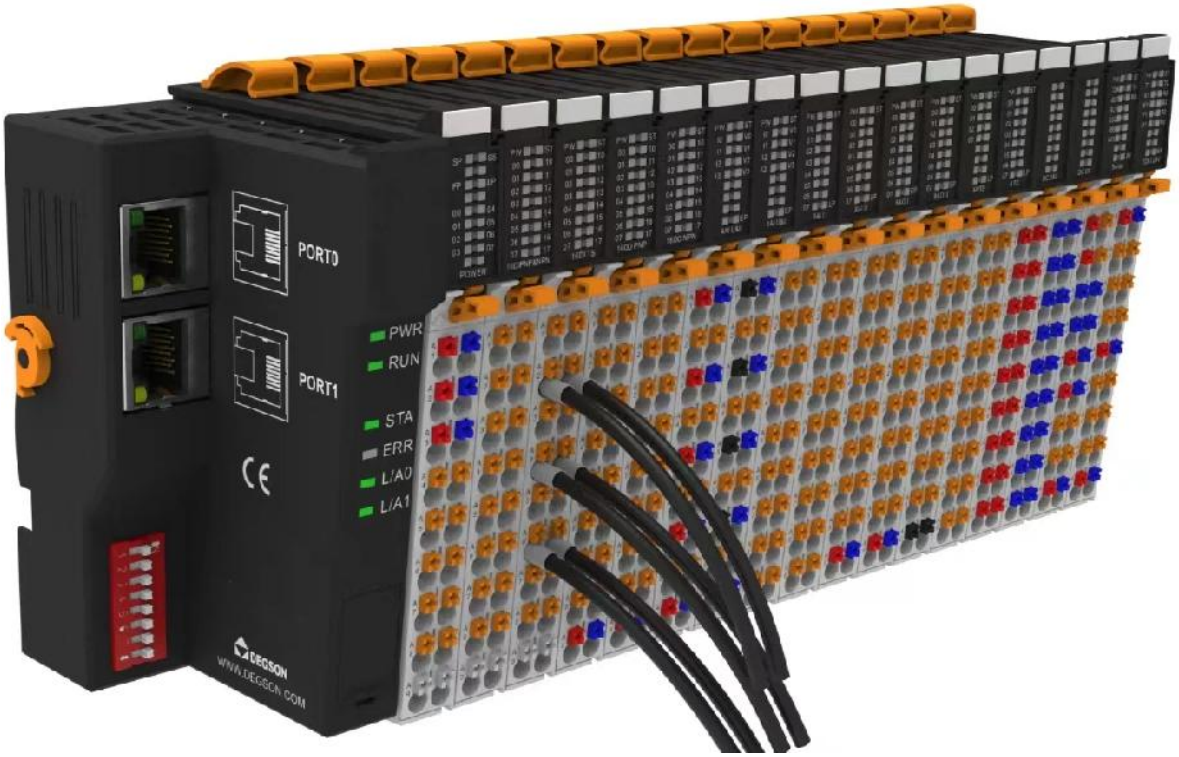
DF50-C- EN - IP

adapter

User Manual



Version History

date	Version	describe
2024/ 9 / 2 6	v1.0.0	Release version

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Preface

Scope of this document

This document is applicable to DF50 series remote IO system

Introduction

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

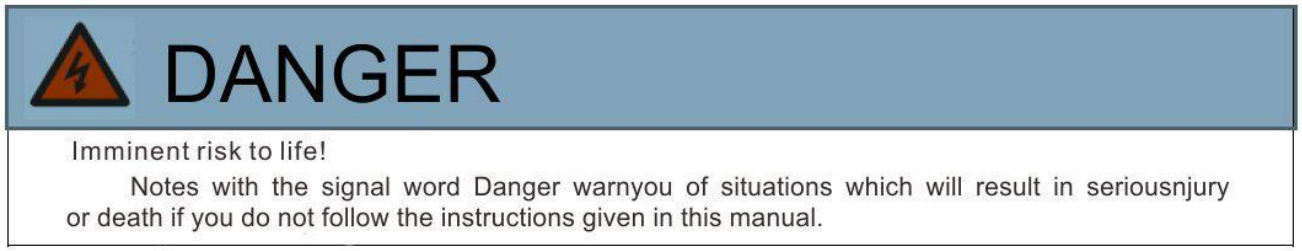
The main contents include:

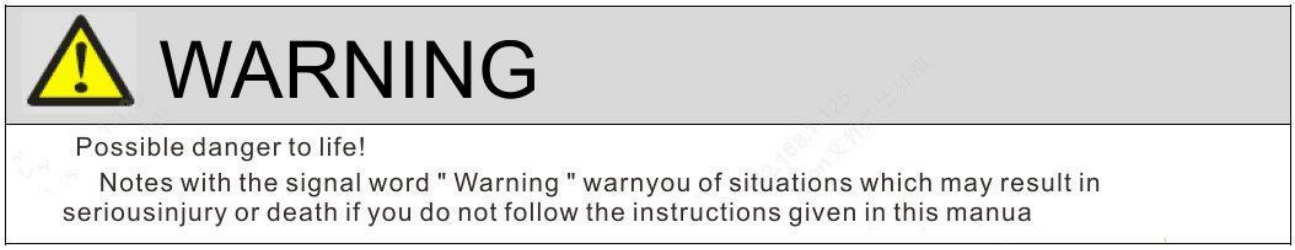
- System Overview: Mainly introduces the product ordering information, product composition, system architecture, product transportation, storage environment, etc. of the DF50 series remote I/O modules;
- Product Description: Introduces the technical parameters of the DF50 series remote I/O modules;
-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

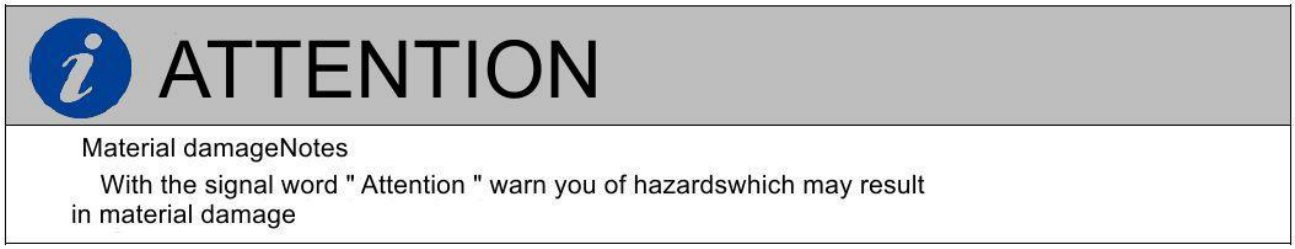
Precautions

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

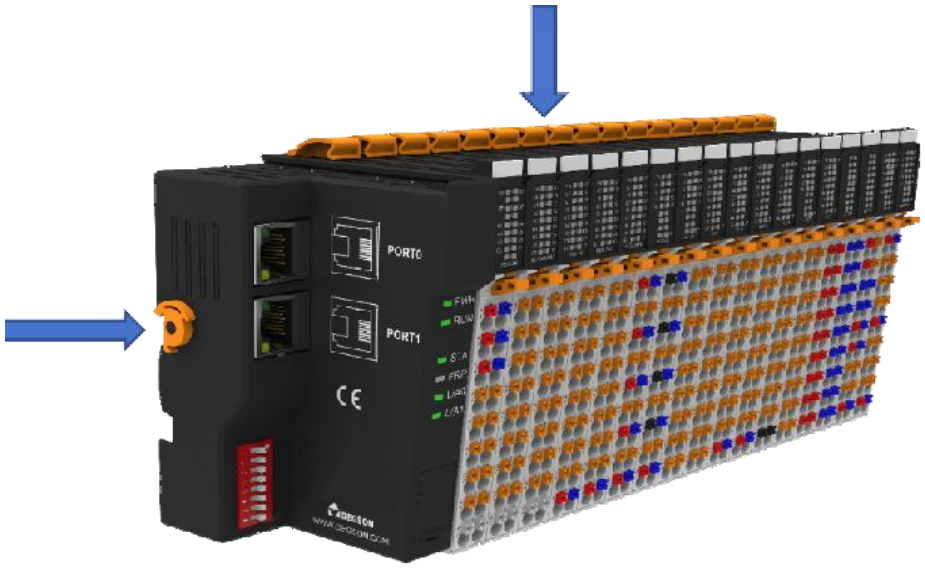
To ensure environmentally friendly recycling of your old device, please contact a certified electronic waste

disposal agency.

1. Product installation and removal

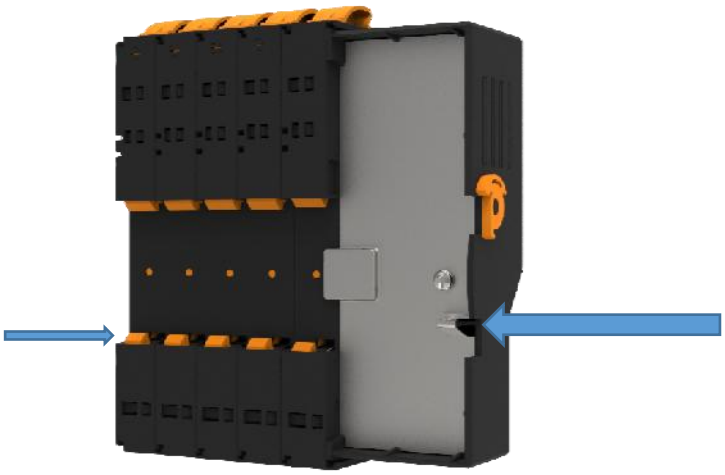
1.1. Installation

- 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.



1.2. 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.



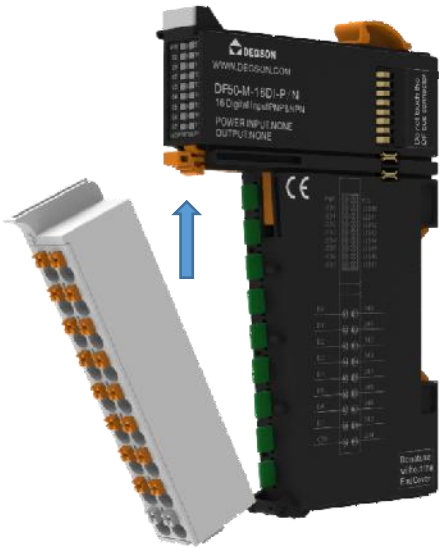
1.3. Disassembly method

1.3.1. 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).

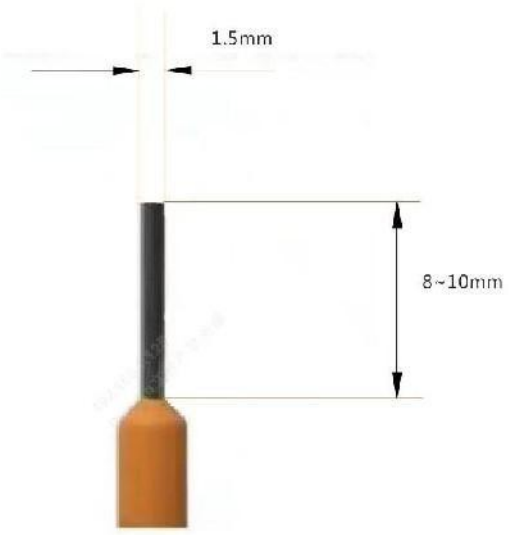
1.3.2. Terminal removal

The terminals can be removed individually by pressing the snaps.

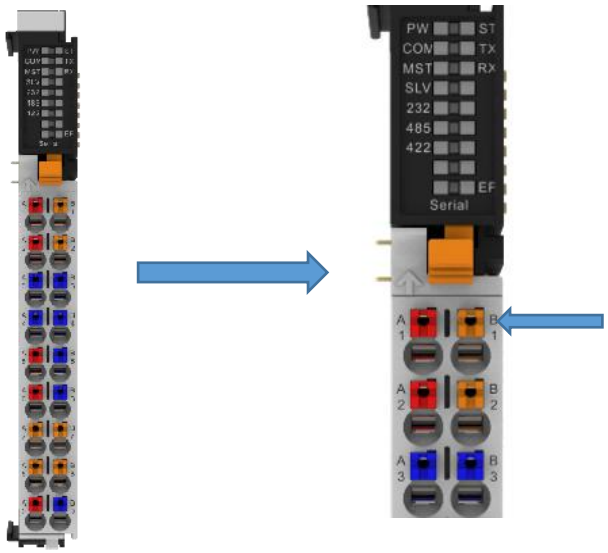


1.3.3. Cold pressed terminal

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.



1.4. 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
	Ethernet/IP bus, 2 RJ45, expandable to 32 modules, 24VDC	DF50-C- EN - IP

1. Ethernet/IP fieldbus adapter (DF 50 -C- EN - IP)

- DF50-C- EN - IP This fieldbus adapter is connected to the Ethernet/IP master station as a slave station . Ethernet/IP is an open industrial Ethernet standard in the field of automation. DF50-C- EN - IP This fieldbus adapter interacts with the expansion module for data transmission, where the analog module and special function module transmit data in the form of words, and the digital module transmits data in the form of bits.
- The fieldbus coupler can be integrated into the application as an Ethernet/IP 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.

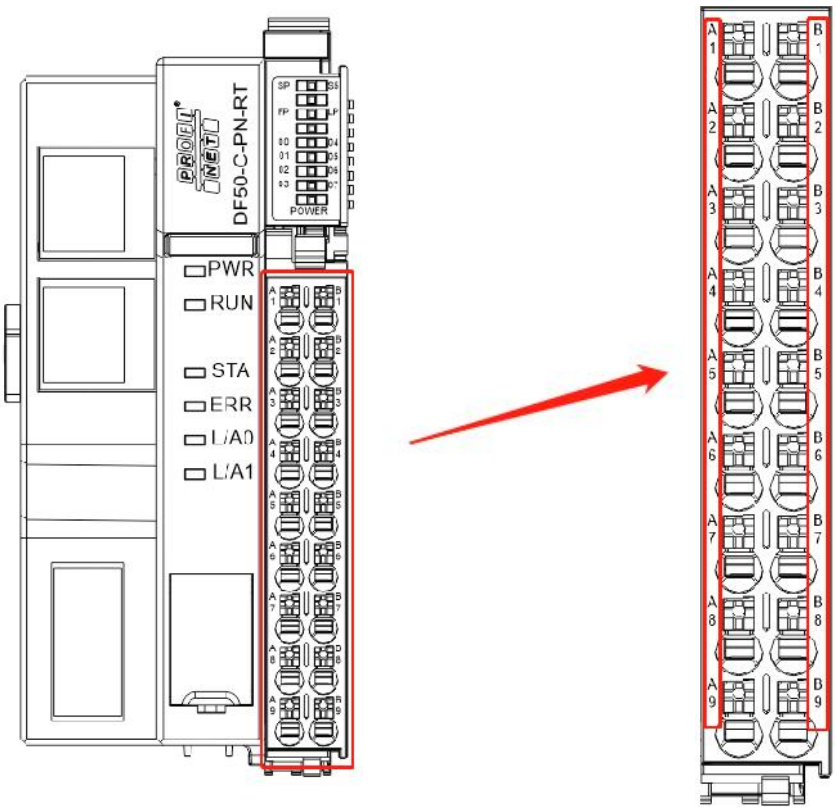
1.1. Specifications

Technical Information		
Specifications		Ethernet/IP bus, 2 RJ45, expandable to 32 modules, 24VDC
Product Description		Ethernet/IP
Connection		2 X RJ45, integrated switch function
Transfer rate		10/100Mbps, full-duplex
Transmission distance		100 meters
PDO Data		1024 bytes
Expandable number of modules		32
Address Mapping		support
Bus address setting		Ethernet/IP Specifications
Transmission medium		Category 5 twisted pair
Isolation method		Electrically isolated from the field
characteristic		RT, Class C compliant, MRP, automatic addressing/topology detection
Alarm function		Diagnostic alarm, process alarm, connector plug and unplug alarm
Minimum cycle time		1ms
Connection		PUSH-IN Terminal 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 (typical at 24V)
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 (typical at 24V)
Internal load rated voltage output		24V DC (20.4V DC~ 28.8V DC)
Internal load rated current output		0.75A (typical at 24V)
D I Parameters		
Number of channels		8
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)

Data size	1 Byte
Connection Type	1-wire, Type 1/Type 3, according to IEC 61131-2
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-wise access
Wiring parameters	
Connection technology: Communication/fieldbus	Ethernet/IP: 2 x RJ-45
Connection technology	PUSH-IN Terminal Blocks
Connection Type	System/Field Power Supply/Input
Wire crimping area	0.14～1.5mm2/26～16AWG
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

1.2. Hardware Interface

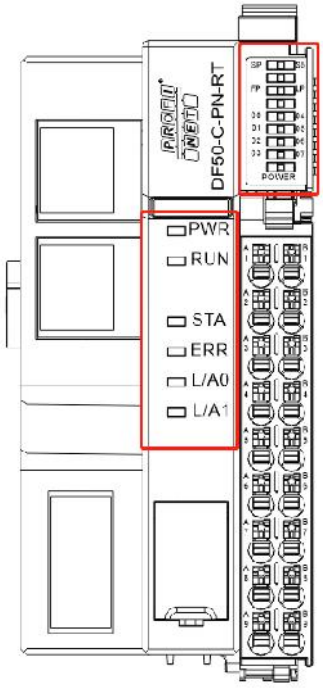
1.2.1. Terminal Block Definition



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	DI signal 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 the best anti-interference performance.

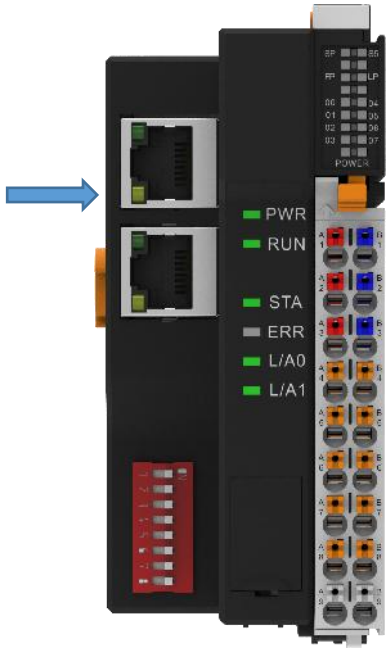
1.2.2. LED indicator definition



Indicator Lights	state	meaning
PWR	Green Bright	Power supply is operating normally
	Green Kill	Abnormal power supply operation
RUN	Green Bright	The coupler is operating normally
	Green Kill	Abnormal operation of the coupler
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 port 1 is connected successfully
	Green Flash	Network port 1 has data communication
L/A1	Green Bright	Network port 2 is connected successfully
	Green Flash	Network port 2 has data communication
FP	Green light is always on	Load power input is normal
	Green light off	Load power input abnormality

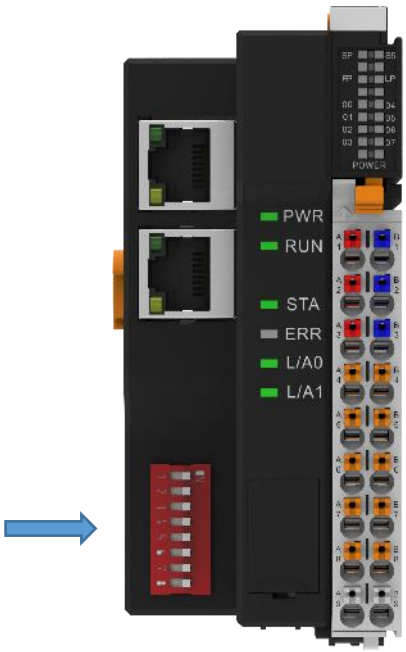
LP	Green light is always on	Load power output is normal
	Green light off	Load power output abnormality
SP	Green light on	System power input is normal
	Green light off	System power input abnormality
S5	Green light on	System power output is normal
	Green light off	System power output abnormality

1.2.3. RJ45 interface



For establishing communication with the host computer, the dual RJ45 ports can easily create a linear structure without using any other network components.

1.2.4. Dip switch



As shown in the figure, the EtherNET/IP adapter module has a set of dip switches. The dip switches have 8 positions, namely position 1, position 2, position 3, position 4, position 5, position 6, position 7 and position 8. Each position represents a value. When pushed to the ON position, they represent 1, 2, 4, 8, 16, 32, 64 and 128 respectively. The sum of the values represented by the positions turned to ON is the address code of the machine.

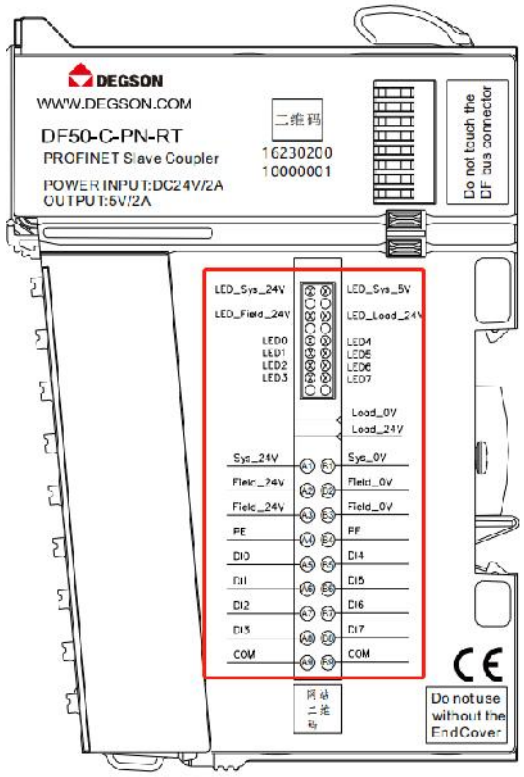
Address 11 is: 1(bit 1) + 2(bit 2) + 8(bit 4) = 11, and address 30 is: 2(bit 2) + 4(bit 3) + 8(bit 4) + 16(bit 5) = 30;

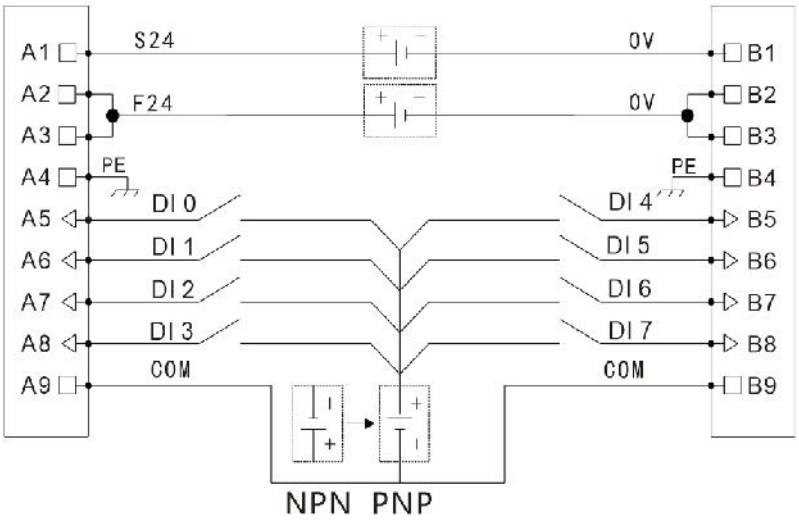
All the dials are turned down to represent 0.

The dip switch can be used to set the last byte of the adapter module IP address, that is, the D segment of the IP address A:B:C:D. The ABC segment of the IP address can be configured through the "IP Setting Tool" configuration tool. In particular, when the dip switch is set to 0 or 255, the ABCD segments of the adapter IP address all use the information configured by the "IP Setting Tool". When the dip switch is set to 254, the adapter IP address is fixed to 192.168.0.254. Therefore, when the IP address is lost, forgotten or in other abnormal situations, the dip switch can be set to 254, and the 192.168.0.254 address can be used to enter the "IP Setting Tool" configuration to reconfigure the network information of the adapter.

When shipped from the factory, the DIP switch is set to 0 and the IP address is configured to 192.168.0.1.

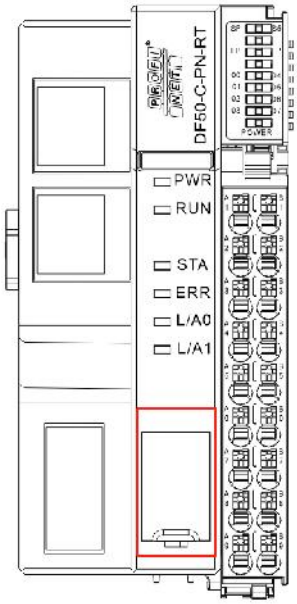
1.2.5. Wiring Diagram





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

1.2.6. Configuring the Interface



configuration 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. Process data definition

1.3.1. SystemDiagnostic: Diagnostic module

The diagnostic module contains two bytes of input data and two bytes of output data. The diagnostic module can display the fault information of the IO module. The user can also obtain the software version of the IO module through the output setting command.

1. Display IO module fault information

Input data: 2 Byte		
Byte No.	illustrate	Remark
Byte 0	Location of the faulty	0x01 represents the first IO module, 0x02 represents the second
Byte 1	Fault Codes	See fault code table 1 for details
Output data: 2 Byte		
Byte No.	illustrate	Remark
Byte 0	Clear Errors	After troubleshooting, write 0x 0001 to clear the current error.
Byte 1		

Table 1: Fault code table

Fault Codes	Fault Description	Troubleshooting
0x10	PLC and adapter communicate normally	/
0xE1	Module power supply abnormality	Check the power cord connection
0xE2	Analog module calibration failure	Contact Supplier
0xE3	Module internal initialization exception	Contact Supplier
0xE 4	Overcurrent signal detected	Check peripherals

0xE8	Module offline	Check inter-module connections

2. Get the software version of the IO module inserted later

Input data: 2 Byte		
Byte No.	illustrate	Remark
Byte 0	IO module software version	0x11 means version V11, and so on.
Byte 1	Reserve	/
Output data: 2Byte (need to be operated by word)		
Word No.	illustrate	Remark
Word 0	Get module software version command output	Setting 0x100 can obtain the software version of the coupler module, setting 0x101 can obtain the software version of the first IO module, setting 0x102 can obtain the software version of the second IO module, and so on.

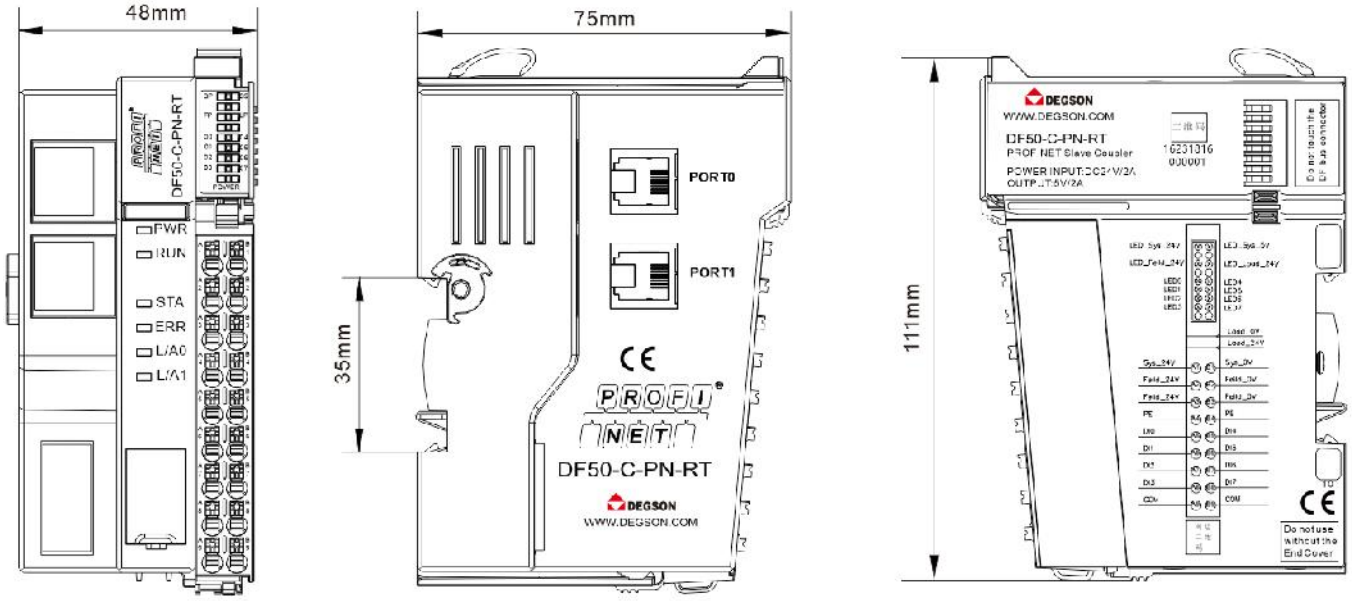
1.3.2. AdapterDigitalInput: Adapter 8-channel digital input display.

Input data: 2 Byte								
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DI 07	DI 06	DI 05	DI 04	DI 03	DI 02	DI 01	DI 00
Byte 1	reserve							

1.4. Mechanical Installation

1.4.1. Installation Dimensions

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



3. Expansion I / O Modules

Function	describe	model
Digital Module	Digital input, 16 inputs, PNP/NPN	DF50-M-16DI-P/N
Digital Module	Digital input, 16 inputs, 8-channel counting, PNP/NPN	DF50-M-16DI-P/N -TS
Digital Module	Digital output, 16 outputs, PNP	DF50-M-16DO-P
Digital Module	Digital output, 16 outputs, NPN	DF50-M-16DO-N
Analog Modules	Analog input, 4 channels, voltage and current type	DF50-M-4AI-UI-6
Analog Modules	Analog input, 8 channels, voltage type	DF50-M-8AI-U-4
Analog Modules	Analog input, 8 channels, current type	DF50-M-8AI-I-5
Analog Modules	Analog output, 4 channels, voltage and current type	DF50-M-4AO-UI-6
Analog Modules	Analog output, 8 channels, voltage type	DF50-M-8AO-U-4
Analog Modules	Analog output, 8 channels, current type	DF50-M-8AO-I-5
Temperature Module	Thermal resistance measurement, 4 channels	DF50-M-4RTD-PT
Temperature Module	Thermocouple measurement, 8 channels	DF50-M-8TC
Pulse counting module	Encoder input/pulse input , 2 channels, 24V	DF50-M-2CNT-PIL-24
Pulse counting module	Encoder input/pulse input , 2 channels, 5V	DF50-M-2CNT-PIL-5
Voltage distribution module	24VDC voltage distribution, 16 channels	DF50-M-DC-U- 24
Voltage distribution module	0VDC voltage distribution, 16 channels	DF50-M-DC-U- 0
Communication module	232/485/422 serial communication, 1 channel	DF50-M-1COM-232/485/422
Digital Module	Digital input, 32 inputs, PNP/NPN	DF50-M-32DI-P/N
Digital Module	Relay module , 4 channels	DF50-M-4DOR

Digital Module	Digital output, 4 outputs, PNP , 2A per channel	DF50-M-4DO-P-2A
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 input and output , 16 input and 16 output , NPN	DF50-M-16DI-16DO-N
Digital Module	Digital input and output , 16 input and 16 output , PNP	DF50-M-16DI-16DO-P

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.

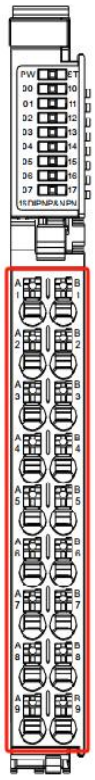
1.1 Specifications

Technical Information		
Product Description		Digital Input Module, 16 Inputs, NPN & PNP, 24VDC
Number of channels		16
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		2 Byte
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- 40 ms 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		45mA
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		0.2～1.5mm ^{2} /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

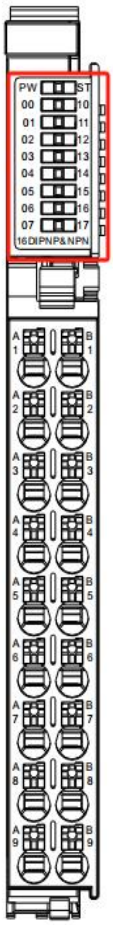
1.2 Hardware Interface

1. 2.1 Terminal Block Definition



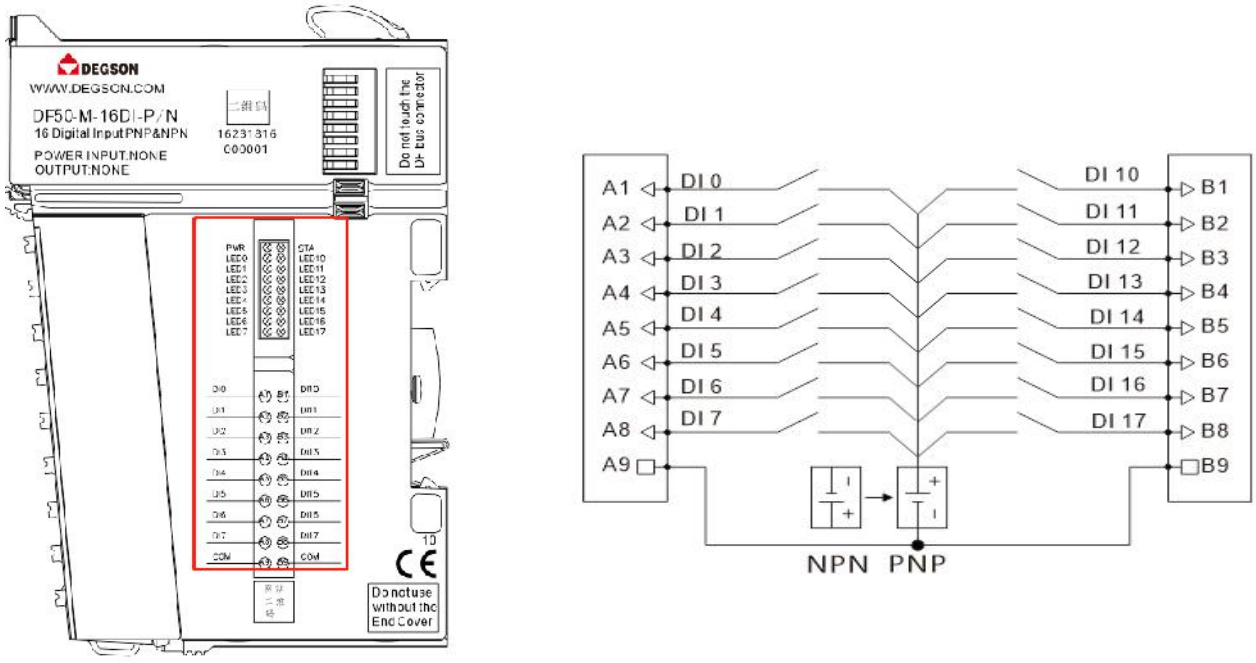
Terminal number	Signal	Terminal number	Signal	illustrate
A1	DI 0	B1	DI 10	DI signal input
A2	DI 1	B2	DI 11	
A3	DI 2	B3	DI 12	
A4	DI 3	B4	DI 13	
A5	DI 4	B5	DI 14	
A6	DI 5	B6	DI 15	
A7	DI 6	B7	DI 16	
A8	DI 7	B8	DI 17	
A9	COM	B9	COM	Public

1. 2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green: System bus power input is normal	
	Green off: System bus power input is abnormal	
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	

1. 2.3 Wiring Diagram



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

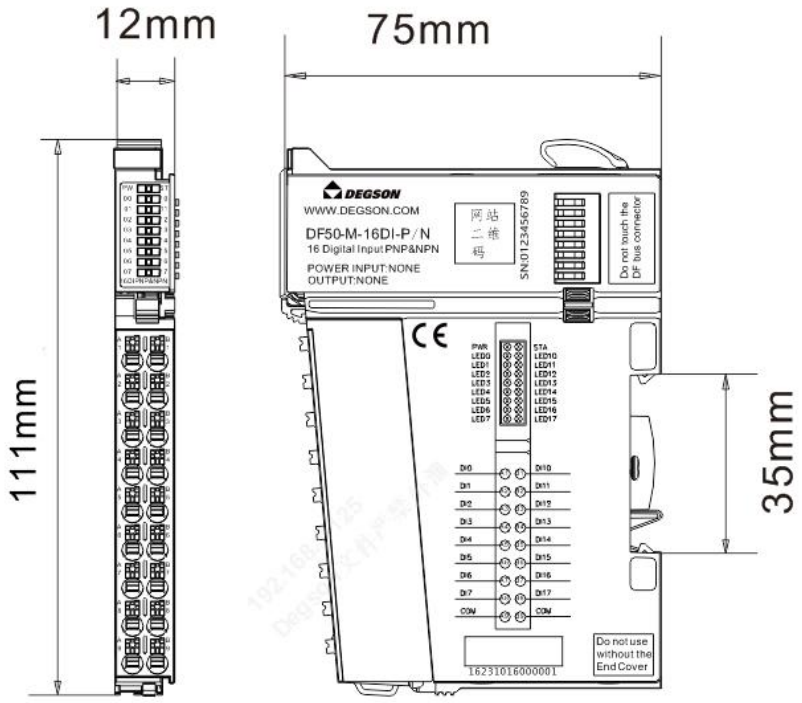
1.3 Process data definition

DF 50 -M-16DI- P/N module process data definition

Input Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DI 7	DI 6	DI 5	DI 4	DI 3	DI 2	DI 1	DI 0
Byte 1	DI 17	DI 16	DI 15	DI 14	DI 13	DI 12	DI 11	DI 10

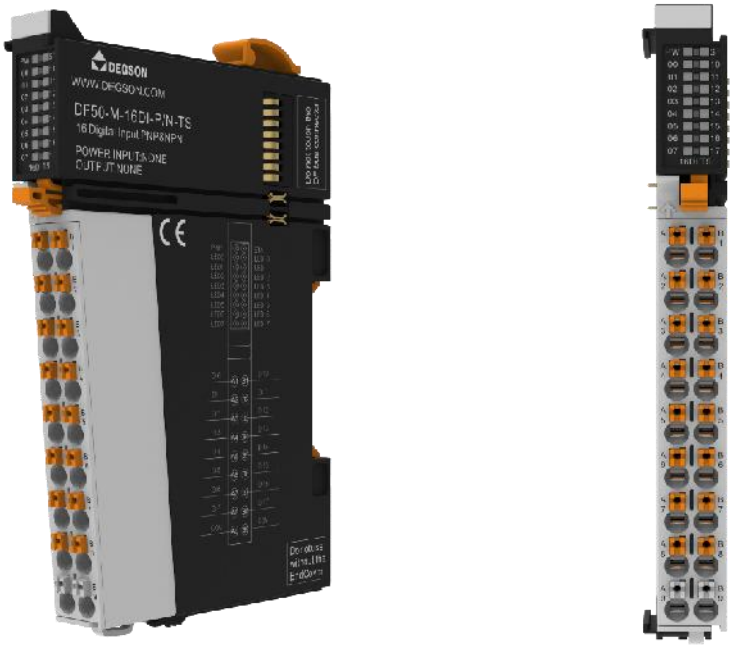
1.4 Mechanical installation

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



2 16-channel digital input/8-channel 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 counting function , 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

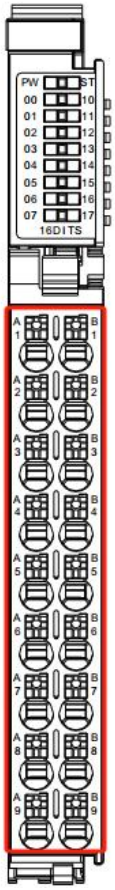
Technical Information		
Product Description		Digital input counting module, 16 inputs, 8 channels with counting function , NPN & PNP, 24VDC
Number of channels		16
Signal Type		NPN & PNP
Signal range	"ON" signal voltage	Voltage difference > 11VDC (voltage difference with common input)
	"OFF" signal voltage	Voltage difference <5VDC (voltage difference with common input)
Counting function Channel parameter information	Counting Mode	Rising edge counting, falling edge counting, double edge counting, configurable
	Counting range	0~4294967296
	Maximum input frequency of counting channel	1KHz
	Count value clear	support

	function	
Hardware response time		200us/200us
filter time without counting function		0~255ms configurable
Data size		Input 34 Byte ; Output 1 Byte
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
Input Impedance		>7.5kΩ
Input Action Display		When the input is in driving state, the input indicator light is on.
IO Mapping		Support bitwise or wordwise 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 (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		0.2～1.5mm ^{2} /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

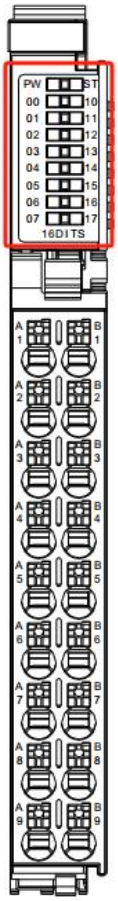
2.2 Hardware Interface

2. 2.1 Terminal Block Definition



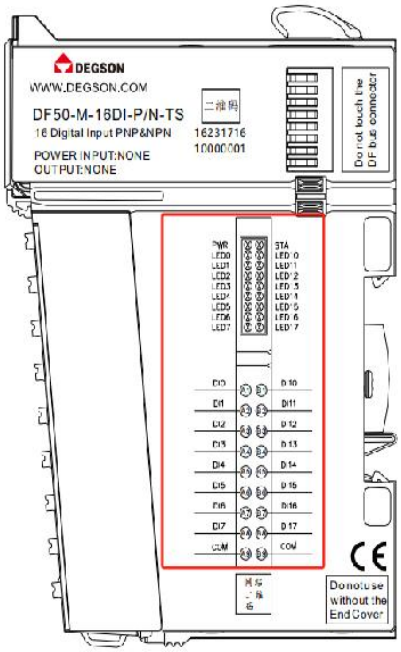
Terminal number	Signal	Terminal number	Signal	illustrate
A1	DI 0	B1	DI 10	DI signal input
A2	DI 1	B2	DI 11	
A3	DI 2	B3	DI 12	
A4	DI 3	B4	DI 13	
A5	DI 4	B5	DI 14	
A6	DI 5	B6	DI 15	
A7	DI 6	B7	DI 16	
A8	DI 7	B8	DI 17	
A9	COM	B9	COM	Public

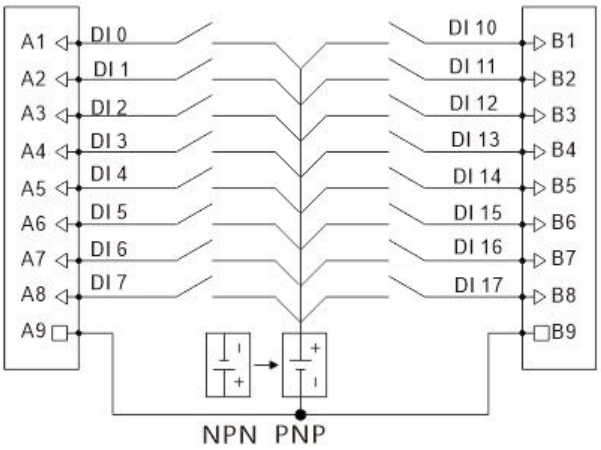
2.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green: System bus power input is normal	
	Green off: System bus power input is abnormal	
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	

2. 2.3 Wiring Diagram

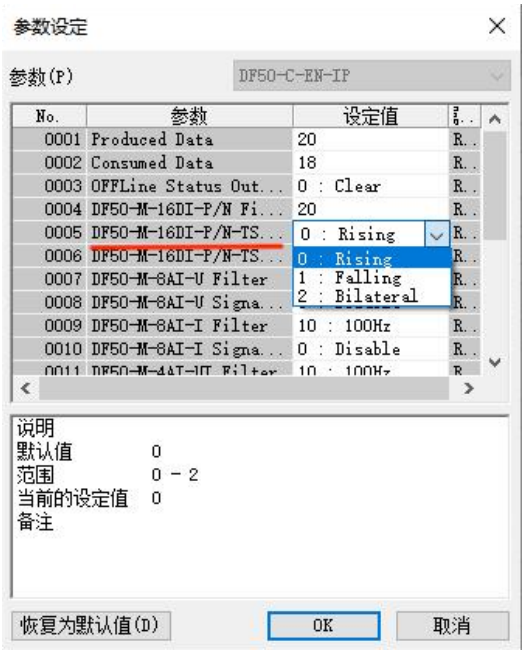




Note: COM is the common terminal, external 24V realizes NPN; external 0V realizes PNP.

2.3 Configuration Data

As shown in the figure, users can uniformly configure the trigger mode for input channel counting from CH00 to CH07 .



There are three counting trigger modes for users to choose from, and their specific meanings are shown in the table.

name	meaning
Rising	Rising edge trigger counting
Falling	Falling edge trigger count
Bilateral	Double edge trigger counting

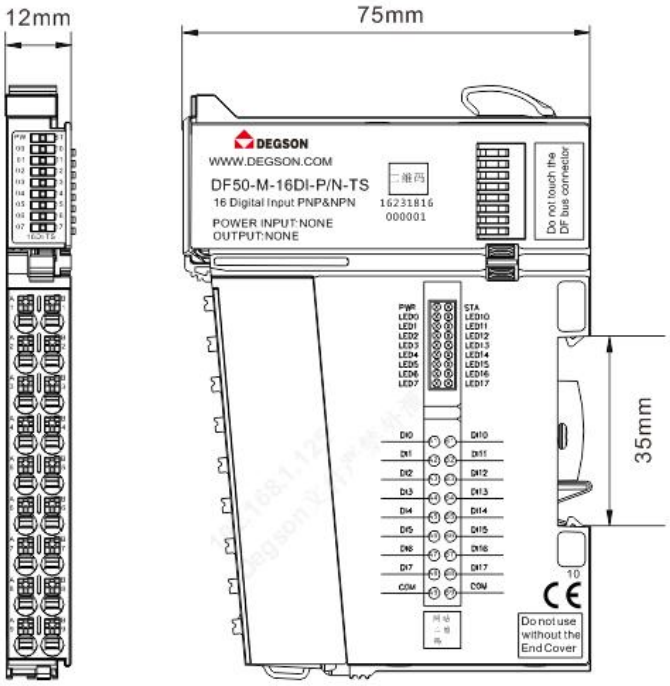
In addition, users can also make unified settings for the signal filtering of the input channels CH10~CH17 without counting function.

2.4 Process data

Output data: 1 Byte		
Byte0	Bit0	0: Channel 0 counts normally; 1: Channel 0 count value is cleared
	Bit1	0: Channel 1 counts normally; 1: Channel 1 count value is cleared
	⋮	⋮
	Bit6	0: Channel 6 counts normally; 1: Channel 6 count value is cleared
	Bit7	0: Channel 7 counts normally; 1: Channel 7 count value is cleared
Input data: 34 Byte		
Byte0	Bit0	Channel 0 signal status
	Bit1	Channel 1 signal status
	⋮	⋮
	Bit6	Channel 6 signal status
	Bit7	Channel 7 signal status
Byte1	Bit0	Channel 10 signal status
	Bit1	Channel 11 signal status
	⋮	⋮
	Bit6	Channel 16 signal status
	Bit7	Channel 17 signal status
Byte2-Byte5	DWord	Channel 0 input count value
Byte6-Byte9	DWord	Channel 1 input count value
⋮	⋮	⋮
Byte 26 -Byte 29	DWord	Channel 6 input count value
Byte 30 -Byte 33	DWord	Channel 7 input count value

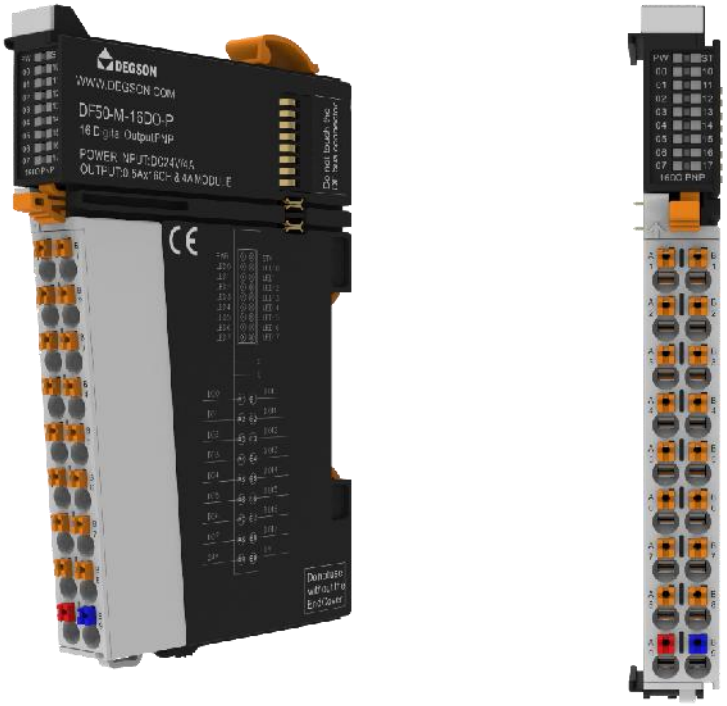
2.5 Mechanical Installation

The installation dimension information is shown in the figure below, in units (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.



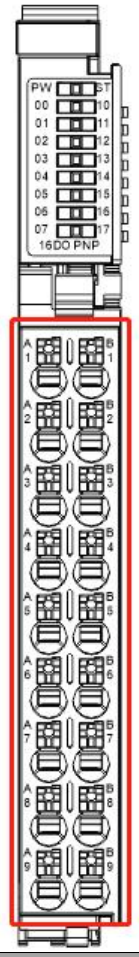
3.1 Specifications

Technical Information	
Product Description	Digital output module, 16 outputs, PNP , 24VDC
Number of channels	16
Signal Type	PNP
"OFF" signal voltage	High impedance
"ON" signal voltage	24 V 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 bitwise or wordwise 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-IN Terminal Blocks
Wire crimping area	0.2～1.5mm ^{2}/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

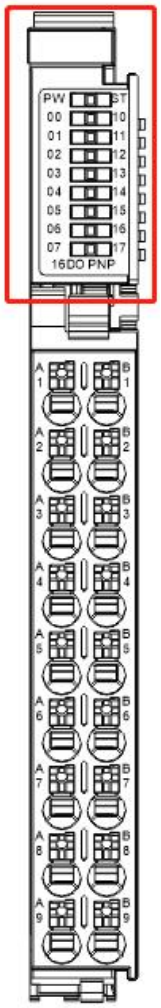
3.2 Hardware Interface

3.2.1 Terminal Block Definition



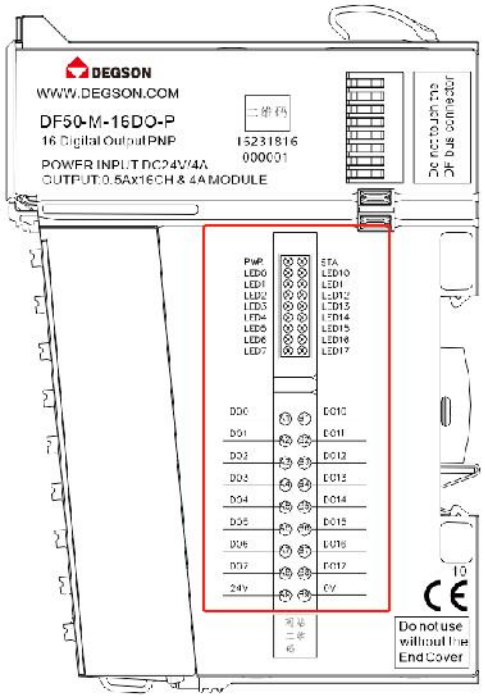
Terminal number	Signal	Terminal number	Signal	illustrate
A1	DO 00	B1	DO 10	DO signal output
A2	DO 01	B2	DO 11	
A3	DO 02	B3	DO 12	
A4	DO 03	B4	DO 13	
A5	DO 04	B5	DO 14	
A6	DO 05	B6	DO 15	
A7	DO 06	B7	DO 16	
A8	DO 07	B8	DO 17	
A9	24V	B9	0V	Terminal power input

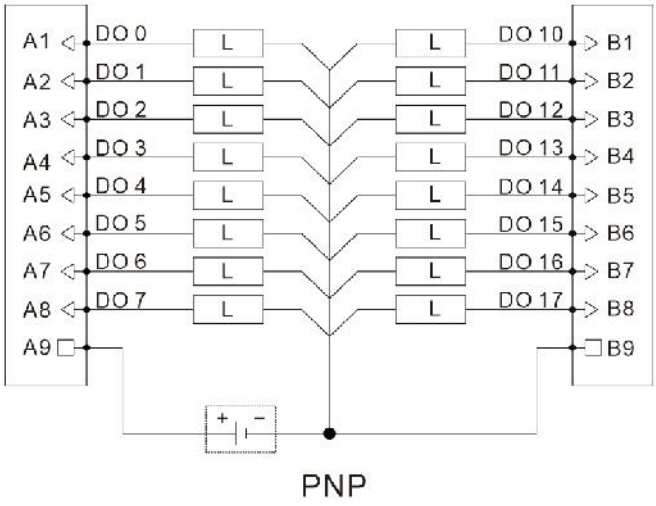
3.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green: System bus power input is normal	
	Green off: System bus power input is abnormal	
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	Green: Output signal is valid	
	Green off: Output signal is invalid	

3.2.3 Wiring Diagram





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

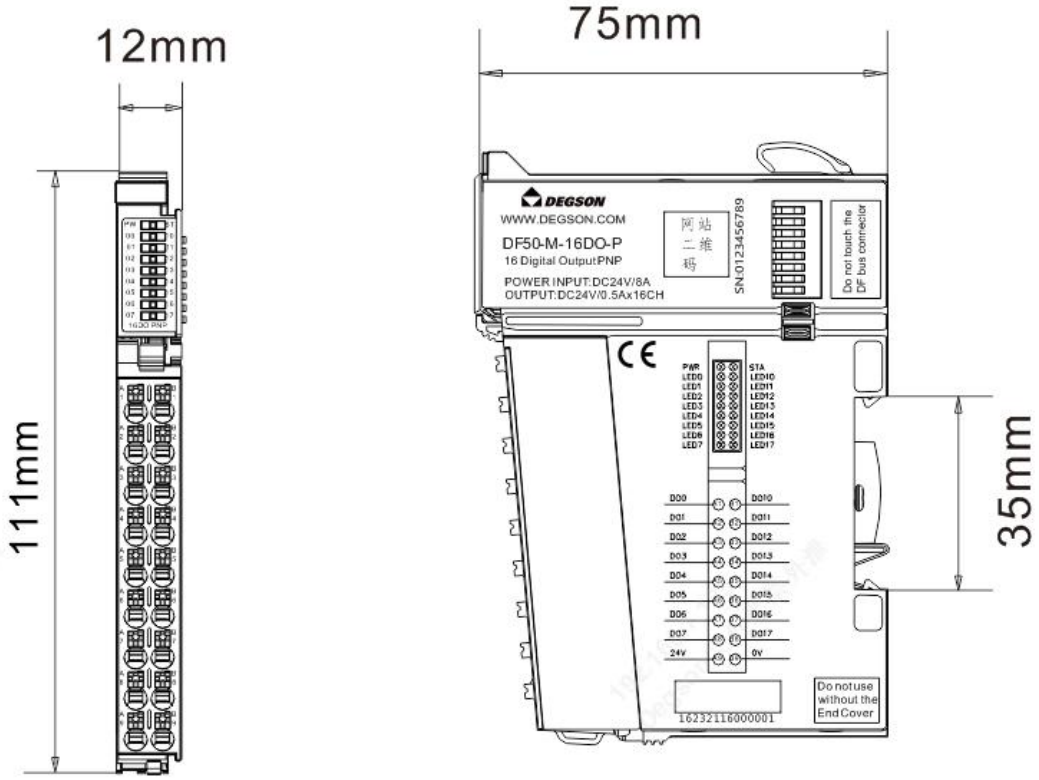
3.4 Process data definition

DF 5 0-M-16D O - P module process data definition

Output Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DO 7	DO 6	DO 5	DO 4	DO 3	DO 2	DO 1	DO 0
Byte 1	DO 17	DO16	DO 15	DO 14	DO 13	DO 12	DO 11	DO 10

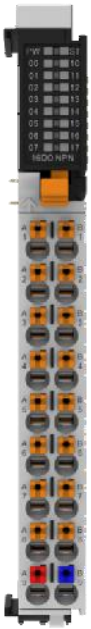
3.5 Mechanical Installation

The installation dimensions are shown in the figure below, in 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.



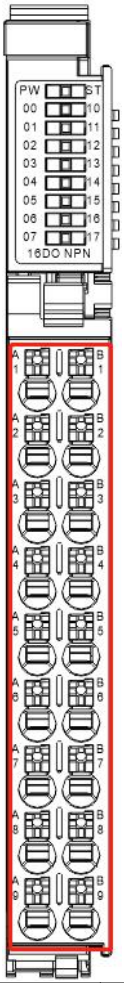
4.1 Specifications

Technical Information	
Product Description	Digital output module, 16 outputs, 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
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 bitwise or wordwise 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-IN Terminal Blocks
Wire crimping area	0.2～1.5mm ^{2}/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

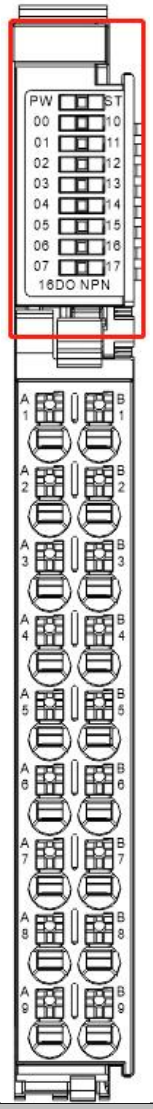
4.2 Hardware Interface

4.2.1 Terminal Block Definition



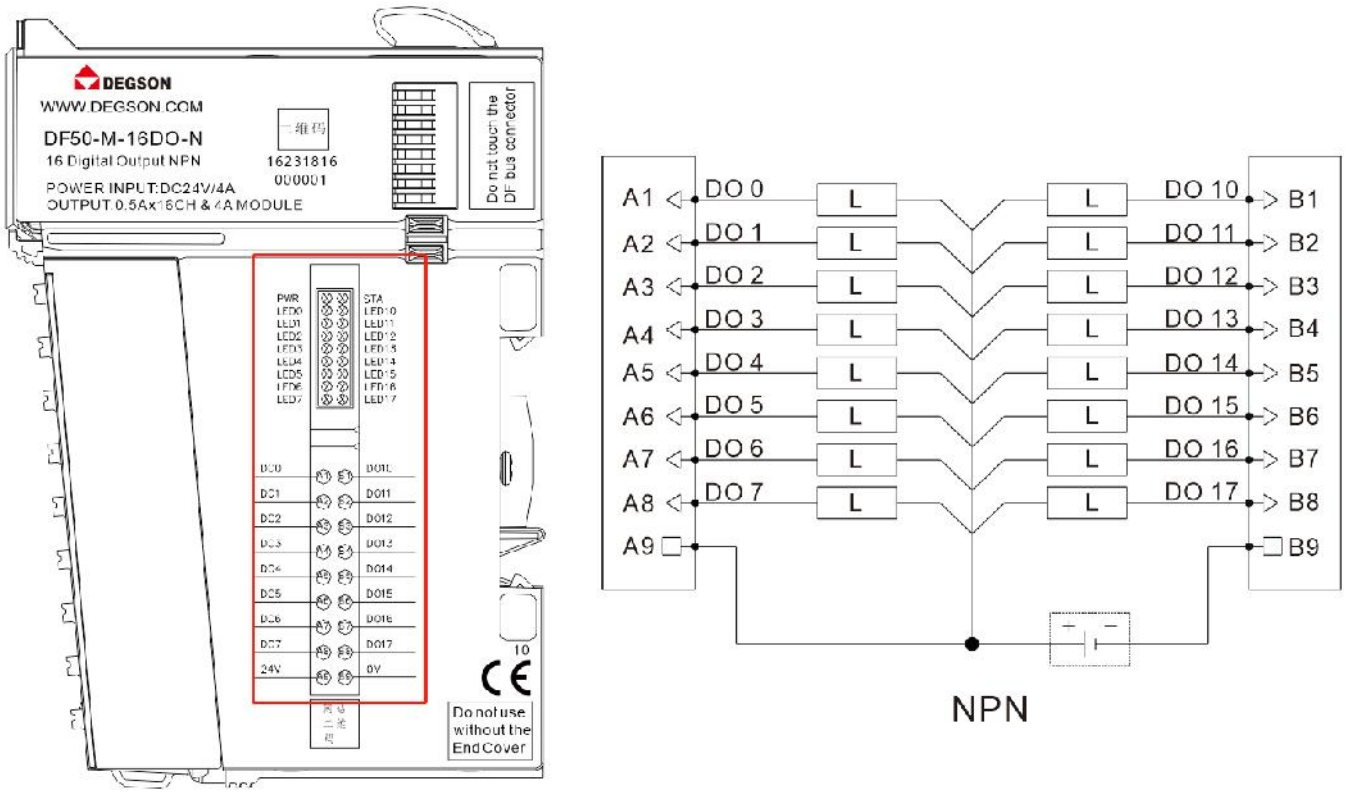
Terminal number	Signal	Terminal number	Signal	illustrate
A1	DO 00	B1	DO 10	DO signal output
A2	DO 01	B2	DO 11	
A3	DO 02	B3	DO 12	
A4	DO 03	B4	DO 13	
A5	DO 04	B5	DO 14	
A6	DO 05	B6	DO 15	
A7	DO 06	B7	DO 16	
A8	DO 07	B8	DO 17	
A9	24V	B9	0V	Terminal power input

4.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green: System bus power input is normal	
	Green off: System bus power input is abnormal	
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	Green: Output signal is valid	
	Green off: Output signal is invalid	

4.2.3 Wiring Diagram



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

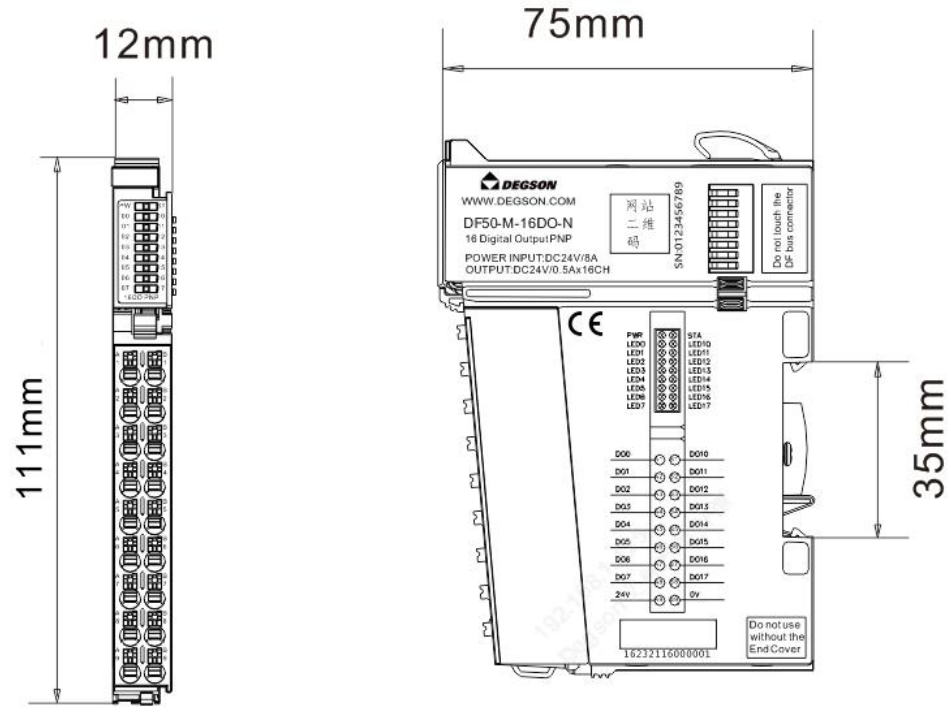
4.3 Process data definition

DF 50 -M-16D O - N module process data definition

Output Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DO 7	DO 6	DO 5	DO 4	DO 3	DO 2	DO 1	DO 0
Byte 1	DO 17	DO16	DO 15	DO 14	DO 13	DO 12	DO 11	DO 10

4.4 Mechanical Installation

The installation dimensions are shown in the figure below, in 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

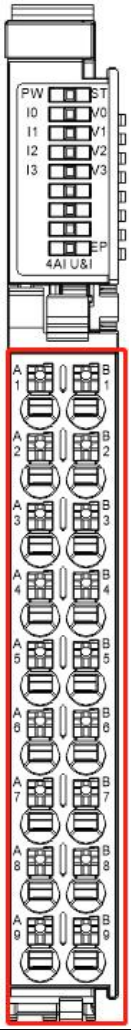
5.1 Specifications

Technical Information	
Product Description	Analog input module, 4 inputs, voltage & current
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, 1~5V support disconnection detection
Current measurement range	0~20mA, 4~20mA
Current acquisition impedance	100Ω
Current input accuracy (full temperature range)	0.2%
Current input limit	Instantaneous 30mA, average 24mA
Current input diagnostics	4~20mA supports 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~50Hz configurable
Input Action Display	When the input signal is valid, the input indicator flashes (software controlled)
IO process 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-IN Terminal Blocks
Wire crimping area	0.2～1.5mm ^{2}/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

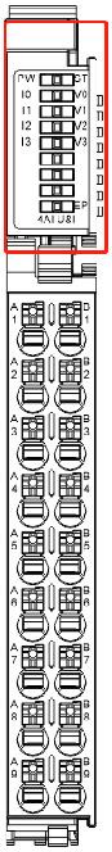
5.2 Hardware Interface

5.2.1 Terminal Block Definition



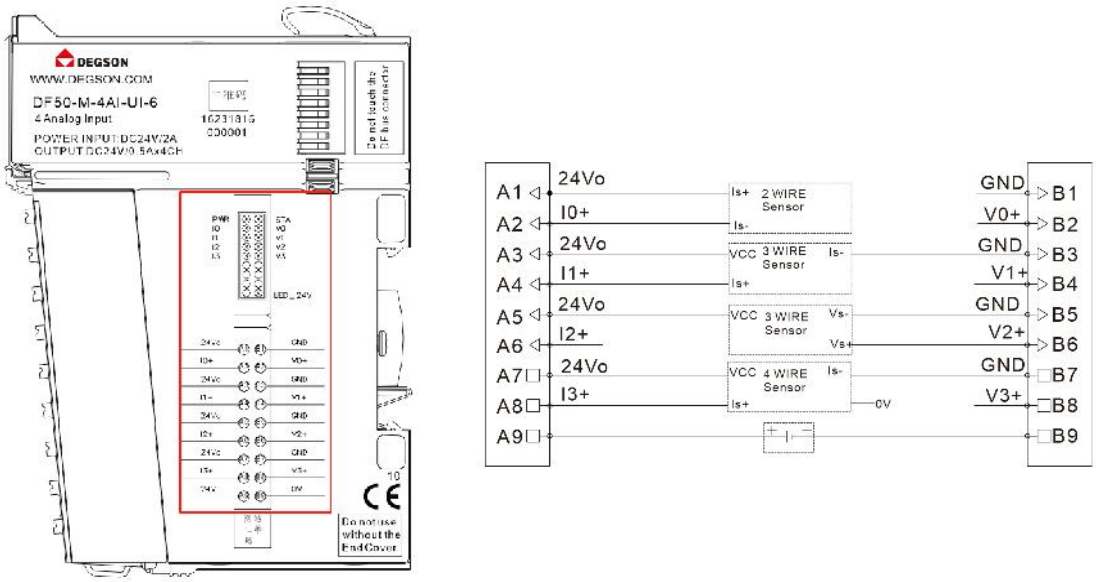
Terminal number	Signal	Terminal number	Signal	illustrate
A1	24Vo	B1	GND	Terminal power output
A2	I0+	B2	V0+	Current/voltage input channels
A3	24Vo	B3	GND	Terminal power output
A4	I1+	B4	V1+	Current/voltage input channels
A5	24Vo	B5	GND	Terminal power output
A6	I2+	B6	V2+	Current/voltage input channels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

5.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green: System bus power input is normal	
	Green off: System bus power input is abnormal	
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: The terminal power input is normal	
	Green off: Terminal power input abnormality	
I0～I3,V0～V3	Green flash: input signal is valid	
	Green off: Input signal is invalid	

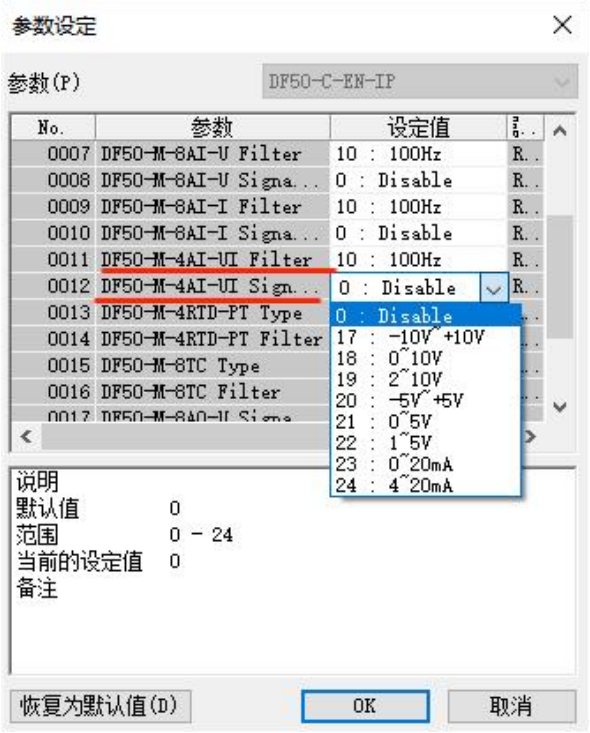
5.2.3 Wiring Diagram



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

5.3 Module configuration data definition

As shown in the figure, users can uniformly configure the signal range and signal filtering of each channel .



