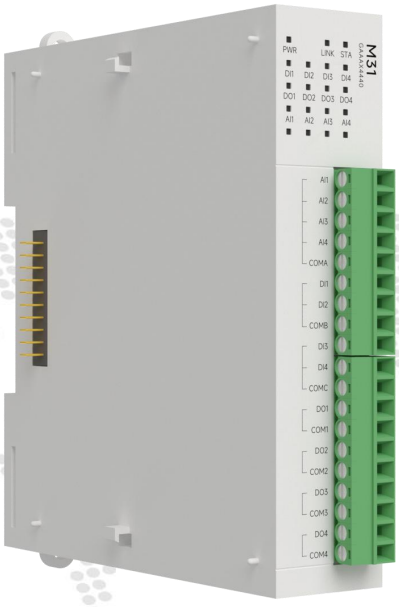
Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual



Distributed IO expansion module

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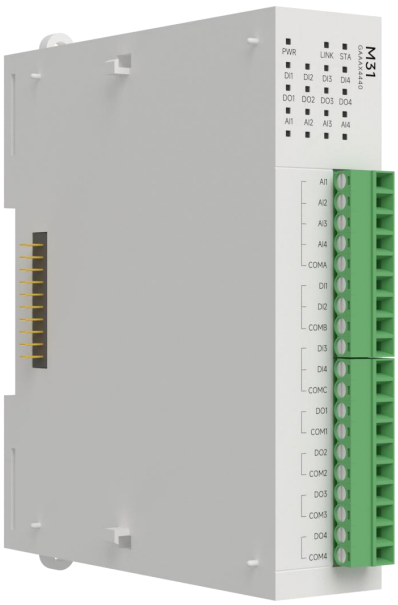
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Chapter1 Product Overview

1.1 Product Introduction

The distributed IO expansion module adopts an expandable design in structure and needs to be used with our M31 series distributed IO host.



1.2 Product Model List

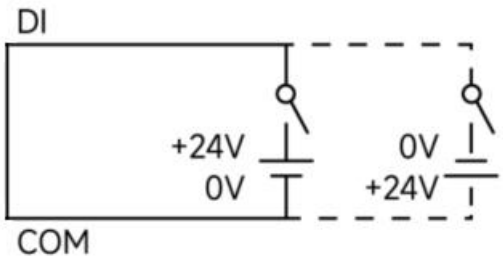
Product Model	Product Specifications
M31-GAAAX4440	4DI+4AI(single-ended current)+4DO
M31-GAXXX8000	8DI
M31-GXXAX0080	8DO
M31-GAXAX4040	4DI+4DO
M31-GAXXXA000	16DI
M31-GXXAX00A0	16DO
M31-GAXAX8080	8DI+8DO
M31-GXAXX0800	8AI (single-ended current)
M31-GXXXA0008	8AO (current output)
M31-GXAXA0404	4AI (single-ended current) + 4AO (current output)
M31-GXFXX0800	8AI (differential current)
M31-GXGXX0800	8AI (differential voltage)

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Charpter2 Wiring Diagram

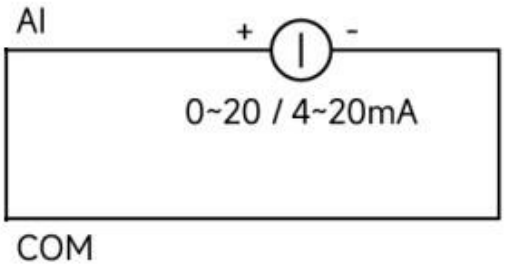
2.1 DI Connection



Note: DI is NPN or PNP active input, and the voltage range only supports 12V~24V.

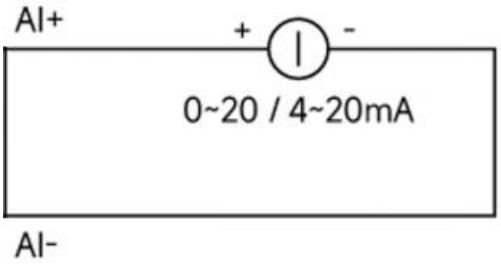
2.2 AI Connectivity

Single-ended analog current acquisition:



Note: AI is used together with the COM port selected by the adjacent wireframe.

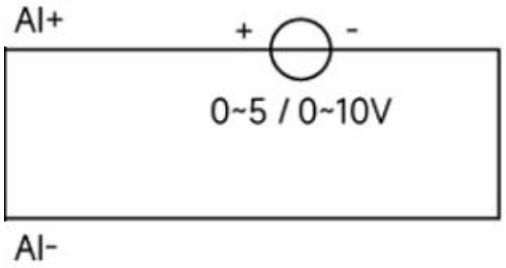
Differential analog current acquisition:



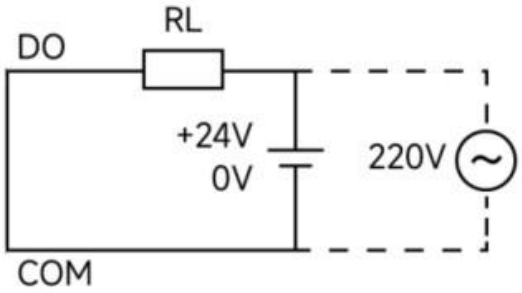
Differential analog voltage acquisition:

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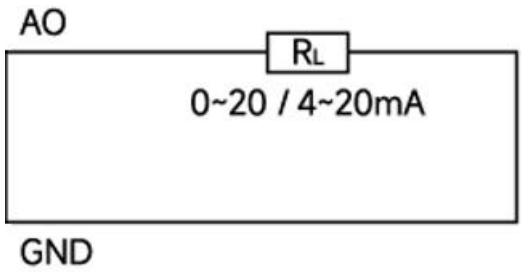
2.3 DO Connection



Note: 1. A single relay supports a maximum of 5A.

2. The maximum total current of each group (same COM common terminal) supports 8A.

2.4 AO Connection



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Charpter3 Technical indicators

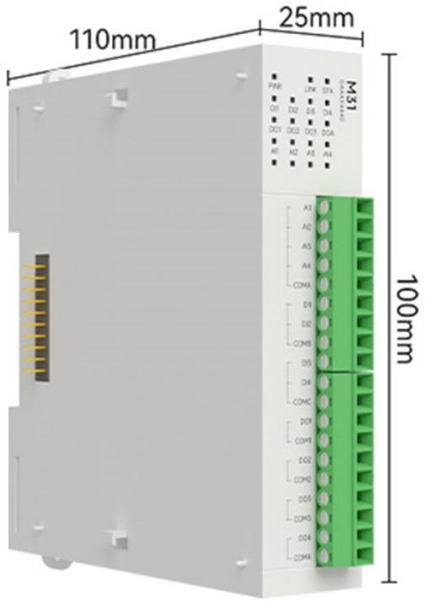
3.1 Specifications

category	name	parameter
DI Input	Input Type	NPN, PNP
	Input voltage	12~24V
	Input Impedance	7.2kΩ
	Collection frequency	Max 1K Hz
	Input Instructions	DI green LED indicator
AI Input	Acquisition characteristics	Single-ended input/differential input (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
	AI Resolution	16 bits (differential) / 12 bits (single-ended)
	AI Precision	1‰(differential)/3‰(single-ended)
	Collection frequency	Single-ended maximum 100Hz/differential maximum 40Hz
	Input instructions	AI green LED indicator
DO Output	DO output type	Type A relay (normally open)
	DO output mode	Level output
	Relay contact capacity	5A 30VDC, 5A 250VAC (the total current of the same COM common terminal supports a maximum of 8A)
	Output indication	DO green LED indicator
AO Output	Output Type	0-20mA, 4-20mA
	AO output accuracy	3‰
	Input Instructions	AO green LED indicator
other	Product size	110mm * 25mm * 100mm (length * width * height)
	Working temperature and humidity	-40 ～ +85℃, 5% ～ 95%RH (no condensation)
	Storage temperature and humidity	-40 ～ +105℃, 5% ～ 95%RH (no condensation)
	Installation	Positioning holes and guide rail installation

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3.2 Dimensions



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3.3 Ports, buttons and LED indicators

Note: Only the latest version (main unit V1.2, expansion module V2.0) has AI indicator light and engraving.

