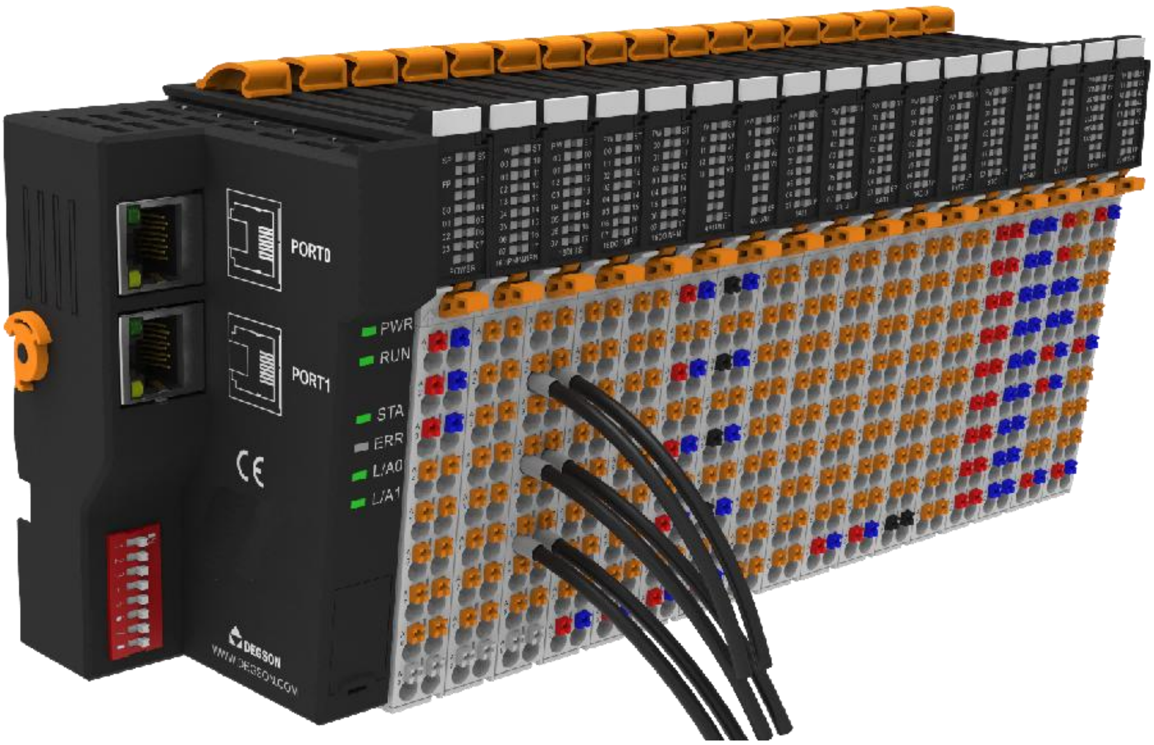
DF50-C-EC

Adapter

User Manual



Version History

date	Version	describe
2024/9/19	v1.0.2	Added DF50-M-4DOR, DF50-M-4DO-P-2A, DF50-M-32DO-N, DF50-M-32DO-P, DF50-M-32DI-P/N, DF50-M-16DI-16DO-N, DF50-M-16DI-16DO-P modules, and added corresponding module operation instructions
2024/1/31	v1.0.1	IncreaseSysmacStudio,CODESYS,SPiiPlus MMIApplication StudioThree software operation instructions
2024/1/17	v1.0.0	Release version

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Preface

Scope of this document

This document is applicable to DF50-C-EC coupler and IO module.

Introduction

This manual mainly introduces the technical specifications, installation, and debugging of the DF50 series remote I/O modules.

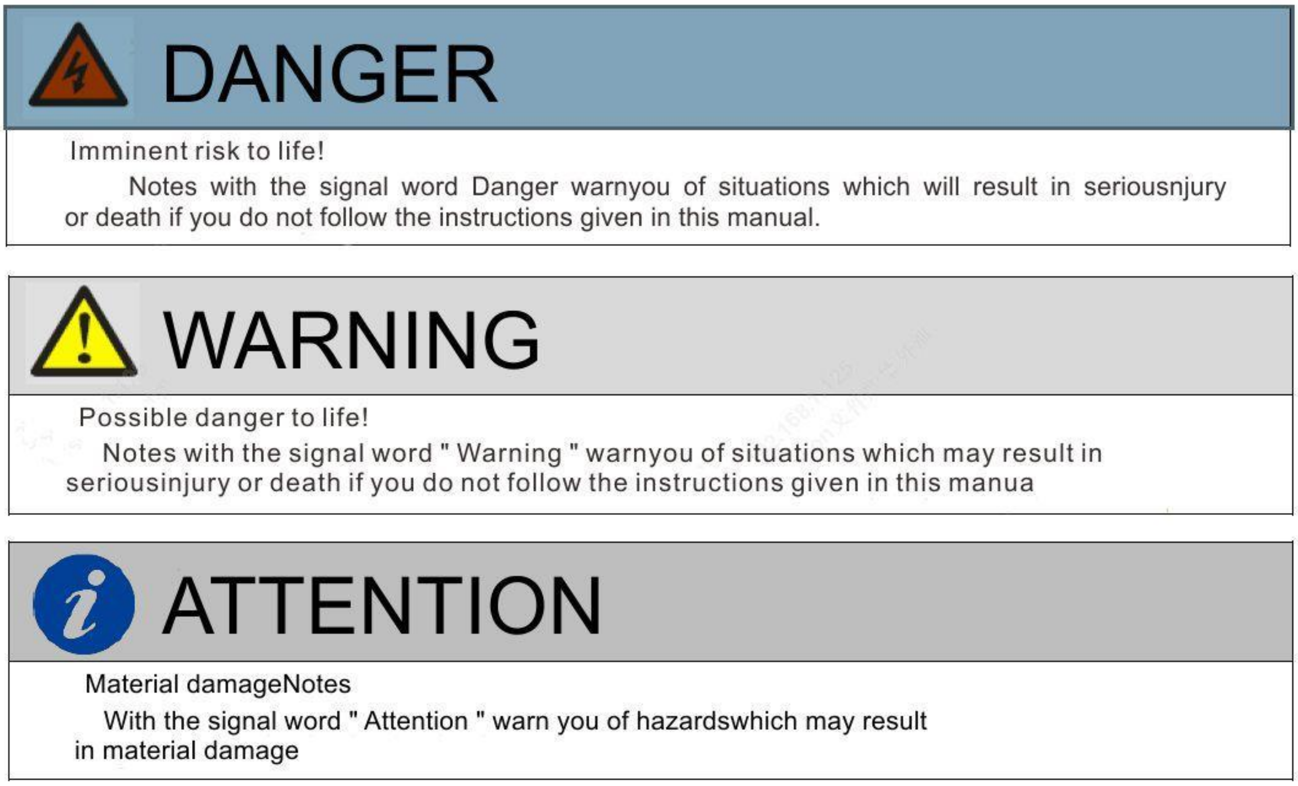
The main contents include:

- System Overview: Mainly introduces the product ordering information, product composition, system architecture, product transportation, storage environment, etc. of the DF50 series remote I/O modules;
- Product Description: Introduces the technical parameters of the DF50 series remote I/O modules;
- Installation and removal guide: Introduces the installation and removal of DF50 series remote I/O modules;
- Mechanical and electrical drawings: DF50 remote IO module dimension drawing and electrical wiring diagram;
- User Guide: Introduces the communication between DF50 series remote I/O modules and mainstream PLCs through examples.

Precautions

This document describes in detail the use of DF50 series remote I/O modules. The reading background is for people with certain engineering experience. DEGSON is not responsible for any consequences caused by the use of this document.

Before attempting to use the device, please read the relevant precautions of the device carefully and be sure to comply with the installation and commissioning safety precautions and operating procedures. For the possible hazards and damages caused by incorrect use of the device, please refer to the following symbols.



Target customers

This manual provides information on the installation and commissioning of the DF50 series remote I/O modules and is designed for engineers, installers, maintenance personnel, and electricians with common sense in automation.

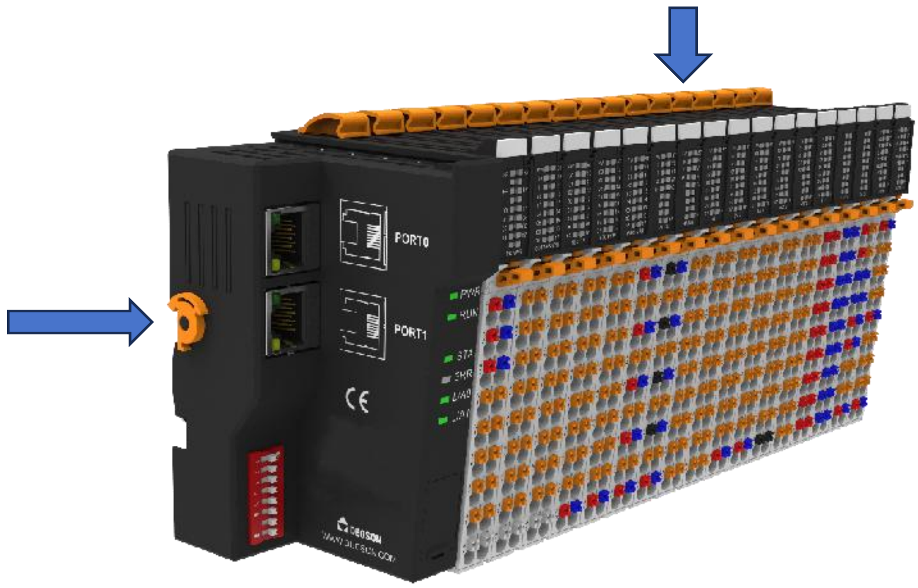
Recycling and Disposal

To ensure environmentally friendly recycling of your old device, please contact a certified electronic waste disposal company.

1.Product installation and removal

1. Installation

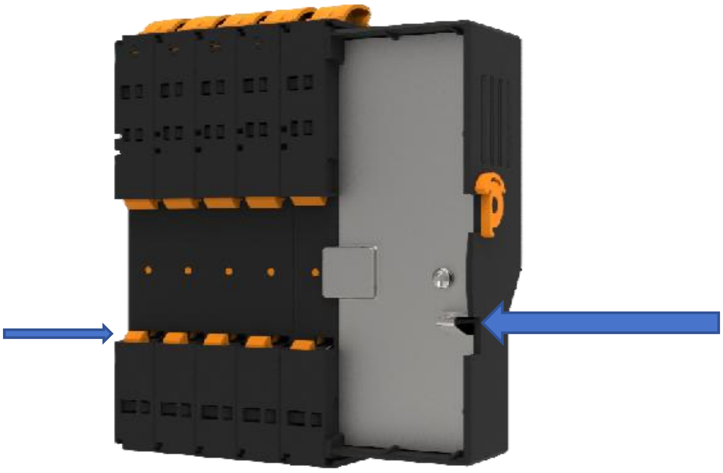
- When installing the module, the DIN rail lock at the bottom of the module can be safely and reliably installed on the 35 mm DIN rail. When installing the module, you need to align the notch, push the module toward the DIN latch, and place the module on the DIN rail.
- When installing the adapter, there is a manual buckle on the upper and left sides for locking the guide rail.



2. Grounding protection

- There is a metal spring on the back of the module, which is used to effectively ground the guide rail.

The metal spring is connected to the grounding PE of the adapter module.



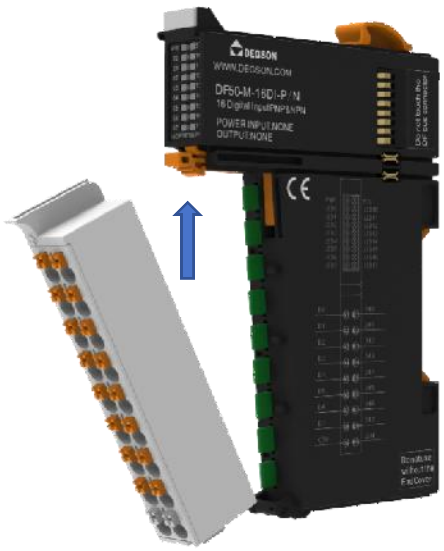
3. Disassembly method

3.1 Module Disassembly

First, remove all signal cables or power cables from the module, then press the latch (arrow above). When removing the adapter module, you also need to open the rail lock clockwise (arrow on the left).

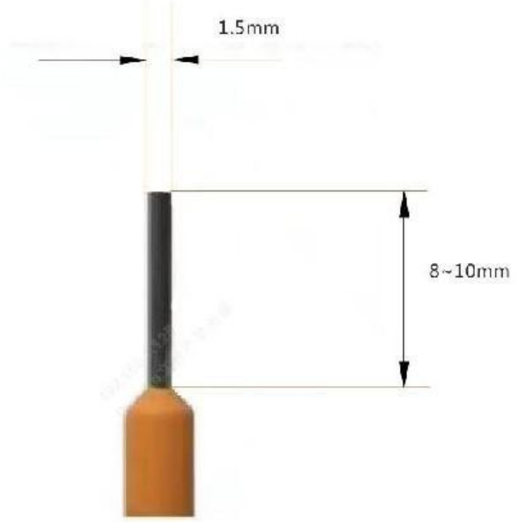
3.2 Terminal Removal

The terminals can be removed individually by pressing the clips.

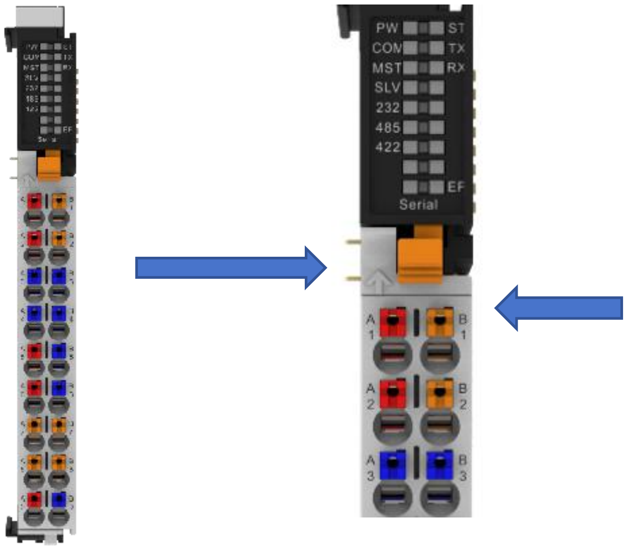


3.3 Cold pressed terminal

It is recommended to use cables with a core size less than 1.5 mm². The reference for the cold terminal parameters is as follows



It is recommended to use a 0.4*2.5 screwdriver to press the terminal button.



4. Precautions

If you encounter a situation where a module is difficult to install, do not use brute force to install it to avoid damaging the current module or other modules. You should remove the module from the guide rail and check whether there is any abnormality in the module (such as blockage by foreign objects, etc.). After confirming that there is no problem, you can plug it in or out.

2.Fieldbus adapter

Fieldbus systems	describe	model
EtherCAT	EtherCAT bus, 2 RJ45, expandable to 32 modules, 24VDC	DF50-C-EC

1. EtherCAT Fieldbus Adapter (DF50-C-EC)

- DF50-C-EC This fieldbus adapter is connected to EtherCAT IO as a slave station. EtherCAT is an open industrial Ethernet standard in the field of automation. It can automatically configure and generate local process images including analog, digital and special function modules. Analog modules and special function modules transmit data in the form of words or bytes, and digital modules transmit data in the form of bits.
- The fieldbus coupler can be integrated into the application as an EtherCAT IO device.
- It is also equipped with a two-port switch, which makes it easy to create a linear structure without using any other network components.

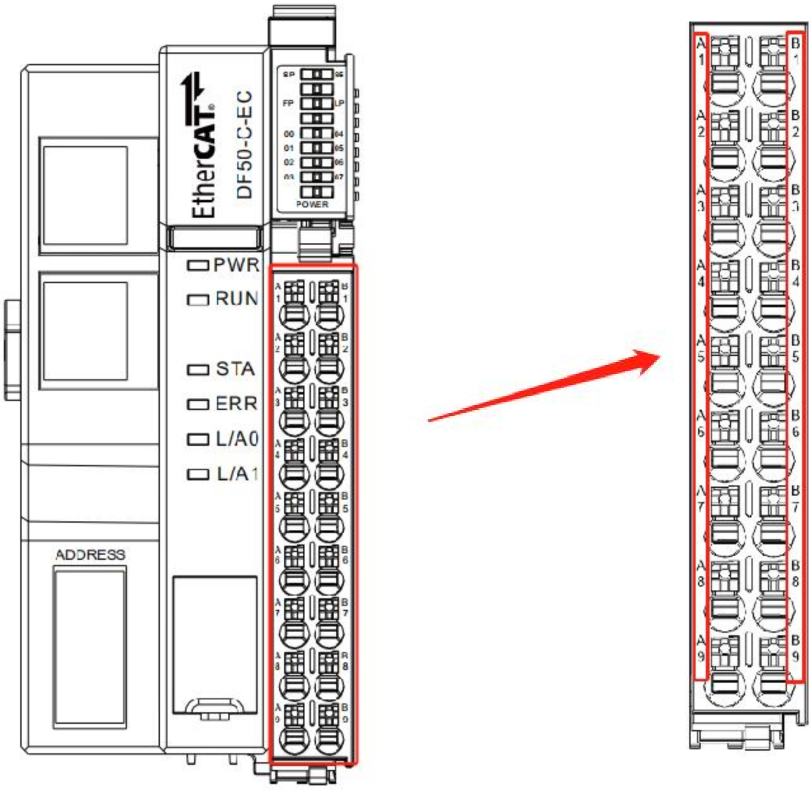
1.1 Specifications

Technical Information		
Specifications		EtherCAT bus,2indivualRJ45, scalable32modules,24VDC
Product Description		EtherCAT
Connection		2 * RJ45, integrated switch function
Transfer rate		10/100Mbps, full duplex
Transmission distance		100rice
PDOdata		1024 bytes
Expandable number of modules		32
Address Mapping		support
Bus address setting		EtherCAT Specifications
Transmission medium		Category 5 twisted pair
Isolation method		Electrically isolated from the field
Alarm function		Diagnostic alarm, process alarm
Minimum cycle time		1ms
Connection		PUSH-INTerminal Blocks
Internal system electrical terminal rated voltage input		24V DC（20.4V DC~ 28.8V DC）
Internal system electrical terminal rated current input		0.75A（24VTypical value when
Internal system rated voltage output		5VDC
Internal system rated current output		2A
Internal load electrical terminal rated voltage input		24V DC（20.4V DC~ 28.8V DC）
Internal load electrical terminal rated current input		0.75A（24VTypical value when
Internal load rated voltage output		24V DC（20.4V DC~ 28.8V DC）
Internal load rated current output		0.75A（24VTypical value when
DIparameter		
Number of channels		8
Signal Type		NPN & PNP
Signal range	"ON"Signal voltage	Pressure difference＞11VDC(Voltage difference from common input)
	"OFF"Signal voltage	Pressure difference5VDC(Voltage difference from common input)
Data size		1 Byte
Connection Type		1-Wire system, Type 1/Type 3, refer toIEC 61131-2
Filter time		0-255msConfigurable
Input Impedance		>7.5kΩ
Input Action Display		When the input is in driving state, the input indicator light is on.
IOMapping		Support bitwise access
Wiring parameters		
Connectivity technology: Communications/Fieldbus		EtherCAT IO: 2 * RJ-45
Connection technology:power supply/Signal input		PUSH-INTerminal Blocks
Connection Type		system/On-site power supply/enter
Wire crimping area		0.14~1.5mm2/26~16AWG
Stripping length		8~10mm
Installation		DIN-35Type guide rail
Material parameters		
color		black
Housing Material		PCplastic,PA66
Conformance mark		CE
Environmental requirements		

Allowable ambient temperature (operating)	-25~60℃
Permissible ambient temperature (storage)	-40~85℃
Protection type	IP20
Pollution degree	2,conform toIEC 61131-2standard
Operating altitude	No temperature derating:0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration resistance	1g,conform toIEC 60068-2-6standard
Shock resistance	15g,conform toIEC 60068-2-27standard
EMCAnti-interference level	conform toIEC 61000-4standard
Corrosion resistance	conform toIEC 60068-2-42andIEC 60068-2-43standard
Relative humidity 75 %AllowedH2SPollutant concentration	10ppm
Relative humidity 75 %AllowedSO2Pollutant concentration	25ppm

1.2 Hardware Interface

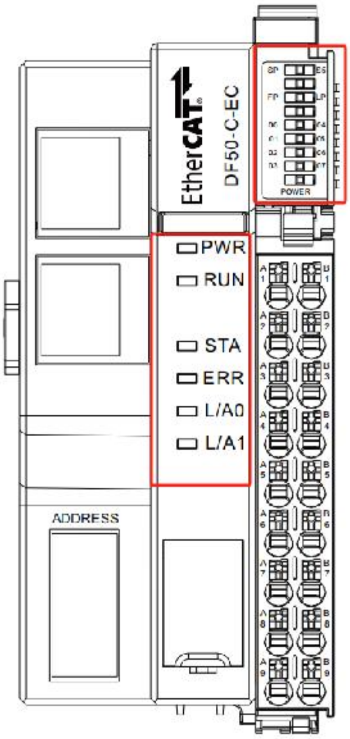
1.2.1 Terminal Block Definition



Terminal number	Signal	Terminal number	Signal	illustrate
A1	Sys-24V	B1	Sys-0V	System Power
A2	Field-24V	B2	Field-0V	Load power supply
A3	Field-24V	B3	Field-0V	
A4	PE	B4	PE	Safely
A5	DI0	B5	DI4	DISignal input
A6	DI1	B6	DI5	
A7	DI2	B7	DI6	
A8	DI3	B8	DI7	
A9	COM	B9	COM	Public

Note:It is recommended to use two isolated 24V power supplies to provide two power supplies for the coupler to achieve optimal anti-interference performance.

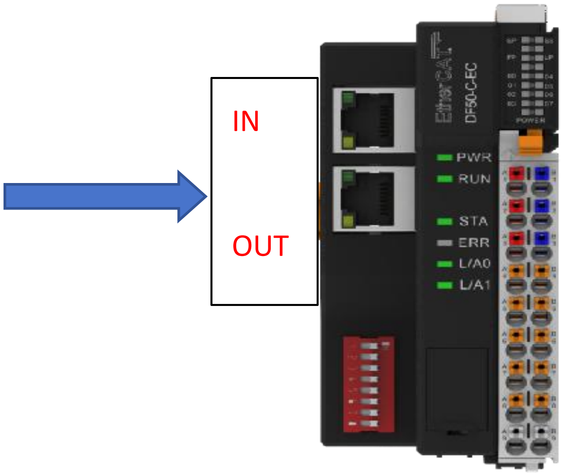
1.2.2 LED indicator definition



Indicator Lights	state	meaning
PWR	Green Bright	Power supply is operating normally
	Green Kill	Abnormal power supply operation
RUN	Green Bright	The coupler enters OP state
	Green flashing (on 200ms, off 200ms)	The coupler is in Pre-OP state
	Green single flash (on for 200ms, off for 1s)	The coupler is in Safe-OP state
	Green Kill	The coupler is in INIT state
STA	Green Flash	The module is running normally
	Green Kill	Module operation abnormality
ERR	Red Bright	Communication abnormality between coupler and module
	Red Extinction	The communication between the coupler and the module is normal
L/A0	Green Bright	Network port1Connection successful
	Green Flash	Network port1With data communication
L/A1	Green Bright	Network port2Connection successful
	Green Flash	Network port2With data communication
FP	Green light is always on	Load power input is normal
	Green light off	Load power input abnormality
LP	Green light is always on	Load power output is normal
	Green light off	Load power output abnormality
SP	Green light on	System power input is normal

	Green light off	System power input abnormality
S5	Green light on	System power output is normal
	Green light off	System power output abnormality

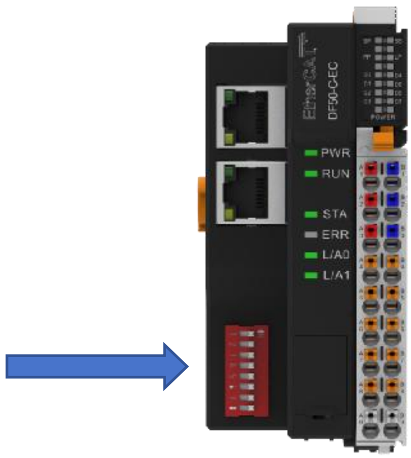
1.2.3 RJ45 interface



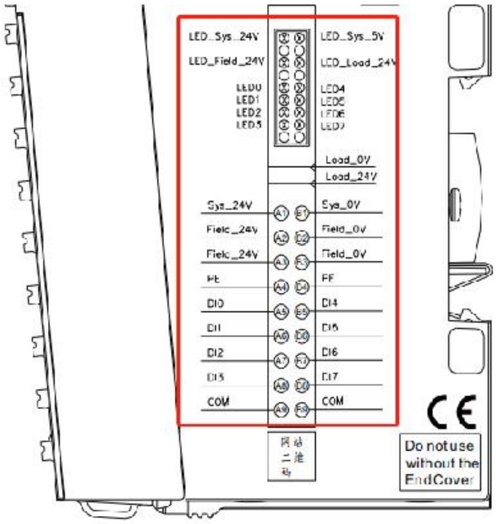
Used to establish communication with the host computer.Dual RJ45 ports can easily create a linear structure without using any other network components. Note that port 1 is input and port 2 is output.

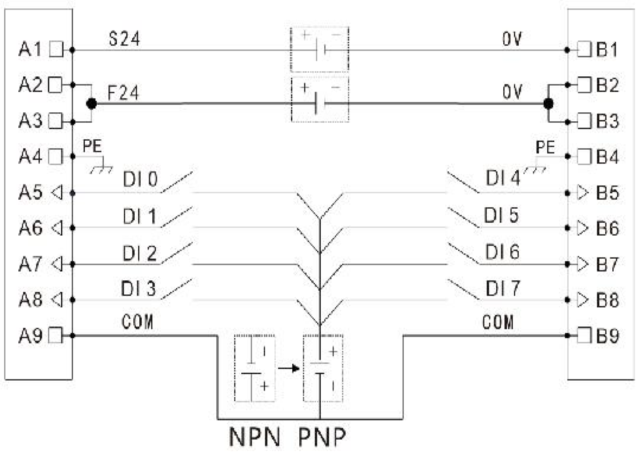
1.2.4 Dip switch

Used to set the site alias address, 1~255.



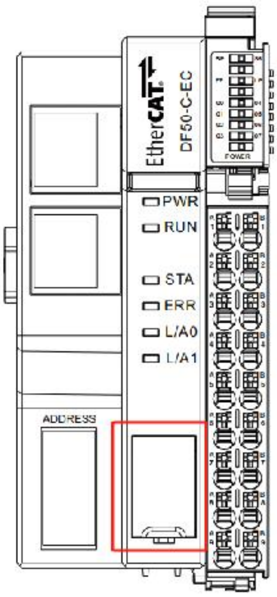
1.2.5 Wiring Diagram





Note: COM is the common terminal, external 24V realizes NPN; external 0V realizes PNP.

1.2.6 Configuring the Interface



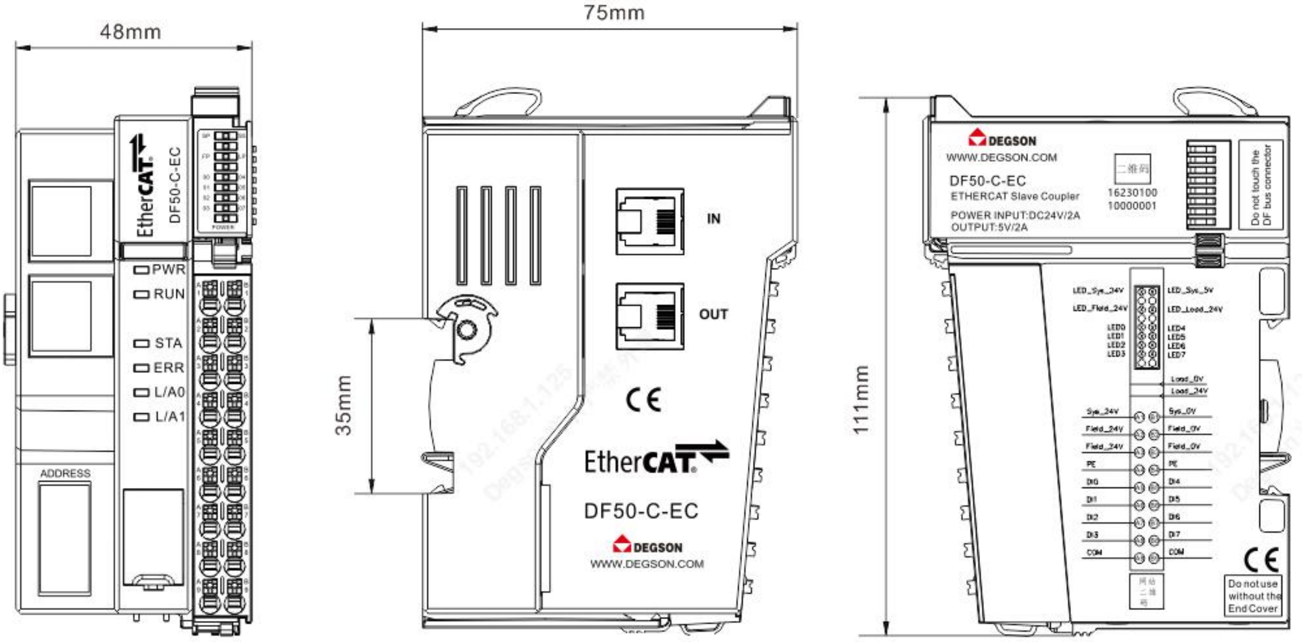
The configuration interface is set up and the cover can be opened to facilitate firmware upgrade of the adapter.

Note:Non-professionals and authorized personnel are prohibited from using this interface to avoid firmware problems.

1.3 Mechanical Installation

1.3.1 Installation dimensions

The installation dimensions are shown in the figure below, in mm:



1.4 Configuration Data

index	Sub-index	name	Size	Value range	default value	meaning
16#F800	1	Behavior of field bus on Module error	0.1	0-1	0	0:Hold OP state 1: Exit OP state

Note: This object is used to configure the internal bus after an error occurs.ECBus actions, including holdingOPStatus and ExitOPstate.

1.5 Process data

TXPDO			
Name	Type	Size	meaning
Device StateWord	UINT	2.0	Device status word, normally0.
Device Input DI0	BIT	0.1	DI0Input valid position1, if invalid,0.
Device Input DI1	BIT	0.1	DI1Input valid position1, if invalid,0.
Device Input DI2	BIT	0.1	DI2Input valid position1, if invalid,0.
Device Input DI3	BIT	0.1	DI3Input valid position1, if invalid,0.
Device Input DI4	BIT	0.1	DI4Input valid position1, if invalid,0.
Device Input DI5	BIT	0.1	DI5Input valid position1, if invalid,0.
Device Input DI6	BIT	0.1	DI6Input valid position1, if invalid,0.
Device Input DI7	BIT	0.1	DI7Input valid position1, if invalid,0.
Device SwitchCode	USINT	1.0	8DIP switch value.
RXPDO			
Device CtrlWord	UINT	2.0	Device control word.

Device CtrlWordCommand table:

Device CtrlWord	Device StateWord
0x0000	Display fault code
0x0001	Clearing fault codes
0x0002	Coupler software version number

When the module fails andDevice CtrlWordfor0x0000hourDevice StateWordhigh8The bit indicates the module position, low8The bits represent the module fault code. The meaning of the fault code is shown in the table below.

Fault Codes	Fault Description	Troubleshooting methods
0XE1	Module power supply abnormality	Check the power cord connection
0XE2	Analog module calibration abnormality	Contact Supplier
0XE3	Module internal initialization exception	Contact Supplier
0XE8	Module offline	Reseat the module

If the first card is powered abnormally,Device StateWordValue is0x01E1,in01Represents the first module,E1Indicates that the card has abnormal power supply; if you need to clear the error,Device CtrlWordWrite0x0001Clear the error and write it back0x0000That's it.

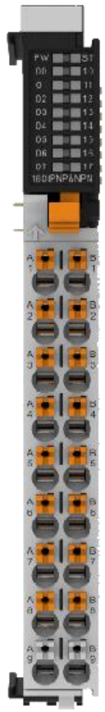
3.Expansion I/O Modules

Function	describe	model
Digital Module	Digital input,16enter,PNP/NPN	DF50-M-16DI-P/N
Digital Module	Digital input,16Input with count,PNP/NPN	DF50-M-16DI-P/N-TS
Digital Module	Digital output,16Output,PNP	DF50-M-16DO-P
Digital Module	Digital output,16Output,NPN	DF50-M-16DO-N
Digital Module	Digital output, 32 inputs,PNP/NPN	DF50-M-32DI-P/N
Digital Module	Digital output, 32 outputs,NPN	DF50-M-32DO-N
Digital Module	Digital output, 32 outputs, PNP	DF50-M-32DO-P
Digital Module	Digital output, 16 inputs and 16 outputs, NPN	DF50-M-16DI-16DO-N
Digital Module	Digital output, 16 inputs and 16 outputs, PNP	DF50-M-16DI-16DO-P
Digital Module	Digital output, 4 channels, relay	DF50-M-4DOR
Digital Module	Digital output, 4 outputs, PNP, 2A	DF50-M-4DO-P-2A
Analog Modules	Analog input,4Channel, voltage and current type	DF50-M-4AI-UI-6
Analog Modules	Analog input,8Channel, voltage type	DF50-M-8AI-U-4
Analog Modules	Analog input,8Channel, current type	DF50-M-8AI-I-5
Analog Modules	Analog output,4Channel, voltage and current type	DF50-M-4AO-UI-6
Analog Modules	Analog output,8Channel, voltage type	DF50-M-8AO-U-4
Analog Modules	Analog output,8Channel, current type	DF50-M-8AO-I-5
Temperature Module	Thermal resistance measurement,4aisle	DF50-M-4RTD-PT
Temperature Module	Thermocouple measurements,8aisle	DF50-M-8TC
Pulse counting module	Encoder input/Pulse output,2aisle,24V	DF50-M-2CNT-PIL-24
Pulse counting module	Encoder input/Pulse output,2aisle,5V	DF50-M-2CNT-PIL-5
Communication	232/485/422Serial communication,1aisle	DF50-M-1COM-232/485/422

serial port module		
IO-LinkCommunication Module	4aisleIO-LinkMain Station	DF50-M-4IOL
Voltage distribution module	24VDCVoltage distribution,16aisle	DF50-M-DC-U-twenty four
Voltage distribution module	0VDCVoltage distribution,16aisle	DF50-M-DC-U-0

1 16-channel digital input/24VDC/PNP&NPN (DF50-M-16DI-P/N)

- The digital input module can receive control signals from field devices (such as sensors, etc.).
- 16-channel digital input, PNP&NPN valid, common terminal conversion.
- Each input module is equipped with an anti-interference filter.
- Each input module has an LED indicator.
- The field level and the system level are isolated by optocouplers.
- Protection grade IP20.



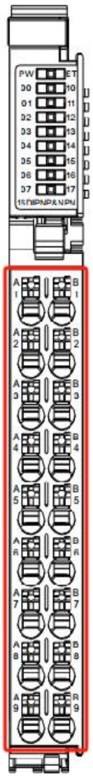
1.1 Specifications

Technical Information		
Product Description		Digital input modules,16enter,NPN & PNP,24VDC
Number of channels		16
Signal Type		NPN & PNP
Signal range	"ON"Signal voltage	Pressure difference＞11VDC(Voltage difference from common input)
	"OFF"Signal voltage	Pressure difference5VDC(Voltage difference from common input)

Hardware response time		200us/200us
Data size		2 Byte
Connection Type		1-Wire system, Type 1/Type 3, refer toIEC 61131-2
Reverse circuit protection		Yes
Isolation method		Photoelectric isolation from the field layer
Error diagnosis		Yes
Filter time		0-255msConfigurable
Input Impedance		>7.5kΩ
Input Action Display		When the input is in driving state, the input indicator light is on.
IOMapping		Support bit-by-bit or word-by-word mapping
Power parameters		
System bus input power rated voltage		5V DC（4.75V DC~ 5.25V DC）
System bus input power rated current		45mA
Terminal power supply(Public)Input rated voltage	NPNSignal Type	24V
	PNPSignal Type	0V
Wiring parameters		
Connection technology: Input		PUSH-INTerminal Blocks
Wire crimping area		0.2~1.5mm2/26~16AWG
Stripping length		8~10mm²
Installation		DIN-35Type guide rail
Material parameters		
color		black
Housing Material		PCplastic,PA66
Conformance mark		CE
Environmental requirements		
Allowable ambient temperature (operating)		-25~60℃
Permissible ambient temperature (storage)		-40~85℃
Protection type		IP20
Pollution degree		2,conform toIEC 61131-2standard
Operating altitude		No temperature derating:0~2000m
Relative humidity (non-condensing)		5~95%RH
Vibration resistance		1g,conform toIEC 60068-2-6standard
Shock resistance		15g,conform toIEC 60068-2-27standard
EMCAnti-interference level		conform toIEC 61000-4standard
Corrosion resistance		conform toIEC 60068-2-42andIEC 60068-2-43standard
Relative humidity 75 %AllowedH2SPollutant concentration		10ppm
Relative humidity 75 %AllowedSO2Pollutant concentration		25ppm

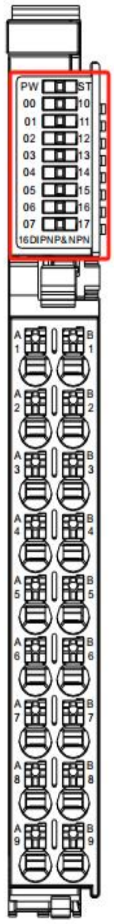
1.2 Hardware Interface

1.2.1 Terminal Block Definition



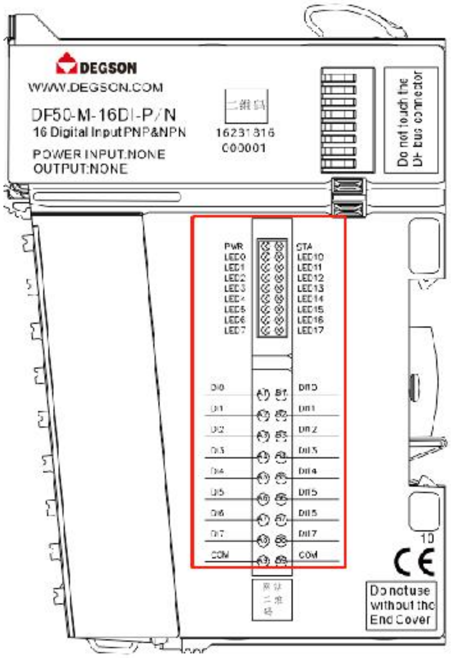
Terminal number	Signal	Terminal number	Signal	illustrate
A1	DI 0	B1	DI 10	DI signal input
A2	DI 1	B2	DI 11	
A3	DI 2	B3	DI 12	
A4	DI 3	B4	DI 13	
A5	DI 4	B5	DI 14	
A6	DI 5	B6	DI 15	
A7	DI 6	B7	DI 16	
A8	DI 7	B8	DI 17	
A9	COM	B9	COM	Public

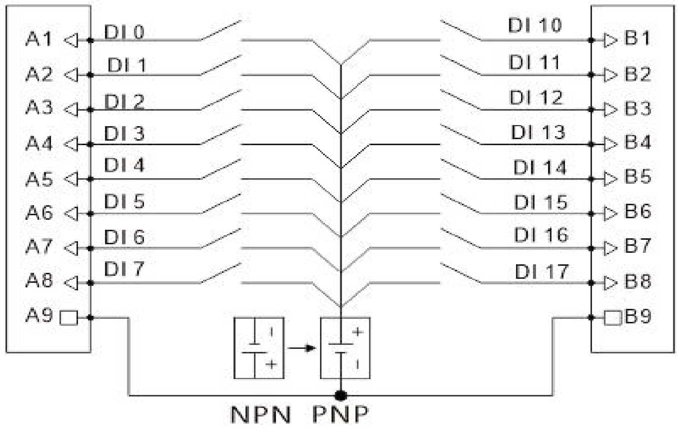
1.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green Bright:System bus power inputnormal	
	Green Kill:System bus power inputabnormal	
ST	Power-on stage	Green: Module initialization error
		Green off: Module initialization is normal
	Operational stage	Green flash: The internal bus of the module is working normally
		Green off: The internal bus of the module is working abnormally
00~07,10~17	Green Bright:Input signal valid	
	Green Kill:Invalid input signal	

1.2.3 Wiring Diagram





Note: COM is the common terminal, external 24V realizes NPN; external 0V realizes PNP.

1.3 Configuration data definition

index	Sub-index	name	Size	Value range	default value	meaning
16#8000	1	ChAll:Input Filter	1.0	0~255	3	Input filtering,0~255msConfigurable
Note: This module is inserted after the coupler.1card slots, thenSDOIndex is16#8000, if inserted in2card slots, thenSDOIndex is16#8010, the index offset is16#10.						

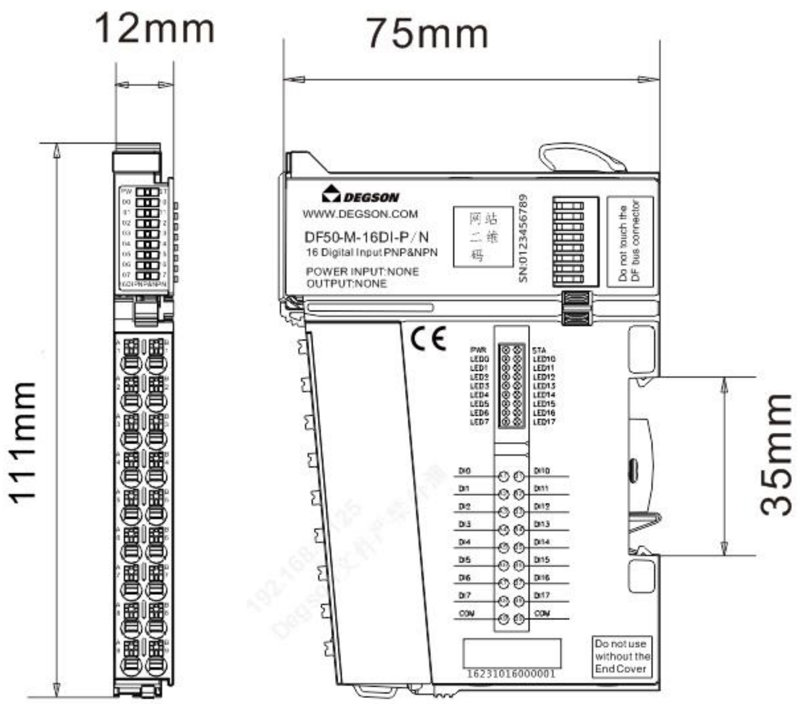
1.4 Process Data Definition

TXPDO			
Name	Type	Size	meaning
DI Ch0 / A1	BIT	0.1	DI Ch0When a valid signal is input, the position1, if invalid,0.
DI Ch1 / A2	BIT	0.1	DI Ch1When a valid signal is input, the position1, if invalid,0.
DI Ch2 / A3	BIT	0.1	DI Ch2When a valid signal is input, the position1, if invalid,0.
DI Ch3 / A4	BIT	0.1	DI Ch3When a valid signal is input, the position1, if invalid,0.
DI Ch4 / A5	BIT	0.1	DI Ch4When a valid signal is input, the position1, if invalid,0.
DI Ch5 / A6	BIT	0.1	DI Ch5When a valid signal is input, the position1, if invalid,0.
DI Ch6 / A7	BIT	0.1	DI6When a valid signal is input, the position1, if invalid,0.
DI Ch7 / A8	BIT	0.1	7DWhen a valid signal is input, the position1, if invalid,0.
DI Ch8 / B1	BIT	0.1	8DWhen a valid signal is input, the position1, if invalid,0.
DI Ch9 / B2	BIT	0.1	9DWhen a valid signal is input, the position1, if invalid,0.
DI Ch10 / B3	BIT	0.1	DI Ch10When a valid signal is input, the position1, if invalid,0.
DI Ch11 / B4	BIT	0.1	DI Ch11When a valid signal is input, the position1, if invalid,0.

DI Ch12 / B5	BIT	0.1	DI Ch12When a valid signal is input, the position1, if invalid,0.
DI Ch13 / B6	BIT	0.1	DI Ch13When a valid signal is input, the position1, if invalid,0.
DI Ch14 / B7	BIT	0.1	DI Ch14When a valid signal is input, the position1, if invalid,0.
DI Ch15 / B8	BIT	0.1	DI Ch15When a valid signal is input, the position1, if invalid,0.
DI WORD VALUE	WORD	2.0	Synchronously display the signal input status of all channels with the above.1Data representation of words.

1.5 Mechanical Installation

The installation dimensions are shown in the figure below, in mm:



2 16-channel digital input with counting/24VDC/PNP&NPN (DF50-M-16DI-P/N-TS)

- The digital input module can receive control signals from field devices (such as sensors, etc.).
- 16-channel digital input with 8-channel low-speed counting, PNP&NPN valid, common terminal conversion.
- Each input module is equipped with an anti-interference filter.
- Each input module has an LED indicator.
- The field level and the system level are isolated by optocouplers.
- Protection grade IP20.

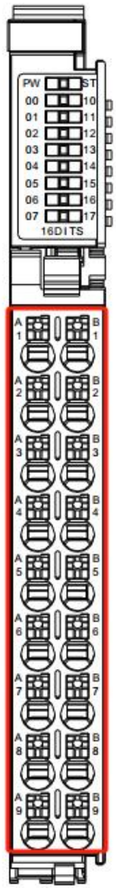
2.1 Specifications

Technical Information		
Product Description		Digital input counting module,16enter,NPN & PNP,24VDC
Number of channels		16
Signal Type		NPN & PNP
Signal range	"ON"Signal voltage	Pressure difference＞11VDC(Voltage difference from common input)
	"OFF"Signal voltage	Pressure difference5VDC(Voltage difference from common input)
Counting Mode		Rising edge counting, falling edge counting, double edge counting, configurable
Counting range		0~4294967296
Hardware response time		200us/200us
Data size		68 Byte

Connection Type		1-Wire system, Type 1/Type 3, refer toIEC 61131-2
Reverse circuit protection		Yes
Isolation method		Photoelectric isolation from the field layer
Error diagnosis		Yes
Filter time		0~255msConfigurable
Input Impedance		>7.5kΩ
Input Action Display		When the input is in driving state, the input indicator light is on.
IOMapping		Support bit-by-bit or word-by-word mapping
Power parameters		
System bus input power rated voltage		5V DC（4.75V DC~ 5.25V DC）
System bus input power rated current		45mA
Terminal power supply(Public)Input rated voltage	NPNSignal Type	24V
	PNPSignal Type	0V
Wiring parameters		
Connection technology: Input		PUSH-INTerminal Blocks
Wire crimping area		0.2~1.5mm2/26~16AWG
Stripping length		8~10mm²
Installation		DIN-35Type guide rail
Material parameters		
color		black
Housing Material		PCplastic,PA66
Conformance mark		CE
Environmental requirements		
Allowable ambient temperature (operating)		-25~60℃
Permissible ambient temperature (storage)		-40~85℃
Protection type		IP20
Pollution degree		2,conform toIEC 61131-2standard
Operating altitude		No temperature derating:0~2000m
Relative humidity (non-condensing)		5~95%RH
Vibration resistance		1g,conform toIEC 60068-2-6standard
Shock resistance		15g,conform toIEC 60068-2-27standard
EMCAnti-interference level		conform toIEC 61000-4standard
Corrosion resistance		conform toIEC 60068-2-42andIEC 60068-2-43standard
Relative humidity 75 %AllowedH2SPollutant concentration		10ppm
Relative humidity 75 %AllowedSO2Pollutant concentration		25ppm

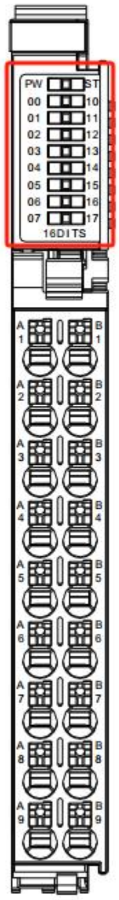
2.2 Hardware Interface

2.2.1 Terminal Block Definition



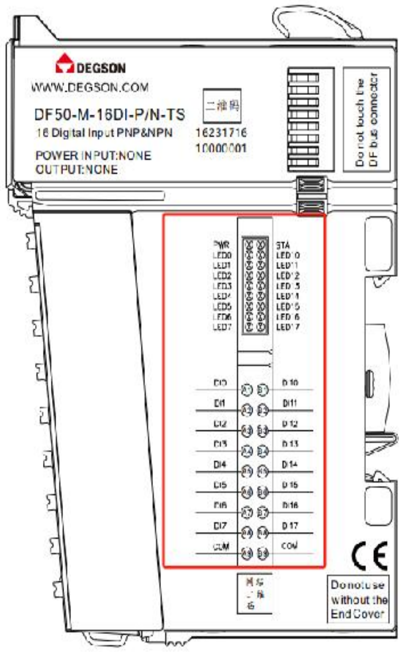
Terminal number	Signal	Terminal number	Signal	illustrate
A1	DI 0	B1	DI 10	DISignal input
A2	DI 1	B2	DI 11	
A3	DI 2	B3	DI 12	
A4	DI 3	B4	DI 13	
A5	DI 4	B5	DI 14	
A6	DI 5	B6	DI 15	
A7	DI 6	B7	DI 16	
A8	DI 7	B8	DI 17	
A9	COM	B9	COM	Public

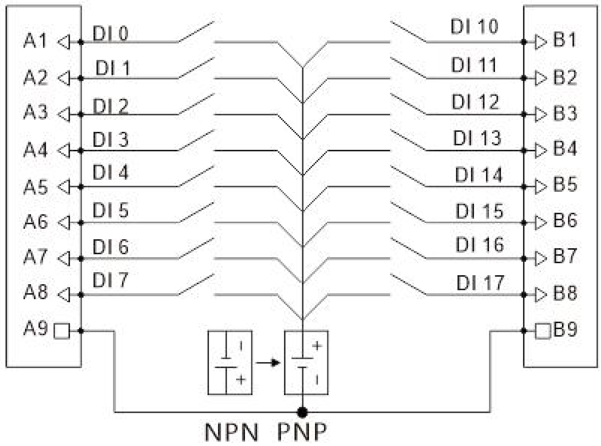
2.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green Bright:System bus power inputnormal	
	Green Kill:System bus power inputabnormal	
ST	Power-on stage	Green: Module initialization error
		Green off: Module initialization is normal
	Operational stage	Green flash: The internal bus of the module is working normally
		Green off: The internal bus of the module is working abnormally
00~07,10~17	Green Bright:Input signal valid	
	Green Kill:Invalid input signal	

2.2.3 Wiring Diagram





Remark:COMFor the public terminal, external24VaccomplishNPN; External0VaccomplishPNP.

2.3 Configuration Data Definition

index	Sub-index	name	Size	Value range	default value	meaning
16#8000	1	ChAll: Input Filter	1.0	0~255	3	All channels digital input filtering,0~255msConfigurable
	35	DI Ch0: Input Count Mode	0.2	0~2	0	Configuration of input counting mode for each channel; 0: rising edge count 1: Falling edge count 2: Double edge counting
	36	DI Ch1: Input Count Mode				
	37	DI Ch2: Input Count Mode				
	38	DI Ch3: Input Count Mode				
	39	DI Ch4: Input Count Mode				
	40	DI Ch5: Input Count Mode				
	41	DI Ch6: Input Count Mode				
	42	DI Ch7: Input Count Mode				
Note: This module is inserted after the coupler.1card slots, thenSDOIndex is16#8000, if inserted in2card slots, thenSDOIndex is16#8010, the index offset is16#10.						

2.3 Process data definition

RXPDO			
Name	Type	Size	meaning
DI Ch0 Clear bit	BIT	0.1	The location1, the corresponding channel count is cleared, the position0, the corresponding channel counts normally.
DI Ch1 Clear bit			

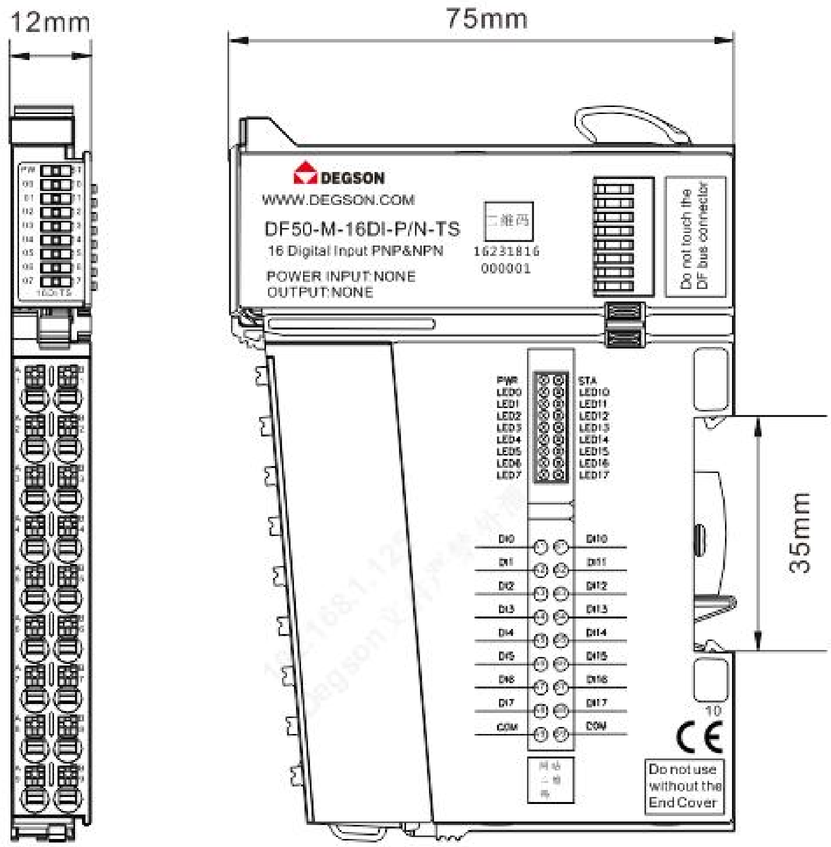
DI Ch2 Clear bit			
DI Ch3 Clear bit			
DI Ch4 Clear bit			
DI Ch5 Clear bit			
DI Ch6 Clear bit			
DI Ch7 Clear bit			

TXPDO			
Name	Type	Size	meaning
DI Ch0 / A1	BIT	0.1	When the corresponding channel inputs a valid signal, this position1, if invalid,0.
DI Ch1 / A2			
DI Ch2 / A3			
DI Ch3 / A4			
DI Ch4 / A5			
DI Ch5 / A6			
DI Ch6 / A7			
DI Ch7 / A8			
DI Ch8 / B1			
DI Ch9 / B2			
DI Ch10 / B3			
DI Ch11 / B4			
DI Ch12 / B5			
DI Ch13 / B6			
DI Ch14 / B7			
DI Ch15 / B8			
DI WORD VALUE	WORD	2.0	Synchronously display the signal input status of all channels with
DI Ch0 / A1 Count	UDINT	4.0	Input count value of each channel
DI Ch1 / A2 Count			
DI Ch2 / A3 Count			
DI Ch3 / A4 Count			
DI Ch4 / A5 Count			

DI Ch5 / A6 Count			
DI Ch6 / A7 Count			
DI Ch7 / A8 Count			

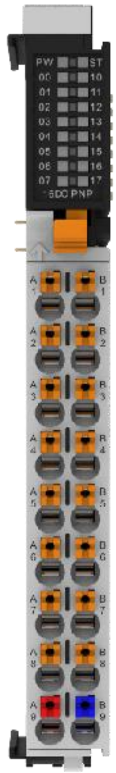
2.5 Mechanical Installation

The installation dimension information is shown in the figure below, the unit is (mm）:



3 16-channel digital output/24VDC/PNP (DF50-M-16DO-P)

- 16-channel digital output, PNP high level is valid.
- Each output channel has an LED indicator.
- The field layer and the system layer are isolated by photocouplers.
- Protection grade IP20.



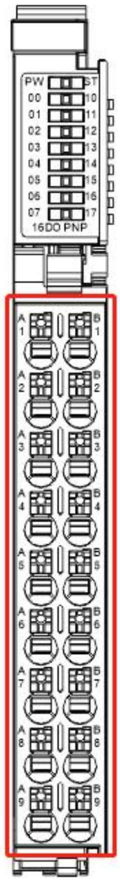
3.1 Specifications

Technical Information	
Product Description	Digital output modules,16Output,NPN,24VDC
Number of channels	16
Signal Type	PNP
"OFF"Signal voltage	High impedance
"ON"Signal voltage	twenty fourV DC
Data size	2 Byte
Connection Type	1-Wire system
Reverse circuit protection	Yes
Overcurrent protection	Yes
Short circuit protection	Yes
Isolation method	Photoelectric isolation from the field layer
Error diagnosis	Yes
Switching frequency(Resistive)	100Hz
Switching frequency(lamp)	10Hz
Switching frequency(Sensibility)	0.2Hz
Response time of protection circuit	< 100μs
Maximum output current per channel	500 mA
Leakage Current	Maximum value:10uA

Hardware response time	100us/100us
Output Impedance	<200mΩ
Output delay	OFF to ON :Max.100us ， ON to OFF: Max.150us
Protection function	Over temperature shutdown: Typical135℃ Overcurrent protection:1.1ATypical value0.5A Support short circuit protection
Load Type	Sensibility(7.2W/point,24W/Modules), resistive(0.5A/point,4A/Modules),lamp(5W/point,18W/Modules)
Output action display	When the output is in driving state, the indicator light is on.
Input derating	exist55℃Derating during operation50%(at the same timeONThe output current does not exceed2A), or output all pointsONTime derating10℃
IOMapping	Support bit-by-bit or word-by-word mapping
Fault shutdown output status mode	Clear, keep current value or output according to preset value
In stop mode	In the fault shutdown mode, no more refresh
Power parameters	
System bus input power rated voltage	5V DC（4.75V DC~ 5.25V DC）
System bus input power rated current	100mA
Terminal power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated current	8A
Wiring parameters	
Connection technology: Output	PUSH-INTerminal Blocks
Wire crimping area	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm
Installation	DIN-35Type guide rail
Material parameters	
color	black
Housing Material	PCplastic,PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60℃
Permissible ambient temperature (storage)	-40~85℃
Protection type	IP20
Pollution degree	2,conform toIEC 61131-2standard
Operating altitude	No temperature derating:0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration resistance	1g,conform toIEC 60068-2-6standard
Shock resistance	15g,conform toIEC 60068-2-27standard
EMCAnti-interference level	conform toIEC 61000-4standard
Corrosion resistance	conform toIEC 60068-2-42andIEC 60068-2-43standard
Relative humidity 75 %AllowedH2SPollutant concentration	10ppm
Relative humidity 75 %AllowedSO2Pollutant concentration	25ppm

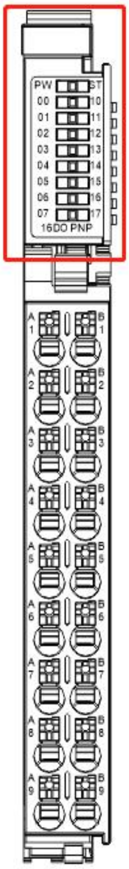
3.2 Hardware Interface

3.2.1 Terminal Block Definition



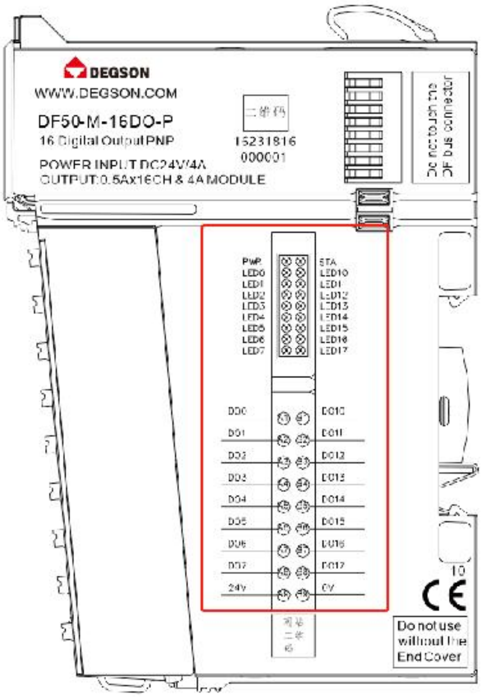
Terminal number	Signal	Terminal number	Signal	illustrate
A1	DO 00	B1	DO 10	DOSignal output
A2	DO 01	B2	DO 11	
A3	DO 02	B3	DO 12	
A4	DO 03	B4	DO 13	
A5	DO 04	B5	DO 14	
A6	DO 05	B6	DO 15	
A7	DO 06	B7	DO 16	
A8	DO 07	B8	DO 17	
A9	24V	B9	0V	Terminal power input

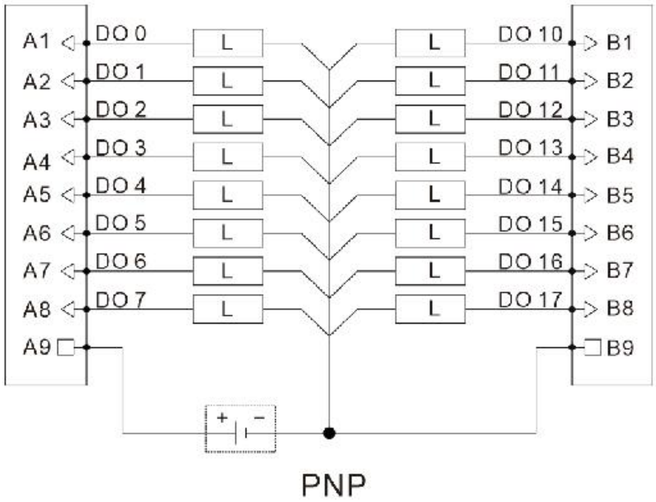
3.2.2 LED indicator definition



<table>
<tr><th>Indicator Lights</th><th colspan="2">meaning</th></tr>
<tr><td rowspan="2">PW</td><td colspan="2">Green Bright:System bus power inputnormal</td></tr>
<tr><td colspan="2">Green Kill:System bus power inputabnormal</td></tr>
<tr><td rowspan="4">ST</td><td rowspan="2">Power-on stage</td><td>Green: Module initialization error</td></tr>
<tr><td>Green off: Module initialization is normal</td></tr>
<tr><td rowspan="2">Operational stage</td><td>Green flash: The internal bus of the module is working normally</td></tr>
<tr><td>Green Kill/Green: The internal bus of the module is working abnormally or the terminal power input is abnormal.</td></tr>
<tr><td rowspan="2">00~07,10~17</td><td colspan="2">Green Bright:Output signal valid</td></tr>
<tr><td colspan="2">Green Kill:Output signal invalid</td></tr>
</table>

3.2.3 Wiring Diagram





Note: A9, B9 24V power supply is provided externally.

3.3 Configuration Data Definition

index	Sub-index	name	Size	Value range	default value	meaning
16#8001	1	Behavior of field bus on Module error	1.0	0~2	0	Fieldbus error output mode configuration, see table for detailsEn0820
	3	Substitute Value	2.0	0~65535	0	Output substitute value
Note: This module is inserted after the coupler.1card slots, thenSDOIndex is16#8001, if inserted in2card slots, thenSDOIndex is16#8011, the index offset is16#10.						

Table En0820

Sub-index object data	name	meaning
0	All outputs off	Turn off all channel outputs
1	Enable substitute value	Enable preset value output
2	Hold last value	Keep current output

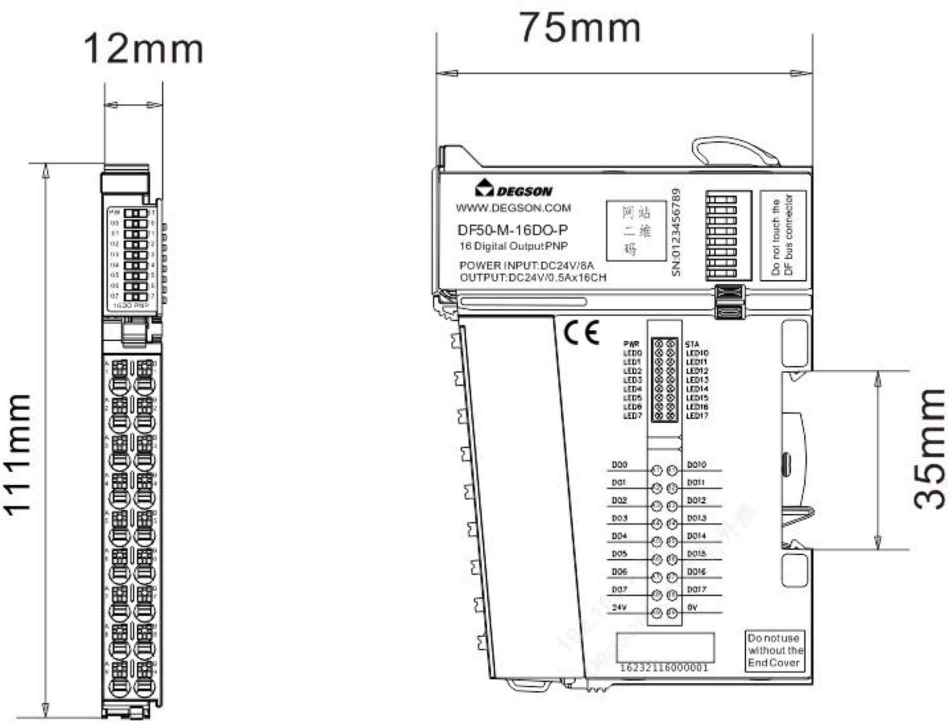
3.4 Process data definition

RXPDO

Name	Type	Size	meaning
DO Ch0	BIT	0.1	1:DO Ch0Output24VDC,0:DO Ch0Output high configuration.
DO Ch1	BIT	0.1	1:DO Ch1Output24VDC,0:DO Ch1Output high configuration.
DO Ch2	BIT	0.1	1:DO Ch2Output24VDC,0:DO Ch2Output high configuration.
DO Ch3	BIT	0.1	1:DO Ch3Output24VDC,0:DO Ch3Output high configuration.
DO Ch4	BIT	0.1	1:DO Ch4Output24VDC,0:DO Ch4Output high configuration.
DO Ch5	BIT	0.1	1:DO Ch5Output24VDC,0:DO Ch5Output high configuration.
DO Ch6	BIT	0.1	1:DO Ch6Output24VDC,0:DO Ch6Output high configuration.
DO Ch7	BIT	0.1	1:DO Ch7Output24VDC,0:DO Ch7Output high configuration.
DO8	BIT	0.1	1:DO8 outputs24VDC,0:DO8 Output high configuration.
DO Ch9	BIT	0.1	1:DO9 Output24VDC,0:DO9 Output high configuration.
DO Ch10	BIT	0.1	1:DO10 Output24VDC,0:DO10 Output high configuration.
DO Ch11	BIT	0.1	1:DO11 Output24VDC,0:DO11 Output high configuration.
DO Ch12	BIT	0.1	1:DO12 outputs24VDC,0:DO12 Output high configuration.
DO Ch13	BIT	0.1	1:DO13 Output24VDC,0:DO13 Output high configuration.
DO Ch14	BIT	0.1	1:DO14 outputs24VDC,0:DO14 Output high configuration.
DO Ch15	BIT	0.1	1:DO15 Output24VDC,0:DO15 Output high configuration.

3.5 Mechanical Installation

The installation dimension information is shown in the figure below, the unit is (mm）:



4 16-channel digital output/24VDC/NPN (DF50-M-16DO-N)

- 16-channel digital output, NPN low level is valid.
- Each output channel has an LED indicator.
- The field layer and the system layer are isolated by photocouplers.
- Protection grade IP20.

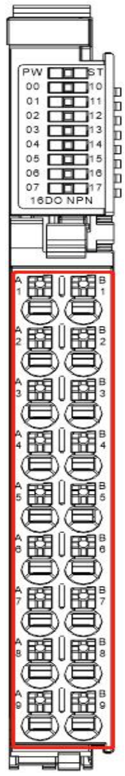
4.1 Specifications

Technical Information	
Product Description	Digital output modules,16Output,NPN,24VDC
Number of channels	16
Signal Type	NPN
"OFF"Signal voltage	High impedance
"ON"Signal voltage	0V DC
Data size	2 Byte
Connection Type	1-Wire system
Reverse circuit protection	Yes
Overcurrent protection	Yes
Short circuit protection	Yes
Isolation method	Photoelectric isolation from the field layer
Error diagnosis	Yes
Switching frequency(Resistive)	100Hz
Switching frequency(lamp)	10Hz
Switching frequency(Sensibility)	0.2Hz
Response time of protection circuit	< 100µs
Maximum output current per channel	500 mA
Leakage Current	Maximum value:10uA

Hardware response time	100us/100us
Output Impedance	<200mΩ
Output delay	OFF to ON :Max.100us ， ON to OFF: Max.150us
Protection function	Over temperature shutdown: Typical135℃ Overcurrent protection:1.1ATypical value0.5A Support short circuit protection
Load Type	Sensibility(7.2W/point,24W/Modules), resistive(0.5A/point,4A/Modules),lamp(5W/point,18W/Modules)
Output action display	When the output is in driving state, the indicator light is on.
Input derating	exist55℃Derating during operation50%(at the same timeONThe output current does not exceed2A), or output all pointsONTime derating10℃
IOMapping	Support bit-by-bit or word-by-word mapping
Fault shutdown output status mode	Clear, keep current value or output according to preset value
In stop mode	In the fault shutdown mode, no more refresh
Power parameters	
System bus input power rated voltage	5V DC（4.75V DC~ 5.25V DC）
System bus input power rated current	100mA
Terminal power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated current	8A
Wiring parameters	
Connection technology: Output	PUSH-INTerminal Blocks
Wire crimping area	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm
Installation	DIN-35Type guide rail
Material parameters	
color	black
Housing Material	PCplastic,PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60℃
Permissible ambient temperature (storage)	-40~85℃
Protection type	IP20
Pollution degree	2,conform toIEC 61131-2standard
Operating altitude	No temperature derating:0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration resistance	1g,conform toIEC 60068-2-6standard
Shock resistance	15g,conform toIEC 60068-2-27standard
EMCAnti-interference level	conform toIEC 61000-4standard
Corrosion resistance	conform toIEC 60068-2-42andIEC 60068-2-43standard
Relative humidity 75 %AllowedH2SPollutant concentration	10ppm
Relative humidity 75 %AllowedSO2Pollutant concentration	25ppm

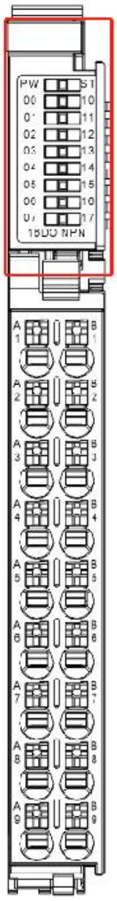
4.2 Hardware Interface

4.2.1 Terminal Block Definition



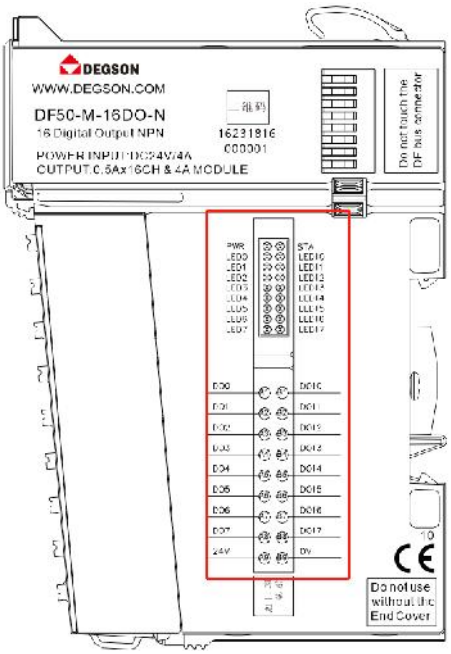
Terminal number	Signal	Terminal number	Signal	illustrate
A1	DO 00	B1	DO 10	DOSignal output
A2	DO 01	B2	DO 11	
A3	DO 02	B3	DO 12	
A4	DO 03	B4	DO 13	
A5	DO 04	B5	DO 14	
A6	DO 05	B6	DO 15	
A7	DO 06	B7	DO 16	
A8	DO 07	B8	DO 17	
A9	24V	B9	0V	Terminal power input

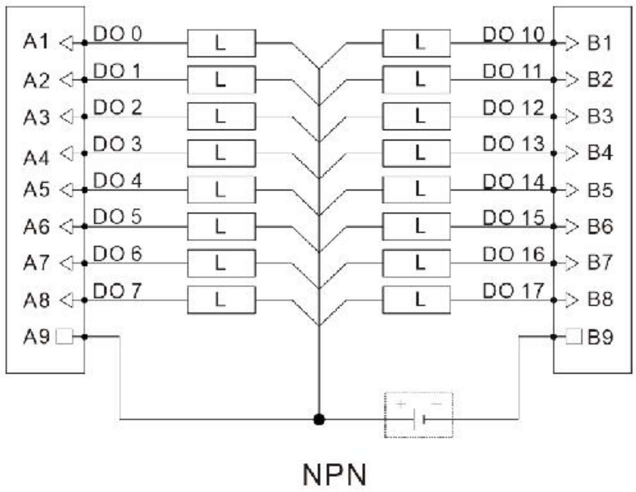
4.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green Bright:System bus power inputnormal	
	Green Kill:System bus power inputabnormal	
ST	Power-on stage	Green: Module initialization error
		Green off: Module initialization is normal
	Operational stage	Green flash: The internal bus of the module is working normally
		Green Kill/Green: The internal bus of the module is working abnormally or the terminal power input is abnormal.
00~07,10~17	Green Bright:Output signal valid	
	Green Kill:Output signal invalid	

4.2.3 Wiring Diagram





Remark:A9,B9 24VThe power supply is provided externally.

4.3 Configuration Data Definition

index	Sub-index	name	Size	Value range	default value	meaning
16#8001	1	Behavior of field bus on Module error	1.0	0~2	0	Fieldbus error output mode configuration, see table En0820 for details
	3	Substitute Value	2.0	0~65535	0	Output Preset
Note: This module is inserted after the coupler.1card slots, thenSDOIndex is16#8001, if inserted in2card slots, thenSDOIndex is16#8011, the index offset is16#10.						

Table En0820

Sub-index object data	name	meaning
0	All outputs off	Turn off all channel outputs
1	Enable substitute value	Use preset output
2	Hold last value	Keep current output

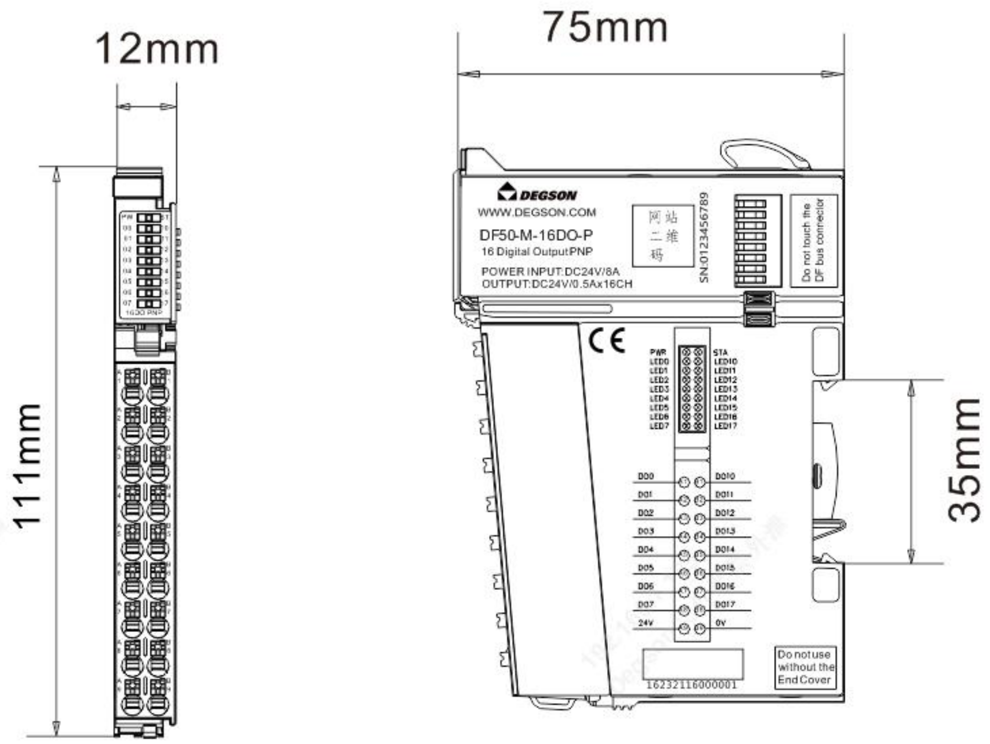
4.4 Process data definition

RXPDO

Name	Type	Size	meaning
DO Ch0	BIT	0.1	1:DO Ch0Output 0VDC,0:DO Ch0Output high configuration.
DO Ch1	BIT	0.1	1:DO Ch1Output 0VDC,0:DO Ch1Output high configuration.
DO Ch2	BIT	0.1	1:DO Ch2Output 0VDC,0:DO Ch2Output high configuration.
DO Ch3	BIT	0.1	1:DO Ch3Output 0VDC,0:DO Ch3Output high configuration.
DO Ch4	BIT	0.1	1:DO Ch4Output 0VDC,0:DO Ch4Output high configuration.
DO Ch5	BIT	0.1	1:DO Ch5Output 0VDC,0:DO Ch5Output high configuration.
DO Ch6	BIT	0.1	1:DO Ch6Output 0VDC,0:DO Ch6Output high configuration.
DO Ch7	BIT	0.1	1:DO Ch7Output 0VDC,0:DO Ch7Output high configuration.
DO8	BIT	0.1	1:DO8 output 0VDC,0:DO8 Output high configuration.
DO Ch9	BIT	0.1	1:DO9 output 0VDC,0:DO9 Output high configuration.
DO Ch10	BIT	0.1	1:DO10 output 0VDC,0:DO10 Output high configuration.
DO Ch11	BIT	0.1	1:DO11 output 0VDC,0:DO Ch11 Output high configuration.
DO Ch12	BIT	0.1	1:DO12 output 0VDC,0:DO12 Output high configuration.
DO Ch13	BIT	0.1	1:DO13 output 0VDC,0:DO Ch13 Output high configuration.
DO Ch14	BIT	0.1	1:DO14 output 0VDC,0:DO14 Output high configuration.
DO Ch15	BIT	0.1	1:DO15 output 0VDC,0:DO Ch15Output high configuration.

4.5 Mechanical Installation

The installation dimension information is shown in the figure below, the unit is (mm）:



5 4-channel analog input/voltage type/current type (DF50-M-4AI-UI-6)

- The analog input module can receive voltage and current standard signals.
- 4-channel analog input, voltage type, current type.
- The two LED indicators indicate that the module is operating normally and communicating normally.
- Magnetic isolation between the field level and the system level.
- Transmitted in 16-bit resolution.
- Protection grade IP20

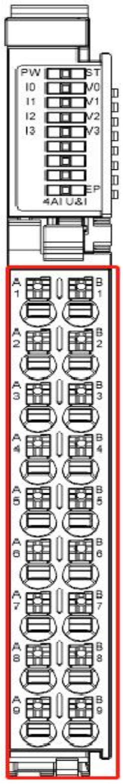
5.1 Specifications

Technical Information	
Product Description	Analog input modules,4Input, voltage type&Current Type
Number of channels	4
Signal Type	Voltage/Current, single-ended signal
Resolution	16 Bit
Voltage measurement range	±10V,0~10V,2~-10V,±5V,0~5V,1~5V
Voltage input impedance	>400KΩ
Voltage input accuracy(Full temperature range)	0.2%
Voltage input limit	±15V
Voltage input diagnostics	2~10V,1~5VSupport disconnection detection
Current measurement range	0~20mA,4~20mA
Current acquisition impedance	100Ω
Current input accuracy(Full temperature range)	0.2%
Current input limit	Instant30mA,average24mA
Current input diagnostics	4~-20mASupport disconnection detection

Isolation	The interface channels are not isolated, the power supply is isolated from the interface, and the interface is isolated from the bus.
Independent channel enable configuration	support
Diagnosis reporting function configuration	support
Channel Mode Configuration	Disable, ±10V,0~10V,2~10V,±5V,0~5V,1~5V, 0-20mA,4-20mA
Filter parameter configuration	1000Hz~50HzConfigurable
Stop Mode	Keep the current value and do not refresh
Input Action Display	When the input signal is valid, the input indicator flashes (software controlled)
IOProcess data size	4 Word
Power parameters	
System bus input power rated voltage	5V DC（4.75V DC~ 5.25V DC）
System bus input power rated current	35mA
Terminal power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated current	30mA
Terminal power output rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power output rated current	0.5A/Each power output channel
Wiring parameters	
Connection technology: Input	PUSH-INTerminal Blocks
Wire crimping area	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm²
Installation	DIN-35Type guide rail
Material parameters	
color	black
Housing Material	PCplastic,PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60℃
Permissible ambient temperature (storage)	-40~85℃
Protection type	IP20
Pollution degree	2,conform toIEC 61131-2standard
Operating altitude	No temperature derating:0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration resistance	1g,conform toIEC 60068-2-6standard
Shock resistance	15g,conform toIEC 60068-2-27standard
EMCAnti-interference level	conform toIEC 61000-4standard
Corrosion resistance	conform toIEC 60068-2-42andIEC 60068-2-43standard
Relative humidity 75 %AllowedH2SPollutant concentration	10ppm
Relative humidity 75 %AllowedSO2Pollutant concentration	25ppm

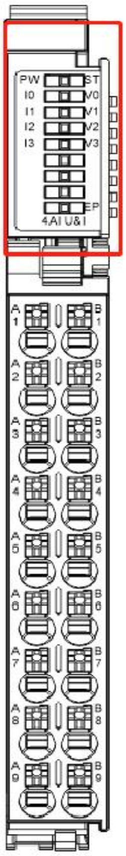
5.2 Hardware Interface

5.2.1 Terminal Block Definition



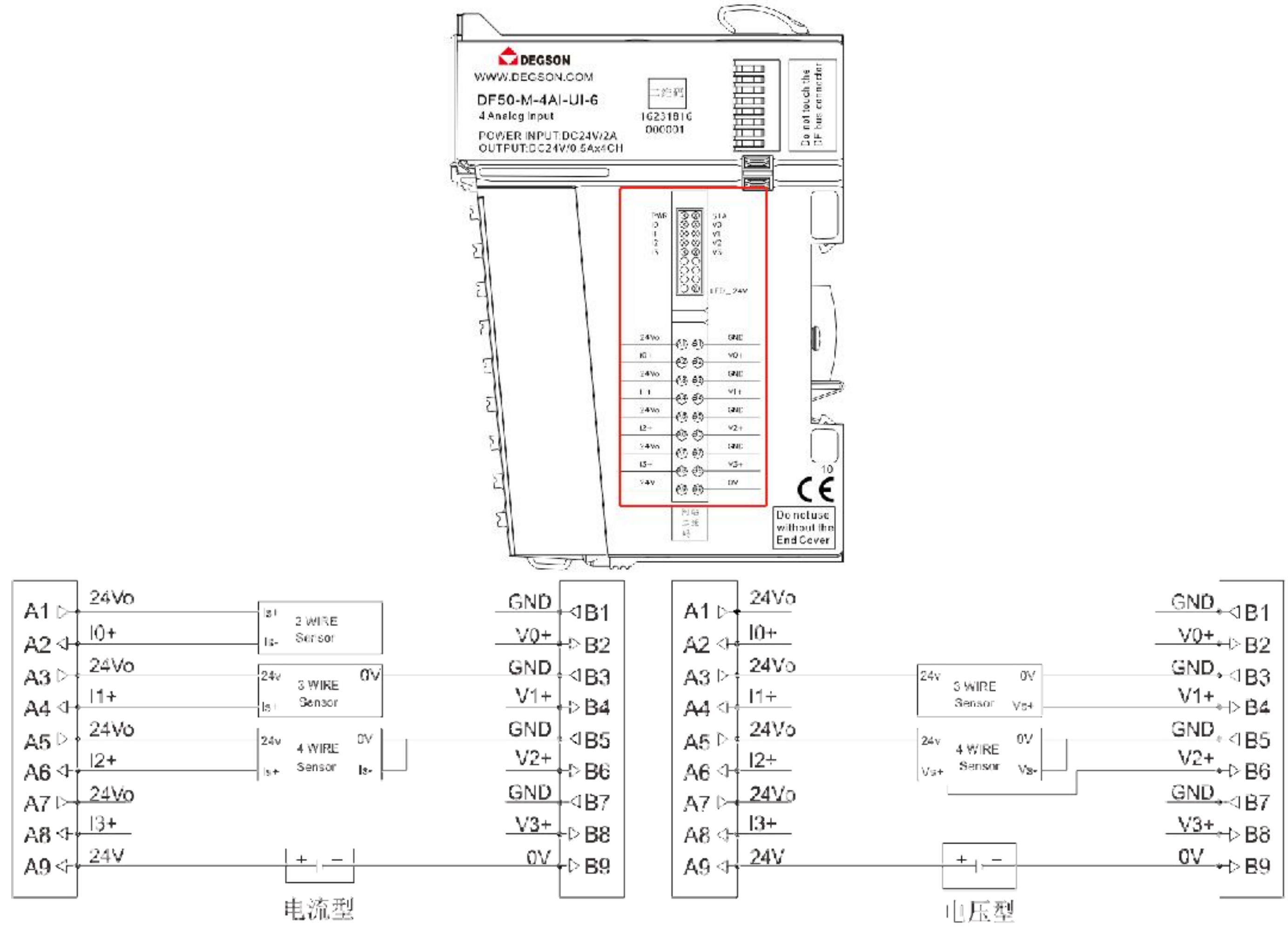
Terminal number	Signal	Terminal number	Signal	illustrate
A1	24Vo	B1	GND	Terminal power output
A2	I0+	B2	V0+	Current/Voltage input channel
A3	24Vo	B3	GND	Terminal power output
A4	I1+	B4	V1+	Current/Voltage input channel
A5	24Vo	B5	GND	Terminal power output
A6	I2+	B6	V2+	Current/Voltage input channel
A7	24Vo	B7	GND	Terminal power output
A8	I3+	B8	V3+	Current/Voltage input channel
A9	24V	B9	0V	Terminal power input

5.2.2 LED indicator definition



<table>
<tr><th>Indicator Lights</th><th colspan="2">meaning</th></tr>
<tr><td rowspan="2">PW</td><td colspan="2">Green Bright:System bus power inputnormal</td></tr>
<tr><td colspan="2">Green Kill:System bus power inputabnormal</td></tr>
<tr><td rowspan="4">ST</td><td rowspan="2">Power-on stage</td><td>Green: Module initialization error</td></tr>
<tr><td>Green off: Module initialization is normal</td></tr>
<tr><td rowspan="2">Operational stage</td><td>Green flash: The internal bus of the module is working normally</td></tr>
<tr><td>Green Kill/Green: The internal bus of the module is working abnormally or the terminal power input is abnormal.</td></tr>
<tr><td rowspan="2">EP</td><td colspan="2">Green: The terminal power input is normal</td></tr>
<tr><td colspan="2">Green off: Terminal power input abnormality</td></tr>
<tr><td rowspan="2">I0~I3,V0~V3</td><td colspan="2">Green Flash:Input signal valid</td></tr>
<tr><td colspan="2">Green Kill:Invalid input signal</td></tr>
</table>

5.2.3 Wiring Diagram



Remark:A9,B9 24VThe power supply is provided externally.

5.3 Configuration Data Definition

index	Sub-index	name	Size	Value range	default value	meaning
16#8002	3	Ch0: Signal Range	1.0	SeeEn0811:surface	0	aisle0Signal range configuration
	4	Ch1: Signal Range	1.0	SeeEn0811:surface	0	aisle1Signal range configuration
	5	Ch2: Signal Range	1.0	SeeEn0811:surface	0	aisle2Signal range configuration
	6	Ch3: Signal Range	1.0	SeeEn0811:surface	0	aisle3Signal range configuration
	11	Ch0: Input Filter	1.0	SeeEn0812:surface	10	aisle0Sampling frequency configuration
	12	Ch1: Input Filter	1.0	SeeEn0812:surface	10	aisle1Sampling frequency configuration
	13	Ch2: Input Filter	1.0	SeeEn0812:su	10	aisle2Sampling frequency

				rface		configuration
	14	Ch3: Input Filter	1.0	SeeEn0812:su rface	10	aisle3Sampling frequency configuration
Note: This module is inserted after the coupler.1card slots, thenSDOIndex is16#8002, if inserted in2card slots, thenSDOIndex is16#8012, the index offset is16#10.						

Table En0811

Sub-index object data	name	meaning
0	Disable	Turn off signal acquisition
1	-10V~+10V	±10VSignal range
2	0V~+10V	0~10VSignal range
3	2V~+10V	2~10VSignal range
4	-5V~+5V	±5VSignal range
5	0V~+5V	0~5VSignal range
6	1V~+5V	1~5VSignal range
17	-10V~+10V OverRange	±10VRange plus out-of-range detection
18	0V~+10V OverRange	0~10VRange plus out-of-range detection
19	2V~+10V OverRange	2~10VRange plus out-of-range detection
20	-5V~+5V OverRange	±5VRange plus out-of-range detection
twenty one	0V~+5V OverRange	0~5VRange plus out-of-range detection
twenty two	1V~+5V OverRange	1~5VRange plus out-of-range detection
twenty three	0~20mA OverRange	0~20maRange plus out-of-range detection
twenty four	4~20mA OverRange	4~20maRange plus out-of-range detection
25	0~20ma	0~20maSignal range
26	4~20ma	4~20maSignal range

Remark:"OverRangeIndicates that the module has the over-range detection function under this configuration.

Table En0812

Sub-index object data	name	meaning
1	1000HZ_1ms	Sampling rate1KHZ
2	500HZ_2ms	Sampling rate500HZ
4	250HZ_4ms	Sampling rate250HZ
8	125HZ_8ms	Sampling rate125HZ
10	100HZ_10ms	Sampling rate100HZ
20	50HZ_20ms	Sampling rate50HZ

5.4 Process data definition

TXPDO

Name	Type	Size	meaning
AD Value CH0	INT	2.0	aisle0Input Data
AD Value CH1	INT	2.0	aisle1Input Data
AD Value CH2	INT	2.0	aisle2Input Data
AD Value CH3	INT	2.0	aisle3Input Data

Channel input data description:

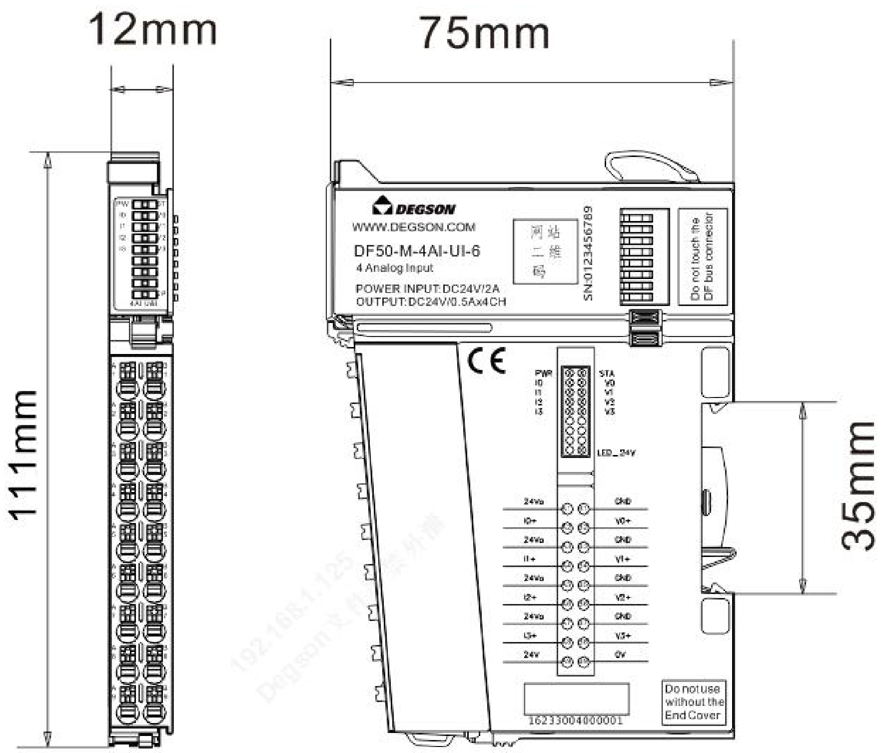
Signal range	Voltage value (U）	Decimal data	Hexadecimal data	Scope	Conversion relationship
-10V~+10V	10V	32767	0x7FFF	Normal range	D = 32767 x U / 10 U = D x 10 / 32767
	0V	0	0		
	-10V	-32768	0x8000		
0V~+10V	10V	32767	0x7FFF	Normal range	D = 32767 x U / 10 U = D x 10 / 32767
	5V	16384	0x4000		
	0V	0	0		
2V~+10V	10V	32767	0x7FFF	Normal range	D = 32767 x (U – 2) / 8 U = D x 8 / 32767 + 2
	6V	16384	0x4000		
	2V	0	0		
-5V~+5V	5V	32767	0x7FFF	Normal range	D = 32767 x U / 5 U = D x 5 / 32767
	0V	0	0x0000		
	-5V	-32768	0x8000		
0V~+5V	5V	32767	0x7FFF	Normal range	D = 32767 x U / 5 U = D x 5 / 32767
	2.5V	16384	0x4000		
	0V	0	0		
1V~+5V	5V	32767	0x7FFF	Normal range	D = 32767 x (U – 1) / 4 U = D x 4 / 32767 + 1
	3V	16384	0x4000		
	1V	0	0		
±10V OverRange	>11.76V	32767	0x7FFF	Overflow	D = 27648 x U / 10 U = D x 10 / 27648
	11.76V	32511	0x7EFF	Upper limit	
	10V	27648	0x6C00	Normal range	
	5V	13824	0x3600		
	0V	0	0x0000		
	-5V	-13824	0xCA00		
	-10V	-27648	0x9400		
	-11.76V	-32511	0x8100	Lower limit	
	<-11.76V	-32768	0x8000	Underflow	
0~10V OverRange	>11.76V	32767	0x7FFF	Overflow	D = 27648 x U / 10 U = D x 10 / 27648
	11.76V	32511	0x7EFF	Upper limit	

	10V	27648	0x6C00	Normal range	
	5V	13824	0x3600		
	0V	0	0x0000		
2~10V OverRange	>11.41V	32767	0x7FFF	Overflow	D = 27648 x (U – 2) / 8 U = D x 8 / 27648 + 2
	11.41V	32511	0x7EFF	Upper limit	
	10V	27648	0x6C00	Normal range	
	6V	13824	0x3600		
	2V	0	0x0000		
	0.59 V	-4864	0xED00	Lower limit	
	<0.59 V	-32768	0x8000	Underflow	
±5V OverRange	>5.88V	32767	0x7FFF	Overflow	D = 27648 x U / 5 U = D x 5 / 27648
	5.88V	32511	0x7EFF	Upper limit	
	5V	27648	0x6C00	Normal range	
	2.5V	13824	0x3600		
	0V	0	0x0000		
	-2.5V	-13824	0xCA00		
	-5V	-27648	0x9400		
	-5.88V	-32511	0x8100	Lower limit	
	<-5.88V	-32768	0x8000	Underflow	
0~5V OverRange	>5.88V	32767	0x7FFF	Overflow	D = 27648 x U / 5 U = D x 5 / 27648
	5.88V	32511	0x7EFF	Upper limit	
	5V	27648	0x6C00	Normal range	
	2.5V	13824	0x3600		
	0V	0	0x0000		
1~5V OverRange	>5.7V	32767	0x7FFF	Overflow	D = 27648 x (U – 1) / 4 U = D x 4 / 27648 + 1
	5.7V	32511	0x7EFF	Upper limit	
	5V	27648	0x6C00	Normal range	
	3V	13824	0x3600		
	1V	0	0x0000		
	0.3V	-4864	0xED00	Lower limit	
	<0.3V	-32768	0x8000	Underflow	
0~20ma	20ma	32767	0x7FFF	Normal range	D = 32767 xI/ 20 I= D x 10 / 32767
	10ma	16383	0x3FFF		
	0	0	0		
4~20ma	20ma	32767	0x7FFF	Normal range	D = 32767 x (I-4)/ 16 I= D x 16/ 32767+4
	10ma	16384	0x4000		
	4ma	0	0		
0~20mA OverRange	>23.52ma	32767	0x7FFF	Overflow	D = 27648 xI/ 20 I= D x 20/ 27648
	23.52ma	32511	0x7EFF	Upper limit	

	20ma	27648	0x6C00	Normal range	
	10ma	13824	0x3600		
	0ma	0	0x0000		
4~20mA OverRange	>22.81ma	32767	0x7FFF	Overflow	D = 27648 x (I– 4) / 16 I= D x 16 / 27648 + 4
	22.81ma	32511	0x7EFF	Upper limit	
	20ma	27648	0x6C00	Normal range	
	12ma	13824	0x3600		
	4ma	0	0x0000		
	1.19ma	-4864	0xED00	Lower limit	
	<1.19ma	-32768	0x8000	Underflow	

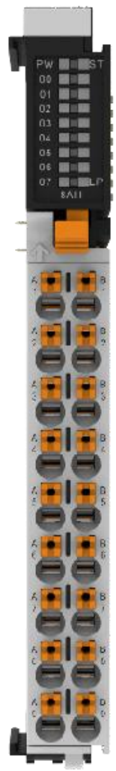
5.5 Mechanical Installation

The installation dimension information is shown in the figure below, the unit is (mm）:



6 8-channel analog input/current type (DF50-M-8AI-I-5)

- The analog input module can receive 0~20mA and 4~20mA standard signals.
- 8-channel analog input, current type.
- The two LED indicators indicate that the module is operating normally and communicating normally.
- Magnetic isolation between the field level and the system level.
- Transmitted in 16-bit resolution.
- Protection grade IP20



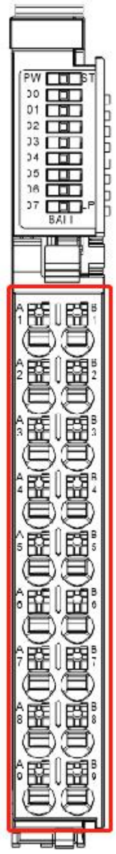
6.1 Specifications

Technical Information	
Product Description	Analog input modules,8Input, current type
Number of channels	8
Signal Type	Current, single-ended input
Resolution	16 Bit
Current measurement range	0~20mA,4~20mA
Current acquisition impedance	100Ω
Current input accuracy(Full temperature range)	0.2%
Current input limit	Instant30mA,average24mA
Current input diagnostics	4~20mASupport disconnection detection
Isolation	The interface channels are not isolated, the power supply is isolated from the interface, and the interface is isolated from the bus.
Independent channel enable configuration	support
Diagnosis reporting function configuration	support

Channel Mode Configuration	Disable, 0~20mA,4~20mA
Filter parameter configuration	1000Hz~50HzConfigurable
Stop Mode	Keep the current value and do not refresh
Input Action Display	When the input signal is valid, the input indicator flashes (software controlled)
IOProcess data size	8 Word
Power parameters	
System bus input power rated voltage	5V DC（4.75V DC~ 5.25V DC）
System bus input power rated current	35mA
Internal load power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Internal load power input rated current	20mA
Wiring parameters	
Connection technology: Input	PUSH-INTerminal Blocks
Wire crimping area	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm²
Installation	DIN-35Type guide rail
Material parameters	
color	black
Housing Material	PCplastic,PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60℃
Permissible ambient temperature (storage)	-40~85℃
Protection type	IP20
Pollution degree	2,conform toIEC 61131-2standard
Operating altitude	No temperature derating:0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration resistance	1g,conform toIEC 60068-2-6standard
Shock resistance	15g,conform toIEC 60068-2-27standard
EMCAnti-interference level	conform toIEC 61000-4standard
Corrosion resistance	conform toIEC 60068-2-42andIEC 60068-2-43standard
Relative humidity 75 %AllowedH2SPollutant concentration	10ppm
Relative humidity 75 %AllowedSO2Pollutant concentration	25ppm

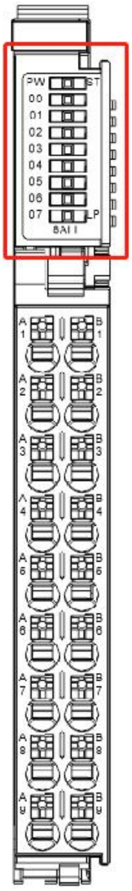
6.2 Hardware Interface

6.2.1 Terminal Block Definition



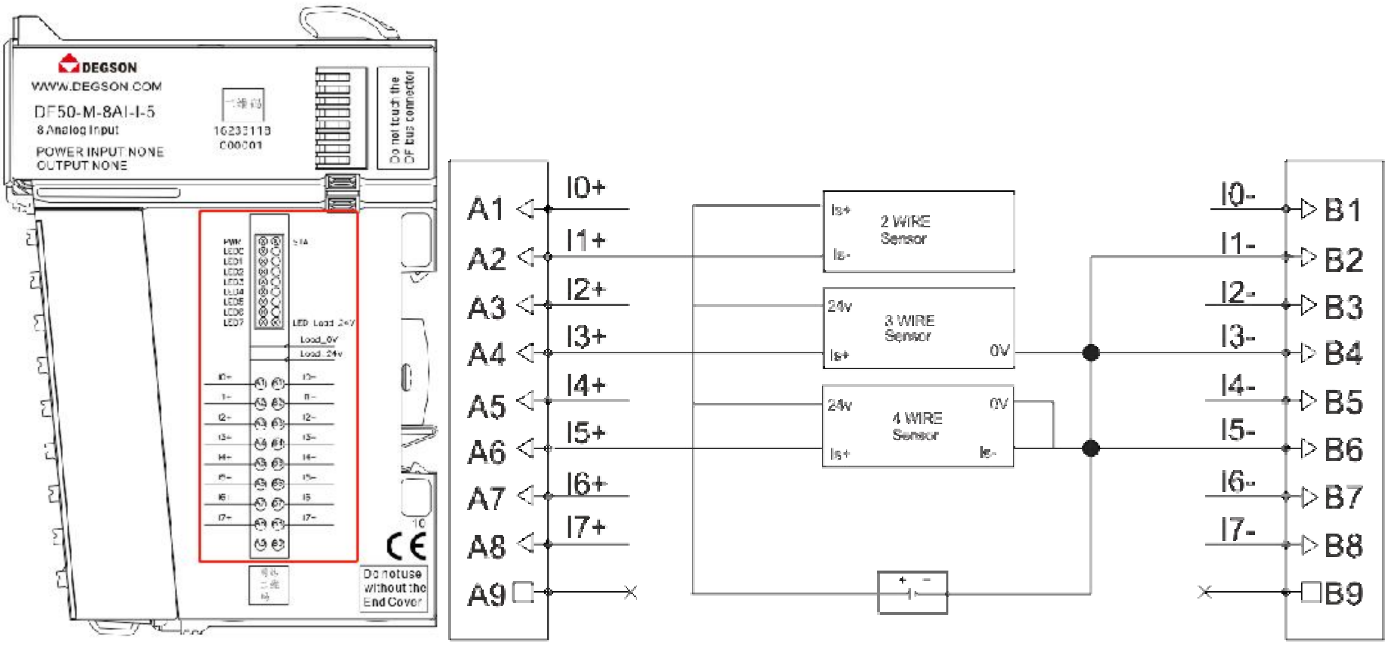
Terminal number	Signal	Terminal number	Signal	illustrate
A1	I0+	B1	I0-	Current input channel0
A2	I1+	B2	I1-	Current input channel1
A3	I2+	B3	I2-	Current input channel2
A4	I3+	B4	I3-	Current input channel3
A5	I4+	B5	I4-	Current input channel4
A6	I5+	B6	I5-	Current input channel5
A7	I6+	B7	I6-	Current input channel6
A8	I7+	B8	I7-	Current input channel7
A9	/	B9	/	/

6.2.2 LED indicator definition



<table>
<tr><th>Indicator Lights</th><th colspan="2">meaning</th></tr>
<tr><td rowspan="2">PW</td><td colspan="2">Green Bright:System bus power inputnormal</td></tr>
<tr><td colspan="2">Green Kill:System bus power inputabnormal</td></tr>
<tr><td rowspan="4">ST</td><td rowspan="2">Power-on stage</td><td>Green: Module initialization error</td></tr>
<tr><td>Green off: Module initialization is normal</td></tr>
<tr><td rowspan="2">Operational stage</td><td>Green flash: The internal bus of the module is working normally</td></tr>
<tr><td>Green Kill/Green: The internal bus of the module is working abnormally or the internal load power input is abnormal.</td></tr>
<tr><td rowspan="2">LP</td><td colspan="2">Green: Internal load power input is normal</td></tr>
<tr><td colspan="2">Green off: Internal load power input is abnormal</td></tr>
<tr><td rowspan="2">00~07</td><td colspan="2">Green Flash:Input signal valid</td></tr>
<tr><td colspan="2">Green Kill:Invalid input signal</td></tr>
</table>

6.2.3 Wiring Diagram



6.3 Configuration Data Definition

index	Sub-index	name	Size	Value range	default value	meaning
16#8002	3	Ch0: Signal Range	1.0	SeeEn0813:surface	0	aisle0Signal range configuration
	4	Ch1: Signal Range	1.0	SeeEn0813:surface	0	aisle1Signal range configuration
	5	Ch2: Signal Range	1.0	SeeEn0813:surface	0	aisle2Signal range configuration
	6	Ch3: Signal Range	1.0	SeeEn0813:surface	0	aisle3Signal range configuration
	7	Ch4: Signal Range	1.0	SeeEn0813:surface	0	aisle4Signal range configuration
	8	Ch5: Signal Range	1.0	SeeEn0813:surface	0	aisle5Signal range configuration
	9	Ch6: Signal Range	1.0	SeeEn0813:surface	0	aisle6Signal range configuration
	10	Ch7: Signal Range	1.0	SeeEn0813:surface	0	aisle7Signal range configuration
	11	Ch0: Input Filter	1.0	SeeEn0812:surface	10	aisle0Sampling frequency configuration
	12	Ch1: Input Filter	1.0	SeeEn0812:surface	10	aisle1Sampling frequency configuration

	13	Ch2: Input Filter	1.0	SeeEn0812:surface	10	aisle2Sampling frequency configuration
	14	Ch3: Input Filter	1.0	SeeEn0812:surface	10	aisle3Sampling frequency configuration
	15	Ch4: Input Filter	1.0	SeeEn0812:surface	10	aisle4Sampling frequency configuration
	16	Ch5: Input Filter	1.0	SeeEn0812:surface	10	aisle5Sampling frequency configuration
	17	Ch6: Input Filter	1.0	SeeEn0812:surface	10	aisle6Sampling frequency configuration
	18	Ch7: Input Filter	1.0	SeeEn0812:surface	10	aisle7Sampling frequency configuration
Note: This module is inserted after the coupler.1card slots, thenSDOIndex is16#8002, if inserted in2card slots, thenSDOIndex is16#8012, the index offset is16#10.						

Table En0813

Sub-index object data	name	meaning
0	Disable	Turn off signal acquisition
twenty three	0~20mA OverRange	0-20maRange plus out-of-range detection
twenty four	4~20mA OverRange	4-20maRange plus out-of-range detection
25	0~20ma	0-20maSignal range
26	4~20ma	4-20maSignal range

Remark:“OverRangeIndicates that the module has the out-of-range detection function under this configuration.

Table En0812

Sub-index object data	name	meaning
1	1000HZ_1ms	Sampling rate1KHZ
2	500HZ_2ms	Sampling rate500HZ
4	250HZ_4ms	Sampling rate250HZ
8	125HZ_8ms	Sampling rate125HZ
10	100HZ_10ms	Sampling rate100HZ
20	50HZ_20ms	Sampling rate50HZ

6.4 Process Data Definition

TXPDO			
Name	Type	Size	meaning
AD Value CH0	INT	2.0	No.0Channel input data
AD Value CH1	INT	2.0	No.1Channel input data
AD Value CH2	INT	2.0	No.2Channel input data

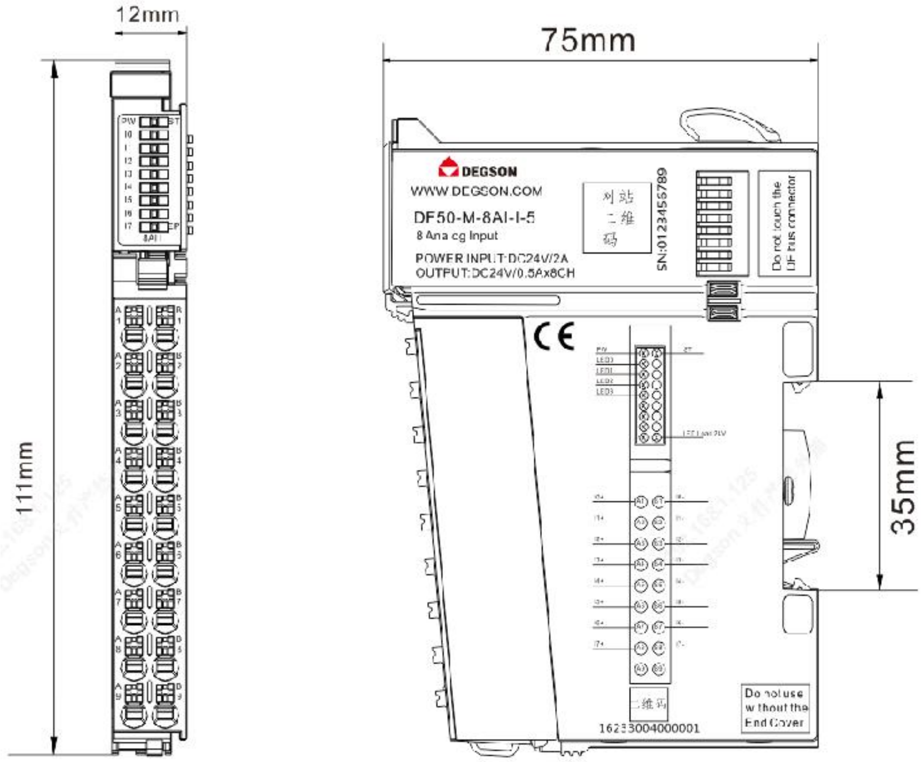
AD Value CH3	INT	2.0	No.3Channel input data
AD Value CH4	INT	2.0	No.4Channel input data
AD Value CH5	INT	2.0	No.5Channel input data
AD Value CH6	INT	2.0	No.6Channel input data
AD Value CH7	INT	2.0	No.7Channel input data

Channel input data description:

Signal range	Current value (I)	Decimal data	Hexadecimal data	Scope	Conversion relationship
0~20ma	20ma	32767	0x7FFF	Normal range	D = 32767 xI/ 20 I= D x 10 / 32767
	10ma	16383	0x3FFF		
	0	0	0		
4~20ma	20ma	32767	0x7FFF	Normal range	D = 32767 x (I-4)/ 16 I= D x 16/ 32767+4
	10ma	16384	0x4000		
	4ma	0	0		
0~20mA OverRange	>23.52ma	32767	0x7FFF	Overflow	D = 27648 xI/ 20 I= D x 20/ 27648
	23.52ma	32511	0x7EFF	Upper limit	
	20ma	27648	0x6C00	Normal range	
	10ma	13824	0x3600		
	0ma	0	0x0000		
4~20mA OverRange	>22.81ma	32767	0x7FFF	Overflow	D = 27648 x (I– 4) / 16 I= D x 16 / 27648 + 4
	22.81ma	32511	0x7EFF	Upper limit	
	20ma	27648	0x6C00	Normal range	
	12ma	13824	0x3600		
	4ma	0	0x0000		
	1.19ma	-4864	0xED00	Lower limit	
	<1.19ma	-32768	0x8000	Underflow	

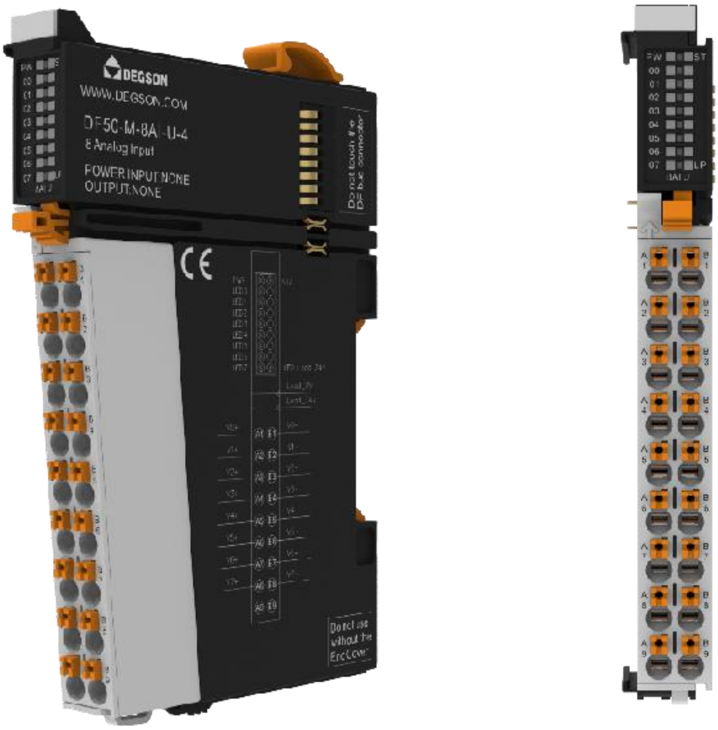
6.5 Mechanical Installation

The installation dimension information is shown in the figure below, the unit is (mm）:



7 8-channel analog input/voltage type (DF50-M-8AI-U-4)

- The analog input module can receive ±10V, 0~10V, 2~10V, ±5V, 0~5V, 1~5V standard signals.
- 8-channel analog input, voltage type.
- The two LED indicators indicate that the module is operating normally and communicating normally.
- Magnetic isolation between the field level and the system level.
- Transmitted in 16-bit resolution.
- Protection grade IP20



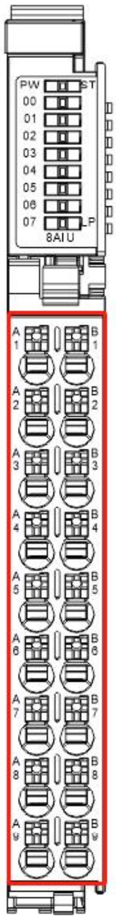
7.1 Specifications

Technical Information	
Product Description	Analog input modules,8Input, voltage type
Number of channels	8
Signal Type	Voltage, single-ended input
Resolution	16 Bit
Voltage measurement range	±10V,0~10V,2~10V,±5V,0~5V,1~5V
Input Impedance	>400KΩ
Voltage input accuracy(Full temperature range)	0.2%
Voltage input limit	±15V
Voltage input diagnostics	2~10V,1~5VSupport disconnection detection
Isolation	The interface channels are not isolated, the power supply is isolated from the interface, and the interface is isolated from the bus.
Independent channel enable configuration	support

Diagnosis reporting function configuration	support
Channel Mode Configuration	Disable, ±10V,0-10V,2-10V,±5V,0-5V,1-5V
Filter parameter configuration	1000Hz~50HzConfigurable
Stop Mode	Keep the current value and do not refresh
Input Action Display	When the input signal is valid, the input indicator flashes (software controlled)
IOProcess data size	16 Word
Power parameters	
System bus input power rated voltage	5V DC（4.75V DC~ 5.25V DC）
System bus input power rated current	33mA
Internal load power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Internal load power input rated current	42mA
Wiring parameters	
Connection technology: Input/Output	PUSH-INTerminal Blocks
Wire crimping area	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm/0.31~0.35 inches
Installation	DIN-35Type guide rail
Material parameters	
color	black
Housing Material	PCplastic,PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60℃
Permissible ambient temperature (storage)	-40~85℃
Protection type	IP20
Pollution degree	2,conform toIEC 61131-2standard
Operating altitude	No temperature derating:0~2000m
Installation location	Any
Relative humidity (non-condensing)	5~95%RH
Vibration resistance	1g,conform toIEC 60068-2-6standard
Shock resistance	15g,conform toIEC 60068-2-27standard
EMCAnti-interference level	conform toIEC 61000-4standard
Corrosion resistance	conform toIEC 60068-2-42andIEC 60068-2-43standard
Relative humidity 75 %AllowedH2SPollutant concentration	10ppm
Relative humidity 75 %AllowedSO2Pollutant concentration	25ppm

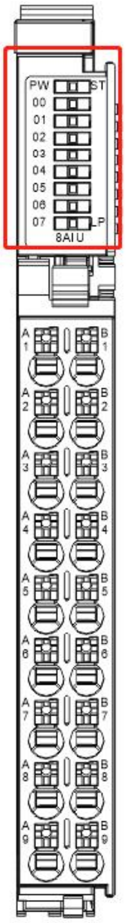
7.2 Hardware Interface

7.2.1 Terminal Block Definition



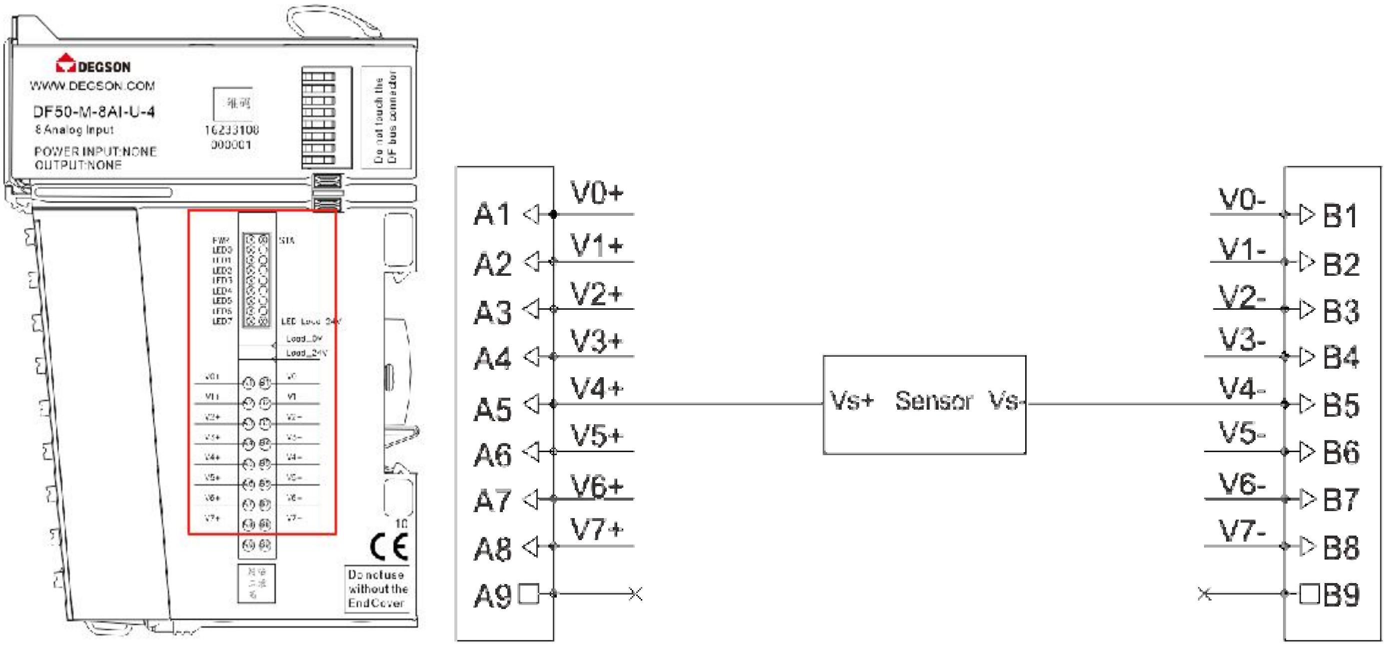
Terminal number	Signal	Terminal number	Signal	illustrate
A1	V0+	B1	V0-	Voltage input channel0
A2	V1+	B2	V1-	Voltage input channel1
A3	V2+	B3	V2-	Voltage input channel2
A4	V3+	B4	V3-	Voltage input channel3
A5	V4+	B5	V4-	Voltage input channel4
A6	V5+	B6	V5-	Voltage input channel5
A7	V6+	B7	V6-	Voltage input channel6
A8	V7+	B8	V7-	Voltage input channel7
A9	/	B9	/	/

7.2.2 LED indicator definition



<table>
<tr><th>Indicator Lights</th><th colspan="2">meaning</th></tr>
<tr><td rowspan="2">PW</td><td colspan="2">Green Bright:System bus power inputnormal</td></tr>
<tr><td colspan="2">Green Kill:System bus power inputabnormal</td></tr>
<tr><td rowspan="4">ST</td><td rowspan="2">Power-on stage</td><td>Green: Module initialization error</td></tr>
<tr><td>Green off: Module initialization is normal</td></tr>
<tr><td rowspan="2">Operational stage</td><td>Green flash: The internal bus of the module is working normally</td></tr>
<tr><td>Green Kill/Green: The internal bus of the module is working abnormally or the internal load power input is abnormal.</td></tr>
<tr><td rowspan="2">LP</td><td colspan="2">Green: Internal load power input is normal</td></tr>
<tr><td colspan="2">Green off: Internal load power input is abnormal</td></tr>
<tr><td rowspan="2">00~07</td><td colspan="2">Green Flash:Input signal valid</td></tr>
<tr><td colspan="2">Green Kill:Invalid input signal</td></tr>
</table>

7.2.3 Wiring Diagram



7.3 Configuration Data Definition

index	Sub-index	name	Size	Value range	default value	meaning
16#8002	3	Ch0: Signal Range	1.0	SeeEn0814surface	0	aisle0Signal range configuration
	4	Ch1: Signal Range	1.0			aisle1Signal range configuration
	5	Ch2: Signal Range	1.0			aisle2Signal range configuration
	6	Ch3: Signal Range	1.0			aisle3Signal range configuration
	7	Ch4: Signal Range	1.0			aisle4Signal range configuration
	8	Ch5: Signal Range	1.0			aisle5Signal range configuration
	9	Ch6: Signal Range	1.0			aisle6Signal range configuration
	10	Ch7: Signal Range	1.0			aisle7Signal range configuration
	11	Ch0: Input Filter	1.0	SeeEn0812surface	10	aisle0Sampling frequency configuration
	12	Ch1: Input Filter	1.0			aisle1Sampling frequency configuration
	13	Ch2: Input Filter	1.0			aisle2Sampling frequency configuration
	14	Ch3: Input Filter	1.0			aisle3Sampling frequency configuration
	15	Ch4: Input Filter	1.0			aisle4Sampling frequency configuration
	16	Ch5: Input Filter	1.0			aisle5Sampling frequency configuration
	17	Ch6: Input Filter	1.0			aisle6Sampling frequency

						configuration
	18	Ch7: Input Filter	1.0			aisle7Sampling frequency configuration
Note: This module is inserted after the coupler.1card slots, thenSDOIndex is16#8002, if inserted in2card slots, thenSDOIndex is16#8012, the index offset is16#10.						

Table En0814

Sub-index object data	name	meaning
0	Disable	Turn off signal acquisition
1	-10V~+10V	±10VSignal range
2	0V~+10V	0~10VSignal range
3	2V~+10V	2~10VSignal range
4	-5V~+5V	±5VSignal range
5	0V~+5V	0~5VSignal range
6	1V~+5V	1~5VSignal range
17	-10V~+10V OverRange	±10VRange plus underflow detection
18	0V~+10V OverRange	0~10VRange plus overflow detection
19	2V~+10V OverRange	2~10VRange plus underflow detection
20	-5V~+5V OverRange	±5VRange plus underflow detection
twenty one	0V~+5V OverRange	0~5VRange plus up and down detection
twenty two	1V~+5V OverRange	1~5VRange plus underflow detection

Table En0812

Sub-index object data	name	meaning
1	1000HZ_1ms	Sampling rate1KHZ
2	500HZ_2ms	Sampling rate500HZ
4	250HZ_4ms	Sampling rate250HZ
8	125HZ_8ms	Sampling rate125HZ
10	100HZ_10ms	Sampling rate100HZ
20	50HZ_20ms	Sampling rate50HZ

7.4 Process Data Definition

TXPDO			
Name	Type	Size	meaning
AD Value CH0	INT	2.0	aisle0Input Data
AD Value CH1	INT	2.0	aisle1Input Data
AD Value CH2	INT	2.0	aisle2Input Data
AD Value CH3	INT	2.0	aisle3Input Data
AD Value CH4	INT	2.0	aisle4Input Data
AD Value CH5	INT	2.0	aisle5Input Data

AD Value CH6	INT	2.0	aisle6Input Data
AD Value CH7	INT	2.0	aisle7Input Data

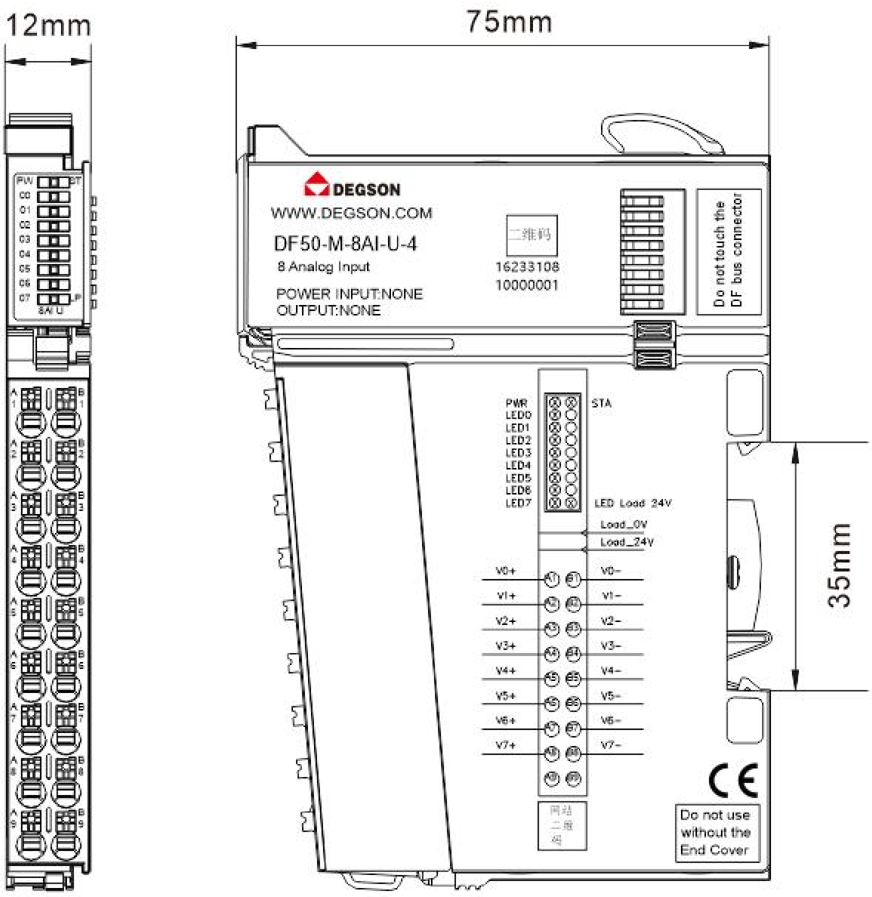
Channel input data description:

Signal range	Voltage value (U）	Decimal data	Hexadecimal data	Scope	Conversion relationship
-10V~+10V	10V	32767	0x7FFF	Normal range	D = 32767 x U / 10 U = D x 10 / 32767
	0V	0	0		
	-10V	-32768	0x8000		
0V~+10V	10V	32767	0x7FFF	Normal range	D = 32767 x U / 10 U = D x 10 / 32767
	5V	16384	0x4000		
	0V	0	0		
2V~+10V	10V	32767	0x7FFF	Normal range	D = 32767 x (U – 2) / 8 U = D x 8 / 32767 + 2
	6V	16384	0x4000		
	2V	0	0		
-5V~+5V	5V	32767	0x7FFF	Normal range	D = 32767 x U / 5 U = D x 5 / 32767
	0V	0	0x0000		
	-5V	-32768	0x8000		
0V~+5V	5V	32767	0x7FFF	Normal range	D = 32767 x U / 5 U = D x 5 / 32767
	2.5V	16384	0x4000		
	0V	0	0		
1V~+5V	5V	32767	0x7FFF	Normal range	D = 32767 x (U – 1) / 4 U = D x 4 / 32767 + 1
	3V	16384	0x4000		
	1V	0	0		
±10V OverRange	>11.76V	32767	0x7FFF	Overflow	D = 27648 x U / 10 U = D x 10 / 27648
	11.76V	32511	0x7EFF	Upper limit	
	10V	27648	0x6C00	Normal range	
	5V	13824	0x3600		
	0V	0	0x0000		
	-5V	-13824	0xCA00		
	-10V	-27648	0x9400		
	-11.76V	-32511	0x8100	Lower limit	
	<-11.76V	-32768	0x8000	Underflow	
0~10V OverRange	>11.76V	32767	0x7FFF	Overflow	D = 27648 x U / 10 U = D x 10 / 27648
	11.76V	32511	0x7EFF	Upper limit	
	10V	27648	0x6C00	Normal range	
	5V	13824	0x3600		
	0V	0	0x0000		
2~10V	>11.41V	32767	0x7FFF	Overflow	D = 27648 x (U – 2) / 8

OverRange	11.41V	32511	0x7EFF	Upper limit	U = D x 8 / 27648 + 2
	10V	27648	0x6C00	Normal range	
	6V	13824	0x3600		
	2V	0	0x0000		
	0.59 V	-4864	0xED00	Lower limit	
	<0.59 V	-32768	0x8000	Underflow	
±5V OverRange	>5.88V	32767	0x7FFF	Overflow	D = 27648 x U / 5 U = D x 5 / 27648
	5.88V	32511	0x7EFF	Upper limit	
	5V	27648	0x6C00	Normal range	
	2.5V	13824	0x3600		
	0V	0	0x0000		
	-2.5V	-13824	0xCA00		
	-5V	-27648	0x9400		
	-5.88V	-32511	0x8100	Lower limit	
	<-5.88V	-32768	0x8000	Underflow	
0~5V OverRange	>5.88V	32767	0x7FFF	Overflow	D = 27648 x U / 5 U = D x 5 / 27648
	5.88V	32511	0x7EFF	Upper limit	
	5V	27648	0x6C00	Normal range	
	2.5V	13824	0x3600		
	0V	0	0x0000		
1~5V OverRange	>5.7V	32767	0x7FFF	Overflow	D = 27648 x (U – 1) / 4 U = D x 4 / 27648 + 1
	5.7V	32511	0x7EFF	Upper limit	
	5V	27648	0x6C00	Normal range	
	3V	13824	0x3600		
	1V	0	0x0000		
	0.3V	-4864	0xED00	Lower limit	
	<0.3V	-32768	0x8000	Underflow	

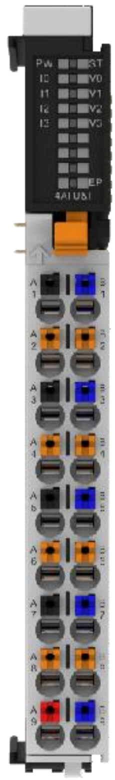
7.5 Mechanical Installation

The installation dimension information is shown in the figure below, the unit is (mm）:


12mm
75mm
35mm
DEGSON
WWW.DEGSON.COM
DF50-M-8AI-U-4
8 Analog Input
POWER INPUT:NONE
OUTPUT:NONE
16233108
10000001
Do not touch the DF bus connector
PWR
LED0
LED1
LED2
LED3
LED4
LED5
LED6
LED7
STA
LED Load 24V
Load_0V
Load_24V
V0+
V1+
V2+
V3+
V4+
V5+
V6+
V7+
V0-
V1-
V2-
V3-
V4-
V5-
V6-
V7-
Do not use without the End Cover

8 4-channel analog output/voltage type/current type (DF50-M-4AO-UI-6)

- The analog output module can output voltage and current standard signals.
- 4-channel analog output, voltage type, current type.
- The two LED indicators indicate that the module is operating normally and communicating normally.
- Magnetic isolation between the field level and the system level.
- Transmitted in 16-bit resolution.
- Protection grade IP20



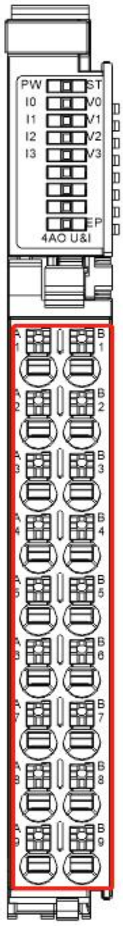
8.1 Specifications

Technical Information	
Product Description	Analog output modules,4Output, voltage type&Current Type
Number of channels	4
Signal Type	Voltage/Current, single-ended signal
Resolution	16 Bit
Voltage output range	±10V,0~10V,2~10V,±5V,0~5V,1~5V
Voltage output load	>1KΩ
Voltage output accuracy	±0.1%
Current output range	0~20mA,4~20mA
Current output load	<600Ω
Current output accuracy	±0.1%
Isolation	The interface channels are not isolated, the power supply is isolated from the interface, and the interface is isolated from the bus.
Independent channel enable configuration	support
Diagnosis reporting function configuration	support

Channel Mode Configuration	Disable,±10V,0~10V,2~10V,±5V,0~5V,1~5V,0~20mA,4~20mA
Output status configuration after shutdown	Clear, keep current value or output preset value
Stop Mode	In the fault shutdown mode, no more refresh
Input Action Display	When the output signal is valid, the output indicator light flashes (software controlled)
IOProcess data size	4 Word
Power parameters	
System bus input power rated voltage	5V DC（4.75V DC~ 5.25V DC）
System bus input power rated current	35mA
Terminal power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated current	90mA
Terminal power output rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power output rated current	0.5A/Each power output channel
Wiring parameters	
Connection technology	PUSH-INTerminal Blocks
Wire crimping area	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm
Installation	DIN-35Type guide rail
Material parameters	
color	black
Housing Material	PCplastic,PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60℃
Permissible ambient temperature (storage)	-40~85℃
Protection type	IP20
Pollution degree	2,conform toIEC 61131-2standard
Operating altitude	No temperature derating:0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration resistance	1g,conform toIEC 60068-2-6standard
Shock resistance	15g,conform toIEC 60068-2-27standard
EMCAnti-interference level	conform toIEC 61000-4standard
Corrosion resistance	conform toIEC 60068-2-42andIEC 60068-2-43standard
Relative humidity 75 %AllowedH2SPollutant concentration	10ppm
Relative humidity 75 %AllowedSO2Pollutant concentration	25ppm

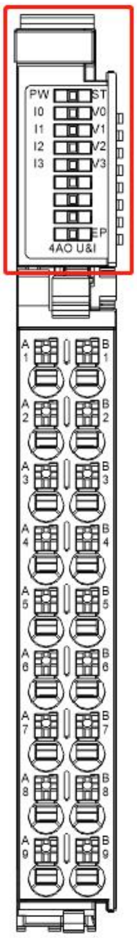
8.2 Hardware Interface

8.2.1 Terminal Definition



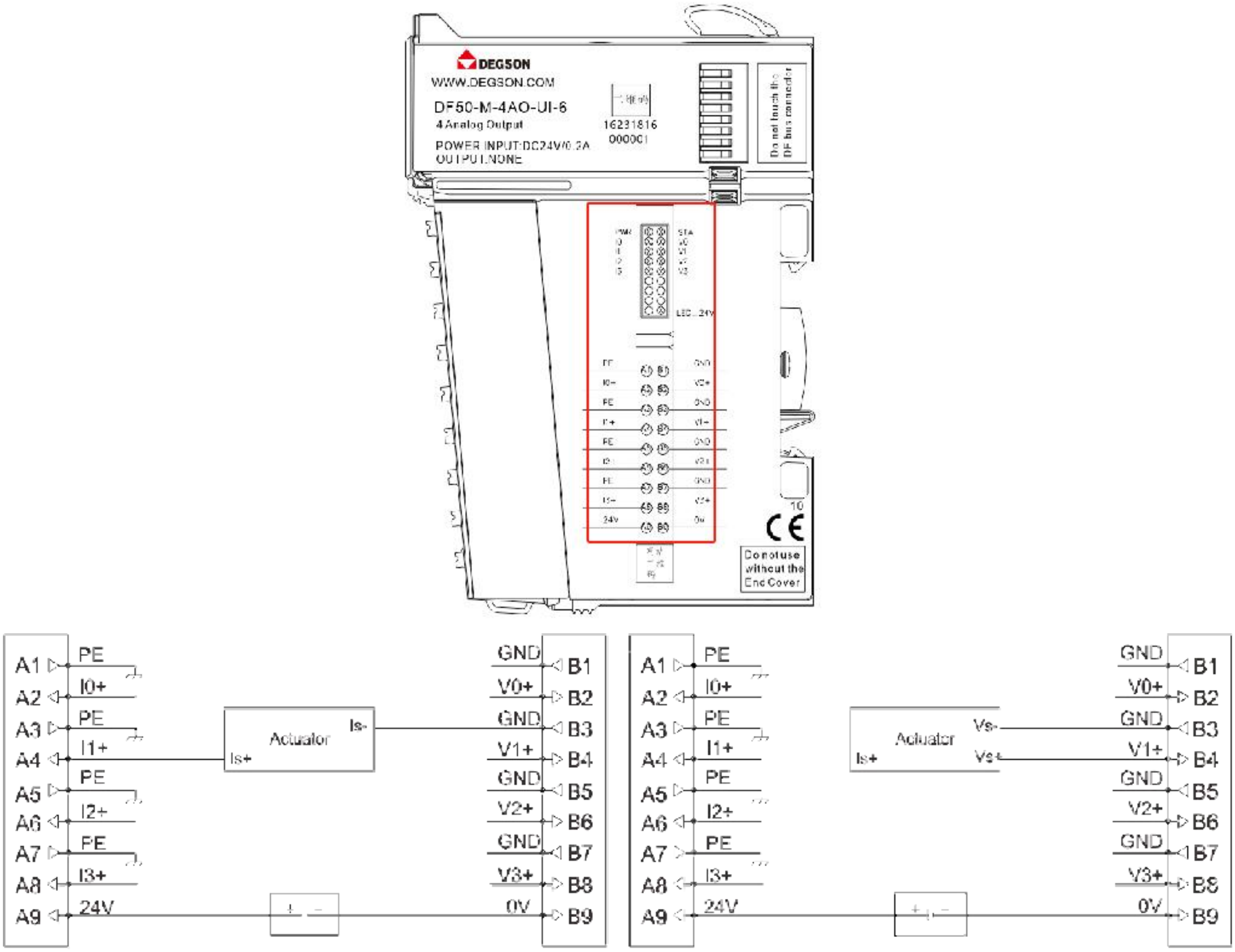
Terminal number	Signal	illustrate	Terminal number	Signal	illustrate
A1	PE	Safely	B1	GND	Voltage/Negative current
A2	I0+	Current output channel0	B2	V0+	Voltage output channel0
A3	PE	Safely	B3	GND	Voltage/Negative current
A4	I1+	Current output channel1	B4	V1+	Voltage output channel1
A5	PE	Safely	B5	GND	Voltage/Negative current
A6	I2+	Current output channel2	B6	V2+	Voltage output channel2
A7	PE	Safely	B7	GND	Voltage/Negative current
A8	I3+	Current output channel3	B8	V3+	Voltage output channel3
A9	24V	Terminal power input24V	B9	0V	Terminal power input0V

8.2.2 LED indicator definition



<table>
<tr><th>Indicator Lights</th><th colspan="2">meaning</th></tr>
<tr><td rowspan="2">PW</td><td colspan="2">Green Bright:System bus power inputnormal</td></tr>
<tr><td colspan="2">Green Kill:System bus power inputabnormal</td></tr>
<tr><td rowspan="4">ST</td><td rowspan="2">Power-on stage</td><td>Green: Module initialization error</td></tr>
<tr><td>Green off: Module initialization is normal</td></tr>
<tr><td rowspan="2">Operational stage</td><td>Green flash: The internal bus of the module is working normally</td></tr>
<tr><td>Green Kill/Green: The internal bus of the module is working abnormally or the terminal power input is abnormal.</td></tr>
<tr><td rowspan="2">EP</td><td colspan="2">Green: The terminal power input is normal</td></tr>
<tr><td colspan="2">Green off: Terminal power input abnormality</td></tr>
<tr><td rowspan="2">I0~I3,V0~V3</td><td colspan="2">Green Flash:Output signal valid</td></tr>
<tr><td colspan="2">Green Kill:Output signal invalid</td></tr>
</table>

8.2.3 Wiring diagram



电流型接线　　　　电压型接线

Remark:A9,B9 24VThe power supply is provided externally.

8.3 Configuration Data Definition

index	Sub-index	name	Size	Value range	default value	meaning
16#8002	1	Output Behavior On Fieldbus Error	1.0	SeeEn0820surface	0	Fieldbus Error Output Mode Configuration
	3	Ch0: Signal Range	1.0	SeeEn0811surface	0	aisle0Signal range configuration
	4	Ch1: Signal Range	1.0			aisle1Signal range configuration
	5	Ch2: Signal Range	1.0			aisle2Signal range configuration
	6	Ch3: Signal Range	1.0			aisle3Signal range configuration
	19	Ch0: Substitute Value	2.0	-32768~32767	0	aisle0Output Preset
	20	Ch1: Substitute Value	2.0			aisle1Output Preset
	twenty one	Ch2: Substitute Value	2.0			aisle2Output Preset
	twenty two	Ch3: Substitute Value	2.0			aisle3Output Preset

Note: This module is inserted after the coupler.1card slots, thenSDOIndex is16#8002, if inserted in2card slots, thenSDOIndex is16#8012, the index offset is16#10.

Table En0820

Sub-index object data	name	meaning
0	All outputs off	Turn off all channel outputs
1	Enable substitute value	Enable preset value output
2	Hold last value	Keep current output

Table En0811

Sub-index object data	name	meaning
0	Disable	Turn off signal acquisition
1	-10V~+10V	±10VSignal range
2	0V~+10V	0~10VSignal range
3	2V~+10V	2~10VSignal range
4	-5V~+5V	±5VSignal range
5	0V~+5V	0~5VSignal range
6	1V~+5V	1~5VSignal range
17	-10V~+10V OverRange	±10VRange plus out-of-range detection
18	0V~+10V OverRange	0~10VRange plus out-of-range detection
19	2V~+10V OverRange	2~10VRange plus out-of-range detection
20	-5V~+5V OverRange	±5VRange plus out-of-range detection
twenty one	0V~+5V OverRange	0~5VRange plus out-of-range detection
twenty two	1V~+5V OverRange	1~5VRange plus out-of-range detection
twenty three	0~20mA OverRange	0~20maRange plus out-of-range detection
twenty four	4~20mA OverRange	4~20maRange plus out-of-range detection
25	0~20ma	0~20maSignal range
26	4~20ma	4~20maSignal range

RXPDO			
Name	Type	Size	meaning
AD Value CH0	INT	2.0	No.0Channel output data
AD Value CH1	INT	2.0	No.1Channel output data
AD Value CH2	INT	2.0	No.2Channel output data
AD Value CH3	INT	2.0	No.3Channel output data

8.4 Process Data Definition

Channel output data description:

Signal range	Voltage value (U)	Decimal data	Hexadecimal data	Scope	Conversion relationship
-10V~+10V	10V	32767	0x7FFF	Normal range	D = 32767 x U / 10 U = D x 10 / 32767
	0V	0	0		
	-10V	-32768	0x8000		
0V~+10V	10V	32767	0x7FFF	Normal range	D = 32767 x U / 10 U = D x 10 / 32767
	5V	16384	0x4000		
	0V	0	0		
2V~+10V	10V	32767	0x7FFF	Normal range	D = 32767 x (U – 2) / 8 U = D x 8 / 32767 + 2
	6V	16384	0x4000		
	2V	0	0		
-5V~+5V	5V	32767	0x7FFF	Normal range	D = 32767 x U / 5 U = D x 5 / 32767
	0V	0	0x0000		
	-5V	-32768	0x8000		
0V~+5V	5V	32767	0x7FFF	Normal range	D = 32767 x U / 5 U = D x 5 / 32767
	2.5V	16384	0x4000		
	0V	0	0		
1V~+5V	5V	32767	0x7FFF	Normal range	D = 32767 x (U – 1) / 4 U = D x 4 / 32767 + 1
	3V	16384	0x4000		
	1V	0	0		
±10V OverRange	0V	>32511	>0x7EFF	Overflow	D = 27648 x U / 10 U = D x 10 / 27648
	11.76V	32511	0x7EFF	Upper limit	
	10V	27648	0x6C00	Normal range	
	5V	13824	0x3600		
	0V	0	0x0000		
	-5V	-13824	0xCA00		
	-10V	-27648	0x9400		
	-11.76V	-32511	0x8101	Lower limit	
	0V	<-32511	<0x8101	Underflow	
0-10V OverRange	0V	>32511	>0x7EFF	Overflow	D = 27648 x U / 10 U = D x 10 / 27648
	11.76V	32511	0x7EFF	Upper limit	
	10V	27648	0x6C00	Normal range	
	5V	13824	0x3600		
	0V	0	0x0000		
2-10V OverRange	0V	>32511	>0x7EFF	Overflow	D = 27648 x (U – 2) / 8 U = D x 8 / 27648 + 2
	11.41V	32511	0x7EFF	Upper limit	
	10V	27648	0x6C00	Normal range	
	6V	13824	0x3600		
	2V	0	0x0000		

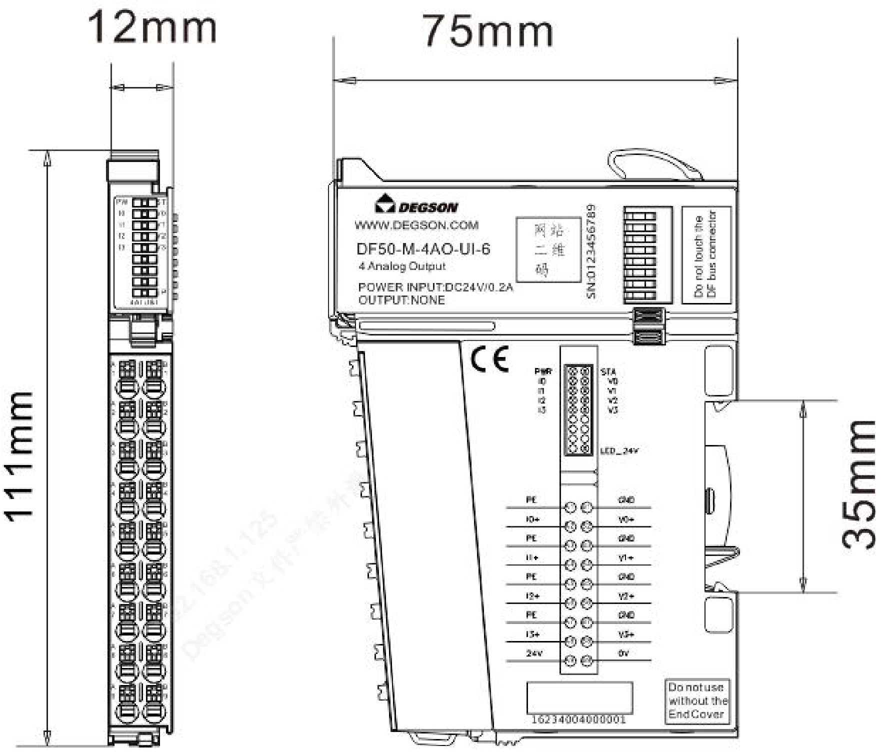
	0.59 V	-4864	0xED00	Lower limit	
	0 V	<-4864	<ED00	Underflow	
±5V OverRange	0V	>32511	>7EFF	Overflow	D = 27648 x U / 5 U = D x 5 / 27648
	5.88V	32511	0x7EFF	Upper limit	
	5V	27648	0x6C00	Normal range	
	2.5V	13824	0x3600		
	0V	0	0x0000		
	-2.5V	-13824	0xCA00		
	-5V	-27648	0x9400		
	-5.88V	-32511	0x8100	Lower limit	
	0V	<-32511	<0x8100	Underflow	
0-5V OverRange	0V	>32511	>0x7EFF	Overflow	D = 27648 x U / 5 U = D x 5 / 27648
	5.88V	32511	0x7EFF	Upper limit	
	5V	27648	0x6C00	Normal range	
	2.5V	13824	0x3600		
	0V	0	0x0000		
1-5V OverRange	0V	>32511	>0x7EFF	Overflow	D = 27648 x (U – 1) / 4 U = D x 4 / 27648 + 1
	5.7V	32511	0x7EFF	Upper limit	
	5V	27648	0x6C00	Normal range	
	3V	13824	0x3600		
	1V	0	0x0000		
	0.3V	-4864	0xED00	Lower limit	
	0V	<-4864	<0xED00	Underflow	

Signal range	Current value (I）	Decimal data	Hexadecimal data	Scope	Conversion relationship
0~20ma	20ma	32767	0x7FFF	Normal range	D = 32767 xI/ 20 I= D x 10 / 32767
	10ma	16383	0x3FFF		
	0	0	0		
4~20ma	20ma	32767	0x7FFF	Normal range	D = 32767 x (I-4)/ 16 I= D x 16/ 32767+4
	10ma	16384	0x4000		
	4ma	0	0		
0~20mA OverRange	0ma	>32511	>0x7EFF	Overflow	D = 27648 xI/ 20 I= D x 20/ 27648
	23.52ma	32511	0x7EFF	Upper limit	
	20ma	27648	0x6C00	Normal range	
	10ma	13824	0x3600		
	0ma	0	0x0000		
4~20mA	0ma	>32511	>0x7EFF	Overflow	D = 27648 x (I– 4) / 16

OverRange	22.81ma	32511	0x7EFF	Upper limit	I= D x 16 / 27648 + 4
	20ma	27648	0x6C00	Normal range	
	12ma	13824	0x3600		
	4ma	0	0x0000		
	1.19ma	-4864	0xED00	Lower limit	
	0ma	<-4864	<0xED00	Underflow	

8.5 Mechanical Installation

The installation dimension information is shown in the figure below, the unit is (mm）:



9 8-channel analog output/voltage type (DF50-M-8AO-U-4)

- The analog output module can output voltage standard signal.
- 8-channel analog output, voltage type.
- The two LED indicators indicate that the module is operating normally and communicating normally.
- Magnetic isolation between the field level and the system level.
- Transmitted in 16-bit resolution.
- Protection grade IP20

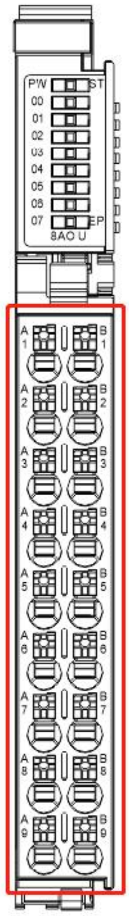
9.1 Specifications

Technical Information	
Product Description	Analog output modules,8Output, voltage type
Number of channels	8
Output signal type	Voltage, single-ended signal
Resolution	16 Bit
Voltage output range	±10V,0~10V,2~10V,±5V,0~5V,1~5V
Voltage output load	>1KΩ
Voltage output accuracy(Full temperature range)	±0.1%
Isolation	The interface channels are not isolated, the power supply is isolated from the interface, and the interface is isolated from the bus.
Independent channel enable configuration	support
Diagnosis reporting function configuration	support
Channel Mode Configuration	Disable,±10V,0~10V,2~10V,±5V,0~5V,1~5V
Output status configuration after shutdown	Clear, keep current output or output preset value
Stop Mode	In the fault shutdown mode, no more refresh

Input Action Display	When the output signal is valid, the output indicator light flashes (software controlled)
IOProcess data size	4 Word
Power parameters	
System bus input power rated voltage	5V DC（4.75V DC~ 5.25V DC）
System bus input power rated current	35mA
Terminal power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated current	90mA
Wiring parameters	
Connection technology: Output	PUSH-INTerminal Blocks
Wire crimping area	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm
Installation	DIN-35Type guide rail
Material parameters	
color	black
Housing Material	PCplastic,PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60℃
Permissible ambient temperature (storage)	-40~85℃
Protection type	IP20
Pollution degree (5）	2,conform toIEC 61131-2standard
Operating altitude	No temperature derating:0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration resistance	1g,conform toIEC 60068-2-6standard
Shock resistance	15g,conform toIEC 60068-2-27standard
EMCAnti-interference level	conform toIEC 61000-4standard
Corrosion resistance	conform toIEC 60068-2-42andIEC 60068-2-43standard
Relative humidity 75 %AllowedH2SPollutant concentration	10ppm
Relative humidity 75 %AllowedSO2Pollutant concentration	25ppm

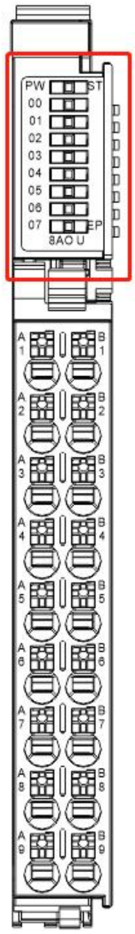
9.2 Hardware Interface

9.2.1 Terminal Definition



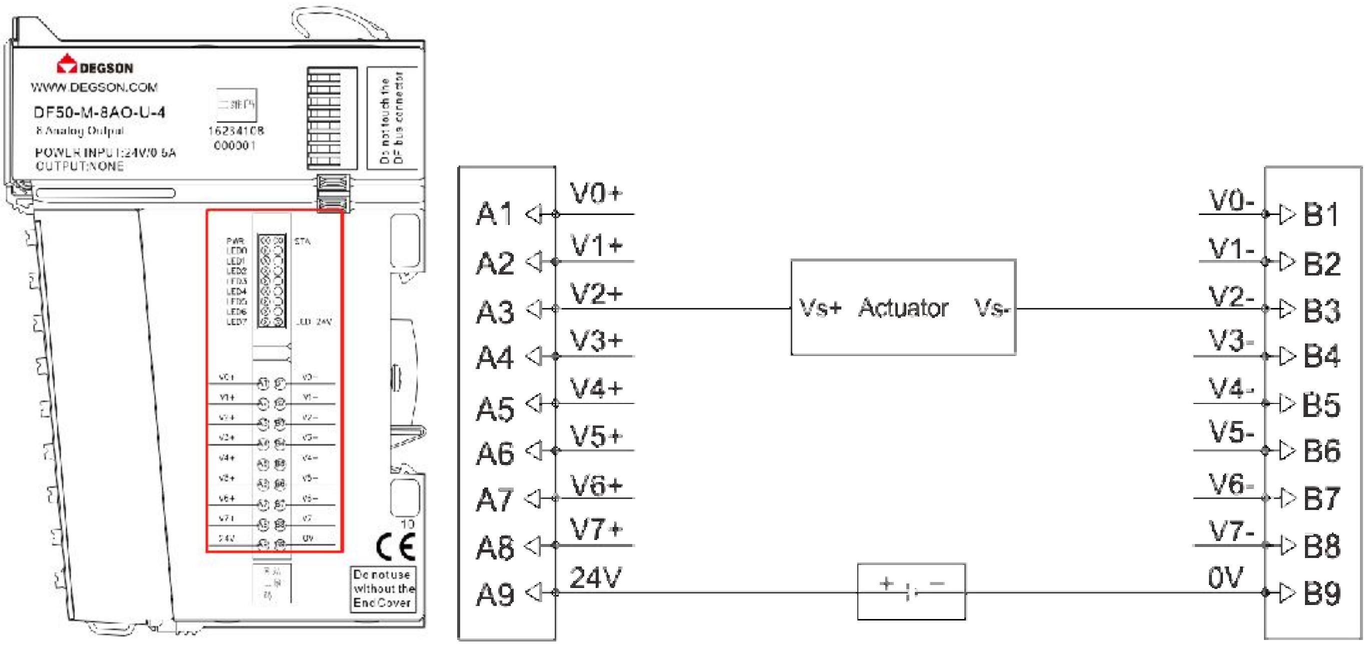
Terminal number	Signal	Terminal number	Signal	illustrate
A1	V0+	B1	V0-	Voltage output channel 0
A2	V1+	B2	V1-	Voltage output channel 1
A3	V2+	B3	V2-	Voltage output channel 2
A4	V3+	B4	V3-	Voltage output channel 3
A5	V4+	B5	V4-	Voltage output channel 4
A6	V5+	B6	V5-	Voltage output channel 5
A7	V6+	B7	V6-	Voltage output channel 6
A8	V7+	B8	V7-	Voltage output channel 7
A9	24V	B9	0V	Terminal power input

9.2.2 LED indicator definition



<table>
<tr><th>Indicator Lights</th><th colspan="2">meaning</th></tr>
<tr><td rowspan="2">PW</td><td colspan="2">Green Bright:System bus power inputnormal</td></tr>
<tr><td colspan="2">Green Kill:System bus power inputabnormal</td></tr>
<tr><td rowspan="4">ST</td><td rowspan="2">Power-on stage</td><td>Green: Module initialization error</td></tr>
<tr><td>Green off: Module initialization is normal</td></tr>
<tr><td rowspan="2">Operational stage</td><td>Green flash: The internal bus of the module is working normally</td></tr>
<tr><td>Green Kill/Green: The internal bus of the module is working abnormally or the terminal power input is abnormal.</td></tr>
<tr><td rowspan="2">EP</td><td colspan="2">Green: The terminal power input is normal</td></tr>
<tr><td colspan="2">Green off: Terminal power input abnormality</td></tr>
<tr><td rowspan="2">V0~V7</td><td colspan="2">Green Flash:Output signal valid</td></tr>
<tr><td colspan="2">Green Kill:Output signal invalid</td></tr>
</table>

9.2.3 Wiring Diagram



Remark:A9,B9 24VThe power supply is provided externally.