5.4 Module process data definition

Input data: 8 Byte

ByteNo.	Word No.	meaning
Byte0-Byte1	Word0	Channel 0 input data
Byte2-Byte3	Word1	Channel 1 input data
Byte4-Byte5	Word2	Channel 2 input data
Byte6-Byte7	Word3	Channel 3 input data

Process data definition description:

Process data description (voltage type)					
Signal range	Voltage value	Decimal data	Hexadecimal	Scope	Conversion relationship
±10V	>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	>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 U = D x 8 / 27648 + 2
	11.41V	32511	0x7EFF	Upper limit	
	10V	27648	0x6C00	Normal range	
	6V	13824	0x3600		
	2V	0	0x0000		

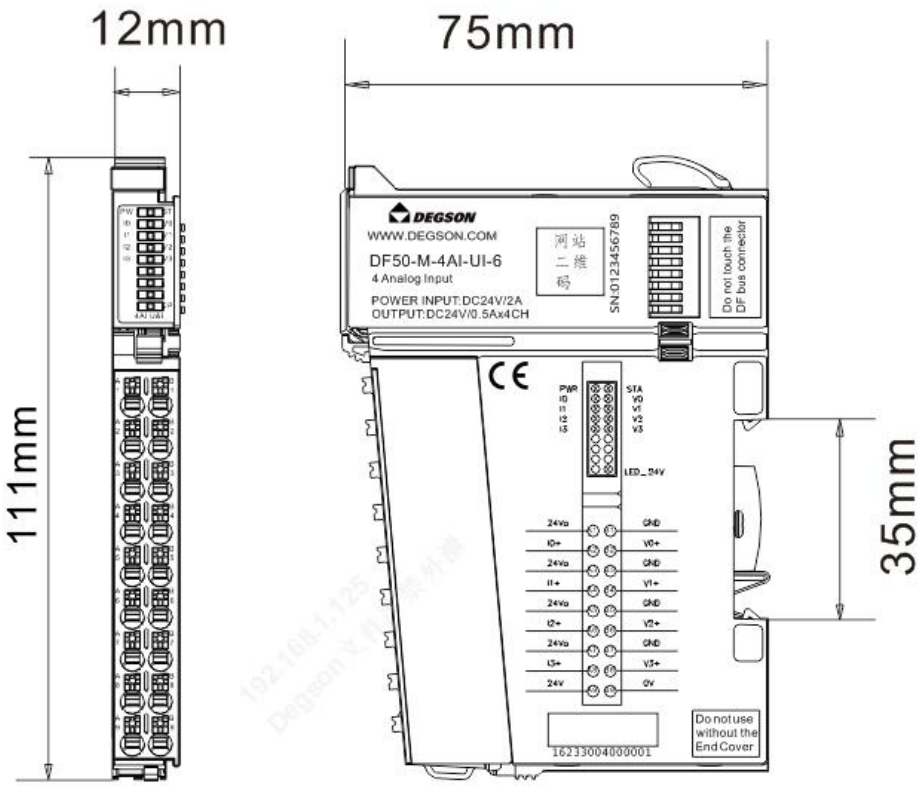
	0.59 V	-4864	0xED00	Lower limit	
	<0.59 V	-32768	0x8000	Underflow	
	>5.88V	32767	0x7FFF	Overflow	
	5.88V	32511	0x7EFF	Upper limit	
	5V	27648	0x6C00	Normal range	D = 27648 x U / 5 U = D x 5 / 27648
	2.5V	13824	0x3600		
±5V	0V	0	0x0000		
	-2.5V	-13824	0xCA00		
	-5V	-27648	0x9400		
	-5.88V	-32511	0x8100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

Process data description (current type)					
Signal range	Current (I)	Decimal data	Hexadecimal	scope	Conversion relationship
	>23.52 mA	32767	0x7FFF	Overflow	
	23.52 mA	32511	0x7EFF	Upper limit	D = 27648 x I / 20
0 - 20 mA	20 mA	27648	0x6C00	Normal	I = D x 20 / 27648
	10 mA	13824	0x3600	range	

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

5.5 Mechanical Installation

The installation dimensions are shown in the figure below, in 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

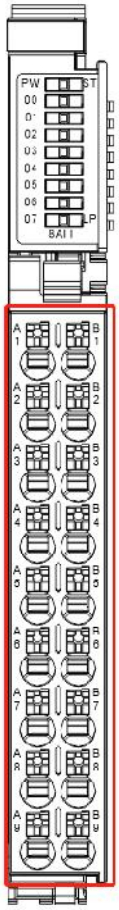
6.1 Specifications

Technical Information	
Product Description	Analog input module, 8 inputs, 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	Instantaneous 30mA, average 24mA
Current input diagnostics	4~20mA supports 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~50Hz configurable
Input Action Display	When the input signal is valid, the input indicator flashes (software

	controlled)
IO process 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-IN Terminal Blocks
Wire crimping area	0.2～1.5mm ^{2} /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

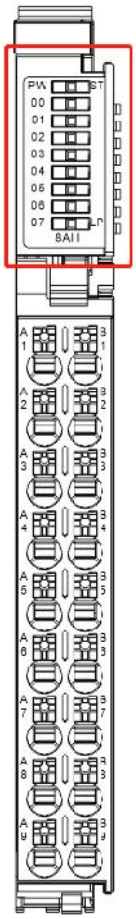
6.2 Hardware Interface

6.2.1 Terminal Definition



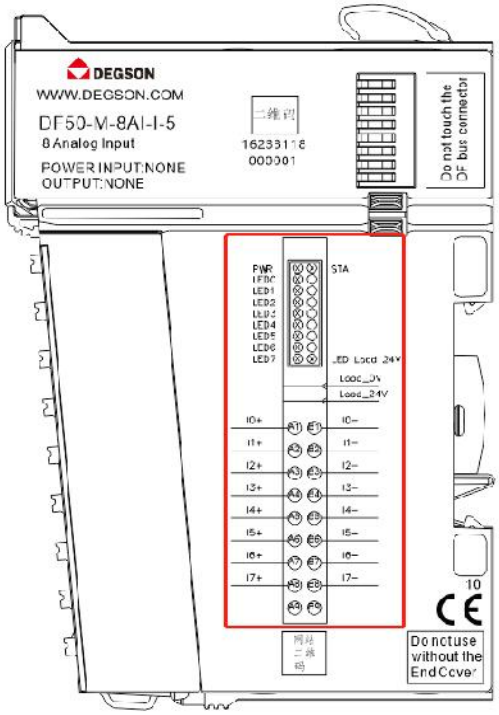
Terminal number	Signal	Terminal number	Signal	illustrate
A1	I0+	B1	I0-	Current input channel 1
A2	I1+	B2	I1-	Current input channel 2
A3	I2+	B3	I2-	Current input channel 3
A4	I3+	B4	I3-	Current input channel 4
A5	I4+	B5	I4-	Current input channel 5
A6	I5+	B6	I5-	Current input channel 6
A7	I6+	B7	I6-	Current input channel 7
A8	I7+	B8	I7-	Current input channel 8
A9	/	B9	/	/

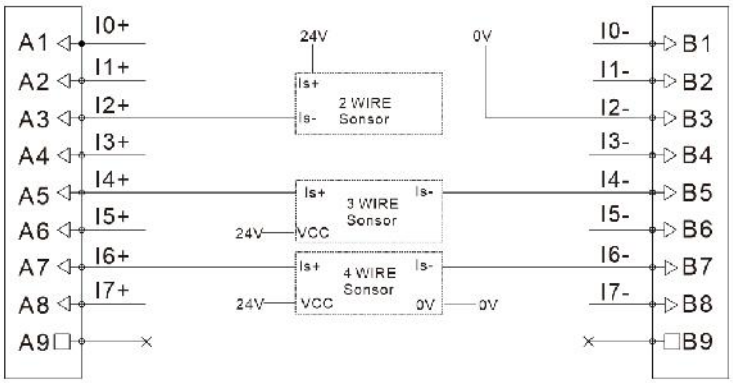
6.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green: System bus power input is normal	
	Green off: System bus power input is abnormal	
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 internal load power input is abnormal.
LP	Green: Internal load power input is normal	
	Green off: Internal load power input is abnormal	
00～07	Green flash: input signal is valid	
	Green off: Input signal is invalid	

6.2.3 Wiring Diagram





6.3 Module Configuration Data Definition

As shown in the figure, users can configure the signal range and signal filtering for each channel.

6.4 Module process data definition

Input data: 16 Byte

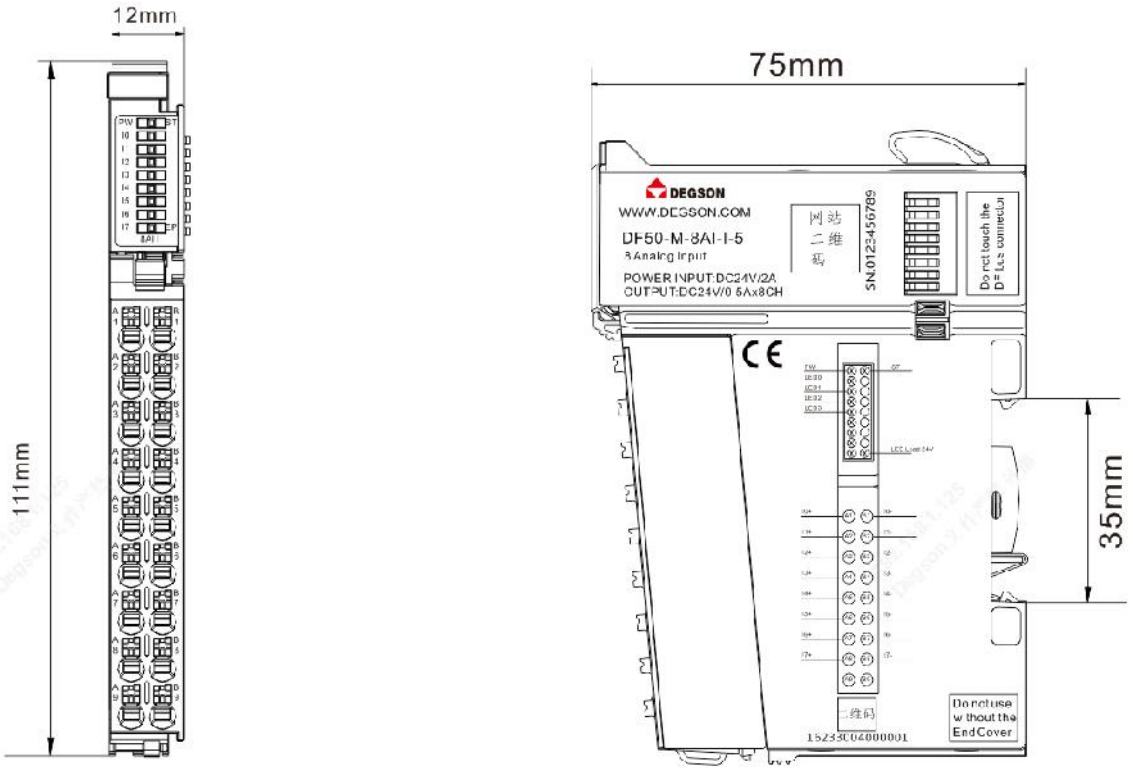
ByteNo.	Word No.	meaning
Byte0-Byte1	Word 0	Channel 0 input data
Byte2-Byte3	Word 1	Channel 1 input data
Byte4-Byte5	Word 2	Channel 2 input data
Byte6-Byte7	Word 3	Channel 3 input data
Byte 8 -Byte 9	Word 4	Channel 4 input data
Byte 10 -Byte 11	Word 5	Channel 5 input data
Byte 12 -Byte 13	Word 6	Channel 6 input data
Byte 14 -Byte 15	Word 7	Channel 7 input data

Process data definition description:

Process data description (current type)					
Signal range	Current	Decimal	Hexadecimal	scope	Conversion relationship
0 ~ 20 mA	>23.52	32767	0x7FFF	Overflow	D = 27648 x I / 20 I = D x 20 / 27648
	23.52 mA	32511	0x7EFF	Upper	
	20 mA	27648	0x6C00	Normal	
	10 mA	13824	0x3600	range	
	0 mA	0	0		
4 ~ 20 mA	>22.81	32767	0x7FFF	Overflow	D = 27648 x (I – 4) / 16 I = D x 16 / 27648 + 4
	22.81 mA	32511	0x7EFF	Upper	
	20 mA	27648	0x6C00	Normal	
	12 mA	13824	0x3600	range	
	4 mA	0	0		
	1.19 mA	-4864	0xED00	Lower	
	<1.19 mA	-32768	0x8000	Underflo	

6.5 Mechanical Installation

The installation dimensions are shown in the figure below, in 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

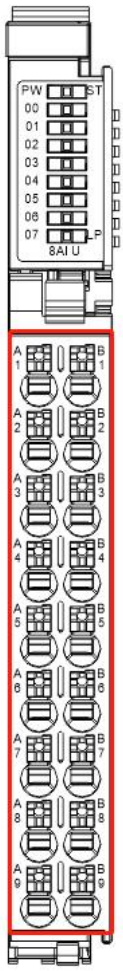
7.1 Specifications

Technical Information	
Product Description	Analog input module, 8 inputs, 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, 1~5V support 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~50Hz configurable
Input Action Display	When the input signal is valid, the input indicator flashes (software controlled)
IO process 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	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-IN Terminal Blocks
Wire crimping area	0.2～1.5mm ^{2} /26～16AWG
Stripping length	8～10mm/0.31～0.35inches
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
Installation location	Any
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

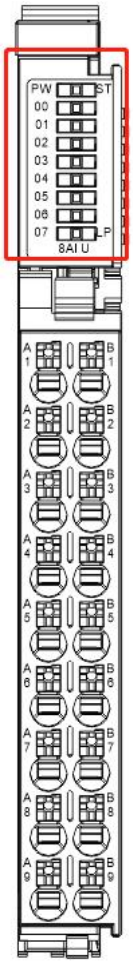
7.2 Hardware Interface

7.2.1 Terminal Block Definition



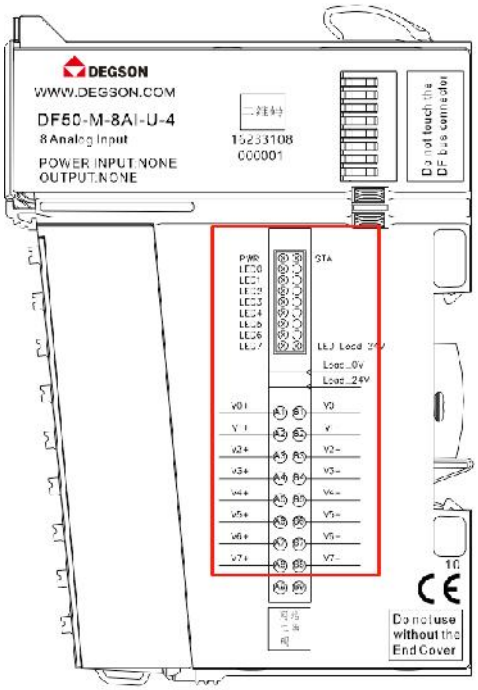
Terminal number	Signal	Terminal number	Signal	illustrate
A1	V0+	B1	V0-	Voltage input channel 0
A2	V1+	B2	V1-	Voltage input channel 1
A3	V2+	B3	V2-	Voltage input channel 2
A4	V3+	B4	V3-	Voltage input channel 3
A5	V4+	B5	V4-	Voltage input channel 4
A6	V5+	B6	V5-	Voltage input channel 5
A7	V6+	B7	V6-	Voltage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

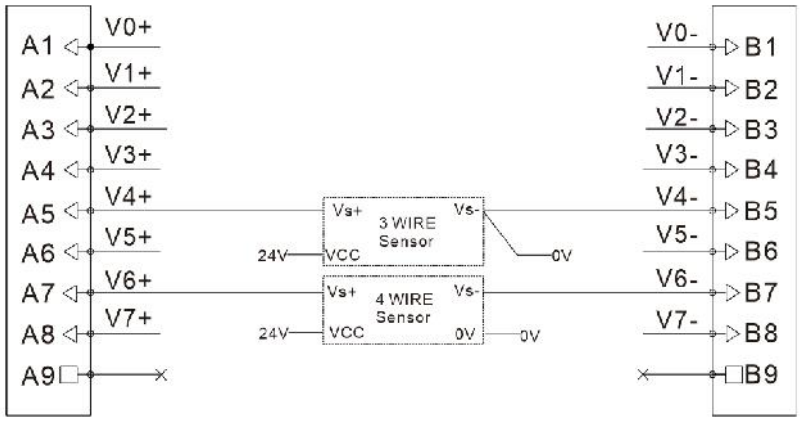
7.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green: System bus power input is normal	
	Green off: System bus power input is abnormal	
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 internal load power input is abnormal.
LP	Green: Internal load power input is normal	
	Green off: Internal load power input is abnormal	
00～07	Green flash: input signal is valid	
	Green off: Input signal is invalid	

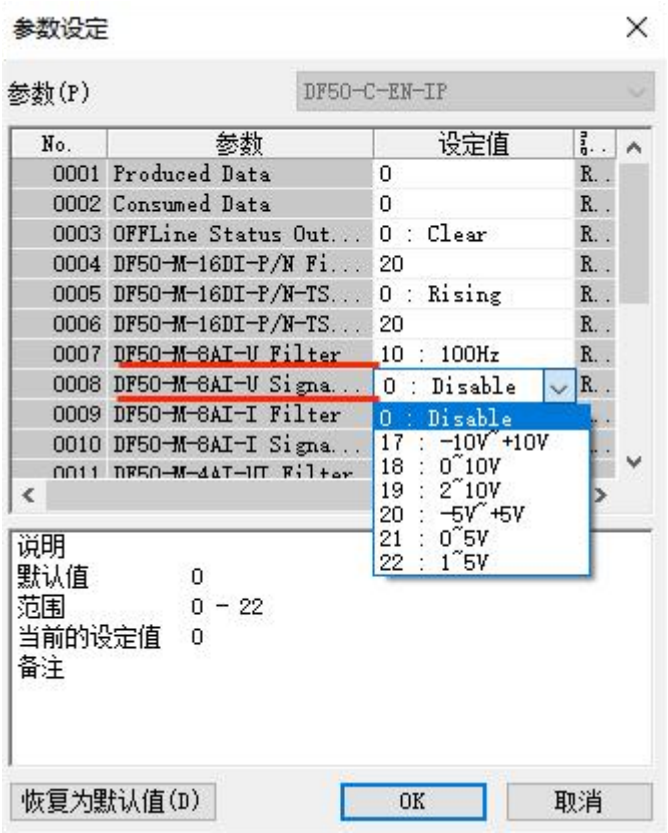
7.2.3 Wiring Diagram





7.3 Module Configuration Data Definition

As shown in the figure, users can configure the signal range and signal filtering for each channel.



7.4 Module process data definition

Input data: 16 Byte

ByteNo.	Word No.	meaning
Byte0-Byte1	Word 0	Channel 0 input data
Byte2-Byte3	Word 1	Channel 1 input data
Byte4-Byte5	Word 2	Channel 2 input data
Byte6-Byte7	Word 3	Channel 3 input data
Byte 8 -Byte 9	Word 4	Channel 4 input data
Byte 10 -Byte 11	Word 5	Channel 5 input data
Byte 12 -Byte 13	Word 6	Channel 6 input data
Byte 14 -Byte 15	Word 7	Channel 7 input data

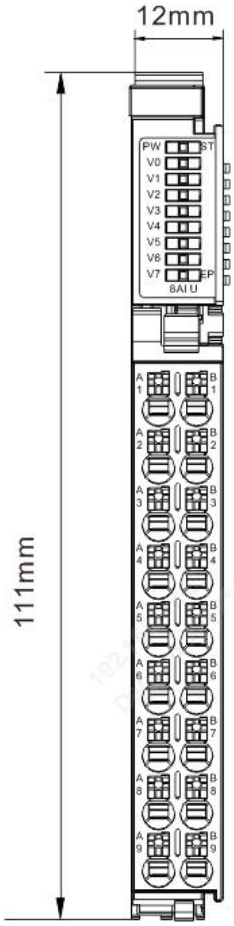
Process data definition description:

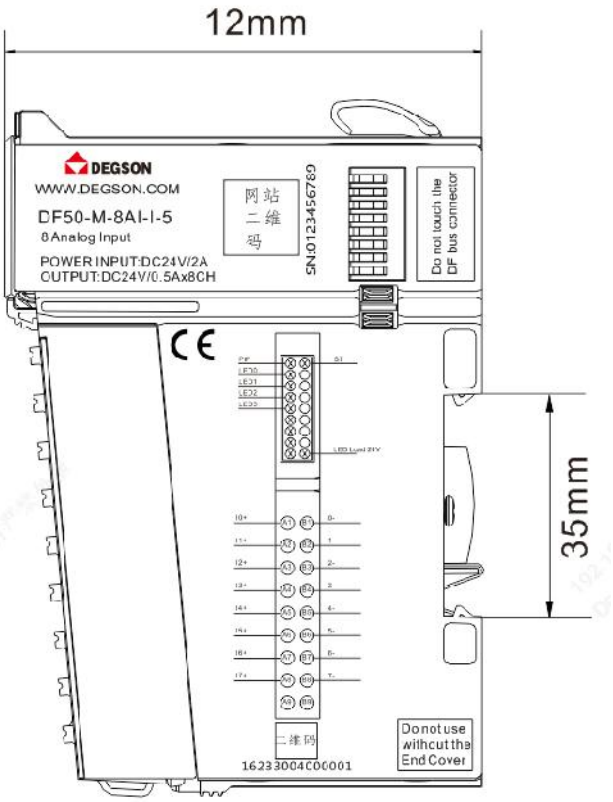
Process data description (voltage type)					
Signal range	Voltage value	Decimal data	Hexadecimal	Scope	Conversion relationship
±10V	>11.76V	32767	0x7FFF	Overflow	D = 27648 x U / 10 U = D x 10 / 27648
	11.76V	32511	0x7EFF	Upper limit	
	10V	27648	0x6C00	Normal range	
	5V	13824	0x3600		
	0V	0	0x0000		
	-5V	-13824	0xCA00		
	-10V	-27648	0x9400		
	-11.76V	-32511	0x8100	Lower limit	
	<-11.76V	-32768	0x8000	Underflow	
0~10V	>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 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	>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	>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	>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

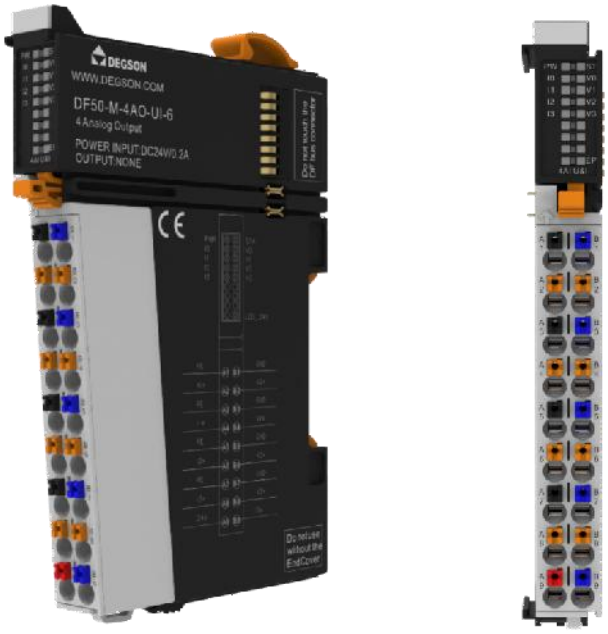
The installation dimensions are shown in the figure below, in mm:





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



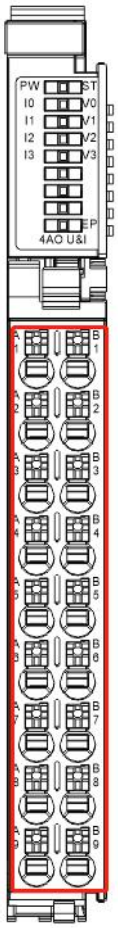
8.1 Specifications

Technical Information	
Product Description	Analog output module, 4 outputs, voltage & current
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

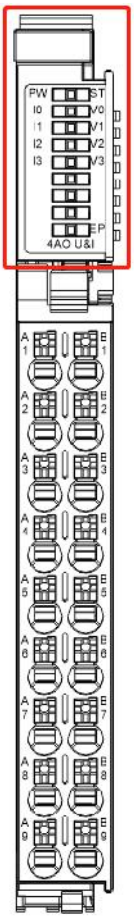
Channel Mode Configuration	Disable, ±10V, 0 ~ 10V, 2 ~ 10V, ±5V, 0 ~ 5V, 1 ~ 5V, 0 ~ 20mA, 4 ~ 20mA
Output status configuration after shutdown	Clear to zero, keep current value
Stop Mode	In the fault shutdown mode, no more refresh
Input Action Display	When the output signal is valid, the output indicator light flashes (software controlled)
IO process 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	PUSH-IN Terminal Blocks
Wire crimping area	0.2～1.5mm ^{2} /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

8.2 Hardware Interface

8.2.1 Terminal Definition



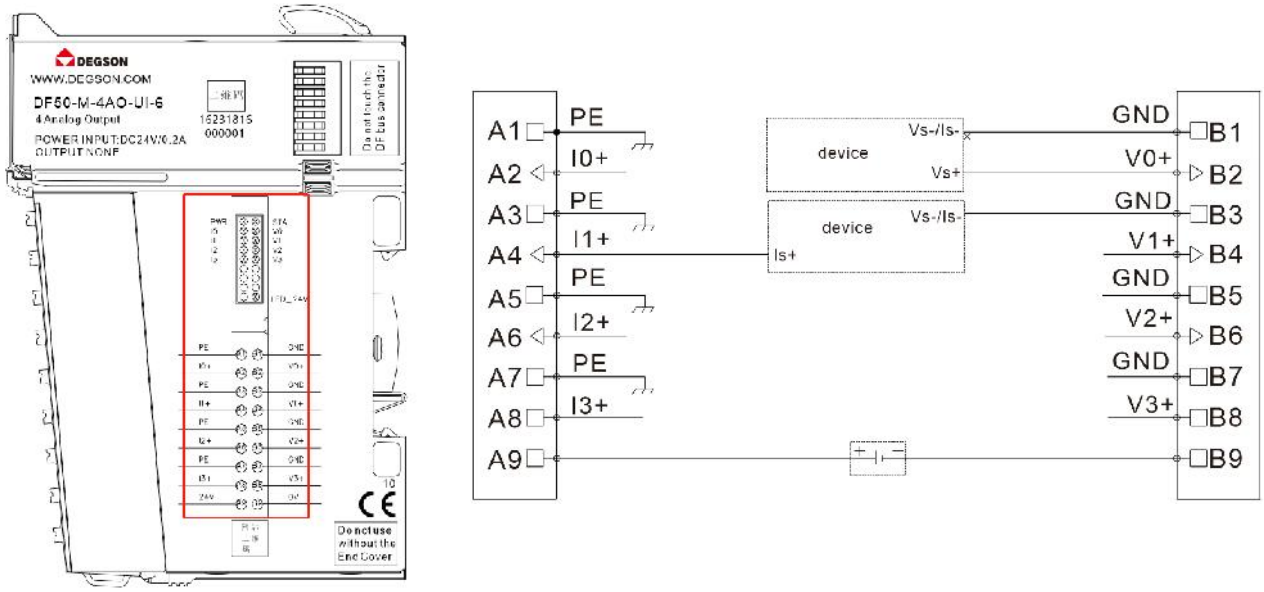
Terminal number	Signal	illustrate	Terminal number	Signal	illustrate
A1	PE	Safely	B1	GND	Negative voltage/current
A2	I0+	Current output channel 0	B2	V0+	Voltage output channel 0
A3	PE	Safely	B3	GND	Negative voltage/current
A4	I1+	Current output channel 1	B4	V1+	Voltage output channel 1
A5	PE	Safely	B5	GND	Negative voltage/current
A6	I2+	Current output channel 2	B6	V2+	Voltage output channel 2
A7	PE	Safely	B7	GND	Negative voltage/current
A8	I3+	Current output channel 3	B8	V3+	Voltage output channel 3
A9	24V	Terminal power input 24V	B9	0V	Terminal power input 0V



8.2.2 LED indicator definition

Indicator Lights	meaning	
PW	Green: System bus power input is normal	
	Green off: System bus power input is abnormal	
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: The terminal power input is normal	
	Green off: Terminal power input abnormality	
I0～I3,V0～V3	Green flash: output signal is valid	
	Green off: Output signal is invalid	

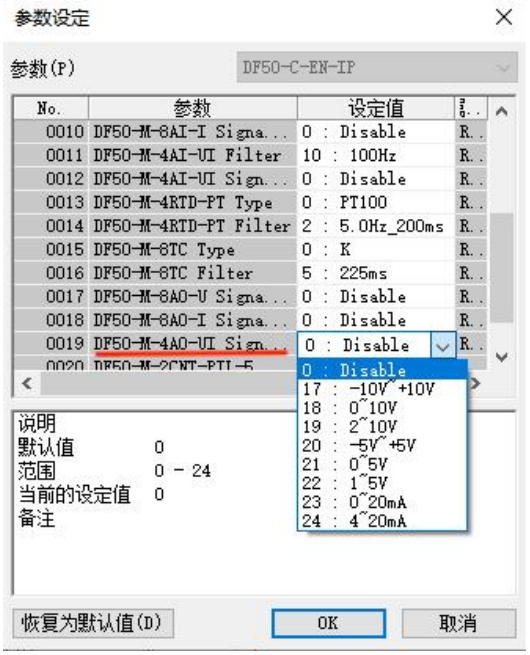
8.2.3 Wiring diagram



Note: A9 and B9 are external power input interfaces.

8.3 Module Configuration Data Definition

As shown in the figure, the user can configure the signal range of each channel.



8.4 Module process data definition

Output data: 8 Byte		
ByteNo.	Word No.	meaning
Byte0-Byte1	Word 0	Channel 0 output data
Byte2-Byte3	Word 1	Channel 1 output data
Byte4-Byte5	Word 2	Channel 2 output data
Byte6-Byte7	Word 3	Channel 3 output data

Channel output data description:

Signal range	Voltage value (U)	Decimal data	Hexadecimal data	Scope	Conversion relationship
±10V	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	0V	>32511	> 0x7EFF	Overflow	D = 27648 x U / 10 U = D x 10 / 27648
	11.76V	32511	0x7EFF	Upper limit	
	10V	27648	0x6C00	Normal	

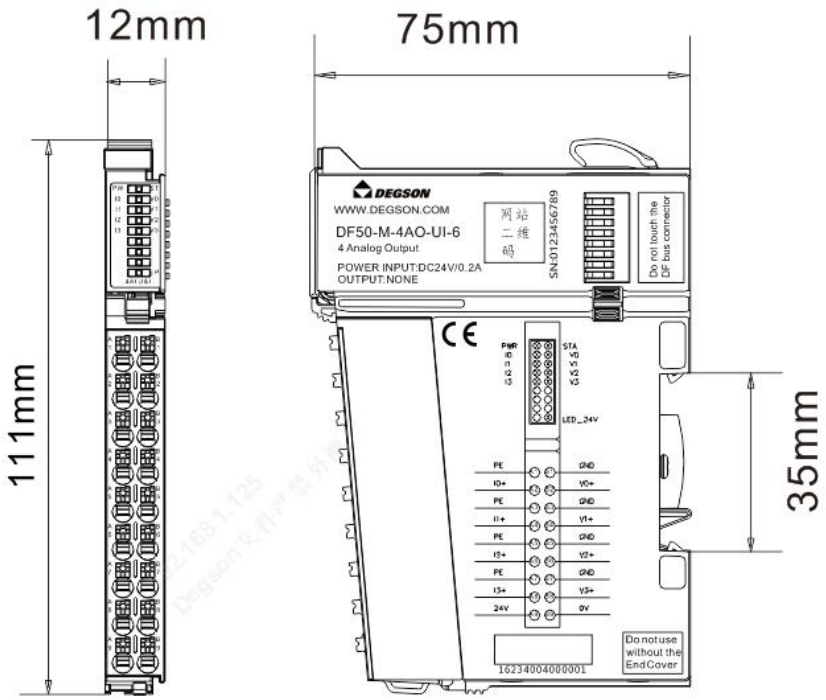
	5V	13824	0x3600	range	
	0V	0	0x0000		
2 ~ 10V	0V	>32511	> 0x7EFF	Overflow	D = 27648 x (U – 2) / 8 U = D x 8 / 27648 + 2
	11.41V	32511	0x7EFF	Upper limit	
	10V	27648	0x6C00	Normal range	
	6V	13824	0x3600		
	2V	0	0x0000		
	0.59 V	-4864	0xED00	Lower limit	
	0 V	<-4864	<ED00	Underflow	
±5V	0V	>32511	>7EFF	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	0V	>32511	> 0x7EFF	Overflow	D = 27648 x U / 5 U = D x 5 / 27648
	5.88V	32511	0x7EFF	Upper limit	
	5V	27648	0x6C00	Normal	

	2.5V	13824	0x3600	range	
	0V	0	0x0000		
1 ~ 5V	0V	>32511	> 0x7EFF	Overflow	D = 27648 x (U – 1) / 4 U = D x 4 / 27648 + 1

Signal range	Current value (I)	Decimal data	Hexadecimal data	Scope	Conversion relationship
0~20ma	0ma	>32511	> 0x7EFF	Overflow	D = 27648 x I / 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 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	

8.5 Mechanical Installation

The installation dimensions are shown in the figure below, in 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

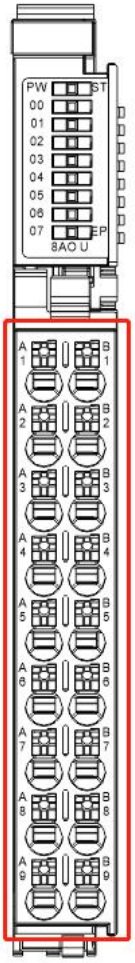
9.1 Specifications

Technical Information	
Product Description	Analog output module, 8 outputs, 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 and keep current output
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)
IO process 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	90mA
Wiring parameters	
Connection technology: Output	PUSH-IN Terminal Blocks
Wire crimping area	0.2～1.5mm ^{2} /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 (5)	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

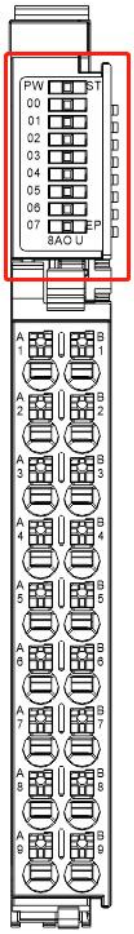
9.2 Hardware Interface

9.2.1 Terminal Definition



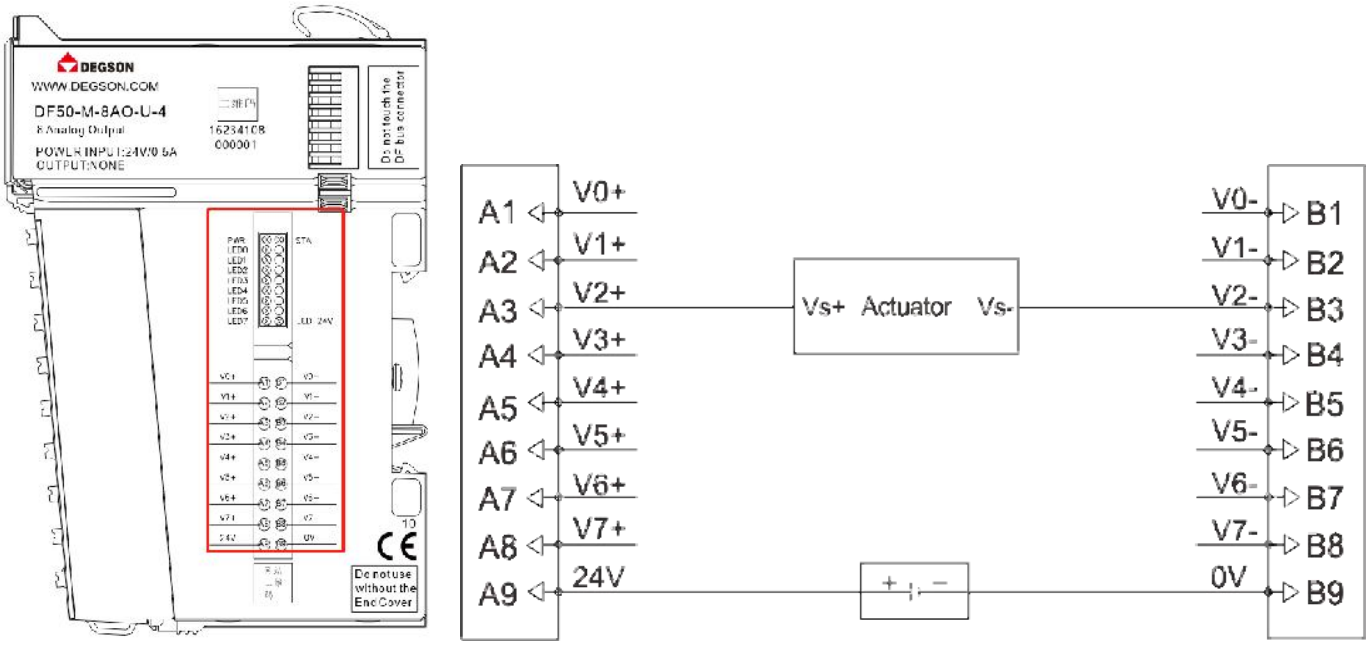
Terminal number	Signal	Terminal number	Signal	illustrate
A1	V0+	B1	V0-	Voltage output channel 0
A2	V1+	B2	V1-	Voltage output channel 1
A3	V2+	B3	V2-	Voltage output channel 2
A4	V3+	B4	V3-	Voltage output channel 3
A5	V4+	B5	V4-	Voltage output channel 4
A6	V5+	B6	V5-	Voltage output channel 5
A7	V6+	B7	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



Indicator Lights	meaning	
PW	Green: System bus power input is normal	
	Green off: System bus power input is abnormal	
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: The terminal power input is normal	
	Green off: Terminal power input abnormality	
V0～V7	Green flash: output signal is valid	
	Green off: Output signal is invalid	

9.2.3 Wiring Diagram



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

9.3 Module Configuration Data Definition

As shown in the figure, the user can configure the signal range of each channel.

9.4 Module process data definition

Output data: 16 Byte		
ByteNo.	Word No.	meaning

Byte0-Byte1	Word 0	Channel 0 output data
Byte2-Byte3	Word 1	Channel 1 output data
Byte4-Byte5	Word 2	Channel 2 output data
Byte6-Byte7	Word 3	Channel 3 output data
Byte 8 -Byte 9	Word 4	Channel 4 output data
Byte 10 -Byte 11	Word 5	Channel 5 output data
Byte 12 -Byte 13	Word 6	Channel 6 output data
Byte 14 -Byte 15	Word 7	Channel 7 output data

Channel output data description:

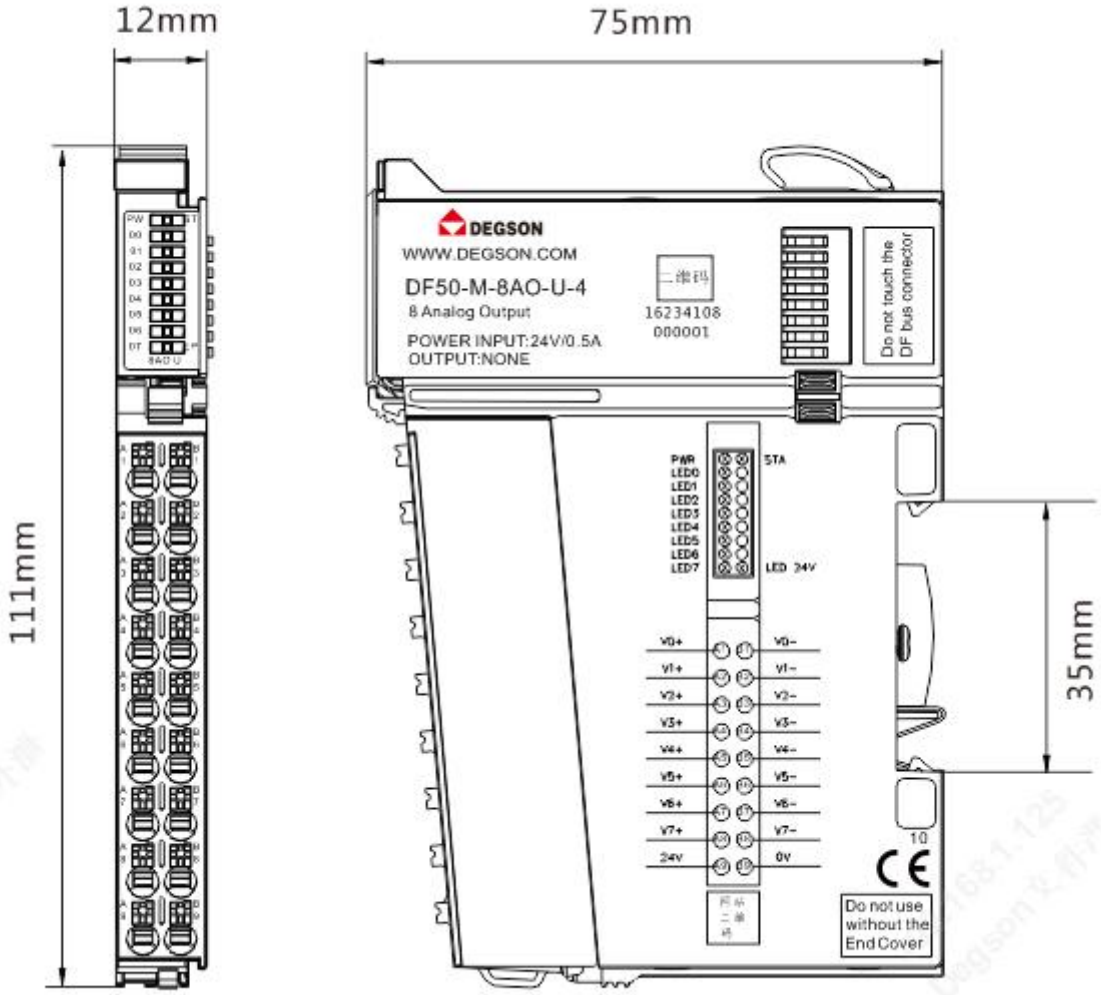
Signal range	Voltage value (U)	Decimal data	Hexadecimal data	Scope	Conversion relationship
±10V	0V	>32511	> 0x7EFF	Overflow	D = 27648 x U / 10 U = D x 10 / 27648
	11.76V	32511	0x7EFF	Upper limit	
	10V	27648	0x6C00	Normal range	
	5V	13824	0x3600		
	0V	0	0x0000		
	-5V	-13824	0xCA00		
	-10V	-27648	0x9400		
	-11.76V	-32511	0x8101	Lower limit	
	0V	<-32511	< 0x8101	Underflow	
0 ~ 10V	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	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	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	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	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	

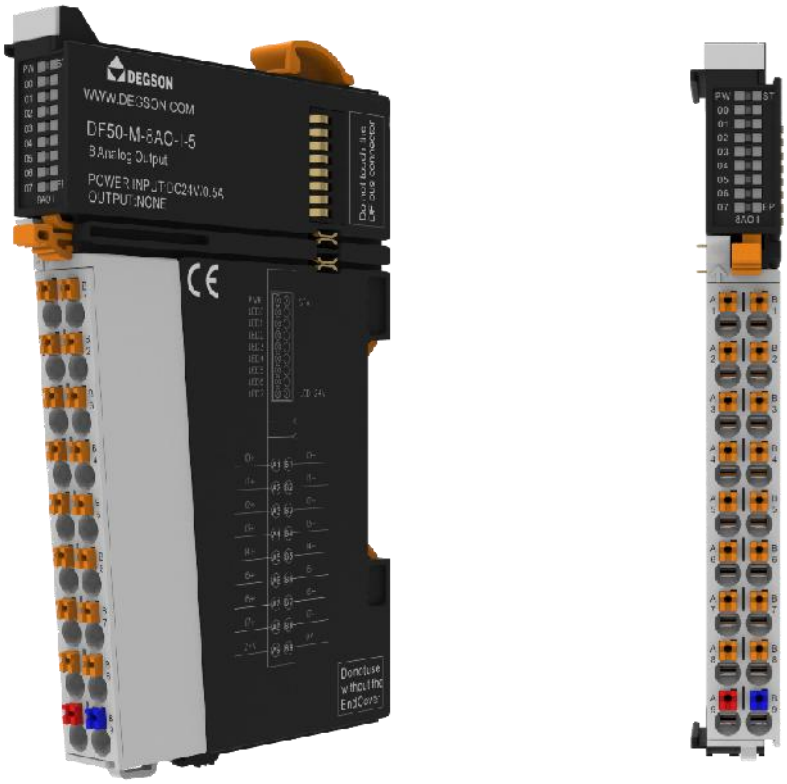
9.5 Mechanical Installation

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



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



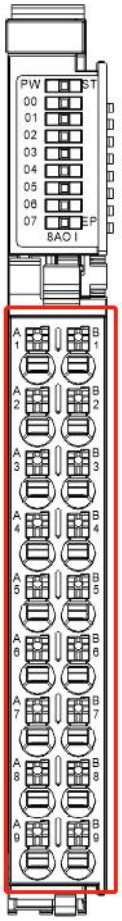
10.1 Specifications

Technical Information	
Product Description	Analog output module, 8 outputs, 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 and keep current output
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)
IO process 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-IN Terminal Blocks
Wire crimping area	0.2～1.5mm ^{2}/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 (5)	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

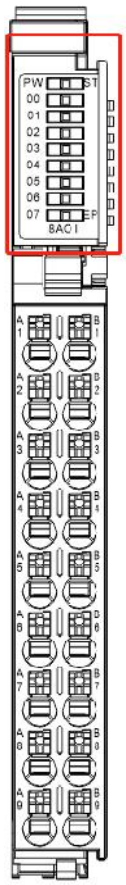
10.2 Hardware Interface

10.2.1 Terminal Block Definition



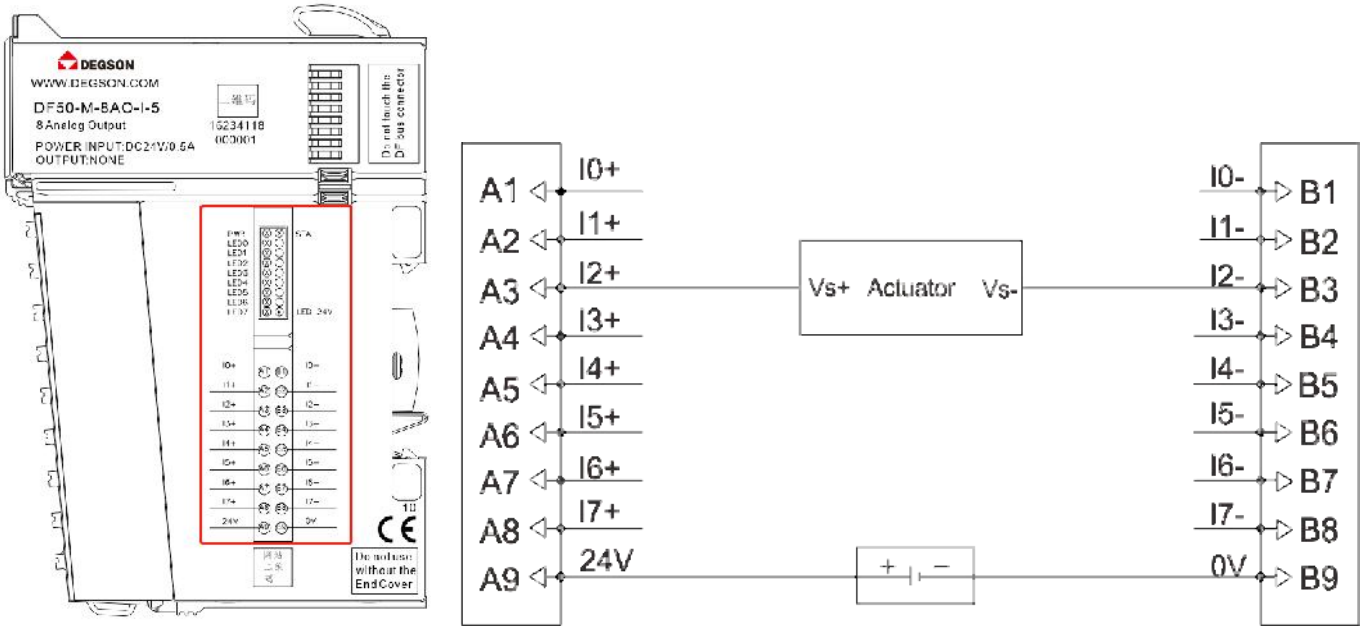
Terminal number	Signal	Terminal number	Signal	illustrate
A1	V0+	B1	V0-	Current output channel 0
A2	V1+	B2	V1-	Current output channel 1
A3	V2+	B3	V2-	Current output channel 2
A4	V3+	B4	V3-	Current output channel 3
A5	V4+	B5	V4-	Current output channel 4
A6	V5+	B6	V5-	Current output channel 5
A7	V6+	B7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

10.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green: System bus power input is normal	
	Green off: System bus power input is abnormal	
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: The terminal power input is normal	
	Green off: Terminal power input abnormality	
I0～I7	Green flash: output signal is valid	
	Green off: Output signal is invalid	

10.2.3 Wiring Diagram



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

10.3 Module Configuration Data Definition

As shown in the figure , the user can configure the signal range of each channel.

10.4 Module process data definition

Output data: 16 Byte		
ByteNo.	Word No.	meaning
Byte0-Byte1	Word 0	Channel 0 output data
Byte2-Byte3	Word 1	Channel 1 output data
Byte4-Byte5	Word 2	Channel 2 output data
Byte6-Byte7	Word 3	Channel 3 output data
Byte 8 -Byte 9	Word 4	Channel 4 output data
Byte 10 -Byte 11	Word 5	Channel 5 output data
Byte 12 -Byte 13	Word 6	Channel 6 output data
Byte 14 -Byte 15	Word 7	Channel 7 output data

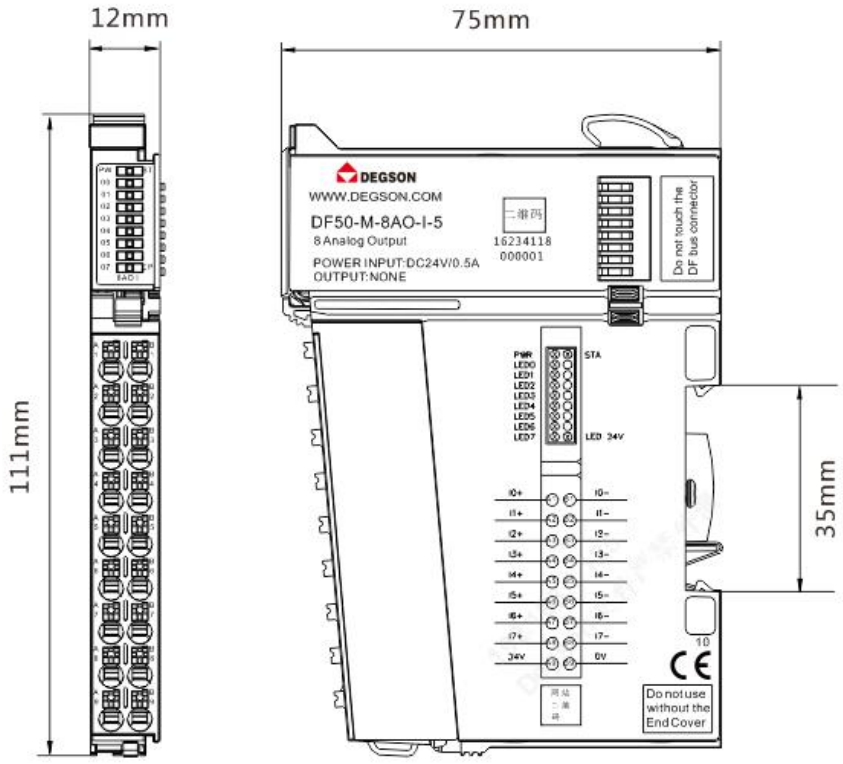
Channel output data description:

Signal range	Current value (I)	Decimal data	Hexadecimal data	Scope	Conversion relationship
0~20ma	0ma	>32511	> 0x7EFF	Overflow	D = 27648 x I / 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 I = D x 16 / 27648 + 4
	22.81ma	32511	0x7EFF	Upper limit	
	20ma	27648	0x6C00	Normal	

	12ma	13824	0x3600	range
	4ma	0	0x0000	
	1.19ma	-4864	0xED00	Lower limit
	0ma	<-4864	<- 0xED00	Underflow

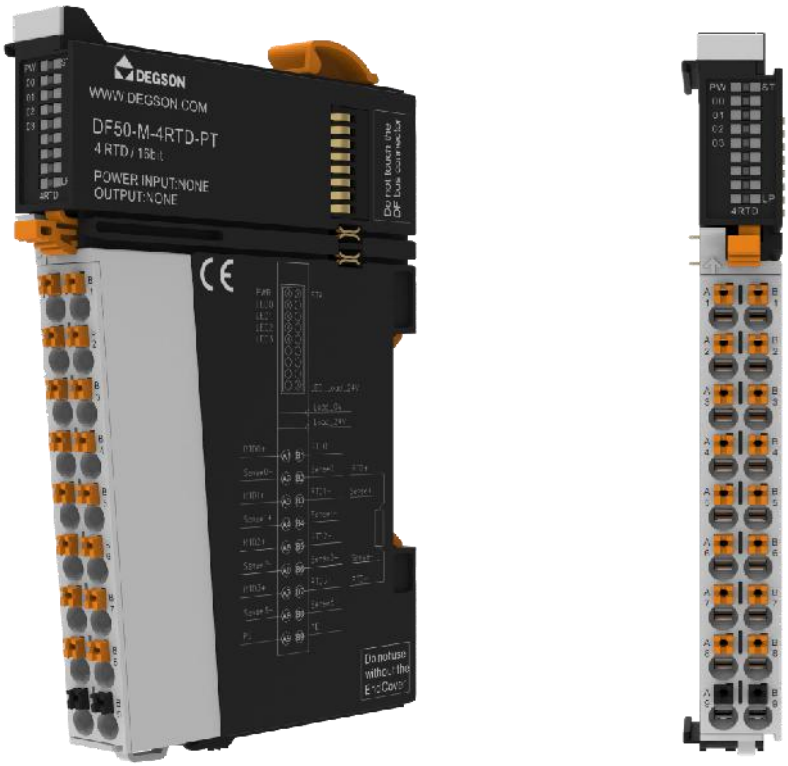
10.5 Mechanical Installation

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



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.

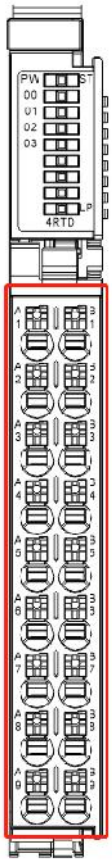


11.1 Specifications

Technical Information	
Product Description	RTD measurement module, 16-bit resolution, 4 channels
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-wire/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~1.25Hz configurable,
Input Action Display	When the input signal is valid, the input indicator flashes (software controlled)
IO process 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-IN Terminal Blocks
Wire crimping area	0.2～1.5mm ^{2}/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

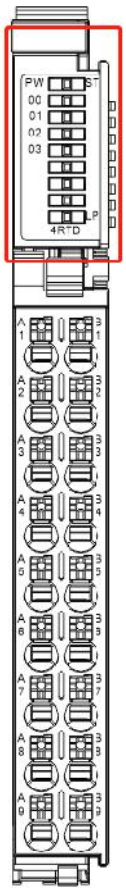
11.2 Hardware Interface

11.2.1 Terminal Block Definition



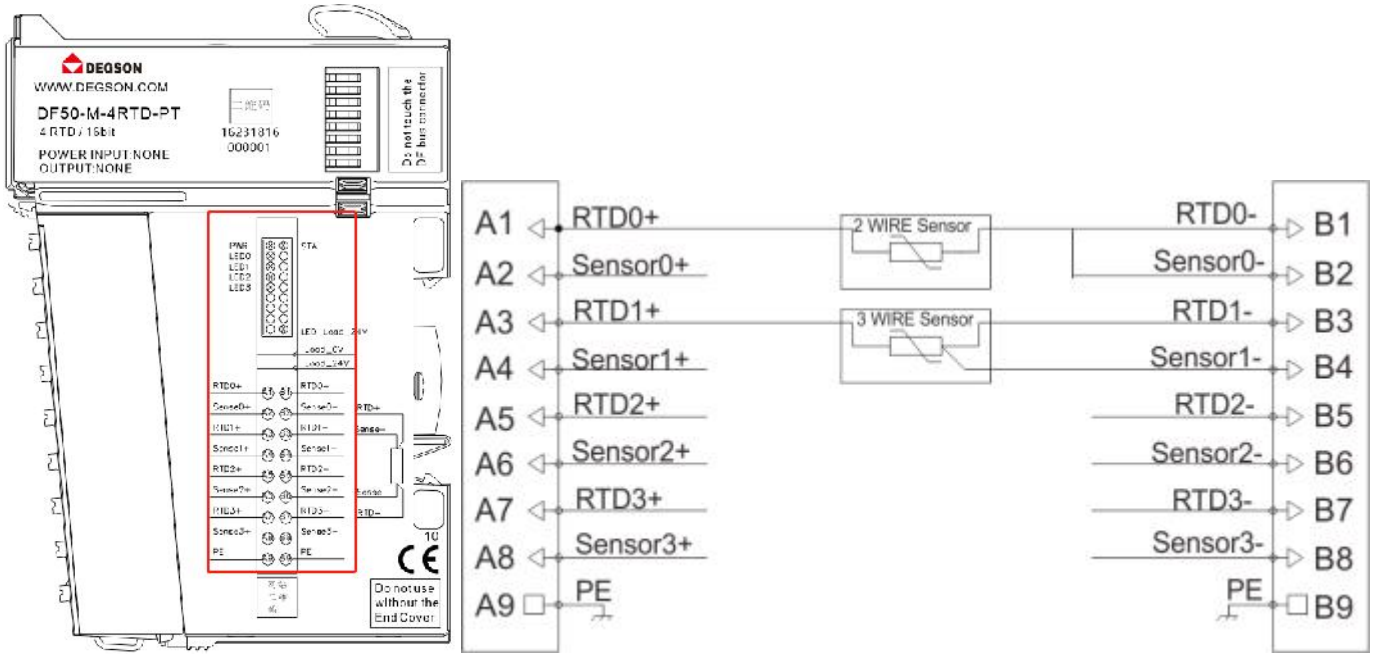
Terminal number	Signal	Terminal number	Signal	illustrate
A1	RTD0+	B1	RTD0-	The first channel signal input
A2	Sense0+	B2	Sense0-	
A3	RTD1+	B3	RTD1-	Second channel signal input
A4	Sense1+	B4	Sense1-	
A5	RTD2+	B5	RTD2-	The third channel signal input
A6	Sense2+	B6	Sense2-	
A7	RTD3+	B7	RTD3-	The fourth channel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

11.2.2 LED indicator definition



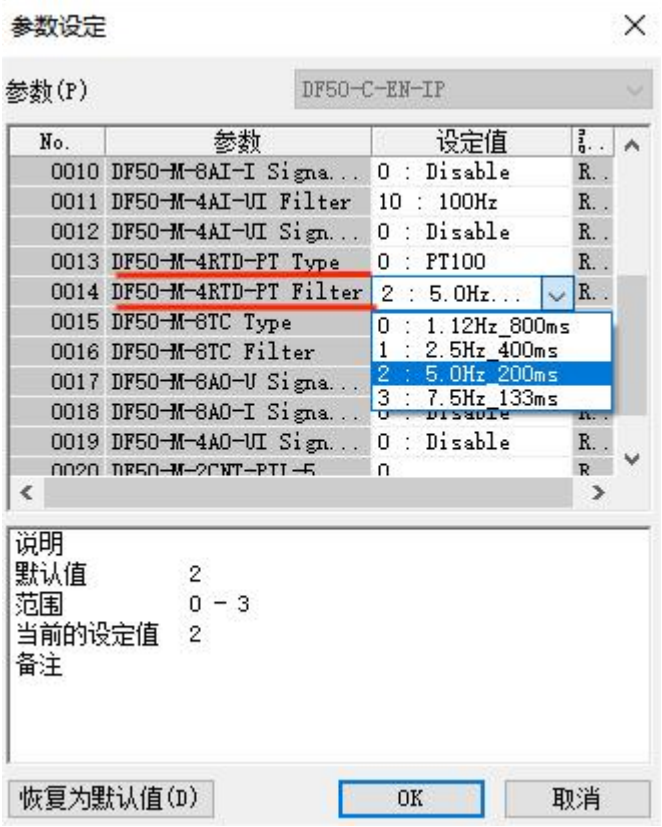
Indicator Lights	meaning	
PW	Green: System bus power input is normal	
	Green off: System bus power input is abnormal	
ST	Power-on stage	Green: Module initialization error
		Green off: Module initialization is normal
	Operational stage	Green flash: The internal bus of the module is working normally
		Green off/green on: The internal bus of the module is working abnormally or the internal load power input is abnormal.
LP	Green: Internal load power input is normal	
	Green off: Internal load power input is abnormal	
00～03	Green flash: input signal is valid	
	Green off: Input signal is invalid	

11.2.3 Wiring Diagram



11.3 Module Configuration Data Definition

As shown in the figure , users can configure each channel signal type.



11.4 Module process data definition

Input data: 8 Byte

ByteNo.	Word No.	meaning
Byte0-Byte1	Word 0	Channel 0 input data
Byte2-Byte3	Word 1	Channel 1 input data
Byte4-Byte5	Word 2	Channel 2 input data
Byte6-Byte7	Word 3	Channel 3 input data

Channel output data description:

PT100			
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

PT200			
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

PT500			
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

PT1000			
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

Ni100			
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

Ni120			
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

NI200			
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

Ni500			
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

Ni1000			
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

Cu10 type			
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

Cu50			
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

Cu53			
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

Cu100

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_130			
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_150			
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_151			
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

0-40ohm type			
Ohm value	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

0-80ohm type			
Ohm value	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

0-150ohm type			
Ohm value	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
0-300ohm type			
Ohm value	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

0-500ohm type			
Ohm value	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

0-1000ohm type			
Ohm value	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

0-2000ohm type			
Ohm value	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

0-4000ohm type			
Ohm value	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

KTY83-110			
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

KTY83-120			
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

KTY83-121			
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

KTY83-122			
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

KTY83-150			
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

KTY83-151			
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

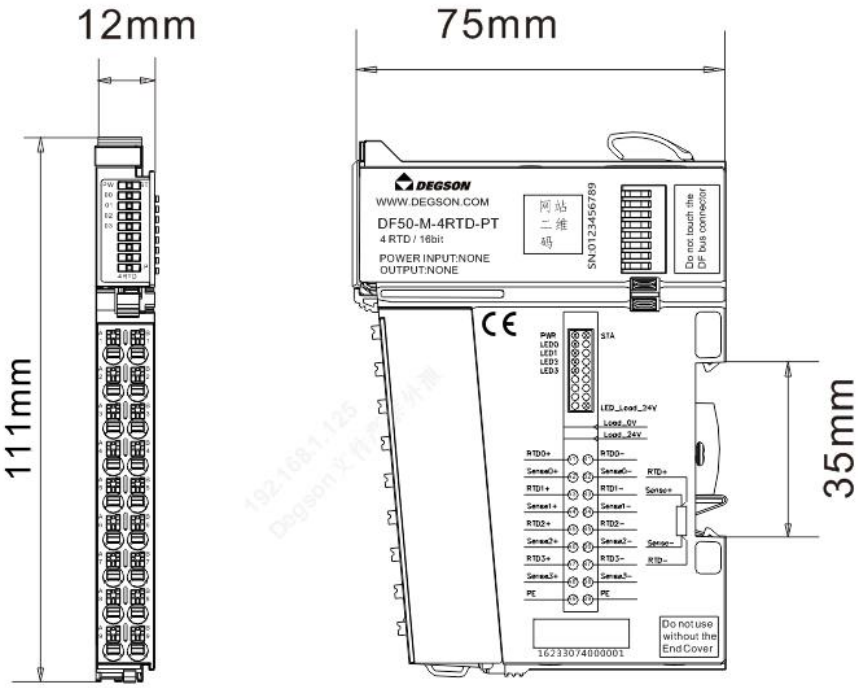
NTC-5K			
temperature	Decimal	hexadecimal	Scope
>90	32767	0x7FFF	Overflow
90	900	0x0384	Normal range
-30	-300	0xFED4	
<-30	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

NTC-10K			
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

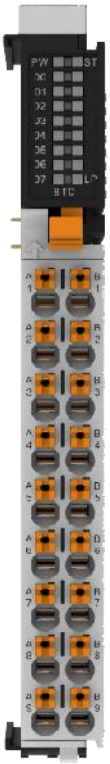
11.5 Mechanical Installation

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



12 8-channel thermocouple measurement (DF50-M-8TC)

- The module uses 8-channel thermocouple 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.

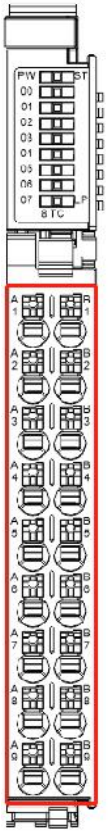


12.1 Specifications

Technical Information	
Product Description	Thermocouple measurement module, 16-bit resolution, 8 channels
Number of channels	8
Sensor Type	K, E, T, J, B, S, R, N, L and millivolt voltage sensors
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~7200ms configurable,
Input Action Display	When the input signal is valid, the input indicator flashes (software controlled)
IO process 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-IN Terminal Blocks
Wire crimping area	0.2～1.5mm ^{2}/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

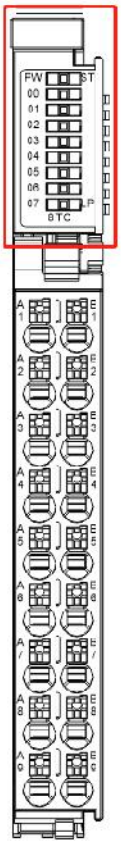
12.2 Hardware Interface

12.2.1 Terminal Block Definition



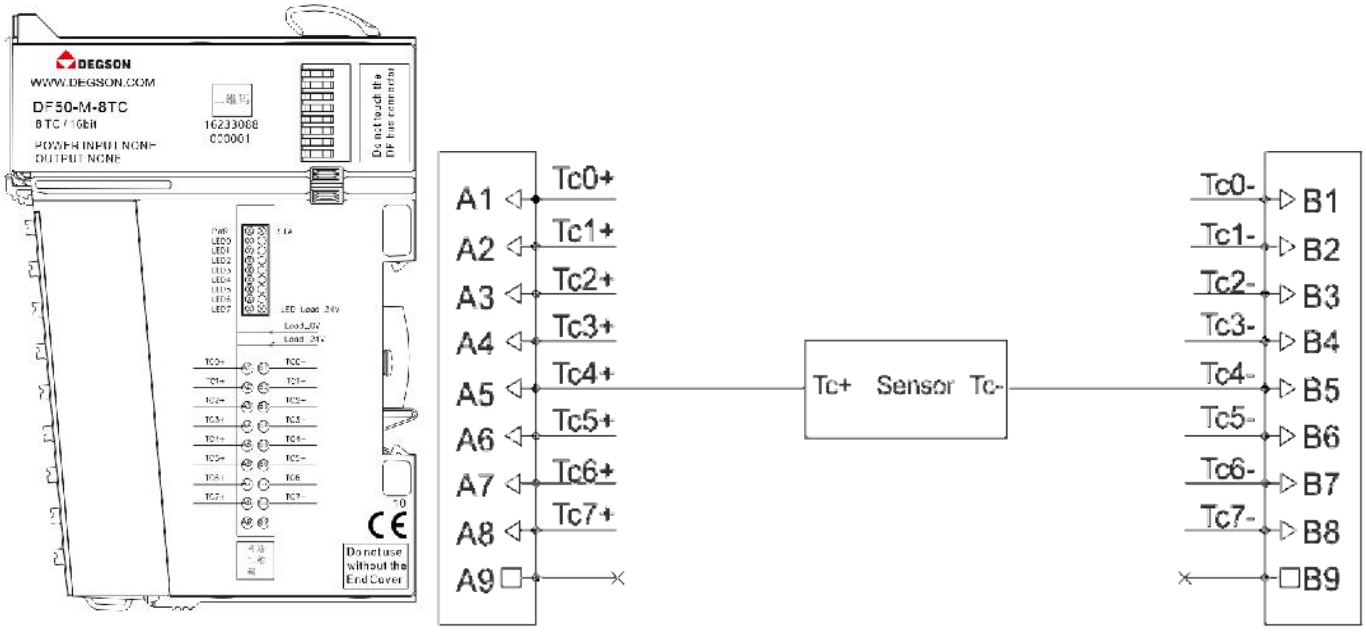
Terminal number	Signal	Terminal number	Signal	illustrate
A1	TC0+	B1	TC0-	Signal input channel 0
A2	TC1+	B2	TC1-	Signal input channel 1
A3	TC2+	B3	TC2-	Signal input channel 2
A4	TC3+	B4	TC3-	Signal input channel 3
A5	TC4+	B5	TC4-	Signal input channel 4
A6	TC5+	B6	TC5-	Signal input channel 5
A7	TC6+	B7	TC6-	Signal input channel 6
A8	TC7+	B8	TC7-	Signal input channel 7
A9	/	B9	/	Reserved for hanging

12.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green: System bus power input is normal	
	Green off: System bus power input is abnormal	
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 internal load power input is abnormal.
LP	Green: Internal load power input is normal	
	Green off: Internal load power input is abnormal	
00～07	Green flash: input signal is valid	
	Green off: Input signal is invalid	

12.2.3 Wiring Diagram



12.3 Module Configuration Data Definition

As shown in the figure , users can configure each channel signal type.

