Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual



M31-U-CAN Series

CANopen distributed I/O host

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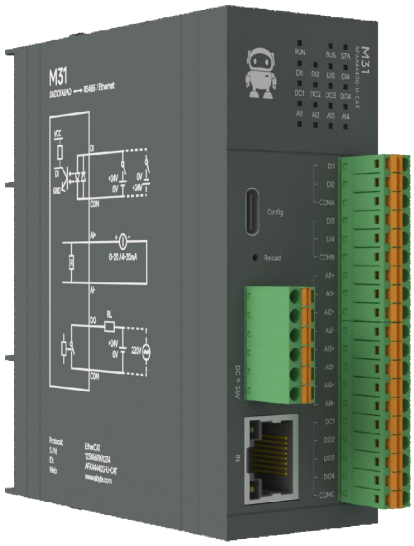
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1.Product Overview

1.1 Product Introduction



The M31-U-CAN series distributed I/O master is a slave module that supports the CANopen protocol .

The device features a modular design, allowing users to flexibly expand it according to their actual needs. It supports multiple I/O types , and when the existing configuration is insufficient to meet specific application requirements, users can easily add matching I/O expansion modules without replacing the entire system, effectively saving costs and simplifying the on-site deployment process .

This product allows connection to up to 16 IO expansion modules (including the host itself) and is built in accordance with EMC Level 3 protection standards. IO input/output and power supply are fully isolated, providing excellent electromagnetic compatibility, outstanding performance and high reliability, and meets CE certification standards.

1.2 Features

- It uses the standard CANopen protocol for communication and can be networked with PLCs, configuration files, host computers, etc.
- Configure device parameters for Ethernet port
- Modular splicing structure, small size, compact structure
- Supports differential analog input, 16-bit resolution, and accuracy within 1‰.
- It can connect up to 16 I/O expansion modules (including the host itself) .
- The maximum number of I/O operations can be supported up to 256 bits.
- Arbitrary combinations of digital input/output, analog input/output, etc.
- Supports multiple I/O types including DI (NPN/PNP), AI (single-ended current), AI (differential current), AI (differential voltage), DO (PNP), DO (relay), AO (current), and AO (voltage).
- It adopts industrial-grade hardware design and has multiple protections including electrostatic discharge, lightning surge, fast pulse group , and reverse power connection protection.
- Supports mounting via positioning holes and guide rails.
- It features I/O input/output and power isolation , and complies with CE certification standards.

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1.3 Product Model List

Product Model	Product Specifications	digital input DI	Switch output DO	Analog input AI	Analog output AO
M31-AFAX4440G-U-CAN	4DI+4DO+4AI	4 (NPN, PNP)	4 (Relay)	4 (Differential Current)	—
M31-AXAX8080G-U-CAN	8DI+8DO	8 (NPN, PNP)	8 (Relay)	—	—
M31-AXEX8080G-U-CAN	8DI+8DO	8 (NPN, PNP)	8 (transistors)	—	—

The following distributed I/O extension modules are currently supported (please refer to the U-series distributed I/O extension module user manual for detailed parameters of the extension modules):

Product Model	Product Specifications	digital input DI	Switch output DO	Analog input AI	Analog output AO
M31-GAFAX4440-U	4DI+4DO+4AI	4 (NPN, PNP)	4 (Relay)	4 (Differential Current)	—
M31-GAXAX8080-U	8DI+8DO	8 (NPN, PNP)	8 (Relay)	—	—
M31-GAXXX8000-U	8DI	8 (NPN, PNP)	—	—	—
M31-GAXXXA000-U	16 DI	16 (NPN, PNP)	—	—	—
M31-GAXEX8080-U	8DI+8DO	8 (NPN, PNP)	8 (transistors)	—	—
M31-GXXAX0080-U	8DO	—	8 (Relay)	—	—
M31-GXXAX00A0-U	16 DO	—	16 (Relay)	—	—
M31-GXXEX00A0-U	16 DO	—	16 (transistors)	—	—
M31-GAXAX4040-U	4 DI+ 4 DO	4 (NPN, PNP)	4 (Relay)	—	—
M31-GXFXX0800-U	—	—	—	8 (Differential Current)	—
M31-GXAXX0A00-U	—	—	—	16 (Single-ended current)	—
M31-GXBXX0A00-U	—	—	—	16 (Single-ended voltage)	—
M31-GXXXA0008-U	—	—	—	—	8 (Current)
M31-GXXXB0008-U	—	—	—	—	8 (Voltage)

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2.Technical indicators

2.1Specifications

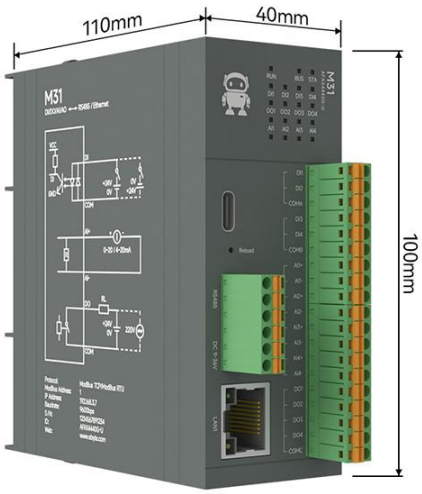
CANopen Distributed I/O Master		
category	name	parameter
power supply	Operating voltage	DC 9～36V; with reverse polarity protection
	Power indicator	RUN red LED indicator
	Power consumption	2-4W
communication	Communication interface	CAN, RJ45
	baud rate	1000k (default), 500k, 250k, 125k, 100k, 50k, 20k, 10k
	Communication Protocol	CANopen protocol
	Internal bus	Up to 1ms
DI Input	Input type	NPN, PNP
	Input range	DC 10～28V
	Isolation methods	Each channel is individually opto-isolated.
	Input impedance	7.2k Ω
	sampling frequency	1000 Hz
	Counting frequency	<500Hz
	Filtering time	Default time 6ms
	Input Instructions	DI green LED indicator
AI input	Acquisition characteristics	Single-ended input/differential input (model optional)
	Input type	Single-ended current: 0-20mA, 4-20mA ; Differential current: 0-20mA, 4-20mA, ±20mA; Differential voltage: 0-5V, ±5V, 0-10V, ±10V; Single-ended voltage: 0-5V, 0-10V
	AI resolution	16-bit (differential)
	AI accuracy	1‰ (differential) / 3‰ (single-ended)
	refresh rate	Maximum 70Hz
	Input Instructions	AI Green LED Indicator
DO (relay) output	DO output type	Type A relay (normally open)
	DO output mode	Level output, pulse output

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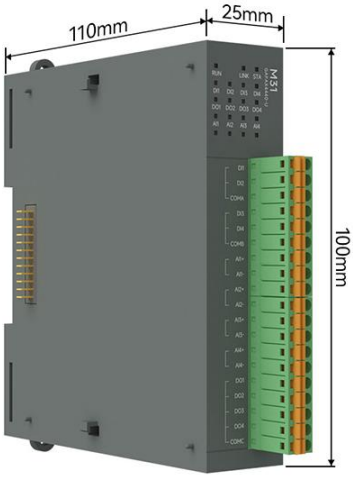
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	Relay contact capacity	5A 30VDC, 5A 250VAC (maximum total current supported at the same COM common terminal is 8A)
	Output Indicator	DO green LED indicator
DO (PNP) output	DO output type	PNP type
	DO output mode	Level output, pulse output
	Output capability	Supports output up to 0.5A per channel and 4A per COM port at voltages between 10 and 30V.
	Output Indicator	DO green LED indicator
AO output	Output type	0-20mA, 4-20mA / 0-5V, 0-10V (Voltage and current models are optional)
	Output accuracy	1‰
	Output impedance	AOV: 40R AOI: 656kΩ
	Output Indicator	AO green LED indicator
other	Product Dimensions	110mm * 40mm * 100mm (Length * Width * Height)
	Operating temperature and humidity	-40 to +85℃, 5% to 95%RH (non-condensing)
	Storage temperature and humidity	-40 to +105℃, 5% to 95%RH (non-condensing)
	Installation method	Positioning holes and guide rail installation

2.2 Dimensions



主机



扩展模块

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2.3 Port, button and LED indicator description