9.3 Configuration Data Definition

index	Sub-index	name	Size	Value range	default value	meaning
	1	Output behavior On Fieldbus Error	1.0	SeeEn0820surface	0	Fieldbus Error Output Configuration Mode
16#8002	3	Ch0: Signal Range	1.0	SeeEn0814surface	0	aisle0Signal range configuration
	4	Ch1: Signal Range				aisle1Signal range configuration
	5	Ch2: Signal Range				aisle2Signal range configuration
	6	Ch3: Signal Range				aisle3Signal range configuration
	7	Ch4: Signal Range				aisle4Signal range configuration
	8	Ch5: Signal Range				aisle5Signal range configuration
	9	Ch6: Signal Range				aisle6Signal range configuration
	10	Ch7: Signal Range				aisle7Signal range configuration
	19	Ch0: Substitute Value	2.0	-32768~32767	0	aisle0Output Preset
	20	Ch1: Substitute Value				aisle1Output Preset
	twenty one	Ch2: Substitute Value				aisle2Output Preset
	twenty two	Ch3: Substitute Value				aisle3Output Preset
	twenty three	Ch4: Substitute Value				aisle4Output Preset

	twenty four	Ch5: Substitute Value				aisle5Output Preset
	25	Ch6: Substitute Value				aisle6Output Preset
	26	Ch7: Substitute Value				aisle7Output Preset
Note: This module is inserted after the coupler.1card slots, thenSDOIndex is16#8002, if inserted in2card slots, thenSDOIndex is16#8012, the index offset is16#10.						

Table En0820

Sub-index object data	name	meaning
0	All outputs off	Turn off all channel outputs
1	Enable substitute value	Enable preset value
2	Hold last value	Keep current output

Table En0814

Sub-index object data	name	meaning
0	Disable	Turn off signal acquisition
1	-10V~+10V	±10VSignal range
2	0V~+10V	0~10VSignal range
3	2V~+10V	2~10VSignal range
4	-5V~+5V	±5VSignal range
5	0V~+5V	0~5VSignal range
6	1V~+5V	1~5VSignal range
17	-10V~+10V OverRange	±10VRange plus over-range control
18	0V~+10V OverRange	0~10VRange plus over-range control
19	2V~+10V OverRange	2~10VRange plus over-range control
20	-5V~+5V OverRange	±5VRange plus over-range control
twenty one	0V~+5V OverRange	0~5VRange plus over-range control
twenty two	1V~+5V OverRange	1~5VRange plus over-range control

9.4 Process Data Definition

RXPDO			
Name	Type	Size	meaning
AD Value CH0	INT	2.0	Channel 0 output data
AD Value CH1	INT	2.0	Channel 1 output data
AD Value CH2	INT	2.0	Channel 2 output data
AD Value CH3	INT	2.0	Channel 3 output data

AD Value CH4	INT	2.0	Channel 4 output data
AD Value CH5	INT	2.0	Channel 5 output data
AD Value CH6	INT	2.0	Channel 6 output data
AD Value CH7	INT	2.0	Channel 7 output data

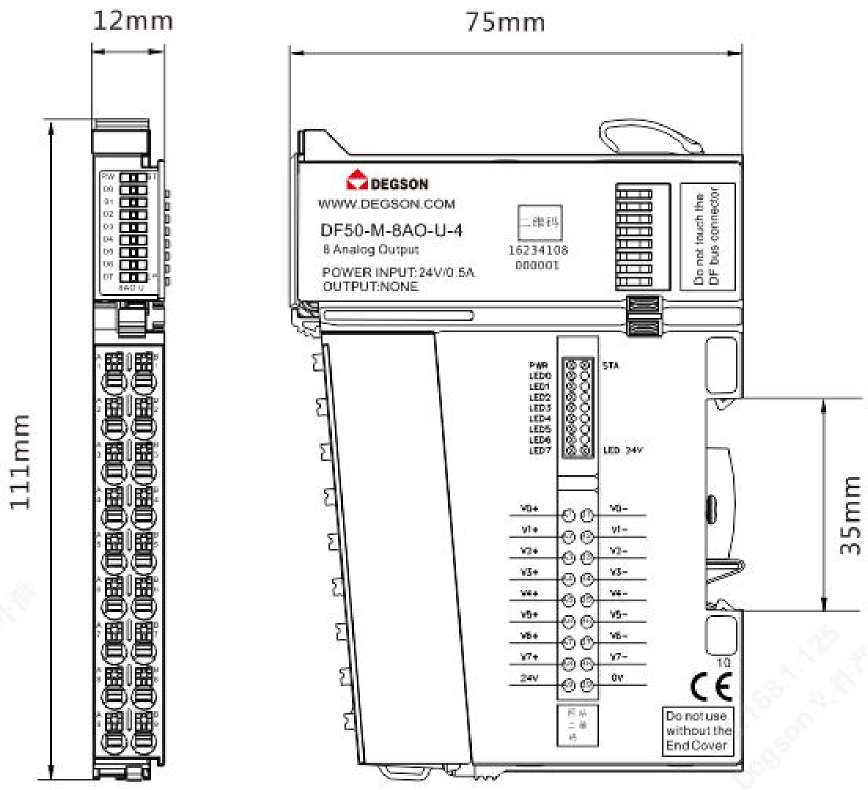
Channel output data description:

Signal range	Voltage value (U)	Decimal data	Hexadecimal data	Scope	Conversion relationship
-10V~+10V	10V	32767	0x7FFF	Normal range	D = 32767 x U / 10 U = D x 10 / 32767
	0V	0	0		
	-10V	-32768	0x8000		
0V~+10V	10V	32767	0x7FFF	Normal range	D = 32767 x U / 10 U = D x 10 / 32767
	5V	16384	0x4000		
	0V	0	0		
2V~+10V	10V	32767	0x7FFF	Normal range	D = 32767 x (U – 2) / 8 U = D x 8 / 32767 + 2
	6V	16384	0x4000		
	2V	0	0		
-5V~+5V	5V	32767	0x7FFF	Normal range	D = 32767 x U / 5 U = D x 5 / 32767
	0V	0	0x0000		
	-5V	-32768	0x8000		
0V~+5V	5V	32767	0x7FFF	Normal range	D = 32767 x U / 5 U = D x 5 / 32767
	2.5V	16384	0x4000		
	0V	0	0		
1V~+5V	5V	32767	0x7FFF	Normal range	D = 32767 x (U – 1) / 4 U = D x 4 / 32767 + 1
	3V	16384	0x4000		
	1V	0	0		
±10V OverRange	0V	>32511	>0x7EFF	Overflow	D = 27648 x U / 10 U = D x 10 / 27648
	11.76V	32511	0x7EFF	Upper limit	
	10V	27648	0x6C00	Normal range	
	5V	13824	0x3600		
	0V	0	0x0000		
	-5V	-13824	0xCA00		
	-10V	-27648	0x9400		
	-11.76V	-32511	0x8101	Lower limit	
	0V	<-32511	<0x8101	Underflow	
0-10V OverRange	0V	>32511	>0x7EFF	Overflow	D = 27648 x U / 10 U = D x 10 / 27648
	11.76V	32511	0x7EFF	Upper limit	
	10V	27648	0x6C00	Normal range	
	5V	13824	0x3600		

	0V	0	0x0000		
2-10V OverRange	0V	>32511	>0x7EFF	Overflow	D = 27648 x (U – 2) / 8 U = D x 8 / 27648 + 2
	11.41V	32511	0x7EFF	Upper limit	
	10V	27648	0x6C00	Normal range	
	6V	13824	0x3600		
	2V	0	0x0000		
	0.59 V	-4864	0xED00	Lower limit	
	0 V	<-4864	<0xED00	Underflow	
±5V OverRange	0V	>32511	>0x7EFF	Overflow	D = 27648 x U / 5 U = D x 5 / 27648
	5.88V	32511	0x7EFF	Upper limit	
	5V	27648	0x6C00	Normal range	
	2.5V	13824	0x3600		
	0V	0	0x0000		
	-2.5V	-13824	0xCA00		
	-5V	-27648	0x9400		
	-5.88V	-32511	0x8100	Lower limit	
	0V	<-32511	<0x8101	Underflow	
0-5V OverRange	0V	>32511	>0x7EFF	Overflow	D = 27648 x U / 5 U = D x 5 / 27648
	5.88V	32511	0x7EFF	Upper limit	
	5V	27648	0x6C00	Normal range	
	2.5V	13824	0x3600		
	0V	0	0x0000		
1-5V OverRange	0V	>32511	>0x7EFF	Overflow	D = 27648 x (U – 1) / 4 U = D x 4 / 27648 + 1
	5.7V	32511	0x7EFF	Upper limit	
	5V	27648	0x6C00	Normal range	
	3V	13824	0x3600		
	1V	0	0x0000		
	0.3V	-4864	0xED00	Lower limit	
	0V	<-4864	<0xED00	Underflow	

9.5 Mechanical Installation

The installation dimension information is shown in the figure below, the unit is (mm）:


12mm
75mm
111mm
35mm
DEGSON
WWW.DEGSON.COM
DF50-M-8AO-U-4
8 Analog Output
POWER INPUT:24V/0.5A
OUTPUT:NONE
16234108
000001
Do not touch the DF bus connector
PWR
LED0
LED1
LED2
LED3
LED4
LED5
LED6
LED7
STA
LED 24V
V0+
V1+
V2+
V3+
V4+
V5+
V6+
V7+
24V
V0-
V1-
V2-
V3-
V4-
V5-
V6-
V7-
0V
Do not use without the End Cover

10 8-channel analog output/current type (DF50-M-8AO-I-5)

- The analog output module can output current standard signal.
- 8-channel analog output, current type.
- The two LED indicators indicate that the module is operating normally and communicating normally.
- Magnetic isolation between the field level and the system level.
- Transmitted in 16-bit resolution.
- Protection grade IP20

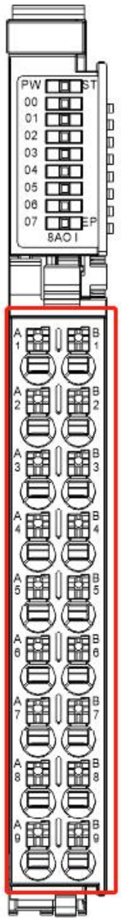
10.1 Specifications

Technical Information	
Product Description	Analog output modules,8Output, current type
Number of channels	8
Output signal type	Current, single-ended output
Resolution	16 Bit
Current output range	0~20mA,4~20mA
Current output load	<600Ω
Current output accuracy	±0.1%
Isolation	The interface channels are not isolated, the power supply is isolated from the interface, and the interface is isolated from the bus.
Independent channel enable configuration	support
Diagnosis reporting function configuration	support
Channel Mode Configuration	Disable, 0-20mA,4-20mA
Output status configuration after shutdown	Clear, keep current output or output preset value
Stop Mode	In the fault shutdown mode, no more refresh

Input Action Display	When the output signal is valid, the output indicator light flashes (software controlled)
IOProcess data size	8 Word
Power parameters	
System bus input power rated voltage	5V DC（4.75V DC~ 5.25V DC）
System bus input power rated current	35mA
Terminal power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated current	33mA
Wiring parameters	
Connection technology: Output	PUSH-INTerminal Blocks
Wire crimping area	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm
Installation	DIN-35Type guide rail
Material parameters	
color	black
Housing Material	PCplastic,PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60℃
Permissible ambient temperature (storage)	-40~85℃
Protection type	IP20
Pollution degree (5）	2,conform toIEC 61131-2standard
Operating altitude	No temperature derating:0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration resistance	1g,conform toIEC 60068-2-6standard
Shock resistance	15g,conform toIEC 60068-2-27standard
EMCAnti-interference level	conform toIEC 61000-4standard
Corrosion resistance	conform toIEC 60068-2-42andIEC 60068-2-43standard
Relative humidity 75 %AllowedH2SPollutant concentration	10ppm
Relative humidity 75 %AllowedSO2Pollutant concentration	25ppm

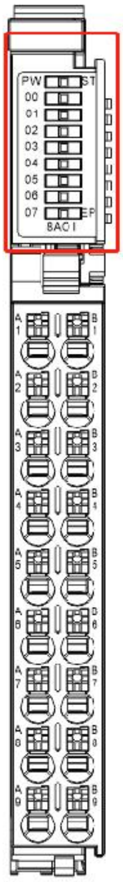
10.2 Hardware Interface

10.2.1 Terminal Block Definition



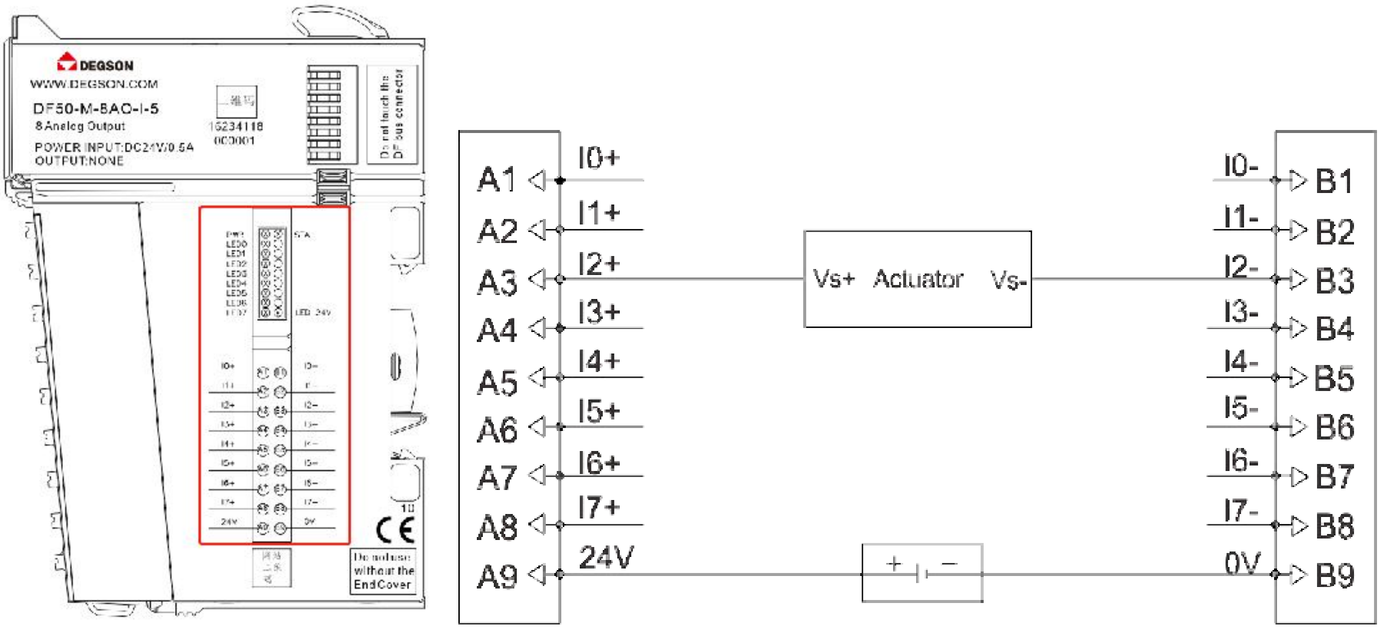
Terminal number	Signal	Terminal number	Signal	illustrate
A1	V0+	B1	V0-	Current output channel0
A2	V1+	B2	V1-	Current output channel1
A3	V2+	B3	V2-	Current output channel2
A4	V3+	B4	V3-	Current output channel3
A5	V4+	B5	V4-	Current output channel4
A6	V5+	B6	V5-	Current output channel5
A7	V6+	B7	V6-	Current output channel6
A8	V7+	B8	V7-	Current output channel7
A9	24V	B9	0V	Terminal power input

10.2.2 LED indicator definition



<table>
<tr><th>Indicator Lights</th><th colspan="2">meaning</th></tr>
<tr><td rowspan="2">PW</td><td colspan="2">Green Bright:System bus power inputnormal</td></tr>
<tr><td colspan="2">Green Kill:System bus power inputabnormal</td></tr>
<tr><td rowspan="4">ST</td><td rowspan="2">Power-on stage</td><td>Green: Module initialization error</td></tr>
<tr><td>Green off: Module initialization is normal</td></tr>
<tr><td rowspan="2">Operational stage</td><td>Green flash: The internal bus of the module is working normally</td></tr>
<tr><td>Green Kill/Green: The internal bus of the module is working abnormally or the terminal power input is abnormal.</td></tr>
<tr><td rowspan="2">EP</td><td colspan="2">Green: The terminal power input is normal</td></tr>
<tr><td colspan="2">Green off: Terminal power input abnormality</td></tr>
<tr><td rowspan="2">I0~I7</td><td colspan="2">Green Flash:Output signal valid</td></tr>
<tr><td colspan="2">Green Kill:Output signal invalid</td></tr>
</table>

10.2.3 Wiring Diagram



Remark:A9,B9 24VThe power supply is provided externally.

10.3 Configuration Data Definition

index	Sub-index	name	Size	Value range	default value	meaning
	1	Output behavior On Fieldbus Error	1.0	SeeEn0820surface	0	Fieldbus Error Output Configuration Mode
16#8002	3	Ch0: Signal Range	1.0	SeeEn0813surface	0	aisle0Signal range configuration
	4	Ch1: Signal Range				aisle1Signal range configuration
	5	Ch2: Signal Range				aisle2Signal range configuration
	6	Ch3: Signal Range				aisle3Signal range configuration
	7	Ch4: Signal Range				aisle4Signal range configuration
	8	Ch5: Signal Range				aisle5Signal range configuration
	9	Ch6: Signal Range				aisle6Signal range configuration
	10	Ch7: Signal Range				aisle7Signal range configuration
	19	Ch0: Substitute Value	2.0	0~32767	0	aisle0Output Preset
	20	Ch1: Substitute Value				aisle1Output Preset
	twenty one	Ch2: Substitute Value				aisle2Output Preset
	twenty two	Ch3: Substitute Value				aisle3Output Preset
	twenty three	Ch4: Substitute Value				aisle4Output Preset
	twenty four	Ch5: Substitute Value				aisle5Output Preset

	25	Ch6: Substitute Value				aisle6Output Preset
	26	Ch7: Substitute Value				aisle7Output Preset
Note: This module is inserted after the coupler.1card slots, thenSDOIndex is16#8002, if inserted in2card slots, thenSDOIndex is16#8012, the index offset is16#10.						

Table En0820

Sub-index object data	name	meaning
0	All outputs off	Turn off all channel outputs
1	Enable substitute value	Enable preset value
2	Hold last value	Keep current output

Table En0813

Sub-index object data	name	meaning
0	Disable	Turn off signal acquisition
twenty three	0~20mA OverRange	0-20maRange plus over-range control
twenty four	4~20mA OverRange	4-20maRange plus over-range control
25	0~20ma	0-20maSignal range
26	4~20ma	4-20maSignal range

10.4 Process Data Definition

RXPDO			
Name	Type	Size	meaning
AD Value CH0	INT	2.0	Channel 0 output data
AD Value CH1	INT	2.0	Channel 1 output data
AD Value CH2	INT	2.0	Channel 2 output data
AD Value CH3	INT	2.0	Channel 3 output data
AD Value CH4	INT	2.0	Channel 4 output data
AD Value CH5	INT	2.0	Channel 5 output data
AD Value CH6	INT	2.0	Channel 6 output data
AD Value CH7	INT	2.0	Channel 7 output data

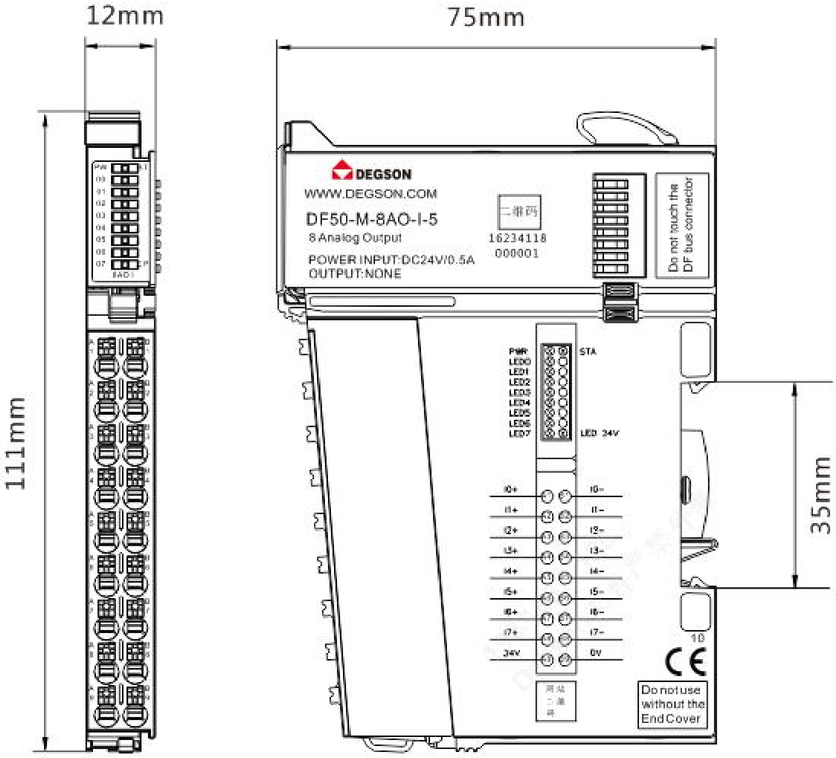
Channel output data description:

Signal range	Current value (I)	Decimal data	Hexadecimal data	Scope	Conversion relationship
0~20ma	20ma	32767	0x7FFF	Normal range	D = 32767 xI/ 20 I= D x 10 / 32767
	10ma	16383	0x3FFF		
	0	0	0		
4~20ma	20ma	32767	0x7FFF	Normal range	D = 32767 x (I-4)/ 16 I= D x 16/ 32767+4
	10ma	16384	0x4000		

	4ma	0	0		
0~20mA OverRange	0ma	>32511	>0x7EFF	Overflow	D = 27648 xI/ 20 I= D x 20/ 27648
	23.52ma	32511	0x7EFF	Upper limit	
	20ma	27648	0x6C00	Normal range	
	10ma	13824	0x3600		
	0ma	0	0x0000		
4~20mA OverRange	0ma	>32511	>0x7EFF	Overflow	D = 27648 x (I– 4) / 16 I= D x 16 / 27648 + 4
	22.81ma	32511	0x7EFF	Upper limit	
	20ma	27648	0x6C00	Normal range	
	12ma	13824	0x3600		
	4ma	0	0x0000		
	1.19ma	-4864	0xED00	Lower limit	
	0ma	<-4864	<-0xED00	Underflow	

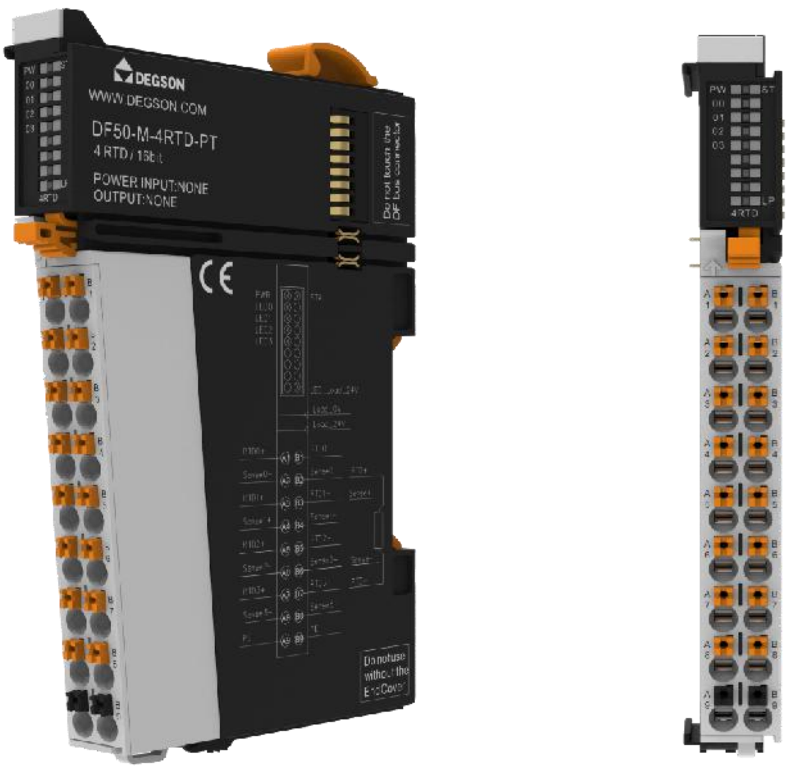
10.5 Mechanical Installation

The installation dimension information is shown in the figure below, the unit is (mm）:


12mm
75mm
111mm
35mm
DEGSON
WWW.DEGSON.COM
DF50-M-8AO-I-5
8 Analog Output
POWER INPUT:DC24V/0.5A
OUTPUT:NONE
16234118
000001
Do not touch the DF bus connector
Do not use without the End Cover

11 4-channel thermal resistance measurement (DF50-M-4RTD-PT)

- The module uses 4-channel thermal resistance measurement and supports 13 conventional thermal resistances.
- Supports four sensors.
- Supports 2-wire, 3-wire, and 4-wire sensors.
- The two LED indicators indicate that the module is operating normally and communicating normally.
- Each channel has an LED indicator.
- Magnetic isolation between the field level and the system level.
- Transmitted in 16-bit resolution.
- Protection grade IP20.



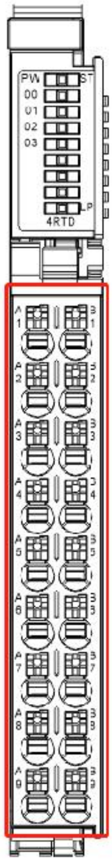
11.1 Specifications

Technical Information

Product Description	Thermal resistor(RTD)Measurement modules,16bit resolution,4aisle
Number of channels	4
Sensor Type	Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni 200, Ni500, Ni1000, Cu10,Cu50,Cu53,Cu100KTY83-110, KTY83-120,KTY83-121,KTY83-122,KTY83-150,KTY83-151, NTC-5K,NTC-20K,TY84-130,KTY84-150,KTY84-151, 40 Ω, 80 Ω, 150 Ω, 300 Ω, 500 Ω, 1 kΩ, 2 kΩ, 4 kΩ
Resolution/Display sensitivity	16bit,0.1℃/Bit
Accuracy	±0.3%
Connection method	Two lines/Three-wire system
Isolation	Isolation between interface channels, isolation between interface and bus
Channel diagnostics	Over-limit alarm, over-lower limit alarm, disconnection alarm, overflow error
Diagnosis reporting function configuration	support
Frequency interference suppression	50Hz | 60Hz
Sampling frequency	7.5Hz~1.25HzConfigurable,
Input Action Display	When the input signal is valid, the input indicator flashes (software controlled)
IOProcess data size	4 Word
Power parameters	
System bus input power rated voltage	5V DC（4.75V DC~ 5.25V DC）
System bus input power rated current	30mA
Internal load power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Internal load power input rated current	10mA
Wiring parameters	
Connection technology:	PUSH-INTerminal Blocks
Wire crimping area	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm
Installation	DIN-35Type guide rail
Material parameters	
color	black
Housing Material	PCplastic,PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60℃
Permissible ambient temperature (storage)	-40~85℃
Protection type	IP20
Pollution degree	2,conform toIEC 61131-2standard
Operating altitude	No temperature derating:0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration resistance	1g,conform toIEC 60068-2-6standard
Shock resistance	15g,conform toIEC 60068-2-27standard
EMCAnti-interference level	conform toIEC 61000-4standard
Corrosion resistance	conform toIEC 60068-2-42andIEC 60068-2-43standard
Relative humidity 75 %AllowedH2SPollutant concentration	10ppm
Relative humidity 75 %AllowedSO2Pollutant concentration	25ppm

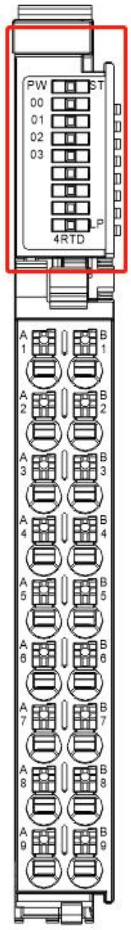
11.2 Hardware Interface

11.2.1 Terminal Block Definition



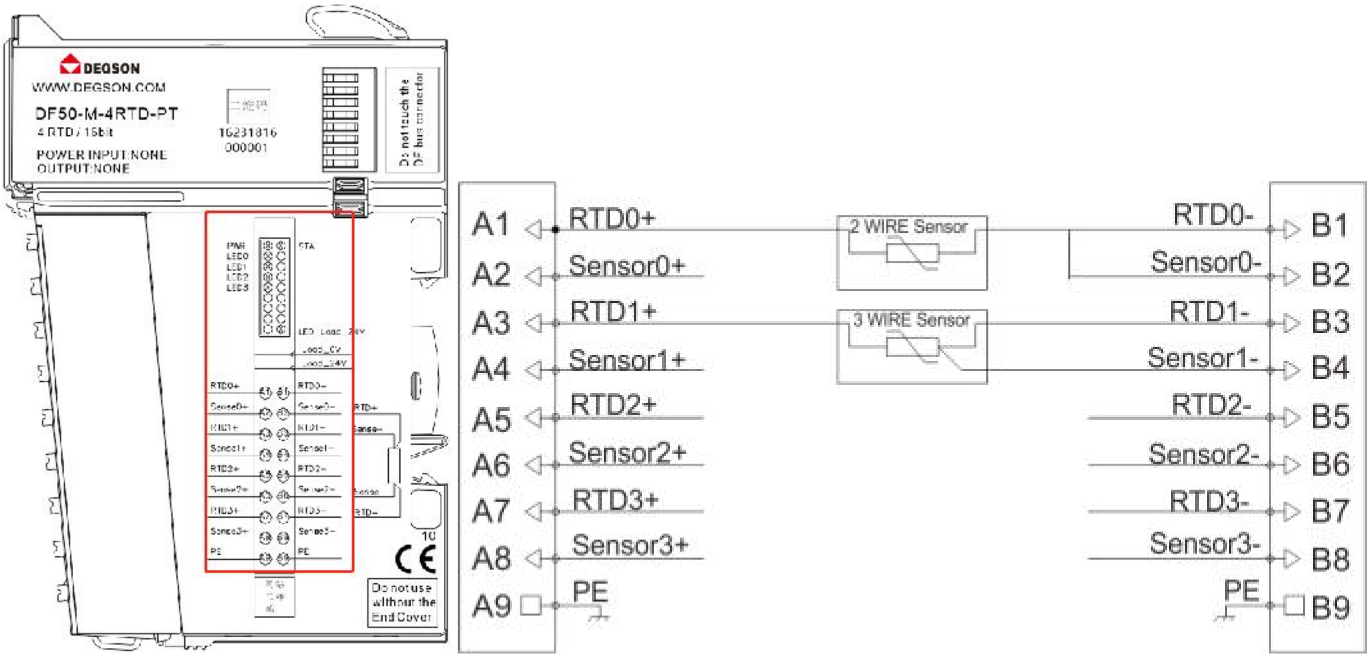
Terminal number	Signal	Terminal number	Signal	illustrate
A1	RTD0+	B1	RTD0-	The first channel signal input
A2	Sense0+	B2	Sense0-	
A3	RTD1+	B3	RTD1-	Second channel signal input
A4	Sense1+	B4	Sense1-	
A5	RTD2+	B5	RTD2-	The third channel signal input
A6	Sense2+	B6	Sense2-	
A7	RTD3+	B7	RTD3-	The fourth channel signal input
A8	Sense3+	B8	Sense3-	
A9	/	B9	/	Reserved for hanging

11.2.2 LED indicator definition



<table>
<tr><th>Indicator Lights</th><th colspan="2">meaning</th></tr>
<tr><td rowspan="2">PW</td><td colspan="2">Green Bright:System bus power inputnormal</td></tr>
<tr><td colspan="2">Green Kill:System bus power inputabnormal</td></tr>
<tr><td rowspan="4">ST</td><td rowspan="2">Power-on stage</td><td>Green: Module initialization error</td></tr>
<tr><td>Green off: Module initialization is normal</td></tr>
<tr><td rowspan="2">Operational stage</td><td>Green flash: The internal bus of the module is working normally</td></tr>
<tr><td>Green Kill/Green: The internal bus of the module is working abnormally or the internal load power input is abnormal.</td></tr>
<tr><td rowspan="2">LP</td><td colspan="2">Green: Internal load power input is normal</td></tr>
<tr><td colspan="2">Green off: Internal load power input is abnormal</td></tr>
<tr><td rowspan="2">00~03</td><td colspan="2">Green Flash:Input signal valid</td></tr>
<tr><td colspan="2">Green Kill:Invalid input signal</td></tr>
</table>

11.2.3 Wiring Diagram



11.3 Configuration Data Definition

index	Sub-index	name	Size	Value range	default value	meaning
16#8003	1	4RTD Type	1.0	SeeEn081Csurface	0	Sensor Type Configuration
	2	4RTD Signal Filter	1.0	SeeEn081Dsurface	2	Sampling frequency configuration

Note: This module is inserted after the coupler.1card slots, thenSDOIndex is16#8003, if inserted in2card slots, thenSDOIndex is16#8013, the index offset is16#10.

Table En081C

Sub-index object data	name
0	PT100 -200...850 degrees C
1	PT1000 -200...850 degrees C
2	PT200 -200...850 degrees C
3	PT500 -200...850 degrees C
4	Ni120 -80...260 degrees C
5	Ni100 -60...250 degree C
6	Ni200 -60...250 degree C
7	Ni500 -60...250 degree C
8	Ni1000 -60...250 degree C
9	Cu10 -100...260 degrees C

10	Cu50 -100...260 degrees C
11	Cu100 -100...260 degrees C
12	Cu53 -100...260 degrees C
13	KTY84-130 -40...260 degrees C
14	KTY84-150 -40...260 degrees C
15	KTY84-151 -40...260 degrees C
20	Resistors 40 Ohm
twenty one	Resistors 80 Ohm
twenty two	Ressistor 150 Ohm
twenty three	Resistors 300 Ohm
twenty four	Ressistor 500 Ohm
25	Ressistor 1000 Ohm
26	Resistors 2000 Ohm
27	Ressistor 4000 Ohm
30	KTY83-110 -55...175 degrees C
31	KTY83-120 -55...175 degrees C
32	KTY83-121 -55...175 degree C
33	KTY83-122 -55...175 degree C
34	KTY83-150 -55...175 degrees C
35	KTY83-151 -55...175 degree C
36	NTC-5K -30...90℃
37	NTC-10K 25...150℃

Table En081D

Sub-index object data	name	meaning
0	1.25Hz_800ms	Sampling rate1.25HZ
1	2.5Hz_400ms	Sampling rate2.5HZ
2	5Hz_200ms	Sampling rate5HZ
3	7.5Hz_133ms	Sampling rate7.5HZ

11.4 Process Data Definition

TXPDO			
Name	Type	Size	meaning
RTD Input CH0	INT	2.0	aisle0Input Data
RTD Input CH1	INT	2.0	aisle1Input Data
RTD Input CH2	INT	2.0	aisle2Input Data
RTD Input CH3	INT	2.0	aisle3Input Data

Process data description:

PT100type			
temperature	Decimal	hexadecimal	Scope
>850	32767	0x7FFF	Overflow
850	8500	0x2134	Normal range
-200	-2000	0xF830	
<-200	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

PT200type			
temperature	Decimal	hexadecimal	Scope
>850	32767	0x7FFF	Overflow
850	8500	0x2134	Normal range
-200	-2000	0xF830	
<-200	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

PT500type			
temperature	Decimal	hexadecimal	Scope
>850	32767	0x7FFF	Overflow
850	8500	0x2134	Normal range
-200	-2000	0xF830	
<-200	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

PT1000type			
temperature	Decimal	hexadecimal	Scope
>850	32767	0x7FFF	Overflow
850	8500	0x2134	Normal range

-200	-2000	0xF830	
<-200	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Ni100type			
temperature	Decimal	hexadecimal	Scope
>250	32767	0x7FFF	Overflow
250	2500	0x09C4	Normal range
-60	-600	0xFDA8	
<-60	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Ni120type			
temperature	Decimal	hexadecimal	Scope
>309	32767	0x7FFF	Overflow
309	3090	0x0C12	Normal range
-79	-790	0xFCEA	
<-79	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

NI200type			
temperature	Decimal	hexadecimal	Scope
>250	32767	0x7FFF	Overflow
250	2500	0x09C4	Normal range
-60	-600	0xFDA8	
<-60	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Ni500type			
temperature	Decimal	hexadecimal	Scope
>250	32767	0x7FFF	Overflow
250	2500	0x09C4	Normal range
-60	-600	0xFDA8	
<-60	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Ni1000type

temperature	Decimal	hexadecimal	Scope
>250	32767	0x7FFF	Overflow
250	2500	0x09C4	Normal range
-60	-600	0xFDA8	
<-60	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Cu10type			
temperature	Decimal	hexadecimal	Scope
>159	32767	0x7FFF	Overflow
159	1590	0x0636	Normal range
-59	-590	0xFDB2	
<-59	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Cu50type			
temperature	Decimal	hexadecimal	Scope
>159	32767	0x7FFF	Overflow
159	1590	0x0636	Normal range
-59	-590	0xFDB2	
<-59	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Cu53type			
temperature	Decimal	hexadecimal	Scope
>150	32767	0x7FFF	Overflow
150	1500	0x05DC	Normal range
-50	-500	0xFE0C	
<-50	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Cu100type			
temperature	Decimal	hexadecimal	Scope
>159	32767	0x7FFF	Overflow
159	1590	0x0636	Normal range

-59	-590	0xFDB2	
<-59	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

KTY84_130type			
temperature	Decimal	hexadecimal	Scope
>280	32767	0x7FFF	Overflow
280	2800	0x0AF0	Normal range
-40	-400	0xFE70	
<-40	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

KTY84_150type			
temperature	Decimal	hexadecimal	Scope
>280	32767	0x7FFF	Overflow
280	2800	0x0AF0	Normal range
-40	-400	0xFE70	
<-40	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

KTY84_151type			
temperature	Decimal	hexadecimal	Scope
>280	32767	0x7FFF	Overflow
280	2800	0x0AF0	Normal range
-40	-400	0xFE70	
<-40	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

0-40ohmtype			
ohmvalue	Decimal	hexadecimal	Scope
>319.25ohm	-32768	0x8000	Beyond the limit
>47.03ohm	32767	0x7FFF	Upper limit
47.03ohm	32511	0x7EFF	Overflow
40ohm	27648	0x6C00	Normal range
0ohm	0	0x0000	
Sensor not connected	-32768	0x8000	Disconnection detection

0-80ohmtype			
ohmvalue	Decimal	hexadecimal	Scope
>319.25ohm	-32768	0x8000	Beyond the limit
>94.07ohm	32767	0x7FFF	Upper limit
94.07ohm	32511	0x7EFF	Overflow
80ohm	27648	0x6C00	Normal range
0ohm	0	0x0000	
Sensor not connected	-32768	0x8000	Disconnection detection

0-150ohmtype			
ohmvalue	Decimal	hexadecimal	Scope
>319.25ohm	-32768	0x8000	Beyond the limit
>176.38ohm	32767	0x7FFF	Upper limit
176.38ohm	32511	0x7EFF	Overflow
150ohm	27648	0x6C00	Normal range
0ohm	0	0x0000	
Sensor not connected	-32768	0x8000	Disconnection detection
0-300ohmtype			
ohmvalue	Decimal	hexadecimal	Scope
>638.5ohm	-32768	0x8000	Beyond the limit
>352.77ohm	32767	0x7FFF	Upper limit
352.77ohm	32511	0x7EFF	Overflow
300ohm	27648	0x6C00	Normal range
0ohm	0	0x0000	
Sensor not connected	-32768	0x8000	Disconnection detection

0-500ohmtype			
ohmvalue	Decimal	hexadecimal	Scope
>638.5ohm	-32768	0x8000	Beyond the limit
>587.94ohm	32767	0x7FFF	Upper limit
587.94ohm	32511	0x7EFF	Overflow
500ohm	27648	0x6C00	Normal range
0ohm	0	0x0000	
Sensor not connected	-32768	0x8000	Disconnection detection

0-1000ohmtype			
ohmvalue	Decimal	hexadecimal	Scope
>1277ohm	-32768	0x8000	Beyond the limit
>1175.89ohm	32767	0x7FFF	Upper limit
1175.89ohm	32511	0x7EFF	Overflow
1000ohm	27648	0x6C00	Normal range
0ohm	0	0x0000	
Sensor not connected	-32768	0x8000	Disconnection detection

0-2000ohmtype			
ohmvalue	Decimal	hexadecimal	Scope
>2554ohm	-32768	0x8000	Beyond the limit
>2351.78ohm	32767	0x7FFF	Upper limit
2351.78ohm	32511	0x7EFF	Overflow
2000ohm	27648	0x6C00	Normal range
0ohm	0	0x0000	
Sensor not connected	-32768	0x8000	Disconnection detection

0-4000ohmtype			
ohmvalue	Decimal	hexadecimal	Scope
>5108ohm	-32768	0x8000	Beyond the limit
>4703.56ohm	32767	0x7FFF	Upper limit
4703.56ohm	32511	0x7EFF	Overflow
4000ohm	27648	0x6C00	Normal range
0ohm	0	0	
Sensor not connected	-32768	0x8000	Disconnection detection

KTY83-110type			
temperature	Decimal	hexadecimal	Scope
>175	32767	0x7FFF	Overflow
175	1750	0x06D6	Normal range
-55	-550	0xFDDA	
<-55	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

KTY83-120type

temperature	Decimal	hexadecimal	Scope
>175	32767	0x7FFF	Overflow
175	1750	0x06D6	Normal range
-55	-550	0xFDDA	
<-55	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

KTY83-121type			
temperature	Decimal	hexadecimal	Scope
>175	32767	0x7FFF	Overflow
175	1750	0x06D6	Normal range
-55	-550	0xFDDA	
<-55	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

KTY83-122type			
temperature	Decimal	hexadecimal	Scope
>175	32767	0x7FFF	Overflow
175	1750	0x06D6	Normal range
-55	-550	0xFDDA	
<-55	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

KTY83-150type			
temperature	Decimal	hexadecimal	Scope
>175	32767	0x7FFF	Overflow
175	1750	0x06D6	Normal range
-55	-550	0xFDDA	
<-55	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

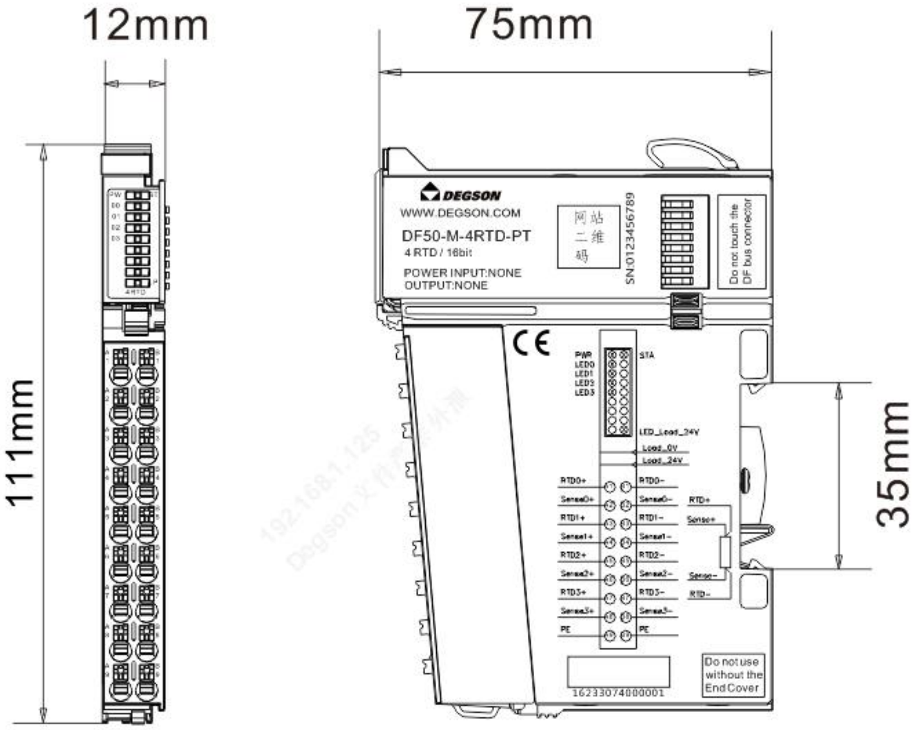
KTY83-151type			
temperature	Decimal	hexadecimal	Scope
>175	32767	0x7FFF	Overflow
175	1750	0x06D6	Normal range
-55	-550	0xFDDA	
<-55	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

NTC-5Ktype			
temperature	Decimal	hexadecimal	Scope
>90	32767	0x7FFF	Overflow
90	900	0x0384	Normal range
-30	-300	0xFED4	
<-30	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

NTC-10Ktype			
temperature	Decimal	hexadecimal	Scope
>150	32767	0x7FFF	Overflow
150	1500	0x05DC	Normal range
25	250	0x00FA	
<25	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

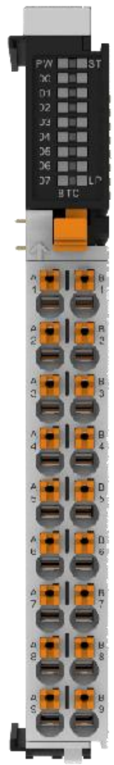
11.5 Mechanical Installation

The installation dimension information is shown in the figure below, the unit is (mm）:



12 8-channel thermal resistance measurement (DF50-M-8TC)

- The module uses 8-channel thermal resistance measurement and supports K/E/T/J/B/S/R/N/L and millivolt voltage sensors.
- Supports eight sensors.
- Supports 2-wire sensors.
- This module reserves eight cold-end compensation output channels to compensate for cold-end temperature differences.
- Each channel has an LED indicator.
- The two LED indicators indicate that the module is operating normally and communicating normally.
- Each channel has an LED indicator.
- Magnetic isolation between the field level and the system level.
- Transmitted in 16-bit resolution.
- Protection grade IP20.



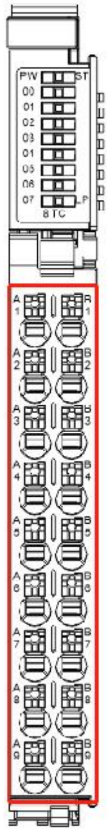
12.1 Specifications

Technical Information	
Product Description	Thermocouple measurement module,16bit resolution,8aisle
Number of channels	8

Sensor Type	K,E,T,J,B,S,R,N,LMillivolt Voltage Sensor
Resolution/Display sensitivity	16bit,0.1℃/Bit
Connection method	Two lines
Accuracy	±0.3%
Isolation	Isolation between interface channels, isolation between interface and bus
Channel diagnostics	Over-limit alarm, over-lower limit alarm, disconnection alarm, overflow error
Diagnosis reporting function configuration	support
Frequency interference suppression	50Hz | 60Hz
Filter time	61.25ms~7200msConfigurable,
Input Action Display	When the input signal is valid, the input indicator flashes (software controlled)
IOProcess data size	8 Word
Power parameters	
System bus input power rated voltage	5V DC（4.75V DC~ 5.25V DC）
System bus input power rated current	35mA
Internal load power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Internal load power input rated current	10mA
Wiring parameters	
Connection technology	PUSH-INTerminal Blocks
Wire crimping area	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm
Installation	DIN-35Type guide rail
Material parameters	
color	black
Housing Material	PCplastic,PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60℃
Permissible ambient temperature (storage)	-40~85℃
Protection type	IP20
Pollution degree	2,conform toIEC 61131-2standard
Operating altitude	No temperature derating:0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration resistance	1g,conform toIEC 60068-2-6standard
Shock resistance	15g,conform toIEC 60068-2-27standard
EMCAnti-interference level	conform toIEC 61000-4standard
Corrosion resistance	conform toIEC 60068-2-42andIEC 60068-2-43standard
Relative humidity 75 %AllowedH2SPollutant concentration	10ppm
Relative humidity 75 %AllowedSO2Pollutant concentration	25ppm

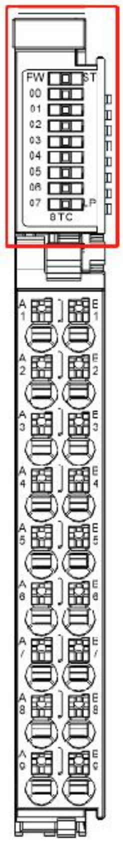
12.2 Hardware Interface

12.2.1 Terminal Block Definition



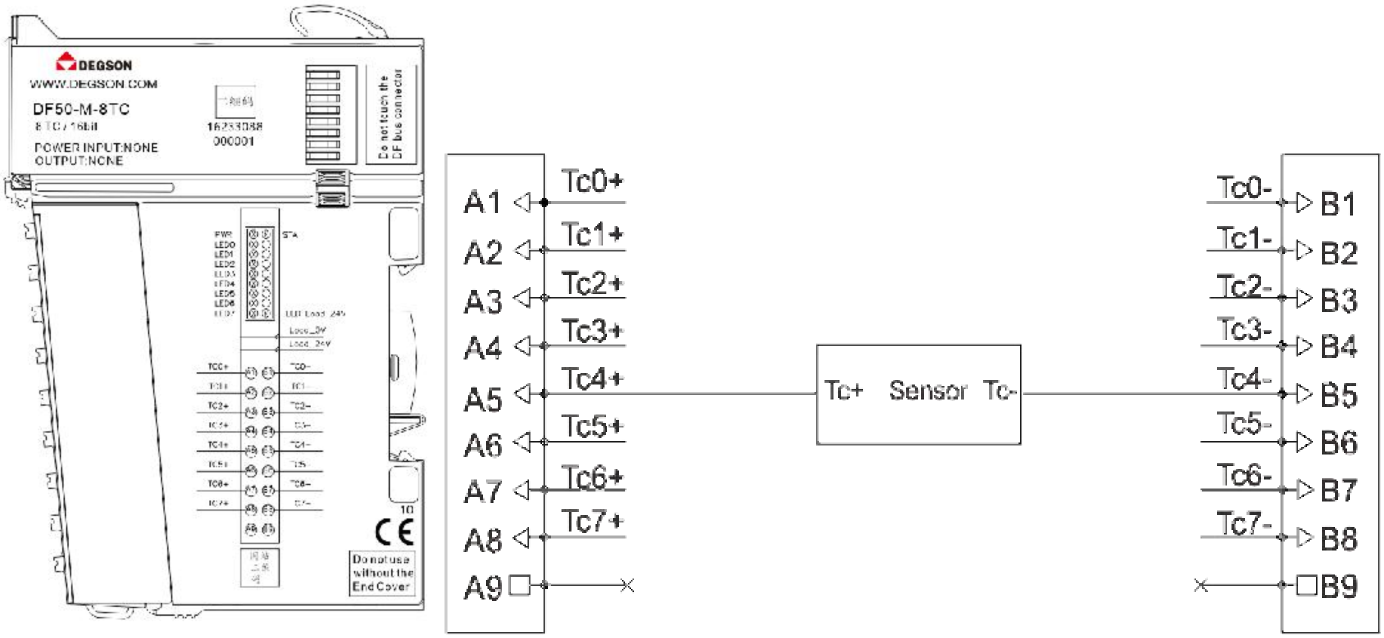
Terminal number	Signal	Terminal number	Signal	illustrate
A1	TC0+	B1	TC0-	Signal input channel0
A2	TC1+	B2	TC1-	Signal input channel1
A3	TC2+	B3	TC2-	Signal input channel2
A4	TC3+	B4	TC3-	Signal input channel3
A5	TC4+	B5	TC4-	Signal input channel4
A6	TC5+	B6	TC5-	Signal input channel5
A7	TC6+	B7	TC6-	Signal input channel6
A8	TC7+	B8	TC7-	Signal input channel7
A9	/	B9	/	Reserved for hanging

12.2.2 LED indicator definition



<table>
<tr><th>Indicator Lights</th><th colspan="2">meaning</th></tr>
<tr><td rowspan="2">PW</td><td colspan="2">Green Bright:System bus power inputnormal</td></tr>
<tr><td colspan="2">Green Kill:System bus power inputabnormal</td></tr>
<tr><td rowspan="4">ST</td><td rowspan="2">Power-on stage</td><td>Green: Module initialization error</td></tr>
<tr><td>Green off: Module initialization is normal</td></tr>
<tr><td rowspan="2">Operational stage</td><td>Green flash: The internal bus of the module is working normally</td></tr>
<tr><td>Green Kill/Green: The internal bus of the module is working abnormally orInternal LoadPower input abnormality</td></tr>
<tr><td rowspan="2">LP</td><td colspan="2">Green:Internal load power inputnormal</td></tr>
<tr><td colspan="2">Green off:Internal load power inputabnormal</td></tr>
<tr><td rowspan="2">00~07</td><td colspan="2">Green Flash:Input signal valid</td></tr>
<tr><td colspan="2">Green Kill:Invalid input signal</td></tr>
</table>

12.2.3 Wiring Diagram



12.3 Configuration Data Definition

index	Sub-index	name	Size	Value range	default value	meaning
16#8003	7	8TC Type	1.0	SeeEn081Esurface	0	Sensor Type Configuration
	8	8TC Signal Filter	1.0	SeeEn081Fsurface	5	Sampling frequency configuration
Note: This module is inserted after the coupler.1card slots, thenSDOIndex is16#8003, if inserted in2card slots, thenSDOIndex is16#8013, the index offset is16#10.						

Table En081E

Table En081F

Sub-index object data	name
0	K -270...1370 degrees C
1	E -270...1000 degrees C
2	T -270...400 degrees C
3	J -210...1200 degrees C
4	B 50...1820 degrees C
5	S -50...1760 degrees C
6	R -50...1770 degrees C
7	N -270...1300 degrees C
8	C 0...2320 degrees C
9	L -200...900 degrees C
10	+/-15.625mv
11	+/-31.25mv
12	+/-62.5mv
13	+/-125mv
14	+/-250mv
15	+/-500mv
16	+/-1000mv
17	+/-2000mv

Sub-index object data	name
0	7200ms
1	3600ms
2	1800ms
3	900ms
4	450ms
5	225ms
6	122.5ms
7	61.25ms

12.4 Process Data Definition

RXPDO			
Name	Type	Size	meaning
Offset Value CH0	INT	2.0	aisle0Input compensation
Offset Value CH1	INT	2.0	Channel 1 Input Compensation
Offset Value CH2	INT	2.0	Channel 2 Input Compensation
Offset Value CH3	INT	2.0	Channel 3 Input Compensation
Offset Value CH4	INT	2.0	Channel 4 Input Compensation
Offset Value CH5	INT	2.0	Channel 5 Input Compensation
Offset Value CH6	INT	2.0	Channel 6 Input Compensation
Offset Value CH7	INT	2.0	Channel 7 Input Compensation

TXPDO			
Name	Type	Size	meaning
TC Value CH0	INT	2.0	Channel 0 input data
TC Value CH1	INT	2.0	Channel 1 input data
TC Value CH2	INT	2.0	Channel 2 input data
TC Value CH3	INT	2.0	Channel 3 input data
TC Value CH4	INT	2.0	Channel 4 input data
TC Value CH5	INT	2.0	Channel 5 input data
TC Value CH6	INT	2.0	Channel 6 input data
TC Value CH7	INT	2.0	Channel 7 input data

Process data description:

Ktype			
temperature	Decimal	hexadecimal	Scope
>1370	32767	0x7FFF	Overflow
1370	13700	0x3584	Normal range
-270	-2700	0xF574	
<-270	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Etype			
temperature	Decimal	hexadecimal	Scope
>1000	32767	0x7FFF	Overflow
1000	10000	0x2710	Normal range

-270	-2700	0xF574	
<-270	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Ttype			
temperature	Decimal	hexadecimal	Scope
>400	32767	0x7FFF	Overflow
400	4000	0x0FA0	Normal range
-270	-2700	0xF574	
<-270	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Jtype			
temperature	Decimal	hexadecimal	Scope
>1200	32767	0x7FFF	Overflow
1200	12000	0x2EE0	Normal range
-210	-2100	0xF7CC	
<-210	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Btype			
temperature	Decimal	hexadecimal	Scope
>1830	32767	0x7FFF	Overflow
1830	18300	0x477C	Normal range
50	500	0x01F4	
<50	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Stype			
temperature	Decimal	hexadecimal	Scope
>1760	32767	0x7FFF	Overflow
1760	17600	0x44C0	Normal range
-50	-500	0xFE0C	
<-50	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Rtype

temperature	Decimal	hexadecimal	Scope
>250	32767	0x7FFF	Overflow
250	2500	0x09C4	Normal range
-60	-600	0xFDA8	
<-60	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Ni500type			
temperature	Decimal	hexadecimal	Scope
>1770	32767	0x7FFF	Overflow
1770	17700	0x4524	Normal range
-50	-500	0xFE0C	
<-50	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Ctype			
temperature	Decimal	hexadecimal	Scope
>2320	32767	0x7FFF	Overflow
2320	23200	0x5AA0	Normal range
0	0	0	
<0	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Ltype			
temperature	Decimal	hexadecimal	Scope
>900	32767	0x7FFF	Overflow
900	9000	0x2328	Normal range
-200	-2000	0xF830	
<-200	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Ntype			
temperature	Decimal	hexadecimal	Scope
>1300	32767	0x7FFF	Overflow
1300	13000	0x32C8	Normal range
-270	-2700	0xF574	
<-270	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

±15.625mV			
Signal	Decimal	hexadecimal	Scope
15.625mV	32767	0x7FFF	Normal range
-15.625mV	-32767	0x8001	
Sensor not connected	-32768	0x8000	Disconnection detection

±31.25mV			
Signal	Decimal	hexadecimal	Scope
31.25mV	32767	0x7FFF	Normal range
-31.25mV	-32767	0x8001	
Sensor not connected	-32768	0x8000	Disconnection detection

±62.5mV			
Signal	Decimal	hexadecimal	Scope
62.5mV	32767	0x7FFF	Normal range
-62.5mV	-32767	0x8001	
Sensor not connected	-32768	0x8000	Disconnection detection

±125mV			
Signal	Decimal	hexadecimal	Scope
125mV	32767	0x7FFF	Normal range
-125mV	-32767	0x8001	
Sensor not connected	-32768	0x8000	Disconnection detection

±500mV			
Signal	Decimal	hexadecimal	Scope
500mV	32767	0x7FFF	Normal range
-500mV	-32767	0x8001	
Sensor not connected	-32768	0x8000	Disconnection detection

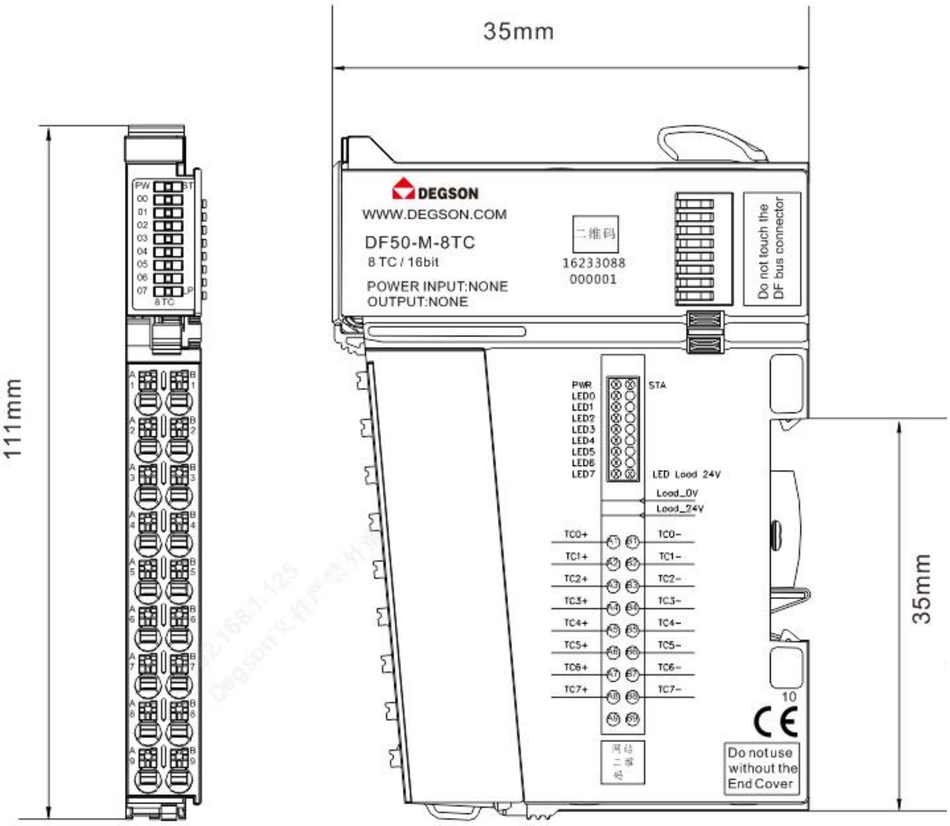
±1000mV			
Signal	Decimal	hexadecimal	Scope
1000mV	32767	0x7FFF	Normal range

-1000mV	-32767	0x8001	
Sensor not connected	-32768	0x8000	Disconnection detection

±2000mV			
Signal	Decimal	hexadecimal	Scope
2000mV	32767	0x7FFF	Normal range
-2000mV	-32767	0x8001	
Sensor not connected	-32768	0x8000	Disconnection detection

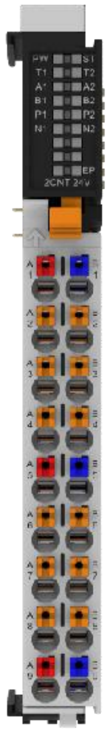
12.5 Mechanical Installation

The installation dimension information is shown in the figure below, the unit is (mm）:



13 2-channel encoder pulse counting/24VDC (DF50-M-2CNT-PIL-24)

- This pulse counting module adopts 2-channel pulse counting. The input signal voltage is 24VDC.
- Each input module is equipped with an anti-interference filter.
- The two LED indicators indicate that the module is operating normally and communicating normally.
- Magnetic isolation between the field level and the system level.
- Protection grade IP20.



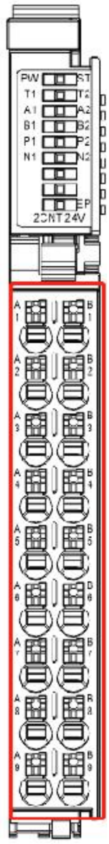
13.1 Specifications

Technical Information	
Product Description	High-speed counting module,2aisle
Number of channels	2
Signal Type	Incremental encoderAB /pulse+Direction signal
Maximum input frequency	1MHZ
Input signal voltage	24V DC
Connection Type	2-Wire system/4-Wire system
Quadrature encoder frequency multiplication	x1/x2/x4
Counting Mode	Linear counter form, ring counter form
Count latch/Reset function	Support, configurable
Filter function	Support, configurable
Counting range	–2147483648~2147483647
Accuracy	±1 pulse
Isolation method	Photoelectric isolation from the field layer
Error diagnosis	support
Input Action Display	When the input is in driving state, the indicator light is on (software control)
IOProcess data size	Output:10 Byte;enter:18 Byte
IOData Mapping	Supports bit-by-bit access, byte-by-byte access, and word-by-

	word access.3kindIOMapping method
Power parameters	
System bus input power rated voltage	5V DC（4.75V DC~ 5.25V DC）
System bus input power rated current	115mA
Terminal power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated current	2A
Terminal power output rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power output rated current	1A
Wiring parameters	
Connection technology:	PUSH-INTerminal Blocks
Wire crimping area	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm
Installation	DIN-35Type guide rail
Material parameters	
color	black
Housing Material	PCplastic,PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60℃
Permissible ambient temperature (storage)	-40~85℃
Protection type	IP20
Pollution degree	2,conform toIEC 61131-2standard
Operating altitude	No temperature derating:0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration resistance	1g,conform toIEC 60068-2-6standard
Shock resistance	15g,conform toIEC 60068-2-27standard
EMCAnti-interference level	conform toIEC 61000-4standard
Corrosion resistance	conform toIEC 60068-2-42andIEC 60068-2-43standard
Relative humidity 75 %AllowedH2SPollutant concentration	10ppm
Relative humidity 75 %AllowedSO2Pollutant concentration	25ppm

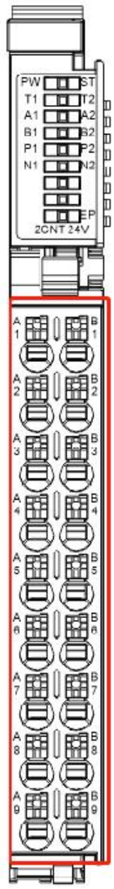
13.2 Hardware Interface

13.2.1 Terminal Block Definition



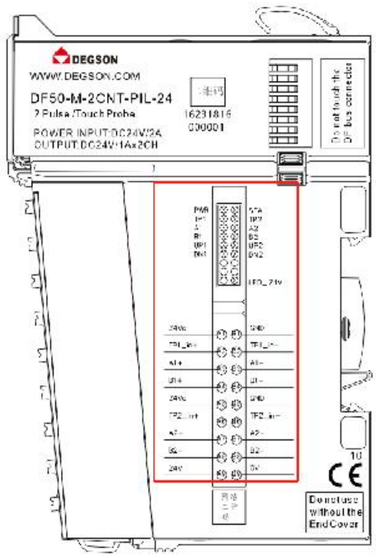
Terminal number	Signal	Terminal number	Signal	illustrate
A1	24Vo	B1	GND	Terminal power output
A2	TP1_in+	B2	TP1_in-	DISignal input
A3	A1+	B3	A1-	Orthogonal coding modeAPhase signal input/ Pulse plus direction mode direction signal input
A4	B1+	B4	B1-	Orthogonal coding modeBPhase signal input/ Pulse plus direction mode pulse signal input
A5	24Vo	B5	GND	Terminal power output
A6	TP2_in+	B6	TP2_in-	DISignal input
A7	A2+	B7	A2-	Orthogonal coding modeAPhase signal input/ Pulse plus direction mode direction signal input
A8	B2+	B8	B2-	Orthogonal coding modeBPhase signal input/ Pulse plus direction mode pulse signal input
A9	24Vin	B9	0V	Terminal power input

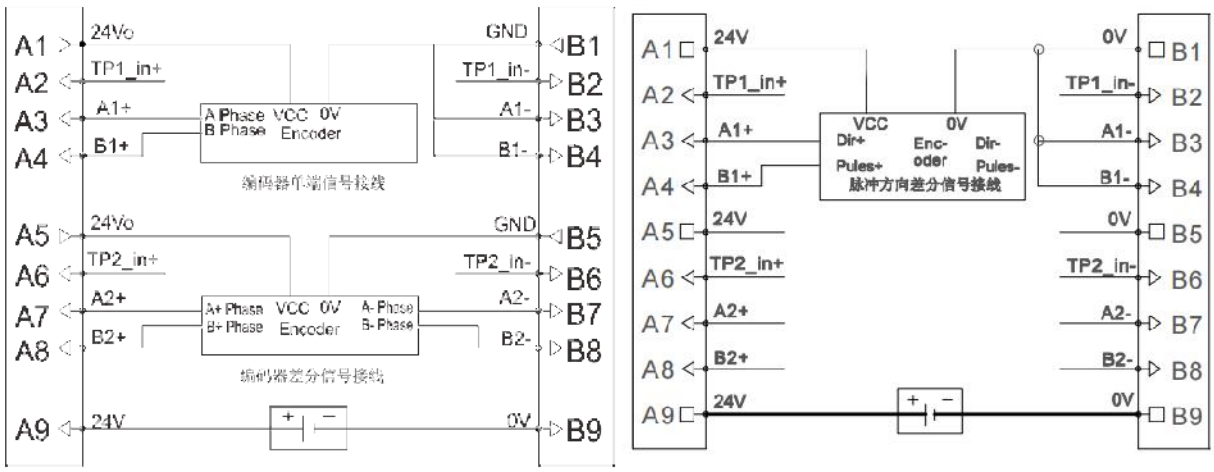
13.2.2 LED indicator definition



<table>
<tr><th>Indicator Lights</th><th colspan="2">meaning</th></tr>
<tr><td rowspan="2">PW</td><td colspan="2">Green Bright:System bus power inputnormal</td></tr>
<tr><td colspan="2">Green Kill:System bus power inputabnormal</td></tr>
<tr><td rowspan="4">ST</td><td rowspan="2">Power-on stage</td><td>Green: Module initialization error</td></tr>
<tr><td>Green off: Module initialization is normal</td></tr>
<tr><td rowspan="2">Operational stage</td><td>Green flash: The internal bus of the module is working normally,</td></tr>
<tr><td>Green Kill/Green: The internal bus of the module is working abnormally or the terminal power input is abnormal.</td></tr>
<tr><td rowspan="2">T1/T2</td><td colspan="2">Green:DIInput signal valid</td></tr>
<tr><td colspan="2">Green off:DIInvalid input signal</td></tr>
<tr><td rowspan="2">A1/A2</td><td colspan="2">Green: Input signal is valid</td></tr>
<tr><td colspan="2">Green off: Input signal is invalid</td></tr>
<tr><td rowspan="2">B1/B2</td><td colspan="2">Green: Input signal is valid</td></tr>
<tr><td colspan="2">Green off: Input signal is invalid</td></tr>
<tr><td rowspan="2">P1/P2</td><td colspan="2">Green: Encoder is rotating forward</td></tr>
<tr><td colspan="2">Green off: Encoder is stationary or reversed</td></tr>
<tr><td rowspan="2">N1/N2</td><td colspan="2">Green: Encoder reverse</td></tr>
<tr><td colspan="2">Green off: Encoder is stationary or rotating forward</td></tr>
<tr><td rowspan="2">EP</td><td colspan="2">Green: The terminal power input is normal</td></tr>
<tr><td colspan="2">Green off: Terminal power input abnormality</td></tr>
</table>

13.2.3 Wiring Diagram





Remark:A9,B9 24VThe power supply is provided externally.

13.3 Configuration Data Definition

index	Sub-index	name	Size	Value range	default value	meaning
	1	Ch0: Signal Type	0.4	SeeEn0815surface	2	aisle0Signal type configuration
	2	Ch0: DI Signal Function	0.4	SeeEn0816surface	0	aisle0 DISignal function configuration
	3	Ch0: Filter Time Signal A	0.4	SeeEn0817surface	14	aisle0 APhase signal filtering configuration
	4	Ch0: Filter Time Signal B	0.4	SeeEn0817surface	14	aisle0 BPhase signal filtering configuration
16#8004	5	Ch0: Directional Logic	0.1	SeeEn0818surface	0	aisle0Direction logic configuration
	6	Ch0: Count Mode	0.1	SeeEn0819surfac	0	aisle0Counting mode

				e		configuration
	7	Ch0: Comparison Function	0.1	SeeEn081Asurface	0	aisle0Compare feature configurations
	8	Ch0: Field Bus Error	0.2	SeeEn081Bsurface	0	aisle0Bus abnormality counting action configuration
	11	Ch0: Upper Limit	4.0	-2147483648 ~2147483647	2147483647	aisle0Cycle mode upper limit
	12	Ch0: Lower Limit	4.0	-2147483648 ~2147483647	-2147483648	aisle0Cycle mode lower limit
	13	Ch1: Signal Type	0.4	SeeEn0815:surface	2	aisle1Signal type configuration
	14	Ch1: DI Signal Function	0.4	SeeEn0816:surface	0	aisle1 DISignal function configuration
	15	Ch1: Filter Time Signal A	0.4	SeeEn0817:surface	14	aisle1 APhase signal filtering configuration
	16	Ch1: Filter Time Signal B	0.4	SeeEn0817:surface	14	aisle1 BPhase signal filtering configuration
	17	Ch1: Directional Logic	0.1	SeeEn0818:surface	0	aisle1Direction logic configuration
	18	Ch1: Count Mode	0.1	SeeEn0819:surface	0	aisle1Counting mode configuration
	19	Ch1: Comparison Function	0.1	SeeEn081A:surface	0	aisle1Compare feature configurations
	20	Ch1: Field Bus Error	0.2	SeeEn081B:surface	0	aisle1Bus abnormality counting action configuration
	twenty three	Ch1: Upper Limit	4.0	-2147483648 ~2147483647	2147483647	aisle1Cycle mode upper limit
	twenty four	Ch1: Lower Limit	4.0	-2147483648 ~2147483647	-2147483648	aisle1Cycle mode lower limit
Note: This module is inserted after the coupler.1card slots, thenSDOIndex is16#8004, if inserted in2card slots, thenSDOIndex is16#8014, the index offset is16#10.						

surfaceEn0815

Sub-index object data	name	meaning
0	Rotary transducer single	Orthogonal Coding1Frequency doubling
1	Rotary transducer double	Orthogonal Coding2Frequency doubling
2	Rotary transducer quadurpe	Orthogonal coding 4 times frequency
3	Pulse and Directions	Pulse plus direction mode

4	CW/CCW (Unused)	(Not supported yet)

surfaceEn0816

Sub-index object data	name	meaning
0	Disable	closureDItrigger
1	Rising edge capture	Rising edge latch
2	Falling edge capture	Falling edge latch
3	Bilateral edge capture	Double edge latch
4	Rising edge reset	Rising edge reset
5	Falling edge reset	Falling edge reset
6	Bilateral edge reset	Double edge reset

surfaceEn0817

Sub-index object data	name
5	1MHZ
6	800KHZ
7	600KHZ
8	420KHZ
9	315KHZ
10	250KHZ
11	200KHZ
12	160KHZ
13	120KHZ
14	100KHZ
15	75KHZ

surfaceEn0818

Sub-index object data	name	meaning
0	Positive logic	Direction positive logic
1	Negative logic	Direction negative logic

surfaceEn0819

Sub-index object data	name	meaning
0	Line Counter	Linear Counting
1	Ring Counter	Cycle Count

surfaceEn081A

Sub-index object data	name	meaning
0	Disable	Turn off comparison
1	Enable	Enable compare function

surfaceEn081B

Sub-index object data	name	meaning
0	Continue counting	Continue counting
1	Hold last value	Keep the current count value
2	Clear last value	Clear count value

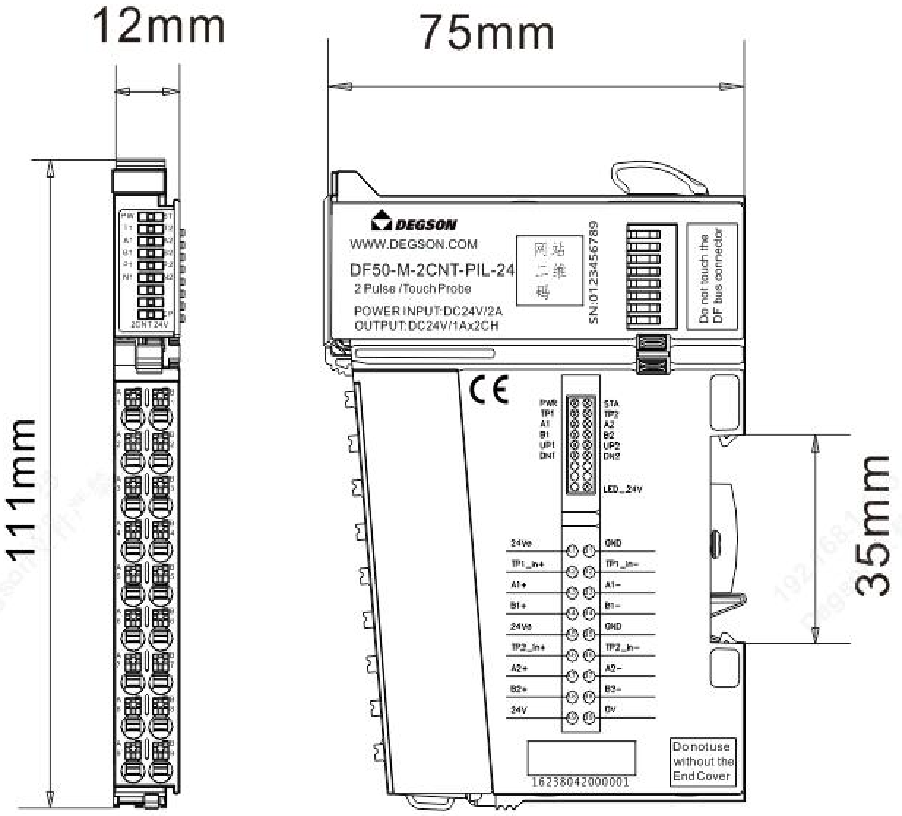
13.4 Process Data Definition

RXPDO			
Name	Type	Size	meaning
Ch0: Count Enable	BOOL	0.1	aisle0Count enable bit
Ch0: Compare Value	DINT	4.0	aisle0Comparison value setting
Ch1: Count Enable	BOOL	0.1	aisle1Count enable bit
Ch1: Compare Value	DINT	4.0	aisle1Comparison value setting

TXPDO			
Name	Type	Size	meaning
Ch0: Counting State	BOOL	0.1	aisle0Count status bit
Ch0: DI state	BOOL	0.1	aisle0 DIInput Status
Ch0: Compare State	BOOL	0.1	aisle0Compare status bit
Ch0: Direction	BIT2	0.2	aisle0Input signal direction
Ch0: Count Value	DINT	4.0	aisle0Count value
Ch0: LatChValue	DINT	4.0	aisle0Latch value
Ch1: Counting State	BOOL	0.1	aisle0Count status bit
Ch1: DI state	BOOL	0.1	aisle0 DIInput Status
Ch1: Compare State	BOOL	0.1	aisle0Compare status bit
Ch1: Direction	BIT2	0.2	aisle0Input signal direction
Ch1: Count Value	DINT	4.0	aisle0Count value
Ch1: LatChValue	DINT	4.0	aisle0Latch value

13.5 Mechanical Installation

The installation dimension information is shown in the figure below, the unit is (mm）:


12mm
75mm
111mm
35mm
DEGSON
WWW.DEGSON.COM
DF50-M-2CNT-PIL-24
2 Pulse /Touch Probe
POWER INPUT:DC24V/2A
OUTPUT:DC24V/1Ax2CH
SN:0123456789
Do not touch the DF bus connector
Do not use without the End Cover
16238042000001

14 2-channel encoder pulse counting/5VDC (DF50-M-2CNT-PIL-5)

- This pulse counting module adopts 2-channel pulse counting. The input signal voltage is 5VDC.
- Each input module is equipped with an anti-interference filter.
- The two LED indicators indicate that the module is operating normally and communicating normally.
- Magnetic isolation between the field level and the system level.
- Protection grade IP20.

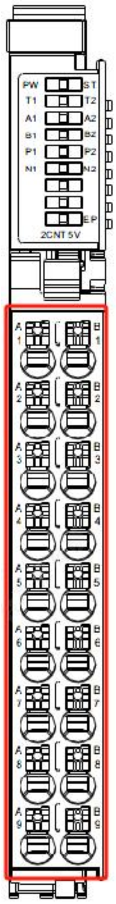
14.1 Specifications

Technical Information	
Product Description	High speed counting module, 2 channels
Number of channels	2
Signal Type	Incremental encoder AB / pulse + direction signal
Maximum input frequency	4MHZ
Input signal voltage	5V DC
Connection Type	2-wire/4-wire
Quadrature encoder frequency multiplication	x1/x2/x4
Counting Mode	Linear counter form, ring counter form
Count latch/reset function	Support, configurable
Filter function	Support, configurable

Counting range	–2147483648~2147483647
Accuracy	±1 pulse
Isolation method	Photoelectric isolation from the field layer
Error diagnosis	support
Input Action Display	When the input is in driving state, the indicator light is on (software control)
IO process data size	Output: 10 Byte; Input: 18 Byte
IO data mapping	Supports 3 IO mapping modes: bit-based access, byte-based access, and word-based access
Power parameters	
System bus input power rated voltage	5V DC (4.75V DC~ 5.25V DC)
System bus input power rated current	115mA
Terminal power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated current	2A
Terminal power output rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power output rated current	1A
Wiring parameters	
Connection technology:	PUSH-IN Terminal Blocks
Wire crimping area	0.2～1.5mm2/26～16AWG
Stripping length	8～10mm
Installation	DIN-35 rail
Material parameters	
color	black
Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25～60℃
Permissible ambient temperature (storage)	-40～85℃
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: 0～2000m
Relative humidity (non-condensing)	5～95%RH
Vibration resistance	1g, in accordance with IEC 60068-2-6
Shock resistance	15g, compliant with IEC 60068-2-27
EMC anti-interference level	Compliant with IEC 61000-4
Corrosion resistance	Compliant with IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S contaminant concentration at 75% relative humidity	10ppm
Permissible SO2 pollutant concentration at 75% relative humidity	25ppm

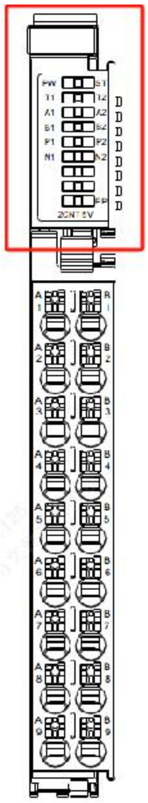
14.2 Hardware Interface

14.2.1 Terminal Block Definition



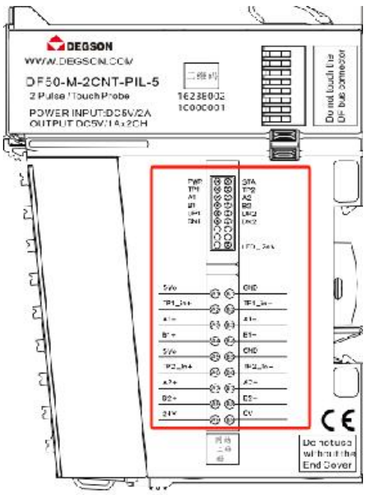
Terminal number	Signal	Terminal number	Signal	illustrate
A1	5V	B1	GND	Terminal power output
A2	TP1_in+	B2	TP1_in-	DI signal input
A3	A1+	B3	A1-	Orthogonal encoding mode A phase signal input/ Pulse plus direction mode direction signal input
A4	B1+	B4	B1-	Orthogonal encoding mode B phase signal input/ Pulse plus direction mode pulse signal input
A5	5V	B5	GND	Terminal power output
A6	TP2_in+	B6	TP2_in-	DI signal input
A7	A2+	B7	A2-	Orthogonal encoding mode A phase signal input/ Pulse plus direction mode direction signal input
A8	B2+	B8	B2-	Orthogonal encoding mode B phase signal input/ Pulse plus direction mode pulse signal input
A9	24Vin	B9	0V	Terminal power input

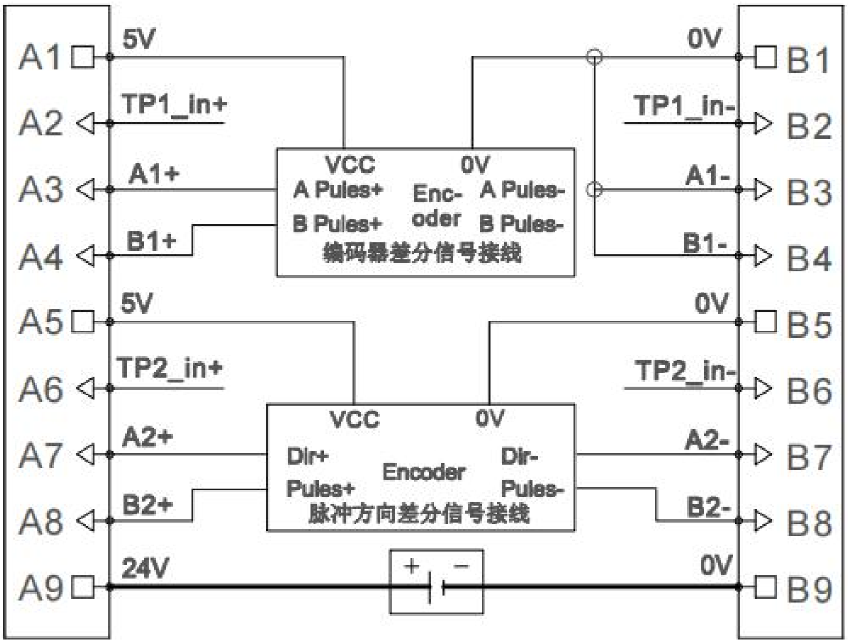
14.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green:System bus power inputnormal	
	Green Kill:System bus power inputabnormal	
ST	Power-on stage	Green: Module initialization error
		Green off: Module initialization is normal
	Operational stage	Green flash: The internal bus of the module is working normally
		Green off/green on: The internal bus of the module is working abnormally or the terminal power input is abnormal
T1/T2	Green: DI input signal is valid	
	Green off: DI input signal is invalid	
A1/A2	Green: Input signal is valid	
	Green off: Input signal is invalid	
B1/B2	Green: Input signal is valid	
	Green off: Input signal is invalid	
P1/P2	Green: Encoder is rotating forward	
	Green off: Encoder is stationary or reversed	
N1/N2	Green: Encoder reverse	
	Green off: Encoder is stationary or rotating forward	
EP	Green: The terminal power input is normal	
	Green off: Terminal power input abnormality	

14.2.3 Wiring Diagram





Note: A9, B9 24V power supply is provided externally.

14.3 Configuration Data Definition

index	Sub-index	name	Size	Value range	default value	meaning
16#8004	1	Ch0: Signal Type	0.4	See En0815 table	2	Channel 0 signal type configuration
	2	Ch0: DI Signal Function	0.4	See En0816 table	0	Channel 0 DI signal function configuration
	3	Ch0: Filter Time Signal A	0.4	See En0817 table	14	Channel 0 A phase signal filter configuration
	4	Ch0: Filter Time	0.4	See En0817	14	Channel 0 B phase signal filter

		Signal B		table		configuration
	5	Ch0: Directional Logic	0.1	See En0818 table	0	Channel 0 direction logic configuration
	6	Ch0: Count Mode	0.1	See En0819 table	0	Channel 0 counting mode configuration
	7	Ch0: Comparison Function	0.1	See En081A table	0	Channel 0 comparison function configuration
	8	Ch0: Field Bus Error	0.2	See En081B: Table	0	Channel 0 bus abnormality counting action configuration
	11	Ch0: Upper Limit	4.0	-2147483648 ~2147483647	2147483647	Channel 0 cycle mode upper limit
	12	Ch0: Lower Limit	4.0	-2147483648 ~2147483647	-2147483648	Channel 0 cycle mode lower limit
	13	Ch1: Signal Type	0.4	See En0815 table	2	Channel 1 signal type configuration
	14	Ch1: DI Signal Function	0.4	See En0816 table	0	Channel 1 DI signal function configuration
	15	Ch1: Filter Time Signal A	0.4	See En0817 table	14	Channel 1 A phase signal filter configuration
	16	Ch1: Filter Time Signal B	0.4	See En0817 table	14	Channel 1 B phase signal filter configuration
	17	Ch1: Directional Logic	0.1	See En0818 table	0	Channel 1 Direction Logic Configuration
	18	Ch1: Count Mode	0.1	See En0819 table	0	Channel 1 counting mode configuration
	19	Ch1: Comparison Function	0.1	See En081A: Table	0	Channel 1 comparison function configuration
	20	Ch1: Field Bus Error	0.2	See En081B table	0	Channel 1 bus abnormality counting action configuration
	twenty three	Ch1: Upper Limit	4.0	-2147483648 ~2147483647	2147483647	Channel 1 cycle mode upper limit
	twenty four	Ch1: Lower Limit	4.0	-2147483648 ~2147483647	-2147483648	Channel 1 cycle mode lower limit
Note: If the module is inserted in the first card slot after the coupler, the SDO index is 16#8004. If it is inserted in the second card slot, the SDO index is 16#8014 and the index offset is 16#10.						

Table En0815

Sub-index object data	name	meaning
0	Rotary transducer single	Orthogonal coding 1x frequency
1	Rotary transducer double	Orthogonal coding 2 times frequency
2	Rotary transducer quadurpe	Orthogonal Coding4Frequency doubling
3	Pulse and Directions	Pulse plus direction mode
4	CW/CCW (Unused)	(Not supported yet)

Table En0816

Sub-index object data	name	meaning
0	Disable	Disable DI trigger
1	Rising edge capture	Rising edge latch
2	Falling edge capture	Falling edge latch
3	Bilateral edge capture	Double edge latch
4	Rising edge reset	Rising edge reset
5	Falling edge reset	Falling edge reset
6	Bilateral edge reset	Double edge reset

Table En0817

Sub-index object data	name
3	4MHZ
4	1.5MHZ
5	1MHZ
6	800KHZ
7	600KHZ
8	420KHZ
9	315KHZ
10	250KHZ
11	200KHZ
12	160KHZ
13	120KHZ
14	100KHZ
15	75KHZ

Table En0818

Sub-index object data	name	meaning
0	Positive logic	Direction positive logic
1	Negative logic	Direction negative logic

Table En0819

Sub-index object data	name	meaning
0	Line Counter	Linear Counting
1	Ring Counter	Cycle Count

Table En081A

Sub-index object data	name	meaning
0	Disable	Turn off comparison
1	Enable	Enable compare function

Table En081B

Sub-index object data	name	meaning
0	Continue counting	Continue counting
1	Hold last value	Keep the current count value
2	Clear last value	Clear count value

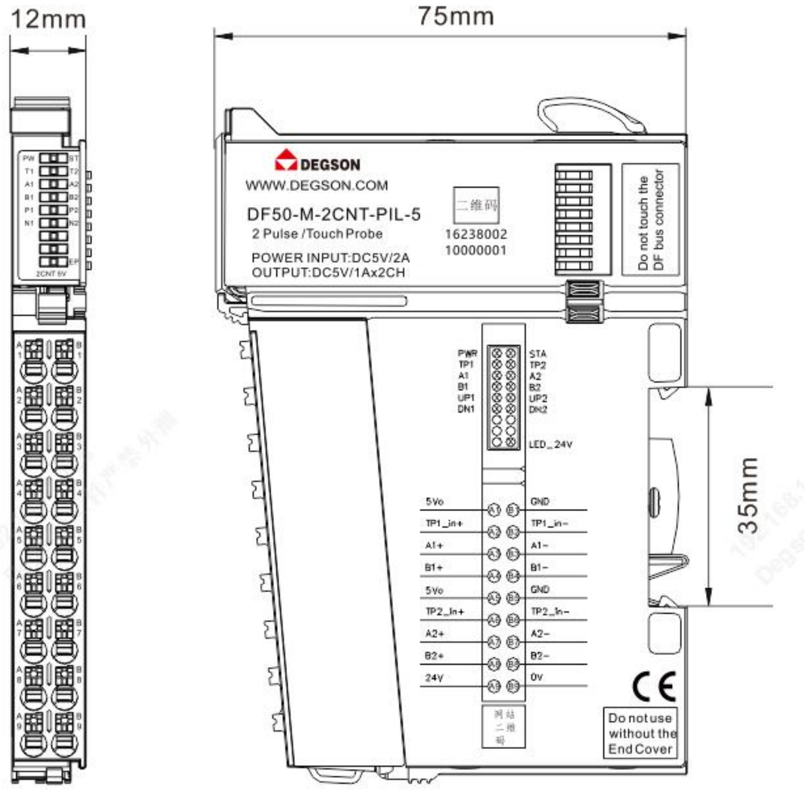
14.4 Process Data Definition

RXPDO			
Name	Type	Size	meaning
Ch0: Count Enable	BOOL	0.1	Channel 0 count enable bit
Ch0: Compare Value	DINT	4.0	Channel 0 comparison value setting
Ch1: Count Enable	BOOL	0.1	Channel 1 count enable bit
Ch1: Compare Value	DINT	4.0	Channel 1 comparison value setting

TXPDO			
Name	Type	Size	meaning
Ch0: Counting State	BOOL	0.1	Channel 0 counting status bit
Ch0: DI state	BOOL	0.1	Channel 0 DI input status
Ch0: Compare State	BOOL	0.1	Channel 0 compare status bit
Ch0: Direction	BIT2	0.2	Channel 0 input signal direction
Ch0: Count Value	DINT	4.0	Channel 0 count value
Ch0: LatChValue	DINT	4.0	Channel 0 latch value
Ch1: Counting State	BOOL	0.1	Channel 0 counting status bit
Ch1: DI state	BOOL	0.1	Channel 0 DI input status
Ch1: Compare State	BOOL	0.1	Channel 0 compare status bit
Ch1: Direction	BIT2	0.2	Channel 0 input signal direction
Ch1: Count Value	DINT	4.0	Channel 0 count value
Ch1: LatChValue	DINT	4.0	Channel 0 latch value

14.5 Mechanical Installation

The installation dimensions are shown in the figure below, in mm:



15 serial communication module (DF50-M-1COM-232/485/422)

- Support 1-way RS485, RS232 or RS422 (choose one from three);
- Support Modbus/RTU master, slave and free transparent transmission modes;
- Applicable to PLC, inverter, scanner, electric meter, water meter, field measuring equipment and other instruments.

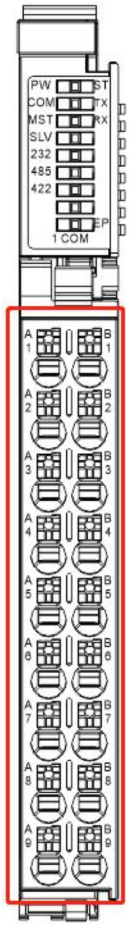

15.1 Specifications

Technical Information	
Product Description	Serial port module, 1 channel, supportsRS232/RS485/RS422
Number of channels	1
Communication Protocol	Modbus RTU master and slave modes; free transparent transmission mode
Baud rate	2400bps~512000bps
Data bits	7bit/8bit
Check digit	None/Even/Odd
Stop bits	1bit/2bit
Diagnosis reporting function configuration	support
Input/output action display	When the input/output signal is valid, the corresponding indicator light flashes
IO process data size	Configurable
Power parameters	
System bus input power rated voltage	5V DC (4.75V DC~ 5.25V DC)
System bus input power rated current	55mA
Terminal power input rated voltage	24V DC (20.4V DC~ 28.8V DC)

Terminal power input rated current	730mA
Terminal 24V power output rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal 24V power output rated current	500mA/each power output channel
Terminal 5V power output rated voltage	5V DC (4.75V DC~ 5.25V DC)
Terminal 5V power supply output rated current	500mA/each power output channel
Wiring parameters	
Connection technology	PUSH-IN Terminal Blocks
Wire crimping area	0.2～1.5mm2/26～16AWG
Stripping length	8～10mm
Installation	DIN-35 rail
Material parameters	
color	Light Gray
Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25～60℃
Permissible ambient temperature (storage)	-40～85℃
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: 0～2000m
Relative humidity (non-condensing)	5～95%RH
Vibration resistance	1g, in accordance with IEC 60068-2-6
Shock resistance	15g, compliant with IEC 60068-2-27
EMC anti-interference level	Compliant with IEC 61000-4
Corrosion resistance	Compliant with IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S contaminant concentration at 75% relative humidity	10ppm
Permissible SO2 pollutant concentration at 75% relative humidity	25ppm
Firmware Upgrade	support

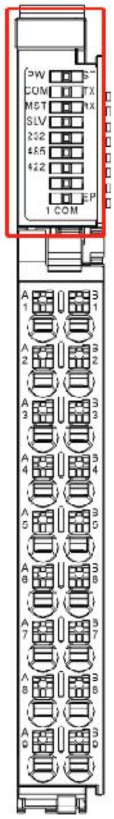
15.2 Hardware Interface

15.2.1 Terminal Block Definition



Terminal number	Signal	Terminal number	Signal	illustrate
A1	485/422 TA+	B1	485/422 TB-	RS422/RS485
A2	422 R+	B2	422 R-	RS422
A3	GND	B3	GND	Power Ground
A4	GND	B4	GND	Power Ground
A5	24Vo	B5	GND	Terminal 24V power output
A6	5Vo	B6	GND	Terminal 5V power output
A7	232CTS	B7	232RTS	RS232
A8	232RXD	B8	232TXD	RS232
A9	24V	B9	0V	Terminal power input

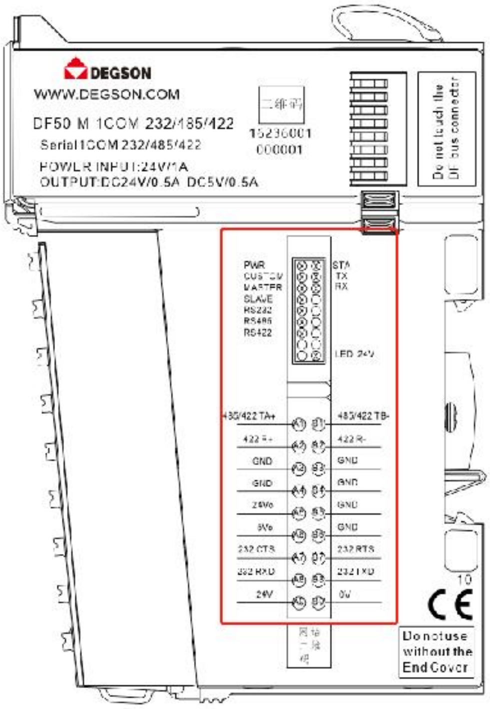
15.2.2 LED indicator definition

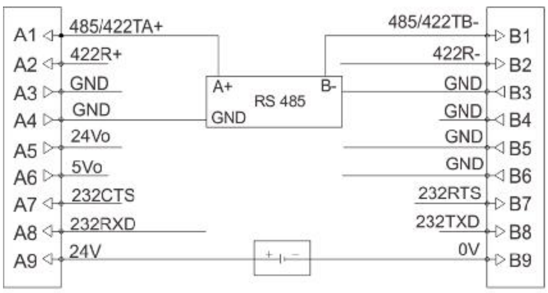


<table>
<tr><th>Indicator Lights</th><th colspan="2">meaning</th></tr>
<tr><td rowspan="2">PW</td><td colspan="2">Green:System bus power inputnormal</td></tr>
<tr><td colspan="2">Green Kill:System bus power inputabnormal</td></tr>
<tr><td rowspan="4">ST</td><td rowspan="2">Power-on stage:</td><td>Green: Module initialization abnormality,</td></tr>
<tr><td>Green off: Module initialization is normal</td></tr>
<tr><td rowspan="2">Operation phase:</td><td>Green flash: The internal bus of the module is working normally</td></tr>
<tr><td>Green off/green on: The internal bus of the module is working abnormally or the terminal power input is abnormal</td></tr>
<tr><td rowspan="2">COM</td><td colspan="2">Green: The module is working in free transparent transmission mode</td></tr>
<tr><td colspan="2">Green off: The module is not working in free transparent transmission mode</td></tr>
<tr><td rowspan="2">MST</td><td colspan="2">Green: The module is working in ModBus master mode</td></tr>
<tr><td colspan="2">Green off: The module is not working in ModBus master mode</td></tr>
<tr><td rowspan="2">SLV</td><td colspan="2">Green: The module is working in ModBus slave mode</td></tr>
<tr><td colspan="2">Green off: The module is not working in ModBus slave mode</td></tr>
<tr><td rowspan="2">232</td><td colspan="2">Green: Enable 232 communication interface</td></tr>
<tr><td colspan="2">Green off: 232 communication interface disabled</td></tr>
<tr><td rowspan="2">485</td><td colspan="2">Green: Enable 485 communication interface</td></tr>
<tr><td colspan="2">Green off: 485 communication interface disabled</td></tr>
<tr><td rowspan="2">422</td><td colspan="2">Green: Enable the 422 communication interface</td></tr>
<tr><td colspan="2">Green off: 422 communication interface disabled</td></tr>
</table>

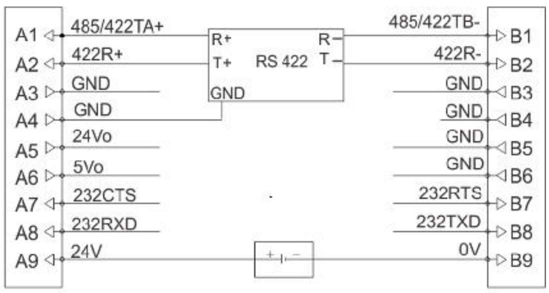
TX	Green flash: The module is sending data
	Green off: The module does not receive data
RX	Green flash: The module is receiving data
	Green off: The module does not receive data
EP	Green: The terminal power input is normal
	Green off: Terminal power input abnormality

15.2.3 Wiring Diagram

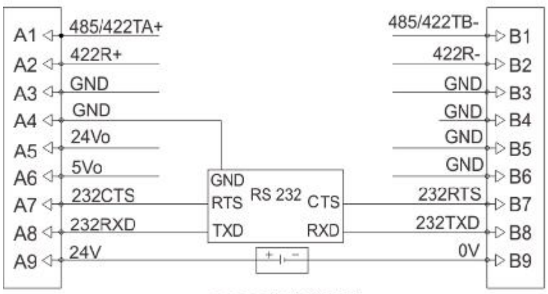




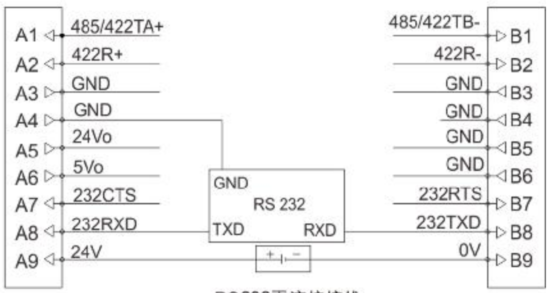
RS 485接线



RS 422接线



RS232有流控接线



RS232无流控接线

15.3 Configuration Data Definition

index	Sub-index	name	Data Types	Value range	default value	meaning	
16#8006	16#1	Operation mode	USINT	Table A	0	Operation Mode	Port common configuration items
	16#2	Interface	USINT	Table B	2	Interface Type	
	16#3	Parity	USINT	Table C	0	Check digit	
	16#4	Data bit	USINT	Table D	0	Data bits	
	16#5	Stop bit	USINT	Table E	0	Stop bits	
	16#6	Baudrate	USINT	Table F	11	Baud rate	
	16#7	Custom Baudrate	UDINT	2400~512000	0	Custom baud rate	
	16#8	FreeRUN Interval time	UINT	0~65535	1	Free mode data frame interval	Free Mode Configuration Items
	16#A	Slave ID	USINT	0~127	1	Slave Mode Slave Mode Address	Slave Mode Configuration Items
	16#10	Slave Response Delay	UINT	0~65535	0	Slave mode slave response time	
	16#11	Ch0: Slave ID	USINT	0~127	0	Channel 0 slave address configuration	Slave 0 configuration items in master mode
	16#12	Ch0: Event Trigger	USINT	Table G	0	Channel 0 trigger mode configuration	
	16#13	Ch0: Lost Action	USINT	Table H	0	Channel 0 offline action configuration	
	16#14	Ch0: Operation Code	USINT	Table I	16	Channel 0 function code configuration	
	16#15	Ch0: Reg Addr	UINT	0~65535	0	Channel 0 register address configuration	
	16#16	Ch0: Reg Num	UINT	Register: 0-20 (40 bytes) Number of coils: 0-320 (40 bytes)	0	Channel 0 register quantity configuration	
	16#17	Ch0: Poll Time	UINT	100 - 5000ms	500	Channel 0 polling period configuration	
	16#18	Ch0: Poll Delay	UINT	0-5000ms	0	Channel 0 interval time configuration	
	16#19	Ch0: Response Timeout	UINT	100~5000ms	1000	Channel 0 slave timeout configuration	
	16#1A	Ch1: Slave ID	USINT	0~127	0	Channel 1 slave address configuration	Slave 1 configuration items in master mode
	:						
	16#22	Ch1: Response Timeout	UINT	100~5000ms	1000	Channel 1 slave timeout configuration	

	16#23	Ch2: Slave ID	USINT	0~127	0	Channel 2 slave address configuration	Slave 2 configuration items in master mode
	:						
	16#2B	Ch2: Response Timeout	UINT	100~5000ms	1000	Channel 2 slave timeout configuration	
	16#2C	Ch3: Slave ID	USINT	0~127	0	Channel 3 slave address configuration	Slave 3 configuration items in master mode
	:						
	16#34	Ch3: Response Timeout	UINT	100~5000ms	1000	Channel 3 slave timeout configuration	
	16#35	Ch4: Slave ID	USINT	0~127	0	Channel 4 slave address configuration	Slave 4 configuration items in master mode
	:						
	16#3D	Ch4: Response Timeout	UINT	100~5000ms	1000	Channel 4 slave timeout configuration	
	16#3E	Ch5: Slave ID	USINT	0~127	0	Channel 5 slave address configuration	Slave 5 configuration items in master mode
	:						
	16#46	Ch5: Response Timeout	UINT	100~5000ms	1000	Channel 5 slave timeout configuration	
	16#47	Ch6: Slave ID	USINT	0~127	0	Channel 6 slave address configuration	Slave 6 configuration items in master mode
	:						
	16#4F	Ch6: Response Timeout	UINT	100~5000ms	1000	Channel 6 slave timeout configuration	
	16#50	Ch7: Slave ID	USINT	0~127	0	Channel 7 slave address configuration	Slave 7 configuration items in master mode
	:						
	16#58	Ch7: Response Timeout	UINT	100~5000ms	1000	Channel 7 slave timeout configuration	
	16#59	Ch8: Slave ID	USINT	0~127	0	Channel 8 slave address configuration	Slave 8 configuration items in master mode
	:						
	16#61	Ch8: Response Timeout	UINT	100~5000ms	1000	Channel 8 slave timeout configuration	
	16#62	Ch9: Slave ID	USINT	0~127	0	Channel 9 slave address configuration	Slave 9 configuration items in master mode
	:						
	16#6A	Ch9: Response Timeout	UINT	100~5000ms	1000	Channel 9 slave timeout configuration	
	16#6B	Ch10: Slave ID	USINT	0~127	0	Channel 10 slave address configuration	Slave 10 configuration items in master mode
	:						
	16#73	Ch10: Response Timeout	UINT	100~5000ms	1000	Channel 10 slave timeout	

						configuration	
	16#74	Ch11: Slave ID	USINT	0~127	0	Channel 11 slave address configuration	Configuration items of slave 11 in master mode
	:						
	16#7C	Ch11: Response Timeout	UINT	100~5000ms	1000	Channel 11 slave timeout configuration	

surfaceA

Sub-index object data	name	meaning
0	FreeRUN	Free transparent transmission mode
1	Modbus RTU Master	Master mode
2	Modbus RTU Slave	Slave Mode

surfaceB

Sub-index object data	name	meaning
0	RS232 Flow Off	RS232 mode flow control disabled
1	RS232 Flow On	RS232 mode flow control enabled
2	RS485	RS485 Mode
3	RS422	RS422 Mode

surfaceC

Sub-index object data	name	meaning
0	None	No check digit
1	Odd	Odd Parity
2	Even	Even parity

surfaceD

Sub-index object data	name	meaning
0	8bit	8 data bits
1	7bit	7 data bits

surfaceE

Sub-index object data	name	meaning
0	1bit	1 stop bit
1	2bit	2 stop bits

surfaceF

Sub-index object data	name	meaning
3	2400bps	2400 baud rate

4	4800bps	4800 baud rate
5	9600bps	9600 baud rate
6	14400bps	14400 baud rate
7	19200bps	19200 baud rate
8	38400bps	38400 baud rate
9	56000bps	56000 baud rate
10	57600bps	57600 baud rate
11	115200bps	115200 baud rate
12	128000bps	128000 baud rate
13	230400bps	230400 baud rate
14	256000bps	256000 baud rate
15	460800bps	460800 baud rate
16	500000bps	500000 baud rate
17	512000bps	512000 baud rate

surfaceG

Sub-index object data	name	meaning
0	Poll mode	Polling Mode
1	Trigger	Trigger Mode

surfaceH

Sub-index object data	name	meaning
0	Hold Data	Keep data
1	Clear Data	Clear data

surfaceI

Sub-index object data	name	meaning
1	01 READ COILS	Reading coil
2	02 READ DISCRETE INPUTS	Read discrete quantity
3	03 READ HOLDING REGISTERS	Read Holding Registers
4	04 READ INPUT REGISTERS	Read Input Register
5	05 WRITE SINGLE COIL	Writing a single coil
6	06 WRITE SINGLE HOLDING REGISTER	Writing a single register
7	15 WRITE MULTIPLE COILS	Writing multiple coils
8	16 WRITE MULTIPLE HOLDING REGISTERS	Writing multiple holding registers

15.4 Process Data Definition

- Free mode process data definition

TXPDO			
Name	Type	Size	meaning
StateWord	UINT	2.0	Status word
Input Length	UINT	2.0	Receive data length

Input Count	UINT	2.0	Receive data sequence number
Data In 0	USINT	1.0	Receive data 1
Data In 1	USINT	1.0	Receive data 2
:			
Data In 38	USINT	1.0	Receive data 39
Data In 39	USINT	1.0	Receive data 40

RXPDO			
Name	Type	Size	meaning
CtrlWord	UINT	2.0	Control Word
Output Length	UINT	2.0	Send data length
Output Count	UINT	2.0	Send data sequence number
Data Out 0	USINT	1.0	Send data 1
Data Out 1	USINT	1.0	Send data 2
:			
Data Out 38	USINT	1.0	Send data 39
Data Out 39	USINT	1.0	Send data 40

StateWord contains the following states:

Normal state value	Status Name	meaning
16#0000	OP_SUCCESS	Configuration or write operation successful
16#0001	DATA_FULL	Data has been updated and can be read
16#0002	WRITE_IDLE	Write idle, writable
16#0003	DATA_EMPTY	Read idle, receive data not updated
Error Status Value	Status Name	meaning
16#E0A1	WRITE_BUSY	Write busy, can't write
16#E0A2	DATA_LARGE	Data length exceeds limit

16#E0A3	CMD_ERR	Command Error
16#E0A4	PARA_ERR	Configuration parameter error
16#E0A5	CHECK_ERR	Verification Error
16#E0A6	SLAVE_NOEXIT	The slave device does not exist
16#E0A7	PACK_LOSS	Packet Loss
16#E0A8	OVER_FLOW	Data overflow

Note: Each time the coupler state machine restarts, after downloading the configuration data through startup, it will automatically send the CONFIGUREPORT command to configure the serial port module. After the configuration is successful, the serial port module automatically enters the READCUSTOM state and feedback StateWord status is 16#0003.

Users can also modify SDO data online in COE online and send it down, and then reconfigure the serial port module by switching the CtrlWord command to 16#00A1:CONFIGUREPORT, and send the read or write command after the configuration is successful. The control word CtrlWord can be used to achieve free mode read and write switching. In situations where continuous reading and writing are required, the PLC can periodically switch CtrlWord to write command 16#00C1 and read command 16#00C2 to achieve this. Whether the reading and writing are successful can be judged by StateWord or combined with InputCount.

- Slave mode process data definition

TXPDO			
Name	Type	Size	meaning
StateWord	UINT	2.0	Status word
Read Data Length	USINT	1.0	Readback data length Byte
Reserve 1	USINT	1.0	reserve
SlaveRegNum	UINT	2.0	Readback register quantity
Data In 0	UINT	2.0	Receive data 1
Data In 1	UINT	2.0	Receive data 2
:			
Data In 18	UINT	2.0	Receive data 19

Data In 19	UINT	2.0	Receive data 20

RXPDO			
Name	Type	Size	meaning
CtrlWord	UINT	2.0	Control Word
SlaveCMD	USINT	1.0	Slave operation commands
SlaveRegAddr	USINT	1.0	Slave register address
SlaveRegNum	UINT	2.0	Number of slave registers
Data Out 0	UINT	2.0	Send data 1
Data Out 1	UINT	2.0	Send data 2
:			
Data Out 18	UINT	2.0	Send data 19
Data Out 19	UINT	2.0	Send data 20

➢ Master mode process data definition

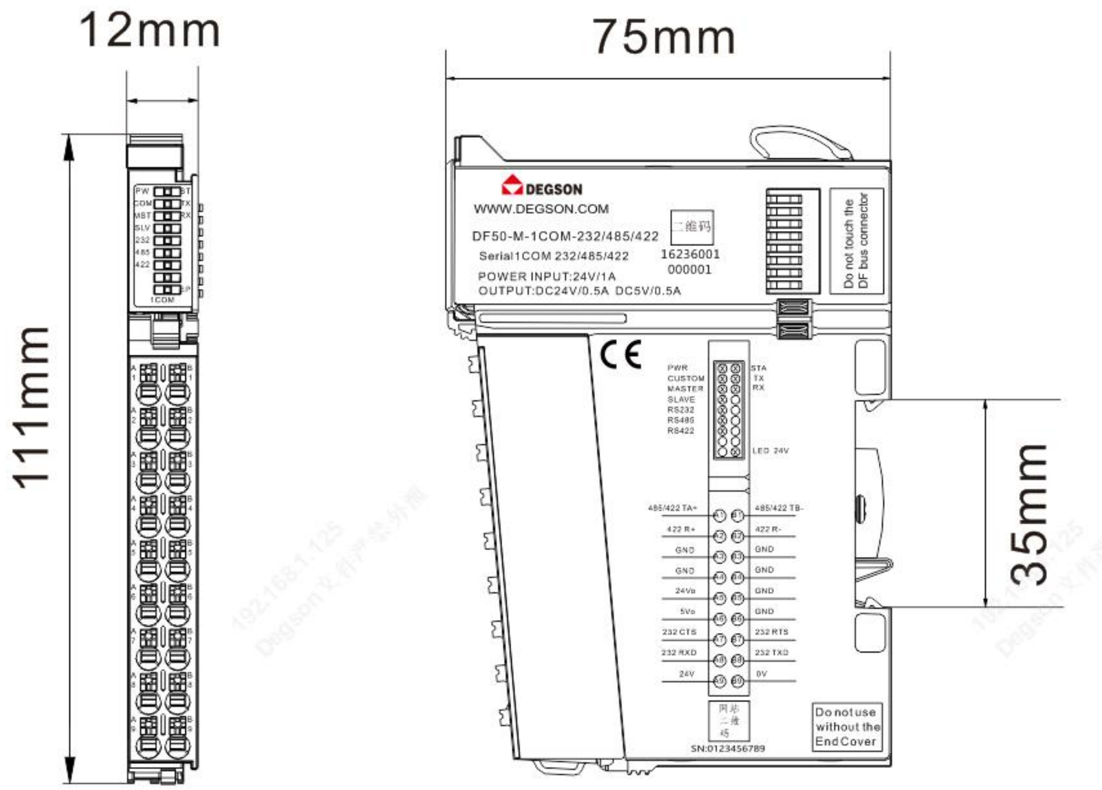
TXPDO			
Name	Type	Size	meaning
StateWord	UINT	2.0	Status word
Read Data Length	UINT	2.0	Receive data length
Active Channel	UINT	2.0	Current active channels
Data In 0	UINT	2.0	Receive data 1
Data In 1	UINT	2.0	Receive data 2
:			
Data In 18	UINT	2.0	Receive data 19
Data In 19	UINT	2.0	Receive data 20

RXPDO			
Name	Type	Size	meaning
CtrlWord	UINT	2.0	Control Word
Reserve	UINT	2.0	reserve
Select Channel	UINT	2.0	Channel operation selection

Data Out 0	UINT	2.0	Transmitter data 1
Data Out 1	UINT	2.0	Transmitter data 2
:			
Data Out 18	UINT	2.0	Transmitter data 19
Data Out 19	UINT	2.0	Transmitter data 20

15.5 Mechanical Installation

The installation dimensions are shown in the figure below, in mm:



16 16 channels/24VDC/voltage distribution (DF50-M-DC-U-24)

- Independent of fieldbus application and connection type.
- Provides 16 channels of 24VDC rated voltage to the external field.
- Protection grade IP20.

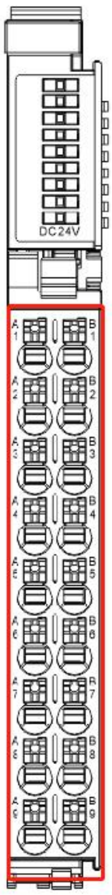
16.1 Specifications

Technical Information	
Product Description	Voltage distribution module, 16 channels, 24V
Number of channels	16
Operating voltage	24VDC (-15%~+20%) through power jumper contacts
Provide on-site voltage	24VDC (-15%～+20%)
Provides the maximum current on site	8A
Number of input power jumper contacts	2
Number of external power jumper contacts	2
Wiring parameters	
Wire crimping area	0.2～1.5mm2/26～16AWG
Stripping length	8～10mm
Installation	DIN-35 rail
Material parameters	
color	black
Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	

Allowable ambient temperature (operating)	-25～60℃
Permissible ambient temperature (storage)	-40～85℃
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: 0～2000m
Relative humidity (non-condensing)	5～95%RH
Vibration resistance	1g, in accordance with IEC 60068-2-6
Shock resistance	15g, compliant with IEC 60068-2-27
EMC anti-interference level	Compliant with IEC 61000-4
Corrosion resistance	Compliant with IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S contaminant concentration at 75% relative humidity	10ppm
Permissible SO2 pollutant concentration at 75% relative humidity	25ppm

16.2 Hardware Interface

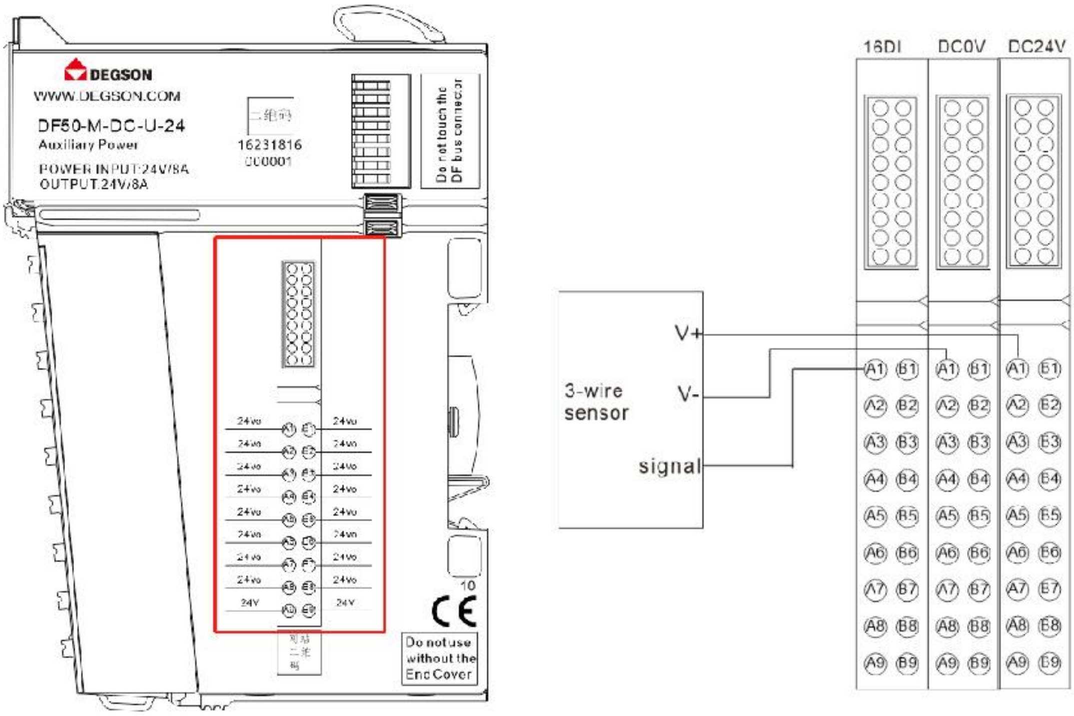
16.2.1 Terminal Definition



Terminal number		Signal	illustrate
A1	B1	On-site power supply 24VDC	Provides 16 channels of 24VDC rated voltage for external loads
A2	B2		
A3	B3		
A4	B4		
A5	B5		
A6	B6		
A7	B7		
A8	B8		

A9	B9	External voltage input 24VDC	External 24VDC voltage input jumper contacts

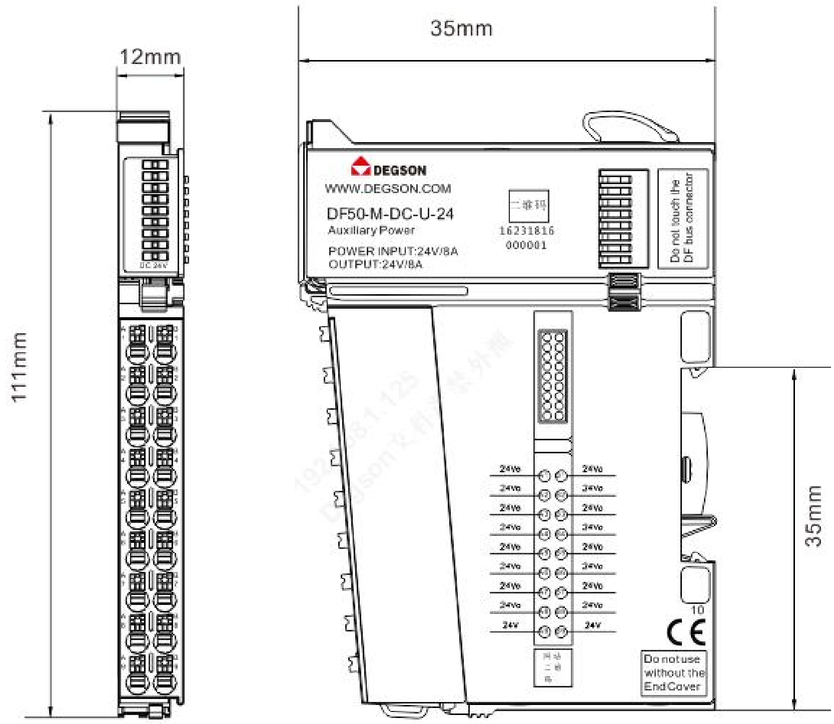
16.2.2 Wiring Diagram



Note: Each of the 16 channels can provide a 24VDC rated voltage to the external load. A9/B9 provides 24VDC externally.

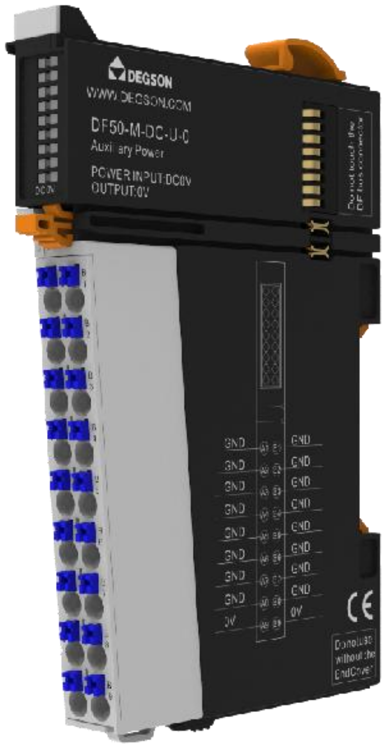
16.3 Mechanical Installation

The installation dimension information is shown in the figure below, the unit is (mm)



17 16 channels/0VDC/voltage distribution (DF50-M-DC-U-0)

- Independent of fieldbus application and connection type.
- Provides 16 channels of 0VDC rated voltage for external fields.
- Protection grade IP20.



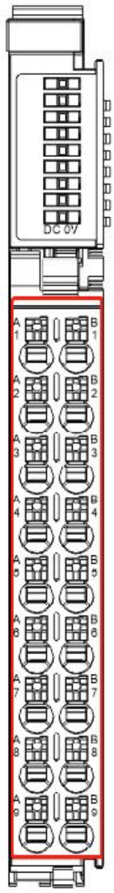
17.1 Specifications

Technical Information	
Product Description	Voltage distribution module, 16 channels, 0V
Number of channels	16
Operating voltage	0VDC (-15% to +20%) through power jumper contacts
Provide on-site voltage	0VDC (-15%～+20%)
Provides the maximum current on site	8A
Number of input power jumper contacts	2
Number of external power jumper contacts	2
Wiring parameters	
Wire crimping area	0.2～1.5mm2/26～16AWG
Stripping length	8～10mm
Installation	DIN-35 rail
Material parameters	
color	black
Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25～60°C
Permissible ambient temperature (storage)	-40～85°C
Protection type	IP20

Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: 0～2000m
Relative humidity (non-condensing)	5～95%RH
Vibration resistance	1g, in accordance with IEC 60068-2-6
Shock resistance	15g, compliant with IEC 60068-2-27
EMC anti-interference level	Compliant with IEC 61000-4
Corrosion resistance	Compliant with IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S contaminant concentration at 75% relative humidity	10ppm
Permissible SO2 pollutant concentration at 75% relative humidity	25ppm

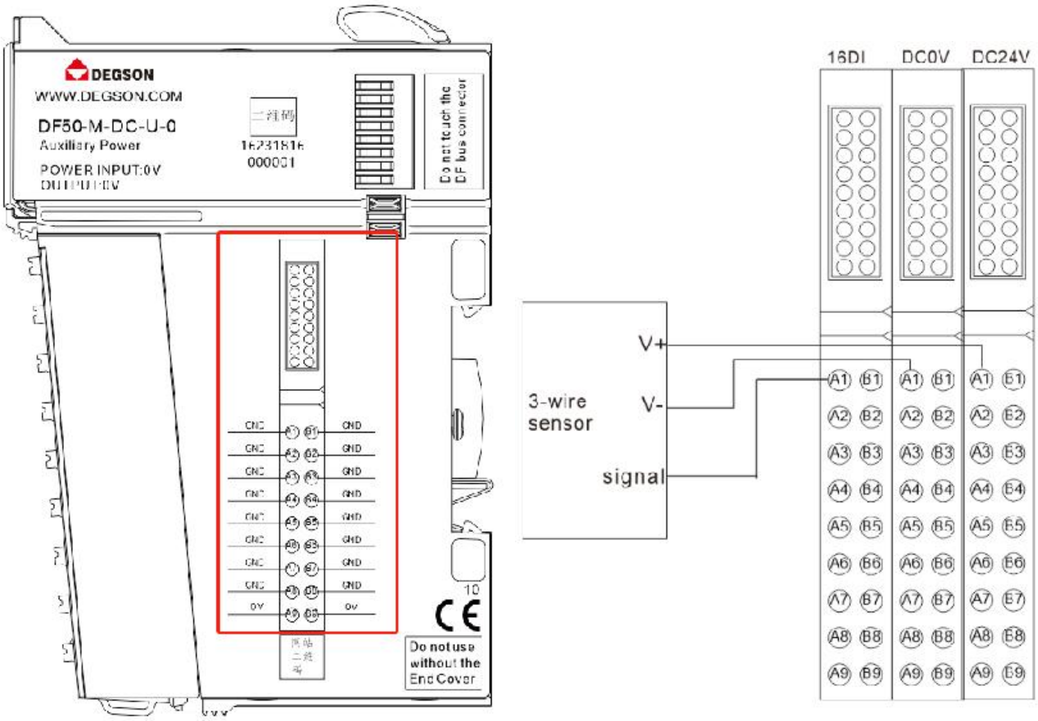
17.2 Hardware Interface

17.2.1 Terminal Block Definition



Terminal number		Signal	illustrate
A1	B1	On-site power supply 0VDC	Provides 16 channels of 0VDC rated voltage for external loads
A2	B2		
A3	B3		
A4	B4		
A5	B5		
A6	B6		
A7	B7		
A8	B8		
A9	B9	External voltage input 0VDC	External 0VDC voltage input jumper contacts

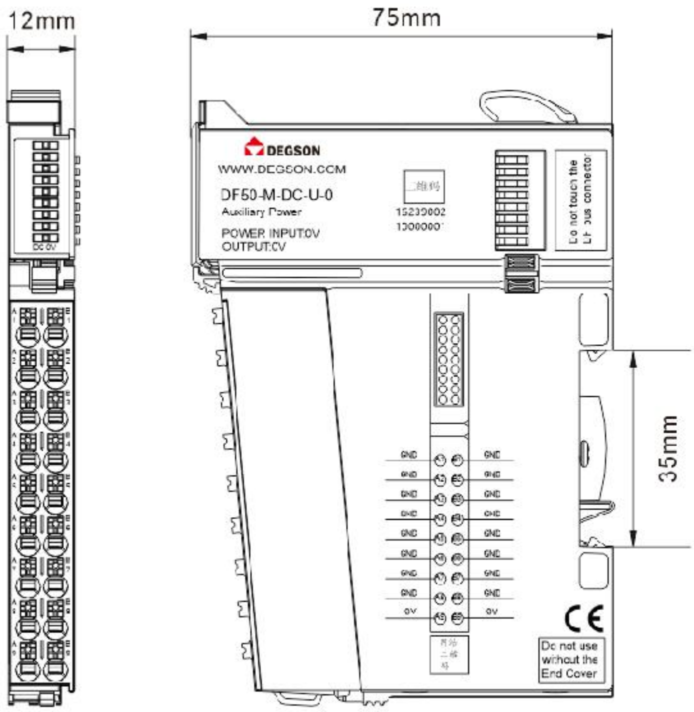
17.2.2 Wiring Diagram



Note: Each of the 16 channels can provide a 0VDC rated voltage to an external load. A9/B9 provides 0VDC externally.

17.3 Mechanical Installation

The installation dimension information is shown in the figure below, the unit is (mm)



18 IO-Link communication module (DF50-M-4IOL)

- Support 4-channel IO-Link communication
- Supports unshielded 3-core or 5-core standard cables
- Applied to sensors, RFID readers, valves, motor starters, I/O modules, etc.

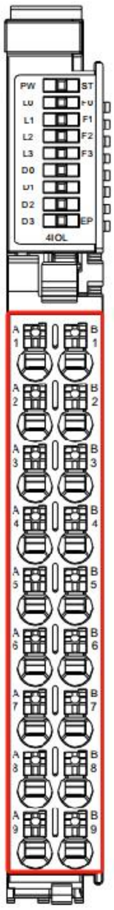
18.1 Specifications

productinformation	
Product Name	DF50-M-4IOL
Product Description	IO-Link communication module
Technical Information	
ordinaryDigital quantityportenterparameter	
Number of channels	4-wire
Signal Type	IEC 61131-2: Type 1 PNP
Input voltage range, "0" signal	-0.3 V DC ... 8 V DC
Input voltage range, "1" signal	12.9 V DC ... 24.3 V DC
IO-LINK port input parameters	
IO-LINK Mode	
Number of ports	4
Connection	Push-in connection
Connecting the system	3 lines\5 lines
Port Type	Category A
Connect the cables	3-wire or 5-wire unshielded standard cable
Digital input mode	
Input Description	IO-Link port in digital input (DI) mode
Input quantity	Max 4
Input Type	IEC 61131-2 :Type 1 PNP

Connection	Push-in connection
Connecting the system	3 lines
Rated input voltage	24 V DC
Input voltage range, "0" signal	-0.3 V DC ... 8 V DC
Input voltage range, "1" signal	12.9 V DC ... 24.3 V DC
Digital output mode	
Output Description	IO-Link port in digital output (DO) mode
Number of outputs	Max 4
Output Type	IEC 61131-2 :Type 0.5 PNP
Connection	Push-in connection
Connecting the system	2, 3 lines
Rated output voltage	24 V DC
Rated current per channel	500 mA
Power parameters	
Operating voltage	24V DC +20 %/ -15 %
wiringparameter	
Connection technology: input/output	PUSH-IN Terminal Blocks
Connection Type	Input/Output
Wire crimping area	0.2～1.5mm2/26～16AWG
Stripping length	8～10mm
Installation	DIN-35 rail
Material parameters	
color	Light Gray
Housing Material	PC plastic, PA66
Conformance mark	CE
environmentwantbeg	
allowAmbient temperature (Runtime）	-25~60℃
allowAmbient temperature (store）	-40~85℃
Protectiontype	IP20
pollutegrade	2,conform toIEC 61131-2 Standard
Workaltitude	temperatureNo derating:0～2000m
Relative humidity（No condensation）	5～95%RH
Vibration resistance	1g, in accordance with IEC 60068-2-6
Shock resistance	15g, in accordance with IEC 60068-2-27standard
EMC-resistantDisruptive	Complies with EN 61000-6-2
EMC—Radiated interference	Complies with EN 61000-6-3
anti-Corrosion resistance	Compliant with IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S contaminant concentration at 75% relative humidity	10ppm
Permissible SO2 pollutant concentration at 75% relative humidity	25ppm

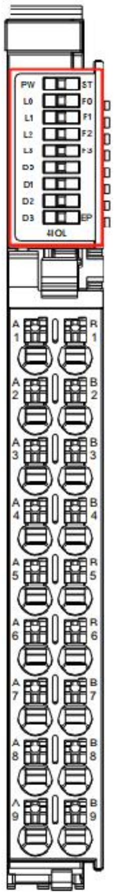
18.2 Hardware Interface

18.2.1 WiringTerminal Definition



Terminal number	Signal	illustrate	Terminal number	Signal	illustrate
A1	C/Q0	Channel 0 C/Q signal	B1	DI0	Channel 0 DI signal
A2	L+ 0	Channel 0 24V output	B2	L-0	Channel 0 0V output
A3	C/Q1	Channel 1 C/Q signal	B3	DI1	Channel 1 DI signal
A4	L+1	Channel 1 24V output	B4	L-1	Channel 1 0V output
A5	C/Q2	Channel 2 C/Q signal	B5	DI2	Channel 2 DI signal
A6	L+2	Channel 2 24V output	B6	L-2	Channel 2 0V output
A7	C/Q3	Channel 3 C/Q signal	B7	DI3	Channel 3 DI signal
A8	L+3	Channel 3 24V output	B8	L-3	Channel 3 0V output
A9	24V	External power input positive	B9	0V	External power input negative pole

18.2.2 LED Indicatorsdefinition

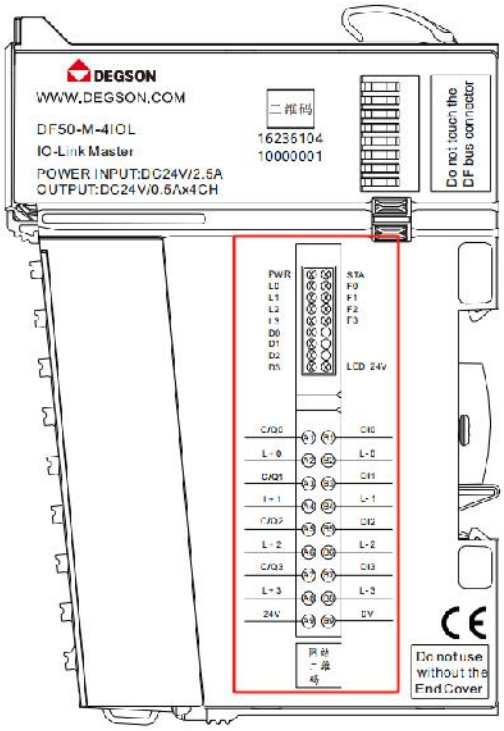


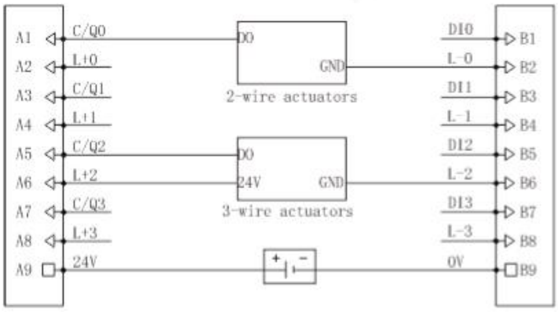
<table>
<tr><th>Indicator Lights</th><th colspan="2">meaning</th></tr>
<tr><td rowspan="2">PW</td><td colspan="2">On: Internal bus power supplynormal</td></tr>
<tr><td colspan="2">Off: Internal bus power supply abnormalityoften</td></tr>
<tr><td rowspan="4">ST</td><td rowspan="2">Power-on stage:</td><td>Green: Module initialization error</td></tr>
<tr><td>Green off: Module initialization is normal</td></tr>
<tr><td rowspan="2">Operation phase:</td><td>Green flash: The internal bus of the module is working normally</td></tr>
<tr><td>Green off: The internal bus of the module is working abnormally</td></tr>
<tr><td rowspan="3">L0~L3</td><td colspan="2">Green: The corresponding channel IO-LINK is communicating normally</td></tr>
<tr><td colspan="2">Green flash: No IO-LINK slave is connected to the corresponding channel</td></tr>
<tr><td colspan="2">Green off: The corresponding channel is not configured as IO-LINK mode</td></tr>
<tr><td rowspan="2">F0~F3</td><td colspan="2">Red: The corresponding channel reports an error</td></tr>
<tr><td colspan="2">Red off: No error reported on the corresponding channel</td></tr>
<tr><td>D0~D3</td><td colspan="2">Green: DI input valid signal</td></tr>
</table>

	Green off: DI has no valid input signal
EP	On: The external interface of the module is powered normally
	Off: The power supply of the module's external interface is abnormal.

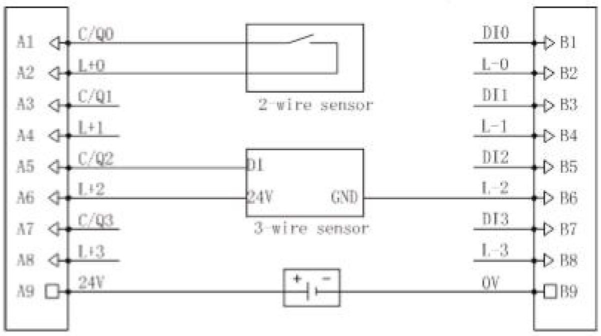
Note: When the C/Q port is used as DI input, no indicator light will be displayed.

18.2.2 Wiring Diagram

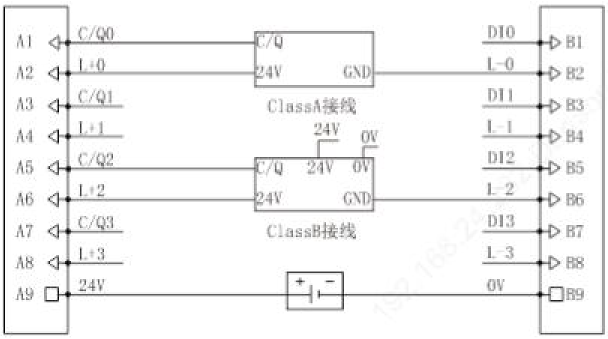




C/Q为DO时接线



C/Q为DI时接线



C/Q为IO-Link模式接线图

18.3 Configuration Data Definition

The SDO index is 16#8007 and the SDO offset of the slot is 16#0010.

Sub-index	Configuration items	Parameter Description	default value
1	Port0 Operating Mode	0:disable 1:IO-LINK 2:DI 3:DO	1
2	Port0 Cycle Mode	0:Free Running 1:Fixed Time 2:Message sync (not supported yet)	0
3	Port0 Cycle Time	3.2ms~132.8ms (This parameter is only effective when Cycle Mode is Fixed Time)	3.2ms
4	Port0 Validation Mode	0:disable 1:compatible 2:identical (not supported yet)	0
5	Port0 Parameter Server	0:disable 1:BackUp/Restore 2:Restore	0
6	Port0 VendorID	Vendor ID (unsigned 16 bits)	0
7	Port0 DeviceID	Device ID (unsigned 32 bits)	0
8	Port0 ISDU Down Load Enable	0:Disable 1:Enable (ISDU download enable bit)	0
9	Port0 ISDU Index	ISDU index (unsigned 16 bits)	0
10	Port0 ISDU SubIndex	ISDU subindex (unsigned 8 bits)	0
11	Port0 ISDU Length	ISDU data length to be written (0~8)	0
12	Port0 ISDU data0		0
13	Port0 ISDU data1		0
14	Port0 ISDU data2		0
15	Port0 ISDU data3		0
16	Port0 ISDU data4		0
17	Port0 ISDU data5		0
18	Port0 ISDU data6		0
19	Port0 ISDU data7		0
20	Port1 Operating Mode	0:disable 1:IO-LINK 2:DI 3:DO	1
twenty one	Port1 Cycle Mode	0:Free Running 1:Fixed Time 2:Message sync (not supported yet)	0
twenty two	Port1 Cycle Time	3.2ms~132.8ms (This parameter is only effective when Cycle Mode is Fixed Time)	3.2ms
twenty three	Port1 Validation Mode	0:disable 1:compatible 2:identical (not supported yet)	0

twenty four	Port1 Parameter Server	0:disable 1:BackUp/Restore 2:Restore	0
25	Port1 VendorID	Vendor ID (unsigned 16 bits)	0
26	Port1 DeviceID	Device ID (unsigned 32 bits)	0
27	Port1 ISDU Down Load Enable	0: Disable 1: Enable (ISDU download enable bit)	0
28	Port1 ISDU Index	ISDU index (unsigned 16 bits)	0
29	Port1 ISDU SubIndex	ISDU subindex (unsigned 8 bits)	0
30	Port1 ISDU Length	ISDU data length to be written (0~8)	0
31	Port1 ISDU data0		0
32	Port1 ISDU data1		0
33	Port1 ISDU data2		0
34	Port1 ISDU data3		0
35	Port1 ISDU data4		0
36	Port1 ISDU data5		0
37	Port1 ISDU data6		0
38	Port1 ISDU data7		0
39	Port2 Operating Mode	0:disable 1:IO-LINK 2:DI 3:DO	1
40	Port2 Cycle Mode	0:Free Running 1:Fixed Time 2:Message sync (not supported yet)	0
41	Port2 Cycle Time	3.2ms~132.8ms (This parameter is only effective when Cycle Mode is Fixed Time)	3.2ms
42	Port2 Validation Mode	0:disable 1:compatible 2:identical (not supported yet)	0
43	Port2 Parameter Server	0:disable 1:BackUp/Restore 2:Restore	0
44	Port2 VendorID	Vendor ID (unsigned 16 bits)	0
45	Port2 DeviceID	Device ID (unsigned 32 bits)	0
46	Port2 ISDU Down Load Enable	0: Disable 1: Enable (ISDU download enable bit)	0
47	Port2 ISDU Index	ISDU index (unsigned 16 bits)	0
48	Port2 ISDU SubIndex	ISDU subindex (unsigned 8 bits)	0
49	Port2 ISDU Length	ISDU data length to be written (0~8)	0
50	Port2 ISDU data0		0
51	Port2 ISDU data1		0
52	Port2 ISDU data2		0
53	Port2 ISDU data3		0

54	Port2 ISDU data4		0
55	Port2 ISDU data5		0
56	Port2 ISDU data6		0
57	Port2 ISDU data7		0
58	Port3 Operating Mode	0:disable 1:IO-LINK 2:DI 3:DO	1
59	Port3 Cycle Mode	0:Free Running 1:Fixed Time 2:Message sync (not supported yet)	0
60	Port3 Cycle Time	3.2ms~132.8ms (This parameter is only effective when Cycle Mode is Fixed Time)	3.2ms
61	Port3 Validation Mode	0:disable 1:compatible 2:identical (not supported yet)	0
62	Port3 Parameter Server	0:disable 1:BackUp/Restore 2:Restore	0
63	Port3 VendorID	Vendor ID (unsigned 16 bits)	0
64	Port3 DeviceID	Device ID (unsigned 32 bits)	0
65	Port3 ISDU Down Load Enable	0: Disable 1: Enable (ISDU download enable bit)	0
66	Port3 ISDU Index	ISDU index (unsigned 16 bits)	0
67	Port3 ISDU SubIndex	ISDU subindex (unsigned 8 bits)	0
68	Port3 ISDU Length	ISDU data length to be written (0~8)	0
69	Port3 ISDU data0		0
70	Port3 ISDU data1		0
71	Port3 ISDU data2		0
72	Port3 ISDU data3		0
73	Port3 ISDU data4		0
74	Port3 ISDU data5		0
75	Port3 ISDU data6		0
76	Port3 ISDU data7		0

18.4 Process Data Definition

RXPDO		
Name	Size	meaning
Command	1.0	Operation Code
C/Q DO	0.1	When the C/Q pin is used as DO, the output control bit
Valid	0.1	Output validity
Select Port	1.0	Operation Port Setting Word

Transmit Length	1.0	Send data length
Data0	1.0	Sending Data
Data1	1.0	Sending Data
Data2	1.0	Sending Data
Data3	1.0	Sending Data
Data4	1.0	Sending Data
Data5	1.0	Sending Data
Data6	1.0	Sending Data
Data7	1.0	Sending Data
Data8	1.0	Sending Data
Data9	1.0	Sending Data
Data10	1.0	Sending Data
Data11	1.0	Sending Data
Data12	1.0	Sending Data
Data13	1.0	Sending Data
Data14	1.0	Sending Data
Data15	1.0	Sending Data
Data16	1.0	Sending Data
Data17	1.0	Sending Data
Data18	1.0	Sending Data
Data19	1.0	Sending Data
Data20	1.0	Sending Data
Data21	1.0	Sending Data
Data22	1.0	Sending Data
Data23	1.0	Sending Data
Data24	1.0	Sending Data
Data25	1.0	Sending Data
Data26	1.0	Sending Data
Data27	1.0	Sending Data
Data28	1.0	Sending Data
Data29	1.0	Sending Data
Data30	1.0	Sending Data
Data31	1.0	Sending Data

TXPDO		
Name	Size	meaning
Event Code	2.0	The most recent event code that occurred
Device Err	0.1	Current error status bit of the device

I/Q DI	0.1	I/Q input status bit
C/Q DI	0.1	C/Q is the input status bit when DI input
Valid	0.1	Input data validity
Active Port	1.0	Current Port
Receive Length	1.0	Received data length
data0	1.0	Receiving Data
data1	1.0	Receiving Data
data2	1.0	Receiving Data
data3	1.0	Receiving Data
data4	1.0	Receiving Data
data5	1.0	Receiving Data
data6	1.0	Receiving Data
data7	1.0	Receiving Data
data8	1.0	Receiving Data
data9	1.0	Receiving Data
data10	1.0	Receiving Data
data11	1.0	Receiving Data
data12	1.0	Receiving Data
data13	1.0	Receiving Data
data14	1.0	Receiving Data
data15	1.0	Receiving Data
data16	1.0	Receiving Data
data17	1.0	Receiving Data
data18	1.0	Receiving Data
data19	1.0	Receiving Data
data20	1.0	Receiving Data
data21	1.0	Receiving Data
data22	1.0	Receiving Data
data23	1.0	Receiving Data
data24	1.0	Receiving Data
data25	1.0	Receiving Data
data26	1.0	Receiving Data
data27	1.0	Receiving Data
data28	1.0	Receiving Data
data29	1.0	Receiving Data
data30	1.0	Receiving Data
data31	1.0	Receiving Data

Port event code:

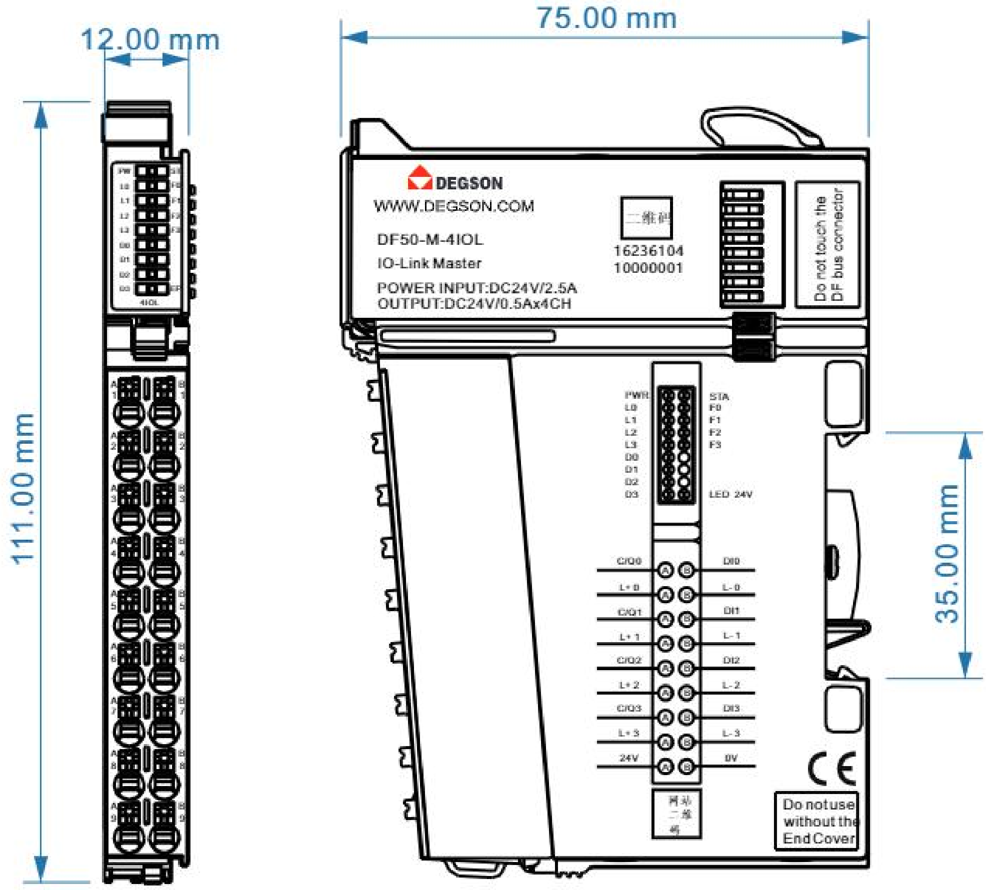
Event Code	illustrate
0x1800	IO-LINK slave is offline, check the slave connection
0x1801	Wrong startup parameters
0x1802	VendorID does not match
0x1803	DeviceID does not match
0x1804	C/Q short circuit
0x1805	PHY chip overheating
0x1806	L+ L- short circuit
0x1807	L+ overcurrent
0x1808	Device event overflow
0x1809	Backup inconsistent, memory out of range
0x180A	Backup inconsistent, identity verification error
0x180B	Backup inconsistency, non-specific error with data storage
0x180C	Backup inconsistent, upload error
0x180D	Parameters are inconsistent, download failure
0x180E	P24 (Class B) missing or overvoltage
0x180F	Short circuit at P24 (Class B), check wire connections
0x1810	I/Q check line has short circuit
0x1811	C/Q is short-circuited when used as digital output
0x1812	I/Q Overcurrent
0x1813	C/Q overcurrent when used as digital output
0x4000	Slave over temperature
0x5000	Slave hardware failure
0x5100	Slave power failure
0x5101	The slave fuse is blown
0x6320	Slave parameter error
0x6321	Slave parameter missing
other	View slave manual

endPort Operation Code:

Command	illustrate
0x00	Normally obtain the port event code
0x01	Clear port event codes
other	reserve

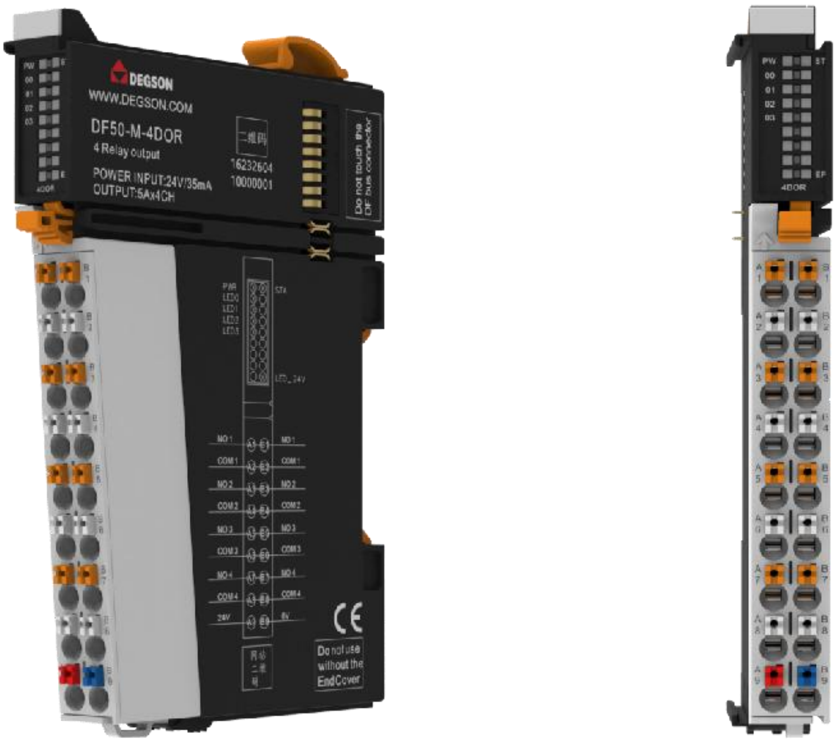
18.5 Mechanical Installation

The installation dimension information is shown in the figure below, the unit is (mm)



19 4-channel relay output/24VDC (DF50-M-4DOR)

- 4-channel digital output.
- Each output channel has an LED indicator.
- The field layer and the system layer are isolated by photocouplers.
- Protection grade IP20.