3.1.1 M31-GAAAX4440

M31-GAAAX4440 port and button description:		
Silkscreen	name	illustrate
AI1	AI1 analog input	AI1 analog input interface, used with COMA
AI2	AI2 analog input	AI2 analog input interface, used with COMA
AI3	AI3 analog input	AI3 analog input interface, used with COMA
AI4	AI4 analog input	AI4 analog input interface, used with COMA
COMA	AI analog input common terminal	AI1-AI4 share the COMA common port
DI1	DI1 switch input	DI1 switch input interface, used with COMB
DI2	DI2 switch input	DI2 switch input interface, used with COMB
COMB	DI switch input common terminal	DI1-DI2 share COMB common terminal
DI3	DI3 switch input	DI3 switch input interface, used with COMC
DI4	DI4 switch input	DI4 switch input interface, used with COMC
COMC	DI switch input common terminal	DI3-DI4 share the common terminal COMC
DO1	DO1 switch output	DO1 switch output interface, used with COM1
COM1	COM port of DO1	COM port of DO1
DO2	DO2 switch output	DO2 switch output interface, used with COM2
COM	COM port of DO2	COM port of DO2
DO3	DO3 switch output	DO3 switch output interface, used with COM3
COM3	COM port of DO3	COM port of DO3
DO4	DO4 switch output	DO4 switch output interface, used with COM4
COM4	COM port of DO4	COM port of DO4

M31-GAAAX4440 indicator light description:		
Silkscreen	name	illustrate
PWR	Power indicator	Red LED light; on: system power supply is normal; off: system power supply is abnormal
LINK	Link indicator	Yellow LED light; on: there is a link; off: there is no link; flashes quickly when there is data exchange
STA	Status indicator	Blue LED light; flashing alternately indicates normal operation; constant on or off indicates abnormal device status
DI1	DI1 input indicator	Green LED light; on: DI1 valid input; off: DI1 invalid input
DI2	DI2 input indicator	Green LED light; on: DI2 valid input; off: DI2 invalid input
DI3	DI3 input indicator	Green LED light; on: DI3 valid input; off: DI3 invalid input

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DI4	DI4 input indicator	Green LED light; on: DI4 valid input; off: DI4 invalid input
DO1	DO1 output indicator	Green LED light; on: DO1 relay closed; off: DO1 relay open
DO2	DO2 output indicator	Green LED light; on: DO2 relay closed; off: DO2 relay open
DO3	DO3 output indicator	Green LED light; on: DO3 relay closed; off: DO3 relay open
DO4	DO4 output indicator	Green LED light; on: DO4 relay closed; off: DO4 relay open
AI1	AI1 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI2	AI2 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI3	AI3 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI4	AI4 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%

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3.1.2 M31-GAXXX8000

M31-GAXXX8000 port and button description:		
Silkscreen	name	illustrate
DI1	DI1 switch input	DI1 switch input interface, used with COM1
COM1	COM terminal of DI1	COM terminal of DI1
DI2	DI2 switch input	DI2 switch input interface, used with COM2
COM2	COM port of DI2	COM2 port of DI2
DI3	DI3 switch input	DI3 switch input interface, used with COM3
COM3	COM port of DI3	COM port of DI3
DI4	DI4 switch input	DI4 switch input interface, used with COM4
COM4	COM port of DI4	COM port of DI4
DI5	DI5 switch input	DI1 switch input interface, used with COM5
COM5	COM port of DI5	COM port of DI5
DI6	DI6 switch input	DI6 switch input interface, used with COM6
COM6	COM port of DI6	COM port of DI6
DI7	DI7 switch input	DI7 switch input interface, used with COM7
COM7	COM port of DI7	COM port of DI7
DI8	DI8 switch input	DI8 switch input interface, used with COM8
COM8	COM port of DI8	COM port of DI8
VO+	Power output positive	The positive pole of the power output is consistent with the power supply voltage of the device
VO+	Power output positive	The positive pole of the power output is consistent with the power supply voltage of the device
VO-	Power output negative pole	The negative pole of the power output is consistent with the power supply voltage of the device

M31-GAXXX8000 indicator light description:		
Silkscreen	name	illustrate
PWR	Power indicator	Red LED light; on: system power supply is normal; off: system power supply is abnormal
LINK	Link indicator	Yellow LED light; on: there is a link; off: there is no link; flashes quickly when there is data exchange
STA	Status indicator	Blue LED light; flashing alternately indicates normal operation; constant on or off indicates abnormal device status
DI1	DI1 input indicator	Green LED light; on: DI1 valid input; off: DI1 invalid input
DI2	DI2 input indicator	Green LED light; on: DI2 valid input; off: DI2 invalid input
DI3	DI3 input indicator	Green LED light; on: DI3 valid input; off: DI3 invalid input
DI4	DI4 input indicator	Green LED light; on: DI4 valid input; off: DI4 invalid input
DI5	DI5 input indicator	Green LED light; on: DI5 valid input; off: DI5 invalid input
DI6	DI6 input indicator	Green LED light; on: DI6 valid input; off: DI6 invalid input
DI7	DI7 input indicator	Green LED light; on: DI7 valid input; off: DI7 invalid input
DI8	DI8 input indicator	Green LED light; on: DI8 valid input; off: DI8 invalid input

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3.1.3 M31-GXXAX0080

M31-GXXAX0080 port and button description:		
Silkscreen	name	illustrate
DO1	DO1 switch output	DO1 switch output interface, used with COM1
COM1	COM port of DO1	COM port of DO1
DO2	DO2 switch output	DO2 switch output interface, used with COM2
COM2	COM port of DO2	COM port of DO2
DO3	DO3 switch output	DO3 switch output interface, used with COM3
COM3	COM port of DO3	COM port of DO3
DO4	DO4 switch output	DO4 switch output interface, used with COM4
COM4	COM port of DO4	COM port of DO4
DO5	DO5 switch output	DO5 switch output interface, used with COM5
COM5	COM port of DO5	COM port of DO5
DO6	DO6 switch output	DO6 switch output interface, used with COM6
COM6	COM port of DO6	COM port of DO6
DO7	DO7 switch output	DO7 switch output interface, used with COM7
COM7	COM port of DO7	COM port of DO7
DO8	DO8 switch output	DO8 switch output interface, used with COM8
COM8	COM port of DO8	COM port of DO8
VO+	Power output positive	The positive pole of the power output is consistent with the power supply voltage of the device
VO+	Power output positive	The positive pole of the power output is consistent with the power supply voltage of the device
VO-	Power output negative pole	The negative pole of the power output is consistent with the power supply voltage of the device

M31-GXXAX0080 indicator light description:		
Silkscreen	name	illustrate
PWR	Power indicator	Red LED light; on: system power supply is normal; off: system power supply is abnormal
LINK	Link indicator	Yellow LED light; on: there is a link; off: there is no link; flashes quickly when there is data exchange
STA	Status indicator	Blue LED light; flashing alternately indicates normal operation; constant on or off indicates abnormal device status
DO1	DO1 output indicator	Green LED light; on: DO1 relay closed; off: DO1 relay open
DO2	DO2 output indicator	Green LED light; on: DO2 relay closed; off: DO2 relay open
DO3	DO3 output indicator	Green LED light; on: DO3 relay closed; off: DO3 relay open
DO4	DO4 output indicator	Green LED light; on: DO4 relay closed; off: DO4 relay open
DO5	DO5 output indicator	Green LED light; on: DO5 relay closed; off: DO5 relay open
DO6	DO6 output indicator	Green LED light; on: DO6 relay closed; off: DO6 relay disconnected
DO7	DO7 output indicator	Green LED light; on: DO7 relay closed; off: DO7 relay open
DO8	DO8 output indicator	Green LED light; on: DO8 relay closed; off: DO8 relay disconnected

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3.1.4 M31-GAXAX4040

M31-GAXAX4040 port and button description:		
Silkscreen	name	illustrate
DI1	DI1 switch input	DI1 switch input interface, used with COM1
COM1	COM port of DI1	COM port of DI1
DI2	DI2 switch input	DI2 switch input interface, used with COM2
COM2	COM port of DI2	COM2 port of DI2
DI3	DI3 switch input	DI3 switch input interface, used with COM3
COM3	COM port of DI3	COM port of DI3
DI4	DI4 switch input	DI4 switch input interface, used with COM4
COM4	COM port of DI4	COM port of DI4
DO1	DO1 switch output	DO1 switch output interface, used with COM1
COM1	COM port of DO1	COM port of DO1
DO2	DO2 switch output	DO2 switch output interface, used with COM2
COM2	COM port of DO2	COM port of DO2
DO3	DO3 switch output	DO3 switch output interface, used with COM3
COM3	COM port of DO3	COM port of DO3
DO4	DO4 switch output	DO4 switch output interface, used with COM4
COM4	COM port of DO4	COM port of DO4
VO+	Power output positive	The positive pole of the power output is consistent with the power supply voltage of the device
VO+	Power output positive	The positive pole of the power output is consistent with the power supply voltage of the device
VO-	Power output negative pole	The negative pole of the power output is consistent with the power supply voltage of the device

M31-GAXAX4040 indicator light description:		
Silkscreen	name	illustrate
PWR	Power indicator	Red LED light; on: system power supply is normal; off: system power supply is abnormal
LINK	Link indicator	Yellow LED light; on: there is a link; off: there is no link; flashes quickly when there is data exchange
STA	Status indicator	Blue LED light; flashing alternately indicates normal operation; constant on or off indicates abnormal device status
DI1	DI1 input indicator	Green LED light; on: DI1 valid input; off: DI1 invalid input
DI2	DI2 input indicator	Green LED light; on: DI2 valid input; off: DI2 invalid input
DI3	DI3 input indicator	Green LED light; on: DI3 valid input; off: DI3 invalid input
DI4	DI4 input indicator	Green LED light; on: DI4 valid input; off: DI4 invalid input
DO1	DO1 output indicator	Green LED light; on: DO1 relay closed; off: DO1 relay open
DO2	DO2 output indicator	Green LED light; on: DO2 relay closed; off: DO2 relay open
DO3	DO3 output indicator	Green LED light; on: DO3 relay closed; off: DO3 relay open
DO4	DO4 output indicator	Green LED light; on: DO4 relay closed; off: DO4 relay disconnected