12.4 Module process data definition

Input data: 16 Byte

ByteNo.	Word No.	meaning
Byte0-Byte1	Word 0	Channel 0 input data
Byte2-Byte3	Word 1	Channel 1 input data
Byte4-Byte5	Word 2	Channel 2 input data
Byte6-Byte7	Word 3	Channel 3 input data
Byte 8 -Byte 9	Word 4	Channel 4 input data
Byte 10 -Byte 11	Word 5	Channel 5 input data
Byte 12 -Byte 13	Word 6	Channel 6 input data
Byte 14 -Byte 15	Word 7	Channel 7 input data

Output data: 16 Byte		
ByteNo.	Word No.	meaning
Byte0-Byte1	Word 0	Channel 0 compensation data
Byte2-Byte3	Word 1	Channel 1 compensation data
Byte4-Byte5	Word 2	Channel 2 compensation data
Byte6-Byte7	Word 3	Channel 3 compensation data
Byte 8 -Byte 9	Word 4	Channel 4 compensation data
Byte 10 -Byte 11	Word 5	Channel 5 compensation data
Byte 12 -Byte 13	Word 6	Channel 6 compensation data
Byte 14 -Byte 15	Word 7	Channel 7 compensation data

Channel output data description:

K-Type

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

Type E			
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

T-Type			
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

J-Type			
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

Type B			
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

S-Type			
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

R-Type			
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

Ni500			
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

Type C			
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

L-type			
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

N-type			
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

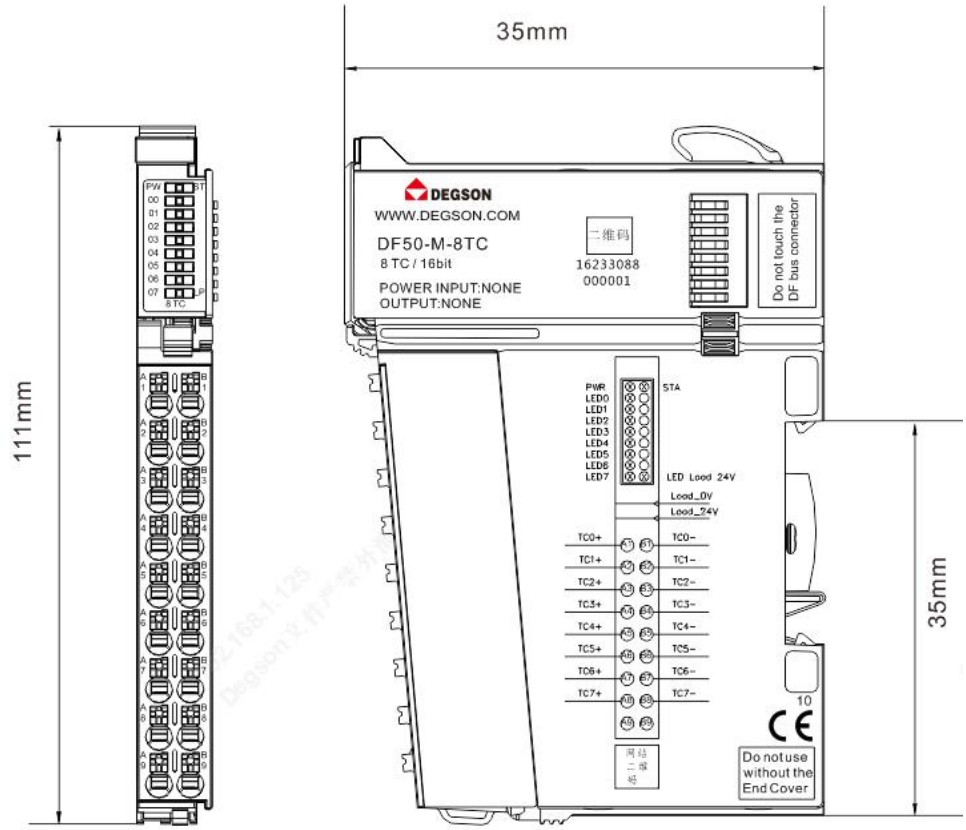
±1000mV			
Signal	Decimal	hexadecimal	Scope
1000mV	32767	0x7FFF	Normal range
-1000mV	-32767	0x8001	
Sensor not connected	-32768	0x8000	Disconnection detection

±2000mV			
Signal	Decimal	hexadecimal	Scope

2000mV	32767	0x7FFF	Normal range
-2000mV	-32767	0x8001	
Sensor not connected	-32768	0x8000	Disconnection detection

12.5 Mechanical Installation

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



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

- The encoder 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.

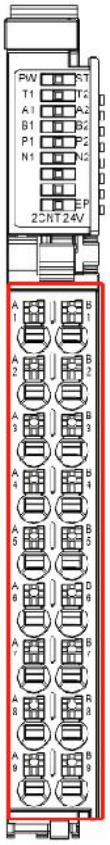
13.1 Specifications

Technical Information	
Product Description	High speed counting module, 2 channels
Number of channels	2
Signal Type	Incremental encoder AB / pulse + direction signal
Maximum input frequency	1 MHZ
Input signal voltage	24V 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	0.2～1.5mm ^{2}/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

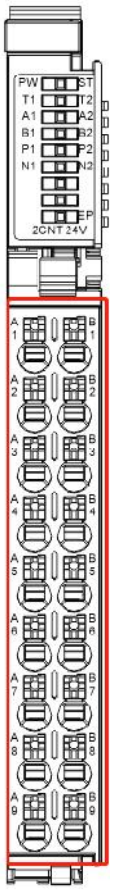
13.2 Hardware Interface

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-	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	24Vo	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

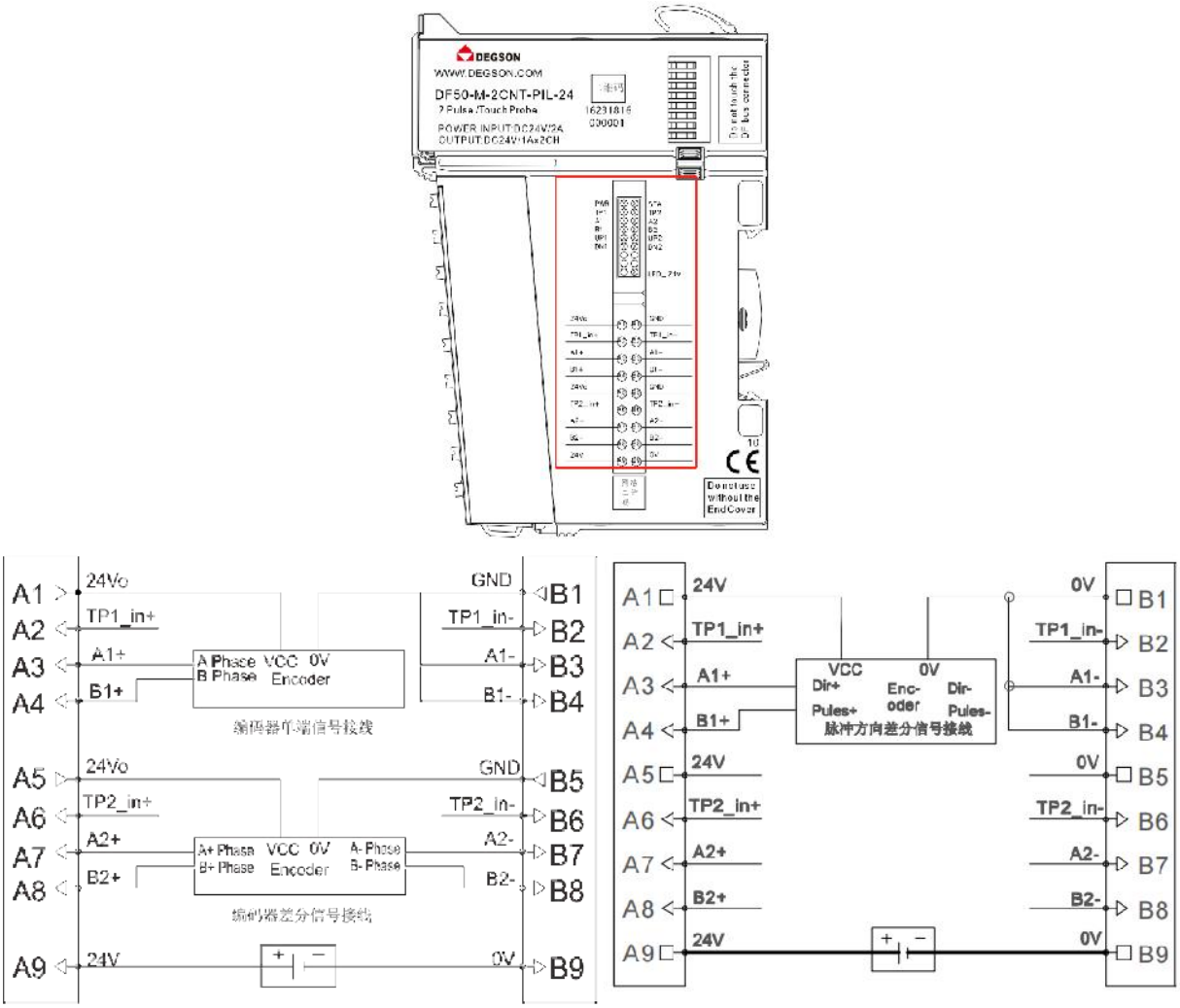
13.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green: System bus power input is normal	
	Green off: System bus power input is abnormal	
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

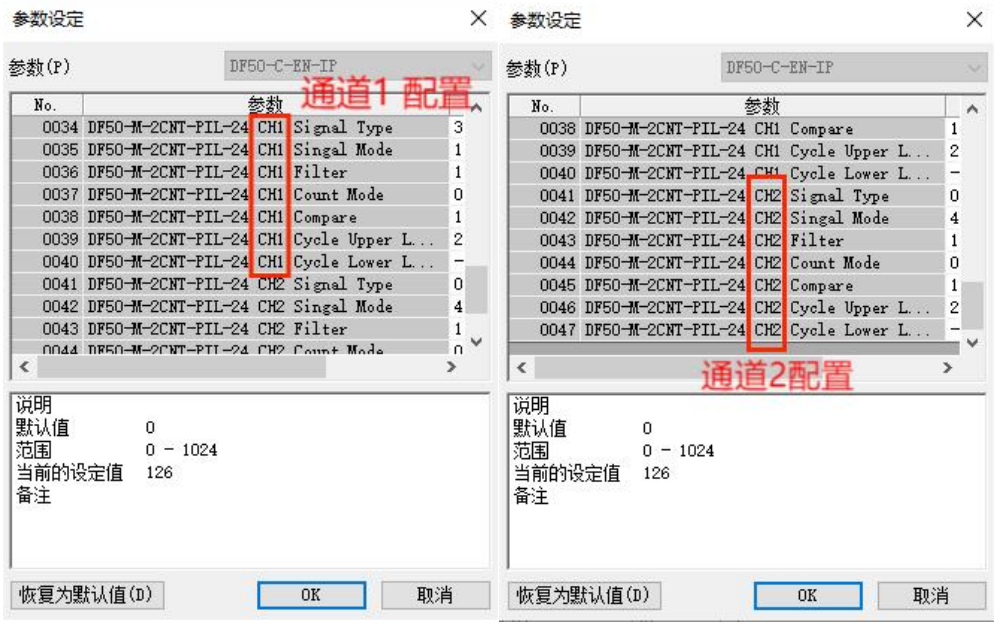
13.2.3 Wiring Diagram



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

13.3 Module Configuration Data Definition

As shown in the figure , users can configure the signal type of each channel as needed . The configuration items of channel 1 are No.34~40, and the configuration items of channel 2 are No.41~47.



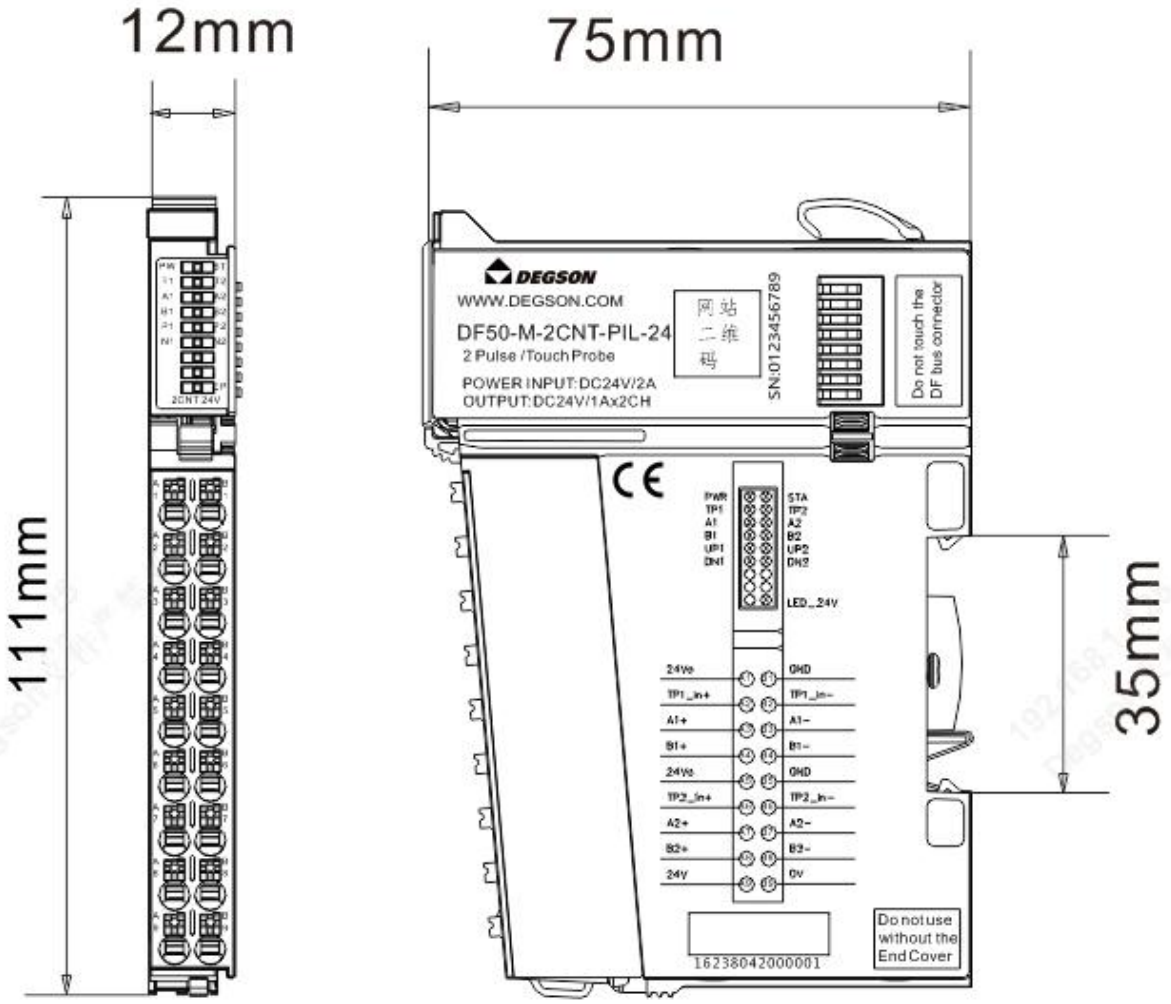
13.4 Module process data definition

Output data meaning		
The first channel output data		
Byte0	Bit 15	reserve
	bit0	0: Channel 1 stops counting and the original count is reset to zero; 1: Channel 1
Byte 2 ~Byte 5		Channel 1 pulse comparison value output, range: –2147483648~2147483647
Second channel output data		
Byte 6~Byte	Bit 15	reserve
	bit0	0: Channel 2 stops counting and the original count is reset; 1: Channel 2 starts
Byte 8 ~Byte 11		Channel 2 pulse comparison value output, range: –2147483648~2147483647

Input data meaning		
First channel input data		
Byte0 ~Byte1	Bit 15	reserve
	bit3~bit4	0: Channel 1 stops; 1: Channel 1 counts up; 2: Channel 1 counts down
	bit2	0: Channel 1 count value is less than the comparison value; 1: Channel 1 count
	bit1	0: No electronic probe/1st channel count reset signal 1: Electronic probe/channel
	bit0	0: Channel 1 counting stop state, the original count is cleared; 1: Channel 1
Byte 2 ~Byte 5		Channel 1 pulse input value, range: –2147483648~2147483647
Byte 6 ~Byte 9		Channel 1 pulse input latch value, range: –2147483648~2147483647
Second channel input data		
Byte 10~Byte 11	Bit 15	Reserved seat
	bit3~bit4	0: Channel 2 stops; 1: Channel 2 counts up; 2: Channel 2 counts down
	bit2	0: Channel 2 count value is less than the comparison value; 1: Channel 2 count
	bit1	0: No electronic probe/channel 2 count reset signal 1: Electronic probe/channel
	bit0	0: Channel 2 counting stop state, the original count is cleared; 1: Channel 2
Byte1 2 ~Byte1 5		Channel 2 pulse input value, range: –2147483648~2147483647
Byte1 6 ~Byte1 9		Channel 2 pulse input latch value, range: –2147483648~2147483647

13.5 Mechanical Installation

The installation dimensions are shown in the figure below, in 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
网站二维码
SN:012345678
Do not touch the DF bus connector
PWR
TP1
A1
B1
UP1
DN1
STA
TP2
A2
B2
UP2
DN2
LED_24V
24Ve
TP1_in+
A1+
B1+
24Ve
TP2_in+
A2+
B2+
24V
GND
TP1_in-
A1-
B1-
GND
TP2_in-
A2-
B2-
0V
16238042000001
Do not use without the End Cover

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

- The encoder 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.

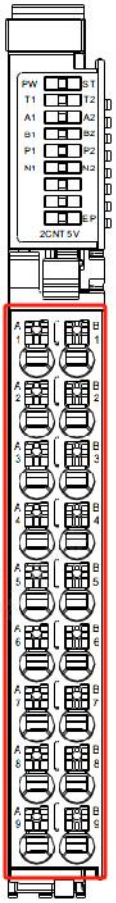
14.1 Specifications

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	0.2～1.5mm ^{2}/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

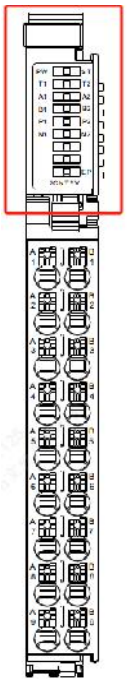
14.2 Hardware Interface

14.2.1 Terminal Block Definition



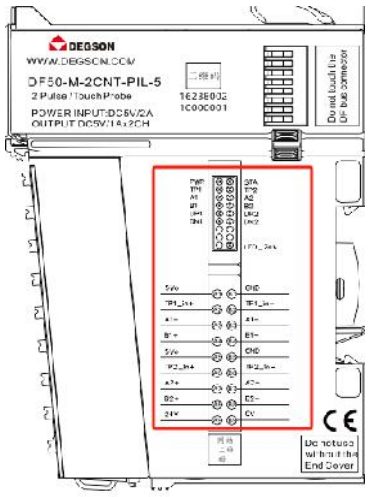
Terminal number	Signal	Terminal number	Signal	illustrate
A1	24Vo	B1	GND	Terminal power output
A2	TP1_in+	B2	TP1_in-	DI signal input
A3	A1+	B3	A1-	Orthogonal encoding mode A phase signal input/ Pulse plus direction mode direction signal input
A4	B1+	B4	B1-	Orthogonal encoding mode B phase signal input/ Pulse plus direction mode pulse signal input
A5	24Vo	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

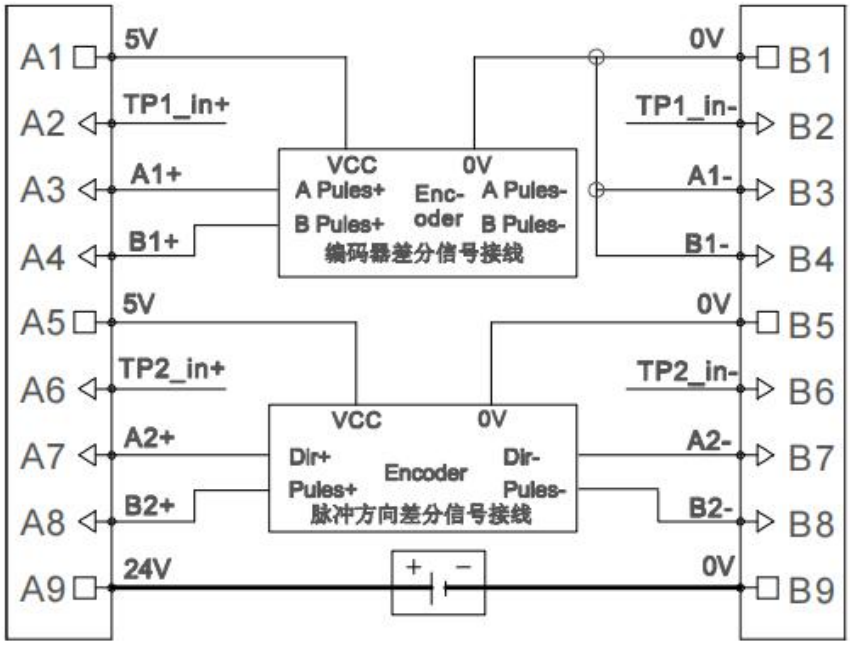
14.2.2 Definition of LED Indicator



Indicator Lights	meaning	
PW	Green: System bus power input is normal	
	Green off: System bus power input is abnormal	
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

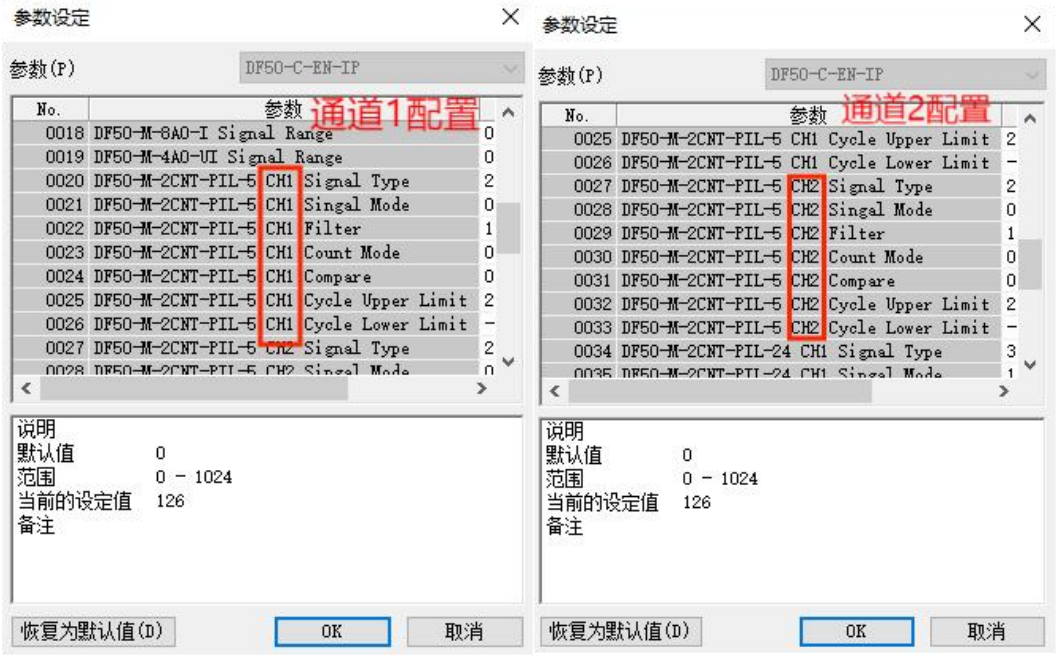




Note: A9, B9 24V power supply is provided externally.

14.3 Module configuration data definition

As shown in the figure , users can configure the signal type of each channel as needed , where the configuration items of channel 1 are No.20~26, and the configuration items of channel 2 are No.27~33.



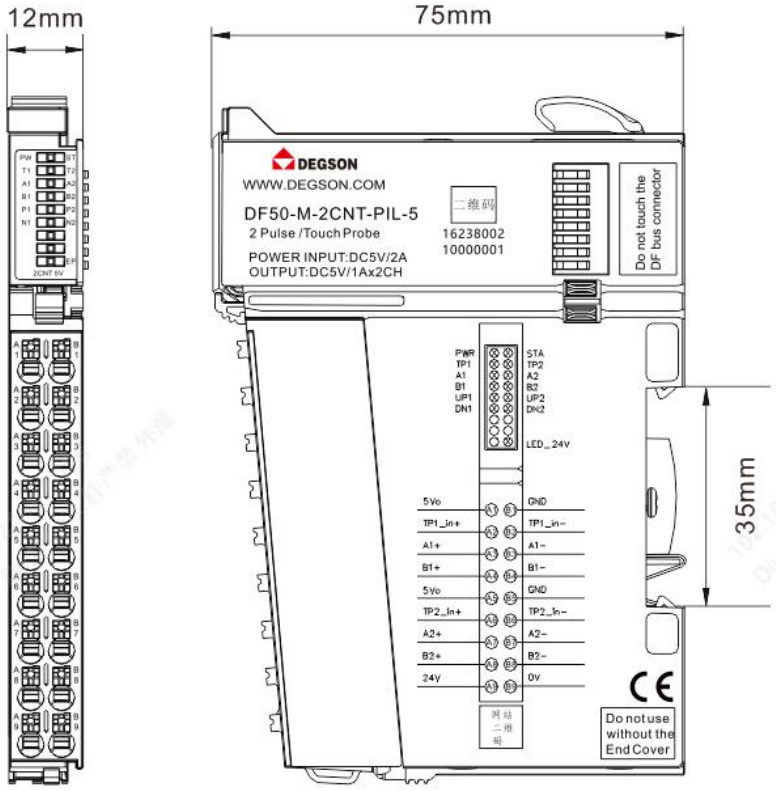
14.4 Module process data definition

Output data meaning		
The first channel output data		
Byte0	Bit 15	reserve
	bit0	0: Channel 1 stops counting and the original count is reset to zero; 1: Channel 1
Byte 2 ~Byte 5		Channel 1 pulse comparison value output, range: –2147483648~2147483647
Second channel output data		
Byte 6~Byte	Bit 15	reserve
	bit0	0: Channel 2 stops counting and the original count is cleared; 1: Channel 2 starts
Byte 8 ~Byte 11		Channel 2 pulse comparison value output, range: –2147483648~2147483647

Input data meaning		
First channel input data		
Byte0 ~Byte1	Bit 15	reserve
	bit3~bit4	0: Channel 1 stops; 1: Channel 1 counts up; 2: Channel 1 counts down
	bit2	0: Channel 1 count value is less than the comparison value; 1: Channel 1 count
	bit1	0: No electronic probe/1st channel count reset signal 1: Electronic
	bit0	0: Channel 1 counting stop state, the original count is cleared; 1: Channel 1
Byte 2 ~Byte 5		Channel 1 pulse input value, range: –2147483648~2147483647
Byte 6 ~Byte 9		Channel 1 pulse input latch value, range: –2147483648~2147483647
Second channel input data		
Byte 10~Byte 11	Bit 15	Reserved seat
	bit3~bit4	0: Channel 2 stops; 1: Channel 2 counts up; 2: Channel 2 counts down
	bit2	0: Channel 2 count value is less than the comparison value; 1: Channel 2 count
	bit1	0: No electronic probe/channel 2 count reset signal 1: Electronic probe/channel
	bit0	0: Channel 2 counting stop state, the original count is cleared; 1: Channel 2
Byte1 2 ~Byte1 5		Channel 2 pulse input value, range: –2147483648~2147483647
Byte1 6 ~Byte1 9		Channel 2 pulse input latch value, range: –2147483648~2147483647

14.5 Mechanical Installation

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



15 1 6 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.

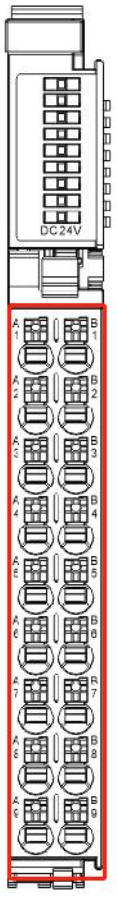
15.1 Specifications

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	0.2～1.5mm ^{2}/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

15.2 Hardware Interface

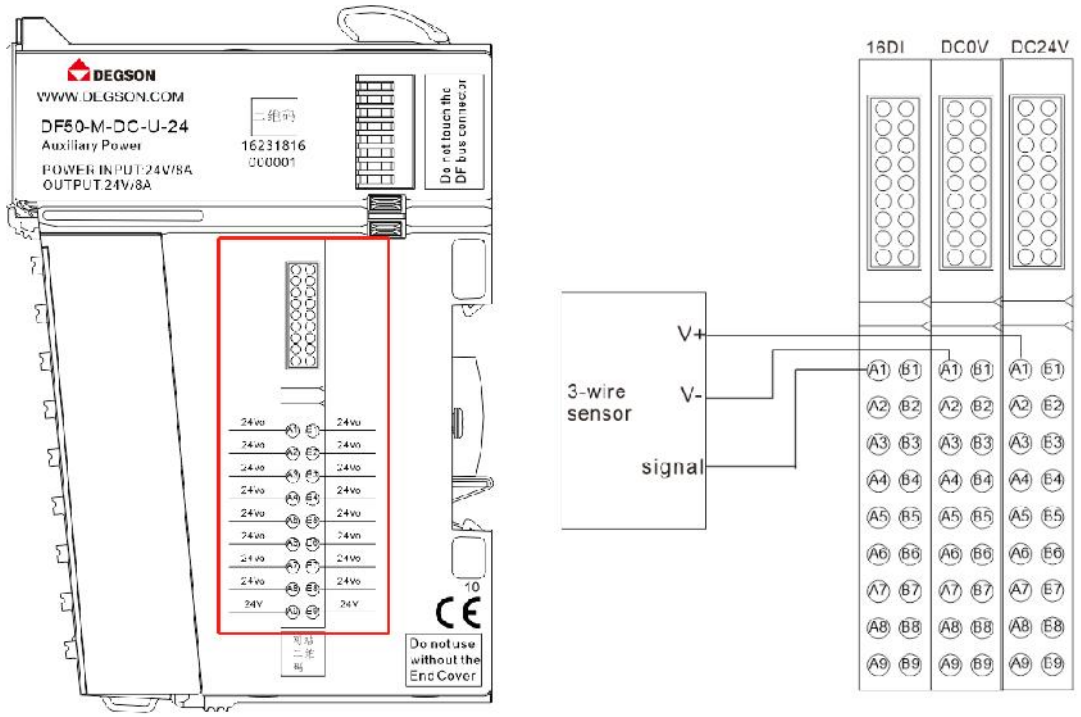
1 5 .2.1 Terminal block definition



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

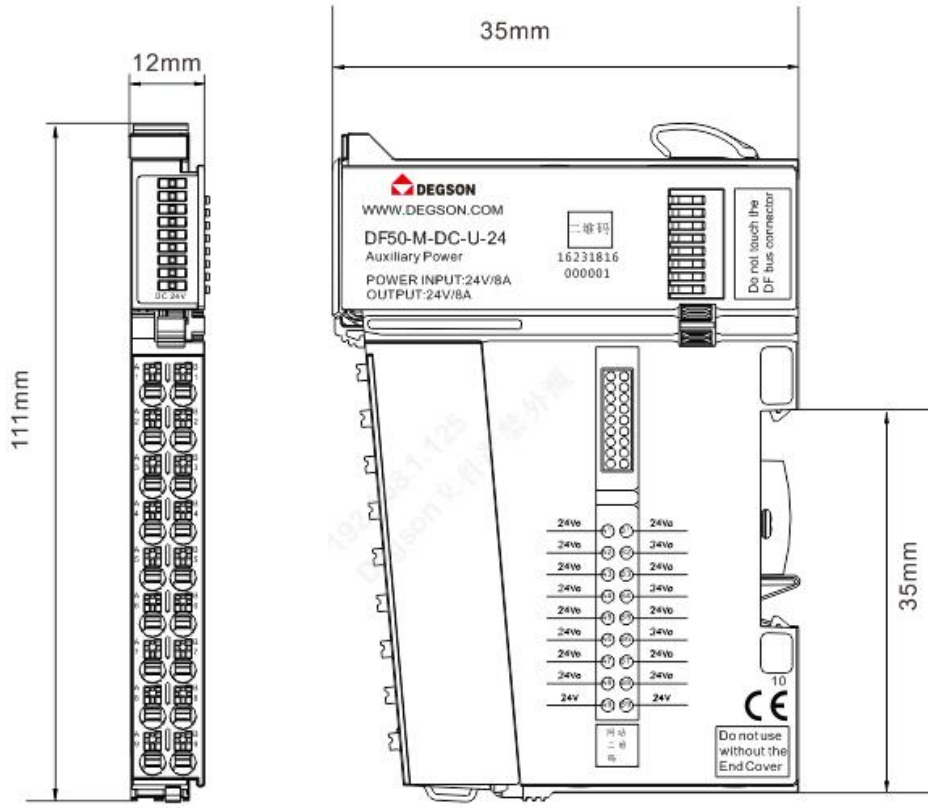
1 5 .2.2 Wiring diagram



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

1 5 .3 Mechanical installation

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



1 6 1 6 channels / 0VDC / voltage distribution (DF50-M-DC-U-0)

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

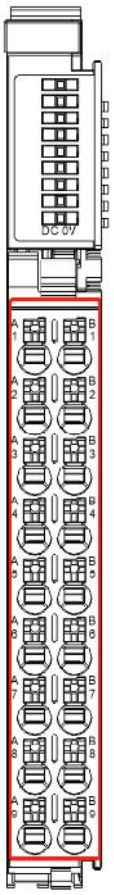
1 6 .1 Specifications

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	0.2～1.5mm ^{2}/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

1 6 .2 Hardware Interface

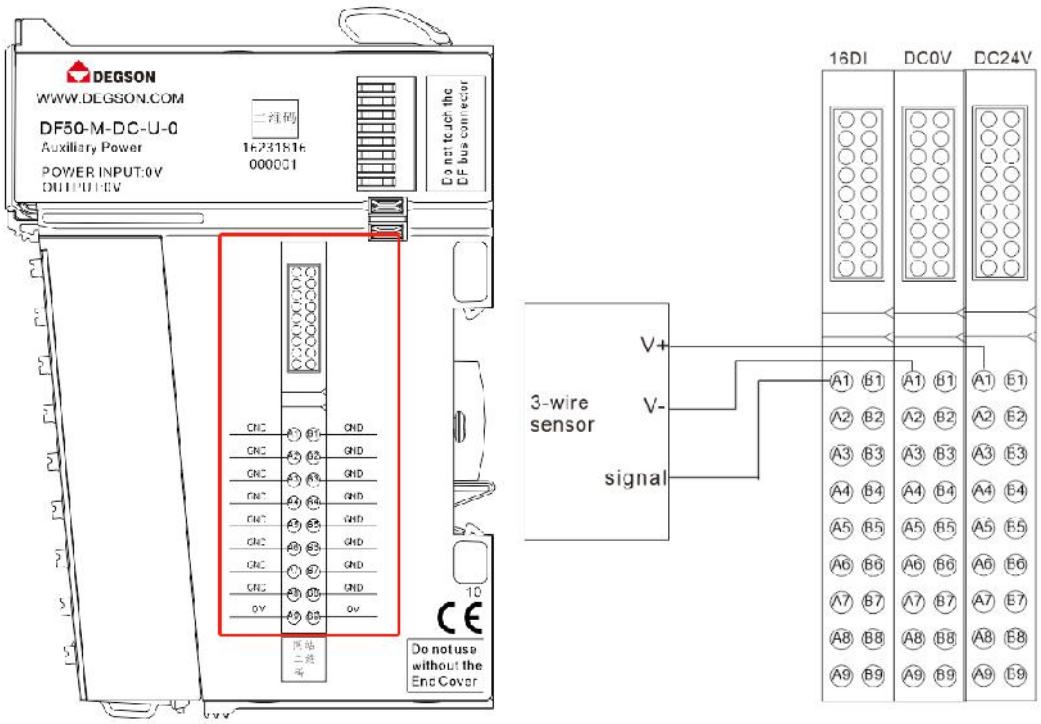
1 6 .2.1 Terminal block definition



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

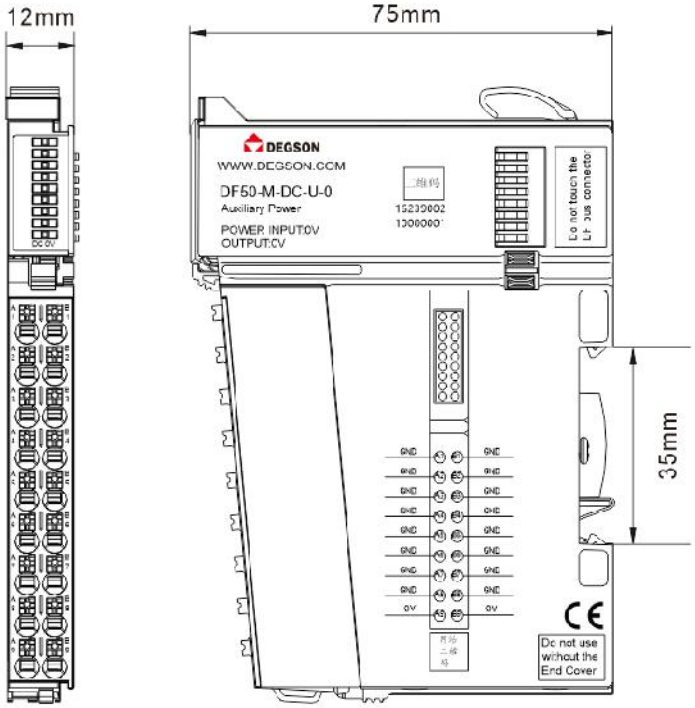
1 6 .2.2 Wiring diagram



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

1 6 .3 Mechanical installation

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



17 4- channel relay output/24VDC (DF50-M- 4 DO R)

- 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.

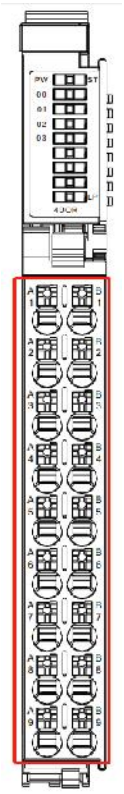
17.1 Specifications

Technical Information	
Product Description	Relay output module, 4 outputs
Number of channels	4
Contact Type	NO contact
Maximum output current	Maximum current per channel output : 5 A
	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	30 Hz
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 value 12 5℃
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	0.2～1.5mm ^{2} /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	1 g, in accordance with IEC 60068-2-6
Shock resistance	1 5 g, in accordance 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

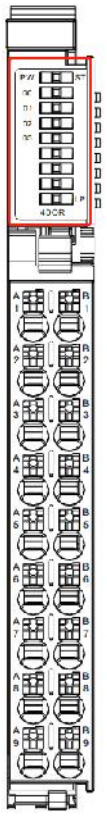
17.2 Hardware Interface

17.2.1 Terminal Block Definition



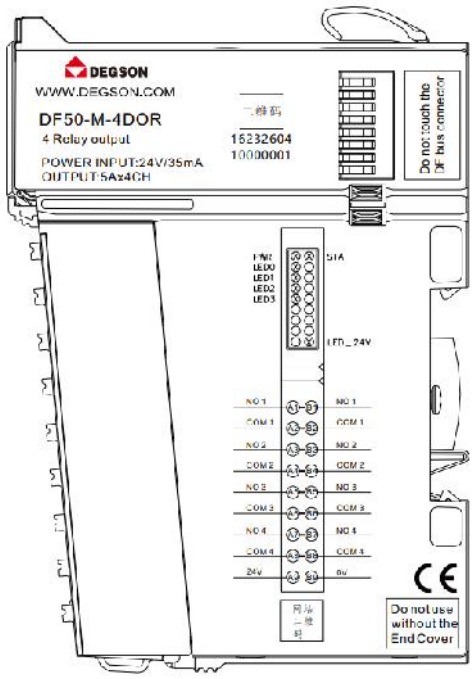
Terminal number	Signal	Terminal number	Signal	illustrate
A1	CH1 contact 1	B1	CH1 contact 1	CH1 relay interface 1
A2	CH1 contact 2	B2	CH1 contact 2	CH1 relay interface 2
A3	CH2 contact 1	B3	CH2 contact 1	CH2 relay interface 1
A4	CH2 contact 2	B4	CH2 contact 2	CH2 relay interface 2
A5	CH3 contact 1	B5	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

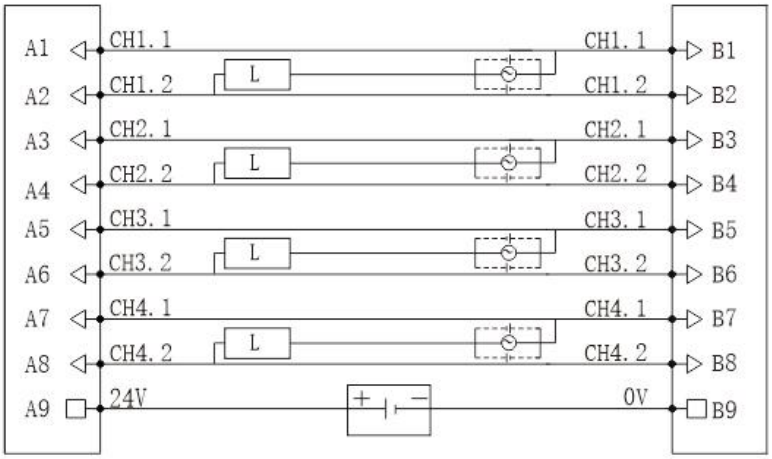
17.2.2 LED indicator light definition



Indicator Lights	meaning	
PW	Green : System bus power input is normal	
	Green off: System bus power input is abnormal	
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	
00～0 3	Green : Relay closed	
	Green off : relay disconnected	

17.2.3 Wiring diagram





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

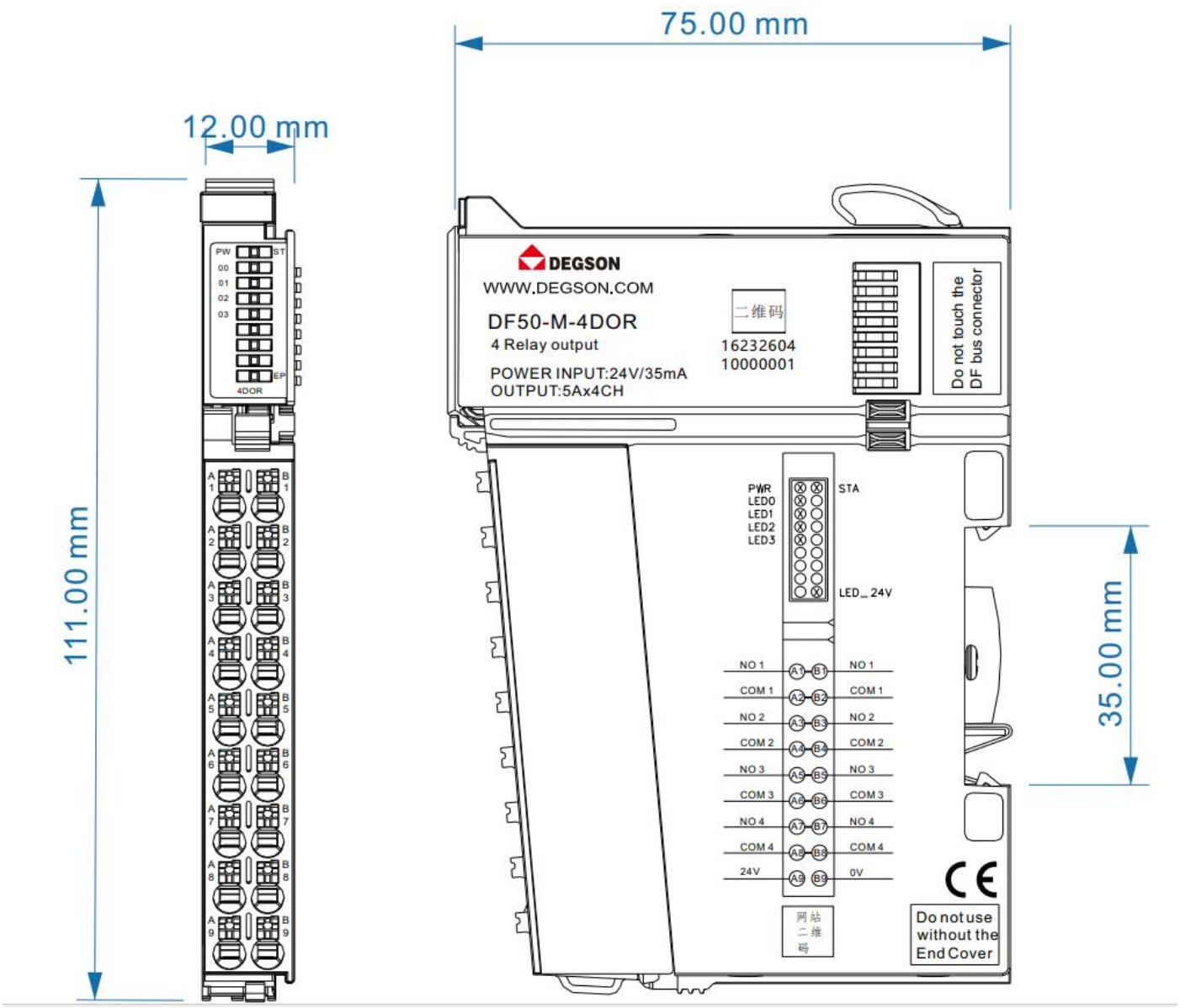
17.3 Process data definition

DF 5 0-M- 4 D O R module process data definition

Output Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved	Reserved	Reserved	Reserved	DO 3	DO 2	DO 1	DO 0

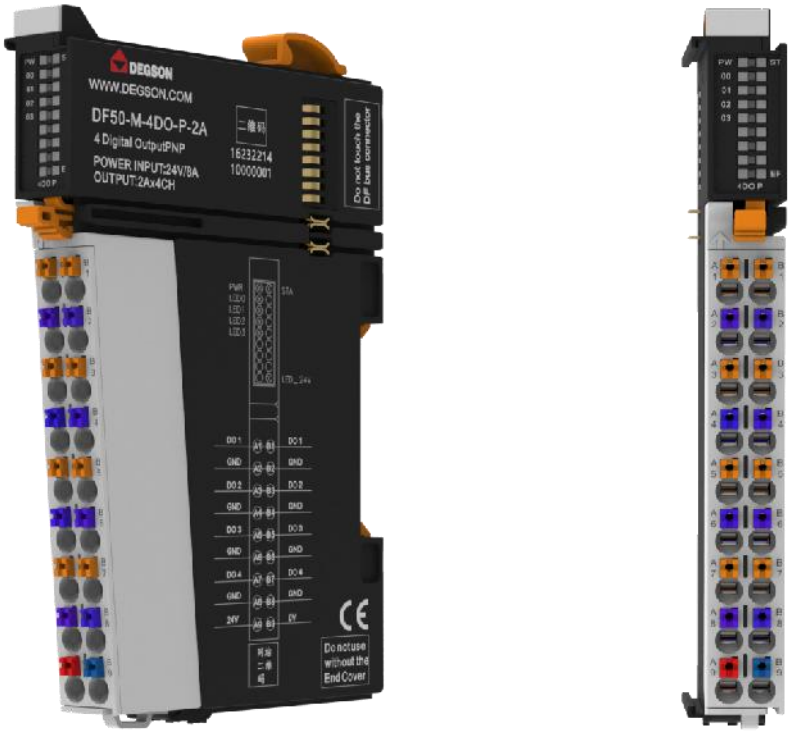
17.4 Mechanical installation

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



18 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.



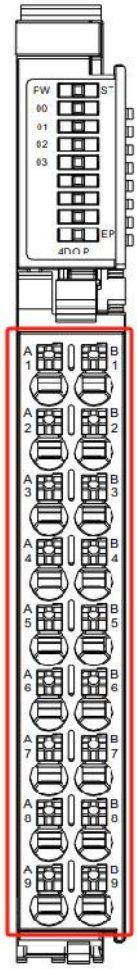
18.1 Specifications

Technical Information	
Product Description	Digital output module, 4 outputs, PNP , 24VDC
Number of channels	4
Signal Type	PNP
"OFF" signal voltage	High impedance
"ON" signal voltage	24 V DC
Data size	1 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	2 A
Leakage Current	Maximum value: 0.18 uA
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: 4 A. Typical 2 A 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	0.2～1.5mm ^{2}/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	1 g, in accordance with IEC 60068-2-6
Shock resistance	1 5 g, in accordance 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

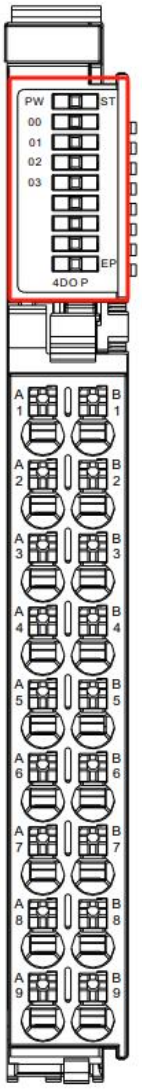
18.2 Hardware Interface

18.2.1 Terminal Block Definition



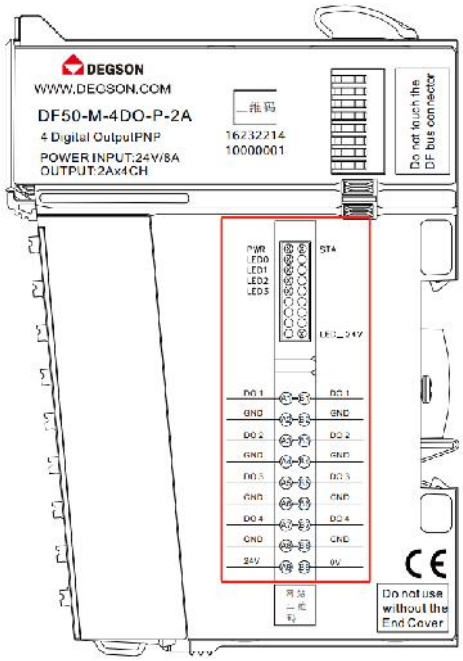
Terminal number	Signal	Terminal number	Signal	illustrate
A1	DO 1	B1	DO 1	DO 1 signal output
A2	GND	B2	GND	
A3	DO 2	B3	DO 2	DO 2 signal output
A4	GND	B4	GND	
A5	DO 3	B5	DO 3	DO 3 signal output
A6	GND	B6	GND	
A7	DO 4	B7	DO 4	DO 4 signal output
A8	GND	B8	GND	
A9	24V	B9	0V	Terminal power input

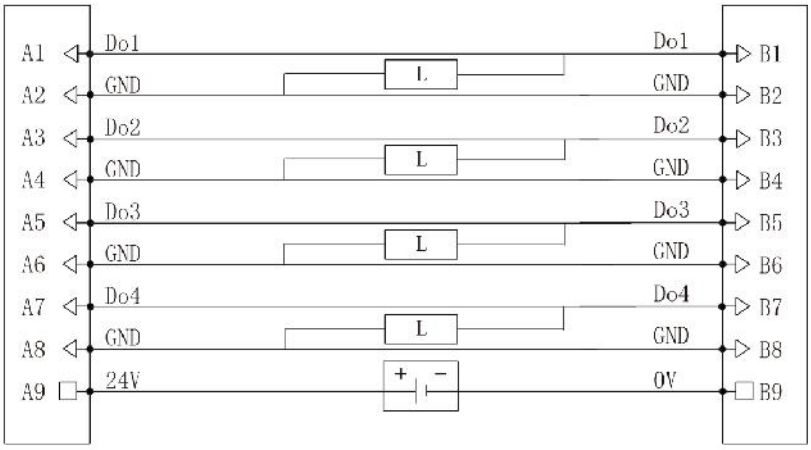
18.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green : System bus power input is normal	
	Green off: System bus power input is abnormal	
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	
00～0 3	Green : Output signal is valid	
	Green off : Output signal is invalid	

18.2.3 Wiring Diagram





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

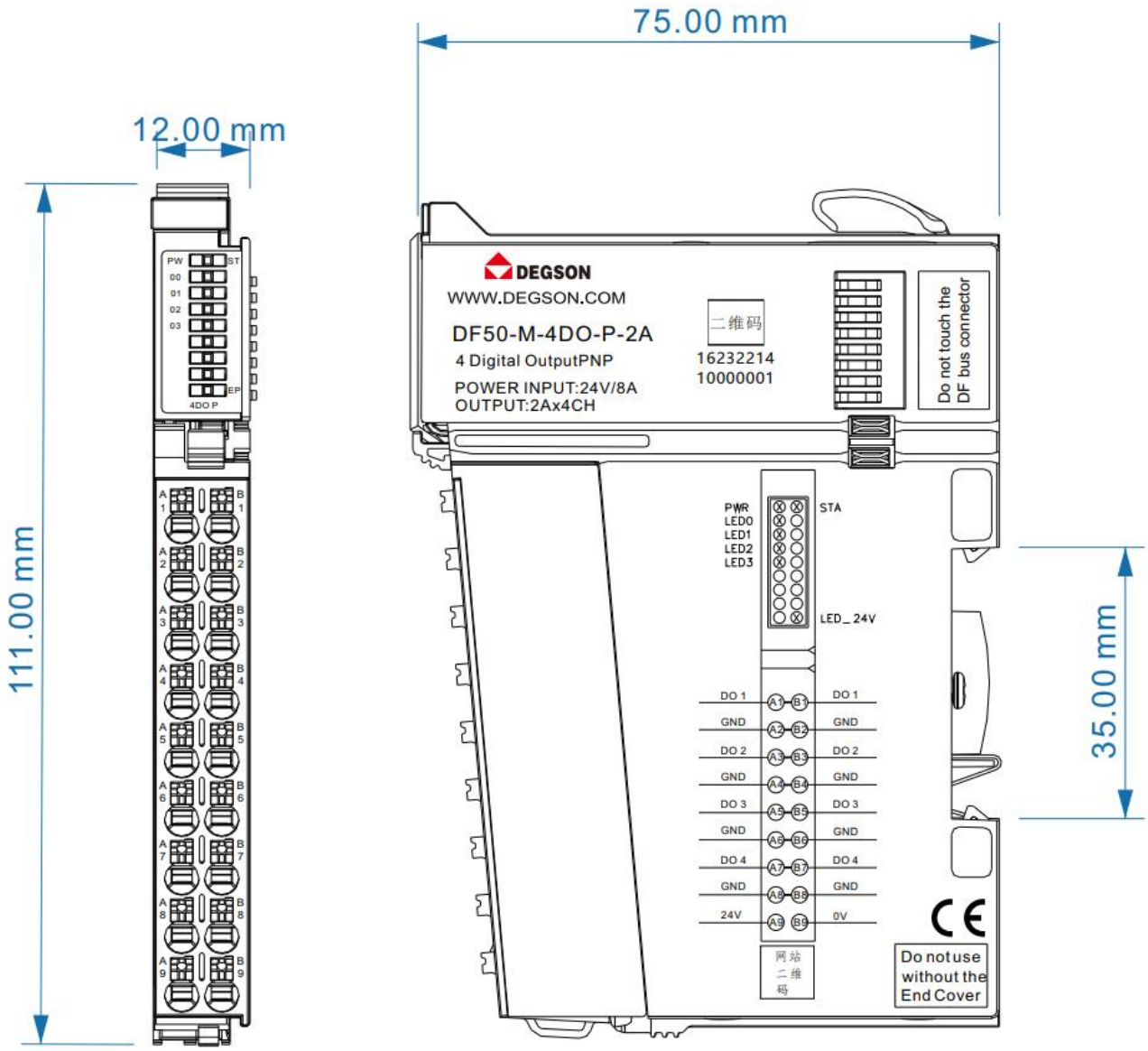
18.4 Process Data Definition

DF 5 0-M- 4 D O - P - 2A module process data definition

Output Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved	Reserved	Reserved	Reserved	DO 3	DO 2	DO 1	DO 0
Input Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 1	Reserved	Reserved	Reserved	Reserved	Overcurrent 3	Overcurrent 2	Overcurrent 1	Overcurrent 0

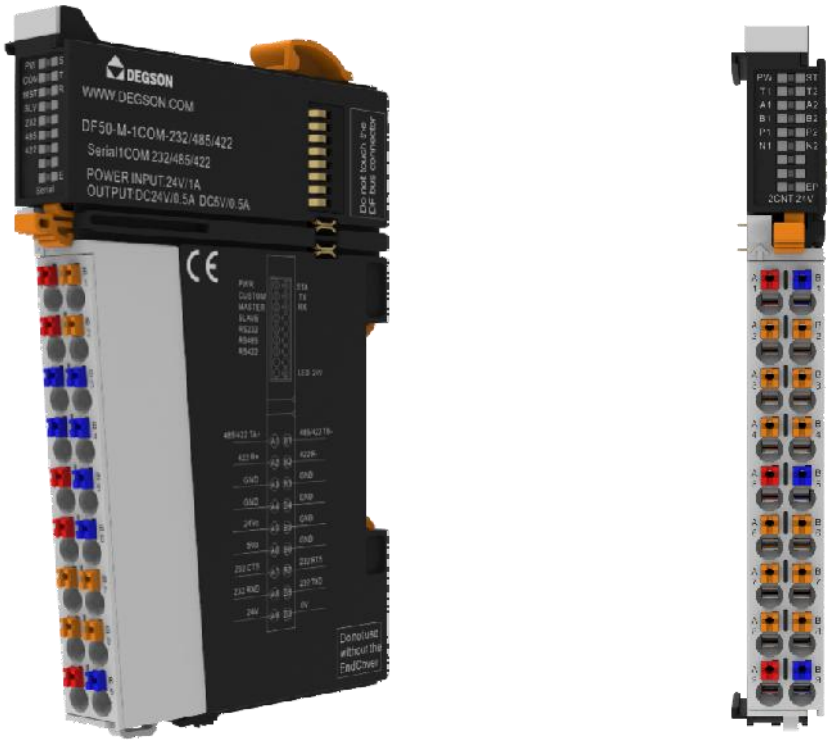
18.5 Mechanical Installation

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



19 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.



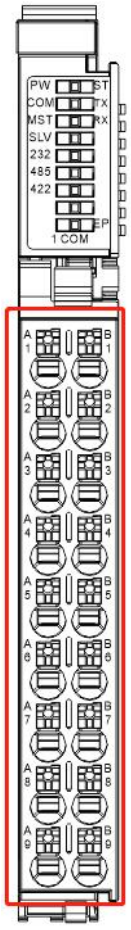
1 9 . 1 Specifications

Technical Information	
Product Description	Serial port module, 1 channel, supports RS232/RS485/RS422
Number of channels	1
Communication Protocol	Modbus RTU master and slave modes; free transparent transmission mode
Baud rate	2400bps ~ 256000bps
Data bits	7bit/8bit
Check digit	None/Even/Odd
Stop bits	1bit/2bit
Diagnosis reporting function configuration	support
Input /output action display	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	5 V DC (4.75 V DC ~ 5.25 V DC)
Terminal 5V power supply output rated current	500mA/each power output channel
Wiring parameters	

Connection technology	PUSH-IN Terminal Blocks
Wire crimping area	0.2～1.5mm ^{2}/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	1 g, 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

19.2 Hardware Interface

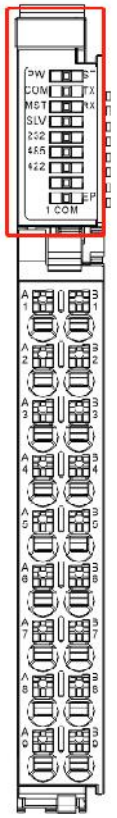
1 9 . 2.1 Terminal block definition



Terminal	Signal	Terminal	Signal	illustrate

number		number		
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

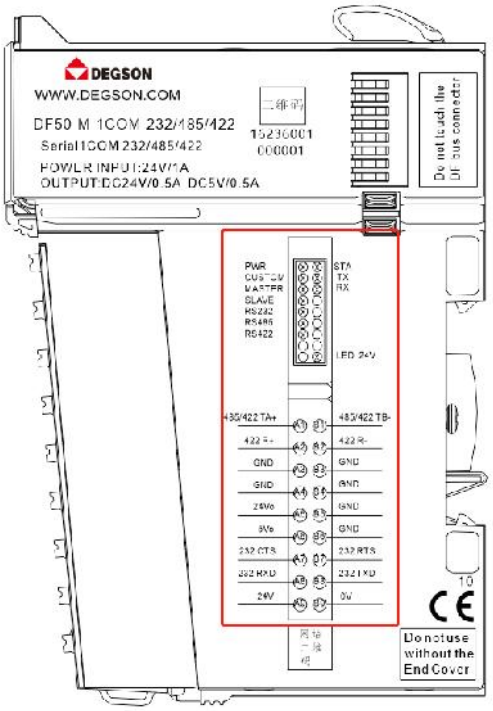
1 9 . 2.2 Definition of LED indicators

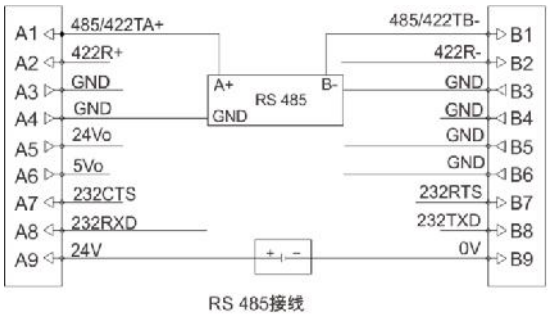


Indicator Lights	meaning	
PW	Green : System bus power input is normal	
	Green off: System bus power input is abnormal	
ST	Power-on stage:	Green: Module initialization abnormality,
		Green off: Module initialization is normal
	Operation phase:	Green flash: The internal bus of the module is working normally
		Green off /Green on : The internal bus of the module is working abnormally or the terminal power input is abnormal.
COM	Green : The module is working in free transparent transmission mode	

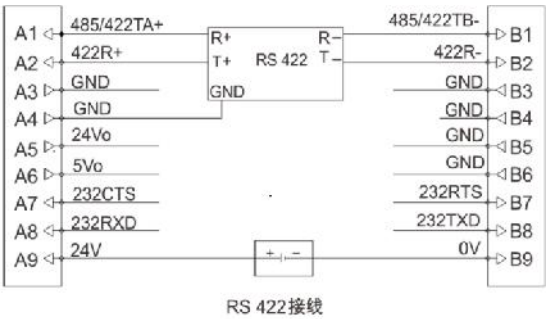
	Green off: The module is not working in free transparent transmission mode
MST	Green : The module is working in ModBus master mode
	Green off: The module is not working in ModBus master mode
SLV	Green : The module is working in ModBus slave mode
	Green off: The module is not working in ModBus slave mode
232	Green : Enable 232 communication interface
	Green off: 232 communication interface disabled
485	Green : Enable 485 communication interface
	Green off: 485 communication interface disabled
422	Green : Enable the 422 communication interface
	Green off: 422 communication interface disabled
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

1 9 . 2.3 Wiring diagram

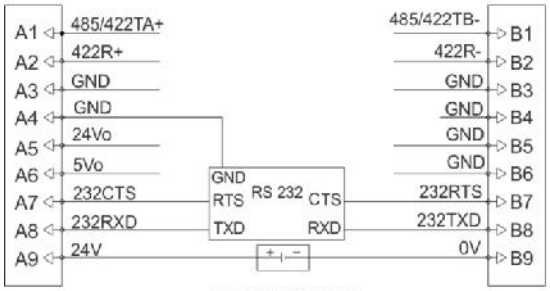




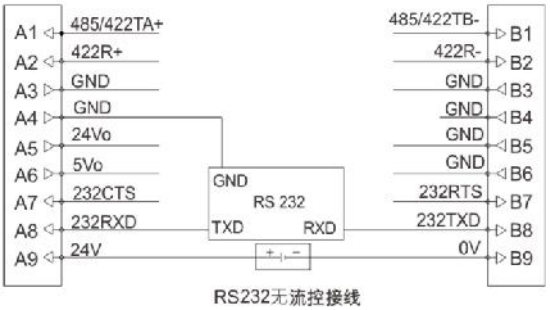
RS 485接线



RS 422接线



RS232有流控接线



RS232无流控接线

19.3 Configuration data definition

name	Value range	default value	meaning
DF50-M-1COM Port Operation Mode	Table A	0	Operation Mode
DF50-M-1COM Port Interface	Table B	2	Interface Type
DF50-M-1COM Port Parity	Table C	0	Check digit
DF50-M-1COM Port Databits	Table D	0	Data bits
DF50-M-1COM Port Stopbit	Table E	0	Stop bits
DF50-M-1COM Port Baudrate	Table F	11	Baud rate
DF50-M-1COM FreeRUN:Interval time(ms)	0~65535	1	Free mode data frame interval
DF50-M-1COM Slave:Slave ID	0~127	1	Slave Mode Slave Mode Address
DF50-M-1COM Slave:Slave Response Delay(ms)	0~65535	0	Slave mode slave response time
DF50-M-1COM Master:Ch0: Slave ID	0~127	0	Channel 0 slave address configuration
DF50-M-1COM Master:Ch0: Event Trigger	Table G	0	Channel 0 trigger mode configuration
DF50-M-1COM Master:Ch0: Lost Action	Table H	0	Channel 0 offline action configuration
DF50-M-1COM Master:Ch0: Operation Code	Table I	16	Channel 0 function code configuration
DF50-M-1COM Master:Ch0: Reg Addr	0~65535	0	Channel 0 register address configuration

DF50-M-1COM Master:Ch0: Reg Num	Register: 0-20 (40 bytes) Number of coils: 0-320 (40 bytes)	0	Channel 0 register quantity configuration
DF50-M-1COM Master:Ch0: Poll Time	100 - 5000ms	500	Channel 0 polling period configuration
DF50-M-1COM Master:Ch0: Poll Delay	0-5000ms	0	Channel 0 interval time configuration
DF50-M-1COM Master:Ch0: Response Timeout	100~5000ms	1000	Channel 0 slave timeout configuration
DF50-M-1COM Master:Ch1: Slave ID	0~127	0	Channel 1 slave address configuration
:			
DF50-M-1COM Master:Ch1: Response Timeout	0~127	0	Channel 1 slave timeout configuration
DF50-M-1COM Master:Ch2: Slave ID	0~127	0	Channel 2 slave address configuration
:			
DF50-M-1COM Master:Ch2: Response Timeout	0~127	0	Channel 2 slave timeout configuration
DF50-M-1COM Master:Ch3: Slave ID	0~127	0	Channel 3 slave address configuration
:			
DF50-M-1COM Master:Ch3: Response Timeout	0~127	0	Channel 3 slave timeout configuration
DF50-M-1COM Master:Ch4: Slave ID	0~127	0	Channel 4 slave address configuration
:			
DF50-M-1COM Master:Ch4: Response Timeout	0~127	0	Channel 4 slave timeout configuration
DF50-M-1COM Master:Ch5: Slave ID	0~127	0	Channel 5 slave address configuration
:			
DF50-M-1COM Master:Ch5: Response Timeout	0~127	0	Channel 5 slave timeout configuration
DF50-M-1COM Master:Ch6: Slave ID	0~127	0	Channel 6 slave address configuration
:			

DF50-M-1COM Master:Ch6: Response Timeout	0~127	0	Channel 6 slave timeout configuration
DF50-M-1COM Master:Ch7: Slave ID	0~127	0	Channel 7 slave address configuration
:			
DF50-M-1COM Master:Ch7: Response Timeout	0~127	0	Channel 7 slave timeout configuration

Table A

Serial number	name	meaning
0	FreeRUN	Free transparent transmission mode
1	Modbus RTU Master	Master mode
2	Modbus RTU Slave	Slave Mode

Table B

Serial number	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

Table C

Serial number	name	meaning
0	None	No check digit
1	Odd	Odd Parity
2	Even	Even parity

Table D

Serial number	name	meaning
0	8bit	8 data bits
1	7bit	7 data bits

Table E

Serial number	name	meaning
0	1bit	1 stop bit
1	2bit	2 stop bits

Table F

Serial number	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

Table G

Serial number	name	meaning
0	Poll mode	Polling Mode
1	Trigger	Trigger Mode

Table H

Serial number	name	meaning
0	Hold Data	Keep data
1	Clear Data	Clear data

Table I

Serial number	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

1 9 . 4 Process data definition

- Free mode process data definition

Input Data			
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

Output Data			
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.

The free mode read and write switching can be realized through the control word CtrlWord. When continuous reading and writing are required, it can be realized by periodically switching CtrlWord to write command 16#00C1 and read command 16#00C2 through PLC. Whether the reading and writing are successful can be judged by StateWord or combined with InputCount.