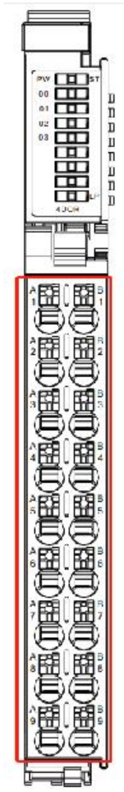
19.1 Specifications

Technical Information	
Product Description	Relay output module, 4 outputs
Number of channels	4
Contact Type	NO contact
Maximum output current	Maximum output current of single channel: 5A
	Module output maximum current: 20A
Maximum switching voltage	250VAC/30VDC
Reverse circuit protection	Yes
Short circuit protection	Yes
Isolation method	Photoelectric isolation from the field layer
Module error diagnosis	Yes
Switching frequency	30Hz
Response time of protection circuit	< 100µs
Leakage Current	Maximum value: 0uA
Output Impedance	<200mΩ
Output delay	OFF to ON:Max.100us, ON to OFF:Max.150us
Protection function	Over temperature shutdown: typical 125°C
Load Type	Resistive (5A/point, 20A/module)

Output action display	When the output is in driving state, the indicator light is on.
IO Mapping	Support bit-mapped mode
Fault shutdown output status mode	Clear to zero, keep current value
In stop mode	In the fault shutdown mode, no more refresh
Power parameters	
System bus input power rated voltage	5V DC (4.75V DC~ 5.25V DC)
System bus input power rated current	30mA
Terminal power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated current	50mA
Wiring parameters	
Connection technology: Output	PUSH-IN Terminal Blocks
Wire crimping area	0.2～1.5mm2/26～16AWG
Stripping length	8～10mm
Installation	DIN-35 rail
Material parameters	
color	black
Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25～60℃
Permissible ambient temperature (storage)	-40～85℃
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	0～2000m
Relative humidity (non-condensing)	5～95%RH
Vibration resistance	1g, in accordance with IEC 60068-2-6
Shock resistance	15g, compliant with IEC 60068-2-27
EMC anti-interference level	Compliant with IEC 61000-4
Corrosion resistance	Compliant with IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S contaminant concentration at 75% relative humidity	10ppm
Permissible SO2 pollutant concentration at 75% relative humidity	25ppm

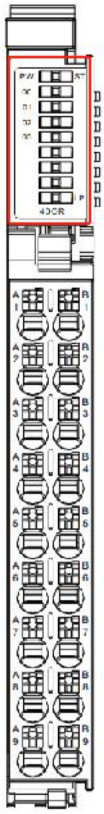
19.2 Hardware Interface

19.2.1 Terminal Block Definition



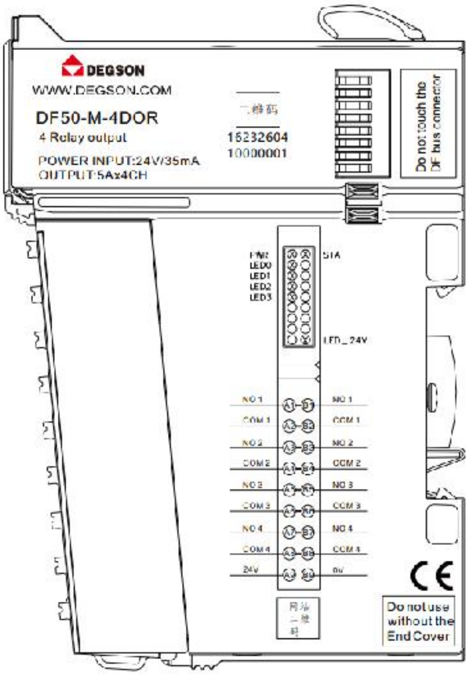
Terminal number	Signal	Terminal number	Signal	illustrate
A1	CH1 contact 1	B1	CH1 contact 1	CH1 relay interface 1
A2	CH1 contact 2	B2	CH1 contact 2	CH1 relay interface 2
A3	CH2 contact 1	B3	CH2 contact 1	CH2 relay interface 1
A4	CH2 contact 2	B4	CH2 contact 2	CH2 relay interface 2
A5	CH3 contact 1	B5	CH3 contact 1	CH3 relay interface 1
A6	CH3 contact 2	B6	CH3 contact 2	CH3 relay interface 2
A7	CH4 contact 1	B7	CH4 contact 1	CH4 relay interface 1
A8	CH4 contact 2	B8	CH4 contact 2	CH4 relay interface 2
A9	24V	B9	0V	Terminal power input

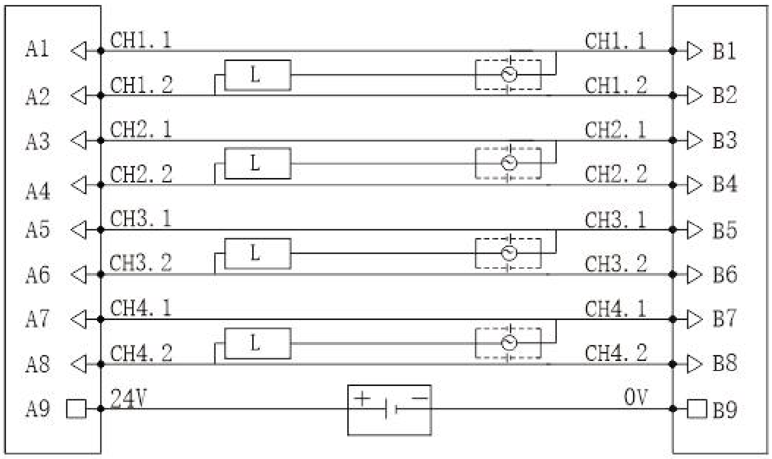
19.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green:System bus power inputnormal	
	Green Kill:System bus power inputabnormal	
ST	Power-on stage	Green: Module initialization error
		Green off: Module initialization is normal
	Operational stage	Green flash: The internal bus of the module is working normally
		Green off/green on: The internal bus of the module is working abnormally or the terminal power input is abnormal
LP	Green: 24V module power supply is normal	
	Green off: 24V module power supply is abnormal	
00～03	Green: Relay closed	
	Green off: relay disconnected	

19.2.3 Wiring Diagram





Note: A9, B9 24V power supply is provided externally.

19.3 Configuration Data Definition

index	Sub-index	name	Size	Value range	default value	meaning
16#8001	1	Behavior of field bus on Module error	1.0	0~2	0	Fieldbus Error Output Mode Configuration, see table En0820 for details
	3	Substitute Value	2.0	0~15	0	OutputPresetsvalue
Note: If the module is inserted in the first card slot after the coupler, the SDO index is 16#8001. If it is inserted in the second card slot, the SDO index is 16#8011 and the index offset is 16#10.						

Table En0820

Sub-index object data	name	meaning
0	All outputs off	Turn off all channel outputs
1	Enable substitute value	usePresetsValue Output
2	Hold last value	Keep current output

19.4 Process Data Definition

DF50-M-4DORModulesProcess data definition

RXPDO			
Name	Type	Size	meaning
DO Ch0	BIT	0.1	1: DO Ch0Relay closed,0:DO Ch0Relay disconnected.
DO Ch1	BIT	0.1	1: DO Ch1Relay closed,0:DO Ch1Relay disconnected.
DO Ch2	BIT	0.1	1: DO Ch2Relay closed, 0: DO Ch2Relay disconnected.
DO Ch3	BIT	0.1	1: DO Ch3Relay closed,0:DO Ch3Relay disconnected.

Data description:

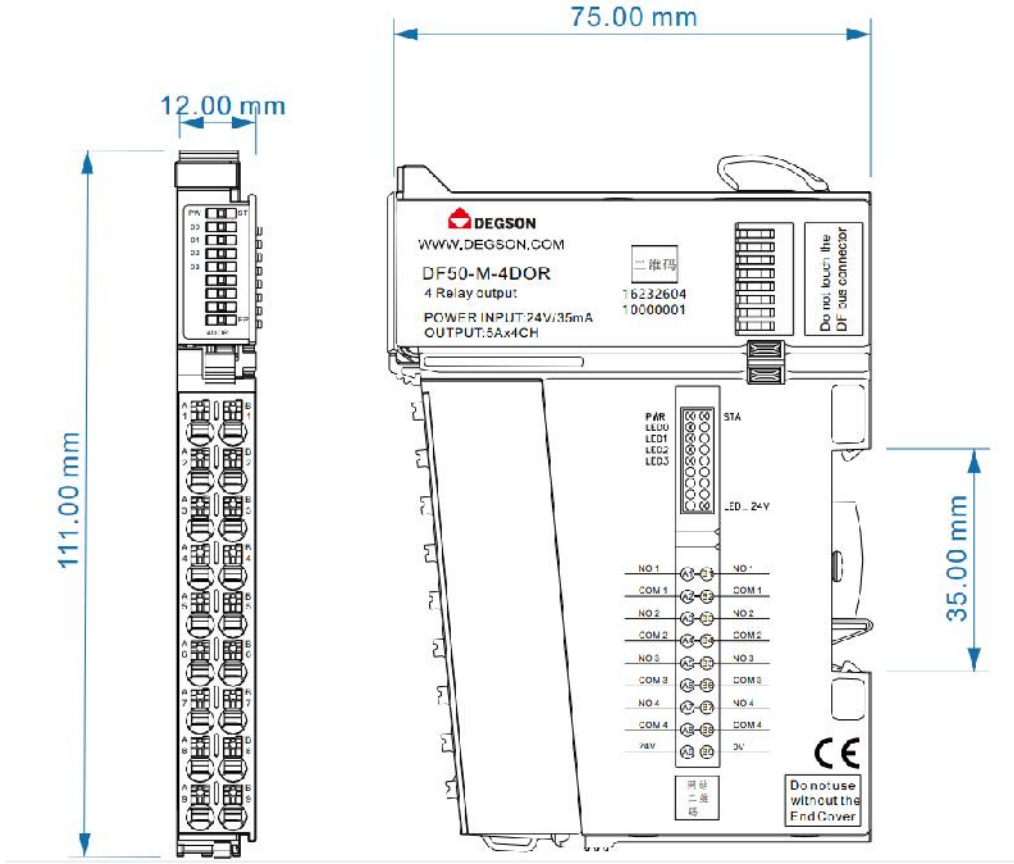
CH1~CH4: When this position is 1, the corresponding channel output signal is valid and the channel relay is energized. When this position is 0, the corresponding channel output signal is invalid and the relay is disconnected.

0: Output signal is invalid

1: Output signal is valid

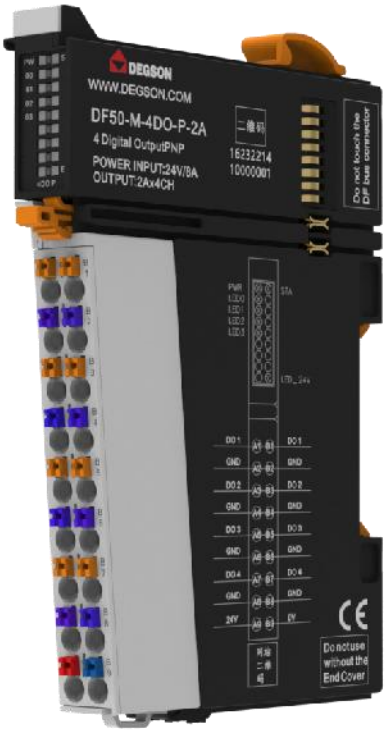
19.5 Mechanical Installation

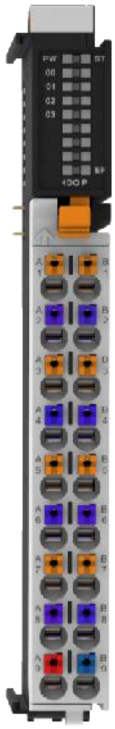
The installation dimensions are shown in the figure below, in mm:



20 4-channel digital output/24VDC/PNP (DF50-M-4DO-P-2A)

- 4-channel digital output.
- Each output channel has an LED indicator.
- The field layer and the system layer are isolated by photocouplers.
- Protection grade IP20.





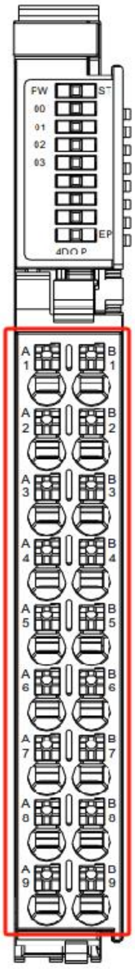
20.1 Specifications

Technical Information	
Product Description	Digital output modules,4Output,PNP, 24VDC
Number of channels	4
Signal Type	PNP
"OFF" signal voltage	High impedance
"ON" signal voltage	twenty fourV DC
Data size	1Byte
Connection Type	1-wire
Reverse circuit protection	Yes
Overcurrent protection	Yes
Short circuit protection	Yes
Isolation method	Photoelectric isolation from the field layer
Error diagnosis	Yes
Switching frequency (resistive)	100Hz
Switching frequency (lamp)	10Hz
Switching frequency (inductive)	0.2Hz
Response time of protection circuit	< 100μs
Maximum output current per channel	2A

Leakage Current	Maximum value:0.18uA
Hardware response time	100us/100us
Output Impedance	<200mΩ
Output delay	OFF to ON:Max.100us, ON to OFF:Max.150us
Protection function	Over temperature shutdown: typical value 135℃ Overcurrent protection:4A. Typical value2A Support short circuit protection
Load Type	Inductive (7.2W/point, 24W/module), Resistive (0.5A/point, 4A/module), Light (5W/point, 18W/module)
Output action display	When the output is in driving state, the indicator light is on.
Input derating	When working at 55℃, the rating is reduced by 50% (the output current of ON at the same time does not exceed 2A), or the rating is reduced by 10℃ when all output points are ON
IO Mapping	Support bit-mapped mode
Fault shutdown output status mode	Clear to zero, keep current value
In stop mode	In the fault shutdown mode, no more refresh
Power parameters	
System bus input power rated voltage	5V DC (4.75V DC~ 5.25V DC)
System bus input power rated current	100mA
Terminal power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated current	8A
Wiring parameters	
Connection technology: Output	PUSH-IN Terminal Blocks
Wire crimping area	0.2～1.5mm2/26～16AWG
Stripping length	8～10mm
Installation	DIN-35 rail
Material parameters	
color	black
Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25～60℃
Permissible ambient temperature (storage)	-40～85℃
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: 0～2000m
Relative humidity (non-condensing)	5～95%RH
Vibration resistance	1g, in accordance with IEC 60068-2-6
Shock resistance	15g, compliant with IEC 60068-2-27
EMC anti-interference level	Compliant with IEC 61000-4
Corrosion resistance	Compliant with IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S contaminant concentration at 75% relative humidity	10ppm
Permissible SO2 pollutant concentration at 75% relative humidity	25ppm

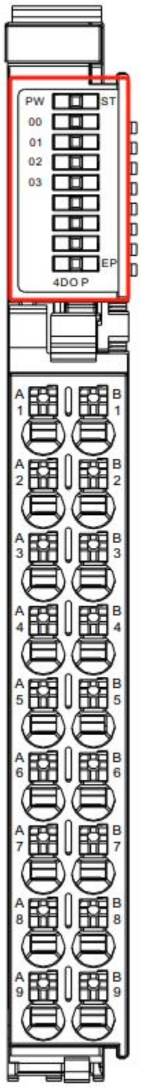
20.2 Hardware Interface

20.2.1wiringTerminal Definition



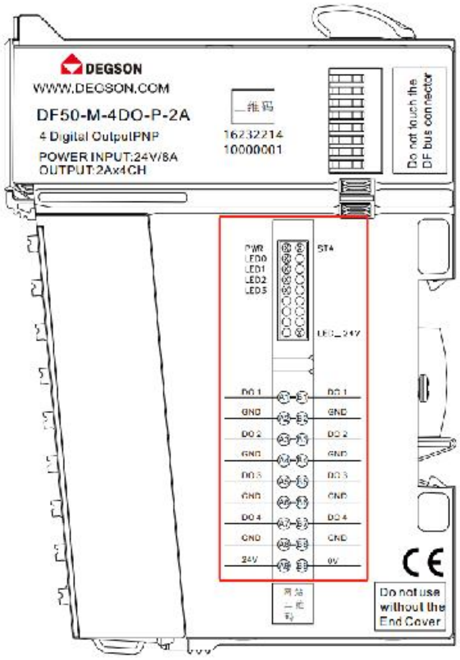
Terminal number	Signal	Terminal number	Signal	illustrate
A1	DO 1	B1	DO 1	DO1 signal output
A2	GND	B2	GND	
A3	DO 2	B3	DO 2	DO2 signal output
A4	GND	B4	GND	
A5	DO 3	B5	DO 3	DO3 signal output
A6	GND	B6	GND	
A7	DO 4	B7	DO 4	DO4 signal output
A8	GND	B8	GND	
A9	24V	B9	0V	Terminal power input

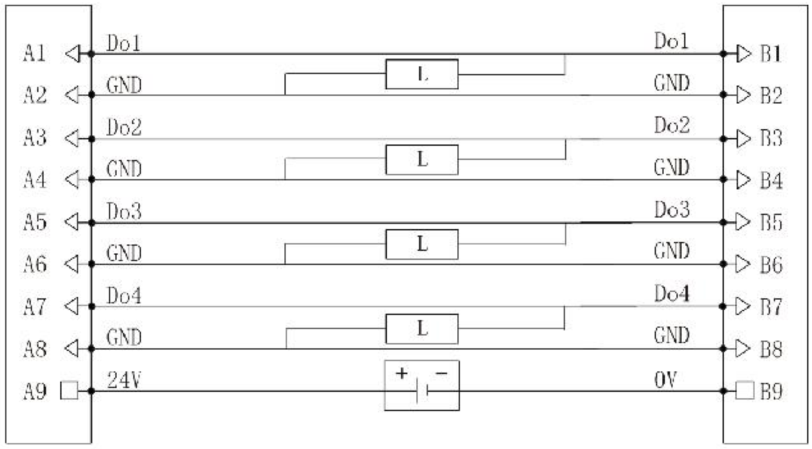
20.2.2 LED Indicatorsdefinition



Indicator Lights	meaning	
PW	Green:System bus power inputnormal	
	Green Kill:System bus power inputabnormal	
ST	Power-on stage	Green: Module initialization error
		Green off: Module initialization is normal
	Operational stage	Green flash: The internal bus of the module is working normally
		Green off/green on: The internal bus of the module is working abnormally or the terminal power input is abnormal
EP	Green: 24V module power supply is normal	
	Green off: 24V module power supply is abnormal	
00～03	Green: Output signal is valid	
	Green off: Output signal is invalid	

20.2.3 Wiring Diagram





Note: A9, B9 The 24V power supply is provided externally.

20.3 Configuration Data Definition

index	Sub-index	name	Size	Value range	default value	meaning
16#8001	1	Behavior of field bus on Module error	1.0	0~2	0	Fieldbus Error Output Mode Configuration, see table En0820 for details
	3	Substitute Value	2.0	0~15	0	OutputPresetsvalue
Note: If the module is inserted in the first card slot after the coupler, the SDO index is 16#8001. If it is inserted in the second card slot, the SDO index is 16#8011 and the index offset is 16#10.						

Table En0820

Sub-index object data	name	meaning
0	All outputs off	Turn off all channel outputs
1	Enable substitute value	usePresetsValue Output
2	Hold last value	Keep current output

20.4 Process Data Definition

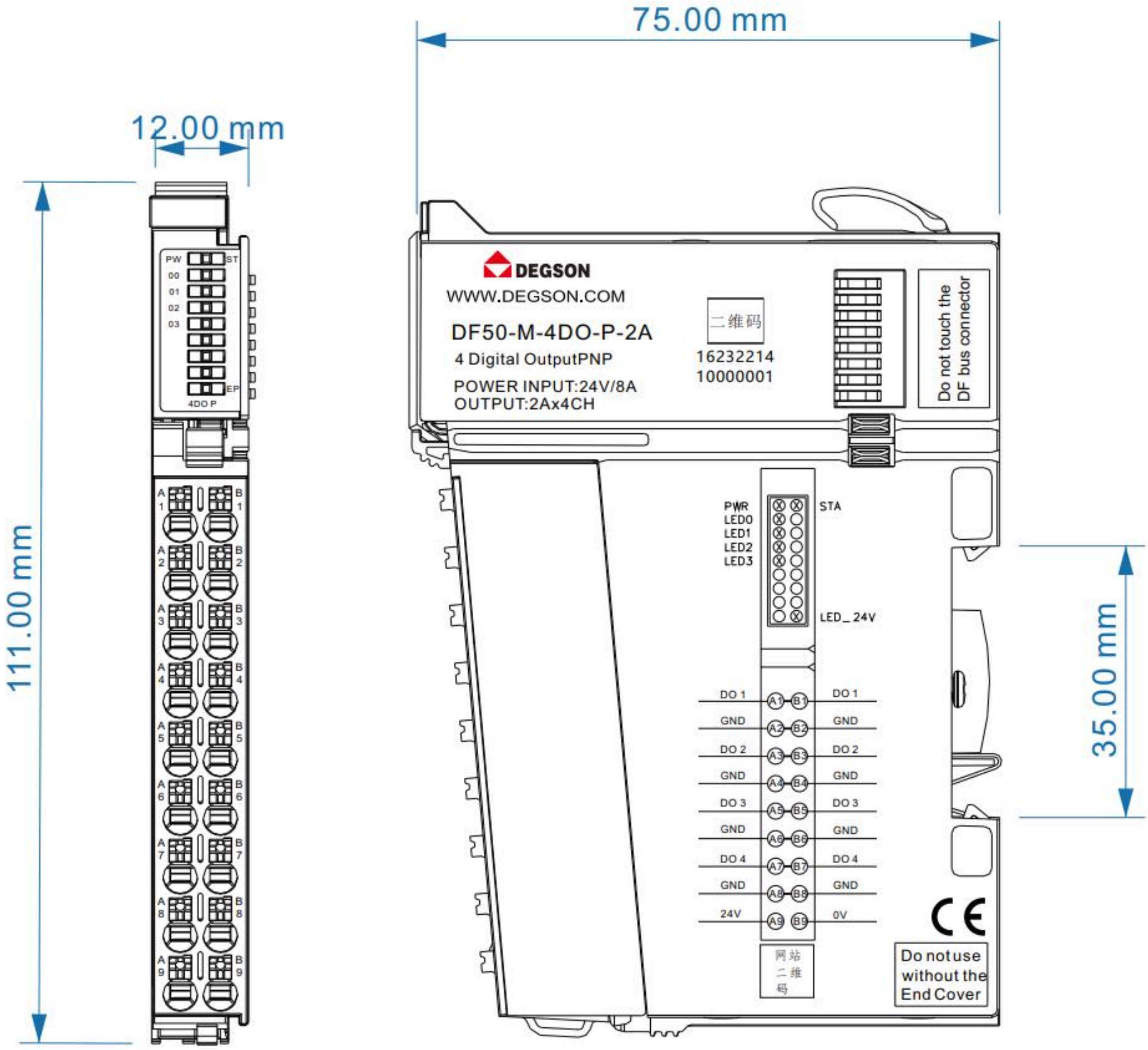
DF50-M-4DO-P-2A moduleProcess data definition

RXPDO			
Name	Type	Size	meaning
DO Ch0	BIT	0.1	1: DO Ch0 outputs 24VDC, 0: DO Ch0 outputs high configuration.
DO Ch1	BIT	0.1	1: DO Ch1 outputs 24VDC, 0: DO Ch1 outputs high configuration.
DO Ch2	BIT	0.1	1: DO Ch2 outputs 24VDC, 0: DO Ch2 outputs high configuration.
DO Ch3	BIT	0.1	1: DO Ch3 outputs 24VDC, 0: DO Ch3 outputs high configuration.

TXPDO			
Name	Type	Size	meaning
Ch0Over Current	BIT	0.1	Ch0Output overcurrentWhennormalThen it is 0.
Ch1Over Current	BIT	0.1	Ch1Output overcurrentWhennormalThen it is 0.
Ch2Over Current	BIT	0.1	Ch2 Output overcurrentWhennormalThen it is 0.
Ch3Over Current	BIT	0.1	Ch3 Output overcurrentWhennormalThen it is 0.

20.5 Mechanical Installation

The installation dimensions are shown in the figure below, in mm:



21 32-channel digital output/24VDC/NPN (DF50-M-32DO-N)

- 32Channel digital output,NPN LowThe level is valid.
- Each output channel has an LED indicator.
- The field layer and the system layer are isolated by photocouplers.
- Protection grade IP20.

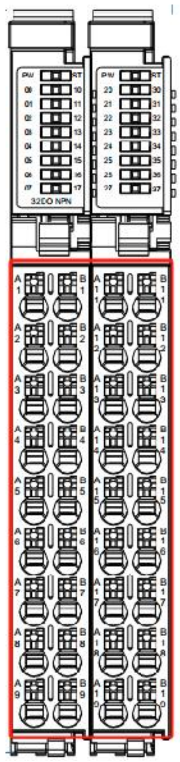
21.1 Specifications

Technical Information	
Product Description	Digital output modules,32Output,NPN, 24VDC
Number of channels	32
Signal Type	NPN
"OFF" signal voltage	High impedance
"ON" signal voltage	0V DC
Data size	4Byte
Connection Type	1-wire
Reverse circuit protection	Yes
Overcurrent protection	Yes
Short circuit protection	Yes
Isolation method	Photoelectric isolation from the field layer
Error diagnosis	Yes
Switching frequency (resistive)	100Hz
Switching frequency (lamp)	10Hz
Switching frequency (inductive)	0.2Hz

Response time of protection circuit	< 100μs
Maximum output current per channel	500 mA
Leakage Current	Maximum value: 10uA
Hardware response time	100us/100us
Output Impedance	<200mΩ
Output delay	OFF to ON:Max.100us, ON to OFF:Max.150us
Protection function	Over temperature shutdown: typical value 135℃ Overcurrent protection: 1.1A. Typical value 0.5A Support short circuit protection
Load Type	0.5A/point,8A/Module
Output action display	When the output is in driving state, the indicator light is on.
Input derating	When working at 55℃, the rating is reduced by 50% (the output current of ON at the same time does not exceed 2A), or the rating is reduced by 10℃ when all output points are ON
IO Mapping	Support bit-by-bit or word-by-word mapping
Fault shutdown output status mode	Clear, keep current value or output according to preset value
In stop mode	In the fault shutdown mode, no more refresh
Power parameters	
System bus input power rated voltage	5V DC (4.75V DC~ 5.25V DC)
System bus input power rated current	200mA
Terminal power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated current	8A
Wiring parameters	
Connection technology: Output	PUSH-IN Terminal Blocks
Wire crimping area	0.2～1.5mm2/26～16AWG
Stripping length	8～10mm
Installation	DIN-35 rail
Material parameters	
color	black
Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25～60℃
Permissible ambient temperature (storage)	-40～85℃
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: 0～2000m
Relative humidity (non-condensing)	5～95%RH
Vibration resistance	1g, in accordance with IEC 60068-2-6
Shock resistance	15g, compliant with IEC 60068-2-27
EMC anti-interference level	Compliant with IEC 61000-4
Corrosion resistance	Compliant with IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S contaminant concentration at 75% relative humidity	10ppm
Permissible SO2 pollutant concentration at 75% relative humidity	25ppm

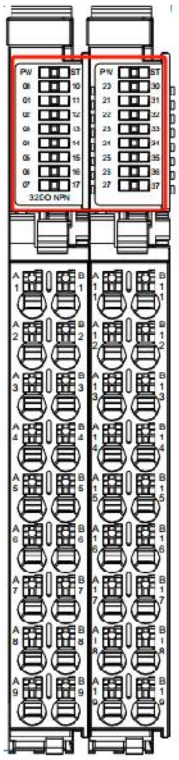
21.2 Hardware Interface

21.2.1 Terminal Block Definition



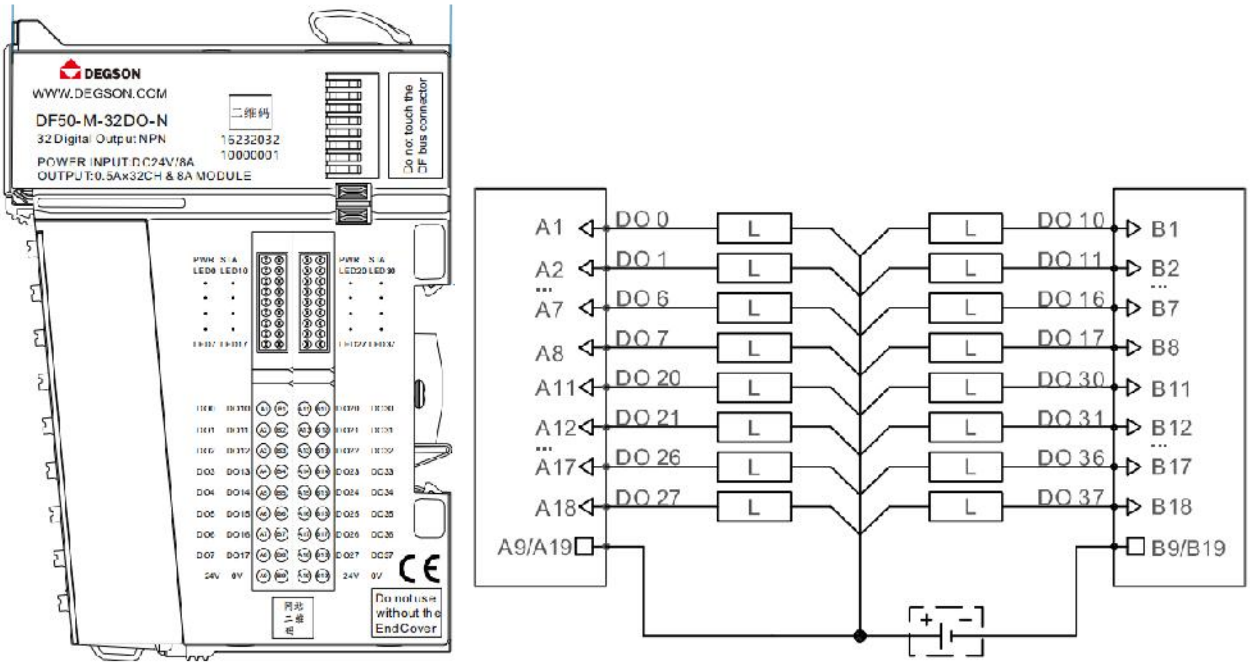
Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	illustrate
A1	DO0	B1	DO10	C1	DO 20	D1	DO 30	DOSignal inputout
A2	DO1	B2	DO11	C2	DO 21	D2	DO 31	
A3	DO2	B3	DO12	C3	DO 22	D3	DO 32	
A4	DO3	B4	DO13	C4	DO 23	D4	DO 33	
A5	DO4	B5	DO14	C5	DO 24	D5	DO 34	
A6	DO5	B6	DO15	C6	DO 25	D6	DO 35	
A7	DO6	B7	DO16	C7	DO 26	D7	DO 36	
A8	DO7	B8	DO17	C8	DO 27	D8	DO 37	
A9	24V	B9	0V	C9	24V	D9	0V	Terminal power input

21.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green:System bus power inputnormal	
	Green Kill:System bus power inputabnormal	
ST	Power-on stage	Green: Module initialization error
		Green off: Module initialization is normal
	Operational stage	Green flash: The internal bus of the module is working normally
		Green off/green on: The internal bus of the module is working abnormally or the terminal power input is abnormal
00～07,10～17 20～27,30～37	Green: Output signal is valid	
	Green off: Output signal is invalid	

21.2.3 Wiring Diagram



21.3 Configuration Data Definition

index	Sub-index	name	Size	Value range	default value	meaning
16#8005	2	Output behavior On Fieldbus Error	1.0	0~2	0	Fieldbus error output mode configuration, see table En0820 for details
	4	Substitute Value	4.0	0~4294967295	0	Output substitute value
Note: If the module is inserted in the first slot after the coupler, the SDO index is 16#8005If it is inserted in the second card slot, the SDO index is 16#8015, the index offset is 16#10.						

Table En0820

Sub-index object data	name	meaning
0	All outputs off	Turn off all channel outputs
1	Enable substitute value	usePresetsValue Output
2	Hold last value	Keep current output

21.4 Process Data Definition

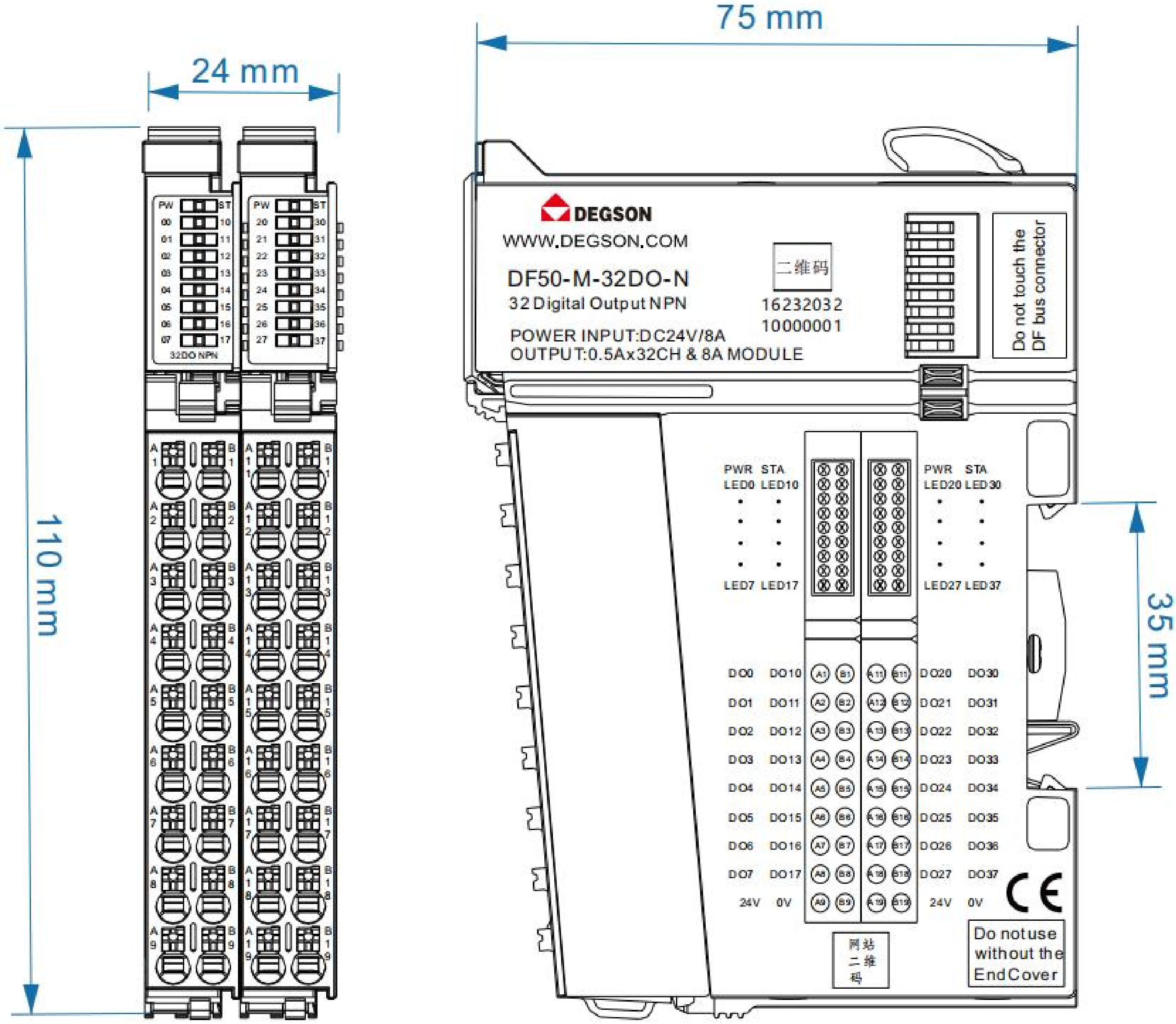
DF50-M-32DO-NModulesProcess data definition

RXPDO			
Name	Type	Size	meaning
DO Ch0	BIT	0.1	1: DO Ch0 output0VDC, 0: DO Ch0 outputs high configuration.
DO Ch1	BIT	0.1	1: DO Ch1 output0VDC, 0: DO Ch1 output high configuration.
DO Ch2	BIT	0.1	1: DO Ch2 output0VDC, 0: DO Ch2 output high configuration.
DO Ch3	BIT	0.1	1: DO Ch3 output0VDC, 0: DO Ch3 output high configuration.
DO Ch4	BIT	0.1	1: DO Ch4 output0VDC, 0: DO Ch4 output high configuration.
DO Ch5	BIT	0.1	1: DO Ch5 output0VDC, 0: DO Ch5 output high configuration.
DO Ch6	BIT	0.1	1: DO Ch6 output0VDC, 0: DO Ch6 output high configuration.
DO Ch7	BIT	0.1	1: DO Ch7 outputs 0VDC, 0: DO Ch7 outputs high configuration.
DO8	BIT	0.1	1: DO Ch8 outputs 0VDC, 0: DO Ch8 outputs high configuration.
DO Ch9	BIT	0.1	1: DO Ch9 outputs 0VDC, 0: DO Ch9 outputs high configuration.
DO Ch10	BIT	0.1	1: DO Ch10 outputs 0VDC, 0: DO Ch10 outputs high
DO Ch11	BIT	0.1	1: DO Ch11 outputs 0VDC, 0: DO Ch11 outputs high
DO Ch12	BIT	0.1	1: DO Ch12 outputs 0VDC, 0: DO Ch12 outputs high

DO Ch13	BIT	0.1	1: DO Ch13 outputs 0VDC, 0: DO Ch13 outputs high
DO Ch14	BIT	0.1	1: DO Ch14 outputs 0VDC, 0: DO Ch14 outputs high
DO Ch15	BIT	0.1	1: DO Ch15 outputs 0VDC, 0: DO Ch15 outputs high
DO Ch16	BIT	0.1	1: DO Ch16 outputs 0VDC, 0: DO Ch16 outputs high
DO Ch17	BIT	0.1	1: DO Ch17 outputs 0VDC, 0: DO Ch17 outputs high
DO Ch18	BIT	0.1	1: DO Ch18 outputs 0VDC, 0: DO Ch18 outputs high
DO Ch19	BIT	0.1	1: DO Ch19 outputs 0VDC, 0: DO Ch19 outputs high
DO Ch20	BIT	0.1	1: DO Ch20 outputs 0VDC, 0: DO Ch20 outputs high
DO Ch21	BIT	0.1	1: DO Ch21 outputs 0VDC, 0: DO Ch21 outputs high
DO Ch22	BIT	0.1	1: DO Ch22 outputs 0VDC, 0: DO Ch22 outputs high
DO Ch23	BIT	0.1	1: DO Ch23 outputs 0VDC, 0: DO Ch23 outputs high
DO Ch24	BIT	0.1	1: DO Ch24 outputs 0VDC, 0: DO Ch24 outputs high
DO Ch25	BIT	0.1	1: DO Ch25 outputs 0VDC, 0: DO Ch25 outputs high
DO Ch26	BIT	0.1	1: DO Ch26 outputs 0VDC, 0: DO Ch26 outputs high
DO Ch27	BIT	0.1	1: DO Ch27 outputs 0VDC, 0: DO Ch27 outputs high
DO Ch28	BIT	0.1	1: DO Ch28 outputs 0VDC, 0: DO Ch28 outputs high
DO Ch29	BIT	0.1	1: DO Ch29 outputs 0VDC, 0: DO Ch29 outputs high
DO Ch30	BIT	0.1	1: DO Ch30 outputs 0VDC, 0: DO Ch30 outputs high
DO Ch31	BIT	0.1	1: DO Ch31 outputs 0VDC, 0: DO Ch31 outputs high

21.5 Mechanical Installation

The installation dimensions are shown in the figure below, in mm:



22 32-channel digital output/24VDC/PNP (DF50-M-32DO-P)

- 32Channel digital output,PNP HighThe level is valid.
- Each output channel has an LED indicator.
- The field layer and the system layer are isolated by photocouplers.
- Protection grade IP20.

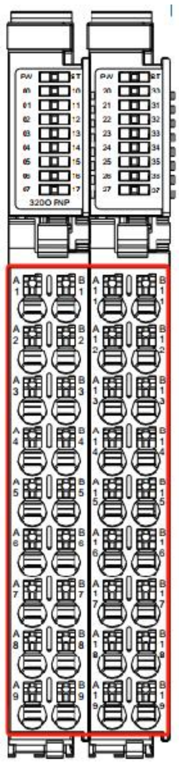
22.1 Specifications

Technical Information	
Product Description	Digital output modules,32Output,PNP, 24VDC
Number of channels	32
Signal Type	PNP
"OFF" signal voltage	High impedance
"ON" signal voltage	twenty fourV DC
Data size	4Byte
Connection Type	1-wire
Reverse circuit protection	Yes
Overcurrent protection	Yes
Short circuit protection	Yes
Isolation method	Photoelectric isolation from the field layer
Error diagnosis	Yes
Switching frequency (resistive)	100Hz
Switching frequency (lamp)	10Hz
Switching frequency (inductive)	0.2Hz
Response time of protection circuit	< 100μs
Maximum output current per channel	500 mA
Leakage Current	Maximum value: 10uA
Hardware response time	100us/100us

Output Impedance	<200mΩ
Output delay	OFF to ON:Max.100us, ON to OFF:Max.150us
Protection function	Over temperature shutdown: typical value 135℃ Overcurrent protection: 1.1A. Typical value 0.5A Support short circuit protection
Load Type	0.5A/point,8A/Module
Output action display	When the output is in driving state, the indicator light is on.
Input derating	When working at 55℃, the rating is reduced by 50% (the output current of ON at the same time does not exceed 2A), or the rating is reduced by 10℃ when all output points are ON
IO Mapping	Support bit-by-bit or word-by-word mapping
Fault shutdown output status mode	Clear, keep current value or output according to preset value
In stop mode	In the fault shutdown mode, no more refresh
Power parameters	
System bus input power rated voltage	5V DC (4.75V DC~ 5.25V DC)
System bus input power rated current	200mA
Terminal power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated current	8A
Wiring parameters	
Connection technology: Output	PUSH-IN Terminal Blocks
Wire crimping area	0.2～1.5mm2/26～16AWG
Stripping length	8～10mm
Installation	DIN-35 rail
Material parameters	
color	black
Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25～60℃
Permissible ambient temperature (storage)	-40～85℃
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: 0～2000m
Relative humidity (non-condensing)	5～95%RH
Vibration resistance	1g, in accordance with IEC 60068-2-6
Shock resistance	15g, compliant with IEC 60068-2-27
EMC anti-interference level	Compliant with IEC 61000-4
Corrosion resistance	Compliant with IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S contaminant concentration at 75% relative humidity	10ppm
Permissible SO2 pollutant concentration at 75% relative humidity	25ppm

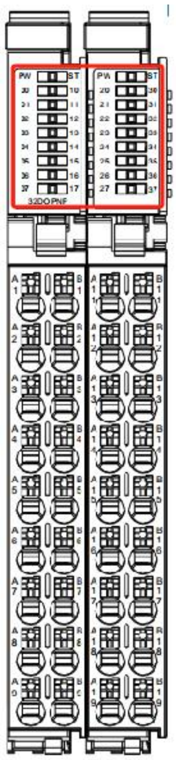
22.2 Hardware Interface

22.2.1 Terminal Block Definition



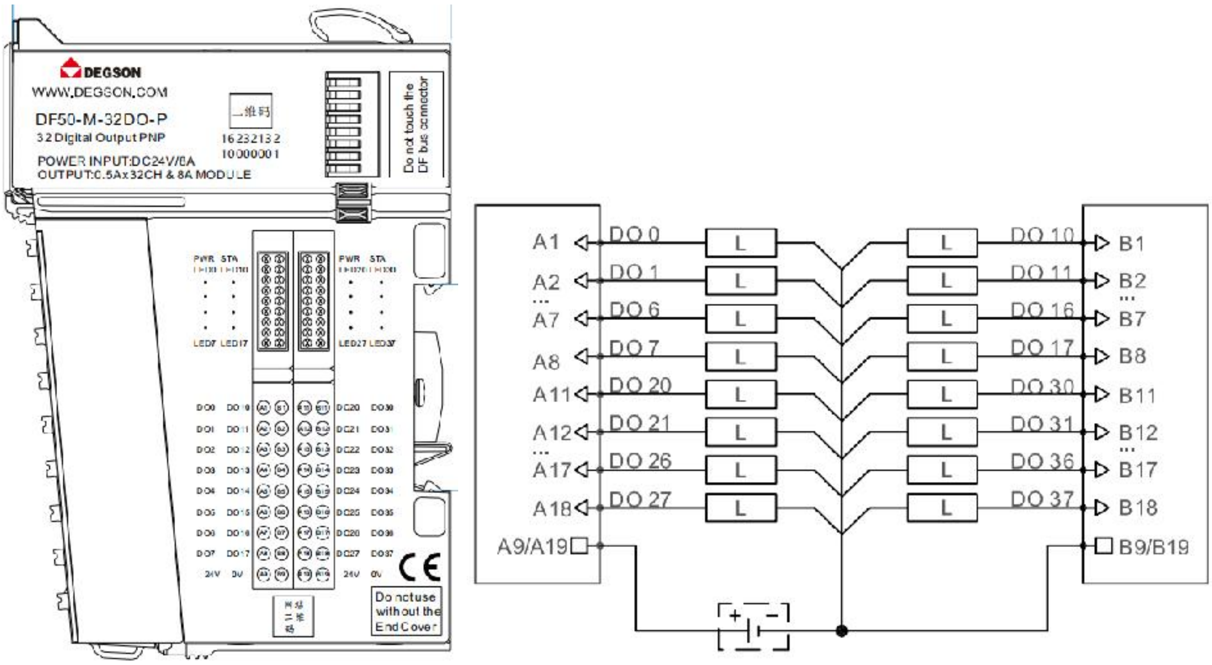
Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	illustrate
A1	DO0	B1	DO10	C1	DO 20	D1	DO 30	DOSignal inputout
A2	DO1	B2	DO11	C2	DO 21	D2	DO 31	
A3	DO2	B3	DO12	C3	DO 22	D3	DO 32	
A4	DO3	B4	DO13	C4	DO 23	D4	DO 33	
A5	DO4	B5	DO14	C5	DO 24	D5	DO 34	
A6	DO5	B6	DO15	C6	DO 25	D6	DO 35	
A7	DO6	B7	DO16	C7	DO 26	D7	DO 36	
A8	DO7	B8	DO17	C8	DO 27	D8	DO 37	
A9	24V	B9	0V	C9	24V	D9	0V	Terminal power input

22.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green:System bus power inputnormal	
	Green Kill:System bus power inputabnormal	
ST	Power-on stage	Green: Module initialization error
		Green off: Module initialization is normal
	Operational stage	Green flash: The internal bus of the module is working normally
		Green off/green on: The internal bus of the module is working abnormally or the terminal power input is abnormal
00～07,10～17 20～27,30～37	Green: Output signal is valid	
	Green off: Output signal is invalid	

22.2.3 Wiring Diagram



22.3 Configuration Data Definition

index	Sub-index	name	Size	Value range	default value	meaning
16#8005	2	Output behavior On Fieldbus Error	1.0	0~2	0	Fieldbus error output mode configuration, see table En0820 for details
	4	Substitute Value	4.0	0~4294967295	0	Output substitute value
Note: If the module is inserted in the first slot after the coupler, the SDO index is 16#8005If it is inserted in the second card slot, the SDO index is 16#8015, the index offset is 16#10.						

Table En0820

Sub-index object data	name	meaning
0	All outputs off	Turn off all channel outputs
1	Enable substitute value	usePresetsValue Output
2	Hold last value	Keep current output

22.4 Process Data Definition

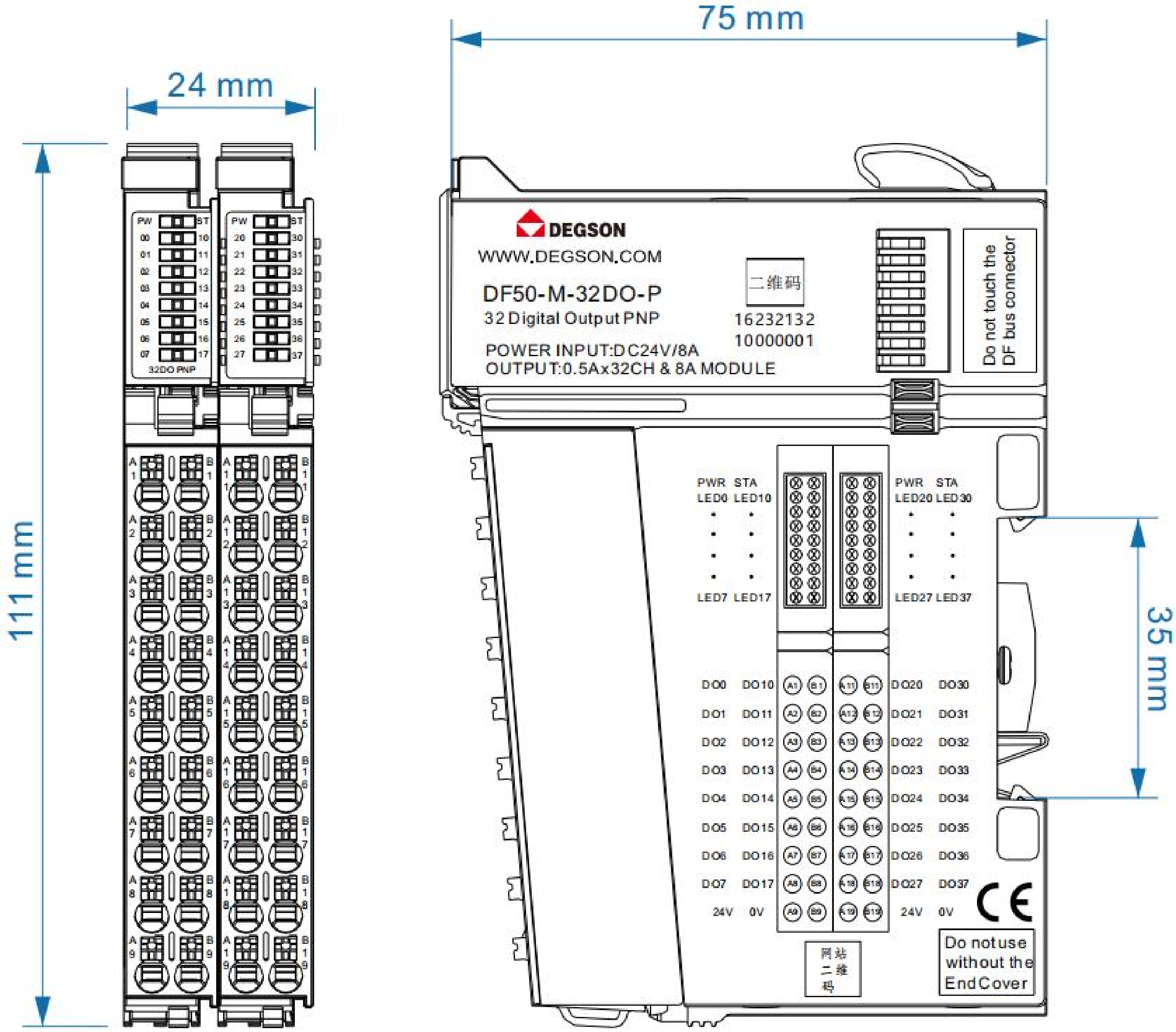
DF50-M-32DO-PModulesProcess data definition

RXPDO			
Name	Type	Size	meaning
DO Ch0	BIT	0.1	1: DO Ch0 outputs 24VDC, 0: DO Ch0 outputs high configuration.
DO Ch1	BIT	0.1	1: DO Ch1 outputs 24VDC, 0: DO Ch1 outputs high configuration.
DO Ch2	BIT	0.1	1: DO Ch2 outputs 24VDC, 0: DO Ch2 outputs high configuration.
DO Ch3	BIT	0.1	1: DO Ch3 outputs 24VDC, 0: DO Ch3 outputs high configuration.
DO Ch4	BIT	0.1	1: DO Ch4 outputs 24VDC, 0: DO Ch4 outputs high configuration.
DO Ch5	BIT	0.1	1: DO Ch5 outputs 24VDC, 0: DO Ch5 outputs high configuration.
DO Ch6	BIT	0.1	1: DO Ch6 outputs 24VDC, 0: DO Ch6 outputs high configuration.
DO Ch7	BIT	0.1	1: DO Ch7 outputs 24VDC, 0: DO Ch7 outputs high configuration.
DO8	BIT	0.1	1: DO Ch8 outputs 24VDC, 0: DO Ch8 outputs high configuration.
DO Ch9	BIT	0.1	1: DO Ch9 outputs 24VDC, 0: DO Ch9 outputs high configuration.
DO Ch10	BIT	0.1	1: DO Ch10 outputs 24VDC, 0: DO Ch10 outputs high
DO Ch11	BIT	0.1	1: DO Ch11 outputs 24VDC, 0: DO Ch11 outputs high
DO Ch12	BIT	0.1	1: DO Ch12 outputs 24VDC, 0: DO Ch12 outputs high

DO Ch13	BIT	0.1	1: DO Ch13 outputs 24VDC, 0: DO Ch13 outputs high
DO Ch14	BIT	0.1	1: DO Ch14 outputs 24VDC, 0: DO Ch14 outputs high
DO Ch15	BIT	0.1	1: DO Ch15 outputs 24VDC, 0: DO Ch15 outputs high
DO Ch16	BIT	0.1	1: DO Ch16 outputs 24VDC, 0: DO Ch16 outputs high
DO Ch17	BIT	0.1	1: DO Ch17 outputs 24VDC, 0: DO Ch17 outputs high
DO Ch18	BIT	0.1	1: DO Ch18 outputs 24VDC, 0: DO Ch18 outputs high
DO Ch19	BIT	0.1	1: DO Ch19 outputs 24VDC, 0: DO Ch19 outputs high
DO Ch20	BIT	0.1	1: DO Ch20 outputs 24VDC, 0: DO Ch20 outputs high
DO Ch21	BIT	0.1	1: DO Ch21 outputs 24VDC, 0: DO Ch21 outputs high
DO Ch22	BIT	0.1	1: DO Ch22 outputs 24VDC, 0: DO Ch22 outputs high
DO Ch23	BIT	0.1	1: DO Ch23 outputs 24VDC, 0: DO Ch23 outputs high
DO Ch24	BIT	0.1	1: DO Ch24 outputs 24VDC, 0: DO Ch24 outputs high
DO Ch25	BIT	0.1	1: DO Ch25 outputs 24VDC, 0: DO Ch25 outputs high
DO Ch26	BIT	0.1	1: DO Ch26 outputs 24VDC, 0: DO Ch26 outputs high
DO Ch27	BIT	0.1	1: DO Ch27 outputs 24VDC, 0: DO Ch27 outputs high
DO Ch28	BIT	0.1	1: DO Ch28 outputs 24VDC, 0: DO Ch28 outputs high
DO Ch29	BIT	0.1	1: DO Ch29 outputs 24VDC, 0: DO Ch29 outputs high
DO Ch30	BIT	0.1	1: DO Ch30 outputs 24VDC, 0: DO Ch30 outputs high
DO Ch31	BIT	0.1	1: DO Ch31 outputs 24VDC, 0: DO Ch31 outputs high

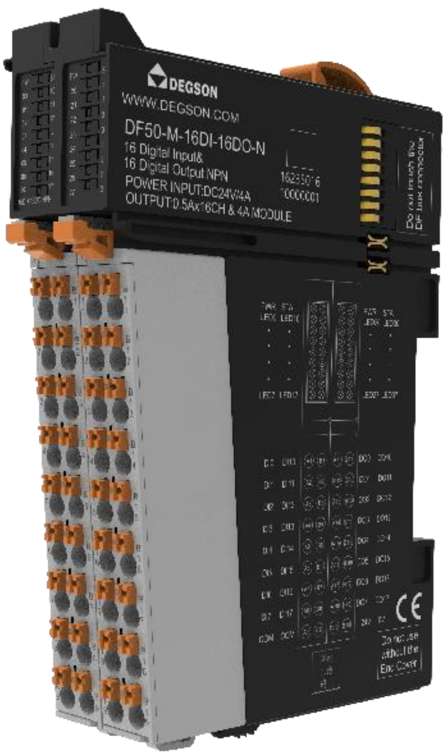
22.5 Mechanical Installation

The installation dimensions are shown in the figure below, in mm:



23 16-channel digital input & 16-channel digital output / 24VDC / NPN (DF50-M-16DI-16DO-N)

- The digital quantityThe module supports 16-channel input and 16-channel output, NPN low level is effective.
- Each input module is equipped with an anti-interference filter.
- Each inputOutputAll modules have LED indicators.
- The field layer and the system layer are isolated by photocouplers.
- Protection grade IP20.



23.1 Specifications

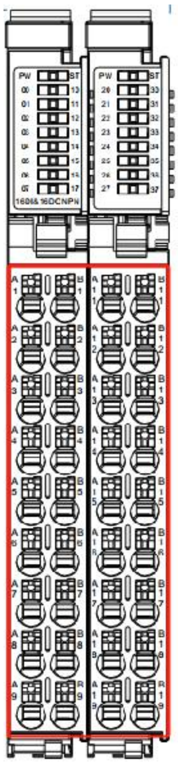
Technical Information		
Product Description		Digital inputOutputModules,16enter+16 output, NPN, 24VDC
Number of channels		16enter+16 output
Signal Type		NPN
Input channel parameters		
Signal range	"ON" signal voltage	Voltage difference > 11VDC (voltage difference with common input)
	"OFF" signal voltage	Voltage difference <5VDC (voltage difference with common input)
Hardware response time		200us/200us
Data size		4Byte
Connection Type		1-wire, Type 1/Type 3, according to IEC 61131-2

Reverse circuit protection		Yes
Isolation method		Photoelectric isolation from the field layer
Error diagnosis		Yes
Filter time		0~40ms configurable
Input Impedance		>7.5kΩ
Input Action Display		When the input is in driving state, the input indicator light is on.
IO Mapping		Support bit-by-bit or word-by-word mapping
Output channel parameters		
"OFF" signal voltage		High impedance
"ON" signal voltage		0V DC
Data size		2 Byte
Connection Type		1-wire
Reverse circuit protection		Yes
Overcurrent protection		Yes
Short circuit protection		Yes
Isolation method		Photoelectric isolation from the field layer
Error diagnosis		Yes
Switching frequency (resistive)		100Hz
Switching frequency (lamp)		10Hz
Switching frequency (inductive)		0.2Hz
Response time of protection circuit		< 100μs
Maximum output current per channel		500 mA
Leakage Current		Maximum value: 10uA
Hardware response time		100us/100us
Output Impedance		<200mΩ
Output delay		OFF to ON:Max.100us, ON to OFF:Max.150us
Protection function		Over temperature shutdown: typical value 135℃ Overcurrent protection: 1.1A. Typical value 0.5A Support short circuit protection
Load Type		Inductive (7.2W/point, 24W/module), Resistive (0.5A/point, 4A/module), Light (5W/point, 18W/module)
Output action display		When the output is in driving state, the indicator light is on.
Input derating		When working at 55℃, the rating is reduced by 50% (the output current of ON at the same time does not exceed 2A), or the rating is reduced by 10℃ when all output points are ON
IO Mapping		Support bit-by-bit or word-by-word mapping
Fault shutdown output status mode		Clear, keep current value or output according to preset value
In stop mode		In the fault shutdown mode, no more refresh
Power parameters		
System bus input power rated voltage		5V DC (4.75V DC~ 5.25V DC)
System bus input power rated current		145mA
Input ChannelsTerminal power supply (common terminal) input voltage	NPN signal type	24V
	PNP signal type	0V
Wiring parameters		
Connection technology: Input		PUSH-IN Terminal Blocks
Wire crimping area		0.2～1.5mm2/26～16AWG
Stripping length		8～10mm²
Installation		DIN-35 rail
Material parameters		
color		black
Housing Material		PC plastic, PA66
Conformance mark		CE
Environmental requirements		
Allowable ambient temperature (operating)		-25～60℃

Permissible ambient temperature (storage)	-40～85℃
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: 0～2000m
Relative humidity (non-condensing)	5～95%RH
Vibration resistance	1g, in accordance with IEC 60068-2-6
Shock resistance	15g, compliant with IEC 60068-2-27
EMC anti-interference level	Compliant with IEC 61000-4
Corrosion resistance	Compliant with IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S contaminant concentration at 75% relative humidity	10ppm
Permissible SO2 pollutant concentration at 75% relative humidity	25ppm

23.2 Hardware Interface

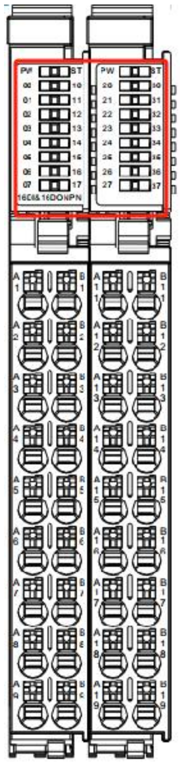
23.2.1Terminal Block Definition



Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	illustrate
A1	DI 0	B1	DI 10	C1	DO 20	D1	DO 30	DI signal input: A1~B9 DO signal output: C1~D9
A2	DI 1	B2	DI 11	C2	DO 21	D2	DO 31	
A3	DI 2	B3	DI 12	C3	DO 22	D3	DO 32	
A4	DI 3	B4	DI 13	C4	DO 23	D4	DO 33	
A5	DI 4	B5	DI 14	C5	DO 24	D5	DO 34	
A6	DI 5	B6	DI 15	C6	DO 25	D6	DO 35	

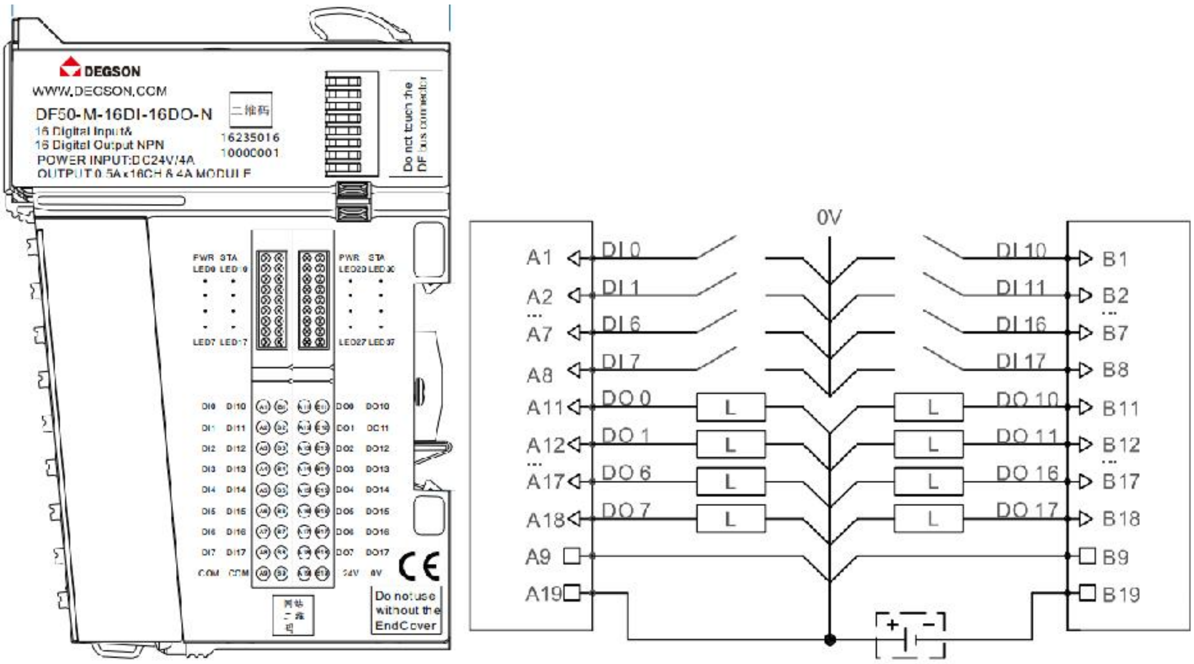
A7	DI 6	B7	DI 16	C7	DO 26	D7	DO 36	
A8	DI 7	B8	DI 17	C8	DO 27	D8	DO 37	
A9	COM	B9	COM	C9	24V	D9	0V	Public

23.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green:System bus power inputnormal	
	Green Kill:System bus power inputabnormal	
ST	Power-on stage	Green: Module initialization error
		Green off: Module initialization is normal
	Operational stage	Green flash: The internal bus of the module is working normally
		Green off: The internal bus of the module is working abnormally
00～07,10～17	Green: Input signal is valid	
	Green off: Input signal is invalid	
20～27,30～37	Green: Output signal is valid	
	Green off: Output signal is invalid	

23.2.3 Wiring Diagram



Note: COM is the common terminal, external 24V is used to realize NPN, external 0V is used to realize PNP.

23.3 Configuration Data Definition

index	Sub-index	name	Size	Value range	default value	meaning
16#8005	1	ChAll: Input Filter	1.0	0~255	3	Input channel filtering
	2	Output behavior On Fieldbus Error	1.0	0~2	0	Fieldbus error output mode configuration, see table En0820 for details
	3	Substitute Value	2.0	0~65535	0	Output substitute value
Note: If the module is inserted in the first slot after the coupler, the SDO index is 16#8005If it is inserted in the second card slot, the SDO index is 16#8015, the index offset is 16#10.						

Table En0820

Sub-index object data	name	meaning
0	All outputs off	Turn off all channel outputs
1	Enable substitute value	usePresetsValue Output
2	Hold last value	Keep current output

23.4 Process Data Definition

DF50-M-16DI-16DO-NModulesProcess data definition

RXPDO			
Name	Type	Size	meaning
DO Ch0	BIT	0.1	1: DO Ch0 output0VDC, 0: DO Ch0 outputs high configuration.
DO Ch1	BIT	0.1	1: DO Ch1 output0VDC, 0: DO Ch1 output high configuration.
DO Ch2	BIT	0.1	1: DO Ch2 output0VDC, 0: DO Ch2 output high configuration.
DO Ch3	BIT	0.1	1: DO Ch3 output0VDC, 0: DO Ch3 output high configuration.
DO Ch4	BIT	0.1	1: DO Ch4 output0VDC, 0: DO Ch4 output high configuration.
DO Ch5	BIT	0.1	1: DO Ch5 output0VDC, 0: DO Ch5 output high configuration.
DO Ch6	BIT	0.1	1: DO Ch6 output0VDC, 0: DO Ch6 output high configuration.
DO Ch7	BIT	0.1	1: DO Ch7 outputs 0VDC, 0: DO Ch7 outputs high configuration.
DO8	BIT	0.1	1: DO Ch8 outputs 0VDC, 0: DO Ch8 outputs high configuration.
DO Ch9	BIT	0.1	1: DO Ch9 outputs 0VDC, 0: DO Ch9 outputs high configuration.
DO Ch10	BIT	0.1	1: DO Ch10 outputs 0VDC, 0: DO Ch10 outputs high configuration.

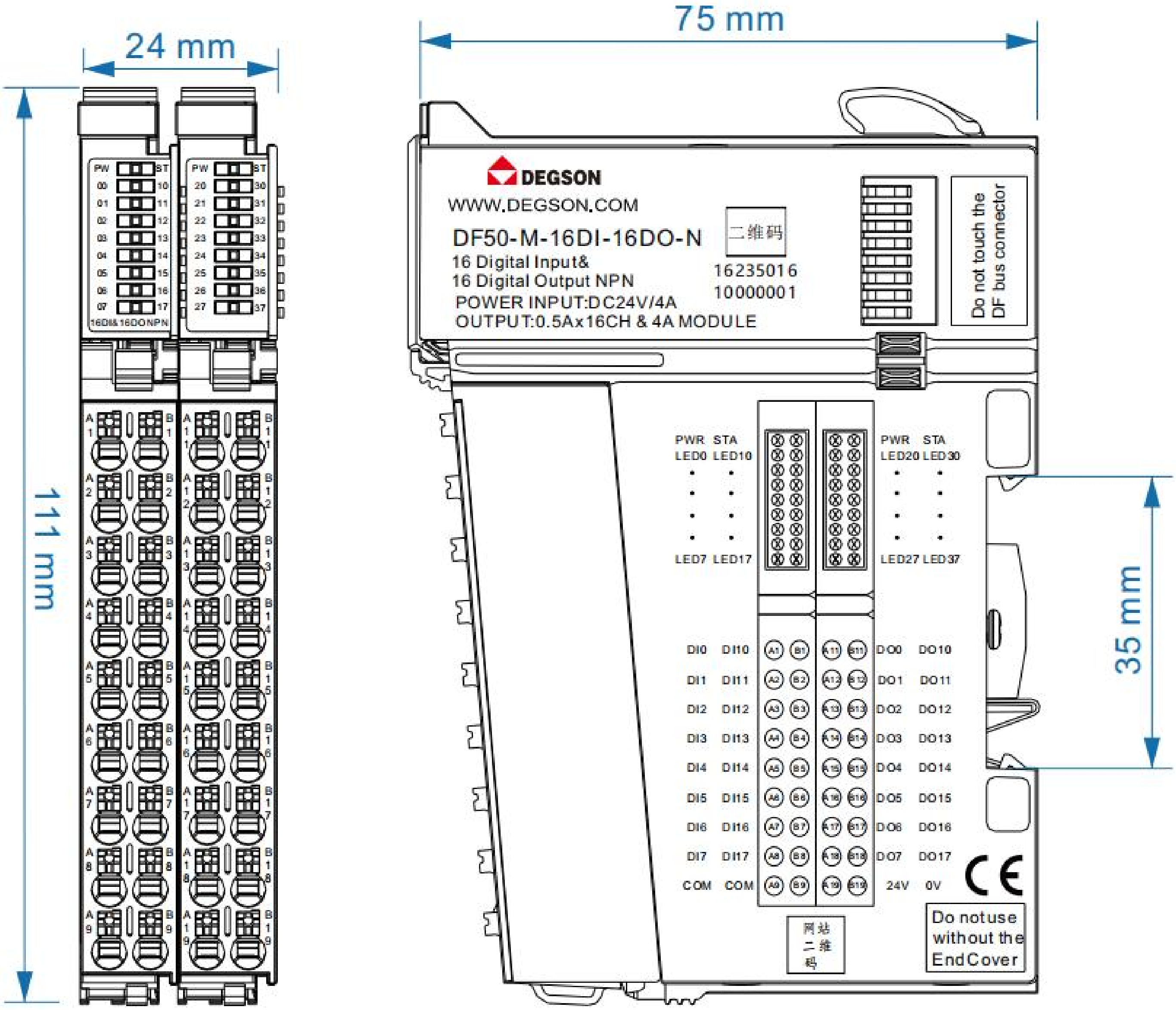
DO Ch11	BIT	0.1	1: DO Ch11 outputs 0VDC, 0: DO Ch11 outputs high
DO Ch12	BIT	0.1	1: DO Ch12 outputs 0VDC, 0: DO Ch12 outputs high
DO Ch13	BIT	0.1	1: DO Ch13 outputs 0VDC, 0: DO Ch13 outputs high
DO Ch14	BIT	0.1	1: DO Ch14 outputs 0VDC, 0: DO Ch14 outputs high
DO Ch15	BIT	0.1	1: DO Ch15 outputs 0VDC, 0: DO Ch15 outputs high

TXPDO			
Name	Type	Size	meaning
DI Ch0 / A1	BIT	0.1	When DI Ch0 inputs a valid signal, this position is set to 1, and when it is invalid, it is set to 0.
DI Ch1 / A2	BIT	0.1	When DI Ch1 inputs a valid signal, this position is set to 1, and when it is invalid, it is set to 0.
DI Ch2 / A3	BIT	0.1	When DI Ch2 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch3 / A4	BIT	0.1	When DI Ch3 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch4 / A5	BIT	0.1	When DI Ch4 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch5 / A6	BIT	0.1	When DI Ch5 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch6 / A7	BIT	0.1	When DI Ch6 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch7 / A8	BIT	0.1	When DI Ch7 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch8 / B1	BIT	0.1	When DI Ch8 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch9 / B2	BIT	0.1	When DI Ch9 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch10 / B3	BIT	0.1	When DI Ch10 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch11 / B4	BIT	0.1	When DI Ch11 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch12 / B5	BIT	0.1	When DI Ch12 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch13 / B6	BIT	0.1	When DI Ch13 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch14 / B7	BIT	0.1	When DI Ch14 inputs a valid signal, this position is 1, and when it is invalid, it is 0.

DI Ch15 / B8	BIT	0.1	When DI Ch15 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI WORD VALUE	WORD	2.0	Synchronously display the signal input status of all channels as above, expressed as 1 word of data.

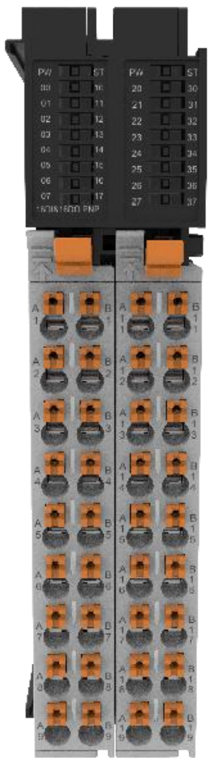
23.5 Mechanical Installation

The installation dimensions are shown in the figure below, in mm:



24 16-channel digital input & 16-channel digital output / 24VDC / PNP (DF50-M-16DI-16DO-P)

- The digital quantityThe module supports 16-channel input and 16-channel output, PNP high level is effective.
- Each input module is equipped with an anti-interference filter.
- Each inputOutputAll modules have LED indicators.
- The field layer and the system layer are isolated by photocouplers.
- Protection grade IP20.



24.1 Specifications

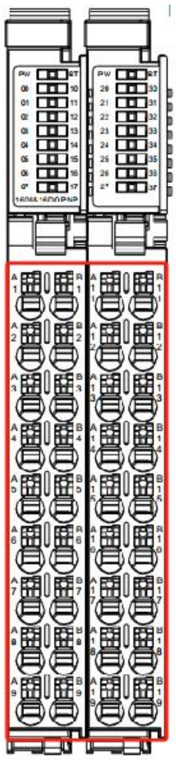
Technical Information		
Product Description		Digital inputOutputModules,16enter+16 output,PNP, 24VDC
Number of channels		16enter+16 output
Signal Type		PNP
Input channel parameters		
Signal range	"ON" signal voltage	Voltage difference > 11VDC (voltage difference with common input)
	"OFF" signal voltage	Voltage difference <5VDC (voltage difference with common input)
Hardware response time		200us/200us
Data size		4Byte
Connection Type		1-wire, Type 1/Type 3, according to IEC 61131-2

Reverse circuit protection		Yes
Isolation method		Photoelectric isolation from the field layer
Error diagnosis		Yes
Filter time		0~40ms configurable
Input Impedance		>7.5kΩ
Input Action Display		When the input is in driving state, the input indicator light is on.
IO Mapping		Support bit-by-bit or word-by-word mapping
Output channel parameters		
"OFF" signal voltage		High impedance
"ON" signal voltage		twenty fourV DC
Data size		2 Byte
Connection Type		1-wire
Reverse circuit protection		Yes
Overcurrent protection		Yes
Short circuit protection		Yes
Isolation method		Photoelectric isolation from the field layer
Error diagnosis		Yes
Switching frequency (resistive)		100Hz
Switching frequency (lamp)		10Hz
Switching frequency (inductive)		0.2Hz
Response time of protection circuit		< 100μs
Maximum output current per channel		500 mA
Leakage Current		Maximum value: 10uA
Hardware response time		100us/100us
Output Impedance		<200mΩ
Output delay		OFF to ON:Max.100us, ON to OFF:Max.150us
Protection function		Over temperature shutdown: typical value 135℃ Overcurrent protection: 1.1A. Typical value 0.5A Support short circuit protection
Load Type		Inductive (7.2W/point, 24W/module), Resistive (0.5A/point, 4A/module), Light (5W/point, 18W/module)
Output action display		When the output is in driving state, the indicator light is on.
Input derating		When working at 55℃, the rating is reduced by 50% (the output current of ON at the same time does not exceed 2A), or the rating is reduced by 10℃ when all output points are ON
IO Mapping		Support bit-by-bit or word-by-word mapping
Fault shutdown output status mode		Clear, keep current value or output according to preset value
In stop mode		In the fault shutdown mode, no more refresh
Power parameters		
System bus input power rated voltage		5V DC (4.75V DC~ 5.25V DC)
System bus input power rated current		145mA
Input ChannelsTerminal power supply (common terminal) input voltage	NPN signal type	24V
	PNP signal type	0V
Wiring parameters		
Connection technology: Input		PUSH-IN Terminal Blocks
Wire crimping area		0.2～1.5mm2/26～16AWG
Stripping length		8～10mm²
Installation		DIN-35 rail
Material parameters		
color		black
Housing Material		PC plastic, PA66
Conformance mark		CE
Environmental requirements		
Allowable ambient temperature (operating)		-25～60℃

Permissible ambient temperature (storage)	-40～85℃
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: 0～2000m
Relative humidity (non-condensing)	5～95%RH
Vibration resistance	1g, in accordance with IEC 60068-2-6
Shock resistance	15g, compliant with IEC 60068-2-27
EMC anti-interference level	Compliant with IEC 61000-4
Corrosion resistance	Compliant with IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S contaminant concentration at 75% relative humidity	10ppm
Permissible SO2 pollutant concentration at 75% relative humidity	25ppm

24.2 Hardware Interface

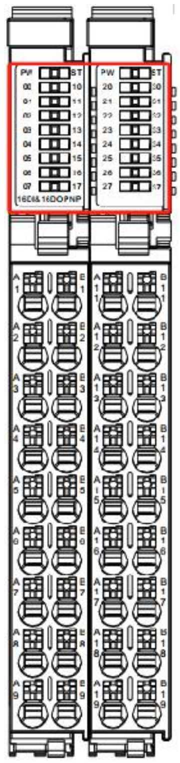
24.2.1 Terminal Block Definition



Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	illustrate
A1	DI 0	B1	DI 10	C1	DO 20	D1	DO 30	DI signal input: A1~B9 DO signal output: C1~D9
A2	DI 1	B2	DI 11	C2	DO 21	D2	DO 31	
A3	DI 2	B3	DI 12	C3	DO 22	D3	DO 32	
A4	DI 3	B4	DI 13	C4	DO 23	D4	DO 33	
A5	DI 4	B5	DI 14	C5	DO 24	D5	DO 34	
A6	DI 5	B6	DI 15	C6	DO 25	D6	DO 35	

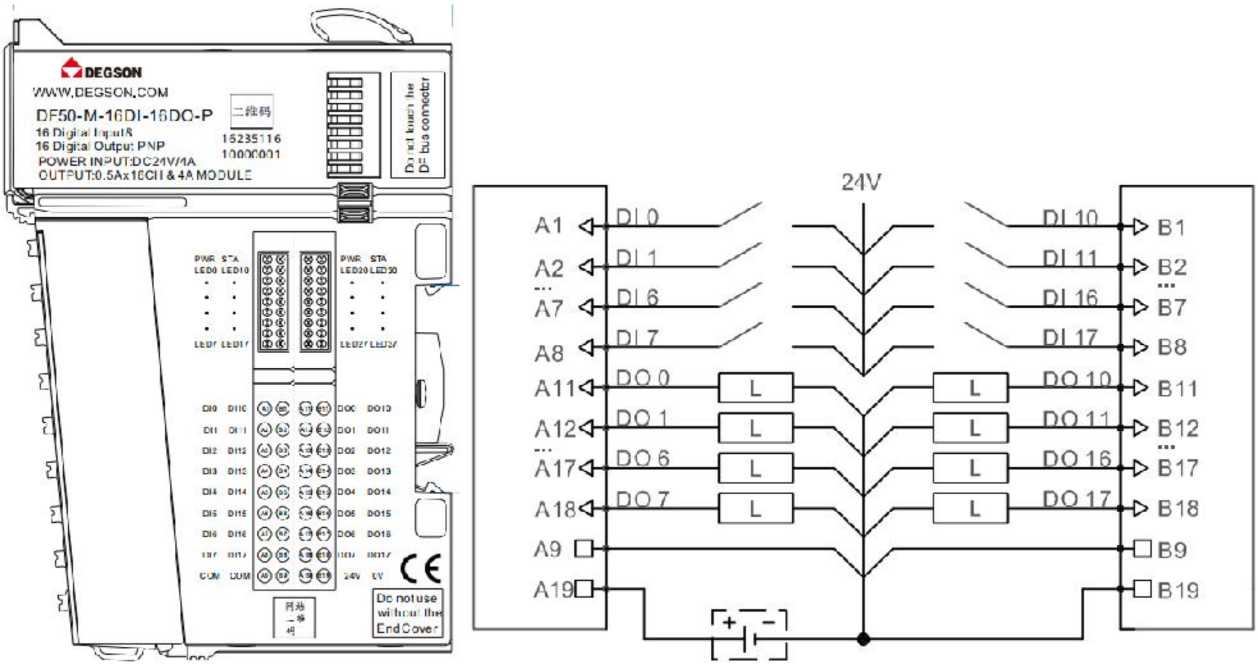
A7	DI 6	B7	DI 16	C7	DO 26	D7	DO 36	
A8	DI 7	B8	DI 17	C8	DO 27	D8	DO 37	
A9	COM	B9	COM	C9	24V	D9	0V	Public

24.2.2 LED indicator definition



<table>
<tr><th>Indicator Lights</th><th colspan="2">meaning</th></tr>
<tr><td rowspan="2">PW</td><td colspan="2">Green:System bus power inputnormal</td></tr>
<tr><td colspan="2">Green Kill:System bus power inputabnormal</td></tr>
<tr><td rowspan="4">ST</td><td rowspan="2">Power-on stage</td><td>Green: Module initialization error</td></tr>
<tr><td>Green off: Module initialization is normal</td></tr>
<tr><td rowspan="2">Operational stage</td><td>Green flash: The internal bus of the module is working normally</td></tr>
<tr><td>Green off: The internal bus of the module is working abnormally</td></tr>
<tr><td rowspan="2">00～07,10～17</td><td colspan="2">Green: Input signal is valid</td></tr>
<tr><td colspan="2">Green off: Input signal is invalid</td></tr>
<tr><td rowspan="2">20～27,30～37</td><td colspan="2">Green: Output signal is valid</td></tr>
<tr><td colspan="2">Green off: Output signal is invalid</td></tr>
</table>

24.2.3 Wiring Diagram



Note: COM is the common terminal, external 24V is used to realize NPN, external 0V is used to realize PNP.

24.3 Configuration Data Definition

index	Sub-index	name	Size	Value range	default value	meaning
16#8005	1	ChAll: Input Filter	1.0	0~255	3	Input channel filtering
	2	Output behavior On Fieldbus Error	1.0	0~2	0	Fieldbus error output mode configuration, see table En0820 for details
	3	Substitute Value	2.0	0~65535	0	Output substitute value
Note: If the module is inserted in the first slot after the coupler, the SDO index is 16#8005If it is inserted in the second card slot, the SDO index is 16#8015, the index offset is 16#10.						

Table En0820

Sub-index object data	name	meaning
0	All outputs off	Turn off all channel outputs
1	Enable substitute value	usePresetsValue Output
2	Hold last value	Keep current output

24.4 Process Data Definition

DF50-M-16DI-16DO-PModulesProcess data definition

RXPDO			
Name	Type	Size	meaning
DO Ch0	BIT	0.1	1: DO Ch0 outputs 24VDC, 0: DO Ch0 outputs high configuration.
DO Ch1	BIT	0.1	1: DO Ch1 outputs 24VDC, 0: DO Ch1 outputs high configuration.
DO Ch2	BIT	0.1	1: DO Ch2 outputs 24VDC, 0: DO Ch2 outputs high configuration.
DO Ch3	BIT	0.1	1: DO Ch3 outputs 24VDC, 0: DO Ch3 outputs high configuration.
DO Ch4	BIT	0.1	1: DO Ch4 outputs 24VDC, 0: DO Ch4 outputs high configuration.
DO Ch5	BIT	0.1	1: DO Ch5 outputs 24VDC, 0: DO Ch5 outputs high configuration.
DO Ch6	BIT	0.1	1: DO Ch6 outputs 24VDC, 0: DO Ch6 outputs high configuration.
DO Ch7	BIT	0.1	1: DO Ch7 outputs 24VDC, 0: DO Ch7 outputs high configuration.
DO8	BIT	0.1	1: DO Ch8 outputs 24VDC, 0: DO Ch8 outputs high configuration.
DO Ch9	BIT	0.1	1: DO Ch9 outputs 24VDC, 0: DO Ch9 outputs high configuration.
DO Ch10	BIT	0.1	1: DO Ch10 outputs 24VDC, 0: DO Ch10 outputs high

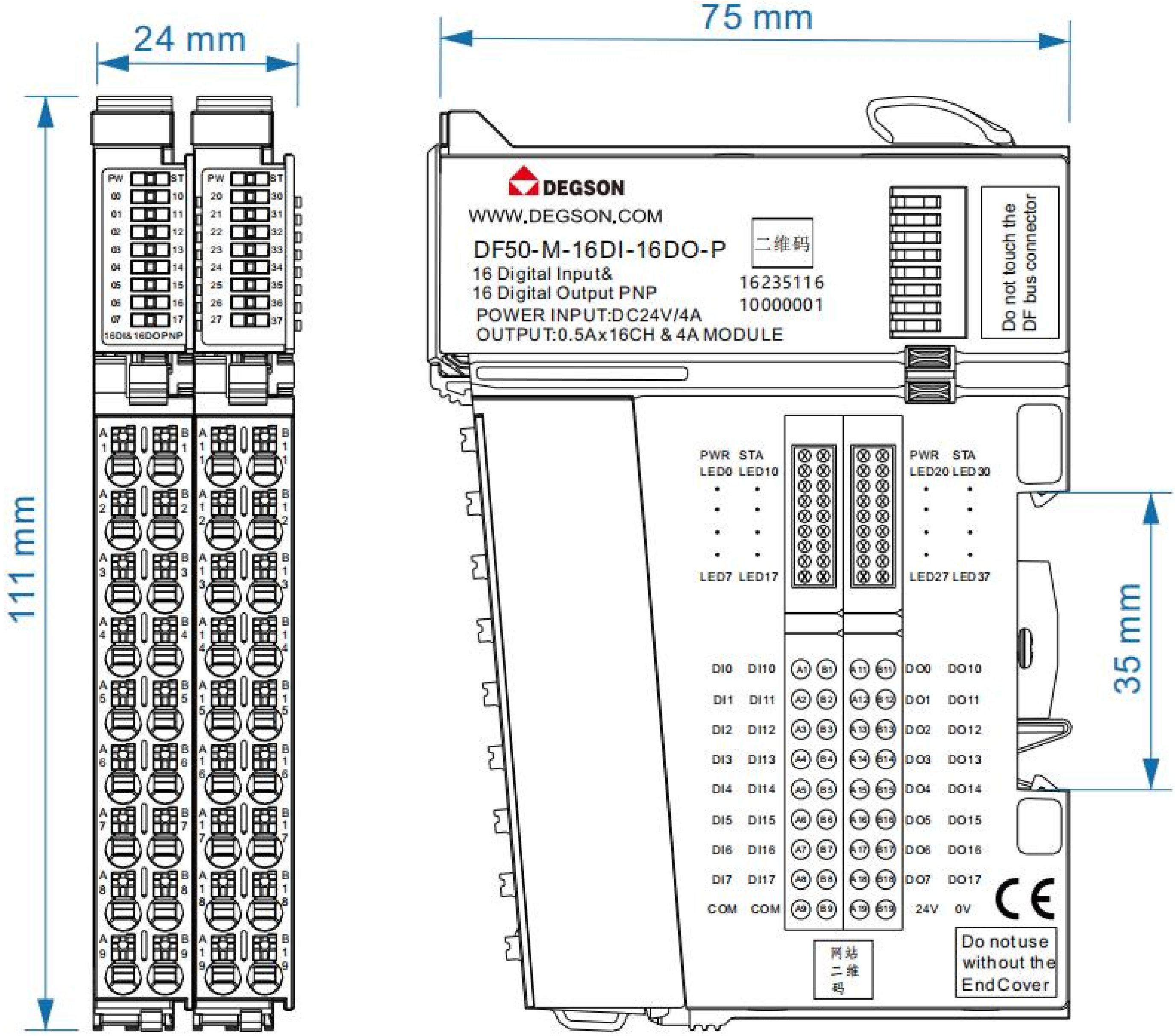
DO Ch11	BIT	0.1	1: DO Ch11 outputs 24VDC, 0: DO Ch11 outputs high
DO Ch12	BIT	0.1	1: DO Ch12 outputs 24VDC, 0: DO Ch12 outputs high
DO Ch13	BIT	0.1	1: DO Ch13 outputs 24VDC, 0: DO Ch13 outputs high
DO Ch14	BIT	0.1	1: DO Ch14 outputs 24VDC, 0: DO Ch14 outputs high
DO Ch15	BIT	0.1	1: DO Ch15 outputs 24VDC, 0: DO Ch15 outputs high

TXPDO			
Name	Type	Size	meaning
DI Ch0 / A1	BIT	0.1	When DI Ch0 inputs a valid signal, this position is set to 1, and when it is invalid, it is set to 0.
DI Ch1 / A2	BIT	0.1	When DI Ch1 inputs a valid signal, this position is set to 1, and when it is invalid, it is set to 0.
DI Ch2 / A3	BIT	0.1	When DI Ch2 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch3 / A4	BIT	0.1	When DI Ch3 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch4 / A5	BIT	0.1	When DI Ch4 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch5 / A6	BIT	0.1	When DI Ch5 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch6 / A7	BIT	0.1	When DI Ch6 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch7 / A8	BIT	0.1	When DI Ch7 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch8 / B1	BIT	0.1	When DI Ch8 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch9 / B2	BIT	0.1	When DI Ch9 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch10 / B3	BIT	0.1	When DI Ch10 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch11 / B4	BIT	0.1	When DI Ch11 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch12 / B5	BIT	0.1	When DI Ch12 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch13 / B6	BIT	0.1	When DI Ch13 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch14 / B7	BIT	0.1	When DI Ch14 inputs a valid signal, this position is 1, and when it is invalid, it is 0.

DI Ch15 / B8	BIT	0.1	When DI Ch15 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI WORD VALUE	WORD	2.0	Synchronously display the signal input status of all channels as above, expressed as 1 word of data.

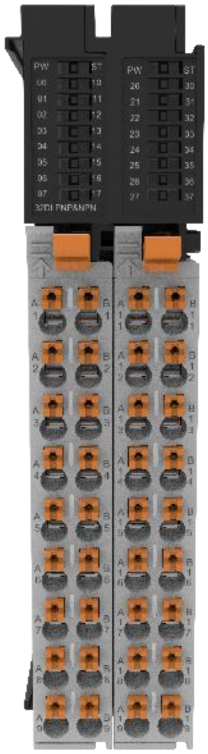
24.5 Mechanical Installation

The installation dimensions are shown in the figure below, in mm:



25 32-channel digital input/24VDC/PNP&NPN(DF50-M-32DI-P/N)

- The digital input module can receive control signals from field devices (such as sensors, etc.).
- 32-channel digital input, PNP&NPN valid, common terminal conversion.
- Each input module is equipped with an anti-interference filter.
- Each input module has an LED indicator.
- The field level and the system level are isolated by optocouplers.
- Protection grade IP20.

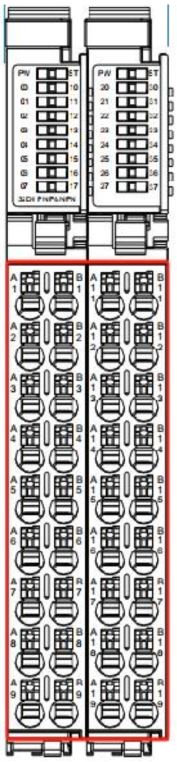


25.1 Specifications

Technical Information		
Product Description		Digital input modules,32Input, NPN & PNP, 24VDC
Number of channels		32
Signal Type		NPN & PNP
Signal range	"ON" signal voltage	Voltage difference > 11VDC (voltage difference with common input)
	"OFF" signal voltage	Voltage difference <5VDC (voltage difference with common input)
Hardware response time		200us/200us
Data size		4Byte
Connection Type		1-wire, Type 1/Type 3, according to IEC 61131-2
Reverse circuit protection		Yes
Isolation method		Photoelectric isolation from the field layer
Error diagnosis		Yes
Filter time		0-40ms configurable
Input Impedance		>7.5kΩ
Input Action Display		When the input is in driving state, the input indicator light is on.
IO Mapping		Support bit-by-bit or word-by-word mapping
Power parameters		
System bus input power rated voltage		5V DC (4.75V DC~ 5.25V DC)
System bus input power rated current		90mA
Terminal power supply (common terminal) input rated voltage	NPN signal type	24V
	PNP signal type	0V
Wiring parameters		
Connection technology: Input		PUSH-IN Terminal Blocks
Wire crimping area		0.2～1.5mm2/26～16AWG
Stripping length		8～10mm²
Installation		DIN-35 rail
Material parameters		
color		black
Housing Material		PC plastic, PA66
Conformance mark		CE
Environmental requirements		
Allowable ambient temperature (operating)		-25～60℃
Permissible ambient temperature (storage)		-40～85℃
Protection type		IP20
Pollution degree		2. Comply with IEC 61131-2 standard
Operating altitude		Temperature without derating: 0～2000m
Relative humidity (non-condensing)		5～95%RH
Vibration resistance		1g, in accordance with IEC 60068-2-6
Shock resistance		15g, compliant with IEC 60068-2-27
EMC anti-interference level		Compliant with IEC 61000-4
Corrosion resistance		Compliant with IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S contaminant concentration at 75% relative humidity		10ppm
Permissible SO2 pollutant concentration at 75% relative humidity		25ppm

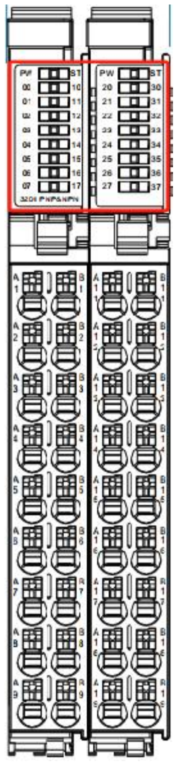
25.2 Hardware Interface

25.2.1 Terminal Block Definition



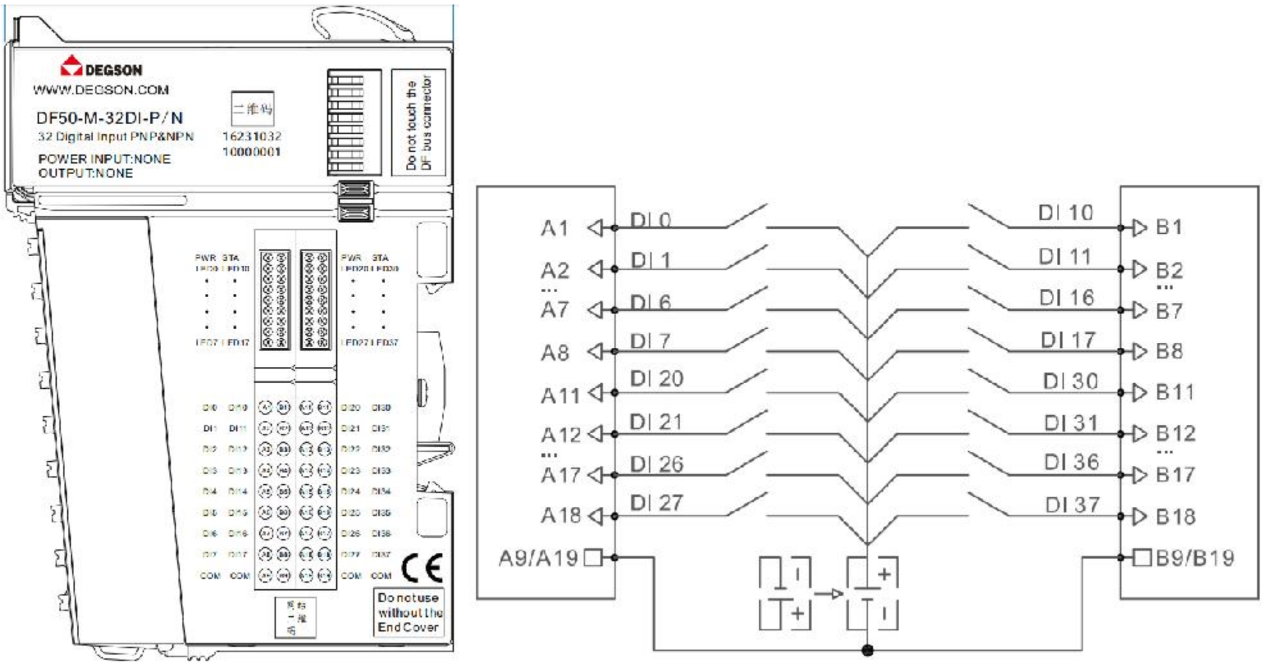
Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	illustrate
A1	DI 0	B1	DI 10	C1	DI20	D1	DI30	DI signal input
A2	DI 1	B2	DI 11	C2	DI21	D2	DI31	
A3	DI 2	B3	DI 12	C3	DI22	D3	DI32	
A4	DI 3	B4	DI 13	C4	DI23	D4	DI33	
A5	DI 4	B5	DI 14	C5	DI24	D5	DI34	
A6	DI 5	B6	DI 15	C6	DI25	D6	DI35	
A7	DI 6	B7	DI 16	C7	DI26	D7	DI36	
A8	DI 7	B8	DI 17	C8	DI27	D8	DI37	
A9	COM	B9	COM	C9	COM	D9	COM	Public

25.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green:System bus powerSource Inputnormal	
	Green Kill:System bus powerSource Inputabnormal	
ST	Power-on stage	Green: Module initialization error
		Green off: Module initialization is normal
	Operational stage	Green flash: The internal bus of the module is working normally
		Green off: The internal bus of the module is working abnormally
00～07,10～17 20～27,30～37	Green: Input signal is valid	
	Green off: Input signal is invalid	

25.2.3 Wiring Diagram



Note: COM is the common terminal, external 24V realizes NPN; external 0V realizes PNP.

25.3 Configuration Data Definition

index	Sub-index	name	Size	Value range	default value	meaning
16#8005	1	ChAll:Input Filter	1.0	0~255	3	Input filter, configurable from 0 to 255 ms
Note: If the module is inserted in the first slot after the coupler, the SDO index is 16#8005If it is inserted in the second card slot, the SDO index is 16#8015, the index offset is 16#10.						

25.4 Process Data Definition

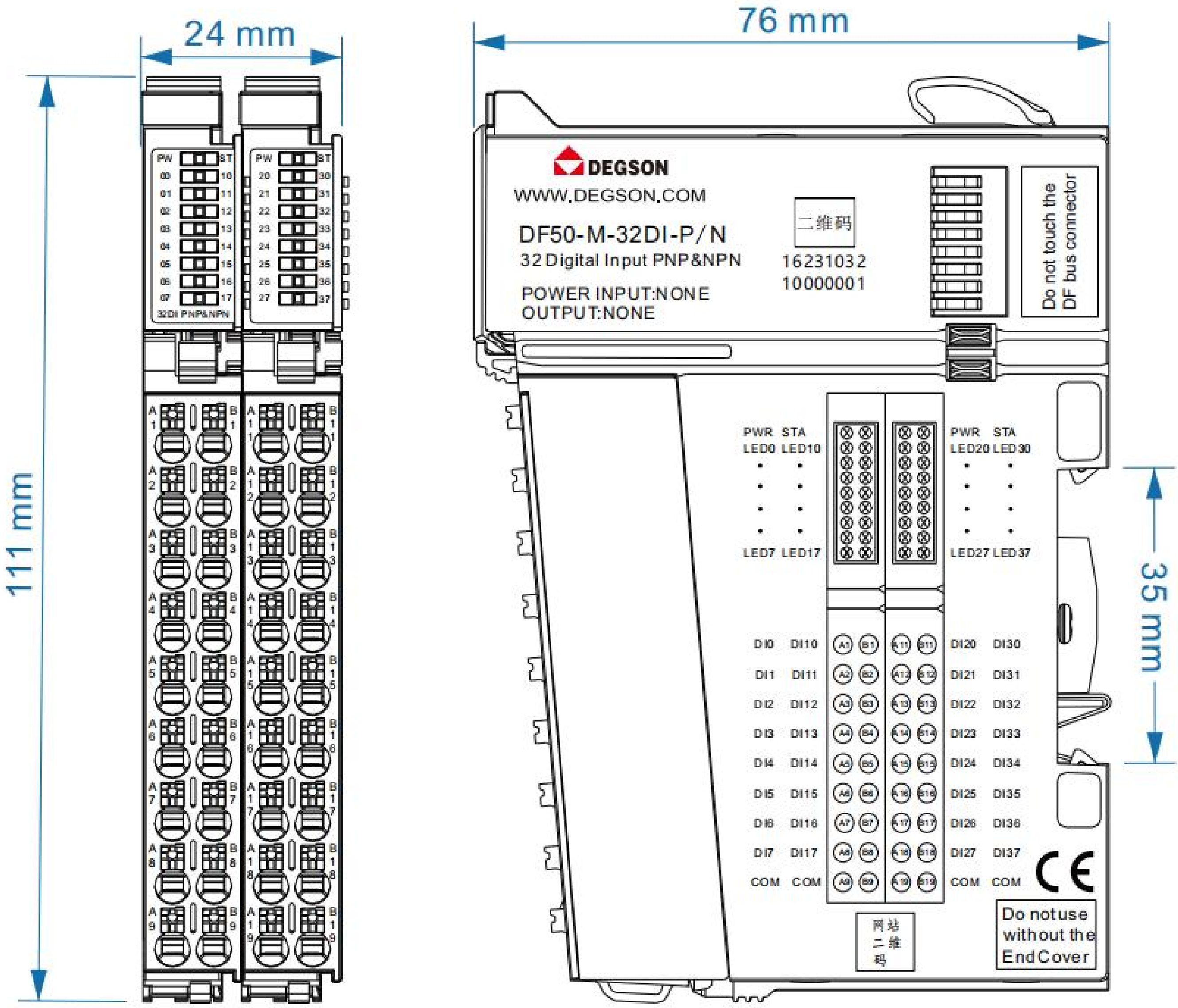
TXPDO			
Name	Type	Size	meaning
DI Ch0 / A1	BIT	0.1	When DI Ch0 inputs a valid signal, this position is set to 1, and when it is invalid, it is set to 0.
DI Ch1 / A2	BIT	0.1	When DI Ch1 inputs a valid signal, this position is set to 1, and when it is invalid, it is set to 0.
DI Ch2 / A3	BIT	0.1	When DI Ch2 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch3 / A4	BIT	0.1	When DI Ch3 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch4 / A5	BIT	0.1	When DI Ch4 inputs a valid signal, this position is 1, and when it is invalid, it is 0.

DI Ch5 / A6	BIT	0.1	When DI Ch5 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch6 / A7	BIT	0.1	When DI Ch6 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch7 / A8	BIT	0.1	When DI Ch7 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch8 / B1	BIT	0.1	When DI Ch8 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch9 / B2	BIT	0.1	When DI Ch9 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch10 / B3	BIT	0.1	When DI Ch10 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch11 / B4	BIT	0.1	When DI Ch11 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch12 / B5	BIT	0.1	When DI Ch12 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch13 / B6	BIT	0.1	When DI Ch13 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch14 / B7	BIT	0.1	When DI Ch14 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI Ch15 / B8	BIT	0.1	When DI Ch15 inputs a valid signal, this position is 1, and when it is invalid, it is 0.
DI16/C1	BIT	0.1	DI16When a valid signal is input, this position is 1, and when invalid, it is 0.
DI Ch17/C2	BIT	0.1	DI Ch17When a valid signal is input, this position is 1, and when invalid, it is 0.
DI18/C3	BIT	0.1	DI18When a valid signal is input, this position is 1, and when invalid, it is 0.
DI19/C4	BIT	0.1	DI19When a valid signal is input, this position is 1, and when invalid, it is 0.
DI20/C5	BIT	0.1	DI20When a valid signal is input, this position is 1, and when invalid, it is 0.
DItwenty one/C6	BIT	0.1	DItwenty oneWhen a valid signal is input, this position is 1, and when invalid, it is 0.
DItwenty two/C7	BIT	0.1	DItwenty twoWhen a valid signal is input, this position is 1, and when invalid, it is 0.
DItwenty three/C8	BIT	0.1	DItwenty threeWhen a valid signal is input, this position is 1, and when invalid, it is 0.
DItwenty four/D1	BIT	0.1	DItwenty fourWhen a valid signal is input, this position is 1, and

			when invalid, it is 0.
DI25/D2	BIT	0.1	DI25When a valid signal is input, this position is 1, and when invalid, it is 0.
DI26/D3	BIT	0.1	DI26When a valid signal is input, this position is 1, and when invalid, it is 0.
DI27/D4	BIT	0.1	DI27When a valid signal is input, this position is 1, and when invalid, it is 0.
DI28/D5	BIT	0.1	DI28When a valid signal is input, this position is 1, and when invalid, it is 0.
DI29/D6	BIT	0.1	DI29When a valid signal is input, this position is 1, and when invalid, it is 0.
DI30/D7	BIT	0.1	DI30When a valid signal is input, this position is 1, and when invalid, it is 0.
DI31/D8	BIT	0.1	DI31When a valid signal is input, this position is 1, and when invalid, it is 0.
DI WORD VALUE	WORD	4.0	Synchronously display the signal input status of all channels with the above.2Data representation of words.

25.5 Mechanical Installation

The installation dimensions are shown in the figure below, in mm:



4.Software Configuration Instructions

4.1 Application in CODESYS software environment

- As shown in Figure 4-1-1, first find the DF50-C-EC V1i0i2_R device description file provided by the manufacturer, double-click the CoDeSys icon, start the software, click "Tools", select "Device Reposity", and click "Install" to install the device.

Figure 4-1-1

- Set the IP address of the computer and the IP address of the PLC to ensure that they are in the same network segment.
- In the newly created project, right-click "Device" in the device tree and select "Add Device". Select the EtherCAT master station in the pop-up device.
- As shown in Figure 4-1-2, select the EtherCAT master in the device view, right-click and select "Add Device", then in the pop-up dialog box, choose to add an EtherCAT slave: select "All Vendors" for supplier, and select "EtherCAT" -> "Slave" -> "EtherCAT Coupler" for fieldbus.

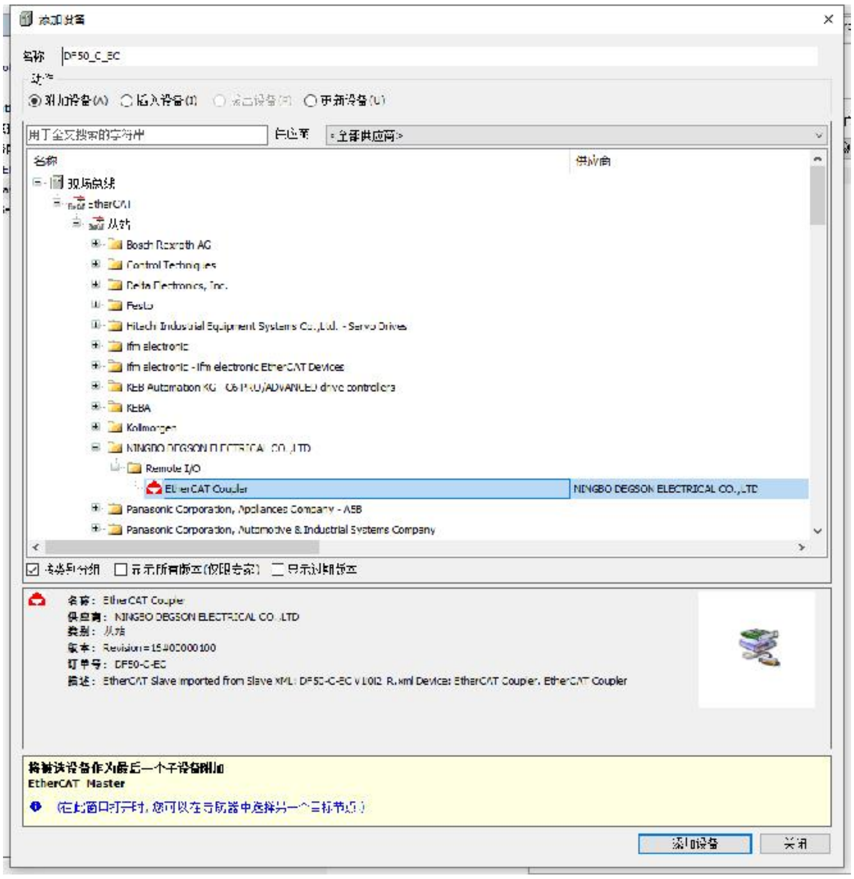


Figure 4-1-2

- In the device view, right-click the newly added device DF50-C-EC to add the device, as shown in Figure 4-1-3. Users can click Edit Module Configuration to add modules to the project according to the actual topology.

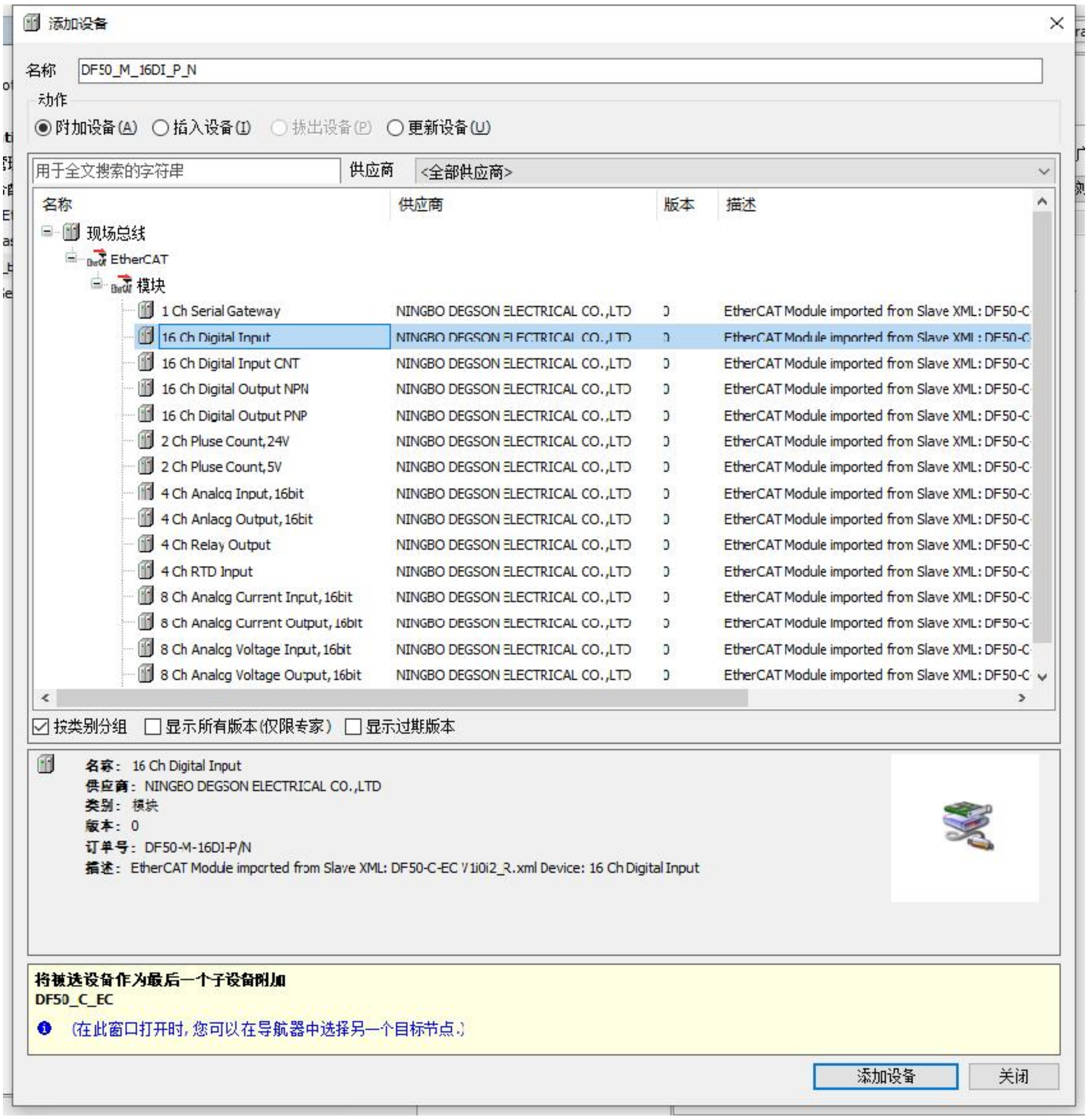

添加设备
名称 DF50_M_16DI_P_N
动作
附加设备(A) 插入设备(I) 拔出设备(P) 更新设备(U)
用于全文搜索的字符串 供应商 <全部供应商>
名称 供应商 版本 描述
现场总线
EtherCAT
模块
1 Ch Serial Gateway
16 Ch Digital Input
16 Ch Digital Input CNT
16 Ch Digital Output NPN
16 Ch Digital Output PNP
2 Ch Pluse Count,24V
2 Ch Pluse Count,5V
4 Ch Analog Input,16bit
4 Ch Anlaog Output,16bit
4 Ch Relay Output
4 Ch RTD Input
8 Ch Analog Current Input,16bit
8 Ch Analog Current Output,16bit
8 Ch Analog Voltage Input,16bit
8 Ch Analog Voltage Output,16bit
NINGBO DEGSON ELECTRICAL CO.,LTD
EtherCAT Module imported from Slave XML: DF50-C
按类别分组 显示所有版本(仅限专家) 显示过期版本
名称: 16 Ch Digital Input
供应商: NINGBO DEGSON ELECTRICAL CO.,LTD
类别: 模块
版本: 0
订单号: DF50-M-16DI-P/N
描述: EtherCAT Module imported from Slave XML: DF50-C-EC V1i0i2_R.xml Device: 16 Ch Digital Input
将被选设备作为最后一个子设备附加
DF50_C_EC
(在此窗口打开时，您可以在导航器中选择另一个目标节点.)
添加设备 关闭

Figure 4-1-3

4.1.1 Adapter Usage Examples

➢ For adapter wiring, please refer to Chapter 2 Section 1.2.The example uses the DF50-C-EC + DF50-M-16DO-P + DF50-M-16DI-P/N + DF50-M-16DO-N + DF50-M-16DI-P/N-TS topology. After adding the corresponding cards, the result is as shown in Figure 4-1-4.

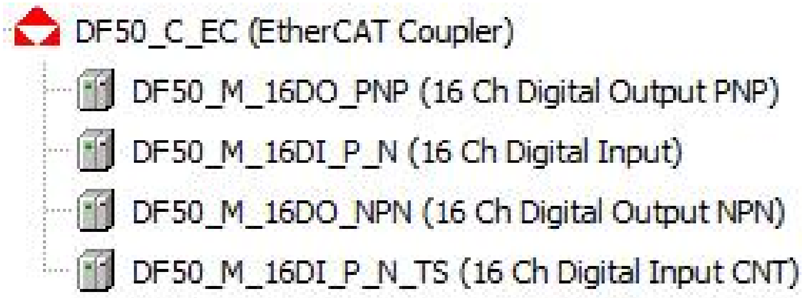


Figure 4-1-4

➢ As shown in the figure below, the process data of the DF50-C-EC adapter can be viewed.

Figure 4-1-5

➢ The meaning of the process data in Figure 4-1-5 is shown in Table 4.1.1.

Table 4.1.1Process data meaning

TXPDO			
Name	**Type**	**Size**	**meaning**
Device StateWord	UINT	2.0	Device status word, normally 0.
Device Input DI0	BIT	0.1	DI0 input is set to 1 if valid and 0 if invalid.
Device Input DI1	BIT	0.1	DI1 input is set to 1 if valid, and to 0 if invalid.
Device Input DI2	BIT	0.1	DI2 input is set to 1 if valid and 0 if invalid.
Device Input DI3	BIT	0.1	DI3 input is set to 1 if valid, and 0 if invalid.
Device Input DI4	BIT	0.1	DI4 input is set to 1 if valid and 0 if invalid.
Device Input DI5	BIT	0.1	DI5 input is set to 1 if valid and 0 if invalid.

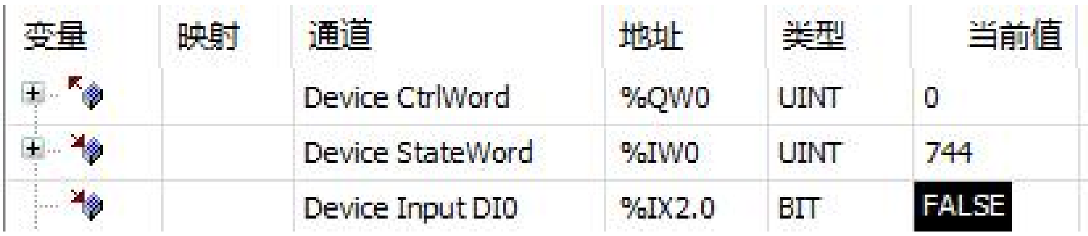
Device Input DI6	BIT	0.1	DI6 input is set to 1 if valid and 0 if invalid.
Device Input DI7	BIT	0.1	DI7 input is set to 1 if valid and 0 if invalid.
Device SwitchCode	USINT	1.0	8-bit DIP switch value.
RXPDO			
Device CtrlWord	UINT	2.0	Device control word.

Device StateWord meaning

➢ As shown in Figures 4-1-6 and 4-1-7, when the value of "Device CtrlWord" is 0x0000 by default, the feedback value of "Device StateWord" is 0x01e8 (488), indicating that an error occurs in the first module after the coupler. Similarly, when an error occurs in the second module, the value of "Device StateWord" is 0x02e8 (744). When all modules are working normally, the value is 0. If you need to clear the error, write "0x0001" to Device CtrlWord to clear the error, and then write it back to 0x0000.

变量	映射	通道	地址	类型	当前值
		Device CtrlWord	%QW0	UINT	0
		Device StateWord	%IW0	UINT	488
		Device Input DI0	%IX2.0	BIT	FALSE

Figure 4-1-6



变量	映射	通道	地址	类型	当前值
		Device CtrlWord	%QW0	UINT	0
		Device StateWord	%IW0	UINT	744
		Device Input DI0	%IX2.0	BIT	FALSE

Figure 4-1-7

➢ Device CtrlWord commands are shown in Table 4.1.2.

Table 4.1.2

Device CtrlWord	Device StateWord
0x0000	Display fault code
0x0001	Clearing fault codes
0x0002	Coupler software version number

➢ When the module has fault information and Device CtrlWord is 0x0000, the upper 8 bits of Device StateWord indicate the module position, and the lower 8 bits indicate the module fault code. The meaning of the fault code is shown in the table below.

Table 4.1.3

Fault Codes	Fault Description	Troubleshooting methods
0XE1	Module power supply abnormality	Check the power cord connection
0XE2	Analog module calibration abnormality	Contact Supplier
0XE3	Module internal initialization exception	Contact Supplier
0XE8	Module offline	Reseat the module

Module error adapter bus status configuration

➢ As shown in Figure 4-1-10, when the module loses data in communication with the adapter and an error occurs, the adapter bus can be set to remain in OP state or exit OP state. The default setting is to remain in OP state.

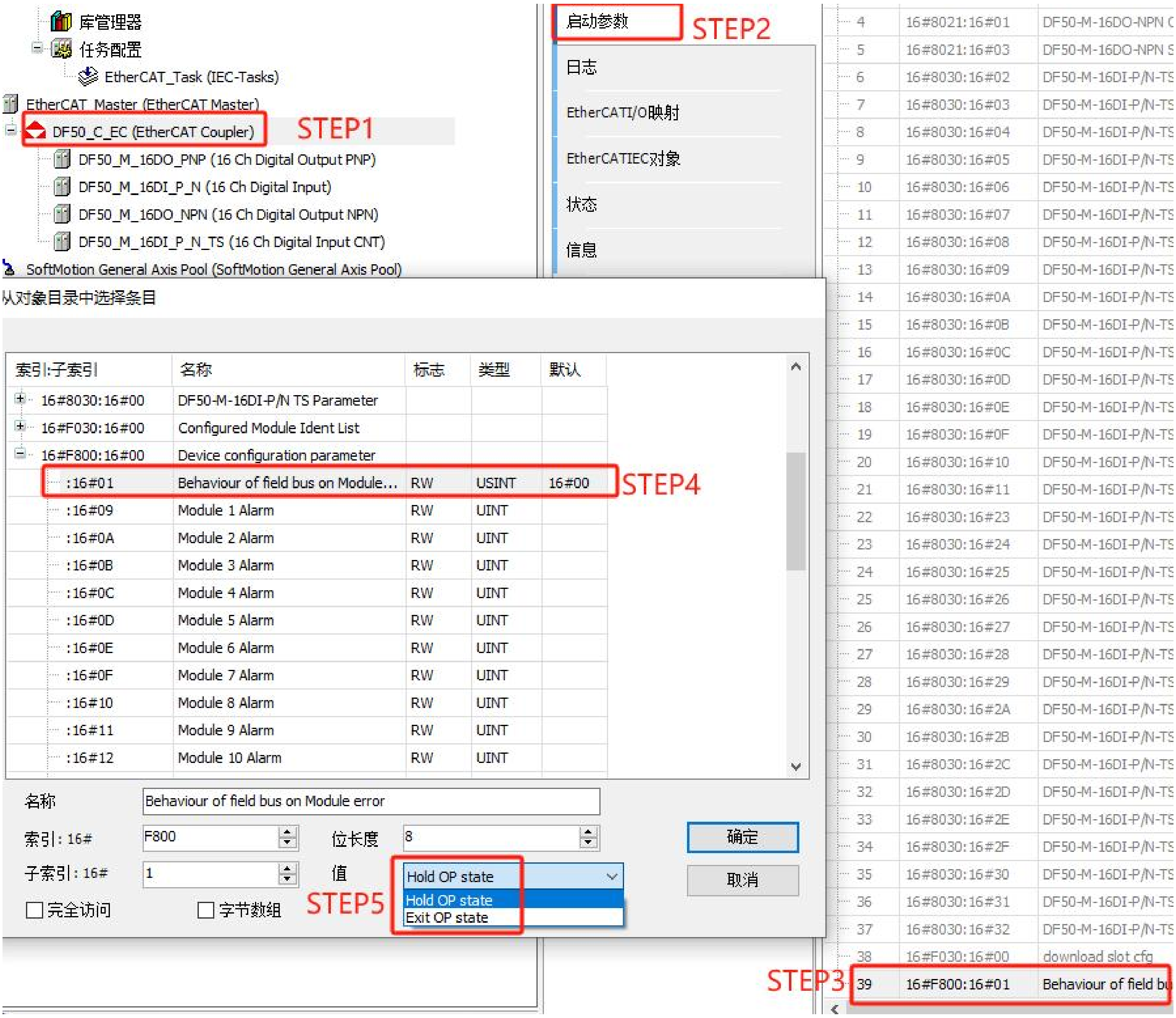


Figure 4-1-8Behavior on bus errors

4.1.2 Digital Module Usage Example

➢ This example uses the topology of DF50-C-EC + DF50-M-16DO-P + DF50-M-16DO-N + DF50-M-16DI-P/N + DF50-M-16DI-P/N-TS + DF50-M-32DO-P + DF50-M-32DO-N + DF50-M-32DI-P/N + DF50-M-16DI-16DO-P + DF50-M-16DI-16DO-N + DF50-M-4DOR + DF50-M-4DO-P-2A. After scanning the slaves, the result is as shown in Figure 4-1-9.

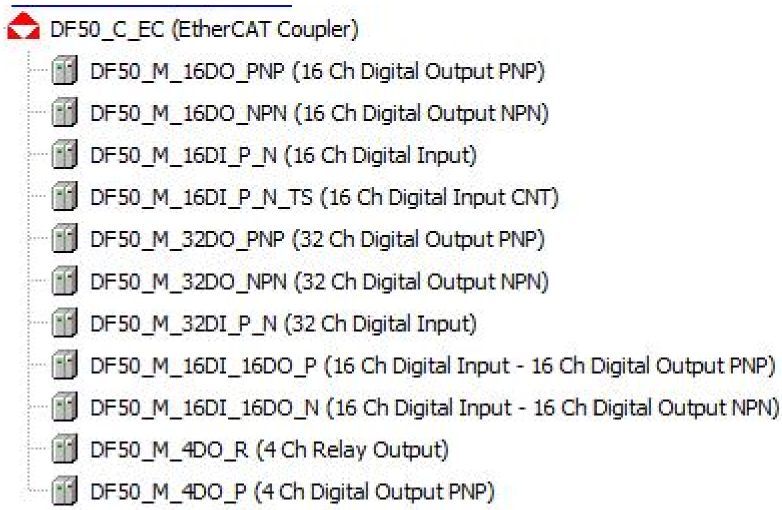


Figure 4-1-9

DF50-M-16DO-P digital output module

➢ Please refer to the module wiring diagramChapter 3, Section 3.2When the EC bus exits the OP state, this type of module can set the output state of the module. The setting method is shown in the figure below. It can be set to: all outputs are closed, use alternative value output, and keep the last value.

Figure 4-1-10

➢ When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.

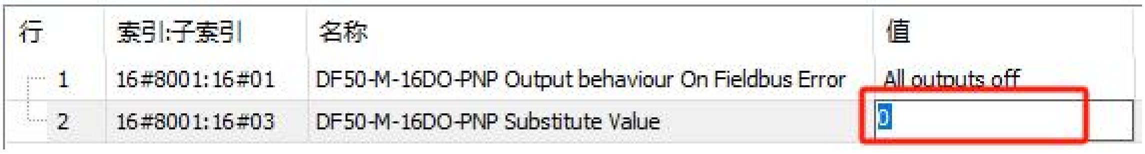


Figure 4-1-11

- As shown in the figure below, after modifying each channel's prepared value, press Ctrl+F7 to modify each channel's output individually.

Figure 4-1-12

DF50-M-16DO-N digital output module

- Please refer to the module wiring diagramChapter 3 Section 4.2When the EC bus exits the OP state, this type of module can set the output state of the module. The setting method is shown in the figure below. It can be set to: all outputs are closed, use alternative value output, and keep the last value.

Figure 4-1-13

- When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.

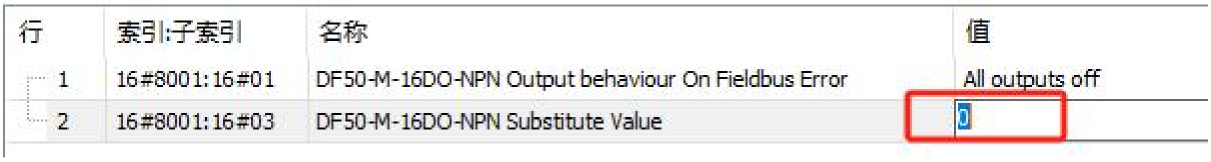


Figure 4-1-14

- As shown in the figure below, after modifying each channel's prepared value, press Ctrl+F7 to modify each channel's output individually.

Figure 4-1-15

DF50-M-16DI-P/N digital input module

- Please refer to the wiring diagramChapter 3, Section 1.2This type of module can be configured for input filtering. The configuration method is shown in the figure below. The configurable range is 0~255ms.

Figure 4-1-16

- As shown in the figure below, when a valid signal is input to the module, the corresponding channel value will become "1".

Figure 4-1-17

DF50-M-16DI-P/N-TS digital input with counting module

➢ Please refer to the module wiring diagramChapter 3, Section 2.2As shown in Figure 4-1-18, you can configure the filter parameters of channels B1~B8 and the trigger mode of channel A1~A8 counting.

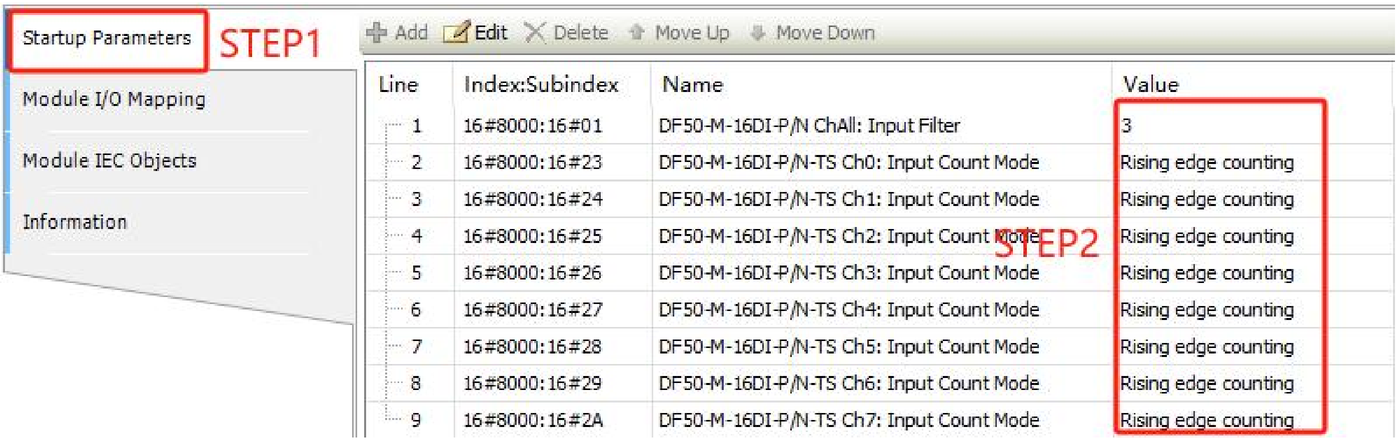


Figure 4-1-18

➢ The counting mode configuration is shown in Figure 4-1-19. The configurable parameters are: rising edge counting, falling edge counting, and both rising and falling edges counting.

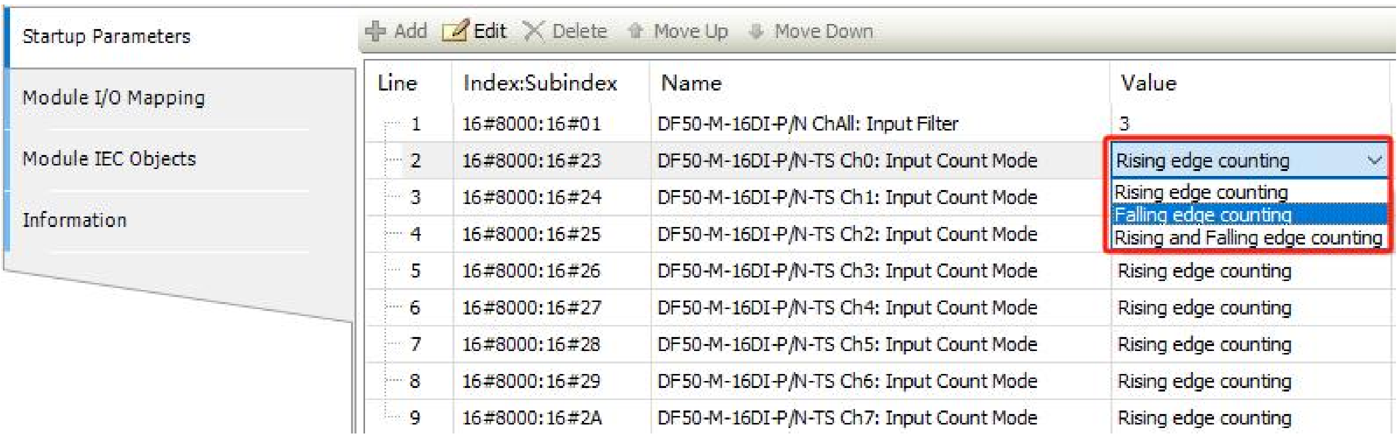
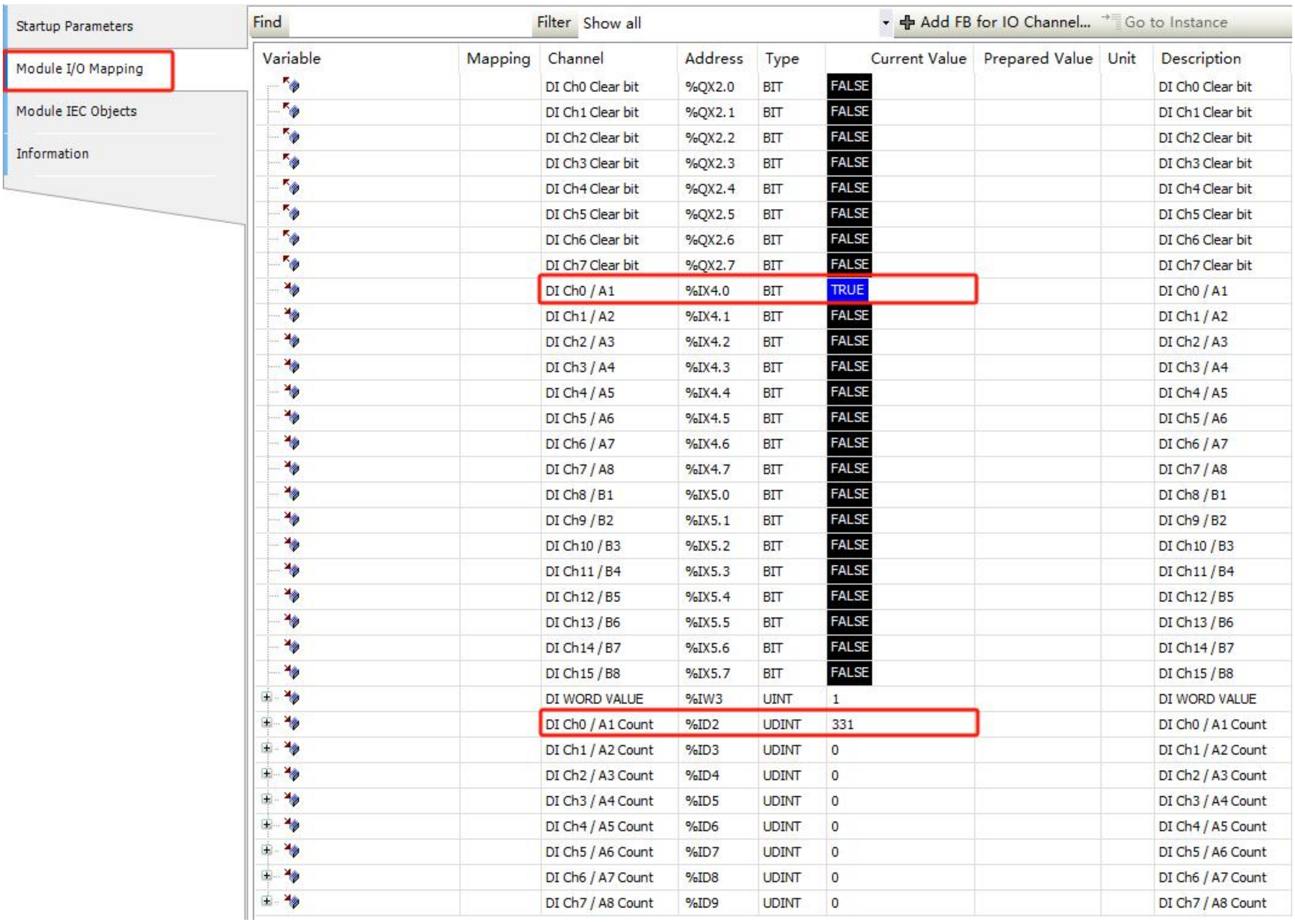


Figure 4-1-19Counting Mode

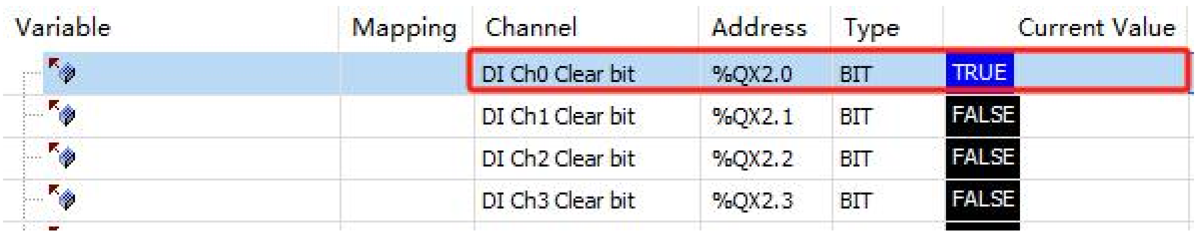
➢ For process data definition, please refer toChapter 3, Section 2.4When a valid signal is input to the module, the corresponding channel value becomes "1", and the corresponding channel count value +1. As shown in Figure 4-1-20, when a valid signal is input to CH0/A1, the current value becomes "1", and the CH0/A1 Count value +1.



Variable	Mapping	Channel	Address	Type	Current Value	Prepared Value	Unit	Description
		DI Ch0 Clear bit	%QX2.0	BIT	FALSE			DI Ch0 Clear bit
		DI Ch1 Clear bit	%QX2.1	BIT	FALSE			DI Ch1 Clear bit
		DI Ch2 Clear bit	%QX2.2	BIT	FALSE			DI Ch2 Clear bit
		DI Ch3 Clear bit	%QX2.3	BIT	FALSE			DI Ch3 Clear bit
		DI Ch4 Clear bit	%QX2.4	BIT	FALSE			DI Ch4 Clear bit
		DI Ch5 Clear bit	%QX2.5	BIT	FALSE			DI Ch5 Clear bit
		DI Ch6 Clear bit	%QX2.6	BIT	FALSE			DI Ch6 Clear bit
		DI Ch7 Clear bit	%QX2.7	BIT	FALSE			DI Ch7 Clear bit
		DI Ch0 / A1	%IX4.0	BIT	TRUE			DI Ch0 / A1
		DI Ch1 / A2	%IX4.1	BIT	FALSE			DI Ch1 / A2
		DI Ch2 / A3	%IX4.2	BIT	FALSE			DI Ch2 / A3
		DI Ch3 / A4	%IX4.3	BIT	FALSE			DI Ch3 / A4
		DI Ch4 / A5	%IX4.4	BIT	FALSE			DI Ch4 / A5
		DI Ch5 / A6	%IX4.5	BIT	FALSE			DI Ch5 / A6
		DI Ch6 / A7	%IX4.6	BIT	FALSE			DI Ch6 / A7
		DI Ch7 / A8	%IX4.7	BIT	FALSE			DI Ch7 / A8
		DI Ch8 / B1	%IX5.0	BIT	FALSE			DI Ch8 / B1
		DI Ch9 / B2	%IX5.1	BIT	FALSE			DI Ch9 / B2
		DI Ch10 / B3	%IX5.2	BIT	FALSE			DI Ch10 / B3
		DI Ch11 / B4	%IX5.3	BIT	FALSE			DI Ch11 / B4
		DI Ch12 / B5	%IX5.4	BIT	FALSE			DI Ch12 / B5
		DI Ch13 / B6	%IX5.5	BIT	FALSE			DI Ch13 / B6
		DI Ch14 / B7	%IX5.6	BIT	FALSE			DI Ch14 / B7
		DI Ch15 / B8	%IX5.7	BIT	FALSE			DI Ch15 / B8
		DI WORD VALUE	%IW3	UINT	1			DI WORD VALUE
		DI Ch0 / A1 Count	%ID2	UDINT	331			DI Ch0 / A1 Count
		DI Ch1 / A2 Count	%ID3	UDINT	0			DI Ch1 / A2 Count
		DI Ch2 / A3 Count	%ID4	UDINT	0			DI Ch2 / A3 Count
		DI Ch3 / A4 Count	%ID5	UDINT	0			DI Ch3 / A4 Count
		DI Ch4 / A5 Count	%ID6	UDINT	0			DI Ch4 / A5 Count
		DI Ch5 / A6 Count	%ID7	UDINT	0			DI Ch5 / A6 Count
		DI Ch6 / A7 Count	%ID8	UDINT	0			DI Ch6 / A7 Count
		DI Ch7 / A8 Count	%ID9	UDINT	0			DI Ch7 / A8 Count

Figure 4-1-20

➢ As shown in Figures 4-1-21 and 4-1-22, writing a value of "1" to the Clear bit of the corresponding channel can clear the count value of the corresponding channel in the input data.



Variable	Mapping	Channel	Address	Type	Current Value
		DI Ch0 Clear bit	%QX2.0	BIT	TRUE
		DI Ch1 Clear bit	%QX2.1	BIT	FALSE
		DI Ch2 Clear bit	%QX2.2	BIT	FALSE
		DI Ch3 Clear bit	%QX2.3	BIT	FALSE

Figure 4-1-twenty oneClear bit enable

		DI Ch0 / A1 Count	%ID2	UDINT	0

Figure 4-1-twenty twoCount value

DF50-M-32DO-P digital output module

- Please refer to the module wiring diagramChapter 3, Section 22.2When the EC bus exits the OP state, this type of module can set the output state of the module. The setting method is shown in the figure below. It can be set to: all outputs are closed, use alternative value output, and keep the last value.

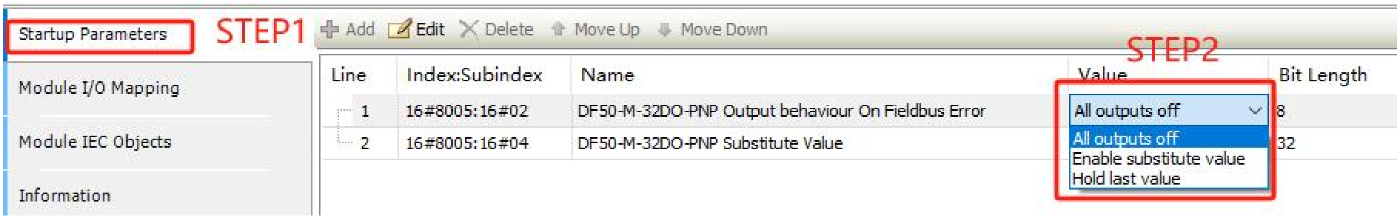


Figure 4-1-twenty three

- When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.

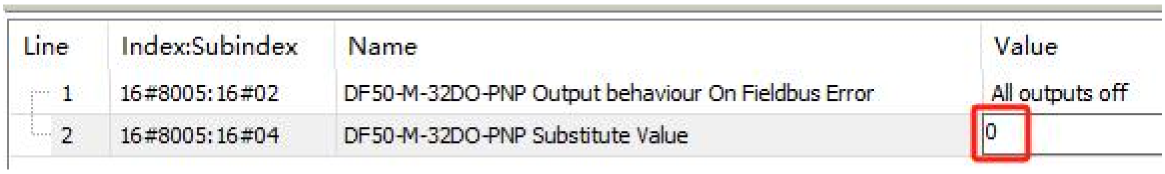


Figure 4-1-twenty four

- As shown in the figure below, after modifying each channel's prepared value, press Ctrl+F7 to modify each channel's output individually.

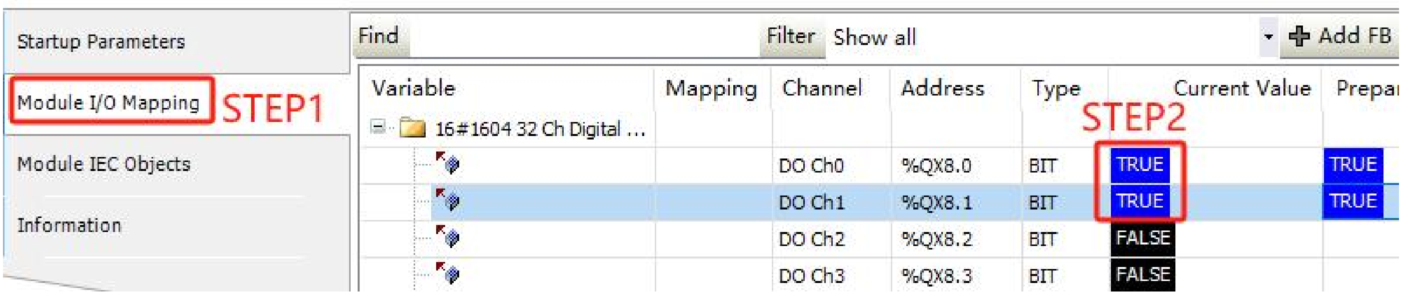


Figure 4-1-25

DF50-M-32DO-N digital output module

- Please refer to the module wiring diagramChapter 3, Section 21.2When the EC bus exits the OP state, this type of module can set the output state of the module. The setting method is shown in the figure below. It can be set to: all outputs are closed, use alternative value output, and keep the last value.

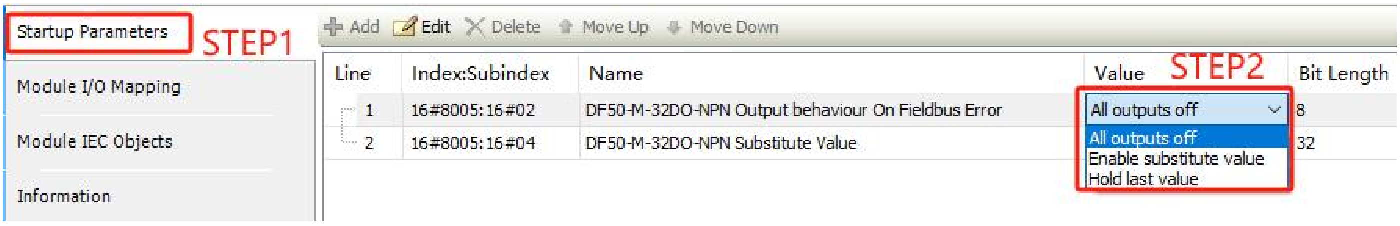


Figure 4-1-26

- When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.

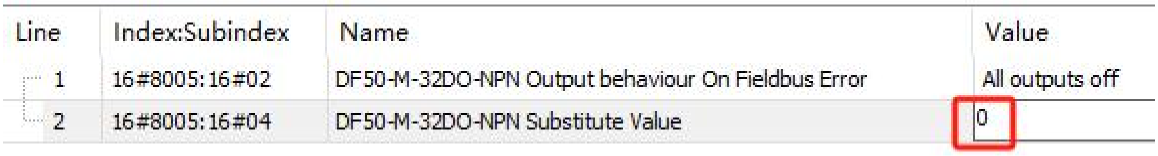


Figure 4-1-27

- As shown in the figure below, after modifying each channel's prepared value, press Ctrl+F7 to modify each channel's output individually.

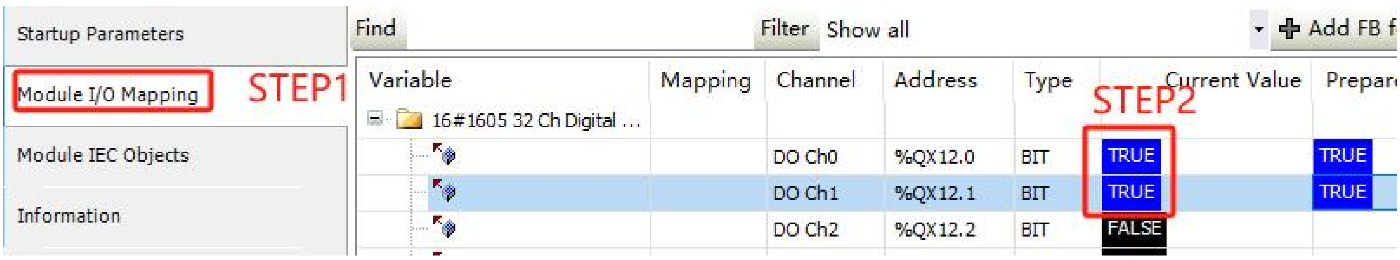


Figure 4-1-28

DF50-M-32DI-P/N digital input module

- Please refer to the wiring diagramChapter 3, Section 25.2This type of module can be configured for input filtering. The configuration method is shown in the figure below. The configurable range is 0~255ms.

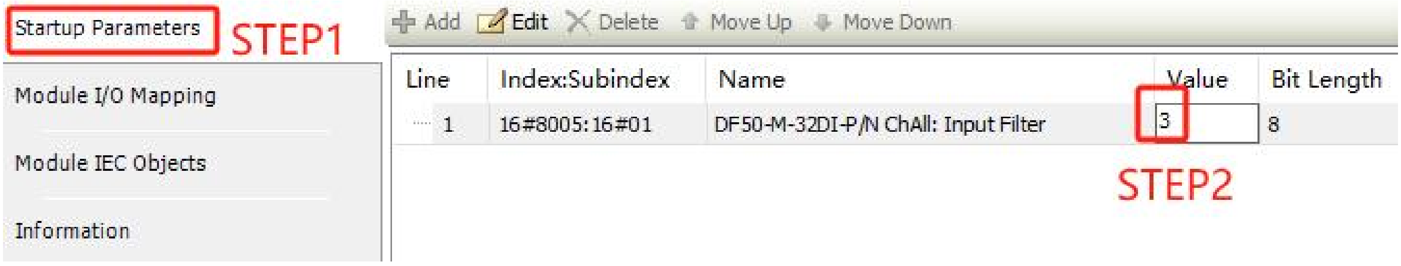


Figure 4-1-29

- As shown in the figure below, when a valid signal is input to the module, the corresponding channel value will become "1".

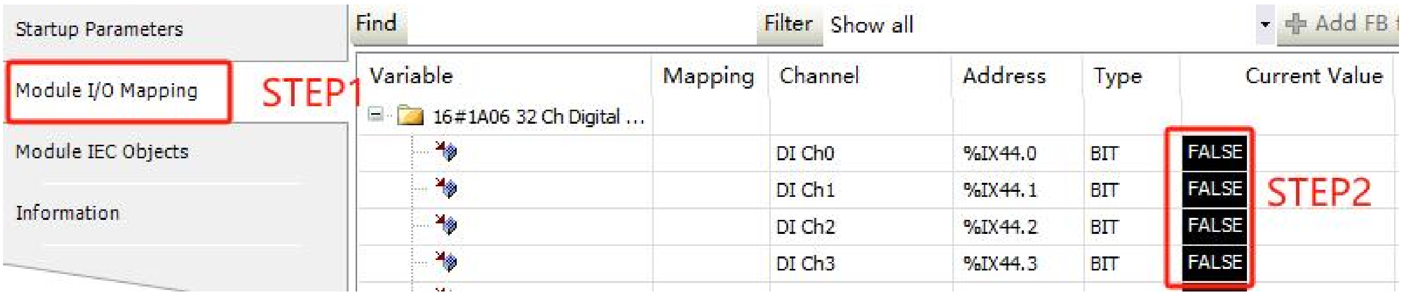


Figure 4-1-30

DF50-M--16DI-16DO-P digital input and output module

- Please refer to the module wiring diagramChapter 3, Section 24.2When the EC bus exits the OP state, this type of module can set the output state of the module. The setting method is shown in the figure below. It can be set to: all outputs are closed, use alternative value output, and keep the last value.

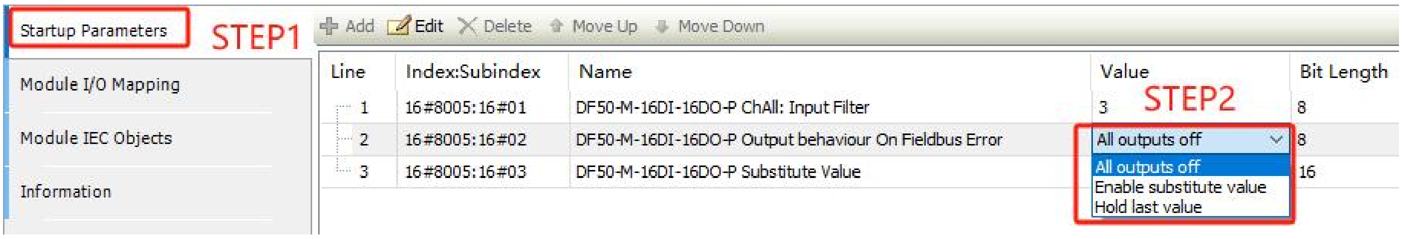


Figure 4-1-31

- When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.

Line	Index:Subindex	Name	Value
1	16#8005:16#01	DF50-M-16DI-16DO-P ChAll: Input Filter	3
2	16#8005:16#02	DF50-M-16DI-16DO-P Output behaviour On Fieldbus Error	All outputs off
3	16#8005:16#03	DF50-M-16DI-16DO-P Substitute Value	0

Figure 4-1-32

- This type of module can be configured for input filtering. The configuration method is shown in the figure below. The configurable range is 0~255ms.

Line	Index:Subindex	Name	Value
1	16#8005:16#01	DF50-M-16DI-16DO-P ChAll: Input Filter	3
2	16#8005:16#02	DF50-M-16DI-16DO-P Output behaviour On Fieldbus Error	All outputs off
3	16#8005:16#03	DF50-M-16DI-16DO-P Substitute Value	0

Figure 4-1-33

- As shown in the figure below, when a valid signal is input to the module, the corresponding channel value will become "1".

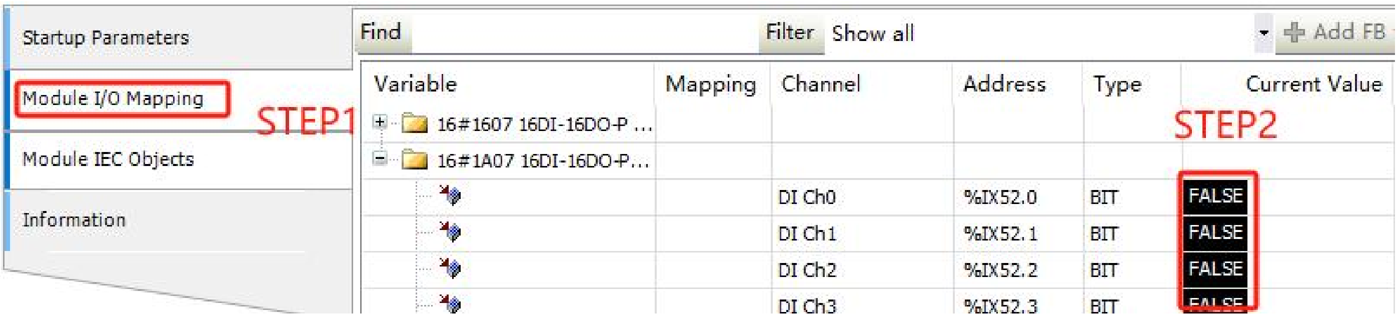


Figure 4-1-34

➢ As shown in the figure below, after modifying each channel's prepared value, press Ctrl+F7 to modify each channel's output individually.