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3.1.5 M31-GAXXXA000

M31-GAXXXA000 port and button description:		
Silkscreen	name	illustrate
DI1	DI1 switch input	DI1 switch input interface, used with COMA
DI2	DI2 switch input	DI2 switch input interface, used with COMA
DI3	DI3 switch input	DI3 switch input interface, used with COMA
DI4	DI4 switch input	DI4 switch input interface, used with COMA
COMA	DI switch input common terminal	DI1-DI4 share COMA common terminal
DI5	DI5 switch input	DI5 switch input interface, used with COMB
DI6	DI6 switch input	DI6 switch input interface, used with COMB
DI7	DI7 switch input	DI7 switch input interface, used with COMB
DI8	DI8 switch input	DI8 switch input interface, used with COMB
COMB	DI switch input common terminal	DI5-DI8 share COMB common terminal
DI9	DI9 switch input	DI9 switch input interface, used with COMC
DI10	DI10 switch input	DI10 switch input interface, used with COMC
DI11	DI11 switch input	DI11 switch input interface, used with COMC
DI12	DI12 switch input	DI12 switch input interface, used with COMC
DI13	DI13 switch input	DI13 switch input interface, used with COMC
DI14	DI14 switch input	DI14 switch input interface, used with COMC
DI15	DI15 switch input	DI15 switch input interface, used with COMC
DI16	DI16 switch input	DI16 switch input interface, used with COMC
COM C	DI switch input common terminal	DI9-DI16 share COMC common terminal

M31-GAXXXA000 indicator light description:		
Silkscreen	name	illustrate
PWR	Power indicator	Red LED light; on: system power supply is normal; off: system power supply is abnormal
LINK	Link indicator	Yellow LED light; on: there is a link; off: there is no link; flashes quickly when there is data exchange
STA	Status indicator	Blue LED light; flashing alternately indicates normal operation; constant on or off indicates abnormal device status
DI1	DI1 input indicator	Green LED light; on: DI1 valid input; off: DI1 invalid input
DI2	DI2 input indicator	Green LED light; on: DI2 valid input; off: DI2 invalid input
DI3	DI3 input indicator	Green LED light; on: DI3 valid input; off: DI3 invalid input
DI4	DI4 input indicator	Green LED light; on: DI4 valid input; off: DI4 invalid input
DI5	DI5 input indicator	Green LED light; on: DI5 valid input; off: DI5 invalid input
DI6	DI6 input indicator	Green LED light; on: DI6 valid input; off: DI6 invalid input
DI7	DI7 input indicator	Green LED light; on: DI7 valid input; off: DI7 invalid input

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DI8	DI8 input indicator	Green LED light; on: DI8 valid input; off: DI8 invalid input
DI9	DI9 input indicator	Green LED light; on: DI9 valid input; off: DI9 invalid input
DI10	DI10 input indicator	Green LED light; on: DI10 valid input; off: DI10 invalid input
DI11	DI11 input indicator	Green LED light; on: DI11 valid input; off: DI11 invalid input
DI12	DI12 input indicator	Green LED light; on: DI12 valid input; off: DI12 invalid input
DI13	DI13 input indicator	Green LED light; on: DI13 valid input; off: DI13 invalid input
DI14	DI14 input indicator	Green LED light; on: DI14 valid input; off: DI14 invalid input
DI15	DI15 input indicator	Green LED light; on: DI15 valid input; off: DI15 invalid input
DI16	DI16 input indicator	Green LED light; on: DI16 valid input; off: DI16 invalid input

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3.1.6 M31-GXXAX00A0

M31-GXXAX00A0 port and button description:		
Silkscreen	name	illustrate
DO1	DO1 switch output	DO1 switch output interface, used with COMA
DO2	DO2 switch output	DO2 switch output interface, used with COMA
DO3	DO3 switch output	DO3 switch output interface, used with COMA
DO4	DO4 switch output	DO4 switch output interface, used with COMA
COMA	COM port of DO	DO1-DO4 share COMA for use
DO5	DO5 switch output	DO5 switch output interface, used with COMB
DO6	DO6 switch output	DO6 switch output interface, used with COMB
DO7	DO7 switch output	DO7 switch output interface, used with COMB
DO8	DO8 switch output	DO8 switch output interface, used with COMB
COMB	COM port of DO	DO5-DO8 share COMB for use
DO9	DO9 switch output	DO9 switch output interface, used with COMC
DO10	DO10 switch output	DO10 switch output interface, used with COMC
DO11	DO11 switch output	DO11 switch output interface, used with COMC
DO12	DO12 switch output	DO12 switch output interface, used with COMC
DO13	DO13 switch output	DO13 switch output interface, used with COMC
DO14	DO14 switch output	DO14 switch output interface, used with COMC
DO15	DO15 switch output	DO15 switch output interface, used with COMC
DO16	DO16 switch output	DO16 switch output interface, used with COMC
COMC	COM port of DO	DO9-DO16 share COMC for use

M31-GXXAX00A0 indicator light description:		
Silkscreen	name	illustrate
PWR	Power indicator	Red LED light; on: system power supply is normal; off: system power supply is abnormal
LINK	Link indicator	Yellow LED light; on: there is a link; off: there is no link; flashes quickly when there is data exchange
STA	Status indicator	Blue LED light; flashing alternately indicates normal operation; constant on or off indicates abnormal device status
DO1	DO1 output indicator	Green LED light; on: DO1 relay closed; off: DO1 relay open
DO2	DO2 output indicator	Green LED light; on: DO2 relay closed; off: DO2 relay open
DO3	DO3 output indicator	Green LED light; on: DO3 relay closed; off: DO3 relay open
DO4	DO4 output indicator	Green LED light; on: DO4 relay closed; off: DO4 relay open
DO5	DO5 output indicator	Green LED light; on: DO5 relay closed; off: DO5 relay open
DO6	DO6 output indicator	Green LED light; on: DO6 relay closed; off: DO6 relay disconnected
DO7	DO7 output indicator	Green LED light; on: DO7 relay closed; off: DO7 relay open
DO8	DO8 output indicator	Green LED light; on: DO8 relay closed; off: DO8 relay disconnected
DO9	DO9 output indicator	Green LED light; on: DO9 relay closed; off: DO9 relay open
DO10	DO10 output indicator	Green LED light; on: DO10 relay closed; off: DO10 relay disconnected

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DO11	DO11 output indicator	Green LED light; on: DO11 relay closed; off: DO11 relay open
DO12	DO12 output indicator	Green LED light; on: DO12 relay closed; off: DO12 relay disconnected
DO13	DO13 output indicator	Green LED light; on: DO13 relay closed; off: DO13 relay disconnected
DO14	DO14 output indicator	Green LED light; on: DO14 relay closed; off: DO14 relay disconnected
DO15	DO15 output indicator	Green LED light; on: DO15 relay closed; off: DO15 relay disconnected
DO16	DO16 output indicator	Green LED light; on: DO16 relay closed; off: DO16 relay disconnected

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3.1.7 M31-GAXAX8080

M31-GAXAX8080 port and button description:		
Silkscreen	name	illustrate
DI1	DI1 switch input	DI1 switch input interface, used with COMA
DI2	DI2 switch input	DI2 switch input interface, used with COMA
DI3	DI3 switch input	DI3 switch input interface, used with COMA
DI4	DI4 switch input	DI4 switch input interface, used with COMA
COMA	DI switch input common terminal	DI1-DI4 share COMA common terminal
DI5	DI5 switch input	DI5 switch input interface, used with COMB
DI6	DI6 switch input	DI6 switch input interface, used with COMB
DI7	DI7 switch input	DI7 switch input interface, used with COMB
DI8	DI8 switch input	DI8 switch input interface, used with COMB
COMB	DI switch input common terminal	DI5-DI8 share COMB common terminal
DO1	DO1 switch output	DO1 switch output interface, used with COMC
DO2	DO2 switch output	DO2 switch output interface, used with COMC
DO3	DO3 switch output	DO3 switch output interface, used with COMC
DO4	DO4 switch output	DO4 switch output interface, used with COMC
DO5	DO5 switch output	DO5 switch output interface, used with COMC
DO6	DO6 switch output	DO6 switch output interface, used with COMC
DO7	DO7 switch output	DO7 switch output interface, used with COMC
DO8	DO8 switch output	DO8 switch output interface, used with COMC
COMC	COM port of DO	DO1-DO8 share COMC for use

M31-GAXAX8080 indicator light description:		
Silkscreen	name	illustrate
PWR	Power indicator	Red LED light; on: system power supply is normal; off: system power supply is abnormal
LINK	Link indicator	Yellow LED light; on: there is a link; off: there is no link; flashes quickly when there is data exchange
STA	Status indicator	Blue LED light; flashing alternately indicates normal operation; constant on or off indicates abnormal device status
DI1	DI1 input indicator	Green LED light; on: DI1 valid input; off: DI1 invalid input
DI2	DI2 input indicator	Green LED light; on: DI2 valid input; off: DI2 invalid input
DI3	DI3 input indicator	Green LED light; on: DI3 valid input; off: DI3 invalid input
DI4	DI4 input indicator	Green LED light; on: DI4 valid input; off: DI4 invalid input
DI5	DI5 input indicator	Green LED light; on: DI5 valid input; off: DI5 invalid input
DI6	DI6 input indicator	Green LED light; on: DI6 valid input; off: DI6 invalid input
DI7	DI7 input indicator	Green LED light; on: DI7 valid input; off: DI7 invalid input
DI8	DI8 input indicator	Green LED light; on: DI8 valid input; off: DI8 invalid input