➢ Slave mode process data definition

Input Data			
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

Output Data			
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

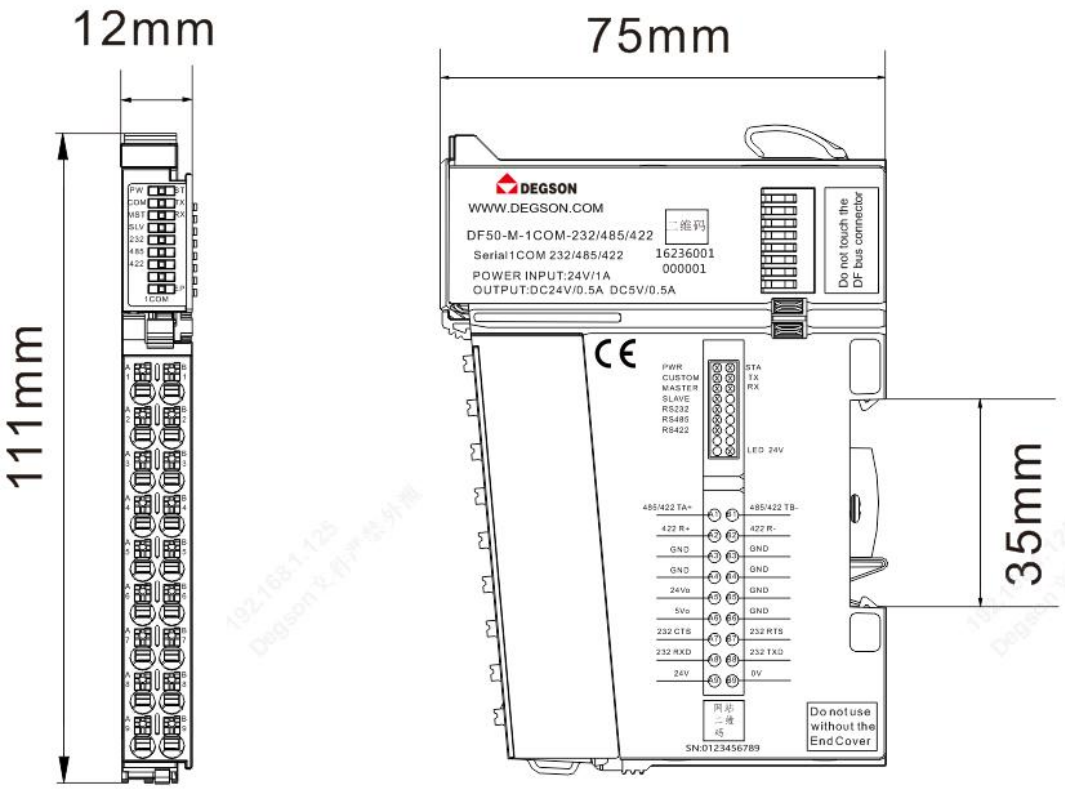
- Master mode process data definition

Input Data			
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

Output data (RWw)			
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

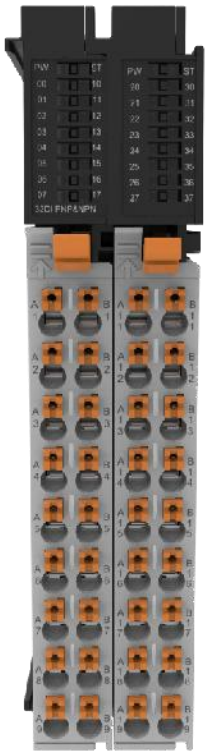
19.5 Mechanical installation

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


12mm
111mm
75mm
35mm
DEGSON
WWW.DEGSON.COM
DF50-M-1COM-232/485/422
Serial1COM 232/485/422
POWER INPUT:24V/1A
OUTPUT:DC24V/0.5A DC5V/0.5A
16236001
000001
Do not touch the DF bus connector
PWR
CUSTOM
MASTER
SLAVE
RS232
RS485
RS422
STA
TX
RX
LED 24V
485/422 TA+
485/422 TB-
422 R+
422 R-
GND
24Vo
5Vo
232 CTS
232 RTS
232 RXD
232 TXD
24V
0V
SN:0123456789
Do not use without the End Cover

20 32- channel digital input /24VDC/NPN (DF50-M- 32 D I - 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.

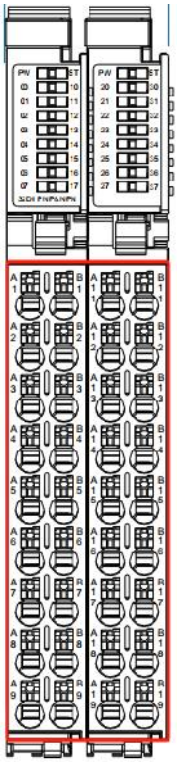


20.1 Specifications

Technical Information		
Product Description		Digital Input Module, 32 Inputs, 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		4 Byte
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- 40 ms configurable
Input Impedance		>7.5kΩ
Input Action Display		When the input is in driving state, the input indicator light is on.
IO Mapping		Support bitwise or wordwise mapping
Power parameters		
System bus input power rated voltage		5V DC (4.75V DC~ 5.25V DC)
System bus input power rated current		90 mA
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		0.2～1.5mm ^{2} /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

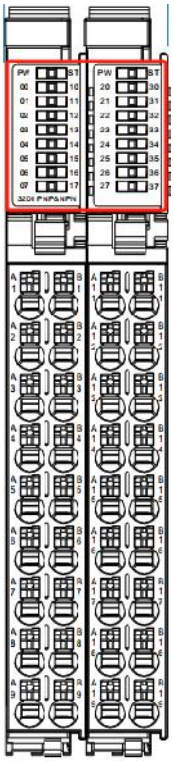
20.2 Hardware Interface

20.2.1 Terminal Block Definition



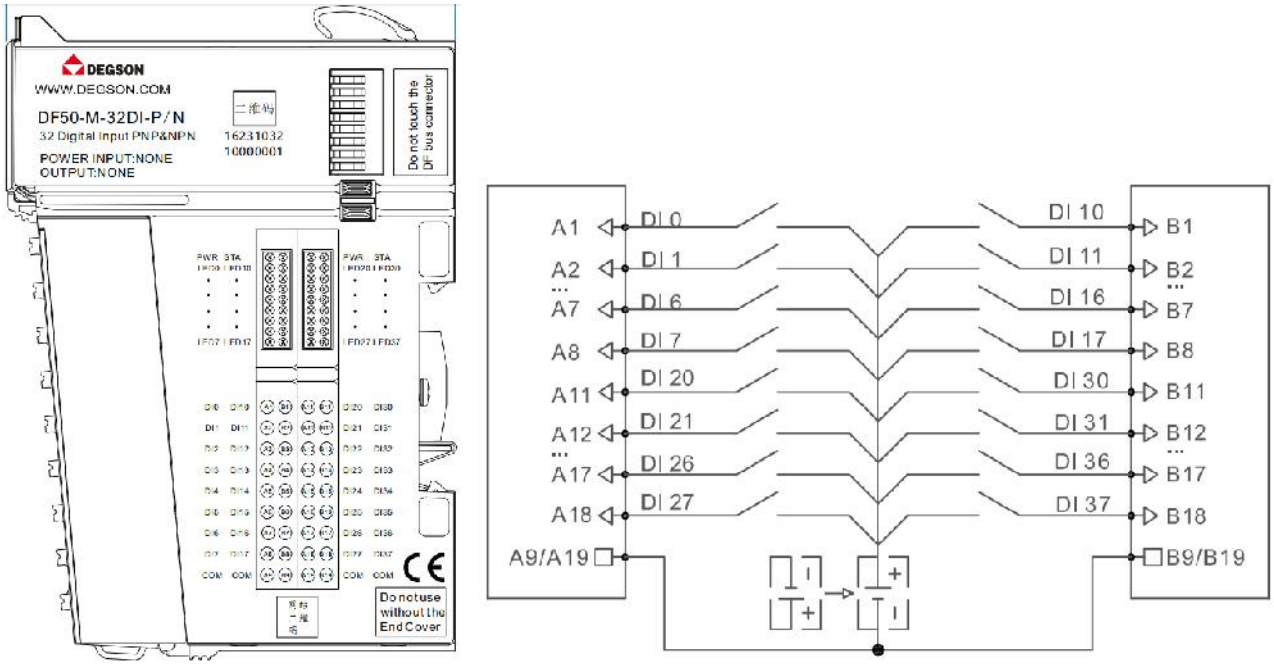
Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	illustrate
A1	DI 0	B1	DI 10	C1	DI 2 0	D1	DI 3 0	DI signal input
A2	DI 1	B2	DI 11	C2	DI 2 1	D2	DI 3 1	
A3	DI 2	B3	DI 12	C3	DI 2 2	D3	DI 3 2	
A4	DI 3	B4	DI 13	C4	DI 2 3	D4	DI 3 3	
A5	DI 4	B5	DI 14	C5	DI 2 4	D5	DI 3 4	
A6	DI 5	B6	DI 15	C6	DI 2 5	D6	DI 3 5	
A7	DI 6	B7	DI 16	C7	DI 2 6	D7	DI 3 6	
A8	DI 7	B8	DI 17	C8	DI 2 7	D8	DI 3 7	
A9	COM	B9	COM	C9	COM	D9	COM	Public

20.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green : System bus power input is normal	
	Green off: System bus power input is abnormal	
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 2 0～ 2 7, 3 0～ 3 7	Green : Input signal is valid	
	Green off : Input signal is invalid	

20.2.3 Wiring diagram

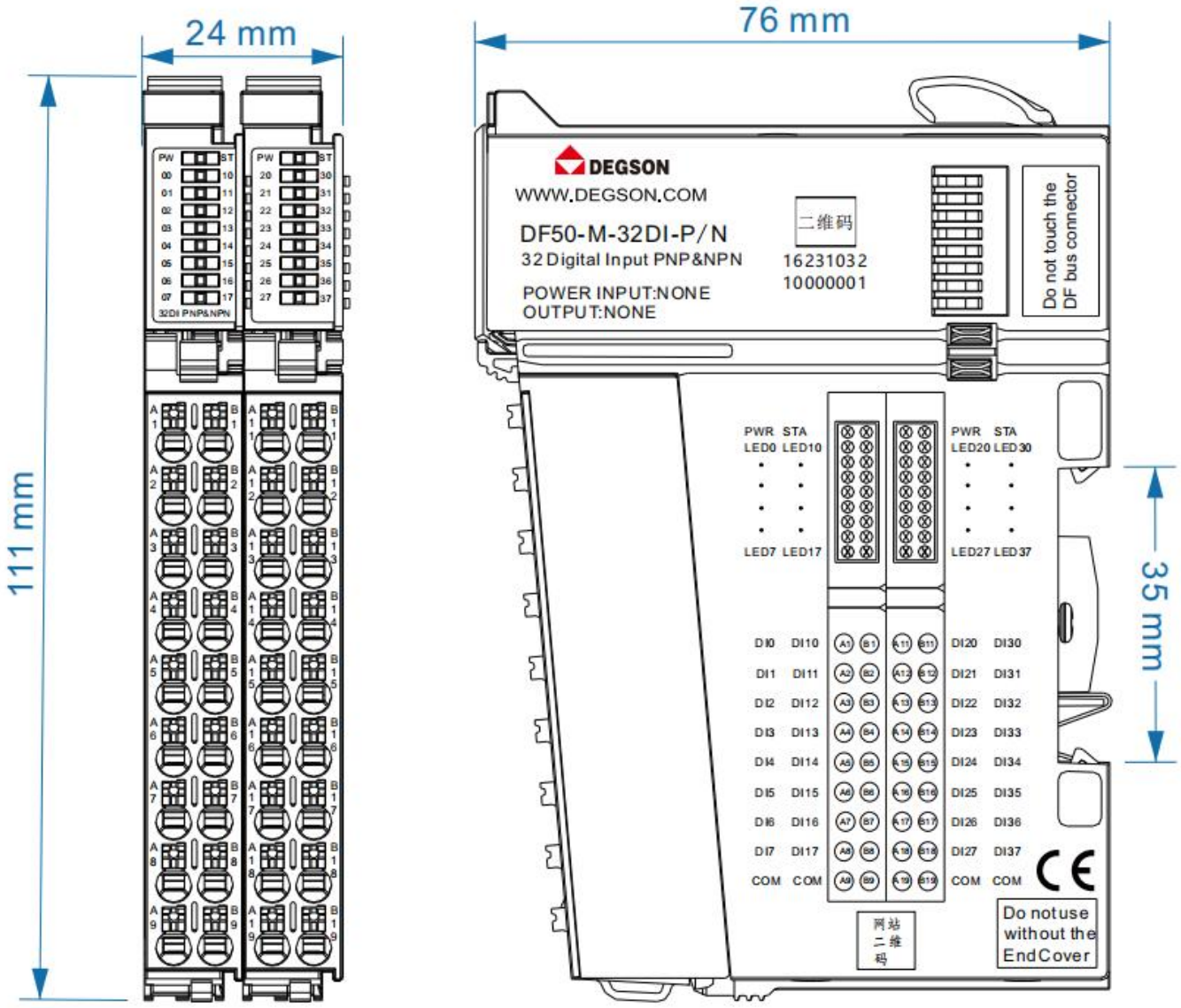


Note: COM is the common terminal, external 24V is used to realize NPN ; external 0V is used to realize PNP.

20.3 Process data definition

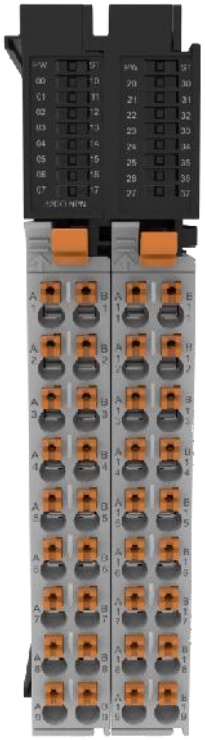
Input Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DI 7	DI 6	DI 5	DI 4	DI 3	DI 2	DI 1	DI 0
Byte 1	DI 17	DI 16	DI 15	DI 14	DI 13	DI 12	DI 11	DI 10
Byte 2	DI 27	DI 26	DI 25	DI 24	DI 23	DI 22	DI 21	DI 20
Byte 3	DI 37	DI 36	DI 35	DI 34	DI 33	DI 32	DI 31	DI 30

20.4 Mechanical installation



21 32- channel digital output /24VDC/NPN (DF50-M- 32 D ON)

- 32 -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.



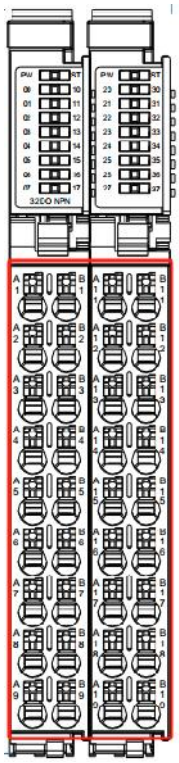
21.1 Specifications

Technical Information	
Product Description	Digital Output Module, 32 Outputs, NPN , 24VDC
Number of channels	32
Signal Type	NPN
"OFF" signal voltage	High impedance
"ON" signal voltage	0 V DC
Data size	4 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	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 bitwise or wordwise 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	2 00mA
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	0.2～1.5mm ^{2}/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

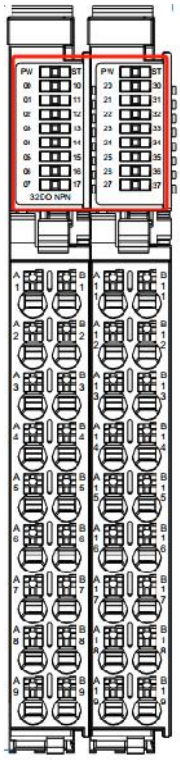
21.2 Hardware Interface

21.2.1 Terminal Block Definition



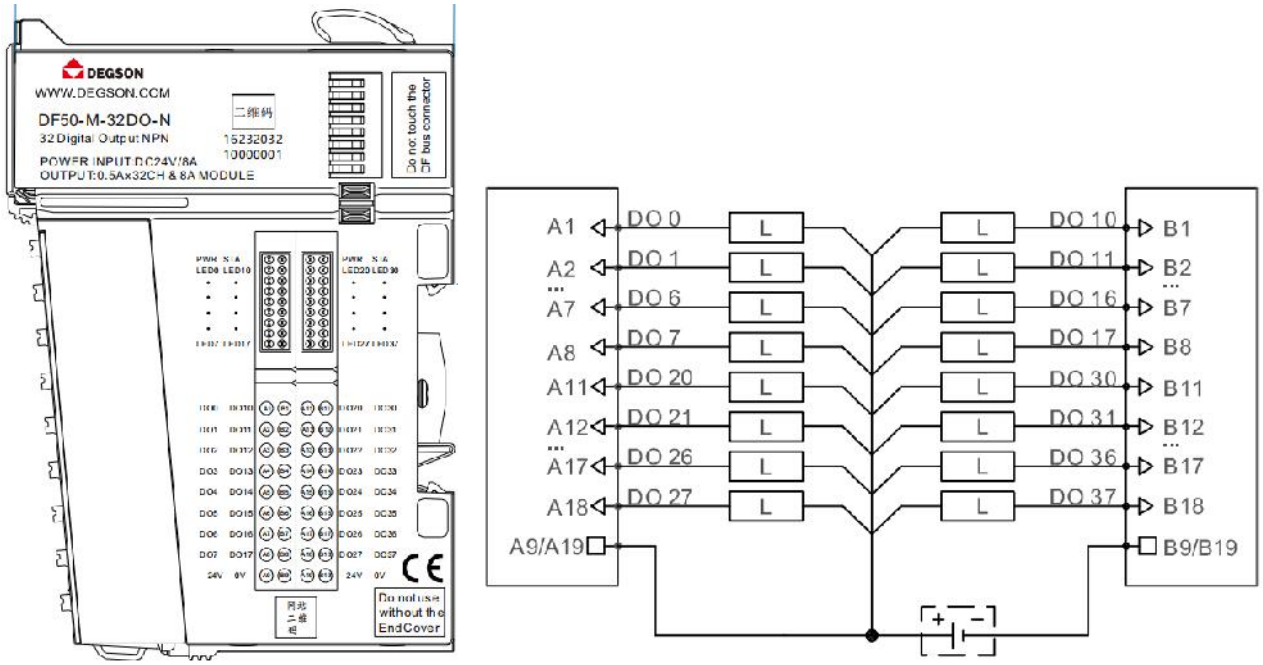
Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	illustrate
A1	DO 0	B1	DO 10	C1	DO 2 0	D1	DO 3 0	DO signal output
A2	DO 1	B2	DO 11	C2	DO	D2	DO 3 1	
A3	DO 2	B3	DO 12	C3	DO	D3	DO 3 2	
A4	DO 3	B4	DO 13	C4	DO	D4	DO 3 3	
A5	DO 4	B5	DO 14	C5	DO	D5	DO 3 4	
A6	DO 5	B6	DO 15	C6	DO 2 5	D6	DO 3 5	
A7	DO 6	B7	DO 16	C7	DO 2 6	D7	DO 3 6	
A8	DO 7	B8	DO 17	C8	DO 2 7	D8	DO 3 7	
A9	24V	B9	0V	C 9	24V	D 9	0V	Terminal power input

21.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green: System bus power input is normal	
	Green off: System bus power input is abnormal	
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	

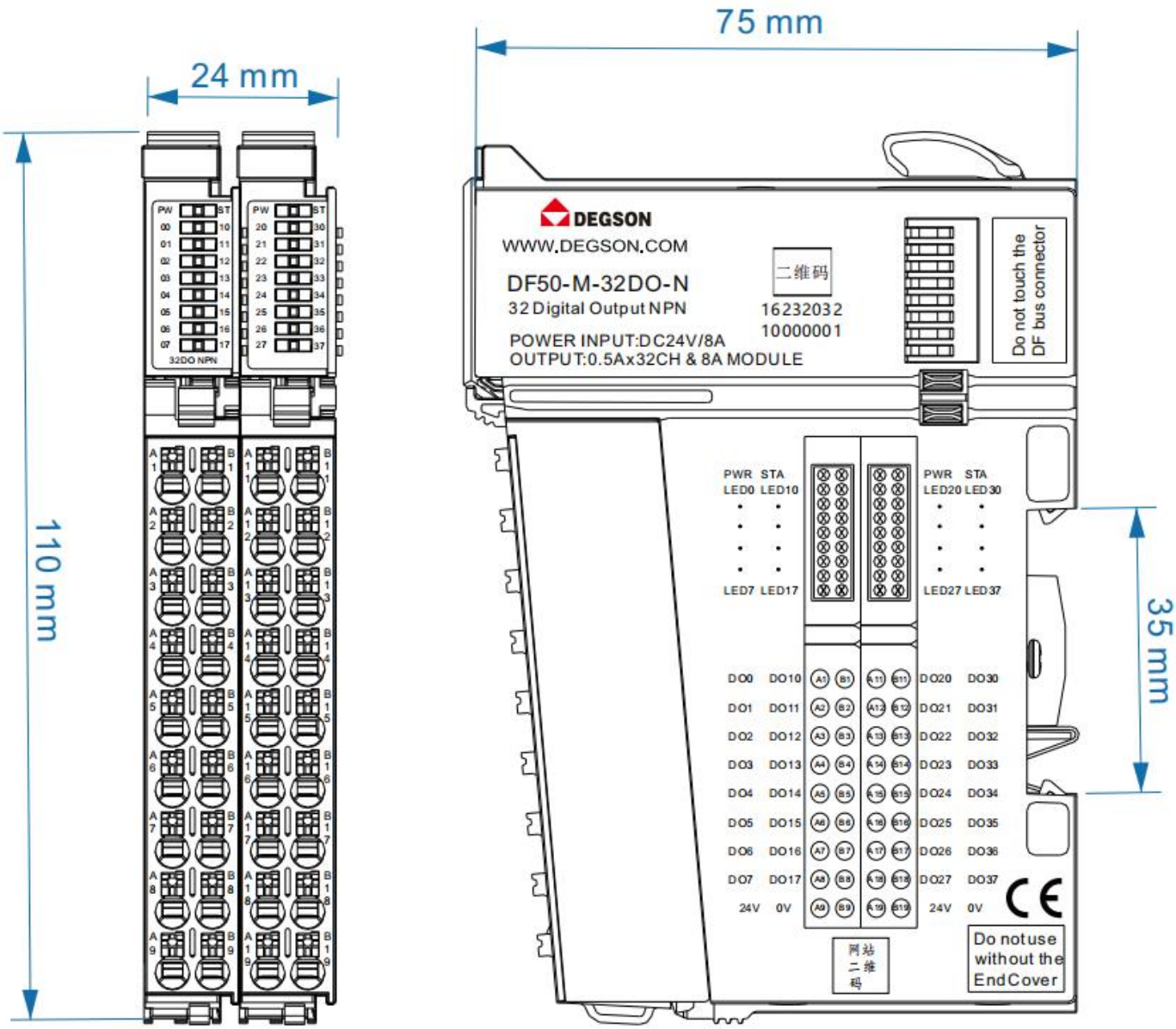
21.2.3 Wiring diagram



21.3 Process data definition

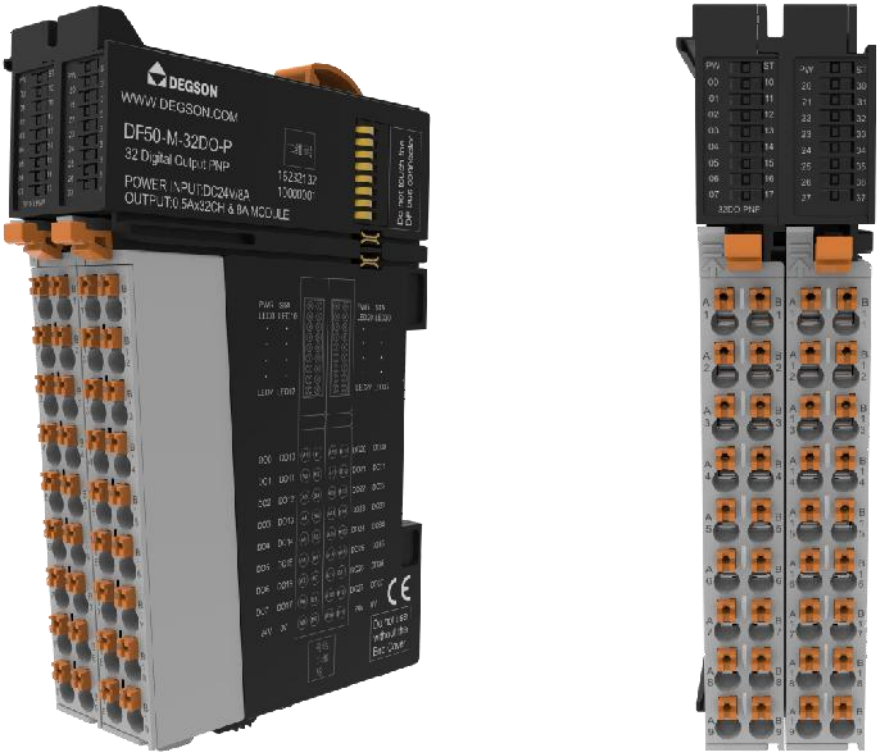
Output Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DO 7	DO 6	DO 5	DO 4	DO 3	DO 2	DO 1	DO 0
Byte 1	DO 17	DO16	DO 15	DO 14	DO 13	DO 12	DO 11	DO 10
Byte 2	DO 27	DO 26	DO 25	DO 24	DO 23	DO 22	DO 21	DO 20
Byte 3	DO 37	DO 36	DO 35	DO 34	DO 33	DO 32	DO 31	DO 30

21.4 Mechanical installation



22 32- channel digital output /24VDC/ PNP (DF50-M- 32 D OP)

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



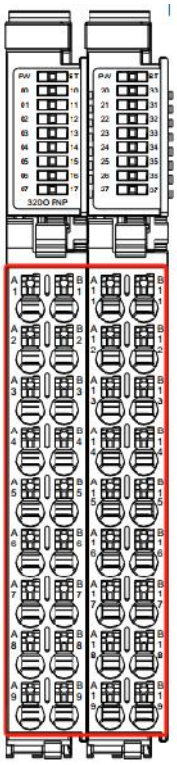
22.1 Specifications

Technical Information	
Product Description	Digital output module, 32 outputs, PNP , 24VDC
Number of channels	32
Signal Type	PNP
"OFF" signal voltage	High impedance
"ON" signal voltage	24 V DC
Data size	4 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	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 bitwise or wordwise 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	2 00mA
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	0.2～1.5mm ^{2}/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

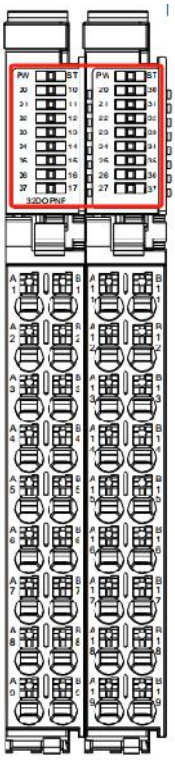
22.2 Hardware Interface

22.2.1 Terminal Block Definition



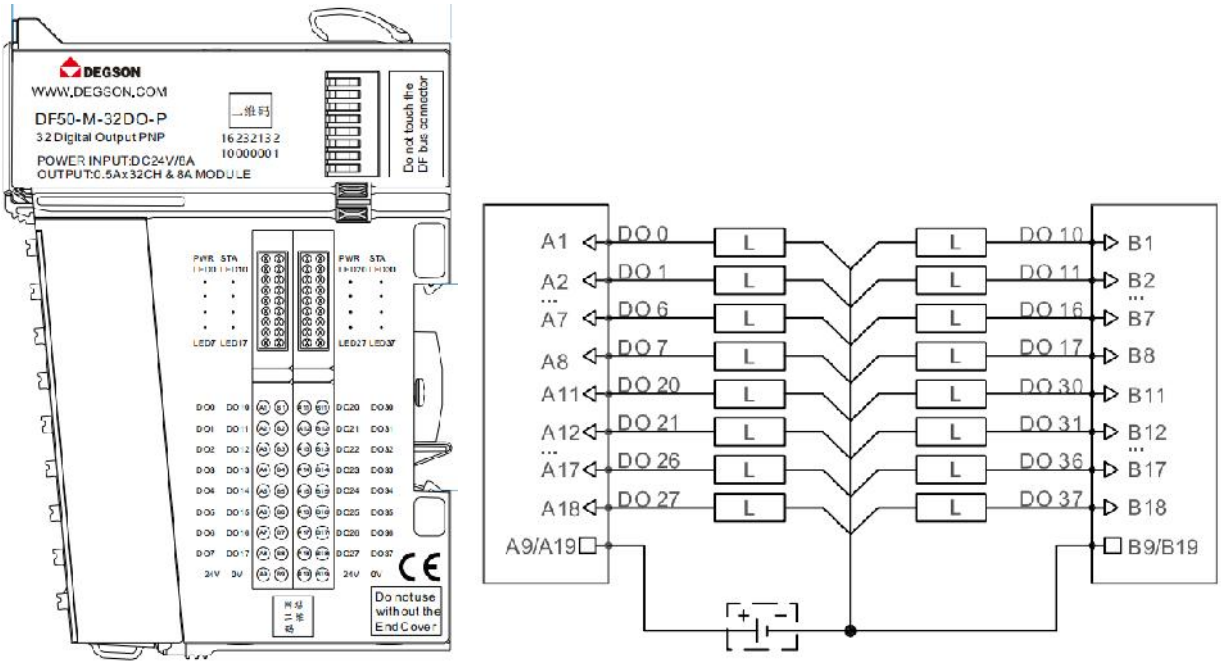
Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	illustrate
A1	DO 0	B1	DO 10	C1	DO 2 0	D1	DO 3 0	DO signal output
A2	DO 1	B2	DO 11	C2	DO	D2	DO 3 1	
A3	DO 2	B3	DO 12	C3	DO	D3	DO 3 2	
A4	DO 3	B4	DO 13	C4	DO	D4	DO 3 3	
A5	DO 4	B5	DO 14	C5	DO	D5	DO 3 4	
A6	DO 5	B6	DO 15	C6	DO 2 5	D6	DO 3 5	
A7	DO 6	B7	DO 16	C7	DO 2 6	D7	DO 3 6	
A8	DO 7	B8	DO 17	C8	DO 2 7	D8	DO 3 7	
A9	24V	B9	0V	C 9	24V	D 9	0V	Terminal power input

22.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green: System bus power input is normal	
	Green off: System bus power input is abnormal	
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	

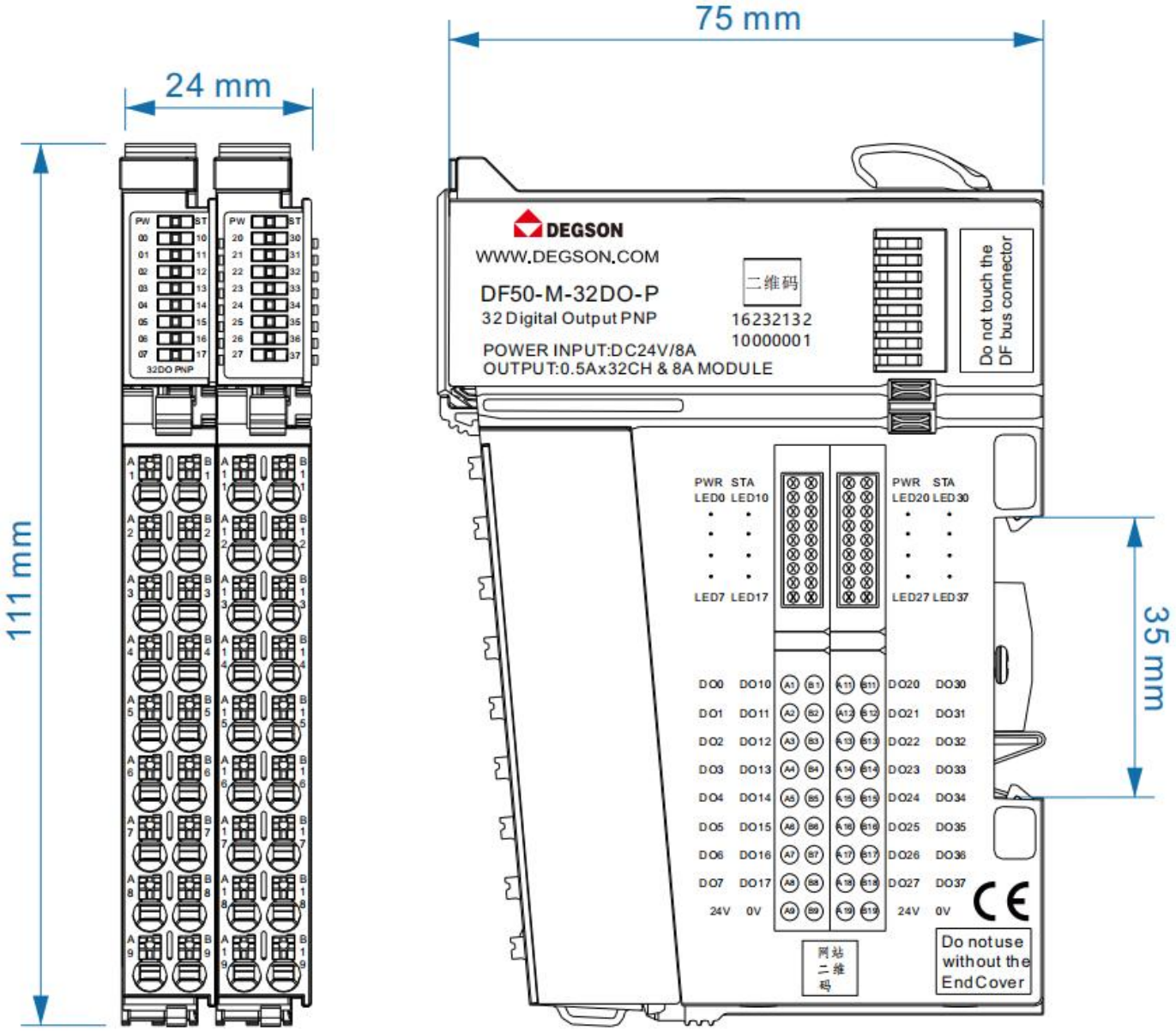
22.2.3 Wiring diagram



22.3 Process data definition

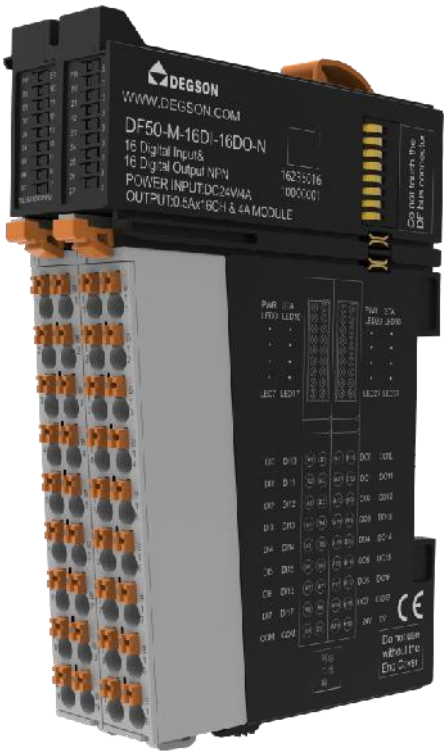
Output Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DO 7	DO 6	DO 5	DO 4	DO 3	DO 2	DO 1	DO 0
Byte 1	DO 17	DO16	DO 15	DO 14	DO 13	DO 12	DO 11	DO 10
Byte 2	DO 27	DO 26	DO 25	DO 24	DO 23	DO 22	DO 21	DO 20
Byte 3	DO 37	DO 36	DO 35	DO 34	DO 33	DO 32	DO 31	DO 30

22.4 Mechanical installation



23 32 -channel digital input + output / 24VDC / NPN (DF50-M- 16DI-16DO-N)

- This digital module supports 16-channel input and 16-channel output, and NPN low level is valid .
- Each input module is equipped with an anti-interference filter.
- Each input and output module has an LED indicator light.
- The field layer and the system layer are isolated by photocouplers.
- Protection grade IP20.



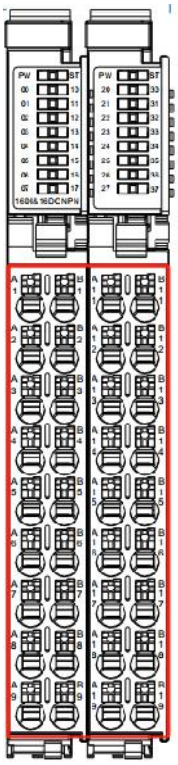
23.1 Specifications

Technical Information		
Product Description		Digital I/ O module, 16 inputs + 16 outputs , NPN, 24VDC
Number of channels		16 inputs + 16 outputs
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		4 Byte
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 ~ 40 ms configurable
Input Impedance		>7.5kΩ
Input Action Display		When the input is in driving state, the input indicator light is on.
IO Mapping		Support bitwise or wordwise 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 bitwise or wordwise 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		145 mA
Input channel terminal 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	0.2～1.5mm ^{2} /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

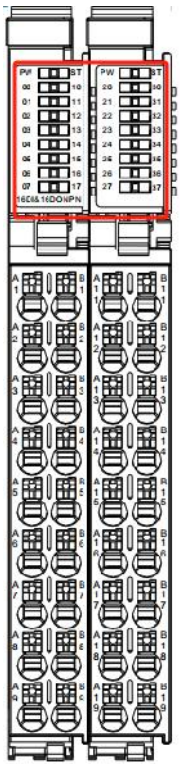
23.2 Hardware Interface

23.2.1 Terminal Block Definition



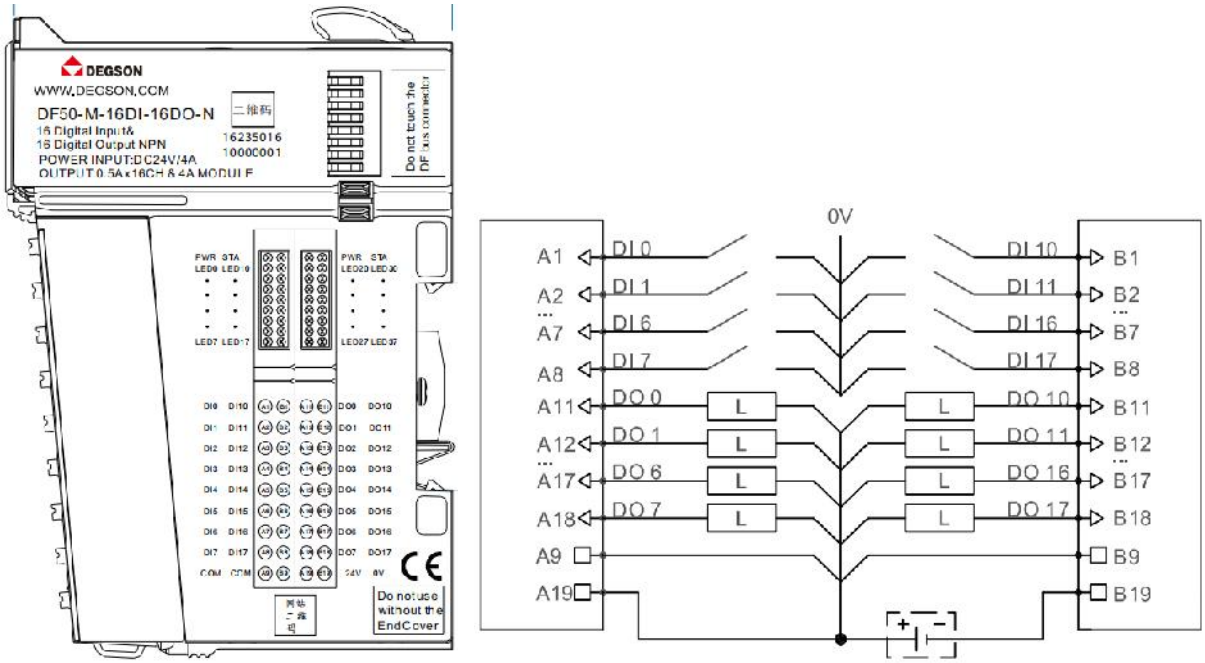
Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	illustrate
A1	DI 0	B1	DI 10	C1	DO 2 0	D1	DO 3 0	DI signal input : A1~B9 DO signal output: C1~D9
A2	DI 1	B2	DI 11	C2	DO twenty one	D2	DO 3 1	
A3	DI 2	B3	DI 12	C3	DO twenty two	D3	DO 3 2	
A4	DI 3	B4	DI 13	C4	DO twenty three	D4	DO 3 3	
A5	DI 4	B5	DI 14	C5	DO twenty four	D5	DO 3 4	
A6	DI 5	B6	DI 15	C6	DO 2 5	D6	DO 3 5	
A7	DI 6	B7	DI 16	C7	DO 2 6	D7	DO 3 6	
A8	DI 7	B8	DI 17	C8	DO 2 7	D8	DO 3 7	
A9	COM	B9	COM	C 9	24V	D 9	0V	Public

23.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green: System bus power input is normal	
	Green off: System bus power input is abnormal	
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.

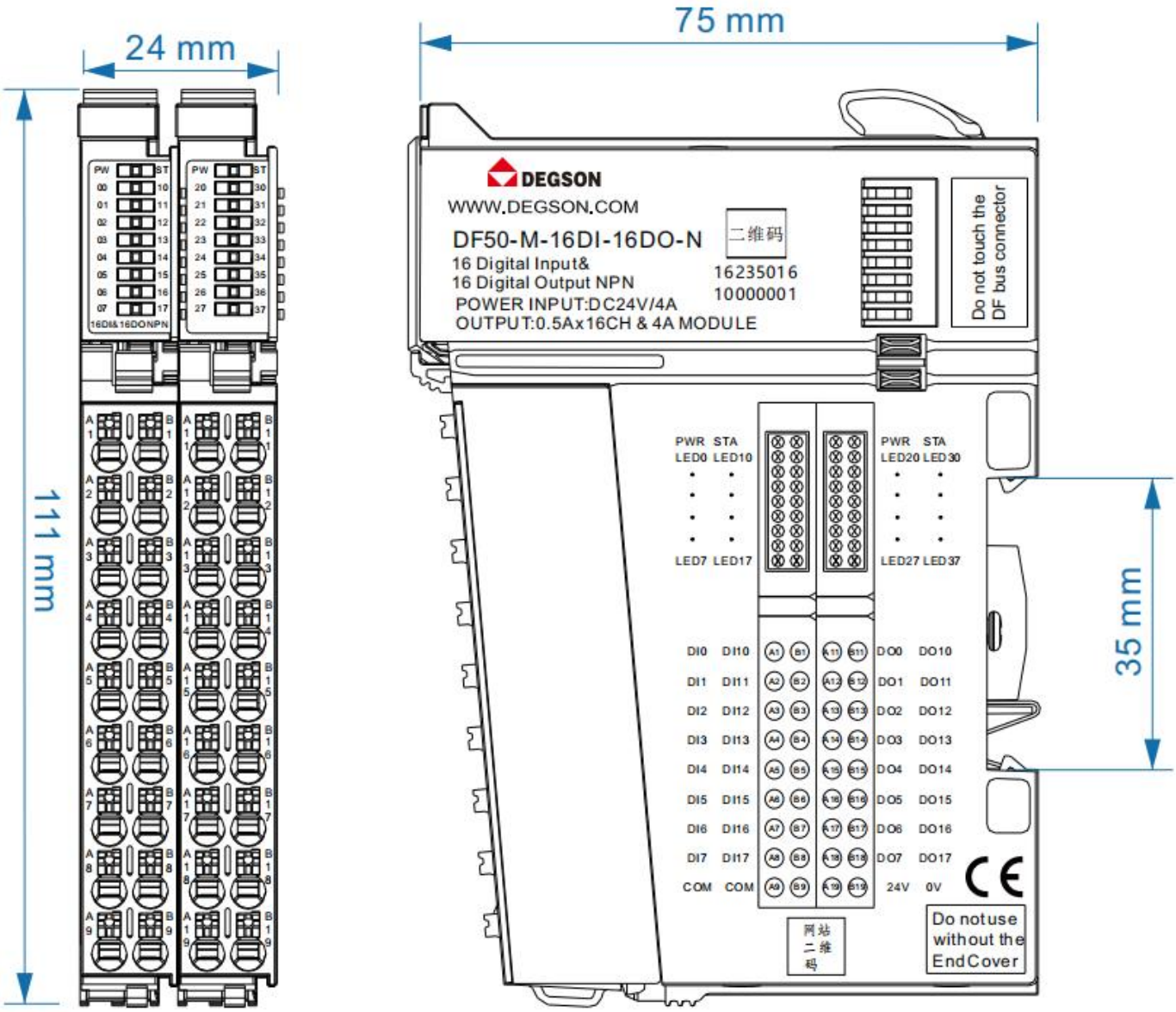
23.3 Process data definition

Input Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DI 7	DI 6	DI 5	DI 4	DI 3	DI 2	DI 1	DI 0
Byte 1	DI 17	DI 16	DI 15	DI 14	DI 13	DI 12	DI 11	DI 10

Output Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 2	DO 27	DO 26	DO 25	DO 24	DO 23	DO 22	DO 21	DO 20

Byte 3	DO 37	DO 36	DO 35	DO 34	DO 33	DO 32	DO 31	DO 30

23.4 Mechanical installation



24 32 -channel digital input + output / 24VDC / PNP (DF50-M -16DI-16DO-P)

- The digital module supports 16-channel input and 16-channel output, and the PNP high level is valid .
- Each input module is equipped with an anti-interference filter.
- Each input and output module has an LED indicator light.
- The field layer and the system layer are isolated by photocouplers.
- Protection grade IP20.

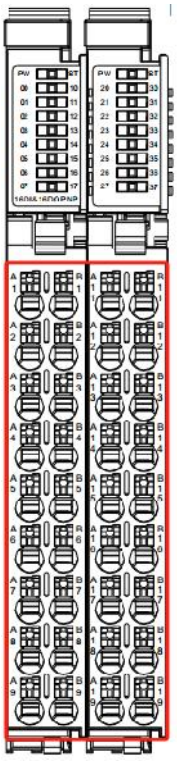
2 4.1 Specifications

Technical Information		
Product Description		Digital I/ O module, 16 inputs + 16 outputs , PNP , 24VDC
Number of channels		16 inputs + 16 outputs
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		4 Byte
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 ~ 40 ms configurable
Input Impedance		>7.5kΩ
Input Action Display		When the input is in driving state, the input indicator light is on.
IO Mapping		Support bitwise or wordwise mapping
Output channel parameters		
"OFF" signal voltage		High impedance
"ON" signal voltage		24 V 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 bitwise or wordwise 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		145 mA
Input channel terminal 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	0.2～1.5mm ^{2} /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

2 4.2 Hardware Interface

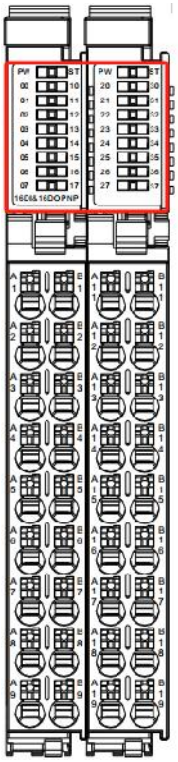
2 4.2.1 Terminal Block Definition



Terminal	Signal	Terminal	Signal	Terminal	Signal	Terminal	Signal	illustrate

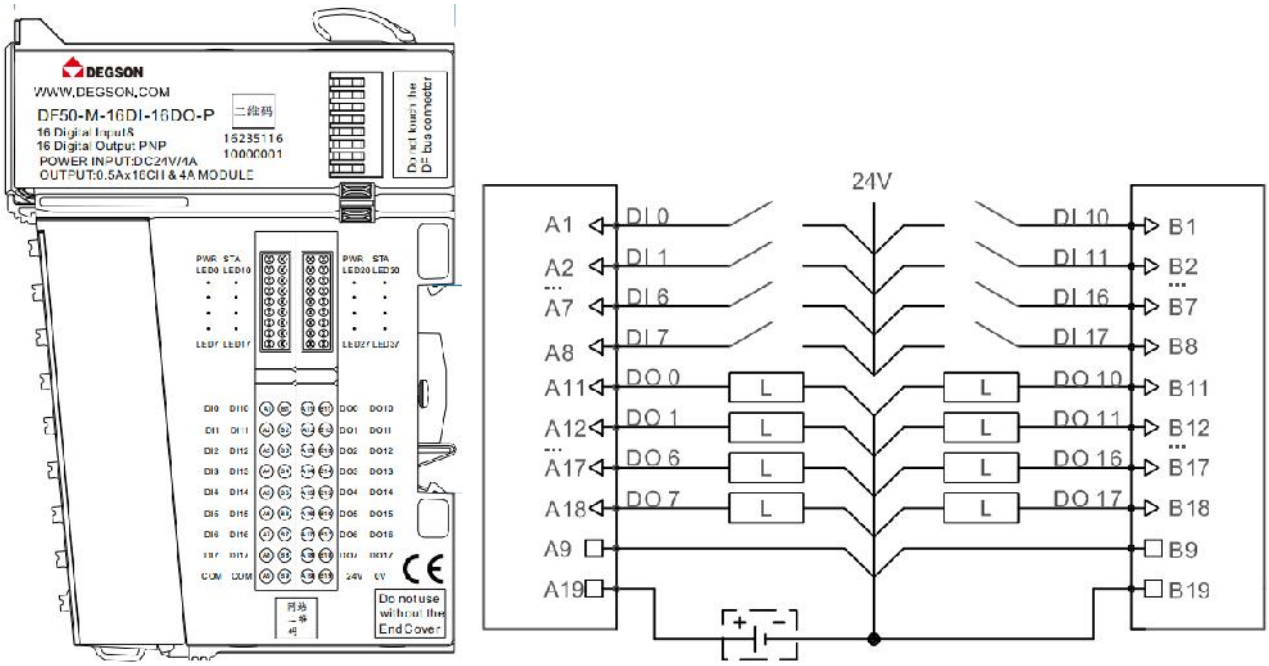
number		number		number		number		
A1	DI 0	B1	DI 10	C1	DO 2 0	D1	DO 3 0	DI signal input : A1~B9 DO signal output: C1~D9
A2	DI 1	B2	DI 11	C2	DO twenty one	D2	DO 3 1	
A3	DI 2	B3	DI 12	C3	DO twenty two	D3	DO 3 2	
A4	DI 3	B4	DI 13	C4	DO twenty three	D4	DO 3 3	
A5	DI 4	B5	DI 14	C5	DO twenty four	D5	DO 3 4	
A6	DI 5	B6	DI 15	C6	DO 2 5	D6	DO 3 5	
A7	DI 6	B7	DI 16	C7	DO 2 6	D7	DO 3 6	
A8	DI 7	B8	DI 17	C8	DO 2 7	D8	DO 3 7	
A9	COM	B9	COM	C 9	24V	D 9	0V	Public

2 4.2.2 LED indicator definition



Indicator Lights	meaning	
PW	Green: System bus power input is normal	
	Green off: System bus power input is abnormal	
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	

2 4.2.3 Wiring Diagram



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

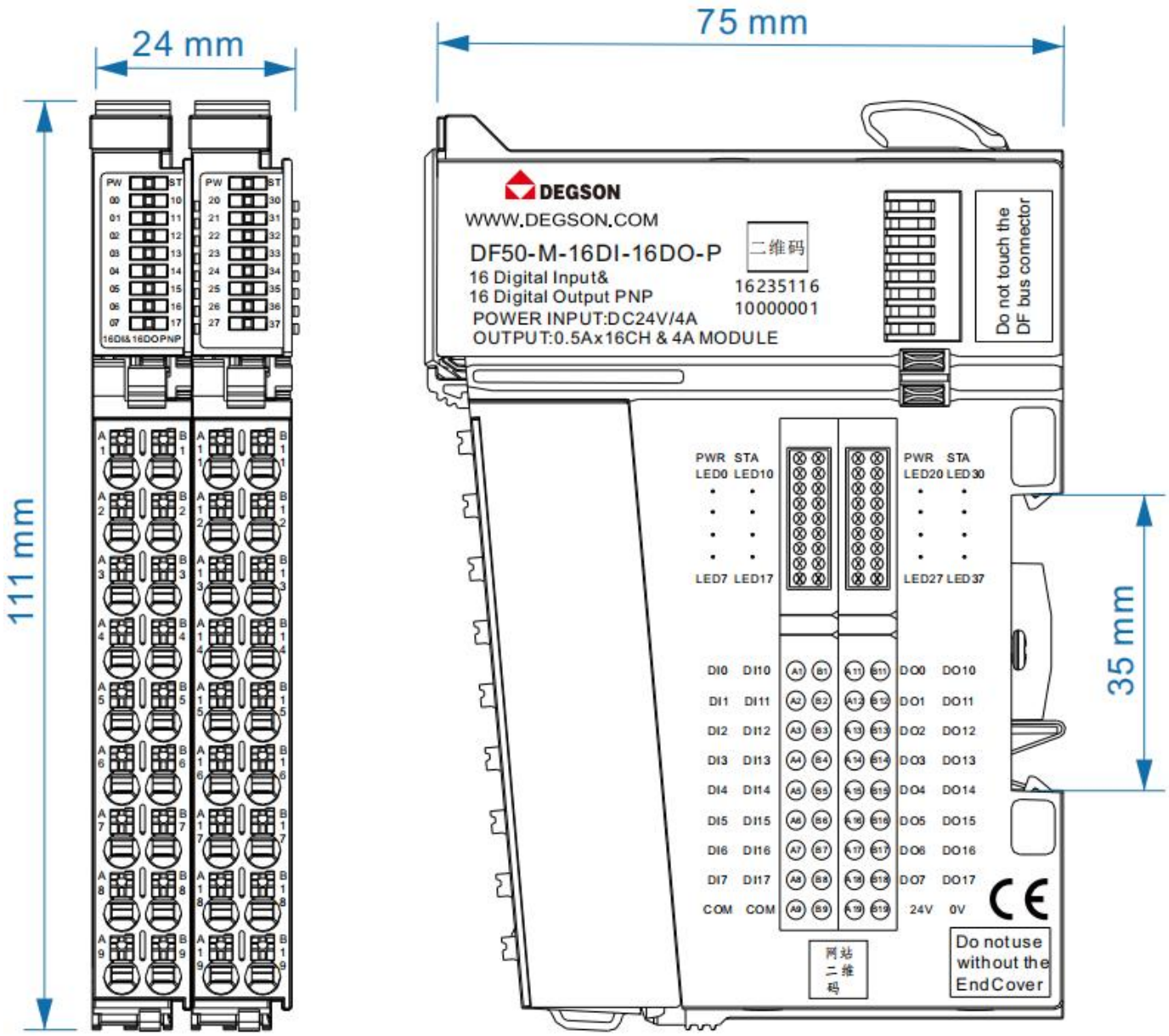
2 4.3 Process data definition

Input Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DI 7	DI 6	DI 5	DI 4	DI 3	DI 2	DI 1	DI 0
Byte 1	DI 17	DI 16	DI 15	DI 14	DI 13	DI 12	DI 11	DI 10

Output Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 2	DO 27	DO 26	DO 25	DO 24	DO 23	DO 22	DO 21	DO 20

Byte 3	DO 37	DO 36	DO 35	DO 34	DO 33	DO 32	DO 31	DO 30

2 4.4 Mechanical Installation



4. Software Configuration Description

1. KV STUDIO V1 1 configuration process

This chapter specifically introduces the use of adapter DF50 - C - EN - IP using KEYENCE 's KV STUDIO V11 as the configuration software .

The PLC model used in this section is KV-8000 .

1.1. Project Creation

1.1.1. New Construction

➢ shown in Figure 4-1-1 , open KV STUDIO V1 1 software, then select “ New Project” from the menu bar to create a new project:

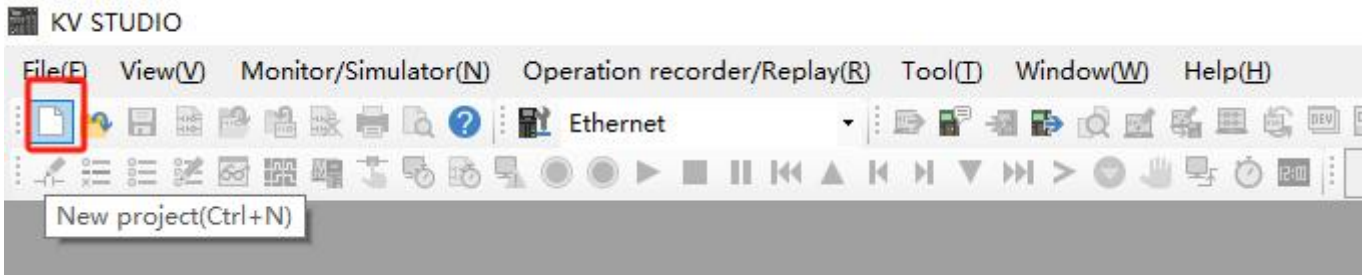


Figure 4-1-1

➢ shown in Figure 4-1-2 , create a project, open the project view , fill in the project name and location, and select the PLC used in the project (the example uses KV-8000) :

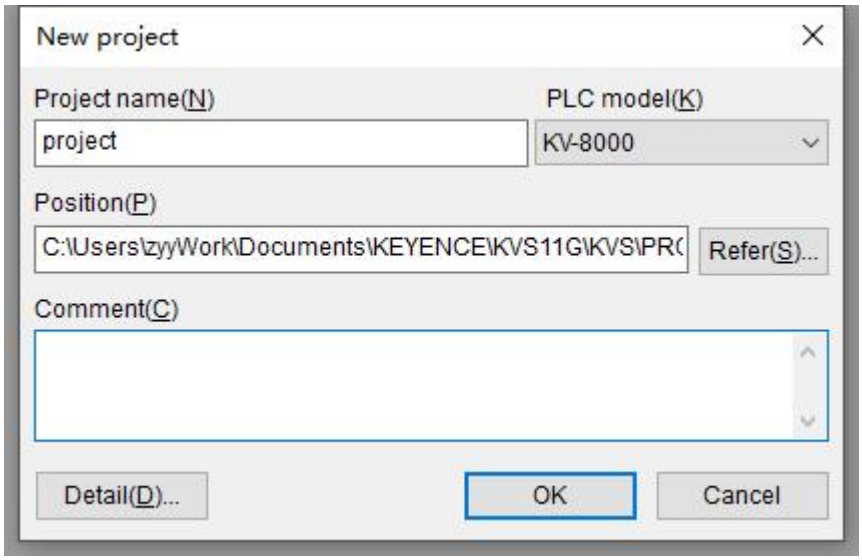


Figure 4-1-2

➢ As shown in Figure 4-1-3 and Figure 4-1-4, click "Yes" in turn.

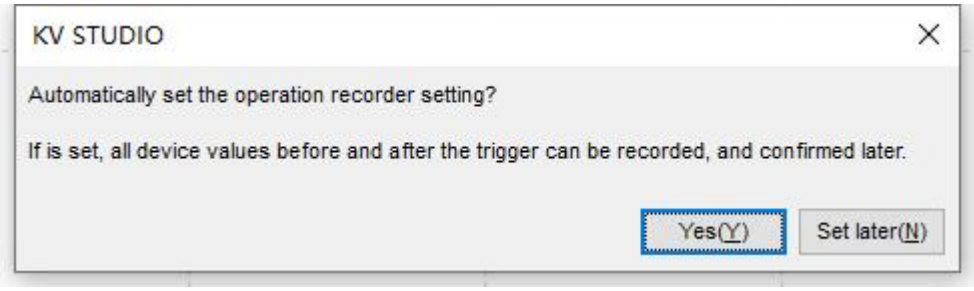


Figure 4-1- 3

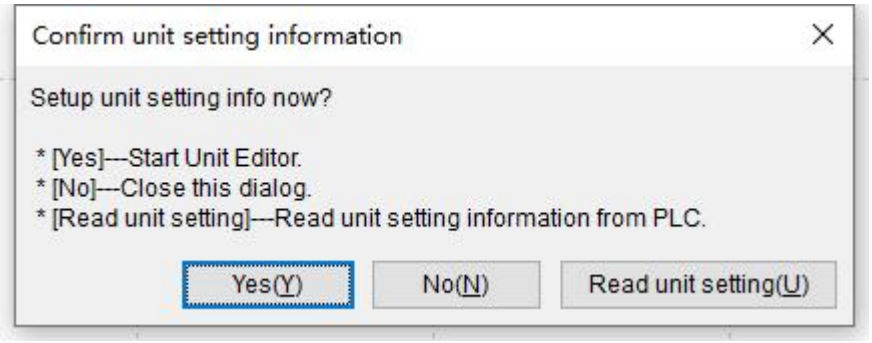


Figure 4-1- 4

➢ in Figure 4-1-5 and Figure 4-1-6 , enter the " EtherNet/IP settings " interface.

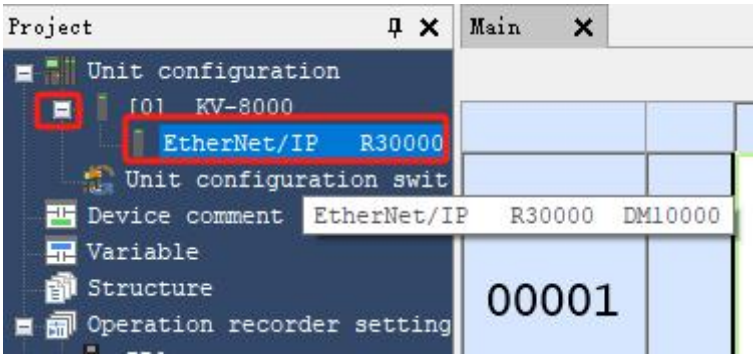


Figure 4-1-5

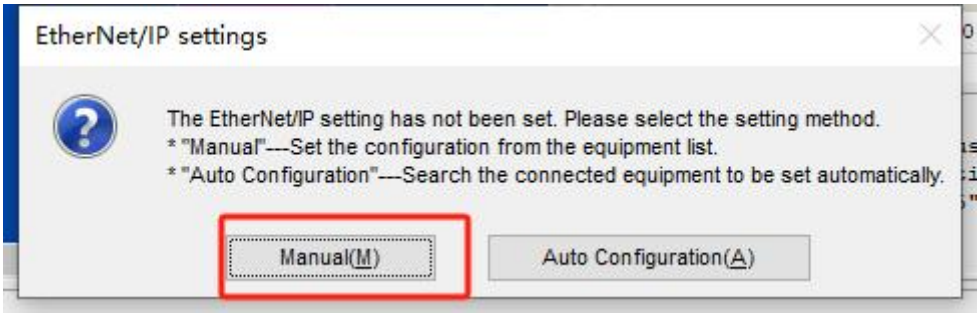


Figure 4-1-6

1.1.2. Add EDS file

➢ As shown in Figure 4-1-7, Figure 4-1-8 and Figure 4-1-9, select "EDS File" in the EtherNet/IP window tab, click "Login" in the drop-down options, and select the EDS file corresponding to the adapter DF50-C-EN-IP to log in to the project :

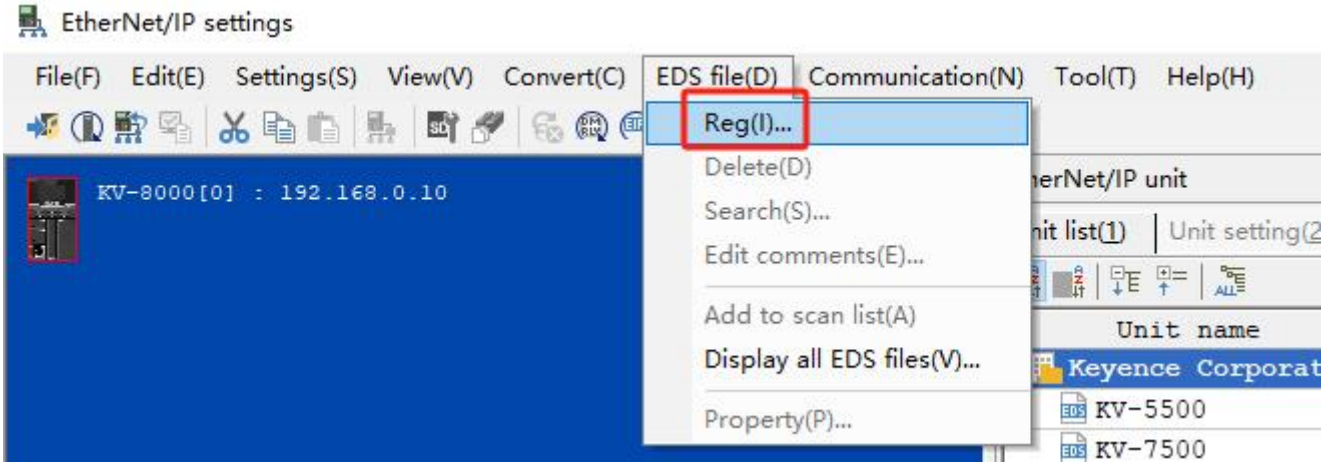


Figure 4-1-7

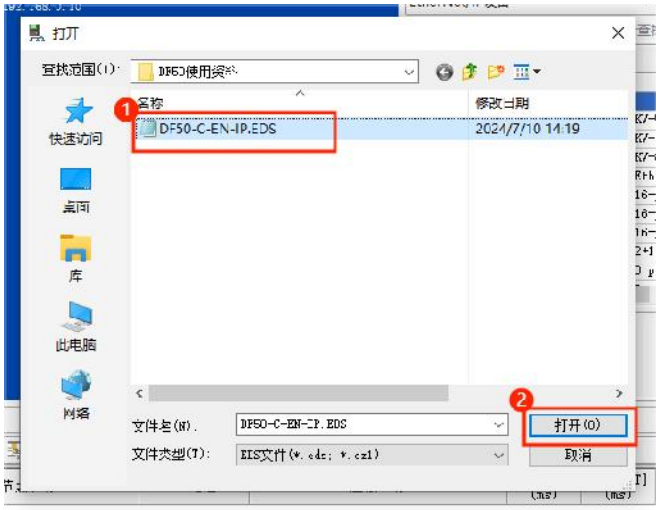


Figure 4-1- 8

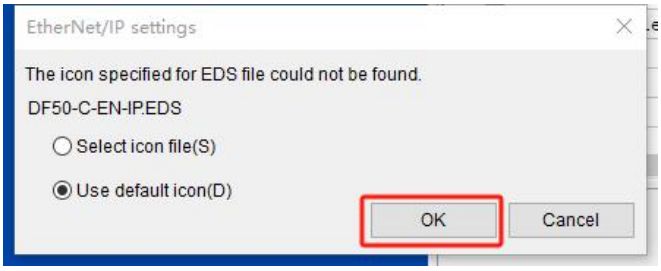


Figure 4-1- 9

➢ The EDS file installation is complete as shown in Figure 4-1-10

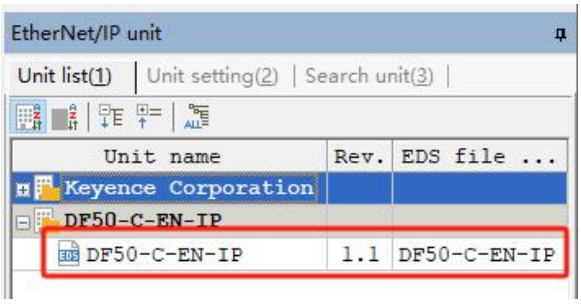


Figure 4-1- 10

1.1.3. Modify IP address and add adapter

➢ as shown in Figure 4-1-11 and Figure 4-1-12 . In this example, the PLC address is 192.168.0.10 :

Figure 4-1- 11

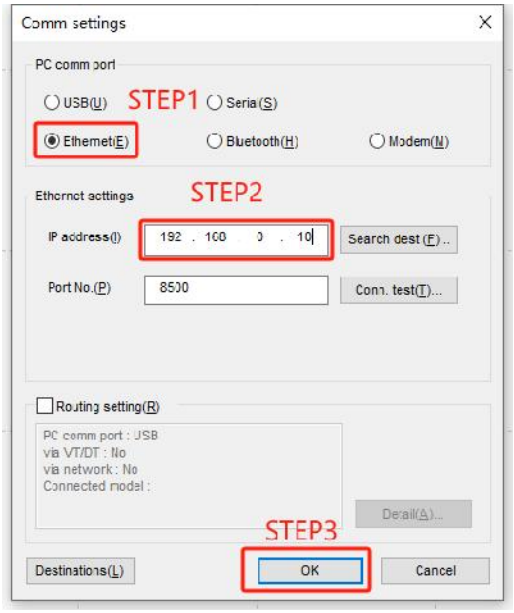


Figure 4-1- 12

➢ Search and change the adapter 's IP as shown in Figure 4-1-13 to Figure 4-1-18 :

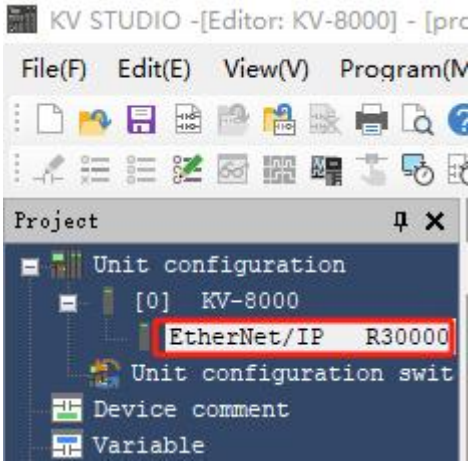


Figure 4-1- 13

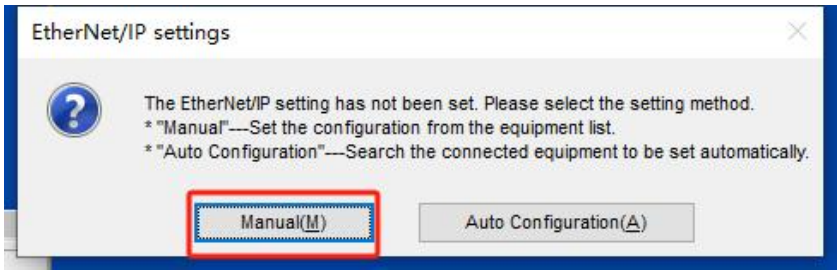


Figure 4-1- 14

Figure 4-1- 15

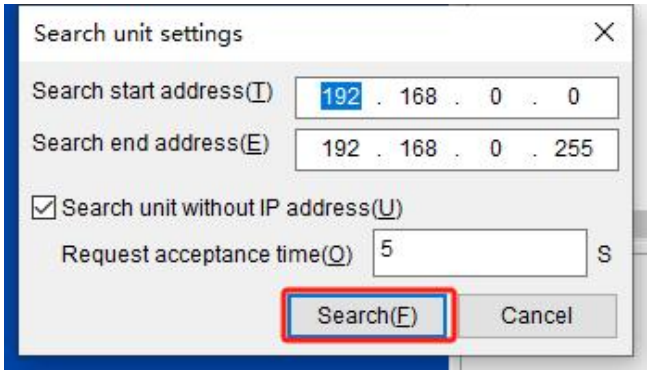


Figure 4-1- 16

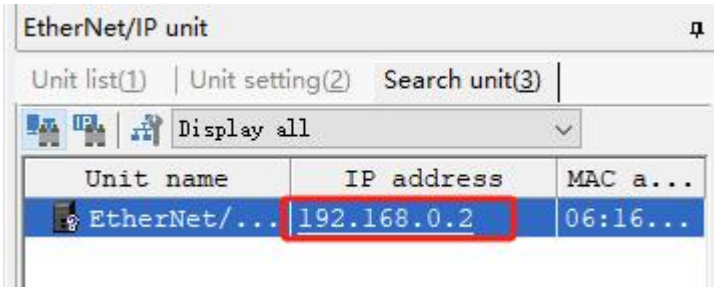


Figure 4-1- 17

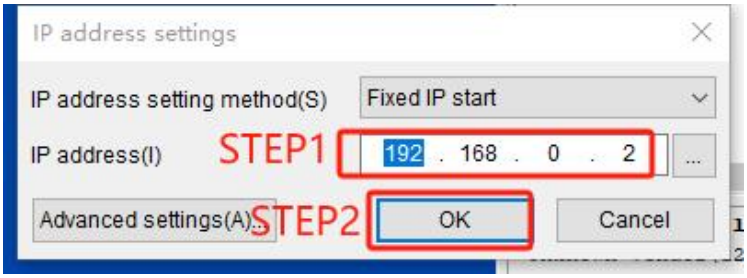


Figure 4-1- 18

➢ Add an adapter as shown in Figure 4-1-19

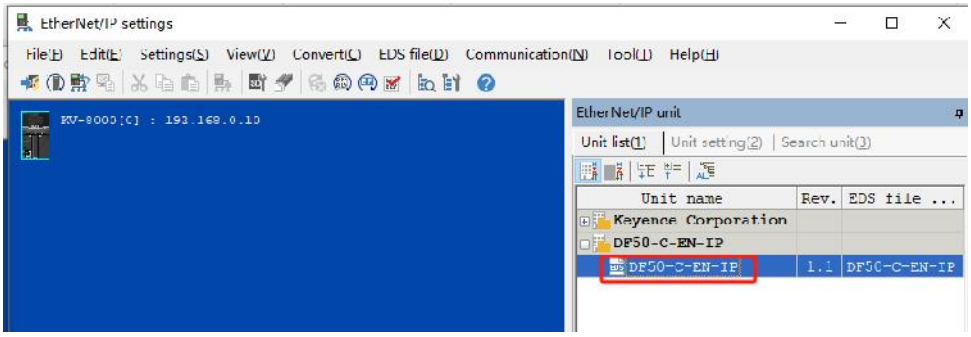


Figure 4-1- 19

➢ As shown in Figure 4-1-20, the adapter is successfully added.

