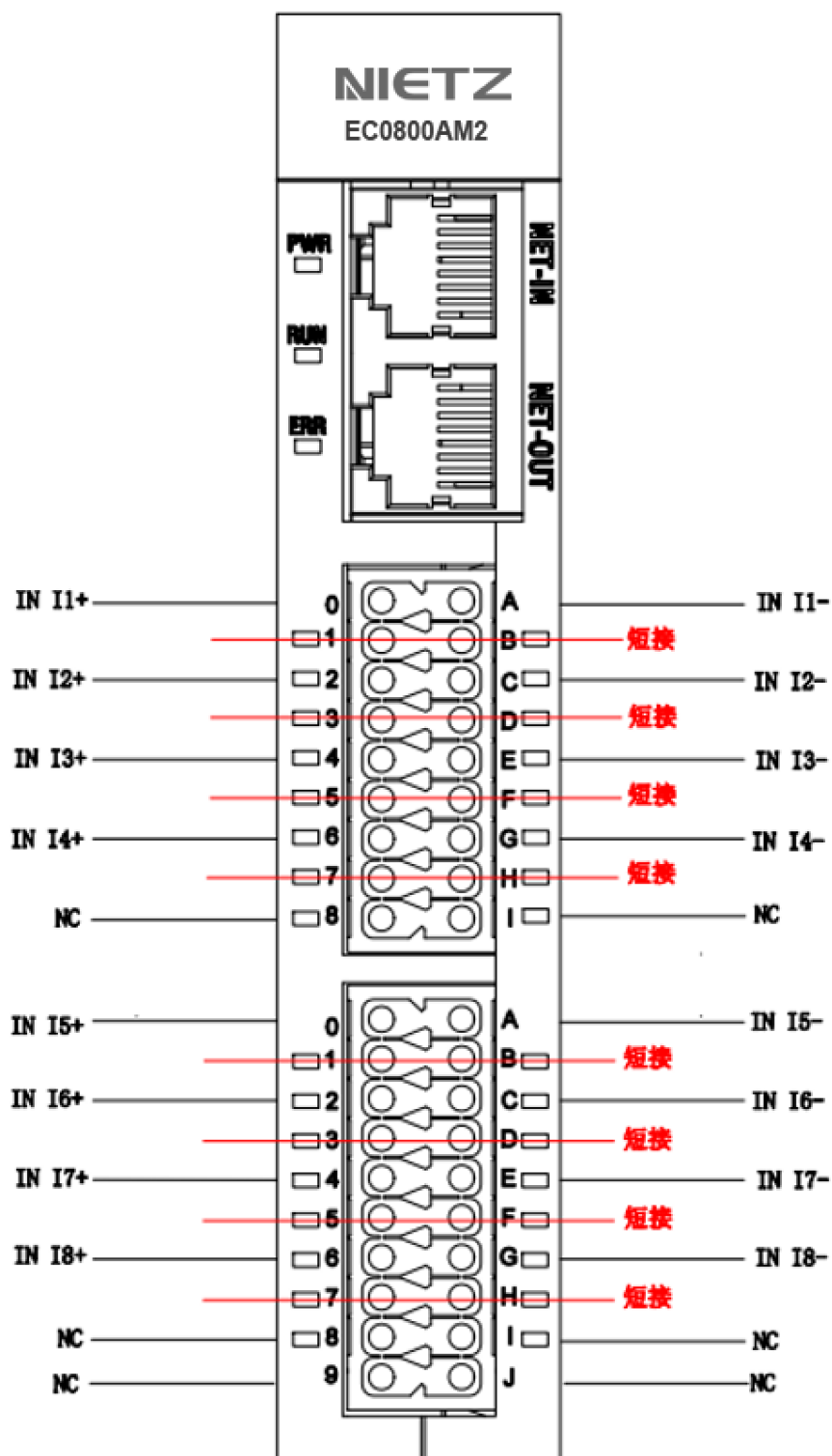
6.4.1 Wiring Diagram

Note: Only the module's main power supply needs to be connected; input/output power supplies are not required.