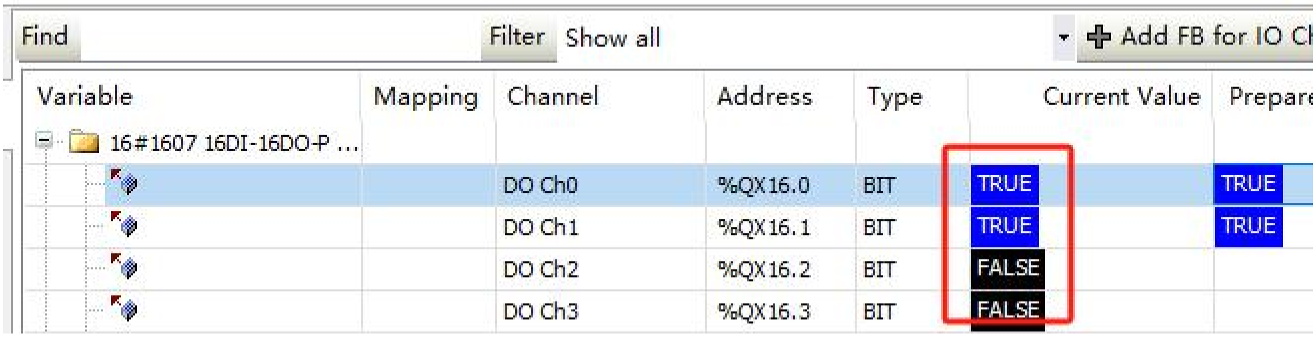


Figure 4-1-35

DF50-M--16DI-16DO-N digital input and output module

- Please refer to the module wiring diagramChapter 3, Section 23.2When the EC bus exits the OP state, this type of module can set the output state of the module. The setting method is shown in the figure below. It can be set to: all outputs are closed, use alternative value output, and keep the last value.

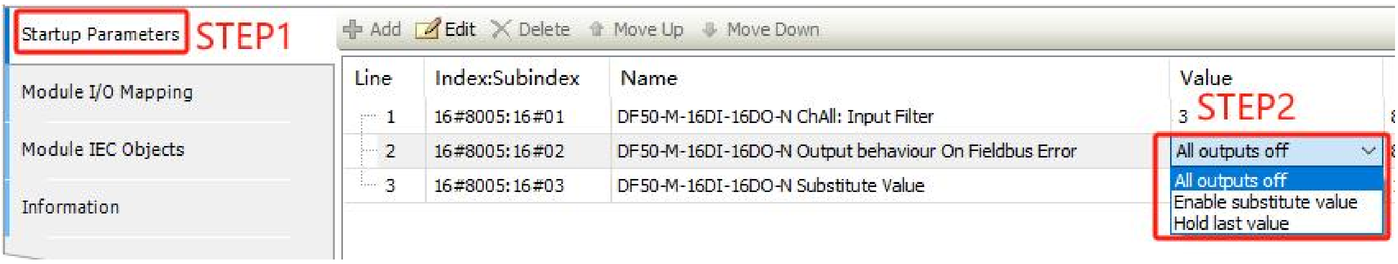


Figure 4-1-36

- When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.

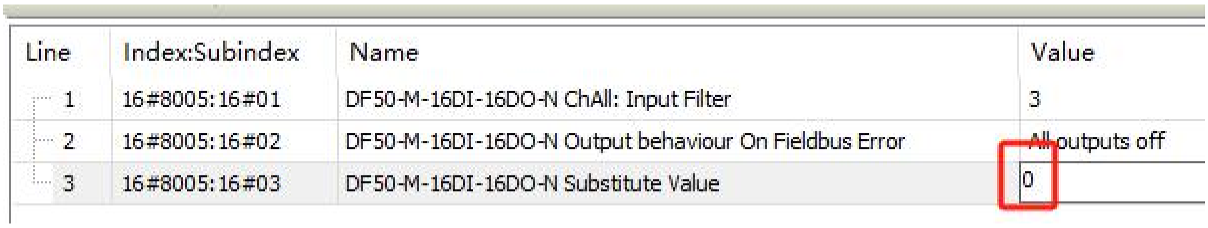


Figure 4-1-37

- This type of module can be configured for input filtering. The configuration method is shown in the figure below. The configurable range is 0~255ms.

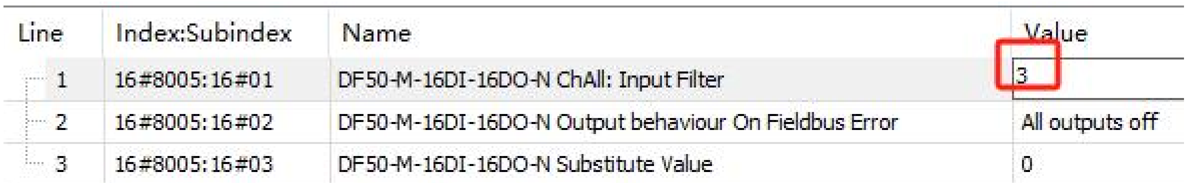


Figure 4-1-38

- As shown in the figure below, when a valid signal is input to the module, the corresponding channel value will become "1".

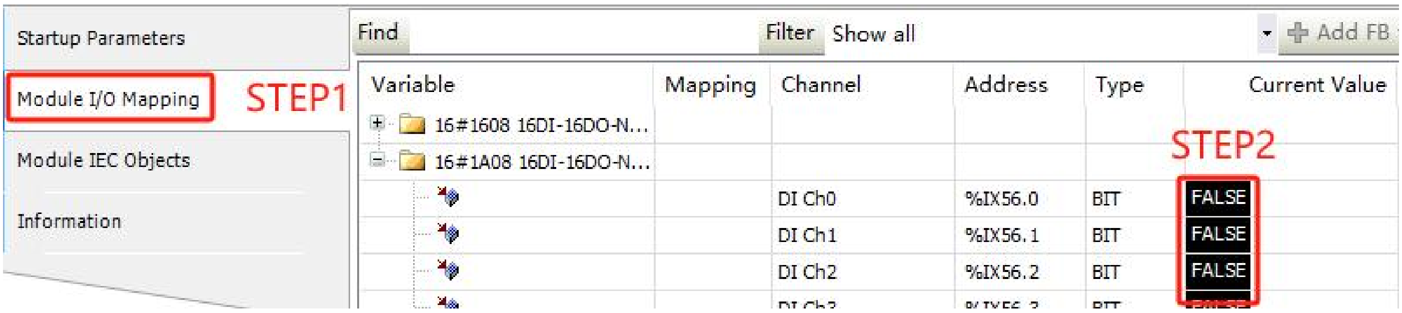


Figure 4-1-39

- As shown in the figure below, after modifying each channel's prepared value, press Ctrl+F7 to modify each channel's output individually.

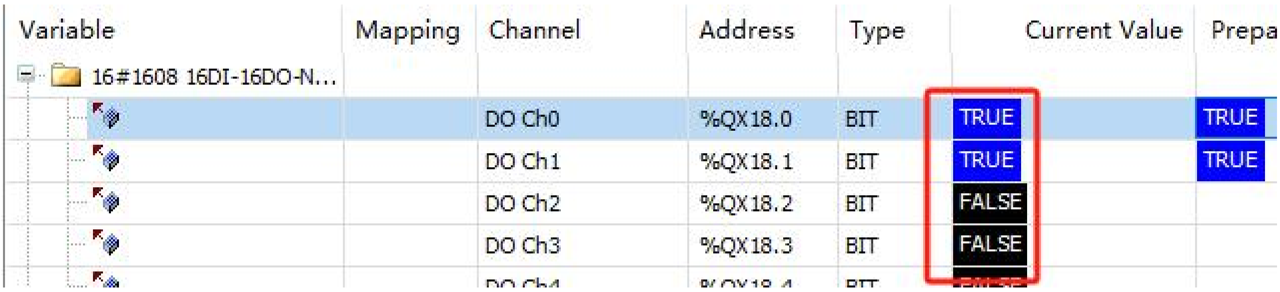


Figure 4-1-40

DF50-M-4DOR relay output module

- Please refer to the module wiring diagramChapter 3, Section 19.2When the EC bus exits the OP state, this type of module can set the output state of the module. The setting method is shown in the figure below. It can be set to: all outputs are closed, use alternative value output, and keep the last value.

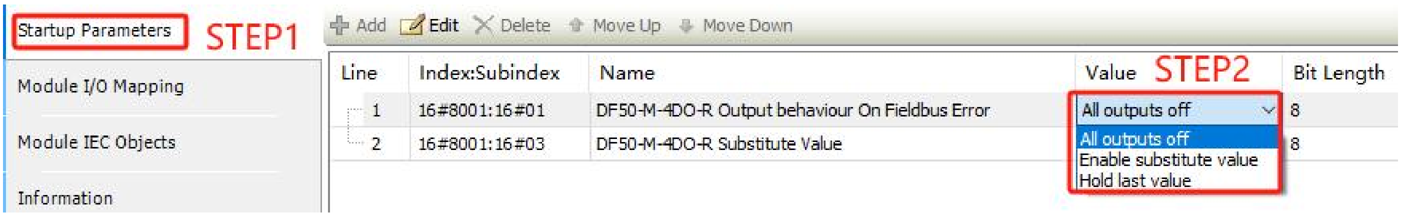


Figure 4-1-41

- When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.

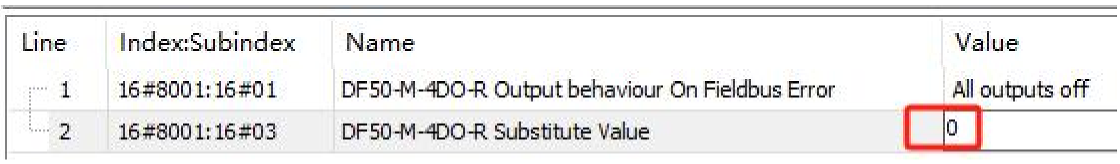


Figure 4-1-42

- As shown in the figure below, after modifying each channel's prepared value, press Ctrl+F7 to modify each channel's output individually.

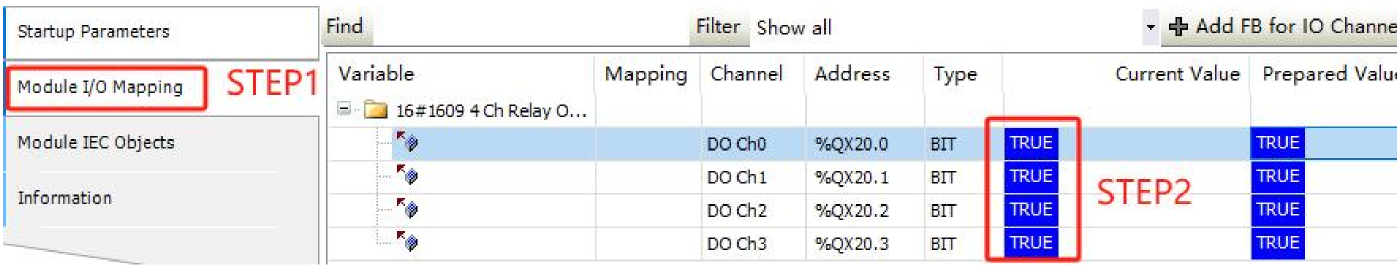


Figure 4-1-43

DF50-M-4DO-P-2A digital output module

- Please refer to the module wiring diagramChapter 3, Section 20.2When the EC bus exits the OP state, this type of module can set the output state of the module. The setting method is shown in the figure below. It can be set to: all outputs are closed, use alternative value output, and keep the last value.

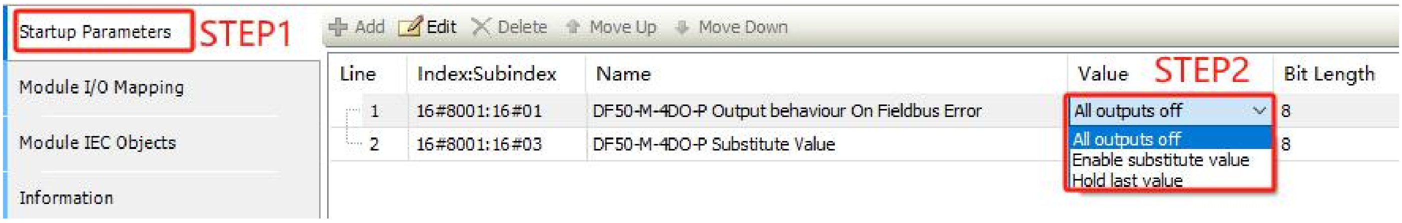


Figure 4-1-44

- When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.

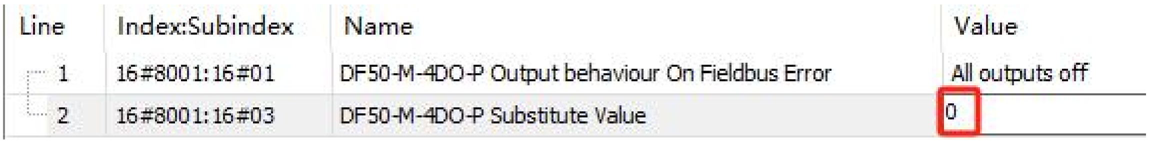


Figure 4-1-45

- As shown in the figure below, after modifying each channel's prepared value, press Ctrl+F7 to modify each channel's output individually.

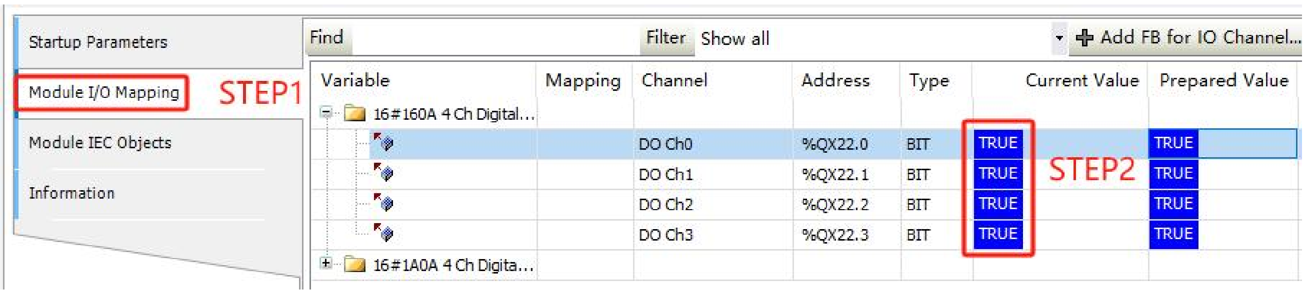


Figure 4-1-46

- As shown in the figure below, it shows whether each channel is overcurrent.

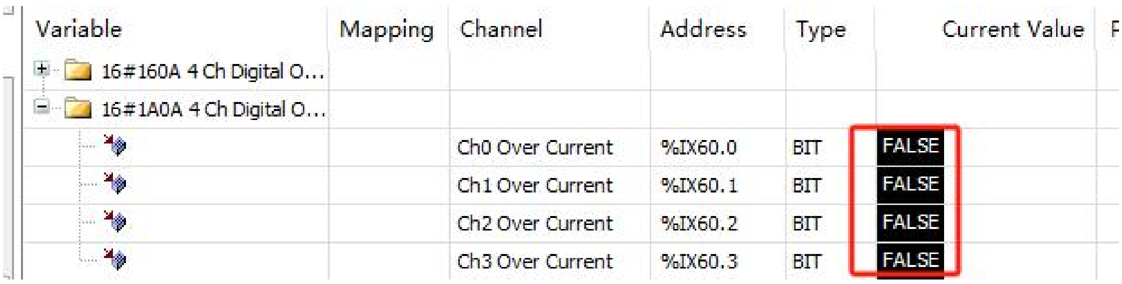


Figure 4-1-47

4.1.3 Analog module usage routine

➢ This example uses the topology of DF50-C-EC + DF50-M-8AO-U-4 + DF50-M-8AO-I-5 + DF50-M-4AO-UI-6 + DF50-M-8AI-U-4 + DF50-M-8AI-I-5 + DF50-M-4AI-UI-6. After scanning the slaves, the following figure is obtained.

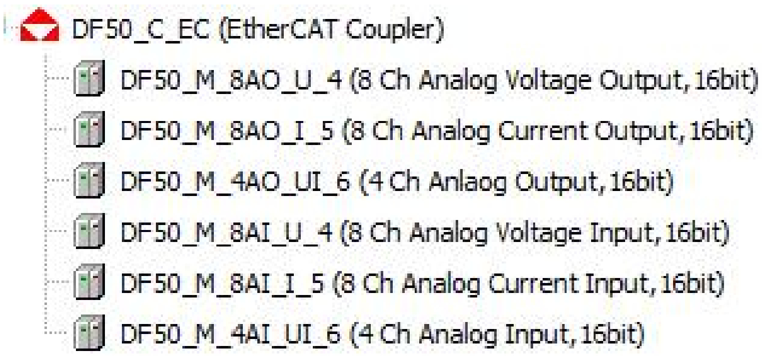


Figure 4-1-48

DF50-M-8AO-U-4 voltage output module

➢ Module wiring diagram see[Chapter 3, Section 9.2]As shown in the figure below, when the EC bus exits the OP state, this type of module can set the output state of the module. The parameters that can be set are: all outputs are closed, alternative value output is enabled, and the last value is maintained.

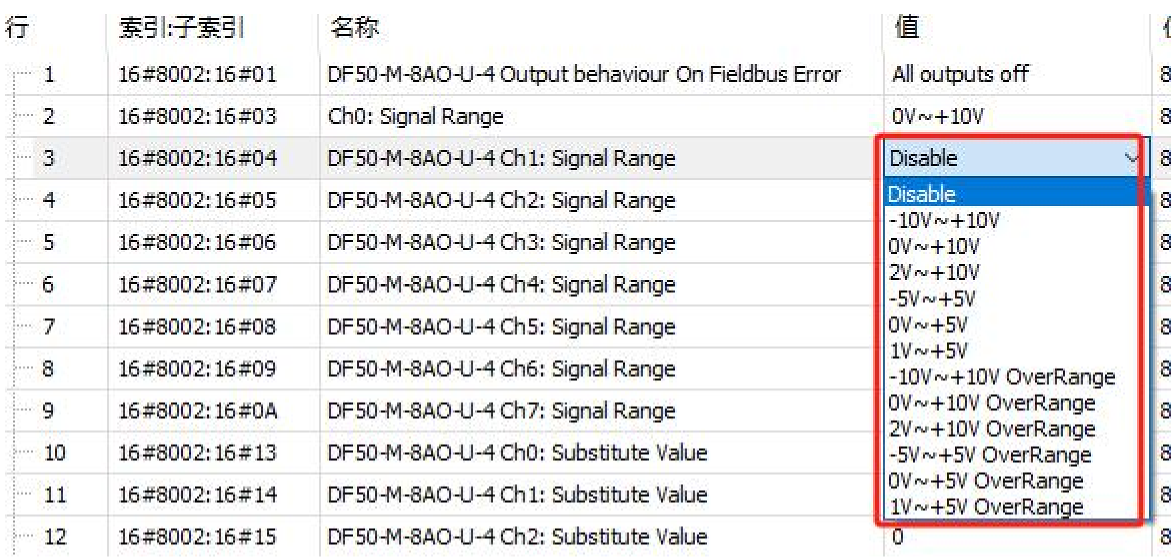
Figure 4-1-49

➢ When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.

行	索引:子索引	名称	值
1	16#8002:16#01	DF50-M-8AO-U-4 Output behaviour On Fieldbus Error	All outputs off
2	16#8002:16#03	Ch0: Signal Range	0V~+10V
3	16#8002:16#04	DF50-M-8AO-U-4 Ch1: Signal Range	Disable
4	16#8002:16#05	DF50-M-8AO-U-4 Ch2: Signal Range	Disable
5	16#8002:16#06	DF50-M-8AO-U-4 Ch3: Signal Range	Disable
6	16#8002:16#07	DF50-M-8AO-U-4 Ch4: Signal Range	Disable
7	16#8002:16#08	DF50-M-8AO-U-4 Ch5: Signal Range	Disable
8	16#8002:16#09	DF50-M-8AO-U-4 Ch6: Signal Range	Disable
9	16#8002:16#0A	DF50-M-8AO-U-4 Ch7: Signal Range	Disable
10	16#8002:16#13	DF50-M-8AO-U-4 Ch0: Substitute Value	0
11	16#8002:16#14	DF50-M-8AO-U-4 Ch1: Substitute Value	0
12	16#8002:16#15	DF50-M-8AO-U-4 Ch2: Substitute Value	0
13	16#8002:16#16	DF50-M-8AO-U-4 Ch3: Substitute Value	0
14	16#8002:16#17	DF50-M-8AO-U-4 Ch4: Substitute Value	0
15	16#8002:16#18	DF50-M-8AO-U-4 Ch5: Substitute Value	0
16	16#8002:16#19	DF50-M-8AO-U-4 Ch6: Substitute Value	0
17	16#8002:16#1A	DF50-M-8AO-U-4 Ch7: Substitute Value	0

Figure 4-1-50

- As shown in the figure below, you can set the output signal range of each channel. Note that the signal range is Disable by default. You must select a signal range when adding a module.



行	索引:子索引	名称	值	
1	16#8002:16#01	DF50-M-8AO-U-4 Output behaviour On Fieldbus Error	All outputs off	8
2	16#8002:16#03	Ch0: Signal Range	0V~+10V	8
3	16#8002:16#04	DF50-M-8AO-U-4 Ch1: Signal Range	Disable	8
4	16#8002:16#05	DF50-M-8AO-U-4 Ch2: Signal Range		8
5	16#8002:16#06	DF50-M-8AO-U-4 Ch3: Signal Range		8
6	16#8002:16#07	DF50-M-8AO-U-4 Ch4: Signal Range		8
7	16#8002:16#08	DF50-M-8AO-U-4 Ch5: Signal Range		8
8	16#8002:16#09	DF50-M-8AO-U-4 Ch6: Signal Range		8
9	16#8002:16#0A	DF50-M-8AO-U-4 Ch7: Signal Range		8
10	16#8002:16#13	DF50-M-8AO-U-4 Ch0: Substitute Value		8
11	16#8002:16#14	DF50-M-8AO-U-4 Ch1: Substitute Value		8
12	16#8002:16#15	DF50-M-8AO-U-4 Ch2: Substitute Value	0	8

Figure 4-1-51

- After setting the output signal range of channel 0 to 0~10V. As shown in the figure below, write "32767" to the channel 0 preparation value and press Ctrl+F7. The multimeter can measure that the output voltage of this channel is 10V. See the conversion relationship[Chapter 3, Section 9.4].

Figure 4-1-52

DF50-M-8AO-I-5 Current Output Module

- ➢ Module wiring diagram see[Chapter 3, Section 10.2]As shown in the figure below, when the EC bus exits the OP state, this type of module can set the output state of the module. The parameters that can be set are: all outputs are closed, alternative value output is enabled, and the last value is maintained.

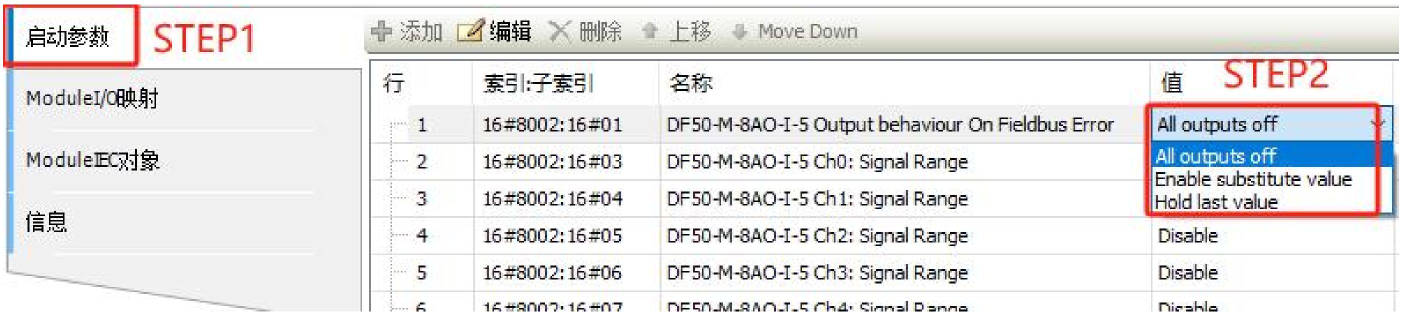


Figure 4-1-53

- ➢ When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.

行	索引:子索引	名称	值
1	16#8002:16#01	DF50-M-8AO-I-5 Output behaviour On Fieldbus Error	All outputs off
2	16#8002:16#03	DF50-M-8AO-I-5 Ch0: Signal Range	Disable
3	16#8002:16#04	DF50-M-8AO-I-5 Ch1: Signal Range	Disable
4	16#8002:16#05	DF50-M-8AO-I-5 Ch2: Signal Range	Disable
5	16#8002:16#06	DF50-M-8AO-I-5 Ch3: Signal Range	Disable
6	16#8002:16#07	DF50-M-8AO-I-5 Ch4: Signal Range	Disable
7	16#8002:16#08	DF50-M-8AO-I-5 Ch5: Signal Range	Disable
8	16#8002:16#09	DF50-M-8AO-I-5 Ch6: Signal Range	Disable
9	16#8002:16#0A	DF50-M-8AO-I-5 Ch7: Signal Range	Disable
10	16#8002:16#13	DF50-M-8AO-I-5 Ch0: Substitute Value	0
11	16#8002:16#14	DF50-M-8AO-I-5 Ch1: Substitute Value	0
12	16#8002:16#15	DF50-M-8AO-I-5 Ch2: Substitute Value	0
13	16#8002:16#16	DF50-M-8AO-I-5 Ch3: Substitute Value	0
14	16#8002:16#17	DF50-M-8AO-I-5 Ch4: Substitute Value	0
15	16#8002:16#18	DF50-M-8AO-I-5 Ch5: Substitute Value	0
16	16#8002:16#19	DF50-M-8AO-I-5 Ch6: Substitute Value	0
17	16#8002:16#1A	DF50-M-8AO-I-5 Ch7: Substitute Value	0

Figure 4-1-54

➢ As shown in the figure below, you can set the output signal range of each channel. Note that the signal range is Disable by default. You must select a signal range when adding a module.

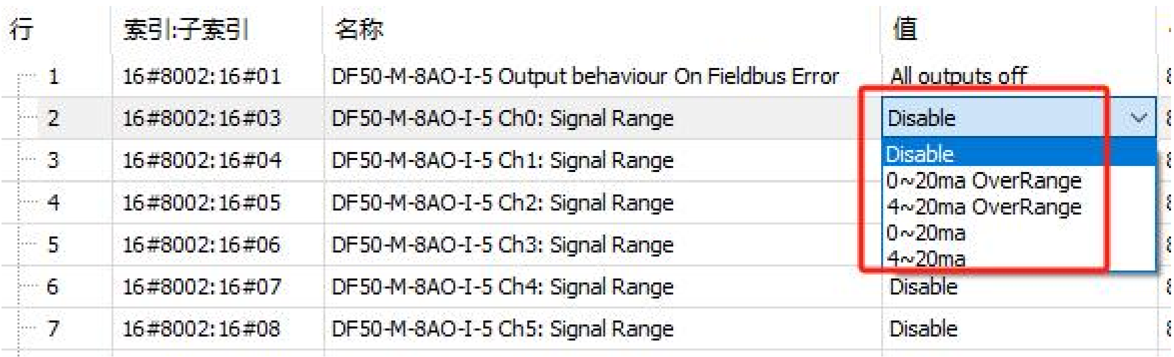


Figure 4-1-55

➢ After setting the output signal range of channel 0 to 0~20ma. As shown in the figure below, write "32767" to the channel 0 preparation value and press Ctrl+F7. The multimeter can measure the output current of this channel to be 20ma. See the conversion relationshipChapter 3, Section 10.4.


启动参数
ModuleI/O映射
ModuleIEC对象
信息
查找
过滤器
显示所有
变量
映射
通道
地址
类型
当前值
预备值
Ch0: Value
%QW9
INT
32767
32767
Ch1: Value
%QW10
INT
0
Ch2: Value
%QW11
INT
0
Ch3: Value
%QW12
INT
0
Ch4: Value
%QW13
INT
0

Figure 4-1-56

DF50-M-4AO-UI-6 Voltage/Current Output Module

➢ Module wiring diagram see[Chapter 3, Section 8.2]As shown in the figure below, when the EC bus exits the OP state, this type of module can set the output state of the module. The parameters that can be set are: all outputs are closed, alternative value output is enabled, and the last value is maintained.

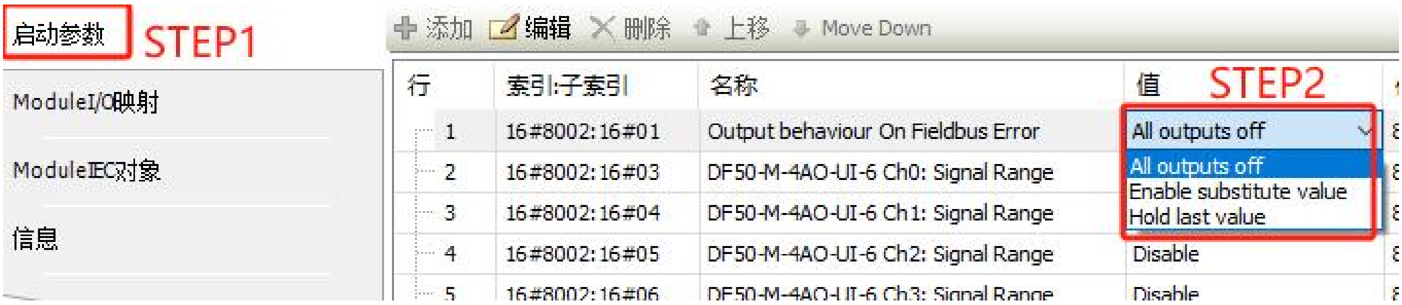


Figure 4-1-57

➢ When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.

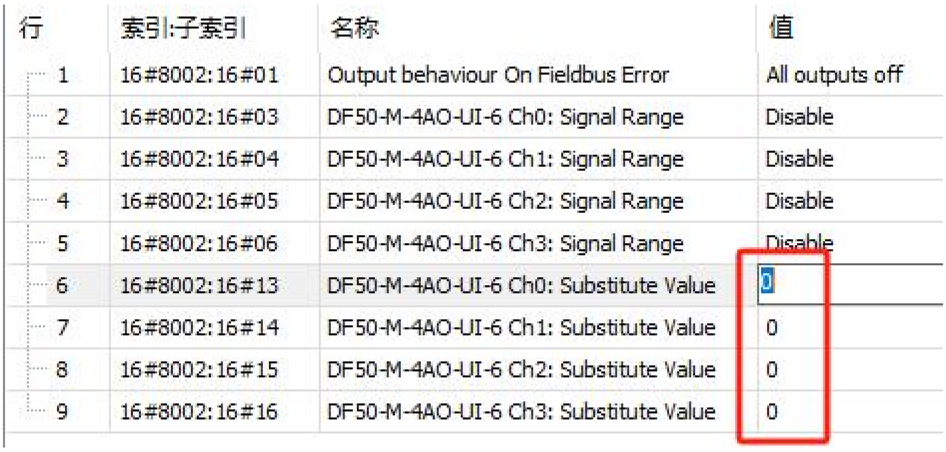


Figure 4-1-58

➢ As shown in the figure below, you can set the output signal range of each channel.Note that the default signal range is Disable. You must select a signal range when adding a module..

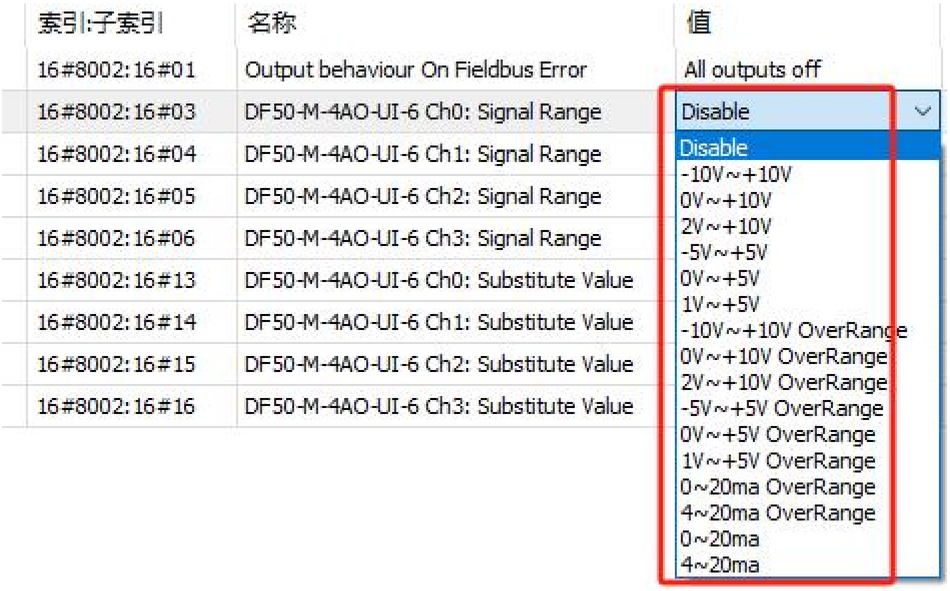


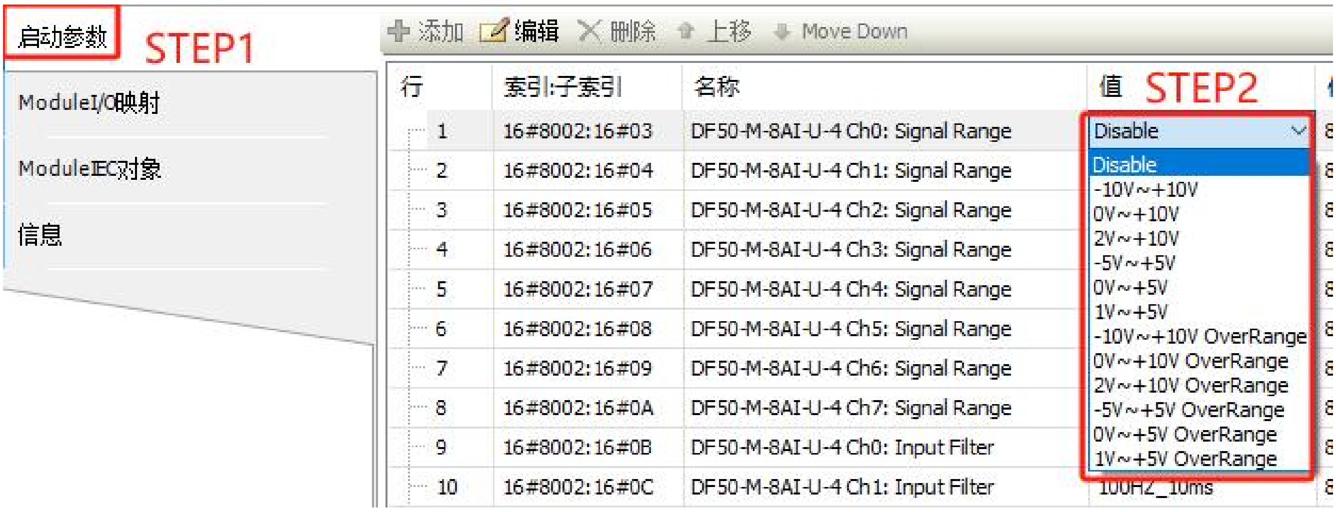
Figure 4-1-59

➢ After setting the output signal range of channel 0 to 0~10V and the output range of channel 1 to 0~20ma. As shown in the figure below, write "32767" to the prepared values of channel 0 and channel 1 and press Ctrl+F7. The multimeter can measure that the output voltage of channel 0 is 10V and the output current of channel 1 is 20ma. See the conversion relationshipChapter 3, Section 8.4.

Figure 4-1-60

DF50-M-8AI-U-4 Voltage Input Module

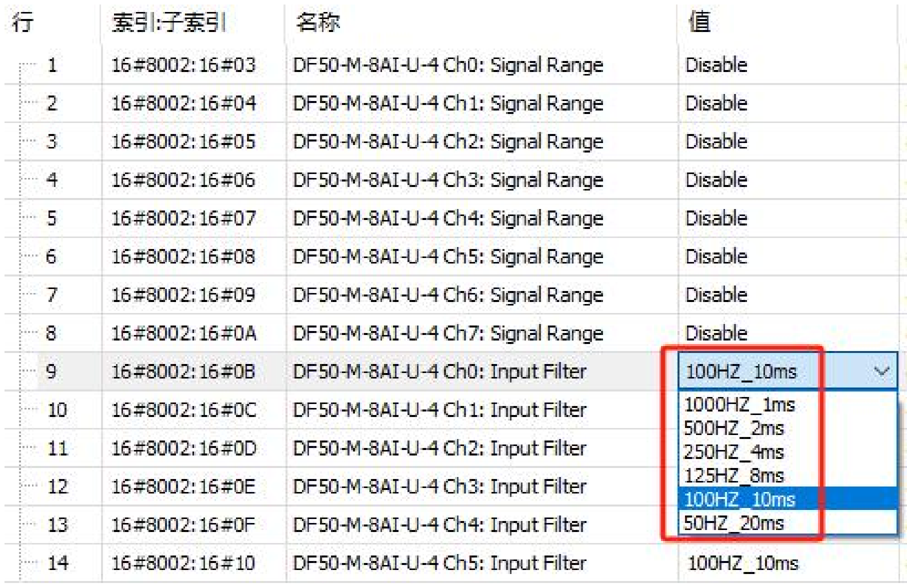
➢ Module wiring diagram see Chapter 3, Section 7.2As shown in the figure below, you can set the sampling signal range of each channel. Note that the default signal range is Disable. You must select a signal range when adding a module..



行	索引:子索引	名称	值
1	16#8002:16#03	DF50-M-8AI-U-4 Ch0: Signal Range	Disable
2	16#8002:16#04	DF50-M-8AI-U-4 Ch1: Signal Range	
3	16#8002:16#05	DF50-M-8AI-U-4 Ch2: Signal Range	
4	16#8002:16#06	DF50-M-8AI-U-4 Ch3: Signal Range	
5	16#8002:16#07	DF50-M-8AI-U-4 Ch4: Signal Range	
6	16#8002:16#08	DF50-M-8AI-U-4 Ch5: Signal Range	
7	16#8002:16#09	DF50-M-8AI-U-4 Ch6: Signal Range	
8	16#8002:16#0A	DF50-M-8AI-U-4 Ch7: Signal Range	
9	16#8002:16#0B	DF50-M-8AI-U-4 Ch0: Input Filter	
10	16#8002:16#0C	DF50-M-8AI-U-4 Ch1: Input Filter	100HZ_10ms

Figure 4-1-61

➢ As shown in the figure below, the input filter parameters can be configured, the default is 100HZ_10ms.



行	索引:子索引	名称	值
1	16#8002:16#03	DF50-M-8AI-U-4 Ch0: Signal Range	Disable
2	16#8002:16#04	DF50-M-8AI-U-4 Ch1: Signal Range	Disable
3	16#8002:16#05	DF50-M-8AI-U-4 Ch2: Signal Range	Disable
4	16#8002:16#06	DF50-M-8AI-U-4 Ch3: Signal Range	Disable
5	16#8002:16#07	DF50-M-8AI-U-4 Ch4: Signal Range	Disable
6	16#8002:16#08	DF50-M-8AI-U-4 Ch5: Signal Range	Disable
7	16#8002:16#09	DF50-M-8AI-U-4 Ch6: Signal Range	Disable
8	16#8002:16#0A	DF50-M-8AI-U-4 Ch7: Signal Range	Disable
9	16#8002:16#0B	DF50-M-8AI-U-4 Ch0: Input Filter	100HZ_10ms
10	16#8002:16#0C	DF50-M-8AI-U-4 Ch1: Input Filter	
11	16#8002:16#0D	DF50-M-8AI-U-4 Ch2: Input Filter	
12	16#8002:16#0E	DF50-M-8AI-U-4 Ch3: Input Filter	
13	16#8002:16#0F	DF50-M-8AI-U-4 Ch4: Input Filter	
14	16#8002:16#10	DF50-M-8AI-U-4 Ch5: Input Filter	100HZ_10ms

Figure 4-1-62

➢ After setting the sampling signal range of channel 0 to 0~10V. Input a 10V voltage signal to channel 0. As shown in the figure below, channel 0 displays a value of 32766. By conversion, it is known that the collected voltage is 10V. The conversion relationship is shown in Chapter 3, Section 7.4.

Figure 4-1-63

DF50-M-8AI-I-5 Current Input Module

- ➢ Module wiring diagram see[Chapter 3, Section 6.2]As shown in the figure below, you can set the sampling signal range of each channel.Note that the default signal range is Disable. You must select a signal range when adding a module..

Figure 4-1-64

- ➢ As shown in the figure below, the input filter parameters can be configured, the default is 100HZ_10ms.

Figure 4-1-65

- After setting the sampling signal range of channel 0 to 0~20ma, input a 10ma current signal to channel 0. As shown in the figure below, channel 0 displays a value of 16401. By conversion, it is known that the collected current is 10ma. The conversion relationship is shown inChapter 3, Section 6.4.

Figure 4-1-66

DF50-M-4AI-UI-6 Voltage/Current Input Module

- Module wiring diagram seeChapter 3, Section 5.2As shown in the figure below, you can set the sampling signal range of each channel.Note that the default signal range is Disable. You must select a signal range when adding a module..

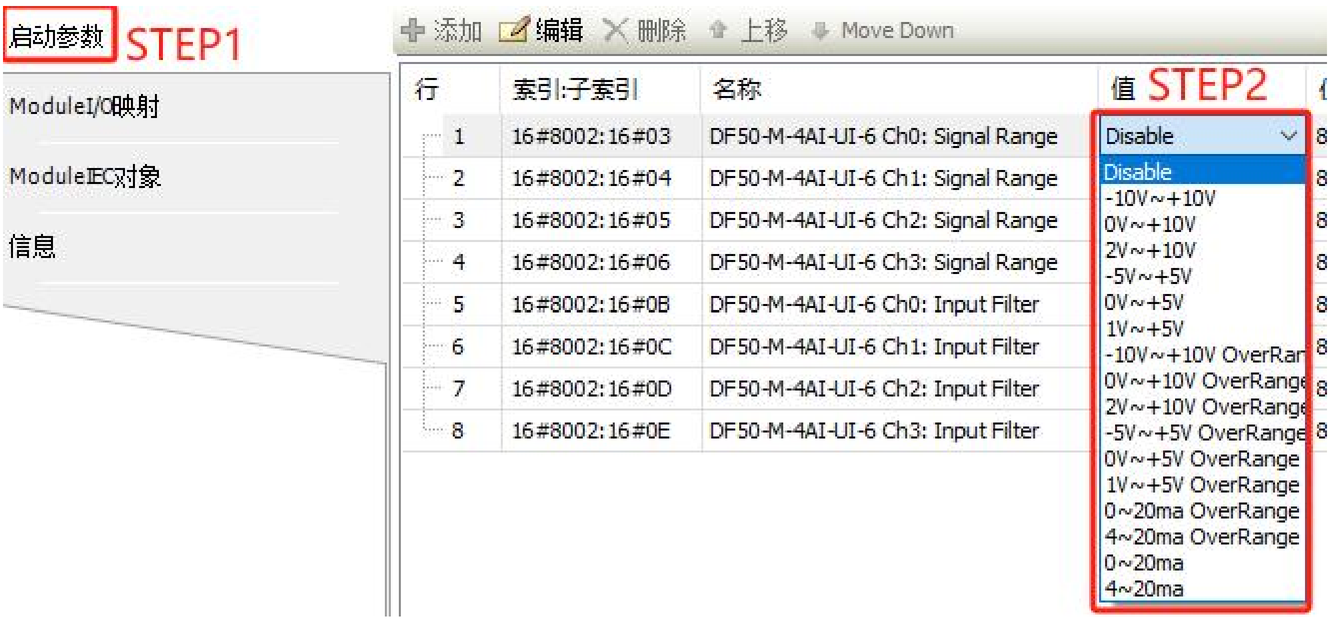


Figure 4-1-67

- As shown in the figure below, the input filter parameters can be configured, the default is 100HZ_10ms.

Figure 4-1-68

➢ After setting the sampling signal range of channel 0 to 0~10V and channel 1 to 0~20ma, input a 10V voltage signal to channel 0 and a 10ma current signal to channel 1. The collected data is shown in the figure below. Channel 0 displays a value of 32766 and channel 1 displays a value of 16392. Through conversion, it is known that channel 0 collects a voltage of 10V and channel 1 collects a current of 10ma. The conversion relationship is shown inChapter 3, Section 5.4.

Figure 4-1-69

4.1.4 Routine use of thermal resistance sensor data acquisition module

➢ This example uses the DF50-C-EC + DF50-M-4RTD-PT topology. After scanning the slaves, the following figure is shown.

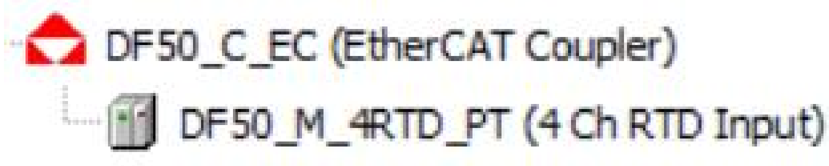


Figure 4-1-70

DF50-M-4RTD-PT Thermal Resistance Measurement Module

➢ Module wiring diagram see[Chapter 3, Section 11.2]The module supports multiple sensor types. The method for selecting the sensor type is shown in the figure below.

Figure 4-1-71

➢ As shown in the figure below, the input filter parameters can be configured, and the system default is 5Hz_200ms.

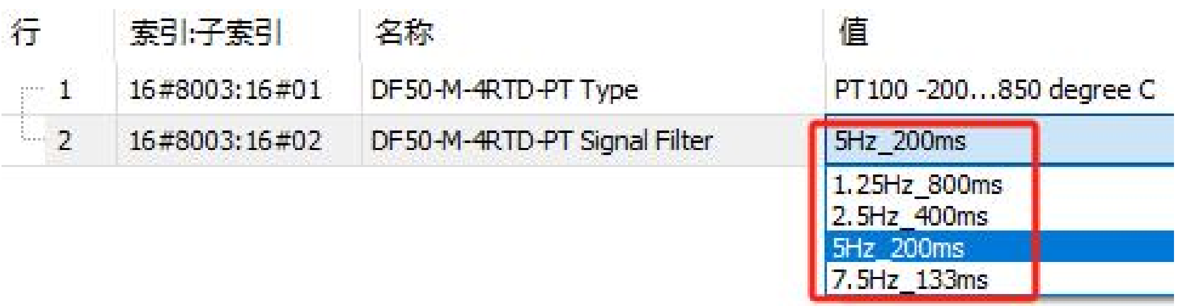


Figure 4-1-72

➢ DF50_M_4RTD_PT supports PT100 type sensors by default. The first channel is connected to the

PT100 sensor, and the other channels are not connected to sensors. As shown in the figure below, the reading of the first channel is 238, representing 23.8℃. The other channels are not connected to sensors, and the reading is -32768, indicating a disconnection. The conversion method is shown in Chapter 3, Section 11.4.

变量	映射	通道	地址	类型	当前值
		RTD Input CH0	%IW2	INT	238
		RTD Input CH1	%IW3	INT	-32768
		RTD Input CH2	%IW4	INT	-32768
		RTD Input CH3	%IW5	INT	-32768

Figure 4-1-73

4.1.5 Thermocouple temperature data acquisition module usage routine

- This example uses the DF50-C-EC + DF50-M-8TC topology. After scanning the slaves, the following figure is shown.

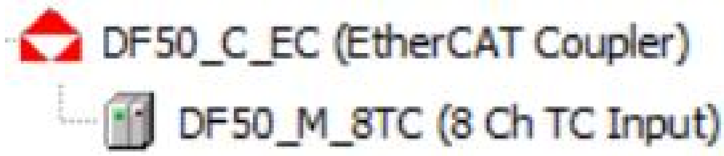


Figure 4-1-74

DF50-M-8TC Thermocouple Measurement Module

- Module wiring diagram seeChapter 3, Section 12.2For process data definition, please refer toChapter 3, Section 12.4As shown in the figure below, you can configure the acquisition sensor type. The default is K-type thermocouple.

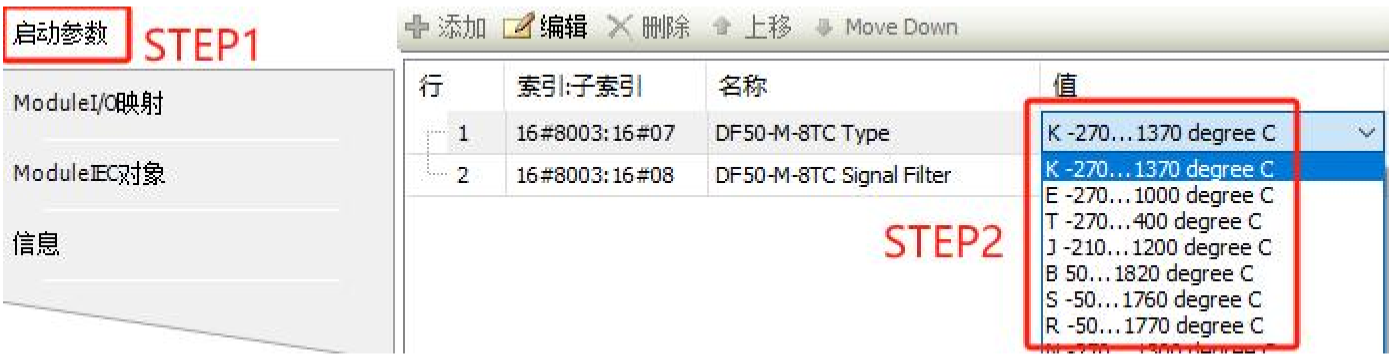


Figure 4-1-75

- As shown in the figure below, the module signal filter configuration can be performed. The default is 225ms.

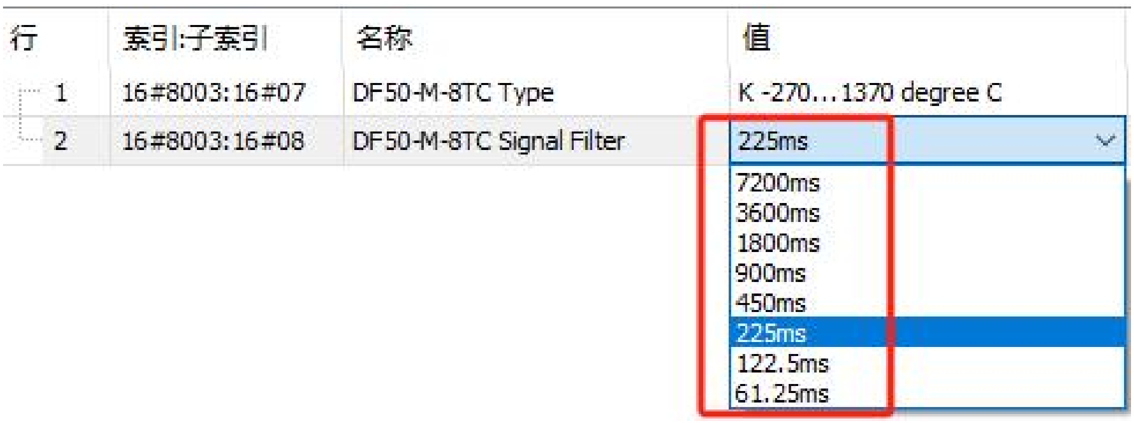
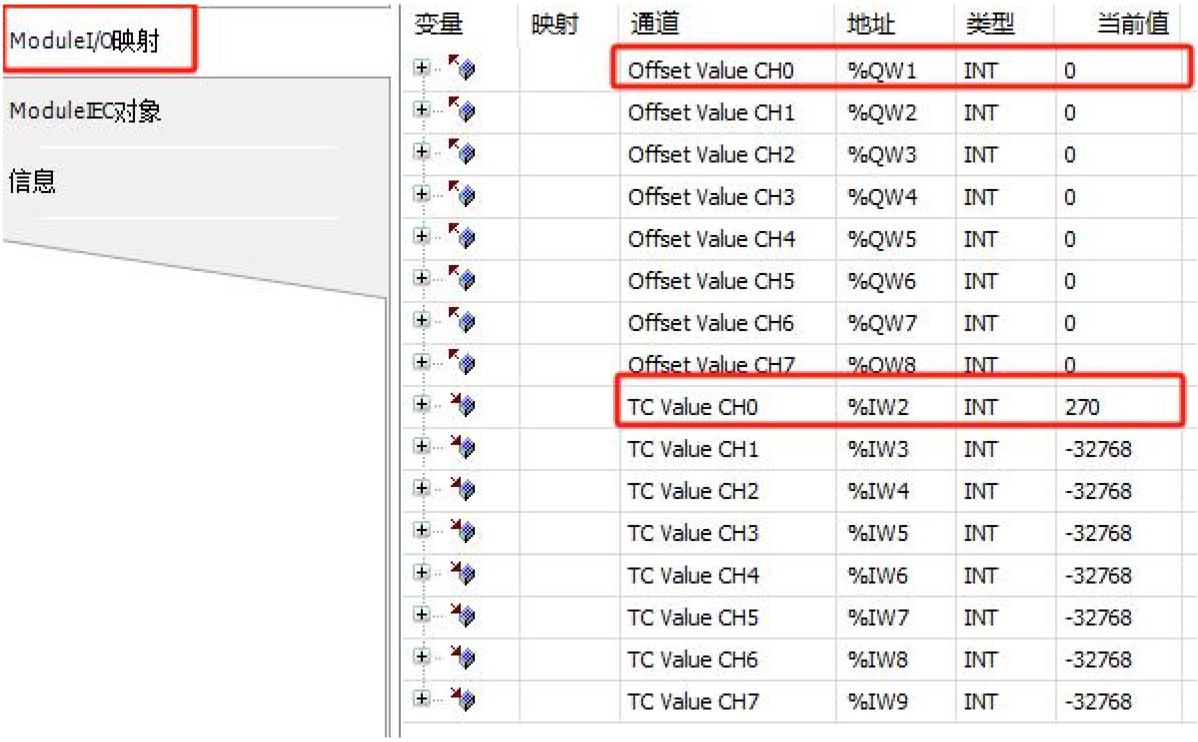


Figure 4-1-76

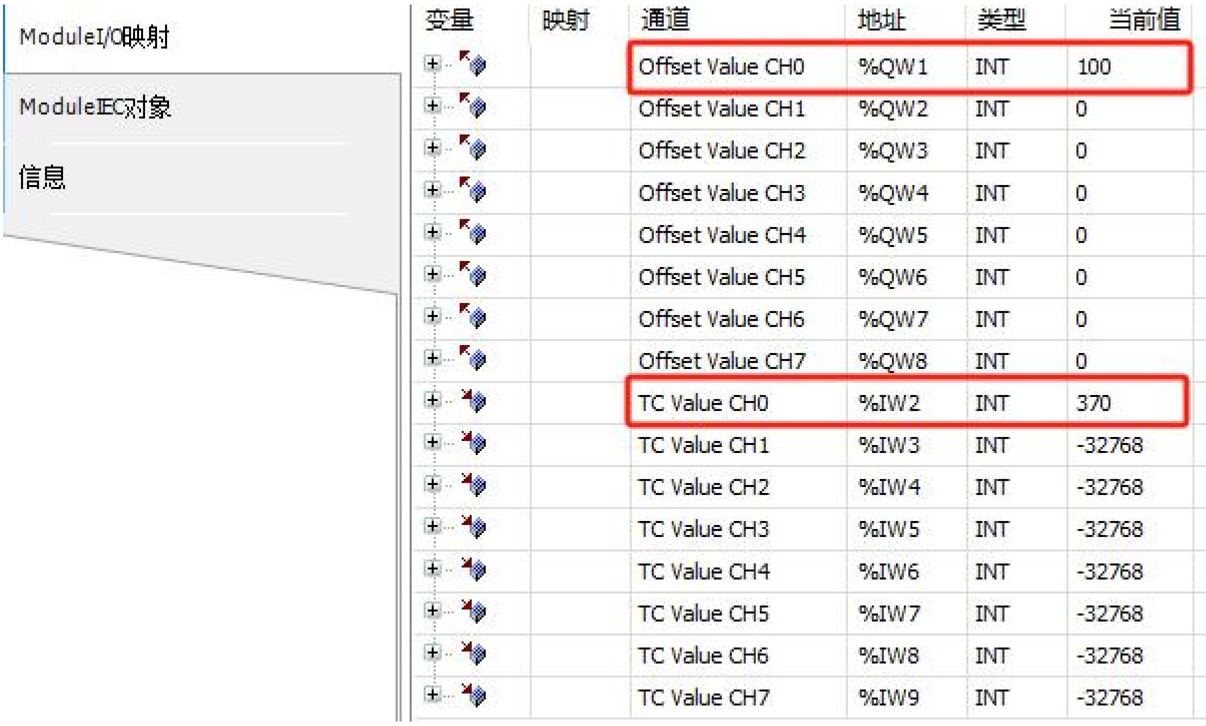
- DF50-M-8TC supports K-type thermocouples by default. As shown in the figure below, the first channel is connected to a K-type thermocouple without compensation, and other channels are not connected to sensors. The temperature data is displayed as shown in the figure. The first channel reading is 270, representing 27.0℃. Other channels are not connected to sensors, and the reading is -32768, indicating a disconnection.



变量	映射	通道	地址	类型	当前值
		Offset Value CH0	%QW1	INT	0
		Offset Value CH1	%QW2	INT	0
		Offset Value CH2	%QW3	INT	0
		Offset Value CH3	%QW4	INT	0
		Offset Value CH4	%QW5	INT	0
		Offset Value CH5	%QW6	INT	0
		Offset Value CH6	%QW7	INT	0
		Offset Value CH7	%QW8	INT	0
		TC Value CH0	%IW2	INT	270
		TC Value CH1	%IW3	INT	-32768
		TC Value CH2	%IW4	INT	-32768
		TC Value CH3	%IW5	INT	-32768
		TC Value CH4	%IW6	INT	-32768
		TC Value CH5	%IW7	INT	-32768
		TC Value CH6	%IW8	INT	-32768
		TC Value CH7	%IW9	INT	-32768

Figure 4-1-77

- As shown in the figure below, the same 27℃ signal is input, the temperature of the first channel is compensated by 100, and the temperature is displayed as 370, representing 37.0℃.



变量	映射	通道	地址	类型	当前值
		Offset Value CH0	%QW1	INT	100
		Offset Value CH1	%QW2	INT	0
		Offset Value CH2	%QW3	INT	0
		Offset Value CH3	%QW4	INT	0
		Offset Value CH4	%QW5	INT	0
		Offset Value CH5	%QW6	INT	0
		Offset Value CH6	%QW7	INT	0
		Offset Value CH7	%QW8	INT	0
		TC Value CH0	%IW2	INT	370
		TC Value CH1	%IW3	INT	-32768
		TC Value CH2	%IW4	INT	-32768
		TC Value CH3	%IW5	INT	-32768
		TC Value CH4	%IW6	INT	-32768
		TC Value CH5	%IW7	INT	-32768
		TC Value CH6	%IW8	INT	-32768
		TC Value CH7	%IW9	INT	-32768

Figure 4-1-78

4.1.6 Encoder data acquisition module usage routine

- The encoder pulse counting module has two types: DF50-M-2CNT-PIL-24 and DF50-M-2CNT-PIL-5. The wiring and usage of the two modules are the same. The difference is that the DF50-M-2CNT-PIL-5 is connected to a 5V encoder signal, and the DF50-M-2CNT-PIL-24 is connected to a 24V encoder signal. This document uses the DF50-M-2CNT-PIL-24 module as an example.Chapter 3, Section 13.2.

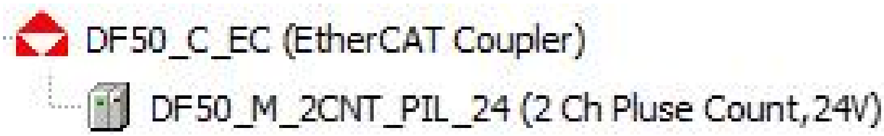


Figure 4-1-79

- DF50-M-2CNT-PIL-24 module features:
- Quadrature encoder A+/A-, B+/B- differential input, 1/2/4 frequency multiplication;
- Electron probe input;
- Linear counter form, ring counter form.
- Three LED indicator outputs. After the module is powered on, PW is always on, indicating that the module is powered on and initialized normally. Different display states of Led2 represent different working states of the module; Led2 flashes when the internal bus of the module is working normally. The external 24V power supply of the module is normal, and the EP light is always on.

➢ The following figure shows the PDO process data of the DF50-M-2CNT-PIL-24 module.When using, set the channel 0 count enable bit (CH0: Count Enable) to 1 to use the channel 0 count function normally.:

通道	地址	类型
Ch0: Count Enable	%QX4.0	BIT
Ch0: Compare Value	%QD2	DINT
Ch1: Count Enable	%QX12.0	BIT
Ch1: Compare Value	%QD4	DINT
Ch0: Counting State	%IX4.0	BIT
Ch0: DI state	%IX4.1	BIT
Ch0: Compare State	%IX4.2	BIT
Ch0: Direction	%IX4.3	BIT
Ch0: Direction	%IX4.4	BIT
Ch0: Count Value	%ID2	DINT
Ch0: LatChValue	%ID3	DINT
Ch1: Counting State	%IX16.0	BIT
Ch1: DI State	%IX16.1	BIT
Ch1: Compare State	%IX16.2	BIT
Ch1: Direction	%IX16.3	BIT
Ch1: Direction	%IX16.4	BIT
Ch1: Count Value	%ID5	DINT
Ch1: LatChValue	%ID6	DINT

Figure 4-1-80

➢ The meaning of process data is as follows:

Table 4.1.4

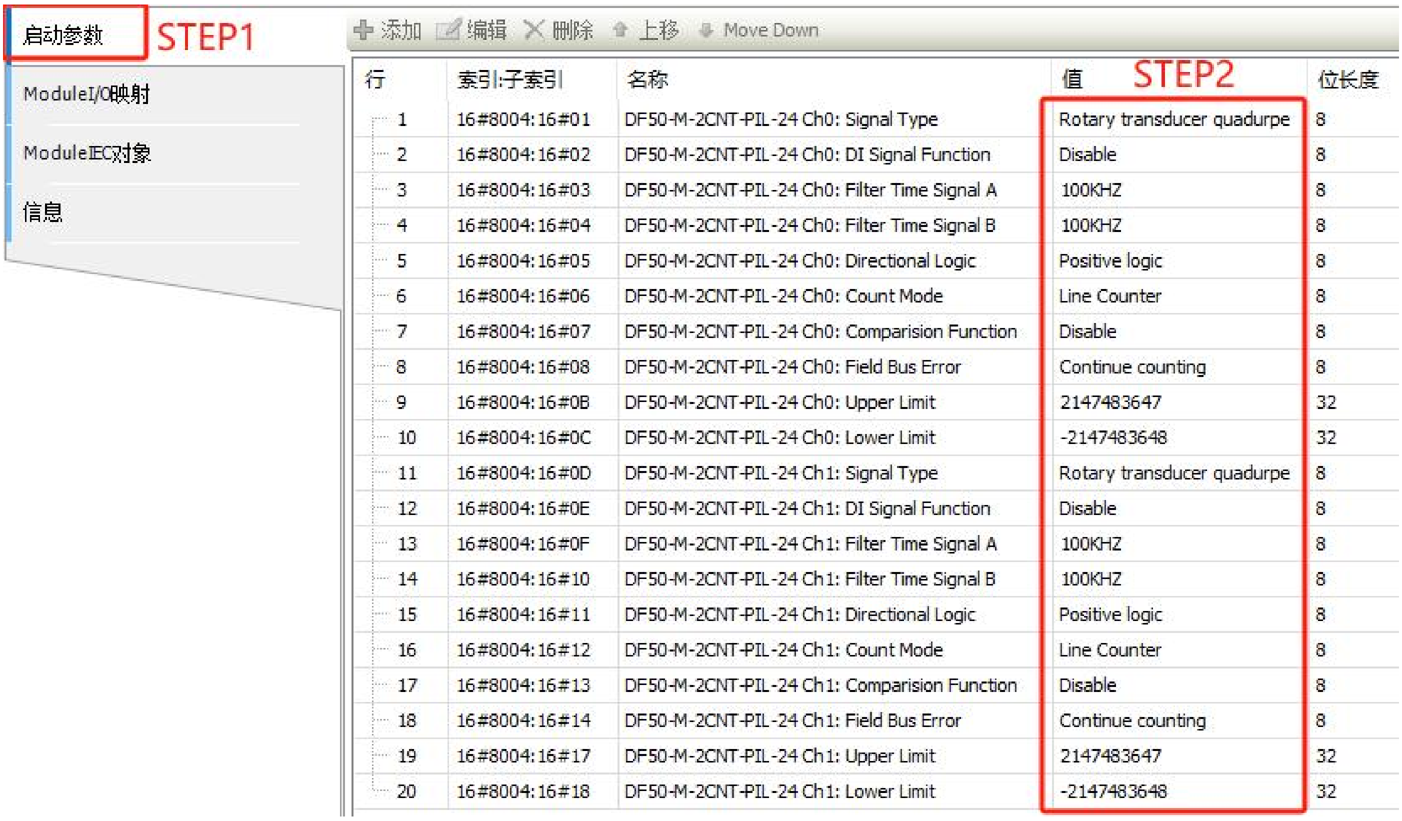
RXPDO			
Name	**Type**	**Size**	**meaning**
Ch0: Count Enable	BOOL	0.1	Channel 0 count enable bit
Ch0: Compare Value	DINT	4.0	Channel 0 comparison value setting
Ch1: Count Enable	BOOL	0.1	Channel 1 count enable bit
Ch1: Compare Value	DINT	4.0	Channel 1 comparison value setting

Table 4.1.5

TXPDO			
Name	**Type**	**Size**	**meaning**
Ch0: Counting State	BOOL	0.1	Channel 0 counting status bit

Ch0: DI state	BOOL	0.1	Channel 0 DI input status
Ch0: Compare State	BOOL	0.1	Channel 0 compare status bit
Ch0: Direction	BIT2	0.2	Channel 0 input signal direction
Ch0: Count Value	DINT	4.0	Channel 0 count value
Ch0: LatChValue	DINT	4.0	Channel 0 latch value
Ch1: Counting State	BOOL	0.1	Channel 0 counting status bit
Ch1: DI state	BOOL	0.1	Channel 0 DI input status
Ch1: Compare State	BOOL	0.1	Channel 0 compare status bit
Ch1: Direction	BIT2	0.2	Channel 0 input signal direction
Ch1: Count Value	DINT	4.0	Channel 0 count value
Ch1: LatChValue	DINT	4.0	Channel 0 latch value

- The configuration data of the DF50-M-2CNT-PIL-24 module can be modified as shown in the figure below. The figure shows the configuration data of channel 0. The configurable content of channel 1 is the same as that of channel 0. They are: signal type configuration (frequency multiplication function is configured here, 4 times frequency multiplication by default), DI signal function configuration, A phase signal filter configuration, B phase signal filter configuration, direction logic configuration, counting mode configuration, comparison function configuration, bus abnormality counting action configuration, cycle mode upper limit value, cycle mode lower limit value. For details, please refer toChapter 3, Section 13.4.

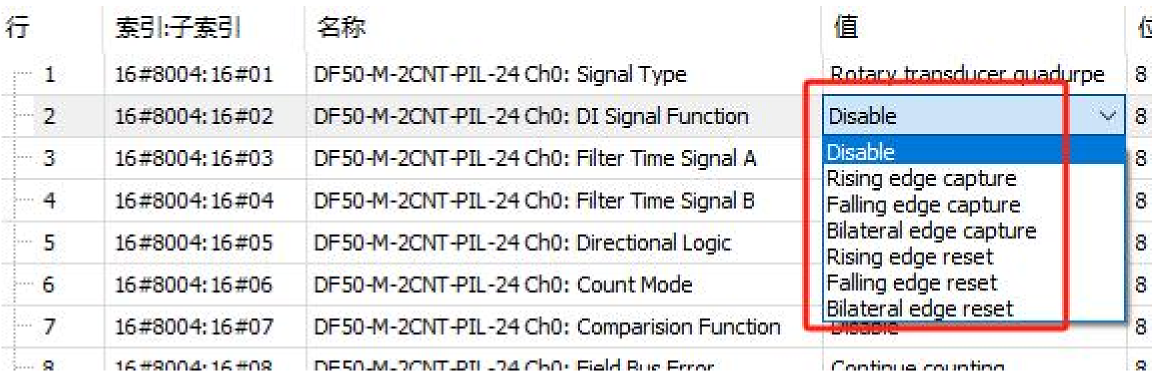


行	索引:子索引	名称	值	位长度
1	16#8004:16#01	DF50-M-2CNT-PIL-24 Ch0: Signal Type	Rotary transducer quadurpe	8
2	16#8004:16#02	DF50-M-2CNT-PIL-24 Ch0: DI Signal Function	Disable	8
3	16#8004:16#03	DF50-M-2CNT-PIL-24 Ch0: Filter Time Signal A	100KHZ	8
4	16#8004:16#04	DF50-M-2CNT-PIL-24 Ch0: Filter Time Signal B	100KHZ	8
5	16#8004:16#05	DF50-M-2CNT-PIL-24 Ch0: Directional Logic	Positive logic	8
6	16#8004:16#06	DF50-M-2CNT-PIL-24 Ch0: Count Mode	Line Counter	8
7	16#8004:16#07	DF50-M-2CNT-PIL-24 Ch0: Comparision Function	Disable	8
8	16#8004:16#08	DF50-M-2CNT-PIL-24 Ch0: Field Bus Error	Continue counting	8
9	16#8004:16#0B	DF50-M-2CNT-PIL-24 Ch0: Upper Limit	2147483647	32
10	16#8004:16#0C	DF50-M-2CNT-PIL-24 Ch0: Lower Limit	-2147483648	32
11	16#8004:16#0D	DF50-M-2CNT-PIL-24 Ch1: Signal Type	Rotary transducer quadurpe	8
12	16#8004:16#0E	DF50-M-2CNT-PIL-24 Ch1: DI Signal Function	Disable	8
13	16#8004:16#0F	DF50-M-2CNT-PIL-24 Ch1: Filter Time Signal A	100KHZ	8
14	16#8004:16#10	DF50-M-2CNT-PIL-24 Ch1: Filter Time Signal B	100KHZ	8
15	16#8004:16#11	DF50-M-2CNT-PIL-24 Ch1: Directional Logic	Positive logic	8
16	16#8004:16#12	DF50-M-2CNT-PIL-24 Ch1: Count Mode	Line Counter	8
17	16#8004:16#13	DF50-M-2CNT-PIL-24 Ch1: Comparision Function	Disable	8
18	16#8004:16#14	DF50-M-2CNT-PIL-24 Ch1: Field Bus Error	Continue counting	8
19	16#8004:16#17	DF50-M-2CNT-PIL-24 Ch1: Upper Limit	2147483647	32
20	16#8004:16#18	DF50-M-2CNT-PIL-24 Ch1: Lower Limit	-2147483648	32

Figure 4-1-81

DI Signal Function Configuration

➢ The configurable data is shown in Figure 4-1-57, which demonstrates the rising edge capture and rising edge reset functions.



行	索引:子索引	名称	值	位
1	16#8004:16#01	DF50-M-2CNT-PIL-24 Ch0: Signal Type	Rotary transducer quadurpe	8
2	16#8004:16#02	DF50-M-2CNT-PIL-24 Ch0: DI Signal Function	Disable	8
3	16#8004:16#03	DF50-M-2CNT-PIL-24 Ch0: Filter Time Signal A		8
4	16#8004:16#04	DF50-M-2CNT-PIL-24 Ch0: Filter Time Signal B		8
5	16#8004:16#05	DF50-M-2CNT-PIL-24 Ch0: Directional Logic		8
6	16#8004:16#06	DF50-M-2CNT-PIL-24 Ch0: Count Mode		8
7	16#8004:16#07	DF50-M-2CNT-PIL-24 Ch0: Comparision Function		8

Figure 4-1-82

➢ **DI rising edge capture:**As shown in Figure 4-1-58, the count value is 2902. After a rising edge is input, as shown in Figure 4-1-59, the DI input state (DI state) changes to 1 for a short while, and the latch value (LatChValue) changes to 2902.

变量	映射	通道	地址	类型	当前值
		Ch0: Count Enable	%QX4.0	BIT	TRUE
		Ch0: Compare Value	%QD2	DINT	0
		Ch1: Count Enable	%QX12.0	BIT	FALSE
		Ch1: Compare Value	%QD4	DINT	0
		Ch0: Counting State	%IX4.0	BIT	TRUE
		Ch0: DI state	%IX4.1	BIT	FALSE
		Ch0: Compare State	%IX4.2	BIT	FALSE
		Ch0: Direction	%IX4.3	BIT	FALSE
		Ch0: Direction	%IX4.4	BIT	FALSE
		Ch0: Count Value	%ID2	DINT	2902
		Ch0: LatChValue	%ID3	DINT	0

Figure 4-1-83DI rising edge capture

变量	映射	通道	地址	类型	当前值
		Ch0: Count Enable	%QX4.0	BIT	TRUE
		Ch0: Compare Value	%QD2	DINT	0
		Ch1: Count Enable	%QX12.0	BIT	FALSE
		Ch1: Compare Value	%QD4	DINT	0
		Ch0: Counting State	%IX4.0	BIT	TRUE
		Ch0: DI state	%IX4.1	BIT	TRUE
		Ch0: Compare State	%IX4.2	BIT	FALSE
		Ch0: Direction	%IX4.3	BIT	FALSE
		Ch0: Direction	%IX4.4	BIT	FALSE
		Ch0: Count Value	%ID2	DINT	2902
		Ch0: LatChValue	%ID3	DINT	2902

Figure 4-1-84DI rising edge capture trigger

- **DI rising edge reset:**As shown in Figure 4-1-60, the count value is 6143. After a rising edge is input, as shown in Figure 4-1-61, the DI input state (DI state) changes to 1 for a short while, and the count value changes to 0.

变量	映射	通道	地址	类型	当前值
		Ch0: Count Enable	%QX4.0	BIT	TRUE
		Ch0: Compare Value	%QD2	DINT	0
		Ch1: Count Enable	%QX12.0	BIT	FALSE
		Ch1: Compare Value	%QD4	DINT	0
		Ch0: Counting State	%IX4.0	BIT	TRUE
		Ch0: DI state	%IX4.1	BIT	FALSE
		Ch0: Compare State	%IX4.2	BIT	FALSE
		Ch0: Direction	%IX4.3	BIT	FALSE
		Ch0: Direction	%IX4.4	BIT	FALSE
		Ch0: Count Value	%ID2	DINT	6143
		Ch0: LatChValue	%ID3	DINT	0

Figure 4-1-85DI rising edge reset

变量	映射	通道	地址	类型	当前值
		Ch0: Count Enable	%QX4.0	BIT	TRUE
		Ch0: Compare Value	%QD2	DINT	0
		Ch1: Count Enable	%QX12.0	BIT	FALSE
		Ch1: Compare Value	%QD4	DINT	0
		Ch0: Counting State	%IX4.0	BIT	TRUE
		Ch0: DI state	%IX4.1	BIT	TRUE
		Ch0: Compare State	%IX4.2	BIT	FALSE
		Ch0: Direction	%IX4.3	BIT	FALSE
		Ch0: Direction	%IX4.4	BIT	FALSE
		Ch0: Count Value	%ID2	DINT	0
		Ch0: LatChValue	%ID3	DINT	0

Figure 4-1-86DI rising edge reset

Comparison Function Configuration

➢ After turning on the comparison function as shown in Figure 4-1-62, set the comparison value as shown in Figure 4-1-63 and set it to 10000.

行	索引:子索引	名称	值
1	16#8004:16#01	DF50-M-2CNT-PIL-24 Ch0: Signal Type	Rotary transducer quadurpe
2	16#8004:16#02	DF50-M-2CNT-PIL-24 Ch0: DI Signal Function	Disable
3	16#8004:16#03	DF50-M-2CNT-PIL-24 Ch0: Filter Time Signal A	100KHZ
4	16#8004:16#04	DF50-M-2CNT-PIL-24 Ch0: Filter Time Signal B	100KHZ
5	16#8004:16#05	DF50-M-2CNT-PIL-24 Ch0: Directional Logic	Positive logic
6	16#8004:16#06	DF50-M-2CNT-PIL-24 Ch0: Count Mode	Line Counter
7	16#8004:16#07	DF50-M-2CNT-PIL-24 Ch0: Comparision Function	Enable (Disable / Enable)
8	16#8004:16#08	DF50-M-2CNT-PIL-24 Ch0: Field Bus Error	
9	16#8004:16#0B	DF50-M-2CNT-PIL-24 Ch0: Upper Limit	2147483647
10	16#8004:16#0C	DF50-M-2CNT-PIL-24 Ch0: Lower Limit	-2147483648

Figure 4-1-87Comparison function enable

变量	映射	通道	地址	类型	当前值	预备值
		Ch0: Count Enable	%QX4.0	BIT	FALSE	
		Ch0: Compare Value	%QD2	DINT	10000	10000
		Ch1: Count Enable	%QX12.0	BIT	FALSE	
		Ch1: Compare Value	%QD4	DINT	0	
		Ch0: Counting State	%IX4.0	BIT	FALSE	
		Ch0: DI state	%IX4.1	BIT	FALSE	

Figure 4-1-88Comparison value setting

➢ As shown in Figure 4-1-64, when the count value is 4414, the compare state bit (Compare State) is 0.

变量	映射	通道	地址	类型	当前值
		Ch0: Count Enable	%QX4.0	BIT	TRUE
		Ch0: Compare Value	%QD2	DINT	10000
		Ch1: Count Enable	%QX12.0	BIT	FALSE
		Ch1: Compare Value	%QD4	DINT	0
		Ch0: Counting State	%IX4.0	BIT	TRUE
		Ch0: DI state	%IX4.1	BIT	FALSE
		Ch0: Compare State	%IX4.2	BIT	FALSE
		Ch0: Direction	%IX4.3	BIT	FALSE
		Ch0: Direction	%IX4.4	BIT	FALSE
		Ch0: Count Value	%ID2	DINT	4414
		Ch0: LatChValue	%ID3	DINT	0

Figure 4-1-89Comparison count

- Figure 4-1-65 When the count value is 11164, it exceeds the set value 10000, and the compare state bit (Compare State) is 1.

变量	映射	通道	地址	类型	当前值
		Ch0: Count Enable	%QX4.0	BIT	TRUE
		Ch0: Compare Value	%QD2	DINT	10000
		Ch1: Count Enable	%QX12.0	BIT	FALSE
		Ch1: Compare Value	%QD4	DINT	0
		Ch0: Counting State	%IX4.0	BIT	TRUE
		Ch0: DI state	%IX4.1	BIT	FALSE
		Ch0: Compare State	%IX4.2	BIT	TRUE
		Ch0: Direction	%IX4.3	BIT	FALSE
		Ch0: Direction	%IX4.4	BIT	FALSE
		Ch0: Count Value	%ID2	DINT	11164
		Ch0: LatChValue	%ID3	DINT	0

Figure 4-1-90Compare count trigger

Pulse plus direction function (Signal Type: Pulse and Directions)

- As shown in Figure 4-1-66, change the signal type to Pulse and Directions. For wiring method, seeChapter 3, Section 13.2.3When using this mode, the A+ and A- ports input high and low levels to indicate the direction, and the B+ and B- ports input valid levels to accumulate count values.

行	索引:子索引	名称	值
1	16#8004:16#01	DF50-M-2CNT-PIL-24 Ch0: Signal Type	Pulse and Directions
2	16#8004:16#02	DF50-M-2CNT-PIL-24 Ch0: DI Signal Function	
3	16#8004:16#03	DF50-M-2CNT-PIL-24 Ch0: Filter Time Signal A	
4	16#8004:16#04	DF50-M-2CNT-PIL-24 Ch0: Filter Time Signal B	
5	16#8004:16#05	DF50-M-2CNT-PIL-24 Ch0: Directional Logic	Positive logic

Rotary transducer single
Rotary transducer double
Rotary transducer quadurpe
Pulse and Directions
CW/CCW(Unused)

Figure 4-1-91

➢ As shown in Figure 4-1-67, when the sensor is stationary, the count value is 0 and the direction state is "0".

变量	映射	通道	地址	类型	当前值
		Ch0: Count Enable	%QX4.0	BIT	TRUE
		Ch0: Compare Value	%QD2	DINT	0
		Ch1: Count Enable	%QX12.0	BIT	FALSE
		Ch1: Compare Value	%QD4	DINT	0
		Ch0: Counting State	%IX4.0	BIT	TRUE
		Ch0: DI state	%IX4.1	BIT	FALSE
		Ch0: Compare State	%IX4.2	BIT	FALSE
		Ch0: Direction	%IX4.3	BIT	FALSE
		Ch0: Direction	%IX4.4	BIT	FALSE
		Ch0: Count Value	%ID2	DINT	0
		Ch0: LatChValue	%ID3	DINT	0

Figure 4-1-92

➢ When the A+ and A- voltage inputs are at a low level, pulse signals are input to B+ and B-. As shown in Figure 4-1-68, it can be seen that the count value decreases and the direction state is "2".

变量	映射	通道	地址	类型	当前值
		Ch0: Count Enable	%QX4.0	BIT	TRUE
		Ch0: Compare Value	%QD2	DINT	0
		Ch1: Count Enable	%QX12.0	BIT	FALSE
		Ch1: Compare Value	%QD4	DINT	0
		Ch0: Counting State	%IX4.0	BIT	TRUE
		Ch0: DI state	%IX4.1	BIT	FALSE
		Ch0: Compare State	%IX4.2	BIT	FALSE
		Ch0: Direction	%IX4.3	BIT	FALSE
		Ch0: Direction	%IX4.4	BIT	TRUE
		Ch0: Count Value	%ID2	DINT	-1331
		Ch0: LatChValue	%ID3	DINT	0

Figure 4-1-93

- When the A+ and A- voltage inputs are at a high level, pulse signals are input to B+ and B-. As shown in Figure 4-1-69, it can be seen that the count value increases and the direction state is "1".

变量	映射	通道	地址	类型	当前值
		Ch0: Count Enable	%QX4.0	BIT	TRUE
		Ch0: Compare Value	%QD2	DINT	0
		Ch1: Count Enable	%QX12.0	BIT	FALSE
		Ch1: Compare Value	%QD4	DINT	0
		Ch0: Counting State	%IX4.0	BIT	TRUE
		Ch0: DI state	%IX4.1	BIT	FALSE
		Ch0: Compare State	%IX4.2	BIT	FALSE
		Ch0: Direction	%IX4.3	BIT	TRUE
		Ch0: Direction	%IX4.4	BIT	FALSE
		Ch0: Count Value	%ID2	DINT	1219
		Ch0: LatChValue	%ID3	DINT	0

Figure 4-1-94

4.1.7 Serial port module usage routine

➢ This example uses the DF50-C-EC+DF50-1COM-232-485-422 topology. DF50-1COM-232-485-422 supports three modes: free transparent transmission, slave mode, and Modbus RTU master mode. The mode switching is achieved by configuring the initialization parameters and PDO data structure.Section 15.2The wiring diagram is connected to the card, the simulated communication device communicates with the DF50-1COM-232-485-422 module, and the following figure is obtained after scanning the slave station.

Figure 4-1-95

➢ The PDO data structure is shown in Figure 4-1-71~76. Different PDO data are configured for different operating modes.

Figure 4-1-96

Figure 4-1-97

Figure 4-1-98

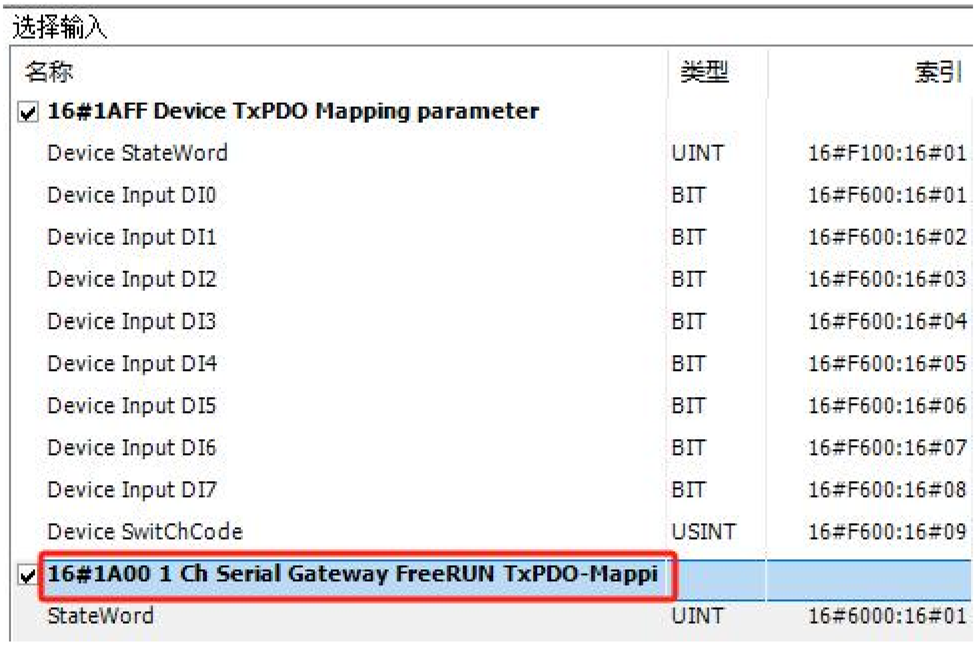


Figure 4-1-99

Figure 4-1-100

Figure 4-1-101

- 16#1600 and 16#1A00 are PDO data formats in FreeRUN mode, 16#1640 and 16#1A40 are PDO data formats in Slave mode, and 16#1680 and 16#1A80 are PDO data formats in Master mode. The default configuration is 16#1600 and 16#1A00 in FreeRUN mode.

Modbus RTU Master Mode Usage Example

- Modbus RTU Master Configuration
- For the meaning of configuration data, please refer toSection 15.3, the communication port configuration interface of Modbus RTU Master mode is shown in the figure below.

名称	值
DF50-M-1COM-232/485/422 Port Operation Mode	Modbus RTU Master
DF50-M-1COM-232/485/422 Port Interface	RS485
DF50-M-1COM-232/485/422 Port Parity	None
DF50-M-1COM-232/485/422 Port Databits	8bit
DF50-M-1COM-232/485/422 Port Stopbit	1bit
DF50-M-1COM-232/485/422 Port Baudrate	115200bps
DF50-M-1COM-232/485/422 Port Custom Baudrate	0
DF50-M-1COM-232/485/422 FreeRUN Interval time(ms)	1
DF50-M-1COM-232/485/422 Slave ID	1
DF50-M-1COM-232/485/422 Slave Response Delay	0

Figure 4-1-102

- The parameters of Ch0~Ch7 can be configured according to the communication format of the slave device to be communicated. Different function code read and write operations can be performed on 8 slaves with different IDs. The addresses are 1~8 respectively:

名称	值
DF50-M-1COM-232/485/422 Master Ch0: Slave ID	1
DF50-M-1COM-232/485/422 Master Ch0: Event Trigger	Poll Mode
DF50-M-1COM-232/485/422 Master Ch0: Lost Action	Hold Data
DF50-M-1COM-232/485/422 Master Ch0: Operation Code	01 READ COILS
DF50-M-1COM-232/485/422 Master Ch0: Reg Addr	0
DF50-M-1COM-232/485/422 Master Ch0: Reg Num	320
DF50-M-1COM-232/485/422 Master Ch0: Poll Time	500
DF50-M-1COM-232/485/422 Master Ch0: Poll Delay	100
DF50-M-1COM-232/485/422 Master Ch0: Response Timeout	1000
DF50-M-1COM-232/485/422 Master Ch1: Slave ID	2
DF50-M-1COM-232/485/422 Master Ch1: Event Trigger	Poll Mode
DF50-M-1COM-232/485/422 Master Ch1: Lost Action	Hold Data
DF50-M-1COM-232/485/422 Master Ch1: Operation Code	02 READ DISCRETE INPUTS
DF50-M-1COM-232/485/422 Master Ch1: Reg Addr	0
DF50-M-1COM-232/485/422 Master Ch1: Reg Num	320
DF50-M-1COM-232/485/422 Master Ch1: Poll Time	500
DF50-M-1COM-232/485/422 Master Ch1: Poll Delay	100
DF50-M-1COM-232/485/422 Master Ch1: Response Timeout	1000
DF50-M-1COM-232/485/422 Master Ch2: Slave ID	3
DF50-M-1COM-232/485/422 Master Ch2: Event Trigger	Poll Mode
DF50-M-1COM-232/485/422 Master Ch2: Lost Action	Hold Data
DF50-M-1COM-232/485/422 Master Ch2: Operation Code	03 READ HOLDING REGISTERS
DF50-M-1COM-232/485/422 Master Ch2: Reg Addr	0
DF50-M-1COM-232/485/422 Master Ch2: Reg Num	20
DF50-M-1COM-232/485/422 Master Ch2: Poll Time	500
DF50-M-1COM-232/485/422 Master Ch2: Poll Delay	100
DF50-M-1COM-232/485/422 Master Ch2: Response Timeout	1000
DF50-M-1COM-232/485/422 Master Ch3: Slave ID	4
DF50-M-1COM-232/485/422 Master Ch3: Event Trigger	Poll Mode
DF50-M-1COM-232/485/422 Master Ch3: Lost Action	Hold Data
DF50-M-1COM-232/485/422 Master Ch3: Operation Code	04 READ INPUT REGISTERS
DF50-M-1COM-232/485/422 Master Ch3: Reg Addr	0
DF50-M-1COM-232/485/422 Master Ch3: Reg Num	20
DF50-M-1COM-232/485/422 Master Ch3: Poll Time	500
DF50-M-1COM-232/485/422 Master Ch3: Poll Delay	100
DF50-M-1COM-232/485/422 Master Ch3: Response Timeout	1000

Figure 4-1-103

DF50-M-1COM-232/485/422 Master Ch4: Slave ID	5
DF50-M-1COM-232/485/422 Master Ch4: Event Trigger	Poll Mode
DF50-M-1COM-232/485/422 Master Ch4: Lost Action	Hold Data
DF50-M-1COM-232/485/422 Master Ch4: Operation Code	05 WRITE SINGLE COIL
DF50-M-1COM-232/485/422 Master Ch4: Reg Addr	0
DF50-M-1COM-232/485/422 Master Ch4: Reg Num	1
DF50-M-1COM-232/485/422 Master Ch4: Poll Time	500
DF50-M-1COM-232/485/422 Master Ch4: Poll Delay	100
DF50-M-1COM-232/485/422 Master Ch4: Response Timeout	1000
DF50-M-1COM-232/485/422 Master Ch5: Slave ID	6
DF50-M-1COM-232/485/422 Master Ch5: Event Trigger	Poll Mode
DF50-M-1COM-232/485/422 Master Ch5: Lost Action	Hold Data
DF50-M-1COM-232/485/422 Master Ch5: Operation Code	06 WRITE SINGLE HOLDING REGISTER
DF50-M-1COM-232/485/422 Master Ch5: Reg Addr	0
DF50-M-1COM-232/485/422 Master Ch5: Reg Num	1
DF50-M-1COM-232/485/422 Master Ch5: Poll Time	500
DF50-M-1COM-232/485/422 Master Ch5: Poll Delay	100
DF50-M-1COM-232/485/422 Master Ch5: Response Timeout	1000
DF50-M-1COM-232/485/422 Master Ch6: Slave ID	7
DF50-M-1COM-232/485/422 Master Ch6: Event Trigger	Poll Mode
DF50-M-1COM-232/485/422 Master Ch6: Lost Action	Hold Data
DF50-M-1COM-232/485/422 Master Ch6: Operation Code	16 WRITE MULTIPLE HOLDING REGISTERS
DF50-M-1COM-232/485/422 Master Ch6: Reg Addr	0
DF50-M-1COM-232/485/422 Master Ch6: Reg Num	20
DF50-M-1COM-232/485/422 Master Ch6: Poll Time	500
DF50-M-1COM-232/485/422 Master Ch6: Poll Delay	100
DF50-M-1COM-232/485/422 Master Ch6: Response Timeout	1000
DF50-M-1COM-232/485/422 Master Ch7: Slave ID	7
DF50-M-1COM-232/485/422 Master Ch7: Event Trigger	Poll Mode
DF50-M-1COM-232/485/422 Master Ch7: Lost Action	Hold Data
DF50-M-1COM-232/485/422 Master Ch7: Operation Code	16 WRITE MULTIPLE HOLDING REGISTERS
DF50-M-1COM-232/485/422 Master Ch7: Reg Addr	20
DF50-M-1COM-232/485/422 Master Ch7: Reg Num	20
DF50-M-1COM-232/485/422 Master Ch7: Poll Time	500
DF50-M-1COM-232/485/422 Master Ch7: Poll Delay	100
DF50-M-1COM-232/485/422 Master Ch7: Response Timeout	1000

Figure 4-1-104

- Among them, ch6 and ch7 are set to a slave address of 0x07 at the same time, and the holding register of the slave station is written. The writing range is 0~20 and 20~40. This flexible configuration can read and write a maximum of 12ch*20word data to the same slave station. Ch8~ch12 is not enabled for the time being;
- Taking channel ch0 as an example, in the startup parameter settings, set the mode to Modbus RTU

Master mode, the slave ID to 1, the function to Read HOLDING REGISTERS, the number of registers to read to 3, and the start address to read to 0.

DF50-M-1COM-232/485/422 Master Ch0: Slave ID	1
DF50-M-1COM-232/485/422 Master Ch0: Event Trigger	Poll Mode
DF50-M-1COM-232/485/422 Master Ch0: Lost Action	Hold Data
DF50-M-1COM-232/485/422 Master Ch0: Operation Code	03 READ HOLDING REGISTERS
DF50-M-1COM-232/485/422 Master Ch0: Reg Addr	0
DF50-M-1COM-232/485/422 Master Ch0: Reg Num	3
DF50-M-1COM-232/485/422 Master Ch0: Poll Time	500
DF50-M-1COM-232/485/422 Master Ch0: Poll Delay	100
DF50-M-1COM-232/485/422 Master Ch0: Response Timeout	1000

Figure 4-1-105

➢ In the PDO mapping settings, configure the process data as 16#1680 and 16#1A80.

Figure 4-1-106

➢ Log in to download the configuration information to the controller and start it.

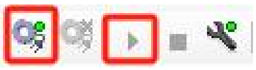


Figure 4-1-107

➢ The Master mode input and output data are shown in the figure below.

通道	地址	类型			
CtrlWord	%QW1	UINT	StateWord	%IW2	UINT
Reserve	%QW2	UINT	Read Data Length	%IW3	UINT
Select Channel	%QW3	UINT	Active Channel	%IW4	UINT
Data Out 0	%QW4	UINT	Data In 0	%IW5	UINT
Data Out 1	%QW5	UINT	Data In 1	%IW6	UINT
Data Out 2	%QW6	UINT	Data In 2	%IW7	UINT
Data Out 3	%QW7	UINT	Data In 3	%IW8	UINT
Data Out 4	%QW8	UINT	Data In 4	%IW9	UINT
Data Out 5	%QW9	UINT	Data In 5	%IW10	UINT
Data Out 6	%QW10	UINT	Data In 6	%IW11	UINT
Data Out 7	%QW11	UINT	Data In 7	%IW12	UINT
Data Out 8	%QW12	UINT	Data In 8	%IW13	UINT
Data Out 9	%QW13	UINT	Data In 9	%IW14	UINT
Data Out 10	%QW14	UINT	Data In 10	%IW15	UINT
Data Out 11	%QW15	UINT	Data In 11	%IW16	UINT
Data Out 12	%QW16	UINT	Data In 12	%IW17	UINT
Data Out 13	%QW17	UINT	Data In 13	%IW18	UINT
Data Out 14	%QW18	UINT	Data In 14	%IW19	UINT
Data Out 15	%QW19	UINT	Data In 15	%IW20	UINT
Data Out 16	%QW20	UINT	Data In 16	%IW21	UINT
Data Out 17	%QW21	UINT	Data In 17	%IW22	UINT
Data Out 18	%QW22	UINT	Data In 18	%IW23	UINT
Data Out 19	%QW23	UINT	Data In 19	%IW24	UINT

Figure 4-1-108

- Modbus RTU Master Process Data Description

Table 4.1.6Output data meaning

Output Data		
name	**length**	**meaning**
CtrlWord	2Byte	Control Word
Reserve	2Byte	reserve
Select Channel	2Byte	Channel operation selection
DataOut 0-19	40Byte	Send data content

- As shown in Table 4.1.6, SelectChannel is used to switch the communication channel, with a value range of 0-11. By default, Ch0 is activated. If SelectChannel is assigned a value of 1, the communication of Ch1 is activated, and the 485 bus on the serial port module will perform Modbus communication according to the configuration of Ch1, the specific address and function code.

Table 4.1.7Input data meaning

Input Data		
name	**length**	**meaning**
StateWord	2Byte	Status word
ReadDataLength	2Byte	Receive data length
ActiveChannel	2Byte	Current active channels
DataIn 0-19	40Byte	Receive data content

- When the PLC queries ActiveChannel and it is 1, it means that the current communication is Ch1. ReadDataLength and DataIn 0-19 both indicate the valid data of Ch1. The PLC can now take the input value and switch to the next channel communication.
- Open the Modbus Slave software on the PC and create a new project.

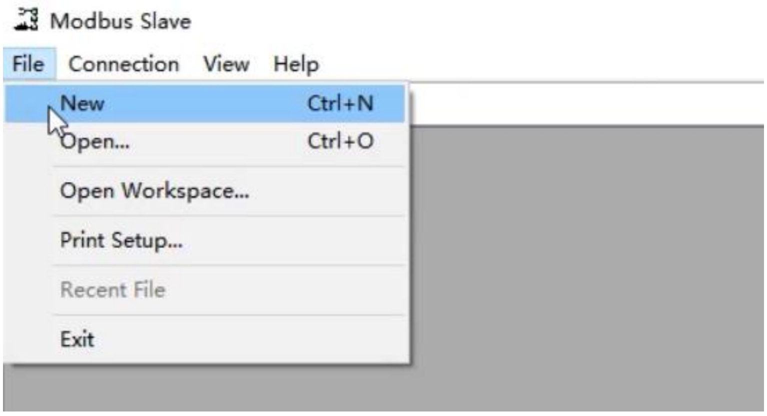


Figure 4-1-109

- Connect to the serial device.

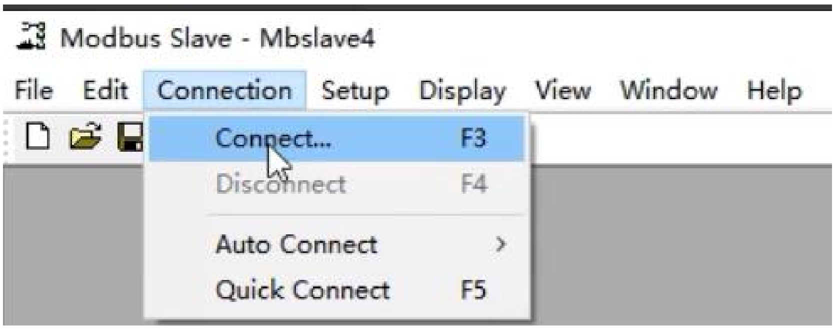


Figure 4-1-110

- As shown in the figure below, set the slave station parameters.

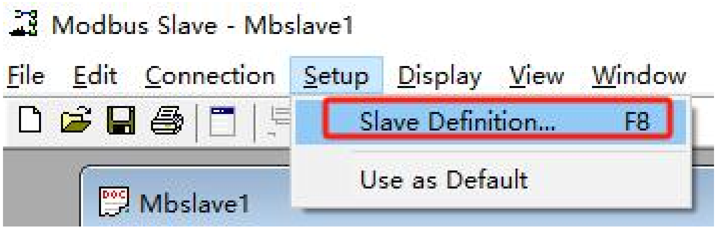


Figure 4-1-111

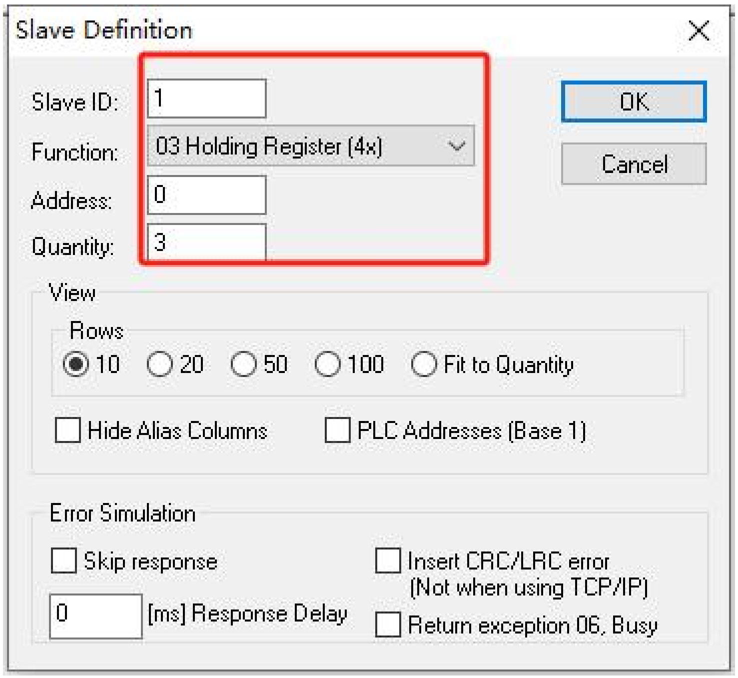


Figure 4-1-112

- Write register data.

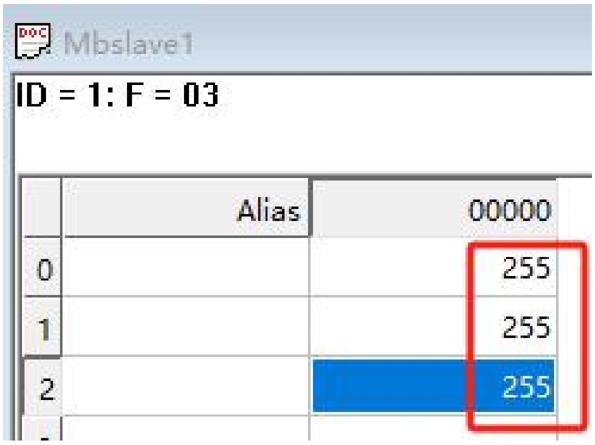


Figure 4-1-113

- CtrlWord writes run command 178 (0x00B2).

Figure 4-1-114

➢ The CtrlWord command table is shown below.

Table 4.1.8CtrlWord data meaning

Command Value	Command Name	meaning
16#00A1	CONFIGUREPORT	Port Configuration Commands
16#00B1	COMFIGUREMASTER	MASTER Mode Configuration Commands
16#00B2	OPERATIONMASTER	MASTER mode run command

➢ Check the module input data and the current data is consistent with the sent data.

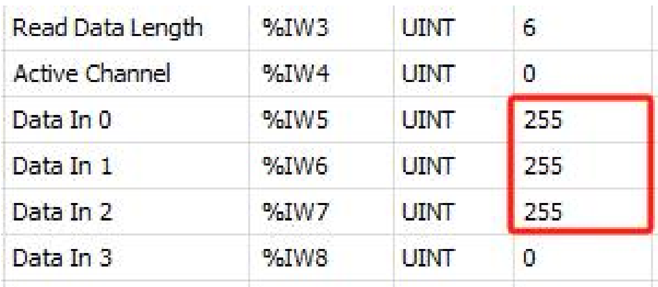


Figure 4-1-115

FreeRUN free transparent transmission mode usage example

➢ Free transparent transmission mode configuration

➢ For the meaning of configuration data, please refer to[Section 15.3](#)The configuration interface of free transparent transmission mode is shown in Figure 4-1-91.

名称	值
DF50-M-1COM-232/485/422 Port Operation Mode	FreeRUN
DF50-M-1COM-232/485/422 Port Interface	RS485
DF50-M-1COM-232/485/422 Port Parity	None
DF50-M-1COM-232/485/422 Port Databits	8bit
DF50-M-1COM-232/485/422 Port Stopbit	1bit
DF50-M-1COM-232/485/422 Port Baudrate	115200bps
DF50-M-1COM-232/485/422 Port Custom Baudrate	0
DF50-M-1COM-232/485/422 FreeRUN Interval time(ms)	1

Figure 4-1-116

- In the startup parameter settings, configure the mode to FreeRUN mode.

名称	值
DF50-M-1COM-232/485/422 Port Operation Mode	FreeRUN
DF50-M-1COM-232/485/422 Port Interface	RS485
DF50-M-1COM-232/485/422 Port Parity	None
DF50-M-1COM-232/485/422 Port Databits	8bit
DF50-M-1COM-232/485/422 Port Stopbit	1bit
DF50-M-1COM-232/485/422 Port Baudrate	115200bps
DF50-M-1COM-232/485/422 Port Custom Baudrate	0
DF50-M-1COM-232/485/422 FreeRUN Interval time(ms)	1

Figure 4-1-117

- In the PDO mapping settings, configure the process data to 16#1600 and 16#1A00.

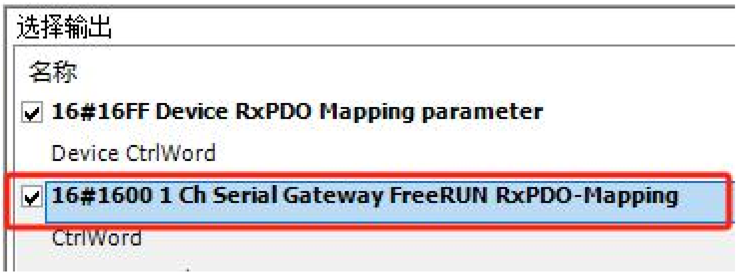


Figure 4-1-118

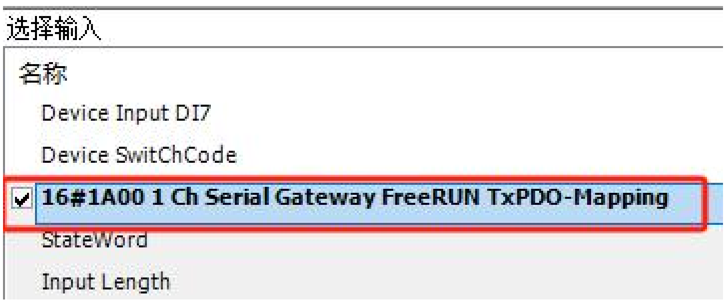


Figure 4-1-119

- Log in to download the configuration information to the controller and start it.

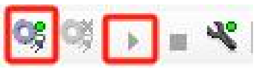


Figure 4-1-120

- The FreeRUN mode input and output data are shown in Figure 4-1-96.

通道	地址	类型	通道	地址	类型
StateWord	%IW2	UINT	CtrlWord	%QW1	UINT
Input Length	%IW3	UINT	Output Length	%QW2	UINT
Input Count	%IW4	UINT	Output Count	%QW3	UINT
Data In 0	%IB10	USINT	Data Out 0	%QB8	USINT
Data In 1	%IB11	USINT	Data Out 1	%QB9	USINT
Data In 2	%IB12	USINT	Data Out 2	%QB10	USINT
Data In 3	%IB13	USINT	Data Out 3	%QB11	USINT
Data In 4	%IB14	USINT	Data Out 4	%QB12	USINT
Data In 5	%IB15	USINT	Data Out 5	%QB13	USINT
Data In 6	%IB16	USINT	Data Out 6	%QB14	USINT
Data In 7	%IB17	USINT	Data Out 7	%QB15	USINT
Data In 8	%IB18	USINT	Data Out 8	%QB16	USINT
Data In 9	%IB19	USINT	Data Out 9	%QB17	USINT
Data In 10	%IB20	USINT	Data Out 10	%QB18	USINT
Data In 11	%IB21	USINT	Data Out 11	%QB19	USINT
Data In 12	%IB22	USINT	Data Out 12	%QB20	USINT
Data In 13	%IB23	USINT	Data Out 13	%QB21	USINT
Data In 14	%IB24	USINT	Data Out 14	%QB22	USINT
Data In 15	%IB25	USINT	Data Out 15	%QB23	USINT
Data In 16	%IB26	USINT	Data Out 16	%QB24	USINT
Data In 17	%IB27	USINT	Data Out 17	%QB25	USINT
Data In 18	%IB28	USINT	Data Out 18	%QB26	USINT
Data In 19	%IB29	USINT	Data Out 19	%QB27	USINT
Data In 20	%IB30	USINT	Data Out 20	%QB28	USINT
Data In 21	%IB31	USINT	Data Out 21	%QB29	USINT
Data In 22	%IB32	USINT	Data Out 22	%QB30	USINT
Data In 23	%IB33	USINT	Data Out 23	%QB31	USINT
Data In 24	%IB34	USINT	Data Out 24	%QB32	USINT
Data In 25	%IB35	USINT	Data Out 25	%QB33	USINT
Data In 26	%IB36	USINT	Data Out 26	%QB34	USINT
Data In 27	%IB37	USINT	Data Out 27	%QB35	USINT
Data In 28	%IB38	USINT	Data Out 28	%QB36	USINT
Data In 29	%IB39	USINT	Data Out 29	%QB37	USINT
Data In 30	%IB40	USINT	Data Out 30	%QB38	USINT
Data In 31	%IB41	USINT	Data Out 31	%QB39	USINT
Data In 32	%IB42	USINT	Data Out 32	%QB40	USINT
Data In 33	%IB43	USINT	Data Out 33	%QB41	USINT
Data In 34	%IB44	USINT	Data Out 34	%QB42	USINT
Data In 35	%IB45	USINT	Data Out 35	%QB43	USINT
Data In 36	%IB46	USINT	Data Out 36	%QB44	USINT
Data In 37	%IB47	USINT	Data Out 37	%QB45	USINT
Data In 38	%IB48	USINT	Data Out 38	%QB46	USINT
Data In 39	%IB49	USINT	Data Out 39	%QB47	USINT

Figure 4-1-121

➢ Process data description in free transparent transmission mode

Table 4.1.9Output data meaning

Output Data		
name	**length**	**meaning**
CtrlWord	2Byte	Control Word
OutputLength	2Byte	Send data length
OutputCount	2Byte	Send data sequence number
DataOut 0-39	40Byte	Send data content

➢ As shown in Table 4.1.9, OutputLength is the length of the data to be sent, DataOut 0-39 is the data to be sent, and assigning a new value to OutputCount can activate a send once. The PLC program can periodically accumulate OutputCount to achieve fixed periodic sending.

Table 4.1.10Input data meaning

Input Data		
name	**length**	**meaning**
StateWord	2Byte	Status word
InputLength	2Byte	Receive data length
InputCount	2Byte	Receive data sequence number
DataIn 0-39	40Byte	Receive data content

➢ As shown in Table 4.1.10, receiving data is similar to sending data. InputLength indicates the length of the received data, DataIn 0-39 is the valid data received, and InputCount indicates the sequence number of the currently received data frame (accumulated value). Users can determine whether a new data frame has been received based on whether the current InputCount value is updated, and the length of the received new data frame can be determined by InputLength.

➢ CtrlWord writes 193 (0x00C1) to configure the module into send mode.

Figure 4-1-122

➢ CtrlWord command table.

Table 4.1.11CtrlWord Command Table

Command Value	Command Name	meaning
16#00A1	CONFIGUREPORT	Configuration Commands
16#00C1	WRITEFreeRUN	Free mode write data command
16#00C2	READFreeRUN	Free mode read data command

➢ Output Length sets the send length to 3, Data Out 0 writes send data 11, Data Out 1 writes send data 22, and Data Out 2 writes send data 33.

通道	地址	类型	当前值
CtrlWord	%QW1	UINT	193
Output Length	%QW2	UINT	3
Output Count	%QW3	UINT	0
Data Out 0	%QB8	USINT	11
Data Out 1	%QB9	USINT	22
Data Out 2	%QB10	USINT	33

Figure 4-1-123

➢ Set Output Count to 1 and send the data to the serial port assistant, as shown in the figure below.Each time Output Count changes, the module sends data.

通道	地址	类型	当前值
CtrlWord	%QW1	UINT	193
Output Length	%QW2	UINT	3
Output Count	%QW3	UINT	1
Data Out 0	%QB8	USINT	11
Data Out 1	%QB9	USINT	22
Data Out 2	%QB10	USINT	33

Figure 4-1-124

➢ The data received by the serial port assistant is shown in the figure below, which is 0x0B (11), 0x16 (22), and 0x21 (33).

接收区

0B 16 21

Figure 4-1-125

- ➢ CtrlWord writes 194 (0x00C2) to configure the module into receive mode.

通道	地址	类型	当前值
CtrlWord	%QW1	UINT	194

Figure 4-1-126

- ➢ PC sends 01 02 03 through the serial port assistant, and the card input data is shown in the figure, which is consistent with the actual data.

StateWord	%IW2	UINT	3
Input Length	%IW3	UINT	3
Input Count	%IW4	UINT	1
Data In 0	%IB10	USINT	1
Data In 1	%IB11	USINT	2
Data In 2	%IB12	USINT	3

Figure 4-1-127

Modbus RTU Slave mode usage routine

- ➢ For the meaning of configuration data, please refer toSection 15.3, the Modbus RTU Slave mode configuration interface is shown in the figure.

名称	值
DF50-M-1COM-232/485/422 Port Operation Mode	Modbus RTU Slave
DF50-M-1COM-232/485/422 Port Interface	RS485
DF50-M-1COM-232/485/422 Port Parity	None
DF50-M-1COM-232/485/422 Port Databits	8bit
DF50-M-1COM-232/485/422 Port Stopbit	1bit
DF50-M-1COM-232/485/422 Port Baudrate	115200bps
DF50-M-1COM-232/485/422 Port Custom Baudrate	0
DF50-M-1COM-232/485/422 FreeRUN Interval time(ms)	1
DF50-M-1COM-232/485/422 Slave ID	1
DF50-M-1COM-232/485/422 Slave Response Delay	0

Figure 4-1-128

- ➢ In the startup parameter settings, configure the mode to Modbus RTU Slave mode, and the Slave ID defaults to 1.

名称	值
DF50-M-1COM-232/485/422 Port Operation Mode	Modbus RTU Slave
DF50-M-1COM-232/485/422 Port Interface	RS485
DF50-M-1COM-232/485/422 Port Parity	None
DF50-M-1COM-232/485/422 Port Databits	8bit
DF50-M-1COM-232/485/422 Port Stopbit	1bit
DF50-M-1COM-232/485/422 Port Baudrate	115200bps
DF50-M-1COM-232/485/422 Port Custom Baudrate	0
DF50-M-1COM-232/485/422 FreeRUN Interval time(ms)	1
DF50-M-1COM-232/485/422 Slave ID	1
DF50-M-1COM-232/485/422 Slave Response Delay	0

Figure 4-1-129

➢ In PDO mapping, configure the process data as 16#1640 and 16#1A40.

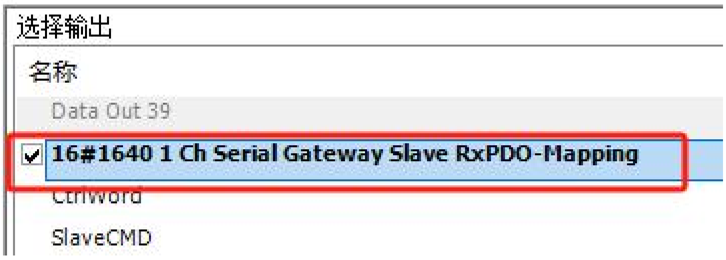


Figure 4-1-130

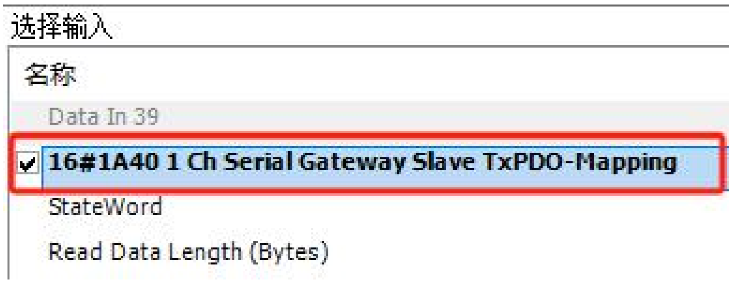


Figure 4-1-131

➢ Log in to download the configuration information to the controller and start it.

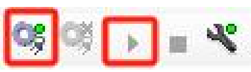


Figure 4-1-132

➢ The input and output data of Modbus RTU Slave mode are shown in the figure below.

通道	地址	类型			
CtrlWord	%QW1	UINT	StateWord	%IW2	UINT
SlaveCMD	%QB4	USINT	Read Data Len...	%IB6	USINT
SlaveRegAddr	%QB5	USINT	Reserve 1	%IB7	USINT
SlaveRegNum	%QW3	UINT	SlaveRegNum	%IW4	UINT
Data Out 0	%QW4	UINT	Data In 0	%IW5	UINT
Data Out 1	%QW5	UINT	Data In 1	%IW6	UINT
Data Out 2	%QW6	UINT	Data In 2	%IW7	UINT
Data Out 3	%QW7	UINT	Data In 3	%IW8	UINT
Data Out 4	%QW8	UINT	Data In 4	%IW9	UINT
Data Out 5	%QW9	UINT	Data In 5	%IW10	UINT
Data Out 6	%QW10	UINT	Data In 6	%IW11	UINT
Data Out 7	%QW11	UINT	Data In 7	%IW12	UINT
Data Out 8	%QW12	UINT	Data In 8	%IW13	UINT
Data Out 9	%QW13	UINT	Data In 9	%IW14	UINT
Data Out 10	%QW14	UINT	Data In 10	%IW15	UINT
Data Out 11	%QW15	UINT	Data In 11	%IW16	UINT
Data Out 12	%QW16	UINT	Data In 12	%IW17	UINT
Data Out 13	%QW17	UINT	Data In 13	%IW18	UINT
Data Out 14	%QW18	UINT	Data In 14	%IW19	UINT
Data Out 15	%QW19	UINT	Data In 15	%IW20	UINT
Data Out 16	%QW20	UINT	Data In 16	%IW21	UINT
Data Out 17	%QW21	UINT	Data In 17	%IW22	UINT
Data Out 18	%QW22	UINT	Data In 18	%IW23	UINT
Data Out 19	%QW23	UINT	Data In 19	%IW24	UINT

Figure 4-1-133

➢ Description of process data in Modbus RTU Slave mode.

Table 4.1.12Input and output data tables

Output Data		
name	**length**	**meaning**
CtrlWord	2byte	Control Word
SlaveCMD	1byte	Slave operation commands
SlaveRegAddr	1byte	Slave register address
SlaveRegNum	2byte	Number of slave registers
DataOut0-19	40byte	Send data area
Input Data		
name	**length**	**meaning**
StateWord	2byte	Status word

Read Data Length	1byte	Readback data length Byte
Reserve 1	1byte	reserve
SlaveRegNum	2byte	Readback register quantity
DataIn0-19	40byte	Receive data area

- When the module is used as a slave station, the data can be freely read and written by the RTU external master station. The number of input registers is 128, the number of holding registers is 128, the number of coils is 1024, and the number of discrete quantities is 1024. The read and write mode is controlled by SlaveCMD.
- Open the ModbusPoll software on the PC and create a new project.

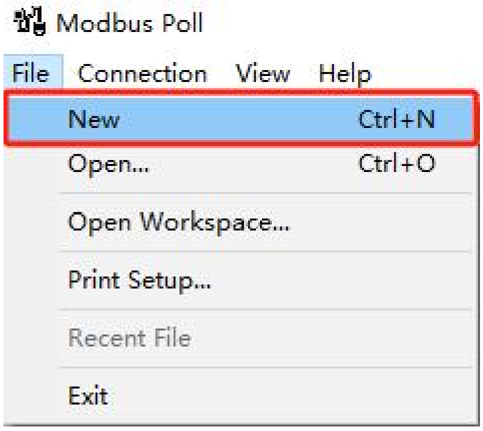


Figure 4-1-134

- Connect to the serial device.

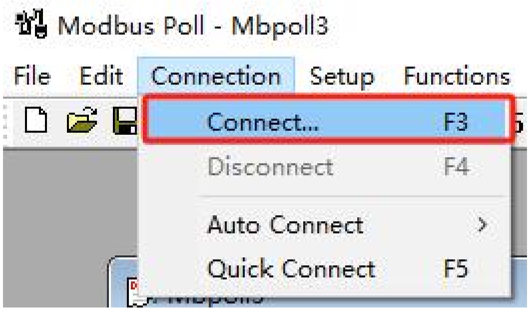


Figure 4-1-135

- As shown in the figure below, set the slave station parameters.

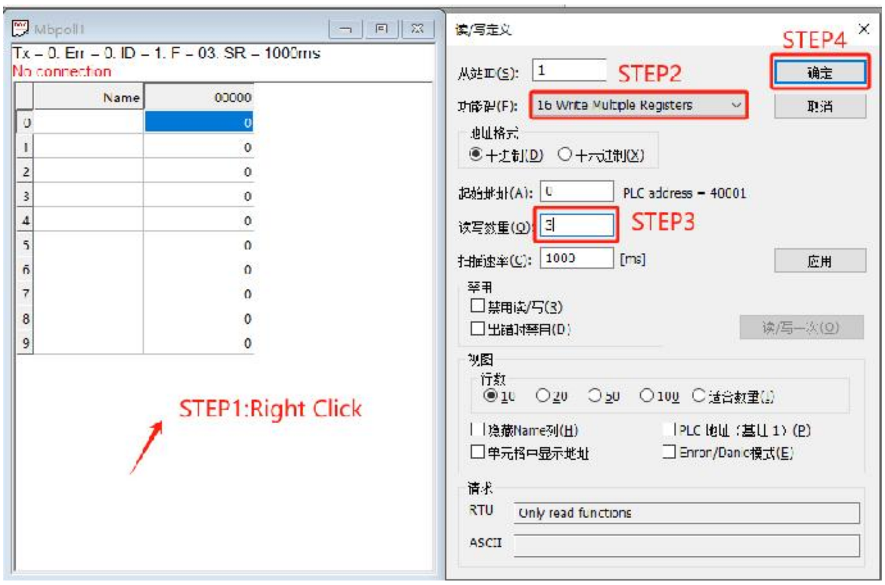


Figure 4-1-136

➢ Set the data that the PC writes to the card.

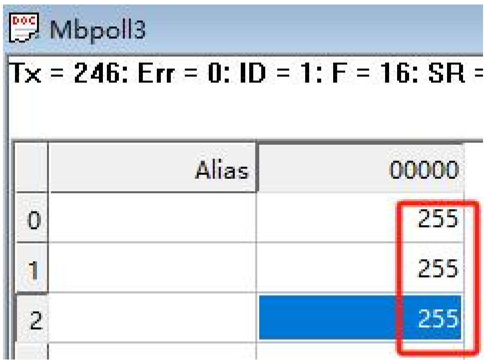


Figure 4-1-137

➢ SlaveCMD writes command 0x02.

通道	地址	类型	当前值	预备值
CtrlWord	%QW1	UINT	0	
SlaveCMD	%QB4	USINT	2	2
SlaveRegAddr	%QB5	USINT	0	
SlaveRegNum	%QW3	UINT	0	

Figure 4-1-138

➢ SlaveCMD command table.

Table 4.1.13SlaveCMD Command Table

SlaveCMD			
value	**name**	**length**	**meaning**
1	ReadCoils	1byte	Read coil value

2	ReadHoldReg	1byte	Read Holding Registers
3	WriteCoils	1byte	Write coil value
4	WriteDiscrete	1byte	Write discrete quantity
5	WriteHoldReg	1byte	Writing Holding Registers
6	WriteInReg	1byte	Write input register

- SlaveRegNum writes the number 3.

通道	地址	类型	当前值	预备值
CtrlWord	%QW1	UINT	0	
SlaveCMD	%QB4	USINT	2	
SlaveRegAddr	%QB5	USINT	0	
SlaveRegNum	%QW3	UINT	3	3

Figure 4-1-139

- Open the module to input data, the current data is consistent with the sent data.

StateWord	%IW2	UINT	0
Read Data Len...	%IB6	USINT	6
Reserve 1	%IB7	USINT	0
SlaveRegNum	%IW4	UINT	3
Data In 0	%IW5	UINT	255
Data In 1	%IW6	UINT	255
Data In 2	%IW7	UINT	255

Figure 4-1-140

4.1.8 IO-Link communication module usage examples

This exampleProgram UseDF50-C-EC+DF50-M-4IOLDuring the power-on phase, the PWR power indicator is always on, the module enters the working state, and the STA status indicator flashes.Please refer to the status light and wiring diagramChapter 3, Section 18.2The module supports 4-channel IO-Link communication, and this section only demonstrates the first channel.

- *As shownBelowThe topology of the routine is scanned out on CODESYS as shown.*

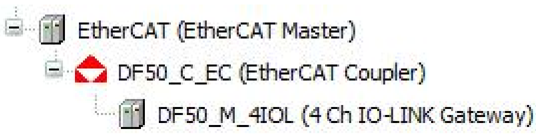


Figure 4-1-141

- Double-click the parameter option to change the configuration options, as shown in the figure below.For the meaning of configuration data, please refer toChapter 3, Section 18.3Configuration parameter definition.

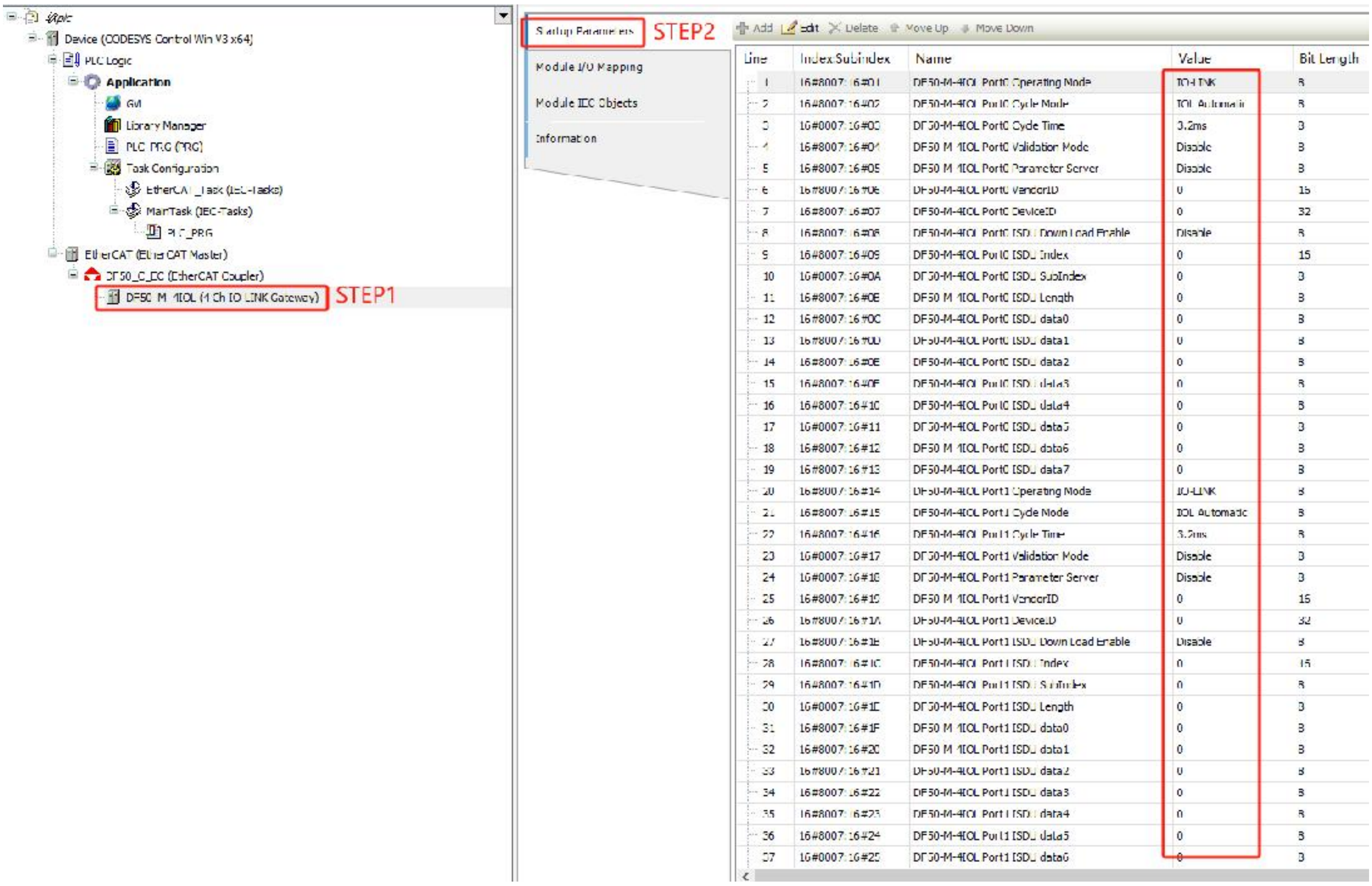


Figure 4-1-142

ISDU Configuration

- Change ISDU Down Load Enable to Enable as shown in the following figure to enable the ISDU download function.There is only one set of ISDU configuration items. If you need to configure multiple ISDUs, just modify the index address and parameters and download repeatedly.

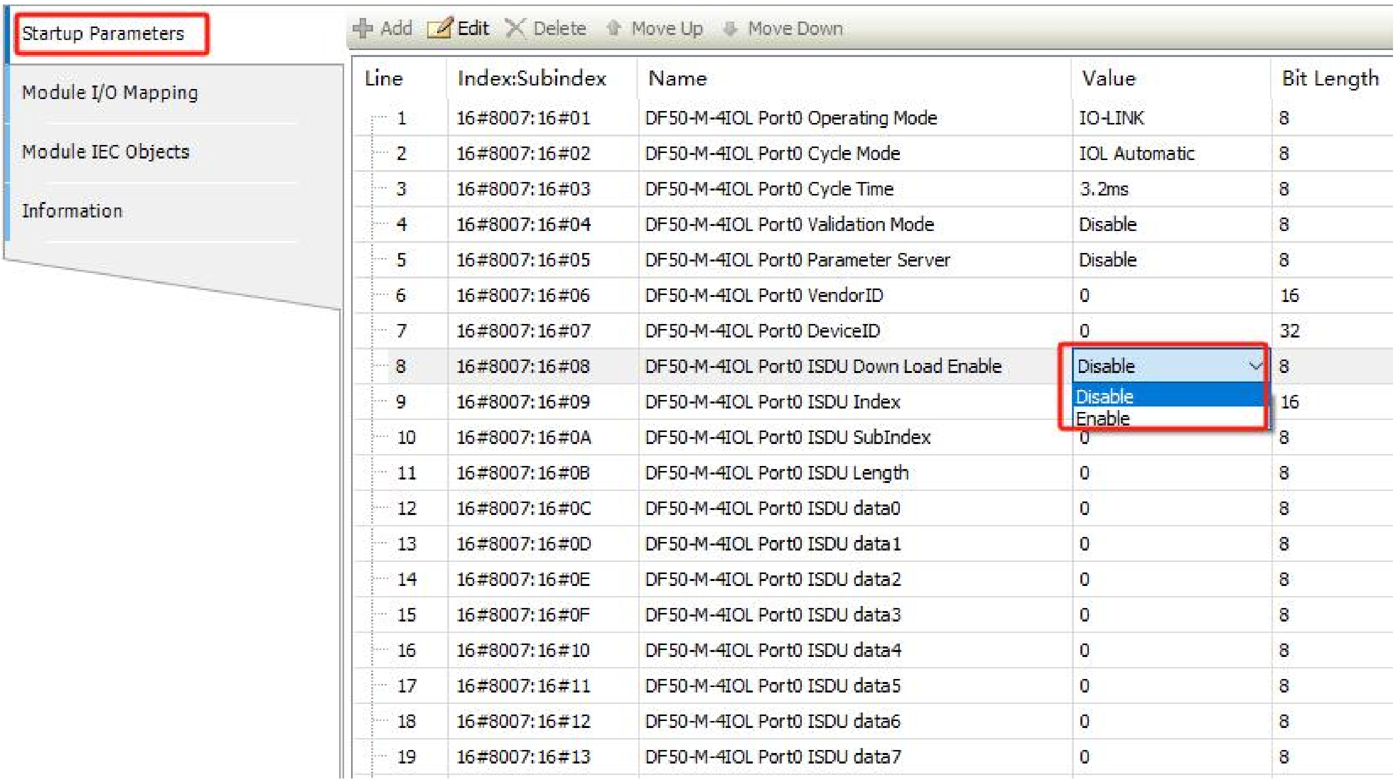


Figure 4-1-143

- This routine uses a16aisleDO/DIofIO-LINKAccess from the stationPort0For exampleFor other slave stations, please consult their manualsThe slave parameter tableISDUIndex is64, sub-index0, parameter size2Bytes, corresponding to16Channel digital enable bit.
- Parameter table of slave station:

Table 4.1.14

ISDU		name	length	default value	meaning
Index	SubIndex				
64	0	Digital enable control	2	16#0000	Bit0~bit15 correspond to 16 channel signal enable bits

- The process output data table of the slave station:

Byte	1								0							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Description	Output port 7 pin 2	Output port 7 pin 4	Output port 6 pin 2	Output port 6 pin 4	Output port 5 pin 2	Output port 5 pin 4	Output port 4 pin 2	Output port 4 pin 4	Output port 3 pin 2	Output port 3 pin 4	Output port 2 pin 2	Output port 2 pin 4	Output port 1 pin 2	Output port 1 pin 4	Output port 0 pin 2	Output port 0 pin 4

Figure 4-1-144

➢ Process input data table of the slave station:

Byte	1								0							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Description	Input port 7 pin 2	Input port 7 pin 4	Input port 6 pin 2	Input port 6 pin 4	Input port 5 pin 2	Input port 5 pin 4	Input port 4 pin 2	Input port 4 pin 4	Input port 3 pin 2	Input port 3 pin 4	Input port 2 pin 2	Input port 2 pin 4	Input port 1 pin 2	Input port 1 pin 4	Input port 0 pin 2	Input port 0 pin 4

Byte	3								2							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Description	Reserve	Reserve	Reserve	Reserve	Reserve	Reserve	Reserve	Reserve	Short circuit port 7	Short circuit port 6	Short circuit port5	Short circuit port 4	Short circuit port 3	Short circuit port 2	Short circuit port 1	Short circuit port 0

Figure 4-1-145

➢ According to the parameter table of the slave station, we first setISDUEnable16Channel digital quantity, as shown in the figure below.

Line	Index:Subindex	Name	Value	Bit Length
1	16#8007:16#01	DF50-M-4IOL Port0 Operating Mode	IO-LINK	8
2	16#8007:16#02	DF50-M-4IOL Port0 Cycle Mode	IOL Automatic	8
3	16#8007:16#03	DF50-M-4IOL Port0 Cycle Time	3.2ms	8
4	16#8007:16#04	DF50-M-4IOL Port0 Validation Mode	Disable	8
5	16#8007:16#05	DF50-M-4IOL Port0 Parameter Server	Disable	8
6	16#8007:16#06	DF50-M-4IOL Port0 VendorID	0	16
7	16#8007:16#07	DF50-M-4IOL Port0 DeviceID	0	32
8	16#8007:16#08	DF50-M-4IOL Port0 ISDU Down Load Enable	Enable	8
9	16#8007:16#09	DF50-M-4IOL Port0 ISDU Index	64	16
10	16#8007:16#0A	DF50-M-4IOL Port0 ISDU SubIndex	0	8
11	16#8007:16#0B	DF50-M-4IOL Port0 ISDU Length	2	8
12	16#8007:16#0C	DF50-M-4IOL Port0 ISDU data0	255	8
13	16#8007:16#0D	DF50-M-4IOL Port0 ISDU data1	255	8
14	16#8007:16#0E	DF50-M-4IOL Port0 ISDU data2	0	8
15	16#8007:16#0F	DF50-M-4IOL Port0 ISDU data3	0	8
16	16#8007:16#10	DF50-M-4IOL Port0 ISDU data4	0	8
17	16#8007:16#11	DF50-M-4IOL Port0 ISDU data5	0	8
18	16#8007:16#12	DF50-M-4IOL Port0 ISDU data6	0	8
19	16#8007:16#13	DF50-M-4IOL Port0 ISDU data7	0	8

Figure 4-1-146

- You can download the ISDU by logging in and downloading it to the PLC.

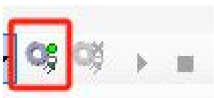


Figure 4-1-147

Figure 4-1-148

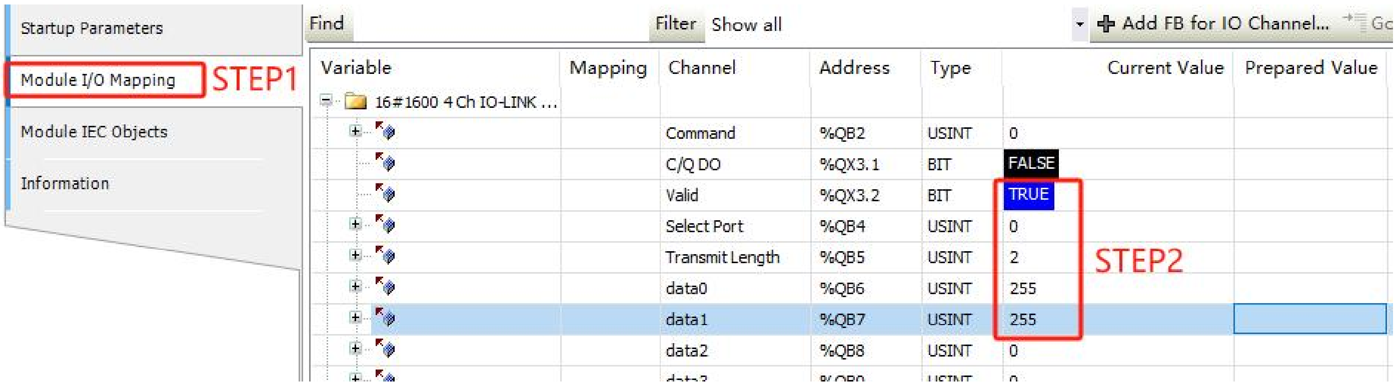
IO-LINK Mode Example

- As shown in the figure below, configure the module Port0 channel to IO-LINK mode, download and start the PLC.

Line	Index:Subindex	Name	Value	Bit Length
1	16#8007:16#01	DF50-M-4IOL Port0 Operating Mode	IO-LINK	8
2	16#8007:16#02	DF50-M-4IOL Port0 Cycle Mode	IOL Automatic	8
3	16#8007:16#03	DF50-M-4IOL Port0 Cycle Time	3.2ms	8
4	16#8007:16#04	DF50-M-4IOL Port0 Validation Mode	Disable	8
5	16#8007:16#05	DF50-M-4IOL Port0 Parameter Server	Disable	8

Figure 4-1-149

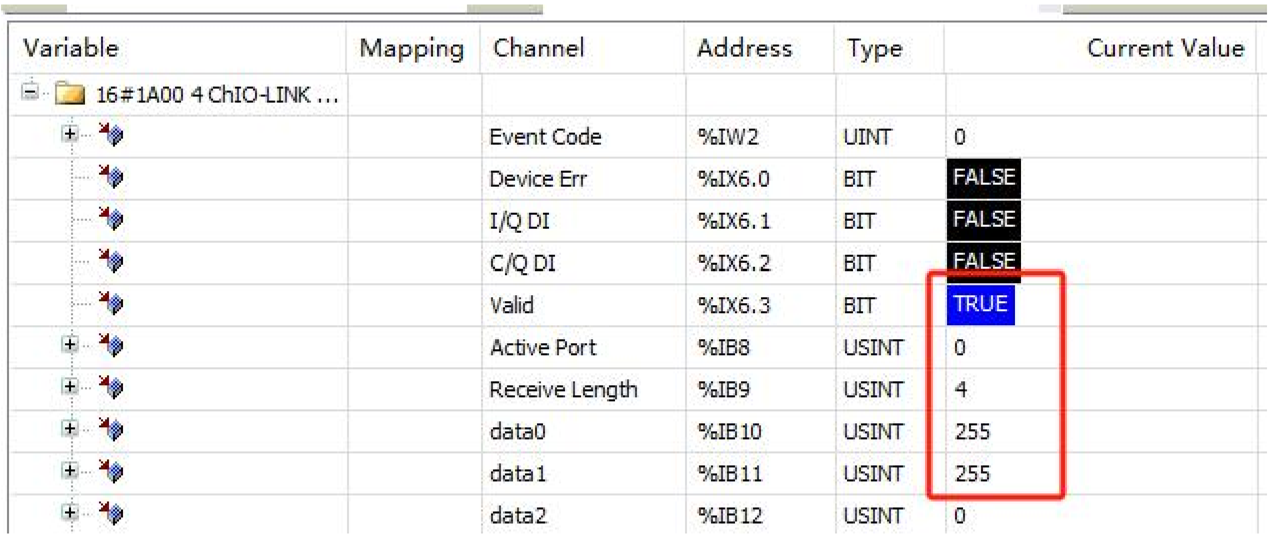
➢ As shown in the figure below, data can be sent to the IO-Link slave. For the specific meaning of process data, please refer toChapter 3, 18.4Sections.



Variable	Mapping	Channel	Address	Type	Current Value	Prepared Value
16#1600 4 Ch IO-LINK ...						
		Command	%QB2	USINT	0	
		C/Q DO	%QX3.1	BIT	FALSE	
		Valid	%QX3.2	BIT	TRUE	
		Select Port	%QB4	USINT	0	
		Transmit Length	%QB5	USINT	2	
		data0	%QB6	USINT	255	
		data1	%QB7	USINT	255	
		data2	%QB8	USINT	0	

Figure 4-1-150

➢ As shown in the figure below,View receiveddata.

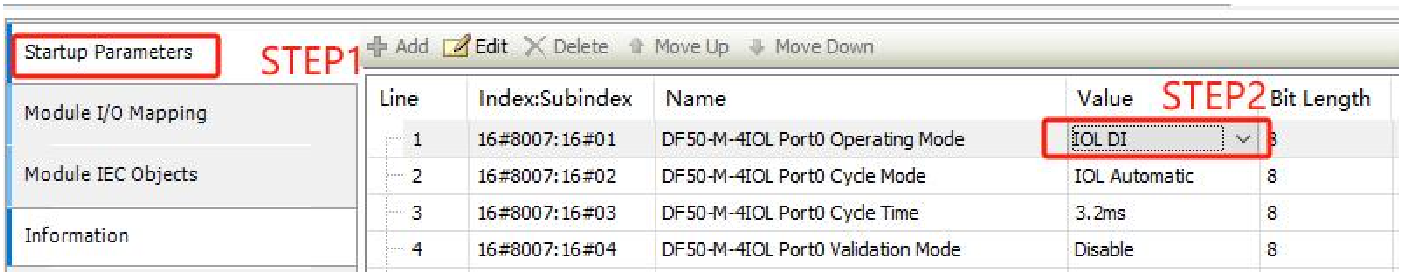


Variable	Mapping	Channel	Address	Type	Current Value
16#1A00 4 ChIO-LINK ...					
		Event Code	%IW2	UINT	0
		Device Err	%IX6.0	BIT	FALSE
		I/Q DI	%IX6.1	BIT	FALSE
		C/Q DI	%IX6.2	BIT	FALSE
		Valid	%IX6.3	BIT	TRUE
		Active Port	%IB8	USINT	0
		Receive Length	%IB9	USINT	4
		data0	%IB10	USINT	255
		data1	%IB11	USINT	255
		data2	%IB12	USINT	0

Figure 4-1-151

IOL DI Mode Routine

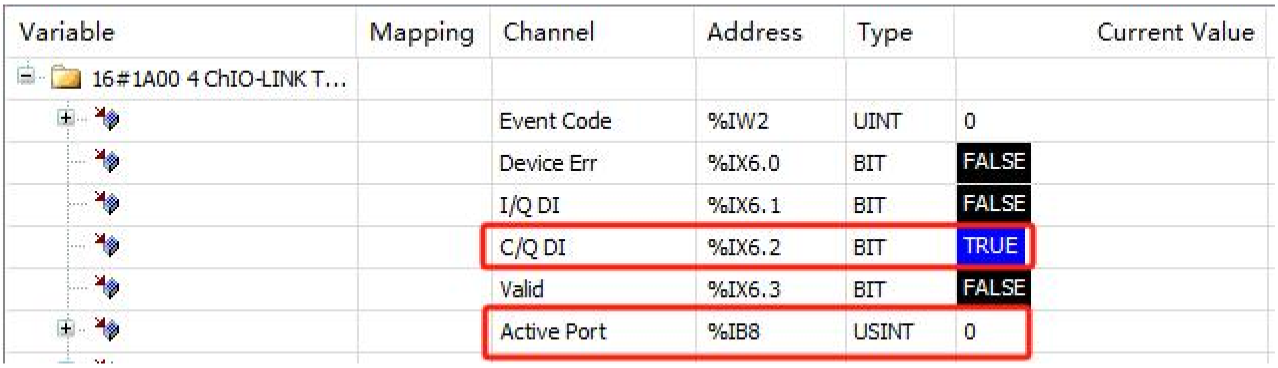
➢ As shown in the figure below, configure the module Port0 channel to IOL DI mode, download and start the PLC.



Line	Index:Subindex	Name	Value	Bit Length
1	16#8007:16#01	DF50-M-4IOL Port0 Operating Mode	IOL DI	8
2	16#8007:16#02	DF50-M-4IOL Port0 Cycle Mode	IOL Automatic	8
3	16#8007:16#03	DF50-M-4IOL Port0 Cycle Time	3.2ms	8
4	16#8007:16#04	DF50-M-4IOL Port0 Validation Mode	Disable	8

Figure 4-1-152

➢ Input a 24V signal to Port0 C/Q. As shown in the figure below, you can see that Port0 C/Q DI becomes TRUE.

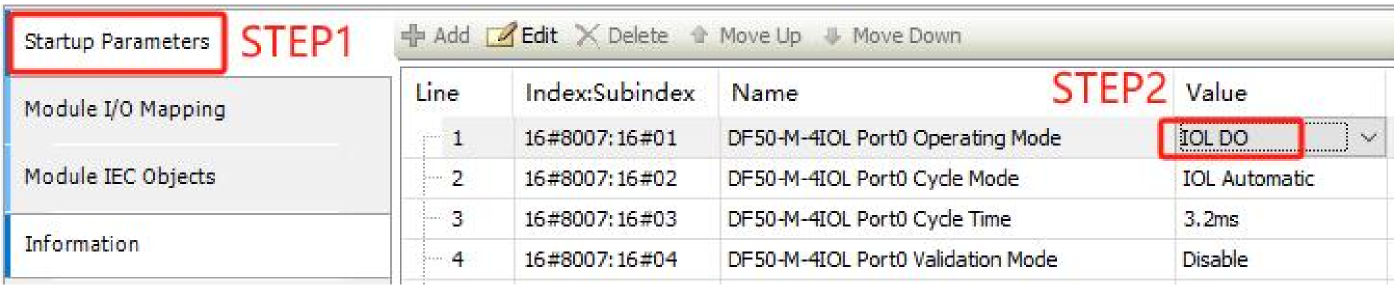


Variable	Mapping	Channel	Address	Type	Current Value
16#1A00 4 ChIO-LINK T...					
		Event Code	%IW2	UINT	0
		Device Err	%IX6.0	BIT	FALSE
		I/Q DI	%IX6.1	BIT	FALSE
		C/Q DI	%IX6.2	BIT	TRUE
		Valid	%IX6.3	BIT	FALSE
		Active Port	%IB8	USINT	0

Figure 4-1-153

IOL DO Mode Routine

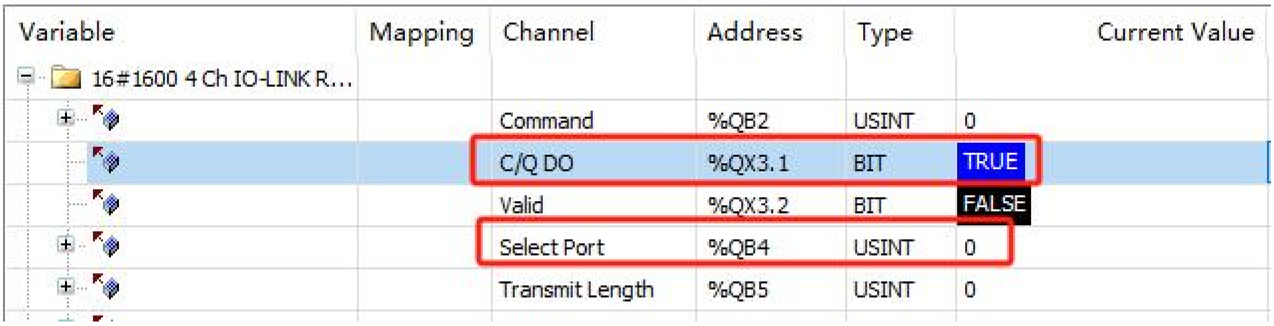
➢ As shown in the figure below, configure the module Port0 channel asIOL DOmode, download and start the PLC.



Line	Index:Subindex	Name	Value
1	16#8007:16#01	DF50-M-4IOL Port0 Operating Mode	IOL DO
2	16#8007:16#02	DF50-M-4IOL Port0 Cycle Mode	IOL Automatic
3	16#8007:16#03	DF50-M-4IOL Port0 Cycle Time	3.2ms
4	16#8007:16#04	DF50-M-4IOL Port0 Validation Mode	Disable

Figure 4-1-154

➢ As shown in the figure below, Port0 C/Q can output 24V signal.

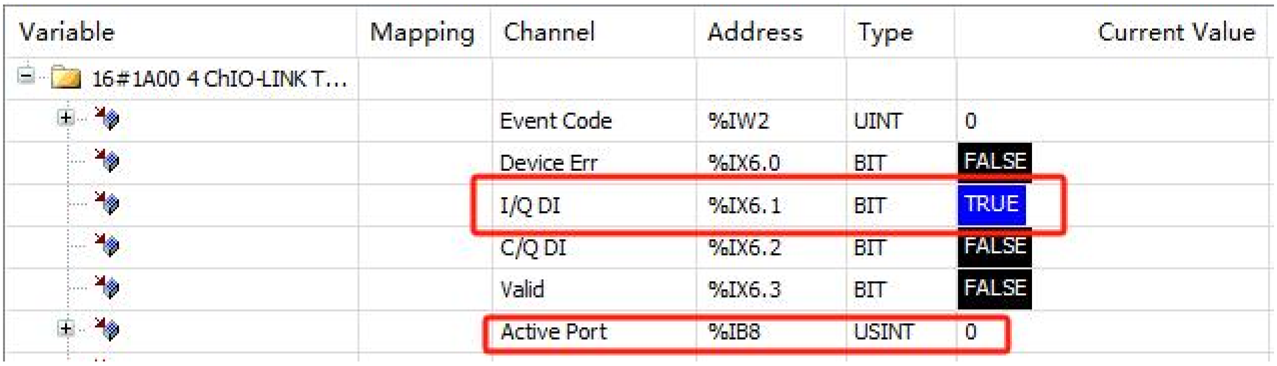


Variable	Mapping	Channel	Address	Type	Current Value
16#1600 4 Ch IO-LINK R...					
		Command	%QB2	USINT	0
		C/Q DO	%QX3.1	BIT	TRUE
		Valid	%QX3.2	BIT	FALSE
		Select Port	%QB4	USINT	0
		Transmit Length	%QB5	USINT	0

Figure 4-1-155

I/Q DIaisle

➢ This channel is valid in any mode, as shown in the following figure, indicating that Port0 I/Q has received a valid signal.

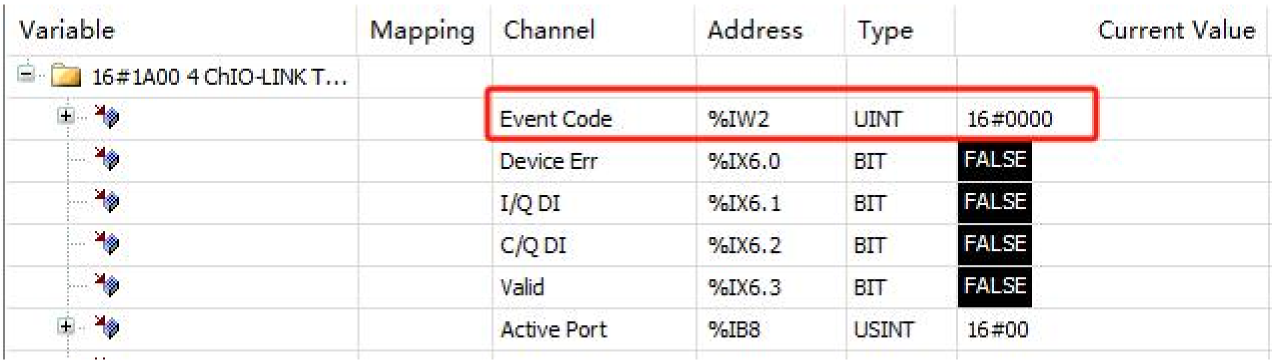


Variable	Mapping	Channel	Address	Type	Current Value
16#1A00 4 ChIO-LINK T...					
		Event Code	%IW2	UINT	0
		Device Err	%IX6.0	BIT	FALSE
		I/Q DI	%IX6.1	BIT	TRUE
		C/Q DI	%IX6.2	BIT	FALSE
		Valid	%IX6.3	BIT	FALSE
		Active Port	%IB8	USINT	0

Figure 4-1-156

Port Diagnostics

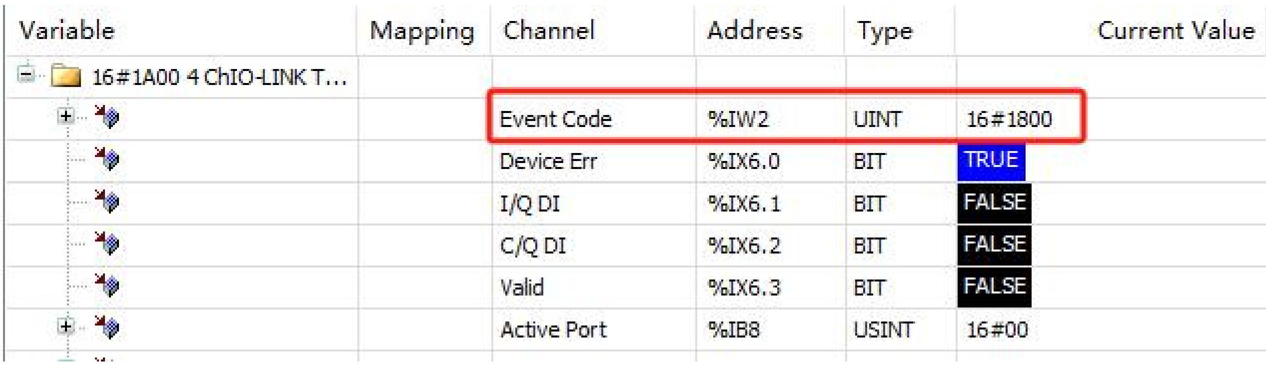
- As shown in the figure below, the Event Code shows data as 0, indicating that there is no error.



Variable	Mapping	Channel	Address	Type	Current Value
16#1A00 4 ChIO-LINK T...					
		Event Code	%IW2	UINT	16#0000
		Device Err	%IX6.0	BIT	FALSE
		I/Q DI	%IX6.1	BIT	FALSE
		C/Q DI	%IX6.2	BIT	FALSE
		Valid	%IX6.3	BIT	FALSE
		Active Port	%IB8	USINT	16#00

Figure 4-1-157

- As shown in the figure below, the Event Code shows data as 16#1800, indicating that the IO-LINK slave is offline.For other event codes, see the port event code table.