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DO1	DO1 output indicator	Green LED light; on: DO1 relay closed; off: DO1 relay open
DO2	DO2 output indicator	Green LED light; on: DO2 relay closed; off: DO2 relay open
DO3	DO3 output indicator	Green LED light; on: DO3 relay closed; off: DO3 relay disconnected
DO4	DO4 output indicator	Green LED light; on: DO4 relay closed; off: DO4 relay disconnected
DO5	DO5 output indicator	Green LED light; on: DO5 relay closed; off: DO5 relay open
DO6	DO6 output indicator	Green LED light; on: DO6 relay closed; off: DO6 relay disconnected
DO7	DO7 output indicator	Green LED light; on: DO7 relay closed; off: DO7 relay open
DO8	DO8 output indicator	Green LED light; on: DO8 relay closed; off: DO8 relay disconnected

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3.1.8 M31-GXAXX0800

M31-GXAXX0800 port and button description:		
Silkscreen	name	illustrate
AI1	AI1 analog input	AI1 analog input interface, used with COM1
COM1	AI1 COM port	AI1 COM port
AI2	AI2 analog input	AI2 analog input interface, used with COM2
COM2	AI2 COM port	AI2 COM port
AI3	AI3 analog input	AI3 analog input interface, used with COM3
COM3	AI3 COM port	AI3 COM port
AI4	AI4 analog input	AI4 analog input interface, used with COM4
COM4	AI4 COM port	AI4 COM port
AI5	AI5 analog input	AI5 analog input interface, used with COM5
COM5	AI5 COM port	AI5 COM port
AI6	AI6 analog input	AI6 analog input interface, used with COM6
COM6	AI6 COM port	AI6 COM port
AI7	AI7 analog input	AI7 analog input interface, used with COM7
COM7	AI7 COM port	AI7 COM port
AI8	AI8 analog input	AI8 analog input interface, used with COM8
COM8	AI8 COM port	AI8 COM port
VO+	Power output positive	The positive pole of the power output is consistent with the power supply voltage of the device
VO+	Power output positive	The positive pole of the power output is consistent with the power supply voltage of the device
VO-	Power output negative pole	The negative pole of the power output is consistent with the power supply voltage of the device

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M31-GXAXX0800 indicator light description:		
Silkscreen	name	illustrate
PWR	Power indicator	Red LED light; on: system power supply is normal; off: system power supply is abnormal
LINK	Link indicator	Yellow LED light; on: there is a link; off: there is no link; flashes quickly when there is data exchange
STA	Status indicator	Blue LED light; flashing alternately indicates normal operation; constant on or off indicates abnormal device status
AI1	AI1 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI2	AI2 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI3	AI3 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI4	AI4 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI5	AI5 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI6	AI6 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI7	AI7 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI8	AI8 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%

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3.1.9 M31-GXXXA0008

M31-GXXXA0008 port and button description:		
Silkscreen	name	illustrate
AO1	AO1 analog output (positive)	AO1 analog output (positive) interface, used with GND1
GND1	AO1 analog output (negative)	AO1 analog output (negative) interface
AO2	AO2 analog output (positive)	AO2 analog output interface, used with GND2
GND2	AO2 analog output (negative)	AO2 analog output (negative) interface
AO3	AO3 analog output (positive)	AO3 analog output interface, used with GND3
GND3	AO3 analog output (negative)	AO3 analog output (negative) interface
AO4	AO4 analog output (positive)	AO4 analog output interface, used with GND4
GND4	AO4 analog output (negative)	AO4 analog output (negative) interface
AO5	AO5 analog output (positive)	AO5 analog output (positive) interface, used with GND5
GND5	AO5 analog output (negative)	AO5 analog output (negative) interface
AO6	AO6 analog output (positive)	AO6 analog output interface, used with GND6
GND6	AO6 analog output (negative)	AO6 analog output (negative) interface
AO7	AO7 analog output (positive)	AO7 analog output interface, used with GND7
GND7	AO7 analog output (negative)	AO7 analog output (negative) interface
AO8	AO8 analog output (positive)	AO8 analog output interface, used with GND8
GND8	AO8 analog output (negative)	AO8 analog output (negative) interface
VO+	Power output positive	The positive pole of the power output is consistent with the power supply voltage of the device
VO+	Power output positive	The positive pole of the power output is consistent with the power supply voltage of the device
VO-	Power output negative pole	The negative pole of the power output is consistent with the power supply voltage of the device

M31-GXXXA0008 indicator light description:		
Silkscreen	name	illustrate
PWR	Power indicator	Red LED light; on: system power supply is normal; off: system power supply is abnormal
LINK	Link indicator	Yellow LED light; on: there is a link; off: there is no link; flashes quickly when there is data exchange
STA	Status indicator	Blue LED light; flashing alternately indicates normal operation; constant on or off indicates abnormal device status

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AO1	AO1 output indicator	Green LED light : On: Normal input reaches 1% of the range or above; Off: Less than 1% of the range;
AO2	AO2 output indicator	Green LED light: On: Normal input reaches 1% of the range or above; Off: Less than 1% of the range;
AO3	AO3 output indicator	Green LED light: On: Normal input reaches 1% of the range or above; Off: Less than 1% of the range;
AO4	AO4 output indicator	Green LED light: On: Normal input reaches 1% of the range or above; Off: Less than 1% of the range;
AO5	AO5 output indicator	Green LED light: On: Normal input reaches 1% of the range or above; Off: Less than 1% of the range;
AO6	AO6 output indicator	Green LED light: On: Normal input reaches 1% of the range or above; Off: Less than 1% of the range;
AO7	AO7 output indicator	Green LED light: On: Normal input reaches 1% of the range or above; Off: Less than 1% of the range;
AO8	AO8 output indicator	Green LED light: On: Normal input reaches 1% of the range or above; Off: Less than 1% of the range;

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3.1.10 M31-GXAXA0404

M31-GXAXA0404 port and button description:		
Silkscreen	name	illustrate
AI1	AI1 analog input	AI1 analog input interface, used with GND1
GND1	AI1 analog input ground	AI1 analog input ground interface
AI2	AI2 analog input	AI2 analog input interface, used with GND2
GND2	AI2 analog input ground	AI2 analog input ground interface
AI3	AI3 analog input	AI3 analog input interface, used with GND3
GND3	AI3analog input ground	AI3 analog input ground interface
AI4	AI4 analog input	AI4 analog input interface, used with GND4
GND4	AI4 analog input ground	AI4 analog input ground interface
AO1	AO1 analog output (positive)	AO1 analog output (positive) interface, used with GND1
GND1	AO1 analog output (negative)	AO1 analog output (negative) interface
AO2	AO2 analog output (positive)	AO2 analog output interface, used with GND2
GND2	AO2 analog output (negative)	AO2 analog output (negative) interface
AO3	AO3 analog output (positive)	AO3 analog output interface, used with GND3
GND3	AO3 analog output (negative)	AO3 analog output (negative) interface
AO4	AO4 analog output (positive)	AO4 analog output interface, used with GND4
GND4	AO4 analog output (negative)	AO4 analog output (negative) interface
VO+	Power output positive	The positive pole of the power output is consistent with the power supply voltage of the device
VO+	Power output positive	The positive pole of the power output is consistent with the power supply voltage of the device
VO-	Power output negative pole	The negative pole of the power output is consistent with the power supply voltage of the device

M31-GXAXA0404 indicator light description:		
Silkscreen	name	illustrate
PWR	Power indicator	Red LED light; on: system power supply is normal; off: system power supply is abnormal
LINK	Link indicator	Yellow LED light; on: there is a link; off: there is no link; flashes quickly when there is data exchange
STA	Status indicator	Blue LED light; flashing alternately indicates normal operation; constant on or off indicates abnormal device status
AI1	AI1 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI2	AI2 input	Green LED light; On: Normal input reaches 1% or more of the range;

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	indicator	Off: No effective access; Fast flashing: Exceeds the range by 10%
AI3	AI3 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI4	AI4 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AO1	AO1 output indicator	Green LED light: On: Normal input reaches 1% of the range or above; Off: Less than 1% of the range;
AO2	AO2 output indicator	Green LED light: On: Normal input reaches 1% of the range or above; Off: Less than 1% of the range;
AO3	AO3 output indicator	Green LED light: On: Normal input reaches 1% of the range or above; Off: Less than 1% of the range;
AO4	AO4 output indicator	Green LED light: On: Normal input reaches 1% of the range or above; Off: Less than 1% of the range;