2.3.1 M31-AFAX4440G-U-CAN

M31-AFAX4440G-U-CAN Port and Button Description:		
silkscreen	name	illustrate
DI1	DI1 digital input	DI1 digital input interface, used in conjunction with COM A
DI2	DI2 digital input	DI2 digital input interface, used in conjunction with COM A
COM A	DI digital input common terminal	DI1-DI2 share COM A common terminal
DI3	DI3 digital input	DI3 digital input interface, used in conjunction with COM B
DI4	DI4 digital input	DI4 digital input interface, used in conjunction with COM B
COM B	DI digital input common terminal	DI3-DI4 share a common COM B terminal
DO1	DO1 digital output	DO1 is a digital output interface used in conjunction with COMC.
DO2	DO2 digital output	DO2 digital output interface, used in conjunction with COMC
DO3	DO3 digital output	DO3 digital output interface, used in conjunction with COMC
DO4	DO4 digital output	DO4 digital output interface, used in conjunction with COMC
COM C	DO's COM side	DO1-DO4 share a common COMC for coordinated use
AI1+	AI1 Analog Input +	AI1 analog input + interface, used in conjunction with AI1-
AI1-	AI1 Analog Input -	AI1 Analog Input Interface, for use with AI1+
AI2+	AI2 analog input +	AI2 analog input + interface, used in conjunction with AI2-
AI2-	AI2 Analog Input -	AI2 Analog Input Interface, for use with AI2+
AI3+	AI3 Analog Input +	AI3 analog input + interface, used in conjunction with AI3-
AI3-	AI3 Analog Input -	AI3 Analog Input Interface, for use with AI3+
AI4+	AI4 Analog Input +	AI4 analog input + interface, used in conjunction with AI4-
AI4-	AI4 Analog Input -	AI4 Analog Input Interface, for use with AI4+
Config	Type-C interface	Firmware upgrade interface
Reload	Factory reset/auto-negotiation	Press and hold for 5-10 seconds to restore factory settings;
H (CAN)	CAN H interface	CAN H interface
L (CAN)	CAN L interface	CAN L interface
G(CAN)	CAN G interface	CAN G interface
PE	Grounding	Grounding
V- (DC9-36V)	negative terminal of power supply	DC (9-36V) power supply negative terminal interface
V+ (DC9-36V)	Positive power supply	DC (9-36V) power supply positive terminal interface
LAN1	network port	Standard RJ45 network cable interface

M31-AFAX4440G-U-CAN Indicator Light Description:

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silkscreen	name	illustrate
RUN	Equipment operating status indicator lights	Red LED light; On/Slow flash/Fast flash: Device is operating normally; fast flash indicates CAN data exchange; Off: Device is malfunctioning; Slow flash indicates no CAN data exchange.
BUS	Device bus status indicator	Yellow LED light; On: Internal bus of the device is operating normally; Off: Internal bus of the device is completely malfunctioning. Flickering: There may be an abnormality in the operation of the device's internal bus.
STA	Bus communication indicator	Blue LED light; flashing: indicates data exchange between the host and the expansion module; off: indicates no data exchange between the host and the expansion module.
DI1	DI1 Input Indicator	Green LED light; On: DI1 valid input; Off: DI1 invalid input.
DI2	DI2 Input Indicator	Green LED light; On: DI2 input is valid; Off: DI2 input is invalid.
DI3	DI3 Input Indicator	Green LED light; On: DI3 input is valid; Off: DI3 input is invalid.
DI4	DI4 Input Indicator	Green LED light; On: DI4 input is valid; Off: DI4 input is invalid.
DO1	DO1 output indicator light	Green LED light; On: DO1 relay closed; Off: DO1 relay open.
DO2	DO2 output indicator light	Green LED light; On: DO2 relay closed; Off: DO2 relay open.
DO3	DO3 output indicator light	Green LED light; On: DO3 relay closed; Off: DO3 relay open.
DO4	DO4 output indicator light	Green LED light; On: DO4 relay closed; Off: DO4 relay open.
AI1	AI1 Input Indicator Light	Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%.
AI2	AI2 Input Indicator Light	Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%.
AI3	AI3 Input Indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%.
AI4	AI4 Input Indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: Not effectively connected; Rapid flashing: Exceeds the range by 10%.

2.3.2 M31-AXAX8080G-U-CAN

M31-AXAX8080G-U-CAN Port and Button Description:		
silkscreen	name	illustrate
DO1	DI1 digital input	DI1 digital input interface, used in conjunction with COMA
DI2	DI2 digital input	DI2 digital input interface, used in conjunction with COMA
DI3	DI3 digital input	DI3 digital input interface, used in conjunction with COMA
DI4	DI4 digital input	DI4 digital input interface, used in conjunction with COMA
COMA	DI digital input common terminal	DI1-DI4 share the same COMA common terminal

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DI5	DI5 digital input	DI5 digital input interface, used in conjunction with COMB.
DI6	DI6 digital input	The DI6 digital input interface is used in conjunction with the COMB module.
DI7	DI7 digital input	The DI7 digital input interface is used in conjunction with the COMB module.
DI8	DI8 digital input	The DI8 digital input interface is used in conjunction with the COMB module.
COMB	DI digital input common terminal	DI5-DI8 share a common COMB terminal
DO1	DO1 digital output	DO1 is a digital output interface used in conjunction with COMC.
DO2	DO2 digital output	DO2 digital output interface, used in conjunction with COMC
DO3	DO3 digital output	DO3 digital output interface, used in conjunction with COMC
DO4	DO4 digital output	DO4 digital output interface, used in conjunction with COMC
DO5	DO5 digital output	DO5 digital output interface, used in conjunction with COMC
DO6	DO6 digital output	DO6 digital output interface, used in conjunction with COMC
DO7	DO7 digital output	DO7 digital output interface, used in conjunction with COMC
DO8	DO8 digital output	DO8 digital output interface, used in conjunction with COMC
COMC	DO's COM side	DO1-DO8 share a common COMC for coordinated use
Config	Type-C interface	Firmware upgrade interface
Reload	Factory reset/auto-negotiation	Press and hold for 5-10 seconds to restore factory settings;
H (CAN)	CAN H interface	CAN H interface
L (CAN)	CAN L interface	CAN L interface
G(CAN)	CAN G interface	CAN G interface
PE	Grounding	Grounding
V- (DC9-36V)	negative terminal of power supply	DC (9-36V) power supply negative terminal interface
V+ (DC9-36V)	Positive power supply	DC (9-36V) power supply positive terminal interface
LAN1	network port	Standard RJ45 network cable interface
LAN 2	network port	Standard RJ45 network cable interface

M31-AXAX8080G-U-CAN Indicator Light Description:		
silkscreen	name	illustrate
RUN	Equipment operating status indicator lights	Red LED light; On/Slow flash/Fast flash: Device is operating normally; fast flash indicates CAN data exchange; Off: Device is malfunctioning; Slow flash indicates no CAN data exchange.
BUS	Device bus status indicator	Yellow LED light; On: Internal bus of the device is operating normally; Off: Internal bus of the device is completely malfunctioning. Flashing: There may be an abnormality in the operation of the device's internal bus.
STA	Bus communication	Blue LED light; flashing: indicates data exchange between the host and the

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	indicator	expansion module; off: indicates no data exchange between the host and the expansion module.
DI1	DI1 Input Indicator	Green LED light; On: DI1 valid input; Off: DI1 invalid input.
DI2	DI2 Input Indicator	Green LED light; On: DI2 input is valid; Off: DI2 input is invalid.
DI3	DI3 Input Indicator	Green LED light; On: DI3 input is valid; Off: DI3 input is invalid.
DI4	DI4 Input Indicator	Green LED light; On: DI4 input is valid; Off: DI4 input is invalid.
DI5	DI5 Input Indicator	Green LED light; On: DI5 input is valid; Off: DI5 input is invalid.
DI6	DI6 Input Indicator	Green LED light; On: DI6 input is valid; Off: DI6 input is invalid.
DI7	DI7 Input Indicator	Green LED light; On: DI7 valid input; Off: DI7 invalid input.
DI8	DI8 Input Indicator	Green LED light; On: DI8 input is valid; Off: DI8 input is invalid.
DO1	DO1 output indicator light	Green LED light; On: DO1 relay closed; Off: DO1 relay open.
DO2	DO2 output indicator light	Green LED light; On: DO2 relay closed; Off: DO2 relay open.
DO3	DO3 output indicator light	Green LED light; On: DO3 relay closed; Off: DO3 relay open.
DO4	DO4 output indicator light	Green LED light; On: DO4 relay closed; Off: DO4 relay open.
DO5	DO5 output indicator light	Green LED light; On: DO5 relay closed; Off: DO5 relay open.
DO6	DO6 output indicator light	Green LED light; On: DO6 relay closed; Off: DO6 relay open.
DO7	DO7 output indicator light	Green LED light; On: DO7 relay closed; Off: DO7 relay open.
DO8	DO8 output indicator light	Green LED light; On: DO8 relay closed; Off: DO8 relay open.

2.3.3 M31-AXEX8080G-U-CAN

M31-AXEX8080G-U-CAN Port and Button Description:		
silkscreen	name	illustrate
DI 1	DI1 digital input	DI1 digital input interface, used in conjunction with COMA
DI2	DI2 digital input	DI2 digital input interface, used in conjunction with COMA
DI3	DI3 digital input	DI3 digital input interface, used in conjunction with COMA
DI4	DI4 digital input	DI4 digital input interface, used in conjunction with COMA
COMA	DI digital input common terminal	DI1-DI4 share the same COMA common terminal
DI5	DI5 digital input	DI5 digital input interface, used in conjunction with COMB.
DI6	DI6 digital input	The DI6 digital input interface is used in conjunction with the COMB module.
DI7	DI7 digital input	The DI7 digital input interface is used in conjunction with the COMB module.