Variable	Mapping	Channel	Address	Type	Current Value
16#1A00 4 ChIO-LINK T...					
		Event Code	%IW2	UINT	16#1800
		Device Err	%IX6.0	BIT	TRUE
		I/Q DI	%IX6.1	BIT	FALSE
		C/Q DI	%IX6.2	BIT	FALSE
		Valid	%IX6.3	BIT	FALSE
		Active Port	%IB8	USINT	16#00

Figure 4-1-158

Table 4.1.15Port event code

Event Code	illustrate
0x1800	IO-LINK slave is offline, check the slave connection
0x1801	Wrong startup parameters

0x1802	VendorID does not match
0x1803	DeviceID does not match
0x1804	C/Q short circuit
0x1805	PHY chip overheating
0x1806	L+ L- short circuit
0x1807	L+ overcurrent
0x1808	Device event overflow
0x1809	Backup inconsistent, memory out of range
0x180A	Backup inconsistent, identity verification error
0x180B	Backup inconsistency, non-specific error with data storage
0x180C	Backup inconsistent, upload error
0x180D	Parameters are inconsistent, download failure
0x180E	P24 (Class B) missing or overvoltage
0x180F	Short circuit at P24 (Class B), check wire connections
0x1810	I/Q check line has short circuit
0x1811	C/Q is short-circuited when used as digital output
0x1812	I/Q Overcurrent
0x1813	C/Q is overcurrent when output as digital
0x4000	Slave over temperature
0x5000	Slave hardware failure
0x5100	Slave power failure
0x5101	The slave fuse is blown
0x6320	Slave parameter error
0x6321	Slave parameter missing
other	View slave manual

Table 4.1.16Port opcodes

Command	illustrate
0x00	Normally obtain the port event code
0x01	Clear port event codes
other	reserve

- As shown in the figure below, writing 1 in Command can clear the current event code.

Variable	Mapping	Channel	Address	Type	Current Value
16#1600 4 Ch IO-LINK R...					
		Command	%QB2	USINT	16#01
		C/Q DO	%QX3.1	BIT	FALSE
		Valid	%QX3.2	BIT	FALSE
		Select Port	%QB4	USINT	16#00
		Transmit Length	%QB5	USINT	16#00

Figure 4-1-159

Variable	Mapping	Channel	Address	Type	Current Value
16#1A00 4 ChIO-LINK T...					
		Event Code	%IW2	UINT	16#0000
		Device Err	%IX6.0	BIT	TRUE
		I/Q DI	%IX6.1	BIT	FALSE
		C/Q DI	%IX6.2	BIT	FALSE
		Valid	%IX6.3	BIT	FALSE
		Active Port	%IB8	USINT	16#00

Figure 4-1-160

4.2 Application in Beckhoff TwinCAT3 software environment

- As shown4-2-1 As shown in the figure, first find the DF50-C-EC V1i0i2_R device description file provided by the manufacturer, copy it to the folder of the installation path C:\TwinCAT\3.1\Config\Io\EtherCAT, and then open TwinCAT3. When TwinCAT3 is started, it automatically adds the devices under the EtherCAT file to the device library.

picture4-2-1

- After opening the software and adding the project, right-click I/O -> Devices to automatically scan the device, as shown in Figure 4-2-2.

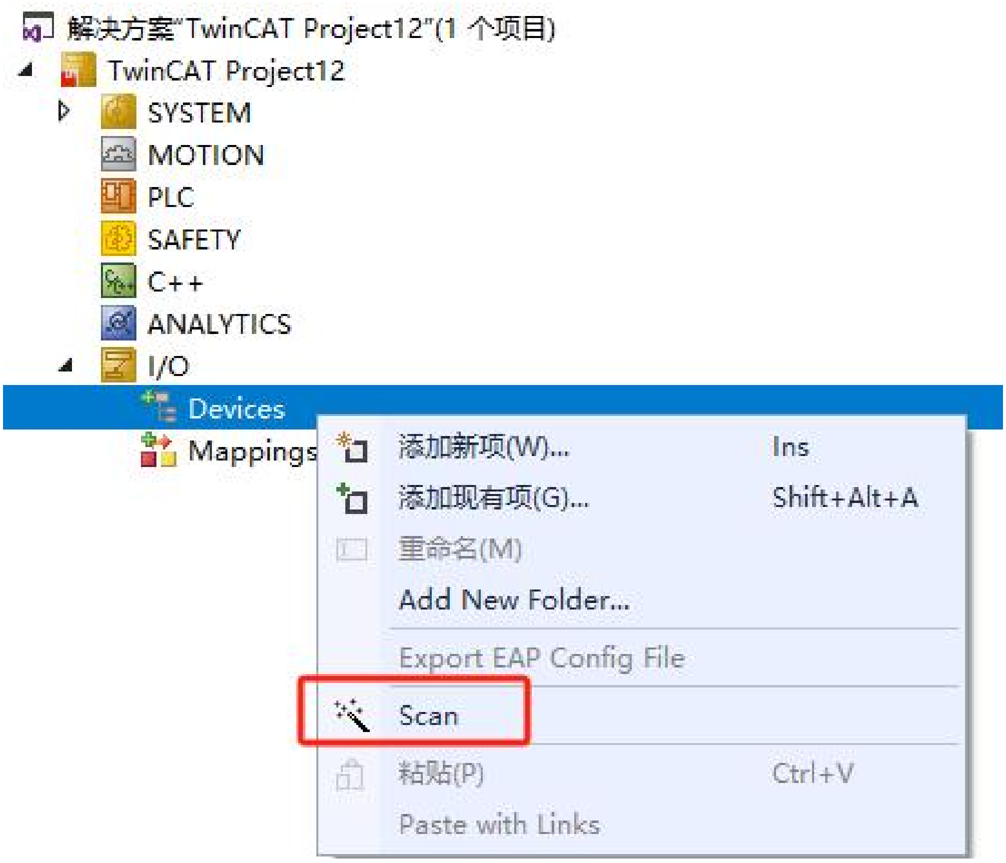


Figure 4-2-2

4.2.1 Adapter Usage Examples

➢ For the wiring diagram of the adapter, please refer toChapter 2 Section 1.2The example uses the DF50-C-EC + DF50-M-16DO-P + DF50-M-16DI-P/N + DF50-M-16DO-N + DF50-M-16DI-P/N-TS topology. After scanning the slaves, the following is obtained:4-2-3: The first "Device TxPDO Mapping parameter" is the device status information and the 8 DI data of the coupler, the second "Device RxPDO Mapping parameter" is the coupler control word, and the 3rd to 6th Module modules are the various IO module cards.

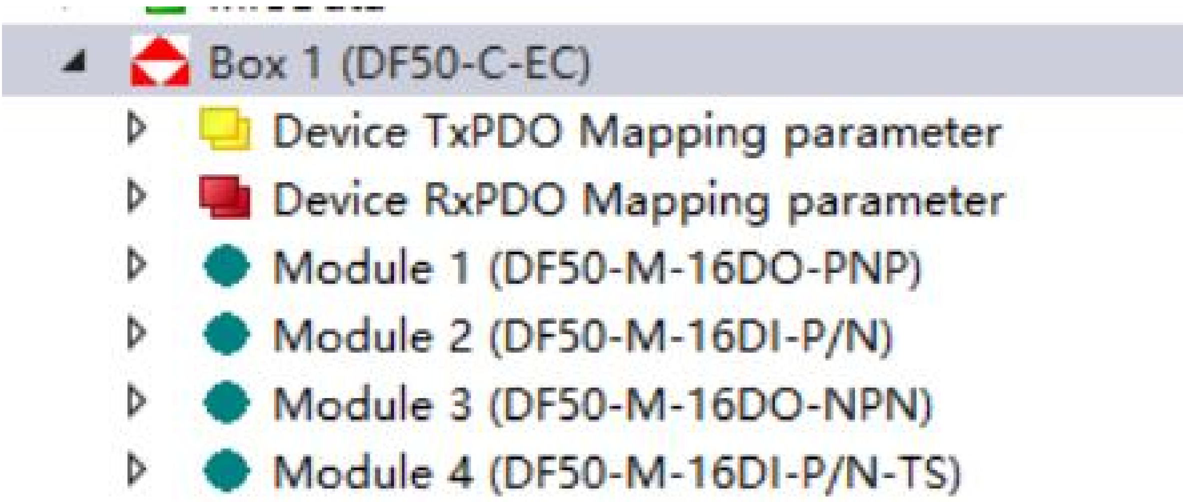


Figure 4-2-3

➢ The process data in "Device TxPDO Mapping parameter" and "Device RxPDO Mapping parameter" are as shown in the table4.2.1.

surface4.2.1

TXPD0			
Name	Type	Size	meaning
Device StateWord	UINT	2.0	Device status word, normally 0.
Device Input DI0	BIT	0.1	DI0 input is set to 1 if valid and 0 if invalid.
Device Input DI1	BIT	0.1	DI1 input is set to 1 if valid, and to 0 if invalid.
Device Input DI2	BIT	0.1	DI2 input is set to 1 if valid and 0 if invalid.
Device Input DI3	BIT	0.1	DI3 input is set to 1 if valid, and 0 if invalid.
Device Input DI4	BIT	0.1	DI4 input is set to 1 if valid and 0 if invalid.
Device Input DI5	BIT	0.1	DI5 input is set to 1 if valid and 0 if invalid.
Device Input DI6	BIT	0.1	DI6 input is set to 1 if valid and 0 if invalid.
Device Input DI7	BIT	0.1	DI7 input is set to 1 if valid and 0 if invalid.
Device SwitchCode	USINT	1.0	8-bit DIP switch value.

RXPD0			
Device CtrlWord	UINT	2.0	Device control word.

Device StateWordExplanation of meaning

- As shown4-2-4 、 4-2-5, when the value of "Device CtrlWord" is 0x0000 by default, the feedback value of "Device StateWord" is 0x01e8, indicating that an error occurs in the first module after the coupler, and so on. When errors occur in two modules, the value of "Device StateWord" is 0x02e8. When all modules are working normally, the value is 0. To clear the error, write "0x0001" to Device CtrlWord to clear the error, and then write it back to 0x0000.

Name	[X]	Online	Type	Size	>Add...	L
Device StateWord		0x01e8	UINT	2.0	39.0	
Device Input DI0		0	BIT	0.1	41.0	
Device Input DI1		0	BIT	0.1	41.1	
Device Input DI2		0	BIT	0.1	41.2	

picture4-2-4First module error

Name	[X]	Online	Type	Size	>Add...	Li
Device StateWord		0x02e8	UINT	2.0	39.0	
Device Input DI0		0	BIT	0.1	41.0	
Device Input DI1		0	BIT	0.1	41.1	
Device Input DI2		0	BIT	0.1	41.2	

picture4-2-5Second module error

- Device CtrlWord commands are shown in the table4.2.2 as shown.

surface4.2.2

Device CtrlWord	Device StateWord
0x0000	Display fault code
0x0001	Clearing fault codes
0x0002	Coupler software version number

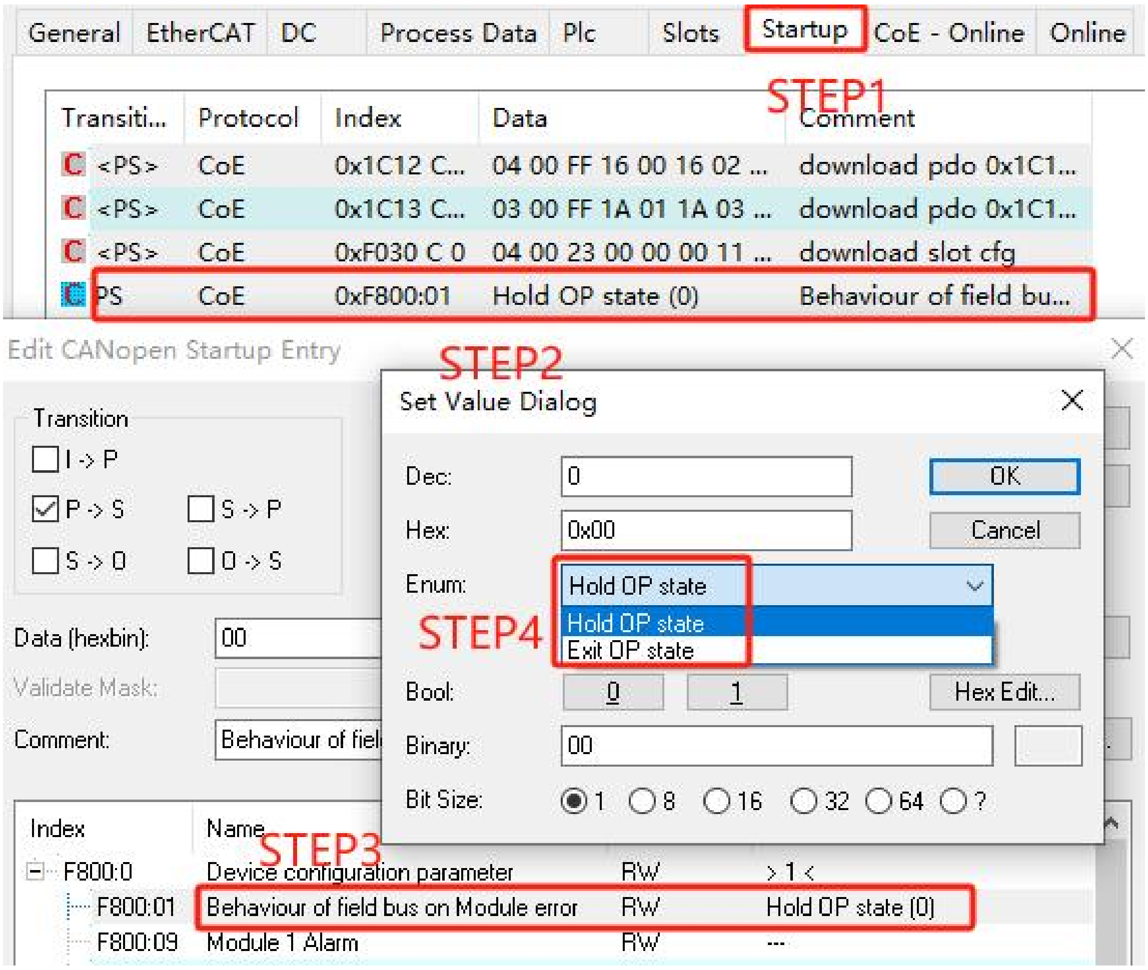
- When the module has fault information and Device CtrlWord is 0x0000, the upper 8 bits of Device StateWord indicate the module position, and the lower 8 bits indicate the module fault code. The meaning of the fault code is shown in the table below.

surface4.2.3

Fault Codes	Fault Description	Troubleshooting methods
0xE1	Module power supply abnormality	Check the power cord connection
0xE2	Analog module calibration abnormality	Contact Supplier
0xE3	Module internal initialization exception	Contact Supplier
0xE8	Module offline	Reseat the module

Module error adapter bus status configuration

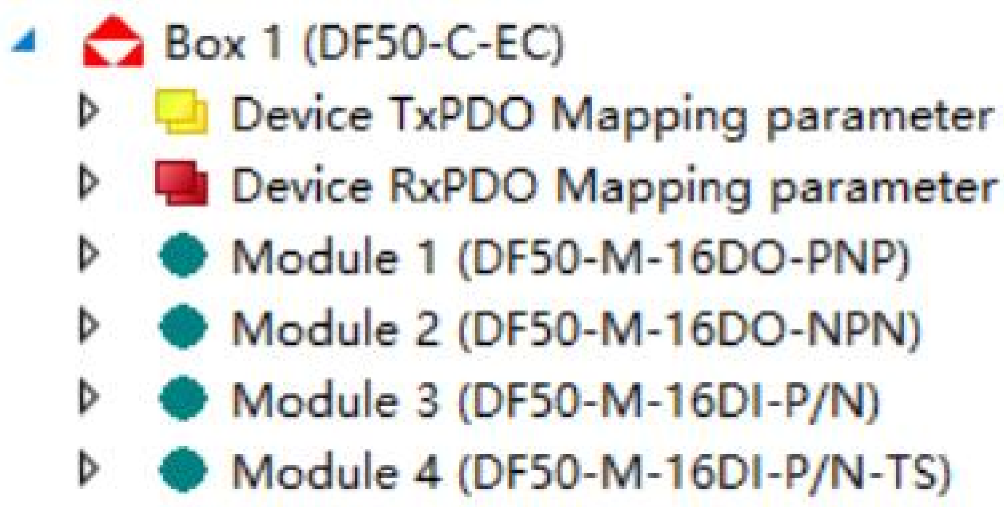
➢ As shown4-2-6, when the module loses data in communication with the adapter and reports an error, the adapter bus can be set to remain in OP state or exit OP state. The default is to remain in OP state.



picture4-2-6

4.2.2 Digital Module Usage Example

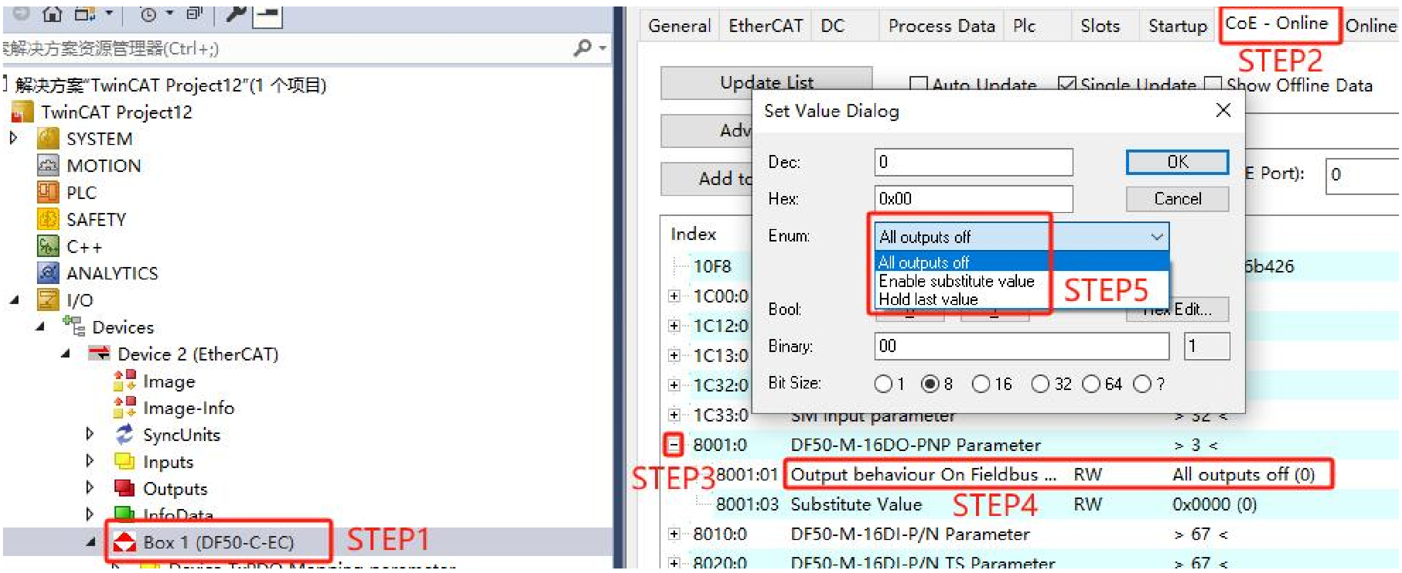
- This example uses the DF50-C-EC + DF50-M-16DO-P + DF50-M-16DO-N + DF50-M-16DI-P/N + DF50-M-16DI-P/N-TS topology. After scanning the slaves, the following is obtained:4-2-7 as shown.



picture4-2-7

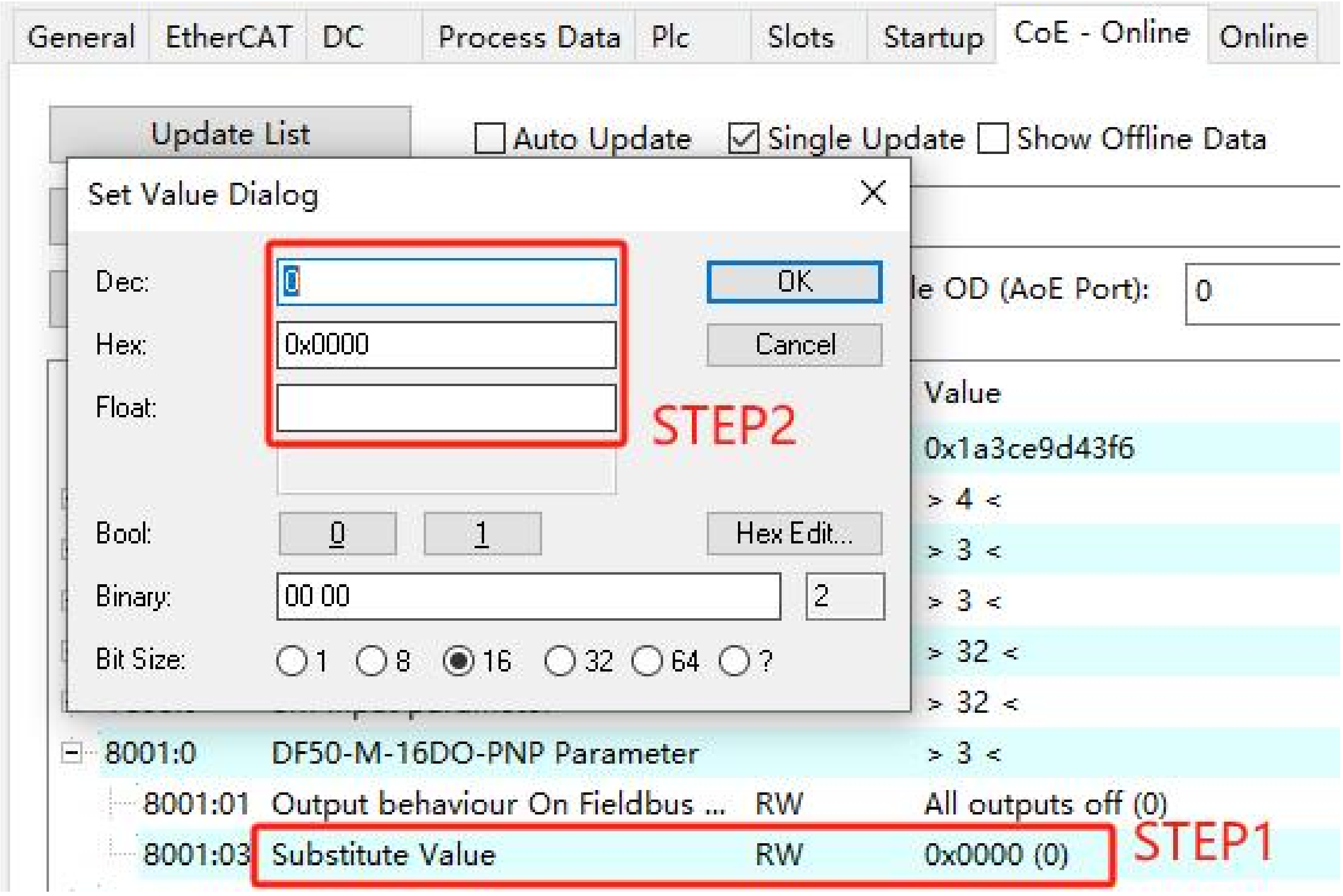
DF50-M-16DO-P digital output module

- Please refer to the module wiring diagram[Chapter 3, Section 3.2]When the EC bus exits the OP state, this type of module can set the output state of the module. The setting method is shown in the figure below. It can be set to: all outputs are closed, use alternative value output, and keep the last value.



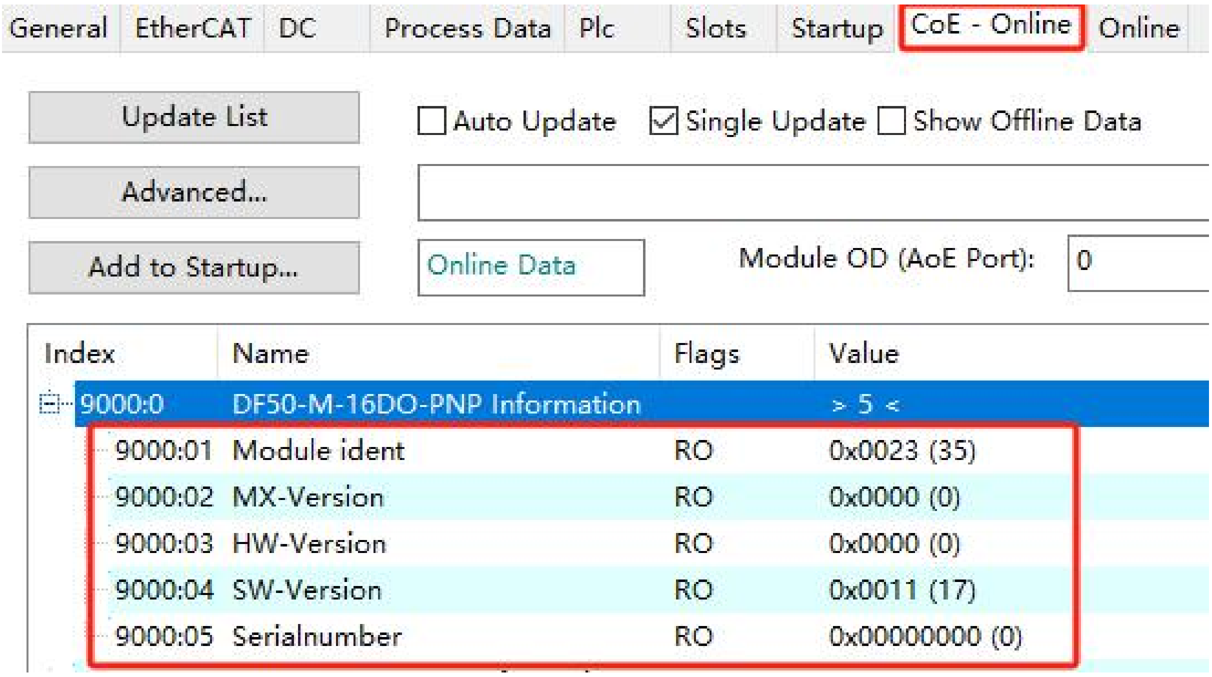
picture4-2-8Behavior on bus errors

➢ When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.



picture4-2-9Alternative value settings

➢ The module information viewing method is shown in Figure 4-2-10, and its meaning is shown in Table 4.2.4.

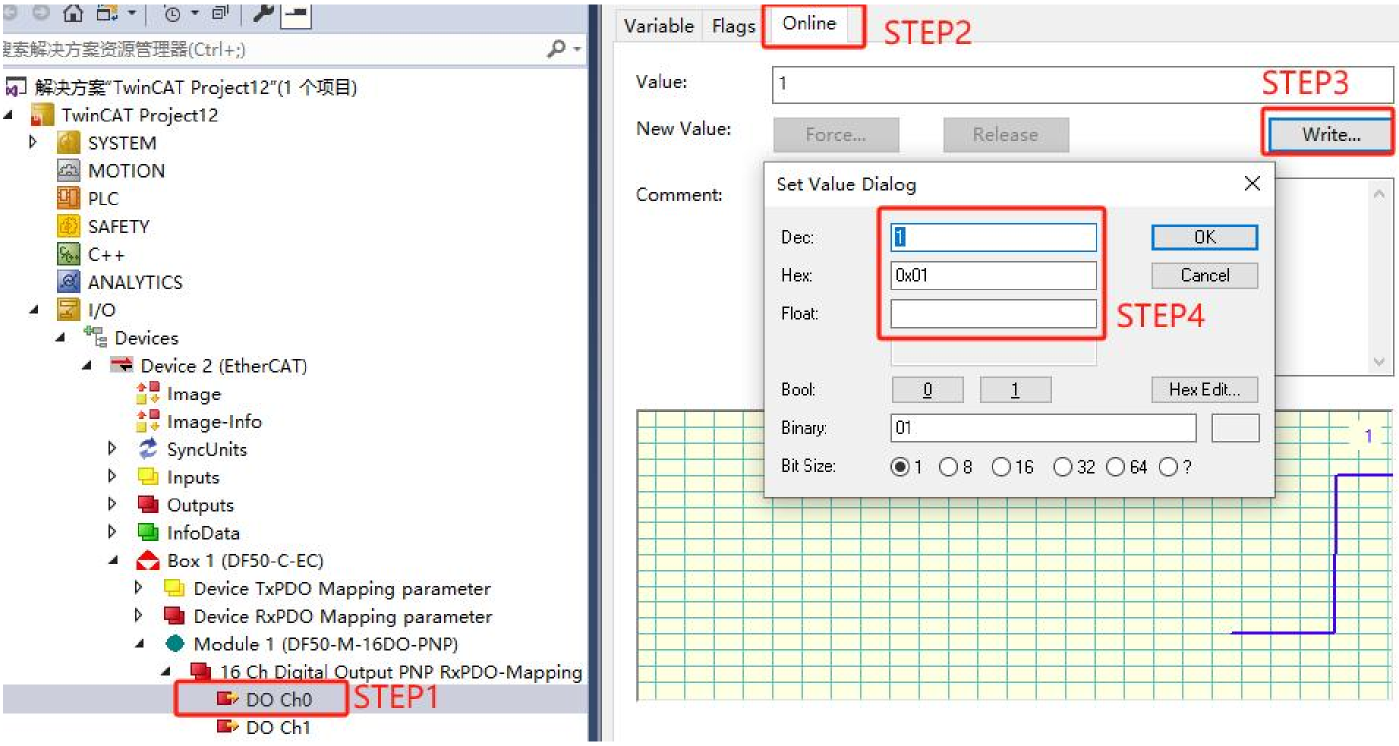


picture4-2-10Module Information

surface4.2.4Module information meaning

name	meaning
Module ident	Module ID
MX-Version	reserve
HW-Version	reserve
SW-Version	Software Version
Serial number	reserve

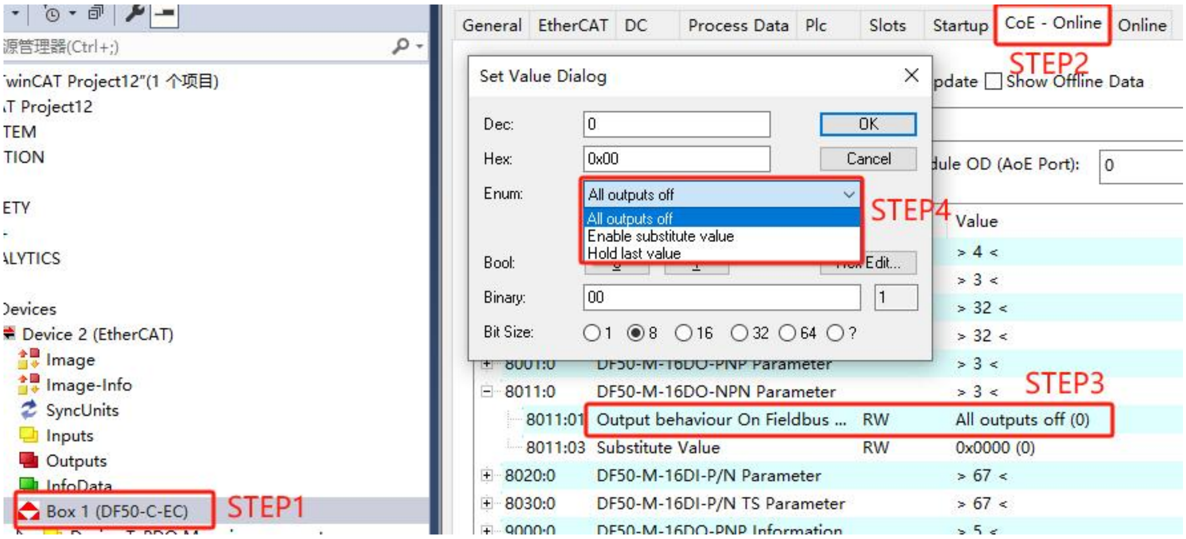
➢ As shown in the figure below, writing "1" to each channel can enable each channel output individually.



picture4-2-11

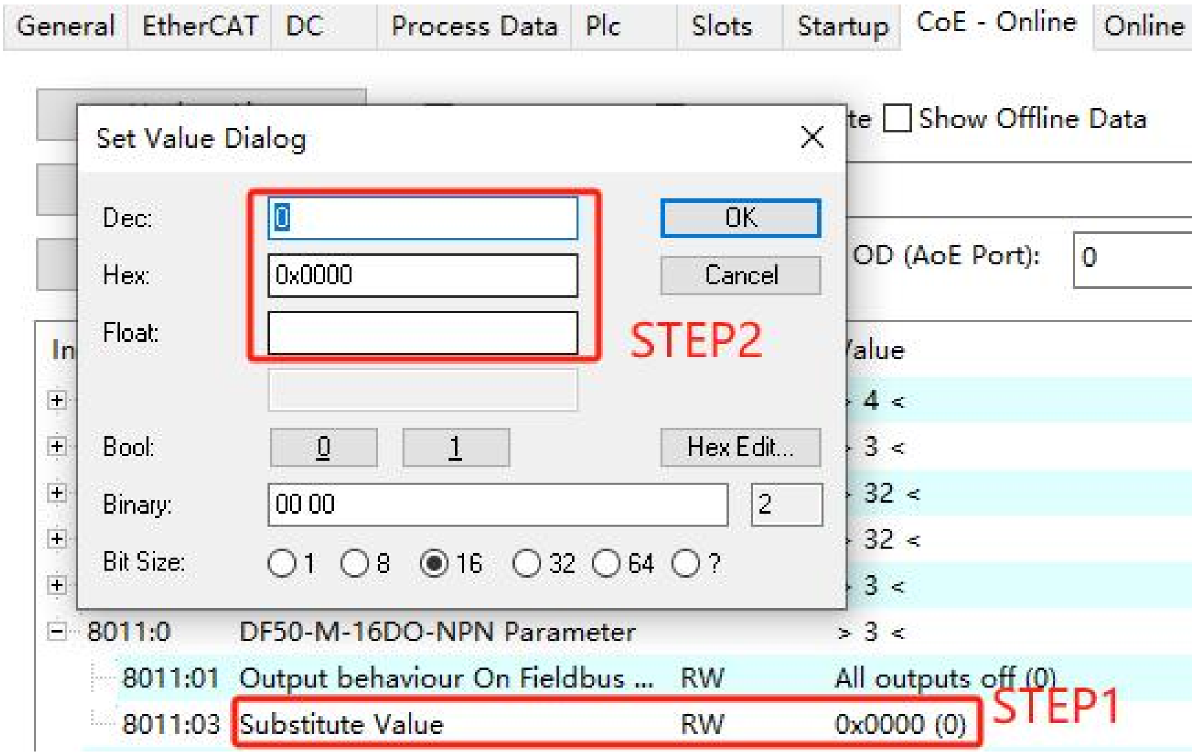
DF50-M-16DO-N digital output module

➢ Please refer to the module wiring diagramChapter 3 Section 4.2When the EC bus exits the OP state, this type of module can set the output state of the module. The setting method is shown in the figure below. It can be set to: all outputs are closed, use alternative value output, and keep the last value.



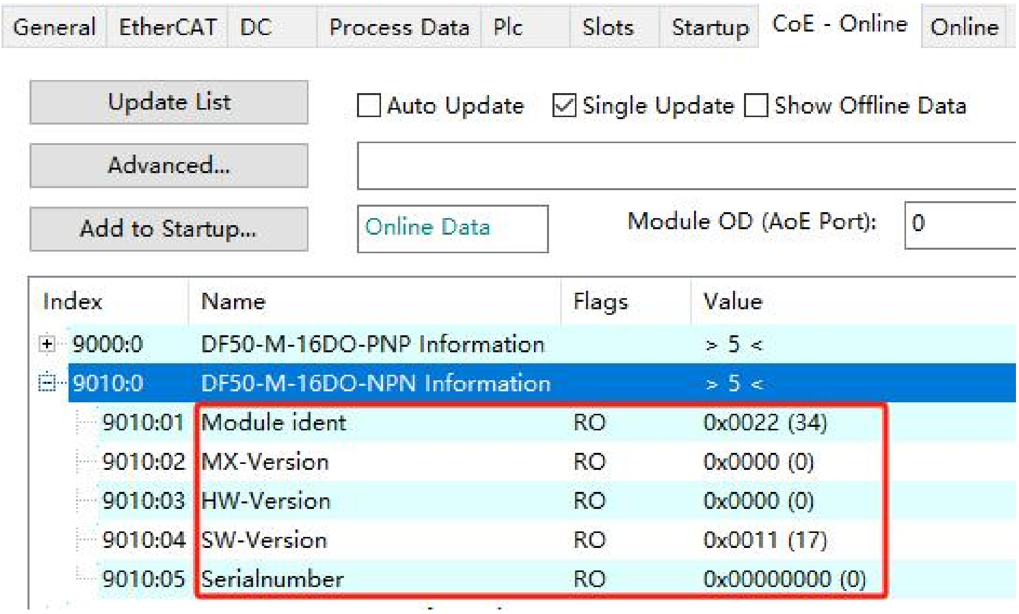
picture4-2-12Behavior on bus errors

➢ When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.



picture4-2-13Alternative value settings

➢ The module information is viewed as shown in the figure4-2-15, its meaning is as shown in the table4.2.5.

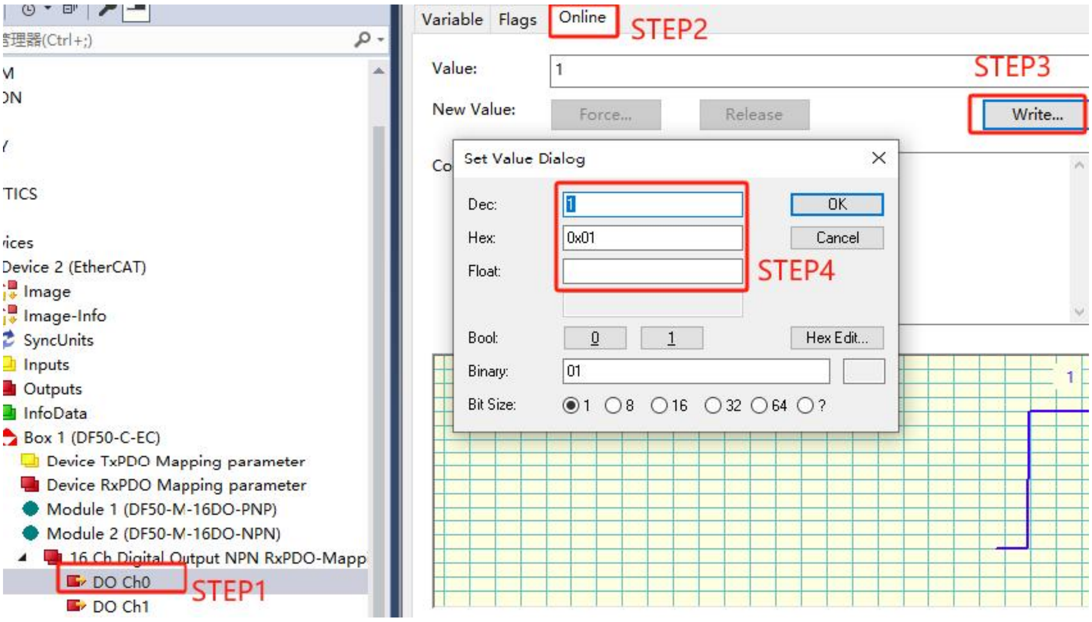


picture4-2-14Module Information

surface4.2.5Module information meaning

name	meaning
Module ident	Module ID
MX-Version	reserve
HW-Version	reserve
SW-Version	Software Version
Serial number	reserve

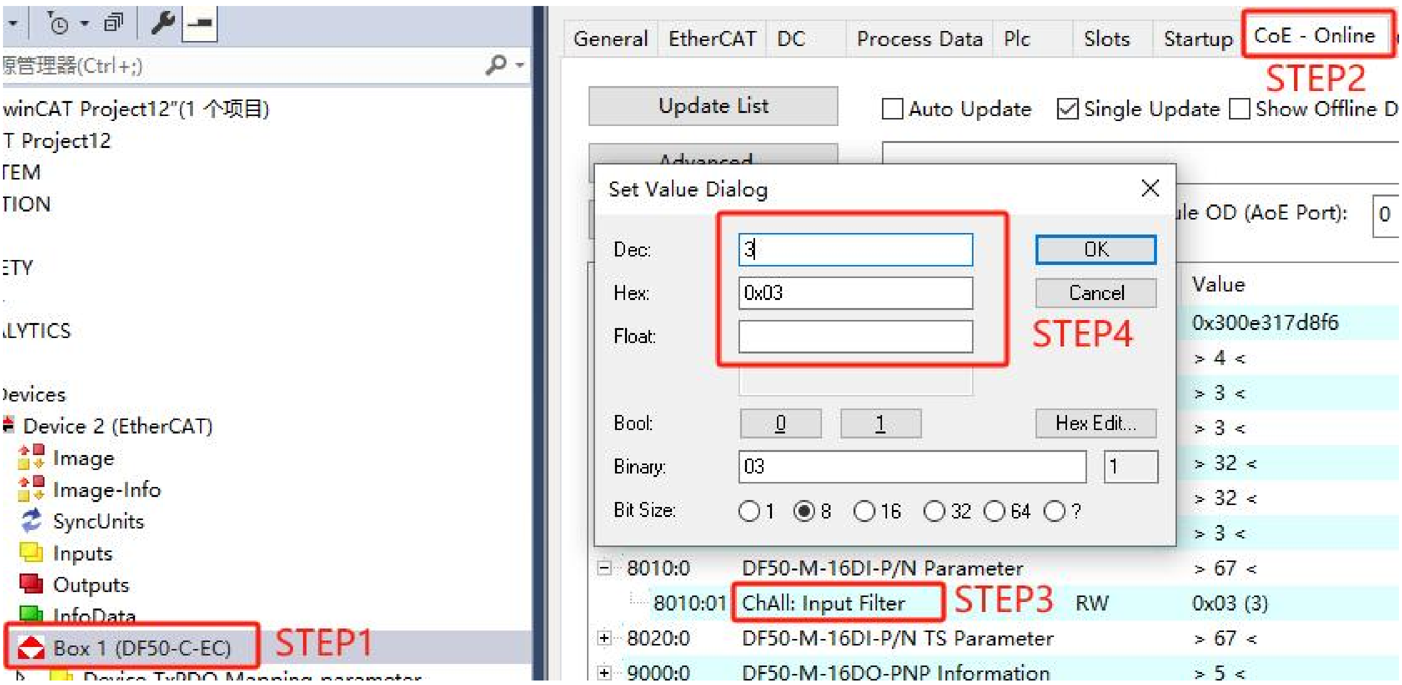
➢ As shown in the figure below, writing "1" to each channel can enable each channel output individually.



picture4-2-15Enable Output

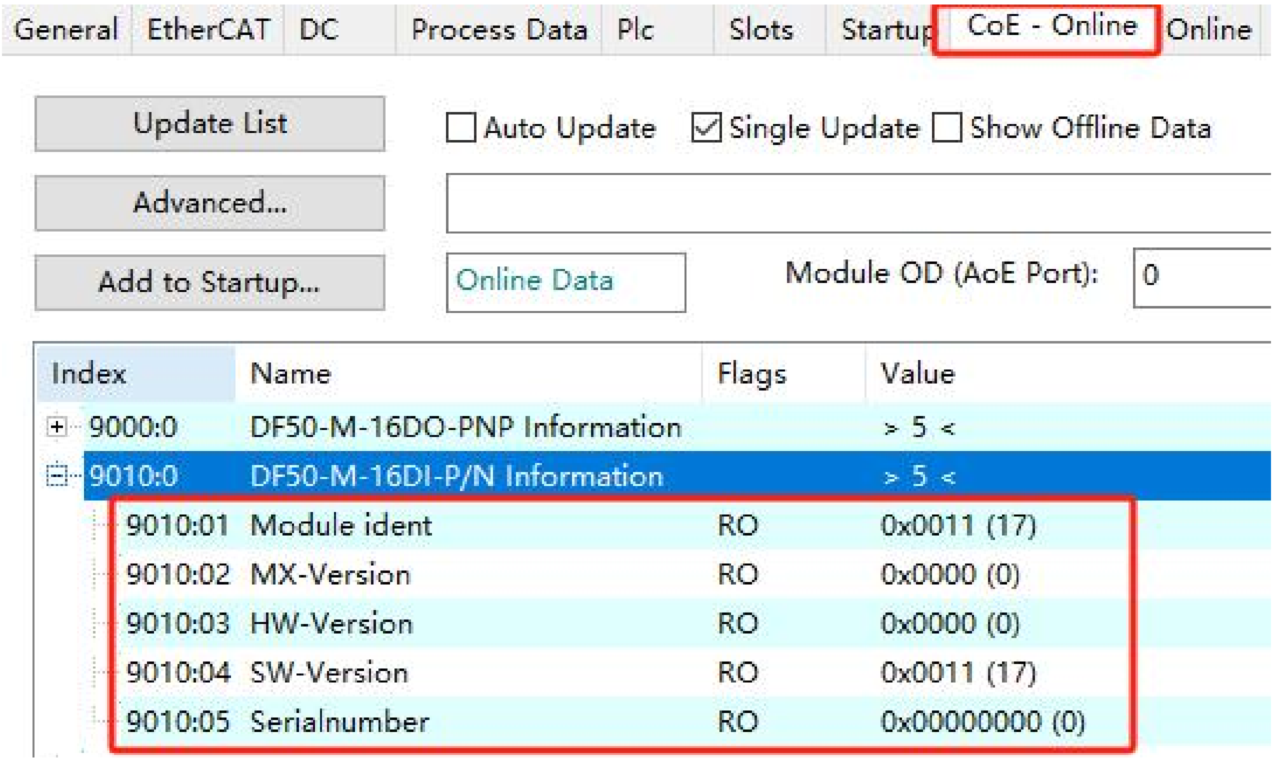
DF50-M-16DI-P/N digital input module

➢ Please refer to the wiring diagramChapter 3, Section 1.2This type of module can be configured for input filtering. The configuration method is shown in the figure below. The configurable range is 0~255ms.



picture4-2-16Input filter configuration

➢ The module information is viewed as shown in the figure4-2-17, its meaning is as shown in the table4.2.6.

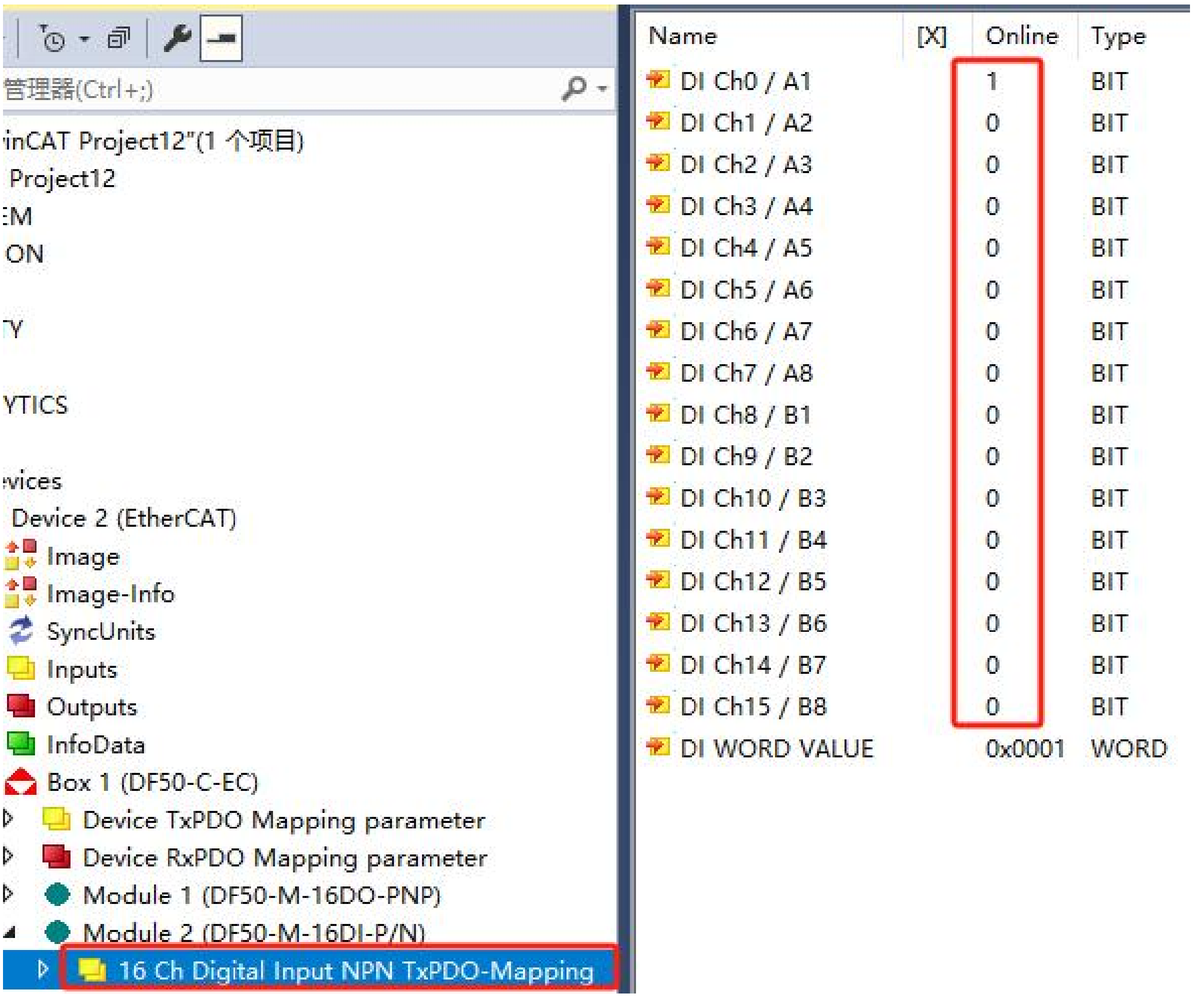


picture4-2-17Module Information

surface4.2.6Module information meaning

name	meaning
Module ident	Module ID
MX-Version	reserve
HW-Version	reserve
SW-Version	Software Version
Serial number	reserve

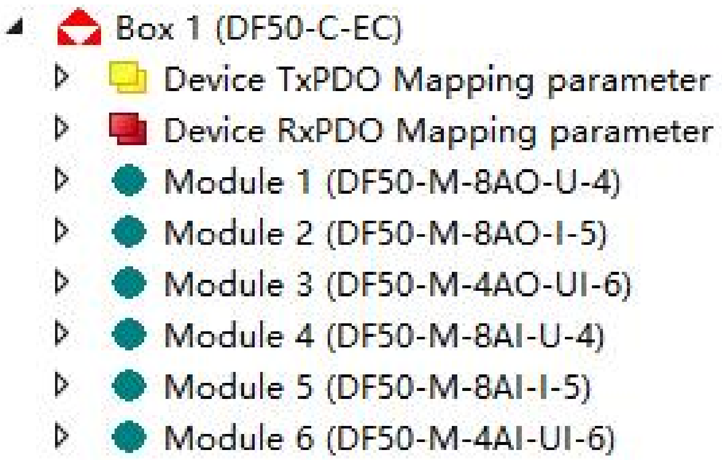
- As shown in the figure below, when a valid signal is input to the module, the corresponding channel value will become "1".



picture4-2-18

4.2.3 Analog module usage routine

- This example uses the topology of DF50-C-EC + DF50-M-8AO-U-4 + DF50-M-8AO-I-5 + DF50-M-4AO-UI-6 + DF50-M-8AI-U-4 + DF50-M-8AI-I-5 + DF50-M-4AI-UI-6. After scanning the slaves, the following is obtained:4-2-21.



picture4-2-twenty four

DF50-M-8AO-U-4 voltage output module

- Module wiring diagram seeChapter 3, Section 9.2As shown in the figure below, when the EC bus exits the OP state, this type of module can set the output state of the module. The parameters that can be set are: all outputs are closed, alternative value output is enabled, and the last value is maintained.

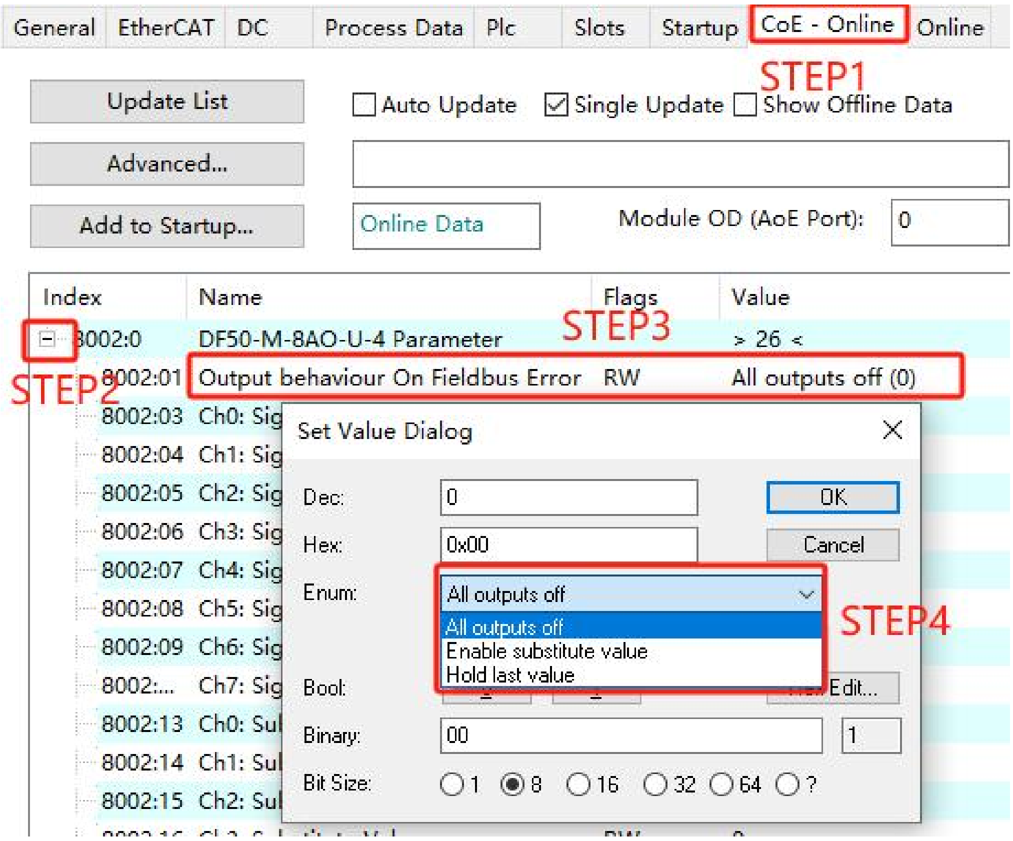
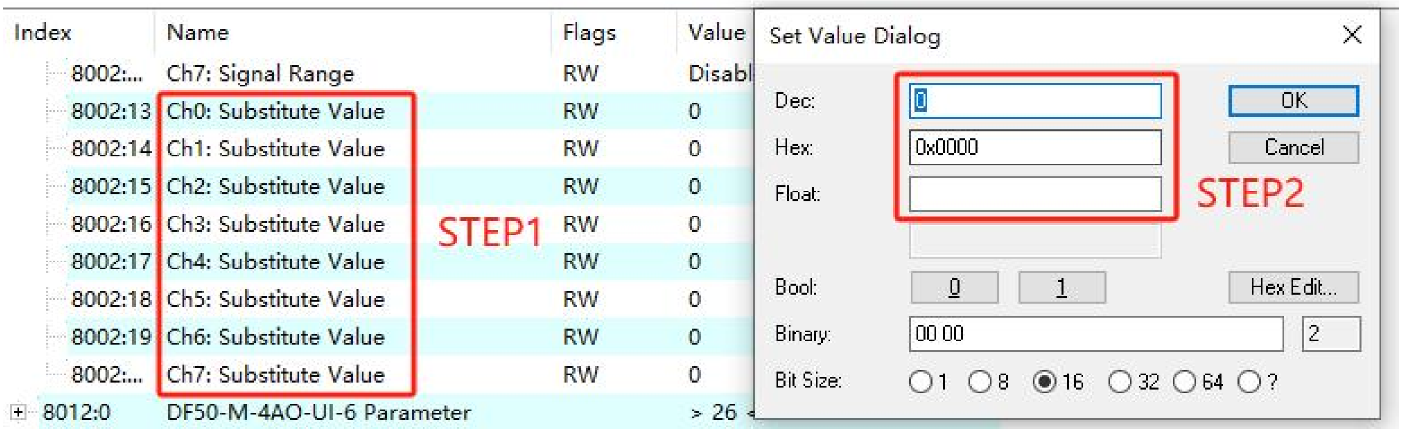


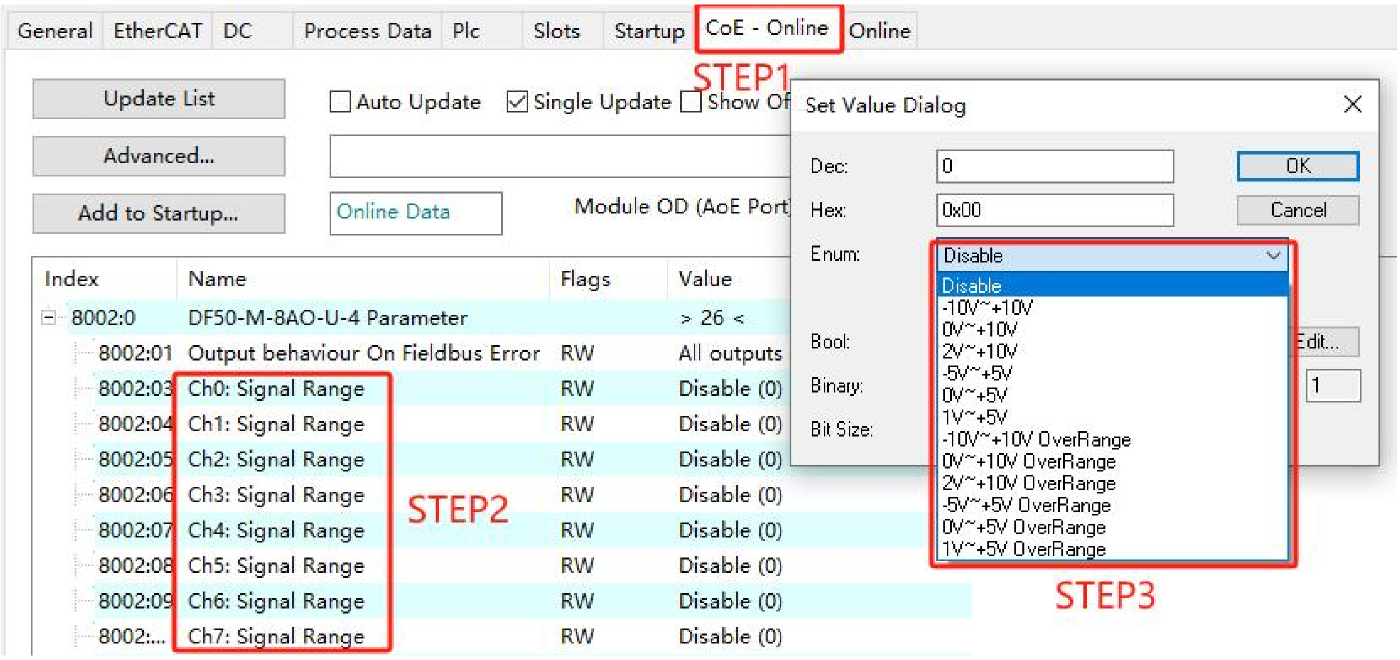
Figure 4-2-25Behavior on bus errors

➢ When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.



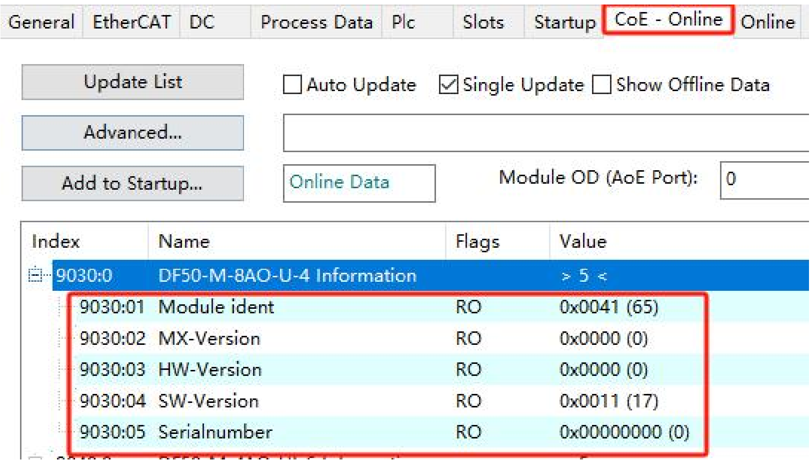
picture4-2-26Alternative value settings

➢ As shown in the figure below, you can set the output signal range of each channel.Note that the default signal range is Disable. You must select a signal range when adding a module..



picture4-2-27Output signal range

➢ The module information is viewed as shown in the figure4-2-28, its meaning is as shown in the table4.2.8.

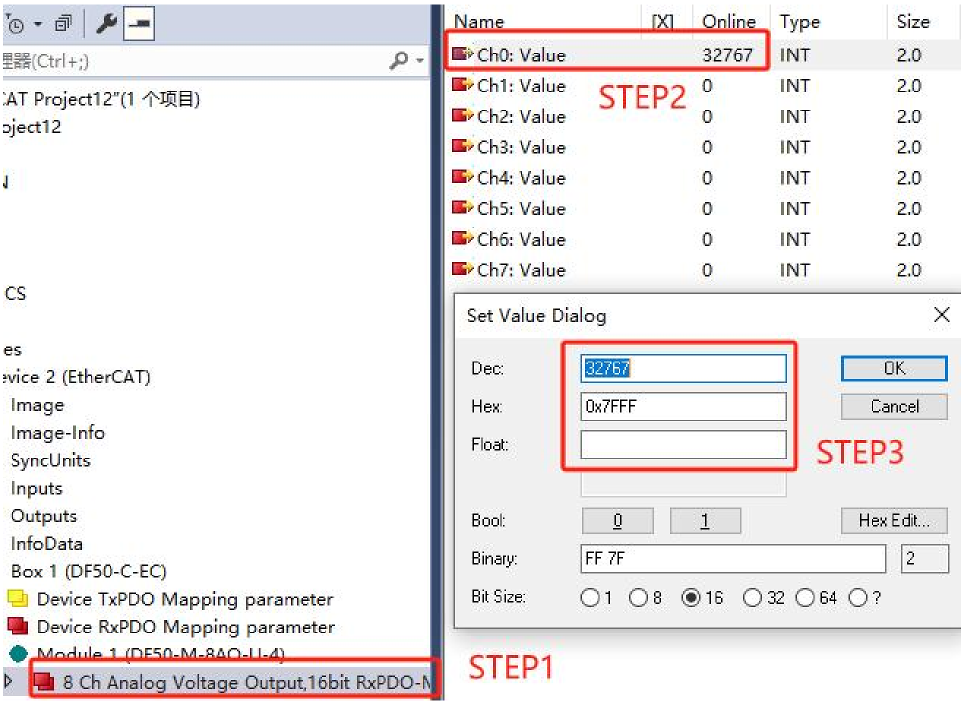


picture4-2-28Module Information

surface4.2.8Module information meaning

name	meaning
Module ident	Module ID
MX-Version	reserve
HW-Version	reserve
SW-Version	Software Version
Serial number	reserve

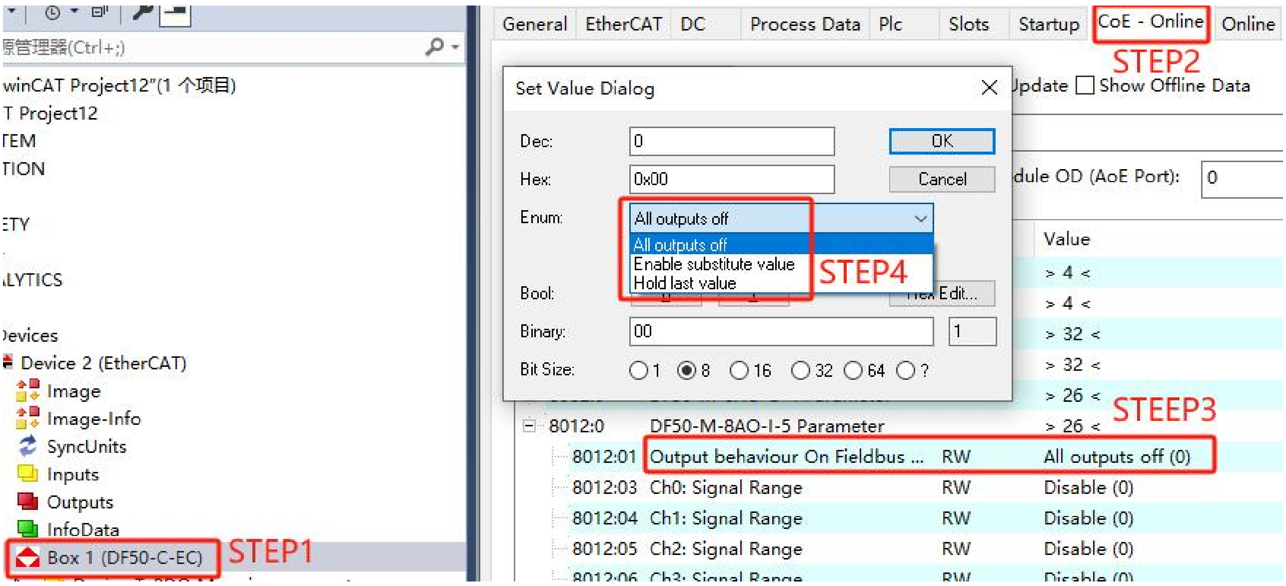
➢ After setting the output signal range of channel 0 to 0~10V.4-2-29, write "32767" to channel 0, and the multimeter can measure the output voltage of this channel as 10V.Chapter 3, Section 9.4.



picture4-2-29Output voltage

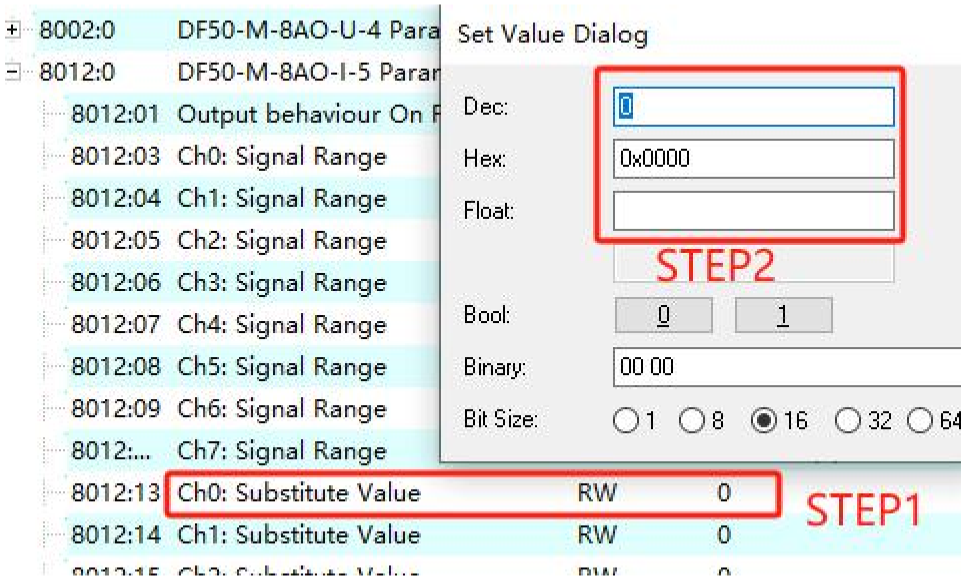
DF50-M-8AO-I-5 Current Output Module

- Module wiring diagram seeChapter 3, Section 10.2As shown in the figure below, when the EC bus exits the OP state, this type of module can set the output state of the module. The parameters that can be set are: all outputs are closed, alternative value output is enabled, and the last value is maintained.



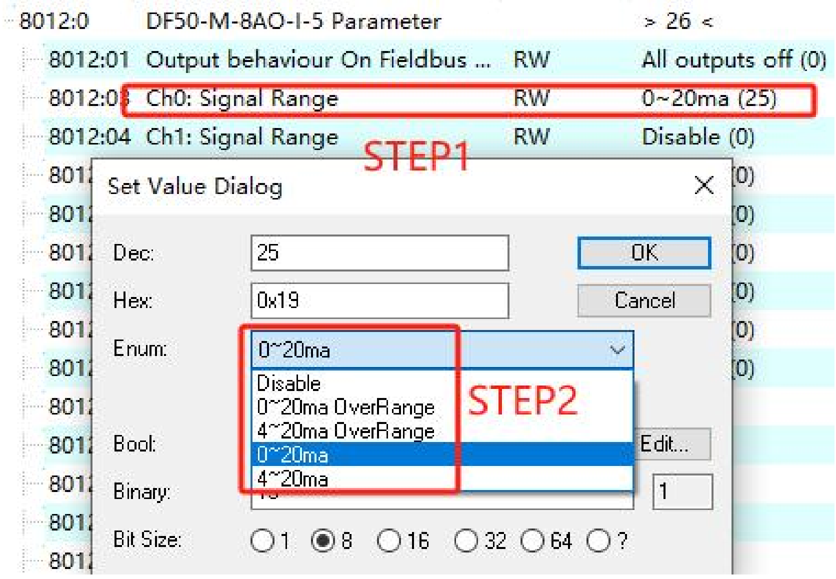
picture4-2-30Behavior on bus errors

- When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.



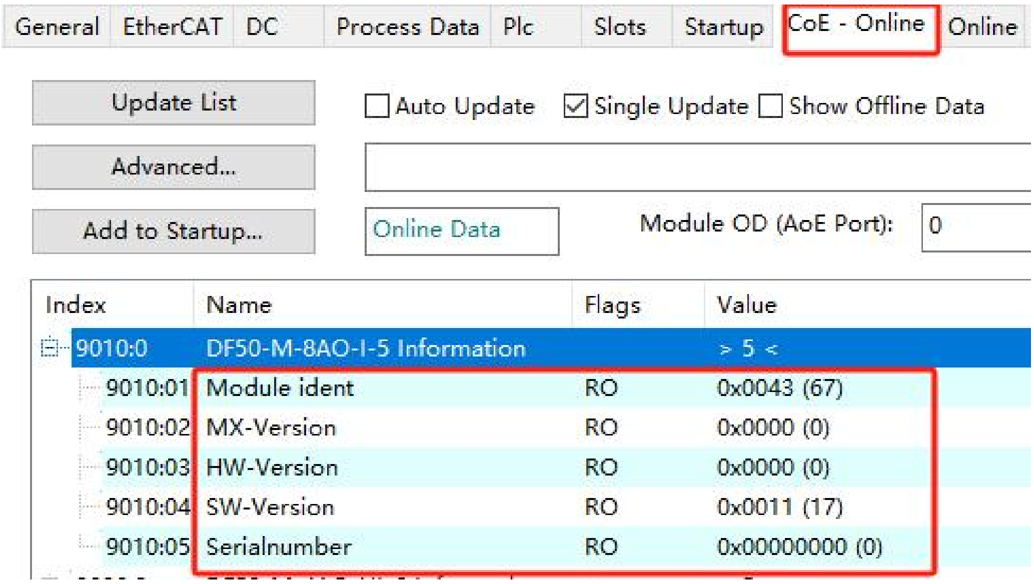
picture4-2-31Alternative value settings

➢ As shown in the figure below, you can set the output signal range of each channel.Note that the default signal range is Disable. You must select a signal range when adding a module..



picture4-2-32Output signal range setting

➢ The module information is viewed as shown in the figure4-2-33, its meaning is as shown in the table4.2.9.

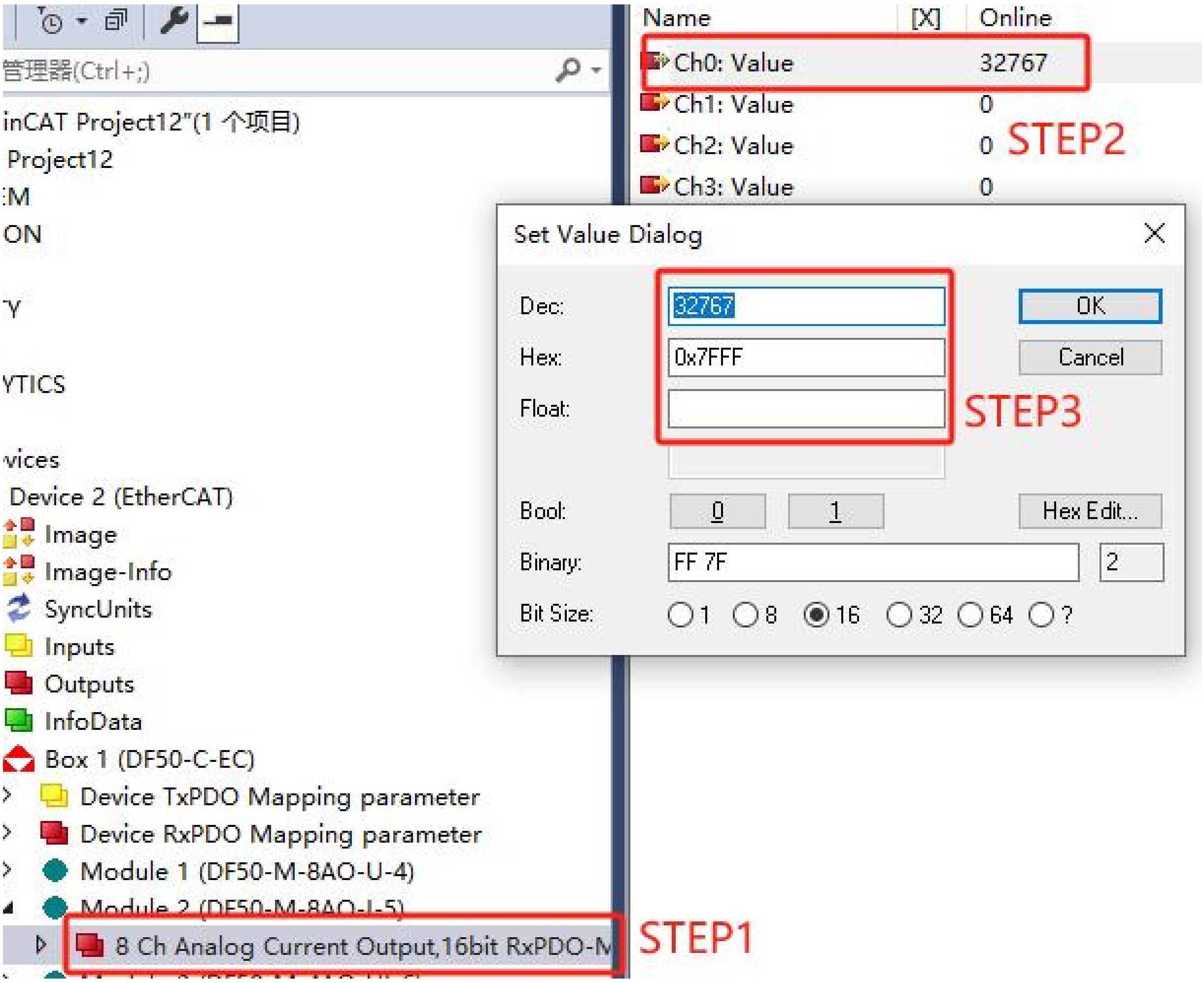


picture4-2-33Module Information

surface4.2.9Module information meaning

name	meaning
Module ident	Module ID
MX-Version	reserve
HW-Version	reserve
SW-Version	Software Version
Serial number	reserve

➢ After setting the output signal range of channel 0 to 0~20ma.4-2-34, write "32767" to channel 0, and the multimeter can measure the output current of this channel as 20ma.Chapter 3, Section 10.4.



picture4-2-34Current output

DF50-M-4AO-UI-6 Voltage/Current Output Module

➢ Module wiring diagram seeChapter 3, Section 8.2As shown in the figure below, when the EC bus exits the OP state, this type of module can set the output state of the module. The parameters that can be set are: all outputs are closed, alternative value output is enabled, and the last value is maintained.

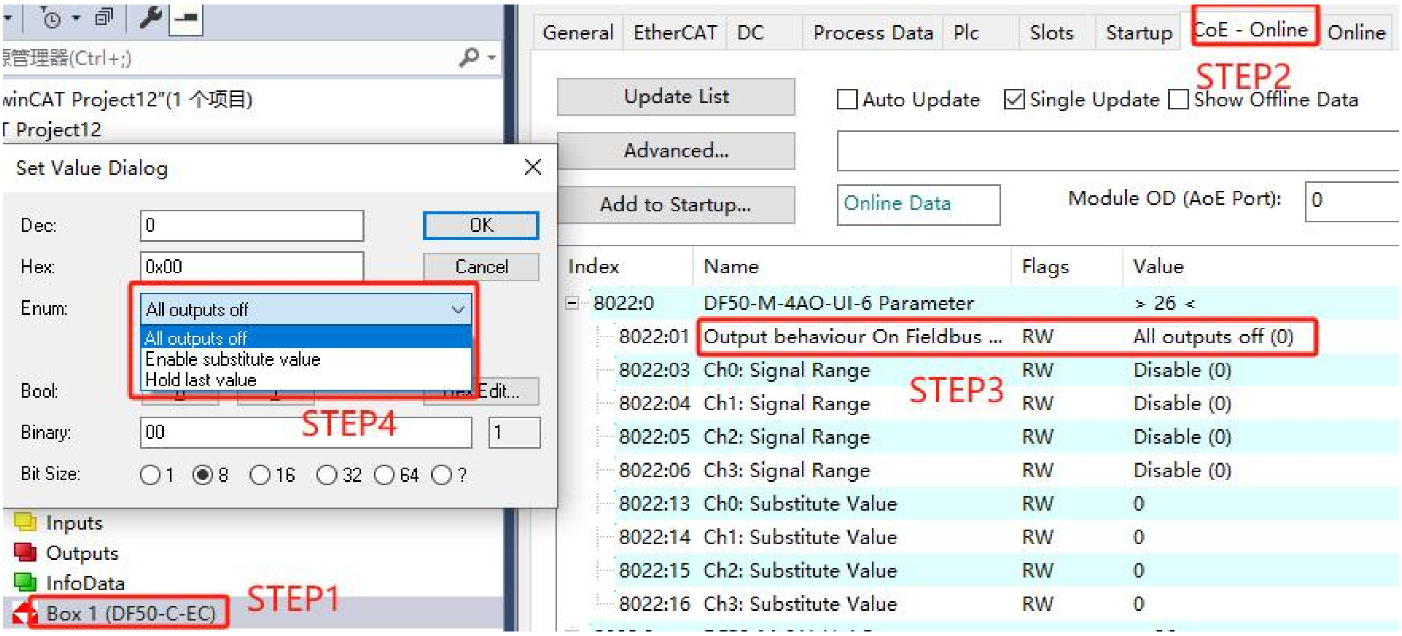
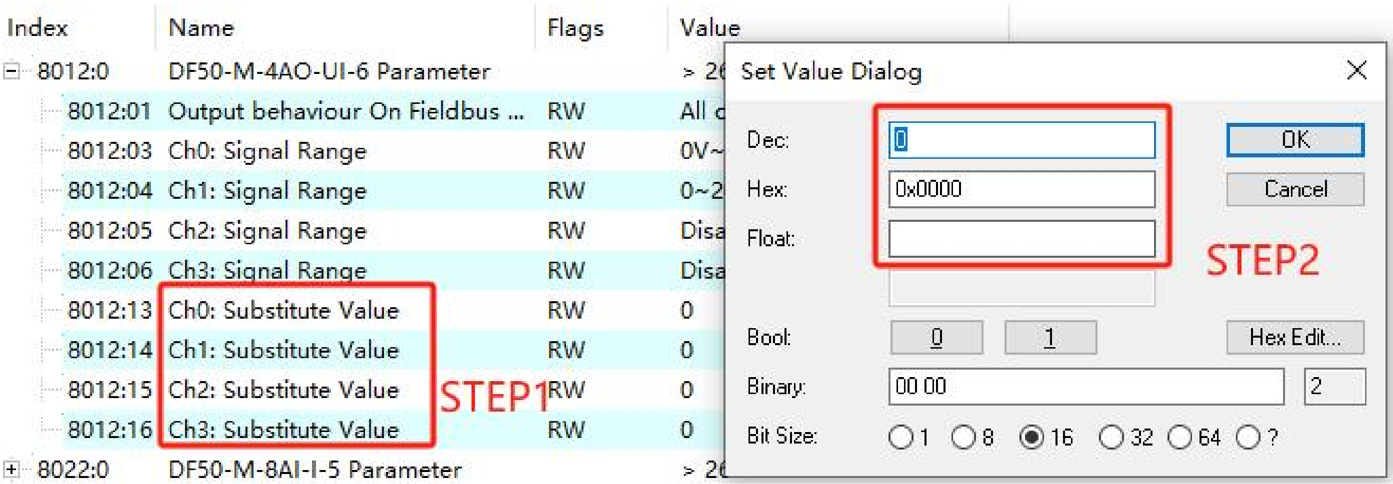


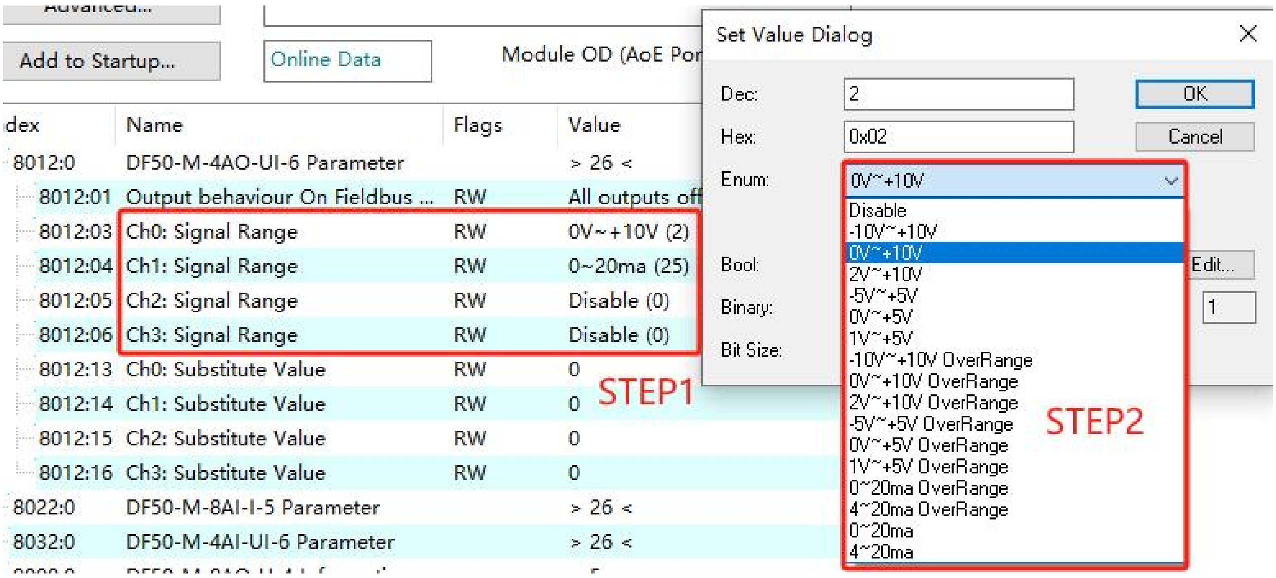
Figure 4-2-35Behavior on bus errors

➢ When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.



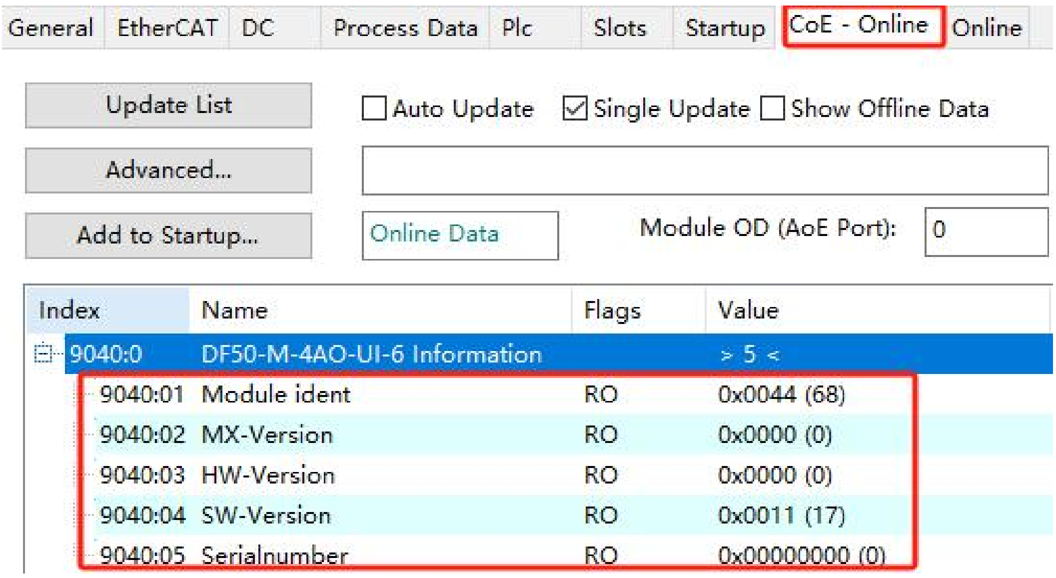
picture4-2-36Alternative value settings

➢ As shown in the figure below, you can set the output signal range of each channel. Note that the signal range is Disable by default. You must select a signal range when adding a module.



picture4-2-37Output signal range

➢ The module information is viewed as shown in the figure4-2-38, its meaning is as shown in the table4.2.10.

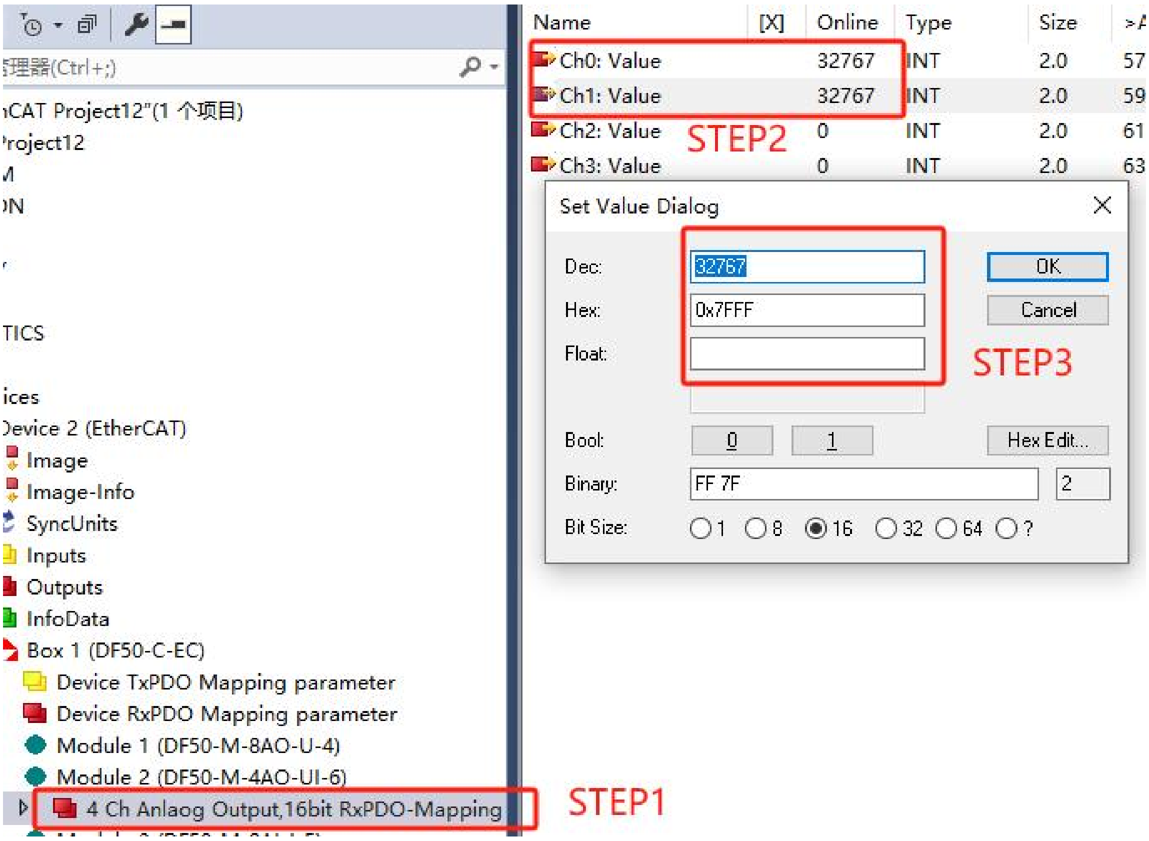


picture4-2-38Module Information

surface4.2.10Module information meaning

name	meaning
Module ident	Module ID
MX-Version	reserve
HW-Version	reserve
SW-Version	Software Version
Serial number	reserve

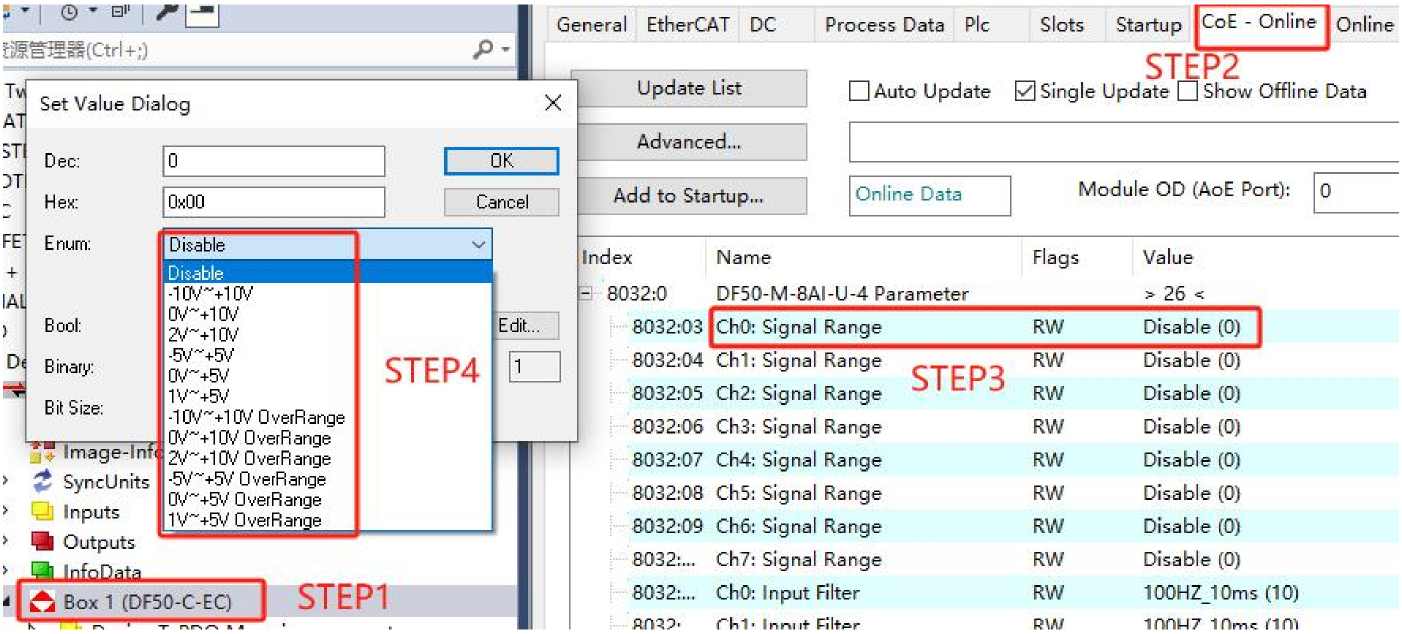
- Set the output signal range of channel 0 to 0~10V and the output range of channel 1 to 0~20ma.4-2-39, write "32767" to channel 0 and channel 1, and the multimeter can measure that the output voltage of channel 0 is 10V and the output current of channel 1 is 20ma.Chapter 3, Section 8.4.



picture4-2-39Output voltage or current

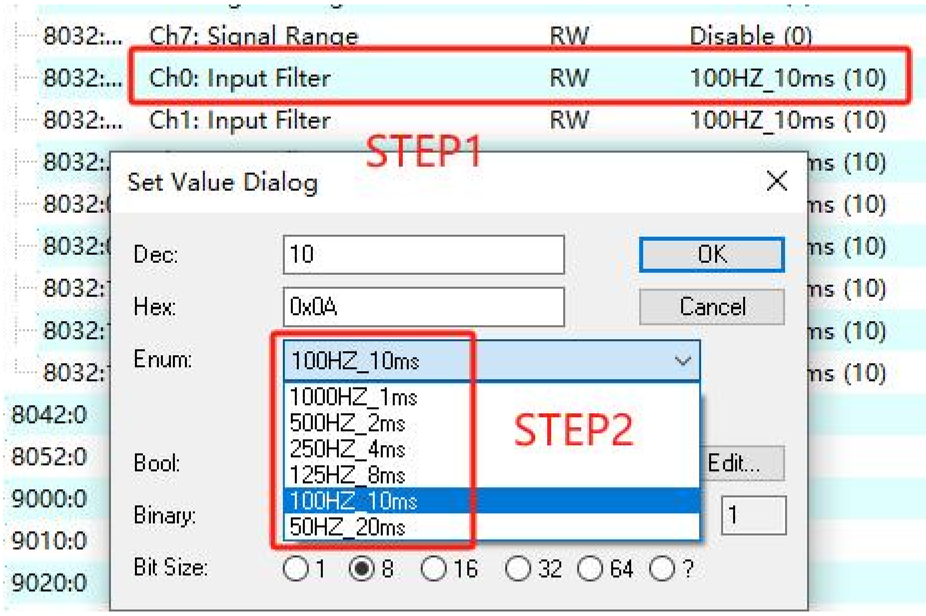
DF50-M-8AI-U-4 Voltage Input Module

- Module wiring diagram seeChapter 3, Section 7.2As shown in the figure below, you can set the sampling signal range of each channel. Note that the signal range is Disable by default. You must select a signal range when adding a module.



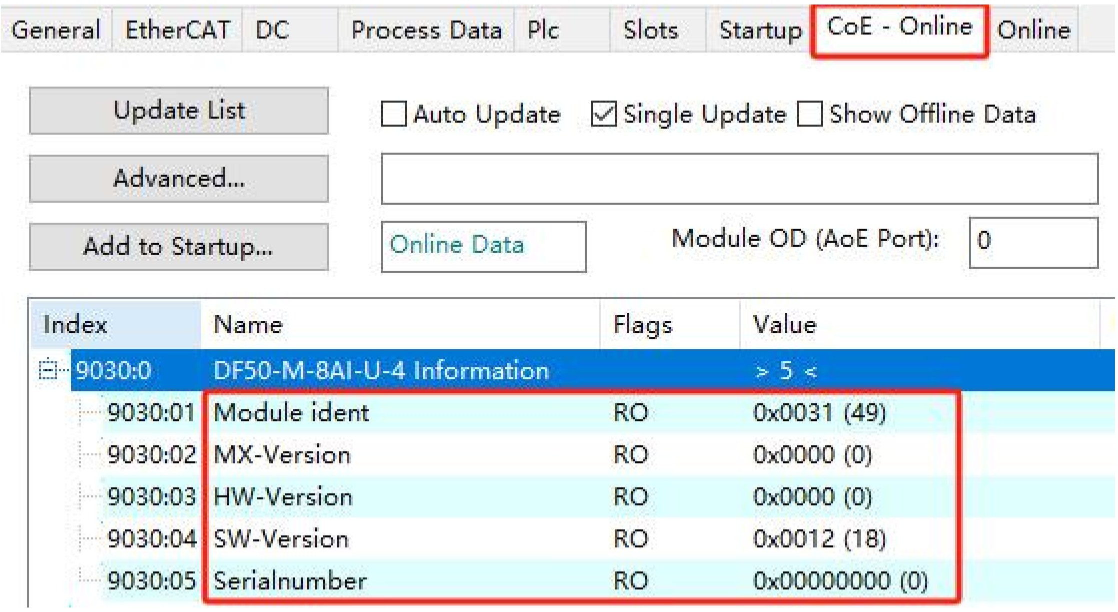
picture4-2-40Signal range setting

- As shown in the figure below, the input filter parameters can be configured, the default is 100HZ_10ms.



picture4-2-41Input filter settings

- The module information viewing method is shown in Figure 4-2-42, and its meaning is shown in Table 4.2.11.

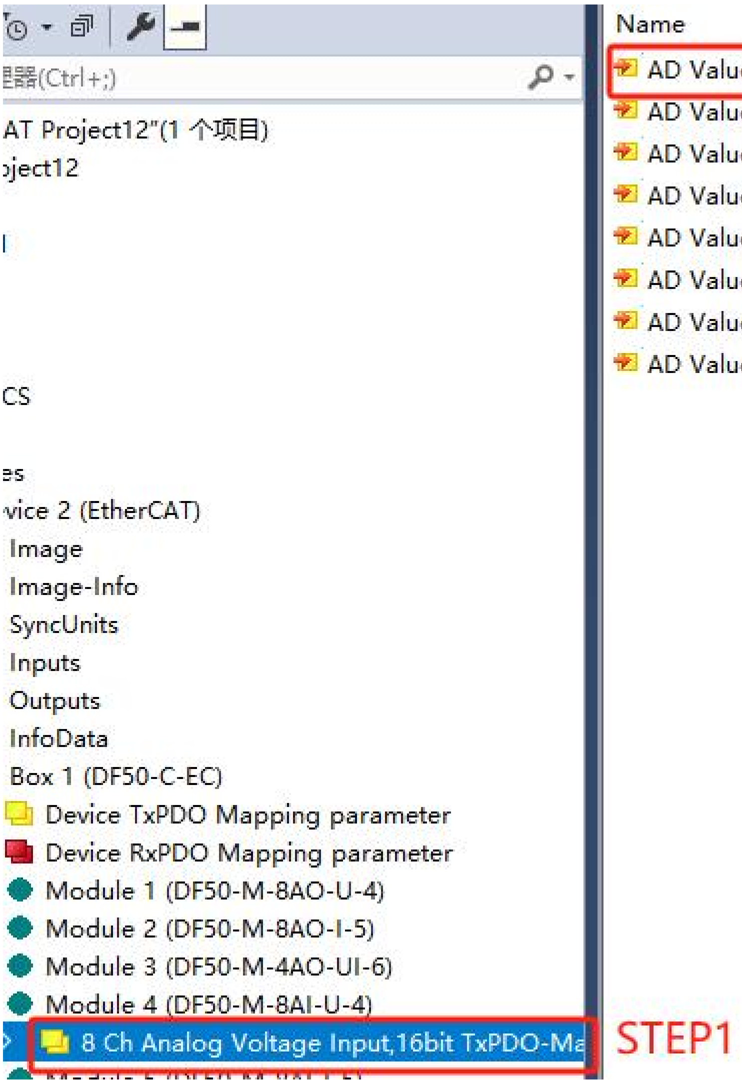


picture4-2-42Module Information

surface4.2.11Module information meaning

name	meaning
Module ident	Module ID
MX-Version	reserve
HW-Version	reserve
SW-Version	Software Version
Serial number	reserve

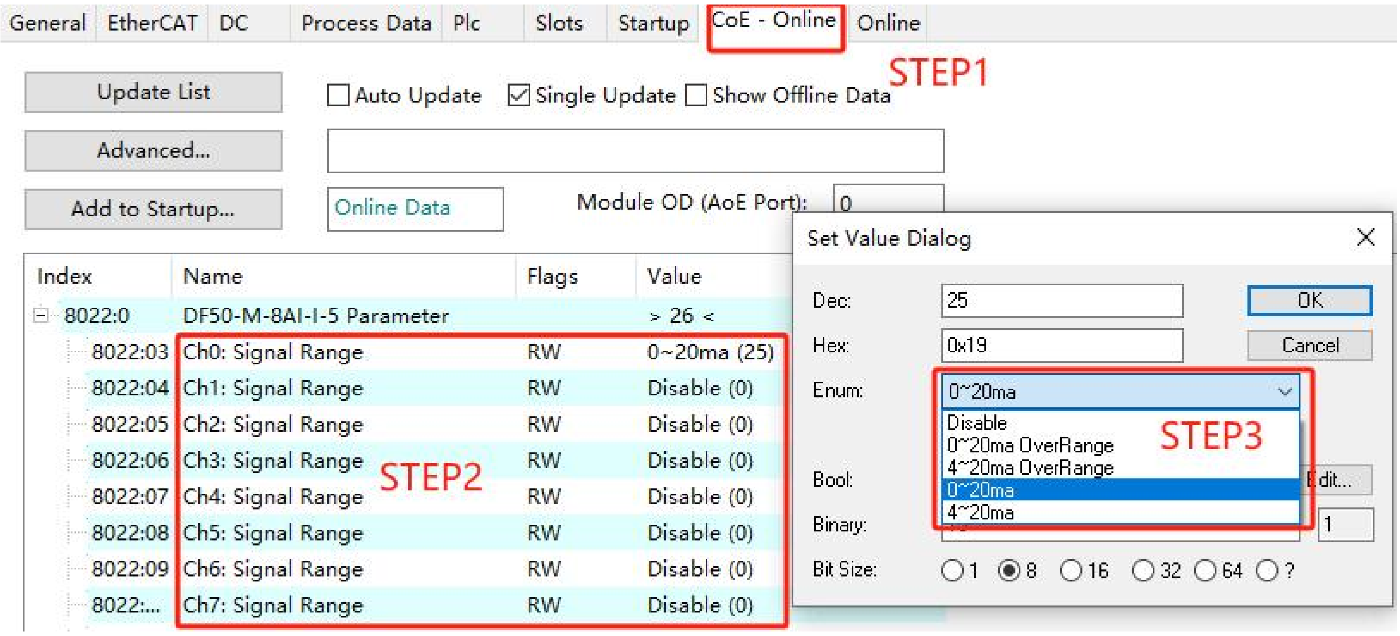
- After setting the sampling signal range of channel 0 to 0~10V. Input a 10V voltage signal to channel 0. As shown in the figure below, channel 0 displays a value of 32766. By conversion, we know that the collected voltage is9.999V, conversion relationship seeChapter 3, Section 7.4.



picture4-2-43Input signal

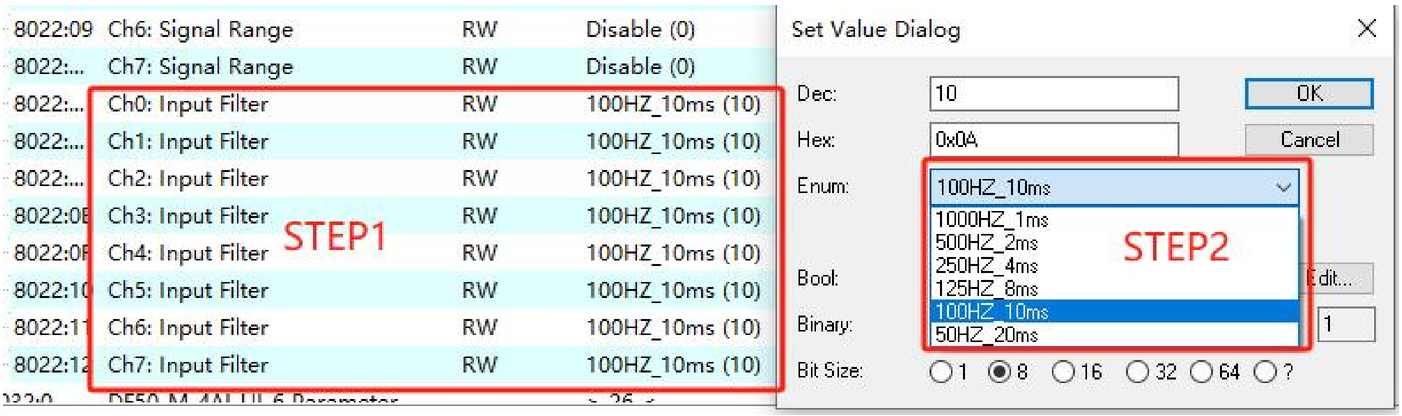
DF50-M-8AI-I-5 Current Input Module

➢ Module wiring diagram seeChapter 3, Section 6.2As shown in the figure below, you can set the sampling signal range of each channel. Note that the signal range is Disable by default. You must select a signal range when adding a module.



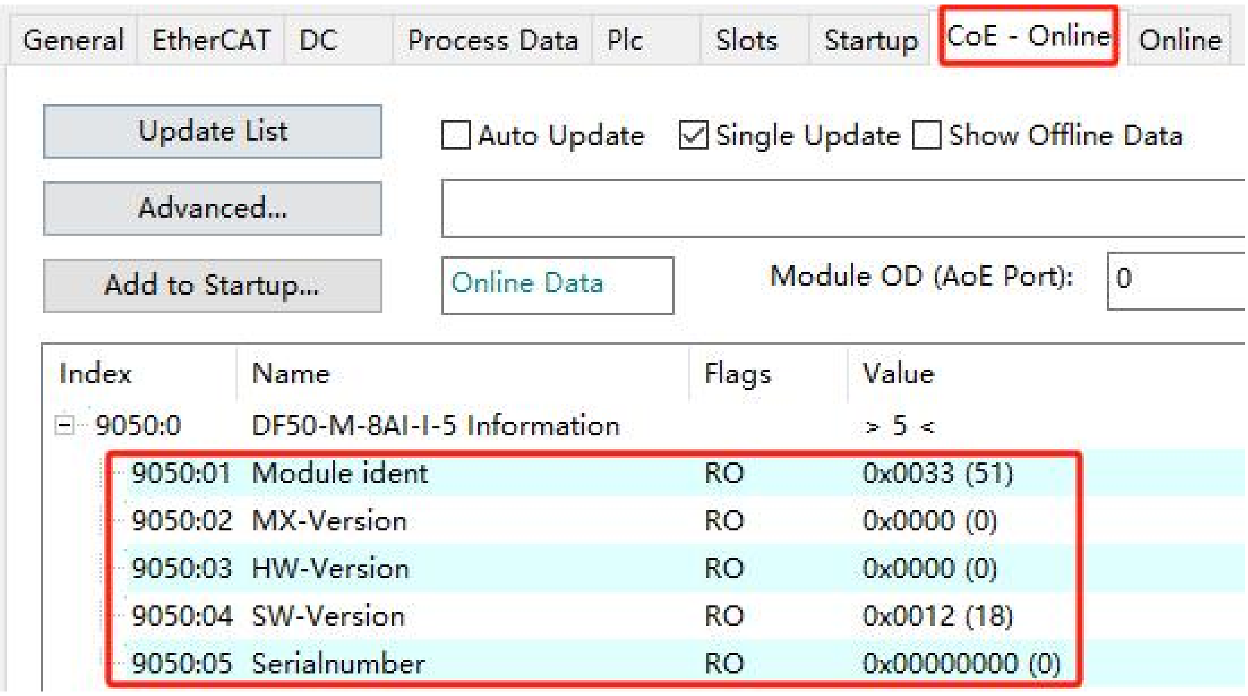
picture4-2-44Sampling signal range

➢ As shown in the figure below, the input filter parameters can be configured, the default is 100HZ_10ms.



picture4-2-45Input filter configuration

➢ The module information viewing method is shown in Figure 4-2-46, and its meaning is shown in Table 4.2.12.

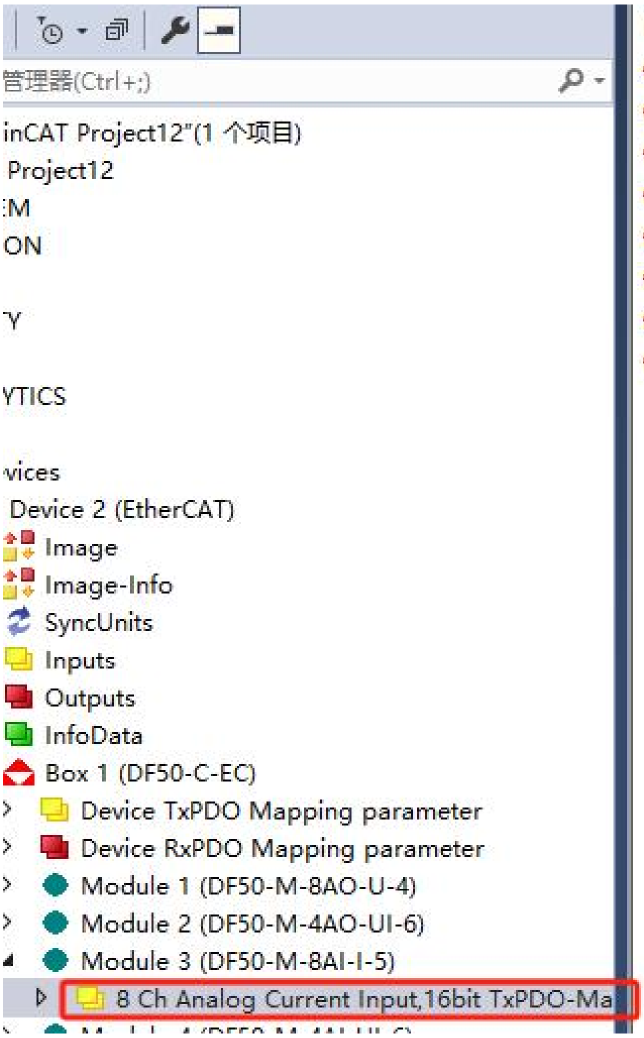


picture4-2-46Module Information

surface4.2.12Module information meaning

name	meaning
Module ident	Module ID
MX-Version	reserve
HW-Version	reserve
SW-Version	Software Version
Serial number	reserve

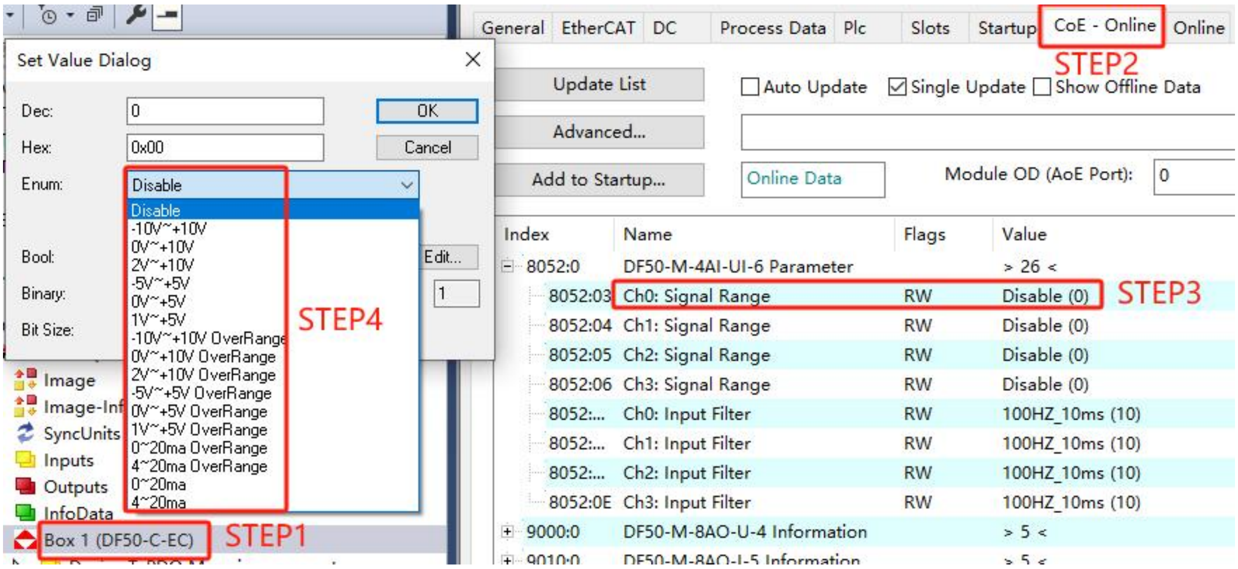
➢ After setting the sampling signal range of channel 0 to 0~20ma. Input a 10ma current signal to channel 0. As shown in the figure below, channel 0 displays a value of 16401. By conversion, we know that the collected current is 10.01ma, conversion relationship seeChapter 3, Section 6.4.



picture4-2-47Collect input current

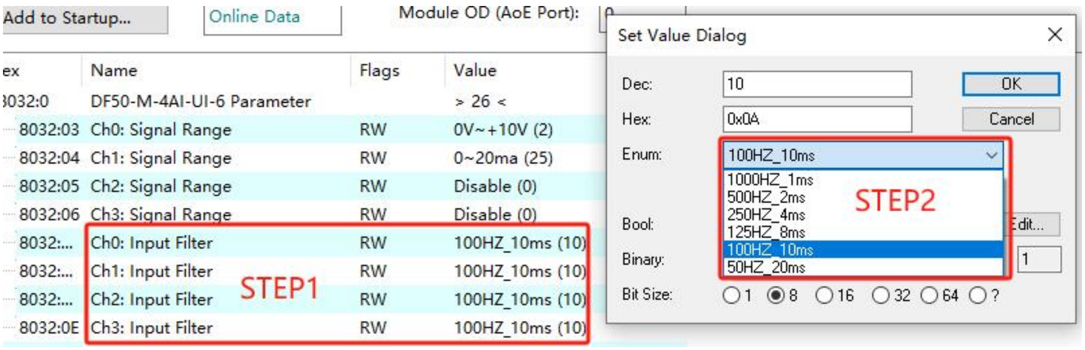
DF50-M-4AI-UI-6 Voltage/Current Input Module

➢ Module wiring diagram see Chapter 3, Section 5.2 As shown in the figure below, you can set the sampling signal range of each channel. Note that the signal range is Disable by default. You must select a signal range when adding a module.



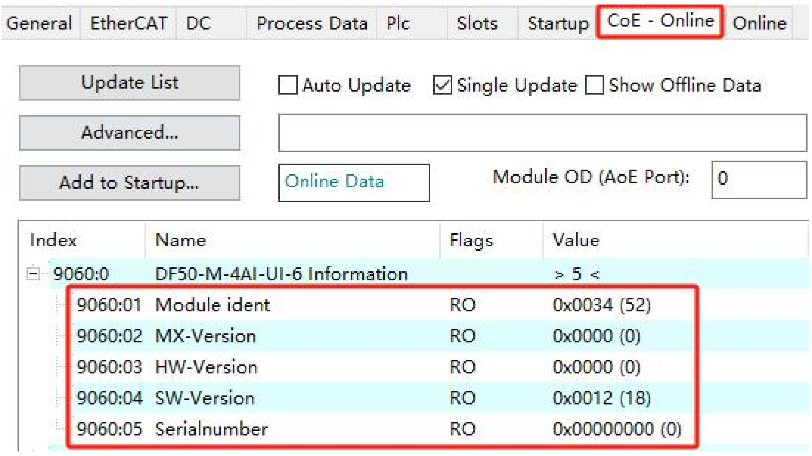
picture4-2-48Sampling signal range

➢ As shown in the figure below, the input filter parameters can be configured, the default is 100HZ_10ms.



picture4-2-49Filter configuration

➢ The module information viewing method is shown in Figure 4-2-50, and its meaning is shown in Table 4.2.13.

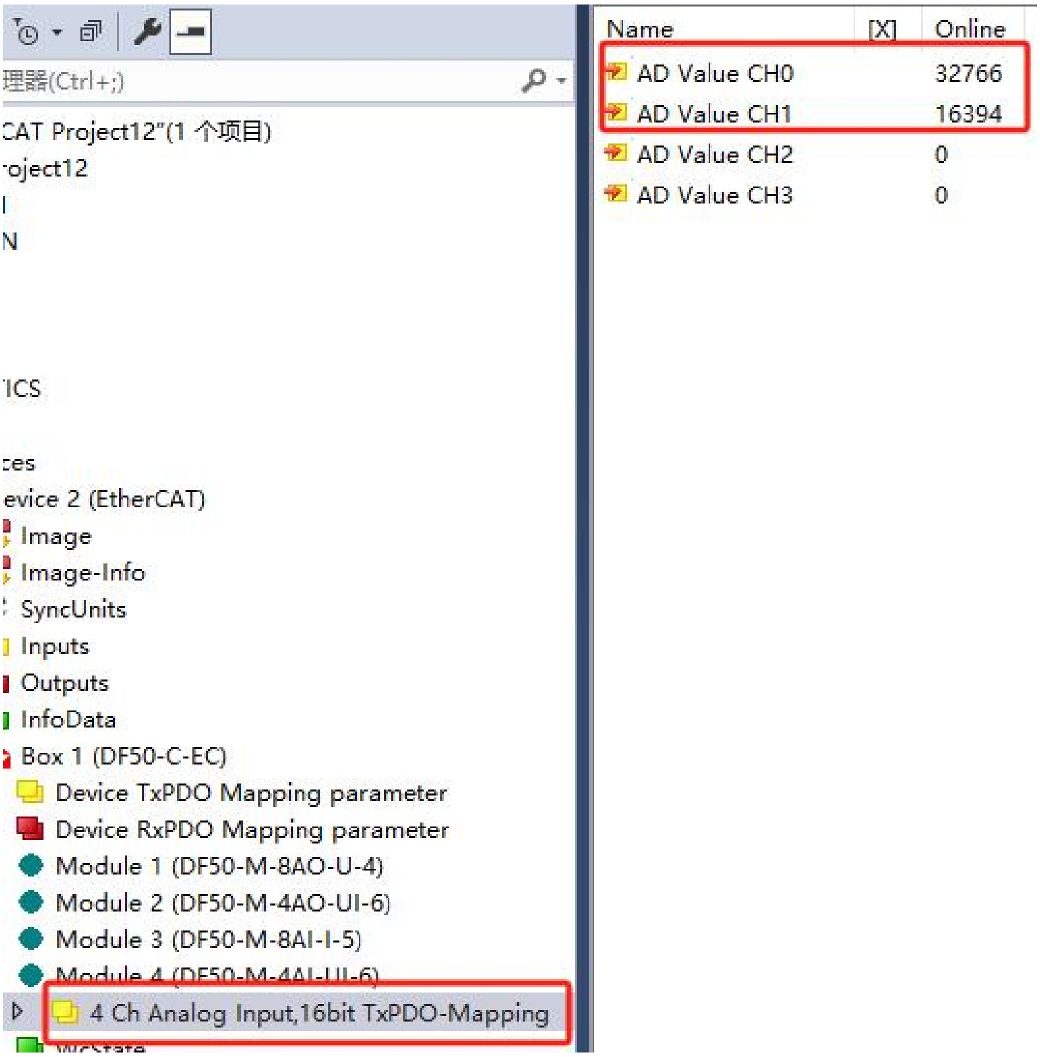


picture4-2-50Module Information

surface4.2.13Module information meaning

name	meaning
Module ident	Module ID
MX-Version	reserve
HW-Version	reserve
SW-Version	Software Version
Serial number	reserve

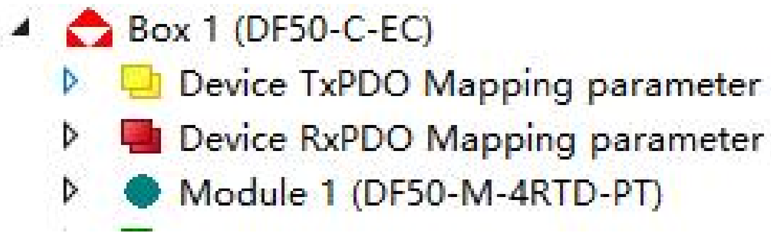
- After setting the sampling signal range of channel 0 to 0~10V and channel 1 to 0~20ma, input a 10V voltage signal to channel 0 and a 10ma current signal to channel 1. The collected data is shown in the figure below. Channel 0 displays a value of 32766 and channel 1 displays a value of 16394. Through conversion, it is known that channel 0 collects voltage9.999V, channel 1 collects current 10.006ma, conversion relationship seeChapter 3, Section 5.4.



picture4-2-51Collect voltage/current

4.2.4 Routine use of thermal resistance sensor data acquisition module

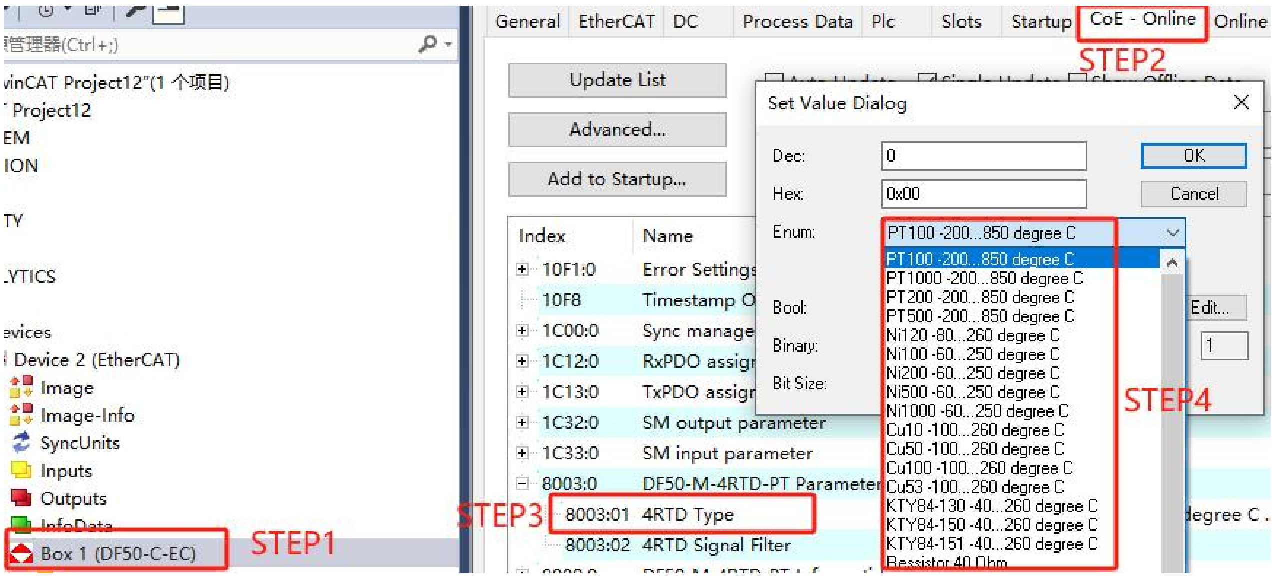
- This example uses the DF50-C-EC + DF50-M-4RTD-PT topology. After scanning the slaves, the following figure is shown.



picture4-2-52

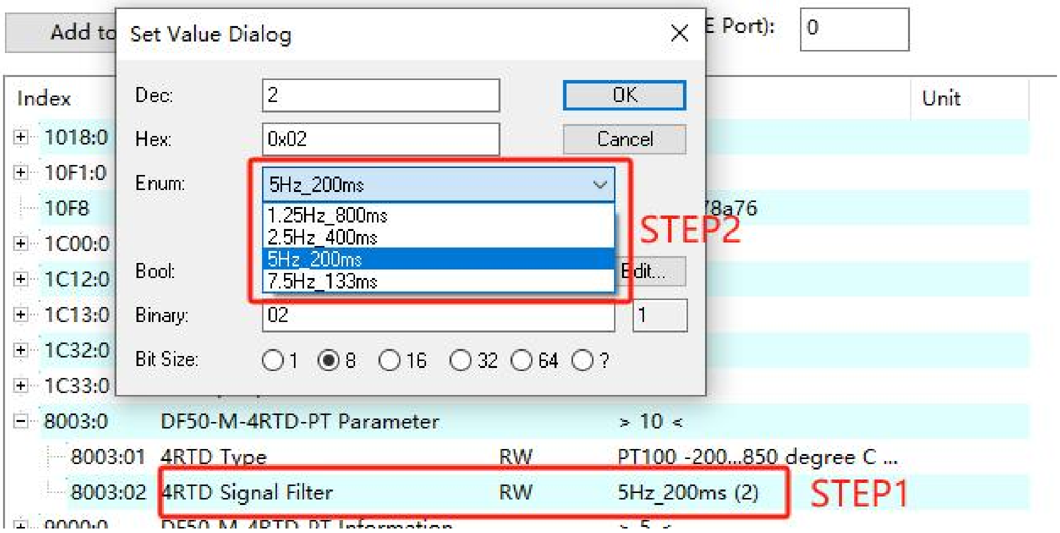
DF50-M-4RTD-PT Thermal Resistance Measurement Module

- Module wiring diagram see[Chapter 3, Section 11.2]The module supports multiple sensor types. The method for selecting the sensor type is shown in the figure below.



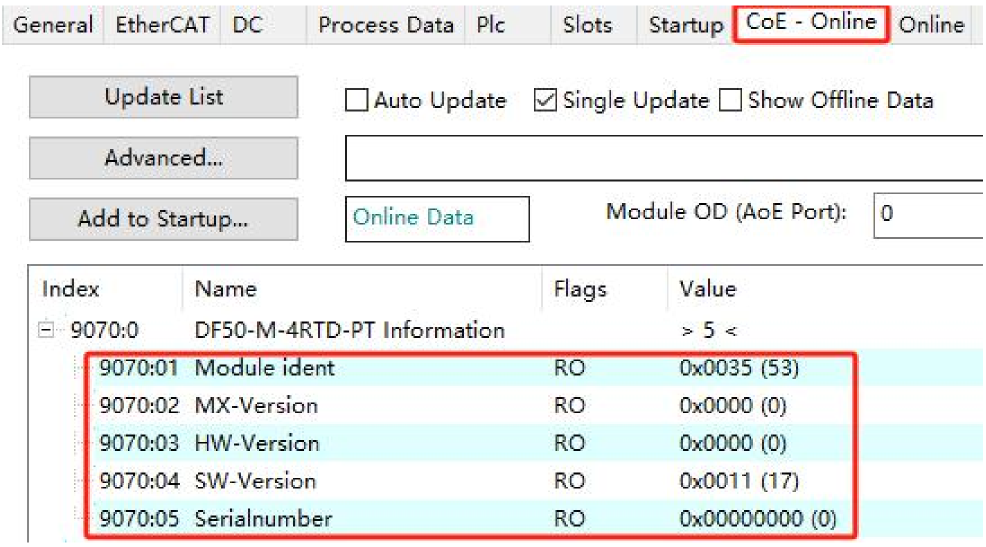
picture4-2-53Sensor Type Configuration

- As shown in the figure below, the input filter parameters can be configured, and the system default is 5Hz_200ms.



picture4-2-54Filter configuration

➢ The module information viewing method is shown in Figure 4-2-55 and its meaning is shown in Table 4.2.14.



picture4-2-55Module Information

surface4.2.14Module information meaning

name	meaning
Module ident	Module ID
MX-Version	reserve
HW-Version	reserve
SW-Version	Software Version
Serial number	reserve

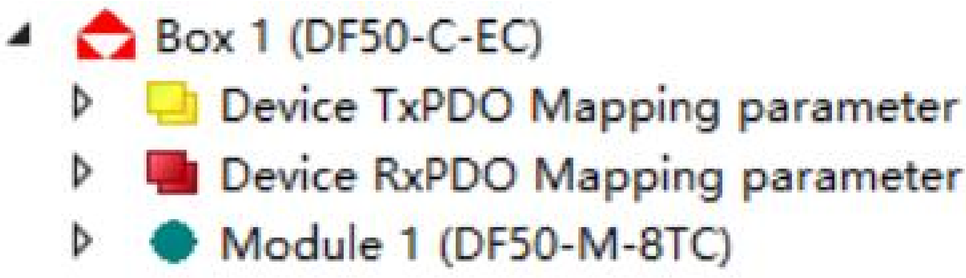
➢ DF50_M_4RTD_PT supports PT100 type sensors by default. The first channel is connected to the PT100 sensor, and the other channels are not connected to sensors. As shown in Figure 4-2-56, the reading of the first channel is 227, representing 22.7℃. The other channels are not connected to sensors, and the reading is -32768, indicating a disconnection. The conversion method is shown inChapter 3, Section 11.4.

Name	[X]	Online	Type	Size	>Add...	In/Out	Linked to
RTD Input CH0		227	INT	2.0	43.0	Input	
RTD Input CH1		-32768	INT	2.0	45.0	Input	
RTD Input CH2		-32768	INT	2.0	47.0	Input	
RTD Input CH3		-32768	INT	2.0	49.0	Input	

picture4-2-56Collect temperature values

4.2.5 Thermocouple sensor data acquisition module usage routine

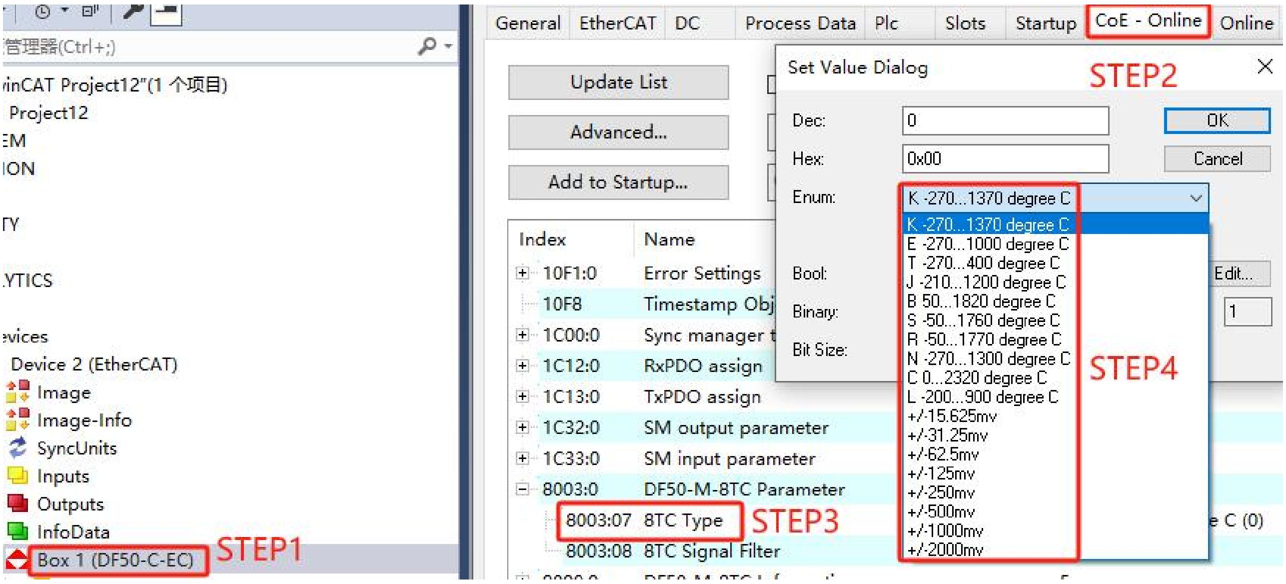
➢ This example uses the DF50-C-EC + DF50-M-8TC topology. After scanning the slaves, the following figure is shown.



picture4-2-57

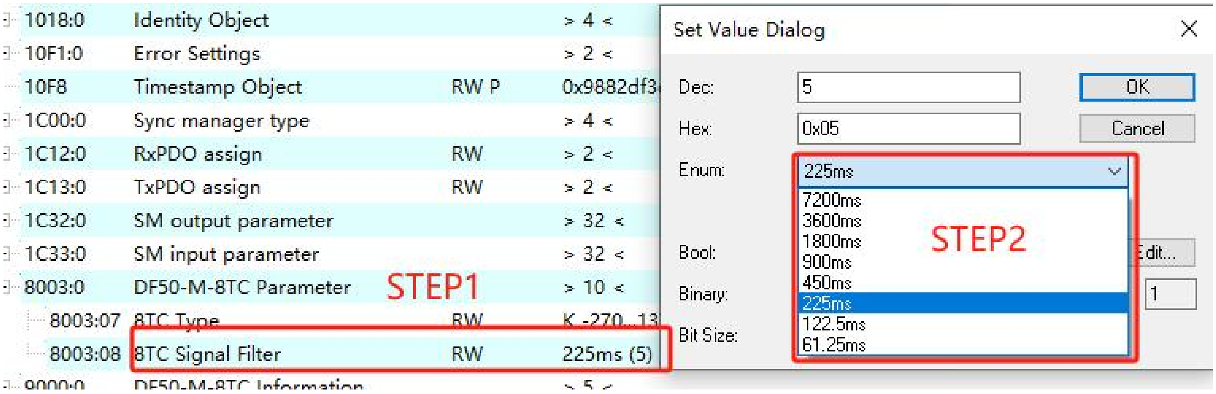
DF50-M-8TC Thermocouple Measurement Module

➢ Module wiring diagram see[Chapter 3, Section 12.2]For process data definition, please refer to[Chapter 3, Section 12.4]As shown in the figure below, you can configure the acquisition sensor type. The default is K-type thermocouple.



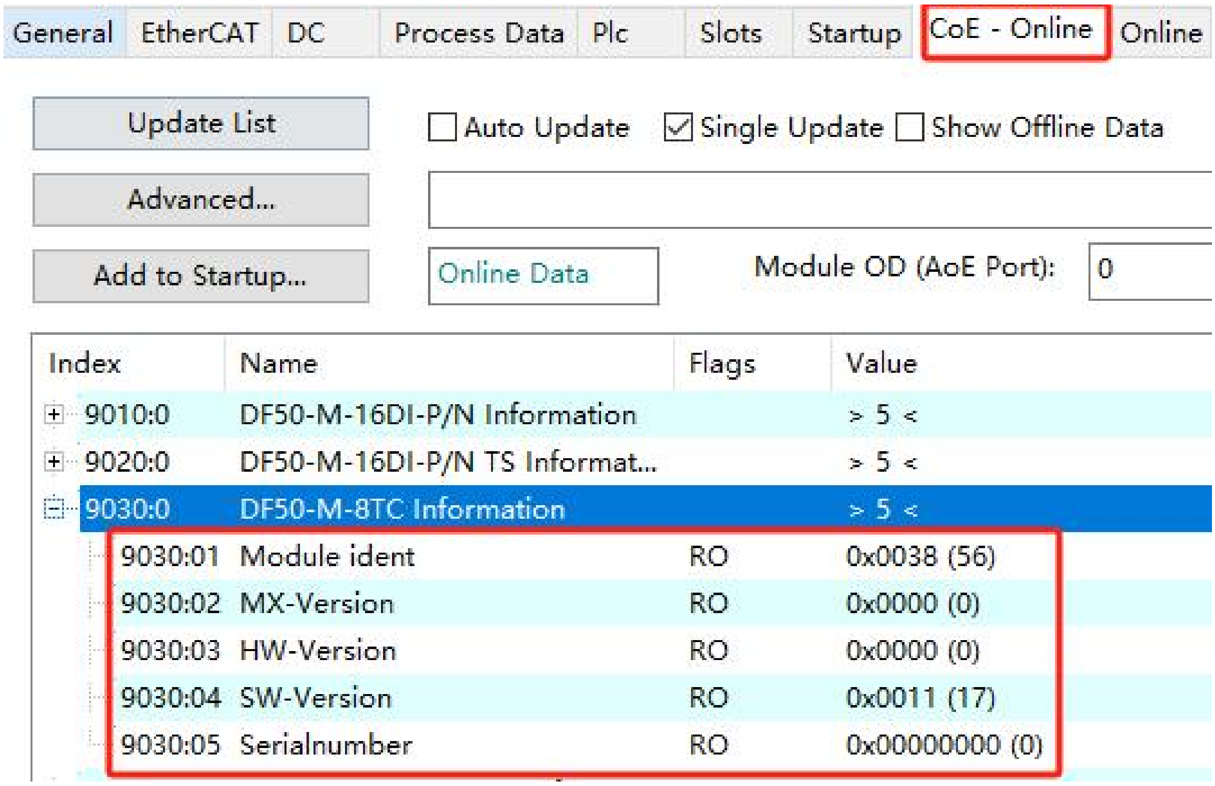
picture4-2-58Sensor Type Configuration

➢ As shown in the figure below, the module signal filter configuration can be performed. The default is 225ms.



picture4-2-59Signal filtering configuration

➢ The module information viewing method is shown in Figure 4-2-60, and its meaning is shown in Table 4.2.15.



picture4-2-60Module Information

surface4.2.15Module information meaning

name	meaning
Module ident	Module ID
MX-Version	reserve
HW-Version	reserve
SW-Version	Software Version
Serial number	reserve

- DF50-M-8TC supports K-type thermocouples by default.4-2-61 shows that the first channel is connected to a K-type thermocouple and is not compensated. Other channels are not connected to sensors. The temperature data is displayed as shown in the figure. The reading of the first channel is 221, representing 22.1°C. Other channels are not connected to sensors and the reading is -32768, indicating a disconnection.

Name	[X]	Online	Type	Size	>Add...	Linked to
TC Value CH0		221	INT	2.0	43.0	
TC Value CH1		-32768	INT	2.0	45.0	
TC Value CH2		-32768	INT	2.0	47.0	
TC Value CH3		-32768	INT	2.0	49.0	
TC Value CH4		-32768	INT	2.0	51.0	
TC Value CH5		-32768	INT	2.0	53.0	
TC Value CH6		-32768	INT	2.0	55.0	
TC Value CH7		-32768	INT	2.0	57.0	

Name	[X]	Online	Type	Size	>Add...	Linked to
Offset Value CH0		0	INT	2.0	41.0	
Offset Value CH1		0	INT	2.0	43.0	
Offset Value CH2		0	INT	2.0	45.0	
Offset Value CH3		0	INT	2.0	47.0	
Offset Value CH4		0	INT	2.0	49.0	
Offset Value CH5		0	INT	2.0	51.0	
Offset Value CH6		0	INT	2.0	53.0	
Offset Value CH7		0	INT	2.0	55.0	

picture4-2-61Acquisition of temperature signal

- "Offset Value CH0~"Offset Value CH7" is used to compensate for the sampling error between sensors.4-2As shown in Figure 62, the same 22°C signal is input, the temperature of the first channel is compensated by 100, and the temperature is displayed as 320, representing 32.0°C.

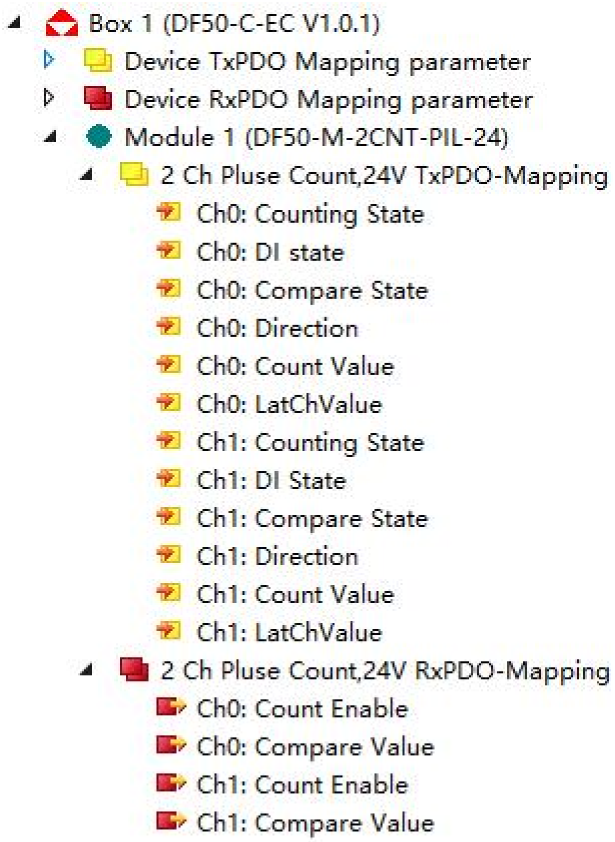
Name	[X]	Online	Type	Size	>Add...	Linked to
TC Value CH0		320	INT	2.0	43.0	
TC Value CH1		-32768	INT	2.0	45.0	
TC Value CH2		-32768	INT	2.0	47.0	
TC Value CH3		-32768	INT	2.0	49.0	
TC Value CH4		-32768	INT	2.0	51.0	
TC Value CH5		-32768	INT	2.0	53.0	
TC Value CH6		-32768	INT	2.0	55.0	
TC Value CH7		-32768	INT	2.0	57.0	

Name	[X]	Online	Type	Size	>Add...	Linked to
Offset Value CH0		100	INT	2.0	41.0	
Offset Value CH1		0	INT	2.0	43.0	
Offset Value CH2		0	INT	2.0	45.0	
Offset Value CH3		0	INT	2.0	47.0	
Offset Value CH4		0	INT	2.0	49.0	
Offset Value CH5		0	INT	2.0	51.0	
Offset Value CH6		0	INT	2.0	53.0	
Offset Value CH7		0	INT	2.0	55.0	

picture4-2-62Acquisition of temperature signal (compensation)

4.2.6 Encoder data acquisition module usage routine

- The encoder pulse counting module has two types: DF50-M-2CNT-PIL-24 and DF50-M-2CNT-PIL-5. The wiring and usage of the two modules are the same. The difference is that the DF50-M-2CNT-PIL-5 is connected to a 5V encoder signal, and the DF50-M-2CNT-PIL-24 is connected to a 24V encoder signal. This document uses the DF50-M-2CNT-PIL-24 module as an example.Chapter 3, Section 13.2; For the DF50-M-2CNT-PIL-5 module wiring diagram, please refer toChapter 3, Section 13.2.
- Figure 4-2-63 shows the PDO process data of the DF50-M-2CNT-PIL-24 module. When using it, set the channel 0 count enable bit (CH0: Count Enable) to 1 to use the channel 0 count function normally:



picture4-2-63

- The meaning of process data is as follows:

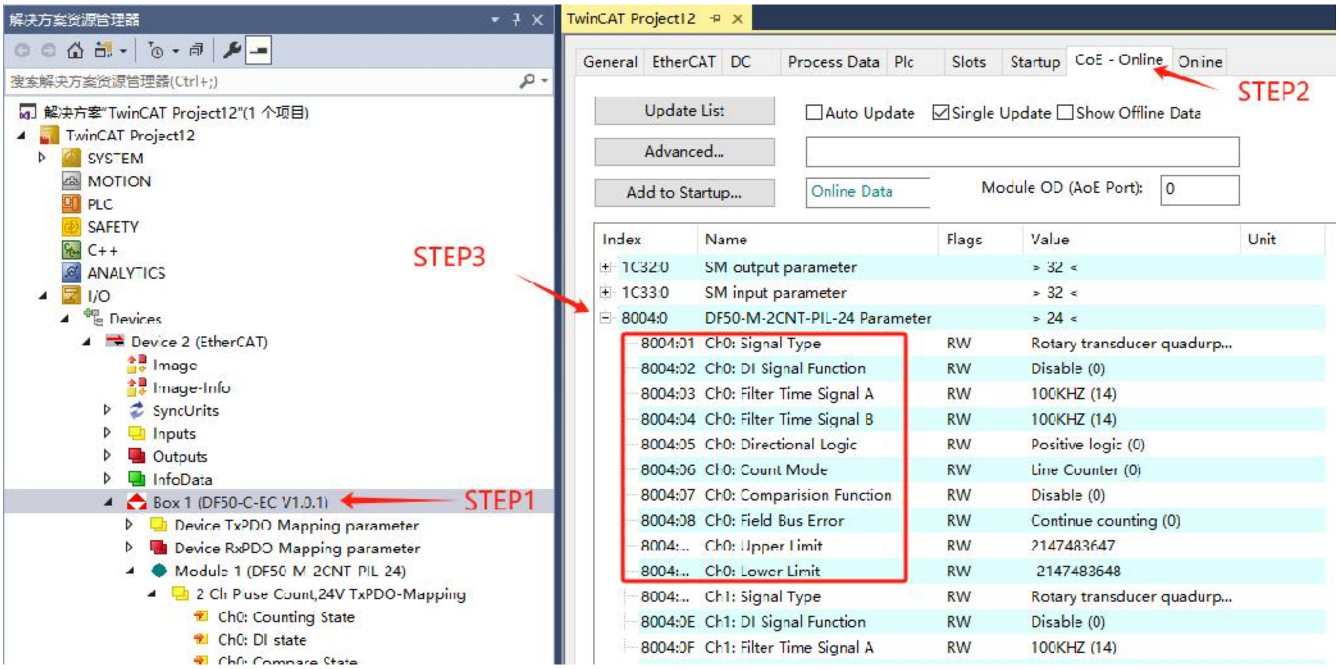
surface4.2.16

RXPD0			
Name	**Type**	**Size**	**meaning**
Ch0: Count Enable	BOOL	0.1	Channel 0 count enable bit
Ch0: Compare Value	DINT	4.0	Channel 0 comparison value setting
Ch1: Count Enable	BOOL	0.1	Channel 1 count enable bit
Ch1: Compare Value	DINT	4.0	Channel 1 comparison value setting

surface4.2.17

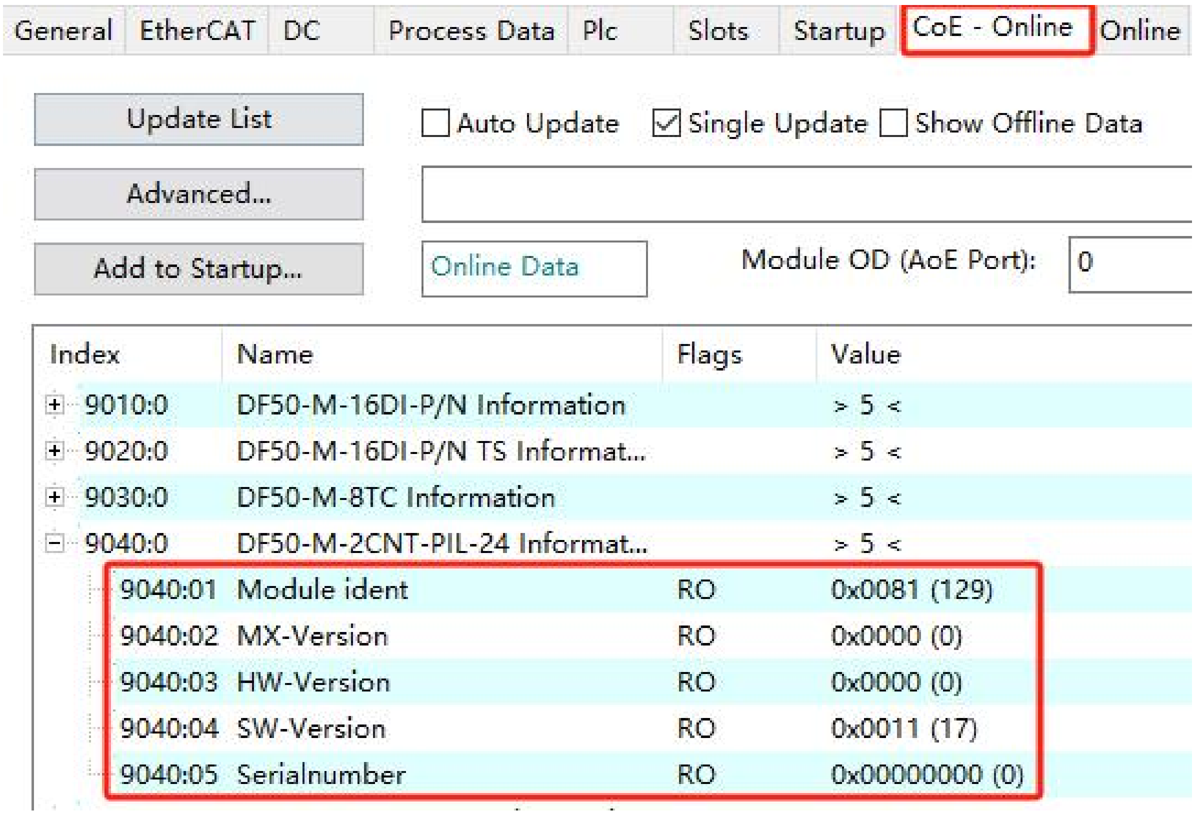
TXPD0			
Name	**Type**	**Size**	**meaning**
Ch0: Counting State	BOOL	0.1	Channel 0 counting status bit
Ch0: DI state	BOOL	0.1	Channel 0 DI input status
Ch0: Compare State	BOOL	0.1	Channel 0 compare status bit
Ch0: Direction	BIT2	0.2	Channel 0 input signal direction
Ch0: Count Value	DINT	4.0	Channel 0 count value
Ch0: LatChValue	DINT	4.0	Channel 0 latch value
Ch1: Counting State	BOOL	0.1	Channel 0 counting status bit
Ch1: DI state	BOOL	0.1	Channel 0 DI input status
Ch1: Compare State	BOOL	0.1	Channel 0 compare status bit
Ch1: Direction	BIT2	0.2	Channel 0 input signal direction
Ch1: Count Value	DINT	4.0	Channel 0 count value
Ch1: LatChValue	DINT	4.0	Channel 0 latch value

- As shown in Figure 4-2-64, the configuration data of the DF50-M-2CNT-PIL-24 module can be modified. The figure shows the configuration data of channel 0. The configurable content of channel 1 is the same as that of channel 0. They are: signal type configuration (frequency multiplication function is configured here, 4 times frequency multiplication by default), DI signal function configuration, A phase signal filter configuration, B phase signal filter configuration, direction logic configuration, counting mode configuration, comparison function configuration, bus abnormality counting action configuration, cycle mode upper limit value, cycle mode lower limit value. For details, please refer toChapter 3, Section 13.4.



picture4-2-64

- The module information viewing method is shown in Figure 4-2-65, and its meaning is shown in Table 4.2.18.



picture4-2-65Module Information

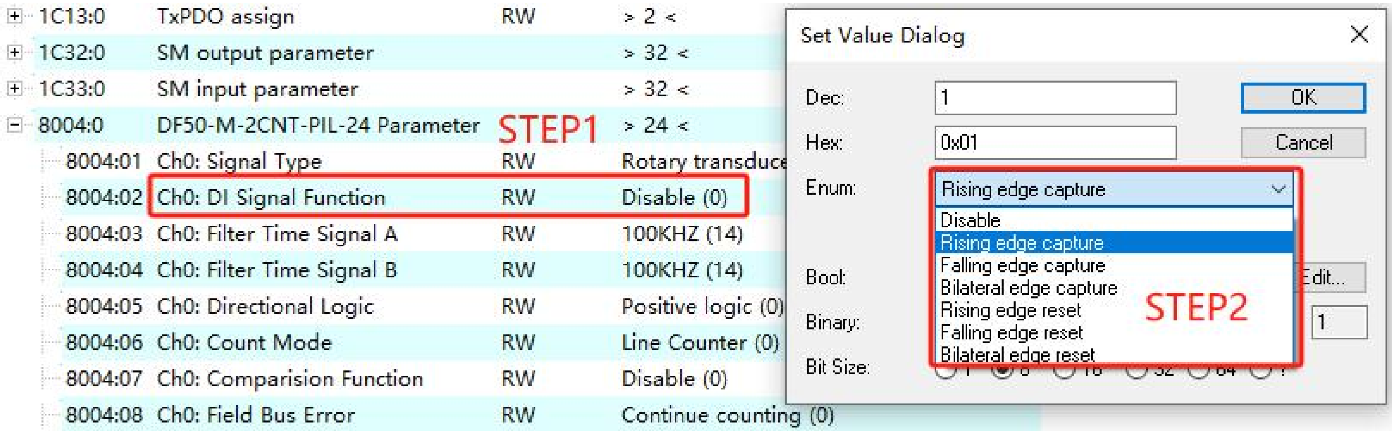
surface4.2.18Module information meaning

name	meaning

Module ident	Module ID
MX-Version	reserve
HW-Version	reserve
SW-Version	Software Version
Serial number	reserve

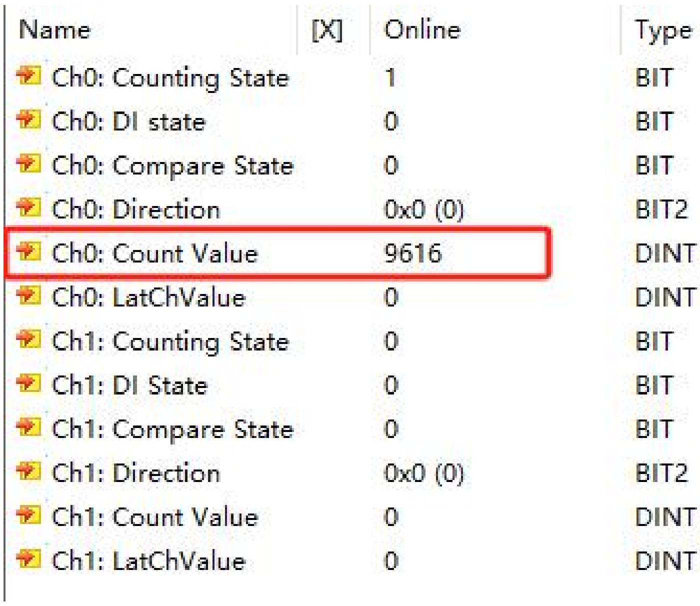
DI Signal Function Configuration

➢ The configurable data is shown in Figure 4-2-66, which demonstrates the rising edge capture and rising edge reset functions.



picture4-2-66DI signal function configuration

➢ DI rising edge capture: As shown in Figure 4-2-67, the count value is 9616. After a rising edge is input, as shown in Figure 4-2-68, the DI input state (DI state) becomes 1 and the latch value (LatChValue) becomes 9616.



Name	[X]	Online	Type
Ch0: Counting State		1	BIT
Ch0: DI state		0	BIT
Ch0: Compare State		0	BIT
Ch0: Direction		0x0 (0)	BIT2
Ch0: Count Value		9616	DINT
Ch0: LatChValue		0	DINT
Ch1: Counting State		0	BIT
Ch1: DI State		0	BIT
Ch1: Compare State		0	BIT
Ch1: Direction		0x0 (0)	BIT2
Ch1: Count Value		0	DINT
Ch1: LatChValue		0	DINT

picture4-2-67Rising edge capture

Name	[X]	Online	Type
Ch0: Counting State		1	BIT
Ch0: DI state		1	BIT
Ch0: Compare State		0	BIT
Ch0: Direction		0x0 (0)	BIT2
Ch0: Count Value		9616	DINT
Ch0: LatChValue		9616	DINT
Ch1: Counting State		0	BIT
Ch1: DI State		0	BIT
Ch1: Compare State		0	BIT
Ch1: Direction		0x0 (0)	BIT2
Ch1: Count Value		0	DINT
Ch1: LatChValue		0	DINT

picture4-2-68Rising edge capture trigger

- DI rising edge reset: as shown in the figure4-2-69 shows that the count value is 15747. After a rising edge is input, the count value is as shown in the figure4-2-70, the DI input state (DI state) becomes 1 and the count value becomes 0.