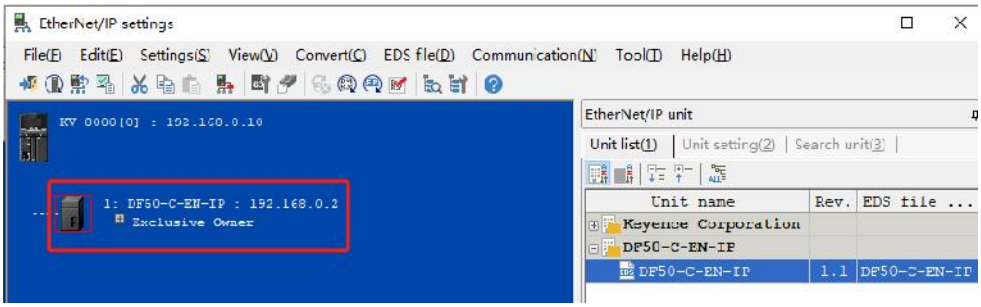


Figure 4-1- 20

1.1.4. Establish connections and add IO expansion modules :

➢ "DF 50 -C-EN-IP Adapter Configuration Table_V1.0" provided by the manufacturer , and configure the table according to the actual module topology (DF50-M-16DI-P/N + DF50-M-16DO-P in this example) as shown in Figure 4-1-21, where SystemDiagnostic and AdapterDigitalInput are the diagnostic modules and 8-channel digital inputs that come with the adapter, and must be added. Then insert DF50-M-16DI-P/N and DF50-M-16DO-P in the second and third slots respectively, calculate the size of "Produced Data Size" and "Consumed Data Size", and fill these two data into the configuration software configuration table as shown in Figure 4-1-22.

Produced Data Size		6		将该数据填入参数设定中的"Produced Data Size"对象中
Consumed Data Size		4		将该数据填入参数设定中的"Consumed Data Size"对象中
序号	IO卡片型号选择	上行数据（byte）	下行数据（byte）	数据含义解释说明
1	SystemDiagnostic	2	2	诊断模块
2	AdapterDigitalInput	2	0	适配器8通道数字量输入PNP/NPN
3	DF50-M-16DI-P/N	2	0	16 通道数字量输入
4	DF50-M-16DO-P	0	2	16 通道数字量输出
5		#N/A	#N/A	#N/A

Figure 4-1- 21

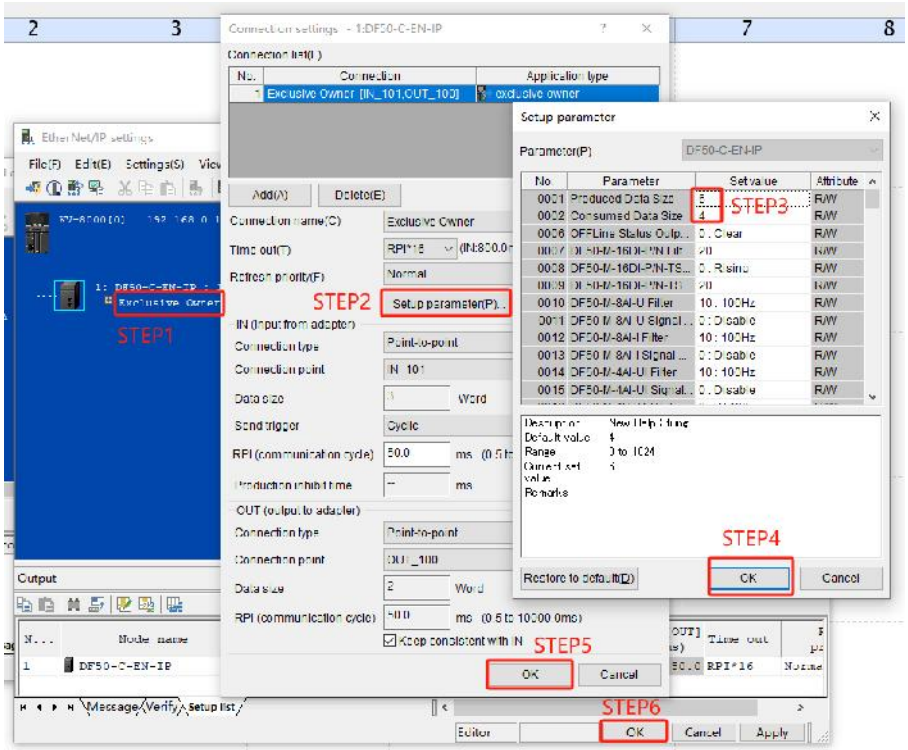


Figure 4-1- 22

➢ As shown in Figure 4-1-23, perform PLC transmission download and click "Yes" in sequence.

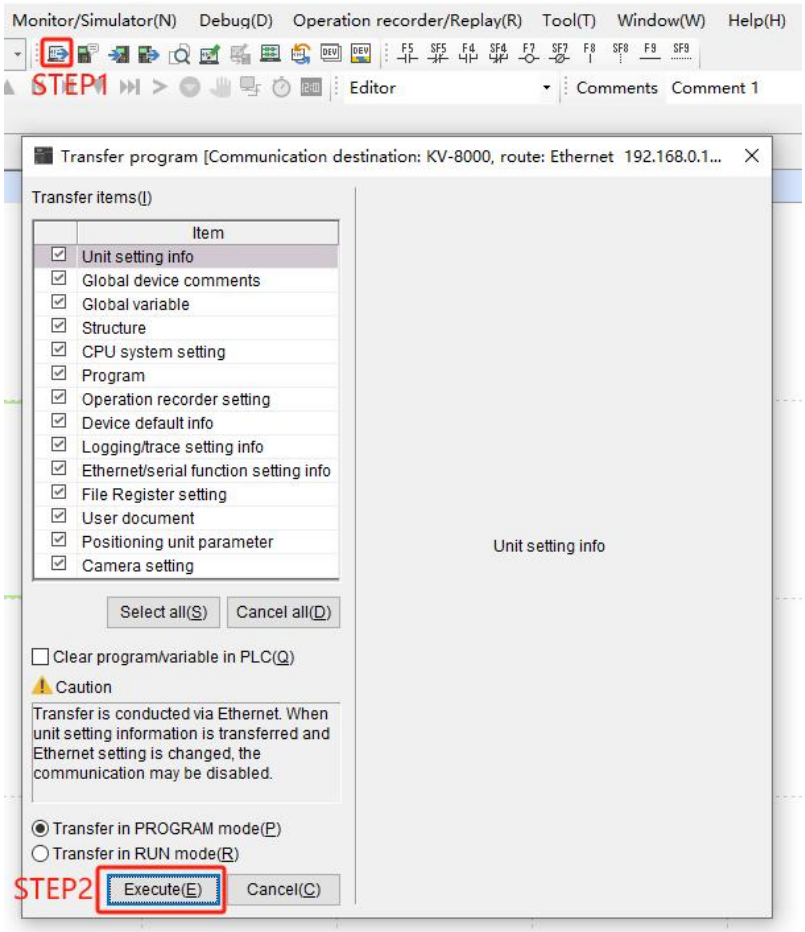


Figure 4-1- 23

1.1.5. Open the data monitoring table

➢ Figure 4-1-24 , open the data monitoring table in monitor mode:

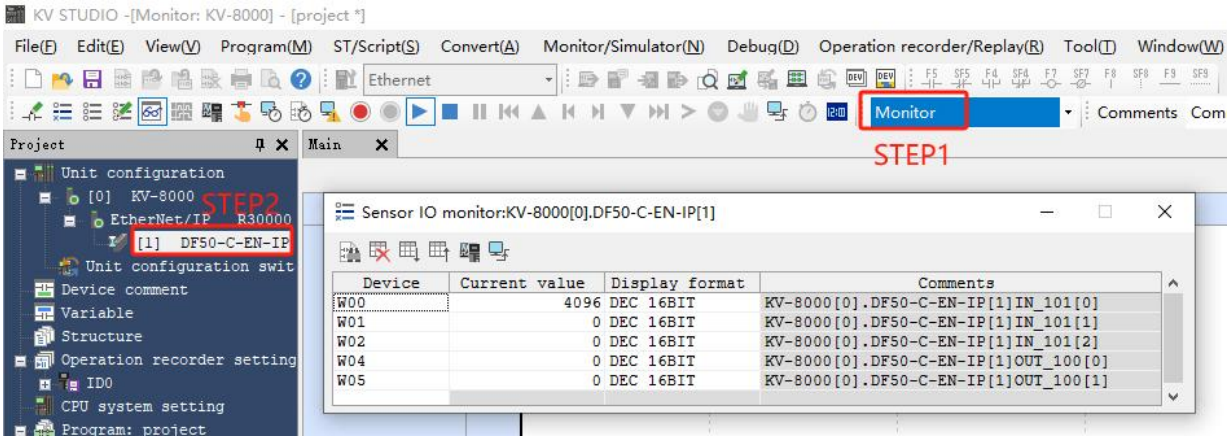


Figure 4-1- 24

➢ data monitoring table can monitor the data received by the I/ O module or force the modification of the output data, which is convenient for us to debug.

1.2. Adapter usage examples

➢ Section 2.2 of Chapter 2 for the wiring diagram of the adapter . The example uses the DF50-C-EN-IP + DF50-M-16DI-P/N + DF50-M-16DO-P topology. After adding the modules in order, the topology shown in Figure 4-1-25 is obtained: the W00 channel represents the output information of the diagnostic module , the W04 is the input information of the diagnostic module , the W01 channel is the adapter 8-channel digital input display information , and the other channels are the input/output information of each I O module card we inserted .

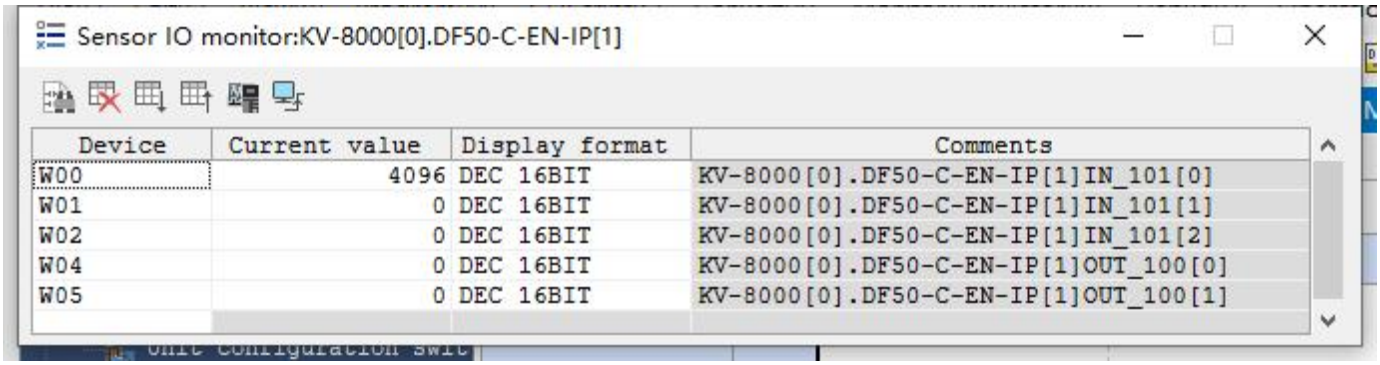


Figure 4-1- 25

1.2.1. SystemDiagnostic: Diagnostic module

➢ The process data is shown in the following table.

Table 4.1.1

Input data: 2 Byte		
Byte No.	illustrate	Remark
Byte 0	Location of the faulty module	0x01 represents the first IO module, 0x02 represents the second module , and so on.
Byte 1	Fault Codes	See the fault code table for details.
Output data: 2 Byte		
Byte No.	illustrate	Remark
Byte 0 and Byte 1	Clear fault codes	The 0x0001 command means clearing the display code, and 0x0000 means normal output of the fault code.

➢ The meaning of the fault codes is shown in the following table.

Table 4.1.2

Fault code table		
Fault Codes	Fault Description	Troubleshooting
0x10	PLC and adapter communicate normally	/

0xE1	Module power supply abnormality	Check the power cord connection
0xE2	Analog module calibration failure	Contact Supplier
0xE3	Module internal initialization exception	Contact Supplier
0xE 4	Overcurrent signal detected	Check peripherals
0xE8	Module offline	Check inter-module connections

➢ shown in Figure 4-1-26 , after changing the display format of channel W00 to 16-bit hexadecimal, the monitoring value of the diagnostic module is "$E801". "01" means that the first IO card is faulty, and "E8" means that the module is offline (see Table 4.1.2 for other fault code meanings); if the monitoring value is "$E802", it means that the second IO card module is offline, and so on .

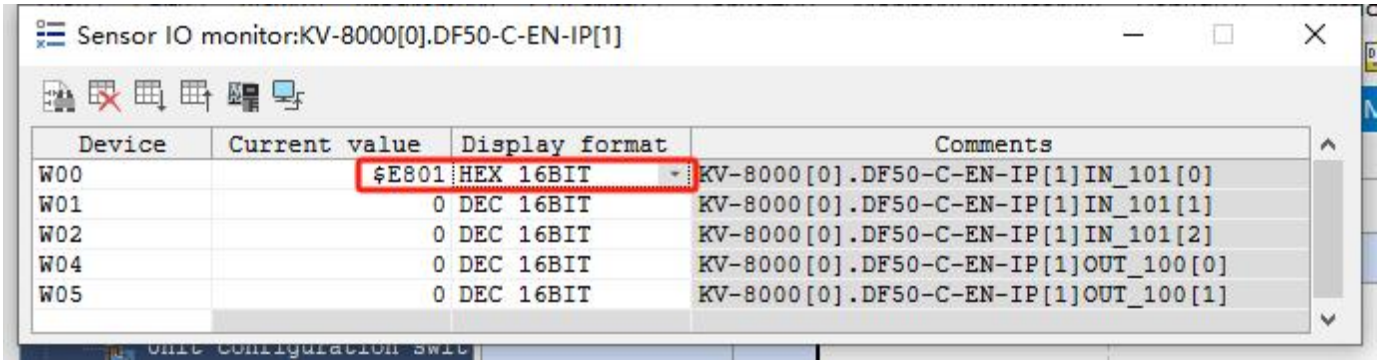


Figure 4-1- 26

1.2.2. AdapterDigitalInput : Adapter 8-channel digital input display

➢ The process data is shown in the following table.

Table 4.1.3

Input data: 1 Byte								
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DI 0 7	DI 06	DI 05	DI 04	DI 03	DI 02	DI 01	DI 00
Byte1	reserve							

1.2.3. Bus Error Adapter Status Setting

➢ shown in Figure 4-1-27 below , in the parameter setting of the configuration software editor mode , you can set the behavior of the adapter when a bus error occurs. You can set it to clear the output value (Clear) or keep the last value (Hold) . The default is to clear the output value.

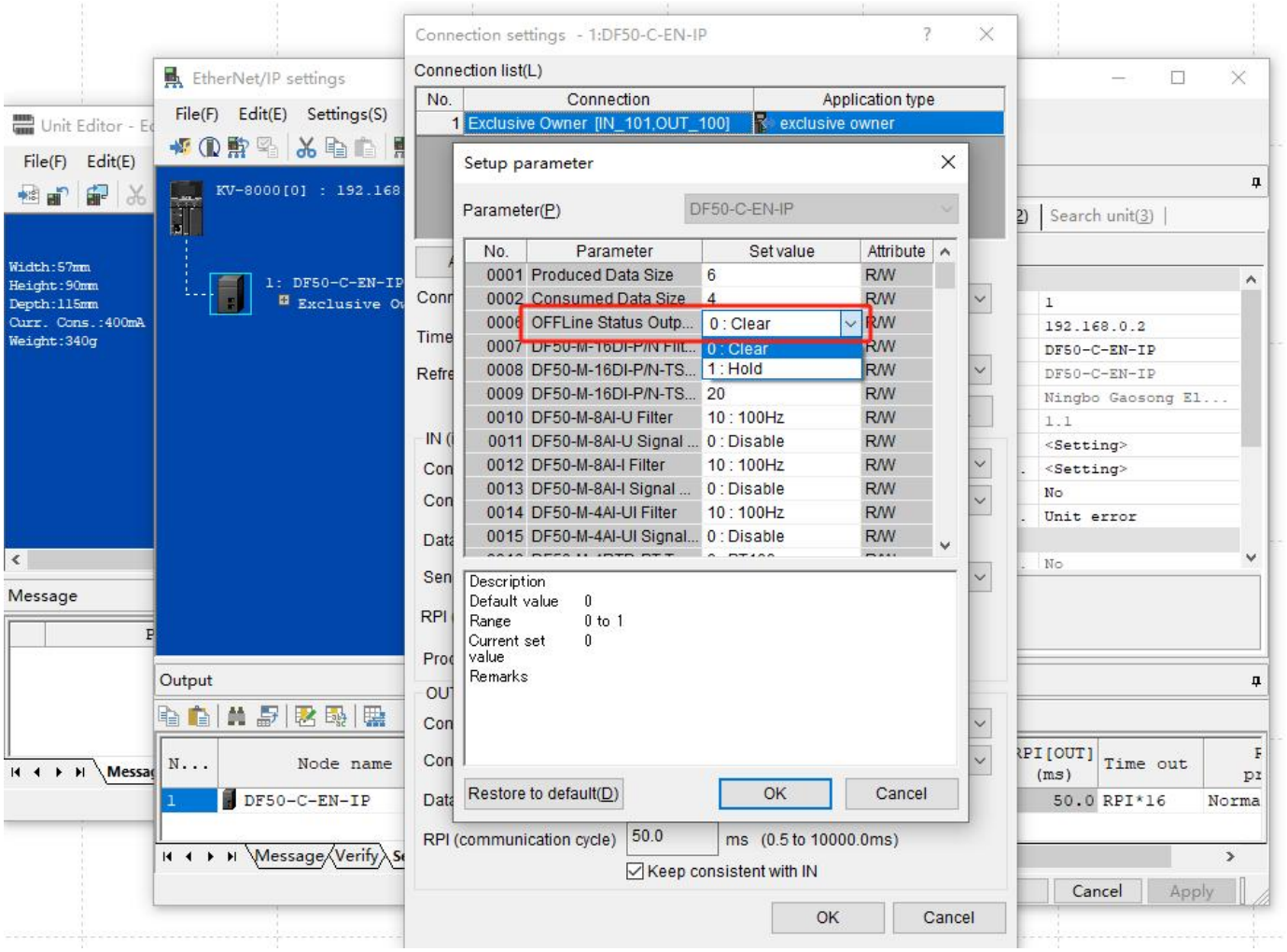


Figure 4-1- 27

1.2.4. Get module software version

➢ Get adapter version information as shown in the figure below. Write " $ 100" in the SystemDiagnostic input address , which is the W04 channel, to get the adapter software version information . " $0010 " indicates version V 11. Enter "$0001" to clear the displayed information.

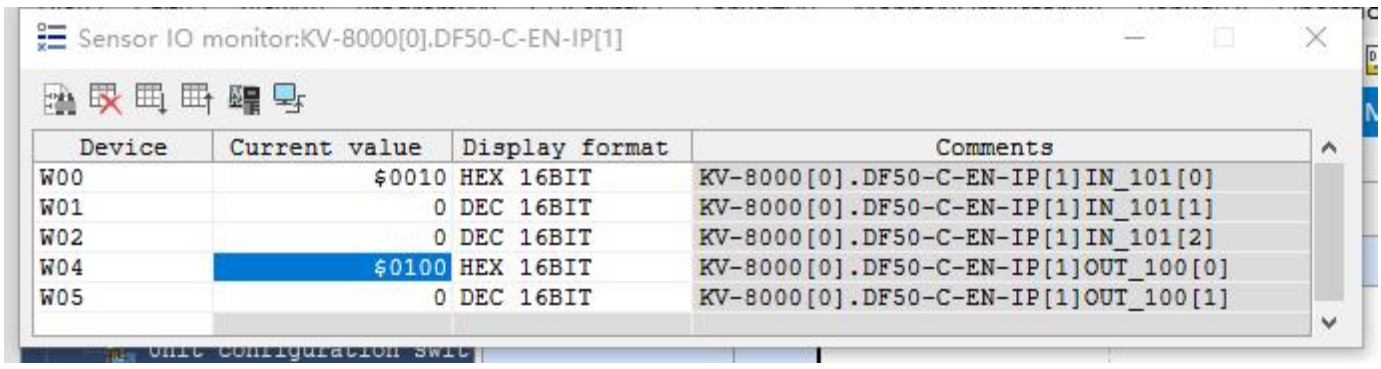
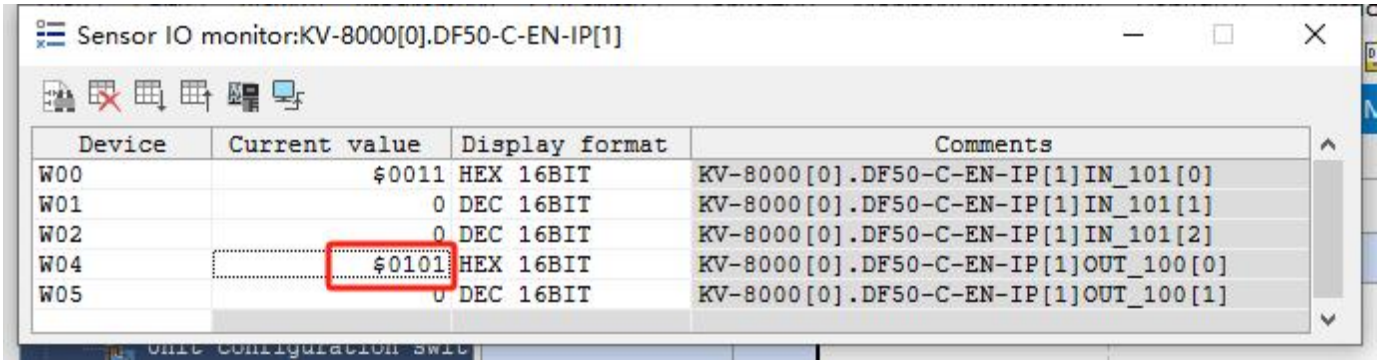


Figure 4-1- 28

➢ $ 101" in the SystemDiagnostic input address to get the software version information of the first module after the adapter. " $0011 " indicates the V11 version .



Device	Current value	Display format	Comments
W00	$0011	HEX 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[0]
W01	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[1]
W02	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[2]
W04	$0101	HEX 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W05	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]

Figure 4-1- 29

1.3. Digital module usage routine

➢ This example uses the DF50-C-EN-IP + DF50-M-16DO-P + DF50-M-16DO-N + DF50-M-16DI-P/N + DF50-M-16DI-P/N-TS + DF50-M-4DO-P-2A + DF50-M-4DOR + DF50-M-32DO-P + DF50-M-32DO-N + DF50-M-32DI-P/N + DF50-M-16DI-16DO-P + DF50-M-16DI-16DO-N topology. After adding the modules, the configuration is shown in the figure below .

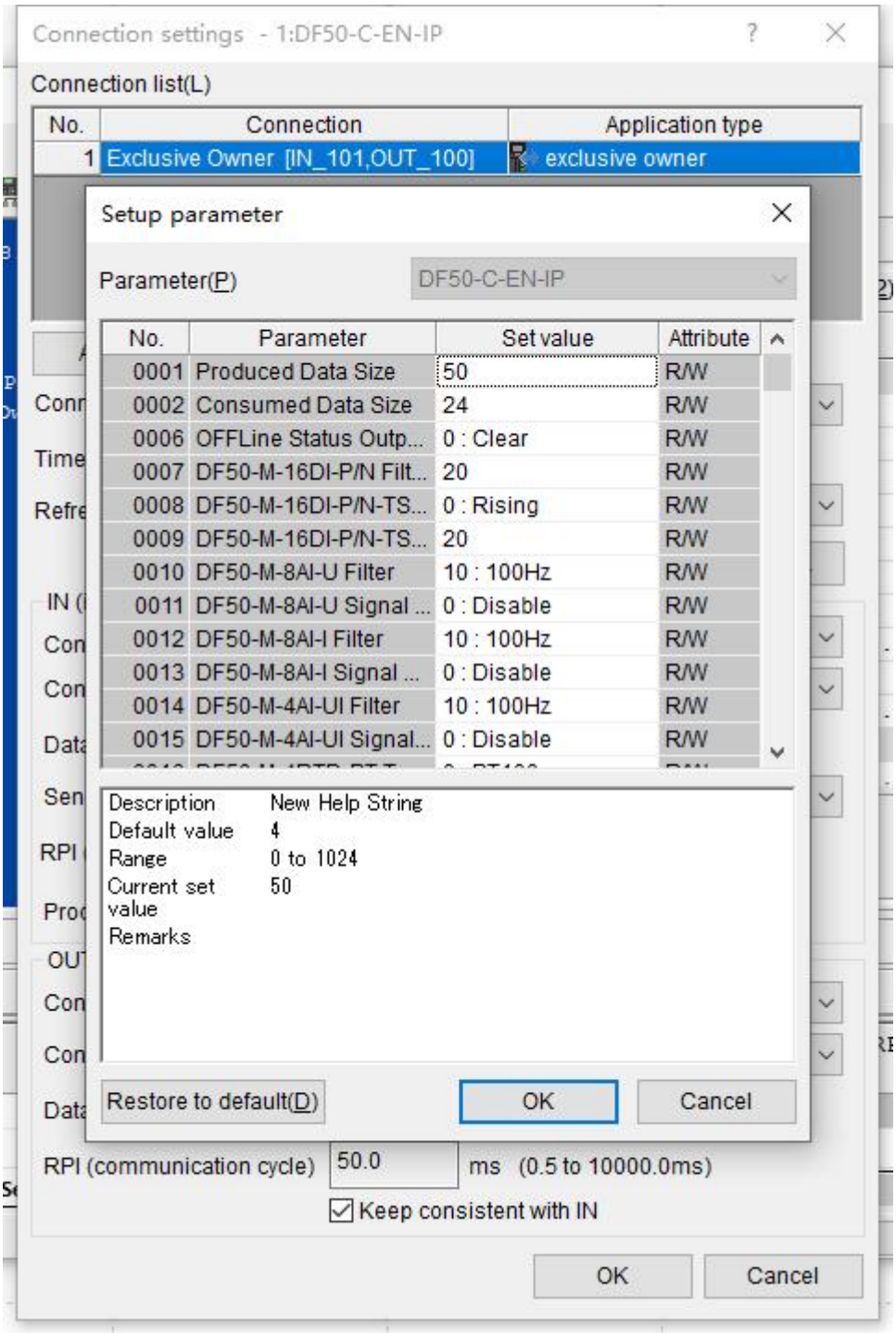
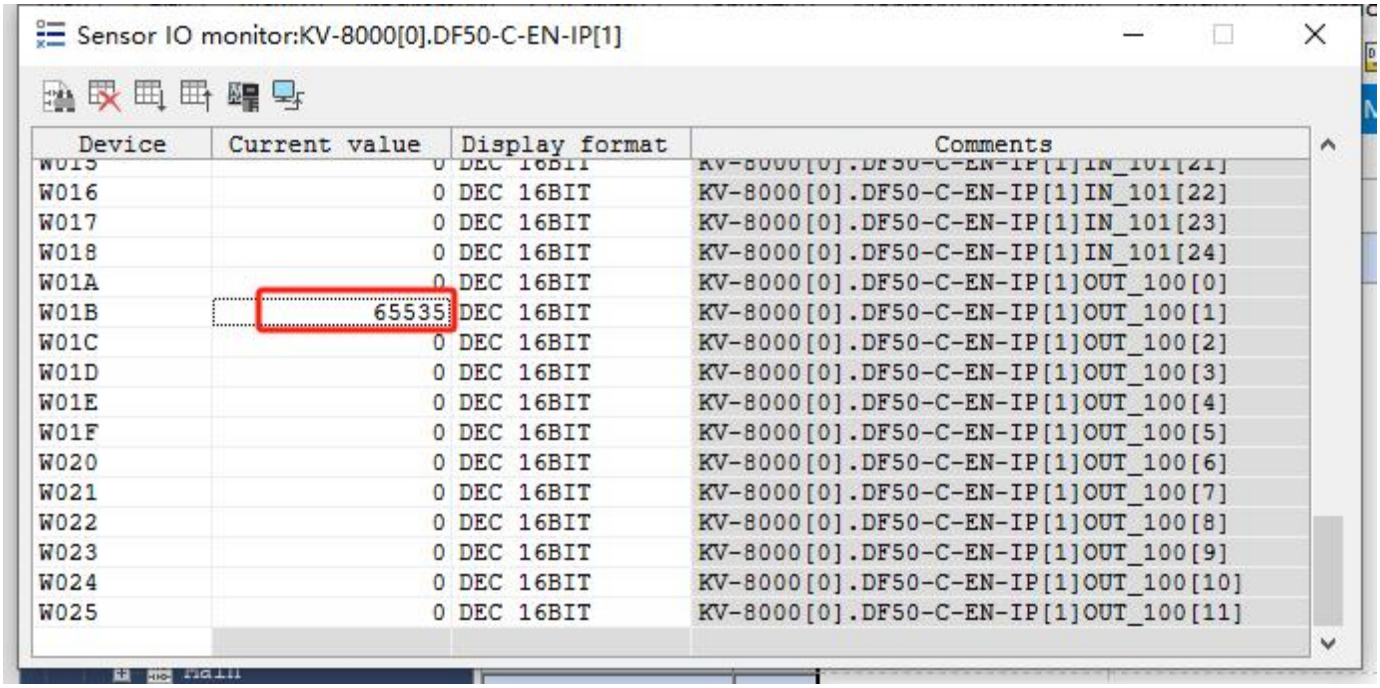


Figure 4-1- 30

1.3.1. DF50-M-16DO-P digital output module

➢ For the module wiring diagram, please refer to Section 3.2 of Chapter 3. The output status of the module when an EIP bus error occurs can be set in the adapter . For the setting method, please refer to Section 1.2.3 of Chapter 4 .

➢ Each channel output can be enabled as shown in the figure below.



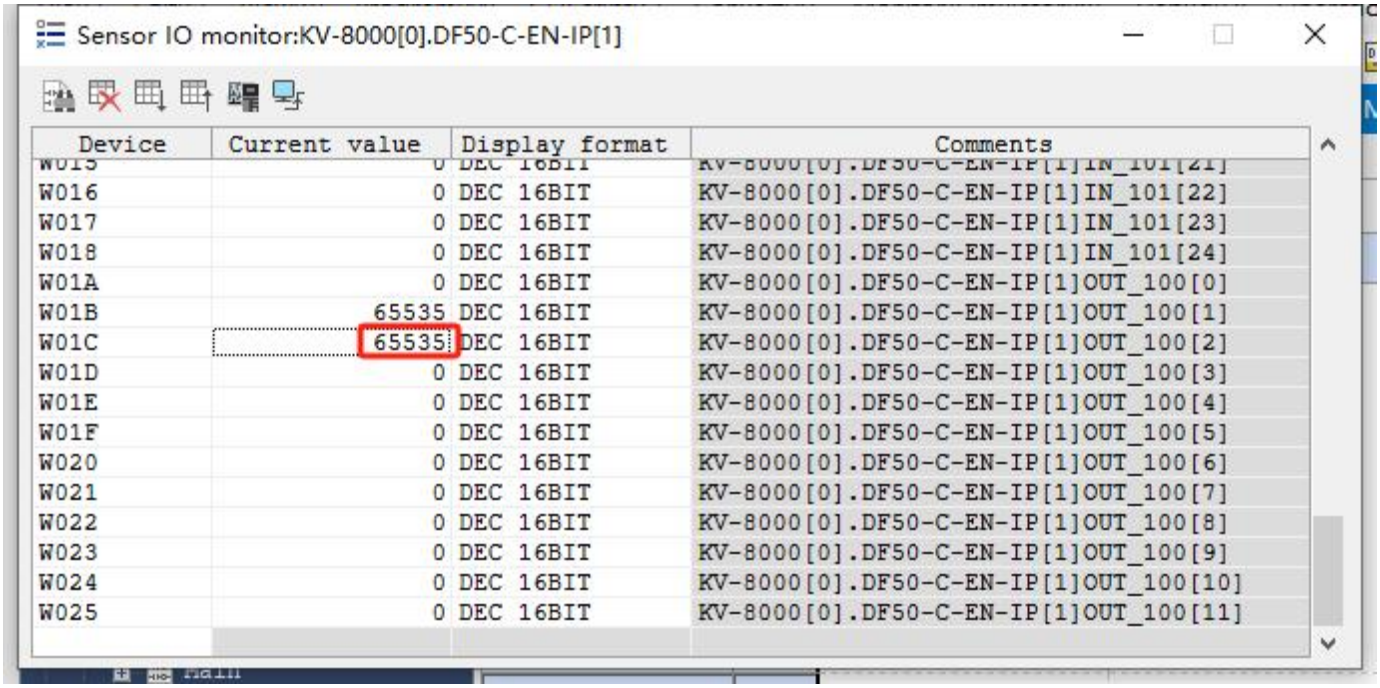
Device	Current value	Display format	Comments
W015	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[21]
W016	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[22]
W017	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[23]
W018	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[24]
W01A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W01B	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W01C	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W01D	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]
W01E	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[4]
W01F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[5]
W020	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[6]
W021	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[7]
W022	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[8]
W023	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[9]
W024	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[10]
W025	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[11]

Figure 4-1- 31

1.3.2. DF50-M-16DO-N digital output module

➢ For the module wiring diagram, please refer to Section 4.2 of Chapter 3. The output status of the module when an EIP bus error occurs can be set in the adapter . For the setting method, please refer to Section 1.2.3 of Chapter 4 .

➢ Each channel output can be enabled as shown in the figure below.



Device	Current value	Display format	Comments
W016	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[22]
W017	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[23]
W018	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[24]
W01A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W01B	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W01C	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W01D	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]
W01E	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[4]
W01F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[5]
W020	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[6]
W021	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[7]
W022	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[8]
W023	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[9]
W024	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[10]
W025	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[11]

Figure 4-1- 32

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

➢ Section 1.2 in Chapter 3 for the module wiring diagram .

➢ This module can set input filtering. The setting method is shown in the figure below. The default setting is 20ms.

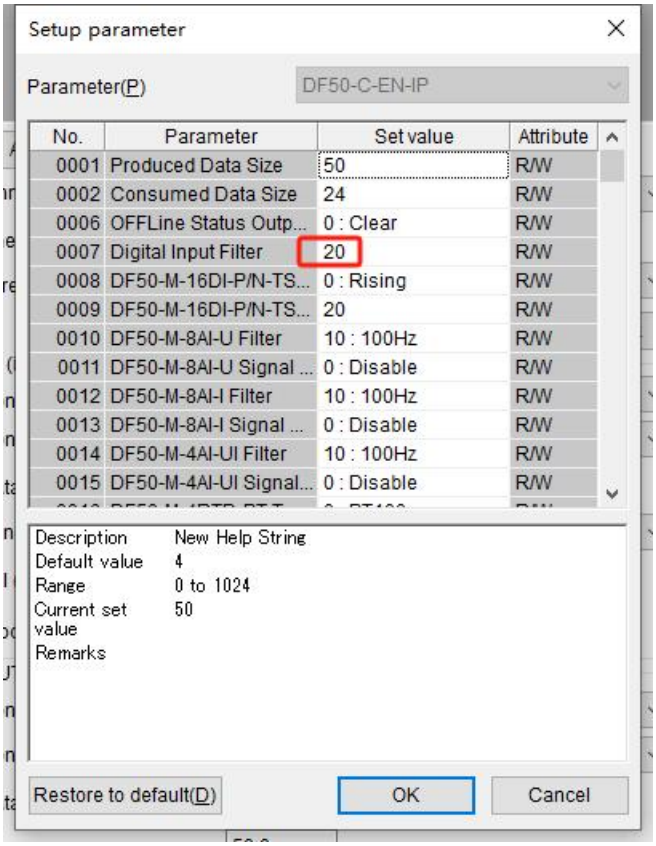


Figure 4-1- 33

➢ As shown in the figure below, you can view the input data of each channel (the DI0 channel of the module receives the external digital signal) .

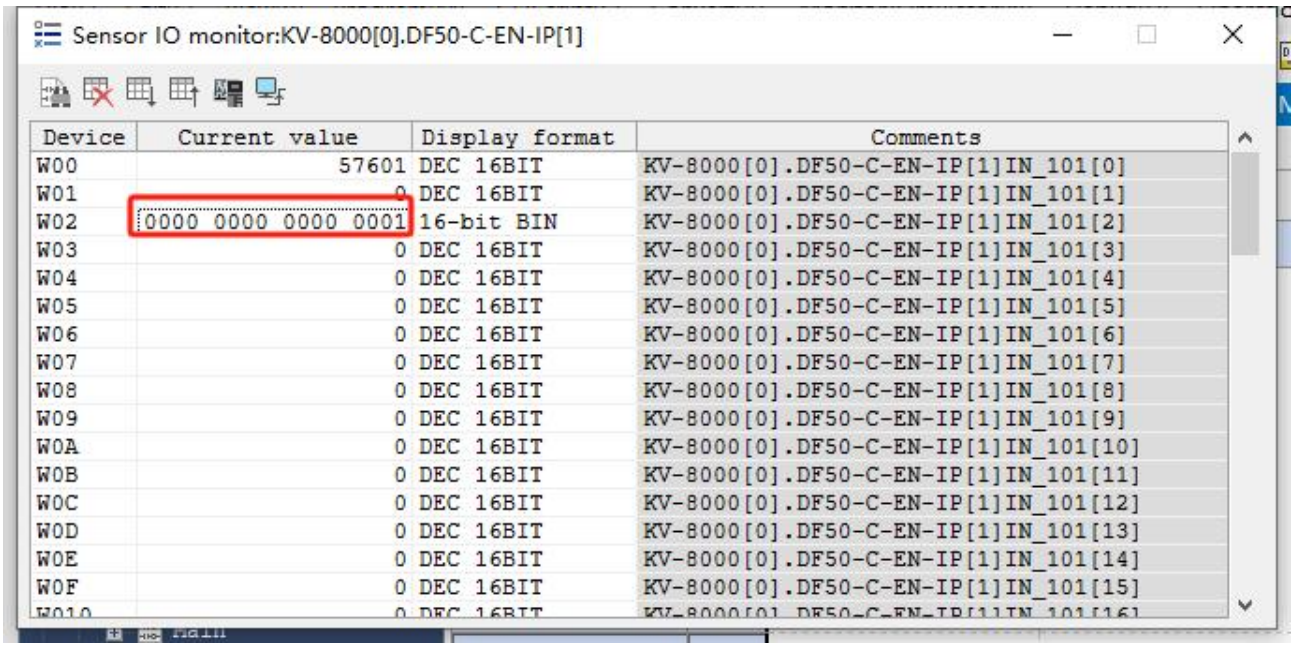


Figure 4-1- 34

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

➢ Section 2.2 in Chapter 3 for the module wiring diagram .

➢ As shown in the figure below, the counting mode of CH0~CH7 can be set uniformly , which can be set to rising edge counting, falling edge counting , and double edge counting . The default is rising edge counting . The maximum counting frequency of a single channel is 1KHz.

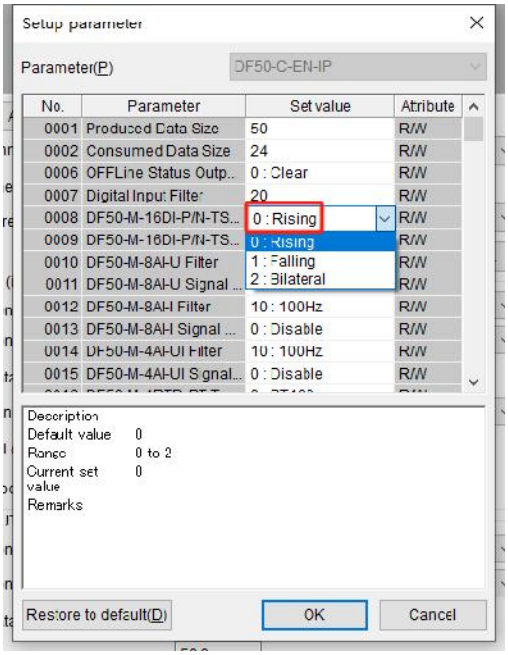


Figure 4-1- 35

➢ As shown in the figure below, for input channels CH10~CH 17 without counting function , the input filter parameters can be modified, the default is 20ms.

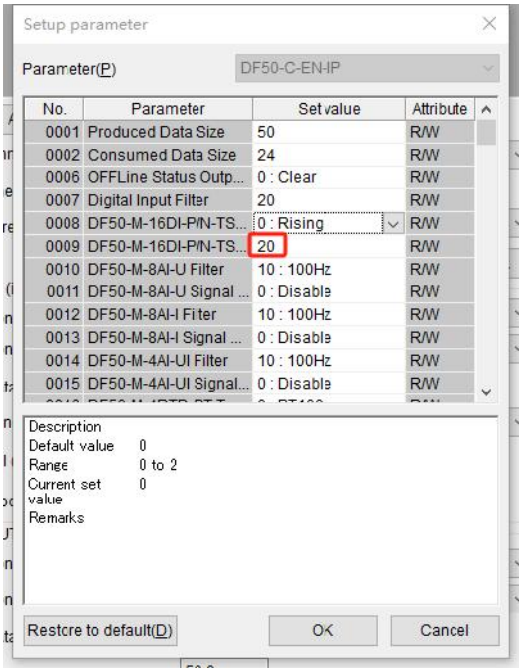
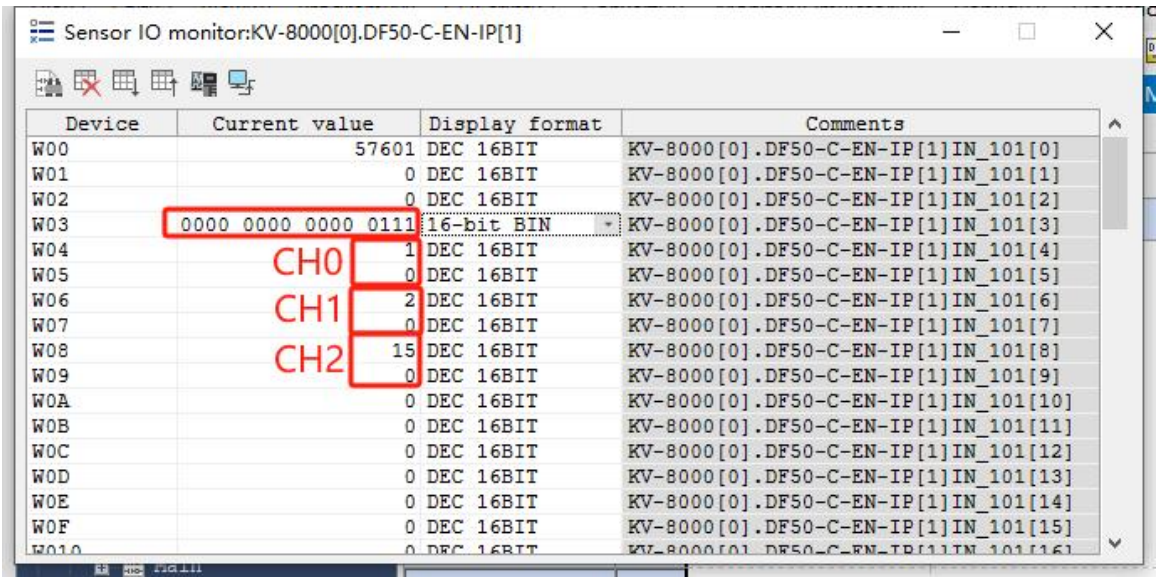


Figure 4-1- 36

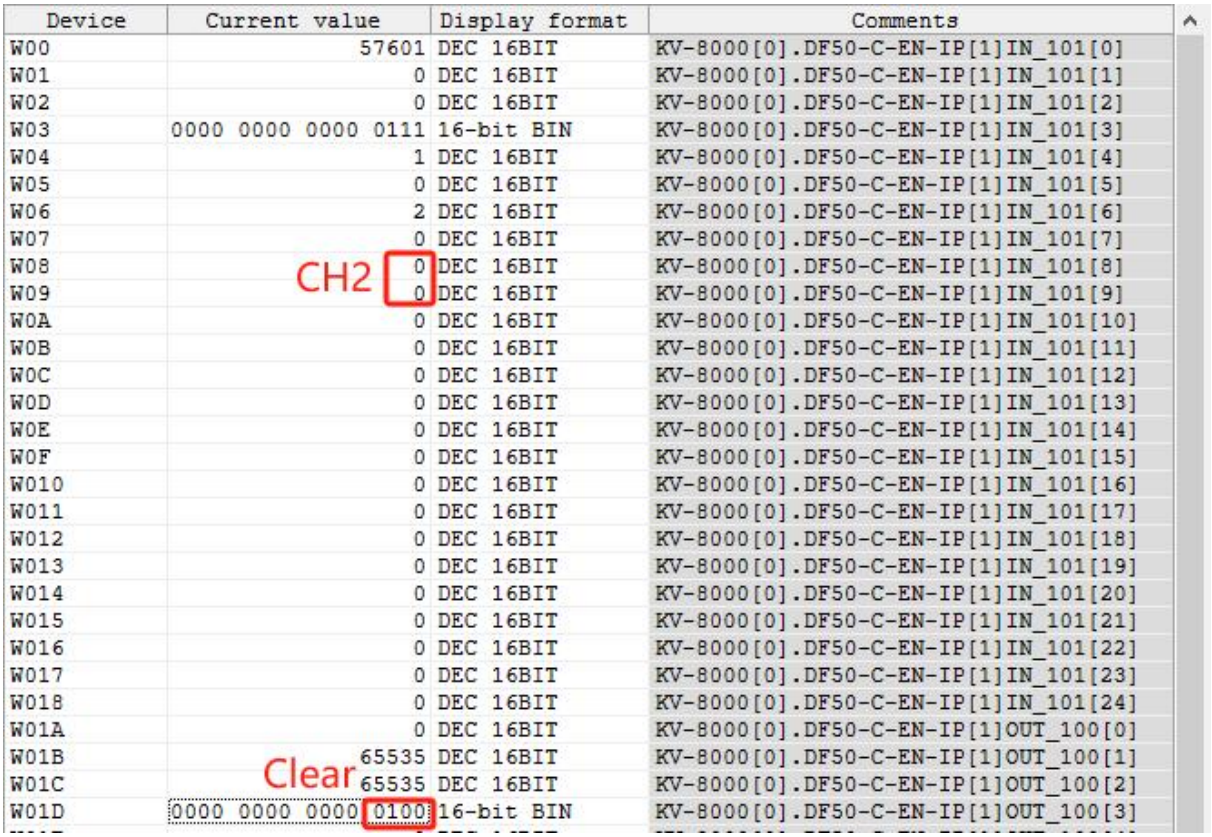
➢ Please refer to Section 2.4 of Chapter 3 for the process data definition , and fill the data we need into the monitoring table, as shown in the figure below. Input valid signals to the A1 (CH0 0) , A2 (CH 0 1) , and A3 (CH 0 2) ports of the IO module respectively, and you can see that the DI input bit of the corresponding channel becomes "1", and the count value of the corresponding channel is also increasing .



Device	Current value	Display format	Comments
W00	57601	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[0]
W01	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[1]
W02	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[2]
W03	0000 0000 0000 0111	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]IN_101[3]
W04	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[4]
W05	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[5]
W06	2	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[6]
W07	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[7]
W08	15	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[8]
W09	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[9]
W0A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[10]
W0B	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[11]
W0C	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[12]
W0D	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[13]
W0E	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[14]
W0F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[15]

Figure 4-1- 37

- CH 0 2 as shown in the figure below.



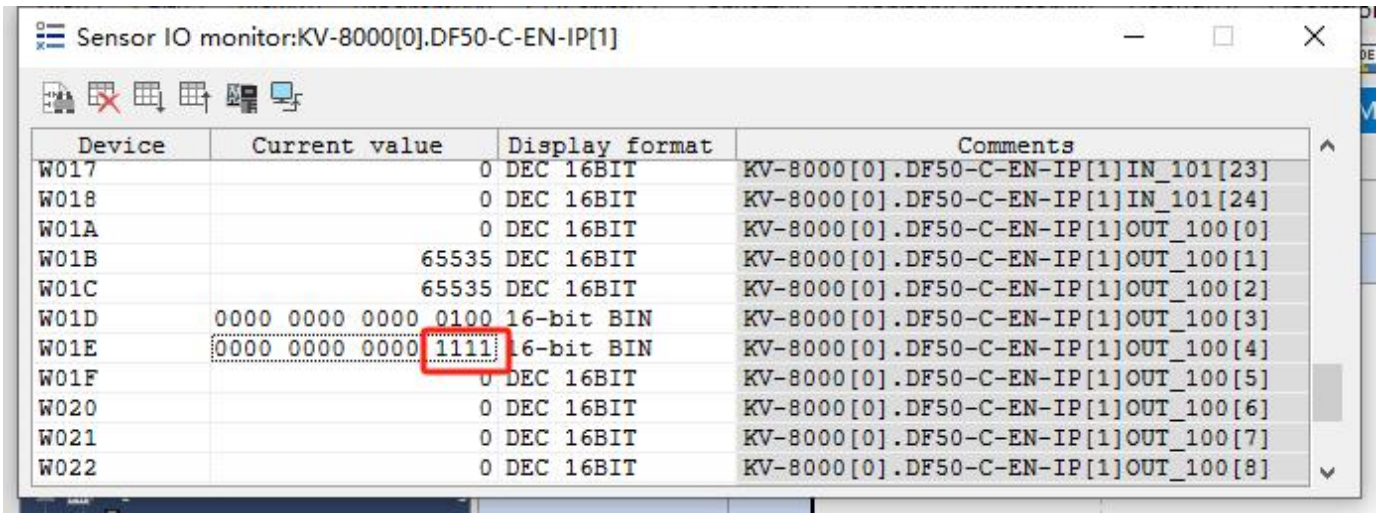
Device	Current value	Display format	Comments
W00	57601	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[0]
W01	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[1]
W02	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[2]
W03	0000 0000 0000 0111	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]IN_101[3]
W04	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[4]
W05	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[5]
W06	2	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[6]
W07	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[7]
W08	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[8]
W09	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[9]
W0A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[10]
W0B	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[11]
W0C	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[12]
W0D	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[13]
W0E	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[14]
W0F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[15]
W010	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[16]
W011	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[17]
W012	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[18]
W013	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[19]
W014	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[20]
W015	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[21]
W016	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[22]
W017	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[23]
W018	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[24]
W01A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W01B	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W01C	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W01D	0000 0000 0000 0100	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]

Figure 4-1- 38

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

➢ For the module wiring diagram, please refer to Section 20.2 of Chapter 3. The output status of the module when an EIP bus error occurs can be set in the adapter . For the setting method, please refer to Section 1.2.3 of Chapter 4 .

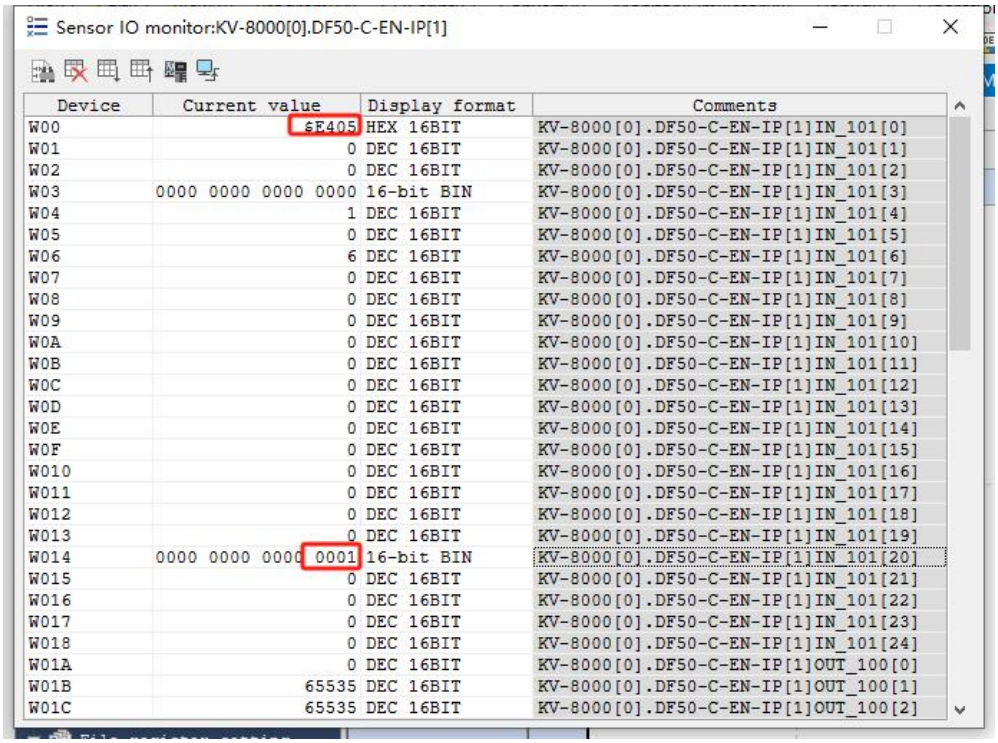
➢ For process data definition, please refer to Section 20.4 in Chapter 3. Each channel output can be enabled as shown in the figure below.



Device	Current value	Display format	Comments
W017	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[23]
W018	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[24]
W01A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W01B	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W01C	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W01D	0000 0000 0000 0100	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]
W01E	0000 0000 0000 1111	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]OUT_100[4]
W01F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[5]
W020	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[6]
W021	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[7]
W022	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[8]

Figure 4-1- 39

➢ As shown in the figure below, the first channel output is enabled. When the module channel output is overcurrent, the overcurrent point is 4A/channel, and the first channel bit in Overcurrent becomes "1", indicating that the first channel output is overcurrent; in addition, the system diagnostic information shows an error "$E405", indicating that the first module detects an overcurrent signal. For the meaning of the diagnostic fault code, please refer to Section 1.3 of Chapter 2 .



Device	Current value	Display format	Comments
W00	$E405	HEX 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[0]
W01	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[1]
W02	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[2]
W03	0000 0000 0000 0000	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]IN_101[3]
W04	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[4]
W05	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[5]
W06	6	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[6]
W07	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[7]
W08	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[8]
W09	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[9]
W0A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[10]
W0B	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[11]
W0C	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[12]
W0D	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[13]
W0E	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[14]
W0F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[15]
W010	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[16]
W011	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[17]
W012	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[18]
W013	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[19]
W014	0000 0000 0000 0001	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]IN_101[20]
W015	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[21]
W016	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[22]
W017	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[23]
W018	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[24]
W01A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W01B	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W01C	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]

Figure 4-1- 40

1.3.6. DF50-M- 4 DO R relay output module

➢ For the module wiring diagram, please refer to Section 19.2 of Chapter 3. The output status of the module when an EIP bus error occurs can be set in the adapter . For the setting method, please refer to Section 1.2.3 of Chapter 4 .

➢ For process data definition, please refer to Chapter 3 , Section 19.3 . Each channel relay can be closed as shown in the figure below .

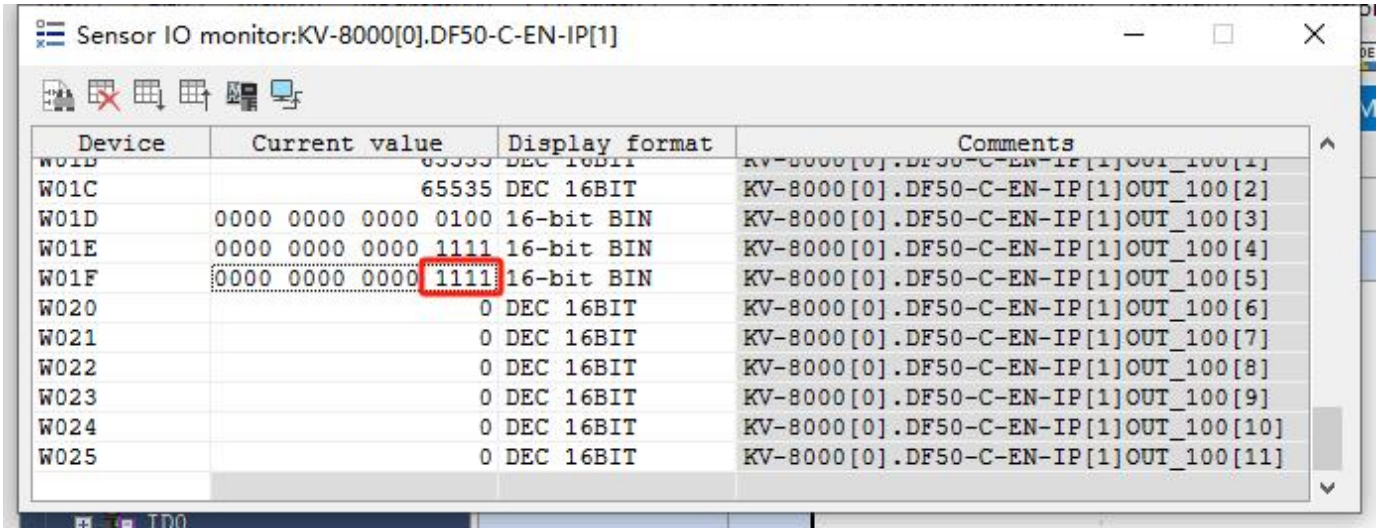
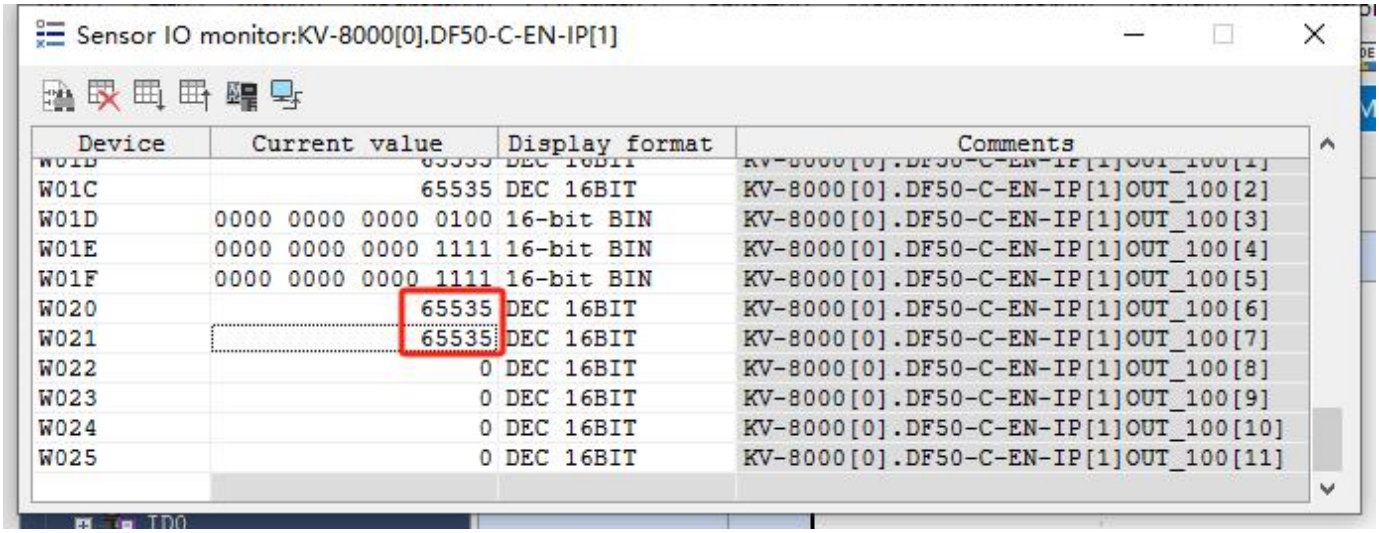


Figure 4-1- 41

1.3.7. DF50-M- 32 DO-P digital output module

➢ For the module wiring diagram, please refer to Section 22.2 of Chapter 3. The output status of the module when an EIP bus error occurs can be set in the adapter . For the setting method, please refer to Section 1.2.3 of Chapter 4 .

➢ Each channel output can be enabled as shown in the figure below.



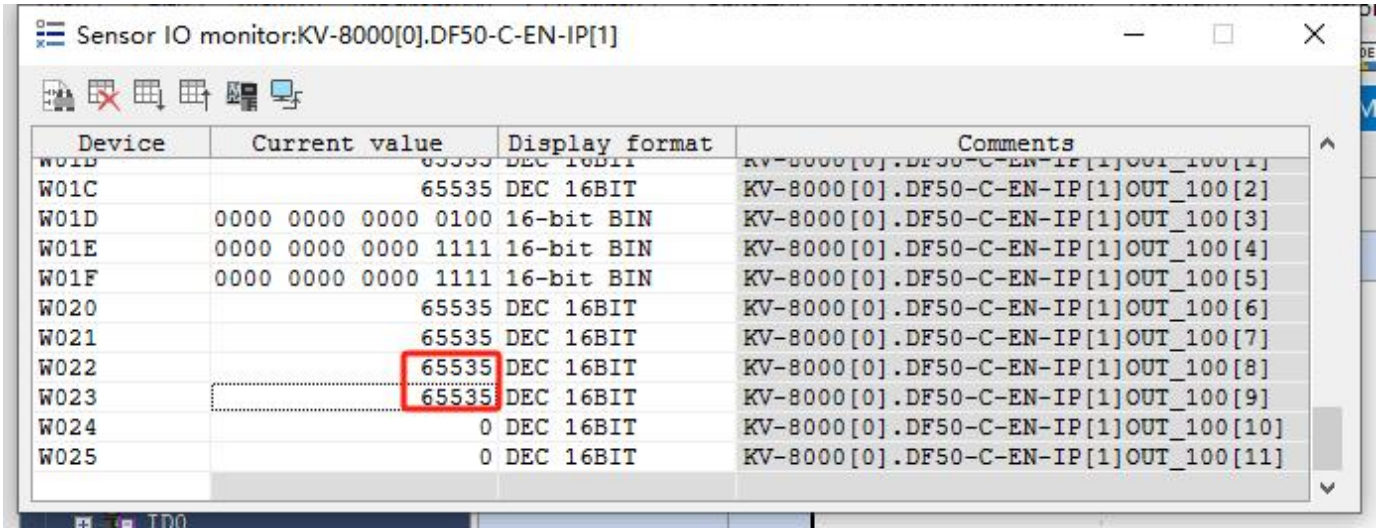
Device	Current value	Display format	Comments
W01C	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W01D	0000 0000 0000 0100	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]
W01E	0000 0000 0000 1111	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]OUT_100[4]
W01F	0000 0000 0000 1111	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]OUT_100[5]
W020	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[6]
W021	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[7]
W022	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[8]
W023	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[9]
W024	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[10]
W025	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[11]

Figure 4-1- 42

1.3.8. DF50-M- 32 DO- N digital output module

➢ For the module wiring diagram, please refer to Section 21.2 of Chapter 3. The output status of the module when an EIP bus error occurs can be set in the adapter . For the setting method, please refer to Section 1.2.3 of Chapter 4 .

➢ Each channel output can be enabled as shown in the figure below.



Device	Current value	Display format	Comments
W01C	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W01D	0000 0000 0000 0100	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]
W01E	0000 0000 0000 1111	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]OUT_100[4]
W01F	0000 0000 0000 1111	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]OUT_100[5]
W020	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[6]
W021	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[7]
W022	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[8]
W023	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[9]
W024	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[10]
W025	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[11]

Figure 4-1- 43

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

➢ For the module wiring diagram, please refer to Section 20.2 in Chapter 3 .

➢ This module can set input filtering. The setting method is shown in the figure below. The default setting is 20ms.

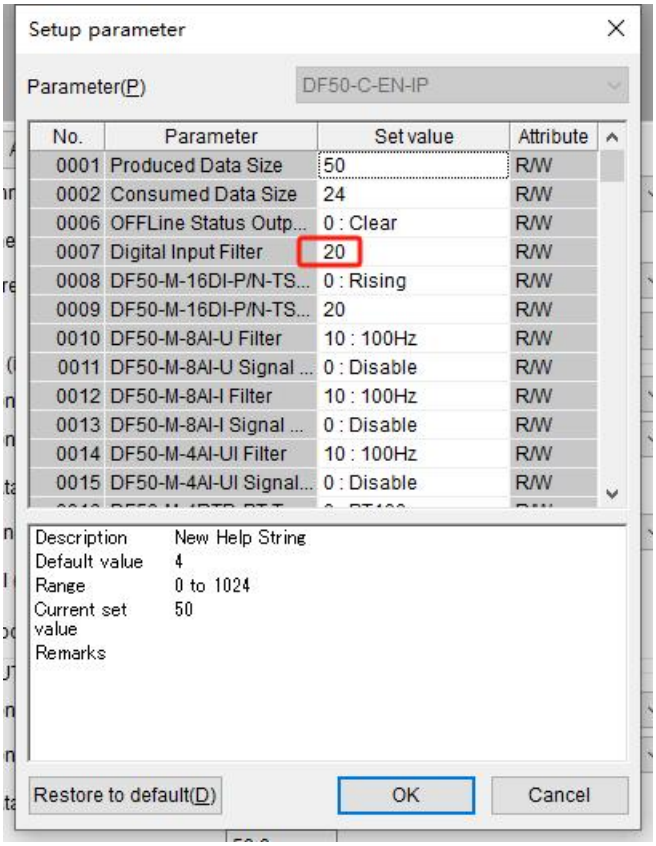


Figure 4-1- 44

➢ As shown in the figure below, you can view the input data of each channel (the DI0 channel of the module receives the external digital signal) .