3.1.11 M31-GXFXX0800

M31-GXFXX0800 port and button description:		
Silkscreen	name	illustrate
AI1+	AI1 analog input +	AI1 analog input + interface, used with AI1-
AI1-	AI1 analog input -	AI1 analog input-interface, used with AI1+
AI2+	AI2 analog input +	AI2 analog input + interface, used with AI2-
AI2-	AI2 analog input -	AI2 analog input-interface, used with AI2+
AI3+	AI3 analog input +	AI3 analog input + interface, used with AI3-
AI3-	AI3 analog input -	AI3 analog input-interface, used with AI3+
AI4+	AI4 analog input +	AI4 analog input + interface, used with AI4-
AI4-	AI4 analog input -	AI4 analog input-interface, used with AI4+
AI5+	AI5 analog input +	AI5 analog input + interface, used with AI5-
AI5-	AI5 analog input -	AI5 analog input-interface, used with AI5+
AI6+	AI6 analog input +	AI6 analog input + interface, used with AI6-
AI6-	AI6 analog input -	AI6 analog input-interface, used with AI6+
AI7+	AI7 analog input +	AI7 analog input + interface, used with AI7-
AI7-	AI7 analog input -	AI7 analog input-interface, used with AI7+
AI8+	AI8 analog input +	AI8 analog input + interface, used with AI8-
AI8-	AI8 analog input -	AI8 analog input-interface, used with AI8+
VO+	Dangling	No effect, access not allowed
VO+	Dangling	No effect, access not allowed
VO-	Dangling	No effect, access not allowed

M31-GXFXX0800 indicator light description:		
Silkscreen	name	illustrate
PWR	Power indicator	Red LED light; on: system power supply is normal; off: system power supply is

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		abnormal
LINK	Link indicator	Yellow LED light; on: there is a link; off: there is no link; flashes quickly when there is data exchange
STA	Status indicator	Blue LED light; flashing alternately indicates normal operation; constant on or off indicates abnormal device status
AI1	AI1 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI2	AI2 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI3	AI3 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI4	AI4 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI5	AI5 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI6	AI6 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI7	AI7 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI8	AI8 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%

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3.1.12 M31-GXGXX0800

M31-GXGXX0800 port and button description:		
Silkscreen	name	illustrate
AI1+	AI1 analog input +	AI1 analog input + interface, used with AI1-
AI1-	AI1 analog input -	AI1 analog input-interface, used with AI1+
AI2+	AI2 analog input +	AI2 analog input + interface, used with AI2-
AI2-	AI2 analog input -	AI2 analog input-interface, used with AI2+
AI3+	AI3 analog input +	AI3 analog input + interface, used with AI3-
AI3-	AI3 analog input -	AI3 analog input-interface, used with AI3+
AI4+	AI4 analog input +	AI4 analog input + interface, used with AI4-
AI4-	AI4 analog input -	AI4 analog input-interface, used with AI4+
AI5+	AI5 analog input +	AI5 analog input + interface, used with AI5-
AI5-	AI5 analog input -	AI5 analog input-interface, used with AI5+
AI6+	AI6 analog input +	AI6 analog input + interface, used with AI6-
AI6-	AI6 analog input -	AI6 analog input-interface, used with AI6+
AI7+	AI7 analog input +	AI7 analog input + interface, used with AI7-
AI7-	AI7 analog input -	AI7 analog input-interface, used with AI7+
AI8+	AI8 analog input +	AI8 analog input + interface, used with AI8-
AI8-	AI8 analog input -	AI8 analog input-interface, used with AI8+
VO+	Dangling	No effect, access not allowed
VO+	Dangling	No effect, access not allowed
VO-	Dangling	No effect, access not allowed

M31-GXGXX0800 indicator light description:		
Silkscreen	name	illustrate
PWR	Power indicator	Red LED light; on: system power supply is normal; off: system power supply is abnormal
LINK	Link indicator	Yellow LED light; on: there is a link; off: there is no link; flashes quickly when there is data exchange
STA	Status indicator	Blue LED light; flashing alternately indicates normal operation; constant on or off indicates abnormal device status
AI1	AI1 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI2	AI2 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI3	AI3 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI4	AI4 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI5	AI5 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No

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		effective access; Fast flashing: Exceeds the range by 10%
AI6	AI6 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI7	AI7 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%
AI8	AI8 input indicator	Green LED light; On: Normal input reaches 1% or more of the range; Off: No effective access; Fast flashing: Exceeds the range by 10%

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Charpter4 Product Features

4.1 IO Expansion

Note: When splicing equipment, do not operate with power on, otherwise it may cause damage to the equipment!

The M31 series distributed IO host adopts an expandable structure design, in which the IO expansion module can be used for expansion with the M31 series host. You only need to dock the IO expansion module with the host slot, and then slide the lock down to firmly connect the host and IO expansion module.

The specific operations are as follows:

First, make sure the host is not powered on and the host slider is at UNLK. Then connect the IO expansion module to the host, as shown below:



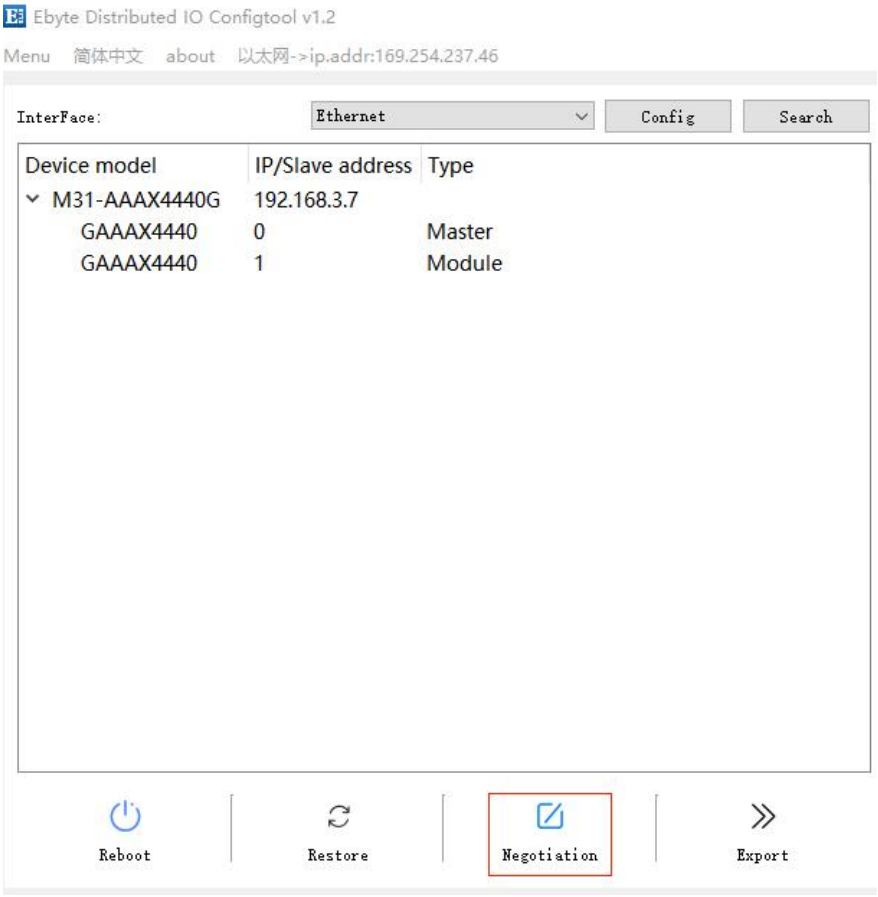
After the IO expansion module is connected, slide the host to the LOCK position, power on the host, and then insert the network cable. Use the automatic negotiation function through the host computer (or double-click the Reload button on the device within two seconds to automatically negotiate). After the negotiation is successful, the IO expansion module can be operated through the serial port or network port on the host.

Note: When adding a new IO expansion module or removing an already negotiated IO expansion module, the auto-

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negotiation function must be performed to ensure the order and status self-check of the overall device.



4.2 DI Input

4.2.1 Input filtering

When the switch input DI collects signals, it needs to maintain multiple sampling cycles before confirmation. The filter

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parameter can be set in the range of 1 to 16 (the default is 6 sampling cycles, 6*1kHz).
It can be configured through instructions or host computer.

4.3 DO Output

Output mode of the relay.

4.4 AI Input

4.4.1 AI Scope

Single-ended analog input AI measures current signal:
The acquisition range is 0～20mA or 4～20mA, the accuracy is 3‰, and the resolution is 12 bits. It uses single-ended input, the sampling frequency is 100Hz, and the input impedance is 100Ω.
Set the sampling range of all AI channels. The valid value is 0 to 1 (default 0).
Configuration is 0: indicates 0～20mA
Configuration is 1: indicates 4~20mA

Differential analog input AI measures current signal:
The acquisition range is 0～20mA or 4～20mA or ±20mA, the accuracy is 1‰, the resolution is 16 bits, differential input is adopted, and the sampling frequency is 40Hz.
Set the sampling range of all AI channels. The valid value is 0 to 2 (default 0).
Configuration is 0: indicates 0～20mA
Configuration is 1: indicates 4~20mA
Configuration 2: indicates ±20mA

Differential analog input AI measures voltage signal:
The acquisition range is 0～5V or 0～10V or ±5V or ±10V, the accuracy is 1‰, the resolution is 16 bits, differential input is adopted, and the sampling frequency is 40Hz.
Set the sampling range of all AI channels. The valid value is 3 to 6 (default is 5).
Configuration is 3: represents 0~5V
Configuration 4: indicates ±5V
Configuration is 5: represents 0~10V
Configuration 6: indicates ±10V

【Note】AI configuration instructions
(1) The AI sampling range of each channel can be set. When the AI channel sampling range is configured as 4-20mA sampling, if the current signal is lower than 3.5mA, it is displayed as 0, and if it is higher than 3.5 mA and lower than 4mA, it is displayed as 4. There is no conversion limit for signals greater than 20mA, but it cannot exceed 25mA (exceeding 25mA will cause risk of equipment damage).
(2) The starting address of the AI channel sampling range parameter is 0x0DAC, the register type is a holding register, and the function code is 0x06, 0x10. When writing the AI channel sampling range parameter, if the written parameter value is

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not within the specified range, it will not take effect, and Modbus will not return an error command.