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DI8	DI8 digital input	The DI8 digital input interface is used in conjunction with the COMB module.
COMB	DI digital input common terminal	DI5-DI8 share a common COMP terminal
DO1	DO1 digital output	DO1 is a digital output interface used in conjunction with COMC.
DO2	DO2 digital output	DO2 digital output interface, used in conjunction with COMC
DO3	DO3 digital output	DO3 digital output interface, used in conjunction with COMC
DO4	DO4 digital output	DO4 is a digital output interface used in conjunction with COMC.
DO5	DO5 digital output	DO5 digital output interface, used in conjunction with COMC
DO6	DO6 digital output	DO6 digital output interface, used in conjunction with COMC
DO7	DO7 digital output	DO7 digital output interface, used in conjunction with COMC
DO8	DO8 digital output	DO8 digital output interface, used in conjunction with COMC
COMC	DO's COM port	DO1-DO8 share a common COMC for coordinated use
Config	Type-C interface	Firmware upgrade interface
Reload	Factory reset/auto-negotiation	Press and hold for 5-10 seconds to restore factory settings;
H (CAN)	CAN H interface	CAN H interface
L (CAN)	CAN L interface	CAN L interface
G(CAN)	CAN G interface	CAN G interface
PE	Grounding	Grounding
V- (DC9-36V)	negative terminal of power supply	DC (9-36V) power supply negative terminal interface
V+ (DC9-36V)	Positive power supply	DC (9-36V) power supply positive terminal interface
LAN1	network port	Standard RJ45 network cable interface
LAN 2	network port	Standard RJ45 network cable interface

M31-AXEX8080G-U-CAN Indicator Light Description:		
silkscreen	name	illustrate
RUN	Equipment operating status indicator lights	Red LED light; On/Slow flash/Fast flash: Device is operating normally; fast flash indicates CAN data exchange; Off: Device is malfunctioning; Slow flash indicates no CAN data exchange.
BUS	Device bus status indicator	Yellow LED light; On: Internal bus of the device is operating normally; Off: Internal bus of the device is completely malfunctioning. Flashing: There may be an abnormality in the operation of the device's internal bus.
STA	Bus communication indicator	Blue LED light; flashing: indicates data exchange between the host and the expansion module; off: indicates no data exchange between the host and the expansion module.
DI1	DI1 Input Indicator	Green LED light; On: DI1 valid input; Off: DI1 invalid input.
DI2	DI2 Input Indicator	Green LED light; On: DI2 input is valid; Off: DI2 input is invalid.
DI3	DI3 Input Indicator	Green LED light; On: DI3 input is valid; Off: DI3 input is invalid.

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DI4	DI4 Input Indicator	Green LED light; On: DI4 input is valid; Off: DI4 input is invalid.
DI5	DI5 Input Indicator	Green LED light; On: DI5 input is valid; Off: DI5 input is invalid.
DI6	DI6 Input Indicator	Green LED light; On: DI6 input is valid; Off: DI6 input is invalid.
DI7	DI7 Input Indicator	Green LED light; On: DI7 valid input; Off: DI7 invalid input.
DI8	DI8 Input Indicator	Green LED light; On: DI8 input is valid; Off: DI8 input is invalid.
DO1	DO1 output indicator light	Green LED light; On: DO1 transistor is conducting; Off: DO1 transistor is cut off.
DO2	DO2 output indicator light	Green LED light; On: DO 2 transistor is conducting; Off: DO 2 transistor is cut off.
DO3	DO3 output indicator light	Green LED light; On: DO 3 transistor is conducting; Off: DO 3 transistor is cut off.
DO4	DO4 output indicator light	Green LED light; On: DO 4 transistor is conducting; Off: DO 4 transistor is cut off.
DO5	DO5 output indicator light	Green LED light; On: DO 5 transistor is conducting; Off: DO 5 transistor is cut off.
DO6	DO6 output indicator light	Green LED light; On: DO 6 transistor is conducting; Off: DO 6 transistor is cut off.
DO7	DO7 output indicator light	Green LED light; On: DO 7 transistor is conducting; Off: DO 7 transistor is cut off.
DO8	DO8 output indicator light	Green LED light; On: DO 8 transistor is conducting; Off: DO 8 transistor is cut off.

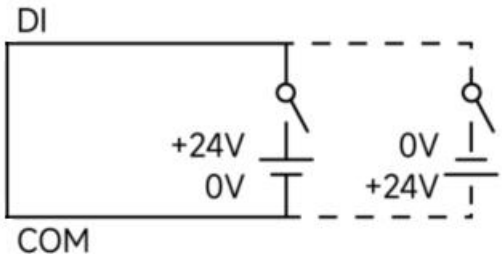
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3.Wiring Instructions

3.1 Device connection

3.1.1 DI connection

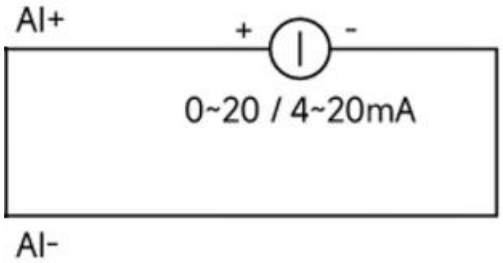


PNP input NPN input

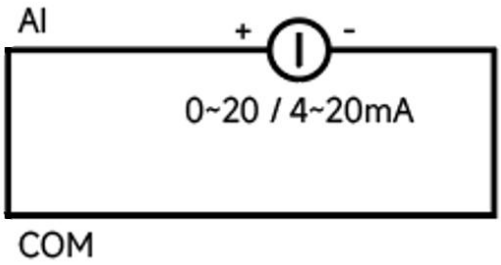
Note: DI is an NPN or PNP active input, and the voltage range supported is only 10 V to 28 V.

3.1.2 AI Connectivity

Differential analog current acquisition:



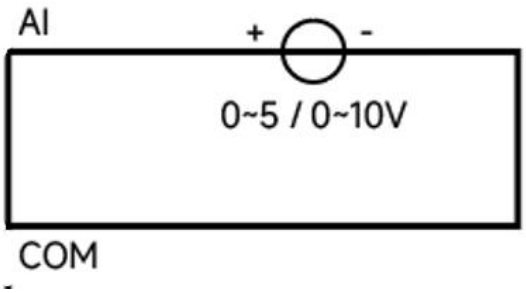
Single-ended analog current acquisition:



Single-ended analog voltage acquisition:

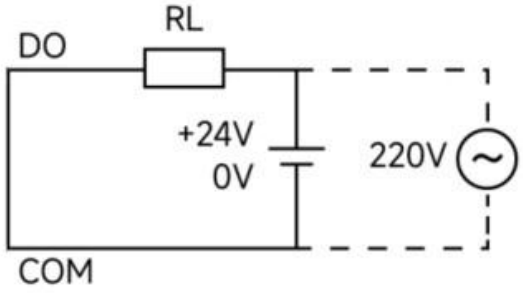
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3.1.3 DO connection

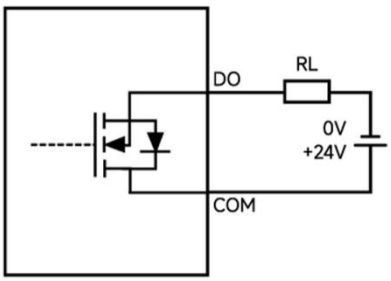
3.1.3.1Relay type



Note: 1. A single relay can support a maximum of 5A.

2. The maximum total current supported for each group (same COM common terminal) is 8A.

3.1.3.2 Transistor type



Note: 1. A single channel can support a maximum of 0.5A .

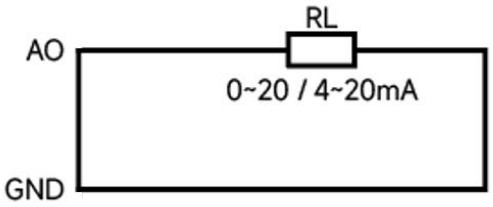
2. The maximum total current supported by each group (same COM common terminal) is 4 A , and the voltage range is 10-30V.