Name	[X]	Online	Type
Ch0: Counting State		1	BIT
Ch0: DI state		0	BIT
Ch0: Compare State		0	BIT
Ch0: Direction		0x0 (0)	BIT2
Ch0: Count Value		15747	DINT
Ch0: LatChValue		0	DINT
Ch1: Counting State		0	BIT
Ch1: DI State		0	BIT
Ch1: Compare State		0	BIT
Ch1: Direction		0x0 (0)	BIT2
Ch1: Count Value		0	DINT
Ch1: LatChValue		0	DINT

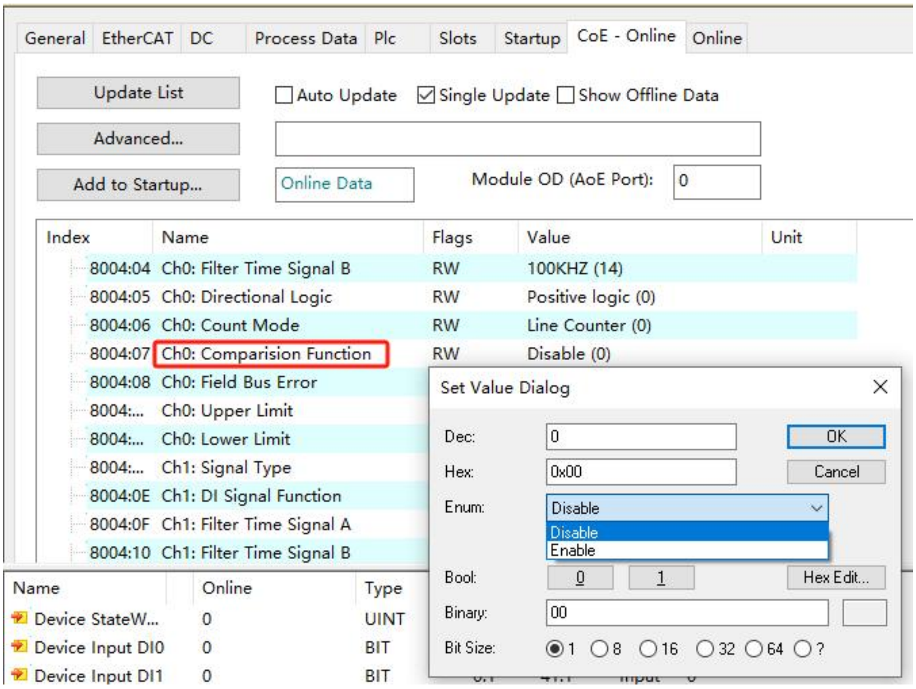
picture4-2-69Rising edge reset

Name	[X]	Online	Type
Ch0: Counting State		1	BIT
Ch0: DI state		1	BIT
Ch0: Compare State		0	BIT
Ch0: Direction		0x0 (0)	BIT2
Ch0: Count Value		0	DINT
Ch0: LatChValue		0	DINT
Ch1: Counting State		0	BIT
Ch1: DI State		0	BIT
Ch1: Compare State		0	BIT
Ch1: Direction		0x0 (0)	BIT2
Ch1: Count Value		0	DINT
Ch1: LatChValue		0	DINT

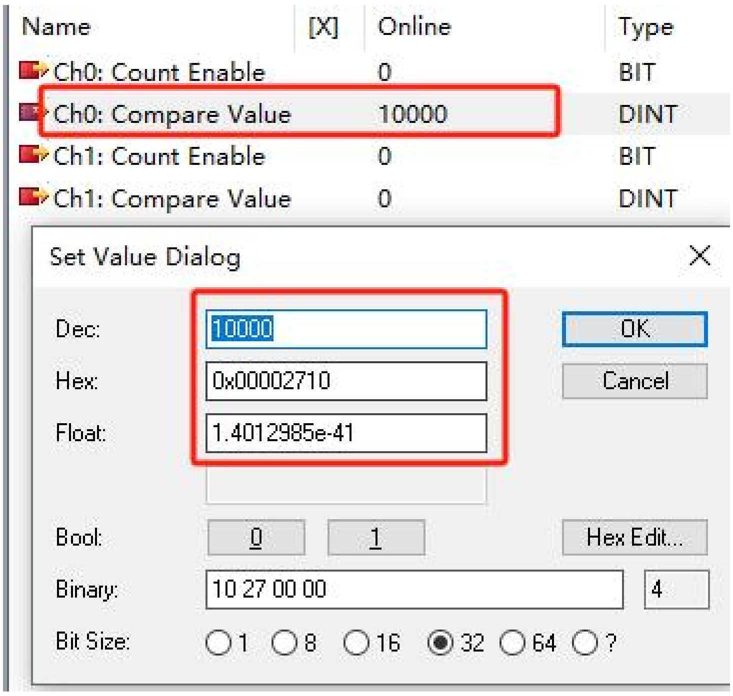
picture4-2-70Rising edge reset trigger

Comparison Function Configuration

➢ As shown4-2-71, after turning on the comparison function, as shown in Figure4-2-72 sets the comparison value to 10000.



picture4-2-71Compare function on



picture4-2-72Set the comparison value

- As shown in Figure 4-2-73, when the count value is 8471, the compare state bit (Compare State) is 0.

Name	[X]	Online	Type
Ch0: Counting State		1	BIT
Ch0: DI state		0	BIT
Ch0: Compare State		0	BIT
Ch0: Direction		0x0 (0)	BIT2
Ch0: Count Value		8471	DINT
Ch0: LatChValue		0	DINT
Ch1: Counting State		0	BIT
Ch1: DI State		0	BIT
Ch1: Compare State		0	BIT
Ch1: Direction		0x0 (0)	BIT2
Ch1: Count Value		0	DINT
Ch1: LatChValue		0	DINT

picture4-2-73Comparison count

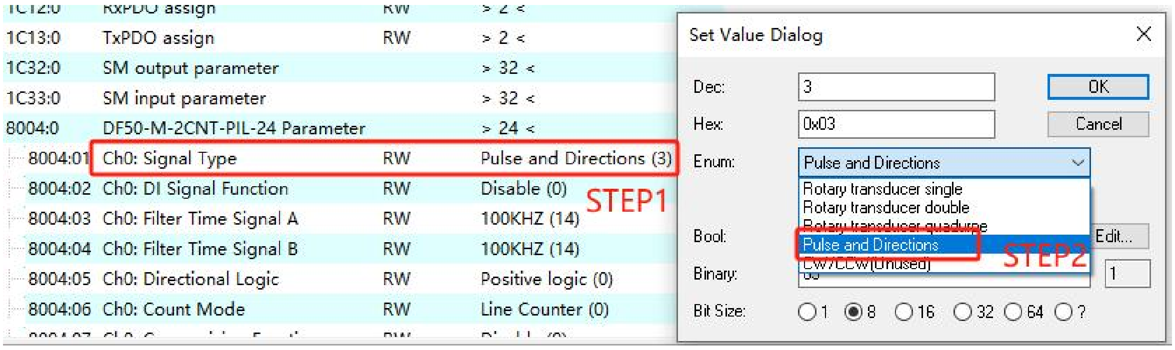
- Figure 4-2-74 When the count value is 10777, it exceeds the set value 10000 and the compare state bit (Compare State) is 1.

Name	[X]	Online	Type
Ch0: Counting State		1	BIT
Ch0: DI state		0	BIT
Ch0: Compare State		1	BIT
Ch0: Direction		0x0 (0)	BIT2
Ch0: Count Value		10777	DINT
Ch0: LatChValue		0	DINT
Ch1: Counting State		0	BIT
Ch1: DI State		0	BIT
Ch1: Compare State		0	BIT
Ch1: Direction		0x0 (0)	BIT2
Ch1: Count Value		0	DINT
Ch1: LatChValue		0	DINT

picture4-2-74Compare count trigger

Pulse plus direction function (Signal Type: Pulse and Directions)

- As shown in Figure 4-2-75, change the signal type to Pulse and Directions. For wiring method, seeWiring DiagramPulse plus direction input. When using this mode, the A+ and A- ports input high and low levels to indicate the direction, and the B+ and B- ports input valid levels to accumulate count values.



picture4-2-75Pulse plus direction enable

- As shown in Figure 4-2-76, when the sensor is stationary, the count value is 0 and the direction status is "0".

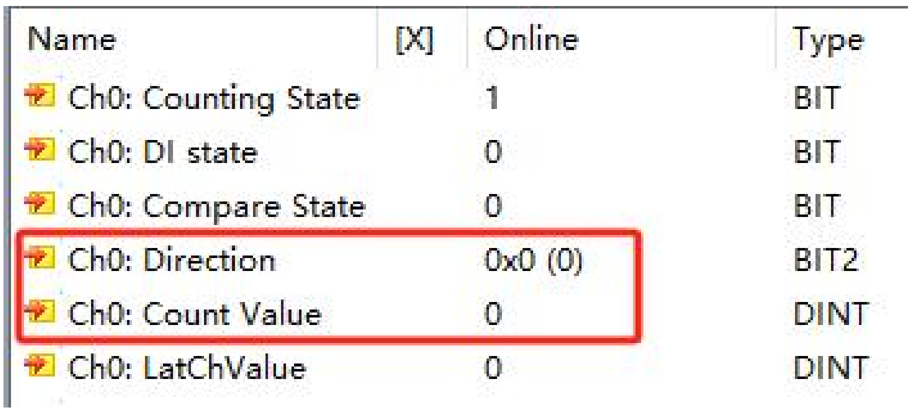


Figure 4-2-76still

- When the A+ and A- voltage inputs are at a low level, pulse signals are input to B+ and B-. As shown in Figure 4-2-77, it can be seen that the count value decreases and the direction state is "2".

Name	[X]	Online	Type
Ch0: Counting State		1	BIT
Ch0: DI state		0	BIT
Ch0: Compare State		0	BIT
Ch0: Direction		0x2 (2)	BIT2
Ch0: Count Value		-190	DINT
Ch0: LatChValue		0	DINT

picture4-2-77Input pulse direction "2"

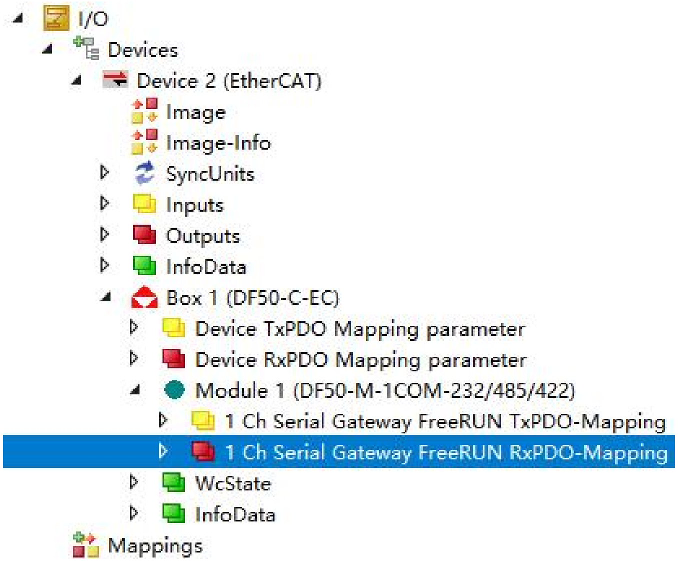
➢ When the A+ and A- voltage inputs are at a high level, pulse signals are input to B+ and B-. As shown in Figure 4-2-78, it can be seen that the count value increases and the direction state is "1".

Name	[X]	Online	Type
Ch0: Counting State		1	BIT
Ch0: DI state		0	BIT
Ch0: Compare State		0	BIT
Ch0: Direction		0x1 (1)	BIT2
Ch0: Count Value		161	DINT
Ch0: LatChValue		0	DINT

picture4-2-78Input pulse direction "1"

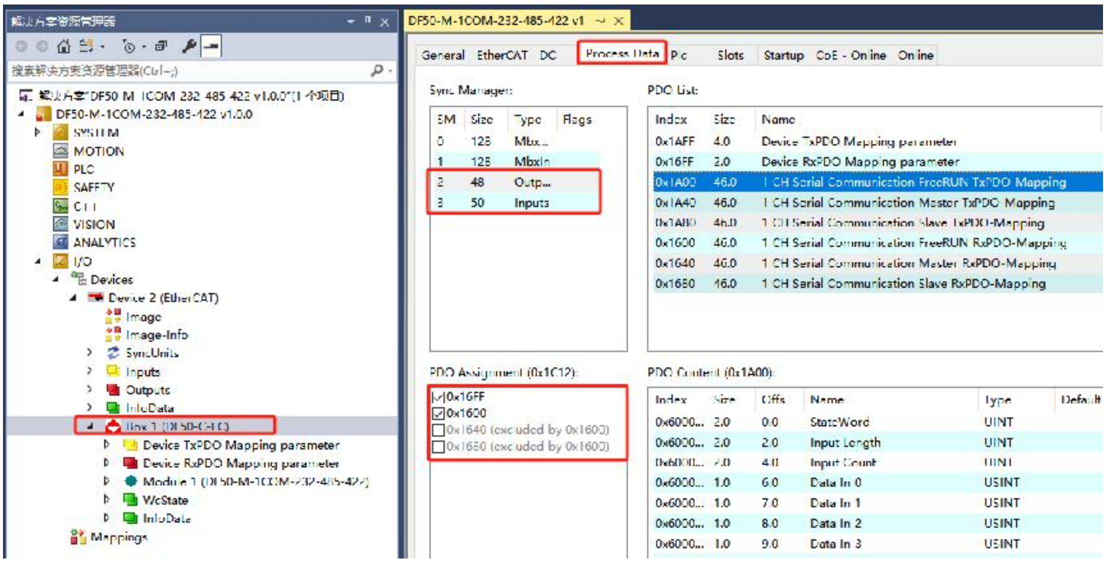
4.2.7Serial port module usage routine

- This example uses the DF50-C-EC+DF50-1COM-232-485-422 topology. DF50-1COM-232-485-422 supports three modes: free transparent transmission, slave mode, and Modbus RTU master mode. The mode switching is done by configuringStartupparameterand PDO data structureaccomplish.PC via USB to 485 data lineSection 15.2Wiring diagram and card connection, simulated communication equipment andDF50-1COM-232-485-422Module communication,After scanning the slave station, the following is obtained:4-2-79shown.



picture4-2-79

- The PDO data structure is shown below. Different PDO data are configured for different operating modes.

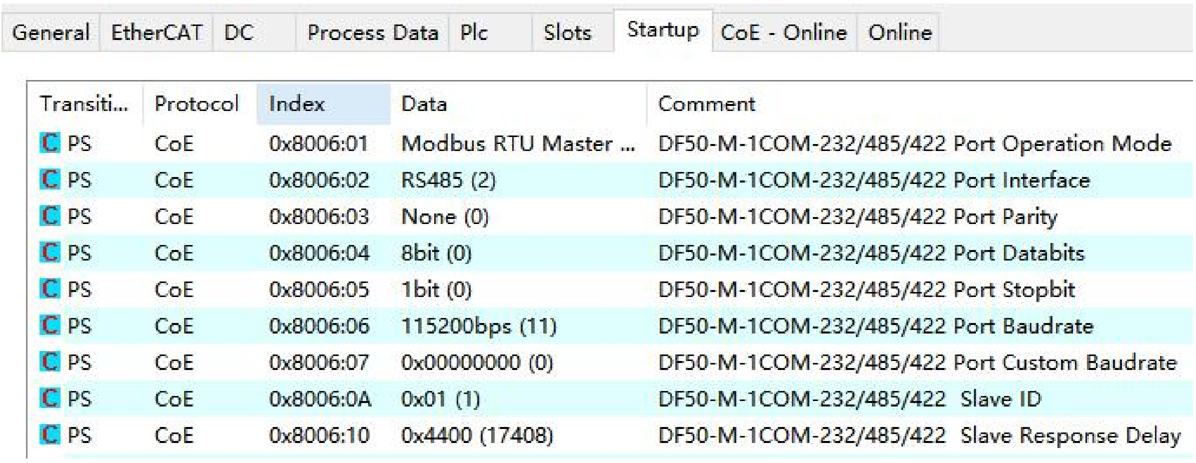


picture4-2-80

- Among them, 0x1600 and 0x1A00 are the PDO data formats in FreeRUN mode, 0x1640 and 0x1A40 are the PDO data formats in Slave mode, and 0x1680 and 0x1A80 are the PDO data formats in Master mode. Note: The SDO index increment of the module is 1. Currently, if the first card is a serial port module, it is 0x1600 and 0x1A00. If it is the second module, it is 0x1601 and 0x1A01, and so on. The default configuration is 0x1600 and 0x1A00 in FreeRUN mode.

Modbus RTU Master Mode Usage Example

- Modbus RTU Master Configuration
- For the meaning of configuration data, please refer toSection 15.3, the communication port configuration interface of Modbus RTU Master mode is shown in the figure below.



Transiti...	Protocol	Index	Data	Comment
PS	CoE	0x8006:01	Modbus RTU Master ...	DF50-M-1COM-232/485/422 Port Operation Mode
PS	CoE	0x8006:02	RS485 (2)	DF50-M-1COM-232/485/422 Port Interface
PS	CoE	0x8006:03	None (0)	DF50-M-1COM-232/485/422 Port Parity
PS	CoE	0x8006:04	8bit (0)	DF50-M-1COM-232/485/422 Port Databits
PS	CoE	0x8006:05	1bit (0)	DF50-M-1COM-232/485/422 Port Stopbit
PS	CoE	0x8006:06	115200bps (11)	DF50-M-1COM-232/485/422 Port Baudrate
PS	CoE	0x8006:07	0x00000000 (0)	DF50-M-1COM-232/485/422 Port Custom Baudrate
PS	CoE	0x8006:0A	0x01 (1)	DF50-M-1COM-232/485/422 Slave ID
PS	CoE	0x8006:10	0x4400 (17408)	DF50-M-1COM-232/485/422 Slave Response Delay

picture4-2-81

- The parameters of Ch0~Ch7 can be configured according to the communication format of the slave device to be communicated. Different function code read and write operations can be performed on 8 slaves with different IDs. The addresses are 1~8 respectively:

General | EtherCAT | DC | Process Data | Plc | Slots | Startup | CoE - Online | Online

Transiti...	Protocol	Index	Data	Comment
PS	CoE	0x8006:0A	0x01 (1)	DF50-M-1COM-232-485-422 Slave ID
PS	CoE	0x8006:10	0x00 (0)	DF50-M-1COM-232-485-422 Slave Response Delay
PS	CoE	0x8006:11	0x01 (1)	M:Ch0 Slave ID
PS	CoE	0x8006:12	Poll Mode (0)	DF50-M-1COM-232-485-422 Master Ch0 Event Trigger
PS	CoE	0x8006:13	Hold Data (0)	DF50-M-1COM-232-485-422 Master Ch0 Lost Action
PS	CoE	0x8006:14	01 READ COILS (1)	M:Ch0 Operation Code
PS	CoE	0x8006:15	0x0000 (0)	DF50-M-1COM-232-485-422 Master Ch0 Reg Addr
PS	CoE	0x8006:16	0x0140 (320)	M:Ch0 Reg Num
PS	CoE	0x8006:17	0x01F4 (500)	DF50-M-1COM-232-485-422 Master Ch0 Poll Time
PS	CoE	0x8006:18	0x0064 (100)	DF50-M-1COM-232-485-422 Master Ch0 Poll Delay
PS	CoE	0x8006:19	0x03E8 (1000)	DF50-M-1COM-232-485-422 Master Ch0 Response Timeout
PS	CoE	0x8006:1A	0x02 (2)	M:Ch1 Slave ID
PS	CoE	0x8006:1B	Poll Mode (0)	DF50-M-1COM-232-485-422 Master Ch1 Event Trigger
PS	CoE	0x8006:1C	Hold Data (0)	DF50-M-1COM-232-485-422 Master Ch1 Lost Action
PS	CoE	0x8006:1D	02 READ DISCRETE I...	M:Ch1 Operation Code
PS	CoE	0x8006:1E	0x0000 (0)	DF50-M-1COM-232-485-422 Master Ch1 Reg Addr
PS	CoE	0x8006:1F	0x0140 (320)	M:Ch1 Reg Num
PS	CoE	0x8006:20	0x01F4 (500)	DF50-M-1COM-232-485-422 Master Ch1 Poll Time
PS	CoE	0x8006:21	0x0064 (100)	DF50-M-1COM-232-485-422 Master Ch1 Poll Delay
PS	CoE	0x8006:22	0x03E8 (1000)	DF50-M-1COM-232-485-422 Master Ch1 Response Timeout
PS	CoE	0x8006:23	0x03 (3)	M:Ch2 Slave ID
PS	CoE	0x8006:24	Poll Mode (0)	DF50-M-1COM-232-485-422 Master Ch2 Event Trigger
PS	CoE	0x8006:25	Hold Data (0)	DF50-M-1COM-232-485-422 Master Ch2 Lost Action
PS	CoE	0x8006:26	03 READ HOLDING R...	M:Ch2 Operation Code
PS	CoE	0x8006:27	0x0000 (0)	DF50-M-1COM-232-485-422 Master Ch2 Reg Addr
PS	CoE	0x8006:28	0x0014 (20)	M:Ch2 Reg Num
PS	CoE	0x8006:29	0x01F4 (500)	DF50-M-1COM-232-485-422 Master Ch2 Poll Time
PS	CoE	0x8006:2A	0x0064 (100)	DF50-M-1COM-232-485-422 Master Ch2 Poll Delay
PS	CoE	0x8006:2B	0x03E8 (1000)	DF50-M-1COM-232-485-422 Master Ch2 Response Timeout

picture4-2-82

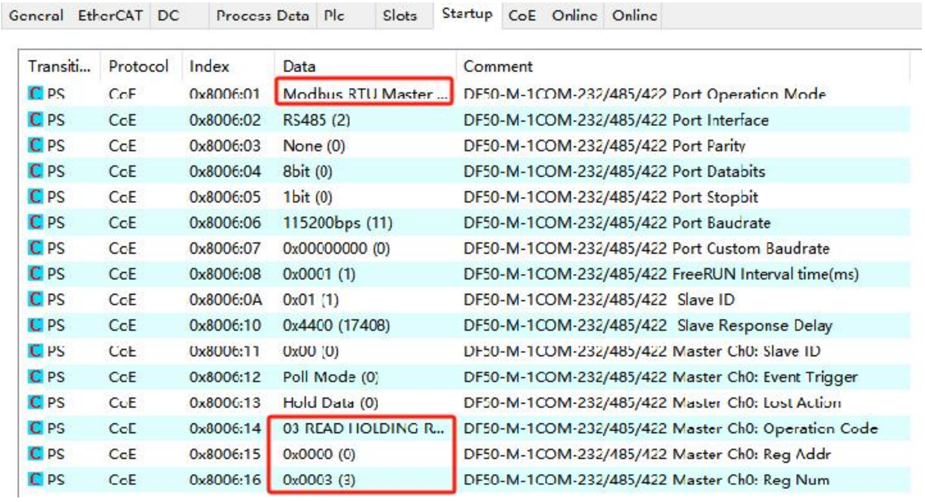
General | EtherCAT | DC | Process Data | Plc | Slots | Startup | CoE - Online | Online

Transiti...	Protocol	Index	Data	Comment
PS	CoE	0x8006:2C	0x04 (4)	M:Ch3 Slave ID
PS	CoE	0x8006:2D	Poll Mode (0)	DF50-M-1COM-232-485-422 Master Ch3 Event Trigger
PS	CoE	0x8006:2E	Hold Data (0)	DF50-M-1COM-232-485-422 Master Ch3 Lost Action
PS	CoE	0x8006:2F	04 READ INPUT REGI...	M:Ch3 Operation Code
PS	CoE	0x8006:30	0x0000 (0)	DF50-M-1COM-232-485-422 Master Ch3 Reg Addr
PS	CoE	0x8006:31	0x0014 (20)	M:Ch3 Reg Num
PS	CoE	0x8006:32	0x01F4 (500)	DF50-M-1COM-232-485-422 Master Ch3 Poll Time
PS	CoE	0x8006:33	0x0064 (100)	DF50-M-1COM-232-485-422 Master Ch3 Poll Delay
PS	CoE	0x8006:34	0x03E8 (1000)	DF50-M-1COM-232-485-422 Master Ch3 Response Timeout
PS	CoE	0x8006:35	0x05 (5)	M:Ch4 Slave ID
PS	CoE	0x8006:36	Poll Mode (0)	DF50-M-1COM-232-485-422 Master Ch4 Event Trigger
PS	CoE	0x8006:37	Hold Data (0)	DF50-M-1COM-232-485-422 Master Ch4 Lost Action
PS	CoE	0x8006:38	05 WRITE SINGLE CO...	M:Ch4 Operation Code
PS	CoE	0x8006:39	0x0000 (0)	DF50-M-1COM-232-485-422 Master Ch4 Reg Addr
PS	CoE	0x8006:3A	0x0001 (1)	M:Ch4 Reg Num
PS	CoE	0x8006:3B	0x01F4 (500)	DF50-M-1COM-232-485-422 Master Ch4 Poll Time
PS	CoE	0x8006:3C	0x0064 (100)	DF50-M-1COM-232-485-422 Master Ch4 Poll Delay
PS	CoE	0x8006:3D	0x03E8 (1000)	DF50-M-1COM-232-485-422 Master Ch4 Response Timeout
PS	CoE	0x8006:3E	0x06 (6)	M:Ch5 Slave ID
PS	CoE	0x8006:3F	Poll Mode (0)	DF50-M-1COM-232-485-422 Master Ch5 Event Trigger
PS	CoE	0x8006:40	Hold Data (0)	DF50-M-1COM-232-485-422 Master Ch5 Lost Action
PS	CoE	0x8006:41	06 WRITE SINGLE HO...	M:Ch5 Operation Code
PS	CoE	0x8006:42	0x0000 (0)	DF50-M-1COM-232-485-422 Master Ch5 Reg Addr
PS	CoE	0x8006:43	0x0001 (1)	M:Ch5 Reg Num
PS	CoE	0x8006:44	0x01F4 (500)	DF50-M-1COM-232-485-422 Master Ch5 Poll Time
PS	CoE	0x8006:45	0x0064 (100)	DF50-M-1COM-232-485-422 Master Ch5 Poll Delay
PS	CoE	0x8006:46	0x03E8 (1000)	DF50-M-1COM-232-485-422 Master Ch5 Response Timeout
PS	CoE	0x8006:47	0x07 (7)	M:Ch6 Slave ID
PS	CoE	0x8006:48	Poll Mode (0)	DF50-M-1COM-232-485-422 Master Ch6 Event Trigger
PS	CoE	0x8006:49	Hold Data (0)	DF50-M-1COM-232-485-422 Master Ch6 Lost Action
PS	CoE	0x8006:4A	16 WRITE MULTIPLE ...	DF50-M-1COM-232-485-422 Master Ch6 Operation Code
PS	CoE	0x8006:4B	0x0000 (0)	DF50-M-1COM-232-485-422 Master Ch6 Reg Addr
PS	CoE	0x8006:4C	0x0014 (20)	M:Ch6 Reg Num
PS	CoE	0x8006:4D	0x01F4 (500)	DF50-M-1COM-232-485-422 Master Ch6 Poll Time
PS	CoE	0x8006:4E	0x0064 (100)	DF50-M-1COM-232-485-422 Master Ch6 Poll Delay
PS	CoE	0x8006:4F	0x03E8 (1000)	DF50-M-1COM-232-485-422 Master Ch6 Response Timeout
PS	CoE	0x8006:50	0x07 (7)	M:Ch7 Slave ID
PS	CoE	0x8006:51	Poll Mode (0)	DF50-M-1COM-232-485-422 Master Ch7 Event Trigger
PS	CoE	0x8006:52	Hold Data (0)	DF50-M-1COM-232-485-422 Master Ch7 Lost Action
PS	CoE	0x8006:53	16 WRITE MULTIPLE ...	DF50-M-1COM-232-485-422 Master Ch7 Operation Code
PS	CoE	0x8006:54	0x0014 (20)	DF50-M-1COM-232-485-422 Master Ch7 Reg Addr
PS	CoE	0x8006:55	0x0014 (20)	DF50-M-1COM-232-485-422 Master Ch7 Reg Num
PS	CoE	0x8006:56	0x01F4 (500)	DF50-M-1COM-232-485-422 Master Ch7 Poll Time
PS	CoE	0x8006:57	0x0064 (100)	DF50-M-1COM-232-485-422 Master Ch7 Poll Delay
PS	CoE	0x8006:58	0x03E8 (1000)	DF50-M-1COM-232-485-422 Master Ch7 Response Timeout
PS	CoE	0x8006:59	0x00 (0)	DF50-M-1COM-232-485-422 Master Ch8 Slave ID

picture4-2-83

- Among them, ch6 and ch7 are set to a slave address of 0x07 at the same time, and the holding register of the slave station is written. The writing range is 0~20 and 20~40. This flexible configuration can read and write a maximum of 12ch*20word data to the same slave station. Ch8~ch12 is not enabled for the time being;

➢ With ch0Take the channel as an example. In the Startup option, configure the mode to Modbus RTU Master mode, set the function to Read HOLDING REGISTERS, and set the number of registers to read to 3.ReadThe starting address is 0.

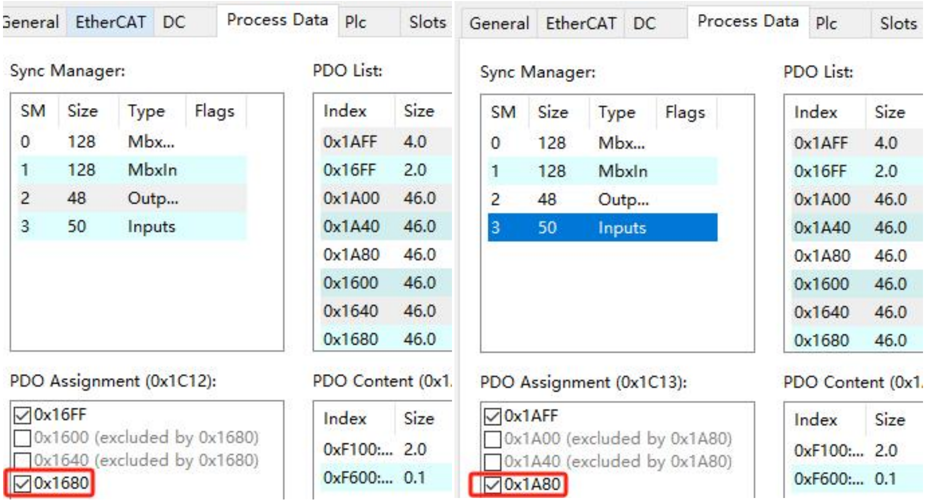


General EtherCAT DC Process Data Plc Slots Startup CoE Online Online

Transiti...	Protocol	Index	Data	Comment
PS	CoE	0x8006:01	Modbus RTU Master ...	DF50-M-1COM-232/485/422 Port Operation Mode
PS	CoE	0x8006:02	RS485 (2)	DF50-M-1COM-232/485/422 Port Interface
PS	CoE	0x8006:03	None (0)	DF50-M-1COM-232/485/422 Port Parity
PS	CoE	0x8006:04	8bit (0)	DF50-M-1COM-232/485/422 Port Databits
PS	CoE	0x8006:05	1bit (0)	DF50-M-1COM-232/485/422 Port Stopbit
PS	CoE	0x8006:06	115200bps (11)	DF50-M-1COM-232/485/422 Port Baudrate
PS	CoE	0x8006:07	0x00000000 (0)	DF50-M-1COM-232/485/422 Port Custom Baudrate
PS	CoE	0x8006:08	0x0001 (1)	DF50-M-1COM-232/485/422 FreeRUN Interval time(ms)
PS	CoE	0x8006:0A	0x01 (1)	DF50-M-1COM-232/485/422 Slave ID
PS	CoE	0x8006:10	0x4400 (17408)	DF50-M-1COM-232/485/422 Slave Response Delay
PS	CoE	0x8006:11	0x00 (0)	DF50-M-1COM-232/485/422 Master Ch0: Slave ID
PS	CoE	0x8006:12	Poll Mode (0)	DF50-M-1COM-232/485/422 Master Ch0: Event Trigger
PS	CoE	0x8006:13	Hold Data (0)	DF50-M-1COM-232/485/422 Master Ch0: Lost Action
PS	CoE	0x8006:14	03 READ HOLDING R...	DF50-M-1COM-232/485/422 Master Ch0: Operation Code
PS	CoE	0x8006:15	0x0000 (0)	DF50-M-1COM-232/485/422 Master Ch0: Reg Addr
PS	CoE	0x8006:16	0x0003 (3)	DF50-M-1COM-232/485/422 Master Ch0: Reg Num

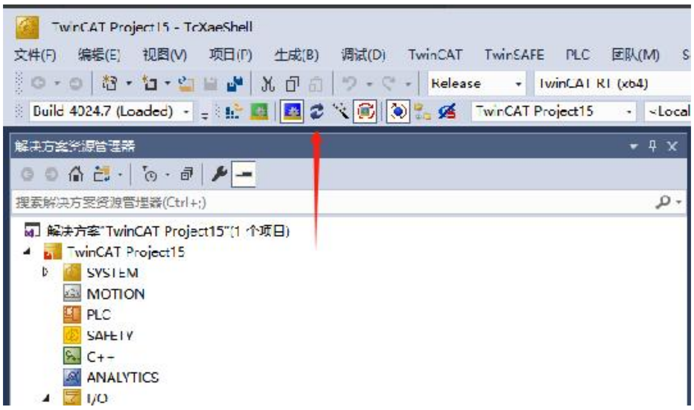
picture4-2-84

➢ Configure the process data in Process Data to 0x1680, 0x1A80.



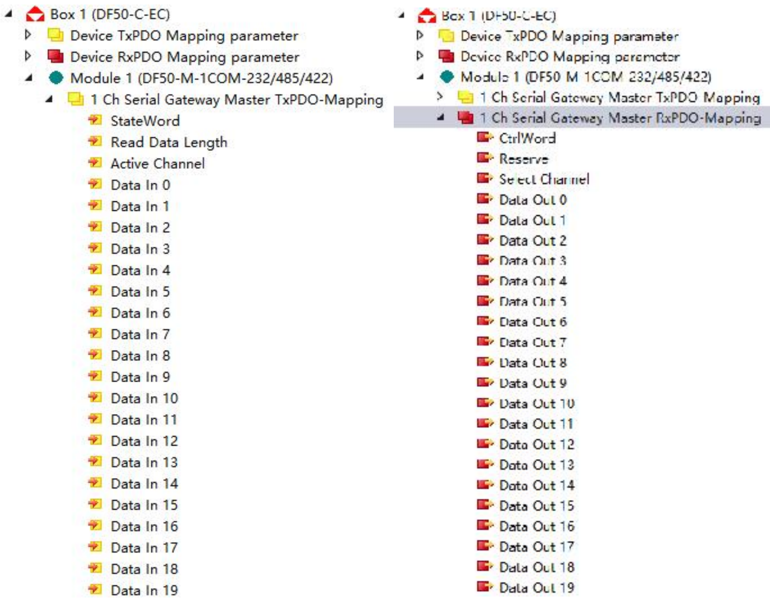
picture4-2-85

➢ Click Reload the device and configure the Master mode parameters.



picture4-2-86

- The Master mode input and output data are shown in the figure.



picture4-2-87

- Modbus RTU Master Process Data Description.

surface4.2. 19 Output data meaning

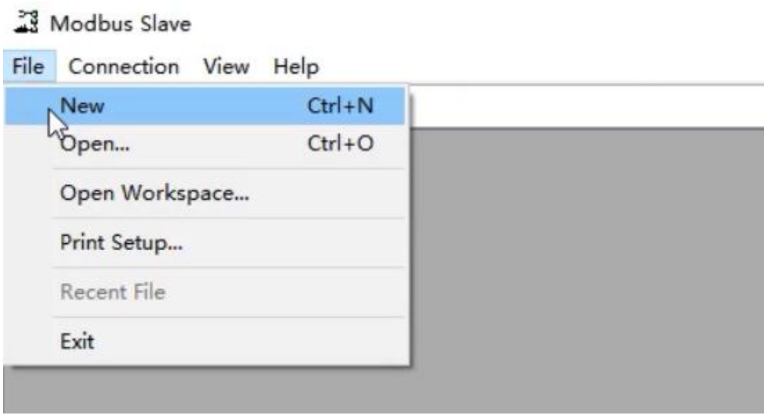
Output Data		
name	**length**	**meaning**
CtrlWord	2Byte	Control Word
Reserve	2Byte	reserve
Select Channel	2Byte	Channel operation selection
DataOut 0-19	40Byte	Send data content

- As table4.2As shown in Figure 19, SelectChannel is used to switch the communication channel, with a value range of 0-11. By default, Ch0 is activated. If SelectChannel is assigned a value of 1, the communication of Ch1 is activated, and the 485 bus on the serial port module will perform Modbus communication according to the configuration of Ch1, the specific address and function code.

surface4.2.20 Input data meaning

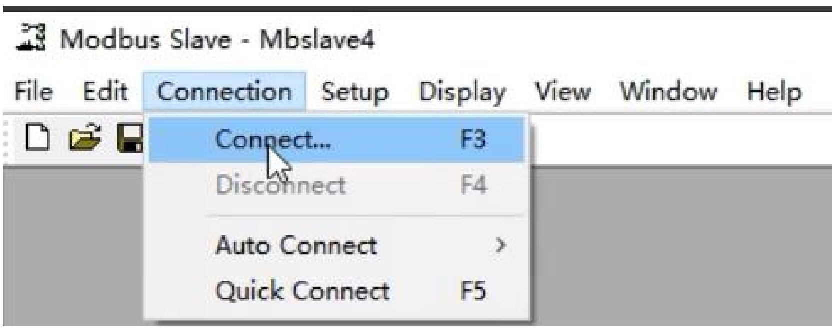
Input Data		
name	**length**	**meaning**
StateWord	2Byte	Status word
ReadDataLength	2Byte	Receive data length
ActiveChannel	2Byte	Current active channels
DataIn 0-19	40Byte	Receive data content

- When the PLC queries ActiveChannel and it is 1, it means that the current communication is Ch1. ReadDataLength and DataIn 0-19 both indicate the valid data of Ch1. The PLC can now take the input value and switch to the next channel communication.
- Open the Modbus Slave software on the PC and create a new project.



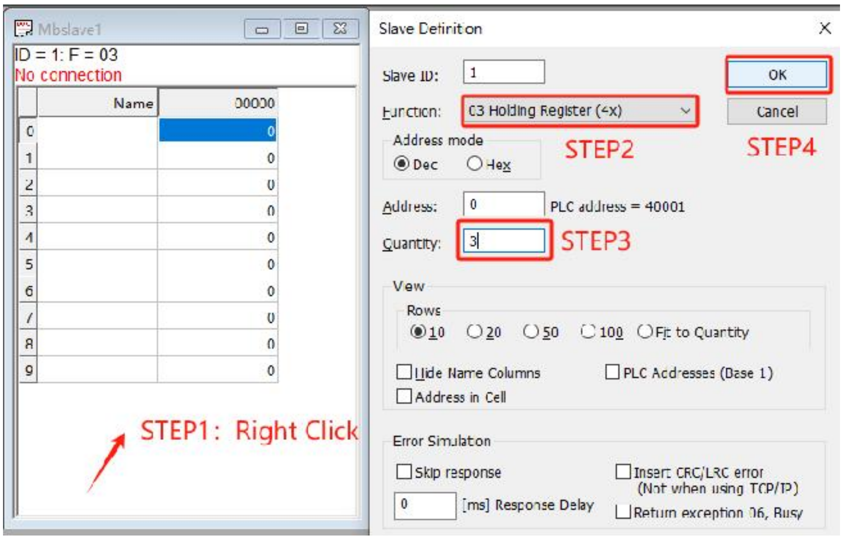
picture4-2-88

- Connect to the serial device.



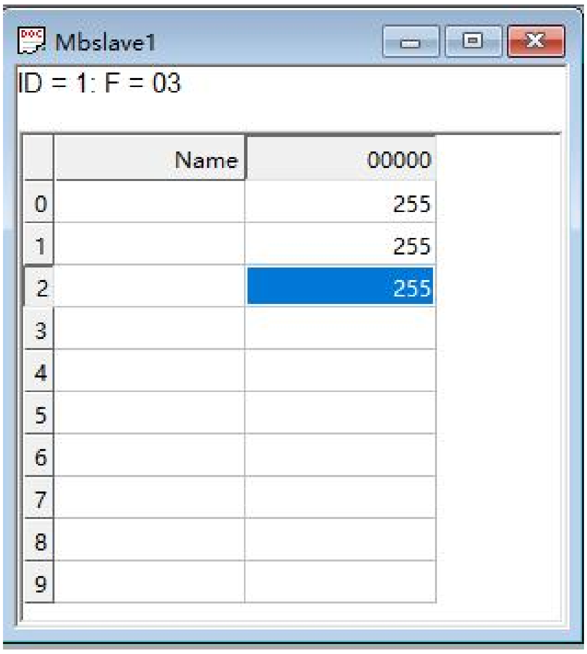
picture4-2-89

- Right-click in the blank area to set the slave parameters.



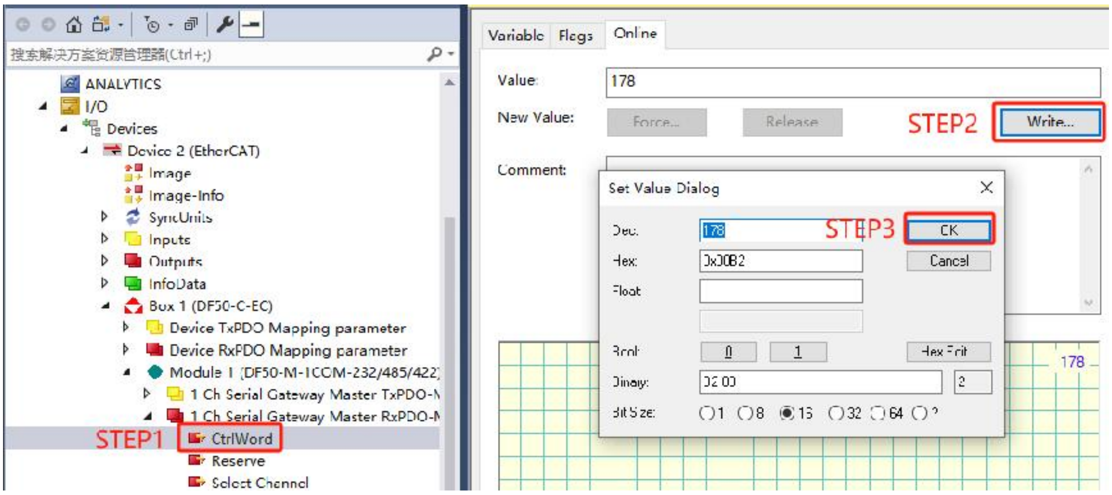
picture4-2-90

➢ Write register data.



picture4-2-91

➢ CtrlWord writes run command 178 (0x00B2).



picture4-2-92

➢ CtrlWord command table.

surface4.2.21CtrlWord data meaning

Command Value	Command Name	meaning
16#00A1	CONFIGUREPORT	Port Configuration Commands
16#00B1	COMFIGUREMASTER	MASTER Mode Configuration Commands
16#00B2	OPERATIONMASTER	MASTER mode run command

- Open the module to input data, the current data is consistent with the sent data.

Name	[X]	Online	Type	Size
StateWord		1	UINT	2.0
Read Data Len...		6	UINT	2.0
Active Channel		0	UINT	2.0
Data In 0		255	UINT	2.0
Data In 1		255	UINT	2.0
Data In 2		255	UINT	2.0

picture4-2-93

FreeRUN free transparent transmission mode usage example

- Free transparent transmission mode configuration
- For the meaning of configuration data, please refer to[Section 15.3]The configuration interface of free transparent transmission mode is shown in the figure4-2-94.

Process Data | Plc | Slots | Startup | CoE - Online | Online

Index	Data	Comment
0xF800:01	Hold OP state (0)	Behaviour of field bus on Module error
0x8006:01	FreeRUN (0)	DF50-M-1COM-232/485/422 Port Operation Mode
0x8006:02	RS485 (2)	DF50-M-1COM-232/485/422 Port Interface
0x8006:03	None (0)	DF50-M-1COM-232/485/422 Port Parity
0x8006:04	8bit (0)	DF50-M-1COM-232/485/422 Port Databits
0x8006:05	1bit (0)	DF50-M-1COM-232/485/422 Port Stopbit
0x8006:06	115200bps (11)	DF50-M-1COM-232/485/422 Port Baudrate
0x8006:07	0x00000000 (0)	DF50-M-1COM-232/485/422 Port Custom Baudrate
0x8006:08	0x0001 (1)	DF50-M-1COM-232/485/422 FreeRUN Interval time(ms)

picture4-2-94

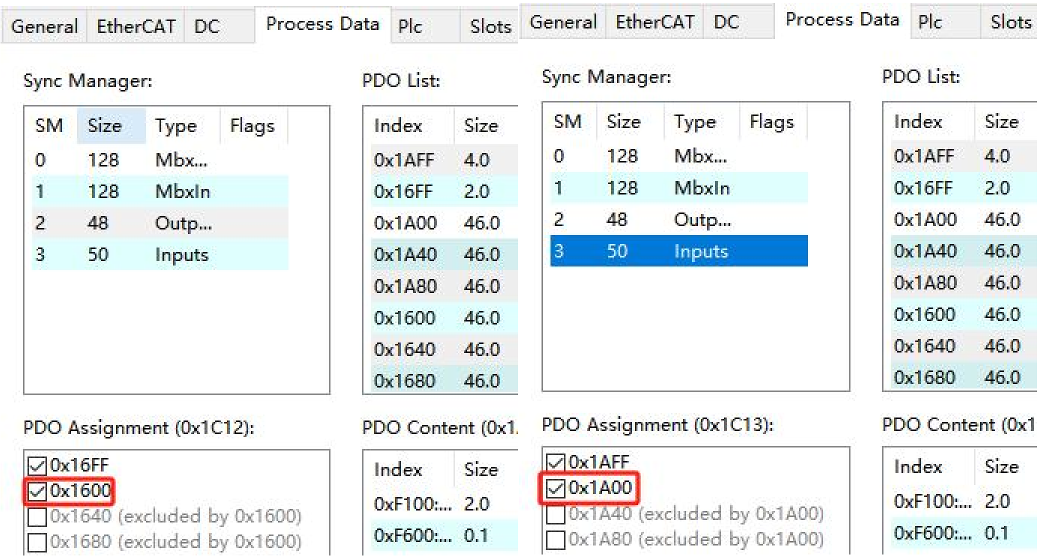
- In the Startup option, configure the mode to FreeRUN mode.

General | EtherCAT | DC | Process Data | Plc | Slots | Startup | CoE - Online | Online

Transiti...	Protocol	Index	Data	Comment
PS	CoE	0x8006:01	FreeRUN (0)	DF50-M-1COM-232/485/422 Port Operation Mode
PS	CoE	0x8006:02	RS485 (2)	DF50-M-1COM-232/485/422 Port Interface
PS	CoE	0x8006:03	None (0)	DF50-M-1COM-232/485/422 Port Parity
PS	CoE	0x8006:04	8bit (0)	DF50-M-1COM-232/485/422 Port Databits
PS	CoE	0x8006:05	1bit (0)	DF50-M-1COM-232/485/422 Port Stopbit
PS	CoE	0x8006:06	115200bps (11)	DF50-M-1COM-232/485/422 Port Baudrate
PS	CoE	0x8006:07	0x00000000 (0)	DF50-M-1COM-232/485/422 Port Custom Baudrate
PS	CoE	0x8006:08	0x0001 (1)	DF50-M-1COM-232/485/422 FreeRUN Interval time(ms)

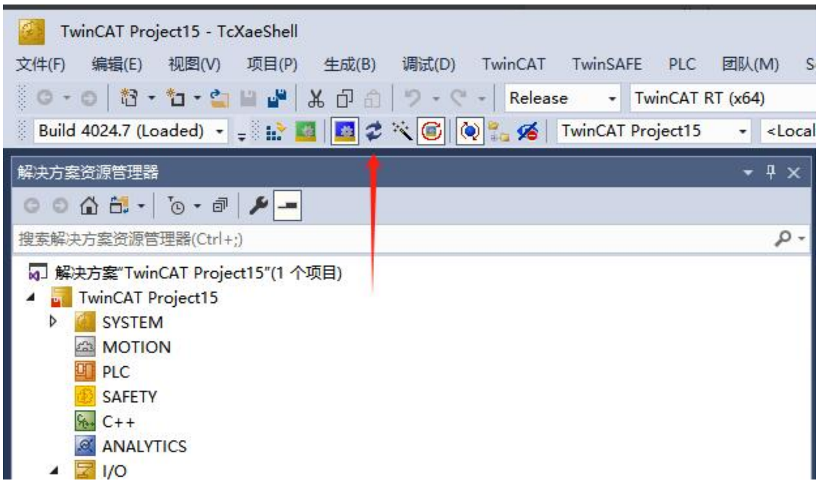
picture4-2-95

➢ Configure the process data in Process Data to 0x1600, 0x1A00.



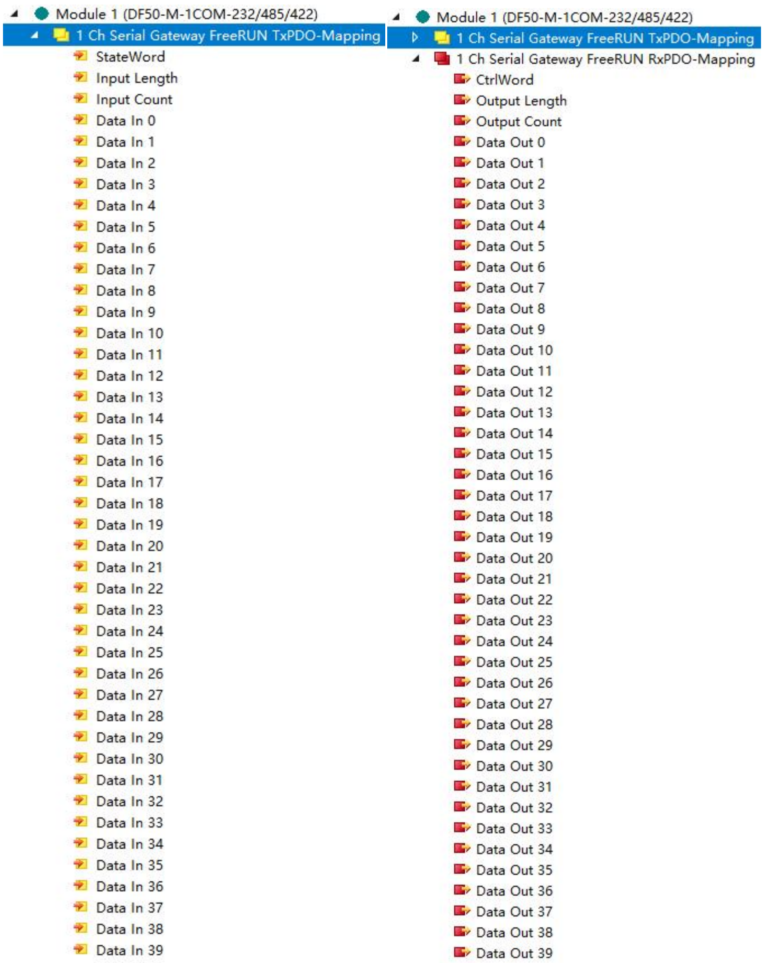
picture4-2-96

➢ Click Reload the device and configure the FreeRUN mode parameters.



picture4-2-97

➢ The FreeRUN mode input and output data are shown in the following figure.



picture4-2-98

➢ Process data description in free transparent transmission mode

surface4.2.22Output data meaning

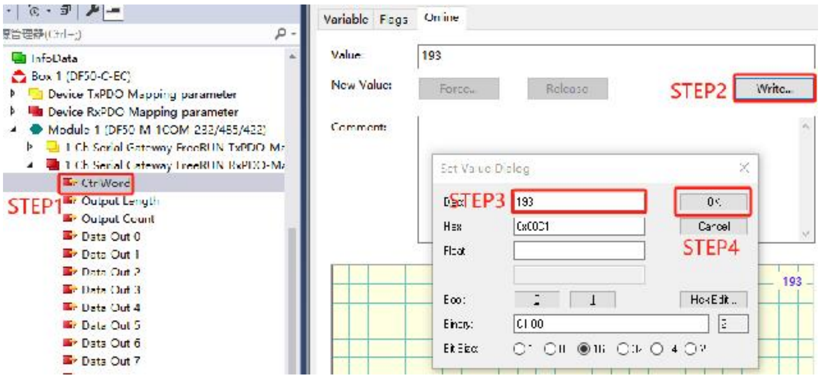
Output Data		
name	**length**	**meaning**
CtrlWord	2Byte	Control Word
OutputLength	2Byte	Send data length
OutputCount	2Byte	Send data sequence number
DataOut 0-39	40Byte	Send data content

➢ As table4.2. 22As shown in the figure, OutputLength is the length of the data to be sent, DataOut 0-39 is the data to be sent, and a new value is assigned to OutputCount to activate a send. The PLC program periodically accumulates OutputCount to achieve fixed periodic sending.

surface4.2.23Input data meaning

Input Data		
name	length	meaning
StateWord	2Byte	Status word
InputLength	2Byte	Receive data length
InputCount	2Byte	Receive data sequence number
DataIn 0-39	40Byte	Receive data content

- As table4.2. 23As shown in the figure, receiving data is similar to sending data. InputLength indicates the length of the received data, DataIn 0-39 is the valid data received, and InputCount indicates the sequence number of the currently received data frame (accumulated value). Users can determine whether a new data frame has been received based on whether the current InputCount value is updated, and the length of the received new data frame can be determined by InputLength.
- CtrlWord writes 193 (0x00C1) to configure the module into send mode.



picture4-2-99

- CtrlWord command table.

surface4.2.24 CtrlWord command table

Command Value	Command Name	meaning
16#00A1	CONFIGUREPORT	Configuration Commands
16#00C1	WRITEFreeRUN	Free mode write data command
16#00C2	READFreeRUN	Free mode read data command

- Output Length sets the sending length to 3, Data Out 0 writes sending data 01, Data Out 1 writes sending data 02, and Data Out 2 writes sending data 03.

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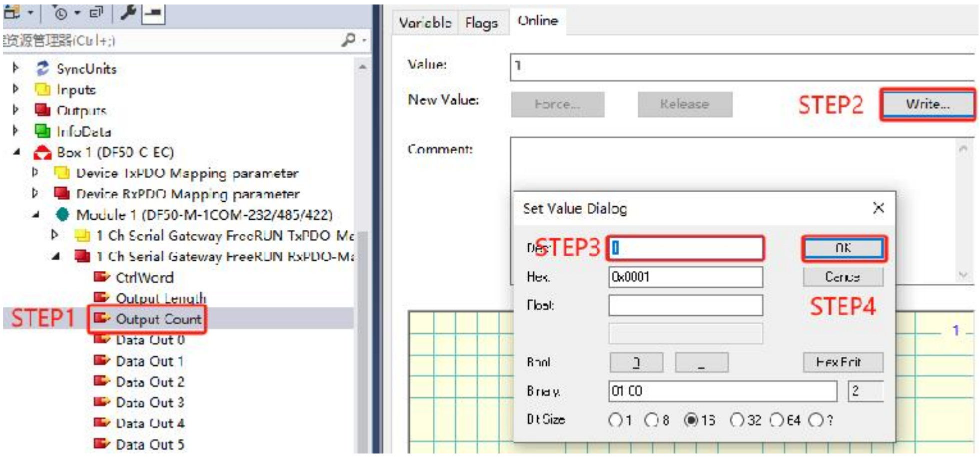
Name	[X]	Online	Type
CtrlWord		193	UINT
Output Length		3	UINT
Output Count		0	UINT
Data Out 0		1	USINT
Data Out 1		2	USINT
Data Out 2		3	USINT

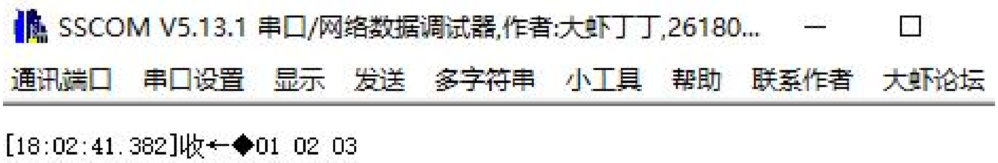
picture4-2-100

- Set Output Count to 1, and the data is sent to the serial port assistant, as shown in the figure below. The module sends data every time Output Count changes.



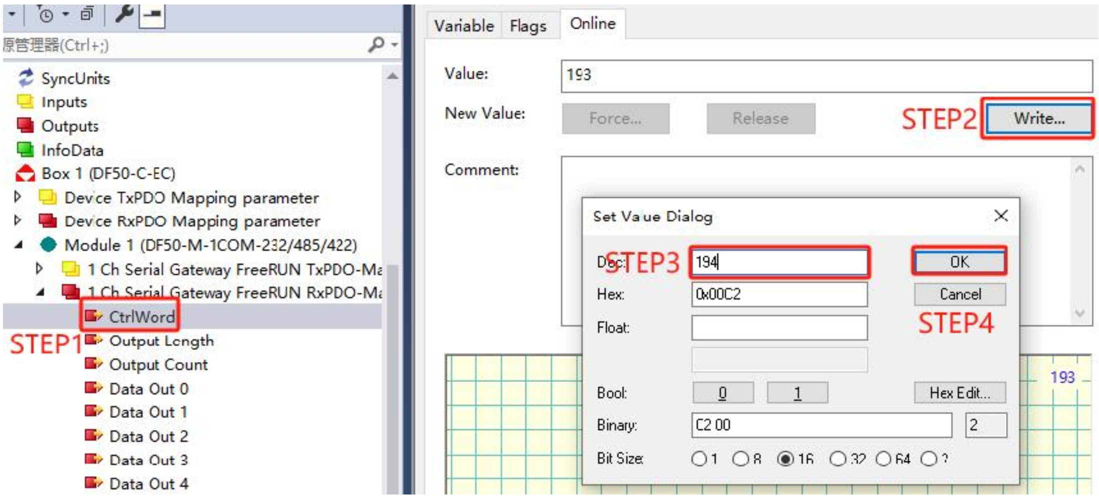
picture4-2-101

- The data received by the PC is shown in the figure below



picture4-2-102

➢ CtrlWord writes 194 (0x00C2) to configure the module into receive mode.



picture4-2-103

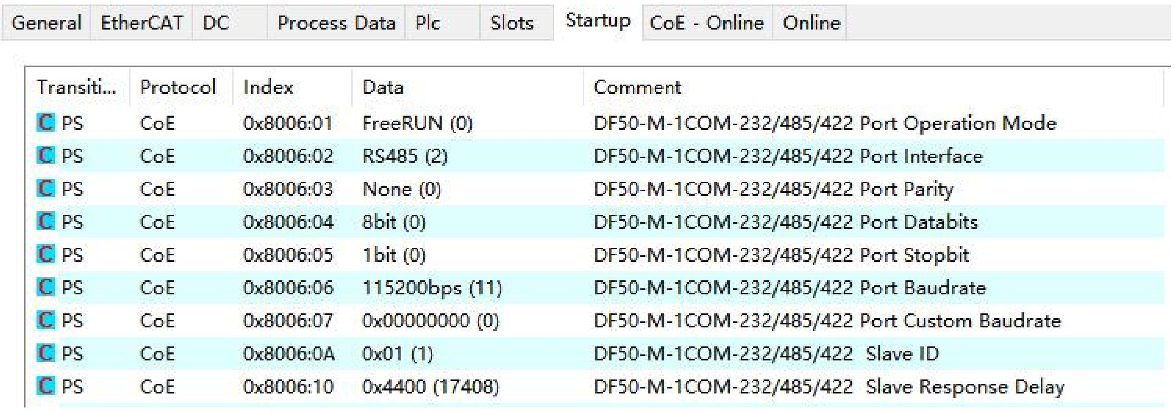
➢ PC sends 01 02 03 04 through the serial port assistant, and the card input data is as shown in the figure, which is consistent with the actual data.

Name	[X]	Online	Type	Size	>Add...	In/Out
StateWord		3	UINT	2.0	43.0	Input
Input Length		4	UINT	2.0	45.0	Input
Input Count		2	UINT	2.0	47.0	Input
Data In 0		1	USINT	1.0	49.0	Input
Data In 1		2	USINT	1.0	50.0	Input
Data In 2		3	USINT	1.0	51.0	Input
Data In 3		4	USINT	1.0	52.0	Input

picture4-2-104

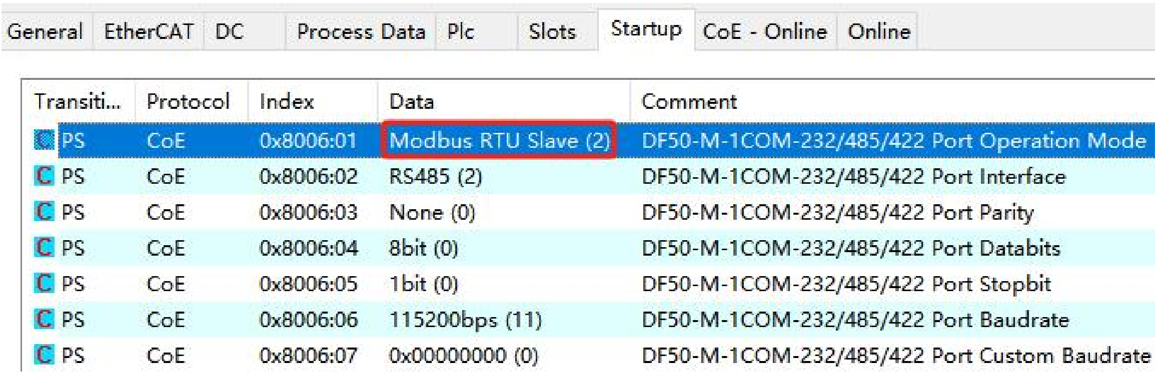
Modbus RTU Slave mode usage routine

➢ For the meaning of configuration data, please refer toSection 15.3, the Modbus RTU Slave mode configuration interface is shown in the figure.



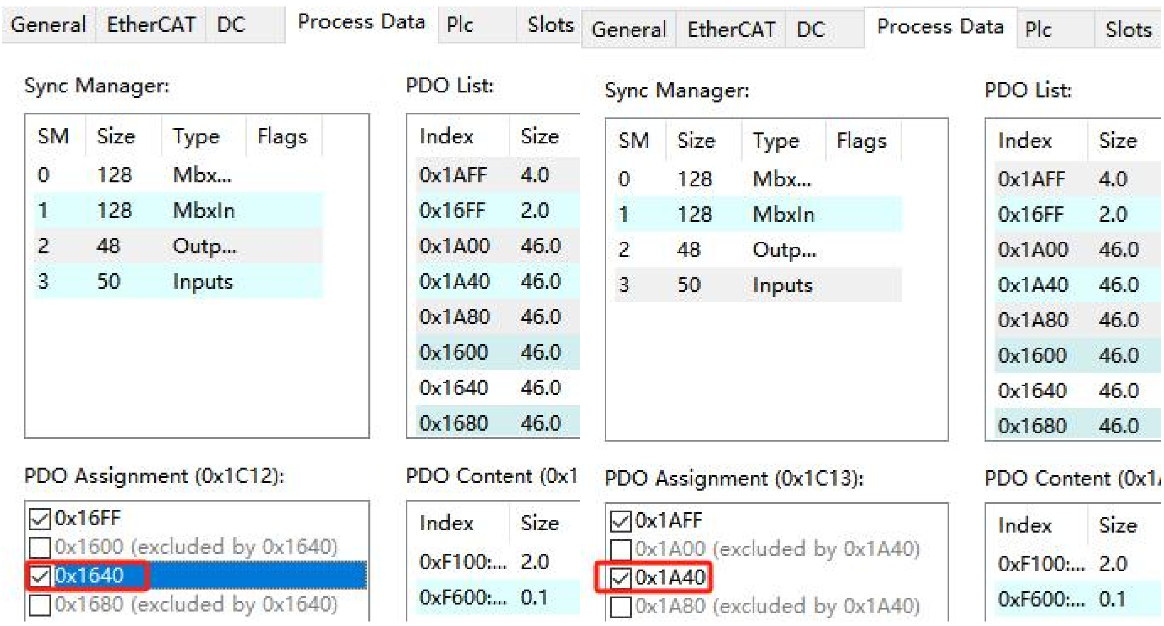
picture4-2-105

➢ In the Startup options, configure the mode to Modbus RTU Slave mode.



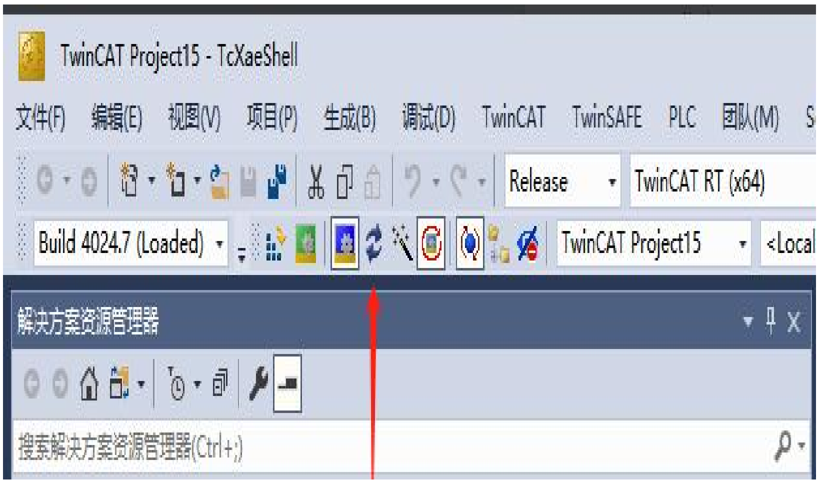
picture4-2-106

➢ Configure the process data in Process Data to 0x1640, 0x1A40.



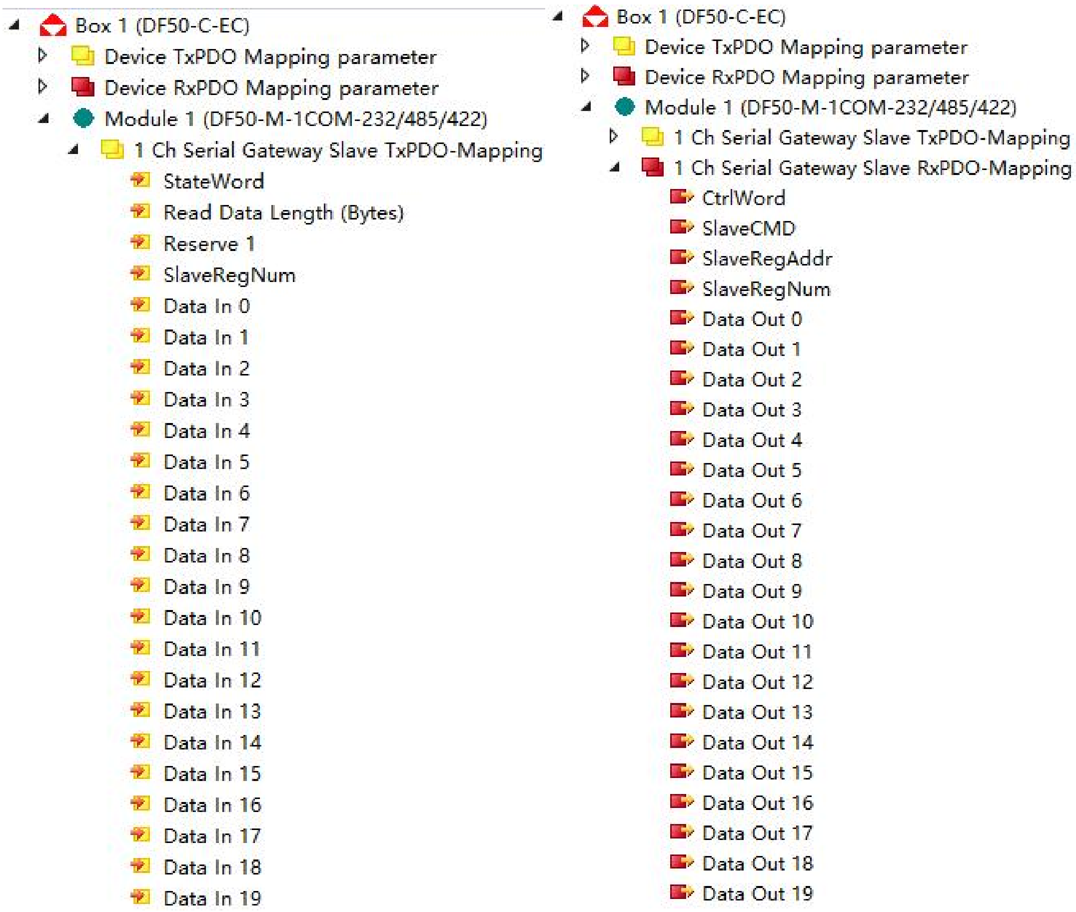
picture4-2-107

➢ Click  Reload the device and configure the Modbus RTU Slave mode parameters.



picture4-2-108

➢ The input and output data of Modbus RTU Slave mode are shown in the figure below.



picture4-2-109

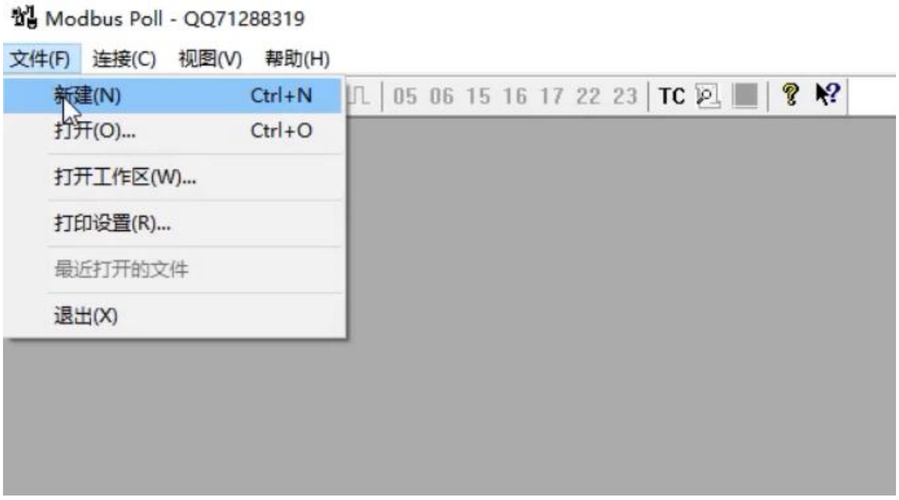
➢ Description of process data in Modbus RTU Slave mode.

surface4.2.25 Input and output data tables

Output Data		
name	**length**	**meaning**
CtrlWord	2byte	Control Word
SlaveCMD	1byte	Slave operation commands
SlaveRegAddr	1byte	Slave register address
SlaveRegNum	2byte	Number of slave registers
DataOut0-19	40byte	Send data area
Input Data		
name	**length**	**meaning**
StateWord	2byte	Status word
Read Data Length	1byte	Readback data length Byte

Reserve 1	1byte	reserve
SlaveRegNum	2byte	Readback register quantity
DataIn0-19	40byte	Receive data area

- When the module is used as a slave station, the data can be freely read and written by the RTU external master station. The number of input registers is 128, the number of holding registers is 128, the number of coils is 1024, and the number of discrete quantities is 1024. The read and write mode is controlled by SlaveCMD.
- Open the ModbusPoll software on the PC and create a new project.

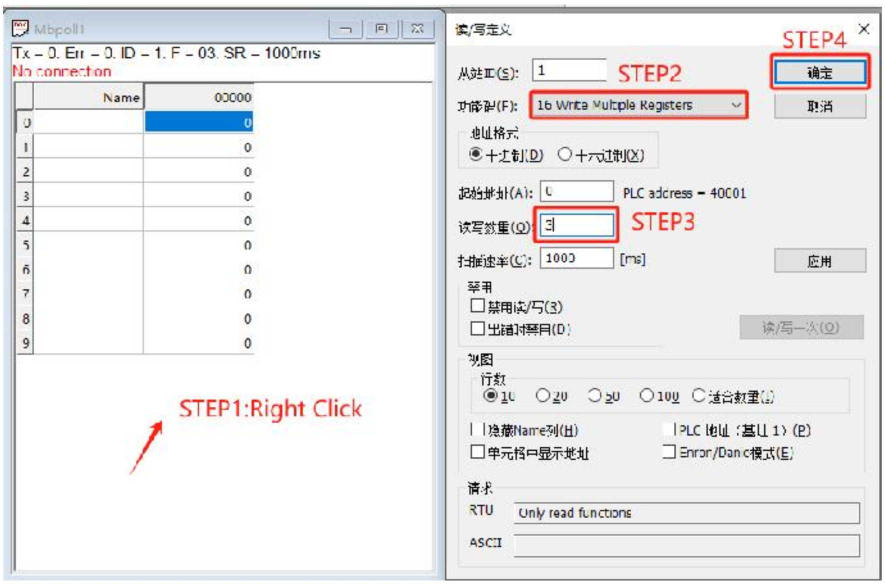


picture4-2-110

- Connect to the serial device.

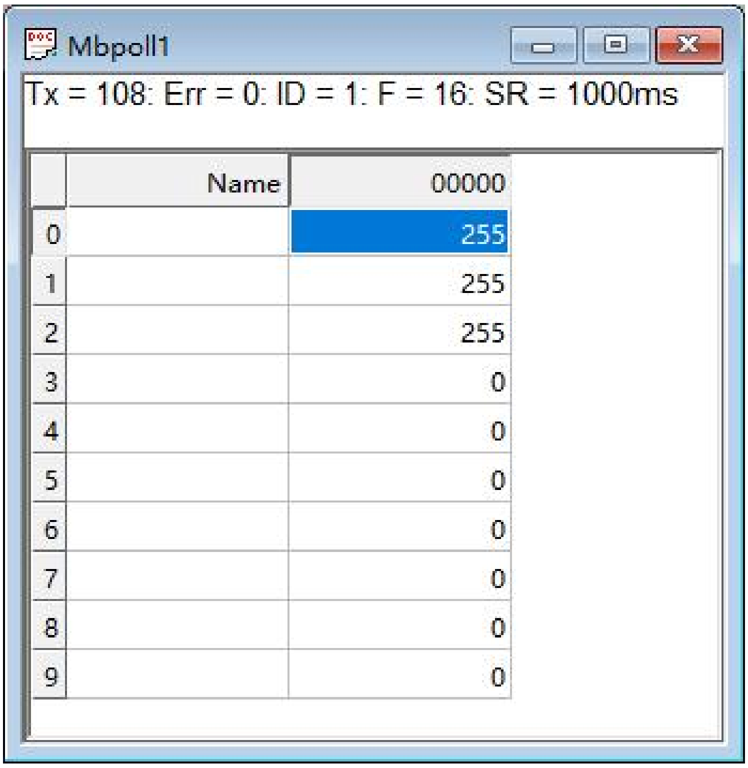
picture4-2-111

➢ Right-click in a blank area to set parameters.



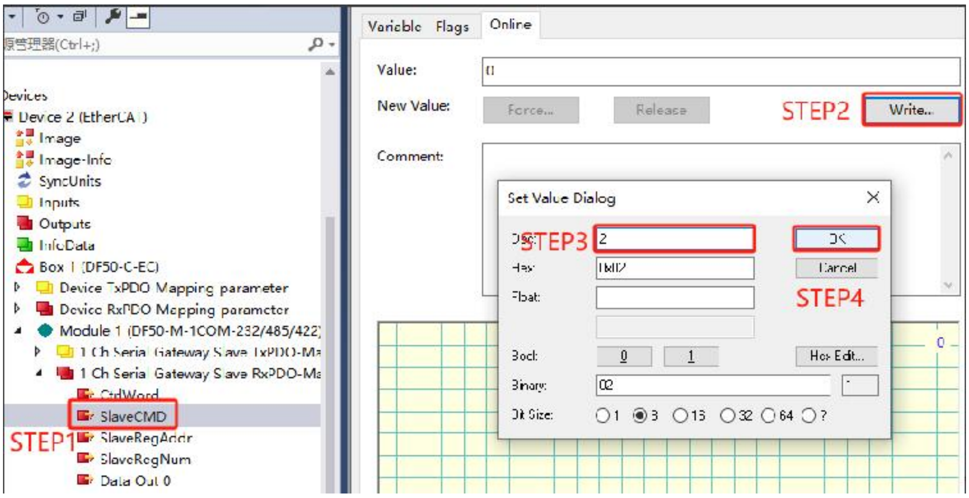
picture4-2-112

➢ Set the data that the PC writes to the card.



picture4-2-113

➢ SlaveCMD writes command 0x02.



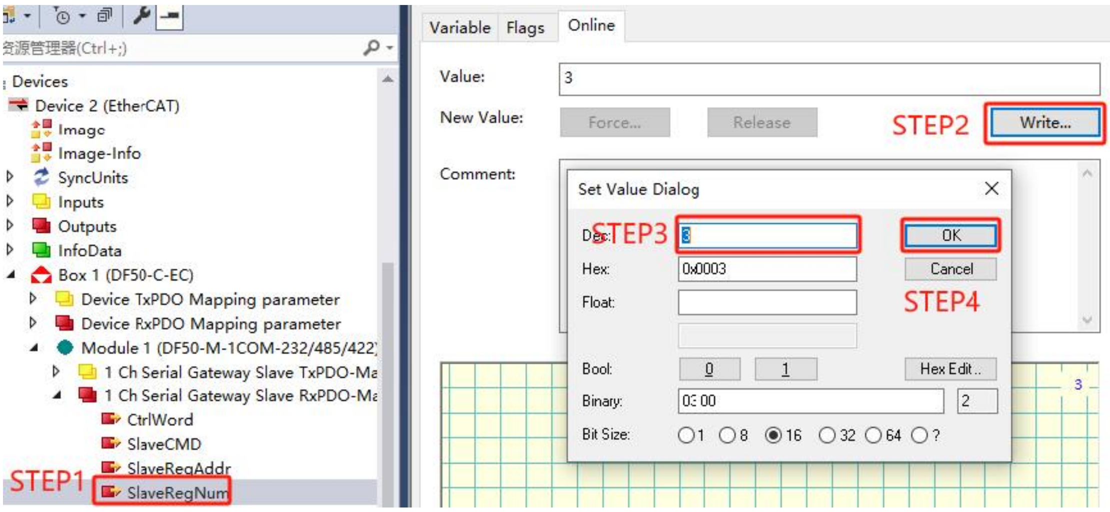
picture4-2-114

➢ SlaveCMD command table.

surface4.2.26 SlaveCMD command table

SlaveCMD			
value	**name**	**length**	**meaning**
1	ReadCoils	1byte	Read coil value
2	ReadHoldReg	1byte	Read Holding Registers
3	WriteCoils	1byte	Write coil value
4	WriteDiscrete	1byte	Write discrete quantity
5	WriteHoldReg	1byte	Writing Holding Registers
6	WriteInReg	1byte	Write input register

➢ SlaveRegNum writes the number 3.



picture4-2-115

➢ Open the module to input data, the current data is consistent with the sent data.

Name	[X]	Online	Type	Size
StateWord		0	UINT	2.0
Read Data Len...		6	USINT	1.0
Reserve 1		0	USINT	1.0
SlaveRegNum		3	UINT	2.0
Data In 0		255	UINT	2.0
Data In 1		255	UINT	2.0
Data In 2		255	UINT	2.0

picture4-2-116

4.3 Application in Sysmac Studio software environment

➢ As shown in Figure 4-3-1, first find the DF50-C-EC V1i0i2_R device description file provided by the manufacturer and copy it to the folder in the installation path "C:\Program Files (x86)\OMRON\SysmacStudio\IODeviceProfiles\EsiFiles\UserEsiFiles".

Figure 4-3-1

➢ Set the IP address of the computer and the IP address of the PLC to ensure that they are in the same network segment.

➢ As shown in Figure 4-3-2, add a DF50-C-EC adapter to the project.

Figure 4-3-2

➢ Users need to note that the device node address in Figure 4-3-3 must be consistent with the setting of the DF50-C-EC DIP switch, otherwise there will be problems with the configuration. After the DIP switch is set, the DF50-C-EC needs to be powered on again.

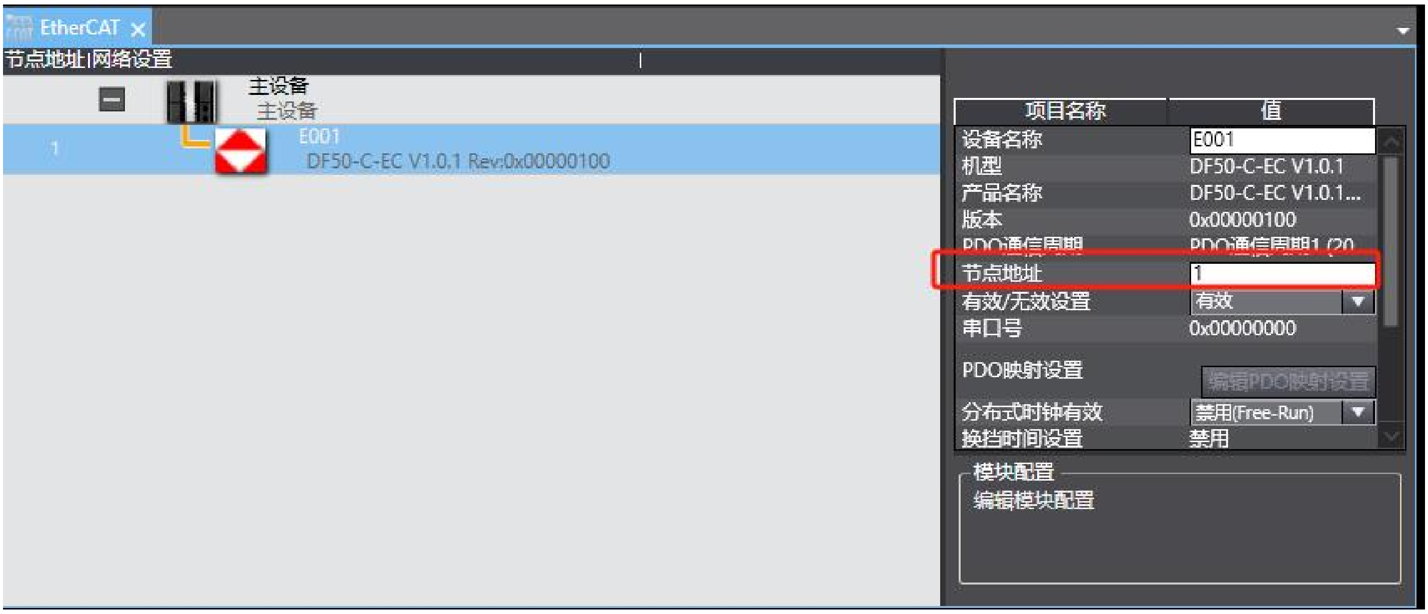


Figure 4-3-3

➢ As shown in Figure 4-3-4, double-click node 1 or click Edit Module Configuration. You can add subsequent mounted IO modules on this page.

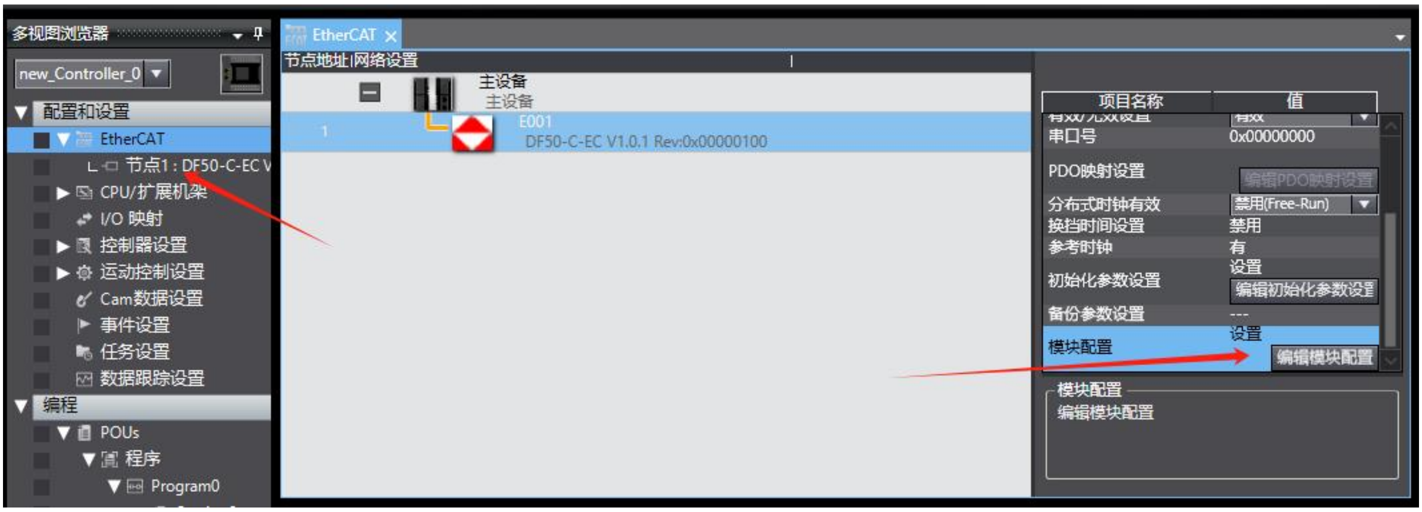


Figure 4-3-4

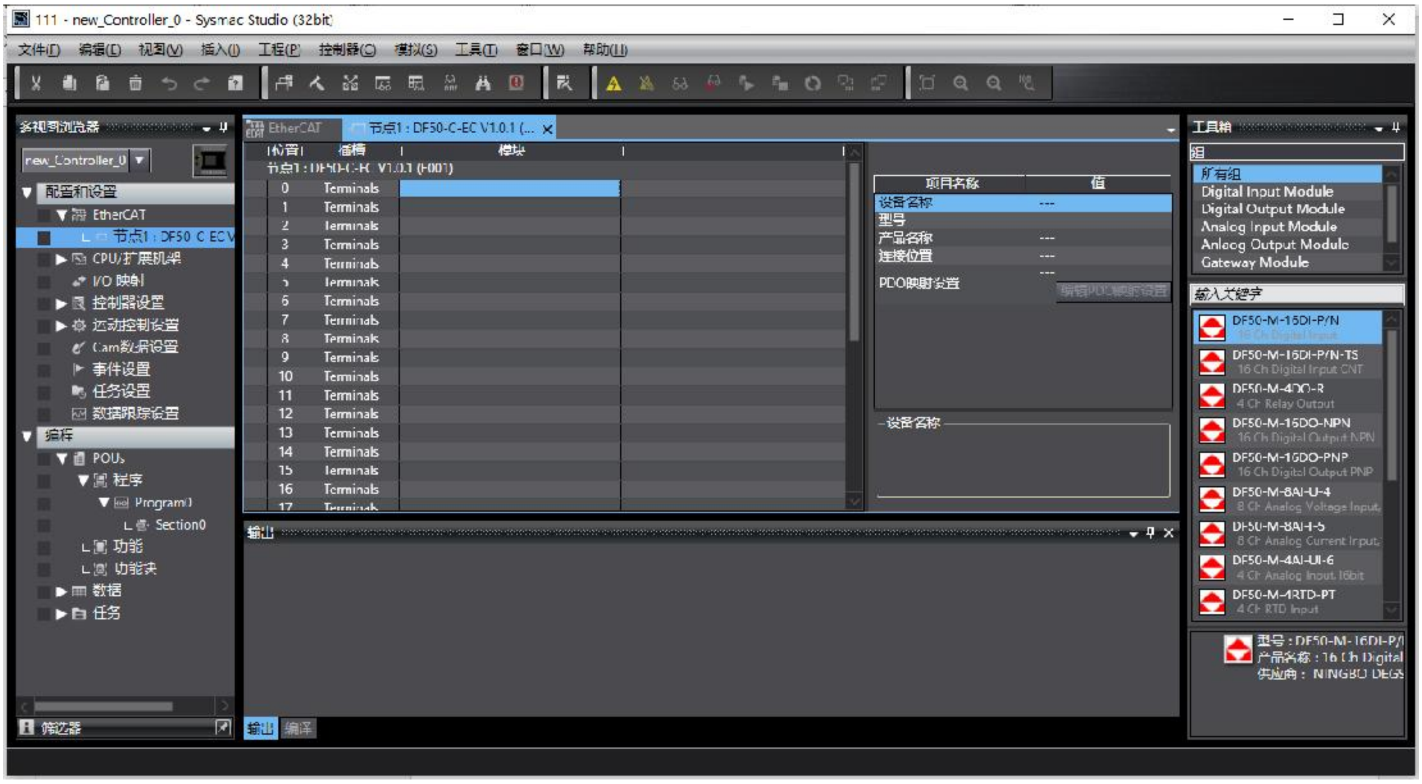


Figure 4-3-5Adding a module view

➢ After adding the card, download the configuration to the PLC.

- As shown in the figure below, in the online state, double-click to open the I/O mapping, you can monitor or modify the data of the corresponding card address, which is convenient for us to debug.

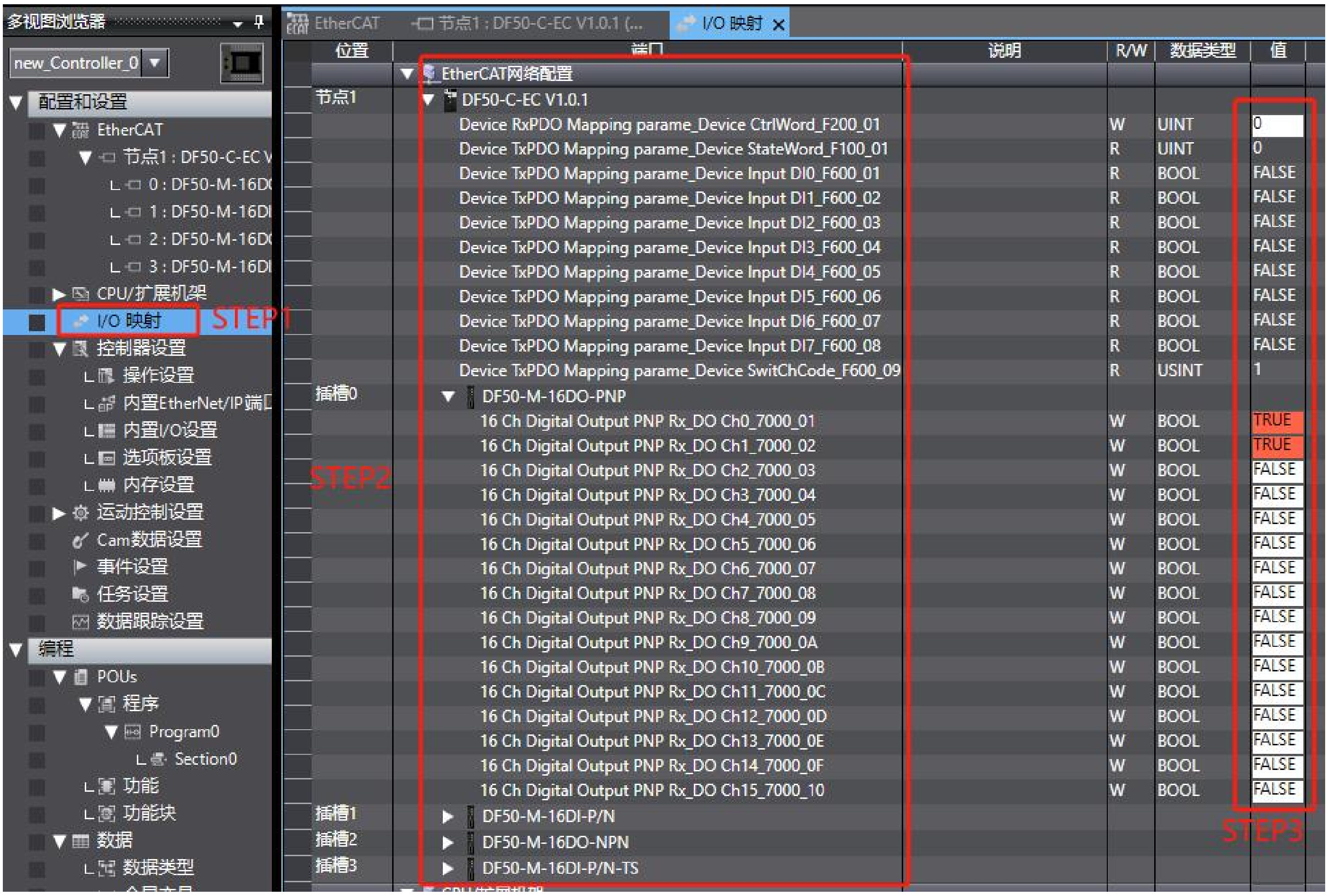


Figure 4-3-6I/O Mapping

4.3.1 Adapter Usage Examples

- For adapter wiring, please refer to Chapter 2 Section 1.2. The example uses the DF50-C-EC + DF50-M-16DO-P + DF50-M-16DI-P/N + DF50-M-16DO-N + DF50-M-16DI-P/N-TS topology. After adding the corresponding cards, the result is as shown in Figure 4-3-7: "Device RxPDO Mapping parame" in node 1 is the coupler control word, "Device TxPDO Mapping parame" is the device status information and the 8 DI data of the coupler, and slots 0~3 are the IO module cards.

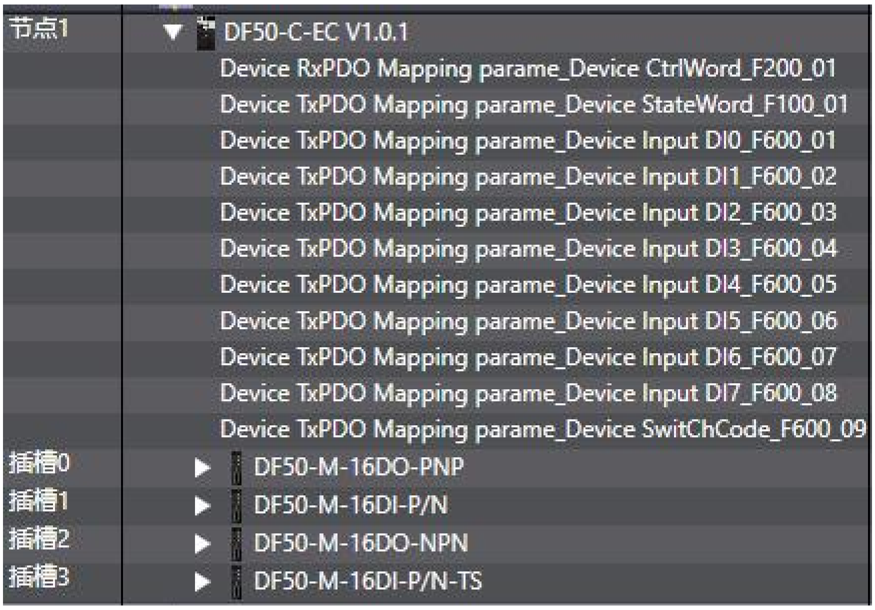


Figure 4-3-7Process data

- The process data in "Device RxPDO Mapping parame" and "Device TxPDO Mapping parame" are shown in Table 4.3.1.

Table 4.3.1Process data meaning

TXPD0			
Name	**Type**	**Size**	**meaning**
Device StateWord	UINT	2.0	Device status word, normally 0.
Device Input DI0	BIT	0.1	DI0 input is set to 1 if valid and 0 if invalid.
Device Input DI1	BIT	0.1	DI1 input is set to 1 if valid, and to 0 if invalid.
Device Input DI2	BIT	0.1	DI2 input is set to 1 if valid and 0 if invalid.
Device Input DI3	BIT	0.1	DI3 input is set to 1 if valid, and 0 if invalid.
Device Input DI4	BIT	0.1	DI4 input is set to 1 if valid and 0 if invalid.
Device Input DI5	BIT	0.1	DI5 input is set to 1 if valid and 0 if invalid.
Device Input DI6	BIT	0.1	DI6 input is set to 1 if valid and 0 if invalid.
Device Input DI7	BIT	0.1	DI7 input is set to 1 if valid and 0 if invalid.
Device SwitchCode	USINT	1.0	8-bit DIP switch value.

RXPD0			
Device CtrlWord	UINT	2.0	Device control word.

Device StateWord meaning

- As shown in Figures 4-3-8 and 4-3-9, when the value of "Device CtrlWord" is 0x0000 by default, the feedback value of "Device StateWord" is 0x01e8, indicating that an error occurs in the first module after the coupler. Similarly, when an error occurs in the second module, the value of "Device StateWord" is 0x02e8. When all modules are working normally, the value is 0. If you need to clear the error, write "0x0001" through Device CtrlWord to clear the error, and then write it back to 0x0000.

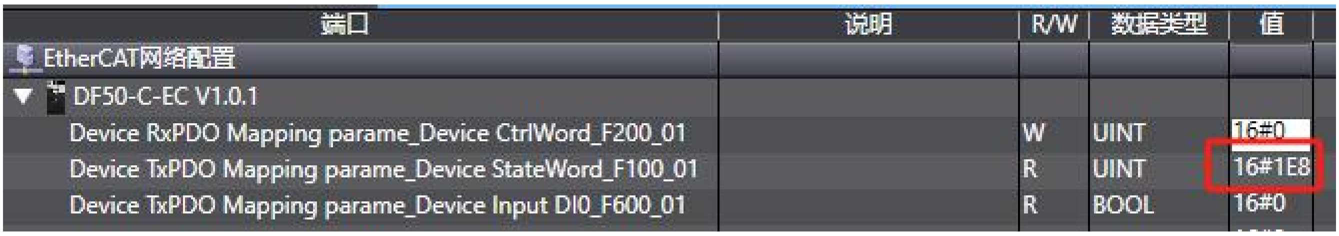


Figure 4-3-8

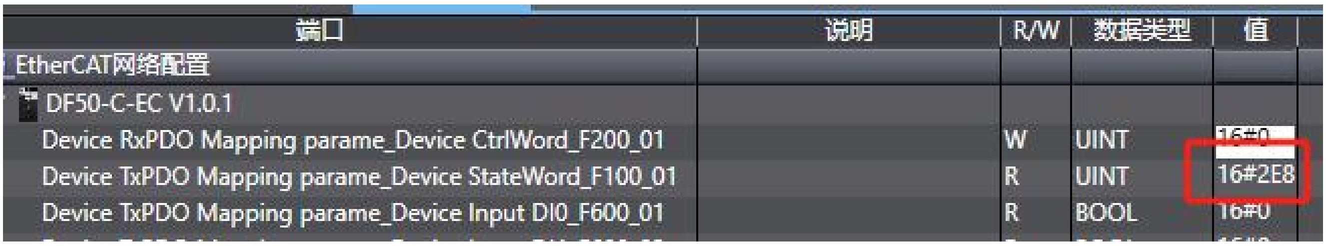


Figure 4-3-9

- Device CtrlWord commands are shown in Table 4.3.2.

Table 4.3.2

Device CtrlWord	**Device StateWord**
0x0000	Display fault code
0x0001	Clearing fault codes
0x0002	Coupler software version number

- When the module has fault information and Device CtrlWord is 0x0000, the upper 8 bits of Device StateWord indicate the module position, and the lower 8 bits indicate the module fault code. The meaning of the fault code is shown in the table below.

Table 4.3.3

Fault	**Fault Description**	**Troubleshooting**

Codes		methods
0XE1	Module power supply abnormality	Check the power cord connection
0XE2	Analog module calibration abnormality	Contact Supplier
0XE3	Module internal initialization exception	Contact Supplier
0XE8	Module offline	Reseat the module

Module error adapter bus status configuration

➢ As shown in Figure 4-3-10, when the module loses data in communication with the adapter and an error occurs, the adapter bus can be set to remain in OP state or exit OP state. The default setting is to remain in OP state.

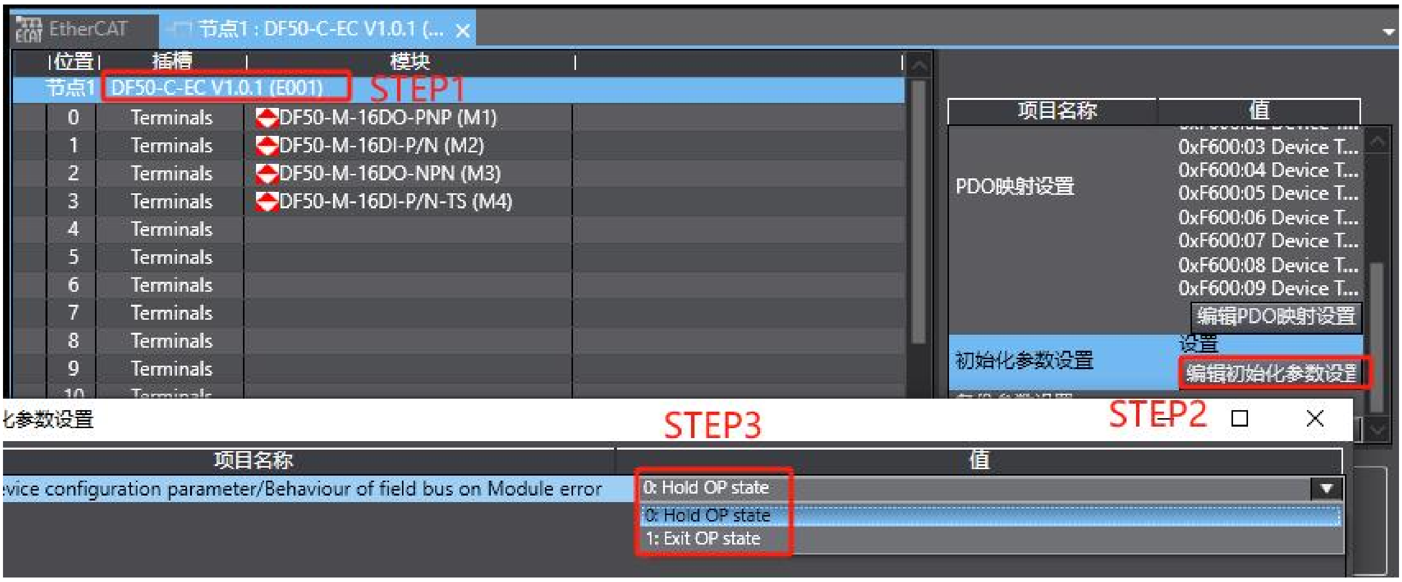


Figure 4-3-10Behavior on bus errors

4.3.2 Digital Module Usage Example

➢ This example uses the DF50-C-EC + DF50-M-16DO-P + DF50-M-16DO-N + DF50-M-16DI-P/N + DF50-M-16DI-P/N-TS topology. Users add modules in order in the project.

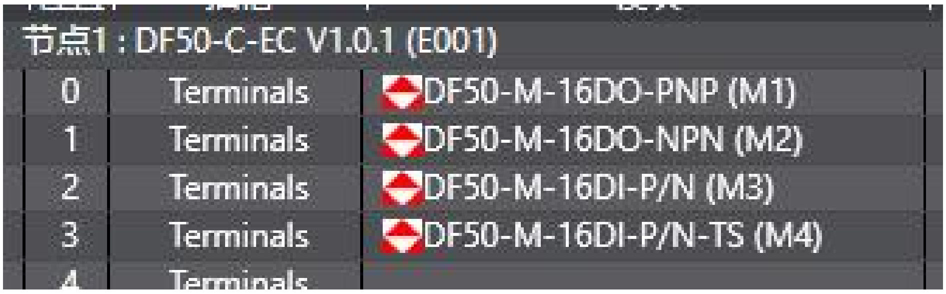


Figure 4-3-11

DF50-M-16DO-P digital output module

➢ Please refer to the module wiring diagramChapter 3, Section 3.2When the EC bus exits the OP state, this type of module can set the output state of the module. The setting method is shown in the figure below. It can be set to: all outputs are closed, use alternative value output, and keep the last value.

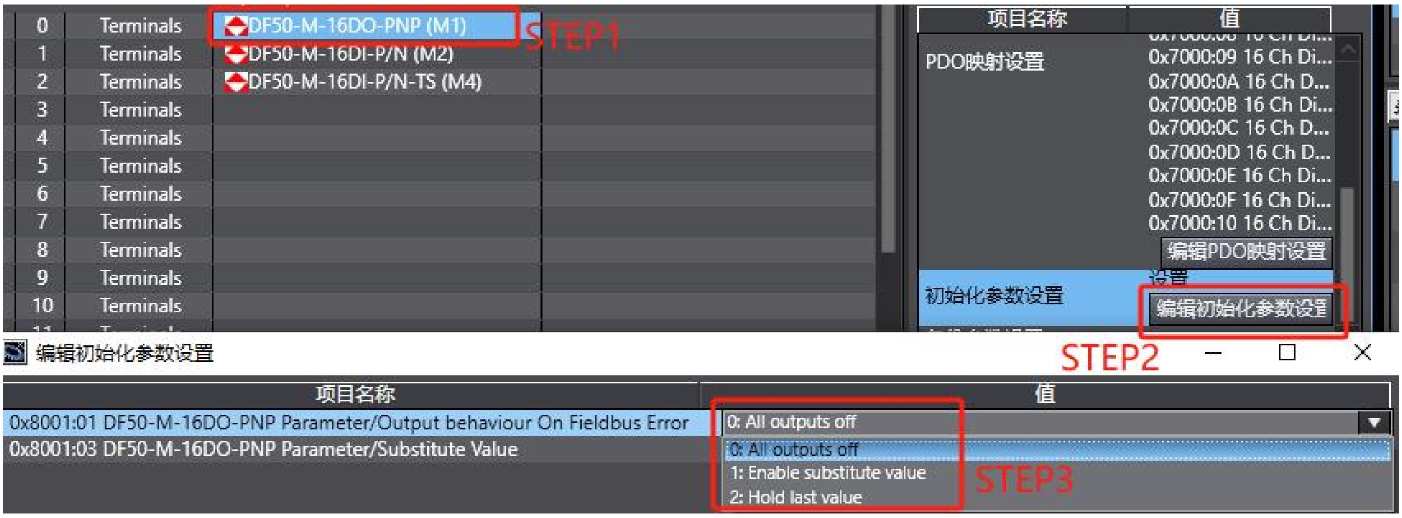


Figure 4-3-12Behavior on bus errors

➢ When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.

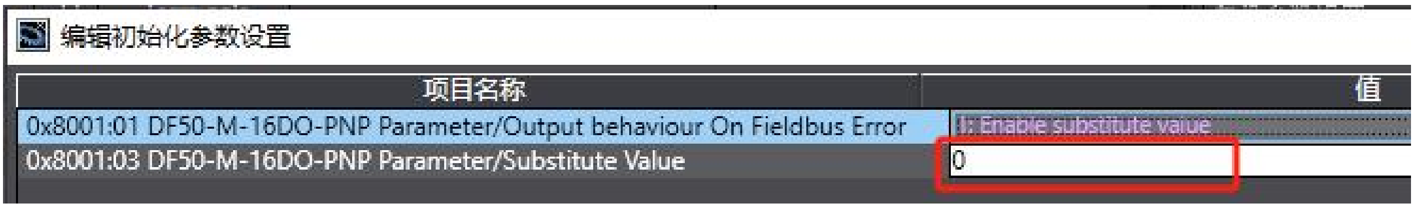


Figure 4-3-13Alternative value settings

- As shown in the figure below, writing "1" to each channel can enable each channel output individually.

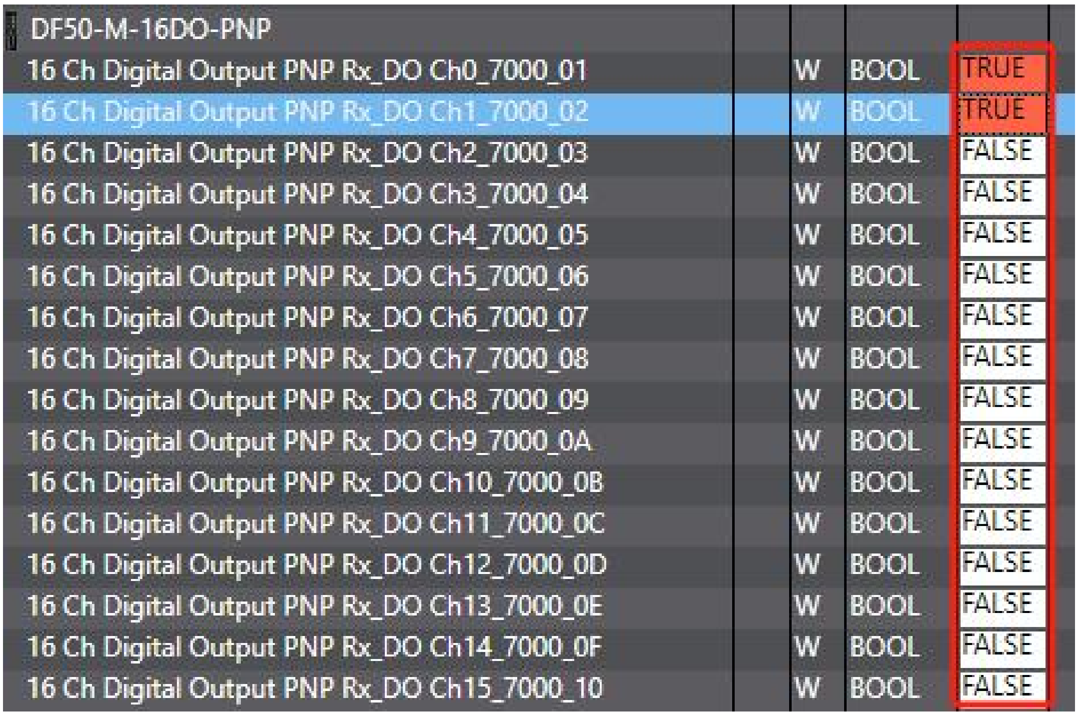


Figure 4-3-14Control output

DF50-M-16DO-N digital output module

- Please refer to the module wiring diagramChapter 3 Section 4.2When the EC bus exits the OP state, this type of module can set the output state of the module. The setting method is shown in the figure below. It can be set to: all outputs are closed, use alternative value output, and keep the last value.

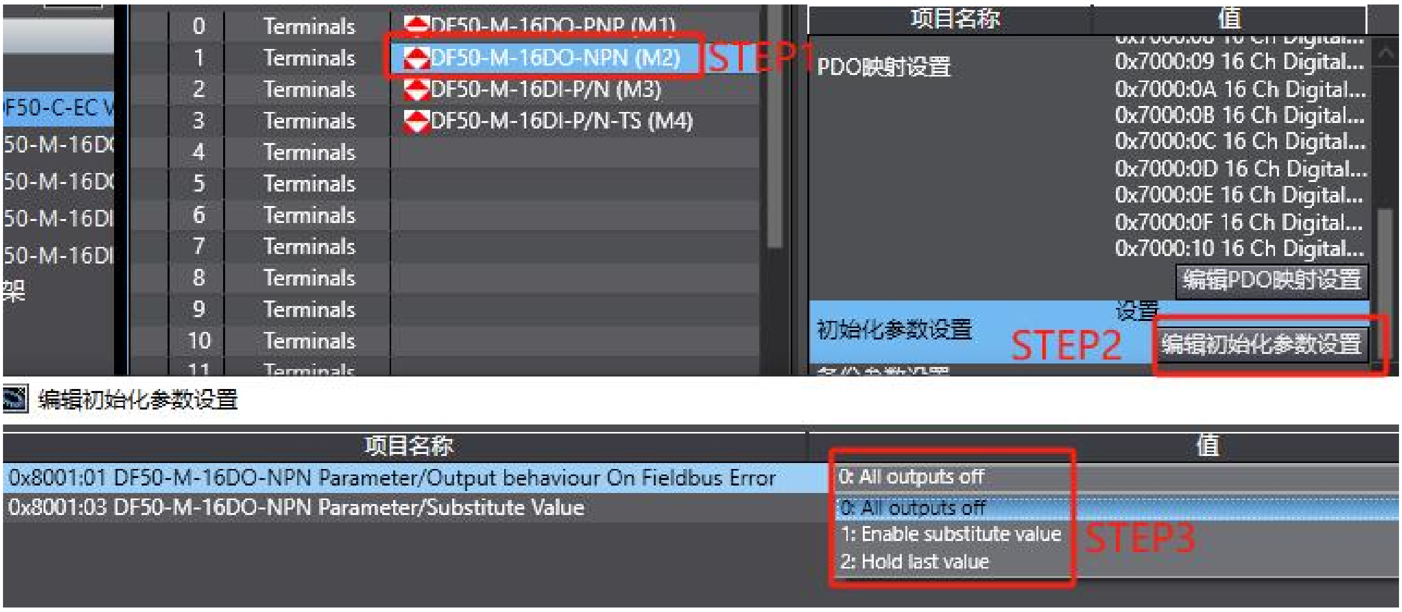


Figure 4-3-15

- When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.

编辑初始化参数设置

项目名称	值
0x8001:01 DF50-M-16DO-NPN Parameter/Output behaviour On Fieldbus Error	0: All outputs off
0x8001:03 DF50-M-16DO-NPN Parameter/Substitute Value	0

Figure 4-3-16

➢ As shown in the figure below, writing "1" to each channel can enable each channel output individually.

DF50-M-16DO-NPN			
16 Ch Digital Output NPN Rx_DO Ch0_7000_01	W	BOOL	TRUE
16 Ch Digital Output NPN Rx_DO Ch1_7000_02	W	BOOL	TRUE
16 Ch Digital Output NPN Rx_DO Ch2_7000_03	W	BOOL	FALSE
16 Ch Digital Output NPN Rx_DO Ch3_7000_04	W	BOOL	FALSE
16 Ch Digital Output NPN Rx_DO Ch4_7000_05	W	BOOL	FALSE
16 Ch Digital Output NPN Rx_DO Ch5_7000_06	W	BOOL	FALSE
16 Ch Digital Output NPN Rx_DO Ch6_7000_07	W	BOOL	FALSE
16 Ch Digital Output NPN Rx_DO Ch7_7000_08	W	BOOL	FALSE
16 Ch Digital Output NPN Rx_DO Ch8_7000_09	W	BOOL	FALSE
16 Ch Digital Output NPN Rx_DO Ch9_7000_0A	W	BOOL	FALSE
16 Ch Digital Output NPN Rx_DO Ch10_7000_0B	W	BOOL	FALSE
16 Ch Digital Output NPN Rx_DO Ch11_7000_0C	W	BOOL	FALSE
16 Ch Digital Output NPN Rx_DO Ch12_7000_0D	W	BOOL	FALSE
16 Ch Digital Output NPN Rx_DO Ch13_7000_0E	W	BOOL	FALSE
16 Ch Digital Output NPN Rx_DO Ch14_7000_0F	W	BOOL	FALSE
16 Ch Digital Output NPN Rx_DO Ch15_7000_10	W	BOOL	FALSE

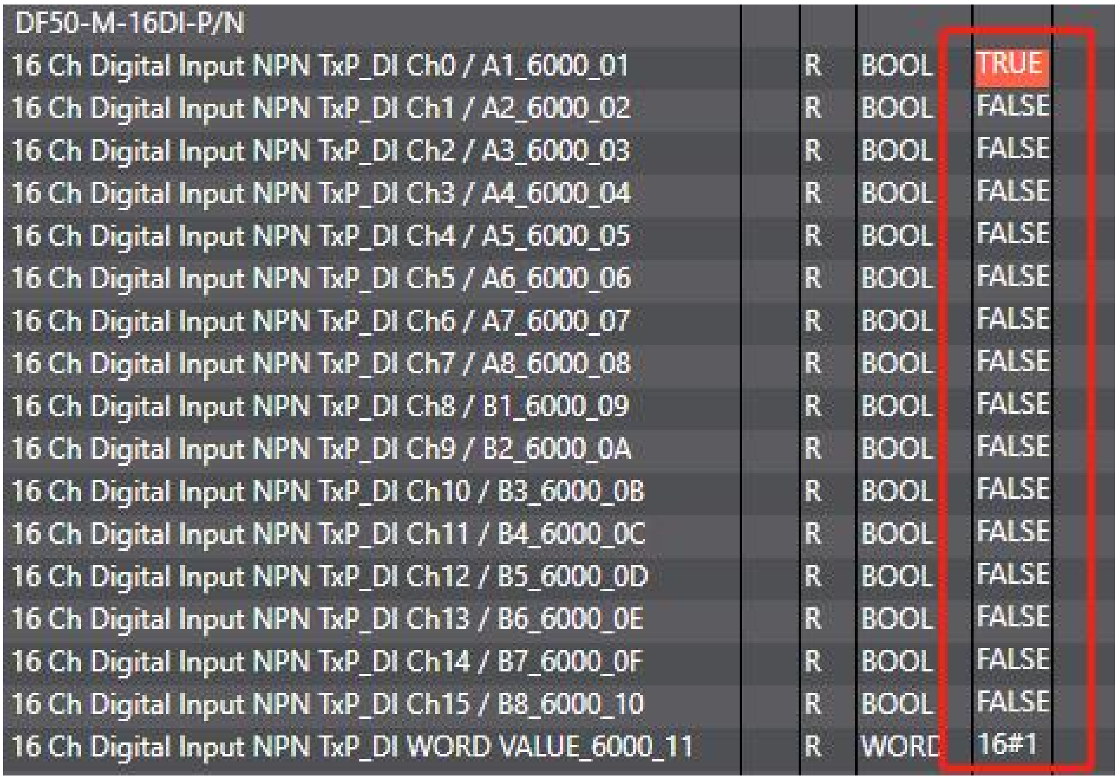
Figure 4-3-17Control output

DF50-M-16DI-P/N digital input module

➢ Please refer to the wiring diagramChapter 3, Section 1.2This type of module can be configured for input filtering. The configuration method is shown in the figure below. The configurable range is 0~255ms.

Figure 4-3-18

➢ As shown in the figure below, when a valid signal is input to the module, the corresponding channel value will become "1".



DF50-M-16DI-P/N			
16 Ch Digital Input NPN TxP_DI Ch0 / A1_6000_01	R	BOOL	TRUE
16 Ch Digital Input NPN TxP_DI Ch1 / A2_6000_02	R	BOOL	FALSE
16 Ch Digital Input NPN TxP_DI Ch2 / A3_6000_03	R	BOOL	FALSE
16 Ch Digital Input NPN TxP_DI Ch3 / A4_6000_04	R	BOOL	FALSE
16 Ch Digital Input NPN TxP_DI Ch4 / A5_6000_05	R	BOOL	FALSE
16 Ch Digital Input NPN TxP_DI Ch5 / A6_6000_06	R	BOOL	FALSE
16 Ch Digital Input NPN TxP_DI Ch6 / A7_6000_07	R	BOOL	FALSE
16 Ch Digital Input NPN TxP_DI Ch7 / A8_6000_08	R	BOOL	FALSE
16 Ch Digital Input NPN TxP_DI Ch8 / B1_6000_09	R	BOOL	FALSE
16 Ch Digital Input NPN TxP_DI Ch9 / B2_6000_0A	R	BOOL	FALSE
16 Ch Digital Input NPN TxP_DI Ch10 / B3_6000_0B	R	BOOL	FALSE
16 Ch Digital Input NPN TxP_DI Ch11 / B4_6000_0C	R	BOOL	FALSE
16 Ch Digital Input NPN TxP_DI Ch12 / B5_6000_0D	R	BOOL	FALSE
16 Ch Digital Input NPN TxP_DI Ch13 / B6_6000_0E	R	BOOL	FALSE
16 Ch Digital Input NPN TxP_DI Ch14 / B7_6000_0F	R	BOOL	FALSE
16 Ch Digital Input NPN TxP_DI Ch15 / B8_6000_10	R	BOOL	FALSE
16 Ch Digital Input NPN TxP_DI WORD VALUE_6000_11	R	WORD	16#1

Figure 4-3-19Input signal

DF50-M-16DI-P/N-TS digital input with counting module

- Please refer to the module wiring diagramChapter 3, Section 2.2As shown in Figure 4-3-20, you can configure the filter parameters of the corresponding channel, and the configurable range is 0~255ms.

Figure 4-3-20Filter settings

- The counting mode configuration is shown in Figure 4-3-21. The configurable parameters are: rising edge counting, falling edge counting, and both rising and falling edges counting.

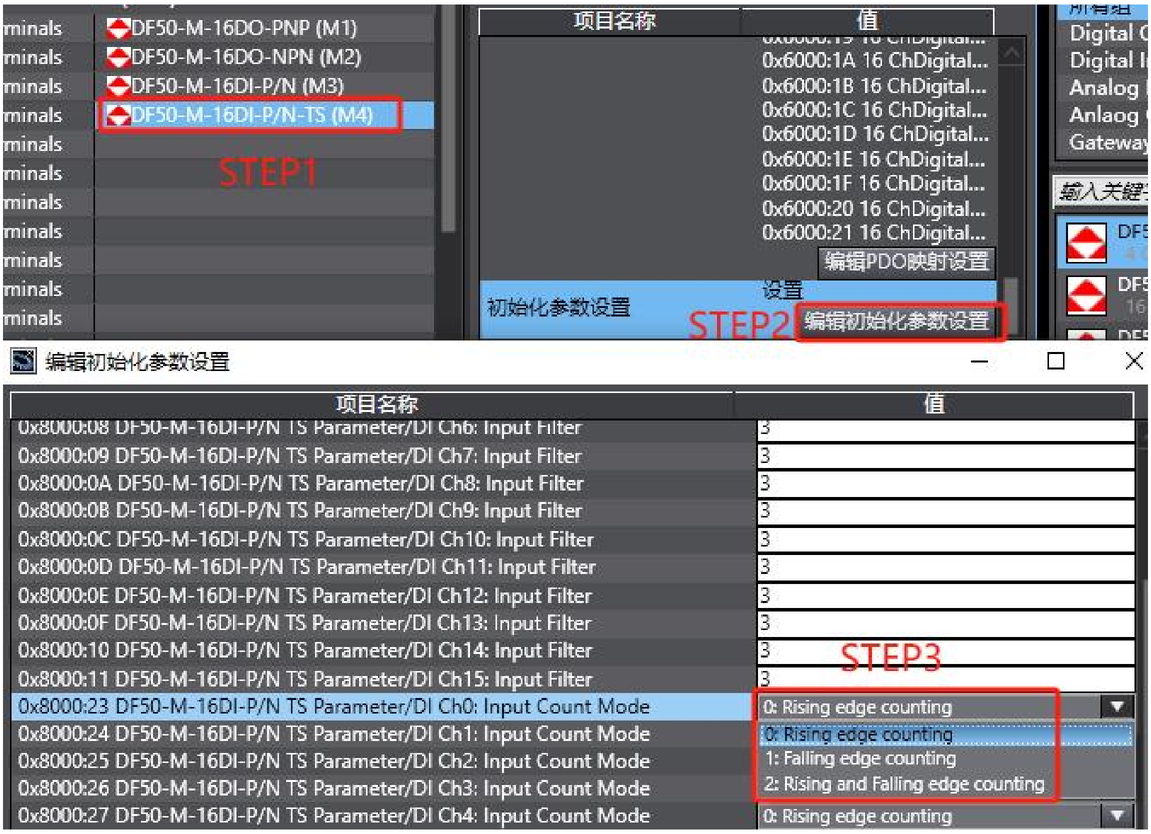


Figure 4-3-twenty oneCounting mode configuration

➢ For process data definition, please refer to Chapter 3, Section 2.4 When a valid signal is input to the module, the corresponding channel value becomes "1", and the corresponding channel count value +1. As shown in Figure 4-3-22, when a valid signal is input to CH0/A1, the Online value becomes "1", and the CH0/A1 Count value +1.

16 ChDigital TS Input CNT T_DI Ch0 / A1_6000_01	R	BOOL	TRUE
16 ChDigital TS Input CNT T_DI Ch1 / A2_6000_02	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch2 / A3_6000_03	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch3 / A4_6000_04	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch4 / A5_6000_05	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch5 / A6_6000_06	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch6 / A7_6000_07	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch7 / A8_6000_08	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch8 / B1_6000_09	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch9 / B2_6000_0A	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch10 / B3_6000_0B	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch11 / B4_6000_0C	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch12 / B5_6000_0D	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch13 / B6_6000_0E	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch14 / B7_6000_0F	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch15 / B8_6000_10	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI WORD VALUE_6000_11	R	UINT	1
16 ChDigital TS Input CNT T_DI Ch0 / A1 Count_6000_12	R	UDINT	13
16 ChDigital TS Input CNT T_DI Ch1 / A2 Count_6000_13	R	UDINT	0
16 ChDigital TS Input CNT T_DI Ch2 / A3 Count_6000_14	R	UDINT	0

Figure 4-3-twenty two

➢ As shown in Figure 4-3-23, writing a value of "1" to the Clear bit of the corresponding channel can clear the count value of the corresponding channel in the input data.

DF50-M-16DI-P/N-TS			
16 ChDigitalTS Input CNT Rx_DI Ch0 Clear bit_7000_01	W	BOOL	TRUE
16 ChDigitalTS Input CNT Rx_DI Ch1 Clear bit_7000_02	W	BOOL	FALSE
16 ChDigitalTS Input CNT Rx_DI Ch2 Clear bit_7000_03	W	BOOL	FALSE
16 ChDigitalTS Input CNT Rx_DI Ch3 Clear bit_7000_04	W	BOOL	FALSE
16 ChDigitalTS Input CNT Rx_DI Ch4 Clear bit_7000_05	W	BOOL	FALSE
16 ChDigitalTS Input CNT Rx_DI Ch5 Clear bit_7000_06	W	BOOL	FALSE
16 ChDigitalTS Input CNT Rx_DI Ch6 Clear bit_7000_07	W	BOOL	FALSE
16 ChDigitalTS Input CNT Rx_DI Ch7 Clear bit_7000_08	W	BOOL	FALSE
16 ChDigitalTS Input CNT Rx_DI Ch8 Clear bit_7000_09	W	BOOL	FALSE
16 ChDigitalTS Input CNT Rx_DI Ch9 Clear bit_7000_0A	W	BOOL	FALSE
16 ChDigitalTS Input CNT Rx_DI Ch10 Clear bit_7000_0B	W	BOOL	FALSE
16 ChDigitalTS Input CNT Rx_DI Ch11 Clear bit_7000_0C	W	BOOL	FALSE
16 ChDigitalTS Input CNT Rx_DI Ch12 Clear bit_7000_0D	W	BOOL	FALSE
16 ChDigitalTS Input CNT Rx_DI Ch13 Clear bit_7000_0E	W	BOOL	FALSE
16 ChDigitalTS Input CNT Rx_DI Ch14 Clear bit_7000_0F	W	BOOL	FALSE
16 ChDigitalTS Input CNT Rx_DI Ch15 Clear bit_7000_10	W	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch0 / A1_6000_01	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch1 / A2_6000_02	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch2 / A3_6000_03	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch3 / A4_6000_04	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch4 / A5_6000_05	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch5 / A6_6000_06	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch6 / A7_6000_07	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch7 / A8_6000_08	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch8 / B1_6000_09	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch9 / B2_6000_0A	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch10 / B3_6000_0B	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch11 / B4_6000_0C	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch12 / B5_6000_0D	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch13 / B6_6000_0E	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch14 / B7_6000_0F	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI Ch15 / B8_6000_10	R	BOOL	FALSE
16 ChDigital TS Input CNT T_DI WORD VALUE_6000_11	R	UINT	0
16 ChDigital TS Input CNT T_DI Ch0 / A1 Count_6000_12	R	UDINT	0

Figure 4-3-twenty threeCount value cleared

4.3.3 Analog module usage routine

➢ This example uses the topology of DF50-C-EC + DF50-M-8AO-U-4 + DF50-M-8AO-I-5 + DF50-M-4AO-UI-6 + DF50-M-8AI-U-4 + DF50-M-8AI-I-5 + DF50-M-4AI-UI-6. As shown in Figure 4-3-24, users add modules in order in the project.

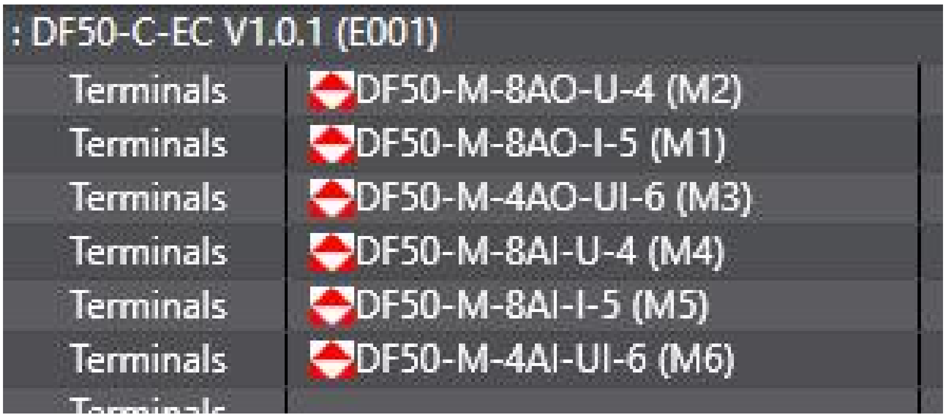


Figure 4-3-twenty four

DF50-M-8AO-U-4 voltage output module

➢ Module wiring diagram see[Chapter 3, Section 9.2]As shown in the figure below, when the EC bus exits the OP state, this type of module can set the output state of the module. The parameters that can be set are: all outputs are closed, alternative value output is enabled, and the last value is maintained.

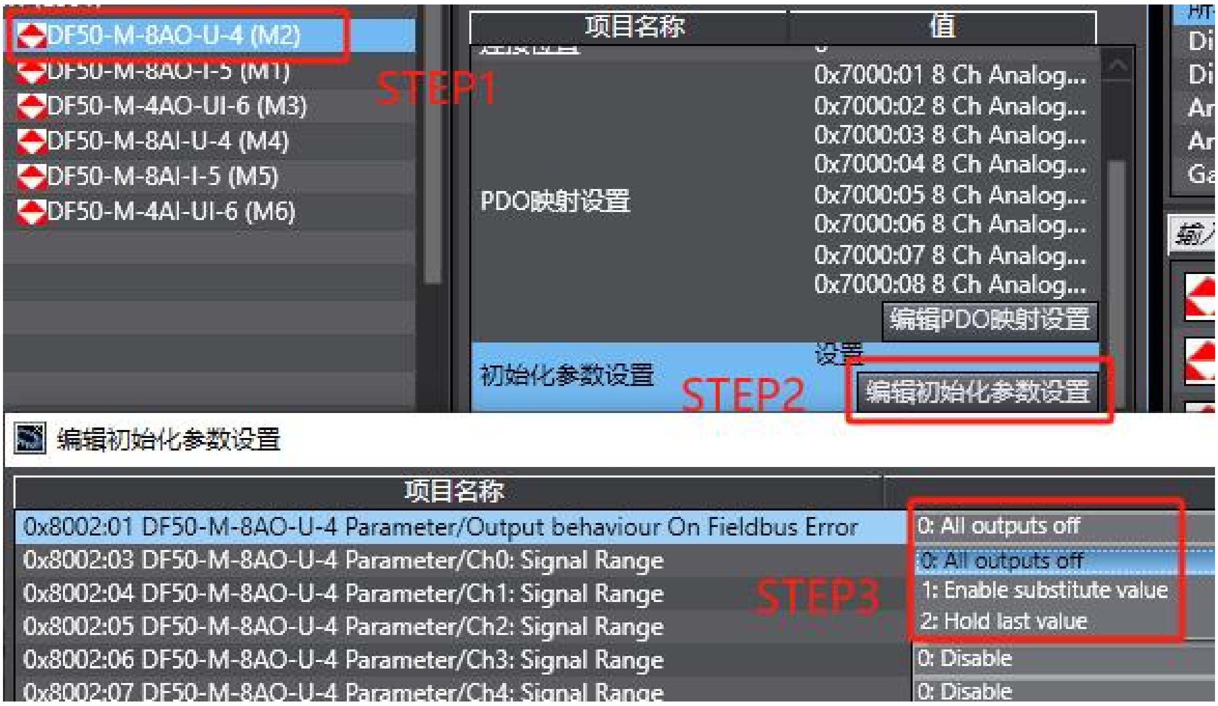


Figure 4-3-25Behavior on bus errors

➢ When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.

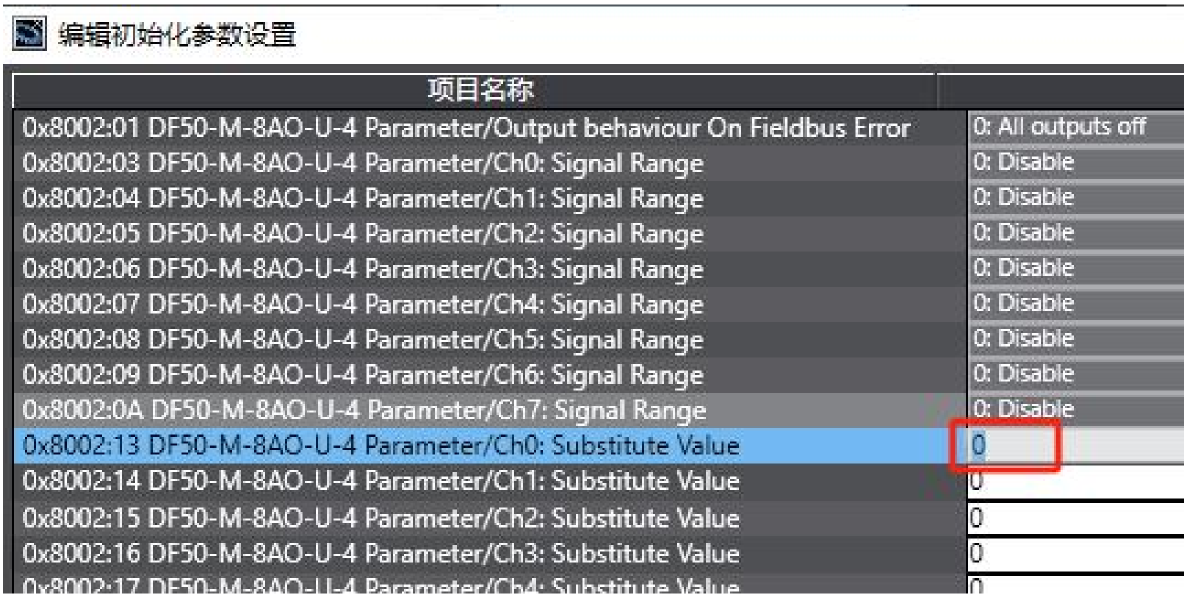


Figure 4-3-26Alternative value settings

➢ As shown in the figure below, you can set the output signal range of each channel. Note that the signal range is Disable by default. You must select a signal range when adding a module.

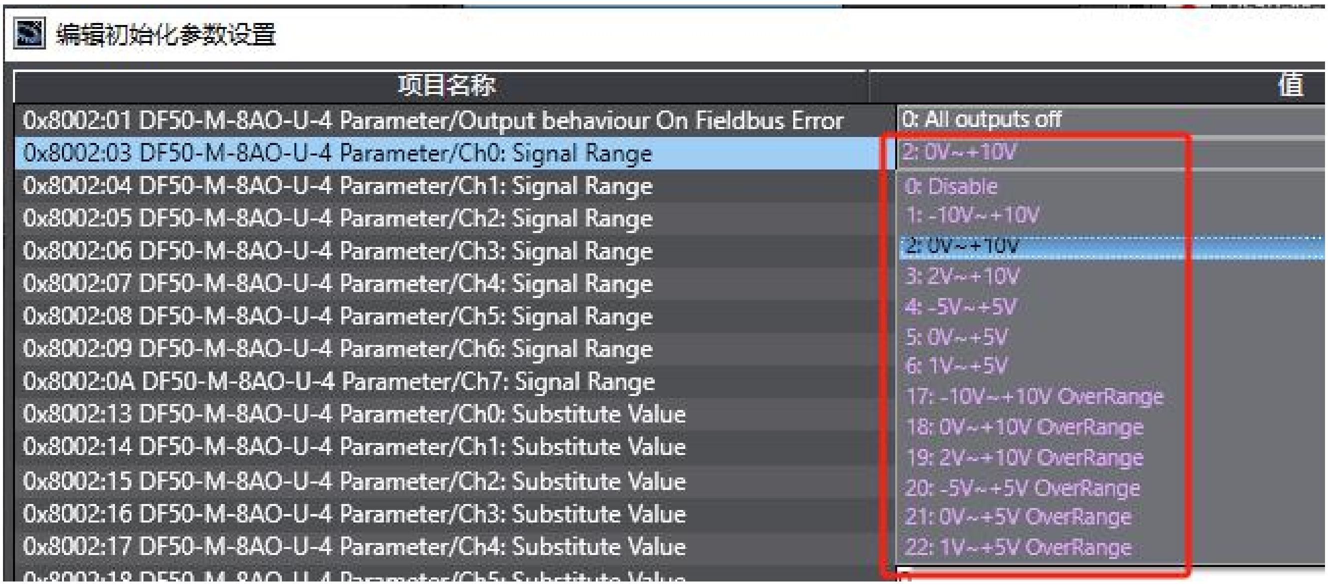


Figure 4-3-27Signal range setting

➢ After setting the output signal range of channel 0 to 0~10V. As shown in Figure 4-3-28, write "32767" to channel 0, and the multimeter can measure that the output voltage of this channel is 10V. See the conversion relationshipChapter 3, Section 9.4.

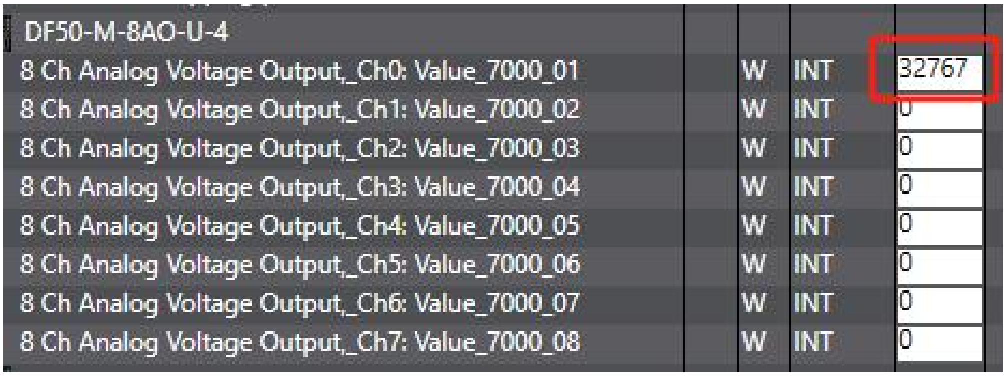


Figure 4-3-28Voltage output

DF50-M-8AO-I-5 Current Output Module

➢ Module wiring diagram seeChapter 3, Section 10.2As shown in the figure below, when the EC bus exits the OP state, this type of module can set the output state of the module. The parameters that can be set are: all outputs are closed, alternative value output is enabled, and the last value is maintained.

Figure 4-3-29Behavior on bus errors

➢ When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.

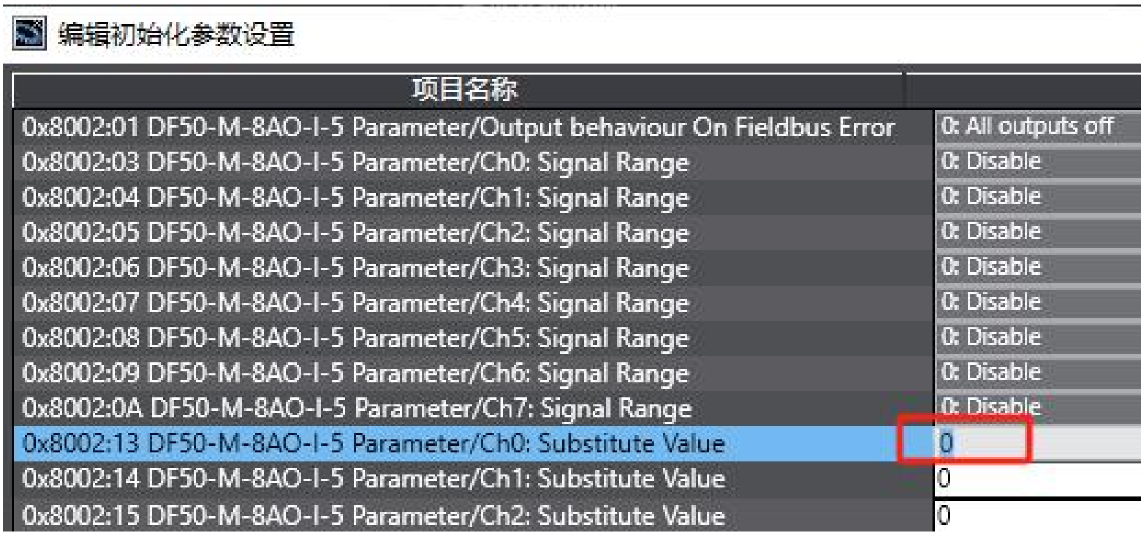


Figure 4-3-30Alternative value settings

➢ As shown in the figure below, you can set the output signal range of each channel. Note that the signal range is Disable by default. You must select a signal range when adding a module.

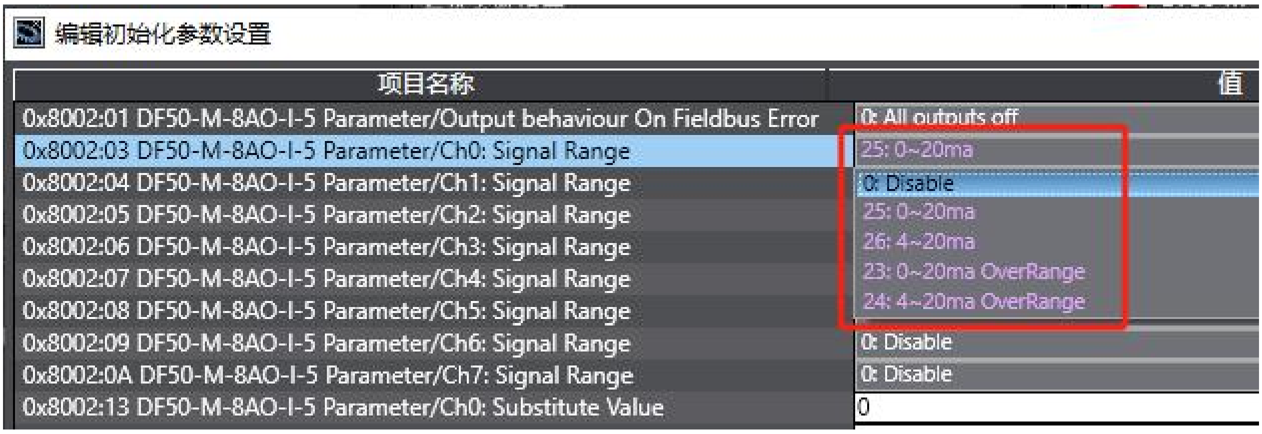


Figure 4-3-31Signal range setting

➢ After setting the output signal range of channel 0 to 0~20ma. As shown in Figure 4-3-32, write "32767" to channel 0, and the multimeter can measure that the output current of this channel is 20ma. The conversion relationship is shown inChapter 3, Section 10.4.

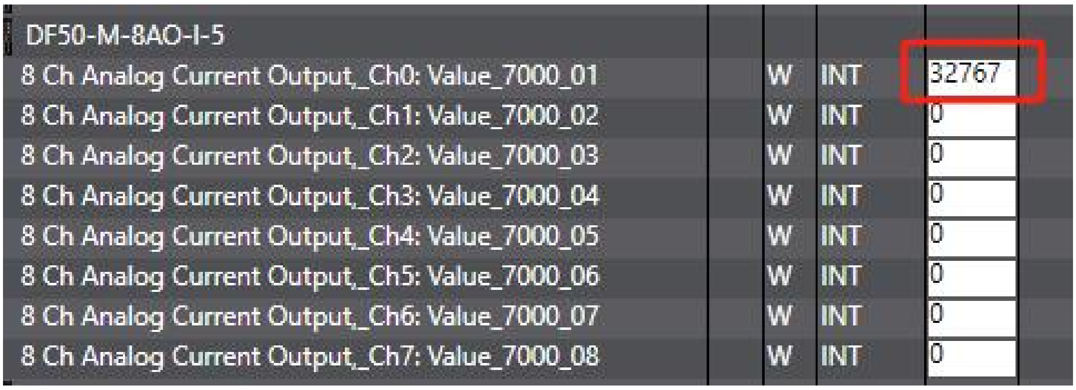


Figure 4-3-32Output Current

DF50-M-4AO-UI-6 Voltage/Current Output Module

➢ Module wiring diagram see[Chapter 3, Section 8.2]As shown in the figure below, when the EC bus exits the OP state, this type of module can set the output state of the module. The parameters that can be set are: all outputs are closed, alternative value output is enabled, and the last value is maintained.

Figure 4-3-33Behavior on bus errors

➢ When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.

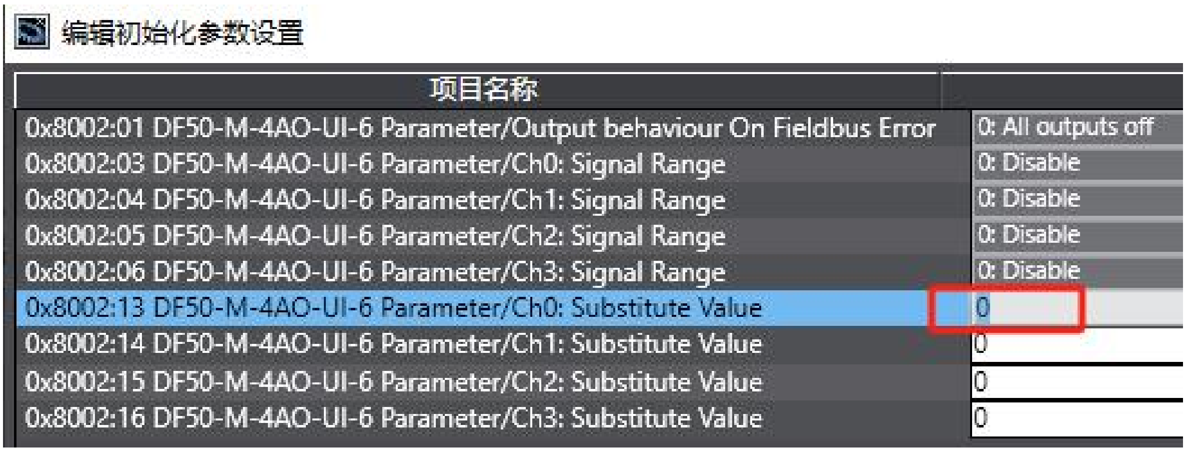


Figure 4-3-34Alternative value settings

➢ As shown in the figure below, you can set the output signal range of each channel. Note that the signal range is Disable by default. You must select a signal range when adding a module.

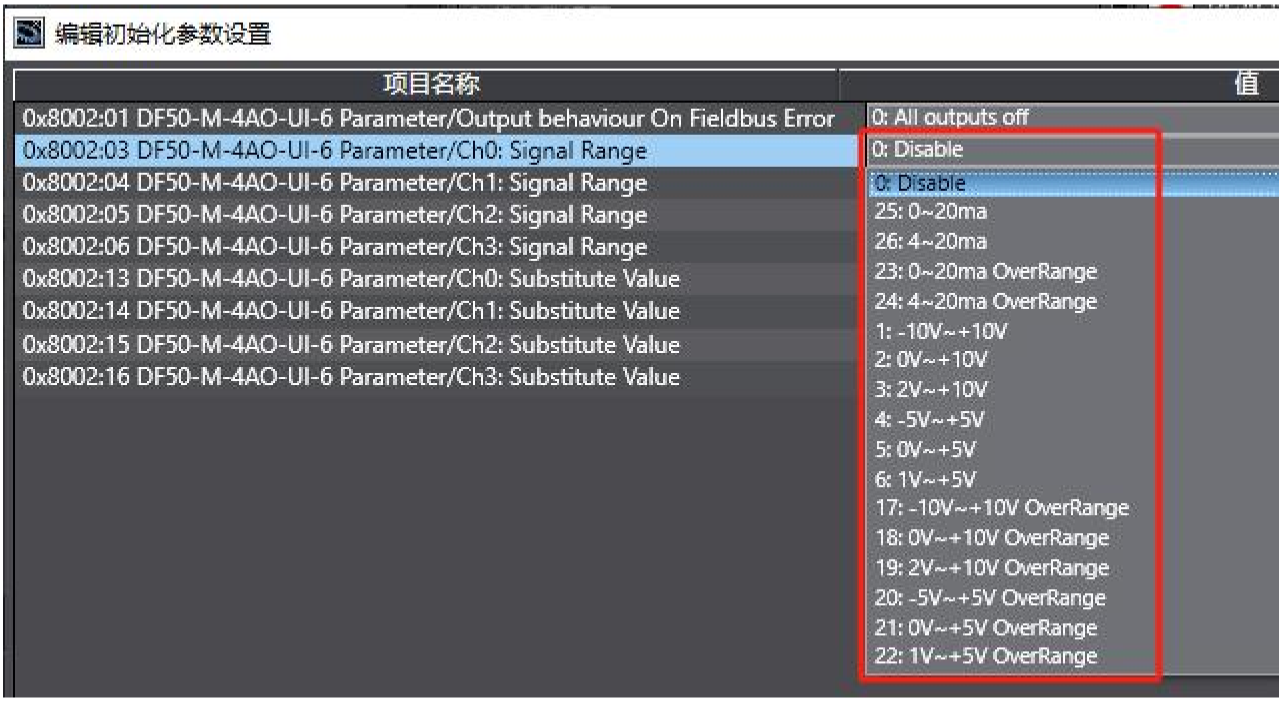


Figure 4-3-35

➢ After setting the output signal range of channel 0 to 0~10V and the output range of channel 1 to 0~20ma. As shown in Figure 4-3-36, write "32767" to channel 0 and channel 1, and the multimeter can measure that the output voltage of channel 0 is 10V and the output current of channel 1 is 20ma. See the conversion relationshipChapter 3, Section 8.4.

DF50-M-4AO-UI-6				
4 Ch Anlaog Output,16bit Rx_Ch0: Value_7000_01		W	INT	32767
4 Ch Anlaog Output,16bit Rx_Ch1: Value_7000_02		W	INT	32767
4 Ch Anlaog Output,16bit Rx_Ch2: Value_7000_03		W	INT	0
4 Ch Anlaog Output,16bit Rx_Ch3: Value_7000_04		W	INT	0

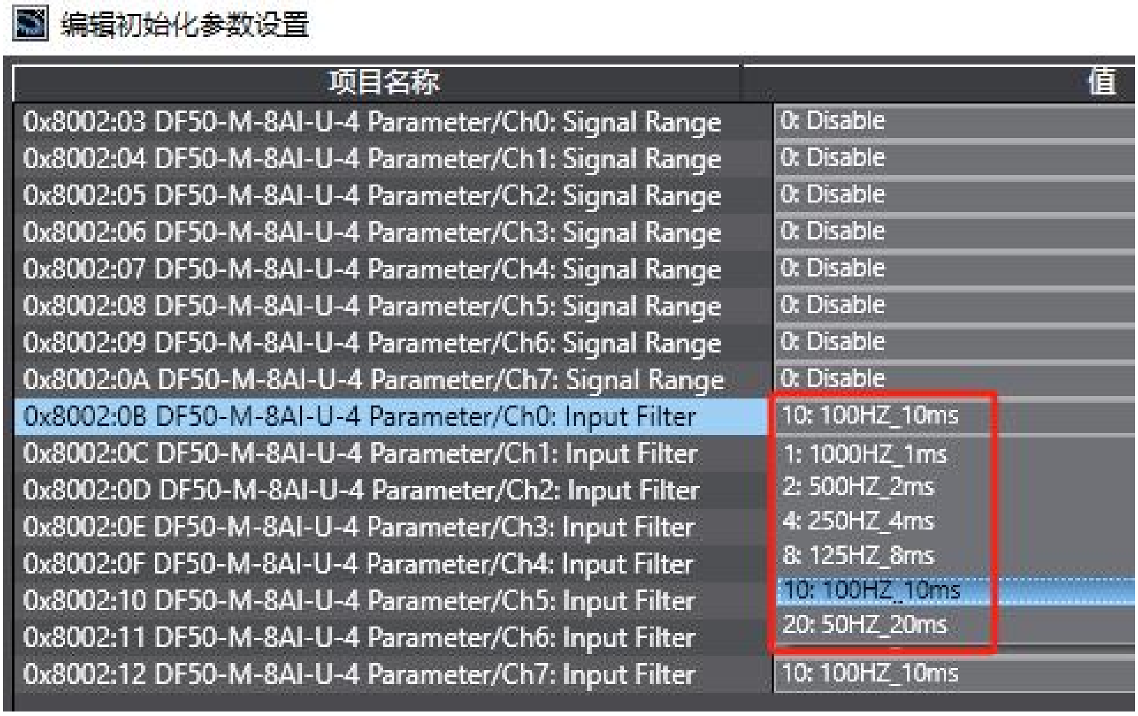
Figure 4-3-36Output voltage/current

DF50-M-8AI-U-4 Voltage Input Module

➢ Module wiring diagram see[Chapter 3, Section 7.2]As shown in the figure below, you can set the sampling signal range of each channel.Note that the default signal range is Disable. You must select a signal range when adding a module..

Figure 4-3-37Signal range setting

➢ As shown in the figure below, the input filter parameters can be configured, the default is 100HZ_10ms.

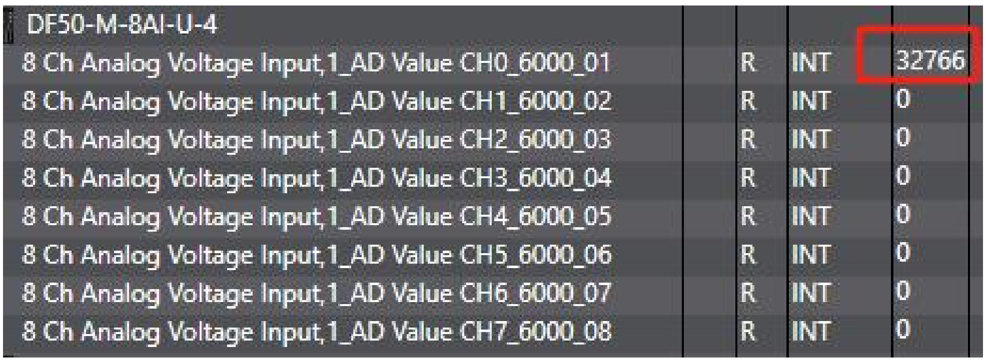


编辑初始化参数设置

项目名称	值
0x8002:03 DF50-M-8AI-U-4 Parameter/Ch0: Signal Range	0: Disable
0x8002:04 DF50-M-8AI-U-4 Parameter/Ch1: Signal Range	0: Disable
0x8002:05 DF50-M-8AI-U-4 Parameter/Ch2: Signal Range	0: Disable
0x8002:06 DF50-M-8AI-U-4 Parameter/Ch3: Signal Range	0: Disable
0x8002:07 DF50-M-8AI-U-4 Parameter/Ch4: Signal Range	0: Disable
0x8002:08 DF50-M-8AI-U-4 Parameter/Ch5: Signal Range	0: Disable
0x8002:09 DF50-M-8AI-U-4 Parameter/Ch6: Signal Range	0: Disable
0x8002:0A DF50-M-8AI-U-4 Parameter/Ch7: Signal Range	0: Disable
0x8002:0B DF50-M-8AI-U-4 Parameter/Ch0: Input Filter	10: 100HZ_10ms
0x8002:0C DF50-M-8AI-U-4 Parameter/Ch1: Input Filter	1: 1000HZ_1ms
0x8002:0D DF50-M-8AI-U-4 Parameter/Ch2: Input Filter	2: 500HZ_2ms
0x8002:0E DF50-M-8AI-U-4 Parameter/Ch3: Input Filter	4: 250HZ_4ms
0x8002:0F DF50-M-8AI-U-4 Parameter/Ch4: Input Filter	8: 125HZ_8ms
0x8002:10 DF50-M-8AI-U-4 Parameter/Ch5: Input Filter	10: 100HZ_10ms
0x8002:11 DF50-M-8AI-U-4 Parameter/Ch6: Input Filter	20: 50HZ_20ms
0x8002:12 DF50-M-8AI-U-4 Parameter/Ch7: Input Filter	10: 100HZ_10ms

Figure 4-3-38Filter configuration

➢ After setting the sampling signal range of channel 0 to 0~10V. Input a 10V voltage signal to channel 0. As shown in the figure below, channel 0 displays a value of 32766. By conversion, it is known that the collected voltage is 10V. The conversion relationship is shown inChapter 3, Section 7.4.