4.4.2 AI input engineering quantity integer value, engineering quantity floating point value, process quantity

There are three ways to read the analog signal collected by the device:
Read AI engineering value shaping value and directly convert it to input current or voltage. The starting address of AI engineering value shaping value register is 0x0000, the register type is input register, and the read function code is 0x04. The value returned by this method is one register representing one channel.
Single-ended current: The value read is 0 to 20000. The method for calculating the current size is 0 to 20000 corresponds to 0mA to 20mA.
That is: current = engineering value / 1000 (mA)

Differential current: The value read is -20000~20000. The method for calculating the current size is -20000~20000 corresponds to -20mA~20mA.
That is: current = engineering value / 1000 (mA)

Differential voltage: The value read is -10000~10000. The method for calculating the voltage size is -10000~10000 corresponds to -10V~10V.
That is: voltage = engineering value / 1000 (mV)

Read the AI engineering quantity floating point value, use the IEE754 conversion tool to convert the hexadecimal data into floating point numbers to get the input current or voltage. The starting address of the AI engineering quantity shaping value register is 0x03E8, the register type is input register, and the read function code is 0x04. This method returns two registers to represent 1 channel.
Read AI process quantity. The starting address of AI process quantity register is 0x0BB8, the register type is input register,

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and the read function code is 0x04. This method returns 1 register to represent 1 channel.

That is: -27648 ~ 27648 represents -10V ~ +10V/-20ma ~ 20ma

Analog input (current 0~20mA)			
Current (0-20mA)	Decimal	hexadecimal	Remark
>23.52	32767	7FFF	Overflow
23.52	32511	7EFF	Over the limit
.	.	.	
>20	27649	6C01	
20	27648	6C00	Rated range
—	—		
10	13824	3600	
.	.	.	
0	0	0	
<0	0	0	Exceeding the lower limit
.	.	.	
-3.52	-4864	ED00	
<-3.52	-32768	8000	Underflow

Analog input (current -20～0mA)			
Current (-20-0mA)	Decimal	hexadecimal	Remark
>3.52	32767	7FFF	Overflow
3.52	4864	1300	Over the limit
.	.	.	
>0	0	0	
0	0	0	Rated range

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.	.	.	
-10	-13824	CA00	
.	.	.	
-20	-27648	9400	
<-20	-27949	93FF	Exceeding the lower limit
.	.	.	
-23.52	-32511	8101	
<-23.52	-32768	8000	Underflow

Analog input (current - 20-20mA)			
Current (-20-20mA)	Decimal	hexadecimal	Remark
>23.52	32767	7FFF	Overflow
23.52	32511	7EFF	Over the limit
.	.	.	
>20	27649	6C01	
20	27648	6C00	Rated range
.	.	.	
10	13824	3600	
.	.	.	
0	0	0	
.	.	.	
-10	-13824	CA00	
.	.	.	
-20	-27648	9400	
<-20	-27949	93FF	Exceeding the lower limit

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.	.	.	
-23.52	-32511	8101	
<-23.52	-32768	8000	Underflow

Analog input (voltage)						
Voltage (0-5V)	Voltage (0-10V)	Voltage (±5V)	Voltage (±10V)	Decimal	hexadecimal	
>5.06	>10.12	>5.06	>10.12	32767	0x7FFF	Overflow
5.06	10.12	5.06	10.12	27979	0x6D4B	Over the limit
5V+0.1808mv	10V+0.3617mv	5V+0.1808mv	10V+0.3617mv	27649	0x6C01	
5	10	5	10	27648	0x6C00	Rated range
.	.	.	.	.	.	
.	.	.	.	.	.	
2.5	5	2.5	5	13824	0x3600	
.	.	.	.	.	.	
.	.	.	.	.	.	
0	0	0	0	0	0x0000	
/	/	.	.	.	.	
/	/	.	.	.	.	
/	/	-2.5	-5	-13824	0XCA00	
/	/	.	.	.	.	
/	/	.	.	.	.	
/	/	-5	-10	-27648	0x9400	
/	/	-5V -0.1808mv	-10V-0.3617mv	-27649	0x93FF	Exceeding the lower limit
/	/	-5.06	-10.12	-27979	0x92B5	
/	/	-5.06<	-10.12<	-32768	0x8000	Underflow

4.4.3 AI Filter Parameters

You can set the filter parameters of the AI channel. The valid value is 1-16, and the default value is 6.

Filter parameter description:

(1) All AI channels share a filter parameter. The higher the parameter value, the more stable the output value and the slower the response.

(2) AI channel filter parameter address is 0x0DA2, register type is holding register, function code 0x06, 0x10.

(3) When writing AI filter parameters, if the written parameter value is not within the range of 1 to 16, the closest value will be automatically taken and written. For example, if the written filter parameter is 0, the device will take 1 as the filter

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parameter, and Modbus will not return an error command.

4.5 AO Output

4.5.1 AO Range

Analog current output, range 0~20mA or 4~20mA, accuracy 3‰, resolution 16 bits, input impedance 500Ω.
Set the output range of a single AO channel. Valid values are 1 and 0 (default 0).
Configuration is 0: indicates 0～20mA
Configuration is 1: indicates 4~20mA
【Note】AO configuration instructions
(1) The AO output range of each channel can be set.
(2) The starting address of the AO channel output range parameter is 0x0DAC, the register type is a holding register, and the function code is 0x06, 0x10. When writing the AI channel sampling range parameter, if the written parameter value is not within the range of 0 to 1, the closest value will be automatically written. For example, if the sampling range parameter is written as 2, the device will take 1 as the sampling range parameter, and Modbus will not return an error command.

4.5.2 AO output engineering quantity shaping value, engineering quantity floating point value, process quantity register

There are three ways to read the current signal collected by the device:
(1) Read and control the AO engineering quantity shaping value, and directly convert it to the output current. The starting address of the AO engineering quantity shaping value register is 0x0000, the register type is a holding register, the read function code is 0x03, and the write function code is 0x06, 0x10. The value returned by this method is that one register represents one channel, and the value is 0 to 20000. The method for calculating the current size is that 0 to 20000 corresponds to 0 to 20mA. That is:
Current = Engineering value / 1000 (mA)
Read and control the floating-point value of AO engineering quantity, and use the IEE754 conversion tool to convert the hexadecimal data into floating-point numbers to get the current. The starting address of the AO engineering quantity floating-point register is 0x03E8, the register type is a holding register, the read function code is 0x03, and the write function code is 0x06, 0x10. This method returns two registers to represent 1 channel.
Read and control the process value shaping value. The starting address of the A O engineering value register is 0x01F4, the register type is a holding register, the read function code is 0x03, and the write function code is 0x06, 0x10. This method returns 1 register to represent 1 channel.
That is: 0~27648 represents 0ma~20ma

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4.6 Online monitoring

The device can monitor whether the device is abnormal through relevant registers:

Device abnormal code	0X7587	4-30088	Zone 4	1	Check the abnormal code of the current device. If it is 0, it means there is no abnormality. If it is 1, it means that the slave does not respond. If it is 2, it means that the expansion module sequence is wrong (this error will directly cause the device to not work properly).	R: 0x03
Extension module exception label	0X7588	4-30089	Zone 4	2	Check which expansion module has not responded. There are two 32-bit registers in total, representing the expansion modules in order. If the bit on the corresponding serial number is 1, it means that this expansion module is abnormal.	R: 0x03

4.7 MODBUS parameter configuration

Note:

1. The DI, DO, AI, and AO registers are all continuous. For example, if an 8DI host is connected to an 8DI expansion module, the DI status register of the expansion module will continue from 0x0000-0x0007 of the host, that is, 0x0008-

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0x0010.

2.0x_ represents hexadecimal.

DI, AI, and DO take the M31-AAAX4440G model as an example to show the continuity of registers after splicing.

AO uses the M31-XAXA0404G model as an example to demonstrate the continuity of registers after splicing.