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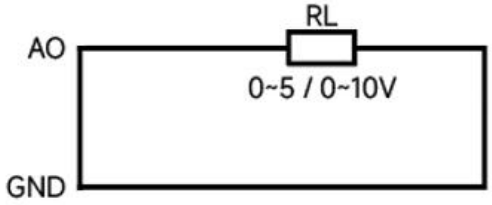
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3.1.4 AO connection

Current type AO :



Voltage type AO :



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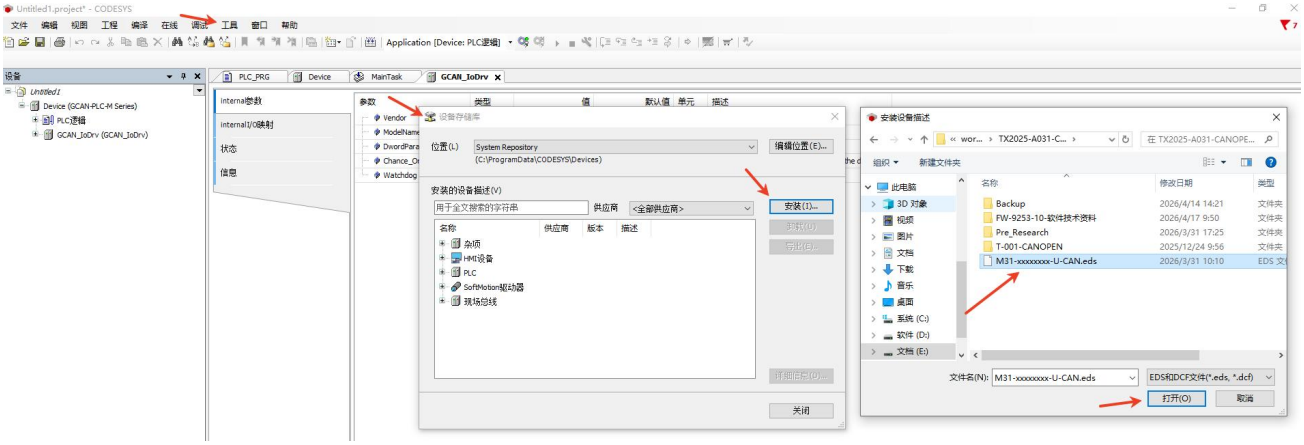
4.Tutorial on loading devices using CODESYS

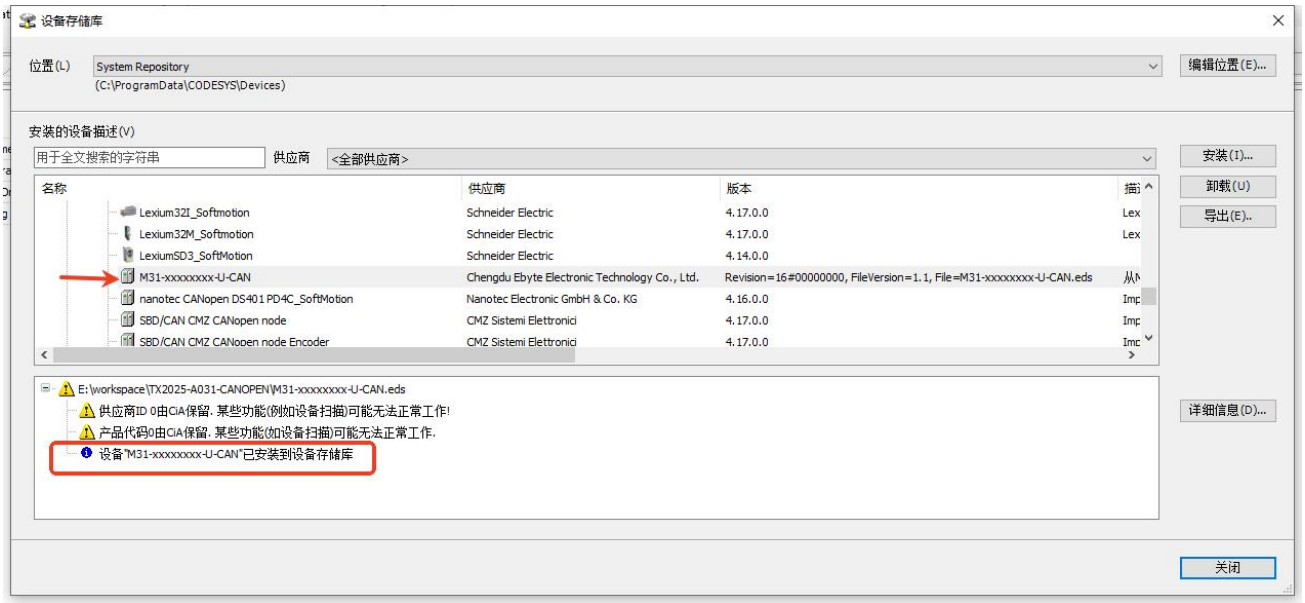
4.1 Preparation before connection

1. Prepare the necessary XML file as follows:
   M31-xxxxxxxx-U-CAN.eds

4.2 Add the M31-xxxxxxxx-U-CAN.eds CANopen device file.

1. In Codosys, click Tools → Device Repository → Install → EDS File → Open. If you see "Device XXX has been installed to the device repository", the installation was successful, as shown in the image below.





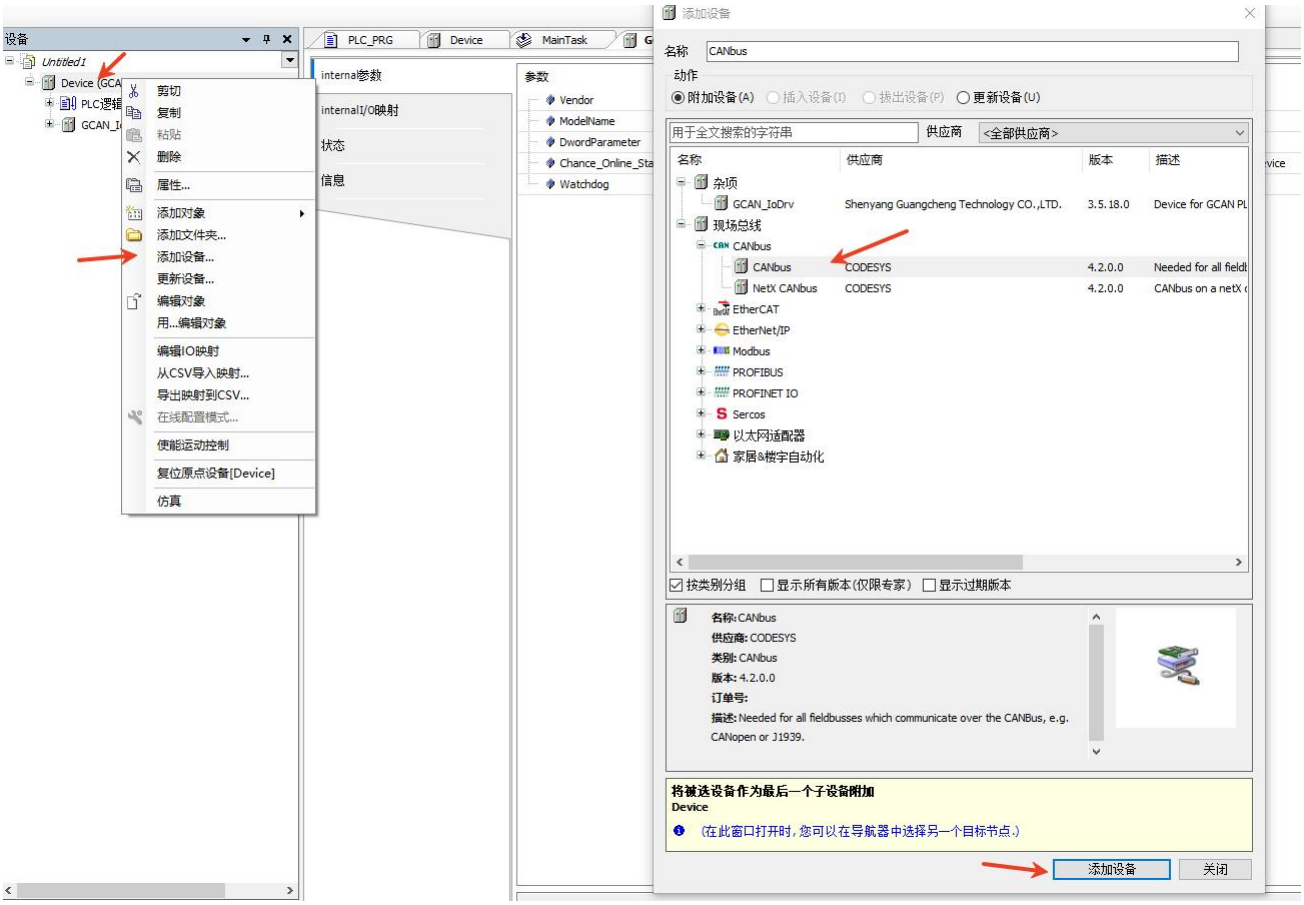
4.3 Add CANopen IO device to project

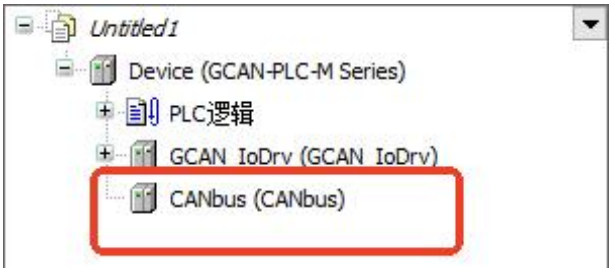
1. Right-click Device → Add Device → CANbus → Add Device. CANbus will appear in the device tree, as shown in

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the image below :