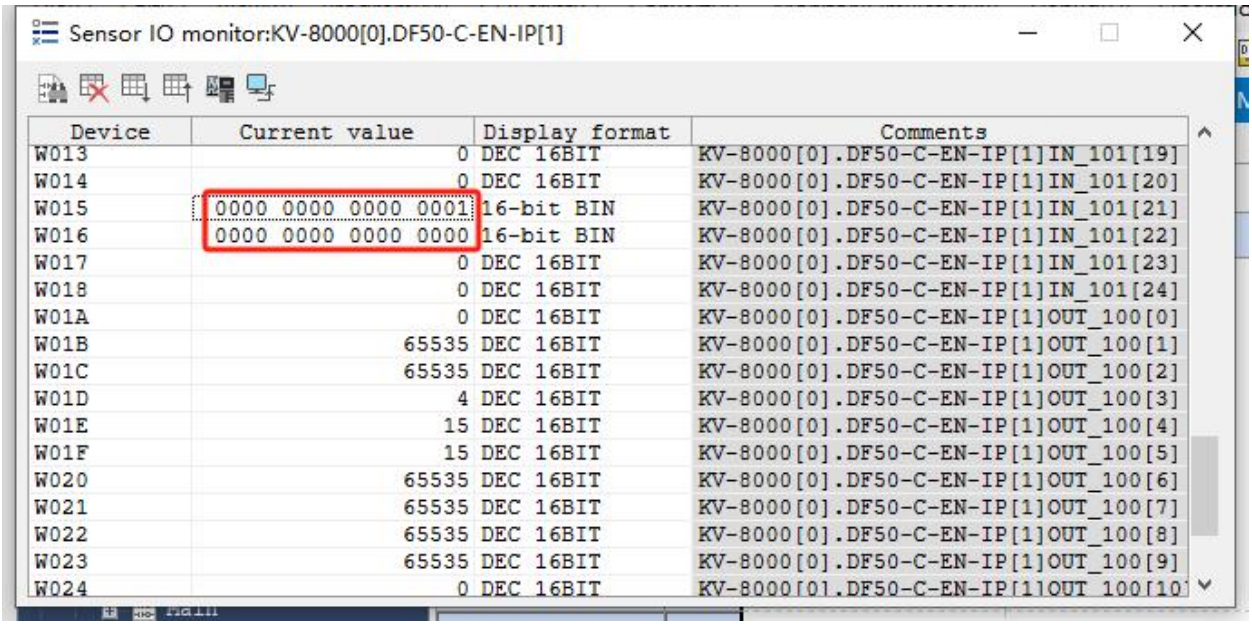


Figure 4-1- 45

1.3.10. DF50-M-16DI-16DO-P digital input module

➢ For the module wiring diagram, please refer to Section 2 4 .2 of Chapter 3. The output status of the module when an EIP bus error occurs can be set in the adapter . For the setting method, please refer to Section 1.2.3 of Chapter 4 .

➢ This module can set input filtering. The setting method is shown in the figure below. The default setting is 20ms.

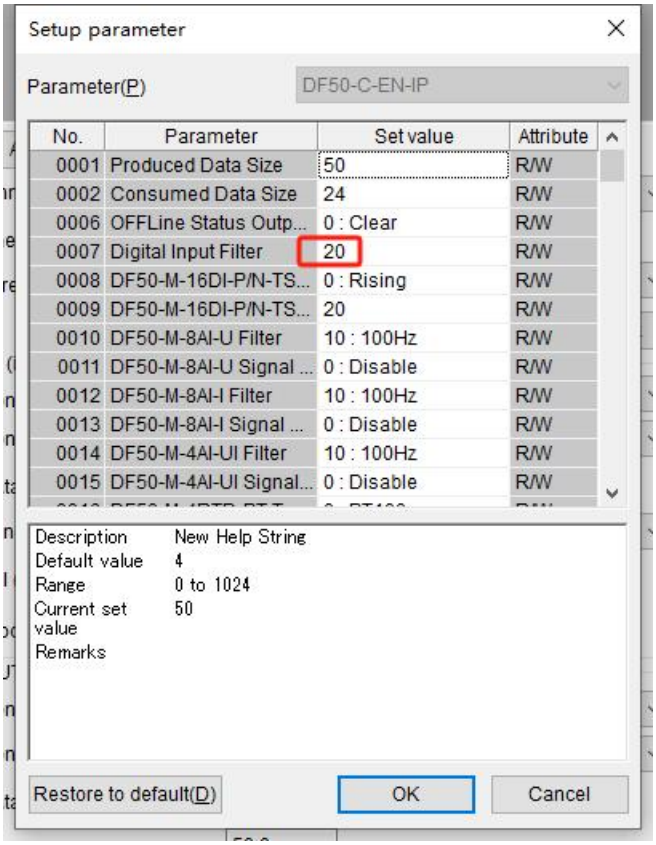


Figure 4-1- 46

➢ As shown in the figure below, you can view the input data of each channel (the DI0 channel of the module receives the external digital signal) .

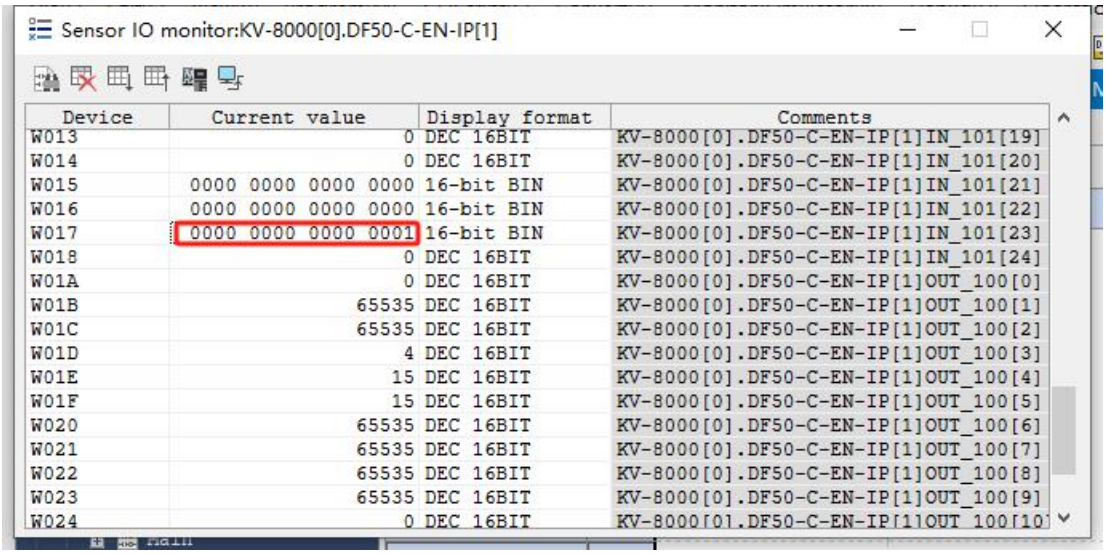
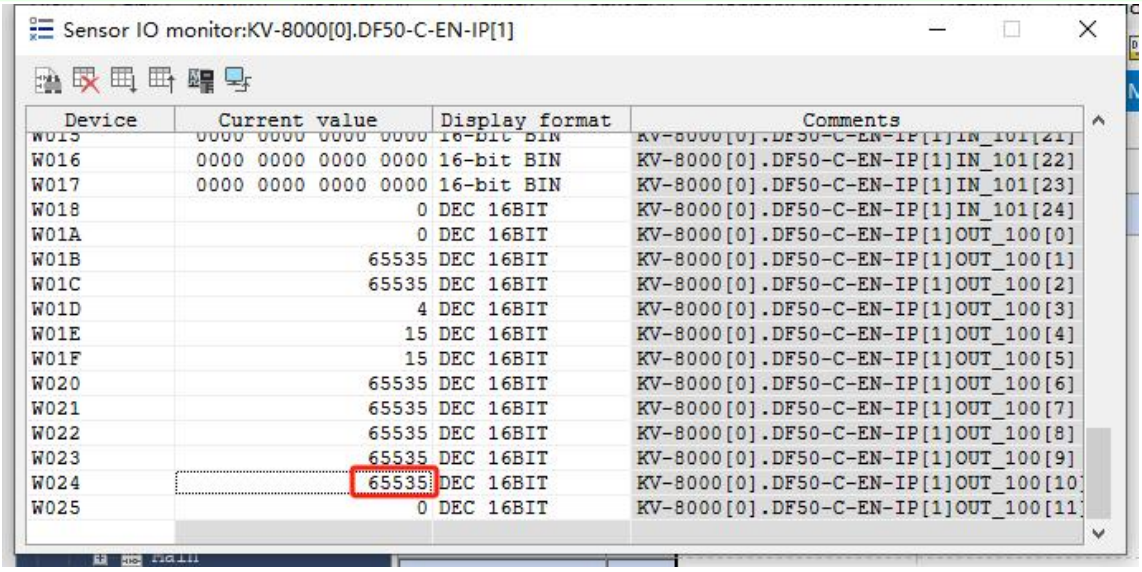


Figure 4-1- 47

➢ Each channel output can be enabled as shown in the figure below.



Device	Current value	Display format	Comments
W016	0000 0000 0000 0000	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]IN_101[22]
W017	0000 0000 0000 0000	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]IN_101[23]
W018	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[24]
W01A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W01B	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W01C	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W01D	4	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]
W01E	15	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[4]
W01F	15	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[5]
W020	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[6]
W021	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[7]
W022	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[8]
W023	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[9]
W024	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[10]
W025	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[11]

Figure 4-1- 48

1.3.11. DF50-M-16DI-16DO-N digital input module

➢ For the module wiring diagram, please refer to Section 2 3 .2 in Chapter 3. The output state of the module when an EIP bus error occurs can be set in the adapter . For the setting method, please refer to Section 1.2.3 in Chapter 4 .

➢ This module can set input filtering. The setting method is shown in the figure below. The default setting is 20ms.

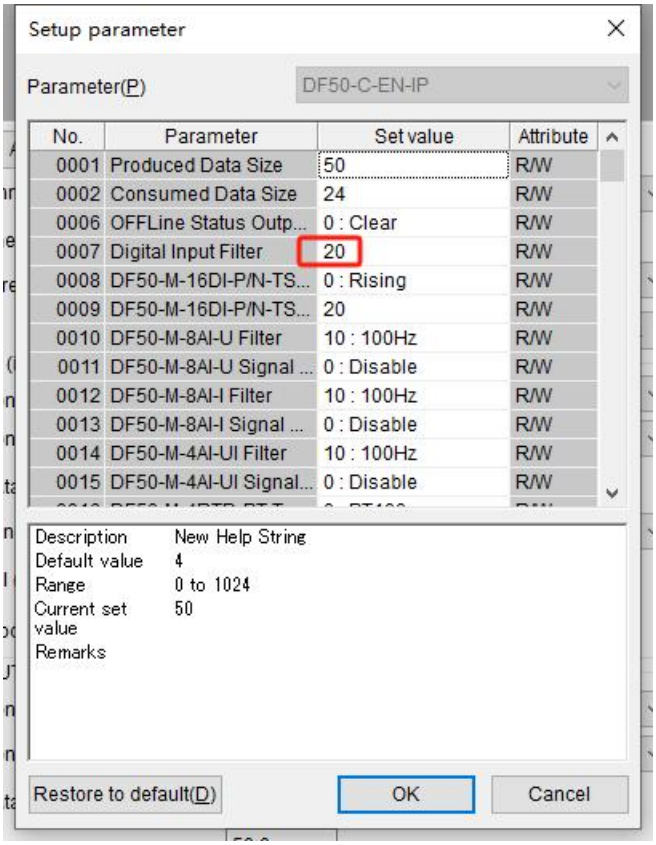


Figure 4-1- 49

➢ As shown in the figure below, you can view the input data of each channel (the DI0 channel of the module receives the external digital signal) .

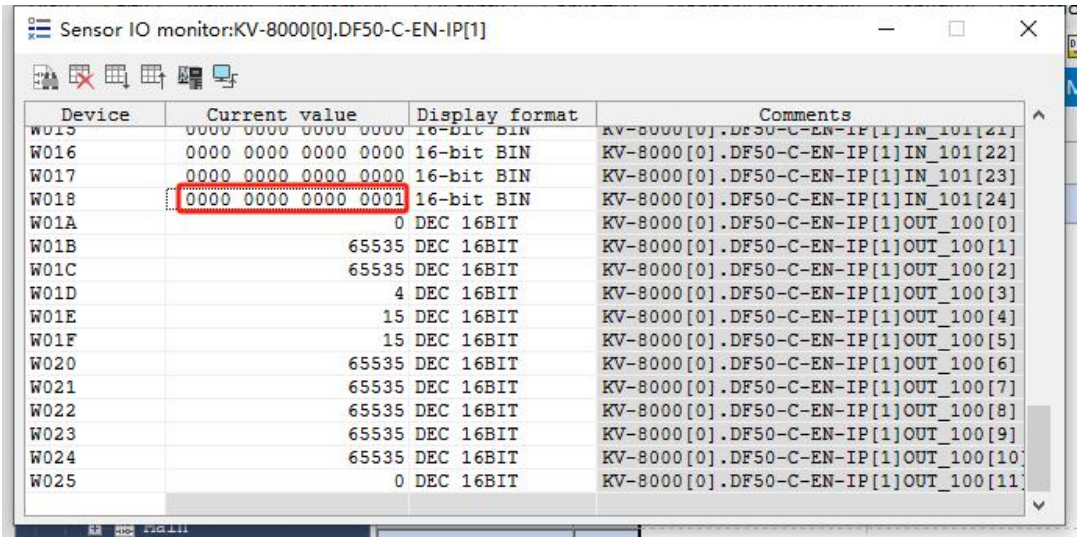
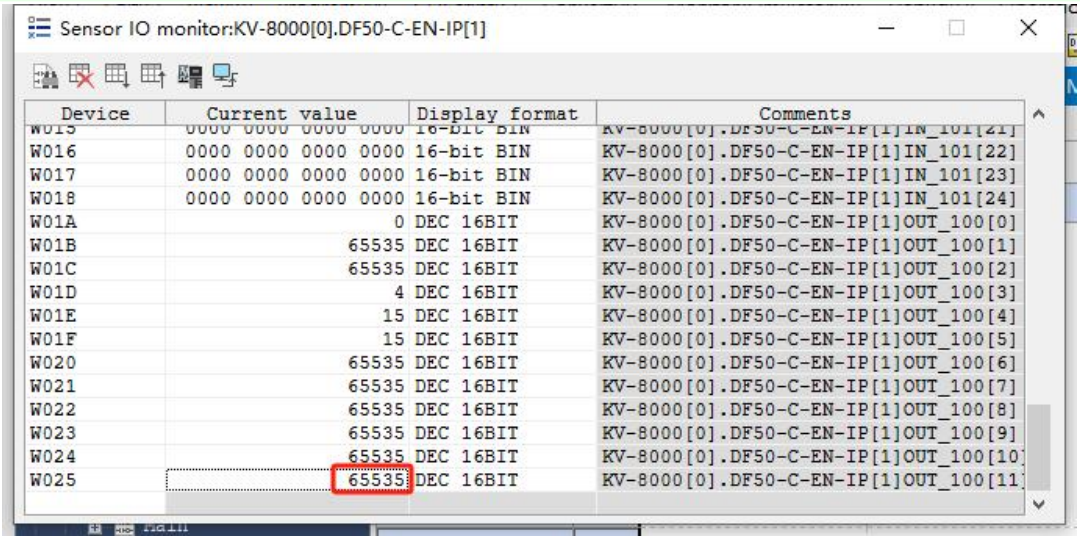


Figure 4-1- 50

➢ Each channel output can be enabled as shown in the figure below.



Device	Current value	Display format	Comments
W015	0000 0000 0000 0000	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]IN_101[21]
W016	0000 0000 0000 0000	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]IN_101[22]
W017	0000 0000 0000 0000	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]IN_101[23]
W018	0000 0000 0000 0000	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]IN_101[24]
W01A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W01B	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W01C	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W01D	4	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]
W01E	15	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[4]
W01F	15	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[5]
W020	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[6]
W021	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[7]
W022	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[8]
W023	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[9]
W024	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[10]
W025	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[11]

Figure 4-1- 51

1.4. Analog module usage routine

➢ This example uses the topology of DF50-C-EN-IP + 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 adding the modules, the configuration is as shown in the figure below .

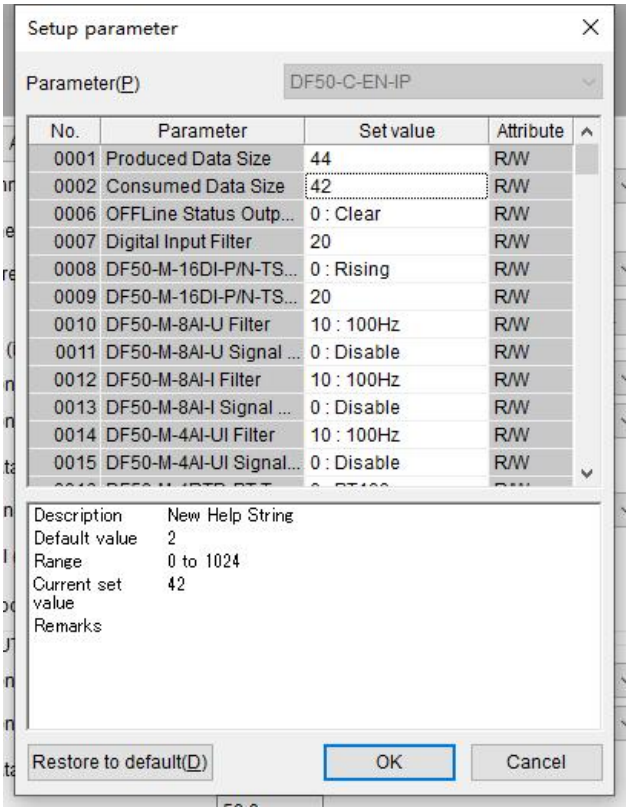


Figure 4-1- 52

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

➢ For the module wiring diagram, please refer to Section 9.2 of Chapter 3. The output status of the module when an EIP bus error occurs can be set in the adapter . For the setting method, please refer to Section 1.2.3 of Chapter 4 .

➢ As shown in the figure below, you can set the module output voltage range, the default is Disabled. Set the module channel output range to 0~10V.

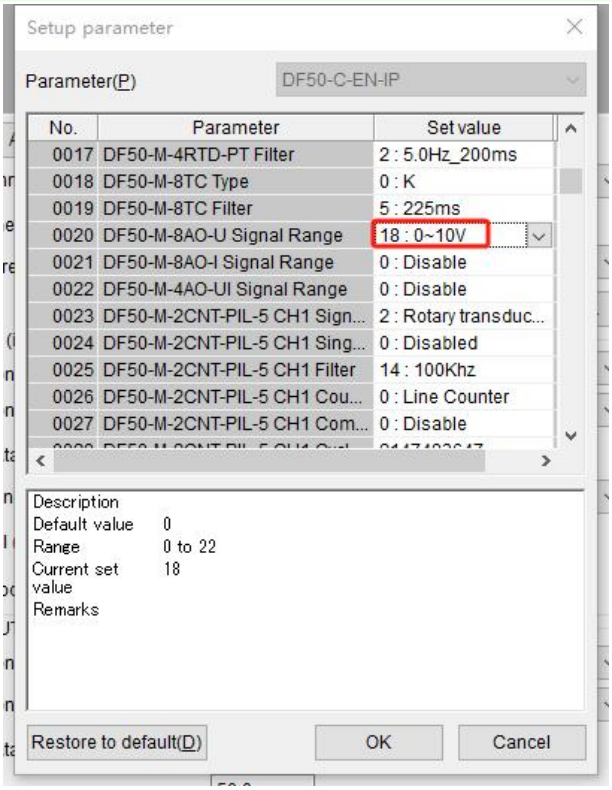


Figure 4-1- 53

➢ As shown in the figure below, write the value "27648" to the module CH0 channel. Through the multimeter measurement, it can be seen that the output voltage of CH0 is 10V. The conversion relationship is shown in Section 9.4 of Chapter 3 .

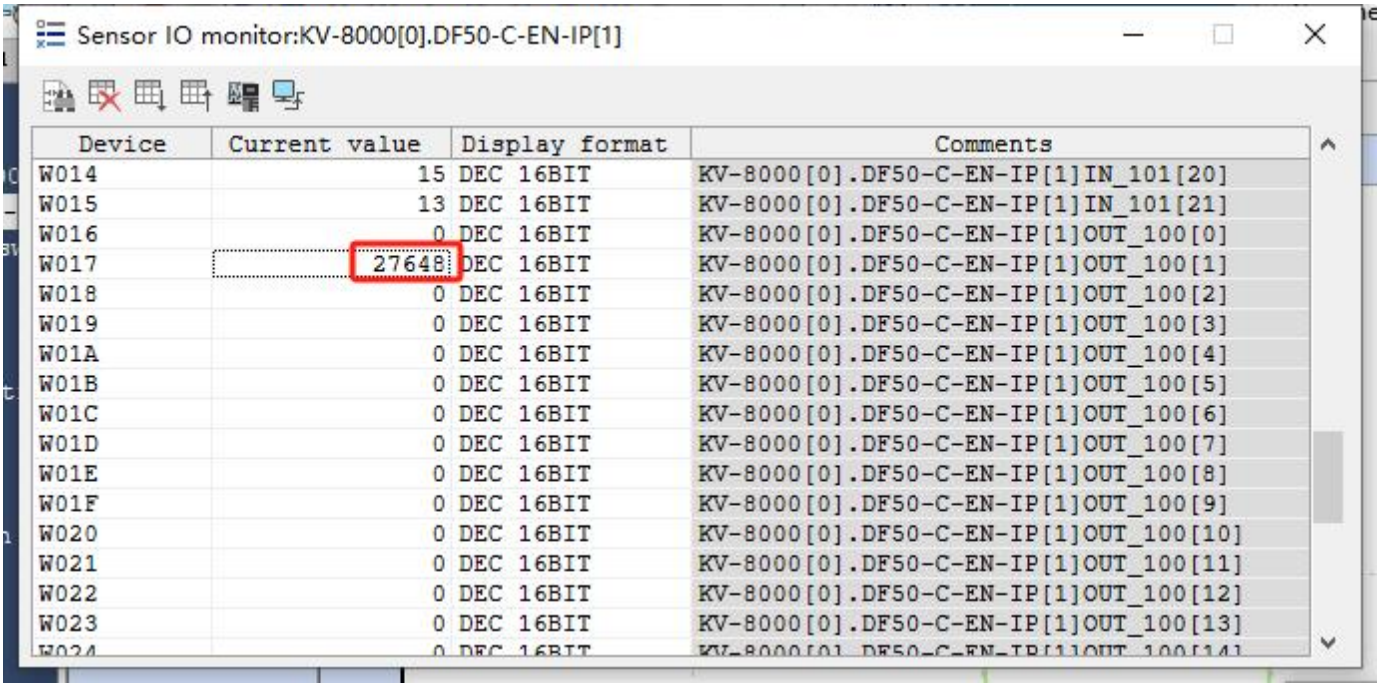


Figure 4-1- 54

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

➢ For the module wiring diagram, please refer to Section 10.2 of Chapter 3. The output status of the module when an EIP bus error occurs can be set in the adapter . For the setting method, please refer to Section 1.2.3 of Chapter 4 .

➢ As shown in the figure below, you can set the module output current range, the default is Disabled. Set the module channel output range to 0~20ma.

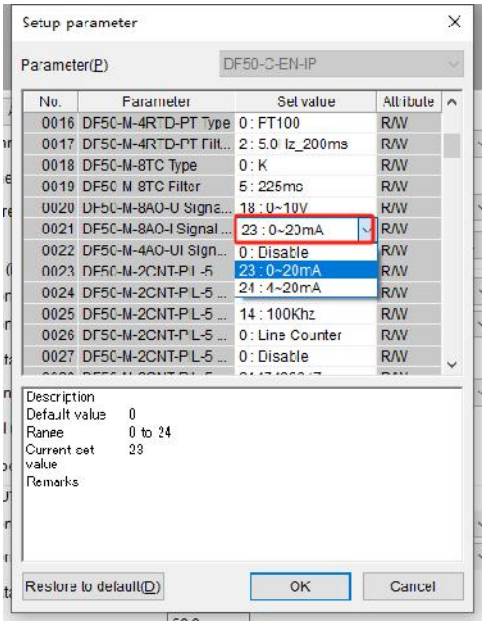


Figure 4-1- 55

➢ As shown in the figure below, write the value "27648" to the module CH0 channel. Through the multimeter measurement, it can be seen that the CH0 output current is 20ma. The conversion relationship is shown in Section 10.4 of Chapter 3 .

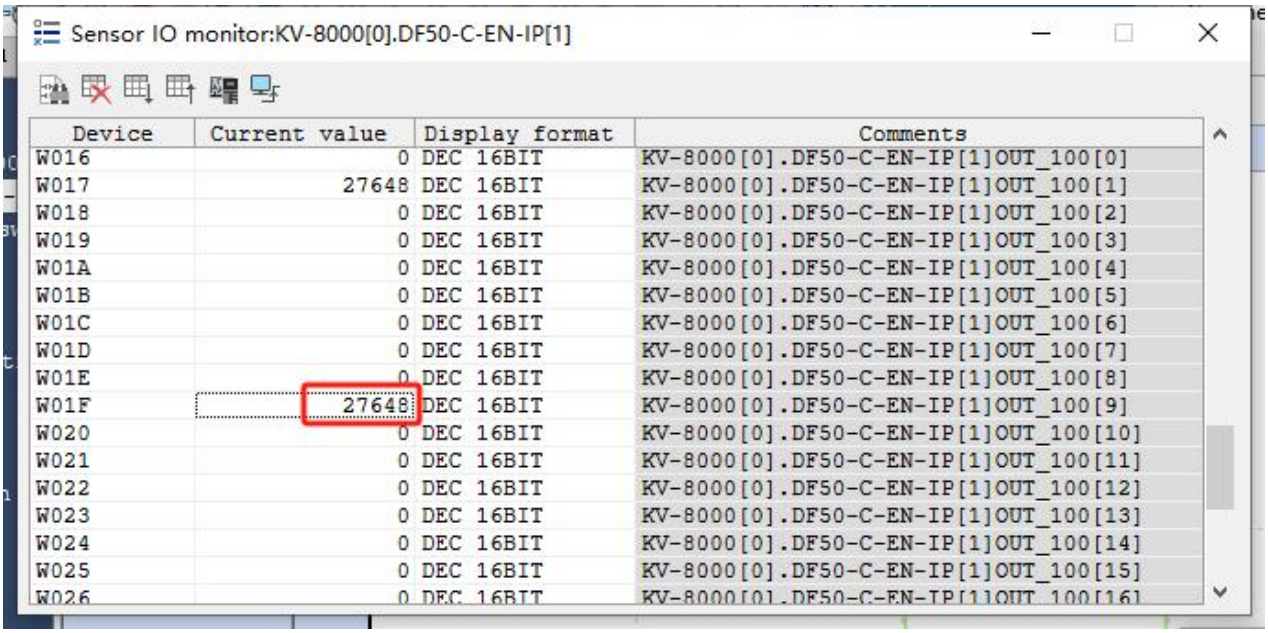


Figure 4-1- 56

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

➢ For the module wiring diagram, please refer to Section 8.2 of Chapter 3. The output status of the module when an EIP bus error occurs can be set in the adapter . For the setting method, please refer to Section 1.2.3 of Chapter 4 .

➢ As shown in the figure below, you can set the module output voltage or current range, the default is Disabled. Set the module channel output range to 0~20ma.

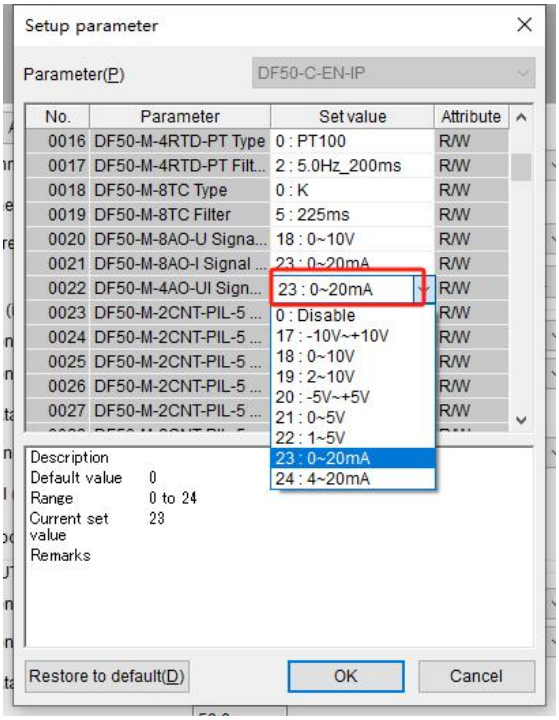


Figure 4-1- 57

➢ As shown in the figure below, write the value "27648" to the module CH0. Through the multimeter measurement, it can be seen that the output current of CH0 is 20ma. The conversion relationship is shown in Section 8.4 of Chapter 3 .

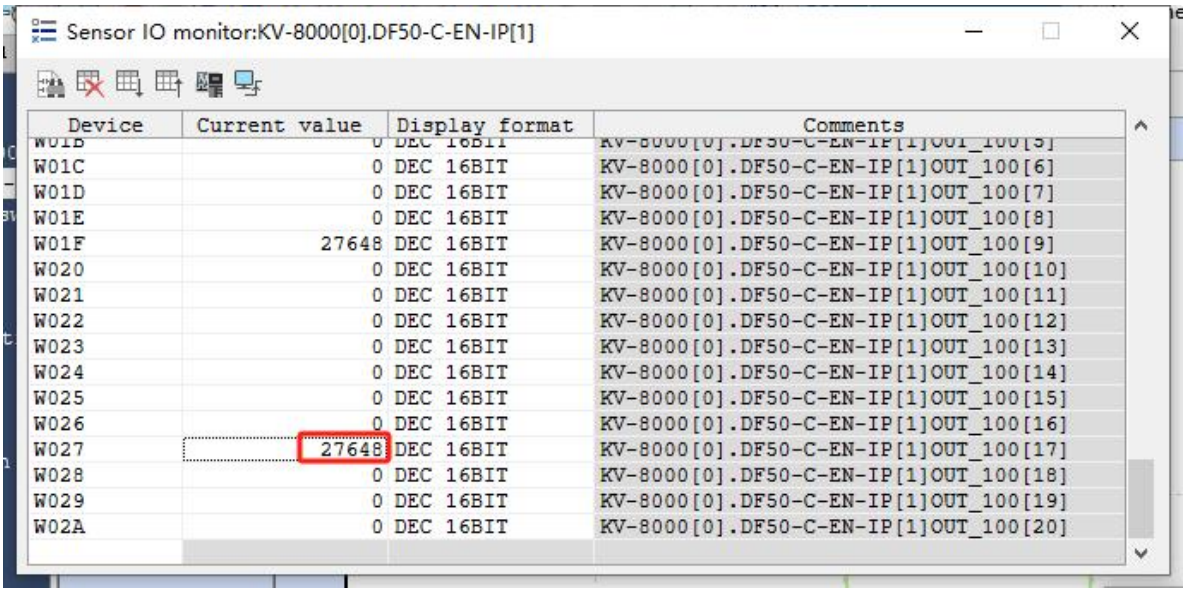


Figure 4-1- 58

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

➢ Section 7.2 of Chapter 3 for the module wiring diagram . As shown in the figure below, you can set the module acquisition voltage range uniformly , the default is Disabled. Set the module output range to 0~10V.

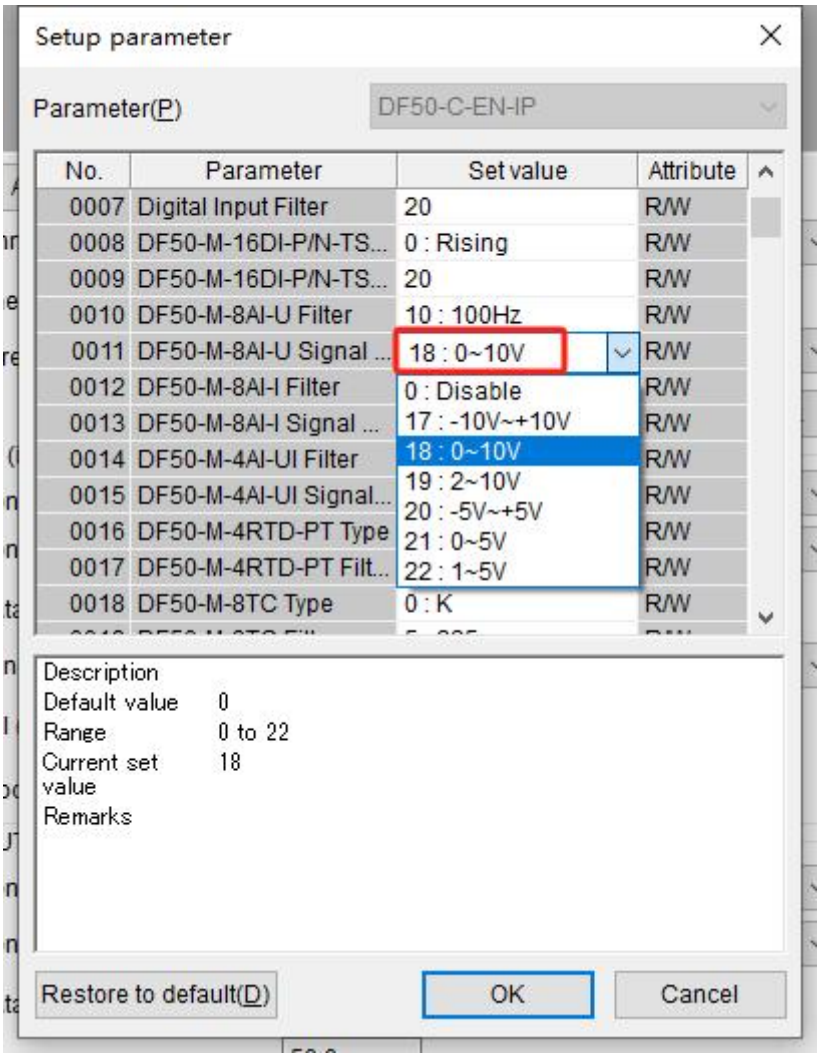


Figure 4-1- 59

➢ As shown in the figure below, you can uniformly set the signal filtering of each channel. The default setting is 100Hz_10ms.

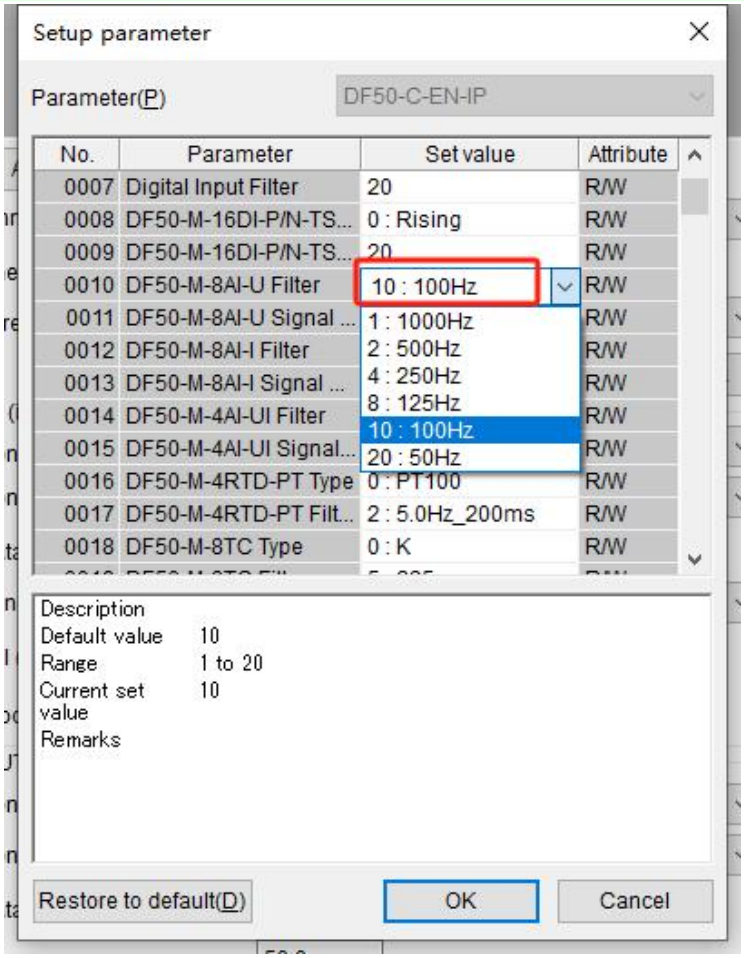


Figure 4-1- 60

➢ After passing 5V voltage into CH0, the value shown in the figure below is obtained. Through conversion, it is known that the collected voltage is about 5V. The conversion relationship is shown in Section 7.4 of Chapter 3 .

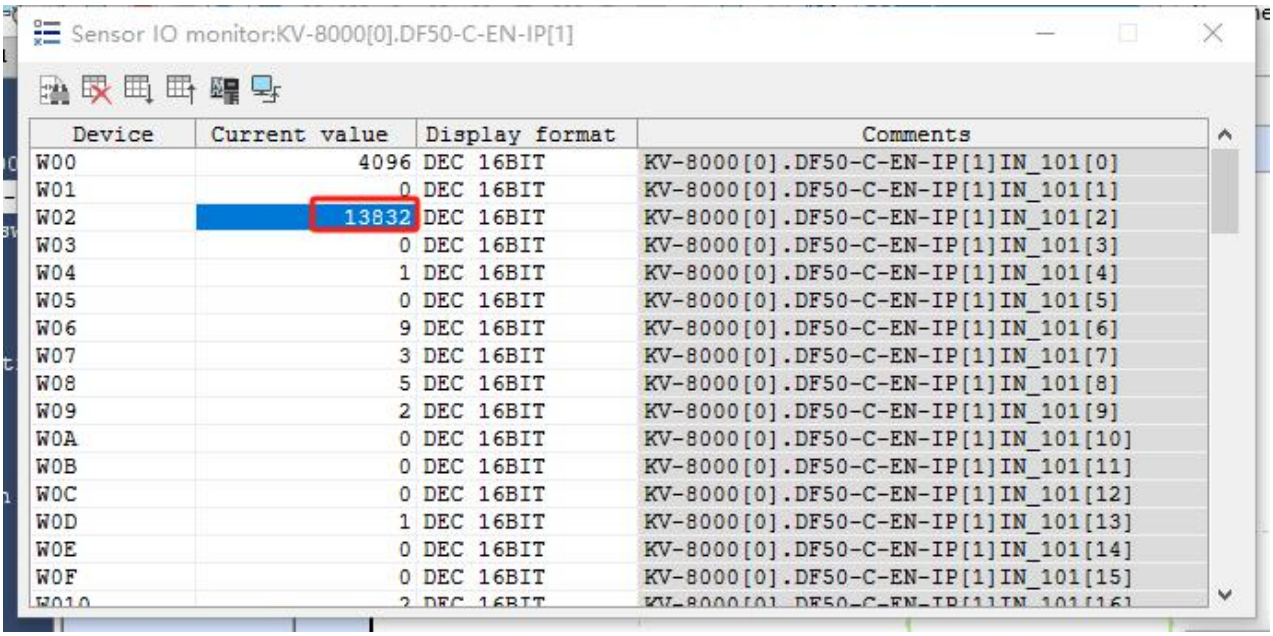


Figure 4-1- 61

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

➢ Section 6.2 of Chapter 3 for the module wiring diagram . As shown in the figure below, you can set the module acquisition current range, which is disabled by default. Set CH0 to 0~20ma.

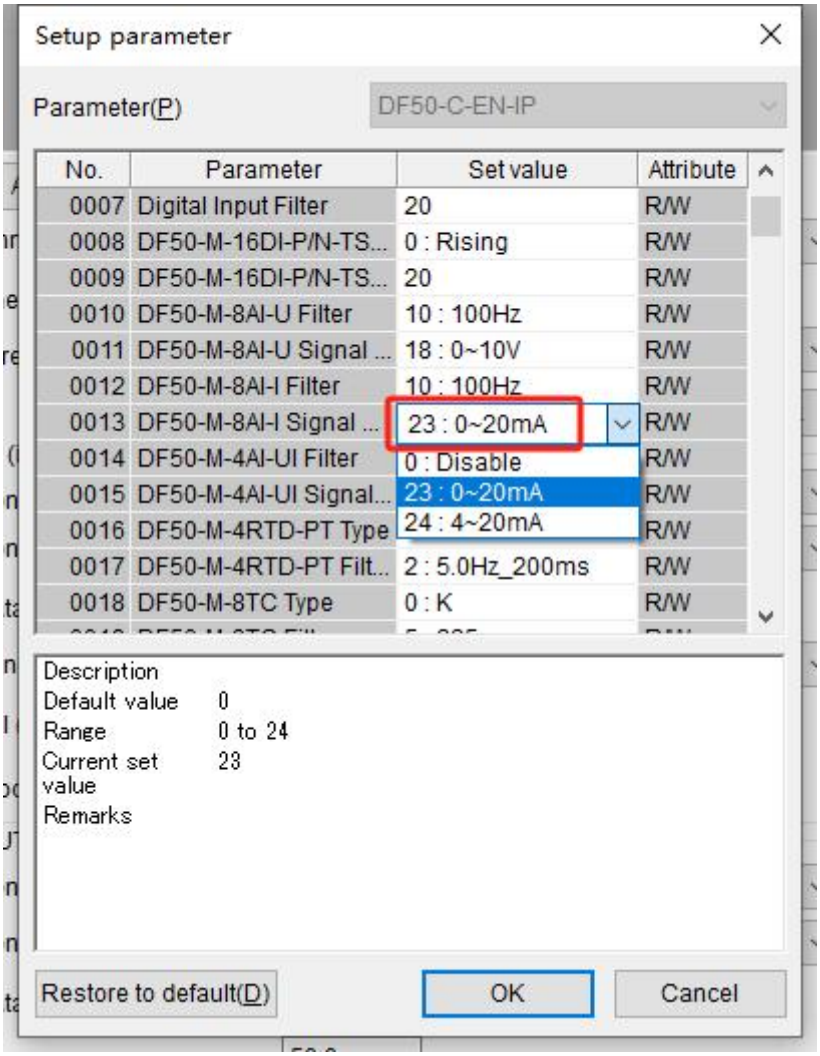


Figure 4-1- 62

➢ As shown in the figure below, you can set the signal filter for each channel, the default is 100Hz_10ms.

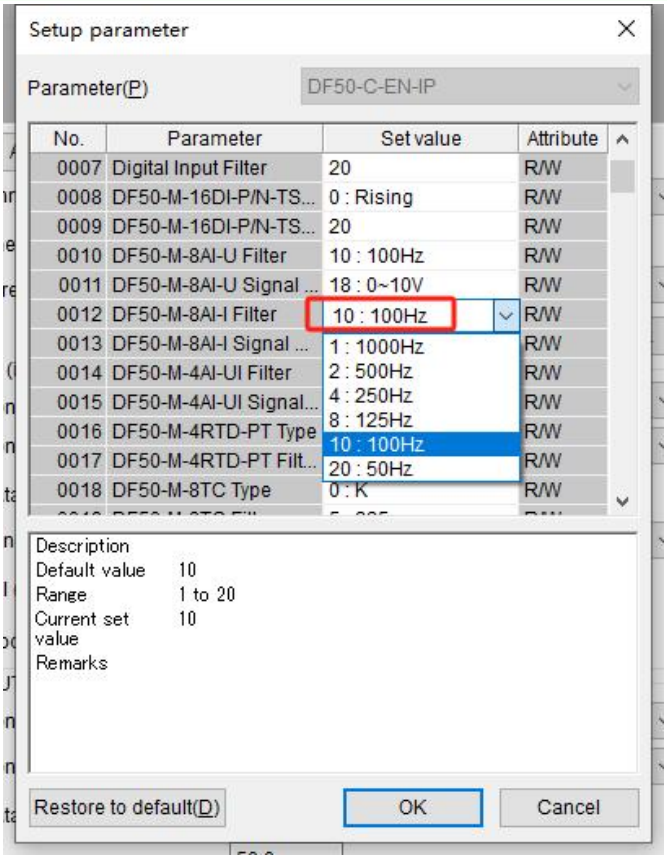


Figure 4-1- 63

➢ After passing 10ma current into CH0, the value shown in the figure below is obtained. Through conversion, it is known that the collected current is about 10ma. The conversion relationship is shown in Section 6.4 of Chapter 3 .

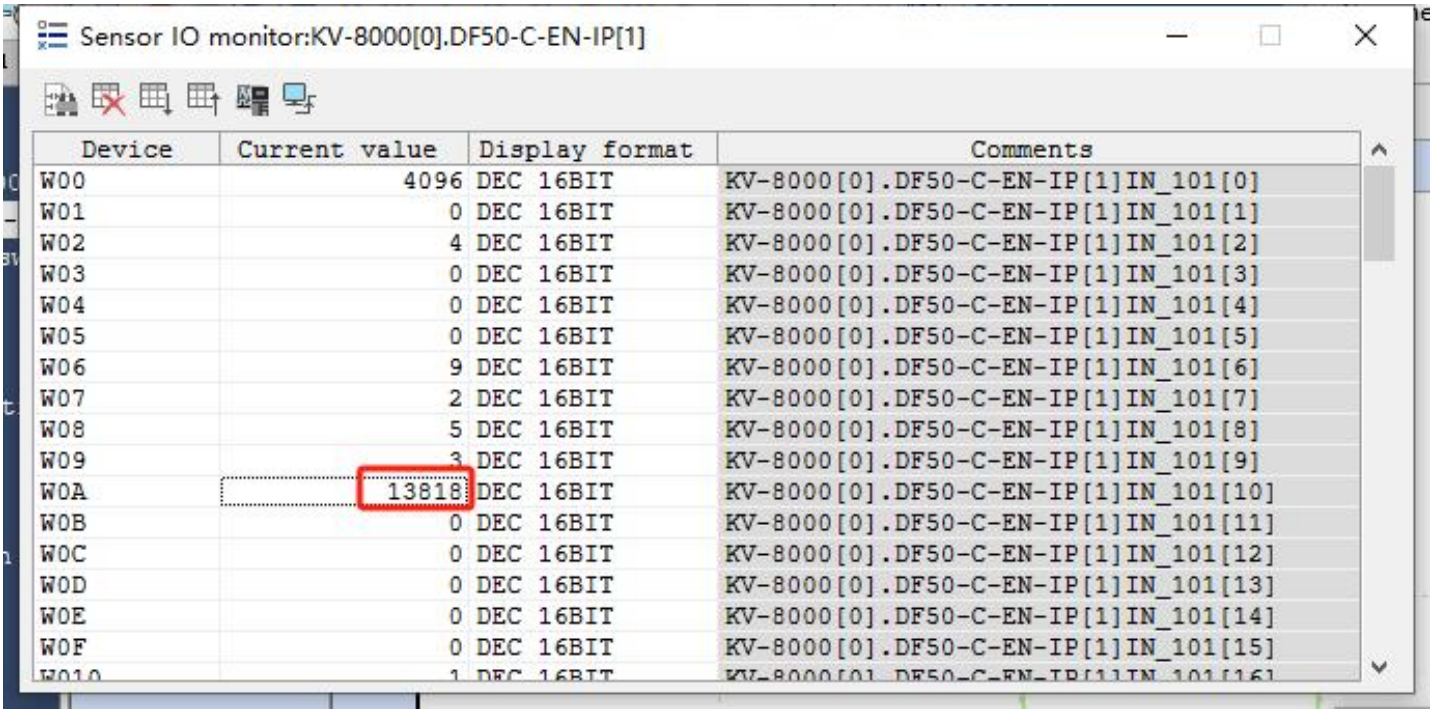


Figure 4-1- 64

1.4.6. DF50-M-4AI-UI-6 voltage and current input module

➢ Section 5.2 of Chapter 3 for the module wiring diagram . As shown in the figure below, you can set the module to collect voltage or current range, which is disabled by default. Set all channels uniformly to 0~10V.

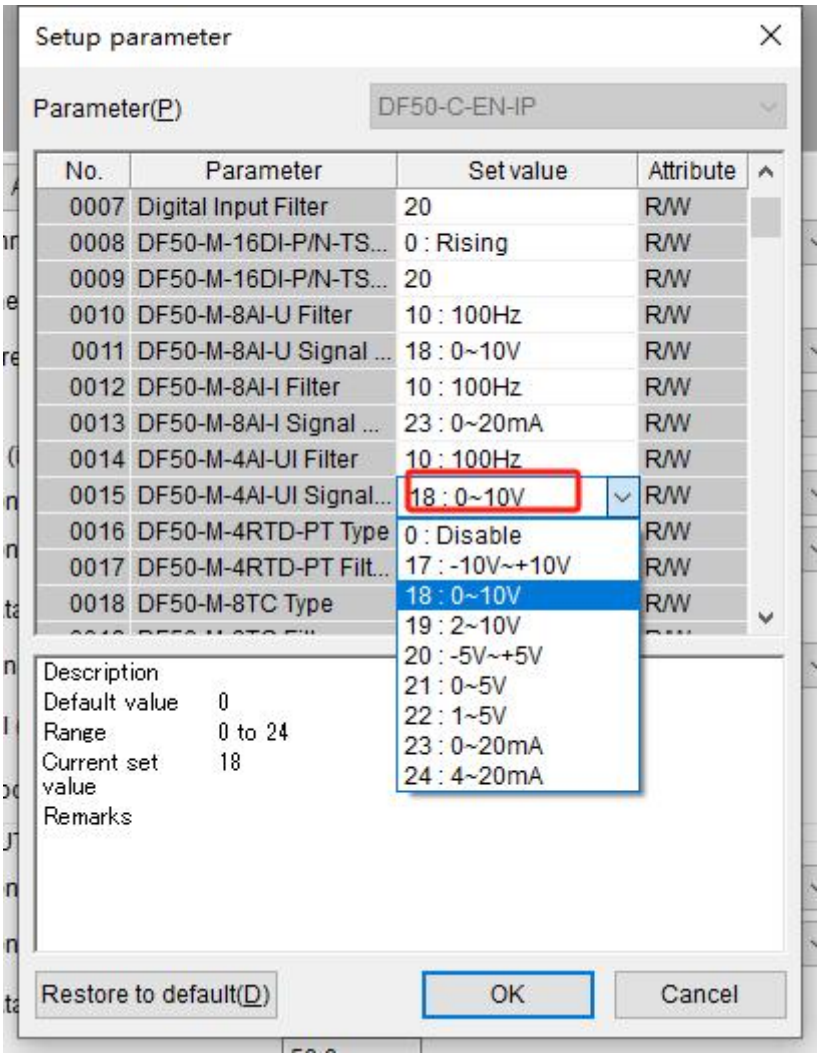


Figure 4-1- 65

➢ As shown in the figure below, you can uniformly set the signal filtering for each channel, the default is 100Hz_10ms.

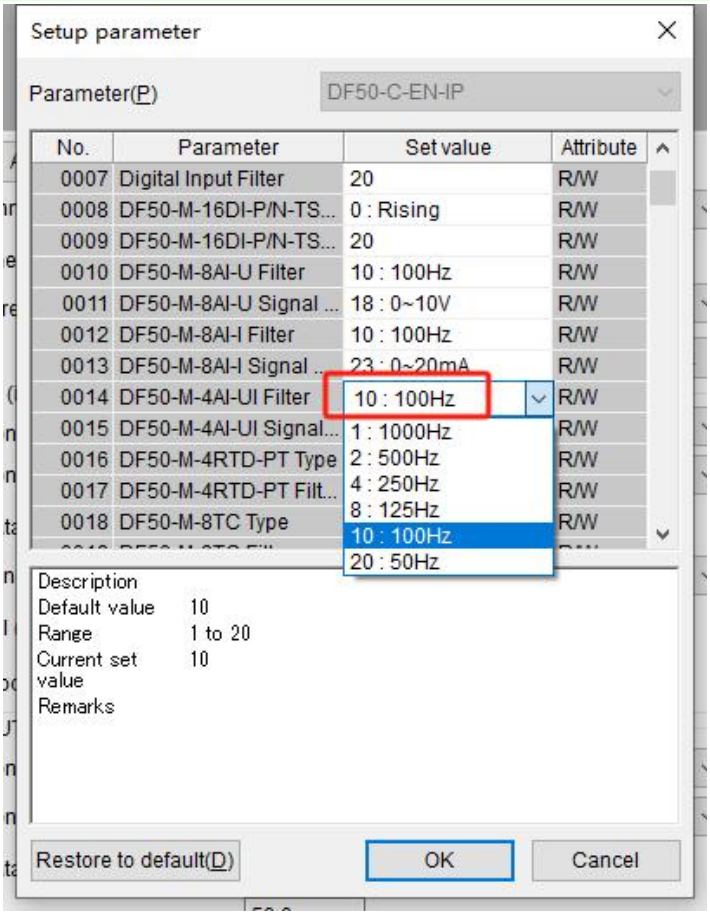


Figure 4-1- 66

➢ After passing 5V voltage into CH0, the values shown in the figure below are obtained. Through conversion, we know that the voltage collected by CH0 is about 5V. The conversion relationship is shown in Section 5.4 of Chapter 3 .

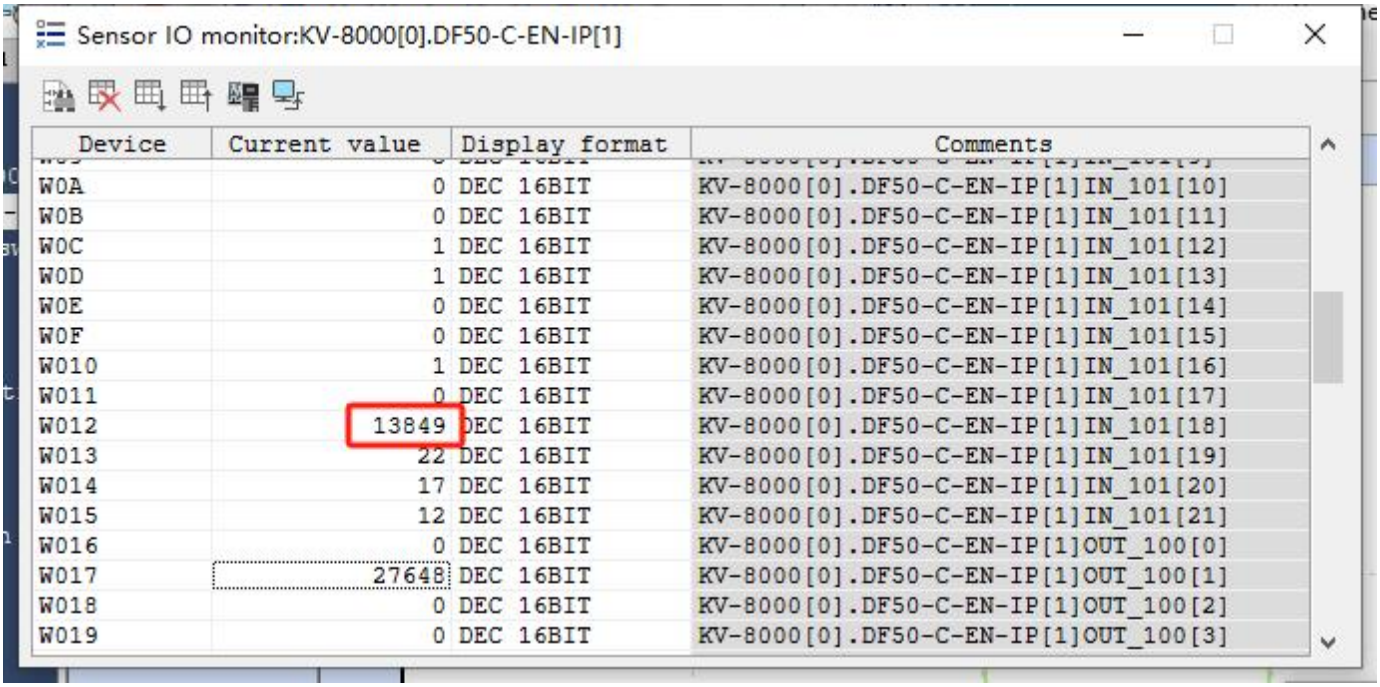


Figure 4-1- 67

1.5. Routine use of thermal resistance sensor data acquisition module

➢ This example uses the DF50-C-EN-IP + DF50-M-4RTD-PT topology. After adding the modules, it is as shown in the figure below .

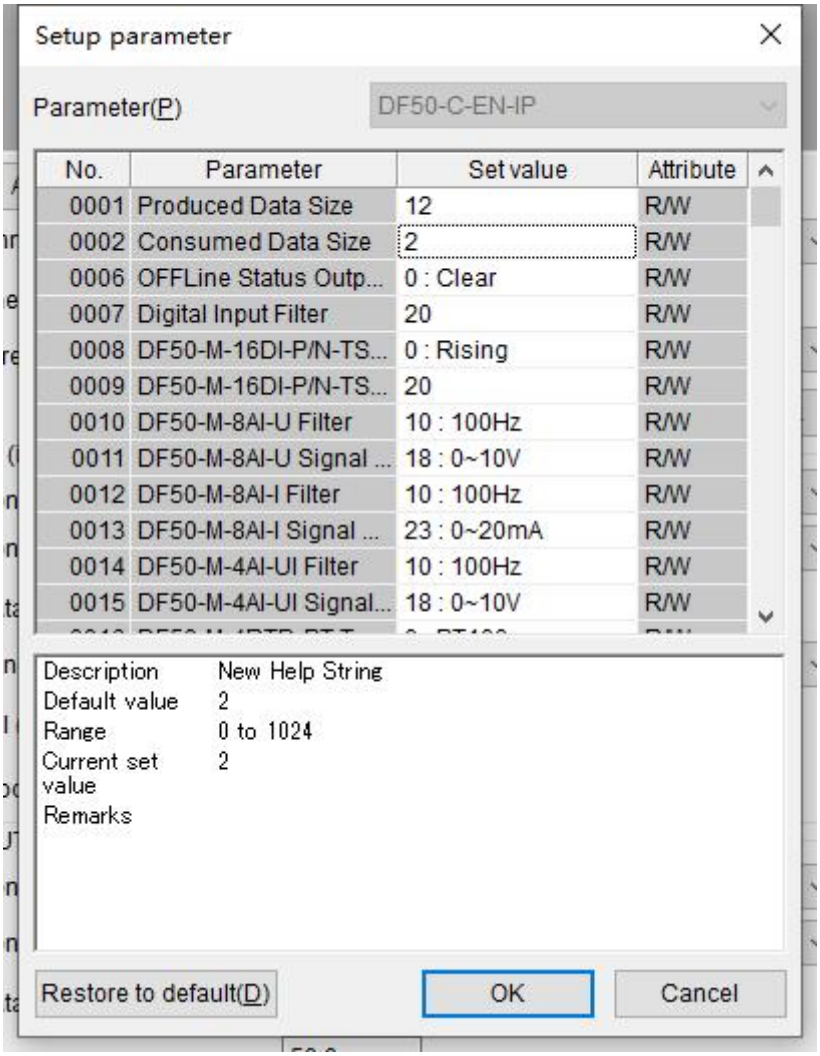


Figure 4-1- 68

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

➢ For the module wiring diagram , please refer to Section 11.2 of Chapter 3. As shown in the figure below, the sensor type collected by this module can be modified, and the default is PT100.

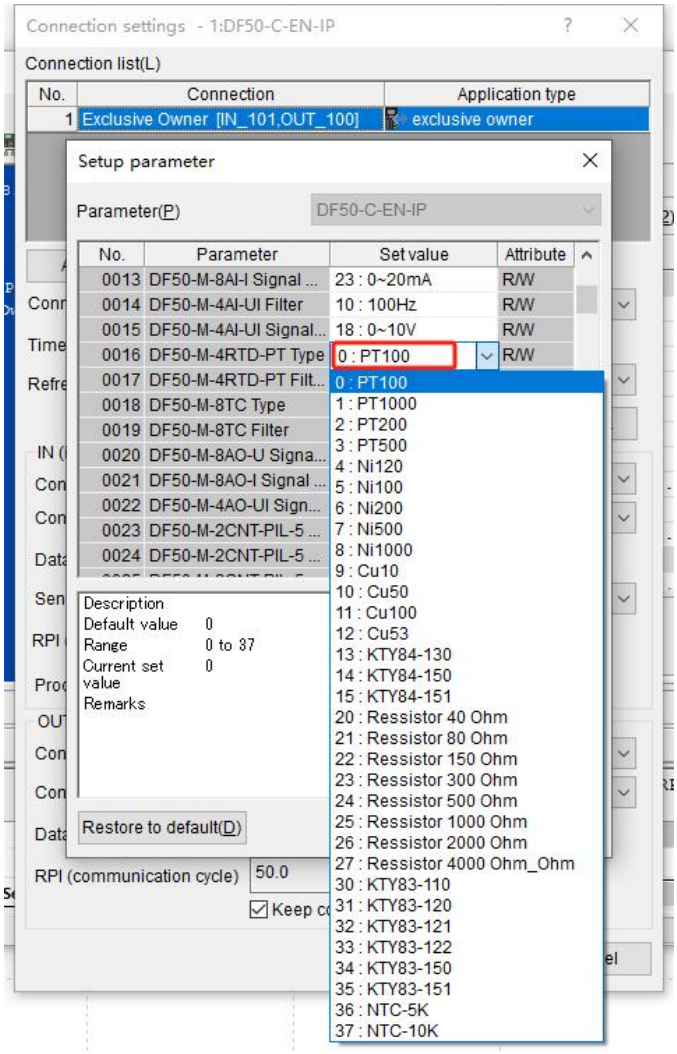


Figure 4-1- 69

➢ The filter settings of this module can be adjusted as shown in the figure below, the default is 5Hz_200ms.

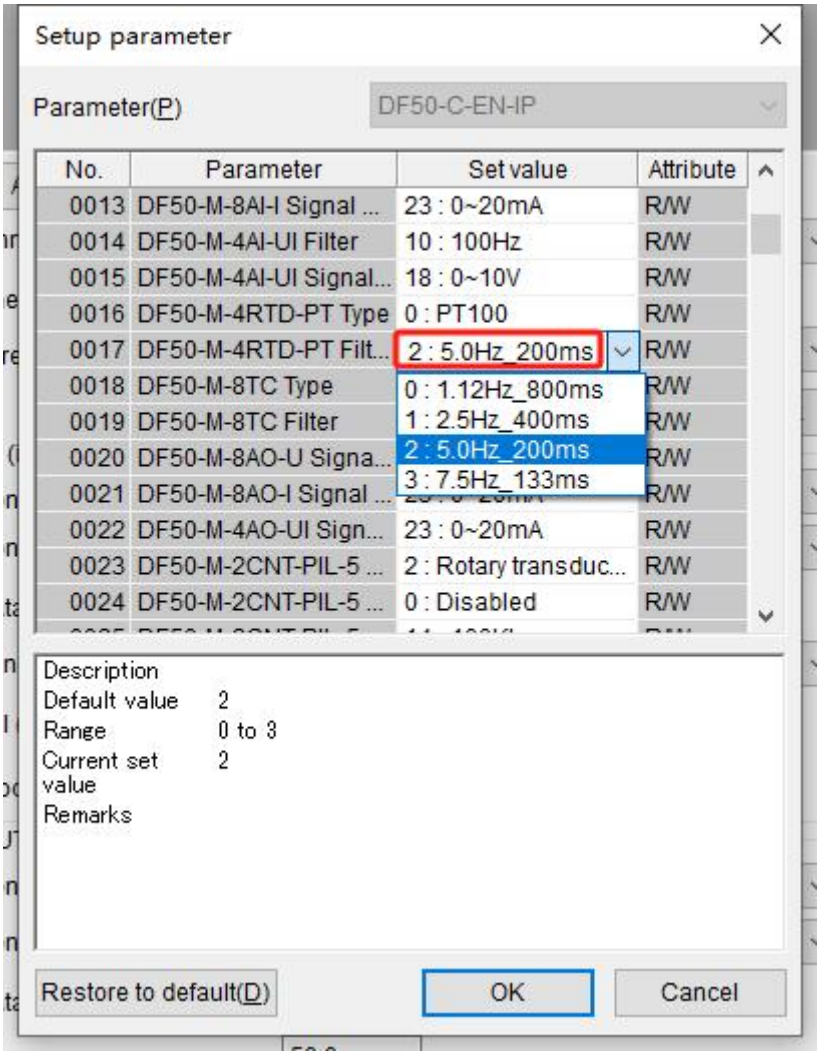


Figure 4-1- 70

➢ After connecting the sensor to module CH0, the following data is obtained. " 254 " means the collected temperature is 25.4 ℃.

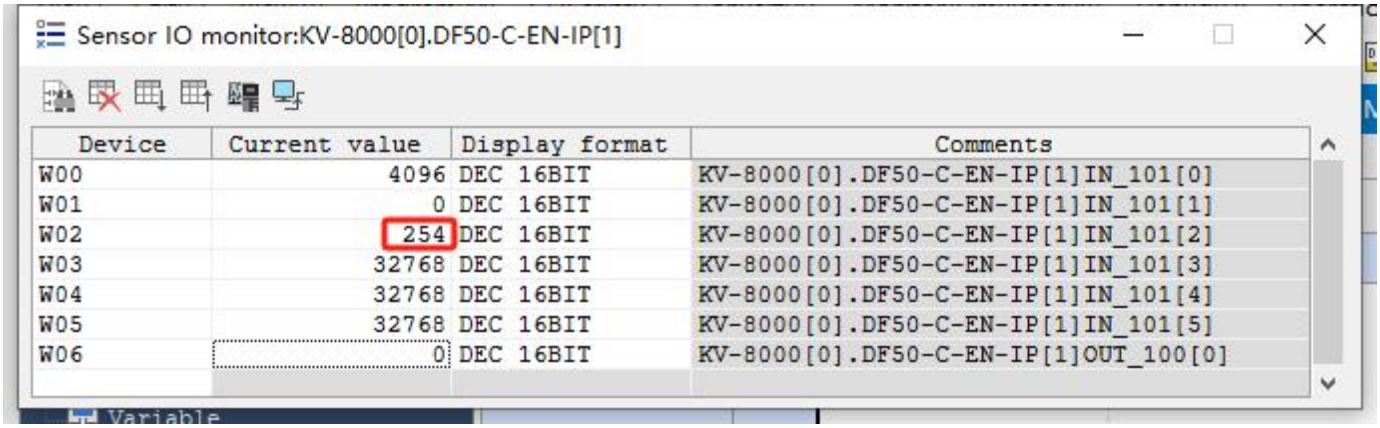


Figure 4-1-71

1.6. Thermocouple temperature data acquisition module usage routine

➢ This example uses the DF50-C-EN-IP + DF50-M- 8TC topology. After adding the modules, it is as shown in the figure below .

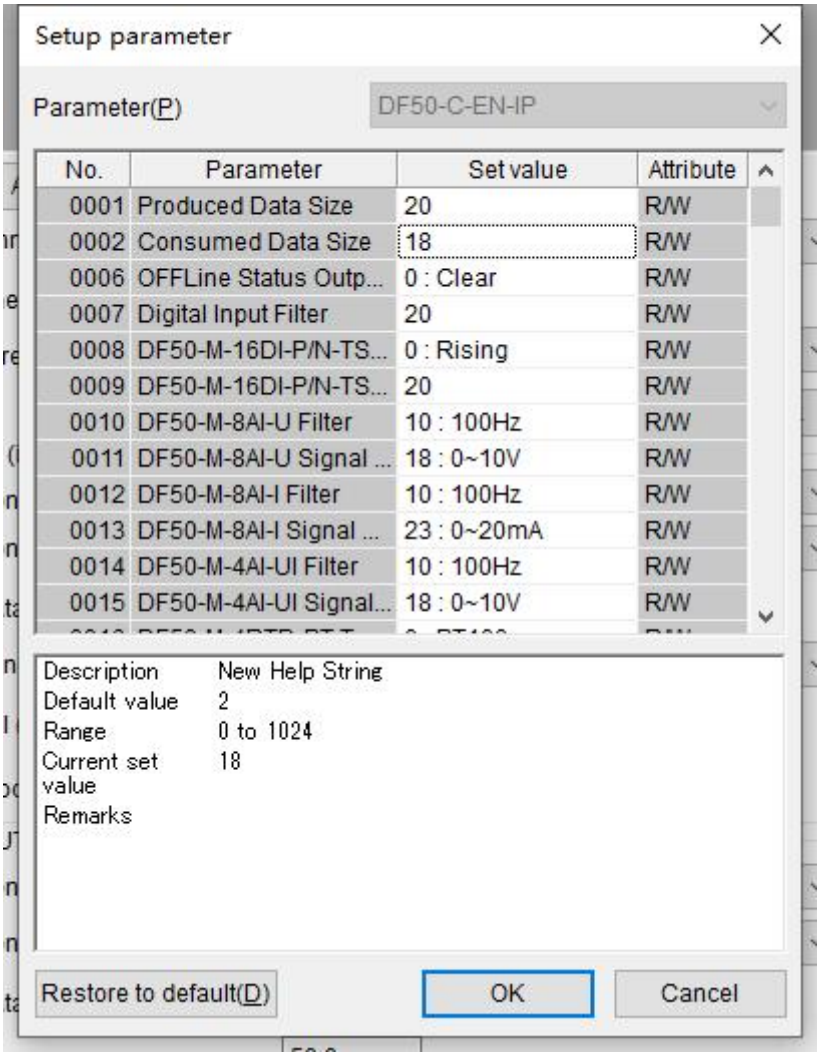


Figure 4-1- 72

1.6.1. DF50-M- 8TC Thermocouple Measurement Module

➢ For the module wiring diagram , please refer to Section 12.2 of Chapter 3. As shown in the figure below, you can modify the sensor type collected by this module. The default is K-type sensor.