DF50-M-8AI-U-4			
8 Ch Analog Voltage Input,1_AD Value CH0_6000_01	R	INT	32766
8 Ch Analog Voltage Input,1_AD Value CH1_6000_02	R	INT	0
8 Ch Analog Voltage Input,1_AD Value CH2_6000_03	R	INT	0
8 Ch Analog Voltage Input,1_AD Value CH3_6000_04	R	INT	0
8 Ch Analog Voltage Input,1_AD Value CH4_6000_05	R	INT	0
8 Ch Analog Voltage Input,1_AD Value CH5_6000_06	R	INT	0
8 Ch Analog Voltage Input,1_AD Value CH6_6000_07	R	INT	0
8 Ch Analog Voltage Input,1_AD Value CH7_6000_08	R	INT	0

Figure 4-3-39

DF50-M-8AI-I-5 Current Input Module

➢ Module wiring diagram seeChapter 3, Section 6.2As shown in the figure below, you can set the sampling signal range of each channel.Note that the default signal range is Disable. You must select a signal range when adding a module..

Figure 4-3-40Signal range setting

➢ As shown in the figure below, the input filter parameters can be configured, the default is 100HZ_10ms.

Figure 4-3-41Filter configuration

➢ After setting the sampling signal range of channel 0 to 0~20ma, input a 10ma current signal to channel 0. As shown in the figure below, channel 0 displays a value of 16398. By conversion, it is known that the collected current is 10ma. The conversion relationship is shown inChapter 3, Section 6.4.

DF50-M-8AI-I-5				
8 Ch Analog Current Input,1_AD Value CH0_6000_01		R	INT	16398
8 Ch Analog Current Input,1_AD Value CH1_6000_02		R	INT	0
8 Ch Analog Current Input,1_AD Value CH2_6000_03		R	INT	0
8 Ch Analog Current Input,1_AD Value CH3_6000_04		R	INT	0
8 Ch Analog Current Input,1_AD Value CH4_6000_05		R	INT	0
8 Ch Analog Current Input,1_AD Value CH5_6000_06		R	INT	0
8 Ch Analog Current Input,1_AD Value CH6_6000_07		R	INT	0
8 Ch Analog Current Input,1_AD Value CH7_6000_08		R	INT	0

Figure 4-3-42

DF50-M-4AI-UI-6 Voltage/Current Input Module

- Module wiring diagram seeChapter 3, Section 5.2As shown in the figure below, you can set the sampling signal range of each channel.Note that the default signal range is Disable. You must select a signal range when adding a module..

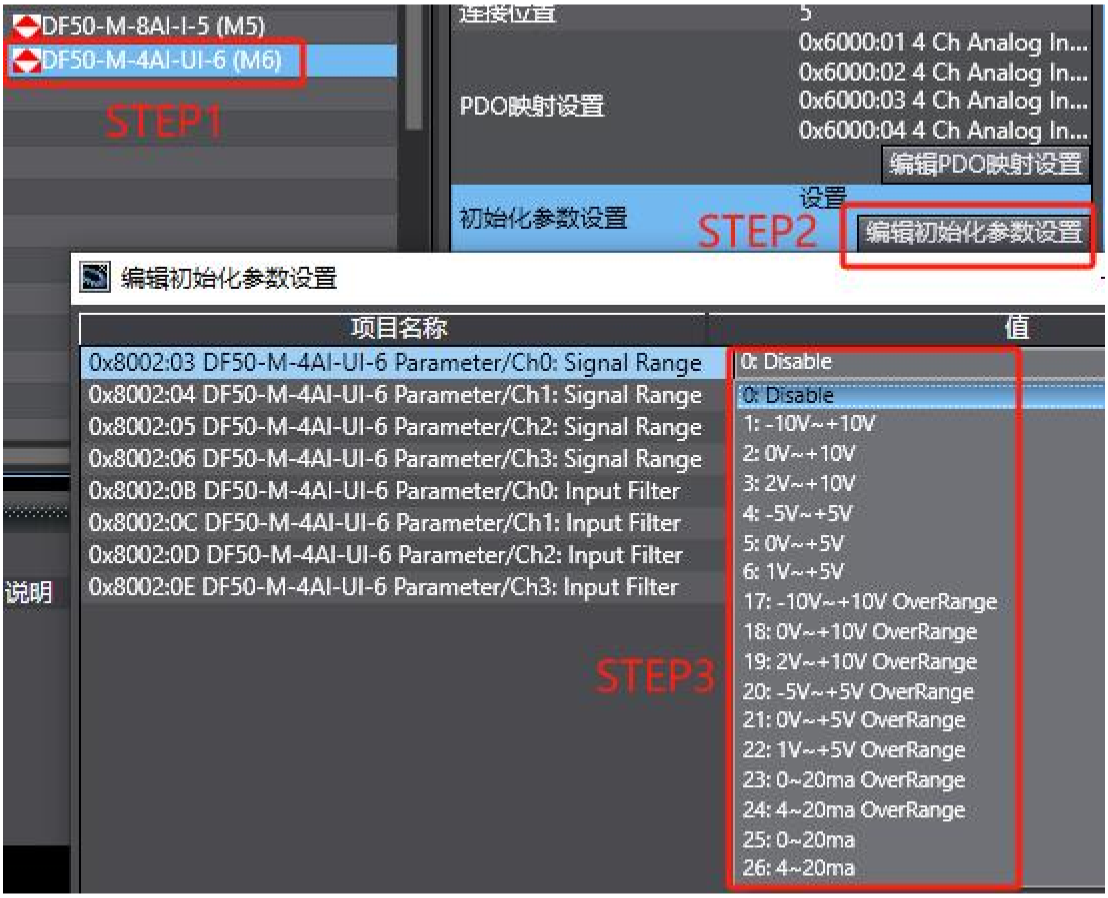


Figure 4-3-43Signal range setting

- As shown in the figure below, the input filter parameters can be configured, the default is 100HZ_10ms.

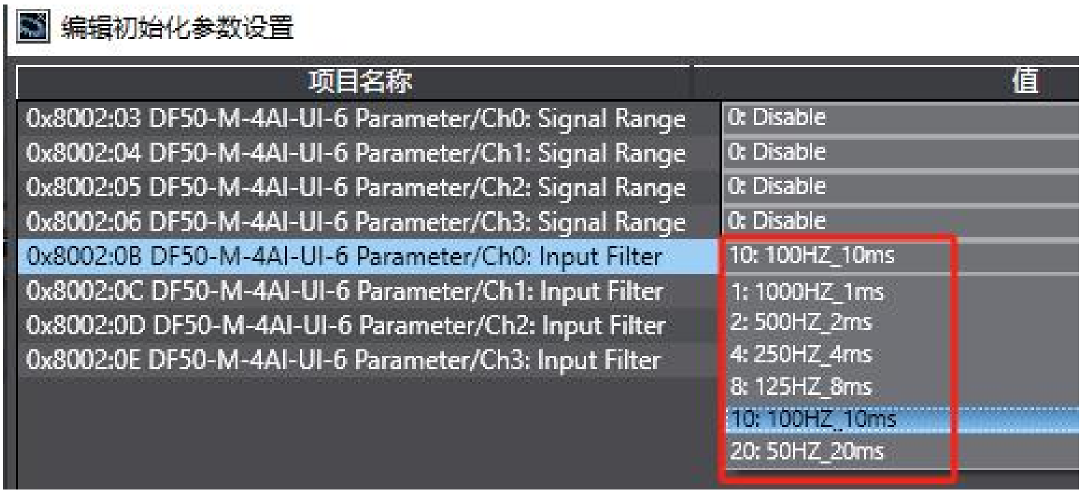


Figure 4-3-44Filter settings

- After setting the sampling signal range of channel 0 to 0~10V and channel 1 to 0~20ma, input a 10V voltage signal to channel 0 and a 10ma current signal to channel 1. The collected data is shown in the figure below. Channel 0 displays a value of 32766 and channel 1 displays a value of 16391. Through conversion, it is known that channel 0 collects a voltage of 10V and channel 1 collects a current of 10ma. The conversion relationship is shown inChapter 3, Section 5.4.

DF50-M-4AI-UI-6					
4 Ch Analog Input,16bit TxP_AD Value CH0_6000_01		R	INT	32766	
4 Ch Analog Input,16bit TxP_AD Value CH1_6000_02		R	INT	16391	
4 Ch Analog Input,16bit TxP_AD Value CH2_6000_03		R	INT	0	
4 Ch Analog Input,16bit TxP_AD Value CH3_6000_04		R	INT	0	

Figure 4-3-45Collect voltage/current

4.3.4 Routine use of thermal resistance sensor data acquisition module

- This example uses the DF50-C-EC + DF50-M-4RTD-PT topology. After scanning the slaves, the following figure is shown.

Figure 4-3-46

DF50-M-4RTD-PT Thermal Resistance Measurement Module

- Module wiring diagram see[Chapter 3, Section 11.2]The module supports multiple sensor types. The method for selecting the sensor type is shown in the figure below.

Figure 4-3-47Sensor Selection

- As shown in the figure below, the input filter parameters can be configured, and the system default is 5Hz_200ms.

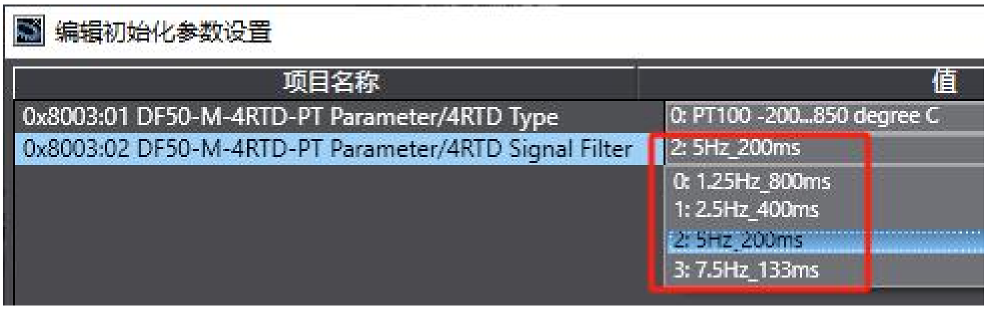


Figure 4-3-48Filter configuration

- ➢ DF50_M_4RTD_PT supports PT100 type sensors by default. The first channel is connected to the PT100 sensor, and the other channels are not connected to sensors. As shown in Figure 4-3-49, the reading of the first channel is 237, representing 23.7℃. The other channels are not connected to sensors, and the reading is -32768, indicating a disconnection. The conversion method is shown inChapter 3, Section 11.4.

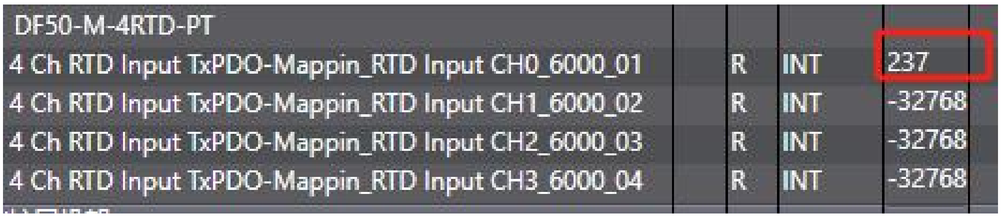


Figure 4-3-49

4.3.5 Thermocouple temperature data acquisition module usage routine

➢ This example uses the DF50-C-EC + DF50-M-8TC topology. After scanning the slaves, the following figure is shown.

Figure 4-3-50

DF50-M-8TC Thermocouple Measurement Module

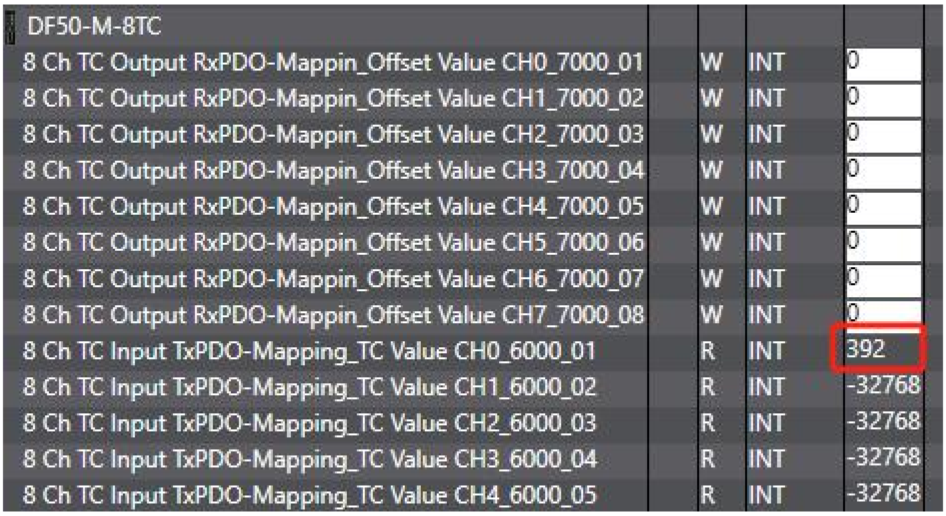
➢ Module wiring diagram seeChapter 3, Section 12.2For process data definition, please refer toChapter 3, Section 12.4As shown in the figure below, you can configure the acquisition sensor type. The default is K-type thermocouple.

Figure 4-3-51Sensor Selection

➢ As shown in the figure below, the module signal filter configuration can be performed. The default is 225ms.

Figure 4-3-52Filter configuration

- DF50-M-8TC supports K-type thermocouples by default. As shown in Figure 4-3-53, the first channel is connected to a K-type thermocouple without compensation, and other channels are not connected to sensors. The temperature data is displayed as shown in the figure. The first channel reading is 392, representing 39.2℃. Other channels are not connected to sensors and the reading is -32768, indicating a disconnection.



DF50-M-8TC			
8 Ch TC Output RxPDO-Mappin_Offset Value CH0_7000_01	W	INT	0
8 Ch TC Output RxPDO-Mappin_Offset Value CH1_7000_02	W	INT	0
8 Ch TC Output RxPDO-Mappin_Offset Value CH2_7000_03	W	INT	0
8 Ch TC Output RxPDO-Mappin_Offset Value CH3_7000_04	W	INT	0
8 Ch TC Output RxPDO-Mappin_Offset Value CH4_7000_05	W	INT	0
8 Ch TC Output RxPDO-Mappin_Offset Value CH5_7000_06	W	INT	0
8 Ch TC Output RxPDO-Mappin_Offset Value CH6_7000_07	W	INT	0
8 Ch TC Output RxPDO-Mappin_Offset Value CH7_7000_08	W	INT	0
8 Ch TC Input TxPDO-Mapping_TC Value CH0_6000_01	R	INT	392
8 Ch TC Input TxPDO-Mapping_TC Value CH1_6000_02	R	INT	-32768
8 Ch TC Input TxPDO-Mapping_TC Value CH2_6000_03	R	INT	-32768
8 Ch TC Input TxPDO-Mapping_TC Value CH3_6000_04	R	INT	-32768
8 Ch TC Input TxPDO-Mapping_TC Value CH4_6000_05	R	INT	-32768

Figure 4-3-53Temperature collection

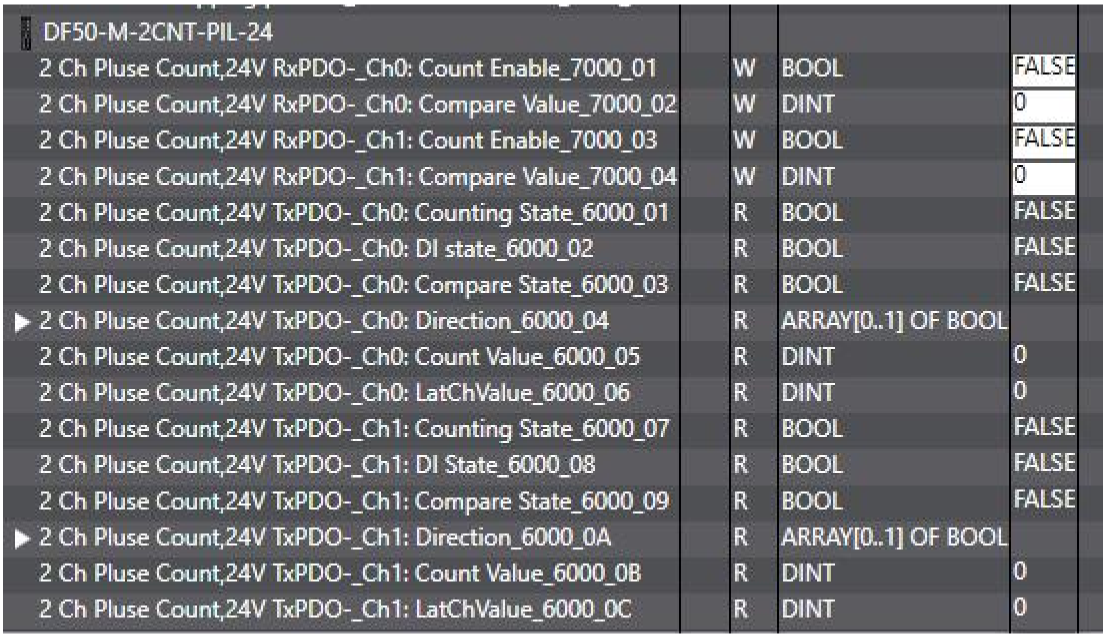
- As shown in Figure 4-3-54, the same 39.2℃ signal is input, the temperature of the first channel is compensated by 100, and the temperature is displayed as 492, representing 49.2℃.

DF50-M-8TC			
8 Ch TC Output RxPDO-Mappin_Offset Value CH0_7000_01	W	INT	100
8 Ch TC Output RxPDO-Mappin_Offset Value CH1_7000_02	W	INT	0
8 Ch TC Output RxPDO-Mappin_Offset Value CH2_7000_03	W	INT	0
8 Ch TC Output RxPDO-Mappin_Offset Value CH3_7000_04	W	INT	0
8 Ch TC Output RxPDO-Mappin_Offset Value CH4_7000_05	W	INT	0
8 Ch TC Output RxPDO-Mappin_Offset Value CH5_7000_06	W	INT	0
8 Ch TC Output RxPDO-Mappin_Offset Value CH6_7000_07	W	INT	0
8 Ch TC Output RxPDO-Mappin_Offset Value CH7_7000_08	W	INT	0
8 Ch TC Input TxPDO-Mapping_TC Value CH0_6000_01	R	INT	492
8 Ch TC Input TxPDO-Mapping_TC Value CH1_6000_02	R	INT	-32768
8 Ch TC Input TxPDO-Mapping_TC Value CH2_6000_03	R	INT	-32768
8 Ch TC Input TxPDO-Mapping_TC Value CH3_6000_04	R	INT	-32768

Figure 4-3-54Temperature acquisition compensation

4.3.6 Encoder data acquisition module usage routine

- The encoder pulse counting module has two types: DF50-M-2CNT-PIL-24 and DF50-M-2CNT-PIL-5. The wiring and usage of the two modules are the same. The difference is that the DF50-M-2CNT-PIL-5 is connected to a 5V encoder signal, and the DF50-M-2CNT-PIL-24 is connected to a 24V encoder signal. This document uses the DF50-M-2CNT-PIL-24 module as an example.Chapter 3, Section 13.2.
- DF50-M-2CNT-PIL-24 module features:
- Quadrature encoder A+/A-, B+/B- differential input, 1/2/4 frequency multiplication;
- Electron probe input;
- Linear counter form, ring counter form.
- Three LED indicator outputs. After the module is powered on, PW is always on, indicating that the module is powered on and initialized normally. Different display states of Led2 represent different working states of the module; Led2 flashes when the internal bus of the module is working normally. The external 24V power supply of the module is normal, and the EP light is always on.
- Figure 4-3-55 shows the PDO process data of the DF50-M-2CNT-PIL-24 module.When using, set the channel 0 count enable bit (CH0: Count Enable) to 1 to use the channel 0 count function normally.:



DF50-M-2CNT-PIL-24			
2 Ch Pluse Count,24V RxPDO-_Ch0: Count Enable_7000_01	W	BOOL	FALSE
2 Ch Pluse Count,24V RxPDO-_Ch0: Compare Value_7000_02	W	DINT	0
2 Ch Pluse Count,24V RxPDO-_Ch1: Count Enable_7000_03	W	BOOL	FALSE
2 Ch Pluse Count,24V RxPDO-_Ch1: Compare Value_7000_04	W	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch0: Counting State_6000_01	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch0: DI state_6000_02	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch0: Compare State_6000_03	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch0: Direction_6000_04	R	ARRAY[0..1] OF BOOL	
2 Ch Pluse Count,24V TxPDO-_Ch0: Count Value_6000_05	R	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch0: LatChValue_6000_06	R	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch1: Counting State_6000_07	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch1: DI State_6000_08	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch1: Compare State_6000_09	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch1: Direction_6000_0A	R	ARRAY[0..1] OF BOOL	
2 Ch Pluse Count,24V TxPDO-_Ch1: Count Value_6000_0B	R	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch1: LatChValue_6000_0C	R	DINT	0

Figure 4-3-55

➢ The meaning of process data is as follows:

Table 4.3.4

RXPD0			
Name	**Type**	**Size**	**meaning**
Ch0: Count Enable	BOOL	0.1	Channel 0 count enable bit
Ch0: Compare Value	DINT	4.0	Channel 0 comparison value setting
Ch1: Count Enable	BOOL	0.1	Channel 1 count enable bit
Ch1: Compare Value	DINT	4.0	Channel 1 comparison value setting

Table 4.3.5

TXPD0			
Name	**Type**	**Size**	**meaning**
Ch0: Counting State	BOOL	0.1	Channel 0 counting status bit
Ch0: DI state	BOOL	0.1	Channel 0 DI input status
Ch0: Compare State	BOOL	0.1	Channel 0 compare status bit

Ch0: Direction	BIT2	0.2	Channel 0 input signal direction
Ch0: Count Value	DINT	4.0	Channel 0 count value
Ch0: LatChValue	DINT	4.0	Channel 0 latch value
Ch1: Counting State	BOOL	0.1	Channel 0 counting status bit
Ch1: DI state	BOOL	0.1	Channel 0 DI input status
Ch1: Compare State	BOOL	0.1	Channel 0 compare status bit
Ch1: Direction	BIT2	0.2	Channel 0 input signal direction
Ch1: Count Value	DINT	4.0	Channel 0 count value
Ch1: LatChValue	DINT	4.0	Channel 0 latch value

➢ As shown in Figure 4-3-56, the configuration data of the DF50-M-2CNT-PIL-24 module can be modified. The figure shows the configuration data of channel 0. The configurable content of channel 1 is the same as that of channel 0. They are: signal type configuration (frequency multiplication function is configured here, 4 times frequency multiplication by default), DI signal function configuration, A phase signal filter configuration, B phase signal filter configuration, direction logic configuration, counting mode configuration, comparison function configuration, bus abnormality counting action configuration, cycle mode upper limit value, cycle mode lower limit value. For details, please refer to[Chapter 3, Section 13.4](#).

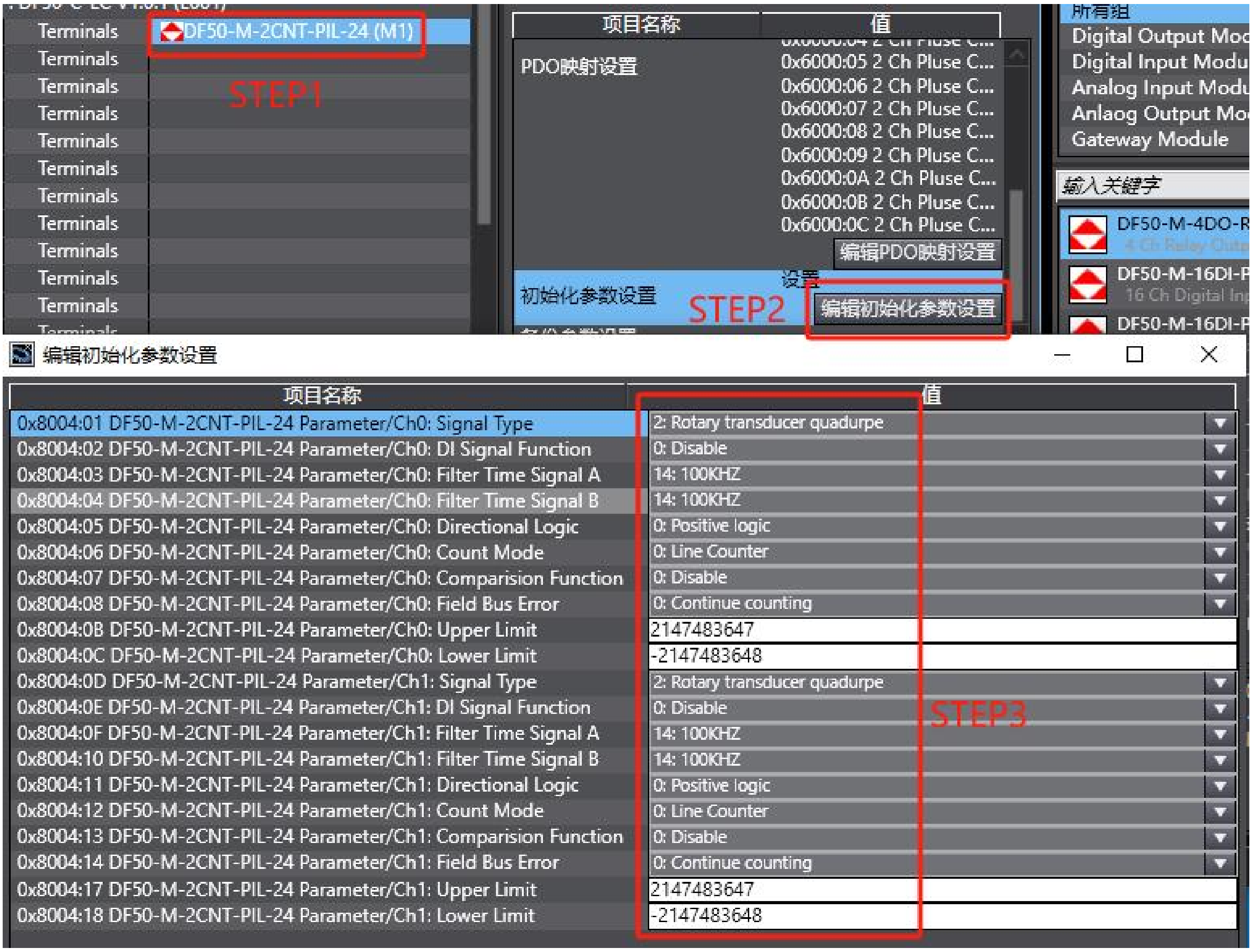
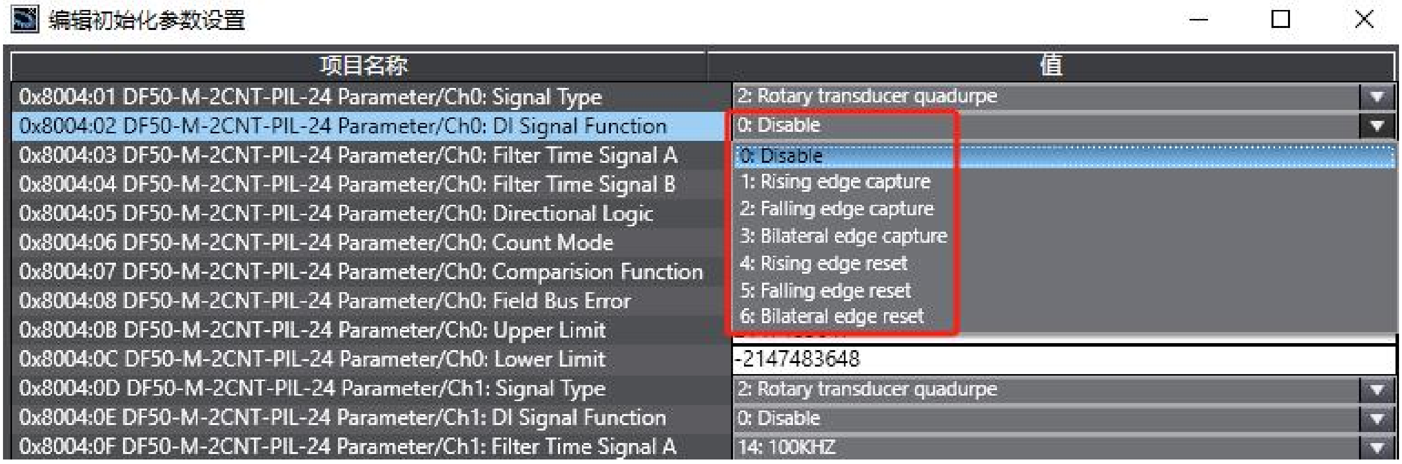


Figure 4-3-56

DI Signal Function Configuration

➢ The configurable data is shown in Figure 4-3-57, which demonstrates the rising edge capture and rising edge reset functions.



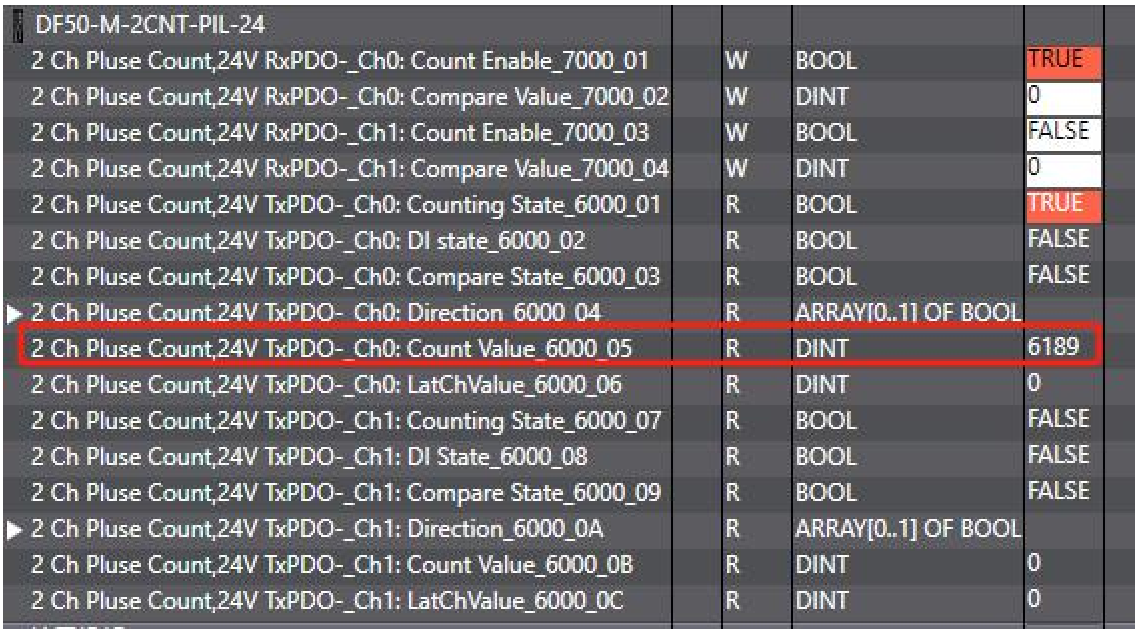
编辑初始化参数设置

项目名称	值
0x8004:01 DF50-M-2CNT-PIL-24 Parameter/Ch0: Signal Type	2: Rotary transducer quadurpe
0x8004:02 DF50-M-2CNT-PIL-24 Parameter/Ch0: DI Signal Function	0: Disable
0x8004:03 DF50-M-2CNT-PIL-24 Parameter/Ch0: Filter Time Signal A	
0x8004:04 DF50-M-2CNT-PIL-24 Parameter/Ch0: Filter Time Signal B	
0x8004:05 DF50-M-2CNT-PIL-24 Parameter/Ch0: Directional Logic	
0x8004:06 DF50-M-2CNT-PIL-24 Parameter/Ch0: Count Mode	
0x8004:07 DF50-M-2CNT-PIL-24 Parameter/Ch0: Comparision Function	
0x8004:08 DF50-M-2CNT-PIL-24 Parameter/Ch0: Field Bus Error	
0x8004:0B DF50-M-2CNT-PIL-24 Parameter/Ch0: Upper Limit	
0x8004:0C DF50-M-2CNT-PIL-24 Parameter/Ch0: Lower Limit	-2147483648
0x8004:0D DF50-M-2CNT-PIL-24 Parameter/Ch1: Signal Type	2: Rotary transducer quadurpe
0x8004:0E DF50-M-2CNT-PIL-24 Parameter/Ch1: DI Signal Function	0: Disable
0x8004:0F DF50-M-2CNT-PIL-24 Parameter/Ch1: Filter Time Signal A	14: 100KHZ

0: Disable
1: Rising edge capture
2: Falling edge capture
3: Bilateral edge capture
4: Rising edge reset
5: Falling edge reset
6: Bilateral edge reset

Figure 4-3-57

➢ DI rising edge capture: As shown in Figure 4-3-58, the count value is 6189. After a rising edge is input, as shown in Figure 4-3-59, the DI input state (DI state) changes to 1 for a short while, and the latch value (LatChValue) changes to 6189.



DF50-M-2CNT-PIL-24			
2 Ch Pluse Count,24V RxPDO-_Ch0: Count Enable_7000_01	W	BOOL	TRUE
2 Ch Pluse Count,24V RxPDO-_Ch0: Compare Value_7000_02	W	DINT	0
2 Ch Pluse Count,24V RxPDO-_Ch1: Count Enable_7000_03	W	BOOL	FALSE
2 Ch Pluse Count,24V RxPDO-_Ch1: Compare Value_7000_04	W	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch0: Counting State_6000_01	R	BOOL	TRUE
2 Ch Pluse Count,24V TxPDO-_Ch0: DI state_6000_02	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch0: Compare State_6000_03	R	BOOL	FALSE
▶ 2 Ch Pluse Count,24V TxPDO-_Ch0: Direction_6000_04	R	ARRAY[0..1] OF BOOL	
2 Ch Pluse Count,24V TxPDO-_Ch0: Count Value_6000_05	R	DINT	6189
2 Ch Pluse Count,24V TxPDO-_Ch0: LatChValue_6000_06	R	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch1: Counting State_6000_07	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch1: DI State_6000_08	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch1: Compare State_6000_09	R	BOOL	FALSE
▶ 2 Ch Pluse Count,24V TxPDO-_Ch1: Direction_6000_0A	R	ARRAY[0..1] OF BOOL	
2 Ch Pluse Count,24V TxPDO-_Ch1: Count Value_6000_0B	R	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch1: LatChValue_6000_0C	R	DINT	0

Figure 4-3-58

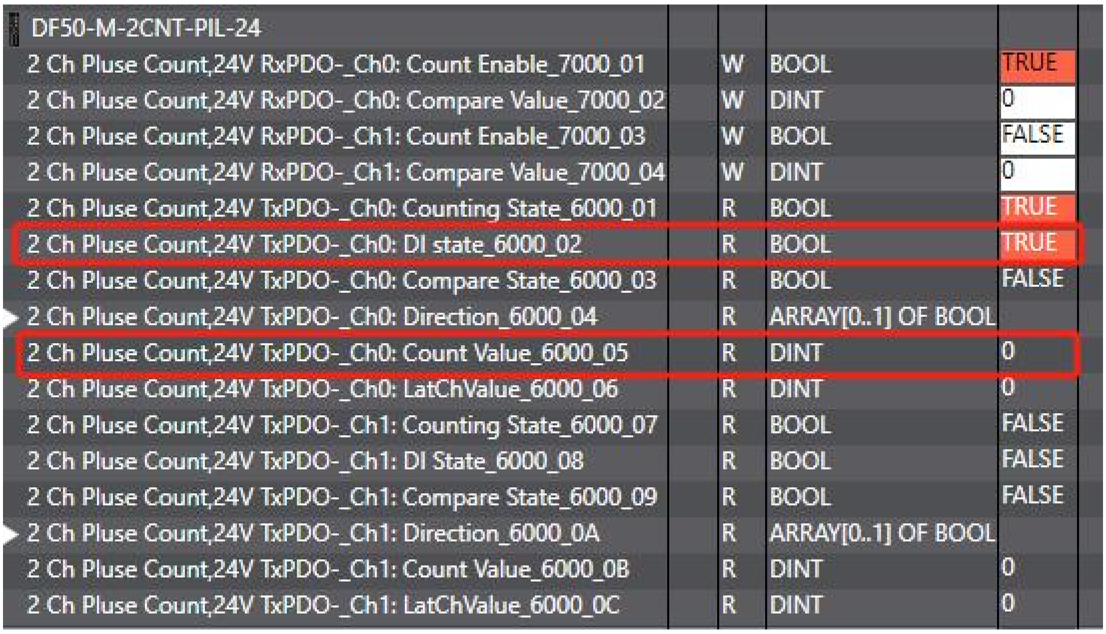
DF50-M-2CNT-PIL-24			
2 Ch Pluse Count,24V RxPDO-_Ch0: Count Enable_7000_01	W	BOOL	TRUE
2 Ch Pluse Count,24V RxPDO-_Ch0: Compare Value_7000_02	W	DINT	0
2 Ch Pluse Count,24V RxPDO-_Ch1: Count Enable_7000_03	W	BOOL	FALSE
2 Ch Pluse Count,24V RxPDO-_Ch1: Compare Value_7000_04	W	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch0: Counting State_6000_01	R	BOOL	TRUE
2 Ch Pluse Count,24V TxPDO-_Ch0: DI state_6000_02	R	BOOL	TRUE
2 Ch Pluse Count,24V TxPDO-_Ch0: Compare State_6000_03	R	BOOL	FALSE
▶ 2 Ch Pluse Count,24V TxPDO-_Ch0: Direction_6000_04	R	ARRAY[0..1] OF BOOL	
2 Ch Pluse Count,24V TxPDO-_Ch0: Count Value_6000_05	R	DINT	6189
2 Ch Pluse Count,24V TxPDO-_Ch0: LatChValue_6000_06	R	DINT	6189
2 Ch Pluse Count,24V TxPDO-_Ch1: Counting State_6000_07	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch1: DI State_6000_08	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch1: Compare State_6000_09	R	BOOL	FALSE
▶ 2 Ch Pluse Count,24V TxPDO-_Ch1: Direction_6000_0A	R	ARRAY[0..1] OF BOOL	
2 Ch Pluse Count,24V TxPDO-_Ch1: Count Value_6000_0B	R	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch1: LatChValue_6000_0C	R	DINT	0

Figure 4-3-59

- DI rising edge reset: As shown in Figure 4-3-60, the count value is 5222. After a rising edge is input, as shown in Figure 4-3-61, the DI input state (DI state) becomes 1 for a short while, and the count value becomes 0.

DF50-M-2CNT-PIL-24			
2 Ch Pluse Count,24V RxPDO-_Ch0: Count Enable_7000_01	W	BOOL	TRUE
2 Ch Pluse Count,24V RxPDO-_Ch0: Compare Value_7000_02	W	DINT	0
2 Ch Pluse Count,24V RxPDO-_Ch1: Count Enable_7000_03	W	BOOL	FALSE
2 Ch Pluse Count,24V RxPDO-_Ch1: Compare Value_7000_04	W	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch0: Counting State_6000_01	R	BOOL	TRUE
2 Ch Pluse Count,24V TxPDO-_Ch0: DI state_6000_02	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch0: Compare State_6000_03	R	BOOL	FALSE
▶ 2 Ch Pluse Count,24V TxPDO-_Ch0: Direction_6000_04	R	ARRAY[0..1] OF BOOL	
2 Ch Pluse Count,24V TxPDO-_Ch0: Count Value_6000_05	R	DINT	5222
2 Ch Pluse Count,24V TxPDO-_Ch0: LatChValue_6000_06	R	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch1: Counting State_6000_07	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch1: DI State_6000_08	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch1: Compare State_6000_09	R	BOOL	FALSE
▶ 2 Ch Pluse Count,24V TxPDO-_Ch1: Direction_6000_0A	R	ARRAY[0..1] OF BOOL	
2 Ch Pluse Count,24V TxPDO-_Ch1: Count Value_6000_0B	R	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch1: LatChValue_6000_0C	R	DINT	0

Figure 4-3-60

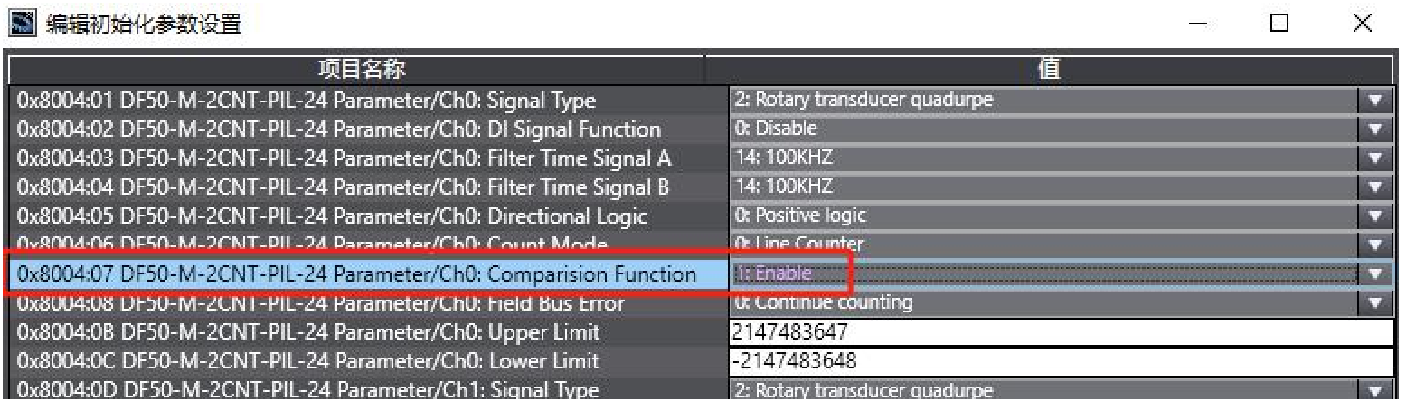


DF50-M-2CNT-PIL-24			
2 Ch Pluse Count,24V RxPDO-_Ch0: Count Enable_7000_01	W	BOOL	TRUE
2 Ch Pluse Count,24V RxPDO-_Ch0: Compare Value_7000_02	W	DINT	0
2 Ch Pluse Count,24V RxPDO-_Ch1: Count Enable_7000_03	W	BOOL	FALSE
2 Ch Pluse Count,24V RxPDO-_Ch1: Compare Value_7000_04	W	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch0: Counting State_6000_01	R	BOOL	TRUE
2 Ch Pluse Count,24V TxPDO-_Ch0: DI state_6000_02	R	BOOL	TRUE
2 Ch Pluse Count,24V TxPDO-_Ch0: Compare State_6000_03	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch0: Direction_6000_04	R	ARRAY[0..1] OF BOOL	
2 Ch Pluse Count,24V TxPDO-_Ch0: Count Value_6000_05	R	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch0: LatChValue_6000_06	R	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch1: Counting State_6000_07	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch1: DI State_6000_08	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch1: Compare State_6000_09	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch1: Direction_6000_0A	R	ARRAY[0..1] OF BOOL	
2 Ch Pluse Count,24V TxPDO-_Ch1: Count Value_6000_0B	R	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch1: LatChValue_6000_0C	R	DINT	0

Figure 4-3-61

Comparison Function Configuration

➢ After turning on the comparison function as shown in Figure 4-3-62, set the comparison value as shown in Figure 4-3-63 and set it to 10000.



编辑初始化参数设置

项目名称	值
0x8004:01 DF50-M-2CNT-PIL-24 Parameter/Ch0: Signal Type	2: Rotary transducer quadurpe
0x8004:02 DF50-M-2CNT-PIL-24 Parameter/Ch0: DI Signal Function	0: Disable
0x8004:03 DF50-M-2CNT-PIL-24 Parameter/Ch0: Filter Time Signal A	14: 100KHZ
0x8004:04 DF50-M-2CNT-PIL-24 Parameter/Ch0: Filter Time Signal B	14: 100KHZ
0x8004:05 DF50-M-2CNT-PIL-24 Parameter/Ch0: Directional Logic	0: Positive logic
0x8004:06 DF50-M-2CNT-PIL-24 Parameter/Ch0: Count Mode	0: Line Counter
0x8004:07 DF50-M-2CNT-PIL-24 Parameter/Ch0: Comparision Function	1: Enable
0x8004:08 DF50-M-2CNT-PIL-24 Parameter/Ch0: Field Bus Error	0: Continue counting
0x8004:0B DF50-M-2CNT-PIL-24 Parameter/Ch0: Upper Limit	2147483647
0x8004:0C DF50-M-2CNT-PIL-24 Parameter/Ch0: Lower Limit	-2147483648
0x8004:0D DF50-M-2CNT-PIL-24 Parameter/Ch1: Signal Type	2: Rotary transducer quadurpe

Figure 4-3-62Comparison Enable

DF50-M-2CNT-PIL-24			
2 Ch Pluse Count,24V RxPDO-_Ch0: Count Enable_7000_01	W	BOOL	TRUE
2 Ch Pluse Count,24V RxPDO-_Ch0: Compare Value_7000_02	W	DINT	10000
2 Ch Pluse Count,24V RxPDO-_Ch1: Count Enable_7000_03	W	BOOL	FALSE
2 Ch Pluse Count,24V RxPDO-_Ch1: Compare Value_7000_04	W	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch0: Counting State_6000_01	R	BOOL	TRUE
2 Ch Pluse Count,24V TxPDO-_Ch0: DI state_6000_02	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch0: Compare State_6000_03	R	BOOL	FALSE
▶ 2 Ch Pluse Count,24V TxPDO-_Ch0: Direction_6000_04	R	ARRAY[0..1] OF BOOL	
2 Ch Pluse Count,24V TxPDO-_Ch0: Count Value_6000_05	R	DINT	-669
2 Ch Pluse Count,24V TxPDO-_Ch0: LatChValue_6000_06	R	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch1: Counting State_6000_07	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch1: DI State_6000_08	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch1: Compare State_6000_09	R	BOOL	FALSE
▶ 2 Ch Pluse Count,24V TxPDO-_Ch1: Direction_6000_0A	R	ARRAY[0..1] OF BOOL	
2 Ch Pluse Count,24V TxPDO-_Ch1: Count Value_6000_0B	R	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch1: LatChValue_6000_0C	R	DINT	0

Figure 4-3-63Comparison value setting

- As shown in Figure 4-3-64, when the count value is 8471, the compare state bit (Compare State) is 0.

DF50-M-2CNT-PIL-24			
2 Ch Pluse Count,24V RxPDO-_Ch0: Count Enable_7000_01	W	BOOL	TRUE
2 Ch Pluse Count,24V RxPDO-_Ch0: Compare Value_7000_02	W	DINT	10000
2 Ch Pluse Count,24V RxPDO-_Ch1: Count Enable_7000_03	W	BOOL	FALSE
2 Ch Pluse Count,24V RxPDO-_Ch1: Compare Value_7000_04	W	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch0: Counting State_6000_01	R	BOOL	TRUE
2 Ch Pluse Count,24V TxPDO-_Ch0: DI state_6000_02	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch0: Compare State_6000_03	R	BOOL	FALSE
▶ 2 Ch Pluse Count,24V TxPDO-_Ch0: Direction_6000_04	R	ARRAY[0..1] OF BOOL	
2 Ch Pluse Count,24V TxPDO-_Ch0: Count Value_6000_05	R	DINT	8915
2 Ch Pluse Count,24V TxPDO-_Ch0: LatChValue_6000_06	R	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch1: Counting State_6000_07	R	BOOL	FALSE

Figure 4-3-64Comparison count

- Figure 4-3-65 When the count value is 12723, it exceeds the set value of 10000, and the compare state bit (Compare State) is 1.

DF50-M-2CNT-PIL-24			
2 Ch Pluse Count,24V RxPDO-_Ch0: Count Enable_7000_01	W	BOOL	TRUE
2 Ch Pluse Count,24V RxPDO-_Ch0: Compare Value_7000_02	W	DINT	10000
2 Ch Pluse Count,24V RxPDO-_Ch1: Count Enable_7000_03	W	BOOL	FALSE
2 Ch Pluse Count,24V RxPDO-_Ch1: Compare Value_7000_04	W	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch0: Counting State_6000_01	R	BOOL	TRUE
2 Ch Pluse Count,24V TxPDO-_Ch0: DI state_6000_02	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch0: Compare State_6000_03	R	BOOL	TRUE
▶ 2 Ch Pluse Count,24V TxPDO-_Ch0: Direction_6000_04	R	ARRAY[0..1] OF BOOL	
2 Ch Pluse Count,24V TxPDO-_Ch0: Count Value_6000_05	R	DINT	12723
2 Ch Pluse Count,24V TxPDO-_Ch0: LatChValue_6000_06	R	DINT	0

Figure 4-3-65Compare count trigger

Pulse plus direction function (Signal Type: Pulse and Directions)

➢ As shown in Figure 4-3-66, change the signal type to Pulse and Directions. For wiring method, seeChapter 3, Section 13.2.3When using this mode, the A+ and A- ports input high and low levels to indicate the direction, and the B+ and B- ports input valid levels to accumulate count values.

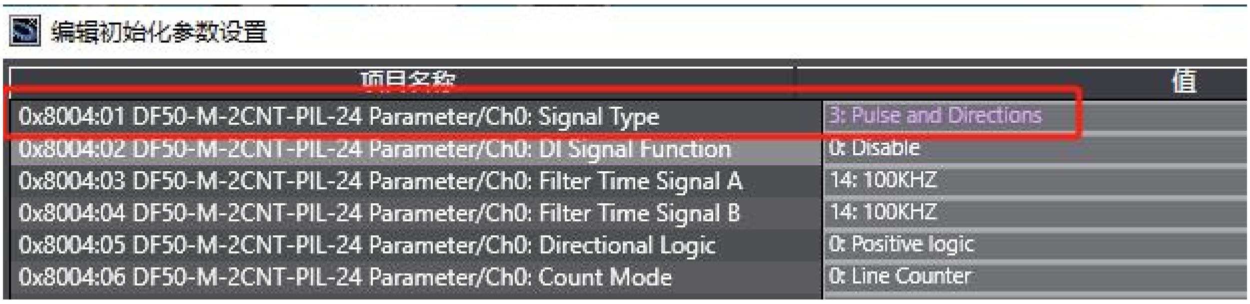


Figure 4-3-66Pulse plus direction setting

➢ As shown in Figure 4-3-67, when the sensor is stationary, the count value is 0 and the direction state is "0".

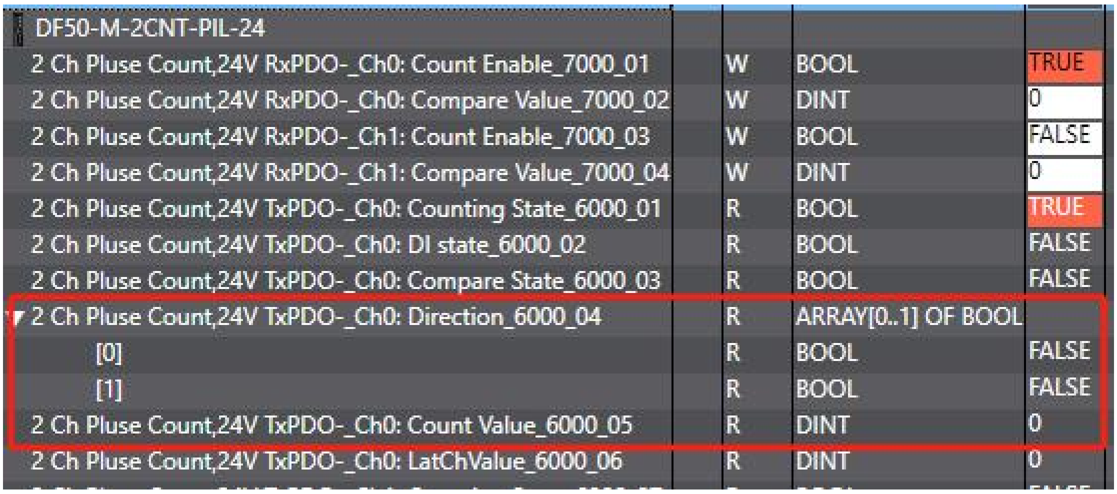


Figure 4-3-67

➢ When the A+ and A- voltage inputs are at a low level, pulse signals are input to B+ and B-. As shown in Figure 4-3-68, it can be seen that the count value decreases and the direction state is "2".

DF50-M-2CNT-PIL-24			
2 Ch Pluse Count,24V RxPDO-_Ch0: Count Enable_7000_01	W	BOOL	TRUE
2 Ch Pluse Count,24V RxPDO-_Ch0: Compare Value_7000_02	W	DINT	0
2 Ch Pluse Count,24V RxPDO-_Ch1: Count Enable_7000_03	W	BOOL	FALSE
2 Ch Pluse Count,24V RxPDO-_Ch1: Compare Value_7000_04	W	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch0: Counting State_6000_01	R	BOOL	TRUE
2 Ch Pluse Count,24V TxPDO-_Ch0: DI state_6000_02	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch0: Compare State_6000_03	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch0: Direction_6000_04	R	ARRAY[0..1] OF BOOL	
[0]	R	BOOL	FALSE
[1]	R	BOOL	TRUE
2 Ch Pluse Count,24V TxPDO-_Ch0: Count Value_6000_05	R	DINT	-3014
2 Ch Pluse Count,24V TxPDO-_Ch0: LatChValue_6000_06	R	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch1: Counting State_6000_07	R	BOOL	FALSE

Figure 4-3-68

- When the A+ and A- voltage inputs are at a high level, pulse signals are input to B+ and B-. As shown in Figure 4-3-69, it can be seen that the count value increases and the direction state is "1".

DF50-M-2CNT-PIL-24			
2 Ch Pluse Count,24V RxPDO-_Ch0: Count Enable_7000_01	W	BOOL	TRUE
2 Ch Pluse Count,24V RxPDO-_Ch0: Compare Value_7000_02	W	DINT	0
2 Ch Pluse Count,24V RxPDO-_Ch1: Count Enable_7000_03	W	BOOL	FALSE
2 Ch Pluse Count,24V RxPDO-_Ch1: Compare Value_7000_04	W	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch0: Counting State_6000_01	R	BOOL	TRUE
2 Ch Pluse Count,24V TxPDO-_Ch0: DI state_6000_02	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch0: Compare State_6000_03	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch0: Direction_6000_04	R	ARRAY[0..1] OF BOOL	
[0]	R	BOOL	TRUE
[1]	R	BOOL	FALSE
2 Ch Pluse Count,24V TxPDO-_Ch0: Count Value_6000_05	R	DINT	749
2 Ch Pluse Count,24V TxPDO-_Ch0: LatChValue_6000_06	R	DINT	0
2 Ch Pluse Count,24V TxPDO-_Ch1: Counting State_6000_07	R	BOOL	FALSE

Figure 4-3-69

4.3.7 Serial port module usage routine

- This example uses the DF50-C-EC+DF50-1COM-232-485-422 topology. DF50-1COM-232-485-422 supports three modes: free transparent transmission, slave mode, and Modbus RTU master mode. The mode switching is achieved by configuring the initialization parameters and PDO data structure.Section 15.2The wiring diagram is connected to the card, the simulated communication device communicates with the DF50-1COM-232-485-422 module, and after scanning the slave station, it is shown in Figure 4-3-70.

Figure 4-3-70

- The PDO data structure is shown in Figures 4-3-71 and 4-3-72. Different PDO data are configured for different operating modes.

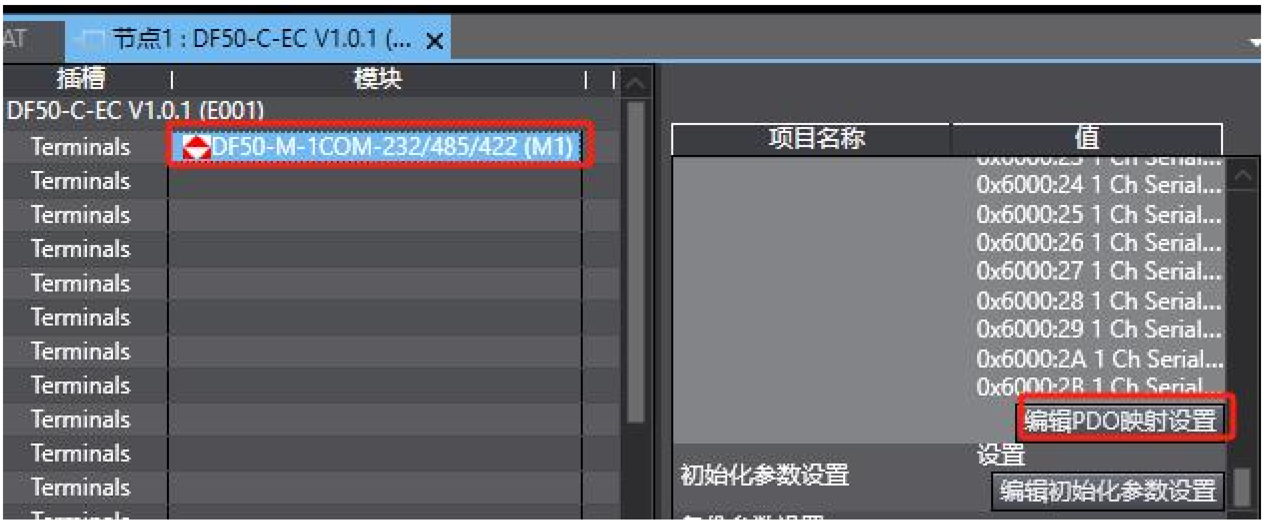


Figure 4-3-71

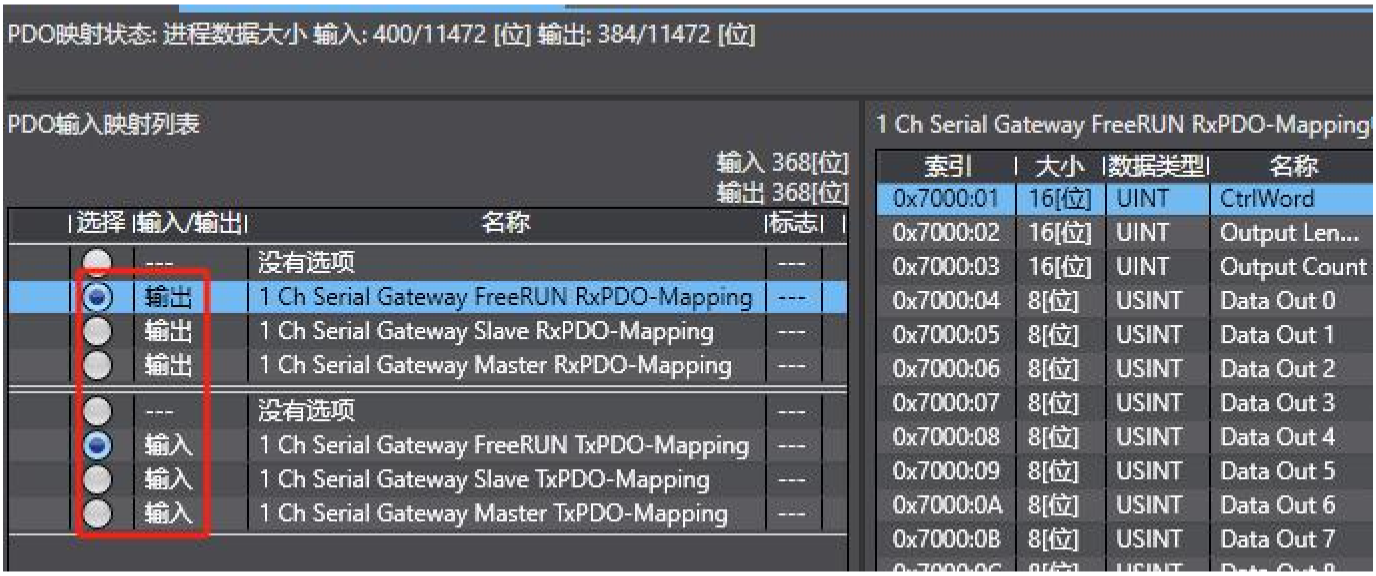


Figure 4-3-72

➢ Among them, FreeRUN RxPDO and FreeRUN TxPDO are PDO data formats in FreeRUN mode, Slave RxPDO and

Slave RxPDO is the PDO data format in Slave mode, Master RxPDO and Master RxPDO are the PDO data format in Master mode. The default configuration is FreeRUN RxPDO and FreeRUN TxPDO in FreeRUN mode.

Modbus RTU Master Mode Usage Example

➢ Modbus RTU Master Configuration

➢ For the meaning of configuration data, please refer to Section 15.3, the communication port configuration interface of Modbus RTU Master mode is shown in the figure below.

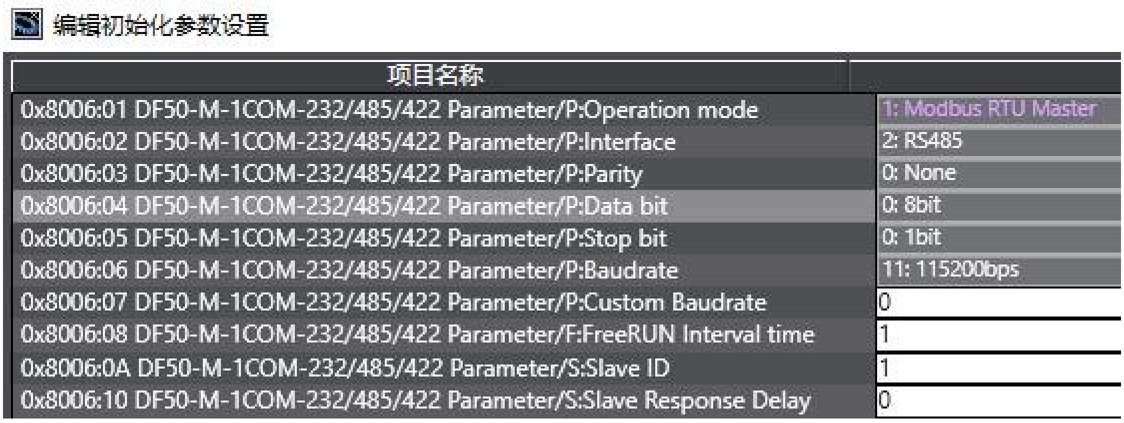


Figure 4-3-73

➢ The parameters of Ch0~Ch7 can be configured according to the communication format of the slave device to be communicated. Different function code read and write operations can be performed on 8 slaves with different IDs. The addresses are 1~8 respectively:

编辑初始化参数设置

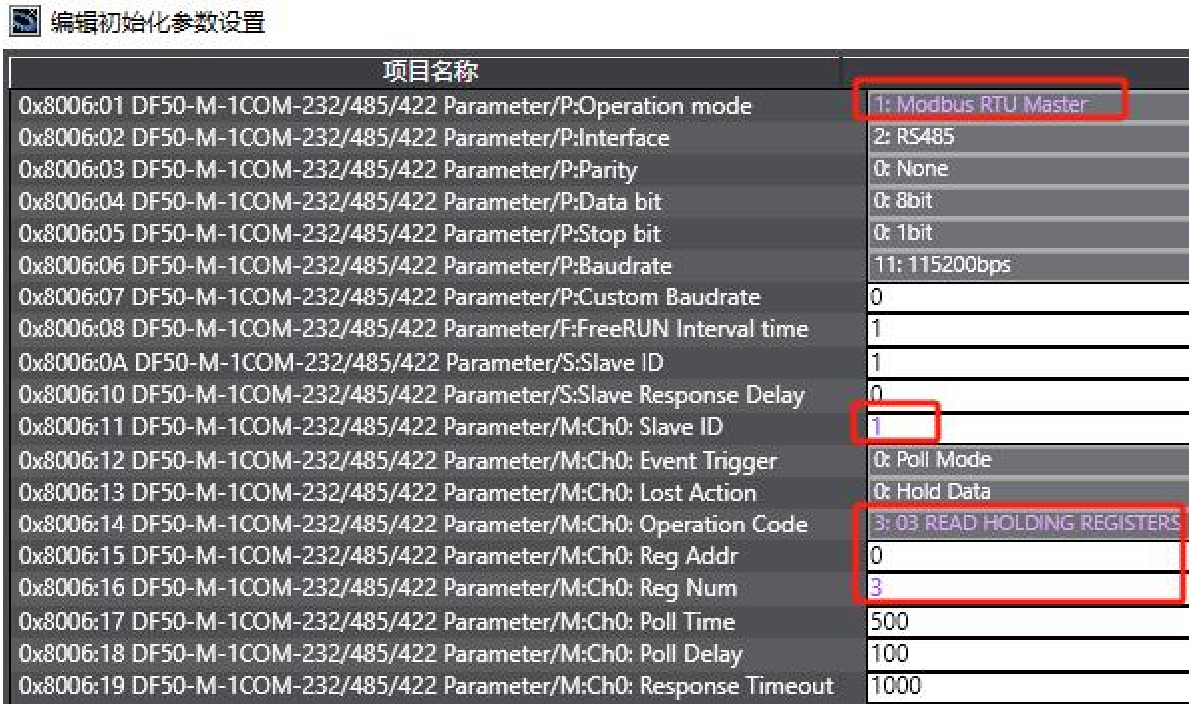
项目名称	
0x8006:0A DF50-M-1COM-232/485/422 Parameter/S:Slave ID	1
0x8006:10 DF50-M-1COM-232/485/422 Parameter/S:Slave Response Delay	0
0x8006:11 DF50-M-1COM-232/485/422 Parameter/M:Ch0: Slave ID	1
0x8006:12 DF50-M-1COM-232/485/422 Parameter/M:Ch0: Event Trigger	0: Poll Mode
0x8006:13 DF50-M-1COM-232/485/422 Parameter/M:Ch0: Lost Action	0: Hold Data
0x8006:14 DF50-M-1COM-232/485/422 Parameter/M:Ch0: Operation Code	1: 01 READ COILS
0x8006:15 DF50-M-1COM-232/485/422 Parameter/M:Ch0: Reg Addr	0
0x8006:16 DF50-M-1COM-232/485/422 Parameter/M:Ch0: Reg Num	320
0x8006:17 DF50-M-1COM-232/485/422 Parameter/M:Ch0: Poll Time	500
0x8006:18 DF50-M-1COM-232/485/422 Parameter/M:Ch0: Poll Delay	100
0x8006:19 DF50-M-1COM-232/485/422 Parameter/M:Ch0: Response Timeout	1000
0x8006:1A DF50-M-1COM-232/485/422 Parameter/M:Ch1: Slave ID	2
0x8006:1B DF50-M-1COM-232/485/422 Parameter/M:Ch1: Event Trigger	0: Poll Mode
0x8006:1C DF50-M-1COM-232/485/422 Parameter/M:Ch1: Lost Action	0: Hold Data
0x8006:1D DF50-M-1COM-232/485/422 Parameter/M:Ch1: Operation Code	2: 02 READ DISCRETE INPUTS
0x8006:1E DF50-M-1COM-232/485/422 Parameter/M:Ch1: Reg Addr	0
0x8006:1F DF50-M-1COM-232/485/422 Parameter/M:Ch1: Reg Num	320
0x8006:20 DF50-M-1COM-232/485/422 Parameter/M:Ch1: Poll Time	500
0x8006:21 DF50-M-1COM-232/485/422 Parameter/M:Ch1: Poll Delay	100
0x8006:22 DF50-M-1COM-232/485/422 Parameter/M:Ch1: Response Timeout	1000
0x8006:23 DF50-M-1COM-232/485/422 Parameter/M:Ch2: Slave ID	3
0x8006:24 DF50-M-1COM-232/485/422 Parameter/M:Ch2: Event Trigger	0: Poll Mode
0x8006:25 DF50-M-1COM-232/485/422 Parameter/M:Ch2: Lost Action	0: Hold Data
0x8006:26 DF50-M-1COM-232/485/422 Parameter/M:Ch2: Operation Code	3: 03 READ HOLDING REGISTERS
0x8006:27 DF50-M-1COM-232/485/422 Parameter/M:Ch2: Reg Addr	0
0x8006:28 DF50-M-1COM-232/485/422 Parameter/M:Ch2: Reg Num	20
0x8006:29 DF50-M-1COM-232/485/422 Parameter/M:Ch2: Poll Time	500
0x8006:2A DF50-M-1COM-232/485/422 Parameter/M:Ch2: Poll Delay	100
0x8006:2B DF50-M-1COM-232/485/422 Parameter/M:Ch2: Response Timeout	1000
0x8006:2C DF50-M-1COM-232/485/422 Parameter/M:Ch3: Slave ID	4
0x8006:2D DF50-M-1COM-232/485/422 Parameter/M:Ch3: Event Trigger	0: Poll Mode
0x8006:2E DF50-M-1COM-232/485/422 Parameter/M:Ch3: Lost Action	0: Hold Data
0x8006:2F DF50-M-1COM-232/485/422 Parameter/M:Ch3: Operation Code	4: 04 READ INPUT REGISTERS
0x8006:30 DF50-M-1COM-232/485/422 Parameter/M:Ch3: Reg Addr	0
0x8006:31 DF50-M-1COM-232/485/422 Parameter/M:Ch3: Reg Num	20
0x8006:32 DF50-M-1COM-232/485/422 Parameter/M:Ch3: Poll Time	500
0x8006:33 DF50-M-1COM-232/485/422 Parameter/M:Ch3: Poll Delay	100
0x8006:34 DF50-M-1COM-232/485/422 Parameter/M:Ch3: Response Timeout	1000

Figure 4-3-74

项目名称	值
0x8006:35 DF50-M-1COM-232/485/422 Parameter/M:Ch4: Slave ID	5
0x8006:36 DF50-M-1COM-232/485/422 Parameter/M:Ch4: Event Trigger	0: Poll Mode
0x8006:37 DF50-M-1COM-232/485/422 Parameter/M:Ch4: Lost Action	0: Hold Data
0x8006:38 DF50-M-1COM-232/485/422 Parameter/M:Ch4: Operation Code	5: 05 WRITE SINGLE COIL
0x8006:39 DF50-M-1COM-232/485/422 Parameter/M:Ch4: Reg Addr	0
0x8006:3A DF50-M-1COM-232/485/422 Parameter/M:Ch4: Reg Num	1
0x8006:3B DF50-M-1COM-232/485/422 Parameter/M:Ch4: Poll Time	500
0x8006:3C DF50-M-1COM-232/485/422 Parameter/M:Ch4: Poll Delay	100
0x8006:3D DF50-M-1COM-232/485/422 Parameter/M:Ch4: Response Timeout	1000
0x8006:3E DF50-M-1COM-232/485/422 Parameter/M:Ch5: Slave ID	6
0x8006:3F DF50-M-1COM-232/485/422 Parameter/M:Ch5: Event Trigger	0: Poll Mode
0x8006:40 DF50-M-1COM-232/485/422 Parameter/M:Ch5: Lost Action	0: Hold Data
0x8006:41 DF50-M-1COM-232/485/422 Parameter/M:Ch5: Operation Code	6: 06 WRITE SINGLE HOLDING REGISTER
0x8006:42 DF50-M-1COM-232/485/422 Parameter/M:Ch5: Reg Addr	0
0x8006:43 DF50-M-1COM-232/485/422 Parameter/M:Ch5: Reg Num	1
0x8006:44 DF50-M-1COM-232/485/422 Parameter/M:Ch5: Poll Time	500
0x8006:45 DF50-M-1COM-232/485/422 Parameter/M:Ch5: Poll Delay	100
0x8006:46 DF50-M-1COM-232/485/422 Parameter/M:Ch5: Response Timeout	1000
0x8006:47 DF50-M-1COM-232/485/422 Parameter/M:Ch6: Slave ID	7
0x8006:48 DF50-M-1COM-232/485/422 Parameter/M:Ch6: Event Trigger	0: Poll Mode
0x8006:49 DF50-M-1COM-232/485/422 Parameter/M:Ch6: Lost Action	0: Hold Data
0x8006:4A DF50-M-1COM-232/485/422 Parameter/M:Ch6: Operation Code	16: 16 WRITE MULTIPLE HOLDING REGISTERS
0x8006:4B DF50-M-1COM-232/485/422 Parameter/M:Ch6: Reg Addr	0
0x8006:4C DF50-M-1COM-232/485/422 Parameter/M:Ch6: Reg Num	20
0x8006:4D DF50-M-1COM-232/485/422 Parameter/M:Ch6: Poll Time	500
0x8006:4E DF50-M-1COM-232/485/422 Parameter/M:Ch6: Poll Delay	100
0x8006:4F DF50-M-1COM-232/485/422 Parameter/M:Ch6: Response Timeout	1000
0x8006:50 DF50-M-1COM-232/485/422 Parameter/M:Ch7: Slave ID	7
0x8006:51 DF50-M-1COM-232/485/422 Parameter/M:Ch7: Event Trigger	0: Poll Mode
0x8006:52 DF50-M-1COM-232/485/422 Parameter/M:Ch7: Lost Action	0: Hold Data
0x8006:53 DF50-M-1COM-232/485/422 Parameter/M:Ch7: Operation Code	16: 16 WRITE MULTIPLE HOLDING REGISTERS
0x8006:54 DF50-M-1COM-232/485/422 Parameter/M:Ch7: Reg Addr	20
0x8006:55 DF50-M-1COM-232/485/422 Parameter/M:Ch7: Reg Num	20
0x8006:56 DF50-M-1COM-232/485/422 Parameter/M:Ch7: Poll Time	500
0x8006:57 DF50-M-1COM-232/485/422 Parameter/M:Ch7: Poll Delay	100
0x8006:58 DF50-M-1COM-232/485/422 Parameter/M:Ch7: Response Timeout	1000

Figure 4-3-75

- Among them, ch6 and ch7 are set to a slave address of 0x07 at the same time, and the holding register of the slave station is written. The writing range is 0~20 and 20~40. This flexible configuration can read and write a maximum of 12ch*20word data to the same slave station. Ch8~ch12 is not enabled for the time being;
- Taking channel ch0 as an example, in the initialization parameter settings, the configuration mode is Modbus RTU Master mode, the slave ID is set to 1, the function is set to Read HOLDING REGISTERS, the number of registers to be read is 3, and the read start address is 0.



项目名称	
0x8006:01 DF50-M-1COM-232/485/422 Parameter/P:Operation mode	1: Modbus RTU Master
0x8006:02 DF50-M-1COM-232/485/422 Parameter/P:Interface	2: RS485
0x8006:03 DF50-M-1COM-232/485/422 Parameter/P:Parity	0: None
0x8006:04 DF50-M-1COM-232/485/422 Parameter/P:Data bit	0: 8bit
0x8006:05 DF50-M-1COM-232/485/422 Parameter/P:Stop bit	0: 1bit
0x8006:06 DF50-M-1COM-232/485/422 Parameter/P:Baudrate	11: 115200bps
0x8006:07 DF50-M-1COM-232/485/422 Parameter/P:Custom Baudrate	0
0x8006:08 DF50-M-1COM-232/485/422 Parameter/F:FreeRUN Interval time	1
0x8006:0A DF50-M-1COM-232/485/422 Parameter/S:Slave ID	1
0x8006:10 DF50-M-1COM-232/485/422 Parameter/S:Slave Response Delay	0
0x8006:11 DF50-M-1COM-232/485/422 Parameter/M:Ch0: Slave ID	1
0x8006:12 DF50-M-1COM-232/485/422 Parameter/M:Ch0: Event Trigger	0: Poll Mode
0x8006:13 DF50-M-1COM-232/485/422 Parameter/M:Ch0: Lost Action	0: Hold Data
0x8006:14 DF50-M-1COM-232/485/422 Parameter/M:Ch0: Operation Code	3: 03 READ HOLDING REGISTERS
0x8006:15 DF50-M-1COM-232/485/422 Parameter/M:Ch0: Reg Addr	0
0x8006:16 DF50-M-1COM-232/485/422 Parameter/M:Ch0: Reg Num	3
0x8006:17 DF50-M-1COM-232/485/422 Parameter/M:Ch0: Poll Time	500
0x8006:18 DF50-M-1COM-232/485/422 Parameter/M:Ch0: Poll Delay	100
0x8006:19 DF50-M-1COM-232/485/422 Parameter/M:Ch0: Response Timeout	1000

Figure 4-3-76

➢ Configure the process data as Master RxPDO and Master TxPDO in the PDO mapping settings.

Figure 4-3-77

➢ Click Online to transfer the configuration information to the controller.

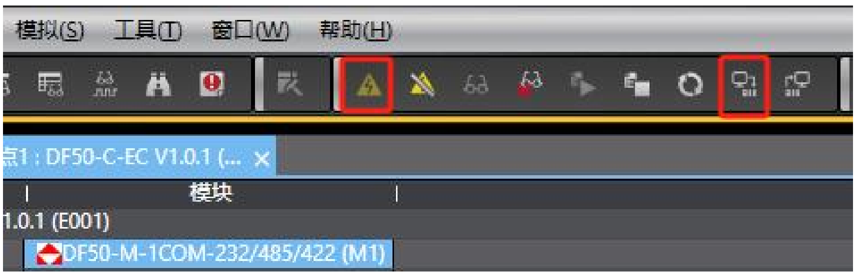


Figure 4-3-78

➢ The Master mode input and output data are shown in the figure below.

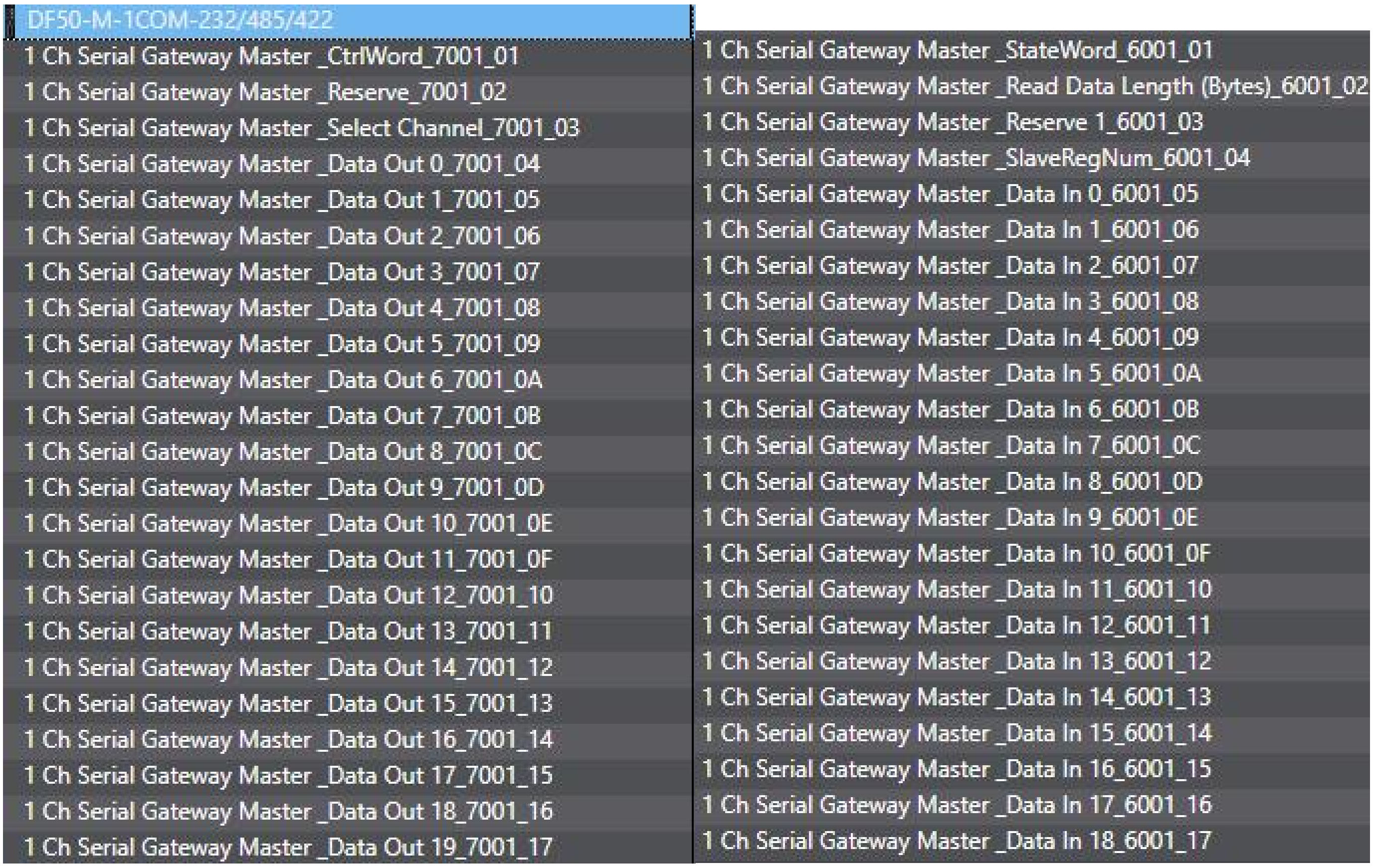


Figure 4-3-79

- Modbus RTU Master Process Data Description

Table 4.3.6Output data meaning

Output Data		
name	**length**	**meaning**
CtrlWord	2Byte	Control Word
Reserve	2Byte	reserve
Select Channel	2Byte	Channel operation selection
DataOut 0-19	40Byte	Send data content

- As shown in Table 4.3.6, SelectChannel is used to switch the communication channel, with a value range of 0-11. By default, Ch0 is activated. If SelectChannel is assigned a value of 1, the communication of Ch1 is activated, and the 485 bus on the serial port module will perform Modbus communication according to the configuration of Ch1, the specific address and function code.

Table 4.3.7Input data meaning

Input Data		
name	**length**	**meaning**

StateWord	2Byte	Status word
ReadDataLength	2Byte	Receive data length
ActiveChannel	2Byte	Current active channels
DataIn 0-19	40Byte	Receive data content

- When the PLC queries ActiveChannel and it is 1, it means that the current communication is Ch1. ReadDataLength and DataIn 0-19 both indicate the valid data of Ch1. The PLC can now take the input value and switch to the next channel communication.
- Open the Modbus Slave software on the PC and create a new project.

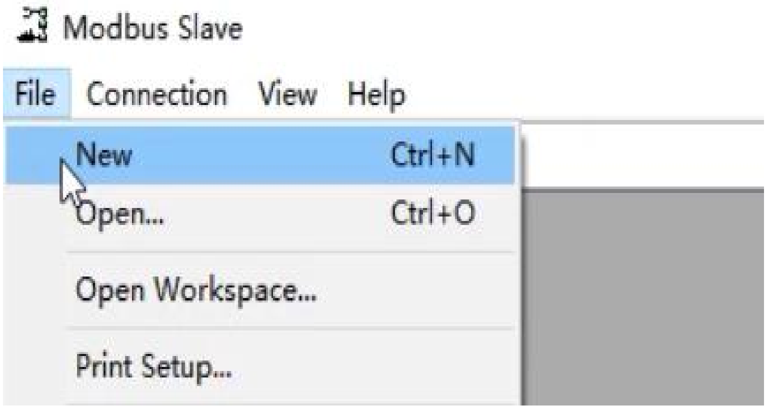


Figure 4-3-80

- Connect to the serial device.

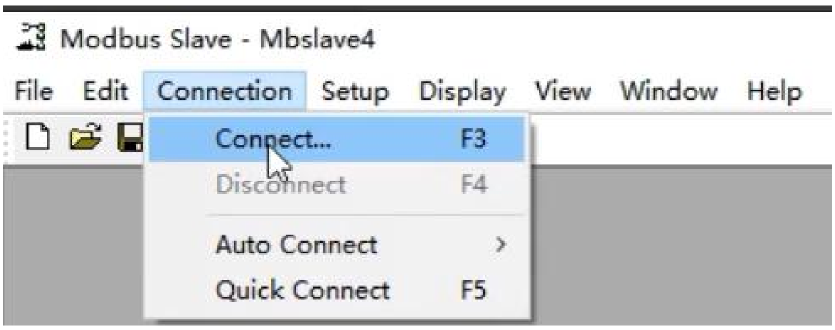


Figure 4-3-81

- As shown in the figure below, set the slave station parameters.

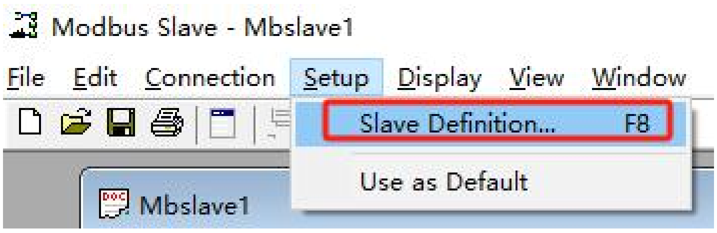


Figure 4-3-82

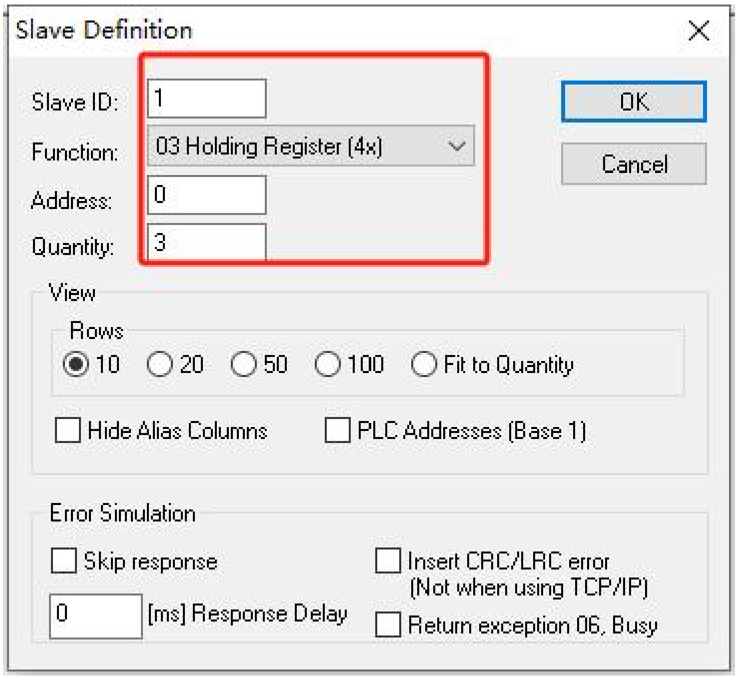


Figure 4-3-83

- Write register data.

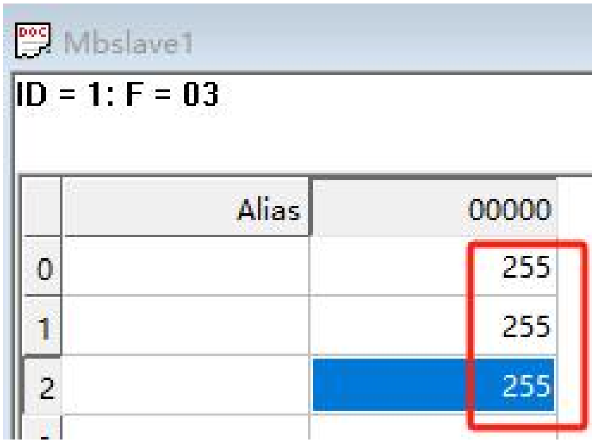
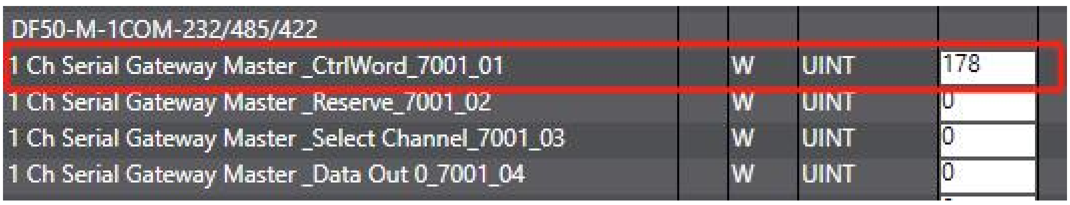


Figure 4-3-84

- CtrlWord writes run command 178 (0x00B2).



DF50-M-1COM-232/485/422			
1 Ch Serial Gateway Master _CtrlWord_7001_01	W	UINT	178
1 Ch Serial Gateway Master _Reserve_7001_02	W	UINT	0
1 Ch Serial Gateway Master _Select Channel_7001_03	W	UINT	0
1 Ch Serial Gateway Master _Data Out 0_7001_04	W	UINT	0

Figure 4-3-85

➢ The CtrlWord command table is shown below.

Table 4.3.8CtrlWord data meaning

Command Value	Command Name	meaning
16#00A1	CONFIGUREPORT	Port Configuration Commands
16#00B1	COMFIGUREMASTER	MASTER Mode Configuration Commands
16#00B2	OPERATIONMASTER	MASTER mode run command

➢ Check the module input data and the current data is consistent with the sent data.

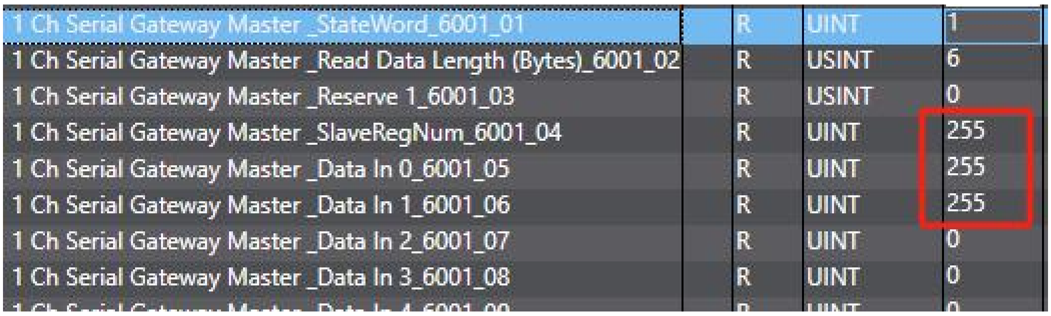


Figure 4-3-86

FreeRUN free transparent transmission mode usage example

- Free transparent transmission mode configuration.
- For the meaning of configuration data, please refer to Section 15.3 The configuration interface of free transparent transmission mode is shown in Figure 4-3-87.

编辑初始化参数设置

项目名称	
0x8006:01 DF50-M-1COM-232/485/422 Parameter/P:Operation mode	0: FreeRUN
0x8006:02 DF50-M-1COM-232/485/422 Parameter/P:Interface	2: RS485
0x8006:03 DF50-M-1COM-232/485/422 Parameter/P:Parity	0: None
0x8006:04 DF50-M-1COM-232/485/422 Parameter/P:Data bit	0: 8bit
0x8006:05 DF50-M-1COM-232/485/422 Parameter/P:Stop bit	0: 1bit
0x8006:06 DF50-M-1COM-232/485/422 Parameter/P:Baudrate	11: 115200bps
0x8006:07 DF50-M-1COM-232/485/422 Parameter/P:Custom Baudrate	0
0x8006:08 DF50-M-1COM-232/485/422 Parameter/F:FreeRUN Interval time	1
0x8006:0A DF50-M-1COM-232/485/422 Parameter/S:Slave ID	1

Figure 4-3-87

- In the initialization parameter settings, configure the mode to FreeRUN mode.

编辑初始化参数设置

项目名称	
0x8006:01 DF50-M-1COM-232/485/422 Parameter/P:Operation mode	0: FreeRUN
0x8006:02 DF50-M-1COM-232/485/422 Parameter/P:Interface	2: RS485
0x8006:03 DF50-M-1COM-232/485/422 Parameter/P:Parity	0: None
0x8006:04 DF50-M-1COM-232/485/422 Parameter/P:Data bit	0: 8bit
0x8006:05 DF50-M-1COM-232/485/422 Parameter/P:Stop bit	0: 1bit
0x8006:06 DF50-M-1COM-232/485/422 Parameter/P:Baudrate	11: 115200bps
0x8006:07 DF50-M-1COM-232/485/422 Parameter/P:Custom Baudrate	0
0x8006:08 DF50-M-1COM-232/485/422 Parameter/F:FreeRUN Interval time	1

Figure 4-3-88

- Configure the process data as FreeRUN RxPDO and FreeRUN TxPDO in the PDO mapping settings.

选择	输入/输出	名称	标志
	---	没有选项	---
	输出	1 Ch Serial Gateway FreeRUN RxPDO-Mapping	---
	输出	1 Ch Serial Gateway Slave RxPDO-Mapping	---
	输出	1 Ch Serial Gateway Master RxPDO-Mapping	---
	---	没有选项	---
	输入	1 Ch Serial Gateway FreeRUN TxPDO-Mapping	---
	输入	1 Ch Serial Gateway Slave TxPDO-Mapping	---
	输入	1 Ch Serial Gateway Master TxPDO-Mapping	---

Figure 4-3-89

- Click Online to transfer the configuration information to the controller.

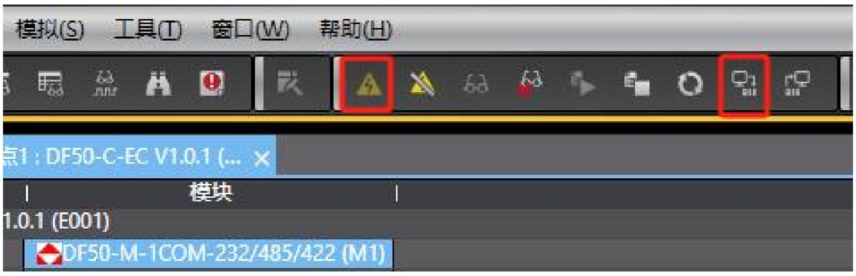


Figure 4-3-90

- The FreeRUN mode input and output data are shown in Figure 4-3-91.

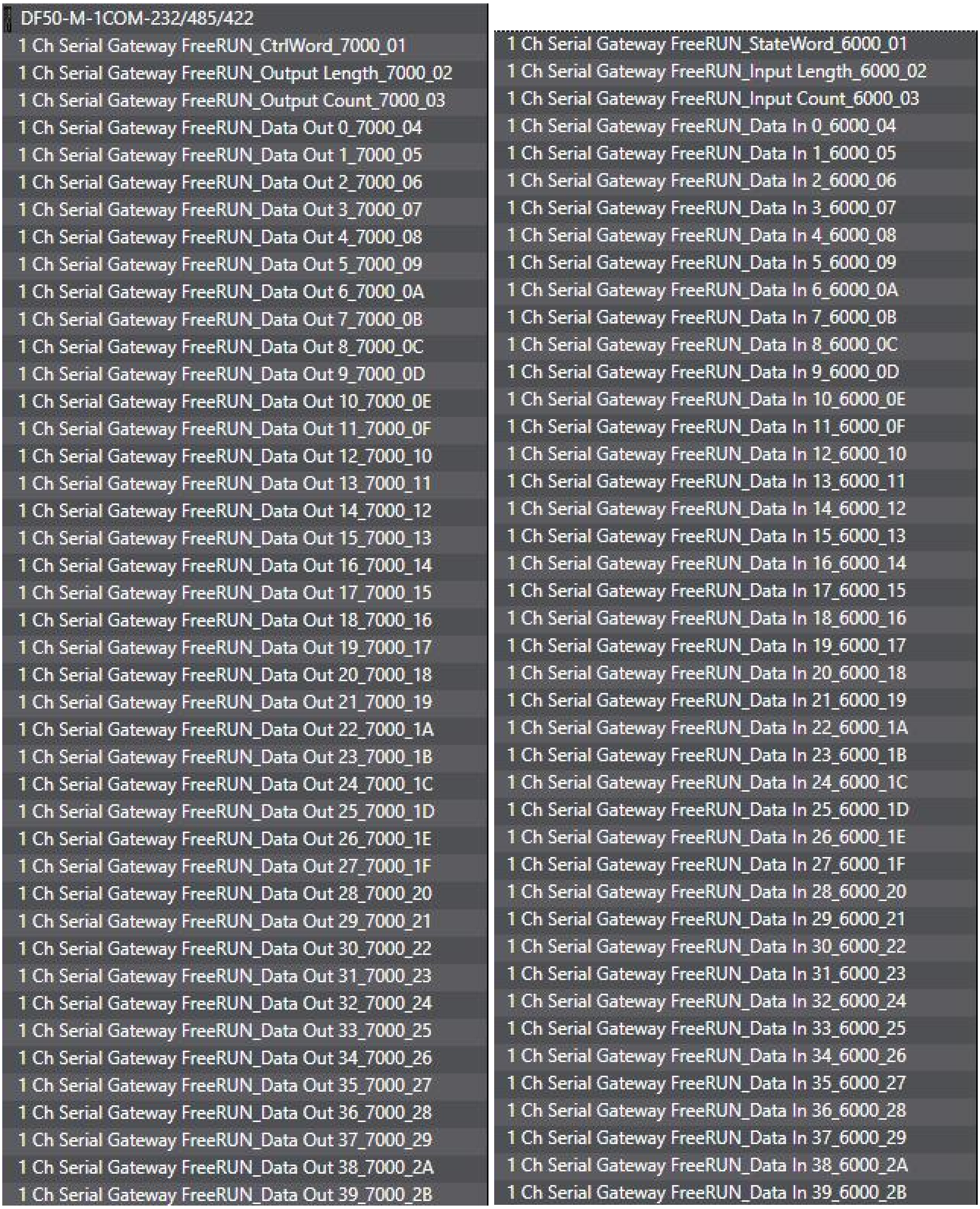

DF50-M-1COM-232/485/422
1 Ch Serial Gateway FreeRUN_CtrlWord_7000_01
1 Ch Serial Gateway FreeRUN_Output Length_7000_02
1 Ch Serial Gateway FreeRUN_Output Count_7000_03
1 Ch Serial Gateway FreeRUN_Data Out 0_7000_04
1 Ch Serial Gateway FreeRUN_Data Out 1_7000_05
1 Ch Serial Gateway FreeRUN_Data Out 2_7000_06
1 Ch Serial Gateway FreeRUN_Data Out 3_7000_07
1 Ch Serial Gateway FreeRUN_Data Out 4_7000_08
1 Ch Serial Gateway FreeRUN_Data Out 5_7000_09
1 Ch Serial Gateway FreeRUN_Data Out 6_7000_0A
1 Ch Serial Gateway FreeRUN_Data Out 7_7000_0B
1 Ch Serial Gateway FreeRUN_Data Out 8_7000_0C
1 Ch Serial Gateway FreeRUN_Data Out 9_7000_0D
1 Ch Serial Gateway FreeRUN_Data Out 10_7000_0E
1 Ch Serial Gateway FreeRUN_Data Out 11_7000_0F
1 Ch Serial Gateway FreeRUN_Data Out 12_7000_10
1 Ch Serial Gateway FreeRUN_Data Out 13_7000_11
1 Ch Serial Gateway FreeRUN_Data Out 14_7000_12
1 Ch Serial Gateway FreeRUN_Data Out 15_7000_13
1 Ch Serial Gateway FreeRUN_Data Out 16_7000_14
1 Ch Serial Gateway FreeRUN_Data Out 17_7000_15
1 Ch Serial Gateway FreeRUN_Data Out 18_7000_16
1 Ch Serial Gateway FreeRUN_Data Out 19_7000_17
1 Ch Serial Gateway FreeRUN_Data Out 20_7000_18
1 Ch Serial Gateway FreeRUN_Data Out 21_7000_19
1 Ch Serial Gateway FreeRUN_Data Out 22_7000_1A
1 Ch Serial Gateway FreeRUN_Data Out 23_7000_1B
1 Ch Serial Gateway FreeRUN_Data Out 24_7000_1C
1 Ch Serial Gateway FreeRUN_Data Out 25_7000_1D
1 Ch Serial Gateway FreeRUN_Data Out 26_7000_1E
1 Ch Serial Gateway FreeRUN_Data Out 27_7000_1F
1 Ch Serial Gateway FreeRUN_Data Out 28_7000_20
1 Ch Serial Gateway FreeRUN_Data Out 29_7000_21
1 Ch Serial Gateway FreeRUN_Data Out 30_7000_22
1 Ch Serial Gateway FreeRUN_Data Out 31_7000_23
1 Ch Serial Gateway FreeRUN_Data Out 32_7000_24
1 Ch Serial Gateway FreeRUN_Data Out 33_7000_25
1 Ch Serial Gateway FreeRUN_Data Out 34_7000_26
1 Ch Serial Gateway FreeRUN_Data Out 35_7000_27
1 Ch Serial Gateway FreeRUN_Data Out 36_7000_28
1 Ch Serial Gateway FreeRUN_Data Out 37_7000_29
1 Ch Serial Gateway FreeRUN_Data Out 38_7000_2A
1 Ch Serial Gateway FreeRUN_Data Out 39_7000_2B
1 Ch Serial Gateway FreeRUN_StateWord_6000_01
1 Ch Serial Gateway FreeRUN_Input Length_6000_02
1 Ch Serial Gateway FreeRUN_Input Count_6000_03
1 Ch Serial Gateway FreeRUN_Data In 0_6000_04
1 Ch Serial Gateway FreeRUN_Data In 1_6000_05
1 Ch Serial Gateway FreeRUN_Data In 2_6000_06
1 Ch Serial Gateway FreeRUN_Data In 3_6000_07
1 Ch Serial Gateway FreeRUN_Data In 4_6000_08
1 Ch Serial Gateway FreeRUN_Data In 5_6000_09
1 Ch Serial Gateway FreeRUN_Data In 6_6000_0A
1 Ch Serial Gateway FreeRUN_Data In 7_6000_0B
1 Ch Serial Gateway FreeRUN_Data In 8_6000_0C
1 Ch Serial Gateway FreeRUN_Data In 9_6000_0D
1 Ch Serial Gateway FreeRUN_Data In 10_6000_0E
1 Ch Serial Gateway FreeRUN_Data In 11_6000_0F
1 Ch Serial Gateway FreeRUN_Data In 12_6000_10
1 Ch Serial Gateway FreeRUN_Data In 13_6000_11
1 Ch Serial Gateway FreeRUN_Data In 14_6000_12
1 Ch Serial Gateway FreeRUN_Data In 15_6000_13
1 Ch Serial Gateway FreeRUN_Data In 16_6000_14
1 Ch Serial Gateway FreeRUN_Data In 17_6000_15
1 Ch Serial Gateway FreeRUN_Data In 18_6000_16
1 Ch Serial Gateway FreeRUN_Data In 19_6000_17
1 Ch Serial Gateway FreeRUN_Data In 20_6000_18
1 Ch Serial Gateway FreeRUN_Data In 21_6000_19
1 Ch Serial Gateway FreeRUN_Data In 22_6000_1A
1 Ch Serial Gateway FreeRUN_Data In 23_6000_1B
1 Ch Serial Gateway FreeRUN_Data In 24_6000_1C
1 Ch Serial Gateway FreeRUN_Data In 25_6000_1D
1 Ch Serial Gateway FreeRUN_Data In 26_6000_1E
1 Ch Serial Gateway FreeRUN_Data In 27_6000_1F
1 Ch Serial Gateway FreeRUN_Data In 28_6000_20
1 Ch Serial Gateway FreeRUN_Data In 29_6000_21
1 Ch Serial Gateway FreeRUN_Data In 30_6000_22
1 Ch Serial Gateway FreeRUN_Data In 31_6000_23
1 Ch Serial Gateway FreeRUN_Data In 32_6000_24
1 Ch Serial Gateway FreeRUN_Data In 33_6000_25
1 Ch Serial Gateway FreeRUN_Data In 34_6000_26
1 Ch Serial Gateway FreeRUN_Data In 35_6000_27
1 Ch Serial Gateway FreeRUN_Data In 36_6000_28
1 Ch Serial Gateway FreeRUN_Data In 37_6000_29
1 Ch Serial Gateway FreeRUN_Data In 38_6000_2A
1 Ch Serial Gateway FreeRUN_Data In 39_6000_2B

Figure 4-3-91

➢ Process data description in free transparent transmission mode

Table 4.3.9Output data meaning

Output Data		
name	**length**	**meaning**
CtrlWord	2Byte	Control Word
OutputLength	2Byte	Send data length
OutputCount	2Byte	Send data sequence number
DataOut 0-39	40Byte	Send data content

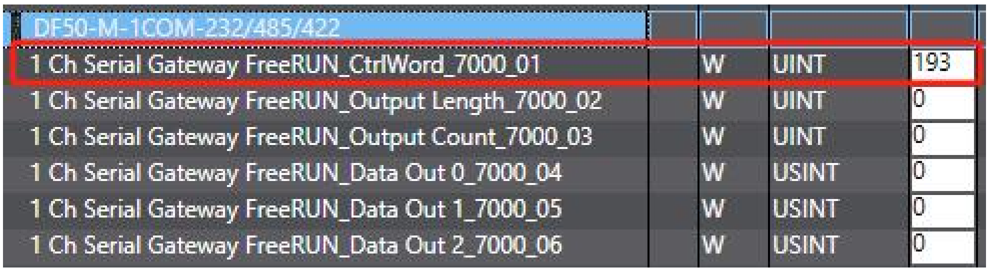
➢ As shown in Table 4.3.9, OutputLength is the length of the data to be sent, DataOut 0-39 is the data to be sent, and assigning a new value to OutputCount can activate a send. The PLC program periodically accumulates OutputCount to achieve fixed periodic sending.

Table 4.3.10Input data meaning

Input Data		
name	**length**	**meaning**
StateWord	2Byte	Status word
InputLength	2Byte	Receive data length
InputCount	2Byte	Receive data sequence number
DataIn 0-39	40Byte	Receive data content

➢ As shown in Table 4.3.10, receiving data is similar to sending data. InputLength indicates the length of the received data, DataIn 0-39 is the valid data received, and InputCount indicates the sequence number of the currently received data frame (accumulated value). Users can determine whether a new data frame has been received based on whether the current InputCount value is updated, and the length of the received new data frame can be determined by InputLength.

➢ CtrlWord writes 193 (0x00C1) to configure the module into send mode.



DF50-M-1COM-232/485/422			
1 Ch Serial Gateway FreeRUN_CtrlWord_7000_01	W	UINT	193
1 Ch Serial Gateway FreeRUN_Output Length_7000_02	W	UINT	0
1 Ch Serial Gateway FreeRUN_Output Count_7000_03	W	UINT	0
1 Ch Serial Gateway FreeRUN_Data Out 0_7000_04	W	USINT	0
1 Ch Serial Gateway FreeRUN_Data Out 1_7000_05	W	USINT	0
1 Ch Serial Gateway FreeRUN_Data Out 2_7000_06	W	USINT	0

Figure 4-3-92

➢ CtrlWord command table.

Table 4.3.11CtrlWord Command Table

Command Value	Command Name	meaning
16#00A1	CONFIGUREPORT	Configuration Commands
16#00C1	WRITEFreeRUN	Free mode write data command
16#00C2	READFreeRUN	Free mode read data command

➢ Output Length sets the send length to 3, Data Out 0 writes send data 11, Data Out 1 writes send data 22, and Data Out 2 writes send data 33.

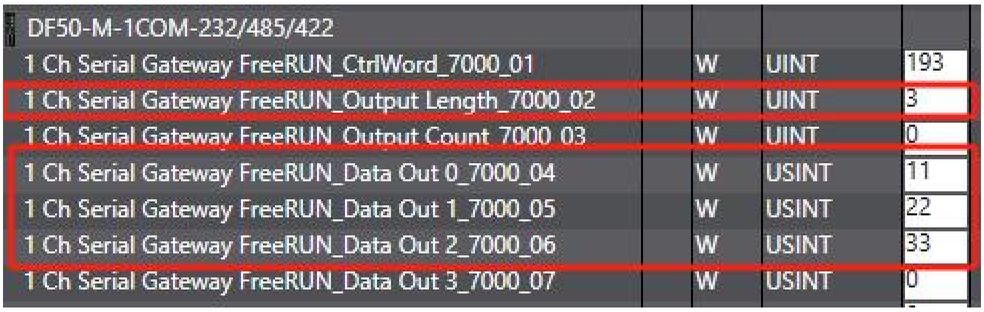


Figure 4-3-93

➢ Set Output Count to 1 and send the data to the serial port assistant, as shown in the figure below.Each time Output Count changes, the module sends data.

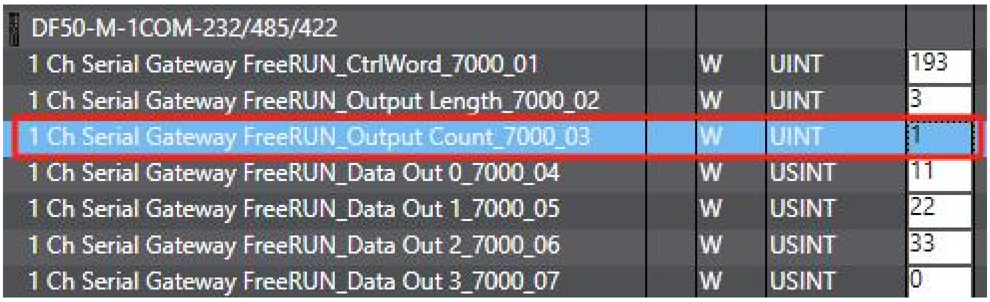


Figure 4-3-94

➢ The data received by the serial port assistant is shown in the figure below, which is 0x0B (11), 0x16 (22), and 0x21 (33).

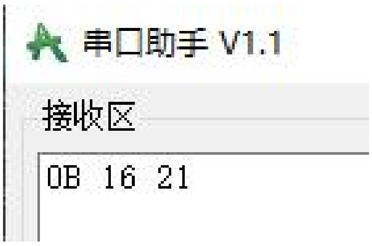
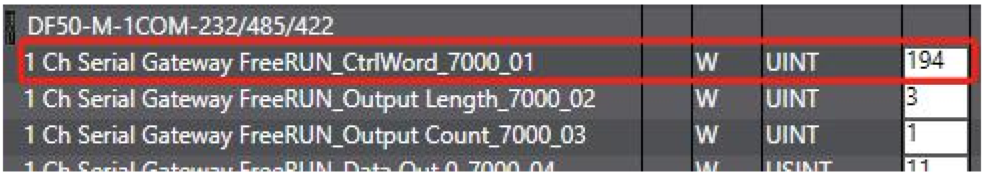


Figure 4-3-95

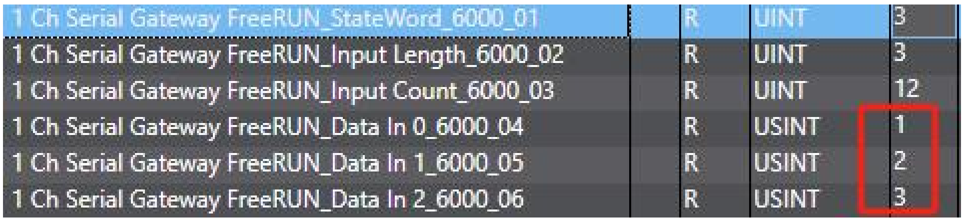
➢ CtrlWord writes 194 (0x00C2) to configure the module into receive mode.



DF50-M-1COM-232/485/422			
1 Ch Serial Gateway FreeRUN_CtrlWord_7000_01	W	UINT	194
1 Ch Serial Gateway FreeRUN_Output Length_7000_02	W	UINT	3
1 Ch Serial Gateway FreeRUN_Output Count_7000_03	W	UINT	1
1 Ch Serial Gateway FreeRUN_Data Out 0_7000_04	W	USINT	11

Figure 4-3-96

➢ PC sends 01 02 03 through the serial port assistant, and the card input data is shown in the figure, which is consistent with the actual data.



1 Ch Serial Gateway FreeRUN_StateWord_6000_01	R	UINT	3
1 Ch Serial Gateway FreeRUN_Input Length_6000_02	R	UINT	3
1 Ch Serial Gateway FreeRUN_Input Count_6000_03	R	UINT	12
1 Ch Serial Gateway FreeRUN_Data In 0_6000_04	R	USINT	1
1 Ch Serial Gateway FreeRUN_Data In 1_6000_05	R	USINT	2
1 Ch Serial Gateway FreeRUN_Data In 2_6000_06	R	USINT	3

Figure 4-3-97

Modbus RTU Slave mode usage routine

➢ For the meaning of configuration data, please refer toSection 15.3, the Modbus RTU Slave mode configuration interface is shown in the figure.

编辑初始化参数设置

项目名称	
0x8006:01 DF50-M-1COM-232/485/422 Parameter/P:Operation mode	0: FreeRUN
0x8006:02 DF50-M-1COM-232/485/422 Parameter/P:Interface	2: RS485
0x8006:03 DF50-M-1COM-232/485/422 Parameter/P:Parity	0: None
0x8006:04 DF50-M-1COM-232/485/422 Parameter/P:Data bit	0: 8bit
0x8006:05 DF50-M-1COM-232/485/422 Parameter/P:Stop bit	0: 1bit
0x8006:06 DF50-M-1COM-232/485/422 Parameter/P:Baudrate	11: 115200bps
0x8006:07 DF50-M-1COM-232/485/422 Parameter/P:Custom Baudrate	0
0x8006:08 DF50-M-1COM-232/485/422 Parameter/F:FreeRUN Interval time	1
0x8006:0A DF50-M-1COM-232/485/422 Parameter/S:Slave ID	1
0x8006:10 DF50-M-1COM-232/485/422 Parameter/S:Slave Response Delay	0

Figure 4-3-98

➢ In the initialization parameter settings, the configuration mode is Modbus RTU Slave mode, and the Slave ID defaults to 1.

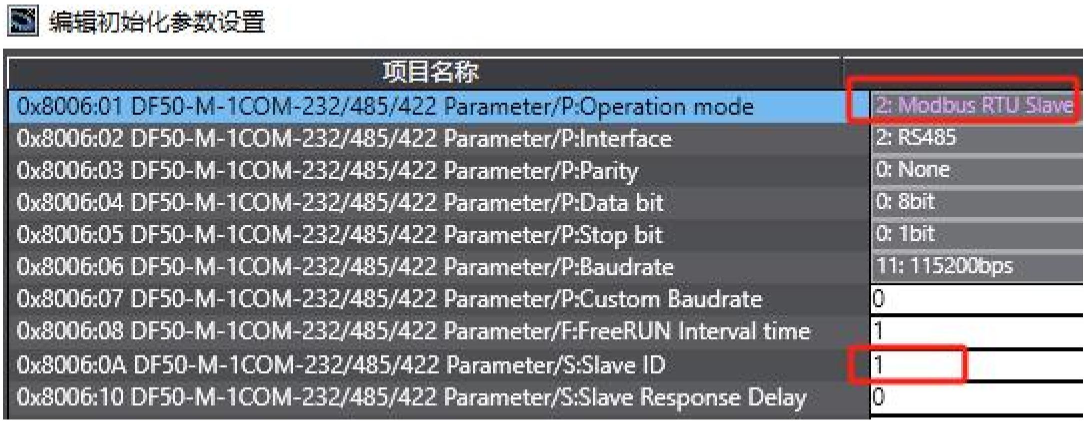


Figure 4-3-99

➢ Configure the process data as Slave RxPDO and Slave TxPDO in PDO mapping.

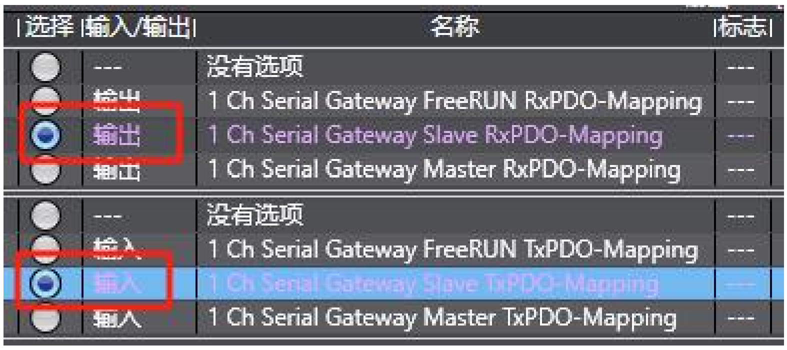


Figure 4-3-100

➢ Click Online to transfer the configuration information to the controller.

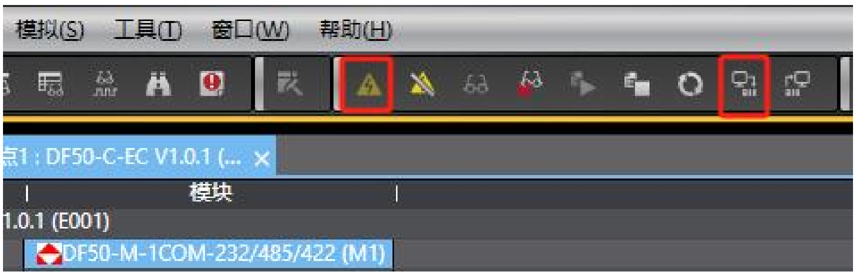


Figure 4-3-101

➢ The input and output data of Modbus RTU Slave mode are shown in the figure below.

DF50-M-1COM-232/485/422	
1 Ch Serial Gateway Slave R_CtrlWord_7002_01	1 Ch Serial Gateway Slave T_StateWord_6001_01
1 Ch Serial Gateway Slave R_SlaveCMD_7002_02	1 Ch Serial Gateway Slave T_Read Data Length (Bytes)_6001_02
1 Ch Serial Gateway Slave R_SlaveRegAddr_7002_03	1 Ch Serial Gateway Slave T_Reserve 1_6001_03
1 Ch Serial Gateway Slave R_SlaveRegNum_7002_04	1 Ch Serial Gateway Slave T_SlaveRegNum_6001_04
1 Ch Serial Gateway Slave R_Data Out 0_7002_05	1 Ch Serial Gateway Slave T_Data In 0_6001_05
1 Ch Serial Gateway Slave R_Data Out 1_7002_06	1 Ch Serial Gateway Slave T_Data In 1_6001_06
1 Ch Serial Gateway Slave R_Data Out 2_7002_07	1 Ch Serial Gateway Slave T_Data In 2_6001_07
1 Ch Serial Gateway Slave R_Data Out 3_7002_08	1 Ch Serial Gateway Slave T_Data In 3_6001_08
1 Ch Serial Gateway Slave R_Data Out 4_7002_09	1 Ch Serial Gateway Slave T_Data In 4_6001_09
1 Ch Serial Gateway Slave R_Data Out 5_7002_0A	1 Ch Serial Gateway Slave T_Data In 5_6001_0A
1 Ch Serial Gateway Slave R_Data Out 6_7002_0B	1 Ch Serial Gateway Slave T_Data In 6_6001_0B
1 Ch Serial Gateway Slave R_Data Out 7_7002_0C	1 Ch Serial Gateway Slave T_Data In 7_6001_0C
1 Ch Serial Gateway Slave R_Data Out 8_7002_0D	1 Ch Serial Gateway Slave T_Data In 8_6001_0D
1 Ch Serial Gateway Slave R_Data Out 9_7002_0E	1 Ch Serial Gateway Slave T_Data In 9_6001_0E
1 Ch Serial Gateway Slave R_Data Out 10_7002_0F	1 Ch Serial Gateway Slave T_Data In 10_6001_0F
1 Ch Serial Gateway Slave R_Data Out 11_7002_10	1 Ch Serial Gateway Slave T_Data In 11_6001_10
1 Ch Serial Gateway Slave R_Data Out 12_7002_11	1 Ch Serial Gateway Slave T_Data In 12_6001_11
1 Ch Serial Gateway Slave R_Data Out 13_7002_12	1 Ch Serial Gateway Slave T_Data In 13_6001_12
1 Ch Serial Gateway Slave R_Data Out 14_7002_13	1 Ch Serial Gateway Slave T_Data In 14_6001_13
1 Ch Serial Gateway Slave R_Data Out 15_7002_14	1 Ch Serial Gateway Slave T_Data In 15_6001_14
1 Ch Serial Gateway Slave R_Data Out 16_7002_15	1 Ch Serial Gateway Slave T_Data In 16_6001_15
1 Ch Serial Gateway Slave R_Data Out 17_7002_16	1 Ch Serial Gateway Slave T_Data In 17_6001_16
1 Ch Serial Gateway Slave R_Data Out 18_7002_17	1 Ch Serial Gateway Slave T_Data In 18_6001_17
1 Ch Serial Gateway Slave R_Data Out 19_7002_18	1 Ch Serial Gateway Slave T_Data In 19_6001_18

Figure 4-3-102

- Description of process data in Modbus RTU Slave mode.

Table 4.3.12Input and output data tables

Output Data		
name	**length**	**meaning**
CtrlWord	2byte	Control Word
SlaveCMD	1byte	Slave operation commands
SlaveRegAddr	1byte	Slave register address
SlaveRegNum	2byte	Number of slave registers
DataOut0-19	40byte	Send data area
Input Data		
name	**length**	**meaning**
StateWord	2byte	Status word
Read Data Length	1byte	Readback data length Byte
Reserve 1	1byte	reserve

SlaveRegNum	2byte	Readback register quantity
DataIn0-19	40byte	Receive data area

- When the module is used as a slave station, the data can be freely read and written by the RTU external master station. The number of input registers is 128, the number of holding registers is 128, the number of coils is 1024, and the number of discrete quantities is 1024. The read and write mode is controlled by SlaveCMD.
- Open the ModbusPoll software on the PC and create a new project.

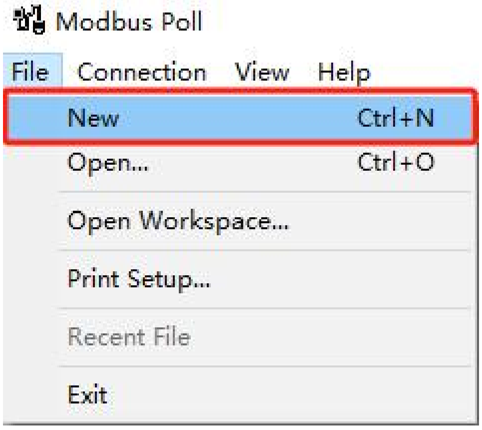


Figure 4-3-103

- Connect to the serial device.

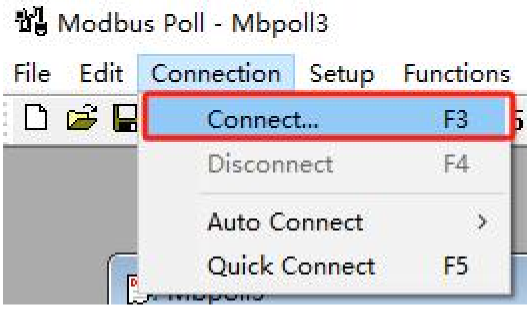


Figure 4-3-104

- As shown in the figure below, set the slave station parameters.

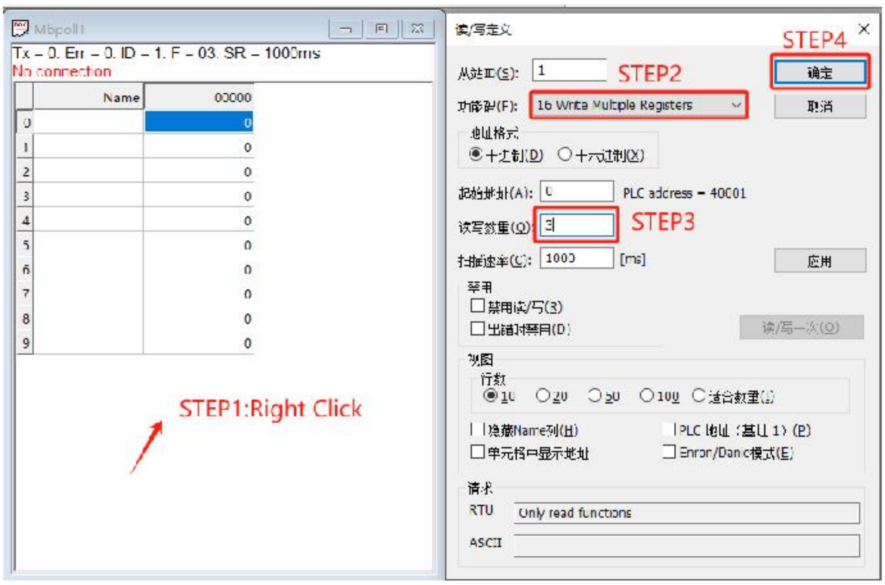


Figure 4-3-105

➢ Set the data that the PC writes to the card.

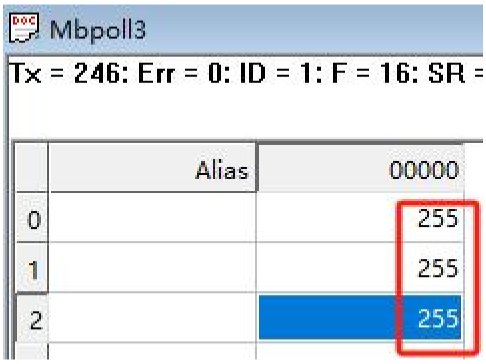
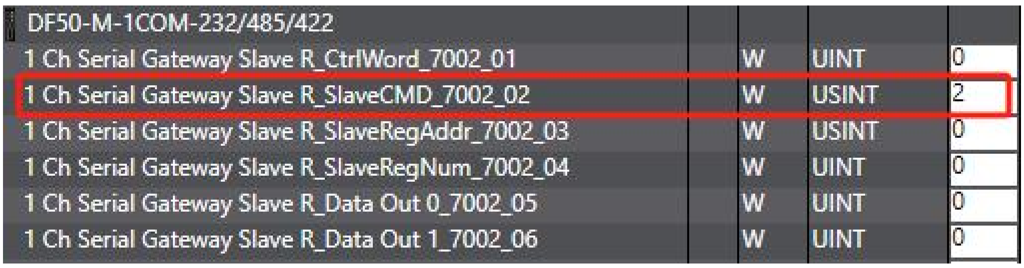


Figure 4-3-106

➢ SlaveCMD writes command 0x02.



➢ SlaveCMD command table.

Table 4.3.13SlaveCMD Command Table

SlaveCMD			
value	**name**	**length**	**meaning**
1	ReadCoils	1byte	Read coil value
2	ReadHoldReg	1byte	Read Holding Registers

3	WriteCoils	1byte	Write coil value
4	WriteDiscrete	1byte	Write discrete quantity
5	WriteHoldReg	1byte	Writing Holding Registers
6	WriteInReg	1byte	Write input register

➢ SlaveRegNum writes the number 3.

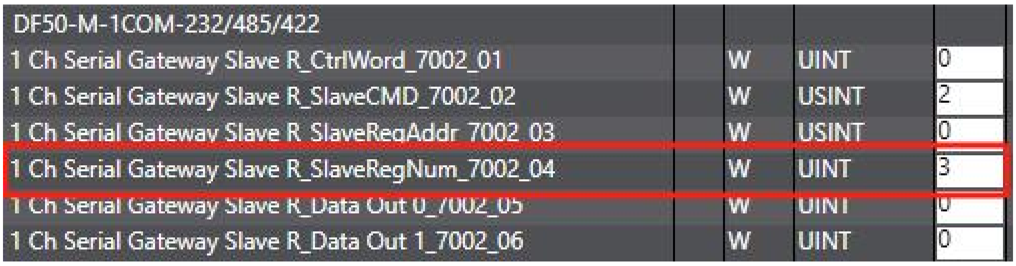


Figure 4-3-107

➢ Open the module to input data, the current data is consistent with the sent data.

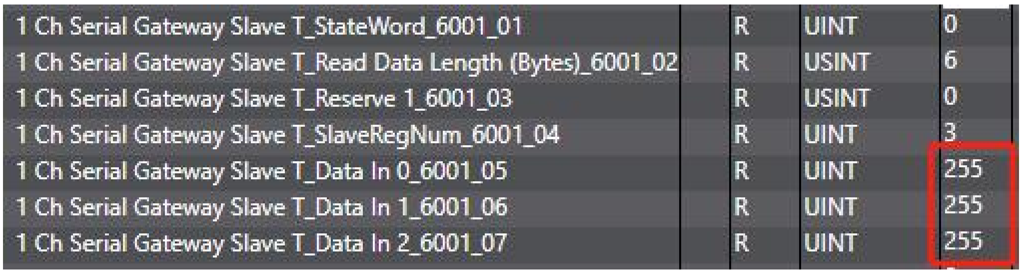


Figure 4-3-108

4.4 Application in SPiiPlus MMIApplication Studio 3.10 software environment

- As shown in Figure 4-4-1, first find the DF50-C-EC V1i0i2_R device description file provided by the manufacturer, copy it to the installation path C:\Users\User\AppData\Roaming\ACS Motion Control Ltd\SPiiPlus MMI Application Studio\3.10.0.0\Repository Data\EtherCAT folder, and then open SPiiPlus MMIApplication Studio 3.10.

Figure 4-4-1

4.4.1 Software Configuration

- Change the computer IP to the same network segment as the motion controller, the default network segment is 10.0.0.***.

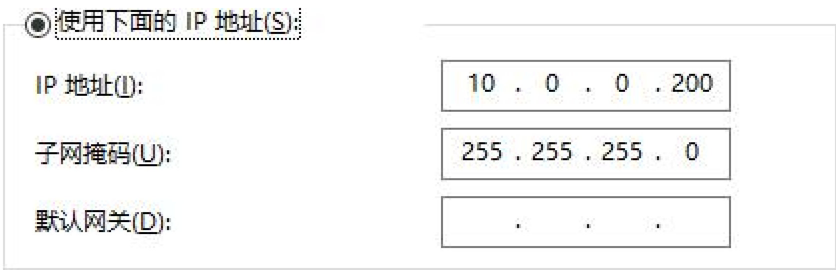


Figure 4-4-2

- Open the software and create a new workspace. Add a controller as shown in Figures 4-4-3 and 4-4-4.

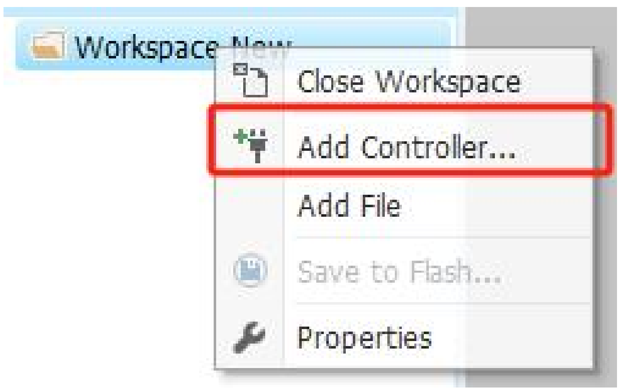


Figure 4-4-3

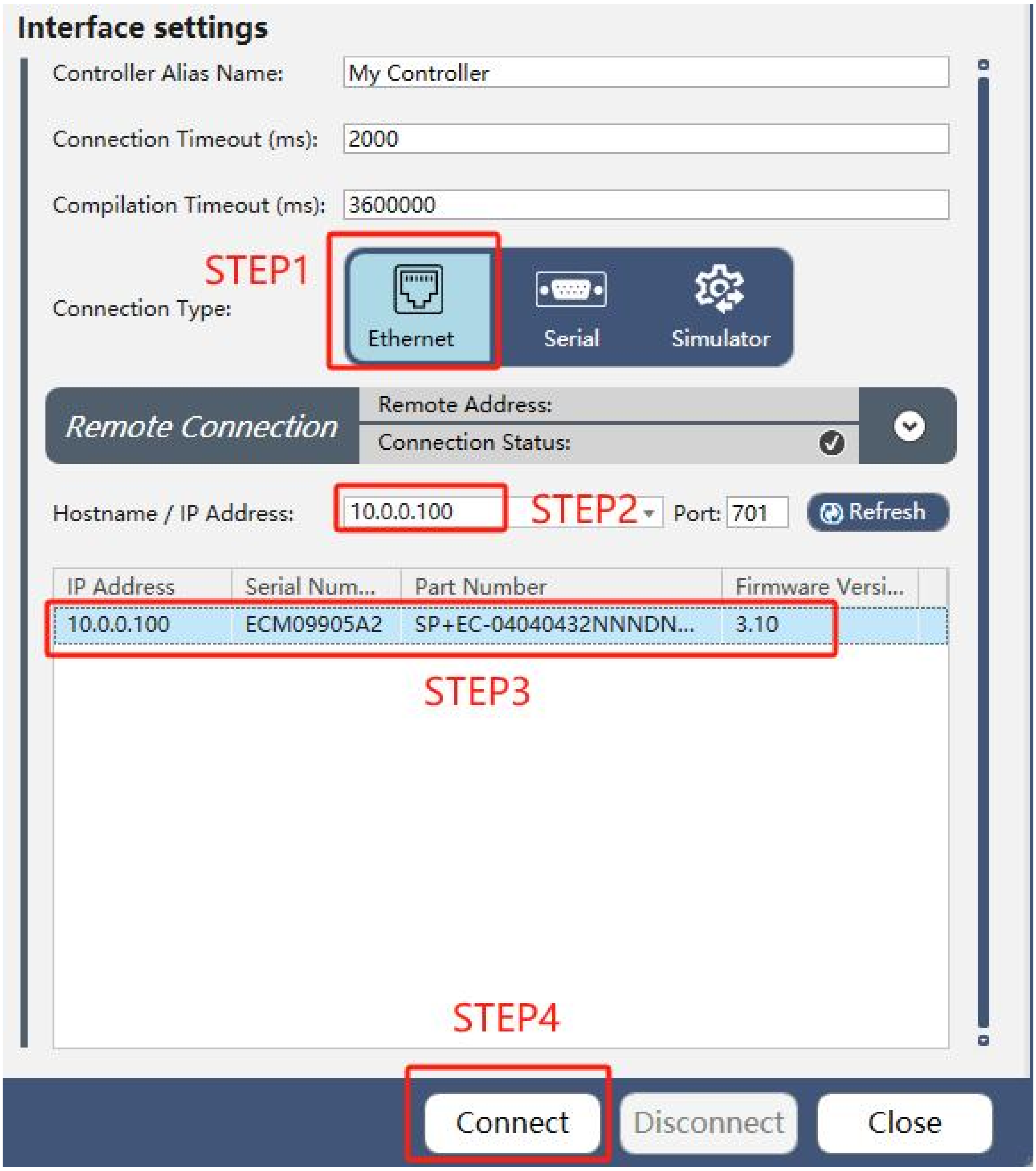


Figure 4-4-4

- Add system settings as shown in Figure 4-4-5, and click Execute to automatically configure the connected IO modules. The automatic configuration takes a long time, so you need to wait patiently. The configuration completion interface is shown in Figure 4-4-6.

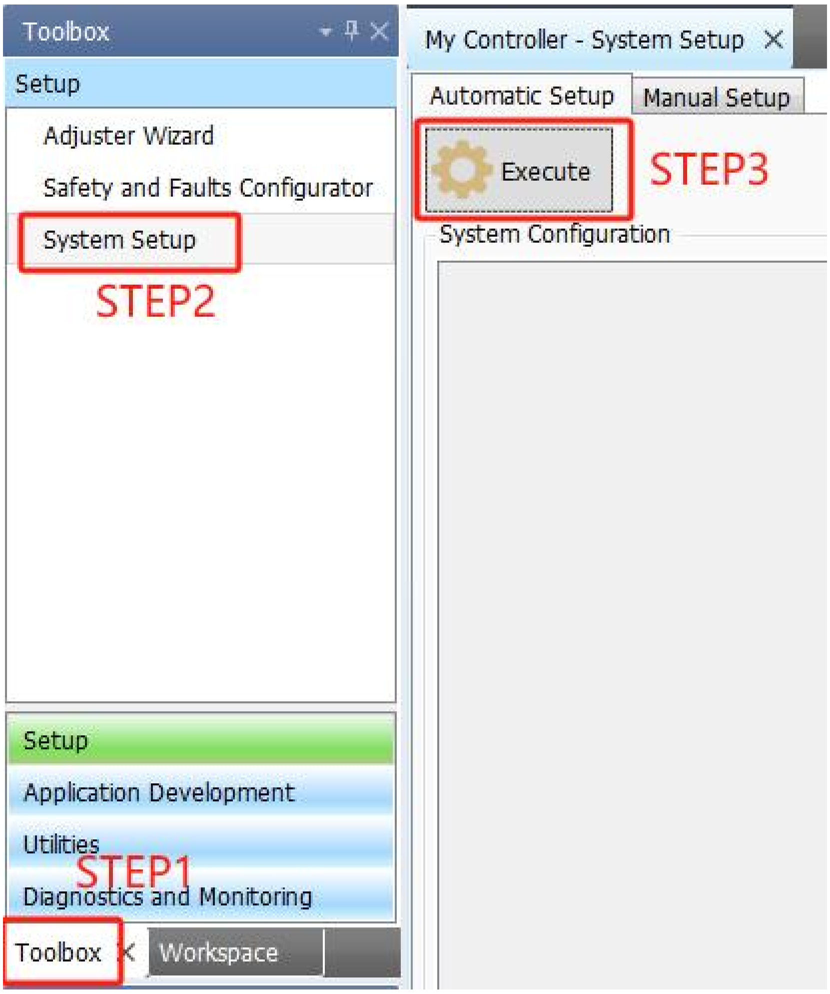

Toolbox
Setup
Adjuster Wizard
Safety and Faults Configurator
System Setup
STEP2
Setup
Application Development
Utilities
STEP1
Diagnostics and Monitoring
Toolbox
Workspace
My Controller - System Setup
Automatic Setup
Manual Setup
Execute
STEP3
System Configuration

Figure 4-4-5

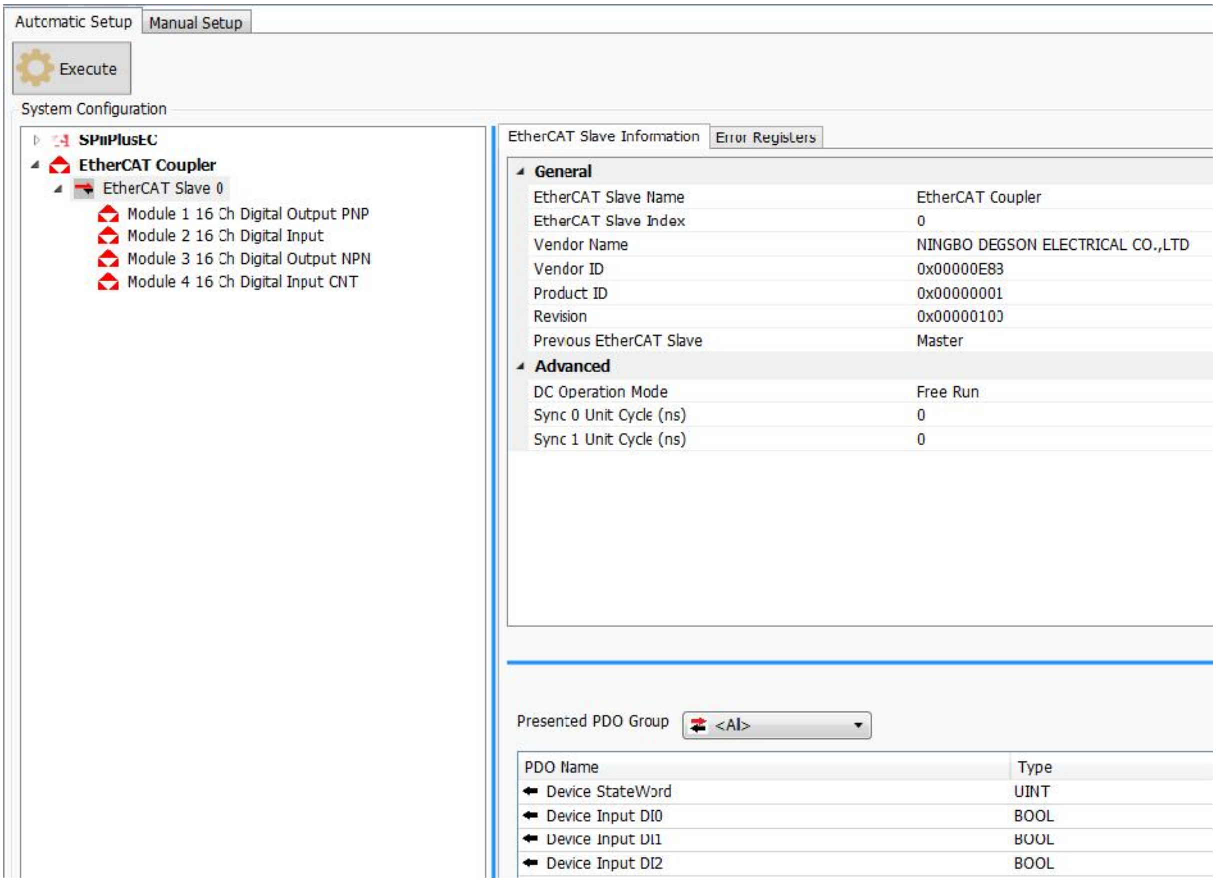
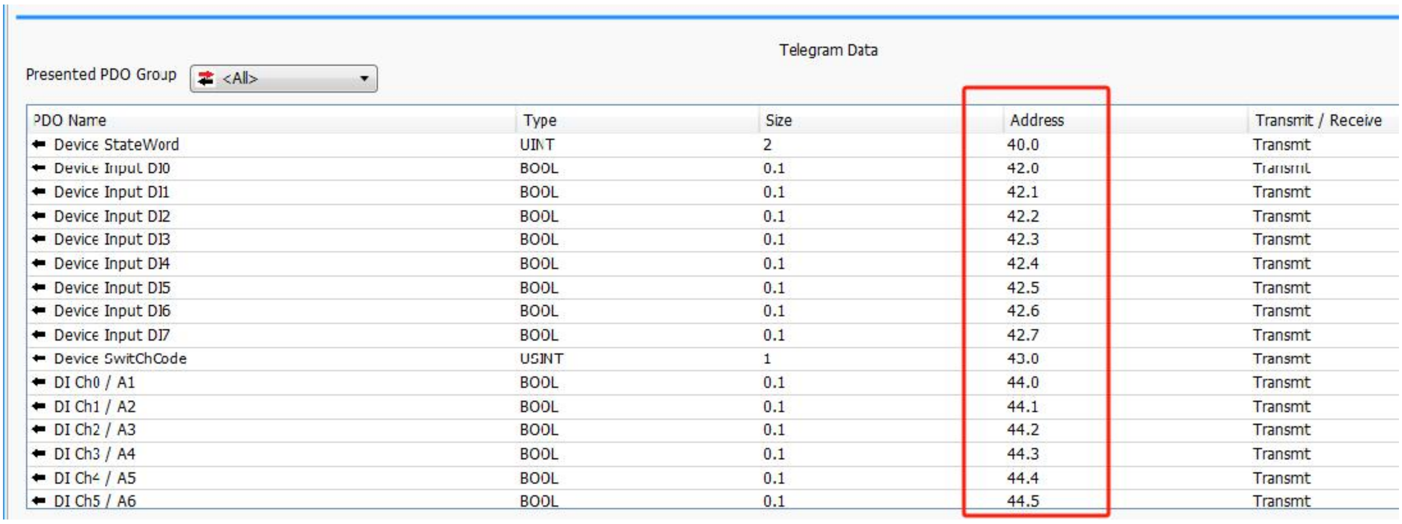


Figure 4-4-6

➢ As shown in the figure below, you can see the data address of each module.



PDO Name	Type	Size	Address	Transmit / Receive
Device StateWord	UINT	2	40.0	Transmit
Device Input DI0	BOOL	0.1	42.0	Transmit
Device Input DI1	BOOL	0.1	42.1	Transmit
Device Input DI2	BOOL	0.1	42.2	Transmit
Device Input DI3	BOOL	0.1	42.3	Transmit
Device Input DI4	BOOL	0.1	42.4	Transmit
Device Input DI5	BOOL	0.1	42.5	Transmit
Device Input DI6	BOOL	0.1	42.6	Transmit
Device Input DI7	BOOL	0.1	42.7	Transmit
Device SwitchCode	USINT	1	43.0	Transmit
DI Ch0 / A1	BOOL	0.1	44.0	Transmit
DI Ch1 / A2	BOOL	0.1	44.1	Transmit
DI Ch2 / A3	BOOL	0.1	44.2	Transmit
DI Ch3 / A4	BOOL	0.1	44.3	Transmit
DI Ch4 / A5	BOOL	0.1	44.4	Transmit
DI Ch5 / A6	BOOL	0.1	44.5	Transmit

Figure 4-4-7

➢ As shown in the following figure STEP3, double-click to add the program manager, and click the STEP4 folder icon to open the programming interface. You need to open Buffer 0 and D-Buffer. And select Buffer 0 as in STEP5.

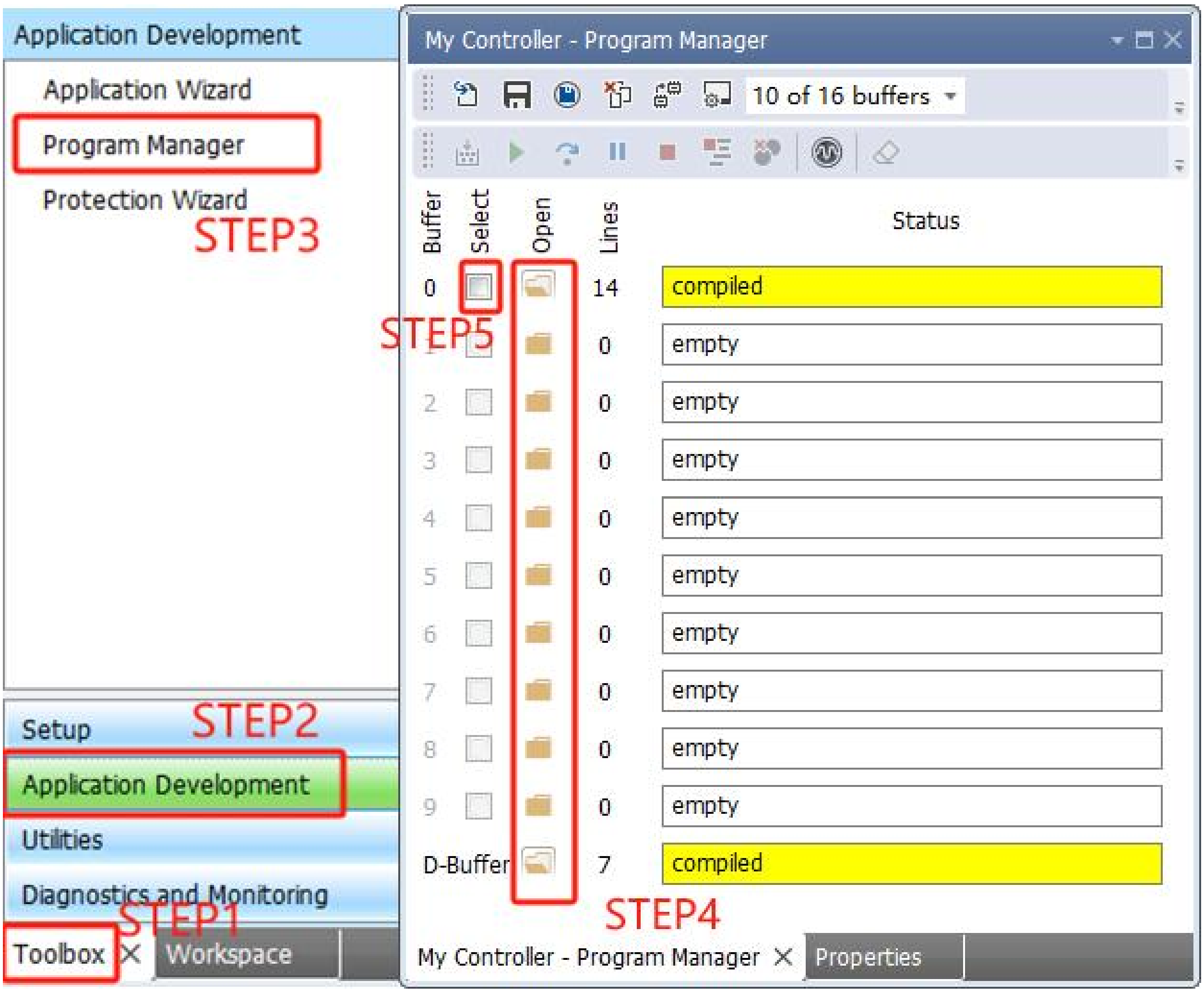

Application Development
Application Wizard
Program Manager
Protection Wizard
STEP3
Setup
STEP2
Application Development
Utilities
Diagnostics and Monitoring
STEP1
Toolbox
Workspace
My Controller - Program Manager
10 of 16 buffers
Buffer
Select
Open
Lines
Status
STEP5
0
14
compiled
1
0
empty
2
0
empty
3
0
empty
4
0
empty
5
0
empty
6
0
empty
7
0
empty
8
0
empty
9
0
empty
D-Buffer
7
compiled
STEP4
My Controller - Program Manager
Properties

Figure 4-4-8

➢ Add a variable manager as shown in the figure below. You can directly view or modify the variable data on this page.

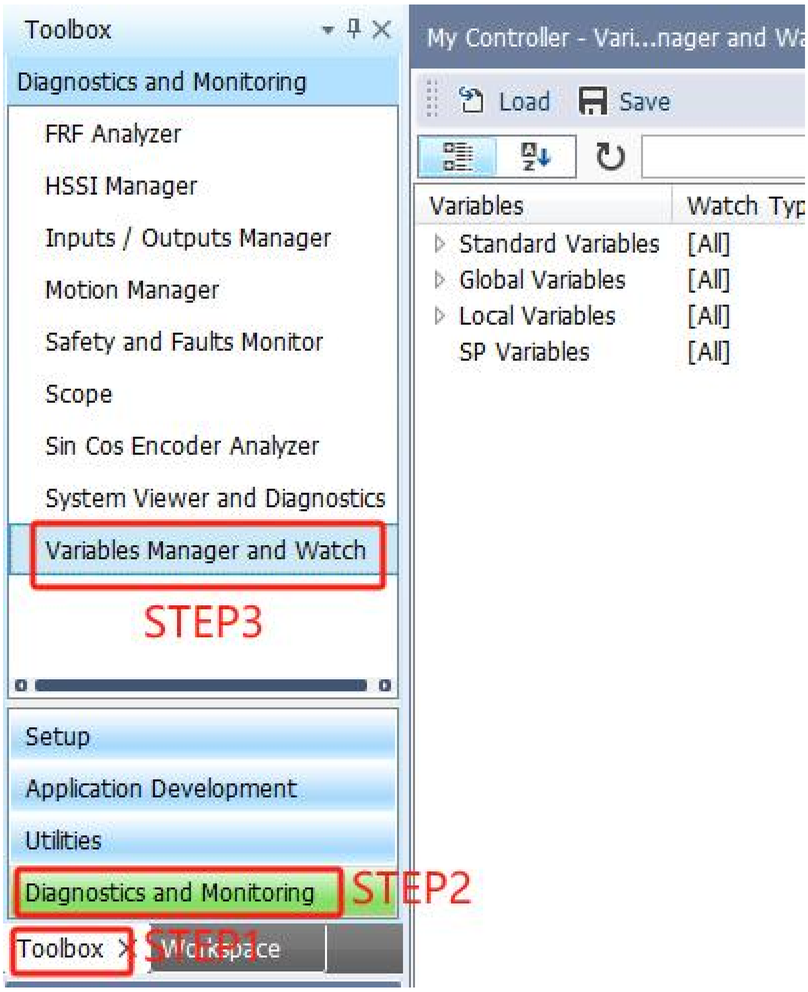


Figure 4-4-9

➢ After adding all the required tools, the workspace should look like the image below.

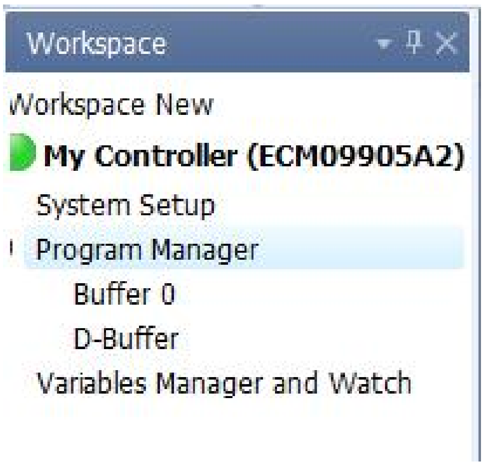


Figure 4-4-10

Module configuration data modification example

- Take the adapter DF50-C-EC as an example, please refer to its configuration parametersChapter 2, Section 1.4.
- Add a new variable "VALUE" in D-Buffer as shown in the figure below and click STEP3 to compile.

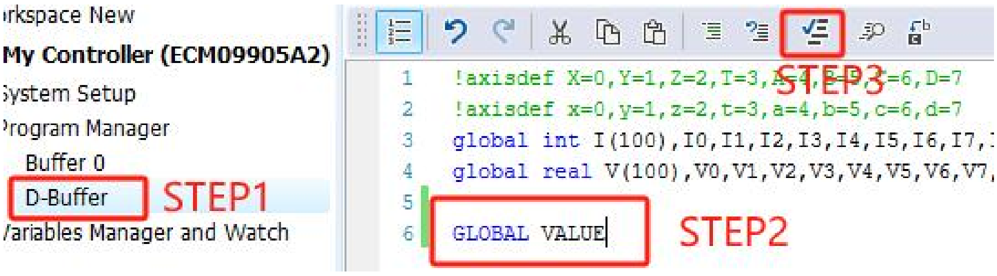


Figure 4-4-11

- Add the following STEP2 code in Buffer 0. The first line writes the configuration data, and the data is 1. The second line reads the configuration data.

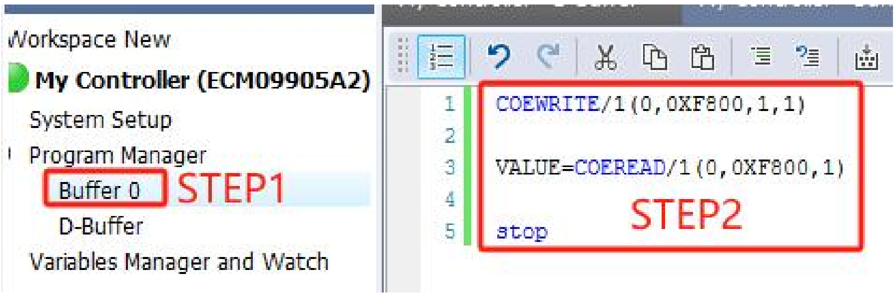


Figure 4-4-12

- Check the parameter changes of "VALUE" in the variable manager as shown in the figure below.Chapter 2, Section 1.4The value "0" indicates to keep the OP state, and "1" indicates to exit the OP state.