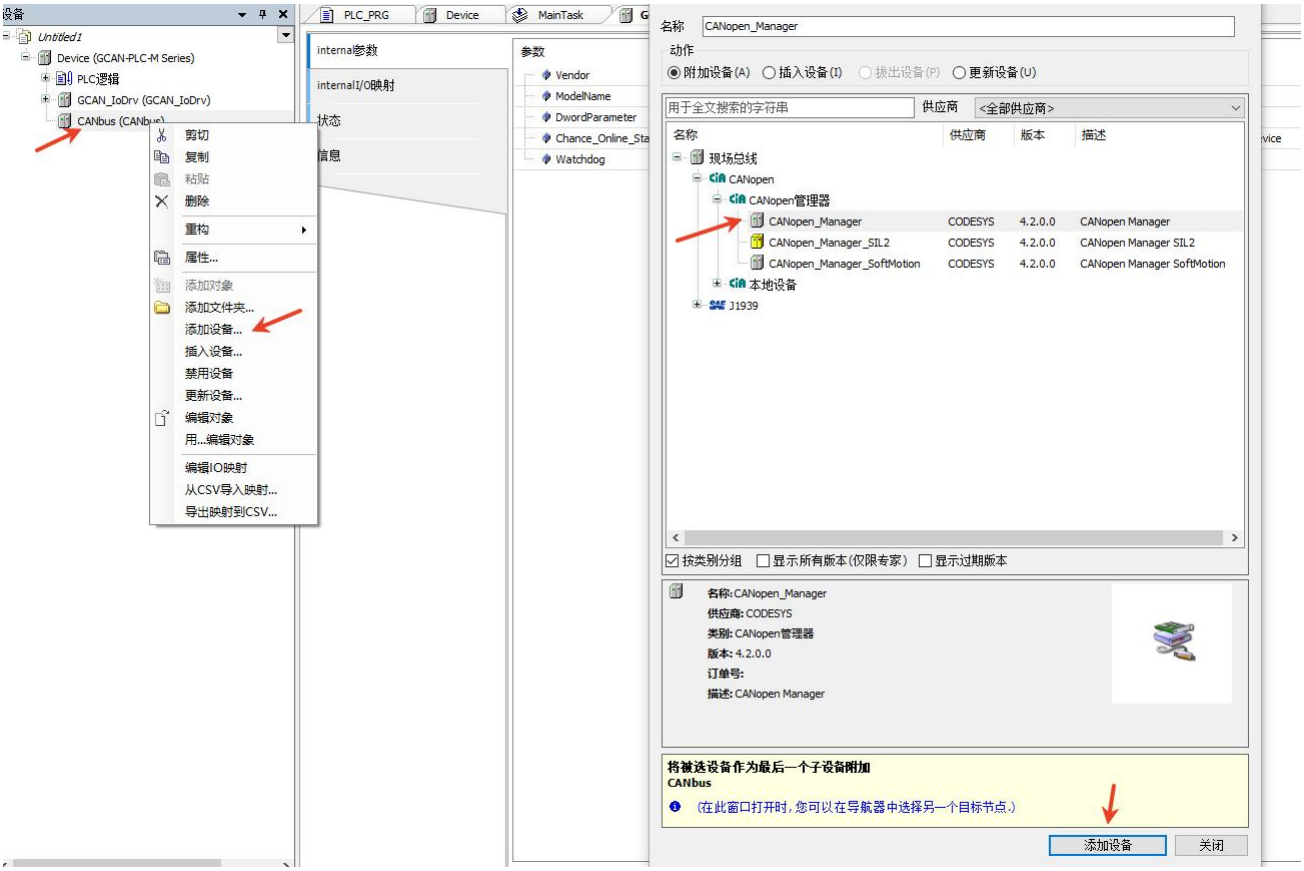


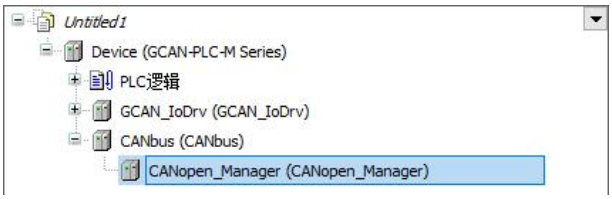


2. Right-click CANbus → Add Device → CANopen_Manager → Add Device. CANopen_Manager will appear in the device tree as shown in the image below:

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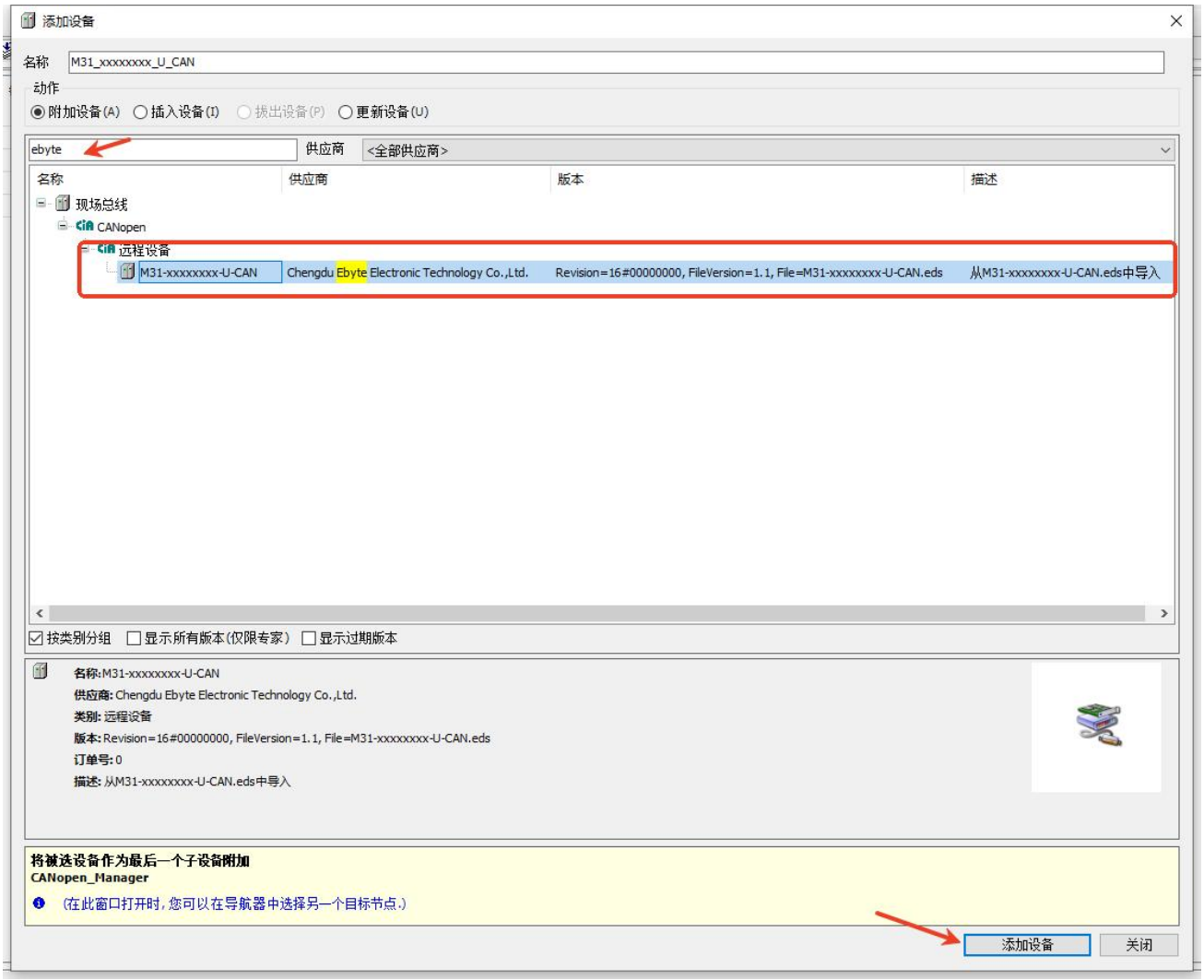


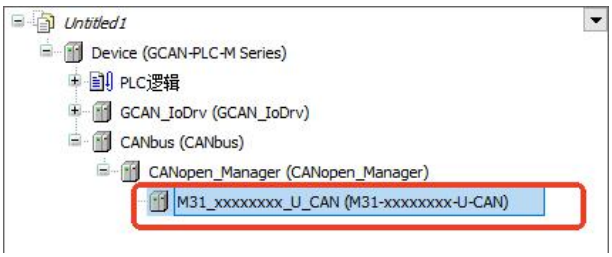
3. Right-click on CANopen_Manager → Add Device → Enter "ebyte" → Click Add Device. If "M31_xxxxxxxx_U_CAN" appears in the device tree, the device has been added successfully. See the image below:



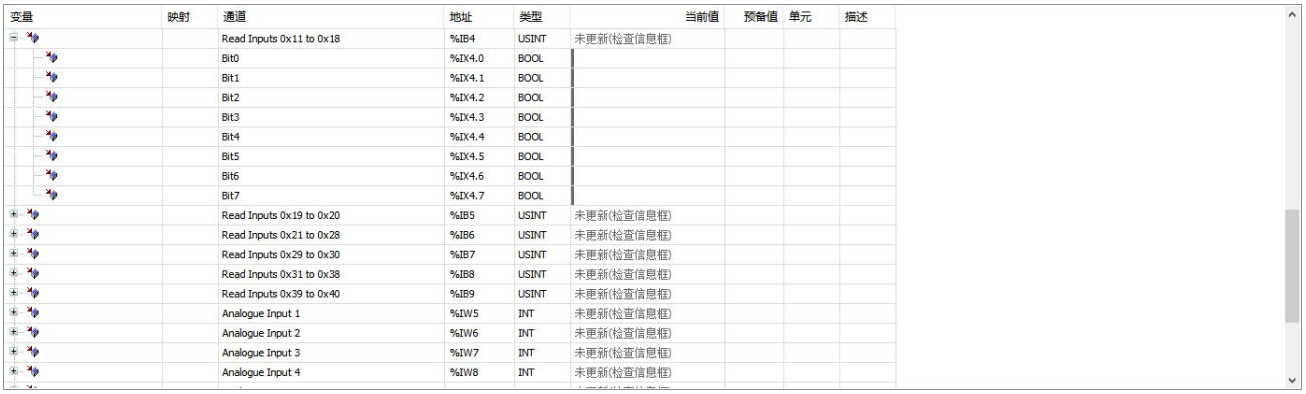
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4. In the CANopen field, you can change the I/O mapping address, or you can use the automatically assigned address.