4.7.1 DI register list

DI status register:

name	Access location	Register address (hexadecimal)	Register address (decimal)	Register area	Related function codes	Default state
DI1	Host	0x0000	1-0001	Zone 1	R: 0x02	0
DI2	Host	0x0001	1-0002	Zone 1	R: 0x02	0
DI3	Host	0x0002	1-0003	Zone 1	R: 0x02	0
DI4	Host	0x0003	1-0004	Zone 1	R: 0x02	0
DI5	IO expansion module	0x0004	1-0005	Zone 1	R: 0x02	0
.....	IO expansion module	.....	.....	Zone 1	R: 0x02	0

DI filter register:

name	Register address (hexadecimal)	Register address (decimal)	Register Type	Data range/description	Related function codes	Default state
DI channel filter parameters	0x0DA3	4-3492	Holding Registers	All DI channel filter parameters, Valid values: 1-16	R: 0x03 W: 0x06, 0x10	6

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4.7.2 DO Register List

DI status register:

name	Access location	Register Address (Hexadecimal)	Register Address (decimal)	Register area	Related function codes	Default state
DO1	Host	0x0000	0-0001	Zone 0	R: 0x01 W: 0x05, 0x0F	0
DO2	Host	0x0001	0-0002	Zone 0	R: 0x01 W: 0x05, 0x0F	0
DO3	Host	0x0002	0-0003	Zone 0	R: 0x01 W: 0x05, 0x0F	0
DO4	Host	0x0003	0-0004	Zone 0	R: 0x01 W: 0x05, 0x0F	0
DO5	IO expansion module	0x0004	0-0005	Zone 0	R: 0x01 W: 0x05, 0x0F	0
.....	IO expansion module	.....	.....	Zone 0	R: 0x01 W: 0x05, 0x0F	0

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4.7.3 AI Register List

AI engineering quantity shaping value register:

name	Access location	Register address (hexadecimal)	Register address (decimal)	Register area	Data range/description (For differential, please refer to the AI input section)	Related function codes	Default state
AI1	Host	0x0000	3-0001	Zone 3	Engineering quantity 0-20000 represents 0-20ma 2-byte integer, unit (uA)	R: 0x04	0
AI2	Host	0x0001	3-0002	Zone 3	Engineering quantity 0-20000 represents 0-20ma 2-byte integer, unit (uA)	R: 0x04	0
AI3	Host	0x0002	3-0003	Zone 3	Engineering quantity 0-20000 represents 0-20ma 2-byte integer, unit (uA)	R: 0x04	0
AI4	Host	0x0003	3-0004	Zone 3	Engineering quantity 0-20000 represents 0-20ma 2-byte integer, unit (uA)	R: 0x04	0
AI5	IO expansion module	0x0004	3-0005	Zone 3	Engineering quantity 0-20000 represents 0-20ma 2-byte integer, unit (uA)	R: 0x04	0
.....	IO expansion module	.....	.....	Zone 3	Engineering quantity 0-20000 represents 0-20ma 2-byte integer, unit (uA)	R: 0x04	0

AI floating point value register:

name	Access location	Register address (hexadecimal)	Register address (decimal)	Register area	Data range/description	Related function codes	Default state
AI1	Host	0x03E8	3-1001	Zone 3	Analog signal floating point value, 4-byte floating point number, unit (mA)	R: 0x04	0
AI2	Host	0x03EA	3-1003	Zone 3	Analog signal floating point value, 4-byte floating point number, unit (mA)	R: 0x04	0
AI3	Host	0x03EC	3-1005	Zone 3	Analog signal floating point value, 4-byte floating point number, unit (mA)	R: 0x04	0
AI4	Host	0x03EE	3-1007	Zone 3	Analog signal floating point value, 4-byte floating point	R: 0x04	0

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					number, unit (mA)		
AI5	IO expansion module	0x03F0	3-1009	Zone 3	Analog signal floating point value, 4-byte floating point number, unit (mA)	R: 0x04	0
.....	IO expansion module	.....	.....	Zone 3	Analog signal floating point value, 4-byte floating point number, unit (mA)	R: 0x04	0

AI process quantity register:

name	Access location	Register address (hexadecimal)	Register address (decimal)	Register area	Data range/description	Related function codes	Default state
AI1	Host	0x0BB8	3-3001	Zone 3	Analog signal integer value, 2 bytes	R: 0x04	0
AI2	Host	0x0BB9	3-3002	Zone 3	Analog signal integer value, 2 bytes	R: 0x04	0
AI3	Host	0x0BBA	3-3003	Zone 3	Analog signal integer value, 2 bytes	R: 0x04	0
AI4	Host	0x0BBB	3-3004	Zone 3	Analog signal integer value, 2 bytes	R: 0x04	0
AI5	IO expansion module	0x0BBC	3-3005	Zone 3	Analog signal integer value, 2 bytes	R: 0x04	0
.....	IO expansion module	.....	.....	Zone 3	Analog signal integer value, 2 bytes	R: 0x04	0

AI filter register:

name	Register address (hexadecimal)	Register address (decimal)	Register area	Data range/description	Related function codes	Default state
AI channel filter parameters	0x0DA2	4-3491	Zone 4	All AI channel filter parameters, Valid values: 1-16	R: 0x03 W: 0x06, 0x10	6

AI sampling range register:

name	Access location	Register address (hexadecimal)	Register address (decimal)	Register area	Data range/description	Related function codes	Default state

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AI1 sampling range	Host	0x0DAC	4-3501	Zone 4	Valid values are 0 and 1. 0 means 0-20mA, 1 means 4-20mA	R: 0x03 W: 0x06, 0x10	0
AI2 sampling range	Host	0x0DAD	4-3502	Zone 4	Valid values are 0 and 1. 0 means 0-20mA, 1 means 4-20mA	R: 0x03 W: 0x06, 0x10	0
AI3 Sampling Range	Host	0x0DAE	4-3503	Zone 4	Valid values are 0 and 1. 0 means 0-20mA, 1 means 4-20mA	R: 0x03 W: 0x06, 0x10	0
AI4 sampling range	Host	0x0DAF	4-3504	Zone 4	Valid values are 0 and 1. 0 means 0-20mA, 1 means 4-20mA	R: 0x03 W: 0x06, 0x10	0
AI5 sampling range	IO expansion module	0x0DB0	4-3505	Zone 4	Valid values are 0 and 1. 0 means 0-20mA, 1 means 4-20mA	R: 0x03 W: 0x06, 0x10	0
.....	IO expansion module	.....	.....	Zone 4	Valid values are 0 and 1. 0 means 0-20mA, 1 means 4-20mA	R: 0x03 W: 0x06, 0x10	0

4.7.4 AO Register List

AO engineering quantity shaping value register:

name	Access location	Register address (hexadecimal)	Register address (decimal)	Register area	Data range/description	Related function codes	Default state
AO1	Host	0x0000	4-0001	Zone 4	Engineering quantity 0-20000 represents 0-20ma 2-byte integer, unit (uA)	R: 0x03 W: 0x06, 0x10	0
AO2	Host	0x0001	4-0002	Zone 4	Engineering quantity 0-20000 represents 0-20ma 2-byte integer, unit (uA)	R: 0x03 W: 0x06, 0x10	0
AO3	Host	0x0002	4-0003	Zone 4	Engineering quantity 0-20000 represents 0-20ma 2-byte integer, unit (uA)	R: 0x03 W: 0x06, 0x10	0
AO4	Host	0x0003	4-0004	Zone 4	Engineering quantity 0-	R: 0x03	0

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					20000 represents 0-20ma 2-byte integer, unit (uA)	W: 0x06, 0x10	
AO5	IO expansion module	0x0004	4-0005	Zone 4	Engineering quantity 0-20000 represents 0-20ma 2-byte integer, unit (uA)	R: 0x03 W: 0x06, 0x10	0
.....	IO expansion module	.....	.....	Zone 4	Engineering quantity 0-20000 represents 0-20ma 2-byte integer, unit (uA)	R: 0x03 W: 0x06, 0x10	0

AO floating point value register:

name	Access location	Register address (hexadecimal)	Register address (decimal)	Register area	Data range/description	Related function codes	Default state
AO1	Host	0x03E8	4-1001	Zone 4	Analog signal floating point value, 4-byte floating point number, unit (mA)	R: 0x03 W: 0x06, 0x10	0
AO2	Host	0x03EA	4-1003	Zone 4	Analog signal floating point value, 4-byte floating point number, unit (mA)	R: 0x03 W: 0x06, 0x10	0
AO3	Host	0x03EC	4-1005	Zone 4	Analog signal floating point value, 4-byte floating point number, unit (mA)	R: 0x03 W: 0x06, 0x10	0
AO4	Host	0x03EE	4-1007	Zone 4	Analog signal floating point value, 4-byte floating point number, unit (mA)	R: 0x03 W: 0x06, 0x10	0
AO5	IO expansion module	0x03F0	4-1009	Zone 4	Analog signal floating point value, 4-byte floating point number, unit (mA)	R: 0x03 W: 0x06, 0x10	0
.....	IO expansion module	.....	.....	Zone 4	Analog signal floating point value, 4-byte floating point number, unit (mA)	R: 0x03 W: 0x06, 0x10	0

AO process quantity register:

name	Access location	Register address (hexadecimal)	Register address (decimal)	Register area	Data range/description	Related function codes	Default state
AO1	Host	0x01F4	3-0501	Zone 4	Analog signal integer value, 2 bytes	R: 0x03 W: 0x06, 0x10	0