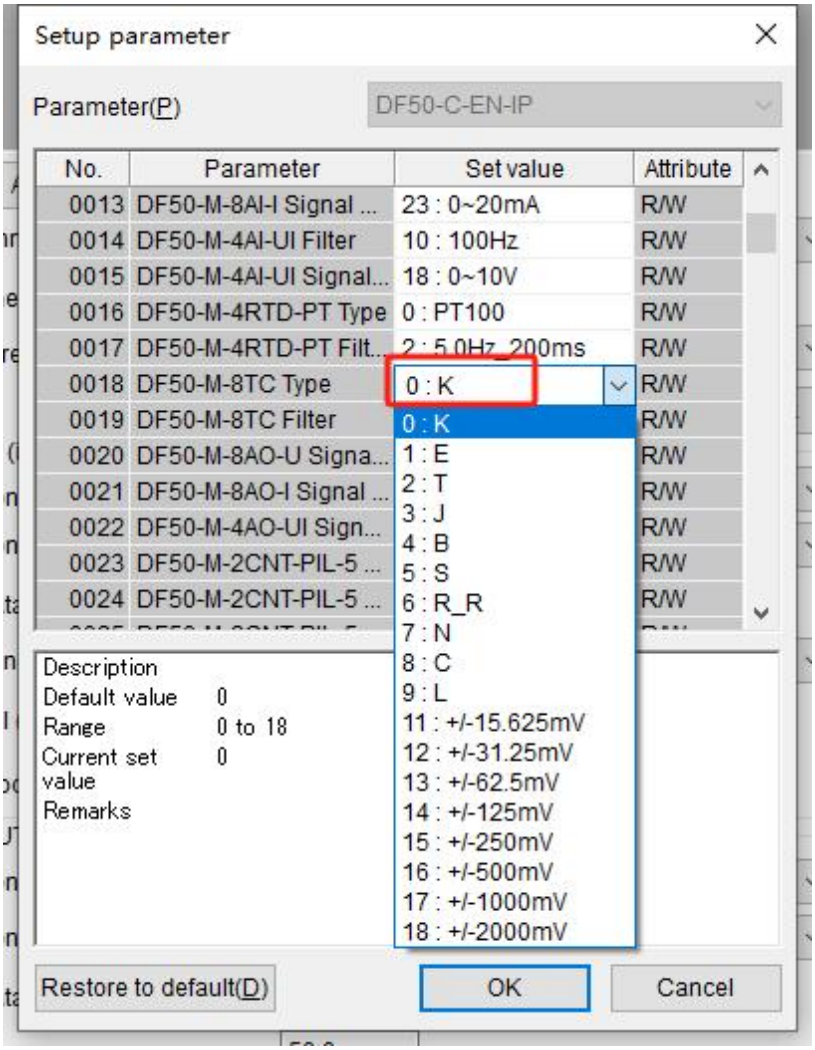


Figure 4-1- 73

➢ The filter settings of this module can be adjusted as shown in the figure below, the default is 225ms.

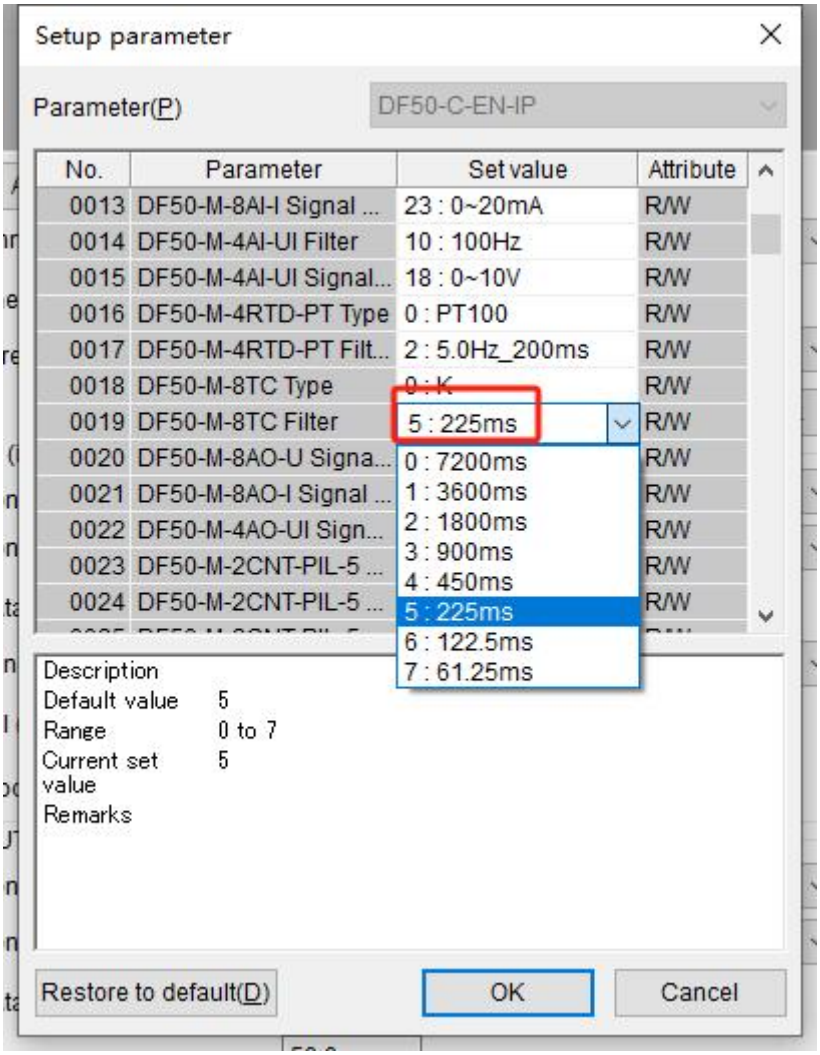
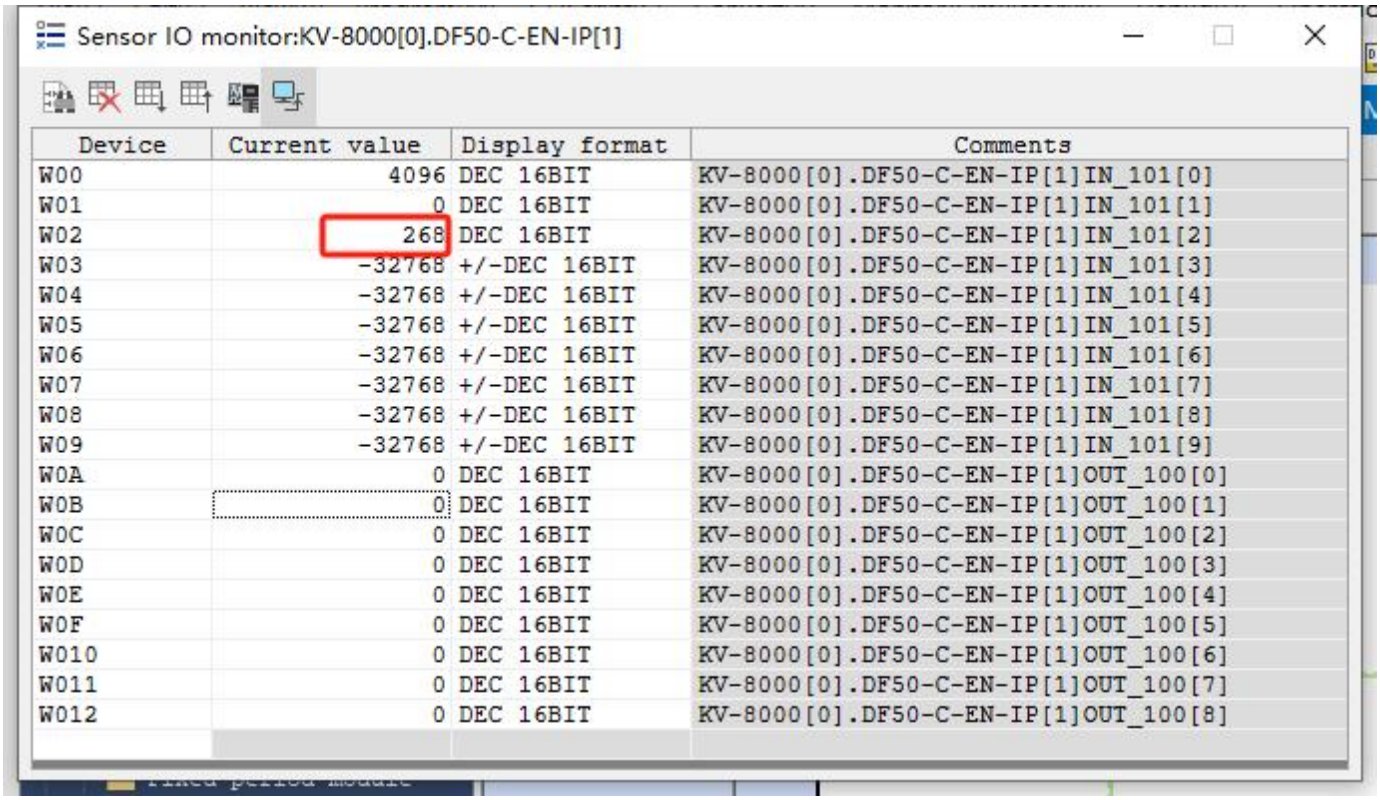


Figure 4-1- 74

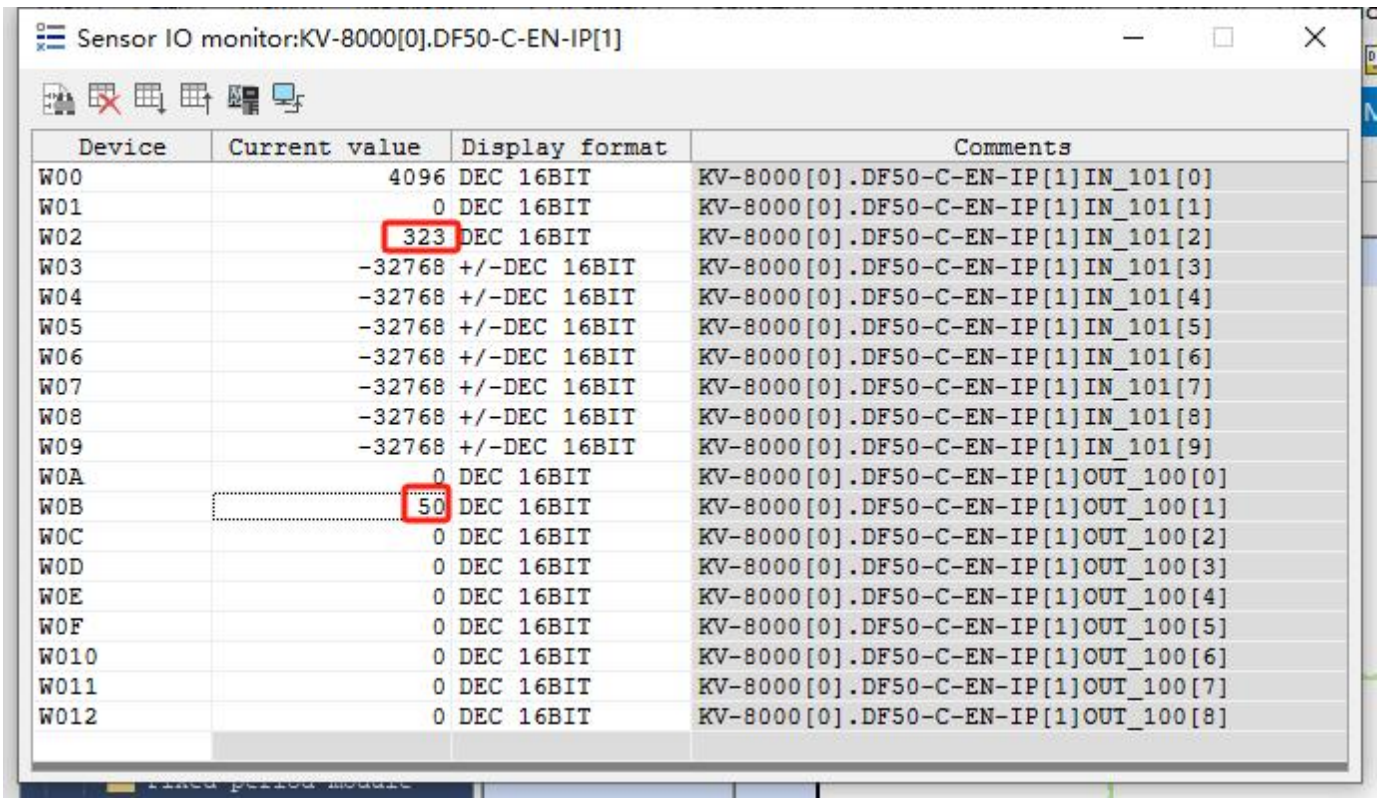
➢ DF50-M- 8TC process data, please refer to Section 12.4 of Chapter 3. After connecting the sensor to CH0, as shown in the figure below, " 268 " means 26.8 ℃, and no compensation value is given at this time.



Device	Current value	Display format	Comments
W00	4096	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[0]
W01	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[1]
W02	268	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[2]
W03	-32768	+/-DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[3]
W04	-32768	+/-DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[4]
W05	-32768	+/-DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[5]
W06	-32768	+/-DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[6]
W07	-32768	+/-DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[7]
W08	-32768	+/-DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[8]
W09	-32768	+/-DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[9]
W0A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W0B	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W0C	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W0D	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]
W0E	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[4]
W0F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[5]
W010	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[6]
W011	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[7]
W012	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[8]

Figure 4-1- 75

➢ When we write 50 into the compensation value of CH0 , we can see that the collected value becomes " 323 ", which means 32.3 ℃.



Device	Current value	Display format	Comments
W00	4096	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[0]
W01	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[1]
W02	323	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[2]
W03	-32768	+/-DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[3]
W04	-32768	+/-DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[4]
W05	-32768	+/-DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[5]
W06	-32768	+/-DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[6]
W07	-32768	+/-DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[7]
W08	-32768	+/-DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[8]
W09	-32768	+/-DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[9]
W0A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W0B	50	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W0C	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W0D	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]
W0E	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[4]
W0F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[5]
W010	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[6]
W011	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[7]
W012	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[8]

Figure 4-1- 76

1.7. 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 the 5V encoder signal, and the DF50-M-2CNT-PIL-24 is connected to the 24V encoder signal. This document uses the DF50-M-2CNT-PIL-24 module as an example. Please refer to Chapter 3, Section 13.2 for the wiring method .
- DF50-M-2CNT-PIL-24 module features:
- Quadrature encoder A+/A-, B+/B- differential input, 1/2/4 times frequency;
- 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.
- DF50-M-2CNT-PIL-24 module as shown below .

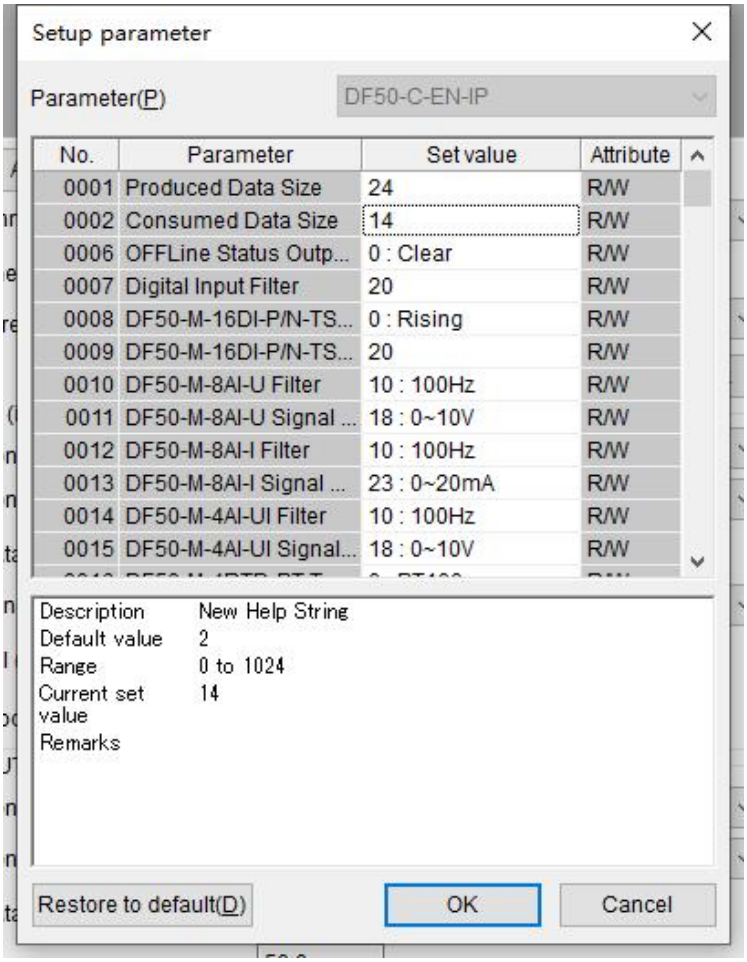


Figure 4-1-77

- output status of the module when a bus failure occurs can be set in the adapter . For the setting method, please refer to Section 1.2.3 of Chapter 4 .

- As shown in the figure below, you can configure the signal mode of the DF50-M-2CNT-PIL-24 module (the frequency multiplication function is set here, the default is 4 times the frequency), D I signal function, filter time signal A, filter time signal B, encoder calculation direction, counter mode setting, comparison function, fieldbus error behavior, count upper limit, and count lower limit.

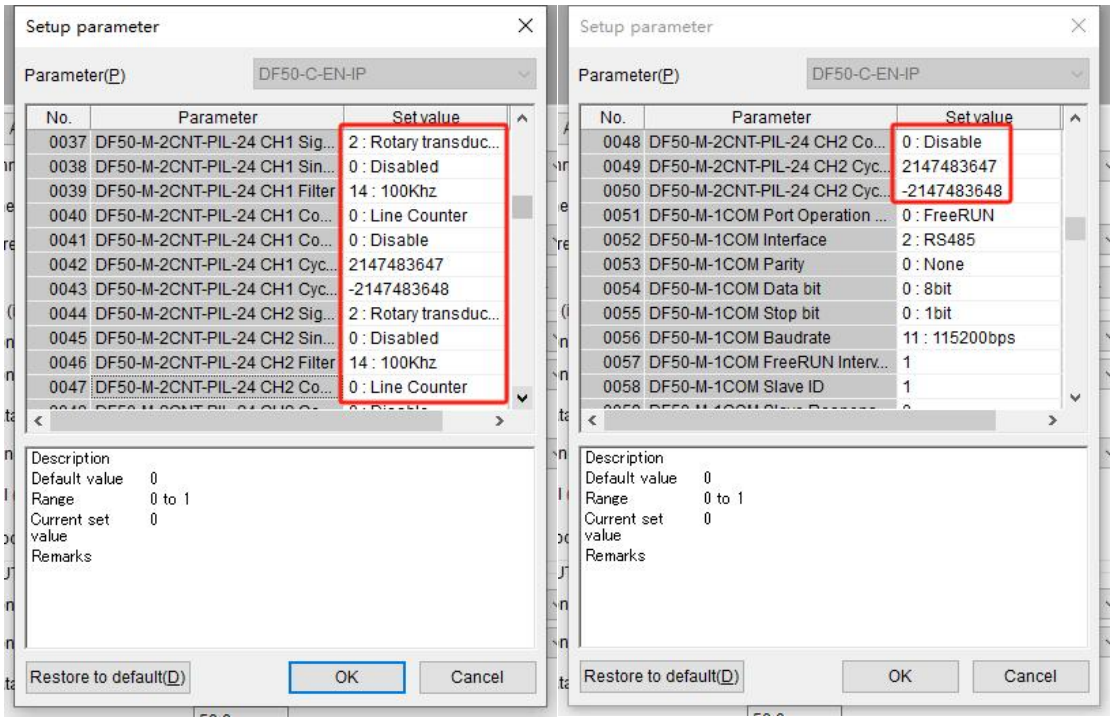


Figure 4-1- 78

- As shown in the figure below, write "1" in the command output data column to use the counting function normally, and the current pulse value can be read in the pulse number column. For the meaning of the process data, please refer to Section 1.7.1 of this chapter .

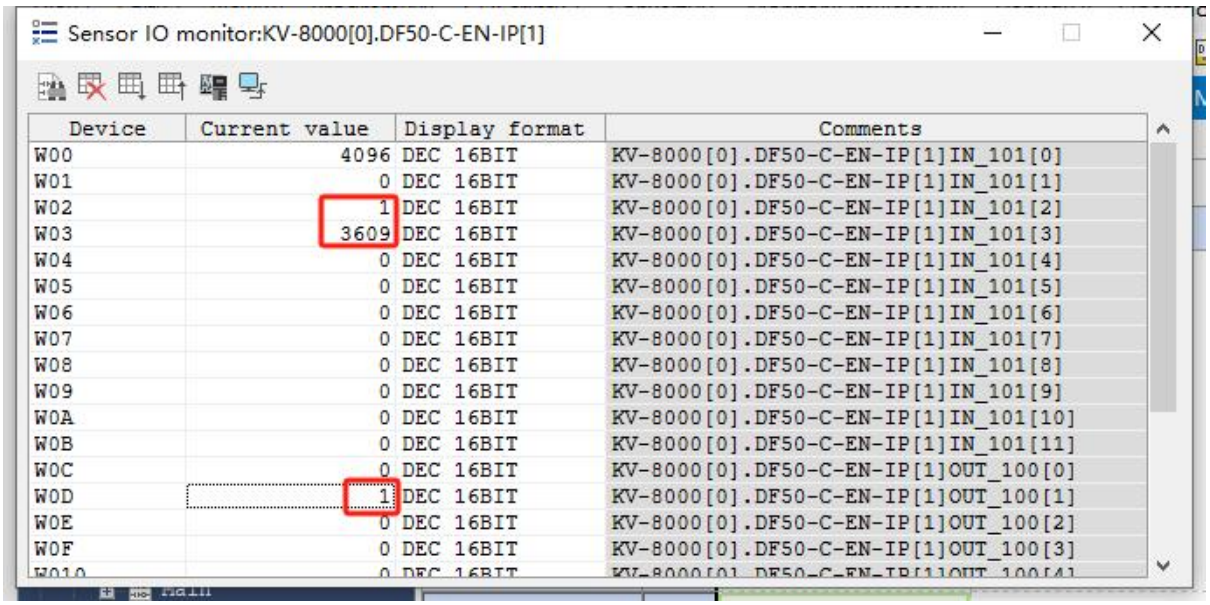


Figure 4-1-79

1.7.1. Module process data description

➢ The table shows the meaning of input and output data, data length and data type.

Table 4.1. 4 Module data length and type

Output Data	Number of bytes	Data Types
Channel 1 command output data	2	Uint 16
Channel 1 pulse comparison value output	4	int32
Channel 2 command output data	2	Uint 16
Channel 2 pulse comparison value output	4	int32
Input Data	Number of bytes	Data Types
Channel 1 Status Input Data	2	Uint 16
Channel 1 Pulse Number	4	int32
Channel 1 Latch pulse number	4	int32
Channel 2 status input data	2	Uint 16
Channel 2 Pulse Number	4	int32
Channel 2 Latch pulse number	4	int32

Table 4.1.5 Output data meaning

Output data meaning		
0~1 byte	Bit 15 ~bit1	reserve
	bit 0	0: Channel 1 stops counting and the original count is reset to zero; 1: Channel 1 starts counting
2 ~ 5 bytes		Channel 1 pulse comparison value output, signed 32 - bit data
6~7 bytes	Bit 15 ~ bit 1	reserve
	bit 0	0: Channel 2 stops counting and the original count is reset; 1: Channel 2 starts counting
8 to 11 bytes		Channel 2 pulse comparison value output, signed 3 2 -bit data

Table 4.1.6 Input data meaning

Input data meaning		
0~1 byte	Bit 15 ~bit5	reserve
	Bit3~bit4	0: Channel 1 stops ; 1: Channel 1 counts up; 2: Channel 1 counts down
	bit2	0: Channel 1 count value is less than the comparison value; 1: Channel 1 count value is greater than the comparison value
	bit1	0: No electronic probe/1 channel count reset signal; 1: Electronic probe/channel count reset signal
	bit0	0: Channel 1 counting stop state, the original count is cleared; 1: Channel 1 counting state

2 ~ 5 bytes		Channel 1 pulse input value, signed 32-bit data
6 to 9 bytes		Channel 1 pulse input latch value, signed 32-bit data
10~11 bytes	Bit 15 ~bit5	Reserved seat
	bit3~bit4	0: Channel 2 stops; 1: Channel 2 counts up; 2: Channel 2 counts down
	bit2	0: Channel 2 count value is less than the comparison value; 1: Channel 2 count value is greater than the comparison value
	bit1	0: No electronic probe/channel 2 count reset signal; 1: Electronic probe/channel count reset signal
	bit0	0: Channel 1 counting stop state, the original count is cleared; 1: Channel 1 counting state
1 2 ~1 5 bytes		Channel 1 pulse input value, signed 32-bit data
1 6 ~ 1 9 bytes		Channel 1 pulse input latch value, signed 32-bit data

1.7.2. DI Signal Function Configuration

- As shown in the figure below, the D I signal function can be configured. The default setting is Disabled. The following functions can be selected: rising edge capture, falling edge capture, dual edge capture, rising edge reset, falling edge reset, dual edge reset. Here we only demonstrate the rising edge capture (Rising edge capture) and rising edge reset (Rising edge reset) functions.

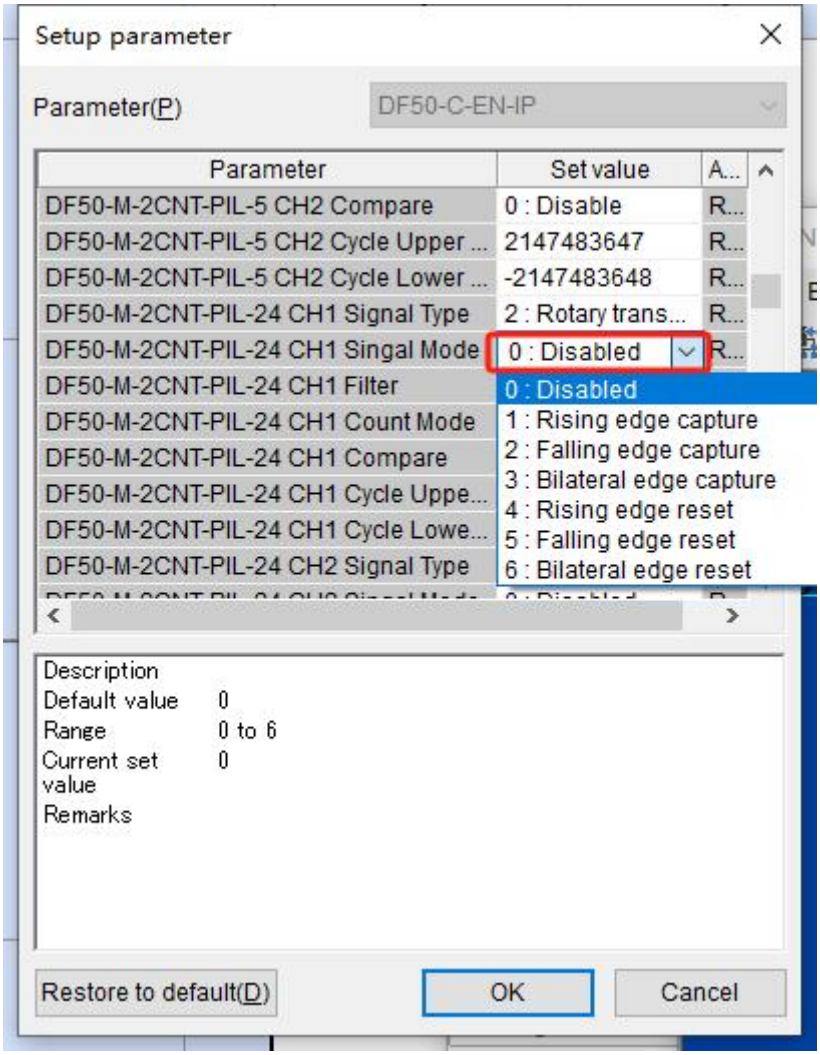
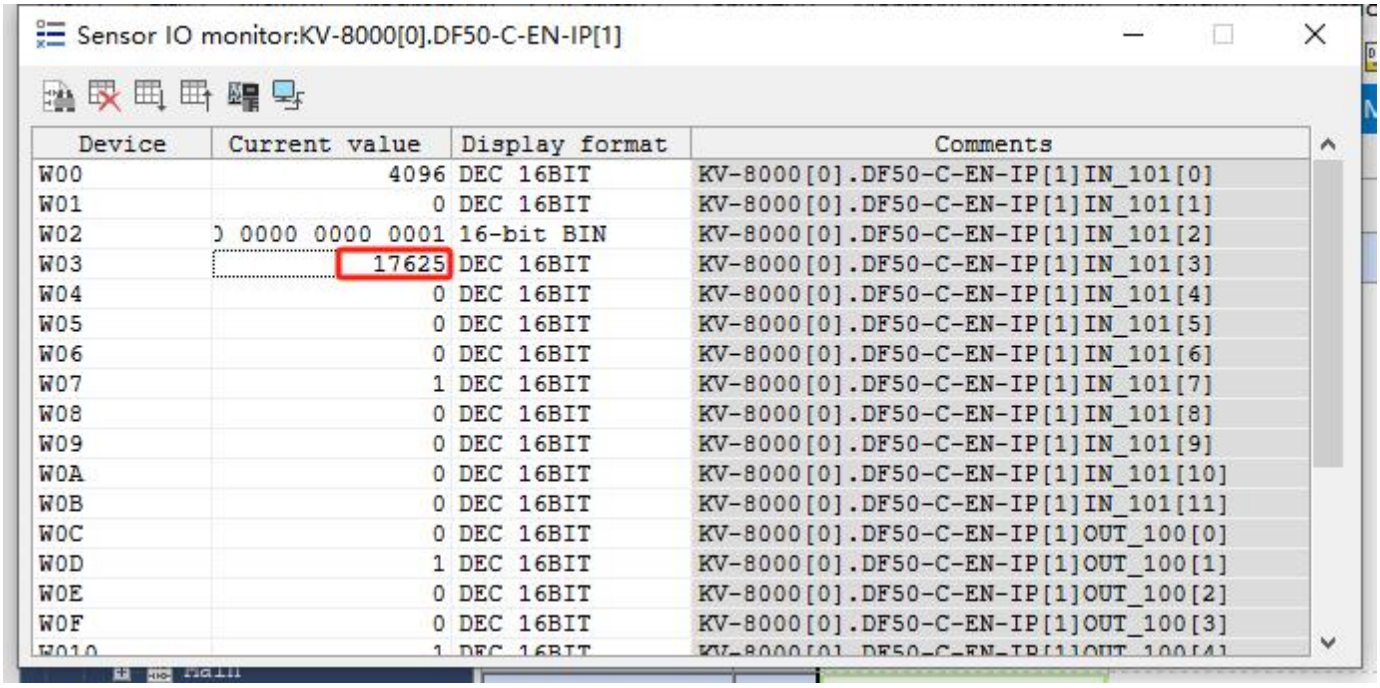


Figure 4-1- 80 DI data configuration

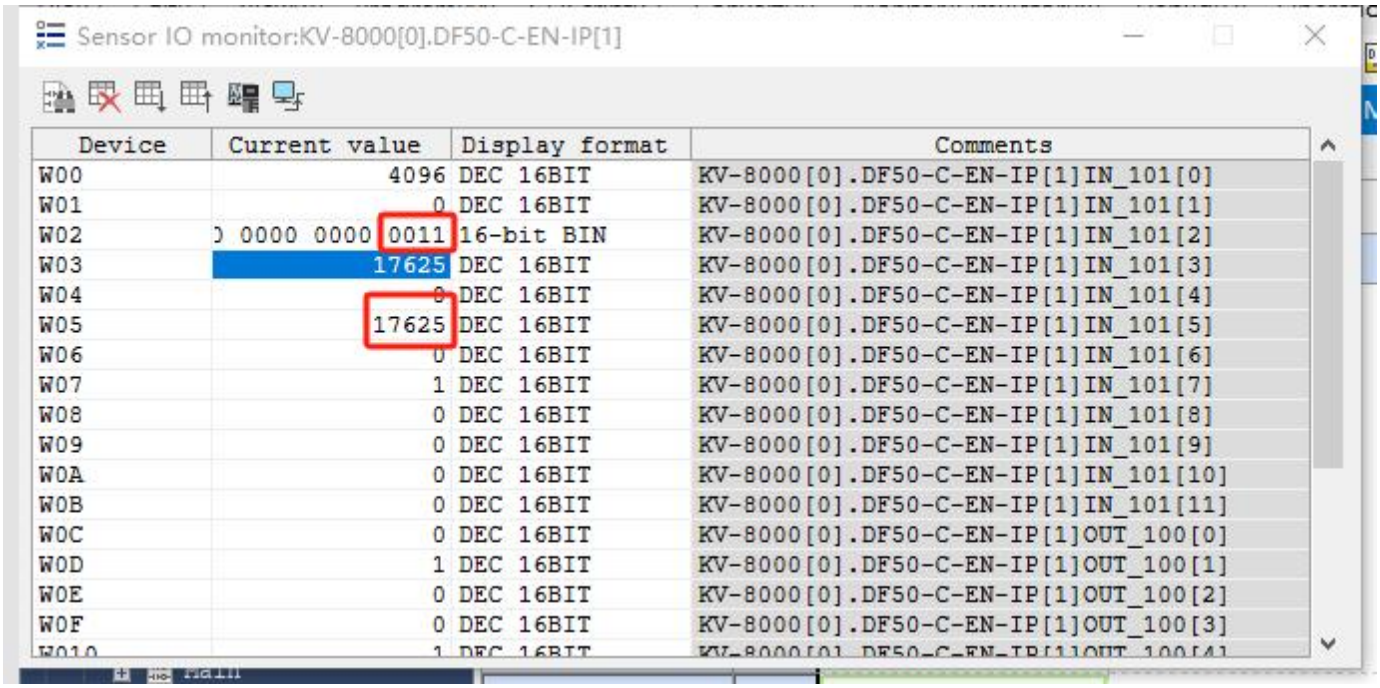
➢ **D I rising edge capture:** As shown in the figure below, the pulse number is " 17625 ".



Device	Current value	Display format	Comments
W00	4096	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[0]
W01	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[1]
W02	) 0000 0000 0001	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]IN_101[2]
W03	17625	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[3]
W04	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[4]
W05	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[5]
W06	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[6]
W07	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[7]
W08	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[8]
W09	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[9]
W0A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[10]
W0B	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[11]
W0C	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W0D	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W0E	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W0F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]

Figure 4-1- 81 DI rising edge capture

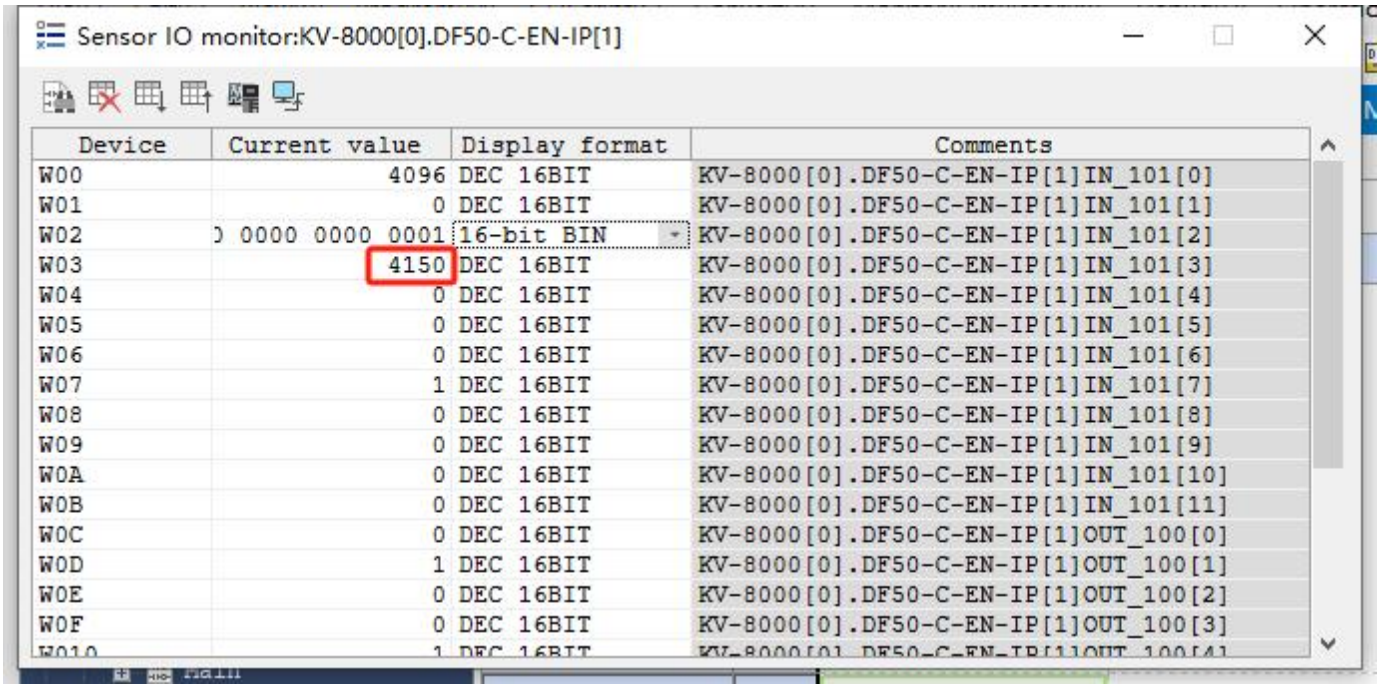
➢ After inputting a rising edge, as shown in the figure below, the second bit of the status input data changes to "1", then to "0", and the number of latch pulses becomes " 17625 ".



Device	Current value	Display format	Comments
W00	4096	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[0]
W01	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[1]
W02	) 0000 0000 0011	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]IN_101[2]
W03	17625	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[3]
W04	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[4]
W05	17625	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[5]
W06	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[6]
W07	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[7]
W08	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[8]
W09	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[9]
W0A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[10]
W0B	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[11]
W0C	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W0D	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W0E	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W0F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]

Figure 4-1- 82 DI rising edge capture trigger

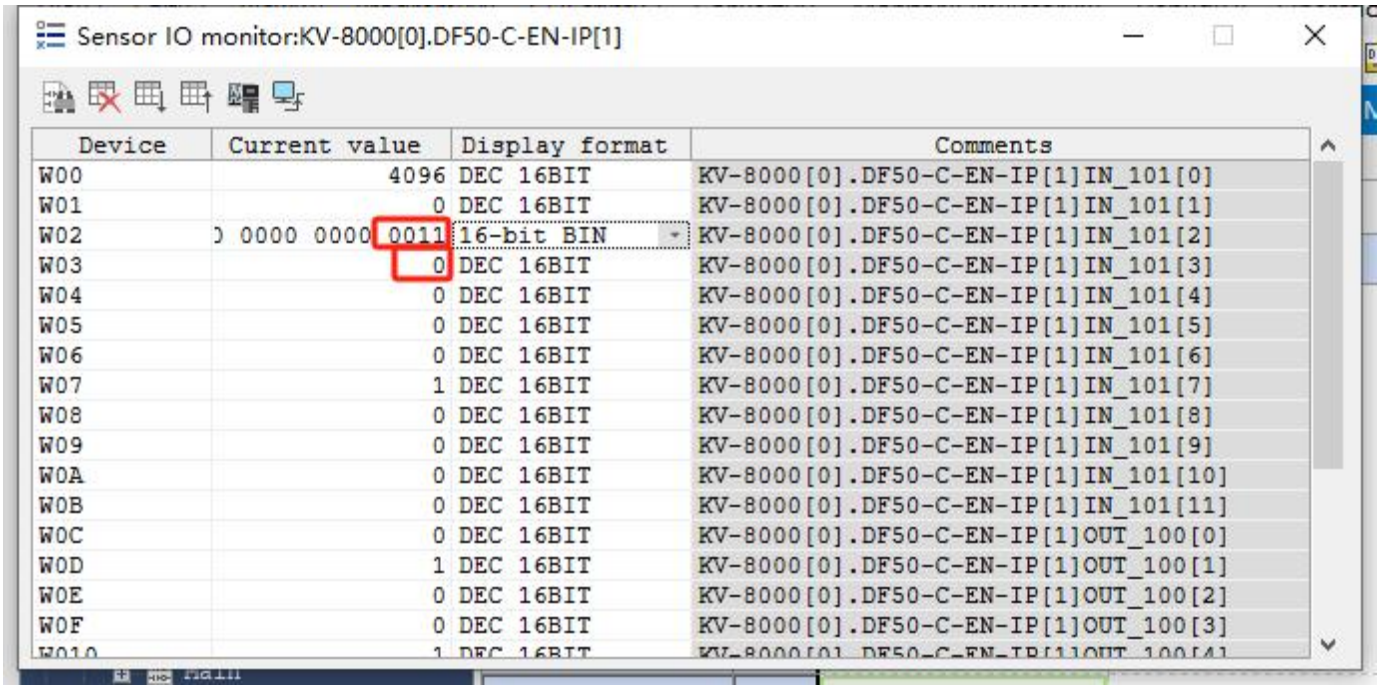
➢ **D I rising edge reset:** As shown in the figure below, the pulse number is " 2995 ".



Device	Current value	Display format	Comments
W00	4096	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[0]
W01	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[1]
W02	) 0000 0000 0001	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]IN_101[2]
W03	4150	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[3]
W04	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[4]
W05	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[5]
W06	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[6]
W07	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[7]
W08	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[8]
W09	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[9]
W0A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[10]
W0B	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[11]
W0C	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W0D	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W0E	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W0F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]

Figure 4-1- 83 D I rising edge reset

➢ After a rising edge is input, as shown in the figure below, the second bit of the status input data changes to "1", then to "0", and the number of pulses becomes "0".



Device	Current value	Display format	Comments
W00	4096	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[0]
W01	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[1]
W02	) 0000 0000 0011	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]IN_101[2]
W03	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[3]
W04	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[4]
W05	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[5]
W06	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[6]
W07	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[7]
W08	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[8]
W09	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[9]
W0A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[10]
W0B	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[11]
W0C	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W0D	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W0E	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W0F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]

Figure 4-1- 84 D I rising edge reset trigger

1.7.3. Comparison Function Configuration (Comparision Function)

➢ Turn on the comparison function as shown below

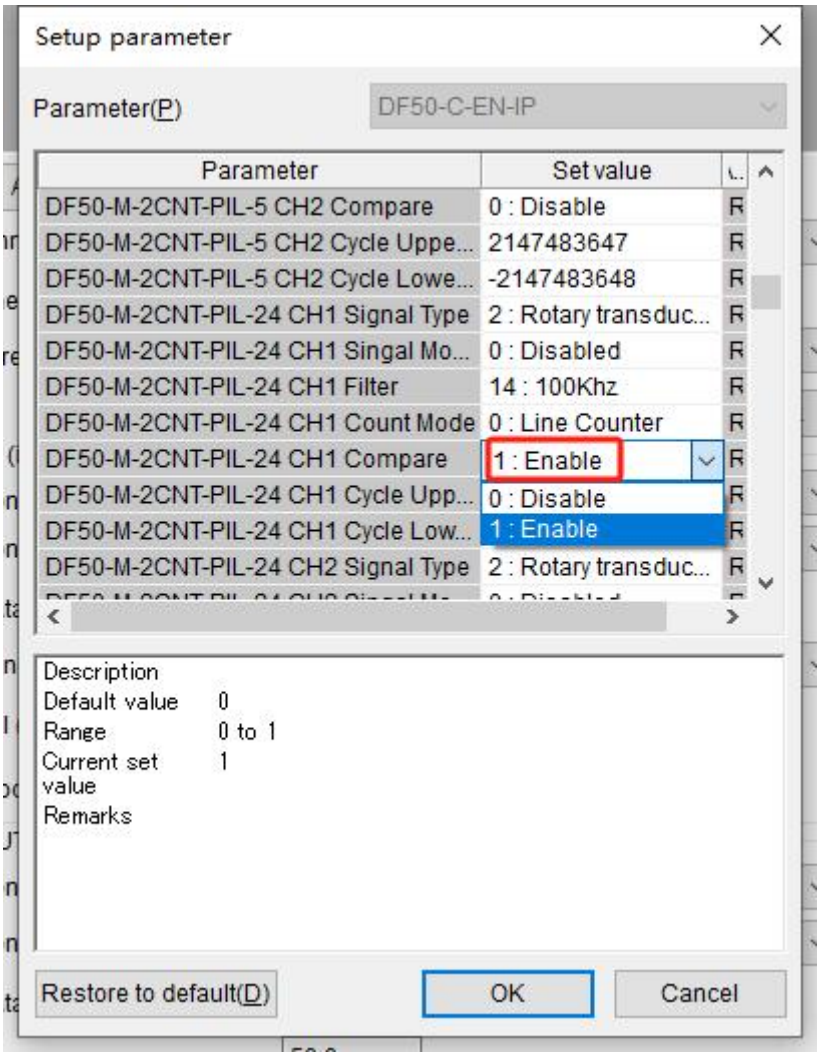
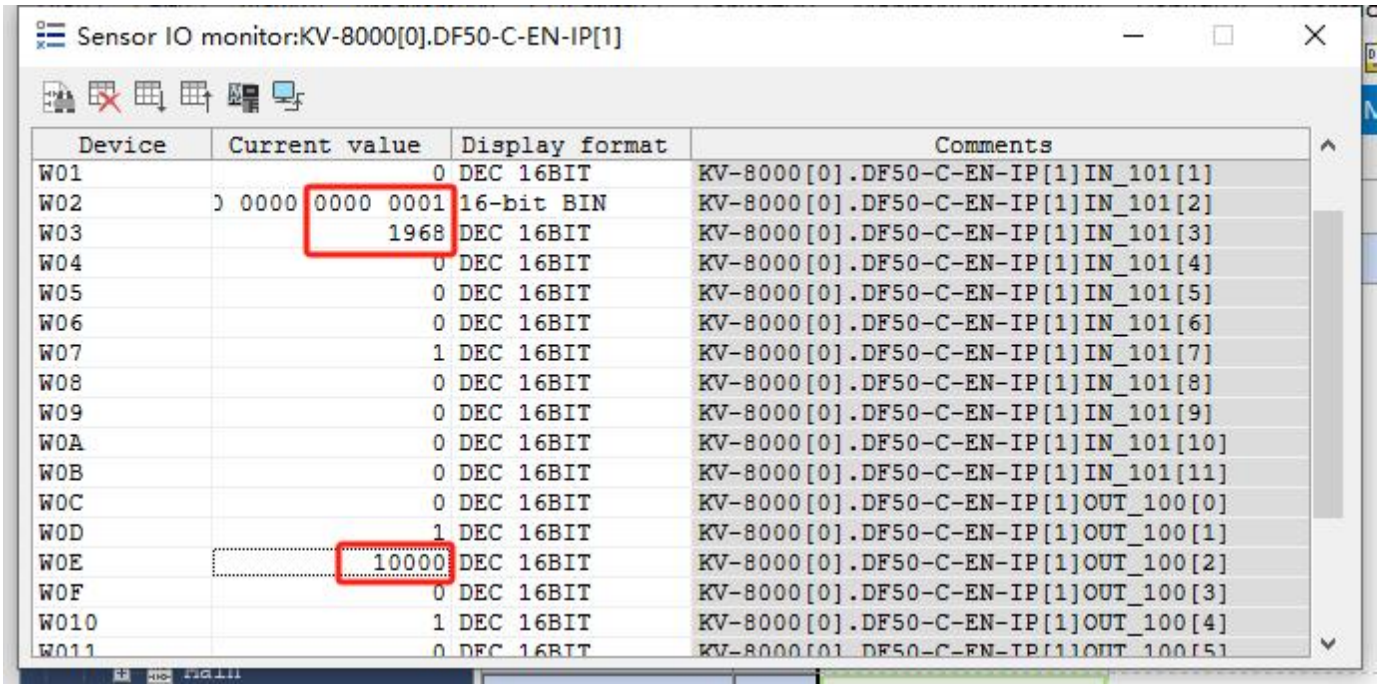


Figure 4-1- 85 comparison function enabled

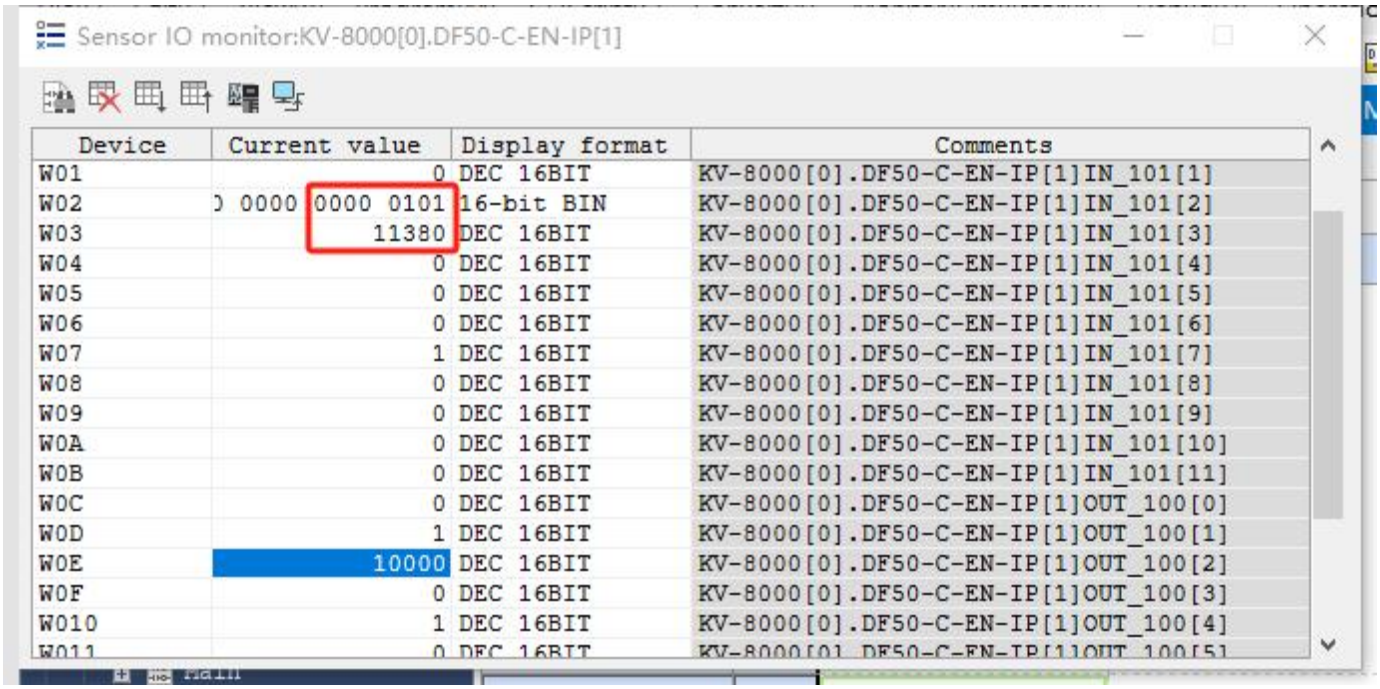
➢ As shown in the figure below, set the pulse comparison value to 10000. When the pulse number is " 1968 ", the third bit of the status input data is "0".



Device	Current value	Display format	Comments
W01	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[1]
W02	0000 0000 0001	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]IN_101[2]
W03	1968	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[3]
W04	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[4]
W05	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[5]
W06	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[6]
W07	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[7]
W08	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[8]
W09	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[9]
W0A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[10]
W0B	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[11]
W0C	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W0D	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W0E	10000	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W0F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]
W010	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[4]
W011	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[5]

Figure 4-1- 86 comparison count

➢ As shown in the figure below, when the pulse number is " 11380 ", it exceeds the set value 10000 , and the third bit of the status input data becomes " 1 ".



Device	Current value	Display format	Comments
W01	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[1]
W02	0000 0000 0101	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]IN_101[2]
W03	11380	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[3]
W04	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[4]
W05	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[5]
W06	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[6]
W07	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[7]
W08	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[8]
W09	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[9]
W0A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[10]
W0B	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[11]
W0C	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W0D	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W0E	10000	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W0F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]
W010	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[4]
W011	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[5]

Figure 4-1- 87 comparison count

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

➢ As shown in the figure below, change the signal mode to pulse plus direction mode. For the wiring method, please refer to Section 13.2.3 of Chapter 3. When using this mode, the high and low levels of the A + and A- ports indicate the direction, and the count value is accumulated after the B + and B- ports input valid levels.

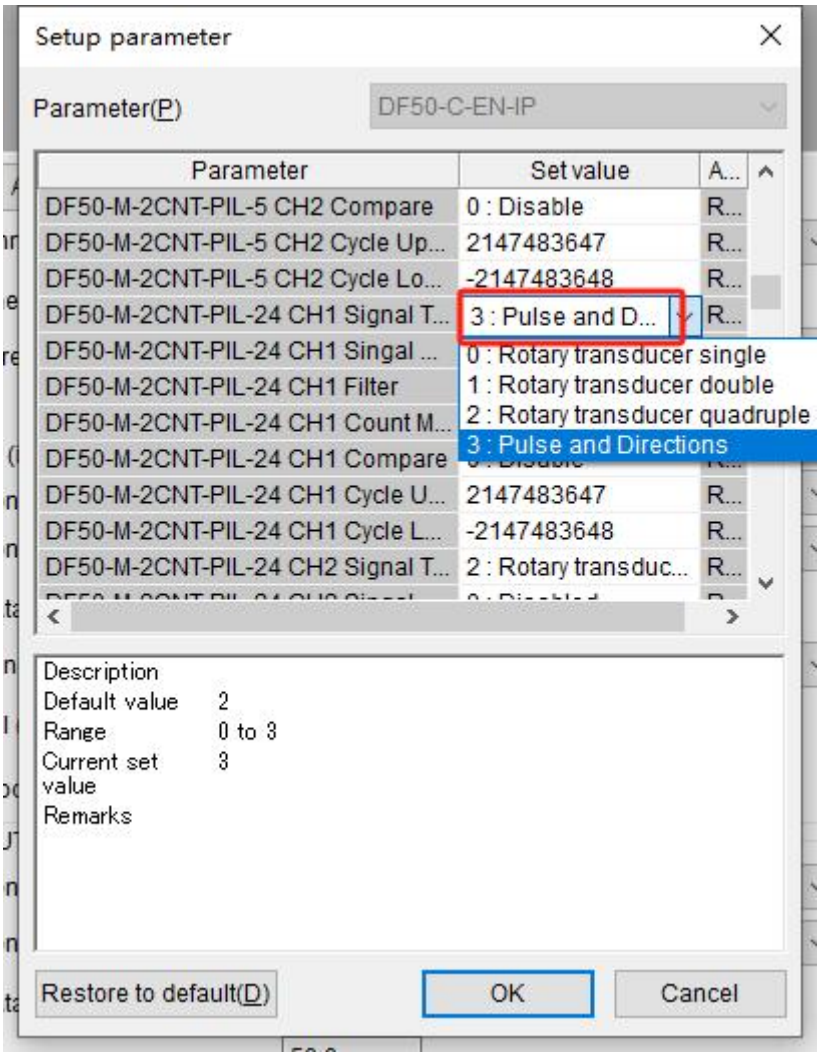
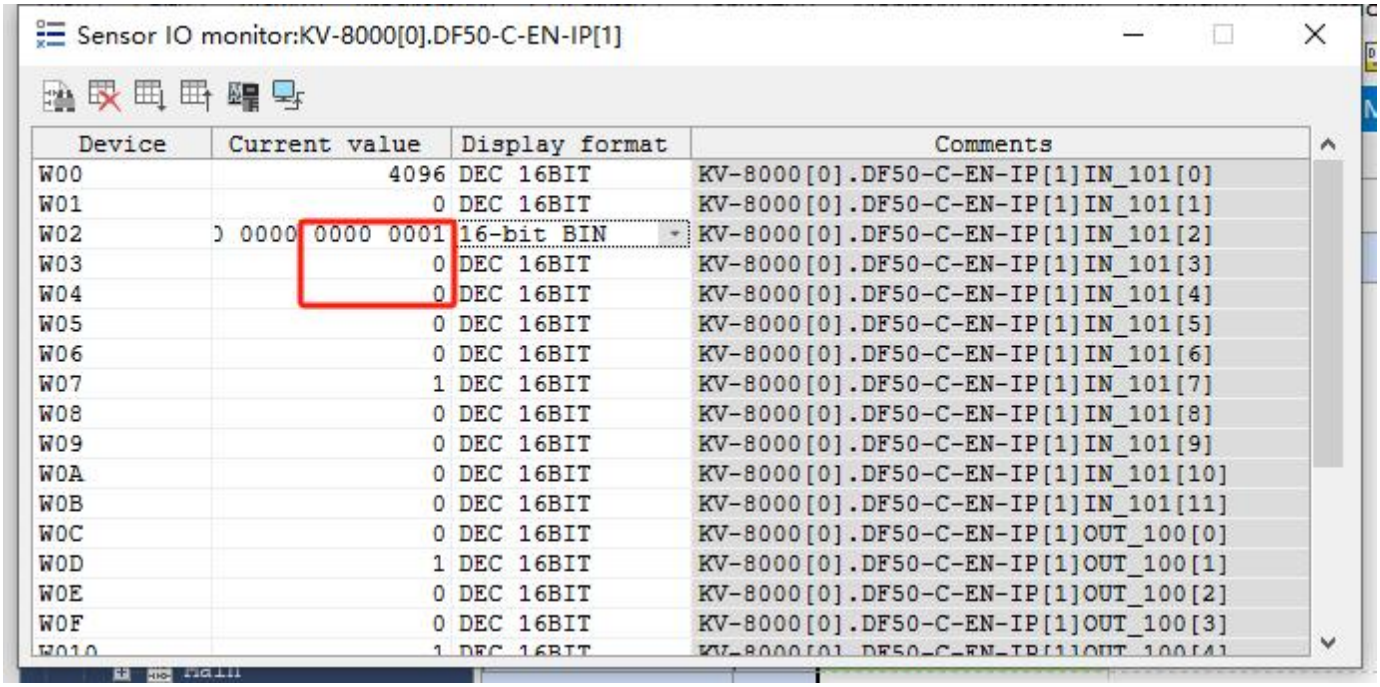


Figure 4-1- 88

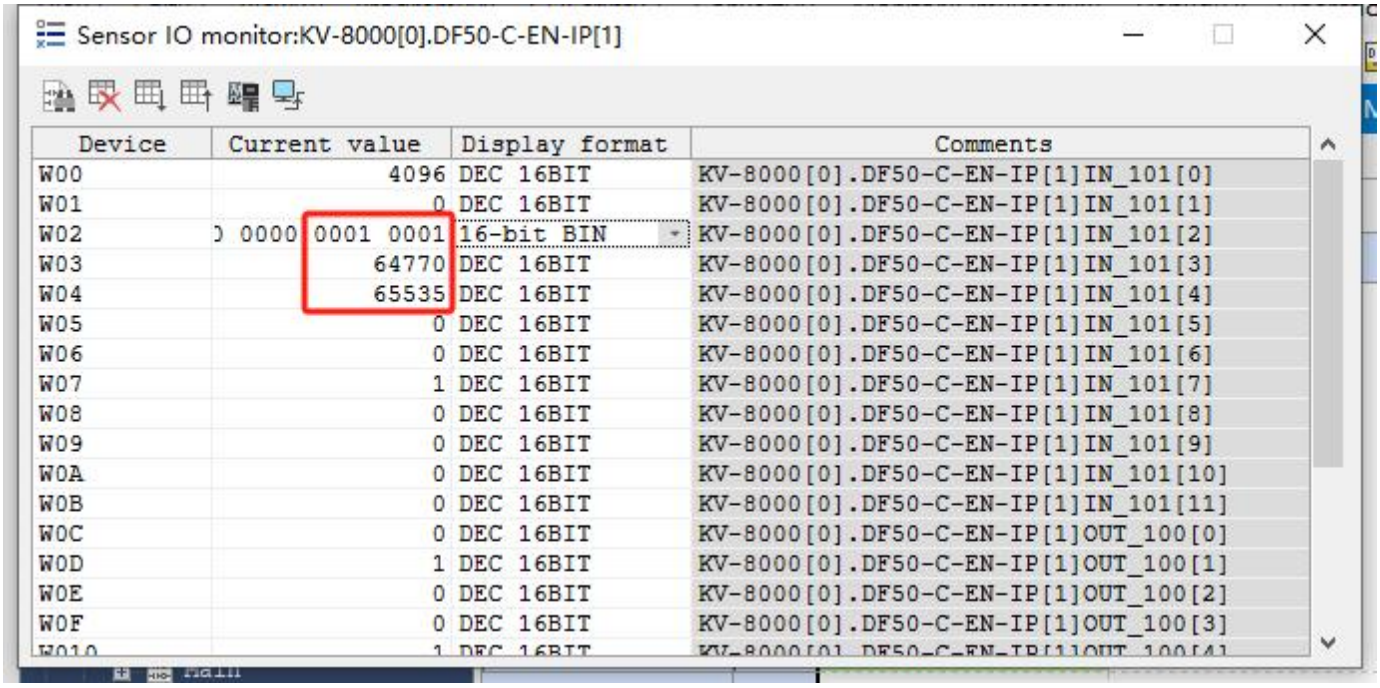
➢ As shown in the figure below, the count value is "0" when the sensor is stationary, and the direction state is "0". For the definition of process data, please refer to Section 13.4 of Chapter 3 .



Device	Current value	Display format	Comments
W00	4096	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[0]
W01	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[1]
W02	0000 0000 0001	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]IN_101[2]
W03	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[3]
W04	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[4]
W05	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[5]
W06	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[6]
W07	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[7]
W08	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[8]
W09	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[9]
W0A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[10]
W0B	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[11]
W0C	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W0D	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W0E	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W0F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]

Figure 4-1- 89

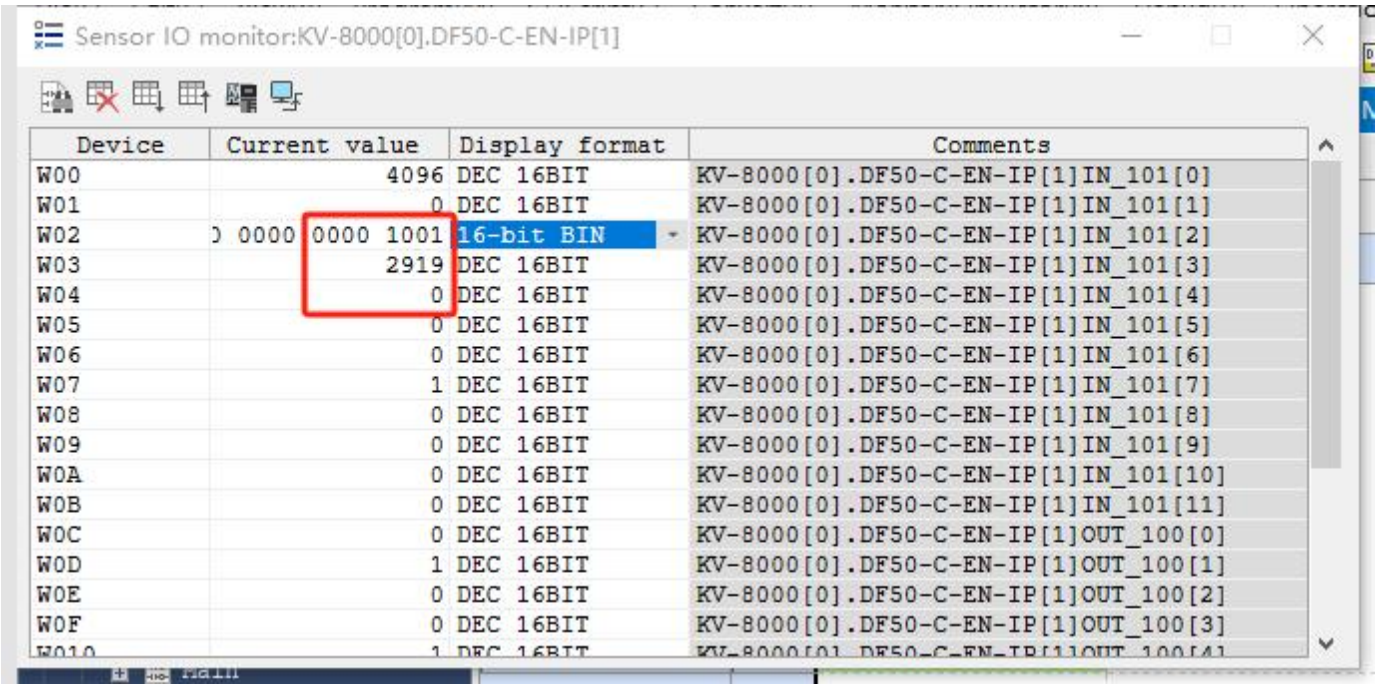
➢ When the A + and A- voltage inputs are at a low level, pulse signals are input to B+ and B- . As shown in the figure below, the count value decreases, and the direction status bit3~bit4 is "2".



Device	Current value	Display format	Comments
W00	4096	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[0]
W01	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[1]
W02	0000 0001 0001	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]IN_101[2]
W03	64770	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[3]
W04	65535	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[4]
W05	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[5]
W06	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[6]
W07	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[7]
W08	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[8]
W09	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[9]
W0A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[10]
W0B	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[11]
W0C	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W0D	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W0E	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W0F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]

Figure 4-1- 90

➢ When the A + and A- voltage inputs are high level, pulse signals are input to B+ and B- . As shown in the figure below, the count value increases, and the direction status bit3~bit4 is "1".



Device	Current value	Display format	Comments
W00	4096	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[0]
W01	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[1]
W02	0000 0000 1001	16-bit BIN	KV-8000[0].DF50-C-EN-IP[1]IN_101[2]
W03	2919	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[3]
W04	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[4]
W05	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[5]
W06	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[6]
W07	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[7]
W08	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[8]
W09	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[9]
W0A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[10]
W0B	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[11]
W0C	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W0D	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W0E	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W0F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]

Figure 4-1- 91

1.8. Serial port module usage routine

- This example uses DF50-C-EN-IP + DF50-1COM-232-485-422 topology, DF50-1COM-232-485-422 supports three modes: free transparent transmission, slave mode and Modbus RTU master mode. Mode switching is achieved by configuring initialization parameters. PC is connected to the card via USB to 485 data cable according to the wiring diagram in Section 19.2 , simulating communication equipment and DF50-1COM-232-485-422 module communication . After adding the slave, the configuration is shown in the figure below .

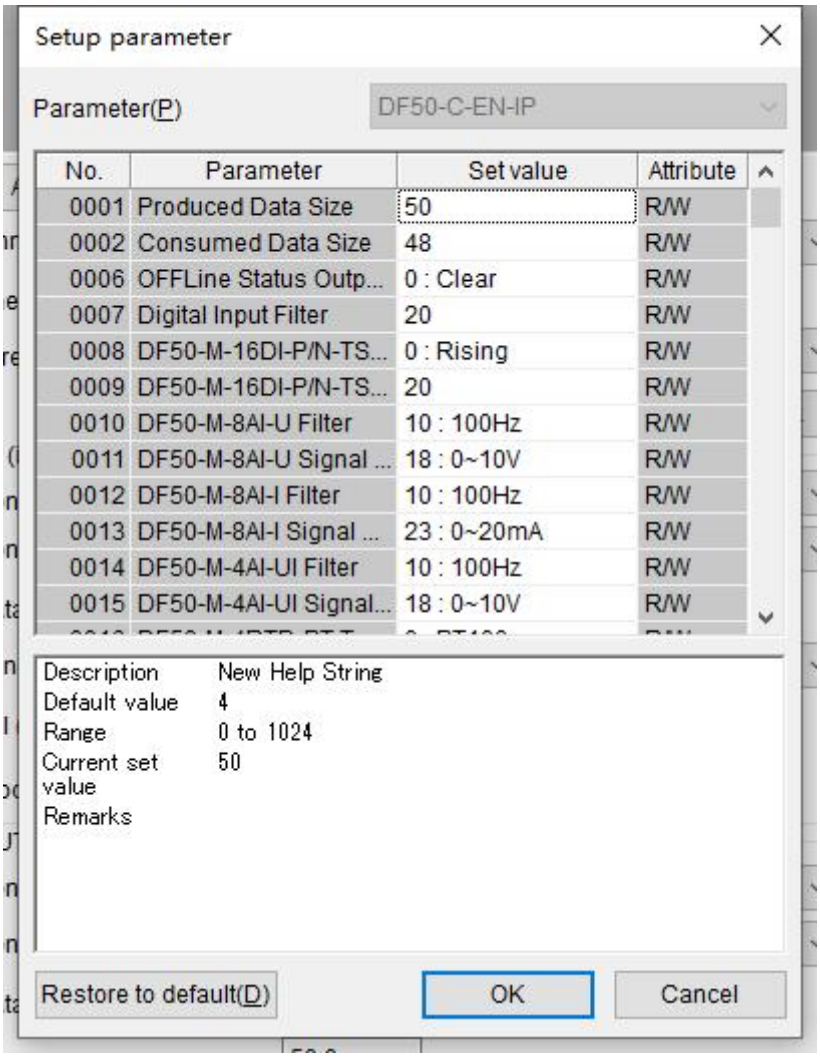


Figure 4-1 - 92

1.8.1. Modbus RTU Master Mode Usage Example

- Modbus RTU Master Configuration
- Please refer to Section 19.3 for the meaning of the configuration data . The communication port configuration interface of Modbus RTU Master mode is shown in the figure below.