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5. Once the mapping is complete, you can download the PLC to control I/O.
6. Equipment parameter configuration introduction

• Equipment Parameter Overview

type	quantity	Object Index
Digital Input (DI)	256 bits (32 bytes)	0x6000
Digital Output (DO)	256 bits (32 bytes)	0x6200
Analog Input (AI)	128 × INT16	0x6401
Analog Output (AO)	128 × INT16	0x6411
Send PDO (TX)	36	0x1800 ~ 0x1823
Receive PDO (RX)	36	0x1400 ~ 0x1423

PDO Introduction

The device supports 36 TPDOs and 36 RPDOs, with the first four TPDO and RPDO groups enabled by default, and the remaining PDOs awaiting user configuration.

TPDO basic parameters:

parameter	value
Transmission type	255 (Asynchronous)
Inhibition time	500 (100 μ s = 50ms)
Event Time	50 ms
SYNC start value	0

RPDO basic parameters:

parameter	value
Transmission type	255 (Asynchronous)
Inhibition time	0
Event Time	0
SYNC start value	0

Introduction to transmission types

Type 0 — Acyclic synchronization

project	illustrate
Triggering method	After the data changes, send it while waiting for the next SYNC frame.
Inhibition time	Available

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Event timer	Unavailable
Periodic	Non-periodic (only triggered when data changes)

Type 1 ~ 240 — Cyclic Synchronization

project	illustrate
Triggering method	A PDO is sent once for every N SYNC frames received.
Inhibition time	Available
Event timer	Unavailable
Periodic	Period (determined by SYNC period × N)

Type 252 — Synchronous RTR

project	illustrate
Triggering method	Data is updated after SYNC + sent only when RTR remote frame request is made.
Inhibition time	Available
Event timer	Unavailable
Periodic	On demand (requires RTR triggering)

Type 253 — Asynchronous RTR

project	illustrate
Triggering method	Send only when an RTR remote frame request is received.
Inhibition time	Available
Event timer	Unavailable
Periodic	On demand (entirely determined by the main site's request)

Type 254 — Vendor Asynchronous

project	illustrate
Triggering method	Manufacturer-defined trigger conditions
Inhibition time	Available
Event timer	Available

Type 255 — Asynchronous Event-Driven

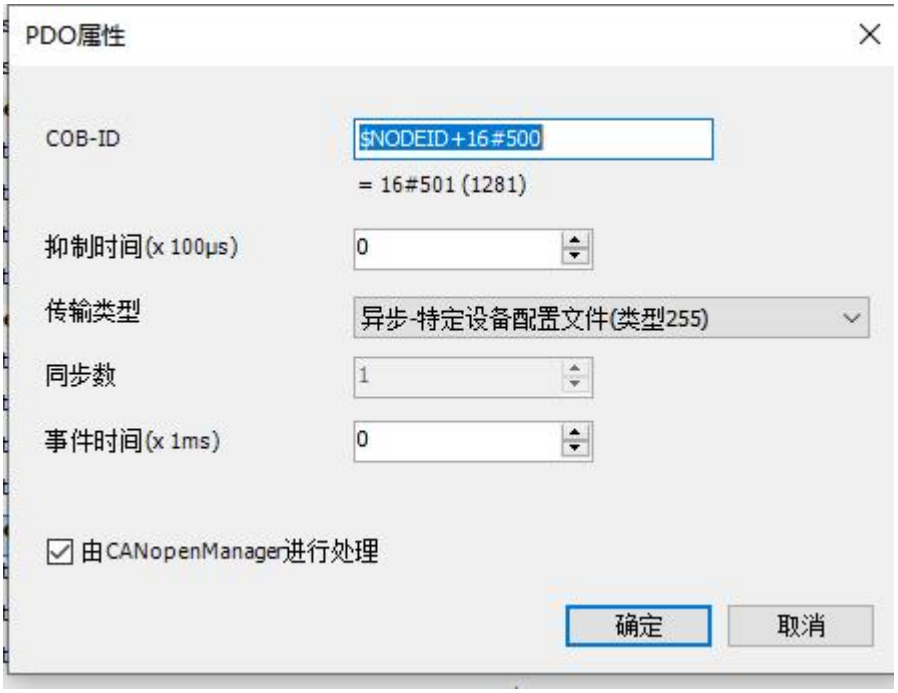
project	illustrate
Triggering method	Data changes are sent immediately + event timers send periodically.

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Inhibition time	Available
Event timer	Available
Periodic	Aperiodic (triggered by data changes)

Users can choose different configurations as shown in the image below:



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5.Introduction to Object Dictionaries

Index	Sub-index	Name	Type	Property	Default Value	Description
0x1000	—	Device Type	UINT32	RO	197009	Equipment type
0x1001	—	Error Register	UINT8	RO	0	Error Register
0x1005	—	SYNC COB ID	UINT32	RW	0x80	Synchronization Frame COB-ID
0x1006	—	Communication Cycle Period	UINT32	RW	0x30D40	Synchronization frame transmission period (μs), default 200ms
0x1007	—	Synchronous Counter Overflow Value	UINT8	RW	0	Synchronous counter overflow value
0x1014	—	Emergency COB ID	UINT32	RW	$NODEID+ 0x80	Emergency message COB-ID
0x1017	—	Heartbeat Time	UINT16	RW	300	Heartbeat duration (ms)
0x1018	—	Identity	RECORD	RO	—	Equipment Identification Object
	sub0	Number of Entries	UINT8	RO	4	Number of sub-indexes
	sub1	Vendor ID	UINT32	RO	0x00000000	Manufacturer ID
	sub2	Product Code	UINT32	RO	0	Product Code
	sub3	Revision Number	UINT32	RO	0	Revision number
	sub4	Serial Number	UINT32	RO	0	Serial Number
0x1200	—	Server SDO Parameter	RECORD	RO	—	SDO Server Parameter Object
	sub0	Number of Entries	UINT8	RO	2	Number of sub-indexes
	sub1	COB ID Client to Server (Receive SDO)	UINT32	RO	$NODEID+ 0x600	COB-ID of SDO from Master Site to Slave Site
	sub2	COB ID Server to Client (Transmit SDO)	UINT32	RO	$NODEID+ 0x580	COB-ID of SDO from slave site to master site
0x1400	—	Receive PDO 1 Parameter	RECORD	RW	—	RPDO1 communication parameters are enabled.
	sub0	Highest SubIndex	UINT8	RO	5	Number of sub-indexes

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		Supported				
	sub1	COB ID used by PDO	UINT32	RW	$NODEID+ 0x200	PDO's COB-ID
	sub2	Transmission Type	UINT8	RO	255	Transport type (asynchronous event-driven)
	sub3	Inhibit Time	UINT16	RW	0	Inhibition time (100 μs)
	sub4	Compatibility Entry	UINT8	RW	0	Compatibility entries
	sub5	Event Timer	UINT16	RW	0	Event timer (ms)
0x1401	—	Receive PDO 2 Parameter	RECORD	RW	—	RPDO2 is enabled.
	sub1	COB ID used by PDO	UINT32	RW	$NODEID+ 0x300	
	sub2	Transmission Type	UINT8	RW	255	
	sub3	Inhibit Time	UINT16	RW	0	
	sub4	Compatibility Entry	UINT8	RW	0	
	sub5	Event Timer	UINT16	RW	0	
0x1402	—	Receive PDO 3 Parameter	RECORD	RW	—	RPDO3，已启用
	sub1	COB ID used by PDO	UINT32	RW	$NODEID+ 0x400	
	sub2	Transmission Type	UINT8	RW	255	
	sub3	Inhibit Time	UINT16	RW	0	
	sub4	Compatibility Entry	UINT8	RW	0	
	sub5	Event Timer	UINT16	RW	0	
0x1403	—	Receive PDO 4 Parameter	RECORD	RW	—	RPDO4，已启用
	sub1	COB ID used by PDO	UINT32	RW	$NODEID+ 0x500	
	sub2	Transmission Type	UINT8	RW	255	
	sub3	Inhibit Time	UINT16	RW	0	
	sub4	Compatibility Entry	UINT8	RW	0	
	sub5	Event Timer	UINT16	RW	0	
0x1404 ~ 0x1423	—	Receive PDO 5 ～ 36 Parameter	RECORD	RW	—	RPDO5 ~ 36, disabled (COB-ID=0x80000000)
0x1600	—	Receive PDO 1 Mapping	RECORD	RW	—	RPDO1 mapping, 8 objects,