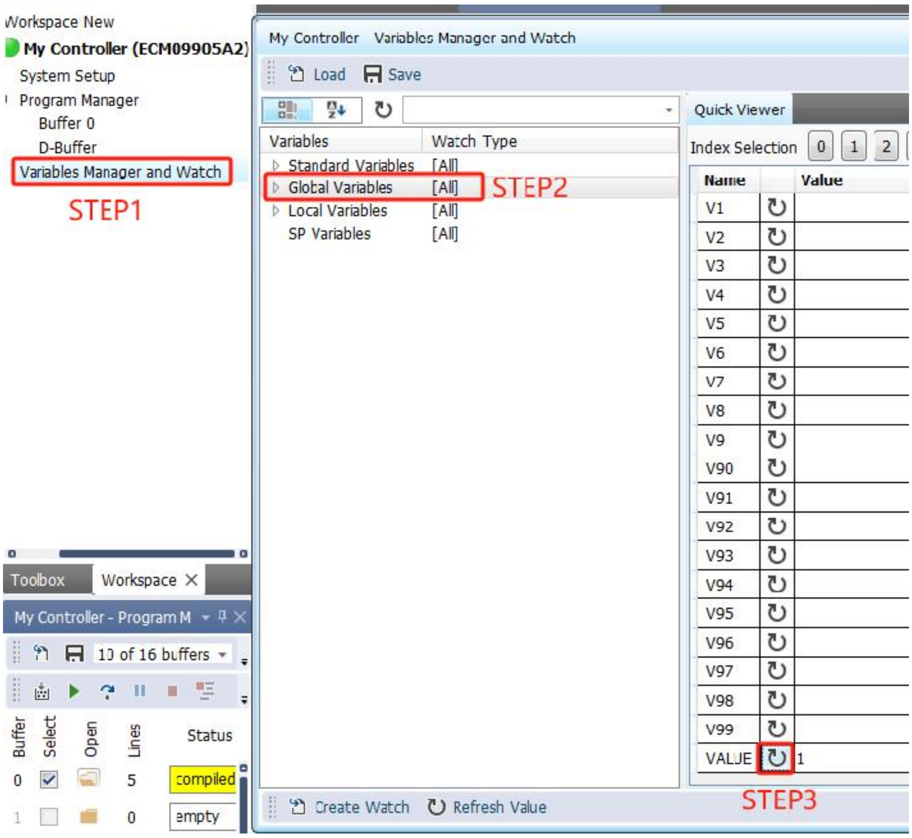


Figure 4-4-13

IO module data collection and output example

- Use DF50-M-16DI-P/N + DF50-M-16DO-P as an example.
- As shown in the figure below, add new variables "Q10" and "I10" in D-Buffer and click STEP3 to compile.

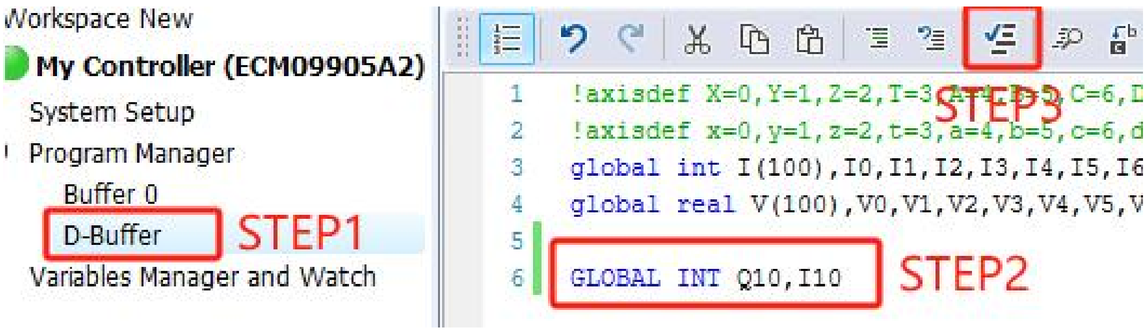


Figure 4-4-14

- Add the following STEP2 code in Buffer 0. After completion, click STEP3 and 4 to compile and run once.

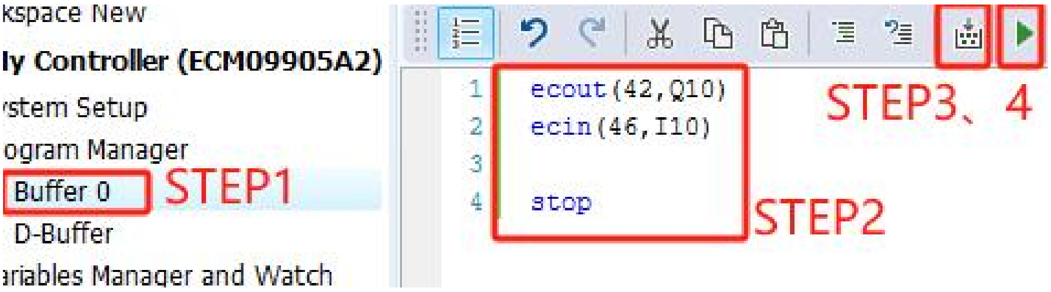

kspace New
ly Controller (ECM09905A2)
ystem Setup
ogram Manager
Buffer 0
STEP1
D-Buffer
ariables Manager and Watch
ecout(42,Q10)
ecin(46,I10)
stop
STEP2
STEP3、4

Figure 4-4-15

➢ As shown in the figure below, you can view or modify parameters in the variable manager. In STEP3, the value of I10 is "128", indicating that a valid signal is input into the module's A8 channel. After writing "1" to Q10 in STEP4, it indicates that a valid signal is output from the module's A1 channel.

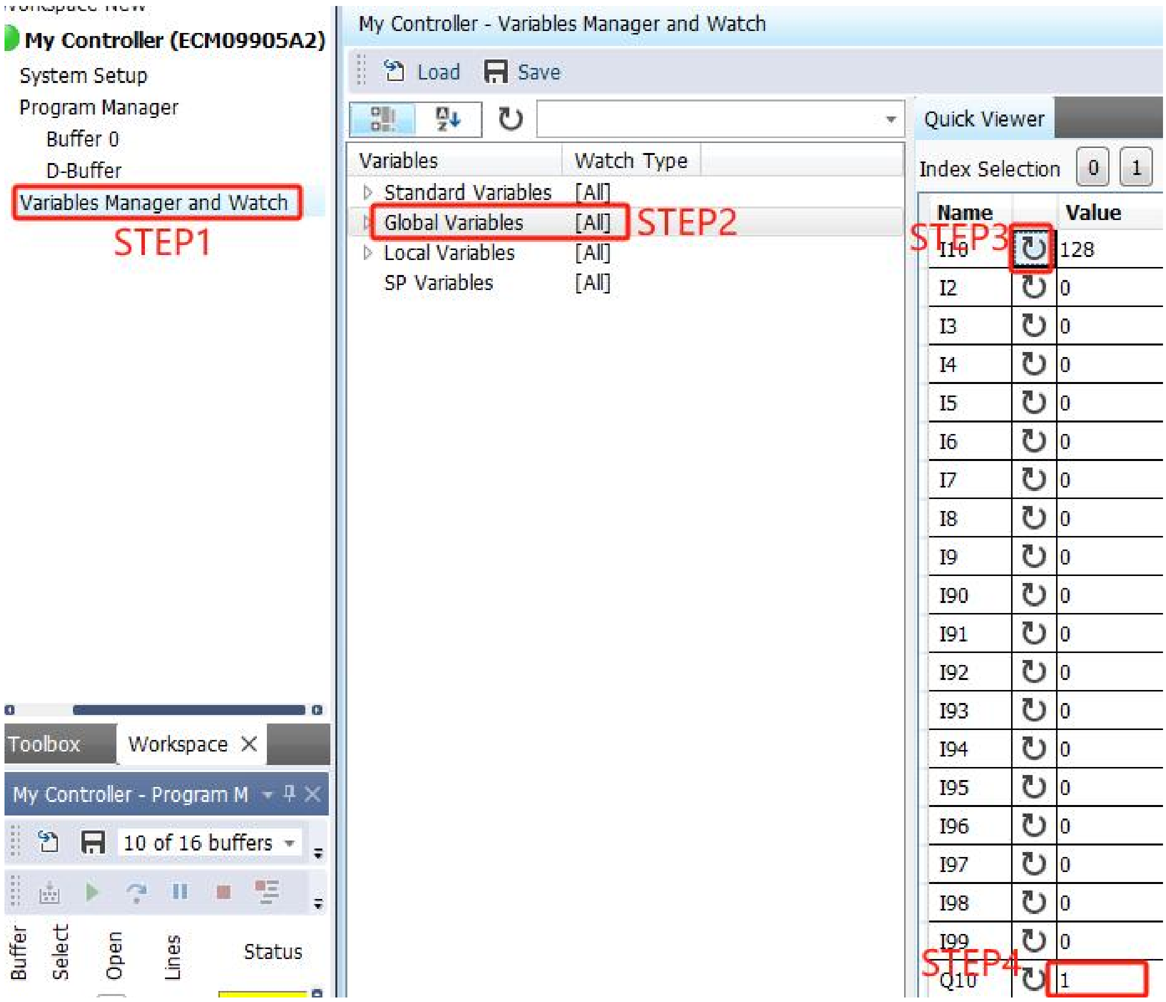


Figure 4-4-16

4.4.2 Adapter Usage Examples

➢ For the wiring diagram of the adapter, please refer toChapter 2 Section 1.2The example uses the DF50-C-EC + DF50-M-16DO-P + DF50-M-16DI-P/N + DF50-M-16DO-N + DF50-M-16DI-P/N-TS topology. After scanning the slave stations, the result is shown in Figure 4-4-17.

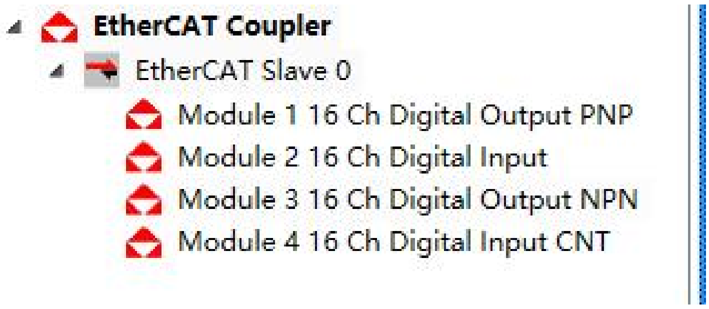


Figure 4-4-17

➢ As shown in the figure below, you can view the data type, length, and address of each channel of the module.

PDO Name	Type	Size	Address
Device StateWord	UINT	2	40.0
Device Input DI0	BOOL	0.1	42.0
Device Input DI1	BOOL	0.1	42.1
Device Input DI2	BOOL	0.1	42.2
Device Input DI3	BOOL	0.1	42.3
Device Input DI4	BOOL	0.1	42.4
Device Input DI5	BOOL	0.1	42.5
Device Input DI6	BOOL	0.1	42.6
Device Input DI7	BOOL	0.1	42.7
Device SwitChCode	USINT	1	43.0

Figure 4-4-18

➢ The meaning of adapter process data is shown in the following table.

Table 4.4.1

TXPDO			
Name	**Type**	**Size**	**meaning**
Device StateWord	UINT	2.0	Device status word, normally 0.
Device Input DI0	BIT	0.1	DI0 input is set to 1 if valid and 0 if invalid.
Device Input DI1	BIT	0.1	DI1 input is set to 1 if valid, and to 0 if invalid.
Device Input DI2	BIT	0.1	DI2 input is set to 1 if valid and 0 if invalid.
Device Input DI3	BIT	0.1	DI3 input is set to 1 if valid, and 0 if invalid.
Device Input DI4	BIT	0.1	DI4 input is set to 1 if valid and 0 if invalid.
Device Input DI5	BIT	0.1	DI5 input is set to 1 if valid and 0 if invalid.

Device Input DI6	BIT	0.1	DI6 input is set to 1 if valid and 0 if invalid.
Device Input DI7	BIT	0.1	DI7 input is set to 1 if valid and 0 if invalid.
Device SwitchCode	USINT	1.0	8-bit DIP switch value.
RXPDO			
Device CtrlWord	UINT	2.0	Device control word.

Device StateWord meaning

➢ As shown in Figures 4-4-19 and 4-4-20, when the value of "Device CtrlWord" is 0x0000 by default, the feedback value of "Device StateWord" is 0x01e8 (488), indicating that an error occurs in the first module after the coupler. Similarly, when an error occurs in the second module, the value of "Device StateWord" is 0x02e8 (744). When all modules are working normally, the value is 0. If you need to clear the error, write "0x0001" to Device CtrlWord to clear the error, and then write it back to 0x0000.

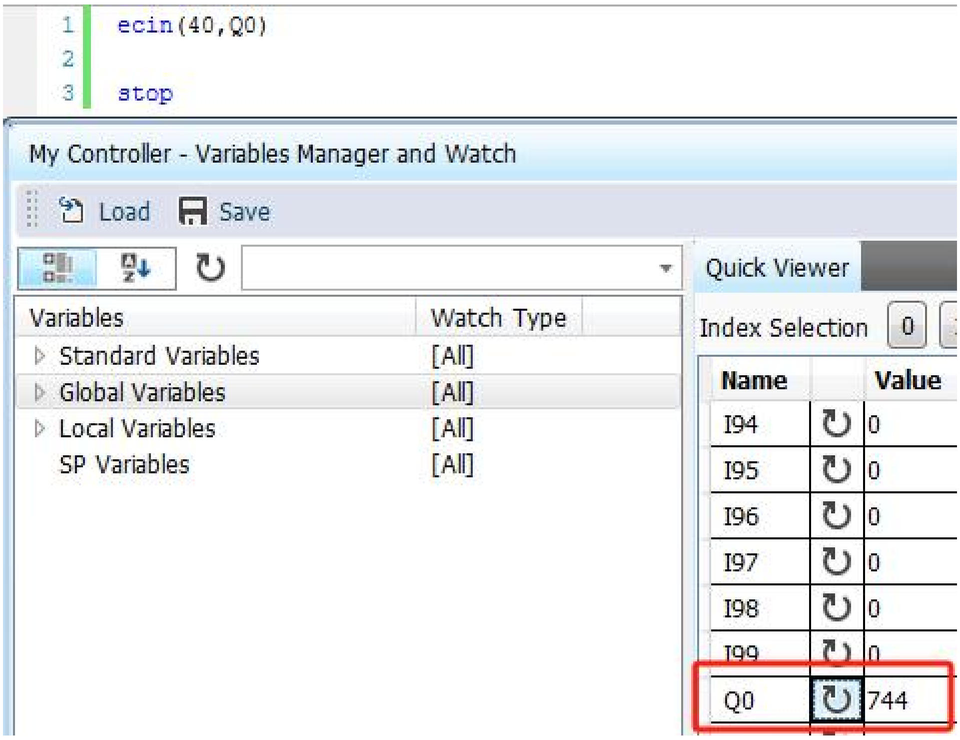


Figure 4-4-19

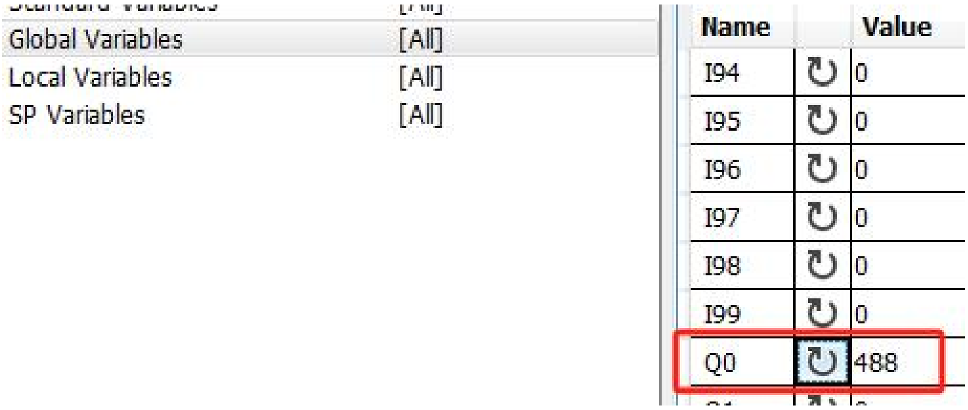


Figure 4-4-20

- The Device CtrlWord commands are shown in Table 4.4.2.

Table 4.4.2

Device CtrlWord	Device StateWord
0x0000	Display fault code
0x0001	Clearing fault codes
0x0002	Coupler software version number

- When the module has fault information and Device CtrlWord is 0x0000, the upper 8 bits of Device StateWord indicate the module position, and the lower 8 bits indicate the module fault code. The meaning of the fault code is shown in the table below.

Table 4.4.3

Fault Codes	Fault Description	Troubleshooting methods
0XE1	Module power supply abnormality	Check the power cord connection
0XE2	Analog module calibration abnormality	Contact Supplier
0XE3	Module internal initialization exception	Contact Supplier
0XE8	Module offline	Reseat the module

Module error adapter bus status configuration

- For adapter configurable parameters and indexes, please refer toChapter 2, Section 1.4When the module loses data in communication with the adapter and reports an error, you can set the adapter bus to remain in OP state (0) or exit OP state (1). The default is to remain in OP state. Change to exit OP state as shown in the figure below.

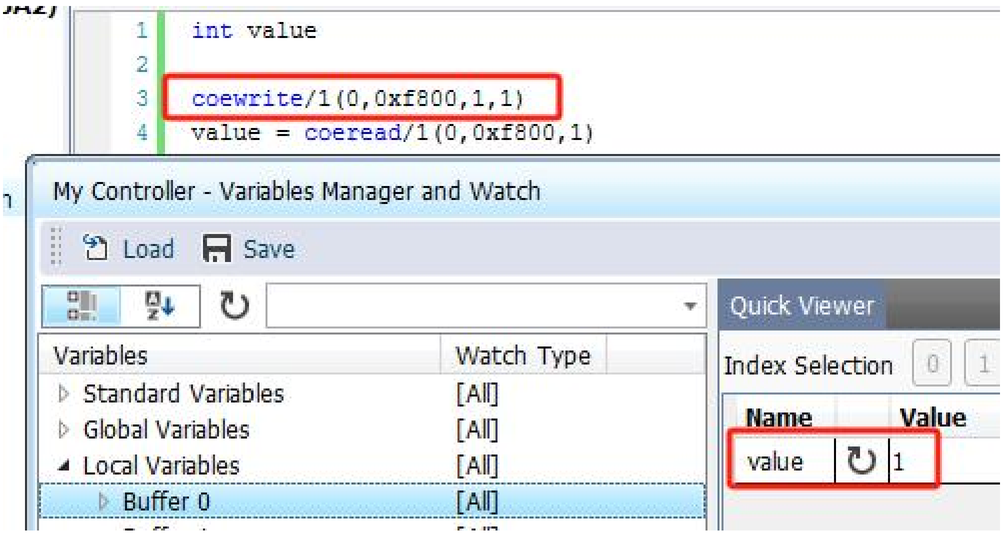


Figure 4-4-twenty one

4.4.3 Digital Module Usage Example

➢ This example uses the DF50-C-EC + DF50-M-16DO-P + DF50-M-16DO-N + DF50-M-16DI-P/N + DF50-M-16DI-P/N-TS topology. After scanning the slave stations, the result is as shown in Figure 4-4-22.

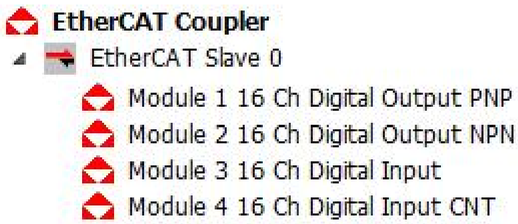


Figure 4-4-twenty two

DF50-M-16DO-P digital output module

➢ Please refer to the module wiring diagramChapter 3, Section 3.2For configuration data index, please refer toChapter 3, Section 3.3When the EC bus exits the OP state, this type of module can set the module's output state, which can be set to: all outputs off (0), use alternative value output (1), keep the last value (2). Set to keep the last value as shown in the figure below.

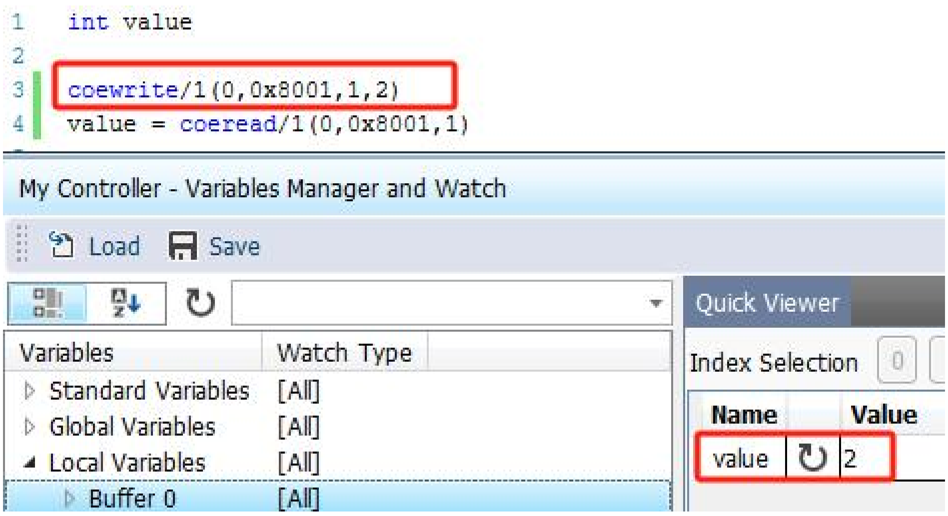


Figure 4-4-twenty three

➢ When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.

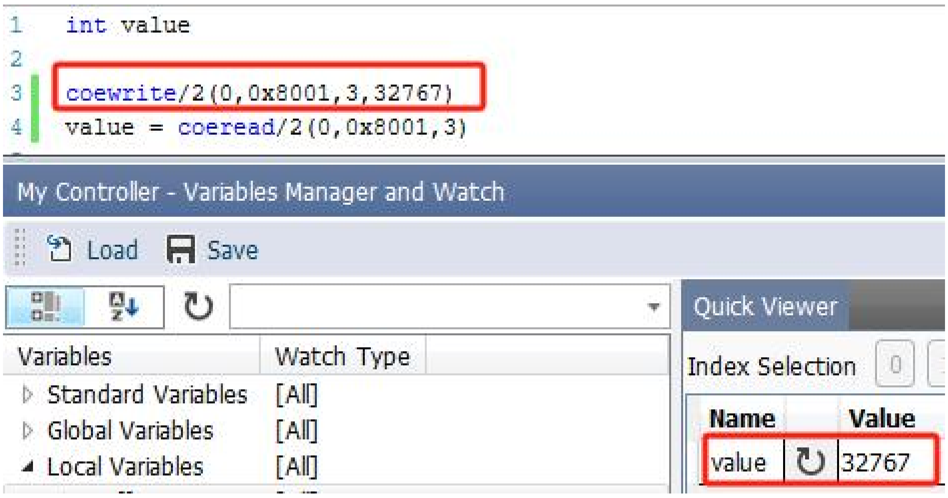


Figure 4-4-twenty four

➢ The data address is shown in the figure below.

PDO Name	Type	Size	Address
DO Ch0	BOOL	0.1	42.0
DO Ch1	BOOL	0.1	42.1
DO Ch2	BOOL	0.1	42.2
DO Ch3	BOOL	0.1	42.3
DO Ch4	BOOL	0.1	42.4
DO Ch5	BOOL	0.1	42.5
DO Ch6	BOOL	0.1	42.6
DO Ch7	BOOL	0.1	42.7
DO Ch8	BOOL	0.1	43.0
DO Ch9	BOOL	0.1	43.1
DO Ch10	BOOL	0.1	43.2
DO Ch11	BOOL	0.1	43.3
DO Ch12	BOOL	0.1	43.4
DO Ch13	BOOL	0.1	43.5
DO Ch14	BOOL	0.1	43.6
DO Ch15	BOOL	0.1	43.7

Figure 4-4-25

➢ As shown in the figure below, all channels can output valid signals. Changing the Q1 value can modify the output of CH0~CH7, and changing the Q2 value can modify the output of CH8~CH15.

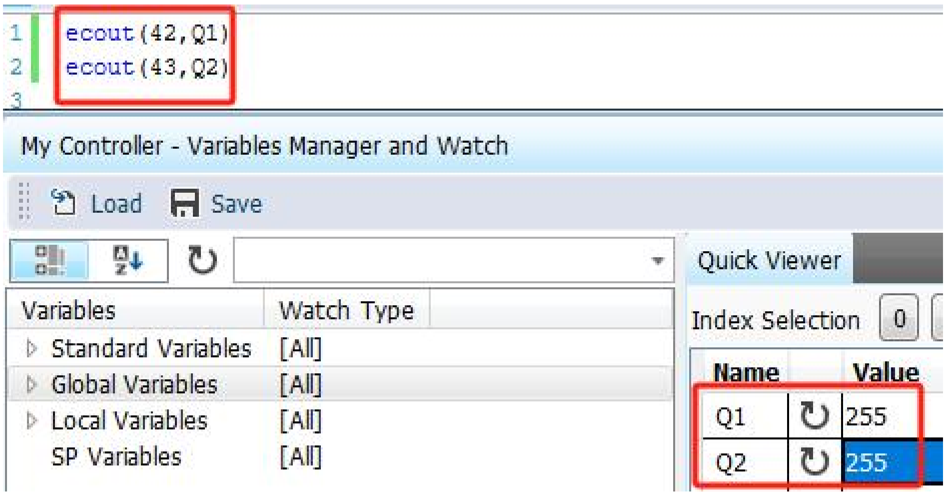

ecout(42,Q1)
ecout(43,Q2)
My Controller - Variables Manager and Watch
Load
Save
Quick Viewer
Variables
Watch Type
Standard Variables
[All]
Global Variables
[All]
Local Variables
[All]
SP Variables
[All]
Index Selection
0
Name
Value
Q1
255
Q2
255

Figure 4-4-26

- DF50-M-16DO-N digital output module
- Please refer to the module wiring diagram[Chapter 3 Section 4.2](#)For configuration data index, please refer to[Chapter 3 Section 4.3](#)When the EC bus exits the OP state, this type of module can set the module's output state, which can be set to: all outputs off (0), use alternative value output (1), keep the last value (2). Set to keep the last value as shown in the figure below.

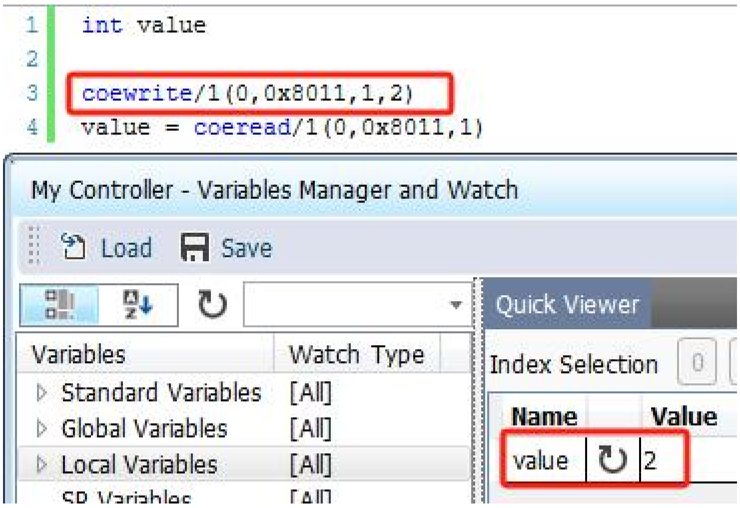


Figure 4-4-27

- When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value setting method is shown in the figure below.

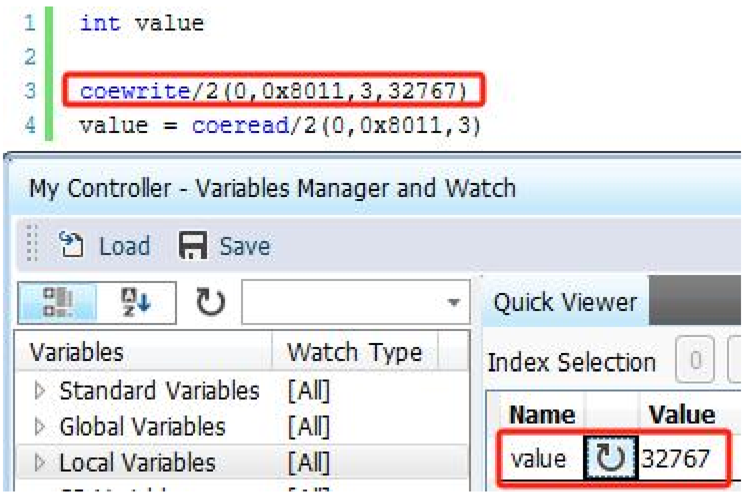


Figure 4-4-28

➢ The data address is shown in the figure below.

PDO Name	Type	Size	Address
DO Ch0	BOOL	0.1	44.0
DO Ch1	BOOL	0.1	44.1
DO Ch2	BOOL	0.1	44.2
DO Ch3	BOOL	0.1	44.3
DO Ch4	BOOL	0.1	44.4
DO Ch5	BOOL	0.1	44.5
DO Ch6	BOOL	0.1	44.6
DO Ch7	BOOL	0.1	44.7
DO Ch8	BOOL	0.1	45.0
DO Ch9	BOOL	0.1	45.1
DO Ch10	BOOL	0.1	45.2
DO Ch11	BOOL	0.1	45.3
DO Ch12	BOOL	0.1	45.4
DO Ch13	BOOL	0.1	45.5
DO Ch14	BOOL	0.1	45.6
DO Ch15	BOOL	0.1	45.7

Figure 4-4-29

➢ As shown in the figure below, all channels can output valid signals. Changing the Q1 value can modify the output of CH0~CH7, and changing the Q2 value can modify the output of CH8~CH15.

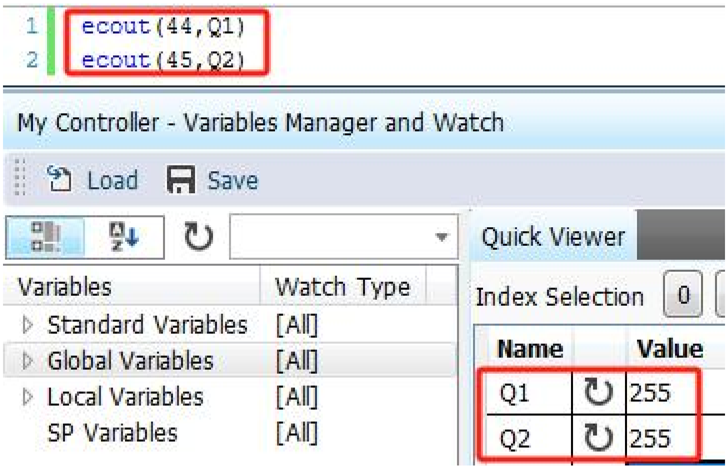
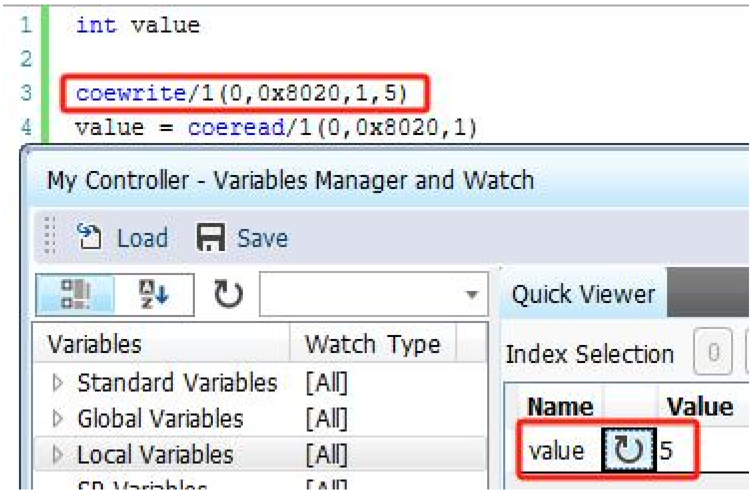


Figure 4-4-30

- DF50-M-16DI-P/N digital input module
- Please refer to the wiring diagramChapter 3, Section 1.2For configuration data index, please refer toChapter 3, Section 1.3This type of module can be configured for input filtering, the configurable range is 0~255ms, the default is 3ms. As shown in the figure below, it is configured to 5ms.



- The data address is shown in the figure below.

PDO Name	Type	Size	Address
DI Ch0 / A1	BOOL	0.1	44.0
DI Ch1 / A2	BOOL	0.1	44.1
DI Ch2 / A3	BOOL	0.1	44.2
DI Ch3 / A4	BOOL	0.1	44.3
DI Ch4 / A5	BOOL	0.1	44.4
DI Ch5 / A6	BOOL	0.1	44.5
DI Ch6 / A7	BOOL	0.1	44.6
DI Ch7 / A8	BOOL	0.1	44.7
DI Ch8 / B1	BOOL	0.1	45.0
DI Ch9 / B2	BOOL	0.1	45.1
DI Ch10 / B3	BOOL	0.1	45.2
DI Ch11 / B4	BOOL	0.1	45.3
DI Ch12 / B5	BOOL	0.1	45.4
DI Ch13 / B6	BOOL	0.1	45.5
DI Ch14 / B7	BOOL	0.1	45.6
DI Ch15 / B8	BOOL	0.1	45.7
DI WORD VALUE	WORD	2	46.0

Figure 4-4-31

➢ As shown in the figure below, a valid signal is input to the B8 channel.

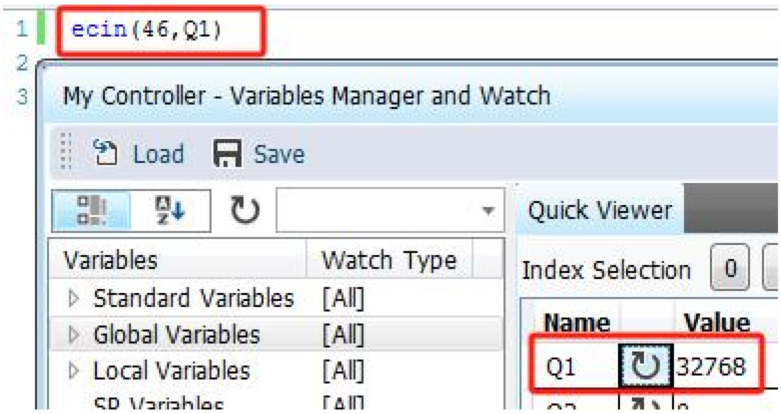


Figure 4-4-32

DF50-M-16DI-P/N-TS digital input with counting module

➢ Please refer to the module wiring diagramChapter 3, Section 2.2For configuration data index, please refer toChapter 3, Section 2.3The filter parameters of each channel can be configured in the range of 0~255ms, and the default is 3ms. As shown in the figure below, configure CH0 to 5ms.

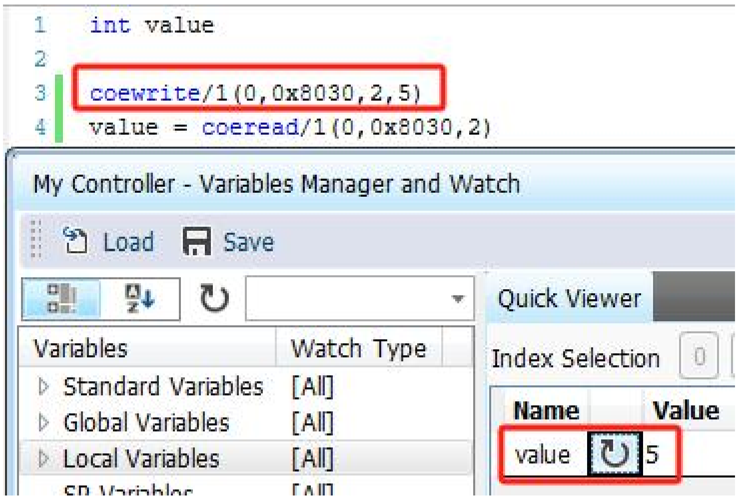


Figure 4-4-33

➢ For counting mode configuration index, please refer toChapter 3, Section 2.3, the configurable parameters are: rising edge count (0), falling edge count (1), both rising and falling edge count (2), the default is rising edge count. As shown in the figure below, configure CH0 to double edge count mode.

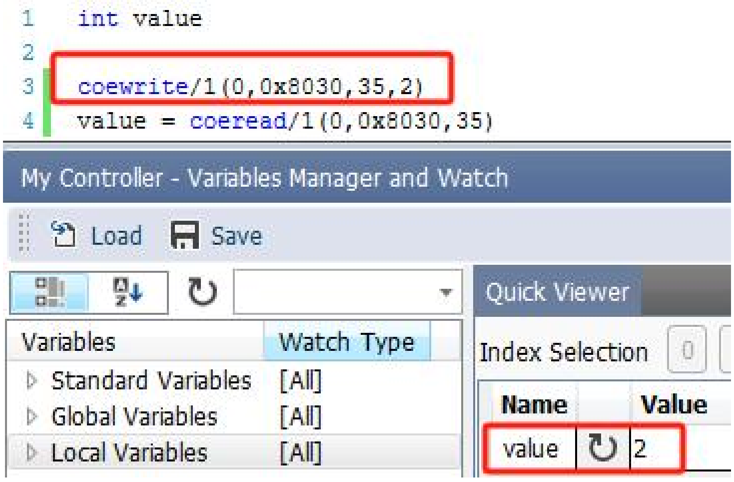


Figure 4-4-34

➢ The data address is shown in the figure below.

PDO Name	Type	Size	Address
DI Ch0 / A1	BOOL	0.1	48.0
DI Ch1 / A2	BOOL	0.1	48.1
DI Ch2 / A3	BOOL	0.1	48.2
DI Ch3 / A4	BOOL	0.1	48.3
DI Ch4 / A5	BOOL	0.1	48.4
DI Ch5 / A6	BOOL	0.1	48.5
DI Ch6 / A7	BOOL	0.1	48.6
DI Ch7 / A8	BOOL	0.1	48.7
DI Ch8 / B1	BOOL	0.1	49.0
DI Ch9 / B2	BOOL	0.1	49.1
DI Ch10 / B3	BOOL	0.1	49.2
DI Ch11 / B4	BOOL	0.1	49.3
DI Ch12 / B5	BOOL	0.1	49.4
DI Ch13 / B6	BOOL	0.1	49.5
DI Ch14 / B7	BOOL	0.1	49.6
DI Ch15 / B8	BOOL	0.1	49.7
DI WORD VALUE	UINT	2	50.0
DI Ch1 / A2 Count	UDINT	4	56.0
DI Ch2 / A3 Count	UDINT	4	60.0
DI Ch3 / A4 Count	UDINT	4	64.0
DI Ch4 / A5 Count	UDINT	4	68.0
DI Ch5 / A6 Count	UDINT	4	72.0
DI Ch6 / A7 Count	UDINT	4	76.0
DI Ch7 / A8 Count	UDINT	4	80.0
DI Ch8 / B1 Count	UDINT	4	84.0
DI Ch9 / B2 Count	UDINT	4	88.0
DI Ch10 / B3 Count	UDINT	4	92.0
DI Ch11 / B4 Count	UDINT	4	96.0
DI Ch12 / B5 Count	UDINT	4	100.0
DI Ch13 / B6 Count	UDINT	4	104.0
DI Ch14 / B7 Count	UDINT	4	108.0
DI Ch15 / B8 Count	UDINT	4	112.0
DI Ch0 Clear bit	BOOL	0.1	46.0
DI Ch1 Clear bit	BOOL	0.1	46.1

Figure 4-4-35

➢ For process data definition, please refer to Chapter 3, Section 2.4 When a valid signal is input to the module, the corresponding channel value becomes "1", and the corresponding channel count value +1. As shown in the figure below, when a valid signal is input to CH0/A1, the current value becomes "1", and the CH0/A1 Count value +1.

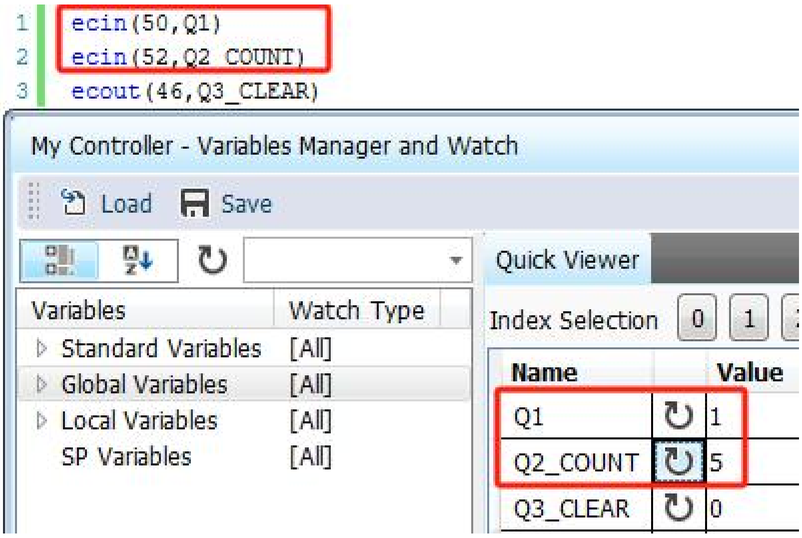


Figure 4-4-36

➢ As shown in the figure below, writing a value of "1" to the Clear bit of the corresponding channel can clear the count value of the corresponding channel in the input data.

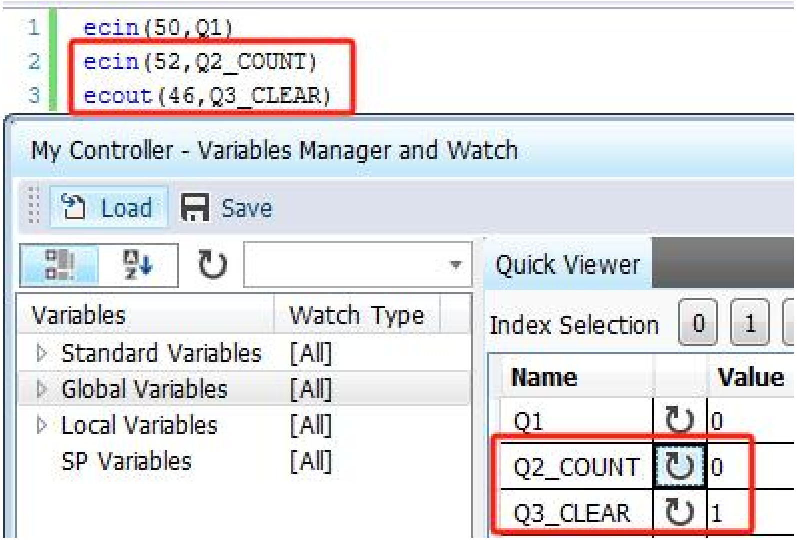


Figure 4-4-37

4.4.4 Analog module usage routine

- This example uses the topology of DF50-C-EC + DF50-M-8AO-U-4 + DF50-M-8AO-I-5 + DF50-M-4AO-UI-6 + DF50-M-8AI-U-4 + DF50-M-8AI-I-5 + DF50-M-4AI-UI-6. After scanning the slave stations, the result is as shown in Figure 4-3-23.

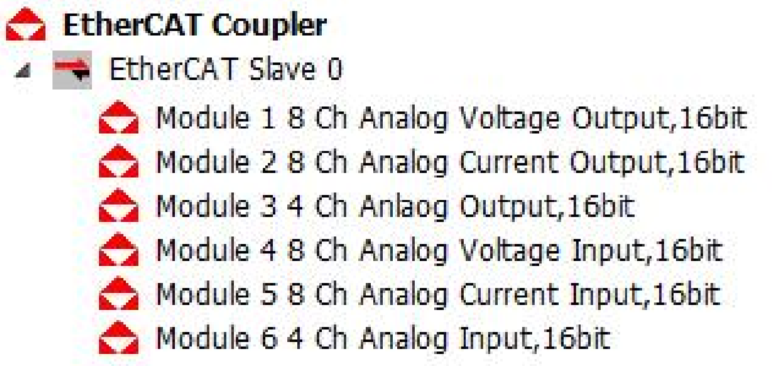


Figure 4-4-38

DF50-M-8AO-U-4 voltage output module

- Module wiring diagram seeChapter 3, Section 9.2For configuration data index, please refer toChapter 3, Section 9.3When the EC bus exits the OP state, this type of module can set the module's output state. The parameters that can be set are: all outputs off (0), enable alternative value output (1), and keep the last value (2). As shown in the figure below, change to the keep last value mode.

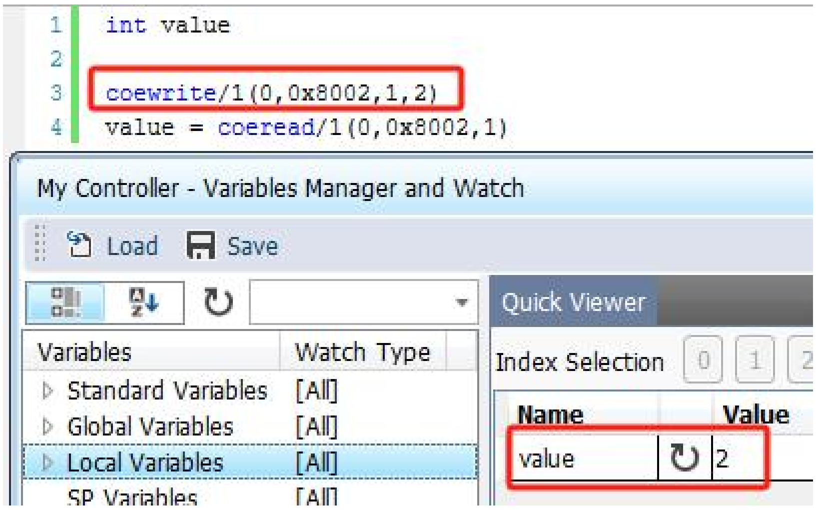


Figure 4-4-39

- When the EC bus exits the OP state, if the output state is set to substitute value output, as shown in the figure below, the CH0 output substitute value is set to "27648".

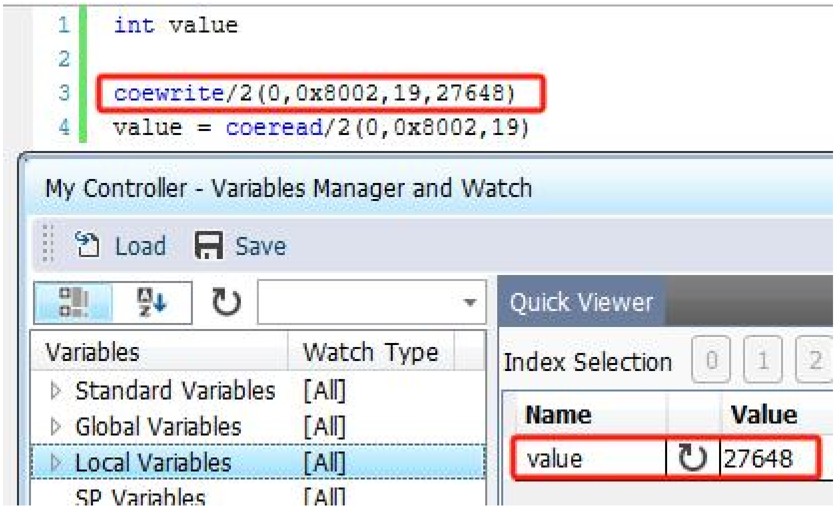


Figure 4-4-40

➢ This module can set the output signal range of each channel. As shown in the figure below, the output signal range of CH0 is set to 0~10V.Note that the default signal range is Disable. You must select a signal range when adding a module..

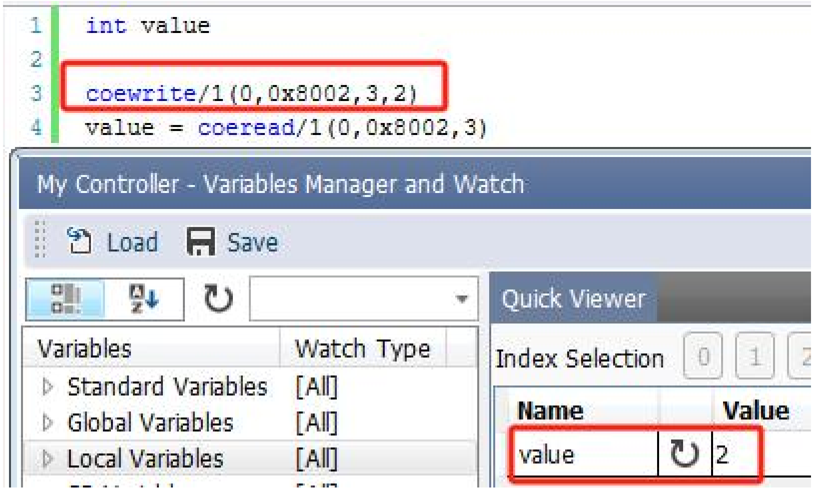


Figure 4-4-41

➢ The data address is shown in the figure below.

PDO Name	Type	Size	Address
Ch0: Value	INT	2	42.0
Ch1: Value	INT	2	44.0
Ch2: Value	INT	2	46.0
Ch3: Value	INT	2	48.0
Ch4: Value	INT	2	50.0
Ch5: Value	INT	2	52.0
Ch6: Value	INT	2	54.0
Ch7: Value	INT	2	56.0

Figure 4-4-42

➢ After setting the output signal range of channel 0 to 0~10V. As shown in the figure below, "32767" is written to channel 0, and the multimeter can measure that the output voltage of this channel is 10V.Chapter 3, Section 9.4.

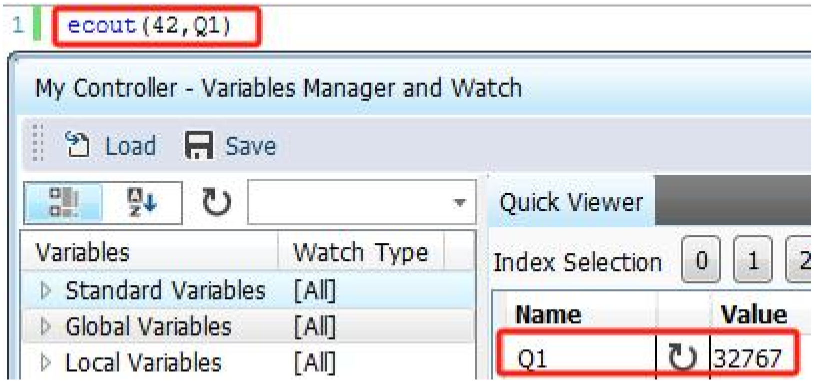


Figure 4-4-43

DF50-M-8AO-I-5 Current Output Module

➢ Module wiring diagram seeChapter 3, Section 10.2For configuration data index, please refer toChapter 3 Section 10.3When the EC bus exits the OP state, this type of module can set the module's output state. The parameters that can be set are: all outputs off (0), enable substitute value output (1), and keep the last value (2). The following figure shows how to set the output to keep the last value.

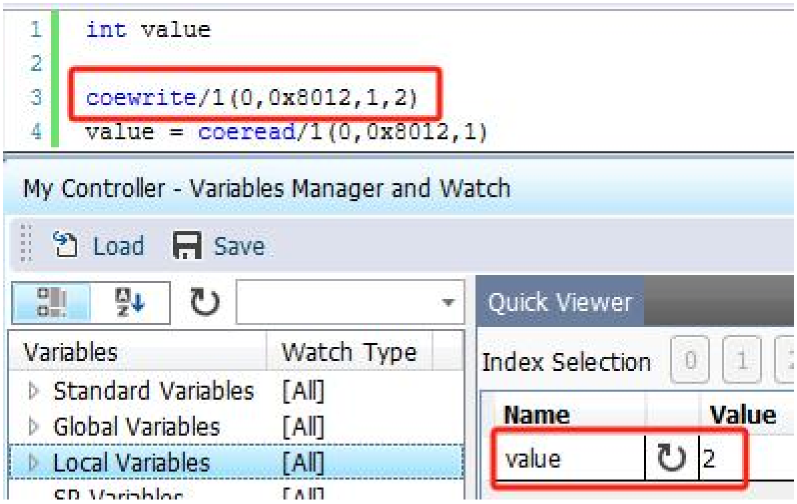


Figure 4-4-44

➢ When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value of CH0 is set to "27648" as shown in the following figure.

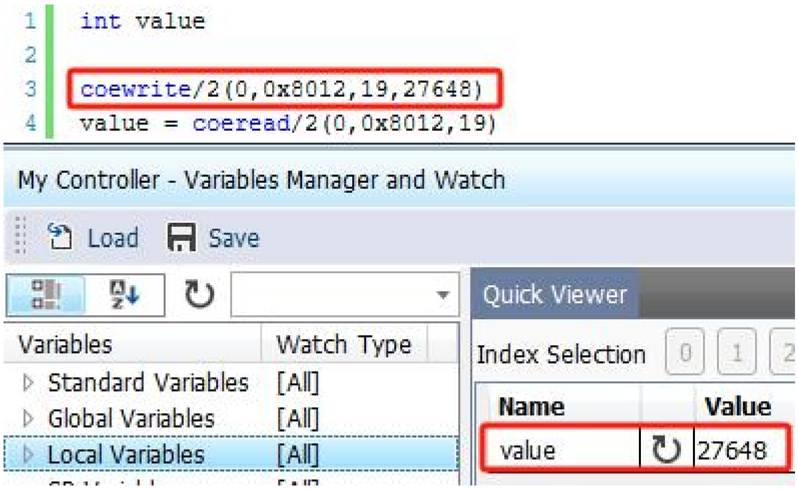


Figure 4-4-45

- This module can set the output signal range of each channel. As shown in the figure below, the output signal range of CH0 is set to 0~20ma.Note that the default signal range is Disable. You must select a signal range when adding a module..

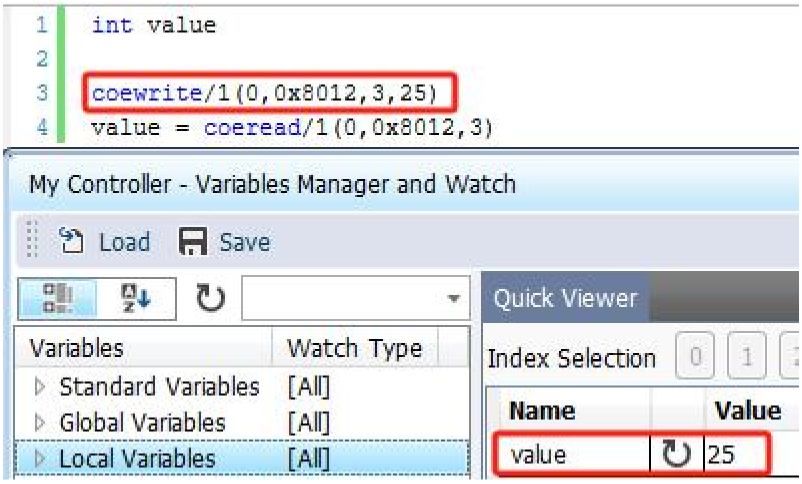


Figure 4-4-46

- The data address is shown in the figure below.

PDO Name	Type	Size	Address
Ch0: Value	INT	2	58.0
Ch1: Value	INT	2	60.0
Ch2: Value	INT	2	62.0
Ch3: Value	INT	2	64.0
Ch4: Value	INT	2	66.0
Ch5: Value	INT	2	68.0
Ch6: Value	INT	2	70.0
Ch7: Value	INT	2	72.0

Figure 4-4-47

- After setting the output signal range of channel 0 to 0~20ma. As shown in the figure below, "32767" is written to channel 0, and the multimeter can measure that the output voltage of this channel is 20ma. The conversion relationship is shown in Chapter 3, Section 10.4.

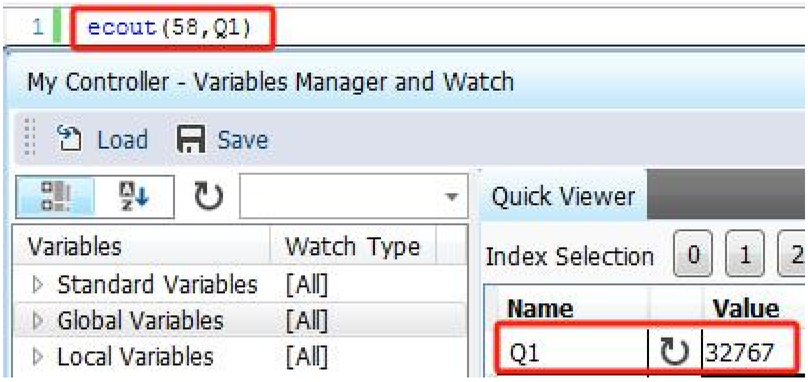


Figure 4-4-48

- ➢ DF50-M-4AO-UI-6 Voltage/Current Output Module
- ➢ Module wiring diagram seeChapter 3, Section 8.2For configuration data index, please refer toChapter 3, Section 8.3When the EC bus exits the OP state, this type of module can set the module's output state. The parameters that can be set are: all outputs off (0), enable substitute value output (1), and keep the last value (2). The following figure shows how to set the output state to keep the last value mode.

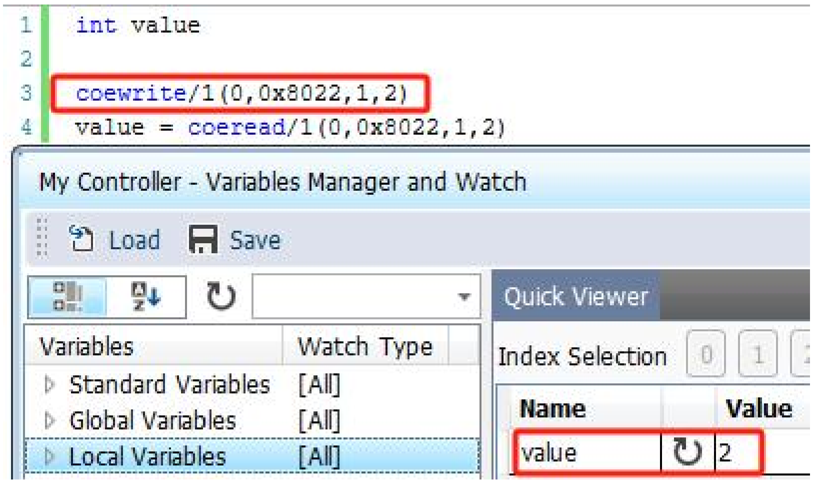


Figure 4-4-49

- ➢ When the EC bus exits the OP state, if the output state is set to substitute value output, the substitute value of CH0 is set to "27648" as shown in the following figure.

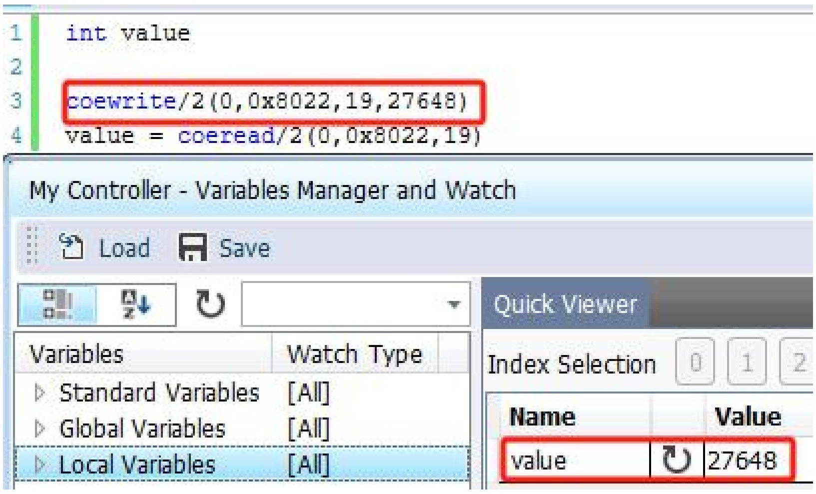


Figure 4-4-50

- ➢ The output signal range of each channel can be set. As shown in the figure below, the output signal range of CH0 is set to 0~10V.Note that the default signal range is Disable. You must select a signal range when adding a module..

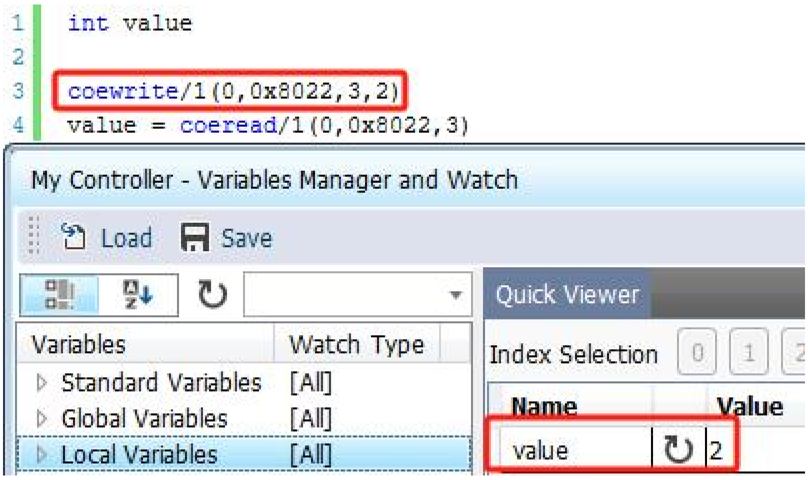


Figure 4-4-51

➢ The data address is shown in the figure below.

PDO Name	Type	Size	Address
Ch0: Value	INT	2	74.0
Ch1: Value	INT	2	76.0
Ch2: Value	INT	2	78.0
Ch3: Value	INT	2	80.0

Figure 4-4-52

➢ After setting the output signal range of channel 0 to 0~10V. As shown in the figure below, after writing "32767" to channel 0, the multimeter can measure that the output voltage of channel 0 is 10V. See the conversion relationshipChapter 3, Section 8.4.

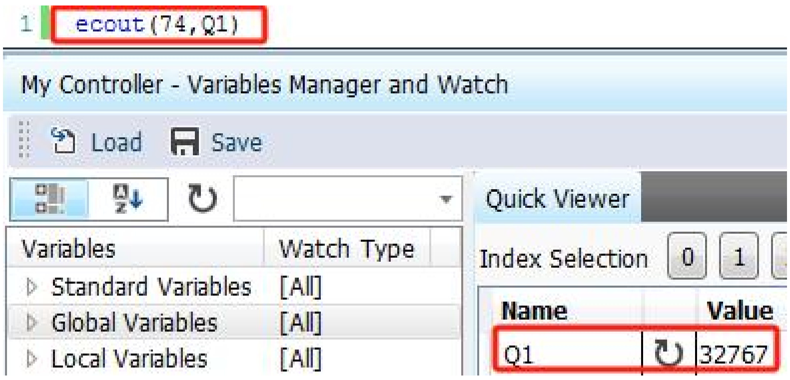


Figure 4-4-53

- DF50-M-8AI-U-4 Voltage Input Module
- Module wiring diagram seeChapter 3, Section 7.2For configuration data index, please refer toChapter 3, Section 7.3The sampling signal range of each channel can be set. The following figure shows that the sampling signal range of CH0 is set to 0~10V.Note that the default signal range is Disable. You must select a signal range when adding a module..

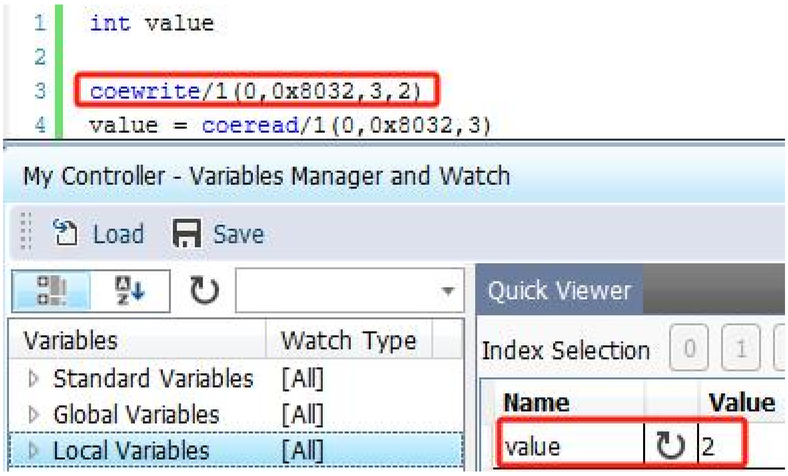
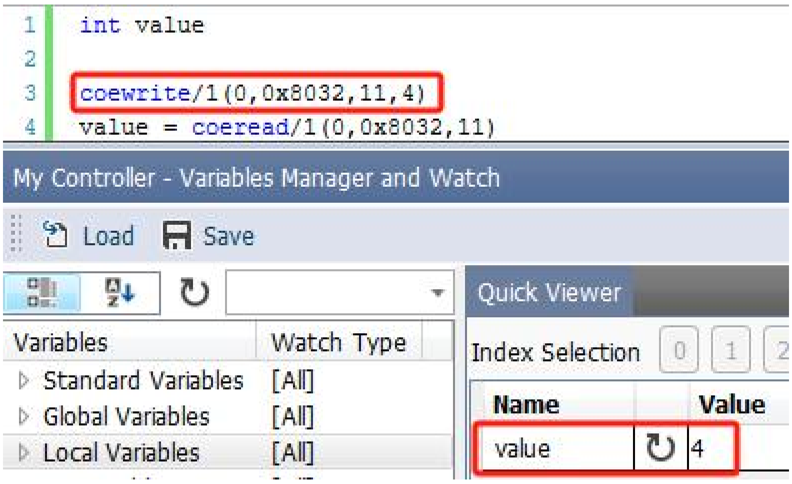


Figure 4-4-54

- This module can configure input filter parameters, the default is 100HZ_10ms. As shown in the figure below, the CH0 sampling frequency is set to 250HZ_4ms.



- The data address is shown in the figure below.

PDO Name	Type	Size	Address
AD Value CH0	INT	2	44.0
AD Value CH1	INT	2	46.0
AD Value CH2	INT	2	48.0
AD Value CH3	INT	2	50.0
AD Value CH4	INT	2	52.0
AD Value CH5	INT	2	54.0
AD Value CH6	INT	2	56.0
AD Value CH7	INT	2	58.0

Figure 4-4-55

- After setting the sampling signal range of channel 0 to 0~10V. Input a 10V voltage signal to channel 0. As shown in the figure below, channel 0 displays a value of 32766. By conversion, it is known that the collected voltage is 10V. The conversion relationship is shown in[Chapter 3, Section 7.4].

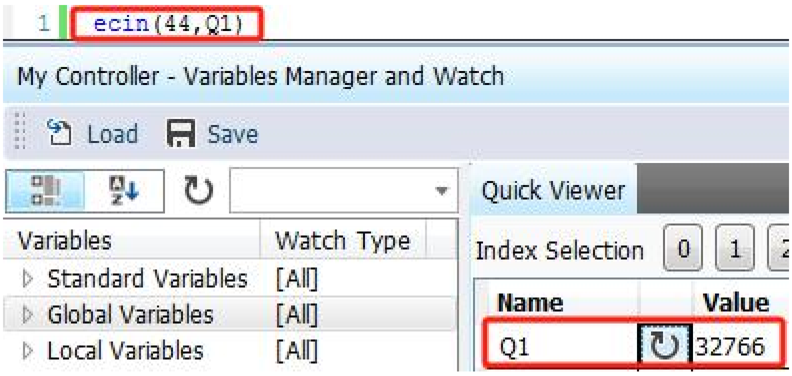


Figure 4-4-56

DF50-M-8AI-I-5 Current Input Module

- Module wiring diagram see[Chapter 3, Section 6.2]For configuration data index, please refer to[Chapter 3, Section 6.3]This module can set the sampling signal range of each channel. As shown in the figure below, the CH0 sampling signal range is set to 0~20ma.Note that the default signal range is Disable. You must select a signal range when adding a module..

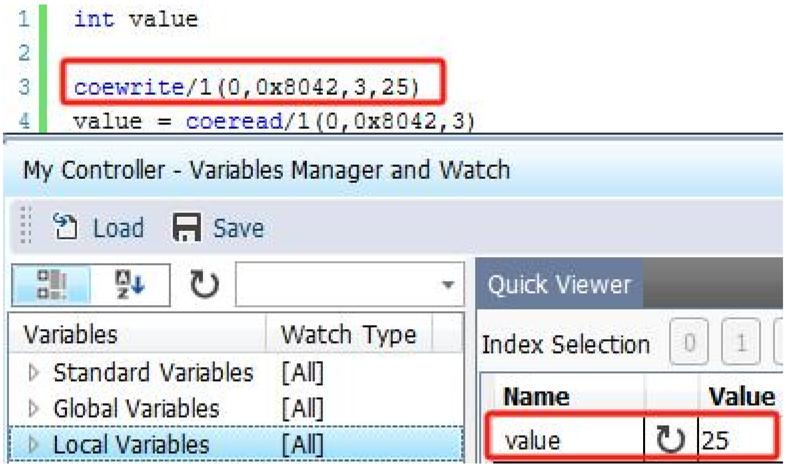


Figure 4-4-57

➢ This module can configure input filter parameters, the default is 100HZ_10ms. The following figure shows that the sampling frequency is set to 250HZ_4ms.

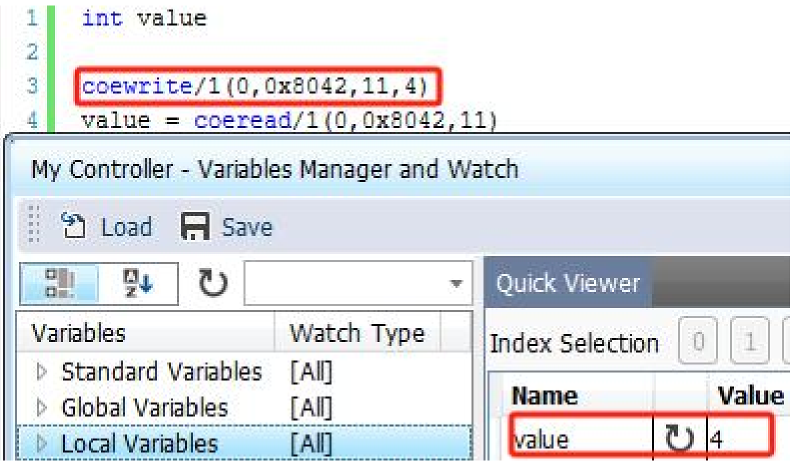


Figure 4-4-58

➢ The data address is shown in the figure below.

PDO Name	Type	Size	Address
AD Value CH0	INT	2	60.0
AD Value CH1	INT	2	62.0
AD Value CH2	INT	2	64.0
AD Value CH3	INT	2	66.0
AD Value CH4	INT	2	68.0
AD Value CH5	INT	2	70.0
AD Value CH6	INT	2	72.0
AD Value CH7	INT	2	74.0

Figure 4-4-59

➢ After setting the sampling signal range of channel 0 to 0~20ma, input a 10ma current signal to channel 0. As shown in the figure below, channel 0 displays a value of 16402. By conversion, it is known that the collected current is 10ma. The conversion relationship is shown inChapter 3, Section 6.4.

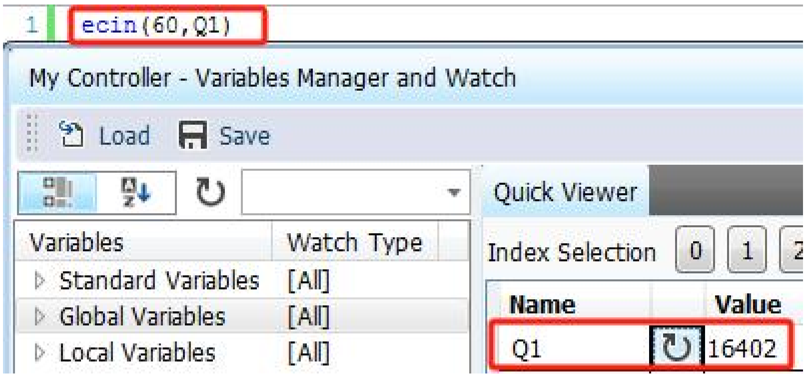


Figure 4-4-60

DF50-M-4AI-UI-6 Voltage/Current Input Module

- Module wiring diagram seeChapter 3, Section 5.2For configuration data index, please refer toChapter 3, Section 5.3This module can set the sampling signal range of each channel. As shown in the figure below, the sampling signal range of CH0 is set to 0~10V.Note that the default signal range is Disable. You must select a signal range when adding a module..

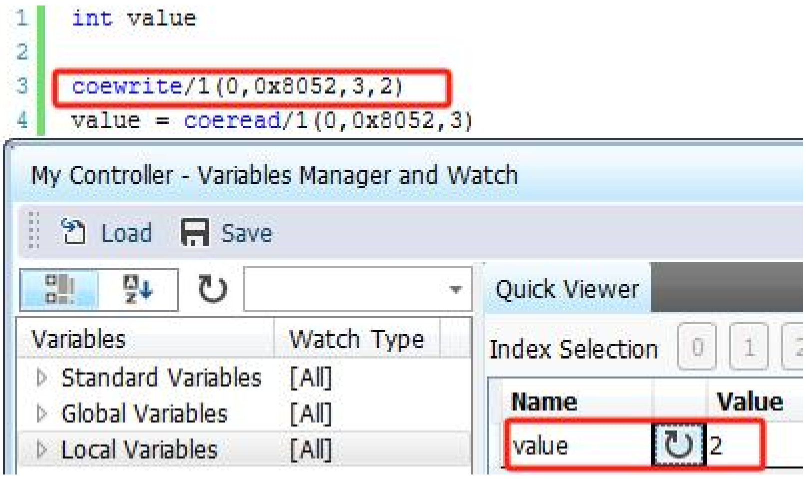


Figure 4-4-61

- This module can configure input filter parameters, the default is 100HZ_10ms. As shown in the figure below, the sampling frequency of CH0 is set to 250HZ_4ms.

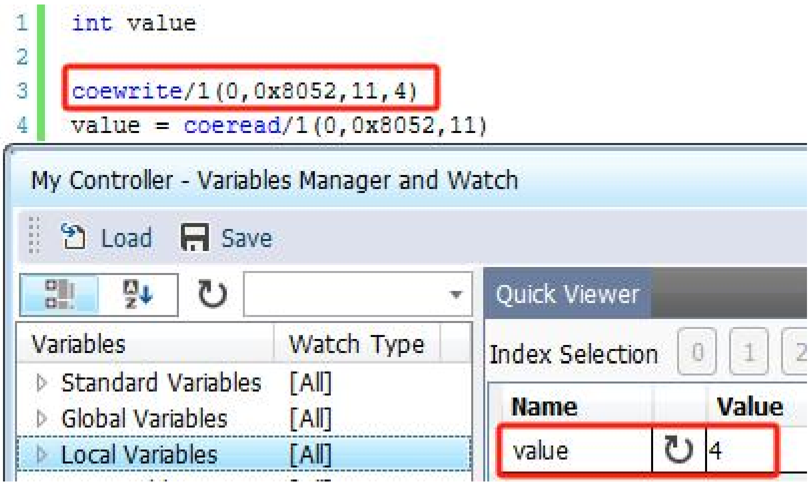


Figure 4-4-62

➢ The data address is shown in the figure below.

PDO Name	Type	Size	Address
AD Value CH0	INT	2	76.0
AD Value CH1	INT	2	78.0
AD Value CH2	INT	2	80.0
AD Value CH3	INT	2	82.0

Figure 4-4-63

➢ After setting the sampling signal range of channel 0 to 0~10V, input a 10V voltage signal to channel 0. The collected data is shown in the figure below. Channel 0 displays the value "32766". Through conversion, it is known that channel 0 collects a voltage of 10V. The conversion relationship is shown inChapter 3, Section 5.4.

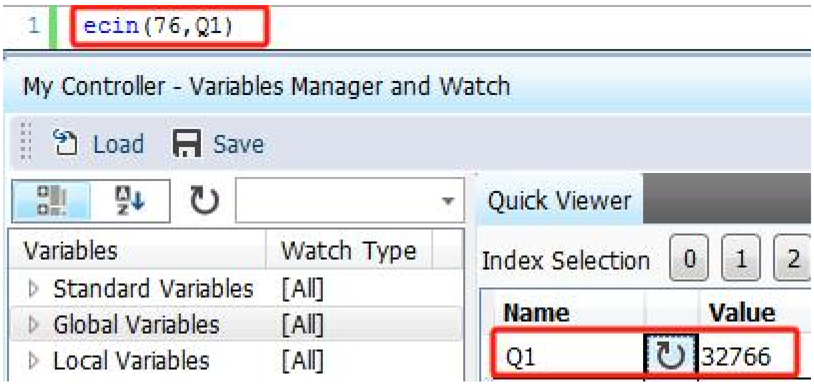


Figure 4-4-64

4.4.5 Routine use of thermal resistance sensor data acquisition module

➢ This example uses the DF50-C-EC + DF50-M-4RTD-PT topology. After scanning the slaves, the following figure is shown.

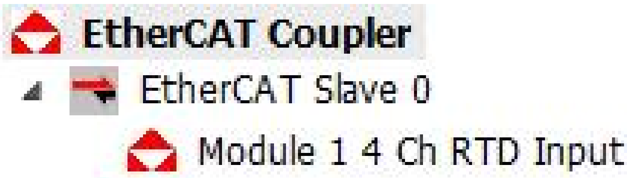


Figure 4-4-65

DF50-M-4RTD-PT Thermal Resistance Measurement Module

➢ Module wiring diagram seeChapter 3, Section 11.2For configuration data index, please refer toChapter 3, Section 11.3The module supports multiple sensor types. The following figure shows the configuration of the sensor type as PT100.

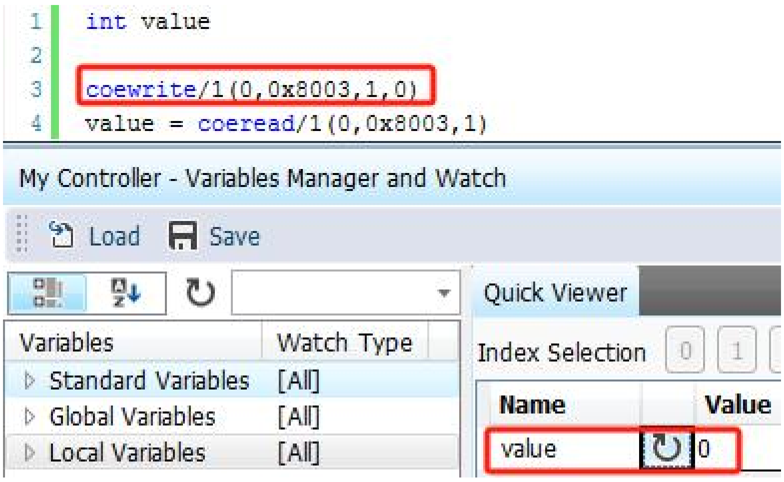
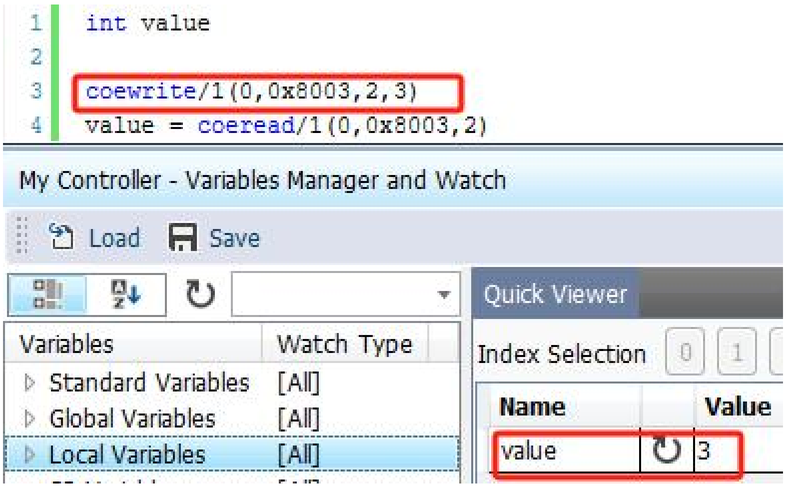


Figure 4-4-66

➢ This module can configure input filter parameters, the system default is 5Hz_200ms. The following figure shows that the sampling frequency is set to 7.5Hz_133ms.



1 int value
2
3 coewrite/1(0,0x8003,2,3)
4 value = coeread/1(0,0x8003,2)
My Controller - Variables Manager and Watch
Load
Save
Quick Viewer
Variables
Watch Type
Standard Variables [All]
Global Variables [All]
Local Variables [All]
Index Selection
Name
Value
value
3

Figure 4-4-67

➢ The data address is shown in the figure below.

PDO Name	Type	Size	Address
RTD Input CH0	INT	2	44.0
RTD Input CH1	INT	2	46.0
RTD Input CH2	INT	2	48.0
RTD Input CH3	INT	2	50.0

Figure 4-4-68

➢ DF50_M_4RTD_PT supports PT100 type sensors by default. The first channel is not connected to the sensor, as shown in Figure 4-4-69, the first channel reading is -32768, indicating a disconnection. Then connect the PT100 sensor to the first channel, as shown in Figure 4-4-70, the reading is 232, representing 23.2℃. The conversion method is shown inChapter 3, Section 11.4.

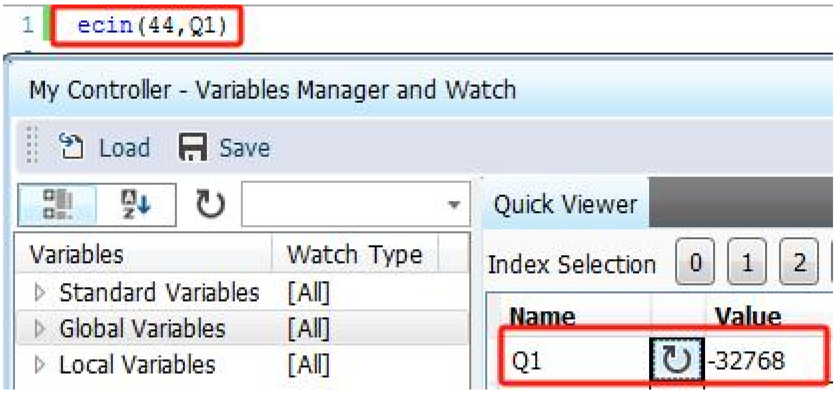


Figure 4-4-69

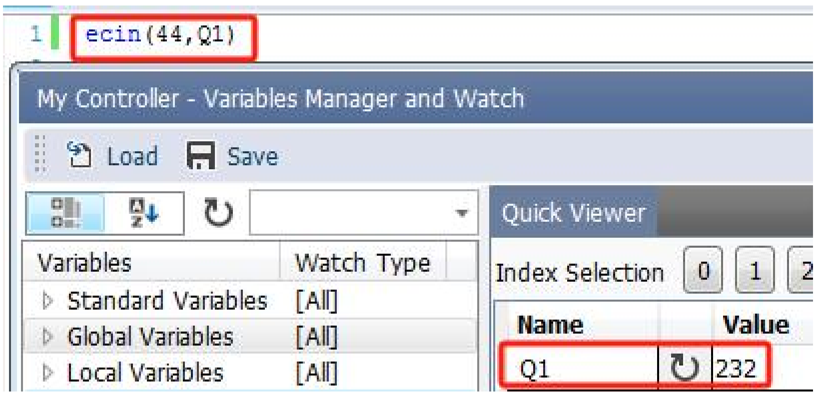


Figure 4-4-70

4.4.6 Thermocouple temperature data acquisition module usage routine

➢ This example uses the DF50-C-EC + DF50-M-8TC topology. After scanning the slaves, the following figure is shown.

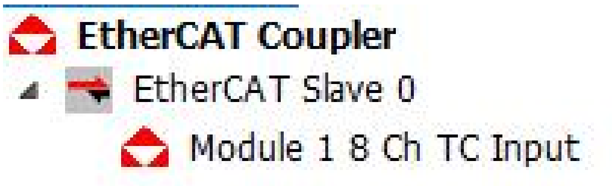


Figure 4-4-71

DF50-M-8TC Thermocouple Measurement Module

➢ Module wiring diagram seeChapter 3, Section 12.2For configuration data index, please refer toChapter 3, Section 12.3For process data definition, please refer toChapter 3, Section 12.4This module can be configured to collect sensor types, the default is K-type thermocouple. The following figure shows that the sensor type is set to E-type thermocouple.

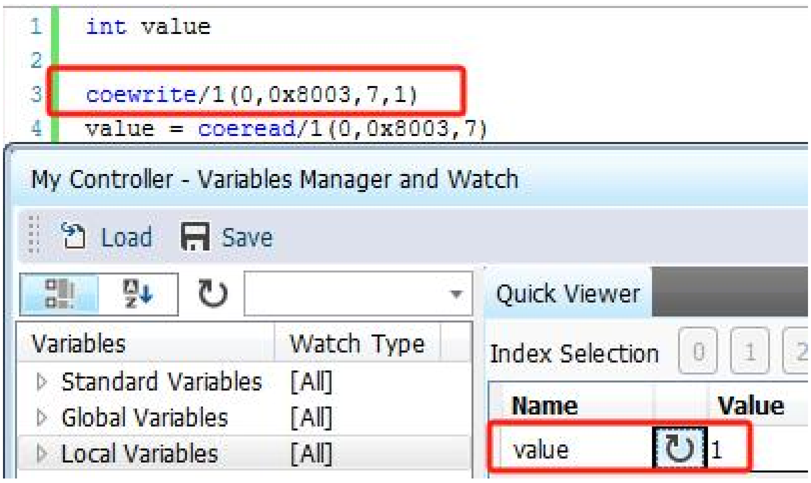


Figure 4-4-72

➢ This module can configure the module signal filter, the default is 225ms. Set it to 900ms as shown in the figure below.

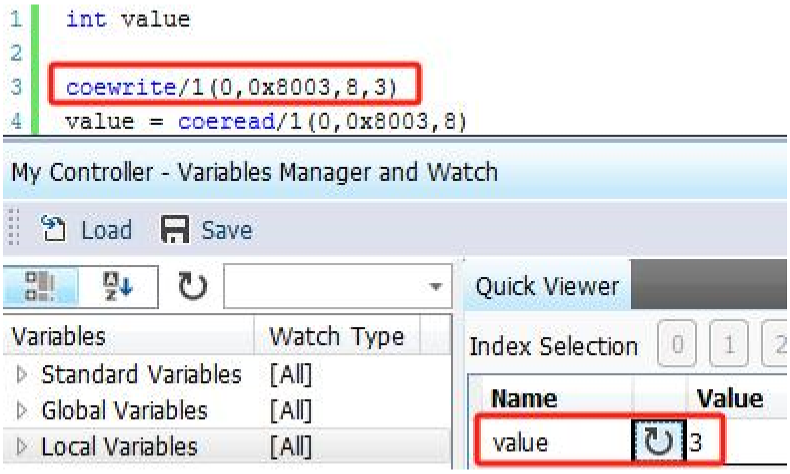

int value
coewrite/1(0,0x8003,8,3)
value = coeread/1(0,0x8003,8)
My Controller - Variables Manager and Watch
Load
Save
Quick Viewer
Variables
Watch Type
Standard Variables
[All]
Global Variables
[All]
Local Variables
[All]
Index Selection
Name
Value
value
3

Figure 4-4-73

➢ The data address is shown in the figure below.

PDO Name	Type	Size	Address
TC Value CH0	INT	2	44.0
TC Value CH1	INT	2	46.0
TC Value CH2	INT	2	48.0
TC Value CH3	INT	2	50.0
TC Value CH4	INT	2	52.0
TC Value CH5	INT	2	54.0
TC Value CH6	INT	2	56.0
TC Value CH7	INT	2	58.0
Offset Value CH0	INT	2	42.0
Offset Value CH1	INT	2	44.0
Offset Value CH2	INT	2	46.0
Offset Value CH3	INT	2	48.0
Offset Value CH4	INT	2	50.0
Offset Value CH5	INT	2	52.0
Offset Value CH6	INT	2	54.0
Offset Value CH7	INT	2	56.0

Figure 4-4-74

➢ DF50_M_8TC supports K-type sensors by default. The first channel is not connected to a sensor, as shown in Figure 4-4-75, the first channel reading is -32768, indicating a disconnection. Then connect a K-type sensor to the first channel, as shown in Figure 4-4-75, the reading is 1086, representing 108.6℃.

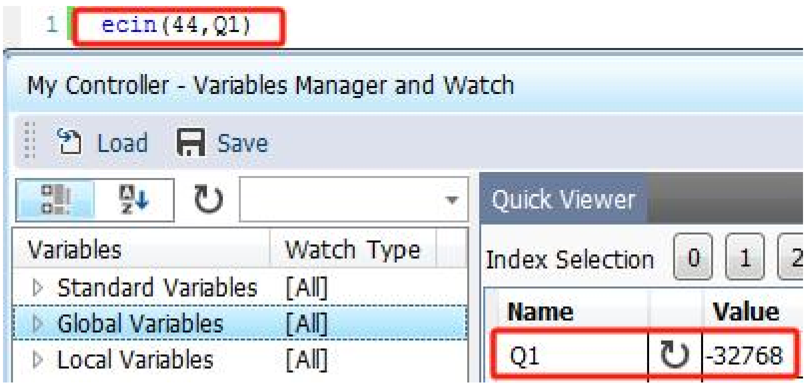


Figure 4-4-75

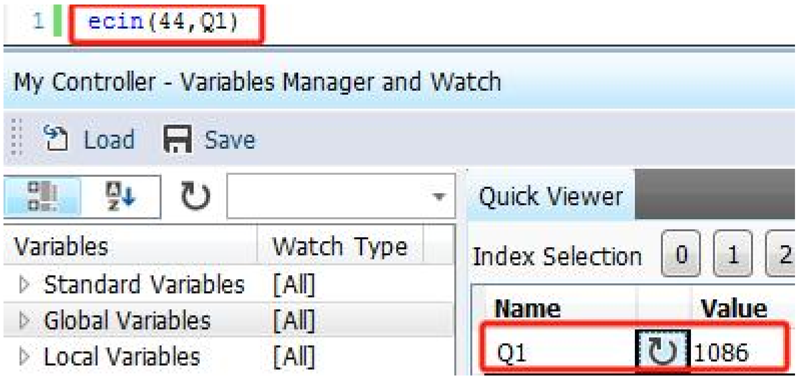


Figure 4-4-76

➢ Set the compensation value as shown in the figure below. Similarly, input a 108.6 ℃ signal. The temperature of the first channel is compensated by 500, and the temperature is displayed as 1586, which represents 158.6℃.

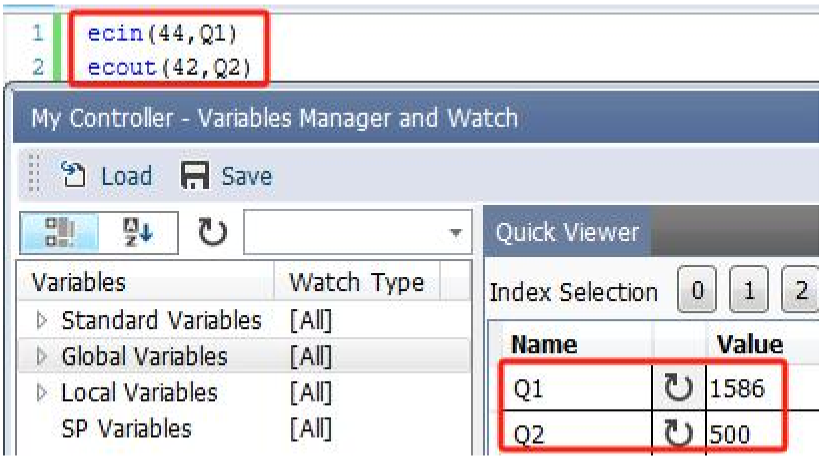


Figure 4-4-77

4.4.7 Encoder data acquisition module usage routine

- The encoder pulse counting module has two types: DF50-M-2CNT-PIL-24 and DF50-M-2CNT-PIL-5. The wiring and usage of the two modules are the same. The difference is that the DF50-M-2CNT-PIL-5 is connected to a 5V encoder signal, and the DF50-M-2CNT-PIL-24 is connected to a 24V encoder signal. This document uses the DF50-M-2CNT-PIL-24 module as an example.Chapter 3, Section 13.2.
- DF50-M-2CNT-PIL-24 module features:
- Quadrature encoder A+/A-, B+/B- differential input, 1/2/4 frequency multiplication;
- Electron probe input;
- Linear counter form, ring counter form.
- Three LED indicator outputs. After the module is powered on, PW is always on, indicating that the module is powered on and initialized normally. Different display states of Led2 represent different working states of the module; Led2 flashes when the internal bus of the module is working normally. The external 24V power supply of the module is normal, and the EP light is always on.

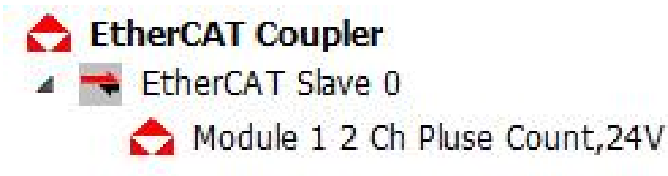


Figure 4-4-78

- The following figure shows the PDO process data of the DF50-M-2CNT-PIL-24 module. When using it, set the channel 0 count enable bit (CH0: Count Enable) to 1 to use the channel 0 count function normally:

PDO Name	Type	Size	Address
Ch0: Counting State	BOOL	0.1	44.0
Ch0: DI state	BOOL	0.1	44.1
Ch0: Compare State	BOOL	0.1	44.2
Ch0: Direction	BIT2	0.2	44.3
Ch0: Count Value	DINT	4	45.0
Ch0: LatChValue	DINT	4	49.0
Ch1: Counting State	BOOL	0.1	53.0
Ch1: DI State	BOOL	0.1	53.1
Ch1: Compare State	BOOL	0.1	53.2
Ch1: Direction	BIT2	0.2	53.3
Ch1: Count Value	DINT	4	54.0
Ch1: LatChValue	DINT	4	58.0
Ch0: Count Enable	BOOL	0.1	42.0
Ch0: Compare Value	DINT	4	43.0
Ch1: Count Enable	BOOL	0.1	47.0
Ch1: Compare Value	DINT	4	48.0

Figure 4-4-79

➢ The meaning of process data is as follows:

Table 4.4.4

RXPDO			
Name	**Type**	**Size**	**meaning**
Ch0: Count Enable	BOOL	0.1	Channel 0 count enable bit
Ch0: Compare Value	DINT	4.0	Channel 0 comparison value setting
Ch1: Count Enable	BOOL	0.1	Channel 1 count enable bit
Ch1: Compare Value	DINT	4.0	Channel 1 comparison value setting

Table 4.4.5

TXPDO			
Name	**Type**	**Size**	**meaning**
Ch0: Counting State	BOOL	0.1	Channel 0 counting status bit
Ch0: DI state	BOOL	0.1	Channel 0 DI input status
Ch0: Compare State	BOOL	0.1	Channel 0 compare status bit
Ch0: Direction	BIT2	0.2	Channel 0 input signal direction
Ch0: Count Value	DINT	4.0	Channel 0 count value
Ch0: LatChValue	DINT	4.0	Channel 0 latch value
Ch1: Counting State	BOOL	0.1	Channel 0 counting status bit
Ch1: DI state	BOOL	0.1	Channel 0 DI input status

Ch1: Compare State	BOOL	0.1	Channel 0 compare status bit
Ch1: Direction	BIT2	0.2	Channel 0 input signal direction
Ch1: Count Value	DINT	4.0	Channel 0 count value
Ch1: LatChValue	DINT	4.0	Channel 0 latch value

- The configurable contents of the DF50-M-2CNT-PIL-24 module are: signal type configuration (frequency multiplication function is configured here, default is 4 times frequency multiplication), DI signal function configuration, A phase signal filter configuration, B phase signal filter configuration, direction logic configuration, counting mode configuration, comparison function configuration, bus abnormality counting action configuration, cycle mode upper limit value, cycle mode lower limit value. For configuration data index, please refer toChapter 3, Section 13.3.
- As shown in Figure 4-4-79 below, the data of CH0 is mapped to the global variables we defined.

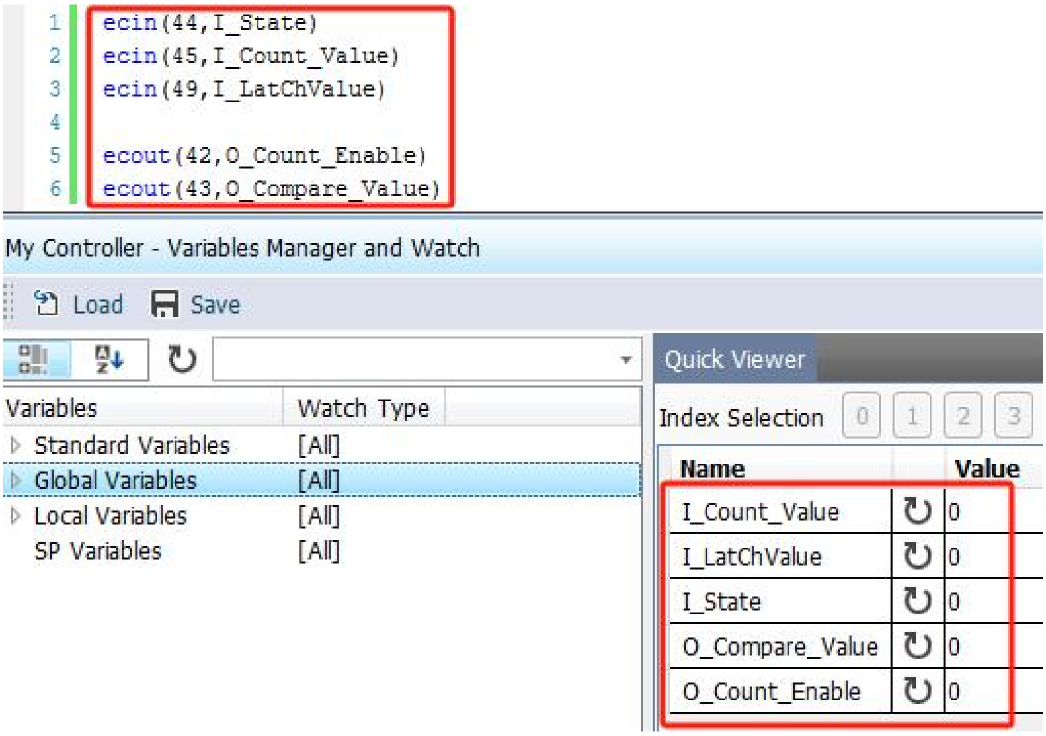


Figure 4-4-80Data Mapping

DI Signal Function Configuration

- Here we demonstrate the rising edge capture and rising edge reset functions.
- DI rising edge capture:
- Configure the DI signal function to rising edge capture mode as shown in the figure below.

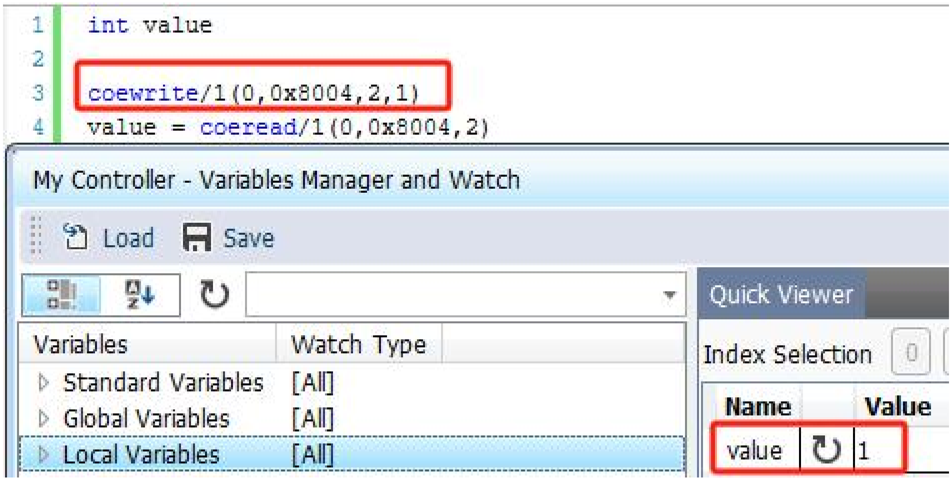


Figure 4-4-81

➢ As shown in Figure 4-4-82, the count value is 8653. After a rising edge is input, as shown in Figure 4-4-83, the DI input state (DI state) changes to 1 for a short while (that is, I_State changes to 2#000).11), the latch value (LatChValue) becomes 8653.

Name		Value
I_Count_Value	↻	8653
I_LatChValue	↻	0
I_State	↻	1
O_Compare_Value	↻	0
O_Count_Enable	↻	1

Figure 4-4-82

Name		Value
I_Count_Value	↻	8653
I_LatChValue	↻	8653
I_State	↻	3
O_Compare_Value	↻	0
O_Count_Enable	↻	1

Figure 4-4-83

➢ Configure the DI signal function as rising edge reset mode as shown in the figure below.

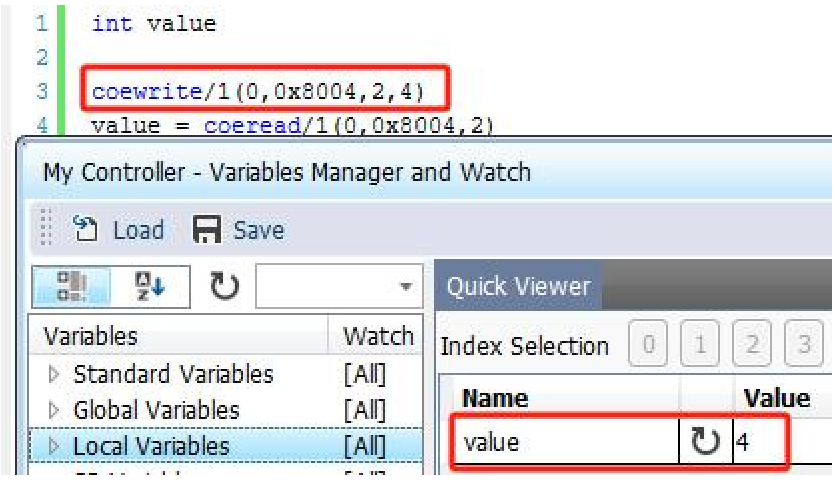
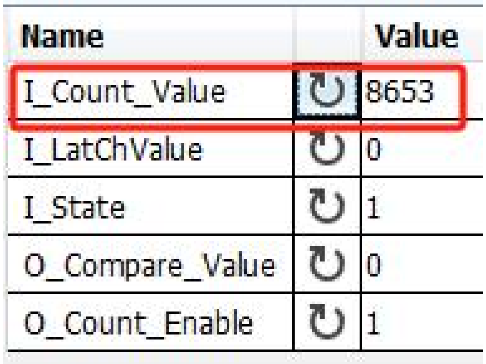

1 int value
2
3 coewrite/1(0,0x8004,2,4)
4 value = coeread/1(0,0x8004,2)
My Controller - Variables Manager and Watch
Load
Save
Quick Viewer
Variables
Watch
Standard Variables
[All]
Global Variables
[All]
Local Variables
[All]
Index Selection
0
1
2
3
Name
Value
value
4

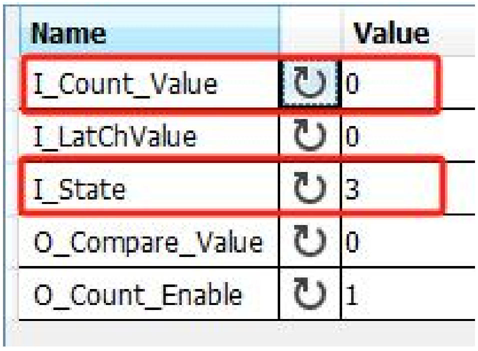
Figure 4-4-84

➢ **DI rising edge reset:** As shown in Figure 4-4-85, the count value is 8653. After a rising edge is input, as shown in Figure 4-4-86, the DI input state (DI state) changes to 1 for a short while (that is, I_State changes to 2#000).11), the count value becomes 0.



Name		Value
I_Count_Value	↻	8653
I_LatChValue	↻	0
I_State	↻	1
O_Compare_Value	↻	0
O_Count_Enable	↻	1

Figure 4-4-85



Name		Value
I_Count_Value	↻	0
I_LatChValue	↻	0
I_State	↻	3
O_Compare_Value	↻	0
O_Count_Enable	↻	1

Figure 4-4-86

Comparison Function Configuration

➢ Turn on the comparison function as shown in the figure below.

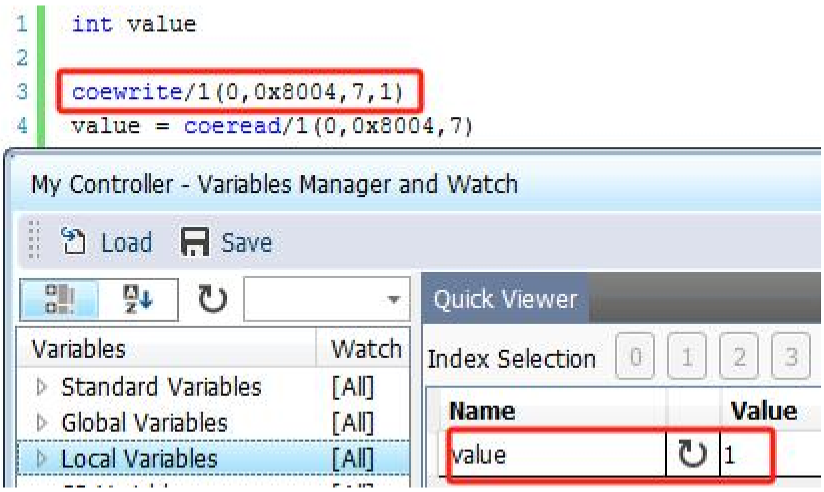


Figure 4-4-87

- Set the comparison value as shown in the figure below and set it to 10000.

Name	Value
I_Count_Value	0
I_LatChValue	0
I_State	1
O_Compare_Value	10000
O_Count_Enable	1

Figure 4-4-88

- As shown in Figure 4-4-89, when the count value is 5556, the compare state bit (Compare State) is 0 (that is, I_State is 2#00001).

Name	Value
I_Count_Value	5556
I_LatChValue	0
I_State	1
O_Compare_Value	10000
O_Count_Enable	1

Figure 4-4-89

- Figure 4-4-90 When the count value is 11068, it exceeds the set value 10000, and the compare state bit (Compare State) is 1 (that is, I_State is 2#00101).

Name	Value
I_Count_Value	11068
I_LatChValue	0
I_State	5
O_Compare_Value	10000
O_Count_Enable	1

Figure 4-4-90

➢ Pulse plus direction function (Signal Type: Pulse and Directions)

➢ As shown in the figure below, change the signal type to Pulse and Directions. See the wiring method for details.Chapter 3, Section 13.2.3When using this mode, the A+ and A- ports input high and low levels to indicate the direction, and the B+ and B- ports input valid levels to accumulate count values.

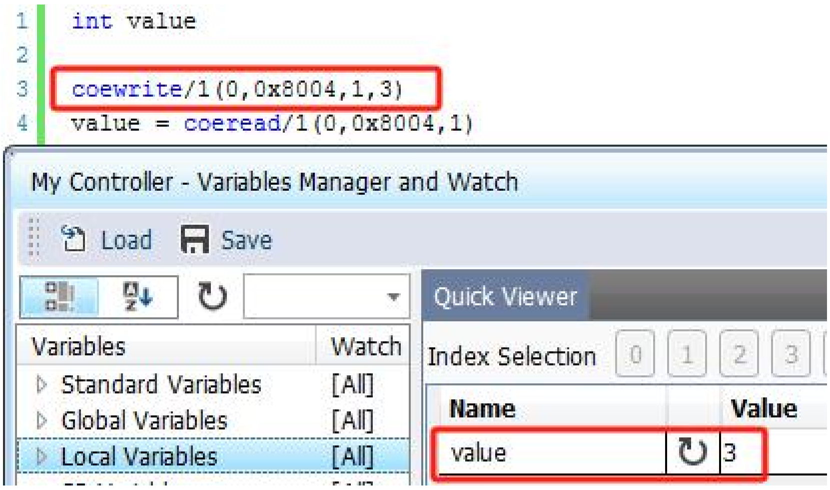


Figure 4-4-91

➢ As shown in the figure below, when the sensor is stationary, the count value is 0 and the direction state is "0" (that is, I_State is 2#00001).

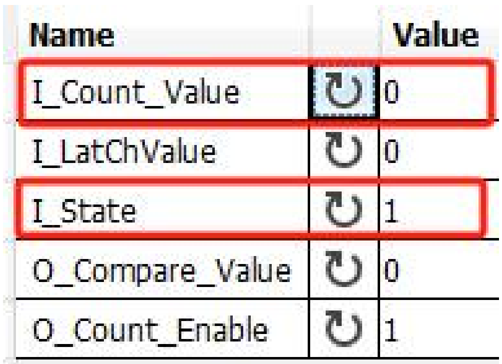


Figure 4-4-92

➢ When the A+ and A- voltage inputs are low level, pulse signals are input to B+ and B-. As shown in Figure 4-4-93, the count value decreases, and the direction state is "2" (i.e., I_State is 2#10001).

Name		Value
I_Count_Value		-661
I_LatChValue		0
I_State		17
O_Compare_Value		0
O_Count_Enable		1

Figure 4-4-93

➢ When the A+ and A- voltages are input at a high level, pulse signals are input to B+ and B-. As shown in Figure 4-4-94, the count value increases, and the direction state is "1" (i.e., I_State is 2#01001).

Name		Value
I_Count_Value		478
I_LatChValue		0
I_State		9
O_Compare_Value		0
O_Count_Enable		1

Figure 4-4-94

4.4.8 Serial port module usage routine

- This example uses the DF50-C-EC + DF50-1COM-232-485-422 topology. DF50-1COM-232-485-422 supports three modes: free transparent transmission, slave mode, and Modbus RTU master mode.Section 15.2The wiring diagram is connected to the card, the simulated communication device communicates with the DF50-1COM-232-485-422 module, and the following figure is obtained after scanning the slave station.

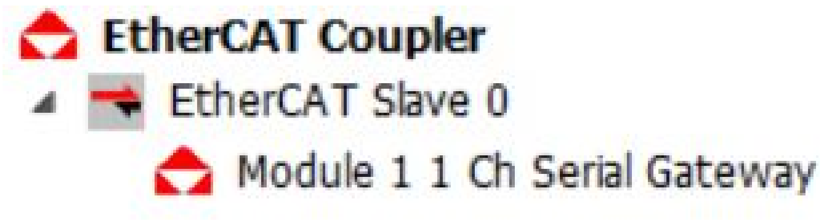


Figure 4-4-95

- The PDO data structure needs to configure different PDO data for different operating modes. The configuration is changed by modifying the default PDO data in the XML file.
- 16#1600 and 16#1A00 are PDO data formats in FreeRUN mode, 16#1640 and 16#1A40 are PDO data formats in Slave mode, and 16#1680 and 16#1A80 are PDO data formats in Master mode. The default configuration is 16#1600 and 16#1A00 in FreeRUN mode.

Modbus RTU Master Mode Usage Example

- Modbus RTU Master Configuration
- For the meaning of configuration data, please refer toSection 15.3The communication port configuration interface of Modbus RTU Master mode is shown in the figure below. A total of 12 slave stations can be configured, from slave 0 to 11.

Table 4.4.6

<table>
<tr><td>16#11</td><td>Ch0: Slave ID</td><td>USINT</td><td>0~127</td><td>0</td><td>Channel 0 slave address configuration</td><td rowspan="4">Slave 0 configuration items in master mode</td></tr>
<tr><td>16#12</td><td>Ch0: Event Trigger</td><td>USINT</td><td>surfaceG</td><td>0</td><td>Channel 0 trigger mode configuration</td></tr>
<tr><td>16#13</td><td>Ch0: Lost Action</td><td>USINT</td><td>surfaceH</td><td>0</td><td>Channel 0 offline action configuration</td></tr>
<tr><td>16#14</td><td>Ch0: Operation Code</td><td>USINT</td><td>surfaceI</td><td>16</td><td>Channel 0 function code configuration</td></tr>
</table>

16#15	Ch0: Reg Addr	UINT	0~65535	0	Channel 0 register address configuration	
16#16	Ch0: Reg Num	UINT	Register: 0-20 (40 bytes) Number of coils: 0-320 (40 bytes)	0	Channel 0 register quantity configuration	
16#17	Ch0: Poll Time	UINT	100 - 5000ms	500	Channel 0 polling period configuration	
16#18	Ch0: Poll Delay	UINT	0-5000ms	0	Channel 0 interval time configuration	
16#19	Ch0: Response Timeout	UINT	100~5000ms	1000	Channel 0 slave timeout configuration	

➢ The input and output data in Master mode are shown in the figure below.

PDO Name	Type	Size	Address
StateWord	UINT	2	44.0
Read Data Length	UINT	2	46.0
Active Channel	UINT	2	48.0
Data In 0	UINT	2	50.0
Data In 1	UINT	2	52.0
Data In 2	UINT	2	54.0
Data In 3	UINT	2	56.0
Data In 4	UINT	2	58.0
Data In 5	UINT	2	60.0
Data In 6	UINT	2	62.0
Data In 7	UINT	2	64.0
Data In 8	UINT	2	66.0
Data In 9	UINT	2	68.0
Data In 10	UINT	2	70.0
Data In 11	UINT	2	72.0
Data In 12	UINT	2	74.0
Data In 13	UINT	2	76.0
Data In 14	UINT	2	78.0
Data In 15	UINT	2	80.0
Data In 16	UINT	2	82.0
Data In 17	UINT	2	84.0
Data In 18	UINT	2	86.0
Data In 19	UINT	2	88.0

Figure 4-4-96

CtrlWord	UINT	2	42.0
Reserve	UINT	2	44.0
Select Channel	UINT	2	46.0
Data Out 0	UINT	2	48.0
Data Out 1	UINT	2	50.0
Data Out 2	UINT	2	52.0
Data Out 3	UINT	2	54.0
Data Out 4	UINT	2	56.0
Data Out 5	UINT	2	58.0
Data Out 6	UINT	2	60.0
Data Out 7	UINT	2	62.0
Data Out 8	UINT	2	64.0
Data Out 9	UINT	2	66.0
Data Out 10	UINT	2	68.0
Data Out 11	UINT	2	70.0
Data Out 12	UINT	2	72.0
Data Out 13	UINT	2	74.0
Data Out 14	UINT	2	76.0
Data Out 15	UINT	2	78.0
Data Out 16	UINT	2	80.0
Data Out 17	UINT	2	82.0
Data Out 18	UINT	2	84.0
Data Out 19	UINT	2	86.0

Figure 4-4-97

- The CtrlWord commands are shown in the following table.

Table 4.4.7CtrlWord data meaning

Command Value	Command Name	meaning
16#00A1	CONFIGUREPORT	Port Configuration Commands
16#00B1	COMFIGUREMASTER	MASTERMode Configuration Commands
16#00B2	OPERATIONMASTER	MASTERMode Run Command

- Modbus RTU Master Process Data Description

Table 4.4.8Output data meaning

Output Data		
name	**length**	**meaning**
CtrlWord	2Byte	Control Word
Reserve	2Byte	reserve
Select Channel	2Byte	Channel operation selection
DataOut 0-19	40Byte	Send data content

- As shown in Table 4.4.9, SelectChannel is used to switch the communication channel, with a value range of 0-11. By default, Ch0 is activated. If SelectChannel is assigned a value of 1, the communication of Ch1 is activated, and the 485 bus on the serial port module will perform Modbus communication according to the configuration of Ch1, the specific address and function code.

Table 4.4.9Input data meaning

Input Data		
name	**length**	**meaning**
StateWord	2Byte	Status word
ReadDataLength	2Byte	Receive data length
ActiveChannel	2Byte	Current active channels
DataIn 0-19	40Byte	Receive data content

- When the PLC queries ActiveChannel and it is 1, it means that the current communication is Ch1. ReadDataLength and DataIn 0-19 both indicate the valid data of Ch1. The PLC can now take the input value and switch to the next channel communication.
- Map the required data to the variables we created, as shown in the figure below.

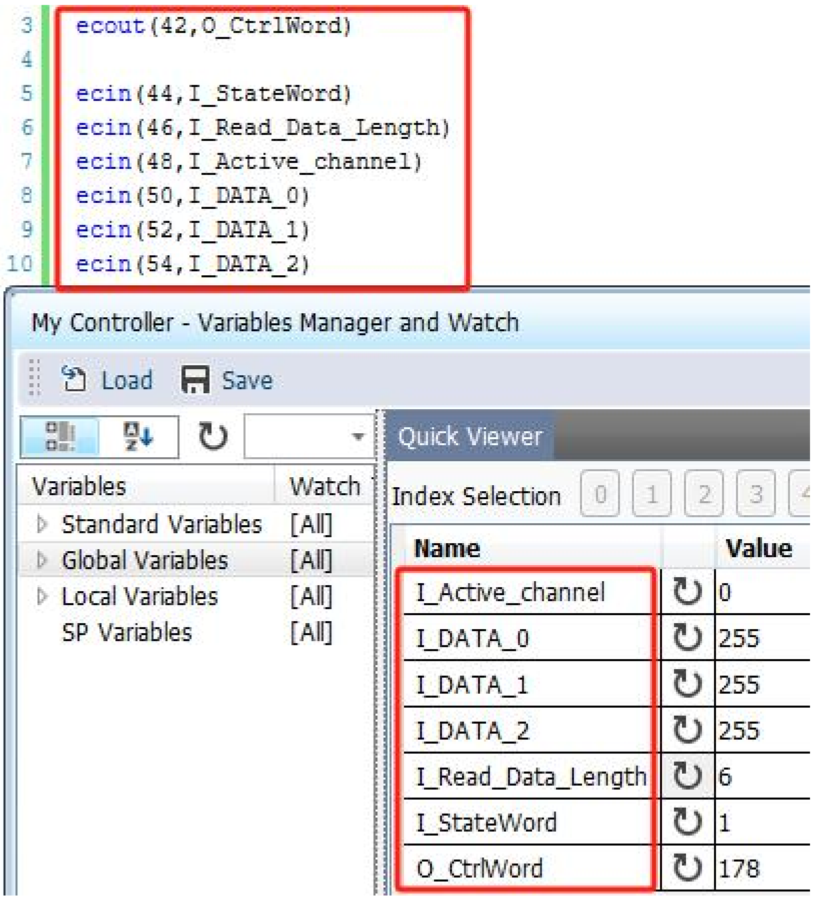


Figure 4-4-98

➢ Taking channel ch0 as an example, configure the operation mode to Modbus RTU Master (1) mode, set the slave address to 1 (1), set the function to Read HOLDING REGISTERS (3), set the read start address to 0 (0), and set the number of registers to read to 3 (3). The configuration method is shown in the figure below.Note: Use the port configuration command orMASTERAfter the mode configuration command is issued, the value in the register needs to change before the configuration command can be sent correctly. If you are not sure whether the value has changed, you can modify it to another value and then change it back to the correct value.

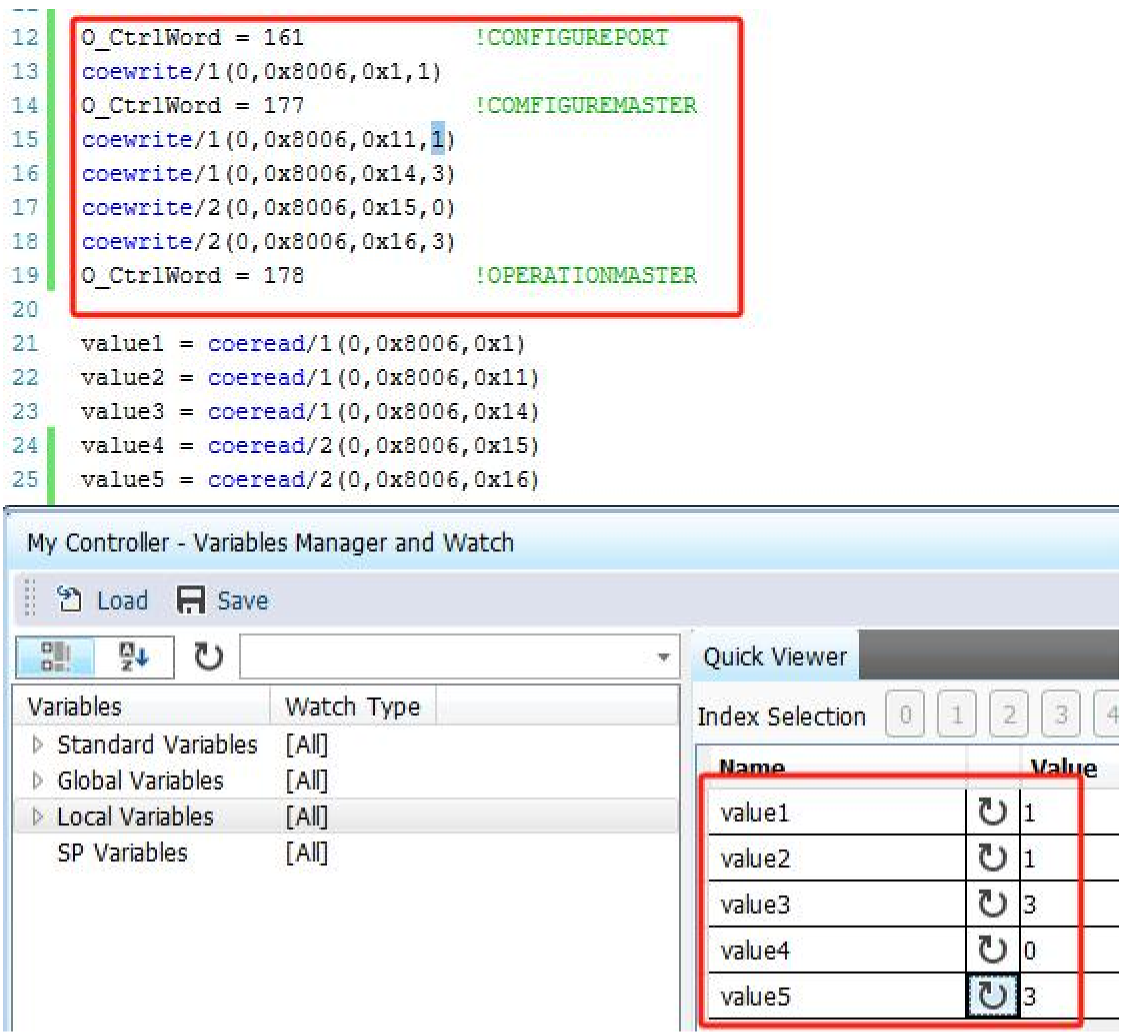


Figure 4-4-99

➢ Open the Modbus Slave software on the PC and create a new project.

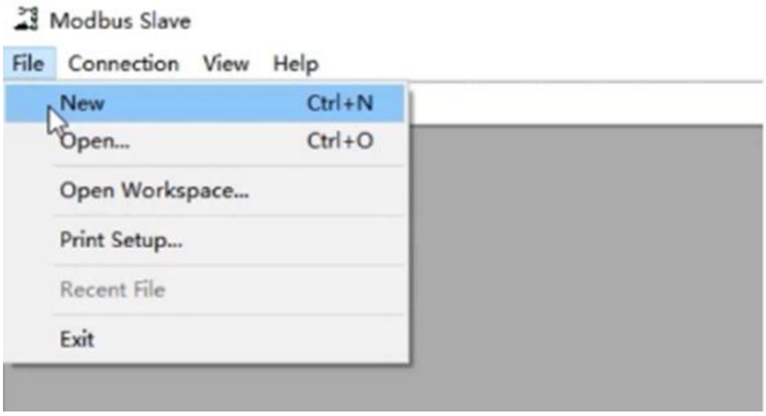


Figure 4-4-100

➢ Connect to the serial device.

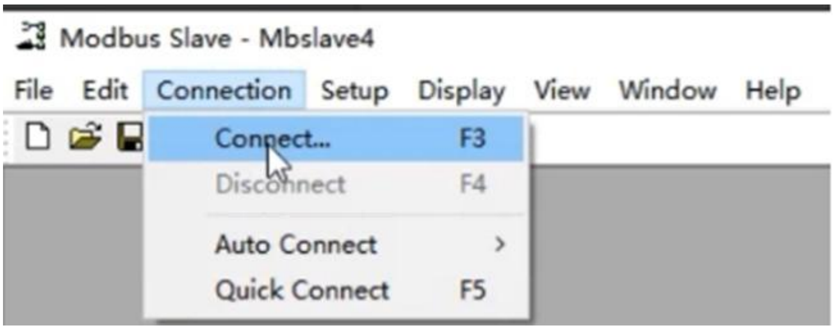


Figure 4-4-101

➢ Right-click in the blank area to set the slave parameters.

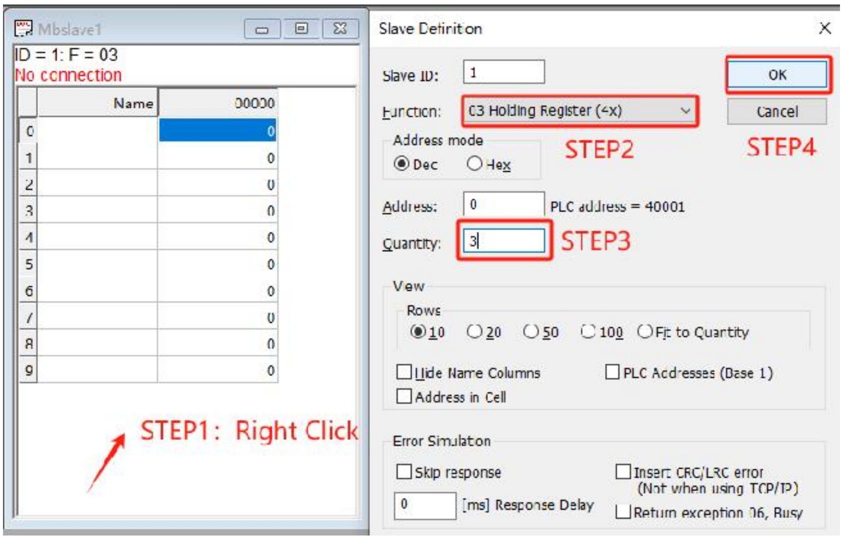


Figure 4-4-102

➢ Write register data.

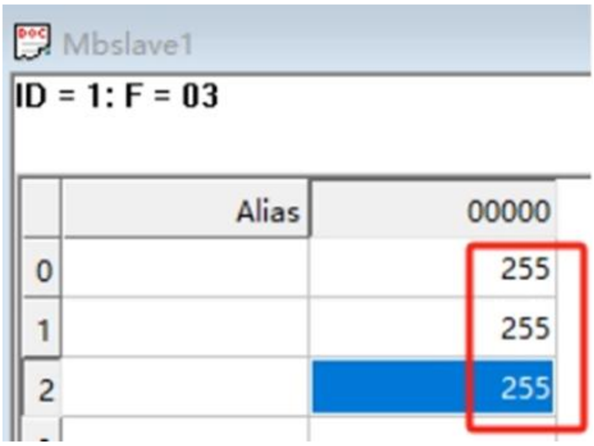


Figure 4-4-103

➢ CtrlWord writes run command 178 (0x00B2).

Name		Value
I_Active_channel		0
I_DATA_0		255
I_DATA_1		255
I_DATA_2		255
I_Read_Data_Length		6
I_StateWord		1
O_CtrlWord		178

Figure 4-4-104

➢ Check the module input data and the current data is consistent with the sent data.

Name		Value
I_Active_channel		0
I_DATA_0		255
I_DATA_1		255
I_DATA_2		255
I_Read_Data_Length		6
I_StateWord		1
O_CtrlWord		178

Figure 4-4-105

FreeRUN free transparent transmission mode usage example

➢ Free transparent transmission mode configuration

➢ For the meaning of configuration data, please refer toSection 15.3The configuration interface of free transparent transmission mode is shown in Table 4.4.10.

Table 4.4.10

16#8	FreeRUN Interval time	UINT	0~65535	1	Free mode data frame interval	Free Mode Configuration Items

➢ The input and output data in FreeRUN mode are as follows.

PDO Name	Type	Size	Address
StateWord	UINT	2	44.0
Input Length	UINT	2	46.0
Input Count	UINT	2	48.0
Data In 0	USINT	1	50.0
Data In 1	USINT	1	51.0
Data In 2	USINT	1	52.0
Data In 3	USINT	1	53.0
Data In 4	USINT	1	54.0
Data In 5	USINT	1	55.0
Data In 6	USINT	1	56.0
Data In 7	USINT	1	57.0
Data In 8	USINT	1	58.0
Data In 9	USINT	1	59.0
Data In 10	USINT	1	60.0
Data In 11	USINT	1	61.0
Data In 12	USINT	1	62.0
Data In 13	USINT	1	63.0
Data In 14	USINT	1	64.0
Data In 15	USINT	1	65.0
Data In 16	USINT	1	66.0
Data In 17	USINT	1	67.0
Data In 18	USINT	1	68.0
Data In 19	USINT	1	69.0
Data In 20	USINT	1	70.0
Data In 21	USINT	1	71.0
Data In 22	USINT	1	72.0
Data In 23	USINT	1	73.0
Data In 24	USINT	1	74.0
Data In 25	USINT	1	75.0
Data In 26	USINT	1	76.0
Data In 27	USINT	1	77.0
Data In 28	USINT	1	78.0
Data In 29	USINT	1	79.0
Data In 30	USINT	1	80.0
Data In 31	USINT	1	81.0
Data In 32	USINT	1	82.0
Data In 33	USINT	1	83.0
Data In 34	USINT	1	84.0
Data In 35	USINT	1	85.0
Data In 36	USINT	1	86.0
Data In 37	USINT	1	87.0
Data In 38	USINT	1	88.0
Data In 39	USINT	1	89.0

Figure 4-4-106

PDO Name	Type	Size	Address
CtrlWord	UINT	2	42.0
Output Length	UINT	2	44.0
Output Count	UINT	2	46.0
Data Out 0	USINT	1	48.0
Data Out 1	USINT	1	49.0
Data Out 2	USINT	1	50.0
Data Out 3	USINT	1	51.0
Data Out 4	USINT	1	52.0
Data Out 5	USINT	1	53.0
Data Out 6	USINT	1	54.0
Data Out 7	USINT	1	55.0
Data Out 8	USINT	1	56.0
Data Out 9	USINT	1	57.0
Data Out 10	USINT	1	58.0
Data Out 11	USINT	1	59.0
Data Out 12	USINT	1	60.0
Data Out 13	USINT	1	61.0
Data Out 14	USINT	1	62.0
Data Out 15	USINT	1	63.0
Data Out 16	USINT	1	64.0
Data Out 17	USINT	1	65.0
Data Out 18	USINT	1	66.0
Data Out 19	USINT	1	67.0
Data Out 20	USINT	1	68.0
Data Out 21	USINT	1	69.0
Data Out 22	USINT	1	70.0
Data Out 23	USINT	1	71.0
Data Out 24	USINT	1	72.0
Data Out 25	USINT	1	73.0
Data Out 26	USINT	1	74.0
Data Out 27	USINT	1	75.0
Data Out 28	USINT	1	76.0
Data Out 29	USINT	1	77.0
Data Out 30	USINT	1	78.0
Data Out 31	USINT	1	79.0
Data Out 32	USINT	1	80.0
Data Out 33	USINT	1	81.0
Data Out 34	USINT	1	82.0
Data Out 35	USINT	1	83.0
Data Out 36	USINT	1	84.0
Data Out 37	USINT	1	85.0
Data Out 38	USINT	1	86.0
Data Out 39	USINT	1	87.0

Figure 4-4-107

The CtrlWord commands are shown in the following table.

Table 4.4.11CtrlWord Command Table

Command Value	Command Name	meaning
16#00A1	CONFIGUREPORT	Configuration Commands
16#00C1	WRITEFreeRUN	Free mode write data command
16#00C2	READFreeRUN	Free mode read data command

➢ FreeRUN mode process data description.

Table 4.4.12Output data meaning

Output Data		
name	**length**	**meaning**
CtrlWord	2Byte	Control Word
OutputLength	2Byte	Send data length
OutputCount	2Byte	Send data sequence number
DataOut 0-39	40Byte	Send data content

➢ As shown in Table 4.4.12, OutputLength is the length of the data to be sent, DataOut 0-39 is the data to be sent, and assigning a new value to OutputCount can activate a send. The PLC program periodically accumulates OutputCount to achieve fixed periodic sending.

Table 4.4.13Input data meaning

Input Data		
name	**length**	**meaning**
StateWord	2Byte	Status word
InputLength	2Byte	Receive data length
InputCount	2Byte	Receive data sequence number
DataIn 0-39	40Byte	Receive data content

➢ As shown in Table 4.4.13, receiving data is similar to sending data. InputLength indicates the length of the received data, DataIn 0-39 is the valid data received, and InputCount indicates the sequence number of the currently received data frame (accumulated value). Users can determine whether a new data frame has been received based on whether the current InputCount value is updated, and the length of the received new data frame can be determined by InputLength.

➢ Map the required data to the variables we created, as shown in the figure below.

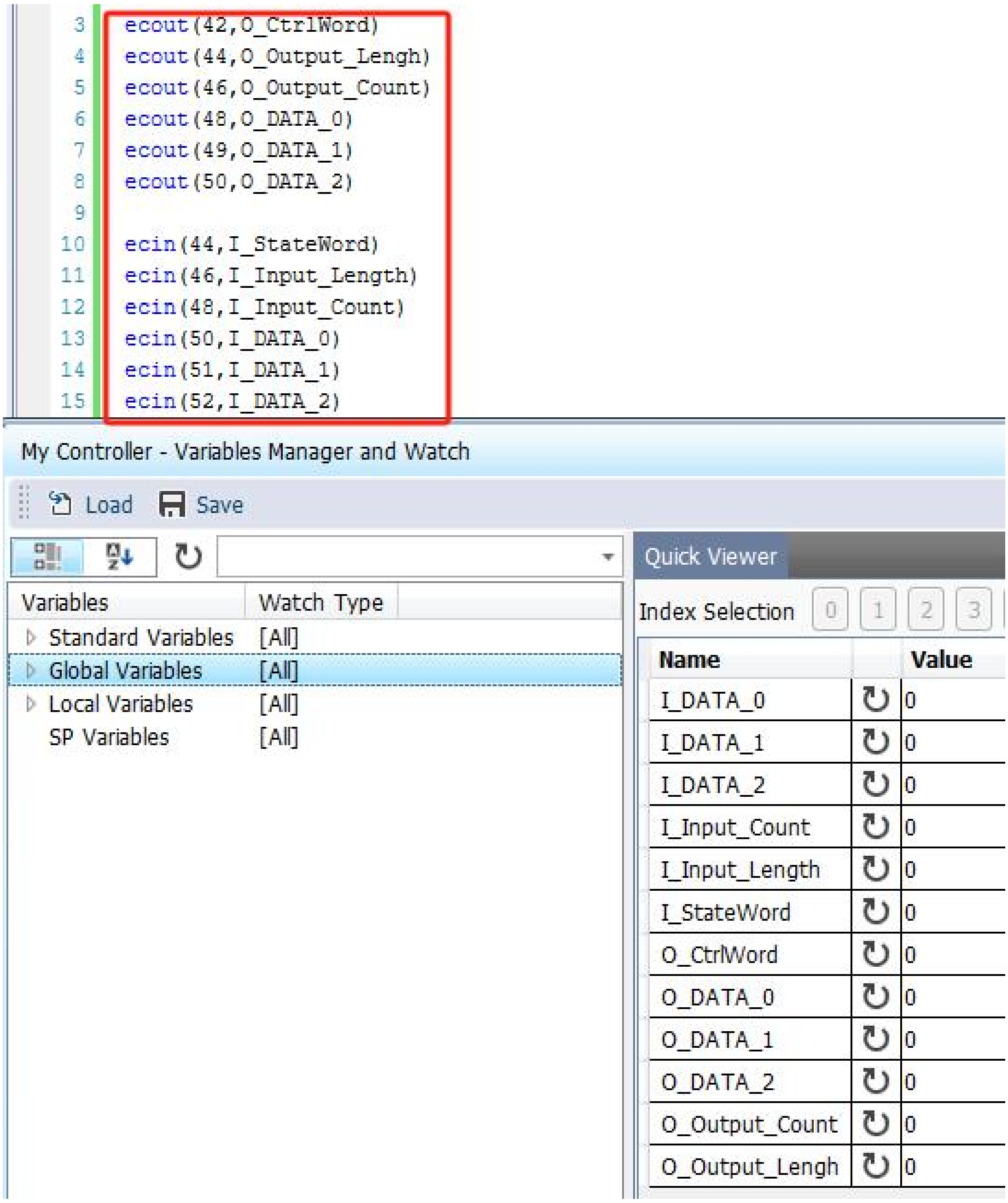


Figure 4-4-108

➢ Configure the running mode to FreeRUN (0) mode, and write 194 (0x00C2) to configure the module to receive mode, as shown in the figure below. Note: After using the configuration command, the value in the register needs to change in order to send the configuration command correctly. If you are not sure whether the value has changed, you can modify it to another value and then change it back to the correct value.

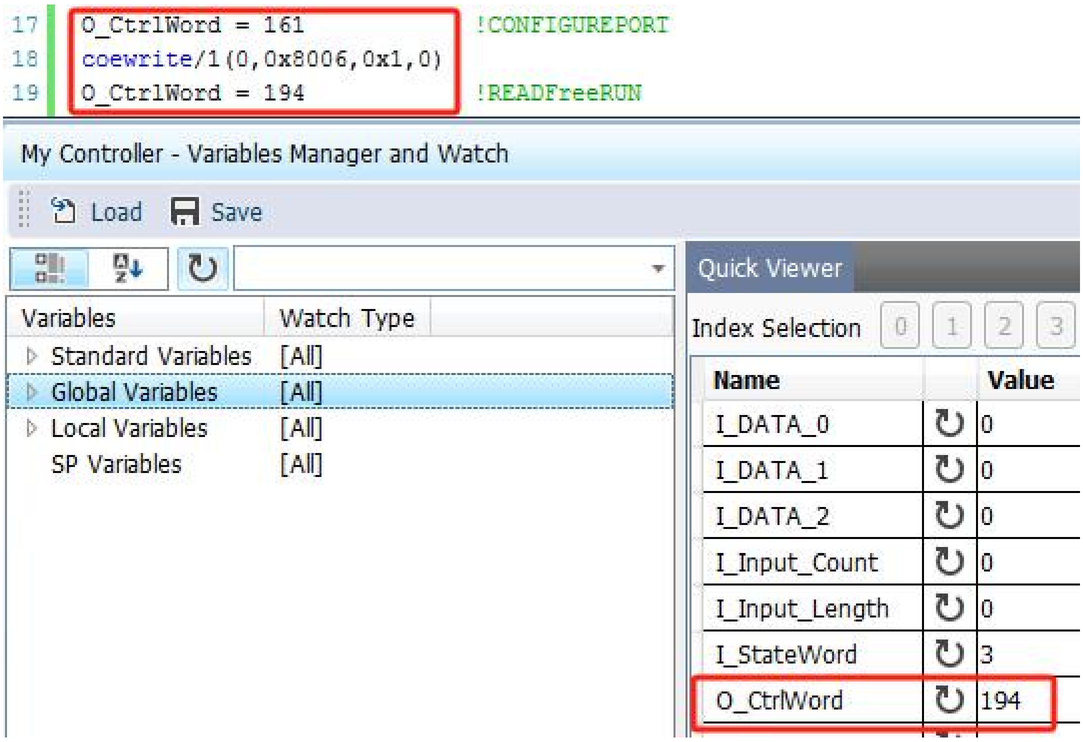


Figure 4-4-109

➢ Use the serial port assistant to send data 01 02 03.

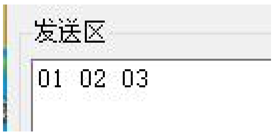


Figure 4-4-110

➢ The receiving result is shown in the figure below.

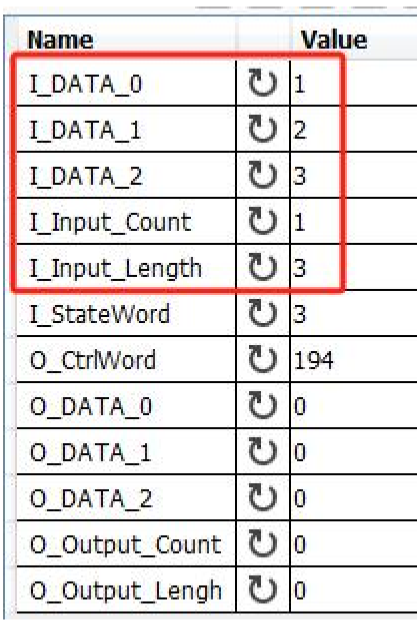


Figure 4-4-111

CtrlWord writes 193 (0x00C1) to configure the module into send mode.

Name		Value
I_DATA_0		1
I_DATA_1		2
I_DATA_2		3
I_Input_Count		1
I_Input_Length		3
I_StateWord		0
O_CtrlWord		193
O_DATA_0		0
O_DATA_1		0
O_DATA_2		0
O_Output_Count		0
O_Output_Lengh		0

Figure 4-4-112

- Output Length sets the sending length to 3, Data Out 0 writes sending data 01, Data Out 1 writes sending data 02, and Data Out 2 writes sending data 03.

O_CtrlWord		193
O_DATA_0		1
O_DATA_1		2
O_DATA_2		3
O_Output_Count		0
O_Output_Lengh		3

Figure 4-4-113

- Set Output Count to 1, and the data is sent to the serial port assistant, as shown in the figure below. The module sends data every time Output Count changes.

O_CtrlWord		193
O_DATA_0		1
O_DATA_1		2
O_DATA_2		3
O_Output_Count		1
O_Output_Lengh		3

Figure 4-4-114

The data received by the serial port assistant is shown in the figure below.

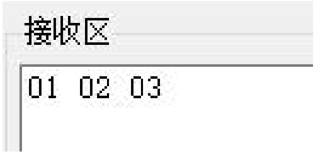


Figure 4-4-115

Modbus RTU Slave mode usage routine

- For the meaning of configuration data, please refer to Section 15.3, the Modbus RTU Slave mode configuration interface is shown in the figure.

Table 4.4.14

16#A	Slave ID	USINT	0~127	1	SlaveMode Slave Mode Address	Slave Mode Configuration Items
16#10	Slave Response Delay	UINT	0~65535	0	Slave ModeSlave Responsetime	

- The input and output data in Slave mode are shown in the figure below.

PDO Name	Type	Size	Address
← StateWord	UINT	2	44.0
← Read Data Length (Bytes)	USINT	1	46.0
← Reserve 1	USINT	1	47.0
← SlaveRegNum	UINT	2	48.0
← Data In 0	UINT	2	50.0
← Data In 1	UINT	2	52.0
← Data In 2	UINT	2	54.0
← Data In 3	UINT	2	56.0
← Data In 4	UINT	2	58.0
← Data In 5	UINT	2	60.0
← Data In 6	UINT	2	62.0
← Data In 7	UINT	2	64.0
← Data In 8	UINT	2	66.0
← Data In 9	UINT	2	68.0
← Data In 10	UINT	2	70.0
← Data In 11	UINT	2	72.0
← Data In 12	UINT	2	74.0
← Data In 13	UINT	2	76.0
← Data In 14	UINT	2	78.0
← Data In 15	UINT	2	80.0
← Data In 16	UINT	2	82.0
← Data In 17	UINT	2	84.0
← Data In 18	UINT	2	86.0
← Data In 19	UINT	2	88.0

Figure 4-4-116

CtrlWord	UINT	2	42.0
SlaveCMD	USINT	1	44.0
SlaveRegAddr	USINT	1	45.0
SlaveRegNum	UINT	2	46.0
Data Out 0	UINT	2	48.0
Data Out 1	UINT	2	50.0
Data Out 2	UINT	2	52.0
Data Out 3	UINT	2	54.0
Data Out 4	UINT	2	56.0
Data Out 5	UINT	2	58.0
Data Out 6	UINT	2	60.0
Data Out 7	UINT	2	62.0
Data Out 8	UINT	2	64.0
Data Out 9	UINT	2	66.0
Data Out 10	UINT	2	68.0
Data Out 11	UINT	2	70.0
Data Out 12	UINT	2	72.0
Data Out 13	UINT	2	74.0
Data Out 14	UINT	2	76.0
Data Out 15	UINT	2	78.0
Data Out 16	UINT	2	80.0
Data Out 17	UINT	2	82.0
Data Out 18	UINT	2	84.0
Data Out 19	UINT	2	86.0

Figure 4-4-117

- The CtrlWord commands are shown in the following table.

Table 4.4.15CtrlWord Command Table

Command Value	Command Name	meaning
16#00A1	CONFIGUREPORT	Configuration Commands

- SlaveCMD command table.

Table 4.4.16SlaveCMD Command Table

SlaveCMD			
value	**name**	**length**	**meaning**
1	ReadCoils	1byte	Read coil value
2	ReadHoldReg	1byte	Read Holding Registers
3	WriteCoils	1byte	Write coil value
4	WriteDiscrete	1byte	Write discrete quantity
5	WriteHoldReg	1byte	Writing Holding Registers
6	WriteInReg	1byte	Write input register

Description of process data in Modbus RTU Slave mode.

Table 4.4.17Input and output data tables

Output Data		
name	**length**	**meaning**
CtrlWord	2byte	Control Word
SlaveCMD	1byte	Slave operation commands
SlaveRegAddr	1byte	Slave register address
SlaveRegNum	2byte	Number of slave registers
DataOut0-19	40byte	Send data area
Input Data		
name	**length**	**meaning**
StateWord	2byte	Status word
Read Data Length	1byte	Readback data length Byte
Reserve 1	1byte	reserve
SlaveRegNum	2byte	Readback register quantity
DataIn0-19	40byte	Receive data area

- When the module is used as a slave station, the data can be freely read and written by the RTU external master station. The number of input registers is 128, the number of holding registers is 128, the number of coils is 1024, and the number of discrete quantities is 1024. The read and write mode is controlled by SlaveCMD.
- Map the required data to the variables we created, as shown in the figure below.

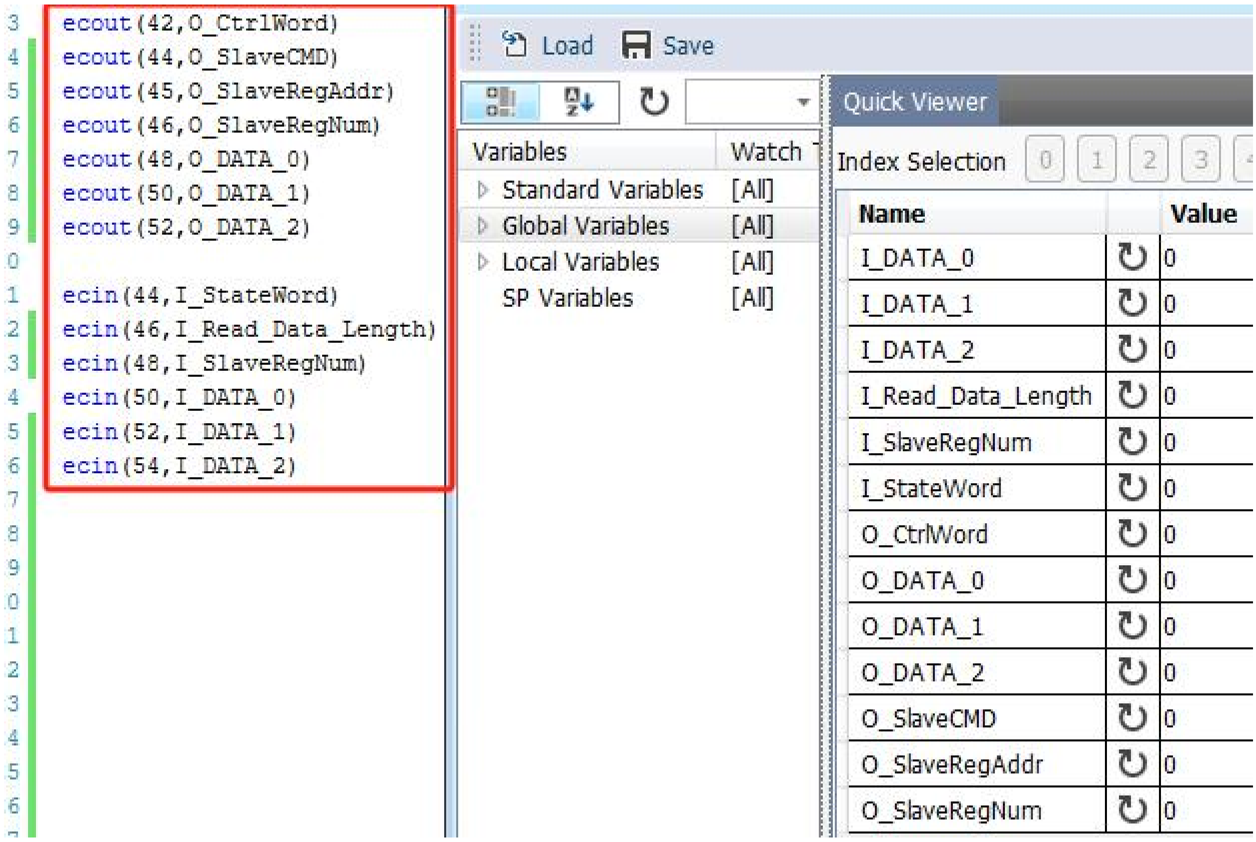


Figure 4-4-118

- After writing 0xA1 (161) in CtrlWord to enter the configuration mode, configure the operation mode toModbus RTU Slave(2) mode, then press Ctrl+Word and type (0) to exit configuration mode, as shown in the following figure.Note: After using the configuration command, the value in the register needs to change in order to send the configuration command correctly. If you are not sure whether the value has changed, you can modify it to another value and then change it back to the correct value.

```
O_CtrlWord = 161          !CONFIGUREPORT
coewrite/1(0,0x8006,0x1,2)
O_CtrlWord = 0
```

Figure 4-4-119

- Open the ModbusPoll software on the PC and create a new project.

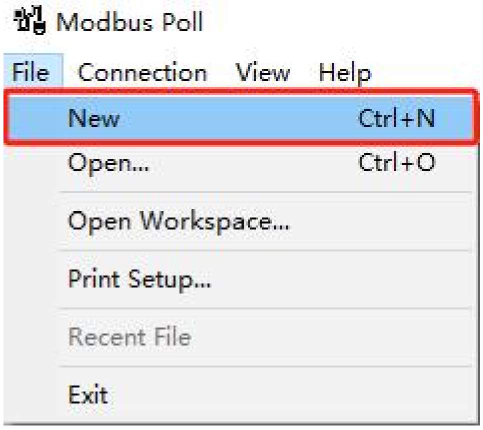


Figure 4-4-120

➢ Connect to the serial device.

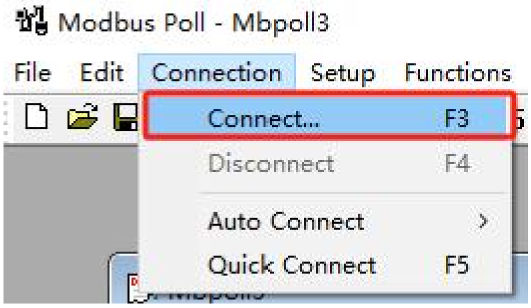


Figure 4-4-121

➢ As shown in the figure below, set the slave station parameters.

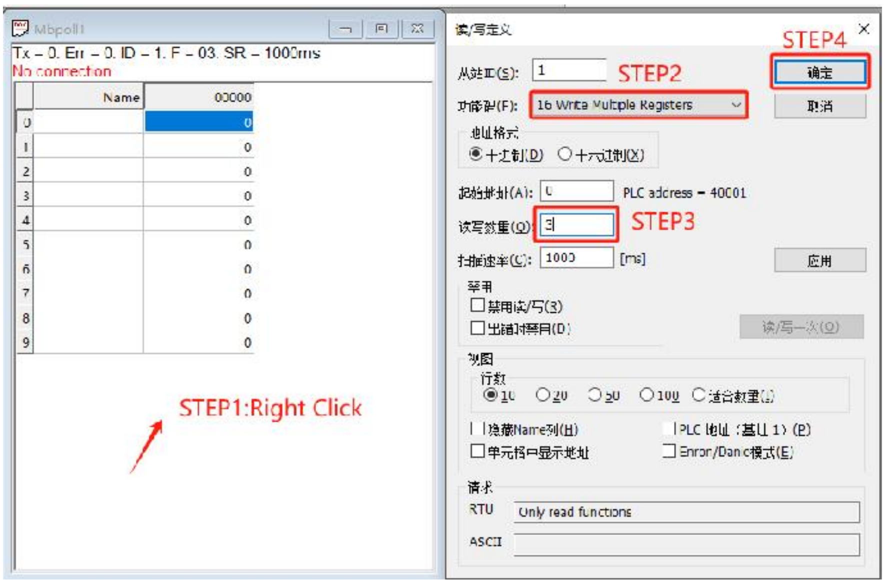


Figure 4-4-122

➢ Set the data that the PC writes to the card.

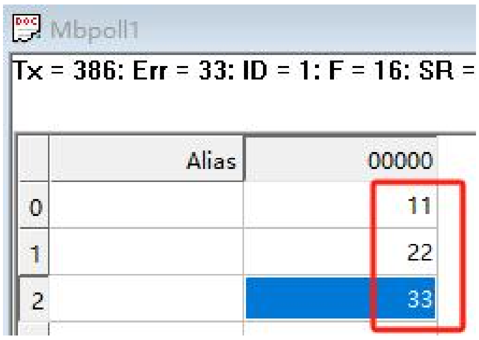


Figure 4-4-123

➢ SlaveCMD writes command 0x02.

O_CtrlWord	↻	0
O_DATA_0	↻	0
O_DATA_1	↻	0
O_DATA_2	↻	0
O_SlaveCMD	↻	2
O_SlaveRegAddr	↻	0
O_SlaveRegNum	↻	3

Figure 4-4-124

➢ laveRegNum writes quantity 3.

O_CtrlWord	↻	0
O_DATA_0	↻	0
O_DATA_1	↻	0
O_DATA_2	↻	0
O_SlaveCMD	↻	2
O_SlaveRegAddr	↻	0
O_SlaveRegNum	↻	3

Figure 4-4-125

➢ Check the module input data and the current data is consistent with the sent data.

I_DATA_0	↻	11
I_DATA_1	↻	22
I_DATA_2	↻	33
I_Read_Data_Length	↻	6
I_SlaveRegNum	↻	3
I_StateWord	↻	2

Figure 4-4-126