I. Voltage-type wiring method:



II. Current-mode wiring method:



6.4.2 Electrical Specifications

Electrical Specifications

Category	project	Specifications/Functional Definitions
Standard Specifications	Power specifications	24VDC (20.4VDC ~ 28.8VDC) -15%, +20%
	Maximum communication speed	100Mbps
	Bus interface	2×RJ45
	Transmission distance	≤100m
	Data transmission medium	Ethernet/EtherCAT CAT5 cable
	Operating temperature	-20 ~ +60°C
	Storage temperature	-25 ~ 75°C
	relative humidity	≤95%, non-condensing
	Protection level	IP20
	Compliant with protocol standards	EtherCAT Slave Protocol
	External dimensions (unit: mm)	77*124*25 (excluding terminals)
	weight	120g (excluding terminals)
	Certification	CE certification
	Installation method	DIN rail mounting, snap-fit connection
	Shell material	PC/ABS
Analog input	Input connection method	Spring-type terminals
	Input type	Voltage type: 0~10V, -10~ 10V Current type: 0~20mA, -20~20 mA
	resolution	16 bit
	Sampling rate	≥1Ksps
	accuracy	±0.1%
	Input impedance	>500kΩ (voltage type); 100Ω (current type)
	Isolation and withstand voltage	500V
	Minimum conversion period	1ms
	Number of input channels	8 channels (voltage and current selectable)

6.4.3 Internal Parameter Configuration

EC0800AM2 SDO Specifications

The SDO mode selection is shown in the table below:

Power-off retention:

Parameter name	Object index number	Data types	Function
Store parameters	1010:0	UINT	Storage parameters
Save all parameters	1010:01	UINT	Save all parameters (Write 0x65766173)

Input mode switching:

Parameter name	Object index number	Data types	Function
AI range mode	8000:0	UINT	8-channel input mode settings
Channel 1 mode	8000:1	UINT	First input channel mode setting
Channel 2 mode	8000:2	UINT	Second input channel mode setting
Channel 3 mode	8000:3	UINT	Third input channel mode setting
Channel 4 mode	8000:4	UINT	Fourth input channel mode setting
Channel 5 mode	8000:5	UINT	Fifth input channel mode setting
Channel 6 mode	8000:6	UINT	Sixth input channel mode setting
Channel 7 mode	8000:7	UINT	Seventh input channel mode setting
Channel 8 mode	8000:8	UINT	Eighth input channel mode setting

Channel 1 Mode to Channel 8 Mode correspond to the eight input channels respectively. Values 0-1 can be written individually to configure two different modes. The specific mode functions are shown in the table below:

Mode Selection	Function
0	0V to 10V Voltage range / 0mA to 20mA Current range
1	-1 0V to 10V Voltage range / -20mA to 20mA Current range

Measuring range :

Input rated range	Rated corresponding digital	Mode selection (AI mode)
0V - 10V	0 - 20000	0
-10V - 10V	-20000 - 20000	1
0mA - 20mA	0 - 10000	0
-20mA - 20mA	- 10,000 - 10,000	1

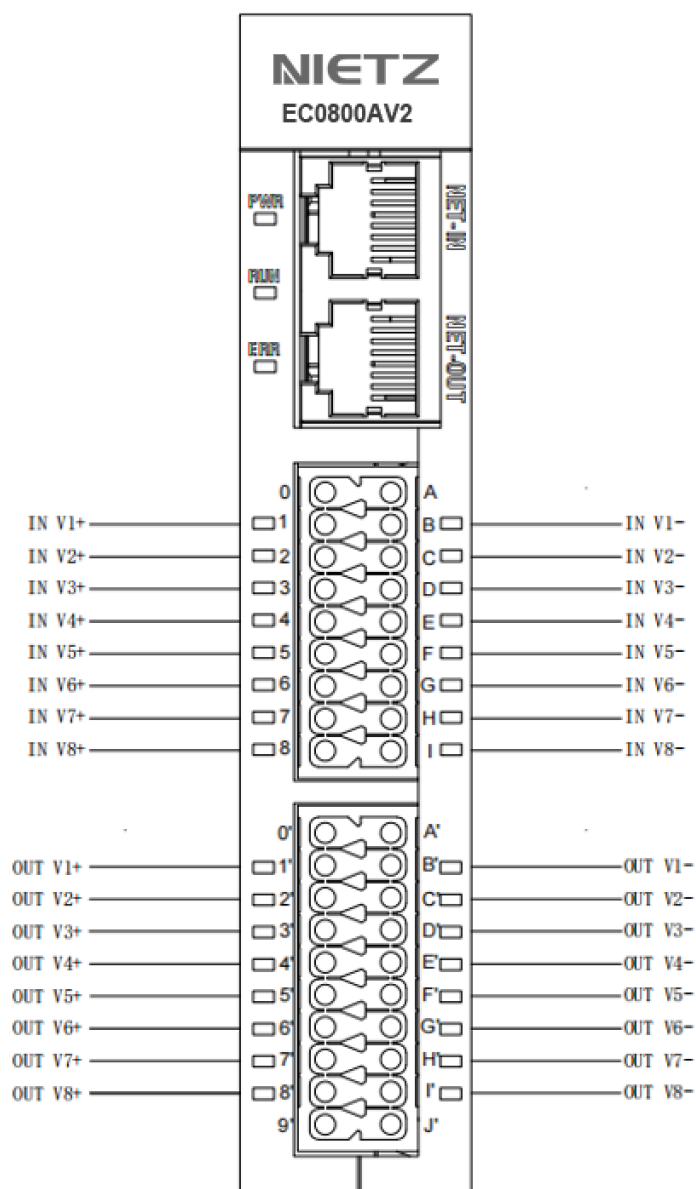
Notice:

Each module's individual channels can be configured to different modes. Furthermore, if using a voltage mode input of $\pm 10\text{V}$, the motion control card's I/O module may read values as integers. Therefore, values greater than 32767 need to be complemented, meaning the actual value equals the read value minus 65536. The same applies to the current mode input of $\pm 20\text{mA}$.

6.5 EC0808AV2

6.5.1 Wiring Diagram

Note: Only the module's main power supply needs to be connected; input/output power supplies are not required.



6.5.2 Electrical Specifications

Electrical Specifications

category	project	Specifications/Functional Definitions
Standard Specifications	Power specifications	24VDC (20.4VDC ~ 28.8VDC) -15%, +20%
	Maximum communication speed	100Mbps
	Bus interface	2×RJ45
	Transmission distance	≤100m
	Data transmission medium	Ethernet/EtherCAT CAT5 cable
	Operating temperature	-20 ~ +60°C
	Storage temperature	-25 ~ 75°C
	relative humidity	≤95%, non-condensing
	Protection level	IP20
	Compliant with protocol standards	EtherCAT Slave Protocol
	External dimensions (unit: mm)	77*124*25 (excluding terminals)
	weight	120g (excluding terminals)
	Certification	CE certification
	Installation method	DIN rail mounting, snap-fit connection
	Shell material	PC/ABS
Analog input	Input connection method	Spring-type terminals
	Input type	Voltage type: -10V to 10V (-32768 to 32767)
	Number of input channels	8-channel voltage input
	resolution	16 bit
	Sampling rate	≥1Ksps
	accuracy	±0.1%
	Input impedance	>500kΩ
	Isolation and withstand voltage	500V
	Minimum conversion period	1ms
Analog output	Input /output connection method	Spring-type terminals
	Output type	Voltage type: -10V to 10V (-32768 to 32767)
	Number of output channels	8-channel voltage output
	resolution	16 bit
	Sampling rate	≥1Ksps
	accuracy	±0.1%
	Load impedance	>500kΩ
	Isolation and withstand voltage	500V

6.5.3 Internal Parameter Configuration

EC0808AV2 SDO Parameter Configuration

Parameter name	Object index number	Data types	Access methods	Function	Remark
Store_Parameters	0x1010	INT	RW	Power-off storage	Write 1 and the current settings will be saved automatically.
BusFault	0x7011	UINT	RW	'0': Reset to zero '1': Keep	The default power-on value is '0'.
DAC_Compensation	0x7012[1:8]	INT	RW	DAC output channel compensation	The default power-on value is '0'. Each sub-index corresponds to one channel. The default is 8 channels.
ADC_Compensation	0x7013[1:8]	INT	RW	ADC input channel compensation	The default power-on value is '0'. Each sub-index corresponds to one channel. The default is 8 channels.
ADC_MODE	0x7014	UINT	RW	ADC mode selection	0: -10V to +10V 1: 0V to +10V
DAC_MODE	0x7015	UINT	RW	DAC mode selection	0: -10V to +10V 1: 0V to +10V

7. Indicator light status and meaning during malfunctions

Fault Indicator Status Table

Indicator lights	state	meaning	Solution
RUN	Extinguish	The master station and slave station are in the initialization state.	Check the configuration and parameter settings; check the communication address; verify that the network cable specifications and length match the recommendations.
RUN	blinking	The slave station is in PREOP state.	Check the slave station configuration to see if any modules are missing or faulty, or if there are any unconfigured modules.
ERR	blinking	Communication error between master and slave stations	Verify that the parameter configurations for the master and slave stations are correct.
PWR	Extinguish	Product not powered on or power module malfunction	Check if the power is on; verify the continuity of the power cables.