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AO2	Host	0x01F5	3-0502	Zone 4	Analog signal integer value, 2 bytes	R: 0x03 W: 0x06, 0x10	0
AO3	Host	0x01F6	3-0503	Zone 4	Analog signal integer value, 2 bytes	R: 0x03 W: 0x06, 0x10	0
AO4	Host	0x01F7	3-0504	Zone 4	Analog signal integer value, 2 bytes	R: 0x03 W: 0x06, 0x10	0
AO5	IO expansion module	0x01F8	3-0505	Zone 4	Analog signal integer value, 2 bytes	R: 0x03 W: 0x06, 0x10	0
.....	IO expansion module	.....	.....	Zone 4	Analog signal integer value, 2 bytes	R: 0x03 W: 0x06, 0x10	0

AO output range register:

name	Access location	Register address (hexadecimal)	Register address (decimal)	Register area	Data range/description	Related function codes	Default state
AO1 output range	Host	0x 1194	4-4501	Zone 4	Valid values are 0 and 1. 0 means 0-20mA, 1 means 4-20mA	R: 0x03 W: 0x06, 0x10	0
AO2 output range	Host	0x1195	4-4502	Zone 4	Valid values are 0 and 1. 0 means 0-20mA, 1 means 4-20mA	R: 0x03 W: 0x06, 0x10	0
AO3 output range	Host	0x1196	4-4503	Zone 4	Valid values are 0 and 1. 0 means 0-20mA, 1 means 4-20mA	R: 0x03 W: 0x06, 0x10	0
AO4 output range	Host	0x1197	4-4504	Zone 4	Valid values are 0 and 1. 0 means 0-20mA, 1 means 4-20mA	R: 0x03 W: 0x06, 0x10	0
AO5 output range	IO expansion module	0x1198	4-4505	Zone 4	Valid values are 0 and 1. 0 means 0-20mA, 1 means 4-20mA	R: 0x03 W: 0x06, 0x10	0
.....	IO expans	.....	.....	Zone 4	Valid values are 0	R: 0x03 W: 0x06, 0x10	0

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	ion modul e				and 1. 0 means 0-20mA, 1 means 4-20mA		

Charpter5 Precautions

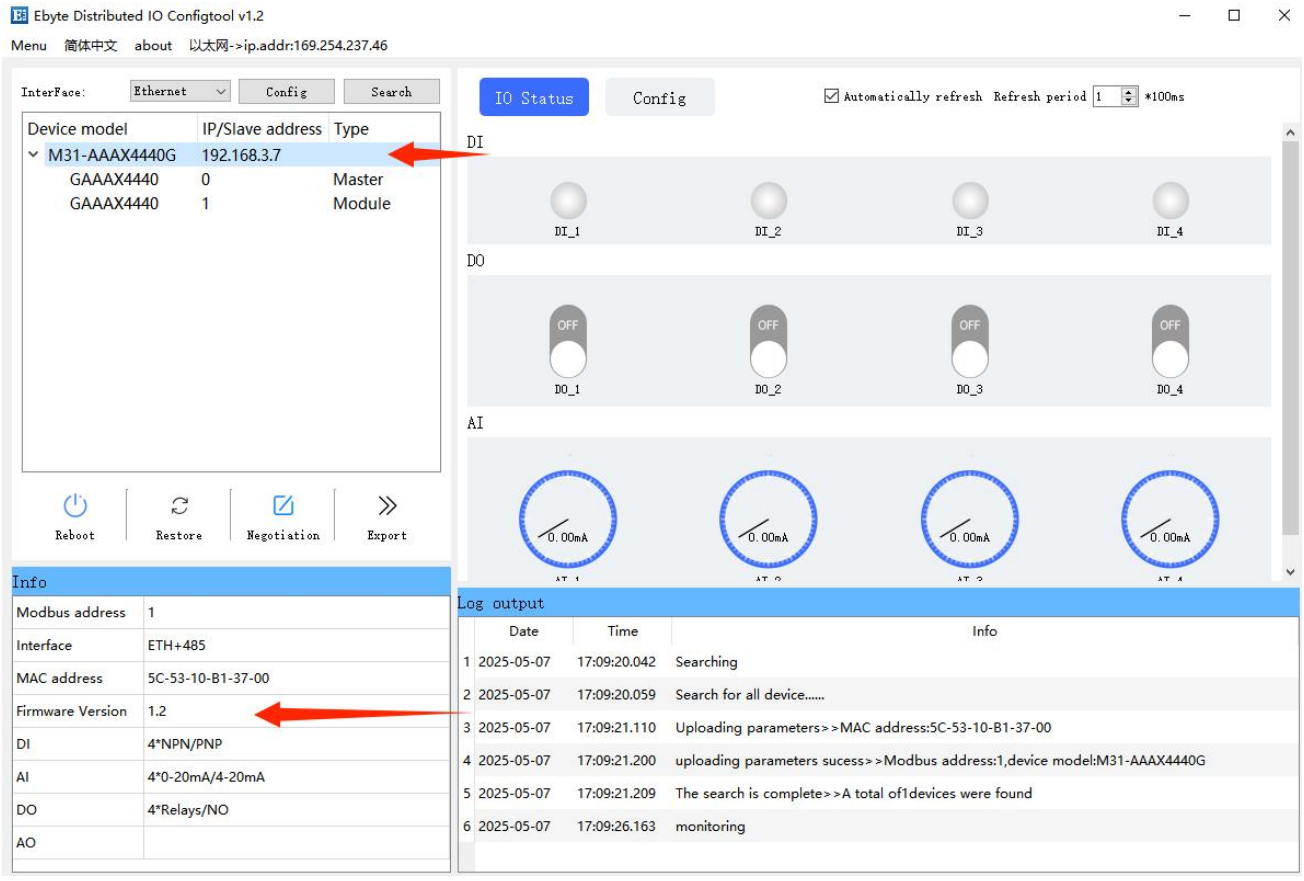
Do not connect the device while it is powered on, otherwise the device may be damaged.

The host software version V1.1 is not compatible with some expansion modules (M31-GXGXX0800, M31-GXFXX0800, M31-GXXXA0008, M31-GXAXA0404, M31-GXAXX0800 (V2.0 version) M31-GAAAX4440 (V2.0 version))

The host software version V1.2 is compatible with all expansion modules. If you need to upgrade, please download the upgrade operation process document at the corresponding model on the official website www.es-ebyte.com .

A complete host includes the host firmware and expansion module firmware versions. How to view the version number is as shown in the figure:

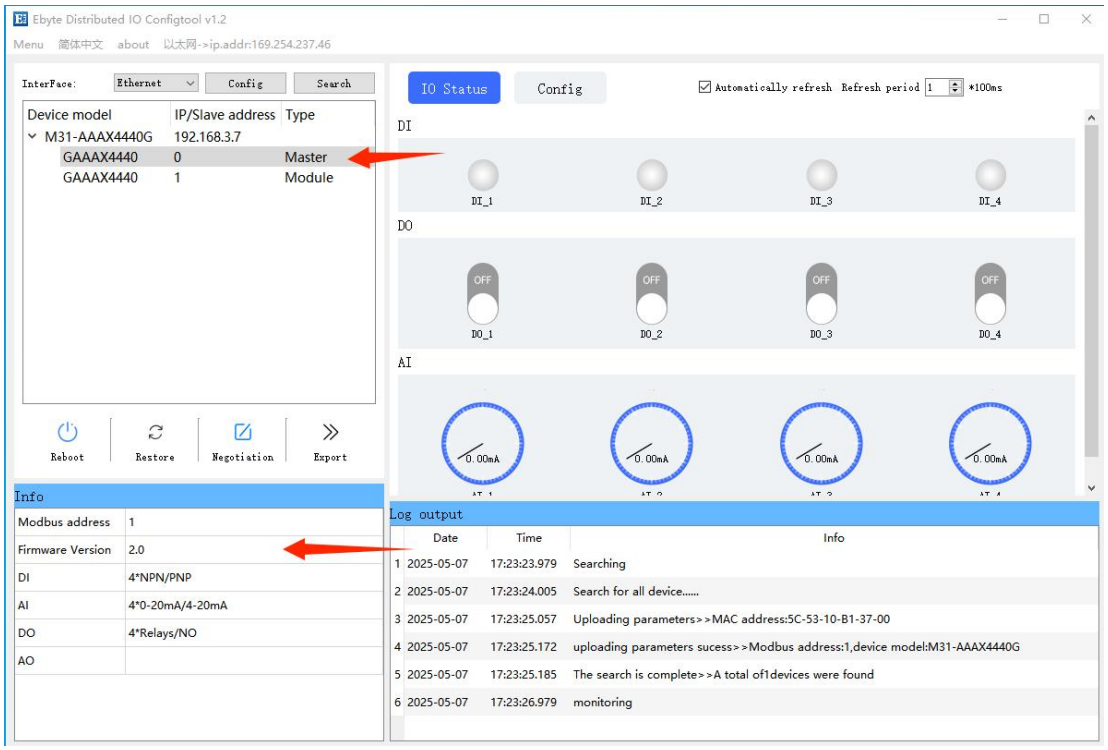
Host:



Extension modules:

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Revision History

Version	Revision Date	Revision Notes	Maintainer
1.0	2025.5.6	Initial release	LT
1.1	2026.1.29	Modify appearance and model name	LT

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