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						mapped to 0x6200
	sub0	Number of Entries	UINT8	RW	8	Number of mapping objects
	sub1	PDO 1 Mapping for an application object 1	UINT32	RW	0x6200_01	Digital output 0x1
	sub2	PDO 1 Mapping for an application object 2	UINT32	RW	0x6200_02	Digital output 0x2
	sub3	PDO 1 Mapping for an application object 3	UINT32	RW	0x6200_03	Digital output 0x3
	sub4	PDO 1 Mapping for an application object 4	UINT32	RW	0x6200_04	Digital output 0x4
	sub5	PDO 1 Mapping for an application object 5	UINT32	RW	0x6200_05	Digital output 0x5
	sub6	PDO 1 Mapping for an application object 6	UINT32	RW	0x6200_06	Digital output 0x6
	sub7	PDO 1 Mapping for an application object 7	UINT32	RW	0x6200_07	Digital output 0x7
	sub8	PDO 1 Mapping for an application object 8	UINT32	RW	0x6200_08	Digital output 0x8
0x1601	—	Receive PDO 2 Mapping	RECORD	RW	—	RPDO2 mapping, 4 objects, mapped to 0x6411
	sub0	Number of Entries	UINT8	RW	4	Number of mapping objects
	sub1 ~ 4	PDO 2 Mapping for an application object 1 ~ 4	UINT32	RW	0x6411_01 ~ 04	Analog output 0x1 ~ 0x4
0x1602	—	Receive PDO 3 Mapping	RECORD	RW	—	RPDO3 mapping, 4 objects, mapped to 0x6411
0x1603	—	Receive PDO 4 Mapping	RECORD	RW	—	RPDO4 mapping, 4 objects, mapped to 0x6411
0x1604 ~ 0x1623	—	Receive PDO 5 ~ 36 Mapping	RECORD	RW	—	RPDO5 ~ 36, not configured
0x1800	—	Transmit PDO 1 Parameter	RECORD	RW	—	TPDO1 communication parameters are enabled.
	sub0	Highest SubIndex Supported	UINT8	RO	5	Number of sub-indexes
	sub1	COB ID used by PDO	UINT32	RW	$NODEID+ 0x180	PDO's COB-ID

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	sub2	Transmission Type	UINT8	RW	255	Transport type (asynchronous event-driven)
	sub3	Inhibit Time	UINT16	RW	500	Inhibition time (100μs), default 50ms
	sub5	Event Timer	UINT16	RW	50	Event timer (ms)
	sub6	SYNC start value	UINT8	RW	0	SYNC starting value
0x1801	—	Transmit PDO 2 Parameter	RECORD	RW	—	TPDO2 is enabled.
	sub1	COB ID used by PDO	UINT32	RW	$NODEID+ 0x280	
	sub2	Transmission Type	UINT8	RW	255	
	sub3	Inhibit Time	UINT16	RW	500	
	sub5	Event Timer	UINT16	RW	50	
	sub6	SYNC start value	UINT8	RW	0	
0x1802	—	Transmit PDO 3 Parameter	RECORD	RW	—	TPDO3，已启用
	sub1	COB ID used by PDO	UINT32	RW	$NODEID+ 0x380	
	sub2	Transmission Type	UINT8	RW	255	
	sub3	Inhibit Time	UINT16	RW	500	
	sub5	Event Timer	UINT16	RW	50	
	sub6	SYNC start value	UINT8	RW	0	
0x1803	—	Transmit PDO 4 Parameter	RECORD	RW	—	TPDO4，Enable
	sub1	COB ID used by PDO	UINT32	RW	$NODEID+ 0x480	
	sub2	Transmission Type	UINT8	RW	255	
	sub3	Inhibit Time	UINT16	RW	500	
	sub5	Event Timer	UINT16	RW	50	
	sub6	SYNC start value	UINT8	RW	0	
0x1804～ 0x1823	—	Transmit PDO 5 ～ 36 Parameter	RECORD	RW	—	TPDO5 ～ 36, disabled (COB-ID=0x80000000)
0x1A00	—	Transmit PDO 1 Mapping	RECORD	RW	—	TPDO1 mapping, 8 objects, mapped to 0x6000
	sub0	Number of Entries	UINT8	RW	8	Number of mapping objects

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	sub1	PDO 1 Mapping for a process data variable 1	UINT32	RW	0x6000_01	Numeric input 0x1
	sub2	PDO 1 Mapping for a process data variable 2	UINT32	RW	0x6000_02	Numeric input 0x2
	sub3	PDO 1 Mapping for a process data variable 3	UINT32	RW	0x6000_03	Numeric input 0x3
	sub4	PDO 1 Mapping for a process data variable 4	UINT32	RW	0x6000_04	Number input 0x4
	sub5	PDO 1 Mapping for a process data variable 5	UINT32	RW	0x6000_05	Number input 0x5
	sub6	PDO 1 Mapping for a process data variable 6	UINT32	RW	0x6000_06	Number input 0x6
	sub7	PDO 1 Mapping for a process data variable 7	UINT32	RW	0x6000_07	Number input 0x7
	sub8	PDO 1 Mapping for a process data variable 8	UINT32	RW	0x6000_08	Numeric input 0x8
0x1A01	—	Transmit PDO 2 Mapping	RECORD	RW	—	TPDO2 mapping, 4 objects, mapped to 0x6401
	sub0	Number of Entries	UINT8	RW	4	Number of mapping objects
	sub1 ~ 4	PDO 2 Mapping for a process data variable 1 ~ 4	UINT32	RW	0x6401_01 ~ 04	Simulate input 0x1 ~ 0x4
0x1A02	—	Transmit PDO 3 Mapping	RECORD	RW	—	TPDO3 mapping, 4 objects, mapped to 0x6401
0x1A03	—	Transmit PDO 4 Mapping	RECORD	RW	—	TPDO4 mapping, 4 objects, mapped to 0x6401
0x1A04 ~ 0x1A23	—	Transmit PDO 5 ~ 36 Mapping	RECORD	RW	—	TPDO5 ~ 36, not configured
0x6000	—	Read Inputs 8 Bit	RECORD	RO	—	Numeric Input Object Directory (256 channels)
	sub0	Number of Input 8 bits	UINT8	RO	32	Number of input groups (32 groups × 8 bits = 256 channels)
	sub1	Read Inputs 0x1 to 0x8	UINT8	RO	0	Input group 1 supports PDO mapping
	sub2	Read Inputs 0x9 to 0x10	UINT8	RO	0	Input group 2 supports PDO mapping

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	sub3 ~ 0x20	Read Inputs 0x11 ~ 0x100	UINT8	RO	0	Input groups 3 to 32 support PDO mapping.
0x6200	—	Write Outputs 8 Bit	RECORD	RW	—	Digital output object catalog (256 channels)
	sub0	Number of Output 8 Bit	UINT8	RO	32	Number of output groups (32 groups × 8 bits = 256 channels)
	sub1	Write outputs 0x1 to 0x8	UINT8	RW	0	Output group 1 supports PDO mapping
	sub2	Write outputs 0x9 to 0x10	UINT8	RW	0	Output group 2 supports PDO mapping
	sub3 ~ 0x20	Write Outputs 0x11 ~ 0x100	UINT8	RW	0	Output groups 3 to 32 support PDO mapping.
0x6401	—	Read Analogue Input 16 Bit	RECORD	RO	—	Simulated input object directory (128 channels, 16-bit)
	sub0	Number of Analogue Input 16 Bit	UINT8	RO	128	Number of analog input channels
	sub1	Analogue Input 1	INT16	RO	0	Analog input channel 1, supports PDO mapping
	sub2	Analogue Input 2	INT16	RO	0	Analog input channel 2, supports PDO mapping
	sub3 ~ 0x80	Analogue Input 3 ~ 128	INT16	RO	0	Analog input channels 3 to 128, supporting PDO mapping.
0x6411	—	Write Analogue Output 16 Bit	RECORD	RW	—	Simulated output object directory (128 channels, 16-bit)
	sub0	Number of Analogue Output 16 Bit	UINT8	RO	128	Number of analog output channels
	sub1	Analogue Output 1	INT16	RW	0	Analog output channel 1 supports PDO mapping
	sub2	Analogue Output 2	INT16	RW	0	Analog output channel 2, supports PDO mapping
	sub3 ~ 0x80	Analogue Output 3 ~ 128	INT16	RW	0	Analog output channels 3 to 128, supporting PDO mapping.

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6.Product Function Introduction

6.1 IO point number expansion

Note: Do not operate the equipment while it is powered on during the assembly process, otherwise it may cause damage to the equipment!

The M31-U -CAN series distributed I/O host adopts an expandable architecture design, in which the I/O expansion module can be used to expand the M31-U -CAN series host. Simply connect the I/O expansion module to the host slot and then slide down the latch to firmly connect the host and the I/O expansion module together.