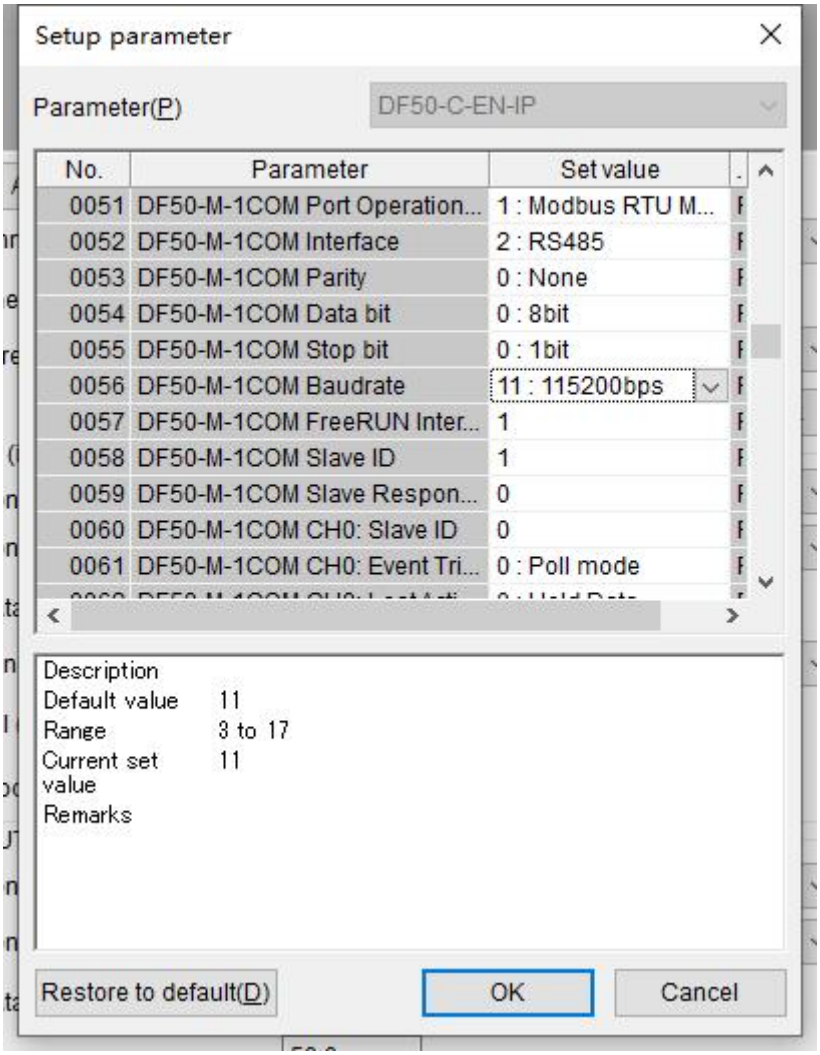


Figure 4-1 - 93

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

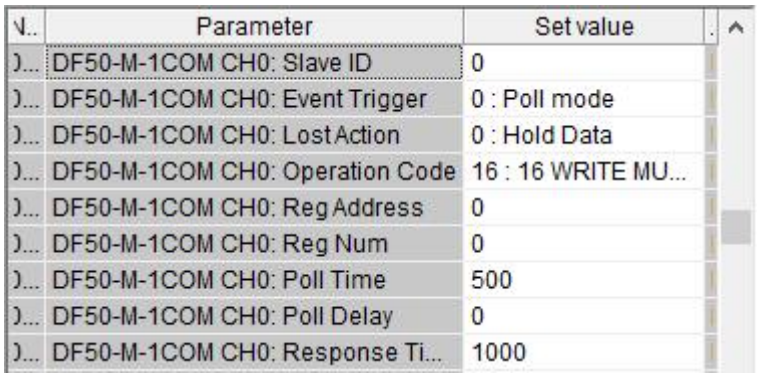


Figure 4-1 - 94

N..	Parameter	Set value
)...	DF50-M-1COM CH1: Slave ID	0
)...	DF50-M-1COM CH1: Event Trigger	0 : Poll mode
)...	DF50-M-1COM CH1: Lost Action	0 : Hold Data
)...	DF50-M-1COM CH1: Operation Code	16 : 16 WRITE MU...
)...	DF50-M-1COM CH1: Reg Address	0
)...	DF50-M-1COM CH1: Reg Num	0
)...	DF50-M-1COM CH1: Poll Time	500
)...	DF50-M-1COM CH1: Poll Delay	0
)...	DF50-M-1COM CH1: Response Ti...	1000

Figure 4-1 - 95

N..	Parameter	Set value
)...	DF50-M-1COM CH2: Slave ID	0
)...	DF50-M-1COM CH2: Event Trigger	0 : Poll mode
)...	DF50-M-1COM CH2: Lost Action	0 : Hold Data
)...	DF50-M-1COM CH2: Operation Code	16 : 16 WRITE MU...
)...	DF50-M-1COM CH2: Reg Address	0
)...	DF50-M-1COM CH2: Reg Num	0
)...	DF50-M-1COM CH2: Poll Time	500
)...	DF50-M-1COM CH2: Poll Delay	0
)...	DF50-M-1COM CH2: Response Ti...	1000

Figure 4-1 - 96

N..	Parameter	Set value
)...	DF50-M-1COM CH3: Slave ID	0
)...	DF50-M-1COM CH3: Event Trigger	0 : Poll mode
)...	DF50-M-1COM CH3: Lost Action	0 : Hold Data
)...	DF50-M-1COM CH3: Operation Code	16 : 16 WRITE MU...
)...	DF50-M-1COM CH3: Reg Address	0
)...	DF50-M-1COM CH3: Reg Num	0
)...	DF50-M-1COM CH3: Poll Time	500
)...	DF50-M-1COM CH3: Poll Delay	0
)...	DF50-M-1COM CH3: Response Ti...	1000

Figure 4-1 - 97

N..	Parameter	Set value
)...	DF50-M-1COM CH4: Slave ID	0
)...	DF50-M-1COM CH4: Event Trigger	0 : Poll mode
)...	DF50-M-1COM CH4: Lost Action	0 : Hold Data
)...	DF50-M-1COM CH4: Operation Code	16 : 16 WRITE MU...
)...	DF50-M-1COM CH4: Reg Address	0
)...	DF50-M-1COM CH4: Reg Num	0
)...	DF50-M-1COM CH4: Poll Time	500
)...	DF50-M-1COM CH4: Poll Delay	0
)...	DF50-M-1COM CH4: Response Ti...	1000

Figure 4-1 - 98

N..	Parameter	Set value
)...	DF50-M-1COM CH5: Slave ID	0
)...	DF50-M-1COM CH5: Event Trigger	0 : Poll mode
)...	DF50-M-1COM CH5: Lost Action	0 : Hold Data
)...	DF50-M-1COM CH5: Operation Code	16 : 16 WRITE MU...
)...	DF50-M-1COM CH5: Reg Address	0
)...	DF50-M-1COM CH5: Reg Num	0
)...	DF50-M-1COM CH5: Poll Time	500
)...	DF50-M-1COM CH5: Poll Delay	0
)...	DF50-M-1COM CH5: Response Ti...	1000

Figure 4-1 - 99

N..	Parameter	Set value
)...	DF50-M-1COM CH6: Slave ID	0
)...	DF50-M-1COM CH6: Event Trigger	0 : Poll mode
)...	DF50-M-1COM CH6: Lost Action	0 : Hold Data
)...	DF50-M-1COM CH6: Operation Code	16 : 16 WRITE MU...
)...	DF50-M-1COM CH6: Reg Address	0
)...	DF50-M-1COM CH6: Reg Num	0
)...	DF50-M-1COM CH6: Poll Time	500
)...	DF50-M-1COM CH6: Poll Delay	0
)...	DF50-M-1COM CH6: Response Ti...	1000

Figure 4-1 - 100

N..	Parameter	Set value
)...	DF50-M-1COM CH6: Poll Delay	0
)...	DF50-M-1COM CH6: Response Ti...	1000
)...	DF50-M-1COM CH7: Slave ID	0
)...	DF50-M-1COM CH7: Event Trigger	0 : Poll mode
)...	DF50-M-1COM CH7: Lost Action	0 : Hold Data
)...	DF50-M-1COM CH7: Operation Code	16 : 16 WRITE MU...
)...	DF50-M-1COM CH7: Reg Address	0
)...	DF50-M-1COM CH7: Reg Num	0
)...	DF50-M-1COM CH7: Poll Time	500
)...	DF50-M-1COM CH7: Poll Delay	0
)...	DF50-M-1COM CH7: Response Ti...	1000

Figure 4-1-101

➢ Take CH0 and CH1 as an example, and set the mode to Modbus RTU Master mode in the startup parameter settings . Set the CH0 slave ID to 1, set the function to 03 Read HOLDING REGISTERS, the number of registers to read is 3, and the read start address is 0. Set the CH1 slave ID to 1, set the function to 16 WRITE MULTIPLE HOLDING REGISTERS , the number of registers to write is 3, and the read start address is 3 .

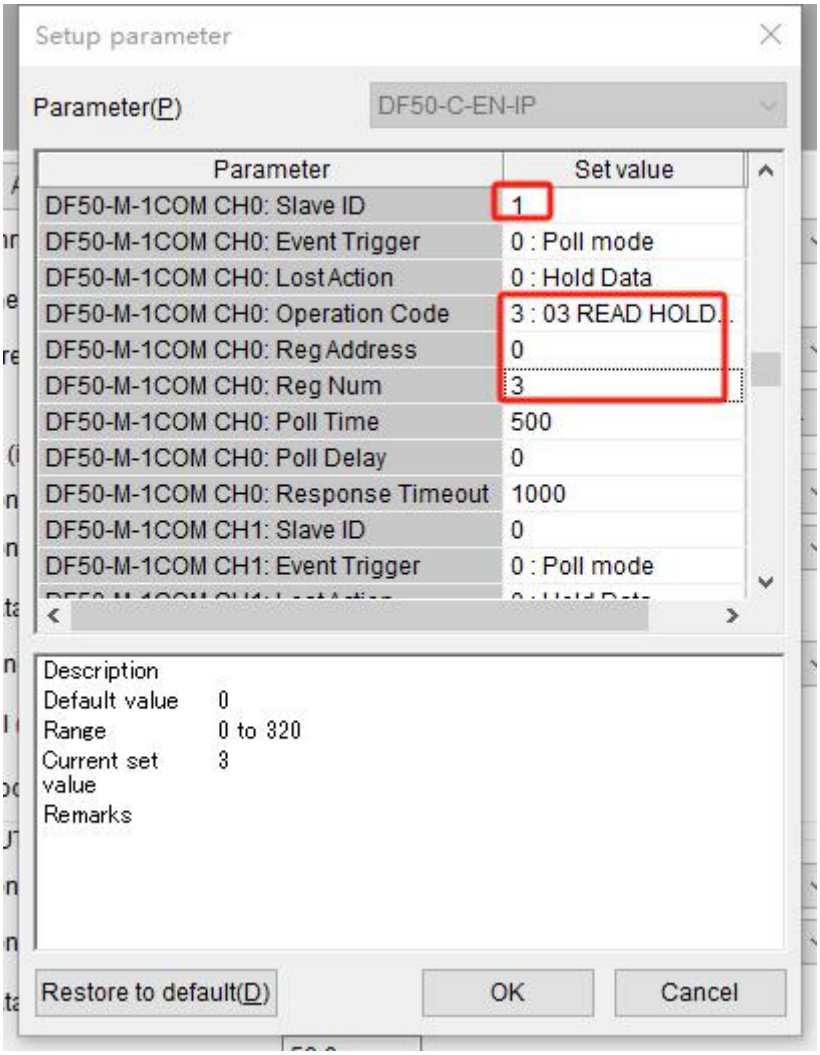


Figure 4-1 - 102

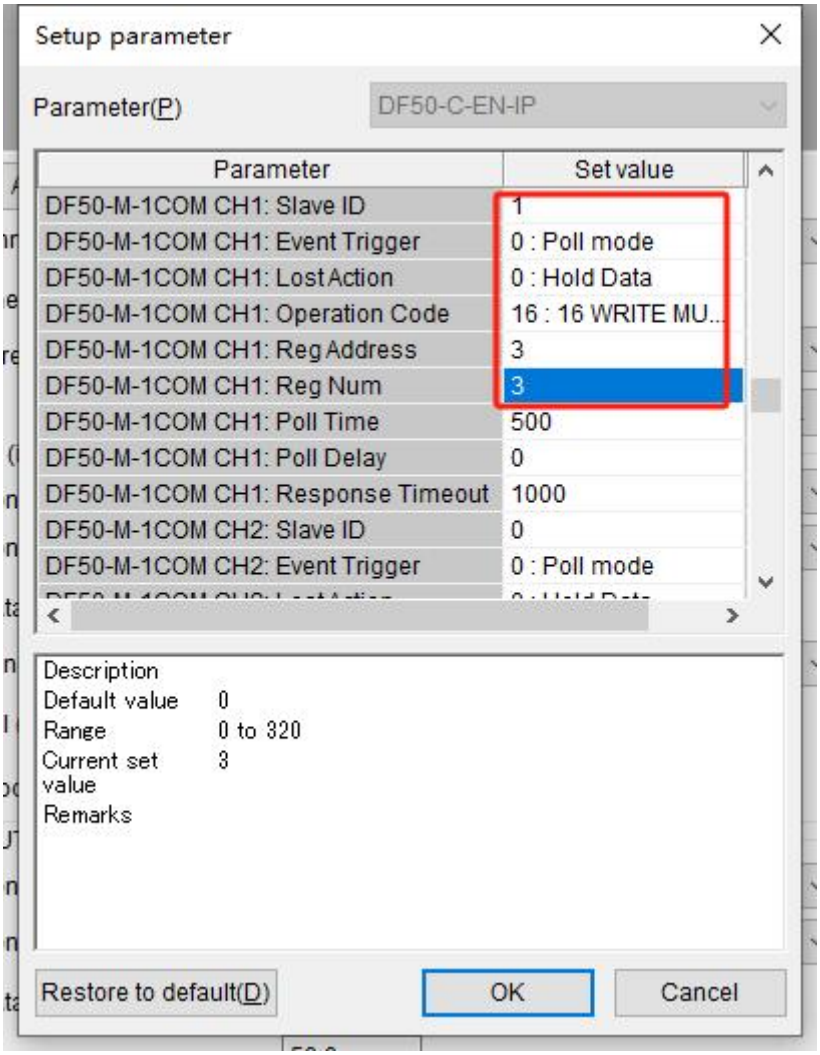


Figure 4-1 - 103

➢ Modbus RTU Master Process Data Description

Table 4.1.7 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 shown in Table 4.1.6 , SelectChannel is used to switch the communication channel, with a value range of 0-7 . 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 4.1.8 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.

➢ Ctrl W ord command table is shown below . It is not used under normal circumstances.

Table 4.1.9 Ctrl Word 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 Modbus Slave software on the PC and create a new project.

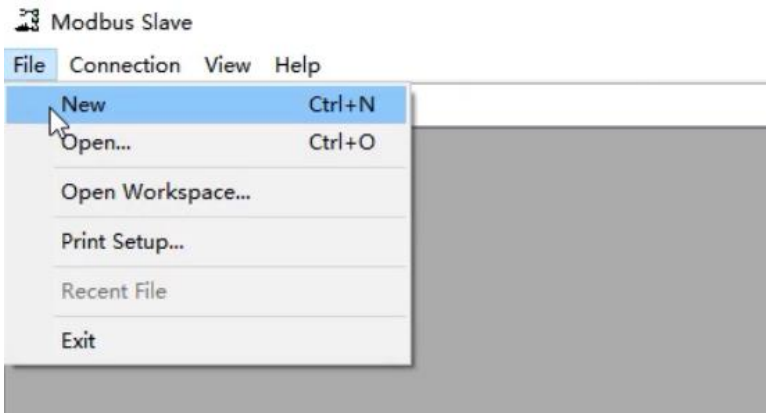


Figure 4-1 - 104

➢ Connect to the serial device.

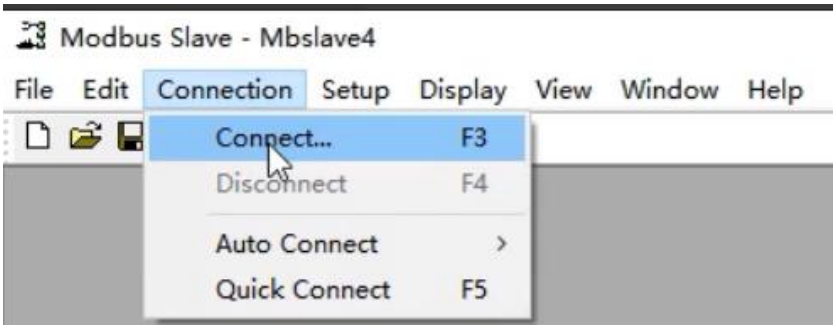


Figure 4-1 - 105

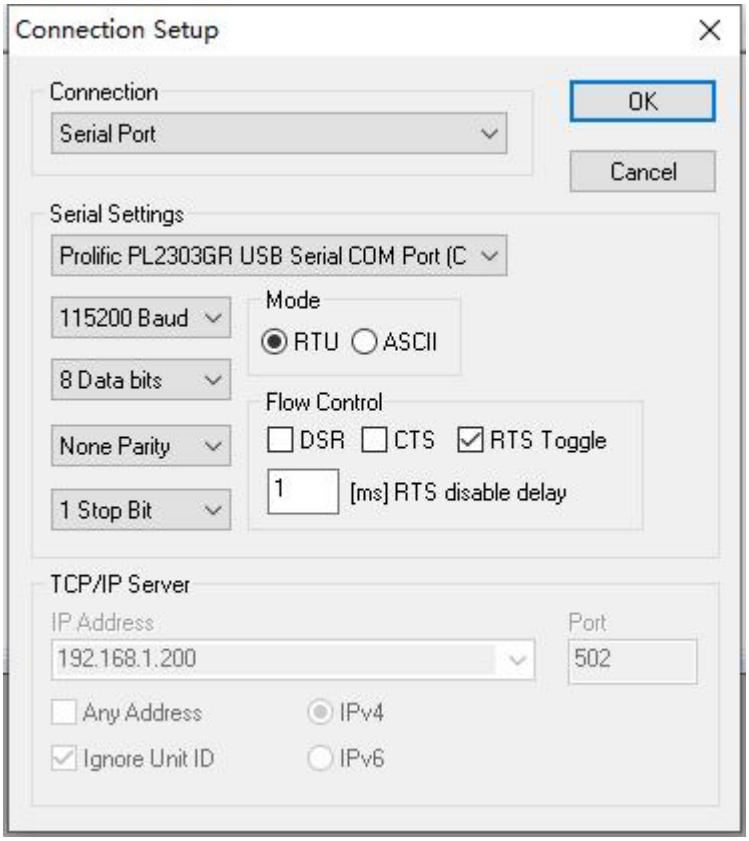


Figure 4-1 - 106

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

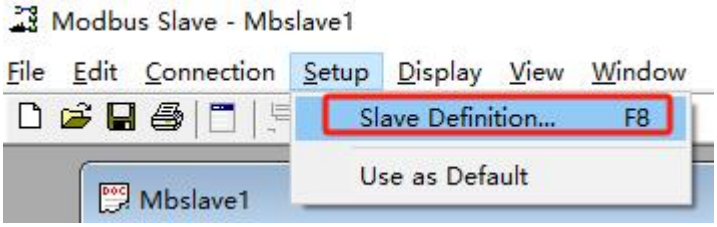


Figure 4-1 - 107

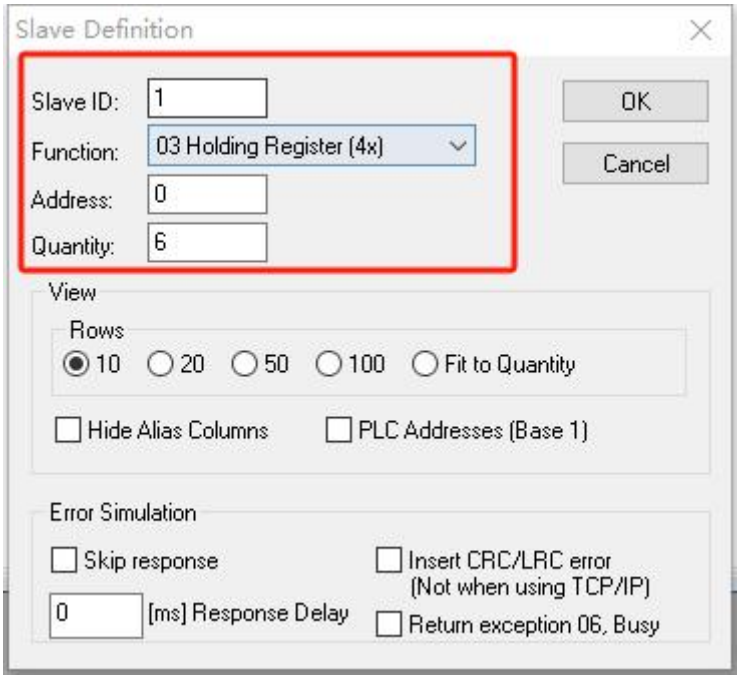


Figure 4-1 - 108

- Write register data.

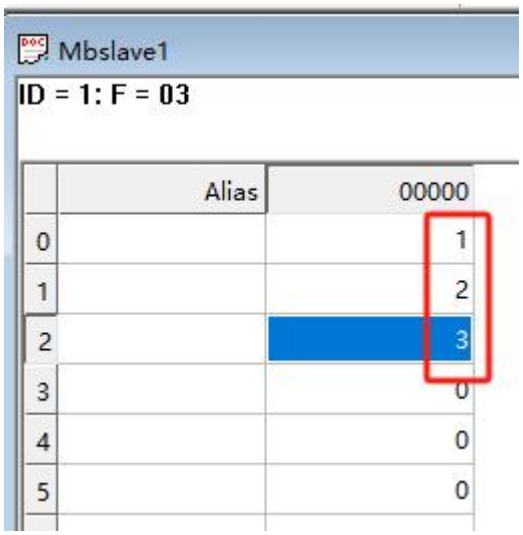


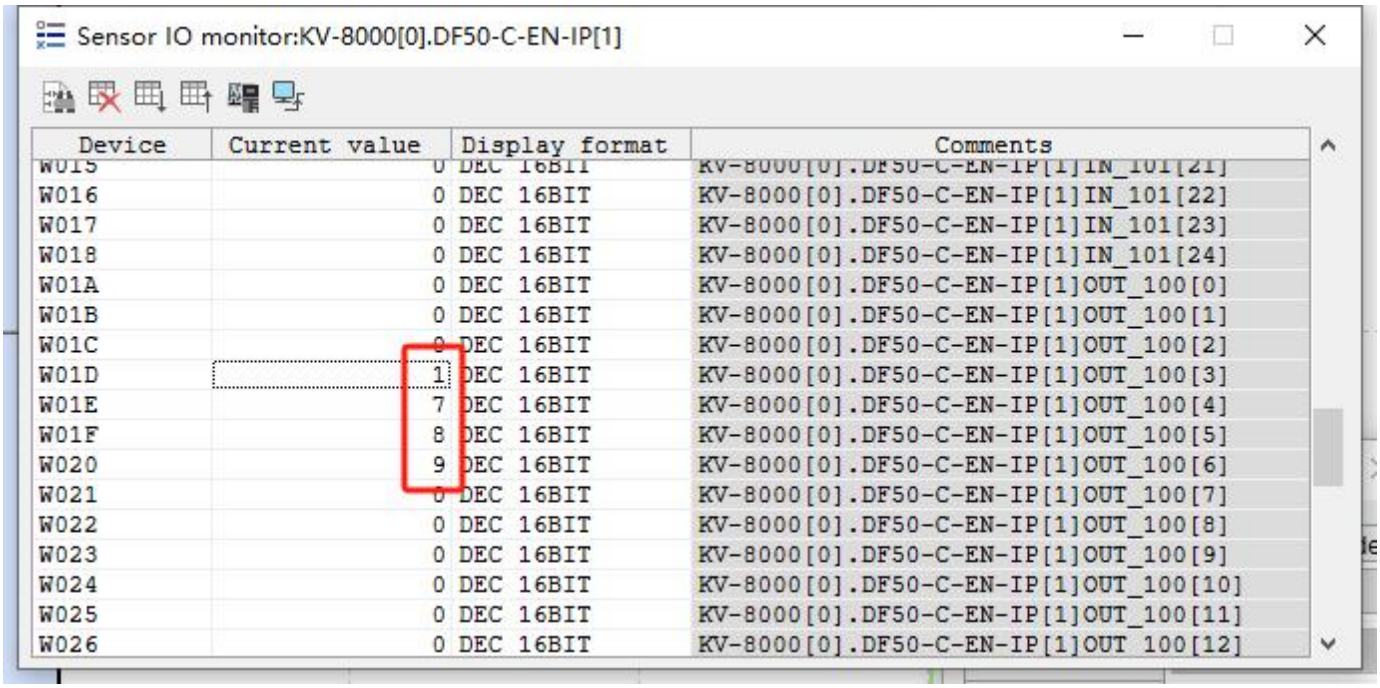
Figure 4-1 - 109

- As shown in the figure below, the PLC reads data 1, 2, and 3.

Device	Current value	Display format	Comments
W00	4096	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[0]
W01	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[1]
W02	$0001	HEX 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[2]
W03	6	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[3]
W04	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[4]
W05	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[5]
W06	2	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[6]
W07	3	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[7]
W08	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[8]
W09	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[9]
W0A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[10]
W0B	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[11]
W0C	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[12]
W0D	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[13]
W0E	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[14]
W0F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[15]
W010	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[16]

Figure 4-1 - 110

➢ Send data as shown in the figure below. From top to bottom, the meaning of the data is to switch to channel 1 and send data 7, 8, and 9.



Device	Current value	Display format	Comments
W015	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[21]
W016	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[22]
W017	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[23]
W018	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[24]
W01A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W01B	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W01C	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W01D	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]
W01E	7	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[4]
W01F	8	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[5]
W020	9	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[6]
W021	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[7]
W022	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[8]
W023	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[9]
W024	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[10]
W025	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[11]
W026	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[12]

Figure 4-1-111

➢ The data received by the Modbus Slave software is shown below.

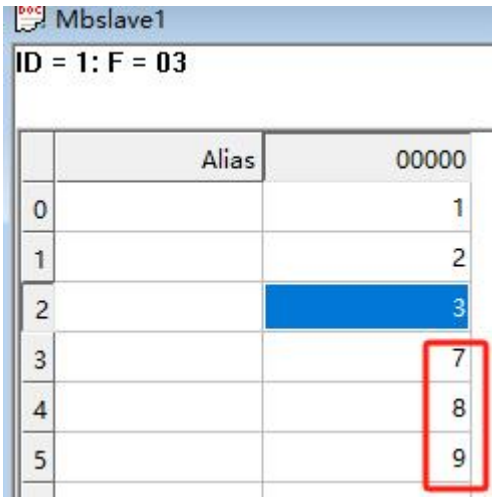


Figure 4-1 - 112

1.8.2. FreeRUN free transparent transmission mode usage example

➢ Free transparent transmission mode configuration

➢ Please refer to Section 19.3 for the meaning of the configuration data . The configuration interface of the free transparent transmission mode is shown in the figure below .

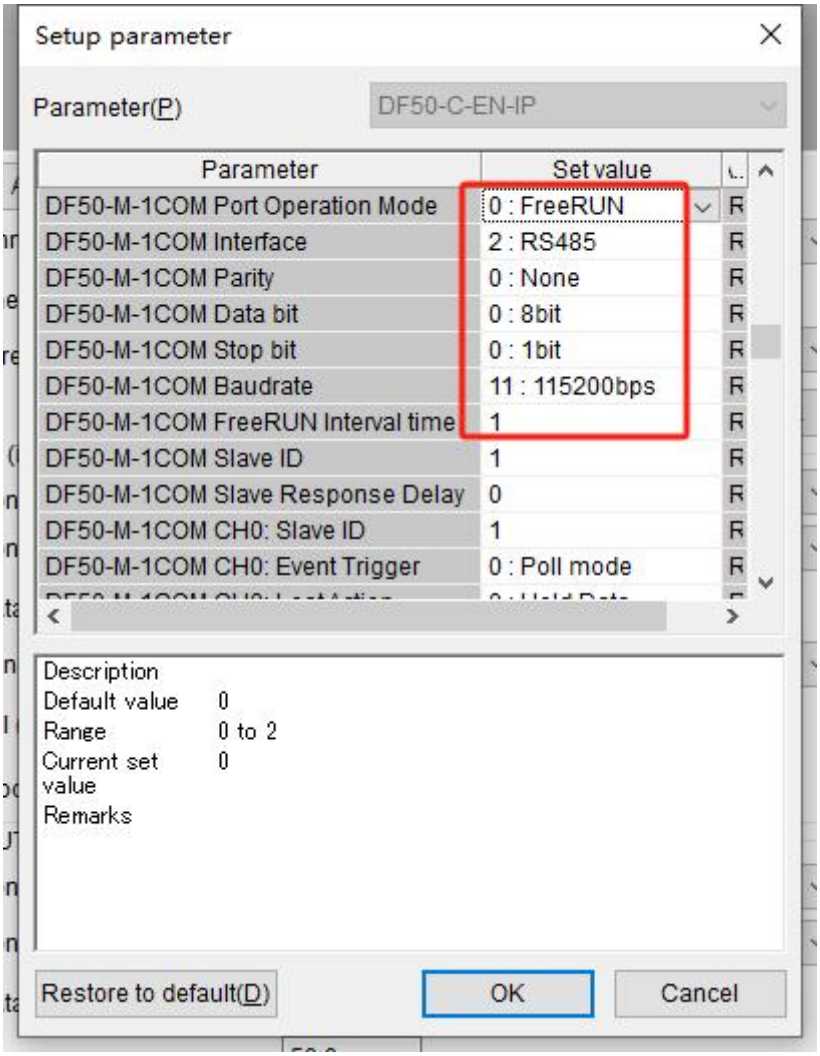


Figure 4-1 - 113

➢ Process data description in free transparent transmission mode

Table 4.1.10 Output 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. The PLC program periodically accumulates OutputCount to achieve fixed periodic sending.

Table 4.1.11 Input 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 command table.

Table 4.1.12 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

➢ The default is receive mode, or write 194 (0x00C2) in CtrlWord to configure the module to receive mode .

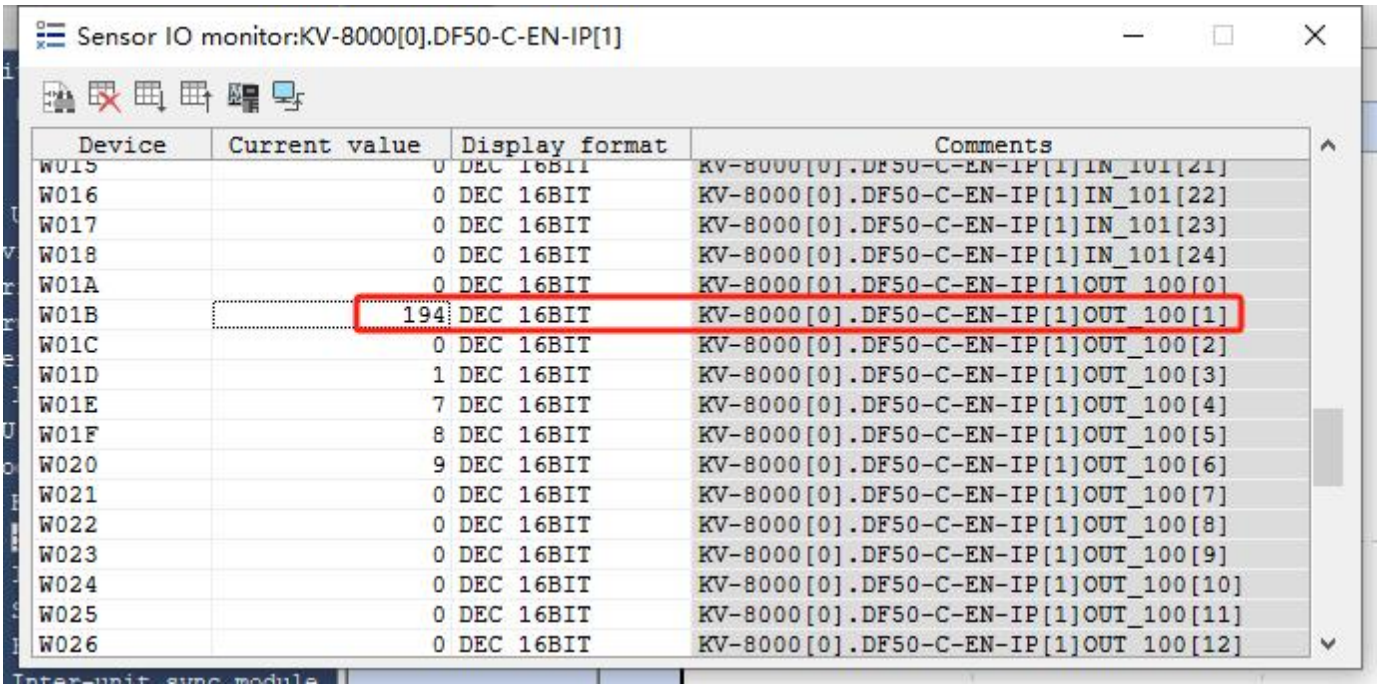


Figure 4-1 - 114

➢ Connect to the serial port assistant and send data.

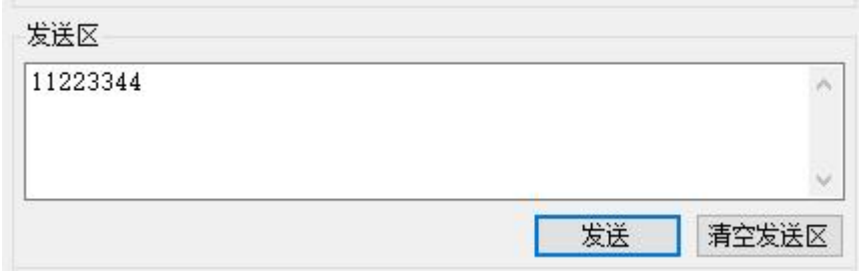
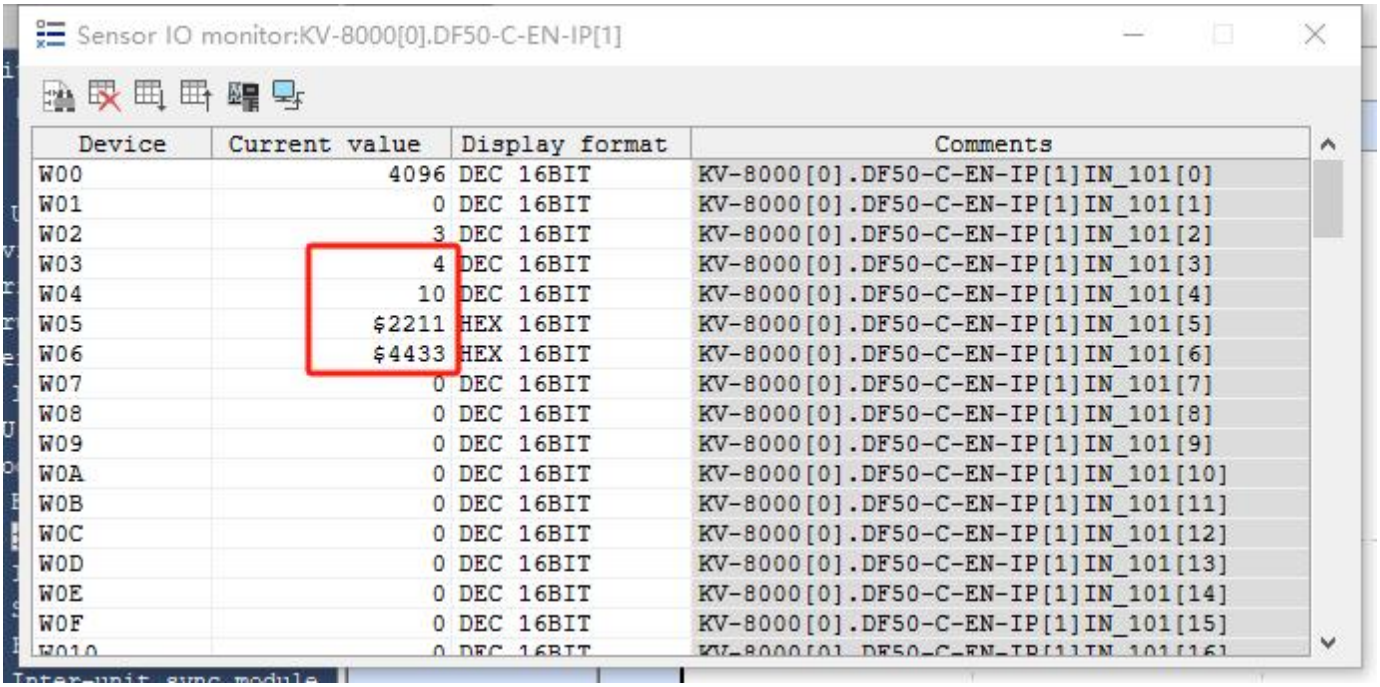


Figure 4-1 - 115

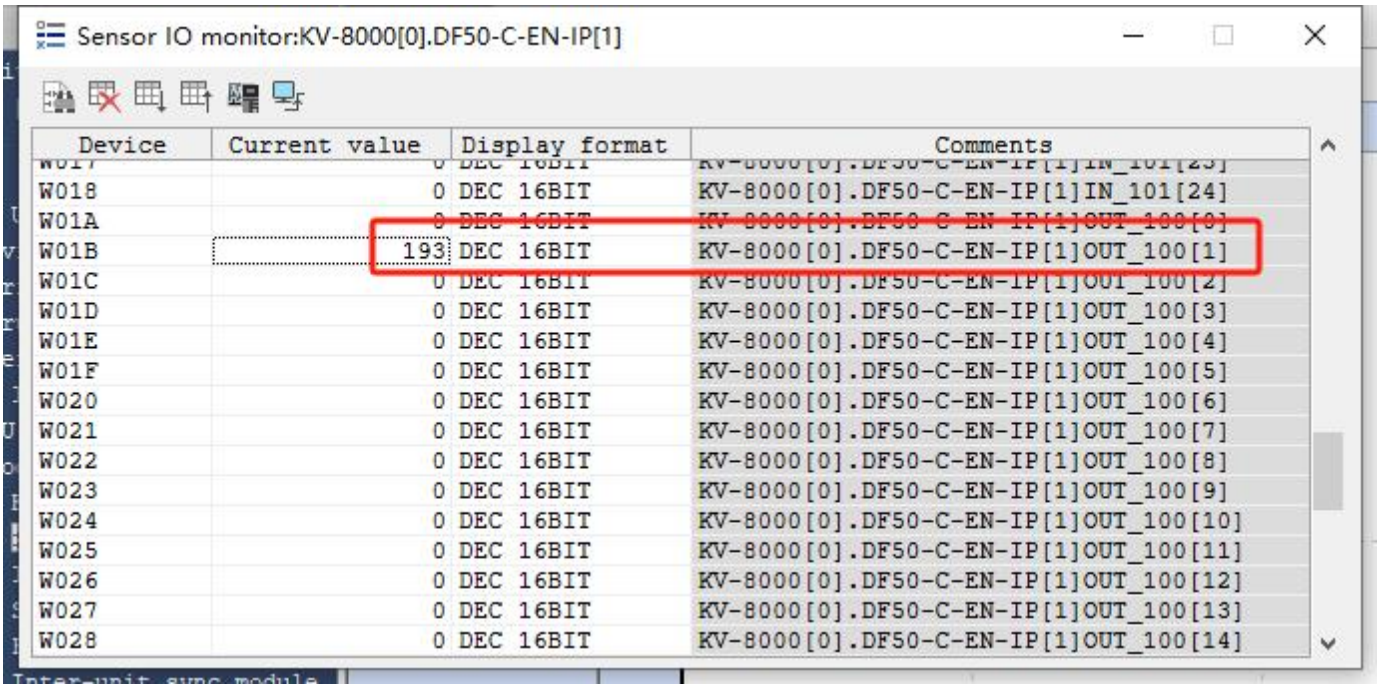
➢ The data received by PLC is shown in the figure below. Its meaning is: length is 4 bytes, sequence number is 10, and the received data is 0x11, 0x22, 0x33, 0x44.



Device	Current value	Display format	Comments
W00	4096	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[0]
W01	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[1]
W02	3	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[2]
W03	4	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[3]
W04	10	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[4]
W05	$2211	HEX 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[5]
W06	$4433	HEX 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[6]
W07	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[7]
W08	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[8]
W09	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[9]
W0A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[10]
W0B	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[11]
W0C	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[12]
W0D	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[13]
W0E	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[14]
W0F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[15]
W010	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[16]

Figure 4-1 - 116

➢ Writing 19 3 (0x00C 1) in CtrlWord configures the module to transmit mode .



Device	Current value	Display format	Comments
W018	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[24]
W01A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W01B	193	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W01C	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W01D	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]
W01E	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[4]
W01F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[5]
W020	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[6]
W021	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[7]
W022	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[8]
W023	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[9]
W024	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[10]
W025	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[11]
W026	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[12]
W027	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[13]
W028	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[14]

Figure 4-1 - 117

➢ The sent data is shown in the figure below, which means: send 2 bytes, the sequence number is 1, and the data content is 0x66, 0x77.

Device	Current value	Display format	Comments
W017	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[23]
W018	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[24]
W01A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W01B	193	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W01C	2	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W01D	1	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]
W01E	$7766	HEX 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[4]
W01F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[5]
W020	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[6]
W021	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[7]
W022	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[8]
W023	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[9]
W024	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[10]
W025	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[11]
W026	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[12]
W027	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[13]

Figure 4-1 - 118

➢ The received data is shown in the figure below.

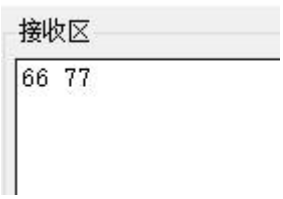
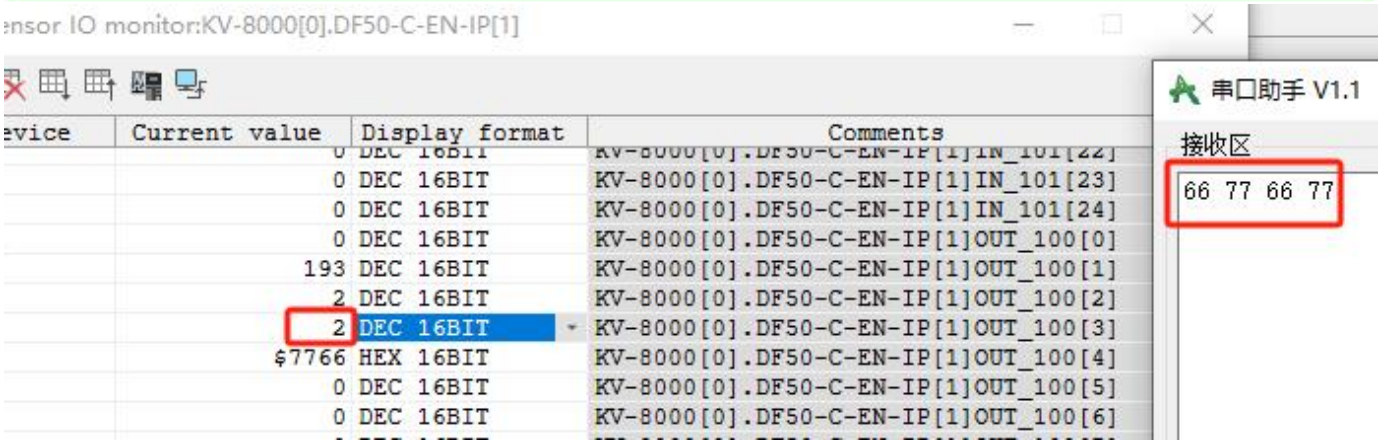


Figure 4-1 - 119

➢ Note that the data will be sent only after the sequence number (OutputCount) is changed. As shown in the figure below, the sequence number is changed and the data is sent again.

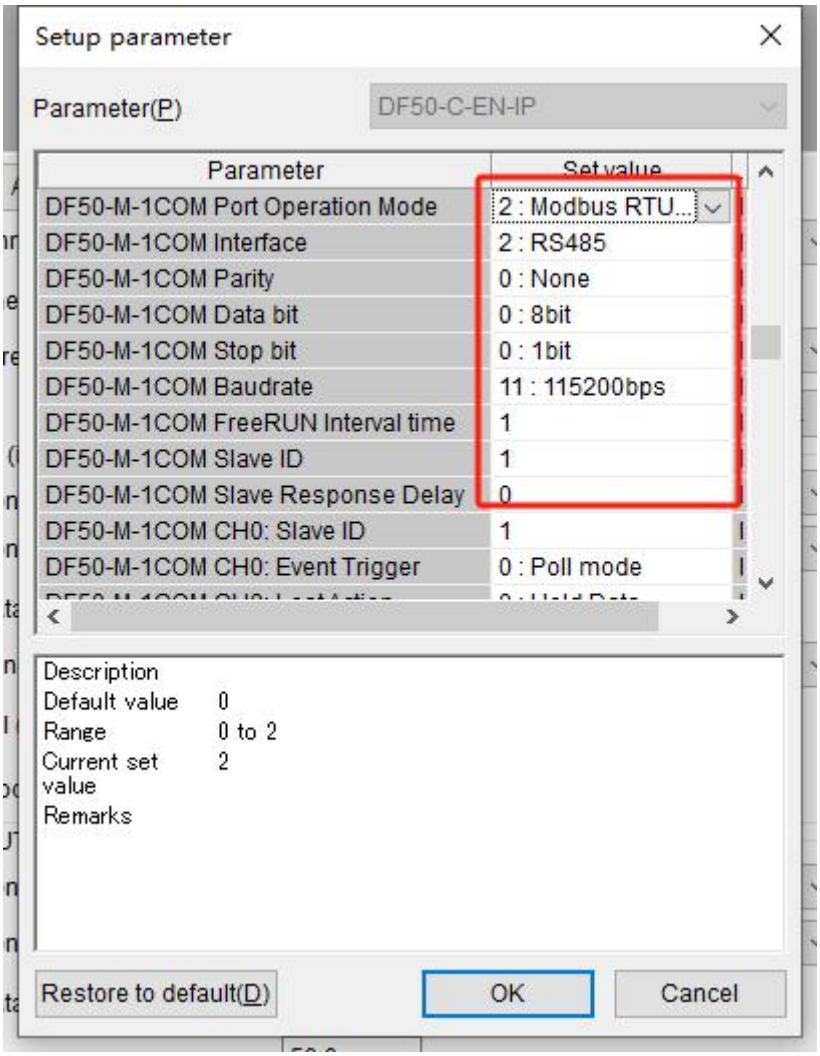


evice	Current value	Display format	Comments
	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[23]
	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[24]
	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
	193	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
	2	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
	2	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]
	$7766	HEX 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[4]
	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[5]
	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[6]

Figure 4-1 - 120

1.8.3. Modbus RTU Slave mode usage routine

➢ Section 19.3 for the meaning of configuration data . The Modbus RTU Slave mode configuration interface is shown in the figure. The default Slave ID is 1 .



➢ Description of process data in Modbus RTU Slave mode.

Table 4.1.13 Input and output data table

Output Data		
name	**length**	**meaning**
CtrlWord	2byte	Control Word
SlaveCMD	1byte	Slave operation commands
SlaveRegAddr	1 byte	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	1 byte	Readback data length Byte
Reserve 1	1 byte	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.

➢ SlaveCMD command table.

Table 4.1.14 SlaveCMD Command Table

SlaveCMD			
value	**name**	**length**	**meaning**
1	ReadCoils	1 byte	Read coil value
2	ReadHoldReg	1 byte	Read Holding Registers
3	WriteCoils	1 byte	Write coil value
4	WriteDiscrete	1 byte	Write discrete quantity
5	WriteHoldReg	1 byte	Writing Holding Registers
6	WriteInReg	1 byte	Write input register

➢ Open the ModbusPoll software on the PC and create a new project.

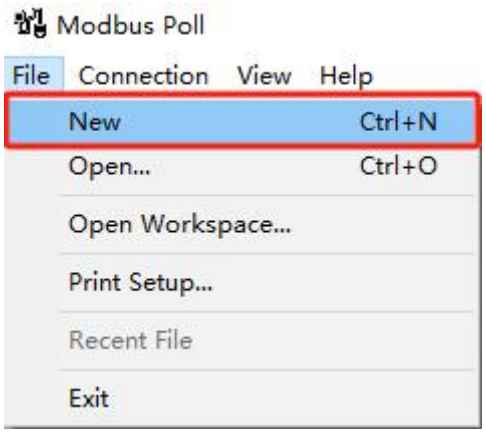


Figure 4-1 - 121

➢ Connect to the serial device.

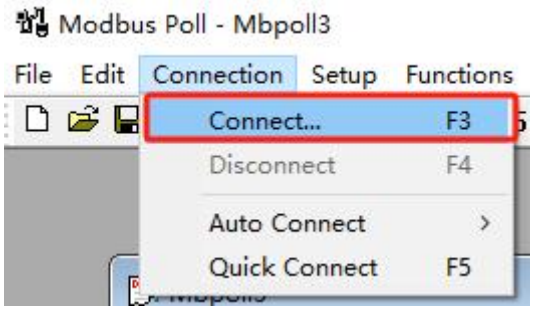


Figure 4-1 - 122

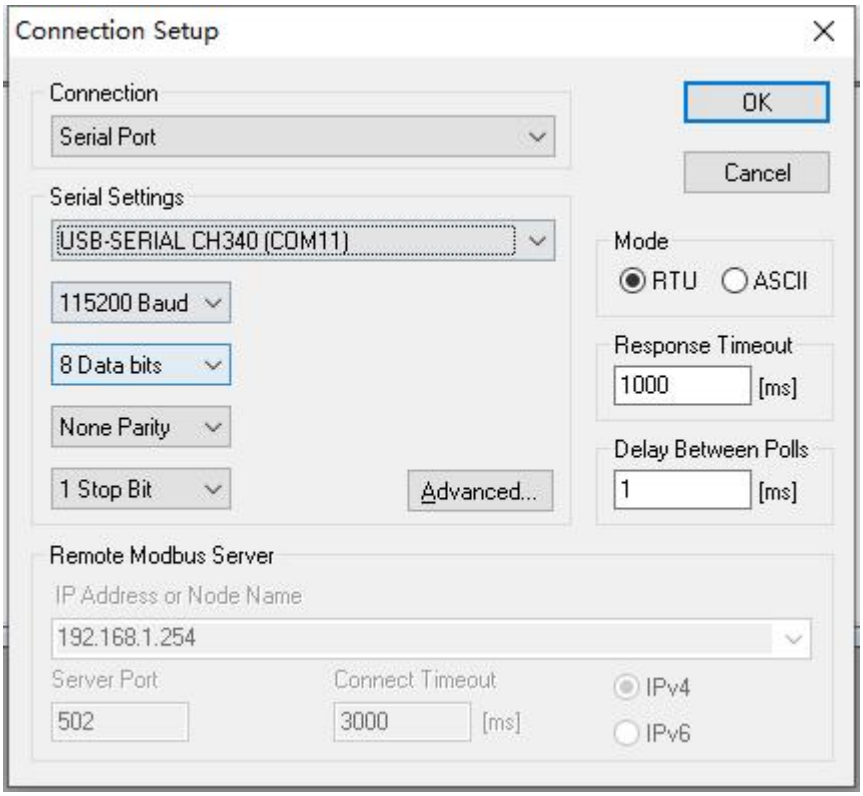


Figure 4-1 - 123

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

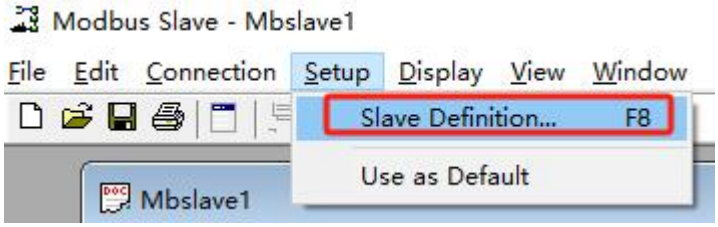


Figure 4-1 - 124

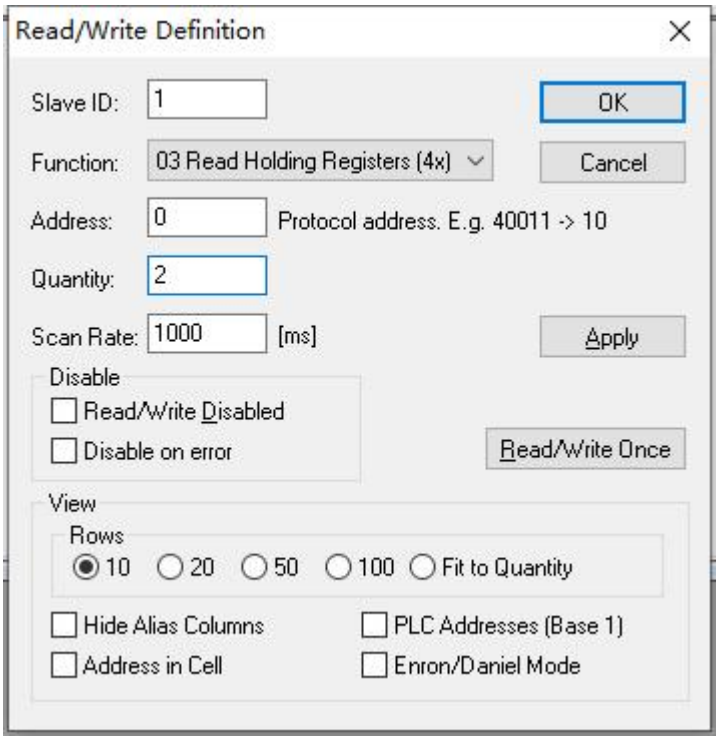


Figure 4-1 - 125

➢ Create a new window and configure it as follows.

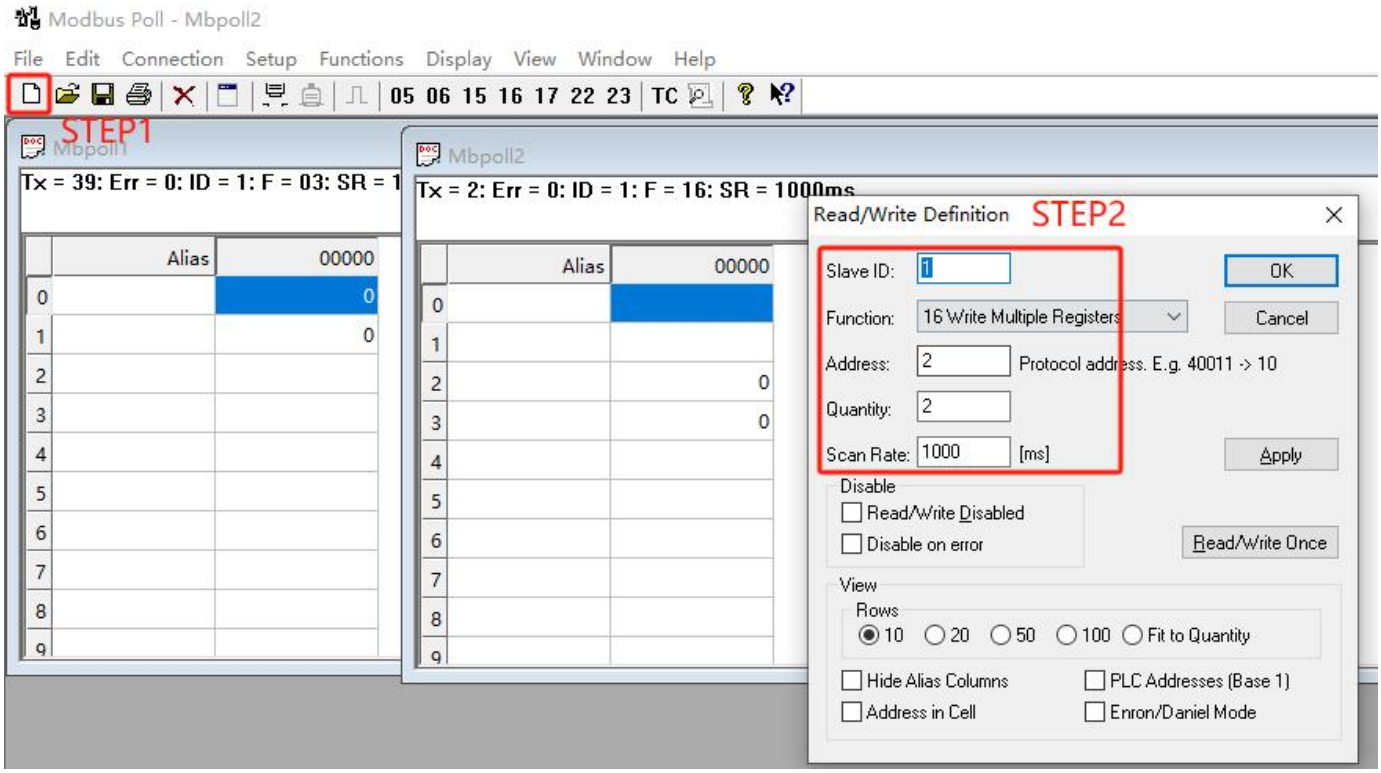
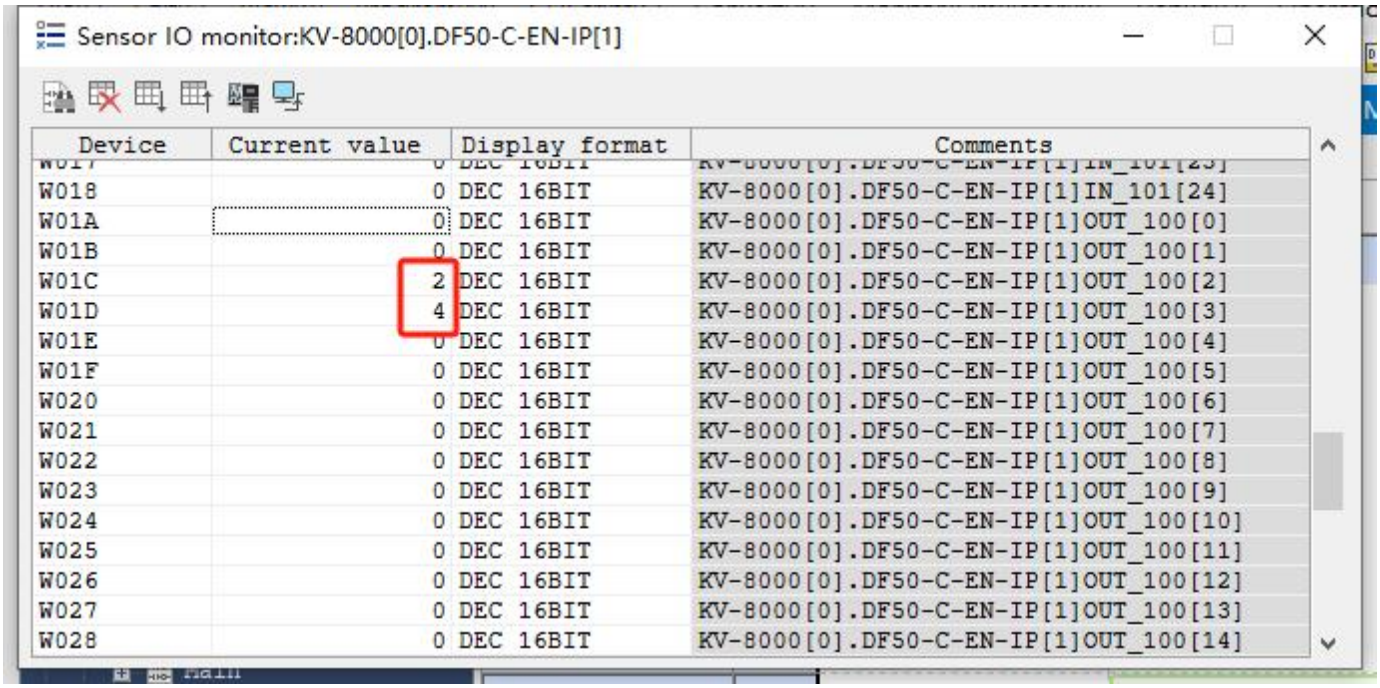


Figure 4-1 - 126

➢ SlaveCMD inputs operation command 2 (read holding register) , SlaveRegAddr is 0, which means starting from the 0th register, and SlaveRegNum input 4 means reading 4 registers.



Device	Current value	Display format	Comments
W018	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[24]
W01A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W01B	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W01C	2	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W01D	4	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]
W01E	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[4]
W01F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[5]
W020	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[6]
W021	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[7]
W022	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[8]
W023	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[9]
W024	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[10]
W025	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[11]
W026	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[12]
W027	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[13]
W028	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[14]

Figure 4-1 - 127

➢ The data written to the card in ModbusPoll . As shown in the figure below, the PLC receives the data correctly.

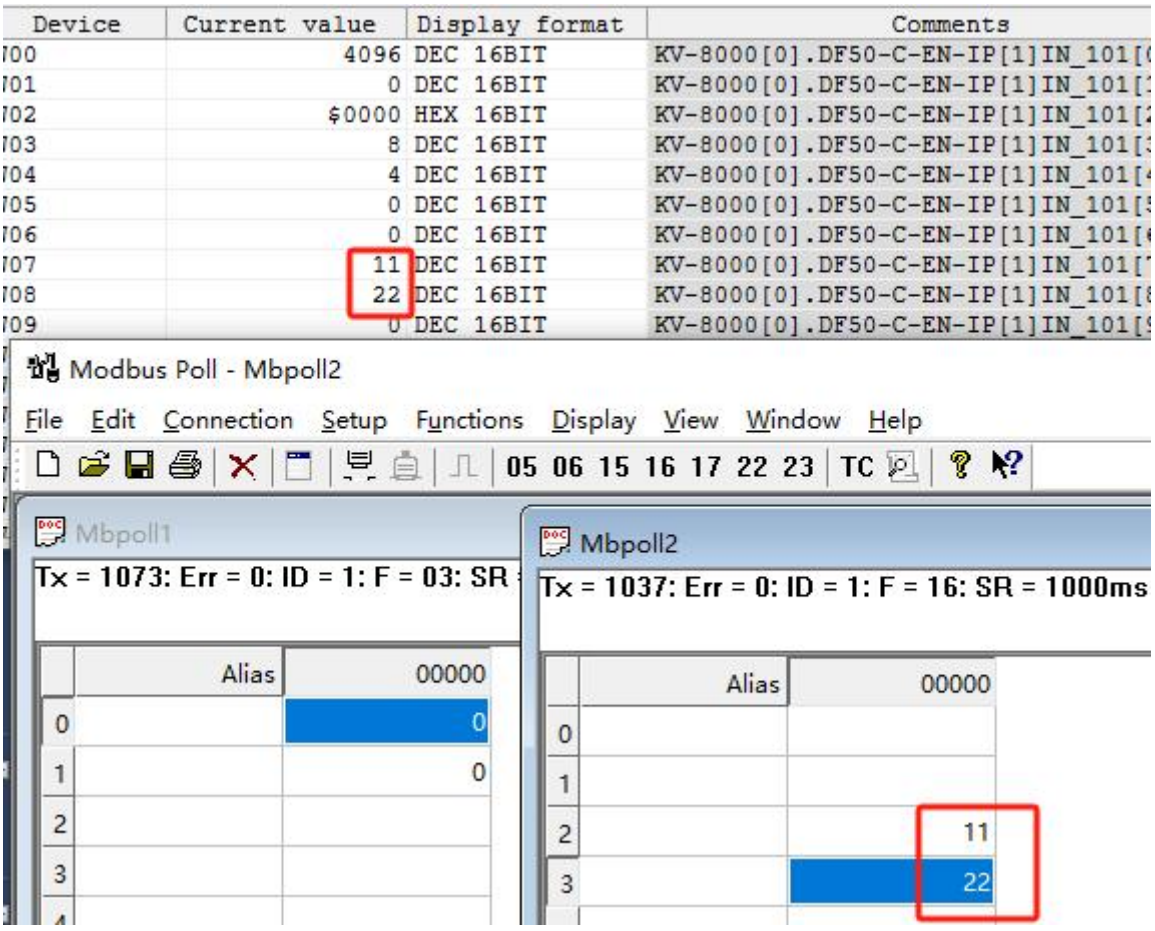


Figure 4-1 - 128

➢ SlaveCMD inputs operation command 5 (write holding register) , SlaveRegAddr is 0, which means starting from the 0th register, and SlaveRegNum input 2 means writing to 2 registers.

Device	Current value	Display format	Comments
W018	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]IN_101[24]
W01A	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[0]
W01B	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[1]
W01C	5	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[2]
W01D	2	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[3]
W01E	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[4]
W01F	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[5]
W020	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[6]
W021	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[7]
W022	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[8]
W023	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[9]
W024	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[10]
W025	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[11]
W026	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[12]
W027	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[13]
W028	0	DEC 16BIT	KV-8000[0].DF50-C-EN-IP[1]OUT_100[14]

Figure 4-1 - 129

➢ As shown in the figure below, PLC writes data 255, 255, and ModbusPoll receives the data normally.

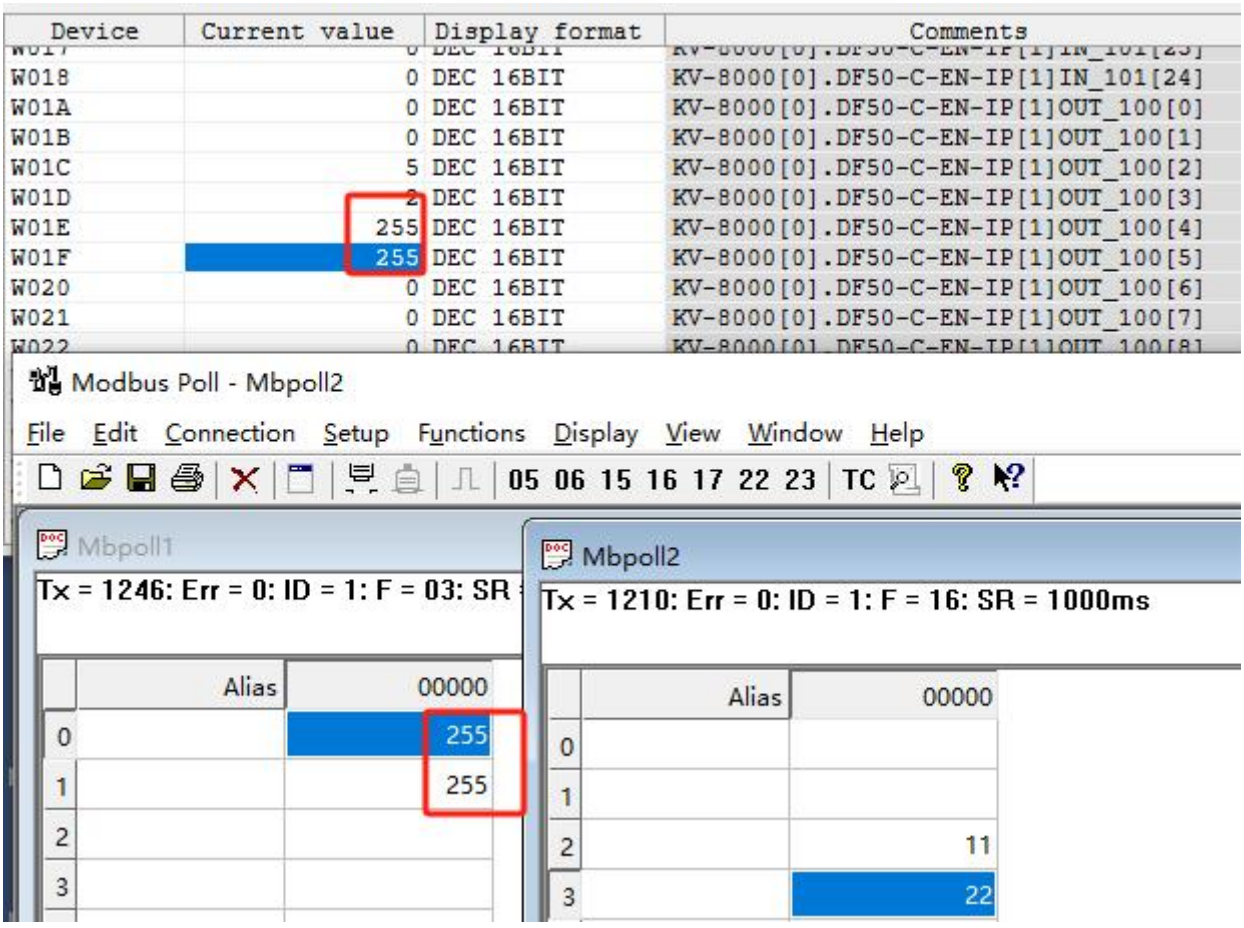


Figure 4-1-130