The specific steps are as follows:

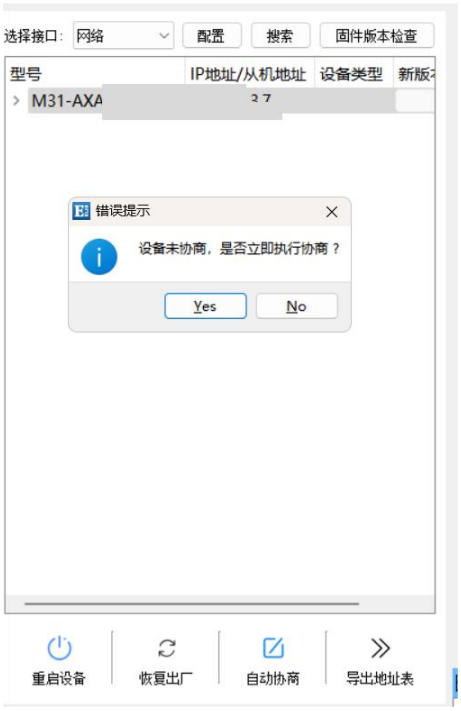
- First, ensure the host is not powered on and that the host's slider is in the UNLK position. Then, connect the IO expansion module to the host, as shown in the following figure:



- After connecting the IO expansion module, slide the host switch to the LOCK position, power on the host, and then plug in the network cable. Use the auto-negotiation function via the host computer (or double-click the Reload button on the device within two seconds to auto-negotiate). Once negotiation is successful, the IO expansion module can be operated via the host's serial port or network port. (When searching via the host computer, clicking on the corresponding host will automatically trigger auto-negotiation to check if the module assembly order has changed . If so, the user will be prompted to negotiate; otherwise , no prompt will be given.)

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Note: When adding new IO expansion modules or removing negotiated IO expansion modules, the auto-negotiation function must be performed to ensure the overall device sequence and status self-check.



Note: The "M31-" designation for the expansion module will not be displayed in the host computer.

6.2 CAN Node and CAN Baud Rate Configuration

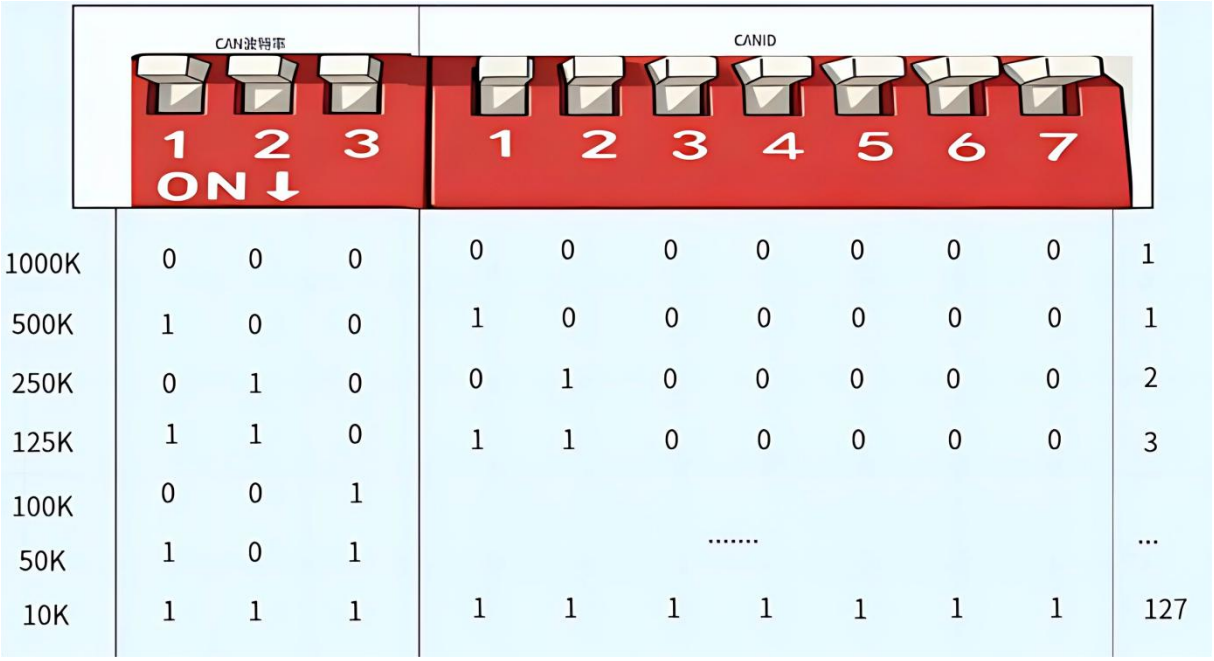
The device baud rate is 1000k by default, in binary form, and is set by the DIP switch (first 3 bits) . Supported baud rates: 1000k, 500k, 250k, 125k, 50k, 10k .

The device node address is 1 by default , in binary form, and is set by the DIP switch (last 7 bits) . The valid range of the node number is 0 to 127.

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As shown in the image below:

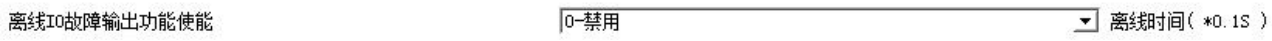


1000K	0	0	0	0	0	0	0	0	0	0	1
500K	1	0	0	1	0	0	0	0	0	0	1
250K	0	1	0	0	1	0	0	0	0	0	2
125K	1	1	0	1	1	0	0	0	0	0	3
100K	0	0	1								
50K	1	0	1				.....				...
10K	1	1	1	1	1	1	1	1	1	1	127

6.3 Instructions for using IO functions

Parameter configuration requires our host computer to connect via the device's network interface .

1. Offline IO fault output function enabled:



0-Disabled: All outputs will retain their current state in the event of a device communication failure.

1-Enable: In the event of a device communication failure, all outputs will be executed according to the configured abnormal output state.

2. DI parameters

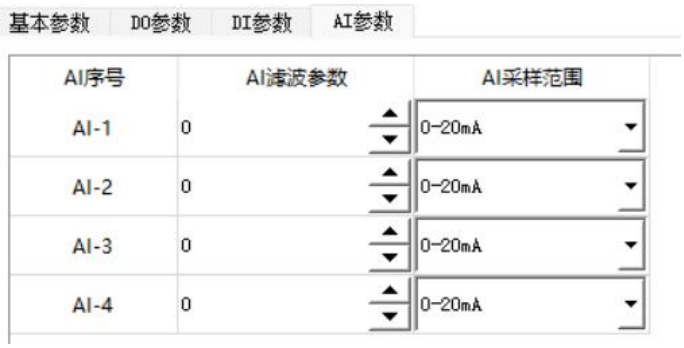


DI filter parameters (DI filter time for each channel can be set individually , range: 1-65535ms, default: 6):

3. AI parameters:

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AI filtering parameters (AI filtering level can be set individually for each channel , range: 0-4, default: 0; the higher the level, the longer the filtering time):

AI sampling range : Current type has selectable ranges of 0 ~ 20mA, 4 ~ 20mA, and -20 ~ 20mA; Voltage type has selectable ranges of 0 ~ 5V, 0 ~ 10V, -5 ~ 5V, and -10 ~ 10V.

4. DO parameters :



DO Abnormal Output Status Setting: When the bus is abnormal, the output status of each channel's DO can be set individually;

0 - Retain Fault State : In the event of a fault, retain the current state of the DO output.

1- Fault DO Output OFF : In case of a fault, reset the DO output to its previous state.

1-Fault DO Output ON : In case of a fault, the DO output is set to its previous state.

5. AO parameters:

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AO output range: Current type is available in 0~20mA and 4~20mA ranges; Voltage type is available in 0~5V and 0~10V ranges .

AO power-on output: The preset fixed value automatically output by the AO channel after the device is powered on.

AO Fault Output Value: The emergency output value that the AO channel automatically switches when the device detects a communication interruption, bus abnormality, or module failure.

AO Fault Output Enable: Controls the on/off state of the AO fault output function. When enabled, the AO channel will execute according to the preset "fault output value" when the device fails; when disabled, the AO channel will retain the last normal output value when a fault occurs.

6. CAN parameters:



Note: CAN ID and CAN baud rate can only be modified by hardware DIP switches; they cannot be modified by the host computer.

Note: After configuring the parameters, click "Save Parameters". Once you see a message in the log output indicating that the parameters have been saved successfully, restart the device. The modified parameters will take effect after the restart is complete.

6.4 Error type related explanation:

Error Type	Triggering conditions	EMCY error code	Internal status bit (Error Bit)	Additional Information (Info Data)
Custom: Bus Failure	Extended I/O bus error	0xFF00	0x40	0xFFFFFFFF

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Custom: Slave failure	Extended I/O slave exception	0xFF00	0x41	Each bit corresponds to the online/error status of a slave station.

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7.Precautions

(1) Do not connect the equipment while it is powered on, otherwise there is a risk of damage to the equipment.

(2) The final interpretation right belongs to Chengdu Ebyte Electronic Technology Co., Ltd.

(3) This product is strictly prohibited from being used in military applications or scenarios related to life safety. The user shall bear all liabilities arising from any unauthorized use in violation of this provision.

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Revision History

Version	Revision Date	Revision Notes	maintainer
1.0	2026-04-20	Initial version	LT

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